



A monograph on the genus

Cliffortia

Christopher M. Whitehouse



*S*TRELITZIA 43

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by

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STRELITZIA

This series has replaced *Memoirs of the Botanical Survey of South Africa* and *Annals of the Kirstenbosch Botanic Gardens* which the South African National Biodiversity Institute (SANBI) inherited from its predecessor organisations.

The plant genus *Strelitzia* occurs naturally in the eastern parts of southern Africa. It comprises three arborescent species, known as wild bananas, and two acaulescent species, known as crane flowers or bird-of-paradise flowers. The logo of SANBI is partly based on the striking inflorescence of *Strelitzia reginae*, a native of the Eastern Cape and KwaZulu-Natal that has become a garden favourite worldwide. It symbolises the commitment of SANBI to champion the exploration, conservation, sustainable use, appreciation and enjoyment of South Africa's exceptionally rich biodiversity for all people.

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Contents

Acknowledgements	iv
1. Introduction	1
Previous studies on <i>Cliffortia</i>	2
2. Morphology	9
Growth form	9
Height	9
Branching	9
Brachyblasts	10
Fire survival strategy	10
Stem characters	11
Colour	11
Pubescence	11
Stem shape	11
Leaf morphology	11
Sheath	12
Stipules	12
Petiole	13
Leaflets	13
Leaf direction	15
Juvenile leaves	15
Inflorescence structure	15
Monoecy versus dioecy	16
Peduncle	16
Flowers	17
Bracteoles	17
Sepal number and ornamentation	17
Male flowers	17
Female flowers	18
Achenes	20
Flowering time	21
3. Phylogeny of <i>Cliffortia</i>	22
Systematic position of <i>Cliffortia</i> within the Rosaceae	22
Molecular phylogeny of <i>Cliffortia</i>	22
Nuclear genome	23
Chloroplast genome	23
Support for hybrid origins from multiple copies	24

4. Biogeography	43
Phytochoria	43
Centres of diversity	43
Areas of endemism	44
Phytogeographical species groups	45
5. Keys to <i>Cliffortia</i>	47
6. Systematics of <i>Cliffortia</i>	62
Subgenus <i>Arboreae</i>	63
Subgenus <i>Eriocephalinae</i>	72
Subgenus <i>Gramineae</i>	86
Subgenus <i>Cliffortia</i>	102
Section <i>Complanatae</i>	103
Section <i>Alatae</i>	127
Section <i>Stipulatae</i>	132
Section <i>Paucistamineae</i>	142
Section <i>Dracomontanae</i>	157
Section <i>Nematobus</i>	178
Section <i>Petiolatae</i>	204
Section <i>Cliffortia</i>	220
Section <i>Filifoliae</i>	237
Section <i>Costatae</i>	255
Section <i>Acerosae</i>	264
Section <i>Tenuifoliae</i>	274
Section <i>Multifidae</i>	280
Section <i>Ruboides</i>	304
Section <i>Bifoliolae</i>	335
Section <i>Multinerviae</i>	372
Section <i>Dichopterae</i>	423
Section <i>Bacciformes</i>	428
Species of uncertain position	431
Named and confirmed hybrids	438
Names probably representing hybrids with uncertain parentage	453
7. Excluded names	455
8. Bibliography	456
Appendix: Voucher specimens used in molecular analysis. Collection includes Genbank accession when this was used.	461
Index to taxa	470

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To the Most Renowned and Most Generous
GEORGE CLIFFORD
Doctor of Civil and Canon Law

Greetings from
CARL LINNAEUS

After the marvellous creation of the World, a work so unimaginable, measureless and stupendous, the Earth was covered everywhere with Plants, those machines of the supreme craftsmanship; their mechanism so far exceeds our grasp that no craftsman's skill can pry into them or imitate them, even in a single detail.

Opening sentence from the dedication of Linnaeus' *Hortus Cliffortianus*,
translated by J.L. Heller in *Taxon* 17: 667 (1968).

Introduction

Cliffortia L. (Rosaceae) is one of the ten largest genera in the Cape Floristic Region (CFR). It extends beyond the CFR, northwards to Namaqualand and eastwards through the Drakensberg, with two species extending into tropical Africa. The genus represents a diversity of growth forms that is rarely matched by other genera within the CFR, e.g. *Pelargonium* (Bakker et al. 1999). Although the majority of species can be described as ericoid shrubs, some grow into small trees up to 5 m tall, while others form low sprawling semi-herbaceous ground covers, or impenetrable dense tangled thickets. Of all growth forms present in fynbos, only annual, succulent and geophytic life forms are not represented by *Cliffortia*.

The species richness of *Cliffortia* is perhaps all the more surprising considering that all species are wind pollinated and there is very little morphological variation in the flowers. It is the most speciose wind-pollinated genus within the CFR after *Restio*. However, compared to Restionaceae, the inflorescence structure of *Cliffortia* is remarkably uniform. Usually flowers are solitary and scattered evenly over the plant, and only in a few species does this pattern vary and a more complex inflorescence can be described, e.g. in the serotinous species such as *C. conifera*.

Almost all *Cliffortia* species have hard, dry seeds suggesting dispersal by ants or, in the species with larger seeds such as *C. dregeana*, mice. This reflects the pattern found in most other fynbos genera. Differentiation of *Cliffortia* species using fruit characteristics is predominantly based upon surface ornamentation. A few species have winged seeds well adapted to wind dispersal, e.g. *C. alata* and *C. teretifolia*. The serotinous species also have small, flattened, light seeds and they too may be wind dispersed. Only *C. baccans* has slightly fleshy bright orange seeds, making it one of the few fynbos species that probably relies upon bird dispersal. Species differentiation within *Cliffortia* is based primarily upon vegetative characters and fruit morphology, as opposed to pollination-driven floral characters.

Cliffortia species are found throughout the CFR but they grow almost exclusively in fynbos. Some species also occur in the transition zones between fynbos and other biomes. Within the fynbos biome they are ubiquitous, from coastal sand plains to the peaks of the highest mountains. Certain species require their roots to be constantly surrounded by water, while others exist in rock crevices of mountains on the arid edge of the Karoo. The majority of *Cliffortia* species is found in acidic, nutrient-poor, sandstone-derived soils, but they are also found on alkaline, limestone-derived soils or the richer shales. Outside of the CFR, *Cliffortia* species are almost entirely restricted to the afro-montane heathlands from the southern Drakensberg to as far north as Mount Kenya, although they are occasional on the low-altitude sandstones of the Eastern Cape and KwaZulu-Natal, or the dolerites of the Great Escarpment.

Previous studies on *Cliffortia*

Weimarck was the last to monograph the genus *Cliffortia* (Weimarck 1934). He continued to describe new species (Weimarck 1937, 1940a, 1940b, 1946) and then produced an updated taxonomic survey of the genus (Weimarck 1948). After this he described a further six species (Weimarck 1953, 1959) but carried out no more in-depth analysis or discussion of the genus.

The first three *Cliffortia* species to be mentioned in literature were by Plukenet (1696), *Cliffortia polygonifolia* var. *trifoliata*, *C. ruscifolia* and *C. strobilifera*. The latter was a galled specimen, which led him to refer it to the genus *Cedrus*. Linnaeus (1753) described four species in his *Species Plantarum*, and there was subsequently a steady rate of new species described by various authors, with major contributions by the younger Linnaeus (1782), based on work by Thunberg, and by Ecklon and Zeyher (1836). Prior to Weimarck, the last major treatment of the genus in its entirety was by Harvey (1862) for the *Flora Capensis*. Weimarck (1934) provides a thorough overview of taxonomic work prior to his monograph. In total only 234 different names, including recombinations, have been used for *Cliffortia*, which is comparatively conservative for a large genus with morphologically variable species.

Only two attempts were ever made to subdivide the genus into separate genera: *Morilandia* by Necker (1790) and *Monographidium* by Presl (1851a). Neither was ever adopted beyond the original publication (Weimarck 1934). In addition, the only species of *Cliffortia* that have been placed in other genera were as a result of serious misidentifications (also in the wrong family, e.g. *Aspalathus* and *Anthospermum*) rather than uncertain delimitation of the genus. Hence, the cohesive nature of *Cliffortia* has never been questioned and the taxonomy has been stable.

Subsequent to Weimarck's thorough study, only Fellingham and the current author have worked on the genus to any extent. These publications have predominantly focussed on the description of new species and the clarification of species limits, but also included some nomenclatural notes (Fellingham 1993a, 1994, 1995; Oliver & Fellingham 1991, 1994; Whitehouse & Fellingham 2007; Whitehouse 2004a, 2004b, 2008, 2014). Fellingham also undertook a study of the phenology and branching patterns of eight species of *Cliffortia* (Fellingham & Linder 2003).

Although the insignificant flowers and difficulty in distinguishing the species may have reduced the interest in this large Cape taxon, especially compared to the charismatic ericas, geophytes and proteas, the paucity of recent taxonomic work on *Cliffortia* can also be attributed to Weimarck's (1934, 1948) accurate and comprehensive studies. Species were generally well defined and the alpha taxonomy has withstood close scrutiny (e.g. Fellingham 1993b, 1994). Consequently, *Cliffortia* has had a relatively uncomplicated taxonomic history and only a few of Weimarck's taxa have been synonymised here. However, Whitehouse's (2003) research showed that Weimarck's sectional classification needed major overhaul, as his sections were often artificial. A new sectional classification is presented in this treatment (Table 1). Earlier sectional names are taken up where they have priority, but typification of the sections (not done by Weimarck) has been chosen to maximise conformity with Weimarck's work. There are also informal series in this treatment, so that the reader can see groupings of very similar species. This is most useful when the section contains a wide diversity of species.

Table 1. Tabulation of the species recognised by Weimarck (1934, 1948) and the sections that he placed them in, alongside the currently recognised species and sections. Taxa recognised by Weimarck that are still recognised (excluding hybrids) are indicated in bold. Species in brackets were not known by Weimarck at that time but can be attributed to the appropriate section based upon his key.

Weimarck's section	Weimarck's species	Current section	Current species
Alatae	<i>C. alata</i> N.E.Br.	Alatae	<i>C. alata</i>
Alatae	(<i>C. burgersii</i> E.G.H.Oliv. & Fellingham)	Alatae	<i>C. burgersii</i>
Alatae	<i>C. semiteres</i> Weim.	Bifoliolae	<i>C. × semiteres</i>
Alatae	<i>C. teretifolia</i> L.f.	Bifoliolae	<i>C. teretifolia</i>
Arboreae	<i>C. arborea</i> Marloth	Arboreae	<i>C. arborea</i>
Arboreae	(<i>C. conifera</i> E.G.H.Oliv. & Fellingham)	Arboreae	<i>C. conifera</i>
Arboreae	(<i>C. dichotoma</i> Fellingham)	Arboreae	<i>C. dichotoma</i>
Bacciformes	<i>C. baccans</i> Harv.	Bacciformes	<i>C. baccans</i>
Bacciformes	<i>C. micrantha</i> Weim.	Complanatae	<i>C. micrantha</i>
Bifoliolae	<i>C. crenata</i> L.f.	Bifoliolae	<i>C. crenata</i>
Bifoliolae	<i>C. crenulata</i> Weim.	Bifoliolae	<i>C. × crenulata</i>
Bifoliolae	<i>C. mirabilis</i> Weim.	Bifoliolae	<i>C. × mirabilis</i>
Bifoliolae	<i>C. phyllanthoides</i> Schltr.	Bifoliolae	<i>C. phyllanthoides</i>
Bifoliolae	<i>C. pulchella</i> L.f. var. <i>mucronulata</i> Weim.	Bifoliolae	<i>C. pulchella</i>
Bifoliolae	<i>C. pulchella</i> L.f. var. <i>pulchella</i>	Bifoliolae	<i>C. pulchella</i>
Bifoliolae	<i>C. varians</i> Weim.	Bifoliolae	<i>C. × varians</i>
Complanatae	<i>C. complanata</i> E.Mey. ex Weim.	Complanatae	<i>C. complanata</i>
Complanatae	<i>C. dentata</i> Willd.	Complanatae	<i>C. dentata</i>
Complanatae	<i>C. filicauloides</i> Weim.	Stipulatae	<i>C. filicauloides</i>
Complanatae	<i>C. gracilis</i> Harv.	Complanatae	<i>C. dentata</i> var. <i>gracilis</i>
Complanatae	<i>C. gracilis</i> Harv.	Complanatae	<i>C. gracillima</i>
Complanatae	<i>C. hantamensis</i> Diels	Stipulatae	<i>C. hantamensis</i>
Complanatae	<i>C. propinqua</i> Eckl. & Zeyh.	Complanatae	<i>C. propinqua</i>
Costatae	<i>C. acockii</i> Weim.	Filifoliae	<i>C. acockii</i>
Costatae	<i>C. aequatorialis</i> R.E.Fr. & T.C.E.Fr.	Dracomontanae	<i>C. nitidula</i> subsp. <i>nitidula</i>
Costatae	<i>C. amplexistipula</i> Schltr.	Bifoliolae	<i>C. amplexistipula</i>
Costatae	(<i>C. anthospermoides</i> Fellingham)	Nematobus	<i>C. anthospermoides</i>
Costatae	<i>C. apiculata</i> Weim.	Nematobus	<i>C. apiculata</i>
Costatae	<i>C. atrata</i> Weim.	Costatae	<i>C. atrata</i>
Costatae	<i>C. browniana</i> Burt Davy	Dracomontanae	<i>C. browniana</i>
Costatae	<i>C. browniana</i> Burt Davy	Dracomontanae	<i>C. dracomontana</i>
Costatae	<i>C. burchellii</i> Stapf	Filifoliae	<i>C. burchellii</i>
Costatae	<i>C. carinata</i> Weim.	Bifoliolae	<i>C. carinata</i>

Table 1. Tabulation of the species recognised by Weimarck (1934, 1948) and the sections that he placed them in, alongside the currently recognised species and sections. Taxa recognised by Weimarck that are still recognised (excluding hybrids) are indicated in bold. Species in brackets were not known by Weimarck at that time but can be attributed to the appropriate section based upon his key (continued).

Weimarck's section	Weimarck's species	Current section	Current species
Costatae	<i>C. castanea</i> Weim.	Acerosae	<i>C. castanea</i>
Costatae	<i>C. concinna</i> Weim.	Bifoliolae	<i>C. glauca</i>
Costatae	<i>C. crassinervis</i> Weim.	Paucistamineae	<i>C. crassinervis</i>
Costatae	(<i>C. cruciata</i> C.Whitehouse)	Complanatae	<i>C. cruciata</i>
Costatae	<i>C. curvifolia</i> Weim.	Nematobus	<i>C. curvifolia</i>
Costatae	<i>C. densa</i> Weim.	Nematobus	<i>C. densa</i>
Costatae	<i>C. dispar</i> Weim.	Eriocephalinae	<i>C. dispar</i>
Costatae	<i>C. dodecandra</i> Weim.	Multifidae	<i>C. dodecandra</i>
Costatae	<i>C. eriocephalina</i> Cham.	Eriocephalinae	<i>C. eriocephalina</i>
Costatae	<i>C. exilifolia</i> Weim.	Nematobus	<i>C. exilifolia</i>
Costatae	<i>C. filicaulis</i> Cham. & Schldl. var. <i>filicaulis</i>	Stipulatae	<i>C. filicaulis</i>
Costatae	<i>C. filicaulis</i> Cham. & Schldl. var. <i>octandra</i> (Cham.) Weim.	Stipulatae	<i>C. filicaulis</i>
Costatae	<i>C. filifolia</i> L.f.	Filifoliae	<i>C. filifolia</i> var. <i>arenaria</i>
Costatae	<i>C. filifolia</i> L.f.	Filifoliae	<i>C. filifolia</i> var. <i>filifolia</i>
Costatae	<i>C. geniculata</i> Weim.	Bifoliolae	<i>C. carinata</i>
Costatae	<i>C. glauca</i> Weim.	Bifoliolae	<i>C. glauca</i>
Costatae	<i>C. hirta</i> Burm.f.	Nematobus	<i>C. hirta</i>
Costatae	<i>C. incana</i> Weim.	Nematobus	<i>C. incana</i>
Costatae	<i>C. juniperina</i> L.f. var. <i>juniperina</i>	Tenuifoliae	<i>C. juniperina</i>
Costatae	<i>C. juniperina</i> L.f. var. <i>pilosula</i> Weim.	Tenuifoliae	<i>C. pilosula</i>
Costatae	<i>C. linearifolia</i> Eckl. & Zeyh.	Dracomontanae	<i>C. linearifolia</i>
Costatae	<i>C. marginata</i> Eckl. & Zeyh.	Bifoliolae	<i>C. marginata</i>
Costatae	<i>C. montana</i> Weim.	Eriocephalinae	<i>C. montana</i>
Costatae	<i>C. nitidula</i> (Engl.) R.E.Fr. & T.C.E.Fr. subsp. <i>angolensis</i> Weim.	Dracomontanae	<i>C. nitidula</i> subsp. <i>nitidula</i>
Costatae	<i>C. nitidula</i> (Engl.) R.E.Fr. & T.C.E.Fr. subsp. <i>nitidula</i>	Dracomontanae	<i>C. nitidula</i> subsp. <i>nitidula</i>
Costatae	<i>C. nitidula</i> (Engl.) R.E.Fr. & T.C.E.Fr. subsp. <i>pilosa</i> Weim.	Dracomontanae	<i>C. nitidula</i> subsp. <i>pilosa</i>
Costatae	<i>C. obcordata</i> L.f.	Bifoliolae	<i>C. obcordata</i>
Costatae	<i>C. obovata</i> E.Mey. ex Harv.	Bifoliolae	<i>C. obovata</i>
Costatae	<i>C. paucistaminea</i> Weim.	Paucistamineae	<i>C. paucistaminea</i> var. <i>australis</i>

Table 1. Tabulation of the species recognised by Weimarck (1934, 1948) and the sections that he placed them in, alongside the currently recognised species and sections. Taxa recognised by Weimarck that are still recognised (excluding hybrids) are indicated in bold. Species in brackets were not known by Weimarck at that time but can be attributed to the appropriate section based upon his key (continued).

Weimarck's section	Weimarck's species	Current section	Current species
Costatae	<i>C. paucistaminea</i> Weim.	Paucistamineae	<i>C. paucistaminea</i> var. <i>paucistaminea</i>
Costatae	<i>C. polita</i> Weim.	Bifoliolae	<i>C. polita</i>
Costatae	<i>C. pterocarpa</i> (Harv.) Weim.	Multifidae	<i>C. pterocarpa</i>
Costatae	<i>C. ramosissima</i> Schltr.	Petiolatae	<i>C. ramosissima</i>
Costatae	<i>C. rigida</i> Weim.	Bifoliolae	<i>C. rigida</i>
Costatae	<i>C. robusta</i> Weim.	Acerosae	<i>C. robusta</i>
Costatae	<i>C. serpyllifolia</i> Cham. & Schldl.	Paucistamineae	<i>C. serpyllifolia</i>
Costatae	<i>C. setifolia</i> Weim.	Paucistamineae	<i>C. setifolia</i>
Costatae	<i>C. sp. 1</i>	<i>Incertae sedis</i>	<i>C. bolusii</i>
Costatae	(<i>C. sparsa</i> C.Whitehouse)	Cliffortia	<i>C. sparsa</i>
Costatae	<i>C. spathulata</i> Weim.	Dracomontanae	<i>C. spathulata</i>
Costatae	<i>C. stricta</i> Weim.	<i>Incertae sedis</i>	<i>C. stricta</i>
Costatae	<i>C. subdura</i> Weim.	n/a	<i>C. × subdura</i>
Costatae	<i>C. subsetacea</i> (Eckl. & Zeyh.) Diels ex Bolus & Wolley-Dod	Complanatae	<i>C. subsetacea</i>
Costatae	<i>C. tenuis</i> Weim.	Bifoliolae	<i>C. marginata</i>
Costatae	<i>C. tuberculata</i> (Harv.) Weim. var. <i>muricata</i> (Harv.) Weim.	Costatae	<i>C. tuberculata</i>
Costatae	<i>C. tuberculata</i> (Harv.) Weim. var. <i>tuberculata</i>	Costatae	<i>C. tuberculata</i>
Costatae	(<i>C. weimarckii</i> C.Whitehouse)	Eriocephalinae	<i>C. weimarckii</i>
Hermaphroditicae	<i>C. hermaphroditica</i> Weim.	Tenuifoliae	<i>C. juniperina</i>
Inflexae	<i>C. cristata</i> Weim.	Cliffortia	<i>C. cristata</i>
Inflexae	<i>C. hexandra</i> Weim.	Cliffortia	<i>C. hexandra</i>
Inflexae	<i>C. lanata</i> Weim.	Cliffortia	<i>C. sericea</i>
Inflexae	<i>C. polygonifolia</i> L. var. <i>membranifolia</i> Weim.	Cliffortia	<i>C. polygonifolia</i> var. <i>trifoliata</i>
Inflexae	<i>C. polygonifolia</i> L. var. <i>polygonifolia</i>	Cliffortia	<i>C. polygonifolia</i> var. <i>polygonifolia</i>
Inflexae	<i>C. polygonifolia</i> L. var. <i>pubescens</i> Weim.	Cliffortia	<i>C. polygonifolia</i> var. <i>trifoliata</i>
Inflexae	<i>C. polygonifolia</i> L. var. <i>trifoliata</i> (L.) Harv.	Cliffortia	<i>C. polygonifolia</i> var. <i>trifoliata</i>
Inflexae	<i>C. sericea</i> Eckl. & Zeyh.	Cliffortia	<i>C. sericea</i>

Table 1. Tabulation of the species recognised by Weimarck (1934, 1948) and the sections that he placed them in, alongside the currently recognised species and sections. Taxa recognised by Weimarck that are still recognised (excluding hybrids) are indicated in bold. Species in brackets were not known by Weimarck at that time but can be attributed to the appropriate section based upon his key (continued).

Weimarck's section	Weimarck's species	Current section	Current species
Multinerviae	<i>C. aculeata</i> Weim.	Gramineae	<i>C. aculeata</i>
Multinerviae	<i>C. cervicornu</i> Weim.	Complanatae	<i>C. cervicornu</i>
Multinerviae	<i>C. cymbifolia</i> Weim.	Multifidae	<i>C. × cymbifolia</i>
Multinerviae	<i>C. dregeana</i> C.Presl var. <i>dregeana</i>	Multinerviae	<i>C. acanthophylla</i>
Multinerviae	<i>C. dregeana</i> C.Presl var. <i>dregeana</i>	Multinerviae	<i>C. dregeana</i> var. <i>dregeana</i>
Multinerviae	<i>C. dregeana</i> C.Presl var. <i>meyeriana</i> C.Presl	Multinerviae	<i>C. ceresana</i>
Multinerviae	<i>C. dregeana</i> C.Presl var. <i>meyeriana</i> C.Presl	Multinerviae	<i>C. dregeana</i> var. <i>spinosissima</i>
Multinerviae	<i>C. dregeana</i> C.Presl var. <i>meyeriana</i> C.Presl	Multinerviae	<i>C. dregeana</i> var. <i>dregeana</i>
Multinerviae	(<i>C. ferricola</i> C.Whitehouse)	Multifidae	<i>C. ferricola</i>
Multinerviae	<i>C. graminea</i> L.f. var. <i>convoluta</i> Weim.	Gramineae	<i>C. graminea</i>
Multinerviae	<i>C. graminea</i> L.f. var. <i>elegans</i> Weim.	Gramineae	<i>C. graminea</i>
Multinerviae	<i>C. graminea</i> L.f. var. <i>graminea</i>	Gramineae	<i>C. graminea</i>
Multinerviae	<i>C. grandifolia</i> Eckl. & Zeyh. var. <i>denticulata</i> Weim.	Multinerviae	<i>C. denticulata</i>
Multinerviae	<i>C. grandifolia</i> Eckl. & Zeyh. var. <i>grandifolia</i>	Multinerviae	<i>C. grandifolia</i>
Multinerviae	<i>C. grandifolia</i> Eckl. & Zeyh. var. <i>recurvata</i> Weim.	Multinerviae	<i>C. recurvata</i>
Multinerviae	<i>C. heterophylla</i> Weim.	Multinerviae	<i>C. heterophylla</i>
Multinerviae	<i>C. ilicifolia</i> L. var. <i>cordifolia</i> (Lam.) Harv.	Multinerviae	<i>C. ilicifolia</i> var. <i>cordifolia</i>
Multinerviae	<i>C. ilicifolia</i> L. var. <i>ilicifolia</i>	Multinerviae	<i>C. ilicifolia</i> var. <i>ilicifolia</i>
Multinerviae	<i>C. ilicifolia</i> L. var. <i>incisa</i> Harv.	Multinerviae	<i>C. ilicifolia</i> var. <i>cordifolia</i>
Multinerviae	<i>C. ilicifolia</i> L. var. <i>reniformis</i> Weim.	Multinerviae	<i>C. reniformis</i>
Multinerviae	<i>C. ilicifolia</i> L. var. <i>schlechteri</i> Weim.	Multinerviae	<i>C. schlechteri</i>
Multinerviae	<i>C. integerrima</i> Weim.	n/a	<i>C. × integerrima</i>
Multinerviae	<i>C. intermedia</i> Eckl. & Zeyh.	n/a	<i>C. × intermedia</i>
Multinerviae	<i>C. lanceolata</i> Weim.	Multinerviae	<i>C. lanceolata</i>
Multinerviae	<i>C. multiformis</i> Weim.	Multifidae	<i>C. multiformis</i>
Multinerviae	(<i>C. nivenioides</i> Fellingham)	Gramineae	<i>C. nivenioides</i>
Multinerviae	(<i>C. oligodonta</i> C.Whitehouse)	Multinerviae	<i>C. oligodonta</i>
Multinerviae	<i>C. ovalis</i> Weim.	Multinerviae	<i>C. ovalis</i>
Multinerviae	(<i>C. prionota</i> C.Whitehouse)	Multinerviae	<i>C. prionota</i>
Multinerviae	<i>C. ruscifolia</i> L. var. <i>purpurea</i> Weim.	Multifidae	<i>C. purpurea</i>

Table 1. Tabulation of the species recognised by Weimarck (1934, 1948) and the sections that he placed them in, alongside the currently recognised species and sections. Taxa recognised by Weimarck that are still recognised (excluding hybrids) are indicated in bold. Species in brackets were not known by Weimarck at that time but can be attributed to the appropriate section based upon his key (continued).

Weimarck's section	Weimarck's species	Current section	Current species
Multinerviae	<i>C. ruscifolia</i> L. var. <i>ruscifolia</i>	Multifidae	<i>C. ruscifolia</i>
Multinerviae	<i>C. ruscifolia</i> × <i>theodori-friesii</i>	Multifidae	<i>C. tridentata</i>
Multinerviae	(<i>C. scandens</i> C.Whitehouse)	Multinerviae	<i>C. scandens</i>
Multinerviae	<i>C. strigosa</i> Weim.	Multinerviae	<i>C. strigosa</i>
Multinerviae	<i>C. theodori-friesii</i> Weim.	Multinerviae	<i>C. theodori-friesii</i>
Multinerviae	<i>C. theodori-friesii</i> Weim. var. <i>puberula</i> Weim.	Multinerviae	(<i>C. theodori-friesii</i> var. <i>puberula</i>)
Multinerviae	<i>C. verrucosa</i> Weim.	Multifidae	<i>C. verrucosa</i>
Multinerviae	<i>C. virgata</i> Weim.	Multinerviae	<i>C. virgata</i>
Petiolatae	<i>C. arcuata</i> Weim.	Petiolatae	<i>C. arcuata</i>
Petiolatae	<i>C. drepanoides</i> Eckl. & Zeyh.	Petiolatae	<i>C. drepanoides</i>
Petiolatae	<i>C. falcata</i> L.f.	Petiolatae	<i>C. falcata</i>
Petiolatae	<i>C. lepida</i> Weim.	Nematobus	<i>C. lepida</i>
Petiolatae	<i>C. pedunculata</i> Schltr.	Nematobus	<i>C. pedunculata</i>
Petiolatae	(<i>C. perpendicularis</i> C.Whitehouse)	Petiolatae	<i>C. perpendicularis</i>
Petiolatae	<i>C. triloba</i> Harv.	Nematobus	<i>C. triloba</i>
Simplices	<i>C. acutifolia</i> Weim.	Ruboides	<i>C. acutifolia</i>
Simplices	<i>C. brevifolia</i> Weim.	Complanatae	<i>C. brevifolia</i>
Simplices	<i>C. cuneata</i> Aiton	Dichopterae	<i>C. cuneata</i>
Simplices	(<i>C. cuneata</i> Aiton var. <i>cylindrica</i> C.Whitehouse)	Dichopterae	<i>C. cuneata</i> var. <i>cylindrica</i>
Simplices	<i>C. discolor</i> Weim.	Ruboides	<i>C. odorata</i>
Simplices	<i>C. erectisepala</i> Weim.	Filifoliae	<i>C. erectisepala</i>
Simplices	<i>C. ericifolia</i> L.f.	Complanatae	<i>C. ericifolia</i>
Simplices	<i>C. esterhuyseniae</i> Weim.	Eriocephalinae	<i>C. esterhuyseniae</i>
Simplices	<i>C. ferruginea</i> L.f.	Ruboides	<i>C. berberidis</i>
Simplices	<i>C. ferruginea</i> L.f.	Ruboides	<i>C. ferruginea</i>
Simplices	<i>C. hirsuta</i> Eckl. & Zeyh.	Ruboides	<i>C. hirsuta</i>
Simplices	<i>C. longifolia</i> (Eckl. & Zeyh.) Weim.	Gramineae	<i>C. longifolia</i>
Simplices	<i>C. monophylla</i> Weim.	Stipulatae	<i>C. monophylla</i>
Simplices	<i>C. neglecta</i> Schltr.	Acerosae	<i>C. neglecta</i>
Simplices	<i>C. odorata</i> L.f.	Ruboides	<i>C. odorata</i>
Simplices	<i>C. phillipsii</i> Weim.	Multinerviae	<i>C. phillipsii</i>

Table 1. Tabulation of the species recognised by Weimarck (1934, 1948) and the sections that he placed them in, alongside the currently recognised species and sections. Taxa recognised by Weimarck that are still recognised (excluding hybrids) are indicated in bold. Species in brackets were not known by Weimarck at that time but can be attributed to the appropriate section based upon his key (continued).

Weimarck's section	Weimarck's species	Current section	Current species
Simplices	<i>C. pilifera</i> Bolus	Ruboides	<i>C. pilifera</i>
Simplices	<i>C. pungens</i> C.Presl	Ruboides	<i>C. pungens</i>
Simplices	<i>C. repens</i> Schltr.	Filifoliae	<i>C. repens</i>
Simplices	<i>C. reticulata</i> Eckl. & Zeyh.	Ruboides	<i>C. reticulata</i>
Simplices	<i>C. strobilifera</i> L.	Gramineae	<i>C. strobilifera</i>
Simplices	<i>C. tricuspidata</i> Harv.	Ruboides	<i>C. tricuspidata</i>
Simplices	<i>C. uncinata</i> Weim. var. <i>recta</i> Weim.	Ruboides	<i>C. uncinata</i>
Simplices	<i>C. uncinata</i> Weim. var. <i>uncinata</i>	Ruboides	<i>C. uncinata</i>
Simplices	<i>C. viridis</i> Weim.	Ruboides	<i>C. viridis</i>
n/a	(<i>C. × dissita</i> C.Whitehouse)	n/a	<i>C. × dissita</i>
n/a	(<i>C. × homunculi</i> C.Whitehouse)	n/a	<i>C. × homunculi</i>
n/a	(<i>C. × ilicioides</i> C.Whitehouse)	n/a	<i>C. × ilicioides</i>
n/a	<i>C. odorata</i> × <i>theodori-friesii</i>	n/a	<i>C. × maclearica</i>

2

Morphology

Growth form

Alongside the diversity of leaf shape and size, the most striking characteristic of the genus *Cliffortia* is the range of growth forms that it encompasses. It is difficult to classify these growth forms, but the extremes are easy to observe. For a more in-depth study of the growth form and development in a range of *Cliffortia* species see Fellingham & Linder (2003).

Height

Most obvious to aspect of growth form is the overall height of the plant. This is strongly affected by the strength of the main branch. At one end, there are the almost herbaceous subshrubs that have weak horizontally spreading stems, like *C. tricuspidata* and *C. dentata*. As the branches grow stronger, the ends of the branches grow upwards even if the main branch lies along the ground, as in *C. filicaulis*. A scrambling, almost climbing habit is evident in *C. ferruginea*, while a tangled mass of branches is exhibited by *C. odorata* and its close relatives. However, the most typical growth form in *Cliffortia* is an erect divaricately branched shrub. Here the branches are self-supporting, though the overall height of the shrub can vary from < 0.5 m in *C. carinata* to tree-like in subgen. *Arboreae*.

Branching

The manner of branching can bear a significant effect on the appearance of the plant. *Cliffortia* has a monopodial branching system. Sometimes the side branches are as dominant as the main branch and the plants form rounded bushes, but in several species the main branch continues to be dominant and the side branches are limited in their growth. This is found particularly in species of sect. *Multinerviae*, where several species can grow to 3 m or more tall, with a central main stem and only short side branches, e.g. *C. phillipsii*, *C. grandifolia* and *C. reniformis*. Outside of sect. *Multinerviae*, species such as *C. erectisepala* and the Swartberg form of *C. montana*, grow into narrowly columnar shrubs, with the side branches strongly ascending. In a few species the branches spread at right angles to the main stem, whereas in nearly all other species they form an acute angle and are ascending. This is most clearly seen in *C. reniformis*, but can also be observed in *C. schlechteri* and *C. perpendicularis*. In all species of *Cliffortia*, the branching pattern is alternate. This is a key difference to separate vegetative plants of *Cliffortia* from the Cape members of the Rubiaceae such as *Anthospermum* and *Nenax*, all of which have opposite leaves and branches.

Brachyblasts

Strongly connected with the branching is the nature of the new shoots. Many species produce numerous short shoots forming clusters of leaves known as brachyblasts. These brachyblasts are where the flowers form. Some of them develop into longer shoots and eventually the main branches of the shrub. Other species, especially in sect. *Multinerviae* and sect. *Ruboides*, do not form brachyblasts but only produce long shoots, with the flowers developing in leaf axils on greatly reduced shoots (Fellingham & Linder 2003). The distinction, however, between long shoots and brachyblasts is not always straightforward; several species produce indistinct brachyblasts, e.g. *C. pedunculata* or *C. dentata*.

In sect. *Multinerviae* the leaves are usually strongly overlapping, so that the main stem is barely visible and internodes are hidden. In sect. *Ruboides* the internodes are long in comparison to most species and the main stem easily visible. In other species the internodes, though present, are very short and the brachyblasts overlap closely. In species with fine leaflets this gives the branch a feathery appearance, e.g. *C. exilifolia* and *C. paucistaminea* var. *australis*.

Fire survival strategy

One last character is important in plant habit, namely the ability of the plant to resprout after fire or to regenerate only from seed (reseeder). Weimarck (1934), who worked almost exclusively from herbarium material in which belowground parts are rarely collected, was thus unaware of the different strategies adopted by various species. A central discovery of the fieldwork in preparing this monograph was the observation that many species produce underground rhizomes. These rhizomes can often spread some distance from the parent plant before emerging. The rhizomes are also able to survive fire and this can result in large areas being dominated by one species of *Cliffortia*, often as the result of a single plant spreading rhizomatously.

A third type of survival strategy, intermediate between the reseeding and clonal resprouting strategies, involves resprouting from an underground caudex. These species do not produce rhizomes, but the central rootstock is apparently able to survive a fire. This strategy appears to be most common in grassland species, e.g. *C. nitidula* and *C. linearifolia*, possibly because grass fires pass through with less intensity, leaving the rootstock relatively undamaged. It also occurs in species that favour rock crevice habitats, where the surrounding rock may provide some protection, e.g. *C. tuberculata* and *C. complanata*. Possibly in such scenarios the species are actually facultative resprouters, making use of their environment to survive fires, rather than physiologically adapted to fire. In *C. ruscifolia* this appears to be the case, where most plants will be killed by fire, but those growing in rocky places often survive, resprouting from the base.

The resprouting versus reseeding character can only be reliably determined soon after a fire. Leaves of resprouting shrubs appear soon after the first good rains of winter. Seedlings generally do not appear until the spring and the first true leaves are not immediately evident. The best evidence that a species does or does not resprout is to find the border of the burn where unburnt plants and old burnt stumps can be seen. On mature plants an educated guess can be made, but unfortunately branching at the base of the plant is not always indicative of it having resprouted, as non-sprouting species are often stunted so that they do not have a clear single stem; nor is a clear single stem always indicative of a non-resprouting species as those that spread clonally often produce just a single stem when they resprout.

Stem characters

The old stems of *Cliffortia* are very characteristic. They bear rather attractive flaky bark, which remains evident on dead or burnt plants. Bark morphology is, however, only useful at a generic level, for the stems generally have very few characters that are highly plastic. However, the new growth on young stems is useful for identification.

Colour

Young stems can be reddish or a whitish green in colour, often varying depending upon the aspect with regard to the sun, with stems becoming redder in full sun. However, there is a degree to which that colour can be an aid in identification. For example, species of sect. *Bifoliolae* have a greater tendency to produce red pigmentation in the stems, whereas species of sect. *Multinerviae* almost never do so.

Pubescence

One of the best characters on young stems is the presence and nature of pubescence. Glabrous stems are very typical, but not universal, in certain groups, i.e. subg. *Gramineae*, sect. *Bifoliolae*, sect. *Multinerviae* and sect. *Filifoliae*. Other groups always have hairy stems, i.e. subg. *Arboreae*, subg. *Eriocephalinae*, sect. *Alatae*, sect. *Stipulatae*, sect. *Paucistamineae*, sect. *Dracomontanae*, sect. *Petiolatae*, sect. *Cliffortia*, sect. *Costatae*, sect. *Acerosae* and sect. *Multifidae*. The nature of the hairs are also distinctive, from the densely curly white hairs of subg. *Eriocephalinae* to the long spreading hairs of *C. odorata* and the short upwardly adpressed hairs of sect. *Costatae* (adpressed downward hairs only occur in *C. dentata* and *C. gracillima*, and occasionally in *C. browniana* and *C. serpyllifolia*). Two species, *C. juniperina* and *C. repens*, have small warts instead of hairs, or in *C. nitidula* the hairs are borne on bulbous bases that leave small warts as the stems age. The other variation from the norm is in species that only have hairs on half the stem, the position varying at each internode, so far observed in *C. obcordata* and *C. robusta*, and some populations of *C. carinata* (possibly as the result of introgression with *C. obcordata*) and *C. pedunculata*.

Although pubescence is useful, it is not always visible. In species that only have long shoots, the leaves are often overlapping. Even when the leaves fall, the sheaths remain on the stem, obscuring it. Although these old sheaths are characteristic, it is not a very helpful character as it is co-extensive with long shoots, which are more evident.

Stem shape

All except a few of the more distinctive species have stems that are more or less cylindrical, with leaves and brachyblasts arranged spirally up the stem. *Cliffortia phyllanthoides*, *C. pulchella*, and to a degree *C. obcordata*, have leaves flattened against a slightly compressed stem. *Cliffortia pedunculata* and its relatives, *C. triloba* and *C. lepida*, have sheaths decurrent on the stem, rendering it slightly winged.

Leaf morphology

The leaves of *Cliffortia* provide by far the most useful characters for both diagnosis and predicting relationships. Most sterile specimens of *Cliffortia* can be named with some assurance from leaf characters

alone, only occasionally is further evidence needed using achene morphology, flowers or life history to distinguish between similar species. Anatomical investigation of leaves will likely provide additional characters, especially in differentiating the needle-leaved species.

The leaf can be divided into its four constituent parts: sheath, stipules, petiole and leaflets.

Sheath

Sheaths are invariably 3-veined and usually clasp the stem in much the same manner. The most useful characters then, are the size of the sheath and the degree of hairiness both adaxially and abaxially. The combination of sheath pubescence is a good character for group diagnoses. The sheath is measured from the base of the middle leaflet to the base of the sheath where it joins the stem. When a petiole is present, there is no articulation between the sheath and the petiole, but the sheath has been measured to the point where the stipules leave the petiole. This is usually the extent of the three raised ribs on the reverse as well.

The presence or absence of hairs on the reverse of the sheath around the three ribs is also a useful character (excluding the lamina of the stipules; this can sometimes have hairs when the rest of the sheath reverse is glabrous, e.g. *C. drepanoides*). A few hairs may extend from the stem onto the base of the sheaths, but these should not be considered in assessing the sheath itself. Hairiness of the sheath on the reverse is partially linked to stem hairiness; a species with glabrous stems will never have hairy sheaths.

The pubescence of the sheath internally is regarded here as a separate character and presence or absence of hairs inside the sheath a useful character, excluding the apex, which nearly always has at least a short fringe of hairs. Hairs, if present, can be long and straight or curled, but this may depend on the age of the leaf, the hairs initially being straight but becoming curled in some species. Often the sheath interior is not entirely glabrous but shows some evidence of a few straight hairs. There is nearly always a short fringe of hairs present at the apex of the sheath, but in a few species there appears to be a complete absence of hairs inside the sheath. *Cliffortia heterophylla* is unique in having a fringe of hairs on the outside of the sheath at the insertion point of the leaf.

Finally, *C. hirta* is unique in having a small, often reddish, glandular extensions of the sheath on the reverse just beneath the insertion of the leaflets. Neither of its close relatives, *C. incana* and *C. anthospermoides*, exhibit this unusual character.

Stipules

Usually some evidence of a stipule is present, although sometimes the more modified leaves subtending flowers or in the middle of a brachyblast appear to lack them. This character helps separate sterile specimens of *Cliffortia* from *Aspalathus*, as stipules are always absent in *Aspalathus* but only occasionally in *Cliffortia*. The length of the stipules is a useful character and quite consistent within a species. The useful ranges to note are whether the stipules are consistently < 3 mm, 3–6 mm, or > 6 mm; in a few species the stipule is, for all intents and purposes, absent. Most stipules in *Cliffortia* are membranous, even translucent. However, in sect. *Stipulatae* they are similar in texture and hairiness to the leaflets. *Cliffortia stricta* is alone in having very evident brownish scarious stipules. The margin of the stipule may be entire, minutely serrulate, or ciliate, especially in species with hairy sheaths.

In the majority of species, the stipules are free and held to each side of the leaflets or petiole, if present. However, some unusual stipule arrangements can be observed, such as in *C. crenata* and *C. reniformis*, where the leaves more-or-less encircle the stem so that the stipules coalesce with one another opposite the leaf, often resembling a small leaflet. In a few unifoliate species, e.g. *C. ferruginea* and *C. odorata*, the stipules do the reverse and tend to touch each other or even join in front of the point of insertion of the leaflet or petiole. *Cliffortia phyllanthoides* is particularly unusual, in having a small subulate awn between the two circular leaflets. This may morphologically be consistent with the fused stipule condition, but its position suggests that it may be an exceptionally reduced middle leaflet.

Petiole

The presence of a petiole is an important diagnostic character for many species and is species consistent. Seedling or resprouting shoots sometimes exhibit a petiole when the mature leaves do not; e.g. resprouting plants of *C. nitidula* subsp. *pilosa* have frequently been confused with *C. filicauloides*. Occasionally the petiole is reduced to a short stump, e.g. *C. ramosissima* and *C. acockii*. Apart from presence or absence, the length of the petiole is a useful character. As the petiole is a continuation of the sheath and only articulates with the leaflets, the petiole is still visible on old leaf sheaths.

Leaflets

Probably the first feature to note when examining any *Cliffortia* plant is the number of leaflets. Only three species can be called bifoliate, the others are either unifoliate or trifoliate. This is for the most part consistent within a species, but some taxa do show variation in the number of leaflets either on the same plant (e.g. *C. multiformis* and *C. × varians*), or rarely between populations (e.g. *C. linearifolia*). Seedling and resprouting leaves can also be atypical as noted above.

There are two distinct types of unifoliate leaves: single-veined and multi-veined. Weimarck (1934) used this character to separate his two sections *Simplices* and *Multinerviae*. Although a very useful character, I disagree with some of Weimarck's assertions as to number of veins entering the base. For example, *C. cuneata* and *C. phillipsii* consistently have more than one vein entering the sheath, whereas *C. aculeata* has just a single significant vein. Nevertheless, it is useful as a defining character for sect. *Multinerviae*, though a few unifoliate species outside of this section also have multiple veins. The number of parallel veins in the leaf is clearly directly related to the width of the leaflet.

When there are multiple leaflets, they are inserted on the sheath in a line, but when there is a petiole, the leaflets join at the point of the petiole in a triangular arrangement so that the bases of the leaflets all touch one another. Sometimes this arrangement can also be found in species without a petiole, suggesting that the petiolate state was not long lost in the evolution of a species.

The lamina of the leaflets varies from being very thin and herbaceous in nature, e.g. *C. dentata*, to very tough and rigid, especially the stiffly spiny species such as *C. dregeana* and *C. ruscifolia*. The midrib can be prominent or barely differentiated. In *C. linearifolia* the midrib is so thickened that it borders directly against the margins so that the intervening lamina is barely visible. Weimarck (1934) regarded most of the needle-leaved species as originating from 'an intense reduction in the width of the lamina, often to such an extent that the midrib takes up almost the whole of the underside'. The lamina exhibit different shades of green, which are difficult to classify. However, there is a definite suite of species in *Cliffortia* with grey to glaucous laminae, especially in sect. *Bifoliolae*. Other species appear greyish because of

their dense hairs, e.g. subg. *Eriocephalinae*. Nearly all leaflets are slightly paler beneath, but in some species the contrast is striking. This is especially the case when the covering of hairs beneath is denser than above, as in *C. hirsuta*. For some species without hairs, the lamina beneath is also paler on each side of the midrib. When the leaflet is narrow this can appear as two pale lines, e.g. *C. linearifolia* or in *C. densa* on the lateral surfaces, or if the margins are tightly inrolled, as a central pale line, e.g. *C. ericifolia*.

The shape and size of the leaflets is another critical character in distinguishing species. In some sections, such as sect. *Multinerviae* and sect. *Bifoliolae*, they are the only character separating some species. While many species have needle-shaped to oblong leaflets, lanceolate or narrowly triangular-shaped leaves are common in sect. *Multinerviae*, and broadly ovate leaves in sect. *Ruboides*. *Cliffortia cuneata* is particularly unusual with its wedge-shaped leaves and truncate apex, and the almost circular leaves of the bifoliolate species are eye-catchingly different. In trifoliolate leaves the outer leaflets can sometimes be a different shape to the middle one. This may just be in how it curves, such as in the species of sect. *Petiolatae*, where the outer leaflets are falcate but the inner one straight. More distinct examples are found in *C. dentata* and *C. filicaulis*, which have broad toothed middle leaflets but entire narrower outer ones. The two varieties of *C. polygonifolia* are distinguished on the basis that var. *trifoliata* has a toothed middle leaflet, but all the leaflets are entire in var. *polygonifolia*. In *C. obcordata* the middle leaflet is smaller than the outer two leaflets and has a notched apex. This form suggests a transition to the bifoliolate species. *Cliffortia phyllanthoides* may represent an extreme case for this, where the middle leaflet has been reduced to a small point (although it might be the fused stipules).

The margins of the leaves are often plane or slightly thickened. In several species the margins are inrolled beneath the lamina. If the leaflet is narrowly elliptic, such inrolling results in a needle shape as is commonly found in subg. *Eriocephalinae*. Other needle-shaped leaflets have virtually no margin, but the leaflet can be either completely terete or have a clearly defined edge, being semi-circular to triangular in cross-section. In some of the tougher spinier species, the whole lamina is curved upwards, creating a central channel rendering the leaf more rigid. In some species the margin is completely smooth, but in others it can be scabrid to minutely serrulate, especially in the needle-leaved species, including *C. atrata* and *C. juniperina*. A few species have clearly toothed leaves, this often contributing to the spininess of the plant. The teeth can be either hyaline (e.g. *C. grandifolia*), or form marked indentations of the lamina (e.g. *C. ilicifolia*). When the teeth are confined to the apex of the leaflet they are described here as being lobed, as in *C. dentata* or *C. filicaulis*. The teeth are usually straight, but in sect. *Ruboides* they curve downward (decurved). This curving aids the plants in scrambling through and over other plants. Whether the margin has teeth or not, the apex of the leaf can often form a sharp point. In some species it can be acute to acuminate but not particularly sharp, while in other species it is reduced to a small mucro or blunt to rounded.

The base of the leaflets articulate at the point of contact with the sheath or petiole if present. The leaflets usually taper gradually to the base or are more-or-less the same width at the base as in the middle. In a few species there is a distinct contraction of the lamina just above the base to form a pseudopetiole. This is particularly obvious in needle-leaved species formed by their inrolled margins (e.g. *C. eriocephalina* and *C. nitidula*). In contrast, a few needle-leaved species also appear to have swollen bases to their leaflets, but this needs more investigation to establish whether this is consistent for a species. For some broad-leaved unifoliolate species, particularly *C. reniformis*, the base of the lamina extends around the stem so that it is clasping.

As with the sheaths, the hairiness of the leaflets is key to species identification. Several species have hairs that are lost early on, so young leaves need to be examined for presence or absence of hairs. Also, sometimes the hairs can be restricted to a few long hairs along the midrib and sometimes only a few of these persist towards the base of the leaf, e.g. *C. dregeana*, and even then they are easily lost. The leaflets are usually more hairy beneath than above, in some species quite densely so with short curled hairs, which give a white tomentose appearance. Even then there are often some long hairs on the midribs and veins, so that they stand out in contrast against the rest of the lamina. Finally, some needle-leaved species lack hairs but bear minute raised tubercles, which can be a difficult character to define as several species have minute dots, which are not raised but probably have the same origin.

Leaf direction

The direction that the leaves curve is a difficult character to separate with certainty, but is important in the overall look of a species. Many species' leaves curve up and towards the stem, while others definitely curve down and away from the stem. In needle-leaved species, the former can create a feathery look while the latter gives a rosette-like appearance to the brachyblast. It is this latter formation that gives *C. arborea* one of its common names: *sterboom* or *startree*. Reliably determining this character from herbarium sheets is tricky and field observations are not always consistent for a given species, as it can depend upon the age of leaves on the shoot, e.g. young leaves are nearly always bent inwards to protect the new buds, and intermediate states also occur where the leaves are more-or-less held straight. In some species, different populations may exhibit this character in opposing ways, while in *C. filifolia* and *C. paucistaminea*, it has been used to assist in separating out the different varieties.

Juvenile leaves

The nature of the juvenile leaves on seedling and resprouting shoots produce a very useful suite of characters especially in confirming relationships between species. Unfortunately, by its very nature, these characters are not always present when determining a specimen, and they are rarely collected. Where they have been observed, however, it is clear that they can vary considerably from mature leaves. Several species have been recorded to revert from trifoliolate to unifoliolate or vice versa between seedling and adult forms of the leaves, as well as varying their degrees of toothiness. A petiole can also be present in the juvenile leaves, but become lost in the mature ones. For many others, juvenile leaves are more-or-less similar to mature leaves. The presence of any sexual structure on the shoot will help in determining if one is dealing with a mature shoot. *Cliffortia nitidula* subsp. *pilosa* has frequently been misidentified as *C. filicauloides* as it has toothed leaflets with a petiole on its resprouting shoots. But these characters are also helpful, such as the petiole on the seedling leaves of *C. burchellii*, which supports its relationship to *C. filifolia*. The juvenile leaves should be disregarded when reading the general descriptions, but can be useful additional characters.

Inflorescence structure

Fellingham and Linder (2003) tried to describe *Cliffortia* inflorescence structure, but only examined eight species and did not go further at attempting to categorise the other species into different groups. Only a few species can be regarded as having an inflorescence, most species have scattered flowers situated at the base of normal vegetative leaves. Fellingham discovered that all species produce their flowers on

short shoots, even if those short shoots are so reduced that they appear to be absent. For her work, she used the terminology of 'bract' to describe any leaf that actually subtended a flower (as opposed to those that subtend the short shoot upon which the flower grows). This terminology gets complicated though, as often the subtending leaf is no different from the normal vegetative ones and therefore to distinguish the two seems arbitrary upon whether the plant is flowering at the time or not. In this account therefore, the leaves of both fertile and vegetative shoots are referred to as a single entity unless they are morphologically different.

Fellingham described several different inflorescence types, but species are split up into just three here. The commonest inflorescence type is the lack of any structure where flowers are scattered apparently uniformly over the plant. The second type is a congested inflorescence. This covers those species where both male and female flowers can be found conglomerated into a small area, such as in *C. ruscifolia* or *C. odorata*. In *C. ruscifolia* the leaves subtending the flowers are markedly reduced (true bracts), whereas in *C. odorata* the flowers look as though they are subtended by an ordinary leaf, but in fact the subtending leaves have been lost. The third type is the female structured inflorescence, this is found in subg. *Arboreae* and in *C. heterophylla*. In this type the female flowers are collected together in a distinct structure, with the subtending leaves (true bracts) of the flowers markedly different from the normal foliage, while the male flowers are scattered across the rest of the plant.

Monoecy versus dioecy

Although Weimarck (1934) considered that there were both monoecious and dioecious species within the genus, my research in the field has led me to believe that all species are at least capable of monoecy, although there may be temporal separation between the flowering of one sex or another. In plants that are evidently male, examination of the leaf litter beneath them or the axils of old leaf sheaths usually reveals the presence of achenes. It is harder to prove the reverse, that plants with only female flowers or achenes have the ability to produce male flowers. Thus, it remains possible that some species are gynodioecious. At the extreme of this are the species that appear to never produce male flowers despite being well-collected, e.g. *C. browniana*, *C. complanata* and *C. phyllanthoides*, or that male flowers have only been collected in a small part of their distributional range, e.g. *C. ruscifolia* and *C. stricta*. It is evident then that apomixis is an essential part of the reproductive strategy for many *Cliffortia* species. Nevertheless, it is possible that they will on occasion produce male flowers, facilitating gene flow within the species.

All *Cliffortia* species have separate male and female flowers. Weimarck (1934) described a section called *Hermaphroditicae* based upon a single species, *C. hermaphroditica*. The species itself was based upon a single specimen that had perfect flowers, but that specimen is considered here to be an abnormal form of *C. juniperina*. Flowers with both male and female parts have also been noted in *C. polygonifolia*, but it is not certain that in either of these cases that both the male and female parts are functional.

Peduncle

The only other inflorescence character to note is the presence of a peduncle. However, use of the word peduncle in *C. conifera*, and genera related to *Cliffortia* such as *Acaena*, is probably not homologous to that found in three other species: *C. pedunculata*, *C. lepida* and *C. triloba*. These three species only ever carry a single flower at the end of their peduncle. It is defined to distinguish the elongated flower-bearing stalk on the stem side of the bracteoles from the pedicel on the flower side of the bracteoles.

Flowers

Both the male and female flowers have a similar basic structure, consisting of bracteoles, a receptacle, which is more-or-less vestigial in the male, and sepals. A few characters are applicable to both the male and female flowers, while others are usually exclusive to one sex or the other, although they are sometimes discernible in a vestigial form in the other.

Bracteoles

The hairiness of the bracteoles is a good character that is usually consistent within a species and often across a section. The bracteoles, independent of the margins, can be hairy or glabrous, although if there are hairs present they are often confined to a small area towards the lower half of the keel. The margins of the bracteoles can exhibit varying degrees of hairiness, referred to as ciliae, apparently independent of whether the rest of the surface is hairy or not. The margin is often distinctly ciliate, but sometimes the ciliae resemble short round projections along the margins, which is then regarded as serrate. In other species the margins are clearly entire.

Sepal number and ornamentation

One of the key diagnostic characters for *Cliffortia* is the number of sepals. Although several species have been described as having three or four sepals, the species is almost always consistent for the number of sepals. Only *C. paucistaminea* shows signs of variation in sepal number between populations, although other species may have the odd flower here and there lacking or gaining a sepal. The number of sepals is likewise consistent between male and female flowers and it is a reliable character at sectional level. The number of stamens is also closely linked to the number of sepals, while 3-sepalled flowers can have the full range of stamen numbers, 4-sepalled flowers only have four or eight stamens.

Although the sepals differ in size and shape between the sexes, they do share characters in common. All species have sepals with a tuft of short hairs inside the apex that hold the sepals together in bud, but in some species the reverse of the sepals have a few long hairs towards the tip. This often reflects the general hairiness of the species. Species with hairless stems nearly always have glabrous sepals. While it is a good diagnostic character, a hand lens is needed to see the presence or absence of hairs properly and they are usually clearer on the male than the female flowers (one may safely presume that if they are present on one sex, they will be present on the other).

Apart from hairs there are few other characters on the sepals. In *C. teretifolia*, the apex of the sepal actually protrudes as a small point set back from their union in bud. Close examination of the flowers shows that the buds are 3-pointed, most obvious in the male flowers as the sepals are larger, but also present in female flowers.

Male flowers

The male flowers are all relatively uniform in structure and have few discrete characters. They all share a similar design with the purpose of exposing their stamens to allow for wind dispersal of the pollen.

The pedicel is measured from above the union of the bracteoles to the base of the sepals. Most often what has been termed a pedicel is actually the vestigial receptacle of the male flowers. A true pedicel is evident in a few species by the presence of an articulation. The two components are not separated in the descriptions, as the presence of an articulation has not been observed consistently across all species. Furthermore, some species have such an elongated vestigial receptacle, e.g. *C. ruscifolia*, that it functions like a true pedicel. Sometimes the pedicel is hairy, but this needs more detailed examination as it may be the pedicel or vestigial receptacle that is hairy. For example, in *C. strobilifera* and *C. longifolia* the pedicel is hairy, there is then a clear articulation and the vestigial receptacle is glabrous.

The typical shape of the male sepals is broadly ovate. In only a few species in subg. *Gramineae* the sepals are better described as narrowly elliptic. In a few species the sepal tips are attenuate and filiform, a character most noticeable in bud, e.g. *C. dentata*. The sepals normally separate completely at anthesis and recurve, but in *C. graminea* the sepals of the male flowers only split on one side and form a hood over the stamens, one of many diagnostic characters of this species. In sect. *Petiolatae* the sepals do not always split at anthesis and the tips may remain fused together by the small patch of hairs at their interior apex. In species of sect. *Stipulatae* the sepals are fused basally into a tube and remain united after they are shed. The sepals remain joined together even when they fall from the plant.

Stamen number in the male flowers is highly diagnostic, especially for the needle-leaved species which otherwise can appear very similar. Stamen number must be determined in freshly opened flowers or even mature buds, as stamens are easily lost in older flowers. While stamen number is helpful, it is rarely exact except in the species with very few stamens, so a range of flowers should be examined. As mentioned before, 4-sepalled flowers always have four or eight stamens. Some 3-sepalled flowers can have as few as six stamens and those species never have more than 12. Several species have an intermediate number of stamens, consistently ranging from 9 to 18. Finally, there are species that have more than 20 stamens, particularly in sect. *Multinerviae*, but species like *C. hirta* and *C. juniperina* are notable amongst the needle-leaved species in having over 20 stamens. Unfortunately, male flowers are only rarely observed in the latter species.

The size of the stamens is usually proportional to the size of the flowers, though in some species the stamens are exerted further beyond the end of the sepals than usual, e.g. *C. ferricola*. The colour of the stamens can be taxonomically helpful and is mostly consistent within a species. The filaments can be red or greenish white, while the anthers can be a reddish brown or yellow. Normally the two elements of the stamens are in accordance, but occasionally in some species, especially sect. *Ruboides*, the filaments can be red while the anthers are yellow and this can create a striking (for *Cliffortia*) effect. In two unrelated species (*C. lanceolata* and *C. acutifolia*), hairs are present on the connective between the anthers and the filaments.

Female flowers

The female flowers appear to follow two basic patterns for capturing wind-borne pollen. One is that typical of most wind-pollinated plants, in which the flower structure is designed to present the stigmatic surface into wind streams. The other is more unusual in that the flowers are hidden within the leaves or even tucked down at the base. Here the leaves have presumably developed to create the right eddies in the wind to allow the pollen to drop out of the air and on to the stigma.

While the bracteoles in the female flowers are much the same as those found in the male flowers, the ratio of the bracteoles to the immature receptacle is a significant character. In some species they completely enclose the developing receptacle, but in others they barely reach to halfway. This has to be observed while the receptacle is immature and before the stigma has withered, as in most species the receptacle grows as it ripens and the achene is often larger than the bracteoles.

The sepals are much smaller than those in the male flowers and are also more variable in shape. At one extreme, the sepals of *C. odorata* are exceptionally small and often fall completely while the stigma is still developing. In contrast, *C. phillipsii* has the largest sepals in the genus, this matching its achenes, the largest in the genus. The shape of the sepals varies more widely than in the male flowers. They are generally broadly ovate to narrowly elliptic. When very broadly ovate, with the widest point near the base, the sepals are more-or-less triangular in shape; when very narrowly elliptic, the sepals are almost linear. The margins can also become weakly inrolled, the sides are more or less parallel and the shape is oblong. None of these states are absolutely discrete, but for any species the range of variation in the female sepal shape is limited. A more reliable character is whether the sepals recurve upon anthesis or remain erect. This is usually consistent within a species or even a section. Sepals of sect. *Multinerviae* and sect. *Bifoliolae* are nearly always erect, whereas in sect. *Multifidae* they are always recurved. However, due caution is needed, firstly to examine mature flowers, as sepals are always erect in bud, and secondly the recurving nature of the sepals can be hampered by the bracteoles, so that they remain upright if not erect. Species in sect. *Petiolatae* have an intermediate state, where the sepals are held straight outwards at about 30–60° to the vertical, thus neither erect or recurved.

As in the male flowers of sect. *Stipulatae*, the sepals of the female flowers can be fused towards the base in the section and fall as a unit. In other species, especially those with erect sepals, two out of the three female sepals can sometimes be fused as well, but this is not consistent.

The immature receptacle reflects most of the characters that will develop as the achene matures. However, if the ribbing of the mature achene is exceptionally shallow or only due to colouration, then the immature receptacle may be completely smooth. A few species also have some hairs on the immature receptacle, especially towards the apex, but they are lost by the time the achene has matured. Although these characters can be useful, they are exceptionally hard to see even with a hand lens, so their use is limited to examination under a dissecting microscope.

The receptacle usually contains a single carpel, but in a few species two or more carpels are united. Weimarck (1934) subdivided the genus into two subgenera based upon this character. The simplest way to observe it is by examining the number of stigmas in a female flower, as this matches the number of carpels. However, stigmas can be easily lost and sectioning a few mature achenes can help to confirm carpel number.

The stigma is often the most visible part of the female flower. The style is usually so short that the stigma and style are considered here as a single unit and measurements are made from point of attachment to the receptacle to top of the highest feathery extension. The stigma is usually highly fringed either side of the central axis, appearing feathery. The degree of fringing does vary and species in subg. *Arboreae* have almost strap-like stigmas. In species with short brush-like stigmas, the axis has become bent, while in *C. graminea* the stigma is bent and twisted to one side of the flower so that it emerges to the side of the leaf. The colour of the stigma can be bright red or greenish white, though occasionally a more intermediate white with a reddish tinge is present in some species. The stigma colour is often consistent within species and is somewhat connected to the length of the stigma and its prominence above the leaves.

Those species with long stigmas, exposed above the leaves are usually red, whereas species with the stigma tucked at the base of the leaves are usually greenish white.

Achenes

The achenes of *Cliffortia* species are often diagnostic, and when both leaves and achenes are present most species can be named with some certainty. But describing the distinctive overall appearance into discrete characters is difficult and comparison with an illustration or herbarium specimen is easier.

In most species the achene is held within the bracteoles and tucked into the base of the leaves. Species in series *C. pedunculata* have the bracteoles and achenes held at the end of a pendent peduncle, while species of sect. *Alatae* have achenes hanging on a recurved pedicel.

The achenes are generally broadly ellipsoid in shape and range in size from less than 2 mm in *C. linearifolia* to 9 mm in *C. phillipsii*. Some achenes are quite narrow and almost cylindrical. Such achenes can often be curved, the extreme example being those of *C. curvifolia*, which has curved achenes up to 12 mm long but less than 2 mm wide. Achenes of subg. *Arboreae* are distinctively flattened and angled. *Cliffortia strobilifera* has truncate and irregularly shaped achenes, a character that helps to distinguish it from closely related *C. longifolia*.

Along with the shape and size, the ornamentation of the achene is also critical in species identification. Ribs are usually present and generally obvious to the naked eye, even if low. Variations include the number and arrangement of the ribs, as well as the nature of the surface between the ribs if visible. In the most common forms of *C. juniperina* the surface between the six prominent ribs is transversely rugose. The surface of some species are warty (*C. tuberculata* and *C. verrucosa*), while other species' achenes lack ribs completely (e.g. sect. *Stipulatae*). *Cliffortia subsetacea* has asymmetric achenes, with two of the ribs curved along their axis so that the achene appears to bulge out to one side. Occasionally the ribs can be obscured by a waxy transparent membrane that must be removed before the ribs are visible. The membrane can peel off naturally as the achene ages or can swell when wetted. This feature is very typical of sect. *Petiolatae* but is also found in other species such as *C. filifolia* and *C. pedunculata* series. In the single fleshy fruited species, *C. baccans*, the fleshy tissue may be a further development of this membranous layer but in this case it is bright orange not transparent.

The ribs can be developed to the extent that the achene becomes winged. The extreme example of this is in sect. *Alatae* but other species also exhibit this on a less obvious scale as in *C. phyllanthoides*, *C. teretifolia*, *C. complanata* and *C. propinqua*. In several species of sect. *Cliffortia*, three of the wings are straight, while the other three are strongly incurved; this most evident in cross-section.

Some achenes have hairs present, but except for a few species where they are very obvious (e.g. *C. alata*), a hand lens is usually needed.

The colour of the achenes is often characteristic, but hard to describe exactly. The achene is generally mid to dark brown as found in *C. juniperina*. *Cliffortia atrata* is very dark reddish brown, whereas *C. castanea* is a richer reddish brown colour. Section *Cliffortia* often have dull reddish brown achenes that can be as noticeable as the flowers and those of sect. *Alatae* are bright red and more noticeable than the flowers. Achenes of sect. *Bifoliolae* are often greyish brown in colour. Sometimes the greyish

colour is imparted by the thin membrane that covers the surface as in sect. *Petiolatae*. Species in sect. *Ruboides* have very pale whitish achenes. The fleshy fruit of *C. baccans* are a bright orange colour.

The presence of a swollen translucent elaiosome has been noted at the base of the achene on a number of species of *Cliffortia*, e.g. *C. atrata*. In herbarium specimens elaiosomes shrivel, making it difficult to confirm their presence or absence. Records of this character are incomplete for the genus, but it appears to be consistent within species and needs better recording.

Flowering time

The flowering time for *Cliffortia* is not particularly diagnostic but does exhibit some interesting patterns. Some species have clearly demarcated flowering periods, usually in spring from September to November, but many other flower throughout the year, although they may well peak during spring. While most species fit one of these two patterns, some species are winter flowering (e.g. *C. falcata* and *C. filifolia*) mainly from March to September, whereas some high altitude species, such as *C. dregeana*, are mainly summer flowering; *C. complanata* and *C. propinqua* flower in late summer to autumn, January to May.

Although flowering time is often limited, achenes may well persist on the plant for some months afterwards. Even when they fall, they can be found around the base of the plant, so that identification of any species, using leaves and achenes, is possible all year round.

3

Phylogeny of *Cliffortia*

Systematic position of *Cliffortia* within the Rosaceae

The Rosaceae are a large family containing around 85 genera with about 3 000 species (Mabberley 1987). The family has been split into various arrangements of subfamilies, but the tribes are more generally agreed upon. *Cliffortia* has always been placed within subfamily Rosoideae and consistently assigned to tribe Sanguisorbeae (although sometimes referred to as Poterieae) (Jussieu 1789; De Candolle 1825; Harvey 1862; Bentham & Hooker 1865; Weimarck 1934; Kalkman 1988). Sanguisorbeae were divided by Weimarck (1934) into those still retaining their petals (Sanguisorbeae petaliferae) and those in which the petals have been lost (Sanguisorbeae apetalae). These groups have been shown to constitute monophyletic assemblages (Helfgott et al. 2000; Kerr 2004). Within the Sanguisorbeae apetalae, the position of *Cliffortia* has been shown to be sister to the *Acaena*-*Polylepis* clade (Kerr 2004). (The South African *Acaena latebrosa* is rather anomalous and sometimes basal to the *Cliffortia* clade; Kerr even suggested that it may have a hybrid origin between *Acaena* and *Cliffortia*.)

Molecular phylogeny of *Cliffortia*

The phylogeny of *Cliffortia* has been examined by sequencing a number of gene regions (Whitehouse 2003 and unpublished data). The study used markers in both the nuclear and chloroplast genomes, sampling over 100 species for both. It was evident from the resulting phylogenetic trees that the three chloroplast markers (*trnL*, *trnK-matK* and *psbA-trnH*) were highly congruent with each other. All the markers could therefore be combined into a single analysis and support for the resultant tree was greatly increased. The trees of the two nuclear markers (ITS and 5S) showed discrepancies with each other, but as the ITS tree was only weakly supported, the differences were not significant enough to justify keeping the datasets separate. Support for branches generally increased when the two nuclear datasets were combined. On the other hand, there was great incongruence in the results in the trees between the nuclear and chloroplast markers. It was important therefore to not combine the two genomes but to analyse the two resultant trees separately to look for patterns in common when interpreting the phylogeny of the genus. It was concluded that although some of the conflict between the two genome trees could be attributed to factors such as lineage sorting, long-branch attraction, paralogy, lack of data, etc., historic and current hybridisation had played a major part in the evolution of the genus. Although unusual for Cape genera, this conclusion is not unusual for genera in the Rosaceae, where hybridisation can often easily occur between species and even genera (Campbell et al. 1997; Alice et al. 2001; Smedmark & Eriksson 2002).

Analyses were carried out using both maximum parsimony and Bayesian analysis. The two methods produced slightly different trees and levels of support, but the general comments below are applicable to either analysis. Only the Bayesian analysis is shown here, see Whitehouse (2003) for results of the maximum parsimony analysis.

Nuclear genome

The results from the analysis of the nuclear genome are shown in Figure 1. Monophyly of *Cliffortia* is strongly supported (100%). At the base of the tree, the three subgenera *Gramineae*, *Arboreae* and *Eriocephalinae*, as well as *C. curvifolia*, form a grade to the rest of *Cliffortia*. All these and the outgroup are missing a medium-sized insertion (47bp long) in the 5S region. This insertion is a synapomorphy for all the other species of *Cliffortia* (subgenus *Cliffortia*). The placement of *C. curvifolia* here is odd. Morphologically it has little in common with either subgenus *Arboreae* or *Eriocephalinae*. Its position on the chloroplast tree backs up the suggestion that this may be an anomaly of the 5S region for this particular species. Another apparent anomaly are the two species of the *C. subsetacea* series. They are placed as sister to subgenus *Eriocephalinae*, but visual inspection of their sequences shows them to be very different. They also have the 47bp insertion that is synapomorphic for subgenus *Cliffortia* and so their placement on the nuclear tree is suspected to be a case of long-branch attraction.

Subgenus *Cliffortia*, excluding the three anomalous species highlighted above, is strongly supported (99%). At its base is a clade composed of the majority of species in section *Petiolatae*, containing species which have a small petiole, and section *Complanatae*, containing species that share four sepals and often exhibit more than one style. This clade is sister to a strongly supported (100%) clade containing the remaining *Cliffortia* species. That clade is itself divided up into 12 smaller clades on an unresolved polytomy.

Chloroplast genome

Although better resolved and more strongly supported across the tree than the nuclear genome, the chloroplast genome (Figure 2) has some very anomalous results. The monophyly of *Cliffortia* is well supported (77.2%) but *C. crassinervis* is retrieved as basal to the rest of *Cliffortia*. The sequence of *C. crassinervis* shared some characters with outgroup species in the more variable parts of the genome. If *C. crassinervis* is removed from the analysis then support for the genus becomes much stronger. The main subgenera then resolve next, although *C. graminea* is oddly placed with subgenera *Eriocephalinae* and *Arboreae* (albeit with weak support). At this level in the tree is also found sect. *Nematobus* (excluding *C. triloba*). This section comprises a collection of rather unusual species that often share characteristics with one or two other species in the section, but there is nothing that binds the section as a whole together.

Deeper into the tree, the two species of sect. *Costatae* are sister to *C. cruciata*. The placement of *C. cruciata* and *C. crassinervis* conflicts with their close morphological relationship to *C. subsetacea* and *C. setifolia* respectively. These relationships are also reflected in the nuclear genome and it seems likely that both find their position on the chloroplast tree as a consequence of introgression with another species, probably *C. tuberculata* or an ancestral species close to it.

Although the tree is well resolved below this node, support is often weak until near the branch tips. Here lack of congruence with the nuclear genome tree is most evident. Species pairs and groups that are

morphologically similar and supported by the nuclear genome tree are often found in different places on the chloroplast genome tree. Two such examples have already been mentioned but other notable ones include *C. ferricola*, *C. integerrima*, *C. intermedia*, *C. recurvata*, *C. reniformis*, *C. schlechteri*, *C. sparsa*, *C. triloba*, *C. varians* and *C. viridis*. *Cliffortia integerrima*, *C. intermedia* and *C. varians* are now considered to be hybrids rather than species as their distribution is very limited, but the others have relatively wide distributions and should continue to be regarded as species, possibly with ancient hybrid origins. Other collections that were considered as possible new species because of their anomalous morphology have also been confirmed as potential hybrids: *C. × dissita*, *C. × homunculi*, *C. × ilicioides* and *C. × maclearica*.

Taxa above species level and their support for monophyletic clades on the respective genome tree are summarised in Table 2.

Support for hybrid origins from multiple copies

It is also worth considering just the ITS-based tree (Figure 3). Although this region is less informative, some samples from the Cape Peninsula were cloned to check for multiple copies. The few sequence changes here resulted in this being the only analysis in which *Cliffortia* did not resolve as monophyletic in regard of the outgroups. More outgroups were available to include in the analysis for this region and three *Sanguisorba* species shared the polytomy at the base of *Cliffortia*. However, this is considered to be a result of the lack of resolution and has only weak support (70.3%). Of more interest is the position of some of the clones. For three species the clones occur together on the same branch of the tree: *C. dentata*, *C. odorata* and *C. theodori-friesii*. *Cliffortia ruscifolia* is split across two clades, but the support for their separation is very weak. The hybrid *C. × maclearica* shows clearly its origins, having two clones as sister to *C. theodori-friesii* and two others as sister to *C. odorata*. *Cliffortia × intermedia*, the putative hybrid of *C. ruscifolia* as confirmed by the chloroplast genome, groups with several species of sect. *Multinerviae* as would be expected, but not with *C. ilicifolia*, one of the proposed parents. However, analysing the 5S region on its own does put *C. × intermedia* as sister to *C. ilicifolia* series. Even more surprising is the *C. ruscifolia* hybrid *C. × integerrima*. This does not group with a member of sect. *Multinerviae* but as a sister to *C. odorata*. It is possible that *C. × maclearica* was part of its ancestry, or it has independently introgressed with *C. odorata*. The Devil's Peak Saddle form of *C. × integerrima* (Whitehouse 70) shows no such affiliation to *C. odorata*, emphasising that it should not be given the same name but consequently it is nameless unless regarded as a broad-leaved *C. theodori-friesii*.

Table 2. Taxa above species level and their support for monophyletic clades on the respective genome tree. Figures in brackets show support for when the clade comprises the majority, but not all, the taxa in the section or the clade is para-phyletic but over 50% of the taxa belong to that section

Higher taxon	Species	Nuclear support	Chloroplast support
Subg. <i>Arboreae</i>	1–3	100%	98.10%
Subg. <i>Eriocephalinae</i>	4–8	100%	100%
Subg. <i>Gramineae</i>	9–13	100%	(100%)
Subg. <i>Cliffortia</i>	14–124	(99.90%)	(78.60%)
Sect. <i>Complanatae</i>	14–22		
<i>C. complanata</i> series	14–15		100%
<i>C. ericifolia</i> series	16–17	100%	100%
<i>C. dentata</i> series	18–19	100%	100%
<i>C. subsetacea</i> series	21–22	100%	
Sect. <i>Alatae</i>	23–24	100%	100%
Sect. <i>Stipulatae</i>	25–28	96.70%	(100%)
Sect. <i>Paucistamineae</i>	29–32	99.50%	
Sect. <i>Dracomontanae</i>	33–38	(87.60%)	(100%)
Sect. <i>Nematobus</i>	39–48		(100%)
<i>C. pedunculata</i> series	39–41	100%	(100%)
<i>C. hirta</i> series	42–44	100%	100%
<i>C. curvifolia</i> series	45–46		
Sect. <i>Petiolatae</i>	49–53	(100%)	(75.50%)
Sect. <i>Cliffortia</i>	54–58	(99.90%)	(100%)
Sect. <i>Filifoliae</i>	59–63	100%	(100%)
Sect. <i>Costatae</i>	64–65		100%
Sect. <i>Acerosae</i>	66–68		100%
Sect. <i>Tenuifoliae</i>	69–70	100%	100%
Sect. <i>Multifidae</i>	71–78		
<i>C. multiformis</i> series	71–73	(88.90%)	(100%)
<i>C. ruscifolia</i> series	74–78	(94.80%)	(100%)
Sect. <i>Ruboides</i>	79–89	(76%)	
<i>C. odorata</i> series	79–84	100%	
<i>C. ferruginea</i> series	85–88	50%	
Sect. <i>Bifoliolae</i>	90–101		
<i>C. glauca</i> series	94–100		
Sect. <i>Multinerviae</i>	102–120	(100%)	
<i>C. ilicifolia</i> series	102–104	100%	(100%)
<i>C. dregeana</i> series	105–107	(99%)	(100%)

Section *Dichopterae* and sect. *Bacciformes* are monotypic and therefore not considered in this analysis of higher taxa.

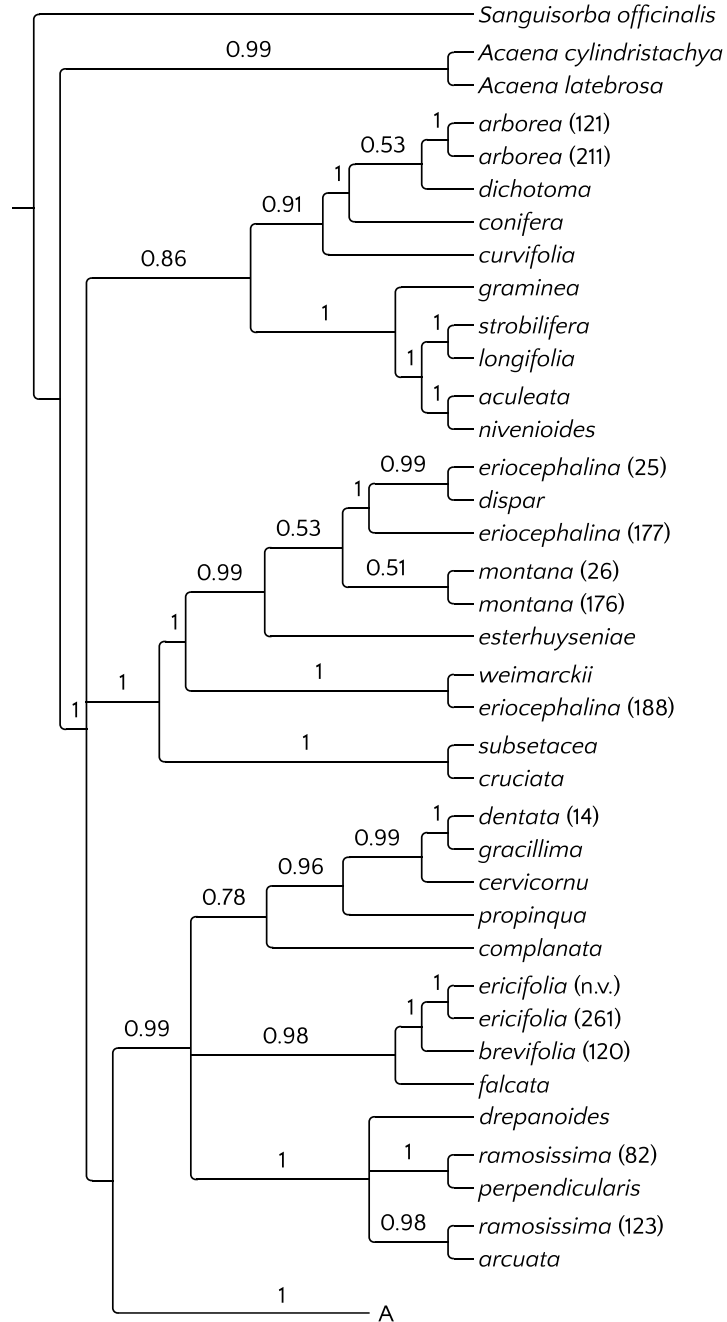


Figure 1. Results from the nuclear genome analysis, which illustrates the strongly supported monophyly of *Cliffortia*.

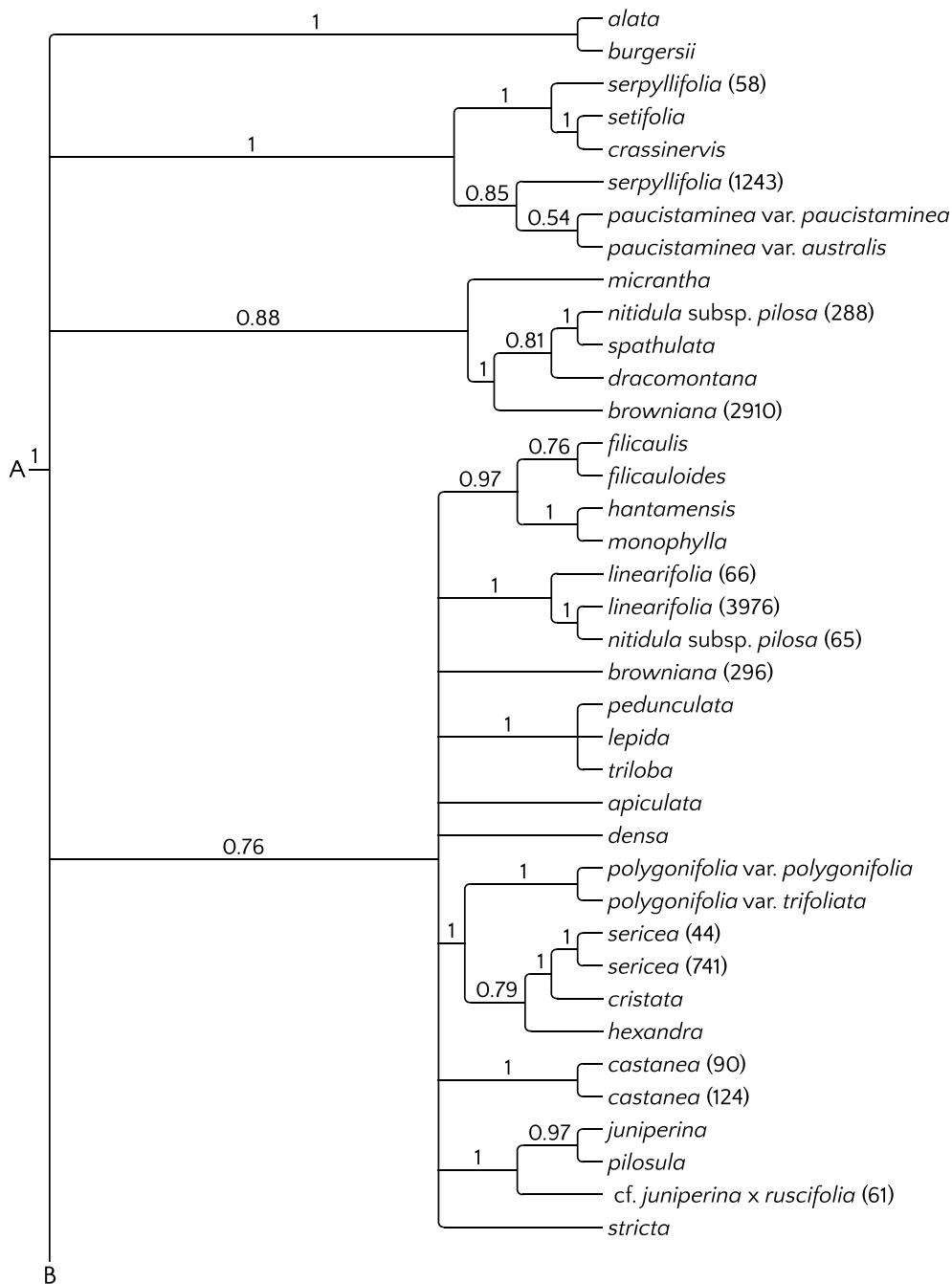


Figure 1. Results from the nuclear genome analysis, which illustrates the strongly supported monophyly of *Cliffortia* (continued).

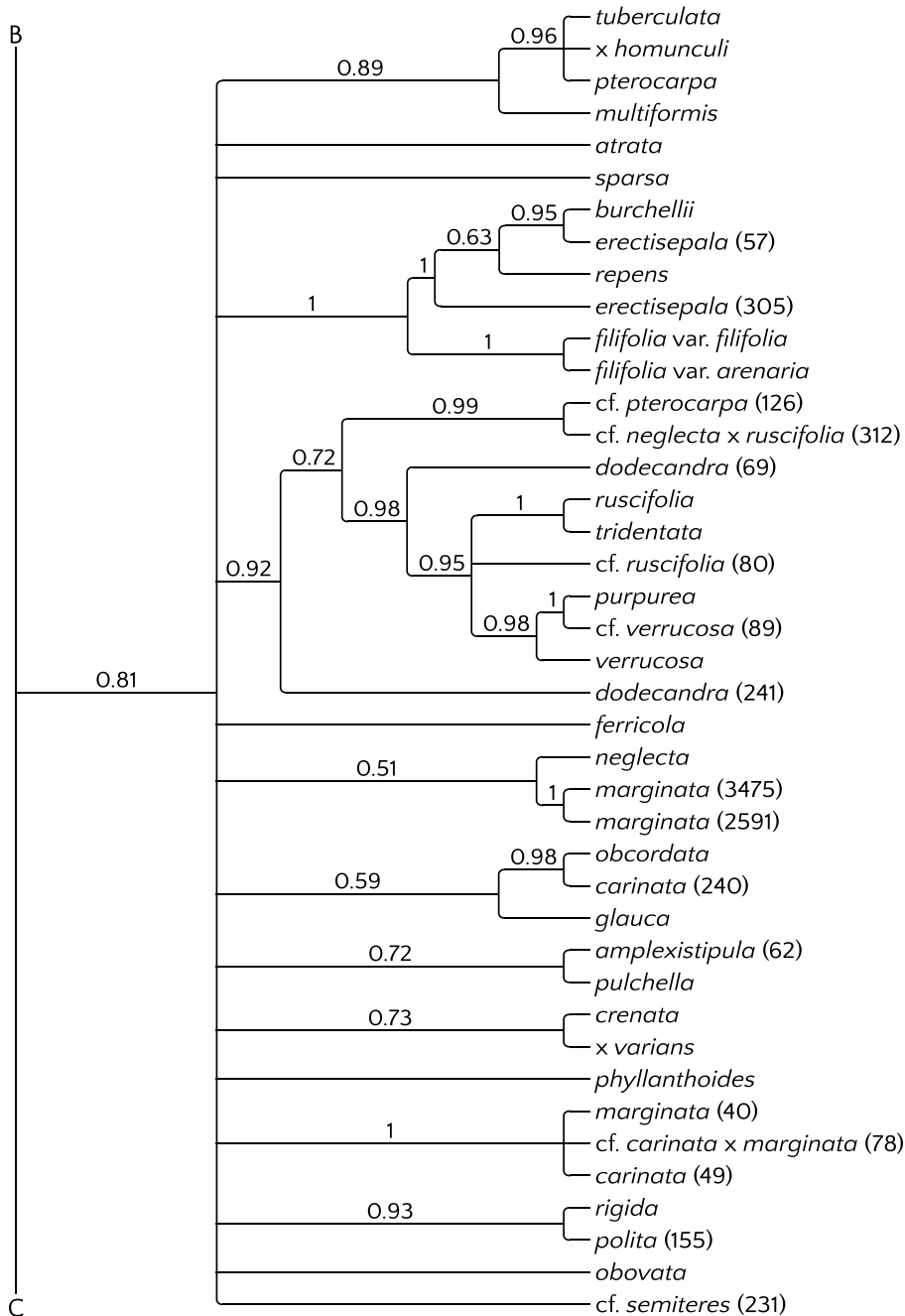


Figure 1. Results from the nuclear genome analysis, which illustrates the strongly supported monophyly of *Cliffortia* (continued).

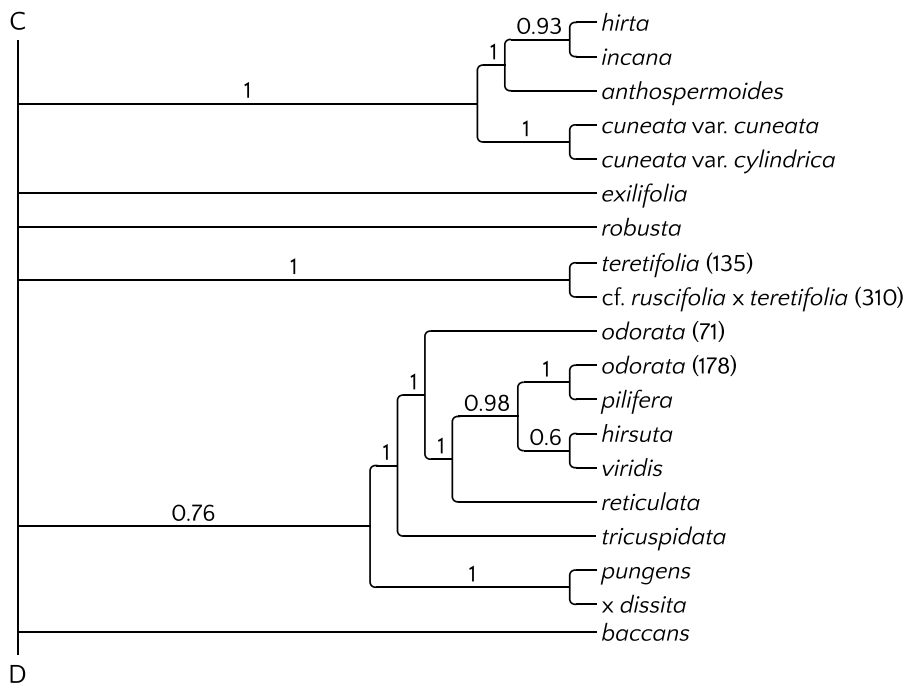


Figure 1. Results from the nuclear genome analysis, which illustrates the strongly supported monophyly of *Cliffortia* (continued).

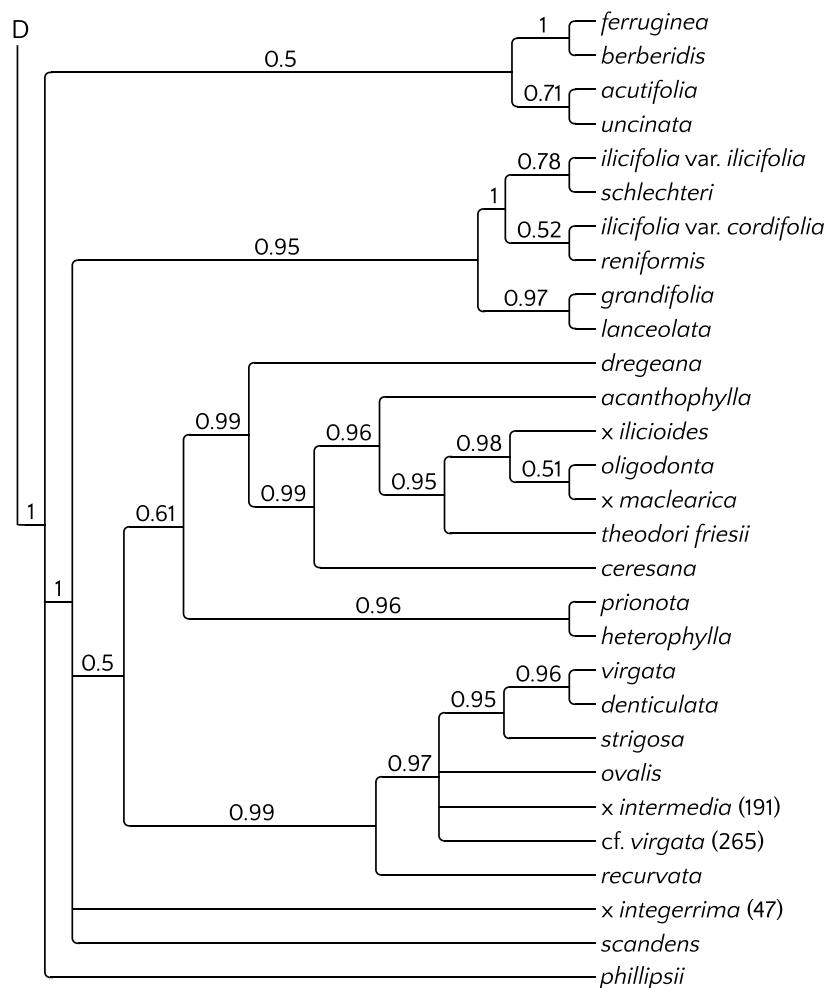


Figure 1. Results from the nuclear genome analysis, which illustrates the strongly supported monophyly of *Clifortia* (continued).



Figure 2. Results from the chloroplast genome analysis of *Cliffortia*.

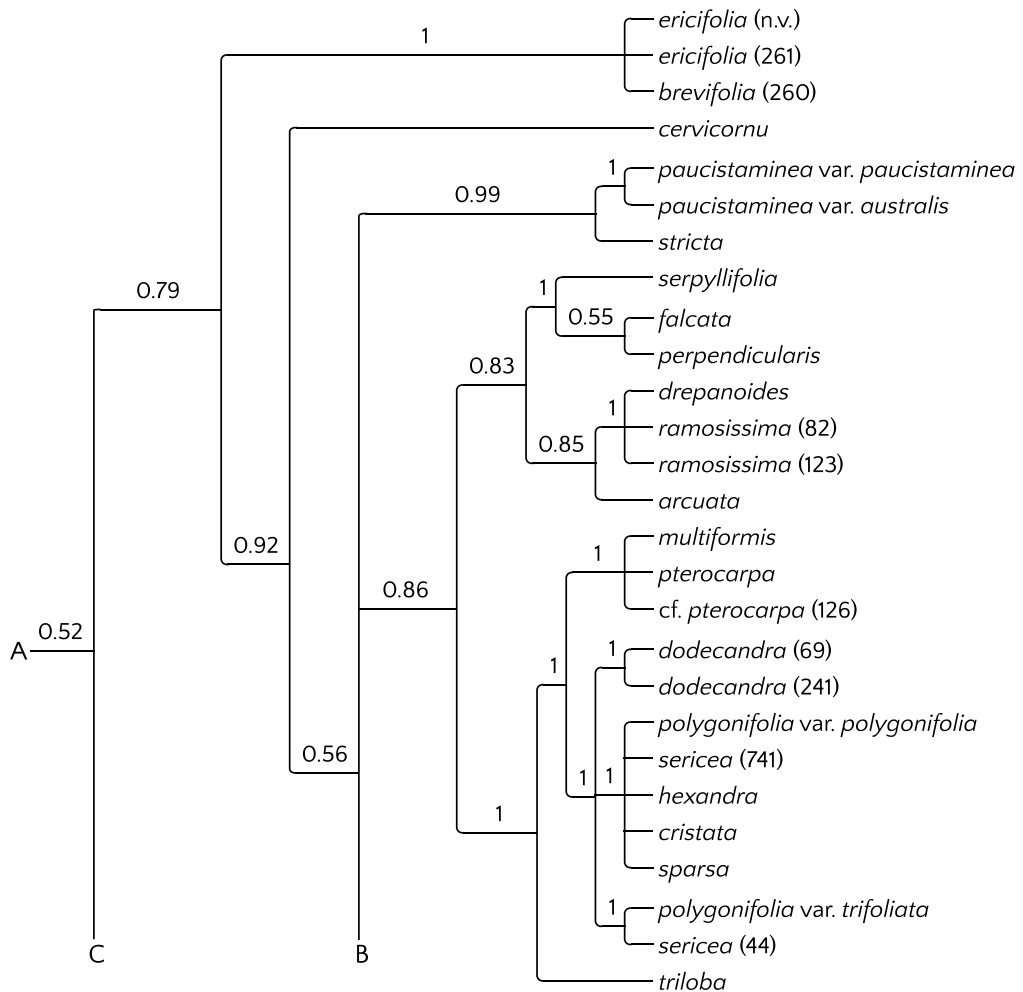


Figure 2. Results from the chloroplast genome analysis of *Cliffortia* (continued).

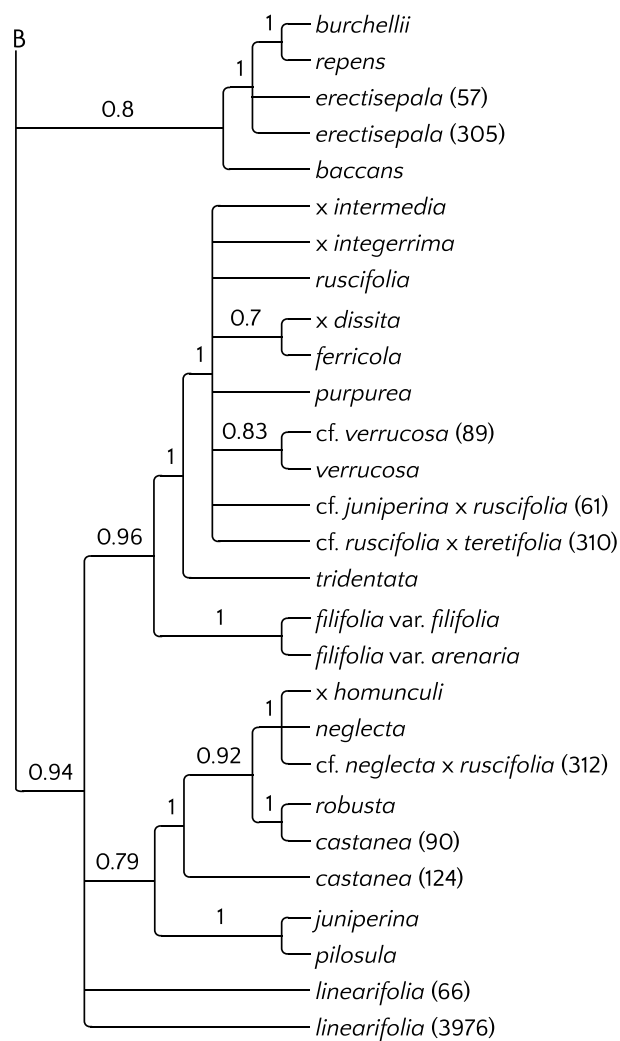


Figure 2. Results from the chloroplast genome analysis of *Cliffortia* (continued).

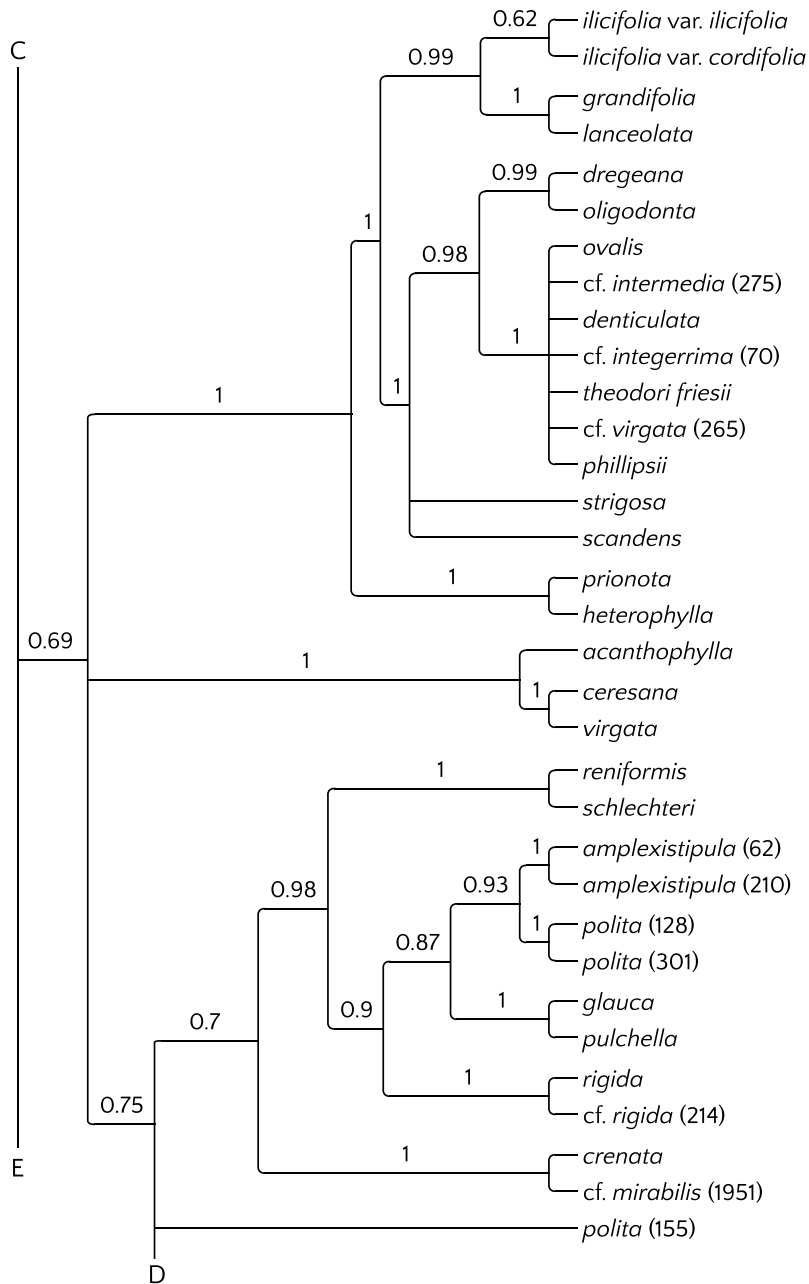


Figure 2. Results from the chloroplast genome analysis of *Cliffortia* (continued).

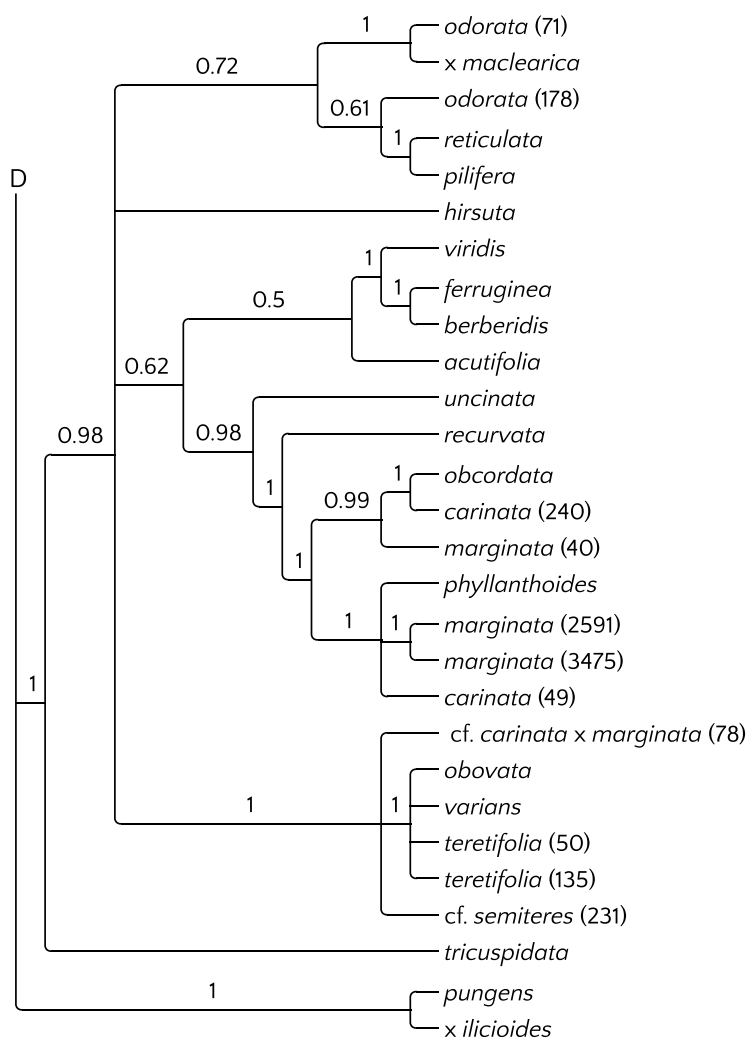
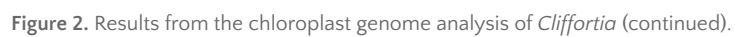


Figure 2. Results from the chloroplast genome analysis of *Cliffortia* (continued).



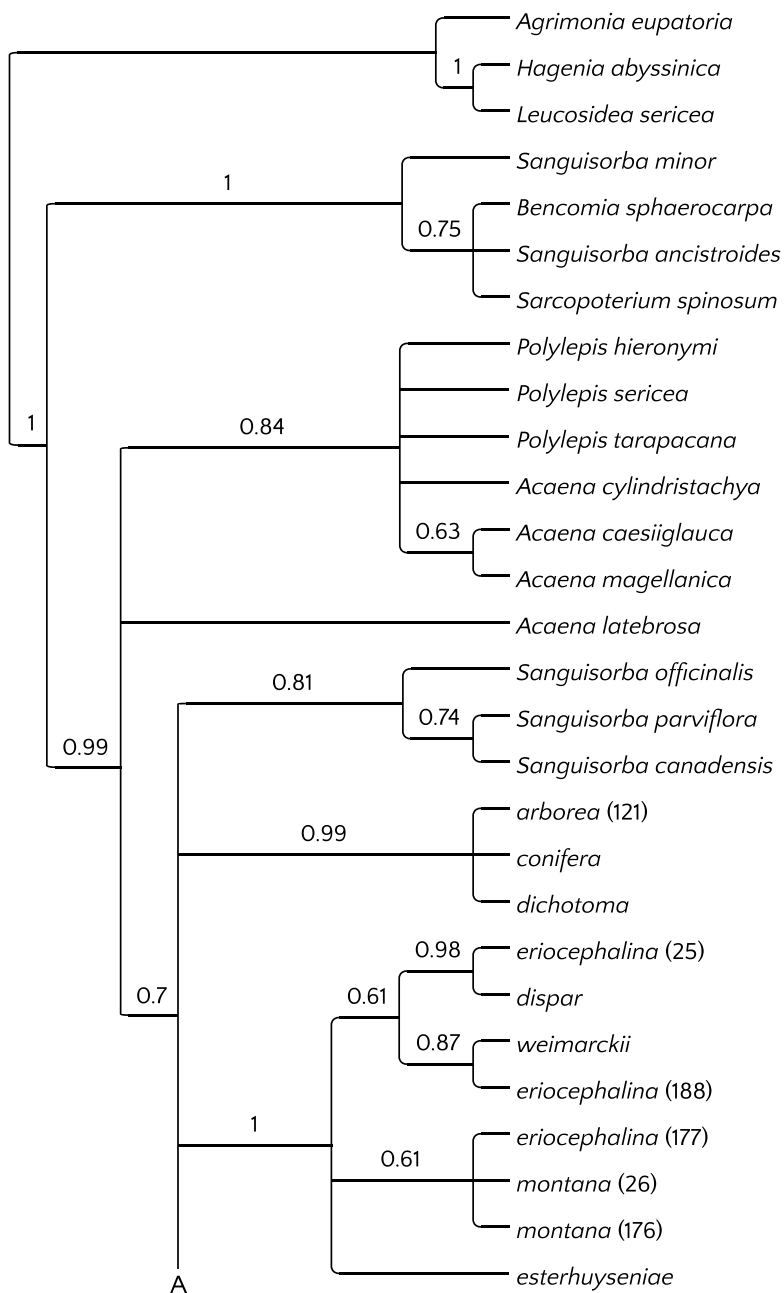


Figure 3. Results from the ITS-based analysis of *Clifortia*.

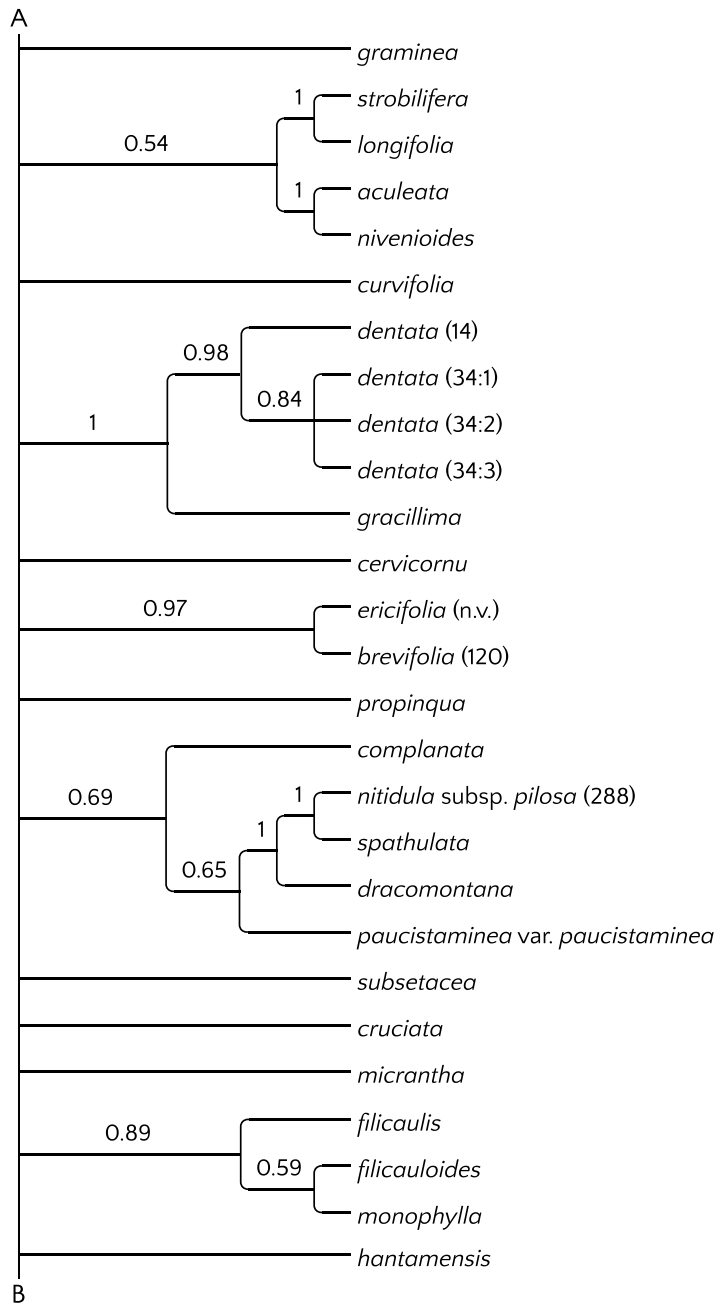


Figure 3. Results from the ITS-based analysis of *Cliffortia* (continued).

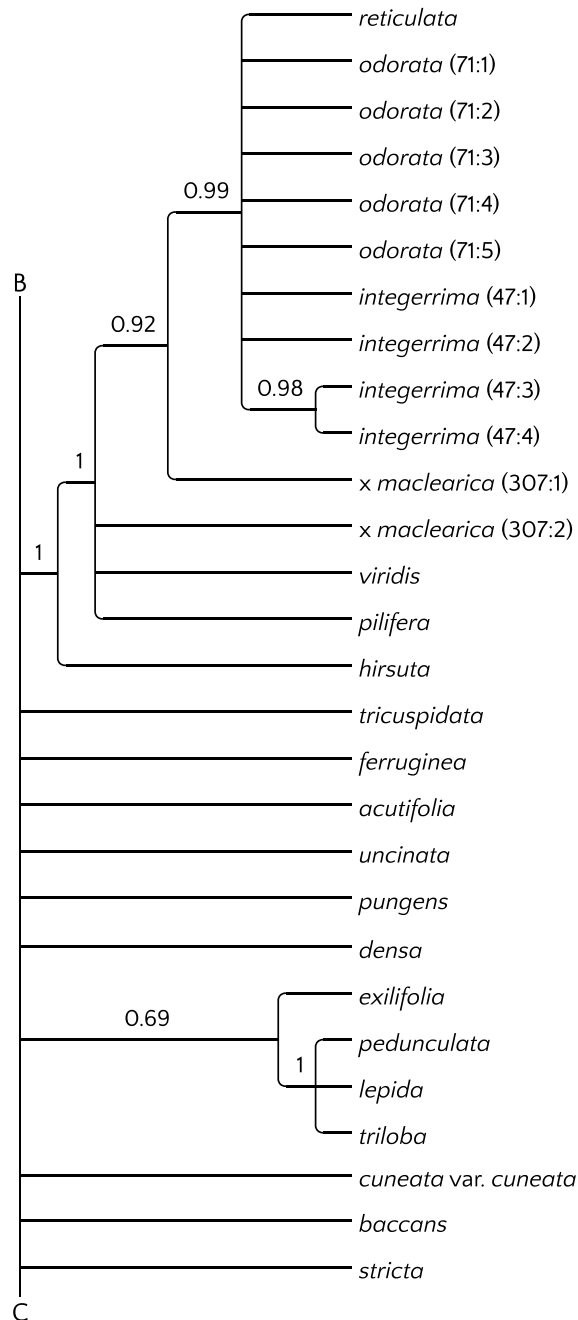


Figure 3. Results from the ITS-based analysis of *Cliffortia* (continued).

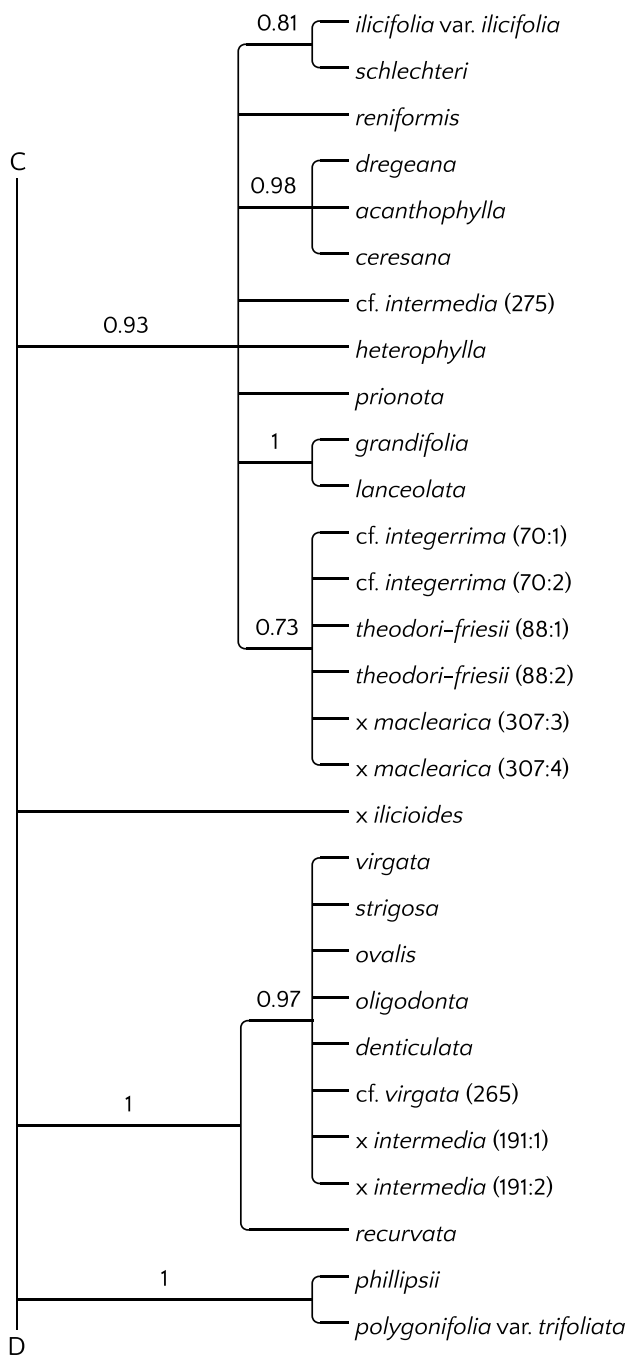
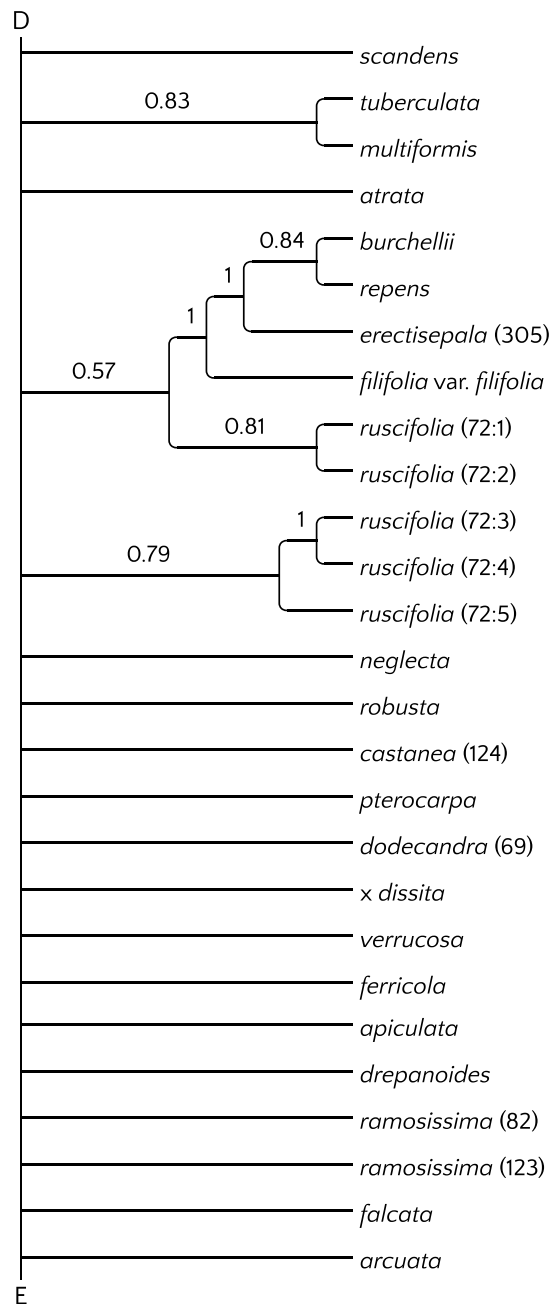


Figure 3. Results from the ITS-based analysis of *Cliffortia* (continued).

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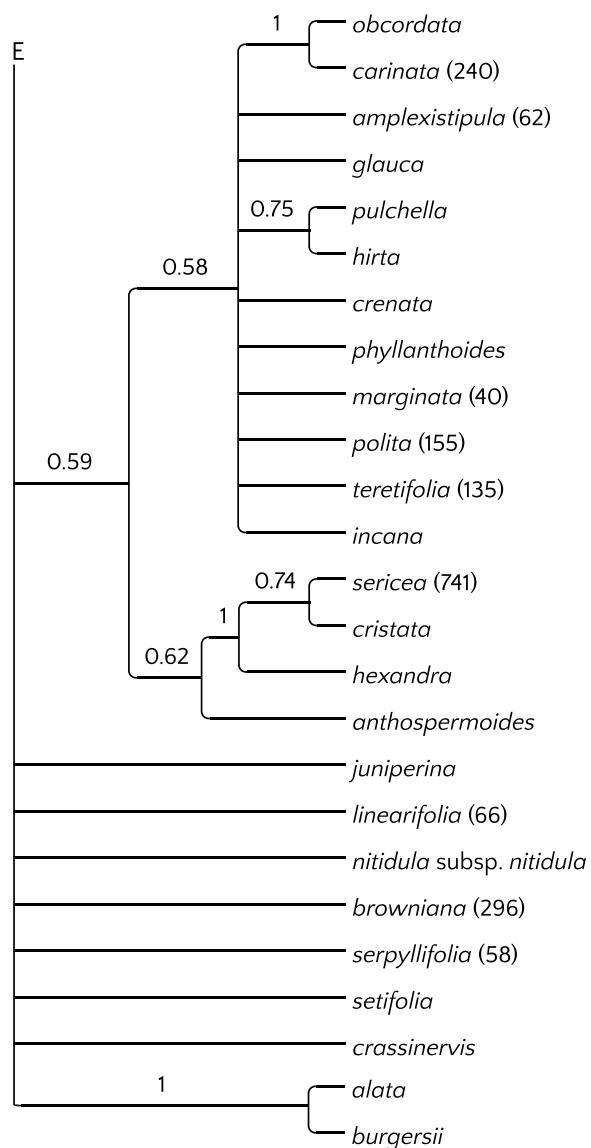


Figure 3. Results from the ITS-based analysis of *Cliffortia* (continued).

4

Biogeography

Weimarck was one of the major proponents of the biogeography of the Cape flora. His seminal work on the subject (Weimarck 1941) was based upon his earlier comprehensive study of *Cliffortia*, as well as other Cape taxa. More recent work on Cape biogeography (Oliver et al. 1983; Linder 2001; Goldblatt & Manning 2002) has supported many of Weimarck's findings, although it has also highlighted some differences (e.g. Langeberg and southeastern centres, Oliver et al. 1983). In addition, the use of more refined techniques has provided empirical support for what had previously been intuitive interpretation to identify the observed patterns (Oliver et al. 1983) and to suggest explanations (Linder & Mann 1998).

Phytochoria

Whitehouse (2003) recognised five phytochoria (areas that have similar species composition) in *Cliffortia*: the northwestern mountains between the Robertson Langeberg and Nieuwoudtville, the southwestern mountains including the Cape Flats and Overberg, the Agulhas coast between Gansbaai and Wilderness, the southern Langeberg between Swellendam and Riversdale, and the southeastern mountains between George and Gqeberha [Port Elizabeth]. In addition, some small clusters were present outside of the major phytochoria, i.e. the Klein and Groot Swartberg, Hantam and Roggeveld mountains and the western Little Karoo mountains.

Centres of diversity

By evaluating the number of species in each quarter-degree grid square, the southwestern mountains clearly show the greatest diversity with a gradual decline to both the north and east. Other centres of diversity for *Cliffortia* include: Cape Peninsula, Agulhas Plain, Cederberg, Witteberg and Anysberg, Langeberg at Swellendam and Riversdale, and the Klein and Groot Swartberg. There are some odd gaps in these centres, such as the Groot Swartberg west of Meiringspoort (3322AD) and the Langeberg between Swellendam and Garcia's Pass (3320DC, 3320DD). These grid squares show considerably fewer species than the grid squares on either side of them, yet they contain very similar ranges of habitat diversity. Gaps such as these could be due to lack of collecting in those areas, especially in the Swartberg, but it would be surprising if a species as prominent as *C. grandifolia* should have been missed on places such as the Tradouw Pass and Grootvadersbos and some of these gaps are probably genuine.

If the scale is further refined, then the mountain ranges quickly emerge as having the highest diversity. *Cliffortia* is generally absent from low-lying areas except for the Cape Flats, Agulhas Plain

and the Knysna coastal strip. The area with the highest diversity of species is in the mountains between Sir Lowry's Pass, Stellenbosch and Franschhoek. Second to this are four localities of comparable diversity: the Cape Peninsula, the mountains around Du Toitskloof and Bain's Kloof, the Winterhoek Mountains near Tulbagh and the western end of the Riviersonderend Mountains. Outside of the Cape Floristic Region (CFR) only the northeastern Drakensberg and possibly the Mpumalanga Highlands can be identified as centres of diversity.

Areas of endemism

Nine areas of endemism can be recognised in *Cliffortia*: Northwestern mountains, Southwestern mountains, Southeastern mountains, Cape Peninsula and Cape Flats, Agulhas Plain, Southern Langeberg, Swartberg and Little Karoo mountains, Bokkeveld Escarpment, and Drakensberg. Table 3 lists endemic species for each of these regions. It would also be possible to subdivide the southwestern mountains area into the Kogelberg, Riviersonderend Mountains and southwestern mountains (from Hottentots Holland to Bain's Kloof).

Table 3. Areas with more than two endemic species. Near-endemics, with only one or two localities that occur outside of the designated area, are given in brackets

Area of endemism	Endemic <i>Cliffortia</i> species
Drakensberg	(<i>C. browniana</i>), <i>C. dracomontana</i> , <i>C. filicauloides</i> , <i>C. spathulata</i>
Southeastern mountains	<i>C. dispar</i> , <i>C. drepanoides</i> , (<i>C. polita</i>)
Swartberg and Little Karoo mountains	<i>C. aculeata</i> , (<i>C. cervicornu</i>), <i>C. conifera</i> , <i>C. crassinervis</i> , <i>C. micrantha</i> , (<i>C. montana</i>), <i>C. nivenioides</i> , (<i>C. robusta</i>), (<i>C. setifolia</i>), <i>C. verrucosa</i>
Southern Langeberg	<i>C. alata</i> , <i>C. densa</i> , (<i>C. glauca</i>), (<i>C. gracillima</i>), <i>C. grandifolia</i> , <i>C. lanceolata</i> , <i>C. reniformis</i>
Agulhas Plain	<i>C. anthospermoides</i> , <i>C. berberidis</i> , <i>C. burgersii</i> , <i>C. curvifolia</i> , <i>C. incana</i> , <i>C. multiformis</i> , <i>C. phyllanthoides</i> , <i>C. schlechteri</i> , <i>C. perpendicularis</i>
Southwestern mountains Kogelberg	<i>C. apiculata</i> , <i>C. ferricola</i> , <i>C. heterophylla</i> , <i>C. prionota</i> , <i>C. recurvata</i> , <i>C. viridis</i>
Riviersonderend Mountains	<i>C. cruciata</i> , <i>C. scandens</i>
Southwestern mountains	(<i>C. dentata</i>), <i>C. denticulata</i> , <i>C. oligodonta</i> , <i>C. ovalis</i> , <i>C. phillipsii</i> , <i>C. pilifera</i> , <i>C. rigida</i> , <i>C. sparsa</i> , <i>C. strigosa</i> , <i>C. cuneata</i> , <i>C. hirsuta</i> , <i>C. obovata</i> , (<i>C. pedunculata</i>)
Cape Peninsula and Cape Flats	(<i>C. acockii</i>), (<i>C. dodecandra</i>), <i>C. hirta</i> , <i>C. theodori-friesii</i> , <i>C. tridentata</i>
Northwestern mountains	<i>C. acanthophylla</i> , <i>C. ceresana</i> , <i>C. esterhuyseniae</i> , <i>C. hexandra</i> , <i>C. pilosula</i> , <i>C. reticulata</i> , <i>C. triloba</i> , <i>C. uncinata</i> , (<i>C. virgata</i>), <i>C. weimarckii</i>
Bokkeveld Escarpment	<i>C. acutifolia</i> , <i>C. dichotoma</i> , <i>C. purpurea</i>

Phytogeographical species groups

Species that share similar distribution patterns can be identified using clustering methods into phytogeographical groups. Thirteen distinct phytogeographical groups of species have been identified (Table 4). Many of these groupings correspond to the phytochoria and centres of endemism, but it also picks out species groups with broader ranges that overlap other groups.

The Northwestern mountains group form a large group of species that can be subdivided into two subgroups that correspond to a northerly (Cederberg) and southerly (Hex River Mountains) divide. The Koue Bokkeveld and Groot Winterhoek mountains share species with both groups. The Southwestern mountains group somewhat surprisingly includes *C. marginata*, but this is presumably an artefact of the resolution, the species truly being found on the low clayish soils of the Cape Flats between Somerset West and Stellenbosch. The subgroup for the Kogelberg is almost entirely made up of endemic species to the area, with *C. pedunculata* the only exception. The Cape ubiquitous and the Southern group both comprise widespread species. The former have a slightly more westerly distribution, while the latter are not found far from the southern coastal belt. *Cliffortia strobilifera* occurs here but is found all the way to the Soutpansberg in Limpopo Province and up the West Coast as far as the Kamiesberg. The only other two species in these groups that extend beyond the CFR are *C. eriocephalina* (mountains around Graaff-Reinet and Amatola Mountains) and *C. odorata* (Pondoland). Within the Cape ubiquitous, a subgroup can be recognised that contains *C. eriocephalina*, *C. neglecta* and *C. tuberculata*, which are all widespread species but are more-or-less restricted to high mountain peaks. There are also subgroups of western mountain species and lowland species.

The Cape Peninsula and Cape Flats species group together even though they have quite different requirements. As with *C. marginata*, this is probably related to the resolution of the analysis. The Agulhas Plain group includes a calcicole subgroup that can tolerate more alkaline conditions.

The Langeberg group is a strongly defined group with many endemic or near-endemic species to the area. On the other hand, the Swartberg Mountains and Graaff-Reinet, Southeastern mountains and Karoo mountains groups are less well-defined, with several species that might appear interchangeable between the groups. In particular, the northern edge Karoo mountains subgroup are found along the lower slopes of the Swartberg. It is in the Karoo mountains group that *C. ramosissima* is placed. It has a very unusual distribution, from the low clay hills around Elim to Blouberg in the Soutpansberg, but is particularly common in the Karoo mountains, which may explain its association here.

The Bokkeveld Escarpment at Nieuwoudtville forms a small isolated group. Lastly, the Extra-Cape and Hantam and Roggeveld mountains groups contain species that have all or the greater part of their distribution outside the CFR. *Cliffortia linearifolia*, *C. paucistaminea* and *C. serpyllifolia* of the Extra-Cape group and *C. hantamensis* of the Hantam and Roggeveld mountains group all extend their range within the CFR for some distance. On the other hand the Drakensberg endemic subgroup are all endemic to that particular area.

All these methods reveal biogeographic areas that are well-known from analyses of other fynbos genera, especially those more frequently associated with mountain fynbos. The role of hybridisation in *Cliffortia* may well have hampered our ability to disentangle the phylogeny, but the biogeography of the genus suggests that it has been subject to many of the same selection pressures that have influenced the evolution of other genera in the fynbos.

Table 4. Phytogeographical species groups

Group	Subgroup	Species group
Agulhas Plain		<i>C. berberidis</i> , <i>C. brevifolia</i> , <i>C. curvifolia</i> , <i>C. multiformis</i> , <i>C. perpendicularis</i> , <i>C. phyllanthoides</i>
	calcicole	<i>C. anthospermoides</i> , <i>C. burgersii</i> , <i>C. incana</i> , <i>C. longifolia</i> , <i>C. schlechteri</i>
Bokkeveld Escarpment		<i>C. acutifolia</i> , <i>C. dichotoma</i> , <i>C. purpurea</i>
Cape Peninsula and Cape Flats		<i>C. carinata</i> , <i>C. dodecandra</i> , <i>C. ericifolia</i> , <i>C. hirta</i> , <i>C. obcordata</i> , <i>C. subsetacea</i> , <i>C. theodori-friesii</i> , <i>C. tridentata</i>
Cape ubiquitous		<i>C. atrata</i> , <i>C. erectisepala</i> , <i>C. polygonifolia</i> , <i>C. ruscifolia</i>
	alpine	<i>C. eriocephalina</i> , <i>C. neglecta</i> , <i>C. tuberculata</i>
	lowland	<i>C. falcata</i> , <i>C. filifolia</i> , <i>C. juniperina</i>
	western	<i>C. complanata</i> , <i>C. dregeana</i> , <i>C. sericea</i> , <i>C. tricuspidata</i>
Extra-Cape		<i>C. browniana</i> , <i>C. linearifolia</i> , <i>C. nitidula</i> , <i>C. paucistaminea</i> , <i>C. repens</i>
	Drakensberg endemic	<i>C. dracomontana</i> , <i>C. filicauloides</i> , <i>C. spatulata</i>
Hantam and Roggeveld mountains		<i>C. arborea</i> , <i>C. hantamensis</i>
Karoo mountains		<i>C. amplexistipula</i> , <i>C. baccans</i> , <i>C. conifera</i> , <i>C. crenata</i> , <i>C. micrantha</i> , <i>C. ramosissima</i> , <i>C. teretifolia</i>
	northern edge	<i>C. castanea</i> , <i>C. cervicornu</i> , <i>C. verrucosa</i>
Langeberg		<i>C. alata</i> , <i>C. densa</i> , <i>C. exilifolia</i> , <i>C. glauca</i> , <i>C. gracillima</i> , <i>C. grandifolia</i> , <i>C. lanceolata</i> , <i>C. pulchella</i> , <i>C. reniformis</i>
Northern mountains	northern	<i>C. acanthophylla</i> , <i>C. hexandra</i> , <i>C. pilosula</i> , <i>C. propinqua</i> , <i>C. triloba</i> , <i>C. uncinata</i>
	southern	<i>C. cerasana</i> , <i>C. cristata</i> , <i>C. esterhuyseniae</i> , <i>C. lepida</i> , <i>C. reticulata</i> , <i>C. virgata</i> , <i>C. weimarckii</i>
Southeastern mountains		<i>C. arcuata</i> , <i>C. dispar</i> , <i>C. drepanoides</i> , <i>C. polita</i>
Southern group		<i>C. burchellii</i> , <i>C. ferruginea</i> , <i>C. filicaulis</i> , <i>C. graminea</i> , <i>C. ilicifolia</i> , <i>C. odorata</i> , <i>C. serpyllifolia</i> , <i>C. stricta</i> , <i>C. strobilifera</i>
Southwestern mountains		<i>C. cuneata</i> , <i>C. dentata</i> , <i>C. denticulata</i> , <i>C. hirsuta</i> , <i>C. marginata</i> , <i>C. monophylla</i> , <i>C. obovata</i> , <i>C. ovalis</i> , <i>C. phillipsii</i> , <i>C. pterocarpa</i> , <i>C. rigida</i> , <i>C. scandens</i> , <i>C. sparsa</i>
	Kogelberg	<i>C. apiculata</i> , <i>C. heterophylla</i> , <i>C. pedunculata</i> , <i>C. prionota</i> , <i>C. recurvata</i> , <i>C. viridis</i>
Swartberg Mountains and Graaff-Reinet		<i>C. aculeata</i> , <i>C. bolusii</i> , <i>C. crassinervis</i> , <i>C. montana</i> , <i>C. nivenioides</i> , <i>C. robusta</i> , <i>C. setifolia</i>
unplaced		<i>C. acockii</i> , <i>C. cruciata</i> , <i>C. ferricola</i> , <i>C. oligodonta</i> , <i>C. pilifera</i> , <i>C. pungens</i> , <i>C. strigosa</i>

5

Keys to *Cliffortia*

Key to the sections (or series if the sections are difficult to define morphologically) of *Cliffortia*.

1. Female flowers clustered into a serotinous inflorescence subgen. **Arboreae**
Flowers solitary at the base of ordinary vegetative leaves, or rarely clustered into an inflorescence but then never serotinous. 2
2. Achene a berry sect. **Bacciformes**
Achene dry and hard 3
3. Stipules absent, leaves trifoliolate, hairy, margins flat (Graaff-Reinet mountains) . . . *C. bolusii*
Stipules present, or if absent then leaves unifoliolate or glabrous or with inrolled margins 4
4. Leaves wedge-shaped with a broad toothed apex sect. **Dichopterae**
Leaves various but never broadest at the very apex 5
5. Sepals 4 6
Sepals 3 17
6. Achenes clearly winged, very sparsely to densely hairy, often reddish 7
Achenes ribbed or smooth, glabrous, brown to whitish 8
7. Achenes small, < 2 mm wide, sparsely hairy *C. complanata* series
Achenes large, > 4 mm wide, densely hairy sect. **Alatae**
8. Leaves hairy above and beneath, leaflets broadly ovate, elliptic or obovate, stipules often similar texture to leaf; sepals often fused towards the base sect. **Stipulatae**
Leaves glabrous or rarely sparsely hairy, stipules membranous; sepals free 9
9. Leaves unifoliolate, needle-shaped, margins inrolled 10
Leaves trifoliolate, variously shaped, margins usually flat or rounded 11
10. Stems glabrous; leaves with a single pale stripe beneath *C. ericifolia* series
Stems densely hairy; leaves with two pale stripes either side of midrib beneath
. *C. linearifolia*
11. Leaves needle-shaped, deeply divided and feathery *C. cervicornu*
Leaves not as above 12
12. Sprawling, mat-forming, semi-herbaceous shrubs *C. dentata* series
Erect, densely branched shrubs 13
13. Leaves broadly obovate and toothed; carpels often 2 or more; achene swollen
. *C. micrantha*
Leaves various; carpels 1; achene ellipsoid 14
14. Leaves curved upwards and inwards; achene thickly 4- or 8-ribbed *C. subsetacea* series

- Leaves curved inwards or outwards; achene smooth or ribbed, but if ribs present then thin and many or indistinct 15
15. Leaves needle-shaped, or sometimes elliptic to obovate; receptacle clearly ribbed 16
Leaves broadly obovate to narrowly elliptic, sometimes with margins inrolled and then appearing needle-shaped; receptacle often indistinctly ribbed... sect. **Dracomontanae**
16. Leaves with flat margins sect. **Paucistamineae**
Leaves with inrolled margins to raised midrib and with two pale stripes either side
..... *C. linearifolia*
17. Flowers on a short to long peduncle. *C. pedunculata* series
Flowers sessile at base of leaves 18
18. Leaves petiolate, outer leaflets often sickle-shaped, stems with upwardly adpressed to spreading hairs; achene covered by membranous layer sect. **Petiolatae**
Leaves without a petiole, or if short petiole present then stems glabrous, outer leaflets straight; achene with or without membranous layer. 19
19. Leaves unifoliolate, very long, 20–70 mm, grass-like or needle-shaped; male sepals generally narrowly elliptic subgen. **Gramineae**
Leaves uni-, bi- or trifoliolate, much shorter, or if longer then broad and lanceolate; male sepals broadly ovate 20
20. Leaves bifoliolate, leaflets broadly obovate to subcircular sect. **Bifoliolae**
Leaves unifoliolate or trifoliolate 21
21. Leaves unifoliolate, although sometimes deeply toothed, multinerved at the base 22
At least some leaves trifoliolate, or if unifoliolate then with a single nerve to the base . . 23
22. Stems usually hairy, forming brachyblasts; leaves usually hairy, at least below; female sepals recurved. *C. ruscifolia* series
Stems and leaves usually glabrous and not forming brachyblasts; female sepals erect
..... sect. **Multinerviae**
23. Stems glabrous or almost so; leaflets glabrous, green, needle-shaped, margins not inrolled; bracteoles glabrous; receptacle smooth. 24
Stems hairy, if not hairy then leaflets either broader or glaucous, or receptacle clearly ribbed to winged; bracteoles hairy or not. 25
24. Leaves bent downwards and out, thick and apex sharply pointed *C. pungens*
Leaves bent upwards and in, often fine sect. **Filifoliae**
25. Decumbent to scrambling shrubs using surrounding vegetation for support; sheath glabrous inside; leaves unifoliolate, bent downwards and out, usually broad and toothed, rarely needle-shaped and then with a hooked tip sect. **Ruboides**
Erect densely branched shrubs; sheath hairy or not; leaves trifoliolate or occasionally unifoliolate, but then greyish hairy with sheath markedly hairy inside or bent upwards and in 26
26. Leaves needle-shaped, curved markedly upwards and in; achene long cylindrical, elongating as it matures *C. curvifolia* series
Leaves various; achene ellipsoid or winged 27
27. Stems with spreading to curly hairs; sheath hairy on the outside; leaves variously hairy, often dense and greyish. 28
Stems glabrous or with short adpressed or rarely spreading hairs; sheath glabrous outside; leaves usually glabrous or with a few scattered hairs. 31
28. Leaflet margins flat; achene large, 3–5 mm long, prominently ribbed or winged, wings if present incurved, often reddish. sect. **Cliffortia**

- Leaflet margins usually inrolled beneath; achene smaller, 2–4 mm long, thinly to indistinctly ribbed, pale to mid-brown 29
29. Stipules scarious and brown *C. stricta*
Stipules membranous 30
30. Sheath markedly hairy inside; female sepals usually narrowly linear
subgen. **Eriocephalinae**
Sheath glabrous or with scattered adpressed hairs inside; female sepals usually ovate . . .
. *C. hirta* series
31. Young stems glabrous, smooth sect. **Bifoliolae**
Young stems hairy or minutely tuberculate 32
32. Leaves oblong to broadly elliptic, sometimes slightly sickle-shaped; filaments red and anthers yellow; achene covered by membranous layer *C. apiculata*
Leaves needle-shaped, or if broader then other characters not as above 33
33. Leaves glabrous, usually glaucous, rarely green, elliptic to obovate or subcircular, if needle-shaped then margins inrolled beneath sect. **Bifoliolae**
Leaves green, needle-shaped 34
34. Stems minutely tuberculate; underside of leaves minutely tuberculate and margins minutely serrate; stamens many, 20–25; female sepals erect; stigma red sect. **Tenuifoliae**
Stems smooth; underside of leaves various; stamens fewer, 6–18; female sepals recurved; stigma white or red 35
35. Leaves curved downwards and out *C. multiformis* series*
Leaves curved upwards and in 36
36. Leaves very fine, closely overlapping giving the branchlet a feathery appearance, stamens ± 6, filaments white, anthers yellow, stigma greenish white to pinkish, achene not tuberculate *C. exilifolia*
Characters not as above 37
37. Leaves broad, 0.5–1.5 mm wide, thick, hard and rigid, margins rounded; bracteole hairy or not on keel sect. **Acerosae**
Leaves finer, <1 mm wide, flexible, margins flat; bracteole hairy on keel sect. **Costatae**

* also keying out here will be certain forms of *C. atrata*.

Key to the species of *Cliffortia*, based on vegetative characters
wherever possible, followed by achenes, female flowers, male
flowers and then growth form and distribution.

1. Leaves all unifoliate, may be deeply divided 2
At least some leaves trifoliate or bifoliate 5
2. Leaves wedge-shaped, broadest at the apex and toothed *C. cuneata*
Leaves various but not broadest at the apex 3
3. Leaves single-nerved to base Key C
Leaves multinerved to base 4
4. Leaves forming brachyblasts Key A
Leaves not forming brachyblasts Key B
5. Leaves bifoliate, or trifoliate and outer leaflets markedly larger than middle leaflet . . .
. Key D

- Leaves trifoliate, leaflets similar in size or middle larger than outer 6
6. Petiole present Key E
 Petiole absent 7
7. Leaves hairy, at least beneath, sometimes glabrescent especially above Key F
 Leaves glabrous above and beneath, even in young leaves 8
8. Middle leaflet margin markedly toothed or lobed Key G
 Middle leaflet margin entire 9
9. Young stems glabrous Key H
 Young stems hairy 10
10. Sepals 4; stamens 4–8 Key I
 Sepals 3; stamens 6–25 Key J

Key A

(Leaves unifoliate, multinerved, forming brachyblasts)

1. Leaves long and broad, 10–50 × 3–15 mm 2
 Leaves shorter and narrower, 4–15 × 1–5 mm 5 (*C. ruscifolia* series)
2. Plants very tall, up to 4 m; leaves longer than 25 mm, deeply 2–6-toothed; receptacle and achene hairy *C. phillipsii*
 Plants up to 1.8 m tall; leaves shorter than 35 mm, toothed or entire; receptacle and achene glabrous 3
3. Leaves long and narrow, less than 7 mm wide, up to 35 mm long
 *C. dregeana* var. *spinosissima*
 Leaves broader, more than 6 mm wide, less than 22 mm long 4
4. Most leaf margins more-or-less entire *C. × integerrima*
 At least some leaf margins clearly toothed *C. × intermedia*
5. Leaf margins entire; flowers clustered in heads with modified reduced leaves ... *C. ruscifolia*
 Leaf margins often with 1 or 2 teeth but sometimes entire; flowers solitary at the bases of ordinary vegetative leaves 6
6. Leaves ± glabrous, narrowly lanceolate, margins entire *C. × dissita*
 Leaves hairy, at least beneath, broader and shorter, margins often toothed or deeply divided 7
7. Achenes slightly tuberculate (Swartberg Mountains) *C. verrucosa*
 Achenes not tuberculate 8
8. Sheath hairy inside and out (Bokkeveld Escarpment) *C. purpurea*
 Sheath glabrous outside and with only scattered hairs inside (Bot River valley) ... *C. ferricola*

Key B

(Leaves unifoliate, multinerved, not forming brachyblasts)

1. Tall erect shrubs with very sparse branching, often clustered together at the nodes; leaves large, 50–80 mm long, or if shorter (>30 mm long) then over 25 mm wide; stamens numerous, 50–100 2

- Short to medium shrubs; if shrubs tall then leaves shorter than 50 mm or less than 20 mm wide; stamens many but usually <50 5
2. Leaves narrow, 5–10 mm long, stipules very long, >10 mm, except for around the female flowers where they are shorter, broadly ovate, forming an elongated inflorescence and lack stipules. *C. heterophylla*
Leaves broader, 15–40 mm long, variation on plant not as above 3
3. Leaves very broadly ovate, 25–40 mm wide *C. denticulata*
Leaves narrower, 10–20 mm wide. 4
4. Leaves very strongly recurved (Kogelberg Mountains) *C. recurvata*
Leaves bent downwards and out but not strongly (Langeberg Mountains) *C. grandifolia*
5. Tall erect shrubs with dense regular horizontally held branches; leaves subcircular, held perpendicular to stem; stamens numerous, 50–100 *C. reniformis*
Characters not as above 6
6. Leaves and stems hairy. *C. strigosa*
Leaves and stems glabrous, rarely with a few sparse hairs in the midrib of the leaves above 7
7. Scrambling, grass-like shrub; sheath very long, 6–45 mm long; stipules similar texture to leaf. *C. graminea*
Medium, usually erect shrubs; sheath shorter, <6 mm long; stipules membranous or green 8
8. Leaves broadly ovate, 15–30 mm wide, clasping stem. *C. virgata*
Leaves oblong to lanceolate or narrowly triangular, 3–20 mm wide. 9
9. Leaves lanceolate (20–35 × 3–7 mm); stipules 6–10 mm long with ciliate margins; anther connectives hairy *C. lanceolata*
Leaves various; stipules shorter, <6 mm long, margins entire; anther connectives without hairs 10
10. Leaf margins entire without teeth 11
Leaf margins toothed 18
11. Leaves shortly lanceolate, 10–20 × 3–5 mm (Table Mountain) *C. theodori-friesii*
Leaves larger. 12
12. Leaves long lanceolate to narrowly oblong, 3–6 times longer than wide 13
Leaves broadly ovate to broadly oblong or triangular. 15
13. Leaves straight or curved slightly upwards, papery to stiff, 25–50 × 5–10 mm (Kogelberg Mountains) *C. prionota*
Leaves curved downwards and out, very stiff and hard, 11–39 × 3–8 mm (*C. dregeana* complex) 14
14. Plant reseeder; leaves nearly always untoothed (Cederberg and Olifants River Mountains) *C. acanthophylla*
Plant reseeder or resprouter; leaves often with teeth (Riviersonderend Mountains, Franschoek to Bain's Kloof Mountains and Hex River Mountains) *C. dregeana*
15. Stigma usually red; long branches very short and almost forming brachyblasts (Cape Peninsula) 16
Stigma white; long branches normal length 17
16. Leaves broadly ovate, never toothed *C. × integerrima*
Leaves long oblong, often toothed *C. × intermedia*
17. Leaves glaucous, 20–35 × 10–15 mm, entire or with up to 5 small teeth (Wemmershoek Mountains) *C. oligodonta*

- Leaves green to glaucous, very variable but if untoothed then usually short and ovate and often clasping stem towards the base (Cape Peninsula or east of Ladismith and Riversdale) *C. ilicifolia*
18. Teeth several to many, 10–50 excluding tip, leaves narrowly lanceolate *C. prionota*
Teeth few, <10 excluding tip, or if more then leaves broadly oblong 19
19. Leaves broadly oblong with a rounded outline, teeth fine and short, <2 mm long, membranous; decumbent to erect shrubs 20
Leaves narrowly lanceolate or if broad and oblong then teeth broad and incised giving an irregular outline; usually erect shrubs 21
20. Teeth 5–14, <1.5 mm long; lower branches lax, stems scrambling *C. ovalis*
Teeth <5, 1.5–2.0 mm long, plants erect *C. oligodonta*
21. Leaves short and broad, 9–15 × 5–15 mm; stigma white; often tall shrubs (Cape Peninsula or east of Ladismith and Riversdale) *C. ilicifolia*
Leaves generally longer and narrower, 12–40 × 3–10 mm; stigma white or red; low to medium shrubs (Riviersonderend Mountains to Cederberg and Olifants River Mountains, excluding Cape Peninsula) 22
22. Leaves narrowly lanceolate, 3–5 times as long as wide, teeth fine to slightly incised; stigma white (*C. dregeana* complex) 23
Leaves broadly lanceolate, 2–3 times as long as wide, teeth broad and deeply incised; stigma usually red 24
23. Plant reseeder; leaves nearly always untoothed (Cederberg and Olifants River Mountains) *C. acanthophylla*
Plant reseeder or resprouter; leaves often with teeth (Riviersonderend Mountains, Franschhoek to Bain's Kloof Mountains and Hex River Mountains) *C. dregeana*
24. Stipules short, <3 mm long; filaments white; anthers yellow (Hex River Mountains, Winterhoek Mountains and Koue Bokkeveld) *C. ceresana*
Stipules long, 3–7 mm long; filaments red; anthers reddish brown (Riviersonderend Mountains) *C. × ilicioides*

Key C

(Leaves unifoliate, single-nerved)

1. Leaf margins entire to serrulate 2
Leaf margins markedly toothed 19
2. Stems glabrous 3
Stems hairy 13
3. Leaf <2 mm wide 4
Leaf >2 mm wide 11
4. Leaves <5 mm long; underside whitish and margins inrolled beneath so that a single white line is visible; sepals 4 5
Leaves usually >5 mm long, more or less the same colour above and beneath; sepals 3 6
5. Leaves 1.5–3.0 mm long; lower branches decumbent but stems ascending .. *C. brevifolia*
Leaves 2.5–5.0 mm long, plants erect *C. ericifolia*
6. Leaves <11 mm long; stamens ± 6(–9); usually growing in well-drained areas 7
Leaves 9–50 mm long; stamens 12–25; growing in wet areas 9

7. Plants tall, usually 1.0–2.5 m high; young stems slender, <0.7 mm wide; female sepals erect *C. erectisepala*
Plants shorter, usually <0.5 m high; young stems thicker, 0.7–1.1 mm wide; female sepals spreading to recurved 8
8. Leaves hard and rigid, 0.5–1.0 mm thick, curved downwards and away from the stem (Western Cape) *C. pungens*
Leaves not hard and rigid, <0.5 mm thick, curved upwards and towards the stem (Eastern Cape to Mpumalanga) *C. repens*
9. Leaves <1 mm thick, often curved downwards at tip to form a small hook; sheath <2 mm long; stipule margins ciliate (Groot Winterhoek Mountains to Cederberg) *C. uncinata*
Leaves 1–2 mm thick, straight or curved upwards and towards the stem; sheath >2 mm long; stipule margins entire (Swartberg Mountains) 10
10. Leaves more or less terete; stamens 19–24 *C. aculeata*
Leaves flattened vertically, thicker than wide; stamens 12–18 *C. nivenioides*
11. Leaves hard and rigid, <30 mm long, curved downwards and away from the stem; plants scrambling, growing in dry areas (Bokkeveld Escarpment) *C. acutifolia*
Leaves flexible, 25–65 mm long, straight or curved upwards and towards the stem; plants erect, growing in water 12
12. Leaves 30–65 × 4–8 mm; stamens 25–30 (neutral and alkaline soils, <10 km from the coast) *C. longifolia*
Leaves 25–45 × 1.5–5.0 mm; stamens 12–18 (wide variety of soils, coastal and inland) *C. strobilifera*
13. Leaves glabrous above and beneath; sheath also glabrous on abaxial side 14
Leaves with hairs above and beneath; if leaves sometimes glabrescent then hairy on abaxial side of sheath 16
14. Leaf margins thickened or inrolled and touching thickened midrib, pale lines present on either side of midrib beneath, curved downwards and away from the stem; sepals 4 *C. linearifolia*
Leaf margins rounded or flat, leaves uniform in colour, curved upwards and towards the stem; sepals 3 15
15. Leaves hard, usually >0.5 mm thick; stigma >3 mm long (Western Cape) *C. neglecta*
Leaves flexible, <0.5 mm thick; stigma <3 mm long (Eastern Cape to Mpumalanga) *C. repens*
16. Leaves 2–4 × 0.5–1.0 mm; large tree up to 4 m high; inflorescence a cone-like structure (Bokkeveld Escarpment) *C. dichotoma*
Leaves 3–15 × 1–5 mm; shrubs shorter than 1.5 m; inflorescence not as above 17
17. Leaves ovate to almost subcircular, margins flat; sepals 4 *C. monophylla*
Leaves elliptic to oblong or linear, margins inrolled beneath; sepals 3 18
18. Erect shrub; leaves unifoliolate to trifoliolate; bracteoles 2–5 mm long, stamens ± 6 (south-eastern Cape mountains) *C. dispar*
Sprawling to scrambling shrub; leaves always unifoliolate; bracteoles <2 mm long; stamens ± 12 (Hex River Mountains) *C. esterhuyseniae*
19. Leaves 10–55 mm wide, base cordate, often with a short petiole 20
Leaves <15 mm wide, base tapered to sheath, petiole always absent 24
20. Petiole absent; leaves discolorous; stamens 18–32; filaments 7–15 mm long *C. hirsuta*
Petiole present; leaves usually the same colour above and beneath; if leaves discolorous then stamens <18 and filaments shorter than 7 mm 21

21. Young stems thin, usually <1 mm wide; leaves soft and herbaceous; stamens 20–30; filaments white with yellow anthers *C. pilifera*
Young stems thicker, >1 mm wide; leaves thicker and more rigid, stamens <22; filaments usually reddish with yellow anthers 22
22. Leaves elliptic to ovate, glabrous or with only a few hairs on the midrib beneath (Kogelberg Mountains) *C. viridis*
Leaves ovate to subcircular, rarely elliptic, hairy especially beneath or sometimes only with some hairs on the midrib 23
23. Leaves 20–65 × 15–55 mm; stipules 6–10 mm long; stamens 12–18 *C. odorata*
Leaves 10–35 × 10–25 mm; stipules <6 mm long; stamens 18–22 (Groot Winterhoek Mountains) *C. reticulata*
24. Leaves and stems distinctly hairy; leaves 3–10 mm long *C. tricuspidata*
Leaves and stems glabrous or with scattered hairs; leaves 7–50 mm long 25
25. Leaves with 10–50 recurved teeth; if fewer teeth then <20 stamens; anthers yellow ... 26
Leaves with <10 straight teeth; stamens 20–40; anthers brownish red 27
26. Plants erect; stamens 17–21 (Brandfontein near Cape Agulhas) *C. berberidis*
Plants sprawling or scrambling; stamens 10–16 *C. ferruginea*
27. Leaves 3–6 mm wide; stipules ciliate, <7 mm long; bracteoles hairy; anther connective with short hairs (Bokkeveld Escarpment) *C. acutifolia*
Leaves 2–4 mm wide; stipules entire, >9 mm long; bracteoles glabrous; anther connective glabrous (Riviersonderend Mountains) *C. scandens*

Key D

(Leaves bifoliate or outer leaflets markedly larger than middle one)

1. Middle leaflet always present, 3–6 mm long, notched at apex *C. obcordata*
Middle leaflet absent, a small point sometime present between the leaflets, or variable across the plant and sometimes fused to one of the outer leaflets 2
2. Stem glabrous; outer leaflets glaucous, a small point present between the leaflets; achenes with 3 wings *C. phyllanthoides*
Stems hairy or glabrous; middle leaflet absent or present but then large and variable; achenes indistinctly ribbed 3
3. Middle leaflet absent, stipules fused on other side of stem, outer leaflets large, 7–20 mm wide, margins often with small teeth, bracteoles glabrous *C. crenata*
Middle leaflet absent or present, outer leaflets <7 mm wide, margins usually entire or minutely serrulate, bracteoles often hairy 4
4. Stems hairy; leaves green, middle leaflet always absent *C. pulchella*
Stems glabrous; leaves glaucous, middle leaflet sometimes present or fused to one of the outer leaflets *C. × varians*

Key E

(Leaves trifoliate, petiole present)

1. Stems glabrous 2
Stems hairy 6

2. Leaves needle-shaped; flowers sessile. 3
Leaves broader, usually distinctly toothed; flowers on a peduncle 4
3. Leaves very short, 3–4 mm long (Paarl to Klapmuts). *C. acockii*
Leaves longer, 6–17 mm long *C. filifolia*
4. Plants clonally spreading and resprouting after fire; leaves 9–12 × 6–9 mm, distinctly 3-lobed at apex; peduncle short, <2 mm long. *C. triloba*
Plants being killed by fire; leaves <6 mm wide, or if wider then much longer than 12 mm, toothed or 3-lobed at apex; peduncle longer, 2–20 mm long 5
5. Leaves 14–19 × 1.5–5.0 mm, toothed or 3-lobed; stamens 15–19 (altitude 1 000–2 000 m) *C. lepida*
Leaves 10–45 × 3–13 mm, toothed, stamens 20–43 (altitude <1 100 m) *C. pedunculata*
6. Leaves hairy, at least beneath, middle leaflet broader and more lobed than outer ones; sepals 4 7
Leaves glabrous all over, all leaflets similar in shape and size but outer ones often sickle-shaped; sepals 3 9
7. All three leaflets lobed; flowers not present, stems often minutely tuberculate *C. nitidula* (juvenile-leaved)
Middle leaflet lobed, outer leaflets not; flowers can be present, stems hairy but not tuberculate. 8
8. Plants semi-erect, branches ascending; petiole absent or very short, <1 mm long (Western Cape) *C. filicaulis*
Plants decumbent; petiole 1–2 mm long, persistent (Drakensberg Mountains) *C. filicauloides*
9. Leaves broad and oblong, 10–14 × 2.5–4.5 mm *C. drepanoides*
Leaves smaller, 2.5–9.0 × 0.5–2.0 mm 10
10. Leaves often 1–2 mm wide, apex rounded to acute; stamens 16–21 (usually coastal, altitude <500 m, often on recent sands or limestone-derived soils) *C. falcata*
Leaves usually <1 mm wide, apex rounded to sharply acuminate; stamens 6–9 (rarely coastal, altitude up to 2 400 m, never on recent sands or limestone-derived soils) 11
11. Plants sparsely branched, with a long main stem and only a few side branches (excluding brachyblasts), unable to support itself upright (Agulhas Plain). *C. perpendiculara*
Plants densely branched, erect 12
12. Leaves 4–9 mm long, apex sharply acuminate, petiole up to 2 mm long; spreading clonally and resprouting after fire. *C. arcuata*
Leaves 2–7 mm long, apex rounded to acute, petiole <1 mm long; only surviving fire as seed *C. ramosissima*

Key F

(Leaves trifoliate, petiole absent, leaves hairy at least beneath)

1. Margins inrolled beneath 2
Margins flat 13
2. Plants tall, tree-like; leaves 12–20 mm long; inflorescence persistent and woody 3
Plants generally much smaller; leaves 2–20 mm long; not forming an inflorescence 4
3. Leaves markedly toothed; inflorescence a cone on a determinate branch (Anysberg) *C. conifera*

- Leaves not toothed; inflorescence (when known) a woody swelling along the main axis of the stem. *C. arborea*
4. Leaves <1 mm wide, margins tightly rolled; achenes large, 4–10 × 4–10 mm, reddish, broadly winged 5
 Leaves 0.5–5 mm wide, margins just margins incurved or tightly rolled; achenes smaller, 1.5–4.0 × 0.5–2.0 mm, pale to dark brown, not winged. 6
5. Leaves greyish hairy above; achenes 4–6 mm long (northern slopes of Langeberg)
 *C. alata*
 Leaves green and glabrous above; achenes 6–10 mm long (De Hoop Nature Reserve) . . .
 *C. burgersii*
6. Stems often minutely tuberculate; leaves 3–7 × 0.5–1.5 mm, glabrescent, apex rounded, sheath glabrous abaxially; sepals 4 (Amatola Mountains to Mpumalanga).
 *C. nitidula* subsp. *pilosa*
 Stems not tuberculate; leaves various but sheath always with a few hairs; sepals 3 (CFR and Graaff-Reinet Mountains to Amatola Mountains). 7
7. Stipules easily visible, brown and scarious; stamens 6; achene ±6-ribbed (South coast and mountains, altitude <1 300 m). *C. stricta*
 Stipules if visible, membranous to green; stamens 6–30, achene 6–26-ribbed 8
8. Leaves 9–19 × 0.5–1.5 mm (altitude <350 m) 9
 Leaves 2–9 mm long, if longer then 1–5 mm wide (altitude 600–2 400 m). 10
9. Leaves hairy above, sheath with a small reddish point at the insertion of the leaflets on the abaxial side; stamens 22–30 (Cape Flats) *C. hirta*
 Leaves glabrous above, sheath without small point; stamens 8–10 (De Hoop Nature Reserve) *C. incana*
10. Plants killed by fire, sometimes very tall with a single main stem, up to 2 m; leaves 2–4 × 0.5–1.0 mm; stamens ±6 (Swartberg and Graaff-Reinet Mountains) *C. montana*
 Plants resprouting or killed by fire; leaves 4–15 mm long, if shorter then plants spreading clonally and resprouting after fire; stamens 6–12 11
11. Plants killed by fire; leaves 3–15 × 1–5 mm, sometimes both unifoliate and trifoliate on same plant, curved downwards and away from stem; stamens ±6 (Southeastern Cape Mountains) *C. dispar*
 Plants spreading clonally and resprouting after fire; leaves <2 mm wide, straight or curved upwards and towards stem; stamens 6–12. 12
12. Leaves broadly elliptic to linear, 2–6 mm long, apex obtuse to rounded; stamens 6–12 . . .
 *C. eriocephalina*
 Leaves narrowly linear, 6–9 mm long, stiff, apex acute; stamens 9–12 (Hex River Mountains to Groot Winterhoek Mountains) *C. weimarckii*
13. Middle leaflet markedly toothed or lobed 14
 Leaflet margins entire or minutely serrate 15
14. Plants decumbent with ascending stems; leaves 3–7 mm long; stipule large and leaf-like, 3–6 mm long; sepals 4; achene unribbed *C. filicaulis*
 Plants erect; leaves 4–11 mm long; stipules membranous or green, 0.5–3.0 mm long; sepals 3; achene 3–6-winged, wings recurved *C. polygonifolia* var. *trifoliata*
15. Leaves needle-shaped to linear, 6–16 × 1.0–1.5 mm, glabrous or almost so above, apex acute to sharply acuminate 16
 Leaves smaller, <9 mm long, <1 mm wide, apex rounded to acute 17

16. Hairs only found on midrib beneath; achene with rounded ribs (Cape Peninsula) *C. dodecandra*
Leaves evenly hairy beneath; achenes shallowly winged or with toothed ribs (Southwestern Cape Mountains) *C. cristata*
17. Brachyblasts closely overlapping, leaves ± glabrous except for a few hairs beneath; bracteoles glabrous (Gansbaai area) *C. anthospermoides*
Leaves hairier; bracteoles hairy 18
18. Leaves oblong to elliptic, 3–7 × 0.5–1.0 mm, straight or curved downwards and away from the stem; stipules absent (Graaff-Reinet Mountains) *C. bolusii*
Leaves usually straight or curved upwards and towards the stem; stipules present 19
19. Leaves 2–4 × 1–2 mm; stipules green and similar texture to leaves; sepals 4; achene unribbed (altitude 1 200–1 700 m) *C. hantamensis*
Leaves 3–9 × 0.5–4.0 mm; stipules membranous green; sepals 3; achene sharply ribbed or with recurved wings 20
20. Leaves 6–9 × 0.5–1.0 mm, green; stamens 10–12 (Southwestern Mountains) *C. sparsa*
Leaves 3–7 × 0.5–4.0 mm, green to silvery hairy; stamens <10 21
21. Leaves less than 6 mm long, 1 mm wide, green; stamens ±6 (Hex River Mountains to Gifberg) *C. hexandra*
Leaves 3–7 × 1–4 mm, green to silvery hairy or woolly; stamens 6–9 22
22. Leaves 1–4 mm wide, green with coarse hairs *C. polygonifolia*
Leaves 1–2 mm wide, densely silky hairy *C. sericea*

Key G

(Leaves trifoliate, glabrous, petiole absent, middle leaflet toothed or lobed)

1. Middle leaflet bilobed, emarginate at the apex, glaucous; stems hairy on one side only; sepals 3 *C. obcordata*
Middle leaflet toothed to 3–5-lobed; stems hairy all round; sepals 4 2
2. Plants trailing, stems decumbent; hairs pointing downwards; leaves thin and membranous, not forming obvious brachyblasts; male sepals with attenuate tips 3
Plants erect or sprawling, but at least upper branches ascending; stem hairs curled, spreading or pointing upwards; leaves thicker, forming brachyblasts; male sepals acute to acuminate but not long and attenuate 5
3. Leaves 3–6 mm long, 3-lobed (Langeberg and Waboomsberg Mountains) *C. gracillima*
Leaves 4–10 mm long, 3–7-toothed or lobed (Southwestern Mountains) 4
4. Leaves 3–7-lobed, middle lobe broader than outer lobes, 1–2 mm wide (Wemmershoek Mountains to Helderberg and Cape Peninsula) *C. dentata* var. *dentata*
Leaves 3-lobed, middle lobe narrower than outer lobes, 0.5–1.0 mm wide (Du Toit's Mountains) *C. dentata* var. *gracilis*
5. Leaves finely divided and feathery, each lobe needle-like and <0.5 mm wide *C. cervicornu*
Leaves broader, 1–4 mm wide 6
6. Leaves very small, 1.0–2.5 × 0.5–1.5 mm, green, bent downwards and away from the stem; stem hairs curled; achene <2 mm long (Little Karoo Mountains) *C. micrantha*
Leaves larger, 2.5–6.0 × 1–4 mm, usually somewhat glaucous, bent upwards and towards the stem; stem hairs adpressed upwards towards the stem; achene 2–4 mm long 7

7. Leaves entire to 3-lobed or toothed; female flowers with bracteoles 0.5–2.0 mm long, sepals 0.5–1.0 mm long, carpels usually 2 (Western Cape) *C. propinqua*
 Leaves 3–7-lobed or toothed; female flowers larger with bracteoles 2–3 mm long, sepals 1.5–2.5 mm long, carpels always 1 (Drakensberg Mountains) *C. spathulata*

Key H

(Leaves trifoliate, glabrous, petiole absent, stems glabrous)

1. Margins inrolled beneath (Langeberg to Eastern Cape Mountains) *C. polita*
 Margins rounded or flat 2
2. Leaves needle-shaped, green; stigma white to red, sometimes hidden by leaves 3
 Leaves flat, ovate to oblong or obovate, usually glaucous; stigma always red and protruding above leaves 8
3. Leaves very long, 12–22 mm; achenes large, 5–7 × 3–4 mm, not winged *C. burchellii*
 Leaves much shorter, <11 mm long; achenes smaller, <5 mm long, 3 mm wide 4
4. Leaves green, 4–11 mm long; stamens 9–25; filaments and anthers red or white to yellow; achenes either >3 mm long or winged and >2 mm wide 5
 Leaves glaucous, usually <4 mm long; stamens 6–12; filaments and anthers reddish brown; achenes <3 mm long and <2 mm wide 7
5. Leaves strongly curved upwards and towards the stem, green with faint whitish lines on each margin; stigma white, very short, <3 mm long; achene narrowly cylindrical, elongating as it matures *C. densa*
 Leaves straight or only slightly curved, green all round; stigma red, 1.5–10.0 mm long; achene broadly ellipsoid or winged 6
6. Plants low, rarely more than 0.5 m high; stem and leaves minutely tuberculate; leaves with distinct margins, leaf tips rounded to acute; sepals without a small spine; achene broadly ellipsoid with 6 ribs, often rugose between the ribs *C. juniperina*
 Plants taller, up to 1.5 m high; young stems and leaves smooth; leaves terete, leaf tips acuminate; sepals with a small spine just beneath apex; achene reddish, variously winged *C. teretifolia*
7. Leaflets ± cylindrical, margins rounded (arid inland mountains, altitude 300–1700 m) *C. amplexistipula*
 Leaflets flatter, margins often semi-translucent (coastal plains, altitude <200 m) *C. marginata*
8. Leaves 4–10 × 2.5–10.0 mm, middle leaflet often fused with outer leaflets or one leaflet missing *C. × varians*
 Leaves <8 mm long, <4 mm wide, leaves usually trifoliate throughout the plant 9
9. Leaf tip acute to acuminate or mucronate 10
 Leaf tip rounded to acute 11
10. Leaves oblong, 3–7 × 1.5–2.0 mm, sometimes fused together, (Franschhoek valley) *C. rigida*
 Leaves elliptic to obovate, larger, 6–8 × 3–4 mm (Langeberg) *C. glauca*
11. Leaves obovate (Southwestern Cape Mountains) *C. obovata*
 Leaves oblong to elliptic 12
12. Langeberg to Eastern Cape Mountains, altitude 550–1650 m *C. polita*
 Cape Flats to Agulhas Plain, altitude <200 m *C. marginata*

Key I

(Leaves trifoliate, glabrous, petiole absent, middle leaflet entire, stems hairy, sepals 4)

1. Leaf margin inrolled beneath. 2
 Leaf margin flat or rounded. 3
2. Midrib thickened so that margins and midrib are touching, always glabrous *C. linearifolia*
 Midrib not so thickened, lamina of leaf usually visible beneath, sometimes with hairs *C. nitidula*
3. Leaflets obovate to elliptic, 0.5–4.0 mm wide. 4
 Leaflets needle-shaped, <1 mm wide 8
4. Plants usually small, <0.5 m high, in shady rock crevices, rarely on open slopes when taller; achenes reddish, hairy, clearly flattened to winged (Northern Langeberg westwards) . . . 5
 Plants usually taller, on open slopes or forest margins; achenes smooth to ribbed, cylindrical and not flattened, glabrous (Southern Langeberg to Mpumalanga and possibly Zimbabwe) 6
5. Leaflets narrowly obovate to elliptic, gradually tapered to base, never toothed; carpels 1 or 2 (Kogelberg to Bain's Kloof). *C. complanata*
 Leaflets broadly obovate, abruptly tapered into a pseudopetiole, often toothed; carpels usually 2 (Bain's Kloof to Cederberg and Northern Langeberg) *C. propinqua*
6. Leaves glaucous, apex rounded, juvenile leaves entire; bracteole margins smooth, 2.0–2.5 mm long; achene 3–4 mm long (Drakensberg, altitude 2 000–3 100 m). *C. dracomontana*
 Leaves green, juvenile leaves toothed; bracteole margins ciliate, 1–2 mm long; achene 2–3 mm long (Western Cape to Mpumalanga and possibly Zimbabwe). 7
7. Leaves elliptic, 2–4 mm long, apex acute; receptacle smooth; achene smooth or faintly ribbed (altitude 1 000–2 500 m) *C. browniana*
 Leaves elliptic to obovate, 3–5 mm long, apex acute to rounded; receptacle and achene clearly ribbed (altitude 0–1 500 m) *C. serpyllifolia*
8. Leaves 6–11 mm long, apex acuminate to pungent, 0.5–1.0 mm long, margins minutely serrulate; stipules 1.5–2.5 mm long 9
 Leaves 2–8 mm long, apex rounded to long acuminate, usually <0.5 mm long, margins ± smooth; stipules <1.5 mm long 10
9. Leaves curved downwards and away from the stem, 0.5–1.0 mm wide (Suurberg Mountains to KwaZulu-Natal). *C. paucistaminea* var. *paucistaminea*
 Leaves curved upwards and towards the stem, <0.5 mm wide (George to Uitenhage) *C. paucistaminea* var. *australis*
10. Plants tall, up to 2 m high; leaves with thickened margins and midrib, varying from curved downwards and away from stem to straight; stipules ciliate (Western Cape to Zimbabwe) *C. linearifolia*
 Plants usually less than 0.5 m high; leaves without thickened margins, midrib occasionally thickened, always distinctly curved upwards and towards the stem; stipules glabrous (Western Cape). 11
11. Achenes 4 or 8-ribbed (Southwestern Cape). 12
 Achenes 9–18-ribbed (Swartberg Mountains) 13
12. Leaves 2–4 mm long; brachyblasts not closely overlapping; achene 4-ribbed, cylindrical, ribs evenly spaced, 3.5–5.0 mm long (Riviersonderend Mountains) *C. cruciata*

- Leaves 4–8 mm long; brachyblasts closely overlapping giving a feathery appearance to branches; achene 4 or 8-ribbed, slightly compressed with two of the ribs curved laterally, 2.5–3.5 mm long (Cape Peninsula to Cape Agulhas) *C. subsetacea*
13. Leaves 0.5–1.0 mm wide, with thickened midrib; brachyblasts not closely overlapping; achene 3–4 mm long. *C. crassinervis*
 Leaves <0.5 mm wide, without distinct midrib; brachyblasts closely overlapping giving a feathery appearance to branches; achene 2–3 mm long *C. setifolia*

Key J

(Leaves trifoliate, glabrous, petiole absent, middle leaflet entire, stems hairy, sepals 3)

1. Leaf margins curved inwards beneath, thus making an ovate to elliptic leaf appear needle-shaped (Langeberg Mountains to Uitenhage) *C. polita*
 Leaves either needle-shaped or ovate to obovate or elliptic, margins always flat or rounded 2
2. Leaves ovate to obovate or elliptic, often glaucous in colour 3
 Leaves needle-shaped to narrowly lanceolate, green 8
3. Leaves oblong to elliptic, 6–12 × 1.5–3.0 mm; stipules ciliate; bracteoles 5–7 mm long; achene covered with membranous layer *C. apiculata*
 Leaves various; stipules usually smooth; bracteoles <3 mm long; achene not covered with membranous layer 4
4. Leaves obovate, apex obtuse to rounded; achene reddish, flattened and winged, hairy; often growing in shady rock crevices *C. complanata*
 Leaves various but apex usually acute to apiculate; achene greyish brown, cylindrical shallowly ribbed, glabrous; habitats various 5
5. Leaves green to glaucous (altitude 250–1700 m) 6
 Leaves glaucous (altitude 0–500 m) *C. carinata*
6. Leaves oblong to elliptic, apex sharply acute (Franschhoek Mountains) *C. rigida*
 Leaves elliptic to obovate, apex obtuse to acute 7
7. Leaves obovate, apex rounded to obtuse; stamens 8–14 (Franschhoek to Riviersonderend) *C. obovata*
 Leaves elliptic to obovate, apex obtuse to acute; stamens 6 (Langeberg eastwards) *C. polita*
8. Leaves 2–3 mm long; achene a small orange fleshy berry *C. baccans*
 Leaves 3–17 mm long; achene a dry achene 9
9. Leaves strongly curved upwards and towards the stem, 10–16 mm long, with a raised midrib; achene very long and curved, 10–13 mm long (Agulhas Plain) *C. curvifolia*
 Leaves not strongly curved upwards, or if so then shorter, <13 mm long, or midrib not raised or indistinguishable from lamina; achene much shorter, <5 mm long 10
10. Stems minutely tuberculate; female sepals erect; stigma red; stamens 20–25. 11
 Stems smooth; female sepals erect to recurved; stigma white to red; stamens 6–18. 12
11. Leaves 4–9 mm long, various curved but never strongly so; achenes sometimes rugose between ribs *C. juniperina*
 Leaves 8–12 mm long, bent clearly downwards and away from stem; achenes never rugose between ribs *C. pilosula*

12. Leaves 8–15 × 1–4 mm, always bent downwards and away from stem (Cape Peninsula to Elim) 13
 Leaves 4–17 × <1.5 mm wide, variously curved 15
13. Leaves often fused, needle-shaped to broadly triangular, 8–10 × 1.5–3.5 mm; filaments 8–11 mm long. *C. ferricola*
 Leaves fused or not, needle-shaped to linear, 8–15 × 1–2 mm; filaments 5–8 mm long 14
14. Leaves always trifoliolate; plants usually killed by fire (Cape Peninsula and possibly Agulhas coast) *C. dodecandra*
 Leaflets variously fused or not; plants clonally spreading and resprouting after fire (Hermanus to Elim) *C. multiformis*
15. Leaves very fine, <0.5 mm wide, upwardly curved and closely overlapping giving a feathery appearance to the branch; receptacle smooth; stamens 6, filaments and anthers white or cream; achene smooth or very faintly ribbed (altitude 900–1 600 m, steep south-facing slopes often in shelter of rocks) *C. exilifolia*
 Leaves broader, 0.5–1.5 mm wide, if branches appear feathery then achene clearly ribbed or tuberculate; receptacle ribbed or not; stamens 4–15..... 16
16. Leaves tough and thick, 11–17 × 1.0–1.5 mm; bracteoles 4–8 mm long (Swartberg and Kammanassie Mountains) *C. robusta*
 Leaves thinner, flexible and smaller, 3–13 × 0.5–1.0 mm; bracteoles <4 mm long 17
17. Leaves almost cylindrical with smooth margins, upwardly curved towards the stem; receptacle smooth; plant killed by fire; achene narrowly cylindrical, 0.5–1.0 mm wide, reddish brown in colour, faintly 6-ribbed (altitude 1 000–1 900 m, shady kloofs in arid mountains from Hex River Mountains to Baviaanskloof Mountains) *C. castanea*
 Leaves variously curved, margins minutely serrulate or angled; receptacle faintly to prominently ribbed or tubercled; plant resprouting after fire or not; achene 1.0–2.5 mm wide, pale to dark brown in colour, clearly ribbed or tuberculate. 18
18. Plants resprouting from a crown after fire; achenes tuberculate (often growing between rocks) *C. tuberculata*
 Plants resprouting or not after a fire; achenes never tuberculate 19
19. Plants killed by fire; achenes broadly ovoid, dark reddish brown, 12–25-ribbed with occasional cross ribs (altitude 0–1 700 m) *C. atrata*
 Plants resprouting after fire; achenes narrowly ovoid to cylindrical, pale to dark brown, 6–12-ribbed 20
20. Leaf apex rounded to acute; plants resprouting from a crown; bracteoles glabrous except for margin; stigma red; stamens 11–18; achene ± 6-ribbed (Southwestern mountains)
 *C. pterocarpa*
 Leaf apex long acuminate; plants clonally spreading or not; bracteoles hairy; stigma white to pinkish; stamens 4–6 where known, achenes ± 9-ribbed (George to Drakensberg). . . 21
21. Achenes pale brown, 2.5–3.5 × 1.0–1.5 mm, resprouting leaves trifoliolate (see Key I, 9) ..
 *C. paucistaminea*
 Achenes brown, 3–5 × 1.5–2.0 mm, resprouting leaves unifoliolate and toothed (Kammanassie Mountains) *C. × homunculi*

6

Systematics of *Cliffortia*

Cliffortia L., Species Plantarum: 1 038 (1753) & 460 (1754); DC.: 595–596 (1825); Harv.: 292–304 (1862); Weim.: 1–229 (1934) & 167–203 (1948). Type species, designated by M.L. Green: 192 (1929): *C. polygonifolia* L.

Morilandia Neck.: 99 (1790). Type species not designated.

Monographidium C.Presl: 202 (1851a) & 562 (1851b). Type species: *M. obcordatum* (L.f.) C.Presl (= *C. obcordata* L.f.)

Low, semi-herbaceous trailing shrubs to small trees, able to resprout after fire, then sometimes clonally spreading by roots underground, or only surviving fire as seed. *Young stems* glabrous to densely hairy, forming brachyblasts or not. *Sheaths* hairy or glabrous both adaxially and abaxially, usually with a fringe of hairs on adaxial side at point of insertion of leaflets; *stipules* when present translucent and membranous, brown and scarious, or green and leaf-like; *petiole* present or absent. *Leaves* glabrous to hairy; uni-, bi- or trifoliolate, if trifoliolate then leaflets always single-veined to base, if bifoliolate always multi-veined, if unifoliolate then either single- or multi-veined; leaflet shape variable, from needle-shaped to subcircular, apex rounded to sharply acuminate or pungent, margins entire to markedly toothed, flat or inrolled beneath, midrib prominent or not, whole leaf curved upwards and towards stem or downwards away from stem. *Inflorescence* usually with flowers solitary in axils of vegetative leaves, sometimes female, or rarely male, flowers clustered into a distinct inflorescence, which is sometimes serotinous. *Flowers* monoecious but sometimes only one sex present on the plant; *bracteoles* 2–3, glabrous or hairy, shorter or longer than immature receptacle, usually sessile, rarely on distinct elongate peduncle; *sepals* 3 or 4, glabrous or hairy, on male flowers broadly ovate, rarely narrowly elliptic, on female flowers linear to broadly ovate or triangular, erect to recurved, rarely absent or vestigial; *stamens* few to many, filaments red or whitish green, anthers reddish brown or yellow, rarely hairy on connective; *receptacle* ribbed or entire, glabrous or with short hairs; *carpels* 1 or rarely 2 or more, ovule solitary, pendulous, 1 ovule per locule; *stigma* short and hidden or long and protruding, strap-like to much branched and feathery, red to greenish white, 1 stigma per carpel. *Achene* broadly ellipsoid to narrowly cylindrical or irregular, sometimes slightly curved; ribbed or winged, glabrous or with a few short hairs, sometimes tuberculate, occasionally with a membranous outer layer, pale brown to black, sometimes reddish.

(1–3) **Subgenus Arboreae** (Weim.) C.M.Whitehouse comb.
nov. Type species: *C. arborea* Marloth

Section *Arboreae* Weim.: 17, 91 (1934) & 188 (1948); E.G.H.Oliv. &
Fellingham: 161 (1994); Fellingham: 46 (2003).

Tall, erect, densely branching shrub or small tree. Young stems with dense, curled hairs, forming brachy-blasts. Sheath hairy abaxially, glabrous adaxially except for fringe of hairs at apex; stipules present or often absent, membranous and free; petiole absent. Leaves unifoliate or trifoliate, single-veined, hairy above, usually densely whitish hairy beneath; leaflet margins inrolled beneath, midrib prominent. **Female flowers clustered in a serotinous cone-like structure;** male flowers scattered at bases of ordinary vegetative leaves. Bracteoles hairy all over; sepals 3 or 4; stamens 4–12; female sepals erect, narrowly oblong to linear; carpel single; stigma red and strap-like, prominent out of cone-like structure. **Achenes irregular, 3–4-angled, entire and glabrous, dark brown to black.**

The species in this small subgenus are easily recognised by the serotinous female inflorescences. The three species are morphologically distinct and allopatric in their distribution making identification simple. Although mature leaves of the species differ in leaflet number and marginal teeth, the seedlings all have trifoliate leaves with toothed leaflets and a petiole. No hybrids have been reported in the subgenus.

1. **Cliffortia arborea** Marloth in Botanische Jahrbücher 39: 318 (1906); Weim.: 91, fig. 26 (1934); Oliver & Fellingham: 159, fig. 1, 4–6 (1994); Coates Palgrave: 247, fig. (2002); Whitehouse & Victor: 115 (2002); Fellingham & Linder: 182, fig. 11–12 (2003). Lectotype, designated by Oliver & Fellingham (1994): Roggeveld Escarpment, Komsberg, 1 500 m, Apr. or Oct. 1905, Marloth 3907 (BOL, lecto!; B†, GRA!, K!, NBG!, PRE).



Erect tall shrub or small tree up to 4(–10) m high [Marloth recorded this species as sometimes up to 10 m high. No trees of this size exist today, but it may be that this species can attain this height and that its former exploitation as a fuel source has meant that all the larger specimens have been cut down. Alternatively, this figure could have been an error for feet.], resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 1.5–2.2 mm wide, hairy; stem hairs spreading or curled, 0.8–1.3 mm long. *Leaves* trifoliate; leaflets elliptic to linear, 12–17 × 1.0–1.8 mm; apex sharply pungent, 0.5–2.0 mm long; margins inrolled beneath, entire and smooth; lamina tough and rigid, 0.4–0.5 mm thick, midrib prominent above lamina, curved downwards and away from stem, greyish hairy above, hairs 0.2–0.5 mm long, whitish hairy all over beneath, hairs 0.3–0.6 mm long; sheath 1.2–3.2 mm long, abaxially hairy, adaxially glabrous except for fringe of hairs at apex; stipules absent except near inflorescence, free, margins smooth; petiole absent. *Flowers* with bracteoles hairy all over; sepals 3 or sometimes 4, hairy on outside. *Male flowers* gathered into small sessile clusters of 2–4 flowers; bracteoles 2.2–2.8 mm long; pedicel 0.8–1.8 mm long; sepals broadly ovate, 3.9–5.0 × 2–3 mm, acute to acuminate at apex; stamens 8–12; filaments 3.2–3.8 mm long, greenish white; anthers yellow. *Female flowers* forming a large serotinous cone around main axis of branch; bracteoles 1.1–1.8 mm long; sepals oblong, 1.7–2 × 0.2–0.4 mm, erect; carpel 1; stigma 5.4–6.8 mm long, red, band-like, prominent above cone; immature receptacle glabrous, smooth. *Cone* 40–60 × 30–45 mm; achene irregular in shape, 2.8–3.8 × 1.2–1.4 mm, dark to blackish brown, glabrous, 3-angled. *Flowering time*: October to April.

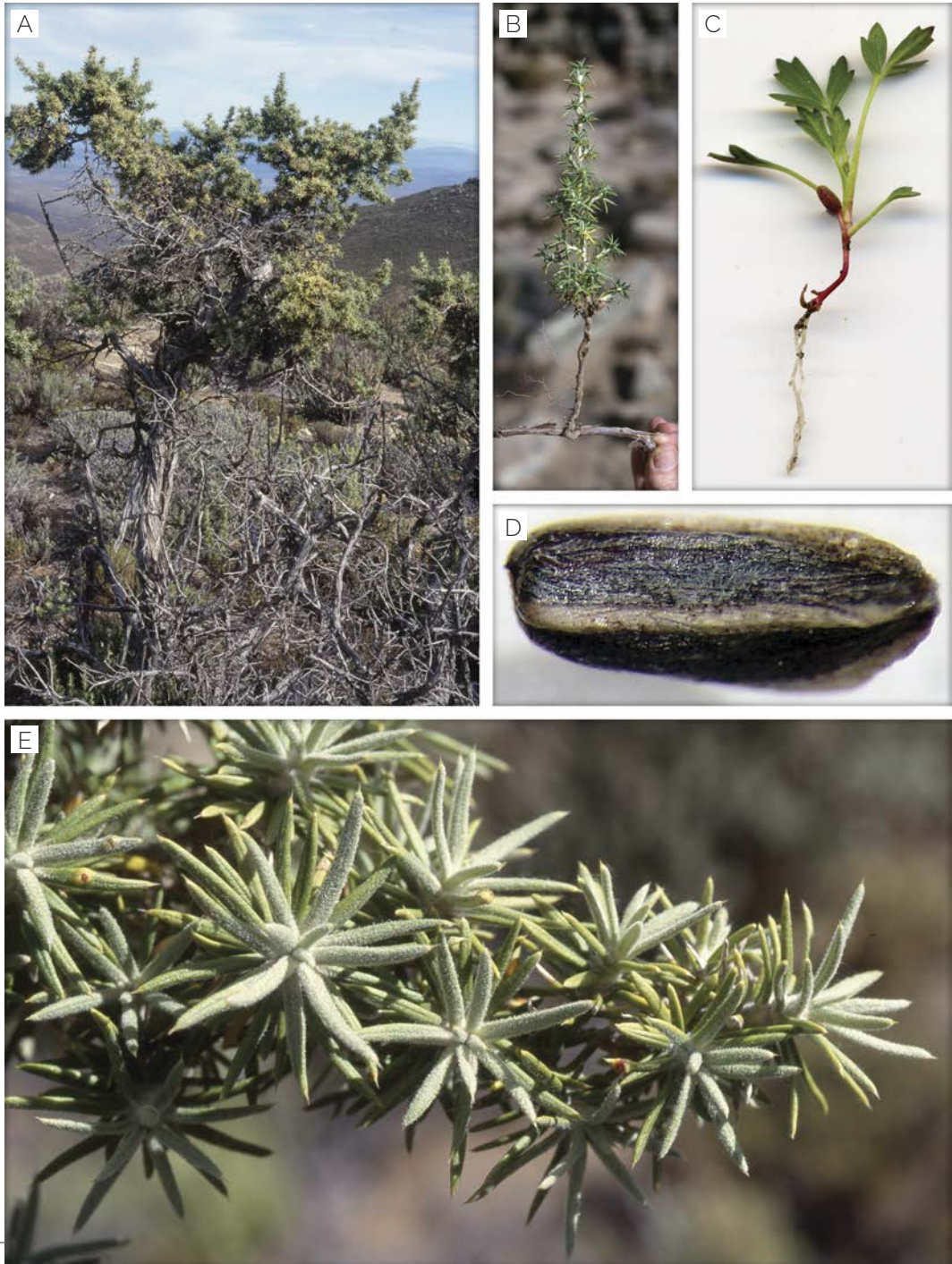
Habitat: dolerite-derived soils, full sun, on the edge of south-facing escarpments and cliffs; altitude 1 350–1 850 m.

Distribution: found scattered along the Great Escarpment ridge from Hantamsberg above Calvinia to the Nieuweveld Mountains near Beaufort West (see also note below).

Conservation status: protected within the Akkerendam Nature Reserve and the Karoo National Park, but outside of these reserves it has been used extensively for firewood as it grows in areas where little else is available. Furthermore, many of the populations appear to be in a state of senescence, with many old and dead plants, and the species appears to be persisting by means of clonal growth rather than recruitment from seedlings. Red List status: VU.

Etymology: *arborea* (Latin) means 'tree-like', referring to the fact that this is one of the largest species of *Cliffortia* known and tends to produce a single thick stem.

Common names. star cliffortia, tree rice-bush; *sterboom* (Afr.).



Notes: one of the better known species of *Cliffortia*, as it's one of the few tree-like species in the area where it occurs. The Afrikaans common name *sterboom* (star tree) is derived from the spreading arrangement of the leaves in the brachyblasts; several farms in the Roggeveld have been named after the populations that grow there.

Marloth (1906) recorded that the stem hairs had glands, which produced a strong aroma and this was also mentioned by Weimarck (1934). Neither Oliver and Fellingham (1994), nor the current author detected any such smell on living plants.

No confusion of this species is possible, especially as it grows in an area where few other shrubs gain such a height. However, there is an unusual collection from the Willowmore Witteberg (peak north of Worlds View Farm, steep south-facing slope, 1160 m, *Viviers & Vlok 211*), which is very similar to *Cliffortia arborea*. The specimen is small and sterile, but in terms of indumentum and leaf shape it matches the typical species. It differs in having leaves erect, rather than recurved, and thus the brachyblasts lack the diagnostic star shape and the branches therefore have a quite different general appearance. Without flowers or fruits it is premature to conclude that it is a separate species, but its highly disjunct distribution and slightly different morphology suggests that it should be recognised once more material is available.

Representative specimens

SOUTH AFRICA. **3119** (Calvinia): summit of Hantam Peak, 1660 m, (–BC), *Wisura 3556* (NBC); Hantamsberg, Akkerendam, 1370 m, 14 Nov. 1955, (–BD), *Acocks 18621* (BOL, K, NBC, PRE); Hantamsberg, Voetpadskloof, 1465 m, 3 Sept. 1986, (–BD), *Oliver 8878* (NBC); Van Rhynshoek Farm, upper E slope of Hantamberg, 7 Oct. 1986, (–BD), *Van Jaarsveld & Thomas 8961* (NBC, PRE). **3220** (Sutherland): Roggeveld Escarpment N of Sutherland, Roggeveld Mts, Sneeuksrants, near summit of Roggeveld Mt., 1740 m, Oct. 1920, (–AD), *Marloth 9730* (NBC, PRE); Roggeveld Escarpment, near Sneeuksrants, Hottentotsbank, 1435 m, 22 Sept. 1981, (–AD), *Rourke 1728* (K, NBC, PRE); Komsberg, S escarpment of Komsberg, W of Verlaten Kloof, 1525 m, Oct. 1920, (–DA), *Marloth 9770* (NBC, PRE); Sutherland, Komsberg Pass, just W of road at top of pass, 22 Sept. 1977, (–DB), *Moffett 1463* (NBC, PRE); Komsberg Pass, top of Komsberg Pass, E of road, plateau at top of pass, 1600 m, 1 Mar. 1986, (–DB), *Moffett & Steensma 4067* (NBC, PRE); S Roggeveld at Komsberg Pass, ENE of Skurwekop, just E of main road, 1815 m, 4 June 1992, (–DB), *Oliver 10054* (BOL, K, NBC, PRE); escarpment at top of Komsberg Pass, 1630 m, 31 May 2000, (–DB), *Whitehouse 121* (BOL, NBC). **3221** (unknown): Sterkboomkloof, Vinkfontein, edge of kloof, c. 200 m below escarpment, amongst rocks, 1500 m, 28 Feb. 1986, (–CA), *Moffett & Steensma 4060* (NBC, PRE). **3222** (Beaufort West): Nieuweveld Mts, Karoo National Park, Mountain View area, near the FM tower, 1830 m, 17 Nov. 1992, (–BC), *Fellingham 1624* (NBC, PRE); Karoo National Park, Nieuweveldberg, Mountain View area, near the look-out, 1830 m, 17 Nov. 1992, (–BC), *Fellingham 1625* (BM, NBC); Beaufort West, Nieuweveld Mts, Mountain View Farm, near radio tower, 1676 m, 14 Feb. 1978, (–BC), *Gibbs Russell et al. 141* (GRA); Karoo National Park, Mountain View, top of mountain, 1830 m, 3 Jan. 1985, (–BC), *Shearing 893* (PRE).

2. **Cliffortia conifera** E.G.H.Oliv. & Fellingham in Bothalia 24(2): 154, fig. 1–4, 6 (1994); Fellingham: 611 (2000); Coates Palgrave: 248, fig. (2002); Whitehouse & Victor: 103 (2002); Fellingham & Linder: 185, fig. 15, 16 (2003). Type: Ladismith District, Anysberg, E end above Prinsklloof, 1 300 m, 4 June 1992, *Oliver 10055* (NBG, holo.; BOL!, K!, MO!, PRE!, iso.).



Erect, tall shrub or small tree up to 4 m high, resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 1.1–1.8 mm wide, covered in thick whitish indumentum but sometimes reddish tinged beneath; stem hairs curled, 0.3–0.6 mm long. *Leaves* trifoliolate; leaflets elliptic, 10.0–19.2 × 2–9 mm; base contracted abruptly to form a pseudopetioclule; apex pungent, 0.2–1.6 mm long; margins inrolled beneath, entire or with up to 3 broad straight teeth, 1.7–2.3 mm long; lamina tough and rigid, 0.3–0.7 mm thick, midrib prominent beneath, curved upwards and towards stem, greyish hairy above but becoming glabrous, hairs 0.1–0.4 mm long, whitish hairy all over beneath, 0.3–0.5 mm long; sheath 2.1–2.6 mm long, abaxially hairy, adaxially glabrous except for fringe of hairs at apex; stipules 0.5–2.4 mm long, free, margins smooth; petiole absent. *Male flowers* gathered into small sessile clusters of 3–5 flowers; bracteoles hairy all over, 1.5–3.4 mm long, pedicel 0.3–0.4 mm long, glabrous; sepals 3 or sometimes 4, hairy on outside, broadly ovate, 2.5–3.2 × 1.6–3.0 mm, acute to acuminate at apex; stamens 6–10; filaments 1.8–5.0 mm long, red or greenish white; anthers yellow. *Female flowers* forming clusters of 4–10 small serotinous cones on determinate length branches from upper parts of main branch; bracteoles 0.6–1.5 mm long, shorter than immature receptacle; sepals oblong, 1.7–2.0 × 0.2–0.5 mm, erect; carpel 1; stigma 4.1–5.6 mm long, red, band-like, prominent above cones; immature receptacle 0.9–1.6 × 0.4–0.6 mm, glabrous, smooth. *Cone* 21–25 × 19–24 mm; achene irregular in shape, 1.8–3.2 × 0.8–1.2 mm, dark to blackish brown, glabrous, 3–4-angled. *Flowering time*: February to June and sometimes as late as August.

Habitat: Steep, rocky, east-facing slope above a gorge on acid sands from Table Mountain Series, in full sun and on well-drained soils; altitude 1 250–1 300 m.

Distribution: Restricted to the eastern end of the Anysberg above Prinspoort.

Conservation status: A very localised species: Oliver and Fellingham (1994) recorded only 50 plants, but it is more common on the steep slopes of the otherwise inaccessible Prinsklloof. Red List status: EN.

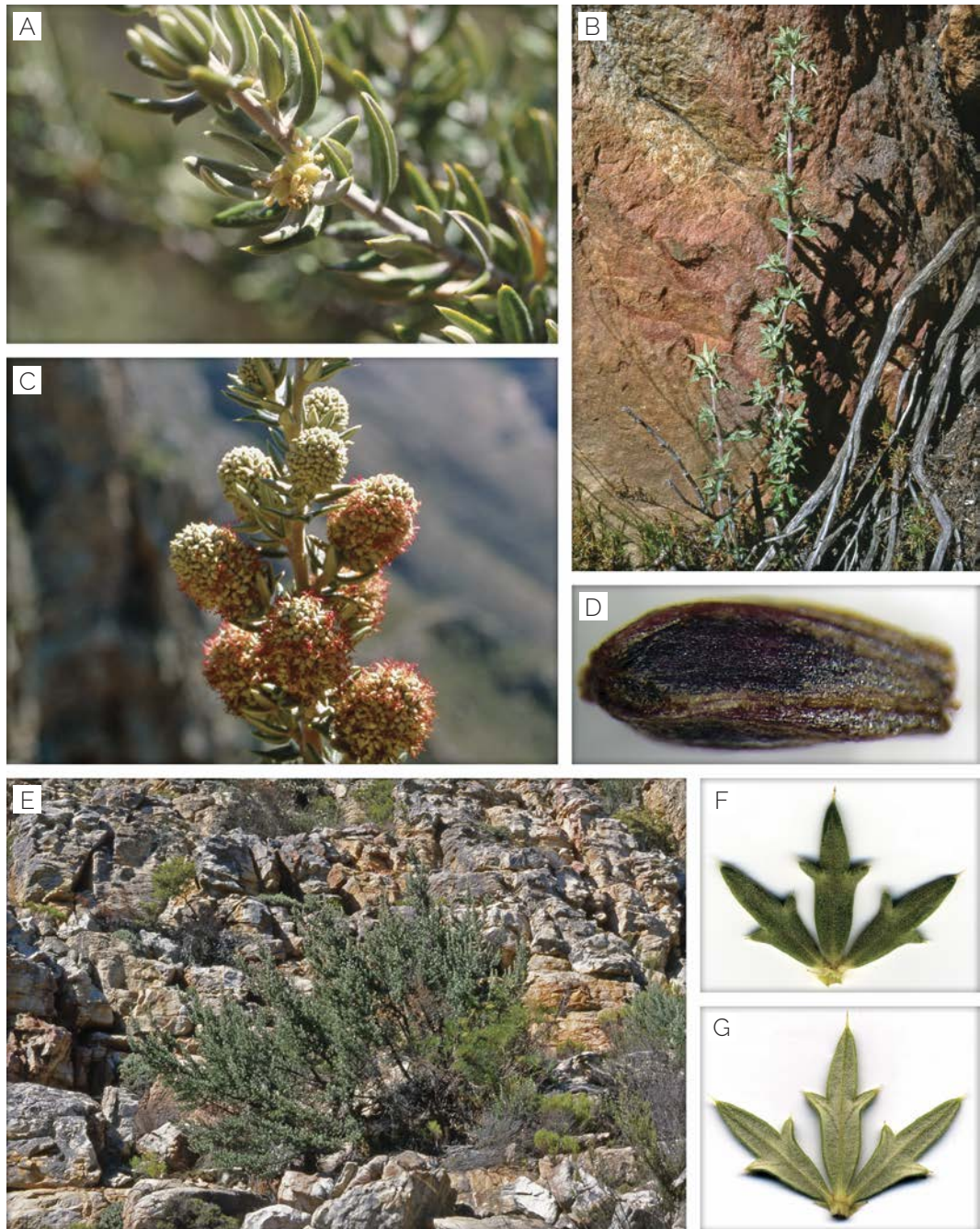
Etymology: *conifera* (Latin) means 'bearing cones', referring to the inflorescence that resembles the cones of a conifer.

Notes: While clearly related to *Cliffortia arborea*, this is a striking species, unique in the genus for its cone-like inflorescences on determinate length side branches. It thus appears more like a *Leucadendron* R.Br. (Proteaceae) or *Widdringtonia* Endl. (Cupressaceae) than a typical *Cliffortia*.

The species is extremely localised, known from the slopes of Prinspoort, which cuts through the Anysberg. As with *Cliffortia arborea*, it is able to spread clonally and many of the plants may belong to the same clone. Seedlings are not evident in the wild, yet the seeds germinate freely in cultivation and are easy to grow if sufficient moisture is available. In exceptional years of rain, the population may perhaps be able to renew itself sexually as well as clonally.

Representative specimens

SOUTH AFRICA. 3320 (Montagu): Anysberg, E cliff overlooking Prinsklloof, 1300 m, 10 Aug. 1991, (–BC), *Fellingham 1531* (NBG); Anysberg, summit slopes just W of Prinsklloof, 1300 m, 23 Sept. 1990, (–BC), *Oliver 9730* (NBG, PRE); Anysberg, E end above Prinsklloof, due E of beacon, 1300 m, 4 June 1992, (–BC), *Oliver 10055* (BOL, K, MO, NBG, PRE); E end of Anysberg, gully leading to Prinsberg, 6 Oct. 1982, (–BC), *van Wyk 1072* (NBG); Anysberg Nature Reserve, E end, gully above Prinspoort, 1250 m, 22 Feb. 2001, (–BC), *Whitehouse 208* (BOL).



Cliffortia conifera: A, branch with male flowers; B, sprouting; C, branch with female flower; D, achene; E, habitat; F, dorsal view of leaf; G, ventral view of leaf.

3. **Cliffortia dichotoma** Fellingham in Bothalia 33(1): 41, fig. 1–3 (2003); Fellingham & Linder: 184, fig. 13–14 (2003). Type: Northern Cape, Nieuwoudtville District, Oorlogskloof Nature Reserve, Farm Cipher Kop 804, 720m, 16 Oct. 1996, Pretorius 396 (NBG, holo.; BOL, K, MO, PRE, iso.).



C. sp. 3 sensu Fellingham: 614 (2000); Coates Palgrave: 247 (2002).

Erect small tree up to 4 m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.6–0.9 mm wide, sometimes tinged reddish, densely hairy; stem hairs curled, 0.1–0.2 mm long. *Leaves* unifoliate, elliptic to oblong or linear, 2.4–3.2 × 0.8–1.0 mm; base contracted abruptly to form a pseudopetiolule; apex acute or mucronate to rounded, up to 0.2 mm long; margins inrolled beneath, entire and smooth; lamina single-veined into base, tough and rigid, 0.25–0.55 mm thick, midrib prominent beneath, curved downwards and away from stem, hairy above but soon becoming glabrous, 0.1–0.3 mm long, whitish hairy all over beneath, 0.1–0.4 mm long; sheath 0.6–0.8 mm long, abaxially hairy, adaxially glabrous except for fringe of hairs at apex; stipules absent; petiole absent. *Male flowers* solitary or gathered into small sessile clusters of a few flowers; bracteoles hairy, ±1 mm long; pedicel ±0.5 mm long, glabrous; sepals 3 or 4, broadly ovate, ±2 × ±1.5 mm, acute to acuminate at apex; stamens 4; filaments ±2 mm long. *Female flowers* forming a large serotinous cone around main axis of branch; bracteoles ±1 mm long, shorter than immature receptacle; sepals 3 or 4, oblong, ±1–2 × ±0.5 mm, erect; carpel 1; stigma ±5 mm long, red, band-like, prominent above cone; immature receptacle ±1.5 × ±1 mm, glabrous, smooth. *Cone* 34–46 × 16–22 mm; achene irregular in shape, 2.4–2.8 × 1.0–1.3 mm, dark to blackish brown, glabrous, 3-angled. *Flowering time*: August to November.

Habitat: Edge of cliffs on acid sands from Table Mountain Series in full sun on well-drained soils; altitude 650–700 m.

Distribution: Only known from a few populations on either side of Oorlogskloof and at Blomfontein in the Bokkeveld Mountains southwest of Nieuwoudtville.

Conservation status: The habitat and distribution is similar in many respects to *Cliffortia conifera*, as it is restricted to areas near a deep gorge. However, it is more threatened than that species because it does not spread clonally but reproduces only by seed. In addition, the population appears to be senescent, consisting only of old and dead plants. Red List status: VU.

Etymology: *dichotoma* (Latin) means 'branching in pairs', referring to the unusual branching pattern.

Notes: Discovered in 1996 and very rare, *Cliffortia dichotoma* should be considered highly threatened until its reproductive biology can be better understood. It is the most tree-like of all *Cliffortia* species, forming a distinct 'trunk' and rounded crown. It is easily distinguished from the other species in the subgenus by its small unifoliate leaves. The leaves appear most similar in form to the even more poorly known *C. bolusii*, except that that species has trifoliate leaves.

Unlike the other two species in subgenus *Arboreae*, this species does not appear to resprout or spread clonally. The plants appear to be large, old and senescing. Despite this, seed germinates freely in cultivation and a conservation programme to refresh dying populations or establish new populations should not present problems in this respect.

Representative specimens

SOUTH AFRICA. **3119** (Calvinia): Lokenburg area, Papkuilsfontein, Oorlogskloof escarpment, Kranskloof, 700 m, 0 Oct. 0, (–CA), *Fellingham 1707* (BOL, BOL, BOL, BOL, BOL); Lokenburg area, Papkuilsfontein Farm Annex, Oorlogskloof escarpment between waterfall in De Hoop-se-Rivier and border with Kranskloof Farm, 700 m, 27 Aug. 1995, (–CA), *Fellingham 1684* (NBG); Lokenburg area, Papkuilsfontein annex, Oorlogskloof escarpment, 700 m, 16 Nov. 1995, (–CA), *Fellingham 1689* (NBG); Lokenburg area, Papkuilsfontein annex, Oorlogskloof escarpment, 700 m, 28 Nov. 1996, (–CA), *Fellingham 1702* (NBG); Lokenburg area, Papkuilsfontein, Oorlogskloof escarpment, Kranskloof, 700 m, 24 Oct. 1997, (–CA), *Fellingham 1705* (NBG); Lokenburg area, Papkuilsfontein, near the waterfall, 700 m, 24 Oct. 1997, (–CA), *Fellingham 1708* (NBG); Lokenburg area, Papkuilsfontein, Oorlogskloof escarpment, 700 m, 24 Oct. 1997, (–CA), *Fellingham 1709* (NBG); Nieuwoudtville District, Keurfontein 946, Soutvlei, flats above Oorlogskloof, 760 m, Sept. 2006, (–CA), *Helme* (NBG); Nieuwoudtville District, Oorlogskloof Nature Reserve, Farm Cipher Kop 804, plateau at bottom of koppie on right of Cipher Kop homestead, 720 m, 16 Oct. 1996, (–CA), *Pretorius 396* (BOL, K, MO, NBG, PRE); Papkuilsfontein, on road to waterfall, c. 1 km from Oorlogskloof and c. 2 km from waterfall, 20 Aug. 1993, (–CA), *van Wyk 626* (NBG); Lokenburg area, Papkuilsfontein Farm Annex, Oorlogskloof escarpment, from waterfall in De Hoop se Rivier, N to border with Kranskloof Farm, 700 m, 22 Aug. 1995, (–CA), *von Willerd s.n.* (NBG); Papkuilsfontein Farm, Oorlogskloof escarpment, just N of waterfall where De Hoop river flows in to Oorlogskloof, 660 m, 18 Aug. 2001, (–CA), *Whitehouse 252* (BOL, K, NBG).

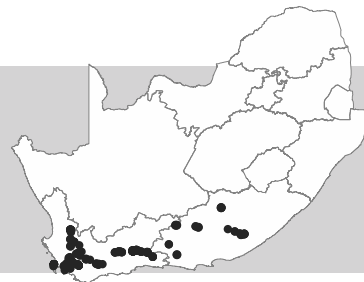


(4–8) **Subgenus Eriocephalinae** *C.M.Whitehouse* subgen.
nov. Type species: *C. eriocephalina* Cham.

Low to medium erect or lax densely branched shrubs. Young stems densely long spreading or curly hairy, forming brachyblasts. **Sheath hairy abaxially, densely hairy adaxially**; stipules present or absent, membranous and free with a ciliate margin; petiole absent. Leaves unifoliate or trifoliate, single-veined, often **greyish hairy above and usually densely hairy beneath**; leaflets elliptic to needle-shaped, **usually contracted at base to form a pseudopetiole, margins entire, inrolled beneath**. Flowers solitary in the axils of ordinary vegetative leaves. Bracteoles hairy all over, longer than receptacle; sepals 3, hairy on the outside; stamens 4–14; female sepals erect, narrowly oblong to linear; receptacle glabrous, distinctly ribbed; carpel single; stigma pinkish white to red, usually prominent above leaves. Achenes ellipsoid, ribbed, glabrous, beige to brown.

The subgenus lacks any unique defining character, but the species share a similar leaf morphology that makes them straightforward to assign. The species are only found at higher altitude, above 600 m. Species not in the subgenus, but with similar leaf morphology, such as *C. hirta* and *C. stricta*, are found at lower altitudes. Hybrids appear to be common within the subgenus where more than one species grows in close proximity. Consequently, boundaries between species within the subgenus can become blurred. No hybrids are known between this subgenus and other subgenera. Seedlings so far examined are trifoliate without a petiole; the leaflets are similar to the mature leaves.

4. **Cliffortia eriocephalina** Cham. in Linnaea 6: 349 (1831); Eckl. & Zeyh.: 269 (1836); Harv.: 302 (1862); Bolus & Wolley-Dod: 260 (1904); Weim.: 44, fig. 8F–J (1934) & 400 (1940b); Levyns: 446 (1950); Fellingham: 615 (2000). Type: Cape Peninsula, Table Mt, 8 Apr. 1827, *Ecklon & Zeyher 1745* [the sheets also have the collection numbers 32 or 192] (B†, holo.; S!, SAM!, TUB!, iso.).



C. phyllicoides Eckl. & Zeyh.: 269 (1836). Type: Worcester District, near Tulbagh, Winterhoek Mts, Nov., *Ecklon & Zeyher 1744* (S, holo.!, B†, SAM!, iso.).
C. ericifolia sensu Drège: 82 (1843), *non* L.f.
C. sp. sensu Phillipson: 248 (1987), based on *Story 3318* (GRA).

Erect shrub up to 1.5 m high, but often much shorter in very exposed areas, resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 0.8–1.3 mm wide, often reddish tinged, densely hairy; stem hairs spreading or curled, 0.35–1.40 mm long. *Leaves* trifoliolate; leaflets elliptic to linear, 2.4–6.0 × 0.6–1.8 mm; base contracted abruptly to form a pseudopetiolule; apex obtuse to rounded, up to 0.2 mm long; margins inrolled beneath, entire; lamina chartaceous, midrib prominent beneath, 0.1–0.4 mm thick, curved upwards towards stem, greyish hairy above (very rarely glabrescent in Swartberg Mountains), 0.4–1.3 mm long, whitish hairy all over beneath, hairs 0.2–0.6 mm long; sheath 1.2–2.4 mm long, abaxially hairy, adaxially very hairy; stipules absent to 0.8 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 3, evenly hairy on outside. *Male flowers* with bracteoles 2.1–3.4 mm long; pedicel 0.8–1.1 mm long; sepals broadly ovate, 2.8–5.1 × 1.4–2.2 mm, acute to acuminate at apex; stamens 6–13; filaments 4.0–6.1 mm long, red to greenish white; anthers brownish red or yellow. *Female flowers* with bracteoles 2.5–3.6 mm long, longer than immature receptacle; sepals narrowly ovate to linear, 1.5–1.9 × 0.2–0.9 mm, erect; carpel 1; stigma 2.4–4.2 mm long, red, feathery, prominent above leaves; immature receptacle 1.1–1.3 × 0.5–0.7 mm, glabrous, clearly ribbed. *Achene* 2.2–3.0 × 0.9–1.2 mm, pale greyish brown, glabrous, ribs 10–16, rounded to acute, <0.1 mm wide. *Flowering time*: September to March.

Habitat: Mountain fynbos on the upper slopes and summit ridges of mountains, often in the slightly deeper loamy soil of shallow depressions or between large boulders, on well-drained acid sands from Table Mountain Series in full sun; altitude 600–2 350 m.

Distribution: A common and widespread species, occurring at high altitudes towards the summits of mountains from Cederberg to the Cape Peninsula, and east as far as Graaff-Reinet and the Amatola Mountains.

Conservation status: Widespread, though localised, usually found on the upper slopes and summits of mountains where it is rarely under threat. Red List status: LC.

Etymology: *eriocephalina* (Greek) means 'little woolly headed', referring to the small tight heads of fascicled hairy leaves.

Notes: The most widespread and commonest of species in the subgenus, it can be identified by its small elliptic trifoliolate leaves that form greyish hairy clusters along the branches. However, where it grows sympatrically with other members of the subgenus, hybrids are frequently found that can blur the boundary between the species. *Cliffortia eriocephalina* is always a clonally spreading resprouter while, except for *C. weimarckii*, the other species are killed by fire. The hybrids are frequently also resprouters thus making it hard to delimit *C. eriocephalina* consistently.

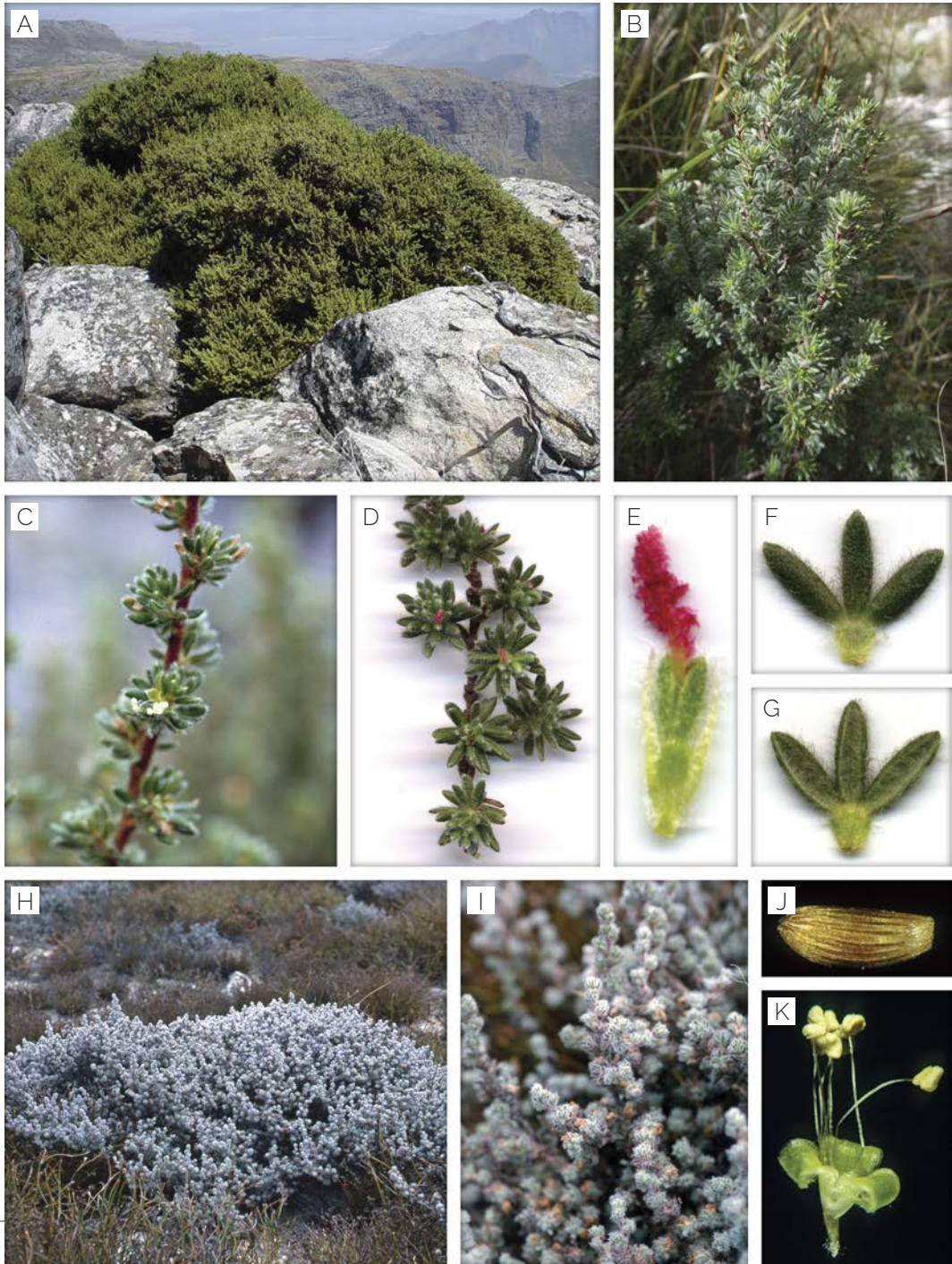
While variation in populations of *Cliffortia eriocephalina* might be attributable to some degree to introgression, there is probably also limited gene flow between the populations as they occur on mountain peaks. Such isolation might be the cause of local extremes, such as those found on top of Matroosberg in the Hex River Mountains, where the leaflets are comparatively small and very densely white woolly (*Esterhuysen* 27707; *Whitehouse* 188) or some populations in the Swartberg where they are almost glabrous (*Esterhuysen* 26807; *Helme* 3343; *Stokoe* 8622, 9325; *Vlok* 1852).

Weimarck (1934) was obviously deceived by the distance that exists between populations when he considered *Bolus* 851 from Graaff-Reinet, Nardouwsberg. He cited it under *Cliffortia nitidula* subsp. *pilosa* but commenting that it is suggestive of *C. eriocephalina*. There is no question that it is the latter species but at the time Weimarck knew *C. eriocephalina* only from as far east as Swellendam, so his reluctance to attribute it to that species was understandable.

Weimarck (1934) mentioned that he had not seen a Krauss collection cited by Meisner (1843), so did not know whether it belonged to the species. The specimen at MO (Cape Flats, *Krauss* 1211) does not appear to be a *Cliffortia* at all and is probably a member of Rubiaceae. Weimarck's (1940b) citation of *Hafström & Acock s.n.* from Bredasdorp Mt is more likely to be *C. stricta*, but I have not seen the specimen itself.

Representative specimens

SOUTH AFRICA. **3126** (Queenstown): 13.5 km SSW of Henning station, 1830–1950 m, 29 June 1950, (–AC), *Acocks* 15906 (K, PRE). **3219** (Wuppertal): Cederberg Mts, Langberg, 1830 m, 15 Dec. 1941, (–AC), *Esterhuysen* 7321 (BOL, K, PRE); Cederberg Tafelberg, 3 May 1953, (–AC), *Esterhuysen* 21379 (BOL, K, PRE); Bokkeveld Tafelberg, 17 Nov. 1966, (–CD), *Thompson* 244 (K, NBG, PRE). **3223** (unknown): Farm Koudvelds Hoogde 117, on the Meelberg, summit plateau, 2100 m, 25 Nov. 2006, (–BB), *Clark & Te Water Naude* 297 (GRA). **3224** (Graaff-Reinet): Farm Onbedacht, Koudeveldberge/Toorberg, below upper line of cliffs, 1900 m, 21 Nov. 2006, (–AA), *Clark & Te Water Naude* 99 (GRA); Nardouwsberg, 1770 m, Apr. 1873, (–BB), *Bolus* 851 (BOL); Nardouwsberg, S slopes of saddle between two summits, 2350 m, 10 Jan. 2001, (–BB), *Whitehouse* 177 (BOL). **3225** (Somerset East): Asante Sana Private Game Reserve, in cliffs below Sneeuwberg summit, approx 1.8km NW of Groot Suurkop, 1854 m, 8 Dec. 2005, (–AC), *Clark & Coombs* 278 (GRA). **3226** (Fort Beaufort): Great Winterberg, Farms Glamorgan 205, 210 & 211, upper W slopes Great Winterberg, 1968 m, 20 Jan. 2009, (–AD), *Clark, Pienaar & Daniels* 21 (WSY); Readsdales, 5 Oct. 1973, (–BC), *Von Gadow* 471 (GRA, PRE). **3227** (Stutterheim): Victoria East District, Hogsback summit, 1920 m, May 1956, (–CA), *Martin* 8890 (GRA); Cata Forest Reserve, 1675 m, 12 Feb. 1948, (–CA), *Story* 3318 (GRA, PRE). **3318** (Cape Town): Table Mt., next to Maclear's Beacon, 1065 m, Feb. 1884, (–CD), *Bolus* 7995 (BOL); Cape Peninsula, Table Mt., top of Blinkwater Ravine, 855 m, 23 Mar. 1941, (–CD), *Bond* 971 (NBG); Blinkwater Grotto, 915 m, 11 Nov. 1926, (–CD), *Compton s.n.* (BOL, BOL); Cape Peninsula, Kirstenbosch, top of Window Gorge, 855 m, 5 Nov. 1942, (–CD), *Compton* 14067 (BOL); Cape Peninsula, Table Mt., Ark Valley, 915 m, 28 Jan. 1945, (–CD), *Esterhuysen* 11395 (BOL); Cape Peninsula, Table Mt., S side on Fountain Ledge, 975 m, 23 June 1946, (–CD), *Esterhuysen* 12854 (BOL); Cape Peninsula, Table Mt., Fountain Ledge, 915 m, 31 Oct. 1948, (–CD), *Esterhuysen* 14624 (BOL); Cape Peninsula, Table Mt., Echo Valley, 915 m, 26 Oct. 1952, (–CD), *Esterhuysen* 20688 (BOL, PRE); Cape Peninsula, Table Mt., Fountain Ledge, 915 m, 28 Oct. 1956, (–CD), *Esterhuysen* 26437a (BOL); Cape Peninsula, Table Mt., Echo Valley, 915 m, 15 Oct. 1972, (–CD), *McKinnon* 63X (NBG); Cape Peninsula, Table Mt., Echo Valley, 15 Oct. 1972, (–CD), *McKinnon* 296 (NBG); Drakenstein Mts, E slopes of Bullerskop, 1065 m, 30 Sept. 1945, (–DD), *Esterhuysen* 11900 (BOL). **3319** (Worcester): Groot Winterhoek Wilderness Reserve, path up to Sneeuwgat, slopes above Die Plaat, 1200 m, 22 Sept. 2001, (–AA), *Whitehouse* 270 (BOL); Hex River Mts, Plateau Point, N of Milner Peak, 1770 m, 24 Aug. 1958, (–AD), *Esterhuysen s.n.* (BOL); Hex River Mts, Buffelshoek Twins, 1830 m, 25 Dec. 1942, (–AD), *Esterhuysen* 8396 (BOL); Matroosberg, flats between summits, 2230 m, 27 Jan. 2001, (–BC), *Whitehouse* 188 (BOL); Du



Toits Kloof, 1839, (–CA), *Drège s.n.* (K); E slopes of Seven Sisters Mt., 1065 m, 24 Sept. 1949, (–CA), *Esterhuysen 15802* (BOL); Du Toits Peak, 1830 m, 26 Jan. 1943, (–CC), *Esterhuysen 8601* (BOL); Wemmershoek Mts, 915–1220 m, 19 Oct. 1943, (–CC), *Esterhuysen 9087* (BOL); Haalhoek Sneeuwkop, 1370 m, 25 Dec. 1943, (–CC), *Esterhuysen 9601* (BOL); Wemmershoek Peak, W side, 1675 m, 31 Dec. 1944, (–CC), *Esterhuysen 11287* (BOL); Wemmershoek Peak, summit, 2 May 1945, (–CC), *Esterhuysen 11577* (BOL); Stettynsberg, S slopes, 1675 m, 16 Dec. 1944, (–CD), *Esterhuysen 11147* (BOL, PRE); Keeromsberg, cliffs on S side, 1525–1830 m, 8 Nov. 1943, (–DA), *Esterhuysen 9225* (BOL); Keeromsberg, gully on S side between Keeromsberg and Ben Heatlie, 1675 m, 22 Mar. 1958, (–DA), *Esterhuysen 27643* (BOL); W Langeberg, SE slopes of Dassieshoek Peak, steep kloof some 100 m SE of trig beacon, 1660 m, 1 Mar. 1997, (–DB), *Helme 1246* (NBG). **3320** (Montagu): Swellendam District (on mountain peak near Swellendam ex Weimarck), 16 Jan. 1815, (–CD), *Burchell 7399* (K); Zuurbraak Mt., 1435 m, 12 Oct. 1897, (–DC), *Galpin 3992* (PRE). **3321** (Ladismith): Swartberg Mts, Toverkop, 1980 m, 5 Sept. 1947, (–AC), *Esterhuysen 13932* (BOL); Seven Weeks Poort Mt., near Beacon on the S side of rocks, 2315 m, 26 Dec. 1928, (–AD), *Andreae 1187* (NBG, PRE); Seven Weeks Poort Mts, ledges on S side of Ridge Peak, 2135 m, 27 Dec. 1928, (–AD), *Andreae 1361* (NBG, PRE); Seven Weeks Poort Mt., summit, 2315 m, 30 Mar. 1959, (–AD), *Esterhuysen 28275* (BOL); Klein Swartberg, main ridge W of Hoekoe Peak, S-facing cliffs, 2040 m, 4 Feb. 1992, (–AD), *Oliver 10020* (NBG). **3322** (Oudtshoorn): Swartberg Pass, S aspect, 1705 m, 10 Nov. 1977, (–AC), *Bond 1163* (NBG, PRE); Swartberg Pass area, Blaauwkop, 1830 m, Dec. 1943, (–AC), *Stokoe 9049* (BOL); Great Swartberg, path from Die Hoek to Gouekrans Hut, 1500 m, 20 Mar. 1999, (–AC), *Whitehouse 25* (BOL); Great Swartberg, ridge to summit of Tierberg, 2000 m, 21 Mar. 1999, (–AD), *Whitehouse 29* (BOL, NBG); Swartberg, main peak in ridge E of Blesberg, S-facing grassy, rocky slope, 1890 m, 6 Jan. 1975, (–BC), *Thompson 2245* (NBG, PRE). **3323** (Willowmore): Witteberg, peak N of Worlds View Farm, 1525 m, 26 July 1986, (–BA), *Vlok 1543* (NBG, PRE). **3324** (Steytlerville): Baviaanskloof, Bosrug Peak, No. 59, 6 May 1995, (–CA), *Euston-Brown 484* (GRA). **3418** (Simonstown): Kogelberg State Forest, S end of Five Beacon Ridge, plot 241, 1100 m, 27 Aug. 1973, (–BB), *Boucher 2203* (NBG); SE side of Somerset Sneeuwkop, 1220 m, Dec. 1939, (–BB), *Esterhuysen 1991* (BOL); Hottentots Holland Mts, Moordenaars Kop, 30 Oct. 1943, (–BB), *Esterhuysen 9122* (BOL); Hottentots Holland Triplets, 1370 m, 31 Oct. 1943, (–BB), *Esterhuysen 9164* (BOL). **3419** (Caledon): Victoria Peak summit, 1525 m, 2 Jan. 1944, (–AA), *Esterhuysen 9699* (BOL); Jonkershoek State Forest, summit of Victoria Peak, 1530 m, 29 Dec. 1983, (–AA), *Forsyth 363* (NBG, PRE); Lebanon Catchment Area 1f, 855 m, 1 Oct. 1967, (–AA), *Kruger 531* (NBG, PRE); Caledon District (Baviaan's Kloof, Genadendal ex Weimarck), 16 Feb. 1815, (–BA), *Burchell 7743* (K); Genadendal, in mountains, 1220 m, 23 Dec. 1896, (–BA), *Schlechter 9819* (BM, BOL, K, PRE, PRE).

5. **Cliffortia montana** Weim. in Monograph of the Genus *Cliffortia*: 46, fig. 9E–K (1934); Fellingham: 613 (2000); Whitehouse & Victor: 115 (2002). Type: Graaff-Reinet District, Sneeuwberg Mts, Koudeveldberg, 1 675–1 830 m, Dec. 1873, *Bolus 2596* (K, holo.!; B†, BOLL, iso.).



Tall erect shrub up to 2 m high, forming a single main stem with determinate length side branches although sometimes stunted and more rounded in exposed conditions, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.5–0.7 mm wide, sometimes tinged reddish, densely hairy; stem hairs spreading or curled, 0.2–0.7 mm long. *Leaves* trifoliolate; leaflets elliptic to linear, 2.4–3.9 × 0.5–0.9 mm; base contracted abruptly to form a pseudopetiolule; apex obtuse to rounded, up to 0.2 mm long; margins inrolled beneath, entire; lamina chartaceous, 0.1–0.2 mm thick, midrib prominent beneath against lamina, ± straight or curved downwards and away from stem, hairy above but glabrescent and usually appearing green, hairs 0.3–0.6 mm long, densely whitish hairy beneath, 0.1–0.4 mm long; sheath 0.7–2.4 mm long, abaxially hairy, adaxially densely curly hairy; stipules absent or up to 0.5 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 3, hairy on outside. *Male flowers* with bracteoles 2.1–3.5 mm long; pedicel 0.3–0.8 mm long; sepals broadly ovate, 3.0–4.5 × 1.3–1.9 mm, acute to acuminate at apex; stamens 6–8; filaments 2.9–5.6 mm long, red or greenish white; anthers yellow. *Female flowers* with bracteoles 1.9–3.2 mm long, longer than immature receptacle; sepals linear, 1.2–1.6 × 0.1–0.4 mm, erect; carpel 1; stigma 2.8–5.7 mm long, red, feathery, prominent above leaves; immature receptacle 0.8–1.5 × 0.3–0.8 mm, glabrous, clearly ribbed. *Achene* 1.8–2.6 × 0.8–1.0 mm, pale greyish brown, glabrous; ribs 14–26, rounded to acute, less than 0.1 mm wide. *Flowering time*: October to April.

Habitat: High altitude montain fynbos on soils from Table Mountain Series, but often in shallow watercourses and depressions in full sun; altitude 1 200–2 300 m.

Distribution: Restricted to the Klein and Groot Swartberg mountains and the Sneeuwberg Mountains near Graaff-Reinet (see note below).

Conservation status: Infrequently collected but more populations have been found recently and therefore probably more widespread, especially in the Swartberg Mountains. Red List status: Rare.

Etymology: *montana* (Latin) means 'growing on mountains', which applies to many species but this is restricted to high altitudes.

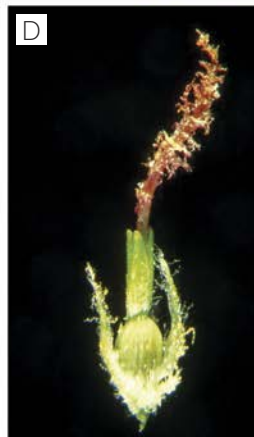
Notes: *Cliffortia montana* is distinctive on account of its small leaves, the smallest in the subgenus. However, while this character is evident on herbarium sheets, the habit of the plants is usually not recorded. This is critical, as plants from the Great Escarpment form divaricately branched rounded shrubs, while those from the Swartberg typically form tall narrowly columnar shrubs with short side branches. The type of *C. montana* is based on a specimen from the Graaff-Reinet mountains and Weimarck described the species from this collection alone. The plants from the Swartberg are so different in habit that they may represent a separate species. For the time being the Swartberg populations are considered to be conspecific with these from the Sneeuwberg Mountains.

The only species in the subgenus that grows sympatrically with *Cliffortia montana* is *C. eriocephalina*, from which it can be distinguished by its less hairy, green leaves and non-resprouting habit. Putative hybrids between these two species have been recorded in the Swartberg (e.g. Ladismith District, Swartberg,

Toverkop, *Esterhuysen 26805* (BOL) & *Esterhuysen 26806* (BOL); Laingsburg District, Seven Weeks Poort, *Esterhuysen 24779* (BOL); Klein Swartberg, Steenslang, *Marshall 142* (NBG, PRE); Ladismith District, Klein Swartberg, N slopes of Hoekoe Peak, *Oliver 10008* (NBG)).

Representative specimens

SOUTH AFRICA. **3224** (Graaff-Reinet): Graaff-Reinet, Sneeuwberg Mts, Koudeveldberg, 1675 m, Dec. 1873, (–AA), *Bolus 2596* (BOL, K); Nardouwsberg, rocky outcrop to NE of summit, 2255 m, 10 Jan. 2001, (–BB), *Whitehouse 176* (BOL). **3321** (Ladismith): Klein Swartberg, Radio Tower track, E of Seven Weeks Poort, ridge S of radio lower peak, 1710 m, 14 Oct. 1980, (–AD), *Bond 1783* (NBG, PRE); Seven Weeks Poort Mt., 1525 m, 13 Oct. 1955, (–AD), *Esterhuysen 24825* (BOL); Swartberg just E of Seven Weeks Poort, above Rocklands, 1920 m, 7 Oct. 1993, (–AD), *Oliver 10373* (NBG); Be-semfontein, Klipkraal Trail, valley bottom near stone kraal, 1645 m, 8 Apr. 2000, (–AD), *Whitehouse 106* (BOL); Swartberg Mts, 1400 m, Jan. 2005, (–BC), *Helme 3332* (NBG); Swartberg Mts, ± 5 km along road to Gamkaskloof, 1280 m, 5 Nov. 1985, (–BD), *Vlok 1237* (K, PRE). **3322** (Oudtshoorn): Swartberg, watershed above Perdepoot R catchment, 1705 m, 9 Dec. 1978, (–AC), *Bond 1627* (NBG, PRE); Swartberg Pass, 1830 m, 25 Jan. 1941, (–AC), *Compton 10425* (NBG); Swartberg Pass area, Dec. 1943, (–AC), *Stokoe 9050* (BOL); Swartberg, NW of Tierberg, deep kloof running N, 1525 m, 4 Jan. 1975, (–AC), *Thompson 2207* (NBG, PRE); Great Swartberg, path from Die Hoek to Gouekrans Hut, 1500 m, 20 Mar. 1999, (–AC), *Whitehouse 26* (BOL, NBG).



6. **Cliffortia weimarckii** C.M.Whitehouse in Bothalia 37(1): 17, fig. 4, 10 (2007). Type: Western Cape, Worcester District, Matroosberg, Spekrievierskloof, stony E slopes above Ski Hut, 1950m, 27 Jan. 2001, *Whitehouse 187* (BOL, holo.!; NBG!, iso.).



Erect shrub up to 0.9 m high, resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 1.1–1.5 mm wide, usually tinged reddish, densely hairy; stem hairs spreading, 0.9–1.5 mm long. *Leaves* trifoliolate; leaflets narrowly oblong to needle-shaped, 6.2–8.9 × 0.8–1.2 mm; base contracted abruptly to form a pseudopetiolule; apex acute to acuminate, 0.1–0.2 mm long; margins inrolled beneath, entire; lamina chartaceous to rigid, 0.1–0.3 mm thick, midrib prominent beneath against lamina, ± straight or curved upwards and towards stem, densely greyish hairy above, hairs 0.4–1.7 mm long, densely whitish hairy beneath, hairs 0.2–0.4 mm long; sheath 2.7–3.1 mm long, abaxially hairy, adaxially densely hairy; stipules 0.2–0.4 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 3, densely hairy on outside. *Male flowers* with bracteoles 3.6–4.0 mm long; pedicel 0.9–1.3 mm long; sepals broadly ovate, 5.0–5.8 × 1.8–2.3 mm, acute to acuminate at apex; stamens 9–11; filaments 4.6–5.7 mm long, red; anthers brownish red. *Female flowers* with bracteoles 2.8–4.8 mm long, longer than immature receptacle; sepals linear, 1.5–2.9 × 0.2–0.5 mm, erect; carpel 1; stigma 4.1–6.5 mm long, red, feathery, prominent above leaves; immature receptacle 1.6–2.2 × 0.7–0.9 mm, glabrous, clearly ribbed. *Achene* 3.2–3.7 × 1.1–1.4 mm, pale greyish brown, glabrous; ribs 11–15, rounded to acute, less than 0.1 mm wide. *Flowering time*: January to February.

Habitat: High altitude mountain fynbos on well-drained acid sands from Table Mountain Series in full sun; altitude 1 200–2 250 m.

Distribution: Hex River Mountains and the highest peaks of the Koue Bokkeveld and Groot Winterhoek mountains, possibly also Baviaansberg, Cederberg Langberg and Touwsberg (see note below).

Conservation status. Populations are scattered as it is restricted to such high altitudes, however it is therefore also not threatened, especially as it is a resprouter. Red List status: Rare.

Etymology: *weimarckii* – named after Henning Weimarck who wrote the last monograph of *Cliffortia*.

Notes: This species is very similar in many respects to *Cliffortia eriocephalina* but differs on account of its longer narrower stiffer and pointed leaves. The leaves are similar in form to the unrelated lowland species *C. stricta*, but are much more hairy and grey in appearance. *Cliffortia eriocephalina* and *C. weimarckii* grow sympatrically, where they are clearly distinguished. No obvious hybrids between the two have been found, although the dense white wooly specimens of *C. eriocephalina* from Matroosberg (see note under that species) could be a result of introgression with *C. weimarckii*. However, it is difficult to determine if specimens from the Baviaansberg and Cederberg mountains belong here, or under *C. eriocephalina*, as they are intermediate in character. There has also been an observation from Touwsberg in the Little Karoo, which morphologically appears to fit here. See also note under *C. esterhuyseniae*.

Representative specimens

SOUTH AFRICA. **3219** (Wuppertal): Koue Bokkeveld, Skoongesig Peak, Apr. 1939, (–CC), *Stokoe 8835* (BOL). **3319** (Worcester): Klein Winterhoek, 18 Feb. 1947, (–AA), *Esterhuysen 13782* (BOL); Tulbagh, Winterhoek Mt., 2000 m, Dec. 1895, (–AA), *Marloth 2250* (PRE); Klein Winterhoek, 1800 m, Oct. 1905, (–AA), *Marloth 4241* (NBG); Waaihoek Mts, 1525 m, 15 Dec. 1942, (–AD), *Esterhuysen 8312* (BOL, K, PRE); Hex River Mts, above Dome, 1525 m, 12 Nov. 1943, (–AD), *Esterhuysen 9368* (BOL); Waaihoek, W slope, 1220–1525 m, 10 Jan. 1944, (–AD), *Esterhuysen 9920* (BOL); SE side of Milner Peak, 1675 m, 6 Dec. 1947, (–AD), *Esterhuysen 14280* (BOL); S side of Skurweberg [Schurftberg], 7 Dec. 1948, (–AD), *Esterhuysen 14722* (BOL); SE side of

Waaiohoek Peak, 1675 m, 12 Dec. 1948, (–AD), *Esterhuysen 14832* (BOL); Hex River Mts, E side of Milner Peak, 1525 m, 18 Dec. 1948, (–AD), *Esterhuysen 14891* (BOL); Hex River Mts, E side of Milner Peak, 1525 m, 16 Dec. 1948, (–AD), *Esterhuysen 14946* (BOL); Hex River Mts, Sentinel Peak, 1675–1830 m, 16 Feb. 1958, (–AD), *Esterhuysen 27575* (BOL); Hex River Mts, Milner Peak, near Amphitheatre, 1525 m, 4 Jan. 1959, (–AD), *Esterhuysen 28090* (BOL); near top of Matroosberg, 2165 m, 30 Sept. 1928, (–BC), *Andreae 1154* (NBC, PRE); SW side of Matroosberg, 1675–1830 m, 2 Dec. 1947, (–BC), *Esterhuysen 14183* (BOL); Groothoek Peak, 1980 m, 6 Apr. 1958, (–BC), *Esterhuysen 27688* (BOL); Matroosberg, slopes above Ski Club Upper Hut, 1770–2135 m, 1 June 1958, (–BC), *Esterhuysen 27772* (BOL); Matroosberg, Spekrivierskloof, stony E slopes above Ski Hut, 1950 m, 27 Jan. 2001, (–BC), *Whitehouse 187* (BOL, NBC); Keeromsberg, below summit, S side, 2010 m, 8 Nov. 1943, (–DA), *Esterhuysen 9296* (BOL).



Cliffortia weimarckii: A, habitat; B, branch with female flowers; C, dorsal view of leaf; D, ventral view of leaf; E, branch; F, achene.

7. **Cliffortia dispar** Weim. in Botaniska Notiser 80: 418, fig. 9 (1946); Fellingham: 612 (2000). Type: Uniondale District, Kouga Mts, near Smutsberg, S slopes, 1 525 m, 12 Nov. 1944, *Esterhuysen 10731* (LD, holo.; BOL!, K!, NBG!, PRE, iso.).



Erect to laxly scrambling shrub up to 1.2 m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.6–1.6 mm wide, sometimes tinged reddish, densely hairy; stem hairs spreading or curled, 0.3–1.2 mm long. *Leaves* 1–3-foliolate; leaflets elliptic to oblong or linear, 2.8–7.2 × 0.7–1.8 mm, but up to 14.1 × 4.4 mm if unifoliolate; base contracted abruptly to form a pseudopetiolule; apex acute to rounded, up to 0.4 mm long; margins inrolled beneath, entire; lamina chartaceous, 0.1–0.4 mm thick, midrib prominent beneath against lamina, ± straight or curved downwards and away from stem, green and glabrous to greyish hairy above, hairs 0.3–1.2 mm long, densely whitish hairy beneath, hairs 0.1–1.6 mm long; sheath 1.6–2.6 mm long, abaxially hairy, adaxially densely hairy; stipules 0.1–1.5 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 3, densely hairy on outside. *Male flowers* with bracteoles 4.0–4.8 mm long; pedicel 0.9–1.0 mm long; sepals broadly ovate, 4.8–5.6 × 1.9–2.9 mm, acute to acuminate at apex; stamens 4–6; filaments 6.8–7.8 mm long, red; anthers brownish red. *Female flowers* with bracteoles 1.9–4.5 mm long, longer than immature receptacle; sepals linear, 1.5–2.9 × 0.2–0.6 mm, erect; carpel 1; stigma 4.2–10.1 mm long, red to pinkish white, feathery, prominent above leaves; immature receptacle 1.0–2.1 × 0.5–1.1 mm, glabrous, clearly ribbed. *Achene* 2.3–2.8 × 0.9–1.1 mm, pale greyish brown, glabrous; ribs 16–22, rounded to acute, less than 0.1 mm wide. *Flowering time*: September to February, with a single record from May.

Habitat: Well-drained soils from Table Mountain Series in full sun; altitude 600–1 700 m.

Distribution: Southern Cape mountains from Grootberg in the Langeberg to Stinkhoutberg near Otterford, and found inland on the southern slopes of the Kammanassie and Kouga mountains.

Conservation status: Infrequently collected but probably more widespread as it grows at high altitude in mountains that are poorly collected. Red List status: LC.

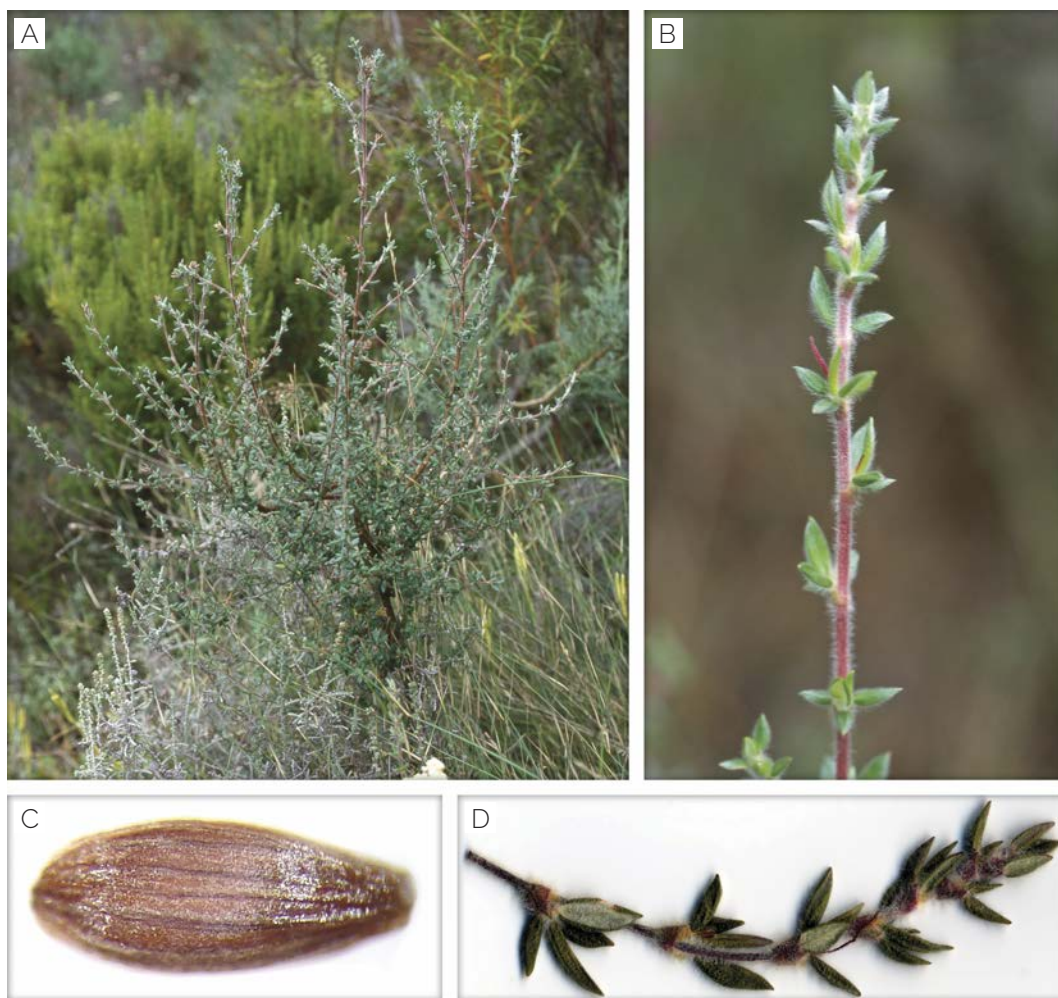
Etymology: *dispar* (Latin) means 'unlike', referring to the leaves being variably one or three foliolate.

Notes: The unifoliolate form of *Cliffortia dispar* is very distinctive, forming a scrambling plant with discolourous leaves, green above and whitish hairy beneath; the leaflets are also much larger than those of *C. eriocephalina*. In this form it appears more similar to *C. esterhuyseniae*, but the two species are never sympatric. In more arid conditions and at higher altitude, *C. dispar* appears more similar to *C. eriocephalina* and it is probable that they hybridise in areas where the two co-occur (e.g. Uniondale District, Hoopsberg, southern slopes, *Esterhuysen 6594*). *Cliffortia dispar* can then best be distinguished by its occasionally unifoliolate leaves and single stem non-resprouting habit, such that it forms a taller, less rounded bush than *C. eriocephalina*; indeed small-leaved forms of *C. dispar* can appear similar to *C. montana*. Additional study of different populations of *C. dispar* is needed to understand whether the unifoliolate and trifoliolate forms are induced by growing conditions or have a genetic basis.

Representative specimens

SOUTH AFRICA. **3320** (Montagu): Lemoenshoek Peak, S slope, 1220 m, 15 Sept. 1944, (–DD), *Esterhuysen 10446* (BOL, K); Boosmansbos Wilderness Area, Helderfontein, on hill overlooking Boosmansbos, 1160 m, 9 Dec. 2000, (–DD), *Whitehouse 168* (BOL, NBG). **3321** (Ladismith): Attakwaskloof, Old Voortrekker Pass, near summit, 855 m, 22 Nov. 1972, (–DD), *Thompson 1612* (NBG, PRE). **3322** (Oudtshoorn): Kammanassie Mts, Mannetjiesberg, 1 Feb. 1941, (–DB), *Esterhuysen 4716* (BOL); Kammanassie Mts, Mannetjiesberg, 1525 m, 1 Feb. 1941, (–DB), *Esterhuysen 4722* (BOL, K);

Oudtshoorn, Mannetjiesberg, 1340 m, 2 Oct. 1971, (–DB), *Oliver 3616* (K, NBG, PRE); Kammanassie Nature Reserve, gully beneath S face of Mannetjiesberg, 1300 m, 17 Feb. 2001, (–DB), *Whitehouse 197* (BOL); Kammanassie Nature Reserve, plateau to N of Buffelsberg, 1500 m, 18 Feb. 2001, (–DB), *Whitehouse 200* (BOL). **3323** (Willowmore): Hoopsberg, S slopes, 1525 m, 6 Nov. 1941, (–CB), *Esterhuysen 6595* (BOL, K, PRE); Prince Alfred's Pass, N slopes, 915 m, 3 Sept. 1951, (–CC), *Acocks 16039* (PRE); Avontuur Mt, 2 May 1941, (–CC), *Compton 10774* (NBG); Prince Alfred's Pass, N side just below summit, 1035 m, 19 Oct. 2000, (–CC), *Whitehouse 156* (BOL); Kouga Mts, near Smutsberg, S slopes, 1525 m, 12 Nov. 1944, (–DB), *Esterhuysen 10731* (BOL, K, NBG, PRE); Louterwater, 26 Jan. 1941, (–DC), *Bond 880* (NBG); Joubertina, Die Hoek, N foot of Tsitsikamma Mts, along track on side of valley, 610 m, Nov. 1958, (–DC), *Esterhuysen s.n.* (BOL). **3324** (Steytlerville): Kouga Mts, near Kouga Peak, S slopes, 915–1220 m, 14 Nov. 1944, (–CA), *Esterhuysen 10828* (BOL); Great Winterhoek Mts, Cockscomb, 1525–1675 m, 3 Mar. 1957, (–DB), *Esterhuysen 27130* (BOL); Otterford area, ridge E of Stinkhoutberg, 825 m, 9 Sept. 1973, (–DB), *Oliver 4463* (NBG).



Cliffortia dispar: A, habitat; B & D, branch with female flowers; C, achene.

8. ***Cliffortia esterhuyseniae*** Weim. in Botaniska Notiser 90: 200, fig. 16 (1948); Fellingham: 609 (2000). Type: Worcester District, Hex River Mts, shale band below Milner Peak, 1 525 m, 11 Nov. 1943, *Esterhuysen 9367* (BOL, holo.!).



Scrambling shrub up to 1.8 m high, forming tangled thickets, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.5–1.5 mm wide, sometimes tinged reddish, densely hairy; stem hairs spreading, 0.2–1.4 mm long. *Leaves* unifoliolate, elliptic to oblong or linear, 6.6–11.7 × 1.9–4.6 mm; base contracted abruptly to form a pseudopetiolule; apex acute to rounded, up to 0.4 mm long; margins inrolled beneath, entire; lamina single-veined from base, chartaceous, 0.1–0.2 mm thick, midrib prominent beneath lamina, curved downwards and away from stem, hairy above, sometimes densely so and greyish, hairs 0.3–0.6 mm long, glabrous to densely whitish hairy beneath, hairs 0.3–0.6 mm long; sheath 0.4–1.3 mm long, abaxially hairy, adaxially densely hairy; stipules absent to 0.4 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 3, hairy on outside. *Male flowers* with bracteoles 1.2–1.7 mm long; pedicel 0.4–0.6 mm long; sepals broadly ovate, 3.0–3.4 × 1.7–2.2 mm, acute to acuminate at apex; stamens 11–13; filaments 2.8–3.4 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 1.1–1.5 mm long, longer than immature receptacle; sepals linear, 1.3–1.5 × 0.1–0.3 mm, erect; carpel 1; stigma 3.9–5.1 mm long, pinkish white, feathery, only extending slightly beyond base of leaf; immature receptacle 1.0–1.1 × ± 0.5 mm, glabrous, clearly ribbed. *Achene* pale greyish brown, glabrous; ribs rounded to acute. *Flowering time*: January to February.

Habitat: Shale bands beneath sandstone cliffs and in fire free areas on the cliffs, generally on south-facing slopes or in shady kloofs; altitude 600–1 850 m.

Distribution: Hex River Mountains between Waaihoek Peak and Matroosberg, and possibly also on the Keeromsberg (see note below).

Conservation status. Localised and specialised endemic, but its habitat is so inaccessible that it is not threatened. Red List status: Rare.

Etymology. *esterhuyseniae* – named after Elsie Esterhuysen, a past staff member of the Bolus Herbarium and prolific collector of the Cape mountain flora.

Notes: The leaves of *Cliffortia esterhuyseniae* are very variable despite its limited distribution. Their size is presumably influenced greatly by water availability, sunlight and exposure in their immediate habitat. It is most similar in morphology to the larger-leaved forms of *C. dispar*, however, *C. esterhuyseniae* never has trifoliolate leaves and the two species are widely separated geographically. Putative hybrids with *C. weimarckii* have been observed on Matroosberg and an odd collection from Keeromsberg (*Esterhuysen 27642*) might also be attributable to a hybrid with that species or *C. eriocephalina*.

Elsie Esterhuysen adds an informative note about the habit of this species on one of her collections (*Esterhuysen 28070*): '*C. esterhuyseniae* is found mainly on rocky places, in kloofs or on slopes. On some scree, formed on the steep shale band slopes of the Hex River Mts, it may form an almost pure stand, becoming woody, dense and tangled, the older woody stems being decumbent while the younger leafy stems are ascending and up to 4 ft tall. Progress through this is difficult because, although the basal woody stems can support one's weight, the upper ones are too flexible to be secure for holding on to; meanwhile one has to peer through this tangle to discover where to walk on the rocks. This scree area of the shale band has a S–SE aspect, and runs below the upper 1,000 ft or more of sandstone cliffs.'

Representative specimens

SOUTH AFRICA. 3319 (Worcester): Hex River Mts, Cathedral Gorge, below Buffelshoek Twins, 610–915 m, 24 Dec. 1942, (–AD), *Esterhuysen 8379* (BOL); below Milner Peak, 1525 m, 11 Nov. 1943, (–AD), *Esterhuysen 9366* (BOL); Hex River Mts, below Milner Peak, 1525 m, 11 Nov. 1943, (–AD), *Esterhuysen 9367* (BOL); Hex River Mts, SE side of Milner Peak, 1675 m, 6 Dec. 1947, (–AD), *Esterhuysen 14279* (BOL); Hex River Mts, E side of Milner Peak, 1675 m, 18 Dec. 1948, (–AD), *Esterhuysen 14889* (BOL, NBG, PRE); Hex River Mts, E side of Milner Peak, 1525 m, 18 Dec. 1948, (–AD), *Esterhuysen 14890* (BOL, PRE); head of kloof at N end of Waaihoek Peak, 1675 m, 25 Dec. 1950, (–AD), *Esterhuysen 18215* (BOL, NBG); Hex River Mts, Milner area, Moraine Kloof, 750–1675 m, 1 Jan. 1959, (–AD), *Esterhuysen 28070* (BOL); Hex R Mts, Milner Peak above Kanetvlei, (–AD), *Versfeld in Whitehouse 284* (BOL, K, NBG); Groothoek Kloof, 760 m, 1 Dec. 1947, (–BC), *Esterhuysen 14180* (BOL); Matroosberg group, Roodeberg, 1830 m, 6 Apr. 1958, (–BC), *Esterhuysen 27697* (BOL); Waaihoek Mts, Jan Du Toits Kloof, 1065 m, 21 Jan. 1949, (–CB), *Esterhuysen 15070* (BOL).



Cliffortia esterhuyseniae: A, branch with male flowers; B, dorsal view of leaf; C, ventral view of leaf.

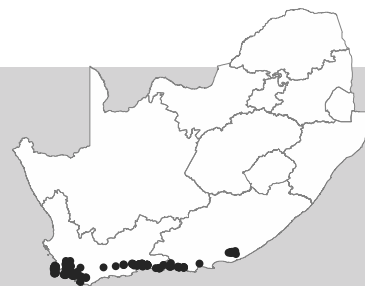
(9–13) **Subgenus Gramineae** *C.M.Whitehouse* subgen. nov.

Type species: *C. graminea* L.f.

Medium to tall, densely to sparsely branched shrub, resprouting after fire from a thick caudex, sometimes scrambling amongst surrounding vegetation. Young stems glabrous, with or without brachyblasts. Sheath glabrous abaxially, glabrous adaxially or sometimes with a short fringe of hairs at the apex; stipules present, often green and similar in texture to the lamina; petiole absent. Leaves unifoliate, **grass-like to long needle-shaped**, green above and beneath, usually glabrous, only rarely with a few hairs on the midrib beneath, single- or multi-veined, apex long acuminate to pungent. Flowers solitary in the axils of ordinary vegetative leaves; bracteoles longer than receptacle; sepals 3, glabrous; **male sepals often narrowly elliptic**; stamens 12–30; female sepals erect; receptacle glabrous; carpel single. Achenes irregular to ellipsoid, ribbed, glabrous, brown. **Growing in permanently wet areas.**

The subgenus contains five species with very long and narrow, often grass-like, unifoliate leaves. All the species grow beside flowing water or in seepage areas. Only seedling leaves for *Cliffortia strobilifera* have been observed and these are similar to the mature foliage. No hybrids have been reported in the subgenus, except possibly for *C. graminea* var. *convoluta* (see note under species).

9. **Cliffortia graminea** L.f., Supplementum Plantarum: 429 (1782); Thunb.: 435 (1823); DC.: 595 (1825); G.Don: 596 (1832); Eckl. & Zeyh.: 266 (1836); Harv.: 296 (1862); Bolus & Wolley-Dod: 259 (1904); Juel: 276 (1918); Weim.: 116 (1934); Levyns: 449 (1950); Fellingham: 609 (2000); Bean & Johns: 192 (2005). Type: Uniondale District, Langekloof, near river & town Driefontyn, *Thunberg s.n.* (LINN, holo.!; LD, S, iso.).



C. graminea var. *convoluta* Weim.: 118 (1934) & 412, fig. 4 (1946). Type: South Africa, without precise locality [Ecklon & Zeyher give three locations for this collection: Cape Peninsula, Table Mt near Constantia and Tokai; Worcester District, mountain flats above waterfall near Tulbagh; Albany District, Moll R not far from Grahamstown], *Ecklon & Zeyher 1723 pro parte* (C, HBG!, L, W, Z).

C. graminea var. *elegans* Weim.: 196, fig. 14, t. 10 (1948); Dahlgren: 302, fig. 4G, fig. 5K (1971); Whitehouse & Victor: 115 (2002). Type: Caledon District, Kogelberg, E side, lower slopes, 16 Jan. 1944, *Esterhuysen 10010* (BOL, holo!).

Scrambling to decumbent semi-herbaceous shrub up to 2 m high but usually much less, resprouting after fire from a central crown; sparsely branched, only forming long branches. *Young stems* 0.9–1.1 mm wide, completely sheathed by leaf bases, glabrous. *Leaves* unifoliate, oblong to narrowly lanceolate, 26–72 × 2.0–4.2 mm; apex sharply acuminate, 1.5–2.8 mm long; margins flat with 6–15 fine straight teeth, 0.4–1.0 mm long; lamina 3–7-veined from base, herbaceous to chartaceous, midrib prominent beneath against lamina, 0.1–0.3 mm thick, ± straight or slightly curved upwards and towards stem, glabrous above and beneath; sheath 6–45 mm long, abaxially glabrous, adaxially glabrous except sometimes for fringe of hairs at apex; stipules green and similar to lamina, 4.5–11.9 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous, margins smooth; sepals 3, glabrous. *Male flowers* with bracteoles 3.4–9.5 mm long, pedicel 1.3–2.8 mm long; sepals narrowly elliptic, 11.4–14.0 × 1.3–2.3 mm, acute to acuminate at apex, separating on one side only at anthesis and forming a hood over stamens; stamens 13–21; filaments 4.5–10.5 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 4.2–8.0 mm long, longer than immature receptacle; sepals ± triangular, 2.2–5.0 × 0.6–1.4 mm, erect; carpel 1; stigma 5.5–8.6 mm long, greenish white, feathery, twisted to one side and so protruding from leaves; immature receptacle 1.8–2.2 × 0.9–1.0 mm, glabrous, clearly ribbed. *Achene* 3.5–5.0 × 1.9–2.3 mm, medium to dark brown, glabrous; ribs 18–24, rounded to acute, less than 0.1 mm wide. *Flowering time*: all year.

Habitat: Permanently wet seepage areas on acid sands from Table Mountain Series in full sun; altitude 0–950 m.

Distribution: Southern coastal plains and lower mountains from the Cape Peninsula to Grahamstown.

Conservation status: Widespread and common species wherever conditions are right, though frequently overlooked. Red List status: LC.

Etymology: *graminea* (Latin) means ‘grass-like’, which this species most definitely is!

Common names: *vlei-rooigras*, *wilde-ertjie* (Afrikaans).

Notes: An easily recognised species, as long as it is first identified as a *Cliffortia*. This species is so grass-like in its habit that careful inspection is needed to confirm that one is looking at a dicotyledon.

It has a very particular habitat preference, namely permanent wet seeps on acid sands, and within its range it is a common component of such habitat. It may be confused with *C. strobilifera* or *C. longifolia* when the plants are resprouting, however, those species will not produce flowers on the resprouting shoots, and have a single main vein in contrast to *C. graminea*'s multiple parallel veins. *Cliffortia graminea* is also unique in the shape of its male flowers. The sepals are long elliptic and united adaxially, forming a hood over the stamens.

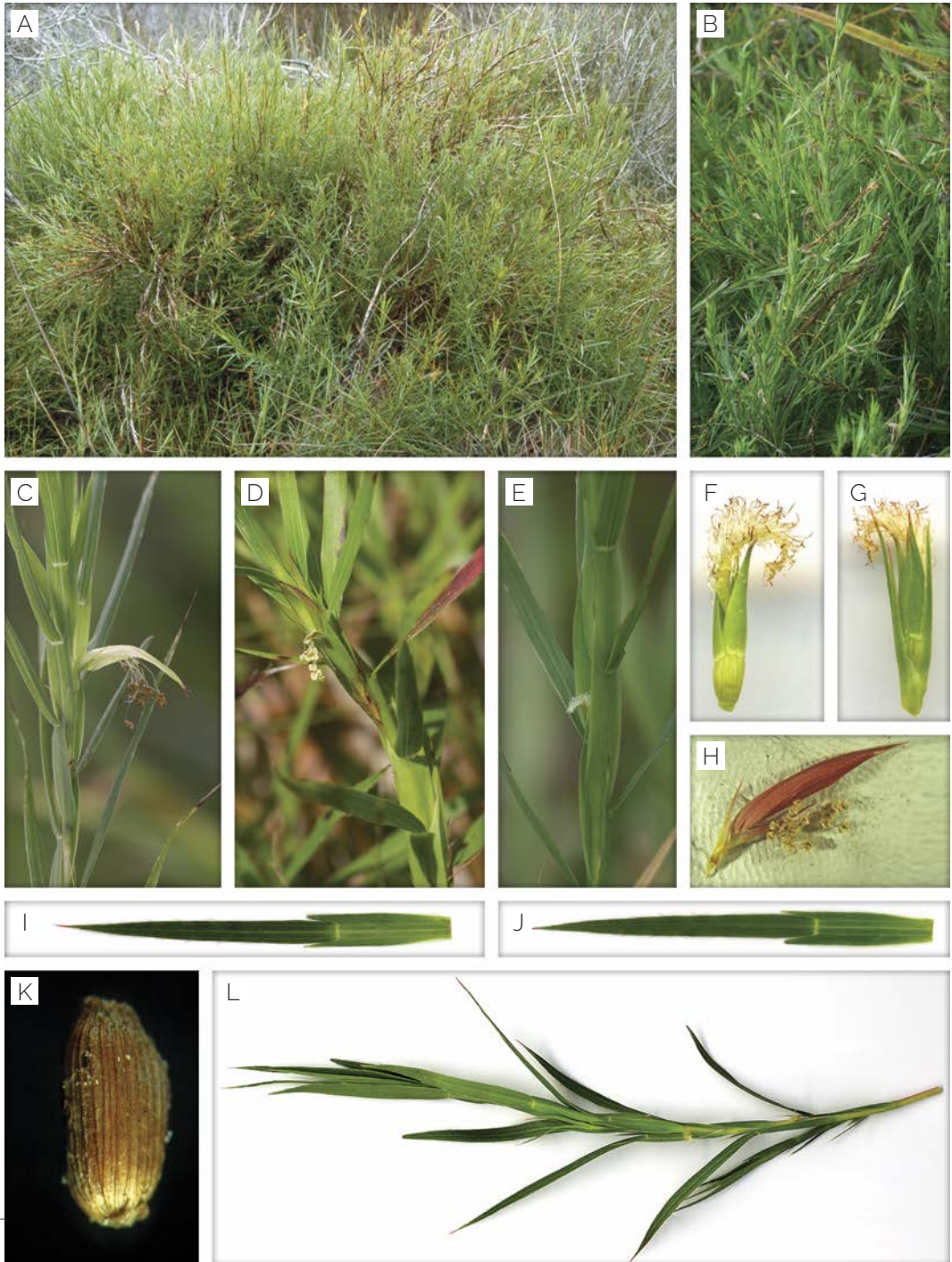
Neither of the varieties described by Weimarck are recognised here. The size and shape of the leaves can vary immensely depending upon the amount of groundwater present and var. *elegans* could represent just a form of the species from a drier habitat. However, the Kogelberg, the type area, is known for producing unusual localised species and so if more material is found that matches the type, the status of var. *elegans* may need reassessment.

The identity of var. *convoluta* is more uncertain. Weimarck (1946) suggests that it is a hybrid with *Cliffortia aculeata* but this seems highly unlikely as that species is restricted to the Swartberg and a long way from the closest populations of *C. graminea*. Furthermore, no other putative hybrids have been suggested with *C. graminea*, an unusual occurrence for *Cliffortia*. If it is a hybrid the most likely candidate would be *C. strobilifera*, as that species is widespread in the area where *C. graminea* grows. However, as the locality cannot be determined for certain, this variety appears to be best sunk into *C. graminea* unless more material that matches the type specimen can be found.

Weimarck (1934) records *Ecklon 943* from near Tulbagh Waterfall (which is also one of the localities for *Ecklon & Zeyher 1723*) but it has not been recollected from that far north in Western Cape and it is possible that the locality is erroneous. On the other hand, with such an incongruous location, this might be the type locality for var. *convoluta* and therefore worth relocating to clarify its status.

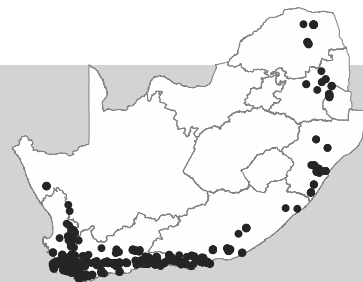
Representative specimens

SOUTH AFRICA. **3318** (Cape Town): Cape, Newlands, Kirstenbosch, Jan. 1920, (–CD), *Garside 1443* (K); near Claremont, 20 m, 8 July 1892, (–CD), *Schlechter 1064* (BM, BOL, PRE); Cape Town, 1825, (–CD), *Sieber 86* (PRE); Paarl District (Paarl Mt ex Weimarck), (–DB), *Drège s.n.* (K); Swartboskloof, Sosyskloof, 550 m, 17 Feb. 1963, (–DD), *Banks 1285* (PRE); Stellenbosch, Jonkershoek Forest Reserve, Swartboskloof, sponge area on contour path past the waterfall, 15 Apr. 1964, (–DD), *Bos 1383* (K); Jonkershoek, Biesjevlei, 335 m, 2 Feb. 1941, (–DD), *Levyns 7535* (BOL); Jonkershoek, 23 Nov. 1951, (–DD), *Parker 4675* (BOL, K, NBG, PRE); Swartboskloof, 395–550 m, 23 Nov. 1960, (–DD), *van der Merwe 24–36* (K, NBG, PRE); Zachariashoek, 9 Feb. 1962, (–DD), *van der Merwe 848* (NBG, PRE). **3319** (Worcester): hills in Du Toits Kloof, 13 Nov. 1949, (–CA), *Esterhuysen 16554* (BOL); Worcester, Bakkerskloof, 700 m, 10 Jan. 1978, (–CC), *van Wilgen 206* (NBG, PRE); La Motte Forest Station, Zachariashoek, Kasteelkloof, 550 m, 6 May 1982, (–CC), *Viviers 226* (NBG, PRE); La Motte Forest Station, Zachariashoek, Kasteelkloof, 305 m, 21 Oct. 1982, (–CC), *Viviers 725* (K, NBG, PRE). **3322** (Oudtshoorn): George, 6 Aug. 1847, (–CD), *Alexander–Prior s.n.* (PRE); N part of Montagu Pass, 15 Oct. 1928, (–CD), *Gillett 1644* (NBG); George, Woodville Forest Reserve, July 1927, (–DC), *Rendle 142* (BM). **3323** (Willowmore): Knysna, Spitskop, 13 May 1971, (–CD), *Geldenhuys 221* (NBG, PRE); Joubertinia, Die Hoek, valley N side of Tsitsikamma Mts, 18 Nov. 1944, (–DC), *Esterhuysen 10670a* (BOL). **3325** (Port Elizabeth): Loerie Plantation, Oct. 1934, (–CC), *Dix 137* (BOL). **3326** (Grahamstown): 9.5 km from Grahamstown, Coldspring, near station, 610 m, July 1928, (–AD), *Dyer 1608* (GRA); near Grahamstown, Faraway, portion 3 of Coldsprings farm, 700 m, 14 Nov. 1976, (–AD), *Jacot–Guillarmod 7767* (GRA); near Grahamstown, Faraway, portion 3 of Coldsprings, 750 m, 13 June 1981, (–AD), *Jacot–Guillarmod 8584* (GRA); Grahamstown, Brookhuysenspoort, 305–610 m, (–AD), *MacOwan 1009* (K); Alexandria District, Grahamstown,



Governors Kop, 30 Dec. 1939, (–BC), *Barker 669* (NBC); Featherstone Kloof near Grahamstown, 550 m, Sept. 1868, (–BC), *Bolus 1936* (BOL); Albany District (Grahamstown ex Weimarck), Aug. , (–BC), *Burchell 3552* (K); Bathurst District, Blaauwkrantz, Sept. 1916, (–BC), *Phillips 1100* (BOL). **3418** (Simonstown): Cape Peninsula, Hout Bay, Tierbos, 18 Jan. 1941, (–AB), *Bond 830* (NBC); between Wynberg and Constantia, 14 Feb. 1811, (–AB), *Burchell 815* (K); Cape Peninsula, Constantiaberg, 610 m, 13 Dec. 1942, (–AB), *Compton 14213* (NBC); Cape Peninsula, Steenberg, 9 Nov. 1944, (–AB), *Compton 16427* (NBC); Cape Peninsula, Noordhoek Mt, S aspect, 365 m, 6 May 1950, (–AB), *Compton 21953* (NBC); Muizenberg, Mar. 1908, (–AB), *Dummer s.n.* (NBC); Silvermine Dam inflow, 455 m, 6 Sept. 1988, (–AB), *Freshwater Research Unit 381* (BOL); Constantiaberg, 855 m, 20 Mar. 1892, (–AB), *Schlechter 498* (BM, BOL, PRE); Muizenberg, 395 m, 3 Apr. 1892, (–AB), *Schlechter 594* (BM); Wynberg, (–AB), *Wallich s.n.* (K); Wynberg, 20 Dec. 1842, (–AB), *Wallich 398* (BM); Cape Peninsula, Silvermine Nature Reserve, at far end of dam, 450 m, 2 Mar. 1999, (–AB), *Whitehouse 18* (BOL, K, MO, NBC, Z); Smitswinkel Bay, 185 m, 21 Nov. 1935, (–AD), *Adamson in Levyns 5278* (BOL); Smitswinkel, 11 Apr. 1928, (–AD), *Salter 259/10* (BM); Cape of Good Hope Nature Reserve, Hottentotskerk, S of Hestersdam, 10 m, 16 Mar. 1970, (–AD), *Taylor 7669* (NBC); Rooskraalberg, SE slopes, 760 m, July 1940, (–BB), *Esterhuysen 2646* (BOL, K, NBC); Kogelberg, lower slopes, E side, 16 Jan. 1944, (–BB), *Esterhuysen 10010* (BOL); Steenbras Siding, 305 m, 11 Sept. 1949, (–BB), *Levyns 9426* (BOL); Kogelberg Forest Reserve, W slopes of Pringle Peak, 730 m, 2 Dec. 1969, (–BD), *Boucher 920* (NBC); Harold Porter Botanic Garden, along the plateau path, 300 m, 12 Oct. 1989, (–BD), *Esterhuysen 36845* (NBC); Malkopsvlei, 10 m, 19 Mar. 1989, (–BD), *Freshwater Research Unit 526* (BOL); Kogelberg State Forest, 2.3 km from Dwars R bridge, right of road to Highlands, 80 m, 22 Sept. 1992, (–BD), *Kruger 800* (NBC); Hangklip Estates, Nov. 1947, (–BD), *Stokoe SAM 23525* (NBC); lower slopes of Paardeberg, on E bank of Palmiet R, 31 Mar. 1966, (–BD), *Thompson 175* (K, NBC, PRE). **3419** (Caledon): Nuweberg, Kathleen Murray Wild Flower Reserve, 10 May 1966, (–AA), *Barker 10377* (NBC); Nuweberg, 760 m, 26 Aug. 1940, (–AA), *Compton 9220* (NBC); Lebanon, 730 m, Sept. 1966, (–AA), *Kruger 143* (K, PRE); mountains W of top of Viljoen's Pass, Nov. 1942, (–AA), *Stokoe 8617* (BOL); Klein River Mts, Hermanus, Hemel en Aarde valley, on slopes of hills facing Babilonstoringberg, 300 m, 21 Oct. 1984, (–AC), *Barker 66* (PRE); Voëlgat, below Beacon Head, S slopes, 580 m, 20 Mar. 1978, (–AD), *Williams 2457* (NBC); Cape, top end of Kleinrivier Lagoon, Voëlkop, Hermanus, 5 m, 7 Apr. 1983, (–AD), *Williams 931* (K); Hermanus, Fernkloof Nature Reserve, Mount Pustulata, S slope, 750 m, 18 Oct. 1979, (–AD), *Woodvine 66* (NBC, PRE); Waterford Farm, S of dam at bottom of Waterkloof, 90 m, 18 May 2001, (–DA), *Whitehouse 224* (BOL). **3420** (Bredasdorp): Swellendam, Zuurbraak, Jan. 1930, (–BA), *Thode 2321* (PRE). **3423** (Knysna): 17.5 km E of Knysna, 8 Nov. 1928, (–AA), *Hutchinson 1337* (BOL, K); Harkerville Plantation, 185 m, Oct. 1921, (–AA), *Keet 829* (NBC, PRE); Knysna, 28 Feb. 1957, (–AA), *McDonald SAAS 148* (PRE). **3424** (Humansdorp): Witte Els Bosch, flats, 215 m, Apr. 1922, (–AA), *Fourcade 2196* (BOL, K, NBC, PRE); Cape, Clarkson, Feb. 1926, (–AB), *Thode 824* (K, PRE).

10. **Cliffortia strobilifera** L., *Systema Vegetabilium*, ed. 13: 749 (1774); DC.: 596 (1825); G.Don: 596 (1832); Eckl. & Zeyh.: 271 (1836); Harv.: 300 (1862); Bolus & Wolley-Dod: 260 (1904); Weim.: 140, fig. 42D–J ; Levyns: 450 (1950); Dahlgren: fig. 1A (1971); J.H. Ross: 183 (1972); Compton: 230 (1976); Fellingham: 32, fig. 1M–R (1994); Mustart et al.: 140, photo. (1997); Fellingham: 611 (2000); Coates Palgrave: 249, fig. (2002); Whitehouse: 2, fig. 4 (2004); Bean & Johns: 192 (2005). Lectotype, designated by Fellingham (1994): Pluk., t. 275, fig. 2 (1696), based on Herb. Sloane 99: 179 (BM)



C. conifera Christm.: 621 (1779); Merrill: 343 (1938), *nom. illegit. superfl. pro C. strobilifera*.

C. conoides Sparrm.: 204 (1783), *nomen nudum*.

C. rogersii Burt Davy: xxi, 316 (1932). Type: Barberton District, Kaapsehoop, 1 220 m, Aug. 1918, *Rogers 21617* (BOL, holo.!; K!, iso.).

Erect shrubs up to 4 m high, lower branches sometimes decumbent when growing in streams, resprouting after fire from a central crown; densely divaricately branched, forming overlapping brachyblasts. *Young stems* 0.7–1.2 mm wide, glabrous. *Leaves* unifoliate, leaflets narrowly oblong to lanceolate, 9.6–44.0 × 1.5–4.5 mm; apex sharply long acuminate, 0.4–0.8 mm long; margins flat, minutely serrulate or scabrid; lamina single-veined from base, herbaceous to chartaceous, 0.1–0.4 mm thick, midrib prominent beneath against lamina, ± straight or slightly curved upwards and towards stem, glabrous or with a few hairs along midrib beneath, hairs 0.2–0.6 mm long; sheath 0.9–2.6 mm long, abaxially glabrous, adaxially glabrous except sometimes for fringe of hairs at apex; stipule membranous or green and similar to lamina, 0.9–2.2 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 3, glabrous. *Male flowers* with bracteoles 2.3–4.8 mm long; pedicel articulated, 0.6–1.3 mm long, glabrous or hairy; sepals broadly ovate, 4.4–5.8 × 1.4–2.6 mm, acute to acuminate at apex; stamens 13–18; filaments 5.7–7.4 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 2.8–4.2 mm long, longer than immature receptacle; sepals oblong to linear, 1.9–3.3 × 0.5–0.8 mm, erect; carpel 1; stigma 1.5–2.6 mm long, red or greenish white, feathery, either hidden at base of leaves or sometimes twisted and protruding to one side; immature receptacle 1.2–2.2 × 0.6–0.9 mm, glabrous, smooth. *Achene* irregular in shape, 2.2–3.0 × 0.8–1.2 mm, pale brown, glabrous; irregularly and obscurely ribbed. *Flowering time*: all year but mainly December to May.

Habitat: Banks of permanent streams, rivers and lakes, as long as the water is open or flowing (it is not found in seeps), on a variety of soils but generally not alkaline, in full sun; altitude 0–1 450 m.

Distribution: Very widespread, extending from Namaqualand to the Soutpansberg, and from the coast as far inland as the Swartberg Mountains.

Conservation status: Very common and can be found in most suitable rivers and streams, even when heavily disturbed. Red List status: LC.

Etymology: *strobilifera* (Latin) means ‘cone-bearing’, referring rather erroneously to the cone-like galls that frequently form on this species and led the species in the 1600s to be originally called a cedar.

Common names: bog rice-bush; *kammiebos*, *pypsteelbos*, *vleibos* (Afrikaans).

Notes: One of the most widespread and common species of *Cliffortia*. Easily recognisable by its general habit, grass-like leaves, and the riverine or lakeside habitat. *Cliffortia graminea* should not be confused as it forms low shrubs and has several veins into the base of the leaf, whereas *C. strobilifera* has just a single main vein. *Cliffortia graminea* also occurs in seeps, whereas *C. strobilifera* grows beside running open water.

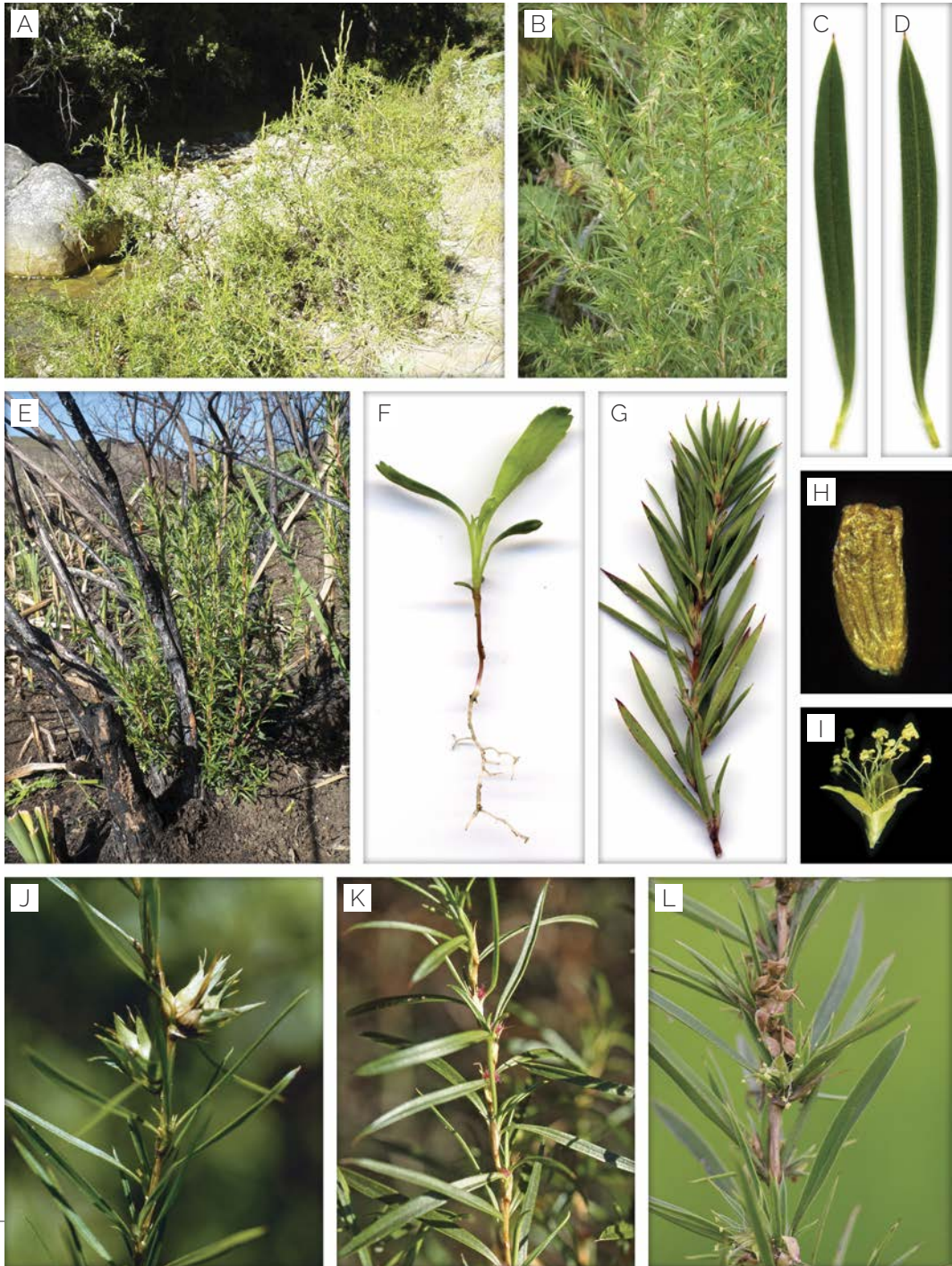
The closely related *Cliffortia longifolia* is very similar but is rarer, restricted to similar habitats but nearly always on slightly alkaline soil not far from the coast. The leaves of new basal shoots of *C. strobilifera* are much larger than those on mature stems, but these rarely (never?) bear flowers and so should not be confused with *C. longifolia*.

The achene is unusual in that it is somewhat truncate, broadest towards the apex and irregular in cross-section. No other species in the genus has similar achenes, which helps to distinguish it further from *Cliffortia longifolia* (though its achenes are often hard to find).

Although widespread, there is very little variation in the species and, apart from *Cliffortia longifolia*, there has not been a history of splitting the species. The only other valid name described is *C. rogersii*, based on a very small-leaved form from the Barberton area. Such small-leaved forms are common throughout the range when growing on slightly drier ground.

Representative specimens

SOUTH AFRICA. **2229** (Waterpoort): Soutpansberg Mts, Wyllies Poort, 5 July 1935, (–DD), *Galpin s.n.* (BOL). **2230** (Messina): E Soutpansberg, Pepiti Falls, 915 m, 21 Aug. 1930, (–CD), *Hutchinson & Gillett 4347* (K); E Soutpansberg, Pepiti Falls, 915 m, 21 Aug. 1930, (–CD), *Hutchinson & Gillett 4347* (BM); Soutpansberg, Sebasa, Pepiti Falls, 885 m, 23 Dec. 1935, (–CD), *Smuts & Gillett 3178* (NBG, PRE). **2330** (Tzaneen): Duiwelskloof District, Westfalia, Mar. 1960, (–CA), *Scheepers & Joynt SKF 1629A* (PRE); Tzaneen, Nov. 1913, (–CC), *Rogers 12575* (BOL). **2530** (Lydenburg): Nelspruit, Lowveld Botanic Garden, Hall and Sons Side, 20 Sept. 1969, (–BD), *Buitendag 109* (NBG, PRE); Belfast, E side of Belfast on outskirts of town, 21 Oct. 1971, (–CA), *Goetze A. in Coetzer 85* (PRE); E side of Belfast on outskirts of town, 21 Oct. 1971, (–CA), *Goetze in Coetzer 85* (K); Barberton, Kaapsehoop, 1220 m, Aug. 1918, (–DB), *Rogers 21617* (BOL, K); Badplaas, Buffelspruit, 17 Apr. 1976, (–DC), *Botha 1446* (PRE). **2631** (Mbabane): Hawane Falls, 30 Apr. 1957, (–AA), *Compton 26881* (NBG, PRE, SDNH); Maloltja Nature Reserve, Hawane Vlei, 1450 m, 30 Dec. 1985, (–AA), *Heath 440* (PRE); Forbes Reef, 7 Apr. 1965, (–AA), *Karsten s.n.* (NBG, PRE); Mbabane, 17 Jan. 1951, (–AC), *Compton 22394* (NBG). **2830** (Dundee): Dundee District, Vant's Drift, banks of Buffalo R, 1065 m, 12 June 1946, (–BA), *Acococks 12704* (K, PRE). **2831** (Nkandhla): Nkandhla District, 6.5 km W of Nkandhla, Ngongou Veld, 915 m, 13 June 1946, (–CA), *Codd 1405* (K, PRE). **2930** (Pietermaritzburg): Karkloof, (–AD), *Bayer 8434* (NU); New Hanover District, Albert Falls, 550 m, 9 Sept. 1965, (–AD), *Moll 1972* (K, PRE); Camperdown, 610 m, 18 Feb. 1908, (–DA), *Franks in Medley Wood 10862* (BOL, PRE); Pietermaritzburg, Table Mt., Umsinslusi R, 425 m, 1 June 1948, (–DA), *Killick 481* (NU); Camperdown District, Nagle Dam, 365 m, 19 June 1957, (–DA), *Wells 1406* (K, NU, PRE); Inanda, 1880, (–DB), *Medley Wood 795* (BM, BOL, K, NBG, PRE); Durban, Hammarsdale area, Hector (ESKOM) substation site, 555 m, 29 Mar. 1995, (–DC), *Ward 12970* (NU). **3018** (Kamiesberg): Kamiesberg, Wilgehout Ravine, 945 m, 17 Jan. 1911, (–AC), *Pearson 6382* (BOL, K). **3030** (Port Shepstone): Alexandria District, Dumisa, Fairfield, 750 m, 14 Jan. 1911, (–AD), *Rudatis 1303* (BM, K, NBG, PRE); Port Shepstone District, Oribi Gorge, Umgimkulwana R, 230 m, 26 Oct. 1963, (–CB), *Hilliard 1891* (NU); Oribi, side river, between boulders, 23 Jan. 1973, (–CB), *Strey 11061* (NU, PRE); Port Shepstone District, Oribi Gorge, Mzimkulwana R, path to Hoopoe Falls, 260 m, 18 Nov. 2002, (–CB), *Whitehouse 322* (BOL). **3129** (Port St Johns): Libode District, bridge over Simanzi R near Zibungu, 800 m, 6 Jan. 1984, (–AC), *Hutching 891* (NU); Port St John's District, near Lusikisiki, on the property of Magwa Tea Corporation, by stream above Magwa Falls, 400 m, 24 Aug. 1984, (–BC), *Balkwill et al. 1859* (NU). **3219** (Wuppertal): Cederberg, Wuppertal, Eselbank, Rietvlei, 5 Sept. 1997, (–AD), *van Rooyen, Steyn, de Villiers 688* (NBG); Sandfontein,



6 Apr. 1947, (–CB), *Compton 19446* (NBG); S Cederberg Mts, foot of Sandfontein Peak, 5 Apr. 1947, (–CB), *Esterhuysen 13876* (BOL); Ceres, Ondertuin, 13 May 1970, (–CC), *Hanekom 1371* (K, NBG, PRE). **3226** (Fort Beaufort): Hogsback, slopes above Red Krantz, 1370 m, 22 July 1952, (–DB), *Levyens 9854* (BOL). **3227** (Stutterheim): Cathcart District, Inverthorn, 21 Dec. 1944, (–AD), *Barker 3455* (BOL, NBG). **3318** (Cape Town): Modder River 721, 30 m, 5 Aug. 1988, (–AD), *Freshwater Research Unit 333* (BOL); Cape Town, May 1847, (–CD), *Alexander-Prior s.n.* (K); Table Mt., (–CD), *Ecklon 187* (BM, K, K); Table Mt, Slangolie, 3 Jan. 1898, (–CD), *Froembling 589* (NBG); Mowbray, Raapenburg, 10 m, 23 July 1889, (–CD), *Guthrie 27* (BOL); Cape Peninsula, Table Mt, Orange Kloof, Aug. 1903, (–CD), *Marloth 3431* (NBG); Cape Town, (–CD), *Rehmann, Dr. A. 1572* (BM); Table Mt., (–CD), *Rogers 1556* (K); Cape Flats near Claremont, 2 Feb. 1892, (–CD), *Schlechter 278* (BM, BOL, PRE); slopes of Table Mt., Mar. 1924, (–CD), *Smuts 1135* (BOL); Cape Peninsula, Oudekraal, Mar. 1948, (–CD), *Stokoe SAM 61501* (NBG); Cape Town, Devil's Peak, 150–305 m, Jan. 1898, (–CD), *Thode 6179* (NBG); Cape Peninsula, Camp Ground, by Black R, 21 Mar. 1896, (–CD), *Wolley-Dod 963* (BOL); Perdeberg, Modderkloof, S end of Perdeberg, 15 June 1966, (–DB), *Rycroft 2970* (NBG); Stellenbosch, past bridge at Du Toit railroad station, Plankenbrug R, 15 Apr. 1964, (–DD), *Bos 1382* (K); Berg R valley, W bank, just N of train bridge opposite arboretum, 100 m, 23 Apr. 1994, (–DD), *Boucher & Ahmed 22* (NBG); Blaauwklip, Jan. 1924, (–DD), *Gillett s.n.* (NBG); Stellenbosch, Jonkershoek, Bosboukloof, 290 m, May 1967, (–DD), *Kerfoot 5805* (NBG, PRE); Stellenbosch, Waterford farm, area adjacent to pear orchard, 120 m, 1 July 1994, (–DD), *Nel & Boucher 121* (NBG, PRE); Jonkershoek, N bank of main dam, 6 Feb. 1994, (–DD), *Oliver 10421A* (NBG, NBG). **3319** (Worcester): Witelsboom Farm, Breede R, upstream of low water bridge across river, 220 m, 14 Mar. 1997, (–CA), *Boucher 6112* (NBG); Worcester 286, Wyersdrift, site B, floodplain of Breede R, 210 m, 10 May 1988, (–CB), *Freshwater Research Unit 149* (BOL); canyon below Franschhoek Pass, 5 Jan. 1948, (–CC), *Rodin 3093* (BOL, K, PRE); Bosjesveld Mts, Jonas Plaats & Waterkloof, 305 m, Apr. 1920, (–DC), *Andreae 362* (NBG, PRE); Genadendal Hiking Trail, De Hoek farm, 330 m, 23 Mar. 2003, (–DC), *Whitehouse 358* (BOL); along side Montagu road, 12 Apr. 1962, (–DD), *Grobler 982* (NBG, PRE). **3320** (Montagu): Matjiesfontein area, Witteberg Mt., 1300–1600 m, 8 Aug. 1933, (–BC), *Humbert 9788* (PRE); Montagu, Poortjiedam, above dam, 305 m, 29 July 1962, (–CD), *Levyens 11324* (BOL); Tradouw Pass, 25 Mar. 1940, (–DC), *Bond 218* (NBG); Langeberg, between Lemoenshoek and Naauwkrantz, Strawberry Hill farm, 11 Jan. 1957, (–DD), *Stokoe s.n.* (NBG); Langeberg East MCA, Compartment 8, Wilderness Area, Lemoenshoek, above small waterfall at old pipeline exit, 550 m, 25 Feb. 1988, (–DD), *van der Merwe 226* (NBG, PRE). **3321** (Ladismith): Landskloof, between Vleiland and Seven Weeks Poort, S foothills of N side of valley, Kraal, 1280 m, 20 Feb. 1986, (–AD), *Moffett & Steensma 3824* (NBG, PRE); Riversdale, Korinte R dam, stream above second arm of dam, 185 m, 26 Sept. 1979, (–CC), *Bohnen 6621* (K, NBG, PRE); Garcia's Pass, near Toll House, next to road, 19 Apr. 1983, (–CC), *Fellingham 445* (NBG, PRE); Garcia's Pass, N of Riversdale, 28 Nov. 1938, (–CC), *Lynes 1969* (BM); Korinte R, Apr. 1909, (–CC), *Muir 93* (PRE); middle of Gysmanshoek Pass, 1.5 km from top on Heidelberg side, 150 m, 30 Jan. 1969, (–CC), *Thompson 714* (K, NBG, PRE); Gysmanshoek Pass, The Oaks road, S of pass, 490 m, 13 Mar. 1978, (–CC), *Thompson 3691* (NBG, PRE); Herbertsdale District, Cloetes Pass, on mountain slopes, Jan. 1948, (–DD), *Finn 56105* (PRE). **3322** (Oudtshoorn): Swartberg Pass, 760 m, 24 Jan. 1941, (–AC), *Compton 10396* (NBG); Cango valley, Boomplaas, on banks of Grobbelaars R, 24 June 1974, (–AC), *Moffett 62* (NBG, PRE); De Hoek campsite, Hoeks-rivier, where path to Gouekrans Hut crosses, 700 m, 22 Mar. 1999, (–AC), *Whitehouse 30* (BOL, K, MO, NBG); near George, 19 Mar. 1929, (–CD), *Hutchinson 3174* (BM, K); near George, 200 m, 29 Mar. 1893, (–CD), *Schlechter 2429* (BM, K); Ebb and Flow, 25 Jan. 1943, (–DC), *Compton 14363* (BOL, NBG). **3323** (Willowmore): Avontuur, 915 m, Mar. 1908, (–CA), *Fourcade 116* (BOL); Uniondale, Avontuur Poort, 6.5 km from Uniondale, 760 m, Dec. 1930, (–CA), *Fourcade 4520* (NBG, PRE); Diep R (Roodemuur), 305 m, Mar. 1921, (–CC), *Fourcade 1265* (BOL, K); Knysna, Rabbets Island, 425 m, 6 June 1923, (–CC), *Phillips 19* (PRE); De Vlugt, Pietersrivier, 17 Mar. 1978, (–CC), *van Daalen 140* (NBG, PRE); Joubertina/Kouga District, Kouga R, Hoeree, 460 m, 8 Sept. 1975, (–DB), *Geldenhuis 345* (NBG, PRE); N slopes of Tsitsikamma Mts, Louterwater, Le Roux's Farm, 600 m, 1 Feb. 1969, (–DC), *Dahlstrand 1710* (NBG, PRE); Die Hoek, N foot of Outeniqua Mts, near Joubertina, 15 Jan. 1947, (–DC), *Esterhuysen 13620* (BOL). **3324** (Steytlerville): Kareedouw District, near Kareedouw, 10 Jan. 1919, (–CD), *Britten 1257* (GRA, PRE); Assegaibosch Station, 3 km from Assegaibosch Station on Zuurans road, 250 m, Feb. 1943, (–CD), *Fourcade s.n.* (NBG, PRE); between Assegaibosch and Essenbosch, Mar. 1922, (–CD), *Fourcade 2185* (BOL, K, NBG, PRE); Krom R, near Assegaibosch, 205 m, Mar. 1931, (–CD), *Fourcade 4565* (BOL, NBG). **3325** (Port Elizabeth): Alexandria District, Suurberg, Upper Coerney R, Melkhoutboom, 31 Mar. 1953, (–BD), *Archibald 5845* (K, NBG, PRE); Groendal Wilderness Reserve, confluence of Zunga to Groendal Dam, W Zunga Catchment, 150 m, 17 Aug. 1974, (–CA), *Scharf 1480* (K, PRE); Van Staadens River Mts, 305 m, Jan. 1867, (–CC), *Bolus 1572* (BOL); Port Elizabeth District, Van Staadens Gorge, (–CC), *Long 647* (K, PRE); W of Port Elizabeth, towards Witteklip, canyon, 26 Aug. 1947, (–CD), *Rodin 1055* (BOL, K, PRE); Port Elizabeth, Parson's Vlei, 1 Mar. 1984, (–CD), *Staines 66* (PEU, PRE). **3326** (Grahamstown): Grahamstown District, Howison's Poort, Palmiet R, along banks, 4 Oct. 1994,

(-AD), *Baars* 2 (GRA); Howison's Poort, banks of Palmiet R near picnic spot, 25 June 1975, (-AD), *Brink* 325 (K, PRE); Grahamstown District, Howison's Poort, picnic spot 13 km from Grahamstown, 21 July 1977, (-AD), *Brink* 559 (GRA, PRE); Howisons Poort, 27 Nov. 1950, (-AD), *Maguire* 591 (NBG); Grahamstown, 21 Apr. 1998, (-BC), *Czeredrecki s.n.* (GRA); Grahamstown, near Featherstone Kloof, 520–580 m, 21 Feb. 1932, (-BC), *Rennie & Rennie* 217 (BOL); Grahamstown?, Jan., (-BC), *Rogers* 1556 (K); Grahamstown, 1 Mar. 1922, (-BC), *Wilson* SA142 (NBG). **3418** (Simonstown): Cape District (Wynberg–Constantia ex Weimarck), Jan., (-AB), *Burchell* 813 (K); Fish Hoek, 22 Feb. 1925, (-AB), *Giffen s.n.* (BOL); Cape of Good Hope Nature Reserve, NW corner, Garslandkloof stream crossing between plots 2 and 3, 9 Mar. 1973, (-AB), *Taylor* 8352 (NBG, PRE); Cape Peninsula, Chapman's Peak Drive, just north of East Fort, 50 m, 19 Feb. 2003, (-AB), *Whitehouse* 347 (BOL); Cape Peninsula, near Cape Town, Constantia, 15 July 1883, (-AB), *Wilms* 3577 (K); Cape Peninsula, Retreat Vlei, 26 Dec. 1896, (-AB), *Wolley–Dod* 2254 (BOL); lower Eerste R, below krammat near mouth on Zandvliet allotment above sewerage works, 5 m, 6 Jan. 1978, (-BB), *Boucher* 3475 (K, NBG, PRE); Gordon's Bay, Mar., (-BB), *Duthie* 762 (NBG); Kogelberg, lower E slopes, 16 Dec. 1946, (-BB), *Esterhuysen* 13345 (BOL); Sir Lowry's Pass, top of Sir Lowry's Pass, 440 m, 24 Apr. 1974, (-BB), *Goldblatt* 1679 (NBG, PRE); Sir Lowry's Pass, 100 m, 20 Jan. 1894, (-BB), *Kuntze s.n.* (K); Sir Lowry's R mouth, 20 m, 13 May 1982, (-BB), *O'Callaghan* 58 (NBG); Somerset West, 31 May 1942, (-BB), *Parker* 3669 (BOL, K, NBG); Sir Lowry's Pass, by road to Steenbras Siding, 425 m, 15 Feb. 2000, (-BB), *Whitehouse* 79 (BOL); Near bridge at Kogelbaai, 5 m, 8 Sept. 1969, (-BD), *Boucher* 446 (NBG, PRE); Palmiet R valley, 25 Apr. 1948, (-BD), *de Vos* 895 (NBG); Palmiet R valley, 2 Feb. 1949, (-BD), *de Vos* 1174 (NBG); Kogelberg State Forest, c. 1 km from 2nd house, left of hiking trail, c. 30–40 m from Palmiet R, 40 m, 6 Oct. 1992, (-BD), *Kruger* 832 (NBG); Kleinmond area, mouth of Palmiet R, E edge of estuary, 15 Jan. 1994, (-BD), *Oliver* 10419 (NBG, PRE); Rooiels R mouth, near Hangklip, 11 Mar. 1981, (-BD), *Parsons* 59 (K, NBG, PRE); Kleinmond, Palmiet R, E side of river, 5 m, 17 Mar. 1983, (-BD), *van Wyk* 1183 (NBG, PRE). **3419** (Caledon): Elgin Basin, Arieskraal Farm (Portion Solva), on Bokkeveld Shales in horseshoe bend of Palmiet R, 215 m, 2 Apr. 1993, (-AA), *Rode & Boucher* 74 (NBG, PRE); Caledon, Elgin, at station, near watertank, 280 m, 6 Mar. 1926, (-AA), *Smith* 2544 (K, PRE); Paardeberg, (-AC), *anon s.n.* (NBG); Onrus, Hemel-en-Aarde, site A, 70 m, 23 May 1988, (-AC), *Freshwater Research Unit* 185 (BOL); Bot R/Afdaks R, 60 m, 16 Mar. 1983, (-AC), *van der Zeyde* 6/83 (PRE); Vioolskloof, Elias Gat 600, 135 m, 24 May 1988, (-AD), *Freshwater Research Unit* 193 (BOL); Caledon, Belsvlei, seepage headwater of Onrus R, 260 m, 24 May 1988, (-AD), *Freshwater Research Unit* 210 (BOL); Caledon, De Diepte Gatt, 270 m, 25 May 1988, (-AD), *Freshwater Research Unit* 227 (BOL); Hermanus, Kettle Point, on edge of lagoon, 0 m, 7 Dec. 1982, (-AD), *Williams* 896 (K, PRE); c. 8 km E of Caledon, 9 Apr. 1956, (-BA), *Winkler* 72 (NBG); Riviersonderend Mts, Oudebos, Apr. 1930, (-BB), *Stokoe s.n.* (NBG, PRE); Hermanus, Salmonsdam, 160 m, 26 May 1988, (-BC), *Freshwater Research Unit* 234 (BOL); Baardskeedersbos, next to track towards Eikerus, 23 Nov. 1991, (-DA), *Fellingham* 1572 (NBG); Pearly Beach, site B, 0 m, 21 Sept. 1988, (-DA), *Freshwater Research Unit* 419 (BOL); Groot Hagelkraal, 75 m, 22 Sept. 1988, (-DA), *Freshwater Research Unit* 463 (BOL); Caledon, between Avoka and Goedvertrou, 75 m, 22 May 1971, (-DA), *Thompson* 1207 (K, NBG, PRE); The Poort, Sept. 1933, (-DB), *Leighton* 21090 (BOL). **3420** (Bredasdorp): Bontebok Park, 7 Feb. 1966, (-AB), *Liebenberg* 7973 (K, PRE); Breede R, Malgas, 15 m, 7 Mar. 1971, (-BC), *Heard* 3 (NBG); Swellendam, Potberg, 90 m, Apr. 1947, (-BC), *Levy's* 8195 (BOL); Potberg, on edge of vlei on sandy flats S of Kollie-se-Kraal, 110 m, 17 Jan. 1995, (-BC), *Paterson–Jones* 118 (NBG); Bredasdorp, Paardekloof, next to stream, 30 Mar. 1970, (-CA), *Theron & van der Schijff* 2267 (PRE). **3421** (Riversdale): NE of Riversdale, Kafferkuils R wetland, 115 m, 3 Mar. 1988, (-AB), *Freshwater Research Unit* 125 (BOL); riverbank below Riversdale Show Grounds, 60 m, 5 Apr. 1926, (-AB), *Smith* 2774 (K, PRE); Riversdale, along right bank of river above the town, 6 Apr. 1926, (-AB), *Smith & Muir* 2774 (PRE); Still Bay, Feb. 1909, (-AD), *Muir* 93 (PRE); by Korente R dam, 185 m, 28 Feb. 1986, (-CC), *Bohnen* 8646 (NBG). **3423** (Knysna): Concordia, 23 Mar. 1925, (-AA), *Kapp* 37 (PRE); Concordia, 215 m, Mar. 1921, (-AA), *Keet* 705 (GRA, NBG, PRE); near Concordia, Oct. 1922, (-AA), *Michell* 344 (BOL, PRE). **3424** (Humansdorp): Hoffmansbosch District, 18 Jan. 1919, (-AB), *Britten* 1296 (K, PRE).

11. ***Cliffortia longifolia*** (Eckl. & Zeyh.) Weim. in Botaniska Notiser 1933: 158, fig. 9a–c (1933) & 144, fig. 42A–C (1934) & 400 (1940b); Levyns: 450 (1950); Fellingham: 31, fig. 1A–L, 2 (1994) & 610 (2000); Whitehouse & Victor: 115 (2002). *C. strobilifera* L. var. *longifolia* Eckl. & Zeyh.: 271 (1836). Type: Breede R near Swellendam, *Mund in Ecklon 1753* β (S, holo.; B $\dagger$, iso.).



Erect shrub up to 4 m high, lower branches always erect, fire survival strategy not known as habitats where it grows rarely burn; densely divaricately branched, forming overlapping brachyblasts. *Young stems* 1.2–2.1 mm wide, greenish white, glabrous. *Leaves* unifoliate, narrowly oblong to lanceolate, 29–65 × 2.5–8.0 mm; apex sharply long acuminate, 0.7–1.5 mm long; margins flat, minutely serrulate or scabrid; lamina single-veined to base, herbaceous to chartaceous, 0.2–0.5 mm thick, midrib prominent beneath lamina, $\pm$ straight or slightly curved upwards and towards stem, glabrous or with a few hairs along midrib beneath, hairs 0.2–0.4 mm long; sheath 4.0–7.8 mm long, abaxially glabrous or hairy on keel, adaxially glabrous except sometimes for fringe of hairs at apex; stipules green and similar to lamina, 4.5–11.0 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 3, glabrous. *Male flowers* with bracteoles 5.7–10.0 mm long; pedicel articulated, 2.2–9.4 mm long, hairy; sepals broadly ovate to narrowly elliptic, 8.1–10.3 × 2.3–3.5 mm, acute to acuminate at apex; stamens 18–29; filaments 6.6–10.7 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 6.4–8.4 mm long, longer than immature receptacle; sepals oblong to linear, 6.4–7.3 × 0.3–1.2 mm, erect; carpel 1; stigma 4.5–6.7 mm long, greenish white, feathery, hidden at base of leaves; immature receptacle 2.5–3.3 × 1.1–1.2 mm, glabrous, smooth. *Achene* ellipsoid, 2.8–4.0 × 1.1–1.5 mm, pale brown, glabrous; ribs 13–20, rounded, up to 0.1 mm wide. *Flowering time*: all year.

Habitat: In streams or at the edge of vleis, close to the sea, usually on slightly alkaline soil; altitude 0–20 m.

Distribution: Widespread along the coast from Langebaan to Still Bay, but only known from a few, very scattered, small populations.

Conservation status: Known from scattered localities around the coast, most of which are under threat of development of some kind. Red List status: VU.

Etymology: *longifolia* (Latin) means 'long-leaved', referring to the length of the leaves in relation to *Cliffortia strobilifera*.

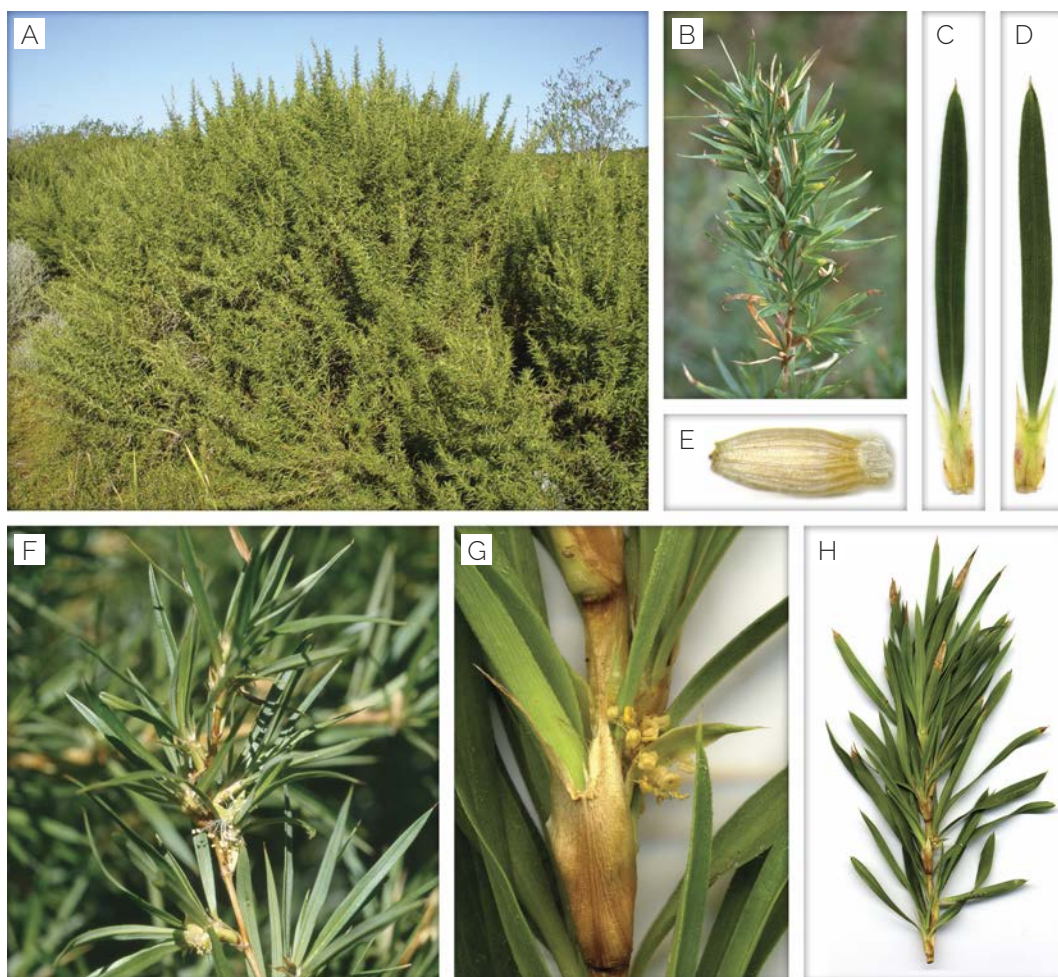
Notes: Very similar to *Cliffortia strobilifera*, but more robust in all its features in particular the longer broader leaves and more stamens per male flower (13–18 in *C. strobilifera*, 18–29 in *C. longifolia*). Furthermore, while the achene of *C. strobilifera* is small and irregular in shape, the fruit of *C. longifolia* is more like a typical *Cliffortia* being ellipsoid and uniformly ribbed. Unlike *C. strobilifera*, there is little difference in the size between juvenile and mature leaves.

The two species are found nearby but not in the same habitat. *Cliffortia longifolia* prefers streams and vleis that are close to the sea and have a more alkaline soil. *Cliffortia strobilifera* grows on more acidic soils, from sea level to 1 500 m.

Representative specimens

SOUTH AFRICA. 3318 (Cape Town): Langebaan Lagoon, Geelbek Farm, E shores, 5 m, 14 Aug. 1975, (–AA), Boucher 2813 (NBC, PRE). 3418 (Simonstown): Cape Peninsula, Rondevlei, 20 Feb. 1958, (–AB), Willems 26 (NBC); Cape Peninsula, Strandfontein swamp, 21 Dec. 1941, (–BA), Bond 1427 (BOL); Cape Peninsula, Zeekoevlei, 5 m, 6 Aug. 1933, (–BA), Levyns 4713 (BOL). 3419 (Caledon): Stanford wetlands, SE of village, 20 m, 21 Feb. 2003, (–AD), Whitehouse 348 (BOL, NBC); Uilenkraalsmond, near bridge over estuary, 0 m, 11 Feb. 1995, (–CB), Fellingham 1659 (NBC); Gansbaai area, Uilenkraalsmond, next to main

road, just off the bridge on the Gansbaai side, 15 Aug. 1996, (–CB), *Fellingham 1690* (BOL, NBG); Gansbaai area, Uilenkraalsmond, next to main road, just off the bridge on the Gansbaai side, 28 Oct. 1996, (–CB), *Fellingham 1698* (NBG); Ratel R mouth, c. 500 m from mouth, seepage N of estuarine lagoon, 50 m from mouth, 50 m, 7 June 1984, (–DC), *O’-Callaghan, Fellingham & van Wyk 483* (NBG, PRE). **3420** (Bredasdorp): De Hoop, Potberg Nature Reserve, Windhoek, Rietkloof, near Bat Cave, 10 m, 16 Jan. 1979, (–AD), *Burgers 1668* (PRE); in valley near De Hoop Vlei, 8 Jan. 1950, (–AD), *Taylor 89* (BOL, NBG); between Noetzie and Elandspad, 60 m, 11 Apr. 1979, (–BC), *Hugo 1800* (NBG); Potberg area, Hamerkop Resort, stony hill, S slopes above sea, 60 m, 18 June 1984, (–BC), *Oliver 8494* (NBG, PRE). **3421** (Riversdale): Riversdale, Still Bay, Kransfontein Farm, 25 m, 7 Oct. 1980, (–AD), *Bohnen 7730* (K, NBG, PRE); Rein’s Private Nature Reserve (Couriqua), littoral W of conference centre near power substation, 3 m, 5 Aug. 1995, (–BC), *Boucher 5928* (NBG); Albertinia, Ystervarkpunt, along stream feeding dam along old coast road, 25 m, 18 Mar. 1987, (–BC), *Willemse 150* (NBG, PRE).



Cliffortia longifolia: A, habitat; B, branch; C, dorsal view of leaf; D, ventral view of leaf; E, achene; F & G, male flower; H, branch with male flower.

12. **Cliffortia aculeata** Weim. in Botaniska Notiser 80: 410, fig. 2, 3 (1946); Dahlgren: fig. 3G (1971); Fellingham: 106, fig. 5I–K, 6, 7B (1995) & 608 (2000). Type: Swartberg Pass, Dec. 1945, *Stokoe 9250* (LD, holo.; BOL!, K!, NBG!, iso.).



C. sp. 2 sensu Weim.: 159 (1934). Based on *Pocock 153* (BOL).

Low sprawling or scrambling semi-herbaceous shrub up to 0.6 m high, resprouting after fire from a central crown; densely divaricately branched, forming brachyblasts. *Young stems* 0.6–1.7 mm wide, tinged reddish, sheathed by leaf bases, winged, glabrous. *Leaves* unifoliate, needle-shaped, 31–44 × 1.0–1.3 mm; apex pungent, 1.3–2.0 mm long; margins turned upwards so that upper surface forms a shallow groove, entire, smooth; lamina single-veined from base, chartaceous to cartilaginous, 1.1–1.3 mm thick, slightly curved upwards and towards stem, glabrous; sheath 3.7–5.5 mm long, abaxially and adaxially glabrous; stipules green and similar to lamina, 2.2–3.3 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous with smooth margins; sepals 3, glabrous. *Male flowers* with bracteoles 4.6–6.6 mm long; pedicel 0.8–1.1 mm long; sepals narrowly elliptic, 10.3–10.9 × 1.4–2.2 mm, acute to acuminate at apex; stamens 19–24, filaments 5.0–8.5 mm long, red; anthers brownish red. *Female flowers* with bracteoles 3.9–4.3 mm long, longer than immature receptacle; sepals triangular to narrowly lanceolate, erect; carpel 1, red, feathery, tucked at base of leaves but still visible; immature receptacle glabrous, smooth. *Achene* medium to dark brown, glabrous; ribs rounded to sharply acute. *Flowering time*: October to April.

Habitat: Seeps, small streams and waterfalls in full sun or shade on upper north-facing slopes of mountains on acid sands from Table Mountain Series; altitude 1400–1900 m.

Distribution: Known only from three localities in the Groot Swartberg, two close to the Swartberg Pass, and the third one distant near Blesberg.

Conservation status: Only known from three very discreet localities, but the area in between is poorly explored and it is highly likely that more populations exist. Red List status: Rare.

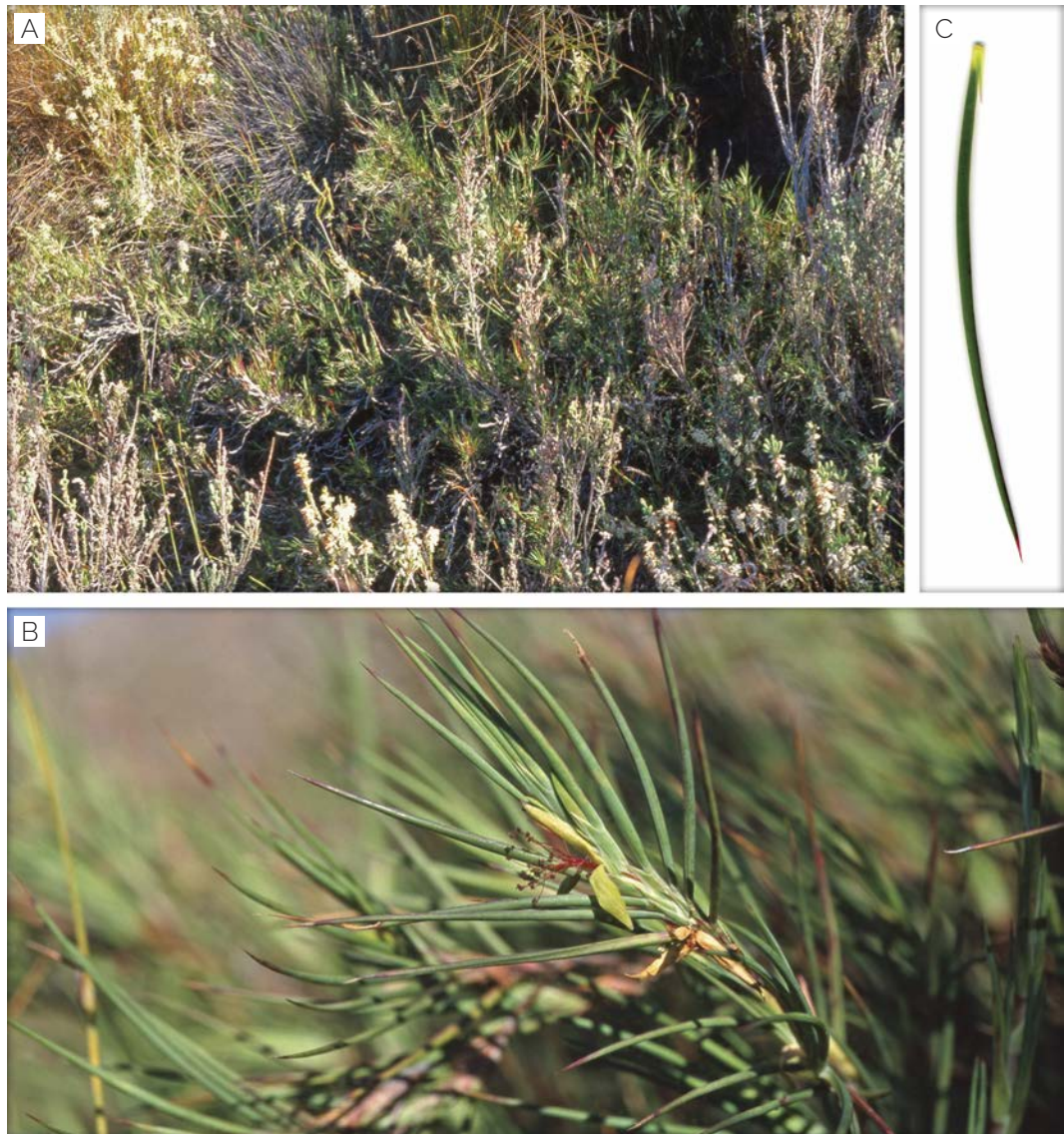
Etymology. *aculeata* (Latin) means 'prickly', referring to the long sharply pointed leaves, hence the texture of the overall bush.

Notes: A distinctive species and only confusion with *Cliffortia nivenioides* is possible. Both species have a sprawling grassy habit and grow in damp seeps, thus are very similar to *C. graminea*, but they differ in having much narrower tougher leaves, amongst many other less obvious characters. The two species differ in the shape of the leaves: *C. aculeata* has narrowly cylindrical leaves, which spread in all directions, whereas the leaves of *C. nivenioides* are bilaterally flattened and form small fans. The young growth of *C. aculeata* is reminiscent of the mature foliage of *C. nivenioides* and resprouting plants may be confused.

Representative specimens

SOUTH AFRICA. **3321** (Ladismith): Waboomsberg, about 15 km along road to Die Hel, at foot of mountain, 1400 m, 30 Nov. 1991, (–BD), *Fellingham & Vlok 1592* (NBG, PRE); Waboomsberg, about 15 km along road to Die Hel, at foot of mountain, 1400 m, 30 Nov. 1991, (–BD), *Fellingham & Vlok 1593* (NBG, PRE); right of Prince Albert Pass, between Waboomsberg and a minor peak to left, Apr. 1942, (–BD), *Stokoe 8616* (BOL); Waboomsberg, upper N slopes of Waboomsberg, next to perennial stream, 1465 m, 26 Dec. 1984, (–BD), *Vlok 879* (NBG, PRE). **3322** (Oudtshoorn): Swartberg Mts, N side above Pass, headwater of Dorps R, 1645 m, 11 Nov. 1983, (–AC), *Bean 1386* (BOL, PRE); Swartberg Mts, Dec. 1945, (–AC), *Stokoe SAM 58304* (BM, BOL, NBG, PRE); Swartberg Pass, 12 Dec. 1942, (–AC), *Stokoe 8606* (BOL,

K, PRE); Swartberg Pass area, Dec. 1943, (–AC), *Stokoe 9047* (BOL); Swartberg Pass, Dec. 1945, (–AC), *Stokoe 9250* (BOL, K, NBG); Swartberg Mts, peak between Waboomsberg and Swartberg Pass, gully on NE side, 1700 m, 20 Oct. 2000, (–AC), *Whitehouse 160* (BOL); E Swartberg, Blesberg area, top of Tierkloof, vertical N facing seep, 29 Nov. 1991, (–BC), *Fellingham & Vlok 1590* (K, NBG, PRE); Swartberg Mts, mid N slopes of Blesberg, near forestry track, 1585 m, 15 Dec. 1986, (–BC), *Vlok 1777* (NBG, PRE).



Cliffortia aculeata: A, habitat; B, branch with male flower; C, leaf.

13. ***Cliffortia nivenioides*** Fellingham in Bothalia 25: 104, fig. 5A–H, 6, 7A (1995) & 609 (2000); Fellingham & Linder: 175, fig. 1–2 (2003). Type: eastern Swartberg Mts, plateau north of Blesberg, 1 900 m, 29 Nov. 1991, *Fellingham & Vlok 1588* (NBG, holo.; K!, MO!, PRE!, iso.).



Low scrambling to erect semi-herbaceous shrub up to 0.6 m high, resprouting after fire from a central crown; densely divaricately branched, forming brachyblasts that are flattened into small fans. *Young stems* 1.0–1.4 mm wide, tinged reddish, glabrous. *Leaves* unifoliate, linear to needle-shaped, 23–31 × 0.7–1.6 mm; apex pungent, 0.7–0.8 mm long; margins rounded, entire and smooth; lamina single-veined from base, chartaceous to cartilaginous, 1.2–1.9 mm thick, ± straight or slightly curved upwards and towards stem, glabrous; sheath 3.8–5.7 mm long, abaxially and adaxially glabrous; stipules green and similar to lamina, 2.5–3.8 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous with smooth margins; sepals 3, glabrous. *Male flowers* with bracteoles 3.2–4.8 mm long; pedicel 1.1–1.4 mm long, glabrous; sepals narrowly elliptic, 8.6–10.4 × 1.8–2.3 mm, acute to acuminate at apex; stamens 13–18; filaments 7.2–11.2 mm long, red; anthers brownish red. *Female flowers* with bracteoles 2.9–5.0 mm long, longer than immature receptacle; sepals ± triangular, 2.4–3.2 × 0.8–1.1 mm, erect; carpel 1; stigma 1.7–2.7 mm long, red, feathery, tucked at base of leaves but still visible; immature receptacle 1.3–2.2 × 0.7–0.9 mm, glabrous, smooth. *Achene* 3.1–4.1 × 1.3–1.6 mm, medium to dark brown, glabrous; faintly ribbed, 16–18, round, less than 0.1 mm wide. *Flowering time*: November to April.

Habitat: Seeps and small streams in full sun on upper north-facing slopes of mountains on acid sands from Table Mountain Series; altitude 1 700–1 800 m.

Distribution: Known only from seeps on the upper northern slopes of Blesberg in the eastern Swartberg.

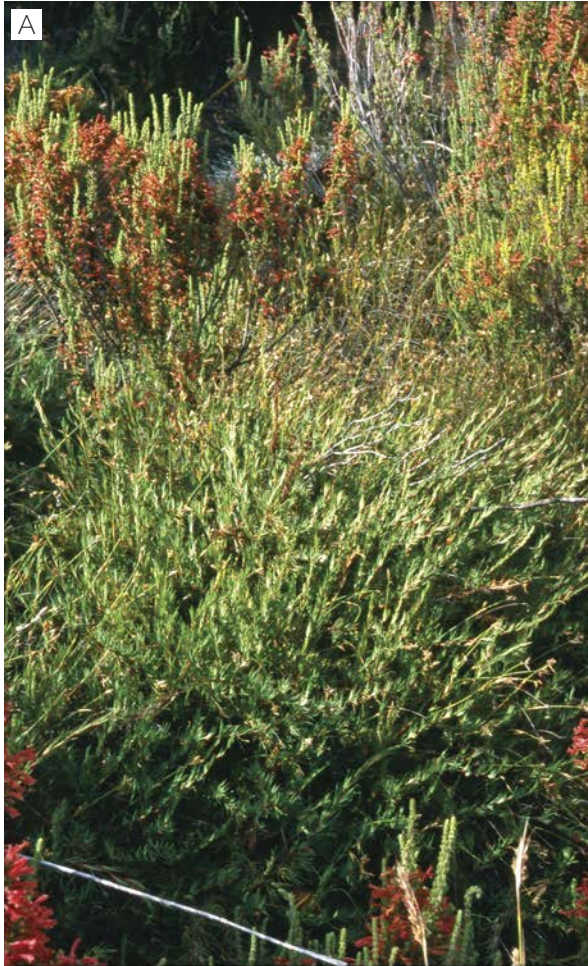
Conservation status: Restricted to a very limited area on the northern slopes of Blesberg in a very specialised habitat: there are few threats to the populations apart from too frequent fires. Red List status: VU

Etymology. *nivenioides* means 'similar to *Nivenia*' (Iridaceae), referring to the fan-like arrangement of the leaves reminiscent of that genus.

Notes: An attractive species that, from morphology, habitat and distribution, can only possibly be confused with *Cliffortia aculeata*. See note under that species for distinguishing characters.

Representative specimens

SOUTH AFRICA. 3322 (Oudtshoorn): Swartberg, E Swartberg on plateau N of Blesberg, 1725 m, 30 Apr. 1980, (–BC), *Bond 1754* (NBC, PRE); E Swartberg, plateau N of Blesberg, between E–W running track and the track to Blesberg, 1900 m, 29 Nov. 1991, (–BC), *Fellingham & Vlok 1588* (K, MO, NBG); Swartberg, Tierkloof, head of Tierkloof NW of Blesberg, 1755 m, 6 Jan. 1975, (–BC), *Thompson 2275* (NBC, PRE); Swartberg Mts, on plateau just N of Blesberg, next to forestry track, 1740 m, 30 Jan. 1990, (–BC), *Viviers & Vlok 470* (BM, BOL, K, NBG); Swartberg, next to track near Blesberg, N facing slope, 1740 m, 18 Dec. 1985, (–BC), *Vlok 1326* (NBC, PRE); Swartberg Nature Reserve, N slopes of Blesberg, along watercourse, 1770 m, 20 Feb. 2001, (–BC), *Whitehouse 204* (BOL).



(14–124) **Subgenus *Cliffortia*** Type species: *C. polygonifolia* L.

Subgenus *Digraphidium* Weim.: 20 (1934). Type not designated.

Subgenus *Monographidium* (C.Presl) Weim.: 28 (1934), nom. invalid, contr. Art. 22.2 as included type of genus when combined.

Small trees, shrubs or herbaceous subshrubs. Leaves simple, bifoliolate or trifoliolate, petiolate or not, glabrous or hairy. Flowers with 3 or 4 sepals; stamens 4–100+; carpels 1–3.

As can be seen from the above brief and very general description, there is no combination of characters that define subgenus *Cliffortia*. Hybrids have been reported both within the sections and between sections, but not with species of other subgenera.

(14–22) **Section Complanatae** *Weim.* in Monograph of the Genus *Cliffortia*: 15, 20 (1934) & 168 (1948). Type species, designated here: *C. complanata* E.Mey. ex Weim.

Low to medium, densely branched shrubs, only surviving fire as seed or possibly facultatively resprouting from a caudex. Sheath hairy adaxially, sometimes markedly so, with a fringe at the apex; stipules present, membranous; petiole absent. Leaves unifoliate or trifoliate, single-veined, glabrous; leaflets needle-shaped or variously toothed or lobed. Flowers solitary, in the axils of ordinary vegetative leaves; **sepals 4**, glabrous; stamens few, 2–8, filaments and anthers usually reddish; **carpels and styles 1 or 2**.

The section includes a range of diverse species. Many of the species have a clear sister species but then few shared characters to the other species in the section. All the species have four sepals with few stamens and include several that normally have two styles per flower. The leaflets are quite small, the largest reaching only to 12 mm long. *Cliffortia cruciata* and *C. subsetacea* are placed here very tentatively as the molecular evidence is ambiguous.

Hybrids are very rare in the section except for some intermediate plants between the species pairs. The molecular phylogenies (e.g. Fig. 1 & 2) suggest that *Cliffortia cruciata* has a hybrid origin.

(14–15) *Cliffortia complanata* series

14. ***Cliffortia complanata*** E.Mey. ex Weim. in Botaniska Notiser 90: 169, fig. 1a–e, t. 3 (1948); [*C. complanata* E.Mey. ex Drège: 80, 173 (1843), *nomen nudum*]; Fellingham: 611 (2000). Lectotype, designated here: Paarl District, du Toits Kloof, 610–915m Oct.–Jan., Drège '*C. complanata* E.M. a' (K, lecto!; B†, HBG!, LD, NY!, REG!, S, SAM, TCD!).



C. zeyheri Schldl. ms, based on Zeyher 325 (W!).

C. serpyllifolia sensu Eckl. & Zeyh.: 268 (1836), non Cham. & Schldl.

?*C. serpyllifolia* var. *foliis-latoribus* Eckl. & Zeyh.: 268 (1836). Type: Swellendam District, Puspas Valley not far from Swellendam, Oct., Ecklon 1737β (S, holo.; B†, C, iso.).

C. serpyllifolia var. *chamissonis* Harv.: 301 (1862).

C. propinqua var. *chamissonis* (Harv.) Weim.: 25, fig. 2H (1934) & 400 (1940b). Type as for *C. complanata*.

C. serpyllifolia var. *penninervis* sensu Harv.: 301 (1862) pro parte quoad Drège 6818.

Erect, or sprawling against rocks, shrub up to 1.8 m high, killed by fire or resprouting after fire from a central crown; densely divaricately branched, forming brachyblasts. *Young stems* 0.3–1.0 mm wide, tinged reddish, hairy; stem hairs adpressed upwards, 0.1–0.8 mm long. *Leaves* trifoliolate; leaflets elliptic to elliptic-obovate, 3.7–11.5 × 0.9–3.7 mm; apex rounded; margins flat, entire and smooth; lamina chartaceous, 0.1–0.2 mm thick, midrib not prominent, curved upwards and towards stem, glaucous, glabrous; sheath 0.5–1.4 mm long, abaxially glabrous, adaxially with long straight hairs; stipules 0.6–3.0 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on keel; margins smooth to serrate; sepals 3 or 4, glabrous. *Male flowers* unknown. *Female flowers* with bracteoles 1.0–2.6 mm long, as long or longer than immature receptacle; sepals ovate, 0.7–1.0 × 0.2–0.3 mm, strongly recurved; carpels 1 or rarely 2; stigma 1.2–3.1 mm long, red, feathery, visible above leaves; immature receptacle ± 1.5 × 1.0–1.1 mm, hairy, clearly ribbed. *Achene* 1.7–4.4 × 0.9–1.7 mm, red to reddish brown, sparsely hairy in lower half, hairs up to 0.4 mm long; wings 2, narrow, straight, 0.2–0.3 mm wide, on either side. *Flowering time*: December to May.

Habitat: Shady rock crevices of Table Mountain Series, but occasionally found in open fynbos of south-facing slopes in wetter areas; altitude 300–1 600 m.

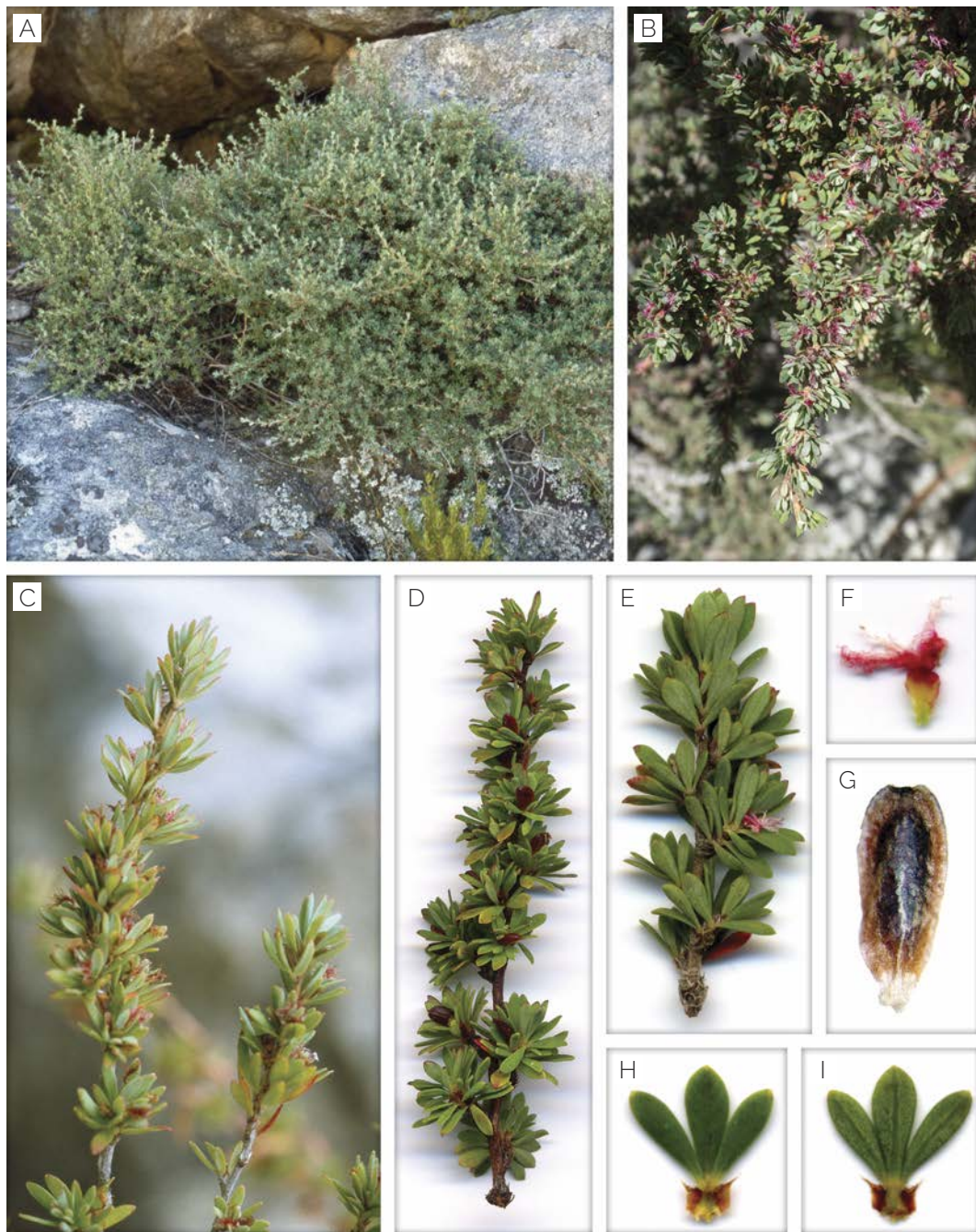
Distribution: From Bain's Kloof in the north to Kogelberg in the south and eastward along the Riviersonderend Mountains as far as Greyton with an outlying population on the Langeberg around Swellendam.

Conservation status. Widespread but localised species, found in many inaccessible mountainous areas and under no threat. Red List status: LC.

Etymology: *complanata* (Latin) means 'flattened out', usually in one plane, referring to the fruits that can appear winged.

Notes: Easily confused with and closely related to *Cliffortia propinqua*, but distinguished by the longer narrower leaves which always have smooth rounded apices. It generally also has just a single stigma, rarely two per flower and often only three sepals. See also note under *C. propinqua*.

Both *Cliffortia propinqua* and *C. complanata* have been confused with *C. serpyllifolia*, which is usually a tall shrub of up to 2 m that grows on open slopes in wet mountain fynbos in the west of its range.



Cliffortia complanata: A, habitat; B, flowering branch; C & E, branch with female flowers; D, branch with achenes; F, female flower; G, achene; H, dorsal view of leaf; I, ventral view of leaf.

Cliffortia complanata grows sympatrically with *C. serpyllifolia*, in the Langeberg around Swellendam. Populations of *C. complanata* in the Riviersonderend Mountains and Langeberg are taller, more robust plants than those to the west. The plants also usually grow on open slopes rather than in rock crevices and are difficult to distinguish from *C. serpyllifolia*. Nevertheless, it can be separated on close examination by the larger, more reddish and winged achenes, as well as more glaucous leaves than *C. serpyllifolia*.

Considering the amount of material that has been collected of this species, it is surprising that no male flowers have yet been discovered and the species is presumably apomictic. *Cliffortia propinqua* is also predominantly only ever found with female flowers, but for that species male flowers have been found at least three times in the northern reaches of its range (*Esterhuysen 2546 & 14495, Maguire 883*).

Index Kewensis attributed this name to Harvey, but Harvey only listed Meyer's sheet name as a synonym of his var. *chamissonis* and therefore never validly published the name *Cliffortia complanata*. Weimarck (1934) indicates that of three specimens cited by Harvey under his variety only *Ecklon & Zeyher 1737* matches the species. Of the other two collections, *Drège 6819* is *C. propinqua* and *Drège 6820* is *C. nitidula* subsp. *pilosa*. But there are other collections by *Drège* from Du Toitskloof labelled '*C. complanata* E.M. a', which are effectively cited by Harvey as belonging to his var. *chamissonis*. As these are the specimens from which the specific name was later adopted, they are designated as the lectotype. I have not seen *Ecklon 1737β*, the type of var. *foliis-latoribus*. Weimarck (1934) attributed it to *C. propinqua* but the location near Swellendam is only within the range of *C. complanata*. He commented that the leaves were longer and tapered more gradually, features that also fit with *C. complanata*.

Representative specimens

SOUTH AFRICA. **3318** (Cape Town): Jonkershoek Twins, rock crevices NE slopes, 915 m, 14 Feb. 1945, (–DD), *Esterhuysen 11484* (BOL); Jonkershoek Twins, ravine, 915 m, 14 Feb. 1945, (–DD), *Esterhuysen 11488* (BOL); kloof near Brakel's Farm, Sept. 1919, (–DD), *Garside 1136* (NBG); Stellenbosch Mt., Van Brakels Kloof, 7 Sept. 1919, (–DD), *Garside 1266* (K); Jonkershoek, Langrivier, 610 m, 28 Jan. 1967, (–DD), *Kerfoot 5706* (NBG, PRE); Stellenbosch, Jonkershoek, Langrivier, above contour path in gully, 760 m, 17 Jan. 1968, (–DD), *Kerfoot 6239* (K, NBG, PRE); Jonkershoek, Jakkalsvlei, 700 m, 16 July 1965, (–DD), *Taylor 6385* (NBG, PRE). **3319** (Worcester): Bain's Kloof, 17 Jan. 1945, (–CA), *Compton 16928* (NBG); Witte R valley, 31 May 1946, (–CA), *Esterhuysen 12821* (BOL); Bain's Kloof, 915–1065 m, 7 Apr. 1956, (–CA), *Esterhuysen 25630* (BOL); Bain's Kloof Pass, by White R, near summit of pass, 550 m, 27 Feb. 1933, (–CA), *Gillett 827* (K, NBG); mountain S of Wemmershoek, E side, 1220 m, Jan. 1921, (–CC), *Andreae 754* (NBG, PRE); Franschoek Forest Reserve, 29 Sept. 1936, (–CC), *Compton 5688* (NBG); Berg R Hoek, 9 Apr. 1944, (–CC), *Compton 15643* (NBG); Berg R Hoek, 19 Sept. 1946, (–CC), *Compton 18312* (NBG); Haalhoek Sneeuwkop, 915–1065 m, 25 Dec. 1943, (–CC), *Esterhuysen 9581* (BOL); Haalhoek Sneeuwkop, 1220 m, 30 Apr. 1945, (–CC), *Esterhuysen 11564* (BOL); on SW slopes of Haalhoek Sneeuwkop, 1065 m, 13 Mar. 1949, (–CC), *Esterhuysen 15169* (BOL); on W slopes of Haalhoek Spitzkop, 915 m, 11 Sept. 1949, (–CC), *Esterhuysen 15703* (BOL); Berg R Hoek, 20 Sept. 1946, (–CC), *Leighton 2049* (BOL); Wemmershoek Mts. sandstone outcrops on E slopes of Winterberg, 1200 m, 20 Feb. 1999, (–CC), *Whitehouse 9* (BOL, K, NBG); Wemmershoek Mts. top end of Elandsvlakte, along stream behind Wemmershoek Tafelberg, W of Olifants Peak, 1150 m, 21 Feb. 1999, (–CC), *Whitehouse 15* (BOL, NBG); Blokkop, ridge to summit S of valley above Villiersdorp Wild Flower Garden, 1065 m, 24 July 2001, (–CD), *Whitehouse 234* (BOL). **3320** (Montagu): Donkerkloof, 760 m, 26 Sept. 1946, (–CC), *Compton 18484* (NBG); Bloupunt Hiking Trail, W facing slopes beneath Bloupunt, 1160 m, 10 June 2000, (–CC), *Whitehouse 127* (BOL); Marloth Nature Reserve, Swellendam Hiking Trail, S slopes of Leeurivierberg, 600 m, 27 Dec. 2002, (–CD), *Whitehouse 338* (BOL). **3418** (Simonstown): below Somerset Sneeuwkop peak, Dec. 1939, (–BB), *Esterhuysen 1988* (BOL); Somerset Sneeuwkop, Staircase Ravine, 13 Dec. 1942, (–BB), *Esterhuysen 8256* (BOL); Somerset Sneeuwkop, Staircase Ravine, 30 Dec. 1945, (–BB), *Esterhuysen 12499* (BOL); upper reaches of Jonkershoek valley, 20 Apr. 1947, (–BB), *Esterhuysen 13902* (BOL); on S slopes of Somerset West Triplets, 1495 m, 10 Apr. 1949, (–BB), *Esterhuysen 15236* (BOL); Stellenbosch, Jonkershoek, The Triplets, 1220 m, Oct. 1967, (–BB), *Kerfoot 6041* (NBG, PRE); Kogelberg Forest Reserve, Buffelstalberg, 2nd SE peak, 645 m, 13 May 1969, (–BD), *Boucher 342* (NBG, PRE); Betty's Bay, Elephant Rock Mt., 305 m, 13 Feb. 1970, (–BD), *Boucher 1127* (NBG, PRE). **3419** (Caledon): Nuweberg, 855 m, 26 Aug. 1940, (–AA), *Compton 9218* (NBG); Greyton, 12 Mar. 1933, (–BA), *Gillett 873* (BOL, NBG); Genadendal, 305 m, 29 Dec. 1896, (–BA), *Schlechter 9863* (BM, K, PRE); Caledon, above Genadendal, Kanonkop, S slope, 1220 m, 21 Feb. 1966, (–BA), *Thompson 145* (K, NBG, PRE); Genadendal Hiking Trail, by side stream between Klein Koffiegat and Groot Koffiegat, 650 m, 23 Mar. 2003, (–BA), *Whitehouse 356* (BOL).

15. **Cliffortia propinqua** Eckl. & Zeyh., Enumeratio Plantarum Africae Australis Extratropicae 2: 268 (1836); Weim.: 23, fig. 2A–G (1934); Fellingham: 613 (2000). Type: Clanwilliam District, Cederberg Mts, Apr., *Ecklon & Zeyher 1736* [only Zeyher went to the Cederberg] (S, holo.; B, C, G, K!, L, M!, S!, SAM, TCD!, U!, W, Z!, iso.).



C. serpyllifolia var. *chamissonis* sensu Harv.: 301 (1862) pro parte, non Harv. sensu stricto.

C. serpyllifolia var. *penninervis* Harv.: 301 (1862); Kuntze: 76 (1898), nom. illegit. Based on *C. propinqua* and *C. serpyllifolia* var. *foliis-lattioribus*, see note below.

Low erect, or sprawling against rocks, shrub up to 1.5 m high, killed by fire or resprouting from a central crown; densely divaricately branched, forming brachyblasts. *Young stems* 0.3–0.8 mm wide, tinged reddish, hairy; stem hairs adpressed upwards, 0.1–1.1 mm long. *Leaves* trifoliolate; leaflets obovate, 2.7–6.3 × 0.9–3.1 mm; base contracted to form a pseudopetiolule; apex acute to rounded, up to 0.2 mm long; margins flat, with 1 or 2 shallow teeth, rarely entire; lamina chartaceous, 0.1–0.2 mm thick, midrib slightly prominent beneath against lamina, curved upwards and towards stem, glaucous, glabrous; sheath 0.4–1.2 mm long, abaxially glabrous, adaxially with long straight hairs; stipules 0.6–1.6 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on keel, margins smooth to shortly ciliate; sepals 4, glabrous. *Male flowers* with pedicel glabrous; sepals ovate, acute to acuminate at apex; filaments 2.2–3.0 mm long, red; anthers brownish red. *Female flowers* with bracteoles 0.8–1.7 mm long, as long as immature receptacle; sepals broadly ovate, 0.6–0.7 × 0.3–0.4 mm, strongly recurved; carpels 2, rarely solitary; stigma 1.0–2.5 mm long, red, feathery, visible above leaves; immature receptacle 1.1–1.5 × 0.6–1.0 mm, hairy, clearly ribbed. *Achene* flattened, 1.7–3.8 × 1.0–1.8 mm, red to reddish brown, sparsely hairy in lower half, hairs 0.1–0.3 mm long; wings 2, narrow straight, 0.2–0.3 mm wide, on either side and a small groove in between two carpels. *Flowering time*: January to May.

Habitat: Shady rock crevices of Table Mountain Series on mountain slopes, very rarely on well-drained open ground; altitude 300–1 550 m.

Distribution: Found from the northern Cederberg to the Wemmershoek and Franschhoek area, and eastwards to the Hex River Mountains.

Conservation status: Widespread but localised, found in many inaccessible mountainous areas and under no threat. Red List status: LC.

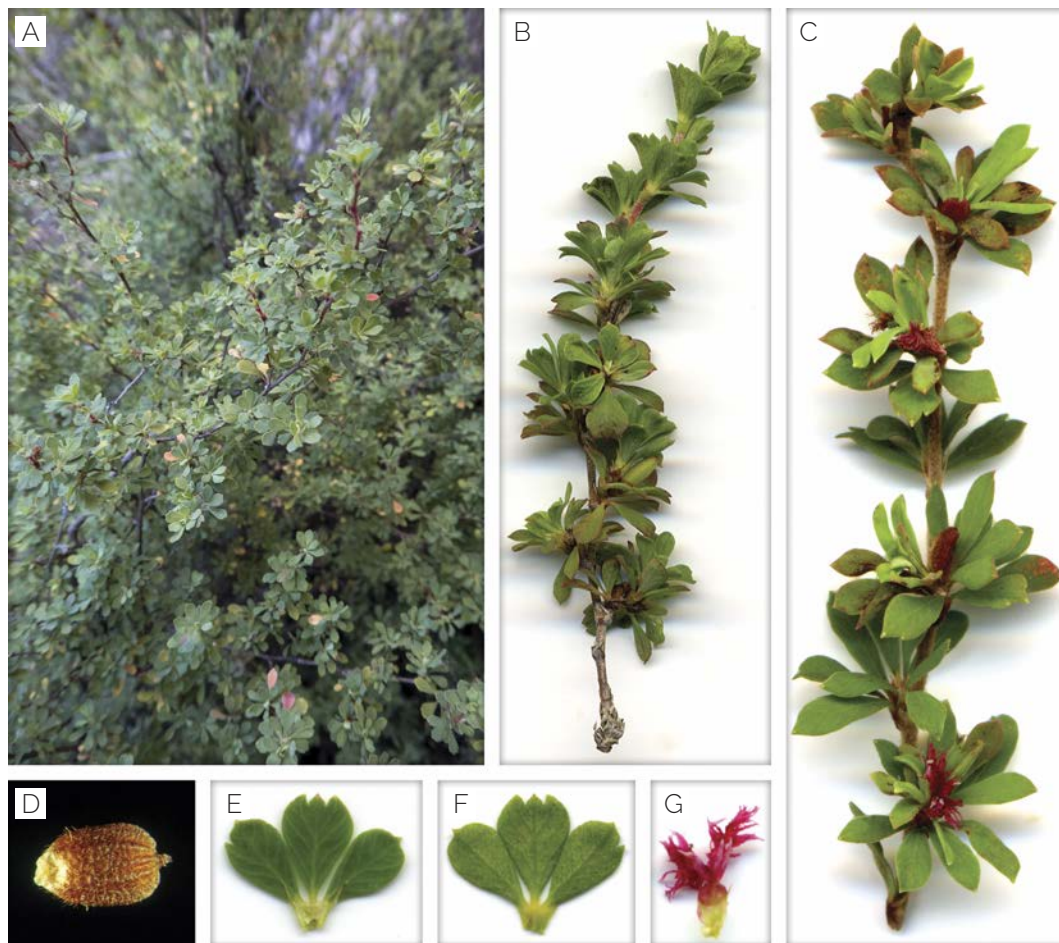
Etymology: *propinqua* (Latin) means ‘near, neighbouring’, referring presumably to its initial similarity to *Cliffortia serpyllifolia*, with which it was once placed as a variety.

Notes: In fruit the closely related *Cliffortia propinqua* and *C. complanata* are easily distinguished from other species of *Cliffortia* by the broad, reddish, almost winged, hairy achenes. *Cliffortia propinqua* is easily confused with *C. complanata*, but is characterised by the smaller more broadly obovate leaves, and generally having toothed apices and two stigmas in each flower. The two species overlap between Bain’s Kloof and Jonkershoek, but in these areas *C. complanata* is usually found at a slightly higher altitude than *C. propinqua*. Indeed in Bain’s Kloof there is a marked point around the 800 m mark where *C. propinqua* is replaced by *C. complanata*. However, unsurprisingly considering the similarity of the two species, intermediate specimens are found in this area, which can be presumed to be hybrids between the two (e.g. *Esterhuysen 1643 & 1977, Levyns 7638*).

Non-fruiting specimens of *Cliffortia propinqua* without toothed leaves could be confused with *C. obovata* but the ranges do not overlap. The veining of the leaves of *C. propinqua* is also more prominent. As with *C. complanata*, *C. propinqua* often grows in rock crevices and is a short stunted shrub of less than 0.5 m. However, a few populations appear to grow in normal fynbos and then the plants may reach almost 2 m in height.

An interesting parallel in species differentiation between *C. propinqua* and *C. complanata* occurs with *C. spathulata* and *C. dracomontana* in the Drakensberg. In both pairs of sister species, they differ by the shape of their leaves: obovate and toothed in the former, more elliptic and entire in the latter. There is also a similar geographic pattern, the former species having a more northerly distribution or where they grow together the latter species being found at a higher altitude.

The name *Cliffortia serpyllifolia* var. *penninervis* Harv. has been placed here on account of including *C. propinqua* as a synonym. However, it also included *C. serpyllifolia* var. *foliis-latoribus*, which is believed to belong to *C. complanata* (see notes under that species). Whether the name is legitimate would



depend upon whether Eckon & Zeyher's variety was itself validly published as it could be considered a polynomial. It is hoped that there will never be a need to resolve this.

Representative specimens

SOUTH AFRICA. **3218** (Clanwilliam): Clanwilliam, Olifants R, at Villa Brakfontein, Apr. 1830, (–BD), *Ecklon & Zeyher s.n.* (PRE); summit of the Skimmelberg [Schimmelberg], 1200 m, 12 Oct. 1939, (–BD), *Pillans 9110* (BOL); Piketberg Mts, W slopes of Zebra Kop, 1065 m, 23 May 1948, (–DB), *Esterhuysen 14495* (BOL, PRE). **3219** (Wuppertal): Krakadouw Peak, 1525 m, 4 May 1933, (–AA), *Adamson in Levyns 4270* (BOL); Clanwilliam, Pakhuis, 29 Sept. 1940, (–AA), *Compton 9562* (BOL, NBG); Suurvleiberg, upper SE slopes on ledges, Mar. 1940, (–AC), *Esterhuysen 2540* (NBG, PRE); upper SE slopes of Suurvleiberg, 915 m, Mar. 1940, (–AC), *Esterhuysen 2546* (BOL); N Cederberg, peak at Koupoort, 23 Oct. 1945, (–AC), *Esterhuysen 12157* (BOL); Cederberg Mts, Middelberg, 900 m, 26 Feb. 2000, (–AC), *Linder in Whitehouse 84* (BOL); Cederberg, Middelberg, 1220 m, 28 Oct. 1923, (–AC), *Pocock 746* (NBG); Cederberg Forest Reserve, Sederhoutkloof, NE base of Sneeuweburg, Eikeboom Farm, as far as Hoogvertoon, 915–1220 m, 3 Sept. 1963, (–AC), *Taylor 5123* (NBG, PRE); Elandskloof Mts, 1065 m, 25 Sept. 1936, (–CA), *Compton 6566* (NBG); Elandskloof, 915 m, 25 Sept. 1936, (–CA), *Levyns 5757* (BOL); Clanwilliam–Ceres, Elandskloof, 25 Mar. 1951, (–CA), *Maguire 883* (NBG). **3319** (Worcester): Ceres, Michell's Pass, 305 m, Dec. 1888, (–AD), *anon s.n.* (NBG); around Michell's Pass, 730 m, Apr. 1882, (–AD), *Bolus 5288* (BOL, K); rocky kloof on SW slopes of Skurweberg [Schurfteberg], 1065 m, 7 Dec. 1948, (–AD), *Esterhuysen 14727* (BOL); Hex River Mts, SE slopes of Prospect Peak, 1065–1220 m, 2 Oct. 1949, (–BC), *Esterhuysen 15933* (BOL); Du Toits Kloof, 1 Apr. 1945, (–CA), *Esterhuysen 11538* (BOL); Slanghoek Mts, cliffs on E slopes of Molenaarsberg, 14 May 1950, (–CA), *Esterhuysen 16956* (BOL, NBG); Bain's Kloof Mts, summit of pass, 18 Feb. 1933, (–CA), *Gillett 786* (NBG); Bain's Kloof, rocky outcrops above trail, 670 m, 10 Apr. 1999, (–CA), *Whitehouse 33* (BOL, MO, NBG); Fairy Glen, Brandwacht, 760 m, 8 Nov. 1948, (–CB), *Acocks 15265* (K, PRE); Franschoek Pass, 610 m, 2 Nov. 1947, (–CC), *Compton 20211* (NBG); Franschoek Pass, 915 m, 12 Feb. 1950, (–CC), *Compton 21910* (BOL, NBG); Wemmershoek Peak, W side, 2 Jan. 1945, (–CC), *Esterhuysen 11363* (BOL, K, NBG, PRE); Haalhoek Spitzkop, 915 m, 11 Sept. 1949, (–CC), *Esterhuysen 15713* (BOL, NBG); Franschoek, Klein Drakenstein, Zachariashoek, Bakkerskloof Mt., 305 m, 9 Jan. 1969, (–CC), *Kruger s.n.* (PRE); Klein Drakenstein Mt., Kasteelkloof [Kasteelberg] Catchment, 600 m, 1 Oct. 1971, (–CC), *Kruger 1474* (NBG, PRE).

(16–17) *Cliffortia ericifolia* series

16. ***Cliffortia ericifolia*** L.f., Supplementum Plantarum: 430 (1782); Thunb.: 433 (1823); DC.: 596 (1825); G.Don: 596 (1832); Eckl. & Zeyh.: 270 (1836); Harv.: 302 (1862); Bolus & Wolley-Dod: 260 (1904); Juel: 276 (1918); Weim.: 133, fig. 39A–E (1934); Levyns: 450 (1950); Fellingham: 609 (2000); Whitehouse & Victor: 103 (2002). Type: Cape, between Cape and False Bay, *Thunberg s.n.* (LINN, holo.!; C, LD!, iso.).



Erect shrub up to 0.8 m high, with lower branches erect, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.4–0.9 mm wide, tinged reddish, glabrous. *Leaves* unifoliate; linear to needle-shaped, 2.8–4.6 × 0.7–0.9 mm; base contracted into a pseudopetiolule; apex mucronate to rounded, up to 0.1 mm long; margins inrolled beneath, entire and smooth; lamina single-veined into base, chartaceous, 0.2–0.4 mm thick, ± straight or slightly curved upwards and towards stem, green above but whitish beneath forming a thin white line because of inrolled margins, glabrous; sheath 0.8–1.5 mm long, abaxially glabrous, adaxially densely hairy; stipules 0.2–0.5 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on keel, margins ciliate; sepals 4, glabrous. *Male flower* with bracteoles 0.5–0.6 mm long; pedicel ± 0.4 mm long; sepals broadly ovate, 2.2–2.4 × 1.0–1.1 mm, acute to acuminate at apex; stamens 4; filaments 3.7–4.0 mm long, red; anthers reddish brown. *Female flowers* with bracteoles 0.5–0.9 mm long, shorter than immature receptacle; sepals ovate, 0.8–1.1 × 0.2–0.3 mm, erect, falling very soon; carpel 1; stigma 1.2–1.5 mm long, red, feathery, tucked at base of leaves; immature receptacle 1.1–1.4 × 0.5–0.8 mm, glabrous, clearly ribbed. *Achene* 2.6–2.9 × 1.0–1.2 mm, medium to pale brown, glabrous; ribs 2–4, rounded, 0.1–0.3 mm wide. *Flowering time*: January to July.

Habitat: Seasonally wet flats and edge of vleis in full sun; altitude 0–100 m.

Distribution: Long thought to be restricted to the Cape Flats, but recently found just north of Cape Agulhas and probably occurs elsewhere on the flats around Bredasdorp where closely related *Cliffortia brevifolia* is common.

Conservation status: Included in the Red List as Endangered because of its restriction to a few small localities on the Cape Flats, but discovery on the flats near Cape Agulhas suggests that it may be more common in that area where it is not as threatened. Red List status: EN.

Etymology: *ericifolia* (Latin) means 'having leaves like *Erica*', more so than other needle-leaved species because of the inrolled margins and pale stripe down the underside.

Notes: *Cliffortia ericifolia* is easily distinguished by its glabrous stems, flowers with four sepals and erect unifoliate needle-shaped leaves that are inrolled beneath. However, the distinction between this species and *C. brevifolia* is poorly defined. *C. ericifolia* has longer leaves and an erect upright habit, whereas *C. brevifolia* has shorter leaves and a more procumbent habit. The former species appears to grow where groundwater is usually permanent, while for *C. brevifolia* the waterlogging is more seasonal. It is possible that they just represent ecotypes depending upon the amount of water available throughout the year. Both species have been found growing together near Cape Agulhas and are distinguished in the field there. However, intermediates, which are probably hybrids, also occur.

The species may be confused with *Cliffortia erectisepala* as this also has unifoliate needle-shaped leaves and glabrous stems. The two species are not closely related: *C. erectisepala* has three sepals not four and the leaf margins are not inrolled beneath.

Representative specimens

SOUTH AFRICA. **3318** (Cape Town): Cape Peninsula, Kenilworth Race Course, at N end, 23 Nov. 1964, (–CD), *Esterhuysen 30847* (BOL); Cape Peninsula, Kenilworth Race Course, N end of course, 6 Mar. 1965, (–CD), *Esterhuysen 30963* (BOL); Cape Peninsula, Kenilworth Race Course, towards N boundary, 16 Feb. 1968, (–CD), *Esterhuysen 31924* (BOL, K, NBG); Cape Peninsula, Kenilworth Race Course, 18 Mar. 1970, (–CD), *Esterhuysen 32425* (BOL); Kenilworth Racecourse, NE corner, 10 m N of northernmost dam, 20 m, 13 May 1998, (–CD), *Helme 1453* (NBG); Cape Peninsula, Table Mt., Jan. 1892, (–CD), *Kassner TRV 12859* (PRE); Cape Peninsula, Kenilworth Flats, near Wynberg, 25 m, 12 Mar. 1892, (–CD), *Schlechter s.n.* (BOL); Zoute R, near Philadelphia, 22 Oct. 1976, (–DA), *Esterhuysen 34433* (BOL, K); Cape, near Doornhoogte, Apr. , (–DC), *Ecklon 1748* (K); Bothasig, 2.5 km along the Malmesbury road, from the turn-off from the N9, 27 Apr. 1976, (–DC), *Esterhuysen 34263* (BOL, K); entrance to King David golfclub, NW airport, roadside, 40 m, 1 Aug. 1998, (–DC), *Helme 1503* (NBG). **3418** (Simonstown): Capricorn, 1 km E of Muizenberg Cemetry, 500 m N of new Baden Powell Drive, W of landfill, 5 m, 6 Sept. 1998, (–AB), *Helme 1536* (NBG); between Fish Hoek and Kommetjie, 8 June 1924, (–AB), *Levyns s.n.* (BOL); Muizenberg, E of vlei, Jan. 1921, (–AB), *Michell s.n.* (BOL); Cape Flats, Zeekoe Vlei, 5 m, July 1935, (–BA), *Esterhuysen 1316* (BOL). **3419** (Caledon): between Elim and Bredasdorp, Langpan, 60 m, 14 Mar. 1977, (–DB), *Thompson 3402* (K, NBG, PRE); road to Brandfontein, just before Springfield turning, W edge of Soutpan, 10 m, 3 Sept. 2001, (–DB), *Whitehouse 261* (BOL, NBG). **3420** (Bredasdorp): Eliaskraal, flats below Heuningrug, 40 m, 25 May 1990, (–CA), *Oliver 9440* (BOL, NBG).



Cliffortia ericifolia: A, habitat; B, branch; C, achene,

17. **Cliffortia brevifolia** Weim. in Botaniska Notiser 1933: 163, fig. 10e (1933) & 134, fig. 39F–L (1934); Fellingham: 609 (2000). Lectotype, designated here [when Weimarck chose the specimen he listed 12 different herbaria in which it was housed. As none of these were Lund, where he did his research, one of these 12 sheets needs to be chosen as the lectotype.]: Bredasdorp District, on hills near Vogelvlei, 60 m, 23 Apr. 1897, *Schlechter 10492* (BOL, lecto.!; B†, BM, BR!, COL, G, GRA!, HBG!, K!, L, P, PRE!, S!, W!, Z!).



Sprawling shrubs up to 0.7 m high, with lower branches decumbent, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.5–0.9 mm wide, tinged reddish, glabrous. *Leaves* unifoliolate; linear to needle-shaped, 1.5–3.0 × 0.6–0.9 mm; base contracted into a pseudopetiolule; apex obtuse to rounded, up to 0.1 mm long; margins inrolled beneath, entire and smooth; lamina single-veined from base, chartaceous, 0.1–0.4 mm thick, curved downwards and away from stem, green above but whitish beneath forming a thin white line because of inrolled margins, glabrous; sheath 0.6–1.3 mm long, abaxially glabrous, adaxially densely hairy; stipules 0.1–0.6 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on keel, margins smooth to serrate; sepals 4, glabrous. *Male flowers* with bracteoles 0.8–1.0 mm long; pedicel 0.3–0.4 mm long; sepals broadly ovate, 1.5–2.3 × 0.8–1.3 mm, acute to acuminate at apex; stamens (2–)4; filaments 1.9–2.6 mm long, red; anthers brownish red. *Female flowers* with bracteoles 0.8–1.2 mm long, as long as or shorter than immature receptacle; sepals ovate to oblong, 0.6–1.1 × 0.1–0.4 mm, erect; carpel 1; stigma 0.8–1.4 mm long, red, feathery, tucked at base of leaves but visible; immature receptacle 0.9–1.4 × 0.4–0.7 mm, glabrous, clearly ribbed. *Achene* 1.6–2.6 × 0.7–1.0 mm, medium to pale brown, glabrous; ribs 2–4, rounded to acute, 0.1–0.3 mm wide. *Flowering time*: November to May.

Habitat: Muddy low-lying flats near the sea, often seasonally inundated, in full sun, occasionally growing directly out of limestone near the sea; altitude 0–100 m.

Distribution: Common on the flats around Bredasdorp, and a few scattered localities on the Cape Flats.

Conservation status: Widespread and common on the muddy flats around Bredasdorp, but threatened by development on the Cape Flats. Red List status: LC.

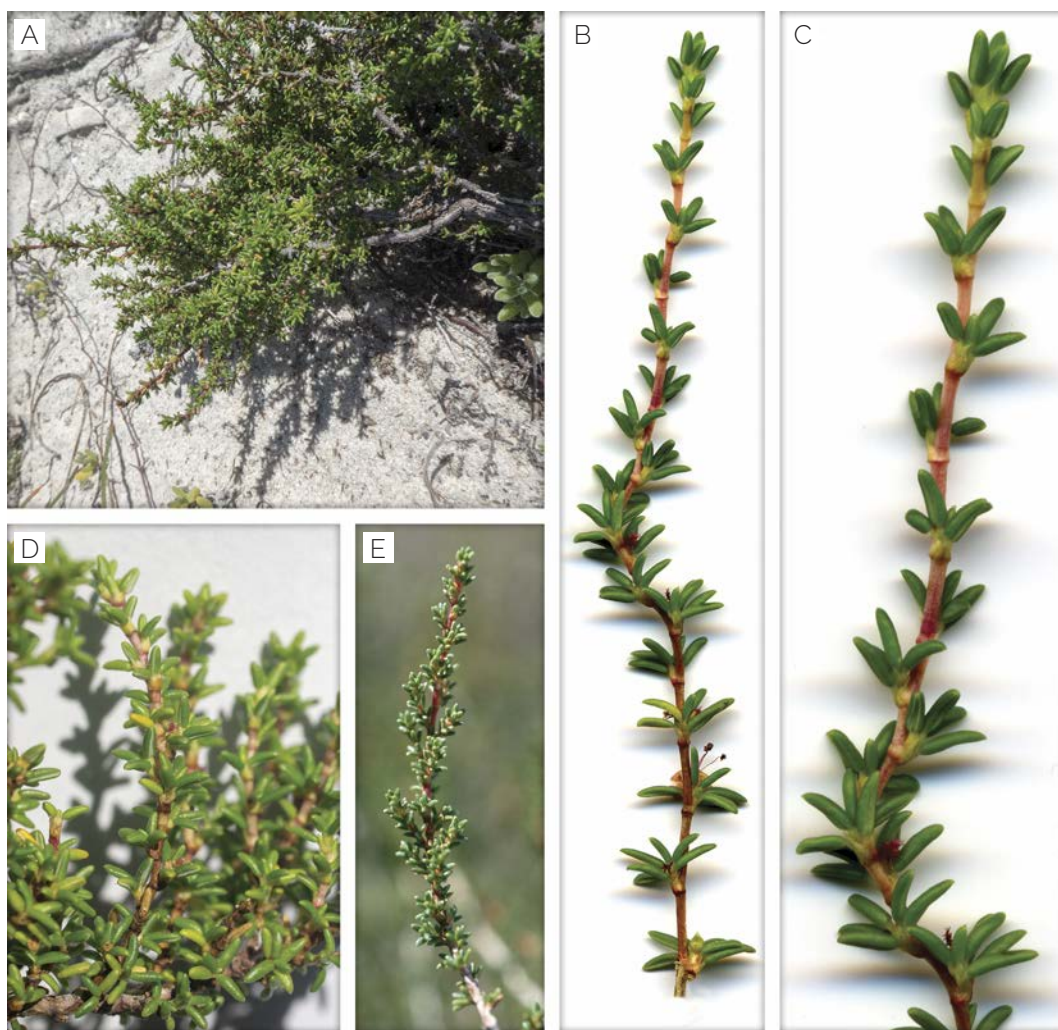
Etymology: *brevifolia* (Latin) means ‘short-leaved’, referring to the fact that they are shorter than the closely related *Cliffortia ericifolia*.

Notes: Morphologically very similar to *Cliffortia ericifolia*, with glabrous stems, flowers with 4 sepals and unifoliolate needle-like leaves inrolled beneath, but distinguished on account of its shorter leaves and more sprawling habit. See also note under *C. ericifolia*.

Representative specimens

SOUTH AFRICA. **3318** (Cape Town): Goodwood, Nordkamp, 1 Oct. 1986, (–DC), *Olivier 34* (NBG). **3418** (Simonstown): Cape Flats, Philippi, vlei land next to Isoetes Vlei, 27 Oct. 1956, (–BA), *Esterhuysen 26433* (BOL); flats between Gordon’s Bay and Strand, 15 Oct. 1975, (–BB), *Esterhuysen 34032* (BOL); Strand, Weltevreden area, 0.5 km S Nomzamo, 15 m, 13 Oct. 1998, (–BB), *Helme 1561* (NBG). **3419** (Caledon): Frikkies Bay, 24 Dec. 1946, (–CB), *Compton 18975* (NBG); Franskraal, 25 Dec. 1946, (–CB), *Leighton 2506* (BOL); ‘Pheasantshoek’ near Viljoenshof, 20 Nov. 1976, (–DA), *Esterhuysen 34463* (BOL, K); Baardskeerdersbos, Heidehof, W of Baardskeerdersbos, 30 m, 31 May 1973, (–DA), *Thompson 1727* (NBG, PRE); road to Die Dam from Wolvengat, N of Ratelrivier farm, 10 m, 10 May 2000, (–DA), *Whitehouse 120* (BOL,

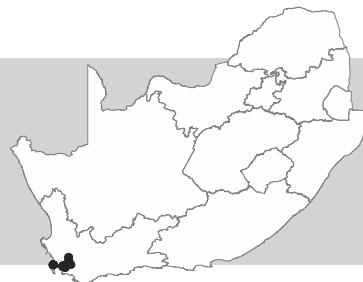
NBG); Mierkraal, SW of Bredasdorp Mt, 30 m, 16 Mar. 1978, (–DB), *Boucher 3773* (NBG); Rietfontein Private Nature Reserve, near Melkbospan on hillside, 60 m, 4 Feb. 1981, (–DB), *Boucher 5032* (NBG); Rietfontein, 11 Apr. 1978, (–DB), *Esterhuysen s.n.* (BOL); Vogelvlei, 60 m, 23 Apr. 1897, (–DB), *Schlechter 10492* (BM, BOL, K, PRE, Z); between Elim and Bredasdorp, Langpan, 60 m, 14 Mar. 1977, (–DB), *Thompson 3403* (NBG); road to Brandfontein, just before Springfield turning, W edge of Soutpan, 10 m, 3 Sept. 2001, (–DB), *Whitehouse 260* (BOL); Brandfontein, along road to Bredasdorp, near coast, 10 m, 13 Oct. 1951, (–DD), *Esterhuysen 19079* (BOL, PRE); Rietfontein, coastal flats between the Soetanyberg and the sea, 13 Apr. 1978, (–DD), *Esterhuysen 34904* (BOL, K). **3420** (Bredasdorp): Potberg, NE slopes near pan on Melkhout R, 75 m, 15 Mar. 1978, (–BC), *Thompson 3764* (NBG, PRE); flats NE of Die Poort, 25 m, 1 June 1973, (–CA), *Thompson 1739* (NBG); hill 0.5 km E of Agulhas, 10 Dec. 1935, (–CC), *Pillans 8180* (BOL). **3421** (Riversdale): Heidelberg District, Puntjie, at the mouth of the Duivenhok's R, 24 Jan. 1961, (–AC), *Esterhuysen 28755* (BM, BOL, K).



Cliffortia brevifolia: A, habitat; B, branch with male flower; C, branch with female flower; D & E, branch.

(18–19) *Cliffortia dentata* series

18. ***Cliffortia dentata*** Willd., Species Plantarum, ed. 4(2): 842 (1805); DC.: 596 (1825); G.Don: 596 (1832); Harv.: 299 (1862); Bolus & Wolley-Dod: 260 (1904) pro parte; Weim.: 20, fig. 1A–F (1934); Levyns: 445 (1950); Fellingham: 612 (2000); Whitehouse: 13 (2007). Type: Cape of Good Hope, without further information (B-W, holo!).



Low sprawling or trailing semi-herbaceous shrub up to 0.7 m high, killed by fire; densely divaricately branched, only forming long branches. *Young stems* 0.3–0.7 mm wide, hairy; stem hairs adpressed downwards, 0.2–1.1 mm long. *Leaves* trifoliolate; leaflets obovate, 4.2–10.3 × 2.3–6.4 mm; apex acute to rounded, up to 0.4 mm long; margins flat except for apices which are sometimes recurved, with up to 5 lobes or teeth, outer leaflets often narrower than middle one and sometimes untoothed; lamina herbaceous, midrib slightly prominent beneath against lamina, curved upwards and towards stem, glabrous; sheath 0.4–0.9 mm long, abaxially hairy, adaxially with a fringe of long straight hairs; stipules 1.9–4.0 mm long, partially joined on reverse side of stem, brown and scarious, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on keel, margins ciliate; sepals 4, glabrous. *Male flowers* with bracteoles 1.6–2.3 mm long, pedicel glabrous, sepals broadly ovate, 3.5–3.8 × 1.5–2.0 mm, with long attenuate apices; stamens 8; filaments 4.0–4.3 mm long, red; anthers brownish red. *Female flowers* with bracteoles 1.5–3.4 mm long, longer than immature receptacle; sepals ovate, 1.2–2.2 × 0.5–0.9 mm, strongly recurved; carpels 2; stigma 2.1–2.6 mm long, greenish white, feathery; immature receptacle 0.9–1.1 × 0.7–1.0 mm, glabrous, smooth. *Achene* slightly flattened, 2.2–2.8 × 1.0–1.2 mm, pale brown, glabrous; unribbed but with a central groove dividing two carpels. *Flowering time*: April to October, possibly as late as December.

Cliffortia dentata and *C. gracillima* form a pair of closely related species which create decumbent trailing mats on shady rocky slopes. The glabrous trifoliolate leaves and general habit distinguish this group from any other *Cliffortia*.

The collection *Wolley-Dod 2849* (BOL) from Miller's Point on the Cape Peninsula was regarded by Bolus and Wolley-Dod (1904) as belonging to *Cliffortia dentata*. It is in fact an unusual plant that belongs to section *Bifoliolae* and is possibly a hybrid between *C. obcordata* and *C. carinata*.

var. ***dentata***; Whitehouse: 13, fig. 6 (2007).

C. trifida Thunb.: 6 (1809); Juel: 277 (1918), nomen nudum, pro parte.

Middle leaflet 4.2–8.5 × 2.9–6.1 mm, outer leaflets 4.3–10.3 × 2.3–5.1 mm, all leaflets 3–5-lobed or toothed, middle lobe 0.6–1.5 × 0.9–2.0 mm.

Habitat: Shady slopes in gulleys and on damp south-facing cliffs on well-drained soils from Table Mountain Series; altitude 300–1 450 m.

Distribution: Found between Wemmershoek Mountains in the north and the Helderberg and Hottentots Holland in the south, with an outlying population on the Cape Peninsula where it is only known from the eastern slopes of the saddle between Table Mountain and Devil's Peak.

Conservation status: An uncommon species, but its localities are well-conserved and inaccessible, however being a seeding species, too frequent fires on Devil's Peak could threaten the Cape Peninsula population. Red List status: not listed.

Etymology: *dentata* (Latin) means 'toothed', referring to the apices of the leaves that can appear like the teeth of a saw.

Notes: *Cliffortia dentata* var. *dentata* has a toothed middle leaflet with a broad lobe in the middle.

Representative specimens

SOUTH AFRICA. **3318** (Cape Town): on Devil's Peak, at the opening towards Rondebosch, Cape Town, July 1847, (–CD), *Alexander-Prior s.n.* (K, PRE); Cape Peninsula, Table Mt., near Fir Tree Waterfall, 915 m, 27 Nov. 1932, (–CD), *Andrae s.n.* (BOL); Cape Town, Table Mt, Oct. 1934, (–CD), *Berg STE 19824* (NBG); Devil's Peak, 520 m, June 1897, (–CD), *Bolus 1545* (BOL); Table Mt., near Rondebosch, 305 m, June 1897, (–CD), *Bolus 7987* (BOL, K); Cape Peninsula, Kirstenbosch, Skeleton Buttress, rocks facing S, 610 m, 26 Sept. 1945, (–CD), *Compton 17451* (NBG); Cape Peninsula, Kirstenbosch, cliff at base of Fernwood Buttress, 7 Apr. 1935, (–CD), *Esterhuysen 121* (PRE); Cape Town, Devil's Peak, (–CD), *Froembling s.n.* (NBG); Devil's Peak, on saddle, July 1906, (–CD), *Marloth 4341* (PRE); Devil's Peak, Saddleback, 305–610 m, Aug. 1897, (–CD), *Thode 6174* (NBG); Devil's Peak, Saddleback, 305–610 m, July 1886, (–CD), *Thode 9181* (NBG); Cape Peninsula, Newlands Ravine, just beneath Saddle between Table Mt and Devil's Peak, 670 m, 16 June 1999, (–CD), *Whitehouse 34* (BOL, BOL, NBG); Newlands, near Cape Town (Devil's Peak ex Weimarck), 9 Sept. 1883, (–CD), *Wilms 3182* (BM, K); below saddle between Table Mt. and Devil's Peak, 3 July 1897, (–CD), *Wolley-Dod 2637* (BM, BOL, BOL, K); Jonkershoek Twins, above the trees in Langrivierskloof, 915 m, 27 Sept. 1974, (–DD), *Esterhuysen 33625* (BOL); Jonkershoek, Langrivier, 915 m, 28 Jan. 1967, (–DD), *Kerfoot 5705* (PRE); Jonkershoek, Swartboskloof, 800 m, 14 May 1981, (–DD), *McDonald 651* (K, NBG, PRE). **3319** (Worcester): Franschhoek Peak, 1400 m, 6 Oct. 1946, (–CC), *Compton 18546* (NBG); Wemmershoek Mts, on S slope of Winterberg above saddle between Winterberg and Tafelberg, 1450 m, 20 Feb. 1999, (–CC), *Whitehouse 14* (BOL, K, NBG). **3418** (Simonstown): Helderberg, 455–610 m, 14 May 1961, (–BB), *Esterhuysen s.n.* (BOL); Somerset Sneeuwkop, 1220 m, Dec. 1939, (–BB), *Esterhuysen 1993* (BOL); Hottentots Holland Mts, Rooskraalberg, 915 m, July 1940, (–BB), *Esterhuysen 2647* (BOL, K, NBG, PRE); Guardian Peak, 7 Oct. 1945, (–BB), *Esterhuysen 11968* (BOL); Helderberg, 14 Nov. 1948, (–BB), *Esterhuysen 14647* (BOL, NBG); Somerset West Triplets, S slopes, 1370 m, 10 Apr. 1949, (–BB), *Esterhuysen 15242* (BOL, PRE); Jonkershoek, on slopes below Pic Sans Nom, 915 m, 26 Sept. 1974, (–BB), *Esterhuysen 33622* (BOL); Jonkershoek State Forest, upper Eerste R valley, near 2nd Waterfall path, 425 m, 7 Sept. 1972, (–BB), *Haynes 692* (K, NBG, PRE); Stellenbosch, Jonkershoek, 2nd Waterfall, 760 m, Oct. 1967, (–BB), *Kerfoot 6021* (K, NBG, PRE); Helderberg, 600 m, 20 Apr. 1940, (–BB), *Parker 3489* (BOL, K, NBG); Hottentots Holland Mts, slopes near Somerset Sneeuwkop, E slopes, Sept. 1948, (–BB), *Stokoe SAM 59213* (NBG, PRE); Nuweberg Forest Reserve, S slope of Sneeuwkop, 1220 m, 26 Nov. 1969, (–BB), *Thompson 994* (K, NBG, PRE). **3419** (Caledon): Emerald Dome, 1220 m, 9 Apr. 1944, (–AA), *Esterhuysen 10100* (BOL, PRE); Hottentots Holland Mts, between Somerset Sneeuwkop and Dwarsberg, Sept. 1946, (–AA), *Stokoe SAM 59213* (PRE).

var. **gracilis** (Harv.) C.M.Whitehouse in Bothalia 37(1): 14, fig. 6 (2007). *C. gracilis* Harv.:299 (1862); Weim.: 22 (1934); Fellingham: 612 (2000). Type: Worcester District, Du Toit's Kloof, 610–915 m, *Drège 145b* (K, holo.; B†, L, S, W iso.).

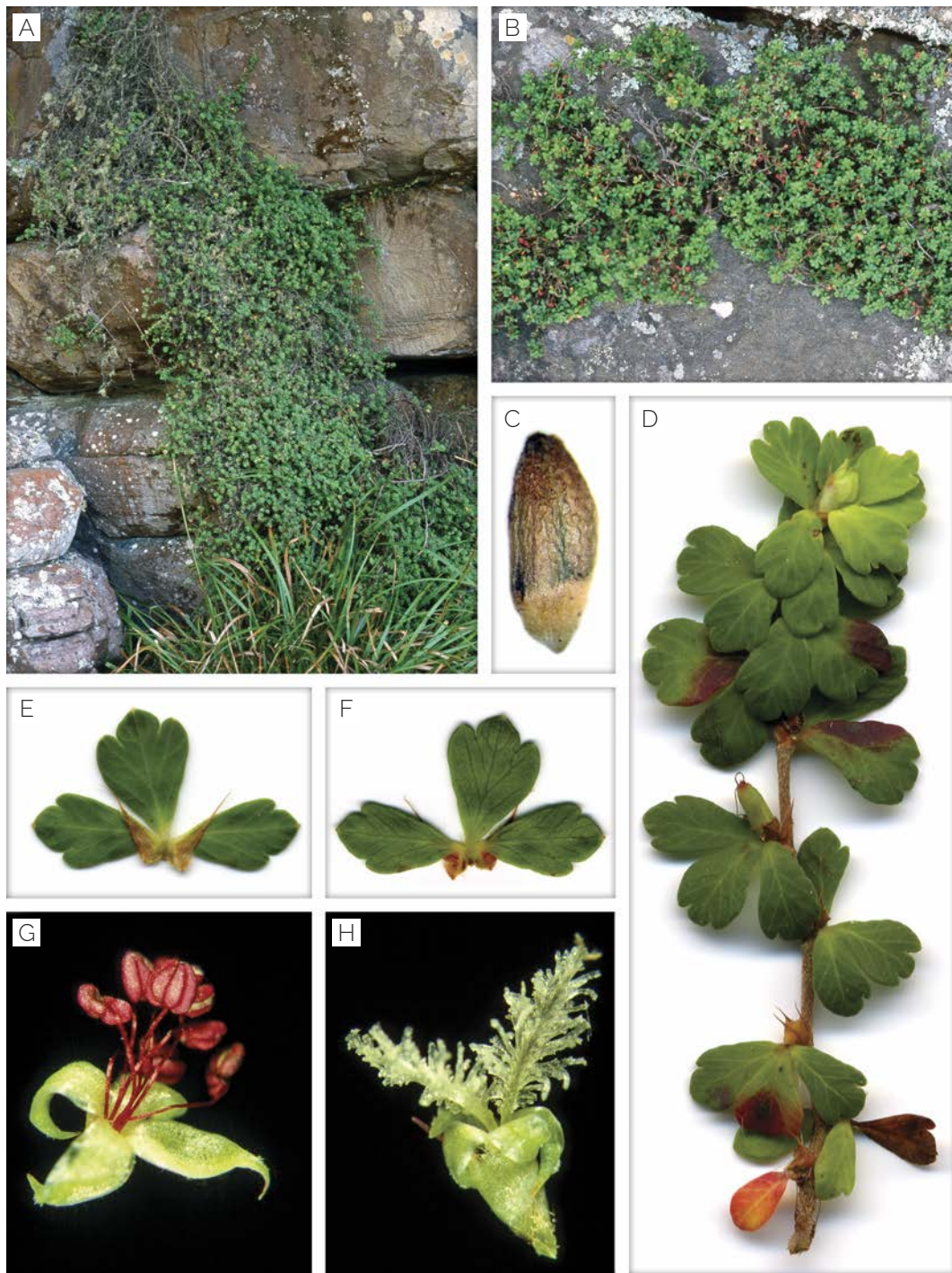
C. dentata sensu Drège: 80 (1843).

Middle leaflet 4.5–8.4 × 4.1–6.1 mm wide, outer leaflets 4.7–9.5 × 3.0–6.4 mm, middle leaflet 3(–5)-lobed or toothed, middle lobe 0.6–1.0 × 0.6–1.2 mm, outer leaflets untoothed.

Habitat: Shady slopes in gulleys and on damp south-facing cliffs on well-drained soils from Table Mountain Series; altitude 600–1700 m.

Distribution: Only known from Molenaarsberg and Upper Wellington Sneeuwkop to the north of Du Toitskloof.

Conservation status: Only known from a small inaccessible area north of Du Toitskloof, but possibly threatened by too frequent fires as it probably only survives as seed. Red List status: not listed.



Etymology: *gracilis* (Latin) means 'thin, slender', referring to the stems that are too weak to hold the plant upright and trail over the rocks.

Notes: *Cliffortia dentata* var. *gracilis* can be distinguished from the typical variety by the middle leaflet, which is often only 3-lobed, with the middle lobe being much narrower than the outer two, and untoothed outer leaflets.

Cliffortia gracilis was considered a distinct species by Weimarck (1934), but in size of the leaves and flowers, the Du Toitskloof populations (the type locality) fall within the range of *C. dentata*. Furthermore, the discovery of a population of the latter species from the Wemmershoek Mountains, a mere 10 km or so from Du Toitskloof, means that the distance between the populations is much narrower than previously thought. Therefore, *C. gracilis* was reduced to varietal status and a new name, *C. gracillima*, given to the Langeberg populations.

Representative specimens

SOUTH AFRICA. 3319 (Worcester): Molenaarsberg, 1370 m, 5 Oct. 1947, (–CA), *Compton 20120* (NBG); Du Toits Kloof, 610–915 m, 1839, (–CA), *Drège s.n.* (K); ravine on Upper Wellington Sneekop, Tierkloof, 1525–1685 m, 31 May 1946, (–CA), *Esterhuysen 12813* (BOL); Molenaarsberg, gully on S side, above Du Toits Kloof, 1370 m, 5 Oct. 1947, (–CA), *Esterhuysen 14062* (BOL, K).

19. **Cliffortia gracillima** C.M.Whitehouse in Bothalia 37(1): 14, fig. 6–7 (2007). Type: Riversdale District, Garcia's Pass, 395m, Oct. 1904, *Bolus 11271* (BOL, holo.; PRE!, iso.).

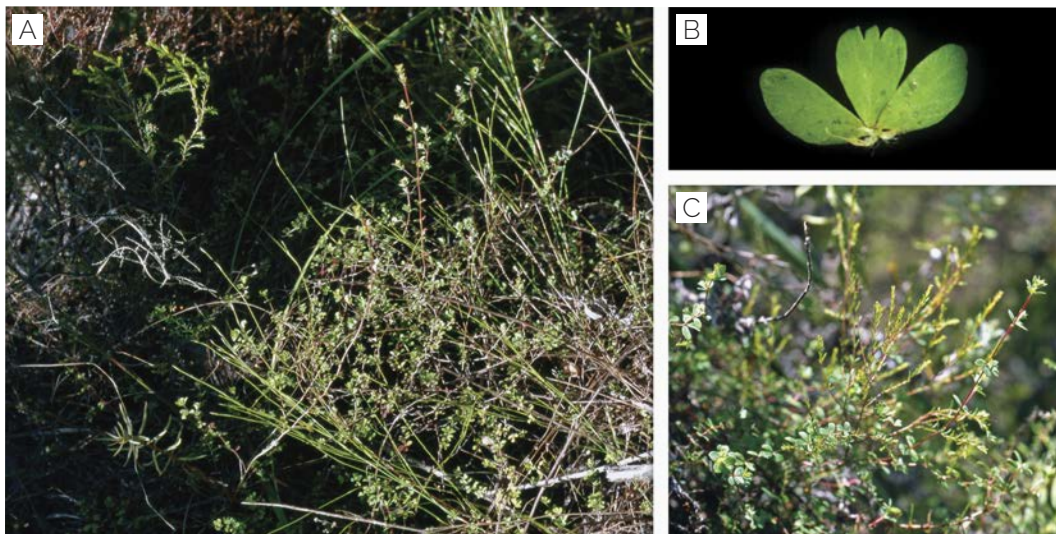


C. dentata sensu Muir: 56 (1929), *non* Willd.

C. gracilis sensu Weim.: 22, fig. 1G–L (1934) pro parte; Fellingham: 612 (2000) pro parte.

Low sprawling or trailing semi-herbaceous shrub up to 0.3 m high, probably killed by fire; densely divaricately branched, only forming long branches. *Young stems* 0.2–0.6 mm wide, hairy; stem hairs adpressed downwards, 0.2–0.8 mm long. *Leaves* trifoliolate; middle leaflet obovate, 3.1–5.4 × 2.2–4.6 mm; apex acute to mucronate, up to 0.4 mm long; margins flat except for apices which are sometimes recurved, entire or up to 3-lobed, middle lobe much smaller and narrower than outer two, 0.4–0.9 × 0.3–1.4 mm, outer leaflets elliptic to obovate, 3.7–6.1 × 1.6–3.1 mm, almost always entire; lamina herbaceous, up to 0.1 mm thick, midrib slightly prominent beneath against lamina, curved upwards and towards stem, glabrous; sheath 0.2–0.6 mm long, abaxially hairy, adaxially with a fringe of long straight hairs; stipules 1.6–3.1 mm long, partially joined on reverse side of stem, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on keel, margins ciliate; sepals 4, glabrous. *Male flowers* with pedicel glabrous; sepals broadly ovate with long attenuate apices; filaments red; anthers brownish red. *Female flowers* with bracteoles 1.7–3.2 mm long, longer than immature receptacle; sepals ovate, strongly recurved; carpels 2; stigma 2.6–3.2 mm long. *Achene* 2.2–3.8 × 0.9–1.5 mm, pale brown, glabrous; unribbed but with a central groove dividing two carpels. *Flowering time*: July to October.

Habitat: Shady areas in gulleys on well-drained soils from Table Mountain Series; altitude 250–1400 m.



Cliffortia gracillima: A, habit; B, leaf; C, branches.

Distribution: Known from a few localities in the Langeberg from Leeurivierberg to Garcia's Pass, with an outlying population on the Waboomsberg near Montagu.

Conservation status: Only known from four localities but intervening areas are poorly explored and it is possible that more populations occur, it grows in inaccessible sites but might be threatened by too frequent fires. Red List status: LC.

Etymology: *gracillima* (Latin) means 'very thin and slender', referring to the stems and alluding to its previous inclusion within *Cliffortia gracilis*, from which it is distinguished in being much smaller in all its parts.

Notes: This species was previously included in *Cliffortia gracilis* (now a variety of *C. dentata*) and differs from *C. dentata* by its much smaller leaves ($3.1\text{--}5.4 \times 2.2\text{--}4.6$ mm compared to $4.2\text{--}10.3 \times 2.3\text{--}6.4$ mm in *C. dentata*), as well as having the disjunction in distribution and therefore occurs in areas where summer rainfall is more common. See also note under *C. dentata*.

Representative specimens

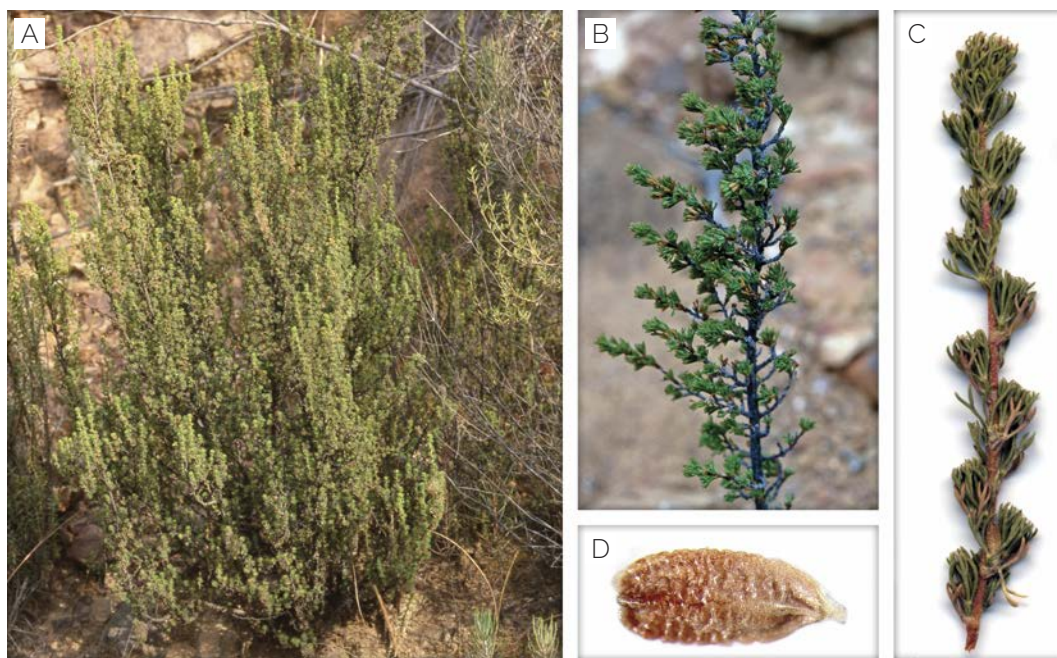
SOUTH AFRICA. **3319** (Worcester): Moedverloreberg, upper N slopes, about 20km NW Montagu, Farm Lopende Rivier, 300m SW of Trig. Beacon, 1480 m, 15 June 2003, (–DB), *Helme 2685* (BOL). **3320** (Montagu): Leeurivierberg, 1220–1525 m, 18 May 1958, (–CD), *Esterhuysen 27765* (BM, BOL). **3321** (Ladismith): Garcia's Pass, 395 m, Oct. 1904, (–CC), *Bolus 11271* (BOL, PRE); Garcia's Pass, riverside below Toll House, 290 m, 7 Oct. 1897, (–CC), *Galpin 4002* (BOL, PRE); Garcia's Pass, July 1929, (–CC), *Levyms 2707* (BOL); Garcia's Pass near Riversdale, 450 m, 14 Feb. 1893, (–CC), *Schlechter 2203* (FHO, K, NBG, PRE); Garcia's Pass, near car park at start of footpath to Kristalkloof, 460 m, 11 Mar. 2000, (–CC), *Whitehouse 98* (BOL, NBG).

20. ***Cliffortia cervicornu*** Weim. in Botaniska Notiser 112: 77, fig. 3e–f, 4 (1959); Fellingham: 614 (2000). Type: Laingsburg District, Seven Weeks Poort, S slopes, 915–1220, 13 Oct. 1955, *Esterhuysen 24773* (BOL, holo.!; K!, LD, NBG!, PRE!, iso.).



Erect shrub up to 1.2 m high, probably killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.2–0.6 mm wide, hairy; stem hairs spreading or curled, 0.1–0.5 mm long. *Leaves* trifoliate; leaflets appear needle-shaped, but in fact are deeply lobed and therefore obovate in outline, 2.3–3.4 × 0.8–2.0 mm; base forming a pseudopetiolule; apex obtuse to rounded, up to 0.1 mm long; margins rounded, deeply 3–5-lobed, each lobe forming a narrow cylinder, 0.1–0.3 mm wide; lamina chartaceous, 0.1–0.3 mm thick, curved upwards and towards stem, glabrous; sheath 0.6–1.4 mm long, abaxially glabrous, adaxially densely hairy; stipules 0.3–0.6 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on keel with smooth margins; sepals 4, glabrous. *Male flowers* unknown. *Female flowers* with bracteoles 0.7–1.4 mm long, shorter than immature receptacle; sepals ovate, 0.4–0.6 × 0.1–0.3 mm, erect; carpel 1; stigma 0.5–1.3 mm long, feathery, hidden amongst leaves; immature receptacle glabrous, clearly ribbed. *Achene* 2.2–2.9 × 0.9–1.2 mm, medium brown, glabrous; ribs 4, rounded, 0.1–0.2 mm wide, transversely rugose between ribs. *Flowering time*: unknown but probably June to September.

Habitat: Arid fynbos on well-drained soil of Witteberg sandstone outcrops, restricted to south-facing slopes or shady kloofs; altitude 900–1 250 m.



Cliffortia cervicornu: A, habitat; B, branch; C, branch with achenes; D, achene.

Distribution: Known from scattered localities along the very arid northern slopes of the Swartberg, as well as the Matjiesgoedberg, Droëkloofberg and Willowmore Witteberg.

Conservation status: Only known from a few very scattered localities and not common, but probably more frequent than recorded as the arid slopes and mountains where it grows are poorly explored. Red List status: LC.

Etymology: *cervicornu* (Latin) means 'stag's horn', referring to the shape of the much divided leaves.

Notes: Appearing similar to several of the finely feathery needle-leaved species, closer examination soon reveals that each leaflet is actually deeply 3-lobed. No other species has leaves so finely divided, although seedlings of *Cliffortia exilifolia* exhibit similar lobing. The affinities of *C. cervicornu* are unclear, Weimarck placed it tentatively next to his section *Multinerviae*, presuming that the lamina of the leaves was only made up of the veins. Molecular evidence, 4-sepalled flowers and shady habitat suggest a closer affinity to *C. dentata*.

Representative specimens

SOUTH AFRICA. **3321** (Ladismith): Seven Weeks Poort, S slopes, 915–1220 m, 13 Oct. 1955, (–AD), *Esterhuysen* 24773 (BOL, K, NBG, PRE); Swartberg, foothills between Bosluis Pass and Die Hel, 10 Oct. 1960, (–BC), *Esterhuysen* 28523 (BOL, K). **3322** (Oudtshoorn): Swartberg Pass, slopes above road, SW of Malvadraai, 900 m, 22 Oct. 2000, (–AC), *Whitehouse* 163 (BOL); Swartberg Mts, De Rust, W slopes of Meiringspoort, 1035 m, 14 Oct. 1990, (–BC), *Vlok* 2426 (NBG, PRE); Droëkloofberg, Vrolikheid farm, S slopes of rocky outcrop on edge of ridge, 1250 m, 21 Feb. 2001, (–BC), *Whitehouse* 207 (BOL). **3323** (Willowmore): Witteberg, Worlds View Farm, peak N of Worlds View Farm, 1540 m, 26 July 1986, (–BA), *Vlok* 1541 (NBG, PRE).

(21–22) *Cliffortia subsetacea* series

21. ***Cliffortia subsetacea*** (Eckl. & Zeyh.) Diels ex Bolus & Wolley-Dod in Transactions of the South African Philosophical Society 14: 260 (1904); Weim.: 72, fig. 18F–K (1934); Levyns: 447 (1950); Dahlgren: fig. 2E (1971); Fellingham: 616 (2000). *C. filifolia* var. *subsetacea* Eckl. & Zeyh.: 270 (1836); Harv.: 303 (1862). Type: Cape Peninsula, slopes of Table Mt, Sept., Ecklon & Zeyher 1751b (S, holo.; W, iso!).



Low to medium erect shrub up to 1.8 m high, but often much less and rarely above 0.8 m, killed by fire, densely divaricately branched, forming closely overlapping brachyblasts. *Young stems* 0.5–1.1 mm wide, hairy; stem hairs adpressed upwards or spreading to curled, 0.2–0.6 mm long. *Leaves* trifoliate; leaflets needle-shaped, 3.6–7.2 × 0.2–0.4 mm; apex sharply long acuminate, 0.2–0.9 mm long; margins rounded, entire and smooth; lamina chartaceous, 0.2–0.3 mm thick, strongly curved upwards and towards stem, green with two paler stripes on each side, glabrous; sheath 0.3–1.1 mm long, abaxially glabrous, adaxially hairy; stipules 0.1–0.7 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on keel, margins serrate; sepals 4, glabrous. *Male flowers* with bracteoles 0.9–1.3 mm long; pedicel 0.3–0.5 mm long; sepals broadly ovate, 2.5–3.1 × 1.1–1.6 mm, acuminate at apex; stamens (7–)8, filaments 1.7–2.1 mm long, red or greenish white; anthers brownish red or yellow. *Female flowers* with bracteoles 1.3–1.6 mm long, similar in length to immature receptacle; sepals ovate, 0.7–1.5 × 0.2–0.4 mm, erect, soon falling off; carpel 1; stigma 0.8–1.3 mm long, red to white, feathery, hidden within leaves; immature receptacle 1.1–1.8 × 0.6–0.9 mm, glabrous, clearly ribbed. *Achene* ellipsoid but slightly compressed laterally, 2.6–3.2 × 1.1–1.4 mm, medium brown, glabrous; ribs 4, rounded, 0.1–0.4 mm wide, 2 strongly curved laterally so that achene is only bilaterally symmetrical, tuberculate to rugose between ribs. *Flowering time*: September to June.

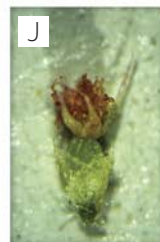
Habitat: Fynbos on well-drained acid sands from Table Mountain Series in full sun; altitude 50–1100 m.

Distribution: Cape Peninsula south of Constantiaberg and at Kenilworth Racecourse, also on the Kogelberg, between Houwhoek and Kleinmond and on sandstone hills east of Pearly Beach.

Conservation status: Scattered but widespread and often common; protected both within the Cape Peninsula National Park and the Kogelberg Biosphere Reserve. Red List status: LC.

Etymology: *subsetacea* (Latin) means 'almost bristle-like', referring to the thin curved short leaves.

Notes: One of the daintiest of all the needle-leaved species; the small thin curved leaves can only be confused with *Cliffortia setifolia* or *C. cervicornu*, but both those species are endemic to the Swartberg and nearby. The smaller forms of *C. filifolia* may be confused with *C. subsetacea* but that species has a short petiole, glabrous stems and only three sepals. The achene of *C. subsetacea* is unique having 4 swollen ribs (often with 2–4 smaller ribs in between), two of which are curved laterally giving the achene an asymmetric appearance.



Representative specimens

SOUTH AFRICA. **3318** (Cape Town): Cape Peninsula, Kenilworth Race Course, inside the circle, 19 June 1968, (–CD), *Esterhuysen 31968* (BOL); Cape Flats near Claremont, 25 m, 23 Mar. 1892, (–CD), *Schlechter 490* (BM). **3418** (Simons-town): Cape Peninsula, Bonteberg, 24 June 1940, (–AB), *Compton 8886* (NBG); Cape Peninsula, Theefontein, 19 Dec. 1949, (–AB), *Compton 21843* (NBG); Cape Peninsula, Bonteberg, Sept. 1940, (–AB), *Esterhuysen s.n.* (BOL); Cape Peninsula, on Steenberg plateau, 305 m, 25 Sept. 1949, (–AB), *Esterhuysen 15831* (BOL, NBG, PRE); Cape Peninsula, near Ocean View Township, 26 Sept. 1978, (–AB), *Esterhuysen 35039* (BOL); Cape Peninsula, plateau NE of Witsands, 29 Apr. 1956, (–AB), *Esterhuysen 35795* (BOL); Hout Bay, (–AB), *Harvey 204* (BM, K, PRE); Cape Peninsula, near Kommetjie, 12 Nov. 1974, (–AB), *Lavranos 11671* (PRE); Cape Peninsula, Red Hill, top of hill, 14 Nov. 1945, (–AB), *Leighton 1468* (PRE); Klaver valley, S end, 365 m, 3 Nov. 1936, (–AB), *Levyys 5929* (BOL); W of Modderdam, plot 228, 75 m, 1 July 1965, (–AB), *Taylor 6368A* (NBG, PRE); Cape Peninsula, Platboom, 6 Nov. 1941, (–AD), *Compton 12310* (NBG); Cape Peninsula, Smitswinkel, 20 July 1942, (–AD), *Compton 13320* (BOL, NBG); Cape Peninsula, Cape Point, Apr. 1943, (–AD), *Goulimis s.n.* (NBG); Cape Peninsula, Cape Point Reserve, near Brightwater, 31 May 1943, (–AD), *Leighton 464* (BOL, K, PRE); near Sirkelsvlei, 10 Jan. 1932, (–AD), *Levyys s.n.* (BOL); low plateau S of Simonstown, 1 Aug. 1915, (–AD), *Pillans 2831* (BOL); Cape Peninsula, Smitswinkel, Apr. 1928, (–AD), *Salter 260/9A* (BM); Cape Point, rise above Ribbokdam, 45 m, 10 Oct. 1965, (–AD), *Taylor 6528* (NBG); Cape of Good Hope Nature Reserve, Suurdam, 115 m, 13 Jan. 1966, (–AD), *Taylor 6661* (NBG, PRE); opposite Smith's Farm, S hillslope, 135 m, 21 Jan. 1966, (–AD), *Taylor 6694a* (NBG); Cape Peninsula, Smitswinkel Vlei, 16 Aug. 1896, (–AD), *Wolley-Dod 1500* (BM, BOL); Kogelberg, 915 m, 1 Jan. 1945, (–BB), *Compton 16869* (NBG); Strand, Kogelberg Forest Reserve Ridge, NE of Kogelberg Peak, 915 m, 12 Mar. 1969, (–BB), *Kruger 810* (NBG, PRE); Kogelberg, 915 m, 31 Dec. 1944, (–BB), *Leighton 878* (BOL); Steenbras Forest Reserve, NW slopes of Kogelberg, where jeep track crosses main valley from Kogelberg, 700 m, 26 Feb. 2003, (–BB), *Whitehouse 353* (BOL); Kogelberg Forest Reserve, Dwars R, 120 m, 23 Oct. 1969, (–BD), *Boucher 783* (K, NBG, PRE); Palmiet R mouth, Sept. 1924, (–BD), *Compton 3351* (BOL, NBG); Palmiet Flats, 26 Mar. 1949, (–BD), *de Vos 1285* (NBG, PRE); near Palmiet R mouth, 25 Jan. 1946, (–BD), *Esterhuysen 12612* (BOL); near Palmiet R mouth, 24 Jan. 1947, (–BD), *Esterhuysen 13695* (BOL); Betty's Bay, wet places at foot of mountain, 16 Apr. 1974, (–BD), *Goldblatt & Gentry 1607* (NBG); Kogelberg State Forest, c. 600 m from Louws Bridge, right of road to Highlands, 120 m, 27 Jan. 1992, (–BD), *Kruger 330* (NBG); S Hot-tentots Holland Mountains, Kogelberg State Forest, 3.5 km from Oudebos, 150 m E of road, 70 m, 13 Dec. 1993, (–BD), *Kruger 1231* (NBG, PRE); Palmiet R mouth, 305 m, 12 Feb. 1937, (–BD), *Levyys 5981* (BOL); Palmiet R mouth, Feb. 1940, (–BD), *Levyys 7173* (BOL). **3419** (Caledon): Lebanon Catchment Area 1f, 975 m, 1 Oct. 1967, (–AA), *Kruger 525* (NBG, PRE); Lebanon, Catchment 2E, plot 271, mountain slopes, 975 m, Nov. 1967, (–AA), *Kruger 540* (PRE); Houwhoek, 1065 m, 25 Nov. 1896, (–AA), *Schlechter 9412* (BM, K, PRE); Kleinmond, W part of urban area, 30 Dec. 1947, (–AC), *de Vos 777* (NBG, PRE); Paardeberg Trail from Highlands State Forest, in valley just before ascent to Paardeberg, 480 m, 28 Feb. 1999, (–AC), *Whitehouse 17* (BOL, K, MO, NBG, Z); Buffeljagsberg, E end above vlei, damp areas N of ridge, 185 m, 13 Mar. 1979, (–DA), *Hugo 1655* (NBG, PRE); Waterford Farm, lower slopes of hill to NE of dam at bottom of Waterkloof, 120 m, 18 May 2001, (–DA), *Whitehouse 223* (BOL).

22. **Cliffortia cruciata** C.M.Whitehouse in Bothalia 37(1): 11, fig. 3–4 (2007). Type: Worcester District, Jonaskop, Wildepaardeberg, just below sandy plateau, 900 m, 15 Sept. 2000, Whitehouse 137 (BOL, holo.; K!, MO!, NBG!, Z!, iso.).



Low erect shrub, up to 0.3 m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.6–0.9 mm wide, tinged reddish, hairy; stem hairs adpressed upwards, 0.2–0.4 mm long. *Leaves* trifoliolate; leaflets linear, 2.7–3.7 × 0.4–0.6 mm; base noticeably swollen and bulbous; apex 0.1–0.2 mm long; margins rounded but slightly grooved, entire and smooth; lamina chartaceous, 0.3–0.5 mm thick, slightly curved upwards and towards stem, green with two paler stripes on each side, glabrous; sheath 0.7–1.0 mm long, abaxially glabrous, adaxially hairy; stipules 0.3–0.8 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on keel, margins ciliate; sepals 4, glabrous. *Male flowers* with bracteoles 1.2–1.5 mm long; pedicel 0.5–0.8 mm long; sepals broadly ovate, 3.4–4.4 × 1.3–2.2 mm, acute to acuminate at apex, tips not completely separating at anthesis; stamens 6–7; filaments 1.2–2.0 mm long, red, anthers brownish red. *Female flowers* with bracteoles 1.3–1.7 mm long, shorter than immature receptacle; sepals 0.8–1.2 × 0.2–0.4 mm, erect; carpel 1; stigma 1.4–2.6 mm long, red to pinkish, feathery, hidden within leaves; immature receptacle 1.3–2.7 × 0.6–1.1 mm, glabrous, clearly ribbed. *Achene* ellipsoid, 3.8–4.7 × 1.7–2.0 mm, medium brown, glabrous; ribs 4, rounded, ± 0.6 mm wide, slightly tuberculate. *Flowering time*: around September.

Habitat: Fynbos on deep sandy plateau, acid sands from Table Mountain Series, full sun, well-drained soils; altitude 900–1 000 m.

Distribution: A very narrow endemic restricted to the sandy plateau of the Wildepaardeberg on the north slopes of Jonaskop in the Riviersonderend Mountains.

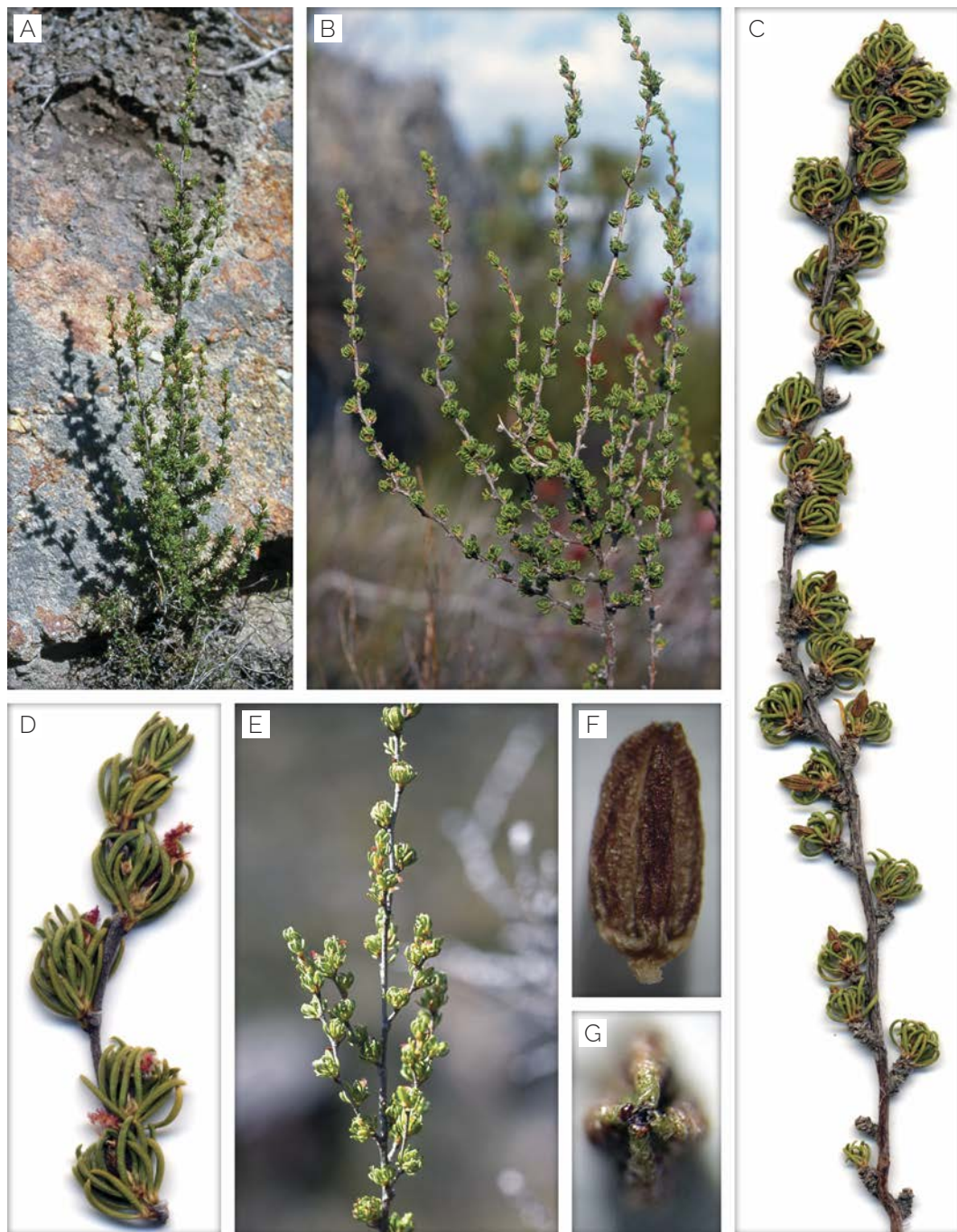
Conservation status: Very narrow endemic, only known from a very particular habitat on a single mountain, although relatively inaccessible it could be threatened by too frequent fires. Red List status: VU.

Etymology: *cruciata* (Latin) means ‘cross-wise’, referring to the shape that the four prominent ribs of the achene make when viewed in cross-section.

Notes: Closely allied to *Cliffortia subsetacea*, but this is only clearly evident by examination of the achenes, which are very similar except that the ribs on *C. cruciata* are not curved. In general appearance the species is more similar to *C. ramosissima* with its short, but comparatively broad and flat, very slightly curved leaves. Apart from the achene, the two species can be easily separated because *C. cruciata* lacks a petiole and the flowers have four sepals. Molecular evidence suggests that this species may have had a hybrid origin with *C. tuberculata* or a close relative as the maternal parent and *C. subsetacea* as the paternal parent.

Representative specimen

SOUTH AFRICA. 3319 (Worcester): Jonaskop, Wildepaardeberg, just below sandy plateau, 900 m, 15 Sept. 2000, (–DC), Whitehouse 137 (BOL, K, MO, NBG, Z).



Cliffortia cruciata: A & B, habitat; C, branch with achenes; D & E, branch with female flowers; F & G, achene.

(23–24) **Section *Alatae*** *Weim.* in Monograph of the Genus *Cliffortia*: 16, 80 (1934) & 185 (1948). Type: *C. alata* N.E.Br.

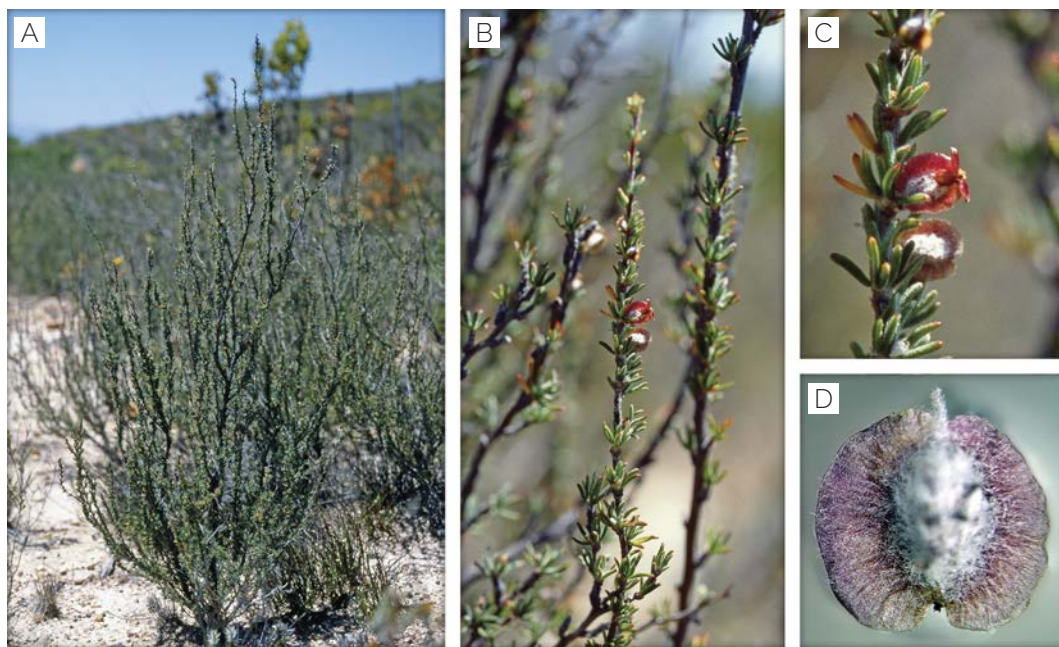
Medium erect densely branched shrubs, clonally spreading by roots underground and able to resprout after fire. Young stems with short curly hairs, forming brachyblasts. Sheath hairy both abaxially and adaxially; stipules present or absent, free, ciliate; petiole absent. Leaves trifoliolate, hairy beneath; leaflets needle-shaped, contracted at base to form a pseudopetiole, margins entire, inrolled beneath. Flowers solitary, in the axils of ordinary vegetative leaves; bracteoles hairy, shorter than immature receptacle; sepals 4, often hairy abaxially; female broadly ovate, recurved; filaments red; anthers brownish red; receptacle clearly ribbed, hairy; carpels 1; stigma red. **Achene on a short recurved stipe, broadly 3–4-winged, tuberculate, hairy, reddish.**

An easily diagnosed couplet of species with their unique red winged hairy achenes. The two species are easily separated as they both have very limited distributions that do not overlap. No hybrids are known with either species.

23. ***Cliffortia alata* N.E.Br.** in Kew Bulletin 15: 121 (1901); Weim.: 80, fig. 22 (1934); Oliver & Fellingham: 60, fig. 7–8 (1991); Fellingham: 614 (2000). Type: Riversdale District, on the Karoo plains at Muis Kraal, near Garcia's Pass, 305 m, 3 Oct. 1897, *Galpin* 3925 (K, holo.; B, BOL!, GRA!, PRE!, SAM!, iso.).



Erect shrub up to 1.5 m high, resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 0.7–1.0 mm wide, tinged reddish, hairy; stem hairs curled, up to 0.3 mm long. *Leaves* trifoliate; leaflets needle-shaped, 3.9–8.4 × 0.6–0.9 mm; base contracted abruptly to form a pseudopetiolule; apex acute to mucronate, up to 0.4 mm long; margins inrolled beneath, entire and smooth; lamina chartaceous, 0.1–0.3 mm thick, midrib prominent beneath, curved upwards and towards stem, greyish hairy above, densely white tomentose beneath, hairs 0.1–0.3 mm long; sheath 0.6–1.4 mm long, abaxially hairy, adaxially markedly hairy; stipules absent to 0.4 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 4, hairy all over on outside. *Male flowers* with pedicel articulated, hairy; sepals broadly ovate, acute to acuminate at apex; filaments red; anthers brownish red. *Female flowers* with bracteoles 1.3–1.8 mm long, shorter than immature receptacle; sepals broadly ovate, 2.1–2.4 × 0.8–1.5 mm, strongly recurved; carpel 1; stigma 0.9–1.3 mm long, red, feathery, very short but visible on top of receptacle; immature receptacle hairy, winged. *Achene* almost globose, 4.6–5.6 × 4.8–6.3 mm, on a short recurved stipe, main body tuberculate and covered with whitish hairs 0.3–0.7 mm long, surrounded by 2–4 broad reddish wings. *Flowering time*: June to October, some female flowers observed as early as May or as late as January.



Cliffortia alata: A, habitat; B, branches with fruit; C, fruit; D, achene.

Habitat: Dry mountain fynbos on sandstone and also renosterveld on clay in full sun on well-drained soils; altitude 300–650(–1 300?) m.

Distribution: Only known from the lower northern slopes of the Langeberg, from east of Barrydale to the slopes just east of Garcia's Pass, where most collections have been made around Muiskraal.

Conservation status: A localised endemic known from three scattered localities, though possibly present between these, it occupies a very specific habitat on margins of fynbos. Red List status: VU.

Etymology: *alata* (Latin) means 'winged', referring to the striking, broadly winged, pinkish fruit.

Notes: This species, when in fruit, can only be confused with *Cliffortia burgersii*, but both are narrow endemics and their ranges do not overlap. The pinkish-red winged fruits are highly diagnostic for both species, but *C. alata* differs from *C. burgersii* in its greyish hairy leaves. Without fruit the leaves are reminiscent of *C. hirta* but some old fruit can usually be found at the base of the plant.

Most records are found within a narrow altitude range. The exception is *Kruger 1345*, which was supposedly collected at 1 280 m, but this seems exceptionally high when it has not been collected at intermediate altitudes. The habitat at that altitude would be much wetter than typical for the species.

Representative specimens

SOUTH AFRICA. **3320** (Montagu): N slopes of Langeberg, Grootvadersbos State Forest, at Moeras Rest Huts, 1280 m, 19 June 1971 (–DD), *Kruger 1345* (NBG, PRE); Boosmansbos Wilderness Area, Compartment 4A, vicinity of Doornrivier huts, 630 m, 29 May 1989, (–DD), *van der Merwe 293* (NBG, PRE). **3321** (Ladismith): Little Karoo, Muiskraal, near foothills in dip next to the dam, 370 m, 10 Aug. 1983, (–CC), *Bohnen 8238* (NBG, PRE); near Muiskraal, 395 m, Oct. 1904, (–CC), *Bolus 11269* (BOL, K, NBG, PRE); Garcia's Pass, N entrance of pass, Muiskraal, 490 m, 15 Sept. 1981, (–CC), *Fellingham 110* (K, NBG, PRE); Muiskraal, near Garcia's Pass, 305 m, 3 Oct. 1897, (–CC), *Galpin 3925* (BOL, K, PRE); Muiskraal, 550 m, July 1927, (–CC), *Levy's 2118* (BOL).

24. ***Cliffortia burgersii*** E.G.H.Oliv. & Fellingham in *Bothalia* 21(1): 60, fig. 6, 8 (1991); Fellingham: 614 (2000). Type: Bredasdorp District, De Hoop N.R., flats NE of Reserve Centre, 30 m, 7 June 1989, *Oliver & Fellingham 9148A* (NBG, holo.; BOL!, K!, MO!, PRE!, iso.).



Erect shrub up to 1.5 m high, resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. Young stems 0.6–1.0 mm wide, tinged reddish, hairy; stem hairs curled, up to 0.3 mm long. *Leaves* trifoliolate; leaflets needle-shaped, 3.2–7.1 × 0.5–0.7 mm; base contracted abruptly to form a pseudopetiolule; apex obtuse to rounded, up to 0.1 mm long; margins inrolled beneath, entire and smooth; lamina chartaceous, 0.1–0.3 mm thick, midrib prominent beneath, curved upwards and towards stem, glabrous above, densely white tomentose beneath, hairs 0.1–0.7 mm long; sheath 0.9–1.2 mm long, abaxially hairy, adaxially markedly hairy; stipules absent or up to 0.4 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 4, hairy to glabrous. *Male flowers* with bracteoles 1.1–1.8 mm long; pedicel 1.0–1.8 mm long, articulated, hairy; sepals broadly ovate, 2.9–3.9 × 1.4–2.3 mm, acute to acuminate at apex; stamens 8–11; filaments 1.9–3.6 mm long, red; anthers brownish red. *Female flowers* with bracteoles 1.0–1.5 mm long, shorter than immature receptacle; sepals broadly ovate, 1.9–2.3 × 1.1–1.5 mm, strongly recurved; carpel 1; stigma 1.4–2.0 mm long, red, feathery, very short but visible on top of receptacle; immature receptacle 2.3–5.6 × 1.6–3.6 mm, hairy, winged. *Achene* almost globose, 6.2–9.7 × 5.1–9.2 mm, on a short recurved stipe, main body tuberculate and covered with whitish hairs 0.3–0.8 mm long, surrounded by 3–4 broad reddish wings. *Flowering time*: observed from January to June but may flower at other times too.

Habitat: Limestone fynbos on sand over limestone in full sun on well-drained soils; altitude 0–50 m.

Distribution: Restricted to a very small area in the De Hoop Nature Reserve where it has been collected several times; may well occur elsewhere in some of the more unexplored parts of the reserve.

Conservation status: A very narrow endemic, known only from an area of a few hundred square metres in De Hoop Nature Reserve; no obvious threats but most of the plants are quite severely grazed, although still flowering. Red List status: EN.

Etymology: *burgersii* – named after Chris Burgers, a conservation officer who was making a detailed study of the De Hoop Nature Reserve's flora.

Notes: Closely allied to *Cliffortia alata*, the only species with which it could be confused, but both are narrow endemics and their ranges do not overlap. The pinkish-red winged fruits are highly diagnostic, *C. burgersii* differing from *C. alata* by its glabrous bright green leaves. Without fruit it may be confused with other needle-leaved species, such as *C. castanea*, but there are usually some achenes present in the leaf litter around the base of the plant and the other species that grow in and around limestone fynbos of De Hoop Nature Reserve (*C. falcata*, *C. filifolia* var. *arenaria*, *C. incana* and *C. longifolia*) are quite different in appearance.

Representative specimens

SOUTH AFRICA. 3420 (Bredasdorp): De Hoop, Potberg Nature Reserve, flats along public road, 30 m, 28 July 1979, (–AD), *Burgers 2061* (NBG, PRE); De Hoop, ± 1 km from old gate of Nature Reserve along public road to Potberg, on De Hoop flats, 30 Jan. 1985, (–AD), *Fellingham 926* (BOL, NBG, PRE); De Hoop, 1 km from gate of Nature Reserve on public road towards Potberg, 20 Mar. 1985, (–AD), *Fellingham 984* (BOL, K, NBG, PRE); De Hoop Nature Reserve, flats

next to old public road, ± 1 km before turn-off to the Opstal, 11 Mar. 1989, (–AD), *Fellingham 1444* (BOL, K, NBC, PRE); De Hoop Nature Reserve, flats NE of the Reserve Centre, 30 m, 7 June 1989, (–AD), *Oliver & Fellingham 9148A* (BOL, K, K, MO, NBC, NBC, PRE); De Hoop Nature Reserve, 1.3 km N along main road from turn-off to campsite, next to old track, 40 m, 20 May 2001, (–AD), *Whitehouse 226* (BOL, NBC).



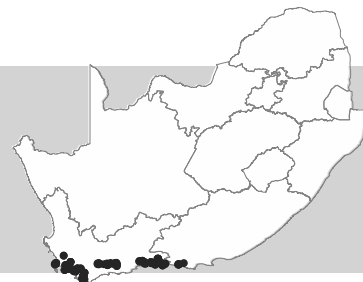
Cliffortia burgersii: A & B, habitat; C & D, fruiting branch; E, leaf; F, female flower; G, achene; H, branch with female flowers; I, branch with male flowers.

(25–28) **Section Stipulatae** Cham. in Linnaea 6: 350 (1831). Type:
C. octandra Cham. (= *C. filicaulis* Cham. & Schldl.).

Low to medium, often sprawling or trailing, densely branched shrubs, only surviving fire as seed. Young stems with long spreading hairs, forming brachyblasts. Sheath hairy both abaxially and adaxially; stipules free, **often a similar texture to the leaf**, but sometimes membranous, ciliate; petiole present or absent. Leaves unifoliate or trifoliate, hairy above and beneath; leaflets ovate, obovate or elliptic, sometimes toothed to lobed, apex acute to rounded, margins flat. Flowers solitary, in the axils of ordinary vegetative leaves; bracteoles hairy, longer than the immature receptacle; **sepals 4, sometimes fused towards the base**, hairy on the outside; female sepals erect; receptacle smooth, glabrous; carpels 1 or 2; stigma red to pinkish. Achene ellipsoid, unribbed, pale whitish brown.

These four species form a tight unit. They all have stipules that are similar in texture to the main leaflets. The four sepals are often fused towards the base and can be removed as a unit. The four species can be easily separated by just three leaf characters: with or without a petiole, toothed or not, unifoliate or trifoliate. Only *Cliffortia monophylla* and *C. filicaulis* overlap in their distributional ranges. No hybrids are known in the section or between these species and other sections.

25. **Cliffortia filicaulis** Cham. & Schlttl. [author of paper is Cham. & Schlttl. but Weimarck only gives Schlttl.] in *Linnaea* 2: 33 (1827), *nom. conserv.*; Eckl. & Zeyh.: 267 (1836); Harv.: 299 (1862); Weim.: 76, fig. 20 (1934); Levyns: 448 (1950); Fellingham: 612 (2000); Whitehouse: 440 (2014). Conserved type: Western Cape, on hills near Swellendam, *Mund s.n.* (SAM, holo.; C, SI, W!, iso.), typ. cons. prop.



C. octandra Cham.: 350 (1831); Eckl. & Zeyh.: 267 (1836); Harv.: 298 (1862); Bolus & Wolley-Dod: 259 (1904). *C. filicaulis* var. *octandra* (Cham.) Weim.: 77 (1934). Lectotype designated by Whitehouse: 440 (2014): Western Cape, near Salt R, *Ecklon* 190 (S, lecto!).
C. serpyllina E.Mey. ex Drège: 124, 173 (1843), nomen nudum, pro parte quoad Drège '*C. serpyllifolia*'.
C. trifida Thunb.: 6 (1809); Juel: 277 (1918), nomen nudum, pro parte.
C. trifoliolata sensu Juel: 277 (1918), non L.

Low sprawling shrub, up to 1 m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.6–1.3 mm wide, hairy; stem hairs spreading, 0.4–2.3 mm long. *Leaves* trifoliate; middle leaflet obovate, 3.7–6.9 × 2.7–4.0 mm, 3-lobed at the apex, outer leaflets elliptic, 3.7–7.6 × 1.4–3.5 mm, unlobed, apex rounded to acute, up to 0.2 mm long; margins flat; lamina herbaceous, midrib prominent beneath, curved upwards and towards the stem, hairy above and beneath, hairs 0.7–1.5 mm long; sheath 1.2–2.1 mm long, abaxially hairy, adaxially hairy; stipules appearing similar to leaflets, 3.1–6.0 mm long, green, free, margins ciliate; petiole absent or very short, 0.3–0.7 mm long. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 4, hairy on outside. *Male flowers* with pedicel glabrous; sepals broadly ovate, acute to acuminate at apex; filaments greenish white; anthers yellow. *Female flowers* with bracteoles 2.8–3.8 mm long, longer than immature receptacle; sepals narrowly ovate to oblong, 2.0–2.6 × 0.5–0.8 mm, erect; carpel 1; stigma 3.0–5.3 mm long, red, feathery, prominent above leaves; immature receptacle 0.9–1.7 × 0.5–0.8 mm, glabrous, smooth. *Achene* ellipsoid, 2.0–2.5 × 0.9–1.1 mm, yellowish to pale brown, glabrous; unribbed. *Flowering time*: August to November.

Habitat: Fynbos on clayish soils from shale bands of Table Mountain Series, Bokkeveld Series or granite-derived soils in full sun; altitude 0–600 (–1 200) m. Only known from above 600 m on Prince Alfred's Pass.

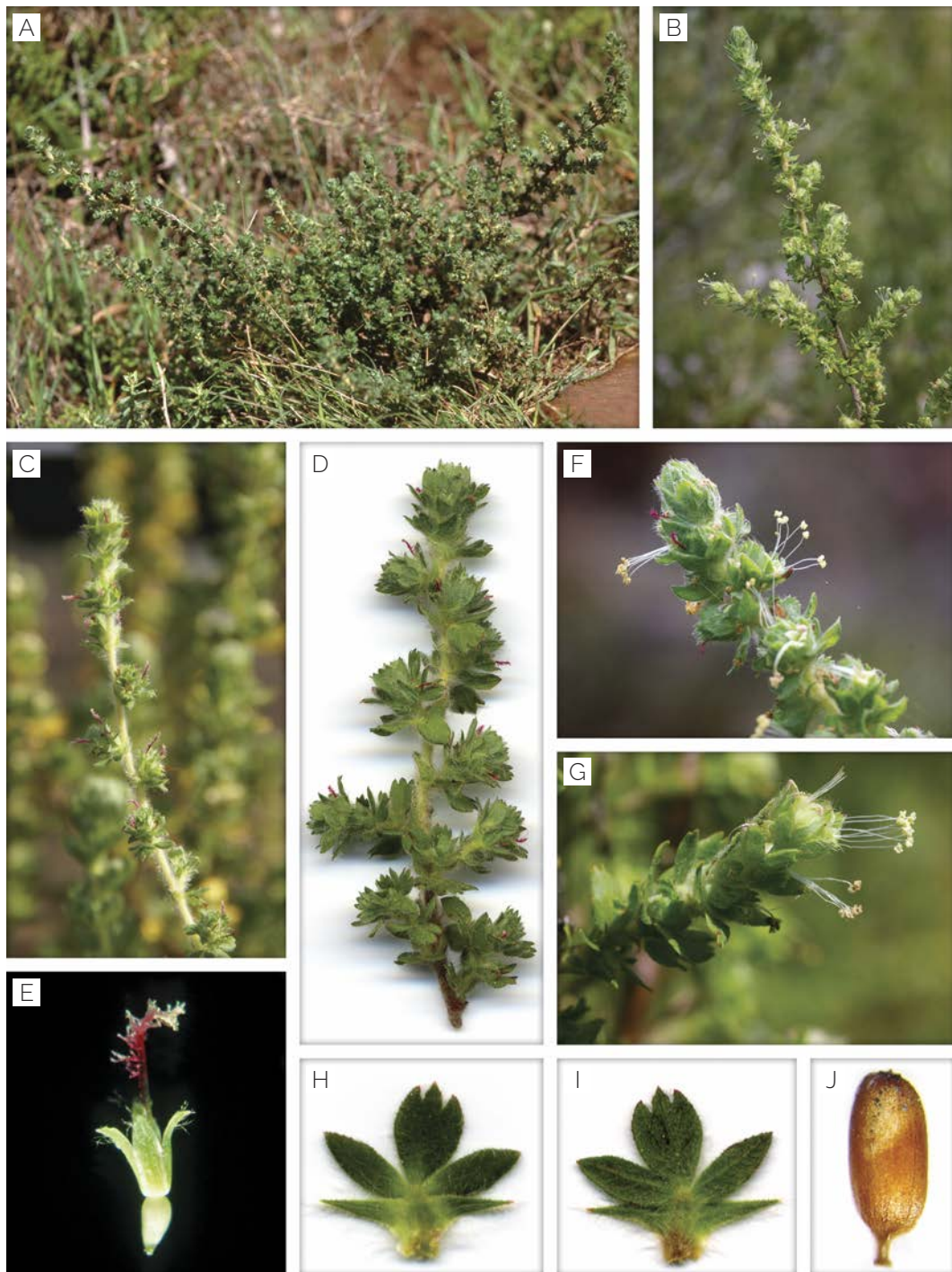
Distribution: Flats and lower slopes of southern Cape mountains from Cape Town to Humansdorp.

Conservation status. Common and widespread, even found frequently along road verges. Red List status: LC.

Etymology: *filicaulis* (Latin) means 'with thread-like stem', although not particularly thin for *Cliffortia*.

Notes: A widespread and common species, *Cliffortia filicaulis* is best recognised by its foliaceous stipules, trifoliate leaves and tridentate middle leaflet. The four-sepalled flowers help separate it from *C. polygonifolia* var. *trifoliata*, which is a more robust and erect shrub. There are some local variants with larger leaves, e.g. *Rode & Boucher* 60, but this may be due to shading or moisture availability. Weimarck (1934) recognised two varieties, var. *filicaulis* and var. *octandra*, but admitted that the differences were not consistent. I cannot uphold them at present. His separation was also possibly based upon the inconsistent use of the name *C. filicaulis* and a desire to continue to recognise both the names *C. filicaulis* and *C. octandra*, even though he now recognised them as the same species.

The plant for which Chamisso and Schlechtendal originally coined the name was collected by Mund & Maire near Tulbagh. That plant is now *Cliffortia tricuspidata*. *Cliffortia filicaulis* is a species of the coastal



plains that does not grow near Tulbagh; the closest it has been collected being Perdeberg near Malmesbury. The confusion appears to have arisen when Ecklon & Zeyher (1836) enumerated the species from around Swellendam and cited Mund as the collector. Unfortunately, specimens distributed as *Ecklon & Zeyher 1731* were subsequently presumed to be the same as the type and therefore Harvey considered plants labelled by Drège as *C. filicaulis* to be wrongly named and described the 'new' species *C. tricuspidata*. Weimarck failed to correct this, not recognising that the specimen he saw in Berlin collected by Mund from near Tulbagh was the type of *C. filicaulis* when he attributed it to the same species as Harvey's *C. tricuspidata*. To resolve this the Mund collection distributed as *Ecklon & Zeyher 1731* has been conserved as the type of *C. filicaulis* (Whitehouse 2014).

Representative specimens

SOUTH AFRICA. **3318** (Cape Town): Kirstenbosch, Cycad Amphitheatre, 24 Nov. 1921, (–CD), *Compton s.n.* (BOL); University of Cape Town grounds, Groote Schuur, below the Bolus Herbarium, Dec. 1955, (–CD), *Esterhuysen s.n.* (BOL); University of Cape Town grounds, 185 m, 15 Oct. 1931, (–CD), *Levy's 3618* (BOL); Rondebosch, University of Cape Town, 185 m, 14 Nov. 1935, (–CD), *Levy's 5228* (BOL); Cape Peninsula, Rhodes' Memorial, E slopes of Table Mt., Sept. 1918, (–CD), *Page s.n.* (BOL); Cape Peninsula, N slopes of Kirstenbosch Ridge, 13 Oct. 1937, (–CD), *Pillans 8379* (BOL); Cape Peninsula, Kirstenbosch, Apr. 1928, (–CD), *Salter 259/19* (BM); Cape Peninsula, path between University and Rhodes Memorial, 120 m, 12 Mar. 1999, (–CD), *Whitehouse 23* (BOL, NBG); roadside behind Fernwood, 25 Apr. 1897, (–CD), *Wolley-Dod 2458* (BOL); Malmesbury District, Perdeberg, above Hoorbosch, 29 Sept. 1974, (–DB), *Esterhuysen 33629* (BOL); Perdeberg, Lemoenkloof Farm, upper Lemoenkloof valley, 520 m, 3 Oct. 1999, (–DB), *Whitehouse 55* (BOL). **3319** (Worcester): Franschoek, 305 m, 18 Nov. 1896, (–CC), *Schlechter 9254* (BM, BOL, K, PRE). **3320** (Montagu): Langeberg Mts, near Swellendam on mountain slopes, 240 m, 11 Jan. 1893, (–CD), *Schlechter 2056* (K, PRE); Langeberg Mts near Swellendam, 245 m, 11 Jan. 1893, (–CD), *Schlechter 88582* (BOL). **3321** (Ladismith): Korinte R dam, along road, 185 m, 28 Feb. 1986, (–CC), *Bohnen 8641* (NBG, PRE); Garcia's Pass, near Toll House, 305 m, 28 Sept. 1897, (–CC), *Galpin 4003* (BOL, PRE). **3322** (Oudtshoorn): Wilderness, 22 Aug. 1944, (–DC), *Compton 15812* (NBG); George, Groenkop, Block B, 20 Jan. 1976, (–DC), *van Daalen 20* (NBG, PRE); George, Saasveld, 215 m, 21 Sept. 1970, (–DC), *Von Breitenbach 105* (PRE); Koratra, 0–305 m, (–DD), *Drège C. serpyllifolia E.M. female* (BM, K); Portland, Feb. 1924, (–DD), *Duthie 926* (BOL, NBG); between Knysna and Barrington, 24 Sept. 1930, (–DD), *Fries, T.C.E., Norlindh & Weimarck 1435* (PRE). **3323** (Willowmore): Prince Alfred's Pass, N side near top, 1160 m, 15 Nov. 1958, (–CC), *Acocks 19957* (BOL, K, PRE); Paardekop, 12 Nov. 1949, (–CC), *Compton 21689* (BOL, NBG); between Avontuur and Knysna, 24 Sept. 1930, (–CC), *Fries, T.C.E., Norlindh & Weimarck 1643* (K, PRE); Knysna, Commonage, 90 m, Oct. 1921, (–CC), *Keet 826* (BOL, NBG, PRE); Prince Alfred's Pass, at top of pass, 1000 m, 28 Mar. 1976, (–CC), *Lavranos 12701A* (PRE); Forest Hall, 31 Jan. 1927, (–CD), *Duthie 1056* (NBG); Bietou R, above Bietou R on road to Avontuur from Reads Hotel, 11 Oct. 1928, (–CD), *Gillett 1438* (NBG, PRE). **3324** (Steytlerville): between Essenbosch and Assegaibosch, 215 m, Aug. 1942, (–CD), *Fourcade 5657* (NBG). **3418** (Simonstown): Lourensfontein Estate, 250 m, 11 Oct. 1944, (–BB), *Parker 3929* (BOL, K, NBG); Kogelbaai boulders above road, 25 m, 10 Sept. 1969, (–BD), *Boucher 536* (K, NBG, PRE). **3419** (Caledon): Hottentots Holland Mts, between Somerset-Sneeuwkopp and Dwarsberg, Sept. 1946, (–AA), *Stokoe SAM 59199* (PRE); base of the Swartberg, near Krige Station, 13 Mar. 1976, (–BA), *Esterhuysen 34204* (BOL); Drayton siding, 12 km E of Caledon, foot of Caledon Swartberg, 5 Sept. 1974, (–BA), *Goldblatt 2514* (PRE); summit of Sondagskloof Pass, ± 30 km E of Stanford, 460 m, 26 Sept. 1962, (–BC), *Taylor 4080* (K, NBG, PRE); Fairfield, 395 m, 26 Sept. 1962, (–BD), *Acocks 22816* (K, NBG, PRE); 'Pheasantshoek' near Viljoenshof, 15 Sept. 1976, (–DA), *Esterhuysen 34376* (BOL, K); Elim, about 5 km outside of Elim on road to Baardskeedersbos, next to road, 1 Sept. 1991, (–DA), *Fellingham 1544* (NBG, PRE). **3420** (Bredasdorp): 7 km WNW of Swellendam, 185 m, 30 June 1948, (–AB), *Acocks 14578* (PRE); Zuurbraak, 245 m, 11 Oct. 1897, (–BA), *Galpin 3993* (PRE); 15 km WNW of Heidelberg, 215 m, 5 Sept. 1951, (–BB), *Acocks 16074* (K, PRE). **3421** (Riversdale): hillside at Garcia Forest Station, 25 May 1950, (–AA), *Esterhuysen 17232* (BOL, PRE); hills near Riversdale, 245 m, Oct. 1904, (–AB), *Bolus 11270* (BOL, PRE). **3423** (Knysna): near Plettenberg Bay (Keurbooms–Bitou R ex Weimarck), 9 Apr. 1814, (–AB), *Burchell 5280* (BOL, K). **3424** (Humansdorp): Wit Els Bos flats, road to Rob Hoek, 215 m, Apr. 1922, (–AA), *Fourcade 2200* (NBG); Witte Els Bosch, flats, 230 m, Aug. 1922, (–AA), *Fourcade 2297* (BOL, K, NBG, PRE); Witte Els Bosch, flats, Dec. 1922, (–AA), *Fourcade 2410* (BOL).

26. **Cliffortia filicauloides** Weim. in Botaniska Notiser 1933: 146, fig. 2a (1933) & 26, fig. 2J–L (1934); Whitehouse: 5, fig. 1E, 8 (2004b). Type: KwaZulu-Natal, Giant's Castle, 1 525 m, Sept. 1905, *Sim* 2929 (NH, holo.).



Low sprawling shrub, up to 0.5 m high, killed by fire; densely divaricately branched, forming brachyblasts; branches arching over rocks and boulders, sometimes rooting where touching ground. *Young stems* 0.7–1.1 mm wide, tinged reddish, hairy; stem hairs spreading or adpressed upwards, 0.3–0.7 mm long. *Leaves* trifoliate; middle leaflet obovate, 3.5–6.2 × 2.8–4.8 mm, 3-lobed at apex, outer leaflets elliptic, 3.3–5.7 × 1.5–2.5 mm, unlobed, apex rounded to acute, up to 0.1 mm long; margins flat; lamina herbaceous, 0.1–0.3 mm thick, midrib prominent beneath, curved downwards and away from stem, hairy or glabrous above, hairy beneath, sometimes only on midrib, hairs 0.4–0.9 mm long; sheath 1.0–1.5 mm long, abaxially hairy, adaxially hairy; stipules, 1.5–2.4 mm long, green, free, margins ciliate; petiole present and persistent on old leaf sheaths, 1.1–1.7 mm long. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 4, hairy on outside. *Male flowers* with bracteoles 2.4–3.6 mm long; pedicel 0.8–1.3 mm long; sepals broadly ovate, 3.3–4.0 × 1.8–2.2 mm, acute to acuminate at apex, joined into a short tube in lower half; stamens 8; filaments 4.7–6.4 mm long, red; anthers brownish red. *Female flowers* with bracteoles 3.7–4.4 mm long, longer than immature receptacle; sepals narrowly ovate, 2.0–2.5 × 0.8–1.2 mm, erect, fused at base; carpels 2; stigma 3.8–4.8 mm long, red to pinkish white, feathery, prominent above sepals; immature receptacle 0.9–1.6 × 0.7–0.8 mm, glabrous, smooth. *Achene* ellipsoid, 2.7–4.1 × 1.7–2.2 mm, pale to mid-brown, glabrous; unribbed. *Flowering time*: August to November.

Habitat: Boulder beds and stream edges on the lower slopes of the basalt and summit of the sandstone; altitude 1 500–2 700 m.

Distribution: Relatively restricted species in the KwaZulu-Natal Drakensberg from Giant's Castle to Cathedral Peak.

Conservation status. Localised species, confined to a relatively specialised habitat, but common there. Red List status: LC.

Etymology: *filicauloides* (Latin) means 'similar to the species *Cliffortia filicaulis*'.

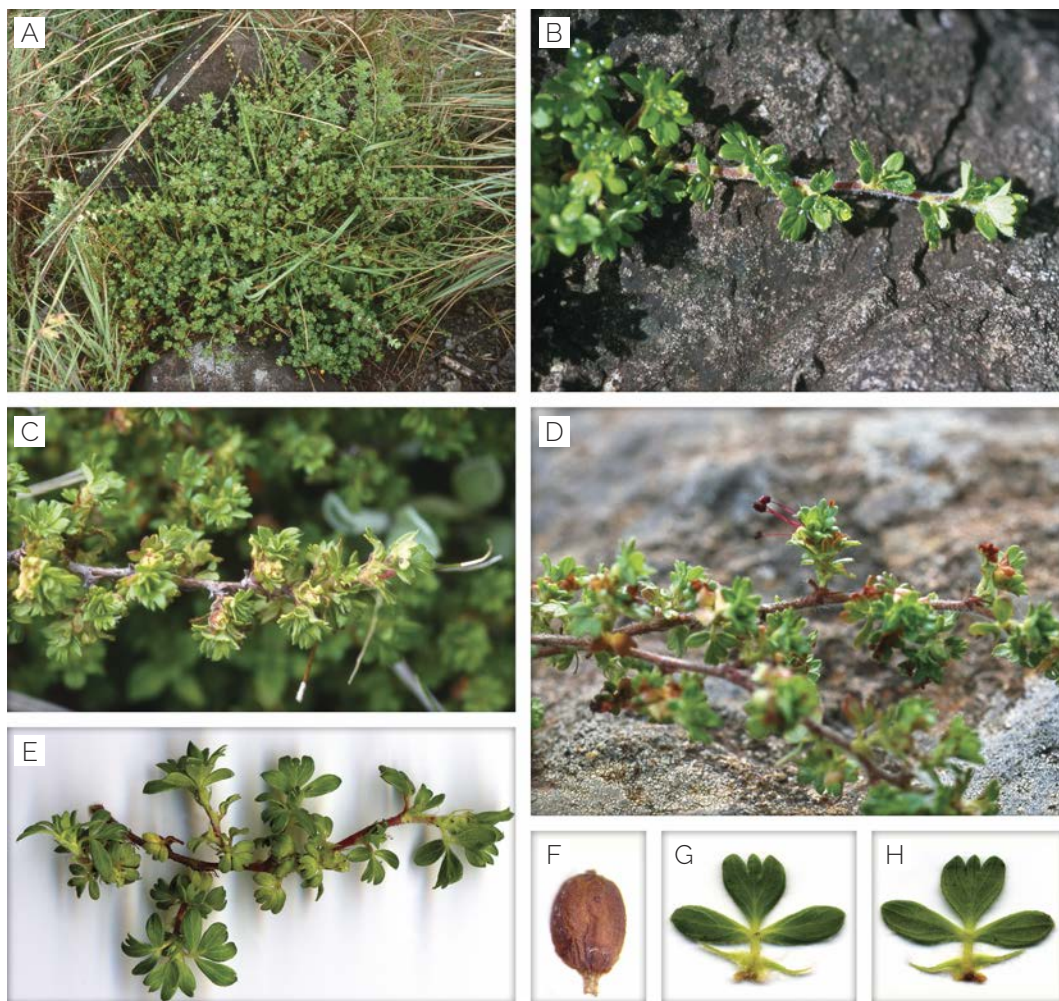
Notes: The only low-growing to mat-forming species in the Drakensberg. The petiolate trifoliate leaves with broad leaflets are diagnostic, but young seedlings or resprouting plants of *Cliffortia nitidula* may appear very similar. If mature leaves are present or the habit is known, they can be easily distinguished. Otherwise they can be separated by the juvenile outer leaflets of *C. nitidula* being lobed, whereas in *C. filicauloides* only the middle leaflet is lobed.

Weimarck (1934) placed *Cliffortia filicaulis* and *C. filicauloides* in separate subgenera on the basis of the different number of carpels. However, in all other respects they are morphologically very similar and molecular evidence supports their close relationship (Fig. 1 & 2). *Cliffortia filicauloides* can be further distinguished from *C. filicaulis* by the longer petioles, visible even after the leaves have fallen from the stem, and by the less hairy leaves, but the two should not be confused because of their allopatric distributions.

Representative specimens

SOUTH AFRICA. 2829 (Harrismith): Drakensberg, Cathedral Peak area, 1830–2135 m, July 1944, (–CC), *Esterhuysen* 10182 (BOL); Drakensberg, Cathedral Peak, at foot, 1525 m, 22 Aug. 1942, (–CC), *Germain* 1543 (NBG); Estcourt District, Cathedral Peak, Msongwaana valley, (–CC), *Granger* s.n. (NU); Cathedral Peak Forest Reserve, tributary of Tseksetseke, 2105 m, 18 Jan.

1983, (–CC), *Hilliard & Burt* 16275 (K, NU, PRE); Cathedral Peak Forest Reserve, Indumeni R (upper reaches), 1920 m, 27 Nov. 1952, (–CC), *Killick* 1791 (K, PRE); Bergville, Cathedral Peak, upper Masonjwaan, 1830 m, Mar. 1963, (–CC), *Krounhout* UAD 722 (K); Cathedral Peak, Aug. 1947, (–CC), *Levy* 8261 (BOL); Drakensberg, Cathedral Peak area, 1525 m, 10 Aug. 1947, (–CC), *Levy* 8285A (BOL). 2929 (Underberg): Drakensberg, Little Tugela area, 1525–1830 m, July 1943, (–AB), *Esterhuysen* 8831 (BOL); Weenen District, Drakensberg, Ndedema area, banks, 1830–2135 m, July 1950, (–AB), *Esterhuysen* 17352 (BOL, PRE); Estcourt District, Monk's Cowl Reserve, valley to W of Cathkin Peak, ± 2 km N of Keith's Bush Camp, 2050 m, 25 Nov. 2001, (–AB), *Whitehouse* 293 (BOL, K, NBG); Estcourt District, Monk's Cowl Reserve, Champagne Fork, Cathkin Mountain Pass, path to S of Ship's Prow, around halfway down to main stream, 2700 m, 25 Nov. 2001, (–AB), *Whitehouse* 294 (BOL); Mpendhle District, Loteni R valley, 1800 m, 13 Jan. 1982, (–AD), *Hilliard & Burt* 15106 (K, NU, PRE); Mpendhle District, Highmoor Forest Reserve, ridge SE of Giant's Castle, headwaters of Elandschoek R, 2285 m, 5 Jan. 1983, (–BC), *Hilliard & Burt* 16236 (K, NU, PRE).



Cliffortia filicauloides: A, habitat; B & E, branch; C, branch with female flower; D, branch with male flower; F, achene; G, dorsal view of leaf; H, ventral view of leaf.

27. **Cliffortia hantamensis** Diels in Botanische Jahrbücher 44: 119 (1909); Weim.: 27, fig. 3A–E (1934); Fellingham: 612 (2000). Type: Calvinia District, W Hantamsberg, 1 450 m, 16 Sept. 1900, *Diels* 724 (B, holo.†). Neotype, designated here: Calvinia, Sept. 1900, *Pritzel & Diels s.n.* (Z, neol.; B†).



Short, low, weakly stemmed shrub, up to 0.5 m high, killed by fire; densely divaricately branched, forming brachyblasts. Young stems 0.5–0.9 mm wide, tinged reddish, long hairy; stem hairs spreading or adpressed upwards, 0.6–1.2 mm long. Leaves trifoliate; leaflets elliptic, 2.1–3.5 × 0.6–1.8 mm; apex acute to rounded, up to 0.2 mm long; margins flat, entire; lamina herbaceous, 0.1–0.2 mm thick, midrib prominent beneath, curved upwards and towards stem, greyish hairy above and beneath, 0.2–0.9 mm long; sheath 0.6–0.9 mm long, abaxially hairy, adaxially very hairy; stipules similar to leaflets, 0.7–1.4 mm long, green, free, margins ciliate; petiole absent. Flowers solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 4, hairy on outside. Male flowers with pedicel 0.5–0.6 mm long, glabrous; sepals broadly ovate, 2.6–3.0 × 0.9–1.3 mm, acute to acuminate at apex, joined into a short tube in lower half; stamens 8; filaments red; anthers brownish red. Female flowers with bracteoles 2.4–2.6 mm long, longer than immature receptacle; sepals narrowly ovate, erect, fused at base; carpels 1 or 2; stigma feathery, prominent above leaves and sepals; immature receptacle glabrous, smooth. Achene ellipsoid, 1.9–2.6 × 1.0–1.2 mm, pale to mid-brown, glabrous; unribbed. Flowering time: August to January.

Habitat: Shallow gulleys on shale bands at high altitudes; altitude 1 200–1 700 m.

Distribution: Extending from the Hantam Mountains near Calvinia along the Roggeveld Escarpment to Uitskyk, and along the mountains to the west of the Tankwa Karoo as far as Baviaansberg and Witteberg near Laingsburg, with an outlying population on the Langeberg above Robertson.

Conservation status. Only known from seven separate widely scattered mountains, but quite possibly more widespread as these ranges are poorly collected and the species is easily overlooked. Red List status: LC.

Etymology: *hantamensis* means from Hantam, referring to the mountains near Calvinia where the species was first collected.

Notes: *Cliffortia hantamensis* affinities lie close to *C. monophylla* and *C. filicaulis* with foliaceous stipules and four partially fused sepals, but it differs in having entire trifoliate leaves and two stigmas in each flower (although some populations appear to only have one). It can easily be confused at first glance with *C. hexandra* or a diminutive *C. polygonifolia*, but these species have only three sepals, a single stigma and incurved winged achenes.

The distribution of *Cliffortia hantamensis* is unusual within *Cliffortia*, being scattered on a few high mountains on the drier Cape Fold Mountains, and then across the Karoo along the Roggeveld Escarpment and Hantamsberg.

The original specimen designated by Diels was destroyed at Berlin, but fortunately a good specimen collected at the same time by Pritzel & Diels is present at the Zurich Herbarium; here chosen as the neotype.

Representative specimens

SOUTH AFRICA. **3119** (Calvinia): Calvinia, Hantamsberg, summit plateau above Ambraalshoek, 1585 m, 18 Aug. 1975, (–BD), Thompson 2326 (NBG, PRE). **3219** (Wuppertal): Cederberg Mts, Tafelberg, 1525 m, 25 Sept. 1942, (–AC), Esterhuysen 8089 (BOL, K, NBG, PRE); base of shale band below Cederberg Tafelberg, 1220 m, 16 Dec. 1950, (–AC),

Esterhuysen 18160 (BOL); Cederberg, Tafelberg, 1525 m, 21 Oct. 1923, (–AC), *Pocock 477* (NBG); Bokkeveld Tafelberg, small gully on SE slopes, 1220–1525 m, 14 Aug. 1953, (–CD), *Esterhuysen 24393* (BOL). **3220** (Sutherland): Roggeveld, Uitkyk Farm, 23 Sept. 1981, (–AD), *Goldblatt 6356* (NBG, PRE); Roggeveld, Uitkyk Farm, 1500 m, Oct. 1920, (–AD), *Marloth 9714* (BOL, NBG, PRE); Roggeveld escarpment, Uitkyk Farm, 1525 m, 23 Sept. 1981, (–AD), *Rourke 1736* (NBG, PRE). **3319** (Worcester): Baviaansberg, 1675 m, 8 Mar. 1964, (–BA), *Esterhuysen 30637* (BOL, K); Langeberg Mts above Robertson, ridge at summit of Watervalkloof, 1495 m, 9 Jan. 2002, (–DB), *Whitehouse 300* (BOL). **3320** (Montagu): Witteberg, S slopes, ravine above Nootgedacht, 1280 m, 1 June 2000, (–BC), *Whitehouse 125* (BOL, K, NBG); Montagu, on crest of Waboonsberg, on farm Pypsteelsfontein, 1250 m, 29 Sept. 1990, (–CA), *Vlok 2409* (NBG).



Cliffortia hantamensis: A, habitat; B, branch; C dorsal view of leaf; D, ventral view of leaf.

28. **Cliffortia monophylla** Schltr. ex Weim. in Botaniska Notiser 1933: 161, fig. 10d (1933) & 151, fig. 44J–N (1934); Fellingham: 610 (2000). Type: Caledon District, Swartberg, 305 m, 7 Apr. 1897, *Schlechter 10369* (LD, holo.; B, BR!, GRA, BM!, COI, G, GRA!, HBG!, K!, L, LD!, P, PH!, PRE!, SI!, W!, WAG!, Z!, iso.)



Low often sprawling shrub up to 0.6 m high, killed by fire; densely divaricately branched, forming brachyblasts. Young stems 0.6–1.4 mm wide, tinged reddish, long hairy; stem hairs spreading, 0.5–1.6 mm long. *Leaves* unifoliate, single-veined from base; leaflet subcircular to ovate, 3.1–4.9 × 1.7–5.0 mm; base rounded to cordate; apex acute to mucronate, 0.1–0.4 mm long; margins flat, entire or rarely with an occasional tooth up to 0.4 mm long; lamina herbaceous, 0.1–0.2 mm thick, midrib prominent beneath, curved downwards and away from stem, greyish hairy above and beneath, 0.4–1.2 mm long; sheath 1.0–1.7 mm long, abaxially hairy, adaxially very hairy; stipules similar to lamina, 1.3–2.5 mm long, green, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 4, hairy on outside. *Male flowers* with pedicels glabrous; sepals broadly ovate, acute to acuminate at apex, joined into a short tube in lower half; stamens 8; filaments red, anthers brownish red. *Female flowers* with bracteoles 2.7–3.4 mm long, longer than immature receptacle; sepals narrowly ovate to oblong, 1.7–2.5 × 0.4–0.8 mm, erect, fused at base; carpel 1; stigma 4.5–5.4 mm long, red to pinkish white, feathery, prominent above leaves and sepals; immature receptacle 1.0–1.7 × 0.5–0.7 mm, glabrous, smooth. *Achene* ellipsoid, 1.7–2.2 × 0.8–1.0 mm, whitish to pale brown, glabrous; unribbed. *Flowering time*: August to January.

Habitat: Fynbos on lower clayish shale slopes of the Bokkeveld Series in full sun on well-drained soils; altitude 150–350 m.

Distribution: A few scattered localities in lowland areas between Houwhoek and Swellendam.

Conservation status: Widespread but very scattered and vulnerable due to its restricted habitat on lowland shale soils that are often ploughed or under development; its range has clearly greatly reduced in recent years. Red List status: VU.

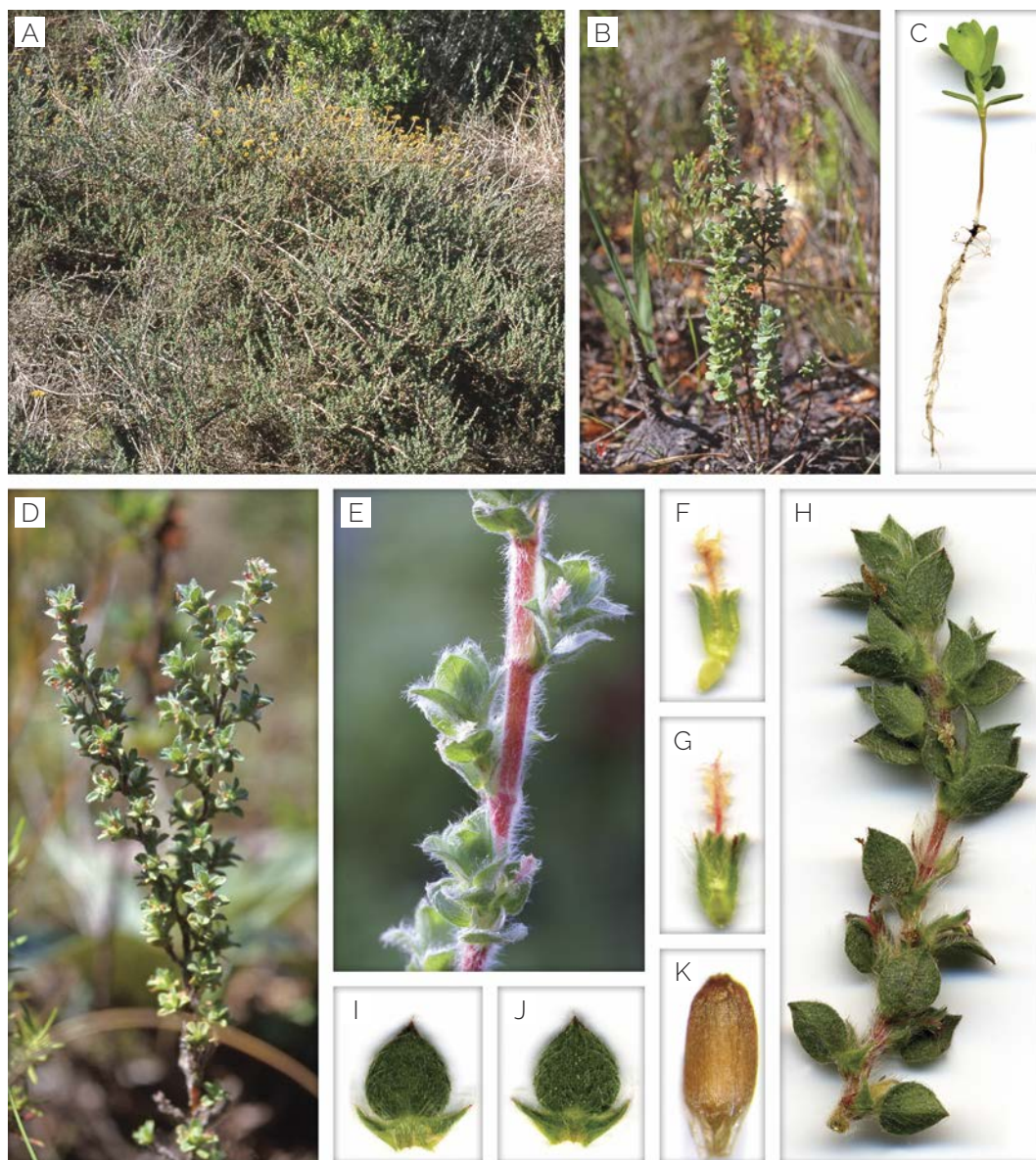
Etymology: *monophylla* (Greek) means 'single leaf', for the leaves with a single leaflet, whereas its closely related species have three leaflets.

Notes: Weimarck (1934) recognised *Cliffortia monophylla* as having a habit similar to *C. filicaulis* but placed it near to *C. odorata* on account of its single leaflet. It shares all the relevant features of sect. *Stipulatae*: flowers with four sepals slightly fused towards their base, very long hairy stems, and leaves and stipules that are leaf-like in texture. *Cliffortia monophylla* is easily recognised being the only species in the section with a single leaflet. On account of its habit, it appears at first glance to be resemble *C. filicaulis*.

Representative specimens

SOUTH AFRICA. 3419 (Caledon): Houwhoek Mt., along the road on the lower slopes, facing the hotel, 28 Sept. 1975, (–AA), *Esterhuysen 33986* (BOL); Houwhoek, low clayish slopes just above hotel, along road on S side of mountain, 320 m, 3 Oct. 2000, (–AA), *Whitehouse 150* (BOL); Caledon, 275 m, 17 Oct. 1894, (–AB), *Schlechter 5580* (BOL, FHO, K, NBG, PRE); Swartberg, 305 m, 7 Apr. 1897, (–AB), *Schlechter 10369* (BM, K, PRE, Z); Caledon, Middleton turn-off from N2, by roadside, 305 m, 20 Jan. 2001, (–AB), *Whitehouse 184* (BOL, NBG); Drayton siding, 12 km E of Caledon, foot of Caledon Swartberg, 5 Sept. 1974, (–BA), *Goldblatt 2514* (PRE); Riviersonderend Mts, foot of mountains, 12 Feb. 1956, (–BB), *Esterhuysen 25334* (BOL); Sondagskloof, 29 Dec.

1940, (–BC), *Bond 772* (NBG); Bredasdorp, Fairfield, 150 m, 27 Aug. 1962, (–BD), *Acocks 22641* (K, PRE); Overberg, Fairfield Farm, c. 14 km NW of Napier, 200 m, Oct. 1993, (–BD), *Kemper IPC184* (NBG). **3420** (Bredasdorp): Swellendam, 5 Sept. 1955, (–AB), *Esterhuysen 24627* (BOL).



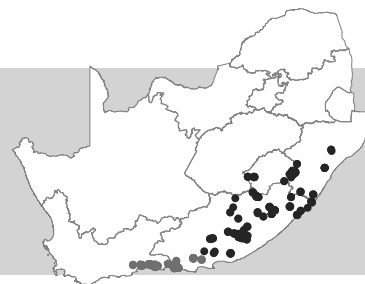
Cliffortia monophylla: A & B, habit; C, seedling; D, E & H, branch with female flowers; F & G, female flower; I, dorsal view of leaf; J, ventral view of leaf; K, achene.

(29–32) **Section Paucistamineae** *C.M.Whitehouse* sect. nov. Type species: *C. paucistaminea* Weim.

Low to medium erect densely branched shrubs. Young stems with short upwardly adpressed hairs, forming brachyblasts. Sheath glabrous abaxially; stipules membranous, free, entire or rarely ciliate; petiole absent. Leaves trifoliolate, glabrous. Flowers solitary, in the axils of ordinary vegetative leaves. Bracteole with a serrate to shortly ciliate margin, longer than immature receptacle; **sepals 4**, glabrous; **receptacle distinctly ribbed**, glabrous; carpels 1. Achenes ellipsoid, ribbed, **often pale yellowish brown**.

Rather similar in characteristic to sect. *Dracomontanae* with divaricate shrubs with needle-shaped to ovate trifoliolate leaves and 4-sepalled flowers. Indeed, separating some forms of *Cliffortia browniana* from *C. serpyllifolia* without locality information is exceedingly difficult. *Cliffortia paucistaminea* possibly forms hybrids with other species, though this has not been confirmed. *Cliffortia crassinervis* is possibly an ancient hybrid species of *C. setifolia* and another needle-leaved species.

29. **Cliffortia paucistaminea** Weim. in Botaniska Notiser 1933: 151, fig. 4c–d (1933); Weim.: 64, fig. 16A–E (1934); J.H. Ross: 183 (1972); Hilliard & Burt: 162, t. 6C (1987); Pooley: 150 (1998); Fellingham: 615 (2000); Whitehouse: 6, fig. 10 (2004b). Type: Lesotho, without precise locality, *Cooper 690* (K, holo.; B, BM!, BOL!, W, Z, iso.)



C. galpinii sensu N.E.Br.: 122 (1901) pro parte, non N.E.Br. sensu stricto.

C. juniperina sensu E.Phillips: 90 (1917) pro parte quoad *Cooper 690*.

Grey dot: var. *australis*.

Erect medium to tall shrub, up to 2 m high, resprouting after fire and sometimes spreading clonally; densely divaricately branched, forming brachyblasts, which are closely overlapping. *Young stems* 0.8–1.7 mm wide, hairy; stem hairs upwardly adpressed, 0.2–0.6 mm long. *Leaves* trifoliolate; leaflets linear to needle-shaped, 5.1–10.2 × 0.3–0.8 mm; apex sharply acuminate, 0.4–0.8 mm long; margins flat, minutely serrulate to scabrid lamina chartaceous, 0.1–0.4 mm thick, midrib keeled and prominent, green with two paler stripes on either side of midrib beneath, glabrous above and beneath; sheath 0.6–1.5 mm long, abaxially glabrous, adaxially glabrous to markedly hairy with fringe of hairs at mouth; stipules 1.5–2.3 mm long, free, margins smooth; petiole absent. *Flowers* solitary at bases of ordinary vegetative leaves; bracteoles hairy, margins serrate to shortly ciliate; sepals 4, or very rarely 3, glabrous. *Male flowers* with bracteoles 0.9–1.8 mm long; pedicel 0.3–0.8 mm long; sepals broadly ovate, 2.2–3.6 × 0.9–1.5 mm, acute to acuminate at apex; stamens 4(–6); filaments 1.4–3.7 mm long, reddish; anthers yellow to brownish red. *Female flowers* with bracteoles 1.6–2.6 mm long, longer than immature receptacle; sepals narrowly ovate, 1.1–1.7 × 0.3–0.5 mm, erect to recurved; carpel 1; stigma 2.5–3.7 mm long, greenish white, feathery, hidden at base of leaves; immature receptacle 1.0–1.8 × 0.6–0.9 mm, glabrous, clearly ribbed. *Achene* 2.1–3.3 × 0.9–1.2 mm, pale yellowish brown, glabrous; ribs 8–16, rounded to acute, 0.1–0.2 mm wide. *Flowering time*: September to April

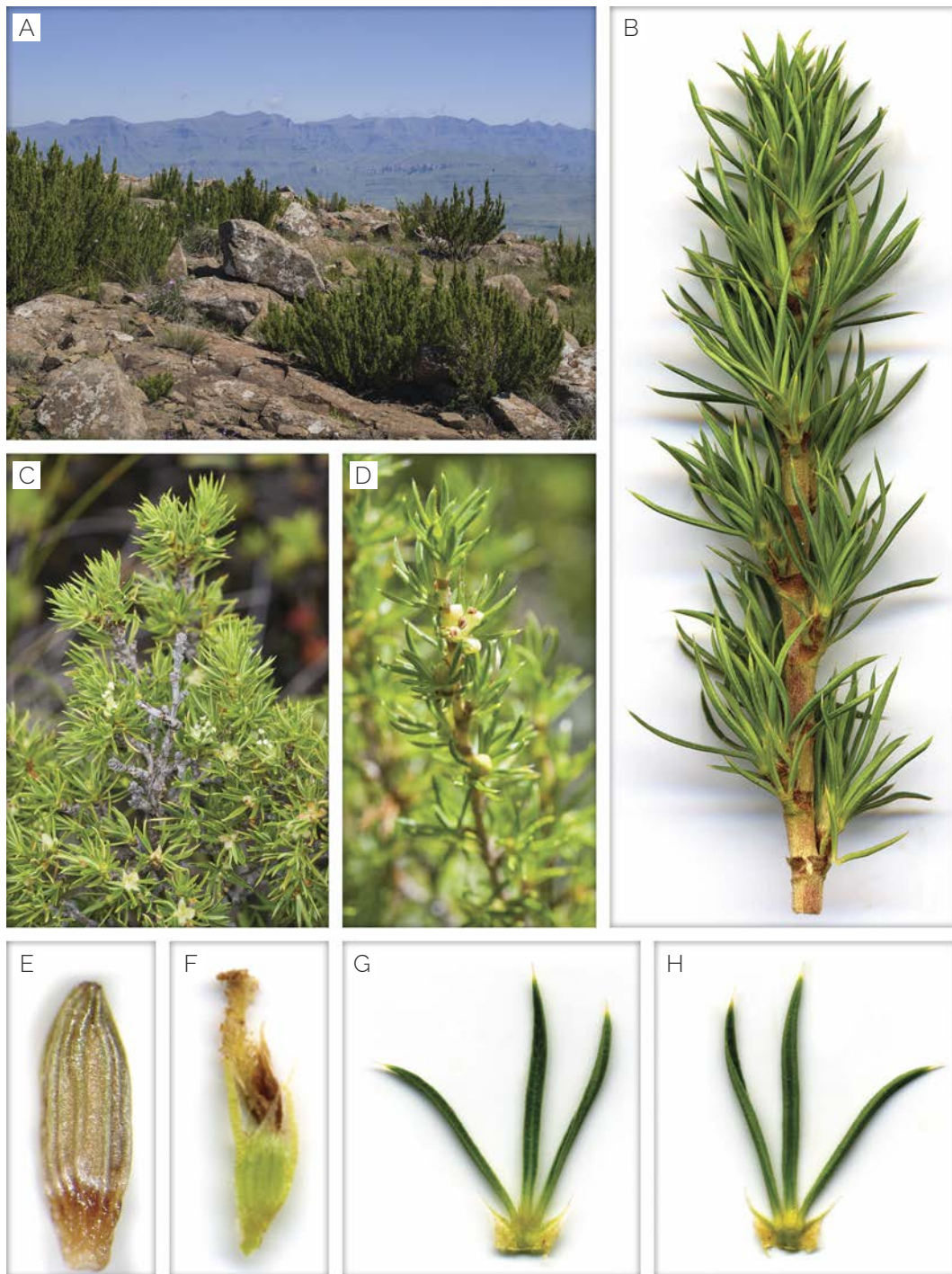
Etymology: *paucistaminea* (Latin) means ‘few stamens’, referring to the 4-staminate male flowers (also characteristic of several other species).

Notes: *Cliffortia paucistaminea* has closely packed fascicles of fine leaves, which give the branches a soft fine look. Having only four stamens and four sepals helps to differentiate it from other needle-leaved species outside this section. The two varieties of *C. paucistaminea* are distinguished not just on distribution with var. *paucistaminea* in the north and east and var. *australis* in the south, but also on the curvature of their leaflets with var. *paucistaminea* leaflets curving outwards and var. *australis* leaflets curving upwards and in. This gives the branches of the varieties a notable contrasting look from each other (var. *australis* also has slightly narrower leaflets, which accentuates the feathery look of the branches).

Cliffortia galpinii was described from material of both *C. paucistaminea* var. *paucistaminea* and *C. ramosissima* (Weimarck 1934). Although an earlier valid name for *C. paucistaminea*, it was lectotypified on the *C. ramosissima* element to prevent further name changes (Whitehouse 2004b).

var. **paucistaminea**; C.M.Whitehouse: 7, fig. 9, 10 (2004b).

C. juniperina var. *foliis-brevioribus* Eckl. & Zeyh.: 267 (1836). *C. juniperina* var. *brevior* Drège: 649 (1847), nom. illegit. superfl. *C. juniperina* var. *brevifolia* Harv.: 303 (1862), nom. illegit. superfl.



Type: Eastern Cape, Winterberg, above the source of the Kat River, *Ecklon 1750β* (S, holo.; B†, ?K!, L, W, iso.)

C. juniperina sensu Jacot-Guillarmod: 186 (1971), non L.f.

Leaflets 0.4–0.8 mm wide, held straight or curved downwards and away from the stem. *Flowering time* predominantly September to February.

Habitat: Humus-rich soil over sandstone rocks in full sun; altitude 0–2 350 m.

Distribution: Widespread from the Suurberg Mountains along the Drakensberg escarpment as far as Giant's Castle, with outlying populations along the Wild Coast and KwaZulu-Natal lowlands as far north as Nkandla.

Conservation status: Widespread and common throughout most of its range, able to persist in over-grazed areas and along roadsides. Red List status: LC.

Notes: Where var. *paucistaminea* grows, in the northern and eastern range of the species, there are no other species that look similar. *Cliffortia atrata* may be confused on vegetative characters, but has 3-sepal flowers, more stamens, and grows only in the southwestern Cape. A putative hybrid between *C. linearifolia* and *C. paucistaminea* was collected in the Stormberg (Clark & Daniels 313).

For comments on the typification of *Cliffortia juniperina* var. *brevifolia*, see under *C. atrata*.

Representative specimens

SOUTH AFRICA. **2831** (Nkandhla): Nkandla District, Nkandla Forest, Nomangei outcut, 1250 m, 2 Jan. 1964, (–CA), Hilliard 2648 (NU); Zululand, Nkandla, 1525–1830 m, 20 Dec. 1898, (–CA), Medley Wood 7903 (BOL, K). **2927** (Maseru): Mafeteng District, Thaba Chicha Mt., Likhoele, 11 Mar. 1915, (–CD), Dieterlen 1103 (NBG, PRE); Thaba Chicha Mt., Likhoele [Likhode], slope of Thaba Chicha Mt., 24 Jan. 1916, (–CD), Dieterlen 1203 (NBG, PRE); Qaba, 3 km E of Qaba, 1700 m, 17 Nov. 1983, (–DC), Hilger 7 (PRE); Qaba, 1700 m, Apr. 1981, (–DC), Schmitz 9223 (NU, PRE). **2929** (Underberg): Garden Castle Forest Reserve, Mlambonja valley, 2075 m, 5 Jan. 1982, (–CA), Hilliard & Burtt 14925 (NU, PRE); road from Himeville to Sani Pass, at turn-off to trading store, 1715 m, 24 Sept. 1983, (–CB), Balkwill, K., Manning et al. 1030 (NU); Bamboo Mt., Sept. 1973, (–CB), Grice s.n. (NU, NU); Cobham Forest Reserve, Upper Polela Cave area, 2075–2350 m, 13 Feb. 1979, (–CB), Hilliard & Burtt 12481 (NU); Cobham Forest Reserve, Upper Polela Cave area, 2045 m, 15 Feb. 1979, (–CB), Hilliard & Burtt 12581 (NU); Cobham Forest Station, Ndlovini, Troutbeck, 1830 m, 7 Nov. 1980, (–CB), Hilliard & Burtt 13284 (NU); Cobham Forest Station, Ndlovini, Troutbeck, 1830 m, 7 Nov. 1980, (–CB), Hilliard & Burtt 13285 (K, NU); Cobham Forest Reserve, Sipongweni, 2135 m, 20 Feb. 1981, (–CB), Hilliard & Burtt 14035 (NU); Bamboo Mt., summit, 2195 m, 21 Nov. 1982, (–CB), Hilliard & Burtt 15591 (NU); Bamboo Mt., N side, 1950 m, 21 Nov. 1982, (–CB), Hilliard & Burtt 15643 (K, NU, PRE); Bamboo Mt., N side, 1950 m, 21 Nov. 1982, (–CB), Hilliard & Burtt 15644 (NU, PRE); Gxalingenwa valley, between Sani Pass and Polela valley edge of forest in rocky stream, 2045 m, 8 Dec. 1983, (–CB), Hilliard & Burtt 17077 (NU, PRE); Gxalingenwa valley, between Sani Pass and Polela valley, 2255 m, 9 Dec. 1983, (–CB), Hilliard & Burtt 17095 (K, NU, PRE); Sani Pass, on sandstone cliffs, 2045 m, 14 Dec. 1984, (–CB), Hilliard & Burtt 17955 (NU, PRE); Cobham Forest Station, Troutbeck valley below Ndlovini, 1830 m, 5 Mar. 1985, (–CB), Hilliard & Burtt 18329 (K, PRE); Cobham State Forest, 'Lakes' Cave area, 2165 m, 12 Dec. 1982, (–CB), Hilliard, Burtt & Manning 15955 (NU); Cobham State Forest, 'Lakes' Cave area, 2350 m, 15 Dec. 1982, (–CB), Hilliard, Burtt & Manning 16069 (NU); Mkhomazana valley, 1600 m, 24 Jan. 1966, (–CB), Killick & Vahrmeyer 3711 (K); Mkhomazana valley, 1600 m, 24 Jan. 1966, (–CB), Killick & Vahrmeyer, 3711 (PRE); Sani Pass, ± 1 km E of South African border post, 1900 m, 28 Nov. 2001, (–CB), Whitehouse 297 (BOL). **2930** (Pietermaritzburg): New Hanover District, Little Noodsberg, Laager Farm, 24 Apr. 1981, (–BD),

Hilliard & Burt 14502 (NU); New Hanover District, Little Noodsberg, Laager Farm, 24 Apr. 1981, (–BD), *Hilliard & Burt* 14503 (NU); New Hanover District, Little Noodsberg, Laager Farm, 24 Apr. 1981, (–BD), *Hilliard & Burt* 14506 (K, NU); New Hanover District, Little Noodsberg, Laager Farm, 24 Apr. 1981, (–BD), *Hilliard & Burt* 14510 (K); New Hanover District, Little Noodsberg, Laager Farm, 17 Sept. 1948, (–BD), *Johnstone* 209 (NU); Noodsberg, Klein Noodsberg, KwaSangwane, 9 Oct. 1989, (–BD), *Williams* 342 (PRE). **3026** (Aliwal North): Elandshoek, near Aliwal North, 1465 m, Jan. , (–DC), *Bolus* 250 (BOL). **3027** (Lady Grey): near Sterkspruit, Majuba Nek, Dec. 1915, (–DA), *Hepburn* 125 (GRA); road between Pitlochrie and Lundin's Nek, Glen Gyle, 1950 m, 3 Dec. 1981, (–DC), *Hilliard & Burt* 14655 (K, NU, PRE); Cape, Barkly East, 9.5 km N by W of Moshesh's Ford, 1890 m, 14 Jan. 1959, (–DD), *Acocks* 20159 (K, PRE). **3028** (Matatiele): Griqualand East, Ramatsilanes Gate, escarpment, 2315 m, 23 Feb. 1975, (–BB), *Bayliss* 1347 (PRE); Lesotho–Transkei border, Ramatsiliso Nek, 2195 m, 27 Jan. 1972, (–BB), *Phillips* s.n. (NU). **3029** (Kokstad): Mt. Ayliff District, Ntsizwa Mt., 1370–1615 m, 17 Feb. 1971, (–CD), *Hilliard & Burt* 6532 (K, NU, PRE); Weza State Forest, Ingeli contour path, 1300 m, 29 Dec. 1986, (–DA), *MacDevette* 1574 (PRE). **3030** (Port Shepstone): Oribi Gorge Nature Reserve, Mkonka Point, 9 Feb. 1971, (–CB), *Glen* 380 (NBG); Port Shepstone District, Umtamvuna Forest Reserve, 22 Sept. 1966, (–CC), *Strey* 6933 (NU, PRE). **3126** (Queenstown): Molteno District, top of Boesmanshoek Pass, 1710 m, 25 Jan. 1956, (–AD), *Acocks* 18690 (K, PRE); Molteno District, Stormberg, Farm Roode Kloof 8, 1923 m, 8 Dec. 2010, (–BC), *Clark & Daniels* 291 (WSY); Queenstown, Hangklip Mt., 1830 m, 12 Nov. 1893, (–DD), *Galpin* 1607 (BOL, PRE). **3127** (Lady Frere): Xalanga District, upper part of Cala Pass, 1435 m, 17 Jan. 1962, (–BC), *Acocks* 21884 (K, PRE); Xalanga District, Cala Commonage, E commonage boundary – FM tower, 1621 m, 20 June 1994, (–DA), *Dold* 815 (GRA); hills near Engcobo, 8 Oct. 1961, (–DB), *Esterhuysen* 29149 (BOL, K). **3128** (Umtata): Maclear District, Ugje, Surat Farm, on small krantz, 1310–1370 m, 30 Jan. 1923, (–AB), *Britten* 4663 (GRA, PRE); hill above Mhlanlane Forest Station, NW of Umtata, 1525 m, 31 Jan. 1983, (–BC), *Hilliard & Burt* 16332 (K, NU, PRE); hill above Mhlanlane Forest Station, NW of Umtata, 1525 m, 31 Jan. 1983, (–BC), *Hilliard & Burt* 16333 (K, NU); Baziya Mt., 1035 m, 10 Feb. 1981, (–CB), *Hilliard & Burt* 13865 (K, NU); Baziya Mt., 1035 m, 10 Feb. 1981, (–CB), *Hilliard & Burt* 13866 (K, NU, PRE); Baziya Mt., 1450 m, 10 Feb. 1981, (–CB), *Hilliard & Burt* 13894 (NU). **3129** (Port St Johns): Tabankulu District, Sebeni Mt., near Dungu Store on Sebeni Mt., 1130 m, 23 Sept. 1947, (–AA), *Acocks* 13838 (K, PRE); Lusikisiki District, Fraser Falls, 29 Dec. 1952, (–BC), *Leighton* 2998 (BOL, PRE); Port St. Johns, Mt. Sullivan, summit of the spout opposite the beacon, 305 m, 13 Apr. 1990, (–DA), *Bean, Viviers & Cloete* 2274 (BOL); Port St. Johns, Western Gate, 365 m, 4 July 1929, (–DA), *Levyans* 6905 (BOL). **3130** (Port Edward): Port Edward, Clearwater, 1 Aug. 1982, (–AA), *Abbott* 177 (PRE); Port Shepstone District, Port Edward on Izingolweni road, 2 Jan. 1965, (–AA), *Hilliard* 3031 (NU); Mkambati Nature Reserve, riverside just above Mkambati Falls, 15 m, 21 Nov. 2002, (–AC), *Whitehouse* 323 (BOL). **3225** (Somerset East): Somerset East, on Boschberg escarpment crest, Waainek, 1316 m, 2009, (–DA), *Clark & Andrews* 107 (GRA); Somerset East, Bosberg, above town, 1370 m, Nov. 1968, (–DA), *van der Walt* 367 (PRE). **3226** (Fort Beaufort): Great Winterberg, Farm Finella Falls 1, 1731 m, 25 Jan. 2009, (–AD), *Clark, Pienaar & Daniels* 546 (WSY); Katberg State Forest, Katberg summit ridge, 1731 m, 10 Dec. 2010, (–BC), *Clark & Daniels* 342 (WSY); SE slopes at top of Katberg Pass, 26 Oct. 1946, (–BC), *Esterhuysen* 13222 (BOL); Winterberg Mountain Range, above Katberg Pass, near to Post Retief turn-off, low hills behind escarpment, 1650 m, 27 Apr. 1995, (–BC), *Victor* 1238 (PRE); Readsdales, 5 Oct. 1973, (–BC), *Von Gadow* 472 (GRA); Glencoe Farm, 19 June 1986, (–BD), *Palmer* 1412 (GRA); Hogsback, hillside above forest, 28 Oct. 1946, (–DB), *Esterhuysen* 13259 (BOL); Seymour Area, Hogsback village, Summertown road, forest margin, roadside, 1220 m, 20 Feb. 1994, (–DB), *Fellingham* 1631 (NBG, PRE); Hogsback Forest Reserve, NW of forestry station, on contour path, 1280 m, 20 Feb. 1994, (–DB), *Fellingham* 1632 (NBG); Hogsback Pass, 1220 m, (–DB), *Giffen* 342 (GRA, PRE, UFH); Amatola Mts, Menziesberg, 1435 m, 14 Dec. 1985, (–DB), *Hilliard & Burt* 18837 (K, NU, PRE); Hogsback, on way to Headlands, 1220 m, Apr. 1960, (–DB), *Jacot-Guillarmod* 3958 (PRE); Cathcart District, Hogsback, Oct. 1950, (–DB), *Leighton* 3127 (BOL); Hogsback, near top of Kettlespout Falls, 1370 m, 16 July 1952, (–DB), *Levyans* 9842 (BOL); Hogsback, slopes above Red Krantz, 1370 m, 22 July 1952, (–DB), *Levyans* 9856 (BOL). **3227** (Stutterheim): Queenstown, Qwatyn Farm mountainside, 16 Dec. 1911, (–AB), *Galpin* 8307 (PRE); Cathcart, Windvogelberg, at summit, 1645 m, 8 Dec. 1981, (–AC), *Hilliard & Burt* 14753 (K, NU); Evelyn Valley, 13 Jan. 1947, (–CA), *Compton* 19176 (NBG); Hogsback Mt, higher NW slopes off highest transverse jeeptrack, 1700 m, 18 June 1995, (–CA), *Fellingham* 1671 (NBG); Hogsback Mt, higher NW slopes off highest transverse jeeptrack, 1700 m, 18 June 1995, (–CA), *Fellingham* 1672 (NBG); Stutterheim, Keiskammahoek, WSW Trollope's burning plots, Gxulu location, 1370 m, 25 Jan. 1977, (–CA), *Gibbs Russell* 3493A (BOL, GRA, PRE, UFH); Keiskammahoek, Apr. 1944, (–CA), *Goulimis* s.n. (BOL); Evelyn Valley, 13 Jan. 1947, (–CA), *Leighton* 2697 (BOL); Hogsback, Wolf Ridge, 1220 m, 10 Sept. 1947, (–CA), *Story* 3116 (PRE); Cata Forest Reserve, 1525 m, 24 Oct. 1947, (–CA), *Story* 3190 (GRA, PRE); NW of Stutterheim, Ailsa Farm, near summit of Kubusie Mt., N slope, 11 Dec. 1995, (–CB), *Victor* 767 (GRA). **3325** (Port Elizabeth): Suurberg Pass, 915 m, 21 Aug. 1973, (–BC), *Bayliss* 493 (PRE); Port Elizabeth District, Suurberg Mts, Addo Elephant National Park 4 hour trail, by track to W of Brandrug, 625 m, 10 Oct. 1999, (–BC), *Whitehouse* 56 (BOL); Somerset

East District, Suurburg, above Anns Villa, 31 Oct. 1945, (–BD), *Acocks 12037* (PRE). **3326** (Grahamstown): Grahamstown, upper end of Howisons Poort, 730 m, 13 Sept. 1931, (–AD), *Rennie & Rennie 168B* (GRA, GRA); Featherstone Kloof, Murie Farm, top of mountain, 8 Sept. 1934, (–BC), *Britten 6408* (GRA).

var. **australis** *C.M.Whitehouse* in *Bothalia* 34(1): 7, fig. 10, 11 (2004b). Type: Eastern Cape, Witte Els Bosch [Witelsbos], flats, Mar. 1922, *Fourcade 2114* (BOL, holo.!, K!, LD, NBG!, PRE!, iso.).

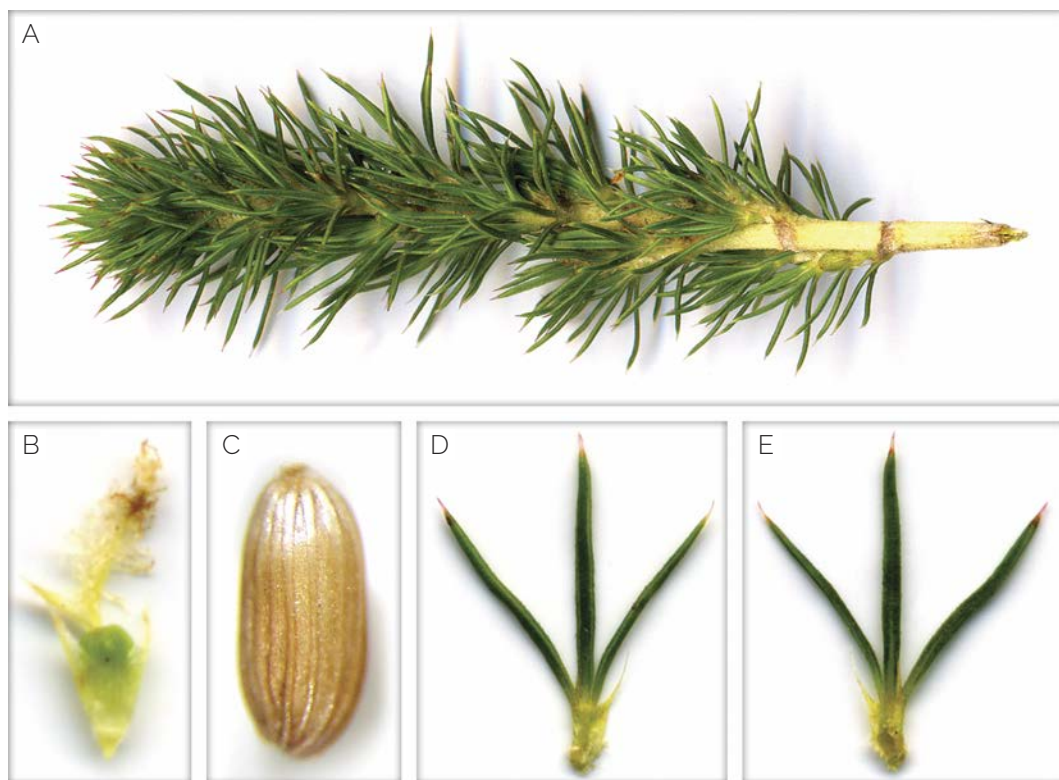
Leaflets 0.3–0.5 mm wide, curved upwards and towards the stem, giving the branches a feathery appearance. *Flowering time*: predominantly November to April.

Habitat: Humus-rich, well-drained Table Mountain Sandstone-derived soils, in full sun. Areas where it grows are subject to frequent rain and cloud; altitude 50–1 550 m.

Distribution: Southern Cape mountains and lowlands between George and Uitenhage.

Conservation status: Localised variety but suffers from few threats except habitat clearance for forestry in the area. Red List status: LC.

Etymology: *australis* (Latin) means 'southern', referring to the distribution of the variety in the southern Cape.



Cliffortia paucistaminea var. *australis*: A, branch with female flowers; B, female flower; C, achene; D, dorsal view of leaf; E, ventral view of leaf.

Notes: var. *australis* could be confused with a number of similar feathery leaved species: *Cliffortia exilifolia*, *C. filifolia*, *C. setifolia* or even *C. burchellii*. *Cliffortia exilifolia*, *C. filifolia* and *C. burchellii* have only three sepals and do not resprout after fire. Furthermore *C. burchellii* has much larger leaves, flowers and exceptionally large achenes. Both that species and *C. filifolia* have glabrous and not shortly hairy stems. *Cliffortia setifolia* is clearly most closely related to *C. paucistaminea* but has much shorter leaflets (<6 mm long). Regardless, of all the species only *C. burchellii* overlaps in distribution and that species is the easiest to distinguish.

Representative specimens

SOUTH AFRICA. **3322** (Oudtshoorn): Outeniqua Pass, 15 Apr. 1952, (–CD), *Compton 23500* (NBG); Montagu Pass, 21 Nov. 1944, (–CD), *Esterhuysen 10854* (BOL, K); Montagu Pass, June 1915, (–CD), *Kensit & Coporn in NBG 150/14* (BOL); Tolberg, steep N slope from top of Outeniqua Pass to summit of peak to S of pass, 800–1375 m, 8 Dec. 1962, (–CD), *Taylor 4451* (K, NBG, PRE); Knysna, Farleigh, Compartment 13, on clearfelled P. can. site, 520 m, 16 Aug. 1956, (–DD), *McDonald 88* (PRE). **3323** (Willowmore): Gouna National Herbarium Experimental area 3, 7 Dec. 1955, (–CC), *Dickinson 4* (BOL); Millwood, 365 m, July 1921, (–CC), *Keet STE 13384* (NBG); Knysna, Ysternek Fynbos Reserve, 13 Dec. 1977, (–CC), *van Daalen 121* (NBG, PRE); Helpmekaar, 28 Jan. 1941, (–DC), *Compton 10458* (NBG); Helpmekaar Peak, 27 Jan. 1941, (–DC), *Esterhuysen 4569* (BOL); Tsitsikamma Mts, Peak Formosa, 1525 m, 1 Dec. 1957, (–DC), *Esterhuysen 27374* (BOL); Storms R Catchment Area, Tsitsikamma, 580 m, 17 Nov. 1977, (–DD), *Bond 1210* (BOL, PRE); Outeniqua Mts, near Joubertina, Camel Pike, 12 Jan. 1947, (–DD), *Esterhuysen 13578* (BOL); Humansdorp, Storms R bridge, 150 m, 24 July 1956, (–DD), *Levy's 10482* (BOL). **3324** (Steytlerville): near Kouga Peak, 12 Nov. 1944, (–CA), *Esterhuysen 10816* (BOL); Kouga Peak, 1370 m, 27 Oct. 1949, (–CA), *Esterhuysen 16272* (BOL); Witte Els Bosch Peak, lower slopes, 16 Nov. 1941, (–CC), *Esterhuysen 6810* (BOL, PRE); Witelsbos Forest Reserve, along R102 near bridge over Elands R, 230 m, 29 Nov. 2001, (–CC), *Whitehouse 298* (BOL, NBG); Great Winterhoek Mts, Cockscomb, E slopes, 1525 m, 3 Mar. 1957, (–DB), *Esterhuysen 27113* (BOL, PRE); Great Winterhoek Mts, Cockscomb, NE slopes, 1220 m, 2 Feb. 1958, (–DB), *Esterhuysen 27541* (BOL, PRE). **3325** (Port Elizabeth): Kromkloof R Catchment, Groot Plaat 282, 1020 m, 29 Mar. 1974, (–CA), *Scharf 1317* (PRE). **3423** (Knysna): Humansdorp – Storms R, 85 m, 15 Nov. 1894, (–BB), *Schlechter 5992* (FHO, K, PRE). **3424** (Humansdorp): Witte Els Bosch, flats, 215 m, Mar. 1922, (–AA), *Fourcade 2114* (BOL, K, NBG, PRE).

30. **Cliffortia setifolia** Weim. in Botaniska Notiser 33: 337 (1937); Dahlgren: fig. 2G (1971); Fellingham: 616 (2000). Type: Seven Weeks Poort Mt., 2 100 m., Dec. 1928, *Stokoe 1788* (PRE, holo.).



Low or sprawling shrub up to 0.5 m high, resprouting after fire and spreading clonally; densely divaricately branched, forming closely overlapping brachyblasts. *Young stems* 0.4–0.7 mm wide, tinged reddish, hairy; stem hairs adpressed upwards, 0.2–0.5 mm long. *Leaves* trifoliate; leaflets needle-shaped, 3.1–5.4 × 0.2–0.4 mm; base slightly swollen; apex mucronate to rounded, up to 0.1 mm long; margins rounded, entire and smooth to scabrid; lamina chartaceous, 0.2–0.3 mm thick, strongly curved upwards and towards the stem, green with two paler stripes on the sides, glabrous; sheath 0.8–1.4 mm long, abaxially glabrous, adaxially glabrous or with a few adpressed hairs; stipules 0.5–0.9 mm long, free, margins smooth to serrulate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on the keel; margins serrate to very shortly ciliate; sepals 4, glabrous. *Male flowers* with bracteoles 1.7–2.1 mm long; pedicel 0.5–1.1 mm long; sepals broadly ovate, 2.4–3.7 × 0.7–1.4 mm, acute to acuminate at the apex, tips not completely separating at anthesis; stamens 4–6; filaments 1.1–2.2 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 1.3–1.9 mm long, longer than immature receptacle; sepals narrowly ovate, 0.8–1.2 × 0.4–0.5 mm, recurved; carpel 1; stigma 1.1–1.3 mm long, greenish white or slightly pink tinged, feathery, hidden at the base of leaves; immature receptacle 1.0–1.1 × ± 0.7 mm, glabrous, clearly ribbed. *Achene* ellipsoid, 2.0–2.5 × 1.0–1.1 mm, pale to medium brown, glabrous; ribs 8–17, rounded to acute, up to 0.2 mm wide. *Flowering time* October to December.

Habitat: Deep acidic sands or between boulders and in cracks on cliff faces on south-facing slopes at high altitudes; altitude 1 750–2 150 m.

Distribution: Endemic to the Swartberg Mountains at high altitudes from Toverkop to Blesberg, but see below.

Conservation status: Rare endemic restricted to high altitudes, but has no immediate threats. Red List status: Rare.

Etymology: *setifolia* (Latin) means 'bristle-leaved', referring to the short very fine leaves.

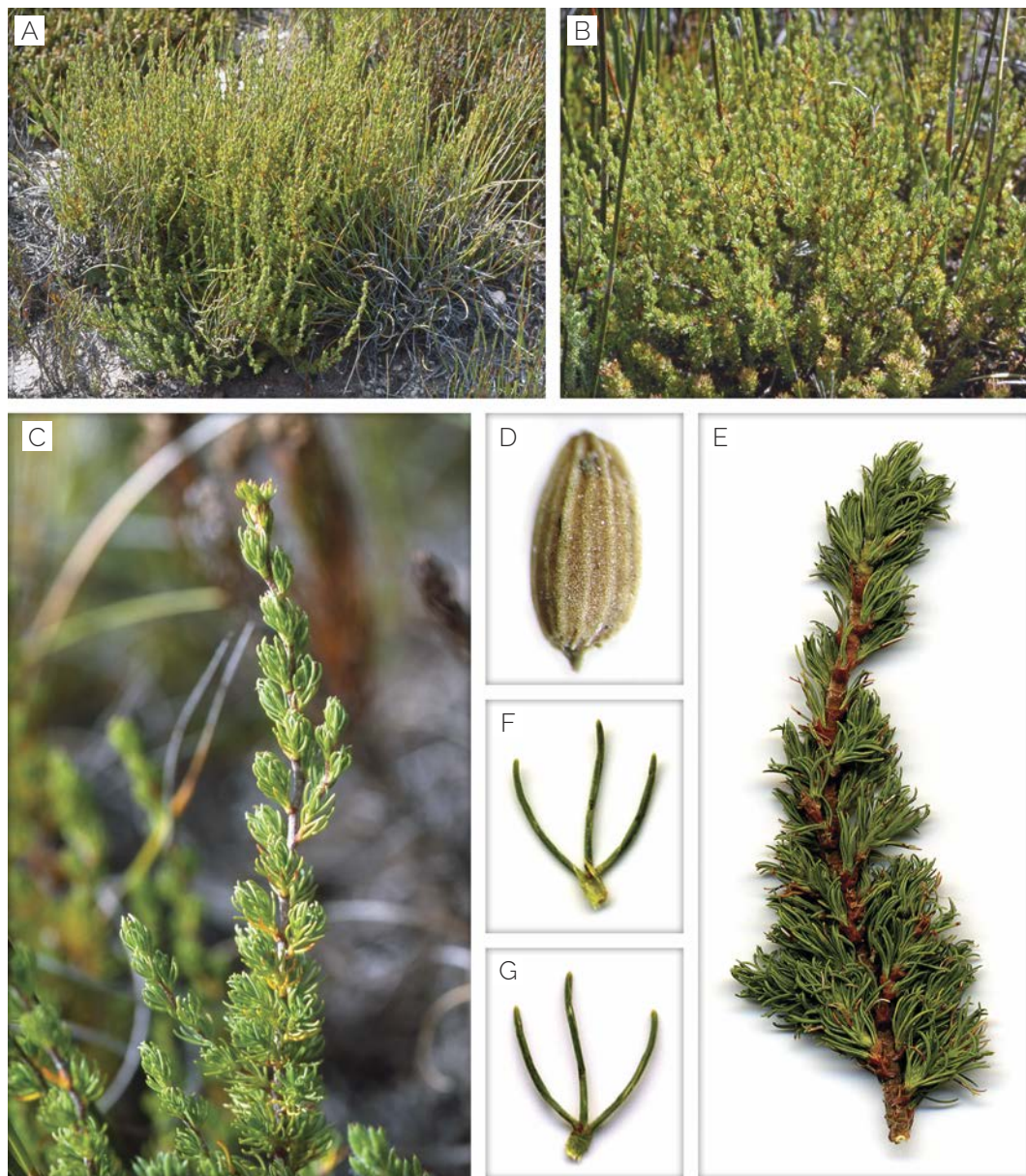
Notes: The very fine strongly curved leaves make this species similar in appearance to *Cliffortia sub-setacea*, but that species does not resprout after fire, has eight stamens and more ornamented achenes. The very different habitats and highly allopatric ranges means that confusion is unlikely. Within the area, it is most likely to be confused with *C. cervicornu* or *C. tuberculata*. The former has deeply lobed leaflets, while the latter has thicker longer leaflets, only three sepals and distinctly tuberculate achenes. *Cliffortia crassinervis* is also closely related, but see comments under that species.

An unusual collection was made in the Adelaide District on the upper western slopes of the Great Winterberg, 20 January 2009 (*Clark, Pienaar & Daniels 27*), which appears to be this species. Morphologically it differs in having the midrib strongly thickened, thus resembling *Cliffortia crassinervis*.

Representative specimens

SOUTH AFRICA. 3321 (Ladismith): Swartberg Mts, near Ladismith, Toverkop, 1980 m, 22 Apr. 1951, (–AC), *Esterhuysen 18518* (BOL, NBG); Swartberg near Ladismith, Toverkop, on S side of peak, 1950–2135 m, 17 Dec. 1956, (–AC), *Esterhuysen 26774* (BOL, NBG); Seven Weeks Poort Mt., near Beacon, 26 Dec. 1928, (–AD), *Andreae 1186* (NBG, PRE); Seven Weeks Poort Mt., 1830–2135 m, 30 Mar. 1959, (–AD), *Esterhuysen 28274* (BOL); Klein Swartberg, on crest of peak E of Seven Weeks Poort, 1800 m, 21 Oct. 1990, (–AD), *Vlok 2435* (NBG). 3322 (Oudtshoorn): E Swartberg, Blesberg,

near summit, S aspect, 2085 m, 29 Nov. 1991, (–BC), *Fellingham & Vlok 1585* (NBG); E Swartberg, nek W of Blesberg, 1800 m, 12 Nov. 1976, (–BC), *Pienaar, W.de K. 70* (NBG, PRE); Swartberg Nature Reserve, Blesberg summit, just W of radio tower, 2075 m, 20 Feb. 2001, (–BC), *Whitehouse 205* (BOL).



Cliffortia setifolia: A & B, habitat; C & E, branch; D, achene; F, dorsal view of leaf; G, ventral view of leaf.

31. **Cliffortia crassinervis** Weim. in Botaniska Notiser 112: 74, fig. 1a–c, 2 (1959); Fellingham: 614 (2000). Type: Laingsburg District, Seven Weeks Poort, ridge, 1 220–1 525 m, 12 Oct. 1955. *Esterhuysen 24786* (BOL, holo.; LD, iso.).



Low shrub up to 0.3 m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.6–0.9 mm wide, tinged reddish, hairy; stem hairs adpressed upwards, 0.3–0.4 mm long. *Leaves* trifoliate; leaflets needle-shaped, $4.1\text{--}5.7 \times 0.4\text{--}0.8$ mm; apex acute to mucronate, up to 0.2 mm long; margins rounded, entire and smooth; lamina chartaceous, 0.3–0.5 mm thick, midrib prominent beneath, curved upwards and towards the stem, glabrous; sheath 1.1–1.3 mm long, abaxially glabrous, adaxially with a few adpressed hairs; stipules 0.6–0.9 mm long, free, margins smooth to serrulate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins serrate to very shortly ciliate; sepals 4, glabrous. *Male flowers* with sepals broadly ovate, acute to acuminate at the apex; filaments red; anthers yellow. *Female flowers* with bracteoles 1.6–2.2 mm long, longer than immature receptacle; sepals narrowly ovate, $0.6\text{--}1.5 \times 0.2\text{--}0.6$ mm, erect; carpel 1; stigma 2.1–3.5 mm long, red, feathery, visible at the base of leaves; immature receptacle $0.8\text{--}1.6 \times 0.5\text{--}0.9$ mm, glabrous, clearly



Cliffortia crassinervis: A, habitat; B & C, branch.

ribbed. *Achene* ellipsoid, $2.1\text{--}3.5 \times 0.9\text{--}1.1$ mm, pale to medium brown, glabrous, faintly 9–11-ribbed; ribs rounded, up to 0.2 mm wide. *Flowering time*: flowers only found once in April.

Habitat: Fynbos on dry stony and sandy slopes in full sun; altitude 1 200–2 100 m.

Distribution: Only found on the higher peaks and ridges on either side of Seven Weeks Poort in the Klein Swartberg.

Conservation status: A very localised species, known only from a small area but not particularly threatened, except possibly from too frequent fires. Red List status: Rare.

Etymology: *crassinervis* (Latin) means ‘thick veined’, referring to the thickened midrib.

Notes: A small insignificant needle-leaved species, distinctive on account of its small trifoliate leaves with a thickened midrib and 4-sepalled flowers. It looks very similar to *Cliffortia setifolia*, which grows close by, but the leaves are thicker and more widely spaced and not fine and feathery like that species. *Cliffortia setifolia* also resprouts after fire whereas *C. crassinervis* appears to only reproduce by seed.

Molecular evidence suggests that it might have both *Cliffortia setifolia* and *C. tuberculata* in its ancestry. However, although intermediate in some characteristics, the thickened midvein is a diagnostic character for this species.

Representative specimens

SOUTH AFRICA. 3321 (Ladismith): Seven Weeks Poort, 1220–1525 m, 12 Oct. 1955, (–AD), *Esterhuysen 24786* (BOL); Seven Weeks Poort Mt., N slopes, 30 Mar. 1959, (–AD), *Esterhuysen 28292* (BOL); Klein Swartberg, N slopes of Hoekoe Peak, 2080 m, 3 Feb. 1992, (–AD), *Oliver 10009* (NBG, PRE); Laingsburg District, Besemfontein, Klipkraal Trail, jeep track to radio mast, on saddle, 1710 m, 8 Apr. 2000, (–AD), *Whitehouse 105* (BOL, NBG).

32. **Cliffortia serpyllifolia** Cham. & Schtdl. in Linnaea 2: 34 (1827); G.Don: 596 (1832); Eckl. & Zeyh.: 268 (1836); Harv.: 301 (1862); Weim.: 51, fig. 12A–E (1934); Compton: 230 (1976); Mendes: 27, t. 6A (1978); Fellingham: 613 (2000); Coates Palgrave: 249 (2002); Whitehouse: 2, fig. 1C, 2 (2004b). Type: South Africa, Cango R., May 1819, *Mund & Maire s.n.* (B, holo.; HAL!) [Cango usually refers to the area around Oudtshoorn. However, this species has never been found near there and the habitat is unsuitable. The HAL specimen does not have a location other than Cape of Good Hope. It is possible that the locality is wrong or that it refers to a different Cango, possibly around Swellendam, where Mund and Maire were also known to collect and the species is common.].



- C. serpyllifolia* var. *foliis-angustioribus* Eckl. & Zeyh.: 268 (1836). *C. serpyllifolia* var. *angustifolia* Drège: 649 (1847), nom. illegit. superfl. Type: Swellendam District, near Wagenmachers Valley, not far from Swellendam, *Mund s.n.* (S, holo., B†, SAM).
C. polyphylla Eckl. & Zeyh.: 268 (1836). *C. serpyllifolia* var. *polyphylla* (Eckl. & Zeyh.) Harv.: 301 (1862) pro parte. Type: South Africa, Eastern Cape, Albany District, Moll R, not far from Grahamstown, June, *Ecklon & Zeyher 1738* (S, holo.; B, C, G, K!, L, M!, SAM, TCD!, U, W, Z, iso.).
C. serpyllina E.Mey. ex Drège: 124, 173 (1843), nomen nudum, pro parte quoad Drège 6821.
C. linearifolia sensu Drège: 649 (1847); Harv.: 301 (1862) pro parte, non Eckl. & Zeyh.

Erect tall shrub up to 4 m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.4–0.8 mm wide, tinged reddish, hairy; stem hairs adpressed upwards or spreading, adpressed downwards in north of range, 0.2–0.5 mm long. *Leaves* trifoliate; leaflets elliptic to obovate, 2.9–4.9 × 0.8–1.6 mm; base cuneate and sometimes forming a pseudopetiolule; apex acute to rounded, up to 0.1 mm long; margins flat, entire and smooth, rarely with a few small teeth in young plants; lamina chartaceous, 0.1–0.3 mm thick, held straight or slightly curved downwards and away from the stem, green but paler on either side of midrib beneath, glabrous; sheath 0.5–1.1 mm long, abaxially glabrous, adaxially hairy; stipules 0.6–1.7 mm long, free, margins ciliate to smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on the keel, margins ciliate to serrate, sepals 4, glabrous. *Male flowers* with bracteoles 1.0–1.6 mm long; pedicel 0.1–0.4 mm long; sepals broadly ovate, 1.9–2.9 × 0.9–1.4 mm, acute to acuminate at the apex; stamens 4–8; filaments 1.3–3.0 mm long, red; anthers brownish red. *Female flowers* with bracteoles 1.1–1.8 mm long, longer than immature receptacle; sepals ovate, 0.9–1.2 × 0.4–0.6 mm, recurved; carpel 1; stigma 2.1–2.4 mm long, red to pinkish white, feathery, barely visible at base of leaves; immature receptacle 0.7–1.3 × 0.5–0.7 mm, glabrous, ribbed. *Achene* 2.2–3.0 × 0.8–1.0 mm, sometimes slightly curved, pale to medium brown, glabrous; ribs 8, rounded to acute, 0.1–0.2 mm wide. *Flowering time*: December to May, although sometimes as early as August.

Habitat: Acidic sands from Table Mountain Series or clayish soil from shale bands of Table Mountain Series, restricted to south-facing slopes or shady kloofs, well-drained soils; altitude 0–1 450 m.

Distribution: Langeberg Mountains near Swellendam to highlands of Eswatini, Zimbabwe and Mozambique.

Conservation status: Widespread and common throughout most of its range. Red List status: LC.

Etymology: *serpyllifolia* (Latin) means ‘thyme-leaved’, referring to the resemblance of the leaflets to that of wild thyme.

Notes: This widespread species is easy to recognise throughout most of its range, having small obovate leaflets, usually with distinct venation. The leaflets are usually flat but occasionally can become inrolled, which may cause confusion with *Cliffortia nitidula* or *C. linearifolia*. A plant with these inrolled leaves formed the basis of *C. polyphylla*, but in all other respects it is typical of *C. serpyllifolia*.

In the far west of its range, *Cliffortia serpyllifolia* grows in much the same habitat as *C. complanata*. *Cliffortia complanata* is usually a much smaller plant confined to rock crevices but where it overlaps with *C. serpyllifolia* it forms tall shrubs in open fynbos. *Cliffortia serpyllifolia* has smaller paler brown faintly ribbed achenes and greener leaves. Around the Mpumalanga Drakensberg escarpment this species is replaced by *C. browniana* and the difference between these two species is hard to pinpoint; *C. browniana* having slightly smaller leaves with more pointed tips and achenes that are shorter and broader.

The stem hairs of *Cliffortia serpyllifolia* are adpressed upwards to spreading in the Cape but further north the hairs are consistently directed downward. This is a useful character to distinguish it from *C. linearifolia*, *C. nitidula* and *C. browniana* (although the latter has occasionally been observed with downward facing hairs in the Drakensberg).



Cliffortia serpyllifolia: A, branch with male flowers; B, female flower; C, dorsal view of leaf; D, ventral view of leaf; E, branch with female flowers.

Representative specimens

ZIMBABWE. 1932: Umtali, Vumba Mts, left of Crippisgrid, 21 Sept. 1948, (–BB), *Chase 1182* (BM, K).

ESWATINI. 2631 (Mbabane): Forbes Reef, 1220 m, 26 Mar. 1956, (–AA), *Compton 25834* (NBG, PRE); Silotwane Hills, 1525 m, 22 Jan. 1959, (–AA), *Compton 26509* (K, NBG, PRE, SDNH); Komati Pass, top of pass, 1370 m, 14 Nov. 1961, (–AA), *Compton 31059* (K, NBG, PRE, SDNH); Mbuluzi Falls, 1065 m, 19 July 1963, (–AA), *Compton 31660* (NBG).

SOUTH AFRICA. 2731 (Louwsburg): Zululand, Ngome, 27 July 1944, (–CD), *Gerstner, Rev.J. 4864* (K, PRE). 2831 (Nkandhla): Babanango District, Babanango, 1265 m, 30 Apr. 1986, (–AC), *Begg 21* (NU); Babanango, 1435 m, 1933, (–AC), *King 246* (NU, PRE); Eshowe, Entumeni, 625 m, 1 Dec. 1936, (–CD), *Gerstner, Rev.J. 1912* (NU, PRE). 2930 (Pietermaritzburg): Pietermaritzburg, summit of Table Mt., July 1946, (–DA), *Esterhuysen 12928* (BOL); Pietermaritzburg District, Table Mt., 3 June 1948, (–DA), *Killick 502* (NU, PRE); Camperdown District, Table Mt., 4 Aug. 1963, (–DA), *Ross 367* (NU); Inanda, Jan. 1882, (–DB), *Medley Wood 1606* (BM, BOL, K, PRE). 3029 (Kokstad): Bizana, 8 km on Kokstad road, 915 m, 19 Dec. 1944, (–DD), *Acococks 10952* (PRE); Bizana, 11 km SSW, 765 m, 25 Feb. 1947, (–DD), *Acococks 13401* (PRE). 3030 (Port Shepstone): Natal, Umzinto District, Ellesmere B, 27 Apr. 1981, (–AD), *Hilliard & Burtt 14531* (K, NU, PRE); Alexandra District, Umgai Flats, Fairfield (Dumisa), 400 m, 17 Dec. 1908, (–AD), *Rudatis 343* (NBG); Alexandria District, Dumisa Station, 600 m, 5 Jan. 1911, (–AD), *Rudatis 1296* (K); Umzinto District, Vernon Crookes Nature Reserve, periphery of small dam, 440 m, 21 Nov. 1984, (–BC), *Balkwill & Cadman, M-J. 2253* (K, NU, PRE); Umzinto District, Vernon Crookes Nature Reserve, 400–500 m, 8 Feb. 1984, (–BC), *Balkwill, K., Manning & Cadman, M-J. 1243* (K, NU); Natal, Mgayi, 45 m, 16 Feb. 1969, (–BC), *Ward 6719* (K, NU, PRE); Vernon Crookes Nature Reserve, 410 m, 17 Mar. 1985, (–BC), *Ward 9798* (PRE); Natal, Oribi Flats, Apr. 1937, (–CB), *McClean 384* (K, PRE); Port Shepstone District, Port Edward Area, Mtamvuna Nature Reserve, below Clearstreams, 400 m, 6 Dec. 1984, (–CC), *Balkwill & Cadman, M-J. 2297* (K, NU); Port Shepstone District, Port Edward Area, Mtamvuna Nature Reserve, below Clearstreams, 400 m, 6 Dec. 1984, (–CC), *Balkwill & Cadman, M-J. 2298* (NU). 3129 (Port St Johns): Lusikisiki District, Magwa Falls, near Lusikisiki, 29 Dec. 1952, (–BC), *Leighton 2974* (BOL, PRE); Mkambati Game Reserve, 53 m, 16 Jan. 1997, (–BD), *Sebothoma 232* (GRA, PRE); Port St. Johns, Goss Point, 10 Nov. 1970, (–BD), *Strey 10139* (K, PRE). 3130 (Port Edward): Mkambati Nature Reserve, riverside just above Mkambati Falls, 15 m, 21 Nov. 2002, (–AC), *Whitehouse 324* (BOL). 3228 (Butterworth): Kentani District, 365 m, 24 Apr. 1909, (–CB), *Pegler 1166* (BM, BOL, K, NBG, PRE). 3320 (Montagu): Swellendam, plateau of One O'clock Mt, 550 m, 28 Nov. 1952, (–CD), *Compton 529* (NBG); Swellendam Mt., S slope, 4 Feb. 1941, (–CD), *Esterhuysen 4826* (BOL, PRE); Leeurivierberg, foothills near Swellendam, Apr. 1941, (–CD), *Stokoe 8620* (BOL); Swellendam Forest Reserve, below Twelve o'Clock Peak, 610 m, 11 May 1963, (–CD), *Taylor 4762* (K, NBG, PRE); Swellendam, Marloth Flora Reserve, 245 m, 27 Jan. 1969, (–CD), *Thompson 626* (K, NBG, PRE); Tradouw Pass, 7 Dec. 1938, (–DC), *Acococks & Hofström 2137* (K, PRE); Tradouw Pass, 7 Dec. 1947, (–DC), *Compton 20348* (NBG); Tradouws Pass, 40 km from Swellendam, beside road, >150 m, 28 Jan. 1969, (–DC), *Thompson 668* (NBG, PRE); Barrydale District, Tradouw Pass, S of summit, by parking area next to road, 275 m, 11 Oct. 1999, (–DC), *Whitehouse 58* (BOL, NBG); Strawberry Hill, lower S slopes of Langeberg, 10 Sept. 1944, (–DD), *Esterhuysen 10379* (BOL); Langeberg Mts near Heidelberg, Naauwkrans, S slopes, 28 Mar. 1948, (–DD), *Esterhuysen 14438* (BOL); Langeberg, between Lemoenshoek and Naauwkrantz, Strawberry Hill farm, 11 Jan. 1957, (–DD), *Stokoe s.n.* (NBG, NBG); Grootvadersbos State Forest, Duiwenhok R, ravine, Boosmansbos Wilderness Area, on very steep slope, 400 m, 4 Aug. 1984, (–DD), *van der Merwe 129* (NBG, PRE); Grootvadersbos near Swellendam, E borderline, 440 m, 21 May 1983, (–DD), *van Wyk 1213* (K, NBG, PRE); Boosmansbos Wilderness Area, on plateau above forest, near Cycle Reference Point E, 490 m, 10 Dec. 2000, (–DD), *Whitehouse 171* (BOL). 3321 (Ladismith): Garcia's Pass, 2 Dec. 1814, (–CC), *Burchell 6967* (K); Garcia's Pass, Sept. 1908, (–CC), *Phillips 302* (K); summit of Langeberg Mts at Riversdale, 915 m, 19 May 1950, (–CD), *Esterhuysen 17030* (BOL, NBG); Rooiberg, Groenkloof, below waterfall below hut, bed of kloof, 915 m, 22 Apr. 1977, (–DA), *Taylor 9644* (NBG, PRE). 3322 (Oudts-
hoorn): Wilderness, hillside, 10 Feb. 1944, (–DC), *Compton 15555* (NBG); Koratra, 0–305 m, (–DD), *Drège 6821* (BM, K). 3323 (Willowmore): Uniondale, Prince Alfred's Pass, gorge at S end, 365 m, 2 Dec. 1960, (–CC), *Acococks 21730* (K, PRE); Outeniqua Mts, about 5 km W of De Vlucht, 450 m, 26 Oct. 1986, (–CC), *Vlok 1683* (NBG, PRE); Nature's Valley, De Vasselot Nature Reserve, 60 m, 11 May 1978, (–DC), *Bond 1401* (NBG, PRE); Peak Formosa, small gully on S side below summit of ridge, 1220 m, 24 Nov. 1957, (–DC), *Esterhuysen 27364* (BOL); Nature's Valley, beside bridge over Grootrivier, 10 m, 18 Jan. 2001, (–DC), *Whitehouse 179* (BOL); mountain slopes near Blaauw Bosch, 610 m, Aug. 1923, (–DD), *Fourcade 2667* (BOL, K, NBG). 3326 (Grahamstown): Albany, Somerset East District, between Atherstone and Highlands, 700 m, 5 Nov. 1945, (–AD), *Acococks 12109* (PRE); Grahamstown Nature Reserve, 5 Apr. 1953, (–AD), *Cottrell s.n.* (GRA); Grahamstown, Faraway, Portion 3 of Coldsprings, S-facing slope, 700 m, 4 Mar. 1984, (–AD),

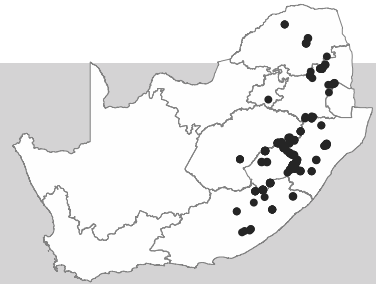
Jacot-Guillarmod 9445 (GRA, PRE); Howisons Poort, 27 Nov. 1950, (–AD), *Maguire 593* (NBG); outskirts of Grahamstown, Woest Hill, 18 Sept. 1920, (–BC), *Britten 2180* (K, PRE); Albany District (Grahamstown ex Weimarck), Aug. , (–BC), *Burchell 3553* (K); Grahamstown, Featherstone Kloof, 520–580 m, 21 Feb. 1932, (–BC), *Rennie & Rennie 216* (BOL); near Grahamstown, May 1893, (–BC), *Schlechter 2640* (BM, K, NBG, PRE); Bathurst District, Hopewell, 185 m, 4 June 1963, (–BD), *Acocks 23283* (K, PRE); Oribi Reserve, Round Hill, 375 m, 7 Apr. 1985, (–BD), *Wirringhaus 109* (GRA); Kowie, just above sea, Sept. 1916, (–DB), *Phillips 1102* (BOL); Bathurst District, Jan. 1966, (–DB), *Sidey 4065* (PRE). **3420** (Bredasdorp): Swellendam, 3 Feb. 1941, (–AB), *Compton 10574* (NBG); Swellendam, 300 m, Feb. 1894, (–AB), *Kuntze s.n.* (K); on hills near Swellendam, 500 m, 22 Oct. 1894, (–AB), *Schlechter 5664* (BM, BOL, K, PRE); Swellendam, Zuurbraak, Mar. 1930, (–BA), *Thode 2325* (K, PRE); lower S slopes of Langeberg Mts near Heidelberg, 27 Mar. 1948, (–BB), *Esterhuysen 14406* (BOL). **3421** (Riversdale): kloof at Garcia Forest Station, 25 May 1950, (–AA), *Esterhuysen 17244* (BOL, NBG, PRE); near Gouritz R bridge, 120 m, 29 Oct. 1892, (–BB), *Schlechter 1707* (BOL, K, PRE, PRE). **3422** (Mossel Bay): George, Gwaing R, SE slopes, top of cliff at W bank of river, 10 m, 26 May 1984, (–AB), *O’Callaghan, Fellingham & van Wyk 224* (NBG, PRE); headlands along coastline, S of Pacaltsdorp, S slope of Rooiklip headland, Aug. 1993, (–AB), *Victor 228* (PRE); George coastal region, E of Herold’s Bay, E headland of Oubaai, 65 m, 3 Jan. 1994, (–AB), *Victor 542* (PRE). **3423** (Knysna): Knysna, Harkerville, S of waterfall, 9 Apr. 1983, (–AA), *Botha 3063* (PRE); Kysna District, Noetzie, 120 m, Feb. 1921, (–AA), *Keet STE 13392* (NBG); Noetzie, on edge of coastal plateau, 120 m, Jan. 1921, (–AA), *Keet 644* (BOL, PRE); Noetsi R, near mouth, W side of river, above parking area of beach, 20 m, 22 May 1984, (–AA), *O’Callaghan, Fellingham & van Wyk 77* (NBG, PRE); Robberg, hillside, 60 m, 1 Jan. 1934, (–AB), *Compton 4486* (NBG); Plettenberg Bay, Bitou R, E of river, 8 Mar. 1983, (–AB), *O’Callaghan 807* (NBG, PRE). **3424** (Humansdorp): Witte Els Bosch, along the coast, 20 Nov. 1941, (–AA), *Esterhuysen 6563* (BOL, K).

(33–38) **Section Dracomontanae** *C.M.Whitehouse* sect. nov. Type:
C. dracomontana C.M.Whitehouse.

Medium erect densely branched shrubs. Young stems with short upwardly adpressed hairs, forming brachyblasts. Sheath glabrous abaxially, markedly hairy adaxially; stipules free, membranous; petiole absent. Leaves trifoliolate; glabrous or occasionally with a few hairs. Flowers solitary, in the axils of ordinary vegetative leaves. Bracteole glabrous with entire to ciliate margin, longer than immature receptacle; **sepals 4**, glabrous, female ovate, recurved; **receptacle smooth** or occasionally distinctly ribbed, glabrous; carpels 1; **stigma red to pinkish** or rarely white. Achenes ellipsoid, ribbed, often indistinctly so, brown.

This section is centred in the Drakensberg centre of endemism. The species are relatively unspecialised shrubs with four sepals and needle-shaped to elliptic or obovate trifoliolate leaves. *Cliffortia linearifolia* is included here only tentatively, partly because it has a tendency to introgress with *C. nitidula* where the species co-occur. The species occur from Eastern Cape to Kenya (though *C. linearifolia* is found in the eastern half of the Western Cape).

33. **Cliffortia nitidula** (Engl.) R.E.Fr. & T.C.E.Fr. in Notizblatt des Botanischen Gartens und Museums zu Berlin-Dahlem 8: 649 (1923); Weim.: 47 (1934); Graham: 42, fig. 4 (1960); Mendes: 25, t. 6B (1978); Coates Palgrave: 248, fig. (2002). *C. linearifolia* Eckl. & Zeyh. var. *nitidula* Engl.: 376 (1899). Lectotype, designated by Weimarck (1934) [By including the other syntype from Angola (Mossamedes, Humpata, *de Melho Ramalho s.n.*) in his subsp. *angolensis*, Weimarck in effect lectotypified *C. nitidula* with the only other specimen cited by Engler.]: Tanzania, Uluguru, Lukwangule, 2500m, Nov. 1894, *Stuhlmann 9160* (B, lecto.†).



Erect tall shrub up to 7 m high, resprouting after fire from a central crown; densely divaricately branched, forming brachyblasts. *Young stems* 0.7–0.9 mm wide, tinged reddish, hairy; stem hairs adpressed upwards to spreading, 0.1–0.8 mm long; older stems sometimes minutely tuberculate. *Leaves* trifoliate; leaflets elliptic to needle-shaped, 3.3–6.8 × 0.6–1.2 mm; base contracted abruptly to form a pseudopetiolule; apex obtuse to rounded, up to 0.3 mm long; margins inrolled beneath, entire and smooth; lamina chartaceous, 0.2–0.4 mm thick across midrib, midrib prominent beneath, held straight or curved downwards and away from the stem, sparsely hairy above becoming glabrous and on midrib beneath or completely glabrous, hairs 0.3–0.9 mm long; sheath 1.5–2.1 mm long, abaxially glabrous, adaxially with long straight hairs; stipules 0.5–1.0 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on the keel; margins serrate to ciliate; sepals 4, glabrous. *Male flowers* with sepals broadly ovate, acute to acuminate at the apex; stamens 4; filaments red; anthers brownish red. *Female flowers* with bracteoles 2.2–3.3 mm long, longer than immature receptacle; sepals ovate, 1.7–2.2 × 0.7–1.2 mm, recurved; carpel 1; stigma 1.6–2.7 mm long, red to pinkish white, feathery, barely visible at the base of the leaves; immature receptacle 1.3–1.8 × 0.8–1.0 mm, glabrous, clearly ribbed. *Achene* ellipsoid, 2.1–3.5 × 1.0–1.5 mm, medium brown, glabrous; ribs 8–9, rounded, 0.1–0.2 mm wide. *Flowering time* predominantly November to February, sometimes as early as September and as late as June.

Etymology: *nitidula* (Latin) means ‘shining’, referring to the leaves which are rather shiny.

Notes: Weimarck (1934) divided this species into four geographical subspecies and species. Weimarck treated the typical subspecies as extending from Zimbabwe to Tanzania. In southern Africa he recognised subsp. *pilosa* on account of its more hairy leaflets and less tightly inrolled margins. In Angola he recognised subsp. *angolensis* as having inrolled margins to the leaflets so tight that they obscured the midrib. In Kenya he recognised *Cliffortia aequatorialis*, which, like his subsp. *angolensis*, had tightly inrolled leaflets, but also had red gland-tipped leaflets. As more collections have filled in the gaps in the distribution, it has also filled in the range of variation. In southern Africa it is not uncommon to find specimens that have narrow leaflets with more tightly inrolled margins, yet retain the hairs of subsp. *pilosa*. Apart from the hairs on the leaves, these populations also differ in having stem hairs with bulbous bases. These are most visible on the older stems as they form small tubercles. I consider this subspecies to merit recognition. Beyond southern Africa, the different forms merge into one. Noting this, Brenan (1954) reduced Weimarck’s subspecies to varietal rank. I find no basis for maintaining subsp. *angolensis* or *C. aequatorialis* as distinct from the typical subspecies.

Considering how common this species is, male flowers have only rarely been recorded. The species also appears to hybridise with *Cliffortia linearifolia*, producing a range of intermediate forms. *Cliffortia linearifolia* always has hairless leaves.

subsp. **nitidula**; Weim.: 47, fig. 10A–E (1934).

C. linearifolia sensu Oliv.: 379 (1871), non Eckl. & Zeyh.

C. aequatorialis R.E.Fr. & T.C.E.Fr.: 649 (1923); Weim.: 50, fig. 11 (1934). *C. nitidula* var. *aequatorialis* (R.E.Fr. & T.C.E.Fr.) Brenan: 433 (1954). Type: Kenya, Mt. Aberdare, near Sattima, 2 700–3 200 m, 17–22 Mar. 1922, R.E. & T.C.E. Fries 2438 (UPS, holo.; BRI, K!, S, iso.).

C. tychonis Weim.: 20 (1932). Type: Zimbabwe, c. 3 km meridiem versus a pago Inyanga in proclivitate, 1700 m, 13 Jan. 1931, Norlindh & Weimarck 4276 (LD, holo.).

C. nitidula subsp. *angolensis* Weim.: 49 (1934). *C. nitidula* var. *angolensis* (Weim.) Brenan: 433 (1954). Lectotype, designated here: Angola, Huilla, Morro de Lopollo, 1 370–1525 m, 14 Apr. 1860, Welwitsch 1277 (K, lecto!; BM!, C, COI, P, PRE).

Older stems without tubercles. *Leaflets* needle-shaped; margins tightly inrolled beneath obscuring midrib, glabrous, rarely with a few hairs.

Habitat: Scrub in Afromontane vegetation; altitude 1 050–2 750 m.

Distribution: Zimbabwe and Mozambique, north to Kenya, including Angola, Zambia, Malawi, Tanzania, Burundi, Rwanda and Democratic Republic of the Congo.

Conservation status: Widespread and common in tropical African highlands. Red List status: not listed.

Representative specimens

KENYA. **0135N** (Kenya): Cherangani Hills, Embobut Forest, E of Kameligon, 3295 m, Jan. 1971, (–BA), Tweedie 3911 (K). **0035N** (Kenya): Marakwet Hills, 2745–3200 m, June 1935, (–BA), Dale F.D. 3432 (K).

DEMOCRATIC REPUBLIC OF THE CONGO. **0228** (Democratic Republic of Congo): Muhi, 30 July 1955, (–DD), Kinet 76 (K).

RWANDA. **0229** (Rwanda): Astrida, 2000 m, Mar. 1956, (–DA), Christiaensen 1576 (K).

BURUNDI. **0329** (Burundi): Bujumbura, Ijenda, Mayuyu, 2150 m, 29 Nov. 1967, (–DA), Lewalle 2411 (K).

TANZANIA. **0637** (Tanzania): Uluguru Mts, Messumbwa Mt., 2100 m, 20 July 1933, (–AB), Schlieben 4190 (K). **0933** (Tanzania): by the Lower Kiwera R, by the lower fishing camp, NW of Rungwe Mt., 2040 m, 24 Oct. 1947, (–BA), Brenan & Greenway 8194 (BM, K).

MALAWI. **1033** (Malawi): Nyika Plateau, Chelunduo Stream at Chelinda Camp, 2200 m, 26 Oct. 1958, (–DB), Robson & Angus 387 (K). **1535** (Malawi): Mt. Mlanje, 1897, (–DC), Adamson 345 (K); Mlanje Mt., Luchunya Plateau, 1870 m, 27 June 1946, (–DC), Brass 16457 (BM, K); Mlanje, 1950 m, May, (–DC), Brown 23 (K); Mlanje Mt., path from Tuchila Hut to head of Ruw Basin, 2130 m, 6 Apr. 1970, (–DC), Brummitt 9667 (K); Lichenya Plateau, 1830 m, 24 Dec. 1956, (–DC), Chapman 322 (BM, K); Mt. Mlanje, reserve on Lichenya Plateau, above waterfall on Boma Path, 1700 m, 6 Feb. 1982, (–DC), Chapman 6112 (K); Mt. Mlanje, site of now destroyed 'University Hut', Lichenya Plateau, 3 Nov. 1986, (–DC), Chapman & Chapman 8178 (K); Mlanje Mt., Chambe Plateau, E end of Chambe Peak, 25 May 1957, (–DC), Goodier 265 (K); Mlanje Mt., spurs overlooking Palombe Plain, 13 July 1956, (–DC), Jackson 1904 (K); Mlanje Mt., spurs overlooking Palombe Plain, 14 July 1956, (–DC), Jackson 1904 (BM); Mt. Mlanje, 2135 m, 1896, (–DC), McClounie 22 (K); Mt. Mlanje, 1896, (–DC), McClounie 33 (K); Mlanje Mt., Tuchila Plateau, 1980 m, 21 July 1956, (–DC), Newman & Whitmore 92 (BM).

ZAMBIA. **1124** (Zambia): Northwestern Province, Mwinilunga District, Chitunta Dambo, 25 km N of Mwinilunga on road to Kalene, 1390 m, 21 Jan. 1975, (–CB), Brummitt, Chisumpa & Polhill 13952 (K).

ANGOLA. **1513** (Angola): Huila, Estação Agronomica, Humpata, 1900 m, 5 June 1937, (–AB), Exell & Mendonça 2583 (BM); Huila, Lubango, Humpata, near Estação Zootecnica, 2200 m, 14 Apr. 1960, (–AB), Mendes 3601a (BM, BM).

ZIMBABWE. **1832** (Zimbabwe): Manicaland Province, Nyanga Mountains, plateau near radio tower (Rukotso area), 2292–2344 m, 4 May 2011, (–BB), *Clark 524* (WSY); Mare R, Inyanga, 1830 m, 21 Oct. 1946, (–BD), *Wild 1442* (K); Inyanga, foot of Mt. Inyangani, 1980 m, 23 Oct. 1946, (–BD), *Wild 1568* (K); Mt. Nuza, 1705 m, 25 June 1934, (–DB), *Gilliland 500* (BM). 1834 (Mozambique): Gorongosa District, summit of Gorongosa Mt., above Bar L Ranch, 1785 m, 22 May 1968, (–AC), *Wright 583* (NU). **1932** (Zimbabwe): Melsetter, S of Mt. Peni, 1300 m, June 1973, (–DD), *Goldsmith 23/73* (K). **1933** (Zimbabwe): Manica Province, Chimanimani National Reserve, summit of Monte Binga, 2435 m, 27 Apr. 2011, (–CC), *Clark 483* (WSY).

subsp. ***pilosa*** *Weim.*, Monograph of the Genus *Cliffortia*: 49, fig. 10F–L (1934); Whitehouse: 5, fig. 1F–G, 7 (2004b). Lectotype, designated here: South Africa, Free State, Besters Vallei, 1980m, Dec. 1893, *Bolus 8159* (BOL, lecto.!; B†, BM!, GRA!, K!, PRE!, Z!).

C. serpyllifolia Cham. & Schldl. var. *chamissonis* sensu Harv.: 301 (1862) pro parte quoad *Drège 6820*.

C. linearifolia sensu E. Phillips: 90 (1917); Burt Davy: 316 (1932) pro parte, non Eckl. & Zeyh.

C. sp. sensu E. Phillips: 90 (1917). Based on *Dieterlen 288* & *Schlechter 6948*.

Older stems tuberculate. *Leaflets* elliptic to needle-shaped, margins inrolled beneath but rarely obscuring midrib, usually with a few hairs above.

Habitat: Clarens Formation-derived soils in full sun, well-drained soils; altitude 1 050–2 750 m.

Distribution: Common throughout the highlands of eastern South Africa and Lesotho, from the Amatola Mts north to Blouberg near Polokwane. Not yet confirmed for Eswatini.

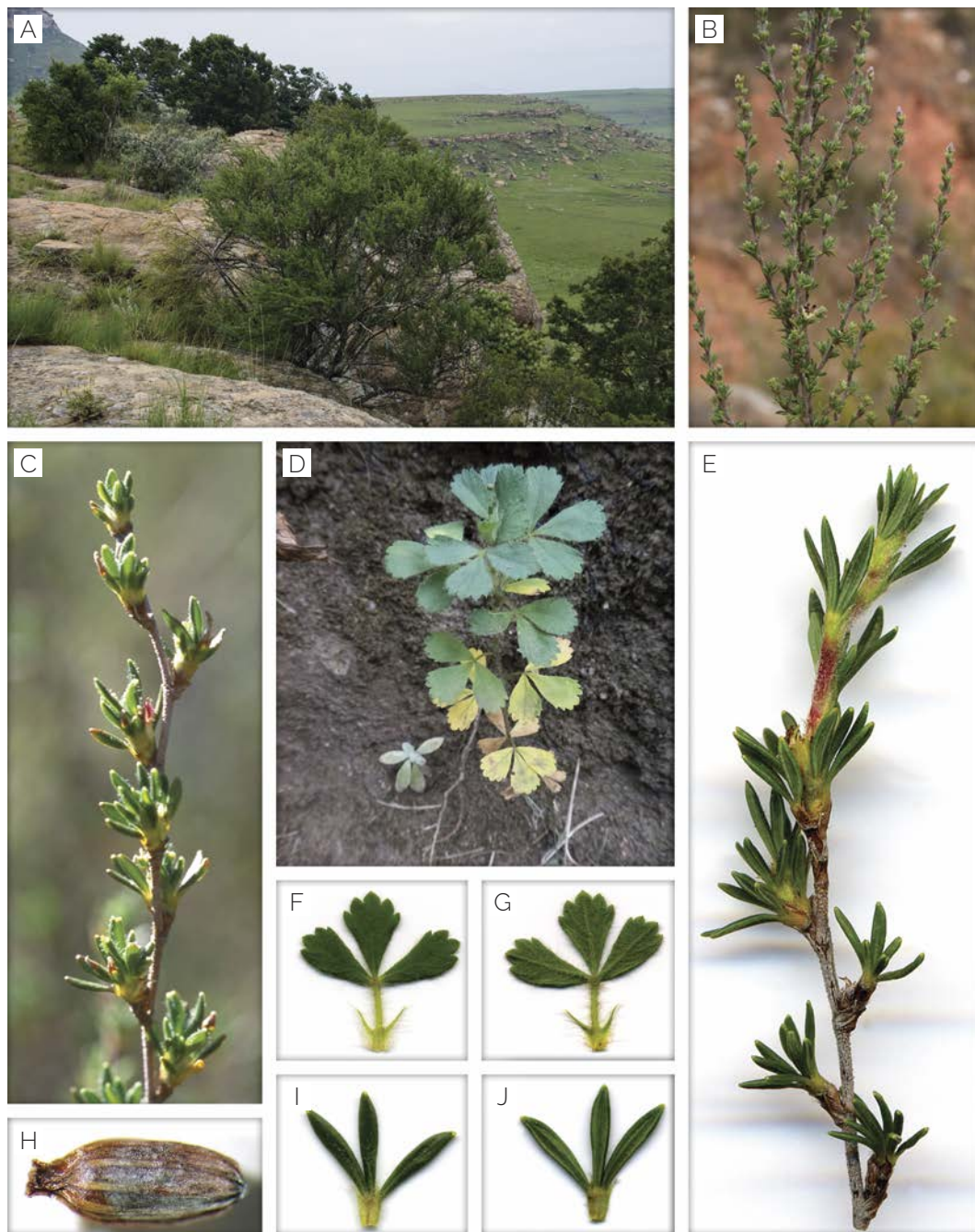
Conservation status. Widespread and common throughout the highlands of northern South Africa. Red List status: not listed.

Etymology: *pilosa* (Latin) means 'hairy, with distinct long ascending hairs', referring to the contrast between true *Cliffortia nitidula*, which is glabrous, and this species with its sparsely hairy leaves.

Common names: common cliffortia, starry rice-bush; *sterretjierysbos* (Afrikaans.); *lenyofane* (Sesotho).

Representative specimens

SOUTH AFRICA. **2328** (Baltimore): Blouberg, Mhlabeng Plateau, 1585 m, 11 Jan. 1955, (–BB), *Codd & Dyer 8988* (K, PRE); Blouberg, 1065–1525 m, 5 May 1933, (–BB), *Leeman 31* (PRE). **2329** (Pietersburg): Forset Glen Forest, 3 km SW of Haenertsburg, 1643 m, 7 Sept. 1996, (–DD), *Allcock 24* (GRA); Haenertsburg, Nov. 1917, (–DD), *Moss & Rogers 876* (K). **2330** (Tzaneen): Wood-bush Mts, at edge of forest, 24 Sept. 1927, (–CA), *Moss 15510* (PRE). **2430** (Pilgrim's Rest): Lydenburg District, Mariepskop, Apr. 1932, (–DB), *van Son TRV 30680* (PRE). **2530** (Lydenburg): Dullstroom, 1980–2135 m, 5 Jan. 1933, (–AC), *Galpin s.n.* (BOL); Belfast Region, Dullstroom R bank, 1980 m, 5 Jan. 1933, (–AC), *Galpin 13123* (K, PRE); Long Tom Pass, Lydenburg, 12 km from Lydenburg, 20 Feb. 1978, (–BA), *Meyer 6196* (PRE); Lydenburg District, Hartebeestvlakte, 2000 m, 28 Jan. 1980, (–BA), *Mohle 229* (PRE); Pilgrim's Rest, Mt. Anderson, 16 June 1932, (–BA), *Smuts 42* (K, PRE); Pilgrim's Rest, Mt. Anderson, 2135 m, 24 Dec. 1932, (–BA), *Smuts & Gillett 2378* (BOL, PRE); Pilgrim's Rest, Mt. Anderson, 2135 m, 24 Dec. 1932, (–BA), *Smuts & Gillett 2383* (BOL, PRE); Lydenburg District, on Sabie road, 1980 m, 26 Oct. 1950, (–BA), *Story 3898* (K, PRE); Vlakkfontein Farm, 22 Feb. 1983, (–CA), *Smuts 8* (PRE). **2531** (Komatipoort): Barberton, road to Piggs Peak, ?Ruins, 1370–1600 m, 22 July 1953, (–CC), *Levy 9977* (BOL). **2628** (Johannesburg): Suikerbosrand District, Schoongezicht, 7 Feb. 1960, (–CA), *Repton 5359* (PRE). **2630** (Carolina): Houtbosch, 1880, (–BB), *Rehmann, Dr.A. 6040* (K). **2729** (Volksrust): Natal, Drakensberg, Coldstream, 1880, (–BD), *Rehmann, Dr.A. 6927* (K); Volksrust District, across Volksrust Koppie, in kloof on slope, under FM Tower, 16 Oct. 1968, (–BD), *Robbertse 359* (PRE); Harrismith District, Orange Free State, W of top of Normandien Pass, 1890 m, 13 Feb. 1966, (–DC), *Acoks 23805* (K, NBC, PRE); Newcastle District, Normandien Pass, on shale cliff, 17 Feb. 1990, (–DC), *Smit 636* (PRE).



Cliffortia nitidula subsp. *pilosa*: A & B, habitat; C, branch with female flower; D, seedling; E, branch with female flowers; F, dorsal seedling leaf; G, ventral seedling leaf; H, achene; I, dorsal view of leaf; J, ventral view of leaf.

2730 (Vryheid): Farm Mooiplaas, 1 Feb. 1994, (–AC), *Jordaan 2708* (PRE); Vryheid District, Kambula Mt., 1525 m, 15 Sept. 1945, (–DA), *Acoccks 11769* (NBC, PRE). **2828** (Bethlehem): Harrismith, Bester's Vlei, 1980 m, Dec. 1893, (–BD), *Bolus 8159* (BM, BOL, K, PRE); Leribe, N slopes of gorge, (–CC), *Dieterlen 288* (NBC, NBC, PRE, Z); Golden Gate Highlands National Park, Mt. Pierre se Kloof, wooded kloof on ridge, 12 Dec. 1988, (–DA), *Gertenbach & Groenewal 8969* (PRE); Golden Gate Highlands National Park, 21 Jan. 1965, (–DA), *Roberts 3441* (PRE); Royal Natal National Park, Tugela Gorge, above Chain Ladder, 1890 m, 6 Feb. 1982, (–DB), *Hilliard & Burtt 15447* (K, NU, PRE); Natal, National Park, near gorge, 28 Aug. 1930, (–DB), *Hutchinson 4543* (K); Mont-aux-Sources District, Pastures Bush, 1830 m, 16 Feb. 1926, (–DB), *McClean & Bayer 103* (K, NU, PRE); Qwa-Qwa District, Witsieshoek, N slopes of Sentinel peak, zig-zags on Sentinel hiking trail, 2685 m, 21 Nov. 2001, (–DB), *Whitehouse 288* (BOL). **2829** (Harrismith): Harrismith District, Platberg, 1830 m, 1 Oct. 1943, (–AC), *Phillips 2255* (PRE); Orange River Colony, Harrismith, 2285 m, Jan. 1905, (–AC), *Sankey 163* (K); Van Reenen, Jan. 1914, (–AD), *Bews 1132* (NU); Van Reenen, Jan. 1914, (–AD), *Bews 1134* (NU); Van Reenen, Jan. 1914, (–AD), *Bews 2839* (NU); Natal, Van Reenens Pass, 20 Mar. 1894, (–AD), *Kuntze s.n.* (K); Van Reenen, 2135 m, 3 Mar. 1895, (–AD), *Schlechter 6948* (BOL); Weenen District, Drakensberg, MnWeni area, 1830–2135 m, July 1951, (–CC), *Esterhuysen 18684* (BOL); Cathedral Peak Forest Reserve, tributary of Tseketske, 2105 m, 18 Jan. 1983, (–CC), *Hilliard & Burtt 16274* (K, NU, PRE); Drakensberg, Cathedral Peak area, Contour Path, 2285 m, 13 Aug. 1947, (–CC), *Levyns 8302* (BOL); Cathedral Peak area, between Camel and Pyramid, 2135 m, July 1944, (–CC), *Schelpel 673* (NU). **2830** (Dundee): Nkandla District, Qudeni, The Heights, 1740 m, 5 Dec. 1957, (–DB), *Edwards 2235* (K, NU, PRE); Nkandla District, Madlozi Mts, Qudeni-Nqutu road, 1645 m, 6 Dec. 1957, (–DB), *Edwards 2248* (NU, PRE); Zululand, Qudeni, 13 Mar. 1939, (–DB), *Gerstner, Rev.J. 3934* (PRE); Nkandla District, Qudeni, near Madhlosi, 1645 m, (–DB), *Phillips, Prof. s.n.* (NU). **2926** (Bloemfontein): Thaba Nchu District, Thaba Nchu Mt., July 1962, (–BD), *Roberts 1802* (PRE). **2927** (Maseru): mountain road, between Molimo Nthuse and Blue Mt. Pass, river valley, 2500 m, Aug. 1978, (–BD), *Schmitz 8341* (PRE). **2928** (unknown): mountain road near Likhalaneng, 2500 m, 2 Mar. 1978, (–AC), *Schmitz 8148* (PRE). **2929** (Underberg): Natal, Drakensberg, Monks Cowl Forest Reserve, Cowl Fork valley, 2100–2300 m, 6 Dec. 1983, (–AB), *Balkwill, K., Manning & Meyer 790* (K, NU); Natal, Drakensberg, Monks Cowl Forest Reserve, Cowl Fork valley, 2100–2300 m, 6 Dec. 1983, (–AB), *Balkwill, K., Manning & Meyer 792* (NU); Drakensberg, Cathkin Peak area, 2440–2745 m, July 1944, (–AB), *Esterhuysen 10181* (BOL, K); upper Loteni valley, vicinity of Ash Cave, 1980 m, 7 Feb. 1985, (–AD), *Hilliard & Burtt 18180* (K, NU, PRE); Garden Castle Forest Reserve, valley beyond forester's house, 1950 m, 11 Nov. 1980, (–CA), *Hilliard & Burtt 13428* (NU); Garden Castle Forest Reserve, Mlambonja valley, 1950 m, 4 Jan. 1982, (–CA), *Hilliard & Burtt 14888* (NU, PRE); Cobham Forest Station, Ndlovini, Troutbeck, 8 Nov. 1980, (–CB), *Hilliard & Burtt 13341* (K, NU); 8–11 km NNW of Castle View Farm, headwaters of Mlahlangubo R, 2315 m, 23 Nov. 1980, (–CB), *Hilliard & Burtt 13563* (NU); Mlahlangubo R, 5–7 miles NNW of Castle View Farm headwaters of river, 2315 m, 26 Nov. 1980, (–CB), *Hilliard & Burtt 13689* (NU, PRE); Sani Pass, 2620 m, 17 Feb. 1982, (–CB), *Hilliard & Burtt 15505* (K, NU, PRE); Sani Pass, 2620 m, 17 Feb. 1982, (–CB), *Hilliard & Burtt 15510* (K, NBC, NU, PRE); Sani Pass, 2440 m, 17 Feb. 1982, (–CB), *Hilliard & Burtt 15542* (NBC, PRE); upper tributaries S of Mkomazi R (feeders of Ka-Ntubu), upper reaches of Ntshish, 2440 m, 2 Dec. 1982, (–CB), *Hilliard & Burtt 15789* (K, NU, PRE); Mkomazi R area, upper tributaries S of Mkomazi R (feeders of Ka-Ntubu), 2010 m, 3 Dec. 1982, (–CB), *Hilliard & Burtt 15816* (NU, PRE); Underberg District, Cobham Forest Reserve, Emerald Vale, 1830 m, 14 Jan. 1985, (–CB), *Hilliard & Burtt 18058* (K, NU, PRE); Upper Mkomazi Area Nhlangeni valley, vicinity of Bird's Nest Cave, 1890 m, 21 Feb. 1985, (–CB), *Hilliard & Burtt 18284* (K, NU, PRE); Underberg, Sani Pass Hotel, Triplets Falls, on slope, 1645 m, 11 Apr. 1975, (–CB), *Jacobsen 4651* (PRE); Sani Pass, where road crosses sidestream from Masubasuba, 2200 m, 28 Nov. 2001, (–CB), *Whitehouse 295* (BOL, NBC); Sehlabathebe National Park, ravine just E of the Research Centre, 2500 m, 8 Jan. 1977, (–CC), *Hoener 1740* (PRE); Bulwer, Mahwaqa Mt., 2000 m, 19 Feb. 1992, (–DC), *Feltham 155* (NU, NU). **2930** (Pietermaritzburg): Karkloof Forest, Mshwati R, bank near 'Two Streams' farm, 31 Aug. 1989, (–AD), *Wirminghaus 982* (NU); Pietermaritzburg, Byrne/Keeron, 21 Apr. 1973, (–CC), *Strey 11272* (K, NU, PRE). **3027** (Lady Grey): Witteberg, Bedgelett, 1890 m, 1 Dec. 1981, (–DA), *Hilliard & Burtt 14609* (K, PRE); Witteberg, Bedgelett, 1890 m, 1 Dec. 1981, (–DA), *Hilliard & Burtt 14613* (K, NU, PRE); Ben McDhui, 2560 m, 3 Feb. 1983, (–DB), *Hilliard & Burtt 16379* (BOL); Ben McDhui, 2620 m, 6 Feb. 1983, (–DB), *Hilliard & Burtt 16486* (K, NU); Ben McDhui, 2620–2680 m, 6 Feb. 1983, (–DB), *Hilliard & Burtt 16502* (K, NU). **3028** (Matatiele): Ongeluk Nek, 2025 m, 5 Dec. 1985, (–AD), *Hilliard & Burtt 18666* (K, NU, PRE); Maclear District, Woodcliffs Trails, ridge opposite Reed Park, 2300 m, 14 Nov. 1992, (–CC), *Abbott 5813* (PRE). **3126** (Queenstown): Andriesberg, 1830 m, 15 Oct. 1896, (–DA), *Galpin 2176* (BOL, PRE). **3127** (Lady Frere): Lady Frere District, Otto du Plessis Pass, 1700 m, 19 Oct. 1977, (–BA), *Jacot-Guillarmod 7821* (GRA). **3128** (Umtata): Baziya Mt., 1435 m, 10 Nov. 1981, (–CB), *Hilliard & Burtt 13882* (K, NU, PRE); Baziya Mt., 1435 m, 10 Nov. 1981, (–CB), *Hilliard & Burtt 13912* (K, NU, PRE). **3226** (Fort Beaufort): Amatola Mts, saddle between Hogsback Peak 1 & 2, 1585 m, 4 Dec. 1999, (–DB), *Whitehouse 65* (BOL). **3227** (Stutterheim): Cathcart District, Toise R, 1065 m, 18 Oct. 1942, (–AD), *Acoccks 9208* (K, PRE); Amatola Mts, Keiskammahoek, top of Amatola Mt range NW of Cata Forest Reserve, 1830 m, 4 Nov. 1948, (–CA), *Story 3668* (PRE); Kologha Range, upper slopes, 1340 m, 1 May 1943, (–CB), *Acoccks 9789* (PRE)

34. **Cliffortia spathulata** Weim. in Botaniska Notiser 90: 180, t. 5 (1948); J.H. Ross: 183 (1972); Whitehouse: 4, fig. 1D, 5 (2004b). Type: Kwazulu-Natal, Amawahqua [Mahwaqa] Mt., 2075m, 6 Apr. 1892, Medley Wood 4578 (K, holo.; NH!, iso.).



C. browniana sensu Weim.: 56, fig. 13E–H (1934) pro parte, non Burt Davy.

Erect medium shrub up to 1 m high, resprouting after fire from a single crown; densely divaricately branched, forming brachyblasts. *Young stems* 0.7–1.2 mm wide, reddish tinged, hairy; stem hairs upwardly adpressed, 0.1–0.6 mm long. *Leaves* trifoliate; leaflets obovate, 2.4–6.1 × 1.2–3.4 mm; base contracted abruptly to form a pseudopetiolule; apex acute to rounded; margins flat, markedly toothed or lobed with 3–7 straight teeth, 0.05–0.25 mm long; lamina chartaceous, 0.2–0.3 mm thick, midrib not prominent above lamina, curved upwards and towards the stem, glaucous, glabrous above and beneath; sheath 0.9–1.5 mm long, abaxially glabrous, adaxially markedly hairy; stipules 0.6–1.1 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous, margins serrate to shortly ciliate; sepals 4, glabrous. *Male flowers* with bracteoles 1.6–2.6 mm long; pedicel 0.6–0.9 mm long; sepals broadly ovate, 2.6–4.2 × 1.3–2.3 mm, acute to acuminate at apex; stamens 5–6; filaments 2.8–4.1 mm long, red; anthers brownish red. *Female flowers* with bracteoles 2.2–2.8 mm long, longer than immature receptacle; sepals ovate, 1.9–2.4 × 0.7–1.0 mm, recurved; carpel 1; stigma 2.4–3.5 mm long, white to red, feathery; immature receptacle 1.7–2.2 × 0.6–0.9 mm, glabrous, smooth. *Achene* 3.2–3.5 × 1.0–1.1 mm, medium brown, glabrous; faintly ribbed and slightly tuberculate to rugose. *Flowering time*: November to December.

Habitat: Sandstone-derived soils or basalt-derived soils, full sun, well-drained rocky soils or on rocky ledges; altitude 1 800–2 750 m.

Distribution: Northern Drakensberg between Witsieshoek and Monk's Cowl (but see note below).

Conservation status: A localised species, confined to a small area of the Drakensberg escarpment, but not particularly threatened as it often grows on inaccessible slopes and cliffs. Red List status: LC.

Etymology: *spathulata* (Latin) means 'spoon- or spatula-shaped', referring to the leaflets that have a broad apex then taper down into a narrow stalk.

Notes: *Cliffortia spathulata*, a species of high altitudes in the northern Drakensberg escarpment, has broadly obovate leaflets, with prominent veins, which make it easily separated from the closely related *C. dracomontana* and *C. browniana*. Specimens of *C. nitidula* have sometimes been wrongly attributed to this species on account of the lobing that appears on juvenile leaves. *Cliffortia spathulata*, however, never has as coarse lobing or hairs on the leaflets.

The type locality of *Cliffortia spathulata* is recorded as Mahwaqa Mt above Bulwer by Medley Wood. However, this mountain is relatively far from the currently known distribution of the species on the Drakensberg escarpment to the north. Furthermore, *C. spathulata* has not been recollected there and was not reported in a recent survey (Meter et al. 2002). It seems likely that the type locality was erroneously recorded.

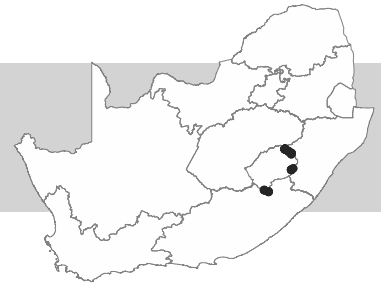
Representative specimens

SOUTH AFRICA. 2828 (Bethlehem): Royal Natal National Park, Tugela Gorge, 1830 m, 6 Feb. 1982, (–DB), Hilliard & Burt 15456 (K, NU); Royal Natal National Park, near Basuto Gate, 2255 m, 19 Feb. 1984, (–DB), Hilliard & Burt 17697 (K,



NU, PRE); National Park, gorge, 28 Aug. 1930, (–DB), *Hutchinson 4550* (K); Mont-aux-Sources, near gorge, 28 Aug. 1930, (–DB), *Hutchinson, J., Forbes & Verdoorn 72* (PRE); Qwa-Qwa District, Witsieshoek, N slopes of Sentinel peak, zig-zags on Sentinel hiking trail, 2685 m, 21 Nov. 2001, (–DB), *Whitehouse 287* (BOL, NBC). **2829** (Harrismith): Drakensberg, Cathedral Peak area, 2440–2745 m, July 1944, (–CC), *Esterhuysen 10180* (BOL, K); Drakensberg, Cathedral Peak area, 2440–2745 m, July 1946, (–CC), *Esterhuysen 12871* (BOL); Weenen District, Drakensberg, upper slopes in Cathedral Peak area, 2745 m, July 1949, (–CC), *Esterhuysen 15485* (BOL); Weenen District, Drakensberg, MnWeni area, 2440–2745 m, July 1949, (–CC), *Esterhuysen 15635* (BOL); Weenen District, Drakensberg, MnWeni area, 2135–2745 m, July 1951, (–CC), *Esterhuysen 18662* (BOL, PRE); Cathedral Peak Forest Reserve, above Tseketske R, 2105 m, 18 Jan. 1983, (–CC), *Hilliard & Burt 16304* (K, NU); Cathedral Peak Forest Reserve, Catchment 2, 2315 m, 11 Apr. 1953, (–CC), *Killick 1932* (PRE). **2929** (Underberg): Natal, Drakensberg, Monks Cowl Forest Reserve, Cowl Fork valley, 2100–2300 m, 6 Dec. 1983, (–AB), *Balkwill, K., Manning & Meyer 793* (NU); slopes of Cathkin Peak, 1830 m, July 1956, (–AB), *Edwards 2013* (NU); Drakensberg, Little Tugela area, 1830–2440 m, July 1943, (–AB), *Esterhuysen 8843* (BOL); Amawahqua Mt., 2075 m, 6 Apr. 1892, (–DC), *Medley Wood 4578* (K).

35. **Cliffortia dracomontana** C.M.Whitehouse in Bothalia 34(1): 3, fig. 1B, 3, 4 (2004b). Type: KwaZulu-Natal, Underberg District, 8–11 km NNW of Castle View Farm, headwaters of Mlahlangubo R, *Hilliard & Burt* 13561 (NU, holo.; E!, K!, PRE, iso.).



C. browniana sensu Weim.: 56 (1934) pro parte; Weim.: t. 5 (1948); Killick: 127 (1963); Edwards: 264 (1967) pro parte; J.H.Ross: 183 (1972); Hilliard & B.L.Burt: 162 (1987) pro parte, non Burt Davy.

Erect low to medium shrub, up to 0.5 m high; densely divaricately branched, forming brachyblasts. *Young stems* 0.7–1.0 mm wide, often reddish tinged, hairy; stem hairs upwardly adpressed, 0.2–0.5 mm long. *Leaves* trifoliolate; chartaceous, 0.1–0.3 mm thick, midrib not prominent above lamina, held $\pm$ straight, glaucous, glabrous above and beneath; sheath 0.9–1.5 mm long, abaxially glabrous, adaxially markedly hairy; stipules 0.8–1.5 mm long, free, margins smooth; petiole absent; leaflets elliptic to obovate, 2.8–6.0 $\times$ 0.7–2.1 mm; apex obtuse to rounded; margins flat, entire. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous, margins smooth; sepals 4, glabrous. *Male flowers* with pedicel 0.5–0.7 mm long; sepals broadly ovate, 2.5–3.1 $\times$ 0.9–1.2 mm, acute to acuminate at apex; stamens 4–6; filaments 1.8–2.3 mm long. *Female flowers* with bracteoles 1.7–2.5 mm long, longer than immature receptacle; sepals ovate, 1.2–1.5 $\times$ 0.5–0.6 mm, recurved; carpel 1; stigma $\pm$ 1 mm long, red; immature receptacle glabrous, smooth. *Achene* 2.9–4.5 $\times$ 1.3–1.8 mm, medium brown, glabrous; faintly ribbed and slightly tuberculate to rugose. *Flowering time*: October to January.

Habitat: Basalt-derived soils in full sun on well-drained soils and scree; altitude 2 150–3 100 m.

Distribution: Drakensberg escarpment, from Mont-aux-Sources to Ben Macdhui.

Conservation status: Although the species is found across a wide range only a few populations have been collected. It is found in remote places at high altitudes and near the escarpment so not threatened by human influences. Red List status: LC.

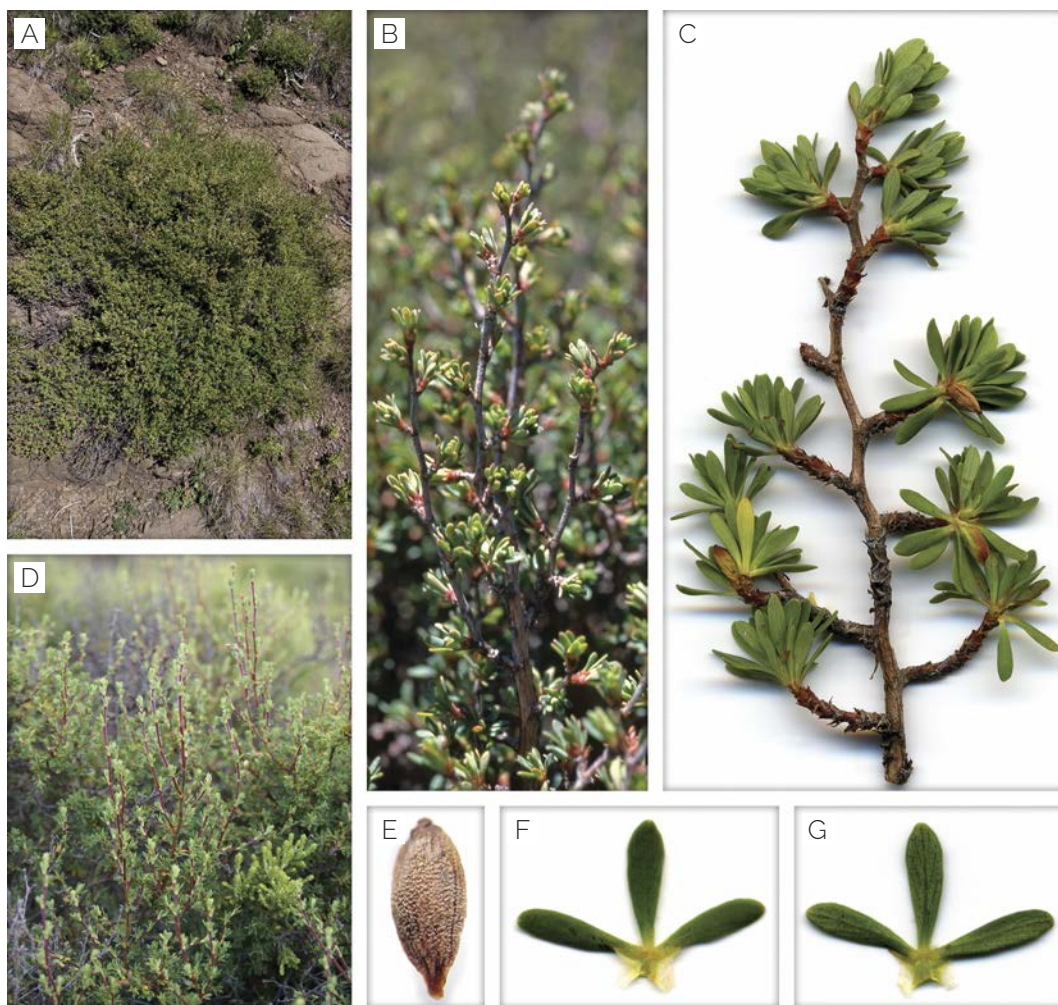
Etymology: Named after the Drakensberg Mountains where it is endemic.

Notes: *Cliffortia dracomontana* was until recently included within *C. browniana*, but it is in fact probably more closely related to *C. spathulata*, sharing the larger achenes, broader leaflets and smooth stipules of that species. The leaflets of *C. spathulata* are clearly toothed, while those of *C. dracomontana* are entire, thus easily distinguished. In contrast, *C. browniana* has smaller achenes, narrower elliptic leaflets with acute apices and ciliate stipules. It also generally occurs at lower altitudes than *C. dracomontana* and *C. spathulata*, which usually occur on or near the escarpment and edge of the plateau. *Cliffortia browniana* can also form larger shrubs, up to 1.8 m high, when in favourable habitats, whereas *C. dracomontana* and *C. spathulata* barely get to more than 0.5 m. However, this may be due to the more exposed nature or shallow soils of the places they grow and if they were brought into cultivation this feature may not be maintained.

Representative specimens

SOUTH AFRICA. 2828 (Bethlehem): Mont-aux-Sources, 3050 m, 17 Mar. 1955, (–DD), *Edwards* 596 (NU, PRE); Drakensberg, Escarpment plateau at Mont-aux-Sources, 3050 m, July 1953, (–DD), *Esterhuysen* 21687 (BOL); Mont-aux-Sources, May 1977, (–DD), *Gilbert* 7593 (PRE); top of Mont-aux-Sources, 3355 m, 29 Aug. 1930, (–DD), *Hutchinson* 4580 (K); Drakensberg, Mont-aux-Sources, 3050 m, 24 Mar. 1946, (–DD), *Schelte* 1381 (NU, PRE); Mont-aux-Sources, on plateau of Amphitheatre, 3200 m,

3 Oct. 1950, (–DD), *Sidey 2015* (PRE); Royal Natal National Park, summit of Ampitheatre near Tugela Falls, 2925 m, 21 Nov. 2001, (–DD), *Whitehouse 286* (BOL); Mont-aux-Sources, 2135–3050 m, 19 Mar. 1971, (–DD), *Wilkinson s.n.* (GRA). **2829** (Harrismith): Drakensberg, Cathedral Peak area, 2745 m, July 1944, (–CC), *Esterhuysen 10183* (BOL); Weenen District, Drakensberg, upper slopes in Cathedral Peak area, 2135–2745 m, July 1949, (–CC), *Esterhuysen 15482* (BOL, NBG, PRE); Drakensberg, MnWeni area, 2440–3050 m, July 1951, (–CC), *Esterhuysen 18661* (BOL, NBG). **2929** (Underberg): Drakensberg, summit of escarpment at Cleft Peak, 3050 m, July 1946, (–AA), *Esterhuysen 12886* (BOL); Garden Castle Forest Reserve, Mlamboja valley, path to Mashai Pass, 2195 m, 8 Jan. 1982, (–CA), *Hilliard & Burt 15021* (K, NU); Garden Castle Forest Reserve, Mlamboja valley, path to Mashai Pass, 2400 m, 26 Nov. 2002, (–CA), *Whitehouse 325* (BOL, NBG); 8–11 km NNW of Castle View Farm, headwaters of Mlahlangubo R, 2315 m, 23 Nov. 1980, (–CB), *Hilliard & Burt 13561* (K, NU, PRE). **3027** (Lady Grey): Ben McDhui, 2620 m, 4 Feb. 1983, (–DB), *Hilliard & Burt 16422* (K, NU, PRE). **3028** (Matatiele): Naude's Nek, 2500 m, 13 Feb. 1983, (–CA), *Hilliard & Burt 16605* (K, NU).



Cliffortia dracomontana: A & D, habitat; B, branches; C, branch with achenes; E, achene; F, dorsal view of leaf; G, ventral view of leaf.

36. **Cliffortia browniana** Burt Davy, A Manual of the Flowering Plants and Ferns of the Transvaal with Swaziland, South Africa 2: xxi, 316 (1932); Weim.: 56, fig. 13A–D (1934); Hilliard & Burt: 162 (1987) pro parte; Whitehouse: 3, fig. 1A, 2 (2004b). Type: Mpumalanga, Lydenburg, Rogers 22985 (BOL, holo.; K!, Z!, iso.).



C. nebrownii Burt Davy, manuscript name.

C. spathulata sensu Hilliard & Burt: 163 (1987), non Weim.

Erect shrub up to 1.8 m high; densely divaricately branched, forming brachyblasts. *Young stems* 0.8–1.2 mm wide, tinged reddish, hairy; stem hairs usually adpressed upwards, 0.2–0.7 mm long. *Leaves* trifoliolate; leaflets elliptic, 1.9–4.3 × 0.6–1.3 mm; apex acute; margins flat, entire and smooth; lamina chartaceous, 0.2–0.4 mm thick, ± straight or slightly curved upwards and towards the stem, green with paler stripes on either side of midrib beneath, glabrous; sheath 0.9–1.4 mm long, abaxially glabrous, adaxially hairy; stipules 0.4–1.2 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous except for ciliate margins; sepals 4, glabrous. *Male flowers* unknown. *Female flowers* with bracteoles 1.3–2.1 mm long, longer than immature receptacle; sepals ovate, 0.9–1.4 × 0.4–0.7 mm, recurved; carpels 1 or 2; stigma 0.9–1.3 mm long, red, feathery, ± hidden by leaves; immature receptacle 1.0–1.3 × 0.6–0.8 mm, glabrous, smooth. *Achene* 2.1–2.4 × 1.0–1.3 mm, medium brown, glabrous; faintly or indistinctly ribbed, rounded to sharply acute. *Flowering time*: November to May.

Habitat: Clarens Formation sandstone-derived soils in full sun, often in damp areas or amongst rocks; altitude 1 050–2 500 m.

Distribution: Extending from Sehlabathebe in Lesotho, through the KwaZulu–Natal Drakensberg, to Witsieshoek in eastern Free State, with a disjunction to the Mpumalanga Drakensberg escarpment between Graskop and Wolkberg, and an outlying population on Blouberg.

Conservation status: Relatively common locally, but with a scattered distribution. Red List status: LC.

Etymology: Named after Nicholas Brown.

Notes: This species has been confused with both *Cliffortia spathulata* and *C. dracomontana* as Weimarck included specimens of those species within his concept of *C. browniana*. Those two species are distinct, with achenes usually at least 50% larger. Other differences are noted under those species.

Cliffortia browniana has a clearly disjunct distribution between the populations of the northern provinces and the Lesotho Drakensberg escarpment but there is little evidence, morphologically at least, to separate them. While the Drakensberg populations can easily be separated from the other species in the area, the northern populations appear very similar to *C. serpyllifolia*, which is recorded from Eswatini to the south and Zimbabwe to the north. The leaflets of *C. browniana* have much more distinct midribs



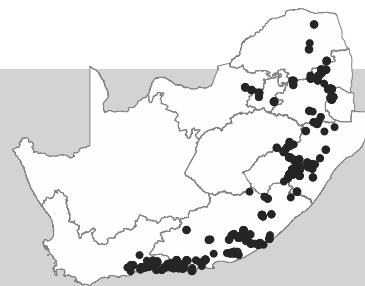
and venation. Except for a few collections in the Drakensberg, the species also has upwardly adpressed hairs, whereas *C. serpyllifolia* outside of the Cape has downwardly adpressed hairs.

A putative hybrid between *Cliffortia browniana* and *C. nitidula* subsp. *pilosa* has been recorded on Serala Peak, Wolkberg (Muller & Scheepers 139). This is a rather surprising hybrid considering the rarity of male flowers in *C. nitidula* and apparent complete absence of them in *C. browniana*.

Representative specimens

SOUTH AFRICA. **2328** (Baltimore): Blouberg, on plateau, 1675 m, 1 June 1953, (–BB), Esterhuysen 21447 (BOL, K, PRE). **2330** (Tzaneen): New Agatha Forest Station, Wolkberg, 1615 m, 12 Mar. 1981, (–CC), Hilliard & Burt 14323 (NU, PRE). **2430** (Pilgrim's Rest): Mariepskop, on top of kop, near SAUK station, 2 Dec. 1981, (–DB), Grobbelaar 2618 (PRE); Mariepskop, below the Radar Station, 1800 m, 17 Sept. 1985, (–DB), Krynauw 782 (PRE); Mariepskop, 3 Mar. 1957, (–DB), Meeuse 9981 (PRE); Mariepskop, mountain top, 1830 m, 27 May 1960, (–DB), van der Schijff 1480 (K); Mariepskop, on top of mountain, 1830 m, 27 May 1960, (–DB), van der Schijff 4480 (PRE); on top of Mariepskop, 6 July 1961, (–DB), van der Schijff 5588 (K, PRE); Pilgrim's Rest, Mt. Sheba Nature Reserve, Jan. 1976, (–DC), Forrester & Gooyer 204 (PRE); Drakensberg Escarpment, God's Window, about 6 km from Graskop. Look-out point, conserved area, 11 May 1995, (–DD), Jordaan 2910 (PRE); E God's Window, escarpment, 1525 m, 8 Sept. 1974, (–DD), Onderstall 170 (PRE). **2530** (Lydenburg): Lydenburg, (–AB), Rogers 22985 (BOL, K, Z). **2828** (Bethlehem): Royal Natal National Park, near Basuto Gate, 2135 m, 18 Feb. 1984, (–DB), Hilliard & Burt 17677 (K, NU, PRE); Royal Natal National Park, near Basuto Gate, E facing slopes, 2195 m, 18 Feb. 1984, (–DB), Hilliard & Burt 17681 (K, NU, PRE); Royal Natal National Park, path from Witsieshoek to Mahai Falls, Basuto Gate, 2165 m, 22 Nov. 2001, (–DB), Whitehouse 289 (BOL). **2929** (Underberg): Weenen District, Ntabamhlope, Table Mt., NW ridge and summit, 1830–1980 m, 26 Apr. 1945, (–BA), Acocks 11462 (NBC, PRE); Garden Castle Forest Reserve, path from forest station to Mlambonja valley, 1900 m, 26 Nov. 2002, (–CA), Whitehouse 326 (BOL); Cobham Forest Station, Ndlovini, Troutbeck, 8 Nov. 1980, (–CB), Hilliard & Burt 13342 (NU); 8–11 km NNW of Castle View Farm, headwaters of Mlahlangubo R, 2135 m, 20 Jan. 1982, (–CB), Hilliard & Burt 15266 (K, NU, PRE); Gx-alingenwa valley, between Sani Pass and Polela valley, 1950 m, 12 Dec. 1983, (–CB), Hilliard & Burt 17225 (K, NU, PRE); Natal, Sani Pass, 1980 m, 15 Dec. 1984, (–CB), Hilliard & Burt 17994 (NU); Cobham State Forest, 'Lakes' Cave area, 2225–2375 m, 13 Dec. 1982, (–CB), Hilliard, Burt & Manning 16026 (K, PRE); Cobham State Forest, 'Lakes' Cave area, 2410 m, 15 Dec. 1982, (–CB), Hilliard, Burt & Manning 16061 (NU); Cobham State Forest, 'Lakes' Cave area, 2410 m, 15 Dec. 1982, (–CB), Hilliard, Burt & Manning 16062 (NU); Sani Pass, just W of South African border post, 2000 m, 28 Nov. 2001, (–CB), Whitehouse 296 (BOL, NBC); Sehlabathebe, 2300–2500 m, 4 Jan. 1973, (–CC), Jacot-Guillarmod, Getliffe & Mzamane 218 (GRA, K, PRE).

37. **Cliffortia linearifolia** Eckl. & Zeyh., Enumeratio Plantarum Africae Australis Extratropicae 2: 270 (1836); Harv.: 301 (1862); Burt Davy: 316 (1932); Weim.: 53, fig 12F–M (1934); Dahlgren: fig. 2l (1971); Compton: 230 (1976); Mendes: 25, t. 6C (1978); Fellingham: 615 (2000); Coates Palgrave: 249 (2002). Lecto-type, designated here: Uitenhage District, Zwartkops R., *Ecklon & Zeyher 1749* (SAM, lecto!).



C. ericifolia var. *acutistipula* Kuntze, Revisio Generum Plantarum 3(2): 76 (1898). Type: Cathcart District, Toise R station, 27 Feb. 1894, *Kuntze s.n.* (NY, holo.!; B†, K!, iso.). [Misspelt as *C. ericifolia* var. *acutifolia* in the index of Weimarck (1934).]

Low erect shrub to tall and virgate up to 3 m high, lower branches sometimes trailing along ground, killed by fire or resprouting after fire from a central crown; densely divaricately branched, forming brachyblasts. *Young stems* 0.5–1.0 mm wide, sometimes tinged reddish, brachyblasts often closely overlapping, densely hairy; stem hairs straight and adpressed or curled, 0.1–0.6 mm long. *Leaves* unifoliate, bifoliate or trifoliate; linear to needle-shaped, 2.4–7.9 × 0.4–1.0 mm; base sometimes contracted to form a pseudopetiolule; apex rounded to mucronate, up to 0.2 mm long; margins rounded or inrolled beneath so that they touch the prominent midrib, entire and smooth; lamina chartaceous, 0.2–0.6 mm thick, held ± straight or curved downwards and away from the stem, glabrous; sheath 0.8–1.6 mm long, abaxially glabrous, adaxially markedly hairy; stipules 0.2–1.5 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on the keel, margins ciliate to smooth; sepals 4, glabrous. *Male flowers* with bracteoles 1.0–2.1 mm long; pedicel 0.2–0.4 mm long, glabrous; sepals broadly ovate, 2.6–3.3 × 1.2–1.8 mm, acute to acuminate at the apex, sometimes joined towards the base; stamens (3–)4; filaments 2.6–4.5 mm long, red or greenish white; anthers brownish red or yellow. *Female flowers* with bracteoles 0.9–1.7 mm long, longer than immature receptacle; sepals ovate, 0.7–1.1 × 0.2–0.6 mm, recurved, often falling off very early; carpel 1; stigma 0.7–1.7 mm long, pinkish to greenish white, feathery, sometimes visible at the base of leaves; immature receptacle 1.1–1.8 × 0.6–1.0 mm, glabrous, clearly ribbed. *Achene* ellipsoid, 1.4–2.6 × 0.8–1.5 mm, pale to medium brown, glabrous; ribs 8–9, rounded to acute, up to 0.2 mm wide. *Flowering time*: flowers can be found at most times of the year but predominantly September to February.

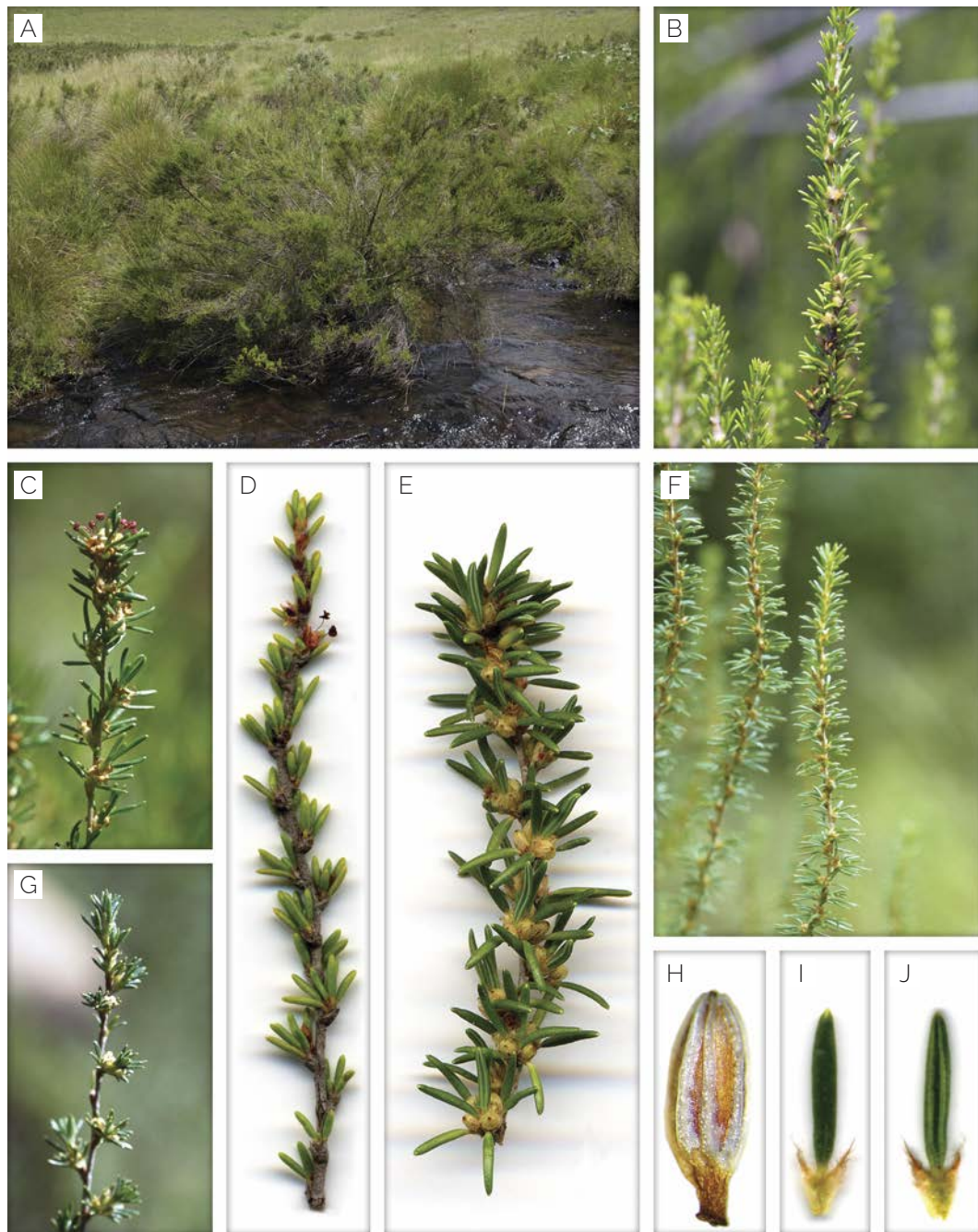
Habitat: Occurring on an exceptionally wide variety of habitats from acid sands of Table Mountain Series to rich soils of streambanks on shale or Clarens Formation-derived soils in full sun; altitude 0–2 600 m.

Distribution: Widespread from the far eastern end of Langeberg north through the Drakensberg to the highlands of Zimbabwe and Mozambique.

Conservation status: Widespread and common throughout its range, easily able to colonise new habitats such as road verges and disturbed ground. Red List status: LC.

Etymology: *linearifolia* (Latin) means 'linear-leaved', referring to the long, straight, narrow leaves.

Notes: A very common species, easily identified by the narrowly linear leaves with a thickened midrib and margins, so that the underside of the lamina is only visible as two pale lines on either side of the midrib. In the Drakensberg the leaves have been noted to be either unifoliate or trifoliate and this may be linked to habitat: the unifoliate plants grow in damp areas, while trifoliate plants are restricted to rock crevices. It is uncertain whether the variants represent different ecotypes or the morphological plasticity of the species adapted to contrasting water availability.



Cliffortia linearifolia: A, habitat; B, branch; C & D, branch with male flowers; E & F, branch with achenes; G, branch with female flowers; H, achene; I, dorsal view of leaf; J, ventral view of leaf.

While the typical species is easy to identify, some plants appear intermediate with *Cliffortia nitidula*. The latter species should have some hairs visible on the young leaves, whereas they are absent on *C. linearifolia*. It is likely that the two species hybridise with introgression leading to the breakdown of these characters. A putative hybrid with *C. paucistaminea* was also collected in the Stormberg (Clark & Daniels 313).

This species is able to colonise new habitats and is often found in newly dug ditches on roadsides. One such record has been found at Valley of Desolation, near Graaff-Reinet, far from the closest other records and it has possibly been introduced recently as seed from tyres of cars.

Ecklon & Zeyher (1836) cite three different localities for their collection 1749: Uitenhage District, Zwartkops River; Albany District, near Grahamstown, Zwartehoogdens, 16 July 1829; and Tambukiland, Klipplaat R. near Silo, May 1830. Most specimens in herbaria do not state from which particular locality the plant was collected. The specimen at SAM does state Zwartkops River and so this is designated here as the lectotype. Other herbaria that have specimens of *Ecklon & Zeyher 1749* include B⁺, C, G, HBG!, K!, L, LD, M!, PRE, REG!, SI, TCD!, UPS, U, W, Z. These, however, cannot be confirmed as isolectotypes unless the locality can be verified in some way.

Representative specimens

ZIMBABWE. 1832 (Zimbabwe): Manica Province, Inyanga, Inyangani Mt., NW of summit, 2300 m, 14 Nov. 1986, (–BD), *Linder 3976* (BOL, K).

SOUTH AFRICA. 2230 (Messina): Sibasa District, Tate Vondo Forest Reserve, on the banks of the Mutale R, 1130 m, 14 Mar. 1978, (–CD), *Hemm 572* (PRE). 2330 (Tzaneen): Duiwelskloof, Westfalia Estate, banks of westernmost feeder stream of Merensky Dam, near sandpits, 915 m, 14 Nov. 1959, (–CA), *Scheepers 767* (PRE). 2430 (Pilgrim's Rest): Mariepskop, near Reitz Grave, 2075 m, 3 Dec. 1959, (–DB), *van der Schijff 4781* (PRE); E Mariepskop, near Reitz Grave, above waterfall, 9 Jan. 1962, (–DB), *van der Schijff 6033 in PR* (K); Ohrigstad Dam Nature Reserve, 1435 m, 7 Aug. 1968, (–DC), *Edwards 4062* (K, PRE); Ohrigstad Dam Nature Reserve, 1525 m, 19 Nov. 1970, (–DC), *Jacobsen 1343* (PRE); near Pilgrim's Rest, Burgers Pass, 1515 m, 19 Jan. 1906, (–DD), *Burt Davy 1560* (BOL); Graskop, Kowyns Pass, 10 Sept. 1963, (–DD), *Rauh & Schlieben, H-J.E. 9733* (K, PRE). 2527 (Rustenburg): Rustenburg region, Avonmoor, Jan. 1941, (–CA), *Acocks 8828* (K, PRE); Rustenburg Nature Reserve, 50 m S of S plateau and S boundary of Rustenburg Nature Reserve, 1585 m, 27 Sept. 1972, (–CA), *Coetzee 1417* (K, PRE); Rustenburg, Oct. 1910, (–CA), *Polt-Leendertz 3372* (K, PRE); Krugersdorp District, Swartkop, picnic spot, 19 Sept. 1939, (–DD), *Repton 1095* (K, PRE). 2529 (Witbank): Middelburg District, Loskop Dam Nature Reserve, 29 Aug. 1959, (–AD), *Mogg 29533* (PRE); Witbank, Scheeperskloof, 30 Sept. 1967, (–AD), *Theron 1550* (PEU, PRE); Middelburg, Broodboomspruit, Doornkop 273 JS, 20 Jan. 1968, (–CB), *Du Plessis 226* (PRE). 2530 (Lydenburg): Dullstroom, 9 km from Dullstroom on Lydenburg road, 1980 m, 26 Oct. 1950, (–AC), *Story 3845* (PRE); Dullstroom, 9 km from Dullstroom on Lydenburg road, 1980 m, 26 Oct. 1950, (–AC), *Story 3895* (GRA, PRE); Belfast, Somerset Farm, Schoemanskloof side valley N–S, 1370 m, 20 Dec. 1932, (–AD), *Smuts & Gillett 2161* (BOL, NBG, PRE); Long Tom Pass, 19 km from Lydenburg between Lydenburg and Sabie, 1 Oct. 1971, (–BA), *Balsinhas & Kersberg 2134* (PRE); Mt. Anderson, 25 Apr. 1934, (–BA), *Pole Evans 4542* (K, PRE); Kaapsehoop, Sept. 1915, (–DB), *Wager TRV 30640* (PRE); Cythna Letty Nature Reserve, off Agnes Mine road W of Barberton, 1220 m, 11 Nov. 1968, (–DD), *Edwards 4103* (K, PRE). 2531 (Komatipoort): Barberton, Mlumati valley, 1065 m, Sept. 1889, (–CC), *Galpin 554* (BOL, K, PRE); Barberton, Nov. 1909, (–CC), *Williams 7659* (K). 2627 (Potchefstroom): Roodepoort, Transvaal Botanic Garden, near waterfall, 1505 m, 29 Aug. 1983, (–BB), *Behr 529* (PRE); Krugersdorp, Witpoortjie, 1958, (–BB), *Repton 4912* (K, PRE). 2628 (Johannesburg): Heidelberg, 23 Dec. 1906, (–BC), *Burt Davy 3107* (PRE); Heidelberg, 23 Dec. 1907, (–BC), *Polt-Leendertz 1040* (BOL, K, PRE). 2631 (Mbabane): Black Mbuluzi Falls, 1065 m, 3 Oct. 1956, (–AA), *Compton 26052* (NBG, PRE, SDNH); Mbabane, near Forbes Reef, 1525 m, 22 Sept. 1958, (–AA), *Compton 28003* (K, NBG, PRE, SDNH); 13 km NNW of Mbabane, W side of Londosi R, 1075 m, 22 Aug. 1978, (–AA), *Prior 99a* (K, K, PRE); near Mbabane, 21 July 1947, (–AC), *Compton 19715* (NBG); Poliniane Dam, 1220 m, 5 Oct. 1961, (–AC), *Compton 30761* (NBG, PRE); Mbabane Power Station, 915 m, 23 Aug. 1962, (–AC), *Dlamini s.n.* (K, NBG, NBG, PRE, PRE, PRE). 2729 (Volksrust): Newcastle, Aug. 1935, (–DD), *Hesom s.n.* (PRE). 2730 (Vryheid): Oshoek, 1830–2075 m, 2 Nov. 1961, (–AD), *Devenish 711* (BM, K, PRE); Oshoek farm, Nov. 1966, (–AD), *Mauve 4507* (K, PRE); Utrecht, Kaffir Drift, July 1922, (–AD), *Thode 225* (PRE); Utrecht, Kaffir Drift, Aug. 1924, (–AD), *Thode 354* (PRE); Mooihoek, 1340 m, 19 Aug. 1965, (–BA), *Devenish 1259* (K, PRE); Pauluitvlugt Farm, pool below house on Stinkwood Falls stream, 1300 m, 12 Oct. 1990, (–BC), *Glen 2444* (PRE); Vryheid, at old water reservoir, 29 Aug. 1939, (–DD), *Gerstner, Revj. 3520* (PRE). 2828 (Bethlehem): Golden

Gate, 22 Jan. 1951, (–DA), *Compton 22477* (NBC); Golden Gate Highlands National Park, Small Caledon R, 1920 m, 25 Oct. 1963, (–DA), *Liebenberg 7279* (K, PRE); Bergville, Royal Natal National Park, slopes of Plowman's Kop, 29 Oct. 1938, (–DB), *Acocks & Hafström 571* (PRE); Royal Natal National Park, under bridge at entrance, 6 Aug. 1954, (–DB), *Edwards 244* (NU); Royal Natal National Park, Mahai Falls, 2075 m, 26 Oct. 1955, (–DB), *Edwards 976* (NU, PRE); Natal, Royal Natal National Park, path from Tendele Camp to Tiger Falls, 1675 m, 3 Feb. 1982, (–DB), *Hilliard & Burtt 15397* (K, NU, PRE); Royal Natal National Park, Mahai R on Tiger Falls path, 1645 m, 22 Nov. 2001, (–DB), *Whitehouse 291* (BOL, NBC); Royal Natal National Park, path to Tugela Gorge, 1770 m, 23 Nov. 2001, (–DB), *Whitehouse 292* (BOL, NBC). **2829** (Harrismith): Harrismith, Platberg, Botanic Garden, on top of mountain, 2400 m, 12 Oct. 1979, (–AC), *Jacobsz 2616* (NBC, PRE); Van Reenen, Jan. 1914, (–AD), *Bews 1133* (NU); Harrismith, Swinburne, Rensburgskop, 11 Nov. 1962, (–AD), *Jacobsz 159* (K, NBC, PRE); Natal, Cathedral Peak Forest Reserve, tributary of Treketseke, 2105 m, 18 Jan. 1983, (–CC), *Hilliard & Burtt 16286* (K, NU, PRE); Bergville, Cathedral Peak, Catchment 1, 1830 m, Mar. 1963, (–CC), *Krounhout UAD 722* (K); Drakensberg, Cathedral Peak area, 1220 m, 3 Aug. 1947, (–CC), *Levyms 8240* (BOL); Natal, Cathedral Peak, 1525 m, Nov. 1960, (–CC), *Ruch 2039* (K, PRE); Cathedral Peak area, Camel Path, 1950 m, Jan. 1944, (–CC), *Schelp 440* (NU); Cathedral Peak area, 1495 m, Nov. 1945, (–CC), *Schelp 1092* (NU). **2830** (Dundee): Zululand, Qudeni, 1830 m, 1903, (–DB), *Sim 19431* (PRE). **2929** (Underberg): Little Tugela area, 1525 m, July 1943, (–AB), *Esterhuysen 8846* (BOL); Loteni R valley, 1800 m, 13 Jan. 1982, (–AD), *Hilliard & Burtt 15105* (K, NU, PRE); Ntabamhlope, Ntabamhlope Vlei, 3 Mar. 1964, (–BA), *Downing 109* (PRE); Estcourt, Thabamhlope Research Station, Bushmans R, 1525 m, 8 Dec. 1938, (–BA), *West 891* (K, PRE); Drakensberg, Rosetta, Kamberg Nature Reserve, next to Mooi R, 14 Jan. 1991, (–BC), *Meyer 7906* (PRE); Garden Castle Forest Reserve, valley beyond forester's house, 1980 m, 11 Nov. 1980, (–CA), *Hilliard & Burtt 13416* (NU, PRE); Natal, Garden Castle Forest Reserve, stream valley beyond forester's house, 1950 m, 11 Nov. 1980, (–CA), *Hilliard & Burtt 13442* (K, NU); Garden Castle Forest Reserve, Mlambonja valley, 1950 m, 4 Jan. 1982, (–CA), *Hilliard & Burtt 14887* (NU); Garden Castle Forest Reserve, Mlambonja valley, 1860 m, 6 Jan. 1982, (–CA), *Hilliard & Burtt 14965* (NU); Sani Pass, Nov. 1964, (–CB), *Gillies 60* (NU); Bamboo Mt., Dec. 1973, (–CB), *Grice s.n.* (NU); Cobham Nature Reserve, Upper Polela Cave area, 2135 m, 21 Nov. 1976, (–CB), *Hilliard & Burtt 9314* (NU); Mlahlangubo R, 8–11 km NNW of Castle View Farm, headwaters of river, above Wilson's Cave, 2165 m, 22 Nov. 1980, (–CB), *Hilliard & Burtt 13508* (NU); Mlahlangubo R, 8–11 km NNW of Castle View Farm headwaters of river, below Wilson's Cave, 2135 m, 22 Nov. 1980, (–CB), *Hilliard & Burtt 13513* (NU); Natal, 8–11 km NNW of Castle View Farm, headwaters of Mlahlangubo R, 2195 m, 24 Nov. 1980, (–CB), *Hilliard & Burtt 13592* (K, NU); Natal, 8–11 km NNW of Castle View Farm, headwaters of Mlahlangubo R, 2075 m, 25 Nov. 1980, (–CB), *Hilliard & Burtt 13653* (K, PRE); Cobham Forest Reserve, Sipongweni, 2195 m, 20 Feb. 1981, (–CB), *Hilliard & Burtt 14011* (NU); 8–11 km NNW of Castle View Farm, headwaters of Mlahlangubo R, 1950 m, 19 Jan. 1982, (–CB), *Hilliard & Burtt 15172* (NU, PRE); Natal, Bamboo Mt., summit, 2195 m, 21 Nov. 1982, (–CB), *Hilliard & Burtt 15592* (NU); Bamboo Mt., foot of mountain, N side, near Mzimkulwana R, riverside rocks, 1555 m, 22 Nov. 1982, (–CB), *Hilliard & Burtt 15667* (NU, PRE); upper tributaries of Mkomazi R (feeders of Ka-Ntubu), 2255 m, 29 Nov. 1982, (–CB), *Hilliard & Burtt 15672* (NU); Natal, upper tributaries of Mkomazi R (feeders of Ka-Ntubu), 2255 m, 29 Nov. 1982, (–CB), *Hilliard & Burtt 15673* (K, NU); Natal, upper tributaries S of Mkomazi R (feeders of Ka-Ntubu), 2440 m, 2 Dec. 1982, (–CB), *Hilliard & Burtt 15790* (K, NU, PRE); Mkomazi R area, upper tributaries S of Mkomazi R (feeders of Ka-Ntubu), 2010 m, 3 Dec. 1982, (–CB), *Hilliard & Burtt 15815* (NU); Gxalingenwa valley, between Sani Pass and Polela valley, on sandstone rock sheets, 2195 m, 9 Dec. 1983, (–CB), *Hilliard & Burtt 17110* (NU); Chameleon Cave area, ± 8 km N of Castle View farm, 2210 m, 1 Dec. 1984, (–CB), *Hilliard & Burtt 17761* (NU); Chameleon Cave area, ± 8 km N of Castle View farm, 1980 m, 2 Dec. 1984, (–CB), *Hilliard & Burtt 17805* (NU); Natal, Sani Pass, 2075 m, 14 Dec. 1984, (–CB), *Hilliard & Burtt 17956* (K, NU, PRE); Cobham State Forest, 'Lakes' Cave area, streamside rocks, 2135 m, 12 Dec. 1982, (–CB), *Hilliard, Burtt & Manning 15965* (NU, PRE); Sani Pass, 2650 m, 7 Jan. 1984, (–CB), *Hilliard, Burtt & Manning 17296* (NU); Sehlabathebe National Park, Matsa a Mafikeng, 2450 m, 29 Sept. 1976, (–CC), *Beverly & Hoener 736* (PRE); Garden Castle Forest Reserve, Sleeping Beauty Cave valley, 1890 m, 3 Nov. 1981, (–CC), *Hilliard 8165* (NU); Natal, vicinity of Tarn Cave, above Bushman's Nek, 2350 m, 22 Nov. 1983, (–CC), *Hilliard & Burtt 16870* (K, NU, PRE); Natal, vicinity of Tarn Cave, above Bushman's Nek, 2350 m, 22 Nov. 1983, (–CC), *Hilliard & Burtt 16871* (K, NU, PRE); Mulangane ridge, above Carter's Nek, on summit of ridge, 2135–2225 m, 1 Dec. 1983, (–DA), *Hilliard & Burtt 16987* (NU); Natal, Mulangane ridge, above Carter's Nek, 2135–2225 m, 2 Dec. 1983, (–DA), *Hilliard & Burtt 17012* (K, NU, PRE); Natal, Mulangane ridge, above Carter's Nek, 2135–2225 m, 2 Dec. 1983, (–DA), *Hilliard & Burtt 17030* (K, NU, PRE); Bulwer, Mahwaqa, 2135 m, 1910, (–DC), *Sim 19432* (NU, PRE). **2930** (Pietermaritzburg): Mooi River, 1220–1525 m, 22 Oct. 1894, (–AA), *Medley Wood 5455* (BM, PRE); Howick, 1220 m, 1 Nov. 1953, (–AC), *Comins 581* (NU, PRE); Mbona area, Mshwati R valley, Karkloof Forest, 2 Oct. 1989, (–AD), *Wirminghaus 1054* (NU); about 6.5 km from Greytown on Tugela Ferry road, 1370 m, 19 Oct. 1955, (–BA), *Edwards 928* (NU, PRE); near Richmond, 610–915 m, (–CD), *Medley Wood 10027* (K). **3027** (Lady Grey): Sterkspruit, May 1917, (–CB), *Hepburn 408* (GRA). **3028** (Matatiele): near Ramas Gate, 2590 m, 13 Nov. 1976, (–BB), *Bayliss 7796* (NBC); Rhodes to Naude's Nek, Dunley, 2285 m, 13 Feb. 1983,

(–CC), *Hilliard & Burt* 16626 (K, NU). **3029** (Kokstad): Mt. Ayliff, Ntsizwa Mt., S slopes above pine plantations, 26 Oct. 1991, (–CD), *Cloete* 1216 (GRA); Kokstad, Thornham, 9 Oct. 1967, (–DA), *Coleman* 476 (K, PRE). **3127** (Lady Frere): 39 km from the Cala turn-off on road to Engcobo, 12 Jan. 1997, (–DB), *Bredenkamp* 1163 (GRA, PRE); hills near Engcobo, 8 Oct. 1961, (–DB), *Esterhuysen* 29148 (BOL); Satanna's Nek, 1435–1465 m, 28 Nov. 1981, (–DB), *Hilliard & Burt* 14538 (K, NU, PRE). **3128** (Umtata): Baziya Mt., near Forest Station, 1035 m, 10 Feb. 1981, (–CB), *Hilliard & Burt* 13867 (K, NU); Baziya Mt., above forest, 1435 m, 10 Feb. 1981, (–CB), *Hilliard & Burt* 13913 (K, NU). **3224** (Graaff-Reinet): Valley of Desolation, alongside road to car park at summit, 1340 m, 9 Oct. 2000, (–AD), *Whitehouse* 172 (BOL). **3225** (Somerset East): along streamlines on the Boschberg summit plateau, 1273 m, 2009, (–DA), *Clark & Andrews* 325 (GRA); Boschberg summit near Bloukop, 1550 m, 5 Dec. 2008, (–DA), *Clark et al.* 304 (WSY). **3226** (Fort Beaufort): Katberg State Forest, Katberg summit ridge, 1615 m, 10 Dec. 2010, (–BC), *Clark & Daniels* 368 (WSY); upper reaches of Katberg Pass, 1531 m, 4 Mar. 2011, (–BC), *Clark & Keevey* 159 (WSY); top of Katberg Pass, 1617 m, 30 Jan. 2009, (–BC), *Clark, Pienaar & Daniels* 731 (WSY); Kroomieberg Plateau, 1152 m, 15 Mar. 2011, (–CB), *Clark* 98 (WSY); 7 km from Post Retief, Fairview Farm, 1250 m, 20 Feb. 1979, (–DA), *Robertshaw* s.n. (GRA); Alice-Seymour near Brambledene, 7 Jan. 1944, (–DB), *Barker* 2894 (BOL, NBG); Keiskamma valley, Hogsback, 18 Mar. 1976, (–DB), *Bond* SA47 (GRA); Hogsback, Flamborough Head, 12 Jan. 1960, (–DB), *Comins* 1862 (GRA, PRE); near Chala Kop, 1220 m, Dec. 1925, (–DB), *Dyer* 305 (PRE); Hogsback, hills above forest, 28 Oct. 1946, (–DB), *Esterhuysen* 13258 (BOL); Amatola Mts, Menziesberg, 1435 m, 14 Dec. 1985, (–DB), *Hilliard & Burt* 18836 (K, NU, PRE); Hogsback, Little Kettlespout Falls, 1220–1370 m, 16 July 1952, (–DB), *Levy* 9843 (BOL); Hogsback, slopes above Red Krantz, 1370 m, 22 July 1952, (–DB), *Levy* 9855 (BOL); Amatola Mts, road to Seymour, about 0.5 km from junction to Hogsback road, hill, 1440 m, 27 Jan. 1995, (–DB), *Victor & Hoare* 497 (PRE); Amatola Mts, Hogsback, circular walk on W side of Headlands, 1280 m, 5 Dec. 1999, (–DB), *Whitehouse* 66 (BOL, NBG). **3227** (Stutterheim): Cathcart, Windvogelberg, top of pass above 'Thorn Meadows', 1645 m, 8 Dec. 1981, (–AC), *Hilliard & Burt* 14756 (K, NU, PRE); near Fort Cunynghame, 1035 m, 2 Jan. 1896, (–AD), *Bolus* s.n. (BOL); Toise R station, 1150 m, 27 Feb. 1894, (–AD), *Kuntze* s.n. (K); Hogsback Mt, higher NW slopes off highest transverse jeeptrack, 1700 m, 18 June 1995, (–CA), *Fellingham* 1670 (NBG); Evelyn Valley, 13 Jan. 1947, (–CA), *Leighton* 2671 (BOL); Amatola Mts, Cata area, Cata Stream, below village, 810 m, 20 Apr. 1983, (–CA), *Phillipson & Furness* 305 (PRE); Cata Forest Reserve, 1065 m, 15 Jan. 1948, (–CA), *Story* 3274 (PRE); Gubru Dam, 11 Dec. 1981, (–CB), *Hilliard & Burt* 14805 (K, NBG, NU, PRE); lower slopes of Mt. Kempt, 13 Jan. 1947, (–CB), *Leighton* 2770 (BOL, PRE); Pirie, 1220 m, Oct. 1892, (–CC), *Sim* 1360 (PRE); Breidbach, May 1893, (–CD), *Sim* 1175 (NU, PRE); 3.7 km from Berlin railway station on old road to Berlin, 15 Jan. 1992, (–DC), *Hoffman* s.n. (GRA); 18 km from East London on Macleantown road, 3 Mar. 1943, (–DD), *Acocks* 9672 (K, PRE); East London, road to King Williams Town before Bridal Drift Dam turn-off, 11 Dec. 1981, (–DD), *Hilliard & Burt* 14811 (NU, PRE). **3228** (Butterworth): 16 km W of Kei R mouth, 24 Nov. 1945, (–CB), *Compton* 17605 (NBG); Komgha, near Kei R mouth, 25 Nov. 1945, (–CB), *Compton* 17671 (NBG); Kentani, 30 Nov. 1906, (–CB), *Pegler* 1349 (PRE); Gonubie Springs, 11 May 1945, (–CC), *Compton* 17039 (NBG). **3321** (Ladismith): Attakwaskloof, 5 Dec. 1951, (–DD), *Compton* 23114 (NBG). **3322** (Oudtshoorn): Robinson Pass, 23 Nov. 1949, (–CC), *Compton* 21792 (NBG); Robinson Pass, below summit on N side, 2 Dec. 1951, (–CC), *Esterhuysen* 19323 (BOL); on plains near George, 200 m, 14 Mar. 1893, (–CD), *Schlechter* 2328 (BOL, K, PRE). **3323** (Willowmore): foot of Helpmekaar Peak, 27 Jan. 1941, (–DC), *Esterhuysen* 4658 (BOL, PRE); Joubertina, Die Hoek, valley on N side of Tsitsikamma Mts, 18 Nov. 1944, (–DC), *Esterhuysen* 10676 (BOL, K); Die Hoek, N foot of Tsitsikamma Mts, near Joubertina, 20 Feb. 1952, (–DC), *Esterhuysen* 19945 (BOL, PRE); Nature's Valley, plateau at top of Grootrivier pass on W side, 215 m, 20 Jan. 2001, (–DC), *Whitehouse* 180 (BOL); Joubertina, 1 Dec. 1941, (–DD), *Esterhuysen* 7096 (BOL). **3324** (Steytlerville): Kouga, Doringkloof, 750 m, 30 July 1978, (–CA), *Bond* 1424 (NBG, PRE); Rietvlei, 11 Nov. 1941, (–CD), *Esterhuysen* 6638 (BOL); between Assegaibosch and Essenbosch, 245 m, Mar. 1922, (–CD), *Fourcade* 2186 (BOL, K, NBG); Kareedouw Pass, 29 Sept. 1952, (–CD), *Theron* 1360 (PRE). **3325** (Port Elizabeth): Groendal Wilderness Reserve, Zunga Catchment basin, Great Winterhoek Mt. range, Paardekop Farm, 580 m, 7 Nov. 1976, (–CB), *Scharf* 1986 (GRA, K, PRE). **3326** (Grahamstown): Albany, between Atherstone and Highlands, 700 m, 5 Nov. 1945, (–AD), *Acocks* 12110 (PRE); in hills between Grahamstown and Coldstream, 305 m, Dec. 1885, (–AD), *Bolus* 10629 (BOL); Thomas Baines Reserve, forest remnant close to N boundary fence, 500 m, 26 Aug. 1995, (–AD), *Killer* 36 (GRA); Grahamstown Commonage, plateau area, 1977, (–BC), *Clacey* s.n. (GRA, PRE); Manley Flats, 10 Jan. 1947, (–BC), *Compton* 19080 (NBG); Grahamstown, 11 Apr. 1952, (–BC), *Compton* 23380 (NBG); 16 km E of Grahamstown, 11 Oct. 1952, (–BC), *Lewis* SAM 67039 (PRE); Grahamstown, Mountain Drive, SW slope, Mar. 1933, (–BC), *Liebenberg* 83 (BOL); Grahamstown, Mountain Drive, SW slopes, Mar. 1933, (–BC), *Liebenberg* 282 (BOL); Collingham Towers, 610 m, 9 Oct. 1947, (–BC), *Story* 3174 (PRE); Oripi Reserve, Round Hill, 375 m, 8 Apr. 1985, (–BD), *Wirminghaus* 116 (GRA). **3422** (Mossel Bay): Herold's Bay Extension, top of headland 300 m from sea, 90 m, 16 Aug. 1993, (–AB), *Victor* 313 (PRE). **3423** (Knysna): Plettenberg Bay, 100 m, 2006, (–AB), *Helme* 3505 (NBG). **3424** (Humansdorp): Witte Els Bosch flats, 215 m, Mar. 1922, (–AA), *Fourcade* 2115 (BOL, K); Hoffmansbosch, 31 Dec. 1918, (–AB), *Britten* 1067 (PRE); Humansdorp, Clarkson, Aug. 1926, (–AB), *Thode* 827 (K, PRE).

38. **Cliffortia micrantha** Weim. in Botaniska Notiser 47: 97 (1940a); Fellingham: 65, fig. 1 (1993b) & 613 (2000). Type: Ladismith District, kloof on the N slopes of Touwsberg, 915–1 220 m, July 1937, *Levyans 6148* (SAM, holo.; BOL!, NBG!, iso.).



Medium erect shrub, up to 1.8 m high, probably killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.5–0.6 mm wide, tinged reddish, hairy; stem hairs curled, 0.1–0.4 mm long. *Leaves* trifoliate; leaflets obovate, 1.2–2.5 × 0.7–1.5 mm, contracted at the base into a pseudopetiolule; apex rounded and shallowly 3–5-lobed, margins flat; lamina chartaceous, 0.1–0.3 mm thick, curved downwards and away from the stem, green with paler stripes on either side of midrib beneath, glabrous; sheath 0.5–1.2 mm long, abaxially glabrous, adaxially hairy; stipules 0.2–0.5 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on the keel, margins ciliate; sepals 4, glabrous. *Male flowers* with bracteoles 0.9–1.3 mm long; pedicel 0.3–0.5 mm long; sepals broadly ovate, 2.3–2.7 × 1.0–1.4 mm, acute to acuminate at the apex; stamens 4–5; filaments 1.7–2.0 mm long, red; anthers brownish red. *Female flowers* with bracteoles 0.8–1.5 mm long, shorter than immature receptacle; sepals broadly ovate, 1.1–1.3 × 0.5–0.7 mm, recurved; carpel 2–3; stigma 1.4–2.0 mm long, red to pinkish, feathery, visible above leaves and sepals; immature receptacle 1.1–1.7 × 0.8–1.2 mm, glabrous, clearly ribbed. *Achene* broadly ovoid to globose, 1.0–1.9 × 0.6–1.6 mm, red becoming reddish brown, glabrous; ribs 8–9, rounded, 0.1–0.2 mm wide. *Flowering time*: April to August.

Habitat: Arid fynbos on well-drained acid sands from Witteberg and Table Mountain Series; altitude 450–1 250 m.

Distribution: Little Karoo mountains between Anysberg, Rooiberg and the Swartberg as far east as Gamkaskloof.

Conservation status: Localised, but widespread, growing in areas with few threats. Red List status: LC.

Etymology: *micrantha* (Greek) means 'small-flowered', though the flowers are not particularly smaller than many other cliffortias.

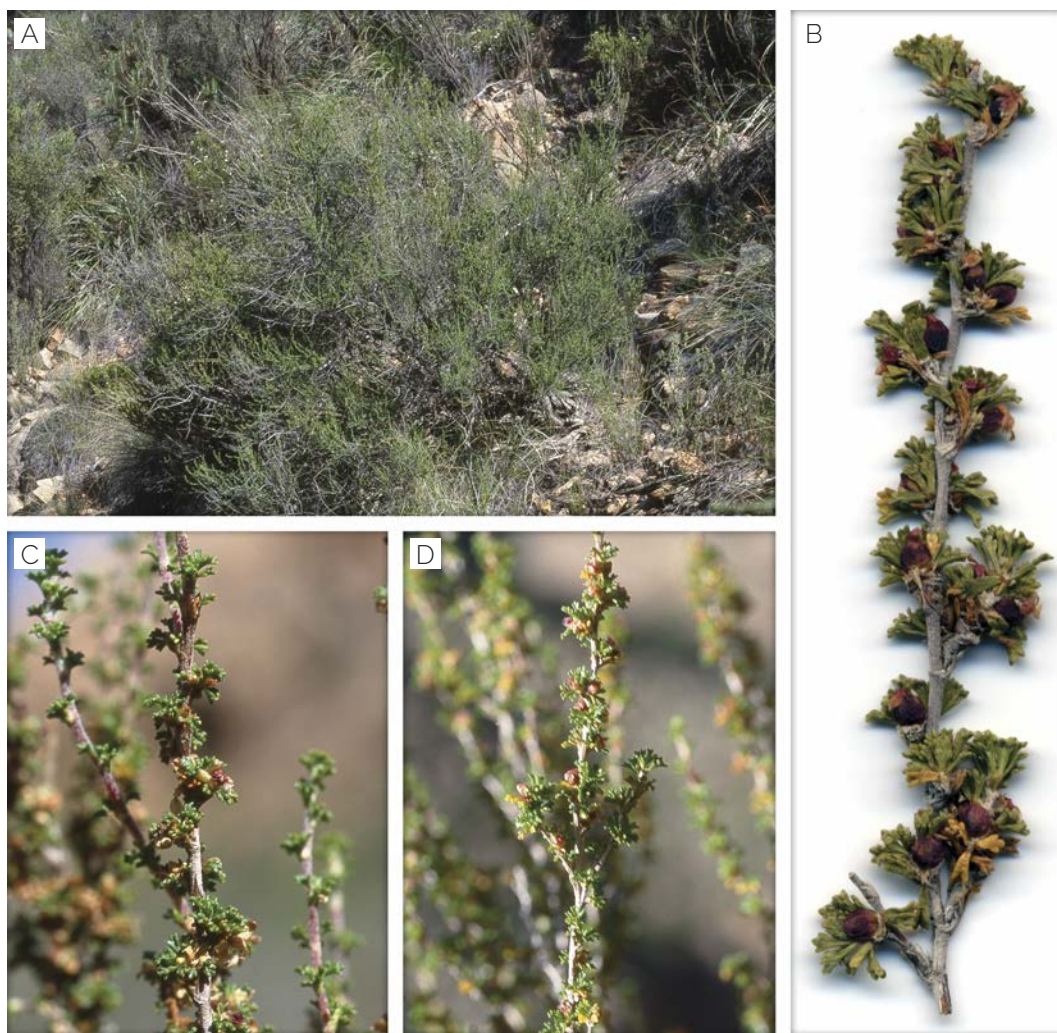
Notes: The very small, lobed leaves make this an easy species to identify. It may be confused with *Cliffortia cervicornu* but that species has more deeply lobed and finely divided leaves. Fellingham (1993b) suggested that *Esterhuysen 28523* was a hybrid between these two species.

Weimarck (1940a) originally placed this species in sect. *Costatae*, but later (Weimarck 1948) considered the fruits to be fleshy and hence transferred it to sect. *Baccatae*. However, Fellingham (1993b) noted that the fruits are not fleshy, but are swollen because they often contain two or three carpels. She therefore recommended its placement in subg. *Digraphidium*. Molecular work fails to corroborate either of these hypotheses. The chloroplast genome is thus far inconclusive, but the nuclear regions suggest a relationship with *Cliffortia spathulata* and some other species of sect. *Dracomontanae* (Fig. 1). It shares similar shaped leaves with *C. spathulata*, as well as four-sepalled flowers, but biogeographically is quite separate from the rest of the section, thus placed here only provisionally.

Representative specimens

SOUTH AFRICA. 3320 (Montagu): Ladismith, on N slopes of Anysberg, in Prinspoort, 730 m, 30 May 1990, (–BC), *Vlok 2307* (NBG, PRE); S slopes of Anysberg, 760 m, 2 Aug. 1956, (–DA), *Wurts 1424* (NBG); Touwsberg, lower S slopes, 610–915 m, 1 June 1956, (–DB), *Esterhuysen 25933* (BOL, K); Little Karoo, Touwsberg, 1035 m, 12 July 1937, (–DB), *Levyans 6148* (BOL, NBG); Ladismith, Touwsberg, S slopes near top, 1005 m, 1 July 1941, (–DB), *Levyans 7483* (BOL, NBG, PRE); Touwsberg, W end

above Zorgvliet, 860 m, 5 Oct. 1993, (–DB), *Oliver 10339* (NBC). **3321** (Ladismith): Besemfontein, Verlorenhoek Trail, gorge slopes above Verlorenhoek Pool, 760 m, 9 Apr. 2000, (–BC), *Whitehouse 109* (BOL, K, NBC); Swartberg Mts, Dolomite Kloof, at the top of the pass leading to Gamkaskloof and Die Hel, 22 Oct. 1986, (–BD), *Goldblatt 7984* (K, NBC); Swartberg, at top of pass to Gamkaskloof, 1220 m, 8 May 1963, (–BD), *Taylor 4744* (NBC, PRE); Swartberg Mts, in ravine between Kliphuisvlei and Gamkaskloof, 1250 m, 7 May 1989, (–BD), *Vlok 2113* (NBC); Ladismith, N slope of kopje about 6.5 km from town, 520 m, 15 Aug. 1948, (–CA), *Levyns 9030* (BOL); Ladismith, kopje S of the town, 610 m, 21 Aug. 1948, (–CA), *Levyns 9114* (BOL); Rooiberg, top of the ridge, 915 m, 10 Aug. 1948, (–DA), *Levyns 8981* (BOL); Van Wyksdorp, next to Rooiberg Pass, c. 3 km N of the Dwars-in-die-Weg Farm, 550 m, 7 Aug. 1990, (–DA), *Viviers & Vlok 486* (NBC, PRE); Gamka Reserve, N slope, moist area in bottom of kloof, 795 m, Mar. 1976, (–DB), *Boshoff P315* (NBC); Gamkaberg Nature Reserve, W facing slopes of Merrie se Kloof (side kloof to Tierkloof), near track to Bakenskop, 795 m, 16 Feb. 2001, (–DB), *Whitehouse 194* (BOL).



Cliffortia micrantha: A, habitat; B & D, branch with achenes; C, branch with female flowers.

(39–48) **Section Nematobus** Schltr. in Botanische Jahrbücher 24: 444 (1897). Type species: *C. pedunculata* Schltr.

Low to medium, densely to sparsely branched shrub, sometimes scrambling through surrounding vegetation. *Young stems* usually forming brachyblasts. *Stipules* present, free. *Leaves* trifoliolate; leaflets single-veined. *Flowers* solitary, in the axils of ordinary vegetative leaves or on a short to long peduncle. *Bracteoles* longer than immature receptacle although sometimes receptacle elongates very quickly; sepals 3; receptacle glabrous; carpel 1. *Achene* ribbed, glabrous, brown.

This section comprises a highly diverse group of species and seems rather unnatural morphologically; the molecular phylogenetic studies, however, shows support for their relationship. In particular, the chloroplast phylogenetic tree includes all species except *C. triloba* in a clade with 100% support (Fig. 2). The section is here divided into three informal series and two unplaced species. The pedunculate species (*Cliffortia pedunculata*, *C. triloba* and *C. lepida*) and the calcicole species (*C. anthospermoides*, *C. hirta* and *C. incana*) are supported by the molecular sequences. A close relationship between *C. curvifolia* and *C. densa* is suggested by morphology but not by the molecular phylogenies. Lastly, *C. exilifolia* and *C. apiculata* are anomalous here based on their morphology, which suggests alternative sectional placement.

Although this section includes many well-defined species, molecular work suggests that some of them may have hybrid ancestry, e.g. *Cliffortia triloba*. Only *C. anthospermoides* has shown evidence of recent hybridity with a species of another section (*C. obcordata*, sect. *Bifoliolae*).

(39–41) *Cliffortia pedunculata* series

39. ***Cliffortia pedunculata*** Schltr. in Botanische Jahrbücher 24: 444 (1897); Bolus & Wolley-Dod: 260 (1904); Weim.: 29, fig. 4F–K (1934); Levyns: 445 (1950); Dahlgren: fig. 5B (1971); Fellingham: 613 (2000). Type: Caledon District, Houwhoek Mt, 760 m, 7 Feb. 1896, *Schlechter 7409* (B, holo.†; BM!, BOL!, COI, G, GRA!, HBG!, K!, L, P, PH!, PRE, S!, SAM, STU!, W!, WAG, Z!).



Low sprawling shrub or scrambling up to 2 m high, killed by fire; brachyblasts forming but often indistinct. *Young stems* 1.7–3.2 mm wide, slightly flattened and winged, glabrous or hairy on one side; stem hairs spreading, up to 0.5 mm long. *Leaves* trifoliate; leaflets elliptic-oblong to oblong-obovate, outer straight to sickle-shaped, 10.1–43.0 × 2.4–13.0 mm; apex acute to acuminate, 0.1–0.6 mm long; margins flat or slightly inrolled beneath, toothed, or rarely entire, with up to 14 straight or slightly recurved teeth, 0.5–1.9 mm long; lamina chartaceous, 0.1–0.6 mm thick, midrib prominent beneath, either curved upwards and towards the stem or downwards and away from the stem, green but with two paler stripes on either side of midrib beneath, glabrous; sheath 4.0–11.9 mm long, abaxially glabrous, adaxially glabrous except sometimes for fringe of hairs at apex; stipules green and rigid with a texture similar to the petiole, 0.9–6.5 mm long, free, margins smooth; petiole present, 2.9–12.5 mm long. *Flowers* solitary in axils of undifferentiated leaves but on a long peduncle; bracteoles glabrous with smooth margins; sepals 3, glabrous. *Male flowers* with peduncles 6–26 mm long; bracteoles 3.0–7.1 mm long; pedicel 0.6–1.3 mm long; sepals broadly ovate, 6.4–10.6 × 2.8–5.3 mm, acute to acuminate at the apex; stamens 20–43; filaments 2.2–11.3 mm long, greenish white; anthers yellow. *Female flowers* with peduncle 1.8–18.0 mm long; bracteoles 2.5–7.0 mm long, longer than immature receptacle; sepals narrowly ovate to oblong, 2.5–4.3 × 0.6–2.3 mm, erect to spreading; carpel 1; stigma 5.1–7.1 mm long, red or greenish white, feathery, prominent above sepals; immature receptacle 1.3–2.1 × 1.0–1.2 mm, glabrous, smooth. *Achene* 4.2–7.2 × 1.5–3.4 mm, medium brown but sometimes appearing greyish on account of being covered by membranous layer, glabrous; irregularly acutely ribbed beneath membranous layer. *Flowering time*: throughout the year.

Habitat: Edges of streams and in seepage areas on clayish soils derived from shale bands of Table Mountain or Bokkeveld Series, in full sun but often slightly shaded by surrounding taller vegetation; altitude 50–1100 m.

Distribution: From Franschhoek in the north to the Kogelberg and east as far as the Klein River Mountains near Hermanus, with a single isolated population on the Cape Peninsula in Orange Kloof.

Conservation status: Widespread in the southwestern Cape, but rare and very localised; populations are often very small and at risk from local extinction through too frequent fires. Red List status: LC.

Etymology: *pedunculata* (Latin) means ‘with a peduncle’, an unusual feature of the flowers of this species and its close relatives compared to the rest of the genus.

Notes: This species along with *Cliffortia lepida* and *C. triloba* form an easily discernible group with their trifoliate, variously toothed or lobed leaves with a well-developed petiole and, even if sometimes quite short, a distinct peduncle beneath the flowers. *Cliffortia pedunculata* has the longest peduncle and the largest leaves of the three species of the section. The leaves are relatively weakly lobed, generally having just narrow teeth. *Cliffortia pedunculata* is a variable species with several different discrete scattered populations, some of which approach *C. lepida* – see also note under that species.



Representative specimens

SOUTH AFRICA. **3318** (Cape Town): Table Mt. above Orange Kloof, 335 m, Oct. 1893, (–CD), *Bolus 7985* (BOL); Table Mt., Orange Kloof and Disa Gorge, Dec. 1915, (–CD), *Bolus s.n.* (BOL); Orange Kloof, (–CD), *Dummer s.n.* (NBG); Cape Peninsula, Orange Kloof, Apr. 1908, (–CD), *Dummer 9301* (PRE); Orange Kloof, 305 m, 14 Oct. 1893, (–CD), *Guthrie 1334* (BOL); Orange Kloof, 100 m, Nov. 1902, (–CD), *Marloth 2750* (PRE); Table Mt., above Orange Kloof, 520 m, 8 May 1892, (–CD), *Schlechter 728* (BOL); Table Mt., 520 m, May 1892, (–CD), *Schlechter 1148* (BM, K); Orange Kloof, beyond end of road near margin of Kloof forest, 455 m, 26 June 1968, (–CD), *Taylor 7326* (K, NBG, PRE); Cape Peninsula, Orange Kloof R, 19 Dec. 1896, (–CD), *Wolley-Dod 2140* (BM, BOL, K); Jonkershoek Forest Reserve, above stream in Eerste R Kloof, 15 June 1975, (–DD), *Esterhuysen 33890* (BOL); Stellenbosch, major tributary of Eerste R, 1065 m, Jan. 1967, (–DD), *Kerfoot 5684* (K, NBG, PRE); Stellenbosch, Jonkershoek, Eerste R, 610 m, Dec. 1967, (–DD), *Kerfoot 6195* (K, NBG, PRE); Jonkershoek, along path below first waterfall, 425 m, 10 June 1972, (–DD), *Taylor 8113* (NBG); Jonkershoek Nature Reserve, N loop of Panorama Trail, slopes beneath Third Ridge Peak, 915 m, 9 Aug. 2001, (–DD), *Whitehouse 243* (BOL, NBG). **3319** (Worcester): Franschhoek Forest Reserve, 4 July 1935, (–CC), *Barker & Esterhuysen s.n.* (BOL); Franschhoek, 335 m, Sept. 1895, (–CC), *Bolus 6981* (BM, BOL, K, NBG, PRE); Berg R Hoek, 1 Jan. 1940, (–CC), *Compton 8317* (NBG); Franschhoek Forest Reserve, 24 Jan. 1942, (–CC), *Leighton s.n.* (PRE); Paarl, Franschhoek Forest Reserve, July 1935, (–CC), *Phillips 3540* (K, PRE); Franschhoek Forest Reserve, near Bushman's Castle, 30 Aug. 1937, (–CC), *Salter 6879* (BM, K). **3418** (Simonstown): Arieskraal, S-facing slopes on Bokkeveld shale above Arieskraal Dam, 215 m, 29 Nov. 2000, (–BB), *Whitehouse 164* (BOL, NBG); S Hottentots Holland Mountains, Kogelberg State Forest, On Fairy Glen side of Palmiet River, ± 180 m from Palmiet R and 3.5 km from S boundary gate, nearly 750 m from Fairy Glen road, 50 m, 18 Oct. 1993, (–BD), *Kruger 1183* (NBG, PRE). **3419** (Caledon): Houwhoek area, western border of Haasvlakte terrain, adjoining De Hoop farm, 19 Sept. 1987, (–AA), *Boucher 5181* (NBG, PRE); Arieskraal, 30 Dec. 1944, (–AA), *Compton 16848* (NBG); Arieskraal, 30 Dec. 1944, (–AA), *Leighton 898* (BOL); Houwhoek, 760 m, 7 Feb. 1896, (–AA), *Schlechter 7409* (BM, BOL, K, PRE, WAG, Z); Klein River Mts, Hermanus, Petersfontein, 610 m, July 1896, (–AC), *Bodkin 4131* (BOL, NBG); Onrus R Mt, SE slopes, 305 m, 30 Nov. 1940, (–AC), *Esterhuysen 4265* (BOL, K, PRE); Onrus R Mt, 305 m, Mar. 2003, (–AC), *Gwynne Evans in Whitehouse 359* (BOL); S Hottentots Holland Mountains, Kogelberg State Forest, 3.3 km from Stokoe Bridge, 500 m N, 140 m, 30 Nov. 1993, (–AC), *Kruger 1216* (NBG, PRE); Kogelberg, S slopes of Mt. Horeb, Kleinmond-Highlands road, 200 m, 27 Sept. 2000, (–AC), *Whitehouse 146* (K, NBG).

40. **Cliffortia lepida** Weim. in Botaniska Notiser 90: 173, fig. 1f–i, t. 3 (1948); Fellingham: 612 (2000). Type: Worcester District, Mostertshoek Twins, 1 525–1 830 m, Jan. 1944, *Esterhuysen* 9836 (BOL, holo.).



Low sprawling shrub or scrambling up to 0.3 m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 1.2–1.5 mm wide, tinged reddish, slightly flattened and winged, glabrous. *Leaves* trifoliolate; elliptic-oblong to obovate, outer ones sometimes slightly sickle-shaped, 12–19 × 1.5–4.9 mm; apex acute to broadly acuminate, 0.3–0.4 mm long; margins flat or slightly inrolled beneath, entire or 2–3-lobed, lobes 1.3–2.5 mm long; lamina chartaceous, 0.3–0.5 mm thick, curved downwards and away from the stem, green but with two paler stripes on either side of midrib beneath, glabrous; sheath 2.0–3.2 mm long, abaxially glabrous, adaxially glabrous except for fringe of hairs at apex; stipules 1.5–3.4 mm long, free, margins smooth to serrulate; petiole present, 2.7–4.6 mm long. *Flowers* solitary in axils of undifferentiated leaves but on a long peduncle; bracteoles glabrous with smooth margins; sepals 3, glabrous. *Male flowers* with bracteoles 3.7–5.0 mm long; pedicel 0.5–0.6 mm long; sepals broadly ovate, 4.6–5.5 × 1.6–2.2 mm, acute to acuminate at apex; stamens 12–19; filaments greenish white; anthers brownish red. *Female flowers* with peduncle 2.4–13.0 mm long; bracteoles 4.0–5.3 mm long, longer than immature receptacle; sepals narrowly ovate to oblong, 2.5–3.2 × 0.7–1.0 mm, spreading; carpel 1, red, feathery, prominent above sepals, glabrous, smooth. *Achene* ± 6.2 × ± 2.1 mm, medium brown but sometimes appearing greyish on account of being covered by membranous layer, glabrous; irregularly acutely ribbed beneath membranous layer. *Flowering time*: throughout the year.

Habitat: In seeps and beside small seasonal streams at high altitude on soils derived from Table Mountain Series, in full sun; altitude 1 050–2 000 m.

Distribution: Scattered on mountains between Groot Winterhoek above Tulbagh to the western end of the Riviersonderend Mountains above Villiersdorp.

Conservation status: This is a poorly known species, with very isolated small populations, growing at high altitudes. It has few threats, but being killed by fire, each population is at risk of local extinction. Red List status: LC.

Etymology: *lepida* (Latin) means 'pleasant, charming, neat' (alternatively it might be derived from the Greek word *lepis* meaning 'scale').

Notes: Weimarck (1948) describes this species as intermediate between *Cliffortia pedunculata* and *C. triloba*, and indeed certain forms are difficult to distinguish from one or the other. Furthermore its distribution is found bridging the gap between those two species. From *C. pedunculata* it differs by its overall smaller habit, fewer stamens and more lobed rather than toothed leaflets. From *C. triloba* it is distinguishable by its laxer more scrambling habit and inability to resprout after fires.

Representative specimens

SOUTH AFRICA. 3319 (Worcester): Great Winterhoek, E side, 1770–1830 m, 17 Apr. 1960, (–AA), *Esterhuysen* 28469 (BM, BOL); Great Winterhoek, 1675–1830 m, 5 Sept. 1960, (–AA), *Esterhuysen* 28513 (BM, BOL, K, NBC, PRE); Klein Winterhoek, 1830–1980 m, 16 Oct. 1960, (–AA), *Esterhuysen* 28532 (BM, BOL); Mostertshoek Twins, 1525–1830 m, Jan. 1944, (–AD), *Esterhuysen* 9836 (BOL); Seven Sisters Mt., 1370 m, 1 Feb. 1953, (–CA), *Esterhuysen* 21189 (BOL); Seven Sisters Mt., 1065–1370 m, 23 Oct. 1960, (–CA), *Esterhuysen* 28538 (BM, BOL, K, NBC, PRE); Chavannesberg, S side, foot of cliffs at summit, 3 Oct. 1948, (–CB), *Esterhuysen* 14591 (BOL, NBC, PRE); Du Toits Peak, NW slopes, 1525 m,

26 Jan. 1943, (–CC), *Esterhuysen 8564* (BOL, PRE); Du Toits Peak, ledges on S slopes, 1220 m, 27 Dec. 1949, (–CC), *Esterhuysen 16654* (BOL); Stettynsberg, SW slopes, 1220–1525 m, 16 Dec. 1944, (–CD), *Esterhuysen 11105* (BOL, K, NBG, PRE); Riviersonderend Mts, Silverstream, between Villiersdorp and Genadendal, 26 Oct. 1986, (–CD), *Esterhuysen 36384* (BOL, NBG); Blokkop, ridge to summit N of valley above Villiersdorp Wild Flower Garden, damp seeps beneath cliffs at summit, 1220 m, 24 July 2001, (–CD), *Whitehouse 232* (BOL, K, NBG).



Cliffortia lepida: A, young plant in habitat; B, branch.

41. **Cliffortia triloba** Harv., *Flora Capensis* 2: 298 (1862); Weim.: 30, fig. 4A–E (1934) & 402 (1940b); Fellingham: 614 (2000). Type: Clanwilliam District, Brakfontein, Aug. 1836, *Ecklon & Zeyher* 1735 (K, holo!; B, G, HBG!, L, LD, P, SI, SAM!, TCD!, U, W, Z!, iso.).



C. dentata sensu Eckl. & Zey.: 268 (1836), non Willd.

Low erect shrub up to 0.6 m high, resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 1.0–1.3 mm wide, sometimes tinged reddish, slightly flattened and winged, glabrous. *Leaves* trifoliate; leaflets obovate, 7.5–11.6 × 3.4–8.4 mm; apex acute to broadly acuminate, 0.3–0.7 mm long; margins flat, 3-lobed, lobes 2.1–4.4 mm long; lamina chartaceous, 0.2–0.4 mm thick across midrib, curved upwards and towards the stem, glabrous; sheath 0.9–1.8 mm long, abaxially glabrous, adaxially glabrous except for fringe of hairs at apex; stipules 1.2–2.9 mm long, free, margins smooth; petiole 0.8–1.2 mm long. *Flowers* solitary in axils of undifferentiated leaves but on a long peduncle; bracteoles glabrous with smooth margins; sepals 3, glabrous. *Male flowers* with sepals broadly ovate, acute to acuminate at the apex; filaments red; anthers brownish red or yellow. *Female flowers* with peduncles 0.7–1.9 mm long; bracteoles 4.1–5.3 mm long, longer than immature receptacle; sepals narrowly ovate to oblong, 4.4–5.1 × 1.3–1.4 mm, spreading; carpel 1; stigma 12.0–15.1 mm long, red, feathery, prominent above leaves and sepals; immature receptacle 1.5–1.7 × 0.9–1.1 mm, glabrous, smooth. *Achene* ± 4.5 × ± 1.6 mm, medium brown but sometimes appearing greyish on account of being covered by membranous layer, glabrous; irregularly acutely ribbed beneath membranous layer. *Flowering time*: July to March.

Habitat. Fynbos on well-drained shale slopes derived from Table Mountain Series, in full sun; altitude 550–1400 m.

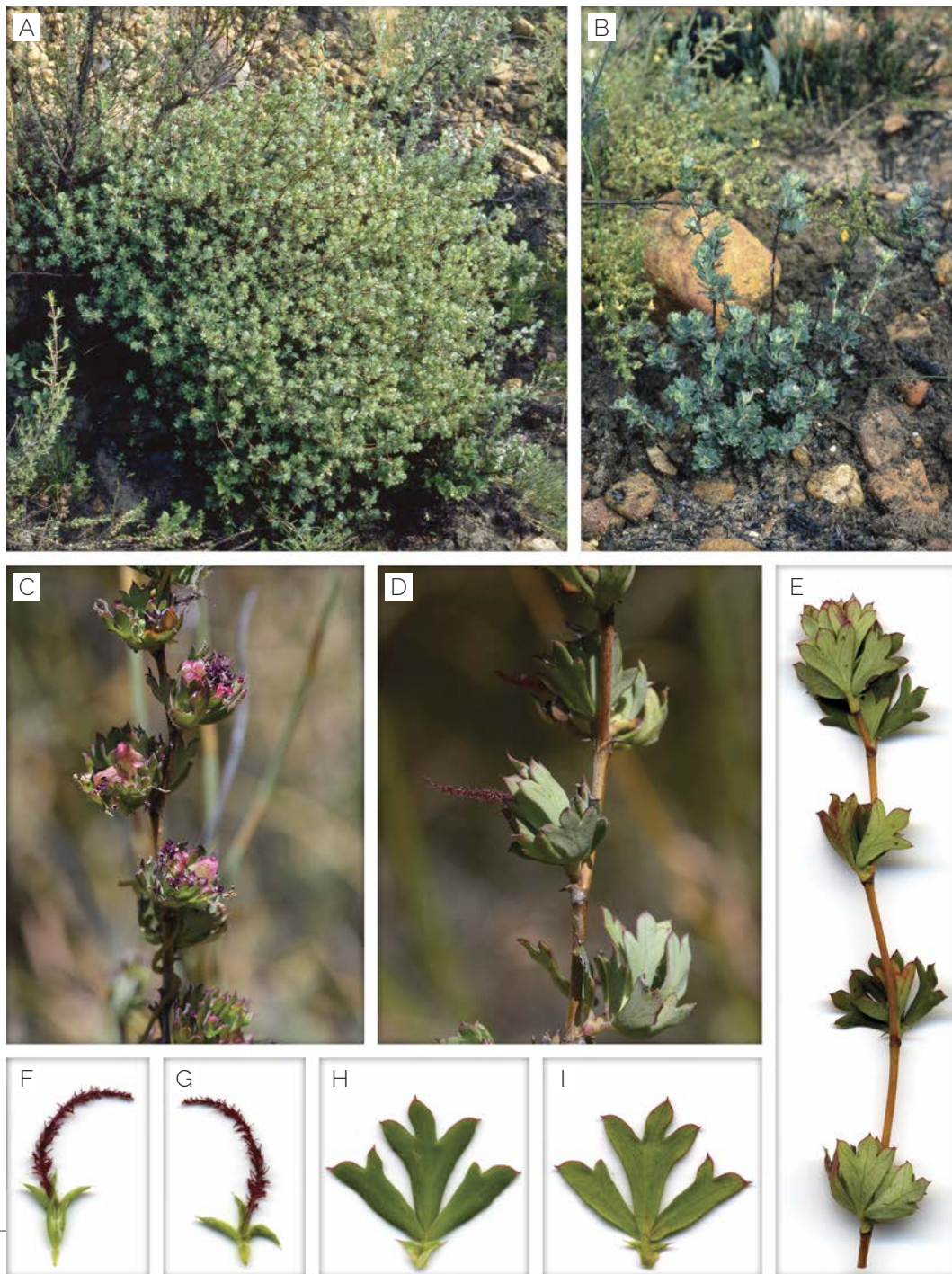
Distribution: Found scattered in the Koue Bokkeveld and Cederberg, from Skurweberg to Pakhuis Pass.

Conservation status: Scattered but not uncommon and being a resprouter it is not at risk from too frequent fires. Red List status: LC.

Etymology: *triloba* (Latin) means ‘three-lobed’, referring to the apex of the leaves which are almost invariably lobed in such a way.

Notes: A distinctive species with its broadly obtriangular lobed leaves on a short petiole. While the short peduncle to the flowers clearly shows its close relationship to *Cliffortia pedunculata* and *C. lepida*, its upright habit distinguishes it from forms of *C. lepida* with similar leaves. It is the only resprouting and clonally spreading species of the three and is able to grow away from permanently damp areas.

While the evidence from the nuclear genome clearly supports the morphological affinities with the other pedunculate species of sect. *Nematobus*, the chloroplast genome exhibits a surprising relationship to a clade containing species such as *C. multiformis* and *C. polygonifolia*. This suggests the possibility that this species might have had a hybrid origin. In such a scenario, characters such as the resprouting ability, more shrubby habit and ability to tolerate more arid habitats could have derived from the parent that did not belong to sect. *Nematobus*. If the species did derive from a hybridisation event such as this,



then it is not a recent event as the distribution is distinct from the other species of sect. *Nematobus* and has spread considerably from wherever its point of origin was.

Representative specimens

SOUTH AFRICA. **3218** (Clanwilliam): Clanwilliam, Brakfontein, Aug. , (–BD), *Ecklon 1735* (K); Clanwilliam, Brakfontein, (–BD), *Ecklon & Zeyher 1735* (PRE). **3219** (Wuppertal): Pakhuis Pass, 760 m, 2 Oct. 1948, (–AA), *Acocks 15032* (K, PRE); Pakhuis, Sept. 1947, (–AA), *Bolus in Herb. Bolus 23786* (BOL); Pakhuis Pass, 610 m, 17 Aug. 1939, (–AA), *Compton 7740* (NBG); Pakhuis Pass, 30 Sept. 1940, (–AA), *Compton 9625* (NBG); Pakhuis, 29 Sept. 1940, (–AA), *Esterhuysen 3441* (BOL, K); Clanwilliam, Pakhuis Pass, 1065 m, 23 Sept. 1949, (–AA), *Levy's 9437* (BOL); Cederberg, Krakadouw Heights, 1065 m, 23 Oct. 1923, (–AA), *Pocock 541* (NBG, NBG); Pakhuis Pass, 29 Sept. 1932, (–AA), *Salter 2770* (BM, BOL, K); Pakhuis Pass, S slope, 1 Sept. 1938, (–AA), *Salter 7520* (BOL); Cederberg, Pakhuis Pass, on bypass road to Soldaatkop, 700 m, 7 July 1984, (–AA), *Taylor 10978* (NBG, PRE); Nieuwoudts Pass, 4 Sept. 1938, (–AC), *Acocks & Hafström 569* (K, PRE); Cederberg, Algeria, 3 Dec. 1934, (–AC), *Compton 4785* (NBG); SE slopes of Suurvliesberg, Mar. 1940, (–AC), *Esterhuysen 2543* (BOL); Cederberg Mts, Middelberg, 14 Dec. 1941, (–AC), *Esterhuysen 7263* (BOL); Cederberg Mts, Uitkyk Peak, 16 Dec. 1941, (–AC), *Esterhuysen 7377* (BOL); Cederberg Mts, Uitkyk Peak, 16 Dec. 1941, (–AC), *Esterhuysen 7378* (BOL); Cederberg, Klein Koupoort path below junction with Groot Koupoort, 760 m, 10 Nov. 1969, (–AC), *Taylor 7483* (NBG, PRE); Wupperthal, Central Cederberg, Sneeuwberg Hut vicinity, plots S of jeep track, TR 884, 1360 m, 19 Sept. 1984, (–AC), *Taylor 11064* (NBG, PRE); Cederberg Mts, N of Algeria, Nieuwoudt Pass, opposite forester's village, 550 m, 18 Aug. 2001, (–AC), *Whitehouse 251* (BOL, NBG); Elandskloof, 3 Oct. 1940, (–CA), *Esterhuysen 3439* (BOL); Grootberg, SW slopes, 1220 m, 21 Dec. 1940, (–CA), *Esterhuysen 4153* (BOL, K, PRE); Krom R, 760 m, 27 Sept. 1934, (–CA), *Leighton 21603* (BOL, PRE); Clanwilliam–Ceres, old Elandskloof, 25 Mar. 1951, (–CA), *Maguire 895* (NBG); Sandfontein Peak, 1370 m, 5 Apr. 1947, (–CB), *Compton 19429* (NBG); Skurweberg [Schurweberg], next to Bokkeveld Tafelberg, SE slopes, 11 Oct. 1952, (–CD), *Esterhuysen 20609A* (BOL).

(42–44) *Cliffortia hirta* series

42. ***Cliffortia hirta* Burm.f.**, Prodrum Florae Capensis: 31 (1768); Weim.: 42, fig. 8A–E (1934); Levyns: 446 (1950); Fellingham: 615 (2000); Trinder-Smith et al.: 150 (2006). Type: South Africa, without precise locality, *Herb. Burman f. s.n.* (G, holo.)



C. sarmentosa L.: 299 (1771); DC.: 596 (1825); G.Don: 596 (1832); Eckl. & Zeyh.: 269 (1836); Harv.: 302 (1862); Bolus & Wolley-Dod: 260 (1904). Lectotype, designated by Fellingham in Cafferty & Jarvis (2002): Cape of Good Hope, *Tulbagh 105*, Herb. Linn. No. 1197.3 (LINN, lecto!).

C. polygonifolia sensu Juel: 276 (1918), non L.

Medium erect shrub up to 1.5 m high but weak-stemmed and often straggling, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.8–1.3 mm wide, tinged reddish, hairy; stem hairs adpressed upwards to spreading, 0.6–1.3 mm long. *Leaves* trifoliolate; linear to needle-shaped, 5.5–17.3 × 0.8–1.6 mm, the outer ones often noticeably shorter than the middle one; apex acute to mucronate, 0.2–0.4 mm long; margins inrolled beneath, entire; lamina chartaceous, 0.1–0.3 mm thick, straight to slightly curved upwards or downwards, midrib prominent against lamina beneath, hairy above, 0.4–0.8 mm long, hairy all over beneath, 0.5–1.0 mm long; sheath 2.1–2.9 mm long, produced to a small, often reddish, point at insertion of leaves, abaxially hairy, adaxially with scattered adpressed hairs and a fringe at the apex; stipules 0.3–1.0 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 3, hairy on outside. *Male flowers* with bracteoles 2.1–3.3 mm long; pedicel 0.8–1.1 mm long; sepals broadly ovate, 5–6 × 3.0–4.1 mm, acute to acuminate at apex; stamens 22–30; filaments 4.3–5.8 mm long, red to white; anthers yellow. *Female flowers* with bracteoles 1.9–3.7 mm long, longer than immature receptacle; sepals narrowly ovate, 1.6–2.7 × 0.6–1.1 mm, erect; carpel 1; stigma 4.2–5.5 mm long, red, feathery, tucked at the base of leaves but often visible; immature receptacle 1.3–2.1 × 0.9–1.2 mm, glabrous, smooth or ribbed. *Achene* 2.3–3.9 × 1.1–1.4 mm, medium to greyish brown, glabrous; ribs 12–14, rounded, up to 0.3 mm wide. *Flowering time*: all year.

Habitat: Clayish soil or wind-blown sands in full sun; altitude 0–200 m.

Distribution: Once widespread on the Cape Flats from Bokbaai north of Milnerton to Froggy Pond near Simonstown and east to Macassar, its range is now greatly reduced and is only found in a few isolated pockets of natural vegetation that remain.

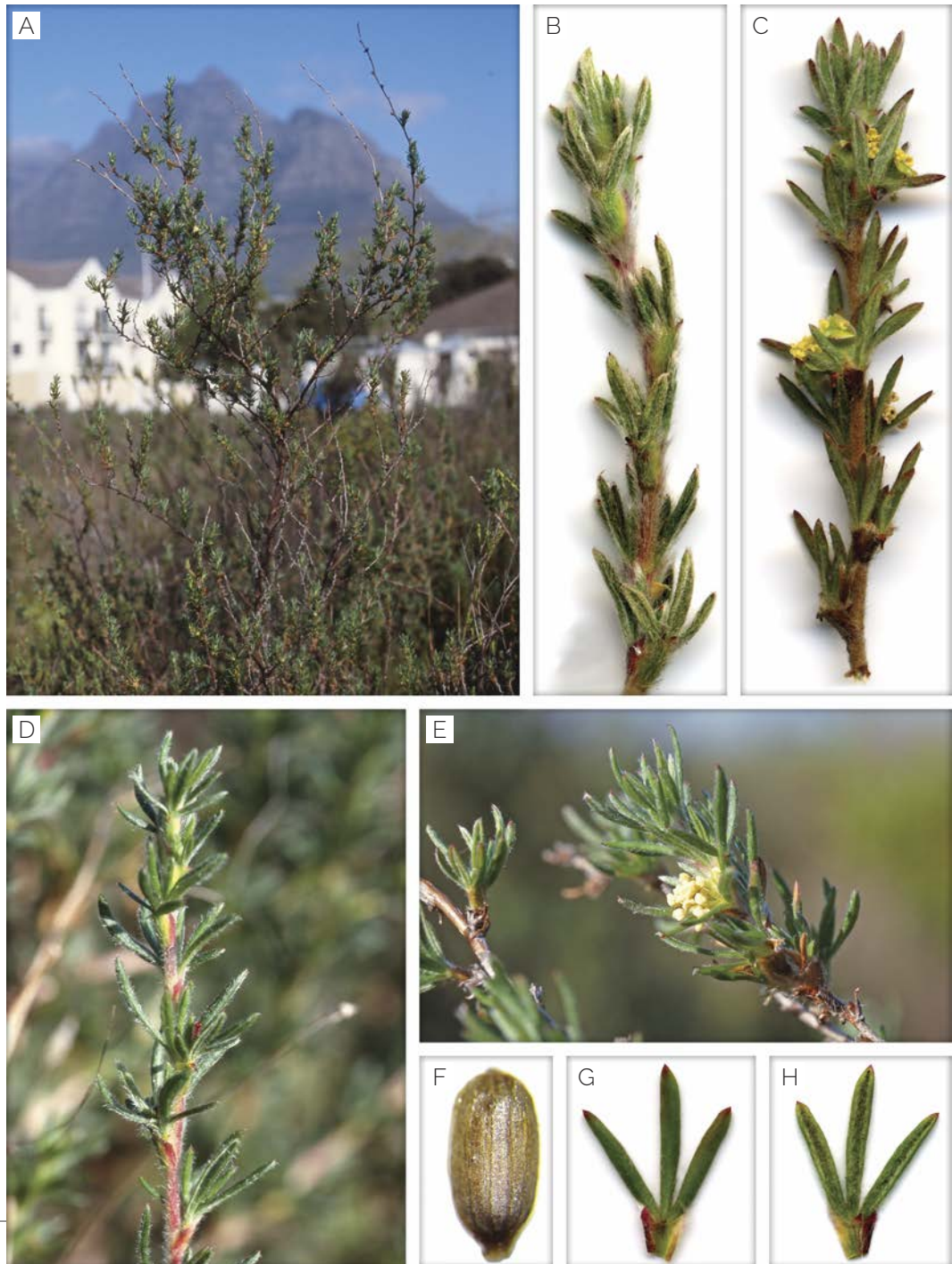
Conservation status: Known from a few restricted isolated small populations. Some are under severe risk of development, others at risk from too frequent burning and recreational activity such as dog-walking, or invasive alien plant species. One population protected in a very small nature reserve only 6 ha in size and restricted to a very small part of that. Red List status: EN.

Etymology: *hirta* (Latin) means 'hairy', particularly with long distinct hairs.

Notes: A relatively isolated species taxonomically, it appears most similar to *Cliffortia stricta* or members of the *C. eriocephalina* group. It has a unique diagnostic character in that the sheaths are extended into a small (glandular?) often reddish point just beneath the insertion of the leaves. The species can therefore easily be distinguished, even when sterile. In flower, the large male flowers with numerous stamens separate this species from the above-mentioned species, which never have more than 15 stamens. Furthermore, only *C. stricta* shares a similar distribution and habitat, *C. eriocephalina* and its allies being restricted to high altitudes.

Representative specimens

SOUTH AFRICA. **3318** (Cape Town): near Bokbaai, 15 Sept. 1940, (–CB), *Esterhuysen 3819* (BOL); Cape Town, Sept. 1846, (–CD), *Alexander-Prior s.n.* (K); Devil's Peak, lower slopes, 3 May 1918, (–CD), *Barnsley s.n.* (NBG); near Cape Town, Mowbray, 30 m, July 1883, (–CD), *Bolus s.n.* (BOL); Cape District (Salt R ex Weimarck), Jan. , (–CD), *Burchell 509* (K); Cape District (Rondebosch ex Weimarck), Feb. , (–CD), *Burchell 756* (K); Cape Peninsula, Rondebosch Common, 30 Nov. 1944, (–CD), *Compton 16573* (NBG); Cape Peninsula, Rhodes Estate above Observatory, 28 May 1945, (–CD), *Esterhuysen 11617* (BOL); Cape Peninsula, University of Cape Town grounds, slopes above Bolus Herbarium, 5 Oct. 1954, (–CD), *Esterhuysen 23544* (BOL, PRE); Cape Peninsula, Devil's Peak, May 1908, (–CD), *Froembling s.n.* (NBG, NBG); Cape Peninsula, Rondebosch Common., 12 Aug. 1974, (–CD), *Goldblatt 2318* (NBG, PRE); Cape Flats, Raapenburg, 10 m, June 1889, (–CD), *Guthrie 23* (BOL); Cape Peninsula, Rondebosch Common, Camp Ground, 3 July 1938, (–CD), *Isaac s.n.* (BOL, PRE); Rondebosch, Camp Ground, 30 Nov. 1944, (–CD), *Leighton 727* (BOL); Rondebosch, University of Cape Town grounds, 185 m, 29 Apr. 1931, (–CD), *Levyans 3120* (BOL); Cape Town, Milnerton, Apr. 1906, (–CD), *Marloth 4267* (NBG, PRE); Rosebank, N end of Camp Ground, 24 July 1918, (–CD), *Pillans 3616* (BOL, PRE); Cape Peninsula, Rondebosch Common, 18 June 1949, (–CD), *Steyn 81* (NBG); Paarden-Eiland, Jakkals R, N part of Eiland small dune S of river mouth, 60 m, Aug. 1969, (–CD), *Tolken 48* (NBG, PRE); Cape Peninsula, Rondebosch Common, SW corner, 20 m, 7 Feb. 2000, (–CD), *Whitehouse 76* (BOL, NBG); Cape Peninsula, Mowbray, 3 May 1896, (–CD), *Wolley-Dod 1051* (BOL); Durbanville Nature Garden, 28 July 1992, (–DC), *Fellingham 1609* (NBG); Tygerberg Nature Reserve, 200 m, 18 July 1976, (–DC), *Loubser 3606* (NBG); Bellville, Tygerberg hills, Tygerberg Nature Reserve, 5 June 1978, (–DC), *Low 461* (NBG); Cape Flats, Bellville, Aug. 1903, (–DC), *Marloth 3430* (NBG); S end of Durbanville Nature Garden next to Durbanville Race Course, 185 m, 1 May 2001, (–DC), *Whitehouse 218* (BOL). **3418** (Simonstown): Cape Peninsula, Simonstown, Froggy Pond, 17 Oct. 1948, (–AB), *Esterhuysen 14617* (BOL); off road from Macassar township to Eerste River, between N2 and Eerste R, 27 May 1978, (–BA), *Low 407* (NBG).



43. **Cliffortia incana** Weim. in Botaniska Notiser 106: 79 (1953); Fellingham: 615 (2000). Type: Bredasdorp District, Potberg range, slopes of Hamerkop near the mouth of the Breede R., frequent on E slopes, 305 m, 5 Oct. 1947, *Levyms 8401B* (SAM, holo.; BOL!, iso.).



Erect medium shrub up to 1.5 m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 1.6–2.2 mm wide, sometimes tinged reddish but densely covered in long white hairs; stem hairs spreading, 0.8–2.0 mm long. *Leaves* trifoliolate; leaflets linear to needle-shaped, 9–19 × 0.8–1.4 mm, middle one usually longer than outer ones; apex sharply long acuminate, 0.5–0.8 mm long; margins inrolled beneath, entire; lamina chartaceous, 0.1–0.4 mm thick, curved upwards and towards the stem, midrib prominent against lamina beneath, green and glabrous above, densely whitish hairy beneath, hairs 0.7–1.8 mm long; sheath 3.0–4.2 mm long, abaxially hairy, adaxially with scattered adpressed hairs and fringe at apex; stipules brown and contrasting with the stem and leaf, 0.7–2.2 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins clearly ciliate; sepals 3, hairy on outside. *Male flowers* with bracteoles 3.8–5.0 mm long; pedicel 0.7–1.1 mm long; sepals broadly ovate, 4.6–5.6 × 2.5–3.0 mm, acute to acuminate at the apex; stamens 8–10; filaments 6.6–8.8 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 3.9–5.1 mm long, longer than immature receptacle; sepals narrowly ovate to oblong, 2.7–3.5 × 0.6–1.1 mm, erect; carpel 1; stigma 4.7–6.8 mm long, red to pinkish, feathery, tucked at the base of leaves but sometimes visible; immature receptacle 1.7–2.4 × 0.8–1.0 mm, glabrous, smooth. *Achene* 2.6–3.1 × 0.9–1.1 mm, medium brown, glabrous; ribs 6–7, rounded, up to 0.1 mm wide. *Flowering time*: probably throughout the year.

Habitat: Near to streams in full sun on deep neutral sand of valley between Table Mountain Series mountain and limestone hills; altitude 100–350 m.

Distribution: Restricted to a small area in the De Hoop Nature Reserve, south of the Potberg near Hamerkop.

Conservation status: Only known from two small populations within close proximity of one another, but no indication of any decline in numbers and protected within a reserve, although alien encroachment or frequent fires could pose a risk. Red List status: VU.

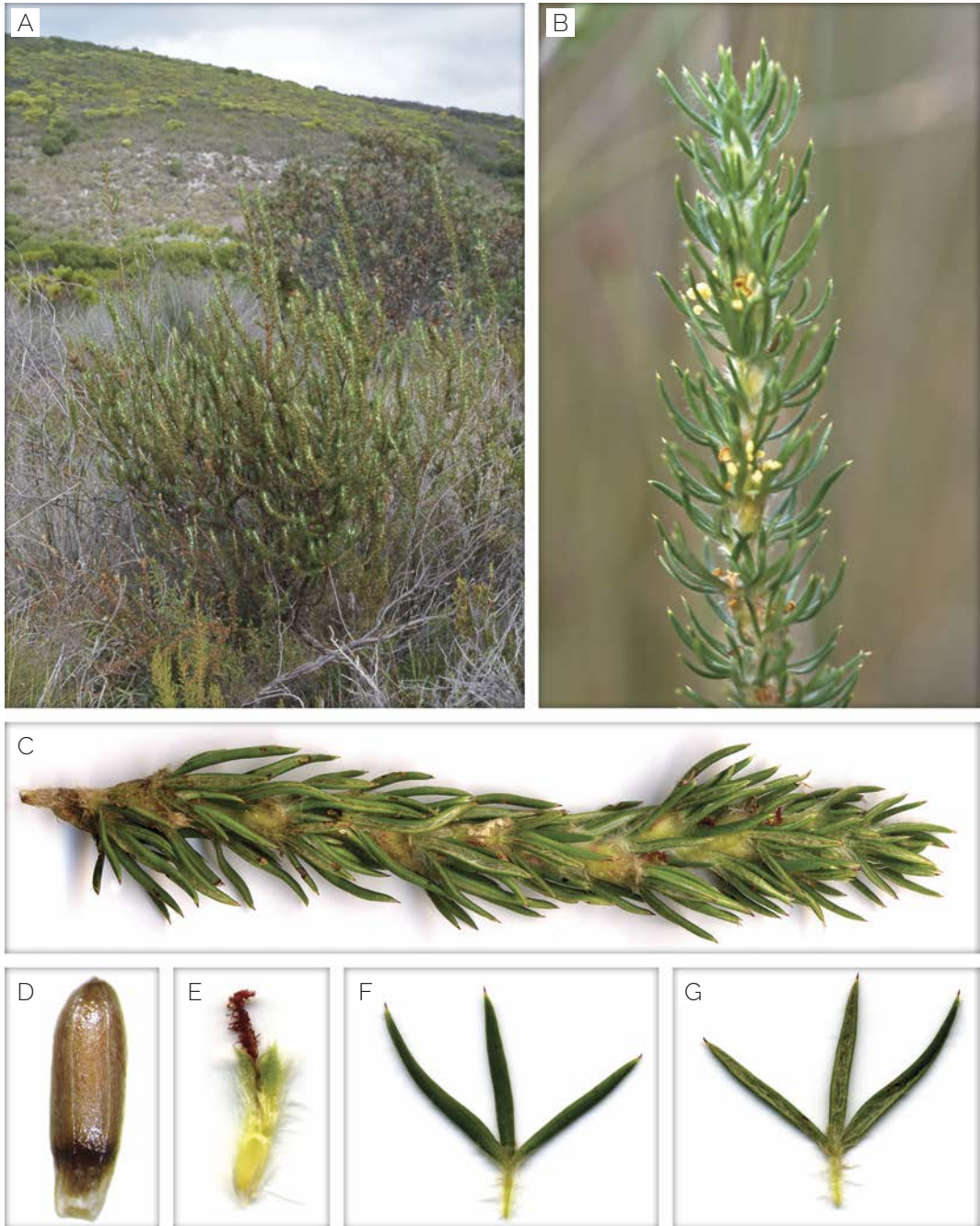
Etymology: *incana* (Latin) means 'greyish white, hoary', referring to the general appearance of the plant with its greenish white leaves and shaggy white hairs on the stems.

Notes: In appearance it is very similar to *Cliffortia stricta*, which grows in the same area and was mixed in with the type collection. However, *C. incana* has much longer, less rigid leaves and shaggily hairy stems. Furthermore, it has always been collected with male flowers, which are very rare in *C. stricta* (although plants with male flowers have been found on the Potberg). No intermediates have been found, which would be expected if the two were closely related. Molecular evidence also suggests that the two species are quite distinct.

The general habit, long needle-like leaves and highly visible male flowers, can also give an impression of *Cliffortia burchellii*, but that species is almost entirely glabrous preventing further confusion.

Representative specimens

SOUTH AFRICA. 3420 (Bredasdorp): Potberg range, Hamerkop, 305 m, 5 Oct. 1947, (–BC), *Levyms 8401* (BOL); De Hoop Nature Reserve, Potberg Section, 2 km W of Cupidoskraal along road, 140 m, 20 May 2001, (–BC), *Whitehouse 227* (BOL, NBG); Potberg area, Witwater, on Potberg Estates NW of Cape Infanta, hills S-facing slopes, 215 m, 18 June 1984, (–BD), *Oliver 8483* (NBG, PRE).



Cliffortia incana: A, habitat; B, branch with male flowers; C, branch with female flowers; D, achene; E, female flower; F, dorsal view of leaf; G, ventral view of leaf.

44. ***Cliffortia anthospermoides*** Fellingham in *Bothalia* 37(1): 9, fig. 1–2 (2007). Type: Western Cape, Caledon Division, Walker Bay area, Grootbos Private Nature Reserve, 150m, 31 Aug. 1996, Fellingham 1691 (BOL, holo.; K!, NBG!, PRE!, iso.)



C. sp. 2 sensu Fellingham: 614 (2000).

Erect shrub up to 1 m high, resprouting after fire and spreading clonally, densely divaricately branched, forming closely overlapping brachyblasts. *Young stems* 0.8–1.2 mm wide, tinged reddish, hairy, older stems minutely tuberculate; stem hairs spreading, 0.4–1.0 mm long. *Leaves* trifoliolate; leaflets elliptic to oblong or linear, 3.6–8.6 × 1.1–1.3 mm; apex acute to mucronate, 0.1–0.3 mm long; margins flat, scabrid; lamina chartaceous, 0.3–0.4 mm thick, straight or slightly curved upwards and towards the stem, glabrous above, with a few scattered hairs along the midrib beneath, hairs 0.4–1.0 mm long; sheath 1.1–2.1 mm long, abaxially hairy to glabrescent, adaxially glabrous except for fringe of hairs at apex; stipules 0.3–0.7 mm long, free, margins ciliate to smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on the keel, margins smooth; sepals 3, glabrous. *Male flowers* with bracteoles 1.7–2.6 mm long; pedicel 0.5–0.6 mm long; sepals broadly ovate, 4.1–5.1 × 2.9–3.4 mm, acute to acuminate at the apex; stamens 11–13; filaments 4.6–6.2 mm long, red; anthers brownish red. *Female flowers* with bracteoles 2.0–2.6 mm long, longer than immature receptacle; sepals ovate, 2.1–2.7 × 1.5–2.0 mm, erect to spreading; carpel 1; stigma 3.3–5.7 mm long, red, feathery, prominent above leaves; immature receptacle 1.4–2.2 × 0.7–1.1 mm, glabrous, clearly ribbed. *Achene* ellipsoid, 1.8–2.4 × 1.0–1.3 mm, medium brown, glabrous; ribs 12–13, rounded to acute, up to 0.1 mm wide. *Flowering time*: October to December and May, possibly all year.

Habitat: Fynbos on alkaline limestone-derived well-drained soils in full sun; altitude 50–250 m.

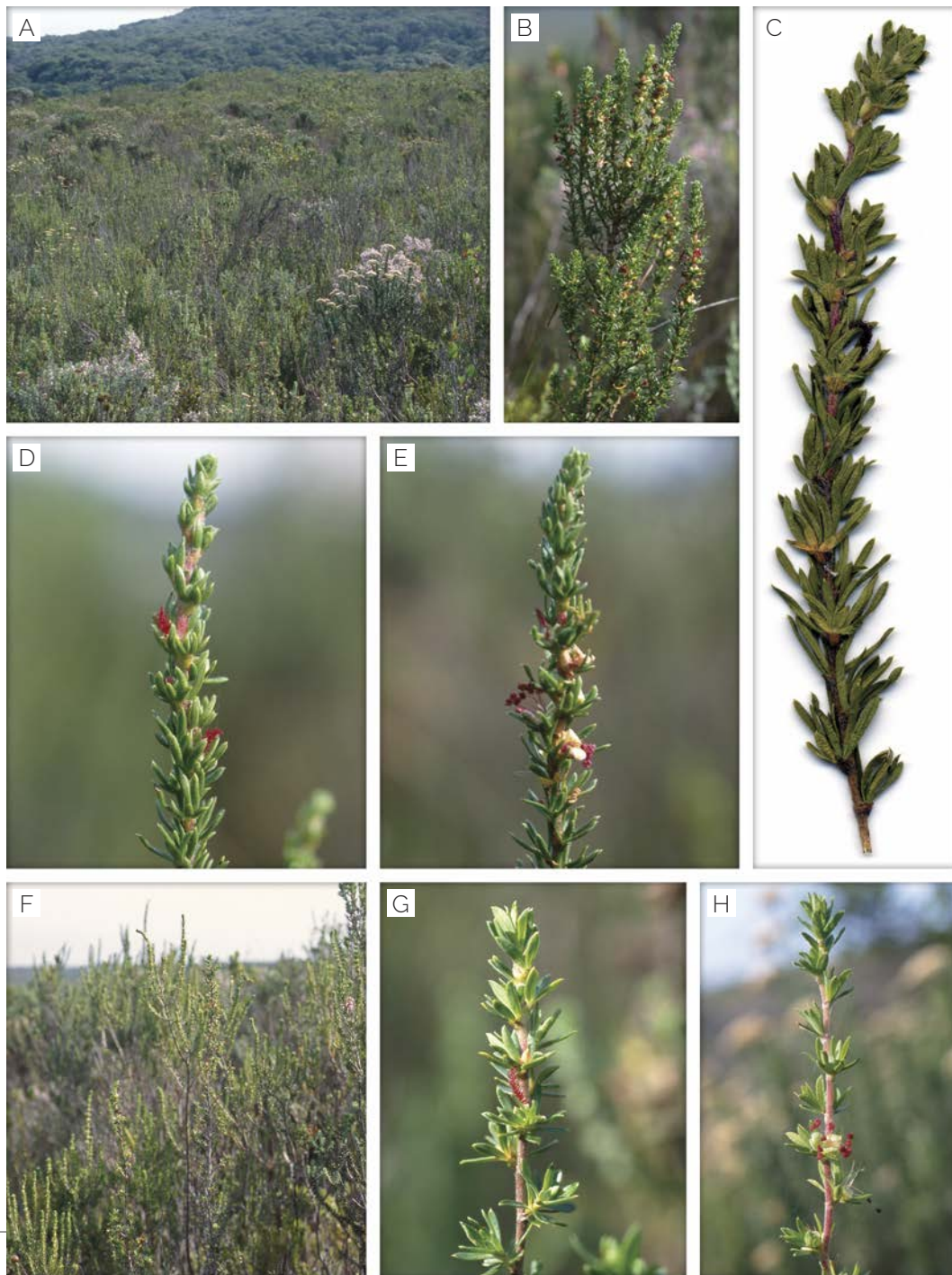
Distribution: Endemic to the limestone hills around Gansbaai and Stanford.

Conservation status: Very limited distribution and area where it grows is heavily infested with alien *Acacia* species, but has the ability to resprout after fire and is protected within the Walker Bay Fynbos Conservancy. Red List status: EN.

Etymology: *anthospermoides* means 'similar to the genus *Anthospermum*' in the Rubiaceae (coffee) family, which this species certainly does look like at first glance; *Anthospermum* species are often confused with *Cliffortia*.

Notes: An unusual species, very distinctive amongst the *Cliffortia* species, but in habit and leaf form almost identical to certain species of *Anthospermum*. *Anthospermum aethiopicum* commonly grows in the same area as *C. anthospermoides* and unless the plants are closely examined, it is hard to differentiate the two species. However, they can be easily distinguished by the arrangement of their leaf clusters: opposite or whorled in *Anthospermum*, alternate in *C. anthospermoides*.

A putative hybrid of *Cliffortia anthospermoides* has also been found (e.g. Caledon District, Gansbaai area, Bobbejaansfontein Farm, about 1 km SW of farmhouse, 245 m, Fellingham 1596 (NBC, PRE); Caledon District, Baviaansfontein, on farm Baviaansfontein, 5.5 km E of Die Kelders near Gansbaai, 200 m, Taylor



4120 (K, NBG, PRE); Caledon District, Grootbos Nature Reserve, just N of public road, ± opposite Bobbejaansfontein farm, 245 m, *C. Whitehouse 220* (BOL)). This has a laxer arrangement of brachyblasts and slightly broader leaves. The only other species that grows in the immediate vicinity is *C. obcordata* and this may be the other parent of the hybrid.

A collection of *Cliffortia repens* by *Gerrard & McKen 1568* (TCD) has been labelled as '*C. anthospermoides* n.sp.' by Harvey. However, this name does not appear to have been published and Fellingham's name is still valid.

Representative specimens

SOUTH AFRICA. **3419** (Caledon): Wortelgat Farm, Dadelkom, 60 m, 21 Oct. 1987, (–AD), *Bosenberg & Rutherford 337* (NBG); Grootbos near Gansbaai, 18 Dec. 1963, (–CB), *Esterhuysen 30602* (BOL, K, NBG, PRE); between De Kelders and Stanford, next to main road, at gate to Woest Arabie, 3 Nov. 1991, (–CB), *Fellingham 1551* (NBG); Gansbaai area, next to Gansbaai–Stanford road, at gate to Woest Arabie, 180 m, 16 Dec. 1991, (–CB), *Fellingham 1597* (NBG); Danger Point, Birkenhead (erf 28), near spot height 23, 2006, (–CB), *Helme 3970* (NBG); Grootbos Nature Reserve, just N of public road, ± opposite Bobbejaansfontein farm, 245 m, 17 May 2001, (–CB), *Whitehouse 219* (BOL, K, NBG, Z).

(45–46) *Cliffortia curvifolia* series

45. ***Cliffortia curvifolia*** Weim. in Botaniska Notiser 1933: 148, fig. 3a–d (1933) & Weim.: 74, fig. 19A–F (1934); Fellingham: 615 (2000); Whitehouse & Victor: 115 (2002). Type: Bredasdorp District, hills near Elim, July 1895, *Bolus 19871* (BOL, holo!; MO!, ?NBG!, iso.). [Although Elim is given as the type locality, no further collections have been made in the immediate vicinity of that town. An examination of Bolus's collecting notes shows that around that time he used Elim as a base and travelled up to 15 km in several different directions. NBG collection is labelled as collected by Guthrie with exactly the same date and locality. It is possible that both collections were made by Guthrie and that Bolus incorporated it into his herbarium using his number, or that both Guthrie and Bolus were present on the same trip.]



Low erect shrub up to 0.3 m high but often semi-prostrate, killed by fire; densely divaricately branched, forming brachyblasts, but few long branches developing. *Young stems* 1.0–1.1 mm wide, hairy; stem hairs spreading or adpressed upwards, 0.3–0.4 mm long. *Leaves* trifoliate; leaflets needle-shaped, 10.1–17.0 × 0.7–1.1 mm; base slightly swollen; apex sharply acuminate to pungent, 0.4–0.8 mm long; margins flat, minutely serrulate; lamina chartaceous, 0.4–0.6 mm thick, midrib prominent beneath, strongly curved upwards and towards the stem, green with two pale stripes on either side of midrib, glabrous; sheath 1.2–2.0 mm long, abaxially glabrous, adaxially glabrous except for fringe of hairs at apex; stipules 1.3–2.0 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles sometimes slightly hairy on the keel, smooth to very shortly ciliate on the margins; sepals 3, glabrous. *Male flowers* with bracteoles 2.2–3.9 mm long; pedicel 0.8–1.1 mm long; sepals broadly ovate, 3.9–6.2 × 1.9–3.2 mm, acute to acuminate at the apex; stamens 9–15; filaments 4.6–7.2 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 3.3–4.8 mm long, longer than immature receptacle but receptacle elongates rapidly during maturation and soon exceeds bracteoles; sepals broadly ovate to triangular, 1.5–2.2 × 0.3–0.6 mm, recurved; carpel 1; stigma 2.0–2.9 mm long, red, feathery, hidden by the leaves; immature receptacle 2.6–5.0 × 0.5–0.7 mm, glabrous, smooth. *Achene* 10.3–12.7 × 1.30–1.55 mm, curved, medium brown, glabrous; ribs ± 12, acute, 0.1–0.3 mm wide. *Flowering time*: possibly all year.

Habitat: Deep well-drained sand in full sun on low sandstone hills, but limestone outcrops also occur very close by and it is possible that the sand is more neutral; altitude 100–200 m.

Distribution: Two recent localities on coastal hills west of Cape Agulhas near Pearly Beach and Soutanysberg.

Conservation status: Only known from two modern collections, widely separated. One population has not been surveyed. The other population was found in an area used for flower and game farming. It was highly localised with just a few scattered plants (only around ten seen but the plants are very inconspicuous in the vegetation). Both populations are now within the Cape Agulhas National Park, but alien vegetation is still widespread there. Red List status: EN.

Etymology: *curvifolia* (Latin) means ‘with curved leaves’, although several species of *Cliffortia* have leaves curved in a similar fashion, they are particularly strongly curved in this species.

Notes: A highly localised species known from only two extant populations. The very long thin cylindrical curved achenes are diagnostic, but appear so similar to the leaves that they can easily be over-

looked. The only species that has similarly long thin curved achenes is the related *Cliffortia densa*, but the achenes are shorter and the leaves of that species are thicker and squarer; furthermore their ranges do not overlap. Without fruit the species can look similar to other curved needle-leaved species, especially *C. arcuata* or *C. falcata*, but those species have a short petiole; indeed the hybrid species *C. perpendicularis* near Elim has been attributed to this species.

Representative specimens

SOUTH AFRICA. **3419** (Caledon): Waterford Farm, on ridge of hill to W of dam at bottom of Waterkloof, 150 m, 18 May 2001, (–DA), *Whitehouse* 221 (BOL, K, NBC, Z); hills near Elim, 150 m, July 1895, (–DB), *Bolus* 19871 (BOL, MO); Springfield, 130 m, 5 Oct. 1982, (–DB), *Cowling* 1778 (NBC); Elim, July 1895, (–DB), *Guthrie s.n.* (NBC).



46. **Cliffortia densa** Weim. in Botaniska Notiser 1933: 148, fig. 3e–h (1933) & Weim.: 75, fig. 19G–M (1934); Fellingham: 615 (2000). Type: Swellendam District, on a mountain peak near Swellendam, Jan. 1815, *Burchell 7417* (K, holo.!).



Medium erect shrub up to 0.6 m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 1.0–1.2 mm wide, glabrous. *Leaves* trifoliolate; leaflets needle-shaped, 7.8–10.3 × 0.8–1.1 mm; base slightly swollen; apex mucronate to acuminate, 0.3–0.8 mm long; margins rounded, entire and smooth; lamina chartaceous, 0.7–1.2 mm thick, strongly curved upwards and towards the stem, with two pale stripes on either side, glabrous; sheath 1.1–1.5 mm long, abaxially glabrous, adaxially glabrous except for fringe of hairs at apex; stipules 0.6–0.9 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous with smooth margins; sepals 3, glabrous. Male flowers with bracteoles 1.5–2.0 mm long; pedicel 0.9–1.0 mm long; sepals broadly ovate; 5.1–6.7 × 2.0–2.8 mm, acute to acuminate at the apex, apices remaining joined at anthesis; stamens 9–12; filaments 2.4–2.8 mm long, greenish white; anthers yellow. Female flowers with bracteoles 1.5–1.6 mm long, longer than immature receptacle but receptacle elongates rapidly during maturation and soon exceeds bracteoles; sepals ovate, 2.0–2.5 × 0.9–1.0 mm, recurved and soon falling off; carpel 1; stigma 1.7–2.2 mm long, greenish white, feathery, hidden by the leaves; immature receptacle 1.8–2.2 × 0.5–0.6 mm, glabrous, clearly ribbed. *Achene* curved, medium to dark brown, glabrous; ribs acute. *Flowering time*: November to March.

Habitat: Mountain fynbos at high altitude on well-drained acid sands from Table Mountain Series in full sun; altitude 700–1 650 m.

Distribution: An endemic to the high peaks and ridges of the Langeberg Mountains between Leeurivierberg and Garcia's Pass.

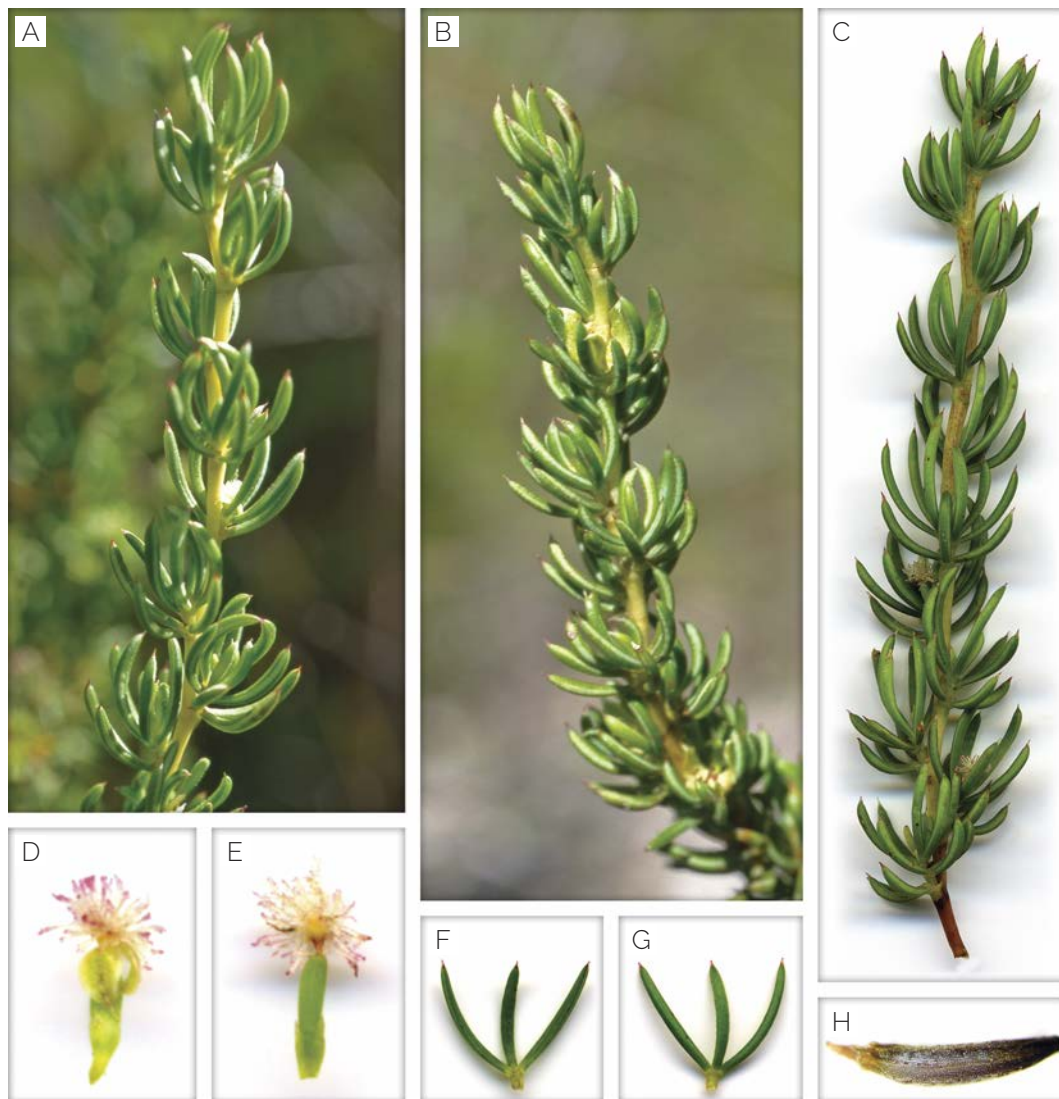
Conservation status: Restricted to a few localities along the Langeberg on the higher peaks and upper slopes, but with few threats except for too frequent fires. Red List status: LC.

Etymology: *densa* (Latin) means 'dense', referring to the dense clustering of the leaves on the short shoots, although this is not particularly greater than many other species.

Notes: The strongly curved thick cylindrical needle leaves make this a distinctive species. The leaflets are almost square in cross-section with rounded angles. It could be confused with *Cliffortia falcata* or *C. arcuata*, but they have flatter leaflets and short petioles (no petiole in *C. densa*). The achene of *C. densa* is narrowly cylindrical and curved. This character is only otherwise found in the extremely rare *C. curvifolia*, which has flatter leaves with the midrib prominent beneath and much longer achenes.

Representative specimens

SOUTH AFRICA. **3320** (Montagu): Swellendam District (on a mountain peak near Swellendam ex Weimarck), Jan. 1815, (–CD), *Burchell 7325* (K); Leeurivierberg, 1525 m, 2 Sept. 1955, (–CD), *Esterhuysen 24457* (BOL); Langeberg Mts, Goedgeloof Peak, 1220 m, 3 Sept. 1955, (–CD), *Esterhuysen 24489* (BOL); Langeberg Mts, Marloth Nature Reserve, towards W end of Langkuijen Valley, 1370 m, 22 Nov. 1989, (–CD), *McDonald 1864* (NBG, PRE); Lemoenshoek, S slopes, 1370 m, Sept. 1944, (–DD), *Esterhuysen 10440* (BOL); Langeberg Mts, summit of Lemoenshoek Peak, 1615 m, 27 Mar. 1948, (–DD), *Esterhuysen 14405* (BOL, K); Langeberg Mts near Heidelberg, S slopes of Naauwkrans, 1220 m, 28 Mar. 1948, (–DD), *Esterhuysen 14437* (BOL, NBG); Grootberg Peak, NW slopes along summit ridge, S-facing, 1400 m, 10 Jan. 1997, (–DD), *Helme 1236* (NBG). **3321** (Ladismith): Garcia's Pass, footpath to Sleeping Beauty, above waterfall, 730 m, 11 Mar. 2000, (–CC), *Whitehouse 97* (BOL, NBG); summit of Langeberg Mts at Riversdale, 1065 m, 19 May 1950, (–CD), *Esterhuysen 17029* (BOL, NBG).



Cliffortia densa: A & C, branch with female flower; B, branch with male flower; D & E, female flower; F, dorsal view of leaf; G, ventral view of leaf; H, achene.

47. **Cliffortia apiculata** Weim. in Botaniska Notiser 80: 416, fig. 7. 8 (1946); Fellingham: 611 (2000). Type: Caledon District, Arieskraal, 18 Nov. 1944, *Leighton 793* (LD, holo.!; BOL!, iso.).



Low erect shrub up to 0.4 m high, resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 0.9–1.0 mm wide, sometimes tinged reddish, slightly compressed, hairy; stem hairs spreading or slightly adpressed, 0.5–0.8 mm long. *Leaves* trifoliolate; leaflets elliptic to oblong, outer ones sometimes slightly sickle-shaped, 6.2–11.1 × 1.6–3.2 mm; apex acute to mucronate, 0.2–0.4 mm long; margins flat, entire and smooth; lamina chartaceous, 0.2–0.4 mm thick, curved upwards and towards the stem, glaucous, glabrous; sheath 2.0–2.9 mm long, abaxially glabrous, adaxially with scattered adpressed hairs and a short fringe at the apex; stipules green with a texture similar to the lamina, 2.3–4.2 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous except sometimes ciliate on the margins; sepals 3, glabrous. *Male flowers* with bracteoles 5.6–6.4 mm long; pedicel 0.3–0.5 mm long; sepals broadly ovate, 4.2–6.2 × 2.0–2.3 mm, acute to acuminate at the apex; stamens 7–9; filaments 8.0–9.4 mm long, red; anthers yellow. *Female flowers* with bracteoles 5.1–6.2 mm long, longer than immature receptacle; sepals oblong, 3.0–3.8 × 0.4–0.6 mm, erect; carpel 1; stigma 8.4–11.4 mm long, red, feathery, prominent above leaves; immature receptacle 1.0–1.3 × 0.7–0.9 mm, glabrous, smooth. *Achene* 3.6–4.5 × 1.5–1.9 mm, medium brown but sometimes appearing greyish on account of being covered by membranous layer, glabrous; irregularly acutely ribbed beneath membranous layer. *Flowering time*: October to December.

Habitat: Fynbos on clayish soils of shale slopes in full sun; altitude 50–250 m.

Distribution: Restricted to shale slopes along the Palmiet River valley.

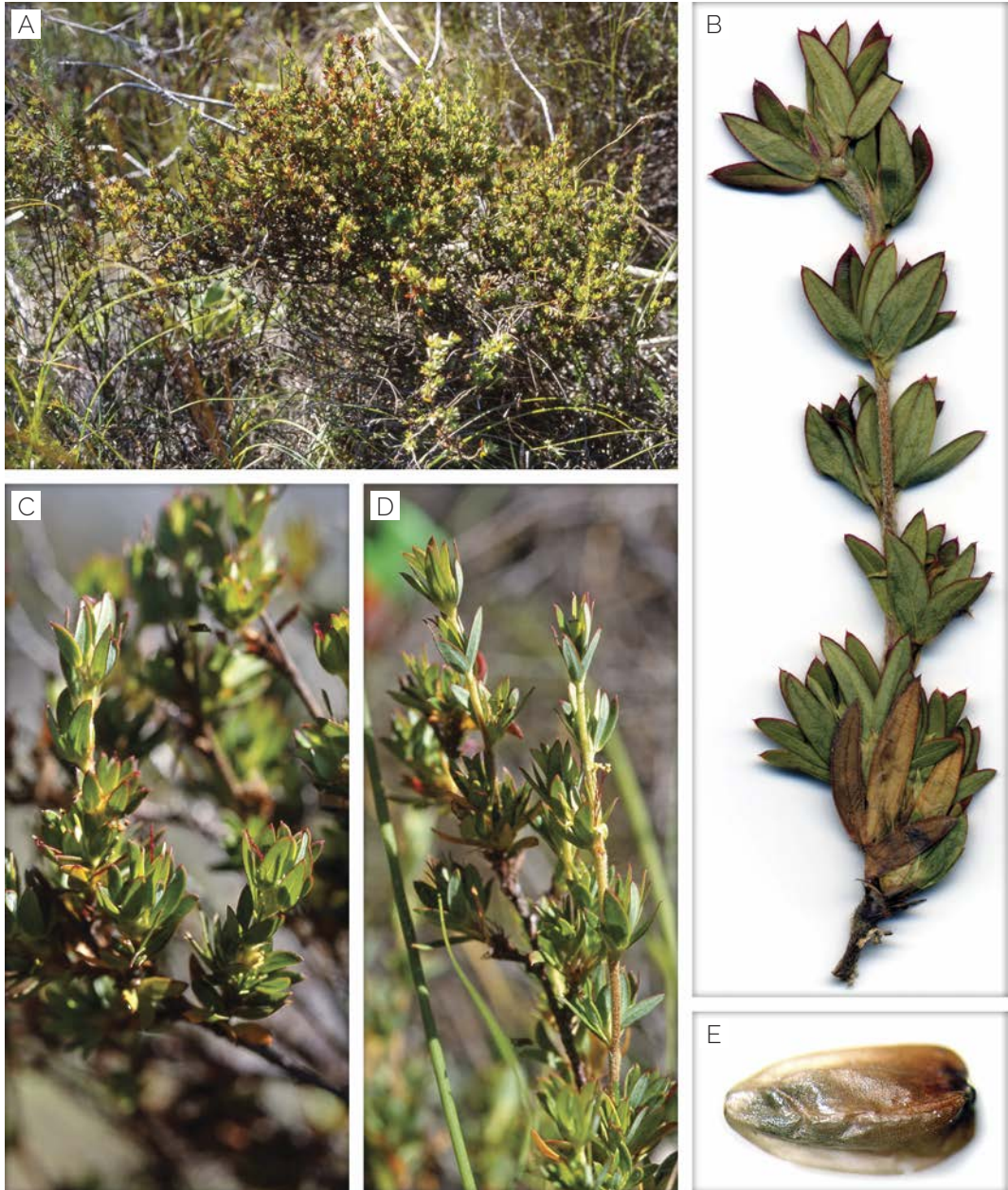
Conservation status: Found on the few clay slopes in the Elgin area that are too steep to be cultivated as orchards, all known populations are small and fragmented. Red List status: CR.

Etymology: *apiculata* (Latin) means 'ending abruptly in a short point', which refers to the apices of the leaves.

Notes: An isolated species taxonomically, although it looks superficially like a member of the *Cliffortia glauca* series. It has also been confused with *C. drepanoides* and shares with that species similar sized and shaped leaves, including a slight curvature on the outer leaflets, and achenes with a membranous layer. However, the flowers are quite different (much fewer stamens and longer red style than *C. drepanoides*), there is no petiole on the leaves, and geographically they are widely separated.

Representative specimens

SOUTH AFRICA. **3418** (Simonstown): Arieskraal, S-facing slopes on Bokkeveld shale above Arieskraal Dam, 215 m, 29 Nov. 2000, (–BB), *Whitehouse 165* (BOL, K, NBC); Fairy Glen, hill behind Fairy Glen, 185 m, 29 Oct. 1969, (–BD), *Boucher 841* (K, NBC, PRE). **3419** (Caledon): Arieskraal, 18 Nov. 1944, (–AA), *Compton 16493* (NBC); between Arieskraal and Palmiet R, 19 Apr. 1966, (–AA), *Esterhuysen s.n.* (NBC); Arieskraal, 18 Nov. 1944, (–AA), *Leighton 793* (BOL); Grabouw District, Arieskraal, hill top above Palmiet R, 8 Dec. 1993, (–AA), *Oliver 10469* (NBC); Grabouw District, Elgin Basin, Arieskraal Farm (Portion Solva), on Bokkeveld Shales in horseshoe bend of Palmiet R, 235 m, 5 Dec. 1993, (–AA), *Rode & Boucher 219* (NBC, PRE); Elgin, Palmiet R, Dec. 1941, (–AA), *Stokoe 8623* (BOL); Kogelberg Reserve, Palmiet R mouth, Paardeberg, 75 m, 6 Feb. 1962, (–AC), *Grobler 698* (NBC, PRE).



Cliffortia apiculata: A, habitat; B & C, branch with female flowers; D, branch with male flowers; E, achene.

48. **Cliffortia exilifolia** Weim. in Botaniska Notiser 90: 183, fig. 6 (1948); Fellingham: 615 (2000). Type: Swellendam District, Leeurivierberg, 1 525 m, Apr. 1941, *Stokoe 58296* (SAM, holo.!; ?BOL, iso.). [The BOL specimen has a number (8614) attached to it but all other collecting details are identical to the SAM specimen. Both numbers are likely to be herbarium numbers rather than Stokoe's own numbers.]



Erect shrub up to 1.5 m high, killed by fire; densely divaricately branched, forming closely overlapping brachyblasts. *Young stems* 0.6–1.1 mm wide, hairy; stem hairs adpressed upwards, 0.3–0.7 mm long. *Leaves* trifoliolate; leaflets needle-shaped, 6.8–11.8 × 0.2–0.5 mm; apex sharply acuminate, 0.3–0.8 mm long; margins rounded, entire and smooth or scabrid; lamina chartaceous, ± 0.3 mm thick, strongly curved upwards and towards the stem, glabrous; sheath 1.0–1.6 mm long, abaxially glabrous, adaxially glabrous except for fringe of hairs at apex; stipules 1.3–2.4 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins serrate to very shortly ciliate; sepals 3, glabrous. *Male flowers* with bracteoles 1.9–2.7 mm long; pedicel 0.5–0.8 mm long; sepals broadly ovate, 3.7–4.4 × 1.4–2.0 mm, acute to acuminate at the apex; stamens 5–6; filaments 3.0–4.2 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 1.9–3.3 mm long, longer than immature receptacle; sepals narrowly ovate, 1.4–2.1 × 0.5–1.0 mm, erect; carpel 1; stigma 1.9–3.0 mm long, white sometimes with a pinkish tinge, feathery, hidden by the leaves; immature receptacle 0.9–1.1 × 0.6–0.7 mm, glabrous, clearly ribbed. *Achene* 2.4–3.1 × 1.0–1.2 mm, blackish brown, glabrous; indistinctly ribbed to wrinkled. *Flowering time*: October to March.

Habitat: On well-drained acidic sands from Table Mountain Series, restricted to wet south-facing slopes or shady kloofs; altitude 900–1 600 m.

Distribution: Southern coastal mountains from Kogelberg to the Langeberg east of Garcia's Pass.

Conservation status: Widespread but very scattered with several isolated populations; killed by fire and therefore susceptible to local extinction caused by too frequent burning. Red List status: LC.

Etymology: *exilifolia* (Latin) means 'slender-leaved', and indeed this species has some of the finest leaves within the genus, which give the branches a feathery look.

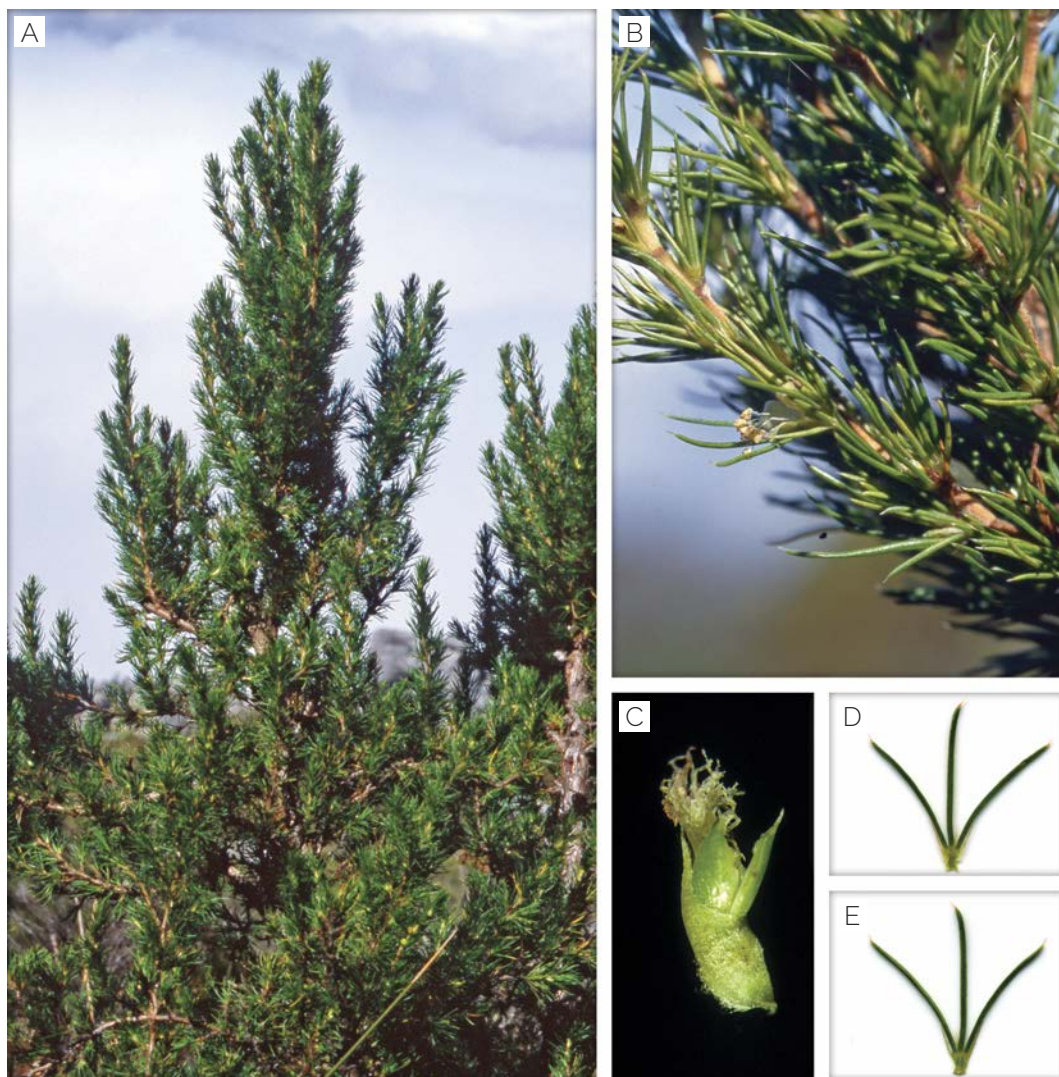
Notes: This species appears superficially similar to several other fine-leaved species. Vegetatively it is almost indistinguishable from *Cliffortia paucistaminea* var. *australis*, but that species has 4-sepalled flowers and its mature achenes are clearly ribbed and a pale beige colour (whereas *C. exilifolia* are only wrinkled and almost black). From the other species *C. exilifolia* is more easily discerned: it has much longer leaves than *C. setifolia* and *C. subsetacea*, and lacks the short petiole and glabrous stem of *C. filifolia*.

The seedling leaves of *Cliffortia exilifolia* are particularly unusual, being very finely lobed. The effect is reminiscent of *C. cervicornu* but the leaflets are much longer.

Representative specimens

SOUTH AFRICA. 3319 (Worcester): Jonaskop, S slopes near top, 1585 m, 9 Nov. 1965, (–DC), *Thompson 135* (NBG, PRE). 3320 (Montagu): Swellendam Mt., S slopes, 4 Feb. 1941, (–CD), *Esterhuysen 4816* (BOL); Langeberg Mts, Goedeloof Peak, S slopes, 1525 m, 3 Sept. 1955, (–CD), *Esterhuysen 24506* (BOL); Leeurivierberg, near Swellendam, 1525 m, Apr. 1941, (–CD), *Stokoe 8614* (BOL); Marloth Nature Reserve, just below summit ridge of Twelve o'Clock Peak, S slopes, 1220 m, 12 Mar. 2000, (–CD), *Whitehouse 100* (BOL, NBG); Lemoenshoek, 1370 m, Sept. 1944, (–DD),

Esterhuysen 10451 (BOL); S slopes of Naauwkransberg, Langeberg Mts near Heidelberg, (Goedehoeberg), 28 Mar. 1948, (–DD), *Esterhuysen 14445* (BOL). **3321** (Ladismith): Paardeberg State Forest, peak 20 km E of Garcia's Pass, summit slopes, 1500 m, (–CD), *Helme* (,). **3418** (Simonstown): Kogelberg State Forest, Kogelberg Peak, slope near summit overlooking bay, 1220 m, 7 Oct. 1976, (–BB), *Boucher 3225* (NBG); Kogelberg, SE slopes, 915 m, 16 Dec. 1946, (–BB), *Esterhuysen 13324* (BOL); Kogelberg, S slopes on neck of main peak, 1100 m, 6 Jan. 1973, (–BB), *Oliver 4169* (NBG). **3419** (Caledon): Riviersonderend Mts, Pilaarkop, S slopes, 21 Nov. 1999, (–BB), *Linder in Whitehouse 67* (BOL); Riviersonderend Mts, Pilaarkop, ridge WNW of peak, 1500 m, 26 Feb. 1999, (–BB), *Oliver 11232* (NBG). **3421** (Riversdale): Riversdale, S slopes of Langeberg Mts at Garcia Forest Station, 19 May 1950, (–AA), *Esterhuysen 17017* (BOL, PRE).



Clifortia exilifolia: A, habit; B, branch with male flowers; C, female flower; D, dorsal view of leaf; E, ventral view of leaf.

(49–53) **Section Petiolatae** Weim. in Monograph of the Genus *Cliffortia*: 16, 28 (1934) & 172 (1948). Type species, designated here: *C. falcata* L.f.

Medium erect densely branched shrubs. Young stems with upwardly adpressed to spreading short hairs, forming brachyblasts. Sheath glabrous adaxially with fringe of hairs at apex; stipules present, free, membranous, usually ciliate; petiole present. Leaves trifoliolate, glabrous, green with two pale stripes on either side of midrib beneath; leaflets oblong to needle-shaped, outer ones usually sickle-shaped and all curved upwards and towards the stem, margins usually entire, midrib not prominent. Flowers solitary, in the axils of ordinary vegetative leaves. Bracteoles usually ciliate on the margins; sepals 3, glabrous, female usually spreading; anthers yellow; bracteoles longer than immature receptacle; carpel single. Achene ribbed, brown to greyish brown, covered with a membranous outer layer.

This is a well-defined section with the species all having a petiole and leaves that tend towards being falcate. *Cliffortia ramosissima* is the only species that needs careful examination to see the very short petiole, and the leaves are more or less straight, not curved. However, a diagnostic character that all the species share, is the ribbed achene with a membranous layer that often peels away or becomes swollen on wetting. The species do appear to hybridise with each other when in close proximity and plants with intermediate characters are then found.

49. **Cliffortia falcata** L.f., Supplementum Plantarum: 431 (1782); Thunb.: 438 (1823); DC.: 596 (1825); G.Don: 596 (1832); Eckl. & Zeyh.: 269 (1836); Harv.: 300 (1862); Bolus & Wolley-Dod: 260 (1904); Juel: 276 (1918); Weim.: 31, fig. 5A–F (1934); Levyns: 445 (1950); Fellingham: 612 (2000). Type: Cape Peninsula, east slopes of Table Mt, *Thunberg s.n.* (LINN, holo!; LD!, iso.).



Erect or slightly sprawling shrub up to 1.2 m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.7–0.9 mm wide, tinged reddish, hairy; stem hairs adpressed upwards or spreading, 0.1–0.4 mm long. *Leaves* trifoliate; leaflets oblong or linear, outer ones sickle-shaped, 2.3–8.3 × 0.7–1.8 mm; apex acute to mucronate, 0.1–0.3 mm long; margins flat, entire and smooth; lamina chartaceous, 0.2–0.4 mm thick, strongly curved upwards and towards the stem, green but with two paler stripes on either side of midrib beneath, glabrous; sheath 0.7–2.1 mm long, abaxially glabrous, adaxially glabrous except sometimes for a tuft of hairs at apex of petiole; stipules 0.5–1.1 mm long, free, margins ciliate to smooth; petiole present, 0.5–2.3 mm long. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on the keel, margins ciliate to serrate; sepals 3, glabrous. *Male flowers* with bracteoles 1.8–2.7 mm long; pedicel 0.5–0.7 mm long; sepals broadly ovate, 4.2–6.5 × 1.6–3.0 mm, acute to acuminate at the apex, tips often not separating at anthesis; stamens 16–21; filaments 2.0–3.2 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 2.1–3.0 mm long, longer than immature receptacle; sepals narrowly to ovate to oblong, 1.9–3.6 × 0.4–0.9 mm, spreading; carpel 1; stigma 2.8–4.2 mm long, pinkish white, feathery, prominent above sepals but hidden within incurved leaves; immature receptacle 0.8–1.1 × 0.6–1.0 mm, glabrous, smooth. *Achene* 3.5–4.0 × 1.8–2.3 mm, medium brown but sometimes appearing greyish on account of being covered by membranous layer, glabrous; irregularly acutely ribbed beneath membranous layer. *Flowering time*: March to September, peaking in May and June and rarely flowering as late as November.

Habitat: Grows in full sun on well-drained deep sands, sometimes from Table Mountain Series but frequently on more alkaline sands derived from limestone or in the slacks of coastal dunes; altitude 0–250(–750) m.

Distribution: Coastal mountains and dunes from Cape Peninsula north as far as Mamre and east to Buffelsbaai near Knysna.

Conservation status: A common species near the coast and, despite growing in areas favoured for development, it is widespread and occurs in several reserves. Red List status: LC.

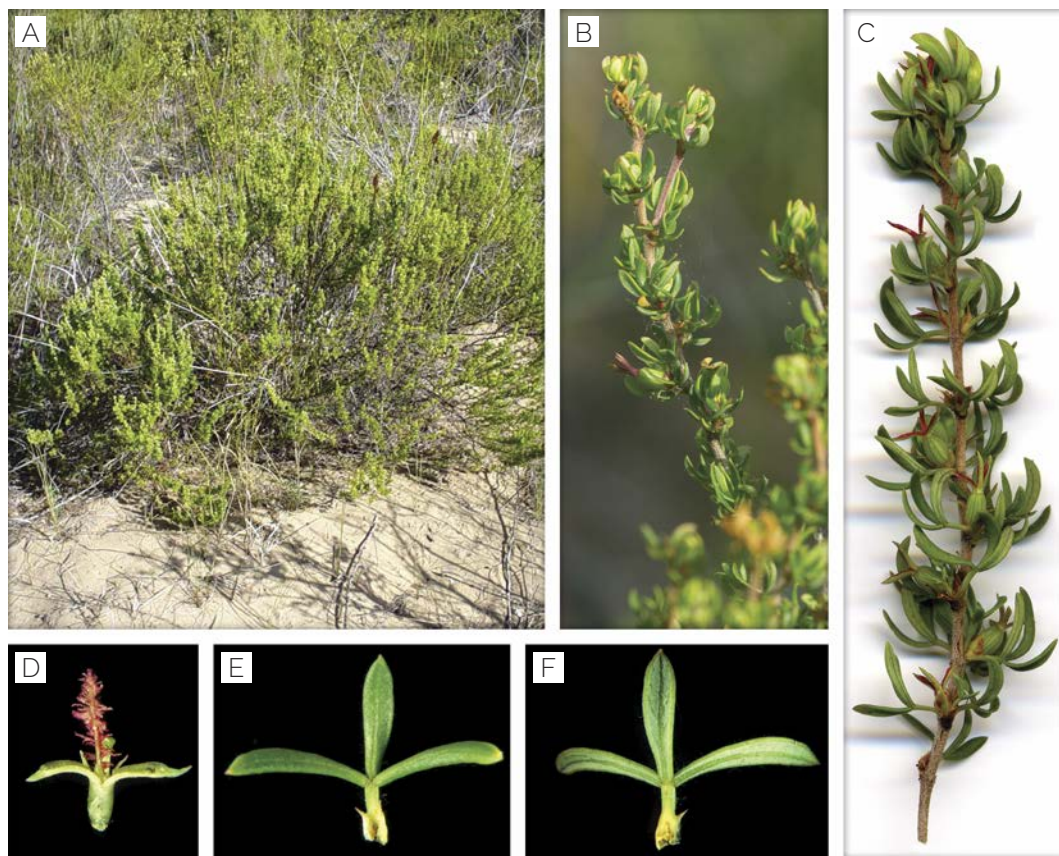
Etymology: *falcata* (Latin) means ‘curved like a sickle’, referring to the outer leaflets that bend in towards each other.

Notes: An easily recognised species on account of its strongly upwardly curved leaflets, especially the outer leaflets which are also sickle-shaped. It is very similar to *Cliffortia arcuata*, but apart from having less pointed apices to the leaflets it can best be distinguished by the habitat in which it grows: *C. falcata* is always found within a short distance of the coast and often amongst dunes. It is the only species of *Cliffortia* that has been found growing directly out of limestone rock, but it is then very stunted.

Two collections from Attaquaskloof (*Thompson 1630*, *Hugo 161*) appear to be this species rather than *Cliffortia arcuata*. The habitat is on the drier northern slopes away from the coast and the plants are found at up to 750 m. However, morphologically these collections fit with this species rather than *C. arcuata*.

Representative specimens

SOUTH AFRICA. **3218** (Clanwilliam): Wadrifoutsoutpan, E of railway, upper marsh, 14 Sept. 1984, (–AB), O’Callaghan, van Wyk 119 (PRE). **3318** (Cape Town): Cape Town, Atlantis area, between Blombosch and Melkpost, S of Continental China factory, 45 m, 26 June 1979, (–CB), Boucher 4381 (K, NBC, PRE); Mamre Road, 6 June 1949, (–CB), Levyns 9403 (BOL); Mamre, slopes E of town, 215 m, 5 Oct. 1977, (–CB), Thompson 3544 (NBC, PRE); NW slopes of Wynberg Hill, Aug. 1914, (–CD), Bolus s.n. (BOL); Wynberg Hill, Apr. 1915, (–CD), Bolus in Herb. Bolus 13309 (BOL); Cape Peninsula, Claremont, Wynberg Hill, N slopes, 15 Sept. 1949, (–CD), Esterhuysen 15744 (BOL, NBC); Devil’s Peak slopes, 1907, (–CD), Froembling s.n. (NBC); Wynberg Hill, July 1890, (–CD), Gamble 22182 (K); Orange Kloof, 305 m, July 1890, (–CD), Gamble 22285 (K); Mowbray, Raapenburg, 15 m, 15 June 1890, (–CD), Guthrie 25 (BOL); Malmesbury District, Burgers Post farm, near Pella, Fynbos Biome Research Site, 200 m, 7 June 1979, (–DA), Boucher & Shepherd 4362 (K, NBC, PRE); De Grendal, W foot of the Tygerberg, 23 June 1956, (–DC), Esterhuysen 26027 (BOL); Paarl–Kraaifontein, 8 Mar. 1958, (–DC), Esterhuysen 27618 (BOL); North Pine, SE of Kraaifontein main road, 25 Mar. 1979, (–DC), Low 838 (NBC); Cape Town District, Killarney, 20 June 1957, (–DC), Lussem 18 (NBC); Cape Flats, Durbanville, 5 km from Durbanville on the Langeberg Road to Kraaifontein, Peaslake, 120 m, 20 July 1963, (–DC), Taylor 4924 (NBC, PRE); Platekloof Nature Reserve, junction of electricity pylons, 60 m, 1 May 2001, (–DC), Whitehouse 217 (BOL). **3321** (Ladismith): Attakwaskloof, near Voortrekkergedenplaat, 730 m, 20 Mar. 1976, (–DD), Hugo 161 (NBC, PRE); Attakwaskloof,



Cliffortia falcata: A, habitat; B & C, branch with achenes; D, female flower; E, dorsal view of leaf; F, ventral view of leaf.

Old Voortrekker Pass, W side, dry, N slope in thick old fynbos, 640 m, 23 Nov. 1972, (–DD), *Thompson 1630* (NBC, PRE). **3418** (Simonstown): Cape Town, Wynberg Flats, 8 May 1847, (–AB), *Alexander-Prior s.n.* (K, PRE); Cape Peninsula, Pollsmoor, 12 June 1947, (–AB), *Barker 4585* (NBC); Cape Peninsula, Slangkop, 9 May 1942, (–AB), *Bond 1499* (NBC); Cape Peninsula, Red Hill above Simonstown, 29 May 1938, (–AB), *Cohen s.n.* (NBC); Cape Peninsula, Llandudno, 26 June 1940, (–AB), *Compton 8899* (NBC); Simonstown, hillside above Froggy Farm, 90 m, 15 Oct. 1980, (–AB), *Davies 53* (NBC, PRE); Cape Peninsula, Retreat, Mar. 1908, (–AB), *Dummer s.n.* (NBC); Cape Peninsula, Steenberg, 25 Sept. 1949, (–AB), *Esterhuysen 15835* (BOL, NBC); Cape Peninsula, Kalk Bay Mts, 2 June 1974, (–AB), *Goldblatt 2043* (NBC); Cape Peninsula, Wynberg Flats, 16 July 1921, (–AB), *Moss 7067* (BM); Wynberg, May 1797, (–AB), *Roxburgh s.n.* (K); Cape Peninsula, Miller's Point, 28 Mar. 1928, (–AB), *Salter 260/3* (BM); Simonstown, about Noah's Ark Battery, 18 Apr. 1897, (–AB), *Wolley-Dod 2463* (BM, BOL, K); Cape Peninsula, Brightwater, 30 May 1943, (–AD), *Compton 14575* (NBC); Cape Peninsula, Cape Point, Apr. 1943, (–AD), *Goulimis s.n.* (NBC); Cape Peninsula, Cape Point Reserve, Buffels Bay, 23 Aug. 1943, (–AD), *Leighton 29* (BOL); Cape Peninsula, Cape Point Reserve, near Brightwater, 31 May 1943, (–AD), *Leighton 463* (BOL, PRE); Cape of Good Hope Nature Reserve, hills above Taylor's beach .75 miles W of Taylor's bungalow at Rheboksdam on Atlantic Coast, 5–45 m, 15 Apr. 1963, (–AD), *Taylor 4695* (K, NBC, PRE); Cape Flats, Eerste River Forest Reserve, near Trig Beacon 28 FO–ST, S of Kuils River, 45 m, 29 May 1968, (–BA), *Taylor 7311* (NBC, PRE). **3419** (Caledon): Caledon, Hermanus, Westcliff, Coronation St, 20 m, 11 June 1980, (–AC), *Williams 288* (K); S of Klein R Mts, 20 km out of Hermanus on road to Stanford, 30 m, 19 July 1991, (–AD), *Fellingham 1528* (NBC); Die Kelders Area, off Grootbos road, at end of track in kloof E of Adams Bos, 1 Sept. 1991, (–CB), *Fellingham 1543* (NBC, PRE); Gansbaai area, foot of Tafelberg, just past Sopieshoogte on road to Uilenkraal, 10 Nov. 1991, (–CB), *Fellingham 1565* (NBC); between De Kelders and Stanford, main road at gate to Woest Arabie, 23 Nov. 1991, (–CB), *Fellingham 1583* (NBC, NBC); Gansbaai area, approaching Baviaansfontein from Uilenskraal, 245 m, 28 May 1992, (–CB), *Fellingham 1606* (PRE); Gansbaai area, next to Gansbaai–Stanford road, at gate to Woest Arabie, 150 m, 24 July 1994, (–CB), *Fellingham 1636* (BOL, NBC); Caledon, ridge running E from Tafelberg, near Franskraal, 140 m, 21 May 1971, (–CB), *Thompson 1189* (K, NBC, PRE); Baardskeerdersbos area, between Boesmansrivier and Korsika, 23 Nov. 1991, (–DA), *Fellingham 1566* (NBC, PRE); Heidehof, W of Baardskeerdersbos, 55 m, 31 May 1973, (–DA), *Oliver 4262* (K, NBC, PRE); Pearly Beach area, Groot Hagelkraal, near Pearly Beach, koppie, 90 m, 16 Mar. 1983, (–DA), *van Wyk 1144* (NBC, PRE); Brandfontein, 10 m, 4 July 1999, (–DD), *Whitehouse 43* (BOL, K, NBC). **3420** (Bredasdorp): Van Der Stels Kraal, 150 m, 1 Aug. 1968, (–AC), *Acocks 24051* (NBC, PRE); De Hoop, Potberg Nature Reserve, Dronkvlei, along track to Koppie Alleen, 30 m, 13 June 1979, (–AD), *Burgers 1859* (NBC, PRE); De Hoop Nature Reserve, Oulande, 20 m, 8 Aug. 1984, (–AD), *Fellingham 741* (NBC, PRE); De Hoop, Oulande, 20 m, 30 Jan. 1985, (–AD), *Fellingham 887* (PRE); De Hoop Nature Reserve, limestone outcrop above vlei near cottages, 15 m, 1 Sept. 2001, (–AD), *Whitehouse 256* (BOL); near Malgas, 150 m, 16 June 1974, (–BC), *Bayliss 931* (PRE); De Hoop Nature Reserve, Hamerkop, moderate slope seaward, 19 Mar. 1985, (–BC), *Fellingham 961* (NBC, PRE); De Hoop, Hamerkop, moderate slope, 180 m, 1 May 1985, (–BC), *Fellingham 1044* (K, PRE); De Hoop, Hamerkop Farm, moderate NW slope, 75–150 m, 19 June 1984, (–BC), *van Wyk 1583* (NBC, PRE); De Hoop area, Hamerkop Farm, 75–150 m, 19 June 1984, (–BC), *van Wyk 1600* (NBC, PRE); Potberg Estate, near Cape Infanta, 150 m, 16 June 1974, (–BD), *Bayliss 6650* (K, NBC); De Hoop, Witwater, 1 km from Witwater, towards sea on Witwater–Elandspad, 150 m, 18 June 1984, (–BD), *van Wyk 1562* (NBC, PRE); De Hoop, Witwater, 90 m, 28 Jan. 1985, (–BD), *van Wyk 2098* (NBC). **3421** (Riversdale): Riversdale, Still Bay, plateau N of rifle range, 60 m, 22 May 1979, (–AD), *Bohnen 5733* (K, NBC, PRE); 7 km W of Albertinia turning, 150 m, 19 June 1962, (–BA), *Acocks 22212* (K, PRE); hills behind Albertinia, May 1914, (–BA), *Muir 1349* (BOL, PRE). **3422** (Mossel Bay): Mossel Bay, Great Brak R mouth, 100 m, 12 Nov. 1981, (–AA), *Parsons 456* (NBC); Mossel Bay, 5 km W of Groot Brak R, from crossing of National Road, 460 m, 26 Sept. 1967, (–AA), *Thompson 555* (K, NBC, PRE); Mossel Bay, near New Town Extension at Golden Rendezvous Hotel, 120 m, 29 Mar. 1987, (–AA), *Vlok 1857* (PRE); George, Gwaing R mouth, top of E bank to NW facing slopes, 10 m, 25 May 1984, (–AB), *O'Callaghan, Fellingham & van Wyk 213* (NBC, PRE); George, Gwaing R, top of cliff at W bank of river, 10 m, 26 May 1984, (–AB), *O'Callaghan, Fellingham & van Wyk 238* (NBC, PRE); George, S of Pacaltsdorp, above Rooiklip headland, 60 m, 14 Aug. 1993, (–AB), *Victor 265* (PRE); Goukamma Provincial, 1969, (–BB), *Heineken 17* (PRE); Buffelsbaai, 30 m, May 1921, (–BB), *Keet 726* (BOL, NBC, PRE); hillside above Sedgfield, 26 July 1953, (–BB), *Leighton 3300* (BOL); Knysna, Groenvlei, 150 m, 11 July 1955, (–BB), *Levy's 10281* (BOL); Goukamma R mouth, 1 km from mouth, 120 m, 23 May 1984, (–BB), *O'Callaghan, Fellingham & van Wyk 111* (NBC, PRE).

50. **Cliffortia arcuata** Weim. in Botaniska Notiser 80: 408, fig. 1a–c, 2 (1946); Fellingham: 611 (2000). Type: Uniondale District, Langkloof, upper Keurbooms R, 21 Nov. 1944, *Esterhuysen 10849* (LD, holo.; BOL., iso.).



Erect shrub up to 0.9 m high, resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 0.7–1.3 mm wide, tinged reddish, hairy; stem hairs adpressed upwards to spreading, 0.2–0.5 mm long. *Leaves* trifoliolate, oblong to linear, outer ones sickle-shaped, 4.1–8.3 × 0.6–1.0 mm; apex sharply acuminate, 0.2–0.9 mm long; margins flat, entire and smooth or scabrid; lamina chartaceous, 0.2–0.4 mm thick, strongly curved upwards and towards the stem, green but with two paler stripes on either side of midrib beneath, glabrous; sheath 1.0–1.6 mm long, abaxially hairy or glabrous, adaxially glabrous except for fringe of hairs at apex; stipules 0.9–1.6 mm long, free, margins ciliate or rarely serrulate; petiole present, 0.2–1.7 mm long. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy or glabrous on the keel, margins ciliate to serrate; sepals 3, glabrous. *Male flowers* with bracteoles 2.4–3.9 mm long; pedicel 0.4–0.5 mm long, sepals broadly ovate, 3.7–4.7 × 2.1–2.8 mm, acute to acuminate at the apex; stamens 8–9; filaments 3.2–4.0 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 2.3–4.0 mm long, longer than immature receptacle; sepals oblong to linear, 1.8–3.5 × 0.5–0.9 mm, spreading; carpel 1; stigma 2.2–4.2 mm long, red, feathery, prominent above sepals but hidden within incurved leaves; immature receptacle 0.9–2.4 × 0.7–1.3 mm, glabrous or hairy, smooth. *Achene* 3.0–5.3 × 1.4–2.9 mm, medium brown but sometimes appearing greyish on account of being covered by membranous layer, glabrous; irregularly acutely ribbed beneath membranous layer. *Flowering time*: July to November, sometimes as late as February.

Habitat: High altitude mountain fynbos on well-drained acid sands from Table Mountain Series in full sun; altitude 450–1700 m.

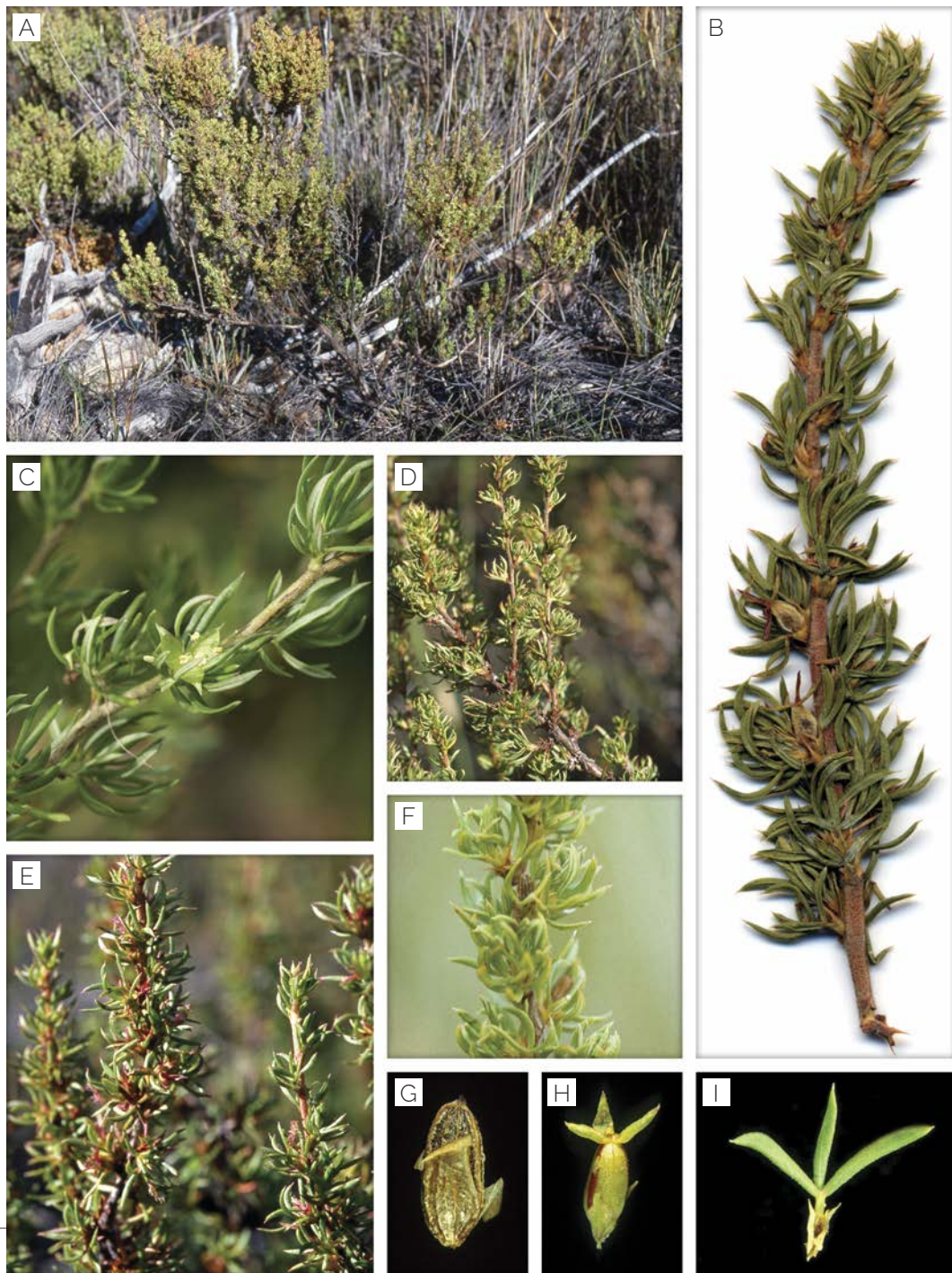
Distribution: Little Karoo mountains from Rooiberg to Cockscomb in the Groot Winterhoek Mountains.

Conservation status: A common species on inland mountains in the east of the CFR where it has few threats. Red List status: LC.

Etymology: *arcuata* (Latin) means 'curved like a bow', referring to the leaves which are distinctly curved both upwards and towards each other.

Notes: Very similar to *Cliffortia falcata* but the leaflets are generally longer with sharply pointed apices. They also appear to differ in life history strategy, but as there is only one confirmed sighting of *C. arcuata* resprouting and spreading clonally after a fire, this needs investigation in other populations.

Weimarck (1934) considered the membranous layer around the achene of *Cliffortia arcuata* to be unique within the genus and therefore diagnostic. However, this membranous layer appears to be present, although maybe not as pronounced, in all the species in the section, as well as a few other apparently unrelated species. The purpose of this layer has not been investigated, but it does appear to swell when wetted and remains damp for some time afterwards, which indicates that it may aid in germination.

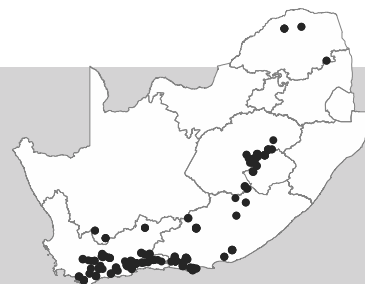


Cliffortia arcuata often grows sympatrically with *C. ramosissima*, although it is then usually found altitudinally above that species. However, at the boundary between the two species some populations appear intermediate in leaflet length and pointedness suggesting that the two species probably hybridise with each other (e.g. Uniondale District, Slypsteenberg, S slopes, *Esterhuysen* 6306; Kammanassie Mts, Buffels R, S of Kammanassieberg, 1 340 m, *Thompson* 1382; Uniondale, on the hill with the fort, S of town, 800 m, *Vlok* 2315; Uniondale District, Kouga Mts near Kouga Peak, lower slopes, *Esterhuysen* 10787).

Representative specimens

SOUTH AFRICA. **3321** (Ladismith): Swartberg, Waboomsberg, NW of Waboomsberg, 2 Jan. 1975, (–BD), *Thompson* 2175 (NBG, PRE); Rooiberg, S-facing slopes of Rooiberg approaching Mount Ararat, below small rocky outcrop just W of beacon 235, below road, 1060 m, 15 Dec. 1989, (–CB), *McDonald* 1908 (NBG, PRE). **3322** (Oudtshoorn): Swartberg Pass, S slopes, 1065 m, 22 Aug. 1948, (–AC), *Levyns* 9127 (BOL); Great Swartberg, path from Die Hoek to Gouekrans Hut, 1000 m, 20 Mar. 1999, (–AC), *Whitehouse* 24 (BOL, K, NBG); Meiringspoort, 1220–1525 m, 16 Oct. 1955, (–BC), *Esterhuysen* 24845 (BOL); De Rust District, mid N slopes of E Swartberg, next to road to Blesberg, at gate to Sta, 1160 m, 29 Nov. 1991, (–BD), *Fellingham & Vlok* 1584 (NBG, PRE); George, Perdepoort, 460 m, 28 July 1956, (–CD), *Levyns* 10513 (BOL); Kammanassie Mts, Kleinberg, Kleinplaas R valley, 1100 m, 11 Aug. 1983, (–DA), *Matthews* 1193 (NBG); Kammanassie Nature Reserve, W of Kammanassieberg, Kleinberg, 1450 m, 18 Feb. 2001, (–DA), *Whitehouse* 201 (BOL); lower S slopes of Kammanassie Mts, at Laudina, 9 Nov. 1949, (–DB), *Esterhuysen* 16467 (BOL, NBG). **3323** (Willowmore): Uniondale Poort, 825 m, 15 Nov. 1958, (–CA), *Acocks* 19970 (K, NBG, PRE); Uniondale Poort, 825 m, 15 Nov. 1958, (–CA), *Acocks* 19972 (K, PRE, PRE); 23 km E by S of Uniondale, 1065 m, 16 Nov. 1958, (–CB), *Acocks* 19991 (K, PRE); Misgund hills, 26 Nov. 1941, (–CB), *Esterhuysen* 6958 (BOL); Misgund, 26 Nov. 1941, (–CB), *Esterhuysen* 6961 (BOL, K); Nieuwe Kloof, 1065 m, 13 Nov. 1958, (–DA), *Acocks* 19914 (K, PRE); Kouga Mts, Saptoukop, E slopes, 915–1220 m, 23 Nov. 1958, (–DA), *Esterhuysen* 27963 (BOL, K, PRE); Kouga Mts, peak E of Smutsberg, 915 m, 27 Nov. 1941, (–DB), *Esterhuysen* 7041 (BOL); Kouga Mts, near Smutsberg, lower slopes, 12 Nov. 1944, (–DB), *Esterhuysen* 10732 (BOL); Kouga, Studtis, 16 Sept. 1975, (–DB), *Manson* 196 (NBG, PRE). **3324** (Steytlerville): Great Winterhoek Mts, Cockscomb, N ridge, 915 m, 2 Feb. 1958, (–DB), *Esterhuysen* 27552a (BOL); Great Winterhoek Mts, Cockscomb, N slopes, 915 m, 30 Nov. 1958, (–DB), *Esterhuysen* 28038 (BOL, K, PRE).

51. ***Cliffortia ramosissima* Schltr.** in Botanische Jahrbücher 24: 444 (1897); E.Phillips: 90 (1917); Weim.: 73, fig. 18L–R (1934) & 402 (1940b) & 419 (1946); Levyns: 447 (1950); Fellingham: 613 (2000); Whitehouse: 8, fig. 8 (2004b). Type [The type appears very similar to the hybrid species *C. perpendicularis*, which is a presumed cross between *C. falcata* and *C. ramosissima*. Both the hybrid and true *C. ramosissima* grow on the hills around Elim and it is impossible to determine for certain which the type belongs to. Therefore an epitype has been chosen to fix the name to the currently accepted taxon.]: Bredasdorp District, Elim, 120 m, 20 Apr. 1896, *Schlechter 7633* (B, holo.†; BM!, BOL!, COI, G, GRA!, HBG!, K!, L, NH, P, PH!, PRE, SI, SAM!, STU!, W!, WAG, Z!); epitype: Bredasdorp District, Elim, Geelkop Nature Reserve, 120 m, 10 May 2000, *Whitehouse 116* (BOL, epi.†; NBG!).



C. linearifolia sensu Harv.: 301 (1862) pro parte quoad *Drège 6843*, non Eckl. & Zeyh.

C. galpinii N.E.Br.: 122 (1901) pro parte. Lectotype, designated by Whitehouse (2004b): Eastern Cape, Queenstown District, Andriesberg, *Galpin 1607*; *C. ramosissima* element (K, lecto.†; BOL!, GRA!).

Erect shrub up to 1.2(–1.8) m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.6–1.2 mm wide, tinged reddish, hairy; stem hairs adpressed upwards, 0.1–0.4 mm long. *Leaves* trifoliate; leaflets oblong to linear, outer ones sometimes slightly sickle-shaped, 2.3–7.2 × 0.5–1.0 mm; apex mucronate to rounded, up to 0.3 mm long; margins flat, entire and smooth or scabrid; lamina chartaceous, 0.1–0.4 mm thick, curved upwards and towards the stem, green but with two paler stripes on either side of midrib beneath, glabrous; sheath 0.6–1.6 mm long, abaxially glabrous, adaxially with a fringe of hairs at apex and sometimes a few scattered adpressed hairs lower down; stipules 0.4–1.7 mm long, free, margins smooth to ciliate; petiole present, up to 0.9 mm long. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on the keel, margins smooth to ciliate; sepals 3, glabrous. *Male flowers* with bracteoles 1.2–3.5 mm long; pedicel 0.3–0.9 mm long, glabrous; sepals broadly ovate, 2.4–5.2 × 1.2–2.4 mm, acute to acuminate at the apex; stamens (5–)6(–8); filaments 1.5–5.6 mm long, red to greenish white; anthers yellow. *Female flowers* with bracteoles 1.7–3.2 mm long, longer than immature receptacle; sepals narrowly ovate to oblong-triangular, 0.8–3.2 × 0.5–1.5 mm, spreading to slightly re-curved; carpel 1; stigma 2.7–5.7 mm long, pinkish white, feathery, slightly prominent above or hidden amongst the incurved leaves; immature receptacle 0.9–1.5 × 0.6–0.9 mm, glabrous or sparsely and very shortly hairy, smooth. *Achene* 2.7–4.7 × 1.3–2.4 mm, medium brown but sometimes appearing greyish on account of being covered by membranous layer, glabrous or sparsely and very shortly hairy; irregularly acutely ribbed beneath membranous layer. *Flowering time*: throughout the year but probably seasonal in different parts of its range.

Habitat: Usually on clayish soils from Table Mountain or Bokkeveld Series, but also found on Clarens Sandstone or dolerite-derived soils, in full sun; altitude 0–2 400 m.

Distribution: An unusual distribution, from the low altitudes of the coastal plains around Elim and Humansdorp, along lower slopes of the Little Karoo mountains, onto the Great Escarpment from Komsberg to the Graaff-Reinet mountains, and north into the Free State as far as Clarens with an outlying population on the Soutpansberg.

Conservation status: Widespread and common throughout its distribution. Red List status: LC.

Etymology: *ramosissima* (Latin) mena 'very much branched', and this species often forms a stiff but intertwining branched mass.

Common names: *sehalahala sa mtlapa* (Sesotho).

Notes: This species was regarded by Weimarck (1934) as a member of sect. *Costatae*, quite distant from the other species in sect. *Petiolatae*. However, in the original protologue, Schlechter (1897) correctly considered this species to be related to *Cliffortia falcata*. Although the petiole is very short it is usually still evident and in all other respects it is morphologically very similar to *C. arcuata* and *C. falcata*. It differs from those two species on account of its much shorter leaves, which only rarely have slightly sickle-shaped outer leaflets. It appears to hybridise with both species where they are more or less sympatric; see notes under *C. arcuata* and *C. perpendicularis*.

Cliffortia ramosissima has a very odd distribution, but despite this it is morphologically uniform across its range. It is the only species of *Cliffortia* that shows a distinct Knysna gap, occurring on the low-lying plains around Bredasdorp and Humansdorp but only in the Little Karoo in between. In the CFR it shows a preference for clayish shale soils, being replaced by *C. arcuata* or *C. falcata* in more sandy areas. However, outside of the CFR it is found on sandy as well as clay soils.

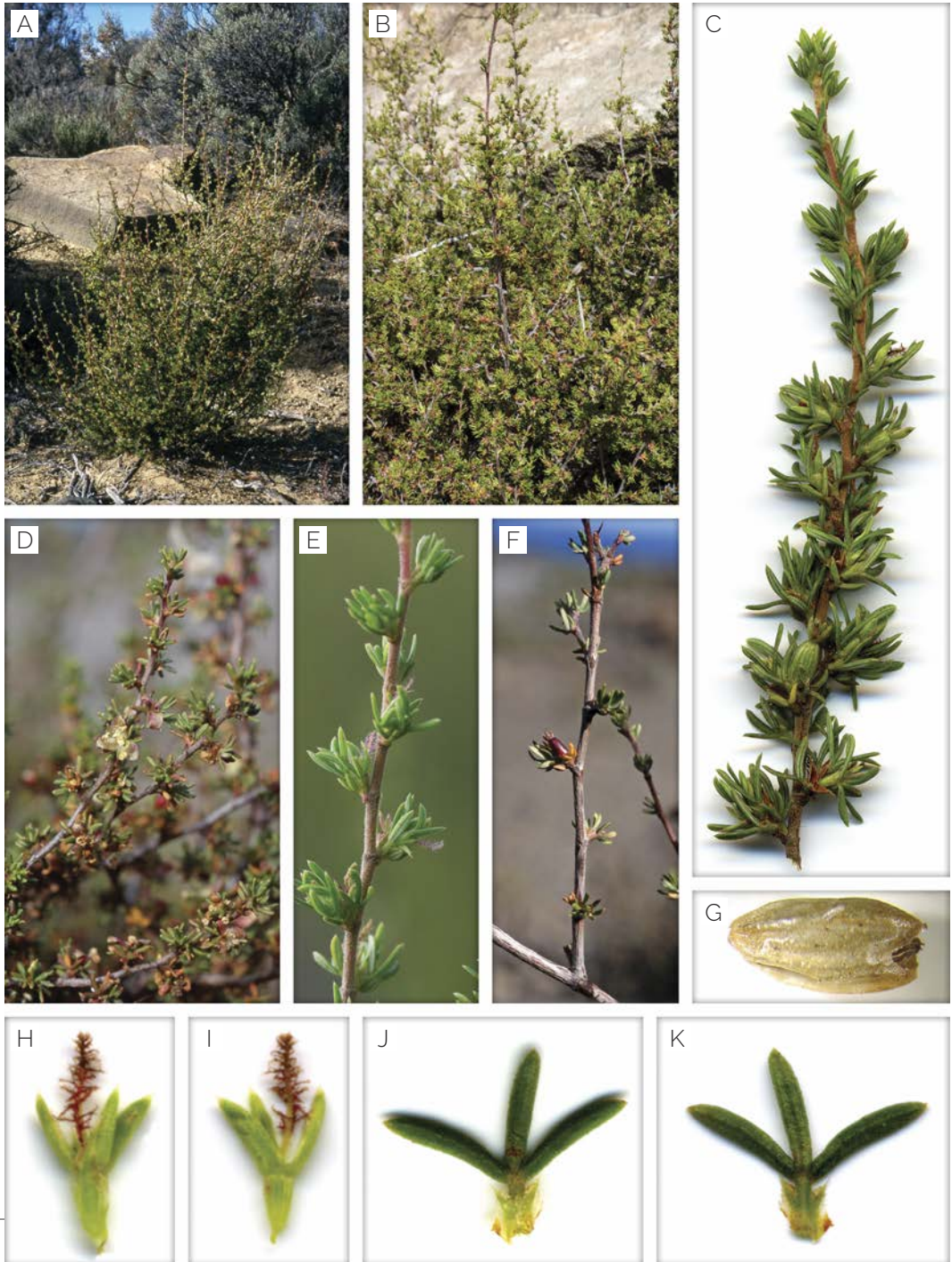
There is a specimen of *Cliffortia ramosissima* collected by Thunberg ('In campo et collibus infra latus orientale Taffelberg', *Thunberg s.n.* (LD, S)) from the flats east of Table Mountain. This rather vague locality is still some distance from the closest modern records of the species, but considering its rather wide distribution, it is not unreasonable to believe that it once occurred on the Cape Flats.

The original collection of *Cliffortia galpinii* was mixed, containing both *C. ramosissima* and *C. paucistaminea* (Weimarck 1934). The *C. ramosissima* element was chosen to fix the name to prevent disrupting *C. paucistaminea* (Whitehouse 2004b).

Representative specimens

SOUTH AFRICA. **2229** (Waterpoort): W Soutpansberg, Crewe Farm, 1495 m, 23 Aug. 1930, (–DC), *Hutchinson & Gillett 4431* (K); W Soutpansberg, Crewe Farm, 1495 m, 23 Aug. 1930, (–DC), *Hutchinson & Gillett 4431* (BM). **2328** (Baltimore): Blouberg Nature Reserve, Ga-Monnaasnamoriri Mt, kloof E of mountain, 8 Dec. 1990, (–BB), *Archer 529* (PRE); Blouberg, Mohlakeng Plateau, 1585 m, 11 Jan. 1955, (–BB), *Codd 8996* (K); Blouberg, 1675 m, 1 June 1953, (–BB), *Esterhuysen 21457* (BOL, PRE). **2430** (Pilgrim's Rest): Mariepskop, on top of mountain near Baken, 6 July 1961, (–DB), *van der Schijff 5611* (PRE); Mariepskop, on summit of mountain near trig station, 23 Oct. 1962, (–DB), *van der Schijff 6198* (PRE). **2827** (Senekal): Winburg District, N end of Korannaberg, 1675 m, 13 Nov. 1959, (–CC), *Acocks 20810* (K, PRE); Ficksburg, Kirklington, 8 km NW of Gumtree, 1675 m, 13 Sept. 1962, (–DC), *Leistner 3051* (K, PRE); Ficksburg District, Gumtree Farm, Schuttes Draai, 1525 m, 25 Sept. 1964, (–DC), *Ross 1322* (NU); Ficksburg District, Gumtree Farm, Schuttes Draai, 1525 m, 25 Sept. 1964, (–DC), *Ross 1324* (NU); Gumtree, Kirklington Farm, 28 Dec. 1962, (–DC), *van Zinderen Bakker 1073* (PRE). **2828** (Bethlehem): Slabberts, Help My, near Bantu Hut, 1900 m, 8 Feb. 1970, (–AB), *Stam 173* (PRE); Fouriesburg, 1525 m, Sept. 1918, (–CA), *Rogers 15940* (K, PRE); road to Clarens, car park on edge of escarpment at Surrender Hill, 1840 m, 20 Nov. 2001, (–CB), *Whitehouse 285* (BOL, NBC); Leribe, 1525–1830 m, Jan. 1913, (–CC), *Dieterlen 71* (K, NBC, PRE). **2927** (Maseru): Ladybrand, ledges on hillside, 1740 m, 23 Jan. 1946, (–AB), *Acocks 12338* (PRE); Ladybrand District, Leliehoek flower park, 26 Oct. 1963, (–AB), *Barker 10112* (NBG); Ladybrand District, Vinies, Hobson's Kloof in mixed scrub, 21 Sept. 1944, (–AB), *Phillips 22545* (PRE); Senekal, Clocolan, Sherwood, 1400 m, 13 Dec. 1969, (–AB), *Stam 68* (PRE); Clocolan, Mabalela, at foot of mountain, 14 July 1964, (–BA), *Brunner s.n.* (NBG); Clocolan, Mabolela, at foot of mountain, 14 July 1964, (–BA), *Brunner 3* (PRE); Thaba Bosiu, 2000 m, Apr. 1977, (–BC),

Cliffortia ramosissima: A & B, habitat; C & E, branch with female flowers; D, branch with male flowers; F, branch with achenes; H & I, female flowers; J, dorsal view of leaf; K, ventral view of leaf.

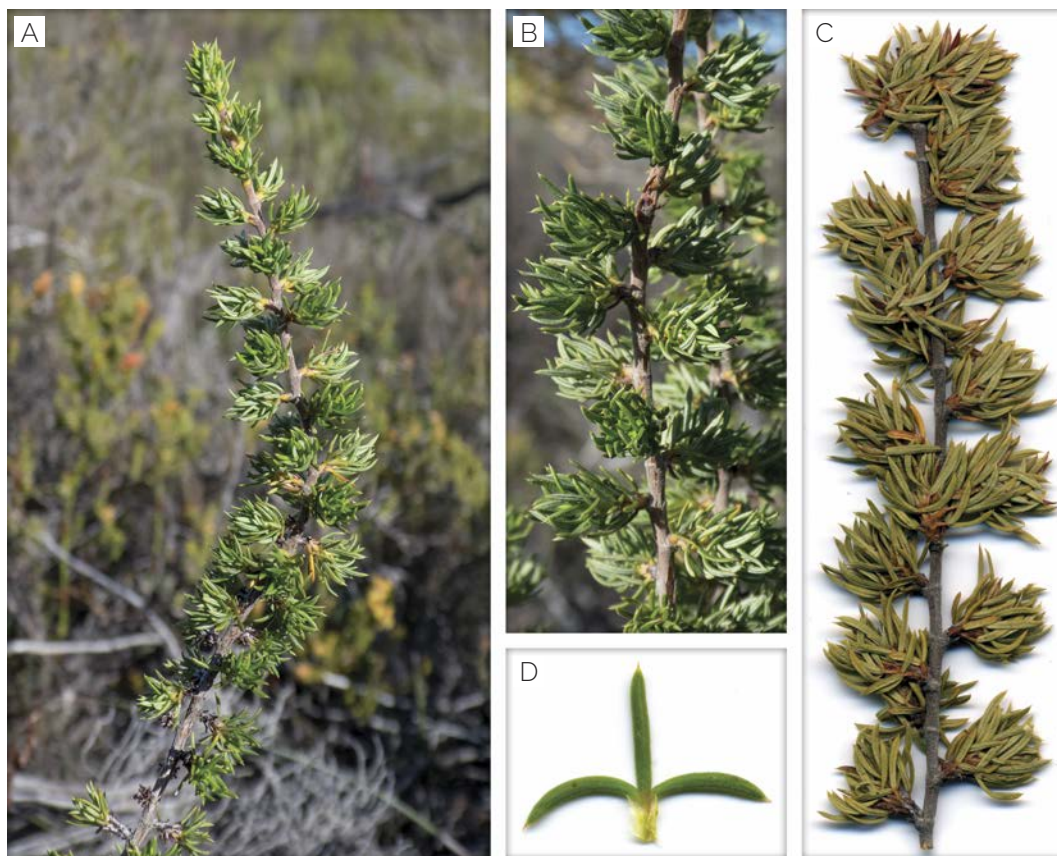


Schmitz 7493 (PRE). **3026** (Aliwal North): Aliwal North, Elandschoek Farm, 40 km S of Aliwal, 1629 m, 16 Aug. 1994, (–DC), *Dold 1628* (GRA). **3027** (Lady Grey): 24 km SE of Zastron, 25 Jan. 1957, (–AC), *Marais 1341* (K, PRE). **3124** (Calvinia): Kompasberg [Kompassberg], 1830–2135 m, 1839, (–DC), *Drège 6843* (K). **3126** (Queenstown): border of Queenstown and Wodehouse Districts, Andriesberg Mt., 1950–2045 m, (–DA), *Galpin 1607a* (BOL, GRA). **3127** (Lady Frere): Wasbankspruit, Weenen Farm in the Wasbankspruit Catchment Area, 13 Apr. 1971, (–AA), *Muller 737* (GRA, PRE). **3220** (Sutherland): Sneeukskrans Mt., S of Voelfontein, at neck below main cliffs, 1370 m, 22 Sept. 1981, (–AD), *Goldblatt 6342* (NBG, PRE); Komsberg Pass, 1525 m, 1 May 1948, (–DB), *Acocks 14316* (K, PRE); escarpment at top of Komsberg Pass, 1630 m, 31 May 2000, (–DB), *Whitehouse 123* (BOL, NBG). **3222** (Beaufort West): Molteno Pass, near Beaufort West, 13 Apr. 1938, (–BA), *Acocks 8630* (BOL, K, PRE). **3224** (Graaff-Reinet): Sneeuksberg, lower slopes of Nardouwsberg summit, on col between Nardouwsberg summit ridge and sharp dolerite ridge to east, 2300 m, 24 Jan. 2006, (–BB), *Clark & Coombs 345* (GRA); Nardouwsberg, saddle to N of summit, 2285 m, 9 Jan. 2001, (–BB), *Whitehouse 175* (BOL). **3319** (Worcester): Keisieberg, summit, 1060 m, 27 Sept. 1946, (–DB), *Levyms 8079* (BOL). **3320** (Montagu): Anysberg East, lower N slopes, SSE of Goedeheop, 900 m, 10 Aug. 1991, (–BC), *Fellingham 1532* (NBG, PRE); Klein Spreefontein, ridge just WNW of the farm, 1000 m, 4 July 1992, (–BC), *Oliver 10094* (NBG, PRE); Anysberg Nature Reserve, N slope of Prinsklouf, 1500 m, 11 Aug. 1993, (–BC), *Victor 153* (PRE); Anysberg Nature Reserve, N slope of Prinsklouf, 1500 m, 11 Aug. 1993, (–BC), *Victor 155* (PRE); Anysberg Nature Reserve, lower N slopes at E end of mountain, beside jeep track, 915 m, 22 Feb. 2001, (–BC), *Whitehouse 211* (BOL); Baden hills, 1065 m, 24 Sept. 1946, (–CA), *Compton 18418* (NBG); 11 km SSW of Hoekvandenbergh Post Office, 28 June 1948, (–CB), *Acocks 14554* (BOL, K, PRE); slopes at S foot of Anysberg, 20 May 1950, (–DA), *Esterhuysen 17080* (BOL); Touwsberg, S slopes, 1065–1220 m, 1 June 1956, (–DB), *Esterhuysen 25915* (BOL); Little Karoo, Touwsberg, on top, 1160 m, 12 July 1937, (–DB), *Levyms 6121* (BOL); Touwsberg, S slopes and on top, 915–1220 m, 18 Aug. 1948, (–DB), *Levyms 9087* (BOL); Touwsberg, W end above Zorgvliet, 850 m, 5 Oct. 1993, (–DB), *Oliver 10334* (NBG); Barrydale/W end of Touwsberg, S slope, Zorgvliet farm, 800 m, 5 Oct. 1993, (–DB), *Victor 395* (PRE); 21 km W by S of Barrydale, 825 m, 9 Mar. 1959, (–DC), *Acocks 20333* (K, PRE). **3321** (Ladismith): Gamka Reserve, near Calitzdorp, Snygans-Baakens Kop area, 22 May 1975, (–DB), *Esterhuysen 33827* (BOL). **3322** (Oudtshoorn): Meiringspoort, 1220 m, 16 Oct. 1955, (–BC), *Esterhuysen 24846* (BOL); Meiringspoort, 16 Oct. 1955, (–BC), *Esterhuysen 24851* (BOL); Oudtshoorn, Outeniqua Mts, N slopes of foothills, Jonkersberg, 580 m, 12 June 1979, (–CC), *Bond 1717* (NBG, PRE); 13 km N of Robinson Pass, 2 Dec. 1951, (–CC), *Compton 23046* (NBG); 13 km N of Robinson Pass, 2 Dec. 1951, (–CC), *Compton 23048* (NBG); Klein Moerasrivier Spruit, 6 Dec. 1951, (–CC), *Compton 23128* (NBG); foothills on N side of Outeniqua Mts, near Moeras R, 6 Dec. 1951, (–CC), *Esterhuysen 19299* (BOL, PRE); Witberg, Moeras R, S lower slopes of Witberg, 175 m, 19 Mar. 1976, (–CC), *Hugo 137* (K, NBG, PRE); Jonkersberg, lower N aspect of Outeniqua Mts, at Sebrafontein, 580 m, 13 July 1986, (–CC), *Vlok 1505* (NBG, PRE); Laudina, 4 Nov. 1941, (–DB), *Esterhuysen 6520* (BOL); lower SE slopes of Kammanassie Mts, at Laudina, 9 Nov. 1949, (–DB), *Esterhuysen 16461* (BOL, NBG); foothills on S side of Kammanassie Mts, at Laudina, 9 Nov. 1949, (–DB), *Esterhuysen 16472* (BOL, NBG). **3323** (Willowmore): Uniondale, on the hill with the fort, S of the town, 800 m, 27 June 1990, (–CA), *Vlok 2315* (PRE); Haarlem, 26 Nov. 1941, (–CB), *Esterhuysen 6927* (BOL); SE slopes of foothills of Kouga Mts, at Braam R, near Joubertina, 28 Oct. 1949, (–DB), *Esterhuysen 16320* (BOL, NBG); SE slopes of foothills of Kouga Mts, at Braam R, near Joubertina, 28 Oct. 1949, (–DB), *Esterhuysen 16324* (BOL, NBG, PRE); Springhaas Capell, where road to Hoeree crosses Kouga R, 425 m, 18 Oct. 2000, (–DB), *Whitehouse 154* (BOL). **3324** (Steytlerville): Kouga Mts, near Kouga Peak, lower slopes, 14 Nov. 1944, (–CA), *Esterhuysen 19787* (BOL); Cape, Ruigtefontein, Sept. 1929, (–CB), *Thode 1849* (K, PRE); Hankey District, Baviaanskloof, road across plateau before Goedeheop (Bergplaas) farm, 640 m, 11 Oct. 2002, (–CB), *Whitehouse 317* (BOL). **3326** (Grahamstown): Bothas Ridge, Penn Rock Farm, 11–13 km from Grahamstown, 460 m, Jan. 1928, (–BA), *Dyer 1162* (K, PRE); Alexandria District, Kopje Alleen road, Kolsrand, 365 m, 9 Nov. 1954, (–CA), *Johnson 1089* (GRA, K, PRE). **3419** (Caledon): Elim, 120 m, 20 Apr. 1896, (–DB), *Schlechter 7633* (BM, BOL, K, PRE, WAG, Z); Elim, Geelkop Nature Reserve, 120 m, 10 May 2000, (–DB), *Whitehouse 116* (BOL, NBG). **3420** (Bredasdorp): Stormsvlei Kloof, Oct. 1940, (–AA), *Esterhuysen 5116a* (BOL, K); Bontebok National Park, Aloe Hill near Elsieskraal campsite, 80 m, 19 Feb. 2000, (–AB), *Whitehouse 82* (BOL, NBG); Kykoedie, 150 m, 21 July 1962, (–AC), *Acocks 22398* (K, PRE); Kathoek, Gouritz R Bush of Pottebergers R, 60 m, 24 June 1962, (–AD), *Acocks 22290* (K, PRE). **3421** (Riversdale): foot of Langeberg at Garcia Forest Station, 21 May 1950, (–AA), *Esterhuysen 17329* (BOL); Riversdale Nature Reserve, near trig beacon R1–LE24, 245 m, 3 June 1970, (–AA), *Taylor 7754* (NBG); Riversdale, Soetmelks R, SSE of Riversdale, 90 m, 10 Aug. 1960, (–AB), *Acocks 21360* (PRE); Vermaaklikheid, Duivenhok's R gorge, N of Vermaaklikheid, 610 m, 19 Sept. 1960, (–AC), *Acocks 21578* (PRE). **3424** (Humansdorp): 12 km W of Humansdorp, 185 m, 27 Apr. 1947, (–BA), *Acocks 13673* (K, PRE); Jeffrey's Bay, July 1927, (–BB), *Fourcade 3287* (BOL, K); on hills near Humansdorp, 45 m, 17 Nov. 1894, (–BB), *Schlechter 6030* (BOL, FHO, K, PRE).

52. ***Cliffortia perpendicularis*** C.M.Whitehouse in Bothalia 37(1): 15, fig. 2, 8 (2007). Type: Bredasdorp District, Elim, Geelkop Nature Reserve, W slope of hill, 120 m, 3 Sept. 2001, *Whitehouse 259* (BOL, holo.!; K!, NBG!, iso.).



Sprawling shrub up to 0.5 m high but often semi-prostrate, killed by fire; divaricately branched and forming brachyblasts that spread at right angles to main stem, but few long branches developing. *Young stems* 0.9–1.6 mm wide, tinged reddish, hairy; stem hairs spreading or adpressed upwards, 0.2–0.5 mm long. *Leaves* trifoliate; leaflets oblong to linear, outer ones sickle-shaped, 3.5–7.5 × 0.7–1.1 mm; apex sharply acuminate, 0.3–0.6 mm long; margins flat, entire and smooth; lamina chartaceous, 0.2–0.5 mm thick, curved upwards and towards the stem, green but with two paler stripes on either side of midrib beneath, glabrous; sheath 1.1–2.0 mm long, abaxially glabrous, adaxially glabrous except for fringe of hairs at apex; stipules 0.8–1.5 mm long, free, margins ciliate; petiole present, 0.6–1.4 mm long. *Flowers* solitary in axils



Cliffortia perpendicularis: A & B, habitat; C, branch with female flowers; D, leaf.

of undifferentiated leaves; bracteoles shortly hairy on the keel, margins ciliate; sepals 3, glabrous. *Male flowers* unknown. *Female flowers* with bracteoles 2.7–3.8 mm long, longer than immature receptacle; sepals oblong to linear, 3.5–4.5 × 0.5–1.0 mm, spreading; carpel 1; stigma 2.5–4.9 mm long, red, feathery, hidden amongst the incurved leaves; immature receptacle 1.1–1.8 × 0.7–1.2 mm, sparsely and very shortly hairy. *Achene* 3.5–4.6 × 1.8–2.6 mm, medium brown but sometimes appearing greyish on account of being covered by membranous layer, glabrous or sparsely and very shortly hairy; irregularly acutely ribbed beneath membranous layer. *Flowering time*: September.

Habitat: Fynbos in full sun on acid sands from Table Mountain Series or clayish soil of Bokkeveld Series; altitude 100–300 m.

Distribution: Known only from two localities, Potberg and around Elim.

Conservation status: A poorly known species and only known from two very small areas but both have populations conserved within nature reserves. Red List status: DDT.

Etymology: *perpendicularis* (Latin) means ‘at right angles’, referring to the way the branches and brachyblasts appear to join the stem at right angles to it.

Notes: This species is a presumed hybrid between *Cliffortia ramosissima* and *C. falcata* and both those species occur in the same area or nearby. It differs from them on two accounts: more sharply pointed leaves, thus it appears similar to *C. arcuata*, and a spindly lax habit, so much so that often only a couple of long branches exist and the main stem is unable to bear the weight of the plant so that it sprawls amongst the surrounding vegetation.

Although of putative hybrid origin, it is unable to survive fire except as seed. Therefore, it can be considered a species in its own right as it has the ability to spread beyond its point of origin. However, male flowers are as yet unknown, so it is presumed that reproduction by seed is apomictic and therefore asexual. The two collections of this species appear more-or-less identical despite growing on different soil types and they both share the unusual sprawling habit that is diagnostic for this species. Population level studies will be needed to determine if they share a common ancestry or if it represents a case of multiple origins for the hybrid.

Representative specimens

SOUTH AFRICA. **3419** (Caledon): 3km S of Elim, farm 248, W of road, N of quarry, (–DB), *Helme* 3973 (NBG); Elim, Geelkop Nature Reserve, 120 m, 10 May 2000, (–DB), *Whitehouse* 119 (BOL); Elim, Geelkop Nature Reserve, W slope of hill, 120 m, 3 Sept. 2001, (–DB), *Whitehouse* 259 (BOL, K, NBG). **3420** (Bredasdorp): De Hoop Nature Reserve, W end of Potberg, where Potberg and Klipspringer trails meet, 305 m, 2 Sept. 2001, (–BC), *Whitehouse* 257 (BOL, NBG).

53. **Cliffortia drepanoides** Eckl. & Zeyh., Enumeratio Plantarum Africae Australis Extratropicae 2: 269 (1836); Harv.: 301 (1862); Weim.: 33 (1934); Dahlgren: fig. 1E, 5D (1971); Fellingham: 612 (2000). Lectotype, designated here: Uitenhage District, Groot Winterhoek Mts above Uitenhage, May to June, *Ecklon & Zeyher 1741* (S, lecto.; B, GRA).



Erect shrub up to 1.5 m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 1.0–1.3 mm wide, tinged reddish, hairy; stem hairs spreading or adpressed upwards, 0.1–0.3 mm long. *Leaves* trifoliate; leaflets oblong to oblong-obovate, outer ones slightly sickle-shaped, 10–15 × 2.6–4.3 mm; apex mucronate to acuminate, 0.2–0.5 mm long; margins flat, entire and smooth; lamina chartaceous, 0.3–0.4 mm thick, curved upwards and towards the stem, glabrous; sheath 1.0–2.4 mm long, abaxially glabrous, although hairy on the stipules, adaxially glabrous except for fringe of hairs at apex; stipules brown and scarious, 1.7–4.3 mm long, free, margins ciliate; petiole present, 0.5–2.0 mm long. *Flowers* solitary in axils of undifferentiated leaves; bracteoles shortly hairy on the keel, margins ciliate; sepals 3, glabrous. *Male flowers* with bracteoles 3.0–5.6 mm long; pedicel 0.6–0.9 mm long, glabrous; sepals broadly ovate, 4.9–9.9 × 3.0–6.1 mm, acute to acuminate at the apex; stamens 19–35; filaments 2.9–6.1 mm long; greenish white; anthers yellow. *Female flowers* with bracteoles 3.4–5.2 mm long, longer than immature receptacle; sepals oblong-triangular, 3.6–6.8 × 0.8–2.4 mm, spreading; carpel 1; stigma 3.8–9.8 mm long, red to pinkish white, feathery, hidden within incurved leaves; immature receptacle 1.7–2.1 × 1.2–1.8 mm, sparsely and shortly hairy, smooth. *Achene* medium brown but sometimes appearing greyish on account of being covered by membranous layer, glabrous; irregularly acutely ribbed beneath membranous layer. *Flowering time*: August to December, sometimes as early as March.

Habitat: Mesic mountain fynbos on well-drained acid sands from Table Mountain Series in full sun; altitude 200–1 250 m.

Distribution: From Uniondale, through the Kouga and Baviaanskloof Mountains to the Great Winterhoek Mountains at Uitenhage.

Conservation status: Widespread though localised. Red List status: LC.

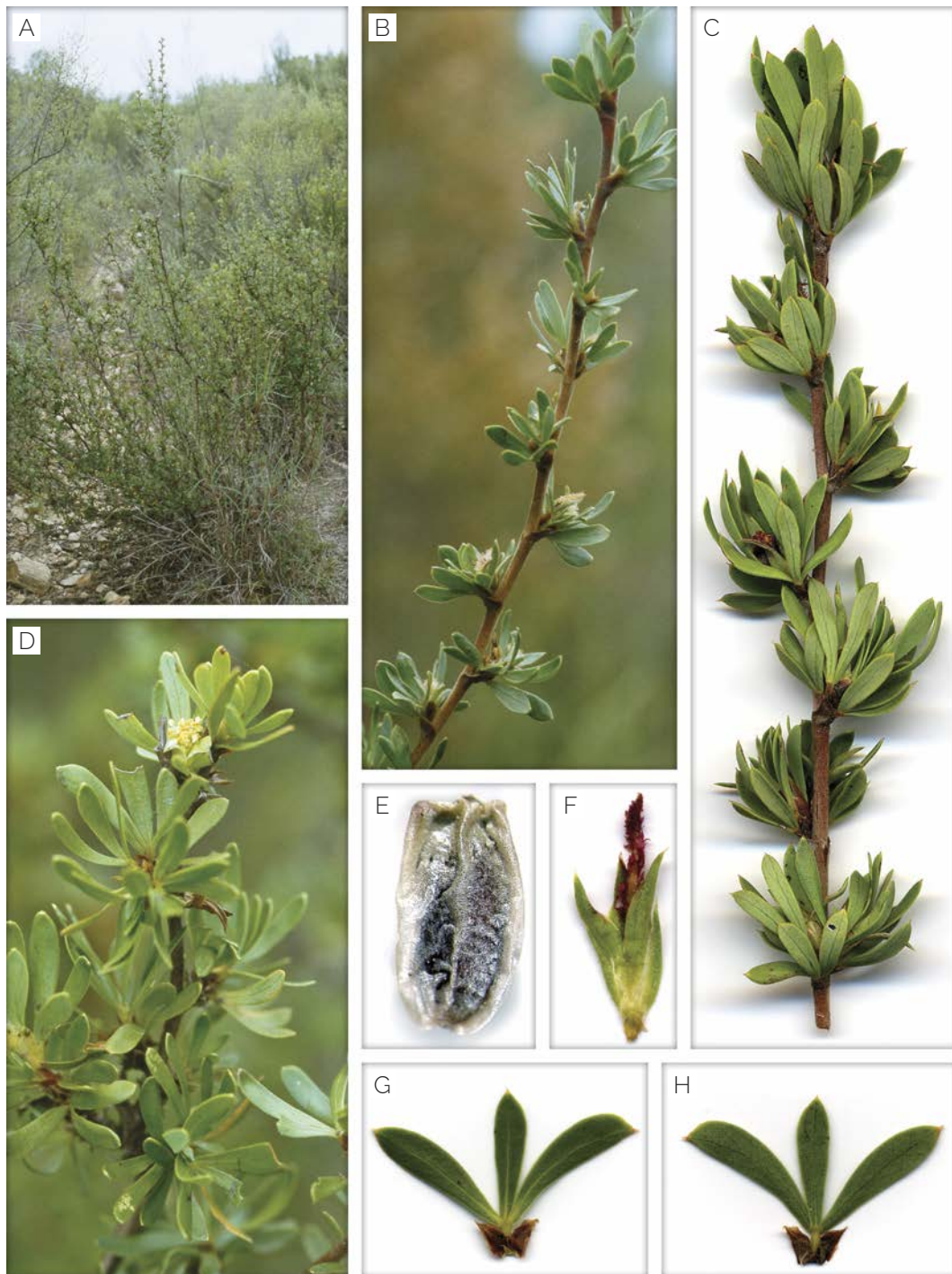
Etymology: *drepanoides* (Greek) means 'similar to a sickle-shaped species', i.e. similar to *Cliffortia falcata*.

Notes: A distinctive species, endemic to the Eastern Cape, distinguished by the long, broad leaflets that are slightly sickle-shaped and is unlikely to be confused with any other species that grow in the same area. It is closely allied to *Cliffortia falcata*, *C. arcuata* and *C. ramosissima* all of which have narrow and somewhat shorter leaves. It appears superficially similar to *C. apiculata*, with which it has occasionally been confused, but it has a petiole and the two species are widely separated in distribution.

There are three different Zeyher collections associated with *Cliffortia drepanoides*. Zeyher 2458 from the Koega River was cited by Weimarck (1934) but neither the number nor the locality were mentioned in Ecklon & Zeyher (1836). Zeyher 81 is mentioned in their publication but has no locality associated with it. Therefore, specimens labelled *Ecklon & Zeyher 1741* with the locality of 'Winterhoeksborg' are here designated as the lectotype.

Representative specimens

SOUTH AFRICA. 3323 (Willowmore): Uniondale Poort, 825 m, 15 Nov. 1958, (–CA), Acocks 19972 (K, PRE); Kouga Mts, Saptoukop, E slopes, 915–1220 m, 23 Nov. 1958, (–DA), Esterhuysen 27969 (BOL); Bo-Kouga area, Twee Riviere,



N of Misgund, ridge SW of farm, 680 m, 15 Dec. 1991, (–DA), *Oliver 9906A* (NBG); road from Kleinrivier to Brandhoek, 460 m, Nov. 1941, (–DB), *Fourcade s.n.* (BOL). **3324** (Steytlerville): Baviaanskloof Mts, Bosrug, on ridge top, 1160 m, 24 Mar. 1979, (–CA), *Campbell 12354* (NBG, PRE); Baviaanskloof, Sandvlakte farm, top of escarpment to W of Erasmusboskloof, 730 m, 10 Oct. 2002, (–CA), *Whitehouse 314* (BOL, NBG); above Combrink, 550–700 m, 29 Apr. 1947, (–CB), *Acocks 13705* (K, PRE); Baviaanskloof Pass, between Cambria and Smitskraal, W side, 460 m, 12 Sept. 1973, (–CB), *Thompson 1928* (NBG, PRE); Baviaanskloof Mts, Kleinrivier, NE of Smitskraal, 610 m, 13 Sept. 1973, (–CB), *Thompson 1943* (NBG, PRE); Zuuranys, on road to Kouga, 460 m, Sept. 1925, (–CC), *Fourcade 3040* (BOL); Kouga Mts foothills, Stuurmanskraal, 480 m, 19 Dec. 1991, (–CC), *Oliver 9961* (NBG); Great Winterhoek Mts, Cockscomb, N slopes, 915–1220 m, 2 Feb. 1958, (–DB), *Esterhuysen s.n.* (BOL); Great Winterhoek Mts, Cockscomb, N slopes, 915–1220 m, 2 Feb. 1958, (–DB), *Esterhuysen 27489* (PRE); Steytlerville, Great Winterhoek Mts, above 'Kleinplaas' TR425 farm, 800 m, 23 Sept. 1976, (–DB), *Taylor 9459* (K, NBG, PRE). **3325** (Port Elizabeth): Perdehoek, 900 m, 11 Dec. 2001, (–CA), *Bruyns 8991* (BOL); Uitenhage, Winterhoek Mts, Osplaat Farm, 1934, (–CA), *Du Toit 1* (K, PRE); Groendal Wilderness Reserve, Kromkloof R, Upper Zwartkops, top of tributary valley, 490 m, 9 Feb. 1974, (–CA), *Scharf 1123* (K, PEU, PRE); near Port Elizabeth, Kamaehs, Nov. 1912, (–CB), *Paterson 2395* (BOL); Groendal Wilderness Area, jeep track to Spitskop, above path to Blindekloof, 245 m, 23 Feb. 2000, (–CB), *Whitehouse 83* (BOL, NBG); Uitenhage, 24 km up Elands R road, 365 m, 3 Aug. 1960, (–CC), *Acocks 21261* (K, PRE); Loerie, (–CC), *Sim 213* (BOL).

(54–58) **Section Cliffortia.** Type species: *C. polygonifolia* L.

Sect. *Latifoliae* DC. in Annales des Sciences Naturelles 1: 449 (1824) & 596 (1825). Type species, designated here: *C. ternata* L.f. (= *C. polygonifolia* L.).

Sect. *Trifoliolae* Harv.: 293, 297 (1862). Type species, designated here: *C. polygonifolia*.

Sect. *Inflexae* Weim.: 186 (1948). Type species, designated here: *C. polygonifolia*.

Sect. *Reflexae* Weim.: 168 (1948), sphalm. Based on sect. *Inflexae*.

Medium erect densely branched shrubs. Young stems with spreading hairs, forming brachyblasts. Sheath hairy abaxially; stipules membranous, free; petiole absent. Leaves trifoliolate, **nearly always with hairs beneath, often hairy above**; leaflet elliptic to obovate or needle-shaped, **margins flat**. Flowers solitary, in the axils of ordinary vegetative leaves; bracteoles hairy, longer than immature receptacle; sepals 3, hairy on abaxially, female ovate, recurved; stamens 6–12, filaments red, anthers reddish brown; receptacle distinctly ribbed, usually glabrous; carpels 1; stigma red. Achene broadly ellipsoid, **6-winged or ribbed, if winged then wings incurved**, usually glabrous, often reddish.

The achenes of the main species in this section are very diagnostic, with their 3 incurved wings that alternate with narrower straight wings or ribs. The species appear to hybridise with each other making diagnosis of intermediate plants difficult. *Cliffortia sparsa* and *C. cristata* are probably the result of past hybridisation events with species outside the section and do not exhibit the clearly incurved wings on the achenes.

54. **Cliffortia polygonifolia** L., Species Plantarum: 1038 (1753); Harv.: 298 (1862); Levyns: 448 (1950); Fellingham: 613 (2000). Lectotype, designated by Stearn (1957) [Oliver & Fellingham (Jarvis et al. 1993) designated a Clifford specimen as lectotype, but this was predated by Stearn's choice.]: '*Cliffortia foliis linearibus pilosis: femina*' in L., t. 32 (1738), based on Herb. Clifford: 501, *Cliffortia* 3 (BM!).



Medium erect shrub, up to 1.5(–3.0) m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.6–3.0 mm wide, sometimes tinged reddish, hairy; stem hairs spreading, 0.1–1.6 mm long. *Leaves* trifoliolate; leaflets elliptic to ovate, 3.1–7.2 × 0.9–3.6 mm; apex acute to rounded, up to 0.3 mm long; margins flat, smooth to scabrid, entire or prominently toothed; lamina chartaceous, 0.1–0.4 mm thick across midrib, midrib prominent beneath, curved upwards and towards the stem, hairy above, sparsely hairy beneath with long hairs on the midrib, shorter ones or absent in between, hairs up to 1.5 mm long; sheath 0.8–2.1 mm long, abaxially hairy, adaxially hairy to glabrous except for fringe of hairs at apex; stipules 0.4–2.8 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 3, hairy on outside. *Male flowers* with bracteoles 3.6–5.5 mm long; pedicel 0.8–1.6 mm long; sepals broadly ovate, 4.9–7.5 × 1.8–2.9 mm, acute to acuminate at the apex; stamens 6–13; filaments 6.2–9.0 mm long, red; anthers brownish red. *Female flowers* with bracteoles 2.7–6.5 mm long, longer than immature receptacle; sepals broadly ovate, 1.7–4.7 × 0.8–1.9 mm, recurved; carpel 1; stigma 3.0–8.7 mm long, red, feathery, prominent above leaves; immature receptacle 1.4–3.0 × 0.7–1.8 mm, glabrous, clearly ribbed. *Achene* ellipsoid to oblong, sometimes slightly flattened, 3.3–4.4 × 2.1–2.6 mm, pale to reddish brown, glabrous or rarely very shortly hairy, hairs up to 0.1 mm long; (3–)6(–7)-winged, 3 wings strongly incurved, 3 wings shorter, sometimes almost absent and often slightly crested; elaiosome swollen around base. *Flowering time*: (June to) August to September (to November).

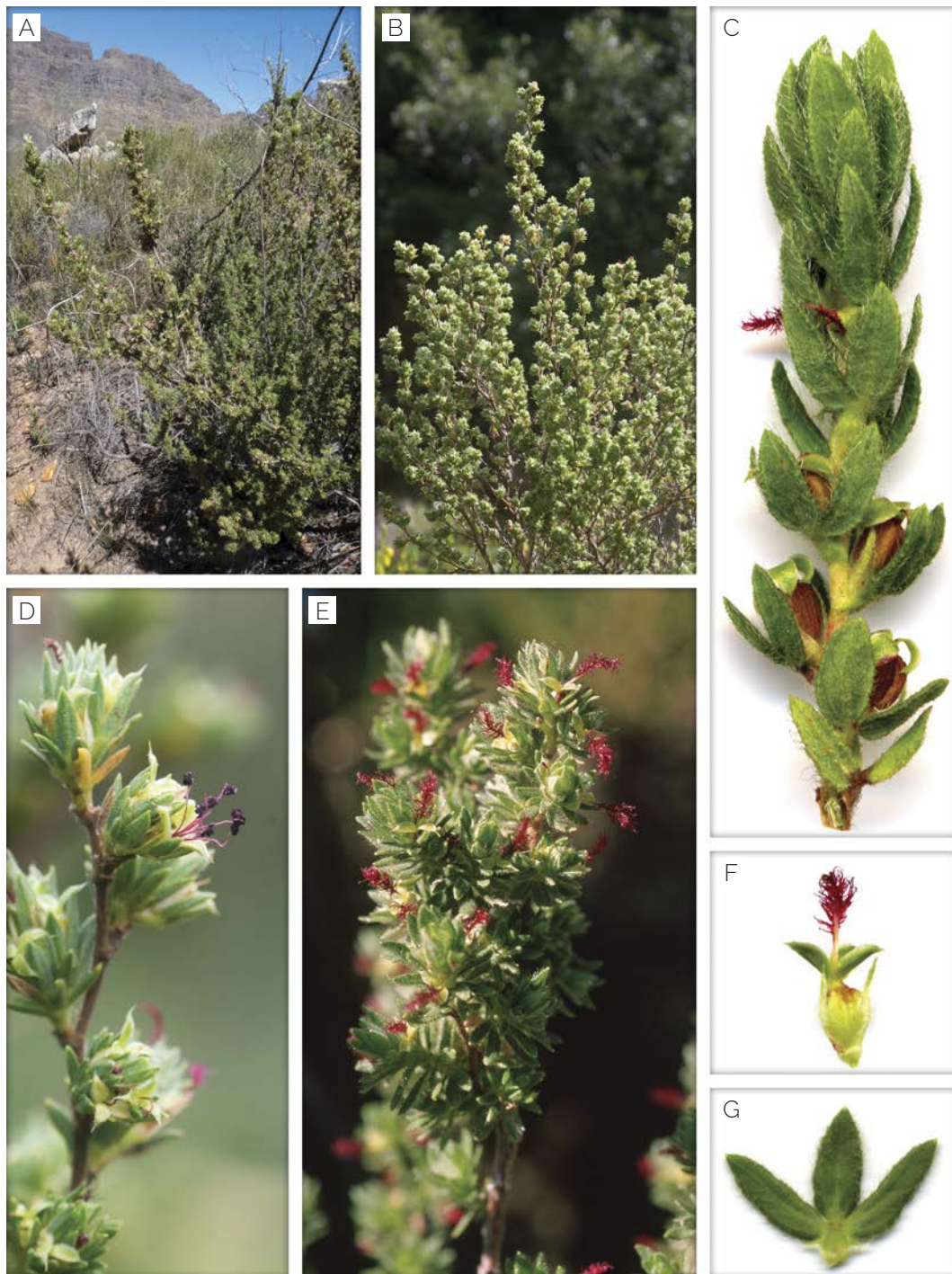
Etymology: *polygonifolia* (Greek) means either 'leaves like *Polygonum*' (i.e. the European docks) or 'many-angled leaves'. The latter seeming more likely upon account of the leaves varying greatly in size and shape and not particularly like any well-known species of *Polygonum*.

Common names: *paddabos* (Afrikaans).

Notes: Both Harvey (1862) and Weimarck (1934) commented on the difficulty of distinguishing the varieties, as transitional specimens between var. *polygonifolia* and var. *trifoliata*, with some leaves un-toothed and some leaves toothed, were commonly found. The varieties are separated here by the presence of any leaf on the plant having a toothed apex. This enables easier distinction than Weimarck found, where it appeared to be based on the majority of leaves. Rather than blurring the two varieties, this makes var. *trifoliata* a geographically cohesive taxon, with well-defined limits of distribution. However, var. *polygonifolia* is found throughout the range of the species.

var. ***polygonifolia***; Weim.: 81, fig. 23B–J (1934).

C. ternata L.f.: 430 (1782); Thunb.: 438 (1823); DC.: 596 (1825); G.Don: 596 (1832); Eckl. & Zeyh.: 267 (1836); Juel: 277 (1918). *C. polygonifolia* L. var. *ternata* (L.f.) Harv.: 298 (1862); Bolus & Wolley-Dod: 259 (1904). Type: South Africa, without precise locality, *Thunberg s.n.* (LINN, holotype!).



All leaflets elliptic to ovate, $3.1\text{--}7.2 \times 0.9\text{--}3.6$ mm, margins entire. *Male flowers* with sepals broadly ovate. *Female flowers* with bracteoles $2.7\text{--}3.4$ mm long, longer than immature receptacle; sepals broadly ovate, $1.7\text{--}2.3 \times 0.8\text{--}1.7$ mm, recurved; carpel 1; stigma $3.0\text{--}4.2$ mm long, red, feathery, prominent above leaves; immature receptacle $1.4\text{--}2.3 \times 0.7\text{--}1.4$ mm, glabrous, clearly ribbed. *Achene* glabrous.

Habitat: Occurring on a wide variety of well-drained soils both sandy and clayish, in full sun; altitude 0–1 700 m.

Distribution: Scattered throughout mountains and flats of Western Cape from the Cederberg to Gansbaai, including the Cape Peninsula; there are also outlying records from the Witteberg and Anysberg further east.

Conservation status: Common and widespread, often occurring in disturbed areas. Red List status: LC.

Representative specimens

SOUTH AFRICA. **3118** (Vanrhynsdorp): expedition to Kamiesberg, Gifberg and Olifants River Mts [flat summit of the Matsikamma], 17 Sept. 1911, (–DB), *Phillips 7458* (K). **3218** (Clanwilliam): Cape, 13 km (a.c.f.) W of Aurora, 45 m, 22 Aug. 1970, (–CB), *Acocks 24286* (K, PRE); E slopes of Kapteinskloof Mt., 21 Oct. 1935, (–DA), *Pillans 7997* (BOL). **3219** (Wupperthal): Pakhuis Pass, 19 Sept. 1937, (–AA), *Compton 6940* (NBG); Pakhuis Pass, 760 m, 29 Sept. 1940, (–AA), *Compton 9578* (NBG); Pakhuis, 29 Sept. 1940, (–AA), *Esterhuysen 3441a* (BOL); N Cederberg, Pakhuis, 760 m, 17 Jan. 1953, (–AA), *Esterhuysen 21159* (BOL); Pakhuis Pass, 610 m, 24 Sept. 1932, (–AA), *Levy's 3948* (BOL); Pakhuis Pass, 610 m, 29 Sept. 1940, (–AA), *Levy's 7208* (BOL); Cederberg, Krakadouw Heights, 1220 m, 26 Oct. 1923, (–AA), *Pocock 667* (NBG); Cederberg District, Boschkloof, 1220 m, 28 Oct. 1923, (–AC), *Pocock 707* (NBG); Cederberg, Matjiesrivier, Sept. 1943, (–AD), *Wagener 243* (NBG). **3318** (Cape Town): near Hopefield, 3 Sept. 1944, (–AB), *Leighton 626* (BOL); Black R, near Cape Town, 30 m, July 1883, (–CD), *Bolus s.n.* (BOL); Kirstenbosch, clearing N of Window Stream, Oct. 1940, (–CD), *Esterhuysen 23177* (BOL); Cape Peninsula, Kenilworth Race Course, 13 Nov. 1969, (–CD), *Esterhuysen 32314* (BOL); Table Mt, flank of Disa Gorge, 610 m, 6 Sept. 1972, (–CD), *McKinnon 11X* (NBG); Table Mt, flank of Disa Gorge, 610 m, Aug. 1972, (–CD), *McKinnon 199* (NBG); sandy flats E of Rondebosch, 9 Aug. 1915, (–CD), *Pillans 2820* (BOL); Cape Peninsula, near Kirstenbosch, 7 Aug. 1951, (–CD), *Salter 9251* (BM); Cape Peninsula, Devil's Peak, 12 Sept. 1895, (–CD), *Wolley-Dod 1* (BM, BOL, K); Cape Peninsula, Devil's Peak, between waterfalls, 2 May 1897, (–CD), *Wolley-Dod 2451* (BOL); Pella, Burgers Post Farm Fynbos Biome Research Site, 200 m, 31 Aug. 1979, (–DA), *Boucher & Shepherd 4556* (NBG, PRE); Kleindassenberg, Kanonkop, E hill SW slope, 6 Sept. 1986, (–DA), *Fellingham 1175* (NBG, PRE); Cape Flats, Doornhoogte, June 1830, (–DC), *Ecklon & Zeyher s.n.* (PRE); near Kraaifontein, 9 July 1929, (–DC), *Markotter SAM 10720* (NBG); Stellenbosch District, Bottelary, 10 Jan. 1942, (–DD), *Compton 12917* (NBG); Pniel, 29 Dec. 1954, (–DD), *Esterhuysen 24032* (BOL, K, PRE); Stellenbosch Mt., 1 Sept. 1917, (–DD), *Garside 1007* (K); lower slopes of Stellenbosch Mt., near Hall's Farm, 31 Aug. 1919, (–DD), *Garside 1253* (K); lower mountain slopes SE of Brandwacht, 14 Aug. 1969, (–DD), *Oliver 10561a* (NBG); Stellenbosch Mt, 29 Aug. 1953, (–DD), *Scholz s.n.* (NBG); Bothmaskop, 28 June 1946, (–DD), *Strey 855* (PRE); main road between N1 and Stellenbosch, just after railway bridge, 150 m, 12 Sept. 2001, (–DD), *Whitehouse 262* (BOL). **3319** (Worcester): ridge in Twenty Four Rivers Mts, above Porterville, 23 Oct. 1949, (–AA), *Esterhuysen 16199A* (BOL, NBG); Worcester side of Du Toits Kloof Pass, 855 m, 8 July 1979, (–CA), *Campbell 10071* (NBG); Du Toits Kloof, 1220–1525 m, (–CA), *Drège 6826* (K); Wellington, lower slopes of Seven Sisters Mt., 2 Oct. 1943, (–CA), *Esterhuysen 9029* (BOL); Bain's Kloof, Hawequas MCA Hawequas Farm, 480 m, 16 Aug. 1987, (–CA), *Forsyth 477* (NBG, PRE); Wellington, Bain's Kloof, 26 Sept. 1952, (–CA), *Leighton BK28* (BOL); Du Toits Kloof, W side, 28 Oct. 1951, (–CA), *Maguire 1120* (NBG); Bain's Kloof, 18 Oct. 1966, (–CA), *Oliver s.n.* (NBG); near Franschoek, Oct. 1887, (–CC), *Bolus 9694* (BOL); at foot of Haalhoek Spitzkop, 1160 m, 11 Sept. 1949, (–CC), *Esterhuysen 15704* (BOL). **3320** (Montagu): Witteberg, 1525 m, 24 Oct. 1943, (–BC), *Henderson 15227* (NBG); Anysberg, E end of Anysberg, summit near beacon, 1980, (–BC), *van Wyk s.n.* (PRE); Anysberg, E end of Anysberg, near Ladismith, rocky summit near beacon, 6 Oct. 1982,

(–BC), *van Wyk 1042* (NBG). **3418** (Simonstown): Cape Peninsula, Imhoff's Gift, 30 Aug. 1940, (–AB), *Barker 847* (NBG); Cape Peninsula, Theefontein, 19 Dec. 1949, (–AB), *Compton 21846* (NBG); S Peninsula, Bonteberg, 6 Oct. 1946, (–AB), *Levyms 8671* (BOL); Cape Peninsula, Klaver Valley, 16 Aug. 1927, (–AB), *Salter 259/16* (BM); flats near Kommetjie, Wildevoelvlei, 5 m, 4 June 1965, (–AB), *Taylor 6320* (NBG, PRE); Cape Peninsula, Imhoff's Gift, 30 Aug. 1940, (–AB), *Walgate s.n.* (BOL); Cape Peninsula, Slangkop Mt, above Kommetjie, near road along track towards ruins of coastguard house, 90 m, 4 Aug. 2001, (–AB), *Whitehouse 242* (BOL); Cape of Good Hope, Wynberg near Cape Town (Mowbray ex Weimarck), 8 July 1883, (–AB), *Wilms 3178* (K); Cape Peninsula, Cape Point Reserve, slopes above Buffels Bay, 23 Aug. 1943, (–AD), *Leighton 28* (BOL, PRE); Buffels Bay, 90 m, 21 Nov. 1935, (–AD), *Levyms 5297* (BOL, PRE); Cape of Good Hope Nature Reserve, along shack track, 45 m, 10 Oct. 1965, (–AD), *Taylor 6530* (NBG); Faure, Eerste R, between pipeline bridge over river and N2 road, 9 Oct. 1976, (–BA), *Boucher 3237* (NBG, PRE); N end of Helderberg, upper slopes, 21 Sept. 1928, (–BB), *Gillett 714* (NBG). **3419** (Caledon): Elgin, 24 Apr. 1943, (–AA), *Compton 14500* (NBG); lower slopes of mountains W of Palmiet R, near Elgin, 25 Apr. 1943, (–AA), *Leighton 468* (BOL); Houwhoek, 610 m, 5 Feb. 1896, (–AA), *Schlechter 7379* (BM, BOL, PRE); Stanford, Paardeberg Farm near Papiesvlei, 13 km E of Stanford, 150 m, 25 Sept. 1962, (–BC), *Taylor 4054* (NBG, PRE); Frikies Bay, 24 Aug. 1946, (–CB), *Compton 18177* (NBG); Franskraal, 24 Aug. 1946, (–CB), *Leighton 1893* (BOL); near Elim, 185 m, July 1895, (–DB), *Bolus 19858* (BOL).

var. **trifoliata** (L.) Harv., *Flora Capensis* 2: 298 (1862); Bolus & Wolley-Dod: 259 (1904); Weim.: 83, fig. 23A (1934). *C. trifoliolata* L.: 1038 (1753); DC.: 596 (1825); G.Don: 596 (1832); Eckl. & Zeyh.: 267 (1836). Lectotype, designated by Fellingham in Cafferty & Jarvis (2002): '*Thymelaeae (forte) affinis Aethiopica, foliis tridentatis, & ex omni parte hirsutie pubescentibus*' in Plukenet, *Phytographia*, t. 319, f. 4, (1696) 1694, based on Herb. Sloane 107: 7 (BM!).

C. polygonifolia var. *membranifolia* Weim.: 86 (1934). Type: Cape Peninsula, on dunes near Newlands, *Ecklon & Zeyher s.n.* (Z, syn.); Devil's Peak, waterfall, 1883, *Wilms 3183* (B, syn.†); without precise locality, *Bergius s.n.* (B, syn.†) & *Drège s.n.* (W, syn.).

C. polygonifolia var. *pubescens* Weim.: 187, fig. 9a–c, t. 7 (1948). Type: Paarl District, Franschhoek Forest Reserve, Berg R Hoek, 20 Sept. 1946, *Leighton 2036* (LD, holo.; BOL!, iso.).

Middle leaflet obovate to cuneate, 4.4–10.6 × 1.8–6.5 mm, 1–3-toothed at apex, middle tooth 1.4–4.0 × 1.0–2.4 mm; outer leaflets elliptic to obovate, 3.9–11.1 × 1.3–5.0 mm, rarely cuneate and toothed as the middle leaflet. *Female flowers* with bracteoles 3.8–6.5 mm long, longer than immature receptacle; sepals broadly ovate, 2.9–4.7 × 1.1–1.9 mm; stigma 4.5–8.7 mm long; immature receptacle 1.6–3.0 × 1.1–1.8 mm, glabrous or hairy, clearly ribbed. *Achene* glabrous or rarely very shortly hairy, hairs up to 0.1 mm long.

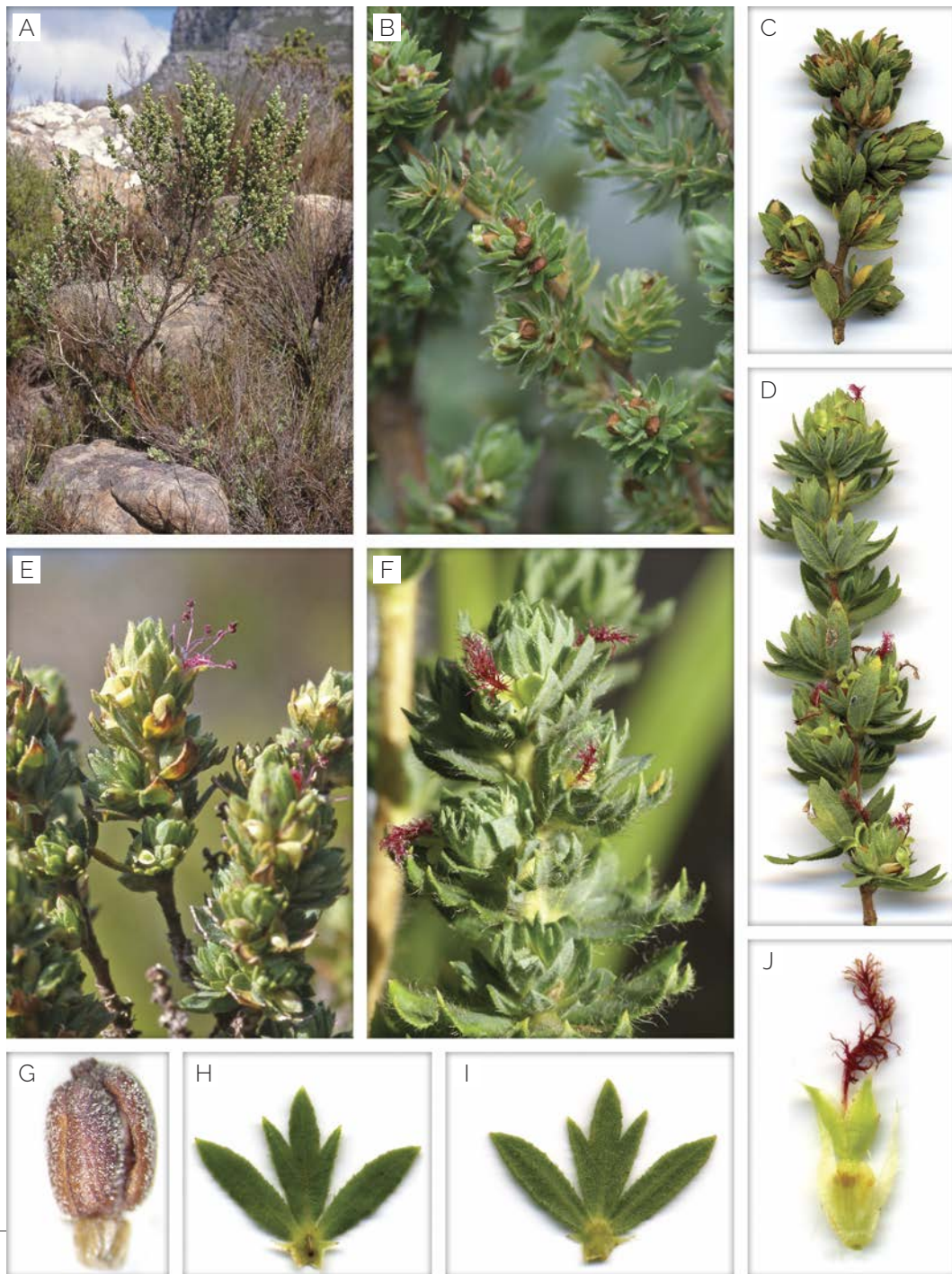
Habitat: A wide variety of well-drained sandy to clayish soils in full sun; altitude 0–1 550 m.

Distribution: Mountains of southwestern Western Cape from Bain's Kloof to the Kogelberg, with outlying populations around Tulbagh and on the Cape Peninsula.

Conservation status: Common and widespread, often occurring in disturbed areas. Red List status: LC.

Etymology: *trifoliata* (Latin) means 'with three leaflets', although the majority of species of *Cliffortia* have this character; it was possibly intended to refer to the fact that the middle leaflet is 3-lobed, but being a Linnaean name that is difficult to establish.

Notes: Var. *trifoliata* is generally a more robust plant than var. *polygonifolia*, although it is not possible to state exact figures. However, a robust form of var. *polygonifolia* is found in the Olifants River Mountains



area (Acocks 19691, Compton 22102, Whitehouse 246). The leaflets are exceptionally broad and it appears like many specimens of var. *trifoliata* except that they are never toothed. This might be recognised as a distinct species, but the variation across the whole of *Cliffortia polygonifolia* needs to be better understood before any decision can be made.

A form with hairs on the achenes occurs around Franschhoek and was differentiated by Weimarck as var. *pubescens*. This is an unusual character and unique within sect. *Cliffortia*. Its leaves are the same as for var. *trifoliata*, and so it is not maintained here as a distinct variety.

Weimarck (1934) also recognised var. *membranifolia*, which has all leaflets toothed. This condition is typical of seedlings of var. *trifoliata*, but is also found on some mature specimens from a variety of locations within the range of var. *trifoliata*. The character does not correlate with geography and is not recognised here.

Representative specimens

SOUTH AFRICA. 3318 (Cape Town): Claremont, 1917, (–CD), *anon s.n.* (BOL); Cape Peninsula, Devil's Peak, summit, 1005 m, 27 July 1955, (–CD), *Baker 780* (BM, NBG); Table Mt., near Cape Town, 150 m, Oct. 1873, (–CD), *Bolus 2785* (BOL, K); Kirstenbosch, 365 m, Aug. 1924, (–CD), *Compton s.n.* (BOL); Cape Peninsula, Table Mt, Pipe Track, 305 m, 23 Sept. 1948, (–CD), *Compton 20991* (NBG); back of Lion's Head, Oct. , (–CD), *Ecklon (ex Herb. Parker) 189* (K); Cape Peninsula, Table Mt., along path S of Beacon, 915 m, 11 Jan. 1942, (–CD), *Esterhuysen 7991* (BOL); Cape Peninsula, Devil's Peak, N slopes below Saddle, 305 m, 24 Aug. 1952, (–CD), *Esterhuysen 20391* (BOL, PRE); slopes of Devil's Peak, (–CD), *Froembling s.n.* (NBG); Cape Peninsula, Table Mt, Skeleton Gorge, upper unwooded part, 11 Sept. 1928, (–CD), *Gillett 48* (NBG); Cape Peninsula, Table Mt, Skeleton Gorge, upper unwooded part, 11 Sept. 1928, (–CD), *Gillett 54* (NBG); Signal Hill, slopes facing city, 25 Aug. 1974, (–CD), *Goldblatt 2435* (NBG, PRE); E slopes of Lion's Head, Aug. 1913, (–CD), *Kensit s.n.* (BOL); Rondebosch, University of Cape Town, 185 m, 16 Nov. 1935, (–CD), *Levyyns 5229* (BOL); Table Mt., above ?Window Gorge, 945 m, 20 Feb. 1944, (–CD), *Levyyns 11643* (BOL); at foot of Table Mt., 75 m, Sept. 1885, (–CD), *MacOwan 566* (BM, K); near Cape Town, Platteklip, 250 m, Sept. 1924, (–CD), *Marloth 3466* (NBG); Lion's Head, Sept. , (–CD), *Pappe s.n.* (K); Cape of Good Hope, Stinkwater [Blinkwater], (–CD), *Rehmann, Dr.A. 1376* (BM); Lion's Rump, 150–305 m, Sept. 1897, (–CD), *Thode 6177* (NBG); Devil's Peak, Saddleback, 305–610 m, Aug. 1886, (–CD), *Thode 9185* (NBG); Cape Peninsula, S slopes of the Twelve Apostles, 14 July 1940, (–CD), *Walgate s.n.* (BOL); Cape Peninsula, Devil's Peak, contour path above Tafelberg road, between Queen's & King's Blockhouses, 440 m, 27 Jan. 2000, (–CD), *Whitehouse 73* (BOL); Cape Peninsula, Devil's Peak, mid N slopes, 440 m, 8 Sept. 2000, (–CD), *Whitehouse 134* (BOL); Cape Peninsula, by bridge on Camp Ground, 26 July 1895, (–CD), *Wolley-Dod 2* (BOL, K); Cape Peninsula, near King's Blockhouse, 430 m, 10 Aug. 1895, (–CD), *Wolley-Dod 3* (K); Cape Peninsula, Devil's Peak, Aug. 1895, (–CD), *Wolley-Dod 4* (BM, BOL); Paarl Mt., burnt area plot A4, 28 July 1961, (–DB), *Kruger M33* (NBG, PRE); Wellington, 19 Sept. 1918, (–DB), *Moss 4472* (PRE); next to Jan Philips road, 345 m, 9 June 1992, (–DB), *Swanepoel 10* (NBG); Paarl Mt., 610 m, 29 Mar. 1962, (–DB), *van der Merwe 965* (K, PRE); near Klapmuts, 215 m, 10 Mar. 1948, (–DD), *Acocks 14102* (K, PRE); Stellenbosch, Jonkershoek valley, next to trail in Swartboskloof, 1 Aug. 1963, (–DD), *Bos 282* (NBG, PRE); Lemoenkloof Farm, NE of Stellenbosch, ridge directly W of Silwerminekloof, 460 m, 12 Oct. 1989, (–DD), *Buys 63* (NBG); Blaauwklip, side of farm road, 13 Sept. 1928, (–DD), *Gillett 115* (NBG); Jonkershoek, Langrivier, upper hill slopes, 1220 m, 1 Dec. 1965, (–DD), *Kerfoot 5489* (NBG, PRE); Brandwacht, 27 Sept. 1974, (–DD), *Louw 20* (NBG); Banghoek, Dwarsrivierhoek, Brian Rycroft Nature Reserve, 430 m, 31 Dec. 1978, (–DD), *Rycroft 3319* (NBG); Stellenbosch, Swartboskloof, 28 July 1960, (–DD), *van der Merwe 23-06* (NBG); Swartboskloof, 335–490 m, 28 July 1960, (–DD), *van der Merwe 23-06* (PRE); Jonkershoek, Assegaiibos, 8 Sept. 1948, (–DD), *van Rensburg s.n.* (NBG); Swartboskloof, 13 Oct. 1960, (–DD), *van Rensburg 2098* (PRE); Swartboskloof, 13 Oct. 1960, (–DD), *van Rensburg 2099* (NBG, PRE); Jonkershoek, Swartboskloof Nature Reserve, 610 m, 15 Aug. 1970, (–DD), *Wenger 1178* (PRE); Jonkershoek, Black Bridge, 27 Aug. 1937, (–DD), *Wicht 468* (PRE). 3319 (Worcester): Tulbagh, Winterhoekseberg, 1065 m, Nov. 1879, (–AA), *Bolus 2785* (BOL); Witzenberg, Inkruip, E slopes, 1 Oct. 1954, (–AA), *Esterhuysen 23421* (BOL); Bergplaas Farm, path up to Sneeuog, around Nooiensverdriet, 600 m, 22 Sept. 2001, (–AA), *Whitehouse 272* (BOL); Du Toits Kloof, 0 Sept. 0, (–CA), *anon s.n.* (NBG); Du Toits Kloof, 1220–1525 m, (–CA), *Drège 6826* (BM, K); slopes along Du Toits Kloof road above Paarl, 610 m, 24 Sept. 1949, (–CA), *Esterhuysen 15819* (BOL); Bain's Kloof, near stream N of hotel, 26 Sept. 1952, (–CA), *Leighton BK33* (BOL); Bain's Kloof, Baviaans Kloof, above waterfall, 15 Aug. 1966, (–CA), *Thompson 194* (K, NBG, PRE); near

Franschhoek, 490 m, May 1895, (–CC), *Bolus s.n.* (BOL, NBG); Franschhoek Pass, 700 m, 20 Aug. 1936, (–CC), *Compton 6412* (NBG); Franschhoek, 5 Oct. 1946, (–CC), *Compton 18539* (NBG); Franschhoek Pass, 610 m, 12 Feb. 1950, (–CC), *Compton 21903* (NBG); Berg R Hoek, 20 Sept. 1946, (–CC), *Leighton 2036* (BOL); Franschhoek Forest Reserve, 6 Aug. 1958, (–CC), *Lewis 5281* (NBG); Franschhoek Peak, 1525 m, Oct. 1946, (–CC), *Stokoe SAM 59200* (PRE); Theewater-skloof, Du Toits R, Purgatory Outspan, W of river, 335 m, 20 Feb. 1979, (–CC), *Thompson 3839* (NBG, PRE); Wemmershoek Mts, Tierkloof, 20 Oct. 1943, (–CC), *Wasserfall 529* (NBG); Franschhoek Pass, car park at summit of pass at start of path to Du Toit's Kop, 760 m, 19 Oct. 2002, (–CC), *Whitehouse 321* (BOL). **3418** (Simonstown): Cape Peninsula, Simonstown, Red Hill, 14 Nov. 1945, (–AB), *Leighton 1471* (BOL); Cape of Good Hope, Roundhouse near Cape Town, 18 Aug. 1883, (–AB), *Wilms 3178* (BM); near Somerset West waterworks, 27 July 1947, (–BB), *Brenan 7618* (K); Stellenbosch District (Sir Lowry's Pass ex Weimarck), 29 Mar. 1815, (–BB), *Burchell 8265* (K); Sir Lowry's Pass, 460 m, 2 Sept. 1924, (–BB), *Compton 3353* (BOL); Hottentots Holland Mts, Moordenaars Kop, 30 Oct. 1943, (–BB), *Esterhuysen 9121* (BOL); Guardian Peak, S slopes, 1065 m, 7 Oct. 1945, (–BB), *Esterhuysen 11986* (BOL); round N end of Helderberg, 21 Sept. 1928, (–BB), *Gillett 630* (NBG); Steenbras, Aug. 1912, (–BB), *Rogers 11088* (K). **3419** (Caledon): Jonkershoek, Dwarsberg, 915 m, 27 Apr. 1962, (–AA), *Banks 1264* (NBG); Stellenbosch, Jonkershoek valley, contour path on N slope of Dwarsberg, 28 Aug. 1963, (–AA), *Bos 478* (NBG, PRE); Grabouw, Lebanon, Catchment 2, just below Met station, 640 m, 16 Aug. 1966, (–AA), *Kruger 154* (NBG, PRE); Lebanon, Catchment 2d, 655 m, 30 Mar. 1967, (–AA), *Kruger 389* (NBG, PRE); Kogelberg State Forest, ± 2.8 km from Stokoe Bridge, ± 0.5 km left of road to Highlands and ± 30 m from Palmiet R, 100 m, 8 Nov. 1993, (–AC), *Kruger 1197* (NBG, PRE); Bot R vlei, at head of vlei, 20 m, 16 Aug. 1982, (–AC), *O'Callaghan 250* (NBG).

55. **Cliffortia sericea** Eckl. & Zeyh., Enumeratio Plantarum Africae Australis Extratropicae 2: 269 (1836); Harv.: 300 (1862); Weim.: 87, fig. 23K–R (1934) & 188, fig. 9f–g (1948); Fellingham: 613 (2000). Type: Tulbagh District, Tulbagh Waterfall, Dec., *Ecklon & Zeyher 1746* (S, holo.; B, C, SAM!, iso.).



C. polycephala E.Mey. ex Harv.: 302 (1862). Type: Caledon District, Genadendal, 610–915 m, *Drège 'C. polycephala E.M.'*

[Weimarck (1934) cited this as *Drège 1124*] (K, holo.; B, HBG!, REG!, S, TUB!, iso.).

C. lanata Weim.: 187, fig. 9a–c, t. 7 (1948); Fellingham: 612 (2000). Type: Worcester District, Brandvlei Kop, 915 m, 2 June 1940, *Compton 8828* (NBG, holo.).

C. polygonifolia sensu Dahlgren: fig. 1G (1971), non Eckl. & Zeyh.

Short to medium erect shrub, up to 1.2 m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.6–1.3 mm wide, tinged reddish, hairy; stem hairs adpressed upwards to spreading, 0.2–1.4 mm long. *Leaves* trifoliate; leaflets elliptic, 3.5–6.6 × 0.7–1.8 mm; apex acute to rounded, 0.1–0.3 mm long; margins flat, entire and smooth; lamina chartaceous, 0.1–0.5 mm thick, midrib prominent beneath, curved upwards and towards the stem to almost straight, densely silky hairy above, hairy all over beneath, hairs 0.1–1.4 mm long; sheath 1.0–2.6 mm long, abaxially hairy, adaxially with scattered adpressed hairs or glabrous except for fringe of hairs at apex; stipules 1.0–2.3 mm long, free, margins smooth to ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 3, hairy on outside. *Male flowers* with bracteoles 3.5–4.6 mm long; pedicel 0.4–0.9 mm long, glabrous; sepals broadly ovate, 4.4–5.1 × 1.6–2.3 mm, acute to acuminate at the apex; stamens 6–9; filaments 5.8–8.4 mm long, red; anthers brownish red. *Female flowers* with bracteoles 3.2–5.0 mm long, longer than immature receptacle; sepals broadly ovate, 2.2–3.8 × 0.8–1.5 mm, recurved; carpel 1; stigma 3.8–6.4 mm long, red, feathery, prominent above leaves; immature receptacle 1.4–3.6 × 0.8–1.9 mm, glabrous, clearly ribbed. *Achene* ellipsoid to oblong, sometimes slightly flattened, 3.5–4.6 × 1.4–2.6 mm, red to reddish brown, glabrous; 6-winged, 3 wings strongly incurved, 3 wings shorter, often slightly crested, wings incurved; elaiosome swollen around base. *Flowering time*: (April to) June to November.

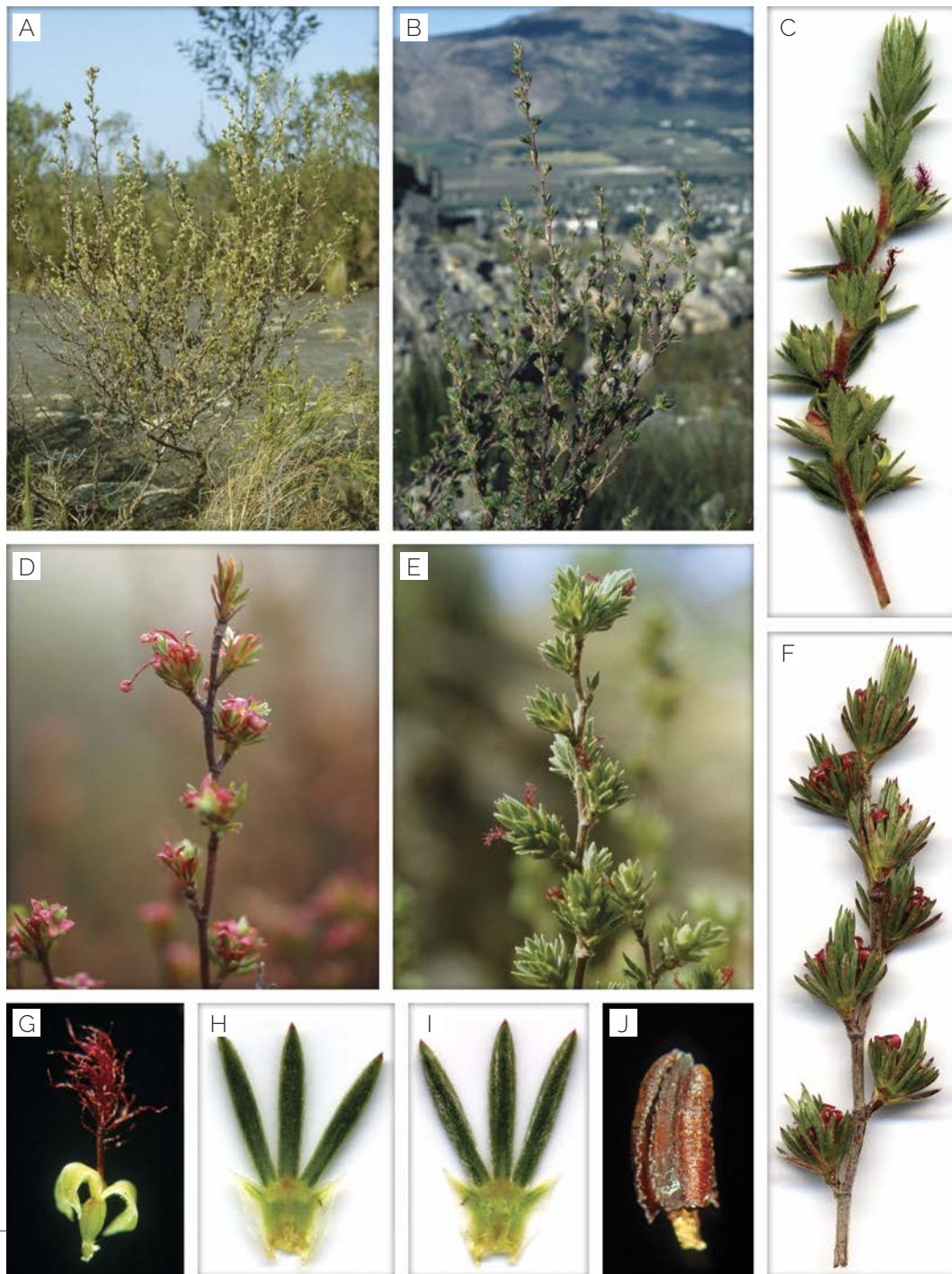
Habitat: Acidic sands from Table Mountain Series, clayish soil from shale bands of Table Mountain Series and clay soils from Bokkeveld Series, full sun, well-drained soils; altitude 100–1 850 m.

Distribution: Koue Bokkeveld south to Sir Lowry's Pass and east along the Riviersonderend Mountains, with outliers on Caledon Swartberg, Shaw's Mountain and around Elim, and inland on the Waboomsberg near Montagu.

Conservation status: Common and widespread, often in nature reserves and mountainous areas. Red List status: LC.

Etymology: *sericea* (Latin) means 'silky', referring to the adpressed long whitish hairs on the leaves.

Notes: Very similar to *Cliffortia polygonifolia* var. *polygonifolia*, but greyish white in colour due to the long silky hairs on the leaves. Weimarck (1934) identified *C. lanata* based upon the even more densely hairy leaves, but under *C. sericea* he comments on the wide range of variation found within the species



and it appears that *Compton 8828* (NBG) is just at one extreme of that scale. At the other end of the scale, with less densely hairy leaves, are plants from Houw Hoek, *Schlechter 7379* (BOL, GRA, PRE) that Weimarck identified as crosses with *C. polygonifolia*.

Cliffortia sericea appears to begin flowering slightly earlier than *C. polygonifolia* and has a longer season.

Representative specimens

SOUTH AFRICA. **3219** (Wuppertal): Elandsbloof, 3 Oct. 1940, (–CA), *Compton 9704* (NBG); Elandsbloof, 1 Oct. 1944, (–CA), *Compton 16218* (NBG); Porterville Mts, summit of ridge above Kromboskloof, 975 m, 28 Sept. 1972, (–CC), *Thompson 1470* (K, NBG, PRE). **3319** (Worcester): Groot Winterhoek State Forest, Perdevlei, 16 Nov. 1977, (–AA), *Durand 298* (NBG, PRE); Witzenberg Vlake, Die Eike, 1 Oct. 1954, (–AA), *Esterhuysen 23471* (BOL); W facing slopes of De Tronk, 900 m, 5 Oct. 1980, (–AA), *Low 1075* (NBG); Groot Winterhoek Wilderness Area, path from De Tronk to Perdevlei, just before turn-off to Groot Kliphuis, 840 m, 12 Sept. 2002, (–AA), *Whitehouse 311* (BOL, NBG); Hansiesberg, 1830 m, 17 Dec. 1944, (–AB), *Compton 16734* (BOL, NBG); W slopes of Vogelvllei Mts, near Gouda, 9 Sept. 1951, (–AC), *Esterhuysen 18789* (BOL); Tulbagh, Sewenfontein Nature Reserve, between Kluitjieskraal and Sewenfontein, 550 m, 10 June 1969, (–AC), *Haynes 114* (NBG, PRE); Wolseley, Kluitjieskraal Forest Station, Watervalsberg, 630 m, 4 Oct. 1994, (–AC), *Meyer 741* (PRE); Waterval, 185 m, 3 Sept. 1892, (–AC), *Schlechter 1419* (BM, BOL, K); Waterval, 21 Aug. 1927, (–AC), *Stokoe 1411* (BOL); Michell's Pass, Slab Peak, 5 Oct. 1941, (–AD), *Esterhuysen 6169* (BOL, K); Slanghoek Peak, 1220–1525 m, 15 Aug. 1943, (–CA), *Esterhuysen 8895* (BOL); Paarl-cliffs on W side of Upper Wellington Sneeuwkop, 1675 m, 9 Jan. 1949, (–CA), *Esterhuysen 15040* (BOL); slopes in Elands Kloof, off Du Toits Kloof, 11 Sept. 1949, (–CA), *Esterhuysen 15718* (BOL, NBG, PRE); Hawequas Mts, E slopes of Seven Sisters Mt., 1220–1370 m, 24 Sept. 1949, (–CA), *Esterhuysen 15788* (BOL, NBG); Brandvlei Kop, 915 m, 2 June 1940, (–CB), *Compton 8828* (NBG); slopes E of Fonteintjiesberg, 915–1220 m, 2 Jan. 1950, (–CB), *Esterhuysen 16745* (BOL); top of Franschoek Pass, 550 m, 26 Sept. 1949, (–CC), *Acoccks 15513* (K, PRE); Franschoek, in mountains, 610 m, Sept. 1895, (–CC), *Bolus 6992* (BOL, NBG, PRE); Franschoek Pass, Summit Parking Area, 730 m, 8 Oct. 1973, (–CC), *Boucher 2273* (NBG, PRE); Franschoek Pass, top, 27 Sept. 1935, (–CC), *Compton 5686* (NBG); Wemmershoek Mts, 915–1220 m, 19 Oct. 1943, (–CC), *Esterhuysen 9094* (BOL); Winterberg, 26 Dec. 1943, (–CC), *Esterhuysen 9666* (PRE); ridge at W end of Du Toits Peak, 1220 m, 16 Oct. 1949, (–CC), *Esterhuysen 16051* (BOL); in Franschoek valley, 460 m, Apr. 1887, (–CC), *MacOwan 732* (BM, BOL, K); Franschoek Pass, 5 Oct. 1966, (–CC), *Thompson 228* (K, NBG, PRE); Zachariashoek State Forest, Kasteelkloof Catchment, 430 m, 5 Oct. 1977, (–CC), *van Wilgen 114* (PRE); near Villiersdorp, Kaaimans Gat, above High Noon, 915 m, 21 Nov. 1973, (–CD), *Esterhuysen 33366a* (BOL); Villiersdorp Wild Flower Garden, lower slopes of Blokkop, 490 m, 24 July 2001, (–CD), *Whitehouse 235* (BOL); Keeromsberg, W side, 7 Nov. 1943, (–DA), *Esterhuysen 9241* (BOL); Kwadous Mts, Orchard, 23 Nov. 1944, (–DA), *Esterhuysen 10899* (BOL); Jonaskop, upper NE slopes, level sandy area between large TMS boulders, 8 Sept. 1987, (–DC), *Oliver 9007* (NBG, PRE); Jonaskop, middle NE area, Jonasplaats, 960 m, 29 Sept. 1993, (–DC), *Oliver 10393* (NBG); Jonaskop, N slopes, 1370 m, 25 Sept. 1965, (–DC), *Rycroft 2898* (NBG); Jonaskop, Wildepaardeberg, rocky outcrop on sandy plateau, 1000 m, 15 Sept. 2000, (–DC), *Whitehouse 139* (BOL). **3320** (Montagu): Waboomburg, E of Pypsteelfontein, 1280 m, 13 July 1994, (–CA), *Oliver 10482* (NBG); on crest of Waboomburg, on farm Pypsteelfontein, 1250 m, 29 Sept. 1990, (–CA), *Vlok 2415* (NBG). **3418** (Simonstown): Sir Lowry's Pass, 460 m, 2 Sept. 1924, (–BB), *Compton 3352* (BOL, K); Somerset West, Sir Lowry's Pass, 3 Aug. 1940, (–BB), *Compton 8999* (NBG); Sir Lowry's Pass, 2 Jan. 1945, (–BB), *Compton 16897* (NBG); Steenbras Siding, 3 Aug. 1940, (–BB), *Esterhuysen 3028* (BOL); top of Sir Lowry's Pass, 2 Jan. 1945, (–BB), *Leighton 921* (BOL, PRE); Stellenbosch, Steenbras Dam, 305 m, 17 Nov. 1944, (–BB), *Levyys 11635* (BOL); Gordon's Bay, 15–460 m, 24 July 1927, (–BB), *Loseby STE 8612* (NBG); Gordon's Bay, mountain slopes, Sept. 1927, (–BB), *Loseby 2197* (NBG); Hottentots Holland Mts, near Sir Lowry's Pass, 460 m, Oct. 1896, (–BB), *MacOwan 1777* (BM, K); Sir Lowry's Pass, 275 m, 3 July 1894, (–BB), *Schlechter 4804* (BOL, FHO, K, NBG, PRE); Sir Lowry's Pass, 425 m, 17 Jan. 1896, (–BB), *Schlechter 7272* (BM, BOL, K, PRE); Sir Lowry's Pass, above Steenbras Siding, by old road, 425 m, 21 July 1999, (–BB), *Whitehouse 44* (BOL, NBG). **3419** (Caledon): Houwhoek, 18 Nov. 1951, (–AA), *Maguire 1236* (BOL, NBG); Highlands, 3 Oct. 1966, (–AC), *Downing 367* (NBG); Shaws Mt., 365 m, Oct. 1899, (–AD), *Bolus s.n.* (PRE); Caledon, Shaws Mt., 395 m, 24 Oct. 1897, (–AD), *Galpin 4005* (PRE); Genadendal, (–BA), *Drège ?1124* (K, K); Robertson, Boesmanskloof Pass, top of pass, 915 m, 23 July 1962, (–BA), *Levyys 11289* (BOL); Riviersonderend Mts, Galgberg, along jeep track to radio mast, just before plateau shelf on N side, 1220 m, 18 Oct. 2001, (–BA), *Whitehouse 279* (BOL).

56. **Cliffortia hexandra** Weim., Monograph of the Genus Cliffortia: 88, fig. 24 (1934); Fellingham: 612 (2000). Type: Expedition to Kamiesberg, Gifberg & Olifant's River Mts, flat summit of the Matsikamma, 17 Sept. 1911, *Phillips 7458* (BOL, holo.). [The K specimen of this number is *C. polygonifolia* var. *polygonifolia*.]



Medium erect shrub up to 2.5 m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.4–0.7 mm wide, sometimes tinged reddish, hairy; stem hairs spreading, 0.1–0.7 mm long. *Leaves* trifoliolate; leaflets elliptic to linear, 3.2–5.9 × 0.5–1.0 mm; apex acute to rounded, up to 0.2 mm long; margins flat, entire and smooth; lamina chartaceous, 0.1–0.3 mm thick across midrib, midrib prominent beneath, curved upwards and towards the stem, scattered hairs above and beneath, 0.2–0.8 mm long; sheath 0.7–1.1 mm long, abaxially hairy, adaxially hairy to glabrous except for fringe of hairs at apex; stipules 0.6–1.2 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy, rarely glabrous; sepals 3, hairy or glabrous on outside. *Male flowers* with bracteoles 2.3–2.9 mm long; sepals broadly ovate, acute to acuminate at the apex; stamens 6–7, red; anthers brownish red. *Female flowers* with bracteoles 2.7–2.7 mm long, longer than immature receptacle; sepals ovate, 1.8–2.2 × 0.7–1.0 mm, recurved; carpel 1; stigma red, feathery, prominent above leaves, glabrous, clearly ribbed. *Achene* ellipsoid to oblong, sometimes slightly flattened, 3.0–3.9 × 1.5–1.7 mm, red to reddish brown, glabrous; 6(–7)-winged, 3 wings strongly incurved, 3 wings shorter, sometimes almost absent and often slightly crested; elaiosome swollen around base. *Flowering time*: (August to) September to October (to November).

Habitat: Seepage areas often on deep sand or slightly clayish soil from Table Mountain Series in full sun; altitude 450–1 250 m.

Distribution: Northern slopes of the Hex River Mountains north to Gifberg.

Conservation status: Although not common, the scattered populations are in remote areas, many conserved within the Cederberg Wilderness Area. Red List status: LC.

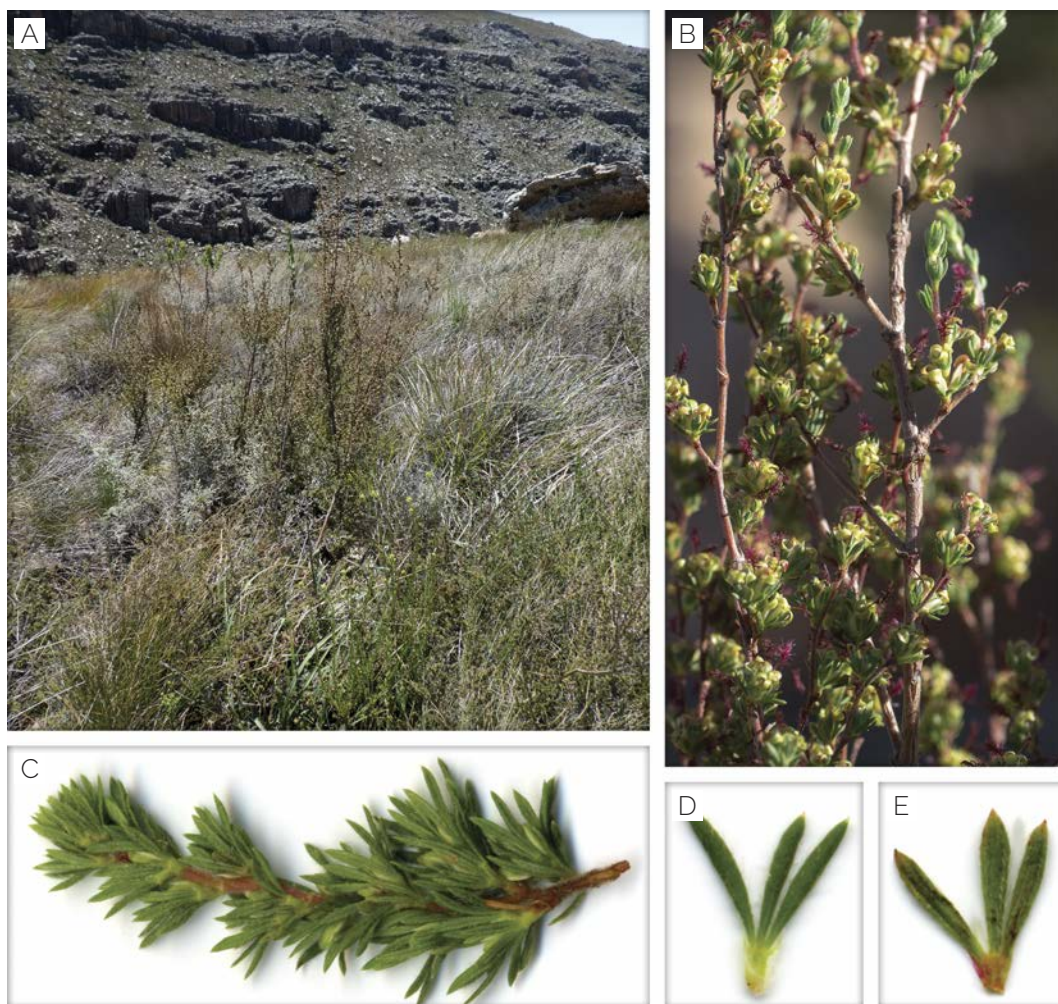
Etymology: *hexandra* (Latin) means 'six stamens', referring to the number of stamens in the male flowers to distinguish it from *Cliffortia polygonifolia* which usually has more.

Notes: This is possibly little more than a northern, small-leaved form of *Cliffortia polygonifolia* var. *polygonifolia*, although some plants have particularly short leaves. The distinction from other specimens of *C. polygonifolia* var. *polygonifolia* found in the area at times is somewhat arbitrary.

Representative specimens

SOUTH AFRICA. 3118 (Vanrhynsdorp): Matsikamma Mt plateau, Op de Berg, in kloof cutting into NE cliffs, 19 Oct. 1998, (–DB), *Helme 1566* (NBC); expedition to Kamiesberg, Gifberg and Olifants River Mts [flat summit of the Matsikamma], 17 Sept. 1911, (–DB), *Phillips 7458* (BOL); Gifberg Plateau, 610–760 m, 14 Oct. 1953, (–DC), *Esterhuysen 22065* (BOL, PRE); Driekoppen, Gifberg Mts, S slopes below the peaks, 460 m, 6 Sept. 1964, (–DC), *Esterhuysen 30741* (BOL); Gifberg, Driekoppen, S slopes below rock peaks, 460 m, 6 Sept. 1964, (–DC), *Esterhuysen 30742* (BOL, K, NBC, PRE). 3119 (Calvinia): Lokenburg, 700 m, 29 Aug. 1953, (–CA), *Acocks 17042* (K, PRE); Lokenburg, 700 m, 24 Sept. 1955, (–CA), *Acocks 18538* (BOL, K, PRE). 3219 (Wuppertal): Pakhuis, 29 Sept. 1940, (–AA), *Esterhuysen 3442* (BOL); Pakhuis, S slopes, 610–915 m, 12 Oct. 1953, (–AA), *Esterhuysen 21914* (BOL, PRE); Cederberg, Middelberg, 25 Sept. 1937, (–AC), *Compton 7048* (NBC); Cederberg, Middelberg plateau, 14 Dec. 1941, (–AC), *Compton 12718* (NBC); N Cederberg Mts, Uilsgat Needles, 1220 m, 7 Oct. 1947, (–AC), *Esterhuysen 13034* (BOL); Cederberg Mts, Middelberg, Sept. 1937, (–AC), *Lewis s.n.* (BOL); Welbedacht, 2 km along jeeptrack NW from home-stead, 1100 m, 10 Apr. 1986, (–AC), *Taylor 11498* (NBC); Cederberg Mts, S of Algeria, Uitkyk Pass, halfway down the old pass,

795 m, 17 Aug. 2001, (–AC), *Whitehouse 250* (BOL); Cederberg, Wolfskeur, halfway up to Wolfberg, 1 June 1984, (–AD), *Fellingham 560* (NBG); Cederberg Mts, Sanddrif, path from Valley of the Red Gods to Wolfberg Cracks, 1200 m, 24 June 2000, (–AD), *Whitehouse 131* (BOL); Elandsbloof Mts, 1065 m, 25 Sept. 1936, (–CA), *Compton 6535* (NBG); Elandsbloof, 3 Oct. 1940, (–CA), *Esterhuysen 3438* (BOL, K); S Cederberg, Krom R, 2 Oct. 1952, (–CA), *Esterhuysen 20535* (BOL); Elandsbloof, 26 Sept. 1936, (–CA), *Lewis 22071* (BOL); Sandfontein Peak, 1220 m, 5 Apr. 1947, (–CB), *Compton 19438* (NBG); Skurweberg [Schurweberg], next to Bokkeveld Tafelberg, SE slopes, 1065–1220 m, 11 Oct. 1952, (–CD), *Esterhuysen 20639* (BOL, PRE). **3319** (Worcester): ridge on Twenty Four Rivers Mts, above Porterville, 915 m, 23 Oct. 1949, (–AA), *Esterhuysen 16178A* (BOL); valley in Twenty Four Rivers Mts, above Porterville, 23 Oct. 1949, (–AA), *Esterhuysen 16193* (BOL); Wittenberg, Inkrup, E slopes, 1 Oct. 1954, (–AA), *Esterhuysen 23385* (BOL); N Cold Bokkeveld, Boboskloof, 24 Oct. 1966, (–AA), *Esterhuysen 31618* (BOL, K); Cydberg, 10 Nov. 1946, (–AB), *Leighton 2223* (BOL); Koue Bokkeveld, Hartbeeskloof, Vaalboskloofberg, S slopes, 1200 m, 3 Nov. 1974, (–AB), *Oliver 5142* (K, NBG, PRE); S side of Skurweberg [Schurftberg], 1065 m, 7 Dec. 1948, (–AD), *Esterhuysen 14723* (BOL); Hex River Mts, Outer Sanddrift Peaks, 1065–1220 m, 28 Oct. 1962, (–BC), *Esterhuysen 29753* (BOL).



Clifortia hexandra: A, habitat; B, branch with female flowers; C, branch; D, dorsal view of leaf; E, ventral view of leaf.

57. **Cliffortia cristata** Weim. in Botaniska Notiser 80: 417, fig. 5f–h, 7 (1946) & 188, fig. 9d–e (1948); Fellingham: 615 (2000). Type: Worcester District, Fonteintjesberg, SE slopes, 610–915 m, 26 Nov. 1944, *Esterhuysen 10948* (LD, holo.; BOL!, iso.).



Medium erect shrub up to 0.9 m high, resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 0.8–1.2 mm wide, hairy, stem hairs spreading, 0.4–0.6 mm long. *Leaves* trifoliolate; narrowly elliptic to linear or needle-shaped, 4.6–15.6 × 0.6–1.5 mm; apex acute to sharply acuminate, 0.5–1.2 mm long; margins flat, entire and smooth; lamina chartaceous, 0.3–0.4 mm thick across midrib, midrib prominent beneath, curved upwards and towards the stem, slightly hairy becoming glabrous above, hairy all over beneath, hairs 0.2–0.4 mm long; sheath 1.4–2.1 mm long, abaxially hairy; stipules 1.0–2.6 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 3, hairy on outside. *Male flowers* unknown. *Female flowers* with bracteoles 4.0–5.1 mm long, longer than immature receptacle; sepals broadly ovate, 3.5–4.0 × 1.0–1.5 mm, recurved; carpel 1; stigma 6.6–7.3 mm long, red, feathery, prominent above leaves; immature receptacle 2.5–3.9 × 1.0–1.5 mm, glabrous, clearly ribbed. *Achene* narrowly ellipsoid, 4.5–5.0 × 1.3–1.6 mm, medium to dark brown, glabrous; ribs 7–12, ribs sharply acute or shortly winged, variously crested; elaiosome swollen around base. *Flowering time*: possibly all year, it has been collected flowering in October, November and March.

Habitat: Well-drained clayish soil from shale bands of Table Mountain Series in full sun; altitude 600–1 250 m.

Distribution: Known from the southwestern Hex River Mountains and eastern slopes of Stettynsberg, other populations putatively belong to this species.

Conservation status: Scattered populations at high altitude with few threats and able to spread clonally and resprout after fire. Red List status: LC.

Etymology: *cristata* (Latin) means ‘crested’, referring to the achenes, which have narrow toothed ridges in place of the normally smooth ribs.

Notes: The leaves of this species are stiff and narrow. The plants are similar to some populations of *Cliffortia pterocarpa* or *C. dodecandra* but the key difference is that the leaves are thinly covered with adpressed hairs, at least beneath, whereas in the *C. multiformis* series the leaves are usually glabrous. Although included in sect. *Cliffortia*, the achenes of *C. cristata* lack the 3-incurved wings typical of the section and instead have short wings or ribs that are finely toothed or cristate. Plants also resprout and spread clonally, whereas the other species of sect. *Cliffortia* are reseederers. The combination of these characters suggests a hybrid origin.

Representative specimens

SOUTH AFRICA. 3319 (Worcester): Fonteintjesberg, SE slopes, 610–915 m, 26 Nov. 1944, (–CB), *Esterhuysen 10948* (BOL); lower S slopes near Fonteintjesberg, 2 Jan. 1950, (–CB), *Esterhuysen 16721* (BOL); S slopes of mountains E of Fonteintjesberg, 2 Jan. 1950, (–CB), *Esterhuysen 16745A* (BOL); Fonteintjesberg, E slopes, 915–1220 m, 29 Mar. 1952, (–CB), *Esterhuysen 20021* (BOL, K, NBG, PRE); ridge above Onserus Brandwacht valley, 7 Nov. 1985, (–CB), *Esterhuysen 36255a* (BOL); Worcester, Fairy Glen Hiking Trail, Brandwacht, 2 Oct. 1982, (–CB), *Perry 1996* (K, NBG, PRE); Stettynsberg, Stettyn farm, track between Heuningneskloof & Elandskloof, 945 m, 10 Mar. 2001, (–CD), *Whitehouse 213* (BOL, K, NBG).



Cliffortia cristata: A, habitat; B, branch with fruit; C & D, branch with female flowers; E, female flower; F, achene; G, dorsal view of leaf; H, ventral view of leaf.

58. **Cliffortia sparsa** C.M.Whitehouse in Bothalia 38(1): 75 (2008) & 16, fig. 4, 9 (2007). Type: Caledon District, Hottentots Holland Nature Reserve, around Nuweberg Forest Station, 560m, 25 Oct. 2001, *Whitehouse 283* (BOL, holo.!; NBG, iso.).



C. pterocarpa sensu Weim.: 62, fig. 16K (1934) pro parte, *non* (Harv.) Weim. sensu stricto.

Medium erect shrub up to 1.2 m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.7–1.0 mm wide, sometimes tinged reddish, hairy; stem hairs adpressed upwards, 0.3–0.6 mm long. *Leaves* trifoliate; leaflets linear to needle-shaped, 6.0–10.1 × 0.6–1.1 mm; apex acute to sharply acuminate, 0.2–0.4 mm long; margins flat, entire and smooth; lamina chartaceous, 0.2–0.5 mm thick, midrib prominent beneath, ± straight to curved downwards and away from the stem, sparsely hairy above and beneath, hairs 0.1–0.6 mm long; sheath 1.2–2.1 mm long, abaxially glabrous, adaxially glabrous except for fringe of hairs at apex; stipules 1.1–2.5 mm long, free, margins smooth to serrulate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins serrate to very shortly ciliate; sepals 3, hairy on outside. *Male flowers* with bracteoles 3.0–4.0 mm long; pedicel 0.6–0.8 mm long; sepals broadly ovate, 4.8–6.0 × 1.9–2.5 mm, acute to acuminate at apex; stamens 10–11; filaments 6.4–7.8 mm long, red or greenish white; anthers yellow. *Female flowers* with bracteoles 2.6–4.2 mm long, longer than immature receptacle; sepals ovate, 2.2–4.1 × 0.9–1.5 mm, recurved; carpel 1; stigma 2.9–5.0 mm long, red to pinkish white, feathery, prominent above leaves; immature receptacle 1.7–2.0 × 0.8–1.0 mm, glabrous, clearly ribbed. *Achene* ellipsoid, 3.5–4.1 × 1.1–1.5 mm, sometimes slightly curved, medium to dark brown, glabrous; 9–12-ribbed, ribs acute, 0.1–0.3 mm wide; elaiosome swollen around base. *Flowering time*: August to November (found once in May).

Habitat: Well-drained clayish soil from shale bands of Table Mountain Series in full sun; altitude 250–800 m.

Distribution: Common along the lower slopes of the Hottentots Holland Mountains from Sir Lowry's Pass to Franschhoek Pass.

Conservation status: Common though localised, some threats from plantations and alien trees. Red List status: not listed.

Etymology: *sparsa* (Latin) means 'sparsely', referring to the leaves, which, although appearing glabrous, are in fact covered with short sparse hairs.

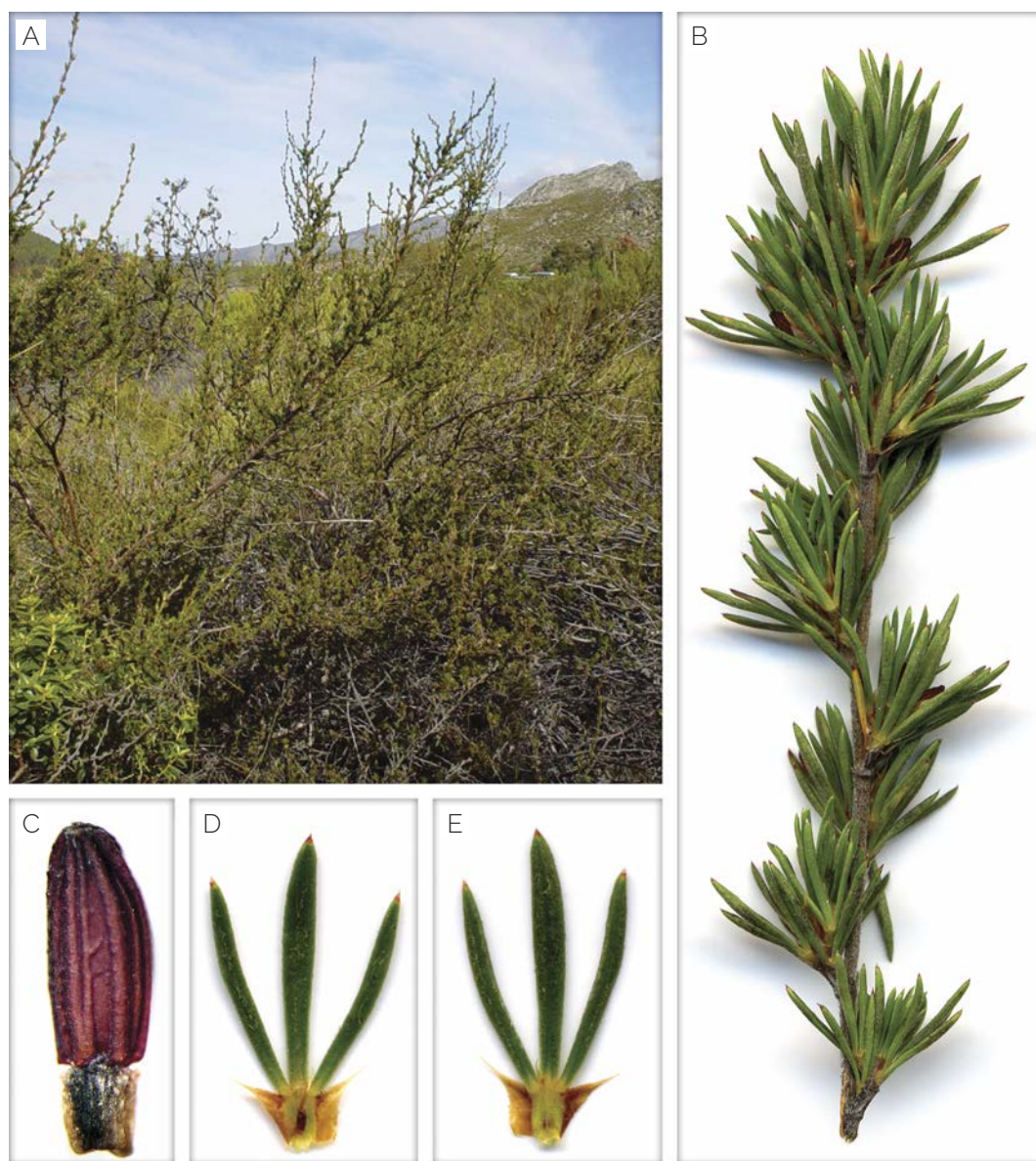
Notes: Molecular evidence suggests that this species may have arisen as a hybrid cross between *Cliffortia atrata* and *C. cristata* or *C. sericea* of sect. *Cliffortia*. In many respects it is intermediate between the two putative parents, having achenes and needle-shaped leaves most similar to *C. atrata*, but the hairs of sect. *Cliffortia*. It is common where it occurs and being a reseeder is clearly able to reproduce, even if only apomictically, by seed. Male and female flowers have been found and further introgression with parent species is likely and possibly explains the many intermediate forms that have been recorded.

It was included within *Cliffortia pterocarpa* by Weimarck (1934) but the leaves and sepals of *C. pterocarpa* are glabrous. *Cliffortia pterocarpa* is also a resprouter.

Representative specimens

SOUTH AFRICA. **3319** (Worcester): Franschhoek Pass, 700 m, 20 Aug. 1936, (–CC), *Compton 6408* (NBG); Franschhoek Pass, 1525 m, 26 Nov. 1939, (–CC), *Compton 8151* (NBG). **3418** (Simonstown): Sir Lowry's Pass, 19 Nov.

1944, (–BB), *Compton 16534* (NBG); Sir Lowry's Pass, 20 Oct. 1951, (–BB), *Maguire 1067* (NBG). **3419** (Caledon): Nuweberg, 760 m, 26 Aug. 1940, (–AA), *Compton 9219* (NBG); Hottentots Holland Nature Reserve, around Nuweberg Forest Station, 560 m, 25 Oct. 2001, (–AA), *Whitehouse 283* (BOL, NBG); Groenlandberg, jeeptrack from Nuweberg to radio mast, 600 m, 16 Dec. 2002, (–AA), *Whitehouse 331* (BOL).



Clifortia sparsa: A, habitat; B, branch with achenes; C, achene; D, dorsal view of leaf; E, ventral view of leaf.

(59–63) **Section Filifoliae** *C.M.Whitehouse* sect. nov. Type species:
C. filifolia L.f.

Low sprawling, to tall erect densely branched shrubs. **Young stems glabrous** or rarely with a few short adpressed hairs, forming brachyblasts. Sheath glabrous, often lacking the fringe of hairs at the apex inside; stipules membranous, free or rarely joined in front of leaf, entire; petiole absent or very short. Leaves unifoliate or trifoliate, single-veined to base, glabrous; **leaflets needle-shaped**, apex acute to long acuminate, margin flat. Flowers solitary, in the axils of ordinary vegetative leaves. **Bracteoles glabrous** and entire or slightly serrate, longer than immature receptacle; **sepals 3**, glabrous, female usually erect or sometimes becoming recurved; filaments red; receptacle smooth, glabrous; carpels 1. **Achenes only faintly ribbed**, glabrous, brown.

This group of species all have needle-shaped leaves and are more or less always glabrous. A few of the species have a short petiole, a character that is often evident in seedlings of the other species in the section.

59. **Cliffortia filifolia** L.f., Supplementum Plantarum: 430 (1782); Thunb.: 434 (1823); DC.: 596 (1825); G.Don: 596 (1832); Eckl. & Zeyh.: 270 (1836); Harv.: 303 (1862); Bolus & Wolley-Dod: 260 (1904); Juel: 276 (1918); Weim.: 68, fig. 17J–N (1934); Levyns: 447 (1950); Fellingham: 615 (2000); Trinder-Smith et al.: 150 (2006); Whitehouse & Fellingham: 19, fig. 13 (2007). Type: Cape Peninsula, Table Mt, E slopes, *Thunberg s.n.* (LINN, holo.; C, LD!, UPS, iso.).



Grey dot: var. *arenaria*.

Nenax acerosa sensu DC.: 596 (1825), non Gaertn.

Low, often sprawling, shrub, up to 1 m high, killed by fire; densely divaricately branched, forming closely overlapping brachyblasts. *Young stems* 0.5–1.0 mm wide, sometimes tinged reddish, glabrous. *Leaves* trifoliate; leaflets needle-shaped, 5.8–17.0 × 0.3–0.8 mm; apex sharply acuminate, 0.2–0.9 mm long; margins rounded, minutely serrulate to scabrid; lamina chartaceous, 0.2–0.4 mm thick, with two pale stripes on either side of midrib, glabrous; sheath 1.3–3.0 mm long, abaxially glabrous, adaxially glabrous except occasionally for a few hairs at the apex; stipules 0.7–3.1 mm long, free, margins smooth to serrulate; petiole 0.2–2.0 mm long. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on the keel, margins smooth to serrate; sepals 3, glabrous. *Male flowers* with bracteoles 2.4–4.3 mm long; pedicel 0.4–0.7 mm long, glabrous; sepals broadly ovate, 3.2–5.2 × 1.2–1.8 mm, acute to acuminate at the apex; stamens 5–6; filaments 3.4–5.2 mm long, red; anthers yellow. *Female flowers* with bracteoles 2.5–4.4 mm long, longer than immature receptacle; sepals narrowly ovate to linear, 1.7–2.7 × 0.4–1.0 mm, erect to spreading; carpel 1; stigma 1.6–2.5 mm long, greenish white, feathery, hidden at the base of leaves; immature receptacle 0.8–1.2 × 0.4–0.7 mm, glabrous, smooth. *Achene* ellipsoid to cylindrical, 2.8–5.2 × 1.2–1.7 mm, greyish to medium brown, covered by membranous layer; glabrous; obscurely 6–9-ribbed, ribs rounded, up to 0.1 mm wide. *Flowering time*: March to September.

Habitat: In the west it is found on shale bands of Table Mountain Series rocks, but east of Cape Agulhas it is restricted to dune slacks; altitude 0–1100 m.

Distribution: Widespread, though scattered, from Piketberg to Knysna.

Conservation status: Widespread, though scattered, but no serious threats except possibly var. *arenaria*, which grows in areas subject to development. Red List status: LC.

Etymology: *filifolia* (Latin) means 'thread-leaved', referring to the fine needle-like leaves.

Notes: An easily recognised needle-leaved species because of its glabrous stems and short petioles. It is relatively variable over its range. Some very short-leaved forms occur in the east where it grows in dune slacks (var. *arenaria*). Seedlings of *Cliffortia burchellii* also have a short petiole, glabrous stems and trifoliate leaves, but the leaflets are longer and flowers do not form on the seedling plants. *Cliffortia acockii* is very similar to var. *arenaria* but has short hairs on the stems and grows on more clayish soils.

Unlike most *Cliffortia* species, *C. filifolia* is often found in small populations of just a few plants often well hidden amongst taller plants. Consequently it has been poorly collected and additional populations probably occur.

var. **filifolia**: Whitehouse & Fellingham: 19, fig. 13 (2007).

C. leptophylla Eckl. & Zeyh.: 270 (1836). Type: Caledon District, Houwhoek Mt, near Knofflookskraal, July, *Ecklon & Zeyher 1752* (S, holo.; B, C, FI!, G, K!, L, M!, REG!, UPS, W, Z, iso.).

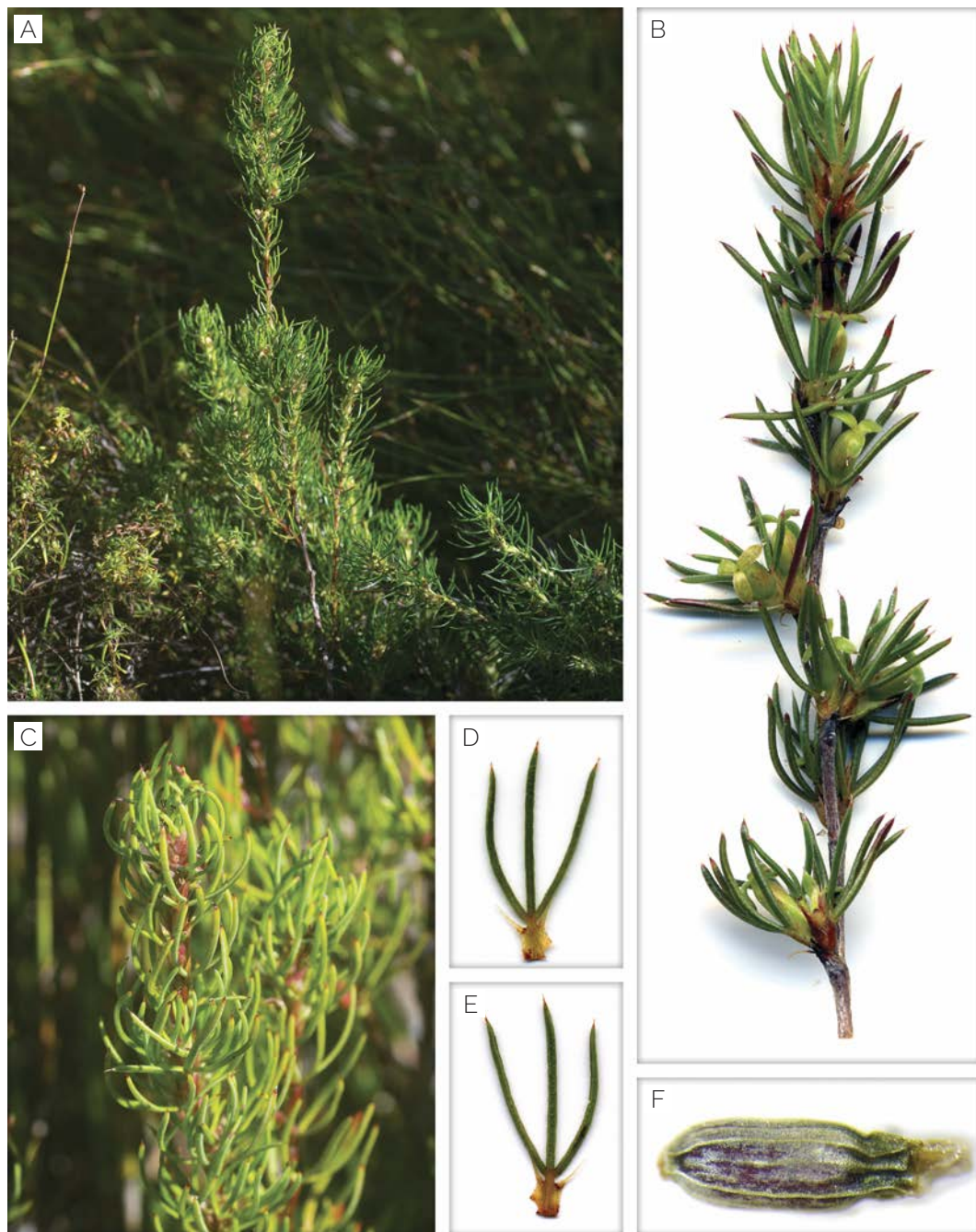
Young stems 0.6–1.0 mm wide. *Leaflets* 6.1–17.0 × 0.4–0.8 mm; apex 0.2–0.9 mm long; lamina 0.2–0.4 mm thick, curved upwards and towards the stem; sheath 1.3–3.0 mm long; stipules 0.7–3.1 mm long; petiole 0.2–2.0 mm long. *Female flowers* with bracteoles 2.5–4.4 mm long; sepals 1.7–2.7 × 0.4–1.0 mm, erect to spreading; carpel 1; stigma 1.6–2.5 mm long, greenish white, feathery, hidden at the base of leaves; immature receptacle 0.8–1.2 × 0.4–0.7 mm. *Achene* 2.8–4.4 × 1.2–1.6 mm. *Flowering time*: May to September.

Habitat: Well-drained soils on shale bands of Table Mountain Series rocks in full sun; altitude 0–1100 m.

Distribution: Common but scattered on the lower slopes of mountains, from Piketberg in the north to hills near Elim in the south, including the Cape Peninsula, with an outlying population on the Potberg in De Hoop Nature Reserve.

Representative specimens

SOUTH AFRICA. **3218** (Clanwilliam): Piketberg Mt., foot of Zebra Kop, 1065 m, 23 May 1948, (–DB), *Esterhuysen 14499* (BOL, NBG); Piketberg Mts, Moutons Vlei, 610 m, 24 May 1948, (–DC), *Esterhuysen 14501* (BOL); E slopes of Avontuur Mt., 9 Nov. 1934, (–DC), *Pillans 7570* (BOL). **3219** (Wuppertal): Olifants River Mts, Thee R, 17 Apr. 1949, (–CC), *Esterhuysen 15325* (BOL, NBG). **3318** (Cape Town): on hill near Wynberg, 75 m, June 1877, (–CD), *Bolus 4017* (BOL, K); Cape Peninsula, Kirstenbosch, clearing N of Window Stream, Oct. 1940, (–CD), *Esterhuysen 11636* (BOL); Cape Peninsula, Kirstenbosch, clearing N of Window Stream, Nov. 1940, (–CD), *Esterhuysen 11658* (BOL, PRE); Cape Peninsula, Kirstenbosch, below the Gum belt, 12 Sept. 1945, (–CD), *Esterhuysen 11857* (BOL); Cape Peninsula, Wynberg Hill, 15 Sept. 1949, (–CD), *Esterhuysen 15745* (BOL, NBG, PRE); Cape Peninsula, Newlands, 20 May 1917, (–CD), *Froembling s.n.* (NBG); Wynberg Hill, 150 m, June 1890, (–CD), *Gamble 22232* (K); Rugby, 4 June 1943, (–CD), *Goulimis s.n.* (BOL); Mowbray, Raapenburg, 29 July 1889, (–CD), *Guthrie 35* (BOL); Cape Peninsula, Cape Town, 0–10 m, 31 July 1933, (–CD), *Humbert 9436* (PRE); Cape Town, Kirstenbosch, at foot of mountain, 50–200 m, 3 Aug. 1933, (–CD), *Humbert 9663* (PRE); E slopes of Table Mt., July 1917, (–CD), *Page s.n.* (BOL, GRA); Cape Peninsula, below cable station, Aug. 1938, (–CD), *Penfold 32* (NBG); Cape Peninsula, Wynberg Hill, 26 May 1951, (–CD), *Salter 9202* (BM); Cape Peninsula, Camps Bay, lower valley of Blinkwater Stream, 150–200 m, 24 Aug. 1963, (–CD), *Stauffer 5022* (K, NBG, PRE); Kalabas Kraal, May 1915, (–DA), *Bolus & L. 13310* (BOL); Pella area, Burgers Post Farm, Fynbos biome research site, 200 m, 7 June 1979, (–DA), *Boucher & Shepherd 4359* (NBG); Perdeberg, Lemoenkloof Farm, plateau between Lemoenkloof and Skelmklip Peak, 550 m, 3 Oct. 1999, (–DB), *Whitehouse 54* (BOL, NBG); Bellville–Kraaifontein, 2 Nov. 1965, (–CD), *Esterhuysen 31353* (BOL). **3319** (Worcester): plateau of Twenty Four Rivers Mts, above Porterville, 22 Oct. 1949, (–AA), *Esterhuysen 16185* (BOL); Stettynsberg, Stettyn farm, mid E facing slopes of 4×4 track above farm, 610 m, 11 Mar. 2001, (–CD), *Whitehouse 215* (BOL). **3418** (Simonstown): Llandudno, 1 Sept. 1938, (–AB), *Acocks & Hafström 568* (PRE); Cape of Good Hope, Simon's Bay, June 1846, (–AB), *Alexander-Prior s.n.* (K, K, PRE); Cape Peninsula, Pollsmoor, 12 June 1947, (–AB), *Barker 4583* (NBG); Cape Peninsula, Hout Bay, 27 June 1945, (–AB), *Compton 17090* (NBG); Wynberg and Constantia, (–AB), *Ecklon 1751* (K); Cape Peninsula, Vlakenberg [Vlaggeberg], May 1944, (–AB), *Goulimis s.n.* (BOL); Red Hill above Simonstown, 275 m, 4 Dec. 1935, (–AB), *Levy's 5322* (BOL); Wynberg, Tokai Flats, 22 Dec. 1935, (–AB), *Levy's 5329* (BOL, PRE); near Simonstown, 275 m, 10 July 1892, (–AB), *Schlechter 1101* (BM); N foot of Teeberg, 85 m, 1 July 1965, (–AB), *Taylor 6365* (NBG, PRE); slopes of Simonsberg, 275 m, 2 July 1965, (–AB), *Taylor 6370* (K, NBG, PRE); Cape Peninsula, path up to Vlakenberg, path before stile, 360 m, 16 June 2002, (–AB), *Whitehouse 304* (BOL, NBG); Cape Peninsula, Noordhoek slopes, 25 May 1896, (–AB), *Wolley-Dod 1072* (K); Cape of Good Hope, Simon's Bay, (–AB), *Wright s.n.* (K); Cape Peninsula, Cape Point Reserve, near Brightwater, 31 May 1943, (–AD), *Leighton 460* (BOL); Cape Peninsula, Smitswinkel, Apr. 1928, (–AD), *Salter 260/9A* (BM); Cape of Good Hope Nature Reserve, along shack track (i.e. track to Ribboksdam), 45 m, 10 Oct. 1965, (–AD), *Taylor 6529* (BOL, K, NBG, PRE); Cape of Good Hope Nature Reserve, Rooihooft, 230 m, 15 June 1966, (–AD), *Taylor 6851* (BOL, NBG, PRE); Guardian Peak, lower S slopes, 7 Oct. 1945, (–BB), *Esterhuysen 11947* (BOL). **3419** (Caledon): Houwhoek, Houwteek terrain, Haasvlakte, 170 m, 4 Dec. 1987, (–AA), *Boucher & Stindt 5282* (NBG); Caledon, Houwhoek Mts, not far from Knofflookskraal, (–AA), *Ecklon 1752* (K); Houwhoek, July, (–AA), *Pappe 36* (BM); Caledon Swartberg, Caledon Nature Reserve, track above Wildflower Garden, 365 m, 9 May 2000, (–AB), *Whitehouse 111* (BOL, NBG); Fisherhaven, Belero Avenue, 10 m, 3 Sept. 1996, (–AC), *Palmer 78* (NBG); Waterford Farm, gully on N slopes of hill above Waterkloof, 150 m, 18 May 2001, (–DA), *Whitehouse 222* (BOL). **3420** (Bredasdorp): Bredasdorp, Hamerkop, S side of Potberg, 120 m, 22 July 1962, (–BC), *Acocks 22426* (K, PRE); De Hoop, Potberg Nature Reserve, Potberg Mt., middle S slopes just W of Boskloof, 260 m, 19 June 1979, (–BC), *Burgers 1947* (NBG,

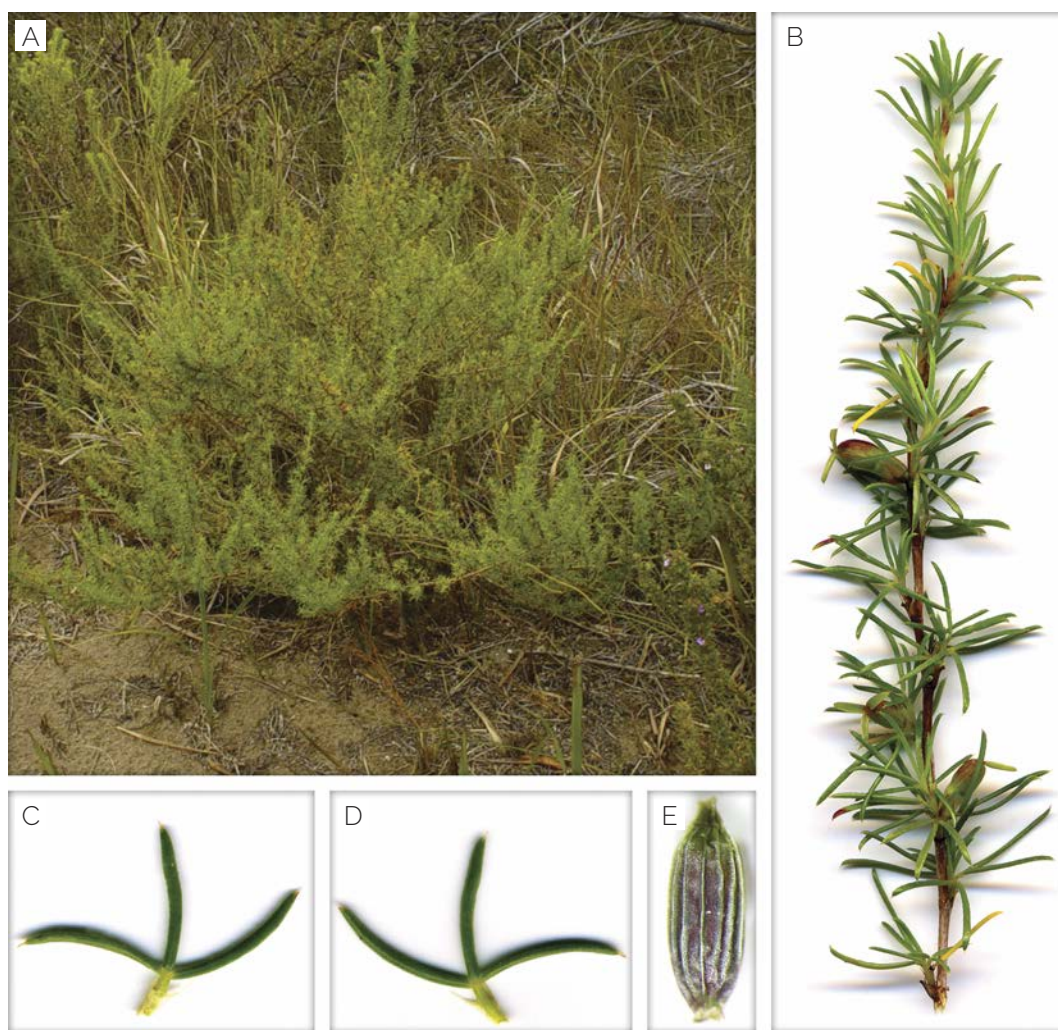


Cliffortia filifolia var. *filifolia*: A, habitat; B, branch with achenes; C, branch; D, dorsal view of leaf; E, ventral view of leaf; F, achene.

PRE); De Hoop area, Elandspad, 1 km from homestead on Cupidoskraal side, higher slopes, 215 m, 19 June 1984, (–BC), *Fellingham* 655 (NBC, PRE); De Hoop, Hamerkop, 185 m, 1 May 1985, (–BC), *Fellingham* 1056 (NBC).

var. **arenaria** *C.M.Whitehouse* in *Bothalia* 38(1): 75 (2008) & 20, fig. 13–14 (2007). Type: South Africa, Western Cape, George District, sand dunes E of Wilderness, 3 Dec. 1951, *Esterhuysen* 19336 (BOL, holo.!; NBGI, PRE!, iso.).

Young stems 0.5–0.6 mm wide. *Leaflets* 5.8–6.6 × 0.3–0.6 mm; apex 0.1–0.3 mm long; lamina 0.2–0.3 mm thick, curved downwards and away from the stem; sheath 0.6–1.1 mm long; stipules 0.7–1.0 mm



Cliffortia filifolia var. *arenaria*: A, habitat; B, branch with achenes; C, dorsal view of leaf; D, ventral view of leaf; E, achene.

long; petiole 0.3–0.5 mm long. *Female flowers* with bracteoles 2.5–2.8 mm long; sepals 2.3–2.5 × 0.6–0.8 mm. *Achene* 4.7–5.2 × 1.6–1.7 mm. *Flowering time*: March to August.

Habitat: Wind-blown sand of dune slacks in full sun; altitude 0–250 m.

Distribution: Coastal areas from De Hoop Nature Reserve as far east as Knysna, with a possible record from the sandplains of the Cape Flats.

Etymology: *arenaria* (Latin) means 'growing on sand', referring to the fact that it is found growing in dune slacks.

Notes: This variety appears to replace the typical variety in the east of the range. However, outlying populations of both varieties appear where the habitat is suitable. Thus on the Potberg, there is a population of var. *filifolia*, while some collections from the Cape Flats appear to be var. *arenaria*.

Apart from the length of the leaves and the habitat, the two varieties look quite different on account of the way the leaves are held. In var. *filifolia*, the leaves are nearly always curved upwards and inwards towards the stem so that the branch appears feathery, while in var. *arenaria*, the leaves curve in a variety of directions and the branches appear rather untidy.

Representative specimens

SOUTH AFRICA. **3318** (Cape Town): Penhill, 0.8 km SE of Melton Rose Station, near powerlines, 40 m, 22 Oct. 1998, (–DC), *Helme 1594* (NBG). **3322** (Oudtshoorn): Wilderness, 24 Aug. 1944, (–DC), *Compton 15828* (BOL, NBG); E of Wilderness, 3 Dec. 1951, (–DC), *Esterhuysen 19336* (BOL, NBG, PRE); George, Wilderness, 28 Aug. 1948, (–DC), *Levy's 9155* (BOL). **3420** (Bredasdorp): De Hoop area, Hamerkop Farm, crevices, 60 m, 19 Sept. 1984, (–BC), *van Wyk 1911* (NBG, PRE); 'Frans Rietfontein', near Cape Infanta, 26 Nov. 1961, (–BD), *Esterhuysen 29401* (BOL); De Hoop, Witwater, Potberg, slight S slope, 90 m, 6 Aug. 1984, (–BD), *Morley 8* (NBG, PRE). **3421** (Riversdale): Riversdale, 10.5 km SE of Vermaaklikheid Post Office, 150 m, 29 July 1962, (–AC), *Acocks 22531* (K, PRE). **3422** (Mossel Bay): Knysna, Lake Pleasant Hotel's dunes, 45 m, 15 Sept. 1960, (–BB), *Acocks 21529* (K, PRE); Buffelsbaai, 30 m, May 1921, (–BB), *Keet STE 13379* (NBG); Buffelsbaai, 30 m, May 1921, (–BB), *Keet 725* (GRA, PRE); Knysna, Groenvlei, 185 m, 11 July 1955, (–BB), *Levy's 10262* (BOL); Knysna, Sedgefield, 150 m, 14 July 1955, (–BB), *Levy's 10313* (BOL); Goukamma R mouth, 1 km from mouth, moderate slope, 120 m, 23 Mar. 1984, (–BB), *O'Callaghan, Fellingham & van Wyk 105* (NBG, PRE); Goukamma Nature Reserve, circular trail, 15 m, 14 Oct. 2002, (–BB), *Whitehouse 318* (BOL, NBG). **3423** (Knysna): Knysna, near Heads, top of ridge near Look-Out Post, 245 m, 17 July 1948, (–AA), *Levy's 7890* (BOL); Knysna, Brenton Head, 150 m, 16 July 1955, (–AA), *Levy's 10345* (BOL). **3424** (Humansdorp): Welgelegen, near Oyster Bay, 40 m, 22 Apr. 1979, (–BA), *Cowling 178* (GRA).

60. **Cliffortia acockii** Weim. in Botaniska Notiser 51: 399, fig. 1–2 (1940b); Fellingham: 614 (2000). Type: Paarl District, gravelly S slopes of low hill between Klapmuts and Paarl Mt, Nov. 1934, *Acock 3529* (S, holo.!).



Low, often sprawling, shrub, up to 0.3 m high; densely divaricately branched, forming brachyblasts. *Young stems* 0.5–0.7 mm wide, sometimes tinged reddish, shortly hairy; stem hairs adpressed upwards. *Leaves* trifoliolate; leaflets needle-shaped, 3.0–4.0 × 0.3–0.5 mm; apex sharply acuminate, 0.2–0.4 mm long; margins rounded, minutely serrulate to scabrid; lamina chartaceous, 0.2–0.3 mm thick, with 2 pale stripes on either side of midrib, glabrous; sheath 1.0–1.5 mm long, abaxially glabrous, adaxially glabrous except occasionally for a few hairs; stipules 1.2–1.7 mm long, free, margins smooth to serrulate; petiole 0.2–0.5 mm long. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on the keel, margins smooth to serrate; sepals 3, glabrous. *Male flowers* unknown. *Female flowers* with bracteoles 1.9–2.8 mm long, longer than immature receptacle; sepals narrowly ovate to linear, 1.5–1.7 × ± 0.3 mm, erect to spreading; carpel 1; stigma 0.5–1.5 mm long, red, feathery; immature receptacle glabrous. *Achene* ellipsoid to cylindrical, 2.7–3.4 × 1.0–1.2 mm, greyish to medium brown, covered by membranous layer; glabrous; obscurely 6–9-ribbed, ribs rounded, up to 0.1 mm wide. *Flowering time*: July.

Habitat: Gravelly slopes over clayish soils amongst renosterveld; altitude 150–550 m.

Distribution: A few scattered localities in the northeastern Cape Flats between Klapmuts and Malmesbury, with an odd outlying population on Toringberg on the edge of Namaqualand.

Conservation status: Endangered as it is only known from a few scattered localities and never common. Many populations are on the edge of farmland or development. Red List status: CR.

Etymology: *acockii* – named after J.P.H. Acocks, renowned plant ecologist best known for his definition of South African veld types. The specimen was collected while he spelt his name as ‘Acock’ and therefore Weimarck’s original spelling should not be corrected.

Notes: This species is one of the few that occurs on the edge or within renosterveld. Unfortunately, on account of this, it is quite endangered as much of its suitable habitat has disappeared under the plough. It is easily overlooked and may be more widespread than the current records indicates.

Cliffortia acockii is closely related to *C. filifolia*, sharing the short petiole character. In its habit and size it is most similar to var. *arenaria* which, however, occurs in a quite different habitat. It is distinguished from that species by the shorter leaves and floral parts, as well as short hairs on the young stems. In the latter feature, along with the short petiole, it resembles *C. ramosissima*, which also occurs in renosterveld, but never this far west.

Representative specimens

SOUTH AFRICA. **3117** (Lepelfontein): Toringberg, 27 km, west of Bitterfontein, summit ridge on Louisfontein 44, 18 June 2009, (–BB), *Helme 6325* (NBG); Toringberg, 25 km, W of Bitterfontein. Summit of main peak, Louisfontein 44, 28 July 2009, (–BB), *Helme 6325* (NBG). **3318** (Cape Town): Preekstoel, 10km NW of Malmesbury, 170 m, June 2006, (–BC), *Helme* (NBG); ±8 km N of Klipheuwel, Bottelfontein 908, 1.5 km S of Wintervogel, 18 June 2009, (–DA), *Helme 65362* (NBG); gravelly S slopes of low hill between Klapmuts and Paarl Mt, 11 Nov. 1934, (–DD), *Acocks 3529* (S); along the crest of low clayish hills near Joostenberg, between Paarl and Durbanville, 11 Oct. 1949, (–DD), *Esterhuysen 16001* (BOL, NBG, PRE); Joostenberg Kloof, just N of Joostenberg hill, ±100m N of R310 at highest point, 200 m, 25 July 2006, (–DD), *Helme 3975* (NBG).



Cliffortia acockii branch.

61. **Cliffortia burchellii** Stapf in Kew Bulletin 24/1910: 328 (1910); Weim.: 70, fig. 18A–E (1934); Dahlgren: fig. 3E, 5H (1971); Fellingham: 614 (2000). Type: George District, Keurbooms R, Langkloof, 22 Mar. 1814, *Burchell 5090* (K, holo.!; B†, iso.).



C. leptophylla var. *longifolia* Eckl. & Zeyh.: 271 (1836). Type: Swellendam District, *Mund s.n.* (S, holo.; SAM).

C. filifolia sensu Meisn.: 528 (1843); Krauss: 423 (1844), non L.f.

C. juniperina sensu J.F.V. Phillips: 114 (1931), non L.f.

Erect medium to tall shrub, up to 3.6 m high, killed by fire; densely divaricately branched, forming overlapping brachyblasts. *Young stems* 0.6–1.2 mm wide, glabrous. *Leaves* trifoliolate; leaflets needle-shaped, 11.5–21.5 × 0.5–1.0 mm; apex sharply acuminate, 0.2–0.5 mm long; margins rounded, minutely serrulate to scabrid; lamina chartaceous, 0.4–0.6 mm thick, curved upwards and towards the stem, glabrous; sheath 1.8–2.4 mm long, abaxially and adaxially glabrous; stipules 1.0–2.9 mm long, free, margins smooth to serrulate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on the keel, margins serrate to smooth; sepals 3, glabrous. *Male flowers* with bracteoles 4.4–6.9 mm long; pedicel 0.6–0.9 mm long; sepals broadly ovate, 4.8–5.8 × 2.0–3.3 mm, acute to acuminate at the apex; stamens 9–19; filaments 3.9–8.8 mm long, red; anthers brownish red or yellow. *Female flowers* with bracteoles 3.6–6.6 mm long, longer than immature receptacle; sepals ± triangular, 1.9–4.0 × 0.6–1.8 mm, erect; carpel 1; stigma 3.0–3.9 mm long, greenish white, feathery, hidden at the base of leaves; immature receptacle 0.7–1.3 × 0.5–0.7 mm, glabrous, smooth. *Achene* broadly ellipsoid, 5.6–6.1 × 3.7–4.0 mm, medium to dark brown, glabrous; 11–12-ribbed, ribs rounded, 0.1–0.2 mm wide. *Flowering time*: December to August.

Habitat: Fynbos on wet south-facing mountain slopes, usually on well-drained clayish soil from shale bands of Table Mountain Series, in full sun; altitude 200–1 550 m.

Distribution: From the Langeberg Mountains above Robertson, along the Outeniqua and Tsitsikamma mountains, the southern slopes of the Kammanassie Mountains, and as far east as the Great Winterhoek near Uitenhage; also on the Riviersonderend Mountains.

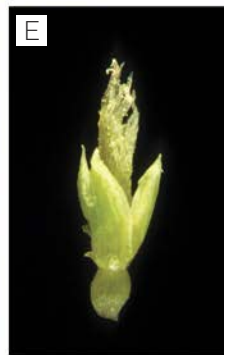
Conservation status: Widespread and common, even establishing itself in disturbed areas by the side of roads. Red List status: LC.

Etymology: *burchellii* – named after William Burchell, one of the earliest and most prolific collectors of the Cape flora.

Notes: One of the most distinctive of the needle-leaved species; the long narrow leaves and glabrous stems make this species easily distinguishable even when sterile, but in fruit it is unmistakable as the achenes are much larger than any other needle-leaved species. Its relationship to *Cliffortia filifolia* is evident in the glabrous nature of most of its parts, but in addition the seedling leaves also have a short petiole.

Representative specimens

SOUTH AFRICA. 3319 (Worcester): Langeberg Mts, Dassieshoek, S slopes, 4 June 1961, (–DB), *Esterhuysen 29055* (BOL). 3320 (Montagu): Marloth Nature Reserve, Block 2, 245 m, 29 Sept. 1978, (–CD), *Haynes 1483* (NBC, PRE); Leeurivierberg, near Swellendam, Apr. 1941, (–CD), *Stokoe 8621* (BOL); Lemoenshoek, 1220 m, 15 Sept. 1944, (–DD), *Esterhuysen 10445* (BOL); Boosmansbos Wilderness Area, close to margin of Boosmansbos Forest, 780 m, 10 Mar.



1987, (–DD), *McDonald 1265* (NBG, PRE); Boosmansbos Wilderness Area, Helderfontein, on hill overlooking Boosmansbos, 1160 m, 9 Dec. 2000, (–DD), *Whitehouse 167* (BOL, NBG). **3321** (Ladismith): Langeberg Mts, above Platteklouf, July 1909, (–CC), *Muir 5437* (BOL); Riversdale, Gysmanshoek Pass, The Oaks, 16 Sept. 1981, (–CC), *van Wyk 726* (K, NBG, PRE); Attakwaskloof, 5 Dec. 1951, (–DD), *Compton 23117* (NBG); Ladismith, Attakwaskloof, summit of Old Voortrekker Pass, 825 m, 22 Nov. 1972, (–DD), *Thompson 1620* (K, NBG, PRE). **3322** (Oudtshoorn): near top of Robinson Pass on S side, 855 m, 6 Mar. 1948, (–CC), *Acocks 14069* (K, PRE); Robinson Pass, 580 m, 16 Feb. 1977, (–CC), *Bond 879* (PRE); Robinson Pass, between Oudtshoorn and Mossel Bay, 2 May 1974, (–CC), *Goldblatt 1776* (NBG, PRE); Robinson Pass, S slopes, 460 m, 27 July 1956, (–CC), *Levy's 10547* (BOL); Robinson Pass, 19 Sept. 1936, (–CC), *Salter 6353* (K); George, Aug. 1847, (–CD), *Alexander-Prior s.n.* (K); Montagu Pass, 760 m, 29 Sept. 1939, (–CD), *Compton 7592* (NBG); Montagu Pass, Saasveld Forest Station, lower S slopes, 400 m, 17 Mar. 1970, (–CD), *Dahlstrand 1414* (NBG, PRE); Outeniqua Mts, Montagu Pass, (–CD), *Rehmann, Dr.A. 176* (Z); Outeniqua Mts, Montagu Pass, (–CD), *Rehmann, Dr.A. 176* (BM); Montagu Pass, on side nearest to George, 8 Apr. 1926, (–CD), *Smith 2794* (PRE); Outeniqua Pass, by side of road at summit, 795 m, 10 Mar. 2000, (–CD), *Whitehouse 91* (BOL, NBG); lower SE slopes of Kammanassie Mts, at Laudina, 9 Nov. 1949, (–DB), *Esterhuysen 16493* (BOL); Kammanassie Mts, Molen River farm, S slopes of Mannetjiesberg, 1280 m, 6 Apr. 1983, (–DB), *Matthews 1044* (NBG); Uniondale, Kammanassie Mts, at Molen River, in an abandoned land, 800 m, 4 July 1989, (–DB), *van Tonder 45* (PRE); Trakadakow Station, near Touws R., (–DC), *Burchell 5736* (K); Kaaimans Gat, 21 Aug. 1944, (–DC), *Compton 15797* (BOL, NBG); Portland, May 1923, (–DD), *Phillips 2* (BOL); Portland, May 1923, (–DD), *Phillips 134* (GRA, PRE). **3323** (Willowmore): hills NE of Avontuur, 915 m, Sept. 1932, (–CA), *Fourcade s.n.* (BOL); Prince Alfreds Pass, S side near top, 915 m, 15 Nov. 1958, (–CC), *Acocks 19947* (K, PRE); Buffelsnek, 6 May 1938, (–CC), *Compton 7191* (BOL, NBG); Prince Alfred's Pass, 885 m, Oct. 1932, (–CC), *Fourcade 4864* (BOL); Klein Gouna plateau, 365 m, 28 Aug. 1921, (–CC), *Keet 758* (NBG, PRE); S slopes of Zondagsberg, upper Prince Alfreds Pass, 1000 m, 17 Dec. 1991, (–CC), *Oliver 9954* (NBG); Forest Hall road, 215 m, Apr. 1928, (–CD), *Fourcade 3699* (BOL); W of Louterwater, Many Waters Kloof, 915 m, 30 Apr. 1935, (–DC), *Compton 5165* (BOL, NBG); Louterwater, 5 May 1938, (–DC), *Compton 7190* (NBG); valley on N side of Tsitsikamma Mts, Die Hoek, 18 Nov. 1944, (–DC), *Esterhuysen 10701* (BOL); valley at N foot of Tsitsikamma Mts, Die Hoek, 2 Nov. 1949, (–DC), *Esterhuysen 16343* (BOL, NBG). **3324** (Steytlerville): Witte Els Bosch Peak, lower slopes, 16 Nov. 1941, (–CC), *Esterhuysen 6809* (BOL, PRE); Humansdorp, Formosa State Forest, 10 km SW of Kareedouw, just N of Oudebosch, Ruggens Farm, 600 m, 12 Aug. 1979, (–CC), *Lubke 2293* (PRE). **3325** (Port Elizabeth): Groendal Wilderness Reserve, Zunga Catchment, Grootplaat Farm, Great Winterhoek, 1100 m, 5 Jan. 1977, (–CA), *Scharf 2044* (GRA, K, PRE); Loerie Forest Reserve, 23 Aug. 1968, (–CC), *Dahlstrand 870* (GRA, NBG); Loerie Plantation, Oct. 1934, (–CC), *Dix 135* (BOL); Port Elizabeth, Longmore Forest Station, 5 Oct. 1972, (–CC), *Olivier 594* (GRA, PEU); Sand River Heights farm, 410 m, 16 June 1977, (–CC), *Scharf 2105* (GRA); Witteklip Mt., Vanstadensberg Trig. Beacon – Lady's Slipper, on Wild Flower Reserve, 607 m, 7 Aug. 1994, (–CD), *Dold 1031* (GRA); Van Staadens Mt., near Port Elizabeth, May 1913, (–CD), *Paterson 2443* (BOL). **3419** (Caledon): Genadendal, Oct. 1846, (–BA), *Alexander-Prior s.n.* (K); Riviersonderend, Olifantsbos, 200 m, 1 Apr. 1922, (–BB), *Marloth 11091* (NBG, PRE); Riviersonderend, 1 Apr. 1922, (–BB), *Wilson SA144* (NBG). **3420** (Bredasdorp): Swellendam, Zuurbraak, Mar. 1930, (–BA), *Thode 2324* (K, PRE). **3421** (Riversdale): lower slopes of Langeberg Mts, at Garcia Forest Station, 25 May 1950, (–AA), *Esterhuysen 17247* (BOL, PRE). **3423** (Knysna): road from Knysna to Deepwalls, edge of forest c. 5 km from Knysna, 9 Oct. 1928, (–AA), *Gillett 1275* (NBG); Concordia, Block B, 28 July 1919, (–AA), *Keet 273* (NBG); near Knysna, Diep R valley, Nov. 1870, (–AB), *Bolus 1413* (BOL). **3424** (Humansdorp): Witte Els Bosch, 18 Nov. 1941, (–AA), *Esterhuysen 6818* (BOL, PRE); Witte Els Bosch, flats, 215 m, Mar. 1921, (–AA), *Fourcade 1160* (BOL, K, NBG); Witte Els Bosch, flats, 215 m, Mar. 1922, (–AA), *Fourcade 2116* (BOL, K, NBG, PRE); Witte Els Bosch, flats, 215 m, July 1923, (–AA), *Fourcade 2649* (BOL); Cape, Clarkson, Aug. 1926, (–AB), *Thode 829* (K, PRE).

62. **Cliffortia erectisepala** Weim. in Botaniska Notiser 1933: 163, fig. 10a–b (1933) & 140, fig. 41J–L (1934) & 400 (1940b); Fellingham: 609 (2000); Whitehouse: 8, fig. 12 (2004b). Type: Paarl District, Paarlberg, 305–610 m, *Drège 6846* (B, G, K, L, P, S, W).



C. filifolia sensu Harv.: 303 (1862) pro parte, non L.f.

C. repens sensu Weim.: 135 (1934) pro parte; Fellingham: 615 (2000), non Schltr.

Medium to tall erect virgate shrub, up to 2.5 m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.3–0.7 mm wide, tinged reddish, glabrous. *Leaves* unifoliolate; single-veined from base, linear to needle-shaped, 5.0–10.8 × 0.3–0.7 mm; apex acuminate to mucronate, up to 0.5 mm long; margins flat to rounded, smooth to scabrid; lamina chartaceous, 0.3–0.6 mm thick across midrib, midrib prominent against lamina beneath, curved upwards and towards the stem, glabrous; sheath 1.0–2.4 mm long, abaxially glabrous, adaxially glabrous except sometimes for a short fringe of hairs at apex; stipules 0.5–1.7 mm long, sometimes touching at top of sheath in front of leaflet insertion, margins smooth to serrulate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on the keel, margins smooth; sepals 3, glabrous. *Male flowers* with bracteoles 2.3–3.6 mm long, sepals broadly ovate, 3.2–5.0 × 0.7–1.6 mm, acute to acuminate at the apex; stamens 6–9; filaments 2.0–3.8 mm long, red; anthers brownish red or possibly yellow. *Female flowers* with bracteoles 3.1–4.4 mm long, longer than immature receptacle; sepals ± triangular to linear, 1.8–3.0 × 0.4–0.9 mm, erect, usually fused at base and falling as a unit; carpel 1; stigma 2.2–3.4 mm long, red, feathery, hidden at the base of leaves; immature receptacle 1.2–1.4 × 0.4–0.7 mm, glabrous, smooth. *Achene* 2.1–3.2 × 0.9–1.0 mm, pale to medium brown, glabrous; unribbed or faintly ribbed. *Flowering time*: possibly throughout the year but mainly April to December.

Habitat: Well-drained soils from shale bands of Table Mountain Series or granite-derived soils in full sun; altitude 150–1 650 m.

Distribution: Scattered throughout the CFR from Matsikammaberg to Grahamstown.

Conservation status: Widespread but localised, often occurring in small stands but then absent from similar localities. Red List status: LC.

Etymology: *erectisepala* (Latin) means ‘with erect sepals’, for the persistent sepals, which remain upright and held together on the maturing achene.

Notes: The species has very fine unifoliolate leaves that usually lie close to the stem, and upright branches that give the shrub a virgate appearance. The female flowers are obscure, hidden at the base of the leaves, and the fruits easily overlooked, so that it is superficially similar to *Aspalathus linearis* (Burm.f.) R.Dahlgren, or *rooibos*.

This species has a very odd distribution. It is most common in the southwestern Western Cape, especially on the mountains around Paarl. It is then also quite common around Grahamstown. In between these two localities populations are scattered, occurring on the Matsikammaberg in the north,



the Rooiberg, Klein Swartberg and Kouga Mountains in the Little Karoo. The apparent disjunction between the Grahamstown and southwestern populations led Weimarck (1934) to regard the eastern populations as *Cliffortia repens*. However, the species are quite distinct: *C. erectisepala* is killed by fire, *C. repens* re-sprouts from a crown; *C. erectisepala* is a tall wiry upright shrub, *C. repens*, at least in the Drakensberg form, usually has branches prostrate; the female sepals of *C. erectisepala* remain erect, almost fused together, before they fall, whereas *C. repens* are separate and often start to recurve.

Representative specimens

SOUTH AFRICA. **3118** (Vanrhynsdorp): Matsikammaberg plateau, Op de Berg, at head of stream cutting into NE cliffs, 800 m, (–DB), *Trinder-Smith in Whitehouse* 305 (BOL, NBC). **3318** (Cape Town): Paarl Mt., 315–610 m, 1839, (–DB), *Drège* 6846 (BM, K, PRE); Paarl Mt, 4 Apr. 1967, (–DB), *Kruger s.n.* (NBC); Paarl Mt. Nature Reserve, NE side of mountain, near start of circular walk just before Oukraal, 520 m, 3 Feb. 2000, (–DB), *Whitehouse* 75 (BOL); Jonkershoek, Jakkalsvlei R, 395 m, 2 May 1962, (–DD), *Banks* 1268 (PRE); Lemoenkloof Farm, NE of Stellenbosch, ridge directly W of Silwerminnekloof, 460 m, 12 Oct. 1989, (–DD), *Buys* 72 (NBC); Simonsberg, 300 m, 26 May 1949, (–DD), *Parker* 4406 (BOL, K, NBC); Jonkershoek, Jakkalsvlei, E segment of Cut-Off Belt 13, N side of valley, 395–700 m, 26 Nov. 1963, (–DD), *Taylor* 5578 (NBC, PRE); Jonkershoek, Jakkalsvlei R Flats, 365 m, 22 Apr. 1965, (–DD), *Taylor* 6235 (NBC, PRE). **3319** (Worcester): Christie Prins Hiking Trail, Koelfontein Farm, W of Gydo Pass, stream at base of Hugosberg, 900 m, 28 July 2001, (–AB), *Whitehouse* 237 (BOL); Wabooms R, foot of Waaihoek Peak, 30 May 1948, (–AD), *Esterhuysen* 14507 (BOL, NBC, PRE); S side of Skurweberg [Schurfteberg], 1065 m, 7 Dec. 1948, (–AD), *Esterhuysen* 14728 (BOL); N slopes below Du Toits Kloof, above Wellington, 8 Dec. 1945, (–CA), *Esterhuysen* 12312 (BOL); Du Toits Kloof, Elands Kloof above the river, 10 Dec. 1945, (–CA), *Esterhuysen* 12353 (BOL, NBC); Wellington, Bain's Kloof, 365 m, 26 Oct. 1944, (–CA), *Levyyns* 7631 (BOL); Du Toits Kloof, 19 Oct. 1947, (–CA), *Levyyns* 8612 (BOL); Bain's Kloof, Happy Valley, 625 m, 10 Apr. 1999, (–CA), *Whitehouse* 32 (BOL, MO, NBC); Brandwacht, Fairy Glen, 760 m, 8 Nov. 1948, (–CB), *Acocks* 15258 (K, PRE); La Motte Plantation Flower Reserve, 4 July 1935, (–CC), *Compton* 5349 (NBC); Wemmershoek, 460 m, 14 Dec. 1940, (–CC), *Compton* 10133 (NBC); Franschhoek, 5 Oct. 1946, (–CC), *Compton* 18536 (NBC); NE of Franschhoek Pass, 17 Dec. 1944, (–CC), *Esterhuysen* 11202 (BOL); Franschhoek District, Wemmershoek Vlei, near Wemmershoek Station outside Franschhoek, S of vlei, Oct. 2001, (–CC), *Klak* 860 (BOL); Klein Drakenstein Mountains Upper Kasteelkloof Catchment Area, 520 m, 17 Mar. 1971, (–CC), *Kruger* 1172 (NBC, PRE); Franschhoek Pass, Villiersdorp side, 3 May 1936, (–CC), *Levyyns* 5642 (BOL); Villiersdorp District, Riviersonderend Mts, Silverstream farm, 14 May 1974, (–CD), *Goldblatt* 1799 (K, NBC, PRE); Villiersdorp District, Kaaimansgat, 16 Apr. 1960, (–CD), *Rycroft* 2219 (NBC); Doringkloof Farm, S foothills of Voetpadsberg, along footpath, 460 m, 27 Apr. 1985, (–DA), *van Wyk* 2363 (NBC, PRE); Doringkloof Farm, S foothills of Voetpadsberg, S-facing moderate slope, 640 m, 8 June 1985, (–DA), *van Wyk* 2375 (NBC, PRE); Kiesiesberg, 915 m, 23 Sept. 1946, (–DB), *Compton* 18401 (NBC); Langeberg Mts, Dassieshoek, 4 June 1961, (–DB), *Esterhuysen* 29048 (BM, BOL, K, PRE); Riethoek Mt., between Montagu and the Karoo, 1065 m, 23 Sept. 1946, (–DB), *Levyyns* 7947 (BOL); 10 km NW of Robertson on upper slopes of Tierberg in vicinity of Vaalfontein on farm Noree B14, 800 m, 7 July 2003, (–DD), *Helme* 2694 (.). **3320** (Montagu): Swellendam, Marloth Nature Reserve (plot 1 vicinity), 305 m, 4 June 1970, (–CD), *Taylor* 7762 (K, NBC, PRE). **3321** (Ladismith): Ladismith, Klein Swartberg Mts, S slopes next to forestry track at Waterkloof, 1065 m, 21 May 1988, (–AD), *Vlok* 1939 (NBC, PRE); Besemfontein, Klipkraal Trail, S side of valley, near stone kraal, 1645 m, 8 Apr. 2000, (–AD), *Whitehouse* 107 (BOL); Rooiberg, roadside on ridge, ± 1 km W of hut near summit, 1370 m, 21 Apr. 1977, (–DA), *Taylor* 9629 (K, NBC, PRE). **3324** (Steytlerville): Kouga Mts, near Kouga Peak, lower slopes, 14 Nov. 1944, (–CA), *Esterhuysen* 10829 (BOL). **3325** (Port Elizabeth): Alexandria District, Suurberg Pass, 670 m, 25 Apr. 1947, (–BC), *Acocks* 13658 (K, PRE); Port Elizabeth District, Suurberg Mts, Addo Elephant National Park 4 hour trail, by track to W of Brandrug, 625 m, 10 Oct. 1999, (–BC), *Whitehouse* 57 (BOL). **3326** (Grahamstown): Albany District, between Riebeck East and Alicedale, Bergplaas farm, 19 Mar. 1992, (–AA), *Norton s.n.* (GRA); Albany District, near Grahamstown, to NE, 610 m, 3 Mar. 1948, (–BA), *Acocks* 14032 (K, PRE); Albany District, Grahamstown, SW slope of Mountain Drive, Mar. 1933, (–BC), *Liebenberg* 281 (BOL); hills near Grahamstown, (–BC), *MacOwan* 1413 (BOL); near Grahamstown, 830 m, May 1893, (–BC), *Schlechter* 2666 (BM, BOL, K, NBC, PRE); Albany District, around 1.5 km SW of Collingham Tower, Johnson's Farm, 610 m, 5 Feb. 1948, (–BC), *Story* 3310 (GRA, PRE). **3418** (Simonstown): Helderberg, 240 m, 3 Nov. 1948, (–BB), *Parker s.n.* (BOL, K, NBC). **3419** (Caledon): Houwhoek, Haasvlakte flats near De Hoop Farm in valley, 310 m, 28 Oct. 1991, (–AA), *Boucher s.n.1* (NBC); Genadendal, 610 m, 2 Mar. 1935, (–BA), *Levyyns* 4849 (BOL). **3420** (Bredasdorp): Swellendam, Zuurbraak, Mar. 1930, (–BA), *Thode* 2326 (K, PRE).

63. **Cliffortia repens** Schltr. in Journal of Botany 34: 392 (1896); Weim.: 135, fig. 40A–G (1934) pro parte; Compton: 230 (1976); Whitehouse: 8, fig. 12 (2004b). Type: Drakensberg Mts, Polela R, 1830–2 135 m, Feb. 1896, *Evans 614* (B, holo.†; NH!).



C. juniperina var. *serrulata* Engl.: 376 (1899). Type: Eastern Cape, Pondoland, 1888, *Beyrich 96* (B, syn.†); Kwazulu-Natal, near Curry's Post, 915–1 220 m., 24 Apr. 1891, *Medley Wood 4449* (B, syn.†; BM!, BOL!, K!, NH); Mpumalanga, Spitzkop, near Lydenburg, Apr. 1892, *Wilms s.n.* (B, syn.†).

C. natalensis J.M.Wood: 362 (1907); Burt Davy: 316 (1932). Type: Kwazulu-Natal, near Curry's Post, 915–1 220 m., 24 Apr. 1891, *Medley Wood 4449* (K, syn.†; B, BM!, BOL!, NH); Mount Gilboa, 1 525–1 830 m, 24 Sept. 1906, *Wylie in Medley Wood 10029* (K, syn.†; GRA, NH).

C. prostrata Engl.: 300 (1915) nomen nudum [According to Weimarck (1934) this is merely a confusion of the name *C. repens*.]

C. sp. sensu E. Phillips: 91 (1917). Based on *Evans 663*.

Short, low to sprawling or erect medium shrub, up to 3.6 m high, resprouting after fire from a central crown; densely divaricately branched, forming brachyblasts. *Young stems* 0.8–1.1 mm wide, tinged red-dish, tuberculate, the tubercles sometimes with short spreading hairs, 0.1–0.3 mm long; older stems minutely tuberculate. *Leaves* unifoliate; single-veined from base, linear to needle-shaped, 5.2–9.9 × 0.4–0.7 mm; apex sharply acuminate, 0.6–0.8 mm long, margins flat, minutely serrulate; lamina chartaceous, 0.3–0.5 mm thick across midrib, midrib prominent against lamina beneath, curved upwards and towards the stem, glabrous; sheath 1.1–1.7 mm long, abaxially glabrous, adaxially glabrous except sometimes for short fringe of hairs at apex; stipules 1–2 mm long, free, margins smooth to serrulate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on the keel, margins smooth; sepals 3, glabrous. *Male flowers* with sepals broadly ovate, acute to acuminate at the apex; stamens 6, red; anthers brownish red. *Female flowers* with bracteoles 2.7–3.3 mm long, longer than immature receptacle; sepals ovate, 1.5–1.8 × 0.5–0.7 mm, erect but becoming recurved as the flower matures; carpel 1; stigma 1.7–2.6 mm long, red, feathery, hidden at the base of leaves; immature receptacle 1.3–1.4 × 0.5–0.6 mm, glabrous, smooth. *Achene* 3.1–3.6 × 0.8–1.1 mm, medium brown, glabrous; ribs 7–8, rounded, up to 0.1 mm wide. *Flowering time*: possibly throughout the year but mainly October to July.

Habitat: Well-drained Clarens Formation-derived soils in full sun; altitude 900–2 450 m.

Distribution: Found on the slopes of the Drakensberg and through the KwaZulu-Natal Midlands north to Mpumalanga around Lydenburg (Mashishing) with outliers in the south at Baziya Mountain and in the north on the Soutpansberg.

Conservation status: Widespread and common, often surviving even in overgrazed areas and able to resprout after fire.

Etymology: *repens* (Latin) means 'creeping', referring to more or less sprawling branches (several species are more deserving of the epithet).

Notes: Of all the species to receive the name 'repens', this species is probably one of the least appropriate. It neither creeps along the ground, nor does it send out rhizomes that creep under ground. In the form around the Drakensberg, the branches do have a tendency to spread horizontally before ascending at their tips, however, the form around Lydenburg (Mashishing) is a typical erect bush. The two forms

are probably worthy of taxonomic distinction. Unfortunately, it is difficult to determine this character from herbarium specimens and I have not surveyed enough wild populations to know how consistent a geographic separation this distinction is.

The species can be identified by the unifoliate, needle-like leaves, which are more or less diagnostic outside of the CFR. The only needle-leaved species in the area that is also sometimes unifoliate is *Cliffortia linearifolia*, but the leaves in that species have a thickened midrib with two paler stripes on either side, whereas *C. repens* is uniformly green. They also differ in that *C. repens* is 3-sepalled and *C. linearifolia* 4-sepalled (although the sepals in the female are so small and usually fall so quickly that they are often not evident).

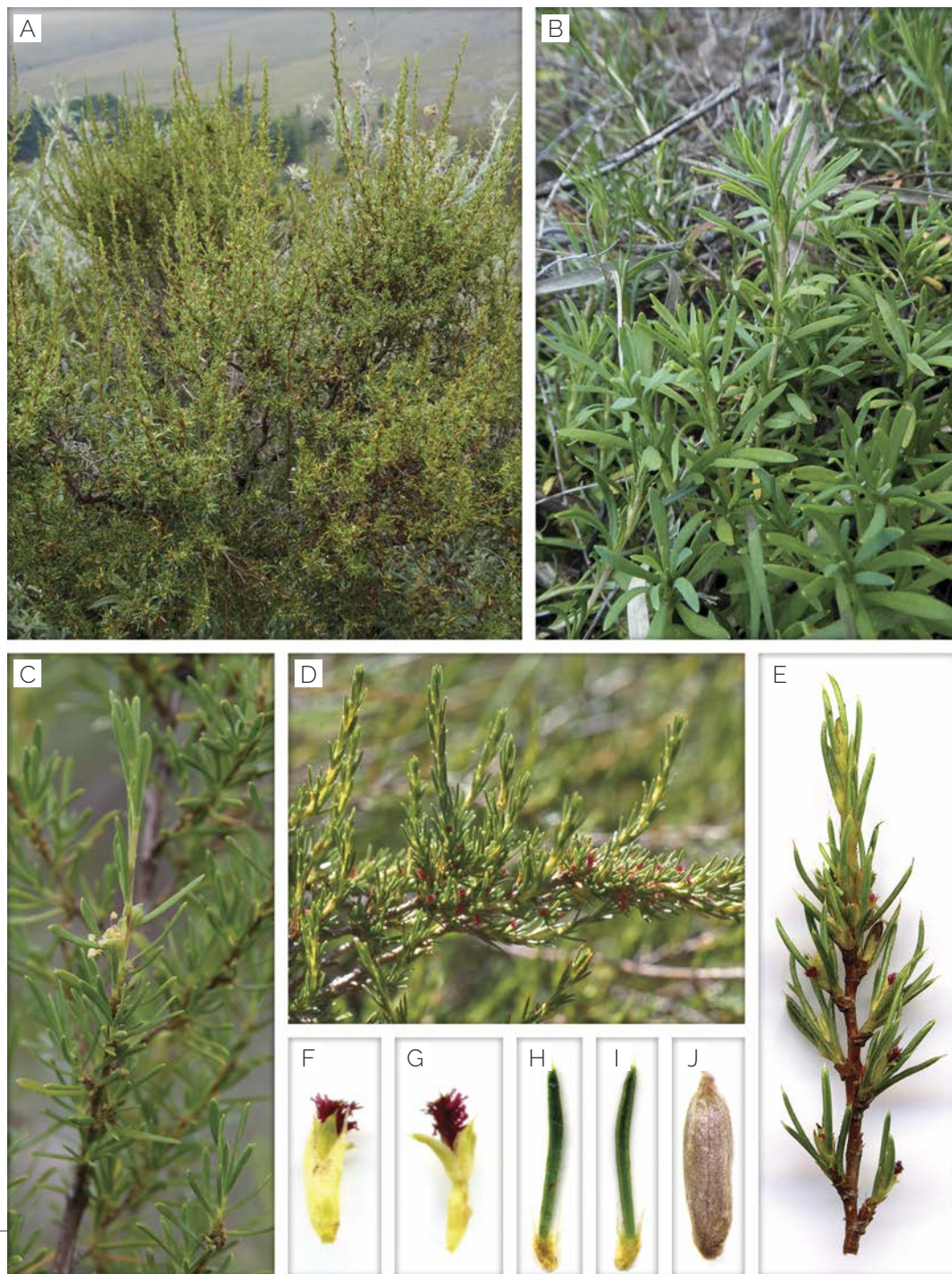
Male flowers are rare in this species, although more common in the Mpumalanga form. The red stigmas of the female plants are quite noticeable in flower, at least for *Cliffortia*. These characters are useful guides in distinguishing *C. linearifolia* from *C. repens*. In *C. linearifolia*, male flowers are much more common, while the female stigmas are usually whitish, very small and difficult to spot. These observations should be confirmed in association with the above characters.

An unusual collection from Barberton made by Thorncroft in *Herb. Rogers 19187* (K!, NBC!) resembles *Cliffortia erectisepala* rather than *C. repens*. The locality might be a mislabelling or it might be a divergent form of *C. repens*. Additional collections are needed from the area before this question can be settled. Several specimens of *C. erectisepala* from the Eastern Cape were included by Weimarck under *C. repens*.

Representative specimens

SOUTH AFRICA. **2230** (Messina): Soutpansberg, near Entabeni, 20 Aug. 1930, (–CD), *Hutchinson & Gillett 4314* (K). **2430** (Pilgrim's Rest): E Mariepskop, 1525 m, 2 Oct. 1938, (–DB), *Compton 7313* (NBC); NE Belvedere 26 N forest, 30 radial km from Pilgrim's Rest, 1525 m, 5 Sept. 1966, (–DB), *Davidson & Mogg 33405* (K, PRE); Mariepskop Forest Reserve, Oct. 1925, (–DB), *Keet STE 13388* (NBC); Mariepskop District, 1675 m, 27 May 1960, (–DB), *van der Schut 4475* (K); Ohrigstad Dam Nature Reserve, 1705 m, 7 Aug. 1968, (–DC), *Edwards 4054* (K, PRE); Ohrigstad Dam Nature Reserve, 1770 m, 15 Feb. 1972, (–DC), *Jacobsen 2272* (PRE); Mt. Sheba Nature Reserve, 1 Jan. 1978, (–DC), *Kerfoot, O., Forrester & Gooyer 31* (PRE); Mount Sheba, 1950 m, 29 Nov. 1980, (–DC), *Kluge 2313* (NBC, PRE); 7.5 km from Pilgrim's Rest Post Office on Pretoria road, 1675 m, 2 Nov. 1950, (–DC), *Story 4003* (GRA, K, PRE); Lydenberg, near Pilgrim's Rest, Burgers Pass, E slopes, 1515 m, 29 Jan. 1906, (–DD), *Burt Davy 1560* (BOL, PRE); near Graskop, Kowyns Pass, at top of pass, 1980 m, 19 July 1949, (–DD), *Levy's 9408* (BOL); Drakensberg, Mac-Mac Creek, (–DD), *Mudd s.n.* (BOL, K). **2530** (Lydenburg): Dullstroom, 2075–2135 m, 22 Jan. 1933, (–AC), *Galpin s.n.* (BOL); Belfast Region, Dullstroom, 2075–2135 m, 22 Jan. 1933, (–AC), *Galpin 13072* (K, PRE); Ceylon Forest Reserve, Hartebeestvlakte, Relevé GBD 86 0215, 1960 m, 18 Oct. 1986, (–BA), *Deall 2303* (PRE); De Kuilen 205 JT Farm, 2150 m, 13 Mar. 1985, (–BA), *Krynauw 310* (PRE); Lydenburg District, Mt. Anderson, 2150 m, 27 Jan. 1955, (–BA), *Leighton 3267* (BOL); Lydenburg District, Devil's ?Knuckles (Spitzkop near Lydenburg ex Weimarck), Apr. 1887, (–BA), *Wilms 595* (K); Mac-Mac Pools and vicinity, 16 Mar. 1981, (–BB), *Hilliard & Burt 14383* (K, NU, PRE); Sabie, Tweefontein Experimental Area, Feb. 1932, (–BB), *Wager 181* (K, PRE); Boshalte, Buffelskloof Nature Reserve, 1600 m, 30 Oct. 1997, (–BC), *Burrows & J.E. 4720* (GRA); Slaaihoek Post Office, 14.5 km W of Slaaihoek Post Office, 1980 m, 17 Jan. 1952, (–CB), *Bruce 495* (K, PRE); Kaapsehoop, 8 km SW of hotel, W slope, 31 May 1972, (–DA), *Nel 221* (NBC, PRE); 5 km from Kaapsehoop to Nelspruit, 2 Feb. 1971, (–DB), *Buitendag 827* (K, NBC, PRE); Kaapsehoop, Mar. 1918, (–DB), *Curator Pretoria Bot. Garden 21565* (PRE); Kaapsehoop, 9 Mar. 1981, (–DB), *Hilliard & Burt 14292* (K, NU, PRE); E Kaapsehoop, Devil's Kanton, 10 Jan. 1924, (–DB), *Pole Evans 967* (K, PRE); E Kaapsehoop, Devil's Kanton, 10 Jan. 1924, (–DB), *Pole Evans 968* (K, PRE); Kaapsehoop, 1220 m, Mar. 1918, (–DB), *Rogers 21565* (K); Kaapsehoop, (–DB), *Rogers 21591* (BOL, K); E Kaapsehoop, Devil's Kanton, Oct. 1928, (–DB), *Thode 1598* (K); 4 km SW of Agnes Mine, 8 Mar. 1956, (–DD), *Story 5448* (BM, K, PRE). **2531** (Komatipoort):

Cliffortia repens: A, habitat; B, sprouting; C, branch with male flower; D & E, branch with female flowers; F & G, female flower; H, dorsal view of leaf; I, ventral view of leaf; J, achene.



mountain area near Barberton, 1675 m, 26 July 1947, (–CC), *Compton 19789* (NBG); Piggs Peak District, Emlembe, 1675 m, 1 Feb. 1959, (–CC), *Compton 28510* (NBG, PRE, SDNH); Piggs Peak, Emlembe, edge of stream, 1370 m, 9 Feb. 1961, (–CC), *Compton 30531* (NBG, PRE); Kangwane, Songimvelo Game Reserve, Mendon boundary with Schultzenhorst, 1690 m, 9 Dec. 1992, (–CC), *Germishuizen 5778* (PRE); KaNgwane, Songimvelo Game Reserve, boundary of Mendon and Schultzenhorst Farms, 1690 m, 9 Dec. 1992, (–CC), *Meyer 58* (PRE). **2631** (Mbabane): 18 km NNW of Mbabane, above source basin of Black Mbuluzi R, E side of Ngwenya escarpment, 1900 m, 12 Sept. 1977, (–AA), *Prior 60* (K); Mbabane, 15 Jan. 1951, (–AC), *Compton 22377* (NBG); hill NE of Mbabane, 11 Mar. 1958, (–AC), *Compton 27606* (K, NBG, PRE, SDNH); 5 km NE of Mbabane, 1200 m, 15 Jan. 1978, (–AC), *Kemp 1223* (PRE, SDNH); Hlatikulu District, Hlatikulu, 1065 m, 13 Nov. 1956, (–CD), *Compton 26285* (K, NBG, PRE); Hlatikulu District, Hlatikulu, 1065 m, July 1960, (–CD), *Ons s.n.* (NBG); Mbabane, 1.5 km from Hlatikulu on Sitobela road, 25 Dec. 1967, (–CD), *Ross 1755* (K, NU, PRE). **2730** (Vryheid): near Vryheid, 1525 m, 17 July 1947, (–DD), *Compton 19746* (NBG). **2731** (Louwsburg): Louwsburg, Itala Nature Reserve, 1300 m, 25 Feb. 1984, (–CA), *Hilliard & Burt 17724* (K, NU, PRE); N Natal, Louwsburg District, Itala Nature Reserve, near Louwsburg, at end of airstrip, 1385 m, 11 Dec. 1977, (–CB), *McDonald 240* (K, NU, PRE). **2828** (Bethlehem): Royal Natal National Park, path from Tendele to Tiger Falls, 1675 m, 3 Feb. 1982, (–DB), *Hilliard & Burt 15403* (K, NU, PRE); Royal Natal National Park, ridge between forest patches at Tiger Falls, Dooley, 1890 m, 17 Feb. 1984, (–DB), *Hilliard & Burt 17668* (K, NU, PRE); National Park, gorge, 28 Aug. 1930, (–DB), *Hutchinson 4534* (K); Mont-aux-Sources, on slopes of Dooley, 1830 m, 14 Feb. 1926, (–DB), *McClellan & Bayer 5* (BOL, K, NU, PRE); Witsieshoek, Qwa-Qwa Mt, 1830 m, Mar. 1896, (–DB), *Thode 6356* (NBG); Royal Natal National Park, path from Witsieshoek to Mahai Falls, Basuto Gate, 2150 m, 22 Nov. 2001, (–DB), *Whitehouse 290* (BOL). **2829** (Harrismith): Van Reenen Drakensberg, 1525–1830 m, Mar. 1895, (–AD), *Medley Wood 5987* (K); Oliviershoek Pass, above Little Switzerland, 1740 m, 5 Feb. 1982, (–CA), *Hilliard & Burt 15430* (K, NU, PRE); Oliviershoek, 1830 m, Feb. 1892, (–CA), *Thode 3286* (NBG); Oliviershoek Pass, 1675 m, Feb. 1907, (–CA), *Thode 4330* (NBG); Drakensberg, Cathedral Peak area, upper and middle slopes, 2440–3050 m, July 1944, (–CC), *Esterhuysen 10184* (BOL, K, NBG, NU); Drakensberg, Cathedral Peak area, 2135–2440 m, July 1946, (–CC), *Esterhuysen 12867* (BOL, PRE); Weenen District, Drakensberg, MnWeni area, 1830 m, July 1948, (–CC), *Esterhuysen 14527* (BOL, NBG, PRE); Weenen District, Drakensberg, MnWeni area, 2135–2440 m, July 1948, (–CC), *Esterhuysen 14528* (BOL); Weenen District, Drakensberg, Cathedral Peak area, 2135 m, July 1949, (–CC), *Esterhuysen 15489* (BOL, NBG); Drakensberg, MnWeni area, 1830 m, July 1958, (–CC), *Esterhuysen 27846* (BOL); Cathedral Peak Forest Reserve, tributary of Tseketske, 2105 m, 18 Jan. 1983, (–CC), *Hilliard & Burt 16273* (K, NU, PRE); Drakensberg, Cathedral Peak, 1450 m, 10 Feb. 1982, (–CC), *Lambinon & Reekmans 82/460* (PRE); Cathedral Peak, 1220 m, Aug. 1947, (–CC), *Levy 8267* (BOL); Drakensberg, Cathedral Peak area, 2285 m, 13 Aug. 1947, (–CC), *Levy 8308* (BOL); Cathedral Peak area, Tryme, 1830 m, 16 Jan. 1965, (–CC), *Schelte 7195* (BOL, PRE); Cathedral Peak Forest Reserve, along top edge of kopje forming N boundary of catchment 9, 1935 m, 9 Nov. 1950, (–CD), *Killick 1109* (K, PRE). **2830** (Dundee): Qudeni Forest, 1525 m, Feb. 1940, (–DB), *Bayer 815* (NU); Zululand, Qudeni Plateau, (–DB), *Dyer & Collett 4700* (PRE); Nkandla District, Qudeni, Ntshiza, 1675 m, 5 Dec. 1957, (–DB), *Edwards 2233* (K, NU, PRE); Nkandla District, Qudeni, near Madhlosi, 1525 m, (–DB), *Phillips, Prof. s.n.* (NU). **2929** (Underberg): Drakensberg, Cathkin area, July 1942, (–AB), *Esterhuysen 7930* (BOL); top of Ntabamhlope, 1830–2135 m, June 1896, (–BA), *Evans 663* (K, PRE); Garden Castle Forest Reserve, stream valley beyond forester's house, 1980 m, 12 Nov. 1980, (–CA), *Hilliard & Burt 13465* (NU); Cobham Forest Station, Ndlovini, Troutbeck, 8 Nov. 1980, (–CB), *Hilliard & Burt 13331* (NU); Cobham Forest Reserve, Sipongweni, 1980 m, 21 Feb. 1981, (–CB), *Hilliard & Burt 14071* (K, PRE); Bamboo Mt., N side, 1950 m, 21 Nov. 1982, (–CB), *Hilliard & Burt 15634* (K, NU, PRE); Cobham Forest Reserve, Sipongweni, S side, 1890 m, 5 Mar. 1983, (–CB), *Hilliard & Burt 16762* (K, PRE); Gxalangenwa valley, between Sani Pass and Polela valley, 1950 m, 10 Dec. 1983, (–CB), *Hilliard & Burt 17169* (K, NU, PRE); Mulangane ridge, above Carter's Nek, on summit of ridge, 2135–2225 m, 1 Dec. 1983, (–DA), *Hilliard & Burt 16986* (NU); Mulangane ridge, above Carter's Nek, 2135–2225 m, 2 Dec. 1983, (–DA), *Hilliard & Burt 17025* (K, NU, PRE); Mulangane ridge, above Carter's Nek, 2135–2225 m, 13 Mar. 1985, (–DA), *Hilliard & Burt 18358* (K, NU, PRE). **2930** (Pietermaritzburg): ?Natal, near Curry's Post, 915–1220 m, (–AC), *Medley Wood s.n.* (BOL); near Curry's Post, 915–1220 m, 24 Apr. 1891, (–AC), *Medley Wood 985* (BM); near Curry's Post, 915–1220 m, 24 Apr. 1891, (–AC), *Medley Wood 4449* (K); Mt. Gilboa, 1525–1830 m, 24 Sept. 1906, (–AD), *Wylie in Medley Wood 10029* (K); New Hanover District, Kingscliffe, 31 Mar. 1981, (–BD), *Hilliard & Burt 14459* (K, NU); 3 km from Harburg on Harburg–Noodsberg road, 4 May 1963, (–BD), *Ross 195* (NU). **3029** (Kokstad): Natal, Ntsizwa Mt., 2075 m, 27 Jan. 1895, (–CD), *Schlechter 6494* (BOL, PRE). **3128** (Umtata): Ciskei, Baziya Mt., 915–1220 m, (–CB), *Baur 494* (K).

(64–65) **Section Costatae** *Weim.* in Monograph of the Genus *Cliffortia*: 16, 34 (1934) & 174 (1948). Type species, designated here: *C. atrata* Weim.

Medium erect densely branched shrubs. **Young stems with short upwardly adpressed hairs**, forming brachyblasts. Sheath glabrous abaxially, a few scattered hairs adaxially; stipules membranous, free, entire; petiole absent. Leaves trifoliolate, glabrous, rarely with a few scattered hairs beneath, **soft to papery**, usually straight to curved upwards and towards the stem; **leaflets needle-shaped, apex long acuminate, margins minutely serrulate**. Flowers solitary, in the axils of ordinary vegetative leaves. Bracteoles hairy with a serrate margin, longer than immature receptacle; **sepals 3**, glabrous, female ovate, recurved; receptacle distinctly ribbed, glabrous; carpels 1. Achene ribbed, glabrous, mid to dark brown.

This is all that is left of Weimarck's large sect. Costatae. It was never natural and one could have chosen almost any of the species as the type. In the end, I have gone for one of the least specialised species in the whole genus; *Cliffortia atrata* being defined almost by its lack of distinguishing characters. Only *C. tuberculata* can with any confidence be said to be related to *C. atrata*.

64. ***Cliffortia atrata* Weim.** in Botaniska Notiser 1933: 150, fig. 4a–b (1933) & 59, fig. 14F–M (1934); Levyns: 447 (1950); Fellingham: 614 (2000). Type: Cape Peninsula, Table Mt., 1 000 m, 1 Oct. 1930, *Fries, Norlindh & Weimarck 1569* (LD, holo.!; K!, PRE, SI, iso.)



C. juniperina sensu Eckl. & Zeyh.: 270 (1836) pro parte; Harv.: 302 (1862) pro parte, non L.f.

C. laricina E.Mey. ex Drège: 80, 173 (1843) pro parte, nomen quoad *Drège 6837*.

C. juniperina var. *brevifolia* sensu Harv.: 303 (1862), excl. locality.

C. juniperina var. *muricata* sensu Harv.: 303 (1862) pro parte; non Harv. sensu stricto.

Erect medium to tall shrub, up to 2 m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.6–1.4 mm wide, tinged reddish, hairy, stem hairs adpressed upwards, 0.1–0.7 mm long. *Leaves* trifoliate; leaflets linear to needle-shaped, 4.2–12.9 × 0.3–0.9 mm; apex sharply long acuminate, 0.2–1.0 mm long; margins flat, scabrid; lamina chartaceous, 0.2–0.6 mm thick, usually ± straight to curved upwards and towards the stem, but curved downwards and away from the stem in southern populations, glabrous, rarely with a few hairs on the midrib beneath; sheath 1.0–2.0 mm long, abaxially glabrous, adaxially glabrous or with a few scattered adpressed hairs; stipules 1.3–3.0 mm long, free, margins smooth to serrulate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins serrate to very shortly ciliate; sepals 3, glabrous. *Male flowers* with bracteoles 2.4–3.4 mm long; pedicel 0.4–0.6 mm long, glabrous; sepals broadly ovate, 3.0–5.5 × 1.5–2.7 mm, acute to acuminate at the apex; stamens 12–15; filaments 3–5 mm long, red; anthers brownish red (occasionally whitish but probably only when deformed). *Female flowers* with bracteoles 2.4–4.4 mm long, longer than immature receptacle; sepals ovate, 1.6–3.3 × 0.5–1.4 mm, recurved; carpel 1; stigma 1.9–3.8 mm long, red or greenish white, feathery, sometimes prominent above the leaves; immature receptacle 1.1–1.9 × 0.8–1.1 mm, glabrous, clearly ribbed. *Achene* ellipsoid, 2.3–3.8 × 1.3–2.4 mm, dark reddish brown to almost black, glabrous; 12–25-ribbed, ribs rounded, up to 0.4 mm wide, transversely rugose between ribs; elaiosome swollen around base. *Flowering time*: predominantly August to October, but can be found at almost any time of the year depending upon the population.

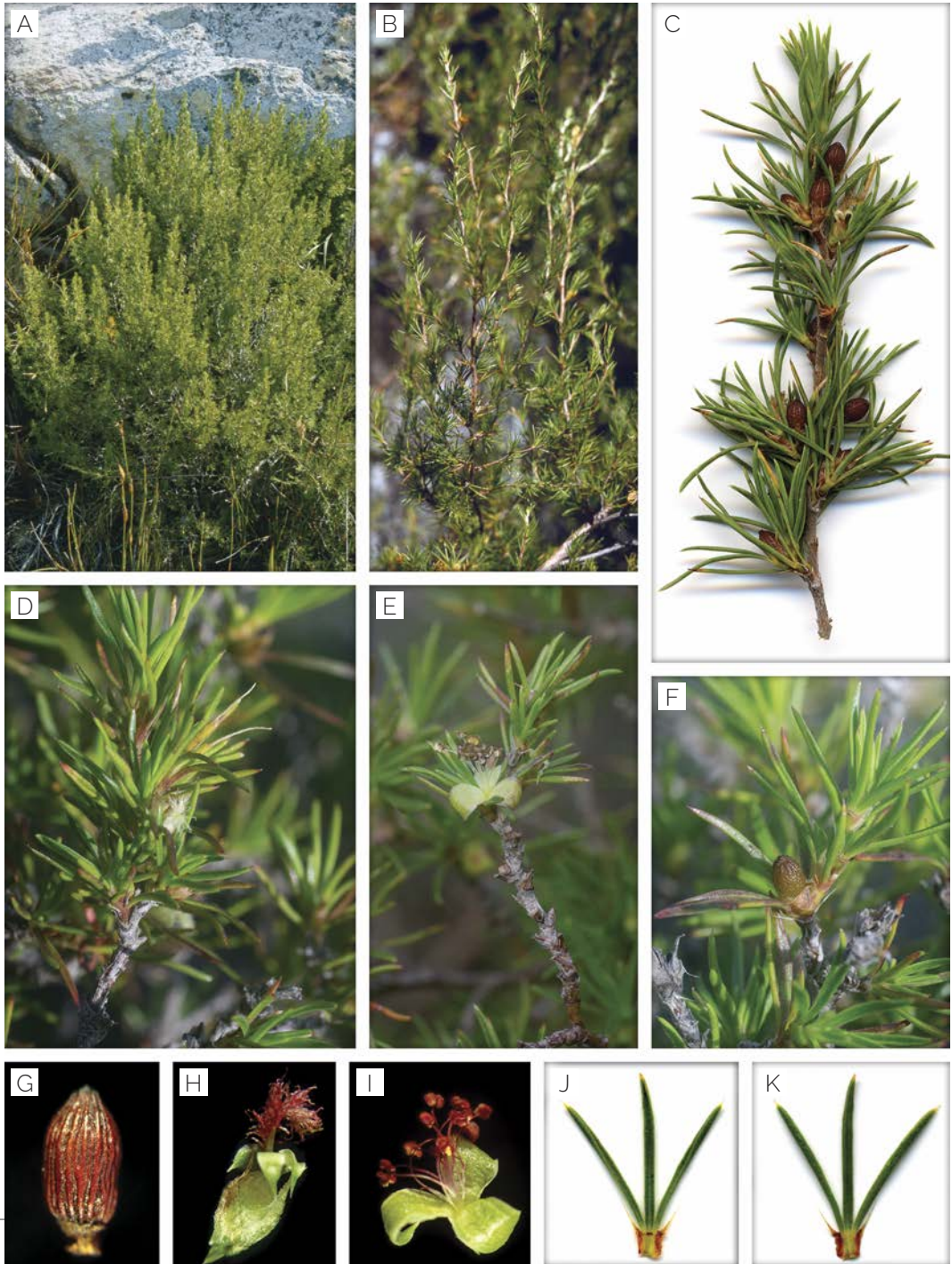
Habitat: Well-drained acid sands from Table Mountain Series in full sun; altitude 0–1 700 m.

Distribution: Mountains of southwestern Western Cape, including the Cape Peninsula, extending from the Groot Winterhoek Mountains to Kogelberg and east as far as Riviersonderend, with an outlying population on the Potberg.

Conservation status. Common and widespread and although in some coastal parts of its range it might be threatened by development, frequent fires or alien plants, there is no significant risk to the species. Red List status: LC.

Etymology: *atrata* (Latin) means 'dark', referring to the dark brown colour of the achenes.

Notes: This is one of the commonest species in the southwestern Western Cape but was relatively late to be recognised. Yet another needle-leaved species, it was included in *Cliffortia juniperina*, but readily



distinguished by the achenes and finer leaves. The fineness and length of the leaves of the species is variable across its range. In most populations the leaves are fine and feathery, usually curving upwards. While in the south around Hermanus it appears to intergrade with *C. multiformis* and the leaves are quite broad and re-curved. Then in some mountainous regions the leaves are quite short, approaching the length of those of *C. tuberculata*. The achene is the key diagnostic character for this species, being broadly ovoid, dark blackish brown, with 12 or more prominent ribs, sometimes with a few interconnecting ribs. Both *C. multiformis* and *C. tuberculata* are resprouting species, a different habit to that of the reseeding *C. atrata*.

Cliffortia juniperina var. *brevifolia* is a problematic name in that the specimen that Harvey saw was almost certainly the one at Kew, which is *Ecklon & Zeyher 1750*. However, when he cited the locality, he used the locality cited for *Ecklon & Zeyher 1750*β, Winterberg above the Kat River. This is far outside of the range of *C. atrata* and is almost certainly *C. paucistaminea* var. *paucistaminea*. The use of the epithet 'brevifolia', shows that Harvey was clearly thinking about *Ecklon & Zeyher's* var. *β foliis brevioribus*. It would therefore be better to conclude that Harvey's citation of *Ecklon & Zeyher 1750* was a mistake for *Ecklon & Zeyher 1750*β, although it is questionable whether he ever saw material of the latter. Fortunately, the name itself is of little consequence in the correct nomenclature of either species.

Representative specimens

SOUTH AFRICA. **3219** (Wuppertal): S end of Teefontein farm, on plateau over Dasklip Pass, 10 Oct. 1966, (–CC), *Thompson 240* (NBG). **3318** (Cape Town): Table Mt., Oct. , (–CD), *Ecklon 193* (BM, K); Table Mt., plateau above Window Gorge, 2 Apr. 1935, (–CD), *Esterhuysen s.n.* (BOL); Cape Peninsula, Kirstenbosch, Table Mt. slopes, 460–610 m, Aug. 1935, (–CD), *Esterhuysen 298* (BOL); Cape Peninsula, Table Mt., slopes between Skeleton and Window gorges, 760 m, 3 Dec. 1944, (–CD), *Esterhuysen 11038* (BOL, K); Cape Peninsula, Table Mt., cliffs on W side, 460–610 m, 14 Jan. 1945, (–CD), *Esterhuysen 11386* (BOL); Cape Peninsula, Table Mt., S end of Apostles between Grootkop and Slangolie Butte, 760 m, 18 Nov. 1945, (–CD), *Esterhuysen 12288* (BOL); Cape Peninsula, Table Mt., 1000 m, 1 Oct. 1930, (–CD), *Fries, T.C.E., Norlindh & Weimarck 1569* (BM, K, PRE); Table Mt reservoir, 1 Jan. 1898, (–CD), *Frombling 537* (NBG); Cape Peninsula, S slope of Grootkop, 25 July 1943, (–CD), *Leighton 467* (BOL); Orange Kloof, sides of gorge, 490 m, 8 Dec. 1934, (–CD), *Levy's s.n.* (BOL); Table Mt., lower plateau, 610 m, 19 Nov. 1933, (–CD), *Levy's 4772* (BOL); Table Mt, top end of Fountain Ravine, 1000 m, 8 Oct. 1933, (–CD), *Marloth s.n.* (NBG); Cape Peninsula, Orange Kloof, 18 Oct. 1928, (–CD), *Salter 260/98* (BM); Cape Peninsula, Newlands Ravine, just above forest, 670 m, 16 June 1999, (–CD), *Whitehouse 35* (BOL, NBG); Cape Peninsula, Devil's Peak, Mowbray Ridge, 670 m, 8 Sept. 2000, (–CD), *Whitehouse 133* (BOL); Simonsberg, 915 m, 31 May 1943, (–DD), *Esterhuysen 8807* (BOL); Groot Drakenstein Mts, Devil's Tooth, summit and cliffs, 915–1190 m, 12 Dec. 1943, (–DD), *Esterhuysen 9541* (BOL); Simonsberg above Stellenbosch, in vicinity of cave near summit, 1370 m, 3 Oct. 1976, (–DD), *Taylor 9471* (K, NBG, PRE); Swartboskloof, 27 July 1961, (–DD), *van der Merwe 804* (K, PRE); Swartboskloof, 13 Oct. 1960, (–DD), *van Rensburg 2048* (K, PRE). **3319** (Worcester): mountains W of Cydo Pass, 27 Oct. 1928, (–AB), *Hutchinson 1020* (BOL); Zuurvlaakte Forest Reserve, Zevenfontein A, 9 June 1969, (–AC), *Stehle 222* (NBG); on mountains near Ceres, 550 m, Apr. 1885, (–AD), *Bolus s.n.* (BOL); Ceres Peak, slopes above Michell's Pass, 915 m, 24 May 1941, (–AD), *Esterhuysen 5194* (BOL, K, PRE); Waaihoek Mt., 1525 m, 15 Sept. 1943, (–AD), *Esterhuysen 8973* (BOL); Hex River Mts, Milner Peak, 17 Dec. 1948, (–AD), *Esterhuysen 14879a* (BOL, PRE); Ceres, gorge W of Ceres, 30 Sept. 1928, (–AD), *Hutchinson 606* (PRE); Milner Peak, halfway from vlakte to 3rd Shale Peak, 1675 m, 20 May 1982, (–AD), *Taylor 10374* (PRE); Hex River Mts, SE slopes above Sanddrift Kloof, 1065 m, 30 May 1949, (–BC), *Esterhuysen 15404* (BOL); Ceres–Matroosberg, W side, 1220–1525 m, 1 June 1958, (–BC), *Esterhuysen 27777* (BOL); Matroosberg, Spekrivierskloof, streambank, 1370 m, 27 Jan. 2001, (–BC), *Whitehouse 186* (BOL); Molenaarsberg, 460 m, 5 Oct. 1947, (–CA), *Compton 20113* (NBG); Du Toits Kloof, 1220–1525 m, 1839, (–CA), *Drege 6837a* (BM, K); Witteberg, 1525–1830 m, 9 Sept. 1943, (–CA), *Esterhuysen 8673* (BOL); Kromrivier Peak, 1220 m, 21 Nov. 1943, (–CA), *Esterhuysen 9444* (BOL); Molenaarsberg, summit, 1615 m, 5 Oct. 1947, (–CA), *Esterhuysen 14081* (BOL); Lower Wellington Sneeuwskop, 1525 m, 30 Dec. 1956, (–CA), *Esterhuysen 26918* (BOL); Limietberg, Bain's Kloof, 915 m, 2 Oct. 1958, (–CA), *Esterhuysen 27918* (BM, BOL); Du Toits Kloof, above Elands Kloof, 11 Jan. 1959, (–CA), *Esterhuysen 28111* (BM, BOL); Du Toit's Kloof, Kromme R, 23 Feb. 1987, (–CA), *Fellingham 1267* (NBG); Bain's Kloof, July 1940, (–CA), *Kies 23* (NBG); Bain's Kloof, 26 Sept. 1952, (–CA), *Leighton BK34* (BOL); Baviaans Kloof, off Bain's Kloof, 20 Oct. 1946, (–CA), *Leighton 2166* (BOL, PRE); Worcester, Bain's Kloof, 460 m, 14 Dec. 1935, (–CA), *Levy's 5095* (BOL); Wellington, Worcester side, Bain's Kloof, 460 m, 27 Oct. 1944, (–CA), *Levy's 7637* (BOL); Worcester, Bain's Kloof above waterfall in Baviaans Kloof, 15 Aug. 1966, (–CA), *Thompson 193* (K, NBG, PRE); Bain's Kloof, 23 Sept. 1959, (–CA), *White 5629* (PRE); Bain's Kloof, ridge above dam above Bain's Kloof village, 700 m, 2

Mar. 2000, (–CA), *Whitehouse 87* (BOL); Bain's Kloof village, 29 July 2001, (–CA), *Whitehouse 238* (BOL); Audenberg summit, 1675 m, 6 Oct. 1940, (–CB), *Esterhuysen 3446* (BOL); Franschoek, 29 Sept. 1936, (–CC), *Compton 5689* (NBG); Franschoek Forest Reserve, 28 Sept. 1935, (–CC), *Esterhuysen s.n.* (BOL); Wemmershoek Mts, 915–1220 m, 19 Oct. 1943, (–CC), *Esterhuysen 9093* (BOL); Haalhoek Sneeuwkop, 915–1220 m, 25 Dec. 1943, (–CC), *Esterhuysen 9577* (BOL); Winterberg, 1220–1525 m, 26 Dec. 1943, (–CC), *Esterhuysen 9665* (BOL); Wemmershoek Peak, 31 Dec. 1945, (–CC), *Esterhuysen 11288* (BOL); Berg R Hoek Forest Reserve, 16 Dec. 1945, (–CC), *Esterhuysen 12390* (BOL); Haalhoek Spitzkop, below summit, 1370 m, 2 Jan. 1947, (–CC), *Esterhuysen 13554* (BOL); Klein Drakenstein Mts, Upper Kasteelkloof Catchment Area, 610 m, 14 Sept. 1971, (–CC), *Kruger 1404a* (NBG, PRE); Franschoek Forest Reserve, 6 Aug. 1958, (–CC), *Lewis 5278* (NBG); Franschoek Pass, 22 Sept. 1946, (–CC), *Rehm STE 26665* (NBG); Wemmershoek Mts, Agter Tafelberg (Elandsvlakte), S of Mountain Club hut, valley bottom, 800 m, 20 Feb. 1999, (–CC), *Whitehouse 7* (BOL); Mont Rochelle Nature Reserve, path to Perdekop, 1380 m, 19 Oct. 2002, (–CC), *Whitehouse 320* (BOL); Riversonderend Mts, Caledon–Worcester boundary at Bobbejaanskop, Jonaskop Knife–Edge Summit Ridge, 1525 m, 9 Nov. 1965, (–CD), *Taylor 6579* (NBG, PRE); Blokkop, ridge to summit N of valley above Villiersdorp Wild Flower Garden, 915 m, 24 July 2001, (–CD), *Whitehouse 236* (BOL); Robertson, Poesjenets R, 1220 m, 12 Apr. 1936, (–DC), *Levy's 5476* (BOL); Jonaskop, middle NE area, Jonasplaats, 960 m, 29 Sept. 1993, (–DC), *Oliver 10391* (NBG). **3418** (Simonstown): Cape Peninsula, Clovelly, 24 Aug. 1941, (–AB), *Bond 1214* (NBG); Cape Peninsula, Clovelly, 16 Aug. 1942, (–AB), *Compton 13366* (NBG); Kalk Bay Mts, Boyes Drive, slopes above Boyes Drive, 6 Apr. 1974, (–AB), *Goldblatt 1414* (NBG, PRE); Muizenberg, 275 m, 13 Aug. 1933, (–AB), *Levy's 4721* (BOL); Kalk Bay, 365 m, 9 Sept. 1934, (–AB), *Levy's 4821* (BOL); Simonstown, Red Hill, 3 June 1940, (–AB), *Olivier 7266* (BOL); Muizenberg, 120 m, 7 Aug. 1892, (–AB), *Schlechter 1299* (BOL); Cape Peninsula, Swartkop, above Boulders Beach, cliffs on E side just below summit, 610 m, 2 Oct. 1999, (–AB), *Whitehouse 51* (BOL); Cape Peninsula, Cape Point, 28 Aug. 1944, (–AD), *Compton 15841* (NBG); Cape of Good Hope Nature Reserve, hills above Matroosdam at Olifantsbos, 50 m, 17 Oct. 1989, (–AD), *Greuter 21895* (PRE); Simonstown, Smitswinkel Bay, Rooihooft, 1 Dec. 1935, (–AD), *Levy's 5303* (BOL, PRE); Cape Peninsula, Cape Point Nature Reserve, plateau above Olifantsbos house, 5 Aug. 1978, (–AD), *Low 87* (NBG); Simonstown, Kanonkop, 150–240 m, 9 Dec. 1965, (–AD), *Taylor 6635* (NBG, PRE); Cape of Good Hope Nature Reserve, W side of Sirkelsvlei, 90 m, 28 Sept. 1972, (–AD), *Taylor 8226* (NBG, PRE); Hottentots Holland Mts, Landdrost Kop, W slope, 915 m, Dec. 1939, (–BB), *Esterhuysen 1994* (BOL); Steenbras Siding, 3 Aug. 1940, (–BB), *Esterhuysen 3029* (BOL); Hottentots Holland Mts, Langkloofberg, 30 Oct. 1943, (–BB), *Esterhuysen 9144* (BOL); around N end of Helderberg, E side near summit, 21 Sept. 1928, (–BB), *Gillett 652* (NBG); Sir Lowry's Pass, at top, 440 m, 24 Apr. 1974, (–BB), *Goldblatt 1678* (NBG, PRE); flats between Sir Lowry's Pass and Elgin, 19 Nov. 1944, (–BB), *Leighton 819* (BOL); Stellenbosch, Steenbras Dam, 305 m, 17 Nov. 1944, (–BB), *Levy's 11636* (BOL); Gordon's Bay, lower mountain slopes, July 1928, (–BB), *Loseby 2046* (NBG); Buffelstalberg, quarry S of Buffelstalberg, 150 m, 16 Sept. 1969, (–BD), *Boucher 648* (NBG, PRE); Kogelberg State Forest, NE slopes of Wynand Louws Kop, 490 m, 1 Feb. 1973, (–BD), *Boucher 2093a* (NBG); Rooiels, 12 Oct. 1947, (–BD), *Esterhuysen 14111* (BOL); S Hottentots Holland Mountains, Kogelberg State Forest, c. 400 m from S boundary gate, right on edge of road to Oudebos, 40 m, 4 Oct. 1992, (–BD), *Kruger 846* (NBG, PRE); S Hottentots Holland Mountains, Kogelberg State Forest, c. 3 km from 2nd house at Oudebos, at 2, 80 m, 3 Nov. 1992, (–BD), *Kruger 882* (NBG, PRE); Kogelberg State Forest, ± 35 m on other side of Stokoe Bridge, ± 150 m left of road to Highlands, nearly on top of hill, 100 m, 17 Aug. 1993, (–BD), *Kruger 1104* (NBG, PRE); Palmiet R mouth, 275 m, 12 Feb. 1937, (–BD), *Leighton 6011* (BOL); Caledon, Rooiels, 30 m, 2 Oct. 1955, (–BD), *Levy's 10365* (BOL); Kleinmond area, mouth of Palmiet R, dry rocky West slope above river, 19 Jan. 1994, (–BD), *Oliver 10420* (NBG, PRE); between Rooiels and Pringle Bay, 20 Aug. 1952, (–BD), *Parker 4781* (K, NBG, PRE); Betty's Bay, 6 Feb. 1962, (–BD), *van der Merwe 849* (NBG, PRE). **3419** (Caledon): Arieskraal, 2 Jan. 1945, (–AA), *Compton 16895* (NBG); Houwtech, S of Houwhoek, main neck, S of Uitkykpos, 475 m, 17 Sept. 1987, (–AA), *Fellingham 1348* (NBG); Jonkershoek, Dwarsberg, Victoria Peak, 1525 m, 1 Feb. 1967, (–AA), *Kerfoot 5746* (K, NBG, PRE); Stellenbosch, Jonkershoek, Dwarsberg, 1370 m, 2 Jan. 1968, (–AA), *Kerfoot 6206* (K, NBG, PRE); Lebanon, Catchment 2D, 760 m, June 1966, (–AA), *Kruger 74* (NBG, PRE); Jonkershoek, Dwarsberg, 1220 m, 13 Mar. 1967, (–AA), *Kruger 397* (K, PRE); Grabouw Lebanon State Forest, N of Look-out at Haasvlakte, 600 m, 21 Aug. 1987, (–AA), *Le Maitre 451* (NBG, PRE); Arieskraal, 30 Dec. 1944, (–AA), *Leighton 888* (BOL); Elgin, 365 m, 25 Sept. 1931, (–AA), *Leighton 3362* (BOL); Caledon, Nuweberg Forest Reserve, source of Palmiet R, 21 May 1969, (–AA), *Stehle 100* (NBG, PRE); Hermanus, 1 Oct. 1942, (–AC), *Barker 1840* (NBG); Kleinmond, July 1938, (–AC), *Esterhuysen 3854* (BOL, K); Kogelberg Reserve, Paardeberg, seaward side, 65 m, 13 Sept. 1962, (–AC), *Grobler 22215* (NBG, PRE); Hermanus, Fisherhaven commonare, 16 July 1996, (–AC), *Palmer 43* (NBG); on road from Hermanus to Stanford, ± 3 km, entrance to kloof, 23 Sept. 1938, (–AD), *Gillett 4385* (BOL, K, PRE); Vogelgat, 395 m, 8 Dec. 1977, (–AD), *Williams 2411* (K, NBG, PRE); Baviaans Kloof, near Genadendal, —, (–BA), *Burchell 7708* (K); Elands Kloof, 5 Aug. 1940, (–BD), *Esterhuysen 3083* (BOL); Baardskeerdersbos, 4 Sept. 1943, (–DA), *Compton 14749* (NBG). **3420** (Bredasdorp): N side of Potberg, 425 m, 13 Nov. 1962, (–BC), *Acoc's 23036* (K, NBG, PRE); De Hoop, Potberg Nature Reserve, Potberg Mt., middle S slopes just W of Boskloof, 260 m, 19 June 1979, (–BC), *Burgers 1946* (NBG, PRE); Potberg N, W end of Potberg, 45 miles from Bredasdorp, 150–610 m, 13 Nov. 1962, (–BC), *Taylor 4343* (NBG, PRE).

65. ***Cliffortia tuberculata*** (Harv.) Weim. in Botaniska Notiser 1933: 153, fig. 5a–d (1933) & 66, fig. 17A–G (1934); Fellingham: 614 (2000). *C. juniperina* var. *tuberculata* Harv.: 303 (1862). Type: Western Cape, Tulbagh District, Witsenberg, Zeyher s.n. (S, holo!).



C. laricina E.Mey. ex Drège: 80, 173 (1843) pro parte, nomen quoad Du Toits Kloof, Drège.

C. juniperina var. *brevior* sensu Drège: 649 (1847) pro parte, non Drège sensu stricto.

C. juniperina var. *muricata* Harv.: 303 (1862). *C. tuberculata* var. *muricata* (Harv.) Weim.: 67, fig. 17H (1934). Type: Western Cape, Worcester District, Du Toits Kloof, Drège 6839 (K, holo!; G, L, S, W, iso.).

Erect short to tall shrub, up to 2 m high, often dwarfed by habitat conditions, resprouting after fire from a central crown; densely divaricately branched, forming brachyblasts. *Young stems* 0.5–0.9 mm wide, tinged reddish, hairy; stem hairs adpressed upwards, 0.1–0.4 mm long. *Leaves* trifoliolate; leaflets needle-shaped, 3.5–10.0 × 0.3–0.7 mm; apex sharply long acuminate, 0.2–0.6 mm long; margins flat, minutely serrulate to scabrid; lamina chartaceous, 0.2–0.4 mm thick, curved upwards and towards the stem, glabrous above, glabrous beneath or rarely with a few scattered hairs up to 0.6 mm long on the midrib; sheath 0.9–1.4 mm long, abaxially glabrous, adaxially glabrous or with a few scattered adpressed hairs; stipules 1.2–1.9 mm long, free, margins smooth to serrulate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins serrate to very shortly ciliate; sepals 3, glabrous. *Male flowers* with bracteoles 1.7–1.8 mm long, glabrous; sepals broadly ovate, acute to acuminate at the apex; stamens 6, greenish white; anthers yellow. *Female flowers* with bracteoles 1.6–4.0 mm long, longer than immature receptacle; sepals ovate, 1.8–3.5 × 0.7–1.5 mm, recurved; carpel 1; stigma 2.2–4.2 mm long, red to greenish white, feathery, occasionally prominent above the leaves; immature receptacle 1.0–2.6 × 0.8–1.4 mm, glabrous, clearly ribbed. *Achene* ellipsoid, 2.4–3.1 × 1.2–1.7 mm, medium brown, glabrous; indistinctly 6-ribbed, ribs rounded, tubercles present; elaiosome swollen around base. *Flowering time*: September to December.

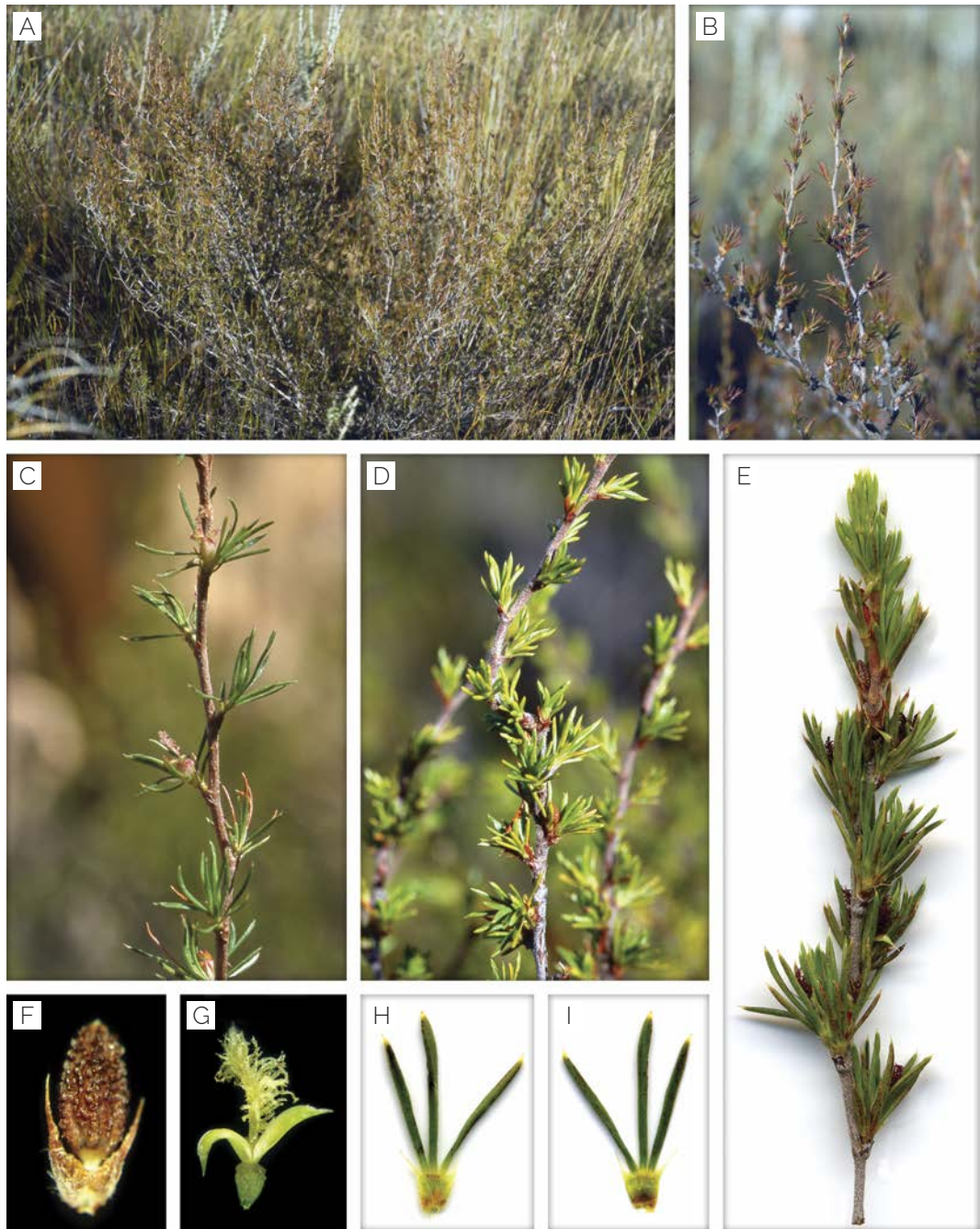
Habitat: Well-drained acid sands from Table Mountain Series in full sun or partial shade, usually growing in cracks between rocks; altitude 200–1950 m.

Distribution: Common at high altitudes through the interior mountains of the Western and Eastern Cape, from the Cederberg and Piketberg as far east as the Great Winterhoek Mountains near Uitenhage.

Conservation status: Common and widespread, especially at high altitudes; able to resprout after fire and at no risk. Red List status: LC.

Etymology: *tuberculata* (Latin) means ‘covered with wart-like projections’, referring to the surface of the achenes, a good diagnostic character for this needle-leaved species.

Notes: This common needle-leaved species is easy to recognise, when achenes are present, by the small warts scattered over the fruit. If not fruiting, a search through the leaf litter beneath the plant will often reveal some old achenes. The tubercles are present on the ovary of the flowers, but they are difficult to see without a strong lens and therefore an unreliable character. Without achenes the species is best distinguished by its resprouting habit from a central crown, which is usually evident by several stems produced from a central underground caudex and short needle-shaped leaves. It can best be distinguished from *Cliffortia atrata*, which is sympatric in the southwest of its range, by these two characters.



Cliffortia tuberculata: A & B, habitat; C & E, branch with female flower; D, branch with fruit; F, achene; G, female flower; H, dorsal view of leaf; I, ventral view of leaf.

In a large part of its range, it is the only needle-leaved trifoliate species occurring above 800 m with leaflets less than 10 mm long and 3 sepals.

Although most commonly found at high altitudes, it can sometimes be found below 500 m in mountainous areas, such as Tradouw Pass.

Harvey recognised two separate taxa as varieties of *Cliffortia juniperina*, var. *tuberculata* and var. *muricata*. In raising var. *tuberculata* to the rank of species, Weimarck (1934) included var. *muricata* here on account of its somewhat longer receptacles and smaller warts. In other characters he regarded the two as very similar. Considering the variability across the entire range of the taxon, there seems no benefit in maintaining these varieties. The isotype of var. *muricata*, Drège 6839 at S is a mixed collection with *C. atrata* according to Weimarck (1934). Drège 6837 collected in the same locality is also a mixed collection between the two species.

A putative hybrid with *Cliffortia neglecta* that resembles neither parent has been recorded in the Kammanassie Mountains and has been described as *C. × homunculi*.

Representative specimens

SOUTH AFRICA. **3218** (Clanwilliam): Zebra Kop, on summit, 1435 m, 13 Oct. 1963, (–DB), *Taylor 5304* (NBG, PRE); top of Versfelds Pass, N side of road, 5 Nov. 1934, (–DC), *Pillans 7161* (BOL, K, NBG). **3219** (Wuppertal): Cederberg Mts, Middelberg Plateau, 14 Dec. 1941, (–AC), *Compton 12713* (NBG); Grootberg, SW slopes, 1065 m, 21 Dec. 1940, (–CA), *Esterhuysen 4185* (BOL); Elandskloof, 1220 m, 16 Dec. 1935, (–CA), *Levyans 5145* (BOL); Cederberg, Apex–Breekrans–Hondverbrand Area, sheltered corridors in ‘Rock Citadel’ near summit, near summit of S Breekrans Twin, 1560 m, 17 Dec. 1983, (–CB), *Taylor 10846* (NBG, PRE); Cardouw Pass, 915 m, 4 Nov. 1951, (–CC), *Compton 23021* (NBG). **3318** (Cape Town): Stellenbosch, Jonkershoek, Langrivier, 760–915 m, 28 Jan. 1967, (–DD), *Kerfoot 5708* (NBG, PRE). **3319** (Worcester): on plateau of Twenty Four Rivers Mts, above Porterville, 22 Oct. 1949, (–AA), *Esterhuysen 16113* (BOL, NBG, PRE); Ceres–Swartgat Peak, Witzenberg, S slope, 1525 m, 2 Nov. 1958, (–AA), *Esterhuysen 27927* (BOL); Kli-phuisvlakte State Forest, near old homestead, 1280 m, 21 Oct. 1970, (–AA), *Kruger 1091* (NBG, PRE); Skurftberg, on farm Visgat, 1 km above second camp, TR312, 1250 m, 6 Nov. 1973, (–AA), *Taylor 8686* (NBG); Groot Winterhoek Peak, rocky ridge leading NW, 1940 m, 16 Nov. 1977, (–AA), *Taylor 9736* (NBG, PRE); Hansiesberg, 1830 m, 17 Dec. 1944, (–AB), *Compton 16730* (NBG); Gydo, 1675 m, 10 Nov. 1946, (–AB), *Compton 18741* (NBG); Gydo, 1675 m, 10 Nov. 1946, (–AB), *Compton 18754* (NBG); mountains W of Gydo Pass, Oct. 1928, (–AB), *Hutchinson 1020* (K); Gydoberg, 10 Nov. 1946, (–AB), *Leighton 2227* (BOL, PRE); Waboomsberg, SW of beacon, S slopes, 1720 m, 24 Nov. 1995, (–AD), *Beyers 256* (NBG); Michell’s Pass, Slab Peak, upper slopes, 5 Oct. 1941, (–AD), *Esterhuysen 6178* (BOL, PRE); Waaihoek Mt., 15 Dec. 1942, (–AD), *Esterhuysen 8286* (BOL); Mostertshoek Twins, 1525 m, Jan. 1944, (–AD), *Esterhuysen 9870* (BOL); cliffs on S slopes of Castle Rocks, 1065 m, 16 Nov. 1947, (–AD), *Esterhuysen 14158* (BOL); S slopes of Castle Rocks, 5 Dec. 1948, (–AD), *Esterhuysen 14699* (BOL, NBG); SW slopes of Michell’s Peak, 1525 m, 10 Dec. 1948, (–AD), *Esterhuysen 14782* (BOL, NBG); Milner Peak, 1525 m, 17 Dec. 1948, (–AD), *Esterhuysen 14877* (BOL); from Witels Kloof to Buffelshoek Peak, 1525 m, 8 Oct. 1956, (–AD), *Esterhuysen 26341* (BOL); gorge W of Ceres, 30 Sept. 1928, (–AD), *Hutchinson 567* (BOL, K, PRE); gorge W of Ceres, 30 Sept. 1928, (–AD), *Hutchinson 606* (BOL, K); Ceres, 610 m, 2 Oct. 1933, (–AD), *Levyans 4662* (BOL); SW side of Matroosberg, 1675 m, 2 Dec. 1947, (–BC), *Esterhuysen 14182* (BOL); Matroosberg, Ski Club hut, 1770 m, 1 June 1958, (–BC), *Esterhuysen 27786* (BOL); Waterkloof Gorge, Ceres, 30 Sept. 1928, (–BC), *Hutchinson 567* (BM); Du Toits Kloof, 610–915 m, (–CA), Drège ‘*C. laricina* E.M.’ b (BM, K); Du Toits Kloof, 1839, (–CA), Drège 6839 (K); Witte R valley, Happy Valley, 2 June 1946, (–CA), *Esterhuysen 12824* (BOL); Slanghoek Mts, on SW slopes of Witteberg, 915–1220 m, 13 Nov. 1949, (–CA), *Esterhuysen 16540* (BOL, NBG); Wellington, Bain’s Kloof, 460 m, 25 Oct. 1944, (–CA), *Levyans 7624* (BOL); Du Toits Kloof, 760 m, 27 Dec. 1947, (–CA), *Levyans 8788* (BOL); Du Toits Kloof tunnel, E side, 28 Oct. 1951, (–CA), *Maguire 1132* (NBG); Bain’s Kloof, 1220 m, 12 Nov. 1896, (–CA), *Schlechter 9115* (BOL, PRE); Fairy Glen, 760 m, 8 Nov. 1948, (–CB), *Acocks 15268* (K, PRE); Audensberg, 6 Oct. 1940, (–CB), *Compton 9773* (NBG); Audensberg, near summit, 1525 m, 6 Oct. 1940, (–CB), *Esterhuysen 3445* (BOL); Fonteintjesberg, SE slopes, 610–915 m, 26 Nov. 1944, (–CB), *Esterhuysen 10949* (BOL); Fonteintjesberg, SE slopes, 26 Nov. 1944, (–CB), *Esterhuysen 10965* (BOL); Waaihoek Mts, Jan Du Toits Kloof, 1220 m, 22 Jan. 1949, (–CB), *Esterhuysen 15083* (BOL, NBG); slopes of mountains E of Fonteintjesberg, 915–1220 m, 2 Jan. 1950, (–CB), *Esterhuysen 16704* (BOL); Wemmershoek, mountains S of

Wemmershoek Upper Part, slope of ?Jevaarlike Kloof, 1310 m, Jan. 1921, (–CC), *Andreae* 678 (NBG, PRE); Franschhoek Pass, Summit Parking Area, 730 m, 8 Oct. 1973, (–CC), *Boucher* 2284 (NBG, PRE); Haalhoek Sneeuwkop, 915–1220 m, 25 Dec. 1943, (–CC), *Esterhuysen* 9577 (BOL, PRE); Wemmershoek Peak, W slopes, 31 Dec. 1944, (–CC), *Esterhuysen* 11275 (BOL); Haalhoek Spitzkop, 2 Jan. 1947, (–CC), *Esterhuysen* 13507 (BOL); Franschhoek, top of pass, 4 Oct. 1931, (–CC), *Levy's* 3431 (BOL); Franschhoek Pass, 550 m, 14 Sept. 1947, (–CC), *Levy's* 8338 (BOL); Kasteelkloof, La Motte Forest Station, Zachariashoek, 670 m, 4 Nov. 1982, (–CC), *Viviers* 686 (NBG, PRE); Wemmershoek Mts, Agter Tafelberg (Elandsvlakte), S of Mountain Club hut, lower E facing slopes, 800 m, 20 Feb. 1999, (–CC), *Whitehouse* 6 (BOL, K, NBG); Franschhoek Pass, car park at summit of pass at start of path to Du Toit's Kop, 760 m, 9 Aug. 1999, (–CC), *Whitehouse* 48 (BOL, K, NBG); Stettynsberg, 915–1220 m, 16 Dec. 1944, (–CD), *Esterhuysen* 11072 (BOL); Ouhangsberg, slopes SE of beacon 152, 740 m, 7 Nov. 1992, (–CD), *Oliver* 10258 (NBG); Jonaskop, middle NE area, Jonasplaats, 960 m, 29 Sept. 1993, (–DC), *Oliver* 10392 (NBG). **3320** (Montagu): Laingsburg, Witteberg, Bantams, 1525 m, 27 Oct. 1941, (–BC), *Compton* 12198 (BOL, NBG); Witteberg, 1525 m, 21 Oct. 1942, (–BC), *Compton* 13980 (NBG); Laingsburg, Witteberg, 1525 m, 24 Oct. 1943, (–BC), *Compton* 15213 (NBG); Laingsburg, Witteberg, 1525 m, 10 Oct. 1944, (–BC), *Compton* 16266 (NBG); Witteberg, 24 Oct. 1943, (–BC), *Leighton* 212 (BOL); Witteberg, 24 Oct. 1943, (–BC), *Leighton* 219 (BOL); Langeberg Mts, Marloth Nature Reserve, towards W end of Langkuilen valley, approaching Misty Point, 1200 m, 22 Nov. 1989, (–CD), *McDonald* 1863 (NBG, PRE); Langeberg Mts, Swellendam State Forest, On NW side of Drosters Pass, Swellendam Hiking Trail, adjacent to, 1140 m, 13 Dec. 1990, (–CD), *McDonald* 1893 (NBG, PRE); Boosmansbos Wilderness Area, Vaalrivierkloof, where hiking trail crosses stream, 960 m, 10 Dec. 2000, (–DD), *Whitehouse* 170 (BOL). **3321** (Ladismith): S slopes of Swartberg Mts below Toverkop, 6 Sept. 1947, (–AC), *Esterhuysen* 14002 (BOL); Swartberg Mts, 1700 m, Jan. 2005, (–BC), *Helme* 3334 (NBG); Swartberg Pass, 13 km W from top of Swartberg Pass, 20 Nov. 1954, (–BD), *Stokoe s.n.* (NBG, PRE); Ladismith, Rooiberg, summit of Rooiberg Peak, trig. RO–RG54, above hut, 1490 m, 28 Oct. 1976, (–CB), *Taylor* 9488a (K, NBG, PRE); Garcia's Pass, 460 m, Oct. 1904, (–CC), *Bolus s.n.* (BOL); Mozambique Kop, summit of N spur, 975 m, 4 Aug. 1924, (–CC), *Muir* 3287 (PRE); Garcia's Pass, Sept. 1908, (–CC), *Phillips* 308 (K, NBG, PRE); Rooiberg, Teeboskop, kloof just W of Teeboskop, 915 m, 9 Nov. 1974, (–DA), *Oliver* 5341 (NBG, PRE); Gamkaberg Nature Reserve, rocky outcrop on N slopes W of Oukraal, 960 m, 16 Feb. 2001, (–DB), *Whitehouse* 193 (BOL). **3322** (Oudtshoorn): Swartberg Pass, summit, 1615 m, Dec. 1904, (–AC), *Bolus* 11480 (BOL, PRE); Swartberg Pass, S side, 1150 m, 7 Dec. 1976, (–AC), *Bond* 756 (NBG, PRE); Swartberg Pass, Prince Albert, N side, 1605 m, 1 Dec. 1977, (–AC), *Bond* 1250 (NBG, PRE); Swartberg Pass, Oudtshoorn side near summit, against rock face, 5 Nov. 1986, (–AC), *Fellingham* 1231 (NBG, PRE); Swartberg Pass, higher S slopes, 1280 m, 30 Nov. 1991, (–AC), *Fellingham & Vlok* 1595 (NBG); top of Swartberg Pass, 1525 m, 13 May 1961, (–AC), *Lewis* 5786 (NBG); 500 m E of Albertsberg, 1100 m, 11 Nov. 1976, (–AC), *Pienaar, W.de K.* 53 (NBG, PRE); Swartberg Pass, near the summit of Swartberg Pass, 1525 m, Dec. 1951, (–AC), *Stokoe s.n.* (NBG); Swartberg Pass, Dec. 1942, (–AC), *Stokoe* 8612 (BOL, K); top of Swartberg Pass, next to road, 1555 m, 26 Dec. 1984, (–AC), *Vlok* 878 (NBG, PRE); Swartberg Pass, S side, 1 km before picnic site, 1060 m, 20 Oct. 2000, (–AC), *Whitehouse* 158 (BOL); Mossel Bay, Ruiterskop, 1370 m, 26 Nov. 1949, (–CC), *Compton* 21823 (BOL, NBG); Mannetjiesberg, S slopes, 1525 m, 6 Nov. 1941, (–DB), *Esterhuysen* 6402 (BOL, PRE). **3323** (Willowmore): Aasvogelberg, S side, 1150 m, 18 Sept. 1923, (–AB), *Andreae* 956 (NBG, PRE); Slypsteenberg, S slopes, 1220 m, 3 Nov. 1941, (–AC), *Esterhuysen* 6306a (BOL); Uniondale at S foot of hill behind town, 8 Nov. 1949, (–CA), *Esterhuysen* 16418 (BOL); Haarlem, 26 Nov. 1941, (–CB), *Esterhuysen* 6926 (BOL); Kouga Mts, Saptoukop, S slopes, 1460 m, 16 Dec. 1991, (–DA), *Oliver* 9917 (NBG, PRE); Kouga Mts, top of Smutsberg, 1775 m, 4 May 1995, (–DB), *Euston–Brown* 446 (GRA). **3324** (Steytlerville): Rietvlei, 11 Nov. 1941, (–CD), *Esterhuysen* 6628 (BOL); Great Winterhoek Mts, Cockscomb, summit and summit ridge, 1675–1740 m, 2 Feb. 1958, (–DB), *Esterhuysen* 27534 (BOL, PRE). **3325** (Port Elizabeth): Great Winterhoek Mts, Groendal Wilderness Reserve, Krompoort Catchment Basin, Strydomsberg Farm, 960 m, 16 Dec. 1976, (–CA), *Scharf* 2040 (K, PRE); Great Winterhoek Mts, Coega Catchment Basin, Vermaakskop 237, 490 m, 24 Aug. 1976, (–CB), *Scharf* 1858 (GRA, K, PRE). **3420** (Bredasdorp): Swellendam, Buffelsjagsdam, Oct. 1975, (–BA), *van der Merwe* 2772 (PRE).

(66–68) **Section Acerosae** *C.M.Whitehouse* sect. nov. Type: *C. neglecta* Schltr.

Medium or sometimes low erect densely branched shrubs. Young stems with short upwardly adpressed hairs, forming brachyblasts. Sheath glabrous abaxially, glabrous or with a few scattered hairs adaxially and a fringe at the apex; stipules free, membranous, entire; petiole absent. Leaves unifoliate or trifoliate, glabrous, **often quite rigid; leaflets needle-shaped, sharply acuminate at the apex**, rarely just shortly acute, **margins usually entire**. Flowers solitary, in the axils of ordinary vegetative leaves. Bracteoles usually glabrous with entire to serrate margins; **sepals 3**, female ovate; filaments and anthers usually reddish; bracteoles longer than immature receptacle, receptacle glabrous; carpels 1. Achene ellipsoid, 6–12-ribbed, glabrous, brown to reddish brown.

The section includes three species, all from high altitudes and with needle-shaped, relatively tough leaves.

66. **Cliffortia neglecta** Schltr. in Botanische Jahrbücher 27: 141 (1900); Weim.: 139, fig. 41A–E (1934); Dahlgren: fig. 2C, 5G (1971); Fellingham: 615 (2000). Type: Ceres District, Koue Bokkeveld, Skurweberg, 1 585 m, 9 Sept. 1896, *Schlechter 8914* (B, holo.; BM!, BOL!, BR!, COL, G, GRA!, HBG, K!, L, P, PH!, PRE, S!, STU!, W!, WAG!, Z!).



Plant low to short shrub, up to 0.6 m high, resprouting after fire from a central crown; densely divaricately branched, forming brachyblasts. *Young stems* 0.8–1.2 mm wide, tinged reddish, hairy; stem hairs adpressed upwards, 0.2–0.5 mm long. *Leaves* unifoliate; single-veined from base, leaflets needle-shaped, 5.7–14.0 × 0.6–1.0 mm; apex pungent, 0.3–1.1 mm long; margins entire and smooth to scabrid, slightly turned upwards forming a shallow channel; lamina cartilaginous, 0.5–1.1 mm thick across midrib, curved upwards and towards the stem, glabrous; sheath 0.8–1.3 mm long, abaxially glabrous, adaxially glabrous except for fringe of hairs at apex; stipules 1.1–3.0 mm long, free, margins smooth to serrulate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy or glabrous on the keel, margins serrate to shortly ciliate; sepals 3, glabrous. *Male flowers* with sepals broadly ovate, acute to acuminate at the apex; stamens 8; filaments red; anthers brownish red. *Female flowers* with bracteoles 2.3–4.0 mm long, longer than immature receptacle; sepals ovate, 1.2–3.5 × 0.5–1.5 mm, recurved; carpel 1; stigma 3.2–4.1 mm long, red, feathery, hidden at the base of leaves; immature receptacle 1.4–2.3 × 0.7–1.1 mm, glabrous, clearly ribbed. *Achene* ellipsoid, 1.6–3.5 × 0.55–2.00 mm, medium brown, glabrous; 6–12-ribbed, ribs rounded to acute, 0.1–0.3 mm wide; elaiosome swollen around base. *Flowering time*: mainly August to November, occasionally female flowers found in other months.

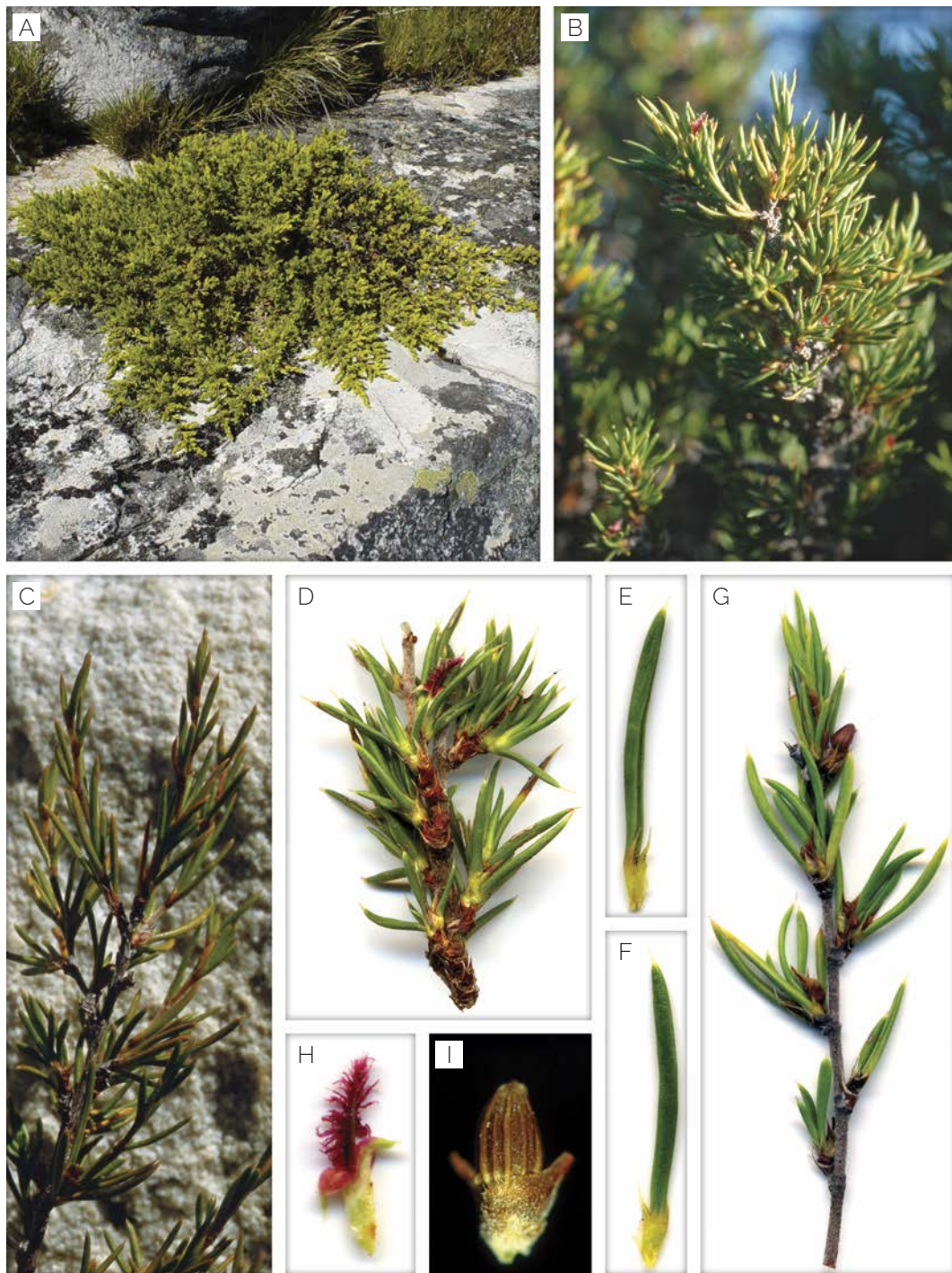
Habitat: Rock crevices and between boulders at high altitude on well-drained acid sands from Table Mountain Series in full sun; altitude 900–2 150 m.

Distribution: Common at high altitudes in the Western Cape mountains from the Cederberg to Wemmershoek and Jonaskop, absent from the Cape Peninsula, and extending east along the mountains of the Little Karoo, including the Swartberg and Kammanassie Mountains, to the Kouga Mountains in the Eastern Cape.

Conservation status. Widespread and common at high altitudes, resprouting after fire. Red List status: LC.

Etymology: *neglecta* (Latin) means ‘neglected’, presumably referring to the fact that this species had long been overlooked.

Notes: This species is an indicator of high altitude fynbos as it is rarely found below 1 000 m. It is immediately distinguished from most other high altitude needle-leaved species by its thick, sharp-pointed, unifoliate leaves. Confusion is likely with *Cliffortia pungens*, which has similar sharply pointed, unifoliate leaves, but the two species do not appear to be particularly closely related as is evident from the achenes of *C. pungens*, which are narrowly cylindrical, smooth and slightly curved. Those of *C. neglecta* are more broadly ovoid with six or more well-developed ribs. Vegetatively, the two species also differ as *C. pungens* has glabrous stems, whereas stems of *C. neglecta* are shortly hairy, and the leaves also curve strongly outwards in *C. pungens*, whereas in *C. neglecta* they are straight or curve upwards towards the stem. The ranges of the two species overlap, although *C. neglecta* is far more widespread, and they occupy different habitats. *Cliffortia pungens* occurs in open fynbos, often in large patches, as it is able to spread rhizomatically. In contrast *C. neglecta* is usually found in rock crevices, and although able to resprout, it does not appear to spread beyond the central crown.



A putative hybrid with *Cliffortia tuberculata* that resembles neither parent has been found in the Kammanassie Mountains and has been described as *C. × homunculi*. Likewise, *Whitehouse 312* from Groot Winterhoek Mountains looks rather like *C. juniperina*, but molecular analysis suggests that it might have been a cross between *C. neglecta* and *C. ruscifolia*.

Representative specimens

SOUTH AFRICA. **3219** (Wuppertal): Cederberg Mts, Krakadouwsberg, 1830 m, 22 Sept. 1942, (–AA), *Esterhuysen 8044* (BOL); Cederberg Mts, Sneekop Mt., 1370 m, 4 Oct. 1897, (–AC), *Bodkin s.n.* (BOL); Langberg, 15 Dec. 1941, (–AC), *Bond 1406* (NBG); Cederberg Mts, Langberg, 1525–1830 m, 15 Dec. 1941, (–AC), *Esterhuysen 7300* (BOL); Cederberg Mts, peak near Sneekop, 1830 m, 2 Jan. 1942, (–AC), *Esterhuysen 7563* (BOL); Cederberg Mts, summit of Tafelberg, 24 June 1942, (–AC), *Esterhuysen 7892* (BOL); Cederberg Mts, Tafelberg, 1830 m, 25 Sept. 1942, (–AC), *Esterhuysen 8096* (BOL); Cederberg, near Crystal Pool, 1370 m, 21 Sept. 1930, (–AC), *Levyms 2890* (BOL); Cederberg, Clanwilliam District, top of Sneekop, 1900 m, Oct. 1923, (–AC), *Pocock 205* (NBG, PRE); Elandskloof, summit of peak, N side, 3 Oct. 1940, (–CA), *Esterhuysen 3440* (BOL, NBG); Cederberg Forest Reserve, Sneeuwberg summit, 1830–2010 m, 1 Sept. 1963, (–CA), *Taylor 5092* (NBG, PRE); Cold Bokkeveld, Blaauwkop, 1525 m, 1 Oct. 1958, (–CB), *Esterhuysen 27914* (BOL); S Cederberg, Gideonskop, TR924, 1530 m, 27 Oct. 1986, (–CB), *Taylor 11645* (NBG); Ceres, Koue Bokkeveld, Skoongesig, 17 Sept. 1969, (–CC), *Hanekom 1230A* (K, K, NBG, PRE, PRE); Koue Bokkeveld, Skurweberg, 1585 m, 9 Sept. 1896, (–CC), *Schlechter 8914* (BM, BOL, K, PRE, WAG, Z); Bokkeveld Tafelberg, SE slopes, 1525 m, 26 Dec. 1942, (–CD), *Esterhuysen 8465* (BOL). **3318** (Cape Town): Groot Drakenstein Mts, Bullerskop, E of Bullerskop, SE. of pt. 4679' near top of peak near edge of precipice, 1370 m, 30 Oct. 1977, (–DD), *Taylor 9622* (NBG, PRE). **3319** (Worcester): Witzenberg, Swartgat Peak, near summit, 1675–1830 m, 2 Nov. 1958, (–AA), *Esterhuysen 27928* (BOL); Hansiesberg, E slopes, 1600 m, 9 Oct. 1975, (–AB), *Oliver 6048* (NBG); Waboomsberg, S and N, 1850 m, Dec. 1988, (–AD), *Cillie 2* (NBG); Hex River Mts, Milner Ridge Peak, 1830 m, 8 Dec. 1940, (–AD), *Esterhuysen 3984* (BOL); Waaihoek Mt., 1525 m, 1 Aug. 1943, (–AD), *Esterhuysen 8884* (BOL); Waaihoek Mt., SE slopes, 1525 m, 15 Sept. 1943, (–AD), *Esterhuysen 8969* (BOL); Mostertshoek Twins, 1525–1830 m, Jan. 1944, (–AD), *Esterhuysen 9869* (BOL); Ceres–Hex River Mts, Buffelshoek Peak, 1525 m, 8 Oct. 1956, (–AD), *Esterhuysen 26345* (BOL); Mostertshoek Twins, NW slopes of lower Twin, on rocky ridge towards summit, 1920 m, 4 Oct. 1981, (–AD), *Taylor 10325* (K, NBG, PRE); Baviaansberg, 1675 m, 2 Jan. 1942, (–BA), *Compton 12872* (NBG); Koue Bokkeveld, Baviaansberg, near summit, 1800 m, 5 Nov. 1989, (–BA), *Forsyth 510* (NBG); Hottentotskloof, 1190 m, 17 Sept. 1965, (–BC), *Acocks 23760* (PRE); Matroosberg, SE slopes, 1525 m, 4 Apr. 1958, (–BC), *Esterhuysen 27662* (BOL); Sonklip, N of Matroosberg, near summit, 2010 m, 5 Apr. 1958, (–BC), *Esterhuysen 27675* (BOL); Ceres–Matroosberg, W side, 1 June 1958, (–BC), *Esterhuysen 27785* (BOL, BOL); Matroosberg, SE slope, 1525 m, 13 Nov. 1960, (–BC), *Esterhuysen 28621* (BOL); Matroosberg, 1830 m, Sept. 1924, (–BC), *Levyms 969* (BOL); Hex R Mts, N slopes of Rooiberg, Conical Peak, 19 Aug. 1999, (–BC), *Oliver & Oliver 11307* (NBG); Witteberg, summit, 1830 m, 9 Mar. 1958, (–CA), *Esterhuysen 27619* (BOL); Audensberg, 1675 m, 6 Oct. 1940, (–CB), *Compton 9775* (NBG); Audenberg summit, 1675 m, 29 Sept. 1940, (–CB), *Esterhuysen 3444* (BOL); Brandwacht Peak, 1810 m, 26 Nov. 1944, (–CB), *Esterhuysen 10988* (BOL); Du Toits Peak, NW slopes, 1525–1830 m, 26 Jan. 1943, (–CC), *Esterhuysen 8590* (BOL); Wemmershoek Mts, 915–1220 m, 19 Oct. 1943, (–CC), *Esterhuysen 9088* (BOL); Wemmershoek Peak, summit, 1830 m, 31 Dec. 1944, (–CC), *Esterhuysen 11285* (BOL); Wemmershoek Mts, on top of Winterberg, 1500 m, 20 Feb. 1999, (–CC), *Whitehouse 13* (BOL, NBG); Stettynsberg summit, 1800 m, 16 Dec. 1944, (–CD), *Esterhuysen 11081* (BOL); Keeromsberg, S side, 1525–1830 m, 22 Nov. 1956, (–DA), *Esterhuysen s.n.* (BOL); Keeromsberg, S side, 1525–1830 m, 8 Nov. 1943, (–DA), *Esterhuysen 9261* (BOL); Moedverloreberg, N slopes, 1350 m, June 2003, (–DB), *Helme* (BOL). **3320** (Montagu): Witteberg, Whitehill, 1525 m, 21 Oct. 1942, (–BC), *Compton 13963* (NBG); Anysberg East, SSE of Goedehoop, summit, next to jeep track., 1220 m, 10 Aug. 1991, (–BC), *Fellingham 1535* (NBG); Anysberg Nature Reserve, Wolfhuiskloof summit, highest point on Anysberg, 1620 m, 10 Aug. 1993, (–DA), *Victor 100* (BOL, PRE); Anysberg Nature Reserve, Wolfhuiskloof summit, highest point on Anysberg, 1620 m, 10 Aug. 1993, (–DA), *Victor 104* (PRE); Touwsberg, mid N slopes SW of Miskraal, 1190 m, 6 Oct. 1993, (–DB), *Oliver 10363* (NBG). **3321** (Ladismith): Radio tower track E of Klein Swartberg, radio tower ridge, 1920 m, 14 Oct. 1980, (–AD), *Bond 1785* (NBG, PRE); Klein Swartberg at Besemfontein,

Cliffortia neglecta: A, habitat; B & D, branch with female flowers; C, branch; E, dorsal view of leaf; F, ventral view of leaf; G, branch with achenes; H, female flower; I, achene.

mountains just E of Seven Weeks Poort, 1950 m, 22 Sept. 1990, (–AD), *Oliver 9683a* (NBG, NBG, PRE, PRE); Swartberg just E of Seven Weeks Poort, above Rocklands, 1860 m, 7 Oct. 1993, (–AD), *Oliver 10377* (NBG, PRE); Prince Albert, Seven Weeks Poort Mt., 2100 m, Dec. 1928, (–AD), *Stokoe 1760* (PRE); Besemfontein, Klipkraal Trail, jeep track to radio mast, 1500 m, 8 Apr. 2000, (–AD), *Whitehouse 104* (BOL); Ladismith, N side of Seven Weeks Poort Mt, 1980 m, 21 Aug. 1956, (–AD), *Wurts 1471* (NBG); Swartberg Pass, 13 km W from top of Swartberg Pass, 1525 m, 20 Nov. 1954, (–BD), *Stokoe SAM 59202* (PRE). **3322** (Oudtshoorn): high mountain crest E of Swartberg Pass, 1865 m, 10 Nov. 1977, (–AC), *Bond 1169* (PRE); Swartberg Pass, near the summit of Swartberg Pass, 1525 m, Dec. 1951, (–AC), *Stokoe SAM 59202* (PRE); Swartberg Pass area, Dec. 1943, (–AC), *Stokoe 9051* (BOL); Swartberg, E of top of pass, S-facing slope, Bothashoek area, 1830 m, 30 Sept. 1971, (–AC), *Thompson 1314* (NBG); Great Swartberg, path from Die Hoek to Gouekrans Hut, 1700 m, 20 Mar. 1999, (–AC), *Whitehouse 28* (BOL, NBG); Swartberg, De Aap area, N foothills of Swartberg, S-facing slope, 1065 m, 18 Dec. 1984, (–AD), *Vlok 870* (NBG, PRE); Blesberg, E of Meiringspoort, 1830 m, 5 Nov. 1978, (–BC), *Bond 1609* (NBG, PRE); E Swartberg, Blesberg, near summit, steep N slope, rock face next to track, 2075 m, 29 Nov. 1991, (–BC), *Fellingham & Vlok 1587* (NBG, PRE); Swartberg Nature Reserve, slopes to NE of Blesberg, by jeep track near gate, 1340 m, 19 Feb. 2001, (–BD), *Whitehouse 202* (BOL); Kammanassie Mts, Mannetjiesberg, 1 Feb. 1941, (–DB), *Esterhuysen 4723* (BOL); Mannetjiesberg, S slopes, 1525 m, 5 Nov. 1941, (–DB), *Esterhuysen 6409a* (BOL, BOL); S Cape, Mannetjiesberg Peak, N slopes near summit, 1890 m, 2 Oct. 1971, (–DB), *Thompson 1357* (NBG, PRE). **3323** (Willowmore): Kouga Mts, Saptoukop, S-facing slopes, 1580 m, 16 Dec. 1991, (–DA), *Oliver 9924* (NBG, PRE); Kouga Mts, peak E of Smutsberg, summit, 1525 m, 27 Nov. 1941, (–DB), *Esterhuysen 7015* (BOL).

67. **Cliffortia robusta** Weim. in Botaniska Notiser 90: 182, fig. 5d-h, t. 6 (1948); Dahlgren: fig. 2A (1971); Fellingham: 615 (2000). Type: Swartberg Pass, Dec. 1943, *Stokoe 9046* (BOL, holo!).



Low to medium shrub, up to 1.2 m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 1.1–1.7 mm wide, tinged reddish, hairy on one side only; stem hairs adpressed upwards, 0.3–0.5 mm long. *Leaves* trifoliolate; leaflets needle-shaped, 11.5–17.0 × 0.9–1.5 mm; apex pungent, 0.2–0.5 mm long; margins rounded, smooth to scabrid; lamina cartilaginous, 0.6–0.9 mm thick, curved upwards and towards the stem, glabrous; sheath 1.5–3.2 mm long, abaxially glabrous, adaxially glabrous except for fringe of hairs at apex; stipules 1.3–2.8 mm long, free, margins smooth to serrulate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on the keel, margins smooth to serrate; sepals 3, glabrous. *Male flowers* with bracteoles 4.6–7.3 mm long; pedicel 0.8–2.2 mm long; sepals broadly ovate, 6.3–9.2 × 2.6–4.4 mm, acute to acuminate at the apex; stamens 13–15; filaments 4.8–7.0 mm long, greenish white or occasionally red; anthers yellow or occasionally slightly reddish. *Female flowers* with bracteoles 5.3–7.6 mm long, longer than immature receptacle; sepals ovate, 3.2–4.7 × 0.9–1.5 mm, erect becoming recurved; carpel 1; stigma 3.9–6.4 mm long, red or greenish white, feathery, hidden at the base of leaves; immature receptacle 1.7–2.5 × 0.7–1.2 mm, glabrous, clearly ribbed. *Achene* ellipsoid, 2.6–3.2 × 1.0–1.2 mm, medium brown, glabrous; 12-ribbed, ribs rounded to acute, 0.1–0.2 mm wide. *Flowering time*: October to February.

Habitat: Amongst sandstone rocks protected from fire on south-facing slopes near the summits of peaks; altitude 1 500–2 100 m.

Distribution: Along the high ridge of the Swartberg Mountains between Towerkop and Blesberg, with an outlying population in the Kammanassie Mountains on Mannetjiesberg.

Conservation status: Only recorded from near the summits of four peaks, but probably more widespread as the peaks in between are poorly explored; mostly in areas protected from fire so is not particularly threatened by too frequent fires. Red List status: LC.

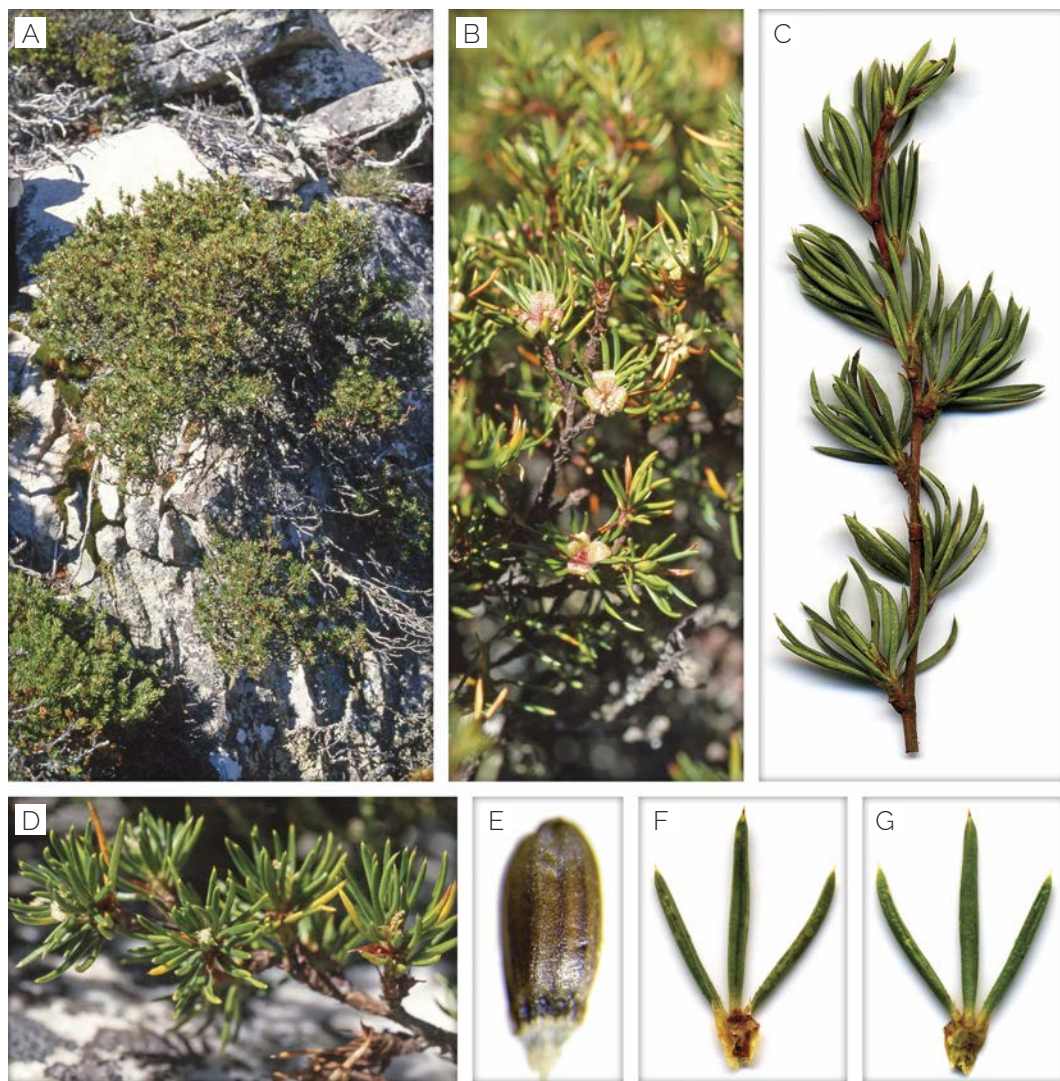
Etymology: *robusta* (Latin) means 'robust', referring to the tough, thick leaves.

Notes: *Cliffortia robusta* has the largest thickest leaves of all the needle-leaved species, and only *C. burchellii* has longer leaves, but they are much finer (<1 mm wide). *Cliffortia robusta* is confined to rocky outcrops along the ridges of the Swartberg and the Kammanassie Mountains, the latter the only place where the range overlaps with *C. burchellii*. *Cliffortia incana* and *C. hirta* also have long leaves, but they are hairy and are restricted to coastal lowlands. *Cliffortia neglecta* occurs in the same habitats and areas as *C. robusta* and may be confused with it as they both have rather stout, thick, sharply pointed glabrous leaves. Careful examination of the individual leaves will reveal whether the plant is unifoliolate (*C. neglecta*) or trifoliolate (*C. robusta*).

Representative specimens

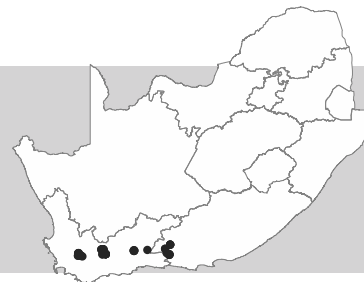
SOUTH AFRICA. 3321 (Ladismith): Swartberg Mts near Ladismith, below Toverkop, 1980 m, 23 Apr. 1951, (–AC), *Esterhuysen 18527* (BOL); Swartberg, Toverkop, 1675–1920 m, 17 Dec. 1956, (–AC), *Esterhuysen 26804* (BOL); Swartberg Mts, 1800 m, Jan. 2005, (–BC), *Helme 3333* (NBG). 3322 (Oudtshoorn): Swartberg Pass, 1830 m, 25 Jan. 1941, (–AC), *Bond 867* (NBG); Swartberg Pass, 1705 m, 10 Nov. 1977, (–AC), *Bond 1164* (NBG, PRE); Swartberg Pass, 1830 m, 25 Jan. 1941, (–AC), *Esterhuysen 4561* (BOL); Swartberg, summits E of top of the pass, 1830 m, 29 Jan. 1961, (–AC), *Esterhuysen 28824* (BOL); Swartberg, on rocky peak near top of pass, 1675 m, 2 June 1962, (–AC), *Esterhuysen 29578* (BOL); Swartberg Pass area, Dec. 1943, (–AC), *Stokoe 9046* (BOL); Swartberg Mountains, on top of peak in rocky outcrop, just W of crest of Swartberg Pass, 1900 m, 16 Dec. 1988,

(–AC), *Vlok 2066* (NBC, PRE); Swartberg Mts, peak between Waboornsberg and Swartberg Pass, N summit, 1900 m, 20 Oct. 2000, (–AC), *Whitehouse 159* (BOL); E Swartberg, Blesberg, near summit, S aspect, 2085 m, 29 Nov. 1991, (–BC), *Fellingham & Vlok 1586* (NBC); Swartberg, main peak in ridge E of Blesberg, 2010 m, 6 Jan. 1975, (–BC), *Thompson 2239* (NBC, PRE); Kammanassie Mts, Mannetjiesberg, 1525–1830 m, 1 Feb. 1941, (–DB), *Esterhuysen 4743* (BOL); Mannetjiesberg, S slopes, 1525 m, 5 Nov. 1941, (–DB), *Esterhuysen 6409* (BOL, K, PRE); Kammanassie Mts, S slopes of the Mannetjiesberg, 1525–1830 m, 8 Mar. 1951, (–DB), *Esterhuysen 18378* (BOL, PRE); Kammanassie Nature Reserve, S-facing rocky outcrops, W of summit of Mannetjiesberg, 1600 m, 17 Feb. 2001, (–DB), *Whitehouse 198* (BOL).



Cliffortia robusta: A, habitat; B, branch with male flowers; C, branch; D, branch with female flowers; E, achene; F, dorsal view of leaf; G, ventral view of leaf.

68. **Cliffortia castanea** Weim. in Botaniska Notiser 90: 181, fig. 5a–c, t. 6 (1948); Fellingham: 614 (2000). Type: Laingsburg District, Witteberg, 1 525 m, 24 Dec. 1943, *Compton 15212* (NBG, holo.). [Weimarck cited a duplicate at BOL, evidently in error as no such specimen has been found there. However, the collection *Leighton 215* was collected at the same locality on the same day.]



Medium erect shrub, up to 1.5 m high, killed by fire; densely divaricately branched, forming brachy-blasts. *Young stems* 0.6–1.1 mm wide, tinged reddish, hairy; stem hairs adpressed upwards, 0.1–0.4 mm long. *Leaves* trifoliate; leaflets needle-shaped, leaflet 3.9–9.0 × 0.4–1.1 mm; apex mucronate to acuminate, up to 0.5 mm long; margins rounded, smooth, chartaceous, 0.4–0.7 mm thick, curved upwards and towards the stem, glabrous above; sheath 0.6–1.5 mm long, abaxially glabrous, adaxially glabrous or with a few scattered adpressed hairs; stipules 0.5–1.4 mm long, free, margins smooth to serrulate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous or hairy on the keel, margins smooth to serrate; sepals 3, glabrous. *Male flowers* with bracteoles 2.4–3.5 mm long; pedicel 0.5–0.9 mm long; sepals broadly ovate, 5.0–6.6 × 2.2–2.6 mm, acute to acuminate at the apex; stamens 8–10; filaments 4.3–5.2 mm long, red; anthers brownish red. *Female flowers* with bracteoles 1.8–3.4 mm long, longer than immature receptacle; sepals ovate, 1.7–3.0 × 0.5–1.0 mm, recurved; carpel 1; stigma 2.7–4.5 mm long, red or rarely pinkish white, feathery, prominent above leaves; immature receptacle 1.0–1.5 × 0.5–0.7 mm, glabrous, smooth. *Achene* cylindrical, 2.1–3.7 × 0.8–1.1 mm, sometimes slightly curved, reddish brown, glabrous; 6–7-ribbed, ribs rounded, up to 0.2 mm wide. *Flowering time*: June to October, male flowers found only once in March.

Habitat: South-facing slopes and kloofs on well-drained clayish soil from shale bands of the Witteberg Series; altitude 1 000–1 900 m.

Distribution: Extending from the Hex River Mountains across the Witteberg and Swartberg, including Little Karoo mountains, east to Baviaanskloof.

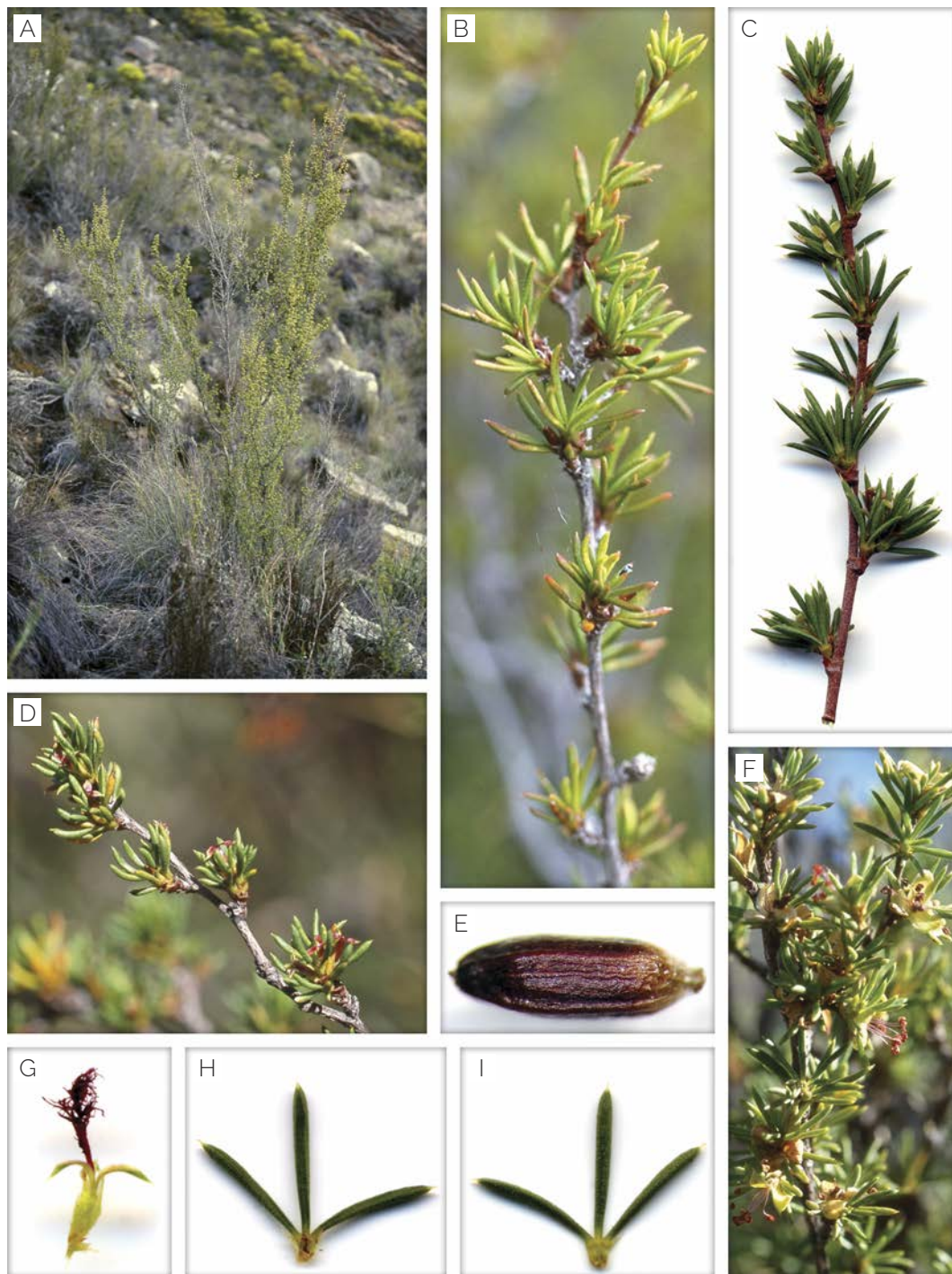
Conservation status: Evidently not common but probably overlooked: growing at high altitudes in remote areas it is not threatened. Red List status: LC.

Etymology: *castanea* (Latin) means ‘chestnut coloured’, referring to the shiny reddish brown colour of the achenes.

Notes: This species is scattered through the high arid mountain ranges of interior Western Cape and western Eastern Cape. It is usually found on shale bands, with slightly richer or moister soil. It is easily overlooked, as it resembles other needle-leaved species that grow in the area. The species is hard to identify without achenes, although these can often be found in the surrounding leaf litter. The achenes are cylindrical and only lightly ribbed, whereas superficially similar *Cliffortia atrata*, *C. pterocarpa* and *C. tuberculata* have ovoid achenes that are prominently ribbed or warty. The fresh achenes are also a shiny brown colour, the feature from which the specific epithet is derived. Without fruit, the leaves can be distinguished from other needle-leaved species by the leaflets being nearly cylindrical in shape and slightly curved upwards and diverging from one another. In this respect it is similar to *C. teretifolia*, but that species has glabrous, not shortly hairy stems.

Representative specimens

SOUTH AFRICA. **3319** (Worcester): Hex River Mts, E side of Milner Peak, 1370 m, 18 Dec. 1948, (–AD), *Esterhuysen 14864* (BOL); Hex River Mts, Milner Peak, S side, 1525 m, 4 Jan. 1959, (–AD), *Esterhuysen 28094* (BOL); Audenberg



Ridge Peak, on S side, 1465 m, 4 Feb. 1962, (–CB), *Esterhuysen 29463* (BOL, K); Robertson–Saw–Edge Peak, 1525 m, 17 Apr. 1954, (–DA), *Esterhuysen 22845* (BOL); Keeromsberg, gully on S side between Keeromsberg and Ben Heatlie, 1675 m, 22 Mar. 1958, (–DA), *Esterhuysen 27641* (BOL, K); Tygerberg, Keeromsberg group, S side, 1890 m, 1 Feb. 1959, (–DA), *Esterhuysen 28168* (BOL). **3320** (Montagu): Witteberg, 1525 m, 24 Oct. 1943, (–BC), *Compton 15212* (NBG); Witteberg, S slope, Whitehill section, 1465 m, 7 Nov. 1948, (–BC), *Compton 21123* (NBG); Witteberg, S slopes, 1370 m, 11 Apr. 1966, (–BC), *Esterhuysen 31506* (BOL, K); Anysberg East, SSE of Goedeheop, summit, next to jeep track., 1220 m, 10 Aug. 1991, (–BC), *Fellingham 1536* (NBG, PRE); E Anysberg, summit, next to jeep track, at sharp bend to W, 1250 m, 10 Aug. 1991, (–BC), *Fellingham 1538* (NBG); Witteberg, 24 Oct. 1943, (–BC), *Leighton 215* (BOL); Anysberg, E end of Anysberg, W of Ladismith, 5 Oct. 1982, (–BC), *van Wyk 1006* (NBG, PRE); Ladismith, E end of Anysberg, 6 Oct. 1982, (–BC), *van Zyl 3375* (PRE); Anysberg Nature Reserve, highest plateau on E end of Anysberg, 1600 m, 10 Aug. 1993, (–BC), *Victor 114* (BOL, PRE); Witteberg, S slopes, ravine above Nooitgedacht, 1280 m, 1 June 2000, (–BC), *Whitehouse 124* (BOL, NBG); Anysberg Nature Reserve, rocky outcrop near summit at E end of mountain, 1310 m, 22 Feb. 2001, (–BC), *Whitehouse 209* (BOL). **3322** (Oudtshoorn): Swartberg Mts, gully N of Platberg, above Scholtzkloof, 1200 m, 21 Oct. 2000, (–AC), *Whitehouse 161* (BOL, NBG); Droëkloofberg, Vrolikheid farm, S slopes just beneath ridge, 1220 m, 21 Feb. 2001, (–BC), *Whitehouse 206* (BOL). **3323** (Willowmore): Blydeberg, plateau W of beacon, 1220 m, 18 Sept. 1923, (–AB), *Andreae 976* (NBG, PRE); Witteberg, peak N of Worlds View Farm, 1220 m, 4 July 1987, (–BA), *Viviers & Vlok 210* (PRE); Witteberg, peak N of Worlds View Farm, 1370 m, 4 July 1987, (–BA), *Viviers & Vlok 212* (PRE); Witteberg, peak N of Worlds View Farm, S-facing slope, 1310 m, 26 July 1986, (–BA), *Vlok 1532* (NBG, PRE); Antoniesberg, lower E slopes, 19 Oct. 1955, (–BC), *Esterhuysen 24942* (BOL); Baviaanskloof, Willowmore end, Adamskraal, on edge of plateau above Nuwekloof, 1035 m, 10 Mar. 2000, (–DA), *Whitehouse 90* (BOL, NBG).

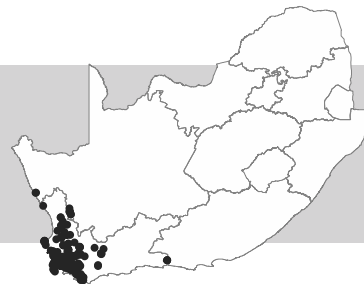
(69–70) **Section Tenuifoliae** DC. in Annales des Sciences Naturelles 1: 449 (1824) & 596 (1825). Type species, designated here: *C. juniperina* L.f.

Section *Hermaphroditicae* Weim.: 171 (1948). Type: *C. hermaphroditica* Weim. (= *C. juniperina* L.f.)

Low to medium densely branched shrubs. Young stems glabrous or with very short hairs, **usually minutely tuberculate**, forming brachyblasts. Sheath glabrous both abaxially and adaxially; stipules membranous, free, entire to serrulate; petiole absent. Leaves trifoliolate, glabrous, **minutely tuberculate beneath**; leaflets needle-shaped, apex acute to sharply acuminate, margins minutely serrulate. Flowers solitary, in the axils of ordinary vegetative leaves. Bracteole glabrous with a serrate or shortly ciliate margin, longer than immature receptacle; sepals 3, glabrous, female erect; **stamens many, 20–25**; receptacle distinctly ribbed, glabrous; carpels 1; stigma red. Achene ribbed, glabrous, brown.

The central species of this section, *Cliffortia juniperina*, is relatively distinct in its typical form with its tuberculate stems and leaves, many stamens, unusual for a needle-leaved species, and rugose achenes. It is a variable species with several forms, one of which is here recognised as *C. pilosula*. Some of the remaining forms may represent taxonomic entities or introgressed hybrids with other species. None of these can be recognised without further study.

69. **Cliffortia juniperina** L.f., Supplementum Plantarum: 430 (1782); DC.: 596 (1825); G.Don: 596 (1832); Harv.: 302 (1862) pro parte; Bolus & Wolley-Dod: 260 (1904); Weim.: 57, fig. 14A–E (1934); Levyns: 446 (1950); Fellingham: 615 (2000). Type: South Africa, without precise locality, *Sparrman s.n.* (LINN, holo.).



C. ericifolia sensu Meisn.: 528 (1843), non L.f.

C. filifolia sensu Harv.: 303 (1862) pro parte, non L.f.

C. teretifolia sensu Harv.: 304 (1862); Bolus & Wolley-Dod: 260 (1904) pro parte, non L.f.

? *C. hermaphroditica* Weim.: 172, fig. 2a–c, t. 4 (1948). Type: Stellenbosch District, Jonkershoek, 4 Nov. 1943, Compton 15332 (NBG, holo.).

C. juniperina L.f. var. *pilosula* sensu Weim.: 180 (1948) pro parte, non Weim. sensu stricto.

Low, slightly sprawling, to medium erect shrub, up to 1.5 m high, resprouting after fire from a central crown; lower branches often spread along ground before ascending, densely divaricately branched, forming brachyblasts. *Young stems* 0.8–1.6 mm wide, tinged reddish, glabrous or very shortly hairy with the bases of the hairs slightly swollen; stem hairs adpressed upwards to spreading, up to 0.2 mm long; older stems minutely tuberculate. *Leaves* trifoliate; leaflets needle-shaped, 3.6–8.4 × 0.5–1.0 mm; apex acute to mucronate, 0.1–0.3 mm long; margins rounded, minutely serrulate to scabrid; lamina chartaceous, 0.4–0.7 mm thick, midrib prominent beneath, ± straight to slightly curved, glabrous, leaf underside with minute raised tubercles; sheath 1.1–1.9 mm long, abaxially glabrous, adaxially glabrous except sometimes for fringe of hairs at apex; stipules 0.5–1.9 mm long, free, margins smooth to serrulate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on the keel, margins serrate; sepals 3, glabrous. *Male flowers* with bracteoles 1.9–2.8 mm long; pedicel 0.6–0.9 mm long; sepals broadly ovate, 4.6–6.3 × 2.3–3.6 mm, acute to acuminate at the apex; stamens 20–25; filaments 2.5–3.6 mm long, red or greenish white; anthers brownish red or yellow. *Female flowers* with bracteoles 2.0–3.7 mm long, longer than immature receptacle; sepals narrowly ovate to linear, 1.5–2.3 × 0.3–0.9 mm, erect; carpel 1 or sometimes more but not consistently so; stigma 1.7–3.8 mm long, red, feathery, prominent above sepals but slightly hidden by the leaves; immature receptacle 1.1–2.3 × 0.6–1.5 mm, glabrous, clearly ribbed. *Achene* broadly ellipsoid to cylindrical, 3.6–5.0 × 1.6–2.2 mm, pale to medium brown, glabrous; 6(–11)-ribbed, ribs rounded, 0.1–0.5 mm wide, transversely rugose between ribs; elaiosome swollen around base. *Flowering time*: throughout the year.

Habitat: Well-drained clayish soils in full sun, often at low altitudes, establishes easily in recently disturbed areas such as old fields and roadsides; altitude 0–1 200 m.

Distribution: Widespread along coastal hills and plains and interior mountains from Nieuwoudtville to Bredasdorp, spreading east inland as far as the Anysberg and Witteberg; outlying populations have been recorded near the coast in Namaqualand and near Louterwater in the Langkloof.

Conservation status: A widespread species and despite its preference for clayish soils often used for farming, it is capable of persisting on road verges, thus not threatened. Red List status: LC.

Etymology: *juniperina* (Latin) means 'like a juniper', presumably referring to the slight resemblance of this needle-leaved species.

Notes: Early uses of the name circumscribed *Cliffortia juniperina* broadly. This is evident from the number of other species (e.g. *C. atrata*, *C. paucistaminea*, *C. tuberculata*), which were first recognised as varieties of *C. juniperina* and early collections that included more than one species under the name.

Typical forms of *C. juniperina* are easily identified by their achenes, which are diagnostic on account of their six broad, widely spaced ribs, with transverse rugose patterning in between. Plants with male flowers are also very distinctive on account of the large number of stamens, unusual in a needle-leaved species. Unfortunately, male flowers are comparatively rare except in the north of its range.

Identification is more difficult with the atypical forms, which often have more ribs on the achene, these more sharply angled and closer together, thus lacking the distinctive ornamentation in between. These have often been identified as *Cliffortia pterocarpa* in the past and it seems possible that these specimens represent introgressed hybrids with other species. They can, nevertheless, still be identified by their small female flowers with erect sepals and the stigma rarely reaching far beyond the end of the sepals, as well as the minutely tuberculate leaves and older stems.

There is at least some evidence of hybridisation in *Cliffortia juniperina*. *Whitehouse 61* from Swartuggen Mountains looked like a very robust form of *C. juniperina*. It resolves as sister to *C. juniperina* for the nuclear-based phylogeny (Fig. 1), but as sister to *C. ruscifolia* in the plastid-based phylogeny (Fig. 2).

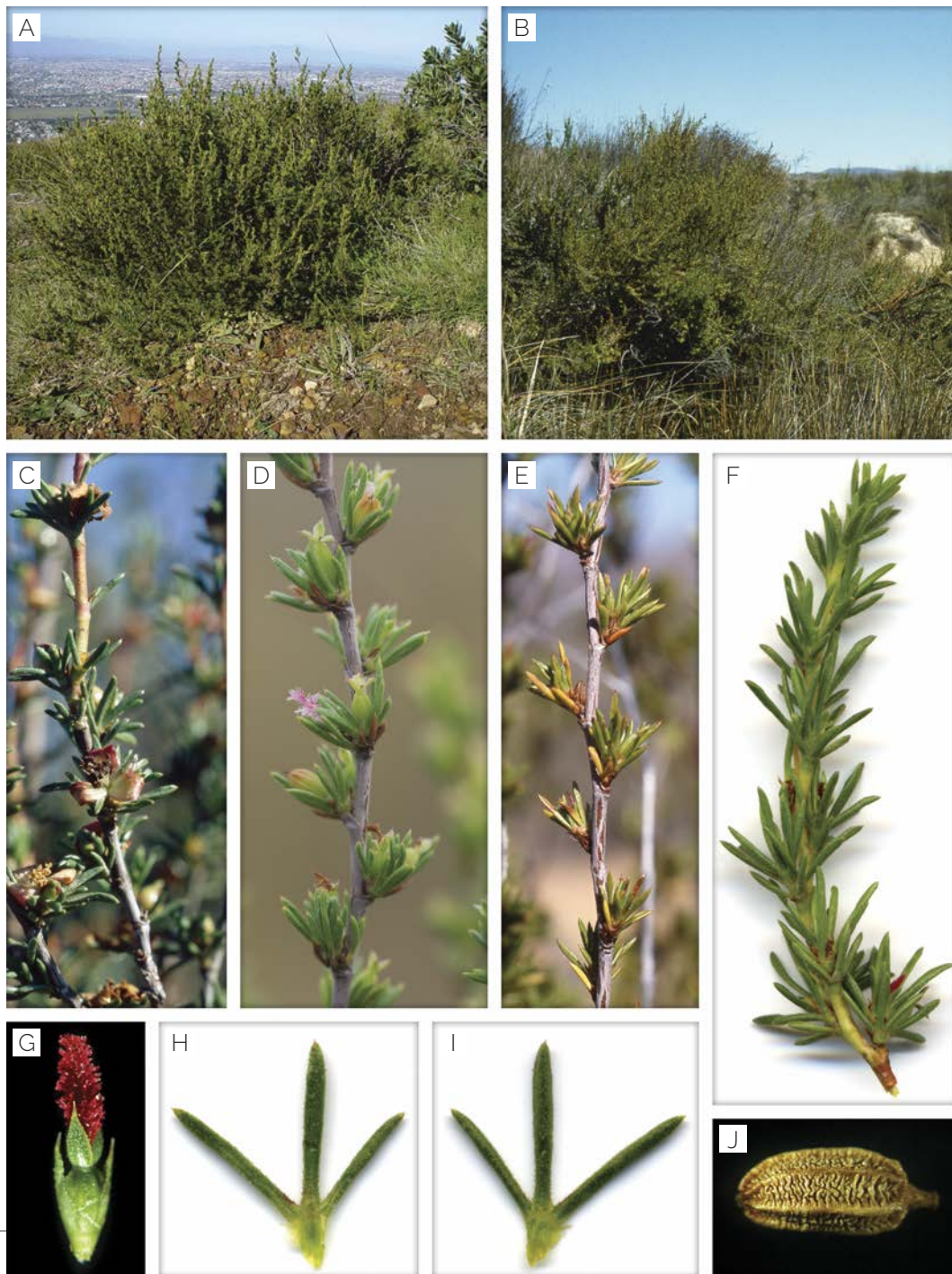
The identification of the apparent synonym *Cliffortia hermaphroditica* is difficult, as the holotype of *Compton 15332*, supposedly deposited at NBG, has not been located. Two other specimens of the same collection at BOL and PRE are a form of *C. juniperina* with close acute ribs. Weimarck had seen the BOL specimen but did not regard it as an isotype of *C. hermaphroditica*, as he included it within his *C. juniperina* var. *pilosula* on account of its hairy stems. However, the photograph of the holotype published by Weimarck (1948: 90) supports the view suggested here that all the collections of *Compton 15332* were no more than a slightly abnormal specimen of *C. juniperina*, some with hermaphrodite flowers. Certainly the type locality has been very well-collected and nothing similar has been found, further indicating that it was an atypical form, possibly of hybrid origin, that arose once and has since disappeared.

The type of *Cliffortia juniperina* was evidently seen by Weimarck, but I have not found any applicable specimen either in LINN or S marked as collected by Sparmann. Specimen 1560.7 in LINN is labelled as *C. juniperina* but has clearly hairy stems and quite sharply ribbed achenes, which fits more with *C. pilosula*. Further work needs to be done to establish the type of this name.

Representative specimens

SOUTH AFRICA. **3118** (Vanrhynsdorp): Gifberg, kloof SE of Rondefontein, 440 m, 14 July 1974, (–DC), *Thompson 2089* (NBG, PRE). **3119** (Calvinia): ± 3 km S of Nieuwoudtville along Botterkloof road, 720 m, 19 Aug. 2001, (–AC), *Whitehouse 255* (BOL); Lokenburg, 700 m, 29 Aug. 1953, (–CA), *Acocks 17043* (K, PRE). **3217** (Vredenburg): on hill near Vredenburg between Hopefield and Saldanha Bay, 90 m, Sept. 1905, (–DD), *Bolus 12675* (BOL, K); between Vredenburg and Saldanha Bay, 7 Sept. 1952, (–DD), *Levy's 9883* (BOL). **3218** (Clanwilliam): Nardouw, 6 Sept. 1951, (–BB), *Compton 22826* (NBG); vlakte on plateau at foot of Zebra Kop, 915 m, 23 May 1948, (–DB), *Esterhuysen 14498* (BOL, NBG); 5 km NW of Sauer Post Office, 60 m, 26 June 1948, (–DC), *Acocks 14531* (PRE). **3219** (Wuppertal): Elandskloof Pass, 610 m, 4 Oct. 1948, (–CA), *Levy's 9263* (BOL); SE foot of Bokkeveld Tafelberg, 915 m, 14 Aug. 1955, (–CD), *Esterhuysen 24392* (BOL). **3318** (Cape Town): near Langebaan, 12 Sept. 1948, (–AA), *Levy's 9182* (BOL); Darling, hills, 31 Aug. 1946, (–AD), *Esterhuysen 12976* (BOL); Bridgetown, banks of Berg R, 21 May 1952, (–BB), *Esterhuysen 20153* (BOL, NBG, PRE); Preekstoel, 10 km NW of Malmesbury, June 2006, (–BC), *Helme* (.); Cape Peninsula, Wynberg Hill, Mar. 1915, (–CD), *Bolus in Herb. Bolus 13312* (BOL); Cape Peninsula, Rondebosch Common, 30 Nov. 1944, (–CD), *Compton 16574* (NBG); Cape Peninsula, Kenilworth Race Course, 12 Jan. 1968, (–CD), *Esterhuysen 31863* (BOL); Cape Peninsula, Kenilworth Race

Cliffortia juniperina: A, habitat; B, × *ruscifolia* in habitat; C, branch with male flower; D & F, branch with female flower; E, branch with achenes; G, female flower; H, dorsal view of leaf; I, ventral view of leaf; J, achene.



Course, 19 Feb. 1970, (–CD), *Esterhuysen 32399a* (BOL); Cape Peninsula, Rondebosch Common, 3 Apr. 1970, (–CD), *Esterhuysen 32489a* (BOL); Cape Peninsula, Kenilworth Race Course, 6 Nov. 1972, (–CD), *Esterhuysen 33330* (BOL); Cape Peninsula, Rondebosch Common, 18 June 1949, (–CD), *Heginbotham 2* (NBG); Cape Peninsula, valley between University and Rhodes Memorial, 9 Apr. 1943, (–CD), *Leighton s.n.* (NBG); Cape Peninsula, valley between University of Cape Town and Rhodes Memorial, 9 Apr. 1943, (–CD), *Leighton 466* (BOL); Cape Peninsula, between Signal Hill and Lion's Rump, 11 Aug. 1944, (–CD), *Leighton 506* (BOL); Rondebosch, Camp Ground, 30 Nov. 1944, (–CD), *Leighton 728* (BOL); Rondebosch, University of Cape Town, 27 Dec. 1933, (–CD), *Levyms 4835* (BOL); Claremont on railway, 30 m, Mar. 1892, (–CD), *Schlechter Guthrie800* (BOL); Cape Flats near Claremont, 25 m, 9 Mar. 1892, (–CD), *Schlechter 490* (BM, BOL, PRE); Burgers Post Farm, near Pella, Fynbos Biome Research Site, 200 m, 11 Oct. 1979, (–DA), *Boucher & Shepherd 4790* (K, NBG, PRE); Zouterivier, near Philadelphia, 9 Nov. 1976, (–DA), *Esterhuysen 34442* (BOL); Agter Paarl, Kulemborg Farm, 140 m, 23 Apr. 1980, (–DB), *Burgers 2353* (NBG); along the Malmesbury road, 2.5 km from the turn-off from the N9, 27 Apr. 1976, (–DC), *Esterhuysen 34268* (BOL); Bellville District, Durbanville, Peaslake, 5 km from Durbanville on Langeberg Road to Kraaifontein, 120 m, 20 July 1963, (–DC), *Taylor 4923* (NBG, PRE); Paarl, Klapmuts, 215 m, 10 Mar. 1948, (–DD), *Acocks 14101* (PRE); Bottelary, 10 Jan. 1942, (–DD), *Compton 12916* (NBG); Jonkershoek valley, 13 Feb. 1945, (–DD), *Esterhuysen 11449* (BOL, K); between Stellenbosch and Kraaifontein, 12 Sept. 1948, (–DD), *Esterhuysen 14555* (BOL, NBG, PRE); near Joostenberg, between Paarl and Durbanville, 11 Oct. 1949, (–DD), *Esterhuysen 15996* (BOL, NBG); near Joostenberg, between Paarl and Durbanville, 11 Oct. 1949, (–DD), *Esterhuysen 16022* (BOL, NBG); Jonkershoek, Biesjevlei, 335 m, 2 Feb. 1941, (–DD), *Levyms 7536* (BOL); Jonkershoek, car park at start of Swartboskloof Trail, 315 m, 6 Mar. 1999, (–DD), *Whitehouse 22* (BOL, K, MO, NBG); main road between N1 and Stellenbosch, just after railway bridge, 150 m, 12 Sept. 2001, (–DD), *Whitehouse 264* (BOL). **3319** (Worcester): on plateau of Twenty Four Rivers Mts, above Porterville, 22 Oct. 1949, (–AA), *Esterhuysen 16112* (BOL, NBG); Nieuwekloof, Mar. 1896, (–AC), *MacOwan 1606* (BM, K); Nieuwekloof, 135 m, 16 Feb. 1896, (–AC), *Schlechter 7489* (BM, PRE); Baviaansberg, 1 Jan. 1942, (–BA), *Bond 1465* (BOL, NBG); along road above Paarl at Du Toits Kloof Nek, 760 m, 24 Sept. 1949, (–CA), *Esterhuysen 15821* (BOL); Bain's Kloof, 275 m, 1 July 1938, (–CA), *Levyms 6419* (BOL); Brandwacht valley, 31 Oct. 1953, (–CB), *Esterhuysen 22199* (BOL); Franschoek Pass, 12 Feb. 1950, (–CC), *Compton 21905* (NBG); Wemmershoek Peak, lowest cliffs on W side, 2 Jan. 1945, (–CC), *Esterhuysen 11361* (BOL); Orchard, Kwaduwes Mts, 23 Nov. 1944, (–DA), *Esterhuysen 10909* (BOL); Hex R valley, Sandhills, 22 Mar. 1958, (–DA), *Esterhuysen 27656* (BOL). **3320** (Montagu): Cabidu, 20 Oct. 1941, (–AB), *Olivier s.n.* (NBG); Eselsfontein, S base of Witteberg, 31 Jan. 1960, (–BC), *Esterhuysen 28845* (BOL); lower N slopes of Anysberg, near Vrede farm, 730 m, 3 Aug. 1987, (–BC), *Viviers, M., Vlok & Bo 273* (PRE). **3323** (Willowmore): Cape, 3.5 km from Louterwater, Longkloof to Avontuur, 27 Sept. 1969, (–DC), *Thompson 957* (K, NBG, PRE). **3418** (Simonstown): Cape Town, Wynberg Flats, 8 May 1847, (–AB), *Alexander-Prior s.n.* (K, PRE); S Cape Peninsula, near Teeberg, 30 m, 13 Jan. 1935, (–AB), *Levyms s.n.* (BOL); Cape, on plains near Wynberg, 25 m, Mar. 1892, (–AB), *Schlechter 1146* (BM, K); Cape Peninsula, Smith's Farm, 21 Nov. 1935, (–AD), *Compton 5987* (NBG); Faure, between Steenbras water pipe bridge over Eerste R and N2 road, 9 Oct. 1976, (–BA), *Boucher 3240* (K, NBG, PRE); Nuclear Research Institute, 1 mile towards Faure along N2 road, 29 May 1968, (–BA), *Taylor 7306* (NBG, PRE); Stellenbosch, Eerste River-Stellenbosch, between Meerlust Quarry and Railway Line, 30 m, 6 Jan. 1978, (–BB), *Boucher 3504* (NBG, PRE); Faure District, 31 July 1946, (–BB), *Strey 848* (K, PRE). **3419** (Caledon): Elgin, flats, 275 m, 21 Sept. 1931, (–AA), *Levyms 3363* (BOL); Genadendal, 550 m, 2 Mar. 1935, (–BA), *Levyms 4840* (BOL); S of Klein R Mts, 20 km out of Hermanus on road to Stanford, roadside, 30 m, 19 July 1991, (–AD), *Fellingham 1526* (NBG); Salmonsdam area, near T-junction of Elim road with Hermanus – Napier road, on lower SE slopes of Koueberg, 23 Nov. 1991, (–BC), *Fellingham 1578* (NBG, PRE); Koksrivier, 60 m, 12 Mar. 1979, (–DA), *Thompson 3956* (NBG, PRE).

70. **Cliffortia pilosula** (Weim.) C.M.Whitehouse comb. & stat. nov. *C. juniperina* var. *pilosula* Weim. in Botaniska Notiser 90: 180 (1948). Type: Clanwilliam District, Pakhuis, 1 Dec. 1934, *Compton 4777* (NBG, holo!).



Medium erect shrub, up to 1.5 m high; densely divaricately branched, forming brachyblasts. *Young stems* 1.3–1.6 mm wide, sometimes tinged reddish, hairy; stem hairs adpressed upwards, 0.1–0.3 mm long; older stems minutely tuberculate. *Leaves* trifoliolate; leaflets needle-shaped, 8.9–12.0 × 0.6–1.3 mm; apex sharply acuminate, 0.3–0.5 mm long; margins flat to rounded, minutely serrulate to scabrid; lamina chartaceous, 0.6–0.9 mm thick across midrib, midrib prominent beneath, curved downwards and away from the stem, glabrous, leaf underside with minute raised tubercles; sheath 1.4–2.2 mm long, abaxially glabrous and slightly tuberculate, adaxially glabrous except for fringe of hairs at apex; stipules 1.3–2.1 mm long, free, margins smooth to serrulate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on the keel; margins serrate; sepals 3, glabrous. *Male flowers* unknown. *Female flowers* with bracteoles 3.4–4.2 mm long, longer than immature receptacle; sepals narrowly ovate, 2.7–3.5 × 1.0–1.3 mm, erect; carpel 1; stigma 3.5–3.9 mm long, red, feathery, prominent above leaves; immature receptacle 1.8–2.2 × 0.8–1.1 mm, glabrous, clearly ribbed. *Achene* ellipsoid, 4.0–4.7 × 1.6–2.1 mm, medium brown, glabrous; 11–12-ribbed, ribs rounded to acute, 0.2–0.4 mm wide. *Flowering time*: recorded in April, August and December.

Habitat: Well-drained clayish soil from shale bands of Table Mountain Series in full sun; altitude 450–1100 m.

Distribution: Evidently restricted to the Cederberg and Olifants River Mountains but limits of species are poorly defined, so determining geographical range is difficult.

Conservation status: A localised species but able to survive in disturbed areas of road verges and apparently not threatened. Red List status: not listed.

Etymology: *pilosula* (Latin) means 'minutely pilose', referring to the small ascending hairs on the stem helping to differentiate this species from *Cliffortia juniperina*, under which it was first recognised as a variety.

Notes: Weimarck referred any specimen of *Cliffortia juniperina* with hairs on the stems to his var. *pilosula*. However, a range of forms of *C. juniperina* may have very short hairs, which are soon lost, leaving behind their bulbous bases as small tubercles. These are here all retained within *C. juniperina*.

The type of *Cliffortia juniperina* var. *pilosula* was collected from a distinctive population in the Pakhuis Mountains and matches other populations in the Cederberg and Olifants River Mountains. Although still having the characteristic flowers and tubercles of the *C. juniperina* complex, it has much longer leaves, that are more evidently curved outwards, away from the stem. It is therefore raised to specific rank, although possibly derived from an introgressed form of *C. juniperina*.

Representative specimens

SOUTH AFRICA. **3218** (Clanwilliam): Olifants R Mts, near junction at Olyvenboskraal, 460 m, 16 Aug. 2001, (–BD), Whitehouse 247 (BOL, NBC). **3219** (Wuppertal): Pakhuis, 1 Dec. 1934, (–AA), *Compton 4777* (NBG); N Cederberg, path from Pakhuis to Heuningvlei, 1065 m, 19 Oct. 1945, (–AA), *Esterhuysen 12058* (BOL).

(71–78) **Section Multifidae** *C.M.Whitehouse* sect. nov. Type species:
C. ruscifolia L.

Medium, erect densely branched shrubs, usually resprouting after fire. Young stems with short upwardly adpressed hairs, forming brachyblasts. Sheath usually glabrous abaxially and with a few hairs adaxially; stipules membranous, free; petiole absent. Leaves trifoliolate or unifoliolate or intermediate with deep toothing, curved downwards and away from the stem; leaflet tip acuminate to pungent. Bracteole longer than immature receptacle; sepals 3, female broadly ovate, usually recurved; receptacle glabrous, distinctly ribbed; carpels 1. Achene ribbed, glabrous, brown.

The species in this section appear to form a link between trifoliolate species and the simple-leaved multi-veined species. The seedlings or resprouting shoots often show deeply lobed unifoliolate leaves regardless of the appearance of mature plants: either unlobed unifoliolate or trifoliolate. *Cliffortia multiformis* appears to have both unifoliolate and trifoliolate leaves even on mature branches. Interspecific hybridisation is remarkably frequent in the section. *Cliffortia ruscifolia* appears to form hybrids with almost any species growing nearby. Consequently, many of the species in the *C. ruscifolia* series may well have had a hybrid origin, while the species of the *C. multiformis* series appear to have risen from an ancestral hybrid cross between *C. ruscifolia* and a species of sect. *Cliffortia*, possibly *C. polygonifolia*.

(71–73) *Cliffortia multiformis* series

71. ***Cliffortia multiformis*** Weim. in Botaniska Notiser 1933: 155, fig. 7 (1933) & 125, fig. 36 (1934); Dahlgren: 295 (1971); Fellingham: (2000); Bean & Johns: 192 (2005). Lectotype, designated here. Caledon District, Vogelgat, 245 m, 11 Apr. 1897, *Schlechter 10405* (BOL, lecto!; B†, BM!, BR!, COI, G, GRA!, HBG, K!, L, PRE!, SI, WI, Z!),



Medium erect shrub up to 1.5 m high, resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 1.0–1.6 mm wide, sometimes tinged reddish, hairy; stem hairs adpressed upwards, 0.1–0.7 mm long. *Leaves* usually trifoliate but a few in each brachyblast unifoliate or bifoliate; leaflets linear to narrowly lanceolate, sometimes deeply lobed almost to base, 8.3–15.0 × 0.9–1.6 mm; apex sharply long acuminate, 0.3–0.9 mm long; margins flat, minutely serrulate to scabrid; lamina chartaceous, 0.2–0.5 mm thick, curved downwards and away from the stem, midrib keeled and slightly prominent beneath, glabrous; sheath 1.5–2.7 mm long, abaxially glabrous, adaxially glabrous or with a few scattered adpressed hairs; stipules 1.6–4.2 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins serrate; sepals 3, glabrous. *Male flowers* with bracteoles 5.3–6.1 mm long; pedicel 0.7–1.0 mm long; sepals broadly ovate, 7.0–8.3 × 2.3–2.9 mm, acute to acuminate at the apex; stamens 13–17; filaments 5.4–7.8 mm long, red; anthers brownish red. *Female flowers* with bracteoles 2.8–3.8 mm long, longer than immature receptacle; sepals ovate, 2.6–4.1 × 1–2 mm, recurved; carpel 1; stigma 2.5–5.2 mm long, pinkish white, feathery, prominent above leaves; immature receptacle 1.6–2.3 × 1.1–1.7 mm, glabrous, clearly ribbed. *Achene* 3.5–6.5 × 1.4–2.5 mm, medium brown, glabrous; ribs 10–14, rounded, 0.1–0.4 mm wide; elaiosome swollen around base. *Flowering time*: throughout the year.

Habitat: Fynbos on low hills in acid sands and clayish soils derived from Table Mountain Series, in full sun on well-drained soils; altitude 50–300 m.

Distribution: Low hills and coastal flats from Hermanus to Elim, mainly on the Agulhas Plain.

Conservation status: Limited distribution but common in the area, even colonising road verges. Red List status: NT.

Etymology: *multiformis* (Latin) means ‘many-shaped’, referring to the leaves, which range from a single leaflet to three and all forms of lobing in between.

Notes: The leaves of this species are usually trifoliate, but frequently two or all three leaflets are fused into a single leaflet. Sometimes these fused leaflets are deeply lobed so that their origin from a trifoliate leaf is evident. For this reason Weimarck identified this species as a linking species between the multi-veined unifoliate species (his sect. *Multinerviae*) and the trifoliate species of *Cliffortia*. However, while the transition between unifoliate and trifoliate leaves is evident in this species, it might possibly be due to a hybrid origin between unifoliate and trifoliate parental species.

This species has been frequently misidentified as *Cliffortia pterocarpa* sensu lato. The type collection has noticeably more unifoliate leaves than many specimens and therefore specimens with predominantly trifoliate leaves were attributed to *C. pterocarpa*. However, all specimens usually have at least some unifoliate and some trifoliate leaves. The species looks very similar to some of the coastal populations of *C. atrata*, which differs in the colour and ribbing of its achenes.



When Weimarck chose the specimen he listed 12 different herbaria in which it was housed. As none of these were Lund, where he did his research, one of the 12 sheets has to be chosen as the lectotype. The specimen at BOL, which is annotated and cited by Weimarck is designated here. Weimarck put the type in Bredasdorp District in the original protologue but this was corrected to Caledon District in his monograph.

Representative specimens

SOUTH AFRICA. **3419** (Caledon): Vogelgat mountains, 245 m, 11 Apr. 1897, (–AD), *Schlechter 10405* (BM, BOL, K, PRE, Z); Caledon, 3 km W by N of Papiesvlei Post Office, 150 m, 27 June 1962, (–BC), *Acocks 22321* (K, PRE); Salmonsdam area, 0.5 km beyond Sandfontein towards Carolina, SE slope of Koueberg, 23 Nov. 1991, (–BC), *Fellingham 1576* (NBG, PRE); Paardeberg, Cooperative past experimental farm on the Paardeberg Farm, near Papiesvlei 13 km E of Stanford, 150 m, 27 June 1962, (–BC), *Taylor 3470* (NBG, PRE); Paardeberg, Papiesvlei, 150 m, 25 July 1962, (–BC), *Taylor 3596* (NBG, PRE); Flouhoogte, at junction of road to Akkedisberg Pass from Stanford–Elim road, 220 m, 21 Feb. 2003, (–BC), *Whitehouse 349* (BOL); Elandsberg Pass, S of Elandsberg, roadside at top of small pass, 11 Apr. 1978, (–BD), *Esterhuysen 34918* (BOL, K); Elands Kloof, 275 m, 10 Oct. 1951, (–BD), *Levy's 9780* (BOL); between Elim and Elands Kloof, 5 Aug. 1940, (–DA), *Esterhuysen 3084* (BOL, K); Baardskeerdersbos, next to track towards Eikerus, 23 Nov. 1991, (–DA), *Fellingham 1569* (NBG, PRE); Hermanus to Elim, Koue Berg Pass, 215 m, 3 July 1999, (–DA), *Whitehouse 37* (BOL, NBG); road to Elim from Napier–Gansbaai road, hill above Koue R, 105 m, 10 May 2000, (–DA), *Whitehouse 115* (BOL, NBG); Elim hills, 5 Aug. 1940, (–DB), *Compton 9133* (NBG); Ratel River, 24 July 1962, (–DC), *Taylor 3559* (NBG, PRE).

72. **Cliffortia dodecandra** Weim., Monograph of the Genus Cliffortia: 61 (1934); Levyns: 447 (1950). Type: Cape Peninsula, Kalk Bay, mountain slopes, 245–275 m, 1933, *Levyns 4719* (LD, holo.; BOLI, iso.).



C. pterocarpa sensu Levyns: 447 (1950), non (Harv.) Weim.

Medium erect shrub, up to 1 m high, usually killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 1.0–1.5 mm wide, hairy; stem hairs adpressed upwards, 0.3–0.6 mm long. *Leaves* trifoliate; leaflets linear to linear-lanceolate, 9.7–12.7 × 1.0–1.4 mm; apex sharply long acuminate, 0.7–1.2 mm long; margins flat, minutely serrulate to scabrid; lamina chartaceous, 0.4–0.5 mm thick, curved downwards and away from stem, midrib keeled and slightly prominent beneath, glabrous or rarely with a few 0.2–0.5 mm long hairs along the midrib beneath; sheath 1.6–2.5 mm long, abaxially glabrous, adaxially glabrous or with a few scattered adpressed hairs; stipules 1.1–2.8 mm long, free, margins smooth or rarely ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins serrate to shortly ciliate; sepals 3, rarely hairy on outside. *Male flowers* with sepals broadly ovate, acute to acuminate at the apex. *Female flowers* with bracteoles 3.2–6.0 mm long, longer than immature receptacle; sepals ovate, 3.2–4.8 × 1.2–1.7 mm, recurved; carpel 1; stigma 4.6–7.5 mm long, greenish white, feathery, prominent above leaves; immature receptacle 2.0–2.9 × 1.1–1.8 mm, glabrous, clearly ribbed. *Achene* ellipsoid, 3.6–5.7 × 1.5–1.7 mm, medium brown, glabrous; ribs 12–15, rounded to acute, 0.1–0.3 mm wide; elaiosome swollen around base. *Flowering time*: June to December.

Habitat: Fynbos on well-drained acidic sands derived from Table Mountain Series in full sun; altitude 50–500 m.

Distribution: Cape Peninsula south of Muizenberg and Kogelberg coast around Betty's Bay, possibly also Brandfontein near Cape Agulhas (see note below).

Conservation status: Despite a relatively small range the populations are not particularly threatened and are protected within both the Cape Peninsula National Park and Kogelberg Biosphere Reserve. Red List status: LC.

Etymology: *dodecandra* (Latin) means 'twelve stamens', referring to the number of stamens that are typically found in the male flower.

Notes: A species of unclear taxonomic delimitation, very closely related to *Cliffortia multiformis* (despite Weimarck placing them in different sections). It is best separated from that species on account of usually not resprouting after fire and its distribution: *C. multiformis* occurs from Hermanus eastwards, whereas *C. dodecandra* occurs west of Kleinmond. *Cliffortia multiformis* also often has leaves not fully divided into three leaflets, something which is invariably so in the leaves of *C. dodecandra*. However, the life strategy of *C. dodecandra* is confused because plants from the type locality, Kalk Bay, have been found to be clonal resprouters. Furthermore, the Kalk Bay population is atypical in the presence of hairs on the underside of the leaf and sepals. These characteristics suggest that this population may have introgressed with another species, possibly *C. ruscifolia*. The resprouting nature is not evident in the type specimen, but the presence of hairs was used by Weimarck as a diagnostic character. The confusion has led to a number of slightly hairy needle-leaved plants being referred to *C. dodecandra* from geographically disparate areas.

Including the plants currently attributed to *Cliffortia dodecandra* under *C. multiformis* would be one way out of this problem. It is something that I am reluctant to do though, on account of the differing life strategies. Another option would be to erect a new name with a new type, but as the status of the species is rather doubtful

in relation to *C. multiformis* and some forms of *C. atrata*, it seems better to leave an expanded understanding of *C. dodecandra* that covers these clonal introgressed plants, including the type.

The other species with which *Cliffortia dodecandra* can be easily confused is *C. atrata*. Populations of the latter from the south of its range have relatively broad recurved leaves similar to *C. dodecandra*. Where the species are sympatric, they can only be separated reliably by the form of their achenes. In *C. atrata*, the achenes are a shiny dark reddish brown with cross ribs between the main ribs, while in *C. dodecandra* the achenes are a dull dark brown without cross ribs. The possibility of introgression between these two species cannot be dismissed and intermediate specimens are known. Around Hermanus the distinction between all these three species is very confused.

A disjunct population at Brandfontein, near Cape Agulhas (Esterhuysen 19029, 19106, 36429, Smith 5093, Whitehouse 42), conforms to *Cliffortia dodecandra* morphologically, but is out of range and confirmation from molecular data would be welcome.



Cliffortia dodecandra: A & B, branch with female flowers; C, female flower; D, dorsal view of leaf; E, ventral view of leaf; F, achene.

Representative specimens

SOUTH AFRICA. **3418** (Simonstown): Cape Peninsula, plateau behind Plat-se-berg, Witsands, 25 Aug. 1946, (–AB), *Esterhuysen 12947* (BOL); Cape Peninsula, Kalk Bay Mt., slope above Boyes Drive, 15 Sept. 1974, (–AB), *Goldblatt 2656* (NBC, PRE); Cape Peninsula, Simonstown, top of Red Hill, 14 Nov. 1945, (–AB), *Leighton 1467* (BOL); Kalk Bay, E slopes of mountain, 305 m, 26 Oct. 1924, (–AB), *Levyms s.n.* (BOL); Kalk Bay, 245 m, 13 Aug. 1933, (–AB), *Levyms 4719* (BOL); Kalk Bay, 275 m, 13 Aug. 1933, (–AB), *Levyms 4720* (BOL); Cape Peninsula, Kalk Bay, 9 Sept. 1934, (–AB), *Levyms 4819* (BOL); Kalk Bay, Cave ledge, 490 m, 9 Sept. 1934, (–AB), *Levyms 4822* (BOL); Kalk Bay, 305 m, 2 Dec. 1934, (–AB), *Levyms 4823* (BOL); Simonstown, W of Red Hill, 150 m, 23 Aug. 1936, (–AB), *Levyms 5841* (BOL); Bonteberg Flats, 60 m, 11 Dec. 1938, (–AB), *Levyms 6875* (BOL); Simonstown District, Red Hill, Erica Ridge, 230 m, 19 June 1962, (–AB), *Taylor 3400* (K, NBC, PRE); Cape of Good Hope Nature Reserve, Bonteberg, 215 m, 14 Apr. 1972, (–AB), *Taylor 8097* (NBC, PRE); Cape Peninsula, Silvermine N.R., above Kalk Bay, valley between Ou Kraal and Kalk Bay Mt., edge of Bona Spei forest, 400 m, 22 Dec. 1999, (–AB), *Whitehouse 69* (BOL, NBC); Cape Peninsula, Slangkop Mt, above Kommetjie, along track towards ruins of coastguard house, 120 m, 4 Aug. 2001, (–AB), *Whitehouse 241* (BOL, NBC); Simonstown, Smitswinkel Bay, 185 m, 21 Nov. 1935, (–AD), *Levyms 5276* (BOL, PRE); Palmiet R mouth, 305 m, 17 Feb. 1936, (–BD), *Levyms 5386* (BOL); Palmiet R mouth, 305 m, 12 Feb. 1937, (–BD), *Levyms 6008* (BOL); Palmiet R mouth, 275 m, 27 Sept. 1945, (–BD), *Levyms 7769* (BOL).

73. **Cliffortia pterocarpa** (Harv.) Weim. in Botaniska Notiser 1933: 152 (1933) & 62, fig. 16F–G (1934). *C. juniperina* var. *pterocarpa* Harv.: 303 (1862). *C. juniperina* var. *vulgaris* Harv.: 303 (1862), *nom. superfl.* Lectotype, designated here: South Africa, Western Cape, Paarl District, Paarl Mt, Drège 'C. *laricina* E.M.' (K, lecto!; B†, REG!, SAM, TUB!).



C. laricina E.Mey. ex Drège: 86, 173 (1843) pro parte, nomen quoad Paarl Mt, Drège s.n.

C. laricina var. *longifolia* Meisn.: 528 (1843), *nom. invalid.* *contr. art. 35.1.* Type: near Caledon, Dec. 1838, Krauss 1203 (NY, holo!).

Low erect shrub up to 0.5 m high, resprouting after fire from a central crown; densely divaricately branched, forming brachyblasts. *Young stems* 0.6–1.1 mm wide, tinged reddish, hairy; stem hairs adpressed upwards, 0.1–0.3 mm long. *Leaves* trifoliolate, leaflets needle-shaped, 5.0–12.1 × 0.4–0.6 mm; apex acute to sharply acuminate, 0.2–0.4 mm long; margins flat, minutely serrulate to scabrid; lamina chartaceous, 0.3–0.5 mm thick, held ± straight or curved slightly downwards and away from the stem, glabrous; sheath 0.9–1.7 mm long, abaxially glabrous, adaxially glabrous or with a few scattered adpressed hairs; stipules 0.4–1.8 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on the keel, margins smooth to ciliate; sepals 3, glabrous. *Male flowers* with bracteoles 1.7–3.7 mm long; pedicel 0.4–1.2 mm long, glabrous; sepals broadly ovate, 3.9–5.6 × 2.0–2.7 mm, acute to acuminate at the apex; stamens 11–18; filaments 2.7–4.4 mm long, red; anthers yellow. *Female flowers* with bracteoles 1.8–3.5 mm long, as long as to longer than immature receptacle; sepals ovate, 1.7–2.5 × 0.7–1.3 mm, spreading and becoming recurved; carpel 1 or 2; stigma 2.4–4.2 mm long, red, feathery, not hidden by leaves; immature receptacle 0.9–2.4 × 0.8–1.0 mm, glabrous, clearly ribbed. *Achene* 3.6–4.4 × 1.4–1.7 mm, medium brown, glabrous; ribs 6–7, rounded to acute, 0.2–0.5 mm wide. *Flowering time*: June to October.

Habitat: Well-drained soils on shale bands and granitic sands in full sun; altitude 250–650 m.

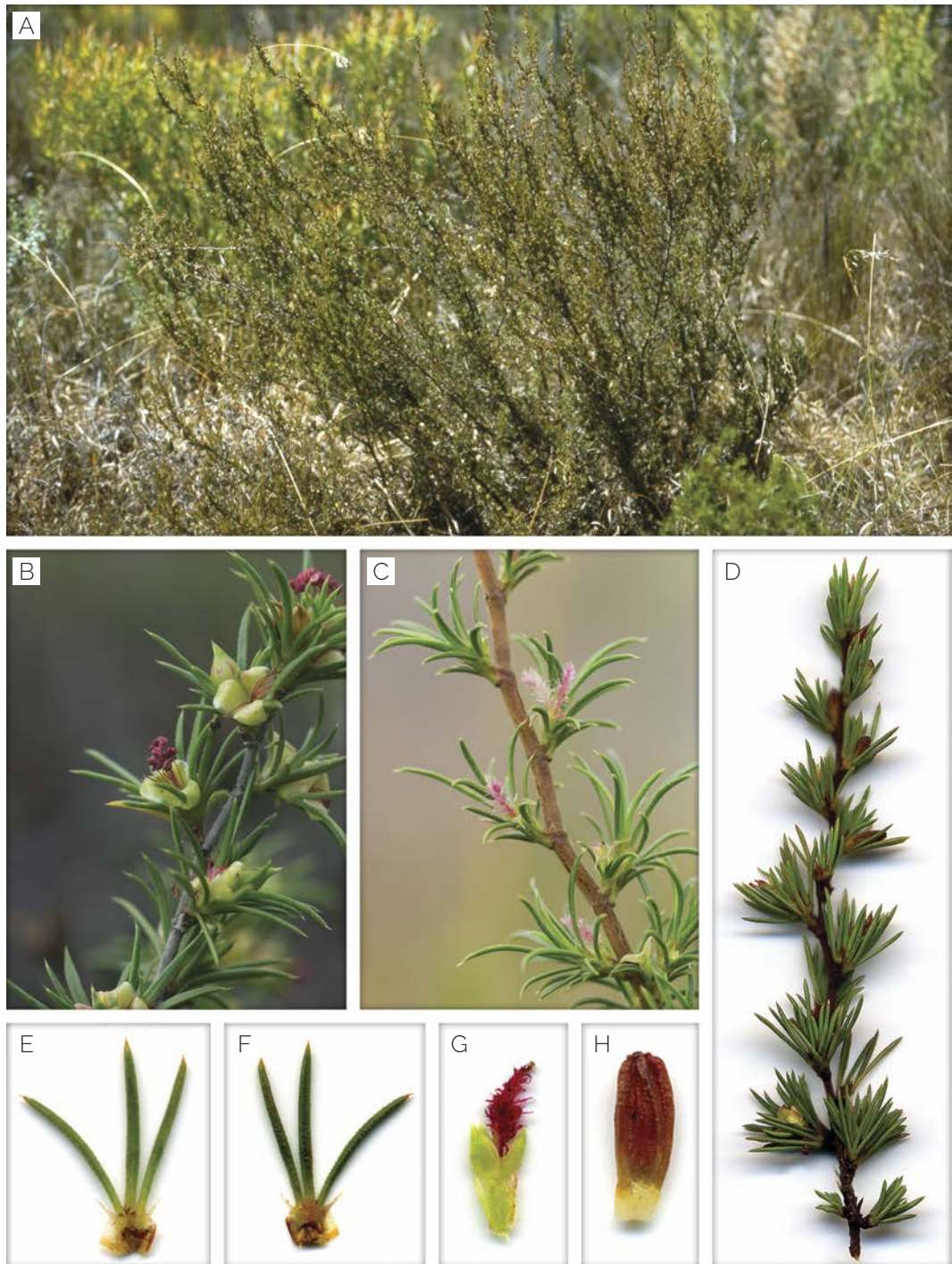
Distribution: Paarl Mountain and lower slopes of Franschhoek and Jonkershoek valleys, possibly also Riebeeck Kasteelberg, Caledon and Langeberg.

Conservation status. Localised but quite common and protected in several reserves. Red List status: LC.

Etymology: *pterocarpa* (Greek) means 'winged fruit', referring to the sometimes sharply narrow ridges on the achenes.

Notes: *Cliffortia pterocarpa* is reminiscent of a smaller, narrower-leaved version of *C. dodecandra*, the leaflets usually less than 10 mm long and only around 0.5 mm wide. In general though, the species is relatively nondescript, a problem in that it ends up being a bucket for plants that don't fit elsewhere and within the bounds of the species are almost certainly included hybrids that have not been recognised as such.

The typification of *Cliffortia pterocarpa* is problematic. Harvey in describing his new variety failed to indicate upon which specimen it was based. Several elements are mentioned in his description of *C. juniperina* and its varieties, but none are attributed specifically to *C. juniperina* var. *pterocarpa*. It is therefore difficult to judge exactly what Harvey had in mind. Weimarck's circumscription is more specific, but includes at least three distinct elements: *C. dodecandra*, *C. sparsa* and what is here referred to *C. pterocarpa*. His original recombination did not specify a type and the only specimen cited is *Diels 1401* [being



from Caledon District, Vanrhynsveld valley it most likely belonged to *C. sparsa*], from which the illustration was drawn. This specimen was not seen by Harvey and as it was from B it is presumably now destroyed.

Harvey mentions three sources of specimens upon which he based his definition for *Cliffortia juniperina*: Ecklon & Zeyher, Thunberg and Drège. Weimarck notes that all three sources have mixed collections. Ecklon & Zeyher's *C. juniperina* (Ecklon & Zeyher 1750) does not contain any specimen that fits Weimarck's circumscription of *C. pterocarpa*. Thunberg's *C. juniperina* does contain a sheet of *C. pterocarpa* according to Weimarck, but he notes that the description given by Thunberg could not refer to this species. Finally, specimens cited by Drège as *C. laricina* belong to three separate taxa, one of which Weimarck refers to *C. pterocarpa* and uses to illustrate the species. Therefore, this sheet has been selected as the type of *C. pterocarpa*.

Cliffortia pterocarpa has in the past been used as a taxon for placing many indistinct and unidentified specimens with needle-shaped leaves and ribbed achenes. In particular, specimens of *C. dodecandra* with glabrous leaves, forms of *C. juniperina* with achenes without rugose interspaces and the species of hybrid origin, *C. sparsa*, have all been determined under this name. The taxon, as circumscribed here, is much narrower than Weimarck's, which contained several different taxa. *Cliffortia pterocarpa* sensu stricto can best be recognised by a combination of its always glabrous narrow short leaves, female sepals becoming recurved on the fruit, rarely growing more than 0.5 m high and forming a resprouting crown. However, there are still several specimens that are difficult to place confidently either within *C. pterocarpa* or elsewhere. Therefore, the limits of this species are somewhat tentatively drawn at present. For example, a clonally spreading specimen from the Langeberg Mountains near Montagu (Whitehouse 126) is morphologically similar to *C. pterocarpa* and molecular evidence supports a close relationship. Weimarck cited Fourcade 3402 from Langkloof as belonging to this species but unusual in form. I consider that specimen an unusual hybrid of *C. paucistaminea*, possibly with *C. tuberculata*.

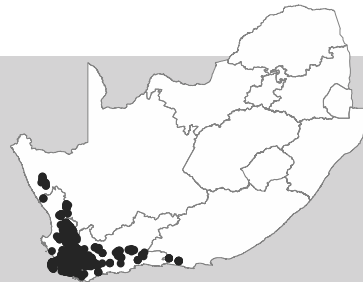
Weimarck wrongly regarded the type collection of *Cliffortia laricina* var. *longifolia* as from Swellendam but the specimen at NY and protologue clearly state Caledon. As *C. laricina* has never been validly published, the variety is also not validly published although it complied with all other elements of the Code.

Representative specimens

SOUTH AFRICA. **3318** (Cape Town): Paarl Mt., 12 Aug. 1951, (–DB), *Compton 22948* (BOL, NBG); Paarl Mt., (–DB), *Drège s.n.* (K); Jonkershoek, Biesievlei, 300–335 m, 11 Oct. 1945, (–DD), *Rycroft 977* (NBG, PRE). **3319** (Worcester): Du Toit's Kloof, W side, 28 Oct. 1951, (–CA), *Maguire 1117* (NBG); Franschoek, La Motte Forest Reserve, near Robertsvlei gate, beside road, 260 m, 7 July 2001, (–CC), *Whitehouse 230* (BOL); Wolfkloof, at top of track from Wolfkloof farm, 610 m, 8 June 2002, (–CC), *Whitehouse 302* (BOL, K, NBG). **3419** (Caledon): S of Klein R Mts, 20 km out of Hermanus on road to Stanford, 30 m, 19 July 1991, (–AD), *Fellingham 1527* (NBG); roadside N of Driefontein on Greyton to Krige road, 365 m, (–BA), 10 May 2000, *Whitehouse 113* (BOL).

(74–78) *Cliffortia ruscifolia* series

74. ***Cliffortia ruscifolia* L.**, Species Plantarum: 1038 (1753); DC.: 595 (1825); G.Don: 596 (1832); Eckl. & Zeyh.: 266 (1836); Harv.: 295 (1862); Bolus & Wolley-Dod: 259 (1904); Marloth: 42, t. 15A4–6 (1925) pro parte; Weim.: 119 (1934); Esterhuysen: 10 (1947); Levyns: 449 (1950); Fellingham: 611 (2000); Fellingham & Linder: 178, fig. 5–6 (2003); Bean & Johns: 192 (2005); Trinder-Smith et al.: 150 (2006). Lectotype, designated by Stearn (1957): '*Cliffortia foliis lanceolatis integerrimis: femina*' in L., t. 31 (1738), based on Herb. Clifford: 501, *Cliffortia* 3 (BM, lecto!).



Borbonia trinervia L.: 707 (1753). Lectotype, designated by Dahlgren (1968): Herb. Clifford: 494, *Borbonia* 2 (BM, lecto!).

C. arachnoidea Lodd.: t. 260 (1819). Type: Cultivated plant, origin unknown, 1799, in Lodd.: t. 260 (1819).

C. ruscifolia L. var. *tridentata* sensu Harv.: 295 (1862), pro parte quoad Zeyher 2457 [given as Zeyher 2451 in *Flora Capensis*, but clearly a misinterpretation of the label], non Willd.

Medium erect shrub, up to 3 m high, killed by fire or resprouting after fire from a central crown; densely divaricately branched, forming brachyblasts. *Young stems* 0.8–1.8 mm wide, tinged reddish, hairy; stem hairs adpressed upwards to spreading, 0.2–1.1 mm long. *Leaves* unifoliolate, narrowly ovate to lanceolate, 9.4–15.0 × 2.0–5.2 mm; apex sharply acuminate to pungent, 0.3–1.8 mm long; margins markedly turned upwards to rounded, entire and smooth, rarely with an odd straight tooth, 0.8–1.6 mm long; lamina 3–13-veined from base, cartilaginous, 0.1–0.5 mm thick, midrib slightly prominent beneath against lamina, curved downwards and away from the stem, glabrous or with a few hairs above and then soon becoming glabrous, 0.25–1.05 mm long, hairy all over beneath, often densely so and whitish, although glabrescent, rarely completely glabrous, hairs 0.2–1.1 mm long; sheath 0.7–5.0 mm long, abaxially glabrous or hairy, adaxially markedly hairy to glabrous; stipules 0.2–3.1 mm long, free, margins smooth to ciliate; petiole absent. *Flowers* clustered together in brachyblasts with reduced leaves at base of each flower; bracteoles hairy to glabrous on the keel, margins clearly ciliate; sepals 3, hairy to glabrous on outside. *Male flowers* with bracteoles 3.9–6.3 mm long; pedicel 1.0–2.5 mm long, not articulated but slightly elongated, glabrous; sepals broadly ovate, 5.3–6.5 × 1.9–2.7 mm, acute to acuminate at the apex; stamens 7–11; filaments 5.0–7.4 mm long, red; anthers brownish red. *Female flowers* with bracteoles 2.8–6.0 mm long, longer than immature receptacle; sepals narrowly to broadly ovate, 2.4–5.0 × 0.9–2.2 mm, recurved; carpel 1; stigma 4.7–9.7 mm long, red to pinkish white, feathery, prominent above reduced leaves; immature receptacle 1.8–3.7 × 0.8–1.6 mm, glabrous, clearly ribbed. *Achene* narrowly ellipsoid, 3.4–4.8 × 1.2–1.8 mm, sometimes slightly curved, medium to greyish brown, glabrous, 10–16-ribbed; ribs rounded to acute, up to 0.2 mm wide, elaiosome swollen around base. *Flowering time*: (July to) August to September (to November).

Habitat: Ranging from fynbos to margins of renosterveld and rock outcrops on high peaks, also common in disturbed habitats such as road verges and abandoned fields, on well-drained soils in full sun; altitude 0–1 600 m.

Distribution: Widespread throughout the CFR, but extending beyond it to the Kamiesberg of Namaqualand, common in the west and southwest but becoming rarer to the east except in the drier interior.

Conservation status: Widespread and often weedy species, an early coloniser of abandoned or degraded areas and road verges. Red List status: LC.

Etymology: *ruscifolia* (Latin) means 'leaves of *Ruscus*', for the resemblance of the leaves to those of *Ruscus* spp., butcher's broom, a mainly European genus, generally with hard green ovate 'leaves'.

Common names: climber's friend; *doringbos*, *rooidoring*, *steekbos*, *steekbossie* (Afrikaans).

Notes: Probably the best known of all *Cliffortia* species, it is a variable species with many local variants. Furthermore, it is very promiscuous, hybridising and introgressing with several other species. Delimitation of boundaries between the different forms or hybrids is almost impossible without splitting the species up into many microspecies. The name is applied here to the form with congested flowerheads and short subtending bract leaves. It blooms almost exclusively in August and September. The head-like inflorescences are usually absent in hybrids, some of which also flower throughout the year. Some of the most distinctive local variants, here recognised as species, also lack head-like inflorescences; i.e. *C. purpurea*, *C. verrucosa*, *C. tridentata* and *C. ferricola*.

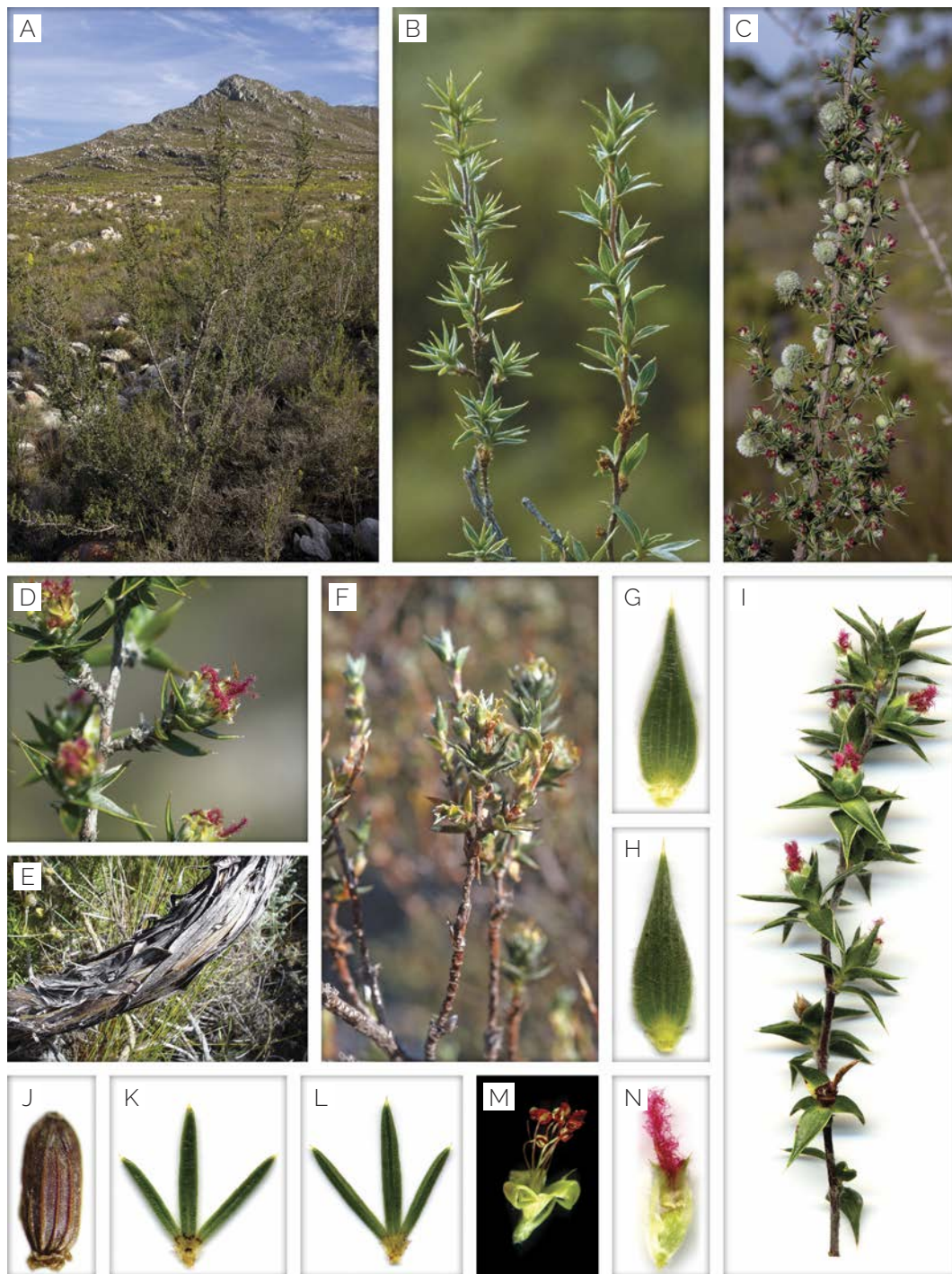
The fire survival strategy of *Cliffortia ruscifolia* is varied, but most commonly plants are killed by fire and regenerate from seed. If the plants are rooted firmly amongst rocks then it may resprout from the protected rootstock. A few populations, however, resemble typical *C. ruscifolia* but demonstrate clonal resprouting. I suggest that these are not pure *C. ruscifolia*, but probably an introgressed hybrid. Fire survival strategy is impossible to determine from herbarium specimens and often difficult even from live plants except in the early years after fire. Until the distribution and frequency of these various types is known better, they are retained within a broad *C. ruscifolia*.

The distribution of male flowers amongst populations of *Cliffortia ruscifolia* is worthy of further investigation. Most populations never appear to produce male flowers but the frequency of records is greatest in the north and west of its range, from Paarl to the Cederberg. Records of male flowering plants on the Cape Peninsula usually turn out to be errors for *C. tridentata* or *C. theodori-friesii*.

Cliffortia ruscifolia is very susceptible to galls, in a similar way to *C. strobilifera*. These should not be mistaken for the congested flowerheads.

Representative specimens

SOUTH AFRICA. **3017** (Hondeklip Bay): Kamiesberg, top of Sneeuokop, 1590 m, 14 Oct. 1928, (–BB), *Hutchinson 851* (K); Kamiesberg, upper W slopes Sneeuokop, 11 Dec. 1910, (–BB), *Pearson 5826* (K); Namaqualand, upper and middle slopes of Rietkloof Mt., N aspect, 9 Dec. 1910, (–BD), *Pearson 5692* (BM). **3018** (Kamiesberg): Kamiesberg, Leliefontein, Rhebokskloof, N of road at the top of Struders Pass, opposite old farm house and orchards, 1100 m, 10 Jan. 1999, (–AC), *Desmet 1932* (NBG); Namaqualand, Leliefontein, near gravel pit at side of road, 1310 m, 12 Oct. 1981, (–AC), *le Roux & Ramsey 625* (NBG); Rooiberg Mt., between mountain and koppie on SE side, 1400 m, 12 Oct. 1981, (–AC), *le Roux & Ramsey 709* (NBG, PRE); near Leliefontein, 1555 m, 27 Sept. 1932, (–AC), *Levyns 4061* (BOL); Kamiesberg, slopes of kopje, SW of Leliefontein, 16 Jan. 1911, (–AC), *Pearson 6314* (K, NBG). **3118** (Vanhynsdorp): expedition to Kamiesberg, Gifberg and Olifants River Mts [flat summit of the Matsikamma], 15 Sept. 1911, (–DB), *Phillips 7461* (BOL, K); flats near Gifberg, 12 Aug. 1967, (–DC), *Firk 9* (NBG). **3119** (Calvinia): Van Rhyns Pass, 670 m, 30 Sept. 1932, (–AC), *Levyns 4091* (BOL); Glen Ridge, 6 km W of Nieuwoudtville, 23 Sept. 1982, (–AC), *Nortje 3* (NBG); Nieuwoudtville, Oorlogskloof Nature Reserve, J12, mountain plateau, 780 m, 24 Aug. 1988, (–AC), *Pretorius 86* (NBG, PRE). **3218** (Clanwilliam): Bosch Kloof, 22 Sept. 1940, (–BB), *Compton 9492* (BOL, NBG); Kapteinskloof, 5 Sept. 1955, (–DA), *van Niekerk 787* (BOL); Grey's Pass, 6 Sept. 1949, (–DB), *Barker 5593* (BOL, NBG); Piketberg/Clanwilliam District, WSW of Citrusdal, top of Piekenierskloof Pass (Grey's Pass), 500 m, 30 Aug. 1993, (–DB), *Strid & Strid 37293* (PRE); hills S side of valley below Moutons Vlei, 11 Nov. 1934, (–DC), *Pillans 7358* (BOL); Piketberg Plateau, 14.5 km from Piketberg, 13 Aug. 1969, (–DC), *Thompson 778* (K, NBG, PRE). **3219** (Wuppertal): Heuningvlei Forest Station, on road to Groenberg, 26 Oct. 1977, (–AA), *Emdon 155* (NBG); Pakhuis, 29 Sept. 1940, (–AA), *Esterhuysen 3443* (BOL, K); Pakhuis Pass, top of Pakhuis Pass



16.5 km from Clanwilliam, 760 m, 24 Aug. 1967, (–AA), *Thompson 315* (NBG, PRE); Cederberg Mts, near Crystal Pool, 1340 m, 22 Sept. 1930, (–AC), *Barnes s.n.* (BOL); Cederberg, Middelberg Plateau, 1220 m, Sept. 1930, (–AC), *Levy's 2915* (BOL); Algeria, NW facing slope, SE of campsite, 550 m, 8 Oct. 1978, (–AC), *Low 702* (NBG); Cederberg, Algeria Forest Station, 15 Nov. 1996, (–AC), *van Rooyen, Steyn, & de Villiers 158* (NBG); Cederberg, Algeria Forest Station, 16 Nov. 1996, (–AC), *van Rooyen, Steyn, & de Villiers 194* (NBG); Cederberg, Matjiesrivier Nature Reserve, Grootberg Mts W of Perdewater, 1200 m, 4 Oct. 1997, (–AD), *Lechmere-Oertel 786* (NBG); Elandsdooie, top of Middelberg Pass, 3 Sept. 1938, (–CA), *Acocks & Hafström 566* (PRE); Cederberg Mts, between Citrusdal and Ceres, Tandfontein Farm, ± 2 km up Hex R from junction with Middeldear, 840 m, Mar. 1997, (–CA), *Marriott s.n.* (GRA); foot of Olifants River Mts, near Warm Bath, 22 Sept. 1911, (–CA), *Stephens 7125* (BM, BOL, K); Cederberg, Krom R Kloof, above the Oak Slope, 940 m, 14 Sept. 1983, (–CB), *Taylor 10640* (NBG, PRE); Cardouw Pass, E slopes, 15 Sept. 1953, (–CC), *Barker 8130* (NBG); Cardouw Pass, E slopes, 15 Sept. 1953, (–CC), *Barker 8131* (NBG); Ceres, Koue Bokkeveld, Skoongesig, 10 Sept. 1966, (–CC), *Hanekom 679* (K, PRE, PRE). **3318** (Cape Town): near Darling, Kapokberg, 395 m, Sept. 1905, (–AD), *Bolus 12674* (BOL); Kasteelberg, Riebeeek Kasteel, above town of Riebeeek Kasteel, Remhoogte Farm, 24 Oct. 1968, (–BD), *Thompson 615* (NBG, PRE); on Table Mt., 14 May 1847, (–CD), *Alexander-Prior s.n.* (K, PRE); Table Mt., above Cape Town, 150 m, Oct. 1873, (–CD), *Bolus 2784* (BOL); Table Mt., ascent by Kloofnek, 915 m, 26 Aug. 1951, (–CD), *Bullock 4017* (K); Cape Peninsula, Kirstenbosch National Botanic Garden, Skeleton Gorge, 275 m, 6 July 1940, (–CD), *Compton 8925* (PRE); Cape Peninsula, Table Mt., on slopes just S of Platteklip Gorge, 460 m, 31 July 1960, (–CD), *Esterhuysen 28510a* (BOL); Rondebosch Common, 60 m, 3 Sept. 1933, (–CD), *Levy's s.n.* (BOL, BOL); Table Mt., Lower Plateau, 610 m, 19 Nov. 1933, (–CD), *Levy's 4777* (BOL); between Kloof Nek and Camps Bay, 150 m, 14 Aug. 1937, (–CD), *Levy's 6280* (BOL); Cape Town, Camps Bay, (–CD), *Marloth 8092* (PRE); Cape Peninsula, near Kirstenbosch, 7 Aug. 1951, (–CD), *Salter 9250* (BM); Table Mt., 23 Aug. 1919, (–CD), *Shantz 77* (K); Cape Peninsula, Cape Town, Lion's Rump, 30–305 m, Sept. 1897, (–CD), *Thode 6178* (NBG); Cape Town, slopes of Table Mt., 305 m, Aug. 1881, (–CD), *Tyson 2436* (NBG); Cape Peninsula, NE slopes of Devil's Peak, just beneath King's Blockhouse, 400 m, 27 Jan. 2000, (–CD), *Whitehouse 72* (BOL); near Kloof Nek, 9 Aug. 1924, (–CD), *Whitwam s.n.* (BOL); Cape Peninsula, Platteklip, near Cape Town, 1 Aug. 1883, (–CD), *Wilms 3177* (K); Cape Peninsula, below King's Blockhouse, 430 m, 25 Aug. 1895, (–CD), *Wolley-Dod 5* (BOL, K); Cape Town, 1909, (–CD), *Worsdell s.n.* (K); Paarl Mt., 610 m, 1 Oct. 1942, (–DB), *Henderson 1186* (NBG, PRE); E slopes of the Perdeberg, 5 Aug. 1935, (–DB), *Pillans 7654* (BOL); Paarl Mt., 29 Mar. 1962, (–DB), *van der Merwe 845* (K); Bellville District, Tygerberg, 28 Aug. 1948, (–DC), *Compton 20756* (NBG); Tygerberg Nature Reserve, area D, 200–400 m, 17 Aug. 1975, (–DC), *Loubser 3365* (NBG); Muldersvlei, ditch by the roadside near Muldersvlei, 13 Sept. 1934, (–DD), *Acocks 2592* (PRE); Jonkershoek, Jakkalsvlei R, 395 m, 2 May 1962, (–DD), *Banks 1269* (NBG); Jonkershoek, near rain gauge No.2., 23 Aug. 1937, (–DD), *Borchardt 471* (PRE); Jonkershoek, near rain gauge no. 2, 23 Aug. 1937, (–DD), *Borchardt 472* (NBG); Groot Drakenstein Mts, Devil's Tooth, summit, 1190 m, 12 Dec. 1944, (–DD), *Esterhuysen 9540* (BOL); Stellenbosch Mt., 1 Sept. 1917, (–DD), *Garside 1004* (K); Jonkershoek Swartboskloof, 7 Nov. 1935, (–DD), *Hubbard 298* (NBG); Stellenbosch, Jonkershoek, Langrivier, 610 m, Aug. 1965, (–DD), *Kerfoot 5397* (NBG, PRE); Waterkloof, plot located on WSW slope adjacent to Veldwachters R, at junction of two farm roads, 190 m, 7 July 1994, (–DD), *Nel & Boucher 222* (NBG); lower slopes S of Brandwacht, above rifle range, 14 Aug. 1996, (–DD), *Oliver 10562* (NBG); Jonkershoek, 4 km from Forest Station to Kleinplaas road, 19 Oct. 1964, (–DD), *Pienaar 21* (NBG); Stellenbosch Mt, 29 Aug. 1953, (–DD), *Scholz s.n.* (NBG); Swartboskloof, 12 Aug. 1960, (–DD), *van der Merwe 23–02* (NBG); Swartboskloof, 9 Feb. 1962, (–DD), *van der Merwe 845* (NBG). **3319** (Worcester): Groot Winterhoek State Forest, Kliphuisvlakte, 15 Nov. 1977, (–AA), *Durand 263* (NBG, PRE); Groot Winterhoek, farm house, 660 m, 2 Oct. 1980, (–AA), *Low 1018* (NBG); Groot Winterhoek farm house behind barn, 650 m, 2 Oct. 1981, (–AA), *Low 1225* (NBG); Bergplaas Farm, path up to Sneeuat, around Nooiensverdiert, 600 m, 22 Sept. 2001, (–AA), *Whitehouse 271* (BOL); Groot Winterhoek Wilderness Area, path to De Tronk, between parking area and Groot Kliphuis R, 800 m, 11 Sept. 2002, (–AA), *Whitehouse 309* (BOL); Ceres, Gydo Pass, top of Gydo Pass, 3 Sept. 1966, (–AB), *Thompson 198* (NBG, PRE); Wolseley, Zevenfontein Reserve, 26 Feb. 1936, (–AC), *Hubbard 328* (NBG); Voelvlei Tortoise Reserve, 28 Aug. 1989, (–AC), *Solomon 48* (NBG); Michell's Pass, 15 Sept. 1928, (–AD), *Gillett 346* (NBG); Theron's Pass, 20 km from Ceres, on road to Calvinia, steep mountain slope, 30 Nov. 1986, (–BC), *Germishuizen 4062* (NBG, PRE); Theron's Pass, 28 Sept. 1924, (–BC), *Marloth 6174* (NBG,

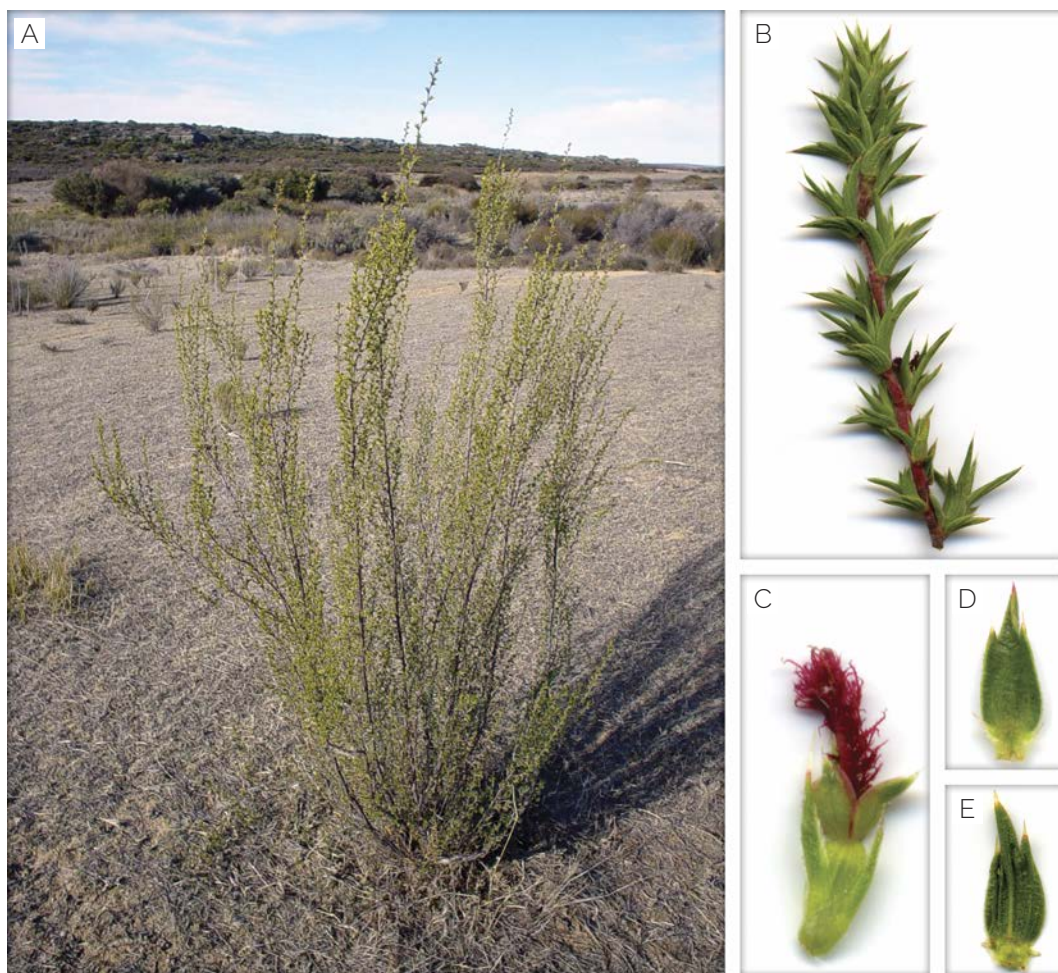
Cliffortia ruscifolia: A, habitat; B, true *C. ruscifolia* (left) and hybrid *C. ruscifolia* (right); C, galls; D & I, branch with female flowers; E, bark; F, branch with achenes; G, dorsal view of leaf; H, ventral view of leaf; J, achene; K, dorsal view of *ruscifolia* × *teretifolia* leaf; L, ventral view of *ruscifolia* × *teretifolia* leaf; M, male flower; N, female flower.

PRE); Welvaart, at base of Sanddrift Peaks, 990 m, 10 Oct. 1974, (–BC), *Oliver 5087* (NBG); Cape region, Leeuwfontein, 28 Nov. 1908, (–BC), *Pearson 3182* (BM, K); Sanddrift valley, 19 km N of Worcester, 5 Nov. 1963, (–BC), *Schlieben & van Breda 9923* (K, NBG, PRE); Verkeerde Vlei, area around camping site, 8 Nov. 1963, (–BD), *Middlemost 2238* (NBG); Bainskloof, hillside just W of hotel, 13 Sept. 1928, (–CA), *Gillett 135* (NBG); Bain's Kloof, Tweede Tol, 915 m, 29 Sept. 1983, (–CA), *Koutnik 1284* (BOL, PRE); Bain's Kloof, hill behind laboratory, 5 Sept. 1953, (–CA), *Leighton s.n.* (BOL); Bain's Kloof, 29 Aug. 1952, (–CA), *Leighton BK32* (BOL); Bain's Kloof, off path from houses to Happy Valley road, 29 July 1978, (–CA), *Low 570* (NBG); Bain's Kloof, 610 m, 20 Sept. 1953, (–CA), *Schelppe 4168* (BM); Bain's Kloof Pass, 18 Sept. 1938, (–CA), *Sherry 506* (NBG); Cape, Du Toit Pass (Paarl Pass), 26 Oct. 1958, (–CA), *Werdermann & Oberdieck 744* (K, PRE); Bain's Kloof village, 29 July 2001, (–CA), *Whitehouse 239* (BOL, NBG); Boland Trail, Jan Jouberts Gat path, Franschoek Pass, 500 m, 29 Aug. 1982, (–CC), *Burman 895* (BOL); Franschoek, Upper Zachariashoek Catchment, 410 m, 3 Sept. 1970, (–CC), *Haynes 362* (NBG, PRE); Franschoek Pass, 5 Jan. 1948, (–CC), *Rodin 3091* (BOL, K, PRE); Groot Drakenstein, Nov. 1919, (–CC), *Rogers 17756* (K); Ouhangsberg, SE of beacon, 700 m, 7 Nov. 1992, (–CD), *Oliver 10257* (NBG). **3320** (Montagu): Tweedside, 1065 m, 30 Sept. 1926, (–AB), *Compton 3039* (BOL); Tweedside, 27 Sept. 1951, (–AB), *Compton 22857* (NBG); Anysberg East, summit plateau, SSE of Goedehoop, E aspect, 1220 m, 10 Aug. 1991, (–BC), *Fellingham 1541* (NBG); E end of Anysberg on jeep track to top, 5 Oct. 1982, (–BC), *van Wyk 1038* (NBG); Montagu, Baden, 490 m, 22 Sept. 1946, (–CA), *Levyys 7938* (BOL); Montagu, Rietfontein farm, hill S of house, 460 m, 29 Sept. 1979, (–CC), *Bohnen 6692* (K, NBG, PRE); Donkerkloof, 26 Sept. 1946, (–CC), *Compton 18470* (NBG); Montagu, Donker Kloof, 460 m, 26 Sept. 1947, (–CC), *Levyys 8056* (BOL). **3321** (Ladismith): Seven Weeks Poort, 27 May 1919, (–AD), *Pole Evans PRE 19119* (PRE); Seven Weeks Poort, 14 Oct. 1962, (–AD), *Rycraft 2696* (NBG); Gysmanshoek Pass, next to road, 29 July 1983, (–CC), *van der Merwe 56* (NBG, PRE); Gysmanshoek Pass, S entrance to pass, 16 Sept. 1981, (–CC), *van Wyk 701* (NBG, PRE). **3322** (Oudtshoorn): Oudtshoorn, crest of hills S of Matjiesrivier Farm, 1100 m, 16 Sept. 1989, (–AC), *Vlok 2167* (PRE); between Doorn R and Klipdrift 11 km from George road, 520 m, Sept. 1932, (–CD), *Fourcade 4721* (BOL, NBG, PRE). **3323** (Willowmore): Joubertina, Kouga Mts, Hoeree Farm, 16 Sept. 1975, (–DB), *Manson 130* (NBG, PRE); Kouga Mts, Hoeree Farm, 600 m, 27 Sept. 1986, (–DB), *Oelofsen 90* (PRE); Springhaas Capell, where road to Hoeree crosses Kouga R, 425 m, 18 Oct. 2000, (–DB), *Whitehouse 153* (BOL). **3324** (Steytlerville): Kouga R, near drift on road to Zuurans, 275 m, Sept. 1925, (–CC), *Fourcade 3089* (BOL, K, NBG). **3418** (Simonstown): Simonstown, Aug. 1929, (–AB), *Alice & Godman 139* (BM); Simonstown, hillside above Froggy Farm, 90 m, 15 Oct. 1980, (–AB), *Davies 46* (NBG, PRE); Simonstown, hillside above Froggy Farm, 90 m, 15 Oct. 1980, (–AB), *Davies 50* (NBG); Cape Peninsula, Silvermine Nature Reserve, top of Blackburn Kloof, 600 m, 16 Sept. 2001, (–AB), *Whitehouse 266* (BOL); near Somerset West, 27 July 1947, (–BB), *Brenan 7615* (K); Steenbras Siding, 3 Aug. 1940, (–BB), *Esterhuysen 3030* (BOL); Sir Lowry's Pass, W slopes, 275 m, 4 Sept. 1932, (–BB), *Levyys 3916* (BOL); Stellenbosch, Steenbras Dam, 17 Nov. 1944, (–BB), *Levyys 11634* (BOL); Somerset West, 5 Sept. 1942, (–BB), *Parker 3717* (BOL, K, NBG); Nuweberg Forest Reserve, slopes of Sneekop, 1220 m, 26 Nov. 1969, (–BB), *Thompson 989* (K, NBG, PRE); Palmiet R, 28 Sept. 1949, (–BD), *de Vos 1435* (NBG); Palmiet R, near mouth, 18 Sept. 1938, (–BD), *Gillett 4244* (BOL, K); Kogelberg State Forest, at first turn of road to Oudebos, c. 1 km from S boundary gate, 40 m, 28 July 1992, (–BD), *Kruger 643* (NBG). **3419** (Caledon): Houtech, S of Houwhoek, main neck, S of Uitkykpos, 475 m, 17 Sept. 1987, (–AA), *Fellingham 1349* (NBG, PRE); Caledon, Hermanus, Fernkloof Nature Reserve, 60 m, 10 Sept. 1974, (–AD), *Orchard 237* (K, NBG, PRE); bought at Hermanus Flower Show, (–AD), *Rogers 29137* (K). **3420** (Bredasdorp): Stormsvlei, 25 Sept. 1930, (–AA), *Fries, T.C.E., Norlindh & Weimarck 1520* (PRE); Riviersonderend/Bredasdorp, junction of R317 & National Road, 11 Mar. 1983, (–AA), *Keetch 7205* (PRE); Swellendam, Bontebok National Park, 150 m, 23 Aug. 1965, (–AB), *Grobler 460* (NBG, PRE); De Hoop Nature Reserve, Potberg, 1 km W of Potberg residence, 150 m, 17 Oct. 1978, (–BC), *Burgers 1387a* (NBG); W base of the Potberg, 13 Oct. 1940, (–BC), *Pillans 9292* (BOL).

75. ***Cliffortia purpurea*** (Weim.) C.M.Whitehouse comb. nov. *C. rus-cifolia* L. var. *purpurea* Weim. in Botaniska Notiser 90: 197, fig. 15f–l (1948). Type: Calvinia District, Oorlogskloof, ± 13 km SE of Nieuwoudtville, 580 m, Sept. 1930, *Lavis s.n.* (BOL, holo.!).



Medium erect shrub, up to 1.5 m high; densely divaricately branched, forming brachyblasts. *Young stems* 1.3–1.5 mm wide, tinged reddish, hairy; stem hairs adpressed upwards, 0.2–0.6 mm long. *Leaves* unifoliate; narrowly triangular to lanceolate, 7.5–9.7 × 2.3–4.7 mm; apex sharply acuminate to pungent, 0.6–1.4 mm long; margins markedly turned upwards to rounded, smooth and entire or with up to 2 straight



Cliffortia purpurea: A, habitat; B, branch with female flowers; C, female flower; D, dorsal view of leaf; E, ventral view of leaf.

teeth, 1.0–2.2 mm long; lamina 5–9-veined from base, cartilaginous, 0.2–0.5 mm thick, midrib slightly prominent beneath, curved downwards and away from the stem, glabrous above, hairy all over beneath, 0.2–0.7 mm long; sheath 1.2–1.3 mm long, abaxially hairy, adaxially markedly hairy; stipules 1.0–1.7 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 3, hairy on outside. *Male flowers* with bracteoles $\pm$ 4 mm long; sepals broadly ovate, 4.0–4.5 mm long; stamens 9. *Female flowers* with bracteoles 3.6–4.0 mm long, longer than immature receptacle; sepals broadly ovate, $2.1\text{--}2.9 \times 0.6\text{--}1.4$ mm, recurved; carpel 1; stigma 3.4–6.1 mm long, red, feathery, prominent above leaves; immature receptacle $1.4\text{--}3.1 \times 0.6\text{--}1.3$ mm, glabrous, clearly ribbed. *Achene* ellipsoid, $\pm 5 \times \pm 1.3$ mm, medium to dark brown, glabrous; 12-ribbed, rounded to acute, 0.1–0.2 mm wide. *Flowering time*: August to November.

Habitat: Well-drained sands from Table Mountain Series in full sun; altitude 550–700 m.

Distribution: Endemic to the Bokkeveld Escarpment near Nieuwoudtville (but see note below).

Conservation status: Restricted to the Bokkeveld Escarpment, but relatively common there and protected in nature reserves and conservancies. Red List status: not listed.

Etymology: *purpurea* (Latin) means 'purple', referring to the reddish purple colour of the male sepals.

Notes: A short-leaved species allied to *Cliffortia ruscifolia*, it also lacks the distinctive flowerheads of that species. In habit *C. purpurea* also forms a more narrowly columnar shrub than *C. ruscifolia*. Weimarck originally described this as a variety of *C. ruscifolia*, but suggested that it might constitute a separate species. Having seen both growing in the same area I find them readily distinguishable, although there may be some introgression between the two.

Collections from the west end of the Baviaanskloof (Levy's 9141, Whitehouse 89) are very similar to this species, especially in the tall columnar habit and small leaves. These populations represent one of the most easterly populations of the *Cliffortia ruscifolia* series, and one of the most distant from Nieuwoudtville, yet tentative molecular evidence from the nuclear genome (Fig. 1) suggests that they may share a common history within the complex.

Representative specimens

SOUTH AFRICA. 3119 (Calvinia): Calvinia, Nieuwoudtville, 14 Nov. 1930, (–AC), Galpin 11146 (K, PRE); Oorlogskloof, 13 km SE of Nieuwoudtville, 580 m, Sept. 1930, (–AC), Lavis s.n. (BOL); Papkuilsfontein Farm, Oorlogskloof escarpment, track between De Hoop and waterfall, 680 m, 18 Aug. 2001, (–CA), Whitehouse 253 (BOL, NBG).

76. **Cliffortia verrucosa** Weim. in Botaniska Notiser 112: 75, fig 3a-d, 4 (1959); Fellingham: 611 (2000). Type: Oudtshoorn District, Meiringspoort, N aspect, 1 220 m, 16 Oct. 1955, *Esterhuysen 24847* (BOL, holo.!).



Medium erect shrub, up to 1.5 m high; densely divaricately branched, forming brachyblasts. *Young stems* 0.7–1.1 mm wide, tinged reddish, hairy; stem hairs adpressed upwards, 0.2–0.8 mm long. *Leaves* unifoliate; elliptic to ovate, 4.3–7.8 × 1.7–3.6 mm; apex sharply acuminate to pungent, 0.5–0.6 mm long; margins markedly turned upwards to rounded, smooth and entire or commonly with up to 2 straight teeth, 0.7–1.6 mm long, 3–7-veined from base, cartilaginous, 0.2–0.4 mm thick, midrib prominent beneath, curved downwards and away from the stem, glabrous above, hairy beneath but becoming glabrous, hairs up to 0.4 mm long; sheath 0.7–1.4 mm long, abaxially glabrous, adaxially with scattered adpressed hairs; stipules 0.4–1.0 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves, but sometimes clustered in the brachyblasts; bracteoles hairy; sepals 3, hairy on outside. *Male flower* unknown. *Female flowers* with bracteoles 3.2–3.8 mm long, longer than immature receptacle; sepals ovate, 2.4–3.0 × 0.9–1.1 mm, recurved; carpel 1; stigma 3.2–5.4 mm long, pinkish white, feathery, prominent above leaves; immature receptacle 2.0–2.6 × 0.8–1.2 mm, glabrous, clearly ribbed. *Achene* ellipsoid, 2.5–3.1 × 1.2–1.3 mm, medium to dark brown, glabrous; indistinctly ribbed with tubercles present. *Flowering time*: September to October.

Habitat: Well-drained sandy soils and rocky outcrops derived from the Witteberg Series in full sun; altitude 1 200–1 400 m.

Distribution: Apparently restricted to the northern slopes of the Groot Swartberg.

Conservation status: Only known from a few collections but probably quite widespread on the northern slopes of the Swartberg. Red List status: Rare.



Cliffortia verrucosa: A, branch with female flowers; B, achene.

Etymology: *verrucosa* (Latin) means 'warty', referring to the achenes, which are covered with small warts.

Notes: Probably of hybrid origin between *Cliffortia ruscifolia* and *C. tuberculata*, which has subsequently introgressed back into *C. ruscifolia*. Slightly tuberculate achenes are present in most Swartberg populations of *C. ruscifolia*, which indicates that introgression is continuing to occur. *Cliffortia verrucosa* can be distinguished from *C. ruscifolia* by the tuberculate achenes and the generally shorter and frequently toothed leaves.

Representative specimens

SOUTH AFRICA. **3321** (Ladismith): Swartberg Mts, above waterfall below Gamkaskloof road, at top end of Grootkloof, 1300 m, 21 Oct. 2000, (–BD), *Whitehouse 162* (BOL). **3322** (Oudtshoorn): Swartberg Pass, N side, 1370 m, 13 Sept. 1955, (–AC), *Acocks 18422* (K, PRE); Meiringspoort, 1220 m, 16 Oct. 1955, (–BC), *Esterhuysen 24847* (BOL).

77. **Cliffortia ferricola** C.M.Whitehouse in Bothalia 37(1): 12, fig. 2, 5 (2007). Type: Caledon District, S slopes of Mt Horeb, Kleinmond-Highlands road, 200m, 27 Sept. 2000, *Whitehouse 145* (BOL, holo.!; NBG!, iso.).



C. versiformis C.M.Whitehouse (2003), manuscript name.

Medium erect shrub, up to 1.5 m high, resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 1.2–1.7 mm wide, tinged reddish, hairy; stem hairs adpressed upwards, 0.2–0.7 mm long. *Leaves* usually unifoliolate and deeply toothed, but occasionally bifoliolate or trifoliolate; leaflets broadly ovate to lanceolate; leaflet 5.3–10.0 × 1.7–3.5 mm; apex sharply acuminate to pungent, 0.7–1.5 mm long; margins turned upwards to rounded, smooth and entire or more frequently with 2 teeth becoming deeply 3-lobed, lobes 0.6–4.9 mm long, straight; lamina 4–7-veined from base, cartilaginous, 0.3–0.4 mm thick, midrib prominent beneath against lamina, curved downwards and away from the stem, glabrous above, hairy beneath on very young growth but soon becoming glabrous, hairs 0.3–0.7 mm long; sheath 1.0–1.8 mm long, abaxially glabrous, adaxially scattered adpressed hairs; stipules 0.7–1.3 mm long, free, margins smooth to ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel with margins ciliate or not; sepals 3, hairy on outside. *Male flowers* with bracteoles 4.0–4.6 mm long; pedicel 1.1–1.4 mm long; sepals broadly ovate, 6.4–6.8 × 2.2–3.0 mm, acute to acuminate at the apex; stamens 9–10; filaments 8.8–10.1 mm long, red; anthers brownish red. *Female flowers* with bracteoles 3.1–4.4 mm long, longer than immature receptacle; sepals ovate, 3.2–4.1 × 0.8–1.3 mm, recurved; carpel 1; stigma 6.7–8.7 mm long, red, feathery, prominent above leaves; immature receptacle 2.4–2.9 × 0.9–1.2 mm, glabrous, clearly ribbed. *Achene* ellipsoid and slightly curved, 3.5–4.8 × 1.2–1.5 mm, medium to dark brown, glabrous; 9–13-ribbed, rounded to acute, 0.1–0.2 mm wide; elaiosome swollen around base. *Flowering time*: September to February, possibly sporadically all year.

Habitat: Well-drained clayish soil of ferricretes from shale bands of Table Mountain Series or Bokkeveld Series in full sun; altitude 150–250 m.

Distribution: Restricted to ferricretes in the Bot River Valley between Houwhoek, Kleinmond and Hermanus.

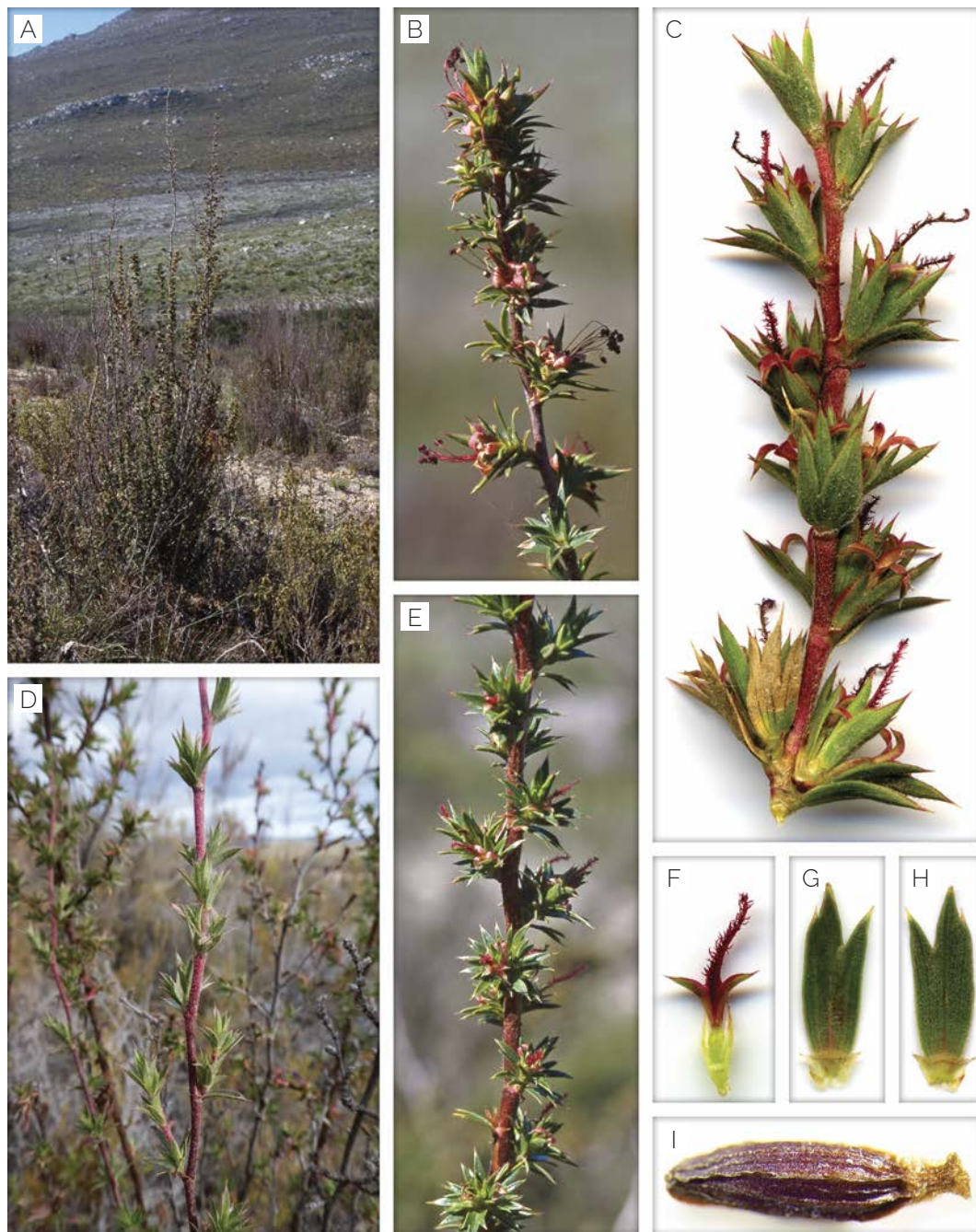
Conservation status: Only known from three recent collections, two of which are in the middle of highway junctions and under threat of development. Red List status: CR.

Etymology: *ferricola* (Latin) means 'inhabiting a ferrous substrate', i.e. ferricretes.

Notes: This segregate of *Cliffortia ruscifolia* is restricted to a small area around Bot River. It is a narrow plant with short side branches and short, often deeply toothed, leaves. The latter feature suggests that the species is derived from a cross between *C. ruscifolia* and a trifoliolate species. Male flowers have exceptionally long stamens and along with the glabrescent leaves, they suggest that the other parent may be a member of the *C. glauca* series, possibly *C. carinata* or *C. obovata*, which grow in the vicinity.

Representative specimens

SOUTH AFRICA. 3419 (Caledon): Highlands, S side of Highlands on road to Forest Station, 31 Mar. 1966, (–AC), Thompson 176 (NBG, PRE); Kogelberg, S slopes of Mt. Horeb, Kleinmond-Highlands road, 200 m, 27 Sept. 2000, (–AC), Whitehouse 145 (BOL, NBG); Kogelberg, S slopes of Mt. Horeb, Kleinmond-Highlands road, 200 m, 16 Dec. 2002, (–AC), Whitehouse 329 (BOL, NBG).



Cliffortia ferricola: A & D, habitat; B, branch with male flowers; C & E, branch with female flowers; F, female flower; G, dorsal view of leaf; H, ventral view of leaf; I, achene.

78. ***Cliffortia tridentata*** Willd., Species Plantarum, ed. 4(2): 838 (1805); G.Don: 596 (1832). *C. ruscifolia* var. *tridentata* (Willd.) Harv.: 295 (1862); Bolus & Wolley-Dod: 259 (1904). Type: Cape of Good Hope, without further information (B-W, holo!).



C. tabularis Diels ex Bolus & Wolley-Dod: 259 (1904), nom. nud.

Based on *Bolus* 7994.

C. intermedia sensu Bolus & Wolley-Dod: 259 (1904), pro parte, non Eckl. & Zeyh.

C. ruscifolia × *theodori-friesii* sensu Weim.: 124, fig. 35F–G (1934); Levyns: 449 (1950).

Medium erect shrub, up to 3 m high; densely divaricately branched, forming brachyblasts. *Young stems* 1.6–2.6 mm wide, tinged reddish, hairy; stem hairs adpressed upwards, 0.4–0.6 mm long. *Leaves* unifoliate; narrowly ovate to lanceolate, 11.6–12.4 × 2.9–4.0 mm; apex sharply acuminate to pungent, 1.0–1.2 mm long; margins markedly turned upwards to rounded, entire and smooth, sometimes with a tooth, up to 0.3 mm long; lamina 3–5-veined from base, cartilaginous, 0.2–0.4 mm thick, midrib not or slightly prominent beneath against lamina, curved upwards and towards the stem, glabrous above, hairy all over beneath, but not densely so and glabrescent, or glabrous, hairs 0.2–0.4 mm long; sheath 1.5–1.8 mm long, abaxially glabrous, adaxially glabrous or with a fringe of hairs at apex; stipules 2.4–3.3 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous; sepals 3, glabrous. *Male flowers* with bracteoles 3.5–5.0 mm long; pedicel 0.7–1.0 mm long, glabrous; sepals broadly ovate, 6.4–7.2 × 2.4–3.6 mm, acute to acuminate at the apex; stamens 8–10; filaments 7.4–7.9 mm long, red; anthers brownish red. *Female flowers* with bracteoles 4.2–5.4 mm long, longer than immature receptacle; sepals narrowly to broadly ovate, 2.8–3.4 × 1.2–1.5 mm, recurved; carpel 1; stigma 4.8–5.8 mm long, red, feathery, prominent above leaves; immature receptacle 2.1–2.3 × 0.9–1.1 mm, glabrous, clearly ribbed. *Flowering time*: August to September.

Habitat: Fynbos and in cracks amongst sandstone rocks; altitude 500–1100 m.

Distribution: Only known from the plateau of Table Mountain.

Conservation status. Widespread and common within its restricted range. Red List status: not listed.

Etymology: *tridentata* (Latin) means 'three-toothed', referring to the leaves, which sometimes have a tooth on each margin, so appearing three-toothed along with the central apex.

Notes: *Cliffortia tridentata* is generally less hairy than *C. ruscifolia* (especially the Cape Peninsula forms of that species), the leaves are broader, more broadly ovate and frequently with an occasional tooth or two. The leaves subtending the flowers are not markedly different from vegetative leaves, thus not forming an 'inflorescence' of the *C. ruscifolia* type. In addition, while male flowers are rare in *C. ruscifolia* on the Cape Peninsula, *C. tridentata* frequently has both male and female flowers.

This species was considered by Weimarck (1934) to be a hybrid between *Cliffortia ruscifolia* and *C. theodori-friesii*. In morphology, this assumption is understandable, as it is similar to *C. ruscifolia*, but is much more glabrous with less clearly defined brachyblasts when flowering, traits associated more with *C. theodori-friesii*. However, *C. tridentata* occupies the plateau area of Table Mountain, while *C. ruscifolia* is mostly found on the lower slopes. It is also evidently able to spread by seed, as it colonises large patches in the absence of *C. ruscifolia*. Molecular evidence thus far (Fig. 1 & 2) shows no affinities with *C. theodori-friesii*. Remarkably, the chloroplast genotype of *C. tridentata* is more distant to that of *C. ruscifolia* sampled from the lower slopes of Table Mountain, than is *C. ruscifolia* from the genotypes

of *C. × integerrima* (Table Mountain), *C. × intermedia* (Table Mountain), *C. ruscifolia × pungens* (Kogelberg), *C. ferricola* (Kogelberg), *C. purpurea* (Nieuwoudtville), *C. cf. purpurea* (Baviaanskloof) and ?*C. verrucosa* (Swartberg). This provides persuasive evidence for the species status of *C. tridentata*.

Harvey (1862) included this name as a variety of *Cliffortia ruscifolia* based upon the specimen Zeyher 2457 (although he misinterpreted the number as 2451). That specimen has clearly tridentate leaves, but it is much hairier underneath, a character noted in Harvey's description of the variety. No provenance is known for the Zeyher collection, but apart from the additional teeth, the plant accords with true *C. ruscifolia* much better than *C. tridentata*.

Representative specimens

SOUTH AFRICA. **3318** (Cape Town): Table Mt., above Cape Town, 150 m, Oct. 1873, (–CD), *Bolus* 2784 (BOL); Table Mt., near Maclear's Beacon, 1050 m, (–CD), *Bolus* 7994 (BOL); Table Mt., Jan. , (–CD), *Burchell* 519 (K); Table Mt., 1862, (–CD), *Cooper* 2493 (K); Table Mt., E side, Fountain Ledge, 760–915 m, 1 Sept. 1935, (–CD), *Esterhuysen s.n.* (BOL); Table Mt., Fountain Ledge, NE side, 915–1005 m, 1 Sept. 1935, (–CD), *Esterhuysen* 5436 (BOL); Cape Peninsula, Table Mt., lower cliffs on NE side, 6 Sept. 1942, (–CD), *Esterhuysen* 7995 (BOL); Cape Peninsula, Table Mt., near edge of upper plateau at Fir Tree, S side, 1005 m, 28 Sept. 1947, (–CD), *Esterhuysen* 14056 (BOL); Cape Peninsula, lower slopes at Kirstenbosch, 22 Sept. 1950, (–CD), *Esterhuysen* 17521 (BOL); Cape Peninsula, Table Mt., on ledges opposite Devil's Peak, 855 m, 27 Aug. 1961, (–CD), *Esterhuysen* 29097 (BM, BOL, NBG); Table Mt., Kasteelspoort, 6 Feb. 1898, (–CD), *Frommeling* 659 (NBG); Silverstream, Table Mountain, 19 Oct. 2013, (–CD), *iSpot* (,); Table Mt., Lower Plateau, 610 m, 19 Nov. 1933, (–CD), *Levyns* 4774 (BOL); Table Mt., lower plateau, 610 m, 19 Nov. 1933, (–CD), *Levyns* 4776 (BOL); Table Mt., Wood Ravine, 490 m, 19 Nov. 1933, (–CD), *Levyns* 4778 (BOL); Table Mt., top of Table Mt., (–CD), *Marloth* 8093 (PRE); Cape Peninsula, S slopes of the Twelve Apostles, 14 July 1940, (–CD), *Walgate s.n.* (BOL); Cape Peninsula, Table Mt., Smuts Track, between Fernwood Buttress and Window Gorge, 880 m, 7 Sept. 2002, (–CD), *Whitehouse* 306 (BOL); Cape Peninsula, Platteklip Gorge, 21 Aug. 1895, (–CD), *Wolley-Dod* 6 (BM, K); Cape Peninsula, Table Mt., fall between Lower Plateau and summit, 20 Dec. 1897, (–CD), *Wolley-Dod* 2151 (BOL, K).



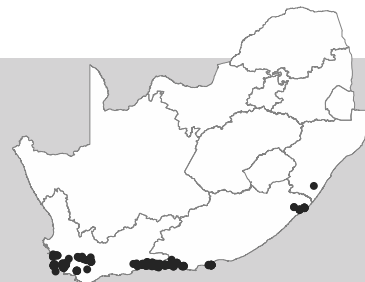
(79–89) **Section Ruboides** *C.M.Whitehouse* sect. nov. Type species:
C. odorata L.f.

Low to medium, **decumbent to scrambling shrubs**, usually only surviving fire as seed. Sheath glabrous adaxially; stipules membranous, usually ciliate. **Leaves unifoliate, single-veined**, curved downwards and away from the stem, **usually toothed with teeth recurved**. Bracteole hairy, longer than immature receptacle; sepals 3; female sepals sometimes absent or vestigial; receptacle glabrous; carpels 1; stigma red, rarely pinkish. Achene glabrous.

The core of this section is easy to recognise by the scrambling shrub or subshrub habit: plants often dominate large patches of damp ground beside streams and in seeps. The stems are almost invariably relatively weak, often entangled and rooting as they spread. The species of more arid areas are harder to place in this section, having smaller tougher leaves and able to thrive with less water. *Cliffortia pungens* is included here with reservation. It is reminiscent of *C. uncinata*, but forms a more upright divaricate shrub than other members of the section.

(79–84) *Cliffortia odorata* series

79. ***Cliffortia odorata*** L.f., Supplementum Plantarum: 431 (1782); Thunb.: 436 (1823); DC.: 595 (1825); G.Don: 596 (1832); Eckl. & Zeyh.: 266 (1836); Harv.: 296 (1862); Bolus & Wolley-Dod: 259 (1904); Juel: 276 (1918); Marloth: 43, t. 15B (1925); Weim.: 152, fig. 45A–E (1934); Levyns: 450 (1950); Fellingham: 610 (2000); Fellingham & Linder: 182, fig. 9–10 (2003); Whitehouse: 1, fig. 7 (2004b). Type: South Africa, Cape Peninsula, hills below Paradys, *Thunberg s.n.* (LINN, holo.; C, UPS, iso.).



C. alnifolia Rchb. in Zeyh.: 4 (1829), nom. nudum. Based on Zeyher 411.

C. odorata L.f. var. *vera* Harv.: 296 (1862), nom. invalid. contr. Art. 24.3. Types: Caledon District, Hottentots Holland Mts, *Ecklon & Zeyher 1724* (GRA, K, SI, syn.) & Paarl District, Berg R, <150 m, *Drège 6827* (BM, L, P, PRE, SI, SAM, TUB!, W!).

C. discolor Weim.: 202, fig. 16d–f (1948); Dahlgren: fig. 5C (1971); Fellingham: 609 (2000). Type: Cape Peninsula, Table Mt, 1000m, Nov. 1884, *Marloth 360* (PRE, holo!).

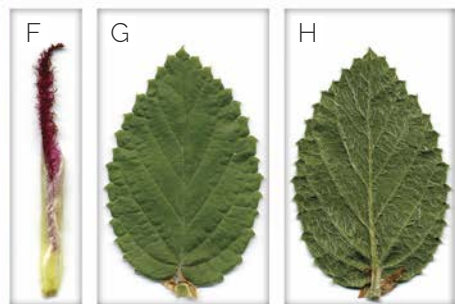
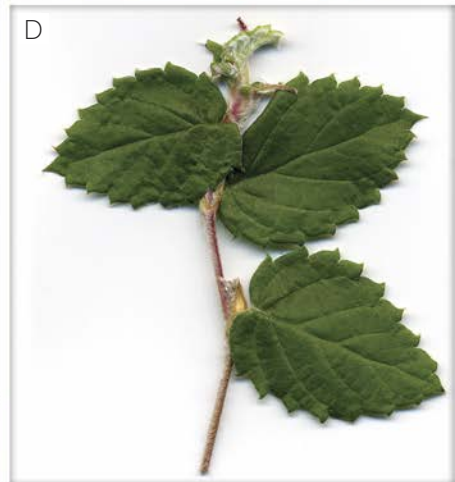
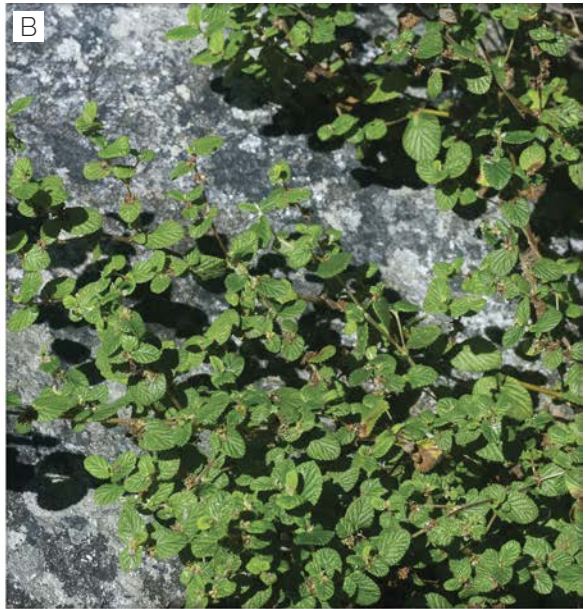
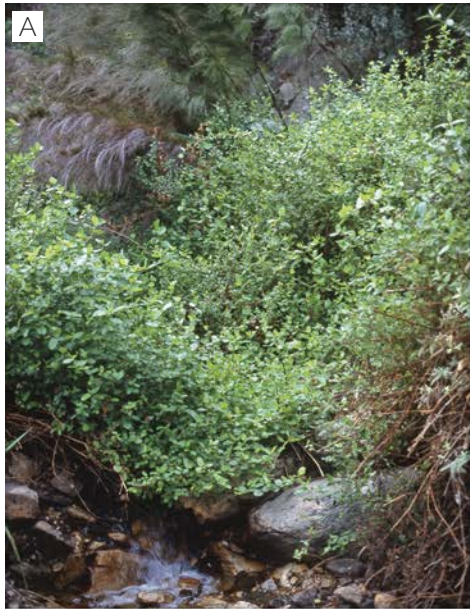
Sprawling shrub or forming a tangled mass up to 2 m high, killed by fire or sometimes surviving low intensity fires because of dampness of the ground; usually only sparsely branched and not forming brachyblasts. *Young stems* 1.2–3.6 mm wide, tinged reddish, hairy; stem hairs spreading, 1.2–3.1 mm long. *Leaves* unifoliate, single-veined from base; leaflets subcircular to elliptic or ovate, 21–62 × 15–54 mm; base cordate; apex sharply acuminate to acute, 0.1–1.5 mm long; margins markedly toothed with 10–36 recurved teeth, 1.1–3.4 mm long; lamina chartaceous, 0.1–0.6 mm thick across the midrib, which is prominent beneath, curved downwards and away from the stem, green above, green to whitish beneath, sparsely hairy above, sparsely to densely hairy beneath, hairs 0.5–3.4 mm long; sheath 1.1–5.2 mm long, abaxially hairy, adaxially glabrous; stipules 4.2–10.4 mm long, joined at top of sheath in front of petiole, brown and scarious, margins ciliate; petiole 0.6–8.0 mm long. *Flowers* clustered together at the bases of ordinary vegetative leaves; bracteoles hairy with margins long ciliate; sepals 3, hairy on outside. *Male flowers* with bracteoles 2.8–9.9 mm long; pedicel 0.8–4.9 mm long, articulated, glabrous; sepals broadly ovate, 4.4–6.4 × 1.8–3.1 mm, acuminate to long acuminate at the apex; stamens 12–18; filaments 3.8–7.1 mm long, red or white; anthers yellow. *Female flowers* with bracteoles 2.8–6.1 mm long, longer than and completely enclosing the immature receptacle; sepals vestigial or absent, triangular, 0.1–1.0 × 0.1–0.3 mm, erect; carpel 1; stigma 5.6–10.0 mm long, red, feathery, prominent above the petiole; immature receptacle 1.2–1.7 × 0.5–0.8 mm, glabrous, smooth. *Achene* ellipsoid, glabrous; faintly ribbed. *Flowering time*: throughout the year.

Habitat: Acid sands or clayish soil from shale bands of Table Mountain Series, generally restricted to south-facing slopes or shady kloofs with year-round groundwater; altitude 0–1 000 m.

Distribution: Disjunct, extending from the Cape Peninsula east along the lower mountain slopes of the Breede River valley, then from George to Gqeberha [Port Elizabeth], with outlying populations on the Wild Coast between Alexandria and Lusikisiki.

Conservation status: Widespread and common locally, although populations are often widely separated. Red List status: LC.

Etymology: *odorata* (Latin) means 'having a smell', but unfortunately a misnomer, as no part of this plant, or any *Cliffortia*, is fragrant in any respect.



Common names: wildewingerd (Afrikaans).

Notes: A common species on the Cape Peninsula and Garden Route between George and Gqeberha [Port Elizabeth], but replaced by *Cliffortia hirsuta* in the Hottentots Holland Mountains, Kogelberg and Riviersonderend Mountains. It has several discrete populations with relatively large distances between them, especially those between Gqeberha [Port Elizabeth] and Lusikisiki. *Cliffortia odorata* lacks a diagnostic character to separate it from the other members of *C. odorata* series: I consider it to be the ancestral species of the series from which the other species are derived. *Cliffortia odorata* may even be paraphyletic, a suggestion supported by preliminary molecular evidence (Fig. 1 & 2). Greater sampling is needed across all populations as well as the other species in the series.

Cliffortia discolor was described by Weimarck for a specimen from Table Mountain with very dense white hairs on the undersides of the leaves. However, this well-explored locality reveals a continuous range of variation typical of *C. odorata* and this is just considered to be another variant of this species.

The rather odd name appears to have been the result of the younger Linnaeus accepting that the male flowers belonged to *Cliffortia*, but that the habit was rather odd, having more in common with mint.

An unusual hybrid between *Cliffortia odorata* and *C. theodori-friesii*, *C. × maclearica*, has been recorded on the plateau of Table Mountain. *Cliffortia × integerrima* also appears to have *C. odorata* in its parentage.

Representative specimens

SOUTH AFRICA. **3030** (Port Shepstone): Alexandra District, Hlokozi, 760–825 m, 22 Feb. 1916, (–AD), *Rudatis* 2242 (NBG). **3129** (Port St Johns): NE Cape, Lusikisiki District, Mkala Spruit on Ludongo road, 795 m, 26 Feb. 1947, (–AD), *Acocks* 13411 (K, PRE); Lusikisiki District, Magwa Falls, 305 m, 13 Mar. 1955, (–BC), *Codd* 9320 (GRA, K, NBG, PRE); Lusikisiki District, Magwa Falls, 29 Dec. 1952, (–BC), *Leighton* 2977 (BOL, K, PRE); 5 km inland Port Grosvenor, 23 Aug. 1969, (–BD), *Strey* 8906 (K, NU, PRE). **3318** (Cape Town): Modder River 721, 30 m, 5 Aug. 1988, (–AD), *Freshwater Research Unit* 334 (BOL); Mamre, near Groene Kloof, 90 m, Oct. 1878, (–CB), *Bolus s.n.* (BOL); Bokkerivier, Buck Bay Farm, river at eye, 14 Dec. 1978, (–CB), *Boucher* 4177 (NBG, PRE); Cape Town, Devil's Peak, 3 May 1847, (–CD), *Alexander-Prior s.n.* (K); Table Mt., middle slopes, 975 m, Nov. 1878, (–CD), *Bolus s.n.* (BOL); Cape Peninsula, Lion's Head, lower W slopes, 1 Feb. 1975, (–CD), *Esterhuysen* 33759 (BOL, K); Cape Peninsula, Newlands, Skeleton Gorge, 6 Feb. 1898, (–CD), *Froembling* 667 (NBG); Table Mt., Skeleton Gorge, upper unwooded part, 11 Sept. 1928, (–CD), *Gillett* 49 (NBG); Cape Town, 1909, (–CD), *Herb. Worsdell s.n.* (K); Table Mt., 5 Apr. 1929, (–CD), *Hutchinson* 3182 (K); top of Skeleton Gorge, June 1915, (–CD), *Kensit s.n.* (BOL); Table Mt., Cape Town, 1000 m, Nov. 1884, (–CD), *Marloth* 360 (PRE); SE slopes of Devil's Peak, (–CD), *McKinnon* 196 (NBG); Cape Peninsula, Orange Kloof, cliffs WSW of Victoria Reservoir, S end of Back Table, 550 m, 8 Jan. 1992, (–CD), *Oliver* 9981 (NBG); Kirstenbosch, ledges below Fernwood Peak, 425 m, 15 Dec. 1970, (–CD), *Rourke* 1274 (NBG); Cape Peninsula, Devil's Peak, Saddleback, 305–610 m, Aug. 1897, (–CD), *Thode* 6175 (NBG); Cape Peninsula, Devil's Peak, Saddleback, 305–610 m, July 1886, (–CD), *Thode* 9182 (NBG); Table Mt., E side, 305–610 m, Dec. 1886, (–CD), *Thode* 9389 (NBG); Cape Peninsula, Newlands Ravine, above contour path, 500 m, 27 Jan. 2000, (–CD), *Whitehouse* 71 (BOL); kloof beyond Kirstenbosch, 26 Sept. 1896, (–CD), *Wolley-Dod* 1725 (BM); Dassenberg farm, below the dam wall on the stream from Pella, 28 July 1979, (–DA), *Esterhuysen* 35224 (BOL, NBG); Stellenbosch, foothills of Stellenbosch Mt., behind Coetzenburg, 3 July 1963, (–DD), *Bos* 127 (K, NBG, PRE); Stellenbosch, Helshoogte valley, 5 Aug. 1919, (–DD), *Garside* 1242 (K); Jonkershoek, 12 Feb. 1968, (–DD), *Geldenhuis s.n.* (NBG); below Bosboukloof, but locally common in Abdolskloof, next to the weir pool, 295 m, 6 June 1967, (–DD), *Kerfoot* 5844 (NBG, PRE); Stellenbosch, Idas Valley, Feb. 1957, (–DD), *Loubser* 825 (BOL); Waterkloof Farm, area adjacent to vineyards, 180 m, 25 Feb. 1994, (–DD), *Nel & Boucher* 73 (BOL, NBG); Stellenbosch, Jonkershoek, Nov. 1921, (–

DD), *Page s.n.* (PRE); Bothmaskop, 12 Oct. 1960, (–DD), *van Rensburg 1979* (PRE); Coetzenburg, Eerste R, 13 Apr. 1986, (–DD), *Wahl 82* (NBG). **3319** (Worcester): De Wet, on farm Orange Grove, 15 June 1960, (–CB), *van Breda 1219* (K, PRE); 'Keerom', at base of Tygerberg, 7 Apr. 1974, (–DA), *Esterhuysen 33509* (BOL); Langeberg Mts, at base of Dassieshoek Peak, 4 June 1961, (–DB), *Esterhuysen 29064* (BOL, K); Doringkloof Farm, S foothills of Voetpadsberg, 610 m, 27 Apr. 1985, (–DB), *van Wyk 2360* (NBG, PRE). **3320** (Montagu): Keurkloof, 5 May 1940, (–CC), *Compton 8747* (NBG); Donkerkloof, 460 m, 26 Sept. 1946, (–CC), *Compton 18466* (NBG); near Montagu, Keur Kloof, May 1940, (–CC), *Esterhuysen 1831* (BOL); kloof off Cogman's Kloof, 28 Oct. 1954, (–CC), *Esterhuysen 23890* (BOL); Cogman's Kloof, 300 m, 2 Feb. 1894, (–CC), *Kuntze s.n.* (K); near bungalow in Cogman's Kloof, Oct. 1922, (–CC), *Levy's 116* (BOL); Montagu, Donker Kloof, 275 m, 5 July 1938, (–CC), *Levy's 6466* (BOL); Bloupunt Hiking Trail, Donkerkloof, between Rietkloof and Ou Meul, 305 m, 10 June 2000, (–CC), *Whitehouse 129* (BOL, NBG). **3322** (Oudtshoorn): Ruitersbos, 3 Dec. 1951, (–CC), *Esterhuysen 19430* (BOL); near George, 19 Mar. 1929, (–CD), *Hutchinson 3168* (BM, K); George, July 1917, (–CD), *Michell s.n.* (BOL); Ebb and Flow, 25 Jan. 1943, (–DC), *Compton 14374* (BOL, NBG); Wilderness, 13 Feb. 1944, (–DC), *Compton 15589* (BOL, NBG); Knysna, Farleigh Plantation, 16 Aug. 1956, (–DD), *Dickin 83* (BOL); Portland, River's End, Feb. 1924, (–DD), *Duthie 928* (NBG). **3323** (Willowmore): Knysna, Gouna Forest Reserve, OP OEWER VAN STROOM., 9 Apr. 1983, (–CC), *Botha 3149* (PRE); Knysna, Gouna, Flower Reserve, 550–610 m, (–CC), *Taylor 1298* (PRE); Knysna, Deepwalls Forest Station, near Gouna Forest, 23 Sept. 1969, (–CC), *Thompson 870* (K, NBG, PRE); Forest Hall, 29 Jan. 1927, (–CD), *Duthie 1054* (NBG); hills E of Plettenberg Bay, 3 Sept. 1955, (–CD), *Theron 1773* (K, PRE); Nature's Valley, beside bridge over Grootrivier, 10 m, 18 Jan. 2001, (–DC), *Whitehouse 178* (BOL); Ratels Bosch flats, 200 m, Aug. 1905, (–DD), *Fourcade 24* (BOL, K, NBG). **3325** (Port Elizabeth): near Port Elizabeth, Theescomb, Feb. 1913, (–CD), *Paterson 2015* (BOL); Port Elizabeth District (Baakens R ex Weimarck), Dec. , (–DC), *Burchell 4353* (K); Port Elizabeth District, Lower Guinea Fowl trail, Baakens R through Port Elizabeth, 10 m, 21 July 1999, (–DC), *Burrows 5141* (GRA); Port Elizabeth, Baakens R Valley Nature Reserve, Mar. 1935, (–DC), *Long 1344* (K, PRE); Port Elizabeth, Baakens River Valley, Targetkloof, 30 Jan. 1974, (–DC), *Olivier 981* (NBG, PEU). **3418** (Simonstown): Cape Peninsula, Smitswinkel Bay, just above the beach and below the dam, 27 Jan. 1963, (–AD), *Esterhuysen 30049* (BOL); below the waterworks near Somerset West, 27 July 1947, (–BB), *Brenan 7625* (K); Somerset West, higher dam near Lord Charles Hotel, 23 Feb. 1995, (–BB), *Fellingham 1660* (NBG); Somerset West, lower dam near Lord Charles Hotel, 23 Feb. 1995, (–BB), *Fellingham 1661* (NBG); Somerset West, lower dam near Lord Charles Hotel, 14 Mar. 1995, (–BB), *Fellingham 1664* (NBG); Somerset West, lower dam near Lord Charles Hotel, 22 June 1995, (–BB), *Fellingham 1678* (BOL, NBG); Somerset West, 10 May 1942, (–BB), *Parker 3663* (BOL, K, NBG); Van der Stel, 30 m, 12 Nov. 1927, (–BB), *Smith 4853* (PRE). **3419** (Caledon): Caledon District (Swartberg, Hot Baths near Caledon ex Weimarck), (–AB), *Burchell 927* (K); Caledon Baths, 245 m, July 1892, (–AB), *Guthrie 2485* (NBG); Riviersonderend, Nov. 1926, (–BB), *Gillett s.n.* (NBG). **3423** (Knysna): Concordia Plantation, Block D, Jan. 1919, (–AA), *Keet 27* (NBG, PRE); Knysna, Concordia, 185 m, 6 June 1925, (–AA), *Laughton s.n.* (PRE). **3424** (Humansdorp): Hoffmansbosch District, 16 Jan. 1919, (–AB), *Britten 1289* (K, PRE); Cape, Clarkson, Mar. 1926, (–AB), *Thode 825* (K, PRE).

80. **Cliffortia reticulata** Eckl. & Zeyh., Enumeratio Plantarum Africae Australis Extratropicae 2: 266 (1836); Weim.: 149, fig. 44A–C (1934); Fellingham: 610 (2000). *C. odorata* var. *reticulata* (Eckl. & Zeyh.) Harv.: 296 (1862). Type: Tulbagh District, Winterhoek Mts, 'alt. II–III', Nov., *Ecklon & Zeyher 1725* (S, holo.; B, C, SAM!, W, iso.).



Shrub forming a tangled mass up to 1.8 m high, killed by fire; usually only sparsely branched and not forming brachyblasts. *Young stems* 1.2–1.6 mm wide, tinged reddish, hairy but soon becoming glabrous; stem hairs adpressed upwards, 0.4–1.9 mm long. *Leaves* unifoliate, single-veined from base; leaflets sub-circular to ovate, 14–35 × 12–22 mm; base cordate; apex acute to acuminate, 0.4–0.5 mm long, margins markedly toothed with 13–31 recurved teeth, 0.9–1.6 mm long; lamina chartaceous, 0.4–0.5 mm thick across midrib, which is prominent beneath, curved downwards and away from the stem, green above and beneath, sparsely hairy above but soon becoming glabrous, hairy beneath but soon becoming glabrous except for the midrib, hairs 0.5–2.1 mm long; sheath 2.7–3.0 mm long, abaxially hairy to glabrous, adaxially glabrous; stipules 3.4–5.6 mm long, brown and scarious, free, margins ciliate; petiole present, 1.3–3.8 mm long. *Flowers* clustered in axils of undifferentiated leaves; bracteoles hairy on the keel, margins ciliate; sepals 3, hairy on outside. *Male flowers* with bracteoles 4.7–6.3 mm long; pedicel 1.4–2.6 mm long; sepals broadly ovate, 6.6–8.2 × 2.4–3.9 mm, long acuminate at the apex; stamens 18–22; filaments 5.3–9.7 mm long, red; anthers yellow. *Female flowers* with bracteoles 4.6–6.0 mm long, longer than and completely enclosing immature receptacle; sepals usually vestigial or absent, triangular, 0.1–0.6(–2.0) × 0.1–0.4(–0.5) mm, erect; carpel 1; stigma 6.3–9.1 mm long, red, feathery, prominent above petiole; immature receptacle 1.4–2.1 × 0.7–0.9 mm, glabrous, smooth. *Achene* ellipsoid, ± 4.1 × ± 1.8 mm, glabrous; faintly 6-ribbed, ribs rounded, less than 0.1 mm wide. *Flowering time*: probably throughout the year.

Habitat: Stream edges and damp slopes in fynbos on south-facing slopes and soils derived from shale bands of Table Mountain Series; altitude 600–800 m.

Distribution: Described from the Groot Winterhoek mountain range, and only recorded in recent years from the path from the Tulbagh Valley to Sneeuugat and a possibly also from the Thee River in the upper reaches of the Olifants River valley.

Conservation status: Only known from two localities, but certainly common at one; only doubtfully distinct from the very widespread and common *Cliffortia odorata*. Red List status: DDT.

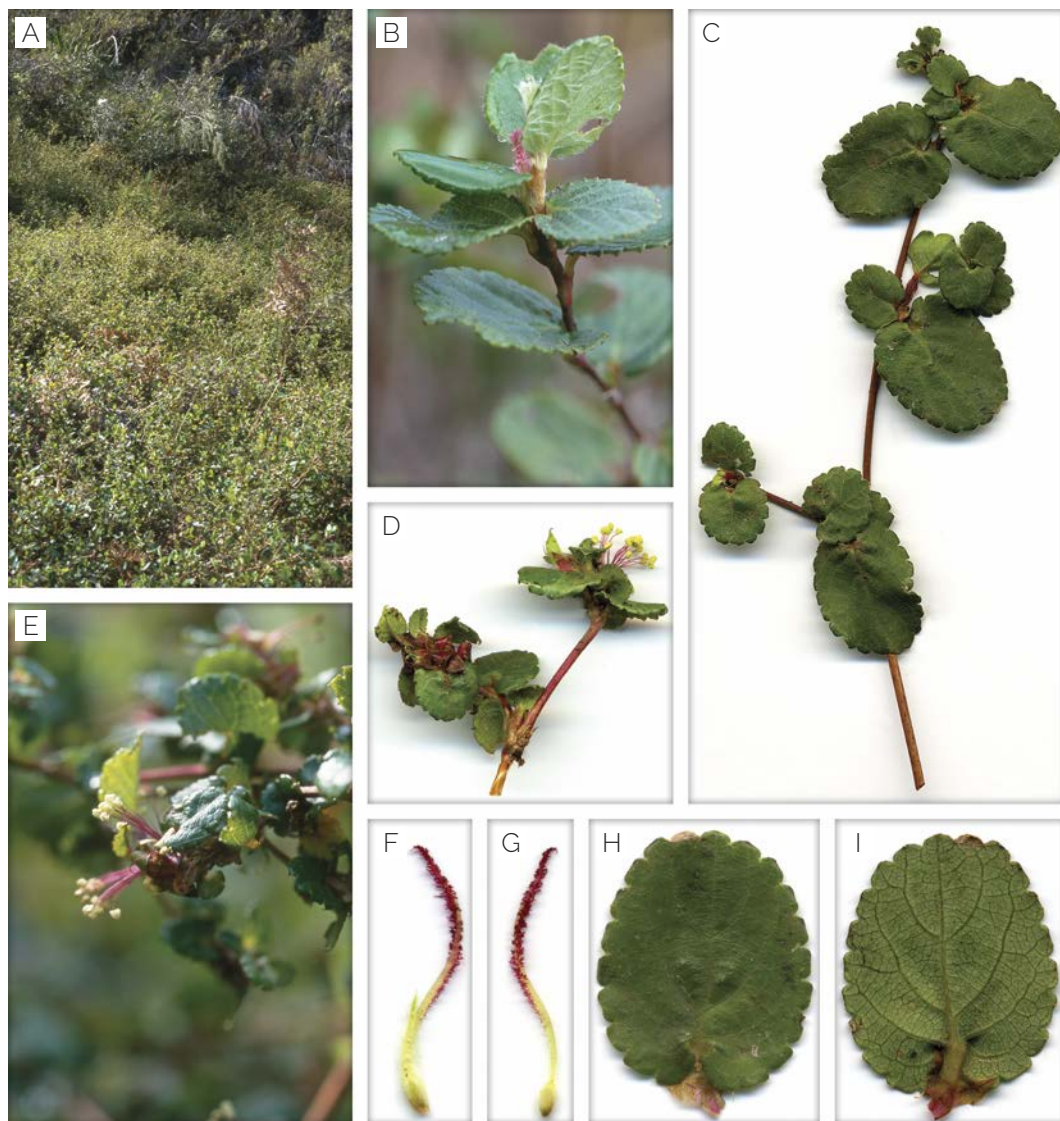
Etymology: *reticulata* (Latin) means 'netted', referring to the clear net-veining beneath, although not necessarily any more so than in closely related species.

Notes: Only doubtfully distinct from the very variable and widespread *Cliffortia odorata*, *C. reticulata* generally has smaller leaves, less hairy and often soon becoming glabrous. It also has a more graceful habit, in this similar to *C. pilifera*. Weimarck suggested that this species might be a hybrid between *C. odorata* and *C. pilifera*, and molecular data does not refute this hypothesis (Fig. 1 & 2). *Cliffortia odorata* grows in the area of *C. reticulata*, but at a slightly lower altitude. The single population of *C. pilifera* is some distance away in Bain's Kloof. Populations from Thee River near Citrusdal may be this species but alternatively are just another form of *C. odorata*.

Populations of *Cliffortia odorata* in the Knysna area have particularly small leaves, resembling those of *C. reticulata*. However, it is very unlikely that they have a common origin and are more likely to be part of the natural geographical variation in the species.

Representative specimens

SOUTH AFRICA. 3319 (Worcester): Drostdy valley, 610 m, 15 Feb. 1934, (–AA), *Compton 4670* (NBG); above the Tulbagh valley, along the path up to the Sneeuat, 1 Sept. 1975, (–AA), *Esterhuysen 33919* (BOL); Groot Winterhoek Wilderness Reserve, path up to Sneeuat, near Die Vurk, path just beyond rock shelter, 800 m, 22 Sept. 2001, (–AA), *Whitehouse 268* (BOL, K, NBG).



Cliffortia reticulata: A, habitat; B, branch with female flower; C, branch; D & E, branch with male flower; F & G, female flower; H, dorsal view of leaf; I, ventral view of leaf.

81. **Cliffortia hirsuta** Eckl. & Zeyh., Enumeratio Plantarum Africae Australis Extratropicae 2: 267 (1836); Weim.: 156, fig. 45F–K (1934); Fellingham: 610 (2000). *C. odorata* var. *hypoleuca* Harv.: 296 (1862). Type: Caledon District, Riviersonderend Mts, near towns Linde and Ecksteen, 'alt. IV', Sept., Ecklon & Zeyher 1726 (S, holo.; B, C, W, Z!, iso.).



Sprawling shrub or forming a tangled mass, up to 2 m high, killed by fire; usually only sparsely branched and not forming brachyblasts. *Young stems* 1.2–3.8 mm wide, hairy; stem hairs spreading, 1.3–4.0 mm long. *Leaves* unifoliate; elliptic or ovate, 17–58 × 13–42 mm; base cordate; apex long acuminate, 0.4–1.5 mm long; margins markedly toothed with 13–34 recurved teeth, 0.5–3.6 mm long; lamina 5–8-veined from base, chartaceous, 0.3–0.7 mm thick across midrib, which is prominent beneath, curved downwards and away from the stem, green above, contrastingly whitish beneath, hairy above, densely hairy, almost tomentose, beneath, hairs 0.5–2.0 mm long; sheath 3.5–8.5 mm long, abaxially hairy, adaxially glabrous; stipules 3.6–10.0 mm long, joined at top of sheath in front of leaf, margins ciliate; petiole absent. *Flowers* clustered in axils of undifferentiated leaves; bracteoles hairy on the keel, margins ciliate; sepals 3, hairy on outside. *Male flowers* with bracteoles 6.0–10.2 mm long; pedicel 1.7–4.6 mm long, articulated, glabrous; sepals broadly ovate, 5.7–9.1 × 2.0–3.8 mm, acute to acuminate at the apex; stamens 18–32; filaments 7.5–14.0 mm long, red; anthers yellow. *Female flowers* with bracteoles 4.9–7.0 mm long, longer than and completely enclosing immature receptacle; sepals absent or vestigial, triangular, 0.1–0.3 × 0.1–0.2 mm, erect; carpel 1; stigma 5.8–15.0 mm long, red, feathery, prominent at the base of the leaves; immature receptacle 1.3–3.0 × 0.6–1.2 mm, glabrous, smooth. *Achene* ellipsoid, 2.8–3.7 × 1.5–1.8 mm, whitish to pale brown, glabrous; faintly 6–8-ribbed, ribs rounded, less than 0.1 mm wide. *Flowering time*: throughout the year.

Habitat: Seeps and damp areas near streams, on acid sands or clayish soil from shale bands of Table Mountain Series, in full sun; altitude 0–1 200 m.

Distribution: Confined to southwestern Western Cape, from the Kogelberg north as far north as Stettinberg and east along the Riviersonderend Mountains, but absent from the Cape Peninsula.

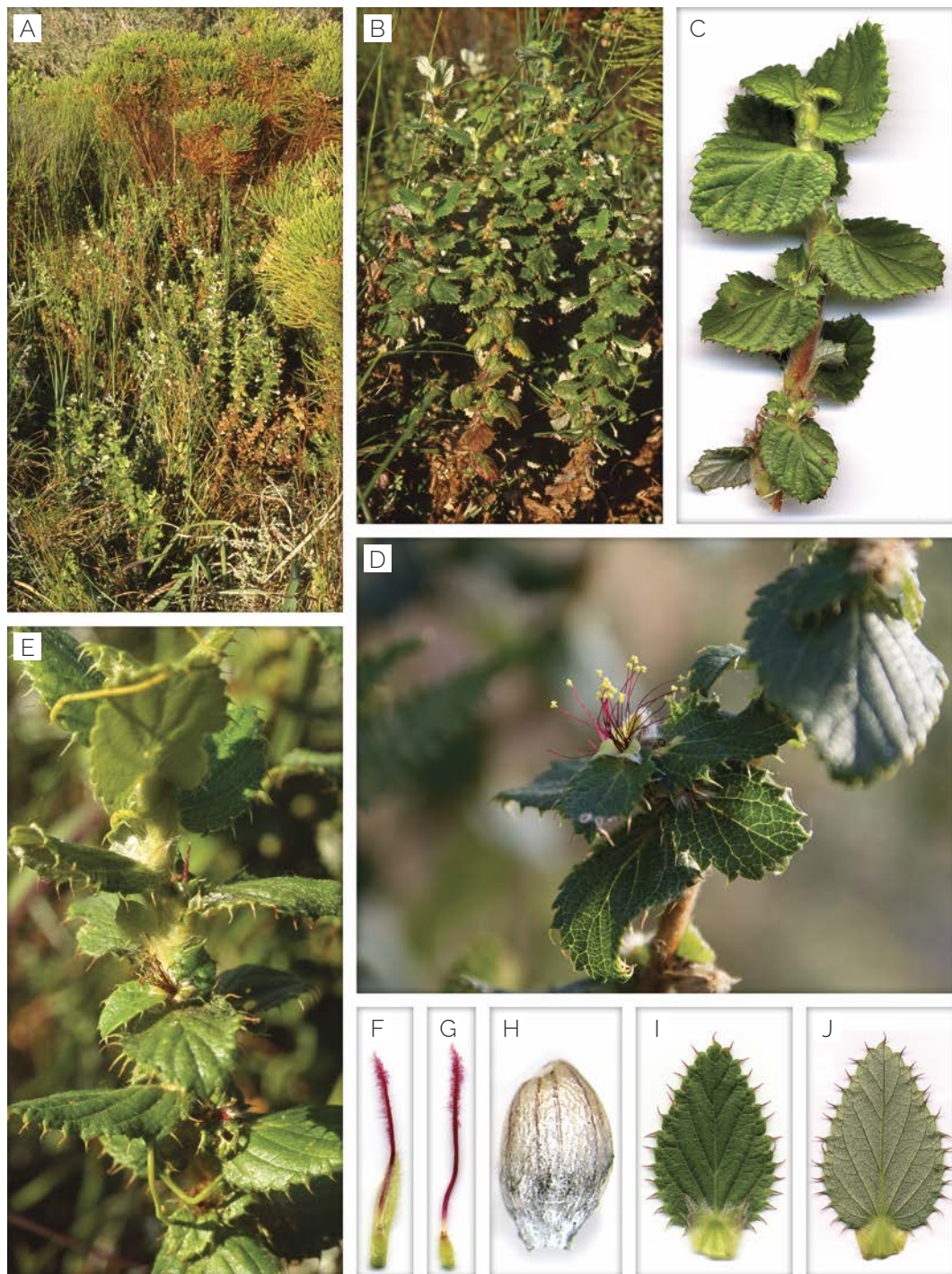
Conservation status: Relatively restricted in distribution but common in suitable habitats there. Red List status: LC.

Etymology: *hirsuta* (Latin) means 'bearing coarse long hairs', present both on the leaves and stems.

Notes: *Cliffortia hirsuta* replaces *C. odorata* in the southwestern mountains, excluding the Cape Peninsula. It is easily distinguished by its coarsely toothed and discoloured leaves, bright green above and white tomentose beneath, and is unique amongst the species in the *C. odorata* series for lacking a petiole. Some forms of *C. odorata* also have noticeably discoloured leaves but they always have a petiole and usually less than 20 stamens.

Weimarck (1934) suggested that *Drège 6827b* (G–DEL) was a hybrid between *C. hirsuta* and *C. odorata*. Where the specimen was collected, Genadendal and Riviersonderend, *C. hirsuta* is common and the collection may just represent an atypical form of the species.

Bayliss 940 is recorded from 'De Hoop'. While this might refer to De Hoop Nature Reserve (3420BC), it seems unlikely, and either the specimen is mislabelled or it is referring to De Hoop farm in the Houw Hoek area (3319AA).



Representative specimens

SOUTH AFRICA. **3318** (Cape Town): Stellenbosch, Swartboskloof, Dasbos, 28 July 1960, (–DD), *van der Merwe* 23–05 (NBG, PRE). **3319** (Worcester): Franschhoek Pass, 31 May 1940, (–CC), *Bond* 351 (NBG); Franschhoek Pass, E side, 610 m, 26 Nov. 1939, (–CC), *Compton* 8163 (NBG); Berg R Hoek, 4 Oct. 1942, (–CC), *Compton* 13860 (NBG); Franschhoek Pass, SE slopes, 31 May 1940, (–CC), *Esterhuysen* 2817 (BOL, K, PRE); Stettynsberg, Stettyn farm, stream to S of 4×4 look-out above Elandsloof, 1130 m, 10 Mar. 2001, (–CD), *Whitehouse* 212 (BOL, NBG). **3418** (Simonstown): Rooskraalberg, near summit, SE side, July 1940, (–BB), *Esterhuysen* 2659 (BOL); Hottentots Holland Mts, ridge E of Rooskraalberg, 610–760 m, 20 May 1979, (–BB), *Esterhuysen* 35209 (BOL, K); SE slopes of Moordenaarskop, 975 m, 8 May 1969, (–BB), *Haynes* 13 (NBG, PRE); flats SW of Klein Hangklip, 20 m, 10 Sept. 1969, (–BD), *Boucher* 572 (K, NBG, PRE); Palmiet, 2 Feb. 1949, (–BD), *de Vos* 1182 (NBG); Palmiet R mouth, near coast, 24 Jan. 1946, (–BD), *Esterhuysen* 12582 (BOL); Harold Porter Nature Reserve, flats below road, 24 Nov. 1989, (–BD), *Esterhuysen* 36906 (NBG); Betty's Bay, foot of mountain, 16 Apr. 1974, (–BD), *Goldblatt* 1615 (NBG, PRE); Palmiet R mouth, 16 Feb. 1936, (–BD), *Levy's* 5331 (BOL); Betty's Bay, 30 m, Nov. 1960, (–BD), *Levy's* 11136 (BOL); Betty's Bay, 20 m, 11 Dec. 1972, (–BD), *Rycroft* 3160 (NBG); Palmiet R, c. 1.5 km WSW from Palmiet R mouth, farm of D.S. Luckhoff, near streamside, 50 m, 15 Mar. 1983, (–BD), *van Wyk* 1103 (NBG, PRE); Betty's Bay, slopes just above high water mark, 1 Aug. 1959, (–BD), *White* 5167 (PRE). **3419** (Caledon): Nuweberg, Kathleen Murray Wild Flower Reserve, 10 May 1966, (–AA), *Barker* 10373 (NBG); De Hoop, 150 m, 17 June 1974, (–AA), *Bayliss* 940 (PRE); Hottentots Holland Mts, near Grabouw, Dec. 1877, (–AA), *Bolus* 4135 (BOL); Elgin, 18 July 1936, (–AA), *Compton* 6427 (NBG); Nuweberg, 760 m, 26 Aug. 1940, (–AA), *Compton* 9212 (NBG); Elgin, 490 m, 23 Sept. 1931, (–AA), *Levy's* 3361 (BOL); Viljoen's Pass, 5 Jan. 1948, (–AA), *Rodin* 3098 (BOL, K, PRE); Naberg, near top of Viljoen's Pass, 6 Dec. 1954, (–AA), *Stokoe* SAM 59994 (PRE, PRE); mountains W of top of Viljoen's Pass, Nov. 1942, (–AA), *Stokoe* 8607 (BOL); near Kleinmond, Sept. 1924, (–AC), *Compton* 3349 (BOL, K); Kleinmond, 9 Nov. 1941, (–AC), *Compton* 12379 (BOL, NBG); Kleinmond flats, N of vle, 24 Apr. 1948, (–AC), *de Vos* 858 (NBG); Kogelberg Reserve, Paardeberg, 60 m, 2 Feb. 1962, (–AC), *Grobler* 589 (NBG, PRE); Bot R vle, 10 m, 10 Aug. 1982, (–AC), *O'Callaghan* 292 (NBG); Kleinmond, E end of village by stream next to Caravan Park, 20 m, 26 Dec. 2000, (–AC), *Whitehouse* 173 (BOL); mountains of Genadendal, near Baviaan's Kloof, (–BA), *Burchell* 7895 (K); Genadendal, 610–915 m, Oct. , (–BA), *Drège* 6828 (BM, K); Riviersonderend Mts, between Greyton and McGregor, Boesmansloof Trail, between Oakes Falls and Die Galg, 490 m, 23 Oct. 1999, (–BA), *Whitehouse* 64 (BOL, NBG).

82. ***Cliffortia viridis* Weim.** in Botaniska Notiser 90: 202, fig 17d–f (1948); Fellingham: 611 (2000). Type: Caledon District, Kogelberg area, 900 m, Sept. 1924, *Stokoe 1018* (PRE, holo!).



Sprawling shrub over or scrambling amongst vegetation, up to 0.5 m high, killed by fire; sparsely branched and not forming brachyblasts. *Young stems* 1.2–1.5 mm wide, tinged reddish, glabrous or with a few long hairs when very young; stem hairs spreading, 1.0–2.6 mm long. *Leaves* unifoliate; elliptic to ovate, 21–36 × 11–20 mm; base cordate; apex acute to acuminate, 0.4–0.8 mm long; margins markedly toothed with 19–26 recurved teeth, 1.2–1.8 mm long; lamina single-veined from base, chartaceous to cartilaginous, 0.4–0.6 mm thick across midrib, which is prominent beneath, curved downwards and away from the stem, green above and beneath, glabrous or very sparsely hairy and very quickly becoming glabrous; sheath 1.9–2.7 mm long, abaxially glabrous or rarely with a few long hairs, adaxially glabrous; stipules 5.4–10.1 mm long, joined at top of sheath in front of petiole; margins smooth to ciliate; petiole present, 3.3–5.3 mm long. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins ciliate; sepals 3, hairy on outside. *Male flowers* with bracteoles 5.4–7.1 mm long; pedicel 1.5–2.3 mm long, articulated, glabrous; sepals broadly ovate, 6.0–6.8 × 2.0–3.1 mm, long acuminate at the apex; stamens 12–15; filaments 4.3–7.7 mm long, red; anthers yellow. *Female flowers* with bracteoles 4.8–8.0 mm long, longer than and completely enclosing immature receptacle; sepals absent or vestigial, triangular, 0.3–0.9 × 0.2–0.3 mm, erect; carpel 1; stigma 5.4–7.4 mm long, red, feathery, prominent above petiole; immature receptacle 1.1–1.5 × 0.5–0.8 mm, glabrous, smooth. *Achene* unknown. *Flowering time*: September to April, and possibly throughout the year.

Habitat: Damp gulleys in fynbos on south-facing mountain slopes on acid sands from Table Mountain Series; altitude 300–1 050 m.

Distribution: Very narrow endemic, restricted to a few damp gulleys in the Kogelberg.

Conservation status: A narrow endemic, probably threatened by too frequent fires. Red List status: VU.

Etymology: *viridis* (Latin) means 'clear green', referring to the leaves being green above and beneath, in contrast to generally discoloured leaves of closely related species.

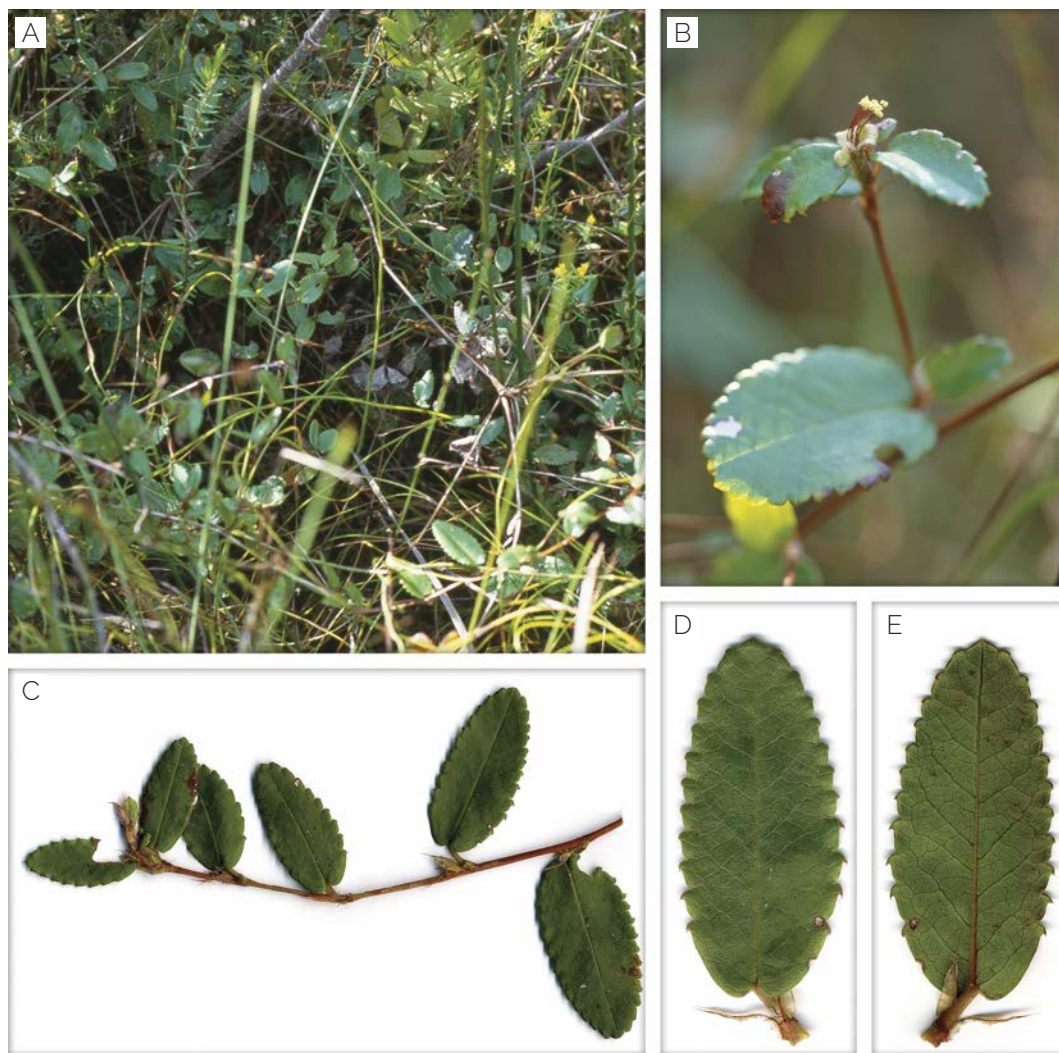
Notes: A narrow endemic of south-facing slopes in the Kogelberg area, this species is easily distinguished by its trailing habit, narrowly elliptic, almost glabrous, green leaves. Molecular evidence suggests that this species may have originated as a cross between *Cliffortia hirsuta* and *C. ferruginea* (Fig. 1 & 2). Morphologically it is intermediate between the two. It can be distinguished from *C. hirsuta* by the green underside to the leaves and from *C. ferruginea* by its larger leaves (21–36 × 11–20 mm in *C. viridis*, 6.8–42.0 × 1.2–14.0 mm in *C. ferruginea*). The achenes are unknown, probably because of its scarcity rather than because it is sterile. Its habit suggests that it is killed by fire, thus regenerating from seed.

A specimen from a kloof in the Riviersonderend Mountains near Riviersonderend (*Esterhuysen 25071*) closely resembles *Cliffortia viridis* except for the paler, whitish underside of the leaves. It is possibly another hybrid with *C. hirsuta*, which is common in the area.

Representative specimens

SOUTH AFRICA. 3418 (Simonstown): Kogelberg, 975 m, 1 Jan. 1945, (–BB), *Compton 16876* (NBG); Kogelberg Forest Reserve, ridge NE of Kogelberg Peak, 915 m, 12 Mar. 1969, (–BB), *Kruger 811* (PRE); Kogelberg, 915 m, 31 Dec. 1944,

(-BB), *Leighton 882* (BOL, NBC); E of Kogelberg, at summit of the peak at the N end of Five Beacon Ridge, 1035 m, 12 Mar. 1969, (-BB), *Rourke 1183* (NBC); Kogelberg, 900 m, Sept. 1924, (-BB), *Stokoe 1018* (PRE); Kogelberg Forest Reserve, steep path up S slope of Platberg, 760 m, 15 Feb. 1968, (-BD), *Boucher 23* (NBC); Kogelberg Forest Reserve, Platberg, plot area, 790 m, 20 Dec. 1968, (-BD), *Boucher 193* (NBC); Pringle East Peak, 21 Sept. 1952, (-BD), *Esterhuysen 18851a* (BOL, BOL, NBC, PRE); Pringle East Peak, S slopes near summit, 23 Nov. 1952, (-BD), *Esterhuysen 20729a* (BOL); at W base of the Platberg, Kogelberg Reserve boundary, 24 Mar. 1979, (-BD), *Esterhuysen 35186* (BOL, K); Harold Porter Botanic Garden, on the plateau path, S aspect, 300 m, 23 Nov. 1989, (-BD), *Esterhuysen 36882* (NBC); Kogelberg Nature Reserve, Kogelberg Trail, W facing gully at NW end of Platberg, 500 m, 10 Oct. 2001, (-BD), *Whitehouse 273* (BOL, NBC).



Cliffortia viridis: A, habitat; B, branch with male flower; C, branch; D, dorsal view of leaf; E, ventral view of leaf.

83. **Cliffortia pilifera** Bolus in Journal of the Linnean Society, Botany 25: 162 (1889); Weim.: 150, fig. 44D–H (1934); Fellingham: 610 (2000). Type: Paarl District, Drakenstein Mts, Bain's Kloof, Darling Bridge, E slopes, 350 m, Mar. 1879, *Bolus 4032* (BOL, holo.; B, K! [date given as March 1877], NBG!, PRE!, SAM!, iso.).



Sprawling shrub over or scrambling up vegetation, up to 1.8 m high, killed by fire; divaricately branched and not forming brachyblasts. *Young stems* 0.4–1.1 mm wide, hairy; stem hairs spreading, 0.8–2.1 mm long. *Leaves* unifoliate; subcircular to ovate, 19–29 × 18–27 mm; base cordate; apex acute to acuminate, 0.9–1.1 mm long; margins markedly toothed with 12–17 recurved teeth, 1.8–3.4 mm long; lamina single-veined from base, herbaceous, midrib prominent against lamina beneath, curved downwards and away from the stem, glabrous or sparsely hairy above and on midrib beneath, hairs 1.0–1.9 mm long; sheath 1.1–1.8 mm long, abaxially hairy, adaxially glabrous; stipules 2.7–4.2 mm long, free, margins ciliate; petiole present, 1.3–2.5 mm long. *Flowers* solitary at the bases of leaves which are often on short slender shoots; bracteoles hairy; sepals 3, hairy on outside. *Male flowers* with bracteoles 1.8–2.3 mm long; pedicel glabrous; sepals broadly ovate, 4.9–5.7 × 2.8–3.2 mm, acute to acuminate at the apex; stamens 22–28; filaments 4.6–6.3 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 2.0–3.1 mm long, longer than immature receptacle; sepals ± triangular to oblong, 1.5–2.1 × 0.5–0.9 mm, erect; carpel 1; stigma 3.2–5.3 mm long, red, feathery, prominent above leaves; immature receptacle 0.8–1.5 × 0.5–0.8 mm, glabrous, smooth. *Achene* ellipsoid, 2.6–2.9 × 1.4–1.5 mm, medium brown, glabrous; faintly 6-ribbed, ribs rounded, less than 0.1 mm wide. *Flowering time*: probably throughout the year.

Habitat: Growing in tangled masses amongst tall streamside vegetation in fynbos on soils derived from Table Mountain Series in full sun; altitude 300–950 m.

Distribution: Known only from a few localities off Bain's Kloof.

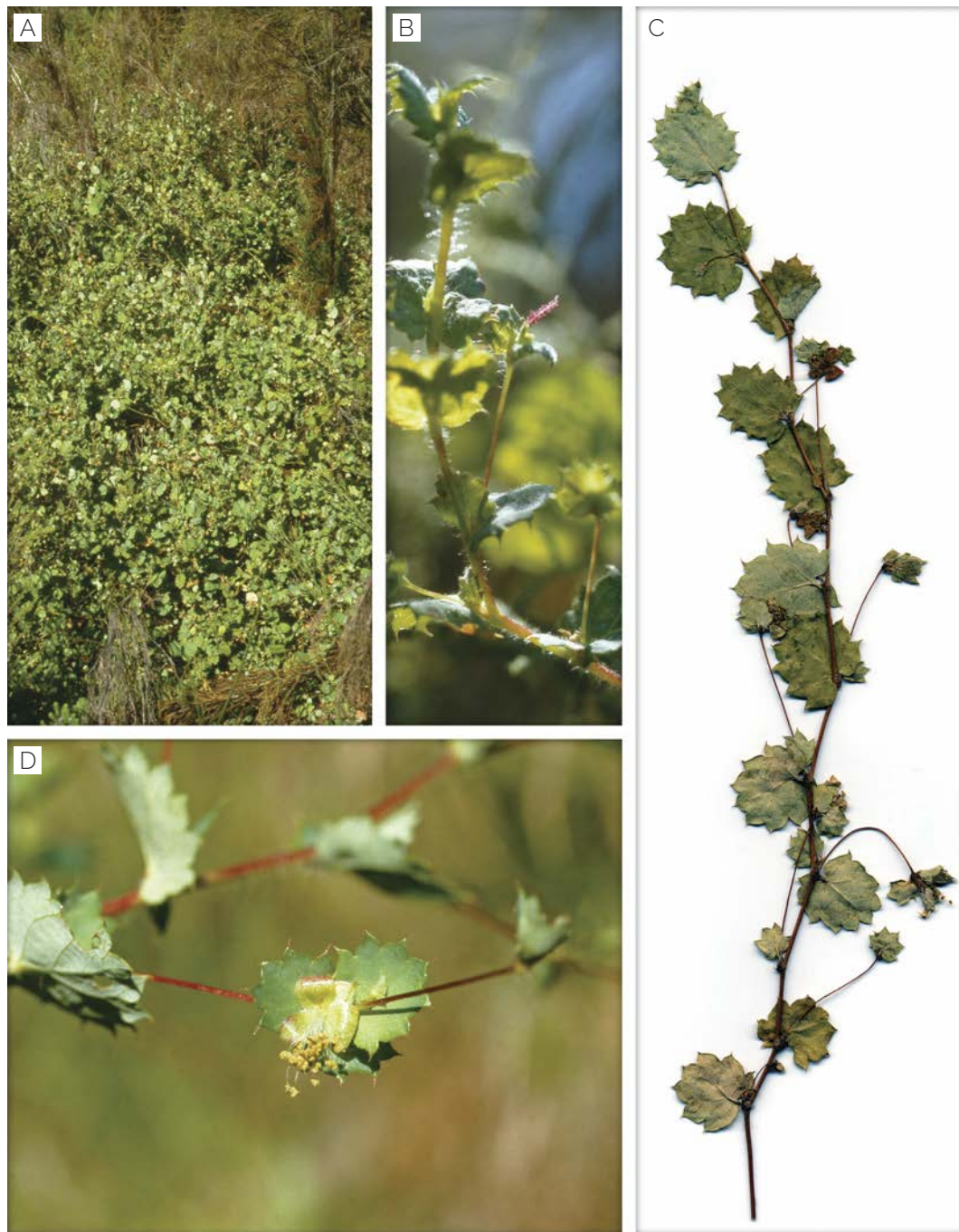
Conservation status: Extremely local endemic, but no immediate threats except from too frequent fires and invasive alien plants. Red List status: VU.

Etymology: *pilifera* (Latin) means 'bearing hairs', generally short weak thin ones, referring to the long thin scattered hairs on the stem and leaves.

Notes: *Cliffortia pilifera* is clearly closely related to the *C. odorata* group, but is readily distinguished by the filiform stems, which appear to hold the flowers on long curved peduncles. *Cliffortia reticulata* is similar, possibly of hybrid origin with *C. pilifera*, but is recognised by the thicker, more rigid leaves and stems, these held more stiffly, and leaf margins with shorter teeth. Both *C. pilifera* and *C. reticulata* are narrow endemics with separate ranges.

Representative specimens

SOUTH AFRICA. 3319 (Worcester): E slopes of Drakenstein Mts, Bain's Kloof, 365 m, Mar. 1877, (–CA), *Bolus 4032* (BOL, K, NBG, PRE); Bailey's Peak, kloof on W slopes, 915 m, 22 Nov. 1953, (–CA), *Esterhuysen 22344* (BOL, K, NBG, PRE); Bain's Kloof, Nov. 1949, (–CA), *Stokoe SAM 59986* (PRE); Sebastian's Kloof and surroundings, 760 m, Sept. 1939, (–CA), *Stokoe 7409* (BOL); Bain's Kloof, Bastiaans Kloof, 305 m, 9 Feb. 2000, (–CA), *Whitehouse 77* (BOL, K, NBG).



Cliffortia pilifera: A, habitat; B, branch with female flower; C & D, branch with male flower.

84. **Cliffortia tricuspidata** Harv., *Flora Capensis* 2: 299 (1862); Weim.: 148, fig. 43P–U (1934); Fellingham: 611 (2000); Whitehouse: 440 (2014). Type: Worcester District, Du Toit's Kloof, 610–915 m, Oct.–Jan., Drège 'C. *filicaulis* a' (K, syn.!; HBG!, NY!, SI, SAM!, TCD!, TUB!) & Paarl District, Drakenstein Mts, 1 220–1 525 m, Oct., Drège 'C. *filicaulis* b' (K, syn.!; B, HBG!, SI, SAM!, TCD!, TUB!).



C. filicaulis sensu Cham. & Schldl.: 33 (1827); G. Don: 596 (1832), non Cham. & Schldl. nom. conserv. (Whitehouse 2014). Based on near Tulbagh, Jan., Mund & Maire s.n. (B†, HAL!).

Low sprawling subshrub or sometimes scrambling over low vegetation, up to 0.3 m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.6–0.9 mm wide, tinged reddish, hairy; stem hairs spreading, 0.3–0.7 mm long. *Leaves* unifoliolate; oblong to ovate, 3.8–9.4 × 2.1–5.2 mm, 3-lobed or toothed at the apex, teeth 0.5–1 mm long, recurved; lamina single-veined from base, herbaceous, 0.1–0.3 mm thick across midrib which is prominent beneath, curved downwards and away from the stem, hairy, sometimes only on midrib beneath, hairs 0.2–1.2 mm long; sheath 1.1–2.0 mm long, abaxially hairy, adaxially glabrous except for fringe of hairs at apex; stipules 1.4–2.9 mm long, free or joined at top of sheath in front of leaf, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 3, hairy on outside. *Male flowers* with bracteoles 3.0–4.0 mm long; pedicel 0.4–0.6 mm long, glabrous; sepals broadly ovate, 3.4–4.6 × 1.5–2.0 mm, acute to acuminate; stamens 6–9; filaments 5.5–10.3 mm long, red; anthers brownish red or yellow. *Female flowers* with bracteoles 2.3–3.5 mm long, longer than immature receptacle; sepals ovate, 1.6–2.0 × 0.6–1.0 mm, recurved; carpel 1; stigma 3.0–4.6 mm long, red, feathery, prominent above at the base of leaves; immature receptacle 0.9–1.4 × 0.5–0.8 mm, glabrous, smooth. *Achene* whitish to pale brown, glabrous; unribbed. *Flowering time*: July to April.

Habitat: Amongst low restios in damp seeps at high altitudes on soils derived from Table Mountain Series in full sun; altitude 900–1 850 m.

Distribution: Extending from the southern Koue Bokkeveld to the Hottentots Holland Mountains, with a doubtful record from the Riviersonderend Mountains above Genadendal.

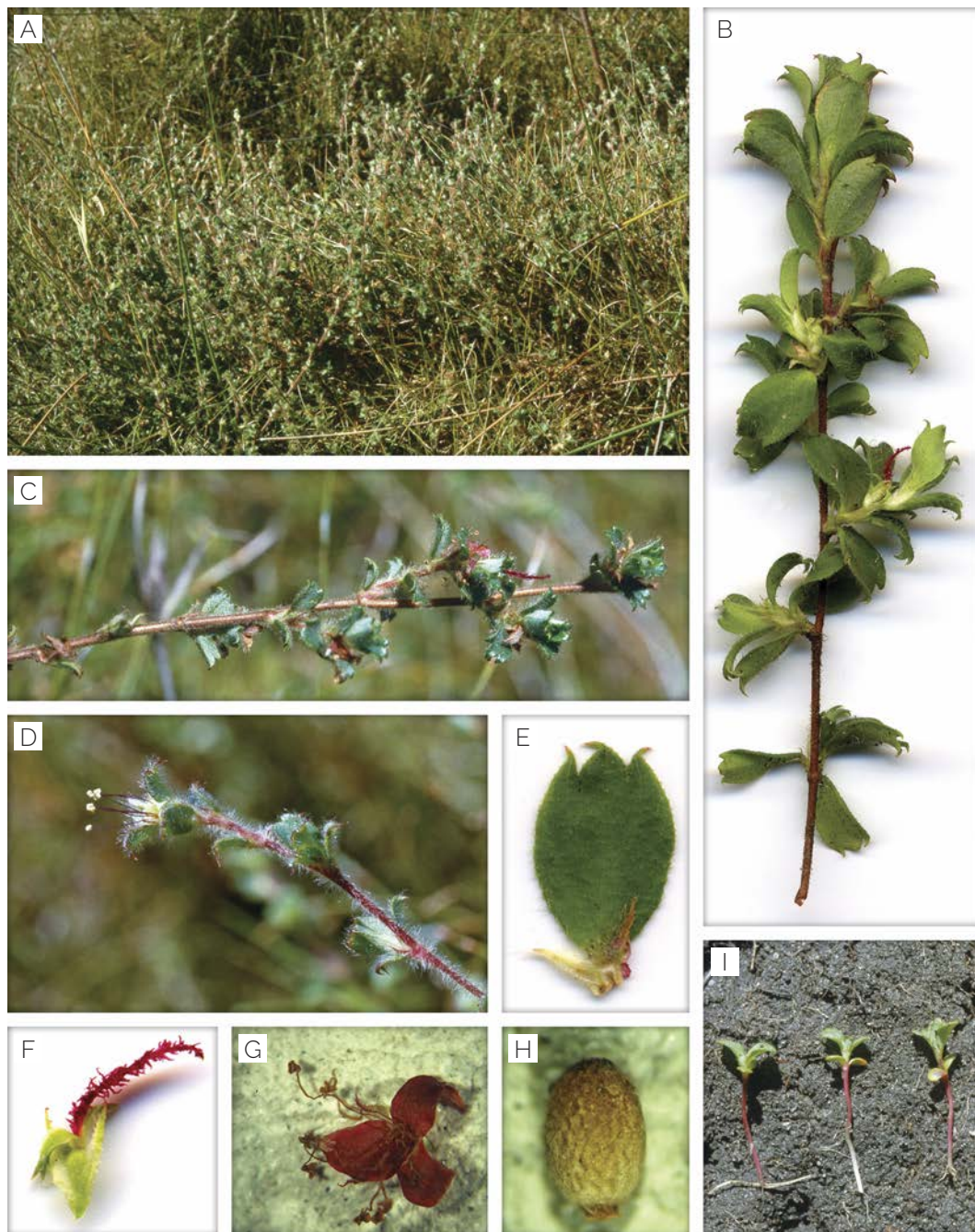
Conservation status: Widespread though scattered but free from any threats except too frequent fires. Red List status: LC.

Etymology: *tricuspidata* (Latin) means 'three cusped', i.e. the leaf ends in three short teeth.

Notes: A low-growing sprawling small plant that forms tangled masses amongst restios in damp seeps. The small 3-toothed leaves are similar to those of *Cliffortia filicaulis*, but that species has three leaflets whereas *C. tricuspidata* has a solitary leaflet. *Cliffortia tricuspidata* was originally described as *C. filicaulis*, but that name is now conserved for a second species and based on a separate Mund collection (for more details see under *C. filicaulis* and Whitehouse (2014)). The 3-sepalled flowers show that its affinities actually lie close to the *C. odorata* and *C. ferruginea* groups and is most similar to *C. ferruginea*, from which it is easily distinguished by the smaller hairier leaves.

Representative specimens

SOUTH AFRICA. 3219 (Wuppertal): Sandfontein, 6 Apr. 1947, (–CB), Barker 4468 (NBC); Sandfontein Peak, 1370 m, 5 Apr. 1947, (–CB), Compton 19431 (NBC). 3319 (Worcester): Sneeuat, 14 Jan. 1923, (–AA), Andreea 916 (NBC, PRE); near the top of the path up to the Sneeuat, 1 Sept. 1975, (–AA), Esterhuysen 33919a (BOL); Skurweberg [Skurfdeberg]



Cliffortia tricuspidata: A, habitat; B & C, branch with female flower; D, branch with male flower; E, leaf; F, female flower; G, male flower; H, achene; I, seedlings.

Mt., near Gydo, 1280 m, Dec. 1891, (–AB), *Bolus 1147* (BM, BOL, K, NBC, PRE); Gydo, 1370 m, 10 Nov. 1946, (–AB), *Compton 18760* (NBC); Koue Bokkeveld, Hansiesberg, kloof on W slopes, 915–1220 m, 18 Apr. 1956, (–AB), *Esterhuysen 25733* (BOL); Wellington, Great Sneeuwkop, Nov. 1926, (–CA), *Adamson 3044* (BOL); Du Toits Kloof, 610–915 m, (–CA), *Drège C. filicaulis a* (BM, K); Slanghoek Mts, 8 Feb. 1943, (–CA), *Esterhuysen 8641* (BOL); Kromrivier Peak, 1220 m, 21 Nov. 1943, (–CA), *Esterhuysen 9440* (BOL, PRE); Upper Wellington Sneeuwkop, above Tierkloof, 1830 m, 31 May 1946, (–CA), *Esterhuysen 12811* (BOL, NBC, PRE); Hawequas Mts, Suurvlakte, 915 m, 9 Feb. 1947, (–CA), *Esterhuysen 13736* (BOL); Hawequas Mts, Suurvlakte, near New Year Peak, 1065 m, 24 Feb. 1972, (–CA), *Thompson 1434* (NBC, PRE); E slopes of Wemmershoek Mts, 1370 m, 4 Nov. 1951, (–CC), *Esterhuysen 19216* (BOL, PRE); Wemmershoek Mts, top end of Elandsvlakte, along stream behind Wemmershoek Tafelberg, W of Olifants Peak, 1150 m, 21 Feb. 1999, (–CC), *Whitehouse 16* (BOL, K, NBC); Mont Rochelle Nature Reserve, Perdekloof, where path to Perdekop crosses, 1480 m, 19 Oct. 2002, (–CC), *Whitehouse 319* (BOL, K, NBC); SE slopes of Blokkop, damp seepage area above kloof to Villiersdorp Wild Flower Garden, 1340 m, 24 July 2001, (–CD), *Whitehouse 233* (BOL, NBC); Omklaarberg, 32 km S of Worcester, 1000 m, Dec. 1924, (–DC), *Stokoe 1063* (PRE); top of Baviaans Kloof, 1525 m, Oct. 1930, (–DC), *Stokoe 2488* (BOL). **3418** (Simonstown): Somerset Sneeuwkop, E slope, 1370 m, Dec. 1939, (–BB), *Esterhuysen 1989* (BOL); Hottentots Holland Triplets, 1065–1220 m, 31 Oct. 1943, (–BB), *Esterhuysen 9169a* (BOL, PRE); Hottentots Holland Mts, N of Somerset Sneeuwkop, 915 m, 3 Jan. 1944, (–BB), *Esterhuysen 9716* (BOL, K); S slopes of Somerset West Triplets, 1465 m, 10 Apr. 1949, (–BB), *Esterhuysen 15238* (BOL, NBC); Stellenbosch–Hottentots Holland Mts, Valleiberg, below summit on S side, 1280 m, 23 Apr. 1961, (–BB), *Esterhuysen 28993* (BOL). **3419** (Caledon): Victoria Peak, Jonkershoek Forest Reserve, opposite Emerald Dome, 1465–1525 m, 19 Jan. 1975, (–AA), *Esterhuysen 33745* (BOL); Stellenbosch, Jonkershoek, Dwarsberg, Victoria Peak, 1495 m, 2 Jan. 1968, (–AA), *Kerfoot 6205* (K, NBC, PRE); between Viljoen's Pass and Somerset Sneeuwkop, 3 Oct. 1938, (–AA), *Stokoe 7037* (BOL, K); Jonkershoek, Dwarsberg, head of valley, 915–1065 m, 28 Aug. 1963, (–AA), *Taylor 5047* (NBC, PRE); Genadendal, Nov. 1930, (–BA), *Stokoe 2488* (K).

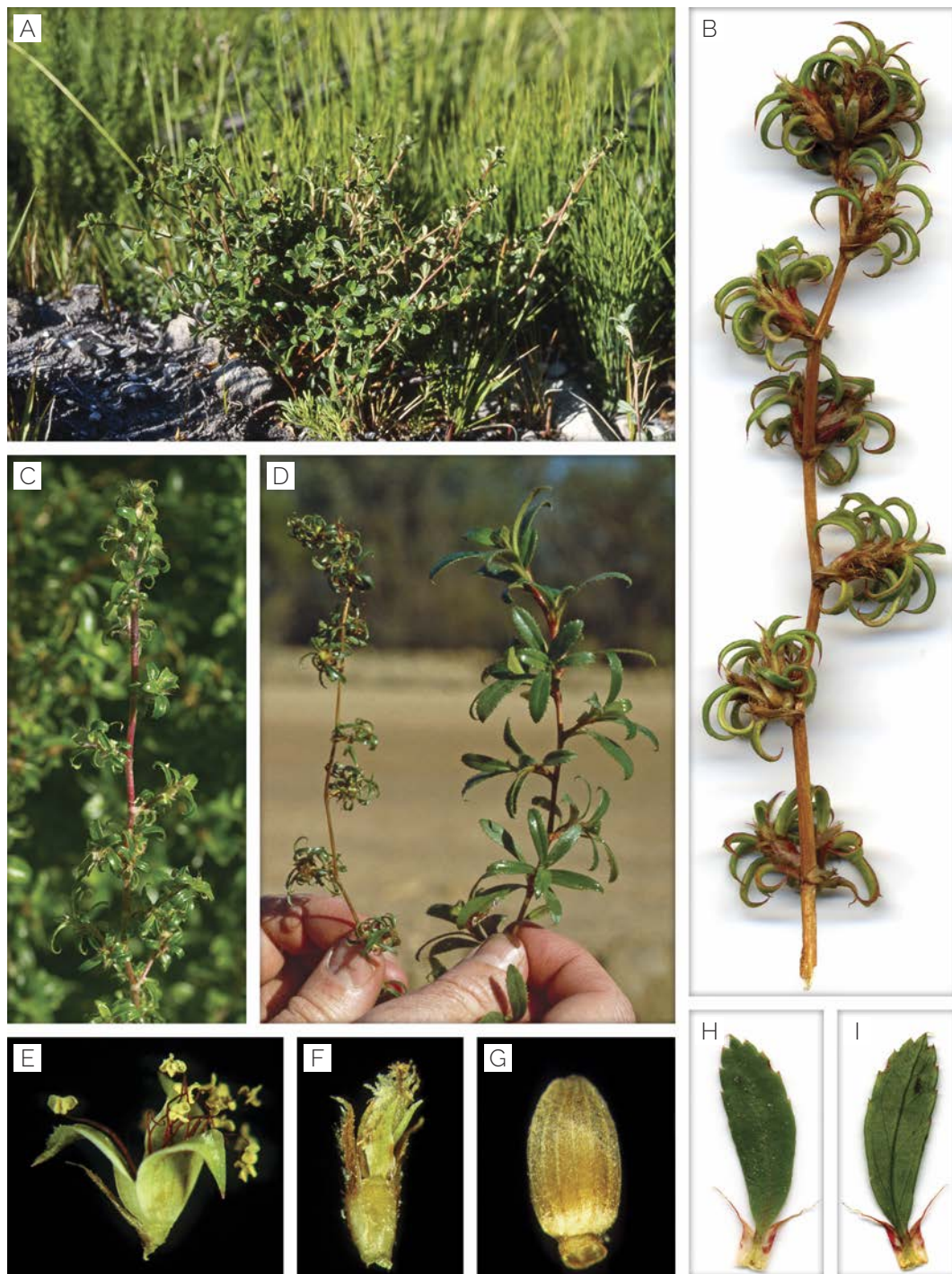
(85–88) *Cliffortia ferruginea* series

85. ***Cliffortia ferruginea*** L.f., Supplementum Plantarum: 429 (1782); DC.: 595 (1825); G.Don: 596 (1832); Eckl. & Zeyh.: 267 (1836); Harv.: 296 (1862); Bolus & Wolley-Dod: 259 (1904); Weim.: 145, fig. 43A–O (1934); Levyns: 450 (1950); Mustart et al.: 140, photo. (1997); Fellingham: 609 (2000). Type: South Africa, without precise locality, 'Cape of Good Hope', *Sparrmann s.n.* (LINN, holo!).



- C. berberidifolia* Lam.: 48 (1786); Weim.: 147 (1934). Type: South Africa, without precise locality, 'Cape of Good Hope' (P-LA, holo!).
- C. serrata* Thunb.: 93 (1800) & 436 (1823); DC.: 595 (1825); G.Don: 596 (1832); Juel: 277 (1918). Type: South Africa, without precise locality 'Cape of Good Hope' [Thunberg's Flora Capensis gives False Bay, Krom R and Langkloof as localities where it was seen], *Thunberg s.n.* (UPS, holo.; LD, iso.).
- C. ferruginea* L.f. var. *longifolia* Eckl. & Zeyh.: 267 (1836). Type: Uitenhage District, river near Port Elizabeth, Feb., *Ecklon 1727β* (S, holo.; SAM, iso.).
- C. ferruginea* L.f. var. *latifolia* Eckl. & Zeyh.: 267 (1836). Type: Uitenhage District, damp flats between Krakakamma and Van Staadens Mt, 'alt. II', July, *Ecklon 1727γ* (S, holo.; SAM, W, iso.).
- C. flexuosa* E.Mey. ex Drège: 122, 173 (1843), nomen quoad Drège '*C. flexuosa* E.M.'
- C. ferruginea* L.f. var. *flexuosa* E.Mey. ex Harv.: 296 (1862). [*C. flexuosa* E.Mey. ex Drège: 173 (1843), nomen nudum.] Type: South Africa, Langkloof, between Welgelegen and Onzer, 450–610 m, Drège '*C. flexuosa* E.M.' (K, syn!; HBG!, NY!, P!) & without precise locality, *Sieber 87* (K, syn!; B, G, C, L, S, W).
- C. ferruginea* L.f. var. *villosa* Harv.: 296 (1862). Type: Uitenhage District, Van Staadens Mt-Bethelsdorp, Dec., Drège 6835 (K, holo!; BM, G, L, P, PRE, W!, iso.).

Low or sprawling subshrub, sometimes climbing up surrounding vegetation, up to 1.2 m high, killed by fire or occasionally resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 0.6–1.4 mm wide, tinged reddish, glabrous or hairy; stem hairs adpressed upwards to spreading. *Leaves* unifoliate; elliptic to oblong or obovate, 6.8–42.0 × 1.2–14.0 mm; apex acute to acuminate, 0.5–1.7 mm long; margins markedly toothed with 1–33 recurved teeth, 0.2–1.1 mm long; lamina single-veined from base, cartilaginous, 0.3–0.4 mm thick across midrib, which is prominent beneath, curved downwards and away from the stem, glabrous or with a few hairs above, hairs 0.6–1.0 mm long; sheath 2.3–4.6 mm long, abaxially glabrous or hairy, adaxially glabrous; stipules 2.2–10.9 mm long, usually joined at top of sheath in front of leaf, margins ciliate; petiole absent. *Flowers* solitary or clustered together in axils of undifferentiated leaves; bracteoles hairy on the keel, margins smooth to ciliate; sepals 3, glabrous. *Male flowers* with bracteoles 2.6–3.5 mm long; pedicel 0.5–1.0 mm long, glabrous; sepals broadly ovate, 3.1–5.2 × 1–3 mm, acute to acuminate at the apex; stamens 10–16; filaments 3.5–4.4 mm long, red; anthers brownish red or yellow. *Female flowers* with bracteoles 2.5–4.2 mm long, longer than immature receptacle; sepals narrowly ovate to linear, 1.2–1.9 × 0.2–0.9 mm, erect; carpel 1; stigma 1.8–3.4 mm long, red to greenish white, feathery, hidden at the base of leaves; immature receptacle 1.2–2.2 × 0.5–0.8 mm, glabrous, smooth. *Achene* 2.6–3.3 × 1.0–1.5 mm, whitish to pale brown, glabrous; 12-ribbed, ribs rounded to acute, less than 0.1 mm wide. *Flowering time*: throughout the year.



Habitat: Damp seeps and seasonally waterlogged areas on a wide variety of soils in full sun; altitude 0–1 250 m.

Distribution: Lowlands (usually below 300 m) in the southwestern Cape, from Atlantis to Agulhas, and along the southern Cape from Knysna to Gqeberha [Port Elizabeth], but at higher altitudes in the Langeberg Mountains between Swellendam and Riversdale.

Conservation status: Widespread and able to persist in damp roadside verges. Red List status: LC.

Etymology: *ferruginea* (Latin) means ‘rusty coloured’, referring to the stems and stipules, which are brown and papery.

Common names: *glastee*, *pypsteelbos*, *teringtee* (Afrikaans).

Notes: A widespread species which is found in a wide range of continuously moist habitats, from dune slacks to seeps at high altitudes, on clay or sand. It is also morphologically very variable and has several local forms, many of which have at one time been recognised as distinct varieties or even species. Particularly unusual is the disjunct distribution not just in distance but also in altitude. Most populations are found below 300 m, but in the Langeberg around Riversdale and Boosmansbos it occurs above 600 m.

It is difficult to recognise these morphological variants taxonomically, as vegetative characters change quite dramatically as the plant develops. The young seedling or resprouting leaves are often considerably larger, while in taller vegetation the leaves often become very thin and strongly curved so that they are used as hooks to allow plants to climb through the surrounding vegetation. Furthermore, water availability through the season also affects the morphology.

In contrast, some populations are relatively uniform and a critical study of the species, including their phenology, may allow recognition of particular forms. One such form, *Cliffortia berberidis*, which appears to be consistent in its morphology and distribution, is regarded here as sufficiently distinct to be recognised as a separate species.

Representative specimens

SOUTH AFRICA. **3318** (Cape Town): Cape Town, Atlantis, Buffelsrivier Farm, Buffels R valley near source, 50 m, 24 Apr. 1979, (–CB), *Boucher 4311* (NBG, PRE); Mamre, 12 Aug. 1933, (–CB), *Garside 4401* (K); Table Mt., 14 May 1847, (–CD), *Alexander–Prior s.n.* (K); near Rondebosch, Feb. , (–CD), *Bolus 3311* (BOL); Cape Peninsula, Kenilworth Racecourse, 1 July 1941, (–CD), *Bond 1017* (NBG); Cape District (Cape Flats near Rondebosch ex Weimarck), Jan. , (–CD), *Burchell 728* (K); Cape Peninsula, around Claremont, 15–30 m, Aug. 1907, (–CD), *Dummer 211* (K); Cape Peninsula, Kenilworth Race Course, 18 Mar. 1970, (–CD), *Esterhuysen 32427* (BOL); Cape Peninsula, Kenilworth Racecourse, 1908, (–CD), *Froembling s.n.* (NBG, NBG); Mowbray, Raapenburg, 15 m, 31 Dec. 1891, (–CD), *Guthrie 24* (BOL); Cape Flats, Claremont, 28 Feb. 1892, (–CD), *Schlechter 488* (BM); Cape Peninsula, Camp Ground, 5 June 1896, (–CD), *Wolley–Dod 2625* (K); Cape Peninsula, Vygekraal, 25 Dec. 1896, (–DC), *Wolley–Dod 2206* (BM, K). **3320** (Montagu): Marloth Nature Reserve, Swellendam Hiking Trail, near Protea Valley hut, 1100 m, 25 Dec. 2002, (–CD), *Whitehouse 335* (BOL); Lemoenshoek Peak, S slope, 1220 m, 15 Sept. 1944, (–DD), *Esterhuysen 10489* (BOL); Lemoenshoek, Grootberg, above Grootvadersbos, 1220–1465 m, 6 Dec. 1981, (–DD), *Stirton 10232* (NBG); Boosmansbos Wilderness Area, Helderfontein, by huts, 1160 m, 9 Dec. 2000, (–DD), *Whitehouse 169* (BOL). **3321** (Ladismith): Garcia’s Pass, Feb. 1904, (–CC), *Marloth s.n.* (NBG); Langeberg, Langkloof Farm, 300 m, 20 Apr. 1984, (–CD), *Bohnen 8445* (NBG, PRE); summit of Langeberg Mts at Riversdale, 915 m, 19 May 1950, (–CD), *Esterhuysen 17012* (BOL, NBG). **3323** (Willowmore): Knysna, near Forest Hall, 29 Jan. 1927, (–CD), *Duthie 1055* (BOL, NBG, PRE); Die Hoek, N foot of Outeniqua Mts, near Joubertina, 15 Jan. 1947,

Cliffortia ferruginea: A & C, habitat; B, branch with female flowers; D, climbing (left) and basal (right) leaves; E, male flower; F, female flower; G, achene; H, dorsal view of leaf; I, ventral view of leaf.

(-DC), *Esterhuysen 13627* (BOL); Coldstream, flats E of village, 19 Dec. 1991, (-DC), *Oliver 9955* (NBG); Bloukrans State Forest, lower edge of Marine Drive, above Clinton's Bank, 240 m, 15 Mar. 1979, (-DC), *Taylor 9986* (K, NBG, PRE); Ratels Bosch flats, 200 m, Aug. 1905, (-DD), *Fourcade 25* (BOL); 32 km from Karreedouw on Knysna road, 20 Oct. 1948, (-DD), *Story 3648* (BM, GRA, K, PRE); E of Storms R, Bluebellies Forest Station, 24 Sept. 1969, (-DD), *Thompson 888* (K, NBG, PRE). **3324** (Steytlerville): Assegaibosch, Apr. 1921, (-CD), *Breijer TRV 23589* (PRE); Humansdorp, Mondplaas, 305 m, 25 Feb. 1976, (-DD), *Bayliss 6223* (PRE). **3325** (Port Elizabeth): Loerie Plantation, 3 Feb. 1935, (-CC), *Dix 201* (BOL, NBG); near Port Elizabeth, Van Staadens, May 1914, (-CC), *Paterson 2513* (BOL); Otterford Forest Reserve, 31 Aug. 1947, (-CC), *Rodin 1135* (BOL, K, PRE); Southernhay, mountain slopes facing SW between Otterford and Loerie, 610 m, 10 Sept. 1973, (-CC), *Thompson 1853* (NBG, PRE); Port Elizabeth District, Baakens R valley, 2 Apr. 1930, (-DC), *Galpin 9935* (K, PRE); Port Elizabeth, Baakens R valley, Fern Glen, 24 Nov. 1975, (-DC), *Olivier 1437* (NBG, PEU). **3418** (Simonstown): Cape Town, Wynberg Flats, 8 Mar. 1847, (-AB), *Alexander-Prior s.n.* (K); Cape Peninsula, Bonteberg, vlei, 9 Mar. 1941, (-AB), *Compton 10622* (NBG); Cape Flats (Constantia ex Weimarck), Jan. , (-AB), *Ecklon 186* (BM, BM, K); Cape Peninsula, Noordhoek Estate, 17 Oct. 1975, (-AB), *Esterhuysen 34041* (BOL, K); above Muizenberg, June 1890, (-AB), *Gamble 22173* (K); Cape Peninsula, Kalk Bay Mt., slopes above Boyes Drive, 6 Apr. 1974, (-AB), *Goldblatt 1429* (NBG, PRE); Silvermine Valley, near picnic spot, Mar. 1924, (-AB), *Levyns s.n.* (BOL); Kalk Bay, on mountain, 275 m, 9 Sept. 1934, (-AB), *Levyns 4820* (BOL); Cape Peninsula, Witsand, May 1925, (-AB), *Marloth 12015* (NBG, PRE); Kommetjie, 30 Dec. 1924, (-AB), *Phillips s.n.* (PRE); Witsand, May 1925, (-AB), *Smuts s.n.* (NBG); Wynberg, 23 Dec. 1842, (-AB), *Wallich 413* (BM); Smitswinkel Bay, 150 m, 21 Nov. 1935, (-AD), *Adamson in Levyns 5275* (BOL); Cape Peninsula, Platboom, 6 Nov. 1941, (-AD), *Compton 12312* (NBG); Cape Peninsula, Buffels Bay, 28 Nov. 1941, (-AD), *Compton 12587* (NBG); Cape Peninsula, vlei above Smitswinkel, 15 Jan. 1946, (-AD), *Compton 17919* (NBG); Smitswinkel Bay, 150 m, 21 Nov. 1935, (-AD), *Levyns 5274* (BOL); Strandfontein, 21 Dec. 1941, (-BA), *Compton 12786* (BOL, NBG); upper Lourens R valley, 10 June 1943, (-BB), *Parker 3810* (BOL, K, NBG); Sir Lowry's Pass, 185 m, 3 July 1894, (-BB), *Schlechter 4786* (BOL, PRE); Sir Lowry's Pass, on mountain slopes near pass, 180 m, 3 July 1894, (-BB), *Schlechter 4796* (FHO, K, PRE); between Aasbank and Blesberg, 20 m, 17 Sept. 1969, (-BD), *Boucher 683* (NBG); Betty's Bay area, flats E of Blesberg, 15 m, 19 Feb. 1995, (-BD), *Oliver 37* (NBG). **3419** (Caledon): Houwhoek, Houtech terrain, W limits below road to Highlands, 1 Dec. 1987, (-AA), *Boucher 5219* (PRE); Caledon, Houwhoek valley, 295 m, June 1896, (-AA), *MacOwan 1735* (BM, K); Kleinmond Flats N of vlei, 25 Mar. 1949, (-AC), *de Vos 1291* (NBG, PRE); Kleinmond, 1 Aug. 1949, (-AC), *de Vos 1398* (NBG); Caledon, Hermanus, Voëlklip, corner 9th St and 4th Ave, 30 m, 21 Jan. 1981, (-AD), *Williams 615* (K, PRE); Strandkloof, 17 Apr. 1950, (-CB), *Compton 21945* (NBG); Uilenkraal, Pofadderbos, 31 May 1946, (-CB), *Jordaan 536* (NBG, PRE); Baardskeerdersbos, 18 Mar. 2000, (-DA), *Bergh in Whitehouse 103* (BOL); Elim, about 5 km out of Elim on road to Baardskeerdersbos, 1 Sept. 1991, (-DA), *Fellingham 1542* (NBG, PRE); Baardskeerdersbos area, between Boesmansrivier and Korsika, 23 Nov. 1991, (-DA), *Fellingham 1568* (NBG); Baardskeerdersbos, next exit to main road to Elim, 23 Nov. 1991, (-DA), *Fellingham 1574* (NBG, PRE); Baardskeerdersbos area, roadside, 12 Sept. 1992, (-DA), *Fellingham 1622* (NBG); Ratel R flats, 12 Feb. 1958, (-DA), *Lewis 5255* (NBG); Baardskeerdersbos, slopes W of settlement, 60 m, 14 Mar. 1977, (-DA), *Thompson 3400* (NBG, PRE); Caledon, Koksrivier, 60 m, 12 Mar. 1979, (-DA), *Thompson 3957* (K, NBG, PRE); Hermanus to Elim, S base of Koue Berg Pass, 120 m, 3 July 1999, (-DA), *Whitehouse 38* (BOL, NBG); Salmonsdam-Gansbaai road, near Bruinklip farm, 80 m, 21 Feb. 2003, (-DA), *Whitehouse 351* (BOL). **3424** (Humansdorp): Cape, Clarkson, Mar. 1926, (-AB), *Thode 826* (K); Slang R, 27 Nov. 1921, (-BA), *Phillips 3396* (K, PRE); 12 km E of Humansdorp, 90 m, 21 Sept. 1949, (-BB), *Acocks 15367* (K, PRE).

86. **Cliffortia berberidis** C.M.Whitehouse sp. nov. Type: South Africa, Western Cape, Bredasdorp District, Rhenosterkop, 15m, 4 July 1999, *Whitehouse 41* (BOL, holo.!; K!, NBG!, iso.).



Erect medium shrub, up to 0.6 m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 1.7–1.8 mm wide, hairy; stem hairs adpressed upwards, 0.3–0.6 mm long. *Leaves* unifoliate; elliptic to obovate, 20–49 × 5.3–12.2 mm; apex acute to acuminate, 0.4–1.2 mm long, margins markedly toothed with 11–46 teeth which are sometimes recurved, 0.3–0.7 mm long; lamina single-veined from base, cartilaginous, midrib prominent against lamina beneath, curved downwards and away from the stem, glabrous; sheath 5.0–6.7 mm long, abaxially hairy, adaxially glabrous; stipules 6.5–12.0 mm long, joined at top of sheath in front of leaf, margins ciliate; petiole absent. *Flowers* solitary or clustered together in axils of undifferentiated leaves; bracteoles hairy on the keel, margins ciliate; sepals 3, glabrous. *Male flowers* with bracteoles 4.0–5.0 mm long; pedicel glabrous; sepals broadly ovate, 7.2–9.1 × 2.3–3.4 mm, acute to acuminate at the apex; stamens 17–21; filaments 7.6–10.2 mm long, red; anthers yellow. *Female flowers* with bracteoles longer than immature receptacle; sepals ± triangular to oblong, erect; carpel 1, red to pinkish white, feathery; immature receptacle glabrous, smooth. *Achene* 4.0–4.2 × 1.5–1.7 mm, glabrous; 14-ribbed, ribs rounded to acute, less than 0.1 mm wide. *Flowering time*: October to March.

Habitat: Deep coastal sands in low-lying, possibly sometimes waterlogged, sites in full sun; altitude 0–250 m.

Distribution: Highly localised in the fynbos on the edge of the mudflats around Cape Agulhas.



Cliffortia berberidis: A, habitat; B, branch with male flower.

Conservation status: Very localised and although officially protected within the Cape Agulhas National Park, appears to be threatened by grazing. Red List status: not listed.

Etymology: *berberidis* (Latin) means 'similar to *Berberis*', a north temperate genus commonly referred to as barberries.

Notes: One of the many regional variants of *Cliffortia ferruginea*, *C. berberidis* is here regarded as sufficiently distinct to be recognised formally. Its erect habit and broad stiff leaves are diagnostic, it also has larger flowers with more stamens in the male than *C. ferruginea*. Some juvenile leaf-forms of *C. ferruginea* may appear remarkably similar and only mature specimens should be used for identification.

In leaf shape it is very similar to the plant described by Lamarck as *Cliffortia berberidifolia*, hence my choice of a similar epithet. However, it is likely that Lamarck's specimen was one of the large-leaved juvenile forms of *C. ferruginea*, rather than a specimen of rare *C. berberidis* as circumscribed here. As it is unlikely that the provenance of Lamarck's type specimen can be established, a new name is used here rather than taking up Lamarck's name.

Representative specimens

SOUTH AFRICA. **3419** (Caledon): Springfield, 3 Jan. 1958, (–DB), *Rycroft 2105* (NBG, PRE); Soetanyssberg, Hangnes Farm, foothills of mountain, 24 Mar. 1982, (–DB), *van Wyk 871* (NBG, PRE); Soetanyssberg, Bergplaas Farm, foothills of mountain, 26 Mar. 1982, (–DB), *van Wyk 932* (NBG, PRE); Brandfontein, 10 m, 13 Oct. 1951, (–DD), *Esterhuysen 19004* (BOL); along the track between Brandfontein and Aasfontein, 210 m, 15 Nov. 1995, (–DD), *Paterson-Jones 690* (NBG); Cape Agulhas, Brandfontein, near Soetanyssberg, 60–90 m, Dec. 1898, (–DD), *Thode 5292* (NBG); Rhenosterkop, 15 m, 4 July 1999, (–DD), *Whitehouse 41* (BOL, K, NBG).

87. ***Cliffortia acutifolia* Weim.**, Monograph of the Genus *Cliffortia*: 132, fig. 38 (1934); Fellingham: 609 (2000). Type: Vanrhynsdorp District, Van Rhyns Pass, foot of sandstone cliffs, 670 m, 30 Sept. 1932, *Levyans 4084* (BOL, holo.; LD).



Sprawling to scrambling shrub, up to 1 m high, probably killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 1.0–1.5 mm wide, tinged reddish, glabrous or occasionally a few scattered short hairs present. *Leaves* unifoliate; oblong to narrowly lanceolate or obovate, 18–31 × 3.7–5.2 mm; apex sharply long acuminate to pungent, 0.8–1.2 mm long; margins flat, entire or markedly toothed with up to 4 straight teeth, 0.8–1.6 mm long; lamina single-veined from base, cartilaginous, 0.4–0.5 mm thick, curved downwards and away from the stem, hairy above but soon becoming glabrous, glabrous beneath, hairs 0.3–0.7 mm long; sheath 3.0–3.7 mm long, abaxially with scattered short hairs, adaxially glabrous except for fringe of hairs at apex; stipules 3.0–6.3 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins serrate to ciliate; sepals 3, glabrous on the male but with a few hairs present on the female. *Male flowers* with bracteoles 4.2–5.7 mm long; pedicel 1.0–1.3 mm long; sepals broadly ovate, 5.5–9.3 × 3.3–4.9 mm, acute to acuminate at the apex; stamens 27–38; filaments 6.1–9.9 mm long, red; anthers brownish red with a few hairs present on the connective. *Female flowers* with bracteoles 4.2–7.4 mm long, longer than immature receptacle; sepals narrowly ovate to triangular, 3.8–4.6 × 1.5–2.2 mm, erect; carpels 1 or occasionally 2; stigma 5.0–5.6 mm long, red, feathery, prominent above leaves; immature receptacle 2.6–4.7 × 1.4–1.9 mm, glabrous, smooth. *Achene* ellipsoid to cylindrical, 8.1–9.7 × 3.7–4.9 mm, dark reddish brown, glabrous; faintly 11–14-ribbed, ribs rounded, 0.4–0.6 mm wide. *Flowering time*: August to November.

Habitat: On sandy soils derived from Table Mountain Series sandstone in full sun; altitude 550–850 m.

Distribution: Endemic to the sandstone plateau of the Bokkeveld Escarpment near Nieuwoudtville, also found recently on the Gifberg Pass.

Conservation status: Narrow endemic known only from a few localities, where it is threatened by overgrazing and road maintenance, but protected within the Oorlogskloof Nature Reserve. Red List status: LC.

Etymology: *acutifolia* (Latin) means 'acute-leaved', referring to the apex of the leaves that taper to a sharp point (but not unique within the genus).

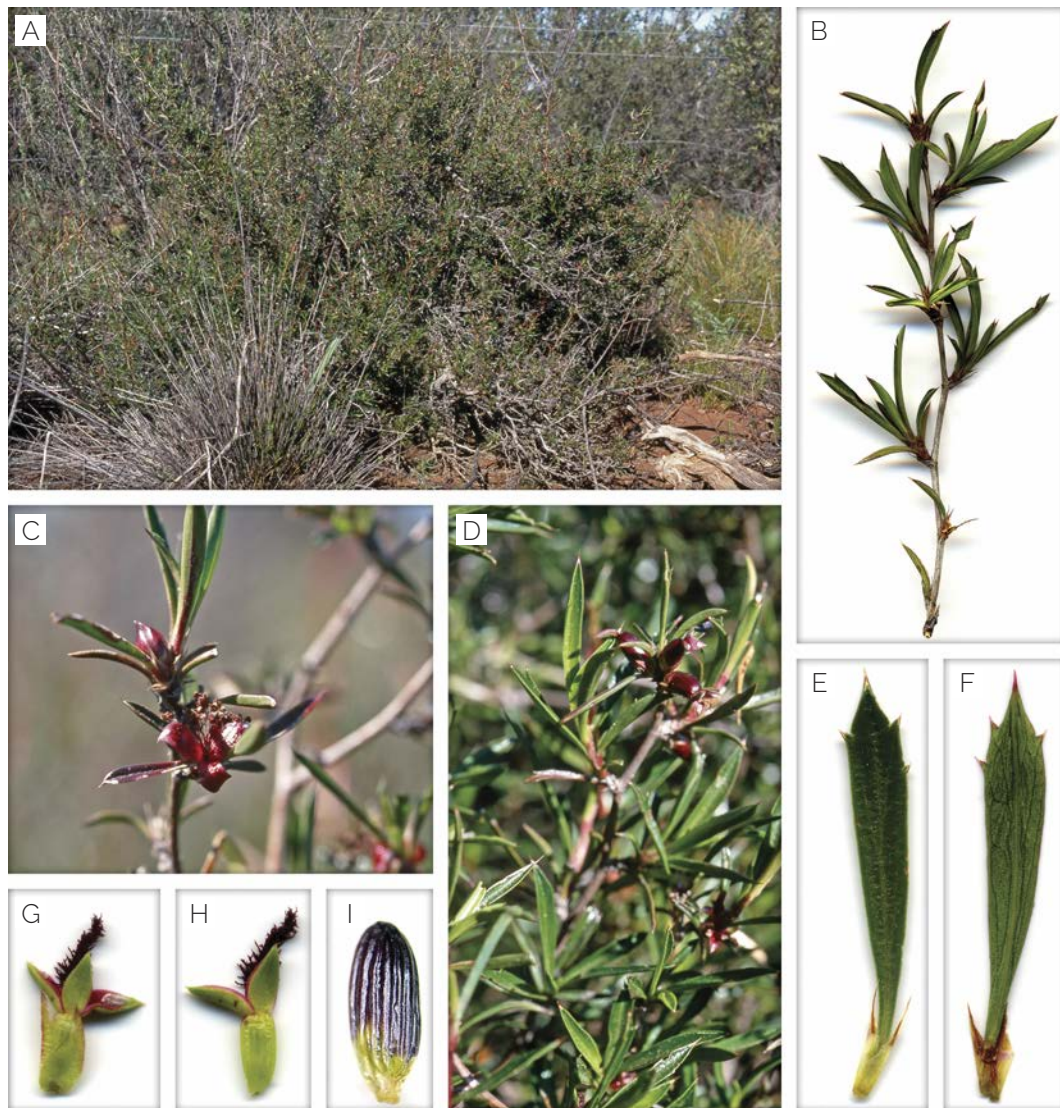
Notes: A narrow endemic from the Bokkeveld Plateau, *Cliffortia acutifolia* is easily recognised by its scrambling habit, dark glossy, sharp-pointed leaves and large achenes. Although related to *C. ferruginea* and *C. uncinata*, the size of the achenes prevent confusion with either of these species. In appearance *C. acutifolia* it is most like *C. scandens* but apart from differing in several morphological characters, the distributions are highly disjunct. *C. acutifolia* is the only other species apart from *C. lanceolata* that has hairs on the connective of the anthers but the two are not closely related.

Weimarck (1934) cited the holotype at STE but the specimen at BOL is marked as the holotype. BOL is also where the first set of Levyans collections are kept.

Representative specimens

SOUTH AFRICA. **3118** (Vanrhynsdorp): Perdekraal, on N extension of Bokkeveld Escarpment, 800 m, 25 Aug. 1985, (–BB), *Oliver 8763* (NBG). **3119** (Calvinia): Nieuwoudtville Plateau, Saaikloof, 680 m, 20 Nov. 1992, (–AC), *Bean & Trinder-Smith 2849* (BOL); Van Rhyns Pass, 1 Oct. 1980, (–AC), *Cameron & Manchip 42* (BOL); top of Van Rhyns Pass, 9 Dec. 1946, (–AC), *Compton 18897* (NBG); slope W of Nieuwoudtville, 7 Aug. 1974, (–AC), *Goldblatt 2293* (NBG, PRE);

top of Van Rhyns Pass, 9 Dec. 1946, (–AC), *Leighton* 2433 (BOL); Van Rhyns Pass, 670 m, 30 Sept. 1932, (–AC), *Levyns* 4084 (BOL); Calvinia, $\pm$ 8 km W of Nieuwoudtville, 760 m, 23 Aug. 1969, (–AC), *Levyns* 11679 (BOL, NBG, PRE); Bokkeveld Plateau, between Nieuwoudtville and Van Rhyns Pass, 760 m, 5 Sept. 1972, (–AC), *Oliver* 3856 (NBG, PRE); Nieuwoudtville, Oorlogskloof Nature Reserve, S16, 580 m, 26 Oct. 1989, (–AC), *Pretorius* 163 (NBG, PRE); Nieuwoudtville, Uitkoms Farm, 820 m, 9 Aug. 1983, (–AC), *van Wyk* 1353 (K, NBG, PRE); $\pm$ 5 km W of Nieuwoudtville along Vanrhynsdorp road, 780 m, 19 Aug. 2001, (–AC), *Whitehouse* 254 (BOL, NBG).



Cliffortia acutifolia: A, habitat; B, branch; C, branch with male flower; D, branch with achene; E, dorsal view of leaf; F, ventral view of leaf; G & H, female flower; I, achene.

88. **Cliffortia uncinata** Weim. in Botaniska Notiser 1933: 164 (1933) & 137, fig. 40H–M (1934); Fellingham: 609 (2000). Lectotype, designated here: Ceres District, Koue Bokkeveld, Skurweberg, near Skoongesig, 1 465 m, 28 Jan. 1897, *Schlechter 10187* (BOL, lecto.!; B, BM!, GRA!, K!, Z).



C. strobilifera sensu Harv.: 296 (1862) pro parte quoad *Drège 6834*, non L.

C. uncinata var. *recta* Weim.: 137 (1934). Type: Clanwilliam District, Cederberg Mts, Ezelbank, 915–1 220 m, Dec., *Drège 6834* (G, K!, L, Sl, W).

Sprawling or scrambling shrub, up to 1 m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 1.0–1.5 mm wide, tinged reddish, glabrous. *Leaves* unifoliate; linear to needle-shaped, 9.2–26.0 × 1.0–1.9 mm; apex long acuminate to pungent, 0.8–1.2 mm long; margins flat or slightly turned upwards, entire and smooth; lamina single-veined from base, cartilaginous, 0.5–0.9 mm thick, curved downwards and away from the stem, glabrous; sheath 1.0–1.8 mm long, abaxially glabrous, adaxially glabrous except for a few hairs at the apex; stipules 3.2–5.0 mm long, free, margins ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins ciliate; sepals 3, glabrous. *Male flowers* with bracteoles 4.3–6.0 mm long; pedicel 0.8–1.0 mm long, glabrous; sepals broadly ovate, 6.7–7.1 × 2.8–3.3 mm, acute to acuminate at the apex; stamens 17–21; filaments 7.3–9.2 mm long, red; anthers brownish red; bracteoles 2.6–3.9 mm long, longer than immature receptacle; sepals ± triangular to oblong, 2.9–3.5 × 0.8–1.2 mm, recurved; carpel 1; stigma 5.3–8.0 mm long, red, feathery, prominent above leaves; immature receptacle 1.5–2.0 × 0.6–0.8 mm, glabrous, clearly ribbed. *Achene* cylindrical, sometimes slightly curved, 4.6–5.6 × ± 1.4 mm, medium brown, glabrous; 13–14-ribbed, ribs rounded to acute, up to 0.2 mm wide. *Flowering time*: August to April.

Habitat: Damp seeps on sandy soils from Table Mountain Series in full sun; altitude 650–1 700 m.

Distribution: Scattered in the Koue Bokkeveld and Cederberg, from Skurweberg to the Middelberg Plateau.

Conservation status: Localised and scattered at high altitudes but relatively common where it occurs and without any significant threats. Red List status: LC.

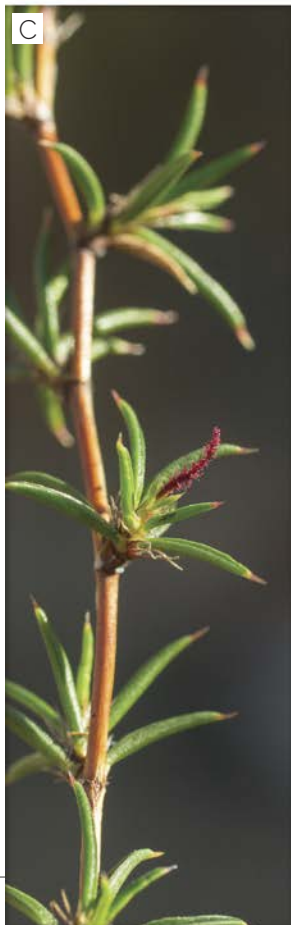
Etymology: *uncinata* (Latin) means 'hooked', referring to the apex of the leaves, that often curves back to form a small hook, used for scrambling through surrounding vegetation.

Notes: An endemic to the Cederberg and Koue Bokkeveld, *Cliffortia uncinata* can be distinguished by its narrow, unifoliate leaves and scrambling habit. Although it frequently has curved leaflets, the leaves may sometimes be straight and relatively thick and such plants were treated by Weimarck as var. *recta*. There are many plants with leaves intermediate between the two, which renders recognition of var. *recta* untenable. Plants with extremely thick, straight leaves may be confused with *C. neglecta*, but the narrowly cylindrical achenes separate it from the broadly ellipsoid achenes of *C. neglecta*. The achene morphology suggests a relationship with *C. pungens*.

When Weimarck chose the specimen he listed six different herbaria in which it was housed. As none of these were Lund, where he did his research, one of these six sheets, annotated by Weimarck, is chosen here as the lectotype.

Representative specimens

SOUTH AFRICA. **3219** (Wuppertal): Cederberg, Juriesberg, 1370 m, 11 Feb. 1936, (–AC), *Compton* 6223 (BOL, NBG); Cederberg, Juriesberg, 24 Sept. 1937, (–AC), *Compton* 7027 (NBG); Middelberg Plateau, 14 Dec. 1941, (–AC), *Compton* 12712 (NBG, PRE); Cederberg Range, Ezelbank, (–AC), *Drège* 6834 (K); Middelberg Plateau, Dec. 1939, (–AC), *Esterhuysen* 2473 (BOL, K); Cederberg Mts, Middelberg, 14 Dec. 1941, (–AC), *Esterhuysen* 7260 (BOL, K, PRE); Cederberg Mts, Uityk Peak, 16 Dec. 1941, (–AC), *Esterhuysen* 7372 (BOL, NBG, PRE); Cederberg, Middelberg Plateau, 1220 m, 28 Oct. 1923, (–AC), *Pocock* 737 (NBG); Sneeuberg, Cederberg in Cedar plots N of hut, 1350 m, 13 Mar. 1985, (–AC), *Taylor* 11296 (K, NBG, PRE); Cederberg Mts, S of Algeria, just S of summit of Uityk Pass, 1005 m, 17 Aug. 2001, (–AC), *Whitehouse* 249 (BOL, NBG); Grootberg, SW slopes, 1065 m, 21 Dec. 1940, (–CA), *Esterhuysen* 4178 (BOL, K, PRE); S Cederberg Mts, S slopes at head of Krom R Kloof, 1220 m, 11 Dec. 1950, (–CA), *Esterhuysen* 17985 (BOL, NBG); Elandskloof, near the waterfall, 915 m, 15 Dec. 1946, (–CA), *Levy* 8120 (BOL); Donker Kloof Peak, near Citrusdal, 1675 m, Jan. 1945, (–CA), *Stokoe* 9243 (BOL); Cederberg Forest Reserve, higher slopes of Sneeuberg, upper shale band, 1675 m, 4 Dec. 1964, (–CA), *Taylor* 6139 (NBG, PRE); Onderboskloof, 2 Jan. 1948, (–CC), *Esterhuysen* 14294 (BM, BOL, K, PRE); Onderboskloof, 3 Jan. 1948, (–CC), *Esterhuysen* 14306 (BOL); Onderboskloof, 3 Jan. 1948, (–CC), *Esterhuysen* 14307 (BOL); Koue Bokkeveld, Skurweberg, near Skoongesig, 1465 m, 28 Jan. 1897, (–CC), *Schlechter* 10187 (BM, BOL, K, Z); Koue Bokkeveld, Skoongesig Peak, Apr. 1939, (–CC), *Stokoe* 8605 (BOL); Porterville Mt., Dasklip Pass, S end of Teefontein Farm, on plateau, 10 Oct. 1966, (–CC), *Thompson* 239 (NBG, PRE); Porterville Mts, Berghof, near Ratel R, 795 m, 27 Sept. 1972, (–CC), *Thompson* 1466 (K, NBG, PRE). **3319** (Worcester): Visgat, upper Olifants R valley, 28 Dec. 1946, (–AA), *Esterhuysen* 13388 (BOL); Twenty Four Rivers Mts, above Porterville, 915 m, 23 Oct. 1949, (–AA), *Esterhuysen* 16150 (BOL); Visgat, between Schurfteberg and Great Winterhoek Mts, Oct. 1953, (–AA), *Stokoe* SAM 63815 (NBG, PRE); Koue Bokkeveld, Kleinvelei at base of Schurfteberg, 980 m, 13 Feb. 1992, (–AB), *Oliver* 10040 (NBG); Schurfteberg, on Visgat Farm W of Rocklands Peak, 1320 m, 7 Nov. 1973, (–AB), *Taylor* 8654 (NBG, PRE).



89. **Cliffortia pungens** C.Presl, *Epimiliae Botanicae*: 202 (1851a) & *Abhandlungen der Königlich Böhmisches Gesellschaft der Wissenschaften*, ser. 5, 6: 562 (1851b); Harv.: 304 (1862); Weim.: 138, fig. 41F–H (1934); Fellingham: 609 (2000). Type: Caledon District, Genadendal, 1 220–1 525 m, Oct., Drège 'C. *teretifolia* Thunb.' [Probably the same collection as Drège 1125.] (PR, holo.; B, BM, G, HBG!, K!, L, LD, P, REG!, S, SAM!, W, iso.).



C. teretifolia sensu Drège: 116 (1843), non L.f.

Short to medium erect shrub up to 1.2 m high, resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 0.7–1.0 mm wide, tinged red-dish, glabrous. *Leaves* unifoliate; needle-shaped to shortly cylindrical, 3.1–9.0 × 0.7–1.1 mm; apex sharply acuminate to pungent, 0.3–1.3 mm long; margins rounded, entire and smooth or scabrid; lamina single-veined from base, cartilaginous, 0.6–1.0 mm thick, curved downwards and away from the stem, glabrous; sheath 0.7–1.5 mm long, abaxially glabrous, adaxially glabrous except sometimes with a few hairs at the apex; stipules 0.4–1.2 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on the keel, margins smooth to serrate; sepals 3, glabrous. *Male flowers* with bracteoles 1.6–2.8 mm long; pedicel 0.3–0.9 mm long; sepals broadly ovate, 3.1–5.2 × 1.5–2.7 mm, acute to acuminate at the apex; stamens 4–6; filaments 2.6–6.8 mm long, red; anthers brownish red. *Female flowers* with bracteoles 1.8–2.2 mm long, longer than immature receptacle; sepals ovate to triangular, 0.9–1.3 × 0.4–0.6 mm, erect; carpel 1; stigma 3.4–4.1 mm long, red, feathery, prominent above leaves; immature receptacle 1.1–1.7 × 0.6–0.9 mm, glabrous, smooth. *Achene* cylindrical, curved, medium brown, glabrous; 6-ribbed, ribs rounded to acute. *Flowering time*: April to October.

Habitat: Mountain fynbos on well-drained acid sands derived from Table Mountain Series in full sun; altitude 900–1 850 m.

Distribution. Restricted to the Hex River Mountains and western Riviersonderend Mountains at high altitudes.

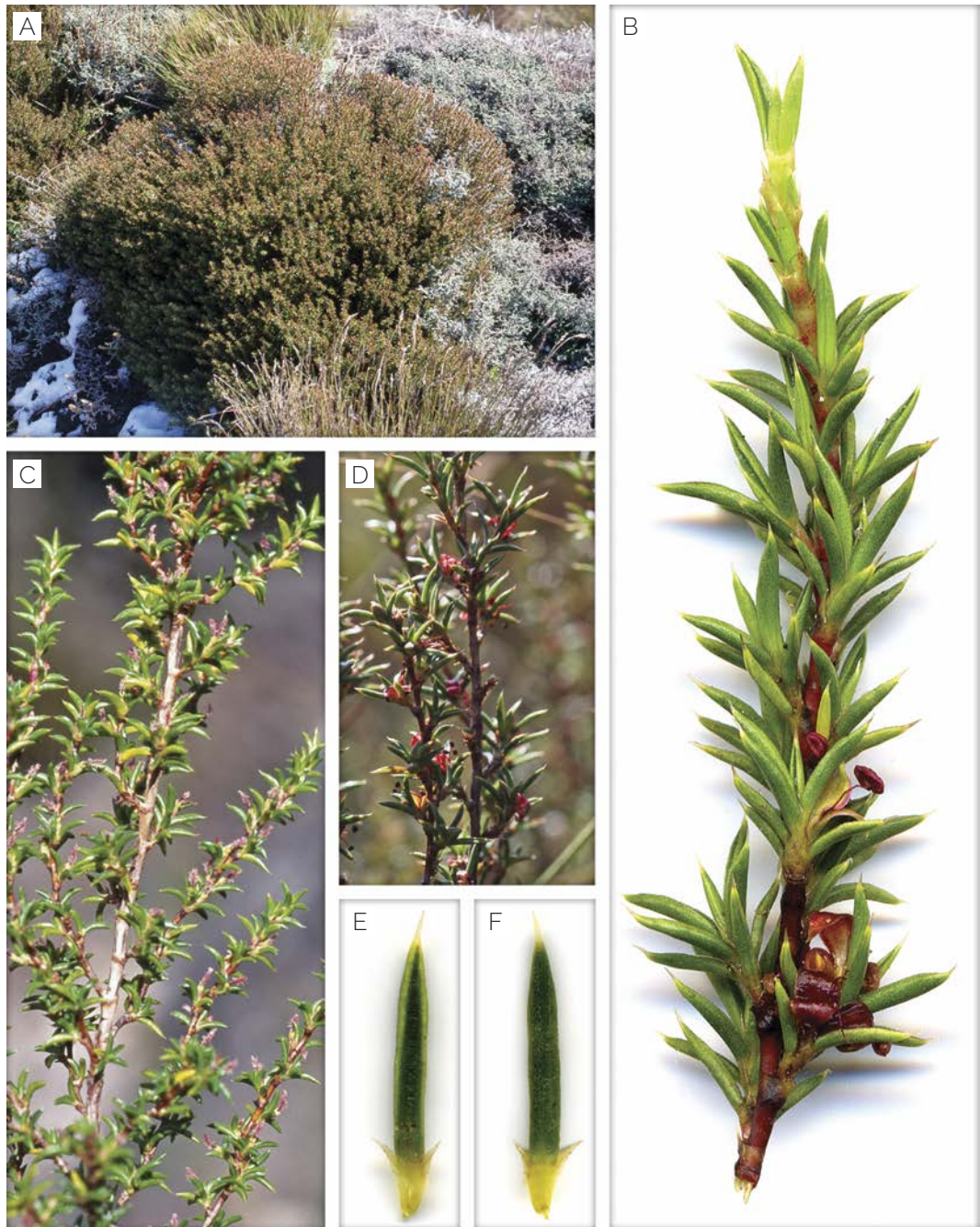
Conservation status: A fairly narrow endemic but common locally; occurring at high altitude it suffers from no severe threats. Red List status: LC.

Etymology: *pungens* (Latin) means 'piercing', referring to the sharp-pointed leaves.

Notes: A distinctive species without obvious relatives, *Cliffortia pungens* superficially resembles *C. neglecta*, another high altitude species, with its sharply pointed, almost cylindrical, unifoliate leaves. *Cliffortia pungens* can be distinguished by the achenes, which are cylindrical and less distinctly ribbed, and the young stems, which are always glabrous (see more detailed discussion under *C. neglecta*).

The glabrous stems, outwardly curved leaves, weakly ribbed cylindrical achenes suggest a relationship with *Cliffortia uncinata*. Molecular data is not resolved enough to provide insights as to the close affinities of *C. pungens* and the relationship based on morphology is not supported. It is therefore tentatively placed within sect. *Ruboides* until its closest relatives are better resolved.

Cliffortia pungens has hybridised with two only distantly related species: *C. dregeana* and *C. ruscifolia*. These hybrids have been named here as *C. × ilicioides* and *C. × dissita*.



Cliffortia pungens: A, habitat; B & D, branch with male flowers; C, branch with female flowers; E, dorsal view of leaf; F, ventral view of leaf.

Representative specimens

SOUTH AFRICA. **3319** (Worcester): Hex River Mts, Milner Peak, 1675 m, 6 Mar. 1943, (–AD), *Esterhuysen 8708* (BOL); Hex River Mts, N slopes of Buffelshoek Peak, 1830 m, 13 Dec. 1948, (–AD), *Esterhuysen 14846* (BOL, NBG); Castle Rocks, N slopes, 975–1065 m, 9 Nov. 1952, (–AD), *Esterhuysen 20706* (BOL, K, NBG, PRE); lower N slopes and foot of Skurweberg [Schurfteberg], 8 Oct. 1953, (–AD), *Esterhuysen 21860* (BOL, PRE); Ceres–Hex River Mts, Buffelshoek Peak, 1525 m, 8 Oct. 1956, (–AD), *Esterhuysen 26346* (BOL); Matroosberg, slopes from vlakke to 'Coat of Arms', 1220–1830 m, 4 Apr. 1958, (–BC), *Esterhuysen 27666* (BOL); Sonklip, N of Matroosberg, 1220–1830 m, 29 May 1960, (–BC), *Esterhuysen 28487* (BOL); Jonaskop summit, 1645 m, 28 Sept. 1973, (–DC), *Boucher 2237* (NBG); Villiersdorp, Jonaskop, NE of tower, on crest W of summit, 1560 m, 20 Oct. 1989, (–DC), *Greuter 21972* (PRE); near top of Jonaskop, S side, 1525 m, 25 Sept. 1965, (–DC), *Rycroft 2896* (NBG); Wildepaardeberg, Oct. 1933, (–DC), *Stokoe 2738* (BOL); towards summit of Jonaskop, 7 Sept. 1982, (–DC), *Walters 2655* (NBG); Jonaskop, Wildepaardeberg, rocky outcrop on sandy plateau, 1000 m, 15 Sept. 2000, (–DC), *Whitehouse 138* (BOL, K, NBG). **3419** (Caledon): Caledon District (Genadendal, Baviaanskloof ex Weimarck), 16 Feb. 1815, (–BA), *Burchell 7741* (K); Genadendal, 1220–1525 m, 1839, (–BA), *Drège s.n.* (K, K); Genadendal, 1370 m, 23 Dec. 1896, (–BA), *Schlechter 9816* (BM, BOL, K, PRE); Riviersonderend Mts, Galgberg, along jeep track to radio mast, just before plateau shelf on N side, 1220 m, 18 Oct. 2001, (–BA), *Whitehouse 280* (BOL).

(90–101) **Section Bifoliolae** DC. in *Annales des Sciences Naturelles*
1: 450 (1824) & 596 (1825). Weim.: 17, 92 (1934) & 188 (1948).
Type species: *C. pulchella* L.f.

Low to medium erect shrubs, clonally spreading by roots underground and able to resprout after fire (except for *Cliffortia phyllanthoides*). Sheath usually glabrous both abaxially and adaxially except for the fringe of hairs at apex; petiole absent. **Leaves bifoliolate or trifoliolate, often glaucous, glabrous**, curved upwards and towards the stem, midrib not prominent. Flowers solitary, in the axils of ordinary vegetative leaves. Sepals 3, glabrous, female sepals usually erect; filaments and anthers usually reddish; receptacle usually glabrous; carpels 1; stigma red. Achene ribbed or winged, usually glabrous.

This section is characterised by the glaucous flat leaves, although the type of the section is atypical, having clear green leaves. While it would be convenient to separate off the bifoliolate species into a section separate from the rest of the *Cliffortia glauca* series, the molecular study does not suggest that they comprise a single clade. Rather, they have either independently arisen within the section, or other species have arisen from the bifoliolate state, or the bifoliolate state has been transferred through hybridisation. *Cliffortia teretifolia* sits rather uncomfortably in this section, but the 3-winged achenes is a feature found in *C. phyllanthoides* and the plant is completely glabrous like many species in the section.

90. **Cliffortia pulchella** L.f., Supplementum Plantarum: 430 (1782); Thunb.: 437 (1823); DC.: 596 (1825); G.Don: 597 (1832); Harv.: 297 (1862); Juel: 277 (1918); Weim.: 93, fig. 27A–E (1934); Fellingham: 608 (2000). Type: Mossel Bay District, Attakwaskloof [Harte-quas Kloof], near Safrankraal, *Thunberg s.n.* (LINN, holo.; LD!, iso.).



C. pulchella L.f. var. *mucronulata* Weim.: 94, fig. 27F (1934). Lectotype, designated here: Mossel Bay District, Goliaths Berg, 460 m, 13 May 1915 (as 1897 in protologue), *Muir 2032* (BOL, lecto., PRE!).

Short to medium erect shrub, up to 1.5 m high, resprouting after fire and spreading clonally; sparsely branched, only forming long branches. *Young stems* 0.8–1.1 mm wide, compressed with leaves flattened against it, hairy; stem hairs spreading to curled, 0.1–0.7 mm long. *Leaves* bifoliate; leaflets subcircular, 3.7–6.2 × 4.0–6.8 mm; base slightly cordate; apex obtuse to rounded, rarely mucronate; margins flat, minutely serrulate; lamina 6–8-veined from base, chartaceous, 0.2–0.3 mm thick, usually adpressed against the stem, glabrous; sheath 0.5–1.4 mm long, abaxially hairy, adaxially with fringe of hairs at apex; stipules absent; sheath forming a circle around the stem, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 3, glabrous. *Male flowers* with bracteoles 4.2–4.8 mm long; pedicel 0.4–0.6 mm long; sepals broadly ovate, 4.7–5.3 × 1.7–2.4 mm, acute to acuminate at the apex; stamens 8–10; filaments 5.0–7.3 mm long, red; anthers brownish red. *Female flowers* with bracteoles 2.7–4.1 mm long, longer than immature receptacle; sepals ovate to obovate, 1.6–2.2 × 0.5–1.1 mm, erect; carpel 1; stigma 5.2–8.2 mm long, red, feathery, prominent above leaves; immature receptacle 1.3–1.9 × 0.6–1.1 mm, glabrous, smooth. *Achene* ellipsoid, 2.3–3.0 × 0.9–1.2 mm, medium brown, glabrous; 12-ribbed, acute, up to 0.1 mm wide. *Flowering time*: throughout the year.

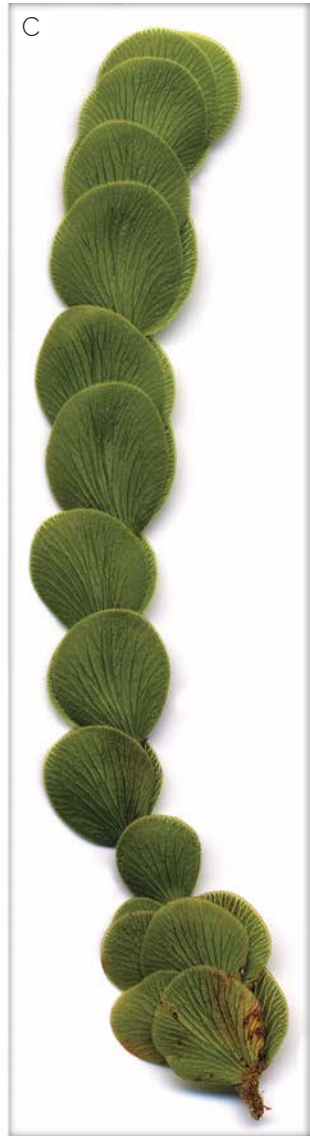
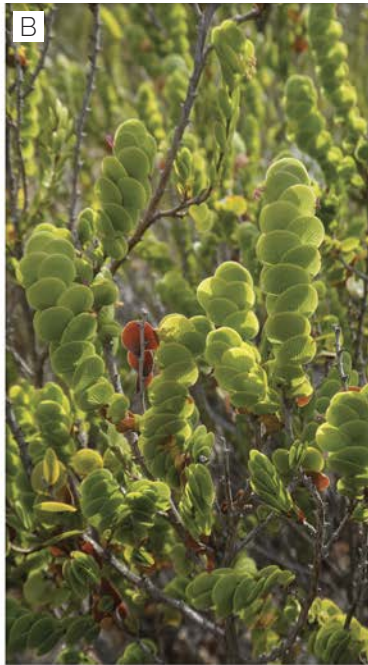
Habitat: Mesic fynbos on well-drained sandy slopes over Table Mountain Series in full sun; altitude 300–1 350 m.

Distribution: Scattered all along the Langeberg Mountains from Robertson to the western end of the Outeniqua Mountains at Moeras River, with outlying records from the Touwsberg and Gamkaberg in the Little Karoo.

Conservation status: Widespread although scattered, and common where it occurs, no real threats and conserved within several nature reserves. Red List status: LC.

Etymology: *pulchella* (Latin) means ‘pretty and little’, indeed one of the prettiest of all cliffortias.

Notes: Often regarded as the most attractive species of the genus, *Cliffortia pulchella* has bifoliate leaves with small circular to rhombic leaflets, held close to one another and adpressed to the stem such that they appear to be a single leaflet. The species is very distinctive, but may possibly be mistaken for *C. phyllanthoides* or *C. crenata*. *Cliffortia phyllanthoides* has smaller, glaucous leaves which lack clear venation, whereas those of *C. pulchella* are green and have distinct venation when held up to the light. *Cliffortia phyllanthoides* also has distinctive 3-winged achenes as opposed to the more ordinary ellipsoid



faintly ribbed achenes of *C. pulchella*. *Cliffortia crenata* has much larger leaflets not closely pressed to the stem except in herbarium specimens. It also often has more obvious fine teeth on the leaf margins.

Weimarck's var. *muconulata* might be the result of introgression with *Cliffortia glauca* and is not worth maintaining, especially as the variation is so slight. This view is supported by an observation of a more evident hybrid with *C. glauca* in the Langeberg to the east of Garcia's Pass. The leaves retain their greenish colour and pretty venation but are more ovate in outline and not closely pressed to the stem.

Representative specimens

SOUTH AFRICA. **3319** (Worcester): Koo, lower slopes of Naudesberg, 22 Nov. 1959, (–DB), *Lewis 5687* (NBG). **3320** (Montagu): Keurkloof, 5 May 1940, (–CC), *Bond 316* (NBG); Swellendam State Forest, Boontjiesrivier Farm, Droëkloof, SE of Montagu, 500 m, 29 July 1988, (–CC), *Brown 565* (NBG, PRE); Keurkloof, 760 m, 22 Sept. 1935, (–CC), *Compton 5690* (NBG); Donkerkloof, 915 m, 26 Sept. 1946, (–CC), *Compton 18478* (NBG); upper slopes in Cogman's Kloof, Oct. 1922, (–CC), *Levyyns 171* (BOL); Leeurivierberg, N slopes, 2 Sept. 1955, (–CD), *Esterhuysen 24451* (BOL); Langeberg, Swellendam Hiking Trail, shaleband below Dwariganek, 2.7 km from Protea Valley, 20 Apr. 1983, (–CD), *McDonald 877* (NBG, PRE); Touwsberg, ridge on S slopes, 1065 m, 1 June 1956, (–DB), *Esterhuysen 25888* (BOL); Zuurbraak Mt Forest Reserve, N slope, 365 m, 21 Nov. 1950, (–DC), *Taylor 232* (BOL, NBG); Langeberg East MCA, Compartment 6, Muurrivier, 700 m, 24 July 1984, (–DD), *van der Merwe 192* (NBG, PRE). **3321** (Ladismith): Garcia's Pass, near Toll House, 460 m, Oct. 1904, (–CC), *Bolus 11273* (BOL, PRE); Garcia's Pass, N slope above the Toll House, 26 Jan. 1961, (–CC), *Esterhuysen 28786* (BOL); Garcia's Pass, near Toll House, 305 m, 28 Sept. 1897, (–CC), *Galpin 4000* (BOL, PRE); Riversdale, Garcia's Pass, Feb. 1904, (–CC), *Marloth 3569* (PRE); Langeberg, foothills at NE base of Aasvoëlkrans, Phesantefontein Farm, Waterkloof, 1600 m, 28 Oct. 1992, (–CC), *Oliver 10241* (NBG, PRE); Garcia's Pass, footpath to Sleeping Beauty, opposite Toll House, 520 m, 11 Mar. 2000, (–CC), *Whitehouse 96* (BOL, NBG); Langeberg Mts, vicinity Garcia Pass, Langekloof area, 730 m, 13 May 1971, (–CD), *Kruger 1282* (NBG, PRE); Langeberg, Sandkraal, Sandkraalsberg, 1160 m, 12 May 1982, (–CD), *Viviers 264* (NBG, PRE); Gamka Mountain Reserve, W end of protea ridge (AN35), 1065 m, 18 Aug. 1987, (–DB), *Erasmus 97* (NBG); Gamkaberg Nature Reserve, S slopes below Bakenskop, 900 m, 16 Feb. 2001, (–DB), *Whitehouse 192* (BOL); Goliaths Berg, 460 m, 13 May 1915, (–DD), *Muir 2032* (BOL, PRE). **3322** (Oudtshoorn): N slopes of Outeniqua Mts, Jonkersberg, Saffraan R valley, Sebraskop, 855 m, 24 Apr. 1979, (–CC), *Bond 1736* (NBG, PRE); foothills N side of Outeniquas, near Moeras R, 6 Dec. 1951, (–CC), *Esterhuysen 19452* (BOL, PRE); Outeniqua Mts, ridge N of Sandkloof, just N of Robinson Pass, 670 m, 24 June 1997, (–CC), *Oliver 10836* (NBG).

91. **Cliffortia phyllanthoides** Schltr. in Botanische Jahrbücher 24: 444 (1897); Weim.: 96, fig. 28F–H (1934); Fellingham: 608 (2000). Type: Bredasdorp District, Elim, 90 m, 22 Apr. 1896, *Schlechter 7676* (B, holo.; BM!, BOL!, COI, G, GRA!, HBG!, K!, L, P, PH!, PRE!, SI, STU!, W!, WAG!, Z!).



Short erect shrub, up to 0.6 m high, killed by fire; usually sparsely branched, mainly forming long branches. *Young stems* 0.6–1.4 mm wide, usually tinged reddish, compressed with leaves flattened against it, glabrous. *Leaves* bifoliolate; leaflets subcircular, 4.5–6.5 × 4.0–7.2 mm; base sometimes slightly cordate; apex mucronate, 0.1–0.4 mm long; margins flat, entire and smooth; lamina obscurely 2–3-veined from base, chartaceous, 0.1–0.3 mm thick, flattened against the stem, glaucous, glabrous; sheath 0.2–1.3 mm long, abaxially and adaxially glabrous; stipules fused into a subulate awn between leaflets, 0.8–1.3 mm long; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 3; glabrous. *Male flowers* unknown. *Female flowers* with bracteoles 1.0–1.5 mm long, shorter than immature receptacle; sepals linear, 1.5–1.9 × 0.2–0.5 mm, erect; carpel 1; stigma 3.5–5.8 mm long, red, feathery, prominent above leaves; immature receptacle 1.5–2.7 × 1.0–2.0 mm, glabrous, clearly ribbed. *Achene* ellipsoid to prismatic, 2.5–3.4 × 1.4–2.2 mm, greyish brown, glabrous, 3-winged. *Flowering time*: throughout the year.

Habitat: Fynbos on clay shale soils in full sun; altitude 0–250 m.

Distribution: Extending from near Onrus to Bredasdorp and Elim, where it is still locally common.

Conservation status: Restricted in its range, it grows on soils that are suitable for farming and much of its habitat has been lost. It is able to survive in disturbed situations along road verges, but these are frequently lost to road widening. It should be considered Vulnerable. Red List status: LC.

Etymology: *phyllanthoides* (Latin) means 'similar to the genus *Phyllanthus*' (Euphorbiaceae), which often has small round leaves.

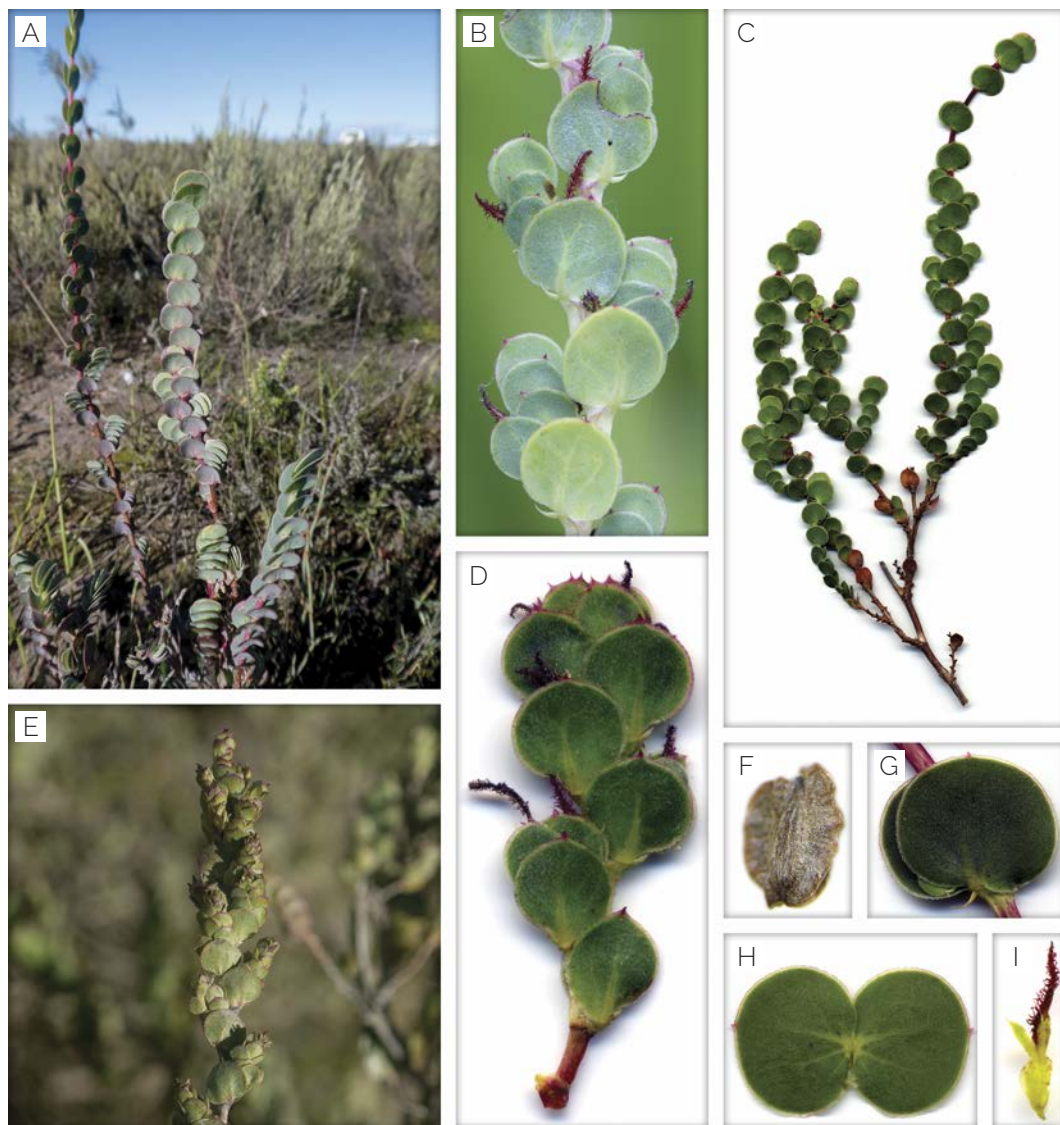
Notes: This attractive bifoliolate species has a distinctive small awn between the two leaflets, this in place of the central leaflet, and 3-winged achenes, almost triangular in cross-section, unlike any other species in the genus. I describe the awn as fused stipules in the description, as that seems most comparable with other species. Its placement between the two main leaflets suggest that it is more likely derived from the reduced middle leaflet (comparable to *Cliffortia obcordata*). In the other two bifoliolate species, *C. pulchella* has both the stipules and the middle leaflet absent, while in *C. crenata* the stipules are fused but on the opposite side of the stem to the main leaflets.

Cliffortia phyllanthoides most closely resembles a small-leaved *C. pulchella*, but it has glaucous rather than green leaves which lack the translucent veins. It grows in clayey shale rather than gravelly sandstone, the habitat of *C. pulchella*.

Representative specimens

SOUTH AFRICA. **3419** (Caledon): Onrus R, roadside at foot of mountain, 1 Dec. 1951, (–AC), *Esterhuysen 19265* (BOL, PRE); Caledon, Hermanus, Westcliff, Canterbury St, 20 m, 19 Nov. 1980, (–AC), *Williams 573* (K, NBG, NU, PRE); N side of Flouhoogte on Stanford–Elim road, 80 m, 21 Feb. 2003, (–BC), *Whitehouse 350* (BOL); Napier–Gansbaai road, Elands R, near Skoenmakersrivier, 230 m, 10 May 2000, (–BD), *Whitehouse 114* (BOL, NBG); Frickies Bay, sand flats, 28 Aug. 1946, (–CB), *Compton 18197* (NBG); Franskraal, 21 Apr. 1946, (–CB), *Leighton 1676* (BOL, NBG); Baardskeedersbos area, between Boesmansrivier and Korsika, 23 Nov. 1991, (–DA), *Fellingham 1567* (NBG, PRE); Baardskeedersbos, 10 km E of Baardskeedersbos, 60 m, 14 Mar. 1977, (–DA), *Hugo 819* (NBG, PRE); Koksrivier, near entrance to farm, 90 m, 11 Mar.

1979, (–DA), *Thompson 3934* (NBC, PRE); W of Elim, on road to Gansbaai, 130 m, 3 July 1999, (–DA), *Whitehouse 39* (BOL, NBC); near Bloemfontein and Elim, 60 m, 10 Dec. 1896, (–DB), *Bolus 8607* (BOL, K, NBC); The Poort, 25 Sept. 1933, (–DB), *Compton 4360* (BOL); Bredasdorp, The Poort, 30 m, Sept. 1933, (–DB), *Levyns 4465* (BOL); Elim, 90 m, 22 Apr. 1896, (–DB), *Schlechter 7676* (BM, BOL, K, PRE, WAG, Z).



Cliffortia phyllanthoides: A & E, habitat; B & D, branch with female flowers; C, branch; F, achene; G, ventral view of leaf; H, dorsal view of leaf; I, female flower.

92. **Cliffortia crenata** L.f., Supplementum Plantarum: 430 (1782); Thunb.: 437 (1823); DC.: 596 (1825); G.Don: 597 (1832); Eckl. & Zeyh.: 267 (1836); Harv.: t.95 (1859) & 297 (1862); Juel: 277 (1918); Weim.: 95, fig. 28A–E (1934); Dahlgren: fig. 4C (1971); Fellingham: 608 (2000); Fellingham & Linder: 176, fig. 3–4 (2003). Type: Worcester District, mountain slopes near Hex R, Thunberg s.n. (LINN, holo.; B†, C, LD, S, iso.).



Medium to tall erect virgate shrub, up to 2.5 m high, resprouting after fire and spreading clonally; sparsely branched, only forming long branches. *Young stems* 1.2–2.2 mm wide, glabrous. *Leaves* bifoliate; leaflets subcircular to oblong-obovate, 8.1–14.5 × 7.5–19.0 mm; base cordate; apex rounded; margins flat, entire and smooth to serrulate with 26–45 short straight teeth, 0.1–0.3 mm long; lamina 4–9-veined from base, chartaceous, 0.2–0.4 mm thick, curved upwards and towards the stem, glaucous, glabrous; sheath 0.9–2.2 mm long, abaxially glabrous, adaxially glabrous or with a few adpressed hairs; stipules similar in texture to lamina, 1.0–4.2 mm long, fused on reverse side of stem, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves or sometimes more than one in each axil; bracteoles glabrous with smooth margins; sepals 3, glabrous. *Male flowers* with bracteoles 1.3–3.0 mm long; pedicel 0.6–1.1 mm long, glabrous; sepals broadly ovate, 5.9–7.9 × 3.2–4.9 mm, acute to acuminate at the apex; stamens 18–23; filaments 3.5–8.5 mm long, greenish white; anthers yellow or rarely brownish red. *Female flowers* with bracteoles 1.6–2.6 mm long, shorter than to ± as long as immature receptacle; sepals ovate to obovate, 2.4–3.8 × 1.1–1.8 mm, recurved; carpel 1; stigma 3.9–8.6 mm long, red, feathery, usually hidden by the upwardly curved leaves; immature receptacle 1.6–3.2 × 0.6–1.2 mm, glabrous, smooth to ribbed. *Achene* ellipsoid, 3.0–3.8 × 1.0–1.2 mm, pale to medium brown, glabrous; 8–14-ribbed, ribs acute, up to 0.1 mm wide. *Flowering time*: throughout the year.

Habitat: Arid fynbos on well-drained sandy soil from Table Mountain Series in full sun; altitude 150–1 650 m.

Distribution: Extending from Jonaskop and the Hex River Mountains to Rooiberg and the Klein Swartberg in the Little Karoo.

Conservation status: Widespread and common where it occurs, no universal threats and conserved within several nature reserves. Red List status: LC.

Etymology: *crenata* (Latin) means 'having rounded teeth' (scalloped), referring to the leaf margin, although the teeth are not particularly rounded.

Notes: *Cliffortia crenata* is the third of the truly bifoliate species and has much larger leaflets than *C. phyllanthoides* and *C. pulchella* and the leaflets, except when young, are not adpressed to the stem but held at an angle. The flowers are often hidden within the alternate overlapping pairs. It grows in arid fynbos, a habitat different from *C. phyllanthoides* and *C. pulchella*, which further helps to distinguish it.

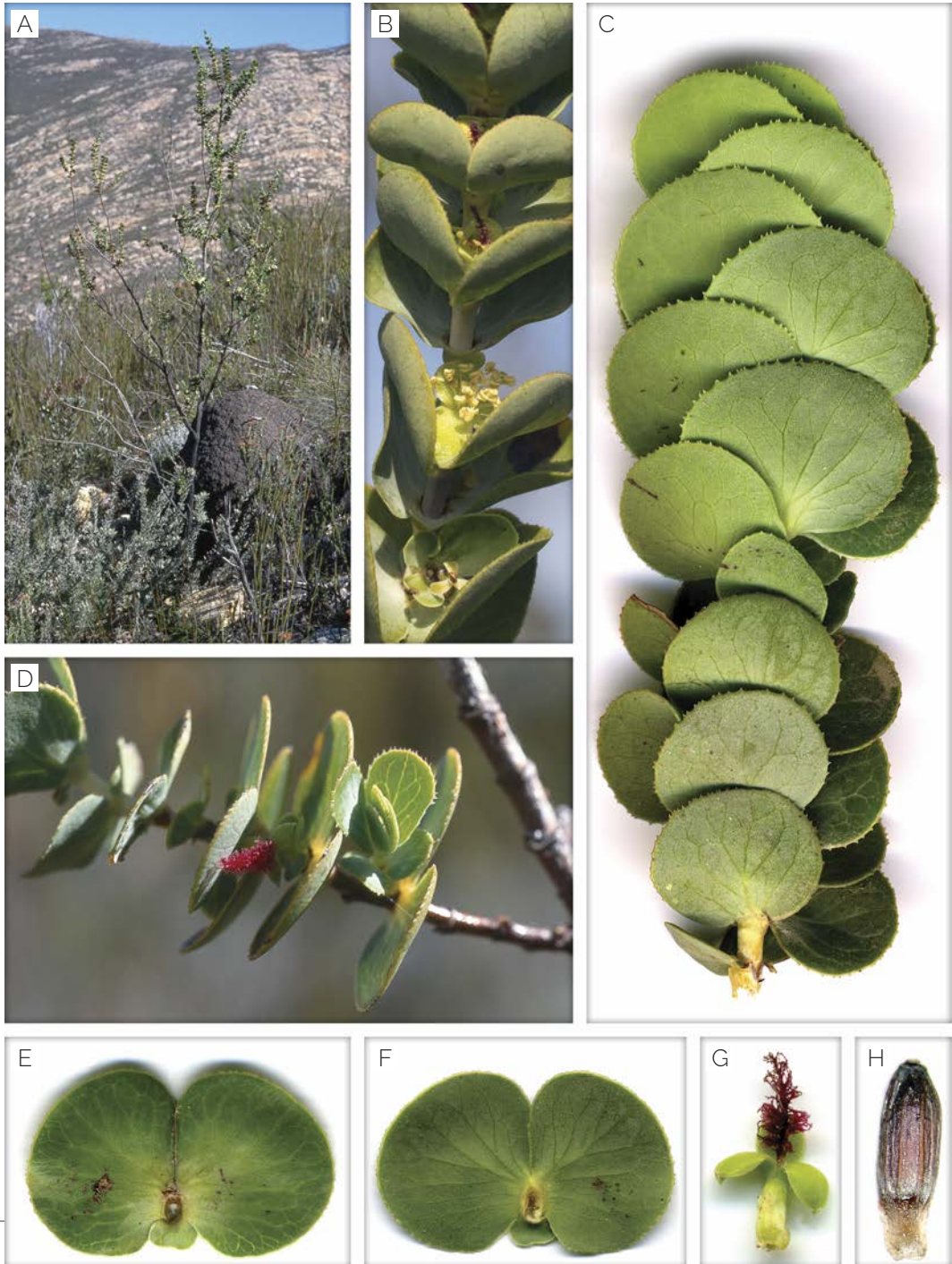
In *Cliffortia crenata* the stipules are fused on the opposite side of the stem to the leaflets and look almost leaf-like, though considerably smaller. A similar arrangement is found in the unrelated *C. reniformis*. Of the other two bifoliate species, the stipules of *C. phyllanthoides* form a very slender curved awn, whereas in *C. pulchella* they are completely absent.

Cliffortia crenata appears to hybridise with other species in the *C. glauca* series. Some of these were named by Weimarck as distinct species: i.e. *C. crenulata*, *C. mirabilis*, and *C. varians*, but none of these

show consistent characters or distributions. Rather they exhibit a range of characters suggesting introgression between *C. crenata* and other species.

Representative specimens

SOUTH AFRICA. **3319** (Worcester): Orchard, July 1944, (–BC), *Esterhuysen 10346* (BOL); Hex R valley, near De Doorns, rocky slope, 30 Oct. 1974, (–BC), *Goldblatt 3202* (PRE); Hex R, E slopes, Oct. 1895, (–BC), *Marloth 1977* (NBG, PRE); near De Doorns, 9 July 1956, (–BC), *van Niekerk 763* (BOL, PRE); Hex R Pass, 26 Sept. 1951, (–BD), *Compton 22843* (NBG); Bonteberg, Vaalkloof, 915 m, Aug. 1919, (–BD), *Marloth 9089* (BOL, PRE); Audenberg, head of Malkopskloof, 6 Oct. 1940, (–CB), *Esterhuysen 3447* (BOL); Hex River Pass, Audenberg, 610 m, Oct. 1898, (–CB), *Marloth 2439* (PRE); Riviersonderend Mts, Paulsgat, N slopes, 610 m, 19 Apr. 1971, (–CD), *Kruger 1204* (NBG, PRE); Hex R valley, Sandhills, 23 Feb. 1958, (–DA), *Esterhuysen 27596* (BOL); Kwadousberg, Saw-Edge Peak, on farm Keeromsberg, side of jeep track, NW facing slope, 1120 m, 29 Oct. 1988, (–DA), *McDonald 1688* (NBG, PRE); Kwadousberg, Sandhills Siding, foothills touching N9, 490 m, 21 Oct. 1971, (–DA), *Taylor 8023* (NBG, PRE); Sandhills, along national road, 8 Aug. 1960, (–DA), *van Breda 214* (K, PRE); Sandhills, Naudesia farm, 9 June 1977, (–DA), *Walters 1741* (NBG); Jonaskop Mt., slope, 915 m, 20 May 1974, (–DC), *Bayliss 865* (PRE); Viliersdorp, Jonaskop, mountain, 915 m, 17 Apr. 1975, (–DC), *Bayliss 1405* (PRE); Riviersonderend Mts, lower N slopes on the Boesmans Pass road, E of Koenieskloof, 610 m, 14 Oct. 1991, (–DC), *Bean & Trinder-Smith 2733* (BOL); Riviersonderend Mts, Jonaskop, roadside to FM tower, 975 m, 14 Jan. 1979, (–DC), *Boucher 4193* (NBG, PRE); Jonaskop Mt, at 2nd gate, 2 Sept. 1981, (–DC), *Boucher 5019* (NBG); McGregor, Boesmanskloof Pass at McGregor, Oct. 1940, (–DC), *Esterhuysen 5241A* (NBG, PRE); foot of Boesmanskloof Pass near McGregor, 13 Sept. 1962, (–DC), *Lewis 6065* (NBG); Riviersonderend Mts, Bosch Kloof, overlooking Retreat Farm, Poesjenets Valley, Waterkloof, 360 m, 29 Nov. 1988, (–DC), *McDonald 1732* (NBG, PRE); McGregor, Galgberg, above McGregor, lower NE slopes, 550 m, 30 Apr. 1973, (–DC), *Oliver 4252* (NBG, PRE); Wansbek, near Wansbek, 365 m, 26 Aug. 1965, (–DC), *van Breda & Joubert, A 1983* (PRE); Jonaskop, Wildepaardeberg, lower slopes, 600 m, 15 Sept. 2000, (–DC), *Whitehouse 136* (BOL); road between Agterkliphoogte and Robertson, 5 Sept. 1985, (–DD), *Simpson 93* (NBG, PRE). **3320** (Montagu): Smousbos, 29 Oct. 1950, (–AA), *Compton 22247* (NBG); Pienaars Poort area, ridge W of Smousbos, 1010 m, 5 May 1994, (–AA), *Oliver 10467* (NBG); Cabidu, near Pienaars Kloof, 20 Oct. 1941, (–AA), *Olivier s.n.* (NBG); 5 km E of Cabidu Farm, 1065 m, 13 Mar. 1948, (–AB), *Acoccks 14121* (PRE); Tweedside, 24 Sept. 1932, (–AB), *Barker 129* (K); Tweedside, 1065 m, 30 Sept. 1926, (–AB), *Compton 3040* (BOL, K); Laingsburg, Cabidu, 10 May 1941, (–AB), *Compton 10830* (NBG); Cabidu, 28 Oct. 1950, (–AB), *Compton 22216* (NBG); Cobita (Cabidu), 10 May 1941, (–AB), *Esterhuysen 5139* (BOL, K, PRE); Matjiesfontein, Tweedside, near Matjiesfontein, quartzite range near house, grant area, 1030 m, 1 June 1925, (–AB), *Marloth 12095* (PRE); Witteberg, 22 Sept. 1941, (–BC), *Compton 11831* (NBG); Anysberg East, summit plateau, SSE of Goedehoop homestead, 1220 m, 10 Aug. 1991, (–BC), *Fellingham 1533* (NBG, PRE); Ladismith, Anysberg, E end of Anysberg, W of Ladismith, 1370 m, 5 Oct. 1982, (–BC), *van Wyk 992* (NBG, PRE); E end of Anysberg, 6 June 1982, (–BC), *van Zyl 3363* (NBG); Anysberg, next to forestry track on N slope of mountain, 1280 m, 2 Aug. 1987, (–BC), *Viviers, M., Vlok & Bo 269* (PRE); Prins Poort Berg, near top, 1280 m, 15 July 1937, (–BD), *Levyms 6167* (BOL); Baden Hills, 1065 m, 24 Sept. 1946, (–CA), *Compton 18425* (NBG); Baden near Montagu, 855 m, 27 Sept. 1946, (–CA), *Levyms 8010* (BOL); Montagu, Goedgemoed, W of Montagu, 600 m, 10 July 1980, (–CA), *Schonken 269* (NBG, PRE); Cogman's Kloof, 5 Aug. 1949, (–CC), *Barker 5420* (BOL, NBG); Cogman's Kloof, 10 July 1954, (–CC), *Barker 8263* (NBG); Montagu Baths, 305 m, Dec. 1892, (–CC), *Bolus s.n.* (NBG); Montagu Baths, 305 m, Dec. 1892, (–CC), *Bolus 7600* (BOL, NBG, NU, PRE); Montagu Baths, 9 Sept. 1924, (–CC), *Compton 3459* (BOL, K); Cogman's Kloof, E slopes at S entrance, 24 July 1974, (–CC), *Goldblatt 2162* (NBG, PRE); Cogman's Kloof, Oct. 1922, (–CC), *Levyms 76* (BOL); hill in front of Montagu Baths, 19 July 1918, (–CC), *Michell s.n.* (PRE); Montagu Baths, kloof, Oct. 1921, (–CC), *Page 93* (PRE); Montagu, Cogmanskloof, 10 July 1931, (–CC), *Salter 1114* (BM); Anysberg Nature Reserve, c. 4 km from highest point to weather station, on top of Anysberg, 1620 m, 10 Aug. 1993, (–DA), *Germishuizen 6584* (PRE); Little Karoo, Touwsberg, S slopes, 915 m, 1 June 1956, (–DB), *Esterhuysen 25911* (BOL); Touwsberg, W end summit



ridge, 920 m, 5 Oct. 1993, (–DB), *Oliver 10330* (NBG); Touwsberg, ridge between camp and base of mountain, 900 m, 7 Oct. 1993, (–DB), *Taylor 12214* (NBG); Montagu, Warmwaterberg State Forest, W of summit, 1280 m, 20 June 1971, (–DD), *Kruger 1346* (NBG, PRE). **3321** (Ladismith): lower S slopes of Swartberg Mts below Toverkop, 6 Sept. 1947, (–AC), *Esterhuysen 13959* (BOL); S end of Seven Weeks Poort, upper edge of Spekboomvlei, 610 m, 13 June 1957, (–AD), *Acocks 19280* (BOL, K, PRE); Seven Weeks Poort, 610 m, 13 Sept. 1938, (–AD), *Compton 7412* (NBG); Ladismith, mouth of Waterkloof, 1 Nov. 1928, (–AD), *Gillett 1908* (BOL, NBG); Ladismith, Waterkloof, 610 m, 1 Nov. 1928, (–AD), *Hutchinson 1123* (BOL, K, PRE); Seven Week's Poort, S slopes, 610–825 m, Sept. 1928, (–AD), *Levyyns 2460* (BOL); Ladismith, Seven Weeks Poort, S entrance, 550 m, 14 July 1961, (–AD), *Levyyns 11194* (BOL); S end of Seven Weeks Poort, 18 Sept. 1936, (–AD), *Salter 6335* (BOL, K); Laingsburg–Seven Weeks Poort, Swartberg Forest Reserve, W slope from poort up rocky ridge at, 915–1220 m, 7 May 1963, (–AD), *Taylor 4728* (K, NBG, PRE); 10 km before Seven Weeks Poort from Vleiland, 13 Mar. 1981, (–AD), *van Wyk 536* (K, NBG, PRE); Rooiberg, footpath W of Bailey's Peak, 1220 m, 20 Sept. 1978, (–CB), *Bond 1511* (NBG, PRE); Rooiberg, near summit on slight slope, 800 m, 23 Nov. 1983, (–CB), *Mauve, van Wyk & Pare 28* (NBG, PRE); Rooiberg, Bailey Peak, N slopes below summit, 1465 m, 29 Oct. 1976, (–CB), *Taylor 9517* (NBG); Rooiberg Pass, S of Calitzdorp, 795 m, 4 July 1948, (–DA), *Acocks 14620* (PRE); Rooiberg, summit, close to road, 915 m, 10 Aug. 1948, (–DA), *Levyyns 8975* (BOL); S Cape, Rooiberg Pass, N side near top, 795 m, 6 Oct. 1971, (–DA), *Oliver 3682* (NBG, PRE); W of Calitzdorp, on Sandberg, 760 m, 30 May 1956, (–DA), *Wurts 1366* (BOL, NBG). **3419** (Caledon): Caledon District (Baviaan's Kloof near Genadendal ex Weimarck), 27 Feb. 1815, (–BA), *Burchell 7833* (K); Riviersonderend Mts, Boesmanskloof Pass, N slopes, 460 m, 26 Sept. 1948, (–BA), *Levyyns 9210* (BOL); Cape of Good Hope, Genadendal, (–BA), *Roser s.n.* (K); mountain near Genadendal, 610–1220 m, (–BA), *Roser in Pappe 12* (BM); McGregor District, Boesmans R, on farm 'Roep-my-Niet', 19 May 1977, (–BB), *Hugo 911* (K, NBG, PRE). **3420** (Bredasdorp): Stormsvlei Kloof, 28 Sept. 1946, (–AA), *Compton 18523* (NBG); Stormsvlei Kloof, 25 Sept. 1935, (–AA), *Lewis s.n.* (BOL); Stormsvlei area, Riviersonderend Mts at Boschewwel, 180 m, 8 Oct. 1993, (–AA), *Oliver 10387* (NBG, PRE).

93. **Cliffortia obcordata** L.f. Supplementum Plantarum: (1782); Thunb.: 437 (1823); DC.: 596 (1825); G.Don: 596 (1832); Eckl. & Zeyh.: 268 (1836); Harv.: 297 (1862); Bolus & Wolley-Dod: 259 (1904); Juel: 276 (1918); Weim.: 36, fig. 6A–E (1934); Levyns: 446 (1950); Fellingham: 613 (2000). *Monographidium obcordatum* (L.f.) C.Presl: 202 (1851a) & 562 (1851b). Type: South Africa, Cape Peninsula, Steenberg, *Thunberg s.n.* (LINN, holo.; LD!, S, SBT!, iso.).



C. obliqua Spreng.: 174 (1821); DC.: 596 (1825); G.Don: 596 (1832). Type: South Africa, without precise locality, 'Cape of Good Hope', *Bergius s.n.* (B, holo.†).

Low, sprawling to medium erect shrub, up to 1.8 m high; densely divaricately branched, forming brachyblasts. *Young stems* 0.8–1.3 mm wide, slightly compressed with upper leaves flattened against it, hairy on one side only; stem hairs spreading, 0.1–0.3 mm long. *Leaves* trifoliolate; middle leaflet broadly obovate, 3.8–5.2 × 3.9–5.8 mm; apex deeply emarginate, outer leaflets oblong to obovate, 5.5–6.5 × 5.0–6.7 mm; apex mucronate, 0.1–0.3 mm long; margins flat, entire and smooth; lamina chartaceous, curved upwards and towards the stem, glaucous, glabrous; sheath 0.8–1.5 mm long, abaxially glabrous, adaxially glabrous except for fringe of hairs at apex; stipules absent or up to 1.3 mm long, free, margins smooth or ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 3, glabrous. *Male flowers* with bracteoles 1.3–2.0 mm long; sepals broadly ovate, 5.3–5.8 × 2.6–2.9 mm, acute to acuminate at the apex; stamens 18–19; filaments 5.7–7.8 mm long, red; anthers brownish red. *Female flowers* with bracteoles 1.1–1.4 mm long, shorter than immature receptacle; sepals ovate, 2.5–3.0 × 0.8–1.0 mm, erect; carpel 1; stigma 6.2–7.8 mm long, red, feathery, prominent above leaves; immature receptacle 1.4–1.9 × 0.8–1.2 mm, glabrous, clearly ribbed. *Achene* ellipsoid, ± 3.9 × ± 1.6 mm, pale greyish brown, glabrous; obscurely 12-ribbed, ribs acute, 0.2–0.3 mm wide. *Flowering time*: throughout the year.

Habitat: Well-drained sandy soils from Table Mountain Series, wind-blown coastal sands and limestone in full sun; altitude 0–250 m.

Distribution: A coastal species common on the southern Cape Peninsula and along the southern Cape Flats as far as Somerset Strand, and near Gansbaai along the coast as far as Cape Agulhas. More recently populations have been discovered on alkaline soils near Still Bay and Gqeberha.

Conservation status. Widespread, though its coastal distribution means that many of its habitats are under threat of development. Red List status: LC.

Etymology. *obcordata* (Latin) means 'reverse heart-shaped', referring to the middle leaflet that has two lobes at the apex with a deep notch in between.

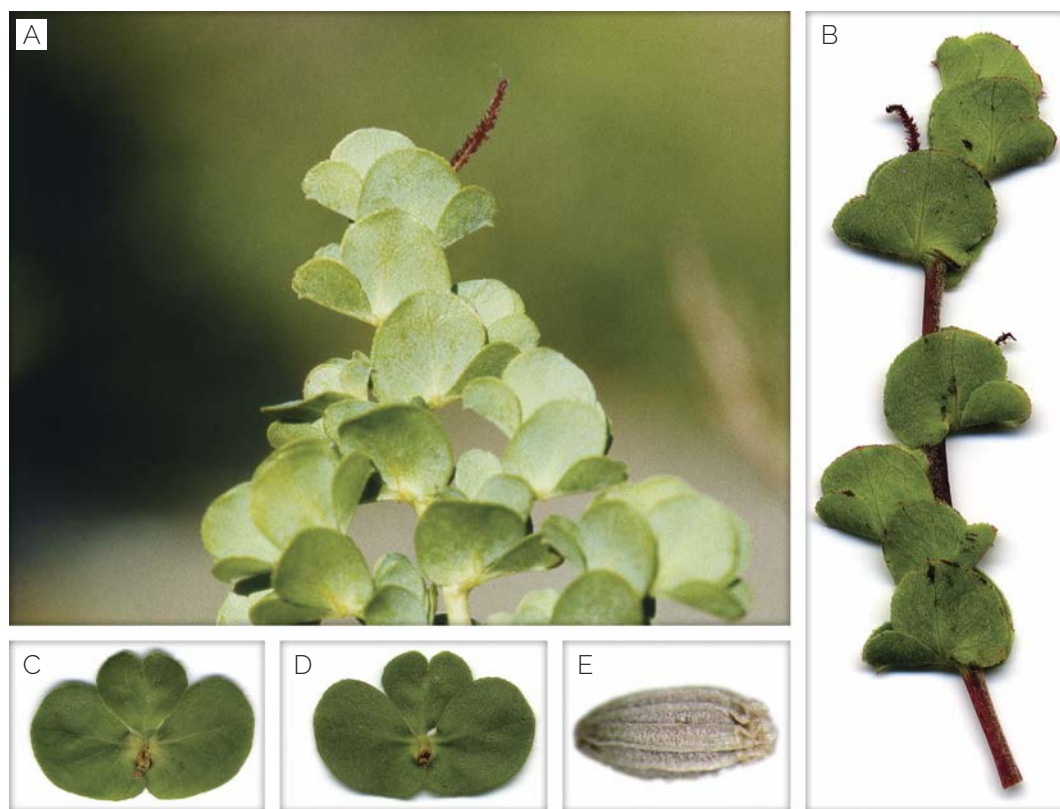
Notes: A very distinctive species with its glaucous leaflets pressed close against the stem on young shoots reminiscent of the bifoliolate species, but still retaining a distinct middle, though reduced, leaflet with a notched apex. It is a coastal species able to grow in the immediate vicinity of sea-spray.

A very odd collection by *Wolley-Dod 2849* near Miller's Point with deeply lobed leaves is probably a hybrid of this species.

Representative specimens

SOUTH AFRICA. 3318 (Cape Town): Cape District (Rondebosch–Wynberg ex Weimarck), Jan. , (–CD), *Burchell 760* (K); Cape Peninsula, Wynberg Hill, N slopes, 15 Sept. 1949, (–CD), *Esterhuysen 15743* (BOL); Cape Peninsula, Kirsten-

bosch, lower slopes on N boundary, 27 Nov. 1950, (–CD), *Esterhuysen 17830* (BOL, NBG); Cape Peninsula, Newlands Forest, 1 Mar. 1908, (–CD), *Froembling s.n.* (NBG); Cape Peninsula, Wynberg Hill, Jan. 1920, (–CD), *Garside 1449* (K); E slopes of Table Mt., July 1917, (–CD), *Page s.n.* (BOL); Cape Peninsula, Wynberg Hill, 17 Oct. 1951, (–CD), *Salter 9339* (BM); Cape of Good Hope, Cape Flats near Claremont, 5 Feb. 1892, (–CD), *Schlechter 281* (BM, PRE); Cape Peninsula, Table Mt, 150–300 m, Mar. 1898, (–CD), *Thode 6176* (NBG). **3418** (Simonstown): Cape Town, Wynberg Flats, 8 May 1847, (–AB), *Alexander-Prior s.n.* (K, PRE); Cape Peninsula, Fish Hoek, hills S of Fish Hoek, between Elsies R and Fish Hoek, 120 m, Nov. 1919, (–AB), *Andreae 93* (PRE); Cape Peninsula, Noordhoek, 50 m, Dec. 1919, (–AB), *Andreae 117* (PRE); Cape Peninsula, Red Hill above Simonstown, 4 May 1962, (–AB), *Barker 9662* (NBG); near Wynberg, 30 m, Oct. 1877, (–AB), *Bolus 3833* (BOL, K); Cape Peninsula, near Kommetjie, 21 Apr. 1940, (–AB), *Bond 283* (NBG); Cape Peninsula, Witsands, 9 Mar. 1941, (–AB), *Compton 10618* (NBG); Cape Peninsula, Scarborough, 24 Apr. 1952, (–AB), *Compton 23537* (NBG); Cape Peninsula, Simonstown, 8 Mar. 1947, (–AB), *Cross 4* (NBG); Cape Peninsula, Simonstown, on mountain, 90 m, Oct. 1908, (–AB), *Dummer 1148* (K); Wynberg, June 1890, (–AB), *Gamble 22145* (K); Kalk Bay Mt., Boyes Drive, slopes above, 6 Apr. 1974, (–AB), *Goldblatt 1421* (NBG, PRE); Cape Peninsula, near Princess Vlei, 10 m, 21 Aug. 1939, (–AB), *Isaac s.n.* (BOL); Kalk Bay, 185 m, 13 Aug. 1933, (–AB), *Levy's s.n.* (BOL); Wynberg, 30 m, Jan. 1885, (–AB), *Marloth 535* (PRE); Fish Hoek, (–AB), *Marloth 9303* (PRE); Sandvlei, 0–20 m, 6 July 1982, (–AB), *O'Callaghan 148* (NBG); Cape of Good Hope, Hout Bay, (–AB), *Rehmann, Dr.A. 1636* (BM); Cape of Good Hope, Wynberg, May 1797, (–AB), *Roxburgh s.n.* (K); near Miller's Point, (–AB), *Salter 259/14* (BM); sand dunes near Witsand, May 1927, (–AB), *Smuts s.n.* (NBG);



Cliffortia obcordata: A & B, branch with female flower; C, dorsal view of leaf; D, ventral view of leaf; E, achene.

Froggy Farm, 45 m, 12 May 1965, (–AB), *Taylor 6242* (NBG, PRE); Cape Peninsula, Constantia, 150–305 m, Mar. 1887, (–AB), *Thode 9186* (NBG); Cape Peninsula, Fish Hoek, 14 Aug. 1939, (–AB), *Walgate s.n.* (BOL, BOL); Cape Peninsula, lower slopes of Simonsberg, just above Boulders Beach, 90 m, 2 Oct. 1999, (–AB), *Whitehouse 52* (BOL, NBG); Cape Peninsula, Klein Constantia, 16 Nov. 1896, (–AB), *Wolley-Dod 2015* (BM, BOL, K); Cape of Good Hope, Simon's Bay, (–AB), *Wright s.n.* (K); Cape Peninsula, Buffels Bay, 21 Sept. 1935, (–AD), *Compton 5986* (NBG); Cape Peninsula, Platboom, 6 Nov. 1941, (–AD), *Compton 12311* (BOL, NBG); Buffels Bay, 150 m, 21 Nov. 1935, (–AD), *Levy's 5285* (BOL); Cape Peninsula, Zeekoevlei, 24 June 1941, (–BA), *Compton 10870* (NBG); Cape Flats, Zeekoe Vlei, 5 m, 6 Aug. 1933, (–BA), *Levy's 4714* (BOL); Cape Flats, Macassar Village, c. 300 m from W end of village along Sand Road towards Macassar Beach, 4 Sept. 1978, (–BA), *van Jaarsveld 3523* (PRE); lower Eerste River area below Kramat, near mouth above sewerage works at Macassar, 15 m, 6 Jan. 1978, (–BB), *Boucher 3481* (NBG, PRE); ?Somerset West, 30 Sept. 1940, (–BB), *Parker s.n.* (NBG); near Faure, 30 Sept. 1940, (–BB), *Parker 3526* (BOL, K); Faure, 29 July 1953, (–BB), *Parker 4887* (K, NBG, PRE); Somerset Strand, dunes, 14 Nov. 1946, (–BB), *Strey 724* (PRE). **3419** (Caledon): Gansbaai area, approaching Baviaansfontein from Uilenskraal, 245 m, 28 May 1992, (–CB), *Fellingham 1606* (NBG); Caledon, Grootbos Forest, near Gansbaai, 185 m, 4 Feb. 1981, (–CB), *Rourke 1690* (NBG, PRE); Die Kelders, Baviaansfontein 5.5 km E of Die Kelders, near Gansbaai, 200 m, 27 Sept. 1962, (–CB), *Taylor 4102* (NBG, PRE); Die Dam, 10 m, 25 June 1962, (–DC), *Acocks 22297* (PRE); 2 km NW of Agulhas lighthouse, 2 July 1997, (–DD), *Helme 1343* (NBG). **3420** (Bredasdorp): Cape Agulhas, 120 m, 11 Apr. 1948, (–CC), *Levy's 8844* (BOL).

(94–100) *Cliffortia glauca* series

The *Cliffortia glauca* series is currently an intractable problem. It is very difficult to precisely circumscribe the species within this complex group. Although there are some species that have a suite of characters that appear to define them, too often there are populations where these characters break down. Characters that normally work well elsewhere in the genus, such as hairs on the stem or tubercles on the achenes, are too inconsistent to use in this complex. Lumping all the species together would not do the group justice. Many populations are probably clonal, either by vegetative growth underground or through apomixis. Calling each one a separate species would be a way out of the problem, but not very helpful for the field botanist. I have therefore tried to group the populations together on shared morphology, but with due consideration to their biogeographical status as well. The latter has been influenced partly by the small amount of molecular work that has been done on this group that shows some affinity between different populations.

94. ***Cliffortia carinata*** Weim. in Botaniska Notiser 90: 179, fig. 4, t. 5 (1948); Fellingham: 611 (2000). Type: Cape Peninsula, Slangkop Mt., 16 Apr. 1942, *Compton 13242* (NBG, holo.; BOLI, iso.).



C. marginata sensu Bolus & Wolley-Dod: 259 (1904), non Eckl. & Zeyh., quoad *Schlechter 670*.

C. glauca sensu Weim.: 144, fig. 1b (1933) pro parte, & 38, fig. 6F (1934) pro parte; Levyns: 446 (1950); Fellingham: 612 (2000) pro parte, non Weim. sensu stricto.

C. geniculata Weim.: 178, fig. 3 (1948); Dahlgren: fig. 5E (1971); Fellingham: 612 (2000). Type: Caledon District, Onrus River Mt., SE slopes, 9 Feb. 1941, *Esterhuysen 4930* (PRE, holo.; BOLI, NBG!, iso.).

Short to medium erect shrub, up to 0.5 m high, resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 0.6–1.4 mm wide, usually tinged reddish, glabrous or hairy; stem hairs adpressed upwards to spreading, 0.1–0.5 mm long. *Leaves* trifoliolate; leaflets elliptic to oblong, 4.2–8.4 × 1.5–3.0 mm; apex acute to mucronate, 0.1–0.4 mm long; margins flat, entire and smooth; lamina chartaceous, 0.2–0.5 mm thick, curved upwards and towards the stem, glaucous, glabrous; sheath 0.6–1.3 mm long, abaxially glabrous, adaxially with a few scattered hairs or glabrous except for fringe of hairs at apex; stipules almost absent or 0.2–1.0 mm long, free, margins smooth or ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 3, glabrous. *Male flowers* with bracteoles 1.2–2.0 mm long; pedicel 0.4–0.6 mm long; sepals broadly ovate, 4.8–7.2 × 1.4–2.7 mm, acute to acuminate at the apex; stamens 6–15; filaments 5.7–6.4 mm long, red to greenish white; anthers brownish red. *Female flowers* with bracteoles 1.1–2.8 mm long, shorter or longer than immature receptacle; sepals narrowly ovate, 2.7–3.9 × 0.6–1.3 mm, erect; carpel 1; stigma 6.2–10.4 mm long, red, feathery, prominent above leaves; immature receptacle 1.5–2.3 × 0.7–1.1 mm, glabrous, clearly ribbed. *Achene* ellipsoid, 2.0–3.5 × 0.7–1.3 mm, greyish brown, glabrous; obscurely 6–12-ribbed, ribs acute, up to 0.1 mm wide. *Flowering time*: throughout the year.

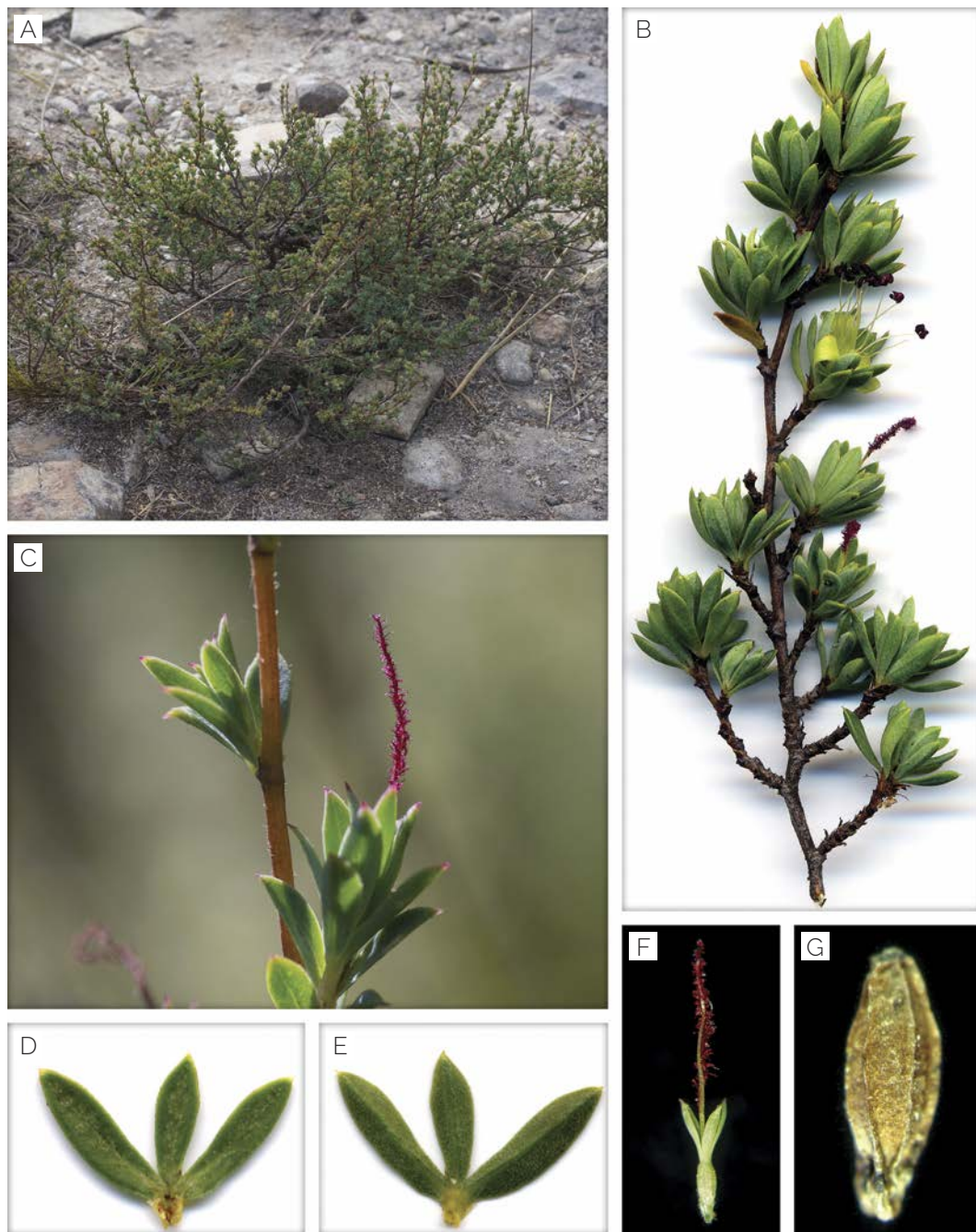
Habitat: Well-drained sandy soil from Table Mountain Series, full sun; altitude 0–250 m.

Distribution: Occurring on the southern Cape Peninsula and around Hermanus to the Akkedisberg but limits of species are poorly defined.

Conservation status: Localised but common where it grows, it is part of a widespread species complex and the distinction of the various species is uncertain. Red List status: Rare.

Etymology: *carinata* (Latin) means 'keeled', referring to the male sepals, which appeared so when first described, although they are not noticeably more so than in many species.

Notes: Weimarck described *Cliffortia carinata* and *C. geniculata* at the same time but surprisingly did not compare them explicitly, instead distinguished each one separately from *C. glauca*. He noted that *C. geniculata* had shortly hairy twigs, thinner leaflets and larger flowers than *C. glauca*. For *C. carinata* he noted that it had keeled male sepals and hairy twigs separating it from *C. glauca*, while in his key he noted that the leaflets are thicker than *C. geniculata*. I do not find any of these characters taxonomically useful in this complex, although there are very few characters of any reliability. Geography and leaf shape and size appear the most consistent discriminating characters. Molecular work links the Hermanus and southern Cape Peninsula populations which is biogeographically compatible. Although plants from the

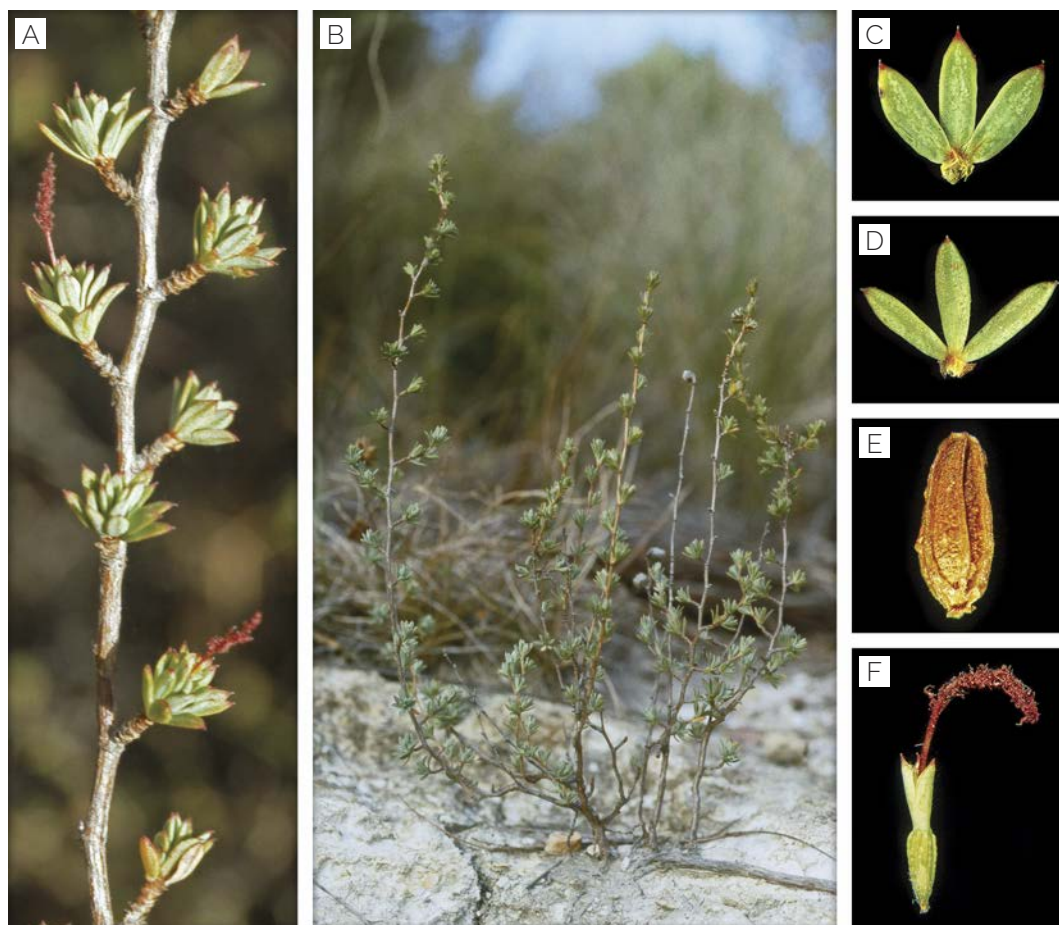


Cliffortia carinata: A, habitat; B, branch with male and female flowers; C, branch with female flower; D, dorsal view of leaf; E, ventral view of leaf; F, female flower; G, achene.

two areas exhibit slight differences in morphology the features are not consistent and it seems best to regard the two sets of populations as conspecific.

Representative specimens

SOUTH AFRICA. **3418** (Simonstown): Cape Peninsula, Slangkop Mts, 16 Apr. 1942, (–AB), *Compton 13242* (BOL, NBG); Cape Peninsula, Simonstown Mts, Miller's Point, 11 Jan. 1944, (–AB), *Compton 15506* (PRE); Cape Peninsula, slope above Scarborough, W coast, 27 Apr. 1980, (–AB), *Esterhuysen 35433* (BOL); Cape Peninsula, near Miller's Point, 3 Apr. 1928, (–AB), *Salter 259/18* (BM); Cape Peninsula, Slangkop Mt, above Kommetjie, along track towards ruins of coastguard house, 160 m, 4 Aug. 2001, (–AB), *Whitehouse 240* (BOL, NBG); Simonstown, Smitswinkel Bay, 120 m, 11 Apr. 1892, (–AD), *Schlechter 670* (BM). **3419** (Caledon): Onrus R Mt., SE slopes, 9 Feb. 1941, (–AC), *Esterhuysen 4930* (BOL, NBG, PRE); Fernkloof Nature Reserve, rise above car park at end of Rotary Way, 200 m, 4 Sept. 1999, (–AC), *Whitehouse 49* (BOL, NBG).



Clifortia carinata x *marginata*: A, branch with female flowers; B, habitat; C, dorsal view of leaf; D, ventral view of leaf; E, achene; F, female flower.

95. **Cliffortia marginata** Eckl. & Zeyh., Enumeratio Plantarum Africae Australis Extratropicae 2: 269 (1836); Harv.: 298 (1862); Weim.: 41, fig. 7E–G (1934) & 400 (1940b); Fellingham: 613 (2000). Type: Stellenbosch District, Hottentots Holland Mts near Somerset West, *Ecklon & Zeyher 1740* (S, holo.!; B†, C, G, K!, L, M!, SAM!, U!, W, iso.).



C. tenuis Weim.: 145, fig. 1c–f (1933) & 41, fig. 7J–M (1934); Fellingham: 614 (2000). Lectotype, designated here: Bredasdorp District, Elim, 90 m, 24 Apr. 1896, *Schlechter 7717* (BOL, lecto!; B†, COL, G, GRA!, HBG!, K!, L, NH!, PRE!, SI, TRV, W!, Z!).

Short erect shrub, up to 0.6 m high; densely divaricately branched, forming brachyblasts. *Young stems* 0.4–0.8 mm wide, usually tinged reddish, glabrous. *Leaves* trifoliolate; leaflets oblong to linear or narrowly obovate, 1.7–4.0 × 0.5–1.0 mm; apex acute to mucronate; margins flat, entire and smooth; lamina chartaceous, curved upwards and towards the stem, glaucous, glabrous; sheath 0.2–0.8 mm long, abaxially glabrous, adaxially hairy; stipules ± absent or 0.2–0.6 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous or hairy; sepals 3, glabrous. *Male flowers* with bracteoles 0.2–0.3 mm long; sepals broadly ovate, 2.0–3.0 × 0.9–2.0 mm, acute to acuminate at the apex; stamens 6–14; filaments 4–5 mm long, red; anthers brownish red. *Female flowers* with bracteoles 0.2–0.6 mm long, shorter than immature receptacle; sepals narrowly ovate, 1.0–1.7 × 0.3–0.7 mm, erect; carpel 1; stigma 3–4 mm long, red, feathery, prominent above leaves and sepals; immature receptacle 1.8–2.3 × ± 1 mm, glabrous, clearly ribbed. *Achene* ellipsoid, 1.2–3.4 × 0.8–1.2 mm, greyish brown, glabrous; obscurely 6-ribbed, ribs acute, up to 0.1 mm wide, tubercles sometimes present. *Flowering time*: March to October, possibly throughout the year.

Habitat: Lowland fynbos on clayish soil in full sun; altitude 0–200 m.

Distribution: From Stellenbosch to the Kogelberg, and in the Overberg from Elim to Rietfontein.

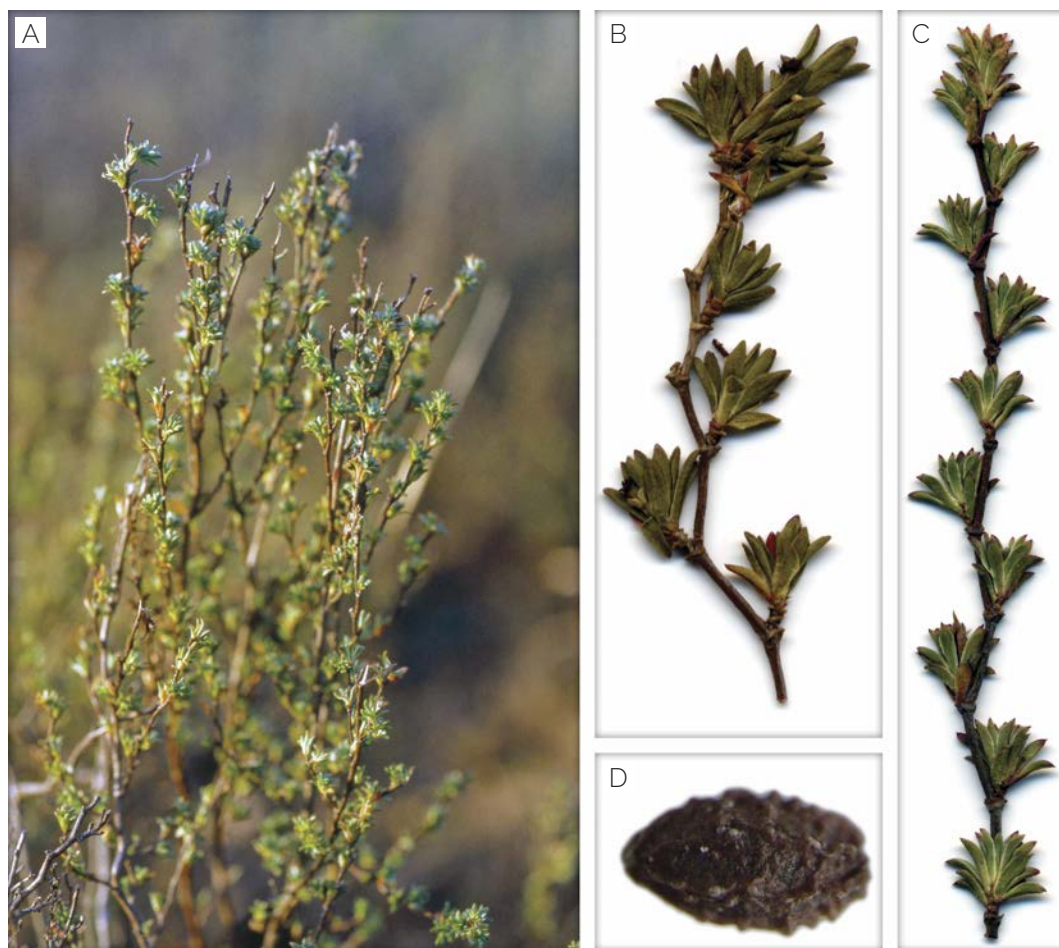
Conservation status: Once regarded as a threatened species of the Cape Flats and area around Stellenbosch, it is part of a poorly understood species complex and now includes *Cliffortia tenuis*, which extends its distribution considerably. Nevertheless, it grows in lowland clay soils, which are at threat of development and agriculture. Red List status: EN.

Etymology: *marginata* (Latin) means ‘margined’, referring to the leaves that appear to have a translucent margin, even visible in dried specimens.

Notes: This species has the smallest leaves in the *Cliffortia glauca* series, not more than 4 mm long and 1 mm wide. Weimarck separated the Overberg populations as *C. tenuis* on the basis of the leaflets lacking a transparent margin and minute stipules (lacking in his *C. marginata*). He also noted that the sole collection of *C. tenuis* had six stamens, whereas *C. marginata* had 12 and *C. tenuis* had small tubercles on the achenes. As with *C. carinata* and *C. geniculata*, I do not find these characters consistent enough to separate species (although the tubercled achenes are rather novel) within this complex without creating many microspecies and prefer to look at broader biogeographically defined species. The leaf size is consistent between the Cape Flats populations and Overberg populations and this makes it possible to recognise the species.

The only other species with similarly small leaves in the complex is *Cliffortia amplexistipula*, but that is confined to more arid regions and the leaves are much thicker. The odd specimen that was described as *C. concinna* has leaves almost as small but a short acuminate tip, see *C. glauca* for further discussion.

Populations that are intermediate in leaf size (3–5 mm long) between *Cliffortia marginata* and *C. carinata* are found around Sir Lowry's Pass and Arieskraal. For convenience, these populations are classified as a hybrid until a better understanding of the whole *C. glauca* series can be established. Molecular evidence from the chloroplast genome points (Fig. 2) to the involvement of *C. obovata*, but many more populations need to be sampled before any firm conclusions can be drawn. Weimarck suggested such a cross for Duthie 1655 from Stellenbosch but proposed *C. glauca* rather than *C. carinata* as the other parent to *C. marginata*. This was based upon his identification of a specimen from Sir Lowry's Pass (Schlechter 4832) as belonging to *C. glauca*. *Cliffortia glauca* is now considered to occur north of the Langeberg and so does not occur close by. The Schlechter specimen is itself now considered to belong to this cross.



Cliffortia marginata: A, habitat; B, branch with female flowers; C, branch; D, achene with tubercles.

Cliffortia marginata was recorded (Weimarck 1940b) from Hout Bay, Tierbos, based on Acock 2346 but I have not seen this specimen housed in the Hafström herbarium at S and so its presence on the Cape Peninsula has yet to be confirmed.

Representative specimens

SOUTH AFRICA. **3318** (Cape Town): Groot Phesantekraal, NE Durbanville, on Corobrik property, 300 m NW of main quarry, 140 m, 1 Sept. 1998, (–DC), *Helme 1534* (NBC); Eensaamheid (Briers Houw) N.R., 10 km W of Paarl, farm 469, 130 m, 28 Aug. 2002, (–DD), *Helme 2591* (BOL). **3418** (Simonstown): Harmony, Harmony Flats, alongside Lwandle Township, 25 m, 14 Jan. 1979, (–BB), *Boucher 4266* (NBC, PRE); between Llwandle and national road, 30 m, 3 Apr. 1980, (–BB), *Burgers 2330* (NBC, PRE); Gastrouw, near Harmony Flats, June 2006, (–BB), *Helme* (,); Meerlust, opposite Kompagniesdrift road to the west of Faure–Lynedoch road, E of railway, 35 m, 5 Aug. 1998, (–BB), *Helme 1507* (NBC); Strand, Dennehof area, 2 km N of Gordon's Bay, 15 m, 1 Oct. 1998, (–BB), *Helme 1616* (NBC); Steenbras area, 16 Nov. 1947, (–BB), *Levyys 8751* (BOL); Somerset West, 26 Mar. 1940, (–BB), *Parker 3475* (BOL, K, NBC). **3419** (Caledon): flats NW of Soetany'sberg, Rietfontein Private Nature Reserve, NW of entrance to reserve (1st gate), 200 m, 25 Feb. 1994, (–DB), *Beyers 230* (NBC); hills near Elim, 8 Dec. 1951, (–DB), *Esterhuysen 19599* (BOL, PRE); between Elim and Bredasdorp, Haasvlakte, 15 m, 26 Mar. 1973, (–DB), *Oliver 4207* (NBC, PRE); Elim, 90 m, 24 Apr. 1896, (–DB), *Schlechter 7717* (BM, BOL, K, PRE, Z); along road to Rietfontein, between Vlooi Kraal and Rietfontein, 55 m, 3 July 1999, (–DB), *Whitehouse 40* (BOL, K, MO, NBC). **3420** (Bredasdorp): Eliaskraal, flats below Heuningrug, 40 m, 25 May 1990, (–CA), *Oliver 9441* (BOL, NBC, PRE).

96. **Cliffortia obovata** E.Mey. ex Harv., Flora Capensis 2: 297 (1862); Weim.: 39, fig. 7A–D (1934); Fellingham: 613 (2000). Type: Caledon District, Genadendal, 610–915 m., Oct., Drège 'C. obovata E.M.' (K, holo.!; B†, HBG!, S!, REG!, SAM!, TUB!, iso.).



C. serpyllifolia var. *obovata* Kuntze: 76 (1898). Type: Caledon District, Houwhoek, 350 m, 20–31 Jan. 1894, Kuntze s.n. (NY, holo.!; B†, K!, Z, iso.).

Medium erect shrub, up to 1.2 m high, resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 0.5–1.2 mm wide, usually tinged reddish, glabrous or rarely hairy on very young growth; stem hairs adpressed upwards, 0.2–0.4 mm long. *Leaves* trifoliolate; leaflets elliptic-obovate to broadly obovate, 3.4–7.2 × 1.4–3.7 mm; apex acute to rounded, up to 0.4 mm long; margins flat, entire and smooth; lamina chartaceous, 0.1–0.4 mm thick, curved upwards and towards the stem, glaucous, glabrous; sheath 0.6–1.2 mm long, abaxially glabrous, adaxially with a few adpressed hairs or glabrous except for fringe of hairs at apex; stipules absent or up to 0.8 mm long, free, margins smooth to ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy or glabrous; sepals 3, glabrous. *Male flowers* with bracteoles 1.1–2.0 mm long; pedicel 0.3–0.7 mm long, glabrous; sepals broadly ovate, 3.8–6.6 × 1.6–3.2 mm, acute to acuminate at the apex; stamens 8–14; filaments 5–12 mm long, red; anthers brownish red. *Female flowers* with bracteoles 0.8–1.8 mm long, shorter than immature receptacle; sepals narrowly ovate to linear, 1.8–3.1 × 0.5–0.9 mm, erect; carpel 1; stigma 4.5–11.7 mm long, red, feathery, prominent above leaves; immature receptacle 1.1–3.1 × 0.6–1.2 mm, glabrous, clearly ribbed. *Achene* ellipsoid, 2.4–3.5 × 0.9–1.2 mm, pale greyish brown, glabrous; obscurely 6–9-ribbed, ribs acute, up to 0.2 mm wide. *Flowering time*: throughout the year.

Habitat: Fynbos on well-drained clayish or sandy soil from Table Mountain Series in full sun; altitude 200–1250 m.

Distribution: Mountains of southwestern Western Cape between Franschhoek, Houwhoek and Boesmanskloof in the Riviersonderend Mountains, with a population on Caledon Swartberg.

Conservation status: Widespread and common where it occurs, and its resprouting ability means that it has few threats. Red List status: LC.

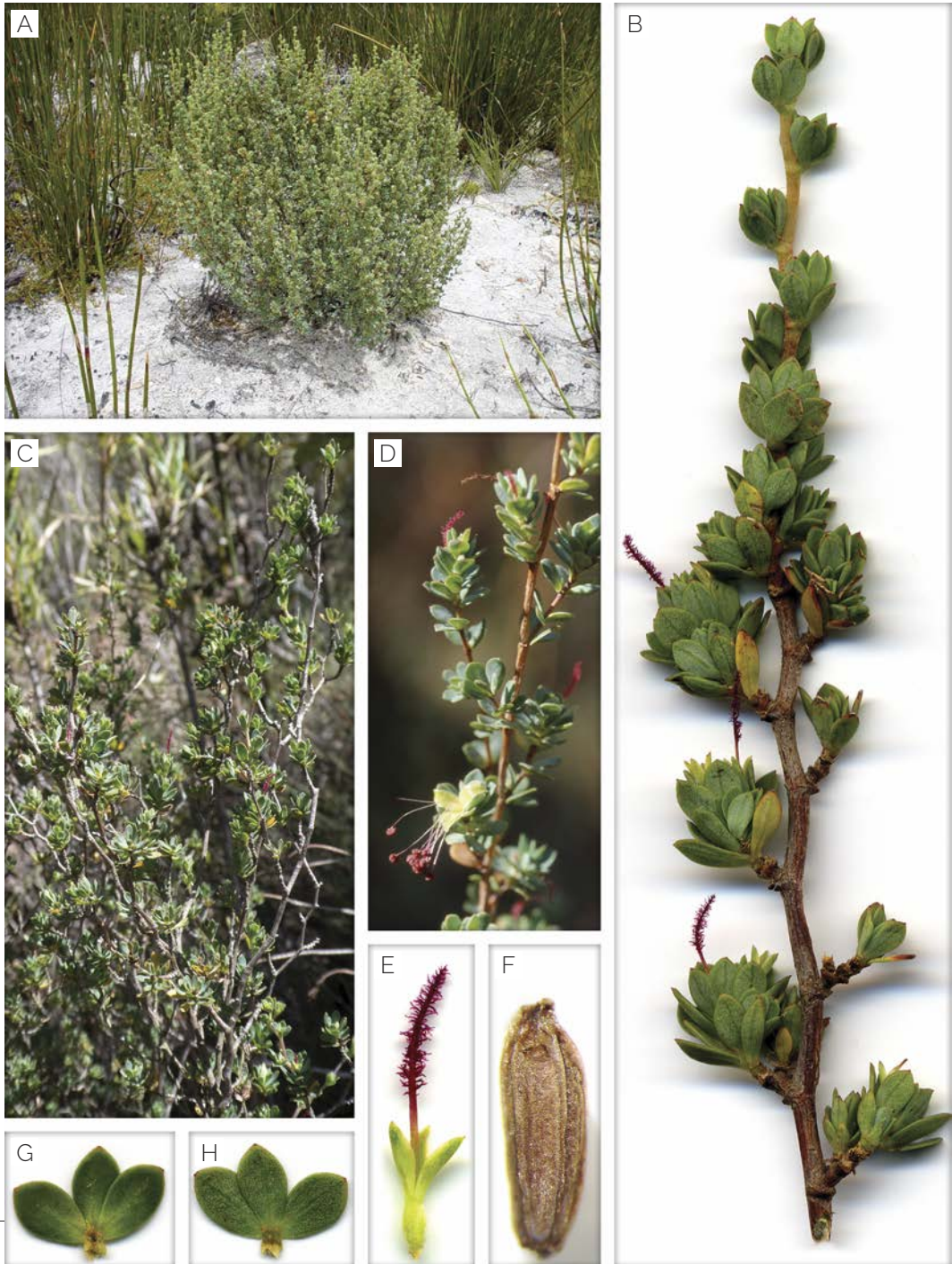
Etymology: *obovata* (Latin) means 'obovate', referring to the shape of the leaflets, a distinctive character when compared to the closely related species.

Notes: This is one of the more well-defined species in the *Cliffortia glauca* series, the leaves of *C. obovata* are consistently broadest above the middle, whereas those of other species are usually elliptic and broadest in the middle. *Cliffortia glauca* sometimes has obovate leaflets, but apart from its geographic separation, *C. glauca* has a pointed tip to the leaflets whereas *C. obovata* are usually rounded or only broadly acute. Weimarck included Burchell 8722 from near Tulbagh in *C. obovata*, but this is outside the range of typical *C. obovata* and is probably better regarded as *C. rigida*.

There is no indication in the protologue of *Cliffortia serpyllifolia* var. *obovata* that the variety was based upon Harvey's species. However, Kuntze also cites *C. serpyllifolia* var. *penninervia* as a new variety by him yet his use of the α symbol shows that this too was probably based upon Harvey's var. *penninervis*. Although considered at one time related to *C. serpyllifolia* on account of the similarity in leaf shape, this and other species of the *C. glauca* series are easily distinguished by their 3-sepalled flowers, glaucous leaves and long red stigma that emerge beyond the leaves.

Representative specimens

SOUTH AFRICA. **3319** (Worcester): Franschoek Pass, 20 Aug. 1936, (–CC), *Compton 6411* (NBG); Franschoek, Feb. 1918, (–CC), *Rogers 17514* (PRE); Franschoek Pass, May 1934, (–CC), *Smuts & Gillett s.n.* (NBG); Franschoek, Franschoek Forest Reserve, Purgatory Outspan, 520 m, 22 May 1969, (–CC), *Stehle 149* (NBG, PRE); Wildepaardeberg, 32 km S of Worcester, Jonas Plaats Farm (Jonaskop), Apr. 1920, (–DC), *Andreae 326* (NBG, PRE); Robertson, Poesjenets R, 460 m, 11 Apr. 1936, (–DC), *Levyms 5452* (BOL); Omklaarberg, 305 m, 4 Nov. 1951, (–DC), *Levyms 9792* (BOL); Robertson, Poesjenets R, 305 m, 12 Oct. 1957, (–DC), *Levyms 10793* (BOL); Robertson, Poesjenets R, 365 m, 12 Oct. 1957, (–DC), *Levyms 10812* (BOL); Jonaskop, Wildepaardeberg, slopes above plateau, 1220 m, 15 Sept. 2000, (–DC), *Whitehouse 141* (BOL, NBG). **3419** (Caledon): Houwhoek, 350 m, 20 Jan. 1894, (–AA), *Kuntze s.n.* (K); Houwhoek, along old road, 275 m, 27 Sept. 2000, (–AA), *Whitehouse 144* (BOL, NBG); Groenlandberg, jeeptrack from Nuweberg to radio mast, 850 m, 16 Dec. 2002, (–AA), *Whitehouse 332* (BOL); Caledon Swartberg, Caledon Nature Reserve, path to Die Plaat in valley bottom, above dam, 490 m, 9 May 2000, (–AB), *Whitehouse 112* (BOL, NBG); Greyton, Boesmanskloof, along jeep track to Die Galg, 675 m, 12 Nov. 1992, (–BA), *Beyers 213* (NBG, PRE); near Genadendal, 275 m, Dec. 1894, (–BA), *Bolus 6937* (BOL, PRE); Caledon District (Baviaans Kloof near Genadendal ex Weimarck), 15 Feb. 1815, (–BA), *Burchell 7606* (K); Genadendal, 1839, (–BA), *Drège s.n.* (K); Riviersonderend Mts, near Greyton, lower S slopes, 1 Jan. 1953, (–BA), *Esterhuysen 21072* (BOL); Riviersonderend Mts, S slopes of Boesmanskloof, near Greyton, 670 m, 21 Apr. 1971, (–BA), *Kruger 1213* (NBG, PRE); Genadendal, 610 m, 2 Mar. 1935, (–BA), *Levyms 4844* (BOL); Robertson, Boesmanskloof Pass, 915 m, 23 July 1962, (–BA), *Levyms 11288* (BOL); Boesmanskloof, McGregor end of kloof, edge of jeep track, 700 m, 6 June 2001, (–BA), *Nowell 111* (,); Riviersonderend Mts, between Greyton and Macgregor, Boesmanskloof Trail, by Oakes Falls, 490 m, 23 Oct. 1999, (–BA), *Whitehouse 63* (BOL, NBG); Riviersonderend Mts, slopes near Riviersonderend, 610–915 m, 12 Feb. 1956, (–BB), *Esterhuysen 25333* (BOL); Riviersonderend, near Olifantsbos, 200 m, 1 Apr. 1922, (–BB), *Marloth 11095* (PRE); Riviersonderend, 1 Apr. 1922, (–BB), *Wilson 143* (NBG).



97. **Cliffortia glauca** Weim. in Botaniska Notiser 1933: 144, fig. 1a (1933) & 38, fig. 6G–K (1934) pro parte; Fellingham: 612 (2000) pro parte. Type: Riversdale District, road between Garcia's Pass and Muiskraal, 565 m, Oct. 1904, *Bolus 11272* (BOL, holo.!; PRE!, iso.).



C. concinna Weim.: 78, fig. 1f–i (1953); Fellingham: 611 (2000).
Type: Ladismith District, S slopes of Rooiberg, NW aspect,
24 May 1950, *Esterhuysen 17173* (LD, holo.!; BOL!, NBG!, iso.).

Medium erect shrub, up to 1.5 m high, resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 0.8–1.1 mm wide, usually tinged reddish, glabrous. *Leaves* trifoliate; leaflets elliptic to obovate, 3.3–7.3 × 1–4 mm; apex sharply acuminate to mucronate, 0.3–0.5 mm long; margins flat, entire and smooth; lamina chartaceous, curved upwards and towards the stem, glaucous, glabrous; sheath 1.0–1.7 mm long, abaxially glabrous, adaxially glabrous except for fringe of hairs at apex; stipules absent or 0.5–0.9 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous with smooth margins; sepals 3, glabrous. *Male flowers* with bracteoles 2.0–2.6 mm long; pedicel 0.5–0.6 mm long; sepals broadly ovate, 4.5–4.9 × 2.3–2.7 mm, acute to acuminate at the apex; stamens 14–15; filaments 6.0–6.8 mm long, red; anthers brownish red. *Female flowers* with bracteoles 1.9–2.7 mm long, longer than immature receptacle; sepals narrowly ovate to obovate, 2.2–2.7 × 0.7–1.1 mm, erect; carpel 1; stigma 6.7–10.7 mm long, red, feathery, prominent above leaves; immature receptacle 1.9–2.6 × 0.7–1.0 mm, glabrous, clearly ribbed. *Achene* ellipsoid, 2.2–2.5 × ± 1.1 mm, greyish brown, glabrous; 6-ribbed, ribs acute. *Flowering time*: throughout the year.

Habitat: Arid fynbos on well-drained clayish soil from shale bands of Table Mountain Series in full sun; altitude 450–800 m.

Distribution: Lower northern slopes of the Langeberg from Swellendam to Garcia's Pass and Rooiberg to the north.

Conservation status: Known from a few localities on the Langeberg and Rooiberg, but the circumscription of the species in this complex is difficult to determine. Red List status: Rare.

Etymology: *glauca* (Latin) means 'glaucous', referring to the bluish grey-green leaves, although a feature of several closely related species also.

Notes: Weimarck regarded *Cliffortia glauca* as having a wide distribution from the Cape Peninsula to Muiskraal at the north end of Garcia's Pass. However, under the biogeographic model adopted here the species is restricted to the northern Langeberg and Rooiberg area. Its main distinguishing character is the sharp point to the leaflets, a character that helps separate it from *C. obovata*.

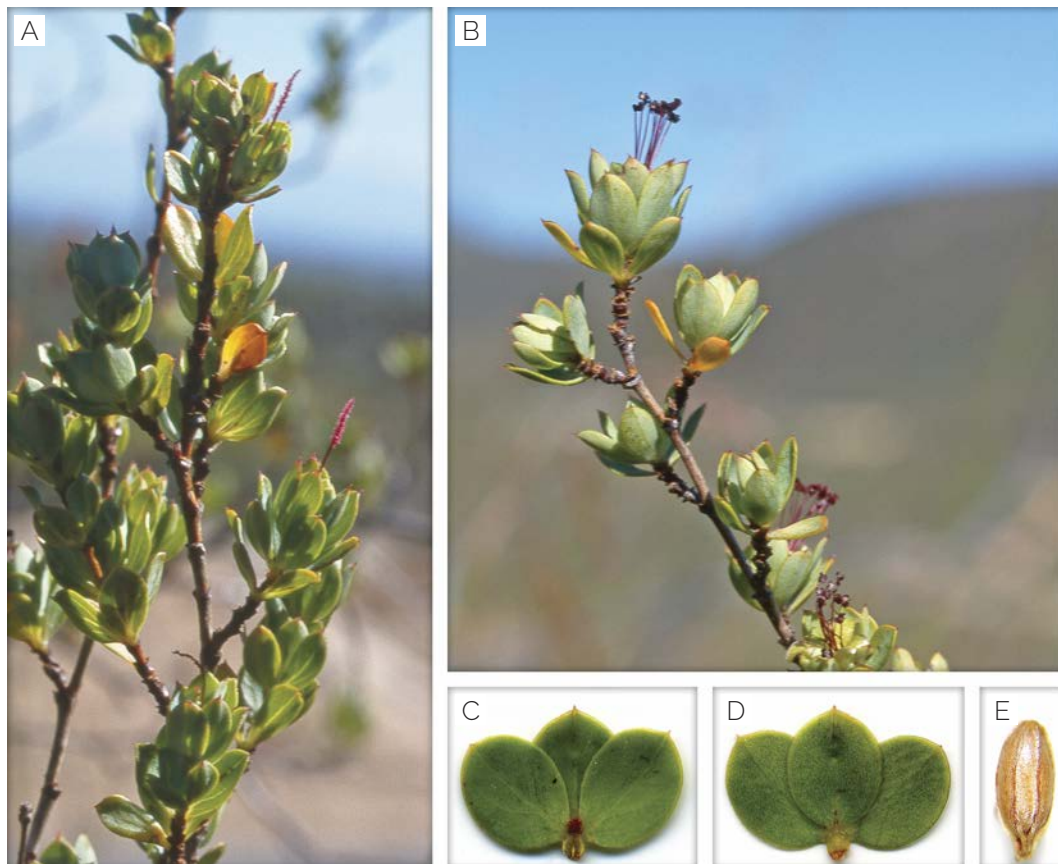
The only other species in the Langeberg in the *Cliffortia glauca* series is *C. polita*. The western populations of this species often lack the inrolled margins of the leaflets and thus look more elliptic than needle-like. *Cliffortia glauca* usually has more obovate leaflets and the acute apex is more prominent.

The synonym, *Cliffortia concinna*, was described by Weimarck for plants from the Rooiberg, which has small leaflets (3–5 × 1.0–1.5 mm), not much larger than *C. marginata* (1.7–4.0 × 0.5–1.0 mm) but with a distinct point at the apex. A second collection, *Esterhuysen 17172*, collected in the same vicinity as the type (*Esterhuysen 17173*), has larger leaflets and appears intermediate between *C. glauca* and *C. concinna*. The only other collection from Rooiberg (*Vlok 1868*) also has larger leaflets. In this complex where

boundaries between species are difficult to establish it is not possible to maintain *C. concinna* as distinct from *C. glauca* at present (but see also comment under *C. amplexistipula*).

Representative specimens

SOUTH AFRICA. **3320** (Montagu): Marloth Nature Reserve, Swellendam Hiking Trail, kloof W of Warmwater R, 800 m, 25 Dec. 2002, (–CD), *Whitehouse 334* (BOL). **3321** (Ladismith): Riversdale, N end of Garcia's Pass, 610 m, 23 Sept. 1949, (–CC), *Acocks 15429* (K, PRE); Riversdale, N end of Garcia's Pass, 610 m, 23 Sept. 1949, (–CC), *Acocks 15430* (K, PRE); Riversdale, N end of Garcia's Pass, 8 Dec. 1938, (–CC), *Acocks & Hafström 2139* (K, PRE); Muiskraal Farm, N foothills of Langeberg, 370 m, 7 Mar. 1987, (–CC), *Bohnen 8768* (NBC, PRE); road between Garcia's Pass and Muiskraal, 565 m, Oct. 1904, (–CC), *Bolus 11272* (BOL, PRE); Muiskraal near Garcia's Pass, 305 m, 3 Oct. 1897, (–CC), *Galpin 4001* (BOL, PRE); N slopes of Langeberg, Garcia's Pass, 13 May 1971, (–CC), *Kruger 1270* (NBC, PRE); Riversdale, Muiskraal, 460 m, 11 Aug. 1948, (–CC), *Levy's 9009* (BOL); Riversdale, Muiskraal, 610 m, 16 July 1957, (–CC), *Levy's 10748* (BOL); 60 km from Barrydale to Garcia's Pass, foothills near the pass, 460 m, 29 Jan. 1969, (–CC), *Thompson 677* (NBC, PRE); Garcia's Pass, just S of Muiskraal, 460 m, 11 Mar. 2000, (–CC), *Whitehouse 93* (BOL, NBC); Riversdale, Waterfall, on Muiskraal–Couritz road, 610 m, 21 July 1962, (–CD), *Levy's 11282* (BOL).



Cliffortia glauca: A, branch with female flowers; B, branch with male flowers; C, dorsal view of leaf; D, ventral view of leaf; E, achene.

98. **Cliffortia rigida** Weim. in Botaniska Notiser 90: 177, fig. 2d–k, t. 4 (1948); Fellingham: 613 (2000). Type: Paarl District, Franschhoek Forest Reserve, 610 m, 29 Sept. 1935. *Compton 5687* (BOL, holo!).



Medium erect shrub, up to 0.5 m high, resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 0.7–1.0 mm wide, usually tinged reddish, glabrous or hairy; stem hairs adpressed upwards, 0.1–0.4 mm long. *Leaves* trifoliolate; rarely unifoliolate or bifoliolate and then multi-veined from base; leaflets elliptic to oblong, 3–7 × 1.2–2.0 mm; apex sharply acuminate to mucronate, up to 0.4 mm long; margins flat, entire and smooth, rarely with up to 2 straight teeth or lobed; lamina chartaceous, 0.2–0.4 mm thick, curved upwards and towards the stem, ± straight or curved downwards and away from the stem, green or glaucous, glabrous; sheath 0.5–1.0 mm long, abaxially glabrous, adaxially scattered adpressed hairs or glabrous except for fringe of hairs at apex; stipules 0.4–0.9 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 3, glabrous. *Male flowers* with bracteoles 1.1–2.8 mm long; pedicel 0.4–0.5 mm long, glabrous; sepals broadly ovate, 3.7–5.6 × 1.5–2.5 mm, acute to acuminate at the apex; stamens 5–12; filaments 5.4–6.8 mm long, red or greenish white; anthers brownish red or yellow. *Female flowers* with bracteoles 1.1–2.3 mm long, longer than immature receptacle; sepals narrowly ovate to obovate, 1.5–3.5 × 0.5–1.2 mm, erect to recurved; carpel 1; stigma 6.0–7.9 mm long, red, feathery, prominent above leaves; immature receptacle 1.4–2.4 × 0.5–0.9 mm, glabrous, clearly ribbed. *Achene* ellipsoid, 1.8–4.0 × 0.5–1.5 mm, medium brown, glabrous; 6–12-ribbed, ribs acute, up to 0.2 mm wide. *Flowering time*: probably throughout the year.

Habitat: Fynbos on well-drained sandy or clayish soil from Table Mountain Series in full sun; altitude 450–800 m.

Distribution: Mountains between Franschhoek and Villiersdorp, possibly an outlying population on the Witzenberg Mountains near Tulbagh.

Conservation status: A poorly defined species, so that it is difficult to determine how rare it is but populations are usually found in mountainous areas under little threat of development. Red List status: DDT.

Etymology: *rigida* (Latin) means 'rigid', referring to the stiffly pointed leaves.

Notes: Least well-defined member of the *Cliffortia glauca* series, *C. rigida* is distinguished mainly as a result of limited molecular study, which suggests that the northwestern populations of the complex are separate from the coastal populations. Weimarck originally described this species based on the presence of leaflets that were sometimes united. This points to the type having introgressed with some other species, such as *C. ruscifolia*. However, as no other name is currently available, while the complex is so poorly understood, it is best to leave all these populations under this name. The populations are in general unremarkable in their morphology, having typical glaucous leaflets, elliptic in shape.

Representative specimens

SOUTH AFRICA. 3319 (Worcester): Franschhoek Forest Reserve, 610 m, 29 Sept. 1935, (–CC), *Compton 5687* (BOL); S side of Wolfkloof, track up from Wolfkloof farm, 490 m, 8 June 2002, (–CC), *Whitehouse 303* (BOL, K, NBC); Stettynsberg, SW slopes, 1220–1525 m, 16 Dec 1944, (–CD), Esterhuysen 11073 (BOL).



Cliffortia rigida: A & C, branch with female flowers; B, branch with male flowers; D, dorsal view of leaf; E, ventral view of leaf; F, female flower.

99. **Cliffortia amplexistipula** Schltr. in Botanische Jahrbücher 27: 140 (1900); Weim.: 157, fig. 47B (1934) & 174 (1948); Fellingham: 67, fig. 2 (1993a) & 614 (2000). Lectotype, designated by Fellingham (1993a): Clanwilliam District, near Wupperthal, Ezelbank, 1 220 m, 2 Sept. 1896, *Schlechter 8825* (B†, holo.; BOL, lecto.; BM!, GRA!, K!, PRE!, iso.).



C. fasciculata Weim.: 413, fig. 5a–e, 6 (1946) & 174 (1948). Type: Clanwilliam District, N Cederberg, between Heuningvlei and Koupoort, 21 Oct. 1945, *Esterhuysen 12116* (LD, holo.; BOL!, K!, iso.).

Short erect shrub, up to 1 m high, resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 0.55–0.80 mm wide, usually tinged reddish, glabrous. *Leaves* trifoliolate; leaflets linear to needle-shaped, 1.6–3.3 × 0.4–1.1 mm; apex acute to mucronate, up to 0.2 mm long; margins rounded, entire and smooth; lamina chartaceous, 0.3–0.5 mm thick across midrib, midrib thickened so that leaf is almost cylindrical, curved upwards and towards the stem, glaucous, glabrous; sheath 0.4–1.1 mm long, abaxially and adaxially glabrous; stipules absent or up to 0.5 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 3, glabrous. *Male flowers* with bracteoles 0.6–1.2 mm long; sepals broadly ovate, 2.2–3.0 × 1.2–1.9 mm, acute to acuminate at the apex; stamens 4–6; filaments 2.9–4.5 mm long, red; anthers brownish red. *Female flowers* with bracteoles 0.6–1.2 mm long, shorter than immature receptacle; sepals narrowly ovate to obovate, 1.0–1.8 × 0.4–0.9 mm, erect; carpel 1; stigma 3.7–5.3 mm long, red, feathery, prominent above leaves; immature receptacle 1.9–2.8 × 0.6–0.9 mm, glabrous. *Achene* ellipsoid, 2.3–2.9 × 0.6–0.9 mm, glabrous; 6–8-ribbed, ribs acute, up to 0.1 mm wide. *Flowering time*: July to April.

Habitat: Arid fynbos on well-drained sandy soil from Witteberg Series in full sun; altitude 300–1700 m.

Distribution: Arid mountains from Namaqualand northwest of Springbok, south as far as the Anysberg and east to Gamkaskloof in the Swartberg Mountains.

Conservation status: Widespread in arid fynbos, which is not under much threat. Red List status: LC.

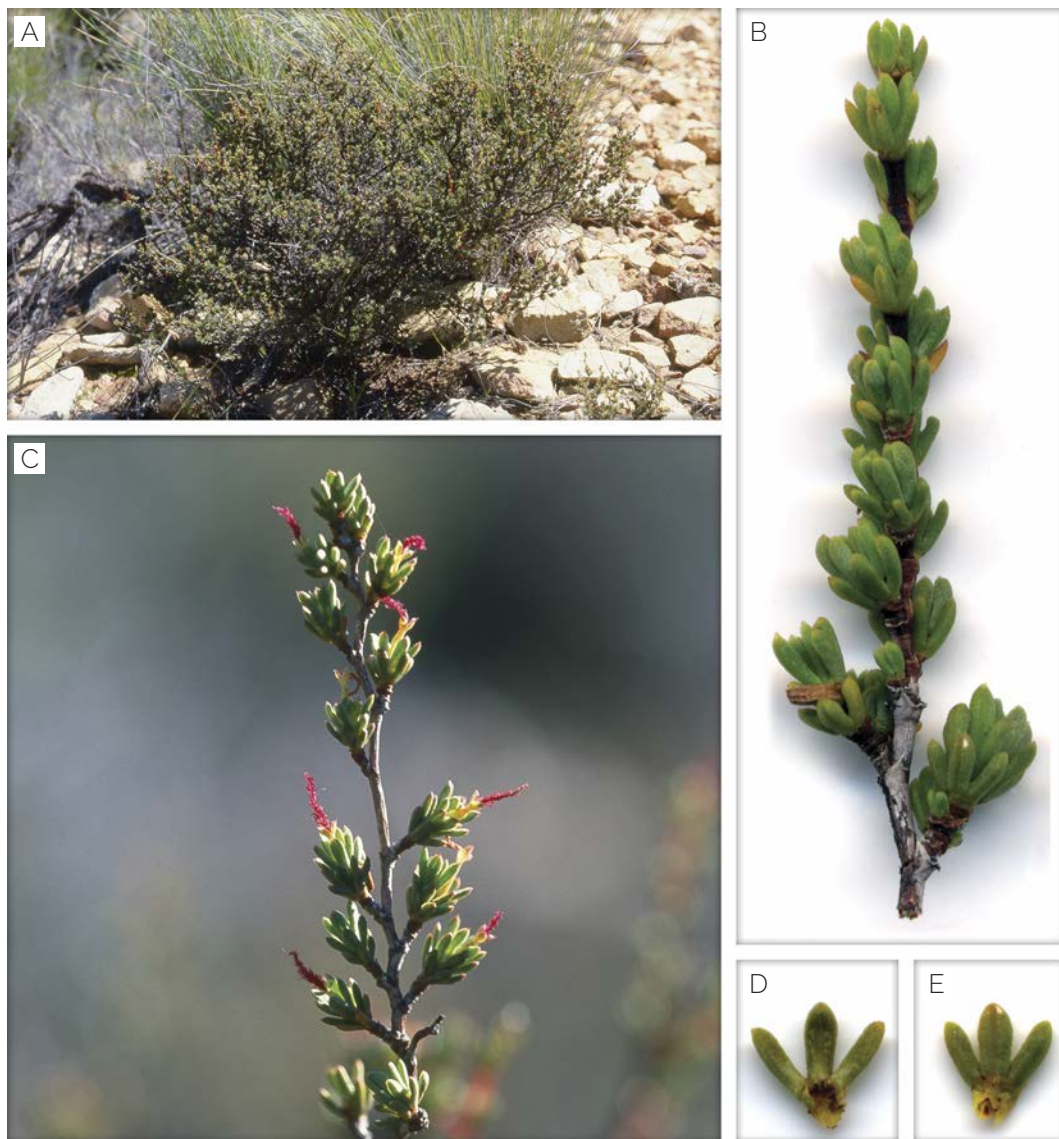
Etymology: *amplexistipula* (Latin) means ‘clasping stipules’, referring to the stipules and sheaths that form a circle around the stem.

Notes: The name *Cliffortia amplexistipula* was included by Weimarck (1934) in his monograph as an imperfectly known species due to the sterile type specimens. He later described the species from fertile material as *C. fasciculata* (Weimarck 1946). Two years later, he regarded *C. fasciculata* as conspecific with Schlechter’s earlier name *C. amplexistipula*, which had priority (Weimarck 1948: 174). *Cliffortia amplexistipula* is easily recognised as the only other species with comparably small glaucous trifoliolate leaves and glabrous stems that are members of the *C. glauca* series and none occur in the same range as this species. The closest occurrence of this species to another member of the *C. glauca* series is the Rooiberg where *C. glauca* occurs, whereas *C. amplexistipula* occurs in the Swartberg. Some small-leaved plants of *C. glauca* on the Rooiberg were described as a new species, *C. concinna* (see *C. glauca*). There is a possibility that these small-leaved plants represent a hybrid between *C. amplexistipula* and *C. glauca*.

Representative specimens

SOUTH AFRICA. 2917 (Springbok): Namaqualand, 4 km N by E of Nigramoep, 825 m, 23 Aug. 1957, (–DA), *Acocks 19409* (BOL, PRE); Namaqualand Province, 4 km N by E of Nigramoep, 825 m, 23 Aug. 1957, (–DA), *Acocks 19709* (K).

3018 (Kamiesberg): Kamiesberg, upper NE facing slopes of Rooiberg north, farm Anegas 455, NE of Sneekop, 1300 m, 3 Sept. 2004, (–AA), *Helme 3073* (NBG); Welkom, Kamiesberg near Garies, 1065 m, 16 Oct. 1954, (–AC), *Esterhuysen 23711* (BOL, NBG, PRE); Kamiesberg, upper NW slopes of Rooiberg, farm Rhebokfontein 421, 1500 m, 31 Aug. 2004, (–AC), *Helme 3072* (NBG). **3118** (Vanrhynsdorp): Gifberg, 440 m, 14 July 1974, (–DC), *Thompson 2088* (NBG, PRE). **3119** (Calvinia): Lokenburg, 700 m, 29 Aug. 1953, (–CA), *Acocks 17015* (K, PRE); Lokenburg, 700 m, 28 Aug. 1958, (–CA), *Acocks 19719* (BOL, K, PRE); Lokenburg, 31 May 1964, (–CA), *Esterhuysen 30707* (BOL). **3219** (Wuppertal): Cederberg



Clifortia amplexistipula: A, habitat; B, branch; C, branch with female flowers; D, dorsal view of leaf; E, ventral view of leaf.

Mts, Heuningvlei, 29 Dec. 1941, (–AA), *Esterhuysen 7468* (BOL); N Cederberg, between Heuningvlei and Koupoort, 21 Oct. 1945, (–AA), *Esterhuysen 12116* (BOL, K); Cederberg Mts, Tafelberg, 25 Sept. 1942, (–AC), *Esterhuysen 8092* (BOL); S Cederberg Mts, Sneeuwberg area, Duiwelsgat, 11 Oct. 1946, (–AC), *Esterhuysen 13101* (BOL); Cederberg Mts, foot of Tafelberg, 1220–1525 m, 29 Dec. 1947, (–AC), *Esterhuysen 14326* (BOL, K, PRE); Ezelbank, 1220 m, 2 Apr. 1896, (–AC), *Schlechter 8825* (BM, BOL, K, PRE); Gideonskop, large vlakte W of main peak, 1490 m, 28 Nov. 1990, (–CB), *Oliver 9801* (NBG, PRE); top of pass on to Zuurvlaakte, road between Ceres–Clanwilliam road and Katbakkies, 1020 m, 13 Oct. 1999, (–CD), *Whitehouse 62* (BOL, NBG); Zuurvlaakte, E of Bokkeveld Sneeuwkop, 20 Apr. 1946, (–DC), *Esterhuysen 12744* (BOL, K, NBG, PRE); Swartruggens, Stompiesfontein, 18 Nov. 1961, (–DC), *Esterhuysen 29305* (BOL, K); Swartruggens, Stompiesfontein, 915–1065 m, 18 Nov. 1961, (–DC), *Esterhuysen 29327* (BOL, K); Swartruggen Mts, Groenfontein Farm, border of farm off Kagga Kamma road, 1220 m, 13 Oct. 1999, (–DC), *Whitehouse 59* (BOL, NBG). **3319** (Worcester): Cydo, 1220 m, 10 Nov. 1946, (–AB), *Compton 18752* (NBG); S Cold Bokkeveld, near Zandberg, Oct. 1940, (–AB), *Esterhuysen 3505* (BOL); Cydo Mt., 10 Nov. 1946, (–AB), *Leighton 2223* (PRE); Gydoberg, 10 Nov. 1946, (–AB), *Leighton 2866* (BOL); Koue Bokkeveld, Winkelhaak area, flats NW of Jakkalsdam, 960 m, 13 Feb. 1992, (–AB), *Oliver 10046* (NBG); Koue Bokkeveld, Hartebeeskloof, Vaalbokskloofberg, 330 m, 13 Nov. 1993, (–AB), *Oliver 10401* (NBG, PRE); Baviaansberg, 1675 m, 2 Jan. 1942, (–BA), *Compton 12877* (NBG); Baviaansberg, 1465 m, 4 Nov. 1962, (–BA), *Esterhuysen 29798* (BOL, PRE). **3320** (Montagu): Fisantekraal, 1370 m, 7 Nov. 1948, (–BC), *Compton 21090* (BOL, NBG); Witteberg, S of Bantams, 4 Nov. 1963, (–BC), *Esterhuysen s.n.* (NBG); Witteberg, 1220–1525 m, 31 Jan. 1961, (–BC), *Esterhuysen 28867* (BOL, NBG); Anysberg, E summit, next to jeep track, at sharp turn to W, 1220 m, 10 Aug. 1991, (–BC), *Fellingham 1537* (NBG); Witteberg, 24 Oct. 1943, (–BC), *Leighton 218* (BOL, NBG); Klein Spreeufontein, ridge just WNW of farm, 1000 m, 4 July 1992, (–BC), *Oliver 10093* (NBG); Anysberg, E end of Anysberg, near Ladismith, rocky summit near beacon, 6 Oct. 1982, (–BC), *van Wyk 1043* (NBG, PRE); Anysberg, next to forestry track on N slope of mountain, 1370 m, 2 Aug. 1987, (–BC), *Viviers, M., Vlok & Bo 302* (PRE); kloof on S side of the Anysberg, Little Karoo, 22 May 1950, (–DA), *Esterhuysen 17077* (BOL); Anysberg, S end of Anysberg, on jeep track to top plateau, 5 Oct. 1982, (–DA), *van Wyk 1033* (NBG, PRE). **3321** (Ladismith): Besemfontein, Verlorenhoek Trail, jeep track just W of Uitkyk rock shelter, 1100 m, 9 Apr. 2000, (–AD), *Whitehouse 110* (BOL, NBG).

100. **Cliffortia polita** Weim. in Botaniska Notiser 90: 184, fig. 7, t. 6 (1948); Dahlgren: fig. 2K (1971); Fellingham: 615 (2000). Type: Uniondale District, Misgund hills, 26 Nov. 1941, *Esterhuysen* 6946 (BOL, holo.!).



C. sp. cf. geniculata sensu Dahlgren: fig. 1I (1971). Based on *Esterhuysen* 24851.

Short to medium erect shrub, up to 1 m high, resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 0.5–1.2 mm wide, usually tinged reddish, glabrous or hairy; stem hairs spreading, 0.1–0.3 mm long. *Leaves* trifoliolate; leaflets elliptic-oblong to obovate, often appearing needle-shaped on account of inrolled margins, 2.7–8.8 × 0.4–3.5 mm; apex acute to mucronate, 0.1–0.3 mm long; margins inrolled beneath or flat, entire and smooth; lamina chartaceous, 0.1–0.4 mm thick, usually curved upwards and towards the stem, green or glaucous, often paler beneath, glabrous; sheath 0.3–1.0 mm long, abaxially glabrous or hairy, adaxially glabrous except for fringe of hairs at apex; stipules 0.3–2.2 mm long, free or fused towards the back of the stem, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy or glabrous with smooth margins; sepals 3, glabrous. *Male flowers* with bracteoles 1.1–1.6 mm long; pedicel 0.3–0.4 mm long; sepals broadly ovate, 3.2–3.8 × 1.0–1.7 mm, acute to acuminate at the apex; stamens 6; filaments 3.8–5.7 mm long, red; anthers brownish red. *Female flowers* with bracteoles 0.8–1.8 mm long, shorter than immature receptacle; sepals narrowly ovate to obovate, 1.1–1.9 × 0.4–0.8 mm, erect; carpel 1; stigma 3.9–7.8 mm long, red, feathery, prominent above leaves; immature receptacle 1.2–2.1 × 0.5–0.7 mm, glabrous, ribbed. *Achene* ellipsoid, 1.8–3.5 × 0.7–1.0 mm, greyish to pale brown, glabrous; 5–8-ribbed, ribs acute, up to 0.1 mm wide. *Flowering time*: August to April.

Habitat: Fynbos on well-drained soils from Table Mountain Series in full sun; altitude 450–1 650 m.

Distribution: Extending from the western end of the Langeberg at Saw-Edge Peak east to the Great Winterhoek Mountains and north to the eastern Swartberg near Meiringspoort.

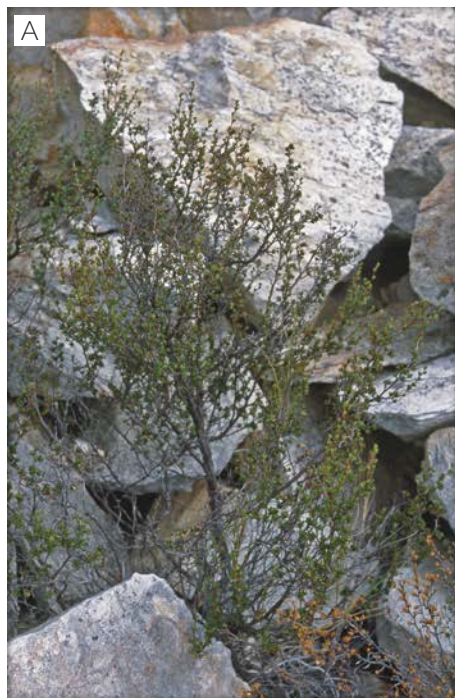
Conservation status: Widespread although scattered, its known range will probably increase with further exploration of the poorly collected eastern mountains of the CFR. Red List status: LC.

Etymology: *polita* (Latin) means 'polished', referring to the shiny upper surface of the leaves.

Notes: *Cliffortia polita* is easily recognised in the east of its range, as it usually has leaflets inrolled beneath, making the leaflets appear needle-like although they are actually narrowly elliptic when opened flat. Even when not inrolled, no other species in the *C. glauca* series occurs in the east of its range, avoiding possible confusion. Identification is difficult in the Langeberg where these populations may be regarded as a separate species, as the leaves are usually flatter and there are usually hairs on the stems and bracteole. However, considering the taxonomic problems in the *C. glauca* series, this seems an unwarranted alternative. The molecular evidence also separates the populations (Fig. 2). These features, however, may be due to introgression from another species, possibly *C. pulchella*. *Cliffortia glauca* itself also occurs in the area, as do plants conforming to the hybrid *C. × mirabilis*.

Representative specimens

SOUTH AFRICA. 3319 (Worcester): Worcester-Saw-Edge Peak, 1525 m, 17 Apr. 1954, (–DA), *Esterhuysen* 22849 (BOL, K, PRE); Langeberg Mts, near Robertson, Dassieshoek, S slopes, ?1220 m, 4 June 1961, (–DB), *Esterhuysen* s.n. (BOL). 3320 (Montagu): Bloupunt Hiking Trail, W facing slopes beneath Bloupunt, 1160 m, 10 June 2000, (–CC),



Whitehouse 128 (BOL, K, NBG); Langeberg Mts, Goedgeloof Peak, 915–1220 m, 3 Sept. 1955, (–CD), *Esterhuysen 24498* (BOL); Marloth Nature Reserve, Swellendam Hiking Trail, S slopes of Middelrivierberg, W of Middel R, 500 m, 27 Dec. 2002, (–CD), *Whitehouse 337* (BOL, NBG). **3322** (Oudtshoorn): E Swartberg, Tierkloof, higher slopes just E of kloof, N of plateau, 1615 m, 29 Nov. 1991, (–BC), *Fellingham & Vlok 1589* (NBG, PRE); Robinson Pass, 915 m, 2 Dec. 1951, (–CC), *Compton 23060* (NBG); Outeniqua Mts, near top of Robinson Pass, 5 Dec. 1951, (–CC), *Esterhuysen 19414* (BOL, K, PRE); Ruitersbos State Forest, Ruitersberg, on SW slopes of Ruitersberg, on S-facing slope, 550 m, 12 Oct. 1987, (–CC), *Vlok 1877* (NBG, PRE); Mannetjiesberg, S slopes, 6 Nov. 1941, (–DB), *Esterhuysen 6449* (BOL, K); lower rocky S slopes of Kammanassie Mts, at Laudina, 9 Nov. 1949, (–DB), *Esterhuysen 16459* (BOL, PRE); Kammanassie Nature Reserve, mid S slopes of Mannetjiesberg, 1200 m, 17 Feb. 2001, (–DB), *Whitehouse 196* (BOL). **3323** (Willowmore): Misingund hills, 26 Nov. 1941, (–CB), *Esterhuysen 6946* (BOL); Kouga Mts, Saptoukop, SE slopes, 915–1220 m, 23 Nov. 1958, (–DA), *Esterhuysen 27962* (BOL, PRE); Kouga Mts, Saptoukop, ridge up from Withoogte, 1280 m, 16 Dec. 1991, (–DA), *Oliver 9947* (NBG, PRE); Kouga Mts, near Smutsberg, 12 Nov. 1944, (–DB), *Esterhuysen 10727* (BOL); Kouga, Studtis, 10 Sept. 1975, (–DB), *Manson 128* (NBG, PRE); Springhaas Capell/Hoeree, above Hoeree, gully beneath beacon, 730 m, 18 Oct. 2000, (–DB), *Whitehouse 155* (BOL). **3324** (Steytlerville): Kouga Mts, near Kouga Peak, 14 Nov. 1944, (–CA), *Esterhuysen 10837* (BOL); Baviaanskloof, Enkeldoorn Track, 550 m, 2 Feb. 1977, (–CB), *Bond 933* (NBG, PRE); Baviaanskloof, Enkeldoorn Track, 870 m, 12 Jan. 1978, (–CB), *Bond 1336* (NBG, PRE); Great Winterhoek Mts, Cockscomb, N slopes, 1220 m, 2 Feb. 1958, (–DB), *Esterhuysen 27498* (BOL, PRE).

101. **Cliffortia teretifolia** L.f., Supplementum Plantarum: 430 (1782); Thunb.: 433 (1823); DC.: 596 (1825); G.Don: 596 (1832); Eckl. & Zeyh.: 270 (1836); Harv.: 304 (1862) pro parte; Juel: 277 (1918); Weim.: 89, fig. 25 (1934); Fellingham: 616 (2000). Type: South Africa, Piketberg, *Thunberg s.n.* (LINN, holo.!; B, C, LD!, S, W, iso.).



C. teretifolia var. *alata* Compton: 292 (1931). Type: Laingsburg District, Witteberg, 1 005 m, 1923, *Compton 2583* (BOL, syn.!) & 1 065 m, 31 Oct. 1924, *Compton 2682* (BOL, K, syn.!) & 915–1 220 m, 21 May 1925, *Compton 2949* (BOL, syn.!).

C. teretifolia var. *tenuior* E.Mey. ex Drège: 173 (1843), nomen nudum. Based on Piquetberg District, between Krom R and Berg Valley, 305 m, Nov., and Namaqualand, between Uitkomst and Geelbeksraal, 610–905 m, Aug., *Drège "C. teretifolia β tenuior* (K!, REG!, TUB!).

C. juniperina sensu Juel: 276 (1918) pro parte, non L.f.

Medium erect shrub, up to 2 m high, resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 0.5–1.3 mm wide, usually tinged reddish, glabrous. *Leaves* trifoliate; leaflets needle-shaped, 4.8–9.5 × 0.4–0.9 mm; apex long acuminate, 0.1–0.5 mm long; margins rounded, entire and smooth or scabrid; lamina chartaceous, 0.3–0.6 mm thick, curved upwards and towards the stem, glabrous; sheath 0.6–2.1 mm long, abaxially glabrous, adaxially glabrous or with a few scattered adpressed hairs; stipules 0.2–1.2 mm long, free, margins smooth; petiole absent. *Flowers*: solitary in axils of undifferentiated leaves; bracteoles glabrous on the keel; margins smooth; sepals 3, glabrous, with a small protruding mucro inserted just beneath apex. *Male flowers* with bracteoles 1.3–2.3 mm long; pedicel 0.4–0.6 mm long; sepals broadly ovate, 4.7–7.7 × 2.0–2.8 mm; stamens 11–16; filaments 4.5–7.0 mm long, red or greenish white; anthers brownish red or yellow. *Female flowers* with bracteoles 1.0–2.7 mm long, shorter than immature receptacle; sepals narrowly ovate to linear, 1.3–3.3 × 0.3–0.9 mm, erect; carpel 1; stigma 6.2–9.2 mm long, red, feathery, prominent above leaves; immature receptacle 1.7–2.9 × 0.8–1.9 mm, glabrous or hairy, clearly ribbed. *Achene* ellipsoid to cuboid, 2.6–4.4 × 2.2–4.2 mm, red to reddish brown, hairy or glabrous; 3–4 straight wings, tubercles present in between wings. *Flowering time*: throughout the year.

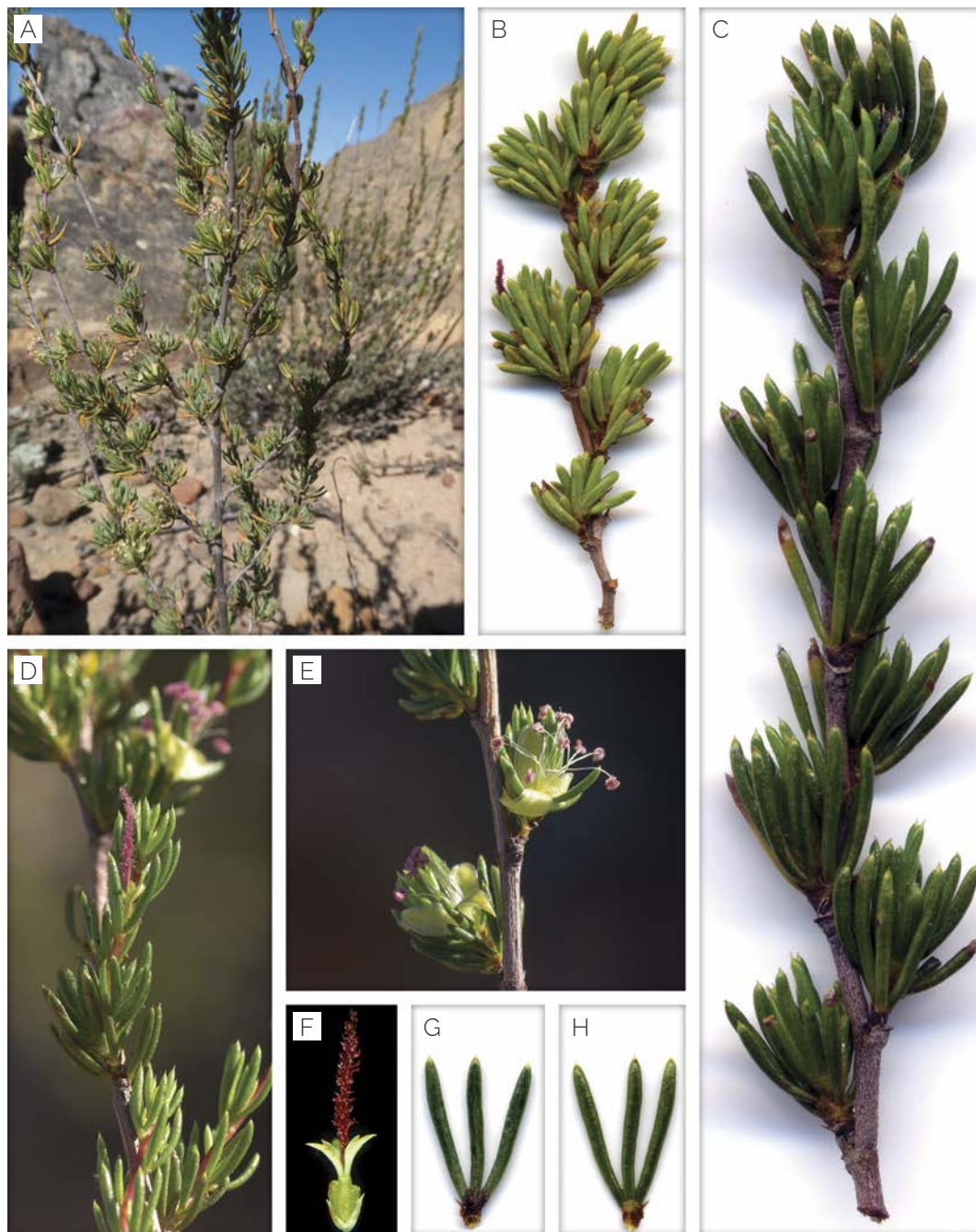
Habitat: Mesic to arid fynbos on well-drained sandy to clayish soils from Table Mountain Series in full sun; altitude 50–1 400 m.

Distribution: Northern Namaqualand around Springbok, south to Paarl and Worcester, and east as far as the Anysberg and Witteberg.

Conservation status: Widespread and common, often occurring in arid areas with little risk of development. Red List status: LC.

Etymology: *teretifolia* (Latin) means 'round in cross-section' for the leaves that lack any real angles to the leaves, which are present in most needle-leaved species.

Notes: The terete leaves are diagnostic for *Cliffortia teretifolia* and the male flowers and achenes are also distinctive, leaving no possibility of doubt about its status. In bud the tips of the sepals are free, but form a 3-pointed bud, a feature most obvious in the male flowers, which have larger sepals. It is also possible to see this character in female flowers but only with difficulty due to their size. When female flowers are present, the developing achenes are distinctively winged, which led Weimarck to place the species in his sect. *Alatae* near *C. alata*. *Cliffortia teretifolia* is, however, taxonomically isolated.



Cliffortia teretifolia: A, habitat; B & D, branch with female flowers; C, branch; E, branch with male flowers; F, male flower; G, dorsal view of leaf; H, ventral view of leaf.

The achene wings appear to be independently derived and the sepal tip character is not found elsewhere in the genus. Molecular data does not help. The chloroplast tree suggests relationship with *C. glauca* series, but the nuclear tree is unresolved as to its closest relatives.

A collection from Windhoek was mistakenly cited by Weimarck (1934) as from Namibia, but the collector Niven (mistakenly written Nebin by Weimarck) travelled no further north than central Namaqualand in South Africa. Windhoek probably refers to the farm of that name near Klawer in Western Cape.

Molecular evidence (Fig. 1 or 2) suggests that *Whitehouse 310* from Groot Winterhoek might be a hybrid between *Cliffortia ruscifolia* and *C. teretifolia*, but morphologically there is little to suggest this relationship as the specimen has leaves typical of needle-leaved species. See photos of *C. ruscifolia* × *teretifolia* on p. 292.

Representative specimens

SOUTH AFRICA. **2917** (Springbok): Namaqualand, Springbok, top of Spektakel Pass, W of Springbok, 17 Aug. 1974, (–DA), *Goldblatt 2368* (NBG, PRE); Springbok, Spektakel Pass, top of Spektakel Pass, 3 Nov. 1982, (–DA), *Goldblatt 6671* (PRE). **3017** (Hondeklip Bay): Namaqualand, W of Kamieskroon, Grootvlei, 640 m, 28 Aug. 1957, (–BB), *Acococks 19467* (K, NBG, PRE); Namaqualand, upper N slopes of Rietkloof Mt., 9 Dec. 1910, (–BD), *Pearson 5702* (K, NBG). **3018** (Kamiesberg): Kamiesberg, Welkom near Garies, 1065–1220 m, 16 Oct. 1954, (–AC), *Esterhuysen 23659* (BOL, PRE). **3118** (Vanhynsdorp): expedition to Kamiesberg, Gifberg and Olifants River Mts [flat summit of the Matsikamma], 15 Sept. 1911, (–DB), *Phillips 7459* (PRE); Matsikamma Mts, large kloof to SE of summit beacon, 860 m, 13 July 1974, (–DB), *Thompson 2066* (NBG, PRE); Matsikammaberg, N of Vanhynsdorp, upper S slope, 11 Nov. 1985, (–DB), *van Jaarsveld & Bodenstein 8296* (NBG); Vanhynsdorp, Gifberg Plateau, 520 m, 19 Mar. 1948, (–DC), *Acococks 14172* (PRE); Gifberg, 2 Sept. 1948, (–DC), *Compton 20801* (BOL, NBG); Gifberg, 760 m, 14 Oct. 1953, (–DC), *Esterhuysen 22034* (BOL); Vanhynsdorp, Heerenlogementsberg, 520 m, 9 Feb. 1978, (–DC), *Thompson 3659* (K, NBG, PRE); Gifberg, flats at top of pass, 640 m, 8 May 1971, (–DD), *Thompson 1176* (K, NBG, PRE). **3119** (Calvinia): Nieuwoudtville, Uitkoms Farm, plateau, moist patches, 820 m, 9 Aug. 1983, (–AC), *van Wyk 1373* (NBG, PRE); Lokenburg, WSW of Calvinia, 640 m, 1 Aug. 1953, (–CA), *Acococks 16846* (K, PRE); Lokenburg, 31 May 1964, (–CA), *Esterhuysen 30706* (BOL); Lokenburg, 31 May 1964, (–CA), *Esterhuysen 30718* (BOL, K, NBG); Boskraal, Koebee R valley (Appel van Zyl), 365 m, 20 Nov. 1983, (–CA), *Taylor 10795* (K, NBG, PRE). **3218** (Clanwilliam): Nardouw, 14 Sept. 1947, (–BB), *Barker 4743* (NBG); Nardouw, 305 m, 22 Sept. 1937, (–BB), *Compton 6985* (NBG); Nardouw, 6 Sept. 1951, (–BB), *Maguire 1046* (NBG); Clanwilliam, near Brakfontein and Olifants R, Apr., (–BD), *Ecklon 1747* (K); Piketberg, Kapteinskloof, 2 Apr. 1938, (–DA), *Acococks 8611* (K, PRE); E base of Kapteinskloof Mt., 20 Oct. 1935, (–DA), *Pillans 7998* (BOL); Piketberg Mts, W slopes of Zebra Kop, 1220 m, 23 May 1948, (–DB), *Esterhuysen 14492* (BOL, PRE); 5 km W by N of Sauer Post Office, 60 m, 26 June 1948, (–DC), *Acococks 14532* (BOL, K, PRE); Cape, 3.2 km NW of Sauer Post Office, 60 m, 22 Aug. 1970, (–DC), *Acococks 24294* (K, PRE). **3219** (Wuppertal): Pakhuis, Sept. 1947, (–AA), *Bolus in Herb. Bolus 23787* (BOL); Pakhuis Pass, 29 Sept. 1940, (–AA), *Bond 576* (NBG); Pakhuis, 28 Dec. 1941, (–AA), *Esterhuysen 7401* (BOL); Cederberg Mts, between Pakhuis and Heuningvlei, 28 Dec. 1941, (–AA), *Esterhuysen 7451* (BOL); Pakhuis Pass, 610 m, 24 Sept. 1932, (–AA), *Levyens 3962b* (BOL); Clanwilliam Pakhuis Pass, 1065 m, 23 Sept. 1949, (–AA), *Levyens 9443* (BOL); Cederberg, Heuningvlei, 1065 m, 24 Oct. 1923, (–AA), *Pocock 597* (NBG); S Cederberg Mts, Ezelbank, 1065 m, 4 Oct. 1897, (–AC), *Bodkin s.n.* (BOL); near Wupperthal, 580 m, 6 Oct. 1897, (–AC), *Bolus s.n.* (BOL); Uitkyk, 3 Dec. 1934, (–AC), *Compton 4793* (BOL, NBG); Cederberg, Algeria Nature Reserve, 14 Feb. 1936, (–AC), *Compton 6224* (NBG); Suurvlei, kloof above Algeria, Mar. 1940, (–AC), *Esterhuysen 2531* (BOL); Nieuwoudts Pass, 13 Dec. 1941, (–AC), *Esterhuysen 7158* (BOL, K); Nieuwoudts Pass, 27 Sept. 1942, (–AC), *Esterhuysen 8148* (BOL, K); Cederberg, on foothills, near Algeria Forest Station, 24 Oct. 1930, (–AC), *Galpin 10568* (K, PRE); 1 km N of Algeria Forest Station on Nieuwoudt's Pass, 515 m, 27 Apr. 1981, (–AC), *Le Maitre 189* (NBG, PRE); Cederberg, Algeria Nature Reserve, plot 3, lower E slopes of Vensterberg, 580 m, 12 Nov. 1969, (–AC), *Taylor 7515* (K, PRE); Wupperthal, Oct. 1929, (–AC), *Thode 1996* (K, PRE); Elandskloof Pass, lower slopes, 3 Sept. 1938, (–CA), *Acococks & Hafström 567* (PRE); Elandskloof, 2 Oct. 1940, (–CA), *Bond 620* (NBG); Elandskloof, 30 Sept. 1944, (–CA), *Compton 16150* (NBG); Elandskloof, 1 Oct. 1944, (–CA), *Compton 16217* (NBG); Elandskloof, 915 m, 20 Dec. 1944, (–CA), *Compton 16810* (BOL, NBG); Grootberg, SW slopes, 1065 m, 21 Dec. 1940, (–CA), *Esterhuysen 4147* (BOL); Krom R, 760 m, 27 Sept. 1934, (–CA), *Leighton 21601* (BOL); Elandskloof, 915 m, 14 Dec. 1935, (–CA), *Levyens 5106* (BOL); Elandskloof Pass, N slopes, 1065 m, 16 Dec. 1946, (–CA), *Levyens 8132* (BOL); Elandskloof, 915 m, 3 Oct. 1948, (–CA),

Levy's 9246 (BOL); Elandskloof, 915 m, Dec. 1948, (–CA), *Levy's 9356* (BOL); Elandskloof, 26 Sept. 1936, (–CA), *Lewis 22070* (BOL); Cederberg, Matjiesrivier Nature Reserve, 880 m, 12 Mar. 1997, (–CB), *Lechmere-Oertel 607* (NBG); Cederberg, Krom R Kloof above The Oak, 940 m, 14 Sept. 1983, (–CB), *Taylor 10642* (NBG, PRE); Wabooms R Mts, 1065 m, 25 Sept. 1936, (–CC), *Compton 6533* (NBG); Wabooms R, 915 m, 25 Sept. 1936, (–CC), *Compton 6534* (BOL); Onderboskloof, 1 Jan. 1948, (–CC), *Esterhuysen 14359A* (BOL); middle E slope of Grasrug Mt., 26 Nov. 1938, (–CC), *Pillans 8713* (BOL); Porterville Mts, Berghof, near Ratel R, on slopes, 795 m, 27 Sept. 1972, (–CC), *Thompson 1464* (NBG, PRE); Porterville, Ringsfontein, N of Porterville, 60 m, 10 Feb. 1978, (–CC), *Thompson 3672* (NBG, PRE); Grootfontein Farm, near Beaverlac campsite, track to Olifants R along Ratel R, 365 m, 24 Sept. 1999, (–CC), *Whitehouse 50* (BOL, NBG); Rosendal on the road from Clanwilliam to Ceres, 29 Sept. 1934, (–CD), *Leighton 21602* (BOL); ridge above Winkelhaaks R, E of Bokkeveld Sneeuwkop, 20 Apr. 1946, (–DC), *Esterhuysen 12702* (BOL, K, PRE). **3318** (Cape Town): Heuningberg, 305 m, 6 Nov. 1963, (–BB), *Acocks 23431* (K, PRE); Piketberg, Heuningberg, hill slope above old house of Vrede Farm, 150–305 m, 6 Nov. 1963, (–BB), *Taylor 5560* (K, NBG, PRE); lower slopes of Perdeberg, just above Lemoenkloof Farm, 245 m, 14 Sept. 2000, (–DB), *Whitehouse 135* (BOL, NBG). **3319** (Worcester): Visgat, upper Olifants R valley, 26 Dec. 1946, (–AA), *Esterhuysen 13395* (BOL); ridge on Twenty Four Rivers Mts, above Porterville, 22 Oct. 1949, (–AA), *Esterhuysen 16122* (BOL, NBG); Saron, 185 m, 23 June 1896, (–AA), *Schlechter 7877* (BM, BOL, K, NBG, PRE); Gydo Mt., near Ceres, 760 m, Jan. 1888, (–AB), *Bolus s.n.* (BOL, BOL); Gydo, 1065 m, 9 Nov. 1946, (–AB), *Compton 18713* (NBG); Gydoberg, 10 Nov. 1946, (–AB), *Leighton 2229* (BOL); Koue Bokkeveld, Winkelhaak area, flats NW of Jakkalsdam, 960 m, 13 Feb. 1992, (–AB), *Oliver 10045* (NBG); Koue Bokkeveld, Hartebeeskloof, Vaalbokskloofberg, 330 m, 13 Nov. 1993, (–AB), *Oliver 10398* (NBG); Koue Bokkeveld, Hartebeeskloof, Vaalbokskloofberg, 330 m, 13 Nov. 1993, (–AB), *Oliver 10399* (NBG); lower W slopes of Vogelvllei Mts, near Gouda, 9 Sept. 1951, (–AC), *Esterhuysen 18797* (BOL); Baviaansberg, 1220–1370 m, 4 Nov. 1962, (–BA), *Esterhuysen 29800* (BOL, K); Karooport, 30 Sept. 1933, (–BA), *Leighton 21201* (BOL); Karooport, 610 m, 30 Sept. 1933, (–BA), *Levy's 4641* (BOL); Matroosberg, on lower SE slopes above De Doorns, 13 Nov. 1960, (–BC), *Esterhuysen 28642* (BOL); Gowionna, kloof in Bonteberg, 915 m, 3 Nov. 1940, (–BD), *Esterhuysen 3720* (BOL, K, PRE); Orchard, Kwadouw Mts, 915 m, 23 Nov. 1944, (–DA), *Esterhuysen 10884* (BOL, K). **3320** (Montagu): Fisantekraal, Matjiesgoedberg, 2 Aug. 1987, (–BC), *Bands 560* (NBG, PRE); Matjiesgoedberg, Klein Spreeufontein farm, 915–1065 m, 16 Sept. 1986, (–BC), *Bean, Vlok & Viviers 1939* (NBG, PRE); Witteberg, kloofs, 1005 m, 1923, (–BC), *Compton 2583* (BOL); Witteberg, foot, 1065 m, 31 Oct. 1924, (–BC), *Compton 2682* (BOL, K); kloof in Witteberg [Whitehill], 915–1220 m, 21 May 1925, (–BC), *Compton 2949* (BM, BOL); Witteberg, 10 Nov. 1935, (–BC), *Compton 5924* (BOL, NBG); Witteberg, Bantams, 1220 m, 27 Oct. 1941, (–BC), *Compton 12235* (NBG); Witteberg, 1220 m, 24 Oct. 1943, (–BC), *Compton 15211* (NBG); Witteberg, 11 May 1941, (–BC), *Esterhuysen 5149a* (BOL, BOL, K, PRE); Anysberg East, SSE of Goede-hoop, summit, 1220 m, 10 Aug. 1991, (–BC), *Fellingham 1534* (NBG, PRE); Witteberg, 1943, (–BC), *Leighton 213* (PRE); Klein Spreeufontein, mountains 4.5 km WSW of farm, 900 m, 4 July 1992, (–BC), *Oliver 10081* (NBG, PRE); Anysberg, next to forestry track on N slope of mountain, 1370 m, 2 Aug. 1987, (–BC), *Viviers, M., Vlok & Bo 297* (PRE); Witteberg, 11 May 1941, (–BC), *Walgate 251* (BOL, NBG); Witteberg, Suurkloof Farm, 975 m, 10 Dec. 1991, (–BD), *Vlok 2549* (NBG, PRE); at S foot of the Anysberg, near Kareevlakte, 20 May 1950, (–DA), *Esterhuysen 17081* (BOL, NBG, PRE); Anysberg, kloof on S slopes, 760–915 m, 3 June 1956, (–DA), *Esterhuysen 25974* (BOL, K, NBG, PRE).

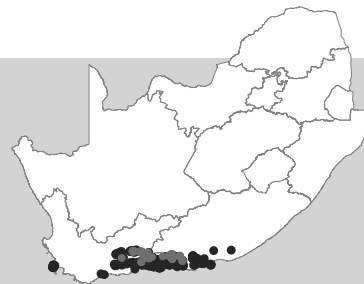
(102–120) **Section Multinerviae** DC. in Annales des Sciences Naturelles 1: 448 (1824) & 595 (1825); Weim.: 17, 98 (1934) & 192 (1948). Type species: *C. ilicifolia* L.

Medium to tall scrambling or erect shrubs. Young stems often covered by leaf sheaths and not forming brachyblasts. Sheath glabrous adaxially except sometimes for a fringe at the apex; stipules if present free or rarely joined on reverse side of stem, usually membranous, rarely similar texture to leaf; petiole absent. **Leaves unifoliate, multi-veined to base**, glabrous or rarely with scattered hairs, usually markedly toothed, apex sharply acuminate to pungent, usually curved downwards and away from the stem. Flowers solitary in the axils of ordinary vegetative leaves or rarely female flowers in a distinct inflorescence. Bracteoles longer than immature receptacle; sepals 3, glabrous or rarely with a few hairs on the abaxially, female erect; **stamens many to numerous, filaments white and anthers yellow**, only rarely both reddish; carpels 1; **stigma tucked in the axil of the leaves, usually whitish green**, rarely protruding. Achene ellipsoid, ribbed, brown.

This section is generally easily recognised by the tough, often toothed, leaves with many veins leading from the base. The stigma is tucked down in the axil of the leaves, which often makes it hard to spot, especially in herbarium specimens. The male flowers are amongst the largest in the genus and have numerous stamens. Hybrids are frequent between the species where they co-occur and several of the species have a tendency to hybridise with species from other sections. In particular, the evolutionary history of sect. *Bifoliolae* and sect. *Multinerviae* appears very entangled.

(102–104) *Cliffortia ilicifolia* series

102. ***Cliffortia ilicifolia* L.**, Species Plantarum: 1038 (1753); DC.: 595 (1825); G. Don: 595, fig. 80 (1832); Eckl. & Zeyh.: 266 (1836); Harv.: 294 (1862); Bolus & Wolley-Dod: 259 (1904); Weim.: 99 (1934); Levyns: 448 (1950); Fellingham: 610 (2000); Whitehouse: 77, fig. 2 (2004a). Lectotype, designated by Stearn (1957): illustration '*Cliffortia foliis dentatis: mas*' in L., t. 30 (1738), without locality or collector.

Grey dot: var. *cordifolia*.

Medium to tall erect shrub, up to 4.5 m high, resprouting after fire and spreading clonally; sometimes dominant main stem with determinate length side branches, usually sparsely branched, only forming long branches. *Young stems* 1.1–1.8 mm wide, completely sheathed by leaf bases, sometimes tinged reddish, glabrous. *Leaves* unifoliate; sub-circular to oblong or ovate, 9.4–16.0 × 3.0–13.5 mm; base cordate to clasping stem; apex sharply acuminate to pungent, 0.6–1.3 mm long; margins flat or slightly channelled, with up to 6 broad teeth, 1.4–3.4 mm long, occasionally entire; lamina 7–13-veined from base, cartilaginous, 0.2–0.5 mm thick, curved downwards and away from the stem, green to slightly glaucous, glabrous; sheath 1.5–2.9 mm long, abaxially glabrous, adaxially glabrous except sometimes for fringe of hairs at apex; stipules 1.2–5.0 mm long, free or becoming fused on reverse side of stem, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins smooth; sepals 3, glabrous. *Male flowers* with bracteoles 3.0–4.5 mm long; pedicel 0.7–1.5 mm long, glabrous; sepals broadly ovate, 6.0–8.2 × 3.7–6.0 mm, acute to acuminate at the apex; stamens 23–36; filaments 3.6–6.3 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 3.1–5.1 mm long, longer than immature receptacle; sepals broadly ovate to triangular, 1.7–2.8 × 0.9–2.0 mm, erect; carpel 1; stigma 1.6–2.3 mm long, greenish white, feathery, hidden at the base of leaves; immature receptacle 1.3–2.5 × 1.3–2.1 mm, glabrous, smooth. *Achene* broadly ellipsoid, slightly flattened, 6.5–7.8 × 3.5–4.7 mm, medium brown, glabrous; 16–21-ribbed, ribs rounded, 0.1–0.6 mm wide. *Flowering time*: throughout the year.

Habitat: Acid sands from Table Mountain Series or clayish soil from shale bands of Table Mountain Series, full sun, well-drained soils; altitude 0–1 700 m.

Distribution: Langeberg beyond Garcia's Pass, east as far as Gqeberha [Port Elizabeth] and north to the Swartberg, with isolated populations on the Cape Peninsula.

Conservation status: Common and widespread, with its ability to resprout and persistence in a wide range of habitats there are few threats. Red List status: LC.

Etymology: *ilicifolia* (Latin) means 'having leaves like some *Ilex* species (i.e. holly)', referring to the coarsely toothed ovate leaves of many forms of this variable species.

Common names: *doorntee*, *doringtee*, *jankoensedoring* (Afrikaans).

Notes: *Cliffortia ilicifolia* is one of the most well-known species of *Cliffortia*, with its sharply toothed leaves from which it derives its specific epithet. Several other species of sect. *Multinerviae* have been included within this species in the past. Weimarck recognised four varieties, two of which, var. *reniformis* and var. *schlechteri*, have now been raised to specific rank. Of the other two, var. *incisa* is an odd form with very deeply toothed leaves resembling those on resprouting stems of *C. ilicifolia* var. *cordifolia* from the Swartberg. No similar collections have been made from mature plants, and var. *incisa* is now included in var. *cordifolia*.

var. **ilicifolia**; Weim.: 99, fig. 29A–B, 29F–H (1934).

C. rubricaulis C.Presl: 141 (1845). Type: Uitenhage District, Zwartkops R, *Drège* 6830 (B, holo.†; BM!, K!, L, P, W).

Leaves subcircular to oblong or ovate, 9.4–15.0 × 6.9–13.5 mm, usually 2–6 broad teeth, 1.4–3.4 mm long, rarely entire.

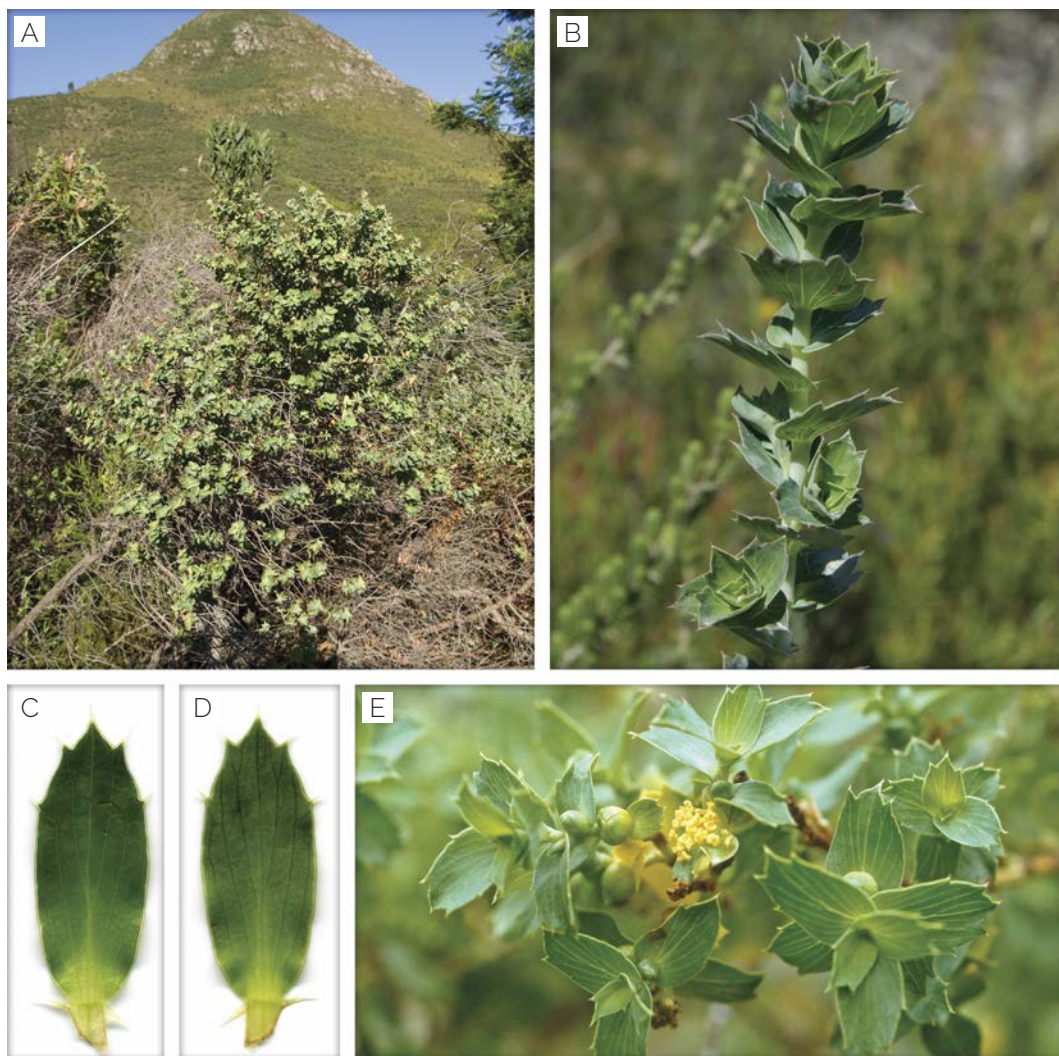
Notes: The typical var. *ilicifolia* occurs in relatively mesic habitats to the south and west of the range, and is recognised by the familiar holly-like leaves. *Cliffortia ilicifolia* may be confused with *C. reniformis* or *C. schlechteri*, which were in the past included in *C. ilicifolia* as varieties, but it has consistently larger leaves (9.4–15.0 × 6.9–13.5 mm) than *C. schlechteri* (5.5–10.9 × 5.7–12 mm) but slightly smaller, more ovate, less toothed leaves than *C. reniformis* (12–20 × 16–26 mm).

The Cape Peninsula populations of this species are odd considering the geographic isolation. Nevertheless, from morphology alone there is no reason to exclude them from this species. The situation however is confused in that there are a number of populations that show intermediate characters between other Cape Peninsula species such as *C. theodori-friesii*, the plants from the Devil's Peak Saddle (parent of *C. × integerrima*) or Noordhoek Peak (akin to *C. × intermedia*). True *C. × intermedia* is probably a cross between the Cape Peninsula *C. ilicifolia* and *C. ruscifolia*. Levyns (1950) regarded populations from near Smitswinkel Bay as *C. dregeana*, but that species is absent from the Cape Peninsula and the plants are more likely a hybrid between *C. ilicifolia* and another species. Dahlgren (1971) cited such a specimen as *C. × integerrima*.

Representative specimens

SOUTH AFRICA. **3318** (Cape Town): Cape Peninsula, Orange Kloof, Feb. 1908, (–CD), *Dummer s.n.* (NBG). **3321** (Ladismith): Herbertsdale, S side of Cloetes Pass, hairpin bend before summit, 460 m, 20 Jan. 2001, (–DD), *Whitehouse 181* (BOL). **3322** (Oudtshoorn): Outeniqua Mts, extreme S of Robinson Pass, 4 Apr. 1979, (–CC), *Campbell 13416* (NBG); Robinson Pass, summit, 795 m, 27 July 1956, (–CC), *Levyns 10532* (BOL); on hills near George, 200 m, 1 Nov. 1894, (–CD), *Schlechter 5774* (BM, BOL, K, PRE); Kammanassie Nature Reserve, lower S slopes of Mannetjiesberg, 975 m, 17 Feb. 2001, (–DB), *Whitehouse 195* (BOL); Wilderness, 13 Feb. 1944, (–DC), *Compton 15590* (NBG); Knysna, hills N of Ruigtevlei, 3 July 1946, (–DD), *Levyns 7811* (BOL); Keurbooms R, crossing of Uniondale–George road, 550 m, 10 Feb. 1964, (–DD), *Wells 2832* (K, PRE). **3323** (Willowmore): Knysna, Gouna, Compartment C32, 7 Aug. 1962, (–CC), *Lange SAAS 359* (PRE); Knysna, Gouna road, 7 July 1946, (–CC), *Levyns 7843* (BOL); summit of Prince Alfred's Pass, 975 m, 7 Sept. 1938, (–CC), *Lynes 1679* (BM); Knysna, Gouna Forest Station, 1 km from Salt R road, 23 Sept. 1969, (–CC), *Marsh 1319* (K, NBG, PRE); Niekerksberg Forest Reserve, 915 m, 17 July 1974, (–CD), *Bayliss 990* (PRE). **3324** (Steytlerville): Stinkhoutberg, Otterford area, ridge E of Stinkhoutberg, 825 m, 9 Sept. 1973, (–DB), *Thompson 1846* (NBG, PRE); Port Elizabeth, Kleinrivier, 305 m, 18 Mar. 1973, (–DD), *Bayliss 265* (K, PRE); Hankey, 6 miles E of Hankey near turn-off to Otterford, 150 m, 15 May 1970, (–DD), *Oliver 3135* (NBG, PRE). **3325** (Port Elizabeth): Suurberg Pass, 670 m, 25 Apr. 1947, (–BC), *Acocks 13657* (PRE); Elandsrivierberg, S slopes just S of Highlands, 775 m, 13 May 1979, (–CA), *Campbell 13951* (NBG); 24 km up Elands R road, 365 m, 31 May 1960, (–CC), *Acocks 21065* (K, PRE); Loerie Plantation, Oct. 1934, (–CC), *Dix 103* (BOL); Uitenhage, Van Staadens Mts, 305–915 m, Jan. 1830, (–CC), *Ecklon & Zeyher s.n.* (PRE); Port Elizabeth District, Van Staadens Pass, (–CC), *Houghton 155* (K); Port Elizabeth, Van Staadens, 45 m, 31 May 1932, (–CC), *Long 599* (K, PRE); Van Staadens, near bridge, 100 m, 24 Nov. 1921, (–CC), *Marloth 10925* (PRE); Van Staadens near Port Elizabeth, 31 May 1913, (–CC), *Paterson 2073* (BOL); Van Staadens Pass, 150 m, 14 Feb. 1932, (–CC), *Rennie & Rennie 200* (BOL, GRA); Loerie, 31 Aug. 1947, (–CC), *Rodin 1103* (BOL, K, PRE); Port Elizabeth District, Van Staadens Pass, near campsite, 12 Nov. 1965, (–CC), *Troughton 155* (GRA, PRE); Uitenhage, Witteklip, Jan. 1899, (–CD), *Bolus 9119* (BOL); Port Elizabeth, Baakens R valley, beyond Sunridge Park, 19 July 1973, (–DC), *Olivier 704* (NBG, PEU). **3326** (Grahamstown): Grahamstown, 1894, (–BC), *Glass 816* (NBG). **3418** (Simonstown): Cape Peninsula, Chapman's Peak, 150 m, 6 Feb. 1940, (–AB), *Compton 8479* (NBG); Table Mt., above Constantia, 150 m, Feb. 1908, (–AB), *Dummer 1177* (BOL, PRE); Cape Peninsula, Constantiaberg, slopes above the head of the Prins Kasteel R, 610 m, 16 Jan. 1972, (–AB), *Esterhuysen 32791*

(BOL); Cape Peninsula, W slopes of Noordhoek Peak, along the contour path above Chapmans Peak–Hout Bay road, 150–245 m, 5 Jan. 1975, (–AB), *Esterhuysen* 33735 (BOL); S end of Constantiaberg, overlooking Hout Bay, 610 m, 14 Jan. 1945, (–AB), *Leighton* 866 (BOL); Steenberg Plateau, 305 m, 19 Sept. 1943, (–AB), *Levy* 8213 (BOL); S slope of Noordhoek Mt., 11 Apr. 1943, (–AB), *Pillans* s.n. (BOL); S slopes of Noordhoek Mt., 11 Apr. 1943, (–AB), *Pillans* 9861 (BOL); Wynberg, 24 Dec. 1842, (–AB), *Wallich* 419 (BM). **3421** (Riversdale): Novo, right bank of Vet R near exit from mountain at Novo, 245 m, May 1909, (–AA), *Muir* 281 (PRE). **3422** (Mossel Bay): Mossel Bay, (–AA), *Zeyher* s.n. (NBC); Brenton-on-Sea, Uitzicht, 150 m, 9 Nov. 1979, (–BB), *Hugo* 2055 (NBC, PRE); Knynsa District, hillside above Sedgfield, 26 July 1953, (–BB), *Leighton* 3299 (BOL, PRE); Knynsa, Swartvlei, 60–90 m, 14 July 1955, (–BB), *Levy* 10335 (BOL). **3423**



Cliffortia ilicifolia var. *ilicifolia*: A, habitat; B, branch; C, dorsal view of leaf; D, ventral view of leaf; E, branch with male flowers.

(Knysna): Concordia Plateau, Block B, 215 m, Nov. 1919, (–AA), *Keet 431* (NBG, PRE); Kranshoek, Uitkykpunt, 23 Apr. 1984, (–AB), *Bredenkamp 102* (PRE). **3424** (Humansdorp): Witte Els Bosch, Apr. 1931, (–AA), *Fourcade 4572a* (BOL, K); Wit Els Bos, Apr. 1931, (–AA), *Fourcade 4577a* (NBG); Witte Els Bosch, 9 Nov. 1928, (–AA), *Hutchinson 1411* (K); Humansdorp, Witte Els Bosch, plateau above sea, 215 m, 9 Sept. 1923, (–AA), *Phillips SAAS 355* (PRE); Cape, Clarkson, Feb. 1926, (–AB), *Thode 823* (K, PRE).

var. **cordifolia** (Lam.) Harv., *Flora Capensis* 2: 294 (1862); Weim.: 103, fig. 29E (1934).

C. cordifolia Lam.: 47 (1786); DC.: 595 (1825); G. Don: 596 (1832). Type: South Africa, without precise locality, *Sonnerat s.n.* (P-LAM, holo.).

C. ilicifolia L. var. *incisa* Harv.: 294 (1862). Type: Swartberg Mts, Klaarstroom, *Drège 9538* (S, holo.; B†, iso.).

?*C. integerrima* sensu Weim.: 104 (1934) pro parte quoad *Bolus 11481*, non Weim. sensu stricto.

Leaves triangular to lanceolate or ovate, 11.0–16.0 × 3–12 mm; margins entire and smooth or sometimes with up to 2 broad teeth, 1.5–5.0 mm long.

Notes: This is the arid variety of *Cliffortia ilicifolia* found in the north and east of the range. It often lacks any teeth on the margins of the leaves and the leaves are more ovate to triangular in shape. Some of the leaves can be particularly narrow with inrolled margins, then resembling short-leaved forms of *C. dregeana* rather than *C. ilicifolia*. However, there are usually some teeth present on the leaves and when they do occur they are usually broader than found in toothed forms of *C. dregeana*. *Cliffortia dregeana* can be distinguished by the bracteoles subtending the flowers that are over 5 mm long, whereas in *C. ilicifolia* and its allies they are usually less than 5 mm long.

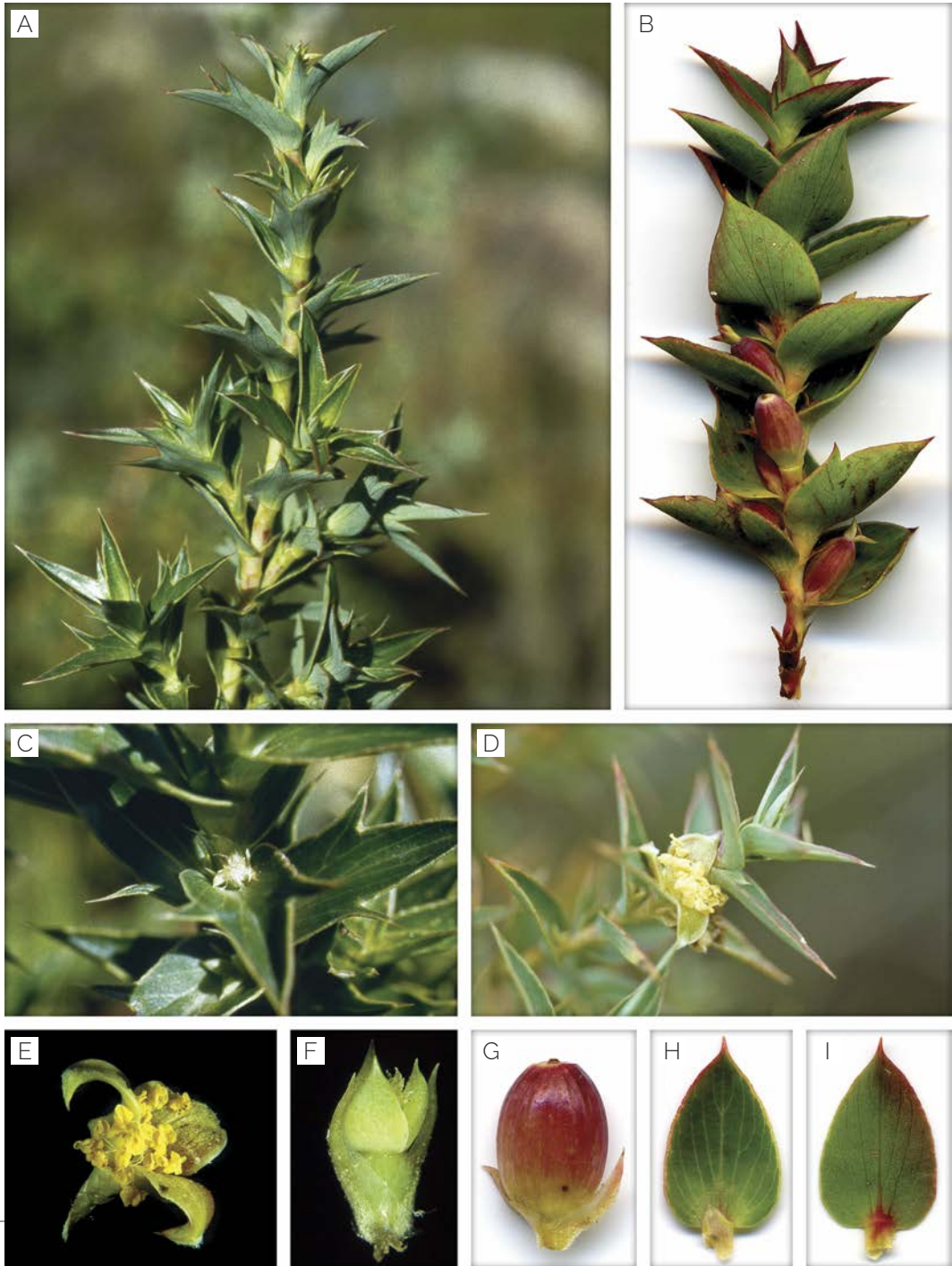
While var. *cordifolia* is easy to distinguish from the typical variety by the lack of teeth, there are many collections intermediate between the two. The populations as a whole then need to be considered: the presence of one or two teeth on a plant does not necessarily exclude the plant belonging to var. *cordifolia*, especially if the leaves are more triangular than ovoid. The existence of intermediate populations represent the justification for varietal rather than species rank.

When Weimarck originally described *Cliffortia integerrima*, he recorded the distribution as far as the Swartberg Pass. This was based upon *Bolus 11481*, which is a very narrow-leaved form of this species or a hybrid between this species and *C. ruscifolia*.

Representative specimens

SOUTH AFRICA. **3322** (Oudtshoorn): Swartberg Pass, higher S slopes, 1340 m, 30 Nov. 1991, (–AC), *Fellingham & Vlok 1594* (NBG, PRE); top of Swartberg Pass, 1525 m, 13 May 1961, (–AC), *Lewis 5783* (NBG); Great Swartberg, path from Die Hoek to Gouekrans Hut, 1600 m, 20 Mar. 1999, (–AC), *Whitehouse 27* (BOL, K, NBG). **3323** (Willowmore): Baviaanskloof, Duiwe R valley, 610 m, 5 June 1952, (–DB), *Taylor 395* (NBG, PRE). **3324** (Steytlerville): Baviaanskloof, Sandvlakte farm, upper slopes of peak between Erasmusboskloof and Sandvlaktekloof, 1100 m, 10 Oct. 2002, (–CA), *Whitehouse 315* (BOL, NBG).

Cliffortia ilicifolia var. *cordifolia*: A, habitat; B, branch with achenes; C, branch with female flower; D, branch with male flower; E, male flower; F, female flower; G, achene; H, dorsal view of leaf; I, ventral view of leaf.



103. **Cliffortia reniformis** (Weim.) C.M.Whitehouse in Bothalia 34(2): 77, fig. 1–2 (2004a). *C. ilicifolia* L. var. *reniformis* Weim.: 102, fig. 29D (1934). Lectotype, designated by Whitehouse (2004a): Riversdale District, Garcia's Pass, 395 m, Oct. 1904, *Bolus 11274* (BOL!, lecto.; B†, PRE).



Erect tall shrub up to 3 m high, resprouting after fire and spreading clonally; dominant main stem with determinate length side branches that are held horizontally, only forming long branches. *Young stems* 1.3–2.6 mm wide, completely sheathed by leaf bases. *Leaves* unifoliate; subcircular, 12–20 × 16–26 mm; base clasping stem; apex sharply acuminate to pungent, 0.2–0.9 mm long; margins flat, with 6–11 broad teeth, 2.8–5.0 mm long; lamina 11–17-veined from base, cartilaginous, 0.2–0.5 mm thick, held at right angles to stem, glaucous, glabrous; sheath 1.4–6.2 mm long, abaxially glabrous, adaxially glabrous except for fringe of hairs at apex; stipules similar in texture to lamina, 2.6–5.9 mm long, fused into a single stipule on reverse side of stem, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins smooth; sepals 3, glabrous. *Male flowers* with bracteoles 3.6–4.9 mm long; pedicel 0.9–1.4 mm long; sepals broadly ovate, 6.4–9.2 × 4.5–6.6 mm, acute to acuminate at the apex; stamens 51–68; filaments 3.8–6.8 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 3.9–5.0 mm long, longer than immature receptacle; sepals broadly ovate to triangular, 2.1–2.8 × 1.0–1.8 mm, erect; carpel 1; stigma 1.4–2.4 mm long, greenish white, feathery, hidden at the base of leaves; immature receptacle 1.7–2.5 × 1.5–2.3 mm, glabrous, smooth. *Achene* broadly ellipsoid, 8.0–8.7 × 4.8–5.5 mm, medium to dark brown, glabrous; 20–22-ribbed, ribs rounded, 0.1–0.4 mm wide. *Flowering time*: more-or-less all year, but mature fruits only found between August and November.

Habitat: Tall streamside vegetation and wet fynbos of lower valley slopes, on soils derived from Table Mountain Series in full sun; altitude 300–900 m.

Distribution: Restricted to the Langeberg Mountains at Garcia's Pass and adjacent valleys.

Conservation status: Highly restricted but very common and frequently dominant in the area. Red List status: VU.

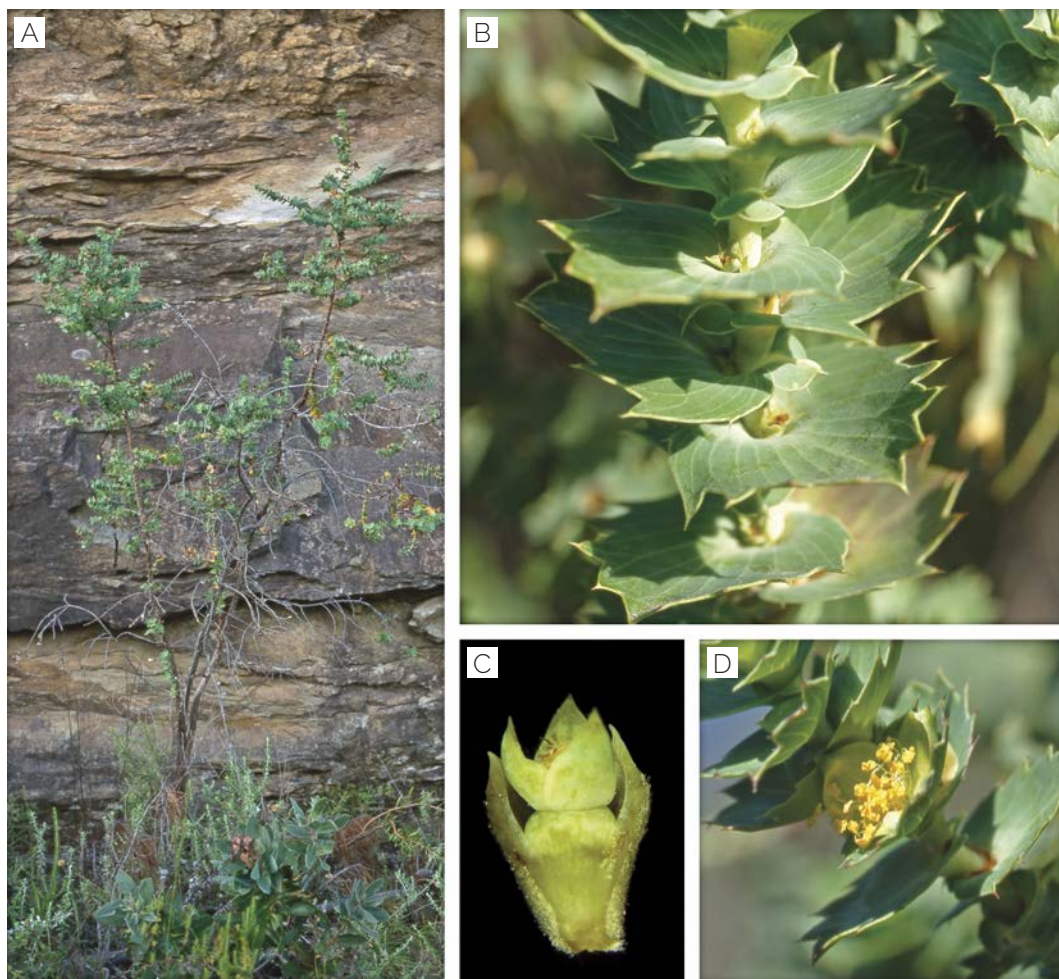
Etymology: *reniformis* (Latin) means 'kidney-shaped', referring to the leaves, which are almost circular in outline and clasp the stem at their base.

Notes: *Cliffortia reniformis* has a unique growth habit: a single stem, often up to 3 m tall, with short lateral branches all along the main axis and spreading at right angles. The leaves are also diagnostic, being held at right angles and almost circular in outline with a leaf-like stipule formed by fusion of the two stipules on the opposite side of the stem. *Cliffortia ilicifolia*, within which it was included by Weimarck as a variety, grows not far away in the Langeberg and it is likely that intermediate forms occur in the area, though none have so far been collected. The leaves of *C. ilicifolia* are shorter, more ovate to oblong in outline and usually held at an angle to the stem before curving outwards. The male flowers of *C. reniformis* are also larger with many more stamens. *Cliffortia schlechteri* shares the habit of leaves spreading at right angles to the stem but its leaves are smaller still and only have at most four teeth.

Representative specimens

SOUTH AFRICA, 3321 (Ladismith): Garcia's Pass, 9 Aug. 1949, (–CC), *Barker 5530* (BOL, NBG); Riversdale, Garcia's Pass, Toll House, roadside, 370 m, 19 Apr. 1983, (–CC), *Bohnen 8160* (NBG, PRE); Garcia's Pass, 395 m, Oct. 1904, (–CC), *Bolus 11274* (BOL, PRE); Garcia's Pass, roadside in Garcia's Pass above kloof, 19 May 1950, (–CC), *Esterhuysen*

17001 (BOL, PRE); Garcia's Pass, near Toll House, roadside, 19 Apr. 1983, (–CC), *Fellingham 442* (NBG); Garcia's Pass, 305 m, 29 Sept. 1897, (–CC), *Galpin 3999* (PRE); Garcia's Pass, 460–915 m, 6 Jan. 1961, (–CC), *Gentry & Barclay 19121* (PRE); Langeberg Mts, Garcia's Pass, 4 Aug. 1976, (–CC), *Goldblatt 3751* (K); Garcia's Pass, 610 m, Oct. 1927, (–CC), *Levyms 2293* (BOL); Riversdale, Garcia's Pass, Feb. 1904, (–CC), *Marloth 3551* (PRE); Garcia's Pass, 17 Aug. 1929, (–CC), *Muir STE 10555* (NBG); Garcia's Pass, July 1930, (–CC), *Muir 4661* (NU); Garcia State Forest, Garcia's Pass, near Toll House, 610 m, 6 Mar. 1984, (–CC), *Richardson 99* (NBG, PRE); Garcia's Pass, 365 m, 5 Apr. 1926, (–CC), *Smith 5322* ?2750 (K); Garcia's Pass, top end of pass, 66 km from Barrydale, 610 m, 29 Jan. 1969, (–CC), *Thompson 687* (NBG, PRE); 14.5 km from Riversdale, foot of Garcia's Pass, 22 Sept. 1969, (–CC), *Thompson 849* (K, NBG, PRE); Riversdale, Garcia's Pass, jeep track to E of Toll House, 14 Sept. 1981, (–CC), *van Wyk 684* (NBG, PRE); Garcia's Pass, car park at start of footpath to Kristalkloof, 460 m, 11 Mar. 2000, (–CC), *Whitehouse 99* (BOL, K, NBG); S end of Garcia's Pass, 535 m, 20 Jan. 2001, (–CC), *Whitehouse 183* (BOL).



Cliffortia reniformis: A, habitat; B, branch with female flower; C, female flower; D, branch with male flower.

104. **Cliffortia schlechteri** (Weim.) C.M.Whitehouse in Bothalia 34(2): 78, fig. 2–3 (2004a). *C. ilicifolia* L. var. *schlechteri* Weim.: 104 (1934). Lectotype, designated by Whitehouse (2004a): Bredasdorp District, near Elim, Koude R, 185 m, 3 Dec. 1896, *Schlechter 9584* (BOL!, lecto.; B, BM, BRI!, COI, G, GRA!, HBG!, K!, L, P, PRE, SI!, W!, WAG!, Z).



Erect medium densely branched shrub, up to 1.8 m high, killed by fire; only forming long branches that usually spread at right angles. *Young stems* 0.9–2.0 mm wide, completely sheathed by leaf bases. *Leaves* unifoliate; subcircular to broadly ovate or oblong, 5.5–10.9 × 5.7–12.0 mm; base clasping stem; apex sharply acuminate to pungent, 0.3–1.0 mm long; margins flat, with 2–4 broad teeth, 0.6–2.6 mm long; lamina 7–10-veined from base, cartilaginous, 0.2–0.4 mm thick, held at right angles to stem, green to glaucous, glabrous; sheath 1.4–2.1 mm long, abaxially glabrous, adaxially glabrous except for fringe of hairs at apex; stipules 1.6–5.8 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins smooth; sepals 3, glabrous. *Male flowers* with bracteoles 2.7–4.0 mm long; pedicel 0.9–1.5 mm long; sepals broadly ovate, 5–8 × 3.2–5.7 mm, acute to acuminate at the apex; stamens 28–41; filaments 2.8–5.0 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 2.3–3.2 mm long, longer than immature receptacle; sepals broadly ovate to triangular, 1.2–1.7 × 0.9–1.2 mm, erect; carpel 1; stigma 1.1–1.4 mm long, greenish white, feathery, hidden at the base of leaves; immature receptacle 1.5–1.8 × 1.0–1.3 mm, glabrous. *Achene* broadly ellipsoid, 6.7–8.7 × 3.4–5.4 mm, medium to dark brown, glabrous; 15–25-ribbed, ribs rounded, 0.2–0.5 mm wide. *Flowering time*: more-or-less all year, but mature fruits only found between May and November.

Habitat: Fynbos on very well-drained, wind-blown sands and limestone-derived soils in full sun; altitude 0–300 m.

Distribution: On the southern Cape coast from Gansbaai across the Agulhas Plain to Gouritz River mouth.

Conservation status: Widespread and often common, occurring in several reserves, as well as along road verges. It is susceptible to local extinctions caused by unnatural fire regimes as it does not resprout after fire. Red List status: NT.

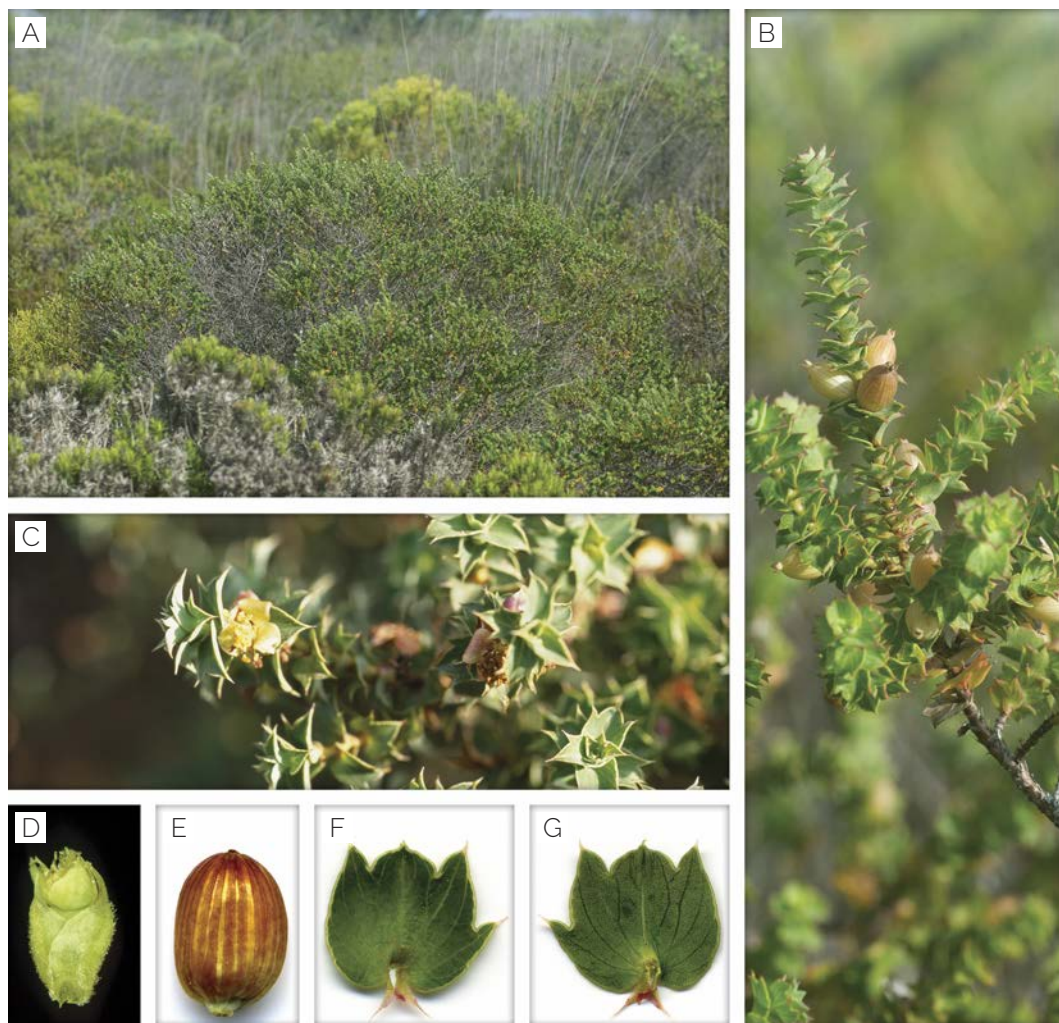
Etymology: Named after Rudolph Schlechter.

Notes: Once included as a variety of *Cliffortia ilicifolia*, *C. schlechteri* is distinct from that species not least because the plants are killed by fire. While it has the characteristic perpendicular branching and leaf orientation characteristic of *C. reniformis*, the branching is much more crowded and the plants form rounded bushes. The leaves are the smallest within the *C. ilicifolia* series. Some forms of *C. ilicifolia* var. *cordifolia* have leaves as short, but they are more ovate and usually lack teeth. *Cliffortia schlechteri* always has leaves with at least two teeth and that are generally as broad as long.

Representative specimens

SOUTH AFRICA. **3419** (Caledon): Havengas Farm, near Strandkloof, 12 June 1950, (–CB), *Maguire 71* (NBG); Hagelkraal, sandy valley, 28 Dec. 1946, (–DA), *Compton 19051* (NBG); Hagelkraal, at base of limestone hills, 50 m, 16 Oct. 1986, (–DA), *Cowling 3174* (NBG); Klein Hagelkraal, Pearly Beach, 12 Sept. 1981, (–DA), *Fellingham 81* (K, NBG, PRE); Hagelkraal R, 27 Dec. 1946, (–DA), *Leighton 2556* (BOL, NBG, PRE); near Elim, Koude R, 185 m, Nov. 1896, (–DA), *Schlechter 9584* (BM, BOL, K, PRE); Caledon, Heidehof, W of Baardskeedersbos, 45 m, 31 May 1973, (–DA), *Thompson 1730* (K, NBG, PRE); Waterford Farm, by dam at bottom of Waterkloof, 105 m, 18 May 2001, (–DA), *Whitehouse 225* (BOL). **3420** (Bredasdorp): De Hoop, Witwater, Potberg, 300 m, 6 Aug. 1984, (–BD), *Morley 27* (NBG, PRE). **3421** (Riversdale): 16 km W of Albertinia, 275 m, 22 Sept. 1949,

(–AB), *Acocks 15410* (K, PRE); near Riversdale, 610 m, 8 July 1974, (–AB), *Bayliss 964* (PRE); Soetbottersvlakte, N of Still Bay hills, 5 Aug. 1951, (–AB), *Johnson 127* (BOL, NBG); Sandhoogte, 120 m, May 1909, (–AB), *Muir 429* (PRE); Albertinia, Dekriet Siding, W of Albertinia, 170 m, 19 Mar. 1975, (–AB), *Oliver 5701* (NBG, PRE); W of Dekriet Siding, S of N2, 160 m, 11 Mar. 2000, (–AB), *Whitehouse 92* (BOL, NBG); Riversdale, Die Baa, road to Blombos, 150 m, 7 Oct. 1981, (–AC), *Bohnen 7985* (K, NBG, PRE); near Albertinia, 30 Jan. 1951, (–BA), *Compton 22577* (BOL, NBG); near Albertinia, 27 July 1953, (–BA), *Leighton 3301* (BOL); Riversdale, Still Bay, between Driefontein and Albertinia, 'Duineveld' on farm Accoordskop, 28 Apr. 1987, (–BC), *Linder 4093* (K, PRE); Albertinia, Ystervarkpunt, (Couriqua) Relevé 142, 120 m, (–BC), *Willemse 252* (NBG, PRE); Rein's Private Nature Reserve (Couriqua), flats alongside entrance road, 190 m, 6 Aug. 1995, (–BD), *Boucher 5936* (NBG); Couritz R mouth, 10 m, 27 May 1984, (–BD), *O'Callaghan, Fellingham & van Wyk 340* (NBG, PRE).



Cliffortia schlechteri: A, habitat; B, branch with achenes; C, branch with male flowers; D, female flower; E, achene; F, dorsal view of leaf; G, ventral view of leaf.

(105–107) *Cliffortia dregeana* series

105. ***Cliffortia dregeana*** C.Presl, Bot. Bemerk.: 141 (1845) & 202 (1851a) & 562 (1851b); Harv.: 295 (1862); Weim.: 109 (1934) pro parte; Fellingham: 609 (2000) pro parte; Whitehouse: 79, fig. 6 (2004a). Type: Worcester District, Du Toits Kloof, 915–1 220 m, Oct.–Jan., Drège 1126 (B, holo.†; BM!, G, HBG!, K!, L, MO!, P!, PRE, SAM!, TUB!, W).



Short to medium erect shrub, up to 1.8 m high, killed by fire or resprouting after fire and spreading clonally; densely divaricately branched or sparsely branched, usually only forming long branches. *Young stems* 1.4–2.2 mm wide, often tinged reddish, completely sheathed by leaf bases, glabrous. *Leaves* unifoliolate; narrowly triangular to lanceolate, 11–35 × 2.9–7.9 mm; apex pungent, 1.0–2.3 mm long; margins markedly turned upwards, entire and smooth or sometimes with up to 5 straight teeth, 1–2 mm long; lamina 4–8-veined from base, cartilaginous, 0.2–0.5 mm thick, curved downwards and away from the stem, usually with a few hairs along the midrib above, 0.4–0.7 mm long, glabrous beneath; sheath 2.4–5.0 mm long, abaxially glabrous, adaxially glabrous except for fringe of hairs at apex; stipules 1.3–7.0 mm long, free, margins smooth; petiole absent. *Flowers* solitary at the bases of undifferentiated leaves; bracteoles hairy on the keel, margins serrate to smooth; sepals 3, glabrous. *Male flowers* with bracteoles 5.4–9.0 mm long; pedicel 0.8–2.2 mm long, glabrous or hairy; sepals broadly ovate, 6.9–11.0 × 2.7–5.5 mm, acute to acuminate at the apex; stamens 25–38; filaments 3.0–9.6 mm long, red or greenish white; anthers yellow. *Female flowers* with bracteoles 5.2–8.5 mm long, longer than immature receptacle; sepals broadly ovate to triangular, 1.6–3.6 × 0.5–1.5 mm, erect; carpel 1; stigma 1.5–4.0 mm long, greenish white, feathery, hidden at the base of leaves; immature receptacle 1.8–3.0 × 1.2–2.2 mm, glabrous, smooth. *Achene* broadly ellipsoid, 6.1–7.2 × 4.2–4.9 mm, medium brown, glabrous; 12–24-ribbed, ribs rounded, 0.2–0.5 mm wide. *Flowering time*: throughout the year but particularly December to March.

Etymology: Named after Franz Drège, one of the most important early collectors at the Cape.

The *Cliffortia dregeana* series is incompletely understood but the species complex is characterised by the leaves with strong spiny apices and large achenes. Weimarck recognised two varieties of *C. dregeana*, var. *dregeana* and var. *meyeriana*, the former having entire leaves and the latter with 2–4 stout teeth. However, he admitted that the distinction between the two varieties was weak and there appears little merit in upholding them as both are often found in the same population. Two geographical forms of *C. dregeana* have been recognised as distinct species (Whitehouse 2004a): *C. cerasana* and *C. acanthophylla*. While *C. cerasana* is easily distinguished from *C. dregeana* by its broader, clearly toothed leaves, *C. acanthophylla* is much harder to identify unless the locality is known.

The names *Cliffortia meyeriana* or var. *meyeriana* have been used for a form of *C. dregeana* occurring between Bain's Kloof and Stettynsberg in which the majority of side branches are so short that they could be termed brachyblasts. The leaves are just as long as those found on long shoots of typical *C. dregeana* and so the brachyblasts closely overlap, covering the main branch and forming an exceptionally spiny columnar branch. The effect recalls the arrangement in *C. phillipsii*, but the plants are much shorter. The individual leaves are exceptionally spiny and toothed (even for *Cliffortia*) and as the main stem is hidden by these, it is a horrible plant to collect. This form is worth recognising, but as typical populations of *C. dregeana* are found in the same region, it merits only the rank of variety. The type of *C. meyeriana* is, however, from Genadendal, and represents typical toothed var. *dregeana*, thus cannot be used for this variety, here described as var. *spinosissima*.

var. **dregeana**

C. meyeriana C.Presl: 202 (1851a) & 562 (1851b); Harv.: 295 (1862). *C. dregeana* C.Presl var. *meyeriana* (C.Presl) Weim.: 110, fig. 31A (1934) pro parte. Type: Caledon District, Genadendal, Baviaanskloof, Oct., *Drège 1127* (B, holo.†; BM!, BOL!, G, HBG!, K!, L, P, S!, W!).

Branches long with leaves evenly spaced along them.

Habitat: Acid sands from Table Mountain Series or clayish soil from shale bands of Table Mountain Series, full sun, well-drained soils; altitude 600–2 150 m.

Distribution: From the Hex River Mountains and Bain's Kloof, south to Jonkershoek and the Riviersonderend Mountains, with outlying records from the Langeberg and Klein River Mountains.

Conservation status: Common within its range at high altitudes and not threatened.

Notes: Hybrids between var. *dregeana* and *Cliffortia pungens* have been found in the Riviersonderend Mountains (see *C. × ilicioides*). Putative hybrids between *C. dregeana* and *C. scandens* have also been found in this mountain range and it is possible that all three species may be involved in a complex hybrid swarm. Such hybrids may be responsible for Weimarck recording *C. × integerrima* (Bulus 7383) and *C. × intermedia* (Burchell 7795) from the area. One of these crosses may also be responsible for the type of *C. theodori-friesii* var. *puberula*, although none of these parents explain the hairiness of the upper surface of the leaves. Similarly, the type of *C. meyeriana* comes from this area too and could be an introgressed form of *C. dregeana* with one of the hybrids.

Weimarck recorded var. *meyeriana* from Table Mountain based on a Bulus collection from Maclear's Beacon. I consider that specimen to rather belong to the complex of hybrids akin to *C. × integerrima*.

Representative specimens

SOUTH AFRICA. **3318** (Cape Town): Jonkershoek, Langrivier, 1065 m, Feb. 1965, (–DD), *Kerfoot 5143* (PRE); Jonkershoek, 915 m, Dec. 1965, (–DD), *Kerfoot 5513* (NBG). **3319** (Worcester): Hansiesberg, 1525 m, 17 Dec. 1944, (–AB), *Compton 16733* (NBG); Hex River Mts, Milner Peak, 1525–1830 m, 7 Mar. 1943, (–AD), *Esterhuysen 8716* (BOL); Mostertshoek Twins, 1525–1830 m, 8 Jan. 1944, (–AD), *Esterhuysen 9859* (BOL); Hex River Mts, Sentinel Shelter, 1570 m, 9 Mar. 1963, (–AD), *Taylor 4648* (K, NBG, PRE); Roodeberg, 1220 m, 19 Jan. 1940, (–BC), *Compton 8429* (NBG); Matroosberg, W slopes, 1830–2135 m, 6 Apr. 1958, (–BC), *Esterhuysen 27702* (BOL); Matroosberg, W slopes, 1980 m, 16 Jan. 1959, (–BC), *Esterhuysen 28115* (BOL); Matroosberg, Spekrivierskloof, banks of side stream, 1340 m, 27 Jan. 2001, (–BC), *Whitehouse 185* (BOL); Matroosberg, N slopes below summit, 2135 m, 27 Jan. 2001, (–BC), *Whitehouse 189* (BOL); Slanghoek Pile, 1370 m, 29 Sept. 1945, (–CA), *Adamson 3625* (BOL); mountains around Du Toits Kloof, 885 m, Jan. 1880, (–CA), *Bulus 5329* (BOL); Du Toits Kloof, 915–1220 m, 1839, (–CA), *Drège 1126* (BM, K); Limietberg, 915 m, Mar. 1940, (–CA), *Esterhuysen 1626* (BOL); Bailey's Peak, 1220–1370 m, 2 Jan. 1943, (–CA), *Esterhuysen 8522* (BOL, K, PRE); Witteberg, 1525–1830 m, 9 Feb. 1943, (–CA), *Esterhuysen 8674* (BOL); Witteberg, 1525–1830 m, 21 Nov. 1943, (–CA), *Esterhuysen 9481* (BOL); Slanghoek Mts, Kromrivier Dome, S slope, 31 Mar. 1945, (–CA), *Esterhuysen 11521* (BOL); Suurvlaakte, 915 m, 1 Apr. 1945, (–CA), *Esterhuysen 11543* (BOL); above Wellington Sneeuwkop, 1370 m, 23 Dec. 1945, (–CA), *Esterhuysen 12463* (BOL); Lower Wellington Sneeuwkop, summit, 1585 m, 23 Dec. 1945, (–CA), *Esterhuysen 12464* (BOL); Mole-naarsberg, SE side (above Du Toits Kloof), 1465 m, 5 Oct. 1947, (–CA), *Esterhuysen 14082* (BOL); E slopes of Seven Sisters Mt., 1220 m, 24 Sept. 1949, (–CA), *Esterhuysen 15792* (BOL, NBG); Paarl-Slanghoek Peak, 1525 m, 26 Jan. 1958, (–CA), *Esterhuysen 27485* (BOL); Wellington, Bain's Kloof, Feb. 1913, (–CA), *Garside 195* (K); Bain's Kloof, 610 m, 19 Nov. 1896, (–CA), *Schlechter 9155* (K); Hawequas Mts, near microwave tower, 1340 m, 24 Feb. 1972, (–CA), *Thompson 1440* (NBG); Hex River Mts, Mt. Brodie, 1675 m, 25 Dec. 1942, (–CB), *Esterhuysen 8447* (BOL); Fonteintjiesberg, SE slopes, 1525 m, 26 Nov. 1944, (–CB), *Esterhuysen 10970* (BOL); Franschoek, 28 Nov. 1946, (–CC), *Dickson s.n.* (NBG); Haalhoek Sneeuwkop, upper slopes, 4 Apr. 1942, (–CC), *Esterhuysen 7710* (BOL); Haalhoek Sneeuwkop, 1220 m, 25 Dec. 1943, (–CC), *Esterhuysen 9585* (BOL); Haalhoek Sneeuwkop, 915–1220 m, 25 Dec. 1943, (–CC), *Esterhuysen 9607*



(BOL); Wemmershoek Peak, summit, 1830 m, 31 Dec. 1944, (–CC), *Esterhuysen 11286* (BOL); Haalhoek Sneeuwkop, 30 Apr. 1945, (–CC), *Esterhuysen 11562* (BOL); Wemmershoek, Perdekop, 1220–1525 m, 2 May 1945, (–CC), *Esterhuysen 11589* (BOL); top of Franschhoek Pass, 915 m, 2 May 1945, (–CC), *Esterhuysen 11598* (BOL); Haalhoek Spitzkop, 1220 m, 2 Jan. 1947, (–CC), *Esterhuysen 13553* (BOL); Groot Drakenstein Peak, 1370 m, 14 Sept. 1947, (–CC), *Esterhuysen 14041* (BOL); Wemmershoek Mts, lower E slopes of Winterberg, 950 m, 20 Feb. 1999, (–CC), *Whitehouse 8* (BOL); Wemmershoek Mts, sandstone outcrops on E slopes of Winterberg, 1200 m, 20 Feb. 1999, (–CC), *Whitehouse 10* (BOL); Wemmershoek Mts, sandstone outcrops on E slopes of Winterberg, 1300 m, 20 Feb. 1999, (–CC), *Whitehouse 11* (BOL); Stettynsberg, SW slopes, 1220 m, 16 Dec. 1944, (–CD), *Esterhuysen 11142* (BOL); Stettynsberg, 16 Dec. 1944, (–CD), *Esterhuysen 11184* (BOL); Jonaskop, summit, 1100 m, 2 Sept. 1981, (–DC), *Boucher 5022* (NBG); Jonaskop, SE facing slopes near beacon, 8 Apr. 1994, (–DC), *Oliver 10453* (NBG); Jonaskop, S slopes, 1645 m, 29 Jan. 1967, (–DC), *Rourke 710* (NBG, PRE). **3320** (Montagu): Marloth Nature Reserve, Swellendam Hiking Trail, path from Dwariganek to Twistniet valley, 900 m, 26 Dec. 2002, (–CD), *Whitehouse 336* (BOL). **3418** (Simonstown): Hottentots Holland Mts, Nuweberg Reserve, below nek on Somerset Sneeuwkop, 1220 m, 24 Apr. 1974, (–BB), *Goldblatt 1639* (NBG, PRE); S origin of Sonderend R, 1160 m, 21 May 1969, (–BB), *Haynes 76* (NBG); Nuweberg State Forest, NE slopes of Sneeuwkop, 1370 m, 15 Mar. 1972, (–BB), *Kruger 1566* (NBG). **3419** (Caledon): Jonkershoek State Forest, Victoria Peak, 1420 m, 29 Dec. 1983, (–AA), *Forsyth 347* (NBG); Stellenbosch, Jonkershoek, Dwarsberg, 1220 m, Feb. 1967, (–AA), *Kerfoot 5763* (K, NBG, PRE); Stellenbosch, Jonkershoek, Dwarsberg, 1370 m, 2 Jan. 1968, (–AA), *Kerfoot 6207* (NBG); Dwarsberg, W edge of Dwarsberg, 975 m, 30 Jan. 1963, (–AA), *Taylor 4620* (NBG, PRE); Bavianskloof near Genadendal, 305–610 m, Oct. , (–BA), *Drège 1127* (BM, BOL, K); Riviersonderend Mts, Galgberg, S slopes beneath radio mast, 1400 m, 18 Oct. 2001, (–BA), *Whitehouse 276* (BOL); above McGregor, Galgberg summit, 1385 m, 5 Feb. 1975, (–BA), *Williams 1967* (NBG); Riviersonderend Mts, minor peak/ridge E of Pilaarkop, at upper Buffelsrivier, 1465 m, 7 Nov. 1997, (–BB), *Oliver 10968* (NBG).

var. **spinosissima** C.M.Whitehouse var. nov. Type: Paarl District, Bain's Kloof, 610m, 19 Nov. 1896, *Schlechter 9155* (BOL, holo!; B†, BM!, COL, G, GRA, HBG, K!, L, P!, PRE!, W, Z!, iso.).

Forming brachyblasts, which closely overlap and hide the main branches, which are only infrequently produced.

Habitat: Acid sands from Table Mountain Series or clayish soil from shale bands of Table Mountain Series, full sun, well-drained soils; altitude 600–1250 m.

Distribution: Found in Bain's Kloof, Klein Drakenstein Mountains and around Stettynsberg.

Conservation status: Although localised, it is found at high altitudes in areas where there are few other threats.

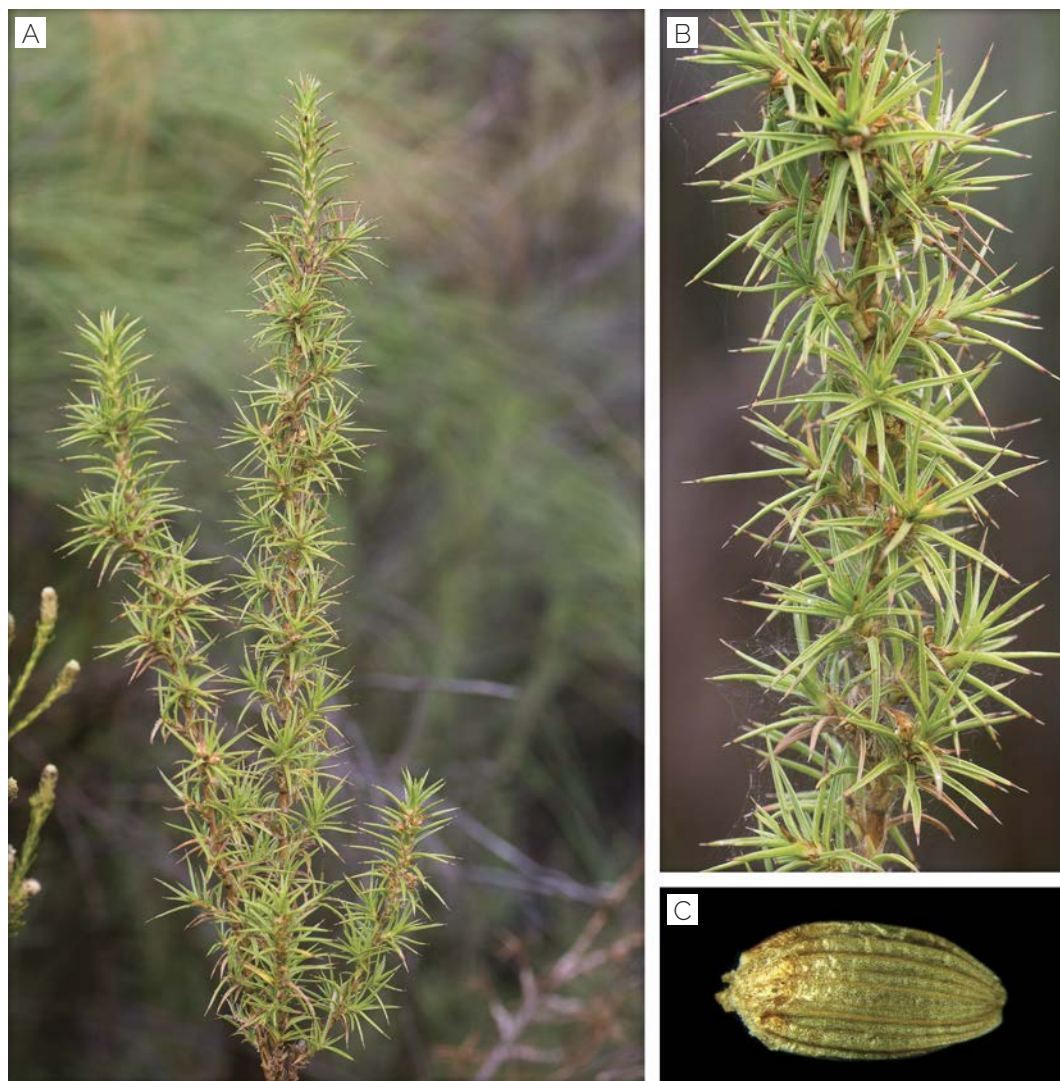
Etymology: Very spiny, referring to the leaves and the whole effect of the branches.

Notes: This variety grows in a manner that suggests it might be a reseeder rather than a resprouter, as it does not form dense stands in the way many populations of var. *dregeana* normally do. I have not been able to confirm the reseeding habit.

Representative specimens

SOUTH AFRICA. **3319** (Worcester): Bain's Kloof, 1065 m, 20 Oct. 1946, (–CA), *Compton 18640* (NBG); Hawequas State Forest, Slanghoek Mt, Grassy Dome area, 1250 m, 1 Mar. 1987, (–CA), *Forsyth 426* (NBG); Worcester, Bain's Kloof, 460 m, 14 Dec. 1935, (–CA), *Levy 5094* (BOL); Bain's Kloof, Stonemansion Botany Station, 610 m, 7 July 1956, (–CA),

Rycroft 1941 (NBG); Bain's Kloof, 12 May 1929, (–CA), *Salter 373/4* (BM); Bain's Kloof, 610 m, 15 Nov. 1953, (–CA), *Schelppe 4263* (BM); Bain's Kloof, 610 m, 13 Nov. 1896, (–CA), *Schlechter 9155* (BM, BOL, PRE); Bain's Kloof, Limietberg, 760 m, 26 Jan. 1980, (–CA), *Taylor 10083* (NBG); Bain's Kloof, Toll Gate, valley leading N of Toll Gate, E slopes, 7 Feb. 1966, (–CA), *Thompson 151* (NBG, PRE); Bain's Kloof, by road 1 km from pass towards Ceres, 610 m, 9 Apr. 1999, (–CA), *Whitehouse 31* (BOL); Haalhoek Sneeuwkop, upper slopes of Donker Kloof, 21 Dec. 1952, (–CC), *Esterhuysen 20877* (BOL); Donker Kloof, below Haalhoek Sneeuwkop, 760 m, 25 Jan. 1959, (–CC), *Esterhuysen 28159* (BOL); Stettynsberg, SW slopes, 915 m, 16 Dec. 1944, (–CD), *Esterhuysen 11141* (BOL); E slopes of Stettynsberg, 1220 m, 31 July 1949, (–CD), *Esterhuysen 15618* (BOL, NBG).



Cliffortia schlechteri: A, habitat; B, branch; C, achene.

106. **Cliffortia acanthophylla** C.M.Whitehouse in Bothalia 34(2): 79, fig. 4A, 5A–C, 6 (2004a). Type: Clanwilliam District, Vogelfontein, 440 m, Sept. 1925, *Levyms 1139* (BOL!, holo.).



C. dregeana sensu Harv.: 295 (1862) pro parte; Weim.: 109, fig. 31B, 31D–E (1934) pro parte, non *C. Presl*.

C. dregeana C.Presl var. *meyeriana* sensu Weim.: 110 (1934) pro parte, non (*C. Presl*) Weim. sensu stricto.

Medium erect plant, up to 1.8 m high, killed by fire, only forming long branches. *Young stems* 2.4–3.0 mm wide, sometimes tinged reddish, completely sheathed by leaf bases, glabrous. *Leaves* unifoliate; narrowly triangular to lanceolate, 28–39 × 6.1–9.0 mm; apex sharply pungent, 1.3–1.8 mm long; margins markedly turned upwards, entire and smooth or with a few long straight teeth; lamina 6–11-veined from base, tough and rigid, 0.4–0.6 mm thick, curved downwards and away from the stem, glabrous above and beneath; sheath 2.8–4.9 mm long, abaxially glabrous, adaxially glabrous except sometimes for fringe of hairs at apex; stipules 4.5–5.2 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins smooth; sepals 3, glabrous. *Male flowers* with sepals broadly ovate. *Female flowers* with bracteoles 5.9–7.0 mm long, longer than immature receptacle; sepals broadly ovate to triangular, 3.0–4.2 × 0.8–1.8 mm, erect; carpel 1; stigma 3.0–4.2 mm long, greenish white, feathery, hidden at the base of leaves; immature receptacle 2.4–3.0 × 1.8–2.2 mm, glabrous, smooth. *Achene* 7.2–9.4 × 5.9–7.4 mm, medium to dark brown, glabrous; ribs rounded. *Flowering time*: throughout the year.

Habitat: Fynbos on deep well-drained sands from Table Mountain Series in full sun; altitude 300–1 600 m.

Distribution: Northern Olifants River Mountains near or in the vicinity of Graafwater and the Cederberg Mountains between Sneeu Berg and Middelberg.

Conservation status: Fairly restricted in its distribution, well-protected within the Cederberg Wilderness Area, but the Graafwater populations are on private land. Red List status: LC.

Etymology: *acanthophylla* (Greek) means ‘spine-leaf’, referring to the long hard straight leaves with a pungent apex.

Notes: *Cliffortia acanthophylla* is difficult to distinguish from *C. dregeana*, but is generally more robust and has larger leaves and fruits (7.2–9.4 × 5.9–7.4 mm in *C. acanthophylla*, 6.1–7.2 × 4.2–4.9 mm in *C. dregeana*), although there is some overlap between the two in the characters. The species appears most distinct when dried when *C. acanthophylla* shows well-developed thickened margins that contrast with the rest of the lamina. Although *C. dregeana* also has thickened margins the condition is less pronounced. The ranges of the two species do not overlap, and both are replaced by the more easily recognised *C. ceresana* in the intervening mountains. Notably some populations of *C. dregeana* from the Hex River Mountains also have thickened margins similar to *C. acanthophylla* [Worcester District, Hex River Mts, Sentinel Peak, 1 675 m, 15 Dec. 1957, *Esterhuysen 27415* (BOL!); Worcester District, Hex River Mts, Sentinel Camp, 1 525 m, 16 Feb. 1958, *Esterhuysen 27567* (BOL!); Worcester District, Brandwacht Mt., Apr. 1929, *Stokoe 19852* (BOL!)].

Although some populations appear to be killed by fire, this has only been observed with confidence in the Graafwater area. The character is difficult to confirm and there may be populations elsewhere that are resprouters.

Representative specimens

SOUTH AFRICA. **3218** (Clanwilliam): 5.5 km E by N of Graafwater, 335 m, 22 Aug. 1958, (–BA), *Acocks* 19656 (K, PRE); 5.5 km E by N of Graafwater, 335 m, 14 Oct. 1958, (–BA), *Acocks* 19765 (K, NBC, PRE); Uitkomst, 20 July 1941, (–BA), *Bond* 1085 (NBC); Vogelfontein, 440 m, Sept. 1925, (–BA), *Levy* 1139 (BOL); Vogelfontein, 395 m, 13 Aug. 1896, (–BA), *Schlechter* 8514 (BM, BOL, K, PRE); Olifants R Mts, Die Berg road, S of Blouboos, 565 m, 16 Aug. 2001, (–BA), *Whitehouse* 248 (BOL, K, NBC, Z). **3219** (Wuppertal): Cederberg, Middelberg plateau, 14 Dec. 1941, (–AC), *Bond* 1344 (NBC); Cederberg, Juriesberg, 1370 m, 11 Feb. 1936, (–AC), *Compton* 6222 (NBC); Alpha, 20 July 1941, (–AC), *Esterhuysen* 5502 (BOL); Cederberg Mts, Middelberg Plateau, 14 Dec. 1941, (–AC), *Esterhuysen* 7243 (BOL, K); top of Nieuwoudts Pass, 27 Sept. 1942, (–AC), *Esterhuysen* 8141 (BOL); Cederberg Mts, top of Nieuwoudts Pass, 12 Oct. 1946, (–AC), *Esterhuysen* 13142 (BOL); between Alpha and Algeria, top of Uitkyk Pass, 10 Sept. 1938, (–AC), *Gillett* 4117 (K, PRE); Cederberg, Middelberg, 1585 m, Dec. 1967, (–AC), *Kerfoot* 6157 (NBC); Cederberg, near Middelberg, 1370 m, Sept. 1930, (–AC), *Levy* 2919 (BOL); Cederberg, between Alpha farm and Algeria, 3 Sept. 1938, (–AC), *Salter* 7561 (BOL, K); Cederberg Forest Reserve, Sneeuberg Hut area, flats and koppies around mountain hut on Sneeuberg, 1370–1525 m, 5 Dec. 1964, (–AC), *Taylor* 6173 (NBC, PRE); Cederberg, Sneeuberg Hut area, koppie SE of hut, steep NE slope, 1500 m, 24 Sept. 1983, (–AC), *Taylor* 10685 (NBC, PRE); Grootberg, SW slopes, 1065 m, 21 Dec. 1940, (–CA), *Esterhuysen* 4169 (BOL). **3319** (Worcester): Worcester District, Hex River Mts, Sentinel Peak, 1675 m, 15 Dec. 1957, (–AD), *Esterhuysen* 27415 (BOL); Worcester District, Hex River Mts, Sentinel Camp, 1525 m, 16 Feb. 1958, (–AD), *Esterhuysen* 27567 (BOL); Worcester District, Brandwacht Mt., Apr. 1929, (–CB), *Stokoe* 19852 (BOL).



107. **Cliffortia ceresana** C.M.Whitehouse in Bothalia 34(2): 80, fig. 4B, 5D–E, 6 (2004a). Type: Ceres District, Michell's Pass, 365 m, 27 Sept. 1936, Levyns 5827 (BOL!, holo.).



C. ilicifolia sensu Weim.: 99 (1934) pro parte quoad Burchell 8688, non L.

Erect medium shrub, up to 1.8 m high, resprouting after fire and spreading clonally, only forming long branches. *Young stems* 1.5–2.1 mm wide, completely sheathed by leaf bases. *Leaves* unifoliate; ovate-elliptic to oblong, 10–27 × 5–16 mm; apex sharply long acuminate to pungent, 1.2–3.1 mm long; margins flat with 5–8 broad teeth, 0.8–5.8 mm long; lamina 5–9-veined from base, tough and rigid, midrib prominent beneath, 0.3–0.8 mm thick, curved downwards and away from the stem, glabrous; sheath 1.9–3.5 mm long, abaxially glabrous, adaxially glabrous except sometimes for fringe of hairs at apex; stipules 1.0–5.5 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins smooth; sepals 3, glabrous. *Male flowers* with bracteoles 3.8–7.0 mm long; pedicel 0.8–1.3 mm long, glabrous; sepals broadly ovate, 6.7–10.4 × 3.0–5.9 mm, acute to acuminate at the apex; stamens 21–34; filaments 2.8–5.5 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 5.5–6.5 mm long, longer than immature receptacle; sepals broadly ovate to triangular, 2.8–3.9 × 0.9–1.6 mm, erect; carpel 1; stigma 1.8–2.5 mm long, red or sometimes greenish white, feathery, hidden at the base of leaves; immature receptacle 2.3–3.7 × 1.8–2.7 mm, glabrous, smooth. *Achene* medium to dark brown, glabrous; ribs rounded to sharply acute. *Flowering time*: September to January.

Habitat: Fynbos on rocky shaley slopes and amongst sandstone rocks at high altitudes, on well-drained soils derived from Table Mountain Series in full sun; altitude 350–1 850 m.

Distribution: Extending from the Groot Winterhoek Mountains and Witzenberg to the western end of the Hex River Mountains.

Conservation status: Common throughout its range, especially at higher altitudes; conserved within the Groot Winterhoek Wilderness Area. Its resprouting habit ensures that it is not threatened by unnatural fire regimes. Red List status: LC.

Etymology: Named after the town of Ceres where it is common on the surrounding mountains.

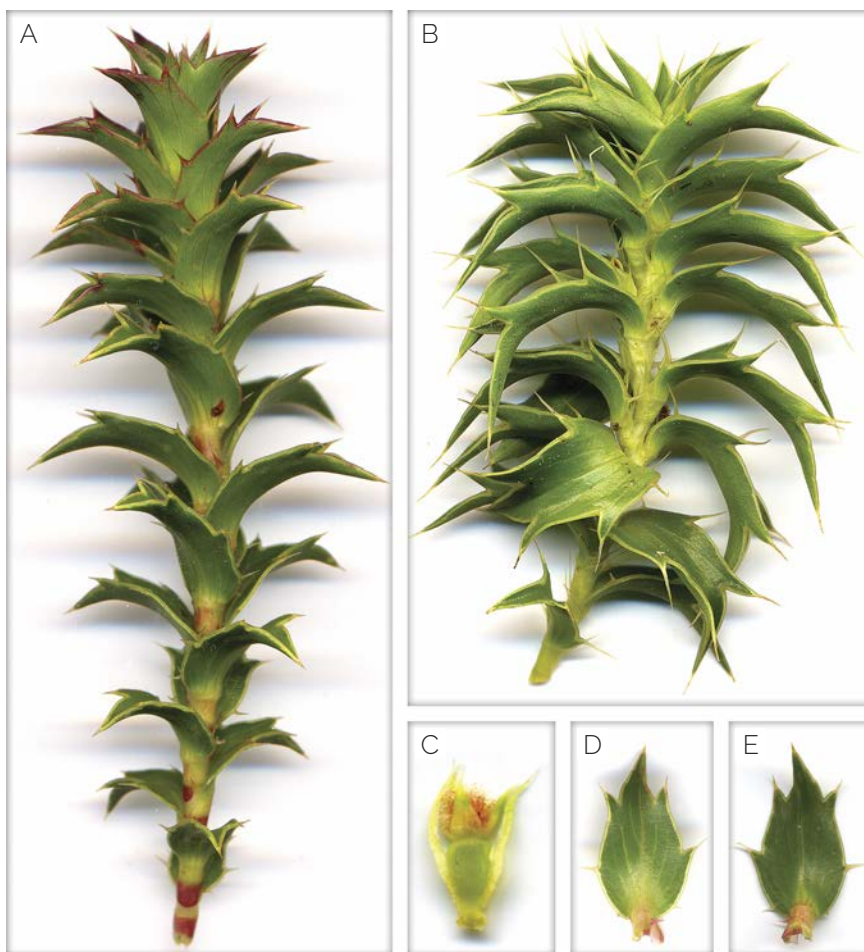
Notes: The broadly oblong few-toothed leaves, combined with the limited distribution range, make this species easily distinguishable. However, in the south of its range, specimens that are more intermediate in character with *Cliffortia dregeana* do occur [Worcester District, Hex River Mts, Buffelshoek Peak, 1 830 m, 26 Dec. 1942, Esterhuysen 8405 (BOL!); Worcester District, Waaihoek Mt., SE, 15 Sept. 1943, Esterhuysen 8970 (BOL!); Worcester District, Hex River Mts, Sentinel Peak, 1 525–1 675 m, 16 Feb. 1958, Esterhuysen 27571 (BOL!)].

Weimarck placed Burchell 8688 within *Cliffortia ilicifolia* on account of its broad toothed leaves. However, in other characteristics the species is closer to *C. dregeana*, with which it has generally been placed in herbaria.

Representative specimens

SOUTH AFRICA. 3219 (Wuppertal): Ceres, Waboomsivier (Koue Bokkeveld), 16 Sept. 1966, (–CC), Hanekom 729 (K, PRE); Ceres, Waboomsivier (Koue Bokkeveld), 16 Sept. 1966, (–CC), Hanekom 730 (K, PRE); Porterville Mts, Berghof, near Ratel R, 795 m, 27 Sept. 1972, (–CC), Thompson 1462 (K, NBG, PRE); Grootfontein Farm, Beaverlac Nature Reserve, Ratel R above swimming pool, 425 m, 10 Sept. 2002, (–CC), Whitehouse 308 (BOL); Groot Winterhoek Wilderness Area, path between parking area and jeeptrack to Groot Kliphuis where it crosses Groot Kliphuis R, 945 m, 13 Sept. 2002, (–CC), Whitehouse 313

(BOL, NBC). **3319** (Worcester): Piketberg District, on plateau of Twenty Four Rivers Mts, above Porterville, 915 m, 23 Oct. 1949, (–AA), *Esterhuysen 16143* (BOL); Kliphuisvlakte State Forest, near old homestead, 1280 m, 21 Oct. 1970, (–AA), *Kruger 1093* (NBG); Visgat, Agter Witzenberg, 610 m, 30 Dec. 1962, (–AA), *Taylor 4536a* (NBG); Groot Winterhoek Wilderness Reserve, N facing S slopes of Sneeuogat, 1400 m, 22 Sept. 2001, (–AA), *Whitehouse 269* (BOL, NBG); Witzenberg Vlake, 6 Oct. 1941, (–AB), *Compton 11989* (NBG); Witzenberg Vlake nek, 975 m, 17 Nov. 1941, (–AB), *Compton 12465* (NBG); Hansiesberg, 1525 m, 17 Dec. 1944, (–AB), *Compton 16702* (NBG); Witzenberg Vlake, 915 m, 11 Nov. 1946, (–AB), *Compton 18802* (NBG); mountains W of Cydo Pass, 27 Oct. 1928, (–AB), *Hutchinson 1022* (BOL, K); Witzenberg Vlake, 11 Nov. 1946, (–AB), *Leighton 2301* (BOL); Michell's Pass, 29 Nov. 1939, (–AD), *Compton 8143* (NBG); Mostertshoek Twins, Jan. 1944, (–AD), *Esterhuysen 9868* (BOL); S side of Castle Rocks, 915 m, 5 Dec. 1948, (–AD), *Esterhuysen 14702* (BOL); Ceres, Michell's Pass, 365 m, 30 Dec. 1934, (–AD), *Levy's 4946* (BOL); Michell's Pass, 365 m, 27 Sept. 1936, (–AD), *Levy's 5827* (BOL); Ceres, mountains near village, Sept. 1924, (–AD), *Marloth 6158* (NBG, PRE); Ceres, Dec. 1929, (–AD), *Thode 2237* (K, PRE); slopes of Michell's Pass, Jan. 1918, (–AD), *Thode 4817* (NBG); Chavonnesberg, SE slopes, 4 Oct. 1942, (–CB), *Esterhuysen 8176* (BOL).



Cliffortia ceresana: A, branch; B, branch with female flowers; C, female flower; D, dorsal view of leaf; E, ventral view of leaf.

108. **Cliffortia oligodonta** C.M.Whitehouse in Bothalia 34(2): 82, fig. 4C, 10C–D, 11 (2004a). Type: Western Cape, Paarl District, SE slopes of Wemmershoek Peak, 1 500 m, 31 Jan. 2003, C. & A. Whitehouse 343 (BOL, holo.; K!, MO!, NBG!, iso.).



Erect medium shrub, up to 1.2 m high, resprouting after fire and spreading clonally; only forming long branches. *Young stems* 2.7–3.0 mm wide, completely sheathed by leaf bases. *Leaves* unifoliate; elliptic-oblong to ovate, 22–36 × 9.5–13.5 mm; apex pungent, 1.4–2.5 mm long; margins flat, entire or with up to 5 straight teeth, 1.0–2.7 mm long; lamina 5–7-veined from base, tough and rigid, 0.5–0.7 mm thick with the midrib occasionally slightly prominent beneath, curved downwards and away from the stem, glaucous, glabrous or sometimes with a few 0.4–1.0 mm long hairs along the midrib; sheath 3.0–4.6 mm long, abaxially glabrous, adaxially glabrous or with a few adpressed hairs and fringed at the apex; stipules 3.5–5.5 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins smooth; sepals 3, glabrous. *Male flowers* with bracteoles 9.4–11.3 mm long; pedicel 1.5–2.1 mm long, glabrous; sepals broadly ovate, 11.4–15.0 × 6.0–7.8 mm, acute to acuminate at apex; stamens 30–35; filaments 7.2–11.8 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 5.6–7.5 mm long, longer than immature receptacle; sepals broadly ovate to triangular, 2.4–3.2 × 0.8–1.6 mm, erect, carpel 1; stigma 2.3–3.5 mm long, greenish white, feathery, hidden at base of leaves; immature receptacle 2.5–3.1 × 2.0–2.5 mm, glabrous, smooth. *Achene* ovoid, 7.3–7.8 × 4.1–5.3 mm, medium to dark brown, glabrous; ribs 16–22, rounded, 0.2–0.4 mm wide. *Flowering time*: September to May.

Habitat: South-facing slopes and in the shelter of rocks at high altitudes, in well-drained rocky soil from Table Mountain Series; altitude 1 450–1 800 m.

Distribution: A narrow endemic, restricted to the upper slopes of the Wemmershoek Mountains between Winterberg and Wemmershoek Peak.

Conservation status: Endemic to a very small area, but common there at high altitudes. Red List status: Rare.

Etymology: *oligodonta* (Greek) means ‘few teeth’, referring to the leaves which vary from being entire to having up to five small teeth.

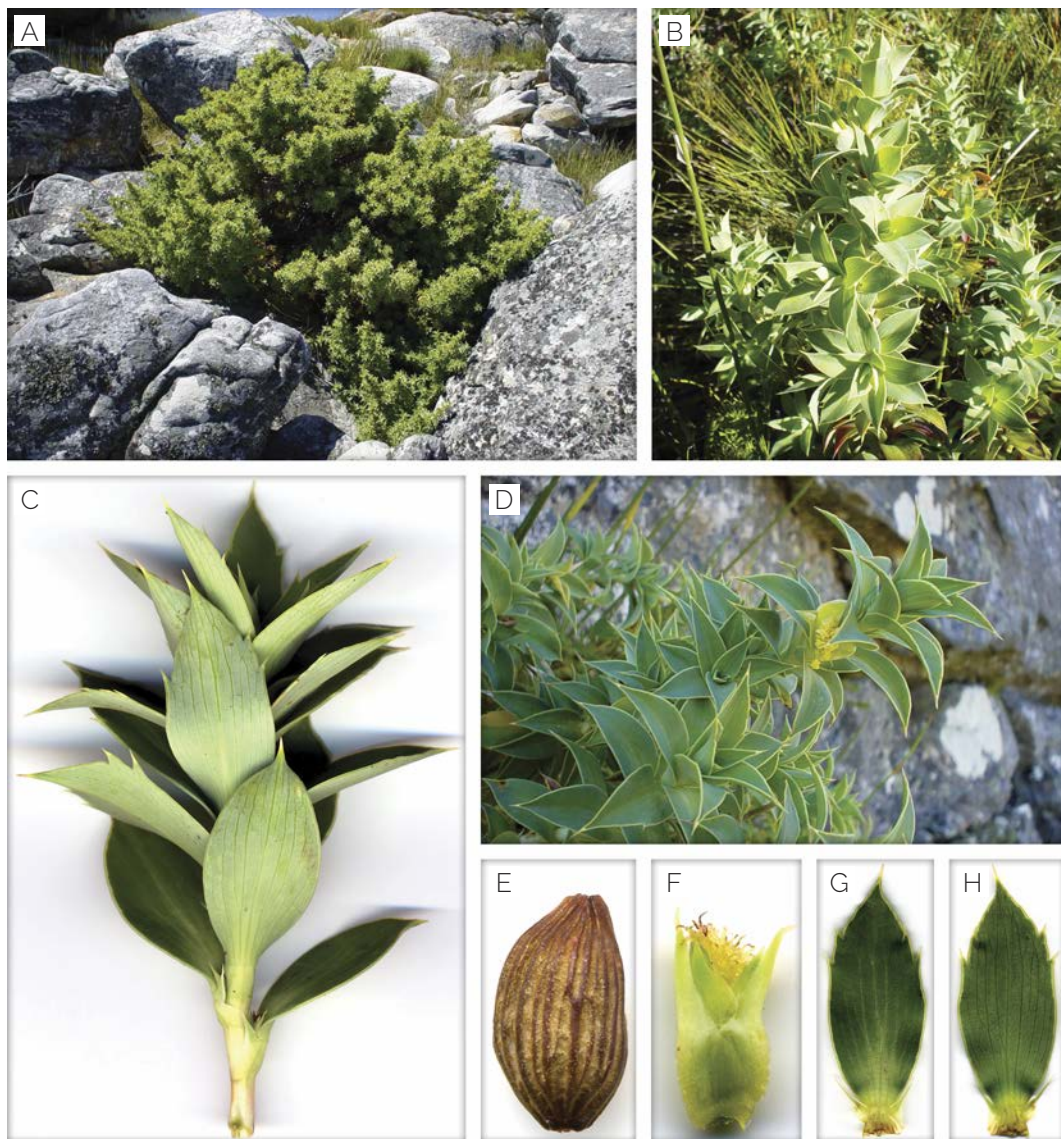
Notes: The species is distinctive on account of its relatively broad elliptic-oblong leaves that are glaucous in colour. The species has so far not been found beyond the Wemmershoek Mountains, so that confusion with other species is unlikely. Within sect. *Multinerviae*, only *Cliffortia dregeana*, with narrowly lanceolate green leaves, grows in the same vicinity, but is replaced by *C. oligodonta* above about 1 600 m. A putative hybrid has been found where the two species grow in close proximity [Paarl District, S slopes of peak between Perdekop and Wemmershoek Peak, C. & A. Whitehouse 344 (BOL)]. The hybrid is intermediate between the two species and has oblong-lanceolate leaves, which are never toothed, generally broader than *C. dregeana* and retain the glaucous colouration of *C. oligodonta*.

This species had been identified on herbarium sheets as *Cliffortia integerrima*. That species was poorly circumscribed by Weimarck (1934) and included several different taxa from the Cape Peninsula, Rivier-sonderend Mountains and Swartberg. The type of *C. integerrima* is based on a hybrid from the lower slopes of Devil’s Peak.

Representative specimens

SOUTH AFRICA. 3319 (Worcester): Winterberg, 1525 m, 26 Dec. 1943, (–CC), Esterhuysen 9670 (BOL, PRE); Wemmershoek Peak, ledge on SW side, 1525 m, 31 Dec. 1944, (–CC), Esterhuysen 11278 (BOL, K, PRE); Wemmershoek Peak, at summit, 1830

m, 2 May 1945, (–CC), *Esterhuysen 11576* (BOL, K, NBG, PRE); Wemmershoek Peak, 1525–1740 m, 15 Mar. 1958, (–CC), *Esterhuysen 27620* (BOL); Wemmershoek Tafelberg, 1675–1830 m, 16 Mar. 1958, (–CC), *Esterhuysen 27621* (BOL); Wemmershoek, 1525 m, Sept. 1939, (–CC), *Stokoe 7404* (BOL); Wemmershoek Mts, on top of Winterberg, 1450 m, 20 Feb. 1999, (–CC), *Whitehouse 12* (BOL, K, NBG); SE slopes of Wemmershoek Peak, 1600 m, 31 Jan. 2003, (–CC), *Whitehouse 342* (BOL, K, MO, NBG); SE slopes of Wemmershoek Peak, 1500 m, 31 Jan. 2003, (–CC), *Whitehouse 343* (BOL, K, MO, NBG).



Cliffortia oligodonta: A, habitat; B, female branch; C, branch with female flower; D, branch with male flower; E, achene; F, female flower; G, dorsal view of leaf; H, ventral view of leaf.

109. ***Cliffortia theodori-friesii*** Weim. in Botaniska Notiser 1933: 156, fig. 8b–d (1933) & 107, fig. 31F–J (1934); Levyns: 449 (1950); Dahlgren: fig. 5I (1971); Fellingham: 611 (2000). Type: Cape Peninsula, Table Mt, 1 000 m, 1 Oct. 1930, *Fries, Norlindh & Weimarck 1568* (LD, holo.!; PRE, SI, iso.).



Grey dot: var. *puberula*.

C. ruscifolia sensu Juel: 277 (1918) pro parte; Marloth: 42, t. 15A1,3,7 (1925) pro parte, non L.

Medium erect shrub, up to 1 m high, resprouting after fire and spreading clonally; quite densely branched, only forming long branches. *Young stems* 1.1–1.4 mm wide, completely sheathed by leaf bases, glabrous. *Leaves* unifoliolate; ovate to lanceolate, 11–17 × 3.1–4.7 mm; apex pungent, 1.3–2.0 mm long; margins turned upwards, entire and smooth; lamina 3–5-veined from base, cartilaginous, midrib slightly prominent beneath, curved downwards and away from the stem, glabrous; sheath 2.1–3.2 mm long, abaxially glabrous, adaxially glabrous except for fringe of hairs at apex; stipules 3.6–5.4 mm long, free, margins smooth; petiole absent. *Flowers* solitary at the bases of undifferentiated leaves; bracteoles hairy on the keel, margins serrate to smooth; sepals 3, glabrous. *Male flowers* with bracteoles 4.5–6.5 mm long; pedicel 0.9–1.2 mm long, glabrous; sepals broadly ovate, 6.2–7.0 × 3.0–3.8 mm, acute to acuminate at the apex; stamens 19–23; filaments 4.6–7.7 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 4.5–4.9 mm long, longer than immature receptacle; sepals broadly ovate to triangular, 1.7–2.3 × 0.4–1.1 mm, erect; carpel 1, greenish white, feathery, hidden at the base of leaves, glabrous, smooth to ribbed. *Achene* ellipsoid, 4.9–6.0 × 2.1–2.6 mm, medium brown, glabrous; 13–18-ribbed, ribs rounded, 0.1–0.4 mm wide. *Flowering time*: November to March, also found in June, possibly all year but undercollected.

Habitat: Acid sands from Table Mountain Series, full sun, well-drained soils; altitude 450–1 100 m.

Distribution: Endemic to Table Mountain on the Cape Peninsula, and possibly further south on Noordhoek Peak.

Conservation status: Local endemic but common even in the well-trodden areas around the Cableway Station; it persists after fire and has few evident threats. Red List status: LC.

Etymology: Named in memory of Prof. Thore Fries, Weimarck's mentor and leader of the expedition to southern Africa during which Weimarck became interested in *Cliffortia*; Fries unfortunately died of pneumonia halfway through the trip.

Cliffortia theodori-friesii has leaves the size and shape of *C. ruscifolia*, but is immediately distinguished by forming long branches rather than brachyblasts. The flowers and fruits are also very different and prevent any confusion. Whereas the style of the female flowers of *C. ruscifolia* are prominent, thin and red and crowded amongst much reduced leaves, the flowers of *C. theodori-friesii* have their styles broad and greenish white tucked at the bases of typical leaves and often invisible unless searched for. The male flowers also differ, *C. ruscifolia* having brownish red sepals, with less than 12 stamens with reddish filaments and anthers, whereas *C. theodori-friesii* has greenish flowers with about 20 stamens, whitish filaments and cream anthers.



Cliffortia tridentata was considered to be a hybrid between the above two species, but I have raised it to specific rank. Any genetic contribution of *C. theodori-friesii* to *C. tridentata* has not been confirmed and it is morphologically and molecularly distinct from *C. ruscifolia*. The differences between *C. ruscifolia* and *C. theodori-friesii* apply to *C. tridentata* as well, except that there is less red in the flowers of *C. tridentata* and the subtending leaves are not reduced as in *C. ruscifolia*. *Cliffortia tridentata* forms very distinct brachyblasts and should not be confused with *C. theodori-friesii*.

Of far greater problem are the other plants belonging to sect. *Multinerviae* found on the Cape Peninsula and their relationship to *Cliffortia theodori-friesii*. A population on the saddle between Table Mountain and Devil's Peak has leaves the size and shape of *C. × integerrima* and is probably one of the parents of that cross. The population cannot, however, be placed in *C. theodori-friesii*, as the leaves are too broad. Another population, this on Noordhoek Peak, accords with *C. theodori-friesii* in leaf size and shape, but there are several other populations in sect. *Multinerviae* in the area that are difficult to place, possibly belonging to *C. × intermedia*. The Noordhoek population may also be another odd hybrid.

Although the hybrid between *Cliffortia theodori-friesii* and *C. ruscifolia* has not been confirmed, the hybrid between *C. theodori-friesii* and *C. odorata* is supported: the plants are exactly intermediate between the two species and this is confirmed by molecular work (Fig. 1, 2, 3). This hybrid has been found below Maclear's Beacon and above Orange Kloof and is here described as *C. × maclearica*. Both species grow in the vicinity, *C. theodori-friesii* on the plateau and *C. odorata* on eastern slopes nearby.

Cliffortia theodori-friesii var. *puberula* (Weimarck 1948) described from the Riviersonderend Mountains was thought by Weimarck to represent a separate species, but too little material was then available. Certainly it has no close relationship with *C. theodori-friesii* itself, but unfortunately there is still too little knowledge of the plant to say whether it is a new species or a hybrid, then most likely between *C. dregeana* and *C. scandens*, both of which occur in the area. See also discussions under *C. dregeana* and *C. × ilicioides*.

Representative specimens

SOUTH AFRICA. **3318** (Cape Town): Table Mt., 1005 m, June 1884, (–CD), *Bolus 1149* (BM, BOL, K); Table Mt., E part, 1035 m, June 1884, (–CD), *Bolus 7042* (K); Cape Peninsula, Echo Valley, 28 Dec. 1939, (–CD), *Compton 8295* (NBG); Cape Peninsula, Valley of Isolation, 27 Nov. 1946, (–CD), *Compton 19422* (NBG); Cape Peninsula, Table Mt., slopes above Window Gorge, 760 m, 6 Dec. 1945, (–CD), *Esterhuysen 12299* (BOL); Cape Peninsula, Table Mt., upper Disa Gorge, catchment area, 7 Jan. 1946, (–CD), *Esterhuysen 12533* (BOL, PRE); Table Mt., slopes of Table Mt., 460 m, Mar. 1894, (–CD), *Flanagan 2463* (PRE); Table Mt., 1000 m, 1 Oct. 1930, (–CD), *Fries, T.C.E., Norlindh & Weimarck 1568* (PRE); Table Mt., Kasteelspoort, 1 Feb. 1898, (–CD), *Froembling 658* (NBG); Table Mt., 1100 m, June 1884, (–CD), *Marloth 121* (PRE); Cape Peninsula, Table Mt., Valley of Isolation, N slopes, 900 m, 7 Mar. 2000, (–CD), *Whitehouse 88* (BOL); Cape Peninsula, summit of Table Mt., 15 Feb. 1896, (–CD), *Wolley-Dod 852* (BM, BOL, K). **3418** (Simonstown): Cape Peninsula, Noordhoek Peak, gully in cliffs below the summit, S side, 670 m, 13 Dec. 1964, (–AB), *Esterhuysen 30874* (BOL).

110. **Cliffortia virgata** Weim., Monograph of the Genus Cliffortia: 111, fig. 32A–C (1934); Dahlgren: fig. 4A, 5J (1971); Fellingham: 611 (2000). Type: Worcester District, Du Toits Kloof, 305–610 m, Drège 'C. cordifolia Lam.' (K, holo.; B†, BM!, G, HBG!, L, P!, REG!, S, W, iso.).



C. cordifolia sensu E.Mey. ex Drège: 78, 173 (1843); Harv.: 295 (1862), non Lam.

Medium erect to virgate shrub, up to 1.2 m high, resprouting after fire and spreading clonally; sparsely to well-branched, only forming long branches. *Young stems* 1.2–1.8 mm wide, often tinged reddish, completely sheathed by leaf bases, glabrous. *Leaves* unifoliate; subcircular to ovate, 22–31 × 17–27 mm; base clasping stem; apex long acuminate, 1.4–2.6 mm long; margins flat with 30–46 straight teeth, 0.3–1.1 mm long; lamina 14–19-veined from base, cartilaginous, 0.5–0.7 mm thick, midrib slightly prominent beneath, curved downwards and away from the stem, glabrous; sheath 1.5–2.8 mm long, abaxially and adaxially glabrous; stipules absent, sheath encircling stem with smooth margins; petiole absent. *Flowers* solitary at the bases of undifferentiated leaves; bracteoles hairy on the keel, margins smooth; sepals 3, glabrous. *Male flowers* with bracteoles 7.2–9.7 mm long; pedicel 0.7–0.8 mm long; sepals broadly ovate, 9.9–11.3 × 4.8–7.0 mm, acute to acuminate at the apex; stamens 21–27; filaments 3.8–5.7 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 5.2–5.8 mm long, longer than immature receptacle; sepals broadly ovate to triangular, 2.8–3.1 × 1.1–1.2 mm, erect; carpel 1; stigma ± 2.6 mm long, red, feathery, hidden at the base of leaves; immature receptacle ± 2.2 × ± 1.7 mm, glabrous, smooth. *Achene* not known but probably medium brown, glabrous; ribs rounded. *Flowering time*: September to December.

Habitat: Fynbos on south-facing clayey shale slopes and in seeps at higher altitude; altitude 600–1 300 m.

Distribution: Extending from the Groot Winterhoek Mountains south through the Witzenberg to the western end of the Hex River Mountains, also in the mountains surrounding Du Toitskloof.

Conservation status: Localised but at high altitudes in areas with few threats. Red List status: LC.



Cliffortia virgata: A, branch; B, dorsal view of leaf; c, ventral view of leaf.

Etymology: *virgata* (Latin) means 'long and slender', referring to the long slender twiggy branches.

Notes: A distinctive species, readily recognised by the glabrous broadly ovate to almost circular leaves clasping the stem. In the same area only *Cliffortia strigosa* and *C. denticulata* have similar leaves, but the former has hairy leaves, which are narrowly ovate, and the latter is a tall spindly single-stemmed plant over 2 m high, unlike the much-branched *C. virgata*.

Cliffortia virgata was first cited by Drège (1843) as Lamarck's *C. cordifolia* and included in Harvey's *Flora Capensis* (1862) as such. However, Weimarck (1934) concluded that Lamarck's species was based on a form of *C. ilicifolia* and is now a variety of that species.

Female flowers were not known to Weimarck, owing to the difficulty of locating them as they are hidden at the base of the leaves and cannot be observed in pressed specimens without dissection. Flowering time is listed above as September to December but due to this inherent problem of herbarium material, it may be conservative.

Representative specimens

SOUTH AFRICA. **3219** (Wuppertal): Cold Bokkeveld Mts, Heksberg, (–CA), *Esterhuysen 18459a* (BOL, PRE); Onderboskloof, upper Olifants R valley, 1 Jan. 1948, (–CC), *Esterhuysen 14302* (BOL). **3319** (Worcester): S slope in Twenty Four Rivers Mts, 915 m, 23 Oct. 1949, (–AA), *Esterhuysen 16158* (BOL, NBG); Bergplaas Farm, path up to Sneeuogat, around Nooiensverdriet, 600 m, 22 Sept. 2001, (–AA), *Whitehouse 267* (BOL); mountains around Michell's Pass, 550 m, Oct. 1882, (–AD), *Bolus 5302* (BOL); Mostertshoek Twins, 1220–1525 m, 8 Jan. 1944, (–AD), *Esterhuysen 9907* (BOL); S slopes of Castle Rocks, 915–1065 m, 5 Dec. 1948, (–AD), *Esterhuysen 14686* (BOL, NBG, PRE); Du Toits Kloof, 305–610 m, (–CA), *Drège C. cordifolia* Lam. male (BM, K); Du Toits Kloof, 305–610 m, (–CA), *Drège 1117* (K); Du Toits Kloof, 30 Mar. 1945, (–CA), *Esterhuysen 11535* (BOL); Du Toits Kloof, below Witteberg, 610–915 m, 15 Nov. 1953, (–CA), *Esterhuysen 22279* (BOL); above Du Toits Kloof, along path to Suurvlaakte, 915 m, 9 Mar. 1958, (–CA), *Esterhuysen 27617* (BOL); Elands Kloof, off Du Toits Kloof, slopes above the river on the right bank, 17 Dec. 1961, (–CA), *Esterhuysen 29428* (BOL); Du Toits Kloof, along the road to Fisantekraal, 11 Jan. 1962, (–CA), *Esterhuysen 29461* (BOL); Limietberg south slopes, on upper edge of shaleband north of Bastiaanskloof, off Bainskloof, 860 m, 11 Nov. 2011, (–CA), *Helme 7248* (NBG); Du Toits Kloof, 700 m, 27 Dec. 1947, (–CA), *Levy's 8787* (BOL); Du Toits Kloof, above Mountain Club Hut, 760 m, 17 Oct. 1963, (–CA), *Taylor 5425* (K, NBG, PRE); lower S slopes near Fonteintjiesberg, 915 m, 2 Jan. 1950, (–CB), *Esterhuysen 16716* (BOL); April Peak, 15 Dec. 1940, (–CC), *Compton 10162* (NBG); Wemmershoek Mts, April Peak, SW slopes, 915 m, 15 Dec. 1940, (–CC), *Esterhuysen 4115* (BOL).

111. ***Cliffortia strigosa*** Weim. in Botaniska Notiser 90: 195, fig. 13, t. 9 (1948); Fellingham: 611 (2000). Type: Paarl District, Limietberg, Mar. 1940, *Esterhuysen 1627* (BOL, holo.).



Medium erect to virgate shrub, up to 0.9 m high, resprouting after fire and spreading clonally; sparsely branched, only forming long branches. *Young stems* 1.2–1.7 mm wide, completely sheathed by leaf bases, hairy; stem hairs spreading. *Leaves* unifoliate; ovate, 17–25 × 9.0–13.5 mm; base clasping stem; apex long acuminate, 1.6–3.0 mm long, flat or turned upwards with 12–23 straight teeth, 2.7–3.6 mm long; lamina 9–14-veined from base, cartilaginous, midrib slightly prominent beneath, curved downwards and away from the stem, hairy above and beneath, hairs 0.8–1.6 mm long; sheath 2.6–4.0 mm long, abaxially hairy, adaxially glabrous except for fringe of hairs at apex; stipules absent or up to 3 mm long, free, margins smooth; petiole absent. *Flowers* solitary at the bases of undifferentiated leaves; bracteoles hairy on the keel, margins clearly ciliate; sepals 3, hairy on outside. *Male flowers* with bracteoles 9.9–11.4 mm long; sepals broadly ovate, 12.3–14.0 × 4.8–6.5 mm, acute to acuminate at the apex; stamens 31–43; filaments 3.3–5.2 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 8.0–9.5 mm long, longer than immature receptacle, 3.4–4.7 × 1.0–1.4 mm, erect; carpel 1; stigma 2.1–3.2 mm long, red, feathery, hidden at the base of leaves; immature receptacle 2.1–2.4 × 1.6–1.8 mm, hairy. *Achene* not known, but probably (as for the group) medium brown, hairy or becoming glabrous; ribs rounded. *Flowering time*: March but probably at other times as well.

Habitat: Mountain fynbos on sandstone amongst boulders on steep south-facing mountain slopes; altitude 750–1250 m.

Distribution: Restricted to Bain's Kloof, between the Cossacks and Limietberg.

Conservation status: A narrow endemic only known from a few populations on either side of Bain's Kloof, between the Cossacks and Limietberg. Despite its narrow range, there are no immediate threats. Red List status: Rare.

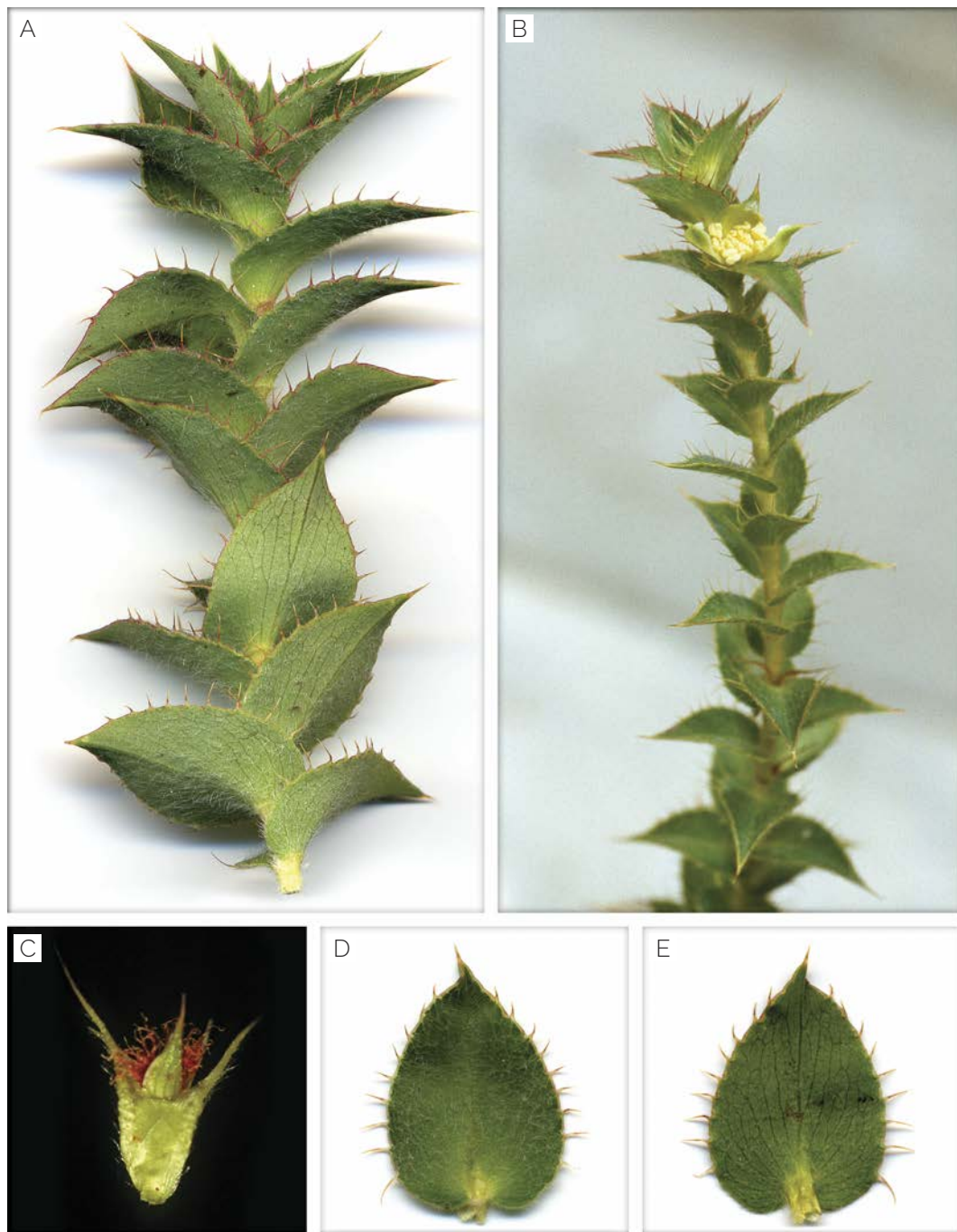
Etymology: *strigosa* (Latin) means 'covered with bristle-like hairs', usually present on almost all parts.

Notes: Clearly related to *Cliffortia virgata*, but with more ovate, narrower leaves, which are hairy all over. The stigmas in both *C. strigosa* and *C. virgata* are red, in contrast to most other species of sect. *Multinerviae*.

A plant from Silvermine Nature Reserve (part of the Table Mountain National Park) (*Whitehouse 265*) has leaves the size of *Cliffortia strigosa*, but lack the hairs of that species and thus may be *C. virgata*. However, considering that the population is out of range, it is more likely of hybrid origin. This is just one of several populations belonging to sect. *Multinerviae* on the Cape Peninsula that require resolution as to their identity. An online observation on iNaturalist (www.inaturalist.org, observation 9 498 251) from Uitkykkop, Greyton Nature Reserve, also appears to be this species but flowers were not visible and it is well outside the expected range of the species.

Representative specimens

SOUTH AFRICA. 3319 (Worcester): Limietberg, Mar. 1940, (–CA), *Esterhuysen 1627* (BOL); Limietberg, S slopes, 1065–1220 m, 2 Oct. 1958, (–CA), *Esterhuysen 27919* (BM, BOL, K, PRE); Bain's Kloof, on E side of river, between Limietberg and Observation Point, 760 m, 31 Oct. 1971, (–CA), *Esterhuysen 32725* (BOL); Paarl–Bain's Kloof Mts, Cossack's Peaks, 26 Dec. 1986, (–CA), *Esterhuysen 36445* (BOL); Bain's Kloof, S face of Limietkop, above stream, 915 m, 2 Mar. 2000, (–CA), *Whitehouse 85* (BOL, K, NBC).



Cliffortia strigosa: A, branch; B branch with male flower; C, female flower; D, dorsal view of leaf; E, ventral view of leaf.

112. **Cliffortia grandifolia** Eckl. & Zeyh., Enumeratio Plantarum Africae Australis Extratropicae 2: 266 (1836); Harv.: 295 (1862); Weim.: 113, fig. 33A–B, 33D–E (1934); Fellingham: 610 (2000) pro parte; Coates Palgrave: 248, fig. (2002) pro parte; Whitehouse: 81, fig. 8 (2004a). Lectotype, designated here: Swellendam District, Puspas valley, Oct., Ecklon & Zeyher 1722 (SAM, lecto!; B†, FI!, G, HBG!, K!, L, LD, M!, MO!, NY!, PRE, SI!, TCD!, U, W!, Z!, iso.).



Tall virgate shrub, up to 5 m high, killed by fire; sparsely branched, only forming long branches that are clustered 2–4 together at nodes. *Young stems* 2.6–3.0 mm wide, completely sheathed by leaf bases, glabrous or hairy, stem hairs adpressed upwards to spreading. *Leaves* unifoliolate; oblong to narrowly lanceolate, 43–79 × 14–25 mm; base clasping stem; apex long acuminate to pungent, 0.9–3.5 mm long; margins flat or slightly curved upwards with 18–27 straight teeth, 1.5–2.7 mm long; lamina 9–14-veined from base, cartilaginous, 0.4–0.6 mm thick, midrib slightly prominent beneath, curved downwards and away from the stem, glabrous; sheath 5.8–8.2 mm long, abaxially hairy or glabrous, adaxially glabrous except sometimes for a few hairs at the apex; stipules 5.8–10.0 mm long, free, margins smooth; petiole absent. *Flowers* solitary at the bases of undifferentiated leaves; bracteoles hairy on the keel, margins smooth; sepals 3, glabrous. *Male flowers* with bracteoles 10.8–14.2 mm long; pedicel 1.9–2.5 mm long, hairy; sepals broadly ovate, 16.5–20.0 × 8.2–12.4 mm, acute to acuminate at the apex; stamens 64–86; filaments 8.3–11.3 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 7.9–9.5 mm long, longer than immature receptacle; sepals broadly ovate to triangular, 2.3–2.8 × 0.8–1.6 mm, erect; carpel 1; stigma 2.1–3.0 mm long, greenish white, feathery, hidden at the base of leaves; immature receptacle 2.3–2.5 × 1.4–1.5 mm, becoming hairy towards the apex, smooth. *Achene* broadly ellipsoid, 4.0–5.5 × 2.4–2.9 mm, medium brown, hairy becoming glabrous; faintly 25–30-ribbed, ribs rounded, up to 0.2 mm wide. *Flowering time*: throughout the year.

Habitat: Wet mountain fynbos on south-facing sandstone and shale slopes; altitude 150–1 250 m.

Distribution: Restricted to the southern slopes of the Langeberg around Swellendam and Garcia's Pass.

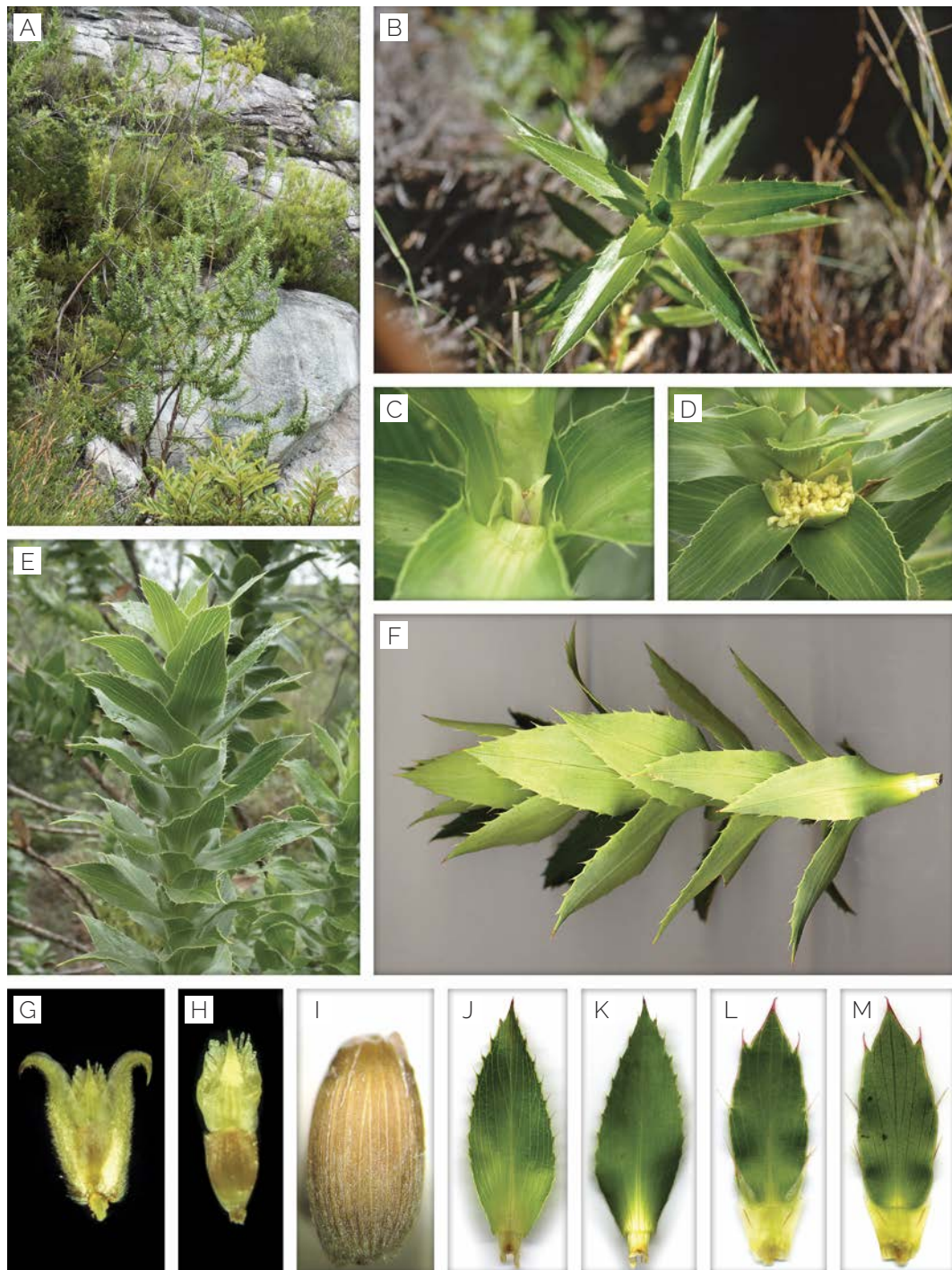
Conservation status: From a small part of the Langeberg Mountains, but quite common there; a prominent and distinctive species and unlikely to occur elsewhere. Red List status: Rare.

Etymology: *grandifolia* (Latin) means 'large-leaved', referring to the leaves, much longer than any other species of *Cliffortia*.

Common names: large-leaved cliffortia, large-leaved rice-bush; *grootblaarrysbos* (Afrikaans).

Notes: The tall spindly nature of *Cliffortia grandifolia* and the exceptionally long lanceolate leaves (43–79 mm long) make this species easy to recognise. *Cliffortia denticulata*, *C. recurvata* and *C. heterophylla* have a similar habit, but do not occur in the Langeberg and have smaller leaves. Putative hybrids have been recorded with *C. lanceolata*.

Weimarck treated *Cliffortia denticulata* and *C. recurvata* as varieties of *C. grandifolia*, but the three species are easily separable and more-or-less allopatric with each other. No intermediate forms have been found between the species, although they do form hybrids with other species that can cause confusion. Weimarck recorded *C. grandifolia* from Hottentots Holland, but the specimen (*Diels 1331*) at Berlin has probably been destroyed. It was most likely *C. denticulata* or a hybrid thereof.



Representative specimens

SOUTH AFRICA. **3320** (Montagu): Swellendam Mt, 915 m, 4 Feb. 1941, (–CD), *Bond 953* (NBC); Swellendam District (mountain peak near Swellendam ex Weimarck), 14 Jan. 1815, (–CD), *Burchell 7311* (K); Swellendam District (mountain peak near Swellendam ex Weimarck), Jan. . (–CD), *Burchell 7387* (K); Swellendam Mt., S slopes, 4 Feb. 1941, (–CD), *Esterhuysen 4820* (BOL); One o’Clock Peak, SE slopes, 610–915 m, 3 Sept. 1956, (–CD), *Esterhuysen 26281* (BOL); Swellendam State Forest, Marloth Nature Reserve, on Die Plaat, 520 m, 15 June 1971, (–CD), *Kruger 1323* (NBC, PRE); Langeberg Mts, Swellendam State Forest, Twelve o’Clock Peak, S slopes, 600 m, 15 Sept. 1988, (–CD), *McDonald 1614* (NBC, PRE); S slopes of the Langeberg above the Marloth Reserve, 520 m, 24 Jan. 1966, (–CD), *Rourke 289* (NBC, PRE); Swellendam Mts, Eleven o’Clock Peak above Swellendam, 610 m, 1 Sept. 1962, (–CD), *Taylor 3854* (NBC, PRE); Montagu, Swellendam State Forest, along trail between Wolfkloof and Forest Station, lower S slopes, 550 m, 10 Apr. 1979, (–CD), *Taylor 10070* (NBC, PRE); Swellendam Forest Reserve, path along Plaat, 395 m, 27 Jan. 1969, (–CD), *Thompson 644* (NBC, PRE); Marloth Nature Reserve, path to Twelve o’clock Peak, just above Die Plaat path, 550 m, 12 Mar. 2000, (–CD), *Whitehouse 102* (BOL, NBC). **3321** (Ladismith): Langeberg East MCA, Compartment 23A, Garcia State Forest, foothills of mountain on S slopes at Meul R, 450 m, 14 Nov. 1986, (–CC), *van der Merwe 167* (NBC, PRE). **3420** (Bredasdorp): near Swellendam, 215 m, Apr. 1887, (–AB), *Bolus 8096* (BOL, K, PRE); Swellendam, 150 m, 1 Apr. 1926, (–AB), *Smith 2724* (K, PRE); Swellendam, (–AB), *Zeyher s.n.* (K).

113. **Cliffortia denticulata** (Weim.) C.M.Whitehouse in Bothalia 34(2): 81, fig. 7–8 (2004a). *C. grandifolia* var. *denticulata* Weim.: 115, fig. 33C (1934). Lectotype, designated by Whitehouse (2004a): Franschhoek, in mountains, *Schlechter 9240* (BOL!, lecto.; B, BM, COI, G, GRA, HBG!, K!, L, P, PRE, S!, W, WAG!, Z!).



C. intermedia sensu Harv.: 295 (1862) pro parte, non Eckl. & Zeyh.

C. grandifolia sensu Bean & Johns: 192 (2005), non Eckl. & Zeyh.

A tall erect spindly shrub, up to 3.6 m high, only forming long branches and very sparsely branched, the branches clustered 2–4 together at nodes, killed by fire. *Young stems* 1.7–5.25 mm in diameter, completely sheathed by leaf bases. *Leaves* unifoliate; very broadly ovate to almost subcircular, 30–68 × 21–41 mm; base clasping stem; apex sharply long acuminate, 1.9–4.0 mm long; margins flat with 52–83 small straight teeth, 0.3–1.3 mm long; lamina 11–17-veined from base, relatively soft and chartaceous, 0.2–0.6 mm thick, curved downwards and away from the stem, glabrous above and beneath; sheath 6.0–10.8 mm long, abaxially and adaxially glabrous; stipules absent or present, 1.6–3.9 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins smooth; sepals 3; glabrous. *Male flowers* with bracteoles 14–17 mm long; pedicel 1.1–1.4 mm long, glabrous; sepals broadly ovate, 23–26 × 6.4–14.5 mm, acute to acuminate at the apex; stamens 60–133; filaments 3.5–8.0 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 6.0–9.2 mm long, longer than immature receptacle; sepals broadly ovate to triangular, 3.2–3.8 × ± 1.7 mm, erect; carpel 1; stigma ± 2.5 mm long, greenish white, feathery, hidden at the base of leaves; immature receptacle ± 3.2 × ± 2 mm, glabrous, smooth. *Achene* medium to dark brown, glabrous; ribs rounded. *Flowering time*: recorded from January and May to September, probably throughout the year.

Habitat: In damp depressions and along watercourses on well-drained soils from Table Mountain Series in full sun; altitude 350–1 350 m.

Distribution: Franschhoek to the southern Hottentots Holland Mountains around Nuweberg.

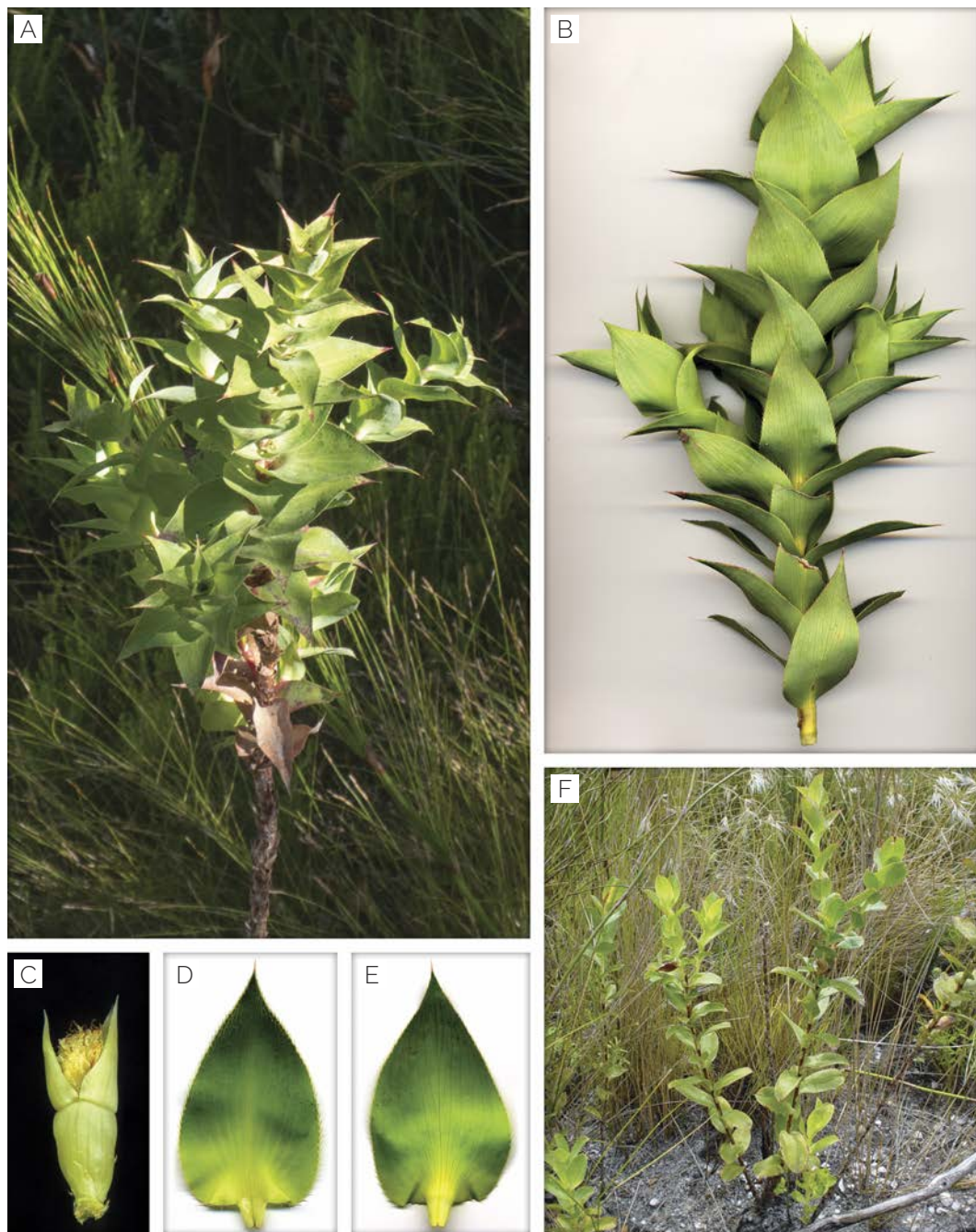
Conservation status: The species has a limited distribution, but entirely conserved within the Hottentots Holland Nature Reserve; being a reseeder it may be susceptible to local extinction caused by too frequent fires. Red List status: LC.

Etymology: *denticulata* (Latin) means 'small-toothed', for the very small teeth on the leaf margins.

Notes: The very broad clasping finely toothed leaves of *Cliffortia denticulata* most closely resemble those of *C. virgata* rather than *C. grandifolia*, within which it was included by Weimarck (1934). The two species are sympatric in the Du Toitskloof/Franschhoek area and putative hybrids have been found in the vicinity of Zachariashoek and Stettynsberg. In the field mature specimens of the two cannot be mistaken, as *C. denticulata* forms tall single-stemmed spindly virgate shrubs, while *C. virgata* forms denser multi-stemmed branching bushes.

Representative specimens

SOUTH AFRICA. **3318** (Cape Town): Jonkershoek valley, 610 m, 15 June 1958, (–DD), *Esterhuysen 27791* (BOL); Jonkershoek, Langrivier, 915 m, July 1965, (–DD), *Kerfoot 5306* (PRE); Jonkershoek valley, above Watermeyer's farm, 13 Aug. 1927, (–DD), *Pillans s.n.* (BOL). **3319** (Worcester): Franschhoek, 395 m, Sept. 1895, (–CC), *Bolus*



Cliffortia denticulata: A, habitat; B, branch; C, female flower; D, dorsal view of leaf; E, ventral view of leaf. *Cliffortia denticulata* × *ovalis*: F, habitat.

6993 (BOL, NBG, PRE); Franschhoek Pass, 460 m, 26 Mar. 1933, (–CC), *Compton 4165* (BOL); Berg R Hoek, 1 Jan. 1940, (–CC), *Compton 8320* (NBG); Franschhoek Forest Reserve, 24 Jan. 1942, (–CC), *Compton 12984* (NBG); Berg R Hoek, 19 Sept. 1946, (–CC), *Compton 18326* (NBG); Franschhoek Forest Reserve, 28 Sept. 1935, (–CC), *Esterhuysen s.n.* (BOL); top of Franschhoek Pass, 915 m, 2 May 1945, (–CC), *Esterhuysen 11594* (BOL); top of Franschhoek Pass, 735 m, 24 Jan. 1942, (–CC), *Leighton 11* (BOL); Forest Reserve S of Franschhoek, 22 Apr. 1935, (–CC), *Pillans 7619* (BOL); Franschhoek, in mountains, 915 m, 18 Nov. 1896, (–CC), *Schlechter 9240* (BM, BOL, K, PRE); Franschhoek District, Assegaiboskloof, 395 m, 16 Aug. 1962, (–CC), *van der Merwe 1202* (NBG, PRE). **3418** (Simonstown): Somerset Sneeuwkop, Deepgat Ravine, 1220 m, 13 Dec. 1942, (–BB), *Esterhuysen s.n.* (NBG); Hottentots Holland Mts, E slopes of Somerset Sneeuwkop, 915–1065 m, Dec. 1939, (–BB), *Esterhuysen 1995* (BOL); Somerset Sneeuwkop, 1220 m, 13 Dec. 1942, (–BB), *Esterhuysen 8244* (BOL); Hottentots Holland, Langkloofberg, SE slopes, 915–1220 m, 30 Oct. 1943, (–BB), *Esterhuysen 9148* (BOL); Hottentots Holland Mts, N of Somerset Sneeuwkop, 915 m, 3 Jan. 1944, (–BB), *Esterhuysen 9717* (BOL); SE slopes at head of Jonkershoek valley, 1065 m, 10 Apr. 1949, (–BB), *Esterhuysen 15252* (BOL, NBG, PRE); Strand, Valleiberg, SE aspect, 1340 m, 20 May 1969, (–BB), *Haynes 51* (NBG, PRE); in small upland valley on E side of Somerset West Triplets, on Swartboskloof Trail, 1130 m, 6 Mar. 1999, (–BB), *Whitehouse 19* (BOL, NBG). **3419** (Caledon): Elgin, mountains W of Palmiet R, 25 Apr. 1943, (–AA), *Leighton 462* (BOL); Nuweberg Forest Reserve, banks of upper Palmiet R, above Boegoekloof Trail, 700 m, 25 Jan. 2003, (–AA), *Whitehouse 341* (BOL).

114. **Cliffortia recurvata** (Weim.) C.M.Whitehouse in Bothalia 34(2): 82, fig. 8–9 (2004a). *C. grandifolia* Eckl. & Zeyh. var. *recurvata* Weim.: 115, fig. 33F (1934). Lectotype, designated by Whitehouse (2004a): mountains E of Steenbras valley, Feb. 1921, *Stokoe s.n.* (BOL!, lecto.).



Tall erect spindly shrub, up to 3.6 m high, only forming long branches and very sparsely branched, the branches clustered 2–4 together at a node, killed by fire. *Young stems* 3.4–4.3 mm wide, completely sheathed by leaf bases, but with upwardly adpressed hairs visible on young growth. *Leaves* unifoliate; lanceolate to narrowly ovate, 64–74 × 20–27 mm; base clasping stem; apex pungent, 2.6–4.0 mm long; margins flat, with 90–109 small straight teeth, 1.4–2.3 mm long, whole leaf often strongly keeled; lamina 13–18-veined from base, chartaceous to tough, 0.25–0.50 mm thick, strongly curved downwards and away from the stem forming almost a semi-circle, glabrous above and beneath; sheath 5.2–6.7 mm long, abaxially glabrous, adaxially with scattered adpressed hairs but without a fringe of hairs at the apex; stipules 0.9–1.4 mm long, sometimes absent, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins smooth; sepals 3, glabrous. *Male flowers* with bracteoles 15–16 mm long; pedicel 2.1–2.4 mm long, hairy; sepals broadly ovate, 19–21 × 7.2–11.0 mm, acute to acuminate at the apex; stamens 75–120; filaments 6.8–9.8 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 10.5–11.3 mm long, longer than immature receptacle; sepals ± triangular, 3.2–4.6 × 0.9–1.8 mm, erect; carpel 1; stigma 2–3 mm long, greenish white, feathery, hidden at the base of leaves; immature receptacle 3.4–3.9 × 2.7–3.0 mm, hairy towards the base, smooth. *Achene* ± 8.1 × ± 4.8 mm, medium to dark brown, glabrous; ribs rounded. *Flowering time*: November to April.

Habitat: In damp depressions and beside watercourses on well-drained soils from Table Mountain Series in full sun; altitude 300–800 m.

Distribution: Confined to the Kogelberg Mountains between the Steenbras valley and Palmiet River.

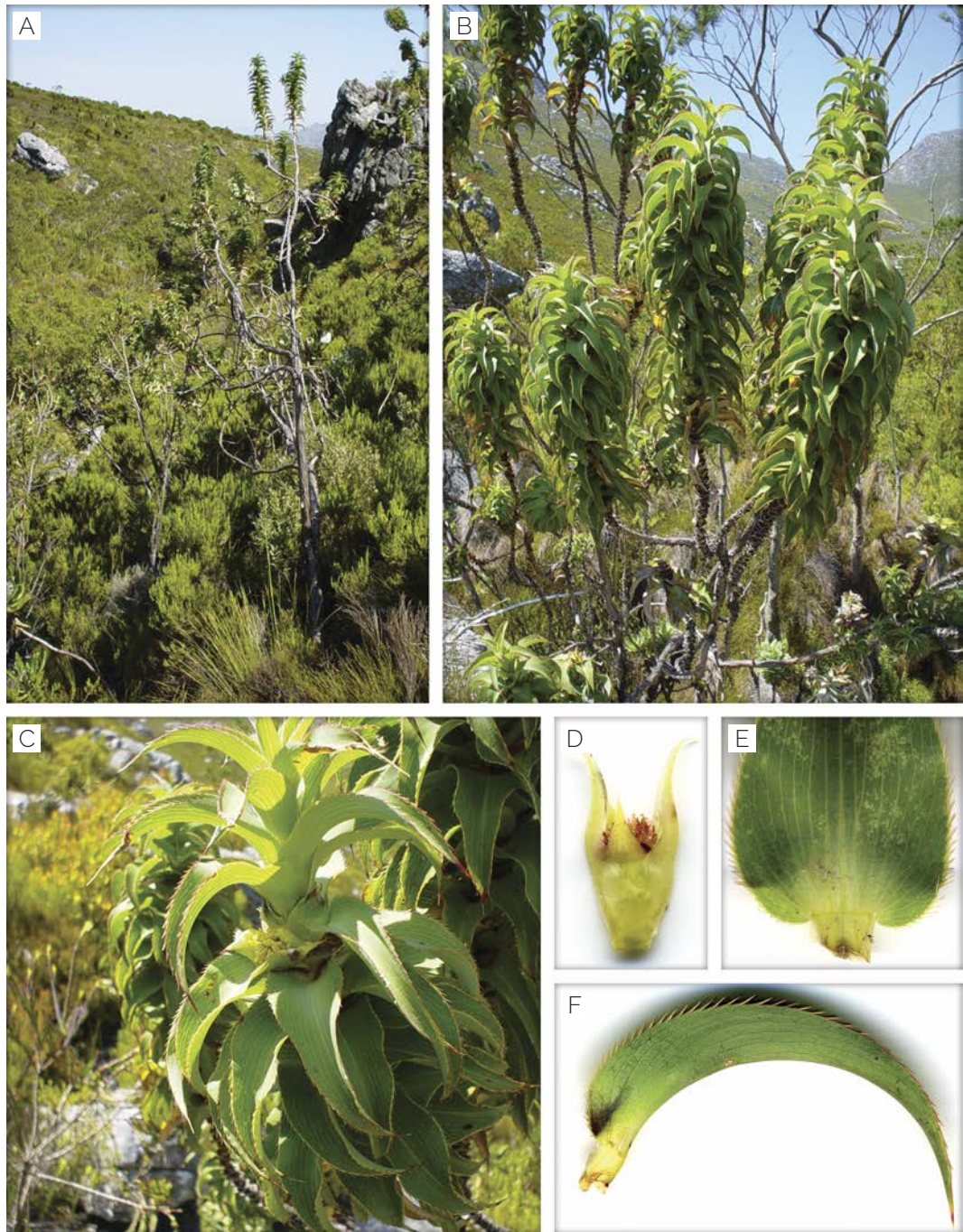
Conservation status: Known only from the middle slopes of the Kogelberg and restricted to a very particular habitat where it is uncommon; being a reseeder it is vulnerable to too frequent fire regimes; however, it is conserved entirely within the Kogelberg Biosphere Reserve. Red List status: VU.

Etymology: *recurvata* (Latin) means ‘curved backwards’, referring to the leaves that are strikingly curved almost into a semicircle.

Notes: The rarest of the three taxa previously included in *Cliffortia grandifolia* by Weimarck (1934) and others. *Cliffortia recurvata* is recognised by the long, strongly recurved leaves, usually clustered towards the top of the spindly branches of this tall wiry shrub. Although *C. grandifolia* is similar in habit, its leaves are more-or-less ascending to straight, only slightly recurved at the tip. *Cliffortia denticulata* has broader, shorter ovate leaves.

Representative specimens

SOUTH AFRICA. **3418** (Simonstown): Kogelberg, 610 m, 17 Nov. 1944, (–BB), *Barker 3325* (NBG); Kogelberg, 760 m, 1 Jan. 1945, (–BB), *Compton 16868* (NBG); Kogelberg, E side, 610 m, 17 Nov. 1944, (–BB), *Leighton 759* (BOL); Steenbras area, 305 m, 1 May 1948, (–BB), *Levy 8858* (BOL); Steenbras Forest Reserve, slopes of Kogelberg above Steenbras Dam, 21 Apr. 2001, (–BB), *Linder in Whitehouse 216* (BOL); mountains E of Steenbras valley, Feb. 1921, (–BB), *Stokoe s.n.* (BOL); Steenbras Forest Reserve, NW slopes of Kogelberg, where jeep track crosses main valley from Kogelberg, 700 m, 26 Feb. 2003, (–BB), *Whitehouse 352* (BOL, K, NBG); Kogelberg Forest Reserve, E slopes of Spinnekopnes Mt., 440 m, 1 May 1970, (–BD), *Boucher 1258* (NBG, PRE); SE of Kogelberg, 760–1065 m, Oct. 1939, (–BD), *Stokoe 7261* (BOL). **3419** (Caledon): Elgin, 24 Apr. 1943, (–AA), *Compton 14491* (NBG).



Cliffortia recurvata: A & B, habitat; C, male branch; D, female flower; E & F, leaf.

115. **Cliffortia heterophylla** Weim. in Botaniska Notiser 1933: 158, 8a (1933) & 112, fig. 32D–G (1934); Fellingham: 610 (2000); Fellingham & Linder: 179, fig. 7–8 (2003); Bean & Johns: 192 (2005). Type: Caledon District, Hangklip, Palmiet R, kloof near whaling station, Apr. 1922, *Stokoe 405* (SAM, holo.!; BOLI, PRE, iso.).



Tall virgate shrub, up to 4.5 m high, killed by fire; only forming long branches and very sparsely branched, the branches clustered 2–4 together at a node. *Young stems* 1.7–2.2 mm wide, completely sheathed by leaf bases, glabrous. *Leaves* unifoliate; vegetative leaves narrowly oblong to lanceolate, 50–77 × 5.1–9.5 mm; female inflorescence leaves broadly ovate, 32–35 × 18–19 mm; apex long acuminate, 0.6–1.8 mm long; margins flat with 23–37 straight teeth, 0.3–1.3 mm long; lamina 4–8-veined from base, chartaceous, 0.2–0.5 mm thick, midrib prominent beneath, ± straight or slightly curved upwards, glabrous; sheath 2.8–8.6 mm long, abaxially glabrous except for fringe of hairs at insertion of leaflet, adaxially glabrous except for fringe of hairs at apex; stipules absent on female inflorescence leaves, vegetative leaves 11.3–21.0 mm long, free, margins smooth; petiole absent. *Flowers* with female flowers gathered in distinct inflorescence structures, male flowers scattered over rest of plant; bracteoles hairy on the keel, margins smooth; sepals 3, glabrous. *Male flowers* with bracteoles 5.4–7.3 mm long; pedicel 1.0–1.4 mm long; sepals broadly ovate, 11.7–14.5 × 6.2–9.4 mm, acute to acuminate at the apex; stamens 56–82; filaments 9.0–13.3 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 6.8–8.9 mm long, longer than immature receptacle; sepals broadly ovate to triangular; 1.9–2.9 × 0.8–1.6 mm, erect; carpel 1; stigma 1.2–2.5 mm long, greenish white, feathery, hidden at the base of leaves; immature receptacle 2.3–2.6 × 1.3–1.6 mm, hairy, smooth. *Achene* ellipsoid, 4.5–5.5 × 2.0–2.8 mm, medium brown, glabrous; 22–24-ribbed, ribs rounded, up to 0.2 mm wide. *Flowering time*: throughout the year.

Habitat: Damp gulleys and streambanks in fynbos on south-facing sandstone slopes; altitude 0–800 m.

Distribution: Restricted to the southern slopes of the Kogelberg Reserve between Hangklip and Kleinmond.

Conservation status: Very restricted in distribution, but protected within a biosphere reserve. Being a reseeders it is vulnerable to too frequent fires. Red List status: Rare.

Etymology: *heterophylla* (Greek) means ‘having leaves of more than one form’, referring to leaves around the female flowers being markedly different from those on the rest of the plant.

Notes: A distinctive species, mature plants having the diagnostic female inflorescence with its broader, shorter leaves forming an almost cylindrical structure at the apex of the shoot; the male flowers are found amongst the ordinary long lanceolate leaves. The female sections of the branches are similar in structure to *Cliffortia denticulata*, but the male and vegetative sections which are always present prevent any confusion. Younger specimens appear similar to the large-leaved tall and spindly *C. grandifolia* or sympatric *C. recurvata* or *C. prionota*. Putative hybrids between this species and *C. prionota* have been recorded.

Representative specimens

SOUTH AFRICA. 3418 (Simonstown): Betty’s Bay, Harold Porter Nature Reserve, near Disakloof bridge, 50 m, 30 Aug. 1994, (–BD), *Behr sub Fellingham 1638* (NBC); Kogelberg Forest Reserve, above Oudebos, 305 m, 20 Dec. 1968, (–BD), *Boucher 209* (K, NBC, PRE); Hangklip gorge, 4 Sept. 1942, (–BD), *Compton 13541* (NBC, PRE); Betty’s Bay, foot

of Waterkloof, 3 Dec. 1950, (–BD), *Compton 22308* (NBC); mountain N of Palmietstrand, 16 Aug. 1947, (–BD), *de Vos 624* (NBC); Betty's Bay, Harold Porter Botanic Garden, 29 July 1968, (–BD), *Ebersoha 15/68* (NBC); S slopes of mountains behind Betty's Bay, 460–610 m, 28 Jan. 1947, (–BD), *Esterhuysen 13677* (BOL); S slopes of mountains near Palmiet R mouth, 25 Jan. 1947, (–BD), *Esterhuysen 13705* (BOL, K, PRE); Hottentots Holland Mts, Louwsbos near Rooiels, 245–305 m, 30 Apr. 1961, (–BD), *Esterhuysen 29003* (BM, BOL, NBC, PRE); Betty's Bay, Harold Porter Nature Reserve, near Disakloof bridge, 50 m, 10 Sept. 1994, (–BD), *Fellingham 1640* (NBC); Betty's Bay, Harold Porter Nature Reserve, near Disakloof bridge, 50 m, 3 Jan. 1995, (–BD), *Fellingham 1647* (NBC); Betty's Bay, Harold Porter Nature Reserve, near Disakloof bridge, 50 m, 3 Jan. 1995, (–BD), *Fellingham 1648* (NBC); Betty's Bay, Harold Porter Nature Reserve, near Disakloof bridge, 50 m, 16 Jan. 1995, (–BD), *Fellingham 1649* (NBC); Betty's Bay, Harold Porter Nature Reserve, near Disakloof bridge, 50 m, 16 Jan. 1995, (–BD), *Fellingham 1650* (NBC); Betty's Bay, Harold Porter Nature Reserve, near Disakloof bridge, 50 m, 16 Jan. 1995, (–BD), *Fellingham 1651* (NBC); Betty's Bay, Harold Porter Nature Reserve, near Disakloof bridge, 50 m, 16 Jan. 1995, (–BD), *Fellingham 1652* (NBC); Betty's Bay, Harold Porter Nature Reserve, near Disakloof bridge, 50 m, 10 Feb. 1995, (–BD), *Fellingham 1654* (NBC); Betty's Bay, Harold Porter Nature Reserve, near Disakloof bridge, 50 m, 10 Feb. 1995, (–BD), *Fellingham 1655* (NBC); Betty's Bay, Harold Porter Nature Reserve, near Disakloof bridge, 50 m, 10 Feb. 1995, (–BD), *Fellingham 1656* (NBC); Betty's Bay, Harold Porter Nature Reserve, near Disakloof bridge, 50 m, 10 Feb. 1995, (–BD), *Fellingham 1657* (NBC); Betty's Bay, Harold Porter Nature Reserve, near Disakloof bridge, 50 m, 10 Feb. 1995, (–BD), *Fellingham 1658* (NBC); Betty's Bay, Harold Porter Nature Reserve, near Disakloof bridge, 50 m, 24 Feb. 1995, (–BD), *Fellingham 1663* (NBC); Betty's Bay, Harold Porter Nature Reserve, near Disakloof bridge, 50 m, 10 Feb. 1995, (–BD), *Fellingham 1668* (NBC); Betty's Bay, Harold Porter Nature Reserve, near Disakloof bridge, 50 m, 22 June 1995, (–BD), *Fellingham 1673* (NBC); Betty's Bay, Harold Porter Nature Reserve, near Disakloof bridge, 50 m, 22 June 1995, (–BD), *Fellingham 1675* (NBC); Betty's Bay, Harold Porter Nature Reserve, near Disakloof bridge, 50 m, 22 June 1995, (–BD), *Fellingham 1677* (NBC); Simonstown, Kogelberg Forest Reserve, Dwars R valley, slopes above river, 26 Jan. 1982, (–BD), *Goldblatt 6460* (PRE); Hangklip Estate, kloof, 4 Sept. 1942, (–BD), *Leighton 13* (BOL); Palmiet R mouth, just below waterfall, 365 m, 29 Sept. 1945, (–BD), *Levyyns 7789* (BOL); Hangklip Estates, kloof behind Cascades, 7 Feb. 1944, (–BD), *Levyyns 8095* (BOL); Betty's Bay, Porter Reserve, 6 June 1967, (–BD), *McMurtry 209* (PRE); Betty's Bay, Cascades, 29 May 1952, (–BD), *Parker 4738* (K, NBC, PRE); Palmiet R Mts, above Hangklip Estate, Jan. 1947, (–BD), *Stokoe SAM 61486* (NBC, PRE, PRE); Palmiet R, from kloof near whaling station, Hangklip, Apr. 1922, (–BD), *Stokoe 405* (BOL); Hangklip, Dwars Kloof, 0 m, 24 June 1922, (–BD), *Stokoe 436* (PRE); SE of Kogelberg, 760–1065 m, Oct. 1939, (–BD), *Stokoe 7264* (BOL, K); Kogelberg, Oudebos, foot of mountain, 29 Mar. 1970, (–BD), *Theron & van der Schijff 2221* (PRE); Betty's Bay, Harold Porter Botanic Garden, Disakloof, 19 Oct. 1961, (–BD), *Tymens 1* (NBC); Betty's Bay, 6 Feb. 1962, (–BD), *van der Merwe 847* (NBC, PRE). **3419** (Caledon): Kleinmond Kloof, S slopes, Region A, 19 Feb. 1949, (–AC), *de Vos 1213* (NBC, PRE); Kogelberg Reserve, Paardeberg (seaward side), 30 m, 15 Aug. 1962, (–AC), *Grobler 20181* (K, NBC, PRE); Kleinmond, kloof running up behind Abattoirs, 185 m, 29 Sept. 1945, (–AC), *Levyyns 7795* (BOL); Kleinmond, in kloof, 100 m, Apr. 1930, (–AC), *Marloth 14106* (NBC, PRE); Kleinmond, Aug. 1949, (–AC), *Stokoe SAM 59988* (NBC, PRE, PRE); Paardeberg, near Palmiet R mouth, Dec. 1943, (–AC), *Stokoe 9048* (BOL); hills behind Kleinmond from Fairy Glen, gully beneath Tweelingpieke, 300 m, 21 July 1999, (–AC), *Whitehouse 45* (BOL, NBC).



116. **Cliffortia phillipsii** Weim. in Botaniska Notiser 1933: 160, fig. gd–e (1933) & 131, fig. 37M–R (1934); Fellingham: 610 (2000); Bean & Johns: 192 (2005). Type: Franschhoek, 460 m, Oct. 1913, *Phillips 1388* (SAM, holo!).



Tall erect narrow shrub, up to 4 m high, killed by fire; forming a single main stem with short determinate length side branches, forming brachyblasts. *Young stems* 2.2–4.4 mm wide, sometimes tinged reddish, completely sheathed by leaf bases, usually hairy; stem hairs adpressed upwards, 0.3–0.9 mm long. *Leaves* unifoliate; oblong to lanceolate or obovate, 25–43 × 6.6–14.0 mm; apex pungent, 0.9–2.4 mm long; margins flat, markedly toothed with 2–6 broad teeth, 2.2–5.6 mm long; lamina 3–5-veined from base, cartilaginous, 0.2–0.6 mm thick, midrib slightly prominent beneath, curved downwards and away from the stem, glabrous or with a few hairs along the midrib, hairs 0.3–1.5 mm long; sheath 3.5–9.2 mm long, abaxially hairy or rarely glabrous, adaxially glabrous except for fringe of hairs at apex; stipules similar in texture to lamina, 3.5–8.7 mm long, free, margins smooth; petiole absent. *Flowers* solitary at bases of undifferentiated leaves; bracteoles glabrous, margins smooth; sepals 3, glabrous. *Male flowers* with bracteoles 7.3–12.3 mm long; pedicel 1.4–2.2 mm long; sepals broadly ovate, 9.7–14.0 × 4.4–6.4 mm, acute to acuminate at the apex; stamens 48–73; filaments 8.5–12.0 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 9.7–15.0 mm long, longer than immature receptacle; sepals broadly ovate to triangular, 4.9–8.1 × 1.3–2.4 mm, erect; carpel 1; stigma 5.8–8.0 mm long, red, feathery, hidden at the base of leaves; immature receptacle 2.5–4.3 × 1.3–2.6 mm, hairy, clearly ribbed. *Achene* broadly ellipsoid, 8.8–9.3 × 6.0–6.7 mm, medium brown, hairy; 25–29-ribbed, ribs rounded, 0.3–0.5 mm wide. *Flowering time*: throughout the year.

Habitat: Fynbos on lower mountain slope on well-drained clayish shale; altitude 150–600(–900) m.

Distribution: Only known from a few localities from Franschhoek to Helderberg Nature Reserve, previously recorded from Klapmuts near Paarl.

Conservation status: Only known now from four or five localities and grows on lower clay slopes which are often threatened. Fortunately, most of its current sites are protected within nature reserves. Threats include too frequent fires and invasive alien plants. Red List status: VU.

Etymology: Named after E.P. Phillips.

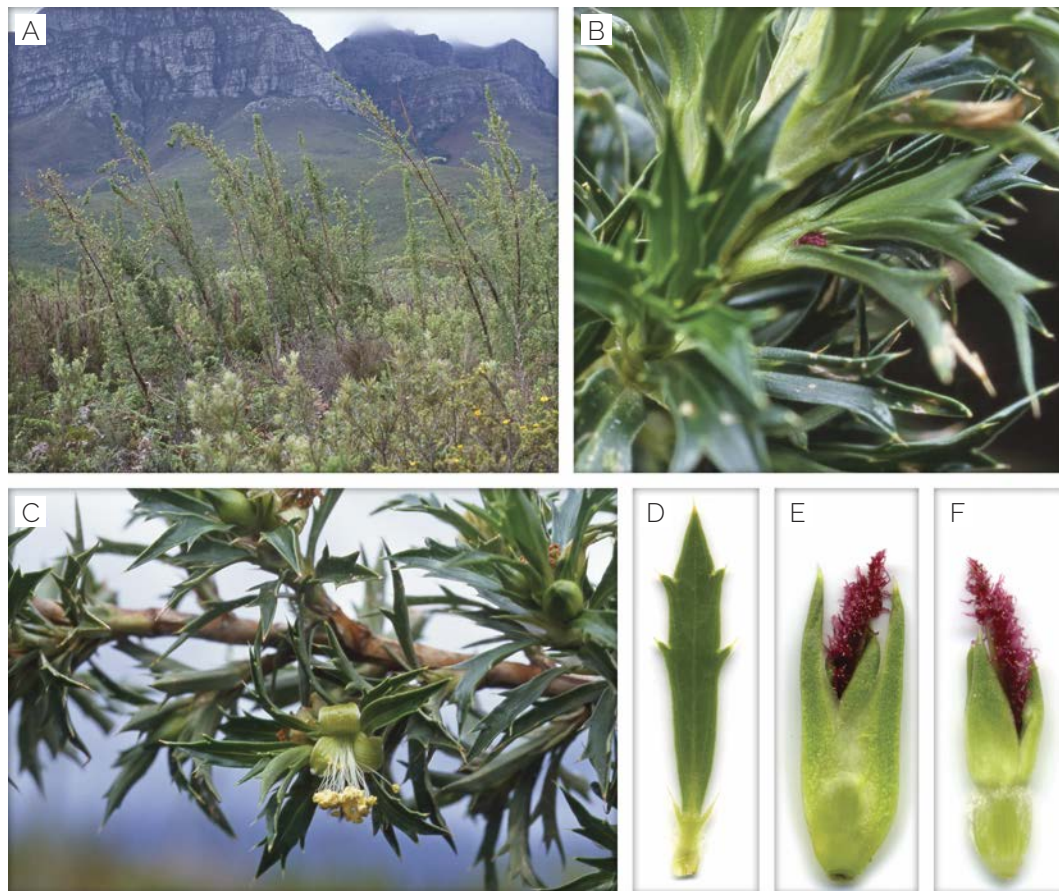
Notes: An extraordinary species growing up to 4 m tall as a tall thin shrub with a single main unbranched stem and only short determinate side branches; along with the deeply incised leaves, this species is unmistakable. Weimarck placed the species in his sect. *Simplices* on account of the leaves with a single vein. However, the leaves are tough, leathery and spiny, pointing to closer affinities with sect. *Multinerviae*. The most similar species is *Cliffortia dregeana* var. *spinosissima*, but that taxon never reaches the size of *C. phillipsii*. The stigma of *C. phillipsii* is red and the achenes are densely hairy, both unusual in sect. *Multinerviae*, and emphasise how distinct the species is.

Weimarck placed *Cliffortia phillipsii* close to *C. cuneata*, but apart from both being very unusual species, they share little in common. Notably, Weimarck (1934) considered one specimen of *Ecklon & Zeyher 1728* (S) from near Klapmuts, between Stellenbosch and Paarl, represented a hybrid between the two species. This suggestion is very likely as most of the collections under that number have glabrous rather than shortly hairy receptacles.

Representative specimens

SOUTH AFRICA. **3318** (Cape Town): Jonkershoek, 305 m, 7 Sept. 1951, (–DD), *Acocks 16103* (K, PRE); Stellenbosch, Jonkershoek valley, Langrivier near the main gauge, 300 m, 20 Aug. 1963, (–DD), *Bos 453* (K, NBG, PRE); Jonkershoek,

Langrivier, 610 m, Aug. 1965, (–DD), *Kerfoot 5385* (NBG); Jonkershoek, near Langrivier, 305 m, 16 July 1940, (–DD), *Levyms 7285* (BOL); Jonkershoek, Langrivier, 14 Dec. 1957, (–DD), *Rycroft 2095* (NBG); Jonkershoek, Sept. 1946, (–DD), *Schoeman 8* (NBG); Jonkershoek, Jakkalsvlei R terrace, 365 m, 6 Oct. 1966, (–DD), *Taylor 6927* (NBG, PRE); Swartboskloof, 9 Feb. 1962, (–DD), *van der Merwe 843* (NBG); Jonkershoek Nature Reserve, N loop of Panorama Trail, slopes at start of trail, 380 m, 9 Aug. 2001, (–DD), *Whitehouse 244* (BOL). **3319** (Worcester): Franschhoek, at foot of mountain, 365 m, Sept. 1895, (–CC), *Bolus 6982* (BOL, K, NBG, PRE, Z); towards head of Franschhoek valley, 4 Aug. 1947, (–CC), *Esterhuysen 13922* (BOL); Franschhoek, 460 m, Oct. 1913, (–CC), *Phillips 1388* (K, SAM). **3418** (Simonstown): Helderberg, lower slopes, 25 Dec. 1941, (–BB), *Esterhuysen 7671* (BOL); Hottentots Holland Mts, at foot of Kaatjies Kloof, 6 Aug. 1950, (–BB), *Esterhuysen 17404* (BOL, PRE); Jonkershoek State Forest, upper Eerste R valley, near 2nd Waterfall path, 425 m, 7 Sept. 1972, (–BB), *Haynes 693* (NBG, PRE); Somerset West, Vergelegen Estate, below Verkykskop on jeeptrack, 400 m, 5 Feb. 1997, (–BB), *Helme 1241* (NBG); Sir Lowry's Pass, 275 m, 4 Sept. 1932, (–BB), *Levyms 3918* (BOL); Helderberg, 450 m, 6 Nov. 1942, (–BB), *Parker 3753* (BOL, K, NBG); Helderberg Nature Reserve, on lower slopes of Helderberg, in valley just above garden, 200 m, 1 Oct. 2000, (–BB), *Whitehouse 148* (BOL, NBG). **3419** (Caledon): Genadendal Mission Station, Mar. 1935, (–BA), *Berg STE 19875* (NBG).



Clifortia phillipsii: A, habitat; B, branch with female flower; C, branch with male flower; D, leaf; E & F, female flower.

117. **Cliffortia lanceolata** Weim. in Botaniska Notiser 1933: 157, fig. 8e (1933) & 119, fig. 34A–D (1934); Fellingham: 610 (2000). Type: Swellendam District, Zuurbraak Mt, 610 m, 12 Oct. 1897, Galpin 3997 (PRE, holo.; GRA, K!, iso.).



Medium erect shrub, up to 1.2 m high, resprouting after fire and spreading clonally; densely divaricately branched, only forming long branches. *Young stems* 1.2–2.1 mm wide, completely sheathed by leaf bases, glabrous. *Leaves* unifoliate; narrowly oblong to lanceolate, 22–32 × 3.2–6.4 mm; apex long acuminate, 1.2–2.4 mm long; margins flat, smooth or with 9–24 straight teeth, 1.4–1.8 mm long, straight; lamina 6–10-veined from base, chartaceous, 0.2–0.4 mm thick, midrib slightly prominent beneath, curved upwards and towards the stem to straight, glabrous or occasionally a few hairs above, glabrous beneath; sheath 3.7–4.7 mm long, abaxially hairy or glabrous, adaxially glabrous except for fringe of hairs at apex; stipules 6.8–9.0 mm long, free, margins ciliate; petiole absent. *Flowers* solitary at the bases of undifferentiated leaves; bracteoles hairy on the keel, margins smooth; sepals 3, glabrous. *Male flowers* with bracteoles 5.4–6.6 mm long; pedicel 1.1–1.6 mm long; sepals broadly ovate, 5.8–9.1 × 2.8–4.5 mm, acute to acuminate at the apex; stamens 15–28; filaments 3.8–6.2 mm long, greenish white; anthers yellow, anther connective hairy. *Female flowers* with bracteoles 6.5–7.0 mm long, longer than immature receptacle; sepals broadly ovate to triangular, 2.3–2.8 × 1.0–1.3 mm, erect; carpel 1; stigma ± 1.6 mm long, greenish white, feathery, hidden at the base of leaves; immature receptacle 1.4–1.7 × 1.1–1.3 mm, hairy towards the apex, smooth. *Achene* probably medium brown, glabrous or with a few hairs; ribs rounded. *Flowering time*: September to May.

Habitat: Wet mountain fynbos on south-facing sandstone and shale slopes; altitude 250–1 300 m.

Distribution: Langeberg Mountains between Leeurivierberg and Suurbraak, with an outlying population near Garcia's Pass.

Conservation status: Relatively localised in the Langeberg Mountains, but quite common there; also occurring further east towards Garcia's Pass. Red List status: Rare.

Etymology: *lanceolata* (Latin) means 'lanceolate or lance-shaped', referring to the shape of the leaves.

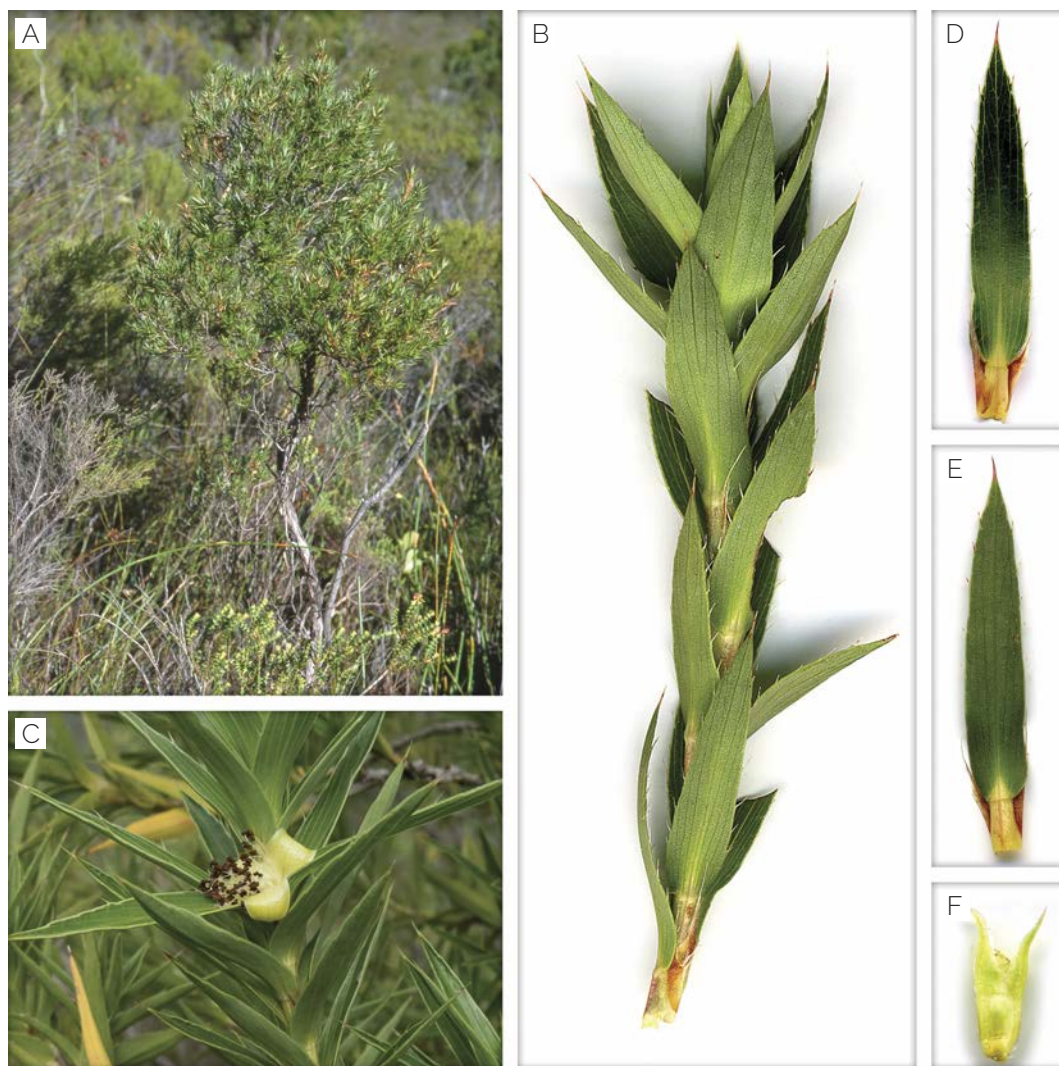
Notes: The lanceolate toothed leaves of *Cliffortia lanceolata* are not particularly distinctive. However, within its range it is the commonest species with such leaves and habit (*C. grandifolia* is sympatric, but the leaves are much larger, as is the whole plant). It could be confused with *C. dregeana*, which has also been found in a small area on the northern slopes of the Langeberg. *Cliffortia dregeana* has much tougher leaves, with upturned margins, and no hairs on the stipules. The diagnostic character for *C. lanceolata* is the small hairs present at the connective between the anther and the filament in the male flowers (only the unrelated *C. acutifolia* also has similar hairy connectives). A hand lens is probably needed to see them clearly. *Cliffortia lanceolata* appears to hybridise with *C. grandifolia*, and various forms of *C. lanceolata* can be found that may represent different levels of introgression.

A curious feature of *Cliffortia lanceolata* is the almost complete absence of female flowers or achenes in herbarium specimens. Casual searching of populations has revealed an abundance of male flowers with only a rare female flower. This may be a seasonal characteristic of the plant and at certain times of the year female flowers will be found. However, it is a very odd strategy for any plant. Fortunately, it is a resprouter and spreads clonally, so only needs to occasionally regenerate by seed.

Representative specimens

SOUTH AFRICA. 3320 (Montagu): Swellendam District (mountain peak near Swellendam ex Weimarck), Jan. , (–CD), Burchell 7318 (K); Swellendam District (mountain peak near Swellendam ex Weimarck), Jan. , (–CD), Burchell

7379 (K); Leeurivierberg, S slopes, 2 Sept. 1958, (–CD), *Esterhuysen s.n.* (BOL); Leeurivierberg, N slopes, 2 Aug. 1955, (–CD), *Esterhuysen 24452* (BOL); Marloth Nature Reserve, path to Twelve o'clock Peak, just above Die Plaat path, 550 m, 12 Mar. 2000, (–CD), *Whitehouse 101* (BOL, NBG); Ten o'clock Mt., 1280 m, 21 Nov. 1952, (–CD), *Wurts 503* (BOL, NBG); Ten o'clock Mt., 1280 m, 14 Jan. 1953, (–CD), *Wurts 504* (BOL, NBG); Swellendam, Zuurbraak Mt., 610 m, 1897, (–DC), *Galpin 3997* (K, PRE); Swellendam Mts, Nine o'clock Peak above Swellendam, S slopes, 460 m, 6 Nov. 1962, (–DC), *Taylor 4244* (NBG, PRE). **3420** (Bredasdorp): Zuurbraak, 1930, (–BA), *Thode 2323* (NBG, PRE). **3421** (Riversdale): Riversdale, S slopes of Langeberg Mts at Garcia Forest Station, 19 May 1950, (–AA), *Esterhuysen 17008* (BOL).



Cliffortia lanceolata: A, habitat; B, branch with female flower; C, branch with male flower; D, dorsal view of leaf; E, ventral view of leaf; F, female flower.

118. **Cliffortia prionota** C.M.Whitehouse in Bothalia 34(2): 83, fig. 4D, 10A–B, 11 (2004a). Type: Caledon District, Kogelberg Nature Reserve, Kogelberg Trail near where it joins jeep track in upper reaches of Louws R valley, 300 m, 10 Oct. 2001, Whitehouse 274 (BOL!, holo.).



Medium to tall erect shrub, up to 2.5 m high, resprouting after fire and spreading clonally, only forming long branches. *Young stems* 1.8–2.8 mm wide, completely sheathed by leaf bases. *Leaves* unifoliate; narrowly oblong to lanceolate, 26–49 × 4.6–8.5 mm; apex sharply long acuminate to pungent, 1.8–3.6 mm long; margins flat or rounded, entire or with 9–42 straight teeth, 0.8–1.8 mm long; lamina 5–10-veined from base, chartaceous to rigid, 0.3–0.5 mm thick, held straight or curved upwards and towards the stem, glabrous; sheath 3.9–5.5 mm long, abaxially and adaxially glabrous; stipules 3.8–6.2 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy or not on the keel, margins smooth; sepals 3; glabrous. *Male flowers* with bracteoles 6.8–8.7 mm long; pedicel 1.3–1.6 mm long; sepals broadly ovate, 11.5–13.5 × 4.6–7.2 mm, acute to acuminate at the apex; stamens 40–50; filaments 6.2–9.7 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 6.4–8.4 mm long, longer than immature receptacle; sepals broadly ovate to triangular, 2.5–3.5 × 0.7–1.5 mm, erect; carpel 1; stigma 2.4–3.3 mm long, greenish white, feathery, hidden at base of leaves; immature receptacle 2.4–3.2 × 1.7–2.3 mm, glabrous, smooth. *Achene* medium to dark brown, glabrous; ribs rounded. *Flowering time*: September to April.

Habitat: In clayish soil on shale bands of Table Mountain Series rocks in full sun, in well-drained soils or along the edge of damp gulleys; altitude 50–350 m.

Distribution: Restricted to the lower mountain slopes of the Palmiet River valley and the slopes near Kleinmond.

Conservation status: Endemic to a small area and uncommon there, forming scattered clonal colonies. Populations near Kleinmond may be threatened by urban expansion but the majority of the populations are protected within the core region of the Kogelberg Biosphere Reserve; being a resprouter it is not particularly threatened by unnatural fire regimes. Red List status: Rare.

Etymology: *prionota* (Greek) means 'like a saw', referring to the leaves, which normally have fine teeth along the margins; it also alludes to the distribution in the Palmiet River area, with *palmiet* (Afrikaans) the common name for the plant *Prionium serratum*.

Notes: Specimens of *Cliffortia prionota* have in the past been identified as *C. intermedia*, but the species bears a closer resemblance to the Langeberg endemic *C. lanceolata*. It lacks the hairs on the anthers that are diagnostic for that species. *Cliffortia prionota* has a very narrow range, being endemic to the Kogelberg, and for that area the long narrowly lanceolate leaves on a clonally spreading erect shrub prevent confusion with any other species. The species is, however, comparatively variable, ranging from leaves that are tough, rigid and entire to those that are relatively soft and flexible and bearing numerous small teeth. This degree of variation may be the result of introgression with other species, such as the sympatric *C. heterophylla* (e.g. Levyns 7042). The similarity in niche differentiation between



C. heterophylla and *C. prionota* in comparison to *C. grandifolia* and *C. lanceolata* is striking. Both pairs comprise of sympatric species with the same contrast in growth forms.

Representative specimens

SOUTH AFRICA. **3418** (Simonstown): Kogelberg, 915 m, 1 Mar. 1947, (–BB), *Compton 19402* (NBG); Kogelberg Forest Reserve, E slopes of Spinnepkopnes Mt. range, N boundary of survey area, 440 m, 1 May 1970, (–BD), *Boucher 1258* (K, PRE); Palmiet R, 305 m, 8 Nov. 1942, (–BD), *Compton 14119* (NBG); mountains near Palmiet R mouth, 21 Jan. 1946, (–BD), *Esterhuysen 12561* (BOL); Kogelberg State Forest, c. 100 m from Dwars R bridge, left of road to Highlands, 50 m, 22 Sept. 1992, (–BD), *Kruger 801* (NBG); Palmiet R mouth, 305 m, 18 Feb. 1939, (–BD), *Levyys 7042* (BOL); mountains near Palmiet R, 305 m, 28 Apr. 1922, (–BD), *Stokoe 407* (NBG); Kogelberg Nature Reserve, Kogelberg Trail near where it joins jeep track in upper reaches of Louws R valley, 300 m, 10 Oct. 2001, (–BD), *Whitehouse 274* (BOL, NBG). **3419** (Caledon): Kleinmond, kloof N of slagpale, 20 Apr. 1949, (–AC), *de Vos 1383* (NBG); hills behind Kleinmond from Fairy Glen, gully beneath Tweelingpieke, 300 m, 21 July 1999, (–AC), *Whitehouse 46* (BOL, NBG).

119. **Cliffortia ovalis** Weim. in Botaniska Notiser 90: 193, fig. 12a–d (1948); Fellingham: 610 (2000). Type: Stellenbosch District, Hottentots Holland, N of Somerset Sneeuwkop, 915 m, 3 Jan. 1944, *Esterhuysen 9718* (BOL, holo.!).



Sprawling to scrambling shrub, up to 1 m high, resprouting after fire and spreading clonally; sparsely branched, only forming long branches. *Young stems* 1.5–1.9 mm wide, glabrous. *Leaves* unifoliate; oblong to broadly elliptic, 17–37 × 9.3–19.0 mm; base clasping stem, apex acute to acuminate, 0.3–0.9 mm long; margins flat with 5–14 straight or recurved teeth, 0.9–1.3 mm long; lamina 5–8-veined from base, cartilaginous, 0.2–0.4 mm thick, curved downwards and away from the stem, glaucous, glabrous; sheath 3.0–5.6 mm long, abaxially and adaxially glabrous; stipules absent or 0.4–2.0 mm long, free, margins smooth; petiole absent. *Flowers* solitary at bases of undifferentiated leaves; bracteoles hairy on the keel, margins smooth; sepals 3, glabrous. *Male flowers* with sepals broadly ovate, acute to acuminate at the apex; stamens 16–24, greenish white; anthers yellow. *Female flowers* with bracteoles 4–5 mm long, longer than immature receptacle; sepals broadly ovate to triangular, 2.5–2.6 × ± 1.5 mm, erect; carpel 1; stigma ± 3 mm long, greenish white, feathery, hidden at the base of leaves; immature receptacle ± 4.2 × ± 2.5 mm, glabrous, clearly ribbed. *Achene* probably medium brown, glabrous; ribs rounded. *Flowering time*: November to January.

Habitat: Damp seeps in mountain fynbos; altitude 900–1 550 m.

Distribution: Confined to a very small area in the Hottentots Holland Mountains between the head of the Jonkershoek valley, Somerset Sneeuwkop and Victoria Peak.

Conservation status: Common in a restricted area and not under any threats at such high altitudes. Red List status: Rare.

Etymology: *ovalis* (Latin) means 'oval', referring to the shape of the leaves.

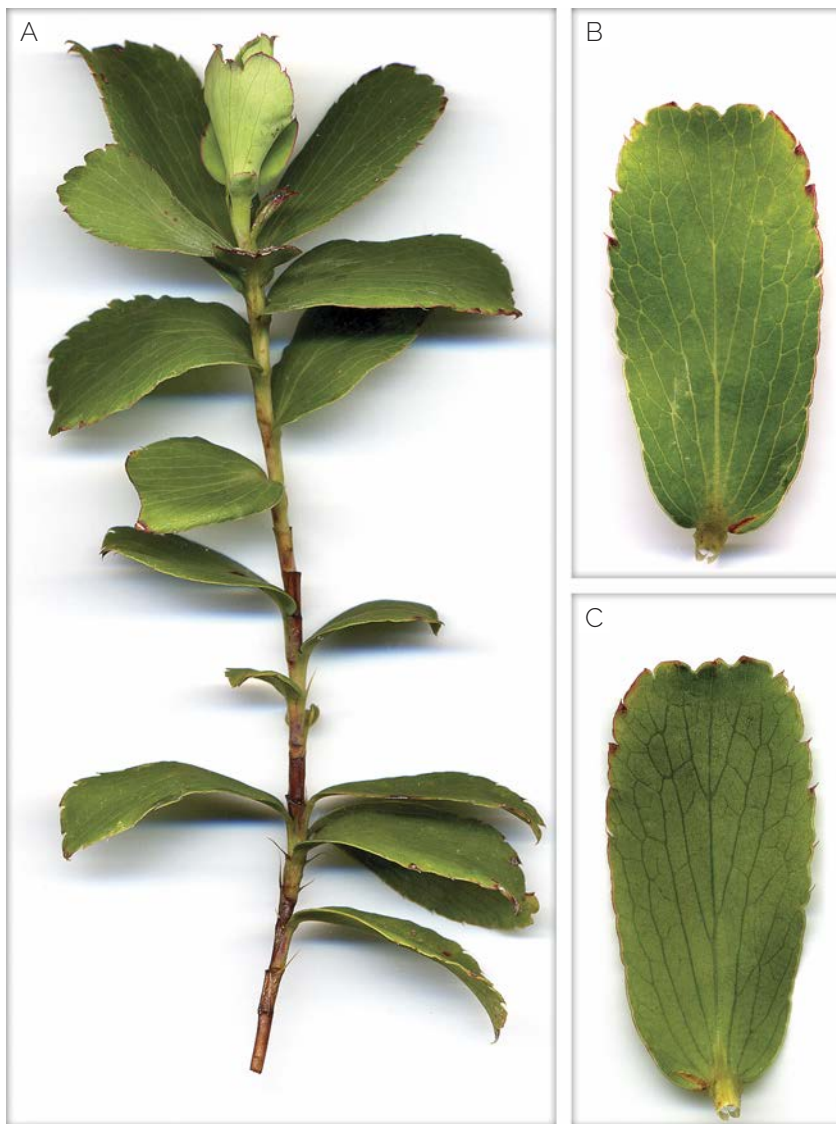
Notes: An unusual species clearly belonging to sect. *Multinerviae*, but with its sprawling habit and it growing in damp areas, it looks more like *Cliffortia odorata*. Glabrous stems and multi-veined leaves, large male flowers with many stamens, and small female flowers with a whitish stigma at the base of the leaves easily distinguish it from *C. odorata*. The broad oblong leaves, combined with sprawling habit, are diagnostic within sect. *Multinerviae*.

It appears to form a hybrid swarm with two other species of the section that grow sympatrically with it, *Cliffortia dregeana* and *C. denticulata*. Plants that show characters of any combination of those three species have been found in the Hottentots Holland Mountains.

Representative specimens

SOUTH AFRICA. **3418** (Simonstown): Hottentots Holland Mts, alongside wilderness trail, SE slopes of Somerset Sneeuwkop, 1420 m, 4 July 1976, (–BB), *Boucher 3063* (NBG, PRE); Hottentots Holland Mts, on SE slopes, on Somerset Sneeuwkop and Landdrost Kop, 1065–1370 m, Dec. 1939, (–BB), *Esterhuysen 1990* (BOL); Hottentots Holland, N of Somerset Sneeuwkop, 915 m, 3 Jan. 1944, (–BB), *Esterhuysen 9718* (BOL); Hottentots Holland Mts, between Triplets and Guardian Peak, 6 Jan. 1944, (–BB), *Esterhuysen 9799* (BOL); Hottentots Holland Triplets, 1370 m, 30 Dec. 1945, (–BB), *Esterhuysen 12508* (BOL, NBG, PRE); SE slopes of Hottentots Holland Mts, near Somerset West Triplets, 1065 m, 10 Apr. 1949, (–BB), *Esterhuysen 15249* (BOL, K, NBG, PRE); gully below Somerset West Triplets, 1220 m, 10 Apr. 1949, (–BB), *Esterhuysen 15253* (BOL); S slopes of Somerset West Triplets, 1220 m, 10 Apr. 1949, (–BB), *Esterhuysen 15358* (BOL); Jonkershoek State Forest, Middle Triplet, summit, 1515 m, 11 Jan. 1970, (–BB), *Kruger 1003* (NBG, PRE); Cape, Nuweberg Forest

Reserve, N slopes of Sneekop, 1220 m, 26 Nov. 1969, (–BB), *Thompson 990* (K, NBC, PRE); N side of Somerset West Triplets, on Swartboskloof Trail, S-facing slope, 1130 m, 6 Mar. 1999, (–BB), *Whitehouse 20* (BOL, K, NBC). **3419** (Caledon): Jonkershoek, Dwarsberg, 1220 m, 27 Apr. 1962, (–AA), *Banks 1265* (NBC); Stellenbosch, Jonkershoek, Dwarsberg, Victoria Peak, 1495 m, 2 Jan. 1968, (–AA), *Kerfoot 6208* (K, NBC, PRE); Jonkershoek, Dwarsberg, 1370 m, 5 Jan. 1946, (–AA), *Rycroft 1127* (BOL, PRE); Jonkershoek, Dwarsberg, 1370 m, 10 Jan. 1948, (–AA), *Rycroft 1200* (BOL, PRE).



Cliffortia ovalis: A, branch; B, dorsal view of leaf; C, ventral view of leaf.

120. **Cliffortia scandens** C.M.Whitehouse in Bothalia 34(2): 84, fig. 11–12 (2004a). Type: Caledon District, Riviersonderend Mts, kloof near Riviersonderend, 20 Nov. 1955, *Esterhuysen* 25075 (BOL, holo.; K!, NBG!, PRE, iso.).



C. dregeana sensu Weim.: 109, fig. 31C (1934) pro parte, non C.Presl.

Medium scrambling shrub up to 0.6 m high; densely branched, forming brachyblasts. *Young stems* 0.6–1.1 mm wide, glabrous. *Leaves* unifoliate; oblong to linear or very narrowly lanceolate, 26–35 × 2.5–3.1 mm; apex sharply long acuminate to pungent, 1.0–1.4 mm long; margins turned upwards, with 4–9 straight teeth, 0.5–1.1 mm long; lamina single-veined from base, chartaceous to rigid, midrib beneath prominent against lamina, curved downwards and away from the stem, with a few 0.7–1.7 mm long hairs above, glabrous beneath; sheath 3.5–4.0 mm long, abaxially glabrous, adaxially glabrous except for fringe of hairs at apex; stipules 9.0–11.8 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on the keel; margins smooth to very shortly ciliate; sepals 3, glabrous. *Male flowers* with bracteoles 6.4–7.3 mm long; pedicel 1.0–1.3 mm long; sepals broadly ovate, 7.0–9.1 × 1.7–2.7 mm, acute to acuminate at the apex; stamens ± 20; filaments 6.5–8.3 mm long, red; anthers brownish red. *Female flowers* with bracteoles as long or longer than immature receptacle; sepals oblong to triangular, erect; carpel 1; stigma red, feathery; immature receptacle glabrous, smooth. *Achene* medium to dark brown, glabrous; ribs rounded. *Flowering time*: November to February.

Habitat: Fynbos on rocky south-facing slopes; altitude 650–1 250 m.

Distribution: Higher southern slopes of Riviersonderend Mountains around Genadendal and Riviersonderend.

Conservation status: A poorly known species, recorded from just two areas of the Riviersonderend Mountains; although apparently very localised there, the range is relatively unexplored; invasive alien plants and unnatural fire regimes are threats, but the majority of the mountain range is conserved within a nature reserve. Red List status: VU.

Etymology. *scandens* (Latin) means 'scrambling or climbing', referring to the way the plants form a tangled growth.

Notes: Specimens of *Cliffortia scandens* were identified in the past as *C. acutifolia* or *C. uncinata*. Both these species are only known from mountains north of Tulbagh. *Cliffortia scandens* is most easily recognised within its range by its long narrow toothed leaves, which form brachyblasts, and the scrambling habit. Hybrid swarms between *C. dregeana*, *C. pungens* and this species occur in the Riviersonderend Mountains. Such hybrids may include the types of *C. theodori-friesii* var. *puberula* or *C. dregeana* var. *meyeriana*. Additional research is needed in this area to identify the parent and hybrid populations, especially to determine the limits of the species involved and the parents of the various hybrid populations. Despite this apparent confusion of species limits, preliminary molecular evidence supports the identification of *C. scandens* as a distinct species, as it has both nuclear (Fig. 1) and chloroplast (Fig. 2) markers not found elsewhere.

Representative specimens

SOUTH AFRICA. **3419** (Caledon): Riviersonderend Mts, Kanonkop, above Genadendal, on S slopes, 1065–1220 m, 21 Feb. 1966, (–BA), *Esterhuysen* 31466 (BOL, K); Genadendal, 915 m, 28 Dec. 1896, (–BA), *Schlechter* 9851 (PRE);

Riviersonderend Mts, kloof near Riviersonderend, 20 Nov. 1955, (–BB), *Esterhuysen 25075* (BOL, K, NBG, PRE); Riviersonderend Mts, kloof near Riviersonderend, 12 Feb. 1956, (–BB), *Esterhuysen 25337* (BOL, PRE); Riviersonderend Mts, Pilaarkop, S slopes, 670 m, 21 Nov. 1999, (–BB), *Linder in Whitehouse 68* (BOL).



Clifortia scandens: A, branch; B, branch with male flowers; C, dorsal view of leaf; D, ventral view of leaf; E, achene.

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- (121) **Section Dichopterae** DC. in Annales des Sciences Naturelles 1: 448 (1824) & 595 (1825). Type species, designated here: *C. cuneata* Aiton.
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Section *Simplices* Weim.: 18, 126 (1934) & 198 (1948), nom. superfl.
Type species, designated here: *C. cuneata*.

Single-stemmed densely branched erect shrubs. Young stems usually glabrous, or with a few hairs that are soon lost, usually not forming brachyblasts. Sheath glabrous abaxially; stipules membranous, free, entire; petiole absent. Leaves unifoliate, multi-veined, glabrous, glaucous, curved upwards and towards the stem, **wedge-shaped, toothed at the apex**, margins flat. Flowers solitary, in the axils of ordinary vegetative leaves or sometimes clustered together. Bracteole margins entire, longer than immature receptacle; sepals 3, glabrous, female erect; filaments red, anthers yellow; receptacle smooth, glabrous; carpels 1; stigma greenish white. Achene ribbed, glabrous, mid to dark brown.

Including just one species, unique in its papery wedge-shaped leaves. There are no morphological characters to really place it well with any other species. Chloroplast data places it in a unique position, but nuclear data (Fig. 1) strongly supports (100%) a relationship with *Cliffortia hirta* series. This is quite likely an anomalous result, possibly due to long-branch attraction of distantly related species coming out close together in the analysis.

Weimarck (1934) stated that his section *Simplices* corresponded to De Candolle's *Dichopterae* and is therefore superfluous. Neither section had type specimens designated, so the same type specimen is here designated to keep their circumscription congruent.

121. **Cliffortia cuneata** Aiton, Hortus Kewensis, ed. 1, 3: 413 (1789); DC.: 595 (1825); G.Don: 596 (1832); Eckl. & Zeyh.: 267 (1836); Harv.: 296 (1862); Bolus & Wolley-Dod: 259 (1904); Weim.: 129, fig. 37A–F (1934); Levyns: 450 (1950); Fellingham: 609 (2000); Bean & Johns: 192 (2005); Whitehouse: 18, fig. 11–12 (2007). Lectotype, designated by Weimarck (1934): South Africa, False Bay, *Robertson s.n.* (BM, holo!).



Medium to tall erect shrub, up to 3 m high, killed by fire; densely divaricately branched, forming long branches and brachyblast when flowering. *Young stems* 1.0–2.5 mm wide, glabrous or slightly hairy but quickly becoming glabrous; stem hairs adpressed upwards, 0.1–0.4 mm long. *Leaves* unifoliate; wedge-shaped to oblong, 13–41 × 4.9–13.9 mm; margins flat, only toothed at apex with 2–6 broad straight teeth, 0.6–2.9 mm long; lamina 3–7-veined from base, chartaceous, 0.1–0.6 mm thick, midrib very prominent beneath, curved upwards and towards the stem, slightly glaucous, glabrous; sheath 0.8–2.3 mm long, abaxially glabrous, adaxially hairy or glabrous except for fringe at apex; stipules 0.2–1.6 mm long, free, margins smooth; petiole absent. *Flowers* solitary at bases of undifferentiated leaves but often clustered together; bracteoles hairy or glabrous on the keel, margins smooth; sepals 3, glabrous. *Male flowers* with bracteoles 6.2–8.5 mm long; pedicel 1.2–2.1 mm long; sepals broadly ovate, 6.6–10.3 × 4.0–5.9 mm, acute to acuminate at the apex; stamens 27–36; filaments 11–14 mm long, red; anthers yellow. *Female flowers* with bracteoles 3.8–10.5 mm long, longer than immature receptacle; sepals ovate to obovate, 3.7–5.9 × 1.4–2.9 mm, erect; carpel 1; stigma 6.5–11.0 mm long, greenish white, feathery, prominent at the base of the leaves; immature receptacle 1.9–5.2 × 1.2–2.9 mm, glabrous, smooth. *Achene* cylindrical to almost globose, 4.5–6.8 × 1.5–3.8 mm, medium to dark brown, glabrous; 6- or 12–14-ribbed, ribs rounded, 0.1–0.8 mm wide. *Flowering time*: June to December.

Distribution: Lower slopes between the Paarl side of Du Toitskloof and Helderberg, and east to Houw Hoek, and along the southern slopes of the Riviersonderend Mountains; apparently also in Claremont on the Cape Peninsula, but extinct there.

Etymology: *cuneata* (Latin) means ‘wedge-shaped’ or ‘inversely triangular’, referring to the distinctive shape of the leaves.

Notes: The long almost inversely triangular, glaucous leaves toothed only at the truncate apex are very distinctive in this medium-sized species. This character is not only diagnostic, but emphasises the isolated position that this species holds within the genus, as it has no close relatives. The isolated nature of the main species has resulted in an important variant being regarded as a variety. In any other section, the comparable differences in fruit have led to such variants being recognised as separate species. Hybrids are almost unknown in the species but a putative hybrid with *Cliffortia phillipsii* was described by Weimarck based upon part of an Ecklon & Zeyher collection from Klappmuts (see note under *C. phillipsii*).

var. **cuneata**; Bothalia 38(1): 18, fig. 11–12 (2007).

Leaves 16–41 × 5.4–13.9 mm; margins toothed at apex with 2–6 broad straight teeth, 0.9–2.9 mm long; lamina 3–7-veined from base. *Male flowers* as above. *Female flowers* with bracteoles 8.2–10.5 mm long; sepals ovate to obovate, 4.2–5.9 × 1.7–2.9 mm; immature receptacle 3.0–5.2 × 2.0–2.9 mm. *Achene* broadly ovoid to almost globose, 6.2–6.8 × 2.9–3.8 mm; 12–14-ribbed, ribs rounded, 0.3–0.8 mm wide. *Flowering time*: June to October, female flowers until December.

Habitat: Low slopes in fynbos on clayish shale soils, clayish soil from shale bands of Table Mountain Series, full sun, well-drained soils; altitude 0–950 m.

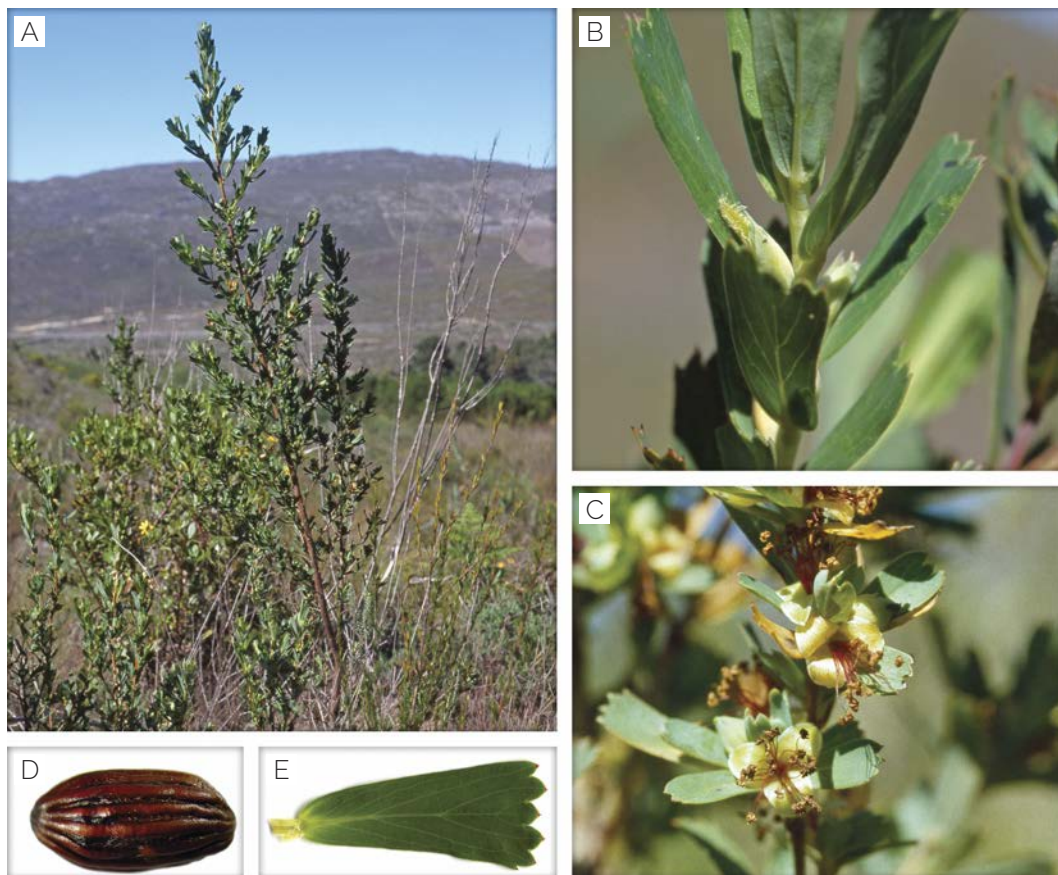
Distribution: As for species.

Conservation status: Widespread but scattered, forming quite extensive populations, several within nature reserves; threatened by too frequent fires and invasive alien vegetation. Red List status: LC.

Notes: Var. *cuneata* has large, almost globose, achenes ($6.2\text{--}6.8 \times 2.9\text{--}3.8$ mm) with numerous ribs. The leaves are consistently larger than var. *cylindrica*.

Representative specimens

SOUTH AFRICA. 318 (Cape Town): Cape Flats, near Claremont, 20 m, 5 Dec. 1892, (–CD), *Schlechter 798* (BOL); Jonkershoek, 305 m, 7 Sept. 1951, (–DD), *Acocks 16102* (BOL, K); Lemoenkloof Farm, NE of Stellenbosch, ridge directly W of Silwerminnekloof, 460 m, 12 Oct. 1989, (–DD), *Buys 64* (NBG); Jonkershoek, 6 Nov. 1943, (–DD), *Compton 15301* (NBG);



Cliffortia cuneata var. *cuneata*: A, habitat; B, branch with female flower; C, branch with male flower; D, achene; E, leaf.

Jonkershoek, June 1932, (–DD), *de Villiers s.n.* (NBG); Botmaskloof, 30 Mar. 1976, (–DD), *Dryfhout 1557* (NBG); Stellenbosch, Jonkershoek, 18 Aug. 1917, (–DD), *Garside 1025* (K); Jonkershoek State Forest, Stellenbosch Mt., 915 m, 8 Dec. 1975, (–DD), *Haynes 1148* (NBG, PRE); Jonkershoek, 7 Nov. 1935, (–DD), *Hubbard 176* (NBG); Stellenbosch, Jonkershoek, Langrivier, 915 m, Aug. 1965, (–DD), *Kerfoot 5412* (NBG); Jonkershoek, 305 m, 16 July 1940, (–DD), *Levyms 7284* (BOL); Jonkershoek, Biesjevlei, 3 Nov. 1941, (–DD), *Levyms 8500* (BOL); Jonkershoek valley, above Watermeyer's farm, 13 Aug. 1927, (–DD), *Pillans s.n.* (BOL); Jonkershoek valley, 14 Jan. 1948, (–DD), *Rodin 3266* (BOL, K, PRE); Banghoek, Dwarsrivierhoek, Brian Rycroft Nature Reserve, 450 m, 6 Oct. 1978, (–DD), *Rycroft 3284* (NBG); Banghoek, Dwarsrivierhoek, Brian Rycroft Nature Reserve, 430 m, 31 Dec. 1978, (–DD), *Rycroft 3318* (NBG); Jonkershoek, Aug. 1946, (–DD), *Schoeman s.n.* (NBG); Jonkershoek, Jakkalsvlei R terrace, 365 m, 21 Sept. 1966, (–DD), *Taylor 6905* (NBG, PRE); Swartboskloof, 9 Feb. 1962, (–DD), *van der Merwe 844* (NBG, PRE); Stellenbosch, Jonkershoek, 13 Apr. 1961, (–DD), *van Rensburg 469* (NBG); Swartboskloof, 13 Oct. 1960, (–DD), *van Rensburg SKF 2033* (K, PRE); Jonkershoek, 1 Oct. 1958, (–DD), *Werdermann & Oberdieck 367* (K, PRE); Jonkershoek, car park at start of Swartboskloof Trail, 315 m, 6 Mar. 1999, (–DD), *Whitehouse 21* (BOL, NBG); Jonkershoek Nature Reserve, N loop of Panorama Trail, slopes at start of trail, 380 m, 9 Aug. 2001, (–DD), *Whitehouse 245* (BOL, NBG). **3319** (Worcester): foot of Du Toit's Kloof, Paarl side, 15 Oct. 1949, (–CA), *Barker 5950* (NBG); Worcester District (Du Toits Kloof ex Weimarck), (–CA), *Drège s.n.* (K); middle slopes, near W entrance to Du Toits Kloof, 460 m, Nov. 1937, (–CA), *Pillans 8422* (BOL); Du Toit Pass (Paarl Pass), 26 Oct. 1958, (–CA), *Werdermann & Oberdieck 743* (K, PRE); Franschhoek, at foot of mountain, 365 m, Sept. 1895, (–CC), *Bolus 6994* (BOL, NBG, PRE); Wemmershoek, 460 m, 14 Dec. 1940, (–CC), *Bond 727* (NBG); Berg R Hoek, 1 Jan. 1940, (–CC), *Compton 8359* (NBG); Berg R Hoek, 19 Sept. 1946, (–CC), *Compton 18324* (NBG); Franschhoek Forest Reserve, 28 Sept. 1935, (–CC), *Esterhuysen s.n.* (BOL); Franschhoek, Assegaibos Reserve, 28 Feb. 1936, (–CC), *Hubbard 396* (NBG). **3418** (Simonstown): Hottentots Holland Mts, in ravine above Lowrensford, Dec. 1939, (–BB), *Esterhuysen 1992* (BOL); around N end of Helderberg, upper slopes, 21 Sept. 1928, (–BB), *Gillett 712* (NBG); Sir Lowry's Pass, above railway line, 185 m, 4 Sept. 1932, (–BB), *Levyms 3919* (BOL); Helderberg, 300 m, 15 Nov. 1941, (–BB), *Parker 3616* (BOL, K, NBG); Somerset West, near the Lourens R, 17 Oct. 1947, (–BB), *Parker 4281* (BOL, K, NBG); Somerset West, Helderberg Nature Reserve, West Blue Route, 375 m, 17 Sept. 1993, (–BB), *Runnalls 587a* (NBG, NBG, PRE); E slopes of Hottentots Holland Mts, near Somerset Sneeuwkop, Sept. 1948, (–BB), *Stokoe SAM 61481* (PRE); Helderberg Nature Reserve, on lower slopes of Helderberg, in valley just above garden, 200 m, 1 Oct. 2000, (–BB), *Whitehouse 149* (BOL, K, NBG). **3419** (Caledon): Elgin, 460 m, 21 Sept. 1931, (–AA), *Levyms 3364* (BOL); Caledon, Houwhoek, 460 m, 20 Oct. 1962, (–AA), *Levyms 11406* (BOL); Caledon, Viljoen's Pass, Dec. 1924, (–AA), *Rogers 29245* (BOL, K, PRE); Houwhoek, 365 m, 12 Apr. 1896, (–AA), *Schlechter 7558* (BM, K, NBG, PRE); Dwarsberg foothills, 25 Aug. 1942, (–AA), *Stokoe 8619* (BOL, PRE); Houwhoek, low clayish slopes just above hotel, along road on S side of mountain, 320 m, 3 Oct. 2000, (–AA), *Whitehouse 151* (BOL).

var. **cylindrica** C.M.Whitehouse in Bothalia 38(1): 75 (2008) & 18, fig. 11–12 (2007). Type: South Africa, Caledon District, Arieskraal, south-facing slopes on Bokkeveld shale above Arieskraal Dam, 215m, 29 Nov. 2000, *C. Whitehouse 166* (BOL, holo.; NBG!, iso.).

Leaves 13–23 × 4.9–7.5 mm; margins toothed at apex with 4 broad straight teeth, 0.6–1.6 mm long; lamina 3–5-veined from base. *Male flowers* unknown. *Female flowers* with bracteoles 3.8–6.0 mm long; sepals narrowly ovate to linear, 3.7–4.1 × 1.4–2.0 mm; immature receptacle 1.9–3.4 × 1.2–1.4 mm. *Achene* cylindrical, 4.5–5.0 × 1.5–1.7 mm; 6-ribbed, ribs rounded, 0.1–0.3 mm wide. *Flowering time*; October and November.

Habitat: Fynbos on south-facing shale slopes; altitude 250–400 m.

Distribution: Only known from Arieskraal in the Kogelberg area and a few localities along the southern slopes of the Riviersonderend Mountains.

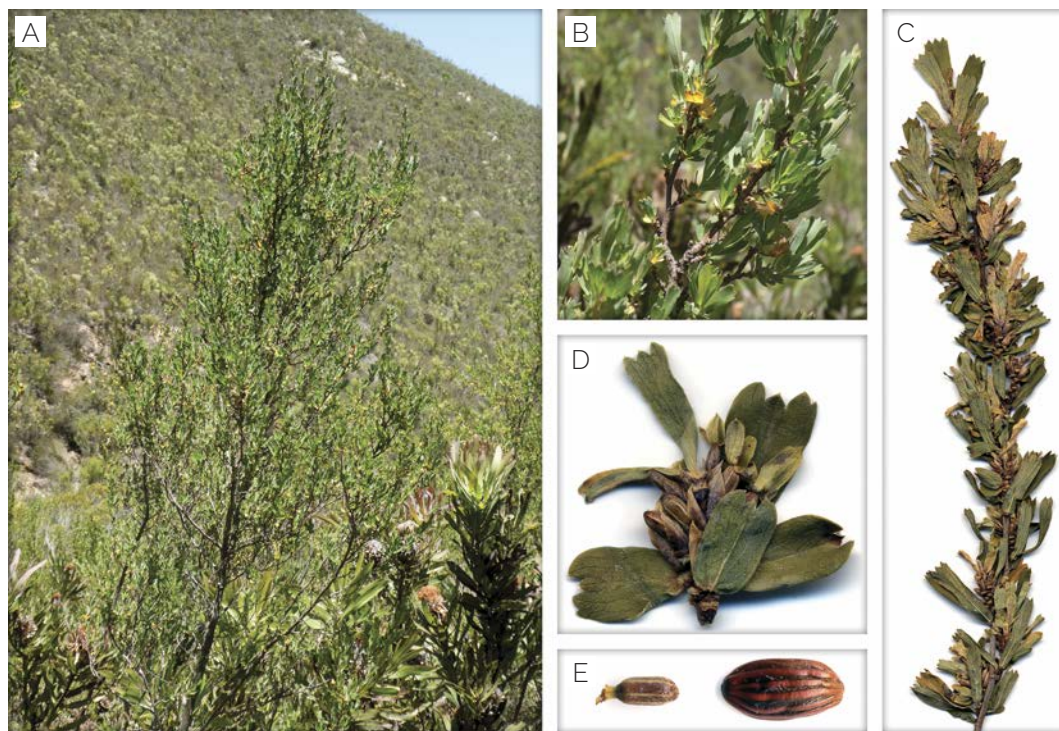
Conservation status. Known from only a few small populations in confined areas. Much of its previous range has already been converted to orchards or vineyards, because it grows on the relatively fertile shale. Red List status: not listed.

Etymology: *cylindrica* (Latin) means 'cylindrical', referring to the shape of the ± straight-sided achenes in contrast with the typical variety, which are broadly ovoid.

Notes: Very similar to var. *cuneata* except for the slightly smaller leaves (although still within the range of variation shown by the main species) and the significantly smaller achenes, almost half the size of those of var. *cuneata*, which are cylindrical rather than broadly ovoid in shape. The achenes only have six ribs compared with the type variety which has double the number. When described, the identity of the Riviersonderend populations was uncertain. More recent observations have suggested that they should all be placed in var. *cylindrica*. Considering the geographic separation of the two varieties, along with discrete morphological characters, specific or subspecific rank for this taxon is probably more appropriate.

Representative specimens

SOUTH AFRICA. **3418** (Simonstown): Elgin basin, Klein Palmiet R, Somersfontein, 250 m, 23 Nov. 1971, (–BB), *Boucher 1749* (NBG); Arieskraal, S-facing slopes on Bokkeveld shale above Arieskraal Dam, 215 m, 29 Nov. 2000, (–BB), *Whitehouse 166* (BOL, NBG). **3419** (Caledon): Arieskraal, 18 Nov. 1944, (–AA), *Compton 16471* (NBG); Arieskraal, 18 Nov. 1944, (–AA), *Leighton 792* (BOL); Elgin, Arieskraal, central part of farm, 260 m, 7 Dec. 1984, (–AA), *van Jaarsveld & Sardien 7686* (NBG); Greyton, Wolfskloof, alongside jeep track, 340 m, 12 Nov. 1992, (–BA), *Beyers 214* (NBG, PRE); (Genadendal, Baviaanskloof ex Weimarck), 27 Feb. 1815, (–BA), *Burchell 7816* (K); Greyton Nature Reserve, Boesmanspas, 350 m, 17 Oct. 1976, (–BA), *Rycroft 3209* (NBG); Riviersonderend Mts, slopes above Olifantskloof, 365 m, 19 Oct. 2001, (–BB), *Whitehouse 282* (BOL, NBG).



Cliffortia cuneata var. *cylindrica*: A, habitat; B, branch; C & D, branch with achenes; E, achene (left) compared to achene from *Cliffortia cuneata* var. *cuneata* (right).

(122) **Section Bacciformes** Weim. in Botaniska Notiser 90: 184
(1948). Type species, designated here: *C. baccans* Harv.

Low erect densely branched shrub, resprouting after fire. Young stems with short upwardly adpressed hairs, forming brachyblasts. Sheath glabrous both abaxially and adaxially; stipules membranous, free, entire; petiole absent. Leaves trifoliate, glabrous, curved upwards and towards the stem; leaflets needle-shaped, margins entire. Flowers solitary, in the axils of ordinary vegetative leaves. Bracteoles glabrous with a entire to serrate margin, longer than immature receptacle; sepals 3, glabrous, female ovate, recurved; receptacle smooth, glabrous; carpels 1; stigma red. **Achene subglobose, fleshy, orange.**

A monotypic section with the single species remarkable only in having a fleshy fruit (drupe) instead of a dry achene. Weimarck placed *Cliffortia micrantha* along with *C. baccans* in the sect. *Bacciformes*. However, while the achenes of *C. micrantha* are swollen, they are not truly fleshy like *C. baccans* (Fellingham 1993b). The species share no other notable characters. In particular, the differing number of sepals indicate that the two species are not closely related. The relationship of *C. micrantha* is still uncertain, but it has tentatively been placed in sect. *Complanatae* due to its morphological affinities with certain species in that section (e.g. *C. dentata*). *Cliffortia baccans* becomes the only species in sect. *Bacciformes*. Its nearest relative remains obscure. Tentative molecular evidence indicates an affinity with sect. *Alatae*, species of which also have very unusual achenes.

122. **Cliffortia baccans** Harv., *Flora Capensis* 2: 303 (1862); Weim.: 79, fig. 21 (1934) & 400 (1940b); Fellingham: 611 (2000). Lectotype, designated here: Worcester District, Hex River Mts, 915–1 220 m, June, *Drège 552a* (K, lecto!; S!, W!).



Short to medium shrub, up to 0.9 m high, killed by fire or resprouting after fire from a central crown; densely divaricately branched, forming brachyblasts. *Young stems* 0.6–0.7 mm wide, often tinged reddish, hairy; stem hairs adpressed upwards, up to 0.2 mm long. *Leaves* trifoliate; leaflets needle-shaped, 1.4–2.8 × 0.3–0.6 mm; apex acute to mucronate, up to 0.1 mm long; margins serrate, entire and smooth; lamina chartaceous, curved upwards and towards the stem, glabrous; sheath 0.6–0.8 mm long, abaxially and adaxially glabrous; stipules 0.2–0.5 mm long, free, margins smooth; petiole absent. *Flowers* solitary at the bases of undifferentiated leaves; bracteoles glabrous on the keel, margins serrate to smooth; sepals 3, glabrous. *Male flowers* with sepals broadly ovate, acute to acuminate, red; anthers brownish red or yellow. *Female flowers* with bracteoles 1.4–2.0 mm long, longer than immature receptacle; sepals broadly ovate to almost circular, 1.2–1.4 × 1.0–1.2 mm, recurved; carpel 1; stigma 1.0–1.4 mm long, pinkish white to greenish white, feathery, hidden at the base of leaves; immature receptacle ± 1.6 × 1.2–1.4 mm, glabrous, smooth. *Achene* globose, 3.1–3.6 × 2.9–3.4 mm, orange to reddish brown, with a fleshy outer layer. *Flowering time*: June to October.

Habitat: Arid fynbos on the edge of karroid vegetation, often on well-drained soils derived from the Witteberg Series; altitude 250–1 250 m.

Distribution: Mainly found on the edge of the Karoo between the Cederberg and Laingsburg Witteberg, also found in the Hex River valley with an outlying population at Moordkuil south of Worcester.

Conservation status: Widespread and found in areas with few threats except possibly overgrazing. Red List status: LC.

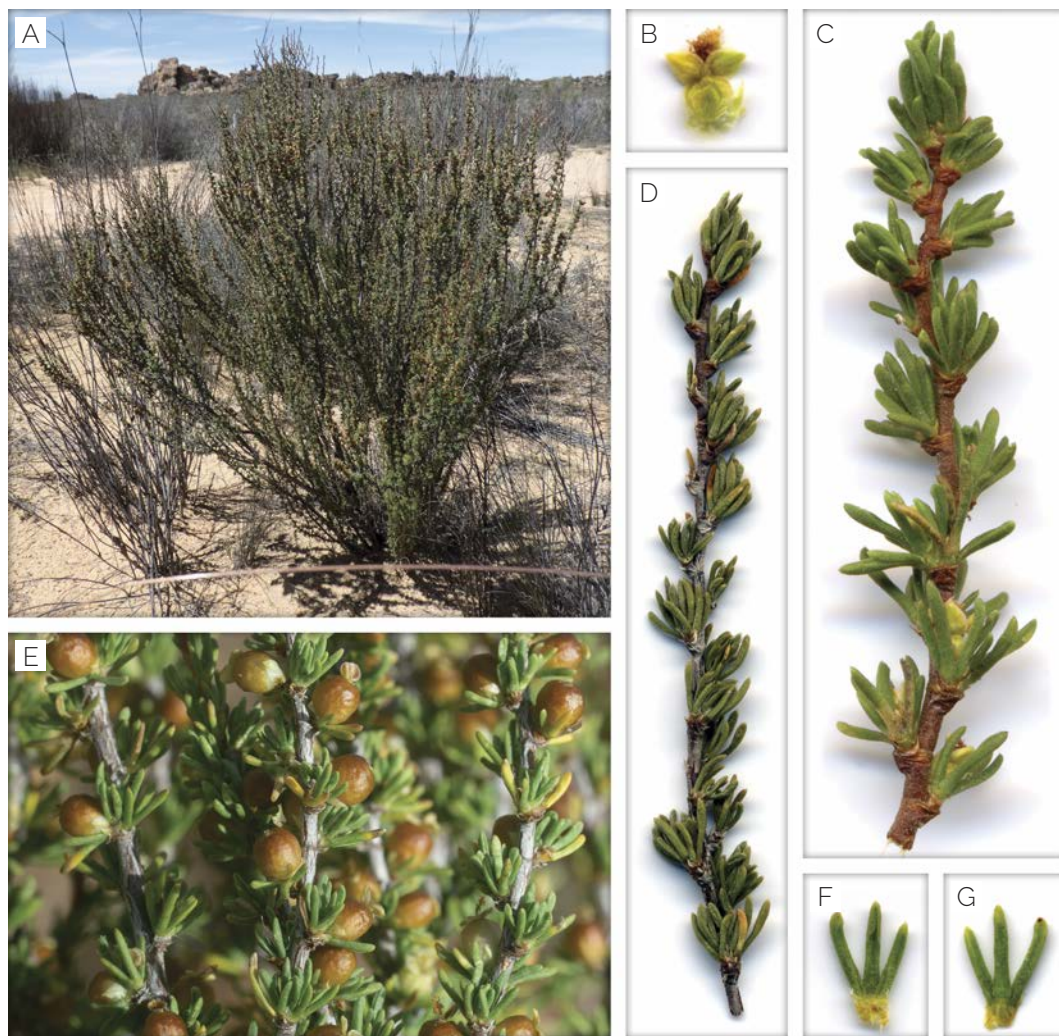
Etymology: *baccans* (Latin) means 'becoming juicy or berry-like', referring to the orange fleshy fruits.

Notes: A unique species with its fleshy berry-like fruits. When sterile it can easily be confused with *Cliffortia amplexistipula* which often grows in the same area. The young stems of *C. baccans* are shortly hairy not glabrous and the leaves green rather than glaucous. Furthermore, searching beneath the plant will often reveal quantities of last years berries.

Representative specimens

SOUTH AFRICA. **3219** (Wuppertal): Cederberg, Matjiesrivier, Sept. 1943, (–AD), *Wagener 104* (NBG); Cederberg, Breekkraansfontein [Bakmakersfontein], 275 m, 15 Sept. 1983, (–CB), *Taylor 10661* (K, NBG, PRE); Rosendal Farm, N end of farm, 72 km N of Ceres, 975 m, 28 Aug. 1976, (–CD), *Boucher 3078* (NBG, PRE); Rosendal, valley NE of farmstead, N of large dam on upper slopes, 1065 m, 10 Oct. 1975, (–CD), *Oliver 6113* (NBG, PRE); Swartuggens, Groenfontein, near Stompiesfontein, 1190 m, 2 Oct. 1991, (–DC), *Bean & Trinder-Smith 2690* (BOL, NBG); Swartuggens, Katbakkies, 1220 m, 26 Sept. 1926, (–DC), *Levy's 1886* (BOL); Swartuggens, 9 km along the farm road going N from summit of Katbakkies Pass, 1220 m, 16 Sept. 1964, (–DC), *Taylor 5889* (K, NBG, PRE); Swartuggen Mts, Groenfontein Farm, near campsite just N of Stompiesfontein, 1160 m, 13 Oct. 1999, (–DC), *Whitehouse 60* (BOL, NBG). **3319** (Worcester): Karooport, 18 Sept. 1938, (–BA), *Acoc's & Hafström 564* (PRE); Karooport, 27 July 1941, (–BA), *Bond 1193* (NBG); Baviaansberg, slopes above Karooport, 30 June 1940, (–BA), *Esterhuysen 2567* (BOL); Karooport, 27 July 1941, (–BA), *Esterhuysen 5273* (BOL, K, PRE); Karooport, on hills above the poort, 3 Nov. 1963, (–BA), *Esterhuysen 30470a* (BOL); Karooport, 610 m, 30 Sept. 1933, (–BA), *Levy's 4640* (BOL); Karooport Mt., 915 m, Aug. 1919, (–BA), *Marloth 9070* (BOL, NBG, PRE); 2.5 km ENE of Matroosberg station, 915 m, 15 June 1965, (–BD), *Acoc's 23655* (K, PRE); near Verkeerde Vlei, 12 July 1954, (–BD), *Barker 8286* (NBG); Hex Rivierskloof, 305–610 m, Sept. 1839, (–BD), *Drège 552b* (K, K); S of Moordkuil, 275 m, 23 Sept. 1951, (–CD), *Levy's 9744* (BOL). **3320** (Montagu): Ceres, Poort to N of

Pienaarskloof, 1005 m, 14 June 1965, (–AA), *Acocks 23646* (K, PRE); Tweedside, 1 Oct. 1926, (–AB), *Compton 3061* (BOL, K); Tweedside, 27 Sept. 1951, (–AB), *Compton 22878* (BOL, NBC); Touws River, 795 m, Sept. 1924, (–AC), *Levy's 852* (BOL); Touws River, 3 km NE of Touws River, 760 m, 15 Oct. 1948, (–AC), *Story 3583* (BM, K, PRE); Pieter Meintjies near Matjiesfontein, S hills opposite station, 1160 m, Dec. 1920, (–AD), *Marloth 9953* (NBC, PRE); Whitehill, 30 Sept. 1932, (–BA), *Barker 20610* (BOL, K); W of Klein Spreeufontein farmhouse, 1035 m, 16 Sept. 1987, (–BC), *Bean, Vlok & Viviers 1923* (NBC, PRE); foot of Witteberg, 975 m, 5 Aug. 1923, (–BC), *Compton 2582* (K); Witteberg [Whitehill], 1065 m, 11 Aug. 1924, (–BC), *Compton 2596* (BM); Witteberg, Bantams, 1220 m, 27 Oct. 1941, (–BC), *Compton 12168* (NBC); Witteberg, N slope, 915–1220 m, 11 May 1941, (–BC), *Es-terhuysen 5157* (BOL, PRE); Witteberg near Matjiesfontein, 460 m, July, (–BC), *Marloth 2958* (BOL, NBC, PRE); S foothills of Witteberg, Klein Spreeufontein Farm, 975 m, 11 Aug. 1988, (–BC), *Vlok 1980* (NBC, PRE).



Cliffortia baccans: A, habitat; B, female flower; C, branch with female flowers; D, branch; E, branch with achenes; F, dorsal view of leaf; G, ventral view of leaf.

Species of uncertain position

These species are members of subg. *Cliffortia*, but their closest relatives are unknown. Rather than create monotypic sections, they are placed here until better resolution of the infrageneric divisions can be obtained. Other species with doubtful placement in sections include: *C. linearifolia*, *C. micrantha* and *C. pungens*, but are assigned to sections based upon their morphology and indications from molecular research. *Cliffortia baccans* and *C. cuneata* could also have been placed here, but there are sectional names already available for them and they have such distinct characters that monotypic sections seemed appropriate. However, their relationship to other sections is unresolved.

123. **Cliffortia stricta** Weim. in Botaniska Notiser 1933: 147, fig. 2 (1933) & 45, fig. 9A–D (1934) & 402 (1940b); Levyns: 446 (1950).

Type: Knysna District, Avontuur to Knysna, 24 Sept. 1930, *Fries, Norlindh & Weimarck 1620* (LD, holo!; BM!, PRE, iso.).

C. sarmentosa sensu J.F.V. Phillips: 114 (1931), non L.

C. eriocephalina sensu Weim.: 44 (1934) pro parte quoad *Burchell 5146*, non Cham.



Erect shrub up to 2.5 m high, killed by fire; densely divaricately branched, forming brachyblasts. *Young stems* 0.8–1.4 mm wide, sometimes tinged reddish, densely hairy; stem hairs adpressed upwards or spreading, 0.3–1.2 mm long. *Leaves* trifoliate; leaflets linear, 4.1–10 × 0.6–1.6 mm; apex sharply long acuminate to mucronate, up to 0.5 mm long; margins inrolled beneath, entire; lamina chartaceous, 0.1–0.4 mm thick, midrib prominent beneath against lamina, curved downwards and away from the stem, green and sparsely hairy to greyish hairy above, hairs 0.2–1.0 mm long, densely hairy beneath, hairs 0.2–0.6 mm long; sheath 2.0–4.4 mm long, abaxially hairy, adaxially glabrous to densely hairy; stipules 1.3–3.6 mm long, brown and scarious, free, margins smooth to ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 3, hairy on the outside. *Male flowers* with bracteoles 3.8–4.3 mm long; pedicel 0.5–0.8 mm long; sepals broadly ovate, 4.2–4.5 × 1.6–2.0 mm, acute to acuminate at the apex; stamens 6; filaments 6.3–7.8 mm long, greenish white; anthers yellow. *Female flowers* with bracteoles 3.0–5.4 mm long, longer than immature receptacle; sepals linear to ovate, 0.7–1.9 × 0.1–0.4 mm, erect; carpel 1; stigma 4.6–7.3 mm long, red to pinkish white, feathery, prominent above leaves; immature receptacle 0.8–2.1 × 0.5–1.2 mm, glabrous, smooth. *Achene* 2–3 × 0.9–1.2 mm, medium to dark brown, glabrous; ribs 6–7, rounded to acute, less than 0.1 mm wide. *Flowering time*: throughout the year.

Habitat: Moist fynbos, able to colonise disturbed areas such as roadsides, occasionally found on limestone; altitude 0–1 300 m.

Distribution: A common species along the southern Cape coastal belt, from Cape Peninsula to Uitenhage, occasionally stretching inland to the Langeberg and Outeniqua Mountains.

Conservation status: A widespread common species that is able to establish itself on disturbed ground. Red List status: LC.

Etymology: *stricta* (Latin) means ‘very straight’, referring to the long straight stiff leaves.

Notes: *Cliffortia stricta* is a common species but without clear relationships. It fits best morphologically with the calcicole species of sect. *Nematobus* (*C. hirta*, *C. anthospermoides* and *C. incana*), but molecular evidence does not support such a placement. The nuclear tree places the species on an unresolved polytomy, while the chloroplast tree places it as sister to *C. paucistaminea* with which it shares few morphological similarities. *Cliffortia stricta* might be confused with species of subg. *Eriocephalinae* but occurs generally at lower altitudes, below 800 m except in the east of its range. It is notable amongst the needle-leaved species for the brown scarious sheaths and stipules, which provide a good diagnostic character, although this may be less developed on young growth.



It is a reseeding species but able to colonise disturbed areas and so is often found along roadsides. Plants with male flowers are extremely rare. Of over 200 records, only five have been recorded with male flowers (Potberg, Botliersfontein, Saptoukop and two collections from Groendal Wilderness Area), but never in the west of its range where it is most often collected.

Representative specimens

SOUTH AFRICA. **3318** (Cape Town): Cape Peninsula, Wynberg Hill, 28 Sept. 1966, (–CD), *Esterhuysen s.n.* (BOL). **3321** (Ladismith): Garcia's Pass, 395 m, Oct. 1904, (–CC), *Bolus 11268* (BOL, K); Gysmanshoek Pass, valley between Kanetberg and Perdeberg, 550 m, 13 Mar. 1978, (–CC), *Boucher 3685* (NBC, PRE); between Herbertsdale and Cloetes Pass, 215 m, 2 Aug. 1951, (–DD), *Levyans 9656* (BOL); Riversdale, Cloetes Pass, S slopes near summit, 700 m, 22 Aug. 1966, (–DD), *Levyans 11584* (BOL); Attakwaskloof, summit of old Voortrekker Pass, 825 m, 22 Nov. 1972, (–DD), *Thompson 1621* (NBC). **3322** (Oudtshoorn): near top of Robinson Pass, 855 m, 6 Mar. 1948, (–CC), *Acocks 14070* (K, PRE); Robinson Pass, 610 m, 23 Nov. 1949, (–CC), *Compton 21785* (NBC); Outeniqua Mts, Robinson Pass area, ridge SW of Ruitersberg, 765 m, 5 Apr. 1994, (–CC), *Oliver 10430* (NBC); Ruitersbos, 16 Sept. 1951, (–CC), *van Niekerk 143* (BOL); George, New Montagu Pass, slopes on Oudtshoorn side, 425 m, 1 Aug. 1952, (–CD), *Levyans 9860* (BOL); George, Outeniqua Pass, N side, 610 m, 25 July 1956, (–CD), *Levyans 10487* (BOL); George/Montagu Pass, 960 m, 3 Nov. 1894, (–CD), *Schlechter 5815* (FHO, K, PRE); Wilderness, 1 May 1941, (–DC), *Compton 10712* (NBC); Wilderness, hillside, 10 Feb. 1944, (–DC), *Compton 15559* (NBC); Wilderness, 22 Aug. 1944, (–DC), *Compton 15815* (NBC). **3323** (Willowmore): Gouna Experimental Area, no. 3, 7 Dec. 1955, (–CC), *Dickin 5* (NBC); Avontuur to Knysna, 24 Sept. 1930, (–CC), *Fries, T.C.E., Norlindh & Weimarck 1620* (BM); Millwood, 365 m, 28 Aug. 1921, (–CC), *Keet 761* (NBC); Knysna–Gouna road, 245–305 m, 7 July 1946, (–CC), *Levyans 7841* (BOL); Knysna, Gouna Experimental Area No. 3, 7 Dec. 1955, (–CC), *McDonald 5* (PRE); Knysna, Kafferskop, Kleineiland, 19 Oct. 1977, (–CC), *van Daalen 116* (NBC, PRE); Niekerksberg Forest Reserve, 915 m, 17 July 1974, (–CD), *Bayliss 996* (K, PRE); Knysna, near Forest Hall, Jan. 1922, (–CD), *Duthie 745* (BOL, NBC); Forest Hall, July 1934, (–CD), *Duthie 1225* (NBC); Knysna, Spitskop Fynbos Reserve, 760 m, 17 Sept. 1970, (–CD), *Geldenhuys 119* (PRE); on hills E of Plettenberg Bay, 3 Sept. 1955, (–CD), *Theron 1772* (K, PRE); Kouga Mts, Saptoukop, ridge up from Withoogte, S slope, 1280 m, 16 Dec. 1991, (–DA), *Oliver 9975* (NBC, PRE); Many Waters Kloof, W of Louterwater, 915 m, 30 Apr. 1935, (–DC), *Compton 5163* (BOL, NBC); Louterwater, 5 May 1938, (–DC), *Compton 7193* (NBC); Louterwater, 760 m, 27 Jan. 1941, (–DC), *Compton 10486* (NBC); Peak Formosa, 30 Jan. 1941, (–DC), *Esterhuysen 4655* (BOL); Helpmekaar Peak, foot, 27 Jan. 1941, (–DC), *Esterhuysen 4659* (BOL). **3324** (Steytlerville): Kouga Mts, near Kouga Peak, lower slopes, 14 Nov. 1944, (–CA), *Esterhuysen 10830* (BOL). **3325** (Port Elizabeth): Groendal Wilderness, Zunga Catchment Basin, Groot Plaat 282, 915 m, 1 Mar. 1974, (–CA), *Scharf 1183* (PEU, PRE); Groendal Wilderness Reserve, Zunga catchment, 885 m, 1 Sept. 1976, (–CA), *Scharf 1888* (GRA, K, NBC, PRE); Groendal Wilderness Reserve, Zunga Catchment, Groot Plaat farm, 945 m, 1 Nov. 1976, (–CA), *Scharf 1965* (GRA, K, PRE); Groendal Wilderness Reserve, Zunga catchment, Great Winterhoek Mts, Strydomsberg farm, 1160 m, 15 Dec. 1976, (–CA), *Scharf 2036* (GRA, K, PRE); Hankey District, Otterford, 500 m, 13 Oct. 1979, (–CC), *Cowling 996* (GRA). **3418** (Simonstown): Cape Peninsula, Silvermine, 245 m, 10 Dec. 1944, (–AB), *Compton 11630* (NBC); Cape Peninsula, Steenberg Plateau, 25 Sept. 1949, (–AB), *Esterhuysen 15834* (BOL, PRE); Cape Peninsula, Kalk Bay Mt., SE slopes, 150 m, 10 July 1976, (–AB), *Goldblatt 3554* (NU, PRE); Cape Peninsula, St James, mountain, 460 m, 2 Dec. 1934, (–AB), *Levyans s.n.* (BOL); between Noordhoek and Kommetjie, 15 m, 10 Nov. 1935, (–AB), *Levyans 5237* (BOL, PRE); Cape Peninsula, Bergvliet near Diep R., July 1916, (–AB), *Purcell 16370* (BOL); Cape Peninsula, near Miller's Point, Apr. 1928, (–AB), *Salter 260/7A* (BM); Cape Peninsula, Red Hill, 21 Apr. 1935, (–AB), *Taylor 110* (BOL); Elsie's Peak, 120–150 m, 26 July 1959, (–AB), *White 5126* (PRE); Cape Peninsula, Brightwater, 30 May 1943, (–AD), *Compton 14573* (NBC, PRE); Cape Peninsula, Cape Point, Brightwater, 23 June 1944, (–AD), *Compton 15717* (NBC); Cape Peninsula, Cape Point Reserve, near Brightwater, 31 May 1943, (–AD), *Leighton 461* (BOL, K, PRE); Smitswinkel Bay, lower slopes, 185 m, 21 Nov. 1935, (–AD), *Levyans 5279* (BOL); Cape of Good Hope Nature Reserve, roadside at The Camp turn-off at 31st milestone on Cape road, 150 m, 19 Mar. 1966, (–AD), *Taylor 6760* (BOL, K, NBC, PRE); Palmiet R mouth, 305 m, 12 Feb. 1937, (–BD), *Levyans 6004* (BOL). **3419** (Caledon): Houwhoek, Houwtech terrain, Haasvlakte, 170 m, 4 Dec. 1987, (–AA), *Boucher & Stindt 5281* (NBC); Houwhoek, 760 m, 7 Feb. 1896, (–AA), *Schlechter 7407* (BM, BOL, K, PRE, Z); Highlands, 9 Nov. 1941, (–AC), *Compton 12345* (NBC); Kleinmond Flats next to road after Heuningklip near mountain, 20 Feb. 1949, (–AC), *de Vos 1226* (PRE); Onrus R Mt, 9 Feb. 1941, (–AC), *Esterhuysen 4918* (NBC); Fernkloof Nature Reserve, 460 m, 6 Aug. 1980, (–AD), *Williams 3044* (K); Vogelgat, Xmas Camp to Fernkloof Gate, 450 m, 31 July 1985, (–AD), *Williams 3619* (K, NBC); Sondagskloof, 29 Dec. 1940, (–BC), *Compton 10224* (NBC);

Salmonsdam area, lower SE slope of Koueberg, near T-junction of Elim road with Hermanus – Napier road, near Carolina, 23 Nov. 1991, (–BC), *Fellingham 1577* (NBC, PRE); Paardeberg, Cooperative past experimental farm on the Paardeberg Farm, near Papiessvlei 13 km E of Stanford, 150 m, 27 June 1962, (–BC), *Taylor 3473* (NBC); Elands Kloof, 5 Aug. 1940, (–BD), *Esterhuysen 3082* (BOL, PRE); Gansbaai area, Dassieshoek, Boesmans R, 20 m, May 1981, (–CB), *Brusse 3864* (K, PRE); Strandkloof, 17 Apr. 1950, (–CB), *Compton 21936* (NBC); Gansbaai, foot of Tafelberg, just past ‘Sopieshoogte’ from Franskraal to Uilenkraal, 23 Nov. 1991, (–CB), *Fellingham 1564* (NBC, PRE); Hagelkraal, 28 Dec. 1946, (–DA), *Compton 19045* (NBC); Hagelkraal R, 27 Dec. 1946, (–DA), *Leighton 2555* (BOL); Kouberg, neck E of Buksse Berg, 275 m, 9 Mar. 1979, (–DA), *Thompson 3890* (NBC, PRE); Buffeljagsberg, E end above vlei, 60 m, 13 Mar. 1979, (–DA), *Thompson 3992* (NBC, PRE); Hermanus to Elim, Koue Berg Pass, 215 m, 3 July 1999, (–DA), *Whitehouse 36* (BOL); S slopes of Bredasdorp Mt., 6 Dec. 1938, (–DB), *Acocks & Hafström 2136* (PRE); Soetanyenberg, Bergplaas Farm, foothills of mountain, 26 Mar. 1982, (–DB), *van Wyk 931* (NBC, PRE). **3420** (Bredasdorp): De Hoop, Potberg Nature Reserve, Potberg Mt., Kloof at upper S slopes 2 km SE of Boskloof, 300 m, 12 Feb. 1979, (–BC), *Burgers 1737* (NBC, PRE); De Hoop Nature Reserve, Elandspad, 1 km from homestead Cupidoskraal side, SE slope, 350 m, 19 June 1984, (–BC), *Fellingham 646* (NBC, PRE); De Hoop, Potberg Area, on Elandspad road, opposite Potberg, 120 m, 29 Jan. 1985, (–BC), *Fellingham 857* (PRE); De Hoop Nature Reserve, Potberg slopes from Elandspad, slope near road, 185 m, 1 May 1985, (–BC), *Leith 50* (NBC, PRE); Swellendam, Potberg, Apr. 1947, (–BC), *Levyyns 8171* (BOL); Potberg North, W end of Potberg, 72 km from Bredasdorp, 150–610 m, 13 Nov. 1962, (–BC), *Taylor 4341* (NBC, PRE); De Hoop area, Hamerkop Farm, 75–150 m, 19 June 1984, (–BC), *van Wyk 1606* (NBC, PRE); De Hoop Nature Reserve, W end of Potberg, S slopes below ridge, 365 m, 2 Sept. 2001, (–BC), *Whitehouse 258* (BOL); 1 km from Witwater towards sea on Elandspad–Witwater road, 500 m, 18 June 1984, (–BD), *Fellingham 607* (NBC); Heuningberg, plateau E of peak, 300 m, 17 Aug. 1995, (–CA), *Paterson-Jones 529* (NBC). **3421** (Riversdale): Albertinia, 15 Apr. 1952, (–BA), *Compton 23518* (NBC); Botliersfontein, 60 m, June 1914, (–BA), *Muir 481* (BOL, NBC, PRE); 2 km on the Hectorskraal road from Albertinia, 250 m, 14 Mar. 1978, (–BA), *Thompson 3742* (NBC); Rein’s Private Nature Reserve, Flats alongside entrance road, 190 m, 6 Aug. 1995, (–BD), *Boucher 5935* (NBC). **3422** (Mossel Bay): Mossel Bay, near new town extension at Golden Rendezvous Hotel, 120 m, 29 Mar. 1987, (–AA), *Vlok 1858* (NBC, PRE); Mossel Bay, between Outeniquastrand and Tergniet, 70 m, 7 Aug. 1988, (–AA), *Vlok 1964* (PRE). **3423** (Knysna): Kysna District, Concordia Plantation, 215 m, May 1921, (–AA), *Keet 730* (NBC); Concordia, (–AA), *Keet 761* (PRE); Noetzie R, near mouth, W side of river above parking area of beach, N slope, 20 m, 22 May 1984, (–AA), *O’Callaghan, Fellingham & van Wyk 79* (NBC, PRE); Plettenberg Bay, 100 m, 2006, (–AB), *Helme 3502* (,); Plettenberg Bay, 100 m, 2006, (–AB), *Helme 3509* (NBC). **3424** (Humansdorp): Witte Els Bosch, hills near coast, 13 Nov. 1941, (–AA), *Esterhuysen 6742* (BOL); Witte Els Bosch flats, 18 Nov. 1941, (–AA), *Esterhuysen 6822* (BOL, K, PRE); flats at Witte Els Bosch, 215 m, Mar. 1921, (–AA), *Fourcade 1160* (BOL, BOL, K, NBC); Witte Els Bosch, Feb. 1926, (–AA), *Thode 828* (K, PRE).

124. ***Cliffortia bolusii*** Diels ex C.M.Whitehouse in Bothalia 38(1): 20, fig. 13, 15 (2007). Type: South Africa, Graaff-Reinet District, Nardouwsberg, Apr. 1873, *Bolus* 2630 (BOL, holo.; B†, iso.).



C. sp. 1 sensu Weim.: 158, fig. 47A (1934).

Shrub, densely divaricately branched, forming brachyblasts. *Young stems* hairy; stem hairs spreading to curled. *Leaves* trifoliate; leaflets elliptic to oblong, 3–7 × 0.6–0.8 mm; apex mucronate to rounded; margins flat, entire and smooth; lamina chartaceous, straight to curved downwards and away from the stem, hairy above and beneath, making 1.5–3.0 mm long, abaxially hairy, adaxially glabrous except for fringe of hairs at apex; stipules absent; petiole absent. *Flowers* unknown but solitary bracteoles found at bases of undifferentiated leaves; bracteoles hairy.

Habitat: Unknown, although the mountain generally has montane grassland with rocky outcrops and cliffs of dolerite; altitude 1 700–1 800 m (but see notes).

Distribution: Known only from a single collection made on the Nardouwsberg near Graaff-Reinet.

Conservation status: Not collected since it was discovered in 1873, though the Nardouwsberg is a large mountain and it may still occur there. The Nardouwsberg is subject to grazing and burning, making the chance of this species surviving away from the protection on rocks unlikely. Red List status: not listed.

Etymology: *bolusii* – named after Harry Bolus, founder of the Bolus Herbarium at the University of Cape Town and the only person to have ever collected this species.

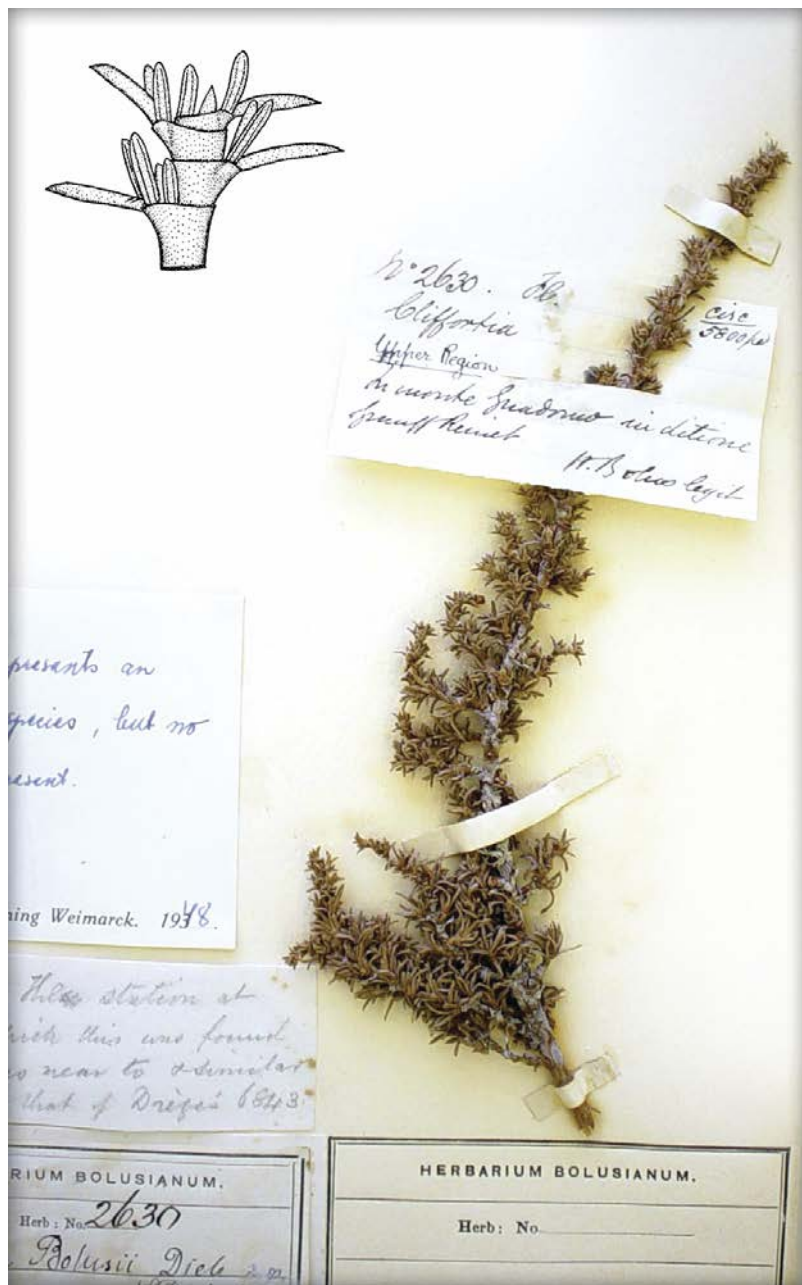
Notes: A very poorly known species, only described from a single surviving fragment of a collection made over 100 years ago. Unfortunately Bolus's notes describing his collecting trip to the Nardouwsberg were lost in a shipwreck, as probably were further specimens, this accounting for the paucity of the remaining fragment at BOL. More accurate information about the collecting locality is also lost. A cursory search of the Nardouwsberg failed to locate the species. Three other species were found there: *Cliffortia eriocephalina*, *C. montana* and *C. ramosissima*.

The name 'bolusii' is written on the herbarium sheet at BOL and attributed to Diels, though it was never published. Diels probably saw the specimen at B, which is now presumed lost, and relayed the information back to Bolus. Although the altitude is given as '5 800 ft' (± 1 770 m), this is also the altitude given for his specimen of *Cliffortia eriocephalina* (*Bolus* 851) from the same locality. On a recent trip to the Nardouwsberg, *C. eriocephalina* was only seen just below the summit, an altitude around 2 300 m.

As Weimarck noted, the lack of a good collection is frustrating. The species has no clear affinities, the small leaves with closely overlapping sheaths and lacking stipules are unknown in any other species. The only fertile parts present on the fragment are the remains of an old bracteole, which gives no indication of relationships. Until this species is rediscovered further clarification of this isolated species, both taxonomically and geographically, will have to wait.

Representative specimen

SOUTH AFRICA. 3224 (Graaff-Reinet): Nardouwsberg, 1770 m, Apr. 1873, (–BB), *Bolus* 2630 (BOL).



Cliffortia bolusii, type specimen.

Named and confirmed hybrids

As *Cliffortia* has an ability to reproduce clonally, either through underground rhizomes or apomictically via seed, hybrids have a tendency to persist and even spread in the environment. As they can play an important part in the ecology of the species due to backcrossing and introgression, any study of the species should note where these have arisen. The parentage of some hybrids are difficult to determine but where parentage has been established, I have considered it worth naming the hybrids, so that they can be referred to succinctly. Furthermore, one may regard them as apomictic species. It is therefore helpful for those who want to treat them that way, to provide the names. However, rather than naming every putative hybrid, I consider it only worth doing when the parentages have been confirmed to a reasonable level of certainty through molecular work and these are given below. All, except *C. × varians*, are intersectional hybrids. This demonstrates the remarkable ability for *Cliffortia* to form hybrids between parents that are morphologically and genetically diverse. It also means that many hybrids cannot be placed in the sectional hierarchy given above.

Conservation status is not included for any of the hybrids. This is not to say that hybrids are not worth conserving. As has been stated above, hybrids can play a significant role in the ecology of the species and its continuing influence of the other species in the area. Furthermore, hybrids may well represent the taxa of the future if the habitat changes radically. After all, that is how many of today's species of *Cliffortia* are thought to have arisen. The problem for hybrids, when it comes to conservation, is that they can be recreated as long as the parents are still present. Hybrids do not necessarily need a single point of origin, but can be formed on multiple occasions and in different places. Furthermore, many of these hybrids are likely to be recently formed. In such situations, declaring a hybrid to be rare or endangered when it has only just arisen, is meaningless. It may be lost in a few generations without any influence at all. On the other hand, though it is short-lived, it may play a vital role in the transfer of genes between one species and another. At present, the role of hybrids in the ecology and evolution of species needs further investigation.

Cliffortia × dissita C.M.Whitehouse hybr. nov. Type: Caledon District, Pringle Bay, by road to Missile Test Site, 60m, 15 Feb. 2000, *Whitehouse 81* (BOL, holo.!; K!, NBG!, iso.).



C. pungens × *ruscifolia*

C. cymbifolia sensu Dahlgren: fig. 3A (1971), non Weim.

Medium erect shrub, up to 0.9 m high, resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 0.9–1.8 mm wide, tinged reddish, hairy but soon becoming glabrous; stem hairs adpressed upwards, 0.3–0.5 mm long. *Leaves* unifoliolate; linear to very narrowly lanceolate, 6.4–12.7 × 1.5–3.8 mm; apex sharply acuminate to pungent, 0.6–1.6 mm long, margins markedly turned upwards, entire and smooth; lamina 3–7-veined from base, cartilaginous, 0.2–0.4 mm thick, midrib slightly prominent beneath, curved downwards and away from the stem, glabrous; sheath 1.1–1.9 mm long, abaxially glabrous, adaxially hairy; stipules 0.8–1.3 mm long, free, margins smooth to ciliate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy; sepals 3, glabrous. *Male flowers* unknown. *Female flowers* with bracteoles 2.8–4.0 mm long, longer than immature receptacle; sepals narrowly ovate, 3.0–4.1 × 0.8–1.5 mm, recurved; carpel 1; stigma 7.2–11.0 mm long, red, feathery, prominent above leaves; immature receptacle 2.3–3.6 × 0.9–1.3 mm, glabrous, clearly ribbed. *Achene* narrowly ellipsoid, 4.2–6.6 × 1.1–1.4 mm, curved, medium to dark brown, glabrous; 8–14-ribbed, ribs rounded to acute, 0.1–0.2 mm wide. *Flowering time*: December to February.

Habitat: Well-drained sandy soil from Table Mountain Series in full sun; altitude 0–200 m.

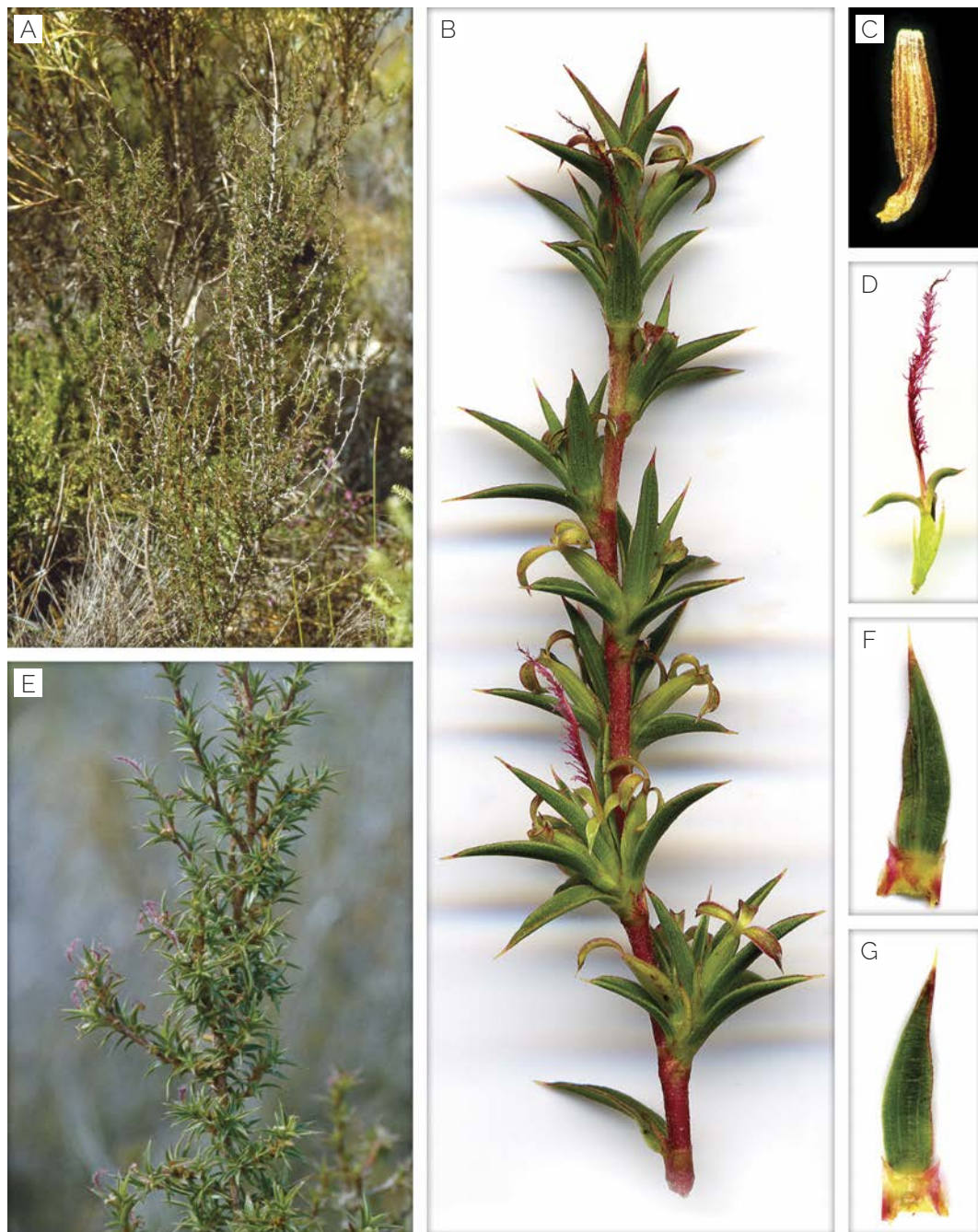
Distribution: Confined to the lower slopes of the Kogelberg around Pringle Bay, and appears to back-cross and introgress with *Cliffortia ruscifolia* further along the coast.

Etymology: *dissita* (Latin) means 'lying apart', referring to the two parents that appear to be a long way from each other.

Notes: This is a rather surprising hybrid as only one parent grows in the vicinity. *Cliffortia ruscifolia* is the maternal parent (Fig. 2) and is common and widespread. However, the closest that *C. pungens* grows is on Jonaskop, some 70 km away. Molecular evidence strongly supports *C. pungens* as the sister taxon in the nuclear tree (Fig. 1) and the paternal parent is either this species or a close relative that has not yet been discovered. At first the plant was included within the circumscription of *C. × cymbifolia*, but it is unlikely that they have the same parentage, as several species could result in a hybrid of *C. ruscifolia* having narrower curved leaves.

Representative specimens

SOUTH AFRICA. **3418** (Simonstown): Pringle Bay, near reservoir, 90 m, 8 Feb. 1956, (–BD), *Levyans 10429* (BOL); near Pringle Bay reservoir, 185 m, 23 Feb. 1957, (–BD), *Levyans 10657* (BOL); Pringle Bay, by road to Missile Test Site, 60 m, 15 Feb. 2000, (–BD), *Whitehouse 81* (BOL, K, NBG); Kogel Bay, beneath Blousteenbergrug, along coast road, 20 m, 27 Dec. 2000, (–BD), *Whitehouse 174* (BOL); Pringle Bay, by road to Missile Test Site, 60 m, 18 Dec. 2002, (–BD), *Whitehouse 330* (BOL).



Cliffortia × dissita: A, habitat; B & E, branch with female flowers; C, achene; D, female flower; F, dorsal view of leaf; G, ventral view of leaf.

Cliffortia × homunculi *C.M.Whitehouse* hybr. nov. Type: Uniondale District, Kammanassie Nature Reserve, plateau to N of Buffelsberg, 1500m, 18 Feb. 2001, *Whitehouse 199* (BOL, holo.!, NBG!, iso.).



C. neglecta × *tuberculata*

Medium erect shrub, up to 0.5 m high, resprouting after fire and spreading clonally; densely divaricately branched, forming brachyblasts. *Young stems* 1.1–1.5 mm wide, tinged reddish, hairy; stem hairs adpressed upwards, 0.2–0.3 mm long. *Leaves* trifoliolate; leaflets linear to narrowly lanceolate, 3.8–9.6 × 0.5–1.0 mm; apex sharply long acuminate, 0.4–0.7 mm long, margins flat, minutely serrulate to scabrid; lamina chartaceous, 0.4–0.6 mm thick, midrib prominent against lamina beneath, curved downwards and away from the stem, glabrous; sheath 1.2–1.9 mm long, abaxially glabrous, adaxially glabrous or with a few scattered adpressed hairs; stipules 0.8–1.2 mm long, free, margins smooth to serrulate; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins serrate or very shortly ciliate; sepals 3, glabrous. *Male flowers* unknown. *Female flowers* with bracteoles 2.2–3.2 mm long, longer than immature receptacle; sepals ovate, 1.8–2.2 × 0.8–1.1 mm, erect becoming spreading; carpel 1; stigma 3.3–4.5 mm long, pinkish to greenish white, feathery, usually prominent above leaves; immature receptacle 1.5–2.0 × 0.9–1.1 mm, glabrous, clearly ribbed. *Achene* ellipsoid, 3.2–4.1 × 1.6–1.9 mm, medium brown, glabrous; 8–11-ribbed, ribs rounded, 0.1–0.2 mm wide. *Flowering time*: found in flower around February.

Habitat: Deep well-drained acidic sands from Table Mountain Series in full sun; altitude 1450–1550 m.

Distribution: Only found once in the Kammanassie Mountains.

Etymology: *homunculi* (Latin) means ‘of the little man’, referring to its location near Mannetjiesberg, the latter being the Afrikaans for ‘little men mountain’.

Notes: This is known from a clonally spreading population found on the deep sandy soils of the plateau behind Buffelsberg near Mannetjiesberg. Morphologically it appears very similar to *Cliffortia multiformis* and originally thought to be an extreme outlier of that species. However, molecular work points to the seed parent as *C. neglecta* (Fig. 2) and the pollen parent as *C. tuberculata* (Fig. 1). *Cliffortia tuberculata* grew within a few metres of the population on a rocky outcrop, while *C. neglecta* is known from Mannetjiesberg. Achenes are freely produced but it is not known whether these are viable or not. While the population spread for several square metres it is possible that this originated from a single clonal plant.

Representative specimen

SOUTH AFRICA. 3322 (Oudtshoorn): Kammanassie Nature Reserve, plateau to N of Buffelsberg, 1500 m, 18 Feb. 2001, (–DB), *Whitehouse 199* (BOL, NBG).



Cliffortia × *homunculi*: A, habitat; B, dorsal view of leaf; C, ventral view of leaf; D & G, branch with female flowers; E, female flower; F, achene.

Cliffortia × ilicioides C.M.Whitehouse hybr. nov. Type: Worcester District, Jonaskop, Wildepaardeberg, slopes above plateau, 1220m, 15 Sept. 2000, *Whitehouse 140* (BOL, holo.!; NBG!, iso.).



C. dregeana × *pungens*

Medium to tall erect shrub, up to 1 m high, resprouting after fire and spreading clonally; forming long branches or elongated brachyblasts. *Young stems* 2.0–2.6 mm wide, completely sheathed by leaf bases, glabrous. *Leaves* unifoliate; oblong to ovate, 17–24 × 7.1–8.1 mm; apex sharply acuminate to pungent, 1.6–2.2 mm long; margins flat or slightly channelled, with 4–6 teeth, 1.7–2.8 mm long, occasionally entire; lamina 5–7-veined from base, cartilaginous, 0.4–0.6 mm thick, curved downwards and away from the stem, green, glabrous; sheath 2.7–3.1 mm long, abaxially glabrous, adaxially glabrous except sometimes for fringe of hairs at apex; stipules 3.7–6.1 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins smooth; sepals 3, glabrous. *Male flowers* with bracteoles 4.8–7.5 mm long; pedicel 1.0–1.2 mm long, glabrous; sepals broadly ovate, 9.4–10.4 × 5.1–6.4 mm, acute to acuminate at the apex; stamens 20–24; filaments 5.7–7.1 mm long, red; anthers brownish red. *Female flowers* with bracteoles 4.9–7.2 mm long, longer than immature receptacle; sepals broadly ovate to triangular, 3.0–3.8 × 1.2–2.2 mm, erect; carpel 1; stigma 3.2–5.8 mm long, red, feathery, reaching above the base of the leaves; immature receptacle 3.3–3.7 × 2.5–2.8 mm, glabrous, smooth. *Achene* not seen. *Flowering time*: collected in flower in September and March, probably throughout the year.

Habitat: Fynbos on acidic sands from Table Mountain Series in full sun; altitude 800–1 250 m.

Distribution: Riviersonderend Mountains, particularly around Jonaskop but possibly further east as well.

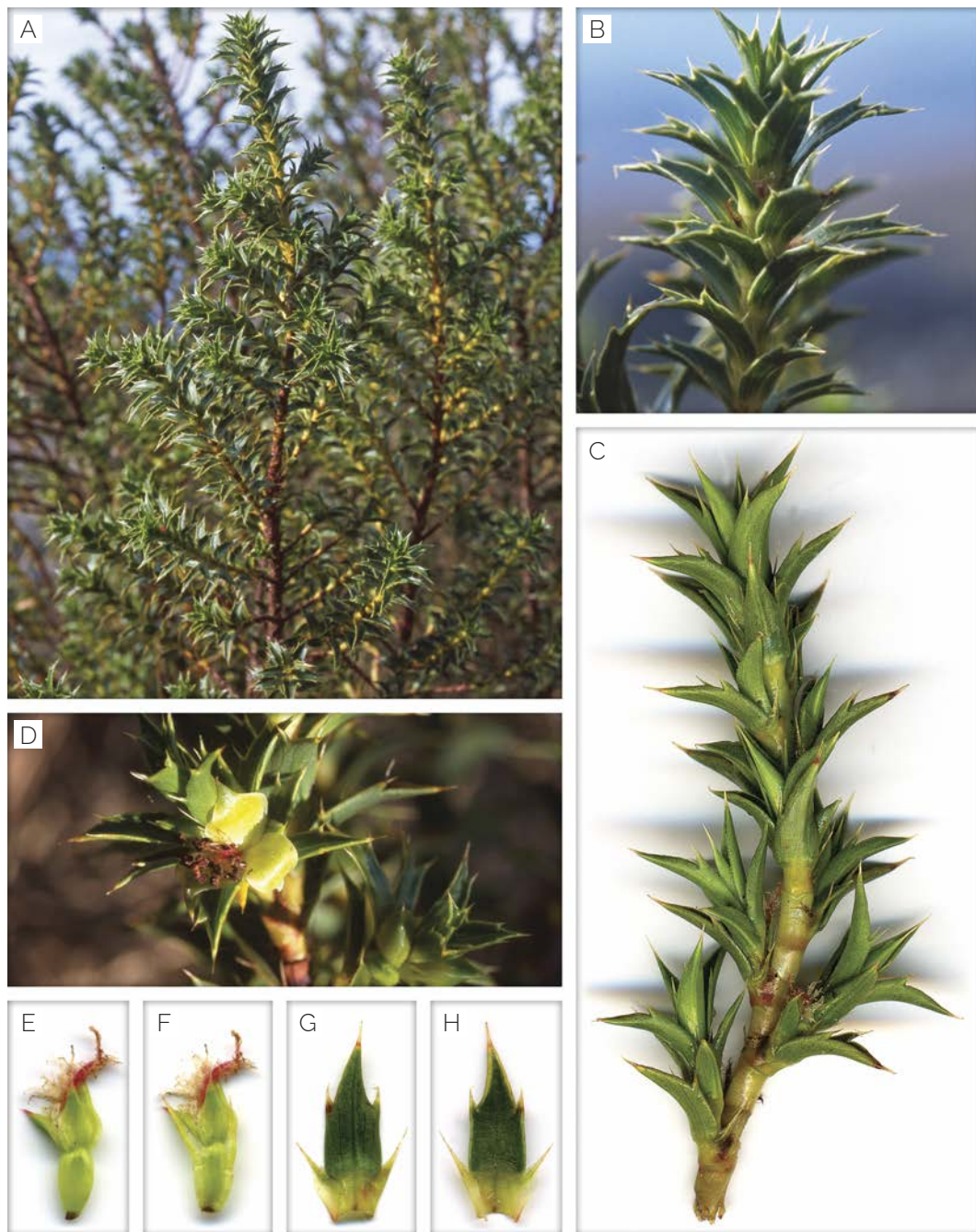
Etymology: *ilicioides* (Latin) means 'like holly (*Ilex*)', referring to its initial similarity to *Cliffortia ilicifolia*.

Notes: This hybrid of *Cliffortia dregeana* and *C. pungens* has been recorded twice in the Riviersonderend Mountains. It forms hybrid swarms with individuals resembling one parent or the other. Both parental species grow in the same location, although the hybrid was only detected as a result of molecular studies. The leaves are strongly toothed, rather like *C. ilicifolia*, a feature that is not present on one parent and only occasionally expressed on the other. The flowers had long red styles, a character not found in *C. ilicifolia*. It was outside the normal range for that species. Molecular work suggested the parentage as given and affinities to both parents can then be identified in the morphology; i.e. long red style as in *C. pungens* and tough broader leaves of *C. dregeana*.

There is a chance that the type of *Cliffortia meyeriana* also represents this cross or a backcross of this. That name would then take priority over *C. × ilicioides*. However, other populations of *C. dregeana* have strongly toothed leaves without *C. pungens* growing in the same vicinity, so there is no certainty that this is the case. The other potential type specimen that might also represent this cross is *C. theodori-friesii* var. *puberula*. However, that name is at a different rank, so would not take priority. Besides, that specimen probably has *C. scandens* involved in its parentage.

Representative specimen

SOUTH AFRICA. 3319 (Worcester): Jonaskop, Wildepaardeberg, slopes above plateau, 1220 m, 15 Sept. 2000, (–DC), *Whitehouse 140* (BOL, NBG).



Cliffortia x ilicioides: A, habitat; B & C, branch with female flowers; D, branch with male flower; E & F, female flower; G, ventral view of leaf; H, dorsal view of leaf.

Cliffortia × integerrima Weim. in Monograph of the Genus Cliffortia: 104, fig. 30A–C (1934); Levyns: 448 (1950). Type: Cape Peninsula, Rondebosch, Oct. 1896, 305m, *Schlechter 9024* [The specimen at BOL has the locality as Rosebank, while the NBG specimen has the altitude as 460m (1500')] (B, holo.†; BM!, BOL!, COI, G-DEL, GRA!, HBG!, K!, NBG!, NH, P, PRE, Z!).



C. odorata × *C. ruscifolia* × *C. sp.*

Low-growing shrub with weak branches becoming procumbent, up to 0.6 m high, resprouting after fire and spreading clonally; forming long branches and weakly-defined brachyblasts. *Young stems* 1.4–1.8 mm wide, sometimes sheathed by leaf bases, glabrous. *Leaves* unifoliate; oblong to ovate, 18–22 × 7.3–10 mm; apex pungent, 0.7–1.7 mm long; margins flat, entire; lamina 8–10-veined from base, tough and rigid, curved downwards and away from the stem, glabrous; sheath 2.6–3.4 mm long, abaxially glabrous, adaxially with a few adpressed hairs; stipules 3–4 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins smooth or ciliate; sepals 3, glabrous. *Male flowers* unknown. *Female flowers* with bracteoles 5.7–7.1 mm long, longer than immature receptacle; sepals narrowly to broadly ovate, 3.8–4.7 × 1.8–2.4 mm, erect; carpel 1; stigma 4.9–8.4 mm long, red, feathery, prominent above leaves; immature receptacle 2.0–2.2 × 1.3–1.4 mm, glabrous, clearly ribbed. *Achene* ovoid, 3.1–3.5 × 1.7–1.8 mm, medium to dark brown, glabrous; ribs 14–16, rounded. *Flowering time*: August to October.

Habitat: Fynbos on shale slopes; altitude 300–450 m.

Distribution: Known only from a small patch on the lower slopes of Devil's Peak.

Etymology: *integerrima* (Latin) means 'absolutely entire', referring to the leaves in contrast to similar species which generally have at least a few teeth present.

Notes: *Cliffortia × integerrima* is known today from a single clonal patch just beneath the King's Blockhouse on the lower slopes of Devil's Peak. This may well be the same population that was collected by Schlechter as it is around the same altitude above Rondebosch. This is evidence of the longevity of some of these hybrids within the genus; this one being known for over 100 years.

It shows the characteristics of a cross between *Cliffortia ruscifolia* and a member of sect. *Multinerviae*, having long and short shoots, although the short shoots never form true brachyblasts. The long red style is also more typical of *C. ruscifolia* than a member of the sect. *Multinerviae*. Interestingly though, molecular analysis of the ITS region (Fig. 3) revealed that it also contained sequences found in *C. odorata*. Although the leaf morphology gives no hint of this parentage, the weak ascending branches which trail along the ground could be an influence from this parent. Despite its tri-parental origins, seed from these plants has been grown, which lends support to apomixis being a prevalent means of reproduction in *Cliffortia*.

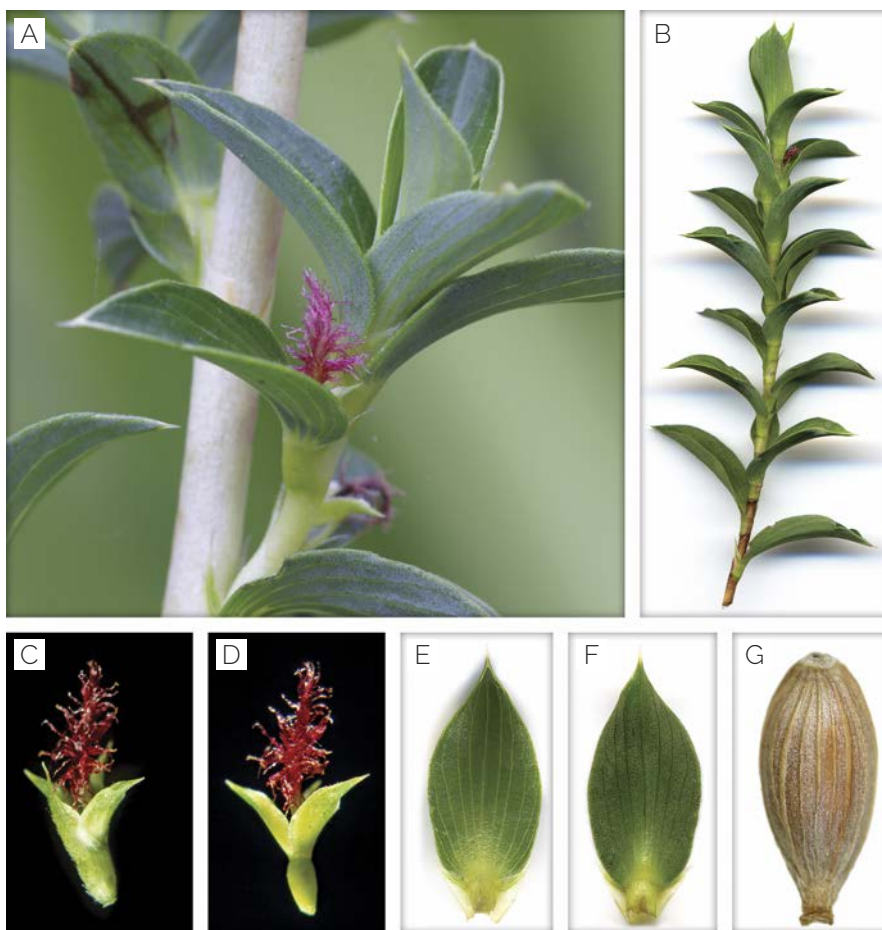
Specimens from the saddle between Devil's Peak and Table Mountain (e.g. on the saddle between Devil's Peak and Table Mt., 20 Mar. 1847, *Alexander-Prior s.n.* (K); saddle between Table Mt and Devil's Peak, at top of Newlands Ravine, 740 m, 27 Jan. 2000, *Whitehouse 70* (NBC)) share the same leaf morphology as the plants from the bottom and the name *Cliffortia integerrima* has been applied to these in the past. However, they are tall erect shrubs, without shorter shoots, and short whitish styles. The type specimen of *C. integerrima* definitely matches the plants from near the King's Blockhouse, having a mixture of long and short shoots. The plants from the saddle could be the third parent of *C. × integerrima*, along with *C. ruscifolia* (chloroplast) and *C. odorata*. However, at present there is no name to apply to them. One could regard them as a broad-leaved form of

C. theodori-friesii, smooth leaved *C. ilicifolia*, or even a new species, but more research is needed on the various forms of sect. *Multinerviae* found on the Cape Peninsula.

Weimarck described a hybrid between *Cliffortia* × *integerrima* and *C. ruscifolia* from around Sir Lowry's Pass. These plants definitely have *C. ruscifolia* in them, but I doubt that *C. × integerrima* is responsible for their other characteristics. At present these are just regarded as another introgressed form of the very variable *C. ruscifolia*.

Representative specimens

SOUTH AFRICA. 3318 (Cape Town): Rondebosch, 460 m, Oct. 1896, (–CD), *Schlechter 9024* (BM, BOL, K, NBG, PRE); Cape Peninsula, NE slopes of Devil's Peak, just beneath King's Blockhouse, 410 m, 5 Aug. 1999, (–CD), *Whitehouse 47* (BOL, K, MO, NBG).



Cliffortia × *integerrima*: A, & B branch with female flowers; C & D, female flower; E, dorsal view of leaf; F, ventral view of leaf; G, achene.

Cliffortia × intermedia Eckl. & Zeyh., Enumeratio Plantarum Africae Australis Extratropicae 2: 266 (1836); Harv.: 295 (1862); Bolus & Wolley-Dod: 259 (1904); Weim.: 106, fig. 30G–K (1934); Levyns: 449 (1950); Dahlgren: 300 (1971). Type: Cape Peninsula, E slopes of Table Mt, above Constantia, *Ecklon & Zeyher 1721* (S, holo.; B†, C, HAL!, SAM!, TCD!, W!, iso.).



C. ilicifolia × *ruscifolia*

Medium erect shrub, up to 1.2 m high, resprouting after fire and spreading clonally; sparsely branched, forming long branches and weakly-defined brachyblasts. *Young stems* 1.8–2.3 mm wide, glabrous. *Leaves* unifoliate; oblong or lanceolate, 13–19 × 6.0–12.5 mm; base cordate to clasping stem; apex pungent, 1.1–2.2 mm long; margins flat or slightly channelled, with up to 2 broad teeth, 1.3–4.0 mm long, often entire; lamina 7–11-veined from base, cartilaginous, 0.2–0.5 mm thick, curved downwards and away from the stem, green, glabrous; sheath 2.0–3.6 mm long, abaxially glabrous, adaxially glabrous except sometimes for fringe of hairs at apex; stipules 2.1–4.3 mm long, free, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel, margins smooth; sepals 3, glabrous. *Male flowers* unknown. *Female flowers* with bracteoles 3.4–5.8 mm long, longer than immature receptacle; sepals ovate to narrowly triangular, 1.9–2.7 × 0.6–1.2 mm, erect; carpel 1; stigma 3.3–4.4 mm long, red, feathery, hidden at base of leaves; immature receptacle 2.5–3.0 × 1.5–2.0 mm, glabrous, smooth. *Achene* broadly ellipsoid, slightly flattened, 5.2–6.2 × 2.7–3.2 mm, medium brown, glabrous, 22–27-ribbed; ribs rounded, 0.1–0.2 mm wide. *Flowering time*: August to January.

Habitat: Fynbos on shale slopes; altitude ± 180 m.

Distribution: Known from the lower eastern slopes of Table Mountain.

Etymology: *intermedia* (Latin) means 'intermediate', presumably between *Cliffortia ilicifolia* and *C. ruscifolia*, which appear to be the parent species.

Notes: Another long-established hybrid, it has been collected a number of times, all on the lower eastern slopes of Table Mountain above Constantia and Bishopscourt. At first appearance it seems to belong to sect. *Multinerviae*, but the presence of shorter shoots points to its hybrid status. Molecular work confirms this, revealing *Cliffortia ruscifolia* as the maternal parent (Fig. 2). On fresh specimens, the style is red, a feature of *C. ruscifolia* and one rarely found amongst sect. *Multinerviae*. The presence of *C. ilicifolia* on the Cape Peninsula is intriguing, and plants that fit typical *C. ilicifolia* have been found near Chapman's Peak and the southern end of Table Mountain above Hout Bay. The ITS region (Fig. 3) suggests that there may be a third species involved from sect. *Multinerviae* other than *C. ilicifolia*.

In Silvermine Nature Reserve (part of the Table Mountain National Park) near Noordhoek Peak, there is a population of plants belonging to sect. *Multinerviae* which have often been attributed to *Cliffortia* × *intermedia* (Steenberg, 13 Sept. 1942, *Compton 13636* (NBG); Noordhoek, by stream, 460 m, 9 May 1943, *Compton 14547* (NBG); Noordhoek Mt, 460 m, 7 Jan. 1945, *Compton 16904* (NBG); Silvermine Nature Reserve, E facing slopes of Noordhoek Peak along jeep track, 650 m, 12 Oct. 2001, *Whitehouse 275* (BOL)). However, these plants do not have short shoots or red styles. As with the plants that look similar to *C. × integerrima*, they appear to be without a name at present.

Representative specimens

SOUTH AFRICA. 3318 (Cape Town): Kirstenbosch, July 1923, (–CD), *Compton s.n.* (BOL, BOL); Cape Peninsula, Wynberg, Bishopscourt, 14 Apr. 1940, (–CD), *Compton 8690* (NBG); Kirstenbosch, Silver Tree Hill, 185 m, 27 Dec. 1944,

(–CD), *Compton 16814* (BOL); Cape Peninsula, Kirstenbosch, slopes on Silver Tree Ridge, near Directors House and below Herbarium, 30 Aug. 1949, (–CD), *Esterhuysen 15686* (BOL, K, NBG); Cape Peninsula, Kirstenbosch, Silver Tree Hill, above dam, 13 Dec. 2000, (–CD), *Whitehouse 191* (BOL). **3418** (Simonstown): on the Constantia side of Table Mt., 28 May 1847, (–AB), *Alexander-Prior s.n.* (K, PRE); Hout Bay Nek, (–AB), *anon s.n.* (BOL); Cape District (Wynberg–Constantia ex Weimarck), Feb. , (–AB), *Burchell 792* (K).



Cliffortia × intermedia: A, habitat; B, branch; C, achene.

Cliffortia × maclearica *C.M.Whitehouse* hybr. nov. Type: Cape Peninsula, Table Mt, Maclear's Beacon, 1065m, 25 Apr. 1926, *Compton* 4272 (BOL, holo.!; LD, iso.).



C. odorata × *theodori-friesii*; Weim.: 154, fig. 46 (1934); Levyns: 450 (1950).

C. odorata × *ruscifolia* sensu Lotsy & Goddijn: 128 (1928).

Low to medium erect shrub, up to 0.5 m high, resprouting after fire and spreading clonally; only forming long branches. *Young stems* 1.6–2.1 mm wide, sometimes tinged reddish, completely sheathed by leaf bases, glabrous. *Leaves* unifoliate; elliptic to oblong, 21–25 × 8.8–9.7 mm; apex pungent, 0.9–1.4 mm long; margins flat, with 9–14 straight teeth, 1.0–1.5 mm long; lamina 4–7-veined from base, cartilaginous, 0.2–0.5 mm thick, midrib beneath prominent, curved downwards and away from the stem,



Cliffortia × *maclearica*: A, habitat; B, dorsal view of leaf; C, ventral view of leaf.

green, glabrous except sometimes for a few 0.3–0.5 mm long hairs on midrib; sheath 3.9–5.0 mm long, abaxially and adaxially glabrous or with a fringe of hairs at apex; stipules 6.1–6.3 mm long, brown and scarious, free, ciliate. *Flowers* solitary in axils of undifferentiated leaves; bracteoles glabrous on the keel, margins ciliate; sepals 3, hairy. *Male flowers* with stamens ± 19 ; filaments ± 8 mm long. *Female flowers* unknown.

Habitat: Amongst fynbos on summit plateau; 1 000–1 100 m.

Distribution: Known only from the Cape Peninsula, on the eastern side of the plateau of Table Mountain. As one of its parents is endemic to Table Mountain, it is very unlikely to be found anywhere else.

Etymology: *maclearica* (Latin) means from the place Maclear, referring to its location near Maclear's Beacon.

Notes: This hybrid is beautifully intermediate between two morphologically different parents. It appears similar to *Cliffortia ovalis* or a robust erect form of *C. ferruginea* in growth habit and leaf form, but the hybrid has densely hairy sepals and brown scarious stipules. Until recently, it was only known from an area just south of Maclear's Beacon, but there have been reports of it further south along the eastern side of Table Mountain.

It is possible that this hybrid is partly responsible for the unusual parentage of *Cliffortia* $\times$ *integerrima*, which was only suspected, following molecular work, to have *C. odorata* in its history.

Representative specimens

SOUTH AFRICA. **3318** (Cape Town): near Maclear's Beacon, slopes facing S, 1065 m., 27 Nov 1932, *Andreae s.n.* (BOL); Table Mt., Maclear's Beacon, 1065 m, 25 Apr. 1926, *Compton 4272* (BOL, LD); Table Mt., between Maclear's Beacon and Fernwood Peak, 1005 m, 20 Feb. 1964, *Levy's 11644* (BOL); Cape Peninsula, Table Mt, Smuts Track, S of Maclear's Beacon, top of Hiddingh Ravine, 1020 m, 7 Sept. 2002, (–CD), *Whitehouse 307* (BOL, NBC).

Cliffortia × varians Weim. in Botaniska Notiser 90: 190, fig. 10, t. 8B (1948); Dahlgren: 295, fig. 5F (1971). Type: Swellendam District, near Bonnievale, Sept. 1933, *Leighton 21167* (BOL, holo!).



C. crenata × *obovata*

Medium shrub, up to 1 m high, resprouting after fire and spreading clonally; forming brachyblasts. *Young stems* 1.1–1.7 mm wide, sometimes tinged reddish, glabrous. *Leaves* unifoliate, bifoliate or trifoliate; leaflets very variable, subcircular to obovate, often assymetric, 7.6–10.4 × 3.6–10.0 mm; apex rounded to obtuse or mucronate, up to 0.2 mm long; margins flat, entire and smooth, sometimes with a tooth or lobe, up to 2.6 mm long; lamina 1–5-veined from base, chartaceous, 0.2–0.3 mm thick, curved upwards and towards the stem, glaucous, glabrous; sheath 1.0–1.4 mm long, abaxially glabrous, adaxially glabrous or with a few adpressed hairs; stipules membranous, up to 0.5 mm long, margins smooth; petiole absent. *Flowers* solitary in axils of undifferentiated leaves; bracteoles hairy on the keel with smooth or ciliate margins; sepals 3, glabrous. *Male flowers* with bracteoles 1.9–2.7 mm long; pedicel 0.5–0.9 mm long, glabrous; sepals broadly ovate, 6.2–7.6 × 3.4–4.2 mm, acute to acuminate at the apex; stamens 13–15; filaments 8.0–10.1 mm long, red; anthers brownish red. *Female flowers* with bracteoles 2.0–3.1 mm long, as long as to longer than immature receptacle; sepals narrowly to broadly ovate, 3.2–4.2 × 1.3–1.8 mm, recurved; carpel 1; stigma 7.6–9.9 mm long, red, feathery, prominent above leaves; immature receptacle 1.6–2.4 × 0.9–1.2 mm, glabrous, smooth to ribbed. *Achene* ellipsoid, 3.2–3.6 × 1.4–1.7 mm, greyish to medium brown, glabrous; 8–12-ribbed, ribs acute, up to 0.1 mm wide. *Flowering time*: September to October.

Habitat: Arid fynbos on well-drained sandy soil from Table Mountain Series in full sun; altitude 650–1100 m.

Distribution: Known from where the two parents grow together on the northern slopes of the Riviersonderend Mountains.

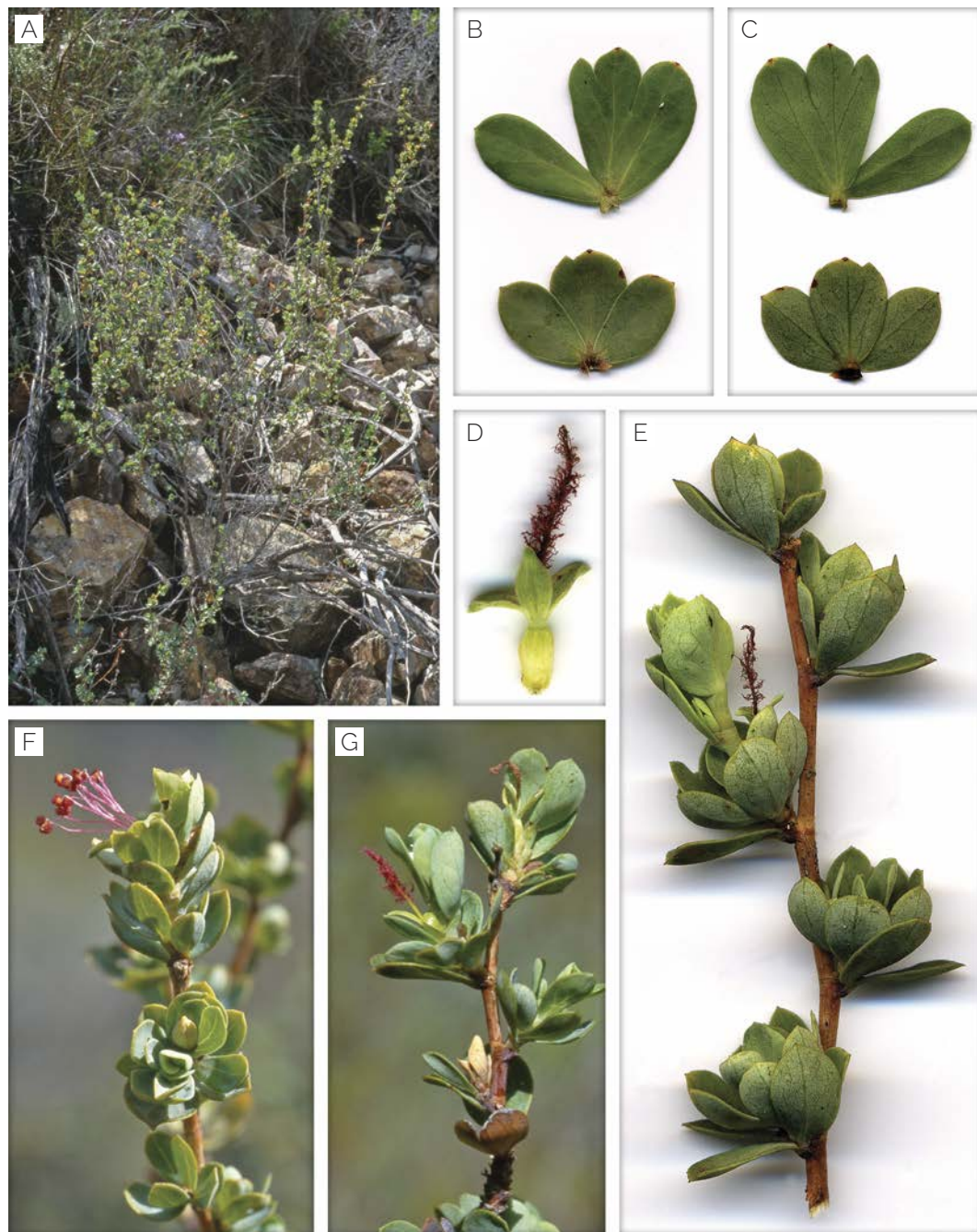
Etymology: *variens* (Latin) means ‘variable’, referring to the leaves that vary widely in shape and form from unifoliate to trifoliate.

Notes: Weimarck described this as a new species, but its distinctive leaf shape is due rather to its parentage between two morphologically dissimilar species. Hybrids that fit *Cliffortia* × *variens* occur in several localities along the northern slopes of the Riviersonderend Mountains, where the ranges of the two parental species overlap.

Cliffortia crenata is probably also one of the parents of other crosses with variable leaves, such as the type specimens of *C. crenulata* and *C. mirabilis*. In these putative crosses, the other parental species has not been determined.

Representative specimens

SOUTH AFRICA. **3319** (Worcester): Jonaskop Mt, first nek after 2nd gate, 1100 m, 2 Sept. 1981, (–DC), *Boucher 5023* (NBG). **3320** (Montagu): near Bonnievale, Sept. 1933, (–CC), *Leighton 21167* (BOL). **3419** (Caledon): Riviersonderend Mts, Die Galg, at end of old pass as trail descend down in to Boesmanskloof, 670 m, 18 Oct. 2001, (–BA), *Whitehouse 281* (BOL, NBG). **3420** (Bredasdorp): Stormsvlei Kloof, Oct. 1940, (–AA), *Esterhuysen 5191a* (BOL).



Cliffortia x varians: A, habitat; B, dorsal view of leaf; C, ventral view of leaf; D, female flower; E & G, branch with female flowers; F, branch with male flower.

Names probably representing hybrids with uncertain parentage

The names below were originally described as species, but I consider them more likely to represent hybrids. However, unlike the names of confirmed hybrids in the previous section, the parents have not been confirmed. Often only one parent can be surmised at, while the other is supposition based upon likely sympatric species. I do not consider these hybrids worth recognising at present until more work is done on them, in particular on the populations from which the type was originally discovered.

Cliffortia × crenulata Weim. in Botaniska Notiser 1933: 154, fig. 6 (1933) & 94, fig. 27G–L (1934). Lectotype, designated here: Caledon District, Riviersonderend, 330m, 20 Oct. 1894, *Schlechter 5641* (BOL, lecto.!; B†, BM!, GRA!, G–DEL, HBG!, K!, L, PRE!, SAM!, W!, Z!, iso.).

Weimarck considered that the plant on which this name was based was most similar to *Cliffortia crenata* and *C. pulchella*, but differed from both in a number of characters. No similar plant has been rediscovered and it is probably a hybrid involving one or both of these species. Given its locality *C. × crenulata* could be the same cross as *C. × varians* (and hence an earlier name), but the type specimen suggests that it is actually a hybrid of *C. pulchella*. However, *C. pulchella* has so far not been found on the Riviersonderend Mountains, although it is common just across the Breede River Valley on the Langeberg.

Cliffortia × cymbifolia Weim. in Botaniska Notiser 90: 197, fig. 15a–e (1948). Type: Paarl District, Franschoek [French Hoek] Forest Reserve, 28 Sept. 1936, *Compton 5684* (NBG, holo.!).

The type is evidently derived from *Cliffortia ruscifolia* but has much narrower leaflets than the species. *Cliffortia neglecta* is a possible other parent, but any needle-leaved species is probably a likely candidate. Other plants from the Franschoek area that fit this hybrid include: Franschoek Forest Reserve, 28 Sept. 1935, *Esterhuysen s.n.* (BOL); Franschoek, 335 m, Oct. 1905, *Kensit s.n.* (BOL); Franschoek Forest Reserve, 3 Oct. 1942, *Leighton s.n.* (K); Franschoek Forest Reserve, 3 Oct. 1942, *Leighton 12* (BOL).

Weimarck also included a plant from the Swartberg Pass (*Stokoe 8615*) in his original protologue, although noting that it was slightly different. Considering the wide gap between that collection and the type, it is very likely it has different origins and different parents.

Cliffortia × mirabilis Weim. in Botaniska Notiser 90: 191, fig. 11, t. 8C (1948). Type: Worcester District, Kwadouws [Karadouws] Mts, NW slopes above Orchard, 915–1220m, 26 July 1944, *Esterhuysen 10883* (BOL, holo.!; NBG!, iso.).

The type of this name is almost certainly a hybrid of *Cliffortia crenata*, but the other parent is less clear. *Cliffortia polita* and *C. teretifolia* grow in the area and are possible parents, but morphology of the type is not enough to confirm either of these. The type of *C. × semiteres*, a putative hybrid of *C. teretifolia*, has also been found around Orchard. Elsewhere, plants attributed to *C. × mirabilis* (e.g. Dahlgren: fig. 1C (1971)) could have other parentage, such as *C. crenata* × *C. amplexistipula*, a likely combination for those plants attributed to *C. × mirabilis* from the Anysberg.

Cliffortia × semiteres Weim. in Botaniska Notiser 90: 186, fig. 9h–i, t. 8A (1948). Type: Worcester District, Hex R Valley, Orchard, July 1944, *Esterhuysen 10344* (BOL, holo.!).

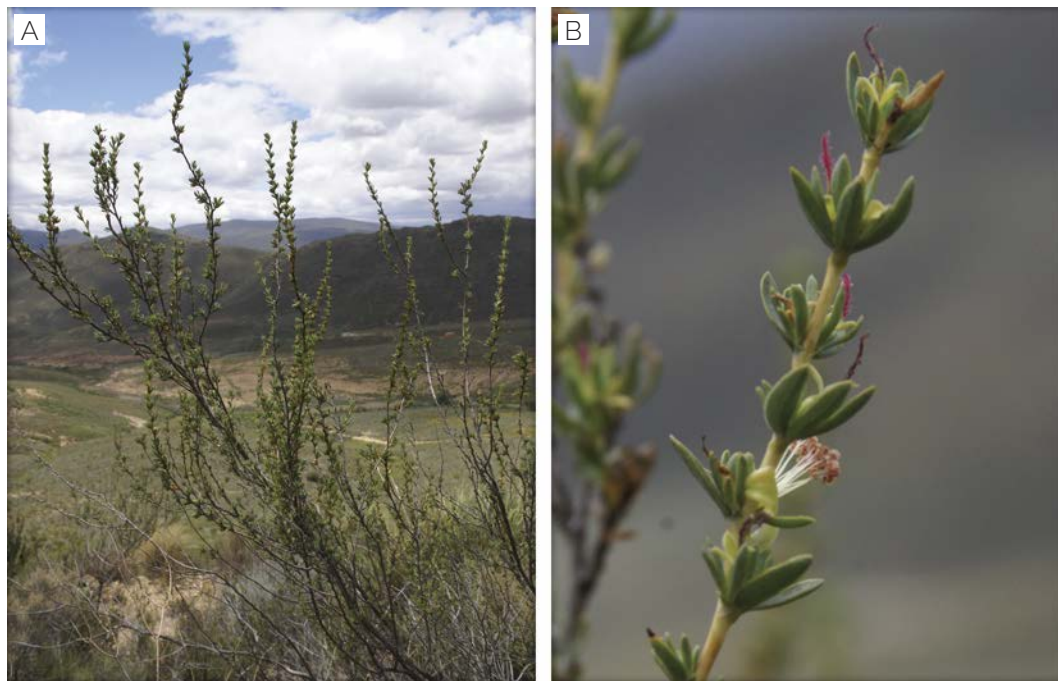
The type specimen is probably a hybrid between *Cliffortia teretifolia* and a member of the *C. glauca* series. Considering the problems in separating the species in the *C. glauca* series, it is questionable whether hybrids can be named with any certainty. Dahlgren (1971) recognised this species based upon *Esterhuysen 25977* from Anysberg but it may not have the same parentage as the type.

***Cliffortia* × *subdura* Weim.** in Botaniska Notiser 112: 75, fig. 1d–f, 2 (1959). Type: Worcester District, Du Toits Kloof, 14 May 1950, *Esterhuysen 16955* (LD, holo.!; BOL!, NBG!, iso.).

The type specimen for this name is very similar to *Cliffortia polygonifolia*, but has shinier, tougher leaves. The lack of further collections suggests an isolated plant or swarm of hybrid origin. *Cliffortia polygonifolia* is known from Du Toitskloof, but the other parent is hard to surmise from morphology alone.

***Cliffortia theodori-friesii* var. *puberula* Weim.** in Botaniska Notiser 90: 195, fig. 12e (1948). Type: Caledon District, Riviersonderend Mts, Sept. 1943, *Stokoe 9002* (BOL, holo.).

The type of this taxon clearly belongs in sect. *Multinerviae*, but has little to do with *Cliffortia theodori-friesii*. Weimarck considered that the plants from the Riviersonderend Mountains might belong to a new species, but there was insufficient material to confirm this. While not ruling out this possibility, there are a number of known hybrid populations in sect. *Multinerviae* in the Riviersonderend Mountains involving *C. dregeana* and *C. scandens*. The possibility that the type represents one of these is much more likely (see also comments under those species and *C. pungens*).



Cliffortia × *mirabilis*: A, habitat; B, branch with male and female flowers.

Excluded names

Cliffortia acerosa Banks, nomen = *Nenax acerosa* Gaertn.

C. cinerea Thunb. = *Nenax cinerea* (Thunb.) Puff

C. concavifolia Eckl. & Zeyh. = *Aspalathus cytisoides* Lam.

C. flabellifolia Sond. = *Myrothamnus flabellifolia* Welw.

C. spicata Rchb. ex Spreng. = *Anthospermum* sp.

C. subulata Weim. in Botaniska Notiser 90: 198 (1948), nom. illegit. A name used by Weimarck for a species when comparing *C. cymbifolia*. He distinguished it from *C. cymbifolia* by its lack of brachyblasts and longer stipules. But he cited no specimen. It is likely a confusion with another species or a species he intended to publish but never completed.

8

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Appendix:

Voucher specimens used in molecular analysis.

Collection includes Genbank accession when this was used

Taxon	Collection	Date	Locality
<i>Acaena cylindristachya</i>	Hibbs 167		Bolivia, Andes
<i>Acaena caesiiglauca</i>	Francisco-Ortega 97-115 (AF183512, AF183535)	1997	From cultivation
<i>Acaena latebrosa</i>	Whitehouse 122	31-May-00	Sutherland District, escarpment at top of Komsberg Pass
<i>Acaena magellanica</i>	Hibbs 61 (AJ512781)		From cultivation
<i>acanthophylla</i>	Whitehouse 248	16-Aug-01	Clanwilliam District, Olifants R Mts, Die Berg road, S of Bloubos
<i>aculeata</i>	Whitehouse 160	20-Oct-00	Oudtshoorn District, Swartberg Mts, peak between Waboomsberg and Swartberg Pass, gully on NE side
<i>acutifolia</i>	Whitehouse 254	19-Aug-01	Calvinia District, ± 5 km W of Nieuwoudtville along Vanrhynsdorp road
<i>Agrimonia eupatoria</i>	Eriksson 654 (U90798)	Jul-93	Uppland, Sweden
<i>alata</i>	Whitehouse 94	11-Mar-00	Riversdale District, Garcia's Pass, just S of Muiskraal
<i>amplexistipula</i>	Whitehouse 62	13-Oct-99	Ceres District, top of pass on to Zuurvlaakte, road between Ceres-Clanwilliam road and Katbakkies
<i>amplexistipula</i>	Whitehouse 210	22-Feb-01	Laingsburg District, Anysberg Nature Reserve, S slopes above kloof leading from Goedeheop, near top of kloof
<i>anthospermoides</i>	Whitehouse 219	17-May-01	Caledon District, Grootbos Nature Reserve, just N of public road, ± opposite Bobbejaansfontein farm
<i>apiculata</i>	Whitehouse 165	29-Nov-00	Caledon Division, Arieskraal, S-facing slopes on Bokkeveld shale above Arieskraal Dam
<i>arborea</i>	Whitehouse 121	31-May-00	Sutherland District, escarpment at top of Komsberg Pass

Taxon	Collection	Date	Locality
<i>cf. arborea</i>	Viviers & Vlok 211	4-Jul-87	Witteberg, peak N of Worlds View Farm, steep S-facing slope
<i>arcuata</i>	Whitehouse 24	20-Mar-99	Oudtshoorn District, Great Swartberg, path from Die Hoek to Gouekrans Hut
<i>atrata</i>	Whitehouse 7	20-Feb-99	Paarl District, Wemmershoek Mts, Agter Tafelberg (Elandsvlakte), S of Mountain Club hut, valley bottom
<i>baccans</i>	Whitehouse 60	13-Oct-99	Ceres District, Swartruggen Mts, Groenfontein Farm, near campsite just N of Stompiesfontein
<i>Bencomia sphae-rocarpa</i>	Santos 96-1 (AF183519, AF183542)	1996	Canary Islands, El Hierro, Tabano
<i>berberidis</i>	Whitehouse 41	4-Jul-99	Bredasdorp District, Rhenosterkop
<i>brevifolia</i>	Whitehouse 120	10-May-00	Bredasdorp District, road to Die Dam from Wolvengat, N of Ratelrivier farm
<i>brevifolia</i>	Whitehouse 260	3-Sep-01	Bredasdorp District, road to Brandfontein, just before Springfield turning, W edge of Soutpan
<i>browniana</i>	Whitehouse 296	28-Nov-01	Underberg District, Sani Pass, just W of South African border post
<i>browniana</i>	Jordaan 2910	11-May-95	Drakensberg Escarpment, God's Window, about 6 km from Graskop, Look-out point, conserved area
<i>burchellii</i>	Whitehouse 91	10-Mar-00	George District, Outeniqua Pass, by side of road at summit
<i>burgersii</i>	Whitehouse 226	20-May-01	Bredasdorp District, De Hoop Nature Reserve, 1.3 km N along main road from turn-off to campsite, next to old track
<i>carinata</i>	Whitehouse 240	4-Aug-01	Cape Peninsula, Slangkop Mt, above Kommetjie, along track towards ruins of coastguard house
<i>carinata</i>	Whitehouse 49	4-Sep-99	Caledon District, Fernkloof Nature Reserve, rise above car park at end of Rotary Way
<i>cf. carinata</i> × <i>marginata</i>	Whitehouse 78	15-Feb-00	Caledon District, Sir Lowry's Pass, by old road to Gantouw Pass
<i>castanea</i>	Whitehouse 124	1-Jun-00	Laingsburg District, Witteberg, S slopes, ravine above Nooitgedacht
<i>castanea</i>	Whitehouse 90	10-Mar-00	Willowmore District, Baviaanskloof, Willowmore end, Adamskraal, on edge of plateau above Nuwekloof
<i>ceresana</i>	Whitehouse 269	22-Sep-01	Tulbagh District, Groot Winterhoek Wilderness Reserve, N facing S slopes of Sneeugetat
<i>cervicornu</i>	Whitehouse 163	22-Oct-00	Swartberg Pass, slopes above road, SW of Malvadraai
<i>complanata</i>	Whitehouse 15	21-Feb-99	Paarl District, Wemmershoek Mts, top end of Elandsvlakte, along stream behind Wemmershoek Tafelberg, W of Olifants Peak
<i>conifera</i>	Whitehouse 208	22-Feb-01	Laingsburg District, Anysberg Nature Reserve, E end above Prinspoort
<i>crassinervis</i>	Whitehouse 105	8-Apr-00	Laingsburg District, Besemfontein, Klipkraal Trail, jeep track to radio mast, saddle

Taxon	Collection	Date	Locality
<i>crenata</i>	Whitehouse 108	8-Apr-00	Laingsburg District, Besemfontein, Klipkraal Trail, ridge down to Verlorenhoek Kloof
<i>cristata</i>	Whitehouse 213	10-Mar-01	Worcester District, Stettynsberg, Stettyn farm, track between Heuningneskloof & Elandskloof
<i>cruciata</i>	Whitehouse 137	15-Sep-00	Worcester District, Jonaskop, Wildepaardeberg, just below sandy plateau
<i>cuneata</i> var. <i>cuneata</i>	Whitehouse 21	6-Mar-99	Stellenbosch District, Jonkershoek, car park at start of Swartboskloof Trail
<i>cuneata</i> var. <i>cylindrica</i>	Whitehouse 166	29-Nov-00	Caledon Division, Arieskraal, S-facing slopes on Bokkeveld shale above Arieskraal Dam
<i>curvifolia</i>	Whitehouse 221	18-May-01	Caledon District, Waterford Farm, on ridge of hill to W of dam at bottom of Waterkloof
<i>densa</i>	Whitehouse 97	11-Mar-00	Riversdale District, Garcia's Pass, footpath to Sleeping Beauty, above waterfall
<i>dentata</i> var. <i>dentata</i>	Whitehouse 14	20-Feb-99	Paarl District, Wemmershoek Mts, on S slope of Winterberg above saddle between Winterberg & Tafelberg
<i>denticulata</i>	Whitehouse 19	6-Mar-99	Stellenbosch District, in small upland valley on E side of Somerset West Triplets, on Swartboskloof Trail
<i>dichotoma</i>	Whitehouse 252	18-Aug-01	Calvinia District, Papkuilsfontein Farm, Oorlogskloof escarpment, just N of waterfall where De Hoop river flows in to Oorlogskloof
<i>dispar</i>	Whitehouse 156	19-Oct-00	Uniondale District, Prince Alfred's Pass, N side just below summit
× <i>dissita</i>	Whitehouse 81	15-Feb-00	Caledon District, Pringle Bay, by road to Missile Test Site
<i>dodecandra</i>	Whitehouse 69	22-Dec-99	Cape Peninsula, Silvermine N.R., above Kalk Bay, valley between Ou Kraal and Kalk Bay Mt., edge of Bona Spei forest
<i>dodecandra</i>	Whitehouse 241	4-Aug-01	Cape Peninsula, Slangkop Mt, above Kommetjie, along track towards ruins of coastguard house
<i>dracomontana</i>	Whitehouse 286	21-Nov-01	Underberg District, Royal Natal National Park, summit of Ampitheatre near Tugela Falls
<i>dregeana</i> var. <i>dregeana</i>	Whitehouse 8	20-Feb-99	Paarl District, Wemmershoek Mts, lower E slopes of Winterberg
<i>drepanoides</i>	Whitehouse 83	23-Feb-00	Uitenhage District, Groendal Wilderness Area, jeep track to Spitskop, above path to Blindekloof
<i>erectisepala</i>	Trinder-Smith in Whitehouse 305	1999	Gifberg
<i>erectisepala</i>	Whitehouse 57	10-Oct-99	Port Elizabeth District, Suurberg Mts, Addo Elephant National Park 4 hour trail, by track to W of Brandrug
<i>ericifolia</i>	No voucher		Cape Flats, Rondevlei Nature Reserve
<i>ericifolia</i>	Whitehouse 261	3-Sep-01	Bredasdorp District, road to Brandfontein, just before Springfield turning, W edge of Soutpan
<i>eriocephalina</i>	Whitehouse 25	20-Mar-99	Oudtshoorn District, Great Swartberg, path from Die Hoek to Gouekrans Hut

Taxon	Collection	Date	Locality
<i>eriocephalina</i>	Whitehouse 177	10-Jan-01	Graaff-Reinet District, Nardouwsberg, S slopes of saddle between two summits
<i>eriocephalina</i>	Whitehouse 188	27-Jan-01	Worcester District, Matroosberg, flats between summits
<i>esterhuyseniae</i>	Versfeld in Whitehouse 284	10-Nov-01	Worcester District, shale band beneath Milner Peak
<i>exilifolia</i>	Linder in Whitehouse 67	21-Nov-99	Caledon District, Riviersonderend Mts, Pilaarkop, S slopes
<i>falcata</i>	Whitehouse 43	4-Jul-99	Bredasdorp District, Brandfontein
<i>ferricola</i>	Whitehouse 145	27-Sep-00	Caledon District, Kogelberg, S slopes of Mt. Horeb, Kleinmond-Highlands road
<i>ferruginea</i>	Whitehouse 38	3-Jul-99	Bredasdorp District, Hermanus to Elim, S base of Koue Berg Pass
<i>filicaulis</i>	Whitehouse 23	12-Mar-99	Cape Peninsula, path between University & Rhodes Memorial
<i>filicauloides</i>	Whitehouse 293	25-Nov-01	Estcourt District, Monk's Cowl Reserve, valley to W of Cathkin Peak, ± 2 km N of Keith's Bush Camp
<i>filifolia</i> var. <i>arenaria</i>	Whitehouse 318	14-Oct-02	Knysna District, Goukamma Nature Reserve, circular trail
<i>filifolia</i> var. <i>filifolia</i>	Whitehouse 54	3-Oct-99	Paarl District, Perdeberg, Lemoenkloof Farm, plateau between Lemoenkloof and Skelmklip Peak
<i>glauca</i>	Whitehouse 93	11-Mar-00	Riversdale District, Garcia's Pass, just S of Muiskraal
<i>gracillima</i>	Whitehouse 98	11-Mar-00	Riversdale District, Garcia's Pass, near car park at start of footpath to Kristalkloof
<i>graminea</i>	Whitehouse 18	2-Mar-99	Cape Peninsula, Silvermine N.R., at far end of dam
<i>grandifolia</i>	Whitehouse 102	12-Mar-00	Swellendam District, Marloth Nature Reserve, path to Twelve o'clock Peak, just above Die Plaat path
<i>Hagenia abyssinica</i>	Knox 2532 (U90800)	1994	Kenya, Mt. Kenya
<i>hantamensis</i>	Whitehouse 125	1-Jun-00	Laingsburg District, Witteberg, S slopes, ravine above Nooitgedacht
<i>heterophylla</i>	Whitehouse 45	21-Jul-99	Caledon District, hills behind Kleinmond from Fairy Glen, gully beneath Tweelingpieke
<i>hexandra</i>	Whitehouse 131	24-Jun-00	Clanwilliam District, Cederberg Mts, path from Sanddrif to Wolfberg Cracks
<i>hirsuta</i>	Whitehouse 64	23-Oct-99	Caledon District, Riviersonderend Mts, between Greyton and Macgregor, Boesmanskloof Trail in valley bottom between Oakes Falls and Die Galg
<i>hirta</i>	Whitehouse 76	7-Feb-00	Cape Peninsula, Rondebosch Common, SW corner
× <i>homunculi</i>	Whitehouse 199	18-Feb-01	Uniondale District, Kammanassie Nature Reserve, plateau to N of Buffelsberg
<i>ilicifolia</i> var. <i>cordifolia</i>	Whitehouse 315	10-Oct-02	Steytlerville District, Baviaanskloof, Sandvlakte farm, upper slopes of peak between Erasmusboskloof and Sandvlaktekloof

Taxon	Collection	Date	Locality
<i>ilicifolia</i> var. <i>ilicifolia</i>	Whitehouse 195	17-Feb-01	Uniondale District, Kammanassie Nature Reserve, lower S slopes of Mannetjiesberg
× <i>ilicioides</i>	Whitehouse 140	15-Sep-00	Worcester District, Jonaskop, Wildepaardeberg, slopes above plateau
<i>incana</i>	Whitehouse 227	20-May-01	Bredasdorp District, De Hoop Nature Reserve, Potberg Section, 2 km W of Cupidoskraal along road
× <i>integerrima</i>	Whitehouse 47	5-Aug-99	Cape Peninsula, NE slopes of Devil's Peak, just beneath King's Blockhouse
<i>cf. integerrima</i>	Whitehouse 70	27-Jan-00	Cape Peninsula, saddle between Table Mt and Devil's Peak, at top of Newlands Ravine
× <i>intermedia</i>	Whitehouse 191	13-Dec-00	Cape Peninsula, Kirstenbosch, Silver Tree Hill, above dam
<i>cf. intermedia</i>	Whitehouse 275	12-Oct-01	Cape Peninsula, Silvermine Nature Reserve, E facing slopes of Noordhoek Peak along jeep track
<i>juniperina</i>	Whitehouse 22	6-Mar-99	Stellenbosch District, Jonkershoek, car park at start of Swartboskloof Trail
<i>cf. juniperina</i> × <i>ruscifolia</i>	Whitehouse 61	14-Oct-99	Ceres District, Swartuggen Mts, Groenfontein Farm, rocky flats above canyon
<i>lanceolata</i>	Whitehouse 101	12-Mar-00	Swellendam District, Marloth Nature Reserve, path to Twelve o'clock Peak, just above Die Plaat path
<i>lepida</i>	Whitehouse 232	24-Jul-01	Blakkop, ridge to summit N of valley above Villiersdorp Wild Flower Garden, damp seeps beneath cliffs at summit
<i>Leucosidea sericea</i>	Helfgott Ben-3 (AF183524, AF183547)	1998	From cultivation
<i>linearifolia</i>	Whitehouse 66	5-Dec-99	Victoria East Division, Amatola Mts, Hogsback, circular walk on W side of Heads
<i>linearifolia</i>	Linder 3976	14-Nov-86	Zimbabwe, Nyanga, Inyangani, NW of summit
<i>longifolia</i>	Whitehouse 228	20-May-01	Bredasdorp District, De Hoop Nature Reserve, Potberg Section, in stream beside Hamerkop
× <i>maclearica</i>	Whitehouse 307	7-Sep-02	Cape Peninsula, Table Mt, Smuts Track, S of Maclear's Beacon, top of Hiddingh Ravine
<i>marginata</i>	Helme 2591	28-Aug-02	Paarl District, Eensaamheid (Briers Houw) N.R., 10 km W of Paarl, farm 469
<i>marginata</i>	Parker 3475	26-Mar-40	Stellenbosch District, Somerset West
<i>marginata</i>	Whitehouse 40	3-Jul-99	Bredasdorp District, along road to Rietfontein, between Vlooi Kraal & Rietfontein
<i>micrantha</i>	Whitehouse 109	9-Apr-00	Laingsburg District, Besemfontein, Verlorenhoek Trail, gorge slopes above Verlorenhoek Pool
<i>cf. mirabilis</i>	Bean et al. 1951	17-Sep-87	Anysberg, along forestry track on crest of mountain, next to W end of forestry track
<i>monophylla</i>	Whitehouse 150	3-Oct-00	Caledon District, Houwhoek, low clayish slopes just above hotel, along road on S side of mountain
<i>montana</i>	Whitehouse 26	20-Mar-99	Oudtshoorn District, Great Swartberg, path from Die Hoek to Gouekrans Hut

Taxon	Collection	Date	Locality
<i>montana</i>	Whitehouse 176	10-Jan-01	Graaff-Reinet District, Nardouwsberg, rocky outcrop to NE of summit
<i>multiformis</i>	Whitehouse 37	3-Jul-99	Bredasdorp District, Hermanus to Elim, Koue Berg Pass
<i>neglecta</i>	Whitehouse 13	20-Feb-99	Paarl District, Wemmershoek Mts, on top of Winterberg
<i>cf. neglecta</i> × <i>ruscifolia</i>	Whitehouse 312	13-Sep-02	Porterville District, Groot Winterhoek Wilderness Area, S slope of ridge along jeeptrack N of Groot Kliphuis
<i>nitidula</i> subsp. <i>pilosa</i>	Whitehouse 65	4-Dec-99	Victoria East Division, Amatola Mts, Hogsback, saddle between Hogsback peak 1 and 2
<i>nitidula</i> subsp. <i>pilosa</i>	Whitehouse 288	21-Nov-01	Qwa-Qwa District, Witsieshoek, N slopes of Sentinel peak, zig-zags on Sentinel hiking trail
<i>nivenioides</i>	Whitehouse 204	20-Feb-01	Swartberg Nature Reserve, N slopes of Blesberg
<i>obcordata</i>	Whitehouse 52	2-Oct-99	Cape Peninsula, lower slopes of Simonsberg, just above Boulders Beach
<i>obovata</i>	Whitehouse 63	23-Oct-99	Caledon District, Riviersonderend Mts, between Greyton and Macgregor, Boesmanskloof Trail, by Oakes Falls
<i>odorata</i>	Whitehouse 71	27-Jan-00	Cape Peninsula, Newlands Ravine, above contour path
<i>odorata</i>	Whitehouse 178	18-Jan-01	Knysna District, Nature's Valley, beside bridge over Grootrivier
<i>oligodonta</i>	Whitehouse 12	20-Feb-99	Paarl District, Wemmershoek Mts, on top of Winterberg
<i>ovalis</i>	Whitehouse 20	6-Mar-99	Stellenbosch District, N side of Somerset West Triplets, on Swartboskloof Trail, S-facing slope
<i>paucistaminea</i> var. <i>australis</i>	Whitehouse 298	29-Nov-01	Humansdorp District, Witelsbos Forest Reserve, along R102 near bridge over Elands R
<i>paucistaminea</i> var. <i>paucistaminea</i>	Whitehouse 56	10-Oct-99	Port Elizabeth District, Suurberg Mts, Addo Elephant National Park 4 hour trail, by track to W of Brandrug
<i>pedunculata</i>	Whitehouse 146	27-Sep-00	Caledon District, Kogelberg, S slopes of Mt. Horeb, Kleinmond-Highlands road
<i>perpendicularis</i>	Whitehouse 259	3-Sep-01	Bredasdorp District, Elim, Geelkop Nature Reserve, W slope of hill
<i>phillipsii</i>	Whitehouse 148	1-Oct-00	Stellenbosch District, Helderberg Nature Reserve, on lower slopes of Helderberg, in valley just above garden
<i>phyllanthoides</i>	Whitehouse 39	3-Jul-99	Bredasdorp District, W of Elim, on road to Gansbaai
<i>pilifera</i>	Whitehouse 77	9-Feb-00	Paarl District, Bain's Kloof, Bastiaans Kloof
<i>pilosula</i>	Whitehouse 247	16-Aug-01	Citrusdal District, Olifants R Mts, near junction at Olyvenboskraal
<i>polita</i>	Whitehouse 128	10-Jun-00	Montagu District, Bloupunt Hiking Trail, W facing slopes beneath Bloupunt
<i>polita</i>	Whitehouse 155	18-Oct-00	Joubertina District, Springhaas Capell/Hoeree, above Hoeree, gully beneath beacon
<i>polita</i>	Whitehouse 301	9-Jan-02	Robertson District, Langeberg Mts above Robertson, ridge just W of Arangieskop
<i>polygonifolia</i> var. <i>polygonifolia</i>	Whitehouse 242	4-Aug-01	Cape Peninsula, Slangkop Mt, above Kommetjie, near road along track towards ruins of coastguard house

Taxon	Collection	Date	Locality
<i>polygonifolia</i> var. <i>trifoliata</i>	Whitehouse 134	7-Sep-00	Cape Peninsula, Devil's Peak, mid N slopes
<i>Polylepis hieronymi</i>	Hibbs 133 (AJ512779)	1998	Bolivia
<i>Polylepis sericea</i>	Hensen 850 (AF183527, AF183550)		Bolivia, Maycu Mayu, Cochabamba chapare
<i>Polylepis tarapacana</i>	Hibbs 163	1999	Bolivia
<i>prionota</i>	Whitehouse 46	21-Jul-99	Caledon District, hills behind Kleinmond from Fairy Glen, gully beneath Tweelingpieke
<i>propinqua</i>	Whitehouse 33	10-Apr-99	Paarl District, Bain's Kloof, rocky outcrops above trail
<i>pterocarpa</i>	Whitehouse 230	7-Jul-01	Paarl District, Franschoek, La Motte Forest Reserve, near Robertsvei gate, beside road
<i>cf. pterocarpa</i>	Whitehouse 126	10-Jun-00	Montagu District, Bloupunt Hiking Trail, just N of saddle at top of Rietkloof
<i>pulchella</i>	Whitehouse 96	11-Mar-00	Riversdale District, Garcia's Pass, footpath to Sleeping Beauty, opposite Toll House
<i>pungens</i>	Whitehouse 138	15-Sep-00	Worcester District, Jonaskop, Wildepaardeberg, rocky outcrop on sandy plateau
<i>purpurea</i>	Whitehouse 253	18-Aug-01	Calvinia District, Papkuilsfontein Farm, Oorlogskloof escarpment, track between De Hoop and waterfall
<i>ramosissima</i>	Whitehouse 82	19-Feb-00	Swellendam District, Bontebok National Park, Aloe Hill near Elsieskraal campsite
<i>ramosissima</i>	Whitehouse 123	31-May-00	Sutherland District, escarpment at top of Komsberg Pass
<i>recurvata</i>	Linder in Whitehouse 216	21-Apr-01	Kogelberg, slopes above Steenbras Dam
<i>reniformis</i>	Whitehouse 99	11-Mar-00	Riversdale District, Garcia's Pass, car park at start of footpath to Kristalkloof
<i>repens</i>	Whitehouse 290	22-Nov-01	Bergville District, Royal Natal National Park, path from Witsieshoek to Mahai Falls, Basuto Gate
<i>reticulata</i>	Whitehouse 268	22-Sep-01	Tulbagh District, Groot Winterhoek Wilderness Reserve, path up to Sneeuwgat, near Die Vurk, path just beyond rock shelter
<i>rigida</i>	Whitehouse 303	8-Jun-02	Franschoek District, S side of Wolfkloof, track up from Wolfkloof farm
<i>cf. rigida</i>	Whitehouse 214	11-Mar-01	Worcester District, Stettynsberg, Stettyn farm, mid E facing slopes of 4x4 track above farm
<i>robusta</i>	Whitehouse 159	20-Oct-00	Oudtshoorn District, Swartberg Mts, peak between Waboomsberg and Swartberg Pass, N summit
<i>ruscifolia</i>	Whitehouse 72	27-Jan-00	Cape Peninsula, NE slopes of Devil's Peak, just beneath King's Blockhouse
<i>cf. ruscifolia</i>	Whitehouse 80	15-Feb-00	Caledon District, Sir Lowry's Pass, by road to Steenbras Siding

Taxon	Collection	Date	Locality
<i>cf. ruscifolia</i> × <i>teretifolia</i>	Whitehouse 310	12-Sep-02	Porterville District, Groot Winterhoek Wilderness Area, jeeptrack from De Tronk, ridge just past where it crosses Klein Kliphuis R
<i>Sanguisorba ancistroides</i>	Santos 97-3 (AF183530, AF183553)	1997	Morocco, Agadir
<i>Sanguisorba canadensis</i>	Fransisco-Ortega 97-173 (AF183531, AF183554)	1997	From cultivation
<i>Sanguisorba minor</i>	No voucher	1999	From cultivation
<i>Sanguisorba officinalis</i>	No voucher	1999	From cultivation
<i>Sanguisorba parviflora</i>	Eriksson s.n. (U90797)	1993	From cultivation
<i>Sarcopoterium spinosum</i>	Helfgott Ben-6 (AF183534, AF183557)	1998	From cultivation
<i>scandens</i>	Linder in Whitehouse 68	21-Nov-99	Caledon District, Riviersonderend Mts, Pilaarkop, S slopes
<i>schlechteri</i>	Whitehouse 225	18-May-01	Caledon District, Waterford Farm, by dam at bottom of Waterkloof
<i>cf. semiteres</i>	Whitehouse 231	24-Jul-01	lower slopes of Blokkop, N slope of valley above Villiersdorp Wild Flower Garden
<i>sericea</i>	Whitehouse 44	21-Jul-99	Caledon District, Sir Lowry's Pass, above Steenbras Siding, by old road
<i>sericea</i>	Meyer 741	4-Oct-94	Tulbagh District, Wolseley, Kluitjieskraal Forest Station, Watervalsberg
<i>serpyllifolia</i>	Whitehouse 58	11-Oct-99	Barrydale District, Tradouw Pass, S of summit, by parking area next to road
<i>serpyllifolia</i>	Balkwill et al. 1243	8-Feb-84	Umzinto District, Vernon Crookes Nature Reserve
<i>setifolia</i>	Whitehouse 205	20-Feb-01	Swartberg Nature Reserve, Blesberg summit, just W of radio tower
<i>sparsa</i>	Whitehouse 283	25-Oct-01	Caledon District, Hottentots Holland Nature Reserve, around Nuweberg Forest Station
<i>spathulata</i>	Whitehouse 287	21-Nov-01	Qwa-Qwa District, Witsieshoek, N slopes of Sentinel peak, zig-zags on Sentinel hiking trail
<i>stricta</i>	Whitehouse 36	3-Jul-99	Bredasdorp District, Hermanus to Elim, Koue Berg Pass
<i>strigosa</i>	Whitehouse 85	2-Mar-00	Paarl District, Bain's Kloof, S face of Limietkop, above stream
<i>strobilifera</i>	Whitehouse 30	22-Mar-99	Oudtshoorn District, De Hoek campsite, Hoeksrivier, where path to Gouekrans Hut crosses
<i>subsetacea</i>	Whitehouse 17	28-Feb-99	Caledon District, Perdeberg Trail from Highlands State Forest, in valley just before ascent to Perdeberg

Taxon	Collection	Date	Locality
<i>teretifolia</i>	Whitehouse 135	14-Sep-00	Paarl District, lower slopes of Perdeberg, just above Lemoenkloof Farm
<i>teretifolia</i>	Whitehouse 50	24-Sep-99	Porterville District, Grootfontein Farm, near Beaverlac campsite, track to Olifants R along Ratel R
<i>theodori-friesii</i>	Whitehouse 88	7-Mar-00	Cape Peninsula, Table Mt, Valley of Isolation, N slopes
<i>tricuspidata</i>	Whitehouse 16	21-Feb-99	Paarl District, Wemmershoek Mts, top end of Elandsvlakte, along stream behind Wemmershoek Tafelberg, W of Olifants Peak
<i>tridentata</i>	Whitehouse 306	7-Sep-02	Cape Peninsula, Table Mt, Smuts Track, between Fernwood Buttress and Window Gorge
<i>triloba</i>	Whitehouse 251	18-Aug-01	Clanwilliam District, Cederberg Mts, N of Algeria, Nieuwoudt Pass, opposite forester's village
<i>tuberculata</i>	Whitehouse 48	9-Aug-99	Paarl District, Franschoek Pass, car park at summit of pass at start of path to Du Toit's Kop
<i>uncinata</i>	Whitehouse 249	17-Aug-01	Clanwilliam District, Cederberg Mts, S of Algeria, just S of summit of Uityk Pass
× <i>varians</i>	Whitehouse 281	18-Oct-01	Caledon District, Riviersonderend Mts, Die Galg, at end of old pass as trail descend down in to Boesmanskloof
<i>verrucosa</i>	Whitehouse 162	21-Oct-00	Swartberg Mts, above waterfall below Gamkaskloof road, at top end of Grootkloof
<i>cf. verrucosa</i>	Whitehouse 89	10-Mar-00	Willowmore District, Baviaanskloof, Willowmore end, Adamskraal, Nuwekloof
<i>virgata</i>	Whitehouse 267	22-Sep-01	Tulbagh District, Bergplaas Farm, path up to Sneeuat, around Nooiensverdriet
<i>cf. virgata</i>	Whitehouse 265	16-Sep-01	Cape Peninsula, Silvermine Nature Reserve, nek between Constantiaberg and Noordhoek Peak, above Blackburn Kloof
<i>viridis</i>	Whitehouse 273	10-Oct-01	Caledon District, Kogelberg Nature Reserve, Kogelberg Trail, W facing gulley at NW end of Platberg
<i>weimarckii</i>	Whitehouse 187	27-Jan-01	Worcester District, Matroosberg, Spekrivierskloof, stony E slopes above Ski Hut

Index to taxa

Current names are in **bold**, synonyms are in *italic*.

<i>Borbonia trinervia</i> L.	290
Cliffortia L.	62
Cliffortia acanthophylla C.M.Whitehouse.	387
<i>Cliffortia acerosa</i> Banks.	456
Cliffortia acockii Weim.	243
Cliffortia aculeata Weim.	98
Cliffortia acutifolia Weim.	327
<i>Cliffortia aequatorialis</i> R.E.Fr. & T.C.E.Fr.	158
Cliffortia alata N.E.Br.	128
<i>Cliffortia alnifolia</i> Rchb.	305
Cliffortia amplexistipula Schltr.	362
Cliffortia anthospermoides Fellingham	192
Cliffortia apiculata Weim.	200
<i>Cliffortia arachnoidea</i> Lodd.	290
Cliffortia arborea Marloth	64
Cliffortia arcuata Weim.	208
Cliffortia atrata Weim.	256
Cliffortia baccans Harv.	429
<i>Cliffortia berberidifolia</i> Lam.	321
Cliffortia berberidis C.M.Whitehouse	325
Cliffortia bolusii Diels ex C.M.Whitehouse	436
Cliffortia brevifolia Weim.	112
Cliffortia browniana Burtt Davy	168
<i>Cliffortia browniana</i> sensu Weim.	163
Cliffortia burchellii Stapf	249
Cliffortia burgersii E.G.H.Oliv. & Fellingham	130
Cliffortia carinata Weim.	349
Cliffortia castanea Weim.	271
Cliffortia ceresana C.M.Whitehouse	390
Cliffortia cervicornu Weim.	120
<i>Cliffortia cinerea</i> Thunb.	455
<i>Cliffortia complanata</i> E.Mey. ex Drège	104
Cliffortia complanata E.Mey. ex Weim.	104
<i>Cliffortia complanata</i> series.	104

<i>Cliffortia concavifolia</i> Eckl. & Zeyh.	455
<i>Cliffortia concinna</i> Weim.	358
<i>Cliffortia conifera</i> Christm.	91
Cliffortia conifera E.G.H.Oliv. & Fellingham.	67
<i>Cliffortia conoides</i> Sparrm.	91
<i>Cliffortia cordifolia</i> E.Mey. ex Harv.	397
<i>Cliffortia cordifolia</i> Lam.	376
Cliffortia crassinervis Weim.	151
Cliffortia crenata L.f.	341
Cliffortia × crenulata Weim.	453
Cliffortia cristata Weim.	233
Cliffortia cruciata C.M.Whitehouse	125
Cliffortia cuneata Aiton.	424
Cliffortia cuneata var. cuneata	424
Cliffortia cuneata var. cylindrica C.M.Whitehouse	426
<i>Cliffortia curvifolia</i> series	195
<i>Cliffortia curvifolia</i> Weim.	195
Cliffortia × cymbifolia Weim.	453
Cliffortia densa Weim.	198
<i>Cliffortia dentata</i> sensu Eckl. & Zeyh.	184
<i>Cliffortia dentata</i> series	114
Cliffortia dentata Willd.	114
Cliffortia dentata var. dentata	114
Cliffortia dentata var. gracilis (Harv.) C.M.Whitehouse	115
Cliffortia denticulata (Weim.) C.M.Whitehouse	404
Cliffortia dichotoma Fellingham	69
<i>Cliffortia discolor</i> Weim.	305
Cliffortia dispar Weim.	82
Cliffortia × dissita C.M.Whitehouse	439
Cliffortia dodecandra Weim.	284
Cliffortia dracomontana C.M.Whitehouse.	166
Cliffortia dregeana Presl.	382
<i>Cliffortia dregeana</i> Presl var. <i>meyeriana</i> (Presl) Weim.	383
<i>Cliffortia dregeana</i> Presl var. <i>meyeriana</i> sensu Weim.	383
<i>Cliffortia dregeana</i> sensu Harv.	387
<i>Cliffortia dregeana</i> sensu Weim.	387
<i>Cliffortia dregeana</i> series	382
Cliffortia dregeana var. dregeana	383
Cliffortia dregeana var. spinosissima C.M.Whitehouse	385
<i>Cliffortia dregeana</i> × <i>pungens</i>	443
Cliffortia drepanoides Eckl. & Zeyh.	217
Cliffortia erectisepala Weim.	248
Cliffortia ericifolia L.f.	110
<i>Cliffortia ericifolia</i> L.f. var. <i>acutistipula</i> Kuntze.	171
<i>Cliffortia ericifolia</i> series	110
Cliffortia eriocephalina Cham.	73
Cliffortia esterhuyseniae Weim.	84
Cliffortia exilifolia Weim.	202

Cliffortia falcata L.f.	205
<i>Cliffortia fasciculata</i> Weim.	362
Cliffortia ferricola C.M.Whitehouse.	299
Cliffortia ferruginea L.f.	321
<i>Cliffortia ferruginea</i> L.f. var. <i>flexuosa</i> E.Mey. ex Harv.	321
<i>Cliffortia ferruginea</i> L.f. var. <i>latifolia</i> Eckl. & Zeyh.	321
<i>Cliffortia ferruginea</i> L.f. var. <i>longifolia</i> Eckl. & Zeyh.	321
<i>Cliffortia ferruginea</i> L.f. var. <i>villosa</i> Harv.	321
<i>Cliffortia ferruginea</i> series.	321
Cliffortia filicaulis Cham. & Schldl.	133
<i>Cliffortia filicaulis</i> Cham. & Schldl. var. <i>octandra</i> (Cham.) Weim.	133
<i>Cliffortia filicaulis</i> sensu Cham. & Schldl.	318
Cliffortia filicauloides Weim.	136
Cliffortia filifolia L.f.	238
<i>Cliffortia filifolia</i> L.f. var. <i>subsetacea</i> Eckl. & Zeyh.	122
<i>Cliffortia filifolia</i> sensu Harv.	248
Cliffortia filifolia var. <i>arenaria</i> C.M.Whitehouse	241
Cliffortia filifolia var. <i>filifolia</i>	238
<i>Cliffortia flabellifolia</i> Sond.	456
<i>Cliffortia flexuosa</i> E.Mey. ex Drège.	321
<i>Cliffortia galpinii</i> N.E.Br.	211
<i>Cliffortia galpinii</i> sensu N.E.Br.	143
<i>Cliffortia geniculata</i> Weim.	349
<i>Cliffortia glauca</i> sensu Weim.	349
<i>Cliffortia glauca</i> series	348
Cliffortia glauca Weim.	358
<i>Cliffortia gracilis</i> Harv.	115
<i>Cliffortia gracilis</i> sensu Weim.	117
Cliffortia gracillima C.M.Whitehouse	118
Cliffortia graminea L.f.	87
<i>Cliffortia graminea</i> L.f. var. <i>convoluta</i> Weim.	87
<i>Cliffortia graminea</i> L.f. var. <i>elegans</i> Weim.	87
Cliffortia grandifolia Eckl. & Zeyh.	401
<i>Cliffortia grandifolia</i> Eckl. & Zeyh. var. <i>denticulata</i> Weim.	113
<i>Cliffortia grandifolia</i> Eckl. & Zeyh. var. <i>recurvata</i> Weim.	415
<i>Cliffortia grandifolia</i> sensu Bean & Johns.	404
Cliffortia hantamensis Diels.	138
<i>Cliffortia hermaphroditica</i> Weim.	275
Cliffortia heterophylla Weim.	409
Cliffortia hexandra Weim.	231
Cliffortia hirsuta Eckl. & Zeyh.	311
Cliffortia hirta Burm.f.	187
<i>Cliffortia hirta</i> series	187
Cliffortia × homunculi C.M.Whitehouse.	441
Cliffortia ilicifolia L.	373
<i>Cliffortia ilicifolia</i> L. var. <i>incisa</i> Harv.	376
<i>Cliffortia ilicifolia</i> L. var. <i>reniformis</i> Weim.	378
<i>Cliffortia ilicifolia</i> L. var. <i>schlechteri</i> Weim.	380

<i>Cliffortia ilicifolia</i> sensu Weim.	390
<i>Cliffortia ilicifolia</i> series	373
<i>Cliffortia ilicifolia</i> var. <i>cordifolia</i> (Lam.) Harv.	376
<i>Cliffortia ilicifolia</i> var. <i>ilicifolia</i>	374
<i>Cliffortia</i> × <i>ilicioides</i> C.M.Whitehouse	443
<i>Cliffortia incana</i> Weim.	190
<i>Cliffortia intermedia</i> sensu Bolus & Wolley-Dod	301
<i>Cliffortia intermedia</i> sensu Harv.	404
<i>Cliffortia juniperina</i> L.f.	275
<i>Cliffortia juniperina</i> L.f. var. <i>muricata</i> Harv.	260
<i>Cliffortia juniperina</i> L.f. var. <i>pilosula</i> sensu Weim.	275
<i>Cliffortia juniperina</i> L.f. var. <i>pilosula</i> Weim.	279
<i>Cliffortia juniperina</i> L.f. var. <i>pterocarpa</i> Harv.	287
<i>Cliffortia juniperina</i> L.f. var. <i>serrulata</i> Engl.	251
<i>Cliffortia juniperina</i> L.f. var. <i>tuberculata</i> Harv.	260
<i>Cliffortia juniperina</i> sensu J.F.V.Phillips	245
<i>Cliffortia juniperina</i> sensu Eckl. & Zeyh.	256
<i>Cliffortia juniperina</i> sensu Jacot-Guillarmod	145
<i>Cliffortia juniperina</i> sensu Juel	368
<i>Cliffortia juniperina</i> var. <i>brevifolia</i> Harv.	143
<i>Cliffortia juniperina</i> var. <i>brevifolia</i> sensu Harv.	256
<i>Cliffortia juniperina</i> var. <i>muricata</i> sensu Harv.	256
<i>Cliffortia lanata</i> Weim.	228
<i>Cliffortia lanceolata</i> Weim.	414
<i>Cliffortia laricina</i> E.Mey. ex Drège	256
<i>Cliffortia lepida</i> Weim.	182
<i>Cliffortia leptophylla</i> Eckl. & Zeyh.	238
<i>Cliffortia leptophylla</i> Eckl. & Zeyh. var. <i>longifolia</i> Eckl. & Zeyh.	245
<i>Cliffortia linearifolia</i> Eckl. & Zeyh.	171
<i>Cliffortia linearifolia</i> Eckl. & Zeyh. var. <i>nitidula</i> Engl.	158
<i>Cliffortia linearifolia</i> sensu Drège	153
<i>Cliffortia linearifolia</i> sensu E.Phillips	160
<i>Cliffortia linearifolia</i> sensu Harv.	211
<i>Cliffortia longifolia</i> (Eckl. & Zeyh.)Weim.	96
<i>Cliffortia</i> × <i>maclearica</i> C.M.Whitehouse	449
<i>Cliffortia marginata</i> Eckl. & Zeyh.	352
<i>Cliffortia marginata</i> sensu Bolus & Wolley-Dod	349
<i>Cliffortia meyeriana</i> C.Presl	383
<i>Cliffortia micrantha</i> Weim.	176
<i>Cliffortia</i> × <i>mirabilis</i> Weim.	453
<i>Cliffortia monophylla</i> Schltr. ex Weim.	140
<i>Cliffortia montana</i> Weim.	77
<i>Cliffortia multiformis</i> series	281
<i>Cliffortia multiformis</i> Weim.	281
<i>Cliffortia natalensis</i> J.M.Wood.	251
<i>Cliffortia nebrownii</i> Burt Davy	168
<i>Cliffortia neglecta</i> Schltr.	265
<i>Cliffortia nitidula</i> (Engl.) R.E.Fr. & T.C.E.Fr.	158

<i>Cliffortia nitidula</i> subsp. <i>angolensis</i> Weim.	158
<i>Cliffortia nitidula</i> subsp. <i>nitidula</i>	159
<i>Cliffortia nitidula</i> subsp. <i>pilosa</i> Weim.	160
<i>Cliffortia nitidula</i> var. <i>angolensis</i> (Weim.) Brenan	159
<i>Cliffortia nivenioides</i> Fellingham	100
<i>Cliffortia obcordata</i> L.f.	345
<i>Cliffortia obliqua</i> Spreng.	345
<i>Cliffortia obovata</i> E.Mey. ex Harv.	355
<i>Cliffortia octandra</i> Cham.	133
<i>Cliffortia odorata</i> L.f.	305
<i>Cliffortia odorata</i> L.f. var. <i>hypoleuca</i> Harv.	311
<i>Cliffortia odorata</i> L.f. var. <i>reticulata</i> (Eckl. & Zeyh.) Harv.	309
<i>Cliffortia odorata</i> L.f. var. <i>vera</i> Harv.	305
<i>Cliffortia odorata</i> series	305
<i>Cliffortia odorata</i> × <i>ruscifolia</i> sensu Lotsy & Goddijn	449
<i>Cliffortia odorata</i> × <i>theodori-friesii</i> Weim.	449
<i>Cliffortia oligodonta</i> C.M.Whitehouse	392
<i>Cliffortia ovalis</i> Weim.	419
<i>Cliffortia paucistaminea</i> Weim.	143
<i>Cliffortia paucistaminea</i> var. <i>australis</i> C.M.Whitehouse	147
<i>Cliffortia paucistaminea</i> var. <i>paucistaminea</i>	143
<i>Cliffortia pedunculata</i> Schltr.	179
<i>Cliffortia pedunculata</i> series	179
<i>Cliffortia perpendicularis</i> C.M.Whitehouse	215
<i>Cliffortia phillipsii</i> Weim.	412
<i>Cliffortia phyllicoides</i> Eckl. & Zeyh.	73
<i>Cliffortia phyllanthoides</i> Schltr.	339
<i>Cliffortia pilifera</i> Bolus	316
<i>Cliffortia pilosula</i> (Weim.) C.M.Whitehouse	279
<i>Cliffortia polita</i> Weim.	365
<i>Cliffortia polycephala</i> E.Mey. ex Harv.	228
<i>Cliffortia polygonifolia</i> L.	221
<i>Cliffortia polygonifolia</i> L. var. <i>membranifolia</i> Weim.	224
<i>Cliffortia polygonifolia</i> L. var. <i>pubescens</i> Weim.	224
<i>Cliffortia polygonifolia</i> L. var. <i>ternata</i> (L.f.) Harv.	221
<i>Cliffortia polygonifolia</i> var. <i>polygonifolia</i>	221
<i>Cliffortia polygonifolia</i> var. <i>trifoliata</i> (L.) Harv.	224
<i>Cliffortia polyphylla</i> Eckl. & Zeyh.	153
<i>Cliffortia prionota</i> C.M.Whitehouse	416
<i>Cliffortia propinqua</i> Eckl. & Zeyh.	107
<i>Cliffortia propinqua</i> Eckl. & Zeyh. var. <i>chamissonis</i> (Harv.) Weim.	104
<i>Cliffortia prostrata</i> Engl.	251
<i>Cliffortia pterocarpa</i> (Harv.) Weim.	287
<i>Cliffortia pterocarpa</i> sensu Levyns	284
<i>Cliffortia pterocarpa</i> sensu Weim.	235
<i>Cliffortia pulchella</i> L.f.	336
<i>Cliffortia pulchella</i> L.f. var. <i>mucronulata</i> Weim.	336
<i>Cliffortia pungens</i> Presl	332

Cliffortia purpurea (Weim.) C.M.Whitehouse	295
Cliffortia ramosissima Schltr.	211
Cliffortia recurvata (Weim.) C.M.Whitehouse	407
Cliffortia reniformis (Weim.) C.M.Whitehouse	378
Cliffortia repens Schltr.	251
<i>Cliffortia repens</i> sensu Weim.	248
Cliffortia reticulata Eckl. & Zeyh.	309
Cliffortia rigida Weim.	360
Cliffortia robusta Weim.	269
<i>Cliffortia rogersii</i> Burt Davy.	91
<i>Cliffortia rubricaulis</i> C.Presl.	374
<i>Cliffortia ruscifolia</i> × <i>theodori-friesii</i> sensu Weim.	301
Cliffortia ruscifolia L.	290
<i>Cliffortia ruscifolia</i> L. var. <i>purpurea</i> Weim.	295
<i>Cliffortia ruscifolia</i> L. var. <i>tridentata</i> (Willd.) Harv.	301
<i>Cliffortia ruscifolia</i> L. var. <i>tridentata</i> sensu Harv.	290
<i>Cliffortia ruscifolia</i> series.	290
<i>Cliffortia sarmentosa</i> L.	187
Cliffortia scandens C.M.Whitehouse	421
Cliffortia schlechteri (Weim.) C.M.Whitehouse	380
Cliffortia × semiteres Weim.	453
Cliffortia sericea Eckl. & Zeyh.	228
Cliffortia serpyllifolia Cham. & Schldl.	153
<i>Cliffortia serpyllifolia</i> Cham. & Schldl. var. <i>angustifolia</i> Drège	153
<i>Cliffortia serpyllifolia</i> Cham. & Schldl. var. <i>chamissonis</i> Harv.	104
<i>Cliffortia serpyllifolia</i> Cham. & Schldl. var. <i>chamissonis</i> sensu Harv.	107
<i>Cliffortia serpyllifolia</i> Cham. & Schldl. var. <i>foliis-angustioribus</i> Eckl. & Zeyh.	153
<i>Cliffortia serpyllifolia</i> Cham. & Schldl. var. <i>foliis-latioribus</i> Eckl. & Zeyh.	104
<i>Cliffortia serpyllifolia</i> Cham. & Schldl. var. <i>obovata</i> Kuntze	355
<i>Cliffortia serpyllifolia</i> Cham. & Schldl. var. <i>penninervis</i> sensu Harv.	104
<i>Cliffortia serpyllifolia</i> Cham. & Schldl. var. <i>polyphylla</i> (Eckl. & Zeyh.) Harv.	153
<i>Cliffortia serpyllifolia</i> sensu Eckl. & Zeyh.	104
<i>Cliffortia serpyllina</i> E.Mey. ex Drège.	133
<i>Cliffortia serrata</i> Thunb.	321
Cliffortia setifolia Weim.	149
<i>Cliffortia</i> sp. 1 sensu Weim.	436
<i>Cliffortia</i> sp. 2 sensu Fellingham	192
<i>Cliffortia</i> sp. 2 sensu Weim.	98
<i>Cliffortia</i> sp. 3 sensu Fellingham	69
<i>Cliffortia</i> sp. sensu E.Phillips	160, 251
<i>Cliffortia</i> sp. sensu Phillipson.	73
Cliffortia sparsa C.M.Whitehouse	235
<i>Cliffortia spathulata</i> sensu Hilliard & Burt	168
Cliffortia spathulata Weim.	163
<i>Cliffortia spicata</i> Rchb. ex Spreng.	455
Cliffortia stricta Weim.	432
Cliffortia strigosa Weim.	399
Cliffortia strobilifera L.	91

<i>Cliffortia strobilifera</i> L. var. <i>longifolia</i> Eckl. & Zeyh.	96
Cliffortia × <i>subdura</i> Weim.	454
Cliffortia subsetacea (Eckl. & Zeyh.) Diels ex Bolus & Wolley-Dod	122
<i>Cliffortia subsetacea</i> series	122
<i>Cliffortia subulata</i> Weim.	455
<i>Cliffortia tabularis</i> Diels ex Bolus & Wolley-Dod	301
<i>Cliffortia tenuis</i> Weim.	352
Cliffortia teretifolia L.f.	368
<i>Cliffortia teretifolia</i> L.f. var. <i>alata</i> Compton	368
<i>Cliffortia teretifolia</i> L.f. var. <i>tenuior</i> E.Mey. ex Drège.	368
<i>Cliffortia teretifolia</i> sensu Harv.	275
<i>Cliffortia ternata</i> L.f.	220
Cliffortia theodori-friesii var. <i>puberula</i> Weim.	454
Cliffortia theodori-friesii Weim.	394
Cliffortia tricuspidata Harv.	318
Cliffortia tridentata Willd.	301
<i>Cliffortia trifoliolata</i> L.	224
Cliffortia triloba Harv.	184
Cliffortia tuberculata (Harv.) Weim.	260
<i>Cliffortia tuberculata</i> var. <i>muricata</i> (Harv.) Weim.	260
<i>Cliffortia tychonis</i> Weim.	159
Cliffortia uncinata Weim.	329
<i>Cliffortia uncinata</i> var. <i>recta</i> Weim.	329
Cliffortia verrucosa Weim.	297
<i>Cliffortia versiformis</i> C.M.Whitehouse	299
Cliffortia virgata Weim.	397
Cliffortia viridis Weim.	314
Cliffortia weimarckii C.M.Whitehouse	80
<i>Cliffortia zeyheri</i> Schldl.	104
<i>Monographidium obcordatum</i> (L.f.) Presl	345
<i>Monographidium</i> Presl.	62
<i>Morilandia</i> Neck.	62
<i>Nenax acerosa</i>	238
Sect. Acerosae C.M.Whitehouse	264
Sect. Alatae Weim.	127
Sect. Arboreae Weim.	63
Sect. Bacciformes Weim.	428
Sect. Bifoliolae DC.	335
Sect. Cliffortia	220
Sect. Complanatae	103
Sect. Costatae Weim.	255
Sect. Dichopterae DC.	423
Sect. Dracomontanae C.M.Whitehouse.	157
Sect. Filifoliae C.M.Whitehouse	237
Sect. Hermaphroditicae Weim.	274
Sect. Inflexae Weim.	220
Sect. Latifoliae DC.	220
Sect. Multifidae C.M.Whitehouse	280

Sect. Multinerviae DC.	372
Sect. Nematobus Schltr.	178
Sect. Paucistamineae C.M.Whitehouse	142
Sect. Petiolatae Weim.	204
Sect. <i>Reflexae</i> Weim.	220
Sect. Ruboides C.M.Whitehouse	304
Sect. <i>Simplices</i> Weim.	423
Sect. Stipulatae Cham.	132
Sect. Tenuifoliae DC.	274
Sect. <i>Trifoliolae</i> Harv.	220
Subgenus Arboreae (Weim.) C.M.Whitehouse	63
Subgenus Cliffortia	102
Subgenus <i>Digraphidium</i> Weim.	102
Subgenus Eriocephalinae C.M.Whitehouse	72
Subgenus Gramineae C.M.Whitehouse.	86
Subgenus <i>Monographidium</i> (Presl)Weim.	102

Strelitzia

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Cliffortia L. (Rosaceae) is one of the ten largest genera in the Cape Floristic Region (CFR). It extends beyond the CFR, northwards to Namaqualand and eastwards through the Drakensberg, with two species extending into tropical Africa. The genus represents a diversity of growth forms that is rarely matched by other genera within the CFR. Although the majority of species can be described as ericoid shrubs, some grow into small trees up to 5 m tall, while others form low, sprawling, semi-herbaceous ground covers, or impenetrable dense tangled thickets. Of all growth forms present in fynbos, only annual, succulent and geophytic life forms are not represented by *Cliffortia*. All species are wind pollinated and there is very little morphological variation in the flowers. Usually flowers are solitary and scattered evenly over the plant, and only in a few species does this pattern vary and a more complex inflorescence can be described. Species differentiation within *Cliffortia* is based primarily upon vegetative characters and fruit morphology, as opposed to pollination-driven floral characters. *Cliffortia* species are found throughout the CFR, but they grow almost exclusively in fynbos, from coastal sand plains to the peaks of the highest mountains. Certain species require their roots to be constantly surrounded by water, while others exist in rock crevices of mountains on the arid edge of the Karoo. The majority of *Cliffortia* species is found in acidic, nutrient-poor, sandstone-derived soils, but they are also found on alkaline limestone-derived soils or the richer shales. Outside of the CFR, they are almost entirely restricted to the afro-montane heathlands from the southern Drakensberg to as far north as Mount Kenya, although they are occasional on the low-altitude sandstones of the Eastern Cape and KwaZulu-Natal, or the dolerites of the Great Escarpment.



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