



*Sunday Work Group enjoying morning tea in the Sensory Garden after a hard morning's work in January Photo Jenny Dowell*

### President's Message

All of us at the Gardens seem to have been running at speed over the last six months. The nursery has been moved to its new site at the western end of the Gardens. The shade-house is in place, as is a safety fence around it. The plants should be in by the time this goes to press and the potting shed is just about to go up. Rose Hand has resigned as propagating office... she will be greatly missed... and Jan de Nardi is taking over, with much support from the propagation team. Hazel Bridgett and Florence Trevorrow have been looking after our plants during the time of the move, which is much appreciated. We are also grateful to the contractors who put up the shade house and fence. And Tommy 'Backhoe' and LCC Waste Facility personnel who helped prepare the site. Special thanks to Greg Buckler and Charlie Crether who help us all the time!

Meanwhile, the new tool shed has been built by Wil and Don and their team, the Pond Platform is waiting

on safety insets for the railings and it will be complete. A new path is going in in the Sensory Garden linking the bitumen loop path with the Anniversary Path and the new Native Rice Garden which is still under construction. Both should happen in the next few weeks.

Florence's maintenance plan is producing obvious results – see her report later in the newsletter. The latest plan is to acquire a motorised wheelbarrow. There has been some erosion in the creek that flows through Fern Gully and moving sandbags and rocks is heavy work for our work teams. As is moving loads of tools and materials over the site for general maintenance.

On 21 December we had a special morning tea for our volunteer workers. We decided to take this opportunity to give Rose a special farewell – not just from the nursery but to acknowledge all she has done at the Gardens over 10 years. We also officially opened the Visitors Centre. It was a great morning – lots of people and again lots of food. We were sorry to lose Glenys Ritchie as our LCC Council representative-

she was a great support to us. But Vanessa Elkins has moved into the role and we are looking forward to working with her.

At our AGM in September our Treasurer Sheila Pring resigned – it was sad to see her go. She added a special dimension to our group. Danielle Teague is replacing her and she brings a lot of experience and knowledge to the job.

The Commemorative Garden platform has had its foundation laid but we are still looking for finance to continue with this project. Hazel Bridgett has put a lot of effort into grant applications and planning details. The path at Geoff's Quarry has been overshadowed by other projects but it is high on our agenda in this coming year.

It is a great experience working with the FLRBG Committee- they are so supportive, enthusiastic, hard working and good company... as are all our other volunteer workers. This is a great group to be involved with. It can be exhausting at times but I love it!

**Marie Matthews**

## Species profile

from Peter Gould

*Polyscias murrayi* Pencil Cedar, White Basswood

Family ARALIACEAE

**Description:** Pencil Cedar is a fast growing, slender tree up to 25m tall. It is often seen growing as a single, unbranched stem, topped by a cluster of leaves looking somewhat palm like in general habit.

The leaves are compound, 1-pinnate and up to 1.3 m long. They have 11–17 pairs of leaflets, narrow-ovate to elliptic in shape and 6–16 cm long by 3–9 cm wide. The apex is acute to acuminate, the base truncate or shortly attenuate and often asymmetric, leaf margins are minutely toothed and the petiole is U-shaped in cross section. The leaves are not aromatic when crushed.

Numerous small, cream or light green flowers form on stalks on umbels in the months of February to March. The fruit is a blue drupe, ca 4mm long, usually having two lobes, or occasionally three. The fruit which matures from April to June is eaten by many birds, including, the Brown Cuckoo Dove, Lewin's Honeyeater, Satin Bower Bird, Pied Currawong and Superb Fruit Dove.

Germination from fresh seed is slow and some regeneration nurseries are known to collect seed from Currawong "spits" after the birds have digested the flesh and regurgitated the seed.

**Distribution and occurrence:** The

Pencil Cedar is one of the most common regrowth plants on disturbed rainforest sites across the Northern Rivers and in the former "Big Scrub" in particular. It prefers rainforest margins on shaley or basaltic soils.

The range of natural distribution is from the Howe Range, just over the border in the state of Victoria (37° S), up through New South Wales and to Atherton, Queensland (17° S). It also occurs in New Guinea.

**Timber:** The timber is light, blond in colour, with a silky texture, very fine grain and showing fine mandillary rays. It is easily worked, takes a high polish and has excellent acoustic properties.

### References:

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<http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Polyscias~murrayi>



Pencil Cedar saplings growing on a disturbed forest edge. (Photo P. Gould)



Older Pencil Cedars (source Wikipedia)



Close up of foliage (P. Gould)

### OUR COMMEMORATIVE GARDEN

This garden will be planted with species used by Australian soldiers in various theatres of war and peace keeping. Some of these are:

**Lalang Grass** *Imperata cylindrica*. In Changi POW camp Lalang Grass was used for many purposes including making writing paper; also 'grass soup', the consumption of which was compulsory to combat vitamin-deficiency blindness.

**Corkwood Tree** *Duboisia myoporoides*. The drug scopolamine is extracted from its leaves. This drug was used for light anaesthetic, eye problems but also sea sickness, so was of great demand during World Wars 1 and 2. It was synthesised in Germany and most supplies came from there, but during the wars this source was not available so Australia became the main source

**Tea Tree** *Melaleuca alternifolia*. Oil is extracted from this plant and was used during WW2 by Australian soldiers as an antiseptic, insect repellent and antifungal. At one stage it was included in their first aid kits.

## Visitor's Centre is Opened



The Friends celebrated the opening of the Visitor's Centre at the Gardens recently. The centre features a pictorial history of the Gardens along the western wall of the building, with information about its establishment. Also there is information about the biodiversity of the Gardens, as well as displays of weaving using traditional Aboriginal techniques, done by the weaving group who use the Gardens.

The centre was opened by Marie Mathews, President of the Friends, Kevin Trustum, from the Lismore City Council and Vanessa Ekins, our

new representative councillor. Afterwards the guests and visitors were taken on a short tour of the newest features of the gardens including a much bigger and most beautiful wooden tool shed, under construction by some of the Friends.

Our "Adopted Journalist" from the Northern Star, Cathryn McLauchlan, was on hand to record the event. We are very lucky to have a media contact who supports us as well as Cathryn does. We appreciate her commitment to informing Lismore and surrounding region about the role of the Gardens in our

community.

At present the Visitor's Centre is usually open every Wednesday morning from 8am till 11am and on the last Sunday of the month from 8 am till 11am or by appointment on 0415 960284. But the Friends are working on organising regular opening hours for the centre and regular guided tours. This will involve a training program and production of materials which is well under way. If you would like to be involved in any way please contact the Friends at [secretary@friendslrbg.com.au](mailto:secretary@friendslrbg.com.au)

Tracey Whitby

## Introduction to our new LCC Councillor

Following hot on the heels of City Councillors Jenny Dowell and Glenys Ritchie is latest FLRBG member, Vanessa Ekins, who has joined the Wednesday work group and is our Council contact. Here I am happy after my first morning with the Wednesday work group pulling out asparagus Vine in the hoop pine forest. I came prepared with my Landcare tool belt not knowing what to expect but keen to meet the friends and see the Gardens.

Having worked on the riverbanks of Lismore with Wilsons River Landcare Group for 17 years, planting trees on weedy and eroding sites and ongoing maintenance dealing with mud after floods, vine infestations from upstream and people camping, the gardens are a real change of pace. Recent visits to the Gardens were educational with Ruth Tsimbinis, Janet Wilson and Margaret Hildebrand learning basket weaving using local plants and traditional Bundjalung techniques. After years of planting many of these useful species it was thrilling to sit and chat with other women about where they can be found, methods of harvest and the months of preparation before making string, fish traps, jewellery and carrying containers. So I am hoping to hang out in the Useful Plants and Sensory sections of the Gardens.

My role at Lismore Council includes liaison with FLRBG, and implementation of our new Biodiversity Strategy and ongoing Koala Plan which are funded through rates and raise \$500,000 a year for rural and urban habitat corridors and other on-ground projects. I am looking forward to having a conversation with FLRBG on a signature tree or trees for Lismore. When you think of Lismore what tree/trees come to mind? What trees would you like to see planted at the entrances to our city and villages? Do we respect the Big Scrub with diverse plantings or choose a particular species like the local totem Hoop Pine (*Araucaria cunninghamii*) or dramatic flowering Silky Oak (*Grevillea robusta*)? Please have a chat with me about it on Facebook email [vanessa.ekins@bigpond.com](mailto:vanessa.ekins@bigpond.com) phone 6624 5500 or in person at the Gardens on Wednesdays.

**Vanessa Ekins**



Vanessa with Geoff at our Christmas MT in December

## Rose's farewell to the Nursery

It was Marcia Mullins – one time secretary of FLRBG and long term supporter of the Gardens - who suggested to me one day that my skills would be utilized by our local Botanic Gardens, so at some point I went to the City Hall to a volunteers event. This is where I met some of the members, and I liked them. One day I rang Mary Harris, one of the early instigators of the Gardens, who took me for a tour of the site. I enjoyed what was there and the potential I could envisage. So I started going to Sunday workdays and within a short time I joined the committee....

So for the last ten years I have worked with the Botanic Gardens, it's been a pleasure and at times a bit of a battle. Being a trail blazer you must go where others have not been and you will always find walls to climb, bridges to build and paths to forge, both literally and metaphorically speaking. But, the effort has been worth the end product, and I would do it all again in a heartbeat.

I must thank Geoff Walker here, as without him we would not have started the Wednesday work group. I was working back then and sometimes I had to go away so Geoff was my backup man and he did a really good job, always supported me 100%. Geoff and I have visions for the Gardens and we never let them go, we are both agitators and we never gave up on this, though one must be patient to allow these visions to come to fruition.

I loved being on the committee as it has allowed me to be pro-active and be involved in the decision making of a Garden which back then didn't have much, mainly only the western end of the Rainforest Walk. I remember the bad frosts that killed some really beautiful trees, then we had long hot dry summers and we all had to get out there watering our designated areas. My area now bears my name 'Rose's Garden'. Many people go looking for the

roses and I don't mind if you guys change it to 'Rose's Ramble' to save the confusion.

A huge thanks here to Ros who took on the Wednesday work group. She didn't know what she was up for but she has made it her own and is doing a fantastic job. It's nice to know things don't stop they just evolve.

At one of our meetings Pat Offord brought some seeds to a meeting and asked me if I would like to propagate them, being a horticulturist I just had to have a go. That was the start of the Botanic Gardens Nursery. I had a shade house in the backyard and little by little my plants got shoved aside and the Nursery became the Tuesday work group. The sale of plants we raised became one of our best if not our only fund raiser. Plus we were economizing on buying plants by growing them for the Gardens. The public love our plants and we get buyers coming back over and over again happy that their plants survived the planting. Plus they are supporting the growing of local native plants grown by their botanic gardens crew. The plants come with guaranteed provenance. An altogether all round win win situation.

A huge thank you to the Nursery crew, mainly Jill who helped with what has become a huge paper trail. Accounts, provenance, record keeping and so much more and through working together we have become good friends. Geoff once



*Rose at work in the shade house*

again has been one of the stalwarts. Geoff, by the way, does both the Tuesday and Wednesday workdays and he is 90 and still going strong - he also goes to the gym! Thanks to Jean who has brought a lot of seed and plant knowledge, we can't forget Neil who has worked very hard for us too. Plus more recently, Jan who is well qualified to manage the nursery and Lyn our 2nd latest recruit who has been just great. And we can't forget Rodney who will be an asset to the Gardens with his plant knowledge. He has helped a lot in the plant ID in the nursery.



*Some of Rose's long term team at the Gardens and the Nursery*

We have always had a happy team having great morning teas on my

verandah where all the discussions and decision making happen both for our future, and what we are doing on the day.... hope you guys keep up the inspiring tradition. Others have also contributed to the nursery but I'd be here forever if I mention you all, so thanks for all your hard work. We have all made some great friends from these work days and we have been quietly building a great Botanic Garden for the future generations to come.

I wanted to say a special thanks to Marie Mathews who has taken to the helm of the Botanic Gardens with a gusto, she is a great leader and the Gardens will go a long way with her directing the Gardens.

I do miss the Gardens but I'm happy doing what I'm doing at present. I may come back to the gardens in the future but there's no second guessing when that might be.

I'm sure the Nursery will fit in to its new surroundings out there and you will all get a great deal out of her. The Nursery is where it should be now. Home. I will be taking a class on cuttings once you are all set up and rearing to go. The best thing being that you have all the plant material you need right there. We can just cut a few branches off, prepare them into cuttings and pot them up. It should be fun.

At my farewell Marie had put a book together on my history at the gardens it is a truly unique document and I would like to thank her here as it's really amazing.



Pat Offord presenting booklet to Rose on 21 December gathering

**Good luck from Rose Hand**

## Bio Char at Gardens

In March 2016 we installed two raised beds in the Sensory Garden to grow coastal heath plants which require a sandy well drained soil. Both beds were filled with the same special coastal plants soil mix, but in one bed we applied Biochar at the recommended rates.

This product is made by heating biomass under limited oxygen condition (slow pyrolysis). It is recognised as being beneficial for soil health. It has an extremely porous nature and is found to be effective at retaining both water and water soluble nutrients and as a habitat for many soil micro organisms. It can be made from forestry and agriculture waste products, municipal green waste, bio solids, animal manures and some industrial wastes such as paper mill waste. It is under investigation as an approach to carbon sequestration to produce negative carbon dioxide emissions.

Several months later, the coastal plants in our gardens have grown and are flowering but with a marked difference. The plants in the bed with biochar have better growth and are flowering more profusely.

When adding biochar generally in the Gardens, the difference between trees planted with the biochar added and those without is not always notable, but with these raised beds the plants were put in at the same time and have had the same conditions and the difference is very obvious. *Ros Little*



*The bed with Bio Char*

## Aboriginal Plant Use Talking Sign

Late in 2016 Mick Roberts and Thelma James recorded information about traditional plant use for a new Talking Sign in the Useful Plants Garden. The sign informs visitors about the many uses of the cunjevoi, typha, kangaroo apple, grevillea, banksia, acacia, grass trees and native raspberry growing near the sign. In the recording Mick and Thelma also explain how various parts of the plants are used and how the Aboriginal people ensured that the plants were there for the next season.

The sign is a wind-up sign which is powered by turning a handle, making it fun for young and old alike and very environmentally friendly. The tracks can be changed to enable new stories to be recorded with each new season, or when particular plants are in flower or fruiting. The Friends would like to thank Mick and Thelma for their time and commitment to the project and to the NRMA for a grant, enabling this sign to be a feature of the Gardens. *Tracey Whitby*



*Thelma & Mick Roberts proudly showing off the new sign*

# Maintenance in the Gardens

## Florence Treverrow

In the last few years there has been a growing awareness that as the Gardens mature the focus needs to change from establishment to maintenance. This resulted in a meeting of interested people on January 27, 2016 to discuss the various issues and to create a management plan.

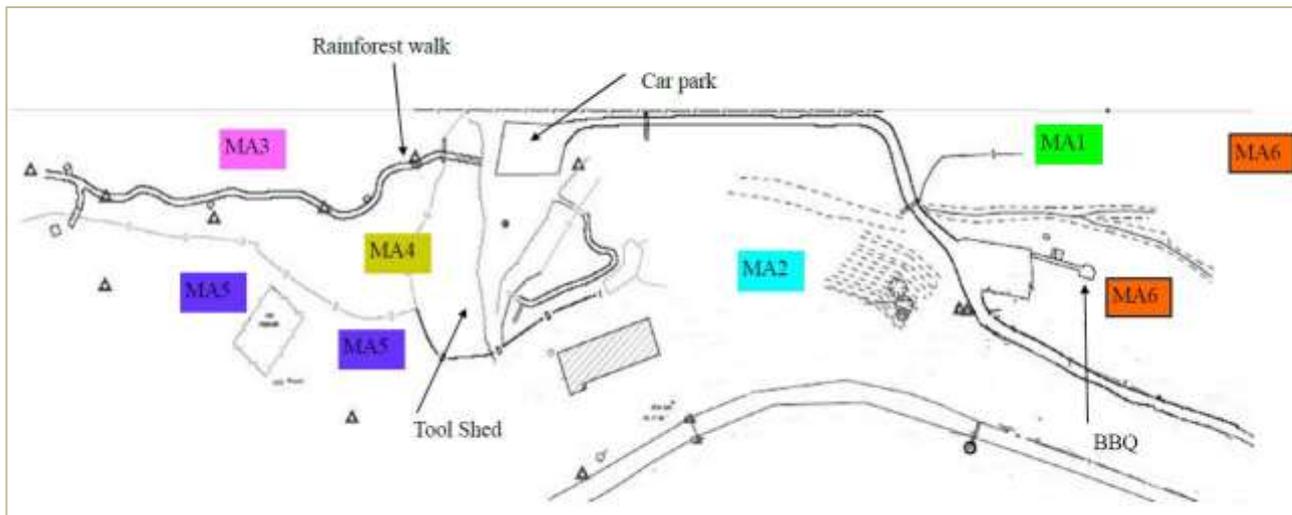
The first part of meeting centred on the question of 'What needs to be done?' in the way of routine maintenance, inspections to identify problems and curation of the collection. The second part of the meeting involved a discussion about policies for: removal of unwanted/diseased/dead trees, cage design and removal, plant storage before planting, use of fertilizer and mulch, treatment of disease and the irrigation system.

Basically, the conclusion was that Ros and some other person would do routine inspections of areas to decide what needed to be done and that Pat, Peter and Mary would cooperate on curating the collection.

Somehow, after Ros and I worked on a maintenance plan for a few weeks, it ended up being my job and eventually we agreed on a plan to divide the Gardens into six maintenance areas which could be the focus of volunteer activity twice a year.

The idea was that someone (depending on the area) and I would do an inspection the week before maintenance was to start and make up a list of what needed to be done. This aspect took a bit of working on to get it right but now it is generally assumed that routine tasks, such as weeding and mulching, will need to be done and the inspection is to determine what else needs attention.

MA1= Wilsons Park planting	March & September
MA2 = Useful plants and Unusual plants	April & October
MA3 = Rainforest north of Anniversary path	May & November
MA4 = Rainforest between path and gully including around shed	June & December
MA5 = Walker Estate/Rose's garden/southside of gully	July & January
MA6 = BBQ area and Hoop Pine forest	August & February



Well, that was the plan ...

We soon discovered that having a plan is one thing but then ... the weather was good for planting in spring and then ... the rain dried up and the hot weather arrived so everyone was spending their time watering. In addition, there is moving the nursery, building and path construction and a major problem with erosion which will require considerable effort to solve.

Nevertheless, having a plan in place means that each area is checked regularly and that if anyone has spare time they can go to the area that is the focus of the month and start weeding - there is never a shortage of asparagus fern after all. The routine of focusing on a particular area for a month is something I try to insist on - there is always the temptation to get sidetracked and move to where the problems may be more obvious or stay working in an area for too long - but if we do this we will end up back where we started with some areas being neglected or only worked on in a spasmodic, ineffective way.

It is also important to note that most people who have some input into the management of the Gardens are in general agreement that we are aiming to have a botanic gardens that not only conserves and showcases local rainforest plants but also their associated flora and fauna. This means that we are not aiming to have a neat and tidy formal garden; we are hoping that visitors can enjoy a rainforest experience and that we can contribute to public awareness that healthy plants need a healthy ecosystem.

*Florence Treverrow*

## Informal gardening – using local plants

In most gardens in the Northern Rivers, indigenous plants are either already present - hanging on after urbanization, already in the soil as stored seed or they have been moved there by ecological agents of dispersal (birds, bats, other vertebrates and invertebrates – even native bees can disperse the seed of some – *mellitochory*). Wind and rain help also. And despite the current emphasis on planting as a means of reclamation, rehabilitation and restoration, the ecological process of 'succession' (see reference) is a very low cost option that can be just as successful, often with better results. A bit of weed knowledge and systematic shifting of the balance in favour of local plants, can have any garden teeming with local native plants that improve the environment and benefit native wildlife.

A modern botanic gardens like ours is quite different from the traditional botanic gardens – there are few formal gardens, the focus is on local plants almost exclusively and conservation of indigenous species is one of our main aims. By utilizing the ecological process of succession in the Gardens – which occurs naturally in all ecosystems – the aim is to conserve what is already indigenous to the site, by not completely eradicating the colonization of new volunteer species. By creating environments that reproduce as much as possible their natural growing conditions an extensive number indigenous species can thrive - many of these occur naturally on site. So the LRBG is growing in species richness not through planting alone, but through what is reclaimed, rehabilitated and restored.

Native grasses and wetland plants are common on site due to a number of factors, but mostly due to the original grassy/shrubby forest type that occurred in the most water logged areas on the LRBG/waste facility grounds such as *Melaleuca* spp., *Lophostemon*

*suaveolens*, *Eucalyptus tereticornis*, *Casuarina glauca*. They persist to the current day due to conditions being made continually available, such as access to a lot of sunlight over a significant part of the day, bare soil from digging (anthropogenic or otherwise) and a ready supply of moisture via any means (dew, rainfall and watering).

These grass species aren't out of place at all in the Gardens and generally are not an enemy of the rainforest plants around which they occur. Although, some of the larger grass species like *Capillipedium spicigerum* need to be physically controlled when growing near some of the smaller specimen plantings. These can be swamped by the more vigorous species. But generally, *C. spicigerum* creates more opportunity for young trees, shrubs, vines, herbs and other native grasses to persist... and it is a food source for Firetail Finches.

When allowed to go to seed and undertake their often needed after-ripening period, native grasses can compete with exotic bullies. These include *Chloris gayana* (Rhodes Grass), *Sorghum halepense* (Johnsons Grass), *Panicum repens* (Torpedo Grass), *Bromus cartharticus* (Prairie Grass), and *Paspalum* spp. (Vasey Grass, Broad-leaved Paspalum and Common Paspalum). Leaving the grasses to seed may look untidy to those expecting manicured gardens, but by allowing the native plants to seed and by systematically controlling the exotics, the natives gradually take over. The important point here is that as long as exotic grasses are being managed, native grasses stand a chance.

Inside the semi-dry rainforests of Lismore, some grass species still persist and are indeed adapted to life under the canopy of these forests. Grasses like *Panicum pygmaeum* (Pygmy Panic), *Oplismenus* spp., *Ottlochloa gracillima* [not found in the LRBG], and *Echinopogon ovatus* (Forest

Hedgehog Grass), play an important role in microclimatic stability at the ground layer for micro-organisms and for young seedlings.

Then there are the local vines, many of them aren't as vigorous and aggressive as their exotic counterparts. Many are important weather shields for other types of plants and animals. They are like sunblock on the skin of a human – protecting other plants from the worst of the searing heat, from wind and eroding rainfall. And they are food resources (fruits and seeds) and the nest microsites for small birds. Vines such as Cockspur (*Maclura cochinchinensis*) and Lawyer Vine (*Calamus muelleri*) tend to have a bad press but they can be beneficial if managed wisely.

Reference: <https://news.mongabay.com/2016/12/researchers-say-natural-regeneration-an-overlooked-but-low-cost-option-for-forest-restoration/>

**Happy gardening, Damian Butler**

### Mongol Conservation C13<sup>th</sup>



In the early 13<sup>th</sup> Century, the conquests of Genghis Khan connected the major trade centres of China and Europe. The empire was governed by a legal code known as Yassa, developed by Genghis Khan. It was based on Mongol common law and contained edicts that prohibited blood feuds, adultery, theft etc. But also included laws that reflected Mongol respect for the environment, such as forbidding bathing in rivers and streams, and orders for any soldier following another to pick up anything that the first soldier dropped. Infraction of any of these laws was usually punishable by death.... The hunting of animals during the breeding season was also forbidden.

<http://www.biography.com/people/genghis-khan-9308634#major-conquests>  
[https://en.wikipedia.org/wiki/Mongol\\_Empire](https://en.wikipedia.org/wiki/Mongol_Empire)

## Experimenting with rainforest lawn alternatives



At Lismore Rainforest Botanic Gardens I have discovered that the native groundcovers mostly work unaided in their own community, interacting in complex ways. Until recently I lived in the Southern Tablelands of NSW where lawn mowing was a very occasional activity. Here with rain and warm weather we need to do it once a week to keep up. And the weeds! Any neglected corner of the garden is soon occupied by a vast array of undesirable plants, mostly agricultural and horticultural imports.

In our little, very suburban garden near central Lismore we regularly meet unexpected native understory species. Maidenhair *Adiantum aethiopicum* and other ferns grown round the deck, while kidney weed *Dichondra repens*, Small-leaved Pennywort *Hydrocotyle peduncularis*, Whiteroot *Pratia purpurascens*, Stinking Pennywort *Hydrocotyle laxiflora*, Basket Grass *Oplismenus aemulus*, Yellow Wood-sorrel *Oxalis perennans* and Gotu Kola *Centella asiatica* slip quietly through the gardens and lawn. My aim is to produce a viable and sustainable low maintenance set of native ground covers that allow light foot traffic, provide living mulch and habitat to small creatures, as well as an attractive pattern of lush, relatively weed-proof foliage at less than ankle height. So I am conducting a rough experiment.

I started with Scurvy Weed *Commelina cyanea*, Kidney Weed *Dichondra repens* and Basket Grass. Each was started from a tiny remnant the size of my little fingernail that was planted in a long pot full of potting mix and watered only to avoid drying out.

It didn't go perfectly. The scurvy weed, grew like crazy and flowered a beautiful deep blue but it wasn't to be tamed. Even after I pulled it out it recolonised the tray from the smallest fragment, too much like its exotic cousin Wandering Jew *Tradescantia albiflora* for comfort. The basket grass worked well but took far more time, was also too messy for my tastes and it didn't provide the dense cover I needed if it was to compete with weeds. Kidney weed passed the test. With some modification I tried new species, starting with Native Geranium *Geranium solanderi* which I planted straight into compost. I tried planting Whiteroot *Pratia purpurascens* into potting mix, but as yet it hasn't taken, so I'll try later with a larger plant. I was given a small mat of local provenance Native Violet *Viola banksii* which I also planted into a partly shaded patch in the garden. In each case a colony of each species was planted in compost and then mulched with five centimetres of close-fitting sugarcane trash topped with ten centimetres of loose tea-tree waste. All were placed on top of my rich pug soil. Colonies were planted about half a metre apart so that I could see what happened when they met, which ones prevailed and which were least susceptible to weeds. Not impeccable experimental methodology but easy to do without much time and trouble.

After 8 months several of the colonies have met. The fastest to spread was kidney weed. It ploughed into one of the neat circular colonies of small-leaved pennywort and started to grow through. The hitherto sedate pennyworts responded vigorously,

suddenly increasing their growth rate and growing steadily into the kidney weed colony. At the same time a small native plant appeared in the pennywort colonies, yellow wood-sorrel *Oxalis perennans*. This quickly flowered, set seed and sent long runners through the pennywort, less so through the kidney weed. Now I am in a quandary as to whether I should remove it. Wood-sorrel is reasonably inconspicuous but the battle between the species is far from settled. My colony of native geraniums grew rapidly. It hid unwanted weeds and was very untidy, so I removed it. The native violets, on the other hand, are doing a great job but have yet to meet up with other species.

In effect I have a cast of characters, each with its own survival strategies and peccadillos. I intend to expand a little upon this until I attain my aims. I am thinking of experimenting in the near future with two or three native violet species to see if and how *Viola banksii* interacts with *Viola hederacea*. Meanwhile the Botanic Gardens provides opportunity to explore the patterns in the many ground covers that naturally occur there and which might provide viable, attractive and useful alternatives to lawns of kikuyu, buffalo grass and couch. All must be of roughly local provenance and must be functional, sustainable and attractive (to me).

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**Rodney Falconer**

## Study of Big Scrub RF trees uses LRBG specimens

Dr Peter Bundock, Southern Cross Plant Science, Southern Cross University

In the August 2015 edition of the Friends Newsletter I wrote about how a collection of leaf samples from rainforest trees from the Lismore Rainforest Botanic Gardens were being used to obtain DNA and carry out DNA sequencing. Southern Cross University Honours student Maximo Bottaro aimed to use the DNA sequences to help him survey genetic diversity in the species sampled. The overall aim was to compare the genetic diversity of trees in a Big Scrub remnant with nursery seedlings for revegetation. [The material from the Gardens - one tree from each species - was used as a reference - without any regard to its origin. It provided the basic information to enable 'genotyping' of the samples.]

The DNA sequencing was used to discover special highly variable regions of DNA (microsatellite DNA), in each of the species collected. With this information we would design assays that could be used across any member of the species. DNA sequences of this type have been used for paternity testing and forensic analysis in humans for nearly 20 years. This is because they are highly variable and analysing the length of a number of these sequences can uniquely identify an individual.

Maximo found that some leaf samples did not yield their DNA up very easily and these species were dropped from the study. The target site for the study of diversity was the area formerly known as the Big Scrub Flora Reserve near Rocky Creek Dam, now part of the Nightcap National park. This represents the largest remnant of the once extensive Big Scrub. Maximo had success with DNA extraction and Plant Science DNA sequencing efforts bore fruit for three species which we collected: Strangler Fig (*Ficus watkinsiana*), White Booyong (*Argyrodendron trifoliolatum*), and Australian Tamarind (*Diploglottis australis*). Unfortunately one of my favourites,

Purple Cherry (*Syzygium crebrinerve*), was among those that did not yield good quality DNA.

Maximo used the DNA information to design assays that enabled him to carry out a comparison of genetic diversity in the Big Scrub remnant versus plants obtained from three rainforest tree nurseries. Would the genetic diversity in the nursery plants be similar to that found in one corner of the former Big Scrub? In White Booyong, seedlings sampled from each of the three nurseries had significantly lower genetic diversity. For Strangler Fig the seedlings from two nurseries had lower genetic diversity, whilst a third was on a par with the Big Scrub remnant. For the Australian Tamarind, the Big Scrub remnant was more genetically diverse than either of the two nurseries it was compared with. So in seven of eight cases the Big Scrub remnant was more genetically diverse than the nursery seedlings. By combining seedlings in equal numbers from the different nurseries the genetic diversity was increased above that found for any single nursery, and in the case of Strangler Fig, above the diversity of the remnant rainforest itself.

What's so special about genetic diversity? Because if we wish to restore areas of rainforest it is likely to be better to plant trees that are genetically diverse so that their chances of adapting to an uncertain future will be increased. I am of course referring to climate change, but there are also other threats to survival such as the introduction of new diseases (a recent relevant example is Myrtle Rust). Our results are only based on three species, but perhaps as a general rule, it might be better to obtain seedlings of each species from several nurseries before undertaking rainforest restoration!

Recall that the same type of DNA sequences we found are used for forensic analysis to identify

individuals (suspects). It has just occurred to me that if forensic evidence from DNA is ever required from the Botanic Gardens (heaven forbid!) then one might imagine that Strangler Fig would certainly be amongst the suspects and using Maximo's DNA sequence we might be able to nail the suspect!

### Fresh Eyes... by Geoff Walker



Like many volunteers I work at the Gardens every Wednesday morning.... almost a ritual. Been doing it for years. The changes that happen from week to week I rarely notice - except maybe a new building or a new path. You could say my volunteering had become a very enjoyable habit. And then some old friends, who were returning to the Gardens after five years, asked me to show them around. Through their eyes I began to see the Gardens in a fresh light. I relished their positive and complementary remarks as they compared today with yesterday ... the lush and wider growth along the Rainforest Walk... the flush of colour on the leaves ... the green " tunnels " of shrubs and trees and the incredible change to the fledgling Sensory Garden. In particular, they remarked on the growth of the Useful Plants Garden and they loved the paths up through the Hoop Pine Forest. I found myself, silently thanking all those FLRBG volunteers, who have made it happen.

My friends made me see again the Gardens with 'fresh eyes'. I had been taking it all for granted. Because of them I too saw again our Gardens as full of bursting buds, bright greens and greys, and the previously unnoticed growth of everything. I reckon all volunteers should take a few friends through the Gardens one cool morning. Then they too will realise that all those Wednesdays at 8 have been well worthwhile. We have made a difference. A huge difference!

## Almost 2000 children visit Gardens in 2016



2016 was a year of rapidly expanding children's activities at the Gardens. Almost 2,000 children visited, mainly on school excursions as well as visits during three community open days.

The Children's Activities Team gratefully appreciated support from Danielle Hanigan (LCC Waste Education Officer) who invited LRBG to be involved in the tours of the Materials Recovery Facility (MRF) offered to schools on completion of the Waste Education Program.

This liaison worked extremely well as schools seem to appreciate the "two for one trip" offer. Generally, schools arrive at the Gardens about 10am. Children are then divided into two groups – one to tour the MRF first whilst the other visit the Gardens. The two groups merge for a picnic in the Gardens then swap activities and are ready to return to school for lunch.

Usually two members of our Children's Activities Team accompany the children and their teacher's, on a short walk, to a chosen area of interest, and then offer five different activities on picnic rugs to allow children time to engage in learning more about plants. Some favourite activities include

- \* Creating art works on black felt mats with leaves and flowers
- \* Studying plant with magnifiers
- \* Searching through leaf litter with tongs to discover little critters
- \* Making string in the traditional Aboriginal way
- \* Matching crushed leaf scents to essential oils

\* Making dangling mobiles to distract birds from flying into the reflective windows at the Visitor's Centre

\* Spotting koalas in the Eucalypt forest

\* Walking in the cool, shady Hoop Pines Forest

Some schools also set interesting tasks for children to follow up, such as drawing maps or planning a natural outdoor area for their school. So our Children's Activity Team must be flexible as every day proves to be a different experience. Every excursion also proves to be a joy, to share the children's excitement being on an adventure and connecting with the wonderful world of plants, gardens and forests.

This year to help our visiting children better understand the close association between people and plants we will construct a "Cool Cubby" in the picnic area near the Visitors Centre.

This special cubby will be built from recycled materials, and designed to passively utilise sunshine and shade. Its solar powered light, rainwater tank, Bush Tucker garden, compost bin to create soil for plants and native flowering shrubs to invite bees and butterflies for pollination will demonstrate environmental sustainability and how our human life and plant life are interwoven in survival.

If anyone has any decking timber planks, a small water tank or compost bin to donate please let us know.

Also if you particularly enjoy being with children and enjoy the great outdoors you might be interested in

joining our Children's Activity Team. You would of course need to join FLRBG (\$15 per year or \$8 concession) and collect a Working with Children Certificate.

There are lots of other ways to become involved with our Botanic Gardens too, work mornings (weeding, watering, planting), helping in the nursery, manning the Visitor's Centre, buying plants, books or cards at our regular plant stalls or simply enjoying a stroll or BBQ any day of the week in our beautiful gardens (and it's all free!)

And if you come across a group of excited children you will know what's happening – 2,000 and counting!! **Margaret Hildebrand**

### Guide Training

We are at present organizing a training program for guides at the Gardens. We have enlisted the services for Kate Heffernan – from the Gold Coast, who has vast experience in this area. We had a meeting in November last year and have been working on material for the course - our history, description of our collection, basic botanical information, Aboriginal input and basic info about the plants in our Useful Plants Garden - later we will work on other areas of the Gardens. We are hoping to have a session with Kate in March and she will present us with information about others factors involved in training people to be guides.

Our plan is to train a small group at this stage and then have regular advertised guided walks - starting once a month, but later more frequently. If you are interested in participating in any way then please let us know – contact details are on back page of the newsletter. You don't have to be a plant specialist or even know much about our Gardens – we will give you all the information and will support you on your first walks. And you can choose an area that interests you particularly – you don't have to do the whole Gardens immediately!!

**Marie Matthews**

## Testing Water Quality at the Gardens....

*Barb Jensen Environmental Educator*



*Barbara water testing with kids at recent open day*

I am lucky enough to have worked alongside children at the pond in the Sensory Garden in the Botanic Gardens, having a lot of fun as we tried to determine the health of this waterway.

The three key indicators for water quality assessment are biological (e.g. water bugs), chemical (e.g. pH) and physical (e.g. dirt).

Usually my activity includes a visual assessment, some physical water testing and dip netting to find out what lives in the dam.

When doing the visual assessment I am looking at what's in and around the pond: e.g. surrounding vegetation type (native v. weeds); surrounding vegetation cover (shade); rocks, logs and water plants (habitat); access by animals or people (bank erosion or contaminants); and human made structures that would affect water flow or introduce contaminants e.g. causeways or drains. These and other factors provide clues and information about what is having positive or negative impacts on the water quality in the pond.

I mostly did four physical water tests with the children. They took the temperature with a thermometer; used pH papers to measure the acid or alkaline level; had a small hand held meter to measure mineral saltiness and by looking down plastic tubes, through the water, measured murkiness

(turbidity). Using a simple *Waterwatch* scoring system the children can determine a healthy, fair or poor water quality result for each test.

To learn more about the health of the water and ecosystem the children would use nets to catch, and the *Waterwatch bug detective guide*, to identify the animal life in the water. This gives an assessment of the site at that particular time. Freshwater macroinvertebrates (water bugs) are animals without a backbone that can be seen with the naked eye, such as beetles, dragonfly larva, shrimps, worms and snails. They live all or part of their life in the water. To assist with water quality monitoring macroinvertebrates have been rated according to their sensitivity or tolerance to pollution and by completing a Stream Pollution Index (SPI) table, a value can be calculated. An 'excellent' SPI score tells you that there is an abundance and diversity of water bugs. It indicates the waterway has low levels of pollution and high levels of dissolved oxygen, shade, logs and rocks for shelter, undisturbed and diverse native vegetation along and overhanging the banks, natural water flow patterns, stable edges, no human structures, little human access, no stock access and no exotic water animals or plants.

I have not done enough testing at this pond to accurately say how healthy it is but most times it turned out to be better than it looked and received a 'fair' SPI result. We have caught many different types of bugs from the most sensitive to very tolerant range. Recent rain and runoff, a low water level and the amount of *Azolla* (small native floating aquatic fern) are some of the major factors that have influenced the types of bugs we found. Also the dam seems to be a part of the site's stormwater management and is surrounded by paths, roads and structures. These are all human impacts that reduce water quality.

However, as the trees and gardens in the surrounding area get more established the water entering the dam should be cleaner, enter more slowly and contain fewer nutrients. This will greatly contribute to a healthier aquatic ecosystem. It has been a pleasure working at the gardens and congratulations to everyone who is putting in their time to care for, educate about and enhance a special patch of our local environment.

*Barbara Jensen is replacing Danielle Hanigan as Environment Education Officer at the LCC Waste Facility and will continue the system of working with Margaret Hildebrand and her education team, with groups of Primary School and Pre School children when they visit the Gardens. She does a wonderful job with the children and we look forward to having her on board.*

### **28 May Open Day**

This special day, organised by BGANZ, is for botanic gardens in Australia and New Zealand.

Watch out for details of our programme for the day on our website and we will also email members

**Save this Date**

## Koalas released



*Photo by Damian Butler*

At the end of November 2016 two koalas were released by Friends of the Koala in our Eucalyptus Forest area. A mother and a nearly grown up baby – they were named Lux and Berg. They were around the barbecue area for several days with the baby obviously being encouraged by its mother to be more independent... and not liking it at all. Link to NCN video of release <http://www.nbnnews.com.au/2016/11/29/koalas-lux-and-burg-released-after-rehabilitation/>



*Men at work inside our new Tool Shed in the second car park*

## Thanks to Sponsors

We would like acknowledge Andrew and Jeni Binns and local firms Adrian Williamson, Ginger Blue Graphic Design and all who are supporting us in various ways. We are very grateful to them and to all who help financially or in other ways at the Gardens.

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Recently Peter Swain and Don Woodley divided one of our native bee hives. We now have three hives and they all seem to be doing very well.



**Congratulations** to Margaret and John Hildebrand on receiving Australia Day Award in Lismore for their long term contribution to Sustainable Environment!

*Photo NR Echo*



**Green House with fence in new position**

**WORK MORNINGS:** Sunday Group meets last Sunday of each month starting at 7.30am in Summer and 8.00am in winter Contact Denis 0431 223340. Wednesday Group every meets Wednesday starting 8am Contact Ros 6628 2909 , 0412 317744, roslittle46@gmail.com Propagation Group every Tuesday starting at 8.00am at the Nursery contact Jan 6629 8244, jandenardi@yahoo.com.au