



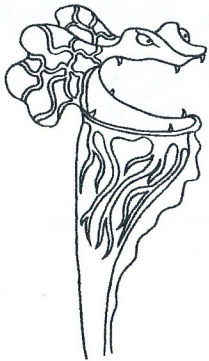
# FLYTRAP NEWS

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**Newsletter of the Carnivorous Plant Society  
of New South Wales (Sydney, Australia)**



# CARNIVOROUS PLANT SOCIETY OF NEW SOUTH WALES

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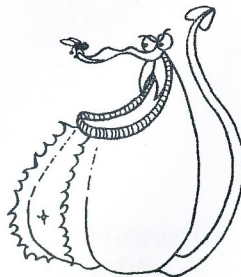
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## MEETINGS

Meetings are held on the second Friday of each month.

Time: 7:30pm – 10.00pm

Venue: Woodstock Community Centre, Church Street Burwood

Date	Speaker	Plant of the Month
July 13th	C.P. Trivia night	Cephalotus
July 29th (Sunday)	Winter Swap Meet	All Species
August 10th	Philippe Reyter	Tuberous Drosera
September 14th	Richard Sullivan, <i>Darlingtonia californica</i>	Darlingtonia
October 12th		V.F.T.
November 9th		Sarracenia
December 9th (Sunday)	Christmas Swap Meet	All Species
January 11th, 02		Drosera, Utricularia, Genlisea,
February 8th, 02		Nepenthes
March 8th, 02		Pinguicula
April 12th, 02		Heliamphora



## Chat Corner

Jessica Biddlecombe

### Fellow Cpers

Winter has started. The Sarras have gone dormant early. What chance did they have with all the rain and then the cold nights. We just can't get a full season!!!

To all those doubting Thomases from last year who said my Tuberous Droseras would not survive.....wrong!!!!!! Despite my neglect they are sprouting wonderfully. The tubers that I got from Ken Harper, was it 4 or 5 years ago, are still going and I guess I had better repot them up this year.

In March Margaret Frey talked about In vitro growing and we all found it most interesting. Margaret has had plenty of success and this has spurred people on to trying their own. I think getting the hormones right will be the hardest. Not only did she tell us about the mixture in the jars but bought in natty little objects that can be found in the house or \$2 shops that cost next to nothing for growing the seedlings on.

On the Internet lately there has been "much to do about nothing" regarding a genetically altered Pinguicula. This plant supposedly glows in the dark and the powers that be wish to send it to Mars on the next trip which I think will be in 2004. There are people who believe it will infect Mars and any of its inhabitants or it can bring back whatever and infect Earth. Of course there are the people who say this "tongue in cheek" but what frightens me is the people who truly believe this will happen. OUTER LIMITS!!!!

Wonders will never cease. I now have a computer. I am learning to turn it on. 21<sup>st</sup> century here I come.

I gave a talk at the Sutherland Garden Society this month. It was a pleasure to be there. They all were interested and bought lots of plants in which I hope will be the start of a collection.

Don't forget to come to the meetings—encourage others to do so and write articles for the Flytrap News. Keep your plants growing for the Christmas Meet. All those competitions to go into. All that fun to have.

We were thrilled to have Siegfried and Irmgard Hartmeyer visit

us. MY regret was that it was not long enough. They were a very interesting couple to talk to [keep on trekking!]. We all hope they do not take another 5 years to return to us here.

Mrs Nancy Bainsbridge [Zone Coordinator for Aust; Garden Club] gave the talk in May. Nancy gave us a brief history of the club and with the photos she showed us it was an interesting night. Thanks also to Mrs Noleen Nolan for coming along to assist.

DON'T FORGET to pay your FEES. This Society is growing ever larger and now we on the internet we are getting more members from all over the world. Kirstie Wulf started the web page for us and now Chris and Kim McClellam have taken over, streamlined it and will be adding more facilities to the page. Our Society is finally coming of age and with everyone doing their bit we can only get bigger and better.

Thank you to all those that put in their time & effort at the Koi Show this year. I do believe it went well & for those that donated their plants I know it was a success for them. Next year we will be better prepared & will amaze them even more, catch up with all the news later in this edition.

I did a talk at the Revesby Garden club this month & Janet Pearce did a talk at the Fairfield Club so the word is getting out there. Richard Sullivan has told me he is getting temperatures at -5 degrees at Bathurst & Chris & Leah Schell are in dormancy themselves at Richmond. There will be two places I will not be looking to buy property at!!!!!!!

At the AGM meeting in June Richard, Janelle & family came and it was good to see them as they live so far away it is rarely they can make it. Richard bought down with him some of his wonderful Tuberous Droseras & gave us a small talk on them.

Kirsty showed us some posters she had made herself for the Koi show & they were great. As well as the information on the particular type of plant there was also a picture of it as well. Very impressive. I know I will never become that adept with the computer.

Congratulations to Greg and Darrien. They were married this month. Happy life to you both.



We must all applaud Kirsty for her work as President for the past year. She implemented the web page, had leaflets printed of the individual plants did lots more & advanced the Society further. THANK YOU.

This year we have at the posts: PRESIDENT, Peter Biddlecombe, VICE PRESIDENT, Scott Sullivan, SECRETARY, Jessica Biddlecombe, TREASURER, Janet Pearce, WEB MASTER/EDITOR, Chris McClellan, EVENTS CO-ORDINATOR, Margaret Frey, SEED BANK MANAGER/COMPETITION MARSHAL, Greg Bourke, LIBRARIAN/SPEAKER ORGANISER, Kirsty Wulf, SUPPER CO-ORDINATOR, Toni Stopin.

We wish everyone well and don't forget they will always need the help of the members.

Your friendly Cper  
Jessica.

### Non-Nepenthes Carnivorous Plants in South East Asia

Robert Gibson

The steamy jungles of South East Asia are well known for the often large and spectacular species of Tropical Pitcher Plant, *Nepenthes*, which epitomise the long-held view that that is exactly the sort of place where such a plant would naturally occur. This article is not about them, however, for this region is also home to admittedly smaller, but no less fascinating other species of carnivorous plant, which are likely to have been trampled on frequently in the quest for just one more photo of a *Nepenthes* pitcher! These more modest size carnivores total a respectable 40 species, and include *Aldrovanda vesiculosa*, *Byblis liniflora*, eight species of *Drosera* and 30 species of *Utricularia*. These are the subjects of this article.

The region in question comprises the Indonesian archipelago,

Borneo, New Guinea, the Philippines, Palau and Guam, Indochina [including southern Burma and southern and eastern Thailand], Peninsular Malaysia and southern China [coastal parts of Guangxi and Guangdong states and the island of Hainan]. That is, within the range of *Nepenthes*. This study is based primarily upon the published literature, but includes observations of herbarium specimens I have had the pleasure of studying over the years. Whilst it is not intended to present the definitive account on these carnivorous plants, it is intended as a guide for those who will visit this area in future.

There have been some superb accounts of *Nepenthes* in various parts of South East Asia, including Shivas (1984), Kurata (1976), Oikawa (1992), Phillipps and Lamb (1988, 1996) and Clarke (1997). These are beautiful documents; however there are few publications which also include comments or observations on other carnivorous plants in the region. These few exceptions include a field guide to the carnivorous plants of Singapore, by Tan (1997), which covers seven species of *Utricularia*. Accounts of fieldwork in South East Asia by James (1993) and Harwood *et al.* (1998) also allude to *Drosera* and *Utricularia* seen whilst seeking *Nepenthes*. Formal accounts of the non-*Nepenthes* carnivorous plants in the region have been covered in Flora Malaysiana by van Steenis (1954) and Taylor (1989). These scientific papers are not readily accessible to most enthusiasts and are not necessarily reader friendly.

In other parts of the world where *Nepenthes* occur there have been full accounts of the carnivorous plant flora published. The best-known account is by Joseph and Joseph (1986) for the Khasi Hills in north-eastern India.

So what are these species I've alluded too? They comprise the monotypic *Aldrovanda vesiculosa*, the most widespread of the *Byblis* species, *B. liniflora*, eight *Drosera* and 30 species of *Utricularia*. Each species is briefly described below:



### *Aldrovanda vesiculosa*

The Waterwheel Plant, *Aldrovanda vesiculosa*, occurs in few widely scattered locations across the Old World. One such site is in southern Timor where this species has been collected at Nikki Nikki Supul swamp (van Steenis, 1954a: p. 381). This suspended aquatic plant forms stems to 200 mm long, which support whorls of narrowly wedge-shaped leaves to 12 mm long. These end in a bilobed trap, with concave sides to 6 mm long. These have a row of short bristles on the free margin and a multitude of trigger hairs on the inner margin. Upon stimulation, the two sides of the trap close together over the hapless invertebrate and function like an aquatic version of the well-known Venus Flytrap. It produces small, solitary white petalled flowers in the warmer months. These have five styles radiating out from the top centre of the ovary and are surrounded by five erect stamens. This species has the ability to form abbreviated dormant apical buds, or turions, which enable this species to survive drought and unfavourably cold temperatures. It favours low nutrient clean water (van Steenis, 1954a) and is often hard to find.

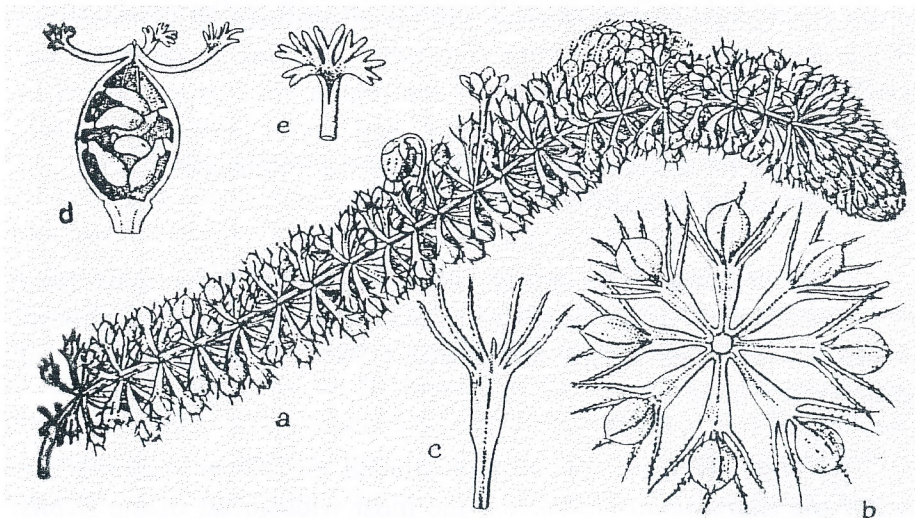
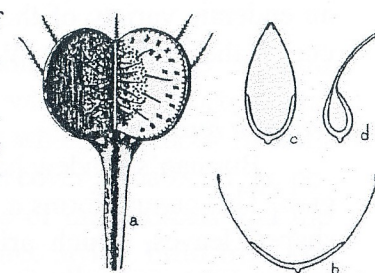


Fig. 1 *Aldrovanda vesiculosa* L. a. Plant, nat. size, b. leaf whorl, blades closed, x2, c. reduced leaf from flowering whorl without blade, x3, d. gynaecium, in section, e. style apex with stigma (after DIELS)

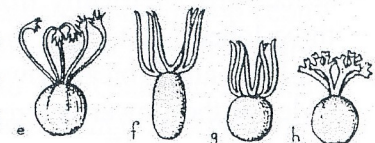
Fig 2. *Aldrovanda vesiculosa* L. a. open leaf blade from above, b. ditto, in section, c. ditto, first stage of closing, d. ditto, final stage.

E-f. Gynaecium of *Drosera*, viz of e. *D. burmannii* VAHL, f. *D. indica* L., g. *D. spatulata* LABILL., h. *D. petiolaris* R. BR., all x 6 (after ASHIDA, and DIELS)



### *Byblis liniflora*

*Byblis liniflora* is an attractive sticky annual that has terete leaves, to 80 mm long held on an erect to trailing stem to 100 mm long. It commonly grows in sandy soil near drainage lines that become damp during the wet season. From the end of the wet season the species produces an array of beautiful purple petalled flower, to 20 mm across, each one on a glandular hairy pedicel about as long as the leaves. When the ground dries out the plant dies and the species persists as seed. This species occurs across northern Australia with a small population in southern New Guinea (van Steenis, 1954b).



### The sundews

Eight species of *Drosera* occur in the region, including two endemic taxa. Most are rosetted species, with two stem-forming taxa. Many species are widespread in the region, and there have been some problems in telling some taxa apart.

**Rosetted *Drosera*.** Five taxa of rosetted sundew occur in the region. One of these, *Drosera petiolaris*, is confined to southern New Guinea and forms a large semi-erect rosetted with very narrow leaves. The opportunistic annual, *Drosera burmannii* occurs in the eastern part of the region and has distinctly wedge-shaped leaves. The spoon-leaf sundew, *Drosera spatulata*, occurs in many locations across the region, and exhibits variation between populations. The very similar *Drosera oblanceolata* looks very like *D. spatulata* during parts of the year, but develops semi-erect very narrow leaves in the summer. Mysteriously

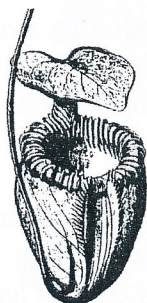


an endemic variety of the otherwise circumboreal *D. rotundifolia* occurs in the mountains of West Papua.

#### *Drosera burmannii*

Burman's sundew has been collected in a few sites across the region. This annual forms a rosette to 50 mm across of distinctly wedge-shaped leaves, which arise vertically from the plant's centre. The scapes arise vertically from the centre of the plant and have unusual three-lobed bracts near the base of the pedicels. The short-lived flowers have an atypical flower structure for the genus, for there are five styles at the flower centre. This annual is likely to grow opportunistically and generally occurs at permanently humid conditions at under 900 m altitude. However, it has been collected at up to 1400 m altitude in central Sulawesi, where it has been recorded and clearly illustrated by James (1993).

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#### *Drosera spatulata*

The spoon-leaf sundew typically produces a rosette 30 mm across consisting of narrow spatulate leaves with a flaring petiole and rounded leaf blade. It is a perennial species which produces filiform scapes which have a curved base and a sparse cover of hairs on the peduncle. Small linear bracts occur at the base of the pedicels and the small white or pink petalled flowers have three styles, bifid from the base, which produce six style segments that radiate from the top centre of the ovary. It has been collected in several sites across the region, from northern Sumatra in the west and Palau and Guam in the east, from the southern Chinese coast in the north and southern New Guinea in the south. Plants have been collected from sea level to 2800 m altitude (van Steenis, 1954a). Across this large area it is perhaps not surprising that some variants occur. Van Steenis (1954a: p. 379) reported differences in the petal and sepal shape and amount of hair on the peduncles between plants on Mount Kinabalu and populations in Sumatra and the Philippines. In addition a diminutive form with rosettes to 15 mm across, and short, few flowered scapes has been in cultivation for almost a decade under the informal name *Drosera* 'species 8, Borneo'. Plants from southern China have an attractive appearance due to the more rounded leaf blade (Clarke, 1998; I. Snyder, pers. comm., 2000); these have previously been known as *D. loureri* (Diels, 1906).

*Drosera spatulata* commonly grows in mountain heaths, which also often support *Nepenthes* and *Utricularia* species (e.g. Harwood *et al.*, 1998: p. 61).

*Drosera spatulata* and *D. burmannii* are frequently confused with each other, especially in herbarium specimens. Key features for *D. spatulata* (with those of *D. burmannii* in parentheses) are given below: spatulate leaves with an obtuse apex (wedge-shape leaves with a truncate apex), sparingly hairy peduncles (glabrous peduncles), simple, linear bracts (three-lobed bracts) and flowers with six style segments (flowers with five styles).



### *Drosera oblanceolata*

The unusual *Drosera oblanceolata* is restricted to southern China. It is very similar in appearance to the very closely related *D. spatulata*, and may be difficult to tell apart during the cooler months when it typically forms a flat rosette. However, in the warmer months the leaves lengthen to approximately 60 mm long, with a very tapered petiole, and form a semi-erect rosette. The scape architecture and flower structure are very similar to *D. spatulata*. This species is best known from barely damp grasslands in hills in Hong Kong where it sometimes grows with *D. spatulata* (Clarke, 1998).

### *Drosera rotundifolia* ssp. *bracteata*

Somewhat of a botanical mystery, not only is *Drosera rotundifolia* recorded from the Snow Mountains of West Papua, it is recognised as a distinct taxa, ssp. *bracteata*. This rosetted sundew is recorded as having semi-orbicular lamina, fusiform seeds at least 0.8 mm long, and large bracts. It is only known from the type location and grows in wet Sphagnum moss at approximately 1750 m altitude (Conn, 1980).

### *Drosera petiolaris*

The distinctive *Drosera petiolaris* forms an impressive dome of semi-erect leaves to 120 mm across. The almost orbicular leaves, to 3.5 mm wide are held at the end of narrow petioles to 60 mm long by 0.8 mm wide. The lower leaf surface is covered with long, white glandless hairs. This species flowers during the wet season, producing hairy racemes with large white or pink petalled flowers. It grows in wet grassland at low elevation in shallowly flooded locations in the wet season. It has the ability to go dormant in order to survive the dry season (Lowrie, 1998). It is found across northern Australia and also in a small part of southern New Guinea (van Steenis, 1954a: p. 379).

**Stem-forming *Drosera*.** Three stem forming sundews occur in the region. *Drosera indica* has very long, narrow strap-like leaves and an often horizontal inflorescence with many flowers. It bears superficial resemblance to the regionally limited *Byblis liniflora*. The two

# 2001

## WINTER SWAP MEET

**The second largest event on the CP calendar.**

**The largest display of Tuberous *Drosera*  
(Sundews) you'll see in Sydney.**

**Bring your plants for sale, swap or show.**

*(All species welcome)*

**SUNDAY JULY 29th. 9am – 5pm  
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your own lunch**

**Please call for further details  
(02)9548 1328 or 0413 749 847**

**Competition categories are as follows:-**

1. Best Tuberous *Drosera* and Tuberous rooted (rosetted)
2. Best Tuberous *Drosera* and Tuberous rooted (erect/scrambling) Includes *D. cistiflora*
3. Best Tuberous *Drosera* (Fan leafed)
4. Best Pygmy *Drosera*
5. Best *Drosera* other species
6. Best *Nepenthes*
7. *Darlingtonia*
8. *Heliamphora*
9. *Utricularia*
10. Best of Any other species



other species, *D. Banksii* and *D. peltata* bear superficial resemblance to each other, with glabrous stems and petiolate crescentic leaves. However, *D. Banksii* has stipules at the base of each leaf, has a hairy inflorescence which lacks bracts and is limited to southern New Guinea. The more widespread *D. peltata* is a tuber-forming perennial that lacks stipules, has bracts on the inflorescence and has hairless sepals.

### *Drosera indica*

The Indian sundew extends to the western Pacific margin and occurs widely throughout the study region. This annual species has a characteristic morphology. It has an erect to trailing stem to 300 mm long that supports linear leaves to 110 mm long by 3 mm wide which lack stipules at their base. The flowers are produced on lateral scapes that are up to 150 mm long with up to 20 flowers. Each bloom is typically 20 mm across with pale pink or purple petals. The three styles are bifid from the base and form six style segments, which curve up and over the ovary. The flowers have the ability to self pollinate and set a prodigious amount of small, ovoid seed. This species grows in periodically wet grassland in strongly seasonal areas, and rarely occurs abundantly. It has been recorded flowering between February and April in Java and in September in New Guinea (van Steenis, 1954a: p. 380). This species may be mistaken for *Byblis liniflora*, but differs from the Rainbow Plant by its flattened (not terete) leaves and scapes with many flowers (not solitary).

*Drosera indica* is a variable species and a number of forms occur in the study area. The typical form has narrow leaves with a distinct area at the base of each leaf that is free of long-stalked glandular hairs. A robust variant of this leaf form from Hainan has leaves to 100 mm long, on stems to 250 mm tall and has orange petalled flowers. A form from Indochina has wider leaves which have long-stalked glands to the leaf base. The latter has been described as *D. finlaysoniana* (Planchon, 1848: p.205).

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### *Drosera Banksii*

*Drosera Banksii* has been recorded in western Papua New Guinea (Lowrie, 1998). This annual forms a stem to 100 mm tall with alternate petiolate reniform leaves. It flowers for several months from the end of the wet season. The small flowers are approximately 5 mm across. They are held on an erect hairy raceme and have hairy sepals. This species looks superficially like a tuberous *Drosera* of subgenus *Ergaleium*, however it has a fibrous root system, has stipules at the base of each leaf and the style segments are only weakly divided. It grows in seasonally damp to sodden places often near creeks (Lowrie, 1998).



### ***Drosera peltata***

*Drosera peltata* is a perennial tuberous *Drosera*, which occurs in the eastern part of the region. It forms an erect stem to 350 mm tall that supports shield-shaped peltate leaves. Flowers are produced at the top of the stem in a short raceme. The flowers have glabrous sepals with a fringed margin and white petals. It grows in a range of damp grassy habitats commonly between 800 and 2400 m altitude, although reaching 3225 m altitude in New Guinea. Flowers have been recorded between December and August throughout the region (van Steenis, 1954a).

### **The Bladderworts.**

The largest group of non-*Nepenthes* carnivorous plants in the region occur in the genus *Utricularia* with 30 species. Given that most of these species are initially difficult to tell apart I have dealt with them in sections as per Taylor (1989). This way, like species are grouped together and diagnostic features are highlighted. In many cases trap and seed morphology are given but will be impractical to use in the field given the size of these features.

**Section *Meionula*.** This small section of terrestrial bladderworts is centred in Tropical Asia. All three species occur in the region of interest. They have small linear leaves arising from fine stolons. The traps are ovoid, to 0.4 mm long with a horizontal lobe projecting from the trap apex for varying lengths and two rows of gland tipped appendages above and below the door. The slender scapes are racemose with small purple or white flowers with a three-lobed lower petal margin. The apex of the spur is weakly bifid and the sub-globose seeds have a series of raised ridges on its surface. All three species are very similar in appearance.

### ***Utricularia minutissima***

The diminutive *Utricularia minutissima* is a well-named annual terrestrial bladderwort. The linear leaves are up to 30 mm long, but often much less. The slender scapes have been recorded between 20 and

220 mm tall and have several small flowers scattered along its upper half and may have short hairs at the base. Each bloom consists of a small, often-erect upper petal, which partially overhangs the weakly defined palate at the base of the lower petal. Lower lip is up to 10 mm long, approximately circular in outline with a raised base and incipiently three-lobed apex. The substantial sub-vertical spur projects below the lower petal. Each flower is white or pale purple and is held on a pedicel that is longer than the subtending bract. The traps are tiny, up to 0.4 mm long, with distinctive stalked glands on its dorsal margin. This species has been collected in flower during most months of the year. It is a widespread species, although often overlooked throughout its range throughout South East Asia. It has been collected in wet, sandy to muddy grassland from sea level to 2100 m altitude (Taylor, 1989).

### ***Utricularia hirta***

*Utricularia hirta* may be likened to a larger and hairy form of *U. minutissima*, and occurs in a more limited area, northern Borneo and Indochina within the area of interest. This likely perennial has leaves to 15 mm long, and inflorescences between 3 and 30 mm tall. The purple or white flowers are up to 10 mm long and held between a pair of conspicuously hairy sepals. This species has been collected in flower between July and December, and grows in damp, often grassy habitats from sea level to 1000 m altitude (Taylor, 1989).

### ***Utricularia geoffrayi***

Another species of similar appearance and size to *U. minutissima*, *U. geoffrayi* is endemic to Indochina. It has been collected in wet grass and rice paddies from sea level to 1300 m latitude, with flowers recorded between September and December. This species has erect scapes to 200 mm tall, which bears purple or white flowers to 4 mm long, which at times are noted as being fragrant. This species differs from *U. minutissima* by its very short pedicels [shorter than the subtending bracts] and from *U. hirta* by its hairless scapes. Its strongly nerved calyx lobes are a unique character (Taylor, 1989).



**Section *Nigrescentes*.** This section of three species of terrestrial species is spread across the tropics of the Old World, of which only one species occurs in the region of interest. The traps and seeds of these species are unique in the genus. The dimorphic traps have a funnel-shaped rim surrounding the door, which is surrounded by radiating rows of gland-tipped hairs. The apex of the trap is extended into a gland tipped beak, which may be as long as the main body of the larger traps. The obovoid seeds have an elongate series of ridges, and a varying number of papillose projections at the seed apex (Taylor, 1989).

#### *Utricularia caerulea*

The variable *Utricularia caerulea* occurs throughout most of the region. This species has oblong leaves to 10 mm long and traps of two sizes: small traps to 0.5 mm long, and large traps to 1.5 mm long, both with horizontal projections over the door. The erect scapes are up to 500 mm tall. They have tapered bracts along their length, which are attached to the scape about their middle, and usually support several alternately arranged flowers towards the apex. The white or purple flowers are 2 to 12 mm long with a yellow marked palate at the base of the lower petal. The sub vertical upper petal is often oblong in shape and shortly exceeds the palate. The lower petal is broadly ovate with a tapering or weakly lobed free end. The sub horizontal spur is of variable length and often projects beyond the margin of the lower petal. This species is incredibly polymorphic in form and colour, and has been described under a significant number of different names. It may be distinguished by the attachment of the bracts on the inflorescence, the dimorphic traps and flowers with a sub horizontal spur. It has been collected in a range of open wet habitats up to 2100 m altitude, and observed in flower during most months of the year (Taylor, 1989).

**Section *Enskide*.** This small section consists of two species found primarily in northern Australia. The distinctive ovoid traps have a short appendage and lip on either side of the door; in *U. fulva* these ridges support a row of gland-tipped hairs. The inflorescence is a raceme with

numerous yellow petalled flowers with sub-equal simple calyx lobes. The lower petal is large, with a lobed margin, and below which projects the long spur. The obovoid seeds have a network of anastomosing ridges over the surface (Taylor, 1989).

#### *Utricularia chrysantha*

The distinctive *Utricularia chrysantha* has a limited range in this region, only occurring in southern New Guinea at low elevations. This annual species has linear to narrowly wedge-shaped leaves to 30 mm long. The ovoid traps are up to 0.6 mm long and have two rows of glandular hairs on either side of the mouth. The simple or rarely branched scapes are up to 600 mm tall. They have numerous basally attached bracts along their lower part and up to 20 alternately arranged flowers. Each bloom is up to 15 mm long. The upper petal is oblong in shape, often weakly two-lobed. The lower petal is semi-circular in outline, with a conspicuously raised centre and a weakly to strongly four-lobed free margin.

The sub vertical spur is clearly visible below the lower petal. The flower colour is a conspicuous feature of this species, as indicated by the specific name. The petals are pale to dark yellow often with darker yellow or brown markings on the palate. It has been collected

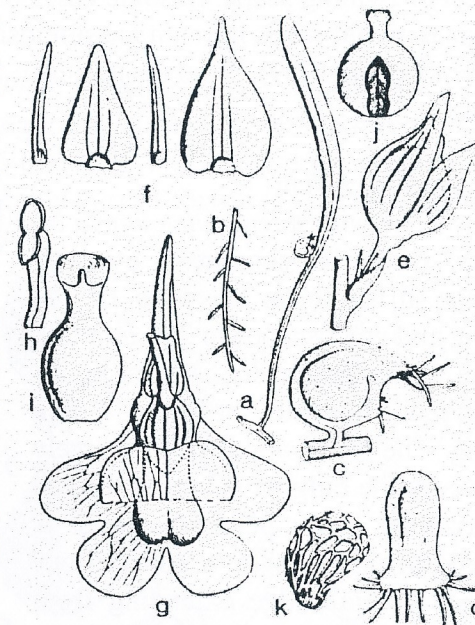


Fig. 3. *Utricularia chrysantha* R.BR. a. Foliar organ, x6, b. part of rhizoid, x 6, c. trap, lateral view, x 24, d. ditto, dorsal view, x 24, e. fruit in calyx, x6, f. bract, bracteoles & (on right) scale, x12, g. flower with upper lip half bent back, x4, h. stamen, x12, i. pistil, x12, j. capsule, ventral view, x6, k. seed x75 (a-d, f-j ADAMS 1737, e GEORGE 12231, k PULLEN 7136).



in flower from March to November and grows in wet grassland (Taylor, 1989).

**Section Oligocista.** This large section of terrestrial bladderworts is well represented in the region. The species are characterised by simple, linear to obovoid leaves; globose traps with variably divided appendage over the mouth; a horizontal wedge-shaped to circular flower petal with a conspicuous raised ridge extending from the palate; and a divergent spur. The flowers are commonly purple or yellow, and held on an erect or twining scape. In some cases the flowers are fragrant. The globose to ovoid seeds have an anastomosing series of ridges over the surface (Taylor, 1989). Twelve species in this group occur in the study region.

#### *Utricularia bifida*

The widespread *Utricularia bifida* is fairly consistent over its range. It has linear leaves to 10 mm long and erect scapes to 200 mm tall. The alternate flowers have large, often reddish ovate sepals to 7 mm long. The small upper petal scarcely exceeds the bulging palate of the sub horizontal lower petal; the latter is ovoid in outline with a conspicuous raised central ridge extending from the palate, and is up to 10 mm long. Both petals are bright yellow. A characteristic feature of this species is that the flowers are strongly pendulous in fruit. This species has been observed in damp or wet conditions, including rice paddies, at low to medium elevation. Plants have been collected in flower dur-

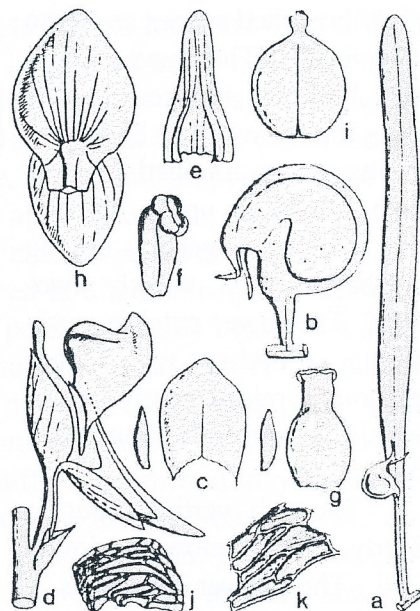


Fig 4. *Utricularia bifida* L. a. Foliar organ x 6, b. trap, x 24, c. bract and bractioles, x 15, d. flower, x 6, e. upper lip of corolla, x 6, f. stamen, x 12, g. pistil, x 12, h. fruiting calyx x 6, i. capsule, x 6, j. seed, x 45, k. testa, x 75 (all after LARSEN 5121)

ing and just following the wet season (Taylor, 1989).

#### *Utricularia odorata*

The medium-sized perennial *Utricularia odorata* has narrowly linear leaves and traps with two appendages extending from the apex. The erect, self-supporting scapes reach 550 mm tall with up to 20 flowers. These are orange yellow, with a long, vertical spur, which may or may not be aromatic. The sepals are large and ovate. It grows in low altitude wetlands in Indochina in the study region, with flowers collected throughout the year (Taylor, 1989).

#### *Utricularia involens*

The medium-sized *Utricularia involens* is very similar to *U. bifida*, but differs by having twining inflorescences to 600 mm long. The large yellow flowers are up to 15 mm long, and at times are reported as being fragrant. The spur is noticeably curved forwards. The flowers are semi-erect in fruit. This species has been collected in Indochina and Peninsular Malaysia within the study area, with flowers noted between August and December. It grows in wet grassland to 900 m altitude (Taylor, 1989).

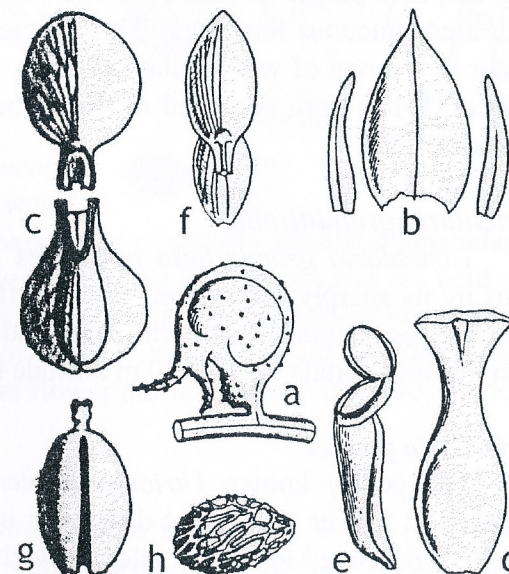


Fig. 5. *Utricularia involens* RIDL. a. Trap, x 24, b. bract and bractioles, x 12, c. corolla, the two lips from inside, x 2, d. pistil, x 12, e. stamen, x 12, f. fruiting calyx, x 2, g. dehiscent capsule, x 4, h. seed, x 24 (a, b, h DING HOU 783, the others after RIDLEY, type)

#### *Utricularia bosminifera*

The characteristic *Utricularia bosminifera* is endemic to south-eastern Thailand, on the island of Ko Chang. It is very like *U. bifida*



but differs by having large leaves, to 8mm wide by 50 mm long, large yellow flowers to 15 mm long, and flowers which are sub horizontal in fruit, in which the pedicel lengthens to up to three times the length of the sepals. It has been collected in flower throughout the year and grows beside streams (Taylor, 1989).

#### *Utricularia uliginosa*

The small, widespread *Utricularia uliginosa* resembles a purple flowered form of *U. bifida* with erect scapes to 300 mm tall, ovate sepals to 5 mm long and flowers to 8 mm long, which are semi-erect in fruit. This species has been collected in flower throughout the year and grows in a range of wet habitats (Taylor, 1989).

#### *Utricularia delphinoides*

The stunning *Utricularia delphinoides* resembles a large form of *U. uliginosa*. The erect scapes are up to 600 mm tall with a cluster of large, fragrant, dark purple flowers at its apex. Each flower is up to 25 mm long, with a conspicuous long spur. This species is endemic to Indochina and grows in a range of wet habitats at up to 1300 m altitude, including rice paddies. It has been observed in flower between October and December (Taylor, 1989).

#### *Utricularia graminifolia*

*Utricularia graminifolia* resembles *U. uliginosa* and may be told apart by its sharply acute sepal tips and its conspicuously long pedicels. This species occurs in southern China and Indochina within the study region, in wet habitats up to 1500 m altitude (Taylor, 1989).

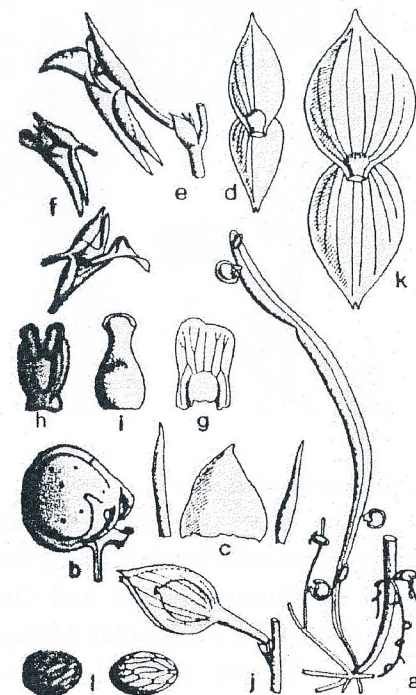
#### *Utricularia pierrei*

The poorly known *Utricularia pierrei* resembles *U. involens* in habitat and flower colour but differs by its straight spur and short pedicels. It is restricted to south-eastern Indochina and has been collected below 1500 m altitude. Flowers have been noted in March, June and December (Taylor, 1989).

#### *Utricularia scandens*

The widespread and large *Utricularia scandens* differs from the otherwise similar *U. involens* by the following features: generally smaller stature with twining inflorescences to 350 mm tall, yellow flowers to 15 mm long and traps with a bilobed appendage over the door. This species has been collected in wet grasslands and bogs up to 2300 m altitude, and flowers have been recorded during most of the year (Taylor, 1989).

Fig 6. *Utricularia scandens* BENJ. a. Base of peduncle with rhizoides, foliar organ and traps, x 4, b. trap, x 30, c. bract and bractioles, x 15, d. calyx, x 6, e. a large flower, x 4, f. two small flowers, x 4, g. upper lip, x 6, h. stamens, x 15, i. pistil, x 15, j. fruit concealed by calyx, x 4, k. fruiting calyx, x 6, l. seeds, x 45 (all after LARSEN except a and c MILNE-REDHEAD & TAYLOR 8008B)



#### *Utricularia foveolata*

The small *Utricularia foveolata* has pale purple petals on a weakly twining scape. Its traps have a characteristic multiply branched appendage over the trap entrance. The flowers are up to 4 mm long and are held on pedicels that are longer than the sepals, and become pendulous in fruit. This species grows in a range of shallow water habitats, including rice paddies, and has been collected in flower during much of the year (Taylor, 1989).

#### *Utricularia heterosepala*

The unique *Utricularia heterosepala* is endemic to the islands of Palawan, Luzon and Sibuyan in the northern Philippines. It has erect scapes to 150 mm tall which supports several white, pink to purple flowers. Each bloom is held on a semi-erect pedicel, which lengthen in fruit. It has been collected in flower between February and May. This species is unique in its section by the absence of bracteoles (Taylor, 1989).



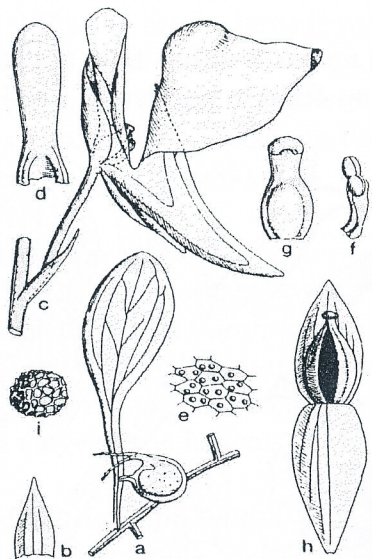


Fig. 7. *Utricularia heterosepala* BENJ. a. Foliar organ with trap, b. bract, c. flower, d. upper lip, all x 6, e. glands inside spur, x 45, f. stamen, x 12, g. pistil, x 12, h. calyx with dehiscent fruit, a thickened area bordering the cleft, x 6, i. seed, x 24 (a-b, h-i ELMER 13127, c-g MERRILL 2085)

### *Utricularia vitellina*

The poorly known and distinctive *Utricularia vitellina* is endemic to Gunong Tahan and Gunong Kerbau in Peninsular Malaysia. The brown marked yellow flowers are held on an erect scape to 50 mm tall, and lack the raised ridge on the lower petal that is found in other members of the section. This species grows in peaty stream banks on two isolated mountains at between 1500 and 2100 m altitude. Flowers have been recorded between January and July (Taylor, 1989).

Due to the size of this article, it will be continued in the next issue of Flytrap News

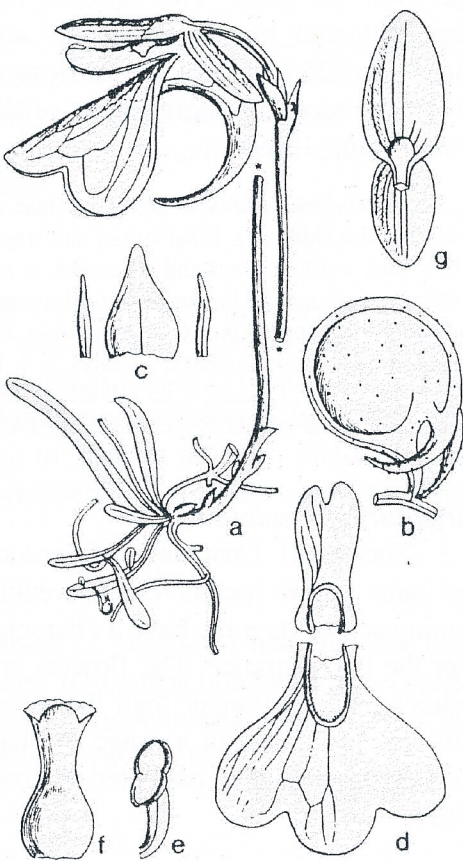


Fig. 8. *Utricularia vitellina* RIDL. a. Flowering plant, x 4, b. trap, x 24, c. bract and bractioles, x 12, d. corolla, the two lips from inside, x 4, e. Stamen, x 12, g. calyx, x 6 (all after RIDLEY, type, except b SPARE S4/41)