Eucalyptus parramattensis

Calgaroo

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Newsletter of the Parramatta and Hills District Group, Australian Plants Society NSW Ltd

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Our Next Meeting

A Thornbill, contemplating a plunge
Image: Inverawe Native Gardens
Visit www.inverawe.com.au
(Another advantage of a Pond provided you have no cat)

Our next meeting will be held at Gumnut Hall, Gumnut Place, Cherrybrook, on Saturday, 23 April 2016 at 2pm. Mark Abell will speak on *Australian Native Ponds: Using Native Fish and Plants to Create a Healthy and Attractive Watergarden.*

Mark is an excellent speaker and will be talking about his daily work so knows his subject well.

To begin, however, we will consider a proposal to make our year January to December to comply with formal changes to Company Law applying to APS NSW Ltd and Company requirements resulting therefrom. The essential point will be that our AGM will be held in February in future rather than in November as at present. We will take the opportunity to rephrase our Rules to provide for our current situation where we have no President, Vice-president or Secretary but Committee members will share the roles normally exercised by those officers. A notice of motion relevant to these matters has been sent to members already.

Later there will an activity for attendees led by Pip Gibian demonstrating the use of an Identity Key to identify local Hakeas.

News Available to All Members

We have been drawing your attention to matters in the newsletters of other APS NSW District Groups, often to great images they contain.

A great read for those considering planting a small Banksia in their garden is an article reporting a recent talk by Karlo Taliana on *Eastern Banksia Cultivars* to the Menai Wildflower Group in their April 2016 newsletter.

The report by Sharon Pearson concludes with the following advice.

"Karlo recommends that the two best banksia cultivars for a suburban garden are *B.* 'Bulli Baby' and *B.* 'Cherry Candles'. He also said that every native gardener should plant at least one banksia in their garden as they flower in autumn and provide food for birds when there are few other native plants in flower. "

These newsletters are published on the APS NSW web site so visit http://austplants.com.au/ then *Login* down the right margin with your name or email address (Continued p2)

AUSTRALIAN PLANTS SOCIETY

Parramatta & Hills District Group, APS

Contact us at info@apsparrahills.org.au
or visit http://www.apsparrahills.org.au/
or contact a Committee person direct

Calendar

Apr 2016
Wed 13 Propagation at Bidjiwong Community Nursery at 10am
Sat 23 Our meeting at Gumnut Hall at 2pm – speaker Mark Abell will speak on ***Australian Native Ponds: Using Native Fish and Plants to Create a Healthy and Attractive Watergarden.*** Pip Gibian will demonstrate the use of the key to the identification of local Hakeas.

May 2016
Sun 6 Deadline for ***Calgaroo*** news / articles
Wed 11 Propagation at Bidjiwong Community Nursery at 10am
Sat 21 APS NSW AGM and Quarterly Gathering at Sutherland Multi Purpose Centre
Sat 28 Colonial Plants Walk with Jennifer Farrer at Fred Caterson Reserve. Meet at 10am at Field No 4 Car Park

(Continued from p1) **and your APS Membership number (which appears on the address label on your *Australian Plants* and *Native Plants* envelopes each quarter.) The first time you will need to register but thereafter you will gain immediate access. Then under *User Menu* click on *District Group Newsletters.* Next click on the District Group whose newsletter you wish to read, Menai in this case, and choose the particular attachment (newsletter) you want, April 2016 in this case. And there is so much more so register today.**

At Our Last Meeting -- The Ecology of the Gymea Lily (*Doryanthes excelsa* (Corr.)); sentinel plant of the Royal National Park

***Sharon Bowen**

Introduction
The Gymea Lily; *Doryanthes excelsa* is a large flowering herb which was described in 1802 by Joseph Correa de Serra from specimens brought to England by George Bass and Governor Hunter. The name '*Doryanthes*' is from the Greek; 'doratos' (a spear) and 'anthos' (flower), 'excelsa' is 'high' or 'far seen'. Its closest relative is *Doryanthes palmeri* found in south east Queensland and the north coast of NSW. The first systematic ecological work was undertaken on this species by a woman, Ira Newman in the late 1920s. Seventy years later in the 1990s, despite being conspicuous enough in the Sydney landscape to have a suburb; Gymea, named after it, little was still known about the autecology and life history of *D. excelsa*.

Study Aim
D. excelsa occurs in a very limited distribution on the central and north coast of NSW in areas under increasing pressure from urban development leading to habitat destruction, increase in nutrient loads, increased frequency of fire and changes in vegetation community structure and floristics. In recent years there has also been an increase in demand for this species from the cut flower and landscaping industries. This study aimed to identify the key environmental factors governing the environmental niche of the Gymea Lily. This would help to inform the management of land that supports *D. excelsa* and also help to inform horticultural and gardening practices for the species.

Review of knowledge on the species
Life history strategies
D. excelsa grows in a basal rosette on a short underground stem. The leaves grow spirally from the centre from 1-3 metres in length. The flowering stalk is an average of 2-4 metres high. The spectacular crimson flowers are borne in a compact thryse (i.e. a compound inflorescence ending in a vegetative (non-floral) bud with the main axis bearing 20-30 cymes (lateral branches ending in a flower)).

D. excelsa flowers for around 5 months from July to March. The flowers contain 3mls of sweet gel like nectar and bear sticky heavy pollen and as the flowers are nectar bearing and are large and conspicuous (tall stalk and bright crimson flowers), it is likely that middle range body size birds are the main vector for pollination and larger honey eaters are often seen accessing the nectar from *D. excelsa*.

D. excelsa persists in a highly fire prone environment and therefore must have life history strategies to survive fire. It survives the removal of its above ground parts by regenerating from a robust underground rootstock. Species that employ this regeneration strategy are known as *auto-regenerating long-lived resprouters*. It also responds to fire by flowering in the next flowering season after the fire with flower production usually taking a year. Seedlings are very slow growing, plants usually taking up to ten years to reach sexual maturity. Nothing was recorded about the nutrient and pH needs of germinants or seedlings.

Distribution
We undertook a review of the distribution data of known locations from previously recorded floristic survey data and herbarium specimen label data. This review showed that *D. excelsa* naturally occurs on the east coast of NSW with three isolated populations near Glenreigh and North West of Corindi on the North coast, the Central coast near Newcastle, and from the Sydney region to just north of Wollongong on the South coast. There were no records of the species from an area of 2 degrees of latitude between the Central coast and North coast populations. In the Sydney Region the species was almost absent between Port Jackson and Port Hacking.

Environmental factors common to all known locations
The known distribution data was modelled to extract its substrate, topographic and climatic data, and we found that the following environmental factors were common to all *D. excelsa* sites:

1. Moderately deep sandy, earthy soil
2. Sandstone substrate
3. South to south east facing slopes, creek sides and gully sides, and sheltered plateaux and ridges
4. Altitude between 100 and 200 m
5. Moderate rainfall and temperature range

Floristic community common to *D. excelsa* sites
The floristic survey data from the known sites showed that *D. excelsa* was most often recorded in open forest of *Angophora costata, Eucalyptus piperita* and *E. gummifera* or woodland of *E. sieberi, E. punctata, A. costata* and *E. gummifera.*

Modelled distribution vs known distribution
We modelled the potential distribution of the species using the environmental factors; geology, topography and climate, and the modelled distribution was then compared with the recorded distribution. This modelling showed that there were suitable conditions for *D. excelsa* to occur within the gaps in its known distribution. Therefore the modelled environmental factors (substrate, topographic and climatic) alone did not determine its niche.

Experimental study on the niche ecology of *D. excelsa*
We hypothesised that there must be more subtle environmental factors that governed the distribution of *D. excelsa* within its geographic range and an experimental study was designed identify the environmental niche of *D. excelsa* in the Sydney Region.

The study was designed to test the following hypotheses:

1. Within the broader Sydney sandstone woodland that supports *D. excelsa* there is a definable *D. excelsa* floristic sub-community
2. Within the *D. excelsa* floristic sub-community, there must be other species that employ similar life history strategies and share the environmental niche of *D. excelsa*
3. There is genetic isolation between geographically isolated populations of *D. excelsa* in the Sydney Region
4. Edaphic factors (i.e. abiotic factors relating to the physical or chemical composition of the soil) governed the niche of *D. excelsa* in the Sydney Region
5. *D. excelsa* has life history strategies to persist in a fire prone environment, therefore it must be reliant on fire for its continued survival

Methods
The experimental design consisted of site survey, soil analysis and seed germination and early seedling growth trials.

Site survey
Two survey locations; Dharug National Park in the north and Royal National Park in the south were selected as locations typical of the habitat of *D. excelsa* in the Sydney Region. At each location replicate sites, half with and half without *D. excelsa* were selected. All sites had the same broad vegetation community type, substrate, fire history, topography and soil type.

At each site vegetation community structure and floristic data was collected from a 100x100m nested quadrat. Soil samples were taken from each site and at sites with *D. excelsa* morphometric data (leaf length, width and number, plant dimensions and flower height), was recorded for all *D. excelsa* plants in the quadrat.

Seed germination and early seedling growth trials
Mature fruits of *D. excelsa* were kept in brown paper bags until they dehisced (split along a natural line) and discharged the seeds. Seeds were then placed in seedling trays and watered from above for a period of 12 weeks. Young seedlings of 20 weeks were then transferred into pots and grown on. Trials of early seedling growth rates in relation to pH and nutrient availability continued for 18 weeks.

Soil analysis - Results

At sites with *D. excelsa* other auto-regenerating long lived resprouters such as *Xanthorrhoea spp*. and *Telopea speciossisima* were also present. Other species that require moist habitat (orchids, ferns, lilies) were also present. Sites with *D. excelsa* were floristically and structurally different to sites without *D. excelsa* in the Northern Sydney Survey sites. No data was available for the southern Sydney region sites.

The morphometric data anlaysis showed that phenotypic (the observable physical characteristics of an organism) variation was no greater between northern and southern Sydney Region populations than within populations.

Analysis of soil samples showed all soils from *D. excelsa* sites were very low in pH (pH 4.1). *D. excelsa* sites were lower in exchangeable cations and organic carbon content (i.e. nutrients) than sites without *D. excelsa* in the same broad vegetation communities. Only magnesium (Mg) and potassium (K) correlated with the floristic data in a meaningful way.

All live seeds were viable and non dormant (mean 86 % germination rate). The seeds have no hard seed coat and no dormancy mechanism. Early seedling growth was very slow and growth greatest at low pH (pH 4.1). At higher than pH 4.1 growth rate was not increased by addition of nutrients (N/P/K). Early seedling growth was retarded at high levels of N/P/K.

Discussion

Within the broad vegetation community supporting *D excelsa* a sub-community was identified that occurs within sheltered microhabitats within dry schlerophyll communities.

The morphometric data anlaysis showed that phenotypic (the observable physical characteristics of an organism) variation was no greater between northern and southern Sydney Region populations than within populations. This indicated that there was no genetic separation. This has recently been confirmed by research into genetic variation.

Analysis of the physical and chemical characteristics (pH, organic carbon, exchangeable cations, structure) indicate that *D. excelsa* prefers deep sandy acid low nutrient soil. Seed germination shows that fruit can release 1000 winged seeds. These seeds are lightweight and are able to germinate readily and immediately in favourable moisture conditions. This indicates that *D. excelsa* has a transient seed bank strategy.

The young seedlings grow slowly and prefer a low pH and low nutrient environment. Therefore the conditions following a disturbance such as fire that increases both soil pH and nutrient levels in the immediate post fire period would not favour the establishment of *D. excelsa* in the post fire environment. Therefore *D. excelsa* is not adapted to take advantage of the immediate post fire environment

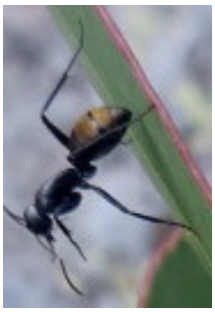
References

Dimech A.M, Ades P.K Taylor P.W.J., Cross R and Ford R (2009) Population diversity of *Doryanthes excelsa* (Doryanthaceae) in eastern Australia Cunninghamia 11(2): 213–219

***Sharon Bowen** gave us an insight into a study that she and Margaret Burchett, both staff of the School of the Environment, Faculty of Science at the University of Technology, Sydney, undertook into the *Ecology of the Gymea Lily* (*Doryanthes excelsa*). The above is her address, only very slightly abbreviated to save space. We thank Sharon for making her paper available. Please use a dictionary to identify meanings of scientific terms.

Pollinators

Marilyn Cross obviously has an eye for the unusual and caught a shiny green fly and an ant on an unknown Eucalyptus sp. growing on the top of Mount Stephens on the Central Coast. The fly in particular is enjoying a meal and inevitably pollinating the Eucalypt. Marilyn has tried to identify the Eucalypt, fly and ant without success. Can any member assist us without more detail?



Myrtle Rust in Australia

NSW Department of Primary Industries

Myrtle rust (*Puccinia psidii*) is a fungal disease which infects plants in the Myrtaceae family. Common Australian Myrtaceae species include eucalyptus, willow myrtle, turpentine, bottlebrush, paperbark, tea tree and lilly pilly.

Since myrtle rust was first detected in NSW in April 2010 it has spread across the eastern Australian landscape in bushland reserves, home gardens, commercial operations and amenity settings such as parks and street plantings. Myrtle rust can now be found in New South Wales, Victoria, Queensland, Tasmania and on the Tiwi Islands in the Northern Territory.

Background

When myrtle rust was first detected, a response was initiated to eradicate myrtle rust. The response was unsuccessful because myrtle rust spores are very easily dispersed by wind. In December 2010 eradication efforts were abandoned and transitioned to management.

Manage risk

Precautions to limit the spread of myrtle rust should be taken by people carrying out activities where there is potential to spread myrtle rust to vulnerable species or plant communities.

People engaged in activities associated with plants known to have, or likely to have myrtle rust should ask themselves:

- Will my actions spread myrtle rust to new areas?
- Will my actions spread myrtle rust to a vulnerable and important plant species or plant community?
- What can I do and how can I change my actions so that I do not spread myrtle rust?

Description

Myrtle rust is a fungal disease which attacks soft, actively growing leaves, shoot tips and young stems. Severity of infection and symptoms vary with different host species. Myrtle rust may also attack flowers and fruit of certain hosts.

Generally myrtle rust starts as small purple spots on leaves. Bright yellow spores form in pustules within these purple spots. Pustules fade to dull yellow and then grey as the infection ages. In severe infections, spots enlarge and merge, often causing leaf distortion.

Heavy infection can result in the death of soft plant material. Whole plant death may occur in highly susceptible hosts.

Plants with dark purple leaves such as willow myrtle 'Afterdark' (*Agonis flexuosa* cv 'Afterdark') do not display obvious symptoms of early infection. Disease becomes apparent once the bright yellow pustules form on both surfaces of the infected leaf.

On turpentine (*Syncarpia glomulifera)*, initial symptoms appear as small purple flecks on young leaves then yellow pustules form on the lower surface.

Visit the Myrtle rust image gallery

Left: Myrtle rust on *Austromyrtus inophloia* 'Blushing Beauty'

Right: Myrtle rust on *Melaleuca quinquenervia* (Broad leaved Paper Bark)

Disease cycle

The visible yellow pustules of myrtle rust are made up of millions of powdery yellow spores. Spores are spread by wind to other host plants. Spores germinate and the myrtle rust fungus grows, piercing plant cells to obtain nutrients from the plant.

Myrtle rust spores require darkness, moisture and temperatures of 15–25℃ to germinate. The first symptoms become visible within 3–5 days of initial infection. The new pustules can mature to release spores in 10–12

days. Spores can remain viable for up to three months.

Spread
Myrtle rust spreads naturally by wind, water, insects and animals. Spread can occur rapidly. Rust spores can travel very long distances and may infect susceptible plants many kilometres from the initial site of infection.

Myrtle rust spores can also spread over long distances if carried on infected plant material, contaminated equipment, vehicles and clothing.

Hosts
Myrtle rust infects plants in the family Myrtaceae.

Common plants that are susceptible to myrtle rust include:

- Eucalyptus species
- willow myrtle (Agonis flexuosa)
- turpentine (Syncarpia glomulifera)
- bottlebrush (Callistemon species)
- paperbark (Melaleuca species)
- water gum (Tristanis neriifolia)
- tea tree (Leptospermum species)
- lilly pilly (Syzygium wilsonii)

New host species in Australia are continuously being discovered. To date, over 300 hosts have been recorded and can be found in the Australian Network for Plant Conservation host list.

Impact
The Australian environment

The plant family Myrtaceae dominates many major Australian ecosystems.

The short term impact of myrtle rust on mature trees is minimal. Continued infection of new seedlings and young trees over time may hinder the regeneration of susceptible species in natural forests. This may alter species balance and modify currently stable environments.

Genetic diversity in highly susceptible species could be greatly reduced and the structure and function of certain ecosystems could be adversely affected in the long term.

Commercial operations
Myrtle rust is a problem for commercial operations such as timber plantations and nurseries. Myrtle rust can lead to seedling death and increases costs of managing disease outbreaks.

The movement of Myrtaceae plant material is regulated in some states and trade can be impacted. At the time of writing Tasmania, Western Australia, Northern Territory and South Australia have quarantine restrictions in place for the importation of products of the Myrtaceae family from states known to have myrtle rust.

Distribution in Australia
Myrtle rust is widespread along the east coast of Australia from southern New South Wales to far north Queensland. In Victoria myrtle rust is found mainly in production nurseries around Melbourne. In Tasmania myrtle rust is found on properties on the north-west coast. Myrtle rust has been found on the Tiwi Islands off the coast of the Northern Territory.

Favourable conditions for the continued spread of myrtle rust include all coastal areas of Australia and inland areas with required humidity levels and susceptible hosts.

Myrtle rust is unlikely to establish in arid regions as dry conditions do not support disease growth and spread.

Prevention
Preventative measures can be taken to reduce the chance of myrtle rust being introduced onto properties, into unaffected plant communities or even in backyards. General measures include:

- Familiarise yourself with signs of myrtle rust
- Do not move plants known to be infected with myrtle rust
- In home gardens, remove healthy plants susceptible to myrtle rust before they become infected
- Launder clothing, hats and gloves worn during activities in high risk areas before using them in other areas

Further reading
Arrive Clean, Leave Clean, Commonwealth of Australia 2015
information page, DEPI Victoria Biosecurity Fact Sheet, DPIPWE Tasmania 2015
Myrtle rust information page, DEPI Victoria Primefact 1417 Myrtle rust

I thank Ian Cox for referring me to this article. We need to know how to manage Myrtle Rust in our gardens.

Responses to the Bush Tucker report last month

Alex McKenzie, a long time member of APS and a staff member of Strathfield Council wrote, "Regarding the bush tucker list: I notice *Smilax australis* was listed but not *S. glyciphylla*. The latter used to grow along the Cooks River as evident by a couple of remnant plants in Strathfield and Canterbury. It can also be found in sandstone derived soils in places like Lake Parramatta."

Alex continued, "In the most recent Cumberland Conservation Newsletter (Issue 32) of which Wayne Olling is Editor, there is an excerpt from Captain John Hunter's writings from 1790: "A number of convicts going out to search for sweet tea, some of them separated from the rest, and were lost in the woods for several days, and one of which was never heard of afterwards."

Alex concludes this matter, "I believe this sweet tea was *Smilax glyciphylla,* thus the name False Sarsaparilla given to *Hardenbergia violacea* whose leaves resemble that of the former."

He then advises, "In other news Strathfield Council is starting to sell the local plant species it produces at the Town Hall on Homebush Road. The plants are for anyone who is interested in native plants, not just Strathfield ratepayers. The species supplied will generally be those from Cumberland Plain vegetation associations although some shale/sandstone transition species may also be available. Interested persons could email me at alex.mackenzie@strathfield.nsw.gov.au for a list of what's available. If we know certain plant species are wanted we'll make sure they are there ready to purchase at the Town Hall at 65 Homebush Road, Strathfield. Otherwise we're just promoting certain species on a month to month basis as there is limited growing space available at the Town Hall. The plants are available for $1.30 for a 50mm tube stock sized plant."

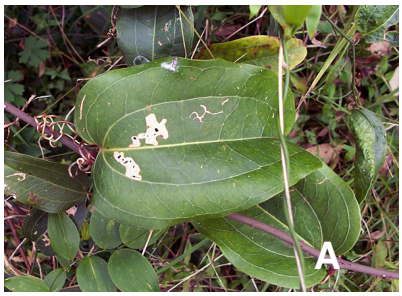
Wayne Olling, editor of the Cumberland Conservation Newsletter referenced above, emailed me, asking, "Did you know that sometime in the last 15 years The Herbarium at Sydney Royal Botanic Garden found *Bidens pilosa* among Joseph Banks collection from Botany Bay? Further, were you aware that *Sonchus oleraceus* (Common Sow Thistle) was also recorded in Botanist, Allan Cunningham's collection from the area of present day Cudgegong River? As you know, both have been considered weeds - the former being more problematic than the latter."

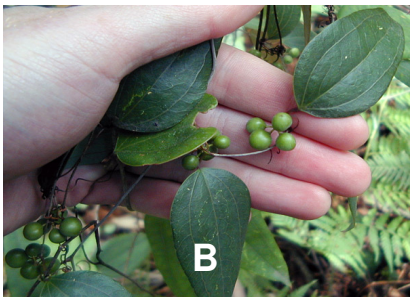
I confess to being predominantly interested in attractive plants and have generally ignored weeds – though some great Australian plants grown out of their natural environment can become serious weeds and I stress this sometimes, perhaps not often enough.

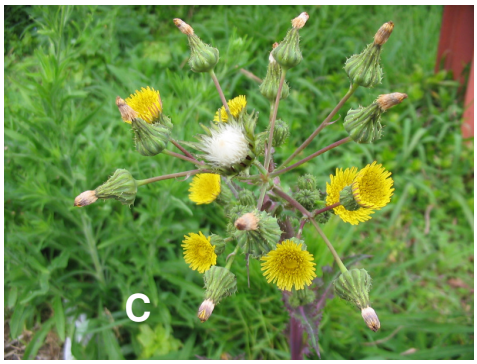
So I ask the question – do we know enough about weeds to protect our gardens and the wider environment?

Incidentally, *Sonchus oleraceus* is shown as a native of Europe, Asia and northern Africa but perhaps if it was found in Allan Cunningham's collection from the area of the present day Cudgegong River we should add Australia to its wide source list. It is certainly common over much of Australia.

The other plants are native to Australia and are weeds as a consequence of their natures yet, as Alex mentions, the leaves of the Smilax species make a sweet medicinal tea and their fruits are edible.







A: *Smilax australis*
B: *Smilax glyciphylla*
C: *Sonchus oleraceus*
D: *Bidens pilosa*

Are there any comments from our own members?

Around the Societies

Fom time to time I find it productive to look at the newsletters of our fellow Societies. The current newsletter of APS South Australia features an image of *Dodonaea microzyga* (Brilliant Hop Bush) on its front page – what a splash of colour, not the flowers but the fruit.

Dodonaea microzyga
(Brilliant Hop Bush)

Two varieties are recognised:
D. microzyga var. acrolobata J.G.West (Western Australia)
D. microzyga (F.Muell.) *var. microzyga*

However, I see that it is rare in most of its distribution which is in the outback, including far western NSW where it is endangered, and where conditions are very different to those in our part of the world. It may be difficult to obtain a plant and our humidity may prove a problem. It would need a very well drained bed and an airy microclimate.

It is a rigid hairless shrub, with sticky, varnished, wedge-shaped leaflets notched at the tip. Leaves are composed of 3-7 leaflets, each 2-4 mm long and 1-2 mm wide. Flowers are inconspicuous, solitary or paired but the fruit is a dull brown to bright red capsule with 3 or 4 vertical wings, 12-15 mm long and 15-18 mm wide including the wings.

I wonder if anyone is growing it? Let us know if you are.

There are other *Dodonaea sp*. that grow well here including *D. viscosa* which is distributed over most of Australia.

Visit APS SA at http://www.australianplantssa.asn.au/

The Hills Guided Walks Program Autumn 2016

Are you seeking suggestions as to where you may bushwalk?

The Hills Council provides a list of possible walks with necessary directions on-line – visit the following web site; http://www.thehills.nsw.gov.au/Venues/Parks-Recreation/Tracks-Trails

Council's conducted walks are led by our own Jennifer Farrer with whom you need to make a booking – phone 9634 3163, Mobile 0407 456 577 or Email jennifer@boroniatours.com

2016 Office Bearers

President
Vacant

Vice-Presidents (2)
Vacant

Secretary
Vacant

Treasurer & Membership Offr
Pip Gibian 9651 1962
37 Carters Road, Dural NSW 2158

Immediate Past President
Tony Maxwell 9651 6682
tonymax@optusnet.com.au

Publicity
Brodie Sutcliffe 8809 0833
brodie.fuller@hotmail.com

Conservation
Ron Gornall
rongornall@hotmail.com

Editor
Gordon Brooks 8096 5530
219/2B Morgan Rd, Belrose 2085
gordon26@iinet.net.au

Assistant Editor
Marilyn Cross 9654 1505
Marilyncross@netspace.net.au

Delegate to the APS Council
Tony Maxwell 9651 6682
tonymax@optusnet.com.au

Propagation Officer
Lesley Waite 0438 628 483
lesleywaite@yahoo.com.au

Committee Persons
Ben Turco 9871 5493
ben_turco@yahoo.com

Marilyn Cross 9654 1505
Marilyncross@netspace.net.au

Librarian
Sue Gibbons 9634 1823

We suggest P&H members who need to renew their membership complete the form in the centre of *Native Plants for NSW* and post it to Pip Gibian at her address above or choose the direct deposit option, follow the directions carefully and advise Merle Thompson and Gordon Brooks by email. Alternatively just pay Pip at the next meeting. Please ask if you are unsure of your membership status.