



Associations of Societies for Growing Australian Plants

ASGAP

Rainforest Study Group

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Study Group Webpage (under construction): <http://farrer.csu.edu.au/ASGAP/rainfor.html>

Email: tropicalbotanics@hotmail.com

Address: Kris Kupsch, 28 Plumtree Pocket, Burringbar, Australia, 2483. Ph. (02) 66771466 Mob. 0439557438

Introduction

It has been a long while since I wrote a newsletter, I apologise for taking so long. Since the last newsletter the family and I have moved back to the Wet Tropics. I now work as an Environmental Scientist undertaking vegetation surveys and compiling environmental management plans for parts of the Wet Tropics World Heritage Area. This has been a rather large transition, leaving behind my garden and all of my immediate plans in NSW; the job was too good to refuse. I wish everyone the best with their endeavours and hope this newsletter was worth the wait.

1. **Membership-** I will not be asking for renewals upon closing of this financial year, instead I will send this edition and will contain a notice within the next for those needing renewal. Please send letters to the NSW address until I settle down at a more permanent location.

2. **Webpage-** a webpage is being constructed for the Study Group. This will be improved on in the coming months.

3. **Photo gallery-** some newsletter photos have been included as a webpage to reduce costs. Sorry for those persons without the use of the Internet. Please ask if you want to download or use these images for any reason at all. Username 'tropicalbotanics' Password '4511113'

4. **Article incentive scheme-** I'm offering an incentive for people who are willing to compose a well researched article on a topic which relates to rainforest plant cultivation and other rainforest based science. Every article must be discussed with me prior to approval. Information on temperate species is highly desirable. Please email or call me to discuss this first.

ASGAP trip to Sydney Nov 2005

During my brief visit to Sydney in November last year as part of an invitation to speak at a SGAP meeting in Ermington, I got to do the following:

1. I was escorted by Cas Liber, ASGAP Banksia Study Group leader. Cas toured me through the Botanic Gardens, his garden, among others. Many thanks to Cas and his family.
2. I visited Betty Rymers garden at Kenthurst. Betty has a notable rainforest garden including a large *Brachychiton discolor*, *Dianella tasmanica* and an unusual variegated *Pisonia umbellifera*. Thanks for the visit Betty and the *Pisonia* cuttings grew!
3. I visited Alan Fairly, author of 'Seldom Seen'. Alan's *Banksia* with 'deflexed' flower spikes was most amazing. Thanks Alan.
4. I visited Pip Gibian's garden at Dural, which surprised me with many tropical species (especially *Phaleria clerodendron* and *Cupaniopsis diploglottoides*). Read further about Pips experiences within this newsletter. Thanks Pip.
5. I visited Jo Hambrett, leader of ASGAP Garden Design Study Group. Jo's garden uses both rainforest and woodland species to great effect. Thanks again Jo.
6. Ian and Tamara Cox's garden at Kenthurst is an amazing sandstone garden. This really taught me how narrow minded I am. Many Grevilleas, Banksias and Ferns are being grown. Thanks Ian and Tamara.

Severe T. C. Larry

Compiled by Kris Kupsch, Rainforest Study Group Leader

I had just moved back to tropical Queensland after spending a year in NE NSW, when it was obvious that a severe tropical cyclone was brewing in the Coral Sea. Whilst living in Cairns between 2002-2005 only a couple of small Coral Sea disturbances occurred. Severe Tropical Cyclone Larry crossed the coast just 70km to the southeast of where I was living. I was living in Atherton, which is usually considered a 'safe haven' from the exposed tropical coast, however Larry moved at such a slow speed (~15km/hr) that little intensity was lost once it smashed Innisfail and the coastal tourist town of Mission Beach. It tracked west directly up the Johnstone Valley affecting some estimated 500 km² of the Wet Tropics. I had never seen anything like it before. Experiencing horizontal rain and pulsing winds that roar like you're standing next to a jet engine for 3 hours, really does change your appreciation for calm sunny days. Following the storm the affect these winds had on pristine rainforest was incalculably obvious. The rainforests within the Palmerston NP and those of the coastal ranges facing the ocean (Graham, Basilisk, Walter Hill, Francis and Bellenden Ker Ranges) bore the full brunt of the very destructive unimpeded clockwise vortex, courtesy of the warm tropical ocean.

Mountain ranges, which were once covered in luxuriant mesophyll forests, were reduced to sticks from afar resembling woodland ecosystems. Ridge tops showed obvious damage with complete canopy collapse a widespread feature. Traversing through cyclone-damaged forests is very difficult. Upon a field visit to the Palmerston area, I was shocked by the degree of damage and subsequent increase in sunlight reaching the forest floor. One element however was within the forests favour, it has been cloudy and rainy almost everyday since Larry arrived on the 20th March, thus providing protection to understorey species and reducing the threat of dry season fires. Incidentally, where I now live, there have been no more than 10 days where the sun has been sighted for 4 months; it has been either heavily overcast, drizzling or raining on all the other days.

Weather events such as TC Larry are completely natural and stronger cyclonic events have occurred in the past, however disturbance within tropical systems in the modern world provides a challenge, as foreign processes now exist which endanger

the integrity of these communities. Small rainforest remnants many on alluvium or basalt have been very hard hit by TC Larry. Within the Innisfail-Babinda areas all linear small fragments with a high edge to core ratio, are now unrecognisable and now prone to invasion by vines and exotic grasses, which increase susceptibility to fire and displace secretive species. Additionally gardens and arboretums, which have taken decades to construct, are now unrecognisable and are missing many prized feature specimens that are rare and hard to obtain. Notably non-native collections were worst affected.

The destruction from the cyclone not only brought life to an end for some forest giants it also created life for others. Barely a few weeks after the storm a 'mast' flowering of several notable species including *Brombya platynema*, *Medicosma sessiliflora*, *Xanthostemon chrysanthus*, *X. whitei* and *Pullea stutzeri* were observed. It could be suggested that the life history traits of these species have evolved or been influenced by disturbance events such as cyclones. It may also help to explain why there are more pioneer species (band-aid species) within tropical rainforests compared to subtropical rainforests. Without events such as these the biodiversity of a given area of forest would become lower due to reduced niche variance. This forms the basis of the 'Intermediate Disturbance Hypothesis' where diversity is maintained due to some areas of forest always being in a transitional state of development.

Upon inspection of post cyclone areas it was found that some species showed a far greater tolerance to cyclonic winds than others. Within the Innisfail area, trees still standing, not uprooted but missing branches were ranked as having a 'reasonable' degree of tolerance, whilst those still possessing branches were 'significantly' tolerant; needless to say many were 'totally intolerant'. The following species illustrated significant tolerance to cyclonic winds: *Flindersia* spp. especially *F. schottiana* which didn't lose leaves even within 200km/hr winds, rainforest Myrtaceae species especially rheophyte species such as *Callistemon* and *Xanthostemon* were very tolerant, *Calophyllum inophyllum*, mature, but not young *Agathis robusta* survived well (Hoop Pines were very susceptible), *Argyrodendron* spp. were notably tolerant within the forest canopy, *Ficus* spp. were mostly tolerant due to their flexible branches, paddock specimens of *Alstonia scholaris* endured well and native palms did well too.

The animal life was undoubtedly affected as the leaves and all the fruit and developing flowers were destroyed in the storm. I noticed a major increase in birds to artificial feeders, as many as 50 honey eaters visited following the storm however after 4 months as few as 5 visit. Increases in road kills were observed, especially ‘secretive’ species, which were obviously distressed.

As much as I was concerned by the state of once intact rainforests I was also engrossed by the opportunity it gave to me as a botanist. I was presented with an array of specimens usually out of reach, within the forest canopy. The forest floor was littered with canopy vegetation including epiphytes, vines and interestingly the mature leaves of forest giants, which are much smaller and rigid than one would expect thus making identification an often-surprising activity. The appearance and odour of freshly cut logs of famed timber trees, which littered the tracks, was also a great experience.

In summary, all natural systems require disturbance however European settlement has resulted in devastating change to most ecosystems, thus natural disturbance in combination with human induced degradation and implications from global warming has the potential to transform ecosystems.

New additions to *Syzygium*

Published in BLUMEA 51 (2006) pg 131–142
 Authors: L.A. Craven¹, E. Biffin^{1,2} & P.S. ASHTON³

Summary: Based on morphological and molecular data, we have concluded that *Acmena*, *Acmenosperma*, *Cleistocalyx*, *Piliocalyx* and *Waterhousea* should be combined with *Syzygium*.

Old name	New name
<i>Acmena divaricata</i>	<i>Syzygium divaricatum</i>
<i>Acmena graveolens</i>	<i>Syzygium graveolens</i>
<i>Acmena hemilampra</i>	<i>Syzygium hemilamprum</i>
<i>Acmena hemilampra</i> subsp. <i>orophila</i>	<i>Syzygium hemilamprum</i> subsp. <i>orophilum</i>
<i>Acmena ingens</i>	<i>Syzygium ingens</i>
<i>Acmena mackinnoniana</i>	<i>Syzygium mackinnonianum</i>
<i>Acmena resa</i>	<i>Syzygium resa</i>
<i>Acmenosperma pringlei</i>	<i>Syzygium pringlei</i>
<i>Waterhousea hedraiophylla</i>	<i>Syzygium hedraiophyllum</i>
<i>Waterhousea mulgraveana</i>	<i>Syzygium mulgraveanum</i>
<i>Waterhousea unipunctata</i>	<i>Syzygium unipunctatum</i>

- 1) Australian National Herbarium, CPBR, CSIRO Plant Industry, G.P.O. Box 1600, Canberra, ACT 2601, Australia.
- 2) Division of Botany and Zoology, Australian National University, Canberra, ACT 0200, Australia.
- 3) Harvard University Herbaria, 22 Divinity Avenue, Cambridge MA 01238, USA; Royal Botanic Gardens Kew, Richmond, Surrey, TW9 3AB, United Kingdom.

Many will be hesitant in adopting these nomenclature changes. I certainly can identify parity within the original genera especially by fruits; however I lack knowledge to differ on this matter.

Notes on *Athrotaxis*

Southern Conifers within the family Cupressaceae

Composed by Phil Parsons, Launceston Botanical Gardens

athro= clustered

taxis= arrangement (in reference to the clustered scales on the seed cone)

Many stands of *Athrotaxis* are found in the alpine areas of Tasmania. Some occur as exposed outliers taking on a Krumholtz form due to their location close to the ‘tree-line’ whilst others are found in the cold oceanic heath vegetation, rising conically or overarching as if designed during ancient times. Like *Callitris macleayana*, the species *Athrotaxis selaginoides* [King Billy Pine] also grows within rainforest. Perhaps unlike *Callitris* they can form coniferous forests; where rainfall is sufficient. Their common name is derived from a part of their home range, the King William ranges in western Tasmania. Like other rainforest species, *Athrotaxis* current distribution is an artefact of fire regimes, both natural and human induced.

At a mine site on Mt Read (near Rosebery), burning occurred in the 1890’s. Whilst recovery has been initiated by both mining and restoration works along with acid mine drainage, there are still very few natural recruits. Within the site a mature remnant remains extant around the mine site water supply. Associated vegetation here includes an understorey of the deciduous *Nothofagus gunnii*, a close relative of the South American species *N. pumilio*, *Orites milliganii*, a difficult to germinate Proteaceous plant and another cypress, *Diselma archeri* (Cheshunt pine – named after the property of the collector who is also commemorated in the species by his friend and correspondent at RBG Kew – Hooker). Occurring with *Athrotaxis* is the Epacridaceous/Ericaceous species *Prionotes cerinthoides* and *Archeria* with *Richea* species occurring on the edge of the tree line. The most easily reproduced of the above is the *Athrotaxis* from both seed and cutting. However, studies show it is very slow to colonise new areas and, once killed by

fires, recovery occurs at a rate of about 60m per century. However, rumours of its intolerance of lower rainfall condition are unfounded. Once established it has survived in a mean average rainfall of 1000mm in years as low as 700mm, and has been grown down to 100m asl.

This species may be seen at Cradle Mountain NP by taking the boardwalk around Dove Lake or if more adventurous the Twisted Lakes walk. Many other sites still contain this tree.

Notes on *Amorphophallus*

Composed by Charles Clarke
James Cook University, Cairns

amorphos = shapeless

phallus = stick, symbol of penis, the flowers spadix is penis like upon emerging from the soil prior to opening.

Plants belonging to the genus *Amorphophallus* in the aroid family (Araceae) are sometimes known as “corpse lilies”, due to the often putrid scent emitted by their flowers. The most famous member of the genus is *A. titanium*, the “Titan Arum”, which grows in the rainforests of Sumatra and produces what is thought to be the largest inflorescence of all plants. This species is now grown in a number of botanic gardens around the world and when it flowers makes headlines attracting crowds of curious onlookers.

However, there is more to the genus than just *A. titanium* - there are several other “giant” species from Sumatra and Borneo, such as *A. hewittii*, *A. decus-silvae* and *A. gigas*. In all, there are about 90 species of *Amorphophallus*, with the genus ranging from tropical Africa, through Asia to northern Australia, where two species can be found. These are *A. paeoniifolius* and *A. galbra*.

Species of *Amorphophallus* have an interesting growth habit. The main storage organ is a tuber, which varies from a few centimetres to over a metre underground. In most seasons, this gives rise to an elaborate leaf, which is borne on a long, straight, fleshy petiole that is often around 1 - 1.5m tall in many species, but up to 5m tall in *A. titanium*. The petiole varies in colour from light green throughout to black, but is often beautifully marked with green, white, grey and purple patches. The leaf is often heavily divided, with 3-4 main branches. The leaves are usually produced at the start of the rainy season and die down soon after the commencement of the dry. Flowers are

produced irregularly (usually at the start of the growing season), also arising from the tuber. These have the classic arum flower features of a central, stalk like spadix surrounded by a wide, hooded spathe. Flowers vary in colour from green through white, pink and dark red, while the shape and size of the spathe varies enormously as well. The flowers of most species only last for a week or so, which is somewhat surprising given their size.

Of the Australian species, *A. galbra* is unusual in that it produces flowers that have a sweet fragrance. These are generally green throughout, but may also be darker in colour in some populations. The name ‘*galbra*’ is unusual (and should not be confused with “*glabra*” which means glabrous) and is derived from the name given to the plants by the Djabugai people near Cairns, where the first specimen was collected. Its range is now known to include northern Queensland, parts of the Northern Territory and New Guinea, where it grows around rivers, streams and beaches, often in vine thickets with a sandy substrate. *A. paeoniifolius* has an even wider distribution, being found throughout Asia, Polynesia and even Madagascar, as well as tropical Australia, where it can be found at a few sites on Cape York Peninsula. This species has played an important role in many societies in Polynesia, and is likely that it was introduced to Australia some time before the arrival of Europeans. *A. paeoniifolius* has a spectacular flower which is wide and brightly coloured with pink, purple and yellow.

Both Australian *Amorphophallus* species are readily grown in tropical climates. Successful cultivation depends on growers appreciating the plants need for a dormant spell during the cooler times of the year. Any good quality potting mix can be used. The plants are gross feeders, so fertilisers should be liberally applied during the growing season. At this time, the mix should be kept moist then during winter should be allowed to dry out. Whilst *Amorphophallus* species are associated with rainforests; they often grow around clearings or disturbed areas, so they appreciate about 50% direct sun most of the time. Species such as *A. paeoniifolius* can actually be grown in full sun, but look best when they receive direct sun for just an hour or two a day, with bright filtered light at other times. Both *A. paeoniifolius* and *A. galbra* are tropical plants, which means are unlikely to grow well, and flower, south of about Brisbane (editor’s note: both species are

growing satisfactorily in NE NSW within a warm north facing garden site). Further south, it will be necessary to provide them with supplementary heat and humidity when they are in active growth (which basically means that a greenhouse will be needed). Despite these limitations, both Australian *Amorphophallus* species are rewarding to grow and deserve much greater attention than they have received to date.

Member's profiles

HAULER GULLY – Reforestation of degraded land and establishment of our garden

Composed by Charlie Pierlot
Rainforest Study Group Member

History.....

We came to this place (twenty minutes drive south west of Coffs Harbour) from Victoria in 1997 and purchased our place at 'Hauler Gully', which is 6.68 hectares or approximately 17 acres. The purchase included nine cattle, as well as 200 banana 'trees' behind the house. The cattle destroyed any self-sown young trees that came up in the paddocks, and it was impossible to plant trees and protect them from the cattle. Cattle destroy more trees by rubbing and pushing them than they do by grazing them. Also the external fences bordering the State Forest were of little deterrent to the cattle.

This land at Crossmaglen, in hindsight, should never have been cleared and planted with bananas, which is now (in-part) an unviable industry. Our land is also not cattle country so we thought *'let's return it as near as possible to its original vegetation'*. In years to come the timber may be able to be selectively milled whilst still retaining the majority as forest.

Removing the cattle left us free to plant trees and allowed natural regeneration of the land to take place. We are amazed at the large number of trees, especially Red Cedars that have self sown outside the electric fence line up on the hill. Around the house, apart from the Citrus trees, a Sandpaper Fig, Silky Oaks and introduced Jacarandas there were no other trees when we arrived. The place was unfortunately heavily infested with weeds, Lantana mainly, but also Camphor Laurel, Cassia and Small Leaf Privet. Lots of hard work and twelve months later the whole place was virtually free of these weeds. The small amount that now come up, mostly are what birds deliver to us, and easily controlled by pulling out by hand. Some of the Lantana

had trunks as thick as an arm so you can imagine they took some removing, although I pulled out almost all by hand. By planting trees we also hope to suppress Giant Parramatta Grass and *Paspalum* as well as the above-mentioned weeds which don't like shade. We still have Crofton Weed, Fireweed and *Ageratum*, which is a continual battle to keep under control. From past experience I have found it is a waste of time trying to eradicate these invasive species without putting some competition in their place. (Editor's note: *'there is no vacuum in nature'*)

Our garden

We commenced our planting at the end of 1997, starting with our house block. We were keen to have mostly rainforest trees, but have mixed these with some exotics, especially *Camellia's*. It was a pleasant surprise to learn when we started the garden that Camellias, especially 'Sasanqua', do well here. Along the way we have made quite a few "big" mistakes, one being planting trees around the house which we have since learnt will grow to become far too large (Editor's note: I too have made this error much to my father's distaste!). For us it has been a steep learning curve in gardening in the subtropics. Our initial concentration in the first couple of years was on the house garden, as we were unable to even think of the paddocks until the cattle were gone. There are now no longer house gardens as all the fences have been removed.

Name tags

As we have increased the number and variety of trees, especially the rainforest trees, we quickly realised that we would have to be able to permanently identify the various trees, especially the more uncommon ones. We started off with aluminium tags [used by nurseries] where you impress the name on with a ball point pen. These were a failure, as very quickly the wind either screwed them off or distorted them so that they were difficult to read. We next tried pieces of old Venetian blind blade, and wrote on them with a permanent garden texta. The blades lasted but not the writing, especially where the sun hit the tag. Next we tried these same tags screwed on to wooden pegs, protected from the sun. It wasn't long in our acid soil before the pegs rotted out. Also with the pegs all painted yellow the place looked like a memorial garden.

We finally settled on the present system of tagging when my son suggested engraving

waste cut-offs of aluminium strips from his workshop, and screwing them on to any aluminium suitable as pegs. This has been very successful and hopefully they will last a long time. My engraving skills leave a lot to be desired but at least the tags are permanently readable.

Thanks to Ann and her trusty computer for record keeping we now have a good database of our trees including when they were planted. We believe only by doing this will we be able to see which ones survive and thrive. We also want to be able to leave our list for people who come after us. We hope this won't be for a long time yet, and will only be when the place becomes too much to manage.

Wallaby fence

Swamp wallaby destruction has caused more heartache and tree-loss than any other problem since we began planting trees in 1997. Overcoming this problem has seen a lot of experimentation.

On my farm in Victoria I had used electric fences with great success so we tried a fence energiser I bought with a maximum voltage of about 4,500 volts. We think the wallabies liked the thrill of this shock, so we went back to the drawing board. We next purchased the present day energiser that delivers 9,500 volts. This was certainly a deterrent for a while, however it comprised of a fence of only positive wires and we have watched a wallaby push at the fence and then jump through so quickly it didn't have time to get a shock. I then added a plain negative wire in between the positive wire. They still seemed to be able to jump through quickly, particularly during winter when the ground is dry and the ability to close the electrical circuit is diminished. I then replaced the negative plain wire with a high tensile barb and this has really stopped them in their tracks. (Editor's note: Barbed wire results in increased bat mortality)

Incidentally, all the steel pegs and most of the wire were already on our property as internal fencing so it has cost very little to set up. The materials were easy to carry up the steep hillside as I was doing all the fencing myself.

Whilst not 100% wallaby-proof it has cut the problem back by at least 98%. We know of one old man wallaby that, every so often, takes to jumping over for a feed, but his damage is minimal and I am willing for him to have his little bit of feed. That is why some

especially tasty trees have a mesh guard still around them. Of course there are species they don't seem to like such as Turpentine and Lemon Scented Gums. Also in rainforest species they don't like Koda, Red Cedar, Black Bean, Foam Bark, White Cedar, Flame Tree, White Beech, Red Kamala, Hollywood, Deep Yellowwood and Hoop Pine [although they will ringbark Hoop Pine].

As well as wallabies, black and white cockatoos also destroy or damage quite a number of trees; however we generally accept this as a part of nature.

One now has to contend with the Currawong regurgitating Camphor Laurel and Bitou seed all over the bare ground as they seem to like to feed on the bare disturbed ground.

Planting of trees [especially the eucalypt plantations]

Again a lot of experimenting. We started off by spraying one-metre diameter circles in the long grass after the cattle were removed. From our experience this has certain drawbacks. The roots from grass such as Kikuyu and other grasses will quickly invade under the soil to compete with the tree. Also the surrounding area is a great source of seeds, which quickly germinate on the bare ground making a lot more work in follow-up spraying. Also in frost prone areas the cold air tends to sit in the hollow and the air has little ability to move on. Also on really hot, still days [over 40°C] the trees, if susceptible, are more likely to suffer heat stress.

We have found complete spraying of the area to remove all competition from weeds to be the most successful method, although we have had to be careful not to kill any established trees. Prior to this year we have slashed then sprayed to keep the weeds under control. One disadvantage of this method is that slashers windrow the grass so you have your mulch all in one row. The better option seems to be to spray the grass [Giant Parramatta, Paspalum, Kikuyu etc.] even when tall, and then mulch. This creates an even bed of mulch, which smothers, for a while at least, any new growth of weeds and creates mulch later for planting of new trees.

When planting I have a certain regime which I follow. I always soak the trees in a bucket in a solution of 'Seasol'® and water as I carry them out for planting. Due to the rocky nature of the ground I use a pick and loosen the soil approximately 500mm in diameter and the depth of the pick (approx 250mm).

The eucalyptus tree plantings are spaced at two metres both ways. This gives a quick canopy in twelve to twenty-four months and suppresses mainly the blade grasses quite quickly reducing the need for spraying. Also I hope that the black cockatoos, due to their wide wingspan and slow flight, will be unable to get into the trunk of the trees to chop them off as they seek for grubs.

I can plant roughly 120-150 trees per day although I don't believe it is a matter of how many you plant in a day, but how many survive, that matters. In this year's planting of around 1800 trees I have only lost 2-3%. Digging a hole to put the plant in destroys the natural structure of the soil as we learnt to our detriment while farming in Victoria. You tend to bury the top few centimetres of soil, with its nutrients and bacteria, and bring up some of the lifeless sub-soil. As planting of eucalypts takes place at the end of February when the soil is generally damp, I do not give the trees any further water, they only get what comes from the heavens.

I do a number of follow-up sprays in the first twelve months to suppress the weeds and encourage greater tree growth. As can be seen, some eucalyptus trees have grown over eight metres in fifteen months using the above regime. In early spring I walk around with a hand held fertiliser spreader and apply DAP over the whole area, and then the trees are 'on-their-own'.

Whilst I already had an inclination to start planting trees there is one person to whom I give great credit, the Botanist, Alex Floyd. He has been my mentor and my inspiration. I have rarely met a person with so much knowledge in his field, and in allied ones such as geology etc. He is an inspiration, not only to me but many others throughout Australia. He is able to impart his knowledge without making one feel inadequate because you either don't know the botanical name of a plant or are unable to pronounce it correctly. Many a time he has looked at me with a puzzled expression at my attempts but I am not afraid to ask or be corrected. He is truly a great educator and a man of the people.

Should any readers wish to visit our place or the Coffs Harbour Regional Botanical Gardens, or if I can pass on more of our experiences please feel free to phone us on [02] 6653 4374. Thanks from Charlie.

Garry Daly

Rainforest Study Group Member
Compiled by Kris Kupsch, Rainforest Study Group Leader

I have never met Garry Daly; however we have kept in touch via email for about 3 years sharing our garden diaries and knowledge of cultivating native rainforest plants. Garry is the director of an environmental consultancy business 'Gaia Research Pty Ltd' located on the south coast of New South Wales at Nowra. Garry is a zoologist and primarily studies threatened species of animal, in particular reptiles and amphibians (see Daly 1996, 1998, Daly *et al.* 2000, 2003). One of his main interests is defining the distribution of rare animals over the landscape in relation to vegetation communities. Recently he published a paper on the Yellow-bellied Glider that linked the distribution and habitat corridor of this species within a coastal area and discussed the problems with conserving this forest dependant species due to development pressures (Daly 2006). You can download one of his reports. Just Google 'Gaia Research' and click on 'Eurobodalla' then 'Landcare - Bingi Strategic Plan part one and two'.

Garry's 40-hectare property has subtropical rainforest along the creeks and 'benches', tall open forest of Blue Gums, Turpentine on the lower slopes, Brown Barrel and Coastal White-tipped Box on the upper slopes and Cinnamon Myrtle (*Backhousia myrtifolia*) as a midcanopy in drier rainforest beside the creeks. The subtropical rainforests of this area were described as "*the thickest jungle in the colony*" and the names Illawarra Brush and Berkeley Brush were used to describe "*the most formidable brush I have ever met with*" (Mills and Jakeman 1995).

Where Garry lives is the most extreme limit of distribution of many subtropical genera of rainforest plants. Due to the near coastal location, moderate rainfall and areas of basalt soil, has allowed for northern species to persist at such southern latitudes. Some species such as White Bolly Gum (*Neolitsea dealbata*), Bolwarra (*Eupomatia laurina*), Red Cedar (*Toona ciliata*) and the Illawarra Flame Tree (*Brachychiton acerifolius*) occur from this region throughout NSW into the tropics of Queensland, however some common Illawarra species become rare or absent within tropical Queensland including Illawarra Plum Pine (*Podocarpus elatus*), Silver Quandong (*Elaeocarpus kirtonii*), Jackwood (*Cryptocarya glaucescens*) Cabbage Palm (*Livistona australis*), Cheese Tree (*Glochidion ferdinandi*), Bleeding Heart

(*Homalanthus nutans*), Sandpaper Fig (*Ficus coronata*) and the Native Tamarind (*Diploglottis australis*). This suggests that the Illawarra-Nowra area is a southern stronghold for subtropical species and a last ditch shelter for the hardier 'megathermal' tropical species. Garry's land adjoins a portion of the Cambewarra Range National Park and a total of over 110 rainforest species occurs on or adjacent to the land. This is one of the richest rainforests in the Illawarra, he says.

Garry has often commented, over the last two years, of dry and extreme weather with below average rainfall. He has subsequently enlarged the existing dams and brought extra water tanks to help his garden through these dry periods. He recently noted 100 mm of rain has fallen over the last week (to his relief) adding however that the drought hasn't broken but that he should be right until September at least.

During the hot weather of New Years day in which Garry recorded a maximum of 44 degrees many of his plants were burnt. He says the Treeferns lost many leaves as "they were fried", "species from highland tropical areas did not fare well" and further states that "if we receive similar extreme temperatures, as is predicted with global warming, then many rainforest species in temperate Australia will be affected and entire vegetation communities may alter". He lost a Bangalow Palm (transplanted specimen) of 1.5m tall during this hot weather, had the tips of his 2m tall Red Carabeen's (*Geissois benthamii*) burnt off and flowers off his Red Apple (*Syzygium ingens* syn. *Acmena ingens*) singed also. Within later emails Garry relates data from the Bureau of Meteorology that "January 2006 was the hottest on record for NSW with average temperatures up 3 degrees". Over the last fire years there have been several wildfires in the Nowra area and the rainforest (and house) on Garry's place has been threatened.

Garry has a large assortment of Australian species many which are rare to his local area with a number of species from NSW and the highlands of Queensland. He has had notable success with tropical rainforest Proteaceae including *Stenocarpus davallioides* (which he has had success in growing by cuttings), *Lomatia fraxinifolia*, *Athertonia diversifolia*, *Placospermum coriaceum*, *Opisthiolepis heterophylla* (taken 11 years to flower) and *Banksia aquilonia*. He has specimens of the

Mountain Grey Palm *Oraniopsis appendiculata* growing within wet sites. The Pine Mountain Coral Tree (*Erythrina* sp. Pine Mountain) hasn't flowered yet however he tells me it has grown very well. Flowers have appeared on the endangered Tweed Caldera endemics Smooth leaved Davidson's Plum (*Davidsonia johnsonii*) and the Small leaved Tamarind (*Diploglottis campbellii*); coincidentally these two species share almost identical northern and southern limits of natural distribution. The Walking Stick Palm (*Linospadix monostachya*) is growing very well and fruiting for him. He has the beautiful mountain species *Uromyrtus tenella* (syn. *Uromyrtus* sp. Tinaroo Range) from the Wet Tropics, flowering. The Stream Lily *Orthothylax glaberrima* (also a restricted species from the Tweed Caldera) is growing well down there. Garry sometimes mentions of a friend of his from Saddleback Mountain near Kiama, who has large specimens of Mountain Mist Palm *Laccospadix australasica* (both single trunk and clumped forms that are now fruiting annually). This species only occurs on high peaks within the Wet Tropics between Paluma and Mt Finnegan south of Cooktown. Garry states "the solitary trunked form from Mt Lewis is about 4 - 5 m in height and the trunks are quite thick. The cool nights, deep red volcanic soils and high rainfall suit this species. I noticed that the seeds of the Mt Lewis form are about twice as large as the clumping form. Some say that they are separate taxa. Saddleback gets about 2500 mm per year compared to our 1200 mm."

Editors note: Correspondence with John Dowe, a renowned Palm taxonomist based at JCU, Townsville has the following to say on *Laccospadix*: "Based on the apparent recognition that there were populations of either multi-stemmed or single stemmed members [which suggested to some people that there may be two species of *Laccospadix*], I have examined this question. I found that this apparent situation was not correct and that all populations are a mixture of both multi-stemmed and single stemmed individuals. I have also looked at fruit and flower variation across different populations and found that there were no significant differences to warrant suggestion of taxonomic changes. Bill Baker [and a student], from the Herbarium, RGB Kew [UK] has been doing some DNA studies with *Laccospadix* and *Howea* [a genus of two species from Lord Howe Island, closely related to *Laccospadix*]. To my knowledge, he

has not found any reason to suggest that the populations of Laccospadix are genetically distinct, but that Howea is otherwise distinct enough to be maintained as a separate genus. The question he examined was 'how closely related are Laccospadix and Howea?', based on the situation that the two genera were morphologically similar enough to be considered as a single genus. In summary, there is no difference in populations to warrant separate recognition, and that the currently recognised single species, Laccospadix australasica, is sound.

Garry has to put tree guards around most trees to protect them against Deer, Swamp Wallabies and Possums; he also occasionally has Rats and Wombats eating his Palms within his shadehouse. Swamp Wallabies have previously broken the tops of his *Trema aspera*, *Elaeocarpus reticulatus* and some *Ficus*, much to his annoyance. He uses 900 mm high, small gauge chicken wire for the guards and often drapes extra segments of old wire over the top again for added protection.

Garry visited Madagascar in October 2005 to learn more about this great islands flora and natural beauty. He sadly reminded me “*the majority of the landscape has become anthropogenic grassland with Borassus palms*”. He further states “*The more I see the interaction between humans and the natural world the less I feel optimistic. If we define the air, water, soil, plants and animals as the natural capital that allows us to exist then we are not only eating into the interest but the core assets*”.

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Notes on *Xanthostemon*

Compiled by Kris Kupsch, Rainforest Study Group Leader
Text anomalies by Garry Sankowsky

xantho = golden
stemon = stamen

Within Australia the genus *Xanthostemon* encompasses 14 recognised species. Some occur as tropical rainforest giants whilst others are littoral or woodland trees and shrubs. A further 31 species occur in New Caledonia, The Solomon Islands, PNG and Malesia. Those from New Caledonia are among the most spectacular of flowering shrubs, nevertheless the Australian species namely *X. chrysanthus*, *X. youngii* and *X. verticillatus* are equally impressive. All but *X. youngii* and *X. crenulatus* can be readily grown in subtropical Australia from north of Sydney, however other species such as *X. whitei*, *X. graniticus* and *X. oppositifolius* could be grown even further south towards Victoria. In the Tweed area of NE NSW I have all but 2 species growing, illustrating the extensive scope of using this tropical genus within horticulture down the east coast of Australia into the subtropics. As some species are from tropical climates with a distinct wet-dry season the further south you are the more important positioning becomes within the garden, so to take full advantage of day lengths during winter, warming the air and soil, to mimic tropical Australia as close as possible. Others from highland areas (above 500m asl) are easy to grow in southern regions.

Hopevale Sand Penda

Xanthostemon arenarius

(*arenarius*= in reference to its natural occurrence on sand)

A little-known species that in recent years has been introduced into horticulture, by the method of asexual propagation. It is classified as ‘rare’ and occurs mostly on sand within the Cape Flattery area just to the north of Cooktown. It reportedly can grow to 20m tall however in the garden a maximum of 6-10m is envisaged. It grows well in subtropical Australia however temperatures to 2°C create black spots (dead cells) on the leaves of young plants in winter. Recently I visited my garden and surprisingly observed new growth being produced quite liberally in the middle of winter where average minimums are 6°C and maximums 20°C, quite unlike Cooktown which currently has 18°C and 28°C respectively. I have only one planted specimen, which is doing very well with no special care required. Full sun and well-drained soil is preferred although I have mine

growing in clay, though not impeded drainage. The flowers are yellow.

Golden Penda

Xanthostemon chrysanthus

(*chrysanthus*= in reference to golden flowers)

A well-known species with cultivars ‘*Expo Gold*’, ‘*Tropic Splendor*’ and ‘*Trail Blazer*’, occasionally being cultivated. The latter two cultivars have variegated leaves, and the former being a prolific flowerer with smaller rounded leaves. The typical wild type occurs almost entirely along watercourses on granite and can possess impressive growth features where seasonal monsoonal floods have moulded their root buttresses into contorted gnarled patterns. They occur in dry - very wet rainforests from the Pascoe River near Iron Range to the area south of Ingham, usually in the lowlands on river banks, however some impressive specimens occur on the Gillies Range and up to 1000m asl. In cultivation it is easy to grow if given extra water during dry periods. The cultivar ‘*Expo Gold*’ is a far superior choice for gardens. An atypical specimen I have growing in NE NSW, originally from the Pascoe River, differs in that it has much broader oblanceolate leaves and limey green flowers. This specimen has grown very well now being 6m tall. Overall this species is easy to grow if given freely drained moist soil. Owing to its riparian habitat it suffers from dry periods in low rainfall and very seasonal areas. Cold is tolerated at least as far south as Nowra.

Cape Penda

Xanthostemon crenulatus

(*crenulatus*= in reference to the slightly notched leaf margins)

An unusual and poorly known Penda in that it has thick crenulated leaves (that are slightly orange in colour) and has a corky trunk, which has growth scars imbedded within it. I obtained this species eleven years ago and my sole specimen has only grown to a height of 1 m tall suggesting that NE NSW is not an ideal climate for this species. In its natural habitat from Cape York to just north of Cooktown, growing within seasonally swampy woodland and gallery rainforest it can grow 15m tall. I have not seen this species for sale nor observed the flowers however they are reputed to be cream/white. It is unlikely to ever be popular within cultivation.

Gum leaved Penda

Xanthostemon eucalyptioides

(*eucalyptioides*= in reference to its resemblance to *Eucalypts*, either its leaves or flowers)

This is perhaps the best foliated Penda at least on young specimens. The leaves don’t have a petiole (at least when young), as they are amplexicaul in that they wrap around the stem as if clasping it. It is native to the NT and WA occurring along streams in woodland and monsoon forests. It requires full sun with an abundance of water during the ‘wet’ however is drought tolerant. Cool wet winters must be avoided as I had a specimen begin to develop a fungus rot on its leaves even in full sun. A maximum height of 10m is expected within cultivation and is a rather fast growing plant even in NE NSW. It has cream coloured flowers and is occasionally available from select nurseries in QLD.

Lime Penda

Xanthostemon formosus

(*formosus*= beautiful)

This extremely restricted species is classified as ‘endangered’ only being known from the Little Cooper Creek area within the mega-diverse ice age refuge collectively known as the ‘Daintree Lowlands’. This species is very spectacular and is possibly mostly pollinated by bats, as its floral morphology is most unique, producing huge amounts of nectar in cavities surrounding the floral gynoeceum (ovules). It is locally common within habitat however occurs mostly as a riparian tree below 100m in altitude (with prominent coppice shoots) in association with many relict species such as *Lepidozamia hopei*, *Idiospermum australiense*, *Stenocarpus cryptocarpus*, *Archidendron kanisii*, *Austromuellera trinervia*, *Syzygium glenum* and *Ryparosa sp. nov* (auct. *R. javanica*). Owing to its lowland tropical heritage it is surprisingly hardy in subtropical Australia tolerating rainfall at least a half (1800mm) of its normal average and temperatures down ten degrees lower (to 2°C) than Cape Tribulation experiences as a minimum. Cutting grown plants have been sold for a few years and it would be interesting to see how it performs in more southern latitudes than NE NSW. In the garden it adopts an open but bushy habit however growth is slower than other *Xanthostemon* species. The new growth is attractive being scarlet-purple. Shade is preferred however should be trailed in sunnier locations for its hardiness.

Granite Penda

Xanthostemon graniticus

(*graniticus*= in reference to its occurrence on granite soils)

This Penda is classified as ‘rare’ and is only known from the immediate surrounds of Mt Pieter Botte at altitudes between 600-800m

asl. This mountain is a sharp protrusion of granite to the direct west of Cape Tribulation and can be seen from the road north of Mossman (if the weather is clear that is). It grows in windswept tropical rainforest within possibly the most remote part of the Wet Tropics World Heritage Area. It has proved to be an easy species to cultivate and cold doesn't seem to worry it. I have several in my garden with the trees positioned in full sun flowering much more heavily. They grow relatively fast and this species only reaches a maximum height of about 10m or usually smaller within cultivation; 5-8m. Possibly the most attractive feature is its leaves which are deeply channelled by the venation and have a rusty-orange new growth. Trees are often multiple stemmed and branches can be rather leggy thus pruning may be a desirable practice; which I haven't tried. Plants are sometimes available from select nurseries, as cuttings have proven relatively easy to strike. The flowers are cream in colour and are highly favoured by butterflies, as are all of the *Xanthostemon* species.

Southern Penda

Xanthostemon oppositifolius

(oppositifolius= in reference to its opposite leaf arrangement, however not atypical within this genus)

This species is restricted to the KinKin – Pomona and Cooloola areas to the south and east of Gympie in SE QLD and can grow to a large tree of 35m. Originally a tree prized for timber, this combined with a naturally restricted distribution has resulted in the species being classified as 'vulnerable' within its natural habitat of lowland subtropical rainforest. The occurrence of this species in SE QLD illustrates a previously greater geographical range for *Xanthostemon* and that the genus is derived from a rainforest origin. I have seen this species in the wild just once (July 1996) growing within sand in the Cooloola National Park in association with species such as *Grevillea hilliana* and *Melicope vitiflora*. It is known to occur further inland as a large tree especially when growing on basalt soils. Within cultivation specimens can flower at 1m in height however may not flower every year following this initial event. I have several within the garden with all growing moderately fast although not as fast as many other species and thus after ten years are crowded by foliage and require more sun for better flowering. Plants tolerate full sun from an early age however constant soil moisture is required. The flowers are creamy green in colour with prominent anthers. They are often difficult to source however as trees fruit

early they can be readily shared among growers.

Xanthostemon paradoxus

(paradoxus= in reference to this species being paradoxically contrary to the usual type- possibly contrary within its dry habitat)

A widespread species occurring from NT, WA and PNG, occurring in woodland and monsoon rainforests, being relatively common in parts. It has hairy leaves at least when young and grows slowly in cultivation. I have just one plant, which has now survived through three winters down to 2°C with no ill effects. This is surprising owing to its monsoonal tropical origin. The flowers are bright yellow rivalling *X. chrysanthus*. This species would prove to be a worthy street tree for drier tropical towns from Townsville to Broome. It needs a full sun position within cultivation.

Guava Penda

Xanthostemon psidioides

(psidioides= in reference to its resemblance to the genus Psidium, the Guava genus)

This Penda is poorly known in horticulture. I have a grafted specimen (on *X. chrysanthus*). It grows very well with no ill effects to temperatures towards 2°C. The leaves are covered in a grey bloom, an adaptation to its often woodland habitat within sandstone and other fire refuges of Arnhem Land, Alligator River, Melville Island and adjacent tropical WA. The flowers are cream and attractive to butterflies. Propagation material is scant and I have only ever seen it cultivated on three occasions. It is a manageable species to a maximum height of about 5m within cultivation. It tolerates hot dry conditions once established.

Varied Penda

Xanthostemon umbrosus

(umbrosus= in reference to it being found often growing within the shade)

Masses of cream flowers adorn this plant when in flower and thus it should be used extensively within subtropical and tropical Australia. The specific name 'umbrosus' is misleading as it prefers to grow in full sun than shade. My plants are all cutting grown and thus flower from 50cm in height. Cold doesn't bother them and growth is moderately fast even in southern latitudes. There are three distinct species often lumped into *X. umbrosus*. The typical *X. umbrosus* is a species of WA, NT and Cape York. There are another 2 species on Cape York which are distinct from *X. umbrosus*, these being *X. sp. 'Mt Tozer'* which is a larger tree having bigger obovate leaf without recoiled margins

(as is common in *X. umbrosus*). The other is *X. sp. 'Bolt Head'* which has longer elliptic leaves with often brownish new growth. Another previously sold as *X. sp. 'Browns Creek'* is now included with *X. sp. 'Bolt Head'*. All these 'species' have creamy-white flowers and are easy to grow within a sunny site. As they all originate from seasonal monsoonal Australia they are very hardy through dry periods. Two are trees whilst *X. sp. Bolt Head* is a big shrub. The natural distribution for *X. umbrosus* is from north of Iron Range in the southern Shelbourne Bay area to Cobbold Gorge west of Mareeba extending to WA. Knowledge of the natural distributions for the two 'species' on Cape York is scant however both occur near Iron Range on the eastern coast.

Bloomfield Penda

Xanthostemon verticillatus

(*verticillatus*= in reference to the leaves being arranged in whorls)

This is a small tree due to its preference as a rheophyte along granite boulder lined, strong flowing feeder creeks of the Bloomfield and Daintree rivers. It was for many years (following Bernie Hyland's initial discovery) thought to be 'lost to science' until Tony Irvine found it growing within the Bloomfield Region. The conservation status is classified as 'rare'. I first saw this species in the wild just a few weeks ago on the edge of Roaring Meg Creek, a tributary of the Bloomfield River. As I approached this watercourse I knew that if I looked hard enough I would probably find this species. After some time of searching I found it directly in front of me growing beneath *Callistemon viminalis* upon an island in the creek. There was a thicket of them, which would be submerged for weeks during heavy rains. The typical *X. chrysanthus* also occurred at this site suggesting that parapatric speciation may be at play contributing to the evolution of this species. Within horticulture it is a very pleasant shrub producing large scented limey-yellow flowers and a bushy manageable shape, which adapts well to pruning. It is best grown in the full sun and surprisingly adapts well to significantly drier and colder sites than its natural habitat would suggest. It grows and flowers well in NE NSW with no ill symptoms.

Atherton Penda

Xanthostemon whitei

(*whitei*= in honour of C.T.White (1890-1950), a Qld Government Botanist for 35 years)

This 'rare' species produces synchronous flowering following cyclonic events within its

natural range from Shipton's Flat, (within the western Bloomfield area near Cooktown) through the Atherton Tablelands, to the region around the Tully Gorge. It occurs both within drier rainforest (1500mm) on basalt, to wetter lowland forests often on subtle ridges susceptible to storm damage and co-dominated by *Acacia* and *Agathis*. Two particular specimens near Kuranda are massive canopy trees to 40m. Therefore many old trees don't exist being cut long ago for timber and their trade name is Red Penda. The flowers are bright yellow and are spectacular, rivalling the better-known Golden Penda. They grow fast within cultivation and can flower at 2m in height. The leaves are large and furry with Apricot-pink new growth. Seed germinates easily and can be stored, typical of most 'dry-seeded' Myrtaceae. All my trees are seed grown, been easy to grow in full sun and cuttings remain unknown. Cold temperatures are tolerated.

Xanthostemon xerophilus

(*xerophilus*= in reference to its dry adapted leaves)

This 'rare' species is found only within the Jardine River area near the tip of Cape York however is reputed to be locally common. I have never seen this species in cultivation however owing to the adaptability of most other *Xanthostemon* it would undoubtedly prove adaptable in southern climates. It is being cultivated on the Atherton Tablelands, near Tolga growing well in basalt with an average rainfall of 1300mm and minimums of 6°C. It has never been available for sale as yet.

Red Penda

Xanthostemon youngii

(*youngii*= in honour of Sir John Young Governor of NSW 1861-1867)

The natural distribution of this 'rare' Penda is from the coastal littoral forests, near the MacIlwraith Range to the Olive River north of Iron Range up to about 50m in altitude. In regards to floral display, this Penda is possibly the best, being red in colour and resembling *Metrosideros excelsa* from New Zealand. This species is however difficult to grow in cultivation and I know of only three well grown trees, these being near Cairns and positioned in well drained soils in mostly full sun. Specimens within full sun, flower much heavier than shaded ones. I haven't been able to grow this species in NE NSW however a nearby native enthusiast has a specimen growing, albeit slowly, within basalt soils with moderately high rainfall. I think grafting would be an ideal pursuit with *X. chrysanthus* or *X. umbrosus* as its rootstock.

Notes on *Ceratopetalum*

Compiled by Kris Kupsch, Rainforest Study Group Leader

cerato = horny
petalum = petal

Ceratopetalum are generally restricted to mountainous regions both within southern and northern latitudes; a disposition shared by almost all the Cunoniaceae species. Within the tropics a biogeographical trait coined 'latitudinal compensation' is obvious as species are restricted to higher altitude forests where as in southern states related species may occur near sea level. This attribute occurs within this genus where there are 8 species in total, all being found within Australian rainforests, with 1 species extending to Papua New Guinea, probably a recent migrant with the onset of the Papuan Central ranges which allowed for an exchange of cool adapted species from Australia, now considered to be the largest stronghold of Australian derived Gondwanan species.

Two species are restricted to temperate and subtropical habitats, being *C. gummiferum* and *C. apetalum*, whilst five species *C. corymbosum*, *C. hylandii*, *C. iugumensis*, *C. macrophyllum*, *C. virchowii* being restricted to the Wet Tropics and *C. succirubrum* extending to PNG. The family Cunoniaceae is probably of Gondwanan ancestry and invariably all species are of rainforest decent with only a couple of genera evolving to frequently capture wet sclerophyll habitats. All *Ceratopetalum* have an 'impaired' wind-dispersed seed, thus don't possess the ability to traverse great distances and bridge dry ecological barriers. Owing to their current distribution, *Ceratopetalum* must be considered to be relictual species in all parts. Whilst driving between Brisbane and Cairns it is very difficult to imagine a cool rainforest type extending in a continuous extent north to south. Therefore, considering current climate trends towards periods of increased warming and drying, it is very unlikely that cool rainforest species will expand their ranges and colonise 'new-niches'.

Comment by Darren Crayn (Research Scientist National Herbarium of New South Wales) "there is strong evidence that Elaeocarpaceae and Cunoniaceae are closely related and probably sister groups. Also, evidence is strong that the following genera are nested within Cunoniaceae: Bauera, Davidsonia and Eucryphia. Each of these has usually been put in its own family. Bauera in particular presents an interesting case of a shrubby, fire and dry-adapted lineage evolving from within a rainforest group. Tetratheca within Elaeocarpaceae is another good example".

Within cultivation all species grow easily if planted in a protected cool moist site. Many species especially *C. hylandii* have considerable horticultural value.

Coachwood

Ceratopetalum apetalum

(*apetalum*= in reference to the calyx lobes which appear to be petals-*apetalum* = no petals)

A widespread common species occurring from the McPherson Range and Girraween National Park (SEQ) down through to Bateman's Bay in NSW. It has simple leaves with variably serrate margins. Within NE NSW, near its northern limit, this species is most common within cool and warm temperate rainforests where it often co-occurs with Antarctic Beach (*Nothofagus moorei*). It however can also be found growing in cool wet sclerophyll gullies and seldom with lowland subtropical rainforests, and if so, on poorer soils where larger leaved species cannot compete. It grows well in cultivation as long as soil moisture is sustained whilst young, however is hardy following this early stage. In the wild it can reach 25m however garden plants seldom reach 10m and are quite bushy. Its flowers are cream but age to a light red colour. See an additional article on this species on page 15.

Thornton's Coachwood

Ceratopetalum corymbosum

(*corymbosum*= in reference to its flowers being a corymb)

A 'rare' species occurring only in very wet mountainous terrain, on a couple of granite peaks within the Daintree region; primarily on Thornton Peak (QLD third highest) and Mount Hemmant. The climate of these peaks, whilst situated well into the tropics, is subtropical in nature and extremely wet and often shrouded in cloud. Average rainfall for these locations well exceeds 5000mm (5m) per year. I first saw this species growing on the summit of Thornton Peak in November 2005. It can be found growing between granite boulders in cloud forests. The new growth of the trifoliolate leaves has a purplish tinge and the trees are often poorly formed and gnarled due to the often-extreme weather conditions. Frozen pools of water have been known to occur on Thornton Peak during winter, within eyeshot of the Daintree lowlands. This species is unknown within cultivation however would be hardy in southern Australia. Its flowers (sepals) are usually cream-white but red has been recorded too. It is unlikely to be ever made available within horticulture for the interim.

New South Wales Christmas Bush

Ceratopetalum gummiferum

(*gummiferum*= in reference to this species bearing a gum like sap when wounded)

This common species is the best known of the genus with the red sepals of the flowers making it an attractive feature commonly grown as a garden plant and on farms for cut flowers in southern states. It flowers around the beginning of summer and occurs naturally between Ulladulla and Evans Head on the central north coast of NSW. Well-drained soil is recommended as wild plants are often found growing on sandstone, thus with good drainage. Fungus can affect plants grown in heavy soils. It is grown successfully as far north as the Atherton Tablelands in North Queensland. The following cultivars have been produced from this species, however not all are traded, 'Albery's Red', 'VIC 90-1', 'Festival' 'Bill Winter', 'Christmas Belle', 'Promises', 'Albery's Millennium Red', 'White Christmas' and 'Christmas Snow'

Hyland's Coachwood

Ceratopetalum hylandii

(*hylandii*= in reference to Australian botanist Bernie Hyland, (1937-) a specialist of Lauraceae and Myrtaceae)

This species is named for eminent Australian botanist Bernie Hyland; however it could equally refer to its mountainous habitat in the granite highlands between Mount Lewis and Mt Spurgeon behind Mossman with another occurrence on the western flank of Mount Bartle Frere. This species is a common small tree within its restricted habitat. Plants can be easily identified by the very undulate margins of its comparatively small trifoliolate leaves. The new growth is purple and is most spectacular. This species can be grown by cuttings and isn't fussy about cool southern climates as long as rainfall is above 1500mm per year and evaporation rates are relatively low (<5mm per day). On Mount Lewis where this species is locally common, maximum temperatures can be as low as 8°C during overcast winter days and down to -2°C on clear winter nights; a vast contrast to the nearby lowlands. A sunny aspect is best to promote a bushy shape and for best flowering: flowers are cream in colour and fragrant. There is potential for this species as cut foliage. This species is rarely available from nursery outlets and its entire natural distribution is within the Wet Tropics World Heritage Area.

Mountain Sycamore

Ceratopetalum iugumensis

(*iugumensis*= in reference to its preference to grow on ridges, or at least where most people have found it)

A poorly known rare species growing to 10m tall that has only been officially recorded between Mt Hemmant, (just to the south of Cape Tribulation) to the Big Tableland about 30km south of Cooktown, however I have found it at Hilda Creek near the Daintree River at 300m asl; most collections are made over 500m asl. The trifoliolate leaflets can be large up to 20cm long (which is how I easily identified it within the field). I haven't seen this species in cultivation and material is only available from protected areas, thus severely restricting its use within horticulture. Once again a reminder that all species originate from the wild and collecting initial material eliminates future *in-situ* pressure from collectors. This species will therefore not be available to enthusiasts as no one can legally collect seed or seedlings from the wild. It however would probably succeed well in southern climates owing to its mountainous habitat. The specific name refers to 'ridge-dweller' and was once referred to as *Ceratopetalum sp.* 'Mt Hemmant', for a very notable 1065m high mountain, <5km from the Coral Sea with steep granite cliffs. Few botanists have ventured to its mossy summit and some species have only ever been found there.

Large leaved Sycamore

Ceratopetalum macrophyllum

(*macrophyllum*= in reference to its unique large leaves)

A 'rare' and unusual small tree possessing simple leaves which on young plants can be up to 30cm long. The new growth is purple and attractive as it unfolds from the large stipules. It can be found growing mainly along granite creeks within the Daintree area (up to 600m asl) between Roaring Meg Creek and Noah Creek often in association with *Gymnostoma australianum*. Little known in horticulture although southern winters are tolerated and potted specimens grow fast and are very striking. Dry conditions are not tolerated. Flowers are fragrant and either purple or cream.

Satin Sycamore

Ceratopetalum succirubrum

(*succirubrum*= in reference to the red sap which oozes from wounded bark)

This comparatively common large tree is rarely encountered within horticulture although is used within restoration plantings in the tropics. It naturally occurs between Mt Finnegan, immediately to the south of Rossville near Cooktown to Millaa Millaa on the southeastern Atherton Tablelands between 400-1200m asl, and also within PNG. This species is easily identified from its

co-occurring cousin *C. virchowii* as its leaf apexes are acute whilst *C. virchowii* has drawn out acuminate tips. It is easily grown in cultivation if moderately cool moist conditions are supplied when dry with high summer rainfalls ensured, thus shade is best in drier sites. Trees become bushy with age and the new growth is crimson-red. Flowers are generally cream in colour. It is currently available from select nurseries in the tropics.

Pink Sycamore

Ceratopetalum virchowii

(*virchowii*= in honour of Professor Rudolph Virchowii (1821-1902) a German scholar in many schools of science)

An attractive rare tree noted for its flowering and ‘flushing’ of trifoliate pale purple foliage. The flowers are cream, which occur in winter and envelop the tree’s rounded canopies. I recently found a flowering population of this species for the first time. They grow on leached soils and have a restricted occurrence within the reasonably cool rainforests of the Bellenden Ker Range including Mt Bartle Frere and the immediate surrounds of the Atherton Tablelands being locally common at Boonjee. In cultivation within NE NSW it grows steadily in a protected site among other rainforest species. Propagation material is scarce however persevering enthusiasts can occasionally source plants from growers in QLD.

Growing rainforest plants in temperate eastern Australia

Composed by Pip Gibian, Rainforest Study Group Member

We have an artificial rainforest where we live in the northwest outskirts of Sydney. The winter temperatures here are cooler than in most of the city. We also have a small rainforest timber plantation at Gloucester, NSW, in a region, which still carries significant natural areas of cool-temperate and wet-temperate rainforest at Barrington Tops. Many rainforest species will grow out of their natural range, and a few northern species can be amazingly hardy in colder climates. There are two distinct difficulties for these plants. Some are frost sensitive-that is they are damaged early one winter’s morning when the thermometer suddenly plunges below zero. Once frostbitten the plants may die, or be so damaged that they are stunted. The other more subtle effect is seen when the day-to-day temperatures are just too low to promote growth. These plants tend to grow for two or three months only each year, i.e. December, January and February. For the other nine months they sit and do nothing, not dead but not very alive either. They

rarely look happy and are not very rewarding, especially once you have seen what they should look like during a holiday up north. Choosing plants more suited to your conditions is the way to go. I want to describe a few random species, which have proved appropriate for our conditions.

Aniseed Myrtle

Anetholea anisata

(*syn. Backhousia anisata*)

This ‘*Backhousia*’ comes from a small area on the central coast of New South Wales, namely the Nambucca and Bellingen valleys. It is now uncommon in the wild. It has long, narrow, undulating, shiny leaves, which smell strongly of aniseed when crushed. The flowers are cream and fluffy, due to conspicuous stamens. The glossy wavy leaves and the plentiful scented flowers make this an attractive plant. With suitable moist conditions it grows into a large tree.

Coachwood

Ceratopetalum apetalum

Coachwood is a common tree in the moist gullies of New South Wales and can be found in quite cold areas on the Great Divide. It is closely related to the NSW Christmas Bush, *Ceratopetalum gummiferum*. The bark is smooth and pale grey with concentric rings around the tree and often with rounded lichen patches. The flowers are cream, aging to a reddish-pink, but never attaining the bright red of the Christmas Bush. Never the less the flowers are massed and showy. As with the Christmas Bush, the “petals” of the flower are actually lobes of the calyx (sepals). Flowering occurs in November and December with the seed ripening in January and February. Fresh seed germinates very well. The timber is a good cabinet timber. It is pinkish brown and is said to smell like caramel. We have found this is a hardy plant, which has survived heavy frost at Gloucester. We did lose quite a few plants last summer. They were young plants, completely exposed in a paddock and did not like the succession of over 40° days in January.

Rosewood

Dysoxylum fraserianum

Rosewood was an important cabinet timber, red-brown and rose scented. Since NSW State Forests stopped logging rainforests, the wood has become scarce and valuable. You can sometimes buy small articles made from recycled Rosewood, some which spent many years in a previous life as a fence post. Termites don’t like it. It is a bit fussy,

requiring rich soil and protection from frosts and excessive heat when young however once established it is much hardier. When grown in the open the tree is dense with a rounded crown and glossy leaves. The flowers are fragrant. The fruit is pink or red and splits to release 6 to 8 glossy red seeds.

Narrow-leaved Orangebark
Maytenus silvestris

Maytenus silvestris is hardy, occurring in dry rainforest and wet sclerophyll forest. It is a large shrub with narrow leaves. The flowers are green and inconspicuous, but the fruits are gold or orange and very attractive. Fresh seed germinates promptly. I have not planted this at Dural, but it has appeared in disturbed ground at Gloucester. It should be pretty easy to grow.

Tall Rice Flower
Pimelea ligustrina

This plant is also found both in rainforest and wet sclerophyll forest. If the truth were known, it could be a bit of a weed as it is very easy to grow. It is a shrub to 2 or 3 metres, so a good garden size, with bright green leaves in regimented rows. The terminal, white flower head is the biggest of the eastern *Pimelea*, being globular and 3 to 4 cm across. Some forms have golden anthers protruding from the white tubular flowers. In our experience each bush is fairly short-lived, maybe 8 or 10 years, becoming woody and unattractive as they age. Hard pruning after flowering keeps the plant looking good for longer. It self-seeds, so you are unlikely to lose the species and the number of spontaneous seedlings has not been a problem for us. Cuttings strike easily and vegetative propagation allows you to maintain the best-flowered forms. We know of a Victorian grafter who has used this plant as the rootstock for grafting some of the Western *Pimelea*. This is an attractive idea for NSW and Queensland growers, who often find that the graft rootstocks do not grow well in our conditions. This is a spectacular plant in flower, and easy to grow.

Elderberry Panax
Polyscias sambucifolia

This plant can become a tree in Victorian cool temperate rainforest, but more commonly is a shrub to 2 metres. It also grows in wet sclerophyll forest and is natural on our Dural block. Seedlings grow rapidly and root suckers can also grow to form a colony. The leaves are pinnate although the actual form varies in different areas of its habitat. The

flowers are green and insignificant. The fruits come in clusters of mauve berries like miniature grapes, and many plants fruit very heavily. The fruit is soft and edible, and very attractive. They are also hardy coming up in very hot, dry parts of our property.

Scrub Turpentine
Rhodamnia rubescens

Usually this is a dense, bushy shrub to 3 metres, but it may grow into a tree. It is an early succession species growing in many rainforest types from southern NSW to SE QLD. The white flowers are fragrant. Late in the year it is covered in small bright red berries, which age to black. The leaves have a rounded “myrtle” shape. It is gradually invading the former cow pasture at Gloucester and would be an ideal regeneration plant.

Notes on Hicksbeachia

Compiled by Kris Kupsch, Rainforest Study Group Leader

Hicksbeachia = in honour of Sir Michael Hicks-Beach (1837-1916) a British Colonial Secretary)

The *Hicksbeachia* genus comprises two recognised species with another form or species remaining to be described. These species are among the most spectacular of rainforest plants and are superb examples of the family Proteaceae that has many equally impressive species. This genus is commonly referred to as Bauple, Red Bopple or Monkey Nuts due to the red fruits arising from racemes upon the trees mostly leafless trunk and (if present) branches. The trees are often monopodial having a single trunk with a tuft of leaves towards the top of the slender stem which grows to a height of about 8-10m often with multiple trunks, especially in *H. pinnatifolia* when growing in regrowth Camphor Laurel dominated forests or as roadside trees. The tropical ‘species’ are very rare within cultivation, however of late a healthy batch of garden grown plants has become available, whilst the southern subtropical species is much easier to source and grow. All deserve being planted as a feature plant within any formal garden or street planting.

Red Bopple Nut
Hicksbeachia pinnatifolia

(*pinnatifolia*= in reference to the pinnate foliage)

The southern species *H. pinnatifolia* occurs within the Big Scrub remnants and other sites within the Tweed-Byron area on basalt and metamorphic soils, extending north to Mount Tamborine in the Gold Coast Hinterlands. Other populations occur within the foothills

of the Dorrigo, Bellinger and Nambucca Valleys further south of the Big Scrub. It is listed as a 'vulnerable' species however is locally abundant. The purple-crimson flowers are produced mostly during spring (and other odd times) and are heavily honey scented. Trees are easy to grow once established and are fairly hardy however seedlings have a very high mortality due to leaf skeletonising insects, their susceptibility to soil borne pathogens and/or intolerance of particular microelements within the soil. I have found that it is best to germinate seeds within pots and plant-out in a fairly sunny position, under a 25% shade cloth shelter at the third leaf stage, providing fertiliser to encourage growth through the 'SIDS' period, all too common within rainforest Proteaceae. Once the threat of summer scorching temperatures has passed (late Feb) remove the shade cloth. This species has attractive pink/red new growth and doesn't grow large thus making it a suitable tree for small gardens and street plantings. It can also be felled to encourage multiple trunks and thus increased flowering. It tolerates cool conditions and can be grown as far south as Melbourne. The fruit kernels are edible but not a delicacy. I have trees which now flower each year and are just six years old.

Ivory Silky Oak

Hicksbeachia pilosa

(*pilosa*= in reference to hairy leaves which distinguish it from *H.pinnatifolia*)

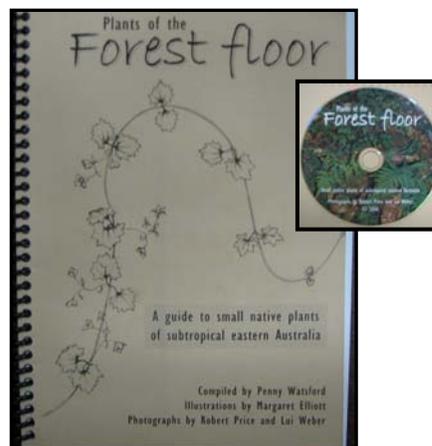
Once lumped in with the southern species, this Wet Tropics endemic is restricted between the Big Tableland-Home Rule area, just south of Cooktown (which is the northern limit of the Wet Tropics Bioregion) to the Cardwell Range up to 1000m asl. It is rather apparent that two forms/species exist under '*pilosa*'. The true '*pilosa*' is only known from the Bellenden Ker Range, which includes Mt Bartle Frere and the immediate surrounds of Topaz. I have seen this species (the true '*pilosa*') only, ever, growing within the unbearably wet forests of Topaz, again on the western approach to Mt Bartle Frere and within the lowlands at Harvey Creek, north of Babinda at the base of Mt Bellenden Ker. The '*other*' species has much coarser leaves and occurs over a wider range of rainforest types. This '*species*' is much less pilose and seems to grow into a better-formed tree, as in the wild the '*true pilosa*' often consists of dead limbs with just a few growing twigs. The '*true pilosa*' has purplish flowers whilst the '*other*' has either cream or again purple flowers. A major difference is the '*true pilosa*' has larger red dimply fruit, more like a drupe whilst the

'*other*' has a smaller red, smooth fruit resembling a large fleshy *Grevillea* follicle. Within cultivation great difference is noted, the '*true pilosa*' is very intolerant of low humidity, bright sun, dry soils and hot temperatures. I once grew 16 plants of the '*true pilosa*' with all dying within 6 months however one garden plant in NSW is growing very well; being possibly the strangest looking plant I have. This plant is just 1m tall though its leaves are 60cm long and broadly lobed. Trees of the '*other*' species have fruited following 8 years of growth to 5m tall however the '*true pilosa*' is much slower growing and after 6 years is just 1m tall, but otherwise healthy. Both '*species*' should be planted in a sheltered site but the '*other*' species is far more tolerant of sun and lower humidity. This '*other*' species is consequently the only one being grown, with a good batch released into subtropical horticulture as of late.

Plant-Animal Interrelationship

It was interesting to read about a group of plants in New Zealand which still possess growth traits once used to defend themselves from the extinct Bird, the Moa. These plants are known as 'divaricating', they are spineless and protect their growing tips by branching at wide angles and forming a ball like habit. This trait is shared among 54 species from various plant families in NZ. The Australian plant *Everistia vacciniifolia* and closely related *Coprosma* species possess a similar 'divaricating' growth trait too. If anyone knows of further Australian species possessing this trait, I would love to hear from you. See http://www.nzes.org.nz/nzje/free_issues/ProNZES24_21.pdf

This is a new book for people interested in rainforest plants occurring on the forest floor. A photographic CD is included with over 150 species. It can be sourced by contacting Nullum Publications. www.nullumbooks@optusnet.com.au



TO:

SENDER:



Associations of Societies for Growing Australian Plants
Rainforest Study Group
28 Plumtree Pocket, Burringbar, NSW, 2483, Australia