CALEYI

Australian Plants SOCIETY NSW


pic Andre Porteners

NORTHERN BEACHES GROUP
December 2017

President
Dr Conny Harris (02) 9451 3231
Vice-President
David Drage (02) 9949 5179
Joint Secretaries
Julia Tomkinson (02) 9949 5179
Penny Hunstead (02) 9999 1847
Treasurer
Lindy Monson (02) 9953 7498
Regional Delegate
Harry Loots (02) 9953 7498
Librarian
Jennifer McLean (02) 9970 6528
Talks Co-ordinator
Estelle Burrows (02) 9451 7404
Walks Co-ordinator
Penny Hunstead (02) 9999 1847
Catering Officer
Georgine Jakobi (02) 9981 7471
Editor
Jane March 0407 220 380

Next Meeting: **7.15 pm Thursday February 1, 2018** at Stony Range Botanic Garden, Dee Why.
Supper: **Georgine & Jane**

Coming Up:
There will be no walk or garden visit in December. **The APS Northern Beaches Christmas lunch** on **Saturday, 16th December** will be our social occasion. The lunch venue is Stony Range, outdoors - if weather is fine and indoors - if wet. **Starting at 12.30 p.m.** Gift giving is a **Kris Kringle** with a **cost limit of $10.**

From the Editor
May I thank members for their contributions of reports, and photographs during 2017. Special mention goes to David & Julia, Conny, Penny & Richard, Russell and Harry. All of whom were ever willing to supply great observations with accurate plant id and relevant images. Georgine also provided some valuable photographs from our walks. Please continue to send me interesting reports or photographs that the members would enjoy. Many thanks to anyone else that I have overlooked. Have a wonderful festive season. Jane. email: march@ozemail.com.au

APS NSW QUARTERLY GATHERING, NOVEMBER 2017.

John Arney

On November 18, our last quarterly gathering for the year was held at the 123ha Ku-ring-gai Wildflower Garden, with members of the North Shore Group our genial hosts. Around 70 members were present for the gathering.


Sue, Bob & Wendy ready to lead the walk. pic: Ed

After registration, the day began with a 1km guided walk, starting at our venue, Caley's Pavilion, and taking us along part of the Smith Track then a link to the Bentham Track, the Fern House, then return to the pavilion via the boardwalk on the Banks Track and Pond.


Smith's track. pic: John Arney.

This extensive Garden has several tracks named after esteemed early botanists and our path took us through a variety of vegetation communities, with both familiar, and some not-so-familiar species to challenge our grey-

matter. The photographers amongst the group were not disappointed, with the overcast sky providing ideal conditions for snaps of the flowers that were on display.


Hibbertia. pic: John Arney.

At the pond we were treated to an interesting sight, with a two mature Red-bellied Black snakes foraging in the dry pond bed, neither appearing to show any concern for the 30-odd people who were watching on from just a few metres away. Upon return to the pavilion there was also a wide selection of plants for sale.


Snakes. pic: John Arney.

After lunch we were formally welcomed by NSW president, John Aitken, who also gave the Acknowledgement of Country of the local Guringai People. Barry Lees, President of North Shore, also welcomed the visitors on behalf of his Group and gave an overview on the history of the Garden. A north-coast *Helmholtzia glaberrima* (Stream Lily) cut flower, which had been grown locally, was on display and this was also discussed.

The guest speaker for the day was Bronwen Roy, a PhD student, from Western Sydney University, who is studying bee pathogens with particular emphasis on viruses. Bronwen's talk was timely as we have just seen the close of Australian Pollinator Week, and the continuation of Pollination, now on display at the Calyx, at the Royal Botanic Garden, Sydney, until late July 2018.

Bronwen gave some interesting statistics on bees and the absolute pivotal role that they play in the worlds food production. Australia is seemingly the last temperate continent that is free from the Varroa destructor mite, a parasite originating from the Asian honey-bee, but which has now spread to infect honey-bee colonies worldwide. Additionally, in recent years, we have been alerted to a decline in bee populations in America where the recent Colony Collapse Disorder (CCD) being responsible for a significant losses in that country. CCD is currently thought to be due to the use of specific pesticides.

Whilst remaining optimistic, Bronwen is alert to the probable introduction of the Varroa mite into Australia and the possible impacts of the mite and the pathogens that it will bring with it, not only on the European bees, but also the currently known approximate 2000 species of native bees that we have in this country. Bronwen then spoke on the type of viruses that predominantly infect bees as being non-enveloped, RNA types that have the ability, amongst others, to mutate and possibly result in a catastrophic decline in bee populations.

Another interesting fact, despite their high importance in the food chain, there has been a relatively small amount of either qualitative or quantitative research being undertaken on bees in Australia, and that this continues to be the situation today. The talk finished with questions from the audience, and we found Bronwen to be a most informative and entertaining speaker. You are encouraged to look-up "Three Minute Thesis Bronwen Roy" (Youtube).

The day concluded with a splendid afternoon tea and our many thanks go to the North Shore Group for their fine efforts.

Further reading can be had by searching the internet for all the words:— Permaculture Northern Beaches, Beeinformed (USA)

The Old Crock's Walk at the North Shore Quarterly.

David Drage

The guided walk at the Quarterly Meeting hosted by North Shore Group (NSG) on Saturday 18th November, started off well in fine, not too hot weather. Ku-ring-gai Wildflower Garden was, of course, very dry having received little or no rain for some time. However, there are always interesting things to see at any time in the bush.

First off there was an *Angophora hispida* in flower by the track and, a bit


Angophera hisbida.pic: David Drage

further on, there were two *Blandfordia nobilis* plants also in flower. The latter were a special treat as Christmas Bells are not often seen in Sydney these days.


Blandfordia nobilis.pic: David Drage

At this point a small number of us split off from the main group and took a different route. This was not just to be contrary but because two of us with reduced mobility didn't fancy the steep rocky section of the walk. Wendy Grimm (NSG) was with us and she very kindly guided Julia, Jane and me on an easier route. This gave us the opportunity to chat with Wendy about things plant and political which rarely happens in spite of our respective groups being close together. For the rest of the main walk and the Quarterly see John Arney's excellent report.

There were two orchid highlights on the alternative walk, as well as undeterred flowering of *Hibbertias, Scaevolas* and *Patersonias* etc. We walked on a zig-zag path down a slope to a lookout and saw many *Dipodium punctatum* flower stems protruding from the ground but not ready to open up yet. Wendy had seen one plant fully in flower at 5:00 pm the previous evening but when we got there something - probably a wallaby - had gobbled it up. Fortunately we did find another two stems with open flowers nearby, so we were not totally disappointed.


Dipodium punctatum pic: Ed


Kunzea capitata pic: David Drage.

The other notable orchid species we could not see as it doesn't appear above ground until December. This was *Genoplesium baueri,* which Wendy had discovered growing in the Ku-ring-gai Wildflower Garden and has been monitoring for some years. We walked by the information


Inspecting the plaque pic: Ed

plaque which tells the story of this species and Wendy's work on it. After all this enjoyment we headed back to the gathering point and lunch. On the way back we had to brush off the attentions of a brush turkey which had taken a great liking to Jane!

BRIAN ROACH PLANT SALE & OPEN GARDEN

SUNDAY 10 DECEMBER, 2017 9.30am to 4.30pm
47 Eucalyptus Dr., Westleigh 2120

Not a great time for an open garden, especially with things so dry at present but there'll be a wide range of native plants for sale in tumblers at $4.50 each or 5 for $20 along with plants in 6"/140mm pots for $8 each or 4 for $30. Perhaps of particular interest will be the availability of our special plant, the dwarf form of the NSW Christmas Bush, Ceratopetalum Johanna's Christmas. They're in 140mm/6"pots at $15 each.

I'll also have quite a few of my Grevillea Spider Mist in tumblers for sale. Another plant to be available will be the stunning Homoranthus prolixus 'Golditops'.

0418115630 – bcroach@optusnet.com.au

GIANT WOMBATLIKE CREATURES MIGRATED ACROSS AUSTRALIA 300,000 YEARS AGO

Sciencemag.org. September 26, 2017 Sid Perkins

About 300,000 years ago, herds of rhino-sized creatures migrated across the floodplains of east-central Australia, mimicking the treks that zebras and antelopes make across Africa's Serengeti today. But these migrants weren't majestic, long-limbed grazers. Instead they were car-sized relatives of today's short and stocky wombat. Evoked by a new analysis of a fossil tooth of the long-extinct animal, called Diprotodon, the scenario would be the only known seasonal mass migration among marsupials and their close kin.

The team's findings are "pretty convincing to me," says Anthony Stuart, a vertebrate paleontologist at Durham University in the United Kingdom. "For the first time, someone has demonstrated that Diprotodon migrated seasonally." Similar analyses of fossils of other members of the same ancient ecosystem may reveal that multiple species participated in the ancient migrations, scientists say.

Like many parts of the world during the most recent ice ages (the last of which ended about 12,000 years ago), Australia had its share of weird giant animals, including a supersized relative of the Komodo dragon, today's largest land lizard. But most of the continent's so-called megafauna were marsupials. The largest was Diprotodon, 1.8 meters tall, nearly 3000 kilograms in weight, and named for its dentition—roughly translated from Greek, Diprotodon means "two forward teeth." That pair of teeth, like the incisors of modern-day rabbits, never stopped growing, says Gilbert Price, a vertebrate paleontologist at the University of Queensland in Brisbane, Australia. As they grew, they incorporated trace elements dissolved in the water that the creature drank, as well as carbon, oxygen, and other elements from the food it ate. Because the isotopic makeup of those elements varies from place to place, Diprotodon's steadily growing teeth became, in essence, a chronicle of its movements, in layers akin to tree rings.

"You've heard of the old saying 'You are what you eat?'" Price asks. "As it turns out, you are where you eat, too."


A fossil tooth of the large marsupial Diprotodon. Price et al., Proceedings of the Royal Society B (2017)

He and his colleagues took dozens of small samples from a 30-centimeter-long Diprotodon incisor. Using radioactive dating techniques, the team found that the creature lived about 300,000 years ago. Samples drilled from evenly spaced sites along the tooth also revealed cyclic variations in isotope ratios, including strontium, carbon, and oxygen, suggesting that this animal migrated about 200 kilometers each year, Price and his colleagues report today in the Proceedings of the Royal Society B. As a comparison, annual mass migrations of animals across the Serengeti plains of Africa cover about 800 kilometers.

The regular variation in isotope ratios suggests that rather than wandering at random from site to site, Diprotodon made the same round trip each year, following seasonal shifts in vegetation and rainfall. It's the first time any marsupial living or extinct has been shown to migrate regularly, the team notes.

Modern-day marsupials such as red kangaroos do roam to find ephemeral food sources, says Stephen Wroe, a paleo-ecologist at the University of New England in Armidale, Australia. But those rovings are random, not regular, as Price and his colleagues propose is the case for Diprotodon. "That's what makes this team's results so interesting, and it suggests that the climate in the region at the time was more predictable than it is now," Wroe says.

The new analysis "is an elegant example of how to use the geochemistry of a fossil to infer the behavior and movement of an ancient creature," says Henry Fricke, an isotope geochemist at Colorado College in Colorado Springs. "Where an animal died doesn't necessarily tell you where it spent its time while alive."

JOSEPH BANKS: BOTANICAL WORK ON COOK'S VOYAGE FINALLY MAKES IT TO PRINT

The Guardian.com November 21, 2017 Michael Slezak

Life-size prints of hundreds of plant specimens collected by the British naturalist come together in Florilegium

One of the images from Banks's Florilegium: Pereskia Grandifolia (rose cactus, Cactaceae). Photograph: Courtesy of Thames & Hudson

The publishing deadline was missed by more than 200 years, but finally the work of one of the great men of the Enlightenment has been printed and distributed, sharing with the world the detailed botanical work of Joseph Banks on his journey aboard James Cook's Endeavour.

Cook's mission when he left England in 1768 was ostensibly to chart the transit of Venus – a measurement that would allow the estimation of the distance from the Earth to the sun, which would aid navigation. However, Cook had been instructed to attempt the "discovery of the southern continent so often mentioned".

Banks first stepped on the land of the Dharawal people – a place the invaders called Botany Bay – in 1770, in the midst of his mission to describe the natural history of the lands encountered on the voyage and to amass the largest collection of plants previously unknown to European science.

Stogmaphyllon Ciliatum (orchid vine, Malpighiaceae).Photo: Courtesy Thames & Hudson

As was the case with many Enlightenment scientists, Banks was a wealthy member of the English upper class. He paid his own way on the ship, as well that of his eight staff and colleagues. Over a period of about two years, Banks completed a journal 200,000-words long and collected 30,000 plant specimens, about half of which were new to science.

But key to the scientific work was the recording of the specimens, which at the time required paintings, drawings and etchings – work undertaken by Sydney Parkinson, a young Scottish artist who was part of Banks's team.

Before Parkinson died at just 25 on the ship's return via South Africa, he had completed 269 plant watercolours and had 673 unfinished sketches.

When Banks returned, he is thought to have put aside £10,000 to publish 14 volumes. In them would be 942 plant illustrations – of which 753 were eventually engraved for printing. But the project was never finished, thanks to the deaths of some of the key authors, and Banks's financial losses following the American War of Independence.

Eventually, about 23 decades later, 100 sets of prints were finished in 1990 – one set sold for more than £22,000 in 2008.

Now, ahead of the 250th anniversary of Cook's voyage next year, those of more modest means can enjoy the finished product of Banks's studies, with publisher Thames and Hudson's release of the book "Joseph Banks Florilegium: Botanical Treasures from Cooks First Voyage.

In the book, 147 of the prints have been delightfully reproduced, and are accompanied by the prose of the former executive director of the NSW Royal Botanical Gardens and Domain Trust, David Mabberley.

Bouganivillea Spectabilis (Nyctaginacea). Photograph: Courtesy of Thames & Hudson

His commentary is written as captions to each plate, but as he explains in his introduction, the captions also produce a continuous narrative, carrying the reader through the selection of glorious life-size prints.

As Mel Gooding explains in the book, Banks' Florilegium was intended primarily as a contribution to science – "the initiation of Australasian botany". But to the modern reader, it is more a work of art.

It is "a work of outstanding graphic achievement and a radiant revelation of natural beauty in its infinite variety and particularity," Gooding writes.

WHY ARE FERN LEAVES SHAPED THE WAY THEY ARE, AND ARE ALL FERNS IDENTICAL?

The Conversation.com November 22, 2017 Gregory Moore Doctor of Botany, University of Melbourne

Ferns are a very old group of plants that came along more than 200 million years before the dinosaurs walked the Earth. They were food for the plant-eating dinosaurs and they're really great survivors.

Fern leaves are shaped the way they are because each species has adapted or changed over time to better suit its particular environment. That's all thanks to evolution. Some ferns are small and grow on other plants in wet places, while others are tall and tough. There are thousands of types of ferns, which grow in different environments all over the world.

The leaves of ferns are called fronds and they all have different sizes, shapes and textures. There are the tiny, soft fronds of maidenhair ferns

The soft fronds of maidenhair ferns are suited to wet environments. Flickr/Anika Malone, CC BY

Then there are the tough, leathery fronds of bracken and the large fronds of tree ferns that may be more than 2 metres long.

The fronds of many ferns begin as small, curled balls. As they grow, they change shape and start to look like the neck of a violin. That's why they're called fiddleheads.

The fronds of many ferns begin as small, curled balls. As they grow, they change shape and start to look like the neck of a violin. Marcella Cheng/ The Conversation, CC BY-ND

Many people think different tree ferns look the same, but if you look closely the various species are very different in size, shape and texture.

If they don't have flowers does that mean all ferns are identical?

Since ferns are such an old group of plants, they don't have flowers or cones. Ferns were around for about 200 million years before plants with flowers came along, so they make new ferns in a different way.

Most ferns use things called spores, which are tiny and look like pepper. They can travel long distances on the wind or by getting a lift from a passing animal. During some times of the year, if you look underneath the fronds, you can see the sporangium (that's the part of the leaf where the spores are made).

You can see the sporangium on the underside of this fern. Flickr/Richard Droker, CC BY

Some look like tiny bunches of grapes, some look like a little brown purse, and others like a dome. Often the sporangium starts out light green and as it ripens, turns dark brown.

Ferns spores develop into what scientists call “gametophytes”, which usually look flat, green and spongy. These gametophytes produce eggs and sperm.

You can see here the gametophyte of a Sword Fern – it is the flattish, spongy-looking bit. Flickr/Richard Droker, CC BY

The egg or sperm from one gametophyte can join up with the egg or sperm from a different gametophyte.

When that happens, the baby ferns produced this way are not genetically identical to the parent or to each other. It only works properly if there's enough water around so that the sperm can swim to the eggs.

Some ferns, however, can sprout ferns from their underground stems or from special bulb-shaped bits on their fronds called “bulbils”. When that happens, the baby fern is genetically identical to its parent.

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FIVE REASONS NOT TO SPRAY THE BUGS IN YOUR GARDEN THIS SUMMER

The Conversation.com November 6, 2017 Lizzy Lowe, Cameron Webb, and Kate Umbers University of Sydney, Western Sydney University, and Macquarie University provide funding as members of The Conversation AU.

The weather is getting warmer, and gardens are coming alive with bees, flies, butterflies, dragonflies, praying mantises, beetles, millipedes, centipedes, and spiders.

For some of us it is exciting to see these strange and wonderful creatures return. For others, it's a sign to contact the local pest control company or go to the supermarket to stock up on sprays.

But while some bugs do us very few favours – like mozzies, snails and cockroaches – killing all insects and bugs isn't always necessary or effective. It can also damage ecosystems and our own health.

There are times when insecticides are needed (especially when pest populations are surging or the risk of disease is high) but you don't have to reach for the spray every time. Here are five good reasons to avoid pesticides wherever possible, and live and let live.

1. Encourage the bees and butterflies, enjoy more fruits and flowers

Hover fly. dakluza/flickr

Flowers and fruits are the focal points of even the smallest gardens, and many of our favourites rely on visits from insect pollinators. We all know about the benefits of European honey bees (Apis mellifera), but how about our “home grown” pollinators – our native bees, hover flies, beetles, moths and butterflies. All these species contribute to the pollination of our native plants and fruits and veggies.

You can encourage these helpful pollinators by growing plants that flower at different times of the year (especially natives) and looking into sugar-water feeders or insect hotels.

2. Delight your decomposers, they're like mini bulldozers

To break down leaf litter and other organic waste you need decomposers. Worms, beetles and slaters will munch through decaying vegetation, releasing nutrients into the soil that can be used by plants.

The problem is that urban soils are frequently disturbed and can contain high levels of heavy metals that affects decomposer communities. If there are fewer “bugs” in the soil, decomposition is slower – so we need to conserve our underground allies.

You can help them out with compost heaps and worm farms that can be dug into the ground. It's also good to keep some areas of your lawn un-mowed, and to create areas of leaf litter. Keeping your garden well-watered will also help your underground ecosystems, but be mindful of water restrictions and encouraging mosquitoes.

3. An army of beneficial bugs can eat your pests

Mantises and dragonflies are just some of the hundreds of fascinating and beautiful bugs we are lucky to see around our homes. Many of these wonderful creatures are predators of mozzies, house flies and cockroaches, yet people are using broad-spectrum insecticides which kill these beneficial bugs alongside the pests.

It may sound counterproductive to stop using pesticides in order to control pests around the home, but that's exactly what organic farmers do. By reducing pesticides you allow populations of natural enemies to thrive.

Many farmers grow specific plants to encourage beneficial insects, which has been shown to reduce the damage to their crops.

This form of pest control in growing in popularity because spraying can result in insecticide resistance. Fortunately, it's easy to encourage these bugs: they go where their prey is. If you have a good range of insects in your yard, these helpful predators are probably also present.

Jumping spiders are great at eating flies and other pests. Craig Franke

4. Your garden will support more wildlife, both big and small

Spraying with broad-spectrum pesticides will kill off more than just insects and spiders – you're also going after the animals that eat them. The more insects are around, the more birds, mammals, reptiles and frogs will thrive in your backyard.

Baiting for snails, for example, will deter the blue-tongue lizards that eat them, so cage your vegetables to protect them instead. Keeping your garden well-watered, and including waterbaths, will also encourage a balanced ecosystem (but change the waterbaths regularly).

5. You and your family be happier and healthier

Engaging with nature increases well-being and stimulates learning in children. Insects are a fantastic way to engage with nature, and where better to do this than in your own back yard! Observing and experimenting on insects is a wonderful teaching tool for everything from life cycles to the scientific method. It will also teach your kids to value nature and live sustainably.

It's also a hard truth that domestic pesticides present a significant risk of poisoning, especially for small children.

In reality, the risk of exposing your children to the pesticides far outweighs the nuisance of having a few bugs around. Instead, integrated pest management, which combines non-chemical techniques like cleaning of food residues, removal of potential nutrients, and sealing cracks and crevices, is safer for your family and your garden ecosystems.

Think globally, act locally

Your backyard has a surprising impact on the broader health of your neighbourhood, and gardens can make significant contributions to local biodiversity. Insects are an important part of ecosystem conservation, and encouraging them will improve the health of your local environment (and probably your health and well-being too).

THE LARGEST EVER TROPICAL REFORESTATION IS PLANTING 73 MILLION TREES

nexusnewsfeed.com/ October 10, 2017 John Converse Townsend

The project in the Brazilian Amazon is using a new technique for planting trees that results in more, stronger plants–and hopes to cover 70,000 acres in new forests.

There are more habitable planets in our galaxy than humans living on planet Earth. But the nearest one is about 70 trillion miles away, which means that, for now, and for the foreseeable future, Earth is the only life-supporting rock hurtling through infinite space we'll ever know. It's really not the best idea to let it burn up–and key to keeping it cool are the massive rainforests of the Amazon. Sadly, we've had a hard time not cutting them down.

A new project should help prevent–or at least slow down–that hot future. If all goes to plan over the next six years, a project led by Conservation International will become the largest tropical reforestation project in history. Seventy-three million trees will sprout up across what's known as the "arc of deforestation," in the Brazilian states of Amazonas, Acre, Pará, Rondônia, and throughout the Xingu watershed. The short-term plan is to restore 70,000 acres (the area of 30,000 soccer fields) that have been cleared for pastureland to their former forested glory.

Ecuador Amazon, Socio Bosque, stakeholders, map of territory of the Socio Bosque Program. [Photo: Conservation International/photo by Katrin Olson]

"If the world is to hit the 1.2°C or 2°C [degrees of warming] target that we all agreed to in Paris, then protecting tropical forests in particular has to be a big part of that," M. Sanjayan, CEO of Conservation International, tells Fast Company. "It's not just the trees that matter, but what kind of trees. If you're really thinking about getting carbon dioxide out of atmosphere, then tropical forests are the ones that end up mattering the most."

He's right: Simply stopping deforestation could allow existing forests to absorb up to 37% of our annual carbon emissions; replenishing degraded areas could do significantly more for the planet.

Piles of logs from recently cleared forest. [Photo: Conservation International/photo by Russell A. Mittermeier]

"This is not a stunt," Sanjayan says. "It is a carefully controlled experiment to literally figure out how to do tropical restoration at scale, so that people can replicate it and we can drive the costs down dramatically."

Over the past 40 years, about 20% of the Amazon has been cut down or destroyed, and scientists worry that another 20% of the rainforest will be lost in the next couple of decades. So, instead of following precedent and planting saplings, which are labor and resource intensive to manage (and, depending on the selected species, may not be best-suited for the territory, resulting in less than ideal survival rates), the organizing coalition is trying something different.

Developed in Brazil only a few years ago, the new planting technique is called muvuca. "In Portuguese, it means a lot of people in a very small place," says Rodrigo Medeiros, Conservation International's vice president of the Brazil program and the lead on the ground.

Landscape near Rio Branco, Acre, Brazil. [Photo: Kate Evans/CIFOR/courtesy Conservation International]

The muvuca strategy demands that seeds from more than 200 native forest species are spread over every square meter of burnt and mismanaged land. The seeds are purchased from the Xingu Seed Network, which since 2007 has acted as a native seed supply for more than 30 organizations, thanks a collection of more than 400 seed collectors–many of whom are indigenous women and local youths.

Of course, even in nitrogen- and phosphorus-rich soil, only some of these seeds will survive–but that bit of natural selection is key to the muvuca magic. Several seeds germinate, compete between themselves for nutrients and sunlight, and the strongest ultimately become big trees. According to a 2014 study by the Food and Agriculture Organization and Bioversity International, more than 90% of native tree species planted with this strategy germinate, and they're especially resilient, able to survive drought conditions for up to six months without irrigation.

Specimen of "Pau mulato" (Calycophyllum spruceanum) within the Amazon floodplain forest, "Ilha das Cinzas," Amapá, Brazil. [Photo: Daniel Kieling/courtesy Conservation International]

"With plant-by-plant reforestation techniques, you get a typical density of about 160 plants per hectare," says Medeiros. "With muvuca, the initial outcome is 2,500 species per hectare. And after 10 years, you can reach 5,000 trees per hectare. It's much more diverse, much more dense, and less expensive than traditional techniques."

Working alongside Conservation International are the Brazilian Ministry of Environment, the Global Environment Facility (GEF), the World Bank, the Brazilian Biodiversity Fund (Funbio), and Rock in Rio's environmental arm "Amazonia Live." While this coalition provides the high-level leadership, it's actually indigenous communities and small family farmers who have ownership of this project.

In any given hectare, as many as 2,000 locals will be actively working together to reforest the land–typically private farmland but also government-owned protected zones and indigenous territories. Pay is issued evenly among participants, and families can earn about $700 per hectare reforested. The finances are typically managed by a local NGO in the field, with support from project sponsors.

Already a couple million trees have been planted, and it's a win-win situation for all involved parties, says Medeiros. The coalition gets labor at a fair price. Indigenous communities can maintain their livelihoods and get recognition as the rightful owners of rainforest land. And farmers sign partnership agreements to fast-track recovery on their own land with logistical support. "Springs, rivers, and streams that were suffering from the lack of water are already beginning to show signs of recovery in the region," says Medeiros, which has led to more productive soil and better yields for farmers, too.

There's more good news, 'as weve previously covered: Despite the reality that millions of acres of rainforest are still disappearing, there are now more trees and other vegetation on the planet than there were in 2003. This project will help Brazil move toward its Paris Agreement target of reforesting 12 million hectares of land by 2030, and may prove key in restoring much of what's been lost in our lifetime.

MAGPIES CAN FORM FRIENDSHIPS WITH PEOPLE – HERE'S HOW

Theconversation.com October 3, 2017 4.26pm Gisela Kaplan

Can one form a friendship with a magpie? –even when adult males are protecting their nests during the swooping season? The short answer is:" Yes, one can" - although science has just begun to provide feasible explanations for friendship in animals, let alone for cross-species friendships between humans and wild birds.

Ravens and magpies are known to form powerful allegiances among themselves. In fact, Australia is thought to be a hotspot for cooperative behaviour in birds worldwide. They like to stick together with family and mates, in the good Australian way.

Of course, many bird species may readily come to a feeding table and become tame enough to take food from our hand, but this isn't really "friendship". However, there is evidence that, remarkably, free-living magpies can forge lasting relationships with people, even without depending on us for food or shelter.

When magpies are permanently ensconced on human property, they are also far less likely to swoop the people who live there. Over 80% of all successfully breeding magpies live near human houses, which means the vast majority of people, in fact, never get swooped. And since magpies can live between 25 and 30 years and are territorial, they can develop lifelong friendships with humans. This bond can extend to trusting certain people around their offspring.

A key reason why friendships with magpies are possible is that we now know that magpies are able to recognise and remember individual human faces for many years. They can learn which nearby humans do not constitute a risk. They will remember someone who was good to them; equally, they remember negative encounters.

Why become friends?

Magpies that actively form friendships with people make this investment (from their point of view) for good reason. Properties suitable for magpies are hard to come by and the competition is fierce. Most magpies will not secure a territory – let alone breed – until they are at least five years old. In fact, only about 14% of adult magpies ever succeed in breeding. And based on extensive magpie population research conducted by R. Carrick in the 1970s, even if they breed successfully every single year, they may successfully raise only seven to eleven chicks to adulthood and breeding in a lifetime. There is a lot at stake with every magpie clutch.

The difference between simply not swooping someone and a real friendship manifests in several ways. When magpies have formed an attachment they will often show their trust, for example, by formally introducing their offspring. They may allow their chicks to play near people, not fly away when a resident human is approaching, and actually approach or roost near a human.

In rare cases, they may even join in human activity. For example, magpies have helped me garden by walking in parallel to my weeding activity and displacing soil as I did. One magpie always perched on my kitchen window sill, looking in and watching my every move.

On one extraordinary occasion, an adult female magpie gingerly entered my house on foot, and hopped over to my desk where I was sitting. She watched me type on the keyboard and even looked at the screen. I had to get up to take a phone call and when I returned, the magpie had taken up a position at my keyboard, pecked the keys gently and then looked at the "results" on screen.

The bird was curious about everything I did. She also wanted to play with me and found my shoelaces particularly attractive, pulling them and then running away a little only to return for another go.

Importantly, it was the bird (not hand-raised but a free-living adult female) that had begun to take the initiative and had chosen to socially interact and such behaviour, as research has shown particularly in primates, is affiliative and part of the basis of social bonds and friendships.

Risky business

If magpies can be so good with humans how can one explain their swooping at people (even if it is only for a few weeks in the year)? It's worth bearing in mind that swooping magpies (invariably males on guard duty) do not act in aggression or anger but as nest defenders. The strategy they choose is based on risk assessment.

A risk is posed by someone who is unknown and was not present at the time of nest building, which unfortunately is often the case in public places and parks. That person is then classified as a territorial intruder and thus a potential risk to its brood. At this point the male guarding the brooding female is obliged to perform a warning swoop, literally asking a person to step away from the nest area.

If warnings are ignored, the adult male may try to conduct a near contact swoop aimed at the head (the magpie can break its own neck if it makes contact, so it is a strategy of last resort only). Magpie swooping is generally a defensive action taken when someone unknown approaches who the magpie believes intends harm. It is not an arbitrary attack.

When I was swooped for the first time in a public place I slowly walked over to the other side of the road. Importantly, I allowed the male to study my face and appearance from a safe distance so he could remember me in future, a useful strategy since we now know that magpies remember human faces. Taking a piece of mince or taking a wide berth around the magpies nest may eventually convince the nervous magpie that he does not need to deter this individual anymore because she or he poses little or no risk, and who knows, may even become a friend in future.

A sure way of escalating conflict is to fence them with an umbrella or any other device, or to run away at high speed. This human approach may well confirm for the magpie that the person concerned is dangerous and needs to be fought with every available strategy.

In dealing with magpies, as in global politics, de-escalating a perceived conflict is usually the best strategy.

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