Carniflora Australis

Journal of the Australasian Carnivorous Plant Society Inc.

Issue 11, March 2008

ISSN 1448-9570 PRICE $8.00 Free with Membership

Subscription

All members, single, family and overseas $AU25.00

Please make cheques or money orders payable to the Australasian Carnivorous Plant Society Inc. Membership and correspondence should be forwarded to the Secretary at

www.carniflora.com

PO BOX 4009
Kingsway West NSW 2208 (Australia)

Meeting are held on the second Friday of each month
Time: 7.30pm—9.30pm
Venue: Woodstock Community Centre
Church St, Burwood
Ph. (02) 4684 3478

Contents

Front Page: *Drosera hilaris* at Silvermine, South Africa (Photo by F. Rivadavia).
Back Page: *Pinguicula lutea* flowering near Gainesville, Florida (Photo by Dr. Mark Whitten)

UPCOMING SPEAKERS AND EVENTS

Date	Subject	Speaker
8th February 2008	AGM; Field trip to WA	Richard Nunn/ Phill Mann
23rd February — 2nd March 2008	Plants with Bite at Mt. Tomah	Various speakers on general and special topics
14th March 2008	Rare Plant auction	Various, come buy stuff
4th April 2008	Building a Bog Garden	Kirk 'Füzzy' Hirsch
9th May 2008	(Growing Tuberous *Drosera*?)	Someone Special
18th May 2008	Koi Show at Fairfield	See add later in the journal
13th June 2008	Trip to Northern Territory	Robert Gibson
11th July 2008	Something exciting	Surprise speaker
8th August 2008	To be announced	?????
12th September 2008	To be announced	Possibly a plant acution
25th—30th September	7th ICPS conference	Various renown speakers

Committee 2008

President:	Greg Bourke
Vice President:	Peter Biddlecombe
Secretary:	Jessica Biddlecombe
Treasurer:	Steve Moyle
Committee Members:	Terry Watts (Webmaster)
	Robert Gibson (Editor)
	Kirk 'Füzzy' Hirsch
	Gareth Hambridge
	Jenssen Turnowsky

Do some species of Pygmy *Drosera* require chilling in order to produce gemmae?

Kirk 'Füzzy' Hirsch
E-Mail: mijmark@ihug.com.au

One would think that the smallest sundews in the world would grow in the wetter areas of the world, yet all but one come from around South West Australia one of the more arid regions of the planet. (*Drosera pygmaea* being the one found elsewhere, from Perth all the way to New Zealand). Something all pygmy sundew species do (besides living up to their name and being little) is to produce gemmae (**Figure 1).**

Ok, what are gemmae? (BTW, one gemma, two gemmae) Liverworts have gemmae too. They're not seeds, but small packages of clones produced by the plant so that in rainy weather these little pieces will be scattered about by the raindrops to drift away in the water. Those little parcels that find suitable conditions will put down a root and start growing from a meristem at one tip.

Figure 1 *Drosera scorpioides* gemmae.
Photo by Dr. Gibson

Since many pygmy sundews don't live too long (2 to 6 years), this way is a good one to keep the numbers up in anyone's collection. It's been known by experts that some species don't produce gemmae when they should (late autumn these growers get a plethora from the same plants, often the same clones.) So, what could be the factor?

Here's one such example. When we lived in Dubbo which experienced winters of –5ºC at night sometimes, one species that has been one of the prize plants in our collection of pygmy sundews – *Drosera scorpioides* (**Figure 2)** —it produced a plethora of gemmae, which in spring were growing vigorously in the pot, in neighbouring pots, and pretty much wherever else we spread the gemmae. After moving to Cardiff along the coast, to a much milder winter, last year there were no gemmae at all, and what's worse is that about half the plants responded by dying on us.

In Mythbusters® spirit we had an idea, one of these do it in your own home experiments. Maybe those colder temperatures are necessary to invigorate this species and to incite gemmae production at this time of year? After all, look where the plant grows in the

wild, all along the southern reaches of West Australia, from Albany up to the southern reaches of Perth's suburbs. It gets chilly there in winter. Maybe like other carnivores of those realms they require some freezing moments to do their thing?

Further evidence came to light when we bought a well-advanced *D. scorpioides* from some grower in the Blue Mountains at the Mt Tomah Fair in March 2007, and it had begun to produce

Figure 2 *Drosera scorpioides* growing near Esperance ,Western Australia.
Photo by Dr. Gibson

gemmae already from some chilly nights they'd had. Within a few weeks in April it had gemmae. So, for a few nights as the end of April approached, when it was getting nippy at night, I stuck the pot of the scorpion pygmy sundew into the fridge for the night, taking it out first thing in the morning for some sun. I did this for 4 weeks. Within four weeks one of the plants showed signs of producing gemmae: that is, a swelling growing tip and the production of leaves that consisted of only petioles.

The happy news is that not only did the one well developed plant produce gemmae, not only did it turn from a sickly plant into a flourishing pygmy sundew, but the other's I'd more recently potted in there that we bought from a dealer seemed to like it as well and to start flourishing. Last good news is that the gemmae are adult plants by now soon to germinate more gemmae (**Figure 3).**

No such trigger seems required for the more readily available and easily grown flat rosetted pygmy *Drosera* (*D. pygmaea*, *D. nitidula* subspecies, *D. pulchella*, *D.* x *badgerupii*, *D.* x *sidjamesii* etc). Perhaps these species don't need the nightly deep chill, just the autumnal cool drop and a bit of cold before dawn? Perhaps it's because plants of these species have their growing point at, or very close to the ground to obtain sufficient nightly chilling in most temperate climates? Perhaps the growth point of *D. scorpioides* within a semi erect rosette atop a short stem is able to keep the growing point a little warmer during frosts than in flat growing species which grow nearby?

If this is the case, then we may predict that plants like *D. barbigera, D. stelliflora, D. lasiantha*, *D. silvicola* also may require some extra chilling in order to induce gemmae production in some collections living in the warmer regions?

Mere hypotheses and speculation at this stage one might say. True one would need to experiment to test this hypothesis. Yet when dealing with pygmy *Drosera* you can be guaranteed of

gaining clones of plants regularly and in some abundance once each year…

Figure 3 *Drosera scorpioides* gemmae sprouting in cultivation.
Photo by Barry Rice

well in most cases anyway. So if the plant isn't producing, try sticking in the big chill for a few nights a week and see if that works. (Maybe it can help for temperate growing *Pinguicula* species too… but that's another article).

ICPS Conference Sydney September 25-30 2008

A First for the Southern Hemisphere, the 2008 International Carnivorous Plant Society Conference will be held in Sydney, Australia at the Royal Botanic Gardens on September 25th through to the 28th, 2008. The conference will include a number of lectures, demonstrations, and some optional field trips to the Blue Mountains and Mt Tomah Botanic Gardens, just a 3 hours drive from Sydney. There will be provisions for a field trip to see Cephalotus, pygmy sundews and tuberous sundews in South Western Australia for conference attendees able to attend after the 30th. Do mark the dates in your diaries; we'd love to see you in Sydney in 2008.

Four weeks in South Africa (Part 2)

Robert Gibson and Kirk 'Füzzy' Hirsch
Email: mijmark@ihug.com.au

Drosera glabripes

Gracile plants of *D. glabripes* grow at Silvermine Nature Reserve and at Fernkloof Nature Reserve where plants thrived in shrubby fynbos vegetation in relatively well-drained sandy soil (**Figure 1**). The leaves of this species are up to 3 cm long, narrowly spathulate in shape with a petiole less than 1mm wide, and are widely spaced on an erect stem up to 50 cm tall. This species flowers in summer and grew in the company of *D. hilaris*, *D. ramentacea* and *D. cuneifolia*.

Figure 1. A semi-erect rosette of *Drosera glabripes* on a slender stem in fynbos at Silvermine Nature Reserve.

Drosera hilaris

Drosera hilaris is a large and attractive sundew that has heavily bedewed leaves despite growing in moist, but free-draining sandy soils on coastal sandstone hills near Cape Town (**Figure 2**). This species seems to prefer south- and east-facing slopes and plants form a stem which has a passing resemblance to *D. capensis* save for the leaves which are proportionally much wider in the petiole and leaf blade for their length. The leaves are also conspicuously hairy too.

This species tends to go dormant in summer, when the main growing point may die. Several new growing points often emerge from the roots in the fol-

Figure 2. Heavily bedewed plants of *Drosera hilaris* in fynbos at Silvermine Nature Reserve.

lowing autumn and one of these becomes the dominant crown and ultimately can form a rosette up to 12 cm across. Some plants were sending up scapes at the time of our visit, and it was noted that in the typical form of this species the scape is erect at its base. Whilst we were keen to see this species in flower, which has amongst the largest flowers of the sundews in this group, we were within a few days of seeing the first blooms of the season.

A variant of *D. hilaris* has been found in the south-facing hills near Franschhoek. Plants in this population had a well-developed stipule at the base of each leaf, and the conspicuously hairy scapes had a strongly ascending (curved) base. To assess its taxonomic status requires further research of this population by skilled botanists.

Drosera pauciflora

The Queen of the Sundews, *D. pauciflora* has the largest flowers recorded in the entire genus, which can reach up to 8 cm across (Obermeyer, 1970). This is a winter-growing species that dies down to swollen roots over the summer, and occurs on the coastal plain on the west coast just north of Cape Town. Plants form a well-developed flat rosette typically about 5 cm diameter (**Figure 3**). Only a few plants in populations visited were seen to flower, and those plants sent up a single scape with up to three white or purple petalled flowers. Plants in undeveloped house blocks on the edge of the town of Darling were strongly stoloniferous. They formed colonies that were the dominant ground cover locally under a light canopy of bulbs and *Drosera cistiflora*. In all other places plants of this species produced few offsets. Perhaps the flowers produced more seeds?

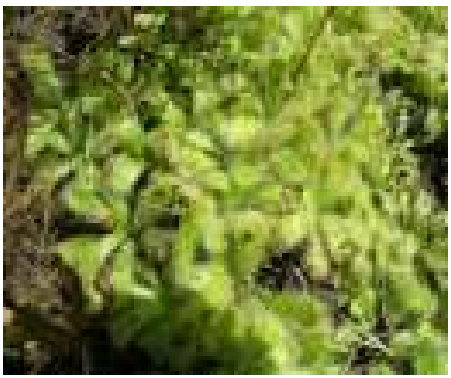

Figure 3. A carpet of *Drosera pauciflora* rosettes at Darling.

Drosera ramentacea

At first glance *D. ramentacea* looks a lot like *D. capensis*. However, upon closer examination the leaves are more broad than the petiole, and they're conspicuously hairy. This species prefers moist, but well-drained sandy soil confined to coastal hills in the South West Cape (**Figure 4**). It never grows in standing water or seeps. It also contrasts with *D. capensis* — often a beginning grower's first plant — by being the most difficult sundew to grow in cultivation even by many experts. It's very fickle with soil type and temperature ranges. *Drosera ramentacea* often grows with *D. hilaris* and *D. glabripes*, and all three species undergo a period of dormancy during the summer.

Figure 4. Hairy rosettes of *Drosera ramentacea* in Silvermine Nature Reserve.

This species was only seen at one location, on a hill slope in the Silvermine Nature Reserve. At the time of our visit the plants were commencing a burst of growth but had yet to develop scapes.

Drosera regia

The amazing *Drosera regia* comes from two populations in a single valley at Baviaanskloof, just east of Baineskloof (**Figure 5**). To see this species requires a 2 hour walk through a scenic valley to see plants in the lower elevation site. In cultivation two forms of this species are known, one with relatively broad leaves and one with relatively narrow leaves. The broad-leaved form occurs in the lower population, and grows in a seepage zone just upslope of a well-made path. Despite this species producing amongst the longest leaves in the genus, this sundew is often mostly hidden by dense surrounding herbs, so that just the leaf tips are exposed to direct sunlight. At the time of our visit plants had linear leaves to about 20 cm tall, by about 2 cm broad at the base. It would have been very easy to miss this site if you did not know where to look.

Whilst Füzzy and Stewart stayed at the lower site to admire and photograph the plants, Andreas, Fernando and Robert went a further kilometer up the valley to search for the narrow-leaved form of *D. regia*. Eric provided a description of where to find plants of this other form on a plateau at the head of the valley, and said that only a few plants were known. Despite over an hour of searching but they eluded our efforts to see them. Instead the three of us enjoyed some time wandering around on this plateau where patches of *D. trinervia* and pink flowered *D. cistiflora* occurred on mats of bright green moss, and where a few small plants of *D. capensis* were found beside a small creek. As the sun sank low into the sky the three of us made a rapid return to the lower *D. regia* site and then we all half walked and half ran and reached the car just after sunset. For the next day or so our leg muscles let us know of the effort that was required to see *D. regia* in the wild. But it was worth it.

Drosera slackii

Most people know *D. slackii* for its vibrant red rosettes with spathulate leaves to a about 4cm long and up to 1.5 cm wide, where the petiole in the lower third of the leaf is prominently flared. The leaf undersurface has coarse red,

oppressed hairs and the leaf base has a prominent red stipule. This is the form of *D. slackii* that occurs in the Fernkloof Reserve, near Hermanus. Both Fernando and Robert indeed saw such lovely plants there in 1997 (Gibson 2000).

During this trip only one or two plants were seen at Fernkloof and these were small, rosettes less than 2 cm across in which the leaves were not well-formed and looked initially like *D. aliciae*. These plants were suffering light deprivation due to thick herbage that now grew over the plants in a drainage line.

There is a second of *D. slackii*, which was collected in the Palmetriver area, between Cape Town and Hermanus, but which is now out of bounds to most people. These plants grow in the catchment of a reservoir in which entry is tightly regulated, even for carnivorous plant enthusiasts. This form has narrower leaves than the plants further east, and has a less-extensive flared leaf margin, and is known as the "narrow-leaf form" in cultivation. Sadly we were unable to see this form of the species on our trip.

Drosera trinervia

In the South West Cape *Drosera trinervia* is by far the most widespread and abundant of all the sundew species; so much so that it was rapidly given the nick-name of *Drosera* "Impala", based on the sheer abundance of this type of gazelle in north-eastern parts of South Africa (such as in the Kruger National Park). This species grows in a wide range of habitats, from seasonally moist clay soils of the coastal plain near Cape Town, to relatively well drained sandy soil on coastal hills, to seepage zones scattered in many locations of the myriad of sandstone ranges. *Drosera trinervia* has narrowly triangular leaves that form rosettes to 4 cm diameter (**Figure 6**).

Figure 6. A rosette of *Drosera trinervia* in scape at Baviaanskloof:
Photo by Fernando Rivadavia

From late winter into the summer, depending upon available soil moisture, the plants send up one or more scapes that end in a raceme of white, or rarely pink-petalled flowers, which are short-lived. The specific name is based on the three prominent veins that occur on the leaf undersurface, and which are most easily seen on the undersurface of unfurling leaves. This species develops a few thickened roots, to which plants retreat when the surrounding soil dries below a critical threshold. I was keen to see pink petalled plants, which grow

around Packhuis Pass and Gifberg. It was interesting to see that both pink and white-petalled plants grow together in these north-western populations.

Drosera zeyherii

Drosera zeyheri is a winter growing, spring-flowering species considered by some botanists to be synonymous with *D. cistiflora*. Plants of this species form a rosette of narrow and prominently tapered leaves that reaches about 5 cm across. In spring plants form a short (< 10cm) single stem that may have one, two or three narrowly ovate stem leaves, or may have no stem leaves at all. The stem ends in a few flowered inflorescence of white, pink or red-petalled flowers that often have a dark green grey centre. (**Figure 7**) We saw this species near Caledon (pink and red petalled plants), and east of Fraenchhoek (white petalled plants).

Between Malmesbury and Darling we found a well-known site of the "yellow" flowered *D. pauciflora*. However, after seeing a few plants it was clear that the leaves were narrow and acutely tapered, and these plants were better considered to be *D. zeyheri*. A few plants were in bud, and some flowers were able to be teased open. The petals are better described as being creamy white rather than yellow. The plants grew in a patch of *Acacia saligna* shrub land on a farm, and grew with pink flowered *D. cistiflora* and white petalled *D. trinervia*.

The endemic genus *Roridula* comprises two species that are found in different areas of the South West Cape, in distinctly different habitats (Obermeyer, 1970). Both species have stalked glandular hairs in the leaf undersurface and margins, and they differ from other carnivorous plants that the secretions are resinous rather than water-based. Both species do not possess digestive glands but rather obtain nutrients from trapped prey through the action of commensal bugs that walk freely over the plants (Anderson, 2005). The plants form woody shrubs to 2 metres tall that are killed by fire. The species then regenerates from long-live seeds that occur in the soil seed bank.

Roridula plants were initially described as species of *Drosera* due to the glandular hairs on the leaves. However, the plants' glands secrete a resin, rather a water-based mucin, and lack digestive glands. The plants are not truly carnivorous but do obtain some benefits from the nutrients of trapped insects by means of a symbiotic relationship with a hemipteran insect. They also differ from *Drosera*, and indeed Droseraceae, in other features too, such as wood structure, flower structure, and molecular data. Now both species form the only members of the Roridulaceae, which is endemic to the South West Cape.

Roridula dentata

Roridula dentata is a rare shrub that grows beside creeks in dry sandstone ranges to the north of Cape Town, such as around Packhuis Pass. The

leaves of this species are narrowly lanceolate to linear, up to 5 cm long by 3 mm wide, and have a conspicuously dentate margin. A colony of plants of this species was seen beside a creek at Packhuis Pass, in which at least 50 mature plants grew together, and where there were a few scattered seedlings. Many of the larger plants were in flower with bright pink flowers about 2 cm diameter (**Figure 8**). The plants had commensal bugs on them, as well as a few species of spiders that made their homes on the plants and ate some of the prey trapped by the leaves. It has been found recently (Anderson, 2005) that the commensal bugs on *Roridula* defecate on the undersurface of the leaves and transfer some of the nutrients from trapped insects to the plant.

Figure 8. A flowering branch of *Roridula dentata* at Packhuis Pass.

Roridula gorgonias

Roridula gorgonias grows in coastal sandstone mountains near Hermanus and plants grow in peaty, sandy soil that is wet to sodden. The leaves of *R. gorgonias* are narrowly lanceolate, to 10 cm long, with an entire margin. The leaves are congested at the tips of the branches (**Figure 9**). The flowers are of similar size and colour to *R. dentata* but this species produces more, but smaller seeds per capsule. Plants were in flower at the time of our visit.

Both Robert and Fernando had seen *R. gorgonias* at Fernkloof Reserve in 1997. Then the plants at the site consisted only of seedlings less than 20 cm high that were flowering for the first time. The seeds had germinated after a fire swept through the fynbos the previous summer, reducing the dense biomass of moist coastal fynbos vegetation. With no further fires the coastal fynbos had become tall and thick. In 2006 *R. gorgonias* proved to be hard to find. So when Fernando found them, we noted there were far fewer plants and those in the colony were now sparse shrubs to 2 m tall growing amongst a range of similar sized shrubs. Once found we spent many hours studying them.

Utricularia bisquamata

Utricularia bisquamata was a common species in most perennial seeps, and some likely seasonal wetlands, and was seen at such places as Hermanus, Table Mountain, Silvermine, Baineskloof and Gifberg. Plants were in flower, and usually had small purple and yellow flowers that were a few millimetres across (**Figure 10**). The next most commonly encountered form had small-flowered white and purple flowers. Whilst we visited sites at Fernkloof

Figure 9. Large plants of *Roridula gorgonias* in coastal fynbos near Hermanus.

and Baineskloof where larger flowered forms have been seen in the past (Gibson, 2004), no flowering plants of such forms were seen on this trip. Instead, Fernando made a remarkable discovery at Gifberg. He found a diminutive, possibly annual form, growing amongst the typical form of the species as well as *Drosera alba*. This small variant of *U. bisquamata* had scapes to 3 cm tall with tiny flowers, with a translucent upper petal with fine purple veins, and requires further study.

There were two species of sundew not seen during our travels in the South West Cape: *Drosera acaulis* and *D. rubrifolius*. *Drosera acaulis* is found in alpine areas near the summit of the highest peaks in the South West Cape. At the time of our visit Eric suggested the plants would not yet be in growth – so it would not be worthwhile visiting any sites, except to admire the view and other flora. *Drosera rubrifolius* is known from a single location near Ceres. We did not get to this area during our visit.

South Coast and Durban Area

Fernando, Andreas and Stewart flew out of Cape Town to other destinations in Africa which we continued our travels by car in South Africa. In the last week in September we drove to Johannesburg via the south coast and Durban, looking for carnivorous plants as we went. We saw five species, two of which we had not seen in the South West Cape.

Drosera aliciae

Flat red rosettes of *Drosera aliciae*

Figure 10. The typical form of *Utricularia bisquamata* encountered in the wild.

were seen in seeps in coastal mountains between George and Humansdorp. The rosettes were up to 5 cm across and comprised an overlapping array of narrowly wedge-shaped leaves (**Figure 11**). Many

plants were in scape, and some plants had begun to flower. The flowers of all plants seen in the East Cape had pale pink petals and had styles that not as divided as plants seen in the South West Cape. The narrowly fusiform seeds were up to 1.4 mm long. It was hoped that these red sundews with narrowly wedge-shaped leaves were *D. natalensis*, but leaf texture, number of leaves per rosette and seed shape identified these plants as *D. aliciae* (Exell and Laundon, 1956).

Drosera cistiflora (again)

Fruiting plants of *Drosera cisitiflora* were found in a remnant patch of fynbos on a hillside near Humansdorp. Plants were up to 25 cm tall with linear leaves on the stem and also the basal rosette. Pink petals were seen on recently finished flowers. This form of the species was typical to that seen in the Western Cape.

Figure 11. Rosettes of *Drosera aliciae* near George, growing with *U. bisquamata*.

Drosera dielsiana

Figure 12. *Drosera dielsiana* at Oribi Gorge, near Durban.

Green rosettes of *Drosera dielsiana* were seen in scattered populations between Knysna and the Oribi Gorge, near Durban. Near Plettenberg Bay *D. dielsiana* grew with *D. aliciae*, and both species were clearly differentiated by leaf shape, leaf colour and petal colour. *Drosera dielsiana* plants form flat rosettes to 4 cm across made from distinctly spathulate leaves, with a narrow, flaring petiole (**Figure 12**). Many plants were in flower in all populations seen and in all cases the flowers had white petalled flowers and six style segments, and produced ovoid seeds to 0.3 mm long. In one population plants were found that had long-stalked retentive glands on the petal apical margin; at this stage it is not known if this is a fixed or transitory character.

Drosera venusta

Vibrant large red rosettes of *D. venusta* were seen at one location in coastal hills near Plettenberg Bay where the plants grew in a very different habitat to those of other South Africa sundews seen on our trip. The plants grew in on a steep road cutting, in a rainforest clearing in a rainforest. The moist soil appeared to quite rich in nutrients and the sundews grew amongst a range of broad-leaved shrubs and saplings. The sundews themselves were wonderful to see, as they were up 8 cm across and formed semi-erect rosettes, often on short stems (**Figure 13**). Many plants were in scape, but there were no open flowers at the time of our visit. The plants were easily seen from a passing car.

Figure 13. Cluster of *Drosera venusta* rosettes in a forest clearing, near Plettenberg Bay.

On the coast nearby, at the entrance to the amazingly beautiful Tsitsikama National Park I happened to see a single sundew in overgrown shrubland that appeared to be a small plant of *D. venusta*: perhaps the variant known in cultivation as *D.* '*coccicaulis*'? More observations are needed of sundews in this area to see how they compare to other populations of *D. venusta* in the area.

Utricularia bisquamata

The widespread *Utricularia bisquamata*, with small purple and yellow flowers was seen at some coastal seeps around George and Knysna, often growing in the company of *Drosera aliciae*.

There were several species of sundew that we did not get to see: *D. burkeana, D. indica, D. madagascariensis, D. natalensis* and *D. nidiformis*. *Drosera indica* would have been dormant at the time, and has been reported from riverbanks to the north of Nelspruit, and also within the Kruger Park. Had there been plants in growth along streams in the Kruger Park then they would have been left well alone; it is not worth botanizing with such a risk of being eaten by lions! We did not visit any seeps in the North East and thus did not to see any of the perennial sundews of the area. Similarly we did not see *Genlisea hispidula* or any of the fifteen locally native bladderworts (*Utricularia firmula*, *U. welwitschii*, *U. arenaria*, *U. livida*, *U. sandersonii*, *U. scandens*, *U. prehensilis*, *U. subulata*, *U. gibba*, *U. australis*, *U. inflexa*, *U. stellaris*, *U. benjaminiana, U. foliosa* and *U. cymbantha*: Taylor (1989).

Figure 7 *Drosera zeyherii* red flowering form from Caledon,.

Figure 5. Erect leaves of *Drosera regia* broad leaf form growing in-situ at Baviaanskloof

Final week: Johannesburg and Kruger National Park

The final week of the trip was mostly spent in the Kruger Park, which was at the end of the dry season. The vegetation was dry and crisp and days were hot and humid. Thus the amazing quintessential African animals, and not the plants were the main things admired here. On the way back from the Kruger Park we visited Robert and Michelle Kunitz, whom one of us (R.G.) had spoken to by phone on the previous visit to the country. This time it was great to finally meet them and to see their lovely garden and talk plants! Robert Kunitz has a collection and a half of non-carnivores, especially orchids growing epiphytically.

A few days were spent in the bustling city Johannesburg, but the time was spent socializing and looking at some of the local landmarks. It was our departure point for the return flight to Australia. And we left having spent an amazing four weeks in South Africa. It was wonderful to revisit some great plant sites seen on previous visits; to have seen many of the impressive spring-flowering sundews in flower in the wild in the South West Cape, and seen some new territory as well. I look forward to further travels in South Africa.

Acknowledgements

This trip would not have been as great if it weren't for Eric Green, Andreas Fleischmann, Fernando Rivadavia, Stewart McPherson, Robert Kunitz and Kobus & De Wett.

References:

Anderson, B. (2005) Adaptations to foliar absorption of faeces: a pathway to plant carnivory. *Annals of Botany* **95**: 757-761.

Exell, A. W. and Laundon, J. R. (1956) New and noteworthy species of *Drosera* from Africa and Madagascar. *Bol. Soc. Brot.* **30**: 213-220

Fischer, E.; Porembski, S. and Barthlott, W. (1990). Revision of the genus *Genlisea* (Lentibulariaceae) in Africa and Madagascar with notes on ecology and phytogeography. *Nordic Journal of Botany* **20**: 291-318.

Gibson, R. (1997) Cape Town Adventures. *Bull. Aust. Carniv. Pl. Soc*. **16**: 3-14.

Gibson, R. (1998) Return to South Africa. *Bull. Aust. Carniv. Pl. Soc*. **17**: 9-11.

Gibson, R. (2000) *Drosera slackii* – a living jewel from South Africa. *Carniv. Pl. Newslett*. **29**: 107-109.

Gibson, R. (2002) *Drosera cuneifolia* and *D. admirabilis*: two rosetted sundews from the Cape Province, South Africa. *Carniv. Pl. Newslett*. **31**: 100-106.

Gibson, R. (2004) A large-flowered form of *U. bisquamata* from near Hermanus, South Africa. *Carniv. Pl. Newslett*. **33**: 77-79.

Gibson, R. (2006) The stunning red-flowered *Drosera cistiflora* in the wild and in cultivation. *Carniv. Pl. Newslett*. **35**: 70-73.

Gibson, R. and Green, E. (1999) *Drosera* x *corinthiaca* (Droseraceae),

Map of South Africa showing the location of towns talked about in this article
Illustration by Dr. R. Gibson

a newly recognized natural hybrid from the Cape Province, South Africa. *Carniv. Pl. Newslett*. **28**: 81-84.

Obermeyer, A. (1970) Droseraceae *in* L. E. Codd, B. De Winter, D. J. B. Killick and H. B. Rycraft (eds.) 'Flora of Southern Africa' Vol. 13, pp. 187-201 (Department of Agriculture Technical Services, Pretoria)

Rivadavia, F. (2000) Endless carnivorous plants in Cape Town, South Africa. *Car. Pl. Newslett*. **29**: 42-45

Taylor, P. (1989) 'Kew Bulletin Additional Series XIV: The genus *Utricularia* – a taxonomic monograph.' (Her Majesty's Stationery Office, London)

Times Atlas of the World (1993) (Times Books, London)

Wikipedia (2007) South Africa. http://en.wikipedia.org/wiki/South_Africa [accessed 16 July 2007]

Note: All photos used in this article, except the one cited, are by Dr. Gibson

Rhizoctonia solani - a root-rot disease affecting *Sarracenia* plants

Helmut Kibellis – Castle Hill, Sydney
Email: zabhel@optusnet.com.au

All of us growing *Sarracenia spp.* would have at some stage had to deal with this rhizome rotting disease. Actually it is a fungus, *Rhizoctonia solani.* The worst thing about it is there is little warning when it strikes. By the time when we notice that our plants are affected it's often too late. By too late I mean shrivelling pitchers are turning brown and when you remove them you will find the rot has set in and the growing points easily break off as that disease takes hold.

So how do you know when this disease creeps into your plants? How could you spot infections especially as there are no visible signs above the soil (eg. leaves or pitchers) until it is too late?

My suspicions is that all of us growing *Sarracenia spp.* would have at some stage had to deal with this rhizome rotting disease. Actually it is a fungus, *Rhizoctonia solani* (**Figure 1**). The worst thing about it is there is little warning when it strikes. By the time when we notice that our plants are affected it's often too late. By too late I mean shrivelling pitchers are turning brown and when you remove them you will find the rot has set in and the growing points easily break off as that disease takes hold.

So how do you know when this disease creeps into your plants? How could you spot infections especially as there are no visible signs above the soil (eg. leaves or pitchers) until it is too late?

My suspicions grow when I notice that there is no new growth development (especially during the warmer months) and when a plant appears stagnant or dormant. Keep an eye on the centre from where new leaves or pitchers develop. If in an approximate time frame of around 10 to 16 days the leaves or pitchers do not grow, then it pays to check the rhizome. If one notices that part of this rhizome has turned brown, the plant can still be saved by cutting the rhizome back to where it is healthy, ensuring that no rotted brown rhizome is left -- and make sure the cutting instrument gets sterilised. Discard the old potting

Figure 1 *Rhizoctonia solani* rotting a *Sarracenia* rhizome.
Photo by Helmut Kibellis

mix and use a new pot and soil. Strangely enough even though you may have several plants in the same pot, not all of them are affected, and there's a reason why.

R. solani is a secondary disease (**Figure 2**). That means it is present in the soil or potting mix. It is not transmitted from one plant to the next. This explains why not all plants in the same pot are simultaneously affected. It will come through open wounds. The wetter the soil and when soil temperatures are low to about 16°C, the higher the losses (though *Rhizoctonia* is still active in drier conditions). Unfortunately, both of these conditions are beyond our control.

Figure 2 Close-up of *Rhizonctonia solani* affected tissue.
Photo by Helmut Kibellis

Can I avoid having *Rhizoctonia* affecting my Sarracenias? According to a report sent to me some years ago by the NSW Dept of Agriculture when I sent a sick plant in for disease identification, sterilisation of potting soil is necessary – Terraclor® is recommended. To sterilise pots I submerged them in household bleach for several days. Also when dividing or cutting a Rhizome, put wettable Sulphur on the wound (despite visiting several Nurseries and Garden Centres, I have not been able to find pure "wettable sulphur"). However, there is "wettable sulphur" in Yates "Mancozeb Plus®" which is readily available.

In conversation with Steve Clemesha (the Guru of *Sarracenia* in Australia, for many plants in today's collections originated from him), he pointed out it is most important when potting a divided Sarracenia up, to have the wound or open cut sitting above the potting mix and preferably facing towards the sunnier side in order that the wound will stay drier. Also, when keeping them try not to submerge the rhizome in stagnant water.

For years, I have had an insurance policy by having about 6 pots per species or variety that I want to keep so if I were to lose one or more plants, I will still have others to keep them in my collection.

Acknowledgement: Thanks to staff at the NSW Department of Agriculture who identified this disease.

References:

McMaugh, J. (1985) 'What Garden Pest or Disease is that?'

Reader's Digest (2001) 'Garden problem solver'

Drosera filiformis: varieties, structure and propagation

Steve Amoroso - Sydney

Abstract

Drosera filiformis is one of the most interesting species of Sundews that is well known, and is native to the United States. There are two main subspecies and a number of variants or hybrids of *D. filiformis* that exist, each having similar characteristics to one another. Furthermore, in their native habitat, these plants can naturally hybridise among one another to produce striking plants that are genetically a combination of each of the parents that crossed. The offspring of two different species within the same genus can take on the phenotype of either the dominant parent plant, a mixture of the two plants, or even in some cases can have a majority of their characteristics of one parent, with only minor characteristics of the recessive parent. The main purpose of this review is to provide a comparison between the different forms of this Sundew and to provide an opportunity of reviewing some of the methods that may be used to cultivate and propagate these plants.

Introduction

Drosera filiformis, commonly referred to as the Thread-leaved Sundew, is native to the United States and Canada. There are a number of recognised varieties, and one recognised hybrid of this sundew between two varieties (although a number of backcrosses are possible). As the name suggests, these plants all produce thin leaves that take on the appearance of threads. Each "thread" can reach to a maximum height of 30-60 cm (Cheers, 1992), depending on the variety, and are covered in sticky glands. During the colder winter months, these plants undergo a resting dormancy period in which the production of a round resting bud forms at the start of autumn. These plants tend to go dormant at least a couple of months earlier than the majority of carnivorous plants, such as *Sarracenia*, which usually becomes dormant around the end of autumn. In early spring, growth recommences, producing new leaves (**Figure 1**), as well as a flower scape. The flower scape usually reaches about 50 cm long*, producing numerous

Figure 1 *Drosera filiformis* var. *filiformes* emerging from dormancy. Photo by Dr. Gibson

flowers (up to 22 or more)* on the same scape. (**Figure 4**)

The aims of this paper is to review the features of different varieties of *D. filiformis*, provide a comparison of any differences in difficulty cultivating these plants, and to consider the different methods that can be used to propagate each variant.

Varieties of *Drosera filiformis*

There are two main recognised varieties of *Drosera filiformis: D. filiformis* var. *filiformis* and *D. filiformis* var. *tracyii*. However, there are also a number of variants and hybrids that exist, such as *D. filiformis* var. *filiformis* 'Florida Giant' and 'Florida Giant Red', *D. filiformis x* 'California Sunset' and *D. x* '*Californica*', which represents all possible hybrids between the varieties of *D. filiformis* (information on *D. x* '*Californica*' provided by Barry Rice, personal comment). These plants, as the name suggests, have beautiful, threadlike leaves that differ in height depending on the variant. The colour of the sticky glands that cover these leaves also varies depending on the variant. *D. filiformis* var. *filiformis* grows up to a maximum height of 30 cm (Cheers, 1992) and has green leaves. The colour of the sticky glands are red. *D. filiformis* var. *tracyii* can reach up to a height of about 60 cm (Cheers, 1992), and the colour of the sticky glands are white. *D. filiformis* var. *filiformis* 'Florida Giant' has almost exactly the same characteristics as *D. filiformis* var. *filiformis*, except it can achieve a height larger than its common counterpart. All varieties produce tall flower scapes up to 50 cm long*, and produces a number of light purple-coloured flowers (**Figure 2**). These species are self-pollinating, producing a number of black seeds.

Figure 2 Open flower of *Drosera filiformis* var. *filiformes*.
Photo by Dr. Gibson

The hybrid version of this species, *D. filiformis x* '*California Sunset*' is an exact replica of its parent species, and is a cross between *D. filiformis* (Raf) *and D. filiformis* (Raf) var. *tracyii* [(Macfar.)(Diels)] (Carnivorous Plant Database), but the colour of its digestive glands are lighter in colour. This plant reaches a height of half a metre and produces pink coloured flowers (Carnivorous Plant Database). This plant can also produce seeds, however if these are sown, the plants will again not become like the parent, but may revert back to one of the original variety.

On occasions, *D.filiformis* var. *tracyii* have produced leaves that are split on the top section of the thread-like leaves, and this leaf division is approximately 1 cm in length.

Figure 3 *D. filiformis* var. *tracyii* in its natural habitat.
Photo by Stewart McPherson

Cultivation of *Drosera filiformis*

Drosera filiformis is generally easy to grow and can be maintained for a number of years. These plants grow best outdoors in full sunlight, and the pot placed in a shallow tray of water. In my growing conditions, plants are maintained in shallow foam boxes that hold water and are exposed to direct sunlight throughout the day. I have managed to grow *D. filiformis* var. *filiformis* successfully in shaded conditions for a few months without any major problems, however the leaves have a darker green appearance and the red colour on the sticky glands are absent. The growing medium I have been using is pure peat moss, however these plants may grow very well in mixtures of peat moss, perlite and coarse washed river sand. However, from time to time, worms can attack these plants. These should be removed as soon as worms are observed. In addition, there is a white-coloured worm, presumably a Geometer moth, that is quite small in size (probably only a couple of centimetres in length), These eat their way into the resting bud of the plant. Such attacks not only cause damage, but it can often lead to secondary fungal attacks. It is therefore suggested that plants are inspected carefully as often as possible to ensure any pests are not attacking plants.

Propagation of *D. filiformis* by seeds

This is one of the easiest methods used to regenerate this species of *Drosera*. It can be used for both subspecies of *D. filiformis*. Even while the flower scape is still green, the seeds produced within the pods usually mature. Provided the individual flower heads are black in colour, it indicates that the seeds are ready to be collected. The seeds themselves are black in colour, long, and thin. Individual flower pods can produce a large number of seeds. Seeds should be sprinkled on the surface of a pot or tray filled with pure peat moss, or a mixture of 3 parts peat moss to either one part of perlite, one part of coarse washed river sand, or a mixture of both.

During the warmer months, pots can be left outdoors in full sun., yet it is recommended seedling pots get placed in a warm and protected environment, such as a glasshouse or terrarium. Even the top of a plastic bottle can cover them on top of the pot. This "protected" environment has several advantages over the outdoors. Warmer, and higher levels of humidity help to promote seed germination in a shorter time period (about one to two months). There is also less chance of drying out due to the humid environment of the terrarium, as well as the pot or tray not being exposed to direct wind, which can often dry out a pot very quickly. Also, in outdoor conditions, seeds can be blown or washed out of the pot quite easily during strong winds and heavy rain, and there is very minimal (if any) chance of this occurring inside a glasshouse or terrarium. It is important that the peat moss is never allowed to dry out, as this can affect the chances of germination. Sit pots in a shallow tray of water. It is best to initially water very lightly from the pot's surface, and then to place water in the tray.

Figure 4 *Drosera filiformis* var. *tracyii* in full bloom
Photo by John Borom

In the case of the *D. filiformis* hybrids, the seeds produced by this hybrid, if sown, should be labelled differently; however, it has been suggested that these seeds should not be sown. The seeds produced by this hybrid may revert back to one of its original forms, or even to a completely different plant. Therefore, the only way of helping such hybrids to survive is by vegetative propagation (see below), or by producing the hybrid yourself by crossing the correct order of parents.

Propagation of *D. filiformis* by Divisions

As with almost any plant that grows from a common rhizome, *D. filiformis* can be propagated by divisions, and is recommended for *D. filiformis x* '*California Sunset*'. Plants may be separated between early spring and throughout summer. During the growing season, a single plant may end up producing several plantlets, and these can be divided off the plant when mature (normally after several months of growth). Each of these plants will have their own root system, and will end up forming a winter resting bud the follow-

ing winter.

Propagation by Leaf Cuttings

A recent attempt at using leaf cuttings as a method of propagation in pure peat moss proved marginally successful. Further attempts need to be revised, experimenting with different growing medium combinations, and performing the cuttings during different seasons of the year (example early spring, as opposed to summer). I have managed to propagate some common *Drosera* species, including *D. adelae*, *D. capensis* and *D. capillaris* successfully using leaf cuttings.

Conclusions

A number of variants of *D. filiformis* exist. Each of these variants differs by colour and maximum height. Each variant has the same general appearance of leaf shape and flower scapes. *D. filiformis* is very easy to cultivate and to propagate by seeds or by vegetative means. It grows best in full sunlight.

Author's Note: *Represents the sizes and height of plants in my growing conditions in Sydney.

References

1.Cheers, Gordon (1992) 'Carnivorous Plants of the World', Collins, Angus & Robertson Publishers Pty Ltd, NSW, Australia.

2.International Carnivorous Plant Society (2006), 'Carnivorous Plant Database.' [http://www.omnisterra.com/bot/cp_home.cgi?name=filiformis&search=all].

Editor's Note: Changes were made to this article for the sake of consistency with the cited International Carnivorous Plant Data Base.

Pinguicula species and how I grow them

Helmut Kibellis – Castle Hill
Email: zabhel@optusnet.com.au

Pinguicula {named after "pinguis" means greasy due to the greasy touch of the leaves}. Colloquially the plants are often known as "Pings".

Species of *Pinguicula* have a wide distribution, reaching from the extreme habitat of NORTH AMERICA, from the ARCTIC CIRCLE through MEXICO into SOUTH AMERICA, in EUROPE, NORTHERN AFRICA and into ASIA.

Most form rosettes, flat leaves with slightly upturned margins. The leaves are covered with tiny hairlike glands, which secrete a sticky substance of acids & enzymes. Interestingly they produce a bactericide that keeps digested food free from bacteria, since potentially harmful bacteria rotting the trapped prey could enter plants through leaves. In northern Europe that knowledge was used by farmers when they applied these leaves on cattle sores.

Some Pings. have the ability to move their leaves and actually curl around their victims. The flowers have 5 petals; 2 upper and 3 lower. However, there will be the odd variant; in one case a 4 petalled plant of *P. mesophytica* was found.

The study of species and subspecies is a complex and unresolved matter. I will not attempt to even touch on this subject. Rather I will categorize them into 3 climate groups —
TEMPERATE, WARM- TEMPERATE and TROPICAL

TEMPERATE SPECIES [often from cold climates]

Figure 1 *Pinguicula grandiflora* growing in L. Legendre's Sydney collection. Photo by R. Gibson

These species require a resting period. Plants die back to a resting bud called hibernacula, a group of tightly held leave-scales. They often loose their roots during dormancy. Temperate Pings. not only reproduce by seeds, but also by gemmae, just like pygmy sundews. These gemmae form around the base of the hibernacula and look like small resting buds. They break off easily .

When the hibernacula opens in Spring it sends up leaves. The soil of these Pings .is often on the alkaline to neutral side. It is important for their cultivation to add a little lime or crushed

shells to the potting mix. *P. grandifora*, (**Figure 1**) *P. vulgaris*, *P. macroceras*, and *P. longifolia* belong to this group.

WARM TEMPERATE PINGS

These grow in temperate to sub-tropical zones e.g. southern Europe and southern U.S.A. They DO NOT form a

Figure 2 *Pinguicula lutea* growing wild in Florida near Gainesville.
Photo by Dr. Mark Whitten

hibernacula during the resting period. They prefer wet acidic soils. *P. lusitanica*, *P.primuliflora*, *P. caerulea*, *P. grandis, P ionantha* and *P. lutea* (**Figure 2**) belong to this group.

TROPICAL PINGS

From Central-America and the Caribbean, these Pings often have a dry resting period. During this time they produce small, dry succulent leaves. These species are the HETEROPHYLLUS [2 leaf forms]. The ones which do not change their leaf-form are called HOMOPHYLLUS.Some of these Pings. even form a bulb, an almost onion like structure below the soil surface during the resting time.

Many of the tropical Pings. flower throughout the year but less plentiful during their resting period: *P.agnata*, *P. esseriana*, *P. gigantea*, *P. mesophytica*, *P. moranensis* (**Figure 3**), and *P. gypsicola* to name a few, belong to this group.

CULTIVATION of PINGS.

TEMPERATE SPECIES

I grow them in either Sand/Peat moss 1:3, Peat/ Vermiculite 3:1 or straight Peatmoss. I find that I have a reasonable success with most temperate species except *P. variegata*.

However it does become rather challenging during the resting period. I do not let them completely dry out but keep them just moist. Yet there is a fine line and sometimes they will rot when kept too moist. Our winter in Sydney is not cold enough thus when growth occurs plants struggle.

In earlier years I thought that by standing pots in trays during the growing season would work. I achieve better results by overhead watering. Not only does it wash minerals and dust off leaves but it also cools the surrounding air, making it more tolerable for all my Pings even in hot summer weather

WARM-TEMPERATE PINGS

I grow them in either Peat/Vermiculite 3:1 or straight Peatmoss. This is best for all the U.S. species and also for *P. hirtiflora* from Europe.

TROPICAL PINGS

These are my favourite because of their big beautiful diversity of flowers., colour, and leaf shape. I also find them easiest to grow and to cultivate.

Potting Mixture: Vermiculite/Perlite 3:2 or Peat/Vermiculite3:1. When plants are young I favour Vermiculite/ Perlite as this encourages development of roots.

I find all Pings. grow well under

Figure 3 *Pinguicula moranensis* growing in the Tamaulipas region of Mexico.
Photo by Noah Elhardt

50% shading. However some are tolerant to more light and develop a nice reddish leaf from sun exposure.

During growth fertilizing is beneficial. I use half strength liquid fertilizer either Blood and Bone or Fish- Emulsion.

PESTS AND DISEASES

Caterpillars and snails are the most damaging. Pyrethrum or Folimat 50 do not harm plants, providing they are not sprayed from an aerosol can or on hot days. Further reading on pest and diseases on Pings is recommended in the March 2005 issue of the Journal of the International Carnivorous Plant Society (I.C.P.S) an article by Dr. Laurent Legendre.

PROPAGATION

The most common method is by seed or leaf-cuttings. Seeds lose their viability quickly and unless fresh they are not always a sure thing. Also it can often take many weeks before any seedlings emerge.

For leaf cuttings, gently pull the leaf off including the petiole [a most important point], then place the leaf- stalk in live sphagnum moss. As mentioned in my article on temperate species this type can also be propagated by gemmae.

SUMMARY

I find Pings. reasonably easy to grow and in most cases they require little attention. Even if the soil is on occasions completely dry, more often than not the Pings would survive, in contrast to most other C.P.s. They don't take up much space and reward us with beautiful flowers.

The biggest headache is when they go into winter-rest. Most C.P. books, which come from authors of the northern hemisphere. They suggest to let Pings.

dry out during the winter-rest. I found out that especially "bulbous" tropical Pings. e.g. *P. heterophylla*, *P. parvifolia*, *P. oblongiloba*, to name a few, will shrivel up and not come back. Maybe our winter is too warm and there is not a complete rest by the plants.

This year I have put them in a plastic container with a lid half open to let fresh air in. The bottom of this container is lined with moist sphagnum. The pots are placed on top of this sphagnum and every 2nd day I give a fine misting to keep the plants just moist.

Fortunately Laurent Legendre left Australia to return home to France and left me a number of plants from his tissue culture. Now I can try some experiments. Though obviously I can't have too many failures as I will be running out of plants.

Acknowledgements & thanks to Peter D'Amoto from his book 'The Savage Garden', and Dr. Laurent Legendre.

Notes to contributors

Contributions including articles, letters, photographs and drawings to the journal are greatly appreciated and may be forwarded to the societies postal address or online The views expressed in this journal are of the authors not necessarily those of the Australasian Carnivorous Plant Society Inc.

Contributions to the journal may be submitted on 3.5inch (PC) disc, CD or by email to mijmark@ihug.com.au Please use Microsoft Word whenever possible. For instructions on submitting photographs and diagrams please contact the editor (mijmark@ihug.com.au). Contact details are preferred for publication but may be excluded by the authors request.

Dedicated to Conservation and Education