The Most Dangerous (Looking) Nepenthes

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If you want to pick a carnivorous plant species to stir man's interest in the terrifying (a large interest if one considers current movie fare), many would pick *Dionaea muscipula*, the Venus' Fly-trap, with its fast moving 'steel-trap' jaws. However, tucked away in the Far-eastern jungles lives another candidate which, though capable of no movement must surely be one of the most bizarre of carnivores: *Nepenthes bicalcarata*.

This rare Pitcher Plant is unique in many ways. Its appearance is certainly a shock and must have fascinated early explorers of N. Borneo. Projecting from the back of the lid are a pair of thorns resembling the fangs of a snake about to strike. Their function is far from clear but they seem to play no part in catching the plant's insect prey. Burbidge believed them to be a device to prevent small insectivorous animals from stealing the plant's meals, (1). Whatever their function (or lack of it) they are merely metamorphosized ribs of the peristome, the pitcher's corrugated mouth. (See photo, back cover.)

This peristome, which has very closely set fine ribs, and the arrangement of the inflorescence in a loose panicle, led Danser to name *N. ampullaria* as its closest living relative, (2). There are however some important differences: *N. ampullaria* has a short petiolate spathulate leaf shape, a small reflexed lid, and is rather densely covered with fine hair on most of its vegetative parts. By contrast *N. bicalcarata* has deeply petiolate leaves, a broad lip covering the mouth, and is lacking in hair. *N. ampullaria* forms numerous rosettes and does not produce upper pitchers on its climbing stems, while rosettes are unknown in *N. bicalcarata* and the plant forms well developed upper pitchers. In general the species resembles the more widespread *N. rafflesiana.*

In the wild *N. bicalcarata* has a symbiotic relationship with a species of ant which drills out the hollow thick tendril where it joins the pitcher to use for its home, (3). What benefit the plant receives, if indeed any, in unknown. Though I know of no information on the subject it seems likely the ant is a carnivore which hunts the insects drawn to the plant and probably not a nectar feeder, otherwise it too would likely end up as the plant's prey.

Cultivation

I have had plants of *N. bicalarata* in cultivation for less than one year. Rumor had it that the plant could not be rooted from cuttings and this has proved false in my experience. What has been the case seems to be a hormone problem: some cuttings developed roots but would not break any dormant buds. Other produced leaves but no roots. Out of twenty-five cuttings only four rooted and began producing new growth and so far only three of these have pitchered. One, kept in a greenhouse over winter in fairly low light levels produced first a green pitcher, then with more light in spring a pale orange one. The largest plant under 24 hour Gro-lux produced yellowish leaves but blood-red traps with white tipped fangs. This plant has since joined the first and it is too early to tell if this color difference is genetic or induced by the constant light. Indeed the cuttings may have been taken from the same plant.

The plants are in a typical *Nepenthes* soil mix consisting of Sphagnum moss, vermiculite, fir bark, and a small amount of peat. Having not been rooted long,

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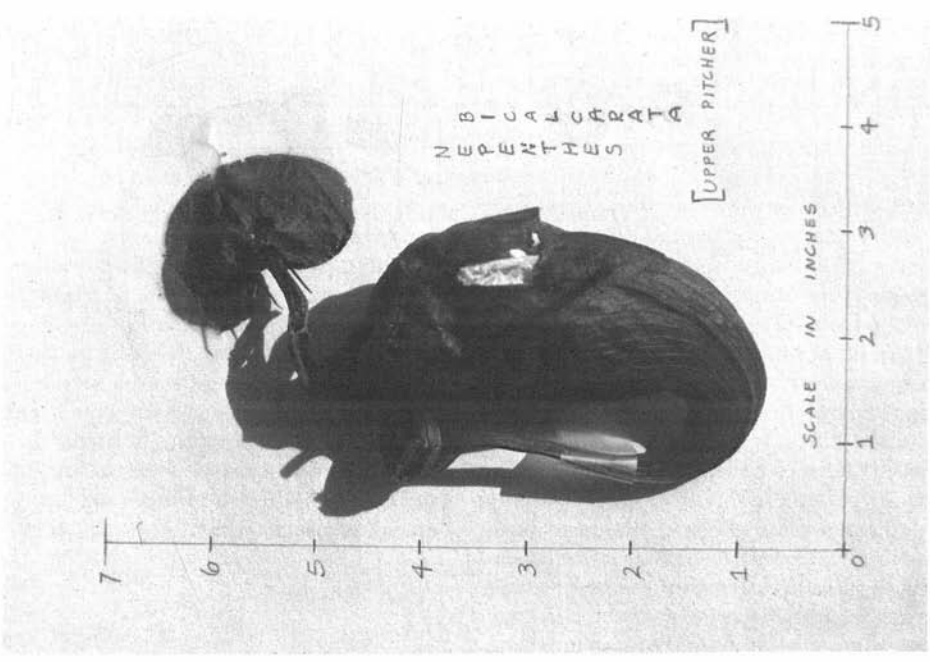
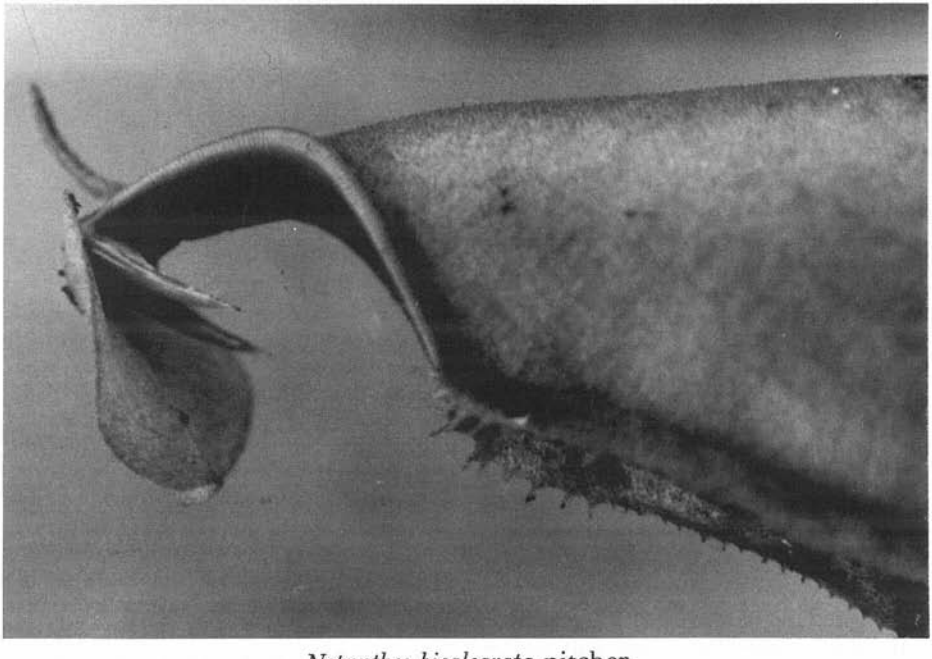


Nepenthes bicalcarata
Dried pitcher shows hollow tendril, reniform lid and fangs.
Photo by R. V. Zillins



Nepenthes bicalcarata pitcher.
Photo by Steve Smith

periments with such poorly defined stimuli must be considered ambiguous. Meat stimulates tentacle movement but it is unclear whether it is because of nitrogenous substances it contains or because it contains sodium salts.

3. See also Fenner (1904) and Williams (1976, Amer. Philos. Soc. 120, 187-204) for a comparison of the glands of these plants. Recent work in Juniper's laboratory has greatly expanded our understanding of both the digestive glands of *Dionaea* (Robins and Juniper, 1980, New Phytol. 86, 279-327) and the sessile glands of *Drosophyllum* (Joel and Juniper, see Williams, C.P.N. *10*, 36).
4. Quintanilha (1927, Biol. Soc. Brot. 4:44-129) has done further work on this subject which is published in Portugese with a French resume. Lloyd reviews some of this paper in *Carnivorous Plants.* Quintanilha found that stimulation of the stalked glands with albumin will result in secretion by the sessile glands and he proposes that a signal must pass from the stalked glands to the sessile glands by a pathway that is still not clear. He reports that direct mechanical stimulation of sessile glands will stimulate secretion but that mechanical stimulation of stalked glands, except in the extreme case of their removal, will not result in secretion of the sessile glands. Franca (1922, 1925) also did important work on this topic which was reviewed by Lloyd.
5. This is an endodermis common in many plant secretory structures (c.f. Lüttage and Higinbothan, 1979, *Transport in Plants* pp. 90-92, Springer-Verlag).
6. Schnepf (1965, Ber. dtsch. bot. Ges. 78, 478-483) has published electron micrographs illustration pores which are 0.2 to 0.3 µm across. These pores which are somewhat larger than those of *Drosera* are near the limit of resolution of the light microscope. Haberlandt did well to observe them.
7. Javelle water is a solution of chlorinated potash. When freshly prepared, it contains about 2.5% active chlorine. *The Merck Index*, 8th Ed., Rahway, New Jersey (1968).
8. Zinc chloride iodine solution was a test for various polysaccarides which could be identified by the color they develop when treated with this solution.
9. *Drosera* has been demonstrated to have pores which are just below the limit of resolution of the light microscope. Ragetli et al. 1972, Can. J. Bot. 50, 159-168; Chafe and Wardrop, 1973, Planta 109, 39-48; Williams and Pickard 1974, Planta 116, 1-16).
10. These "papillae" are the cytoplasm that fills the spaces between the cell wall ridges Haberlandt describes. When hardened with a fixative and isolated from their walls they have the appearance illustrated (figs. 16, 17, 19, 20). This observation does not by any means prove they are sensory receptors.
11. The function of these ridges in the cell wall is unclear but it seems unlikely that they have a role in anything more than giving strength to the gland or increasingly the membrane surface area.
12. The lack of "pit chambers" in *Drosophyllum* is neither a necessary nor a sufficient condition for their acting as sensory structures in *Drosera.*

Nepenthes *(Continued from page 64.)*

regular fertilizing has only just begun.

Brought into cultivation to England in the early 1900s and subsequently lost, this, the most dangerous looking *Nepenthes,* re-enters cultivation again. With luck it may be common in collections in the not-too-distant future.

I would like very much to thank Ron Zillins for the time and effort put into the excellent close-up photographs which have done this unique species justice.

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Those interested in obtaining slides or enlargements of this and other species of CP should contact:

High Key Photo, 914 Woodmere Cir., Ormond Beach, Florida 32074

Bibliography

1. S. Kurata, *Nepenthes of Mount Kinabalu,* Sabah National Parks Publication No. 2, Sabah National Parks Trustees, (1976) pp. 37-40.

2. Danser, B. H., *The Nepentheacae of the Netherlands Indies,* Bull. Jard. Bot. Buitenz., Ser. III. Vol. IX, Liv. 3-4, (1928) pp. 405, 407.

3. Danser, pp. 270-272.

Carnivorous Plant Seed

In your recent issue of December 1981, in the article on the Fernkloof Nature Reserve, written by Mr. Alain Christophe, it is mentioned that I am a possible supplier of *Drosera* seeds.

This position is as follows: I have a seed catalog which lists shrub and tree species but does not contain any insectivorous species. This list will be of little or no interest to your members.

When Mr. Christophe visited me, we discussed the possibility of my supplying this seed, but I had no way of judging the likely demand. As a result of the article, I have now received letters from many parts of the world asking for *Drosera* seed.

Could you perhaps advise your readers that I now intend to collect *Drosera* seed and will communicate eventually with all who have written to me, advising prices and species available.

In the meantime, your members may care to write to the following address to obtain a catalog of 18 species of insectivorous plant seeds, cacti, etc.

Exoticana Seeds
P.O. Box 184
Greytwon 3500
SOUTH AFRICA

I look forward to further correspondence with you and ask your members who have written to be patient.

ss/Y. Woodvine

N & V *(Continued from page 56.)*
Borneo but so far I have not been able to substantiate this. I would be interested in hearing from anyone who has come across the winged-tendril form in the *Nepenthes* genus.

ADRIAN WALTER (4 Homer Road, Clarence Park, South Australia 5034) writes: Recently in South Australia we formed a carnivorous plant society which has gotten off to a roaring start. Within six months of our first meeting we have some eighty members.

I have enclosed for your interest a copy of our first newsletter which at the moment we hope to produce on a quarterly basis.

Starting with the next issue we will be including the first of a series of fifteen articles on South Australian carnivorous plants. These are kindly being written by Ray Nash, a man who has done a lot of research on these plants (and other Australian CP) over the past ten years or so.

We would appreciate it very much if you could mention our society in your newsletter. We can guarantee with our current membership and the amount of enthusiasm we all have for CPs, that our society is here to stay.

WANT AD

Bruce Bednar, 25 Lake Court Loop, Ocala, FL 32672. (WBT) *Heliamphora,* especially *minor.* (T) *Nepenthes madagascarensis,* × *minamiensis,* × *accentual Koto,* × *fukaksiana,* × *Ville de Roven,* × *sens,* × *wittei,* 60 more.