

CALEYI



NORTHERN BEACHES GROUP

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CALENDAR

As the **Covid-19 Delta** variant necessitates a further extension of Lock-down in NSW we have no current activity plans.

For up-dates please check our

Facebook page
Australian Plants Society Northern Beaches Group

or website:
www.austplants.com.au/northern-beaches

Many thanks to our wonderful contributor - Russell Beardmore.

If you have any photographs, articles, links or suggestions for CaleyI please feel free to send to/contact me Jane March march@ozemail.com.au or 0407 220 380.

SPRING IS SPRINGING ON OUR LOCAL TRACKS

Russell Beardmore

Jan and I have been out and about on some of our local tracks and marvelling, as always, at the incredible variety of species. Recently our walks have included the **Bluff Trail**, **Red Hill** and **Chiltern Trail North** - I thought I would share some of the more interesting plants seen on these three trails.

Last year some members will recall that we did a group outing to the **Bluff Trail**, walking as far as the lookout over Bantry Bay. This year, when we were nearly at the lookout, we took a right turn to descend the track to the Natural Arch Bridge. After the first easy section of a few hundred metres, things turned nasty and we started to doubt the wisdom of our decision. But we pressed on, down some very steep, rocky sections until we arrived at the beautiful Natural Arch. It was well worth the effort.



Starting right back just after the entrance to the Trail, we saw an extensive group of the lovely single petals of *Hybanthus vernonii*. Another quite common species in this area was *Pultenaea polifolia*. (This species is also common on a section of the Red Hill Track).



On the difficult descent, we were rewarded with small numbers of *Leucopogon amplexicaulis* with the base of the leaf wrapping around the stem and *Gonocarpus teucroides*. This is a common and rather ordinary looking plant, easily overlooked unless in flower as it was here.



There is a large stand of *Pultenaea daphnoides* and *Hibbertias* everywhere, including the relatively uncommon *H.nitida*.



Red Hill is an easy track and moderately floriferous, with the *Boronia* looking wonderful and plenty of *Grevillea buxifolia* and *sericea*. For me, the star of the track is a stand of *Sprengelia incarnata*.



We found single specimens of *Burchardia umbellata* with its prominent stamens and *Dampiera purpurea*. This cousin of the much more common *D. stricta* is a scrappy looking plant but the flowers are really beautiful.



Our most recent outing was to **Chiltern Road North Trail** - I recall a group outing to this track some years ago. It is a gem of a track, not too long and highly floriferous with *Eriostremon australasius* just coming into bloom and other common species too numerous to mention.

RARE CARNIVOROUS FLOWER YET TO BE NAMED AFTER LUCKY FIND BY WA PHOTOGRAPHER

ABC Mid West & Wheatbelt September 8, 2021 Liam Blythe



The leaves of the rare sundew traps insects (Supplied: Thilo Krueger)

A nature photographer has unwittingly stumbled upon a rare and yet-to-be-named wildflower on a walk near Jurien Bay in Western Australia's Mid West.

The carnivorous sundew is in the process of being named by the Royal Botanic Gardens Victoria and Blue Mountains Botanical Gardens in New South Wales.

Curtin University carnivorous plant researcher Thilo Krueger said it was an exciting find. "As far as I know, this is one of the rarest species of sundews we have here in Western Australia," he said.

Mr Krueger says the species uses its leaves to attract, capture and swallow insects such as flies, which provide nutrients to sustain the plant. He says this particular species only grows locally in Lesueur National Park near Jurien Bay. There is just one other historical record of the plant in a herbarium sample from the 1920s.



The photo of the rare Sundew that was posted on social media. (Supplied: Daniel Anderson)

Lucky discovery

Wildlife and nature photographer Dan Anderson said he was walking around the national park in August last year when he spotted a plant he had not seen before and wanted to know more.

He captured the photo and posted it on a wildflower Facebook group where it got the attention of a number of people including Mr Krueger, an expert on sundews. Mr Krueger asked where it could be found so he could survey it.

Mr Krueger and Mr Anderson visited the site together so it could be

properly surveyed and it was confirmed as a sundew plant that was distinct from all other species. Mr Anderson said he was very pleased by the confirmation. "I felt a little special – me finding this thing all on my own, not really having much experience with that sort of thing," he said.

A very rare species

Mr Krueger said he was also excited by the find but stressed people should not go and pick the flowers. "These particular sundews are very rare ... the populations are very small," he said. "Even if you collect just five plants of such a small population, you are doing great harm to these species."

Mr Krueger said the process of naming a plant involved collecting a specimen and describing it, before publishing it in a taxonomic journal. He is now working on a report to name the plant with the Royal Botanic Gardens Victoria and Blue Mountains Botanical Gardens which should be published by late this year or early 2022.

GUIDE TO NATIVE ORCHIDS OF NSW AND ACT

Lachlan Copeland, Gary Backhouse

Paperback - January 2022 - AU \$49.99



GUIDE TO NATIVE ORCHIDS OF NSW AND ACT

LACHLAN M. COPELAND AND GARY N. BACKHOUSE



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Julien Christ/Unsplash

THE DAILY DANCE OF FLOWERS TRACKING THE SUN IS MORE FASCINATING THAN MOST OF US REALISE

The Conversation September 10, 2021. Gregory Moore, University of Melbourne

When I was a child, I was intrigued by the Queensland box (*Lophostemon confertus*) growing in our backyard. I noticed its leaves hung vertical after lunch in summer, and were more or less horizontal by the next morning. This an example of heliotropism, which literally means moving in relation to the sun. We can see it most clearly as spring arrives and various species burst into flower — you might even get the feeling that some flowers are watching you as they move.

Many of us probably first got to know of heliotropism at home, kindergarten or primary school by watching the enormous yellow and black flowering heads of aptly name sunflowers, which moved as they grew. These flowers track the course of the sun spectacularly on warm and sunny, spring or summer days. Sometimes they move through an arc of almost 180c from morning to evening.

So with the return of sunny days and flowers in full bloom this season, let's look at why this phenomenon is so interesting.

The mechanics of tracking the sun

A number flowering species display heliotropism, including alpine buttercups, arctic poppies, alfalfa, soybean and many of the daisy-type species. So why do they do it?



Heliotropium arborescens. They were very popular in gardens a century ago. Shutterstock

Flowers are really in the advertising game and will do anything they can to attract a suitable pollinator, as effectively and as efficiently as they can. There are several possible reasons why tracking the sun might have evolved to achieve more successful pollination.

By tracking the sun, flowers absorb more solar radiation and so remain warmer. The warmer temperature suits or even rewards insect pollinators that are more active when they have a higher body temperature. Optimum flower warmth may also boost pollen development and germination, leading to a higher fertilisation rate and more seeds.

So, the flowers are clearly moving. But how?

For many heliotropic flowering species, there's a special layer of cells called the pulvinus just under the flower heads. These cells pump water across their cell membranes in a controlled way, so that cells can be fully pumped up like a balloon or become empty and flaccid. Changes in these cells allow the flower head to move.



Fly traps have somewhat similar mechanics to heliotropism. Shutterstock

When potassium from neighbouring plant cells is moved into the cells of the pulvinus, water follows and the cells inflate. When they move potassium out of the cells, they become flaccid. These potassium pumps are involved in many other aspects of plant movement, too. This includes the opening and closing of stomata (tiny regulated leaf apertures), the rapid movement of mimosa leaves, or the closing of a fly trap.

But sunflowers dance differently

In 2016, scientists discovered that the pin-up example of heliotropism — the sunflower — had a different way of moving.

They found sunflower movement is due to significantly different growth rates on opposite sides of the flowering stem. On the east-facing side, the cells grow and elongate quickly during the day, which slowly pushes the flower to face west as the daylight hours go by — following the sun. At night the west-side cells grow and elongate more rapidly, which pushes the flower back toward the east over night. Everything is then set for the whole process to begin again at dawn next day, which is repeated daily until the flower stops growing and movement ceases.

While many people are aware of heliotropism in flowers, heliotropic movement of leaves is less commonly noticed or known. Plants with heliotropic flowers don't necessarily have heliotropic leaves, and vice versa. Heliotropism evolves in response to highly specific environmental conditions, and factors affecting flowers can be different from those impacting leaves. For example, flowers are all about pollination and seed production. For leaves, it's for maximising photosynthesis, avoiding over-heating on a hot day or even reducing water loss in harsh and arid conditions.

Some species, such as the Queensland box, arrange their leaves so they're somewhat horizontal in the morning, capturing the full value of the available sunlight. But there are also instances where leaves align vertically to the sun in the middle of the day to minimise the risks of heat damage.

Plants are dynamic

It's easy to think of plants as static organisms. But of course, they are forever changing, responding to their environments and growing. They are dynamic in their own way, and we tend to assume that when they do change, it will be at a very slow and steady pace. Heliotropism shows us this is not necessarily the case. Plants changing daily can be a little unsettling in that we sense a change but may not be aware of what is causing our unease.

As for me, I still keep a watchful eye on those Queensland boxes!

FLANNEL FLOWERS BURST INTO 'SPECTACULAR' BLOOM NEAR PORT MACQUARIE AFTER BUSHFIRES, FLOODS

ABC Mid North Coast September 17, 2021 Emma Siossian, Meredith Kirton



Flannel flowers are blooming in abundance in the Lake Innes Nature Reserve after the 2019 bushfires.(Emma Siossian)

Flannel flowers have burst into bloom in huge numbers in a bushfire-affected landscape, and are reaching towering and unexpected heights. The iconic Australian flowers are an eye-catching sight in the Lake Innes Nature Reserve, just south of Port Macquarie on the New South Wales mid-north coast. They appear to be a moving sea of white in the Australian bush.

Locally based National Parks and Wildlife Service (NPWS) senior project officer Geoffrey James said he hadn't seen such a display of flannel flowers in that location in decades.

"It hasn't been like that in Lake Innes Nature Reserve for a long time ... for 20-plus years," he said. "It's nearly like a meadow ... like snow has fallen on the ground. It's quite spectacular.



The flannel flowers in some areas are well over 1.5 metres tall.(ABC Mid North Coast: Meredith Kirton)

"The last big bushfire [before the 2019 bushfires] that went through there was in 2000, but I don't remember the flowers like that afterwards."

Mr James said he had been watching the flannel flowers develop for a few months. "Every time I drove down [past the reserve], I could see the carpet of leaves through there, that silvery blue look, and I was saying to my wife, 'Wait for spring, it's going to look so good,'" he said.

"It's great, it brings a bit of hope after the devastation of the drought and the bushfire years, that nature is bouncing back.

"We need a few good years to get the flowers and the animals to bounce back in numbers, we don't know when the next fire is going to happen or the next drought."

Towering flannel flowers

Flannel flowers normally grow from about 30 to 70-centimetres tall, but some in the Lake Innes reserve are well beyond that. "These are nearly as high as I am, so getting close to ... 1.7-metres tall ... is pretty unreal," Mr James said.



NPWS senior project officer Geoffrey James says it's rare to see flannel flowers so tall.(ABC Mid North Coast: Emma Siossian)

"They are thick, there are hundreds of them, so they are all supporting each other so they can get really tall."

Cathy Offord, based at the Australian Botanic Garden Mount Annan in Sydney's south-west, has published many articles on flannel flowers and after looking at photos of those in the Lake Innes Nature Reserve said she had never seen any as huge. "Wow! That's an amazing sight," Dr Offord said. "I declare these are tallest flannel flowers I've seen — I've seen a lot — and I don't think I've seen them growing so thickly."

Why are the flowers booming?

Flannel flowers, named for their soft, woolly feel, grow along Australia's east coast, from the NSW south coast, up into south-east Queensland and out to Narrabri in NSW's central-west. They normally flower in spring and summer and some years they are much more prolific than others.

Mr James said this year's display near Port Macquarie was the combined result of the drought, followed by a severe bushfire in late 2019, and then heavy rainfall, which led to flooding in many areas earlier this year. "It was a combination of all those different factors that just made it perfect conditions [for flannel flowers]," he said.

"Basically, they've had a window of opportunity since the bushfires in 2019, so it's nearly two years since we had that fire that went through the Lake Innes Nature Reserve, and that's basically opened the overstorey, the tea tree and things that were really dominant.

"The light has got in there and then we had that really good rainfall, and they [the flowers] are just booming. "It was a combination: bushfire, the drought, all those overstorey plants let their leaves go and the sun could come in and hit the ground and let the seeds germinate."

The bushfires also resulted in a burst of flannel flowers last summer in the Blue Mountains, west of Sydney.

"Twelve months ago in the Blue Mountains there was actually a big flourish of the pink flannel flowers; that is really specific to that area. We just get the white ones up here," Mr James said. "A lot of people hadn't seen them before. That [display of flowers] was really a response to the bushfires that went through there.

"It really is typical of Australian plants and wildlife to have this boom-and-bust cycle and it purely reflects the climate. We have these really good rainfall events and then big droughts."

Christmas bells next

CLIMATE CHANGE IS TESTING THE RESILIENCE OF NATIVE PLANTS TO FIRE, FROM ASH FORESTS TO GYMEA LILIES

The Conversation September 21, 2021 Rachael Helene Nolan, Andrea Leigh, Mark Ooi, Ross Bradstock, Tim Curran, Tom Fairman, Victor Resco de Dios,



One year following the 2019/20 fires, this forest has been slow to recover. Rachael Nolan, CC BY-NC-ND

Green shoots emerging from black tree trunks is an iconic image in the days following bushfires, thanks to the remarkable ability of many native plants to survive even the most intense flames.

But in recent years, the length, frequency and intensity of Australian bushfire seasons have increased, and will worsen further under climate change. Droughts and heatwaves are also projected to increase, and climate change may also affect the incidence of pest insect outbreaks, although this is difficult to predict.

How will our ecosystems cope with this combination of threats? In our recently published paper, we looked to answer this exact question — and the news isn't good.

We found while many plants are really good at withstanding certain types of fire, the combination of drought, heatwaves and pest insects may push many fire-adapted plants to the brink in the future. The devastating Black Summer fires gave us a taste of this future.



Examples of fire-adapted plants: prolific flowering of pink flannel flowers (upper left), new foliage resprouting on geebung (upper right), seed release from a banksia cone (lower left), and an old man banksia seedling (lower right). Rachael Nolan

What happens when fires become more frequent?

Ash forests are one of the most iconic in Australia, home to some of the tallest flowering plants on Earth. When severe fire occurs in these forests, the mature trees are killed and the forest regenerates entirely from the seed that falls from the dead canopy.

These regrowing trees, however, do not produce seed reliably until they're 15 years old. This means if fire occurs again during this period, the trees will not regenerate, and the ash forest will collapse. This would have serious consequences for the carbon stored in these trees, and the habitat these forests provide for animals.

Southeast Australia has experienced multiple fires since 2003, which means there's a large area of regrowing ash forests across the landscape, especially in Victoria. The Black Summer bushfires burned parts of these young forests, and nearly 10,000 football fields of ash forest was at risk of collapse. Thankfully, approximately half of this area was recovered through an artificial seeding program.

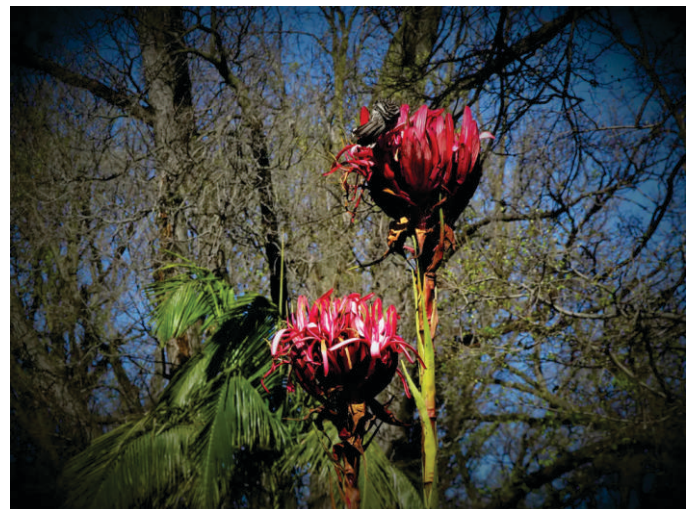


Ash to ashes: On the left, unburned ash forest in the Central Highlands of Victoria; on the right, ash forest which has been burned by a number of high severity bushfires in Alpine National Park. Without intervention, this area will no longer be dominated by ash and will transition to shrub or grassland. T Fairman

What happens when fire seasons get longer?

Longer fire seasons means there's a greater chance species will burn at a time of year that's outside the historical norm. This can have devastating consequences for plant populations. For example, out-of-season fires, such as in winter, can delay maturation of the Woronora beard-heath compared to summer fires, because of their seasonal requirements for releasing and germinating seeds. This means the species needs longer fire-free intervals when fires occur out of season.

The iconic gynea lily, a post-fire flowering species, is another plant under similar threat. New research showed when fires occur outside summer, the gynea lily didn't flower as much and changed its seed chemistry. While this resprouting species might persist in the short term, consistent out-of-season fires could have long-term impacts by reducing its reproduction and, therefore, population size.



Out-of-season fires could have long-term impacts on gynea lilies. Shutterstock

When drought and heatwaves get more severe

In the lead up to the Black Summer fires, eastern Australia experienced the hottest and driest year on record. The drought and associated heatwaves triggered widespread canopy die-off.

Extremes of drought and heat can directly kill plants. And this increase in dead vegetation may increase the intensity of fires.

Another problem is that by coping with drought and heat stress, plants may deplete their stored energy reserves, which are vital for resprouting new leaves following fire. Depletion of energy reserves may result in a phenomenon called “resprouting exhaustion syndrome”, where fire-adapted plants no longer have the reserves to regenerate new leaves after fire.

Therefore, fire can deliver the final blow to resprouting plants already suffering from drought and heat stress.

Drought and heatwaves could also be a big problem for seeds. Many species rely on fire-triggered seed germination to survive following fire, such as many species of wattles, banksias and some eucalypts.

But drought and heat stress may reduce the number of seeds that get released, because they limit flowering and seed development in the lead up to bushfires, or trigger plants to release seeds prematurely.

For example, in Australian fire-prone ecosystems, temperatures between 40°C and 100°C are required to break the dormancy of seeds stored in soil and trigger germination. But during heatwaves, soil temperatures can be high enough to break these temperature thresholds. This means seeds could be released before the fire, and they won't be available to germinate after the fire hits.

Heatwaves can also reduce the quality of seeds by deforming their DNA. This could reduce the success of seed germination after fire.



Many native plants, such as banksia, rely on fire to germinate their seeds. Shutterstock

What about insects? The growth of new foliage following fire or drought is tasty to insects. If pest insect outbreaks occur after fire, they may remove all the leaves of recovering plants. This additional stress may push plants over their limit, resulting in their death.

This phenomenon has more typically been observed in eucalypts following drought, where repeated defoliation (leaf loss) by pest insects triggered dieback in recovering trees.

When threats pile up

We expect many vegetation communities will remain resilient in the short-term, including most eucalypt species.

But even in these resilient forests, we expect to see some changes in the types of species present in certain areas and changes to the structure of vegetation (such as the size of trees).



Resprouting eucalypts, one year on following the 2019-2020 bushfires. Rachael Nolan

As climate change progresses, many fire-prone ecosystems will be pushed beyond their historical limits. Our new research is only the beginning — how plants will respond is still highly uncertain, and more research is needed to untangle the interacting effects of fire, drought, heatwaves and pest insects.

We need to rapidly reduce carbon emissions before testing the limits of our ecosystems to recover from fire.

Disclosure statement

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