if there were initially just two distinct plants from two seeds that were self sterile — we'll call them plants A and B — only a cross *between* plant A and B (or their descendents by asexual propagation) would produce fertile seed. If either plant were propagated asexually, the progeny of the original plant A *or* B would not produce seed if pollinated *within* all the progeny of either group. A good example would be *Drosera binata*. If one initially got one plant and asexually propagated any number of them, seed could not be produced even though pollen would come from "separate individuals." This may be the reason why some of you may not be able to produce seed of this species even though you may have more than one plant.

The dioecious state requires that both male and female plants be present and that both be in flower at the same time so that transfer of pollen from the male flower to the female flower be accomplished while the female is receptive. The genus *Nepenthes* is the only CP to have this characteristic. This is probably one of the reasons why *Nepenthes* are still relatively rare in cultivation and why there are not more hybrids with many more species. Most of the material in cultivation, specifically, named hybrids, has been propagated from cuttings and are of only one sex. Also, the process for making the plant flower at will has not been totally worked out. (See Botanist's Corner, CPN Vol. 6, Nos. 3 and 4.)

(To be continued)

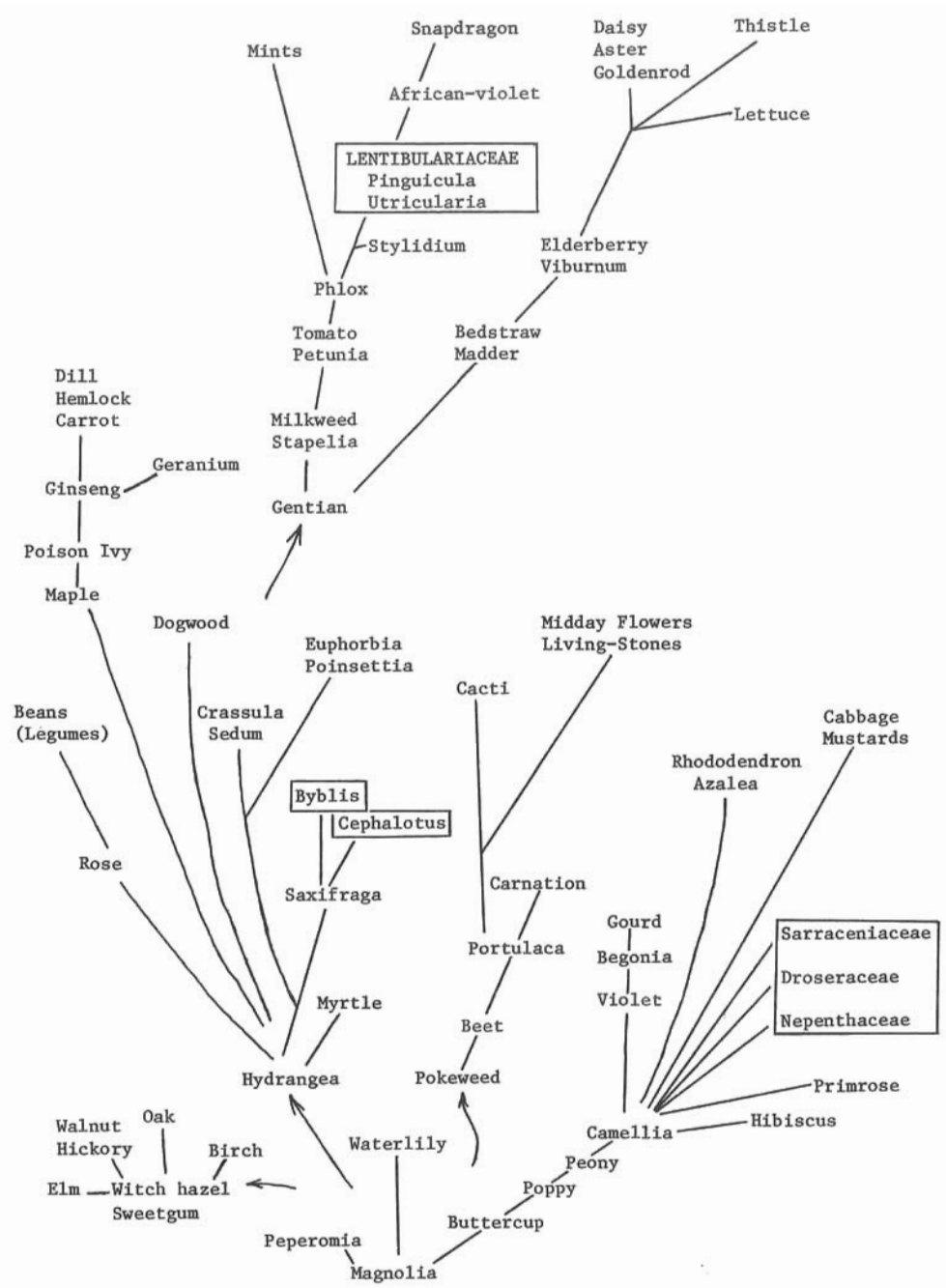
BOTANIST'S CORNER

by Larry Mellichamp

The Genera of Carnivorous Plants

The diagram shows a schematic representation of the possible evolutionary relationships of the flowering plants (excluding the lilies, grasses, orchids, and their relatives), indicating the positions of the carnivorous plants in the overall system. I have tried to use familiar plants in constructing this "evolutionary tree" to help you get some feeling for the diversity and pattern within this large group of flowering plants, which contains probably over 200,000 members. It will be noted that while some groups of CP are relatively closely related (the pitcher plants and sundews, for example), they still represent diverse adaptations and are found at widely separated places in the natural order of types. This is what is so interesting and inexplicable: why has the carnivorous way of life arisen at different points in such widely different plants? Being fairly complicated, as plants go, involving trapping mechanisms, leaf modifications, and the development of digestive enzymes it would seem that such adaptations would be unlikely to occur more than once or twice. But plants, being what they are, dynamic, evolving, adapting, and changing have been able to do some pretty weird and wondrous things in this complicated and unpredictable world.

Below is additional information about the Carnivorous Plants which several members have requested to see summarized again, and which I hope will prove useful and interesting to everyone.



An Evolutionary Tree of the Flowering Plants

FAMILY	GENUS/COMMON NAME	NUMBER OF SPECIES	GEOGRAPHIC RANGE	KIND OF TRAP
Sarraceniaceae	*Sarracenia* Pitcher plant	8-10	Eastern N. America	Passive/pitfall
	Darlingtonia Cobra plant	1	California, Oregon	
	Heliamphora Marsh Pitcher	6	Venezuela/Guyana Highlands	
Nepenthaceae	*Nepenthes* Tropical Pitcher plant	±75	Tropics of Eastern Hemisphere	
Cephalotaceae	*Cephalotus* Australian Pitcher plant	1	S. W. Australia	
Droseraceae	*Dionaea* Venus Flytrap	1	N. & S. Carolina	Active/steel trap
	Aldrovanda	1	Warm areas of Eastern Hemisphere	
	Drosera Sundew	±130	Worldwide	Active/sticky hairs
	Drosophyllum	1	Morocco, Portugal Spain	Passive/sticky hairs
Byblidaceae	*Byblis*	2	W. Australia	Passive/sticky hairs
Lentibulariaceae	*Pinguicula* Butterwort	±50	N. Hemisphere S. America	Active/flypaper
	Utricularia Bladderwort	±170	Worldwide	Active/mousetrap
	Polypompholyx	2	Australia	
	Genlisea	±14	Brazil, W. African tropics	Passive/lobster trap

NOTE: The above synopsis is slightly modified from a masters thesis by John Lindquist, University of Wisconsin, 1975, "Bacteriological and Ecological observations on the northern Pitcher Plant, *Sarracenia purpurea L.*". Lindquist acknowledges as sources Shetler (1972), Lloyd (1942), and Ziemer & Mazrimas (1974). The evolutionary tree is based on principles presented in Cronquist (1968).

Pronunciations of carnivorous plant genera:

Sarracenia (sĕr-ă-sḗ-nĭ-ă)
Darlingtonia (dăr-lĭ́ng-tō-nĭ-ă)
Heliamphora (hē-lĭ-ăḿ-fōr-ă)
Nepenthes (nē-pēń-thēz)
Cephalotus (sĕf-ă-lṓ-tŭs)
Dionaea (dī-ō-nḗ-ă)
Aldrovanda (ăl-drō-văń-dă)
Drosera (drŏś-ĕr-ă)
Drosophyllum (drŏs-ō-fĭĺ-ŭm)
Byblis (bĭb́-lĭs)
Pinguicula (pĭn-gŭicḱ-ū-lă)
Utricularia (ū-trĭḱ-ū-lā́-rĭ-ă)
Polypompholyx (pŏly-pŏḿ-fō-lĭcks)
Genlisea (gĕn-lĭ́-sĭ-ă)

References cited:

Cronquist, Arthur. 1968. The Evolution and Classification of Flowering Plants. Houghton Mifflin Co., Boston. 396 pp.

Lloyd, F. E. 1942. The Carnivorous Plants. Chronica Botanica Co. Reprinted 1976 by Dover Publications. 352 pp.

Shetler, S. G. 1972. Carnivorous Plants, pp. 938-939. *In* Encyclopedia Britanica, Vol. 4.

Ziemer, R. & J. Mazrimas. 1974. World Carnivorous Plant list. Carnivorous Plant Newsletter, Spec. Proj. Suppl. 1.

Next in the Botanists Corner we will begin a series on the discovery of the various CP genera, and the derivation and meanings of their scientific and common names.

Review of Recent Literature

Colombo, P. M., Rascio, N. Ruthenium red staining for electron microscopy plant material. J. Ultrastruct. Res. 60(2): 135-139 (1977).

Drosera spathulata mucilage was intensely stained using ruthenium red in glutaraldehyde and osmium tetroxide as seen by the electron microscope.

Dzwonko, A., Plazinska, J. Decline of selected water plants in the vicinity of Krakow during the last 150 years. Zesz. Nauk. Uniw. Jagiellonsk. Pr. Bot. 5, 134-148. 1977. In Polish with English summary.

Aldrovanda vesiculosa is one of the species of extinct plants from the Oxbow lakes of the Vistula River near Krakow, Poland. The authors discuss the causes of this and some conservation measures.

Folkerts, George W. 1977. Endangered and threatened Carnivorous Plants of North America. pp. 301-303 *In* Chillean T. Prance & T. S. Elias, editors. Extinction is Forever: Threatened and Endangered species of plants in the Americas and their significance in ecosystems today and in the future. New York Botanical Garden, New York. [Folkerts' address for reprints: Dept. of Zoology-Entomology, Auburn University, Auburn, Alabama 36830.]

Brief discussion of each species of CP (or genus for larger groups) and its status as an endangered plant. All species of *Sarracenia* and *Darlingtonia* are discussed. Of these, *S. oreophila* and *S. alabamensis* ssp. *wherryi* (= *S. rubra* ssp. *wherryi*) are considered by the author to be threatened; while *S. alabamensis* ssp. *alabamensis* (= *S. rubra* ssp. *alabamensis*) and *S. jonesii* (= *S. rubra* ssp. *jonesii*) are considered to be endangered. ENDANGERED implies that a species is on the verge of becoming extinct unless measures are taken to preserve it. THREATENED means that the numbers of species or populations are critically low so that the species is