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SOME PERSONAL OBSERVATIONS ON CULTIVATING THE HELIAMPHORA

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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-

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.

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