A Practical Method for Cultivation of *Heliamphora* spp.

Cliff Dodd, (2225 S. Atlantic Ave.,Daytona Beach, FL 32018) &
Charles Powell (2138 Harrison St., Santa Clara, CA 95050)

After several years of cultivating CP, *Nepenthes* in particular, one of us (C.D.) traded a *Nepenthes fusca* for a *Heliamphora heterodoxa* and began the task of cultivation of the genus in Central Florida, a habitat vastly different from the Venezuelan tepuis the plants call home. Over the years several methods were employed to try and grow *Heliamphora* but generally with poor results. These methods included:

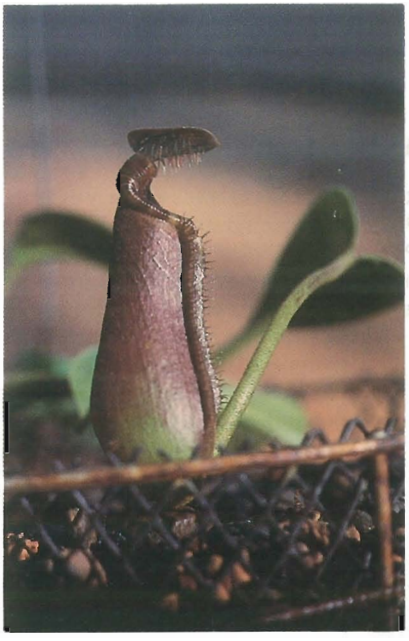
1. An old refrigerator which was modified by cutting a large hole in the door and siliconing in two layers of plexiglas over the hole, leaving a dead air space for insulation. Fluorescent lights (plant lights) were mounted on the inside separate from the ballasts which were mounted outside the unit to prevent heat build-up. Due to the limitations of the unit this kept the plants too cool (45 degs. F.) resulting in almost no growth over a six month period.
2. Under greenhouse cultivation at ambient temperatures in Florida and California the plants were badly stressed to the point where they were easily lost during transplant or division. Even though in Florida they were placed in front of a cooling pad (swamp cooler) the temperatures in summer were in the low 90's. F.
3. An ice cream freezer was equipped with a new thermostat, plexiglas top, and bank of fluorescent lights. This worked fairly well and the plants did fair, but I (Cliff) was trying to run a day/night temperature cycle for highland *Nepenthes* which grow under different environmental conditions. In any case the humidity and drying rates were too hard to control.

Finally a good friend, Bruce Sutton, talked me into trying a much simpler method based on the facts that these plants only need a relatively constant set of conditions and no special refrigeration. They *do* need cooling but only in the range where someone is comfortable without perspiring in a household setting, no warmer than 80-82° F. in summer and 65-70° F. in winter with nighttime temperature 5-10° F. cooler.

The method:

Take for example, a 30 gallon aquarium and set about 6 or 8 inverted 2″ flower pots or cross sections of PVC pipe in the bottom. On top of this set a layer of the plastic "egg crate" fluorescent light diffuser used with drop ceilings (it is usually white and forms a grid of 1/2 inch squares). This is set atop the inverted pots and should fit exactly the inside dimensions of the aquarium. It can be cut easily with a saber saw. Next, lay down a layer of plastic window screening over the grid to prevent particles of moss from falling into the water that will fill the bottom of the tank. In place of the grid a layer of an inert rock (pumice or quartz) can be used to set the potted plants on. Pumice will absorb water and release it slowly as vapor and is relatively cheap. The advantages of plastic is that it can be daily cleaned whereas the rocks would have to be discarded. The purpose of the grid suspended over the bottom of the tank is that when the plants are watered all excess water drains into this reservoir preventing suffocation of the roots and less rapid breakdown of the moss. The reservoir below the grid also maintains a very high humidity at all times. When the water level reaches the bottom of the grid it can be siphoned off using a length of aquarium tubing slipped through the grid at the corner of the tank or pushed into the rocks.

At this point you will have to start thinking about containers for the plants. The size will depend on the size of the specimens, ultimate size of the species, and size of the aquarium used. We use plastic 4.5″ square and 6″ round pots with extra large drainage holes cut into two sides of the pot for aeration and extra drainage.



N. lowii juvenile pitcher. Note hairs under lid.

Close up of lid of *N. macfarlaneii.* Photos by Cliff Dodd.

Heliamphora growing atop a 30 gallon aquarium. Beginning with the large plant at one end and going towards the opposite end *H. tatei* var. *neblinae,* a small *H. heterodoxa,* two *H. nutans* in flower, *H. minor,* and *H. sp.* from Ilu-tepui.

Now you *must* pressure-cook, or boil some sphagnum to sterilize it. I feel this is a necessity since otherwise you will get ferns and weeds in the terrarium and they will be a constant nuisance later, competing for light and nutrients with the *Heliamphora.* Once the moss has cooled, carefully pot the plant and add any green moss (clean live *Sphagnum* tops from other containers) as a topping to start a moss "culture." If any live moss is left over it can be placed around the outside of the pots up to the rim to hide the containers and keep the humidity high. Be very careful when transplanting these plants as the roots are very delicate and easily broken. Pitchers, or groups of pitchers which break off when potting or dividing, should also be potted up. Quite recently Charles Powell learned that pitchers accidentally broken off during division will root and produce plants if they are cleanly pulled from the rhizome and placed in live sphagnum. His success with one species led me (Cliff) to try a second species and we are happy to report it works well. As other species mature we plan to try all of them. This could be one of the fastest ways to produce a large number of plants, especially in those species that may not produce offsets freely.

The newly potted plants are then placed on the screen and plastic grid or gravel. The plants could be planted in a bed of moss over the grid, but this would make it difficult to remove the plants for division or to remove old, dead leaves. Also, the roots could enter the water below the grid and possibly rot, where this is unlikely in a pot.

Finally, a full glass or clear acrylic cover forms the lid of the tank. In lieu of this, clear plastic wrap can be used and will seal to the edges of the tank if moistened. An advantage of the plastic is that it can be replaced when it becomes dirty and is less dangerous around children and hobbyists.

For lighting we use 2 or 4, 4′ wide spectrum fluorescent lights. Although I have seen good plants from cool whites and from plant lights, the lumen output of plant lights is quite low requiring many bulbs that raise temperature levels above optimum. The lights must be kept high enough above the tank so as not heat the terrarium beyond 82° F and can be suspended or set on top of a spacer allowing air flow between the cover glass and the lights. Full spectrum bulbs are best but they can be expensive. However, once the tank is set up there is little expense and virtually no maintenance. A timer set for a 16 hr. photoperiod seems to work well and produces good color in the pitchers.

Should heat build up become a problem an air stone can be placed in the water below the grid and connected to a small aquarium air pump. Placing the pump near the floor will pick up cool air, humidify it and force warm air out any small air leaks at the top of the tank. Because of splashing from the air stone it should not be placed directly under a plant.

Because of the high humidity and constant environmental conditions the plants only need watering every two weeks to two months when the moss begins to dry out. A dilute solution of Peter's 20-20-20 (1/4 teaspoon or less per gal.) may be poured into the pitchers every few months with good results, however, it does tend to damage the live sphagnum and the sphagnum should be flushed with pure water between fertilizations.

The success of this method is amazing. I (Cliff) was given three plants, 2 *minor* and 1 *nutans,* that had been neglected, due to the unfortunate death of the grower who was boarding them. They were loaded with pill-bugs, millipedes, and snails and only had two damaged leaves on each of the plants. After clean up and repotting them there was little hope of their survival, especially since the transplanting was done in summer. However, they lived through the first few weeks and began putting out about one leaf a month. Within a year and a half these sickly plants were dividable and produced 3 *H. nutans* and over a dozen of *H. minor* have been produced. A small 1″ tall seedling of *H. heterodoxa* has also been grown using this method and after one year is producing 4 inch sub-adult pitchers. To date *H. nutans* and *minor* have both flowered.

While not perfect (we would prefer to grow them at 65° F year round) it has been a very successful and practical method and has produced beautiful plants. The ease of cultivation with this method makes growing these rare carnivores easy and rewarding. Good growing!