

BOTANIST'S CORNER

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Nepenthes mirabilis in Australia

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A U S T R A L I A

The genus *Nepenthes* contains about 70 species spread between Madagascar and New Caledonia, but with the center of distribution being the Malay Peninsula, Borneo and Sumatra. One species, *N. mirabilis*, occurs in Cape York Peninsula. It is the most widespread species in the genus occurring in New Guinea, throughout the island to the mainland of Asia.

The first reference to *Nepenthes* in Australia comes from William Carron, the botanist with the ill-fated Kennedy expedition of 1848. Carron (1849) writes of an area near the Walsh River, "By the side of the small streams running through the flat ground, I saw a curious herbaceous plant, with large pitchers at the end of the leaves, like those of the common pitcher plant (*Nepenthes distillatoria*). It was too late in the season to find flowers, but the flower stems were about 18 inches high, and the pitchers would hold about a wine glass full of water. This interesting and singular plant very much attracted the attention of all our party."

This record is interesting as *Nepenthes* has not subsequently been reported from anywhere near this area. However, Carron was writing from memory and the record is therefore by no means certain. Pitcher plants were also commented on by other explorers such as Logan Jack (Jack, 1921), but the rigors of travel in this area were such that serious botanical records were not obtained until the establishment of the settlement at Somerset by Frank Jardine in the later part of the last century. Jardine was host to many leading scientists and naturalists, including the

Queensland Colonial Botanist, F. M. Bailey, and the noted painter, Mrs. Rowan, whose paintings of *Nepenthes* are to be found in 'Plant of Prey' by Rica Erickson.

The first botanical description of Australian material was by Baron von Mueller in 1866, who described *N. kenedyi*. Bailey followed with descriptions of another 10 species between 1881 and 1905. These were *N. bernaysii*, *N. jardinei*, *N. albo-lineata*, *N. moorei*, *N. alicae*, *N. cholmondeleyi*, *N. pascoensis*, *N. armbrustae*, *N. garrawayae*, *N. rowanae*.

These names stood until 1928 when B. H. Danser in his epic work, *The Nepenthaceae of the Netherlands Indies*, (still the standard reference on the genus), reduced all these names to synonyms of *N. mirabilis*, saying "... they are nearly all mere growth forms of *N. mirabilis*."

Nepenthes mirabilis is a plant of swamp margins and other areas which are wet for at least half the year. While it is sometimes thought of as occurring in a few separate areas such as Weipa, Tozer's Gap, the Jardine River area and near Coen Airport, it is in fact a very common plant in the northern part of the Peninsula wherever the habitat is suitable. Vast areas of swampland, almost never visited, are abundant on the east coast and *N. mirabilis* is one of the most conspicuous plants in these swamps. Apart from Carron's report, pitcher plants have apparently not been found south of Coen, with the exception of an isolated population several hundred kilometers to the south near Cairns.

The climate of northern Cape York Peninsula is strongly seasonal. Most of

Please see **NEPENTHES** p. 72.



N. mirabilis growing in swampy conditions near Bamaga, northern Cape York Peninsula.



The author with a large plant of *N. mirabilis* near Tozer's Gap.

Nepenthes mir

Photos by



Habitat of *N. mirabilis* near Tozer's Gap. This area is an open sedge swamp.



The form of *N. mirabilis*, originally named *N. rowanae* by F. M. Bailey.



Male inflorescence and pitchers of *N. mirabilis*.

N. mirabilis in Australia

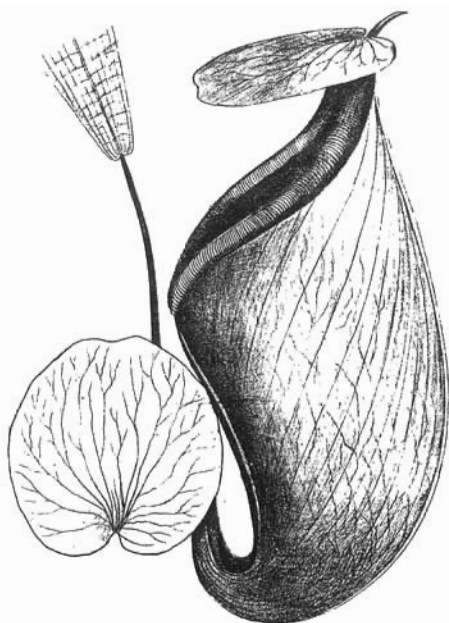
Lavarack



Young plants of *N. mirabilis* growing sand at Tozer's Gap.

the area receives in excess of 1,400 mm of annual rainfall, but all of this falls in the period December to April. However even in the dry season the area is subject to moist south-easterly winds which maintain a high humidity throughout the year. Temperatures never fall below 15° C. over most of the area, although near Coen in the southern part (where pitcher plants are scarce) July temperature may fall to about 10° C. Day temperatures vary from a maximum of about 28° C. in winter to about 35° C. in summer.

In exposed situations which are dry during the winter, the plants are usually compact small shrubs, but in permanently wet shady swamps, they grow into long straggling vines reaching up to 10 m into the trees. Plants growing under the latter conditions usually produce very few pitchers, while those in the sun produce pitchers prolifically and, as a rule, ones that are more colorful. I have seen *Nepenthes* in several different parts of the Peninsula and, the greatest variation appears to occur in the area near the Jardine River and north to Cape York itself. The largest pitchers I saw were about 25 cm long but this was on one plant only. Most have pitchers about 8 to 15 cm long or smaller on younger plants. The form described by Bailey as *N. rowanae* is one of the most decorative, having large pitchers which are squat in shape and usually deep red in color. Some plants continually produce small pitchers less than 5 cm in length. One such plant has been growing in my glasshouse in Brisbane for about three years with no increase in size of the pitchers. Color is variable, mostly green but often with patches of red, particularly on the upper part of the pitcher. Quite often the underside of the lid is dark red. The shape is also variable from squat to elongated. Lower pitchers often are ornamented with two distinct fimbriate wings which are absent or nearly so on the upper pitchers. In the southern part of the range, and in the Cairns population, there is not a lot of variation, with



Nepenthes rowana, Bail.; (¼ nat. size); Gov't. Printing Office, Brisbane.

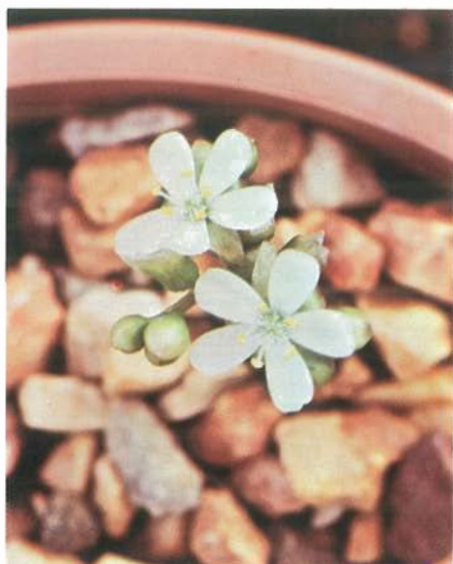
the pitchers mostly being about 10 cm long, relatively slender and even green in color or with the upper portion light red.

The flowering period is not entirely clear, but I have observed flowers in August and September and have collected fresh viable seed in September and December. Seedlings are common, but the plants also reproduce by natural layering as the long straggling stems put down roots and send up shoots wherever they touched the ground. Old stems eventually die and separate plants result.

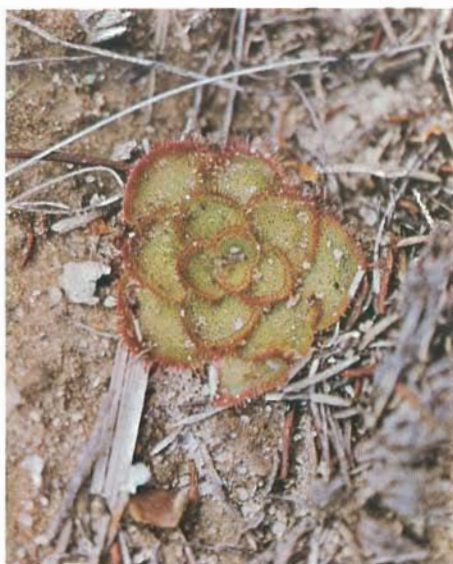
In their natural habitat the plants suffer from very few pests and diseases. These are two problems facing pitcher plants on Cape York—fire and pigs. The plants survive the occasional fire which penetrates the swamps in very dry years by means of a below-ground tuber, but they cannot withstand regular yearly fires. Wild pigs often dig plants up when digging up other food plants.

Cultivation is possible in bush house
Please see **NEPENTHES** p. 75.

Drosera zoneria



D. zoneria in flower. Photo by Allen Lowrie.



D. zoneria showing the concentric arrangement of rosette leaves. Photo by K. W. Dixon and J. S. Pate.

***N. mirabilis* in Australia continued**

Photos by Dr. P. S. Lavarack



A fairly typical form of *N. mirabilis* from near Massy Creek on Cape York Peninsula.



N. mirabilis in flower at Tozer's Gap.

Drosera zonaria in Flower

by Allen Lowrie

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In February, 1980 I planted out all my tuberous *Drosera* that had been stored dry over the summer period in plastic bags. The only reason they were planted out then was because the majority of tubers had started to grow.

Tuberous *Drosera* may have a built in time clock. The tubers stored dry in plastic bags — in the house — in the dark at even temperature were just as advanced as those tubers that were left in pots in the glasshouse.

About May, 1980 some of the tuberous *Drosera* were starting to appear in their pots. Among them to my surprise and delight was *D. zonaria* sending up a flower spike. As most of you know, this event for *D. zonaria* is very rare. Up to this day few people have had the opportunity to observe the whole process day by day.

The flower spike, complete with unopened buds, burst through the soil surface. It took only a few days for the flower spike to reach its full height of 4 cm; then, each day a flower opened. On one particular hot day 3 flowers opened at one time. The flower shape and parts

are very similar to *D. erythrorhiza*, except the perfume of *D. zonaria* is stronger and sweeter to the nose. Of the 20 *D. zonaria* tubers planted in February, 1980, three of them flowered.

When all the flowers had faded, the typical *D. zonaria* plant rosette appeared on the flower spike at ground level. As the rosette grew larger it pushed the flower spike over to one side, to the point where it was flat on the soil surface when the rosette had reached full size.

Maybe the reason *D. zonaria* flowered so well was their storage in plastic bags — in which they may have created their own ethylene gas. K. Dixon's studies show that ethylene gas produced by bush fires stimulates mass flowering of some Western Australian tuberous *Drosera*. All the *D. erythrorhiza* tubers I stored the same way as *D. zonaria* flowered. This is one tuberous *Drosera* that needs a bush fire to produce mass flowering.

Next season I intend to store tuberous *Drosera* the same way but this time I plan to introduce an ethylene gas producing agent. Perhaps this will make all my *D. zonaria* flower at the same time.

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conditions in the tropics or in a heated glasshouse in temperate regions. The plants should be kept evenly moist and humid at all times and should preferably be grown in a strong light. Night time temperatures above 15° C. are best for good growth and the plants must be sheltered from winds at all times. They do well in a variety of mixtures but most include peat moss, sphagnum moss, perlite and coarse sand. The medium should remain moist but not soggy after watering.

Propagation from plants in cultivation is best achieved by cuttings as the production of seed requires a male plant

and a female plant to be in flower at the same time.

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- Carron, W. (1849) "Narrative of an Expedition undertaken under the direction of Mr. Assistant Surveyor E. B. Kennedy etc." Kemp and Fairfax, Sydney. p. 48.
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ALDROVANDA continued from p. 73. occur, not on the midrib of the leaf, which is occupied by compact, patelliform glands [See the small gland at the base of the tactile hair; Plate VI, fig. 1.], but rather toward both sides of the leaf. They do not form a thick beard, however, as Cohn indicates. I never counted more than 18 to 20 bristles along the midrib. They occur only sparingly on the surface of the part of the leaf blade which forms the bladder. They are more numerous on the edge of the leaf, where I counted 7 to 9 bristles on either side. In all then, a leaf exhibits no more than about 30 to 40 tactile bristles.

In their lower parts, the 0.45 to 0.6 mm long tactile bristles are composed of four, and in the upper parts of two rows of cells occurring side by side, which form 5 to 7 tiers (Plate VI, fig. 1). The lowest tier is short-celled and forms a pedestal. Darwin erroneously considered it to be a basal hinge. But its outer walls are only slightly, if at all thinner than those of the tier above it (fig. 9). Neither does this footpiece exhibit the remarkable deviations in chemical and physical properties which are characteristic of the true "hinge" of the bristle. The bristle is inserted into the leaf surface at an angle. The colorless footpiece is separated from the chlorophyll-containing "epidermis" by very delicate, slightly bowed walls, which have numerous, though faint, fissure-shaped pits. Most cells of the footpiece contain some fine-grained starch.

One to three tiers of elongated cells occur on the short-celled pedestal, whose outer walls are very thick, while the radial walls remain delicate. On top of this follows a remarkably short-celled tier, whose cells are only approximately twice as long as wide, and have thin outer walls. This tier represents the sensitive part, the hinge of the bristle. The upper tiers finally are long-celled, and have thickened outer walls—of course, the thickening here, is for the most part—not as strong as in the lower parts of the bristle, with the exception

of the section bordering immediately on the hinge. The two top end cells usually separate slightly at the tip of the bristle.

The hinge has two cells, or sometimes four as a result of a cross-division (Plate VI, fig. 2). The adjoining elongated cells arch forward slightly on both sides toward the hinge cells. The thinness of the outer walls of the hinge is all the more noticeable because of the contrast with the walls of the elongated cells bordering directly on them, which are usually somewhat thicker than the rest. The hinge is restrained on both ends by a tough ring of wall material, which prevents excessive deformation of the cross-sectional form of the hinge when it is bent [See the thickened parts of the wall at the top and base of the cells in the center of Plate VI, fig. 2.]. The thin outer walls of the hinge cells are covered by a very delicate cuticle, which extends to cover the entire surface of the bristle in the same fashion. Only in the case of the elongated, rigid cells and the footpiece do the parietal layers under the cuticle consist of relatively pure cellulose. Here they stain a beautiful shade of violet with zinc chloride-iodine, without significant swelling. However, the delicate outer walls of the hinge cells swell tremendously and exhibit pulvinate thickening, but remain completely colorless (fig. 4). Such mucilaginous swelling of the outer wall occurs easily, in any case. One can frequently observe it on old leaves without the addition of reagent, particularly toward the end of the vegetative period. The swelling regularly occurs during treatment of the bristles with Javelle water² (fig. 3). The huge

Please see **ALDROVANDA** p. 83

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The form of *N. mirabilis* which has recently been found south of Cairns, Queensland, Australia.

Photo by Dr. Peter S. Lavarack