Beginner's Corner

by L. Song

With this issue of CPN, we begin a series on the various aspects of propagation (the production of additional plants from a single plant by sexual and/or asexual means). We will start by defining some of the terms used and present some of the basic concepts of propagation. More details and specific information will be given in later installments where each genus and, if necessary, individual species will be discussed.

Sexual propagation is any method that would entail a rearrangement of the genetic material. In CP, this would be by seed. Asexual propagation would be methods that would maintain the original arrangement of the genetic material by using a portion(s) of the original plant for growing new individuals. Some examples would be leaf, stem and root cuttings, as well as simple division (splitting a clump of plants into separate independently growing portions). Newer techniques of cloning or asexual propagation, such as aseptic tissue culture (growing in test tubes under sterile or germ free conditions in a culture medium that supplies all nutrients and hormones) of the meristem (growing point) so commonly used in orchid and fern culture, have not been widely used in CP. More research is needed here.

Propagation by seed has several advantages and disadvantages. It is useful where variability is desired, or where variability is not important; and produces large numbers of easily stored and transported propagules (seeds). One of the obvious disadvantages, of course, would be a situation where a very uniform batch of offspring is desired. Another would be the time element. It is necessary to catch the flower(s) at just the right stage of maturity and successfully pollinate it. In addition, waiting for the seeds to mature and then growing a plant from seed to maturity in most cases takes much longer than starting from a leaf, stem or root cutting. In *Sarracenia, Nepenthes,* and *Byblis,* however, starting from seed is so far the only method of producing large numbers of plants. For *Drosophyllum,* it is the only reliable method of propagation.

Techniques of propagation will also be covered and will include information on the various types of seed treatments necessary to induce germination (the visible beginning of growth of the new plant). Some of the treatments are stratification (storage in a moist state under a given, usually low, temperature), treatment with various chemicals or hormones, etc. These treatments are necessary to overcome a physiological (biochemical) type of dormancy. In some cases, the type of dormancy is physical — that is, a simple physical barrier exists, such as an impervious seedcoat, that can be overcome by scarification (making the seedcoat permeable to water and air by breaking through the seedcoat by the use of strong chemicals, filing, sanding, etc.). In many cases, both physical and physiological dormancy exist concurrently.

Another less obvious disadvantage to sexual propagation would be the existence of inherent barriers to seed production. Two of these would be self-sterility and the dioecious state (separate male — *pollen* producing and female — *seed* producing plants). In the former, seed can be only produced by the application of pollen from a genetically distinct clone to the stigma of the flower of another genetically distinct clone. In other words,

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.