



President's Message

I am pleased and relieved to report that, thanks to a tremendous effort by volunteers and gardener Damian, the **hours spent watering** have resulted in minimal loss of plants over the recent extremely hot, dry spring and summer. Visitors will notice that as watering was the priority, there is much weeding to do over the coming months. There was some tree fall and these have been chopped up and left to rot on the forest floor - a source of nutrients as they are populated by fungi. They also provide habitat for small animals and insects.

Our multi-skilled Secretary, Florence Trevorrow and committee member Neil Walker have connected more **water supply lines and many more taps** in the Hoop Pine Forest, Wilson Park species plantings and rainforest areas. More taps mean more hoses and less need to drag long hoses around the Gardens which can be very tiring on hot days. We can always use surplus hoses so if you know anybody who is downsizing and

has spare hoses please think of us. We are also planning to install **rain water tanks** at the plant nursery and Visitors' Centre as funds allow. Plans to install four large water tanks in the quarry face at the Western end of the Gardens will require grant funding.

The **Development Application** for the amenities block at the Visitors' Centre and the high level bridge to span upper fern gully has been approved. These builds would not be possible without funds provided by our donors. However, these projects will use up all our currently available funds. We have also submitted **grant applications** for wildlife friendly fencing for the Northern and Eastern boundary fences and a music cubby in the rainforest. We continue to submit grant applications for the large wheelchair accessible shaded deck in the commemorative garden at the Western end of the Sensory Garden. This DA approved deck has been designed by Architect Don Granatelli and engineered by Peter Lucena

At our Volunteers morning tea in December the LCC General Manager Shelley Oldham presented the updated **MOU for signing**. Our ongoing cordial arrangements with Council are vital for the successful running of our Gardens.

The coming months will see us preparing the Gardens for the **Open Day on Sunday 31 May**, this is a special year for botanic gardens between Sydney and Cooktown as they plan to hold special events, activities and displays as part of **Encounters 2020**. These activities reflect the plants described by Sir Joseph Banks and Daniel Solander during the voyage of the Endeavour 250 years ago and the history surrounding their uses by the traditional owners of the land on which they grow.

I hope you enjoy this informative and topical edition compiled by editor Marie Matthews. Looking forward to welcoming you and your visitors to the area in 2020.

Hazel Bridgett



Friends of the Gardens at the special Christmas Morning Tea for our volunteers in December Photo: Jenny Dowell

Species profile

Dysoxylum mollissimum subsp. *molle* Red Bean

Family MELIACEAE

Peter Gould

Description:

Red Bean is a large tree growing to a maximum 35m tall with a trunk diameter up to 120cm.

Leaves are compound, large with 11-21 leaflets from 3 to 12cm long. The leaflets are asymmetric with a pointed apex, the base obtuse and unequal; while the margins are entire. They are mostly glossy or slightly hairy above and hairy below. Small, hairy domatia are present in most lateral vein angles



Peter Gould showing leaves of Red Bean in Room 2

The bark is smooth and grey in colour. Young stems are densely covered with fine hairs.



Bark of Red Bean at the Gardens



Mature Red Bean Tree at Lismore rainforest Botanic Gardens

The fruit is a yellow-brown capsule 1.5 to 1.8 cm in diameter, with 3 to 5 valves which open to reveal black seeds, each covered in an orange to red aril.

Distribution:

Red Bean is a widespread tree of warmer rainforests, mostly found in coastal districts, from North East Queensland to Bateman's Bay in NSW. It also occurs in Malaysia and the SW Pacific Islands.

Timber:

Red Bean produces a prized type timber that is fine grained and easily worked. It is used for cabinet work, carving and boat building. The heartwood varies in colour from a light reddish brown to deep chocolate while the sapwood is creamy pink and not resistant to termites. Care should be taken to

avoid breathing the irritant dust from sanding of this timber Being both reasonably fast growing and hardy it is an **excellent tree for cabinet timber plantations.**

References:

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- Harden G.J. (ed.) 1993 *Flora of New South Wales Vol.2. NSW University Press, Kensington, NSW*
- Harden, G., McDonald, B. & Williams, J, 2006 *Rainforest trees and shrubs: a field guide to their identification, Gwen Harding Publishing, Nambucca Heads, Plantnet*
- <http://plantnet.rbgsyd.nsw.gov.au/>



Timber from Red Bean tree. Photo with permission Richmond River Historical Society & Hugh Nicholson

Forests all over the world are vanishing at an alarming rate. As the green lungs of Mother Earth, they are vital to our health and survival. It will be an international challenge to preserve forests for all mankind and to promote sustainable forest management throughout the world.

Doris Pui-ying Lee

Encounters 2020 project

The Friends recently secured funding from the Maritime Museum in Sydney to help celebrate 250 years anniversary of the discovery by western science of the flora of New Zealand and Australia's east coast in 1769-70 and well over 40,000 years of traditional knowledge.

During the voyage of the Endeavour, pressings of over 520 new taxa, unknown to western science, were collected by Joseph Banks and Daniel Solander along the route up the east coast of Australia and these, along with thousands of botanical illustrations, somehow made it back to England in the face of shipwreck, waterlogging and the dank and humid conditions below decks. The rich abundance of diverse flora excited the botanic world.

With the support of the Bundjalung elders, Thelma James and Delta Kay and the Bundjalung of Byron Bay Aboriginal Corporation (Arakwal) and NSW National Parks and Wildlife Service, the Friends of Lismore Rainforest Botanic Gardens will use the grant to produce multiple copies of four flora identification wheels for use by visiting school students. Over 200 schools visit the Botanic Gardens and the National Park each year. The illustrations for all the wheels are being done by our own Ros Little and she is doing a magnificent job!



First Banksia being planted in new walk-through Gardens

The aim of the resources is to provide historical reference and understanding, linking local plants to the story of Banks and Solander's journey and the voyage of the Endeavour. Students will understand the basic process used to identify plants species and develop a deeper understanding and appreciation for native plant species. The wheel will feature Bundjalung plant knowledge and will highlight the role Aboriginal people play in protecting Country.

A well signed walk through an area featuring some of the plants collected by Banks and Solander is being established at our Gardens. Plants include *Melaleuca citrina* Red Bottlebrush, *Banksia integrifolia* Coast Banksia, *Dianella caerulea* Blue Berry Lily, *Eustrephus latifolius* Wombat berry, *Banksia serrata* Old man banksia, *Hibbertia scandens* (Climbing guinea flower), *Commelina*

Sailor), *Hoya australis* and *Commelina solanderi*.

At Byron Bay the wheels will help students learn more about the existing botany in the National Park. The official launching of the plant identification wheels will take place at Byron Bay on 15 May 2020. At our gardens we will have our launch at our Open Day on 31 May and we will on that day also officially open the new education walking path.



Bottlebrush illustration by Ros Little

cyanea
(Wandering



LCC General Manager Shelly Oldham, President Hazel Bridgett and Secretary Florence Treverrow signing the Memorandum of Association in December.

Shade Roof on Nursery potting area

In spite of the very hot working weather Will - with some help from the rest of our building team - has managed to get the roof on the shelter over the potting area at the Garden's Nursery. This makes the whole area so much cooler and pleasant to work in.

As from February the Nursery will be open Tuesday and Wednesday for work mornings from 9 and for sales between 10 and 11 on those days.

Keeping the plants going in the extreme dry heat has not been easy but most have survived and are doing well thanks to the ongoing hard work of the Nursery Team. In spite of an automatic watering system a lot of hand water has been needed.

Fire Loving Fungi *Stephen Axford & Catherine Marciniak*

In November last year fire went through the wet sclerophyll forests in Nightcap National Park in the far north of New South Wales. Named the Mt Nardi Fire, it was near to where we live. Once we had an all clear to enter the forest we investigated an area which was referred to as a 'black zone' where intense fire has been through.

So you might ask what is a fungi photographer doing in a burnt out forest. Surely there can be no fungi here. But we were amazed at what we discovered.

Strangely enough one of the first things to recover after a fire is the fungus. Firefighters reported to us they were seeing mushrooms coming up in the ash and the charcoal within a few days of the fire going through. The first fungus we came across was *Pyrophilous* or fire loving orange



Pyronema sp. Orange Fungus



Stonemaker fungus

fungus in the *Pyronema* species. It was spreading across the ground like a soft surface crust. These fungi come up a week or two after the fire and grow where the fire was at its

hottest, in the case of the one we found, along the ash bed of a burnt log. Everytime a puff of wind hits the fungus a spray of spores takes to the air in a fine white mist. Amazing that it is sporing within days of the fire.

When we dug up a little we could see that it was holding the soil together, and underneath the crust the soil seems to be wetter. So, it could be the fungus is occupying moist areas, or maybe it is locking the moisture into the soil, making the soil it occupies more moist. Whatever the mechanics of its growth it is obvious the fungus is creating structure in the soil and plants grow very much better in soil with structure than just in dust or ash. The second example we found was similar to the orange fungus but was pink and was spreading across the ground at the base of a burnt tree.

Its burnt bark had fallen off in a fine layer around edge and this fungus had grown on the charcoal... which is an unusual place for it to grow.

When a fire goes through a forest like this, it heats the soil up in the upper layers, so when it gets above about 60 degrees it effectively sterilizes the soil so all the life, all active life, is killed from the soil. But because their spores can survive the extreme heat some fungi will persist. And then they grow very quickly after the fire because there is no competition and they form mats of

mycelium. Mycelium is the body of the fungus similar to the tree roots only much, much, much finer. And as the fungi grow and spread, they potentially play an extremely useful



Steve at work amongst his fungi

role in the rehabilitation of the forest after the fire.

A third quite different fungus we found is called a Stonemaker fungus. It comes up very quickly after the fire has passed through. Locals tells us they were finding it within days of the fire. It's called a Stonemaker fungus because it grows off what looks like a stone in the ground. However, the 'stone' is actually a mass of mycelium which is how it survives the fire. I was able to dig one up and its 'stone' was large enough to more than fill my hand. The structure above the ground looked a conventional large mushroom shape. The underground section, the stone, is really a mycelium mass. The mycelium spreads out underground waiting for a fire to happen. The fire stimulates the fungus to fruit. There are so many different fungi and they can fill many different ecological niches. These three are amongst many that manage to fill a niche that isn't there until there is fire. As fire doesn't happen often in wet forest they often have a very long wait! How cool is that!

Adapted from video 'Fire Loving Fungi' published in January 2020 on Planet Fungi @planet.fungi on Facebook and YouTube. Presenter and photographer Stephen Axford and Filmmaker Catherine Marciniak



Catherine with camera and mike

The fire in Terania Creek Rainforest

On 14 November last year Hugh Nicholson wrote on the Terania Rainforest Facebook page: *'Just a quick post to show that our rainforest at Terania Creek is burning / has burned. Deeply shocking to see - though the evidence presented to the Terania enquiry 40 years ago indicated that the Terania Basin burned about every 1000 years. Somehow I feel that with climate change it will happen more often. Possibly too frequent for the rainforest to recover. Only time will tell.'*



Terania Forest on fire
Photo Elke Nicholson

On 4 December Terri Nicholson, after viewing the fireground from above, wrote: *'The north facing ridge slopes definitely copped the worst. In some places the forest is just blackened sticks. The motley greens and rusty browns of the canopy almost make it seem like autumn leaves. [It seems] most of the fires were understory rather than canopy fires. Even though the canopy looks green where fire has gone through as an understory fire there is still significant impact on smaller trees (and loss of some huge ones). There was much discussion on line about the likelihood of species becoming extinct as a result of the fire. Deborah Perry wrote: 'Large fires have occurred before in the history of this land. I don't think plants will become extinct, but I do think it will*

take decades to repopulate again. That is if the drought breaks and we get 'normal' rainy seasons again.'

Hugh's response: *'Large fires have occurred in the past but we have fragmented the landscape to such an extent with agriculture that connectivity is missing so recolonisation is unlikely. As for 'normal' wet season only time will tell.'* On 20 December Hugh noted: *'It is interesting to watch how the recovery of our burned forests progresses.'*



Crab Apple sprouting from the base
Photo Hugh Nicholson

Hugh and Nan have walked in Terania Basin several times since the fires; initially to check on 'smokers' (logs still smouldering) and more recently after the rains, to see what has burned and to look for signs of recovery. Hugh says:

'While it is true that our original post on November 14th implied that all the rainforest of Terania had burned, this is not the case. Large sections are unburned. It appears that the eucalypt areas toward the ridges have been severely burned and the fire has crept through the ecotone where eucalypt and Brush Box mix with the rainforest. Certainly there have been hot spots in this where dry



Fire in Terania Creek Rainforest taken from the verandah of the house where Laurie and Irma Chelsworth, founding members of our Gardens, used live. They would have been horrified! Photo Scott McCaskill

palm fronds have flared and, more damagingly, where leaf accumulation has caused the fire to linger in the buttressed base of large trees. This slow burn has led to the death of many of the huge old-growth trees – robbing the hollow-dependent birds and animals of their homes. It will take hundreds of years to replace this loss.

*Further afield in Nightcap National Park, the already Endangered (NSW) and Critically Endangered (Commonwealth) Nightcap Oak, *Eidothea hardeniana*, has been seriously impacted by the fires. This ancient ancestor Proteaceae – think *Grevilleas*, *Macadamias*, etc. – is botanically as important as the Wollemi Pine yet had none of the protection given to the Wollemi Pine: fire-crews helicoptered in and sprinkler systems established'.*

A report in the Northern Rivers Echo from the Rural Fire Service on 22 January indicated that some recent heavy rain had extinguished the last of the fires in the Mt Nardi fireground. A second heavy fall a week later had helped to rejuvenate the landscape. It is greening up again. However, only time will tell just how the rainforest will recover. Collated by Marie Matthews from Terania Rainforest Facebook page with added information from Hugh and Nan Nicholson.

[See Postscript page 11]

Can ecosystems recover from recent intense fires?

Extracted from article in 'The Conversation' published 17 January 2020

Many plants from fire-prone ecosystems have evolved strategies to survive, and even thrive, with fire. Some resprout, with green shoots bursting from blackened stems. For others, fire stimulates flowering or seed germination.



Photo: Science.edu.anu

We can capitalise on this natural recovery by not disturbing the soil where the seeds are scattered, not clearing 'dead' plants which may resprout and provide shelter for remaining wildlife, including perches for birds who may bring in seeds.

Many plants and ecosystems, including **alpine and rainforest species, are not resilient to fire**, especially if drought persists or they have been burnt too frequently. Fires which are intense and severe can kill them outright, or the plants damaged will be very slow to recover – taking many years to reach maturity again.

We need comprehensive monitoring to detect which species are not returning, with systematic field surveys starting immediately, and continuing after the first rains to identify which species emerge from the soil.

And **when ecosystems aren't able to repair themselves, it's up to us to intervene**. Land managers, supported by volunteer community groups, could sow seeds or plant seedlings in fire-affected areas. Restoring

ecosystems can be a healing process for those affected by the fires.

But for that to happen, **we need enough seeds to supply restoration efforts**. With millions of hectares already burnt, few areas may be left for seed collection. This means unburnt areas are at risk of over-collection from commercial and volunteer seed collectors.

How to better prepare next time?

It is important that land managers are prepared. They need data on the distribution of species and the fire frequency, severity and season that they can tolerate. A nationwide database could identify which species and ecosystems are most at risk, and could be incorporated into fire and restoration planning – including seed collecting – to ensure plant material is available if species fail to recover.

Botanic Gardens have a special role to play as many already have conservation seed banks of threatened species, and their living collections provide additional genetic material. Across Australia there is already a network of seed banks collaborating through the Australian Seed Bank Partnership that collect, store and undertake research to better support plant conservation.

However, **we need more ongoing investment in seed banks, and investment in skilled staff** to run them. As well as national guidelines for seed use and training programs for staff and volunteers.

Authors [Lucy Commande](#), Adjunct Lecturer, University of Western Australia & [Heidi Zimmer](#), Research associate, SCU
<https://theconversation.com/yes-native-plants-can-flourish-after-bushfire-but-theres-only-so-much-hardship-they-can-take-129748?fbclid=IwAR1bCuh-B7a9rD0pi1Z0u0rudO44Qk-CFqJpjEw1Qemh82JfppkHJTrLSrw>

Firefighters helped save Wollemi Pines from Gospers Mountain fire

Firefighters have saved the only known natural stand of Wollemi pines, so-called "dinosaur trees" that fossil records show existed up to 200m years ago, from the bushfires that have devastated New South Wales.

The state's environment minister, Matt Kean, said a specially deployed team of remote area firefighters helped save the critically endangered trees from the giant Gospers Mountain fire.

The pines are in an undisclosed sandstone grove in the Blue Mountains, about 200km north-west of Sydney. They were thought extinct until discovered 26 years ago.



Wollemi Pine *Wollemia nobilis*

Family *Araucariaceae*

Photo from [sbs.com.au](#)

He said the operation by the NSW National Parks and Wildlife Service and NSW Rural Fire Service included air tankers dropping fire retardant and specialist firefighters being winched in by helicopter to set up an irrigation system in the gorge. As the fire approached, helicopters water bucketed the fire edge to reduce its impact on the groves of trees. A scientific assessment found that while some of the trees were charred the species would survive in the wild. Kean said the government would continue to keep the precise location of the trees secret to ensure their long-term protection.

Extracted from article by Adam Morton, *The Guardian Environment* editor. Published online Wed 15 Jan 2020

<https://www.theguardian.com/australia-news/2020/jan/15/dinosaur-trees-firefighters-save-endangered-wollemi-pines-from-nsw-bushfires>

Vision of Lismore Rainforest Botanic Gardens

- To engender and facilitate scientific research into rainforest species
- To develop an understanding of rainforest eco-systems
- To contribute to the conservation of Australian rainforest species
- To provide opportunities for reflective appreciation of rainforests.
- To illustrate the history of human interaction with rainforests

Decomposers and transporters of nutrients

Soil bacteria and soil fungi are the start of the soil food web that supports other soil organisms and the functions of a healthy soil. Diverse populations of soil bacteria and fungi can suppress root diseases and they are both encouraged by ground cover and organic matter.

SOIL BACTERIA populations change rapidly depending on moisture, time of year, type of crop, stubble management, etc. Bacteria are the most abundant microbes in the soil. They are single celled organisms, and there can be billions of bacteria in a single gram of soil. Populations can boom or bust in the space of a few days in response to changes in soil moisture, soil temperature or carbon substrate. Some bacteria species are very fragile and may be killed by slight changes in the soil environment. Others are extremely tough, able to withstand severe heat, cold or drying. Some bacteria are dependent on specific plant species.

SOIL FUNGI are slower to develop, and are strongly set back by cultivation. They are microscopic plant-like cells that can be single celled (e.g. yeast) or grow in long threadlike structures or hyphae that make a mass called mycelium. They can be symbiotic with plant roots. Fungi are generally not as dependent on specific plant species as some bacteria, and populations are slower to develop.

Fungi are the great decomposers and recyclers of nature. When a tree grows, nutrients such as nitrogen and phosphorus accumulate. After the tree dies, it must decompose before these nutrients become available for other plants, and fungi helps with this process.

Fungi have another important role as they **are able to degrade lignin** - the material that gives wood its strength. It is the most durable component of wood. Lignin is a three-dimensional polymer, which is difficult to dismantle. Specific fungi (e.g. bracket fungi) are designed to do this job, and once they have started, other fungi will follow.

By breaking down organic material so plants can re-use the nutrients, **fungi help rainforests to grow on very poor soil** making fungi ecologically vital to rainforest communities.

Just about every square centimetre of rainforest soil has fungi filaments. Fungi hair-like filaments invade dead



*Fungi in our Gardens late January after rain.... from above
..... and from below*

Photos Marie Matthews & Ros Little



plant matter, and are sometimes parasitic on tree roots.

All fungi contribute to the welfare of the forest, no matter how big or small they are. They transfer nutrients via a structure called a mycorrhiza. The fungal threads form a sheath around the root before penetrating between the root cells. The fungi receive vitamins, simple proteins and sugars from the tree in exchange.

Adapted from info sheets from <http://rainforest-australia.com/fungi.html>
<http://www.soilquality.org.au/factsheets/soil-bacteria-and-fungi-nsw>

Year of the micro-organism

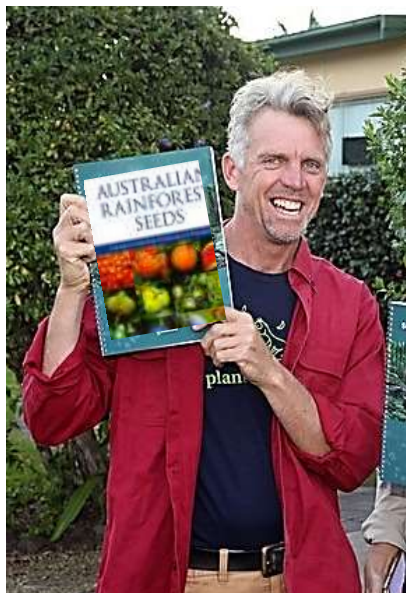
Rick Shepherd, head gardener at the National Trust Garden, Retford Park in Bowral, is making 2020 the year of the micro-organism. He has been reading Charles Massey's *'Call of the Warbler'* and thinking about conversations he has had with fungi expert Alison Pouliot [author of book *'The Allure of Fungi'*]. As a result, his 2020 plan is to increase the diversity and health of mycorrhizae in the soil at Retford.

One of Pouliot's recommendations is for mulch [to be] in diverse sizes to suit a range of micro-organisms. 'My first idea was to throw our branch prunings back under the trees,' he said, 'but people have certain expectations of what a National Trust Garden should look like, and mess under the trees doesn't fit. So I have been thinking about more aesthetically pleasing approaches.'

The solution he has hit on is to collect the most interesting twisted and lichen-crusting branches from the prunings, trim them into regular lengths and use them as 'necklaces around the trees' - neat enough for visitors, messy enough for life!

From article 'From little things, sprig things grow', published National Times Sunday 5 January 2020

Mark Dunphy and the Gardens



Mark Dunphy is a local rainforest regenerator and plant propagator. When Lismore Rainforest Botanic Gardens were first established in 2002, it was decided to do our initial planting along the entrance driveway. Most of us were not familiar with a wide range of our local rainforest species and it was suggested that we contact Mark Dunphy at his Firewheel Rainforest Nursery... then at Rosebank.

Mark was happy to put together a selection of species that occur in this area. We had made a decision to

plant rainforest species that occur within 200kms of Lismore but that first selection was mostly species growing very close to Lismore like *Grevillea robusta* Silky Oak, *Ficus coronata* Creek Sandpaper Fig, *Mallotus discolor* White Kamala and *Macadamia tetraphylla* Bush Nut.

Every year we do an audit of our collection in order to replace dead species and seek other species for new gardens that now cover most of the site. Our initial order each year is to Firewheel Nursery and Mark is always on hand with advice and perhaps a suggestion about some of the new species in the nursery. He has been a great support to us here at the Gardens right through our almost 20 years.

Mark is a co-author of the recently released book 'Australian Rainforest Seeds' and as the subject matter is based on 30 years of research into rainforest trees in northern New South Wales we are looking forward to seeing it. The book is being launched at Eltham Pub on 20 February from 5.30pm

Pat Offord, FLRBG Curator



Don, Michael and John putting in foundations of a small walkway over a boggy area in Room 5 early this month

Changes for RSBG

Jimmy Turner - Chief Horticultural Manager at Royal Sydney Botanic Gardens believes that we have to make choices about what to save and what to let go of in the changing climatic conditions.

'Nature is telling us something. I intend to listen and change accordingly.'

At Mt Tomah Botanic Gardens, one-quarter of its main garden's 28 hectares were affected by bushfire. Fires also damaged its 186-hectare conservation area.

Many areas of the Sydney gardens were not irrigated, relying on rainfall. Mr Turner said the Gardens had been working with Sydney Water to measure every drop, and improve efficiency any way it could. He is developing a \$20 million plan to install a desalination plant - using the water from the Harbour at its edge - and a modern irrigation system to replace the antiquated system. It will take a few years to develop and fund.

Mr Turner is assessing what plants to water and save, and what to sacrifice at the three botanic gardens including Sydney, Mt Annan and Mt Tomah, and at Centennial Park and the Domain.

'Ornamental gardens like roses, grown for more than 100 years in Centennial Park's "rosarium", may be jettisoned. They contribute to the garden's amenity, but they weren't rare,' he said.

Extracted from SMH article interview with Jimmy Turner by Julie Power January 3, 2020
<https://www.smh.com.au/national/nsw/sydney-s-botanic-garden-works-out-what-to-save-and-what-to-let-go-20200102-p530ex.html>



Ros watering downstream of the Fern Gully bridge. Those on the watering roster spent many hours watering over the last several months – it was at times exhausting but still very rewarding!

"As I speak, south-east Australia is on fire. Why? Because the temperatures of the Earth are increasing. We have been putting things off year after year. We've been raising targets, saying 'oh well, if we do it in the next 20 years ...' the moment of crisis has come." **David Attenborough**
www.theguardian.com/tv-and-radio/2020/jan/17/david-attenborough/

A Frog Hotel at the Gardens



We hope this will provide a good habitat for the frogs.

We positioned the tub near the pond in the Sensory Garden where there should be plenty of frogs. When they find it, it should be interesting for children and adults alike to observe and recognise the many different frog species that are in the area.

We are hoping to install a frog identification sign, with sounds, on the adjacent viewing platform... when funds allow... to further encourage kids and their adults to learn to about these interesting amphibians.

Ros Little

A frog hotel is just a number of pipes placed together, vertically, in a boggy or damp place to allow frogs to take shelter... and tall enough to keep out cane toads. The toads do not have suction pads on their feet and so cannot climb!

We have seen several ways of doing this but our version is to place the pipes in a large tub – ours is 80cm x 50cm. We first painted our pipes to help them blend in with their surroundings! We then filled the tub with a gravelly potting mix and filled it with water.

Around the pipes we have planted water loving plants including:

Alisma plantago-aquatica Water Plantain

Philydrum lanuginosum Woolly Frogmouth

Persicaria decipiens Slender Knot Weed

Marchantia sp. Liverwort

One of the Green Tree Frogs that lives in the Gardens – not in the Frog Hotel but in a water feeder we have for the native bees. The white disk behind its head is a little foam disk which floats in the water to give the bees a place of refuge if they accidentally fall. We haven't actually seen the frog eat any bees but suspect that he might very well do so!



Marchantiophyta?



A Palm Tree on a tropical island?



No! Rather the fruiting bodies of Liverwort sp. in a container at the Gardens



Close up of "Palm Tree" with pair of spore producing capsules - sporophytes - visible under 'leaves of the palm'.

Liverworts are very primitive non-vascular plants. The word wort means 'small plant' and the 'liver' refers to the shape of some species and early herbalists thought they were a remedy for liver problems. They are found virtually all over the world – always in damp, but not salty, places - and there are around 9000 species which have been identified. They always grow flat to the ground or other surface. They do not have roots and instead have rhizoids which are small hairless fixtures which they use to attach to the surface on which they grow. They do not reproduce using seeds or fruit but have spores, like mosses and fungi. They do not have stoma but can still photosynthesise.

Reference: ANBG Fact sheet

www.anbg.gov.au/bryophyte/what-is-liverwort.html

... and Jan de Nardi

Guided Walks held on the last Sunday of every month at 9.30am

23 February - History of the Gardens with walk through with Phil Jarman

29 March - Useful Plants Garden with Ken Wilson

Watch our Web Site and Facebook page for details of walks later in year.

Tree planting in drought conditions

Ten months ago my farmer daughter, by her own admission “no gardener” announced that the fifty young trees we had bought at Burringbar were going to be buried on the fenceline, unstaked and, after the initial planting, unwatered, apart from any rain we might have.

The trees were **allowed to grow in their pots until just under a metre** from the soil surface. They were planted in 1 metre deep holes previously filled with water and allowed to drain. The excavated soil was returned unenriched by fertiliser or compost and tamped down to form a shallow saucer round the plant which then received a final deep watering. Immediately after planting the soil was lightly dressed with compost and covered with Weedgunnel matting and a deep mulch of wood chips. Native ground covers were shallow planted between the trees.

I, a seasoned gardener with over a thousand successful tree plantings to my credit in Europe, was aghast, but kept quiet and stood by, watching as the poor things were buried to within 8 inches of their tips.

That was last April. Today I marvel that those little tips are now healthy metre tall plants which have not only



Acacia species 10 months after being deep stem planted

survived but weathered the current drought with aplomb.

In view of the fact that long dry periods are likely to become our new norm, it may be useful to record the progress of this “**long stem planting**”

method which was first devised by environmentalist Bill Hicks in 1986 and more recently promoted by Angus Stewart in his book “Creating an Australian Garden” and on ABC TV Gardening Show. .

When exotic willow trees were planted to stabilize eroding river banks in the Hunter Valley of NSW Bill wondered why Australian native trees and shrubs had not been used, particularly those endemic to the region. The authorities assured him that they could not match the ability of willows to anchor the sandy soil, but he believed that this might not be the case and, in his retirement, developed a technique which enabled him eventually to produce over 25,000 native trees for the Hunter River Planting Programme.

The original arguments against it included the assertions that:

The crowns would rot below the soil surface

The root system, deeply buried in the subsoil, would rot out

A plant with an elongated stem suitable for deep planting would have a pot bound, dysfunctional root system to begin with.

Undeterred by the conventional wisdom, Bill went ahead anyway and planted various varieties of native shrubs and trees up to a metre deep. Not only did the plants survive- they rapidly overtook specimens of the same species planted alongside them using conventional techniques. He found that the method was not plant or soil selective so would work across a variety of climates and solve a variety of vegetal issues. It is not,



The photo shows that the self styled ‘no gardener’ educated me in deep stem planting ... in spades!!!!

however, suitable for many non woody plants including grasses and grass like plants.

To quote Angus Stewart, **Reasons for adopting long stem planting include:**

*Only a single watering is required
As the plant establishes, adventitious roots are established all the way along the stem*

Once this happens, the plant is able to grow much more quickly

The tree or shrub will have a much stronger, better formed root system. This makes for a more stable plant that is less likely to blow over in the wind as the top increases in size and ensures that several years on you will not have unexpected gaps in your planting scheme

The technique has proved to be successful in a wide range of soil types over a fifteen year period **An augur or scissor shovel is needed** to dig the metre deep holes and you must realise that you will lose some height in the plant as you are burying most of the top growth. However, experience has shown that whilst you may sacrifice an instant effect, you will benefit much more in the long term.

Tree Species included in this planting

Leptospermum, Callistemon
Grevillea, Backhousia
Eucalyptus, Banksia,
Acacia, Angophera, Melaleuca,
and Hakea

Diana Sharpe, Rous

Christmas Plants in Australia Geoff Walker



I write this as a rebel - against the Christmas symbols from Northern Europe. The green holly and its red berries with perhaps a background of snow is all very well but I think that we can do better with our own flora. Here in our Lismore Botanic Gardens there are several excellent young trees and shrubs in flower or fruit that we should use as subjects for our Christmas art.

The **Brown Kurrajong** *Commersonia bartramia* is a small tree with pagoda-like branches laden with white blossoms. From a distance it seems to be snow-laden. I can understand why the early migrants from Europe termed it their Christmas Tree.

The **Flame Tree** *Brachychiton acerifolius* is well known for its impressive red bell shaped blossoms

are very photogenic and the tree does very well in this area. Even the **Lacebark Tree** *Brachychiton discolor* merits recognition in December with its large showy pink blossoms.

The **Native Tamarind** *Diploglottis cambellii* has showy red arils (seed covers) in mid summer. It would be an excellent berry type image for Christmas cards.

The **NSW Christmas Bush** *Ceratopetalum gummiferum* is the most popular of our native species at and has been incorporated into our culture. It produces colourful pink/red sepals at Christmas time. From this plant have been bred several cultivars.

The **Christmas Bell** *Blandifordia grandiflora* grows on the heath at Evans Head and also had been incorporated into our Summer culture. It is of several colours including the traditional yellow with red tips. This bell and the Christmas Bush flourish in a sandier soil along the coastal fringe of NSW. This year of droughts and fires seems to have induced a more noticeable



Geoff at work in the Nursery having just cleaned and stacked all the empty pots.
Photo Jillian Levingston

flowering of these shrubs and trees in the Gardens. A bonus for our native bees and a reward for our volunteers who have put so much time and effort into keeping these plants alive and healthy... looking beautiful... during this difficult Spring/Summer season.

References, *Mangroves to Mountains* Leiper, Glazebrook, Cox & Rathie. *Australian Rainforest Plants Series* by H and N Nicholson.

A consequence of loss of rainforest plants

Every day, some 80,000 acres of rainforests are cleared, and another equivalent amount degraded. Unknown numbers of species undergo extinction or are threatened with extinction. Mostly all of these losses occur without human knowledge, but there are some examples on record. Here is one story.

The U.S. National Cancer Institute funded a 1987 plant collection expedition on the island of Borneo in the Malaysian State of Sarawak. Among the samples obtained were those from the tree *Calophyllum lanigerum* var *austrocoriaceum*, an incredibly rare species. When extracts of this plant were discovered to show good antiviral activity toward the AIDS causing human immunodeficiency virus (HIV), researchers returned to the site of the original collection to find that **the tree was gone**, cut down for firewood or building purposes. No more *C. lanigerum* could be located. However, a subsequent intense search finally led to additional samples of *C. lanigerum* in the Singapore Botanic Garden. Over a century ago, the British had planted several collected specimens. Calanolide A, a complex natural product, is obtained from the bark and latex of *Calophyllum lanigerum* var *austrocoriaceum*, and it is now undergoing clinical trials for the treatment of HIV infection. Medical research narrowly escaped a major scientific loss.

How many undocumented losses have occurred?

Author: Paul F. Torrence Emeritus Professor of Chemistry and Biochemistry at Northern Arizona University. article © 2012
<https://www.rainforesttrust.org/owed-to-nature-medicines-from-tropical-forests/>

Postscript re RF fire damage

In a recent communication from Dailan Pugh of North East Forest Alliance (NEFA) he writes, "... vast swathes of rainforest have been burnt. My preliminary estimate is 80,000 ha burnt. I am currently mapping burnt rainforest in the Gondwana Rainforests of Australia, and have found that aside from Nightcap, other rainforests - Mt. Nothofagus, the eastern fall of Washpool and the Oxley Wild Rivers country - have been very badly affected, particularly the smaller stands. Some have had all their canopy affected, many partially affected, and large areas had understorey fires with most understorey burnt and some trees." We have not yet heard in detail about rainforests in southern NSW but the forests where we took many of the photographs used in our Rainforest Key have been mentioned repeatedly in the ABC fire reports. I have grave fears for these southern, temperate rainforests.
Hugh Nicholson – Terania Rainforest Facebook Page 31 January 2020

AUSTRALIAN RAINFOREST SEEDS

A Guide to Collecting, Processing and Propagation



By Mark Dunphy, Steve McAlpin, Paul Nelson and Michelle Chapman, with photographs by Hugh Nicholson

This long-awaited guide to rainforest seed propagation unlocks the secrets of growing 300 rainforest species.

Australian Rainforest Seeds provides detailed information on how to sustainably collect, process and germinate seeds and aims to support the growing movement for rainforest restoration.

With details from 30 years of research and nursery experience in Northern New South Wales, the authors expect users will find even difficult species delightfully easy to grow.

The fruits or seeds of each plant are beautifully illustrated with photographs by Hugh Nicholson.

Books can be ordered from Mark Dunphy info@firewheelnursery.com.au; or Hugh & Nan Nicholson <http://rainforestpublishing.com.au>

Acknowledgments

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A special LRBG branding iron with which we can clearly label our bee boxes and other equipment at the Gardens.



Capparis arborea Caper Bush flowering in the Useful Plants Garden in the middle of that very hot fiery weather



Mallotus philippensis Red Kamala producing its beautiful red seed pods

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