

Beginner's Corner

NEPENTHES

By Joe Mazrimas

Nepenthes plants are perennial, tropical vines that either grow upward toward the forest canopy clinging to trunks and branches of the forest or snake along the ground with the growing tip raised into the humid air. The plants have a rigid stem which is semi-woody and supports the leaf blade and pitcher. The green or reddish colored stem is usually cylindrical or triangular in cross-section. The leaves are really the expanded center midrib, which is its prominent feature and is continuous with the tendrils which supports the true modified leaf, the pitcher.

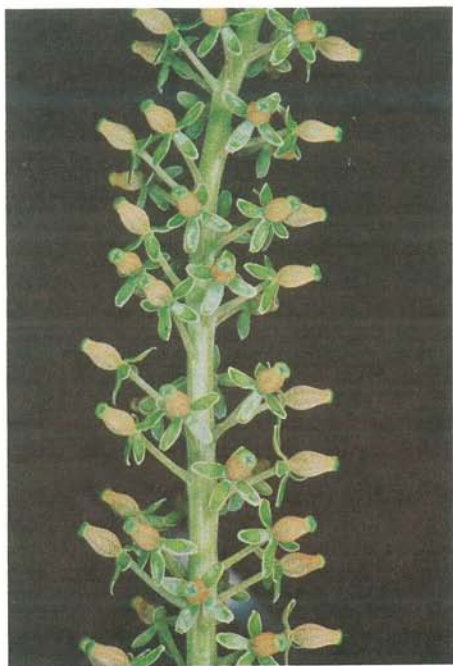
The shape of the pitcher on any one species of *Nepenthes* usually takes two or three different forms depending on the maturity and position on the plant. The lower pitchers which usually touch the ground are short and jug-like in shape. The aerial pitchers which may develop several feet (a meter) or more above the ground are shaped like funnels with a very narrow bottom or cornucopian in shape. The tendrils of these pitchers are sensitive to touch and frequently are found spiraled around branches of trees. Sometimes, a third form of pitcher which is cylindrical in shape is found developing between the two forms mentioned above, and it's thought to be an intermediate form.

Nepenthes plants are dioecious, which means they exhibit either male or female flowers on separate plants. The flowers have no petals but instead have four insignificant pale green or yellow sepals.

The male sepals have large glands that emit a powerful pungent musty odor. One finds that the stamens are fused together into one column so that the anthers are crowded into a tiny umbrella shape. The umbrella is bright yellow and covered with thousands of pollen grains. The female flower has a central oval-shaped ovary with a central stigma that may be white or yellow in color.

In order to obtain seed, one must transfer pollen from the male plant and firmly stick it to the stigma of the female plant. If successful, the ovary begins to enlarge and when mature, it may be 4 - 6 x larger in size than the unfertilized ovary. The seed capsule is mature when it turns color from light green to light brown which takes about 2-3 months time. The seeds are pale brown color which are about $\frac{1}{3}$ inch (1 cm) long and are very thin and spindle-shaped. One finds the actual embryo is situated in the center and in fertile seed shows up as a prominent bead. Usually, unfertile seed is smaller and the bead is small or absent.

The roots of *Nepenthes* are fibrous and black in color. The root system is rather extensive in size and somewhat brittle in nature. The root tips are yellowish-orange in color. In fact, the roots on most carnivorous plants are black in color, and a beginner should not mistake this fact for thinking he has a dead plant. Two major exceptions to this are the roots of *Sarracenia* and *Heliamphora*. It's a good idea to look at the root tips which are lighter



Nepenthes female flower
photo by F. Case



Nepenthes male flower
photo by F. Case



N. x nagoya

photo by L. Song

in color which indicates that the roots are alive and well.

Growing *Nepenthes* requires the following factors:

WATER: I use plain tap water to wet the root zone of the plants and spray the leaves daily. My water is about 250 ppm in dissolved salts, and one should water with tepid water at least 60°F or else add hot water to reach this temperature. I water the plants daily during the growing season.

MEDIUM: I grow my plants in a 50-50 mixture of perlite and chopped sphagnum moss or Canadian peat and perlite. Recently, I tried growing the plants in pure vermiculite grade #2 with good results. It's a simple medium offering good drainage and sterile conditions to grow the most fastidious species of *Nepenthes*.

POT: The pot should fit the size of species. I would use a minimum of a six inch pot for the small species such as *N. gracilis*, *N. kampfiana* and *N. gracillima*. I would use large pots for the bigger species such as *N. mixta*, *N. x dyeriana* and *N. maxima*. A ten inch pot is adequate for these plants. It should have large drain holes cut out of the sides for adequate air exchange and drainage.

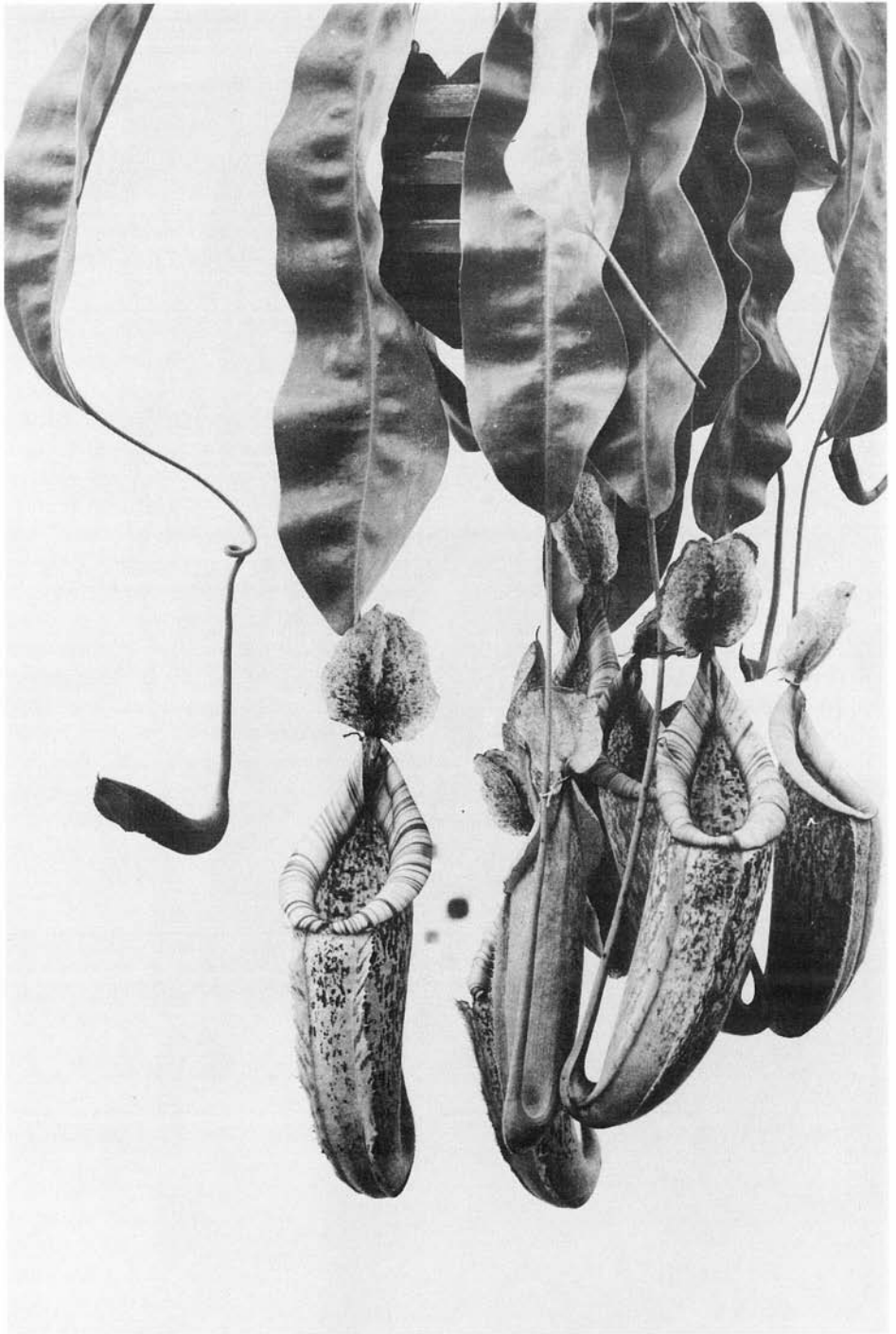
PROPAGATION: *Nepenthes* are best propagated from cuttings. The terminal cutting with at least two dormant buds is a good place to start. Next, one should allow time for the next dormant buds to grow out to at least 1/2 inch or so before taking another cutting since this physiological response allows the next cutting to root quicker. The cuttings root in the same mediums used above for growth. A plastic bag may be placed over the pot containing the cutting to help you from overwatering the medium during the rooting process. It turns out that the rooting process is promoted in an airy, well-

drained medium that is kept moist but not soggy. Placing the pot over a warm place will promote rooting and you should have roots started in most hybrid cuttings in 2-4 weeks and 4-8 weeks in some species cuttings. As a general rule, hybrid *Nepenthes* grow and root twice as fast as most species plants. You can dip the cutting in a Rootone powder to help promote rooting and retard stem rot.

FERTILIZER: I find that *Nepenthes* growth is stimulated by fertilizers applied to the roots during the growing season. Recently, I found that slow release fertilizers such as OSMOCOTE are very good for promoting fast growth of leaves and pitchers. You can also use fish emulsion and inorganic fertilizers but these must be applied in dilute form more often due to the leaching effect of daily watering.

HUMIDITY: *Nepenthes* will grow and form pitchers when humidity levels are between 80-100%. These levels of humidity can be achieved in a greenhouse by a misting system set on timers that maintain the minimum humidity or with a humidistat. A large terrarium can be constructed rather cheaply out of 1" x 3" lumber and covered with 6 mil polyethylene sheeting. Standard 4-foot fluorescent lighting could be installed to provide adequate light to the limited collection of plants.

TEMPERATURE: In most cases, a night temperature of 65°F (18°C) is considered minimum and a daytime temperature of 70-85°F (21-26°C) is the optimum. The question of growing *Nepenthes* at lower temperatures in the 50°F to 65°F range (10° - 18°C) is a subject that has come up by those growers wishing to grow the plants in unheated or minimally heated greenhouses. With the energy crisis upon us, the question of growing any



Nepenthes x dicksoniana
Longwood Gardens Photograph



Nepenthes ventricosa
Longwood Gardens Photograph

tropical plant now in a fully heated greenhouse is a legitimate subject of debate and discussion. I am in the process of studying this question of growing *Nepenthes* at lower temperatures and over the last few seasons discovered the following facts:

Most *Nepenthes* species I tried to grow with minimum temperature of 45°F (7°C) with an average of 55°F (13°C) seem to do well but the plant grows very slowly. The plant is never killed by the lower temperatures, and it appears that a major change takes place in the appearance of the plant. It seems that the ratio of the leaf length to pitcher length changes significantly. In other words, the leaf length is markedly reduced so that the ratio is nearly one in the plants grown at lower temperatures in comparison to the same species grown at warm, tropical temperatures. Also, if the warm tropical environment is conducive in producing 10-12 new leaves and pitchers during the season, only 2-3 new leaves and pitchers are produced in the plant grown at lower temperatures. Further observations and experiments on selection of more hardy seedlings may result in a plant that can be grown at lower temperatures. We will have more to say about this low temperature growing in the near future.

LIGHT: The most important factor for *Nepenthes* growth is light of the proper intensity. Low light levels are not satisfactory since they produce weak growth and few pitchers. I try to give about 50% sunlight at least 60-75% of the day which promotes good growth and very good pitcher production. Sometimes the leaves of some species get a reddish tinge to the surface when they receive a little more than sufficient light. If you grow them under artificial lights, then they require at least 4 x 40 watt fluorescent lamps about one foot under the lamps. An eighteen hour light-dark cycle

should be sufficient light to produce good pitchers.

FLOWERING: No one knows why and when flowering occurs in *Nepenthes*. In fact, we don't know what factor(s) control the onset of flowering. Obviously, it is due to either some pattern of hormone concentration or light and nutrition levels inside the plant. It is our desire to coordinate the male and female flowering periods so that by pollination more seed will be available to everyone. This is one of the more important investigations that requires a speedy solution.

FUTURE PROJECTS: We should work on getting a cold-adapted *Nepenthes* species or hybrid. We should try and graft several species or more on a common rootstock to conserve space. In addition we should develop dwarf species of the big leaf species. *Nepenthes* plants are fun to grow and we haven't reached the full expectation of their beauty until we experiment with them.

NEPENTHES FROM SEED: In order to have good successful germination of *Nepenthes* seed, the seed **MUST BE FRESH**. Its germination potency goes down rapidly with time, probably because of its thin seed coat which allows the embryo to desiccate. One can store *Nepenthes* seed in envelopes made from paper in the refrigerator at 40°F (4°C) for as long as 6 months or more and still retain almost full germination potential. To grow from seed, sow the dry seed on the surface of Canadian peat moss which was previously well-soaked in distilled water. Then carefully spray the seed with a fine mist from your handy mist sprayer until the seed looks well-soaked and a darker brown in color. Water the seed thoroughly daily but try to be careful not to disturb the location of

(Please turn to Page 39)



David W. Taylor

became interested in CP ten years ago when he purchased some *Dionaea* bulbs. As it was impossible to get other species of CP in England, he was almost at the point of giving up the idea of collecting them. As a member of the Royal Horticultural Society he advertised for material in the society journal. Warren P. Stoutamire saw this, and wrote with an offer of help. Mr. Stoutamire also mentioned CPN which had been started in that particular year. So David became the first private CP collector in England to subscribe to CPN. He is also a founder member in the newly formed CP society in England. David grows his plants in two greenhouses, one of which he made himself (see picture). He lives with his wife Diana and four children in a pleasant suburb just a few miles from London's Heathrow airport. He is self-employed as a specialist in the restoration of bows for stringed musical instruments.

Beginner's Corner

(continued from page 27)

the seeds on the peat surface. In 3-6 weeks you should have most of the seed germinated. The temperature here was an average 75° F (23°C) and the humidity averaged 85%. If your humidity is lower, I would recommend a plastic bag be placed over the pot. I did not have to spray any type of fungicide on the seed since fungus was never a problem.

Errata

We wish to apologize for the transposition of photos in Richard Adams' article "The SEM: Seeing a New World" (CPN 7:110). The caption which appears on page 110 refers to the photo on page 114; the caption on page 115 refers to the photo on page 111.

In the Want Ads (CPN 7:104), Chris Tate's ad should read: (WB) Plants or seeds of *Cephalotus*, *Heliophora nutans*, *Nepenthes rafflesiana*.