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Vice President: Marj King 8985 6885
Secretary: Jan Herrmann 8988 9723
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JUNE 2004 NEWSLETTER

MEETINGS AND FIELD TRIPS

We meet on the third Thursday of the month at 7:30pm. We attempt to conclude the general meeting by 8;00pm and this is followed by a guest speaker beginning at 8:15pm, leaving time for a cuppa between the meeting and the talk. The meeting venue is Marrara Christian School, on the corner of Amy Johnson and McMillans Drive. All are welcome and invited to bring plants to swap, sell or have identified.

COMING EVENTS COMING EVENTS COMING EVENTS

~NEXT MEETING THURSDAY 17 JUNE~

Mike Clark, CEO of Greening Australia NT, was due to be the guest speaker at the June general meeting, on the topic of Agroforestry; unfortunately he has another commitment and has asked that another date be arranged for him. As a result the meeting will be a Members Night; members are asked to come along and discuss a number of matters of interest to the Society, including another look at our objectives and future activities, how changes in the new Associations Act will affect us, and preparations for the Tropical Gardens Spectacular.

~JUNE FIELD TRIP~

To be advised at the coming Members Night

GREENING AUSTRALIA MINI PLANT SPECTACULAR 17 JULY

Greening Australia will not be exhibiting at this year's Tropical Gardens Spectacular but will instead have their own event at their premises in Stuart Park where plants will be sold and information provided. Further details will be provided in the next newsletter.

TROPICAL GARDENS SPECTACULAR 7-8 AUGUST

In recent years TENPS has put considerable effort into our representation at the Spectacular and this year will be no exception. The committee is planning for a larger display than previously, and more will be outlined at coming meetings. There will be a huge demand for native plants, so members should consider what plants they may have available for sale, or can access from others.

~COMMITTEE MATTERS~

The Committee wishes on behalf of all members of the Society its appreciation to Pat Rasmussen for her continued support of the Society by providing supper at our monthly meeting.

The Society had a bank balance of $4264.75 at the end of May. If members have any good ideas of how some of this money can be spent the Committee would like to know about it. Members are invited to come up with suggestions at general meetings.

Suggestions for speakers are particularly welcome as we would like to finalise the speaker list for the year as soon as possible, as well as field trips. The next committee meeting will be held at Russell's place at 730pm on Tuesday 22 June. Members are welcome to attend as always.

Due to Jan Hermann's extremely busy schedule over the next couple of months, she has temporarily relinquished the newsletter editorship and Geoff Gaskell has taken over producing a bumper issue. He will accept any deficiencies, but would also appreciate articles for the upcoming editions. The deadline for the July issue is 30 June.

~REST OF 2004 MEETING SCHEDULE (TBC)~

July	Phil Short	'In pursuit of plants' – the exploration and collection of plants through history.	15 July	TBC
August	Jared Holmes	Data deficient plants: Rare species in the Litchfield Shire	18 August	Sunday 5 September
September	David Liddle	*Ptychosperma bleeseri*	16 September	Sunday 5 & 19 September
October	Mike Clark?	Whys and Wherefores of Agroforestry	21 October	TBC

PAST FIELD TRIPS AND TALKS

~APRIL MEETING: CYCADS WITH DAVE LIDDLE~
~Woodland to Grassland: the future for the Top End~

David Liddle works for Parks and Wildlife in a scientific role. He has recently completed his doctorate on Northern Territory cycads and is awaiting its final assessment.

On Thursday 15 April, David spoke to a small group of members about the potential impact that the combination of exotic grasses and fire might have on the Top End environment. As way of introduction, *Cycas armstrongii* is a local member of the cycad species. It can be found around Darwin, south to Hayes Creek, on the Cobourg peninsula and Tiwi islands.

Figure one: Still a Woodland!: cycads at Charles Darwin National Park

C. armgstrongii is distinctive plant, 2 to 4 metres tall, with a single stem often seen growing in stands. The straight trunk is covered by a rough dark gray bark often blackened by fire. Dark green fronds 50 to 100 cm long arise from the top of the stem. They are divided into numerous stiff, straight flat narrow leaflets. Often sharply pointed when mature the fronds are soft with velvety hair when young. Late in the wet season fallen brown fronds carpet the ground around the stem with new frond growth arises from the apex.

Female cycads have pendulous flattened hairy spikes with a triangular tip with sharp spines at the tip and along edges from which the fruit can be seen. These arise from the apex of the trunk. Fruits are hard smooth round 2 to 4 cm in diameter becoming red-brown when ripened, containing a single seed. Fruiting occurs March to September; later fruit can be seen scattered around the plant. The seed has been long used as bush flour by Aboriginal people but requires carefully washing and soaking to remove toxic chemicals. Male cycads have a single cone arising from the

apex of the trunk typically 12 to 20 cm long, consisting of numerous spirally arranged scales.

There has been much impact on the cycad environment in recent years. For example, land clearance for plantation timber on the Tiwi Islands and around Darwin the urban development, mango farms and pasture development. The floral industry harvest Cycad leaves for use in flower arrangements.

Exotic grasses such as Gamba and Mission grass play a role in environmental changes in several ways; through competition with native grasses and through the increased fuel load and the timing of when that fuel load is susceptible to burning. David estimates that the presence of Gamba grass within a woodland area may increase fuel load from 5 to 7 tonnes per hectare up to 20 tonnes per hectare.

Mission grass (*Pennisetum polystachion*) is a slender stemmed, tussocking perennial grass that grows to 3 metres. It has a propensity to grow in disturbed areas along the side of roads, neglected pastures and waste sites. It also displaces native grasses. Mission grass was introduced as a pasture species but proved unsuitable and now is a declared noxious weed. It remains green until late in the dry season thus providing additional fuel for late dry season hot fires.

Gamba grass (*Andopogon gayanus*) is taller growing up to 4 metres in height and more robust. It favours creek lines, flood plain fringe and *Eucalyptus* savannahs where rainfall exceeds 600 mm a year. It was also introduced as a pasture species, but becomes unpalatable to stock when mature. Gamba grass forms dense stands, which greatly adds to the fuel load of dry season fires. Gamba grass is not a declared noxious weed, although there are many who would disagree with its official status.

David has collected data from select areas in Charles Darwin National Park. This area of bushland between Winnellie and the mangrove has been the responsibility of Parks and Wildlife since 1997. Its history includes storage of military munitions going back to the 1940's with heritage listed storage shelters still on site.

1997 was notable for a large bush fire in the area. Since 1998 different fire regimens have been used on various plots of land within the Park. These include no burning, annual burning, triennial burning and intensive burning using hay bales to represent the effect of exotic grasses.

Figure two: A "cool" fire burning away undergrowth in the Top End.

David has observed that any fires will damage cycad stems and may even destroy stems but the plant may resprout the next wet season. The hotter the fire the more likely the plant will be killed. Cycads are long-lived and slow growing (3 to 5 cm per year). It is uncertain as to how long it will take for such resprouts to reach reproductive maturity.

Using statistical modelling based upon collected data from field trips, David presented a series of graphs to illustrate his theories.

The data presented in figure three reveals that with annual burning, the population of cycads is likely to remain stable over the 100 year period with populations densities never falling below 4000 plants per hectare. There appears to be little difference in the impact of fire frequency.

Looking at graphs, which differentiated the plants into levels of maturing, such fires, not unexpectedly had the greatest impact on the young juvenile plants.

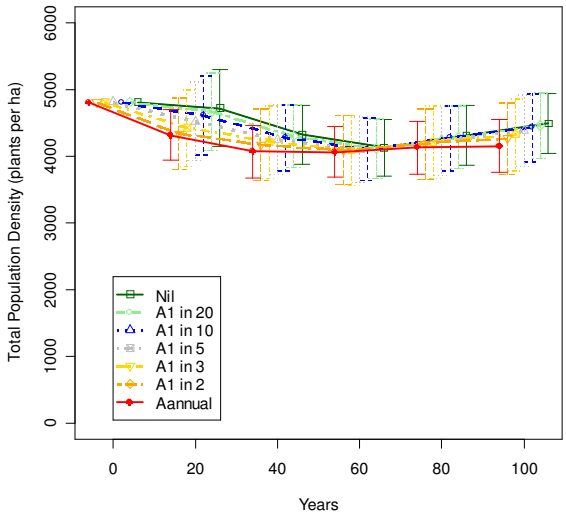


Figure three: Impact of ambient fuel fires.

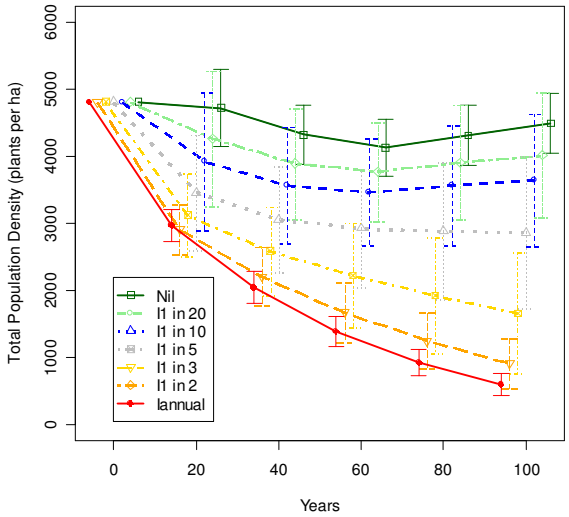


Figure four: Impact of intense fires

The modelling data presented in figure four reveals a much more dire problem for cycad populations. Here annual intense burning, such that may happen should Gamba or mission grasses become a feature of the environment, will reduce densities to less than 1000 plants per hectare. Even burning at a frequency of every 5 years appears to have a substantial effect upon cycads. Looking at the differential graphs, the impact is spread across the populations, with a much higher impact on the reproductively mature individuals than the less intense fires.

Figure five summarises the disparity between the impact of ambient versus high fire loads and the relationship to fire frequency. Thus it is evident that even with annual low intensity fires that the probability of exceeding decline threshold remains essentially nil. Whereas the probability of exceeding the decline threshold reaches 1.0, that is certainty, when intense fires occur every 5 years. Even with an intense burns every decade the probability of exceeding decline threshold is markedly increased.

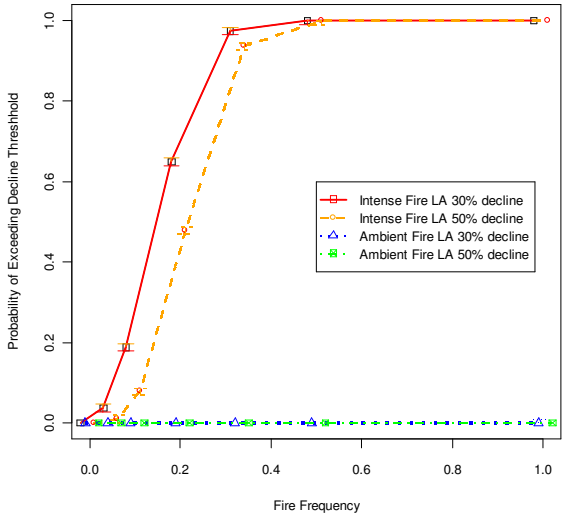


Figure five: Modeled Probability of Decline with Fire

It remains uncertain as to what is the critical number required to sustain the population of cycads. However as numbers fall, the loss of genetic diversity is likely to lead to inbreeding and adversely affect reproduction.

	Nil	Ambient	Intense
Ironwood (Erythrophleum chlorostachys)	0%	75%	89%
Woollybutt (Eucalyptus miniata)	0%	8%	11%
Stringybark (Eucalytpus tetradonta)	0%	14%	30%
Cocky Apple (Planchonia careya)	0%	32%	94%
Billy Goat Plum (Terminalia ferdinandiana)	0%	11%	100%

Table one: Death of woody plants following the different fire regimens.

Table one shows that cycads are not alone when it comes to impact by intense fires. Some species have great susceptibility to fire;

for example, of the five species described only the Eucalypts appeared to be spared during the intense fires. Of note the Billy goat plum seems to be well adapted to ambient fuel load fires with a loss in a similar percentage to the Eucalypts in these cooler fires.

David concluded that fires that occur once Gamba or Mission grasses become established tend to be hotter because of the fuel load. Thus these hotter fires have the potential to destroy all wood plants including cycads and over time grasslands will replace our tropical woodland. It doesn't take much to consider the impact of this on bird and animal life, potential for soil erosion and affect on river ecology and impact on air quality and our own health.

By Mark Raines with illustrations courtesy of David Liddle

Additional information

Brock J. Top End Native Plants 1988 John Brock. Darwin.
Smith NM Weeds of the wet/dry tropics of Australia. Environment Centre NT Inc. Darwin 2002

~MONITORING OF *CITRUS GRACILIS* AT SAYER ROAD~
~Two site visits March & April 2004~

Following representation from the Top End Native Plant Society and part funding from the NT Government, in 2002 the Litchfield Shire Council marked off a section of the roadside verge near where Sayer Road meets the Stuart Highway. The intention was to look after part of a population of a near threatened tree, *Citrus gracilis*. It was hoped that in addition to looking after this particular site, the exercise would illustrate the environmental value of roadside reserves within the Litchfield Shire. TENPS undertook to periodically weed the area to control Gamba Grass and Mission Grass. Several field trips have been undertaken since 2002 to control these grasses. Control has been quite successful, though will be an ongoing task due to proximity of seed sources that will ensure a constant supply of new tussocks.

***Citrus gracilis* leaves**

To gauge the response of the *Citrus* population to the management undertaken and to provide information on changes in the size or structure of the population TENPS put in place some monitoring in February 2002. All plants that could be found were individually tagged and measured for height and disturbance such as evidence of slashing. In March and April 2004 TENPS members reassessed the *Citrus* plants. A preliminary summary of the monitoring results follows. There appears to have been an increase in Citrus "plants" within the area enclosed by bollards, from 102 to 150 plants.

Note the definition of plants is somewhat subjective as many of these are thought to be root suckers from other plants. The data suggests there has been an increase in the total number of plants, however, it is impossible to tell how many of these were simply missed in 2002 and how many are "new on the block". Now that two assessments have been undertaken, as well as measuring the location of known plants, we should be much more confident in the future about interpreting changes in numbers. Of particular note, out of 102 plants tagged in 2002, four tags were found with no evidence of a nearby plant while two were not found and assumed to be dead. This represents a relatively low mortality rate with the loss of only 6 out of 102 plants over a two year period. All six were relatively small, with a height of 25cm or less.

As could be expected with cordoning off the area, the occurrence of slasher damage reduced dramatically. In 2002, 80% of plants exhibiting recent slasher damage while in

2004 no recent damage was evident. There was a corresponding increase in height of the 96 living stems for which data was available in both years, a mean of 58cm in 2002 and 63cm in 2004. This relatively modest mean growth in part reflects substantial declines in the height of a couple of the biggest plants, a decline of 398cm for one and 455cm for another. The cause of the loss or reduction in the size of the main stem on these plants is unknown.

***Citrus gracilis* bark**

A useful way to gauge the response of the population is to examine the size class distribution of the living plants (figure 1).

While keeping in mind the sample size varies with 102 living plants recorded in 2002 and 150 living plants recorded in 2004, it is interesting to see that the proportion of plants 50cm or less in height is very similar in each year. It is pleasing to see that the proportion of plants between 51 and 100cm has increased in 2004. This suggests that despite the unexplained reduction of some large adult stems, there has been a movement in a cohort of small plants (50cm or less) into the next size class. If this trend continues, there is a good chance that the large plants that have been lost will be replaced in the future. Evidence to date suggests the population is responding positively to the management implemented, an encouraging sign that makes the effort to weed and the input of the Litchfield Shire Council in looking after the area all the more worthwhile.

Thanks to Alison Worsnop, Joyce Stobo, Pat Rasmussen and Strider for population monitoring in 2002 and to Felicity, Jen Cooke, Justin Tutty, Linda Rennie, Liz, Marj King, Mark Raines, Pat Rasmussen, Sally Jacka and Strider for monitoring in 2004. Thanks to all those who have assisted in weed control at the site. *Written by Dave Liddle, photos by Mark Raines taken on the second visit on 25 April 2004.*

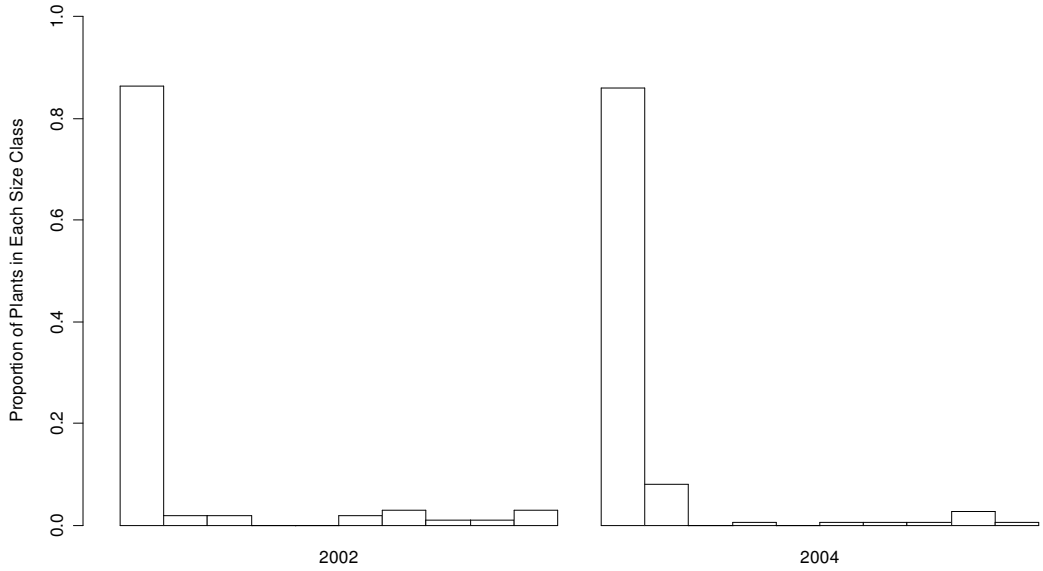


Figure 1: Size class distribution of tagged living *Citrus gracilis* at Sayer Road. Each column (or gap for a column) represents a 50cm size class. The left hand column represents the proportion of plants ≤50cm tall, the next column represents the proportion between 51 and 100cm tall. The right hand column represents plants between 451 and 500cm in height.

~MAY MEETING; GUEST SPEAKER STEVE POPPLE~

Steve has been the Darwin Urban Landcare Extension Officer for a number of years, and been directly responsible for supporting the Duke Street, Ludmilla Creek, Rapid Creek and Casuarina Coastal Reserve Landcare groups during a period of strong activity over the past 10 years. These groups are self-funding but many have been able to source additional funds from local and national sources eg National Heritage Trust/Envirofund.

All groups have been concerned to maintain existing native vegetation that has been negatively affected by development, resulting in invasion by weeds such as coffee bush, and soil erosion has been evident. Re-vegetating affected areas with natives of local provenance has been the main activity.

Duke Street Landcare Group looks after a smallish area of monsoon forest in Stuart Park. This spring-fed area is dominated by large *Szygium armstrongii* but was badly affected by dumping; weeds (many weed seeds dropped by birds) and low-quality storm drain water. With support from Darwin City Council, the Group has removed all the rubbish and weeds, put in new plantings in an open area behind Darwin Honda, installed a walking trail/boardwalk, and had some influence on vehicle traders to establish gross pollutant traps to improve water quality in the storm drain.

Ludmilla Creek Landcare Group is the largest and oldest group; initially the major efforts went into coffee bush clearing and draining and ponding as needed. Over the 2 years beginning in 1999, 4000 trees were planted, using seed collected from the catchment. Initially fast-growing pioneer species such as Black Wattles and *Albizias* were planted, to be cut out later as slower growing species became established.

A new project has been established at the rear of Ludmilla School, called Ludmilla Environmental Park. It aims to highlight local flora for home and educational use, and has a high level of plant diversity, with many plants labelled. For example, there are 8 mangrove species in the area, and many birds are attracted there. In the last 2 years, with assistance from ANZ Bank, concrete paths have been built, with a boardwalk planned.

Rapid Creek Landcare Group has focussed on the riparian vegetation along Rapid Creek between Trower Road and the airport, aiming at returning it to its original vegetation cover along a 5m wide corridor. This has proved difficult, as it is a big catchment and newly-planted trees have to cope with flooding. There are 26 stormwater drains feeding in to the creek, only 4 with trash-catchers, and as it is a popular area for recreation, there is a problem with stream-bank compaction. The Group is working with Darwin City Council to get 'controlled' areas so that the human impact, including fires, can be reduced. Plants grown include *Barringtonia sp*, paperbarks and *Alphitonia sp* (fast-growing).

Casuarina Coastal Reserve Landcare Group has worked for 7 years on an area with a long history of disturbance and damage along the Tiwi Creek/drain on Rocklands Drive; as a result a large quantity of coffee bush has been removed and revegetation carried out along the creek corridor to the main forest fringe and an adjacent area. Natural regeneration has been good, and only the occasional fire presents a threat. The major activity at present is controlling weeds (*Centrosema sp, Clitoria sp, Senna sp*) among the new plantings, and getting organised for a new project area along the Casuarina Beach foreshore near the free beach. Plants are sourced from Greening Australia and some home propagation efforts.

To sum up, Steve 'plugged' Landcare groups as a great way for people with a variety of aims to make a contribution to protecting diversity in our urban environment by a monthly effort for a couple of hours, and the importance of working with local land managers to achieve the groups' aims.

~23 MAY 2004 FIELD TRIP ON HOWARD RIVER CATCHMENT OFF GUNN POINT ROAD~

A group of 11 TENPS members turned out for this very successful field trip. We were really fortunate to have Ian Cowrie from the Herbarium join us, and every one of us benefited from his great expertise. Add to that Joyce Stobo's wo nderful knowledge plus Sally Jacka and Dave Liddle and we were all kept well informed. There was always someone to turn to for an answer to the many questions.

A good eye, assisted by a magnifying lens, a flexible back and strong knees were all essential requirements for identifying these small plants.

The group pouring over some yet another species

The location was ideal for investigating these small flowering plants. There was such abundance in the area that it took us well over an hour to get more than 50 metres from the road where we'd parked! On seeing the variety and hearing so many new names I quickly decided to adopt a learning strategy where I'd try and remember 5 plants that I would still be able to name by the end of the morning! I assure you for me that is a challenge, as my expertise is definitely not in the field of plants – give me a human body and I'm fine with my muscles, bones and tendons!!

Close to the road where it was drier we saw *Goodenia purpurea*, *Mimulus uvedaliae*, *Lobelia dioca, Cartonema trigonopermum* and *Mitrasacme subvolubilis.* We also saw *Utricularia leptoplectra* in this area with a very pretty deep purple petal upper side and yellow underside. There were more, but I was already up to six plants to remember and we weren't e ven 5 metres into the walk!

Goodenia purpurea

In this area we also saw *Rhamphicarpa australiensis* (listed as near threatened) – most were already in seed but there was one sample with some late flowers – and that meant I had a 7th plant to memorize! I think that I could identify five of those seven again, so not bad for a start – I wonder if I will remember them next season?

Huxleya linifolia

So whilst the rest of the group continued with their identifying of the remaining plants – I spent my time being 'clever" – remembering, reciting and identifying the seven plants for anyone who cared to listen – proof that new found knowledge is dangerous in some hands!!

I was truly amazed at the variety of species seen. We slowly made our way off the roadside – heads down, bottoms up – and I think we managed to get only 100 metres into

the flood plain by the time it was ready to go. As we moved along the ground became wetter until there was surface water still present. We started to see *Drosera indica* (in both large pink flower and tiny white flower forms) and *Drosera petiolari.* Then in the wetter zone we also saw *Nymphoides aurantiacas* and *Huxleya linifolia*, an NT endemic. Fortunately, for all, Sally kept a list of all the plants spotted; and I have surprised myself at what I have remembered!

Thanks must be given to Ian Cowrie for giving up a Sunday morning to accompany us. Although I'm sure he enjoyed himself his assistance with identifying the plants was invaluable and greatly appreciated by all of us. It was without doubt a very successful morning outing, which I'd happily do again .

Plant List

Buchneria gracilis
Byblis aquatica (Top End endemic and listed as near-threatened)
Calandrina gracilis
Cartonema trigonopermum (Top End endemic)
Centrolepis banksii
Drosera indica (large pink flower and tiny white flower form)
Drosera petiolaris
Goodenia eliaosome (not officially named as yet, Top End endemic)
Goodenia purpurea (Top End endemic)
Huxleya linifolia (NT endemic)
Limnophyla fragrens
Lindernia aplectra
Lindernia lobelioides
Lobelia dioca
Mimulus uvedaliae (mauve flower)
Mimulus uvedaliae var. lutea (white flower)
Mitrasacme subvolubilis
Nymphoides aurantiacas
Oldenlandia leptocaulis (Top End endemic)
Rhamphicarpa australiensis (Listed as near threatened)
Salomonia ciliata
Sowerbaea alliacea
Stylidium fissilobum (Listed as Data Deficient)
Trithuria lanternia
Utricularia chrysantha
Utricularia D17394 parvialba (Previously *caerulea*)
Utricularia lasiocaulis
Utricularia leptoplectra
Utricularia odorata
Xyris sp.

Field trip report by Jennifer Cooke. Plant list provided by Sally Jacka

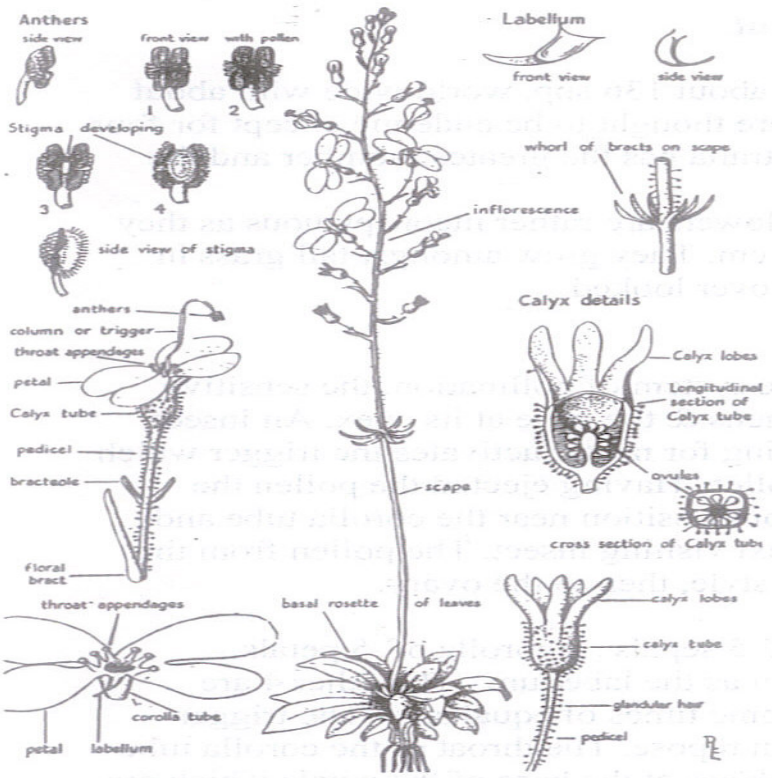
~THE BOTANY OF STYLIDIUM SP (TRIGGER PLANT) OF THE FAMILY STYLIDIACEAE~

It is thought that there are about 136 species world wide with about 130 species in Australia. All are thought to be endemic except for 4 species in Asia. West Australia has the greatest number and the largest flowering plants of the genus.

Here in the Territory the flowers are rather inconspicuous as they are seldom more than 1cm in diameter. They grow amongst tall grass in damp areas and are easily overlooked. These plants have a unique system of pollination; the sensitive trigger bares both the stamens and the style at its apex. An insect visiting the flower and looking for nectar activates the trigger, which showers the insect with pollen. Having ejected the pollen the trigger returns to its previous position near the corolla tube and presents the style to the next visiting insect. The pollen from the insect is transferred to the style then the ovary.

The flower is made up of 5 sepals and a corolla of 5 petals. One is very small and is known as the labellum. The other 4 are usually vertically paired and are sometimes of equal size. The trigger hides the labellum when in repose. The throat of the corolla tube often has coloured appendages at the base of the petals, which are different in the varying species.

Contributed by Joyce Stobo



These images are taken from Rica Erickson's book "Triggerplants", which was published 1n 1985.

They do show the parts of most stylidiums but there are variations in the different species.

~TENPS WEBSITE~

The URL for the TENPS is **http://tenpsnt.tripod.com.**

The site contains copies of the Newsletter, committee minutes, the Library list, links to other websites and interesting photos of Top End plants. Mark Raines who is editing the website would appreciate contributions from members - photographs, planting tips, lists of bird attracting plants for home gardens, interesting links - anything that members would think will enhance the website and be informative for the general public as well as members. You can email contributions directly to Mark at mailto:rain0021@optusnet.com or to the TENPS email address tenps@austarnet.com.au Check out the website and see what you think!

~TENPS MEMBERS AT WORK~

Measuring the location of Citris gracilis at the Sayer Road site

Citris gracilis growing out of termite mound

Meeting the third Thursday of the month at 7:30 pm at Marrara Christian School Library.

NEXT MEETING THURSDAY JUNE 15
MEMBERS' NIGHT

SENDER: TOP END NATIVE PLANT SOCIETY
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NT 0831

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