FLRBG

August 2021

Newsletter of the Friends of Lismore Rainforest Botanic Gardens Inc.

President's Message

We are getting our breath back after a **hectic few months** which included some extra workdays. We planted in the Sensory Garden, along the Anniversary Path and down the slope to the Environment Education Centre (EEC) and in the former Acacia beds after removal and chipping of the old trees. Rainforest trees were fertilised. Landscaper Geoff McGrath created some new beds for future plantings, grading terraces and using imported red soil. The beds were then mulched with tea tree mulch and the paths between the beds were mulched with cardboard and the chipped wattle trees.

Botanic gardens open day in May was a super day with the unveiling of the sign to thank our benefactors **Jeni and Andrew Binns,** non-stop guided walks, nursery sales, a Settler's Twine demonstration and displays at the Visitor's Centre, card and book sales and food at the EEC. A big thank you to the volunteers and friends who provided hot soup and bread, quiche, cake, coffee, tea and homemade lime juice cordial. We are now planning for our next big day **Big Scrub Day at the Botanic Gardens** on Sunday 17 October.

We were required to vacate the office at the EEC which we had previously shared with the Waste Facility Education Officer. We have temporarily stored our property at the Visitor's Centre or in committee members' homes, whilst we await council approval of the **new office** planned as an extension on the eastern side of the Visitors' Centre.

Another project, which was held up by the wet weather, is **the bridge across upper fern gully** at the western end o f the bitumen path through the main rainforest area. Our dingo driver, Simon Griffiths, formed the track to the Western bank which our specialist volunteer path person, Grahame Grayson, covered with a deep layer of gravel. The digging of the bridge foundations is finally done and ready for the concrete pour by Will Evans and Don Woodley. They will be supported by other volunteers in the building team.

Andrew and Jeni Bins at the unveiling of a special sign in the Sensory Garden in their honour Photo: Peter Weekes

The Wednesday work day volunteer numbers have been increased by very **welcome, enthusiastic new members**, some of whom are also members of the guiding team. The results of their weeding activity are amazing. The work of weeding and maintaining the Gardens is a constant and new volunteers are always welcome. The weeding teams now have the benefit of a **curatorial and weeding advisory group** (CWAG) led by the Curator, Judy Blood**.** As in-situ restoration is occurring across the site this success story has to be managed and choices made about which plants to leave or remove. The CWAG will review the plans for each area of the Gardens.

Future projects which will require grant funding include a larger shed and workshop with power to replace the smaller tin shed, and a rotunda and special paved area in the Commemorative Garden at western end of the Sensory Garden. Thank you to **Ben de Nardi** of **Paper Plans** for his time drawing a structure which will fit the site. It will have a roof so will be another covered area for picnics and education activities near the second car park.

Other projects include a vine display along the Anniversary Path with benches restored from those which came from the 'pie cart', a music cubby in the rainforest and a pond within the pond which can be kept topped up with fresh water from the rainwater tank in dry times. We are currently exploring options for this, one of which is a discarded yacht hull. The depth required is 1.3 metres so if you know of an old boat that might be suitable could you please contact us. Thanks to everybody involved for their continued work and support.

Hazel Bridgett

President@friendslrbg.com.au

Tree Profile

from Peter Gould

Pouteria australis (syn. Planchonella australis)

Black Plum Family: SAPOTACEAE

Black Plum is a medium to large sized tree attaining a maximum height of 30 metres and 120 cm in diameter. It can be identified by its trunk which is very distinctly fluted and flanged at the base, and by the many fallen fruit often found under the trees. Young stems and leaf petioles exude a sticky white sap when broken.
It occurs in Subtropical Rainforest, Dry Rainforest and Littoral Rainforest from the Shoalhaven River in NSW to Bulburin in Qld.

The Leaves are thick and leathery, simple, alternate and obovate, ovate or elliptic in shape, mostly 8–16 cm long, 2–5 cm wide. The apex is either obtuse, acute or acuminate and bluntly pointed. The leaf base is tapering and surfaces are glabrous, tapering, thick and leathery, surfaces glabrescent, the upper surface being shiny or dull, the lower surface shiny and paler green, they are pinnately veined with 10–14 pairs of lateral veins, distinct and raised on both surfaces; the petole is 5–12 mm long.

The Flowers are axillary and often ramiflorous, solitary or 2–6-flowered clusters. Flowers bisexual, 5-merous. Sepals 5, fused at base. Petals 5, fused to halfway, 3–5 mm long, greenish or whitish. Stamens 5, staminodes 5 and alternating with the corolla lobes.

The Fruit is obovoid or globose, plum-like, 15–60 mm long, purplish or black and at first pruinose, with persistent style at apex and sepals at base; 2–5-seeded; seeds c. 2 cm long, narrowly ellipsoidal, compressed, brown and shiny with a whitish elongate scar.

Timber

As a timber tree Black Plum is slow growing. It produces a fine grained, golden-coloured wood of medium density which takes a high polish. The timber is remarkably stable and much appreciated by pattern makers and instrument makers.

Bushfood:

Black Plum fruit are edible and the fruit of the best trees are one of my favourite bushfoods but the fruit is often infested with Fruit Fly larvae by the time they drop from high in the canopy.

Typical fluted trunk on Black Plum beside the Protester's Falls walking track in Nightcap National Park

Black Apple - *Planchonella australis*
Image from Royal Botanic Gardens & Domain Trust

References:

PlantNET New South Wales Flora online https://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Planchonella~australis

Harden, G., McDonald, B. and Williams, J. 2006, ***Rainforest trees and shrubs; a field guide to their identification,*** Gwen Harden Publishing, Nambucca Heads, NSW.

Floyd, A.G. 1990, ***Australian rainforests in New South Wales***, Surrey Beatty and sons, Chipping Norton, NSW.

Dwarf Cassowary

At a recent guided walk led by Peter Gould in the Uncommon Plants Garden the focus was on the reasons that some rainforest plants are so rare. The causes were many and varied, but one of special interest was why some big seeded local rainforest fruit do not get eaten by animals and so have very limited range. It had been presumed that maybe the animal able to deal with the big seeds was now extinct or at least no longer in this area.

There is some old fossil evidence that there once was a Dwarf Cassowary *Casuarius lydekkeri* in New South Wales in the Pleistocene period. This is based partly on the discovery of a tibia bone thought to have been found in cavern-deposits in Wellington in Central NSW.

More recently, Rhys Lemoine, Researcher PHD Student at Aarhus University in Denmark, has done research into this matter. She found that fossils of this species are known in New Guinea, as well as Eastern NSW. She believes that the old fossil could actually have come from the Darling Downs region. This is based on another line of evidence, namely the extreme prevalence of plants with cassowary-adapted fruits still in the NSW-QLD border region.

Numerous genera of fruit-bearing plants, known to be eaten and dispersed by cassowaries in New Guinea and the Cape York Peninsula, are also found in the eastern borderlands. It is likely that they depended on cassowaries for dispersal in the past. They include *Endiandra compressa*, *E. floydii*, *E. pubens*, *Niemeyera whitei*, and *Syzygium moorei*. The extinction of their main dispersers is likely responsible for the limited distribution and consequently threatened status of *E. floydii*, *N. whitei*, and *S. moorei*. Several fruiting genera that do not occur in the current range of cassowaries, but may also have been eaten/dispersed by them in the past, include *Davidsonia*, *Diploglottis*, *Hicksbeachia*, and ***Pouteria*,** among others.

https://www.linkedin.com/pulse/rewilding-eastern-australian-rainforest-dwarf-rhys-lemoine?fbclid=IwAR3r3l6WCsl5NeJmqILxVIJ8GkoTjNGa0gXqcx5A4h0g6COxQXnO1cNOAvY

The History and Significance Fossil *Casuarius Lydekkeri* By Alden H. Miller UCLA Berkley 1961

Exciting new group of guides and volunteers join the Friends in 2021

In March we were thrilled to receive a wonderful response to our invitation for people to join our guiding team. The twelve new trainees gladly gave up two Saturdays for training with their nine mentors and Bundjalung elders, Thelma James and Mick Roberts. They enjoyed guided walks through the Gardens, information sessions on the objectives and history of the Gardens, basic botany and ecosystems of the rainforest, features of an interesting walk and began planning for their practice walks.

All twelve guides presented an overview of their walks by the final day and since then, we have had amazing practice walks. Mentors have provided feedback and since then many of the guides have led public walks on the last Sundays of the month, as well as at our Botanic Gardens Open Day on 30th May. They have also taken over 200 school students on walks during World Environment Day activities.

Each guide has developed a walk in a particular section of the Garden which piqued their interest. Supported by the notes and ideas of mentors, the new guides are blossoming into wonderful members of the Friends, many of them choosing to assist with all aspects of the Gardens. We have excellent new guides for children's activities, propagators for the nursery, photographers, writers for advertising and even enthusiastic weeders for the Wednesday work day.

The committee is very grateful for the dedication of this wonderful group of volunteers. They have already become "hooked" on the beauty of the rainforest and are learning more about our local native plants every week.

From Tracey Whitby

Bove: Room full of keen students on Day 1 of Guide Training Course
Right: Some of the new guides at work

Our new set of greeting cards has been selling very well, 12 different photos of beautiful flowering plants in the Gardens, taken by Friends of the LRBG. Only $20 a set of 12! Blank for your own message. If you would like to purchase them, email publicity@friendslrbg.com.au

Our stunning 2022 Calendar will be available on October 17 at our Big Scrub Day at the Gardens. $15 so save the date!!

Working with children at the Gardens

Butterfly made of flowers and leaves by one of the young visitors at our recent Open Day

Margaret Hildebrand has been Education Officer at the Gardens almost since she joined the Friends in the mid 2010s. Her special love is working with the very young visitors to the Gardens. In non-Covid times the Children's Education Team would have up to 2000 visiting children each year - mostly primary school and preschool groups. Working with various other volunteers over the years they have introduced many children to the joy of the Gardens and love of nature generally. Here are some of Margaret's thoughts behind her approach to working with children.

"I have always been studying, working as an Early Childhood Educator, Primary and High School teacher as well as in Tertiary Education. During my studies Howard Gardener's Theory of Multiple Intelligence really captured my attention. In 1983 Gardener presented his theory regarding different ways of thinking - Visual Spacial, Linguistic Verbal, Logical Mathematical, Body Kinaesthetic, Musical and Interpersonal and Intrapersonal. His theory seemed in keeping with my family and my teaching experience and certainly seemed useful in my interactions, and in planning learning material for a range of ages.

So, when developing learning activities for varying ages of school groups visiting our Botanic Gardens I have tended to think about multiple approaches again and always like to give students the opportunity to connect to nature in their own particular way. For example:

Using flowers and plant material to create a picture on black felt mats (**Visual Spacial**)

Pulling flowers apart and studying parts with magnifying glasses (**Logical)**

Blind fold touch and feel then find the seed pod (**Kinaesthetic**)

Discussing experience e.g. Is the dark Hoop Pine Forest scary? (**Interpersonal)**

Singing a song, sometimes just made up (**Musical)**

It is interesting to note, when checking Howard Gardener's theory online I have discovered in more recent years he has added another intelligence (or preferred way of thinking) and that is **Naturalistic.** Gardener, explains this term, as being 'more in tune with nature, interested in nurturing and exploring our environment and highly aware of subtle changes to the environment'. Now isn't that interesting!! Something to be nurtured in everyone.

I'm sure all the volunteers who help maintain our gardens are strong… and Naturalistic!"

Margaret HIldebrand

Ephemeral art work by Visual Arts student Craig McDonald from Lismore TAFE, after an experiential morning at the Gardens

Sculpture students at the Gardens

In the middle of June we had a group of sculpture students from Lismore TAFE's Visual Arts Course with their teacher, local sculptor, David Hickson. They came looking for inspiration to help them prepare ephemeral sculptures using natural materials. This was to happen later in the day at Lismore Community Gardens. David draws on work by Scottish sculptor Andy Goldsworthy for ideas relating to making ephemeral sculptures in nature.

One of our guides, Graeme Patterson, took them all on a walk first in the Useful Plants Garden and then in the Hoop Pine Forest up the walking track to the labyrinth at the summit. David reported that students and teacher really enjoyed their time at the Gardens finding it all fascinating. He forwarded an image of a sculpture done that day by student Craig Macdonald which was inspired by the visit.

Women plant collectors of the Richmond Valley

Syzygium hodgkinsoniae, Mrs Mary Hodgkinson
Image courtesy Royal Botanic Gardens Victoria

Few people will know that from 1872 to 1895 four women from northern New South Wales played an important role in contributing native plant specimens to Australia's first herbarium. I made this discovery whilst undertaking my Doctor of Visual Arts at Griffith University. I have been investigating women who were involved, in an amateur capacity, in nineteenth century Australian botany and ornithology.

Miss Annie Edwards collected at Casino, where I was born and Runnymede Station, which later became farms for my father and grandfather. Mrs Mary Hodgkinson and her daughter Virginia collected in the Ballina area, where I now live. And Miss Edith Thornton collected in the Clarence and Richmond Valleys. Three of these women collected specimens new to science and some had species names after them including *Hodgkinsonia ovatiflora* and *Syzygium hodgkinsoniae*.

Prior to the mid-1800s most botanical specimens collected in Australia were sent to European collections. This changed when Ferdinand von Mueller was appointed the Government Botanist of Victoria in 1853. He also held the post of Director of the Melbourne Botanic Gardens from 1857 to 1873. During this time Mueller set about creating the first herbarium in Australia, which was to become the most significant in the southern hemisphere.

To help with this enormous task he created a network of approximately 1,400 collectors, specifically in remote areas. The overwhelming majority of these collectors were amateur and around 220 were women, many of whom were early settlers in isolated areas of Australia. Mueller targeted women through newspaper advertisements and ladies' journals. Many collected in family and social groups: mothers, daughters, sisters, aunts, nieces and friends.

I have compiled a list of over 600 specimens collected by the women, which is the inspiration for a series of artworks that will be exhibited in a solo exhibition at Lismore Regional Gallery from 11 June to 31 July 2022.

I felt it was important for me to become a collector, which lead me to the Lismore Rainforest Botanic Gardens, where there are over 100 of the species collected by the women. I have been warmly welcomed by those who care for the Gardens and am extremely grateful to Peter Gould for his expertise in identifying species and for his patience with my lack of botanical knowledge. I am also spending time with Peter Mouatt and Heidi Lunn at the Southern Cross Plant Science Herbarium, viewing and photographing specimens with their dissecting and compound microscopes. This allows me to view specimens in ways that were unimaginable to the early female collectors.

Lyndall Phelps

Spring Flowers

Following on from 2019/20's hot, dry, fiery summer, this year has been much kinder to the Gardens with regular rain and moderate temperatures. Plants have responded well with obvious growth and already spring flowers are appearing in the Sensory Garden and throughout the Gardens generally.

Lambertia Formosa Mountain Devil

Westringia sp.

Hovea sp. *Photo Phil Jarman*

Open Day 2021

This year's theme for Botanic Gardens Open Day in May was '**Celebrating the Power of Plants**',. It was focussing on celebrating plants and their vital role in our wellbeing, weather and climate stabilisation, providing food and habitat, and in research and medicine.

At our Gardens we celebrated with educational displays, children's activities, a native plant stall, five guided walks by our trained guides, book and card sales and the dedication of the Sensory Garden to Gardens' benefactors, Jeni and Andrew Binns.

Volunteer guide, Ken Wilson, set up an amazing demonstration of the Power of Plants, testing the strength of Settlers Twine, *Gymnostachys anceps.* All the guided walks were booked out and the Nursery's plant stall sold out.

Thank you to all our wonderful volunteers for their support of the day, contributing their time and energy to welcome visitors and share their knowledge and passion for the Gardens.

Jake leading Guided Walk– note young Xanthorrhea flower stem

Unveiling Binns sign in Sensory Garden

Graeme Patterson with young sculptors in Useful Plants Garden

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Gardens included in Vintage Train Journey

Earlier this year the Friends were approached by Vintage Rail Journeys Tour Director, Brett Smith, asking to visit the Gardens with a view to including us in a day of excursions for passengers. Mr Smith was very excited to tour all parts of the Gardens and was convinced many of their travellers would love to join our guided tours on June 27th.

"As a key part of the day's activities exploring the Lismore region, our 1940s Flexible Clipper was bringing 25 of our special guests to enjoy a guided walk through several sections of the Gardens," said Mr Smith.

"Unfortunately, the lockdown in Sydney in June, as Covid 19 escaped into many areas of the city, meant that the train had to return to Sydney before we could complete the tour. This meant that our Guests couldn't enjoy the Gardens the way I was able to when visiting earlier in the year".

Mr Smith is keen for the Gardens to be included in the itinerary for future Vintage Rail Journeys and we look forward to showing them our beautiful rainforest as soon as possible. *Tracey Whitby*

Myrtle Rust Symposium

From the 23rd to the 25th of March I represented LRBG at a National Myrtle Rust Symposium held in Ballina. The symposium was hosted by the Australian Plant Biosecurity Science Foundation, and partners including the Australian Network for Plant Conservation, the Threatened Species Recovery Hub, the New South Wales Government's Saving Our Species program, and the Biosecurity Collective. The symposium brought key stakeholders together to build a community of interest, share knowledge and build co-ordination and implementation of the Myrtle Rust National Action Plan.

Over 200 delegates took part, either in-person or online, with online contributions coming from Western Australia, New Zealand, Hawaii, California and South Africa. Presenters shared the latest research, response, surveillance and conservation activity, framed against the Action Plan. There was strong Indigenous representation throughout, beginning with a welcome to country given by Auntie Julia Paden, representing the Jali LALC. A number of speakers gave an indigenous cultural perspective on the impacts of Myrtle Rust. Milly Davis of Butchulla Land and Sea Rangers spoke of the threats to the biota of K'Gari (Fraser Island) and their response.

Cathy Offord, Rob Kooyman and Di Brown at Ballina Conference

Bob Makinson giving a grim but realistic appraisal of the past response to, and future outlook for, Myrtle Rust in Australia.

Unfortunately, the tour of field sites in the Tweed Valley planned for day one had to be cancelled because of flooding and problems of access, but the balance of the program ran without a hitch.

Session 6 "Towards Recovery" on day 3 was of particular interest as it dealt directly with the role of Botanic Gardens in the establishment of ex-situ plantings of Endangered Species and their conservation. I made contact with Marion Riordan and Adrien Weber from Earth Learning and we came to an agreement to purchase some of their cutting grown plants for planting in our collection in Lismore.

A decision was made not to print the symposium proceedings but rather to make all the presentations available online at : *http://www.apbsf.org.au/myrtle-rust/*

From Peter Gould

LRBG approved as an ex-situ planting site for Critically Endangered Species

LRBG has recently been approved as an ex-situ planting site for three Critically Endangered Species - *Lenwebbia sp.* Main Range, *Rhodamnia rubescens* (Scrub Turpentine) and *Rhodomyrtus psidioides* (Native Guava). Craig Stehn from the NSW Saving our Species program has added us as associates to his scientific license, a legal requirement if we are to grow and manage these highly myrtle rust susceptible plants.

Earth Learning, a not for profit group from the Tweed Valley and Border Ranges area, have been collecting cutting material of these and several other species of plants which are badly affected by Myrtle Rust, and Russel Costin of Limpinwood Nursery has grown them on. They have maintained a database which identifies the exact GPS location of each plant from which cuttings have been collected. *https://www.earthlearning.org.au/*

Conserving small things

Velvet Worm *Onychophoran*

97 percent of all animals are invertebrates - animals without backbones. So far around 1.25 million species have been described, most of which are insects, and it is estimated that there are millions more still to be discovered.

Invertebrates have been recorded in the upper reaches of the atmosphere, in deserts and in the wettest rainforests… even in Antarctica at temperatures of -35degrees C. They provide many services that are vital for our survival.

In a recent episode of ABC RN's 'Off Track' programme, the focus was Insect Conservation. There is much anecdotal evidence of a dramatic reduction in the number of insects generally. This includes many reports of a great decrease in the numbers of insects found squashed on vehicle windscreens after driving at night on country roads!

Because there is virtually no recorded information of what insect numbers in Australia were in the past with which to compare those of the present, this evidence cannot be used as scientific proof that insect numbers are decreasing because there is not the previous data to compare it with. It is not easy to get funding for projects which lack long term scientific evidence. Funding tends to go to well known mammals or birds with log recorded history.

However, most scientists agree that biodiversity generally is declining at an alarming rate and that all invertebrates are an important part of the Earth's biodiversity. And we know a lot of good things that can be done to preserve and increase biodiversity.

It is suggested that maybe if scientists work on groups of invertebrates rather than naming every species, then they can gradually build up data.

Ideally we need to save everything we now have and restore those we have lost! Instead of spending huge amounts of money focussing on saving one species maybe we should focus instead on a broader picture and in the process end up saving 100s of species.

It is unlikely that we will ever discover all the insects that live - even those in our own backyards - but they are there, and every action we take and everything we do is affecting them. Dr Kate Umbers suggested that it would be best to take a whole system approach. Care about nature as a whole and care about protecting nature. 'Decide to do something to help protect every living thing that lives here whether we can see it or know what its name is.'

References:

https://australian.museum/learn/teachers/learning/what-are-invertebrates/;

ABC - RN 'Off Track' radio "Conserving small things on a big scale" aired 10 July 2021

From Marie Matthews

A rowdy place?

Through their finest roots and using electrical impulses, there is much scientific evidence to support the belief that trees communicate with each other. These mycorrhizal networks are fine, hairlike root tips of trees which join together with microscopic fungal filaments to form the basic links of the network 'Some are calling it the 'wood-wide web'. Trees need each other and like each others' company. They even attempt to sustain each other through tough times and through these impulses, warn of attacks by insects. A lone tree in the middle of a paddock has a shorter life than amongst its siblings in a forest.

If trees do communicate with each other within our Pine Forest, it must be a rowdy place up there some nights!

References :

Wohlleben Peter 'The Hidden Life of Trees'. Publ. Black Inc. 2015

Richard Grant, Smithsonian Magazine | March 2018

From Geoff Walker

Earth's natural internet

In mycorrhizal associations, plants provide fungi with food in the form of carbohydrates. In exchange, the fungi help the plants suck up water, and provide nutrients like phosphorus and nitrogen, via their mycelia. Since the 1960s, it has been clear that mycorrhizae help individual plants to grow.

Fungal networks also boost their host plants' immune systems. That's because, when a fungus colonises the roots of a plant, it triggers the production of defense-related chemicals. These make later immune system responses quicker and more efficient, a phenomenon called "priming". Simply plugging into mycelial networks makes plants more resistant to disease.

We now know that mycorrhizae also connect plants that may be widely separated. In 2008 fungus expert Paul Stamets called them "Earth's natural internet". He first had the idea in the 1970s when he was studying fungi using an electron microscope. Stamets noticed similarities between mycelia and ARPANET, the US Department of Defense's early version of the internet.

http://www.bbc.com/earth/story/20141111-plants-have-a-hidden-internet

Cells of all kinds can detect chemical signals, using proteins on the cell surface called receptors. Communication between plants isn't a controversial idea within biology.

Hoop Pine Forest at the Gardens

Weed Warriors working wonders at LRBG

As all gardeners despair, weeding is a never ending activity. But many hands make light work and, in our case, remove a lot of weeds.

Recently, our band of Weed Warriors has substantially increased in number. This has enabled a corresponding increase in the volume of weeds removed from a greater expanse of area. It is so very satisfying at the conclusion of our Wednesday morning's work to look at our achievement and be inspired to return the next week to get back into it.

The main weeds removed are Asparagus Fern and Coral Berry, together with Camphor Laurel seedlings, Farmers Friend/Cobblers Peg and Privet. Some grasses are also removed, but these are less problematic.

Weeding is a very important aspect of maintaining the Gardens. It controls the invasion of weeds from the biological aspect of maintaining the plant species, and as importantly makes the Gardens presentable to those who visit.

I've been involved with the Gardens since 2014, and enjoy the camaraderie with my fellow volunteers. Sometimes the chatter whilst weeding is quite hearty, and other times the activity seems more meditative. One thing for sure, we all consider we are contributing to a worthwhile community asset for now and the future.

Susan Fitzpatrick Co-Ordinator Weeding Team

Susan , draped in huge Asparagus Fern root and surrounded by greenery from same plants.

Sunken Garden

When we were mapping our the path of the walking track in the Hoop Pine Forest back in 2017 we came across a small quarry almost at the top of the hill, just below the level of the Labyrinth. We thought it could one day become a sunken garden. Since then Neil Walker has put a lot of work into that garden - keeping down weeds and looking after young plants. Getting the water supply up there a couple of years ago made a big difference. Neil now has that quarry looking like a proper sunken garden. The plants still need another season to reach head height but they are getting there and soon it will be a beautiful cool shady place to enjoy after the long climb up the hill.

A very enthusiastic weeding team (plus a couple of others who were doing erosion control) off to weed in high western end of the Gardens. This is a new and very interesting area to be developed once bridge at end of path is completed.

Mosses in Rainforest

In our rainforest botanic garden we usually wander with our gaze upwards upon the foliage.

However, beneath our feet, the rainforest mosses are invading the edges of the main asphalt path. These green "cushions" are at their best during summer when the storms are filling up the drains, but they hang on during the drier periods. Theirs is a deeper green than the trees.

Mosses are very ancient plants. They do not produce flowers but rather produce spores. They have stems and leaves, but don't have true roots. As they are very tiny you have to squat down low to enjoy the sight of mosses in spore production mode.

Moss producing spore
Public domain image PBS Shots

When we commenced clearing the weed infested fields that have become the Gardens, there were no moss-edged drains. There were few trees, hence little shade.

As our rainforest trees mature and produce greater shade, the mosses at our feet will spread along the paths. They will also appear on rocks and fallen branches and on the lower bark of the mature trees. However, (contrary to my early bushcraft training) in Australia, moss is <u>not</u> always found on the southern side of tree trunks. ***Geoff Walker***

Getting Psilotum nudum to reproduce!

In the Gardens Nursery Jan de Nardi is anxiously watching the development of spores on a Fork Fern *Psilotum nudum***.** She has it set up surrounded by empty trays of seed raising mix, eagerly anticipating the development of some new plants from the tiny yellow balls that are appearing on the stems of the plants.

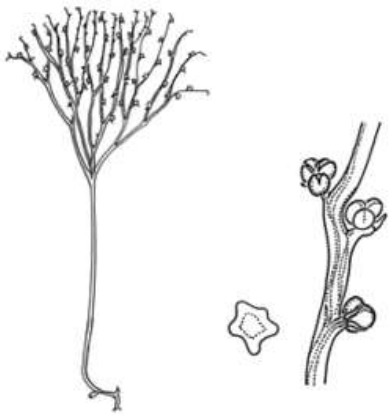

Image: https://plantnet.rbgsyd.nsw.gov.au/

Psilotum nudum belongs to an ancient group of living vascular plants usually found growing on rocks and as an epiphyte in rainforest.

Jan says that she was fascinated by the plant as it has been called a fern ally.

"It has many characteristics of the algae - every branch results in 2 new branches, though sometimes one of those branches is actually a sporangium (where the reproductive organs - spores- occur). It seems to fit in so well with the development of the plant kingdom showing increasing complexity in reproductive techniques. The spores in Psilotum are dispersed by water splashes, (different from the seeds in Poaceae, the grasses, which are dispersed by wind). I find them exciting!

At one time I worked where there was a rooftop nursery with big windows and a concrete floor. The plants were watered by an automatic watering system which must have resulted in both warm and damp conditions for the spores.

The result was that Psilotum almost became a nursery weed. My boss at the time used to get great delight from showing our "nursery weed" to visiting European and American botanists, who had previously only really seen these plants in books.

I was delighted when I discovered this *Psilotum* in the nursery when it was in its previous site (Rose Hand's backyard). In spite of my efforts to get its spores to germinate - which are so far non-productive - I noticed the other day that there is one plant of *Psilotum* growing, without any help from me, in a pot of *Hoya australis* - another native which grows in similar warm damp areas!

Psilotum nudum in our nursery

Insects in all shapes, sizes, and colours

A Super Plant the World Forgot

A plant so strong it excited attention in the great Paris Exhibition in 1867

At Lismore Botanic Garden 2021 Open Day in May, I conducted a demonstration on the Settlers Twine (*Gymnostachy Anceps*) to test the tensile strength of the leaf of the plant.

The 12mm by 200mm green leaf piece was clamped very tightly then gradually stretched out to test its breaking strength.

The general consensus of the 15 spectators who witnessed the event was that it would probably break at around 35kg. When the weight reached about 40kg I invited everyone to feel the leaf thinking it would snap at any moment considering the immense tightness it was showing. Everyone guessed again the possible breaking weight.

Slowly winding the nut on the old 10mm bolt we reached the 60kg mark. At that point the thread stripped and let go, which was a bit unnerving. However, I repositioned the thread and started again and to my shock the leaf didn't break until it reached at 72kg when it snapped with quite a bang at a far greater weight than I expected. Though one of our spectators did guess at that figure!

Out of all the plants on a guided walk I lead in the Useful Plants Gardens, the *Gymnostachys Anceps* intrigued me most of all. I could see the interest on the faces of people doing the walks when I told them about Indigenous people in and around the Big Scrub using this plant for fishing lines, traps and even head bands for carrying heavy weights.

Early settlers also recognised the plants as being useful for making strong ropes. One report indicates that it was used to tie up pigs to take to market.

Walking through a cow paddock along a rocky ridge at Wyrallah recently, I sighted several *Gymnostachys* growing where not even privet had survived last year's drought, nor the destruction of vegetation by hungry cattle. Standing

Just before the Gymnostachys leaf broke at 72kgs – Ken Wilson gradually increasing the weight while spectators watch in great anticipation.

tall, the thin unsupported flower stems reached around 1.5m and the leaves about a metre high were waving in the wind. I tried to pull out a small plant but it was impossible to budge it as the rhizome roots were firmly fixed into the rocky outcrop.

Information from Australian National Botanic Gardens indicates that little is known about the longevity of this plant in the wild but specimens at the Canberra Botanic Gardens have been growing for over 3O years.

My research on this strong hardy plant indicates that it has no known bugs or predators to bother it. The plant has another extraordinary survival technique - the ability to stay alive in total darkness longer than most other plants. *Gymnostachys anceps* has a very high absorption rate of Carbon Dioxide, with little help from the sun, and can still have good respiration (Carbon Dioxide to Oxygen) even in the dark.

An article in the Sydney Morning Herald in 1867 reports that *Gymnostachys anceps*, commonly known as Settlers Twine, was on show in the Paris Exhibition drawing attention to the immense strength of the fibre of the green leaf. Some thought it could be perhaps the strongest plant in the world.

In 1872 it was reported to be growing only around Eastern NSW and South East Qld in sparse patches in rainforest, wet sclerophyll forests, coastal and escarpment ranges. It was not considered to be of any commercial value, being not sufficiently abundant in any one locality.

The Nature Conservation Act 1992 quotes this plant as having no significant conservation value, leaving this interesting perennial herb unprotected.

Ken Wilson
FLRBG volunteer and guide

New theatre experience at the Gardens

During June and July, Roundabout Theatre, together with an inspiring miscellany of artists, spent time at the Lismore Rainforest Botanical Gardens developing a new theatre work for young people called *Understory*.

Understory will be both an immersive theatre experience and an extended adventure game that will traverse the whole of the Gardens. The aim of the show experience is to inspire in children a deep curiosity and connection to the natural world through an imaginative, playful and embodied approach.

The group began the creative development process in the main rainforest areas and Hoop Pine Forest with 'forest bathing' exercises – a term first coined in Japan to describe the experience of being a forest situation with a conscious awareness of nature. It is a powerful way of 'crossing the threshold' from our busy lives into a liminal state, where our active imaginations can be ignited.

We then spent time 'world building' - exploring and devising potential stories and characters through writing, drawing and improvising. We played with sound design; live music, hidden speakers, geo-locative sound walks, call and response, mnemonic chants and spaces for deep listening and stillness. We looked at ways we might use technology and biodegradable site-sympathetic set design to create magic and adventure and to augment the existing natural environment: projections, woven stick tunnels, magical portals, temporary bridges, miniature markers and camouflaged puzzles.

On our journey, we discovered microscopic magic, symbiotic networks, energetic highways, ancient moss maps, stone eating giants, lichen codes, tiny portals, deep, deep holes to hidden worlds, winking trees, upside down trees, sky-walking tricksters. We followed our wonder to develop a 'wonder-full' show that we would share with future children and their adults.

We were inspired by the forest around us and there were hundreds of ideas generated for stories, characters and design.

One of the performers wrote after the week., ". . .I am left with a feeling of having woken up from a dream, trying to piece it all back together.. . . I was inspired by the questions we asked the forest, the activity of creating worlds in the moment, and wonder how those ways of active participation in making the worlds can be structured into the final piece."

We now possess the seeds of the meta-story and its central characters, a mapped experience design, game and puzzle components and some strong starting points for how children will be called to adventure and be actively participating throughout the show.

The next stage of the process will include consultation with Indigenous knowledge holders and environ-mental educators to refine the educational content of the show and a period of play-testing with children in the Gardens through a series of workshops with local schools. After this we will continue to develop the show to presentation, hopefully for Spring 2022.

Valley Lipcer, Roundabout Theatre Artistic Director

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Palm Gully looking great after a wet winter

Guided Walk Uncommon Plants with Peter Gould