Drosera cuneifolia and *D. admirabilis*: Two Rosetted Sundews from the Cape Province, South Africa

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During three months in South Africa I had the very good fortune to explore many areas, including the fynbos region. Fynbos is a shrubland vegetation type endemic to the Cape Floral Kingdom that is phenomenally rich in endemic species. It occurs predominantly over infertile soils and invariably includes heath-like shrubs, particularly *Ericas*, grass-like *Restios*, and bulbous herbs and experiences frequent fires (Cowling and Richardson, 1995).

During this time I had the opportunity to see the attractive *D. cuneifolia* and *D. admirabilis* in the wild. The former is endemic to the Cape Range, including Table Mountain (Figure 1). It is a handsome species reaching 8 cm across, with broad, wedge-shaped leaves to 1.5 cm wide at the truncate leaf apex (Figure 2). The leaves have an incomplete cover of appressed white hairs on the lower surface. The lower surfaces of the largest leaves are almost completely hairless. The short ovoid stipule is minutely notched at its blunt apex.

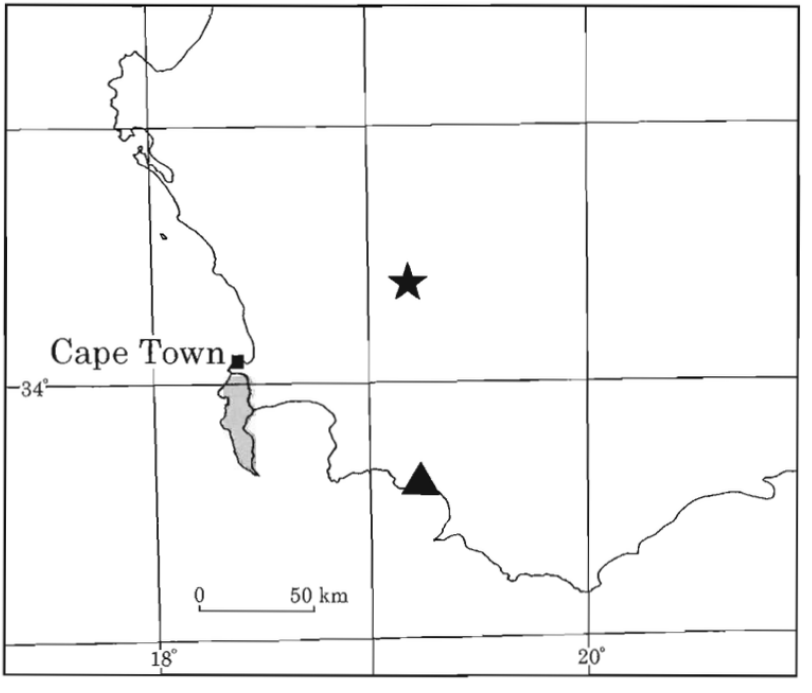


Figure 1: Distribution of *D. cuneifolia* (grey shading), *D. admirabilis* (triangle) and *D. sp.* "floating" (star) in southwest South Africa. *Drosera admirabilis* is likely to be more widespread; the type was collected west of the triangle at an unspecified location, and the enigmatic *D. sp.* "floating" may be conspecific.

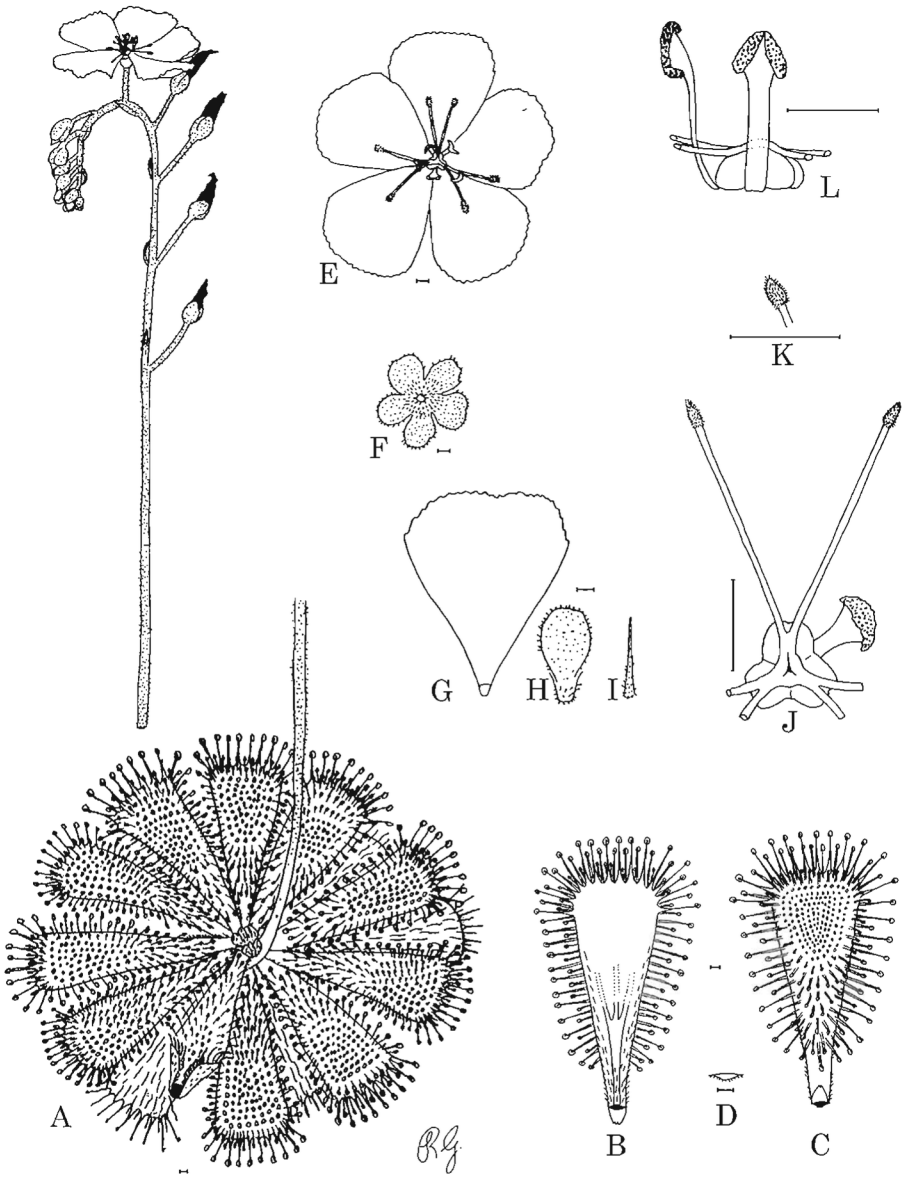


Figure 2: *Drosera cuneifolia*. A: Rosette, 6 cm in diameter; B: leaf lower surface, note the few hairs near the leaf base; C: leaf upper surface, note the absence of hairs; D: leaf cross-section; E: open flower; F: calyx; G: petal; H: sepal; I: bract; J: ovary, partial view of styles and one stamen; K: stigma; L: ovary, two stamens and the base of the styles. Scale bars=1mm. Illustration by R. Gibson.

In late spring some *Drosera cuneifolia* plants produce a robust scape. It is erect from the base and bears up to 20 flowers in a one-sided inflorescence. Flowering has been recorded between November and January (Obermeyer, 1970). The flowers are large and attractive (see Front Cover) up to 3 cm across and remain open between 8 am and 4 pm (in Cape Town). The ovary is surmounted by three styles that are bifid from the base to produce six style segments. Each style segment is typically entire, although minutely bifid style apices are occasionally produced. The tip of the stigma is hairy. The green ovary is surrounded by five erect stamens. Each filament is white, and is expanded at the apex where the two anthers are located. The almost orbicular sepals overlap each other markedly in bud. Observations on plants in cultivation and the wild indicate that this species is self-incompatible. The seeds, not seen, are recorded by Obermeyer (1970) as fusiform.

I observed *Drosera cuneifolia* at two locations in 1997. The first was at the southern part of Table Mountain, near Constantia Neck, where the plants grew near a small creek in the company of *D. aliciae*. The second was to the south at the Silvermine Nature Reserve, where several populations were seen within a single valley. Here the plants grew in a range of intermittent drainage lines and wetlands in substrate consisting predominantly of quartz sand and a variable amount of organic matter.

At Silvermine I observed that plants often formed clonal colonies up to 30 cm across, probably from buds generated along the thick roots of established plants (Figure 3). Only a few plants per colony flowered, and I observed pollen on the stigmas of many flowers, so insect pollinators must have been active. Mysteriously very few flowers set seed that season. Rosettes in exposed conditions died down as summer progressed, and it appears likely that the species survives as dormant roots during dry conditions. This ability would also serve this species well in surviving the not infrequent fynbos fires.

I studied *Drosera admirabilis* in the Kleinriviersberge near Hermanus, 90 km south east of Cape Town. Eric Green (a very well known carnivorous plant enthusiast in Cape Town) and I visited this site several times, and had been literally walking over plants of *D. admirabilis* without recognising them as different from the sympatric *D. aliciae*! *Drosera admirabilis* forms compact, reddish rosettes up to 4 cm across, consisting of narrowly wedge-shaped leaves with a rounded apex (Figures 4, 5). The stipule is small, triangular and distinctly divided into three segments. The leaf lower surface has a sparse cover of appressed hairs, and is glabrous at the apex. The scape base is typically vertical, but can be weakly ascending (Debbert, 1987), and bears up to 15 flowers. These have light pink petals and are up to 2 cm across. The flowers close by 3 pm. Unlike *D. cuneifolia* the styles flare at the apex into two fan-like lobes. The stamens have filaments which widen uniformly towards the anthers and the obovate sepals weakly overlap in bud. In cultivation, the flowers appear to be self-compatible, and automatically self-pollinate as they close. A flowering plant of this species appears in extreme lower left of the colour plate of *D. slackii* in Gibson (2000: p. 108).

Drosera admirabilis grows in wet peaty swamps along drainage lines, in the company of *D. aliciae, D. capensis, D. slackii, D.* × *corinthiaca* (=*D. glabripes* × *aliciae*) and *Utricularia bisquamata*. It superficially resembles small plants of *D. aliciae*, but can be distinguished readily by observing the leaf lower surface and flower structure. It was interesting to note that during my site visit in December 1997, flowers of all sundews mentioned above, save for *D. aliciae,* were open under the ambient temperature conditions (of about 30°C), suggesting that these sympatric species have differing pollination ecology.



Figure 3: A colony of *Drosera cuneifolia* at Silvermine.



Figure 4: *Drosera admirabilis*.

A plant very similar to *D. admirabilis* occurs 100 km to the north of Hermanus, in a creek that supports the most accessible *D. regia* population known. This sundew forms a compact reddish rosette up to 4 cm across of narrowly cuneate leaves, each with a rounded apex. The few hairs on the leaf lower surface are concentrated at the base, whilst the remainder is dotted with small, sessile red glands. The scapes in cultivated plants in Cape Town have a strongly ascending base, and the seeds are up to 1 mm by 0.2 mm. The flower structure has not yet been documented. However, photos of the open flower taken by Nigel Hurneyman (Figure 6), show that it has style segments that divide at apex into two, or more narrow triangular stigmas. Thus the flower structure is very like that of *D. admirabilis*.

This incompletely known sundew is widely grown in cultivation under the name of *D. sp.* "floating". The name has an amusing history, and has caused some confusion for those attempting to cultivate this plant. Some enthusiasts have incorrectly interpreted the name to indicate that this is a fully aquatic species! In nature it grows in a shallow, gravely creek bed where many plants have to cope with up to 5 cm of clear water. In this situation the plants produce flexible stems to bring the rosette to the surface of the water but have their roots firmly anchored in the substrate. When Eric first saw these plants he found, to his amusement, that these rosettes could be moved about the water surface on their flexible stems and thus appeared to be floating. This sundew grows happily in drier soil beside the creek, and in this condition remains a flat rosette.

All three sundews are well established in cultivation, especially in western Europe. Some seed-raised plants of *D. cuneifolia* in England have been observed to develop an undulose leaf margin and have been referred to with the invalid name "*D. cuneifolia* var. *undulata*." These plants originated from seed collected at Silvermine (E. Green, pers. comm, 1998).

Taxonomy

Drosera cuneifolia was amongst the first sundews to be formally described (Linnaeus, 1753), mysteriously predating the formal description of the much more widespread *D. aliciae* (Hamet, 1905) by 152 years. In 1987 Debbert described *Drosera admirabilis*, but it was reduced to synonymy to *D. cuneifolia* by Schlauer (1996, 2001). In the revised *Drosera* key (Schlauer, 1996, p. 79), *D. admirabilis* was reduced to synonymy with *D. cuneifolia* based on cuneate leaf shape with an indistinct petiole, sparse hairs on the leaf lower surface, swollen stigma and styles not repeatedly forked. From my own observations these taxa differ in leaf shape, leaf lower surface hair cover, and the amount of style division; perhaps due to introgression with *D. aliciae* in *D. admirabilis*. These and other differences are summarised in Table 1 below.

	D. cuneifolia	*D. admirabilis*
Max. leaf length	20 - 40mm	16 - 20mm
Leaf apex	Truncate	Obtuse
Stipule	Obscurely 3-lobed	Fully 3-lobed
Scape base	Erect	Erect to weakly ascending
Filament shape	Spathulate	Narrowly cuneate
Stigma	Simple, terete; rarely barely bifid	Divided into two fan-shaped lobes
Cytology	2n=32	2n=40
Distribution	Cape Range	Kleinriviersberge and The Kogelberg

Table 1: A summary of key differences between *D. cuneifolia* and *D. admirabilis* based primarily from my own observations, with additional details from Obermeyer (1970), Kondo (1976) and Debbert (1987).

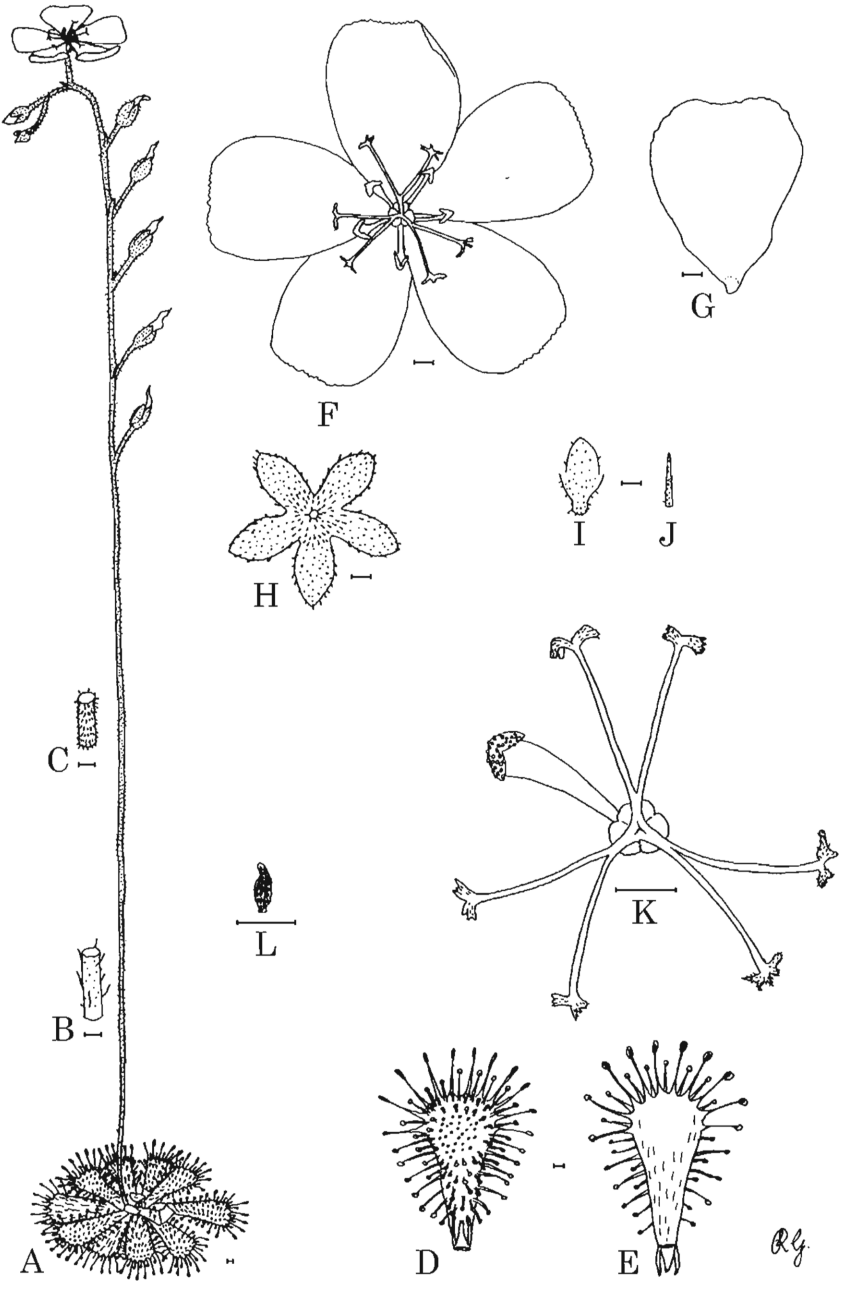


Figure 5: *Drosera admirabilis* from the Kleinriviersberg, collected by Fernando Rivadavia, and grown by Eric Green. A: Whole plant in flower; B: basal portion of the scape with long eglandular hairs; C: typical shortly-glandular hairy indumentum of the scape; D: leaf upper surface; E: leaf lower surface, note the distribution of hairs; F: open flower; G: petal; H: calyx; I: sepal; J: bract; K: gynoecium with one of the five stamens; L: seed. Scale bars=1mm. Illustration by R. Gibson.



Figure 6: *Drosera cf. admirabilis* (100 km north of Hermanus), plants in cultivation. Left: close-up of whole flower. Top right: close-up of anthers showing broad connective. Bottom right: close-up of upper portion of styles and stigmas showing apical ramification. Photographs by Nigel Hurneyman.

Species may be defined a number of ways, e.g. by morphological, genetic and environmental differences, and also by genetic isolation (Snow, 1997). Within the genus *Drosera*, species boundaries have been most commonly erected based on floral structure, plant morphology, cytology and pollen structure (Diels, 1906; Schlauer, 1996). From the features outlined in the above table it is suggested that *D. admirabilis* and *D. cuneifolia* are best treated as separate species, whilst freely acknowledging that they are members of the same subgenus and section of the genus (subgenus *Drosera*: section *Drosera*).

Both taxa are amenable to cultivation, especially *D. admirabilis* which thrives in conditions suitable to the sympatric *D. capensis* and *D. aliciae*. *Drosera cuneifolia* hails from better-drained soils and thus does best in a more open mix (i.e. more air gaps in the medium). Eric found it did well in fern fiber rather than peat moss, and other open organic mixes are also likely to be suitable. Using a large pot may also provide optimum conditions, and as a bonus will readily accommodate its large root system. Both species may be propagated by leaf cuttings and seed. Root cuttings are also likely to work.

In conclusion, *D. cuneifolia* and *D. admirabilis* are distinctive rosetted sundews from South Africa. They have many different features but it is noted that the still-mysterious *D. sp.* "floating" appears allied to *D. admirabilis* and requires further study.

Acknowledgements

I wish to thank Dr. John Rourke and the other helpful staff at the Compton Herbarium for granting study access to the collection, and Dr. Neville Marchant of the Western Australian herbarium for his support with the herbarium study aspects of this paper. I am grateful to Stan Lampard and Thomas Carow, and other growers, for the many stimulating conversations on these sundews in cultivation. This work would not have been possible without the very generous support and friendship of Eric Green and his family in Cape Town.

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News and Views

Lubomír Adamec and Kamil Pásek (adamec@butbn.cas.cz; csper@volny.cz) write: "We are greatly honored to introduce our new website on *Aldrovanda vesiculosa* to the world-wide "carnivorous" public. The website (www.BestCarnivorousPlants.com/aldrovanda/) has just been completed and is freely accessible. This specialized website on *Aldrovanda* includes all possible aspects of this very rare aquatic carnivorous plant. The website contains complete on-line texts of the most important papers on *Aldrovanda*. It is subdivided into the following chapters: Photo gallery, Literature references, Important papers available on-line, News and views, *Aldrovanda* for sale, *Aldrovanda* web links, Help us!, Sponsorship of research, and Persons involved with *Aldrovanda*. We will be happy if this website brings useful pieces of knowledge of *Aldrovanda* to readers and carnivorous plant growers and will also be grateful for any interesting feedback."

(Editor's note: While we do not want CPN to be used to describe every new carnivorous plant web site, we decided to print this to remind ICPS members of the interesting resources available to them on the internet. This and other web sites can be found on the ICPS web ring, at www.carnivorousplants.org.)

John Green (jsg16@utah.edu, 1025 MacFarland Dr., Salt Lake City, UT 84116 USA) wrote the following to the carnivorous plant listserve, and it deserves reprinting in CPN: "I remember someone a while back explaining that they feed drops of milk to their *Pinguicula* with good results. A month or two ago while examining my plants I swatted a mosquito that had been making a meal of me. Somehow I didn't smash it so the abdomen was still full of my blood. I dropped it onto a little *Pinguicula* 'Sethos' × *gypsicola*. When I looked a day or two later the blood had run out onto several leaves, and shortly after that the mosquito got kind of moldy so I picked it off. But since then the plant has nearly doubled in size and it is putting out much fatter leaves than ever before. It has always grown well for me but this is the best it has ever looked. Maybe next time I get a cut I'll go feed my plants.

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Front Cover: *Drosera cuneifolia* flowers. See article on page 100.

Back Cover: Mike King's giant *Sarracenia flava* var. *rugelii*. Photo by Mike King. See article on page 120.

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