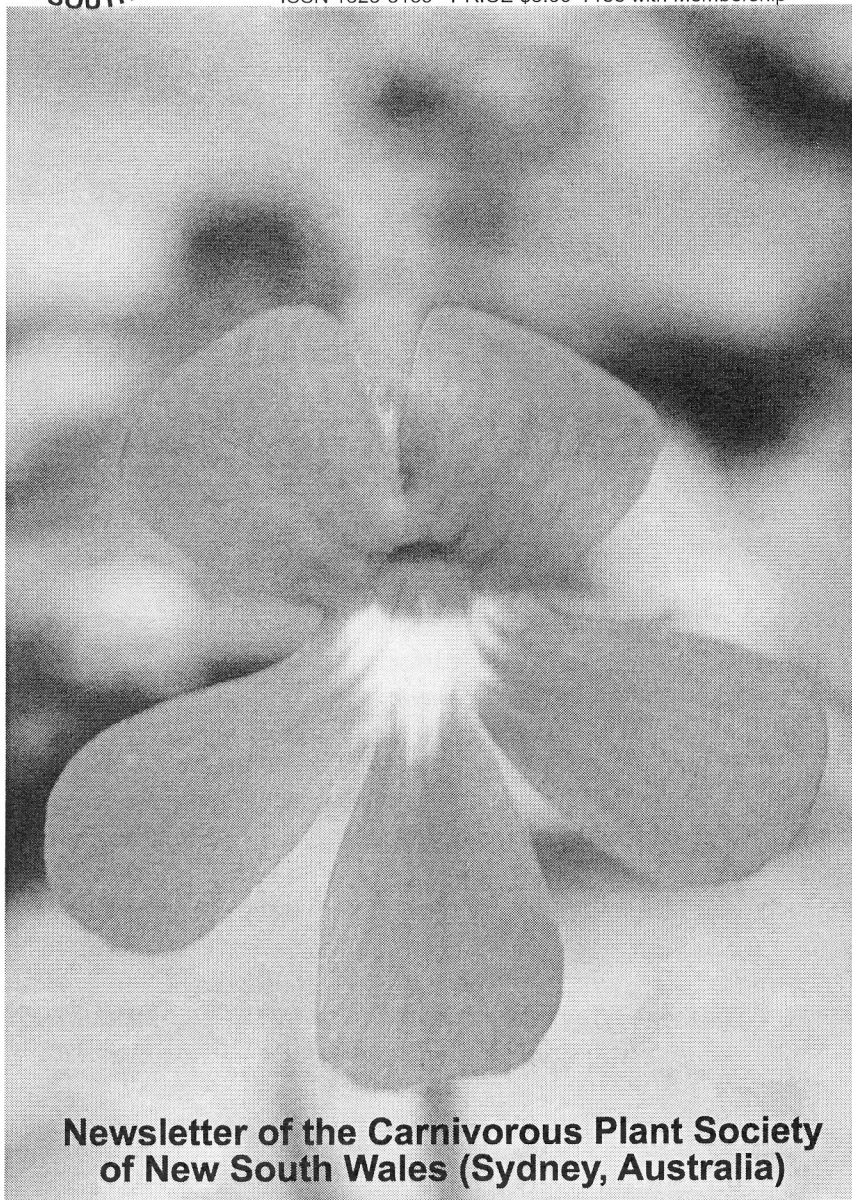




# FLYTRAP NEWS

Volume 15 Number 4  
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**Newsletter of the Carnivorous Plant Society  
of New South Wales (Sydney, Australia)**



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## MEMBERSHIP

### July 2002– June 2003 Subscription

All members, single, family and overseas AU \$25.00

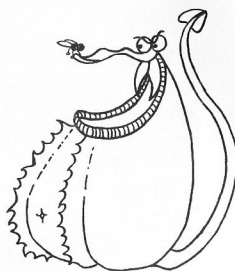
Please make cheques or money orders payable to the  
Carnivorous Plant Society of New South Wales.

Membership and correspondence should be  
forwarded to the Secretary at the above address.

Meetings are held on the second Friday of each month .

Time: 7:30pm – 10.00pm

Venue: Woodstock Community Centre,  
Church Street Burwood



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	Date	Speaker/Activity
Monthly Meeting	July 12th, 2002	Annual General Meeting / Trivia Night
Monthly Meeting	August 9th, 2002	"A Sarracenia Discussion Night" Kirstie Wulf
Monthly Meeting	September 18th, 2002	"A General discussion night" Have questions about carnivorous plants? or your plants? (bring your plants).
Monthly Meeting	October 11th, 2002	"A Slide Night" Greg Bourke

## President's Note

Don't forget that the membership fees for 2002 – 2003 are now \$25.

The Society's postal address has also changed, please refer to Page 2 for the correct address.

## Chat Corner

*Hi Fellow Cper's*

We are catching up with our magazine for the year and winter has caught up with us. This seems to be the coldest winter for some time. Moved to Bargo and already we have had -3 degrees and a number of frosts. Now I know how the members feel who live near the Southern Highlands and Blue mountains. While the ice has not bothered me I find the gales of wind may defeat me. The ice crystals on my *Drosera*'s and *Dionaea*'s look like fairyland and I am amazed at how they survive. Be careful with all your potted plants as the wind will dry them out quickly-- try not to water them late afternoon. If you have a cold wind it could freeze the cells in the plants and you could lose them.

In April Greg Bourke and Richard Ryles returned from Borneo and Greg gave us quite a show with the slides of *Nepenthes* and a few brilliant orchids. What an eye opener to see the conditions the *Nepenthes* grow in. An observation was the plants growing amongst the tree canopy in leaf mould and sphagnum were long and vine like, growing over rocks, shrubs and into the trees. The type that grew in atrocious conditions on the sides of the roads and open banks or hillocks on granite and clay like soils were short and more rosette. Greg and Richard were lucky to see the free-swimming ants in the *N. bicalcarata* and the holes in the stems where the ants live. The experience of seeing these plants in their native habitat would have been a lifetime adventure as Greg and Richard travelled great distances to cover most areas. When I look at Greg's *Nepenthes* collection I am all oo's and aahh's but Greg says now he has seen how large and prolific they grow in the wild he feels his are an anticlimax. I say do your best and enjoy them.

Over the years our Society has grown from a small membership to quite a large group. We have had to expand to a larger meeting room to accommodate members. We are a loud bunch and everyone has an opinion to give. The meetings are fun to go to and are informative every time. You make great friends and can build up your plant collection from the sale plants. For those that are not able come to the AGM meeting I can only say how sorry I am that you will miss the fun of a trivia night which is run by Greg Bourke.

The winter meet went well for those that could attend. Greg's collection has grown over the last year and your fingers itch to be able to have some of the varieties. It is amazing in such a short time how the bogs and the plants he has grown have matured. As you wander through the trees you find *Nepenthes*, *Pinguiculas* and *Droseras* growing amongst them. You go home wishing you could do that, well you can!!! Start in a small corner and later you can expand. Thanks for the day Greg.

We wish to congratulate David and Belinda Hooper on their new baby

daughter Larissa. A bundle of joy and another addition to the Society.

In July we will vote for the new offices and I hope whomever is voted in continues to encourage the best in all for the Society. Keep growing those plants so they are never lost to us and remember ...

**YOUR FEES ARE NOW DUE----- \$25**

Your Friendly CPer  
Jessica

## Growing CP in Sydney, Australia

Marcello Catalano  
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Milano  
rafflesiana@yahoo.com

If you are a gardener and you want to work in a Botanic Garden, 6 months of winter is not the best period to do it. So, after my 3 months internship at Kew Gardens in London, I simply have to move on to another part of the planet, to Sydney, to continue my activity. I arrived on October 21, and the day after I began my internship at the Royal Botanic Gardens, Sydney (RBG) that would continue until December 21. As soon as possible, after having found a comfortable small room, I began to enter in contact with the people of the local Carnivorous Plant Society.

But, before proceeding, I need to explain precisely how the CPS work here, in Australia. First of all, the opposite to what many people may think, there is not a unique Australian Society with many sections but there exists a Society for every region. We have the New South Wales CPS, the Victoria CPS and the South Australia CPS. This last one was the first to be born (for that it is called Australian CPS) and it has even more foreign members than Australian ones. But each of these CPS is

mainly occupied in contacting the members of its own region. That because, given the size of the territory, it may not be possible to manage a continental society. There are even very few contacts among these three groups. The NSW CPS counts about 100 members, of which 50 concentrated in the Sydney area. It has been founded about 17 years.

Friday 9 November I went to the monthly meeting of the New South Wales CPS, organized in a place called Woodstock. There were about 25 people. I was warmly welcomed by the librarian Kirstie Wulf and by the treasurer Janet Pierce. There was in progress a slide show about New Caledonia commentated by Laurent Legendre. The slides were exceptional. Later there was a competition for the best *Sarracenia*. I was completely amazed at the vision of the conditions in which *N. vieillardii*, *D. neo-caledonica* and some *Utricularia* grow on this island. It seems that *N. vieillardii* likes full sun, warm and a very dry soil to give the best of itself. In fact it grows on the rocks, in hard clay and in other places that are more suitable for a cactus rather than *Nepenthes*. That also thanks to a stem that is extended underground, developing the radical system only at a certain depth, while at the base of the plant a swelling is formed, that acts as reserve when the water is scarce.

And there is more. A large area of the island was deforested and very damaged. Well, thanks to the "pioneer" nature of *Nepenthes*, they usually are the first ones to repopulate the environment after a fire or a deforesting because of the return of light, the government has decided to spray tons of peat mixed with *N. vieillardii* seeds all over the zone, to favor the return of the vegetation and of a new equiliber! Imagine what kind of garden will come out of that...

The competition was won by a hybrid, I believe it was *S.psittacina* x *S. leucophylla*. I have to say that it was a deserved victory. The winner, Jessica Biddlecombe, was able to give much dignity to a simple hybrid, using a very elegant plastic pot with absolutely perfect sphagnum carpet.



I spoke for forty minutes with Jessica and her husband, Peter, to find out about the marvellous pot he has his *Nepenthes* in. I was not sure if it was plastic or clay! It was in fact a special plastic with a venerated inner pot for good air movement. The thickness of the pot was almost a centimetre. A perfect imitation, with all of the advantage of the plastic but with the elegance of clay. Many people carried plants to swap, sell or just for display. Impressive were two plants *N. aristolochioides* and *N. eymae* each 50 cm. tall and some hybrids. I was surprised by the fact that they were all growing in pure living sphagnum moss. To the end of the evening, tea and pastries were served in an extremely friendly atmosphere. A *Nepenthes* lover Terry Nichols gave me a lift home and for half an hour we had been monothematic.

On November 24 I went to the Blue Mountains together with Kirstie Wulf. Besides the spectacular sight -it is a canyon covered by eucalyptus forests, where the mountains remind me of the Tepuis - we enjoyed the show offered by the abundant *D. binata* var. *dichotoma*. Our journey just followed the long and rather steep stairs in stone that covers from the top to the bottom the whole side of a vast rocky wall dominated by the "Bride Veil" waterfall. This wall is constantly damp in a lot of parts. The moss, peat and clay are deposited here and there, offering a good handhold to the vegetation.

Here you can find *D. spathulata*, able to live in a gram of soil on a boiling rock, *D. binata* "T-form" and var. *dichotoma*, *D. pygmaea* and *D. peltata*. The *D. binata* "T-form" was almost always red, and was growing just next to the var. *dichotoma*, in sand, peat or clay, where however the soil was always wet. But the better show was given by the var. *dichotoma*, green and more plentiful, growing in one metre large clumps, following the lines of soil residues inserted in the rock layers. Often we were walking and, seeing a few var. *dichotoma* near our feet, we follow them until realizing that the best specimen were growing just above our heads, one or two metres above, hanging from the rock projection on the upper part of the path we had just walked.

All those jewel-like drops, shining with pride at the sun and almost laughing at the fact that nobody could reach them up there.

From a side of the wall that was particularly exposed, we could admire, by binoculars, these thousands of small "V" scattered all over in a linear way. *D. pygmaea* and *D. peltata* were growing in small numbers, often together with the other species; the first one always on the vertical wall side (perhaps to avoid being covered by other plants), *D. peltata* both on the wall and on the ground, along the sides of the trail, standing upright thanks to the grass blades.

All these species seemed to be attracted mainly by the water, unique and irreplaceable source of life. They could grow on many kinds of soil, sometimes even small and green because of the poor light, but always where a good amount of water could be ensured even in the hottest and driest periods.

We also saw a couple of *Utricularia* on our way, *U. uniflora* and *U. lateriflora*. Both of them quite rare. The first one with always 1-5 flowers per square metre (but likely we were early in the season, as there were many young flower buds); they were growing both on the wall and on the ground, but never submerged. The second one was nearly always submerged by 1 cm. of water, on the ground or on the small cliffs of the rock, but never on the vertical side.

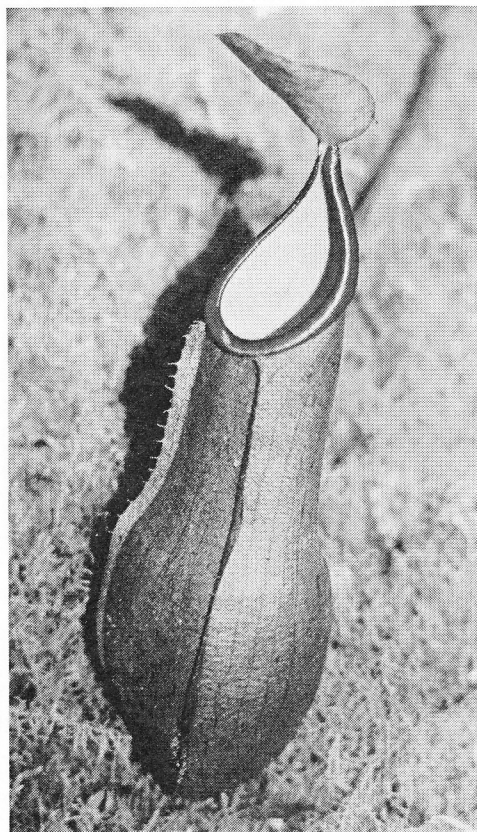
The 25 November I visited the Greg Bourke's collection. He's the seed bank manager. Before entering his two greenhouses, Greg showed me the two small bogs he built in the garden. In one of them, besides some *Sarracenia*, there was also an *U. longifolia* var. *forgetiana*. It had short and dense foliage, maybe a little burned because of the strong sun, but more than happy. Greg told me that in winter it can loose all the leaves, but in spring it grows back better than before and it covers with flowers. In the other small bog, made only with sand, there were some pygmy sundews. All the tuberous ones were in the dormancy period and

invisible. Also a *N. maxima* and some hybrids were growing in the garden, under a tree, always more vigorous and healthy as Greg cut them to the soil level whenever they become too tall.

I should add that here in Sydney the minimum temperature is around 10 degrees, and the quality of tap water is very good, so that it can be used with CP without problems.

Entering in the first greenhouse I was impressed by its general look. Besides a lot of *Nepenthes* there were Orchids and Bromeliads, that gave a nice harmony of colours and reminded me of the old mysterious Victorian greenhouses that I like so much.

The shading was 80% and the temperature was 37°C. It was very hot and I began to drip sweat. But the plants were fine. They were mostly hybrids. It seems that many people here complain about the high prices of the few species on the market, so that hybrids are becoming even too common. Between Greg's nice specimens I remember a *N. eustachia* with 15 cm. pitchers, 4-5 *N. alata* forms with 15-20 cm. pitchers, 2-3 *N. ventricosa* with 15 cm. pitchers, a couple of small *N.*



*N. thorelii* x *tobaica*  
Greg Bourke

*rajah*, a small *N. mirabilis* "John Holmes" and a *N. truncata* with 20 cm. pitchers. I also saw a healthy *U. humboldtii* and a small *U. quelchii*. The second greenhouse is for the sundews. Nearly the whole bench on the right hand side was full with apparently empty pots, with all the dormant tubers. The soil was hard as a rock, made with sand and pebbles.

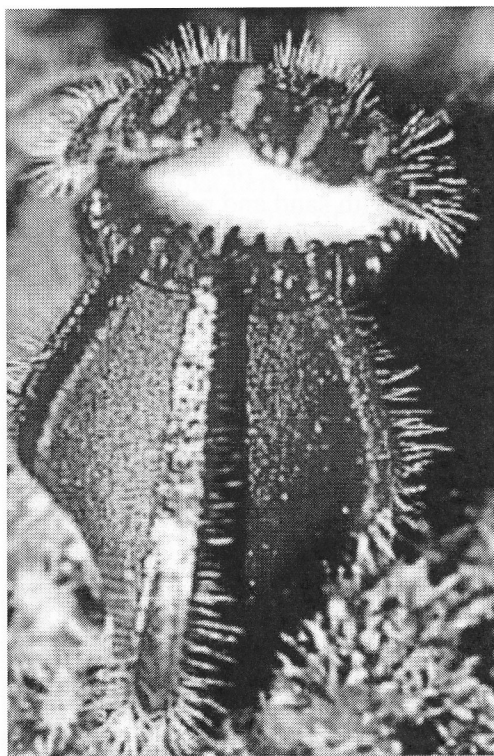


*D. pulchella* 'orange'  
Greg Bourke

I can remember some impressive *D. filiformis*, *binata* var. *multifida* and *hamiltonii*. The pygmies species were growing in very deep 20-cm pots, so that the roots must reach the bottom side to find the right moisture level.

There was an other flowering *U. longifolia* var. *forgetiana*, and, under the bench, covered with water, a happy *U. volubilis*, unfortunately with no flowers yet. Before going out (in this greenhouse the temperature was





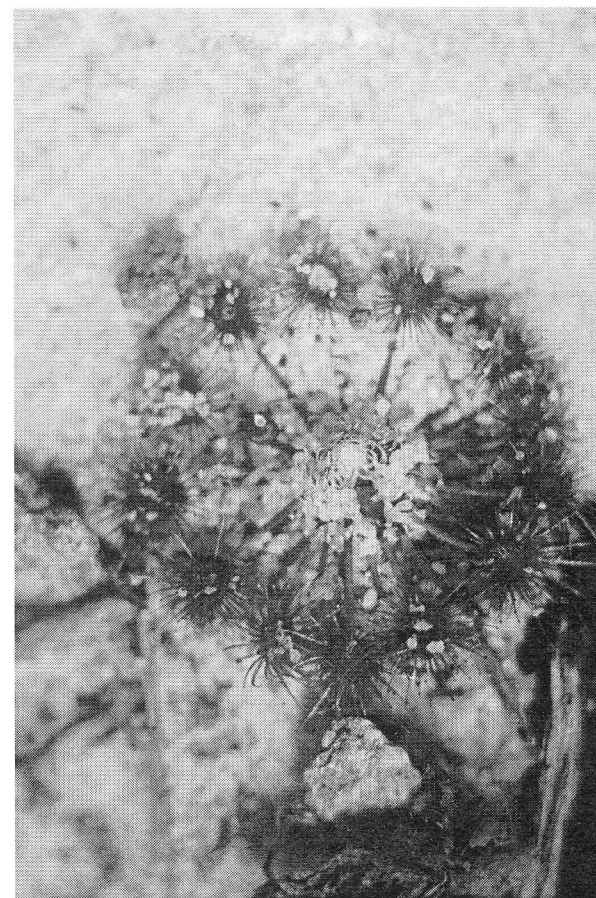
*Cephalotus follicularis*  
Greg Bourke

very high, but with less shading) I saw *Cephalotus*, under the bench as well. It was a nice plant, I was told that it's really difficult to grow in this area, as also are *Dionaea* and *Darlingtonia*, mainly for the too high temperature in winter.

After looking at his plants we took his white minivan – very "Australian"- and we drove to the Royal National Park, 15 minutes away. But before that we spent three quarters of hour speaking about *Nepenthes* (star of the day: *N. mirabilis* var. *rowanae*), looking at photo's on his computer with a glass of Sprite.

At the Royal National Park the omnipresent *D. spathulata* together with *D. binata*, *U. uniflora* and *U. uliginosa* were waiting for us and ... *D. capensis* as well! It was introduced here more than 30 years ago. In spite of that I saw just 4-5 large plants, close to each other. In 30 years it managed to grow apparently only in that small area.

We found all these species on the sandy banks of a small creek, 30 cm. deep and a couple of metres wide, completely exposed to the full sunlight. We also found some dead *D. peltata*, whose tubers were resting between a thin layer of very dry moss and the surface of a big boulder half buried in the ground.



*D. pygmaea*  
Royal National Park, Greg Bourke

Greg then took me to a kind of lagoon, produced thanks to the construction of a road that artificially cuts the stream. Here we found just a few *U. australis* – once more common – that probably survived in the increasing water pollution in this lost paradise.

Something made me curious and ... maybe also moved me. Both on the Blue Mountains and at the Royal National Park, our dear CP showed me how adaptable but at the same time specialized they can be. To better explain, Kirstie and Greg travelled all around these huge areas for about 10 years

looking for CP. Nevertheless the places they showed me and a few others are the only ones where these plants can be found. Forests and rivers for hundred of kilometres, but just over those 10 square metres, where the water, even if scarce, is constant, there is sunlight and the soil is poor and sandy, they grow just over there. Maybe on a rock or in such conditions where probably other pioneer plants couldn't survive, and yet they just grow there. Then nothing for other 100 km.

December 9 was the time of the "Christmas Swap Meeting". Usually on this occasion everyone brings the best of their collection to swap, to sell or simply to exhibit. There were many specimens from Greg's collection, but I also remember a *S. flava* var. *ornata* very dense with pitchers, particularly large *D. regia* and *filiformis*, *N. truncata* with 25 cm. pitchers, *N. aristolochioides*, *eymae*, *ventricosa* and a really nice *N. talangensis*. And then again a *Heliamphora* hybrid, *H. heterodoxa* x *minor*, with quite big and dense pitchers, *U. longifolia* var *forgetiana* and some varieties of *U. livida*, *U. graminifolia* and some others. But as usual the best thing was .... the people! Besides the typical barbeque where everyone brings their own food, there was a competition for the best specimen of every species (more or less a prize for every plant exhibited!) and a competition for the grower who most resembled their plant!! The winner was a tall and slim guy with his *S. alata* "red throat" x *flava* (*S.* x *popei*). The trophy for the best plant of the exhibition -won by Greg, if I'm not wrong- was a wonderful *N. trusmadiensis* pitcher, sent by Phil Mann to Peter Biddlecombe who had it bronzed and mounted to form a perfect and eternal sculpture.

Well, so I arrived at the end of my activity at the Botanic Garden. Unfortunately over there the carnivorous plants are not taken in much consideration even if, during the Christmas Meeting, one of the gardeners of the RBG, Gareth, finally decided to join the CPS, so bringing some hope for the future of the Garden cp collection. But I had anyway the possibility to pour out my passion the last day, moving some large *Nepenthes*, full of leaves but without any pitcher (*N. mirabilis*, *ventricosa*, *reinwardtiana*, *mixta* x *maxima* and *N. x rokko*), from the dark tropical greenhouse to the brightest one, where the Cycads are growing. At the end of the growing season they'll send me some photograph to see if it worked.

I also worked at the Mt.Tomah Botanic Garden, where they keep a small *Sarracenia* collection 2 square metres large. They were quite neglected, so I tried to give them back their dignity. The plants had been moved

from their artificial peat bog because of some big weeding work and then they had been badly potted. So I moved to the surface the rhizomes that were growing more than 4 cm. underground (!), I planted them so that the growing points were raised in the pot. Some of them actually needed to be moved in larger pots, but with this solution I saved a lot of time and even if the people there will forget to repot them, for a few years the plants will be fine anyway.

After throwing away some pots with dead plants and doing some weeding, I put some plastic sheets on the grating-shaped trays and I told the lady of the nursery to avoid the top sprinklers (they fill the pitchers with water, making them bend) and to simply connect the metal water pipe to the trays with some small spaghetti-like pipes. Also in this case they will send me some photos of the results at the end of summer, about three months from now.

However, apart from these two times, I worked with everything but CP. I did weeding, cleaning, pruning, watering, potting, mulching and everything else with really nice and interesting people, talking for hours about any possible subject and never getting bored. All of that in a wonderful botanic garden surrounded by elegant skyscrapers, by the Sydney Harbour and by the triumphant Opera House. Moments that I'll never forget.

But Christmas is coming. And what an odd Christmas! I am completely alone, all the stores are closed, there isn't anybody around, and it is 32 degrees and not even a breath of wind. To complete this absurd atmosphere there's ... a strange sky. A blue and clean sky on my right and orange/grey on my left. When the wind begins blowing and I start smelling something familiar, my neighbors tell me that Sydney is surrounded by fires. But there isn't any worry because the dangerous area is at least one hour by train from here. I was told by Greg that the fire had arrived to within 100 meters from his home and all the locations that I had seen with him burned together with 80% of the Park! For a tragic



irony, the fire - misfortune for many people, animals and things - is a manna for the CP that, finally with a space free from trees, shrubs and grass, will have again enough light to spread and fill larger areas.

I spent the New Year's eve at the Botanic Garden, with an incredible view, fireworks from the skyscrapers, from the ships, from the coast and from the Opera House.

I began getting organized to find a cheaper place than Sydney (as with my few cash-in-hand gardener jobs I didn't get enough to stay there). But my airplane ticket gives me the possibility of an interesting stop over in a really cheap place: Thailand.

## Two South American Beauties

Greg Bourke

I've recently had the opportunity of obtaining two *Utricularia* species of the section *Aranella*. This section consists of nine species all found in South America with one (*U. simulans*) extending its range into tropical Africa. They are distinguished from all others in the Genus by their fimbriate sepals and distinctive traps.

### *Utricularia blanchetii*

I've been cultivating *Utricularia blanchetii* for approximately two years. It is easily grown in a 50/50 peat/sand mix in moist to wet, sunny conditions. It has experienced temperatures as high as 45°C and as low as 5°C with no ill effects. It does however seem to require daytime temperatures over approximately 17°C to flower.

The leaves and traps of *Utricularia blanchetii* are small and somewhat unexciting but it's the flowers which make this species so special. *Utricularia blanchetii* has flowered almost continuously since I've had

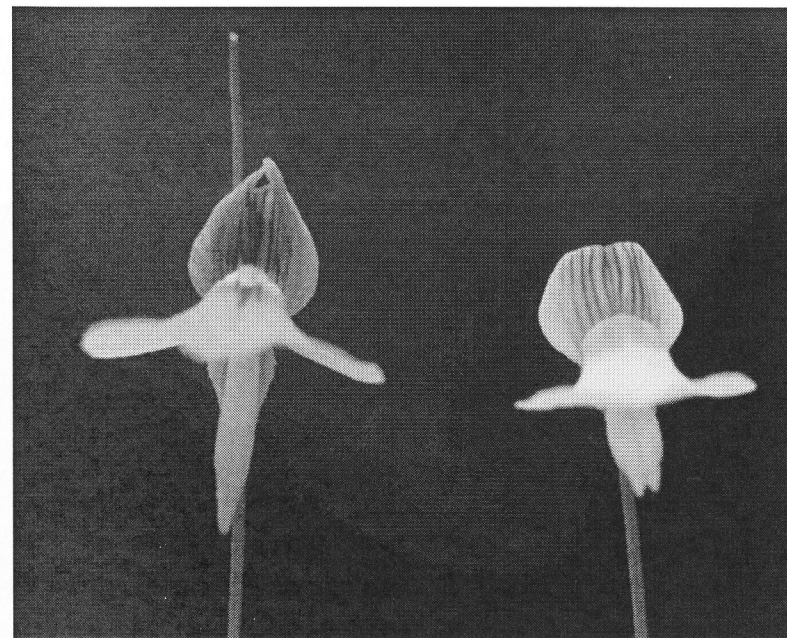


Fig. 1; Front view of *Utricularia blanchetii* (left) and *Utricularia parthanopipes* (right).

it! At present this plant is in a 150mm squat pot with over 60 scapes and more than 150 flowers! Scapes to 150mm tall with up to seven flowers are common. Although the flowers are quite small (10mm across), they are extremely beautiful. The corolla is purple with a bright yellow blotch at the base of the lower lip. The upper lip of the corolla has intricate dark purple venation on a light purple background.

### *Utricularia parthanopipes*

*Utricularia parthanopipes* is a fairly new introduction to my collection but has proven to be equally as rewarding as *Utricularia blanchetii*. With a distribution which overlaps that of *Utricularia blanchetii* in its native South America, *Utricularia parthanopipes* is easily cultivated under the same conditions. Although the flowers of *Utricularia parthanopipes* are

very small (<6mm) they are no less spectacular than those of *Utricularia blanchetii*. They have a white corolla in the lower part with an orange blotch at the base. The upper lip is light purple with very dark purple venation.

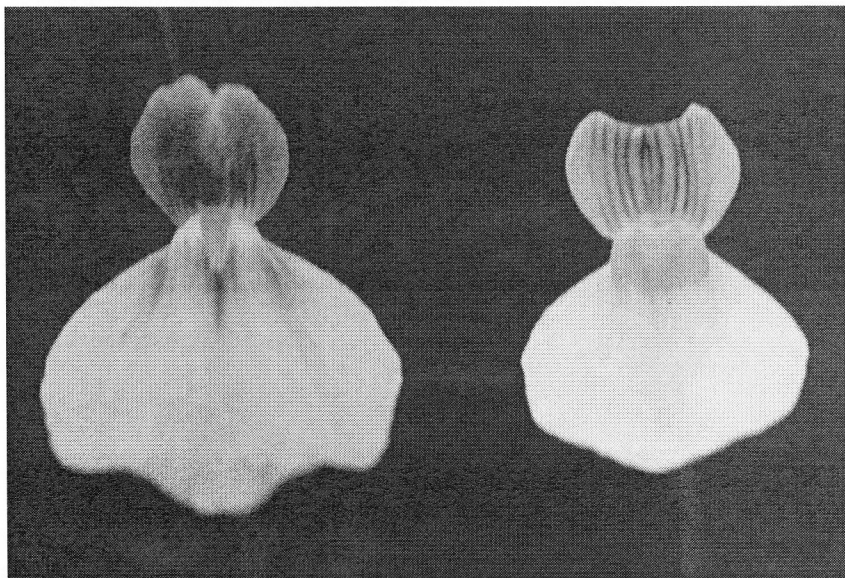


Fig. 2; Above Front view of *Utricularia blanchetii* (left) and *Utricularia parthanopipes* (right).

A white flowered form of *Utricularia blanchetii* also exists (R. Gibson Pers. Com.) which may create some confusion in distinguishing these two species. The flowers of these two though similar in structure have some quite obvious differences. Of these, spur length and shape of the upper lip are easiest to observe (Fig. 1 and Fig. 2). *Utricularia parthanopipes* having a spur length shorter than the corolla, *Utricularia blanchetii* being as long or longer than the corolla. *Utricularia parthanopipes*' upper lip being "very broadly obovate-cuneate" (Taylor. 1989) as opposed to "transversely elliptic or subreniform" (Taylor. 1989) in *Utricularia blanchetii*.

Whether you are a *Utricularia* collector or are looking for your first *Utricularia* species, this two species will not disappoint. You will be rewarded with a pot full of colour.

#### References:

Taylor, P. (1989). 'Kew Bulletin Additional Series XIV The Genus *Utricularia*- a taxonomic monograph' Her Majesty's Stationery Office, Royal Botanic Gardens, Kew.

Gibson, R. (2001). 'A Rare Beauty From Brazil' Bulletin. Australian Carnivorous Plant Society, Vol. 20, No. 2, p16

## Learning to grow Carnivorous Plants under lights – Part 3

Rhonda Strickland

Reprinted from FTN, Mar-Apr 1987

### Section 2 – Special uses of fluorescent lights

#### Propagation

Many CP growers keep a separate light garden for propagation for the following reasons ;

1. Since the light garden is not for show the cheapest building supplies can be used (heavy sheet plastic instead of plexiglass or glass; utility fixtures instead of decorative fixtures; common lumber etc).
2. Since propagation involves small seedlings, the growing area is small and can be tucked away in an out of the way place.
3. Trays of seeds and cuttings must be closer to the light than normal size plants making a separate growing area necessary.

When setting up a propagation light garden, be sure to make the fixtures adjustable. Many growers start seeds or cuttings with the light only 1 or 2 inches from the germination medium, moving the lights away as the seed germinates and grows. In propagation light gardens, humidity, moisture and warmth are of extreme importance. Covered jars and plastic shoe boxes make excellent propagation cases, as the humidity and warmth is higher in these small enclosed containers than in a large garden loosely covered with plastic.

### Aquatic plants

Those CP collectors interested in growing aquatic *Utricularia* (Bladderworts) should setup a separate light garden for these plants. They can be grown in jars filled with water or a large aquarium placed under lights. You should be aware that algae usually develops in aquatic gardens although the fluorescent instead of natural sunlight cuts down on this problem. Keeping the water acidic also discourages algae. Add sphagnum or peat and let the water age for a week or so to ensure a low pH. Chemical additives should not be used. The small amounts of algae that may form in an aquatic light garden with acid water can be controlled by regular cleaning : scraping with a razor blade or wiping with a cloth. Finally, avoiding overly warm temperatures as this encourage algae and reduces necessary oxygen in the water. Another plus for fluorescent lights over sunlight : the surface water temperature will be warmer than water at the bottom of the tank, duplicating the natural environment of *Utricularia* ponds.

### Tall pitcher plants

One of the most perplexing problems among CP light gardeners is how to grow the *Sarracenia* species that reach two or more feet in height. Tall hexagonal aquaria can be purchased for these plants, or one large tank can sit upside down on another identical tank creating a tall covered

terrarium. But even when a tall terrarium is constructed to house these plants separately from shorter carnivorous species, the problem is not solved. The intensity of fluorescent light varies inversely with the distance from the plants to the lights, dropping off dramatically as the distance becomes greater. This results in optimum light levels at the tops of the pitcher plants but practically no light at the crown of the plants, causing new growth to show signs of severe light deficiency. Some light gardeners that grow tall house plants such as *Schefflera* suggest mounting tubes vertically as well as horizontally across the top, but many plants react to this unfavourably, twisting and turning to catch light that is radiating sideways rather than directly overhead. I do not know if pitcher plants react this way also; this light setup would be an interesting experiment as I have not heard of anyone trying it. A similar solution is described in Donald Schnell's book *Carnivorous Plants of the United States and Canada*: he has somewhat successfully used one horizontal light fixture overhead with one placed horizontally on each side, turned slightly at an angle to shine on the soil surface. This solution seems to be better than using vertical side fixtures, as the crown of the plant would get overhead light.

### Mixed Plantings

Horticulturists of eclectic taste may want to experiment with mixed plantings – carnivorous and non-carnivorous plants – under lights. The needs of the non-carnivorous should be carefully considered as some are so special or different that they cannot be grown successfully with CP. Cacti and succulents, bromeliads and epiphytic orchids can only be grown in semi-enclosed terrariums and do not do well in the bog-like conditions of the CP garden. However, if your plants are growing in pots, in a very large well ventilated case, some of them can be grown along with carnivores. There are many plants that require the same conditions. Look for small or miniature plants that grow in woody or tropical environments. The most compatible plants seem to be northern woodland plants such as *Partridge Berry*, *Rattlesnake Plantain*, (in



USA) and small ferns and mosses. Most of these plants need a winter dormancy and are therefore very compatible with northern CP's.

Among tropical plants, look for miniatures that like fairly moist soil as well as high humidity, I have found that terrestrial *Bromeliads* and *Peperomias* eventually have to be replaced since the CP environment is too moist for them. The miniature flowering *Sinningias* and *Begonias* and creeping ground covers (such as *Pilea*, *Ficus* and *Selaginella*) all do well. Many people have successfully grown terrestrial orchids such as the *Jewel Orchid*, *Aneochilus sikkimensis*, in enclosed terrarium environments; however most orchids, like *Bromeliads*, need more ventilation than is found in most terrariums. Remember, if the light garden is large enough, the installation of a fan is possible and then these other plants can be grown with CP.

Most of these plants can be grown in the same soil medium. You should check soil requirements carefully and grow plants requiring different soils in their own pots. Temperature is important too; some of these plants, although liking the same moisture and humidity as carnivores, do better in cooler temperatures. The best arrangement is to have separate light gardens: one for warm loving tropical carnivores, and appropriate companions such as Orchids, Begonias and Sinningias, another for temperate plants liking slightly cooler temperatures and dormancy. With a separate temperature light garden the whole tank can be put in a cool basement/garage for winter dormancy and the lighting adjusted to shorter days, eliminating the need to pull plants out of an established terrarium and sticking them in the refrigerator !.

*Editor's Note : As I mentioned in the Editor's notes at the end of part 2, reprinted in the previous Journal, the original Bibliography mentioned that certain books were available through ILGSA, (Indoor Light Gardening Society of America Inc.). But I did a few searches on the internet and did not find any details at all--- check your library!!*

## Learning to grow Carnivorous Plants under lights – Part 4

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### Section 3 – Commercial Lights

Probably the most difficult part of setting up a CP light garden is choosing the fluorescent tubes. There is a bewildering variety of types and brands available in department stores, hardware stores, plant shops and nurseries. There are basically two types of fluorescent lights :

- Those that are designed that are designed for industrial lighting
- Those designed for plant and animal growth

For years indoor gardeners have used industrial tubes, a combination of “cool white” and “warm white” being the most preferred. These lights are highest in yellow and green since these are the colours we read and see by. However, research has shown that plants need high amounts of blue and red for photosynthesis and flowering. The “cool white”/“warm white” combination supplies a fair amount of blue but is low in red. Regardless, many indoor gardeners grow plants successfully with these tubes by increasing the intensity (using the longest, highest wattage tubes and as many as possible) to compensate for colour deficiency. But people that grow plants requiring high light (CP people included), especially when space is limited, usually find the cool white/warm white insufficient. For this reason, fluorescent tubes were designed and sold as “plant growth” lights. Although plants seem to do very well under them, these lights give out a bluish or pinkish colour, and many gardeners find this unappealing. Industrial and plant tube manufacturers have put together a “balanced light” tube that follows the even distribution of



natural sunlight by having high, nearly equal amounts of all visible colours in the spectrum. These tubes are used by artists and photographers and in industries where true natural colour is important. Light gardeners found that not only did the natural white light show off their plants in true colours but the balanced spectrum seemed to promote better growth than tubes high only in red and blue. There is much debate over whether the balanced “white light” spectrum is really better. Some research has shown the photosynthesis is greater when red and blue is used together in equal amounts but nothing has been absolutely proven. Some fluorescent tubes are also high in some invisible colours of the spectrum: ultraviolet and far red. Some people feel these colours are unnecessary, but many orchid, cactus and CP growers insist that their plant do significantly better under lights with ultraviolet. Until recently ultraviolet light was considered harmful, but research showed that ultraviolet is generally harmless in small doses. Studies by Dr. John Nash Ott seem to prove that ultraviolet is actually very beneficial and necessary to plants, animals and people but his research is not totally accepted by all scientists. As for the far red light, recent research has discovered a chemical in plants called phytochrome that reacts significantly under far red. Phytochrome affects the biological timeclock in plants in ways that are not completely understood as yet. It seems to control a plant’s development from one stage to the next, and therefore has significant effects on germination and flowering.

As there is still much controversy as to which light is best, it is important to understand the colour differences in the variety of tubes available. However, no one can “prove” which is better since much research remains to be done. You will have to decide which seems best to you from what research there is and from your own experience and experimenting.

As far as costs goes industrial tubes are the cheapest and special balanced spectrum plant lights are the most expensive. Figure 4 is a chart of commercial tubes with a general description of their spectral

characteristics to aid in selecting lights. The tubes included are the most popular kinds used by light gardeners. There are many other plant lights on the market that you may want to find out about by writing to the manufacturers.

**Figure 4**

Industrial Tubes

Cool White	High in blue, lacking in red
Warm White	Some blue, some red

“Plant Growth” Tubes

Gro-Lux (Sylvania)	High in blue, high in red
Gro-Lux wide spectrum	Some blue, high in red, some far red

“Balanced Full Spectrum” tubes

Naturescent (Duro-Test Corp.)	High and nearly equal in all visible colours
VitaLite (Duro-Test)	Same as the Naturescents, but some ultraviolet
Spectralite (Carnivorous Gardens)	High and nearly equal in all colours
Verilus TruBloom (Verilux Corp)	High and nearly equal in all colours, some ultraviolet
AgroLite (Westinghouse)	High in all colours, some ultraviolet and far red
Chroma-50 (General Electric)	High in all colours

Experiments with fluorescent lights – spectral characteristics

In the previous discussion of the various fluorescent tubes available, it was pointed out that much research need to be done. The following is a list of suggested experiments for those interested in discovering the reaction of carnivorous plants to the differing spectral characteristics of

tubes. In all of these experiments, be certain that all cultural conditions and plants are as equal as possible so any differences can be attributed to the type of tube used. Use plants that have been propagated vegetatively from one single parent to ensure genetic identity. In addition, use the standard two 4-foot tubes for all experiments so you will be sure length or number of tubes isn't a problem; you will be looking only for plant response to the differing spectral combinations in tubes.

- 1 Compare the reaction of carnivorous plants to the cool white/warm white combination, and the red and green plant growth tubes or the balanced full spectrum tubes. This would require a minimum of two light gardens – more if you want to make comparisons of different brands within the three main categories. Use the standard 16 or 18 hour day and carefully record plant responses on a daily or weekly basis, looking for these things: optimum/minimum growth, coloration, inducing of flowering or dormancy, plant shape and form. Keep plenty of good illustrated CP books handy so you can compare your experiments with what the healthy CP should be like.
- 2 How necessary is ultraviolet light? Does it have effect at all on plants? Gesneriad growers have reported rapid plantlet or offshoot production under ultraviolet; *Bromeliad* and cacti growers report superior coloration; African Violet growers notice no difference at all. Some people have found phototropism to be a problem under ultraviolet; however I've never noticed this with carnivores. Among CP growers, the usual consensus seems to be that, under ultraviolet red colouring is equal to or even surpasses the richly coloured plants growing in natural habitats in full sunlight. This response could be a shield against ultraviolet rays. Make your own comparison using tubes that are nearly the same except for the ultraviolet.
- 3 What happens to CP grown under lights with infra-red or far red? Again, use two similar tubes such as Gro-Lux and Gro-Lux Wide Spectrum. The latter has infrared and is advertised as a light for

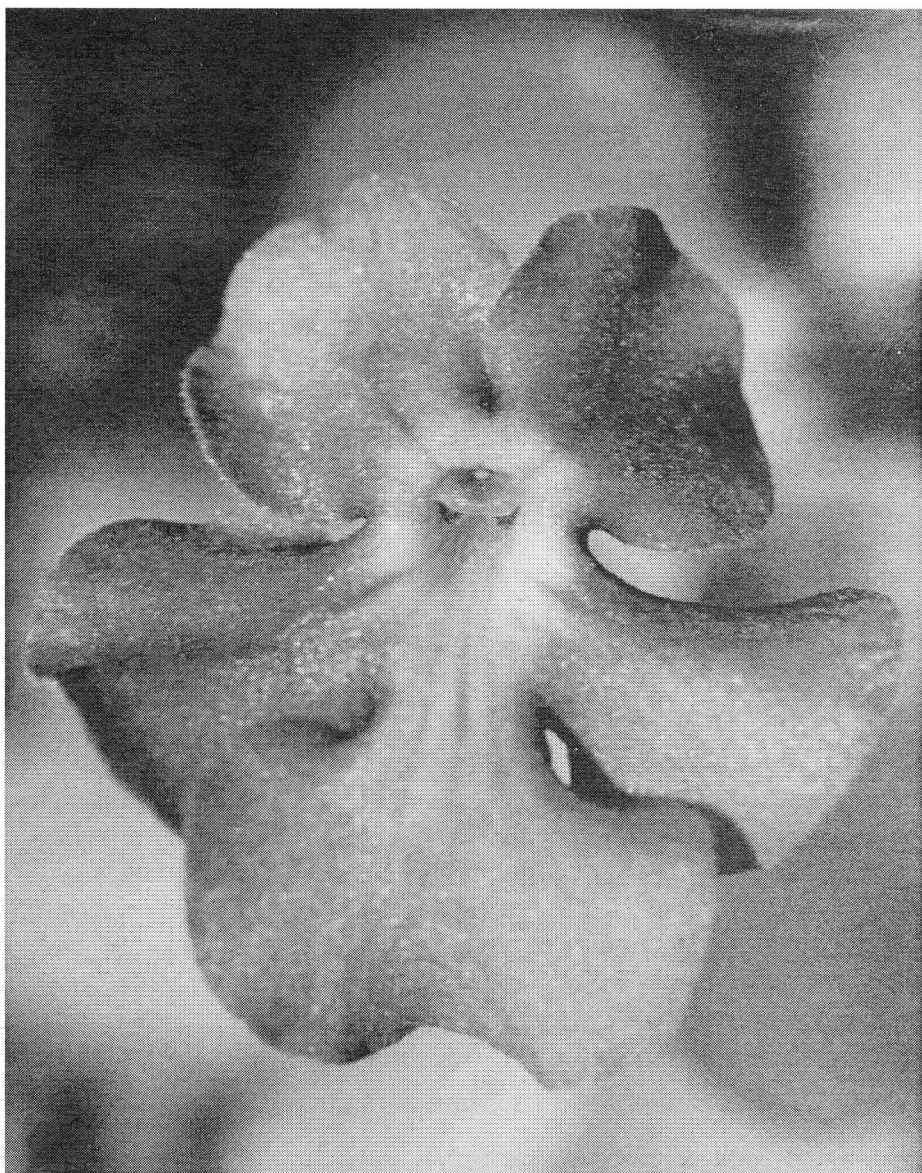
plants that require full sunlight, especially flowering plants. Normal incandescent light bulbs, which produce mostly infra-red, can be used as supplements. Do carnivores flower more readily under infra-red ? Do seeds germinate more successfully? Is there any stem elongation, more or less coloration? The latter two are possible since phytochrome controls cell elongation and anthocyanin synthesis (pigmentation) as well as germination and flowering.

### Photoperiodism

- 1 What happens to a thriving temperate carnivore when a short day (8 hours of light, 16 hours of darkness) is suddenly forced on it?

Can an artificial dormancy be introduced at any time? When the photo-period is changed back to long days, will the plant come back and resume it's normal growth phase to maturity and flowering? Try forcing a short day on tropicals too and see what happens.

- 2 What happens when a temperate CP is forced year round without a dormancy period? This is a long-range experiment that may go on for a few years before effects are noticed. Results may differ widely between species and genera so you may want to try several, keeping control plants that get a normal dormancy period for comparison.
- 3 Until recently, a 24 hour light period was considered detrimental to plants as it was assumed that plants need a dark period to carry on respiration, which proceeds only in the absence of light. However many light gardeners have experimented with 24 hour light periods and found no harmful effects; on the contrary, there are reports of quick, lush growth and speedy flowering. Some CP growers keep lights on for 24 hours when forcing rhizomes or when germinating seeds. Whether or not this has some long-term adverse effect is debatable and an interesting basis for an experiment.



*P. cyclōsecta*  
Greg Bourke