Issue 54 - December 2020

Wombat Forestcare Newsletter

As we head into summer our attention turns to insects and in particular the pollinators of our indigenous flora. The Barking Owls bred successfully and scientists have been busy researching impacts on Greater Gliders and their genetics. **Gayle Osborne** (editor) and **Angela Halpin** (design)

Young Barkers

Words by Trevor Speirs

The previous issue of the Wombat Forestcare newsletter featured the discovery of a pair of Barking Owls *Ninox connivens* that had begun breeding in the Wombat forest. With the health restrictions limiting travel from early August it wasn't until mid- September, when things started being relaxed (in regional Victoria at least) that we could get back and check on their progress. Turned out it was worth the wait!

The first couple of return visits found both adults in pretty much the same area as before. However, with no chicks heard trilling, and the adults showing little interest in the assumed nest tree, we started to wonder whether something might have gone amiss. The frequency of the adults calling had also tapered off although the male was often heard giving low grumbles at dusk. At first it was thought this might have been a reaction to our presence, albeit distant, but the song meter revealed the same grumbly sounds throughout the night, suggesting it was most likely to be a contact call.

The young Barking Owl emerged from the nest hollow and perched high on a branch in a Candlebark, exposed to strong winds. Photography © Gayle Osborne.

The young Barking Owls are intensely curious while the mother remains unconcerned. Photography © Gayle Osborne.

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The family together. Within a week the owls had left the breeding area. Photography © Gayle Osborne.

Fortunately our concerns were unfounded, as on the 1st of October it was very exciting to see a juvenile owl perched high, and somewhat exposed, on an open branch and the adult female in a neighbouring tree. The following week the juvenile was in a much less vulnerable perch, hidden amongst the foliage of a leafy peppermint, closely attended by the female. Just when we thought this was going to be a one chick family, on the 13th of October it was a very pleasant surprise to see another juvenile had joined its sibling. Maybe we missed it on the last visit. This time it was the whole family, well-camouflaged in the same peppermint. There were to be no further additions to the family. One to three eggs can be laid, with two being the norm.

The depths of winter might not seem the best season for breeding, but the increase of prey species, especially birds, from late autumn when breeding begins until mid-spring when the young emerge from the nest, is quite noticeable. Migratory bird species, including Fan-tailed Cuckoos, Shining Bronze-Cuckoos, Sacred Kingfishers and Olive-backed Orioles had all arrived and were calling constantly. Yellow-tufted and Fuscous honeyeaters were also reasonably abundant.

An analysis of 13 regurgitated pellets collected over the breeding season from below the owls' various roosts revealed 26 items of prey. Of these, birds made up 10 items, European Rabbits 7, Sugar Gliders 5, insects 3 and possum 1, probably a young ringtail. Barking Owls are known to be large consumers of insects, especially beetles, particularly outside the breeding season, but when there are young to be fed the extra biomass gained from mammals is essential.

Arboreal mammals, particularly the Squirrel Glider, are a preferred prey of the Barking Owl in northern parts of Australia but with the decline of this species of glider in Victoria, European Rabbits, as can be seen from the pellet analysis, have become an important prey item. Being an established pest in Victoria, land owners are expected to control, or attempt to control, the European Rabbit on their land and this is sometimes done with the use of an anticoagulant product like Pindone, which is readily available. Anticoagulants have been suggested as a possible reason for the decline of the Little Eagle, a large consumer of rabbits, in NSW and the ACT. We know anticoagulants have seriously impacted Boobook Owl populations in WA (consuming poisoned rats) but I haven't read or heard of any studies showing them having an adverse effect on Barking Owls. This could be because Barking Owls don't usually eat parts of the rabbit (the innards) where the poison is most concentrated. Still, it's an issue of which relevant Landcare groups should be made aware.

By the second week of November the Barking Owl family couldn't be found in the breeding area or the near vicinity. This is approximately 5 to 6 weeks after the first juvenile appeared out of the nest and this roughly coincides with a study of breeding Barking Owls in NSW where the family also left the breeding area around a month post-fledging. Young Barking Owls are dependent on their parents for several months (up to 5) after fledging, a similar time period to the Powerful Owl young.

Barking Owls are known for their faithfulness to particular sites. I'm aware of one spot in Central Victoria where Barking Owls have been breeding regularly for at least 35 years. How long our owls have been breeding at the Wombat site is, of course, unknown, but following this season's success there is every chance they will return to do it all again next winter. ■

Breaking News: Greater Gliders are three distinct species

By Gayle Osborne

Denise McGregor undertook her PhD project, at James Cook University, to examine the relationships between thermoregulation and body size across the northern and southern distribution of Greater Gliders *Petauroides volans*, and as a result of taking DNA samples, three taxa have been confirmed.

There has been a long-held theory that the Greater Glider was multiple species, but there was a lack of published data and evidence.

A team of researchers from James Cook University, The Australian National University, the University of Canberra and CSIRO analysed the genetic material from the PhD project as well as from museum specimens, and confirmed that there are three distinct species: *Petauroides volans*, *Petauroides minor* and *Petauroides armillatus*.

Denise said that their research only identified three species, and it is possible there may be more species as their data set was not exhaustive and lacked samples in NSW.

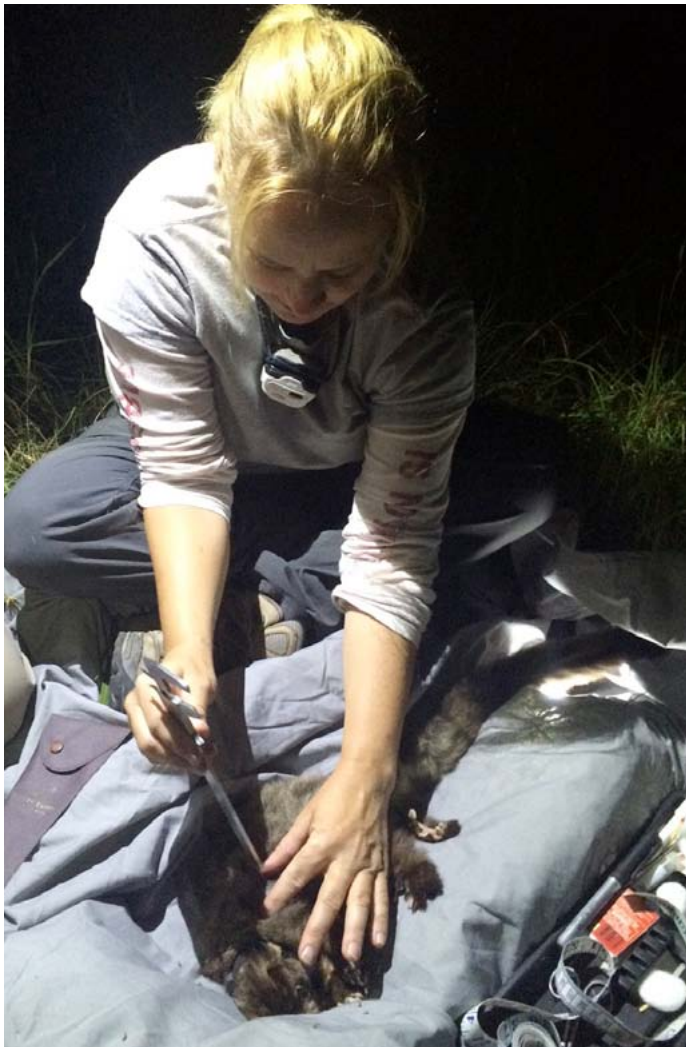
Greater Glider researchers have largely ignored the Wombat State Forest and we were pleased that Denise and her co-researchers have included the Wombat in the research project. She noted that they "found no significant difference in Greater Glider body measurements between the two southern sites (Wombat and Bendoc)". *Petauroides volans* would be retained as the most southerly distributed species from Bundaberg in Queensland to the Wombat forest in Victoria.

It is of great interest that Denise will publish other papers in the near future that will focus on gliders from Wombat and other areas, looking at comparisons in home range and habitat use between different populations. This research will also include tree hollow temperatures and will investigate glider metabolic rates, examining the thermal neutral zone of gliders from the different species.

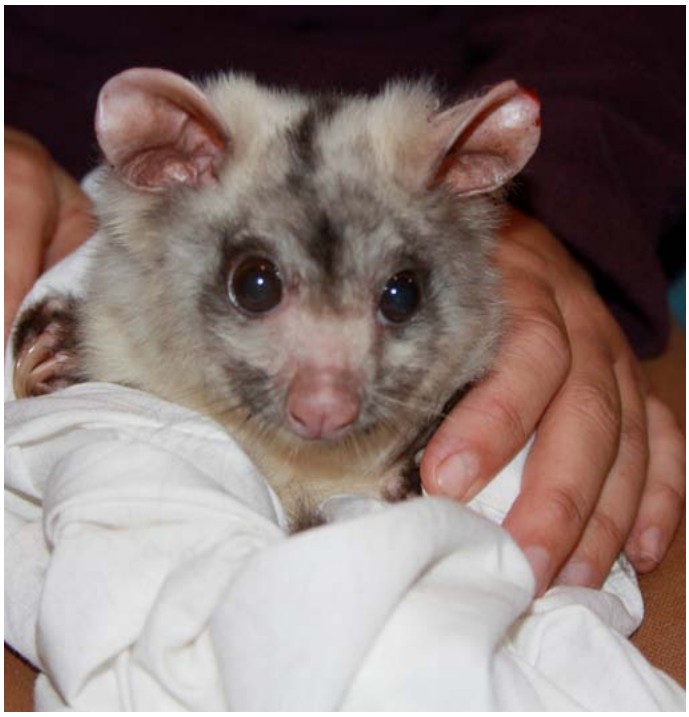
The establishment of three species will have implications for the conservation status of Greater Gliders, given that there are now new species with smaller geographic ranges than the previous widespread distribution. This new information does not alter their distribution in Victoria as *P. volans* remains the only Greater Glider species in Victoria, however it is important to note that the division of *P. volans* into three species reduces its overall geographic distribution and significantly reduces its total population size.

This discovery highlights the importance of rigorous research and it is to be hoped that both the State and Commonwealth governments act quickly to incorporate this research into policy to protect all the Greater Glider species.

We congratulate Denise McGregor and the team of researchers. ■



Denise measuring *Petauroides minor* at Taravale, Qld.
Photograph supplied by Denise McGregor.



Petauroides volans about to be fitted with a radio tracking collar.
Photograph supplied by Denise McGregor.

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Petauroides armillatus – Central group. Photography © Jasmine Vink.

Reference

McGregor, D.C., Padovan, A., Georges, A. *et al. Genetic evidence supports three previously described species of greater glider, Petauroides volans, P. minor, and P. armillatus. Sci Rep* 10, 19284 (2020).

https://www.nature.com/articles/s41598-020-76364-z

Petauroides minor – Northern group. Photography © Denise McGregor.

Too hot to eat?

By Gayle Osborne

Greater Gliders, a once common species, are quickly becoming rare, and are drastically declining in Victoria. We need to know whether these population declines are also happening in the Wombat forest.

This year, the Biolinks Alliance symposium concentrated on two threatened species, Greater and Squirrel Gliders, and it is the new research into Greater Gliders *Petauroides volans* that is very relevant to the Wombat forest. Of particular interest was a presentation by Dr Kara Youngentob from the Australian National University (ANU) titled "*Overlooked driver of decline - the influence of temperature on food intake in arboreal folivores*"

Warm-blooded animals eat less as temperatures increase, a fact that is understood by farmers of livestock, but widely overlooked by wildlife researchers. Food intake creates heat, and as Kara said "Eating makes us hot."

Kara looked into the effects of elevated night-time temperatures on Greater Gliders, as this is when they feed. She referred to research at a laboratory at the ANU into ringtail possums that showed a dramatic reduction of intake of food at 26°C and possums mostly laying on their backs and panting at 27°C.

Kara asked us to consider the factors that put a species at risk of extinction:

- Water derived mostly from their food.
- The animal uses more energy to consume food than it is able to gain.
- Diets high in fibre and low in available nutrients. Such diets mean that an animal cannot store a lot of energy and therefore cannot live very long between meals (low energy reserves).
- Restricted feeding times.
- Toxins are present in the food they eat. Heat stress reduces an animal's ability to metabolise and excrete toxins. Some of these toxins produce their own heat and some are diuretics.

All these risk categories apply to Greater Gliders. Kara said, "research has shown that fasting for even one night can prove fatal (to Greater Gliders)."

Water intake in warm weather is important for Greater Gliders. They do not sweat and in hot conditions, they control their body temperature by licking their fur.

Kara pointed to studies in Victoria, the Blue Mountains and Booderee National Park (NSW) where high night-time temperatures could be a factor in Greater Glider population declines.

In his keynote address, Prof David Lindenmayer discussed the disappearance of Greater Gliders, in 2007, from the Booderee National Park in NSW, an area that is not subjected to logging nor has had a recent large scale bush fire. Kara noted that this followed a period of extremely high night-time temperatures.

According to Kara, night-time temperatures over 20°C for Greater Gliders, at least for the southern population, can reduce their capacity to function.

Kara listed what we still need to know. "How variable are responses within and between populations and what mechanisms drive that variability (i.e. acclimatisation, learnt

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behaviour, genotypes)? Also, how does the nutritional quality and moisture content of the leaves consumed affect the Greater Glider's resilience or susceptibility to thermal stress?

She said that "resolving these issues will help to identify climate change refugia."

It will be of interest to our group to access overnight temperature records for the Wombat forest. We should also consider the effects of variations in night-time temperatures on the gliders as temperatures often drop by early morning.

Another excellent presentation was given by Ben Wagner, PhD candidate "*Predicting habitat suitability for greater glider (Petauroides volans) using remote sensing: implications for conservation planning*".

Ben is studying the interaction between forest nutrition, changes in foraging quality and climate, using a combination of Unmanned Aerial Vehicle (UAV) based remote-sensing, field validation and landscape modelling to predict habitat for Greater Gliders.

In his talk, Ben discussed the role of tree nutrition on the occurrence of Greater Gliders. As the gliders only eat eucalyptus leaves and buds, they need to eat leaves with a high percentage of nitrogen, which they can convert into protein.

The leaves of trees where gliders were seen foraging in East Gippsland were analysed for nitrogen and were found to be higher in nitrogen than species where no gliders were observed. Messmate *Eucalyptus obliqua*, Swamp Gum *E. ovata*, Narrow-leaved Peppermint *E. radiata* and Manna Gum *E. viminalis* were all found to be high in nitrogen. Young leaves were found to have the most nitrogen and nitrogen content was found to increase with altitude.

In the Wombat forest we have observed Greater Gliders in Messmate and Narrow-leaved Peppermint, as well as either Manna Gum or Candlebark *E. rubida*. Due to the difficulty in differentiating between these species we have just had to record them as gum-barked species. To date we have not observed any Greater Gliders in Swamp Gum dominated areas.

One evening, two gliders were observed eating in the canopy of a small Narrow-leaved Peppermint in the Wombat forest. This was one of the rare occasions that we have been able to document the actual feeding.

Populations of gliders are found in the southeastern part of the Wombat forest in Mountain Grey Gum *E. cypellocarpa* dominated forest. This species is not quite as rich in nitrogen as the above listed species.

In the Wombat forest we continue to establish where the populations of Greater Gliders occur so we can see the extent of their ranges. The forest is fragmented by roads, which keeps some populations isolated. In some cases logged areas may also restrict movement. In some habitats with hollow-bearing trees close to glider populations we have failed to find gliders. We need to re-survey these sites, as although gliders are easy to spotlight, we might not have been in the right place at the right time. Gliders can emerge from their hollows at dusk, while others emerge up to two hours later.

We will play closer attention to night-time temperatures when spotlighting. High temperatures could explain why sometimes we don't find gliders. We tend to spotlight just after dusk as we can see gliders emerging from their hollows before they disappear into the canopy to feed, but this is when temperatures can remain high. Temperatures tend to fall after midnight.

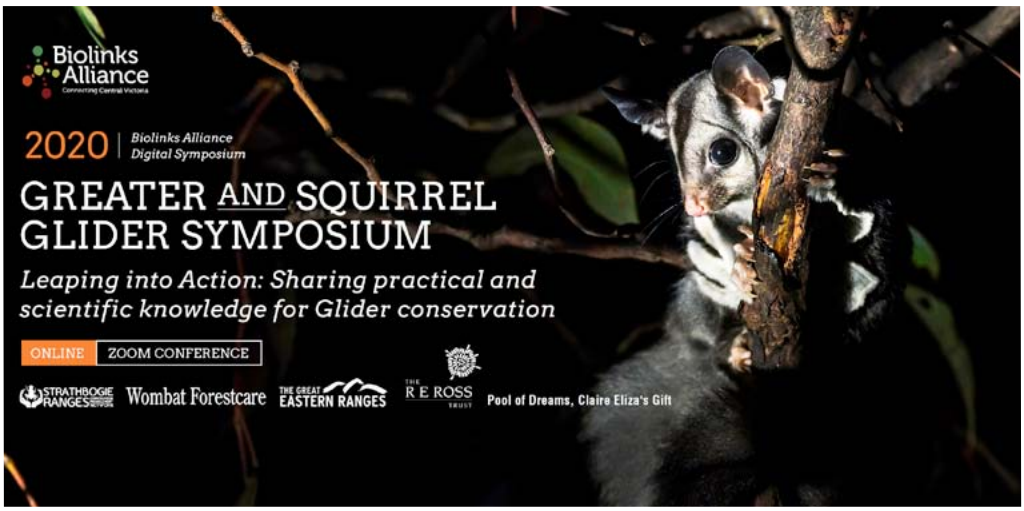
The composition of Eucalyptus species in the Wombat forest is favourable for Greater Gliders. Narrow-leaved Peppermint dominate the ridges, Messmate is common and there are gum species in the gullies.

We need to establish whether we are recording gliders in Candlebarks or Manna Gums. In the south of the Wombat, Broad-leaved Peppermints *Eucalyptus dives* dominate the ridges and we need to check whether Greater Gliders are using this habitat.

The Department of Environment, Land, Water and Planning has set up a long-term Greater Glider monitoring project with multiple sites. This should help to establish whether the Wombat glider populations are stable.

The research covered in the symposium has given us much to think about.

The Biolinks Alliance symposium was outstanding; keynote speakers were leading scientists, the latest research explained by researchers, interesting Q & A sessions and the entire symposium was recorded and is available to watch by going to the website. ■



Reference

https://biolinksalliance.org.au/greater-glider-and-squirrel-glider-symposium

Promoting Pollinators – a new project for the UCLN

Words and images by John Walter

The Landcare movement has been a part of my life since December 1997 and I am currently the President of both Malmsbury District Landcare Group and the Upper Campaspe Landcare Network (UCLN). While I have worked on a great many interesting and exciting projects over the last 23 years, I think the latest project organised by the UCLN is the most exciting one of all. This project seeks to establish pollinator corridors throughout the upper Campaspe region over the next decade and was officially launched during Pollinator Week in November 2020.[1]

Planting to increase biodiversity is a key aspect of the project, but we want this to have a science base and the UCLN has engaged pollinator expert Mark Hall from Western Sydney University[2] to assist in the design of the project. Mark will undertake a series of baseline surveys of pollinator species at numerous reference sites established in a variety of habitats across the district, ranging from bushland, to gardens, to farmland, to parks & reserves and to riparian zones, among others. These sites will be linked to the proposed pollinator corridor sites and will be monitored over coming years to identify any changes in the pollinator species and population size.

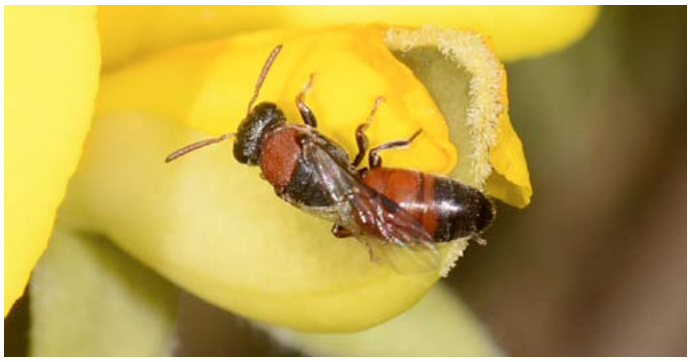
We are currently seeking partner organisations who are prepared to make a financial contribution to the research aspect of the project and allow us to provide for the right number of hours in the field to conduct these vital baseline surveys.

For most of us, the term pollinators immediately brings bees to mind, but there is a wide range of other insects that are essential pollinators along with many bird species and both small and medium sized mammals. Before I introduce you to some of our many pollinators, I should apologise for mistakenly identifying a beautiful little *Lasioglossum* species as a "Blue-banded Bee" in our June issue. I have spent a great many hours studying our native bee species since then and now have a much better understanding of their diversity and taxonomy.

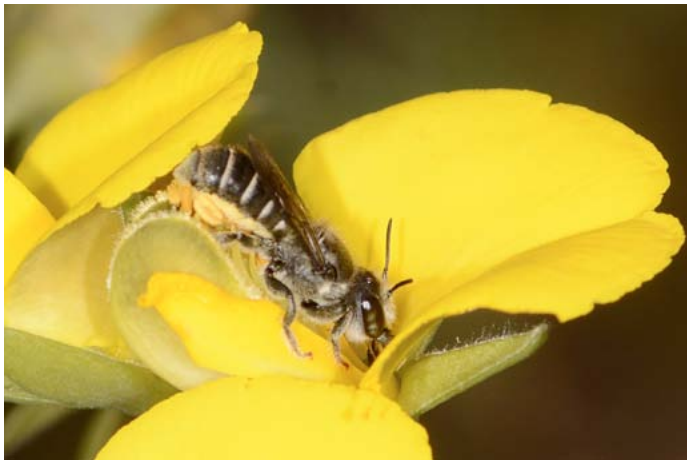
Some flowers seem to attract a wide range of insect pollinators and one *Gompholobium huegelii* plant I watched attracted eight different species in just over an hour. One visitor was a beautiful red and black wasp-like member of the bee genus *Hylaeus*. The bees in this group are mostly hairless and cannot transport pollen back to their nests on the outside of their body like many other bees. Instead, they ingest the pollen, mixed with some nectar, and transport it back to the nest in their crop where it is regurgitated into the cells built for their larvae. They generally nest in existing holes such as those left by boring insects and some may use the old nest tunnels left by other bees or wasps.

Another visitor was a *Megachile* species which specialise in transporting pollen on specially branched hairs called scopa on the underside of their abdomen. They are "lodger" bees utilising existing holes or cavities for their nests which they upgrade by cutting and transporting leaf segments (Leaf-cutter Bees) or plant resins (Resin Bees) back to line the nest.

Yet another visitor was an *Exoneura* species, one of the Carpenter bees, so called as they often excavate their own nest burrows in wood. The *Exoneura* also often nest in the old canes of blackberry or garden plants like roses and, in the wild, in the old flower stems of *Xanthorrhoea* species. They have scopa on their hind legs and a distinctive flattened upper surface to the tip of their abdomen. This flattened section of



This image of the red and black *Hylaeus (Rhodohylaeus) proximus*, the Proximate Masked Bee, made the banner of our iNaturalist UCLN Pollinator Hunters group.



The female *Megachile* sp. collects pollen onto the underside of her abdomen while simultaneously supping on the nectar.

the abdomen is pressed against the inside of the nest entrance to prevent the entry of predatory or parasitic wasps.

Not all the visitors were bees however and another potential pollinator on the *Gompholobium* was the beautiful Fringed Blue Butterfly, *Neolucia agricola*.[3] The larvae of this species feed on the flowers and flower buds of many Fabaceae species. This one was clearly taking nectar from the flowers although it was not able to expose the anthers and come into contact with the pollen, unlike the *Megachile* sp. which is perfectly adapted to part the wings and lower the keel of the flowers to ensure it has good access to the pollen while it is simultaneously taking up the nectar.

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Some of the other genera of native bees you might find include the *Homalictus*, the *Leioproctus* and the *Trichocolletes*. Where are all these bees coming from, I hear you ask? There are over 1600 described species of native bees in Australia and the prime reason we do not see them is because we are not usually looking. I have been astounded by the diversity of bees and other insect species I have seen since I began sitting down next to a shrub in flower (camera in hand) and waiting for a few minutes to see who might come visiting. There will be opportunities for members of the public to become involved in the UCLN project in 2021 with Citizen Science activities and seminars and field days and many of the local Landcare groups will also have their own associated activities.

If you would like to participate in spotting, photographing and recording our local pollinators, you can join our group project on iNaturalist. Sign on to iNaturalist and search "UCLN Pollinator Hunters" in the projects section and join the project.[4] That is all you need to do, and any pollinator insect, bird or mammal records you post on iNaturalist, (where the location is within the UCLN area) will automatically be listed in the project. Our experts will keep a lookout and attempt to identify your finds. Please list the name of the plant species your pollinator is on in the Notes area to help us learn more about our pollinators and their behaviour.

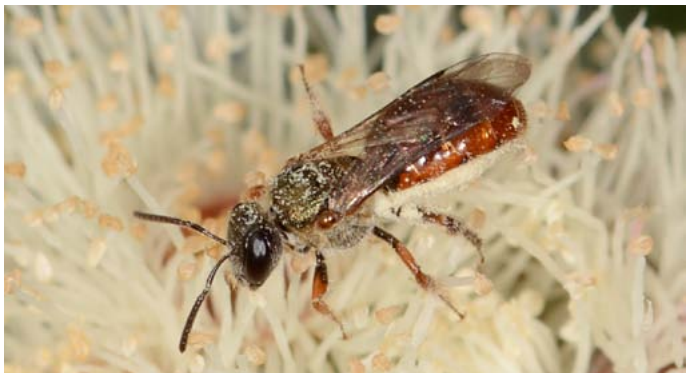
The image for the *Trichocolletes* species appears on the following page, but on checking you will notice that these bees could be confused visually with the European Honeybee, *Apis mellifera*. Their behaviour is quite different however and they are much faster flyers. This male has staked out a *Daviesia leptophylla* bush in the hope of finding a visiting female.

A great many other insects are active pollinators, including beetles which are represented in this article by the black and white Pin-tail Beetle, *Hoshihananomia* sp. This is one of the larger species and is around 8mm long. There are lots of smaller species of Pin-tails too, and they are often seen on our native flowers along with many other beetle species.

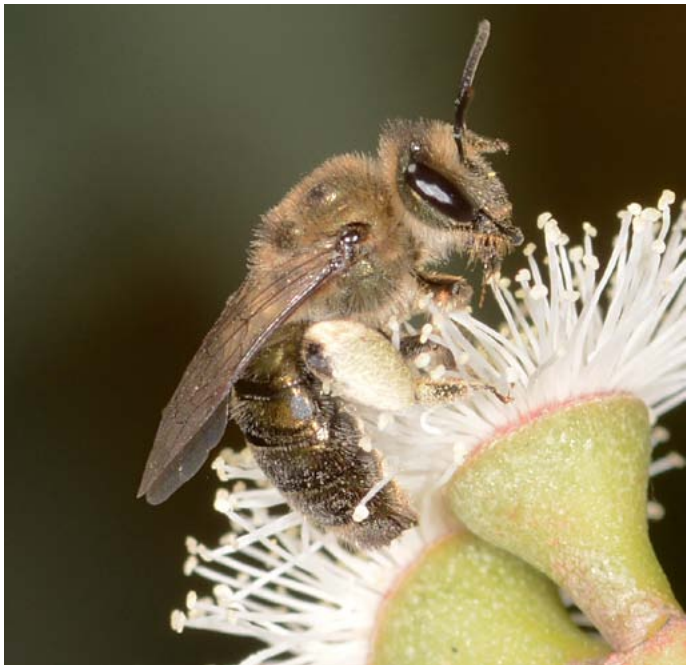
The moths and butterflies are also active pollinators, with some species like the *Oenogenes fugalis* visiting flowers in daytime to feed on the nectar. These moths are often long-lived species (one to three weeks for most species that have feeding abilities) that are seeking nectar to prolong their active life. I first saw this moth species on the xerochrysums

Note the flattened abdomen and shiny black thorax of the *Exoneura* sp.

The Fringed Blue Butterfly, *Neolucia agricola* looks good on the flowers but in this instance it is just taking nectar and not benefitting the plant by pollinating it.



This *Homalictus* sp. is another bee that gathers pollen on the underside of its abdomen.



The shimmering green/gold colours of this *Leioproctus* sp. make it standout on the Snow Gum flowers.

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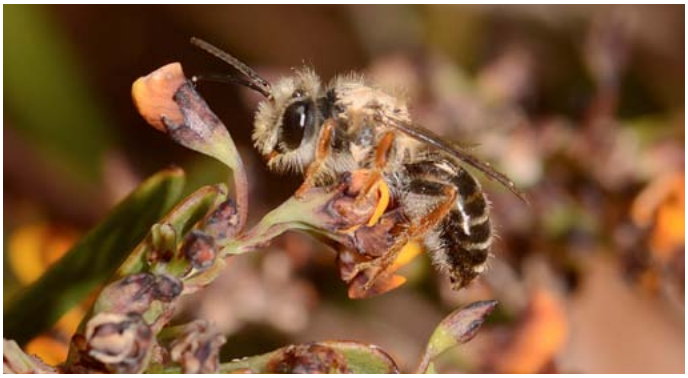
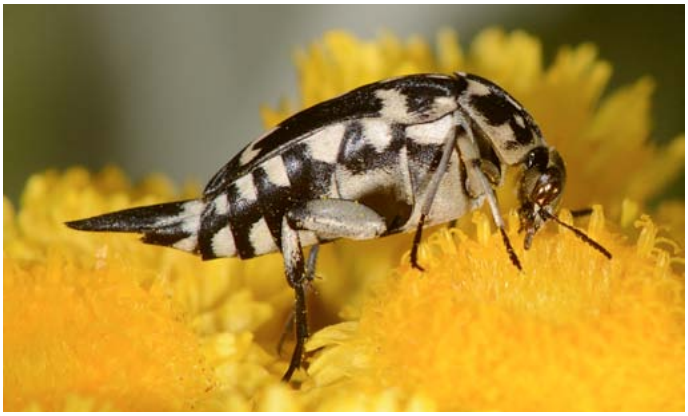
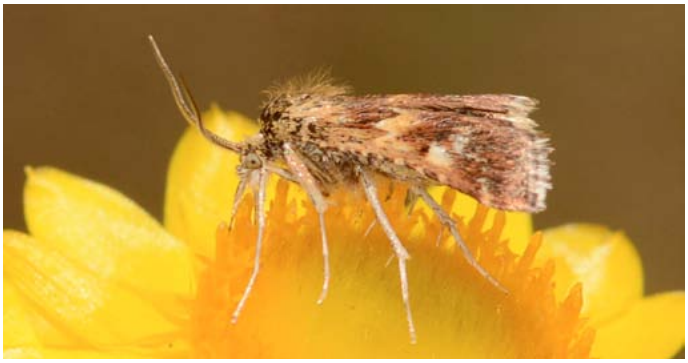


Male bees like this *Trichocolletes* sp. often stake out plants waiting for a female to visit. If you think of the plant as being like a club or wine bar, you will get the picture.

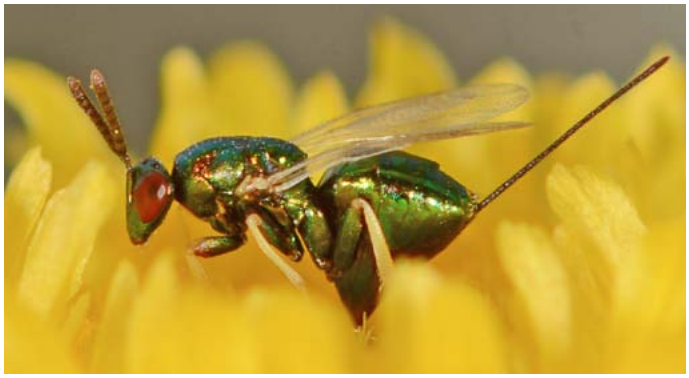


Pin-tail beetles like this *Hoshinananomia* sp. are common visitors to *Myrtaceae* and *Asteraceae* flowers but bury their heads or drop off the flowers quickly when you approach with a camera.



For this *Oenogenes fugalis* moth every day is a bad hair day.

Flies like this Common Drone Fly, *Eristalis tenax* have short antennae and only a single pair of wings. Bees and Wasps have long antennae and 2 pairs of wings. The two whitish semi-circles between the wings are the club-like halteres that remain from the second set of wings.



Metallic green with red eyes and oversized hind legs on a body just 3 mm long. Wow! The world of insects is so amazing that I am certain I will find another creature that will outshine even this little member of the *Torymidae* wasp family.

on November 18 and my last photograph was December 9 in which the individual was looking quite tatty. There is also evidence that some moths are after dark flower visitors, but there is little study of night pollination based on Australian species although there are some studies from Europe available.

Flies and wasps are also known to be pollinators and are frequent visitors to the plants on my property. The Common Drone Fly, *Eristalis tenax*, is another species often confused for a honeybee. It has a preference for yellow flowers and consumes the pollen that gathers on its legs and body. The little green wasp has a body length of 3mm so is generally overlooked but is a beautiful creature when seen close up. It is a member of the Torymidae family and is probably a *Torymoides* species, but I will let the experts make that determination. It is not there for the pollen or nectar but is a parasitic species most likely searching for insect larvae in which it will lay an egg using its comparatively large ovipositer.

While the images illustrating this article focus on insect pollinators, the UCLN project is also looking at other pollinators such as our many species of honeyeater and small mammals such as the Feathertail Glider, the Sugar Glider, the Eastern Pygmy Possum and some of our bats. They are all easier to identify than the myriad of native bees, but it may be possible to determine some images of native bees to species level. While that is not likely to be the normal scenario, if your images show some details of the veins in the wings, that will help determine the family and sometimes the genus. Many bees must be examined microscopically (or even internally) to identify the correct species name.

I mentioned my error regarding a *Lasioglossum* species of bee earlier, but I have not discussed them further and would like to include some information about this genus of native bees. The *Lasiogossum* genus has been broken up into eight different subgenera although most Australian species belong to just two of these, the *Chilalictus* and the *Parasphecodes*. The subgenus is generally written in parenthesis after the genus, *Lasioglossum (Chilalictus)* sp. They vary greatly in size, from just 3mm to 12mm and are the genus you will most likely encounter as they visit such a wide variety of

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flower types. We have over 250 different species in Australia with around 100 occurring in Victoria.

The images included here depict species of both these subgenera as well as some other interesting activities such as "bubbling" and how one species uses its hind legs to expose the anthers on *Podolobium procumbens* flowers and then gathers the pollen. You do not have to have a camera to enjoy the antics of our many pollinators and you will be surprised at what you find and see once you stop to look closely at the flowers in a garden or in the bush. The native bees will be about until the heat of late summer and will then return in the autumn as another group of host flowers become available. ■

Notes

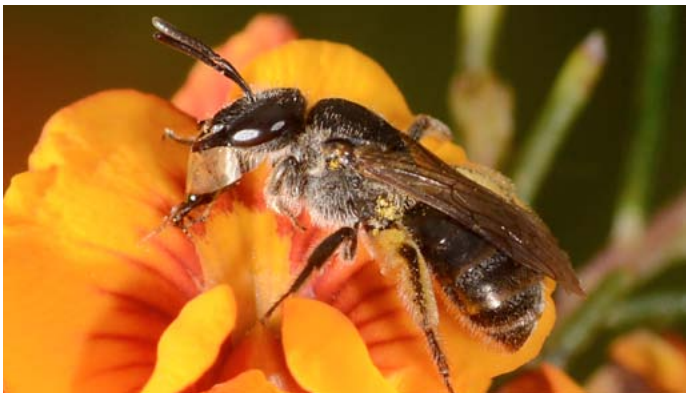
1. Visit the UCLN website and view a number of pollinator related short videos. https://www.uppercampaspelandcare.org.au/

   Click in the recent links on the lower right of the page or try some of the links below.

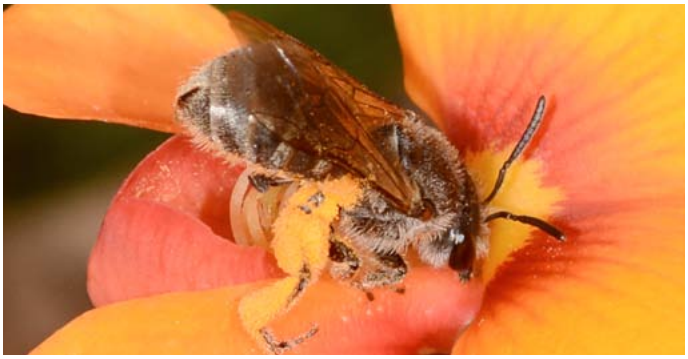
   https://www.uppercampaspelandcare.org.au/a-little-more-about-pollinators-with-doctor-mark-hall

   https://www.uppercampaspelandcare.org.au/ucln-president-john-walter-teaches-us-how-to-site-and-record-pollinator-sightings/

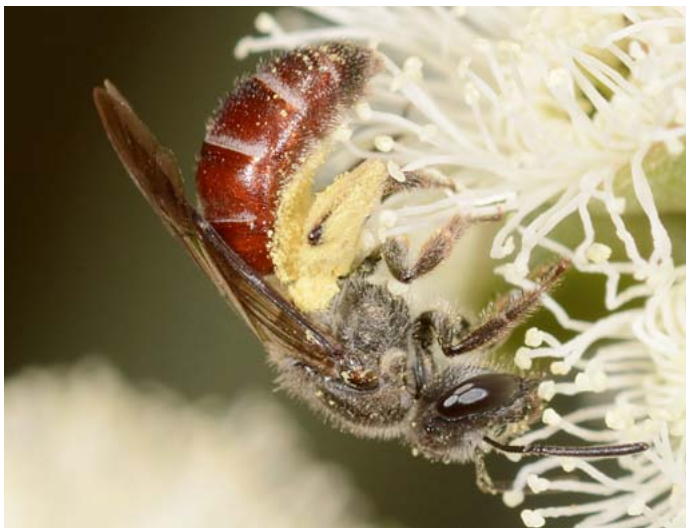
   Look around the site as there are several other videos on making simple bee hotels and water puddlers.
2. Mark Hall's impressive profile can be accessed at https://www.westernsydney.edu.au/hie/people/postdoctoral_fellows/doctor_mark_hall
3. Sometimes called the Fringed Heath-blue.
4. https://www.inaturalist.org/projects/ucln-pollinator-hunters?tab=observations



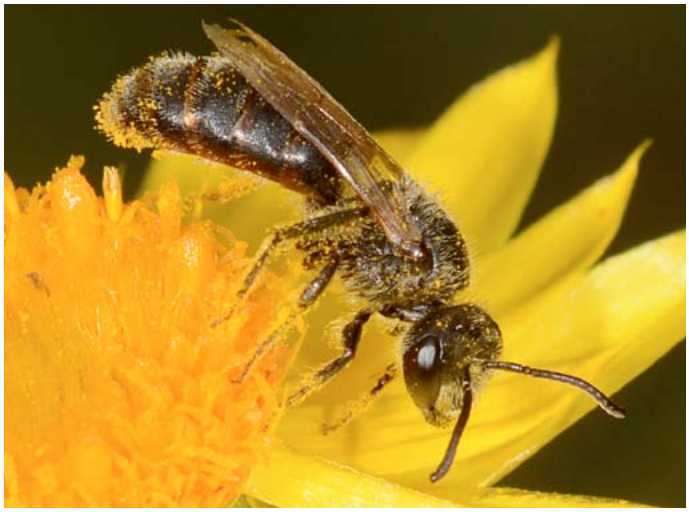
A *Lasioglossum (Chilalictus)* sp. is regurgitating nectar from its crop back onto its tongue where it evaporates a little and concentrates. It is soon after swallowed and then regurgitated again. Sometimes called "bubbling" this activity is widely practiced in the bee world.



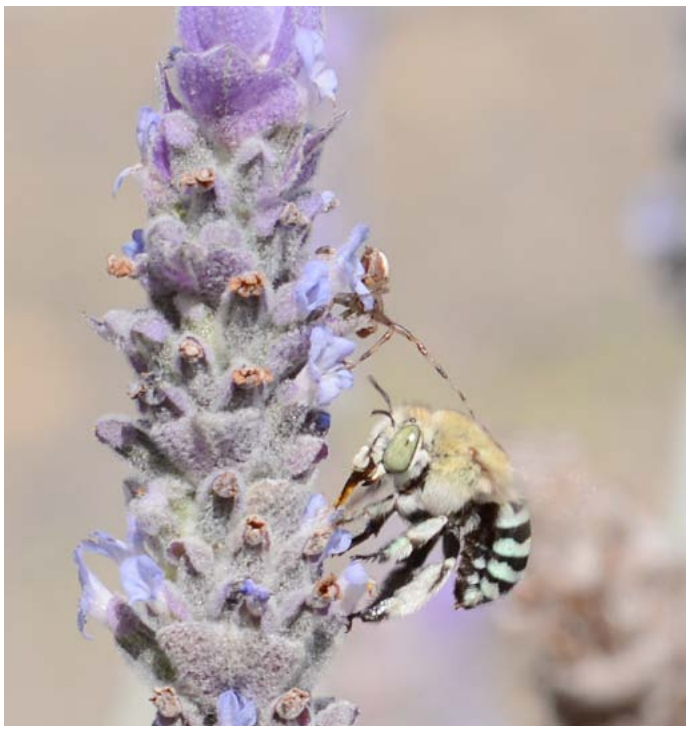
A different species of *Lasioglossum (Chilalictus)* extends its hind legs to expose the pollen laden anthers of *Podolobium procumbens*.



Members of *Lasioglossum (Parasphecodes)* often have a red abdomen and this one collects pollen primarily onto its hind legs although it can also hold pollen on its abdomen.



This *Lasioglossum (Chilalictus)* sp. is a male and has no scopal hairs for storing pollen but it still manages to gather a fine dusting.



Here is a genuine Blue-banded Bee, *Amegilla* sp. (with spider attendant) for those who noticed my error back in June.

What is pollinating the *Bossiaea vombata*?

Words and images by Gayle Osborne

The Wombat Leafless Bossiaea *Bossiaea vombata* is only known from four sites in the Wombat forest. If you want to know more about this special plant, read Natalie Cursio's article in our March 2020 newsletter.

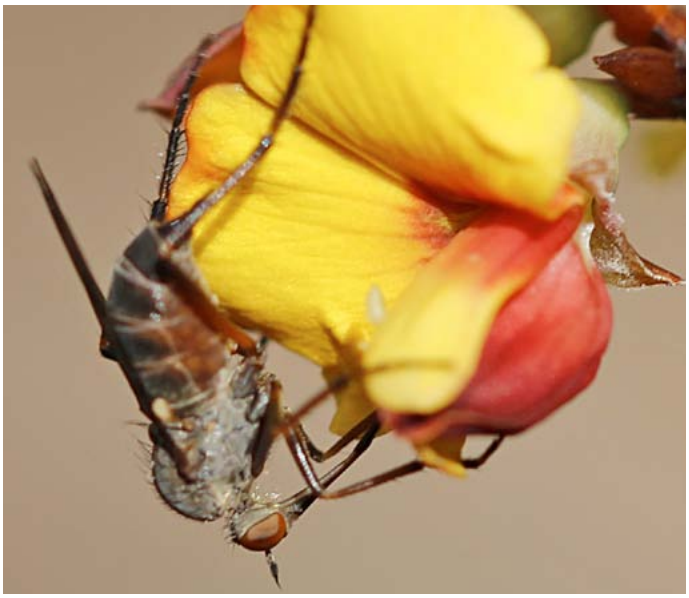
Natalie noted "so far, only clonal reproduction has been observed occurring naturally, leading to the suspicion that *B. vombata* cannot produce viable seed even though it has been seen with numerous seedpods."

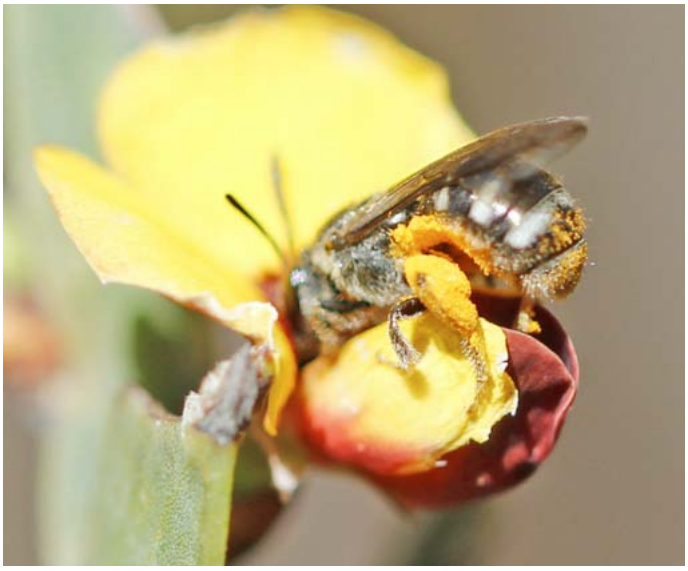
It is possible that the distance between individual plants is too great for the pollinators to fly. With that in mind, I visited the bossiaea twice this spring in order to photograph insects visiting the flowers.

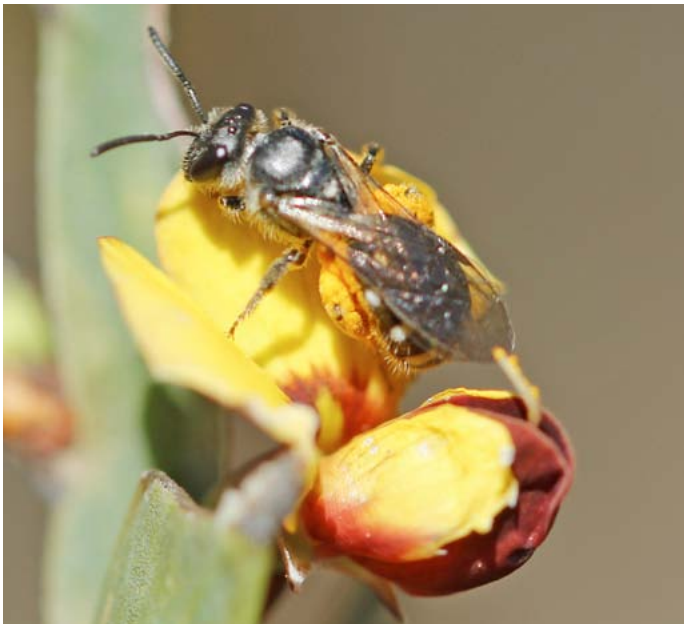
On my first trip, I saw a fly with a very long proboscis visiting the flowers and this has now been identified as a Dagger Fly of the family Empididae. They are called Dagger Flies due to the long proboscis. Species of this family are predators of various arthropods, although some visit flowers to take nectar.

On my second visit to the bossiaea, there were indigenous bees with large quantities of pollen packed on the bristles of their hind legs. They were *Lasioglossum (Chilalictus)* sp.

A Dagger Fly extracting nectar from a *Bossiaea vombata* flower.







While this bee, *Lasioglossum (Chilalictus)* sp. takes nectar from the flower the stigma is exposed, which has hopefully been fertilized.

and are important pollinators of many pea species. The bee lands on the pea to take nectar and then pushes down on the wings of the flower with its rear legs. The wings separate and push on the keel petals exposing the sexual parts allowing pollen to be deposited from the anthers onto the bee and the collected pollen from another flower to be deposited on the stigma, thus pollinating the pea.

The failure of the many pods to develop viable seed may be a combination of the distance between plants and a lack of suitability of the plant's own pollen to produce a viable germ given that each bossiaea population consists of multiple suckering stems of the same plant. ■