

banksia

bulletin

summer 2020-21

Bayside beetles
Visiting birds
Volunteers return



From the Mayor

Welcome to the Summer 2020/21 edition of *Banksia Bulletin*.

Well done to everyone living in the City of Bayside who played a part in getting Victoria out of the COVID-19 crisis we found ourselves in this year.

While it was certainly an interesting Council election campaign this year without the opportunity for a lot of face-to-face interaction with our community, I am very humbled to be returning to the City of Bayside as a Councillor for the next four years, and another term to serve as your Mayor.

As many of you would know, I am very passionate about our local environment, and I'm really pleased to see the work of our volunteers published in this magazine. They are greatly appreciated by all of our community.

I heard recently from Council's Biodiversity and Conservation Planning Officer Amy Weir that she had received a thank you email

from a reader located in the United Kingdom.

One of the biggest benefits of *Banksia Bulletin* going to a digital version is the reach it now has. The reader highlighted the learning opportunities *Banksia Bulletin* provided, and it even sparked a discussion at the Botanical Society of Britain and Ireland's Events & Communications Committee. Well done to everyone involved in making this happen.

It is fantastic to see our Friends groups coming together and ramping up their working bee schedules for next year, and well done to BRASCA for squeezing in two before the year ends.

Our Friends groups are very important to the combined efforts we all make in protecting our local flora and fauna, but they are also important for social connectivity.

I hope you enjoy being back together and I look forward to seeing you in the



new year.
On behalf of all my fellow Councillors,
Merry Christmas Bayside..

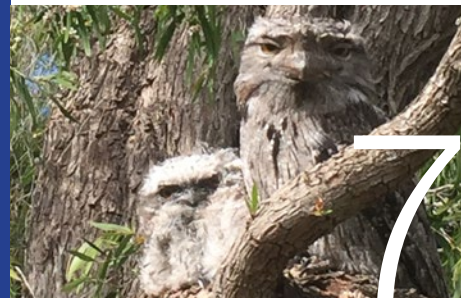
Cr Laurence Evans
Mayor
Bayside City Council



Cover image: Musk Lorikeet
Photo: John Eichler

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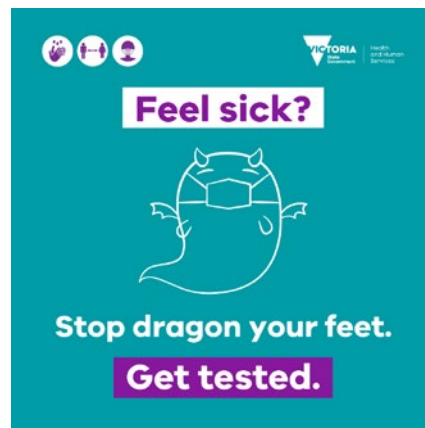


BEETLE OBSERVATIONS



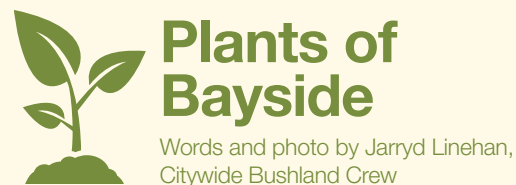
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Poranthera
Photo by Pauline Reynolds



Small Poranthera

Poranthera microphylla, also referred to as the Small Poranthera, is a small annual herb found in all states of Australia and New Zealand. It is a fleshy plant growing to roughly 15cm in diameter and about half that in height. It has greyish spoon or even egg-shaped leaves with a small point on the tip. It prefers well-drained soils and quite often appears after a fire. Despite the large range of this little herb it's not a plant that we often come across in our days working in the heathlands. Citywide first noticed it back in autumn and we were scratching our heads attempting to identify this unusual plant, searching our Flora of Melbourne hoping to come across some clues. It wasn't until spring when the white flowers were very pronounced and we were able to officially welcome the small poranthera back to Balcombe Reserve. It had been previously recorded back in 2016 after a controlled burn and has popped up in similar circumstances after the 2019 burn. We are hoping to collect some seed from the Balcombe Reserve specimens and propagate the small poranthera at our Bayside Community Nursery. Bushland team member Matthew Powell recently discovered some more small poranthera at Cheltenham Park. The rediscovery of this plant has the bushland team searching for other small poranthera plants around Bayside. This has challenged us to further improve our plant identification skills.



Birdlife ID resources

Birdlife Australia has produced two booklets for citizen scientists involved in shorebird and waterbird monitoring.

The **Wetland Birds of south eastern Australia Identification booklet** can help you identify waterbirds found on the wetlands of south-eastern Australia. The booklet says, *'Sadly many of these species and their habitats are subject to increasing threats. By monitoring their trends, we can identify conservation priorities and seek to halt declines.'*

The **Shorebirds Identification booklet**, 'covers all 54 shorebird species that occur regularly in Australia. For easier identification we have included ID tips for each species and maps of where you are most likely to encounter them.'



For more information on how to get involved visit the Birdlife Australia website



The rise and fall of Chota Croton

An environmental success story

Words and photos by Sue Raverty
Convenor Friends of Ricketts Point
Landside

Chota Croton at 411 Beach Road in Beaumaris was built in the 1930s. The house was named after a mansion in Caulfield called Crotonhurst, which was demolished in 1937.

The marble fire place surround and plinth, stained glass windows, the Cornish entrance porch, chimney pots and possibly the gates were salvaged from Crotonhurst and installed at the new Chota Croton at Ricketts Point.

There was access to Beach Road through beautiful gates at the rear of the property. The land was tiered due to the steep slope of the block and the main access to the house was from Lang Street, not Beach Road.

In 1999, when the Friends of Ricketts Point Landside began working at the site, the access path was grassed and was wider than a normal driveway. In



the 2000s we reclaimed a large area to the right of the track which was used as a turnaround and storage for a trailer.

Around 2014, we started to plant along the edges of the access road to narrow it. We continued to maintain and revegetate more of the sides of what had then become more like a track.

In March 2016, the house was put on the market. In July 2016, when the house was vacant, we prepared the site and planted out the rest of the grassy area.

After the house was demolished in 2019, the house block was cleared and has been left untouched since then.

The plants in front of the gates have continued to grow and at the present time it is hard to find the access entrance and the gates can no longer be seen from Beach Road.

We are waiting to see what is built on the empty block and how it will impact the reserve. Fingers crossed it will be a good outcome.



Black Rock and Sandringham Conservation Association Inc volunteers, December 2020 working bee.

Volunteers are back!

Words and photos by Pauline Reynolds

The first volunteer session since March took place at the Bayside Community Nursery on the morning of Tuesday 8 December 2020.

Council and Citywide have put in place their COVIDSafe Plans, and a maximum of 10 volunteers at each session are allowed.

Citywide Bushland and Nursery Supervisor Jo Hurse and Bayside Nursery Coordinator Julie Valentine have worked out the safe set up and everyone was very happy to be working and helping again.

Since then, we have tubed many trays of *Goodenia ovata*, and we welcomed three new volunteers.

While a little out of practice, it didn't take long to get the fingers going again.

I hope we can continue to contribute to the propagation of the number of plants required for next year. There was a concern that in this disruptive year the plants that were ready for sale would not be sold. Amazingly, they were sold to wholesale customers including golf



Our volunteers' propagating work at the Bayside Community Nursery has resumed.

courses and schools that took advantage of the quiet time to do extra planting.

All other environmental volunteers will be back doing work and contributing in the way they enjoy next year. BRASCA will squeeze in two working bees before 2020 is over.

I'm sure there were times this year when everyone, like me, thought we'd never be allowed out but here we are. Hopefully a vaccination early next year might see the end of this virus and fingers crossed the next one doesn't come along too soon!



Tawny Frogmouth Photo by Diana Pearce

The story of a pair of Tawny Frogmouths

Story by Diana Pearce and Moira Longden

In the 2007 Summer/Autumn edition of *Banksia Bulletin*, Moira Longden wrote a wonderful article following the progress of a pair of Tawny Frogmouths, which had nested and roosted in our neighbouring trees for a couple of years.

Since then, neighbours have taken an interest in where they may build a nest and shared news when we discovered a nest.

Sometimes, it was a surprise when the nest was on the top of a light pole near the Beaumaris school.

Eventually they would return to our tree and show off the family (often right outside our back door). In hot weather, they would enjoy a family bath with a soft hose down.

Each year the pair has produced chicks and reared them until they



Photo credit: Jarryd Linehan

were sent on their way, and then they would settle back to roost in our tree (*Agonis flexuosa*). We have had almost daily pleasure of knowing that they are present.

Earlier this year, we were hoping that the pair would mate again as all the signs seemed right.

Then, one day there was a dead Tawny hanging in the foliage of the tree. The other bird kept vigil for many days until finally I asked a neighbour to help me

release the dead Tawny from the tree.

To our surprise and pleasure, another Tawny Frogmouth turned up and we were hopeful that they might mate and continue the dynasty.

Just when we thought it wasn't going to happen, the force of life showed its colours and they did!

It took a while to find where they had nested but finally Moira spotted the nest in her Casuarina tree. Friends around our area were reassured that they were still our Tawnies!

Fast forward a few weeks and as I write, two chicks are looking like they are ready to fledge.

It has been interesting to watch the fly-in-fly-out action as the parents take turns to look after the nest and feed the chicks – who look like wide-eyed fluffy toys making purring noises when the parents are busy hunting and feeding them.



Blue-banded bee
Photo by John Coke



Grevillea infecunda

Insects as pollinators — here, there and everywhere

Story by Elizabeth Walsh
Convenor FoNW Inc.

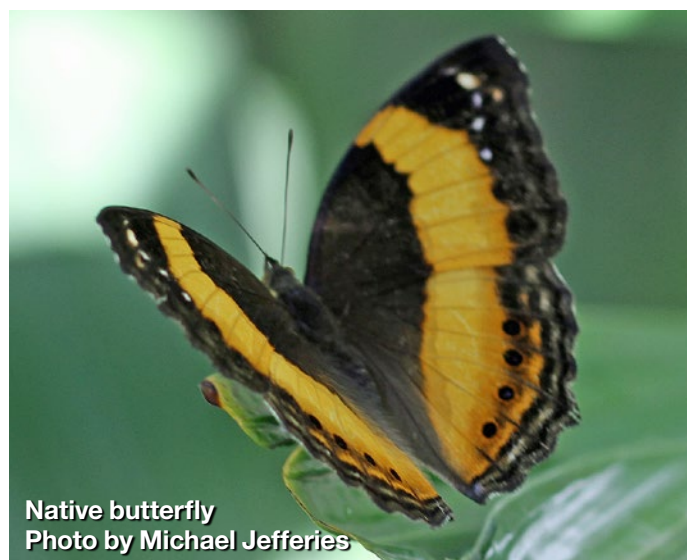
Friends of Native Wildlife Inc. hosted a zoom session, *Wild in Bayside*, featuring Luis Mata presenting an online talk *Pollinator Observatories* – a fun and engaging way of reconnecting people with nature in cities.

The addition of some of his personal macro photographs from various local heathland settings provided relevance and entertainment.

Luis recently moved back to Bayside after conducting a successful large-scale pollinator program at Westgate Park using citizen science and supported by RMIT, Melbourne University, Clean Air and Urban Landscapes Hub, Westgate Biodiversity: Bili Nursery & Landcare and the City of Melbourne.

During his talk, Luis talked about themes of pollination, invasion ecology, indigenous culture, plant-insect interactions and colour patterns.

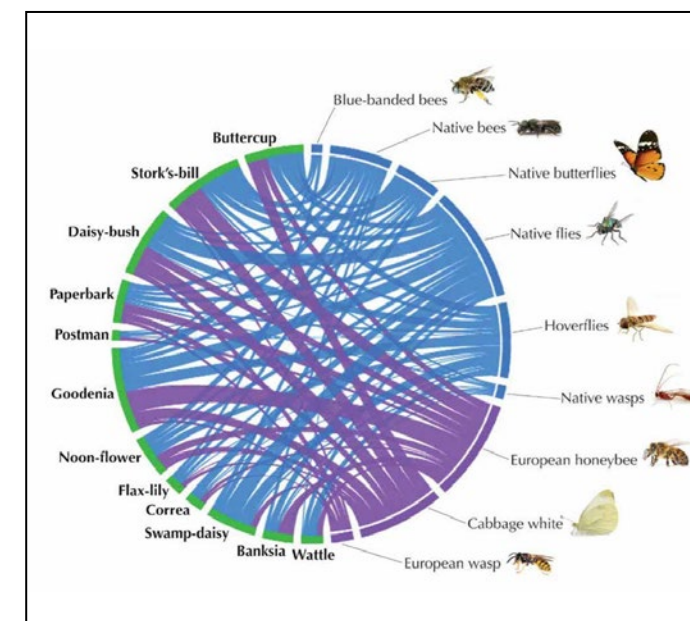
One such flower example is the daisy-like flowers. Whether introduced or indigenous, daisies, with their bright yellow flowers, attract native bees and honey bees. Some wasps delight in finding their way down narrow flower trumpets, collecting pollen as they forage for sweet nectar. The many beetles, flies, bugs and butterflies also have their colour preferences.



Native butterfly
Photo by Michael Jefferies

The results from Westgate Park showed the greatest interactions were from bees down to flies, butterflies, then bugs, wasps, beetles and lastly, ants. It was interesting to note that 65 per cent of interactions were from native insect species and 35 per cent from non-native species.

Whether planting for ground cover, low or medium shrubs, understorey or canopy, insects of every shape and species can be found as part of the biodiversity of the natural environment.



These ecological networks across all types of plants support and link the health of our environment.

Pollination is carried out whilst insects feed on pollen or nectar or are fooled into attempting to mate because of the pheromones exuded from specialised plants, thus moving pollen from one plant to another. The leaves and buds provide food to foliage-eating insects, and those insects in turn become food for larger insects, birds and reptiles.

Luis explained how management actions could restructure the landscape of urban meta-networks, and the important of decision-makers fully understanding the impacts of biodiversity.

Find out more about Luis Mata at <https://luismataresearch.wordpress.com/about-me/>

It's a wonder

Words and photo by Rob Saunders
Rare Plants Group

Bayside Community Nursery has recently propagated a plant that has been locally extinct for many years. Now known as the Anglesea Grevillea (*Grevillea infecunda*), it was collected by Baron von Mueller from "bushland near Brighton" in the 1850s.

As its Latin name implies, this species is infertile. It only spreads by suckering.

This is a truly rare and fascinating plant. So few remain in the wild, it is listed under the *Commonwealth Environment Protection and Biodiversity Conservation Act (1999)*. Because it is infertile, each plant is a clone, so it could be argued that this is Bayside's only indigenous Grevillea.

It is fascinating that the same plant was able to spread from wherever it first evolved to Anglesea and Brighton.

Assuming a growth rate of around 10cm per year, it would take at least 500,000 years to spread from a central point between those two locations.

So how did it cross Port Phillip Bay, you ask? Well, Port Phillip Bay only formed at the end of the last Ice Age. And how did it cross the Yarra River? The answer is that the Yarra River itself would have changed course many times over that period.

Plants such as this can be used in teaching a variety of subjects, from geography to history and even mathematics. But perhaps most importantly, they can teach a sense of wonder.



Why birds visit Bay Road Heathland Sanctuary

Yellow-tailed Black Cockatoo. Photo: Sue Forster



Common Bronzewing in Black Wattle, Bay Road Heathland Sanctuary, 8 November 2020. Photo: John Eichler.

Story by Sue Forster

Convenor Friends of Bay Road Heathland Sanctuary

When it comes to attracting birds, Bay Road Heathland Sanctuary lacks many of the advantages of nearby golf courses, particularly scale and a permanent water source.

Typical residents common to Bayside include dominant honeyeaters such as Noisy Miners, Red and Little Wattlebirds; larger predatory passerines such as Australian Magpies, Pied Currawongs and Little Ravens; and, lurking in denser shrubs, small Brown Thornbills and White-browed Scrubwrens.

Grey Butcherbirds, Magpie Larks, Rainbow Lorikeets and Eastern Rosellas are frequent visitors and, on rare occasions, a Laughing Kookaburra may fly in from Sandringham Golf Course.

Although the Sanctuary is primarily conserved for its heathland vegetation, roving birds are most likely to seek out its Manna Gums or Black Wattles, for shelter or food. There is, of course, no shortage of insect life when the heathland is blooming – a bonus for the many omnivorous or insectivorous birds in the area.

Musk Lorikeets are regular seasonal visitors, feeding on lerp and nectar from flowering Manna Gums in January and February. In a mixed lorikeet flock, they can be distinguished from Rainbow Lorikeets by their mainly green plumage, smaller size, shorter tail and high-pitched call. A red cheek patch differentiates them from the similar but less common Little Lorikeet.

Large Yellow-tailed Black Cockatoos disperse to the lowlands after breeding in higher ranges between July and January. The last time I heard their plaintive *whee-la* call and registered the effects of their visit was in April 2020. They occasionally drop in to the Sanctuary to extract Cossid Moth and Longicorn Beetle larvae from under the bark of Black Wattles. Apparently, they can hear the larvae tunnelling around the cambium layer of the trunks. Black Cockatoos can cause considerable damage to saplings as their strong beaks pierce many centimetres into bark, shredding it during extraction.

After exchanging notes with Citywide bushland crew and local naturalist John Eichler, I discovered that, between July and November 2020, the Sanctuary had five visiting species that I had not



Bassian Thrush. Photo: John Eichler.



Female Australian King Parrot, Dandenong Ranges. Photo: Sue Forster.



Australian King Parrot (immature or female) in Black Wattle, Bay Road Heathland Sanctuary, 16 September 2020. Photo: Matt Powell



Musk Lorikeet. Photo: John Eichler

previously observed in this area. In the case of the Common Bronzewing, I was simply not in the right place at the right time. Michael Norris, former Bay Road Heathland Sanctuary Friends Convener, recorded 38 Common Bronzewing observations in the Sanctuary between 1996 and 2019. In late October this year, John Eichler initially spotted a Common Bronzewing in the south-west part of the reserve and a week later managed to obtain a photo of one in the stand of Black Wattles at the north-east corner. The timing of his observations, after the trees had finished flowering, is not surprising. Black Wattle seeds are a favourite food source for the not-so-common Common Bronzewing. This visitor may have come from a small flock located in the Royal Melbourne Golf Course.

‘Surprise’ visitors are, of course, often spotted elsewhere in Bayside, as was the case for a pair of Australian King Parrots seen in the Sanctuary by Citywide crew on 16 September. Using his iPhone, Matt Powell managed to get a photo of one of them in a Black Wattle. It was either a juvenile or female as adult males have red heads as well as breasts. This was a first for the Sanctuary. These large, colourful parrots are usually found in or near wet Eucalypt forest, such as Sherbrooke Forest in the Dandenong Ranges, and Bayside is well beyond their usual range. King Parrots eat fruit, seeds, blossoms and insects. The Black Wattle blossom, which was in full bloom during September, may have attracted the visiting pair.

Unfortunately, the two other novel birds were already dead when discovered. Their deaths may have

been the result of inexperience as both were possibly juveniles. One of these, found near the viewing platform on 2 November, was a Bassian or Scaly Thrush. Like the King Parrot, it is more usually found feeding on insects and fruit in moist forests, but is hard to detect due to its well-camouflaged plumage and quiet skulking habits. Michael Norris previously recorded this species in the Sanctuary on only one occasion, back in 1986. Although the scalloped pattern of the bird’s feathers is highly distinctive, I emailed my photos to Birdlife Bayside president Tania Ireton for a species confirmation. We agreed that the bird could have been a juvenile seeking new territory. Fox predation is a likely cause of death.

Raptors, such as Brown Goshawks, were once common around Bayside, but

are rarely sighted these days. A Goshawk found on 28 July by Citywide Bushland and Nursery Operations Supervisor Jo Hurse and Matthew Hutchins (casual crew) appeared to have collided with a car. After discovering the bird at 2 Marshall Avenue, adjacent to Bay Road and opposite the Sanctuary, they took measurements and photos, and sent them to Melbourne Museum for identification. A Birdlife Bayside quiz taught me that Brown Goshawks and Collared Sparrowhawks are very difficult to tell apart; however, unlike Goshawks, Sparrowhawks have not been recorded around the Sanctuary. I believe this bird’s dark brown upper parts and heavily streaked chin, throat and breast were indicative of a juvenile bird; despite their common name, adult Brown Goshawks have a grey head, back

and tail with a rufous collar. Goshawk prey includes small reptiles, birds and mammals – all found within the Sanctuary. As Goshawk hunting tactics include low concealed aerial approaches and ground stalking, this young bird may have misjudged safety distance around the road.

Just as I was finishing this article, I received a text message and photo from Citywide crewman Jarryd Linehan, who had found two Tawny Frogmouth feathers inside the Bay Road entrance. This was another previously unrecorded bird. A search revealed neither a roosting Tawny Frogmouth nor a corpse, so the bird was probably hunting for insects on the previous night and moved on.

Our Sandringham bushland corridors provide vital food and shelter for

roving bird visitors as well as local residents. It’s always exciting to find new bird species in this habitat, but, as these stories indicate, our suburban ‘sanctuaries’ are not always safe havens for inexperienced juveniles far from home.

Thank you to all the people mentioned above who contributed their photos, observations and expertise.

To view photos of the c. 435 flora, fungi and fauna species observed during 2020 in Bay Road Heathland Sanctuary visit <https://inaturalist.ala.org.au/projects/bay-road-heathland-sanctuary>

Beetle observations

Words and photos by John Eichler

The Gramatan Avenue Heathland Sanctuary is the smallest of Bayside's natural reserves, being about the size of four house blocks. Despite its small size it supports a valuable, almost weed-free remnant of sand heathland vegetation. This vegetation in turn supports a range of fauna, including numerous invertebrates. The four spectacular insects shown here were observed during visits in October and November 2020. Based on available records and personal observations these insects are apparently uncommon to rare in Bayside. Finds like these help reinforce the importance of local natural reserves in providing a refuge for a variety of life forms.

Some impressive local insects



Jewel Beetle
Stigmodera macularia

Several of these large (30-35mm long) beetles were found feeding on Prickly Tea-tree flowers at the Gramatan Avenue Heathland Sanctuary this spring. This beetle is apparently rare locally, with no known records from other local natural reserves, although it was recorded from Cheltenham in the early 1900s. The larvae of most Jewel Beetles are wood borers.



Jewel Bug
Scutiphora pedicellata

A colourful bug which is thought to feed on the fruit of native and introduced plants. Observed locally at Balcombe Park and Gramatan Avenue Heathland Sanctuary. The nymph (immature) stage of the bug (lower image) is quite different to the adult (left image) but is just as colourful.



Jewel Beetle
Castiarina flavopicta

This small (10mm long) beetle feeds on the nectar and pollen of various native flowers – in this case Prickly Tea-tree. It has been observed at Balcombe Park, Long Hollow Heathland Reserve, Bay Road Heathland Sanctuary and Gramatan Avenue Heathland Sanctuary. Approximately 100 species of *Castiarina* occur in Victoria. While there are historical records of several species from Bayside this is the only one recorded recently.



Golden Stag Beetle
Lamprima aurata

The larvae of this stunning, iridescent beetle feed on decaying wood. Golden Stag Beetles have been found at Gramatan Avenue Heathland Sanctuary and Bay Road Heathland Sanctuary. The individual shown here is a male, which has prominent mouthparts. The presence of large mouthparts on this group of beetle has led to them being called Stag Beetle.



Banksia pruning at Ricketts Point

Bayside City Council has been pruning the Coast Banksia trees around Ricketts Point to mitigate risk associated with some of the declining Banksia trees in this precinct.

The area has recently been surveyed for risk by independent arborists and several trees have been identified for canopy pruning. In some cases, dangerous dead (stag) Banksias have been removed.

Trees identified as high risk are located within the Ricketts Point Teahouse garden area, Ricketts Point Landside and around the Beaumaris Life Saving Club.

All trees will be reassessed for habitat and/or nesting species and where possible, nesting hollows will be retained.

These works are part of Council's ongoing tree maintenance program and as part of that program, Coast Banksia will be replanted in other appropriate areas of the foreshore around Ricketts Point.

For more information please contact Council's arborist Mary Markowski via email mmarkowski@bayside.vic.gov.au



Wildlife-friendly regulations for household fruit netting

Photo: Douglas Gimesy

Attention all household gardeners who live in Victoria

Story by Animal Welfare Victoria

If you use netting to protect your fruit or vegetable harvest you will need to be aware of new provisions under Victoria's *Prevention of Cruelty to Animals Regulations 2019 (POCTA Regulations)*.

The regulations, being introduced in September 2021, relate to the sale and use of household fruit netting. They do not apply to commercial circumstances.

Fruit netting is commonly used by household gardeners to protect their trees and fruit from hungry wildlife.

Netting with a large mesh size is more likely to entangle birds, possums or flying foxes. Their subsequent struggling to free themselves may cause deep cuts and strangulation, often leading to death.

From 1 September 2021, any netting used to protect household fruit trees, vegetable gardens, or other fruiting plants must have a mesh size, when at

full stretch, of no greater than 5mm x 5mm. Netting advertised or offered for sale for household use must also be compliant with these required mesh specifications.

If you are looking to purchase netting this year, it is highly recommended that you buy netting that meets these requirements for this harvest season. Not only will this protect our wildlife, but it will mean that you don't need to replace non-compliant netting next year. Any existing household fruit netting that does not meet these specifications must be replaced with appropriate netting before 1 September 2021.

An alternative to netting is the use of fruit bags that are placed over individual branches. These also reduce the risk of capturing animals while leaving excess fruit available for hungry wildlife.

Don't forget that old netting, when discarded, can still become an

entanglement risk. It helps to place old netting into a strong biodegradable bag before putting into landfill.

Further advice on protecting fruit trees and wildlife, and helping injured wildlife, is available at <https://agriculture.vic.gov.au/livestock-and-animals/animal-welfare-victoria/pocta-act-1986/protecting-fruit-trees-and-wildlife>

The use of appropriate mesh sized netting supports a productive harvest while also protecting wildlife.

You can find more information on the POCTA Regulations at <http://agriculture.vic.gov.au/agriculture/animal-health-and-welfare/animal-welfare/animal-welfare-legislation/prevention-of-cruelty-to-animals-legislation>

Please direct any requests and questions you may have on this matter to the Animal Welfare Victoria team via email at animal.welfare@agriculture.vic.gov.au

How non-native plants are contributing to a global insect decline

The impact of introduced plants on native biodiversity has emerged as a hot-button issue in ecology. But recent research provides new evidence that the displacement of native plant communities is a key cause of a collapse in insect populations and is affecting birds as well.

Words by Janet Marinelli

Source Yale 360, published by the Yale School of the Environment

For years, Doug Tallamy sounded the alarm about the grave threat that plants introduced from abroad pose to native insects. By transforming native plant communities into so-called novel landscapes increasingly dominated by exotic species on which many insects cannot feed, the University of Delaware entomologist speculated, they imperil not only insects but also the birds and other animals that depend on insects for survival.

Not everyone has greeted the thesis with open arms. The effect of introduced plants on native biodiversity has been one of the most contentious issues in ecology, compared to gun control, abortion, and other “hot-button issues in contemporary American culture” by Peter Del Tredici, senior research scientist at Harvard’s Arnold Arboretum. “Over the past few decades,” 19 leading ecologists, including Del Tredici, wrote in a 2011 commentary in the journal *Nature*, “‘non-native’ species have been vilified for driving beloved ‘native’ species to extinction and generally polluting ‘natural’ environments... ‘Nativeness’ is not a sign of evolutionary fitness or of a species having positive effects.”

Dozens of recent studies, however, have provided evidence that supports Tallamy’s hotly disputed hypothesis. In a paper published online on November 18 in the journal *Ecological Entomology*, Tallamy and two co-authors review the research buttressing the proposition that the widespread displacement of native plant communities by non-native plants in agriculture, agroforestry, and horticulture is a key cause of insect declines.

Insects have been clobbered by an array of threats, from habitat destruction and deforestation to climate change.

The issue of non-native plants has become newly urgent as the scope of the “insect apocalypse” has become clear. In the past few years, insect declines have been documented around the globe, including western and northern Europe,

North America, neotropical countries such as Costa Rica and Puerto Rico, and even the High Arctic. In a comprehensive review of 73 historical reports published in *Biological Conservation*, scientists found that in terrestrial ecosystems, Lepidoptera (butterflies and moths), Hymenoptera (bees and their close relatives), and Coleoptera (beetles), as well as four major aquatic insect groups such as Odonata (dragonflies and damselflies), have suffered dramatic declines. What’s more, it’s not just specialist species with restricted ecological requirements, like dependence on a small number of plants, that have slumped but many common and generalist species as well. A blockbuster 2017 study that revealed a shocking 76 percent decline in the biomass of flying insects over 27 years at protected areas in Germany catapulted the plight of insects into the public consciousness.

According to researchers, the global insect demise began at the dawn of the 20th century, accelerated during the 1950s and 1960s, and reached alarming proportions globally during the past two decades. Reports of an ongoing “bird armageddon” that mirrors the insect apocalypse suggest that insectivorous birds have been collateral damage in the collapse of insect populations worldwide.

Scientists say that insects have been clobbered by an array of continuing threats, from habitat destruction, deforestation, climate change, and light pollution to the rise of industrial agriculture. A widely publicized study published last year in *PLOS ONE* calculates that U.S. agriculture is 48 times more toxic to insects than it was 25 years ago, with neonicotinoid pesticides accounting for 92 percent of the lethal escalation; the study notes that “this increase in toxicity loading is consistent with the reduction in beneficial insect and insectivorous bird populations observed in recent years.” Yet one threat that has attracted little notice, and that more than two dozen international experts failed to mention in their recommendations for solutions to the insect crisis, is the replacement of native plants with non-native vegetation under way around the world.

Tallamy’s paper aims to rectify the oversight. University of Connecticut entomologist David Wagner, who peer-reviewed the paper, called it a “much needed contribution” to the insect conservation literature. He added that it “does an especially laudable job of exposing the weak footing of many arguments that some have used to claim that non-native plants are not a threat to biodiversity, which I regard as nonsense.”

Mark Davis, an ecologist at Macalester College, has a different view. He points out that even Tallamy and his co-authors concede that they can only extrapolate the impact of non-native plants on insect populations from short-term studies performed at local scales because longer-term, landscape-scale studies have not yet been done. “In other words,” says Davis, “there is as yet no evidence that non-native plants reduce insect abundance over the general landscape.”

Tallamy’s early hunch that non-native plants have helped decimate insect populations was based on decades of research showing that many insects, especially the phytophagous or plant-eating species that account for most insect diversity, depend on a limited number of plants for survival. Since the 1960s, scientists have attributed this so-called host plant specialization to several factors, including the need for feeding insects to develop ways to get around plant defenses, like the production of chemical compounds that would be fatal to other species. As a result, the diet of most insects is restricted to a single plant family, and the closer species are to the tropics, the more constrained their menus are likely to be. More than 90 percent of the insect herbivores in the rainforests of Papua New Guinea, for example, can utilize only plants in a single genus, or a closely related group of species.

The diet restrictions of butterflies and moths have been studied more than those of other insect groups whose populations are plummeting. Five years ago when scientists looked at the diet breadth of plant-eating insects around the world, they found that 69 percent of caterpillar species can develop on just one plant family. Given such restricted

diets, Tallamy and his co-authors write, it stands to reason that “the displacement of native plants by non-native species may have profound effects on phytophagous insect populations everywhere.”

When native host plants dwindle or disappear, the populations of plant-eating insects shrink and become less diverse.

In fact, research has shown repeatedly that when native host plants dwindle or disappear from an area, the populations of insect herbivores shrink and become less diverse. An analysis of 76 studies of caterpillar health on native and introduced plants found that with few exceptions caterpillars were larger and more likely to survive when reared on their native host plants. And in plant communities invaded by non-native species, the study found, the abundance and diversity of butterflies and moths were significantly reduced.

There have, however, been exceptions. In a small percentage of cases, insect herbivores have adopted introduced plants as food sources, especially if they belong to the same genus or family as their native hosts. In the most celebrated example, 34 percent of California butterfly species were found to feed or lay their eggs on non-native plants.

Because not every study has demonstrated negative effects, the long-running controversy over whether introduced plants are harmful to native insects continues. Ecologist Richard Hobbs, a senior research fellow at the University of Western Australia’s School of Biological Sciences, says that “the assumption that species cannot adapt to new resources is being increasingly questioned.” He notes that “studies indicate that non-native species can have positive, neutral, or negative impacts, and it is not as simple as just assuming that non-native species are just plain bad.”

According to Tallamy, however, the positive cases are uncommon, and “you have to look at the negative as well as the positive effects.” He points to kudzu, a rampant invader of the eastern U.S. that has been found to support the silver-spotted skipper, a native butterfly. This has led some people to conclude that invasive non-native plants are not all bad. “With a kudzu invasion you may gain the silver-spotted skipper,” Tallamy responds, “but you lose literally thousands of species” that depend on the native plants the kudzu replaced.

Even among those who consider non-native plants a significant problem, there is some difference of opinion about the degree of threat that they pose. University of Connecticut’s Wagner, who has described the plight of insects as “death by a thousand cuts,” says “there’s no question that invasive species and the ornamentals we plant in our yards are taking a toll on insects.” Although they’re “super important stressors,” in

Wagner’s words, the truly destructive “cuts” are agricultural intensification, deforestation, and land use change. “Those are ones that are just wicked bad,” he adds, “and are making it tough for species to continue to live with humans on this planet.”

Tallamy says that in 2001, when he began to focus on this subject, “there was a whole lot in the literature on the problems caused by invasive species but wrecking the food web wasn’t one of them.” When he realized how large an area has been transformed by non-native plants, it struck him that this was a major issue. Nearly half of the planet’s land is now in some form of agriculture. According to the World Bank, almost 45 percent of the land in the lower 48 U.S. states is devoted to production agriculture, and this figure soars when the area occupied by rangeland and tree farms is factored in. According to the UN Food and Agriculture Organization, 44 percent of the world’s planted forests include non-native tree species; many have escaped from cultivation and now dominate nearby native forests. Tallamy and his co-authors also call attention to the fact that due in large part to the strong preference for exotic plants in landscaping, urban areas are rife with introduced species, and it’s estimated that these quickly growing areas could cover as much as 20 percent of the earth’s habitable land by 2030.

Some 96 percent of North American terrestrial birds rear their young on insects, so when insects decline, they do too.

Horticulture has been one of the primary proliferators of invasive non-native plants in natural and human-dominated landscapes alike. Studies show that 50 to 70 percent of invasive and naturalized species arrived in their new lands via the horticulture trade. And Tallamy points out that even if these ornamental plants never become invasive, they are still replacing the native vegetation that is critical for the survival of most insects.

In the words of a groundbreaking 2018 *Proceedings of the National Academy of Sciences* paper co-authored by Tallamy, “the widespread preference for non-native plants in the horticultural industry has globally transformed millions of acres from potential habitat into ‘food deserts’ for native insects, with the unintentional consequence of reducing the abundance and distribution of birds as well.” The paper was the first to provide data demonstrating that the decline of insects has cascading effects higher up the food chain.

For three years, lead author Desirée Narango, a postdoctoral fellow at the University of Massachusetts, Amherst, and a team of field assistants measured what happens to breeding Carolina chickadees and the caterpillars that are essential food for their chicks in the suburbs of Washington, D.C. Among their findings is that parent birds foraged for food on

native plants 86 percent of the time. Yards dominated by introduced plants produced 75 percent less caterpillar biomass than primarily native landscapes and were 60 percent less likely to have breeding chickadees at all. Nests that chickadees did build in yards with many non-native plants contained 1.5 fewer eggs than nests on properties dominated by natives.

The chickadees were able to achieve the so-called replacement rate — that is, produce enough chicks each year to replace adults that succumb to old age and predators — only in yards with less than 30 percent introduced plant biomass; unfortunately for the birds, Narango and her co-authors found that, on average, 56 percent of the plants in the Washington, D.C. suburbs are not native. They point out that if a common “urban-adapted” bird like the Carolina chickadee is limited by the relative lack of food in a typical suburban landscape, it may be an even bigger problem for birds with more specialized diets. What’s more, some 96 percent of North America’s terrestrial birds rear their young on insects rather than seeds or berries, so when insects decline, they do too.

For these reasons, Tallamy has proposed a domestic version of Harvard biologist E.O. Wilson’s Half Earth Project. If American homeowners converted half of their lawn to productive native plant communities, he says, they would create a “Homegrown National Park” larger than the Everglades, Yellowstone, Yosemite, Grand Teton, Canyonlands, Mount Rainier, North Cascades, Badlands, Olympic, Sequoia, Grand Canyon, Denali, and Great Smoky Mountains National Parks combined.

At the conclusion of their new paper, Tallamy and his co-authors concede that critical gaps in our knowledge remain. But they conclude that at this point enough studies have been completed and enough evidence gathered that, in Tallamy’s words, “we can now definitively answer the question, ‘Are alien plants bad?’ In terms of supporting insects, the preponderance of the evidence says yes.”

Janet Marinelli is an award-winning independent journalist who was director of scientific and popular publications at Brooklyn Botanic Garden for 16 years. She has written and edited several books on imperiled species and the efforts to save them. She also covers ecological approaches to creating resilient landscapes and communities. Her articles have appeared in a variety of publications, from *The New York Times* and Audubon to *Landscape Architecture* and *Kew* magazine.



Assessing the conservation benefits of revegetation

Source: Department of Environment, Land, Water and Planning

Across Australia, landholders, community groups and government agencies are actively carrying out revegetation activities. Whether plantings are for shelterbelts, woodlots or along creeks to reduce erosion, revegetation can provide habitat for native plants and animals, particularly in landscapes that have otherwise been heavily cleared.

ARI in partnership with La Trobe University and several land managers, non-government agencies and community groups have completed research to understand how revegetation contributes to nature conservation. We asked:

- What are the features of revegetation plantings that most increase their value for animals?
- Which species benefit most from revegetation in rural landscapes?
- Does the conservation value of revegetation change over time as plantings age and mature?
- What is a quick and robust monitoring technique to assess revegetation outcomes (survival, growth) and identify key factors that influence survival?



To answer these questions, we examined bird and butterfly communities in a large field study undertaken in Glenelg Hopkins region of western Victoria during 2019 and 2020. The study repeated bird and habitat surveys at more than 250 of sites surveyed in 2006/07. We surveyed across a range of revegetation types to help us understanding of how the value of revegetation for birds has changed over time.

We found that all revegetation activities had broad landscape scale benefits for both birds and butterflies, increasing both the number of species and community complexity. Many benefits of revegetation are realised in the first 15 years after planting, however for some species, such as those that rely on formation of hollows, the benefits will take many more years to emerge.

A monitoring method for land managers

This project also developed a monitoring method to help land managers and community groups to evaluate how well they are achieving revegetation goals. Our monitoring approach focused on the post-summer survival of revegetation which is the most critical time for establishment of plantings.

In 2019/20, we trialled the monitoring method at 65 sites across Victoria. It identified a range of responses across the survey area ranging from very limited planting success to high levels of survival. Unsurprisingly, rainfall and presence of tree guards had a significant influence on plant survival. Species selection was also important.

This research is designed to improve the efficiency of future investment programs and help achieve better conservation outcomes for revegetation activities. This project was funded by the Victorian Government.

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Bushfire response 2020 – impacts on reptiles and frogs

Surveys have helped determine the immediate impact of intense and extensive fires on reptiles and frogs

Source Department of Environment, Land, Water and Planning

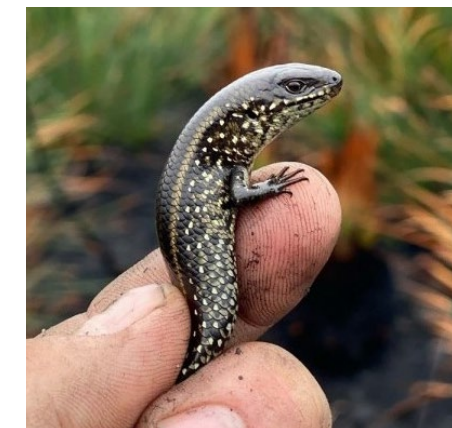
The late 2019 – early 2020 'Black Summer' fires were unprecedented in their impact and scale. Extensive tracts of the coastal side of the Great Dividing Range in south-eastern Australia were affected, with significant impacts on biodiversity.

Most reptiles and frogs have small home ranges, and even the larger, more mobile species are unable to escape large, fast-moving fires. For many, including some threatened species, eastern Victoria represents a large, and often the most secure and continuous, proportion of their state distribution. Field assessments of fire impacts and threats immediately after fires like this allows us to understand the impacts of the fires, the most immediate threats, and quickly implement recovery management actions.

ARI completed surveys within months of the fires, targeted at species particularly vulnerable to post-fire threats, such as those where:

- a large proportion of their known habitat was likely burnt (e.g. Gippsland Water Dragon)
 - they were known to be in decline before these fires (e.g. Alpine Tree Frog)
 - burnt areas were previously considered a stronghold of their distribution (e.g. Swamp Skink)
 - they have specialised habitat preferences (e.g. Alpine She-oak Skink)
 - they have ecological traits that may make them particularly susceptible to impacts from fires (e.g. Lace Monitor)
- Immediate and short-term impacts of these fires on reptiles and frogs identified during our surveys include:
- loss of shelter and habitats used for thermoregulation, foraging and predator avoidance

- massive amounts of ash and sediment washing into waterways, burying riparian habitats and smothering egg-laying sites for species such as Water Dragons, turtles and frogs
- reduction in food sources e.g. invertebrates
- increased exposure to predators, including foxes and feral cats, not only due to loss of habitat, but also because body colours and patterns that are usually camouflaged against the background now make the animal stand out



Despite the challenges of accessing fire-affected areas (some were unable to be reached), most of fire-affected East Gippsland and the alpine region were surveyed in the months before winter. There were mixed findings. Some species were not detected or only found in low numbers in burnt areas (e.g. Gippsland Water Dragon). For some species, most (but not all) of their habitat was unburnt (e.g. Alpine She-oak Skink), and others appeared to be more able to persist in burnt areas than most species (e.g. Yellow-bellied Water Skink).

Some key observations from the surveys include:

- habitats that don't usually burn easily, such as swamps, were severely damaged

- individuals of some species, such as Swamp Skink, were found sheltering in burrows in burnt habitat (although these may represent a small fraction of the numbers in those areas before the fires)
- adjacent burnt and unburnt riparian habitat showed striking differences in the number of Water Dragons
- all remaining shelter sites, such as standing trees (dead or alive), logs and rocks are essential for the persistence of the surviving reptiles and frogs who will be the founders for recovering populations

In addition, several species were unable to be properly surveyed due to access issues, such as the Alpine Bog Skink, Alpine Water Skink, Mountain Skink and Copper-tailed Skink. Confirming the status of these species in burnt areas is a high priority this spring and summer.

Concerns for remaining populations include ongoing exposure to introduced predators, further degradation of habitat from horse and deer trampling and grazing, and geographic isolation that may lead to a loss in genetic diversity. Dense vegetation regrowth can block sunlight from reaching key habitats, making them unsuitable or suboptimal for extended periods. Increasing frequency of fires can permanently change vegetation communities, sometimes rendering them unsuitable for reptiles and frogs that previously occurred there.

This work is informing management actions intended to prevent significant decline and maximise recovery potential.

This project was funded through the Victorian Government's Bushfire Biodiversity Response and Recovery program (Phase 1).

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Friends group convenors will be in touch with all volunteers with information about resuming working bees. Volunteers will be required to adhere to a COVIDSafe Plan, developed specifically for their program. Stay tuned for further information from your group conveners and volunteer leaders.

For more information contact Jo Hurse at Jo.Hurse@citywide.com.au



banksia

bulletin

Editorial Policy

The purpose of publishing the Banksia Bulletin is to circulate information, report on events, and to profile relevant environmental issues important to our community. The Bulletin is also published to support the network of people involved in enjoying and protecting our local environment.

Bayside City Council encourages people from our local community groups to submit articles of interest, share experiences and news about any upcoming events. All articles are reviewed prior to publication and Council reserves the right to omit or edit submissions.

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Disclaimer

The views expressed in the Banksia Bulletin are not necessarily those of Bayside City Council nor its representatives.

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Jewel Bug, *Scutiphora pedicellata*
Photo by John Eichler