CARNIVOROUS PLANT NEWSLETTER

VOLUME 12, Number 2 JUNE 1983

CARNIVOROUS PLANT NEWSLETTER

Official Journal of the International Carnivorous Plant Society

Volume 12, Number 2
June 1983

COVER

P. grandiflora f. pallida from the southern Jura, Switzerland/ France. Sent by Dorothea Huber.

The co-editors of CPN would like everyone to pay particular attention to the following policies regarding your dues to the ICPS.

All correspondence regarding dues, address changes and missing issues should be sent to Mrs. Pat Hansen, 3321 Hamell Rd., Fullerton, CA 92635. DO NOT SEND TO THE CO-EDITORS. Checks for subscriptions and reprints should be made payable to CSUF FOUNDATION-ICPS.

All material for publication, comments and general correspondence about your plants, field trips or special noteworthy events relating to CP should be directed to one of the co-editors. We are interested in all news related to carnivorous plants and rely on the membership to supply us with this information so that we can share it with others.

Views expressed in this publication are those of the authors, not necessarily the editorial staff.

Copy deadline for the Sept. issue is July 15, 1983.

CO-EDITORS:
D. E. Schnell, Rt. 1, Box 145C, Pulaski, VA 24301
J. A. Mazrimas, 329 Helen Way, Livermore, CA 94550
T. L. Mellichamp, Dept. of Biology, UNCC, Charlotte, NC 28223
Leo Song, Dept. of Biology, California State University, Fullerton, CA 92634

Seed Bank: Patrick Dwyer, St. Michael's Episcopal Church, 49 Killean Park, Albany, NY 12205, USA.

BUSINESS MANAGER: Mrs. Pat Hansen, c/o The Fullerton Arboretum

PUBLISHER: The International Carnivorous Plant Society by the Fullerton Arboretum, California State University, Fullerton, CA 92634. Published quarterly with one volume annually. Printer: Kandid Litho, 129 Agostino Rd., San Gabriel, CA 91776. Circulation: 581 (113 new, 468 renewal). Dues: $10.00 annually, $15.00 foreign. Reprints available by volume only.

News and Views

GLENN HICKS (2857 W. San Jose Terrace, Tucson, AZ) sent this note from *Grounds Maintenance,* February, 1983, entitled "Health Warning."

Sporotrichosis, an infection that has occurred in many parts of the country, develops as a result of a fungus present in rose bushes, ferns, sphagnum moss and other materials commonly used in the landscape industry. Now regarded as an occupational hazard, the fungus enters the system through an open sore or puncture, as might be caused by a rose thorn. The fungus is not very powerful and usually produces only local skin eruptions or ulcers. In extreme cases, it can travel in the lymph vessels and cause eruption on the skin along these channels.

A major problem with this infection is the difficulty doctors have in making the correct diagnosis. If peculiar skin diseases are noticed, a doctor should be alerted to sporotrichosis as a possible cause. The usual treatment is a saturated solution of potassium iodide (SSKI) taken orally. Treatment is continued until evidence of infection has disappeared.

The major cause of sporotrichosis appears to be sphagnum moss. Persons using this material should frequently wash the skin exposed to it and pay attention to skin abrasions and cuts.

JEFF JACOBS (6114 N. Hermitage, Chicago, IL 60660) writes: I would like to inform the readers of a new carnivorous plant exhibit in the Chicago area. It is located at the Chicgo Botanic Garden in Glencoe, IL. This greenhouse has tried in the past to show a few CPs which were placed in a large terrarium where they quickly succumbed to neglect.

The current exhibit is small, well-made and looks promising. A tall, walk-around, glassed-in area surrounds a landscaped setting. Several genera are represented including Dionaea, Sarracenia, Drosera, Utricularia, Pinguicula and Cephalotus. I was told that Nepenthes would soon be added.

The exhibit is taken care of by a volunteer as the regular staff could not spare the time to maintain the plant collection. I wish the exhibit well, as it is the only Chicago area effort to display this little group of beautiful plants.

ISAMU KUSAKABE (5-14-6 Chitosedai, Setagaya, Tokyo 157 Japan) writes: In *CPN* 8, 13 1979, I published a list of hybrid Nepenthes made by Japanese breeders. Since then, I found several errors and I wish to correct now the parentage of these Nepenthes:

N. × Minami(-ensis) = oiso × wrigleyana = (mixta × maxima) × wrigleyana (not *mixta* × wrigleyana)

N. × Kikuchi(-ae) = Oiso × maxima = (mixta × maxima) × maxima (not *mixta* × maxima)

N. × Ambrosial Kota = trichocarpa × hookeriana (not *gracilis* × hookeriana)

N. × Balmy Koto = thorelii × maxima (not thorelii × *mixta*)

STEPHEN W. LAMINACK (9838 American Ave. SW #7, Tacoma, WA 98498) has found a supplier of silk-screened T-shirts for a very good price and would like some indication of interest on the part of ICPS members. He would appreciate hearing any ideas, possibilities for art work, and an estimate of how many T-shirts people might be interested in. If anyone has art work or ideas for art work, please let him know, but do not send art work at this time.

From CLIFF OWENS (4807 SW 30th Way, Ft. Lauderdale, FL 33312): I read with interest the attempt made to organize the ICPS with the election of officers and finding no one in attendance. Perhaps the problem lies with the membership: 1) not knowing others qualified to replace the interim officers and 2) they're not familiar with those who are qualified and vote.

It would seem there is more to running an organization than just having an inter-

est in the club. The officers will need to be experienced in financial, budgetary, and other considerations on a much larger scale than just a normal household endeavor. Many members, who might nominate themselves, may be frightened of that responsibility.

I would suggest a listing of candidates submitted by the interim officers and/or membership with their qualifications. A first draft of candidates would be the first step in a vote taking place.

With the membership spread out around the country, continent, and perhaps overseas, it's difficult for them to drop whatever they're doing and assemble in one place to begin the selection of officers. There will always be someone who can't attend on one day or another for a variety of reasons. The only feasible alternative is to do what is described in my text. It will take time to locate candidates and have them acquiesce to nomination and finally a vote. Ideally it is possible that officers could be elected within one to two years. The *CPN* can be used as the medium by which nominations can be requested with an insert placed in the last issue of the volume year describing candidates, offices and ballots. Allowing, at least, one quarter of the next volume year for the membership to respond the results could be ready for publication in the June or September issue of the *CPN*. I'm ready to vote! Give me some choices.

STEVE SMITH (1159 Trim St., Kirkwood, NY 13795) reports: I have been repotting my *Nepenthes* and taking cuttings the last few days. I removed the top of the *N. bicalcarata* below the air-layered cut. A cut was made in the stem and a wad of moss was wrapped around it and the whole thing was protected with a plastic wrap to prevent it from drying out. After two months to the day, I had a mass of three to four inch roots. So far, it has reacted well to the transplant. I cannot believe how vigorous this plant is. At its present rate, it will be a weed by the end of summer. (See photo, right.)

JEROME WEXLER (13 Langshire Dr., Madison, CT 06443) writes: The plant *Martynia lutea* has been mentioned several times in the past few issues of CPN.

I have a complete life history study of this plant photographed in both black and white and in color. (A 'life history study' is from seed to seed.)

If anyone needs some photos for some paper he is writing, they can contact me at the above address. I also have life history studies of several other carnivorous plants —some in black and white and in color and some only in color. Venus' Fly Trap was photographed only in color. I had to convert some of the photos to black and white for my book, *Secrets of the Venus' Fly Trap.*

Anyway, I thought I'd let you know that professional photographs are available on various carnivorous plants.

Details on ordering reprints of Volumes 1-6 will appear in the September issue.

N. bicalcarata
Photo by Steve Smith

ICPS SEED BANK*

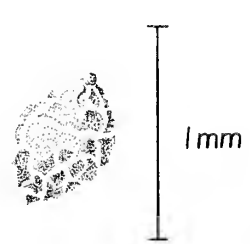
$.75 each

Byblis gigantea (6), *B. liniflora* (15), *Darlingtonia californica*, *Dionaea muscipula*, *Drosera adelae* (2), *D. aliciae*, *D. aliciae* (pale) (10), *D. auriculata*, *D. burkeana* (6), *D. burmannii* (4), *D. capensis*, *D. capensis* (narrow), *D. capillaris*, *D. communis* (3), *D. dielsiana* (9), *D. intermedia*, *D. lovellae* (6), *D. montana* (5), *D. peltata* (10), *D. pygmaea* (3), *D. regia* (2), *D. rotundifolia*, *D. spathulata*, *D. spath.* (Formosa) (15), *D. spath.* (Kansai), *D. spath.* (white) (6), *Nepenthes fusca* (4), *N. gracilis*, *N. khasiana*, *N. mirabilis*, *N. rafflesiana* (2), *Pinguicula alpina* (10), *P. caerulea* (9), *P. corsica* (10), *P. grandiflora* (4), *P. grandiflora pallida* (5), *P. grandiflora rosea* (5), *P. vulgaris* (10), *P. vulgaris bicolor* (5), *Sarracenia flava*, *S. leucophylla*, *S. purpurea purpurea*, *S. rubra wherryi* (14), *S. leuco* × *alata* (11), *S. rubra* × *leuco* (5), *S. rubra* × *oreo* (3), *Utricularia subulata* (2), *U. violacea* (2) (formerly listed as *U. lateriflora?*)

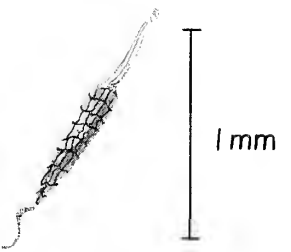
*See *CPN*, March, 1983 for details on sending or ordering seed.

SEED STRUCTURE OF CARNIVOROUS PLANTS

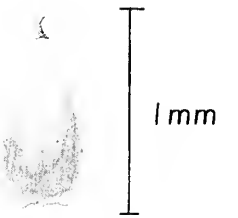
(The text of Patrick Dwyer's report on the seed structure of carnivorous plants was printed in its entirety in the March, 1983 issue of *CPN*. Unfortunately, due to space limitations, many of the seed drawings and SEM photomicrographs could not be included until this issue. The drawings were done by Debbie Tolman and John Randall; the SEM's were sent by Tom Story.)



Drosera adelae



Drosera aliciae



Drosera anglica

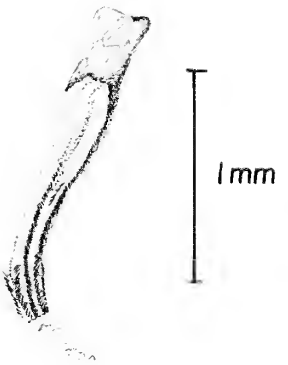
Drosera adelae F.Muell. (Australia) – pitted, three-angled, almost round, black (Erickson, 1968), length around 0.5 mm.

Drosera aliciae Hamet. (S. Africa) – elliptic to fusiform, attenuate at one or both ends, reticulate, length about 1 mm, black.

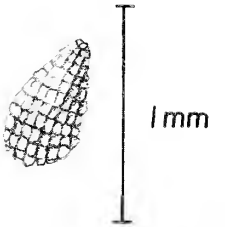
Drosera anglica Huds. (Europe, N. American Boreal, Japan) – sigmoid-fusiform, 1-1.5 mm, longitudinally striate-areolate, black (Wynne, 1944).

Drosera arcturi Hook. (Australia, New Zealand) – obovoid (Erickson, 1968), length around 0.8 mm, minutely pitted dark brown.

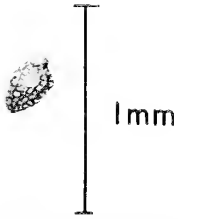
Drosera arcturi



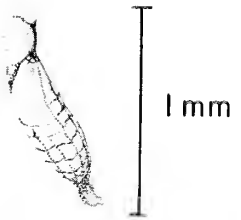
Drosera auriculata



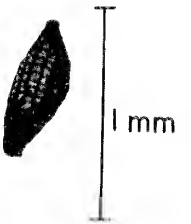
Drosera brevifolia



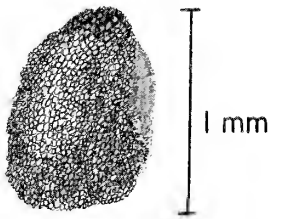
Drosera burmanni



Drosera capensis



Drosera capillaris



Drosera erythrorhiza

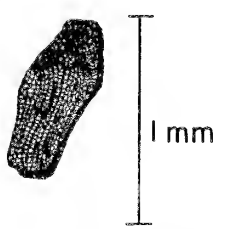
Drosera auriculata Backh.Ex. Planch. (Australia, New Zealand) – linear or ellipsoid extended slightly at each end (Erickson, 1968), length about 1.7 mm, brown.

Drosera brevifolia Pursh. (N. America) – obovate, oblong, caudate at base, 0.3-0.4 mm long, crateriform, pits in 10-12 rows, black (Wynne, 1944).

Drosera burmanni Vahl (Asia, Trop. Australia) – minute, minutely pitted, black (Erickson, 1968), length around 0.25 mm.

Drosera capensis L. (S. Africa) – fusiform, reticulate, acute at one end, length around 1 mm, black.

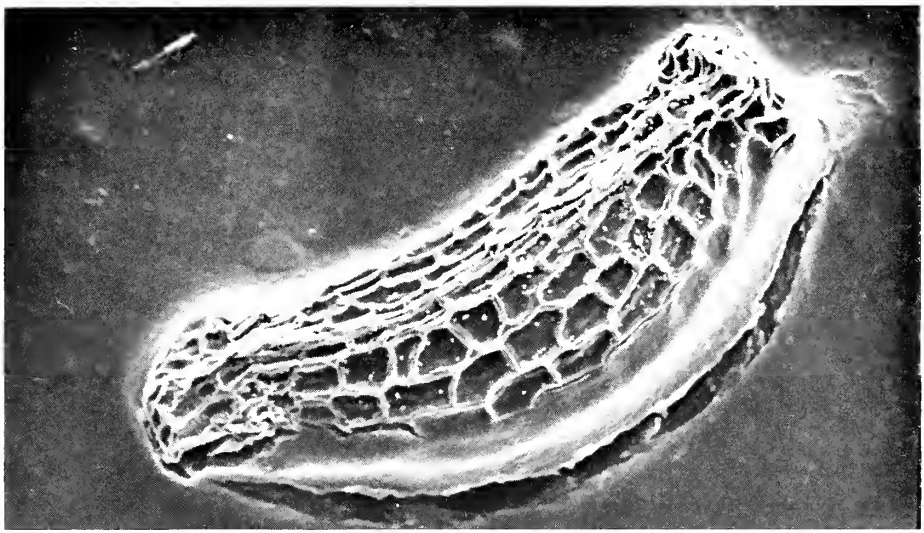
Drosera capillaris Poir. (N. & C. America, Colombia, Brazil, Guyana, Venezuela) – elliptic to oblong-ovate, asymmetric, 0.4-0.5 mm long, coarsely papillose, corrugated in 14-16 ridges, brown (Wynne, 1944).



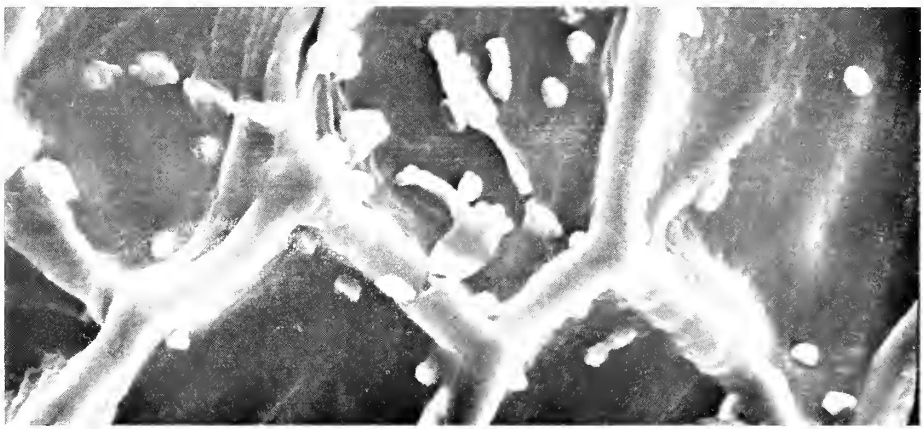
Drosera filiformis

Drosera erythrorhiza Lindl. (Australia) – almost round with angled corners, covered with spongy seed membrane, black (Erickson, 1968), length around 1 mm, pitted.

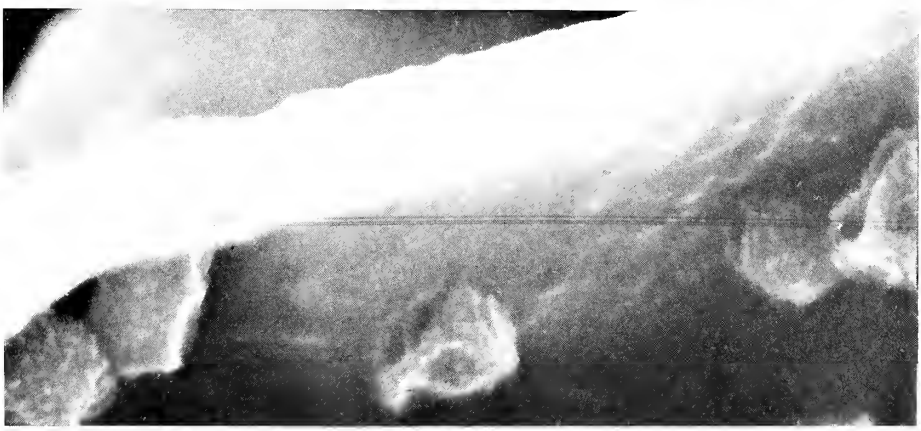
Drosera filiformis f. filiformis Rafin. (N. America) – elliptic, abruptly caudate at both ends, 0.5-0.8 mm long, coarsely crateriform, pits in 16-20 rows black (Wynne, 1944).



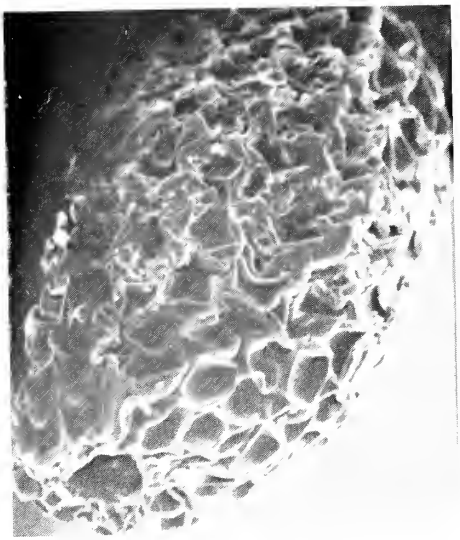
D. capensis Mag. 130×



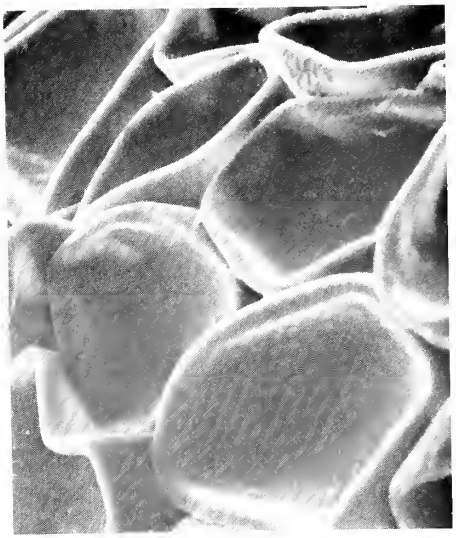
D. capensis Mag. 1300×



D. capensis Mag. 6700×



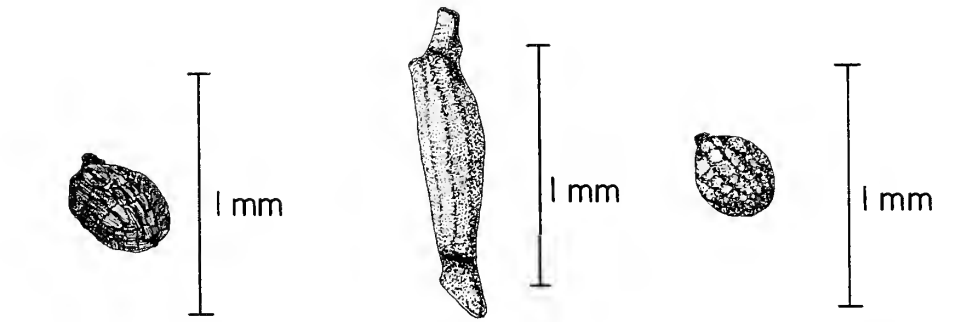
D. capillaris Mag. 130×



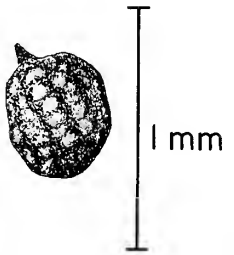
D. capillaris Mag. 650×

D. filiformis Mag. 100×

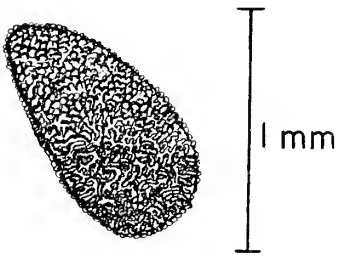
D. filiformis var. *tracyi* Mag. 1100×



Drosera gigantea *Drosera hilaris* *Drosera indica*



Drosera glanduligera



Drosera intermedia

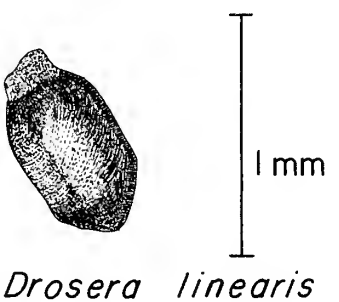
Drosera gigantea Lindl. (Australia) – almost round (Erickson, 1968) reticulate, length about 0.5 mm, black.

Drosera glanduligera Lehm. (Australia) – ovoid with honeycombed membrane, slate grey (Erickson, 1968), length around 0.5 mm.

Drosera hilaris Cham. Et Schlechtal. (S. Africa) – linear, truncate at both ends, very rugose, length about 1.25 mm, brown.

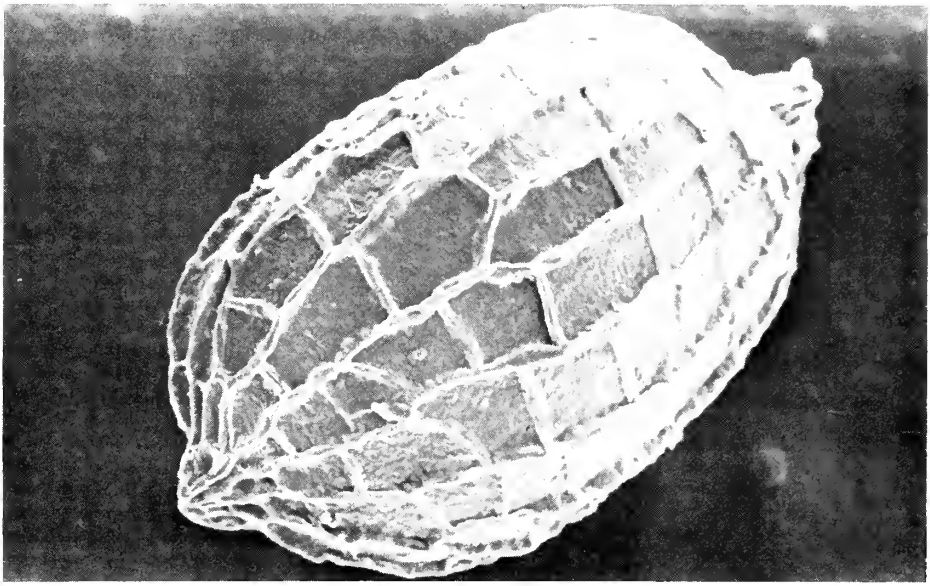
Drosera indica L. (Asia, Trop. Australia, S. Africa) – pointed, minutely pitted (Erickson, 1968), about 0.5 mm long, broadly ovate – elliptic, slightly acute at one end, longitudinally ribbed and cross lined (Ohur, 1965), black.

Drosera intermedia Hayne (Europe, N. America, Guyana) – oblong, blunt at ends, 0.75-0.95 mm long, densely and irregularly covered with long papillae, reddish brown (Wynne, 1944), rhomboidal (Cruise & Catling, 1974).



Drosera linearis

Drosera linearis Goldie (N. American Borreal) – rhomboidal, oblong-obovate, 0.5-0.8 mm long, densely and irregularly crateriform, black (Wynne, 1944), densely pebbled (Wood, 1955).



D. gigantea Mag. 170×

D. gigantea Mag. 700×

D. gigantea Mag. 17,000×

(Continued on page 45.)

Utricularia menziessii: An Amazing Plant

P. Temple (20 Buzzard Rd., Luton Beds, LU40 OVW, England)

Utricularias are not everybody's favourite plants. They are still relatively uncommon in collections, probably because they are most undemonstrative plants except when in flower. As *U. menziesii* is also a relatively expensive species it is not surprising that few people seem to have grown it yet. But it is possibly the most rewarding of all.

This Australian species lies dormant for much of the year as a tuber. At this stage the tuber resembles a pea-sized hairy coconut, the upper end being a narrow, hairy extension.

When in growth the tuber rapidly produces a web-like network through the soil, and above the surface one finds a bunch of the very tiny leaves, barely 4 mm long at the most. The flowering scape is very narrow and about 6 to 8 cm. long. Supported by this slender stem is an almost grotesquely large flower which is certainly more beautiful than any description I have read. It could well rival other flowers such as orchids; it is a riot of colour varying from all shades of yellow through orange to red.

I am not a believer in waiting for plants to grow. In nature conditions often retard or hasten growth, so why shouldn't I? In April the tuber was placed with its growing tip 3 cm below the surface of a sphagnum peat/sand mixture (equal parts). At this stage there was no sign of growth which is normally indicated by the development of small white hair-like structures from the growing point. I then placed the pot in rainwater such that the entire tuber would be submerged and maintained a temperature of 75-80° F. In June the first leaf suddenly erupted from the soil and this was rapidly followed by the rest of what ended up as an unusually large bunch.

U. menziesii

Photo by P. Temple

I allowed 14 to 16 hours of artificial light (a single "Grolux" tube) held 35 cm above the soil. In July a first flower stem began to emerge from within the leaf cluster followed two weeks later by another. These each took about a month to reach their full height. The buds took a full week to burst open after the first glimpse of petal colouration could be seen. The flowers lasted 5 to 6 weeks and pollination proved to be fairly straightforward, especially as the flowers are quite robust. It took a further 5 to 6 weeks for the seed to ripen after the flower had fallen. The unpollinated flower remained on the other scape even despite my attempts to remove it.

All this information is a guide based on the performance of just one plant. I do not know of any other reported flowering of this species in cultivation but feel our Australian colleagues must be familiar with this. If anyone else has managed I would be interested to hear or read of any differences between their experiences and this one. In particular I would like to hear of germination methods for the seed which I have yet to try. In the event that this proves easy I see no reason why *U. menziesii* should not become one of the most popular of all carnivorous plants.

U. menziessii

U. menziessii Photos by P. Temple

A Photographic Primer of the Pinguiculas of the Southeastern United States

by Donald E. Schnell
(Rt. 1, Box 145C, Pulaski, VA 24301)

This is the fourth in the annual primer series, and we are leaving the pitcher plants. Many readers and fellow CP students have asked for an article discussing the southeastern United States Pinguiculas, and we will attempt to provide some guidance.

For economic reasons, we try to limit these primers to two facing pages, usually for a total of eight photos maximum so that they will not be too small to be of use. Therefore, I have selected photos to emphasize certain points of differentiation. The interested reader should look into the general references listed below for more details and complete coverage of each of the six species (Godfrey and Stripling, 1961; Schnell, 1976; Godfrey and Wooten, 1981).

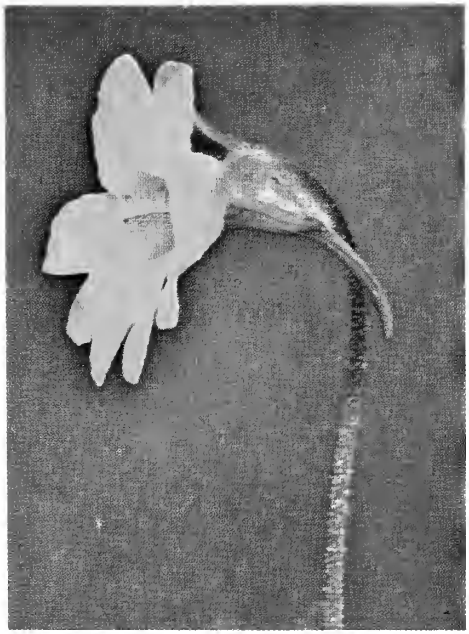
In order to identify a plant of the six species in the general region under consideration, one must consider: 1) Location, whether Atlantic coastal, Gulf coastal or peninsular Florida; 2) Leaf characters, particularly size and color; and most importantly 3) Flower characters. To identify any one plant with certainty, examination of flowering material is most often necessary.

Geographically, only *P. caerulea, P. lutea* and rarely *P. pumila* are found along the Atlantic coast. They tend most often to grow in sandy savanna soils; sometimes two species will be adjacent but only rarely admixed. *P. lutea* seems capable of colonizing slightly drier areas, while *P. caerulea* will be found in somewhat more moist habitat. *P. pumila* is of course characterized by its very small size in this locale, and a white flower. *P. lutea* has a yellow flower (Fig. 1) and *P. caerulea* has a large violet flower with deeply colored veins (Fig. 5). It is almost impossible to tell *lutea* and *caerulea* apart vegetatively. Of course, variations always rear their heads. A white flowered variant of *P. caerulea* has been recently described (Schnell, 1980) and is proving to be rather widespread.

What does one do about the floral color variants? Godfrey and Stripling (1961) and Godfrey and Wooten (1981) have excellent drawings of the plant hairs of the internal corolla. Examination of the three types in combination and comparison with the illustrations allows one to identify a species very accurately. This requires a low power dissecting microscope, but with some experience is a very easy process. One can also correlate such factors as geographic location, plant size, leaf character, etc. We would strongly urged serious *Pinguicula* students to become familiar with this type of examination.

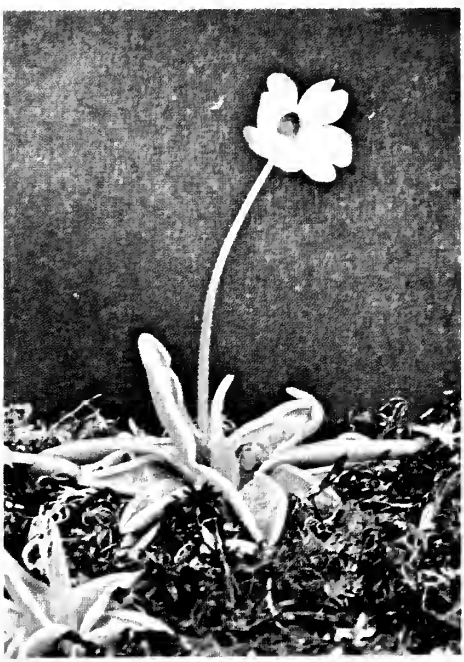
In the broad aspect, all six species are found along the Gulf coast, although practically, *P. pumila* is the only species found in southern peninsular Florida. *P. caerulea, P. lutea* and even *P. pumila* generally are larger plants in their southern extremes, and this larger size carries over in culture side by side with Atlantic coast plants. *P. pumila* leaf rosettes will be larger, have flatter leaves and often some venation near the rosette center (Fig. 7). In addition, although flowers are "typically" white, yellow flowered and pink to rose flowered variants are commonly found and indeed become most prominent in hummocks of the Everglades and in the Big Cypress Swamp (Fig. 8). The inexperienced have excitedly reported *P. lutea* and *P.caerulea* in the latter areas, and here is an ideal situation for plant hair examination as noted above.

P. ionantha has the smallest range of all in the Florida panhandle, tending to occur in very wet areas with standing water. The leaves are always green (so far!), and the flower is white with a pink to rose center (Fig. 6, right). *P. planifolia* has a much wider



1 *Pinguicula lutea* with large bright yellow flower

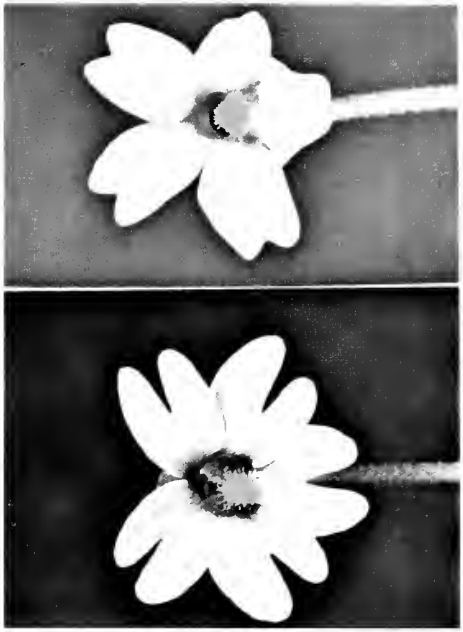
2) *Pinguicula planifolia* in flower. The large flat leaves of this rather large plant will most often be dark red, but sometimes green.



3) *Pinguicula primuliflora*. The typical flower has a white center with rose colored petal tips.

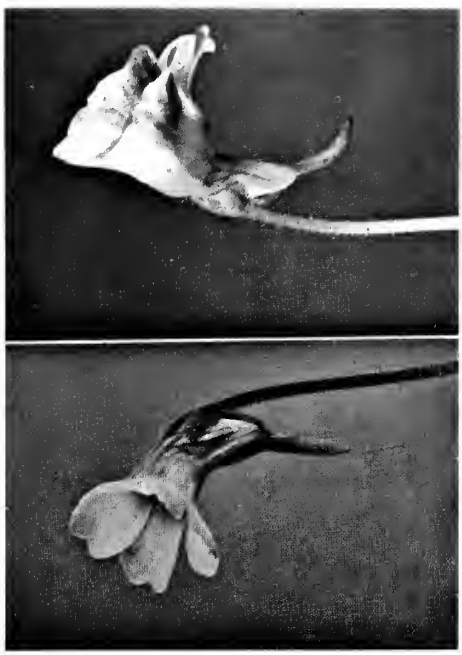
4) *P. primuliflora*, showing vegetative budding at leaf tips, a rather specific feature in nature for this species, although in culture several other species can occasionally exhibit this process.

5) *Pinguicula caerulea* with typically purple veined flower. Color variants from diffuse dark purple to white have been found.



6) Flowers of *P. planifolia* (left) and *P. ionantha* (right) for comparison. Note difference in color of petal tips and depth of clefts in petal tips as well.

7) *Pinguicula pumila* in southern peninsular Florida. In this area, the rosettes are larger and frequently partially pigmented if growing in full sun in moist habitat.



8) *P. pumila*, showing yellow (v. *busavellii*) and pink flower forms.

Gulf coastal distribution and is a huge plant (rosettes 15-20 cm across when mature). The leaves are usually dark red to purple in full sunlight, and the plant prefers a sandier to marly location. However, forms with green leaves are also found and the inexperienced may have a problem differentiating *P. planifolia* from *P. ionantha*. The flowers of *P. planifolia* also have a dark center, *but* the petal tips are lighter pink to rose rather than white, and the clefts in the petal tips are deeper (Fig. 6, left). Figure 2 shows a mature, typical specimen of *P. planifolia* in flower.

P. primuliflora is an interesting species often difficult to locate out of flower. The species grows in rather wet areas, usually in shaded places such as streamsides or beneath tufts of bunch grass and sedges. Vegetatively, the plant is interesting because it can reproduce by budding at leaf tips (Fig. 4) in the field, and thus the species often occurs in clusters of many plants of variable size with the larger toward the center in "hen and chick" fashion. The flower is very distinctive, having a white center and rose petal tips (Fig. 3).

Hybridization between species in the field has never been confirmed, nor have valid hybrids been obtained in culture. However, the various color variant forms of a species (such as white and typical *P. caerulea*) do commonly hybridize. So far, there have been no floral variants of any significance described for *P. planifolia, P. ionantha, P. primuliflora* or *P. lutea*, although anecdotally several of us have seen a rather lighter straw-colored floral form of *P. lutea* along some Florida panhandle roadsides. The yellow-flowered form of *P. pumila* has been described and named v. *buswellii* (Moldenke, 1934).

Barnhart, J.H. 1933. *Pinguicula caerulea.* Addisonia 18:21-22, Pl. 587.

Godfrey, R.K. and H.L. Stripling. 1961. A synopsis of *Pinguicula* (Lentibulanaceae). in the southeastern United States. Am. Midl. Naturalist 66: 395-409.

Godfrey, R.K. and J.W. Wooten. 1981. Aquatic and wetland plants of the southeasteran United States: Dicotyledons. University of Georgia Press, Athens. 933 pp.

Moldenke, H.N. 1934. *Pinguicula pumila* var. *buswellii* Moldenke, var. nov. Phytologia 1: 98-99.

Schnell, D.E. 1976. Carnivorous plants of the United States and Canada. John F. Blair Publisher, Winston-Salem, NC. 125 pp.

Schnell, D.E. 1980. *Pinguicula caerulea* Walt. forma *leucantha*: A new form. Castanea 45: 56-60.

Question: How about a photographic primer sometime on the variants of *S. alata* that have been described? I understand that there are as many forms as in *S. rubra.*

Answer: Trying to sort out *true* forms of the genetic species *Sarracenia alata* can be extremely difficult since the range of the species encompasses the range of several other species and the area is well-known for extensive hybridization with interesting backcrosses that often puzzle even the most experienced "Sarraceniologist" as to parenthood.

After many years of looking and growing and crossing, my tentative thought is that there is actually little intrinsic variation in the species, that being color. The most common expression is yellow-green with light venation, but individuals with deep maroon coloration of the upper pitcher and hood interior can be seen scattered in the same bog.

Of the examples you cited in your letter, the short, stocky plant with pubescent exterior is almost certainly a backcross. I have seen these in the field and have grown plants sent to me. The "stocky" appearance and external pubescence speak for a *S. purpurea* ssp. *venosa* influence, such as the possible formula (*S. alata* × *S. purpurea* ssp. *venosa*) × *alata*. Backcrossing of a fertile hybrid back into a parent is more likely in the field than two hybrids crossing. The lid of *S. alata* is typically round, and a "wavy" margin with larger hood, and a tall slender pitcher would speak for a similar backcross with *S. leucophylla*.

In a complex field situation such as many Gulf coastal U.S. locations, one must be extraordinarily careful to sort out hybrids from true variants of a species. (DES)

Drosera montana St.Hil. (Brazil, Venezuela) – fusiform, reticulate, acute at one end and truncate at the other, length about 0.2-0.3 mm, brown.

Drosera nitidula Planch. (Australia) – three-angled, ovoid, glistening and smooth, black (Erickson, 1968), length about 0.7 mm.

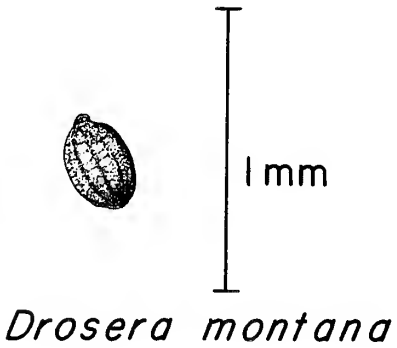
Drosera pauciflora Banks Ex D.C. (S. Africa) – ovoid to almost deltoid, strongly ribbed longitudinally and faintly cross ribbed, length around 0.5 mm, black.

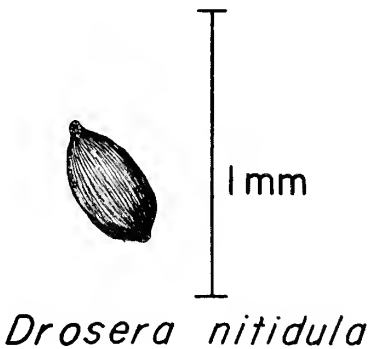
(Continued from page 38.)

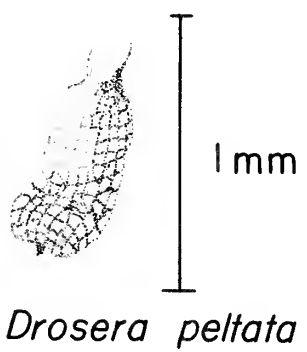
Drosera peltata Sm. Ex Willd. (Australia, Japan, Formosa) – round, pitted, minutely ribbed, black (Erickson, 1968), length about 0.8 mm.

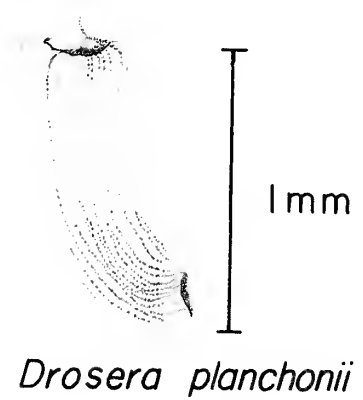
Drosera planchonii Hook. F. Ex. Planch. (Australia) – shortly cylindrical, black (Erickson, 1968), slightly truncated at one end, length about 3 mm.

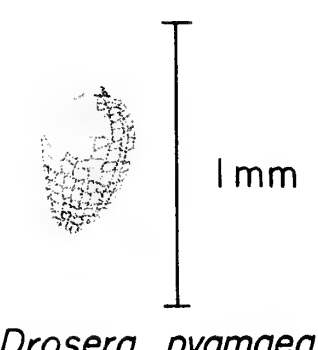
Drosera pygmaea DC. (Australia, New Zealand) – ellipsoid, almost smooth, black (Erickson, 1968), retticulate, length around 0.5 mm.

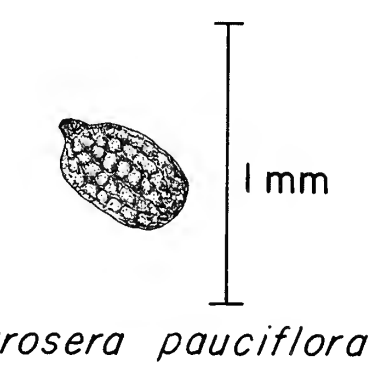












Drosera rotundifolia L. (Northern Hemisphere) – sigmoid-fusiform, finely and regularly longitudinally striate, shiny with metallic luster, 1-1.5 mm long, light brown (Wynne, 1944).

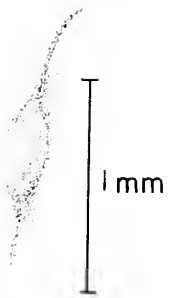
Drosera spathulata Labill. (Formosa type) (Formosa) – ovate to ellipsoid, reticulate, length about 0.3 mm, dark brown.

Drosera spathulata Labill. (Hong Kong type) – ovate to ellipsoid, reticulate, length about 0.5 mm, black.

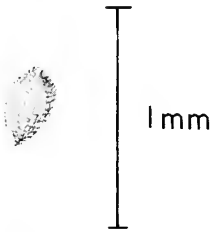
Drosera spathulata Labill. (Kansai type) (Japan) – minute, fusiform, obtuse and mucronulate at both ends (Ohwi, 1965), reticulate, length about 0.75 mm, dark brown.

Drosera trinervia Spreng. (S. Africa) – orbiculate, reticulate, length about 0.4 mm, brown.

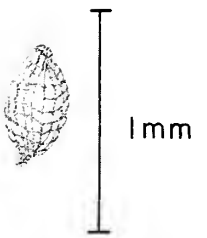
Drosera whittakeri var. *praefolia* (Tepper) Black. (S. Australia) – almost spherical (but some are square), spongy seed coat with many pits, length or width no more than 1.0 mm, black.



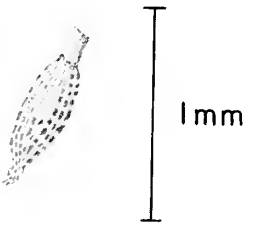
Drosera rotundifolia



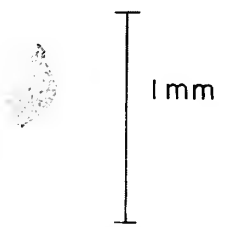
Drosera spathulata (Formosa)



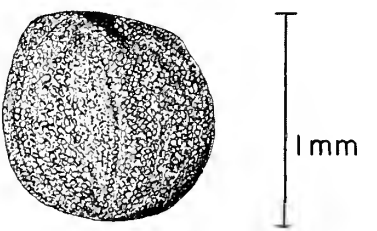
Drosera spathulata (Hong Kong)



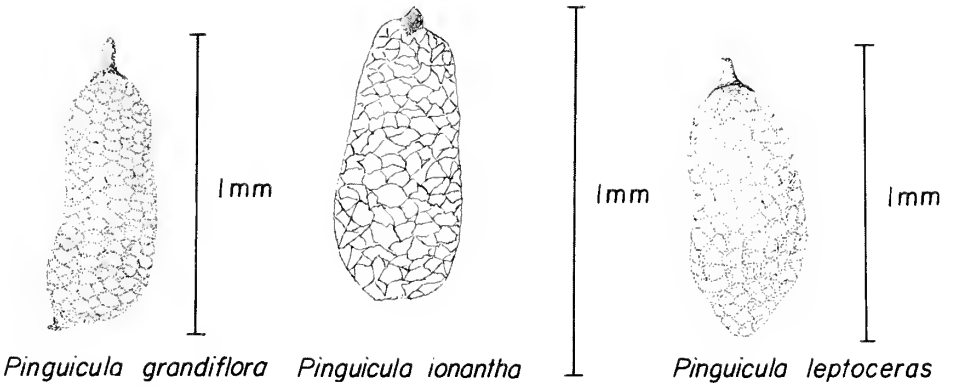
Drosera spathulata (Kansai)



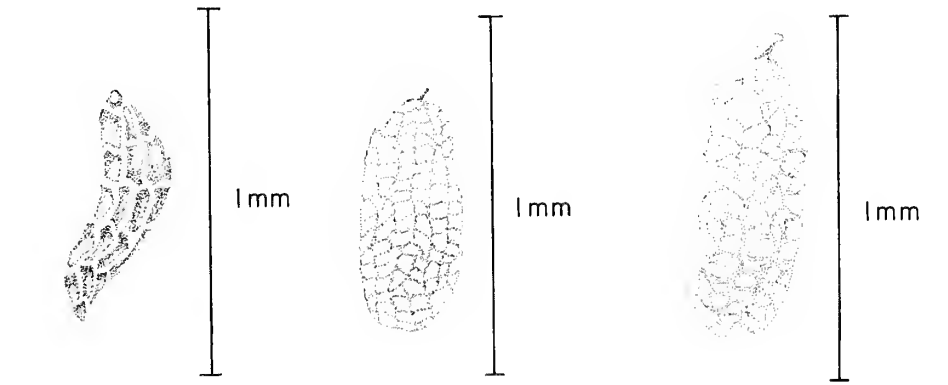
Drosera trinervia



Drosera whittakeri



Pinguicula grandiflora *Pinguicula ionantha* *Pinguicula leptoceras*



Pinguicula lusitanica *Pinguicula lutea* *Pinguicula macroceras*

Pinguicula grandiflora Lam. (Ireland, Spain, France, Switzerland) – scobiform, fusiform, (0.6) 0.85 (1.1) mm long and (0.2) 0.3 (0.4) mm wide, alveolate (Casper, 1966), brown.

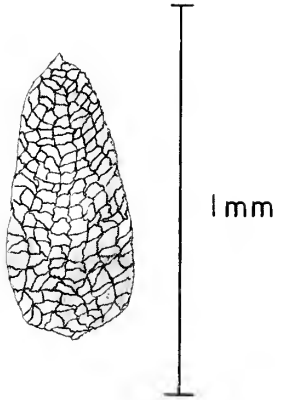
Pinguicula ionantha Godfrey (Fla.-USA) – scobiform, oblong-cylindrical, 0.6-0.8 mm long, alveolate, brown (Casper, 1966), alveolae with 1-2 cross lines (Godfrey & Stripl., 1961), black.

Pinguicula leptoceras Reichb. (Switzerland, Australia, Italy, France) – scobiform, fusiform, ± 0.7-0.8 mm long and 0.2-0.3 mm wide, alveolate (Casper, 1966), light brown.

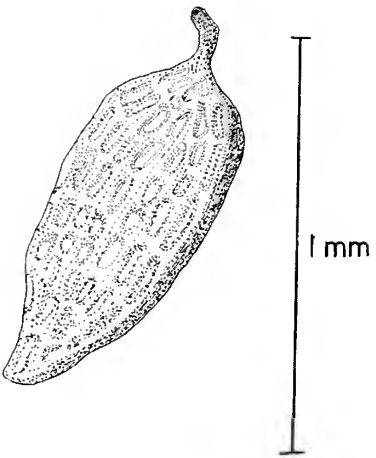
Pinguicula lusitanica L. (Portugal, France, Great Britain, N. Africa, Spain) – scobiform, subcylindrical, 0.5-0.65 mm long and 0.2-0.26 mm wide alveolate (Casper, 1966), brown.

Pinguicula lutea Walt. (La., Miss., Ala., N.C., S.C., Ga., Fla.-USA) – scobiform, fusiform, 0.5-0.8 mm long alveolate (Casper, 1966), oblong, alveolate with 3-4 cross lines (Godfrey & Stripl., 1961), black.

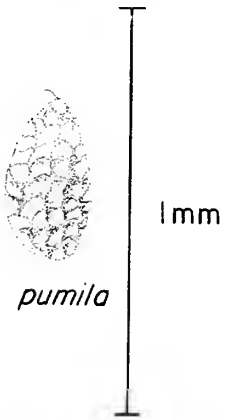
Pinguicula macroceras Link. (Japan, USSR., N.W. & N. America) — scobiform (Casper, 1966), length around 1 mm, reticulate, ovate, brown.



Pinguicula primuliflora



Pinguicula vallisneriifolia



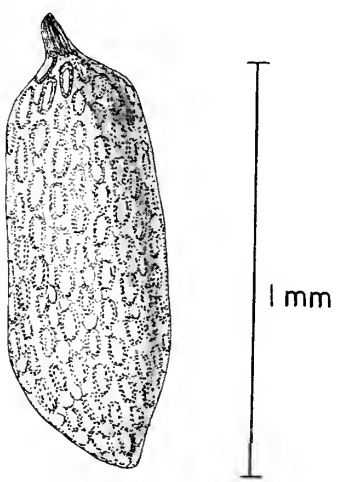
Pinguicula pumila

Pinguicula primuliflora Wood et Godfrey (Ala., Ga., Fla., Miss.-USA) – scobiform, subcylindrical, truncated, 0.5-0.7 mm long, brown (Casper, 1966), obpyramidal to subcylindric-truncate, alveolae without cross lines (Godfrey & Stripl., 1961).

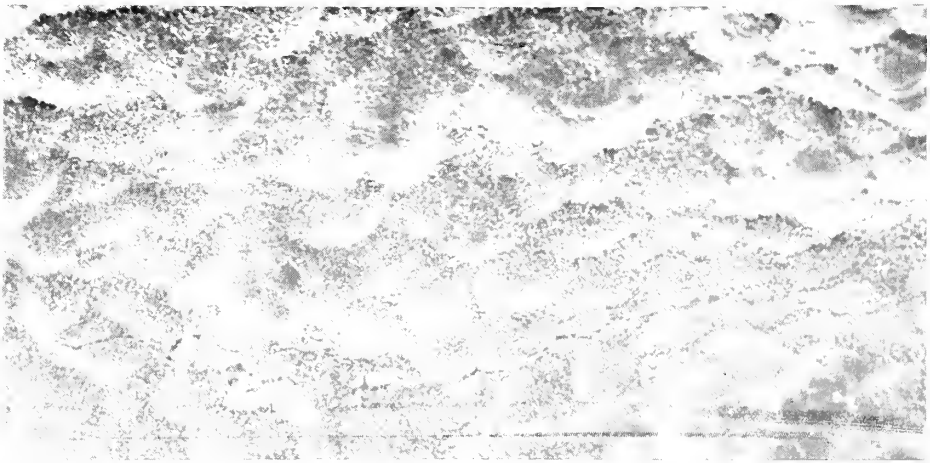
Pinguicula pumila Michx. (Tex., La., Ala., N.C., Ga., Fla.-USA, Bahamas) – scobiform, fusiform, 0.3-0.5 mm long and 0.2-0.3 mm wide alveolate (Casper, 1966), oblong to obpyramidal, alveolate mostly with 2-3 cross lines (Godfrey & Stripl., 1961), brown.

Pinguicula vallisneriifolia Webb. (Spain) – scobiform, alveolate (Casper, 1966), slightly attenuate at one end, length around 1 mm, light brown.

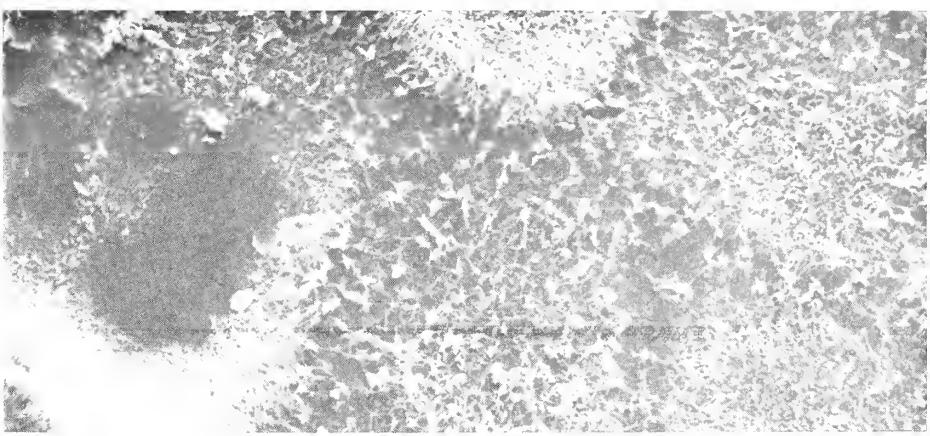
Pinguicula vulgaris L. (Europe, Siberia, American Borreal) – scobiform, cylindric-conical, (0.5) 0.68-0.8 (0.96) mm long and (0.16) 0.2-0.28 (0.32) mm wide alveolate (Casper, 1966), brown.



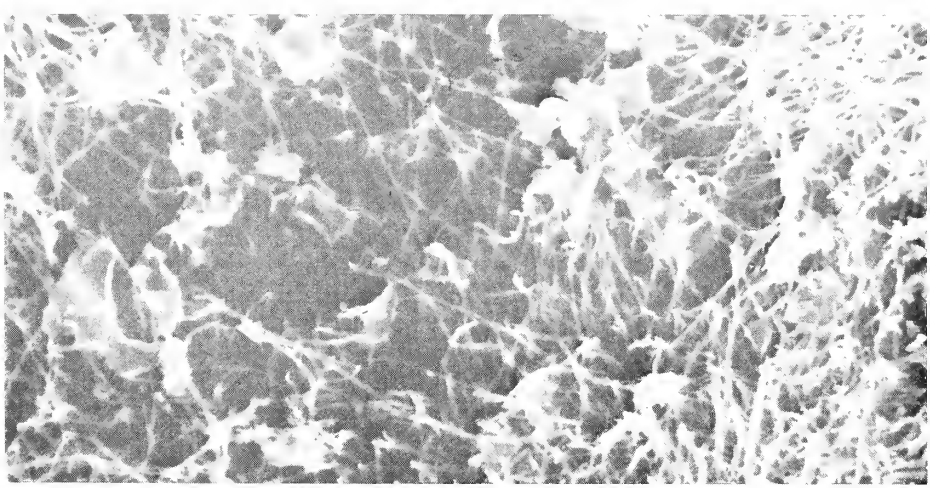
Pinguicula vulgaris



Sarracenia flava Mag. 200×



Sarracenia flava Mag. 1000×



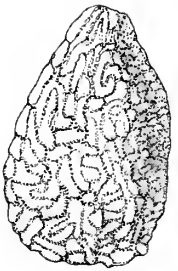
Sarracenia flava Mag. 4000 K

1 mm

Sarracenia alata

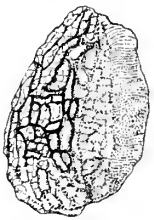
1 mm

Sarracenia leucophylla



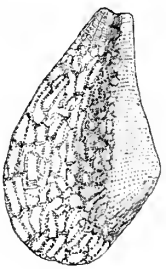
1 mm

Sarracenia flava



1 mm

Sarracenia minor



1 mm

Sarracenia purpurea

1 mm

Sarracenia rubra

Sarracenia alata Wood. (Ala., Miss., La., Tex. -USA) – obovoid-clavate, bullate-areolate, 1.9-2.2 mm long (McDaniel, 1971), brown.

Sarracenia flava L. (Va., N.C., S.C., Ga., Fla., Ala. -USA) – obovoid, tuberculate areolate, 1.8-2.5 mm long (McDaniel, 1971), brown.

Sarracenia leucophylla Raf. (Ga., Fla., Ala., Miss.-USA) – verrucose-areolate, 1.5-2.1 mm long (McDaniel, 1971), brown.

Sarracenia minor Walt. (N.C., S.C., Ga., Fla.-USA) – obovoid, tuberculate-areolate, 1.1-1.3 mm long (McDaniel, 1971), light brown.

Sarracenia purpurea L. (Eastern N. America) – obovoid, areolate-tuberculate, 1.7-2.0 mm long (McDaniel, 1971), yellowish brown.

1 mm

Sarracenia rubra ssp. jonesii

Sarracenia rubra Walt. (N.C., S.C., Ga., Fla., Ala., Miss.-USA) – irregularly obovoid, tuberculate-areolate, 1.2-1.5 mm long (McDaniel, 1971), light brown.

Sarracenia rubra ssp. *jonesii* Wherry (N.C., S.C., Fla., Ala., Miss.-USA) – obovoid, tuberculate-areolate, around 2 mm, brown.

A RE-VISIT TO FLORIDA AND GEORGIA C.P.

Gary De Puy (4301 Confederate Point Rd. #259, Jacksonville, FL 32210)

After having lived for several years in Virginia and finally moving back to Florida in September of 1982, one of the first things I wanted to do was revisit some of the many CP sites in the area.

On the last weekend in September, I left for the Georgia border from Jacksonville. As I approached the border, patches of *Sarracenia minor* became more numerous. *Drosera capillaris* were very common in the wet drainage ditches, and *Pinguicula* were very common in the areas along the roads. Just over the border, I found lots of *S. minor, D. capillaris* and *P. lutea* in the damp sandy areas and Utricularias were in very wet and flooded areas.

After driving 30 miles into Georgia, and several more miles on a dirt road, there was a very low-lying area, mostly sandy but some sphagnum in spots. There was the usual *S. minor, D. capillaris, D. inter*
usual *S. minor, D. capillaris, D. intermedia* and *P. lutea*, and in the sphagnum moss areas I saw *S. flava* and *S. psittacina* growing. After reaching Rt. 84, going west, I passed through a small town which had a three-street interchange in the middle of town. There, on the corner lot which was vacant, were hundreds of *S. minor* growing in the grass, weeds and brush and it was evident that it was not mowed for ages. It was quite a contrast to see this thriving bog in the middle of a town and seemingly unnoticed. I remembered this lot from several years ago and wondered from time to time how it was doing. I was glad to see it still untouched.

While I was in Georgia, I was told by a state employee that the highway department no longer cuts the roadside grass and weeds due to the damage they were causing carnivorous plants and I was glad that they were allowed to grow freely. This gives me something to remember as we can help to preserve areas by simply informing or caring enough about CP.

I left this area on the way to Folkston to visit the Okeefenokee Swamp. I went to a small area which was under several inches of water with plenty of sphagnum, where in the past I found probably the largest and most beautiful *Drosera intermedia* that I've ever seen. For whatever reason, I didn't find even one single plant now, which was a real loss. I'm hoping to see them in the spring, if they do return. I did see some really nice plants of the "Okee Giant" *S. minor.* All the plants were going through the dormancy process, but the good pitchers

"Okee Giant", *Sarracenia minor* in Okeefenokee Swamp Park.
Photo by Gary De Puy

that were left did show their tall and stately appearance as compared to their shorter cousins outside the swamp. It was interesting that the "Okee Giant" *S. minors* were going dormant and yet most of the shorter *S. minor* were still in flower and many were actively growing. I also found lots of *S. psittacina* which were still in bloom.

Well, by now it was now raining, and I had donated enough blood to the mosquitoes, so I headed for home. I regretted that I didn't get the chance to view some other areas where other species of *Sarracenia* and *D. filiformis* grew. Hopefully, in the spring I'll have more time to do this. It was good to return to areas where not much has changed and many small stands of CP are surviving.

Looking back on my trip, I noted that the *S. minor, S. psittacina, Drosera capillaris,* and *D. intermedia* were all flowering but neither the Pinguiculas nor *S. flava* were in bloom. Utricularias were in bloom everywhere, sometimes just filling a drainage ditch or wet fields with flowers. Although most of the plants seemed to be actively growing, several weeks later we had some cool weather here, and judging from the CP in the Jacksonville area, that cool spell finally sent them on their way to dormancy. And with that, this field trip comes to an end with bites and wet feet — at least until spring.

Pinguicula in Folkston, GA
Photo by Gary De Puy

Review of Recent Literature

Aldenius, J., et. al. 1983. Effects of insect trapping on growth and nutrient content of *Pinguicula vulgaris* L. in relation to the nutrient content of the substrate. New Phytol. 93: 53-59.

Plants fed insects or given soil nutrients or both in controlled enviroments grew larger and had greater dry weight. A single "dipterid" insect was applied to one leaf of each test plant in the series, and those plants so fed seemed better able to take up nutrients applied in the soil, suggesting some other component absorbed from the insect that seemed to increase root absorption efficiency.

(Ed. comment – It would seem that these results can only be related to the experimental environment since in nature many insects of diverse kind and over a period of time are trapped by a plant.) (DES)

Broussaud, F., and C. Vintejoux. 1982. Etudes ultrastructurales et cytotechniques de tissue superficiels places a l'entree des urnes d'*Utricularia* (Lentibulariaceae). Bull. Soc. Fr., 129, lettres bot., 191-201.

IN FRENCH

Examination of the utricle entrance of Utricularias by ultrastructural and cyto-

chemical techniques disclosed different zones whose characteristics have been described. The outer portions produced long wall expansions with superposed lipid and polysaccharidic substances that seem to play a role in the mechanism of the trap. (DES)

Kaul, R.B., Am. J. Bot. 69(5): 793-803. 1982. Floral and fruit morphology of Nepenthes lowii and N. villosa, montane carnivores of Borneo.
The floral nectar glands are similar in structure to nectar glands and digestive glands of pitchers. Only 4.5% of the seeds in the sample bore embryos and fertile seeds lack endosperm. There is more need for field observations on pollination.

Lerner, Carol. 1983. Pitcher plants. William Morrow & Co., Inc., 105 Madison ave., New York 10016. 64 pp. $11.00.
This superb little book is officially designated as a children's book, but should be in every CP enthusiast's library. The author-illustrator is experienced in botanical illustration and there are multiple line drawings as well as full color watercolors of each of the species of *Sarracenia* and *Darlingtonia*. The line drawings also cover basic morphology and the various insect parasites. The text is very clearly and accurately written and includes a surprising amount of information in the 64 pages. The book is more than worth the price for the illustrations alone. Conservation is emphasized throughout, but not in a boorish or pedantic way. The book also has a list of gardens where growing plants may be observed. (DES)

Mellichamp, T.L. Cobras of the Pacific Northwest. Nat. History 92: 46-50. 1983.
This article describes the history of discovery, the name Darlingtonia, and the type of area where these plants can be found growing. The author also discusses the relationships to other CP and the geological and ancestral history of its origin on the West Coast of the U.S. Beautiful photographs taken by Makoto Honda of the plants in their natural environment grace this article.

New Scientist, July 1, 1982. Plant thieves threaten rare species.
This magazine article relates an interesting incident regarding an upsurge in thefts of rare and endangered plants which the Nature Conservancy Council is looking at with some alarm. It seems that in Britain a warden of a nature reserve discovered someone digging up a sundew (Drosera anglica). The man admitted to being a member of the Carnivorous Plant Society and was made to replace the plant. The British Society condemned the theft and added that the plants were commercially available. At last report, the NCC has decided not to prosecute the man under the Wild Creatures and Wild Plants Act of 1975, but Friends of the Earth is considering legal action. The penalty for uprooting a sundew or orchid is a fine up to $150 for each specimen taken. Some rarer plants like the lizard orchid can bring a fine of $750 per plant! Beware!

Peng, C. and Kenton, A., Ann. Missouri Bot. Gard. 69:418-419. 1982. Chromosome number of *Byblis liniflora* Salisb. (Byblidaceae).
The authors report a 2n = 18 for B. gigantea and 2n = 32 for B. liniflora. The latter number of chromosomes differ from a report by K. Kondo which reported a 2n = 24. This difference may be due to the sticky ends which would cause aggregation. The "long" chromosomes that Kondo showed in his drawings were absent in the present authors' pictures and the lower count could be due to aggregates.

Rea, Philip A. 1982. Fluid composition and factors that elicit secretion by the trap lobes of *Dionaea muscipula* Ellis. Z. Pflan-

zenphysiol. Bd. 108. S. 255-272.
The acid secretion is found to be HCl. Stimulation of secretion is effected by a wide range of ions, including many low molecular weight nitrogen compounds and even several alkali metal salts. Salt-free protein suspensions were found to be inactive and it is postulated that Darwin's experiments with ovalbumin and Venus' flytrap secretions worked because of salt contamination of the protein; pure ovalbumin did not work for this author. Some other cations are also secreted along with H^+, but in extremely small amounts.

Rea, Philip A. 1983. The dynamics of H^+ efflux from the trap lobes of *Dionaea muscipula* Ellis (Venus' flytrap). Plant, Cell and Environment 6: 125-134.
Hydrogen ion efflux from trap lobes of *Dionaea* was increased by FC, IAA and 2,4-D, and suppressed by ABA and DES. Also, potassium, ammonium ions and urea caused efflux of a rapid as well as prolonged character. The mechanism of these agents is hypothesized in physiologic terms in the paper. (DES)

Steffan, W. A., Kodani A. and Evenhuis, N., Mos.Q. Syst. 14(1): 11-13. 1982. *Toxorhynchites nepenthicola,* new species from Papua, New Guinea (*Diptera*: *Cullicidae*).
The above new species was described. The adults were bred from larvae collected in Nepenthes pitchers in the upper Fly River area of New Guinea.

Watson, A.P., Matthiessen, J.N. and Springett, B.P., Aust. J. Ecol. 7(1): 13-22. 1982. Arthropod associates and macronutrient status of the red-ink sundew *(Drosera erythrorhiza).*
The authors studied the above plant in a bushland site of Spearwood Dunes System near Perth, Australia. An insect new to the area was found to supply 100% of the nitrogen and phosphorus to the nutrient pool of the plant. The soil supplied sufficient potassium to the plant. Other insects were found that could be called "opportunistic predators" because they scavenge captured prey items.

Book Review –

Flora of Australia, Volume 8

by P.S. Lavarack (Queensland National Park, Pallarendo, Townsville, Australia)

Australia is one of the world centers of carnivorous plants and, in particular, of the genus *Drosera.* Australia has 54 species of *Drosera* out of a world total of about 100. Since this genus becme popular in horticulture a few years ago, there has considerable confusion over the taxonomic status of many of the Australian plants. Late in 1982 a book was published which sheds a considerable amount of light on this topic. This is Volume 8 of the new series *Flora of Australia*. This series which will run to some 49 volumes and will take 20 years to complete will provide the first complete study of the flora of the Australian continent since Bentham's *Flora Australiensis* published between 1863 and 1878. It is a massive undertaking and will eventually include contributions by hundreds of botanists. Volume 8 is, in fact, the third volume to be published–the numbering is in systematic sequence, but the volumes are published according to the availability of suitable authors and other factors. The first volume contains an introduction and a series of essays on the Australian flora, Volume 29 includes the family Solanaceae, and Volume 8 contains 19 families among which are Nepenthaceae and Droseraceae. In all, the volume consists of 420 pages of which the two carnivorous families contribute 62 pages.

Other families covered in this volume include Lecythidaceae, Flacourtiaceae, Bix-

aceae, Cistaceae, Violaceae, Tamariaceae, Frankeniaceae, Passifloraceae, Cucurbitaceae, Datisaceae, Salicaceae, Capparaceae, Brassicaceae, Moringaceae, Resedaceae, Gyrostemonaceae, Bataceae. Other carnivorous families will be covered in Volumes 10 (Byblidaceae) and 7 (Lentibulariaceae).

Australia has one species of *Nepenthes*, 54 of *Drosera* and one of *Aldrovanda*, each of which is covered by a concise, but detailed, description. Synonyms, references to type specimens and to illustrations are also given along with a brief description of the habitat, notes on distribution and a short list of representative herbarium specimens. The distribution of each species is further illustrated on a series of small maps and there are fourteen full-page line illustrations and three quarter-page colour plates. Notes on identification are given for most species.

The genus *Drosera* is subdivided into three subgenera and thirteen sections, all of which are briefly described. A key to these and to the 54 species is provided. Three new species and three new subspecies are described and four other taxonomic changes are made in the appendix.

The authors are all professional botanists and specialists in their own fields. *Nepenthaceae* was written by T.D. Stanley, *Drosera* by N.G. Marchant and A.S. George and *Aldrovanda* by H.I. Aston.

This volume includes the first review of *Drosera* in Australia since Rica Erickson's *Plants of Prey* was published in 1968 and it is interesting to compare the two. At first glance they may be thought to be quite similar, as Erickson lists 56 species and Marchant and George list 54, but there are some major differences. Five species have been described since 1968 (*D. fimbriata* DeBuhr, *D. marchantii* DeBuhr, *D. graniticola* N. Marchant, *D. radicans* N. Marchant, *D. subtilis* N. Marchant) and several of those listed by Erickson have since been shown to be synonyms or have been demoted to subspecific rank. *D. peltata* and *D. auriculata* have been kept separate despite some recent contrary opinions.

It must be stressed that this is a scientific book and is not intended for the popular market. However, it should have appeal to serious lovers of carnivorous plants as it is well laid-out and is full of botanical facts expressed in clear and concise terms. When coupled with *Plants of Prey* it gives very good coverage of Nepenthaceae and Droseraceae in Australia.

The cost of this volume is A$34 (hard cover) and A$29 (soft cover) exclusive of postage. It is available from the Australian Government Publishing Service, Post Office Box 84, Canberra, A.C.T. 2600, Australia. The catalogue numbers are 82-08573-3 for the soft cover edition, and 82-0856-1 for the hard cover.

WANT ADS

When submitting Want Ads, please be sure to print clearly for best results and to eliminate mistakes. Please circle the correct letter before each item (Want, Trade, Sell or Buy). Want ads are limited to carnivorous plants, terrariums, greenhouses and moss. There is a charge of ten cents per item, with no limit to the number of items you may submit per issue.

Send coin or check to:
Arboretum, Want Ads
California State University
Fullerton, CA 92634

Don Clements (104 Sunset Ave., Atco, NJ 08004). Wants to buy or trade for *Drosera linearis* and *D. anglica*. Offering for trade *D. filiformis, D. rotundifolia, D. intermedia, D. capillaris, D. brevifolia*.

Bruce Pierson (P.O. Box 179, Albion Park, NSW 2527, Australia). (WT) Any CP seed, especially *Heliamphora*. Send list of seed you have, for list of seed I have.

Keith Shoesmith (32 Pendas Mead, Lindisfarne Way, Homerton E9 5PX, London, England). (WB) Rooted *Nephenthes* cutting, Mexican *Pinguicula, Heliamphora*, American *Pinguicula*, tropical *Utricularia* (epiphytic).

P. × *kewensis* growing on a moss-covered pole. This *Pinguicula* is relatively easy to grow.

Photo by J.A. Mazrimas.