

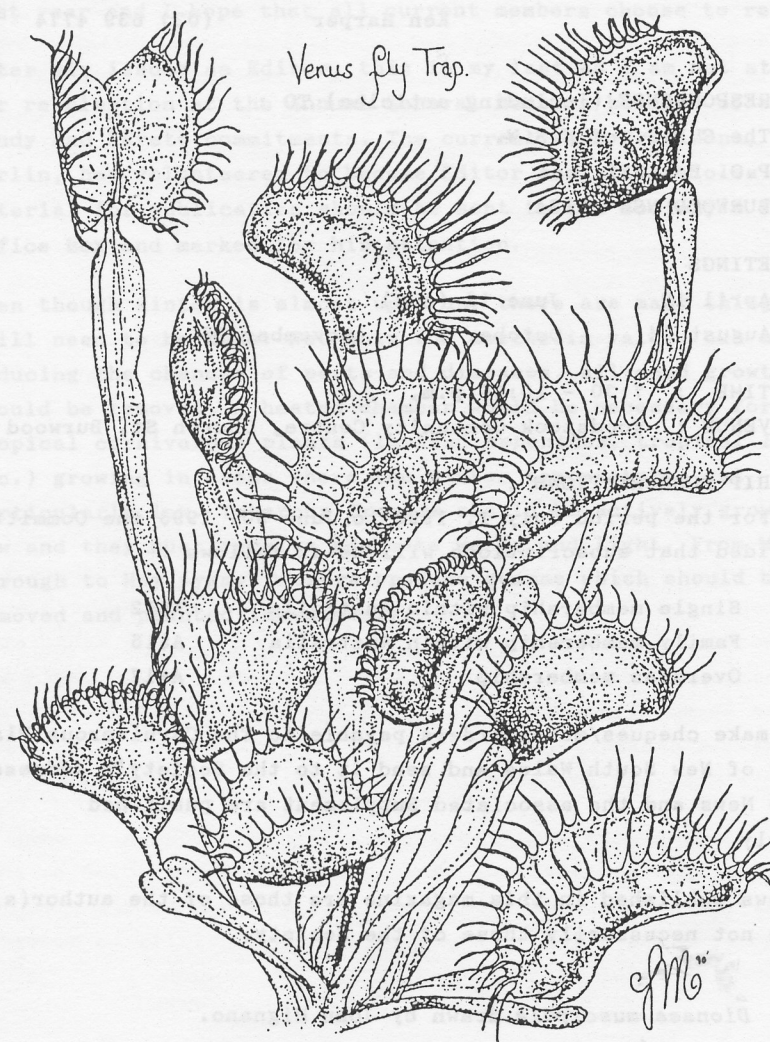
FLYTRAP

NEWS

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APRIL/MAY/JUNE 1992

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NEWSLETTER OF THE CARNIVOROUS PLANT SOCIETY OF NSW



Dionaea muscipula.

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ALL CORRESPONDENCE (including articles) TO :

The C.P.S. of N.S.W.
P.O. Box 87
BURWOOD NSW 2134

1992 MEETINGS :

April 10 June 12 (AGM)
August 14 October 9 November 13

TIME : 7:30 - 10:00 p.m.

VENUE : Woodstock Community Centre, Church St, Burwood

MEMBERSHIP SUBSCRIPTIONS :

For the period July 1, 1992 to June 30, 1993 the Committee has decided that subscriptions will be as follows :-

Single membership within Australia	A\$12
Family membership within Australia	A\$15
Overseas membership	A\$17

Please make cheques/money orders payable to The Carnivorous Plant Society of New South Wales and send it to the Society's address. Flytrap News and the associated Supplement are published quarterly.

The views published in this magazine are those of the author(s) and are not necessarily those of the Society.

COVER : *Dionaea muscipula* drawn by John Mignano.

EDITOR'S REPORT

This issue of *Flytrap News* is the last of your subscription and a renewal notice accompanies this journal. Even though postage rates and the cost of processing the colour photos have increased, subscription rates have been kept at the same level as last year and I hope that all current members choose to renew.

After six issues as Editor, this is my last as I am not standing for re-election at the Annual General Meeting because of work, study and Karate commitments. The current Vice-President, Peter Carlin, has volunteered to become Editor and all articles and material for publication should be sent to the Society's Post Office Box and marked for his attention.

Even though winter is almost upon us, there are many things which still need to be done. Not only for aesthetic value, but mainly reducing the chances of pests and diseases, all dead growth should be removed. A heated chamber would be necessary for tropical carnivorous plants (lowland *Nepenthes*, tropical *Drosera*, etc.) growing in areas where the winter temperatures get particularly low. Tuberous *Drosera* should be actively growing by now and they must receive adequate water and light. From March through to May pygmy *Drosera* produce gemmae which should be removed and planted immediately.

Contents of *Flytrap News*

by Ken Harper

Over Christmas I looked through the back issues of *Flytrap News* and thought it would be interesting to analyse exactly what had been published since the Society began in June 1985.

Including this issue, the CPS of NSW has produced 23 journals which have covered a variety of plants and subjects. The categories I devised included not only all genera published but topics which were frequently addressed (including general CP cultivation, growing chambers, field trips, etc.) and the "Number of Pages" calculated does not include photographs, diagrams or drawings. "Lists" refers to articles published on existing CP Societies and suppliers of CPs, while the "Miscellaneous" category includes all articles which did not justify their own subheading.

Two bar graphs accompany this article: the first (Figure 1) shows the number of articles by category while the second (Figure 2) graphs the number of pages devoted to each topic. From these graphs, it is interesting to observe some trends.

The most popular subject has been *Drosera*, with the most number of pages being printed on this. Other topics which have received wide coverage include overseas field trips, growing chambers and *Utricularia* but it is the lack of articles on common genera such as *Nepenthes*, *Pinguicula* and *Sarracenia* which is both surprising and disappointing. I know that these plants are widely grown and articles on how to cultivate them in Australia are rarely published in journals or CP books. Why not then put pen to paper and write down how you grow your plants??

Byblis, *Darlingtonia* and *Drosophyllum* are less common in most collections but somebody out there must have information to share on these topics. I think that those subjects and genera which have not received a lot of exposure should hopefully be addressed in future issues of *Flytrap News*.

C.P.S. of N.S.W.
Number of Articles

Figure 1

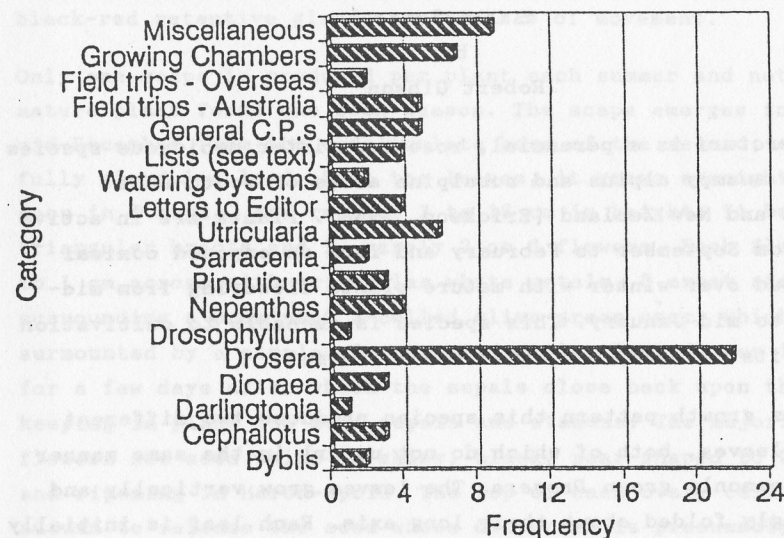
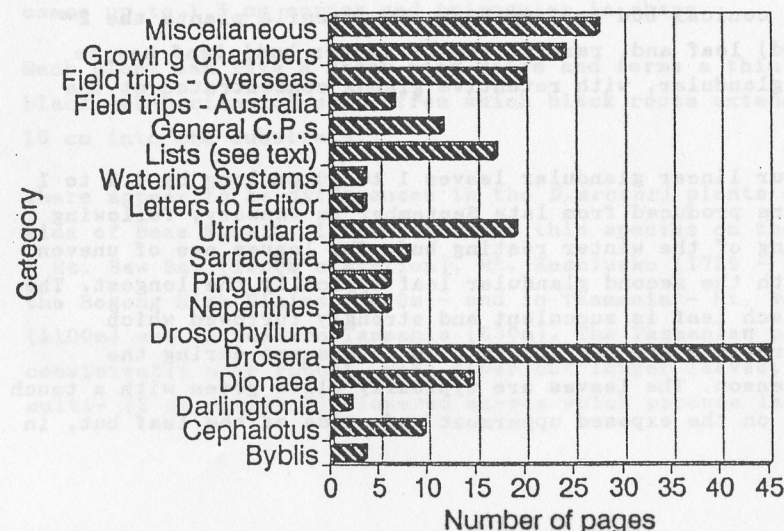
C.P.S. of N.S.W.
Pages by Article Category

Figure 2



Drosera arcturi - The Alpine Sundew

by

Robert Gibson

Drosera arcturi is a perennial, rosetted winter deciduous species native to swampy alpine and subalpine areas of south-east Australia and New Zealand (Erickson, 1968). Plants are in active growth from September to February and form an exposed conical dormant bud over winter with mature plants flowering from mid-December to mid-January. This species is amenable to cultivation provided its dormancy and water needs are met.

Due to its growth pattern this species produces two different types of leaves, both of which do not uncurl in the same manner as more commonly grown *Drosera*. The leaves grow vertically and are strongly folded about their long axis. Each leaf is initially held erect but falls away from the growing point as the leaf ages. The first two leaves to open in spring are the ones which formed the winter resting bud, produced the previous February. These are triangular in shape, to 3 cm in length and are typically non-glandular (in mature plants), the inner leaf (2nd) growing longer than the outer leaf (1st). During autumn and winter *D. arcturi* is dormant and the leaves form a dense, succulent conical bud to 3 cm high. In juvenile plants the 2nd (outer bud) leaf and, rarely, the 1st (inner bud) leaf may be sparsely glandular, with retentive glands concentrated at the leaf tip.

One to four linear glandular leaves 1 to 20 cm long by 0.5 to 1 cm wide are produced from late September to January, following the opening of the winter resting bud. The leaves are of uneven length with the second glandular leaf typically the longest. The base of each leaf is succulent and strongly furrowed which perhaps protects the new growth from cold snaps during the growing season. The leaves are typically olive green with a touch of maroon on the exposed uppermost underside of the leaf but, in

full sun, the plant obtains an orange-red colour. Only the black-red retentive glands are capable of movement.

Only one scape is produced per plant each summer and not every mature plant forms one each season. The scape emerges in early to mid-December from the canaliculate base of the second, or third, fully glandular leaf. Like the leaves, it grows straight up, also seen in *D. regia*, and reaches 3 to 15 cm in height. It bears small triangular bracts and 1, rarely 2 or 3 flowers. Each flower is up to 1 cm across with triangular white petals, 5 erect stamens surrounding a prominent 3-celled olive-green ovary which is surmounted by a simple, 3-segmented style. Each flower is open for a few days after which the sepals close back upon the ovary, keeping in place the dead sepals and stamens. The majority of flowers set seed which is shiny, black, pear-shaped to 2 mm long, and ripening in March-April. The top of each ovary cell opens in autumn to release the seed whose dispersal is presumably assisted by the action of rain or wind.

In some plants I observed in Western Tasmania, the leaves produced during and after flowering were intermediate in form between normal linear glandular leaves and winter bud leaves. They were either sparsely glandular, with retentive glands restricted to the end of the leaves or non-glandular, and in many cases up to 1.5 cm across and triangular in shape.

Each plant can live a great many years and forms a thin, short, black sub-horizontal stem, from which black roots extend at least 10 cm into the substrate.

There appear to be differences in the *D. arcturi* plants on either side of Bass Strait. I have observed this species on the mainland - Mt. Baw Baw (1500m elevation), Mt. Kosciusko (1720 - 2140m), the Bogong High Plains (1850m)- and in Tasmania - Mt. Wellington (1100m) and in western Tasmania (530m). The Tasmanian plants are consistently more robust, with fewer but longer leaves, and often multi- (2 or rarely 3) flowered scapes which produce larger seed,



when compared with plants on the mainland. The plants found in New Zealand, although occasionally producing 2-flowered scapes, are similar to plants found on mainland Australia (Bruce Salmon, personal communication, 1991). The Tasmanian plants require further study and may warrant subspecies status (Allen Lowrie, personal communication, 1991).

The species grows in a number of alpine and subalpine regions, all of which are permanently moist and subject to winter frost and snow. However the plants are commonly found at the boggy confluences of alpine streams and on the banks a short distance downslope, often growing with sphagnum moss. In Western Tasmania this species is commonly found in peaty soil or, more rarely, moist gravel in Button Grass plains.

Drosera arcturi can be cultivated successfully provided its dormancy requirements are met. From my experience in growing this species in Hobart, at a more southerly latitude to where the plants were collected, this species is more sensitive to temperature than day length. Thus, in order to grow this species well in warmer climates, the dormant buds will need to be stored in the fridge (not freezer) for part if not all of winter. Minor chilling at the start of autumn is recommended to coax the plants into dormancy; failing this, the plants will survive for a few years but do not go completely dormant and hence decline in vigour year after year.

Propagation may be achieved by seed or division of mature plants. Seed needs to be stratified for at least 6 weeks in winter prior to sowing on moist peat moss in early spring. Secondary growing points are naturally produced along the stem and, when well established, may be divided. To date leaf cuttings have been unsuccessful and both root and stem cuttings have not yet been tried.

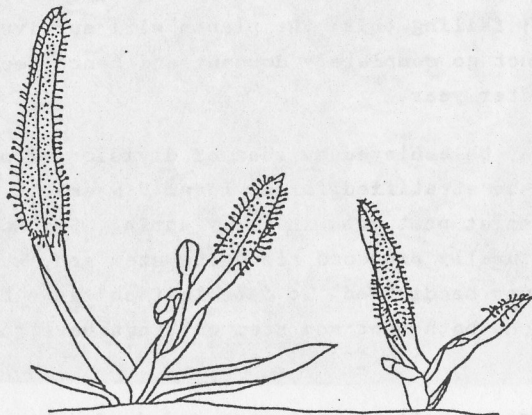
This species grows well in peat moss and dead sphagnum moss and requires a constant supply of water, even when dormant.

Dehydration leads to poorly formed retentive glands, which do not produce mucin, and, in more severe cases, death of the plant. Considering the slow growth of this species and paucity of leaves produced, one day of neglect can show on the plant for the entire growing season. A well-lit aspect is essential. Like other *Drosera* species it is not immune to pests and is susceptible to caterpillars and aphids.

In conclusion, the Alpine Sundew is an unusual winter-deciduous native *Drosera*. It is amenable to cultivation if provided with a permanently wet sphagnum moss-based growing medium and a sunny position. To sustain this species in warmer climates than its native environment, artificial winter cooling is required. New plants may be obtained by division and sowing (stratified) seed. Although not commonly available, this species should become more so with time and the robust Tasmanian form is the more rewarding one to grow.

REFERENCES:

Erickson, Rica: Plants of prey in Australia - Nedlands:
University of Western Australia Press, 1968.



Western Tasmanian *Drosera arcturi* (70% life size)
sketched by Robert Gibson, 20.12.1991

Venus Fly Traps/*Dionaea muscipula*

- A commentary on how to grow and multiply them -

by Richard Riles

I have put pen to paper in order to impart the basics of growing Venus Fly Traps (*Dionaea muscipula*, but I will use VFT/VFTs to make it easier on me). Before I get into the "nitty gritty" of explaining how I successfully grow over three hundred VFTs (and tripling or more each year), you might be interested in knowing how I came to get that many in the first place, and for that matter how I came to collect carnivorous plants.

It all started in my early days of High School (1984) when I was shown a VFT in a nursery. I did not even know what a VFT was and so at that time I did not give it a second glance because I was into palms and ferns and was busy looking around for a particular plant I wanted. Dad was also at the nursery and asked me to come and look at one of the VFTs, showing me how the leaves snapped shut when they were touched. This fascinated me and so I had to have one; I was hooked!

Unfortunately a few weeks after this the plant was dead. Four VFTs later I was getting desperate and so looked in the phone book to see if there was something there that could help me. Sure enough I found a reference to the Western Australian Carnivorous Plant Society.

Immediately I wrote a letter asking if I could join and for advice on my problem. I received a reply to my letter a few weeks later saying that this society had been dissolved some time ago but the writer had heard of a Society forming in New South Wales. He gave me Daryl Brenton and Cecily Rumps' address [Ed: Committee Members of the CPS of NSW at this time] advising that I contact them and a short explanation on how to grow the plants with a reference to Adrian Slack's first book (his second book was published a few years after this - 1986). It was only then that I learnt about the importance of standing the plants in water and

giving them heaps of sunlight. This knowledge would have been useful four VFTs ago!

I contacted Daryl and Cecily soon after this and they informed me where the Society met (at that time, Ryde Catering College) and the dates of the next few meetings. I persuaded mother to be my taxi service and so was able to attend my first meeting where I joined the Society. At my second meeting there was a raffle being held. The prize was a VFT - well actually a pot of nine VFTs. Now of course I was broke but mother, loving raffles, had a few pennies to spare. No prizes for guessing - I won.

After I had asked for detailed information on how to grow them at the meeting, the VFTs did very well that summer and started to divide. By next spring the pot was crowded so I repotted the nine plants, dividing each as I went and ending up with twenty plants. As I began to understand what growing conditions the plants liked best their multiplication rate increased. So, in a few short years, even selling excess plants as I went, I have ended up with three hundred VFTs.

REPOTTING

Through the years one thing has become clear: VFTs do not like to be crowded. If you want large traps, and I know all of you do, you must not let the plant divide and become pot bound; if this happens the traps become very small and develop very little colouration. To avoid this problem and other problems mentioned later, repot every year if you can. My VFTs usually look poorly after repotting, however in a month they look much better for it.

Potting VFTs is very easy, the only difficulty is trying not to close the traps. That's right, you DO NOT want to CLOSE THE TRAPS. This wastes the plant's energy which it could otherwise put into producing the season's roots.

Repotting early in August avoids the problem of closing traps as the plant is still in dormancy and probably will not have many

traps to close anyway. If it does, these will be anaesthetised from the cold and so will not be very responsive if a finger or bits of peat moss touch the hairs in the trap.

It is also possible to repot from mid-August to mid- to late September. After this I do not like to repot my plants as by this time the roots are usually well into growth and repotting may, I believe, cause the plants stress, thus slowing their growth for that season.

The potting mixture of a VFT is easy to make up: simply use one part peat moss and one part perlite. I have only ever used German peat moss (Eurotorf) and have found it to produce consistently good results and therefore have not tried anything else. If perlite is used, a medium to coarse grade is sufficient.

To demonstrate how easy it is to repot VFTs I will give a hands on talk at the August meeting. Generally though, squeeze the pot so that the soil can be seen to rise a little, moving the pressure point around the pot's circumference. Place two fingers over the plant (not in the middle of a trap of course!), invert the pot and it should separate from the soil. If it does not, squeeze the pot a few more times while in the upside-down position.

Separate the plant from the potting mix so that you can see the roots. I find that dipping the roots in water is helpful. At this point I usually trim the roots, just enough so that they will be a centimetre away from the bottom of the pot. The only reason I do this is because I use tomato pots for my VFTs rather than using a larger pot each year. Through my experience they do not need a large pot, so I do not waste potting mixture giving them more room than they need. The only point I might mention is that, if you have a choice of pots, use a wide squat pot - say eight to ten centimetres - as this will keep the traps level with the ground rather than growing over the edges of the pot.

After cutting away any dead leaves, I examine the plant to see if there is any point on the rhizome where it can be divided; if so, I gently pull the sections apart. If the plant has truly divided, the sections of the rhizome will separate relatively easily. Do not be afraid to apply a little pressure, these plants are not bone china! Sometimes on a section of old rhizome from which the leaves have died back you will find that many suckers (very small VFTs, probably without roots, which draw their energy from the parent plant) have developed. These generally are in a tangled mess and should be removed. I pot all my suckers in one large pot as they are too small to go in a tomato pot by themselves, with about ten percent of them dying during the season anyway. Those suckers that survive, even though they may not have had any roots to start with, normally double their size within a year.

Next I get a pot and fill it with new potting mix, make a hole in the potting mix in the centre of the pot with my finger, place the VFT in the hole and pack the potting mix around the plant, filling any holes with additional mix. One important point when doing this, ensure the plant is potted to the original level in the soil (i.e. that the white centre is not visible).

LIGHT REQUIREMENTS

After repotting your plant it is simply a matter of placing it outside in full/direct sunlight. Do not make the mistake of putting your plants in a shadehouse thinking they are delicate. If your plant is in there, MOVE IT!!!! Do not, however, move it straight into eight hours of summer sun. First place it in a position where it will receive a little morning sun, gradually moving it over the weeks so that it receives not only the morning sun but more and more of the midday and afternoon sun. Basically, you are aiming to give the VFT as much direct sun as possible. For this reason I do not keep any VFTs on a window sill, as they always seem to need more light and do better outside. If, however, you do not have a choice a north or north-east facing window is best.

If your VFT was under shade, within weeks of receiving more sun you will notice the following changes in your plant:-

- 1) The leaves become a solid healthy looking light green, possibly with red tinges, from that semi-translucent pale green which they developed in the shade, and
- 2) On the new leaves the difference will be very noticeable, they will be thicker and more sturdy looking. The actual traps develop a red colouration on the inside lobes, however this colouration differs markedly from plant to plant and seems to be conditional on the plant's genes.

Alternatively, and especially if the above method is burning the VFT's leaves, wait until the plant has died down for winter or stopped growing and then move it outside to the direct but weaker winter sun. If you are forced to use this method, do not repot again when August comes as the plant needs time to adjust.

Through my various observations and from the experiences of others, VFTs receiving adequate sun will come out of dormancy earlier than those in the shade which start growing anything up to a few months later.

ARTIFICIAL LIGHTING

Although I have not completed adequate experiments with artificial lighting, the results I have achieved are about the same as if the plants were grown in the shade. I therefore cannot recommend this technique if it is avoidable but, since it is possible to use many different combinations of lighting, I am not prepared to say that this method will not work. I do not know any locals who grow VFTs under lights, so cannot cite their experience either. There was an article on the subject in the International Carnivorous Plant Society's journal which you might want to refer to; this edition is available from our Society's Library. Apart from this you will just have to experiment.

If you live in a unit, where direct midday sun is difficult to find, you may try a combination of lights using a "Grolux"

fluorescent tube, keeping the plants fairly close to the light, say fifteen to twenty centimetres away. Use only "Grolux" tubes and do not accept an "Aquarium Light" on the basis that it makes aquatic plants grow.

About the "Grolux" lights themselves: there are two different types, normal and "Wide Spectrum". If the plants are in a dark corner of your unit I would suggest using "Wide Spectrum", however if you use this (signified by a "W/S" on the tube) I do not know what your second light should be because the "Wide Spectrum" lights simulate sunlight more closely, while the normal "Grolux" concentrate on the blue and red parts of the light spectrum which the plants utilise for photosynthesis. I would think that using a normal "Grolux" with the Wide Spectrum, if your plants are in a dark corner, would produce reasonable results. If on the other hand your plants are near a window, a normal "Grolux" light is sufficient, possibly with a standard white tube which supplies more of the green and yellow parts of the light spectrum.

When growing plants under lights, the usual practice is to have two fluorescent tubes placed at a certain distance above the plants, the tube type depending on the plants you want to grow and the distance between the tubes and the plant's leaves depending on the type of plants. Thus the number of combinations of lights and the height of the tubes is endless.

WATERING

Perhaps the most crucial ingredient in the recipe for growing VFTs is water. In summer the plants should stand in water and failing that should be watered every day, ensuring the mixture is wet, not just moist. In my opinion, to leave a small pot not standing in water in the summer sun is inviting the death of a VFT. These plants will not tolerate a dry soil and, even in winter, the potting mix must be at least moist.

I find that my plants must stand in water which is approximately one third of the pot's depth. On a hot day this reservoir often dries out and in the height of summer it is necessary to refill the water trays every day.

When I first started growing VFTs I collected rainwater to water them, believing they needed mineral and salt free water. Now I do not bother as they survive perfectly well on Sydney's tap water, so why collect rainwater? The only situation where I think that the use of rainwater may be advisable is if you kept the plants in the one pot year in and year out. Since I repot my plants at least once every two years, this is not necessary as the mineral salts do not have a chance to build up in the potting mix, and I would not suggest that you leave any plant in the one pot for too long without repotting.

In the wild, the plants receive much more water in summer than they do in winter. In winter I try to simulate this by letting the water trays dry out and then waiting approximately two days, depending on the weather, before watering again by half filling the trays. Keep in mind that the potting mix should not dry out.

In summary the basic aim of watering is to have the soil as wet as possible in summer while not drowning the plant, and in winter to keep the soil moist while never letting the potting mix dry out.

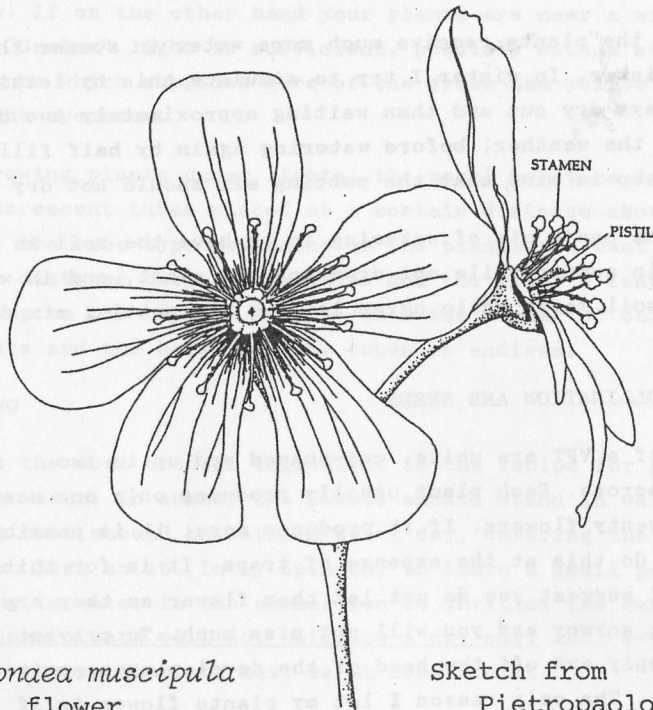
FLOWERING, POLLINATION AND SEEDS

The flowers of a VFT are white, cup-shaped and up to two centimetres across. Each plant usually produces only one scape with up to twenty flowers. If it produces more, it is possible that it will do this at the expense of traps. It is for this reason that I suggest you do not let them flower as they are fairly boring anyway and you will not miss much. To prevent flowering simply cut off the head of the developing scape as soon as it appears. The only reason I let my plants flower is if I want seeds for the Society's Seed Bank, not to obtain seeds for

myself as it takes a long time to get a decently sized plant from a seed (approximately seven years). However they are always popular in the Seed Bank so, if you feel like producing some, read on.

When the flower opens it will first produce pollen, the yellow powder on the anthers. After the anthers have given off all their pollen the stigma, at the top of the centre stalk (style) of the flower, will open. You will know the stigma is open when a multitude of small hairs appears on the end of the style.

To pollinate a flower you must take pollen from a flower which has its anthers producing pollen and place it on the hairs of the stigma on a flower which has its stigma open. One plant often has flowers open at different stages on the one scape.



Dionaea muscipula
flower

Sketch from
Pietropaolo (1986)

FERTILISER

With the reproduction rate of my VFTs you would be crazy for even thinking of fertiliser! Seriously though, you should never fertilise a VFT or any carnivorous plant other than *Nepenthes* (as for other rarer species I do not know). Ian English [Ed: a foundation member, previously President of the CPS of NSW and an experienced commercial grower] used to fertilise his carnivorous plants but he had a special fertiliser formulated for them. This type of formula is not available at a nursery, and other fertilisers are not suitable for Carnivorous Plants with the exception of *Nepenthes*.

You do not need to catch insects for your plant either! The plant will catch what it needs, no more no less, simple, and much easier on you! I have a friend who once had a VFT. He caught flies for his VFT and placed them in the plant's traps, then wondered why the plant did not close on them and say thank-you for supplying dinner!!?? So he closed the trap and then wondered why the trap was open again the next morning. This is because the VFT requires its victims to trigger the hairs inside the trap where there are three on each lobe. After it has triggered one hair twice or two hairs once within a space of about twenty seconds or so, the trap will close with the victim moving inside the trap, continually stimulating the hairs as it tries to escape. This only causes the trap to close more tightly and start to produce digestive juices. Thus a VFT will not eat a dead fly.

PESTS AND DISEASES

I have only ever come across one pest, which was a plague of whitefly that we had in 1990. However when the winter of 1991 came along and the plants died down, it killed all of what remained of their eggs and larvae and by next spring the problem was no more.

I am reluctant to use pesticides, especially on carnivorous plants as it seems to cause them considerable stress. If you

think it is necessary, go to your local nursery and buy something which you can dilute. Ask the attendant to suggest something for the particular insect (if you do not know what the insect is, take an example of it along in a sealed container). Whatever the label suggests you use as a dilution factor for ornamentals, halve it. If the attendant suggests a few brands, ask for the weakest. Whatever you do, do not do what my aforementioned friend did: he saw a bug on his plant and used Mortein. Naturally the VFT did not last long!!

The only disease that I have seen is root rot, which generally occurs if the plants have been kept too wet over winter. Look for wilting green leaves. The only way to arrest the problem is to unpot the plant, remove all the soil and cut away the affected rhizome. If you notice it quickly enough you can usually save the plant. When you unpot the plant you will see the affected leaves will be brown underneath the soil, these areas are usually "mushy". This must be removed from the rhizome completely and it will not hurt the plant if it is dipped into some diluted fungicide such as Benlate. Hopefully you will have some plant left after you have made the cuts!

SUMMARY OF GROWING TIPS

- Repot every year if you can.
- Repot from early August to mid- to late September.
- Use a potting mix consisting of one part German peat moss and one part medium or coarse perlite, which is wet when repotting.
- When repotting you should remove all potting mix from the roots, trim the roots if necessary, divide the VFT if possible, remove suckers and repot the VFT to the same depth in the soil as it was before repotting. An eight to ten centimetre squat pot is recommended.

- VFTs should be kept outside in full direct sunlight.
- Artificial lighting could be used; however this is experimental.
- In summer a VFT should have its pot standing in water which is about one third of its depth. The water trays should be refilled every day. In winter the water trays should be half filled every time the water reservoir dries out. NEVER let the potting mix dry out.
- It is best not to let the plants flower as this wastes their energy. If allowed to flower, seeds may be obtained by taking pollen from one flower with the anthers open and transferring it to a flower with its stigma open.
- Do not fertilise a VFT, do not catch insects for it and do not close the traps "for fun" too often.
- Pests can naturally disappear if only a small infestation; however, if spraying is necessary, use half the concentration recommended on the dilution factor table for ornamentals.
- Diseases - Root rot: use fungicide after removing all traces from the rhizome. Otherwise: use Fungicide and pray often!

Nepenthes maxima and *Nepenthes x rokko*

by Ken Harper

Nepenthes maxima

This highland species is one of the most commonly grown in *Nepenthes* collections all over the world. *N. maxima* is native to montane and sub-montane areas of Borneo, Celebes, Moluccas and New Guinea at altitudes ranging from 600 to 2745 metres above sea-level. The tallest plant of *N. maxima* I have seen was nearly 5 metres high with a stem approximately 1 cm thick. Both the lower and upper pitchers of *N. maxima* can grow to dimensions of 20 cm tall and up to 5 cm wide but the upper pitchers are more infundibulate (conical) to cylindrical than the lower ones. I prefer the more colourful lower pitchers to the blander uppers and hence my plants are cut back at least every two years to promote a more bushy (I think more attractive) look.

Nepenthes x rokko

The hybrid *N. x rokko* was created from *N. thorelii* and *N. maxima* by Yamakawa in Japan in 1978. *N. thorelii* is described as having gibbous (rounded or hipped swelling in the bottom part of the pitcher) reddish-green lower pitchers and cylindrical upper pitchers which have an enlarged lid and fringed wings. *N. thorelii* is native to Vietnam and grows in lowland regions. Hence *N. x rokko* is an interzonal hybrid, i.e. one parent from lowland areas and the other highland. I have found *N. x rokko* to be a most rewarding plant which has inherited the nicest characteristics from its parents. Lower pitchers are almost identical to *N. maxima* in size but the peristome is a brick-red colour instead of a dark brown-black, the mottling of the pitchers is more red than crimson and purple and the pitcher shape is slightly gibbous. Like *N. maxima*, the upper pitchers of *N. x rokko* are not particularly attractive and it is treated similarly. I grow *N. x rokko* with my highland *Nepenthes* but I suspect it could be satisfactorily grown as a lowland.



Photograph of *N. maxima* (right) and *N. x rokko* (left) taken in March 1992 by Robert Gibson from Ken Harper's collection. Both pitchers are 4 cm at their widest point and 17 cm tall.

Carnivorous Plants in Autumn

by Pierre Sibille

[Ed's note: This article has kindly been translated by J Harper from the 1987 Special Edition of *Dionée*, published by the French Carnivorous Plant Society]

Harvest Time

The start of autumn is for the most part of the time when carnivorous plants reach fructification. We should be watchful of the ripening seed-pods in order to gather as much seed as possible. This collection has three objectives :-

1) To increase our plant numbers. To quote D E Schnell: "It has been said, and rightly so, that you do not actually have a plant until you are able to propagate it through seed or vegetative means".

2) To supply the Association's seed bank.

3) To prevent certain spontaneous seedlings which run the strong risk of bringing some confusion into our collections (of *Drosera* in particular). Some prolific species such as *D. capensis* or *D. capillaris* will 'squat' spontaneously in neighbouring pots, mixing with other species.

Collecting seed requires care. The pre-selected seed-pods are opened over a piece of paper; the contents are spread out to get rid of seed-pod debris and the seeds are left to dry. This is the time to observe them through a strongly magnifying lens. The way the grain looks can help determine the species. This observation also allows, for *Sarracenia* in particular, sorting of the best seed, eliminating those which are not viable.

Put them in packets (those used by philatelists are practical), and close with two or three folds and some glue rather than with

some adhesive tape where the seeds will allow themselves to be stuck. For very fine seed (e.g. *Drosera*) wrap them in fine paper folded in a square before bagging them. Record the species and the harvest/collection date.

Preparations for Wintering

If the sun shines generously enough at the start of autumn, the shortening of the days induces our outside plants, forced and in cool greenhouses, to develop towards a dormant state.

Since summer, Western European butterworts, except for *Pinguicula lusitanica*, reduce their rosettes and prepare for winter. For those plants raised in tanks just as for *Sarracenia purpurea* in mini-peatbogs, a light protection (small plastic 'tunnel') will be placed during autumn.

In this season the most important task is to carefully remove all the withered or blackened parts of the plants, thus lessening the risk of rot.

Gradually reduce the plants' watering, especially when the weather becomes cold and rainy. This is particularly important for plants which reduce to a winter bud. This is the case with *Drosera filiformis*, a species very susceptible to botrytis (i.e. grey mould) and for which a preventative fungicide treatment is a wise precaution.

The withered pitchers of *Sarracenia* should be cut at the base. For this genus, from time to time in autumn and winter one can let the plants dry out for several days before light watering at the base of the pots. One species is the exception here : *S. psittacina* which will spend the winter totally submerged (in non-calcareous water) right up until the first signs of spring growth.

As for species originating from hot and humid regions, like lowland *Nepenthes*, epiphytic *Utricularia*, North Queensland

Droseras, kept in indoor terrariums or hothouses, they are not affected by the cold season.

Autumn "Babies"

It is in autumn that pygmy *Drosera* give birth to numerous buds nestled in the centre of their rosettes. We take out these gemmae to plant them immediately (see Dionée 3).

Some Mexican butterworts, e.g. *Pinguicula moranensis* and its varieties, are going to flower again after the lull of summer. It would doubtless be necessary to practise a hand-pollination (see Dionée 8). Some weeks later, the seed pods will be ripe, the seeds - sown immediately - could give plantlets less than three months growth after pollination.

Really, for the amateur carnivorous plant grower, autumn is not a dead season!!

Easy to Grow *Drosera*

by Ken Harper

Pygmy *Drosera*

All species are found in the south-west region of Western Australia. *D. pygmaea* is the only species of pygmy *Drosera* that grows outside of W.A., and its range extends through the Eastern States of Australia and to New Zealand. Even though these *Drosera* rarely exceed 3 cm in diameter, the small rosettes are delightful and many produce attractive flowers.

Most pygmy *Drosera* survive quite well in a normal greenhouse using either a compost of 2 parts peat moss : 1 part sand or equal parts of peat moss and sand (i.e. 1:1).

Pygmy *Drosera* should be kept reasonably dry during summer when they are dormant. If moisture is available throughout the year many of these sundews will not go dormant and grow less vigorously each year. When dormancy is broken, by an increase in watering and a reduction in daily mean temperature, I like to give these sundews as much light as possible.

For a few years I grew these plants in year-round high humidity and low light intensity causing a decline in their numbers. They all now grow outside mainly in my peat bog, and are doing well. If you choose to grow them in pots, use at least a 15cm deep pot, to accommodate the surprisingly long root system.

Pygmy *Drosera* are best propagated by gemmae (winter buds formed in the centre of the rosette between March and May) which should be treated as seeds. Gemmae must be removed even if they are not used otherwise they tend to suffocate the parent plant. I normally collect the gemmae on a moist finger and then place them somewhere I want them to grow. If grown in a pot, the pot can be tilted over a piece of paper and a toothpick or similar used to dislodge the gemmae onto the paper.

Generally flowering starts at the end of winter or the start of spring and seeds can be sown on the same potting mix that the plants are grown in. Allen Lowrie has described 4 naturally occurring pygmy *Drosera* hybrids in Volume 2 of Carnivorous Plants of Australia so, hybridisation is possible.

Species which I have found easy to grow include *D.miniata*, *D.nitidula*, *D.omissa*, *D.pulchella* and *D.pygmaea*.

Tropical *Drosera*

D.adelae and *D.prolifera* are both relatively easy to cultivate and North Queensland natives. An important, if not essential, component in ensuring growing conditions simulate their natural environment is high humidity. This can be achieved by covering the pot with a plastic container (e.g. the bottom or top of a plastic soft drink bottle), growing it inside an enclosed aquarium or terrarium or inside a plastic "igloo". With both sundews I have had excellent results using either pure sphagnum or a mix of 2 parts peat moss : 1 part sand as a growing medium.

D.adelae has sword-shaped leaves up to 10cm, ranging in colour from light green to brownish-red. Numerous flowers, normally red (apparently there is also a form with white flowers), are produced but I have never obtained seed from them. Propagation is easy using either leaf or root cuttings. I prefer to use a large pot (even a 4 litre ice-cream container) because new plants develop from surface roots and it gives the plant room to expand.

D.prolifera is a basally-rosetted plant with fibrous roots. The leaves are long-stalked (about 4 - 5 cm long), similar to those of *D.rotundifolia* but larger, gradually ascending with kidney-shaped blades about 2 - 3 cm across. This sundew flowers sporadically throughout the year and, at the end of the scape, is a vegetative bud which will develop into a plant. I use a wide pot so that the scapes of the plant fall within the pot area and then I do not have to spend a lot of time potting up new plants.

My tropical *Drosera* generally are grown in about 60-70% humidity, with temperatures not exceeding 40°C in summer and seldom lower than 10°C in winter. None of the sundews appear able to endure direct sunlight and grow best in relatively low light levels.

Tuberous *Drosera*

All known species of tuberous *Drosera* are native to Australia with *D.peltata* having the widest distribution from Australia through Asia and up to Japan. These *Drosera* are dormant during the hot summer months of the Southern Hemisphere forming a tuber underground. Allen Lowrie in Volume 1 of Carnivorous Plants of Australia writes that "it would seem that dormancy is not broken by changes in temperature nor by the onset of winter rains". Correspondence with Northern Hemisphere growers has ascertained that tuberous *Drosera* break dormancy at roughly the same time in both hemispheres. Hence, the growth cycle of tuberous *Drosera* would appear to be pre-programmed.

General cultivation advice about these *Drosera* was featured in *Flytrap News* Volume 5 Number 1. Briefly though, pots deeper than 15 cm must be used and the potting mix should be roughly 1 part peat moss : 1 part sand. I normally plant tubers at least 8-10 cm below the soil surface and no later than mid-March would I consider repotting or disturbing the pot. Every couple of years repotting is necessary because the tubers tend to migrate downwards after every season.

During dormancy, tubers can be removed and stored in the refrigerator or, the more popular method, is just to let the pot gradually dry out and move it away from the weather. Towards the end of summer start watering the pots containing the tubers and ensure that they will be growing in an environment which receives strong sunlight and gives them the opportunity to catch a lot of prey. Watering should be increased over the active growth period and not reduced until all visible foliage has turned brown or the tuber's development will be retarded.

Problems usually arise from overwatering during dormancy, insufficient growing months which causes progressively smaller tubers to be developed (i.e. tuberous *Drosera* experience roughly 6 months of growth) and underwatering during active growth. I keep the pots containing *D.peltata* and *D.auriculata* tubers slightly damp during dormancy to simulate the natural environment they grow in around Sydney, and it hasn't appeared to cause any ill-effects.

Species which I have found to be good growers include *D.auriculata*, *D.bulbosa* 'multiclone', *D.macrophylla*, *D.peltata*, *D.ramellosa*, and *D.stolonifera* (subspecies *rupicola* and *stolonifera*).

Other *Drosera*

D.aliciae. One of my favourite sundews, this South African *Drosera* forms rosettes up to 5 cm in diameter. The leaves are wedge-shaped and the flowers a purplish pink colour. Copious amounts of seed are produced and it can quickly form an eye-catching carpet.

D.binata. All forms of this sundew are easy to grow. The leaves rise from the base and consist of a long, rather flat, leaf stalk (up to about 30 cm long on adult plants) which gives way to a long narrow glandular-hairy blade that splits at least once, but in most forms two or three times. This sundew forms a dormant bud and has an extensive root system ideal for taking root cuttings. Leaf cuttings are also a successful means of propagation.

D.capensis was probably the first sundew most people obtained. While many growers consider it a weed, I still find this showy South African sundew pleasing to grow. Leaves are erect with the leaf blade roughly as long as the petiole. Numerous flowers are borne on each scape with pink being the typical flower colour but a white-flowered form is becoming more common in cultivation. To avoid this *Drosera* spreading uncontrollably, I remove some flower

scapes and carefully monitor the remainder to make sure that the seed goes where I want it to!!

D.capillaris is native to North, Central and South America and frequently mistaken for *D.rotundifolia* even though *D.capillaris* grows year round. Rosettes are typically 3-5 cm in diameter (I have a large Gulf Coast form which can grow up to 8 cm across) and leaves are longer than wide. Flowers are either pink or white and there are normally 1-10 flowers per scape.

D.filiformis is native to the east and south east of the USA and has thread-like leaves which grow upright. Subspecies *filiformis* has red glands and leaves up to 25 cm long, while subspecies *tracyi* has leaves up to 50 cm long with green glands. Both subspecies form a dormant bud in winter and can be propagated by seed or leaf cuttings.

D.hamiltonii. Another Australian native, this sundew has huge lilac flowers up to 4 cm across. Leaves are wedge-shaped and rosettes can reach a diameter of 10 cm. Propagation is easiest from root cuttings and I have had no success in getting the plant to set seed.

D.regia. Known as King of the Sundews, the flowers are 3-4 cm across, pale pink and produced on a long stalk in late spring. From the central bud, the sword-shaped leaves unroll up to a reported length of 71 cm!! The best leaves I ever had were about 45 cm long. Propagate this sundew from root cuttings and I recommend not letting the plant flower if you want to grow really large plants.

D.spatulata is very common in Australia and also grows in New Zealand and some regions of Asia. Leaves vary in shape from spoon to wedge-shaped. All forms are rosetted with diameters up to 7 cm and produce up to 15 white or pink flowers. This sundew is easy to grow from seed and forms a pleasant carpet in a short time if allowed to.

All sundews in this section will grow in pots sitting in water trays or, equally well, in an outdoor peat bog. The potting mix I use is roughly 2 parts peat moss : 1 part perlite : $\frac{1}{2}$ part sand and I always place some sphagnum moss in the bottom of the pot to prevent the mix "escaping" through the drainage holes. Species forming a winter resting bud (*D. binata*, *D. filiformis*, etc...) receive less water during their dormancy to prevent rotting.

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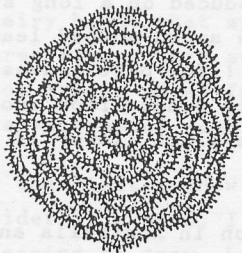
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