Literature Review

Brugger, J. and Futishauser, R., Architecture and development of non-aquatic species of *Utricularia*. Bot. Helv. 99(2): 91-146. 1989.

> The old view that in *Utricularia* each primordium can develop into any kind of organ is only partially correct according to these authors. There are still some developmental and positional constraints but these are very relaxed and deviate from construction rules valid for most flowering plants. The parts are designated leaf, stem (stolon) and bladder but the classical criterium for distinction between stems and leaves does not apply. A lief tip may continue its growth and develop into a stolon, or a stolon may become determinate and flat, thus forming a terminal leaf. Three terrestrial and four epiphytic species were studied.

Crouch,I.J., J.F. Finnie and J. van Staden. Studies on the isolation of plumbagin from in vitro and in vivo grown *Drosera* species. Plant Cell Tissue Organ Culture 21(1): 79-82. 1990

> *Drosera auriculata* roots contained more than twice as much plumbagin as in vivo grown *D. capensis* plants. *Drosera natalensis* have half the amount and it was concluded that extraction of this chemical for commercial uses was not feasible.

Fromm-Trinta, E. The genus *Utricularia* L. in Brazil: V. Species of the southeastern region. Bradea 5(24): 267-274. 1989.

> In the area around Sao Paulo, there are 30 species of *Utricularia,* of which 9 are aquatic, 3 epiphytic and the rest terrestrial.

_____ 1988. *Lentibulariaceae* do Brasl. II. Utricularias epifitas. Bradea 5:91-107.

_____1988. O genero *Utricularia* L. do Brasil. II. Especies da regiao norte. Bradea 5:125-135.

_____ 1989. O genero *Utricularia* L. do Brasil. III. Especies da regiao nordeste. Bradea 5:188-194.

> In Portugese. These three papers are covered together since they encompass reviews of *Utricularias* in Brazil. The first covers the epiphytic species, the second species of the north to the border of Venezuela, and the third in the northeast of her country. All papers have keys, listings of collected specimens (herbarium) and locations, comments on habitat and range, and an extensive bibliography. The first paper on the epiphytes also includes complete descriptions and line drawings of each species. (DES)

Givnish, Thomas J. 1988. Ecology and Evolution of carnivorous plants, Pp 243-290 in Abrahamson (ed.), Plant-Animal Interactions. McCraw-Hill, New York.

> This chapter in a book on Plant-Animal interactions constitutes an extensive review of the literature on carnivorous plants viewed from the ecological

perspective. Among the topics which are extensively covered are: Geographic and ecological distribution, Prey specialization, Mutualism and digestive symbionts, Competition with animals for prey, Pollination, Nutritional benefits of carnivory, Autotrophy vs. heterotrophy in carnivorous plants, and Cost-benefit analysis of the carnivorous habit.

Questions such as why carnivorous plants so often occur in sunny, wet, mineral poor and burned over habitats are reviewed and discussed. Because of the incomplete state of knowledge, complete answers to these questions are not always possible but a review of the relevant work and clear suggestions for the direction future research are presented. (SEW)

Greenway, W, J. May, S. English and F.R. Whatley. Metabolism of nitrogen -15-glycine and carbon -13-glycine by *Dionaea muscipula* studied by gas chromatography-mass spectrometry. New Phytol. 114(4): 581-588. 1990

Traps were fed the labeled amino acid glycine and it was found that labelling was detected in glycine and serine with both labels of carbon and nitrogen. The nitrogen labelling alone was found in alanine, aspartic acid , and glutamic acid. Only the trap and lamina contained the labels.

Kondo, J. and Segawa, M. A cytotaxonomic study in artificial hybrids between *Drosera anglica Huds.* and its certain closely related apecies in series *Drosera, section Drosera, subgenus Drosera, Drosera.* Kromosomo (Tokyo) 2(51/52): 1697-1709. 1988.

Artificial hybrids between the tetraploic species *D. anglica* (2n=40) and the diploid species *D. capillaris, D. filiformis, D. intermedia* and *D. rotundifolia* showed intermediate chromosome numbers and complements of the bimodal karotypes at mitotic prophase and metaphase. The same tetraploid specie was crossed with *D. spathulata* (2n=40) "Kanto-type" and with *D. spathulata* (2n=60) "Kansai-type" to give hybrids that showed various configurations with various multivalent formations.

Kreher, B., Neszmelyi, A. and Wagner, H., Napthoquinones from *Dionaea muscipula.* Phytochemistry (Oxf.) 29)2): 605-606. 190.

Beside plumbagin, a new compound hydroplumbagin has been isolated from *Dionaea* which joins two known naphthoquinones, droserone and 3-chloroplumbagin for a total of four of this family of compounds from this genus.

Malayan Nature Society, 1990.Endau-Rompin—A Malaysian heritage. Geo 12:32-43.

This article is an abstract from a book of the same title in this Australasian Geographic magazine. It features a natural history expedition to this area of Malaysia. Regarding CP, there is an excellent full page color photo of *Nepenthes ampullaria*. The *Nepenthes* are mentioned little in the article, but the photo legend mentions that a small species of crab was found inhabiting many of the pitchers where it apparently fed on captured prey remains. (DES)

Phillipps, A. & A. Lamb. Pitcher Plants of East Malaysia and Brunei in Nature Malaysiana Vol 13(4): 8-27. 1988

There are 30 accepted Borneo species of *Nepenthes* with 5 of them absent from East Malaysia and Brunei and these five are located in the mountains of Indonesian Borneo. There are also natural hybrids which are more common than B. H. Danser indicated in his 1928 monograph on the genus.

The authors give brief descriptions and locations for these species which in this short article is adequate but the greatest portion of the space is devoted to many color photos of species and hybrids (about 80 in all). This is followed by the Biology of the plants with facts that we know so well from other texts but there are also many interesting relationships especially between insects and a plant that preys on them! *Nepenthes* pitchers, we find, not only protect insect pupa and eggs of insects but about 150 different species of insect larvae thrive in the liquid! Spiders set traps for insects in the upper part of the pitcher and hide in the liquid when disturbed. Many ants zealously guard their pitchers while lapping up the nectar secreted by the peristome. And it is well-known now that *N. bicalcarata* plays host to a colony of ants. Finally, studies on the development of a *N. villosa* pitcher way up into the clouded Mt. Kinabalu takes 8-10 months to mature and lasting as long.

There are many uses for this plant ranging from medicinal drugs and cooking utensils to making rope.

Finally, the best descriptions are detailed for *N. veitchii* including a magnificent cover photo and for *N. northiana* and *N. edwardsiana* which are all rarely found species and little was known about them in the past. In this article, we learn more information about them as they fill their ecological niches.

Back copies of this magazine may be obtained from the publisher:
The Publisher, Tropical Press Sdn. Bhd., 29, Jalan Riong, 59100 Kuala Lumpur, Malaysia. Price is $3.50 U.S. currency by surface mail.

Reddy, M.M., The genus *Utricularia* L., in Marathwada (India). J. Econ. Taxon. Bot. 12(1): 110-112. 1988.

Six species of this genus are described with a diagnostic key and critical notes on their distribution are presented. *U. bifida, U. polygaloides, U. caerulea, U. Striatula, U. Ulignosa,* and *U. stellaris* are noted.

Rogers, W.A. & Gupta, S. The pitcher plant (*Nepenthes khasiana* HK.F.) sanctuary of Jaintia hills, Meghalaya (India): Lessons for conservation. J. Bombay Nat. Hist. Soc. 86(1): 17-21. 1989.

This *Nepenthes* species is considered an endangered endemic plant and a pitcher plant sanctuary was set up in 1974 to protect it. The sanctuary has declined in conservation status over the past decade and the authors urge the state and conservation agencies to continue a viable level of protection.

Santos, E. The Genus *Drosera* L. in Brazil: II. On *Drosera montana* St.-Hil. Bradea 5(21): 249-256. 1989

The name *D. montana* was applied to many other species and varieties of *Drosera* in the past. In this study, the author tries to deal with the confusion and to revalidate the *Drosera* species of *tormentosa, hirtella* and *hirtella* var. *lutescens.*

Schulze, W., and E-D. Schulze. Insect capture and growth of the insectivorous *Drosera rotundifolia L.* Oecologia (Heidelb) 82(3): 427-429. 1990

It was observed that rates of insect capture increased with leaf area and that leaf loss equaled leaf growth in plants having a natural rate of insect capture. Nitrogen from prey was stored in the hypocotyl and it was estimated that about 30% of the nitrogen stored after winter originated from insect capture in the previous season.

Speta, Franz and Franz Fuchs, 1989. Drei neue *Pinguicula*-Arten der sektion *Orcheosanthus* DC. aus Mexico. Phyton 29:93-103.

In German. Three new species of *Pinguicula* are described from Mexico, these being *P. laueana, P. rectifolia* and *P. potosiensis.* The first two are from the state of Oaxaca, and the third from San Luis Potosi. Latin descriptions as well as description in German are given, along with habitat and cultivation notes. There are line drawings and black and white photos as well. (DES)

Taggart, J.B., S.F. McNally and P.M. Sharp. Genetic variability and differentiation among founder populations of the pitcher plant (*Sarracenia purpurea L.*) in Ireland. Heredity 64(2): 177-184. 1990.

Presently, this pitcher plant grows on six sites in Ireland as a result of being transplanted initially in 1906. The authors tested the genetic variability among the populations and found that the overall level was low, but within the range recorded for native North American populations.

Tammaro, F. and Pace, L. The genus *Pinguicula L.* (Lentibulariacea) in central Italy and description of a new species: *P. fiorii,* new species. Inf. Bot. Ital. 19(3): 429-436. 1987.

The damp gorges in the Majella mountain (Abruzzo, Italy) area shelters a *Pinguicula* distinct from 3 other species found in central Italy: *P. vulgaris, P. leptoceras* and *P. reichenbachiana*. The new species shows morphological affinity with *P. balcanica* but differ from it in the leaves and flowers. Named after the author of Flora of Italy, the chromosome number is 2n=32.

Taylor, Jan. 1990. The plant empire strikes back: Geo 12:82-91.

This brief article, well written with excellent photos, covers various ways that plants combat animal predation or utilize animals to their purpose in unusual ways. Poisonous plant metabolites, orchid flowers that mimic insects and trigger plants are covered. In addition, there is some discussion

of CP, particularly in Australia. There are two full page photos each of *Drosera gigantea* and *Byblis gigantea* with prey and flowers. (DES)

Thum, M. The significance of opportunistic predators for the sympatric carnivorous plant species *Drosera intermedia* and *Drosera rotundifolia*. Oecologia (Berl) 81(3): 397-400. 1989.

Using fruit flies as prey, the author shows that bog-dwelling ants steal 3 times more prey from *D. rotundifolia* than *D. intermedia* in field studies. The advantage of plundering seems to be more important for the ants than the danger of being caught.

Thum, M. The significance of carnivory for fitness of *Drosera* in its natural habitat: the amount of captured prey and its effect on *Drosera intermedia* and *Drosera rotundifolia*. Oecologia (Berl) 81(3): 401-411. 1989.

In this two-year study, the author noted the benefits obtained from prey are partially transferred to the next year by the winter bud. *D. rotundifolia* grew better on hilly mounds while *D. intermedia* prefered lower positions and influenced its neighborhood situation by reproducing by seeds or axillary buds. *D. rotundifolia* was only observed reproducing by seeds. Both plant species have similar prey biomass per plant biomass despite their differences in plant shape, size and microhabitats.

Ueda, Kunihiko. Phytogeography of Tokai hilly land (Japan). Acta Phytotaxon Geobot. 40(5/6): 190-202, 1989.

The hill and terrace regions around Ise Bay have endemic, semi-endemic and relic taxa growing in small mires. CP that were found are *Utricularia minutissima, Drosera indica* and *Drosera spathulata* ssp. *tokaiensis*.

REMINDER

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