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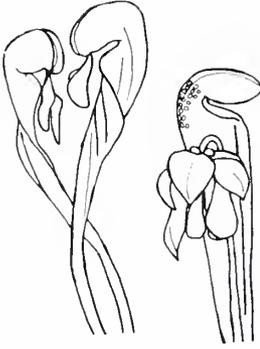
CARNIVOROUS PLANT NEWSLETTER

VOLUME 8, Number 3

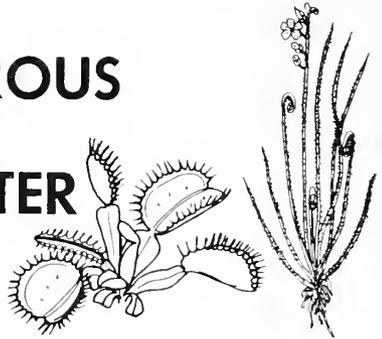
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CARNIVOROUS PLANT NEWSLETTER



Volume 8, Number 3
September, 1979

Cover

Heliamphora ionassii with the person after which the plant was named, Mr. Jonah Boyan. Courtesy of Dr. Bassett Maguire and the New York Botanical Garden. Used with permission.

The co-editors of CPN would like everyone to pay particular attention to the following policies regarding your subscription to CPN:

All correspondence regarding subscriptions, address changes and missing issues should be sent to Pat Hansen, c/o The Fullerton Arboretum, California State University, Fullerton, CA 92634. DO NOT SEND TO THE CO-EDITORS. Checks for subscriptions and reprints should be made payable to CSUF FOUNDATION — ARBORETUM.

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 December issue is November 1, 1979.

CO-EDITORS:

D. E. Schnell, Rt. 4, Box 275B, Statesville, NC 28677

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

SECRETARY-TREASURER: Pat Hansen, c/o The Fullerton Arboretum

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Editor's Corner

Well, here we are at the half-way mark. We hope that this has been a good year for all so far.

We have received many inquiries as to the possibility of using CP as a natural substitute for insecticides. The editors, for the most part, feel that this would not be a good idea for several reasons. First of all, being insect-trapping plants, CP must *lure* insects to their vicinity and (by their various contrivances) trap/ensnare and eventually digest their victims. The key word here is *lure*. By doing so, the "insect traffic" in the immediate vicinity of the plant is increased. Also, not all of the insects attracted are captured, nor are all types attracted. Therefore, the use of CP would probably worsen the problem. Also, the pitcher types, upon becoming full of dead and decaying insects, would create an odor problem,

probably attracting more insects. Even if we assume maximum trapping, a good-sized pitcher of *Sarracenia leucophylla* usually fills up within a week, so that the plant would become "saturated", since new pitchers would not be produced fast enough to keep up. We suggest that these plants be kept for their interest as CP and not as an answer to the insect problem.

Now is the time for all good CPN'ers to harvest seed and help support the Seed Bank. The Seed Bank is important for several reasons. It helps to disseminate CP more widely than if only plant material were available, and also generates funds to support CPN. Any problems/questions regarding the Seed Bank should be directed to Patrick Dwyer. He would also appreciate a word on how the seeds are germinating.

Seed Bank

Patrick Dwyer (49 Killean Park, Albany, NY 12205) reports that he has answered 235 letters from January 1 to July 22. The Seed Bank has three small *Cephalotus* plantlets in test tubes which are available to donors of seed for \$2.50 each. Also available are twenty cuttings of *D. binata* for \$1.50 each. In the future, Patrick will be able to handle *Cephalotus* cuttings, *Heliamphora* and pygmy *Drosera* gemmae. He does not have room for other cuttings.

To order and send seed, please see CPN 8:4.

Donations & Donors to Seed Bank

As of July 22, 1979

B. Hanrahan (1051), J. Mazrimas (951), J. Miller (705), R. Gardner (601), L. Song (456), D. Schnell (430), R. Fleming (279), C. Bramblett (265), J. Brodie (194), G. Nolan (157), P. Thomas (153), R. Riedl (151), S. Olejnik (143), O. Tallman (132), S. Jackson (124), R. Browne (120), R. Frenzer (120), P. Dwyer (120), G. Ashley (118), W. Greenwood (87), A. Omori (81), R. Gent (72), E. Weiss (66), B. Carroll (60), H. Weiner (58), R. Goulder (53), A. Lowrie

(52), L. Mellichamp (48), S. Thomas (48), P. Taverna (45), D. Taylor (45), P. Tsang (41), A. Horvath (39), J. Watkins (39), D. Burden (35) B. Muller (34), M. De Paz (33), C. Palmer (33), B. Augustine (32), R. Phillips (32) S. Plamondon (32), S. Rehder (32), D. Butler (31), G. LaLonde (31), J. Korolas (30), J. Pietropaulo (30), R. Humble (28), J. Kwan (27), D. Foulger (22), R. Chapman (20), M. Levy (20), P. McLaughlin (20), O. Massey (14), A. Dunne (11), J. Gold (11), H. Dickler (10), B. Dudley (10), J. Farina (10), J. Forrest (10), D. Graber (10), A. Magnus (10), S. Peschock (10), R.

Tilbrooke (10), M. Woodring (10), W. Clemens (7), J. VanDyke (7), A. Bendorf (6), S. Richardson (6), R. Shivas (6), R. Adams (5), H. Nakagawa (5), W. Siede (5), R. Spores (5), S. Henderson (4), S. Segal (3), A. Griesser (2), M. Leidig (2), P. Ware (2), P. Heiple (1)

CPN REPRINTS
ARE STILL AVAILABLE

CPN SEED LIST

July 22, 1979

\$.50 per packet

(Number listed if less than 15)

Byblis liniflora, *Darlingtonia californica*, *Dionaea muscipula*, *Drosera aliciae* (pale fl.), *D. anglica*, *D. arcturi*, *D. auriculata*, *D. burkeana* (12), *D. burmannii*, *D. capensis*, *D. capensis* (narrow), *D. capensis* mix, *D. capillaris*, *D. capillaris* (long leaf), *D. capillaris* (white fl.) (10), *D. capillaris* mix, *D. dielsiana* (3), *D. filiformis filiformis*, *D. intermedia*, *D. montana* (white fl.), *D. natalensis* (6), *D. peltata*, *D. rotundifolia*, *D. rotundifolia* (Oregon), *D. spatulata*, *D. spath.* (Australian), *D. spath.* (Kansai), *D. spath.* (Kanto), *D. spath.* (white fl.), *D. spath.* (mix), *D. whittakerii* *D. sp.* mix (US rosette types), *D. sp.* mix, *Drosophyllum lusitanicum*, *Nepenthes ampul-*

laria (Borneo), *N. khasiana*, *N. rafflesiana* (Singapore), *N. intermedia* x *hookeriana*, *Pinguicula grandiflora* (1), *P. ionantha*, *P. lutea*, *P. planifolia*, *Sarracenia alata* (6), *S. alata* (x-ray treated), *S. flava*, *S. flava* (Gulf-yellow hvy vein mix), *S. flava* (Gulf), *S. flava* (Gulf-hvy vein), *S. leucophylla*, *S. minor*, *S. purpurea*, *S. purpurea purpurea*, *S. purpurea venosa*, *S. purpurea venosa* (pink fl.), *S. rubra*, *S. rubra* (Gulf), *S. rubra alabamensis*, *S. rubra jonesii*, *S. rubra wherryi* (2), *S. sp.* mix, *S. alata* x *leuco.*, *S. alata* (purple) x *leuco.*, *S. leuco.* x *rubra* F₂ (10), *S. leuco.* x *wrigleyana* (1), *S. minor* x *psitt.* (various hybrids & backcrosses) (5)

News and Views

GREG DAVIS (Rt. 3, Box 384, Plant City, FL 33566) writes: I was a subscriber to CPN a few years back when it was a xerox sheet and am pleased to see how the publication has grown. I see a note in Vol. 7 that dues will not go up. (*We hope! Ed.*)

I find a note in "Dwarf Trees" by Shinobu Nosati, copyright 1940, describing the use of sundews ("mosen-goke") as accent plants for bonsai — says they are raised in bog moss, keto soil (a friable clay), tree fern, or charcoal (!). Also raised are the allied Ko-mosengoke and nagabano-mosengoke.

ANTHONY DUNNE (1 Saford St., Forestville, NSW, 2087, AUSTRALIA) wishes to query a section of the Botanist's Corner, CPN 8:31: The Kew Bulletin, 1897 (*Nepenthes* species) lists *N.*

kennedyana as a species of Australia, but according to *Plants of Prey* (Rica Erickson, 1968): "The Queensland pitcher plant was originally named *Nepenthes kennedyi* by Baron Von Bueller, the Government Botanist of Victoria, in 1865. About the turn of the century the Queensland Government Botanist, F. M. Baily, added ten more species to the list. However, more recently research by Danser, an authority on *Nepenthes*, has revealed that all Australian *Nepenthes* are merely growth forms of *Nepenthes mirabilis*. The ten type species listed are *N. albo.*, *N. alicae.*, *N. armbrustae.*, *N. gernaysii.*, *N. cholmondeleyi.*, *N. garrawayae.*, *N. jardinei.*, *N. moorei.*, *N. pascoensis.*, *N. rowanae.*

"Only *N. rowanae* shows a character not yet met with *N. mirabilis*, viz., cam-

panulate-infundibuliform upper pitchers. A similar aberration, however, is often met with in several species and is certainly insufficient for specific distinction. Though the pitchers of *N. rowanae* reminds one of *N. treviana*, in the other vegetative parts (the inflorescences, etc., are unknown) it is pure *N. mirabilis*."

TOULOUSE ENGELHART (2449 Via Anacapa, Palos Verdes Estates, CA 90274) writes: For all you *Aldrovanda* buffs out there, I thought I should relate my experience. After following Joe Mazrimas' cultural instructions to the tee (See CPN Dec. 78) and my plants had adjusted to their new home, I decided to do a little experimenting! To my artificial pond I added 1/4 teaspoon of Miracid®, and you should see the results! ! My plants are booming! In fact, the main stem is now branching off with new stems, all of which are producing maximum traps! ! No flowers yet, but I'll keep my fingers crossed! The only negative point I've noticed so far is an incredible overnight algae growth, which must be immediately removed. Also benefiting from this experiment are my aquatic Utrics!

(P.S. All you aquatic carnivore buffs, keep in touch!)

LARRY MELLICHAMP (Dept. of Biology, UNCC, Charlotte, NC 28223): Recent action has been taken to preserve some endangered habitats of *Sarracenia* in the Southern Appalachians, Piedmont, and Coastal Plain of the Carolinas. The Federal Fish and Wildlife Service is continuing to gather data on carnivorous plants and is considering some species for Endangered or Threatened status at the federal level. The species primarily under consideration are: *Sarracenia alabamensis*, *Sarracenia jonesii*, *Sarracenia oreophila*, *Pinguicula ionantha*, and *Dionaea muscipula*. Any information readers wish to contribute concerning localities heretofore unknown, large wild pop-

ulations, unusual forms, etc., should be sent to E. LaVerne Smith, Staff Botanist, Office of Endangered Species, U.S. Fish and Wildlife Service, Washington, D.C. 20240.

NEW JAPANESE BOOKS *Insectivorous Plants*

A new Japanese book on CP was published recently titled: *Insectivorous Plants*. It was edited by members of the Insectivorous Plant Society of Japan to commemorate the 30 years of their society. Many of you may remember the 20-year anniversary was commemorated by publication of a special issue of "New Flower" Magazine which CPN once offered in the past but is now out of print. The new book is 200 pages long; its main contents are:

1. Frontpiece and color photographs of various CP
2. Structure and Mechanism
3. What is "C.P."?
4. CP species and cultivation

The publisher is Seibundo-Shinko-Sha; 1-5 Nishiki-cho, Kanda Chiyoda-ku, Tokyo JAPAN 101. Price is 1400 yen (about US\$ 6.50), plus shipping. Text in Japanese. (Book #2376-3854)

Cacti, Succulents and Carnivorous Plants

Another new book from Japan is in two parts. One part is devoted to cacti and succulents, and the second half is about CP. There are many excellent photos of CP. Text in Japanese. The cactus and succulent portion was written by Hirao; Kusakabe wrote the portion on CP. The book is one of the Home Garden Series. 127 pp. Publisher is Gakushu Kenkyusha; 4-40-5 Kami-ikedai; Otaku, Tokyo Japan 145. Price is 1500 yen (about US\$ 7.00), plus shipping.

Short Notes

ARE YOU READY FOR A BOG GARDEN?

by John H. Hummer

1705 N. Quebec St., Arlington, VA 22207

These are the basic ingredients necessary for success in creating a "bog garden": A large enough yard with plenty of sun, a lot of time, a genuine interest in CP and past experience in growing CP.

I started growing plants in a "bog garden" this spring after spending time studying their cultural requirements last fall. As of this writing I have at least 10 species of domestic CP growing in my bog, alive and well. These include the following: *S. purpurea*, *S. flava*, *S. rubra*, *S. purpurea x flava*, *Dionaea muscipula*, *D. intermedia*, *D. capillaris*, *D. filiformis*, *D. x hybrida*, *D. rotundifolia* and *D. x nagamoto*. The species of CP within this bog represent plants that are favorable for outside growth at this particular latitude and climate. Here, in Northern Virginia, the average minimum temperature is around 0°F. With a good green sphagnum ground cover over and around the plants, these temperatures will be no problem. The more southerly type *Sarracenia* species (i.e. *S. minor*, *S. leucophylla*, etc.) cannot withstand prolonged periods of sub-freezing weather, which are all too common north of the 35th latitude (exception to this would be the Pacific Coastal areas only). Persons living south of this latitude shouldn't worry about planting certain species due to climate with the exclusive exception of *Darlingtonia* (Cobra Lily), which, as everyone should know by now, desires a cool root environment.

Though it isn't absolutely necessary to plant and locate your bog garden in a "full sun" location (6-8 hours or more of sun), take note of the fact that the more sun your garden receives, the more colorful and robust the plants will be.

Plant your taller pitcher plants in the rear north portion, smaller rosette type plants on the lower (south) portion. During the first years your plants are adapting to their new outside environment, weeds are definitely going to be a problem. Periodic weeding will be in order, especially during the warm season. If your bog is large enough, you may want to fire it in the fall; check with local fire regulations on open burning first. But before all the planting is to be done, the bog itself must be prepared and readied. This alone involves much work.

Having decided the location and size of your bog, the next thing to do is remove 8-12" of soil from the desired location. It is desirable to separate your new medium from the present medium at the base of the bog. This is done by using 2 mil ply sheet plastic, which is available in 100' rolls. It is simply rolled out to the desired length overlapping the edge of the bog area by 6-10". Heavy stones or bricks can be used to keep the sheet plastic firm around the edges where needed. The new medium is then placed over the plastic. The type of medium used should be left to individual choice since most CP growers obtain varying results with different soil compounds. Your bog should be filled with your new medium to within 2-3" of the top. Be sure if you're using peat moss to wet it down well. You are then ready to add surface live sphagnum moss. It is not necessary to cover your bog's surface area completely with the sphagnum, as the moss will grow. A smart tip to insure a good pH in your soil that will maintain acidity is to add either pine needles (almost any
(Please turn to Page 95)

CPN as the Registration Authority for Cultivars

By Larry Mellichamp

Dept. of Biology, UNCC, Charlotte, NC 28223

James Robinson's article on "Cultivar Naming and Registration" in CPN Vol. 8, p. 51 has prompted me to compile the following to emphasize my support of his idea.

It is very important to understand what a cultivar is, how it originates, how it is perpetuated, and why it is important to name and register them. The comments below have been simplified, from a somewhat complex body of information, to apply specifically to CP.

A cultivar (literally *cultivated variety*) is what we have for years referred to as a "variety" when referring to cultivated plants non-specialists will probably continue to call such plants "varieties," and this is all right as long as we realize that we are talking about *cultivated* varieties, not botanical or wild varieties.

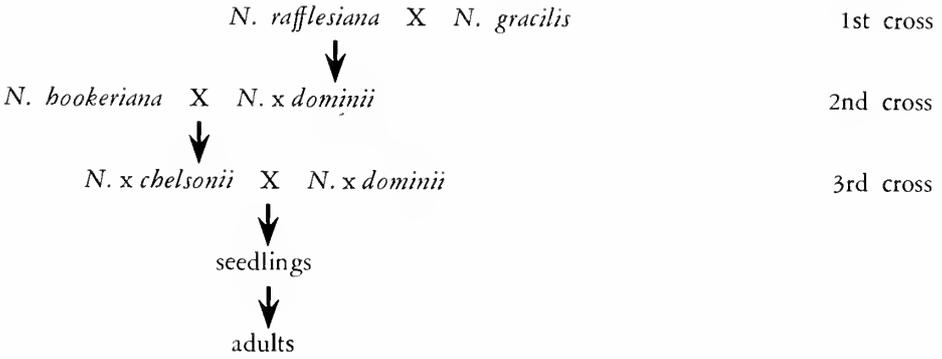
A cultivar is a named group of cultivated plants which are (1) very special and distinctive when compared to other members of the same species (of wild or cultivated plants) or hybrid group; (2) usually derived from a *single* selection of one plant from individuals of the same species or group of hybrid offspring; and (3) usually propagated by vegetative means, producing a clone, to maintain the desirable characteristics for which the cultivar was originally selected.

Cultivars do not exist as such in nature; they are created when man recognizes something distinctive and desirable in an individual specimen and "brings that specimen into cultivation to be preserved and perpetuated." Merely growing a "wild-collected" plant in a pot under cultivation does not make it a cultivar. Cultivar recognition occurs when a unique individual is selected from among many

which have been grown in cultivation for some time because it appears to be something out of the ordinary, something special, something better than the average member of that species or group. The early collectors of plants from unknown regions around the world were not selecting cultivars when they brought unusual new plants back to civilization; it was the nurserymen and gardeners who grew the plants and knew what was new and different who actually made cultivar selections.

Cultivars may also be selected from among the various seedlings resulting from a hybrid cross in cultivation. Most of our distinctive cultivars of ornamentals and crop plants are the result of hybridization and selection. Because of the variation in characteristics exhibited by wild and hybrid plants, it is very important that cultivars be propagated by vegetative means (except in the case of annuals) so that all individuals prepared for distribution will be identical to that first special selection. Only then can a plant be deserving of cultivar status. The fact that some types of plants are difficult to propagate vegetatively has been a deterrent to their producing significant numbers of cultivars.

To my knowledge there are no legitimately named cultivars among CP except *Nepenthes* hybrids made by the Japanese and the few *Nepenthes* hybrids made by George Pring prior to 1950 at the Missouri Botanical Gardens, most of the latter apparently having been lost from cultivation. The following is a chart showing the lineage of these American hybrids and how the cultivars were selected and named: (see Pring, G. H. Missouri Botanical Garden Bulletin, p. 31, 1950.):



‘Director George T. Moore’	‘Katherine Moore’	Specimens designated
‘Lieut. R. Bradford Pring’	‘Joseph Cutak’	as cultivars from
‘Dr. Edgar Anderson’	‘Henry Shaw’	among all offspring.
‘Dr. D. C. Fairburn’	‘St. Louis’	
‘Gerald Ulric’	‘Nell Horner’	

If any of these cultivars could be shown to still exist, they could be registered since they were properly published (named and described) in 1950 [although they were not called “cultivars” at that time].

It is no simple matter to produce a cultivar, and such activity should not be taken lightly. The selection, whether of a species or hybrid, must be shown to be distinctive and worthy of recognition (at least in someone’s opinion); and it must be shown, over a period of time and over a range of conditions, that it is capable of maintaining its distinctive characteristics while being readily propagated. This all may take several years. One should not be discouraged, however, because there is no time like the present to begin — spectacular results may be obtained for the effort. One must be cautioned that it is very important to keep meticulous records of hybridizations, the parents involved, which seedlings are which, and as they grow up which ones seem to be the best. One should be careful not to glut the “market” (or other people’s collections) with poor quality plants or confusing and erroneously designated hybrids. Hybrids should not be allowed to breed uncontrolled with pure species, and then lose track of which is

which (this is most likely to occur, for example, with a large collection of *Sarracenia* growing outside together where cross-pollination is likely to occur). All plants must be scrupulously labeled; over the years it may take to develop a hybrid cultivar, one can forget which plant is which.

As Mr. Robinson pointed out, the naming of cultivars is governed by the International Code of Nomenclature of Cultivated Plants (1969). A cultivar is designated by a fancy name, in English (or other modern language, not Latin), attached to the generic name (e.g. *Rhododendron* ‘Roseum Elegans’), hybrid name (e.g. *Camellia x williamsii* ‘Donation’), or common name (e.g. Lilac ‘Mont Blanc’).

In order for a cultivar name to be legitimate, it must be in the proper form as described above and must be published in some printed form and distributed to the public, as in a journal like CPN or a dated seed catalog. In order to be valid this publication of the cultivar name must include a description (in any language), preferably an illustration, and a clear statement as to how this cultivar may be distinguished from related cultivars, species, or hybrids. The first validly publish-

ed name for a particular cultivar will be the correct one.

Registration of a cultivar name means that the name is accepted by a registration authority and included in a printed registry. CPN in this case would be the registration authority and would contain, periodically, a list of newly registered names (inclusion in the list constitutes registration). Registration is different from valid publication of a cultivar name. Publication can occur in any suitable periodical, catalog, or book; registration can occur only if the name is listed by the registration authority. The purpose of the registration authority is to provide one central clearing house through which all new cultivar names must pass so that everyone can know where to go and find such a listing of correctly named cultivars — it sort of makes the cultivar "officially" recognized.

The following are guidelines for the production of a list of cultivar names by a registration authority. Names submitted for registration should be accompanied by the following:

1. name of the cultivar
2. name and address of the originator of the cultivar
3. name of the describer or namer (if different from above) and full reference to the place and date of publication
4. information regarding the parentage, when known
5. information on the testing of the distinctiveness of the cultivar; that is, how does it differ from similar plants and does it faithfully maintain the distinction through propagation
6. awards received, with dates
7. a description (usually in English) including where possible, information on classification, details of color, shape, chromosome numbers, etc.
8. all known synonyms

For examples of long active Registration

Authorities, see the American Orchid Society Bulletin or the Bulletin of the American Rhododendron Society.

In particular, I would like to point out that the cultivars listed in Mr. Robinson's article, namely *Drosera capillaris* 'Gulf Coast Giant', *D. capillaris* 'Long Leaf', *S. purpurea venosa* 'Louis Burk', and *S. rubra* 'Gulf' have not been, to my knowledge, formally published with description, distinguishing characteristics, etc. I would be pleased to hear from anyone with evidence to the contrary. For example, no one specimen of *S. purpurea venosa* with pink flowers which occurs widely in the western Florida panhandle into Alabama has been singled out and propagated as an outstanding form and called 'Louis Burk.' When Wheery first saw it in cultivation in 1933 and called it "Horticultural Variety Louis Burk" it was thought to be very restricted and rare. Currently, the name 'Louis Burk' has no legal meaning whatsoever, horticulturally or botanically; this could easily be rectified, however, since the Code is lenient with regard to restrictions on names published before January 1, 1959.

In conclusion, CPN can become the medium for publication of new cultivars; and it can be designated as the appropriate Registration Authority for new cultivars. We welcome comments from readers expressing their views on these subjects.

For further information on cultivars and registration, obtain the following: International Code of Nomenclature of Cultivated Plants — 1969 (available from the American Horticultural Society, 2401 Calvert St., N.W., Washington, D.C. 20008; price about \$3.00)

Article: "The Concept of the Cultivar" (available from the author, Dr. James S. Pringle, Box 399, Royal Botanical Gardens, Hamilton, Ontario L8N, 3H8, Canada)

RECENT STATUS OF *HELIAMPHORA*

by J. A. Mazrimas

(329 Helen Way, Livermore, CA 94550)

The Guiana Highlands, south of the 1600 mile Orinoco River system in the Gran Sabana region of southeast Venezuela, is a sparsely inhabited area of dense jungles and high sandstone table mountains or mesas. Locally, they are called tepuis and these massive flat-topped mesas rise vertically from the jungle floor usually with sheer rock faces with heights exceeding 2,000 meters (6,000 feet). The "Lost World" consists of 400,000 sq. miles (1 million sq. km.), a land so remote that some portions of it were only recently explored in the early 1950's and much of it remains unexplored. It's a land noted for the highest waterfall in the world — namely Angel Falls with water cascading 3,212 feet! Nearby, the mighty Amazon River flows 4000 miles into the sea after draining this vast area known for its high annual rainfall exceeding 100 in or 250 cm per year. The tepuis were formed millions of years ago as a result of uplifting and consequent rapid erosion by the numerous rivers separating the sandstone mesas.

Transportation is mainly by canoe with outboard motor with the rivers as the

highways in this land. However, your destination is confined to the lowland jungles since the high vertical cliff faces of many mesas are unbroken and climbing them is difficult or nearly impossible. As a result, what flora or fauna inhabit the top of these mesas is largely unknown except for a few instances where helicopters were used. *Heliamphora* are confined to the tepui growing in acid water-logged soils.

Tepuis can be considered as islands dotting the jungle landscape. Therefore, the flora of each tepui is isolated and dispersal of seed from one mesa top to another top is virtually non-existent. Summit species do not grow or establish themselves at lower altitudes so that plants growing on the mesas have narrow generic and specific endemism.

The first *Heliamphora* species (*mutans*) was collected by the Schomburgk brothers in 1839 from the 9,024 foot Mt. Roraima. It was not until 90 years later in 1928, that the zoologist and explorer G. H. Tate led an expedition to Mt. Duida (7,200 ft.) and collected



FIG. 1

three more species which were described by H. A. Gleason as *H. macdonaldae*, *H. tatei* and *H. tyleri*. Subsequently in 1937, Tate collected from Mount Auyán-tepui another species namely, *H. minor*. Then, it was not until 1951, when Julian Steyermark collected and described specimens of *H. heterodoxa* from the Mount Ptari-tepui. Thus, six species of *Heliamphora* were proposed on the basis of chiefly pitcher differences.

Bassett Maguire published a report on *Heliamphora* in 1978 which described six species of *Heliamphora* but two of the above species were determined to be really a single species. So, *H. macdonaldae* and *H. tyleri* are now incorporated under the species of *H. tatei*. In addition, two new species were proposed, namely *H. ionasi* (front cover this issue) and *H. neblinae* (back cover this issue). The latter plant is actually found near the borderline of Brazil and Venezuela and in fact is found on both sides of the border. Dr. Gleason had too few specimens of the species from Mt. Duida to make a good decision on defining the species that were present at that time.

Maguire looked at 15 characters of each plant including all structures of the flower and seed under scanning electron microscopy and light microscopy. Based on this information and other facts from ecology and morphology, he came to the conclusion that there were six distinct species as follows:

- 1) *H. nutans* Bertham, Mt. Roraima, Venezuela (1840) (9,094 ft.)
- 2) *H. minor* Gleason, Mt. Auyán-tepui, Venezuela (1939) (9,688 ft.)
- 3) *H. heterodoxa* Steyermark, Mt. Ptari-tepui, Venezuela (1951)
 - a) var. *heterodoxa*
 - b) var. *glabra*
 - c) var. *exappendiculata* (no appendage on leaf)
- 4) *H. ionasi* Maguire, sp nov, Mt. Ilu-tepui, Venezuela (1952)
- 5) *H. tatei* Gleason, Mts. Huachama-

cari (a) and Duida (b), Venezuela (1928)

a) var. *tatei*

b) var. *macdonaldae*

- 6) *H. neblinae* Maguire, sp nov, Cerro de la Neblina, (9,888 ft.) Venezuela (1953)

a) var. *neblinae*

b) var. *viridis*

c) var. *parva* (rose petals)

It is interesting that one species namely *H. tatei* var. *tatei* is the only dendroid species (tree-like) and forms dense populations over extensive moor-like savannas. Here the plants uniformly reach a height of 1-1.5 meters (3-4 feet). However, in marginal areas or in open sparse woodlands certain individuals may become partly scandent (climbing without tendrils) and will reach a height of 4 meters (13 feet)!

H. ionasi was considered by Maguire to be the most impressive of all the *Heliamphora* species especially under field conditions. It was named after a co-discoverer, Jonah Boyan who accompanied the author on his trip. The *H. neblinae* species was named after the area where it grows, namely on the southern Venezuelan-Brazilian borderline.

Finally, above numbered species correspond with location on map. (Fig. 1)

REFERENCES

- Bentham, G. 1840. *Heliamphora nutans*, a new pitcher plant from British Guiana. Trans. Linn. So. 18:429-433.
- Gleason, H. A. 1931. Botanical results of the Tyler-Duida Expedition. Bull. Torrey Club 58:277-506.
-, and E. P. Killip. 1939. The flora of Mount Auyan-tepui, Venezuela. Brittonia 3:164.
- Maguire, Bassett. 1970. On the flora of the Guayana Highland. Biotropica 2 (2):91-92.
-, 1978. Sarraceniaceae. Mem. N.Y. Bot. Gard. 29:36-62.
- Steyermark, J. A. 1951. Botanical exploration in Venezuela — 1. Fieldiana Bot. 28(1):239.



Heliamphora tatei

Courtesy Dr. Bassett Maguire and the New York Botanical Garden.
Used with permission.



Heliamphora tatei habitat

Courtesy Dr. Bassett Maguire and the New York Botanical Garden.
Used with permission



Heliamphora minor

Photo by J. Mazrimas



BOTANIST'S CORNER

by Larry Mellichamp

Botanical History of CP IV: *Heliamphora*

There are many strange plants in the world! A plant may be strange because of how it looks, where it lives, or what it does. Carnivorous plants have always been considered strange for all these reasons. They are usually different looking from "normal" plants; most come from far away places, or habitats regarded as mysterious, inhospitable, and otherwise unusual for normal activities (e.g. bogs); and everyone would agree that catching insects is odd behavior for a plant!

Eventually you find that even within CP as a group, some are more intriguing than others because of some particularly unusual aspect of their existence. In this context I am referring to that singular group of plants in the genus *Heliamphora*, the Marsh Pitchers. Why do they strike people as being stranger than strange? They are among the rarest of CP in cultivation: while they may be easy to grow, they are certainly next to impossible to obtain. This makes them strange — because you never saw one before in real life!

They seem to look like a pitcher plant, with short, tubular water-holding leaves formed in a clump or on a short erect stem; but they have no hood over the pitcher mouth, and the white flowers are born several on a stem and don't really look like the familiar but distinctive *Sarracenia* or *Darlingtonia* flowers. Yet, *Heliamphora* are considered to be primitive forms of pitcher plants that eventually gave rise to the more specialized

types of *Sarracenia* and *Darlingtonia*. This seems contradictory, since *Nepenthes*, with pitchers very similar to *Sarracenia*, are considered totally unrelated to members of the Sarraceniaceae (see CPN Vol. 7, p. 18) while *Heliamphora* are considered quaint members of the Sarraceniaceae. These relationships, Dear Reader, are revealed in details of the flower parts, pollen grains, seeds, internal anatomy of stem and pitcher, etc.

What is most remarkable about *Heliamphora* is where it grows. The six species of *Heliamphora* occur in the remote Guayana Highland in northeastern South America, an area where Brazil, Guyana, (ex-British Guiana), and Venezuela come together. This region is characterized by jungles, rivers, savannahs, and extraordinary sandstone plateau mountains; and has been lavished in mystery and romanticism by famous legends such as the classic story "Lost World" of Sir Arthur Conan Doyle. These spectacular isolated sandstone plateaus, of which the 9,000' Mt. Roraima is the most famous (See photo, p. 87), contain some of the most unusual plants and animals in the world. The 2,000' Roraima Falls is the third highest waterfall in the world. "Seldom do richness of natural history and delightful fantasy of fabulous legend and classic literature so combine to lure attention as they do in the ancient region of Guayana." (Maguire, 1953)

The history of the Guayana Highland commenced soon after Columbus discovered the New World as sailors told stories of the riches and marvels of this far



**Mt. Roraima, from Schomburgk's diary of his Travels, 1841
(Quality is poor because of age of the original.)**

away land. The first thorough explorations of the Guayana Highland began with the travels of the German naturalist Robert Hermann Schomburgk (1804-1865), who, in 1838-39, traversed this wild region by water and on land surveying the natural richness of British Guiana for the Geographical Society of London. It was on this trip that the first *Heliamphora*, *H. nutans*, was discovered, collected, and sent back to George Bentham at Kew Gardens in London for description and naming (see Bentham, 1840). Surprisingly, it was not until *after* this, in 1841, that *Darlingtonia* was discovered in the unexplored wilderness of the American Northwest (See CPN

Vol. 7, p. 83).

The following excerpts from Schomburgk's diary (1841) will give you some of the flavor of the expedition, the appearance of the terrain, and the habitat of the plants:

19th October [1838]. At 2 o'clock in the afternoon, we crossed the Yawaira [River] which flows to the northward and is a tributary of the Caroni: we had therefore now entered the river-basin of the Orinoco that is divided from that of the Amazon stream by the sandstone range that we had just crossed. . . In the neighborhood of an abandoned Indian Village, there showed itself for the first time that remarkable range, the highest summit of which is Roraima. It was enveloped in thick clouds of mist and was situated about 40 miles away to the North Northeast. . .

21st October. The most extraordinary natural wonder of this district was without doubt Roraima which lay about 35 miles distant and was not unlike a huge gloomy rampart enveloped in clouds. . . . After we had again crossed the river, we reached a second Arecuna [Indian] village. They had prepared a feast for us here in advance, because they had been notified of our arrival by messengers. The banqueting and dancing was carried on all night through by the natives who had donned their best decorations. The ever-repeated refrain "Roraima, the red rock, enveloped in cloud, the ever fruitful mother of the torrents" echoed everlastingly in my ears. . . . I never before on any one occasion saw such a quantity of brilliant feather-tufts and head-decorations: truly the whole feathered race must have been requisitioned for its most beautiful plumage! A number of necklaces of monkey or peccary teeth, or spines of the porcupine, with long cotton fringes that again were decorated with squirrel, Toucan, and various other skins, hung down the necks of the dancers. . . .

Shivering with cold, I woke on the morning of the 27th October to find my Indians crouched round a fire. The thermometer registered 58½° Fahr. . . . Mount Roraima was almost continually enveloped in clouds and no day went by but we had a storm. . . .

On the 2nd November we resumed our journey in an easterly direction towards Mount Roraima and crossed many intervening mountain ridges and streams that all flowed towards Yuruani [River]. The vegetation was vigorous only in the vicinity of the river banks; otherwise it was unusually scanty. . . . at 6 o'clock in the evening we were but a mile distant from the perpendicular rocky walls of Roraima, where we pitched camp in a hollow. As the bush, owing to the continuous rain, was uncommonly wet, it was only after many vain attempts that we succeeded in making a fire. Towards midnight, the thermometer registered 59° Fahr. Before sunrise, and for half an hour subsequently, Mount Roraima was free of all clouds and we could see it lying in front of us in all its beauty. It rose 3,700 feet above the Arecuna village Arawayam Botte — its perpendicular walls have a height of 1,500 feet and the summit towers over the village to 5,200 feet. . . . Particularly remarkable are the many waterfalls, which rush down from this immense height, and subsequently flow in different directions towards the three main streams of South America, the Amazon, Orinoco and Essequibo. The four mountains, Roraima, Cukenam, Ayang-Catsibang, and Marima form almost a quadrilateral figure of which Roraima is the highest and most southeasterly

point. . . . Roraima is but rarely free from cloud, and it was only on two occasions that I saw it so. The fact that thick forests extend from its northern spur as far as the coast of the Atlantic Ocean, while immense savannahs stretch to the southward, may perhaps contribute to the continual wet and the numerous thunderstorms that prevail here. Words fail me to describe its thundering and foaming waterfalls that rush down from a height of from 1,400 to 1,500 feet, and which, especially when they are swollen by rain after a thunderstorm, form a truly imposing sight.

In the swampy savannahs at the foot of the mountains grow a number of rare and interesting plants among which a *Utricularia*, that deserves to carry off the prize for this family, especially distinguished itself. I named it after the most distinguished of South America's travellers, after Baron Humboldt. The root is fibrous, and out of it shoots up one or occasionally two reniform leaves. The stalk of a dark purple colour, is from three to four feet high, and carries several lovely purple blossoms 2½ inch in diameter. The under lip falls down like a collar and is some 2 inches wide: the upper lip or hood is wide, flattening out towards the edges, and broader than the palate which it overshadows. Another plant of great interest, the *Heliamphora nutans*, judging by its leaves has much resemblance with the *Nepenthes*, the leaves of which in many respects resemble the *Sarracenia variolaris* [= *S. minor*]: but according to the flower differs from it considerably because it bears several blossoms and has winged seeds. The flower resembles our snow-drop and consists of from four to six petals. Of not less interest to me was a *Cypripedium* [Orchid] that grew amongst the *Utricularia* in the swampy ground: if I mistake not, it is the first South American species. Its hirsute and many leaved stem, 8 feet in height, carried on each flower stalk several blossoms which also were covered with hair. Space does not allow me room to enumerate all the numerous plants that I found in this remarkable area. . . .

(Schomburgk, 1841; translated, 1931)

Throughout the 188 page "Travels," Schomburgk indicates rough conditions, fever and sickness, many new plants, and good rapport with the natives. Above we may notice the open savannah-like habitat of *Heliamphora*, with plenty of moisture and even cool temperatures.

The horticultural world would have to wait until 1881 when David Burke,

one of the most avid collectors for the Veitch Nurseries (see CPN Vol. 8, p. 32), rediscovered *Heliamphora nutans* at Mount Roraima, and successfully introduced living specimens to England. It flowered for the first time in cultivation in June 1889 (Hortus Veitchii, 1906; p. 299). The other 5 species of *Heliamphora* have been discovered on numerous expeditions from the 1930's to the 1960's, many of which involved botanists from the New York Botanical Garden (Maguire, 1953, 1978). Perhaps there are other strange plants to be found in this enticing botanical wonderland.

References:

- Bentham, George. 1840. On the *Heliamphora nutans*, a new Pitcher plant from British Guiana. Transactions of the Linnean Society, London. 18:429-433.
- Maguire, Bassett, *et al.* 1953. The Botany of the Guayana Highland. Memoirs New York Botanical Garden Volume 8, pp. 87-95.
- Maguire, Bassett. 1978. Sarraceniaceae [*Heliamphora*] in The Botany of the Guyana Highland — Part X. Memoirs of the New York Botanical Garden Vol. 29, pp. 36-61.
- Schomburgk, R. H. 1841. Travels in Guiana and on the Orinoco. Leipzig. English translation by Walter E. Roth, Georgetown, British Guiana, 1931.
- Veitch, James H. 1906. Hortus Veitchii. p. 87 & 299.

The Correct Common Name for *Heliamphora*

by Larry Mellichamp

Occasionally the question arises as to the correct common name for plants of the genus *Heliamphora* (Sarraceniaceae). The possibilities are Sun Pitchers or Marsh Pitchers. They have been referred to as the South American Pitcher Plant, which is less colorful but at least unambiguous.

The tendency to refer to them as Sun Pitchers comes from the observation that the generic name seems to be made up of the combination of the Greek word *belios*, meaning "the sun", and the Latin word *amphora*, meaning "a wine jar, or pitcher". Similarly, *Helianthus* is the generic name of Sunflowers, with the Greek word *anthos* meaning "a flower".

On the other hand, the Greek word *belos* means "a marsh"; and in making the generic name, the genitive case *beleos* would have been used. In forming the compound generic name, the masculine -os ending would have been dropped in both cases above, leaving the root to be joined with *amphora*. Thus, *Heleamphora* would have been the "Marsh Pitcher." Either common name is appropriate because the first discovered plants grew

in an open, sunny, marshy savannah (see Botanist's Corner). Upon first encountering the name, I would have preferred to translate it "Sun Pitcher" because it is spelled *Heliamphora* instead of *Heleamphora*.

However, the correct common name is Marsh Pitcher, and we would certainly be confused if it weren't for the fact that George Bentham, the English botanist who named *Heliamphora* in 1840, meant to call it Marsh Pitcher, and says so in the description: "I now proceed to give the technical character of the *Heliamphora nutans*, of which I have derived the name from ἑλος, a marsh, and ἀμφορεῖν, a pitcher". He may have changed the spelling to make it easier to pronounce, otherwise the reason is unclear.

The translation of the generic name is unfortunately misleading and could be interpreted correctly in either context (sun or marsh). The fact, however, that Bentham explained the name "Marsh Pitcher" is proof enough for its correctness.

Beginner's Corner

SOME PERSONAL OBSERVATIONS ON CULTIVATING THE HELIAMPHORA

by Robert R. Ziemer
(P. O. Box 4562, Arcata, CA 95521)

The following note is based on some 7 years experience growing three species of *Heliamphora* — *H. heterodoxa*, *H. nutans*, and *H. minor*. This information is not intended to be a definitive or even a comprehensive guide to the cultivation of these species, but simply some observations on what I have found to work for me through trial and error. I have not conducted any rigorously controlled experiments on either potting mixture, light, or temperature. Since these plants are sufficiently difficult to obtain, every death is a traumatic experience for me and I have not wanted to repeat the sequence simply to study the reasons for failure. My main objective has been to keep the little fellows alive rather than risk losing some through experimentation. In general, however, I have found that all three species are about equally easy to grow and propagate, except, to date my *H. minor* has failed to produce flowers.

SOIL MEDIUM AND WATER: I have found that my plants grow best in a light, well-drained soil medium. Live sphagnum moss seems to be best. I have tried a mixture of live sphagnum and perlite, but the plants have generally done somewhat poorly. On the other hand, a sphagnum and peat mixture seems to be too heavy to allow good root penetration. Since the plants, except for *H. minor*, are fairly large (15-20 cm pitcher), I have found a 20 cm diameter plastic pot to be a good size. Ten cm pots are too small and the

plants easily topple. I have tried clay pots, but, for some reason, the plants in plastic pots have grown much better. I have also tried 25 x 40 cm plastic dish tubs with the bottom filled with perlite and the top $\frac{3}{4}$ with live sphagnum. Again, the plants in the 20 cm pots grow much better.

My *Heliamphora* absolutely do not grow well in water-logged conditions. They also do not like to be subjected to standing water. Drainage is a must. One problem I have found with live sphagnum is that even though the surface is green and growing, a few cm below the surface the moss begins to break down and, within a year, forms a rather water-logged medium. I have found it best to repot the plants in fresh live sphagnum once a year — preferably in the spring. If left in the old material they seem to progressively become less thrifty and more susceptible to rot. I water the plants from the top every several days so that water freely flushes through the medium and the pitchers remain full of water. Once, through a lack of attention, I allowed the sphagnum to dry to the point where the plants wilted. However, with a thorough rewatering, the plants survived, although the tops of the mature pitchers were killed. I believe it is better to keep *Heliamphora* slightly on the dry side rather than too wet.

TEMPERATURE AND LIGHT: I live along the foggy Pacific Coast of extreme northwestern California (41° latitude)

in the land of the Redwood. The area has the reputation of being one of the foggiest places on earth. Summer daytime temperatures may occasionally reach 22°C, but generally remain below 20°C and summer night temperatures remain around 13°C. My plants are grown in a greenhouse where the daytime temperature seldom exceeds 25°C. The greenhouse is located under some Redwood trees, so it receives direct sun only about 2 hours a day. In addition to the diffuse sunlight, the plants are located about 1 m under four 4-foot vitagrow fluorescent lamps. These are operated on a 10-hour photoperiod all year. In winter, a heater in the greenhouse is set to operate if the temperature drops below 12°C. I believe the plants grow best at temperatures between 13°C and 22°C and under less than full sunlight. Once the temperature in the greenhouse dropped so that water in the pitchers froze — probably an air temperature of -2°C. Although there was some frost damage to the pitchers, all plants recovered.

DORMANCY: I have not found the *Heliamphora* to enter a true dormancy period under my growing conditions. New leaves continue to be produced in the winter, though at a lower frequency. However, flowering is confined to late spring through summer. Most of my plant losses have occurred in winter. This may be the result of variable greenhouse conditions. The plants definitely enter a period of reduced activity in winter. Typically in winter, we have a week or so of rainstorms followed by several days of clearing before the next series of storms. During the storms, temperatures are cool and light levels are quite low. During the clearing periods, light levels increase dramatically and the daytime temperature in my greenhouse can reach 25°C. I feel this variability in temperature and light during the winter stresses the plants and predisposes them to disease.

PROPAGATION: I have found all

three species of *Heliamphora* fairly easy to propagate although they grow rather slowly. The best method is through crown division, as with *Sarracenia*. As the plant matures, pitchers begin originating from several distinct points. Every 6 months or so the plants can be separated very easily by carefully breaking them apart. Both the roots and the pitchers of *Heliamphora* are extremely brittle and break at the least provocation. The roots are very easily damaged by transporting and often break near the plant, leaving a rootless group of pitchers. The pitcher leaves are equally susceptible to breakage — which makes shipping mature plants a somewhat chancy venture.

I usually divide the plants in early summer. Last fall I gave in to temptation and separated my plants in late fall. Out of 50 divisions, only 7 survived the winter. Most of the plants progressively rotted, despite frantic attempts to save them. I now believe this disaster was due to the wintertime stresses discussed above under dormancy. When I have separated plants in the summer, they have become well established by fall. I cannot recall losing even one of those plants. Dividing the plants in early summer is generally incompatible with producing seed and some compromise is necessary. This is the reason I attempted fall divisions last year.

I have found propagation by seed is difficult and growth of the seedlings is very slow. Seed is not terribly difficult to produce, given some patience, although, as I stated earlier, my *H. minor* has never flowered. Obtaining pollen while the stigma is receptive is the greatest problem. The anthers ripen a week or so after the stigma ceases to be receptive to pollen. I have found that the stamens of *H. nutans* remain firmly attached to the flower even as the ovaries become enlarged, whereas the stamens of *H. heterodoxa* become detached shortly after the anthers ripen. Pollen from *H. nutans* can be easily obtained by lightly teasing the anthers with a small stick. The same ac-

tivity simply detaches the stamens of *H. heterodoxa* without yielding pollen. However, pollen can be extracted from *H. heterodoxa* by breaking the anther in half and twirling the halves between the fingers. Pollen, once obtained, can then be placed on a new flower in which the petals have just opened. I have found the stigma to be receptive for only a couple of days after the petals open.

Last year I attempted to produce *H. heterodoxa* x *nutans** and *H. nutans* x *heterodoxa* hybrids. I was successful in obtaining mature seeds which appeared normal in all respects, but none of the 6 persons I sent the seed to were able to germinate it. There also appears to be some differences in success in pollinating the two species. Assigning a value of 100 for a full complement of mature seed, actual seed production from *H. heterodoxa* x *heterodoxa* would rate a value of about 80, *H. nutans* x *nutans* about 40, *H. heterodoxa* x *nutans* about 60, and *H. nutans* x *heterodoxa* about 20. I must reiterate that these are uncontrolled and limited results based on one season's observations.

I have no knowledge how well *Heliamphora* seed can be stored. Two years ago I conducted some germination tests on *H. heterodoxa* seed and found that 31 out of 35 fresh seeds germinated. This year I have just planted 60 seeds which have been stored in the refrigerator for 1 year. Later in the year I will give a short report to CPN on the results.

For germination, I simply sow the seeds on the surface of sphagnum peat, cover the pot with a plastic bag, and place it in a diffusely lighted place in my greenhouse. The seeds begin to germinate within 6 weeks. Seeds have continued to germinate up to 9 months after sowing. I have found that if the seedlings are left on the peat moss they will grow extreme-

* female parent x male parent

ly slowly and eventually will die within a year, having reached a size of less than 5 mm. If the seedlings are transplanted to live sphagnum, they become quickly over topped by the moss. I have had such seedlings which, at the end of 2 years, were only about 15 mm tall. The very small and brittle root of the seedling is very easily damaged. Even a drop of water can break it. Thus, I have had very poor success growing *Heliamphora* from seed.

AVAILABILITY: I have a very limited number of *Heliamphora* plants for several reasons. First, I have very little space in which to grow them. However, the primary reason is that I feel this is a very beautiful plant and I would like others to have the opportunity to grow it. Over the years I have given away several hundred plants to CPN members. I have no idea how many of those plants are now alive. I no longer have the time to correspond, package, and ship plants, so now all of my plants are distributed through WIP as they become available. Any requests for the plants should be directed to WIP.*

In summary, I feel I still have much to learn about growing *Heliamphora* although over the last 7 years I have developed some methods which work reasonably well for me in my greenhouse and in my climate. Some of my practices are based on limited observation and have developed because previous failures or successes have led me to reject some methods and adopt others. Under different conditions, different methods may work better. I am certain the readers of CPN would be interested in additional or contradictory findings by other growers of *Heliamphora*.

Late note: seeds of the cross between *H. heterodoxa* and *H. nutans* have germinated.

* 560 Sherwood Ave.
Satellite Beach, FL 32937

SPECIAL LITERATURE REVIEW

Triphyophyllum peltatum (Hutch. & Dalz.) Airy Shaw: A "New" Carnivorous Plant

Green, Sally and TL, and Yolande Heslop-Harrison. 1979. Seasonal heterophylly and leaf gland features in *Triphyophyllum* (Dioncophyllaceae), a new carnivorous plant genus. Bot. J. Lin. So. 78:99-116. (Reprints: Dr. Heslop Harrison, University College of Wales, Welsh Plant Breeding Station, Plas Gogerddan, Near Aberystwyth, SY23 3EB, Wales)

Marburger, Joy E. 1979. Glandular leaf structure of *Triphyophyllum peltatum* (Dioncophyllaceae): A "fly paper" insect trapper. Amer. J. Bot. 66:404-411. (Reprints: 50 cents, Joy E. Marburger, 5709 Rural St., Pittsburgh, PA 15206)

Botanists and carnivorous plant enthusiasts have a tendency to settle into a few well-circumscribed genera of plants that we wish to label "carnivorous" and pretty well let it go at that (but we generally ignore the carnivorous fungi!). Quite often such anthropocentric barriers are breached by nature with yet another little surprise that causes consternation among the rigid but generally fascinates the rest of us. We all tend to feel we know what the term "carnivorous" means in botany, but actually we cannot define or limit it precisely, and a few abortive attempts to do so have resulted — in our present state of knowledge — in heated disagreements over circular and sometimes ill-founded arguments.

Actually, there have been suggestions for many years that many plants other than the "carnivorous genera" may vegetatively trap animals for nutritional resources. As anyone who has looked into the matter knows, it is not easy proving a plant carnivorous when one gets down to it, even though it may seem so on the surface and with what we have learned from the accepted genera. Now comes a very small plant family, the Dioncophyllaceae, with its three monotypic genera, growing in a comparatively small range along the coastal nations of tropical west Africa. And we now have good evidence that one of its members, *Triphyophyllum peltatum*, is likely carnivorous, at least on a "part time" basis.

Airy Shaw (1951) did the first modern reworking of this family which he described as "one of the strangest groups of plants to be found in the vegetable kingdom." Schmid (1964) correlated the family further with others and concluded that it was closely related to Droseraceae, Nepentheaceae and Sarracenaceae, and also presented a rather thorough workup of developmental morphology. Other authors also made contributions, but these seemed to be the landmarks until this 1979 work by the Greens, Heslop-Harrison and Marburger.

Of the three genera in the family, only *T. peltatum* has the structure for carnivory. It is a tropical liane growing in hot, seasonally wet forest of Sierra Leone and Liberia where only a few inches of mulch and airable soil covers a laterite-pebble hardpan. Here the species shares another disquieting characteristic of all carnivorous plants: It is severely threatened and near the brink of extinction as forests are leveled for wood and agriculture. Indeed, four of the six selected study sites of the Greens and Heslop-Harrison had to be abandoned in the course of the study because of forestry operations. Coupled with very precise growth requirements that have yet to be worked out from a cultivation aspect (Kew kept seedlings for only two years and Marburger germinated seed but the seedlings expired after endosperm stores were exhausted; neither attempt produced carnivorous leaves),

and a tendency to not flower and produce seed regularly from year to year, our "new" genus seems to have an uncertain destiny.

Morphologically, the species is fascinating. The juvenile shoot (which may reach 1 m.) bears rather unremarkable oblong-lanceolate leaves. Then, timed with the rainy season (May-August peak), glandular leaves are produced from the top of the shoot. These leaves reach to 300 mm and are circinate and filiform in growth pattern much like *Drosera filiformis*. Sometimes a mixed leaf is produced, having a blade-like base with the midrib extending beyond and bearing glands, much as *Nepenthes* pitchers are produced at the end of the laminar petiole. The glands (which are up to 1 mm across) have much the same pattern macroscopically as *Drosophyllum*, and similar to this species there is no tentacular movement. Then in the third stage, the leaves just as abruptly become aglandular again, oblong-elliptic and with two hooklets at the tips, at which point the plant becomes a climbing liane, reaching to the treetops where it flowers.

The timing of glandular leaf production to the beginning of the rainy season suggests a spurt of activity to acquire extra nutrients not provided in the poor soil so that along with the increased moisture from the rains the plant can begin its maturity phase as a climbing liane to reproduce. The other two genera of the family have a similar morphologic-seasonal pattern, but lack the glandular leaves.

The seeds of the species are not without interest, to put it mildly. I was fortunate to acquire some (non-viable due to age) from Ms. Marburger. The seeds are discoid and up to 10 cm across! The bulk of a seed is a broad, thin circular wing with the nearly spherical 1 cm true seed portion in the center. The seeds tend to mature externally, dangling by funiculi from the flower head. Such a seed structure indicates wind dispersal, which

seems to be the case.

Both of the papers being reviewed are excellent studies providing strong ecological, morphologic, anatomic and preliminary physiological evidence indicating that *T. peltatum* is indeed carnivorous. The Greens and Heslop-Harrison remark that they would like to do further absorption and other studies to show utilization of trapped insects by the plant, but this would have to be done ideally in cultivation, which presents the problem summarized earlier. In addition to these fine papers, one should also read Airy Shaw for further background.

Research is after all a human endeavor, and I would conclude this review on a human note (from personal correspondence with Dr. Heslop-Harrison): "When one hears from the Greens of the circumstances under which they have worked, as I have done in correspondence over these years (I think Professor Green is in his early 70s), I really feel their work has been a great and distinguished achievement. They have driven through torrential rains at killing temperatures, along muddy tracks, suffered innumerable malaria attacks, and have often been frustrated, on arrival at a known site, by finding it destroyed. I feel that this may well be the last time that this threatened plant will be described from its natural habitat. It has really been exciting working with the Greens, watching the story unfold; they are both such enthusiasts. . ."

Before leaving Sierra Leone for retirement in Spain, the Greens spent a last season searching for flowering and fresh seed for us, but it was not a flowering year, and the plants are fewer and fewer.

DES

Other References:

Airy Shaw, HK 1951. On the Dioncophyllaceae, a remarkable new family of flowering plants. Kew Bull. (1951) :327-347.

Schmid, R. 1964. Die systematische Stellung der Dioncophyllaceen. Bot. Jahr. 83:1-56. IN GERMAN.

WANT ADS



When submitting Want Ads, please be sure to print clearly for best results and to eliminate mistakes. Please indicate 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

Bob Syrluk, 217 Drake Ave., Apt. 3J, New Rochelle, NY 10805: (TS) *D. spathulata* (white flower), *D. spathulata* Kansai, *D. capillaris*, *D. capensis*, *U. longifolia*, *U. subulata*. (B) *Heliophora* species, *P. gypsicola*, *D. prolifera*, *Drosophyllum*.
Michael D. Goddard, 90 S. Yates, Denver, CO 80219. (S) *S. leucophylla*, *S. purpurea*, *S. flava*, *S. rubra*. (B or T) *S. oreophila*, *S. leucophylla* (red), *S. rubra jonesii*, *S. flava* (purple throat) and *S. flava* (red top), and any *Nepenthes*.

Jeffrey Gold, 13126 Anza Drive, Saratoga, CA 95070. (WB) seed, plant or cutting of *Nepenthes ampullaria*, *Heliophora*, *Drosera adela*, *D. schizandra*, *D. cuneifolia*, *Drosophyllum lusitanicum*, *Utricularia sandersoni*. Plant or root cutting of *Byblis gigantea*.

Jeff Helmer, 3620 Shawnee Road, San Diego, CA 92117: (WB) *Utricularia* species of interest (see CPN 8:50), live sphagnum.

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type) or evergreen droppings (cedar, juniper, etc.) that break down slowly and continually meet the bog's acid needs. Simply drop or sprinkle them over the sphagnum moss. It isn't necessary to mix them in by hand; they will work themselves in over time. A good watering by rain or hose will aid in this process. The next job to tackle, after all this is done, is to build a fence around the bog to keep out animals of all types. Birds and squirrels, especially, will make confetti of your bog if you let them. The fencing material I employed was chicken wire stapled to 2 x 3" studs, which were hammered into the ground around the perimeter of the bog, at given distances. You may want to use some stain or wood preserver on your studs before you put them in the ground. Chicken wire is fairly flexible, and you will want to leave your fencing loosely attached at several points around your bog to gain easy access to the inside for planting and removal of weeds. Around the perimeter of your bog you may want to have washed stone or gravel. Not only will this improve the

looks of your bog, but it will also aid in keeping seeds and weeds out. GOOD LUCK!

Q and A

I grow my CP in a terrarium but I seem to have a pest known as the fungus gnat. I had these a long time and I also see many silvery-backed smaller bugs crawling through the soil. What's the best way to get rid of them? T. S., Antioch, CA.

I would not use any liquid pesticide in a terrarium since the residue lingers a long time and may definitely harm your CP. Instead, I would obtain a pest strip and snip off a corner triangle with a knife or razor blade and insert the piece in the corner of your terrarium. Please handle this material with plastic bags over your hands and discard the bags afterwards. The piece of pest strip gives off a vapor that kills most pests and should last several months after which you have to replace the piece with another one. Wrap the rest in aluminum foil.
J. A. M.



Heliamphora neblinae is another recently described species. Courtesy of Dr. Bassett Maguire and the New York Botanical Garden. Used with permission.