

New species and notes on *Hesperantha* (Iridaceae) in southern Africa

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ABSTRACT

Field studies of the sub-Saharan African and largely southern African *Hesperantha* conducted since 2003 have resulted in the discovery of three new species in this genus, bringing the total to 82. *Hesperantha longistyla* J.C.Manning & Goldblatt, known from one collection from the mountains of SW Namibia, is a dwarf plant with moderately long-tubed, purple flowers and unusually long style branches, possibly allied to the Kamiesberg species, *H. latifolia*. A second species, *H. helmei* Goldblatt & J.C.Manning, also known from a single collection from the interior mountains of Eastern Cape near Graaff-Reinet, has terete leaves and small flowers with tepals $\pm 8 \times 2.5$ mm, about as long as the perianth tube. It is apparently most closely allied to the Roggeveld species, *H. ciliolata*. A third novelty, *H. lithicola* J.C.Manning & Goldblatt, restricted to the Swartuggens range in the eastern Cold Bokkeveld, has bell-shaped corms with toothed margins, leaves 1–2 mm wide, and white flowers with a tube 10–12 mm long, and appears most closely allied to the widespread *H. falcata*. A new collection of *H. karooica* from northeast of the Hantamsberg represents a small but significant range extension for this local endemic previously known from just two collections near Calvinia, south of these mountains. The flower size, especially dimensions of the tepals, confirms its status as a separate species allied to *H. vaginata*. Lastly, new collections of the relatively uncommon, yellow-flowered variant of *H. acuta* show that this plant, confined to the eastern portion of the range of the species, differs consistently from the white-flowered form in several floral features, and it is raised to subspecies rank as *H. acuta* subsp. *tugwelliae*.

INTRODUCTION

Hesperantha Ker Gawl. (Iridaceae: Crocoideae) is distributed across sub-Saharan Africa but is most diverse and species-rich in southern Africa. The genus has two centres of diversity here, the winter rainfall west (Goldblatt 1984), and the coast and adjacent mountains of the eastern, summer rainfall half of the subcontinent (Hilliard & Burt 1986). In the most recent revision of the genus, 79 species were recognized (Goldblatt 2003). Although *Hesperantha* is now well understood taxonomically, three collections made since the publication of this revision represent novelties, all from areas of southern Africa that are poorly collected. We describe them here. In addition, a new collection and important range extension of the poorly known *H. karooica* Goldblatt confirm that flower size, especially dimensions of the tepals, consistently differs from that in the closely allied *H. vaginata* (Sweet) Goldblatt, removing doubts about its status as merely a depauperate form of the latter. In *H. acuta* new collections have provided convincing evidence that the eastern, yellow-flowered populations of the species consistently have larger flowers that differ in several additional features from the western, white-flowered populations. The yellow-flowered populations clearly constitute a separate race of the species, which we recognize as *H. acuta* subsp. *tugwelliae*. The total number of species in *Hesperantha* is thus increased to 82: 43 of these occur in the southern African winter rainfall zone; 39 in the southern African summer rainfall zone south of the Limpopo; and four in tropical Africa.

TAXONOMY

***Hesperantha longistyla* J.C.Manning & Goldblatt, sp. nov.**

Plantae ± 30 mm altae, cormo campanulato ± 10 mm diam. margine spinis radiatis armato, caule ad 8 mm longo, foliis 3 falcatis $30\text{--}50 \times 2.5\text{--}3.0$ mm, spica 1- vel 2-flora, bracteis viridibus 7–10 mm longis, floribus manifeste purpureis ad faucem tubi flavis, tubo perianthii 20–25 mm longo, tepalis subaequalibus anguste ovatis patentibus, staminibus adscendentibus, antheris ± 5 mm longis, ramis styli ± 10 mm longis laxe patentibus.

TYPE.—Namibia, 2716 (Witputz): south of Sebrafontein, 1 400 m, (–DD), 28 August 2003, P. Bruyns 9484A (NBG, holo.).

Plants ± 30 mm high; corm bell-shaped with flat base, ± 10 mm diam. at base, margin with radiating spines. Stem reaching up to 8 mm above ground, unbranched. Leaves 3, falcate, $30\text{--}50 \times 2.5\text{--}3.0$ mm; cataphylls membranous. Spike 1- or 2-flowered; bracts green, 7–10 mm long, outer about as long as inner or slightly longer, inner forked at apex. Flowers evidently purple, yellow in mouth of tube; perianth tube 20–25 mm long, slender, widening near apex; tepals subequal, narrowly ovate, $\pm 10 \times 6$ mm, outer slightly wider than inner, spreading horizontally. Stamens symmetrically disposed, slightly spreading; filaments ± 4 mm long, exserted ± 3 mm from tube; anthers ± 5 mm long. Ovary ovoid, ± 1.5 mm long; style dividing at mouth of perianth tube, branches ± 10 mm long, spreading laxly. Capsules and seeds unknown. Flowering time: mid-August to early September. Figure 1A.

Distribution and ecology: found in rock crevices at higher elevations in the mountains of southwestern

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FIGURE 1.—A, *Hesperantha longistyla*, Bruyns 9484A; B, *H. helmei*, Helme 3144. Scale bars: 10 mm. Artist: J.C. Manning.

Namibia near Rosh Pinah, in the winter rainfall part of that country (Figure 2). Plants were growing among dolomite rocks and in crevices on the summit of a high ridge, where they would have benefited from any additional moisture that condensed from sea fog. It is likely that the species occurs elsewhere in suitable places in this rugged, largely inaccessible, and botanically poorly explored region. Known only from the type collection, made by Cape Town succulent specialist Peter Bruyns in 2003, *Hesperantha longistyla* is a surprising discovery, representing the only species of the genus known from Namibia.

Diagnosis and relationships: distinctive in its short stature, falcate leaves, relatively long perianth tube, 20–25 mm long, and disproportionately long style branches, *Hesperantha longistyla* has the bell-shaped corm with a flat base that characterizes a handful of other species in the genus from the southern African winter rainfall zone to the south, including white-flowered *H. falcata* (L.f.) Ker Gawl. as well as the two purple-flowered species, *H. latifolia* (Klatt) M.P.de Vos and *H. pauciflora* (Baker) G.J.Lewis. The last two species occur in Namaqualand, the former restricted to the Kamiesberg and the latter reaching its northern limit there, well to the south of

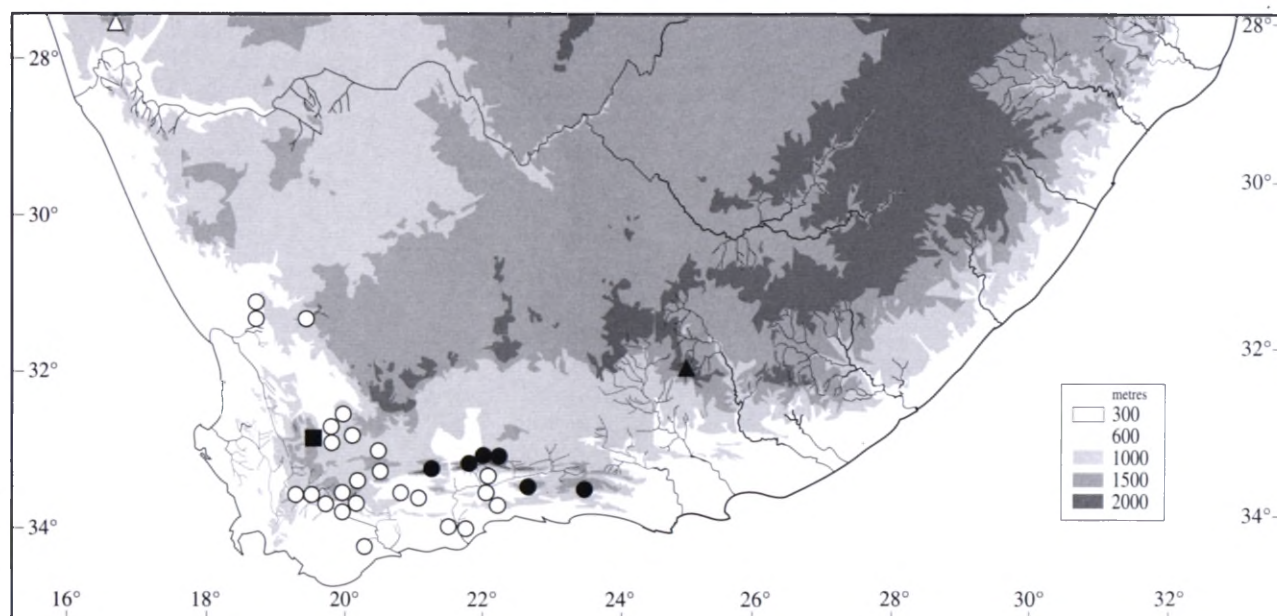


FIGURE 2.—Known distribution of *Hesperantha longistyla*, Δ ; *H. helmei*, $\blacktriangle$; *H. lithicola*, $\blacksquare$; *H. acuta* subsp. *acuta*, $\circ$; and *H. acuta* subsp. *tugwelliae*, $\bullet$.

Namibia. Nevertheless, the proximity of their ranges, and their similar flower colour suggest that *H. longistyla* is allied to these two species. *H. longistyla* is most similar to the long-tubed *H. latifolia* but differs in its smaller flowers, with tepals ± 10 mm long, and in the marked difference in the relative proportions of stamens and style. The filaments in *H. longistyla* are relatively short, 3–4 mm long and the style branches project ± 3 mm beyond the tips of the anthers, thus appearing unusually long. The flowers of *H. latifolia*, in contrast, are generally much larger, with tepals 15–23 mm long, the filaments (4–)7–10 mm long, and the style branches do not extend much beyond the tips of the anthers.

***Hesperantha helmei* Goldblatt & J.C.Manning, sp. nov.**

Plantae 180–250 mm altae, cormo globoso asymmetrico ± 9 mm diam., caule eramoso in quarta superiore folium squamiformem gerente, foliis 3, inferioribus dua teretibus costatis, superiore vaginanti, spica 1- vel 2-flora, bracteis viridibus, ± 9 mm longis, floribus pallide malvinis, tubo perianthii 6–8 mm longo, tepalis subequalibus anguste ovatis $\pm 8 \times 2.5$ mm patentibus, filamentis ex tubo ± 2 mm exsertis, antheris ± 4 mm longis, ramis styli ± 3.5 mm longis.

TYPE.—South Africa, Eastern Cape, 3224 (Graaff-Reinet): ± 50 km E of Graaff-Reinet, upper northern slopes of Nardouwsberg, 1 km N of main peak, Annex Stijlfontein 250, 2300' [700 m], (–BB), 19 November 2004, *N.A. Helme* 3144 (NBG, holo.).

Plants 180–250 mm high; corm globose, ± 9 mm diam., asymmetric, with concentric tunics. *Stem* slender, unbranched, bearing short, scale-like leaf in upper fourth. *Leaves* 3, lower 2 terete, conspicuously grooved, blades 8–15 $\times$ 1.2 mm, uppermost leaf sheathing lower half to two thirds of stem; cataphylls membranous. *Spike* 1- or 2-flowered; bracts green, ± 9 mm long, inner about as long as outer and forked at apex. *Flowers* pale mauve,

darker at mouth of tube, outer tepals with broad purple streak on reverse; perianth tube 6–8 mm long, slender, widening near apex; tepals subequal, narrowly ovate, $\pm 8.0 \times 2.5$ mm, outer slightly larger than inner, spreading slightly above horizontal. *Stamens* symmetrically disposed, slightly spreading; filaments exserted ± 2 mm from tube; anthers ± 4 mm long. *Ovary* ovoid, ± 2 mm long; style dividing at mouth of perianth tube, branches ± 3.5 mm long, ascending, ultimately reaching to about middle of anthers. *Capsules* and *seeds* unknown. *Flowering time*: November and probably December. Figure 1B.

Distribution and ecology: apparently restricted to the southern edge of the interior escarpment, where it is known from a single collection made at high elevations in rocky grassland in the Sneeuberge, east of Graaff-Reinet (Figure 2). The plants were found in open areas in *Merxmuellera* grassland among dolerite boulders. These grasslands burn regularly every few years during the dry season and are regularly covered with snow in winter (N.A. Helme pers. comm.) The tips of the long, basal leaves in all the specimens have been burned or frosted off, indicating that the species begins leafing early in the growing season when the danger of fire or frost is not yet over.

Diagnosis and relationships: *Hesperantha helmei* is named for its discoverer, the Cape Town ecologist and energetic and wide-ranging plant collector, N.A. Helme. The species is distinctive in its relatively small, pale mauve flower with a perianth tube 6–8 mm long, narrow tepals $\pm 8.0 \times 2.5$ mm, and terete, finely ribbed leaves. Another unusual attribute of the species is the small, sheathing, scale-like leaf in the upper part of the stem. This distinctive feature is characteristic of a small group of species allied to *H. pilosa* (L.f.) Ker Gawl., all native to the winter rainfall zone of southern Africa. Among these species, *H. pilosa* is largely a species of the Cape floristic region, whereas *H. ciliolata* Goldblatt, *H. teretifolia* Goldblatt and the hairy-leaved *H. pseudopilosa*

Goldblatt are centred on the Roggeveld Escarpment of the Western Karoo (Goldblatt 1987). Among the species in this group, *H. helmei* is probably most closely related to *H. ciliolata* and *H. teretifolia*, which also have terete, prominently ridged leaves, the grooves lined with fine ciliate hairs that are absent in *H. helmei*. The flowers of *H. ciliolata* and *H. teretifolia* are slightly larger than those of *H. helmei*, with a perianth tube ± 8 mm long and tepals ± 10 mm long. *Hesperantha teretifolia* in particular is broadly similar to *H. helmei* in general appearance, but has minutely ciliate leaf ribs, a small, scale-like leaf, 2–4 mm long, and larger anthers, ± 8 mm long. *H. helmei*, in contrast, has glabrous leaves, a larger scale-like leaf, 8–10 mm long, and smaller anthers, ± 4 mm long.

While the presence of an endemic species of *Hesperantha* in the Sneeuberge is surprising, it is not without precedent in the Iridaceae. A handful of species of the family occur there, including taxa from both the winter rainfall zone to the west and the summer rainfall zone to the east. Those from the winter rainfall zone include *Moraea ciliata*, *M. crispa* and *M. unguiculata*. The Iridaceae from the summer rainfall zone include one *Dierama* species, *Romulea macowanii*, three species of *Syringodea*, including the near endemic *S. pulchella*, and a distinctive short, broad-leaved form of *Babiana bainesii*. This mix of summer and winter rainfall species reflects the transitional position of these mountains, that have a grassland-dominated flora characteristic of the summer rainfall region at higher elevations but which receive predictable amounts of winter rainfall that permit the persistence of a handful of species from the winter rainfall zone to the west.

***Hesperantha lithicola* J.C.Manning & Goldblatt**, sp. nov.

Plantae (40–)80–200(–290) mm altae, cormo campanulato, 7–10 mm diam., ad basem dentato, caule eramoso, foliis 4, inferioribus 2 suberectis vel falcatis (30–)50–100(–160) $\times$ 1–2 mm, spica 1–4-flora, floribus albis, tepalis exterioribus extra rubris, tubo perianthii 10–12 mm longis, tepals subaequalibus, 10–15 $\times$ 4.0–6.5 mm, filamentis 3–5 mm longis, antheris ± 6 mm longis, ramis styli 4.0–5.5 mm longis.

TYPE.—South Africa, Western Cape, 3219 (Wuppertal): Swartruggens, Farm Knolfontein, between Katbakkies Pass and Skitterykloof, in loam and leaf litter on sandstone pavement, (–DC), 12 September 2006, P. Goldblatt & J.C. Manning 12817A (NBG, holo.; MO, PRE, iso.).

Plants (40–)80–200(–290) mm high; corm bell-shaped with flat base, 7–10 mm diam., breaking into segments below, margins fringed and often with radiating spines. Stem unbranched or rarely with one branch from near base. Leaves 4, lower 2 basal, suberect or falcate, often undulate or loosely coiled, midrib prominently raised and margins squared and minutely scabrid along both edges, blades (30–)50–100(–160) $\times$ 1–2 mm, uppermost leaf entirely sheathing; cataphylls membranous. Spike 1–4-flowered; bracts green, flushed reddish and becoming dry apically, 11–20 mm long, inner about as long as outer and forked at apex. Flowers white, outer

tepals red outside, opening in evening and producing rosy citrus fragrance; perianth tube 10–12 mm long, not or slightly exerted beyond bracts, slender, widening near apex; tepals subequal, elliptic, 10–15 $\times$ 4.0–6.5 mm, outer slightly larger than inner, spreading horizontally when fully open. Stamens symmetrically disposed, slightly spreading; filaments 3–5 mm, exerted 2–3 mm from tube; anthers horizontal, pale yellow, ± 6 mm long. Ovary ovoid, ± 3 mm long; style dividing at mouth of perianth tube, branches 4.0–5.5 mm long. Capsules ellipsoid, 9–10 $\times$ 4 mm. Seeds subglobose with flattened chalaza and persistent funicle, golden brown, 1.0–1.5 mm diam., rugose, testa cells domed. Flowering time: September. Figure 3.

Distribution and ecology: known from sandstone rock pavement in the Swartruggens Mountains in the eastern Cold Bokkeveld, where the plants grow in rock crevices or shallow humus, often in the shelter of small shrubs (Figure 2).

Diagnosis and relationships: *Hesperantha lithicola* is distinctive in its symmetrical, bell-shaped corm and narrow, often twisted or coiled leaves. It is probably most closely allied to *H. falcata*, which it resembles in general appearance, but from which it differs in its consistently narrower leaves, 1–2 mm wide (vs. 4–8 mm in *H. falcata*), and longer perianth tube, 10–12 mm vs. 4–9 mm. The two species differ also in their habitats. *Hesperantha lithicola* is restricted to shallow soils on sandstone rock pavement, whereas *H. falcata* is a common and widespread species of seasonally moist, deeper clay or sandy soils. This ecological difference is very evident at the type locality, where *H. falcata* occurs on sandy flats not far from rocky outcrops to which *H. lithicola* is restricted.

Hesperantha lithicola is remarkably similar in general appearance to *H. acuta* (Licht. ex Roem. & Schult.) Ker Gawl. but this species has an asymmetrical corm with one side flattened and extended downward. Without corms, however, the two taxa are essentially indistinguishable, although *H. acuta* does not occur on the Cold Bokkeveld and is typically found on clay soils, rarely limestone or in pockets of loam on sandstone outcrops.

Other material examined

WESTERN CAPE.—3219 (Wuppertal): Katbakkies 139 Farm, exposed sandstone slope, (–DC), 20 September 1991, C. Reid 1389 (NBG, PRE); Swartruggens, 60 km NE of Ceres, Knolfontein, 1 205 m, (–DC), 14 September 2005, J. & C. Jardine 126 (NBG); Groenfontein, Zeekoegat, west of Riet River, 900 m, (–DC), 15 September 2001, M.S. Stobie 7 (NBG).

TAXONOMIC NOTES

Hesperantha karooica Goldblatt

Known from just a handful of plants collected at two locations around Calvinia in Northern Cape, *Hesperantha karooica* is recognized among the species of the genus with large, asymmetric corms with overlapping tunics by its low stature, 30–50 mm high, and spikes of 1 or 2 yellow flowers with a tube ± 5 mm long and tepals ± 20 mm long (Goldblatt 1984, 2003). In general aspect

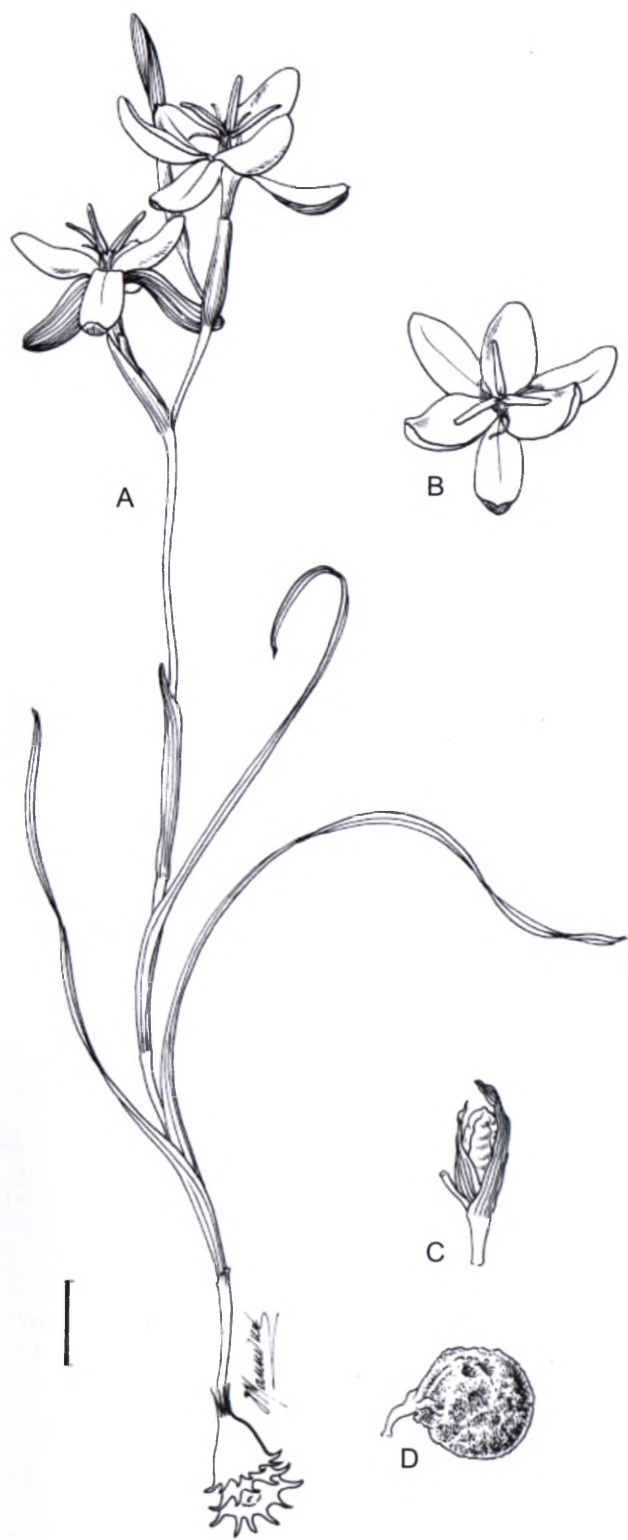


FIGURE 3.—*Hesperantha lithicola*, Goldblatt & Manning 12817A. A, whole plant; B, flower; C, capsule; D, seed. Scale bars: A–C, 10 mm; D, 1 mm. Artist: J.C. Manning.

the species is very like the more widespread Bokkeveld Plateau species, *H. vaginata* (Sweet) Goldblatt, which is normally taller, 120–180 mm high, and has spikes of (1)2–4 yellow flowers, usually marked with contrasting brown markings in the centre and on the tips of the outer tepals. Plain yellow-flowered plants are known from a few sites but both these and plants with marked tepals have a perianth tube 5–8 mm long and tepals $30\text{--}35 \times 15\text{--}17$ mm. Although the two species have been recognized in recent revisions of the genus (Goldblatt 1984,

2003), there has remained some doubt as to whether they are really distinct.

New collections of *Hesperantha vaginata* from near Loeriesfontein and of yellow-flowered plants that accord with *H. karooica* from well to the east of Calvinia, contribute to our understanding of the two taxa. The latter population, found some 50 km NNE of Calvinia on the road to Klipwerf in the area known as the Agter Hantam (Goldblatt & Porter 12747), consists of plants with bright yellow flowers, the outer tepals shaded brown outside, and ranging in height from 50 to 100 mm, with one plant found in the shade of a low shrub attaining a height of 160 mm. The flowers have a perianth tube 6–7 mm long, thus longer than until now reported for *H. karooica* and matching *H. vaginata*, but the tepals are $\pm 20 \times 9\text{--}10$ mm long and the anthers ± 10 mm long, thus $\pm$ as recorded for the two other collections of *H. karooica* (Goldblatt 1984).

The collection of *Hesperantha vaginata* from near Loeriesfontein (Goldblatt & Porter 12775), from the Farm Rietfontein, and which comprises a modest range extension (Goldblatt 1984), consists of plants 50–120 mm high, the smallest of these unusual for the species. All individuals have flowers with the brown markings on the inside of the tepals that are typical of the species and anthers that are ± 12 mm long and tepals $30 \times \pm 12$ mm. Even the smallest plants have flowers typical of the species.

We conclude that plant height and perianth tube length are not factors that consistently distinguish the two species, but that anther length and tepal size always differ. The tepal size especially is substantially smaller in *Hesperantha karooica*. Both this species and *H. vaginata* typically grow on heavy red clay derived from dolerite, although populations of *H. vaginata* from the west of its range also occur on tillite-derived clay or a mix of clay and sand derived from Table Mountain Sandstone.

Range extensions

Hesperantha karooica

NORTHERN CAPE.—3119 (Calvinia): Agter Hantam, NNE of Calvinia on road between Moordenaarspoort and Klipwerf, stony dolerite clay flats, (–BB), 1 September 2006, Goldblatt & Porter 12747 (MO, NBG, PRE).

Hesperantha vaginata

NORTHERN CAPE.—3119 (Calvinia): Farm Rietfontein, ± 48 km SE of Loeriesfontein, low dolerite clay hill, (–BC), 5 September 2006, Goldblatt & Porter 12775 (MO, NBG, PRE).

Hesperantha acuta (Licht. ex Roem. & Schult.) Ker Gawl.

New and well-preserved collections of the yellow-flowered variant of *Hesperantha acuta* (Goldblatt 1984), until now believed to be rare, have provided us with additional information about the species. Typical white-flowered *H. acuta* is common in the western Karoo, and blooms prolifically in years of adequate rainfall. The flowers, including the anthers, are white, although the outer tepals are brown to red on the outside. Careful measurements of the stamens and styles show that the

TABLE 1.—Comparison of yellow- and white-flowered variants of *Hesperanthes acuta*. Only well-pressed, fully open flowers were measured

Perianth colour	Yellow	White
Perianth tube length (mm)	12.5–15.0	8.5–12.0
Tepal length (mm)	12.5–16.0	(9.5–)11.0–16.0
Anther length (mm)	6–8	5.3–7.0
Filament exertion (mm)	± 4	1.5–2.5
Style tip level	± middle of anthers	2 mm below to 1 mm above anther tips

filaments are exerted 1.5–2.5 mm from the tube and that the style branches reach from ± 2 mm below the anther tips to 1 mm above them. The tube itself is 8.5–12.0 mm long and the tepals 9.5–16.0 mm long (Table 1). Plants with flowers falling in the upper range of these dimensions are most common along the Cederberg but also occur over the entire range of the white-flowered variant of the species (Figure 2). Smaller-flowered plants occur mainly in the northwest of the range, along the foothills of the Bokkeveld and Matsikamma–Gifberg Mountains. Yellow-flowered plants, referred by R.C. Foster (1948) to *H. tugwelliae*, occur in the east of the range of *H. acuta*, in the northern foothills of the Swartberg Mountains, along the Kammanassie Mountains, and in the Long Kloof to the south in the vicinity of Joubertina (Figure 2). New collections made since 2002 (listed below) show that plants have a perianth tube 12.5–15.0 mm long and tepals 12.5–16.0 mm long, thus closely matching the white-flowered plants, but the filaments are exerted ± 4 mm and the anthers are 6–8 mm long, whereas the style branches reach only to about the middle of the anthers (Table 1).

These consistent differences in the dimensions of anthers and style provide proof, in addition to flower colour, that the eastern populations constitute a separate, larger-flowered race, and we believe it is useful to recognize the yellow-flowered populations as a separate taxon. Because of the small differences between the two, and complementary geographic ranges, we recommend subspecies rank for the taxon, and thus make the combination *H. acuta* subsp. *tugwelliae*.

***Hesperanthes acuta* subsp. *tugwelliae* (R.C.Foster) Goldblatt & J.C.Manning, comb. et stat nov. *Hesperanthes tugwelliae* R.C.Foster**, Contributions from the Gray Herbarium 166: 26 (1948). Type: South Africa, [Western

Cape], Prince Albert, *Tugwell s.n. (Nat.Bot.Gard.1151/29 in K, holo.!, BOL, MO, iso.!).*

Selected specimens

WESTERN CAPE.—3321 (Ladismith): 30 miles beyond Seven Weeks Poort along Ladismith–Laingburg road, (–AC), 9 September 1971, *Thomas s.n. (NBG93821)*; Swartberg, between Matjesvlei and Gamkaspoot, (–BC), Oct. 1986, *Vlok s.n. (MO)*; Swartberg Mtns, road to Gamkaskloof, (–BD), 9 September 2001, *Goldblatt & Porter 11859 (MO, NBG)*. 3322 (Oudtshoorn): Prince Albert, Farm Kleinsleutelfontein, (–AB), 1 August 1995, *Marincowitz sub Snijman 1492 (NBG)*; Kareedouw Pass between Klaarstroom and Prince Albert, (–AD), 10 September 2002, *Goldblatt & Porter 12191 (MO, NBG)*; Groot Doorn River, (–CD), August 1931, *Thorne s.n. (SAM51710)*. 3323 (Willowmore): eastern slopes of Kammanassie Mtns, Farm Wildepaardefontein, (–CA), 18 August 1986, *Viviers & Vlok s.n. (MO)*; Kammanassie Mtns, lower steep slopes above Buffelsdrif, (–DB), 8 August 1983, *Matthews 1128 (NBG)*.

EASTERN CAPE.—3323 (Willowmore): 8 km west of Joubertina, (–DD), 24 August 1981, *Snijman 450 (NBG)*; hill north of Joubertina, (–DD), August 1923, *Fourcade 2690 (BOL, K, NBG)*.

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