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Meetings are held on the second Friday of each month
Time: 7.30pm—10.00pm
Venue: Woodstock Community Centre
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UPCOMING SPEAKERS AND EVENTS

Date	Subject	Speaker
11th November	Borneo	Greg Bourke
26th November	Christmas Swap meet	Richard Sullivan's House
9th December	General Discussion	
13th January	General Discussion	
10th February	AGM Propagating Nepenthes	Peter Biddlecombe
25/26th February	Mt. Tomah Botanic Gardens	Various speakers, display and plant sales
10th March	To be confirmed	

Committee 2005

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Vice President:	Kirstie Wulf
Secretary:	Jessica Biddlecombe
Treasurer:	Steve Moyle
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	Richard Sullivan
	Kirstie Wulf
	Helmut Kibellis
	Luis Mendoza
	Robert Pollet

Koi Show 2005

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The Society has for the last few years participated in the Koi Show at Fairfield Showgrounds and it has been a great success.

Many of our members exhibit and sell their plants at the stand we have there. This show has been a great place to show the best plants we have on hand at the time, sell off excess plants, make extra money for ourselves and the Society and to introduce the public to Carnivorous plants.

This year we had some of the best plants from Phillipe Reyter, Kirstie Wulfe, Margaret Frey, Richard Sullivan, Jessica Biddlecombe, Greg Bourke and newcomers Jensson Turnowsky and Damon Vella.

This could not have been a success without all of the others that came to help and we give our thanks to them. These shows allow everyone to get to know each other. It has always been a lot of fun.

Each grower had a different mix in their plants but all the plants seemed to be doing as well as each other whether it was grown in straight sphagnum or a mixture of bark, peat and vermiculite as well as some mixtures I could not identify.

Nepenthes maxima x *vietchii* with grower Greg Bourke. Damon Vella can be seen serving the eager public to the left. Photo by Steve Moyle

We all have to say the "Plant of The Show" would have had to go to Greg's Nepenthes *maxima* x *vietchii*. It was snatched up by another member of the Society who knew a bargain when he saw it. Congratulations Nick Lavidis.

Our stand consisted of four sides with plastic covered tables. The plants were placed around to show their best advantage with a selection of Society Journals for sale, plant information and membership brochures. In the centre of the square were eager sales people ready to help the public with any information and to help them with their choice of plants. You will notice in the photos the excellent quality of plants for sale.

If I missed mentioning anyone I'm sorry but thanks for making it such a great day. For those who did not make it this year I hope to see you there at next years show!

Even before the show was officially opened to the public, the Societies display was a hive of activity with other stall holders trying to get a bargain. Photo Steve Moyle

The Remarkable Float-forming *Utricularia*

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Bladderworts are pretty neat. Their traps are awesome in form and function and have certainly captivated the attention of many. *Utricularia* is the largest genus of carnivorous plants and the most widespread. Perhaps not surprisingly they have evolved into a galaxy of different forms. One small group of a dozen species, in the main group of free-floating species, develop what to me is a remarkable structure: that of radial floats of spongy tissue on the peduncle. The whorl of modified stolons aid in keeping the scape erect and above the water's surface. To me these floats are almost as nifty as the traps and in this article I summarise these species with information primarily from Taylor (1989).

Function and development

The formation of radial floats is part of the scape-forming process, and was elegantly described and illustrated by Slack (1980: 169-171). The cells in these floats, with the exception of *U. perversa*, are large and often contain gas. They are produced between the base and near the apex of the scapes: the location is often diagnostic of each particular species (See Table 1). When not in flower these species of bladderwort look like any other member of the section. There are some species in this group, *U. aurea* and *U. punctata* that do not always produce these nifty floats on their scapes indicating that there is cost to the plant to produce such structures.

Taxonomy

According to Taylor (1989) free-floating *Utricularia* are found in three sections of subgenus *Utricularia*. Most are in section *Utricularia*, which has 34 species and is found on every vegetated continent. Some of these species are firmly attached to substrate at the bottom of lakes and rivers. Three purple-flowered from the Americas, with whorled leaf-like stolons that terminate in traps, form the next largest group with this free-floating habit and form the very natural section *Vesiculina* (see Schnell, 2001: 348-

Table 1. Summary of characters of the float-forming *Utricularia* species (based on Taylor, 1989). →

Species	Distribution	Flower colour	Location of floats on scape	Float shape and maximum dimensions length x diameter (mm)
Utricularia punctata	Burma – China-Sumatra	Purple, pink or white	Base	Fusiform, 100 x 6
Utricularia aurea	Sthn and SE Asia to Nthn Australia	Yellow	Base	Fusiform, 100
Utricularia inflexa	Africa and Nthn India	Yellow	Base to middle	Cylindrical, 50
Utricularia stellaris	Africa, SE Asia, Australia	Yellow	Upper half	Ovoid, 20 x 10
Utricularia muelleri	Northern Australia	Yellow	Upper half	Ovoid, 40
Utricularia perversa	Mexico	Yellow	Lower half	Filiform, 10
Utricularia radiata	Eastern USA	Yellow	Upper half	Cylindrical, 25 x 4
Utricularia platensis	SE South America	Yellow	Lower half	Cylindrical, 40 x 4
Utricularia inflata	Eastern USA	Yellow	Middle	Obovoid, 100 x 3
Utricularia incisa	Cuba	Yellow	Upper half	Fusiform, 30 x 6
Utricularia breviscapa	South America	Yellow	Middle	Cylindrical, 25 x 3
Utricularia benjaminiana	Nth South America, Africa	Purple	Base	Fusiform, 25 x 3

350). And then there is the weird *U. tubulata* from northern Australia that is the only free-floating aquatic species in section *Pleiochasia*. All species that develop these neat radial stolons are in subgenus *Utricularia*.

Within this group of float-forming species are some seemingly natural assemblages. The species *U. aurea, U. inflexa, U. stellaris* and *U. muelleri* occur in Africa, tropical and subtropical southern and eastern Asia and extend to northern and eastern Australia (Figure 1). These species have relatively simple floats, auricles at the base of most leaves, scapes that lack scales, often-hairy flowers, sepals that commonly enlarge, and pedicels that reflex in fruit. Within the Americas

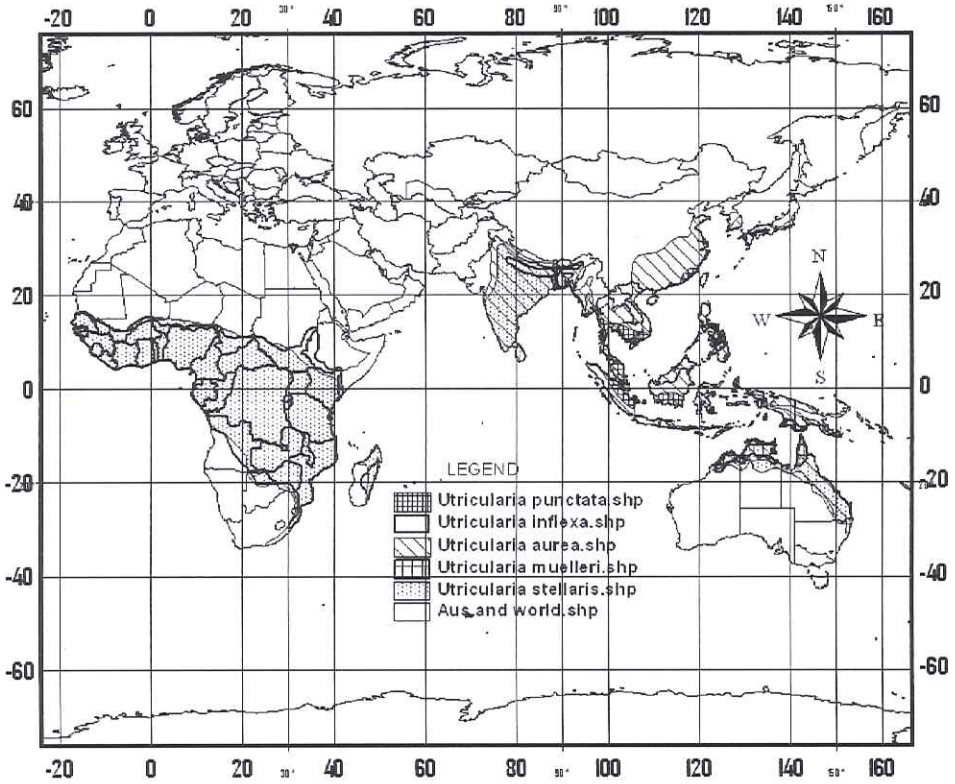


Figure 1. Approximate distribution of *Utricularia aurea, U. inflexa, U. muelleri, U. punctata* and *U. stellaris*. Based on Taylor (1989).

is a group comprising of *U. inflata, U. radiata, U. incisa, U breviscapa, U. perversa* and *U. platensis* that has well-developed radial floats (not swollen in the case of the odd plant of)*U. perversa*) and all lack bracteoles on the scapes (Figure 2).

Description of species that form floats.

Utricularia punctata

Utricularia punctata is a medium-sized species from low altitude lakes, swamps and rivers in a region bound by southern Burma, southern China, Sumatra and south-eastern Borneo (Figure 1). Individual stolons are reported to reach up to 1.8 m long. The leaves have two

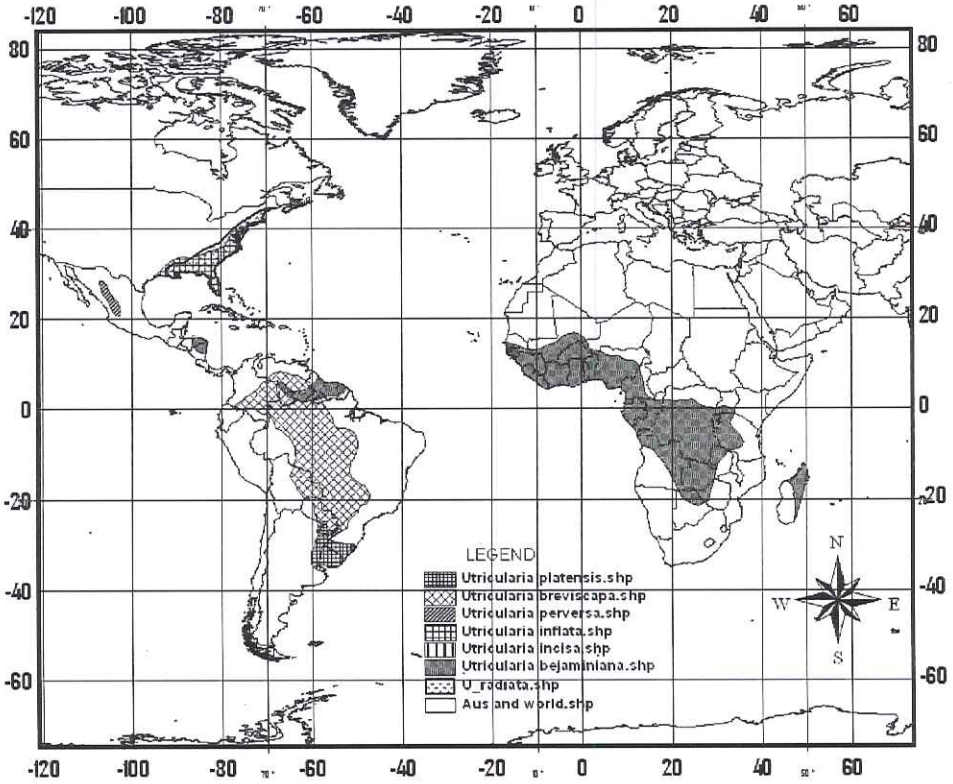


Figure 2. Approximate distribution of *Utricularia benjaminiana, U. breviscapa, U. inflata, U. inflata, U. perversa, U. platensis* and *U. radiata*. Based on Taylor (1989).

or three primary segments that are repeatedly dichotomously divided, and grow up to 6 cm long. The traps, which grow up to 2 mm long, are not abundant; many leaves often bear none. The inflorescence is erect, to 30 cm long bearing six to twelve purple, pink or white flowers that are externally glabrous. The sepals are small. The flower up to 1.5 cm long comprises a transversely elliptic upper petal that curves over the larger oblong lower petal, with prominently raised yellow palate, and has a wide blunt spur that curves forward under the flower. The pollen grains are unusual in the group as they are clustered in groups as tetrads. The capsule is ellipsoid in shape and sparsely glandular hairy. The seeds are few in number and are broadly winged (Taylor, 1989: 569-571).

Radial floats are not produced at the base of every peduncle; a trait shared only by *U. aurea*. When they are produced they are narrowly fusiform, to 10 cm long by up to 6 mm maximum diameter and have short leafy segments either in their distal half or along their entire length.

Utricularia aurea

Utricularia aurea is a large, common and widespread species of aquatic bladderwort that occurs from Pakistan to southern China, Korea and Japan, to northern and north-eastern Australia and most places in between (Figure 1). The stems grow up to 1 metre long and bear numerous, multiply-dichotomously divided leaves to 8 cm long with three to five primary segments, each with a small narrow wing, or auricle, at the base. The numerous traps are of two distinct types and are up to 4 mm long. The erect inflorescence grows up to 25 cm tall and commonly has five to ten pale yellow, hairy flowers. The sepals are approximately ovate and small at flowering, to 3 mm long, but enlarge to about 9 mm long when in fruit. The open flower is up to 15 mm long (Harden 1992) with a broadly ovate upper petal and a larger transversely elliptic lower petal; the latter has a prominently bulbous palate. The spur narrows markedly in the middle and runs parallel to the lower petal and is about the same length. The fruit is globose, to 5 mm diameter and contains numerous disk-shaped seeds to 2 mm across, including a narrow rim.

As with *U. punctata* this species does not produce radial floats at the base of every scape. When present they are produced at or near the base of the peduncle and are fusiform in shape, to 10 cm long by up

to 3 mm maximum diameter. They bear numerous short, much-divided leaf-like branches sparsely along the full length.

Apparent hybrids with *U. muelleri* have been collected in Northern Australia. These are intermediate in morphology between both parents and the floats are produced about the mid point of the peduncle. Such specimens appear to be sterile (Taylor, 1989: 625-627).

Utricularia inflexa

Utricularia inflexa is a large perennial bladderwort that occurs in much of Africa and central India (**Figure 1**). The stems grow up to 1 metre long bearing large multi-divided leaves to 6 cm long that have three to six primary segments. The numerous traps are up to 3 mm long. A conspicuous feature of this species is the presence of a circular membrane, or auricle, at the base of each leaf. The inflorescence is erect and up to about 30 cm long with two to sixteen white, purple or rarely yellow pubescent flowers. Each bloom is up to 10 mm long with an ovate upper petal and transversely elliptic larger lower lip with an inflated base. The blunt spur is conspicuously hairy and often extends beyond the lower petal. At the base of each pedicel are ovate basifixed bracts up to 3 mm long. The sepals are initially small, at up to 3 mm long, but enlarge in fruit to up to 10 mm long, and exceeding the capsule. Simultaneously the pedicel also lengthens and becomes deflexed (downward-pointing). The seeds are prismatic and minutely papillose.

Between five and ten sessile floats are normally produced about the mid-point of the peduncle. The narrowly cylindrical floats may measure between two and five centimetres long and bear short, much divided leaf segments at the apex (Taylor, 1989: 627-631).

Utricularia stellaris

Utricularia stellaris is a large aquatic bladderwort found throughout much of Africa, from India to Vietnam and to northern and eastern Australia. The stems can reach up to 2 metres in length (G. Steenbeeke, pers. comm., 2005) and bear numerous multiply divided leaves to 15 cm long with three to six primary segments. At the base of each leaf is a much-divided auricle that is semi-circular in outline. The traps are abundantly produced and are up to 3 mm long. The erect inflorescence is up to 30 cm long and bears 2 – 12 yellow flowers. Each bloom is up to 1 cm long and usually densely covered with short glandular hairs. The upper petal is

broadly ovate and the lower petal is transversely elliptic with a swollen base. The blunt spur is shorter than the lower petal. The round sepals are about 3 mm long in flower but enlarge considerably in fruit to be as long as the capsule. The rhombic seeds are up to 3 mm across and are minutely verrucose (Taylor, 1989: 632-635).

The sessile floats in this species are produced in a whorl of above the middle of the peduncle (**Figure 3 and 4**). Each float is up to 2 cm long, is narrowly oblong in shape and is smooth in outline save for short, dichotomously branched leaf segments at the apex.

Utricularia muelleri

Utricularia muelleri is a medium-sized bladderwort from tropical Australia and southern New Guinea (**Figure 1**). It has stems to around 50 cm long with numerous dichotomously divided leaves to 5 cm long with three or sometimes more primary segments. A short, very fimbriate much divided auricle often occurs at the base of each leaf. The numerous traps are up to 3 mm long. The erect scape commonly grows to 30 cm tall and has be-

Figure 3. Photo of *Utricularia stellaris* collected in north eastern New South Wales, the first record of this species in the state. Photo by G. Steenbeeke. Note the reddish tinge to the float and the Australian 5 cent coin in the lower left corner (for scale). The float is produced in the upper part of the scape.

tween 2 and 14 yellow flowers. The flowers are borne on relatively long pedicels, much longer than the ovate sepals, and each bloom is up to 7 mm long, with an oblong upper petal and a larger transversely elliptic lower petal with a swollen base. The conical spur is shorter than the lower petal. Short glandular hairs occur sparsely over the exterior of the flower. In fruit the pedicels are weakly recurved and the sepals do not enlarge significantly. The seeds are lenticular with a continuous wing around the margin.

The floats in *U. muelleri* are up to 4 cm long and have a short stalk at the base. They are cylindrical to narrowly ovoid and are smooth save for a few short, dichotomously branched leaves on the apical half and at the base of each float (Taylor, 1989: 635-638).

Utricularia perversa

Of the float-forming bladderworts, the Mexican *U. perversa* is an oddity (**Figure 2**). The whorl of modified stolons on the lower half of the peduncle is not inflated! As for the rest of the plants, the stolons are usually about 30 cm long, with numerous divided leaves to 2 cm long with two primary segments. The abundant traps are up to 2 mm long. The inflorescence is up to 12 cm long with two to three yellow flowers. The bracts at the base of the pedicels are basifixed, broadly ovate with an entire margin. The sepals are glandular hairy, to 3 mm long and transversely elliptic in shape. The flower is about 1 cm long with an ovate upper petal, above a larger, transversely elliptic lower petal with a swollen base and a 3-lobed free margin. The conical spur is shorter than the lower petal (Taylor, 1989: 655-657).

The floats of *U. perversa* are unusual. Each whorl consists of three to five leaf-like stolons that are not at all inflated. Perhaps this species represents an intermediate stage in the evolutionary development of floats within the genus? This species is so far known from few locations and is poorly known.

Utricularia radiata

Endemic to the eastern seaboard of temperate to sub-tropical North America, *Utricularia radiata* is one of the best-known float-forming species due to the excellent work of Schnell (1974, 2001) (**Figures 2 and 5**). This medium sized species has stems to 50 cm long with abundant leaves to 10 cm long that are multi-divided and have 2 primary segments. The abundant traps are between 0.7 and 2.0 mm long. The inflorescence is up to 25 cm tall with up to 7 flowers congested at

the apex. Each bloom is up to 2 cm long with a spur that is much shorter than the lower petal, and is usually entire at the apex. In fruit the pedicels are usually erect and the sepals do not enlarge conspicuously (Taylor, 1989: 657-659).

The floatation device of *U. radiata* consists of 4 to 7 floats that are approximately cylindrical in shape,

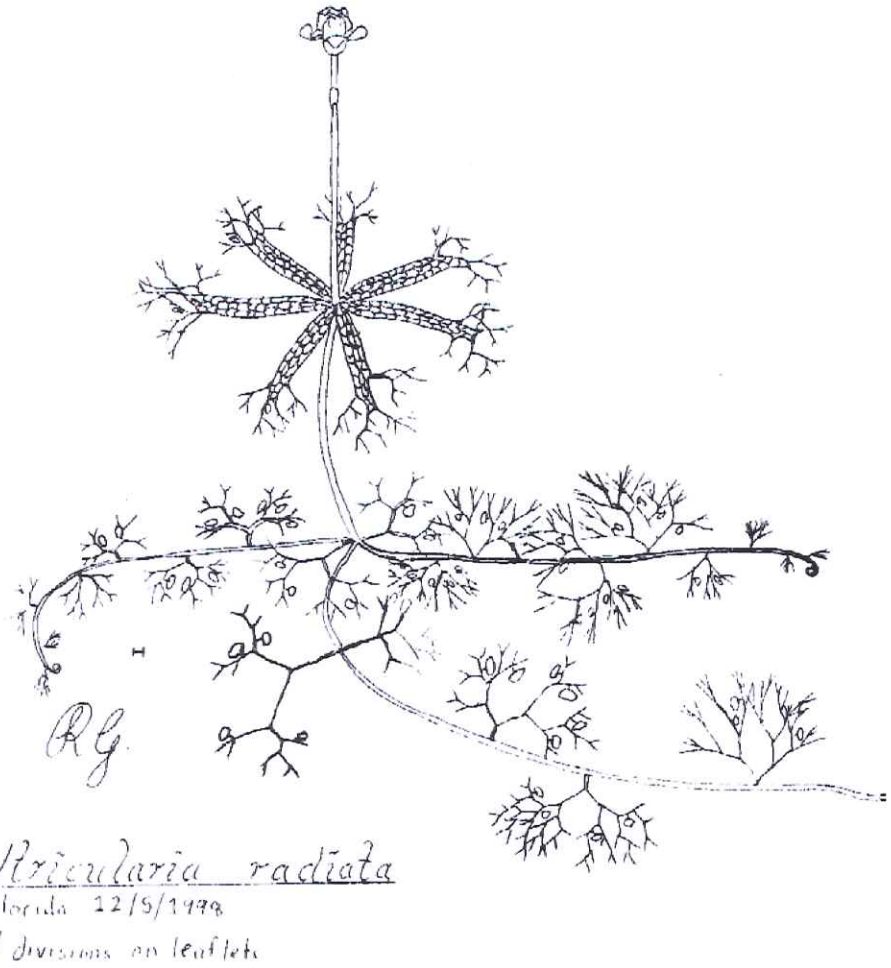


Figure 5. Sketch of a flowering specimen of *Utricularia radiata*, observed in central Florida. Below the float the plant is like any other aquatic bladderwort. The scale bar above the signature represents 1 mm.

Utricularia platensis

A South American species, *Utricularia platensis* is found in north-eastern Argentina, Paraguay, Uruguay and southern Brazil (**Figure 2**). The large species has stems to at least 40 cm long by 1 mm thick. The inflorescence is up to 22 cm long with up to 7 yellow flowers. Each bloom is up to 2.5 cm long. The cylindrical spur is distinctly shorter than the lower petal and has an entire apex.

The floatation device consists of 5-8 cylindrical to fusiform floats that are up to 4 cm long and 4 mm maximum diameter. A number of small projections occur near the apex that terminate in short, multi-divided leaf-like segments (Taylor, 1989: 660-662).

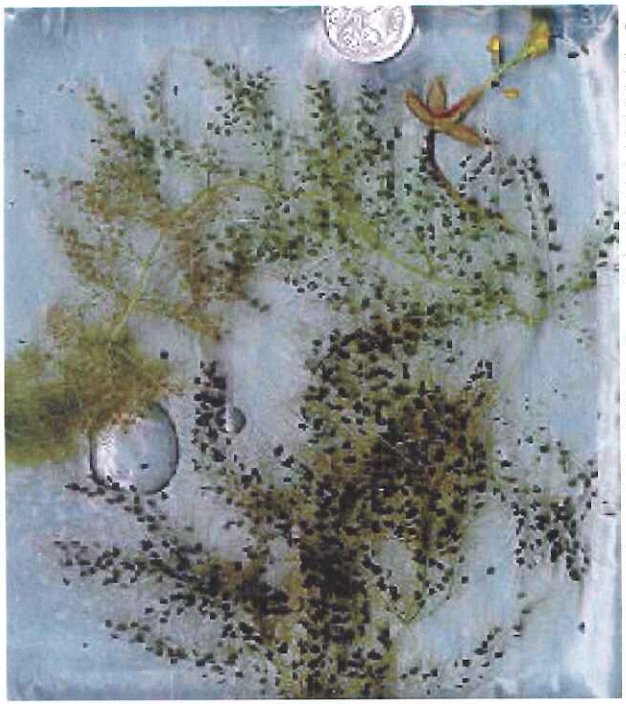
This species has many similarities to *U. radiata*. However, it differs from it, and all other float-forming species by the location of the traps and by minute projections on the leaves that occur on both the terminal and sub-terminal segments. *Utricularia platensis*, in common with *U. inflata* and *U. benjaminiana* is able to form tubers in order to survive unfavourable conditions.

Utricularia inflata

Thanks to Slack (1981) and Schnell (1974) *Utricularia inflata* is perhaps the best-known of the float-forming bladderworts (**Figures 6 and 7**). It is endemic to the south eastern coastal plain of the USA, from New Jersey to Florida and west to Texas (Schnell, 2001) (**Figure 2**) and is a robust species with stems to at least 1 m long by up to 2 mm diameter. The scapes are up to 50 cm long, with 4 – 17 yellow flowers. The petals are up to 2.5 cm long, and the cylindrical spur is much shorter than the lower petal and is usually bifid at the apex. In fruit the pedicels become strongly decurved.

The floats of *U. inflata* have been well illustrated by Schnell (1974; 2001) and Slack (1980). The unit consist of 5 – 10 obovoid floats that are often up to 10 cm long and widen gradually to the base. The apex of each float has a number of projections from which short leaf-like segments emerge (Taylor, 1989: 662-203).

This species is a survivor. It is one of the few members of this group that is able to form tuber-like structures in response to desiccation of its habitat. In this form the species survives in a dormant state, and new plants emerge when the local environment is again sub-



This page from "The Remarkable Float-forming *Utricularia*"

Figure 4 (Left). *Utricularia stellaris*. Photo Greg Steenbeeke

Figure 6 (Below). *Utricularia inflata* from New Jersey, USA in cultivation in the Czech Republic. Photo Lubomir Adamec

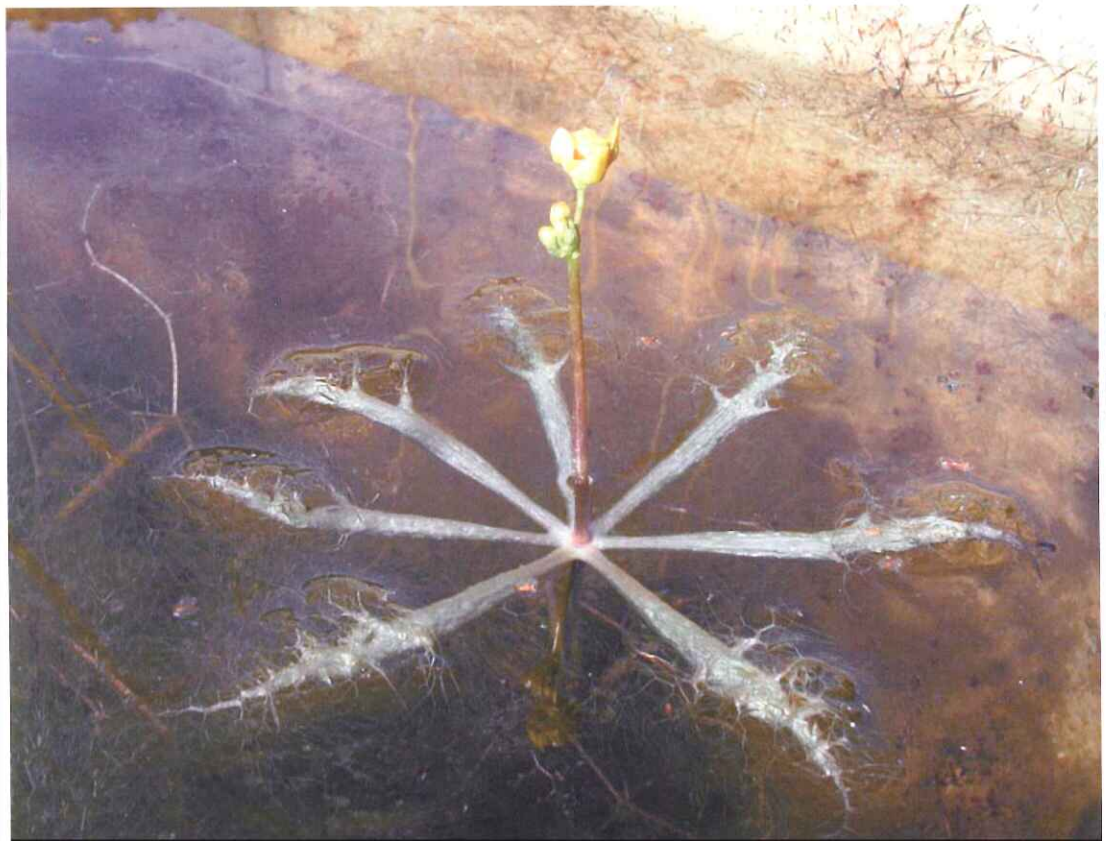
Opposite page from "Variation in *Utricularia multifida*"

Clockwise from Top: Figure 3. A distinct deeply lobed flower form from an isolated granite outcrop near Albany, Western Australia.

Figure 7. A double flowered form

Figure 6. An odd looking white flowered form. Usually extremely rare, a handful were found within this tiny population

Figure 4. Another extreme form from near Albay with emarginate lower lip.



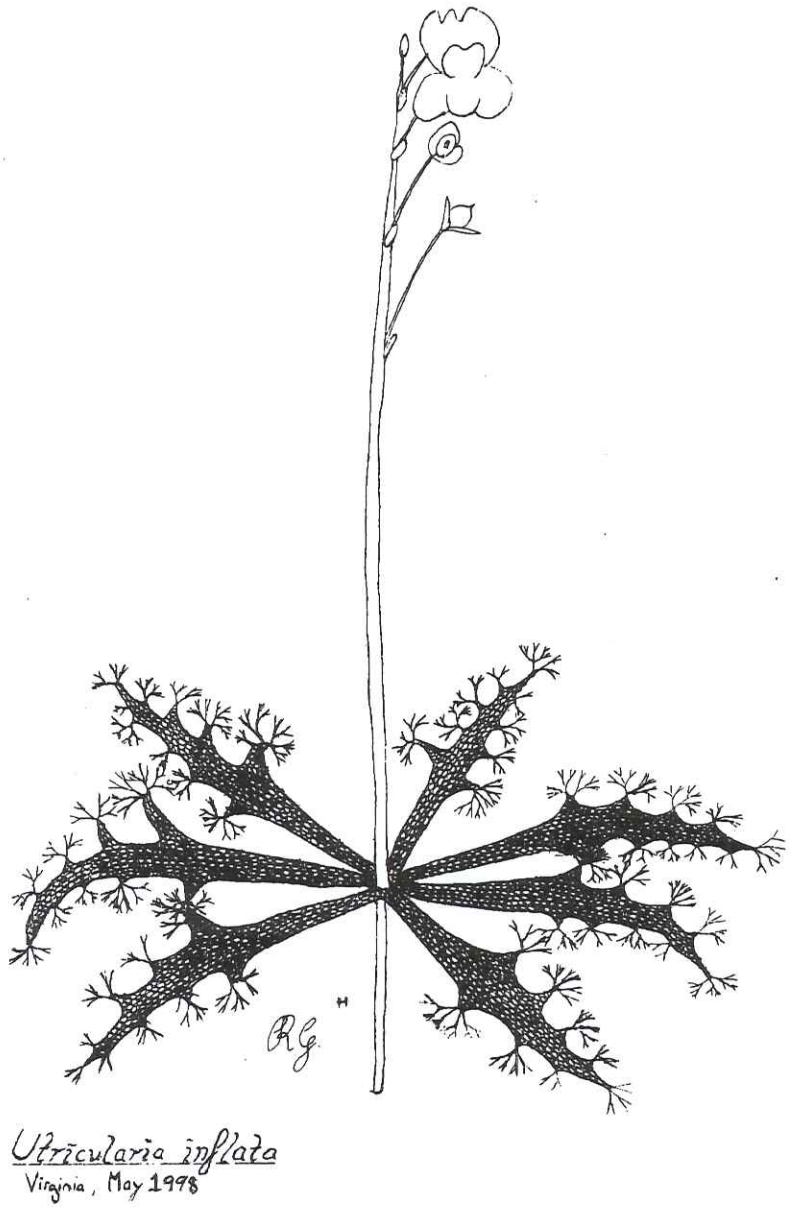


Figure 6. Sketch of *U. inflata* float and inflorescence, from a specimen observed in Virginia. The cells in the floats are large and often gas-filled. The scale bar represents 1 mm.

two different types of scapes: those with fully formed and opening flowers (chasmogamous) and those with flowers that do not open and instead self-pollinate (cleistogamous). The chasmogamous flowers are yellow, with reddish marks at the base of the upper petal, and up to 1.2 cm long, and produced in a congested group of up to four blooms. The cleistogamous scapes have a small single flower on an abbreviated scape that scarcely exceeds the float. In all cases the flowers are erect in fruit (Taylor, 1989: 668-671).

This species is distinguished from all other float forming species by its short scapes, the common production of cleistogamous scapes and its leaf division, with primary and secondary branches in threes. It appears to be very simular to the North American *U. radiata*.

Utricularia benjaminiana

Utricularia benjaminiana is a distinctive species found across much of tropical and subtropical Africa, including Madagascar, and occurs in northern South America, Central America and Cuba (**Figure 2**). This robust species has a cover of fine hairs over most parts, and is recorded at forming tubers in response to unfavourable conditions. The leaves are up to 10 cm long, with variable division and have traps up to 3 mm long, and are always produced in the junction of leaflet divisions. This species produces both chasmogamous and cleistogamous inflorescence; as also found in *U. breviscapa*. The chasmogamous scapes are up to 25 cm long with a whorl of floats produced near the base. The floats are fusiform, up to 2.5 cm long, with divided leaf-like segments at the apex. The unusual flowers are purple, with a yellow palate, up to 1.5 cm long. The flower is held horizontally, with the broad spur extending well beyond the lower petal. The upper petal is deeply two-lobed. Cleistogamous flowers are commonly produced and are often found at the base of chasmogamous scapes or are produced on very much reduced scapes, that frequently remain submerged. The flowers are erect in fruit (Taylor, 1989: 671-674).

Utricularia benjaminiana is an unusual species. It is one of the few species with hairy vegetative parts, has an odd placement of its traps, has distinctive chasmogamous flowers and has been found growing in saline water. It also produced radial floats. Photos of this plant in the wild would be great to see.

Discussion

The distribution of the float forming species raises some interesting questions. All species are known from all vegetated continents except for Europe, and are generally found within 40 degrees from the equator (Figure 1 and 2). Three species are endemic to Australasia – *U. aurea, U. muelleri* and *U. punctata*, and six species are endemic to the Americas – *U. breviscapa, U. incisa, U. inflata, U. perversa, U. platensis* and *U. radiata*. The remaining three species all occur in Africa, with *U. benjaminiana* shared with northern South America and parts of the Caribbean, and *U. inflexa* and *U. stellaris* extending to the east into southern Asia (and *U. stellaris* to Australia). It seems odd that there are no species of this group endemic to the vast continent of Africa. Perhaps, as Taylor (1989: p. 674) eludes an endemic and undescribed new species may occur in Angola, but more herbarium collections are needed to test this speculation.

The concentration of species in the Americas, and number of endemic species suggests that this is the centre of evolution for this group. Perhaps *U. perversa* has retained more of the relatively primitive characters that occurred in the transition to this group? The occurrence of three endemic species in Australasia my represent a secondary centre of diversity. In this region the genetic similarity of *U. aurea* and *U. muelleri* is shown by the occurrence of a putative, sterile natural hybrid between them in northern Australia. Whilst such speculation is unlikely to be tested by fossils, due to poor preservation ability of the group and the submergence of likely habitat and stepping stones by high sea-level in interglacial periods (such as the one we are now in) molecular techniques may shed light of the evolution of this group at the population to genus level. I look forward to seeing the details of this story as the work is done.

As with other *Utricularia* species, when not in flower these species can be easily missed. Also, agriculture, industry and urbanisation are rapidly altering many suitable habitats for this group of bladderworts (and associated species). In addition these species would be spread by moving water and water fowl, and thus may be continually naturally reintroduced into areas where they may be temporarily exterminated – e.g. by drought. Thus the ranges given are often under estimates, and unusual gaps in ranges, such as the apparent absence from Peru of *U. breviscapa* may be due to under collection or local and temporary extinction.

This remarkable group of aquatic bladderworts grows in many well-known parts of the world, yet remain remarkably poorly studied. These species have much horticultural appeal, due to the usual modified stolons on the scape, as well as the other intriguing characters shared by all bladderworts.

ACKNOWLEDGEMENTS

I wish to thank Greg Steenbeeke for information kindly provided on *Utricularia stellaris* and for reviewing the manuscript.

REFERENCES:

Harden G. (ed.) (1993) *The Flora of NSW South Wales, Volume 3.* University of New South Wales Press, Kensington, Australia.

Schnell, D. E. (1974) *Carnivorous Plants of the United States and Canada.* John F. Blair, Winston-Salem, North Carolina.

Schnell, D. E. (2001) *Carnivorous Plants of the United States and Canada: Second Edition.* Timber Press, Portland, Oregon.

Slack A, (1980) *Carnivorous Plants.* Reed. Alphabooks.

Taylor, P. (1989). *'Kew Bulletin Additional Series XIV: The Genus Utricularia – a taxonomic monograph'*. HMSO, London.

Mt Tomah Botanical Gardens Display

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After many months of Greg Bourke helping the staff at Mt Tomah Botanical Gardens with their extensive new "bog Garden" our Society had a nine day display at the Gardens. The first weekend started with the Minister officially opening the "Bog".

Visitors are amazed by what they see!

It was a big day for all and the display was well received as was the talks given by our members. The Gardens made three Giant "Venus Fly Traps" out of foam and sponge noodles that became a photo opportunity with many of the visitors. There were signs hanging above the carnivorous display and T-shirts with a photo of *Nepenthes villosa* from the cover of our Journal printed on them and sold in the shop there. Richard Sullivan kept an eye on the display throughout part of the week and answered any questions people may have had.

The vicious looking foam flytraps!

The Sunday of the second weekend Members bought their plants for sale. I have been with carnivorous plants for 25 years but my draw dropped at the quality of plants there that day. The eye catcher of the display was Greg's *Nepenthes maxima* x *veitchii* which was later sold at the Koi Show.

The plants of Phillip Reyter, Richard Sullivan, Greg Bourke, Kirstie Wulf, Owen O'neil and Gorden Hannah disappeared as fast as they could be put on the benches for sale. Gordon's *Nepenthes maximas* were just stunning and of course everyone's Sarracenias were stunning as were the VERY large *Darlingtonia* Greg bought in. More talks were given and these were packed every time.

Although the "bog" was still new we could see how the plants would look when established. This Display generated a lot of interest, which revitalised our members, and we have so many new members who have become very active in the Society.

The Botanical Gardens are having the Society for another display/sale on the weekend of 25/26th February 06. Have your plants ready and put this date on your calendar.

Members donated over 200 plants for the bog which were planted out by Richard Sullivan and Greg Bourke. At the time of planting it didn't look like much but many plants have been added since then and the bog looks spectacular!

Smoking

Duncan Gray
Canberra
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About two years ago my interest in growing carnivorous plants was rekindled when I discovered two other people at my work also grew them. I joined the ACPS and put in an order for tuberous Sundew seeds *Drosera whittakerii*, *D. peltata*, *D. erythrorhiza*, *D. macrantha* ssp *planchonii*, *D. macrantha* ssp *macrantha*, *D. stolonifera* and *D. gigantea*. This article describes my success in germinating these.

In May 2004 I planted out all of the *D. peltata* and *D. whittakerii* seeds and half of the other seeds. I didn't treat any of the seeds initially. After I had planted the seeds though I decided that a smoke treatment would be good. So I lit a little bonfire in each pot. Nothing germinated. I was expecting that at least the *D. peltata's* would come up. In September I dried the pots, hoping for germination the next year.

In April 2005 I devised a method of smoking the rest of my seeds, based on a water bucket bong. I cut the bottom off a plastic 2 litre juice bottle. I attached a cone made from an aluminium can to the top of the bottle. I had a bucket filled with water. Collected gum leaves were crumpled into the cone and the bottle was placed in the bucket, with the water level just below the cone. I lit the leaves. When they were burning nicely I slowly raised the bottle out of the water. This pulled air through the cone, filling the bottle with smoke. When it was fully out of the water I covered the cone to keep the smoke in the bottle.

The seeds were still in the paper envelopes that ACPS had mailed them in. I placed these packets in a small stand to raise them off the ground. I put the smoke filled bottle over the stand. The next day I planted the seeds out in 3 pots. The soil was half peat and half sand. The seeds had certainly had a good smoking. To this day the paper envelopes still smell smokey!

In September I noticed a sole *D. stolonifera*, a *D. macrantha* ssp *macrantha* and several *D. gigantea* seedlings. It's now mid November and they have gone into dormancy (or rotted away). I'm just happy they germinated.

Success With *Pinguicula* 'Hawkesbury'

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We've had success growing a particular hybrid of *Pinguicula* made by Laurent Legendre when he was working for the University of Western Sydney there in Richmond -- *Pinguicula* 'Hawkesbury' (see back cover). It's very hardy, grows quite large, has a lush lime green colour and flowers readily. It seems to prefer smaller insect prey than larger ones. It survived outside when we lived in Dubbo, even in the low 40°C heat of summer. We had a second plant growing in our indoor CP terrarium too. It's still there now that we're in the Newcastle area too. The one in sheltered conditions is far larger than the other, yet both are doing just fine and currently flowering with lovely burgundy shaded blooms **(Figure 3)**.

Figure 1. *Pinguicula moctezume*. One of the parents of *Pinguicula* 'Hawkesbury' which brings the vigorous nature and narrow leaf shape to the hybrid.

Figure 2. The large Pinguicula sp. 'Ayautla' is the second parent in the hybrid and what gives it its large size

It grows well in the perlite/vermiculite/sand mix some *Pinguicula* growers prefer. It grows well in regular sandy/peat mix most carnivorous plants prefer, and it grows well in regular potting mix too. It responds to misting. It also grows fine without regular

Figure 3. *Pinguicula* 'Hawkesbury' flower . Photo Greg Bourke

misting.

But the BEST thing about this *Pinguicula* is propagating it. It seems counter-intuitive, but it works, and works well. Take an older leaf from the parent plant and pull it off. Now get some sphagnum, preferably alive, but brown sphagnum works too. Simply rest the leaf atop the moss. Don't bury any part of it, but lay it on top and ignore it. In 2 to 4 weeks as the leaf dies back, little plantlets will emerge at the base of the leaf. Don't touch them, leave them alone and let them get bigger.

Sure enough, the leaf will eventually die. That's when the little *Pinguicula* babies may be harvested and planted out. Mist them often (so-so if in a terrarium, to a few times a day when they're outside in a dry Dubbo-like environment) enough to develop their roots at this stage. Once they're established keep them about as moist as a flytrap, viz, enough to keep their feet wet, but not drowning in water.

If you're worrying about either ignoring it or pampering it too much, err on the side of ignoring it. If we all grow this plant and keep the propagation up, the world will be taken over by *Pinguicula* 'Hawkesbury'. So, success with this plant is pretty much a guarantee. A beginning carnivorous plant grower should try to include it in his/her collection; the experts wouldn't be sad to have a go with it either.

Variation in *Utricularia multifida*

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Utricularia multifida has been cultivated widely since the late 80's and has always been a popular and easy grower. It is a small annual species endemic to the South of Western Australia. Typically *Utricularia multifida* has a pink flower with a three lobed lower lip. The centre lobe often being the largest but all being oblong-cuneate with the apices being truncate, commonly bilobed (**Figure 1**).

Figure 1. A typical form of *Utricularia multifida* from Bunbury W.A.

I had grown this beautiful annual for many years before making my first trip to Western Australia to see it in the wild and I was amazed at what I found. This delightful *Utricularia* was found at many of the locations I stopped in a wide range of soils. On the steep moss covered granite slopes of the Porongurups the largest flowers were seen born on scapes to 15cm in height. Some of the largest flowers measuring 3cm across! Although some fairly large colonies of 100-200 plants were found generally they were scattered in small patches in between the grasses and shrubs. Perhaps the sparseness of flowers together with the almost constant fog at the time of flowering has forced the species to put more energy into the production of large flowers in order to attract a pollinator.

Esperance at the eastern extremity of *Utricularia multifida's* range the rainfall is quite high for an extended period of time. The land is fairly flat with surrounding vegetation low. It is here where the species is at its smallest with flowers

of less than 1cm across.

In areas around Perth and along the west coast to the south the flowers of the species were found to be fairly uniform in size and shape with scape size varying from 10cm to 40cm depending on depth of water at the time of flowering and the surrounding vegetation. It was in such areas that the largest colonies were found with ephemeral lakes being of the highest density.

The forests of the south near Albany are quite tall and thick, not being good habitat for Utricularia at all but occasionally granite outcrops can be found (**Figure 2**). These are home to many species of plants that can't survive in the light starved soils of the forest floor. Being isolated in a small pocket such as this can prove very difficult for a plant especially when it comes to reproduction. The first problem the plants face is attracting pollinators. For the *Utricularia* this is not a problem given that it is insect pollinated. The insects are able to fly between colonies spreading pollen preventing inbreeding. If however the colony is small and is

Figure 2. Isolated granite outcrops on the south coast of Western Australia like this one allow for plants to evolve unaffected by nearby colonies.

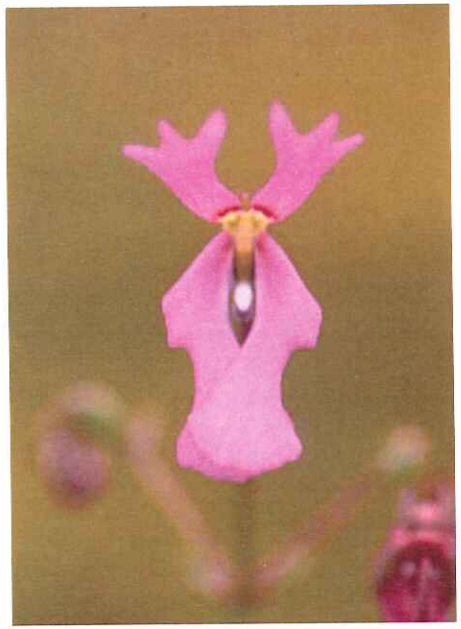

Figure 5. Stylidium calcaratum. A small annual herb commonly found on granite outcrops

isolated from other colonies by a long distance, longer than the pollinator will travel the gene pool is restricted and inbreeding occurs. Again this may not be a problem if your fruit is eaten by an animal and spread to other colonies introducing new clones to the gene pool. If this doesn't happen and inbreeding of a small gene pool takes place, abnormalities can appear and the rate at which the species may evolve in relation to surrounding colonies increases. This was the case for a small colony I found in the Albany area where it appeared that the typical form of *Utricularia multifida* was less successful than those with more obscure shapes. (**Figures 3, 4 and Cover**).

The variation in flower shape at the isolated site near Albany was extraordinary with almost every flower being different to the next. Were these plants attempting to imitate other species like *Stylidium calcaratum* (**Figure 5**) (who share the same habitat) in order to attract pollinators. I think it is more probable that it was simply a result of a depleted gene pool. Evidence of this was in the form of an increased amount of white flowered forms (**Figure 6**) which are usually very rare and also several double flowered plants were encountered (**Figure 7**).

No other *Utricularia* species were found at this site but several *Drosera* species were found. One of these *Drosera microphylla* was also found to be quite different to the more typical forms found in the area. *Drosera erythrogyne, Drosera menziesii ssp. menziesii* and *Drosera purpurascens* were also present but no unusual characteristics were identified.

One other interesting *Utricularia multifida* flower was encountered on the trip at a location near Perth.

This was found growing in a large swampland along side *Utricularia inaequalis*, *Utricularia violacea,* and *Utricularia menziesii* with the latter being well on its way to dormancy.

Although *Utricularia multifida* is found in a different subgenus (Polypompholyx) to *Utricularia inaequalis* and *Utricularia violacea* both of the section Pleiochasia in the subgenus Utricularia, the possibility of hybrids exists. *Utricularia multifida* and *Utricularia inaequalis* utilise the same pollinator (Lowrie , 1998: Page 76) . I witnessed European Honey Bees visiting *Utricularia multifida* at several locations near Perth. These bees are known to target only one species at a time to avoid mixing pollen but part way through the day they will change species and visit a different plant. It is possible that a bee could accidentally visit the wrong species at some stage or at the time of changing species accidentally transfer pollen to the wrong species. The chance of hybridization is very small but I believe I was lucky to find one such

Figure 8. From left to right, *Utricularia multifida, Utricularia inaequalis* and *Utricularia violacea* south of Perth.

Figure 9. Is this the hybrid *Utricularia inaequalis x multifida?*

flower. **Figure 8** shows the three species in flower at the Perth site with **Figure 9** showing the possible hybrid *Utricularia inaequalis* x *multifida.* Certainly the dark pink colour is typical of the latter species but all other floral parts were intermediate between the two. The lower lip is entire at the apex which to my knowledge has never been recorded for the latter species. There are four distinct raised yellow ridges in the palate like those found in the former but the dark purple outline is replaced by a faint pink outline and the upper lip is held vertical and far reduced in size when compared with *Utricularia inaequalis*. Whether this actually was a hybrid or not will never be known given that no collection was made. Further study of these two species is required perhaps with hybridisation experiments in cultivation before conclusions can be drawn.

Although most of the variation discussed here is of little significance to taxonomists further investigation into western Australia's unique *Utricularia* will reveal many more interesting anomalies. Perhaps some of these may become popular with collectors before they are lost to development.

References:

Lowrie, A. (1998) *Carnivorous Plants of Australia - vol. 3*, University of Western Australia Press

Lowrie, A. (2005) *A taxonomic revision of Drosera section Stolonifera (Droseraceae)*, Nuytsia (15)3 355-393

Taylor, P. (1989) *The Genus Utricularia—a taxonomic monograph,* Royal Botanic Gardens Kew