# Beginner's Corner

WATER AND THE GROWING MEDIUM by Joe Mazrimas

One of the most overlooked factors that is indispensible to healthy growth of carnivorous plants is the quality of the water. Taking nature's course, one of the best sources of water is rainwater simply because it contains a low concentration of salt. If rainwater is not available, then a good substitute is either distilled or deionized water. These substitutes can be purchased but over a long period of time they can become very expensive especially if you need large quantities.

Carnivorous plants grow best when the salt content of your water does not exceed 150 ppm in total salt content. You can inquire from your local water company office on the hardness of your water. One must use water with low salt concentration in order to minimize the damage that occurs to the soil medium. Most CP grow in acidic soils or soil that contains a high concentration of peat or sphagnum moss. These acidic substances can act like ion exchangers by substituting hydrogen ions from the plant for cations that are in the water. The most common cations are sodium, magnesium, potassium and calcium with smaller concentrations of metal ions such as mercury, lead and iron. When these cations bind to the moss (either dead or alive), the moss in turn releases hydrogen ions which, of course, is responsible for the production of acidity needed by the plants. If the water contains a very high concentration of salts, then the exchange capacity of the moss is exceeded rather quickly (the moss can't grow fast enough) and you have a rapid salt buildup changing the growing medium from acidic to alkaline. It is this high salt buildup and alkaline medium which spells doom for your plants.

If you choose to grow your plants in a closed system such as a terrarium, then I would recommend using distilled water since only small amounts are needed to replace that which evaporates. Most of it gets recycled. In open systems, evaporation will be considerable and cost of distilled water becomes prohibitive and so some other substitute must be found.

One system that is simple to use is to make your own water with a process called reverse osmosis. A previous article in CPN described its function, and so I won't go into detail here (CPN IV:43, 1975). Usually, such systems can give you water that is about 10 times lower in salt content than your tap water, and it uses no other energy source than the water pressure from your tap. A unit that will give you a minimum of five gallons a day of low salt water can be rented for less than $10/month. A home unit is available from the Culligan Water Co. called the H-5 model. The artificial membranes which filter the water will last a year or more depending on use.

For CP to thrive over a long period of time, they require an acidic soil with good drainage but still capable of holding moisture. I find that a good soil mixture consisting of Canadian sphagnum peat moss and perlite makes a light and ubiquitous medium for almost any situation that confronts CPs. This peat moss is good because of its homogeneous consistency which lends itself to starting seeds of any size from *Utricularia* to that of *Drosophyllum*. I add either perlite or sand in various amounts up to 50% by volume to aid in keeping the roots well oxygenated and to allow for good drainage. By adding sand or perlite, there is less tendency for the surface to form a hard crust which later becomes impervious to water and discourages the formation of surface algae.

For those growers who prefer to use living sphagnum moss, it is important to remember that this moss doesn't like to be packed tightly but instead prefers a loose but firm structure in order to sustain growth. Perlite can be used to increase the volume of chopped sphagnum moss which keeps the moss healthy and contributes to good drainage. One can use up to 50% by volume of perlite mixture for most of your CP needs.

In conclusion of this series of articles, I want to say that carnivorous plants are normally slow growers in comparison to other plants such as crop or house

plants. This means that for the effort expended, one must exercise extreme patience in growing your plants. Never try to hurry them up into fast growth since that would only result in abnormal growth or form. Some species only put out a few leaves (pitchers) a year, but that is probably normal under the circumstances and not to worry about this. All we ask is that you grow your favorite CP the best way you know how, and that's where all the fun of growing these plants begins!

NEXT: A series on PROPAGATION

BOTANIST'S CORNER

Flowers, Sex, and Hybridization
in Carnivorous Plants *(cont.)*

Larry Mellichamp

HYBRIDIZATION

I should make a final comment regarding hybridization. This is usually considered to occur when you successfully cross two different *species*. The more closely related genetically two species are, the better the chance of hybridizing them. It rarely occurs in nature because of the differences between habitats, pollinators, and flowering dates. It is much more likely to occur in cultivation where the grower can control all environmental factors, in addition to the actual pollen transfer. Some species will hybridize readily, others will not. *Sarracenia* are a classic example of species which are all capable of hybridization with one another, and the hybrids can then in turn be used in further hybridizations to produce some spectacular results. Other species, such as in *Pinguicula*, are more difficult or impossible to hybridize because the species are just too different genetically.

Any attempts at hybridization in cultivation could be important and produce novel plants, as well as indicate something about the genetic relationships of the plants involved. It is worth the practice to become proficient at crossing (both within and between species) to produce seed for exchange and preservation, and for ornamental purposes. Whenever you make artificial crosses at home, keep good records indicating what the species are, which is the female parent (received the pollen), and what the success of seed production is. Any seeds of pure species made available for exchange should indicate whether they are from cross or self-pollinated individuals. (If cross-pollinated, make sure both individuals are good, pure, typical specimens for that species.)

Problems encountered with artificial crossing can usually be attributed to poor timing (old pollen or unreceptive stigmas); actually not getting pollen on the stigma; plant in such poor health that it cannot produce a seed crop (unlikely, if the plant produces flowers in the first place); the crossing of incompatible plants (either flowers on the same plant, or plants of the same genetic clone); or the two species involved just will not hybridize (you can never be sure of this until you've tried many times). If you are doing critical hybridization work, whenever you cross two plants it is best to put bags made of silk stockings (or similar lightweight material) around the pollen-receiving flowers to keep insects from bringing additional unknown pollen to that flower.

For additional practial discussion of hybridization in CP, see appropriate portions of D.E. Schnell's *Carnivorous Plants of the U.S. & Canada* and Pietropaolo's *The World of Carnivorous Plants* (see CPN VI(1) for publishers). A good introductory botany textbook would provide further information on flower structure and terminology.

NOTE: I would be pleased to receive comments from readers regarding the contents of this column. I hope I am presenting information that is useful and interesting in a manner that is understandable. Although I have ideas for future articles, I would rather have ideas from you, the Reader, as to what you would be most interested in knowing more about. How about: a list of the pronunciation of CP names; the meanings of the scientific names of CP; the history of the discovery, naming, and early horticulture of CP. Send your comments and suggestions on a postcard or in a letter; none of your questions or suggestions will be considered inappropriate. DO IT TODAY! (T.L. Mellichamp, Biology Dept., UNCC, Charlotte, NC 28223).