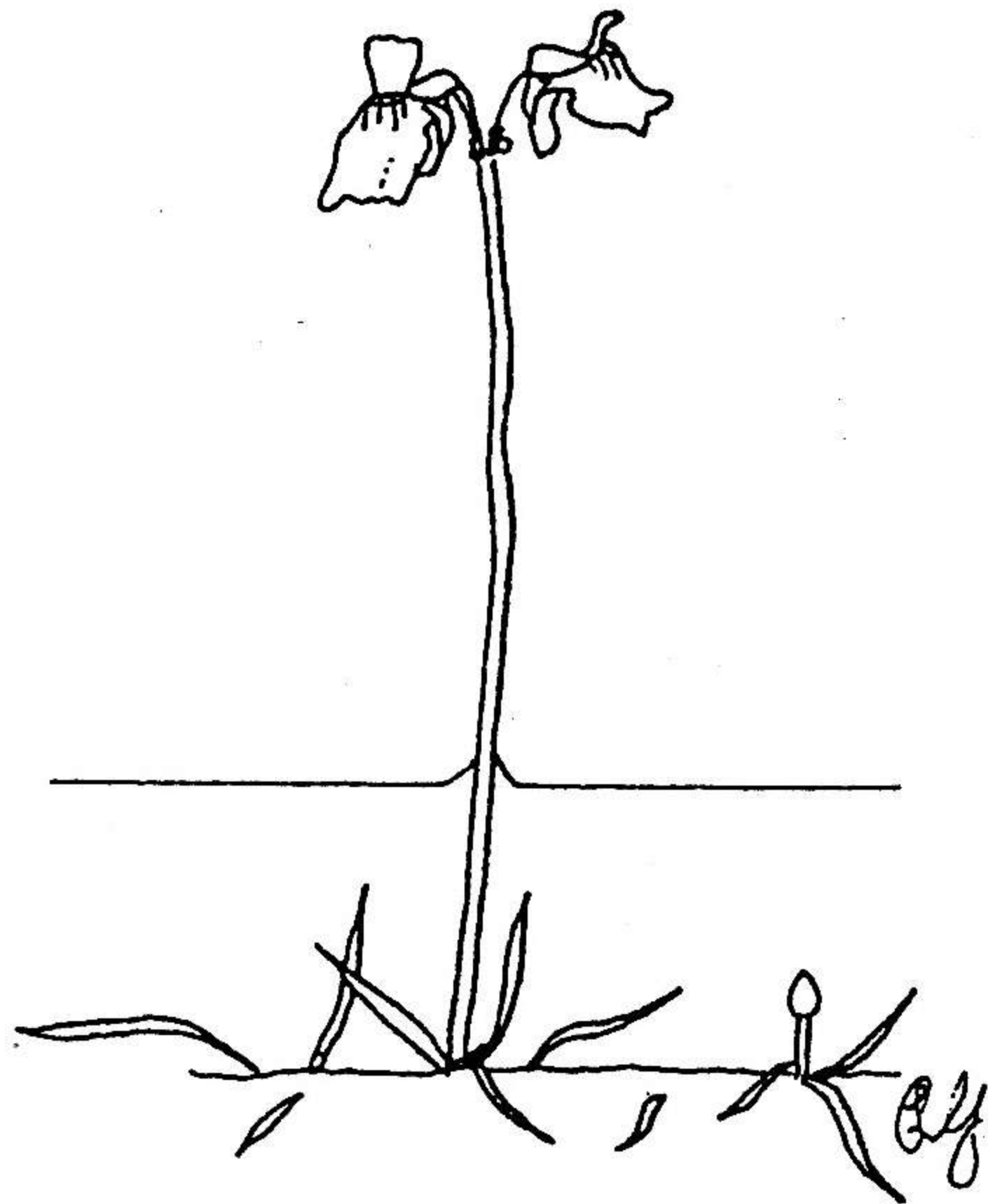


FLYTRAP NEWS

Volume 7 Number 3
January / February / March 1994

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Utricularia dichotoma Western Sydney R. Gibson 1993. Scale full size

NEWSLETTER OF THE CARNIVOROUS
PLANT SOCIETY OF NSW

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ALL CORRESPONDENCE (including articles) TO:
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P.O Box 87
Burwood NSW 2134

Meetings are regularly held on the second Friday of the following months
February, March, April, (The April meeting will not be held if the second Friday of April is Good
Friday) May, June (AGM), August, September, October and November
TIME: 7.30 - 10.00pm
VENUE: Woodstock Community Centre, Church St, Burwood.

Remaining Meeting Dates for 1994			
		12 th August	
		9 th September	
		14 th October	
13 th May		11 th November	
10 th June	AGM	11 th December	Christmas get together.

CURRENT MEMBERSHIP RATES

Single Membership within Australia	\$A15
Family membership within Australia	\$A15
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The views published in this magazine are those of the author(s) and are not necessarily those of the Carnivorous Plant Society of NSW.

While every effort will be made to print articles submitted in their entirety, in one edition, the editor reserves the right to abridge or publish in two or more parts any lengthy article.

Other organisations are reminded that, as a matter of courtesy, the permission of the Carnivorous Plant Society of NSW and/or the author(s) should be sought before reprinting any article published in this journal.

President's report Denis Daly

Amalgamation

Correspondence dated 20th February 1994 was received from the ACPS with regard to Amalgamation. However I have to report that negotiations are somewhat "bogged down" by a number of relatively trivial issues.

Both Committees recognise and support the concept of support for the existence of local branches. However the issue of funding for those local groups, which is an integral prerequisite to their viability, remains unresolved at the present time.

The CPS of NSW recognises that successfully amalgamated local groups can use the strength of numbers in the amalgmated Society to promote their activities but that local groups are best placed to provide support and assistance to the individual members.

Despite the current setback the Committee of the CPS of NSW is hopeful that these trivial issues can be overcome so that Amalgamation of Carnivorous Plant Groups within Australia might be possible in the future.

The present Committee will continue to encourage and promote this concept.

Follow up on interest groups

You may remember that in the last issue of Flytrap News (i.e. Vol 7 No 2)

Robert Moolenbroek from North Queensland expressed an interest in corresponding with growers of Nepenthes. As yet the response has not been exactly overwhelming. The Society will respect your privacy and does not give out your name and address without permission. However surely there are members with an interest in Nepenthes who would like to correspond with Robert. The society provides you with the opportunity to meet or correspond with others who have similar interests. Please use this facility.

Edd Harris of the ACT desired to form an ACT interest group (phone 06 291 8357) I hope the ACT CP growers contacted Edd. If you live in the ACT but have overlooked giving Edd a call DO IT NOW.

In Search of *Aldrovanda vesiculosa* David Colbourn

Part II - History and Cultivation of *Aldrovanda*

History : The earliest account of *Aldrovanda* was in the 16th century, when Leonard Plukenet, in his *Almagestum Botanicum*, of 1696, describes it from tropical India to which he gave the name *Lenticula palustris Indica*. Plants were later found in the Dulioli Swamp, east of Bologna, Italy, by an Italian physician, Dr Carlo Amadei who sent specimens to the botanist Gaetano Monti, who describes it under the name *Aldrobandia* in an undated paper of around 1747. He named it in honour of Ulisse Aldrovandi (1522-1605), an Italian botanist who set up the Botanical Gardens in Bologna. (The species name, *vesiculosa*, refers to the leaf structure, bearing vesicles). This plant was identified by J.J.Dillon with the Plukenet one from India. In 1751 it was mentioned in a dissertation by L.J.Chenon (1751), a student of Linnaeus, as *Aldrovanda* (probably a mistake in copying, thinks Duval-Jouve, 1861) and finally published by Linnaeus in his *Species Plantarum* of 1753, as *Aldrovanda vesiculosa*.

Caspari points out on high philological authority that the Linnaean name is ungrammatical. The name *Aldrovanda* is now generally accepted in accordance with the International Rules of Nomenclature. Another plant from India was described as the species *verticillata* by Roxburgh in *Flora Indica*, of 1832, but this was shown by T.Thomson not to be distinct, but has been regarded as a variety. A plant from Queensland, once called the var. *australis*, is not distinguishable from the original species, though Darwin found some difference in size, together with other minor ones, such as the number of serrations on the bristles.

The morphology and anatomy of the vegetative parts of the plant were first described by Cohn in 1850, and more completely by Caspari in 1859 and 1862. Further reference to details was made by Goebel (1891), Fenner (1904), and Haberlandt (1901).

Augé de Lassus in 1861, noted in the *Bulletin de la Société Botanique de France* that the leaves were sensitive to stimuli, thinking that they were air storage organs to give the plant buoyancy in water. In 1871 Delpino recorded that it caught small fresh-water molluscs. In 1877, Charles Darwin's experiments with *Aldrovanda* indicated that absorption of prey took place in the traps and, realising the similarity of this plant to *Dionaea*, assumed *Aldrovanda* secreted enzymes which digested the prey. Darwin referred to *Aldrovanda* as a 'miniature aquatic *Dionaea*'. Fermi and Buscaglione in 1899 confirmed that *Aldrovanda* did indeed digest its prey with enzymes produced by the plant.

Late last century, in Australia, Dr. Ferdinand von Müller, arguably Australia's greatest plantsman and scientific botanist with the Victorian Government, sent specimens of *Aldrovanda vesiculosa* to Charles Moore, a botanist with the Royal Botanic Gardens in Sydney, with the accompanying letter below:

12/3/94

Let me thank you, dear Mr Moore, for sending on the Californian letter and journal. It was not necessary to allude to any opening of these, as I repeatedly opened letters misdirected or misdelivered, which in our large correspondence so very excusable. Mine was 6000 letters in 1893 on their equivalent mostly primary own hands. What a "matheur", the appearance of the *Thylla xua rastatrix* now also at Liverpool! Here with I send a specimen of *Aldrovanda vesiculosa*, which aquatic plant is doubtless discoverable in lagoons of NSW as this remarkable plant has now been to arid to N. Queensland. Perhaps you like to show the specimen to friends, who live on lagoons, questionably Riverina settlers. The leaves are like those of *Dionaea muscipula* in miniature, the flowers white. the verticillate leaves remind of some W.A. *Drosera*. The plant is often entangled among others, and thus not abundant as it so shy in flowering. Let me hope that you are happy and well. With friendship yours Ferdinand Müller

The letter to Mr Moore is held at the New South Wales Herbarium, Sydney, and is hand written. The exact transcript is not totally clear, due to Müller's handwriting, but Müller mentions that it can be found in lagoons in New South Wales. He also compares the leaves of the Waterwheel plant to that of the Venus Fly Trap, "the leaves are like those of *Dionaea muscipula* in miniature". This statement is very similar to Darwin's description of *Aldrovanda*, in 1875, "This plant may be called a miniature aquatic *Dionaea*". The comparison of the two statements indicates that Darwin's investigation of *Aldrovanda* influenced Müller's work in Australia.

Although Müller mentions Queensland in his letter to Moore, the material of *Aldrovanda vesiculosa* which accompanied the letter is not part of any Queensland, or Australian collections which Müller had available to him. Müller sent some of the overseas material he had in Melbourne up to Moore. This material is now held at the New South Wales Herbarium, and is one of two Melbourne collections made by Friedrich Leybold, c. 1849-54, in the Australian Tyrol region.

In May 1981, Helen I. Aston examined these collections and has drawn the following conclusions: The two collections are from Bozen (possibly Botzen) and Salurn or Salura (writing difficult). These Leybold collections are the only *Aldrovanda* ones at Melbourne which match in the material, and in the old mounting paper, with the samples at N.S.W. It is most probable the Salurn or Salura collection which Müller forwarded as there is an abundance of it and also he has annotated "Salurn Leibold". The incorrect spelling of Leybold's name is on two of the small mounting papers, so Müller has obviously looked over the material. These papers are still in Melbourne.

Cultivation :

Planting Media : The plants require an acid water pH 5-6.9. Place sphagnum moss or peat moss in the bottom of the container, which must be deep enough to provide the plant with a water depth of 15-30cm. After the sediments have settled, the water should be a have a brown to green tinge. The container should be placed in partial shade, or waterlilies, rushes, and reeds can be added to maintain the water condition.

Light : In natural conditions the plant experiences full sunlight to partial shade. If artificial lighting is to be used then a light intensity of 1500 foot candles should be used to maintain vigorous growth. A photo period of 14-16 hours during the growing season and 6-10 hours during dormancy.

Temperature : The most favourable temperature is 25°C. The temperature must not exceed 30°C. Normal growing temperatures are between 20°C and 30°C in summer. If continual growth is required, the water temperature must not drop below 17°C.

Feeding : Adding fertiliser to the water is not advisable as it induces algae growth. Mosquito larvae added to the water will satisfy its food requirements.

Pests and Disease : There are no known diseases of *Aldrovanda*. Algae is the major pest of any aquatic plant and can be controlled by maintaining the water acidic, and reducing the light intensity. The introduction of micro-organisms will also help control algae. Algicides are not to be used as damage may be done to the plant.

Propagation :

Sexual Reproduction : *Aldrovanda* plants require a pH of about 6, a temperature at about 25°C and several hours of direct sunlight per day to flower and set seed. Pollination is best done artificially as its ability to self-pollinate is unknown. Take the pollen from the stamens at the centre of a flower and deposit it on the stigmas. The seeds are self-sowing.

Asexual Reproduction : The only viable method of Asexual reproduction is stem cuttings. Cut the stem and/or branches in pieces, 5-8cm in length, in the spring and replace in the water. Each section will develop into a new plant, identical to the mother plant, provided the sections are large enough to supply the energy required for bud development and growth.

Hybridisation : There have been no hybrids of *Aldrovanda vesiculosa* recorded.



Aldrovanda
vesiculosa, L.

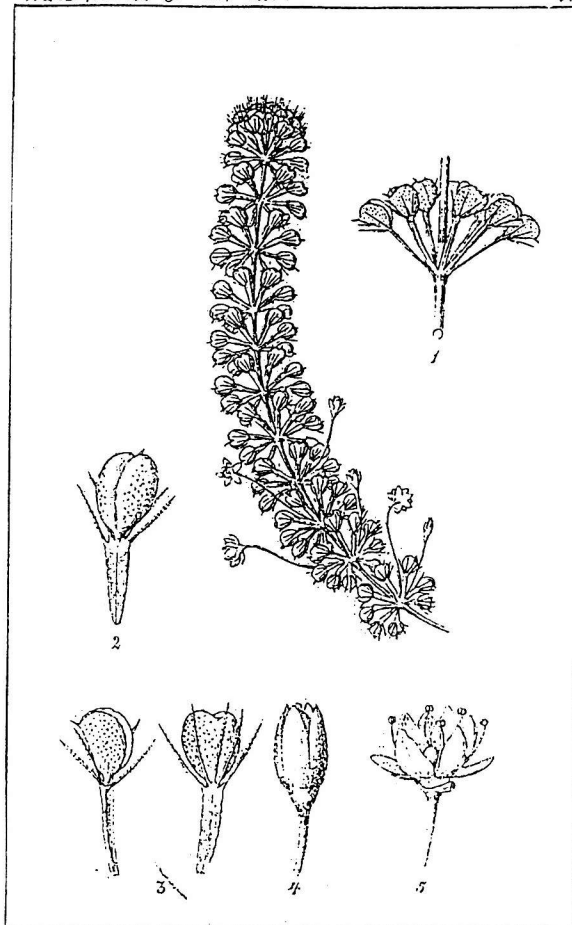
Aldrovanda vesic-
iculosa L.
Leaves in whorls
transparent. Flower
white, solitary,
axillary.



Photocopies of the original specimens sent to Moore by Müller in 1894

1589-2

Rd. S. N. S. W. (2nd Ed.) Vol. 1.



H. Graff del.

Aldrovanda vesiculosa Linne'.

J. H. Sarsen

Aldrovanda vesiculosa drawn by R. Graffdel, 1889; Herbarium of New South Wales.

Insects and Carnivorous Plants by Ken Harper

It can be difficult to identify what is actually damaging your carnivorous plants. Many of the commonly available CP books detail the signs of common pests (aphids, red spider mite, scale, whitefly, etc.) and chemicals which can be used to eradicate/discourage these infestations.

Before treatment is possible the most difficult task I have found is locating whatever is doing the damage to my CPs. In *Flytrap News* (Volume 6 Number 2) I wrote an article entitled "Insects eating plants", which described my nightly battles with locusts and grasshoppers.

This year my challenge has been with a particular caterpillar. I do not know where it comes from, but it eats into the rhizome of my *Sarracenia* (primarily *S. purpurea* and its hybrids). At first glance there does not appear to be anything out of the ordinary but closer examination of the rhizome reveals fine silk webbing and castings. These caterpillars have grey bodies with black heads and are about 5 to 10 mm long and 2 mm wide. They can move really quickly and are difficult to catch, let alone kill. I have had to mangle quite a few *Sarracenia* just to make sure that these pests have been killed. In previous years I have had some minor problems with these pests but this year they have really caused quite a lot of damage. Finding and destroying this pest can be a time-consuming job but it is essential if the *Sarracenia* are to continue thriving.

Occasionally I open up some of my *Nepenthes* and *Sarracenia* pitchers to see what they have been eating. Apart from the normal flies, ants, moths, etc. that they catch, I was rather surprised that only my *Nepenthes khasiana* plants catch the dreaded European wasp. This wasp is about the size of a large bee, with distinctive yellow and black banding on its body. It is not as hairy as the native paper nest wasps (*Polistes* spp. and *Rhopalidia* spp.) and has black antennae about half the length of its body with bright yellow legs.

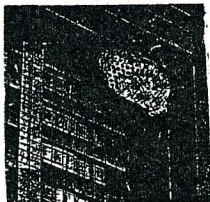
I cannot explain why the European wasp would only be attracted to *Nepenthes khasiana*. This *Nepenthes* is native to a small region of the Khasi Hills in India and would not be a natural enemy of this wasp. *N. khasiana* is probably the blandest of all my *Nepenthes* but each pitcher would catch two or three of these wasps in its lifetime. I have not found any evidence of nests and infestations of European wasps should be brought to the attention of the Department of Agriculture in your State.

The relationships between CPs and animals are fascinating. In my own collection, I have caterpillars that eat *S. purpurea* and its hybrids and *N. khasiana* which catches European wasps. The challenge to all of us suddenly becomes more than just what is eating our CPs: what are the CPs themselves eating!

BEWARE OF WASPS AND BEES

PAPERNEST WASP

Nest of the papernest wasp showing typical 'honeycomb' structure. Papernest wasps are sometimes mistaken for European wasps.



European wasps are sometimes confused with native papernest wasps, *Polybia* spp. and *Rhopalidia* spp., but papernest wasps have narrower bodies with a more obvious waist and are usually coloured in shades of orange and brown.

The nests of papernest wasps are also quite different from those of the European wasp, normally comprising a single layer of exposed, downward-facing cells—not unlike the honeycomb of bees. They are often found hanging by a short stalk from the eaves, window sills or door frames of houses; or attached to branches of trees or shrubs.

European wasp

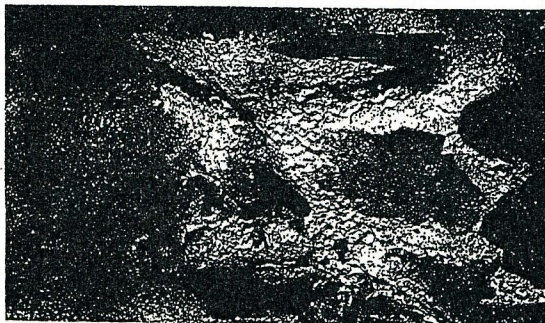
Description

The European wasp worker is about the size of a bee, but it has distinctive yellow and black banding on its body and is not as hairy. The wasp has black antennae about half the length of its body, and bright yellow legs. When resting, it folds its transparent wings back along its body.

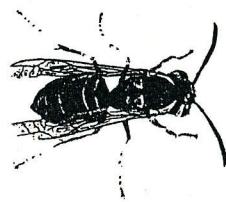
Nests of the European wasp are nearly always concealed, usually underground but also in retaining walls, earthen embankments, house wall cavities, ceiling spaces, or in hollow trees and logs. Often the only sign of a nest is wasps entering or leaving through small paper-lined holes or cracks.

The nests are constructed from wood fibre which is collected from telegraph poles, fence palings and dead trees, then mixed with saliva and chewed to a pulp.

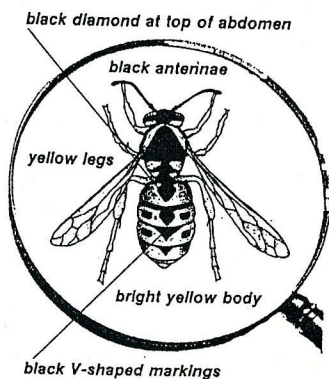
A European wasp nest is concealed behind this retaining wall. Only its entrance is visible.



European wasp



actual size

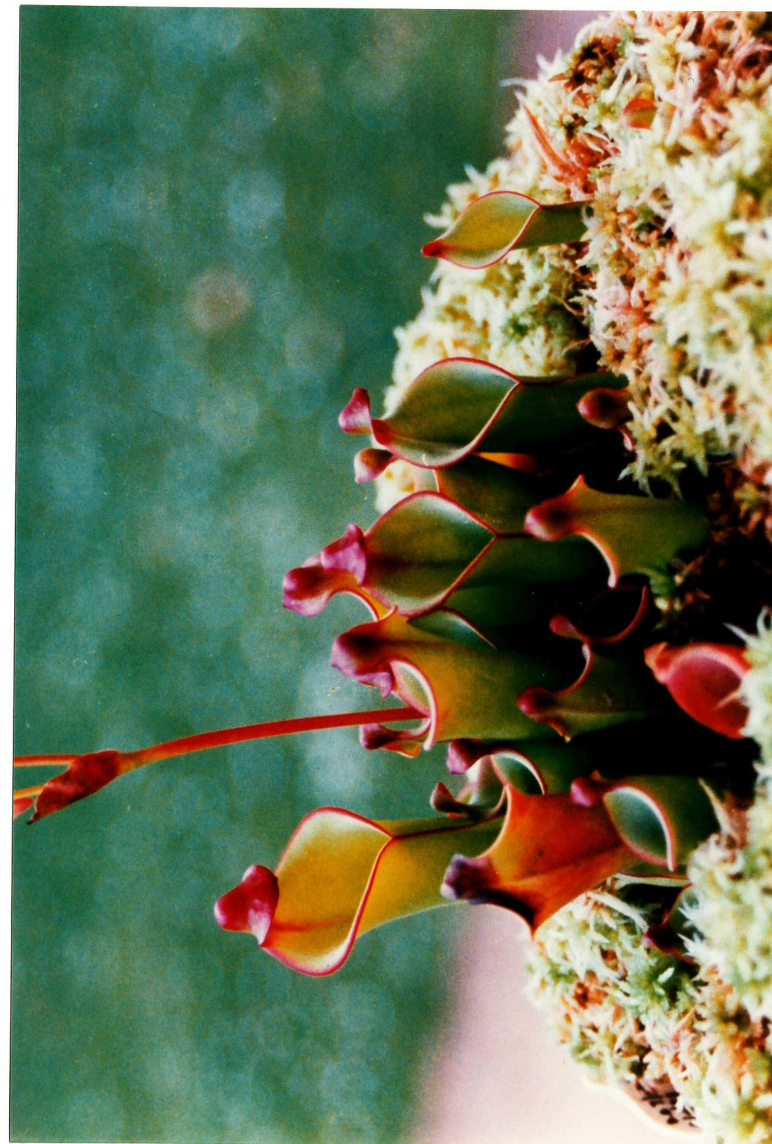


WHAT IF I'M STUNG?

WARNING—Drinking from cans or bottles

Foraging wasps sometimes enter an open can or bottle of drink and become trapped. Anyone drinking from the container could be stung in the mouth or throat, resulting in severe swelling which may restrict breathing. If this happens, seek medical attention immediately!

Avoid drinking directly from cans or bottles when outdoors; use a straw or glass, and take particular care with children.



Heliamphora heterodoxa from the collection of Colin Clayton trading as Dingley Home and Garden

Brocchinia reducta

by Ken Harper

It is only relatively recently that members of the *Bromeliaceae* (Bromeliad) family have been found to join the ranks of genuine "carnivorous plants". Three species so far (*Brocchinia reducta* (1974), *Brocchinia hecetioides* (1986) and *Catopsis berteroniana* (1976)) have satisfied all the characteristics which distinguish them as carnivorous plants. It is not unreasonable to expect more CP discoveries from this genus as remote areas of South America are opened up to the scientific community. This article will only discuss *Brocchinia reducta*, its natural environment, trapping mechanisms and how I grow this carnivorous plant (CP).

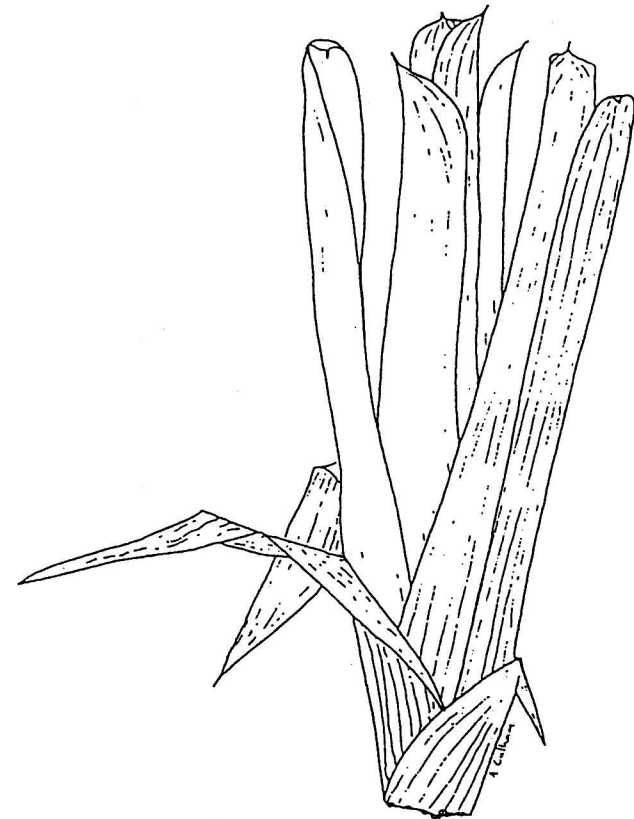
B. reducta grows on sterile sandstone surfaces in the Gran Sabana in southeastern Venezuela. Bütschi (1989) reports that this CP grows both in the lowland savannah and on the plateau of the Tepuis. In the foothill regions, they grow in dense colonies in open swamp while, on the plateau, *B. reducta* grows in loose sand or layers of peat moss. In its native habitat *B. reducta* stands in full sunlight, causing the narrow upright leaves to turn a bright yellow-green. The leaves can reach up to 50 cm high and 5 cm wide and are held together in a cylindrical rosette. The edges of these leaves overlap to form a vessel into which insects fall and are digested. The inside leaf surface is coated with a fine waxy powder which breaks off easily. The detachable wax not only causes insects to fall into the trap but also entangles their legs and reduces their mobility (Juniper *et al.*, 1989). Small white flowers are borne on a solitary inflorescence that can reach 60 cm high but plants take many years to reach maturity. Seeds are numerous and flat.

My own *B. reducta* plants were obtained from tissue-cultured stock. There is little cultivation information available about this CP because it is still very uncommon in collections around the world. I have found the plant easy to grow but it is not a spectacularly impressive plant (as, say, *Nepenthes*) to look at.

I use a mixture of 2 parts peat moss to one part horticultural sand and have found this satisfactory. Bütschi (1989) grows *B. reducta* in clay pots in a 5:1 peat-sand mix and other growers I know use a 50/50 peat moss to sand ratio.

The key ingredient to successfully growing *B. reducta* is plenty of sunlight. My own plants are not the yellow-green colour of the Venezuelan native plants, but they do receive a lot of sun and are more of a light green colour. As light intensity decreases, the leaves turn a shade of dark green and the rosette of leaves opens up. *B. reducta* will continue to grow in low light levels but growth rates are slow and its attractiveness somewhat reduced.

My *B. reducta* plants are only 18 cm tall but propagation by division has proven a simple and effective means of generating additional pots of plants. Lateral buds sprout from the base of existing rosettes and these can be carefully removed and potted up in the mixture outlined above. According to Cheers (1992), *B. reducta* produces numerous seeds but my plants have yet to reach this stage of maturity.



Brocchinia reducta

Brocchinia reducta (A. Culham)

I have grown *B. reducta* in pots standing in water trays and also only being watered from above. The plants growing in the water tray have slightly less developed root systems than those growing in standard free-standing pots. However, in terms of vigour, there is little discernible difference in either method and I favour growing my plants in trays because they are less likely to die from neglect. Humidity appears to be an important requirement for *B. reducta* and it seems to appreciate the climatic conditions associated with growing *Sarracenia* and highland *Nepenthes*.

Brocchinia reducta has proven a difficult CP to obtain but is relatively simple to grow. Carnivory in the bromeliad genus is only a recent scientific discovery and it is hoped that all growers have the opportunity to cultivate this unusual CP. It is not inconceivable that more bromeliads will be recognised as carnivorous and I will write about *Catopsis berteroniana* and *Brocchinia hecetioides* once I have had some experience in growing them.

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Utricularia dichotoma in western Sydney Robert Gibson

In mid September, 1993, I discovered a small flowering colony of *Utricularia dichotoma* near Richmond, in western Sydney. It was growing on the bed of an ephemeral lake and, when found was growing under a few centimetres of clean water. The open flowers were unusual in that they closely resembled those of *U. monanthos* in shape.

The plants grew in sticky clay. During dry periods the surface of this clay was baked and cracked, but the plants probably survived as stolon segments in moist sub-surface clay. The leaves were elongate, to 30mm long by 1mm wide, with a tapering free end. The green to black bladders were 1mm diameter and of the typical form of this species (shown in Taylor, 1989, page 109).

The green scapes, to 8cm tall, supported two dichotomously held flowers. These had an erect, forward projecting upper lip, with a free end 3mm wide and high. The sub-horizontal lower lip was rectangular in outline, to 8mm long and 7mm wide, strongly folded down its length. The palate consisted of numerous ridges, the outlines of which were indistinct due to almost uniformly purple colour of the flower. Only the very top of the central ridges and entrance to the nectary spur was sulphur yellow in colour. The purple nectary spur was up to 6mm long and was sub-vertical with a forward pointed end. The flowers were quite different from the more typical fan shaped specimens found in the nearby Blue Mountains, central Victoria and in Tasmania.

This form of *U. dichotoma* has the ability to self pollinate its flowers, as happened with the material I collected. From my experience this is a more widespread phenomenon in *U. monanthos* than *U. dichotoma*.

It is interesting to note that *Utricularia dichotoma* is a highly variable species, which, as shown by this discovery, contains forms very similar in shape to *U. monanthos*. It has been suggested that *U. monanthos* is an alpine variant of *U. dichotoma* (Cochrane et al. 1968), but this is not supported by my observations of both species in the wild or growing together in cultivation. The differences are genetic, but it may be that "*U. dichotoma*" and "*U. monanthos*" are two ends of a spectrum along which intermediate forms, such as the form described above, occur. Clearly more work needs to be done to define both species, although it is interesting to note that whilst *U. monanthos* is a relatively uniform species, with a disjunct range in alpine areas of south east Australia, Tasmania and throughout New Zealand (Taylor, 1989), *U. dichotoma* occurs as a more continuous range of overlapping local forms.

This *U. monanthos*-like form of *U. dichotoma* in western Sydney is an attractive and very interesting locally native carnivorous plant. It provides an insight into the taxonomy of both species.

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Cochrane, G.R. et al. 1968. *Flowers and Plants of Victoria*, Sydney. (cited in Taylor, 1989).
Taylor, P. 1989. *Kew Bulletin Additional Series XIV: The Genus Utricularia - a taxonomic monograph*. Her Majesty's Stationary Office, London, pp. 724.

Cultivation of and experimenting with *Drosera binata* Steve Amoroso

I have found *D. binata* to be a very easy plant to grow. I have four forms of *D. binata* in my collection, T form, Y form, 'dichotoma giant' and 'marston mill'.

Cultivation

I have tried three methods of growing *D. binata*:

In a shadehouse:-	Plants produced thin, weak and green leaves and hardly ever flower.
In a glasshouse:-	Plants produce green leaves while the flower scape eventually develops.
Outside in full sun:-	Produces red leaves, strong stem and freely flowers if plant is old enough.

Plants evidently grow best in full sun provided a water tray is available between September and April. I repot early to mid spring in a mix of 3 parts peat moss, 1 part perlite and 1 part coarse river sand.

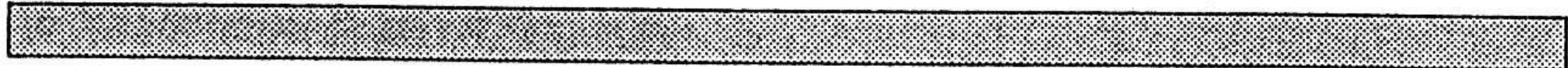
Propagation methods tried.

Root cuttings:- Root cuttings taken in spring are supposed to produce plantlets from a number of points on the root. I have taken a root cutting recently and am awaiting the results.

Seeds:- I have had difficulty in getting my *D. binata*'s to set seed.

Attempt at Hybridisation

Due to the difficulty of getting *D. binata* to set seed I attempted to pollinate two of the flowers of *D. binata* with one of my pygmy drosera's (*D. capillaris*). I will sow the resultant seed and see whether I have produced a new hybrid.



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