

Your guide to the
**INSECTS OF
CENTRAL VICTORIA**



INSECTS OF CENTRAL VICTORIA

Acknowledgement of Country

The Upper Campaspe Landcare Network, Wombat Forestcare, Macedon Ranges Shire Council, City of Greater Bendigo, Hepburn Shire Council and Mount Alexander Shire Council acknowledge the Dja Dja Wurrung, Taungurung and Wurundjeri Woi-wurrung Peoples as the Traditional Owners and Custodians of this land and waterways. We recognise their living cultures and ongoing connection to Country and pay respect to their Elders past, present and emerging.

Acknowledgements

This booklet was prepared by the Upper Campaspe Landcare Network (UCLN) in conjunction with our partners at Wombat Forestcare (WFC), Macedon Ranges Shire Council (MRSC) and City of Greater Bendigo (CoGB). Hepburn Shire Council and Mount Alexander Shire Council have also been enthusiastic supporters of this project.

The layout draws on previous publications on birds and native flora by Macedon Ranges Shire Council and a publication on weeds prepared in conjunction with other shires and Landcare before that.

John Walter has led the project on behalf of the UCLN and has been the major contributor both in the provision of images, species selection, text and the layout discussions. Dr. Mark Hall of Western Sydney University, and more recently from CoGB, provided the introductory text for each insect group as well as species identification support. Krista Patterson-Majoer from MRSC and Michelle Wyatt from CoGB have been enthusiastic supporters from the start and Gayle Osborne of WFC not only provided support to the project but also contributed to our knowledge of the local insect diversity.

Thanks to Chris McLean for providing critical feedback on the guide and Heather Hoare (Pixel City Design) for the layout, graphics and assistance with printing.

All images are by John Walter unless otherwise marked by the initials of the photographer. Other photographers are Gayle Osborne (GO), Lynda Wilson (LW), Euan Moore (EM), Albert Golden (AG), Andrew Allen (AA), Brian Bainbridge (BB), Shiloh Ritchie (SR) and Roger Standen (RS).

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PURPOSE AND LAYOUT GUIDE

Purpose

This guide began as an important component of the UCLN Pollinator Corridors project. The project aims to increase habitat, the diversity of pollinators, and pollination activities in our natural environment and gardens by linking and enhancing suitable patches for our insect, bird and mammal species.

We are conducting two years of initial insect surveys to establish a baseline against which we can measure the results of our revegetation activities over the coming decades. A huge part of this project involves community interest and engagement, and we hope that the production of this guide will increase awareness about our fascinating insect fauna and the critical role they play in sustaining our environment.

While it is not possible to cover more than a few species in a guide of this size, we believe you will readily find many of the species illustrated here in your garden or nearby bushland. Other species have been included to demonstrate the diversity of insects and yet others to illustrate the bizarre forms some insects take. We hope that this guide helps you determine if your latest insect find is a bee or a wasp, or to separate a bug from a beetle. You may also recognise that flies are sometimes beautiful and that even termites have their role to play. Above all else, we hope that you will take some time to explore the fascinating world of the insects.

Layout Guide

We have not followed the traditional taxonomic sequence or language when setting out this book. Instead, we use commonly understood terms and include common names for species where they are available.

Each section is colour coded with the group name appearing in the “bubble” at the top. With two species appearing on each page (mostly), the common name of the first is on the top left of the page with the second (lower) species appearing on the right.

Sub-group names appear in the “bubble” of some insect orders, e.g. Butterflies changes to Moths and Dragonflies changes to Damselflies although layout restrictions have limited this. All insects have been identified to the highest level possible based on current knowledge and resources.

FOOD & HABITAT GUIDE

A selection from the icons below is included for each species (or each species cluster) where such information is known to us. Insects will use a wide range of habitats, some for feeding, some for resting or roosting and others for nesting. We have tried to indicate the most common habitat type for each species, but you may well see them elsewhere.

Similarly, the lifestyle/food of the adult may be different to the food of the larvae and the following diagram indicates how we layout this information for each species.

	Lifestyle		Habitat
Adult		A	
Larvae		L	

Lifestyle/Food Icons



Pollinator (consumes nectar and/or pollen)



Parasite (invades the body or steals from others)



Predator (consumes the body of others)



Herbivore (includes sap sucking insects)



Omnivore (eats everything)

Habitat Icons



Ground/Soil



Shrubs



Leaf Litter



Trees



Logs/Wood



Woodland



Grass/Sedges



Forest



Small Plants/Herbs



Streams/Wetlands

DISTRICT MAP

Map of the region covered by this guide



The Upper Campaspe Landcare Network operates within the catchment of the upper reaches of the Campaspe river.

Nature, however, does not follow such restrictive boundaries and many of the species illustrated in this guide can readily be found outside the shires listed here. All photographs, however, were taken within this region.

RESOURCES

We list below a few publications and online resources to help you learn more about and identify insects.

Texts

CSIRO Field Guides

The CSIRO has published numerous field guides in recent decades and unfortunately some of them are now out of print. eBooks are available for those that are unavailable in print.

- *A Guide to Native Bees of Australia*, Houston
- *The Complete Field Guide to Butterflies of Australia*, Braby
- *A Guide to the Beetles of Australia*, Hangay & Zborowski
- *A Guide to Australian Moths*, Zborowski & Edwards
- Other titles include Stick Insects, Cockroaches, Crickets, Katydid, Stag Beetles, Dragonflies and Mosquitoes

The CSIRO also published the monumental *Insects of Australia* in 1970 and produced a second edition in 1991. Both versions may be found second hand, or the 1991 edition can be purchased as a PDF file.

An excellent concise guide is *A Field Guide to Insects in Australia*, Zborowski & Storey, which is still in print.

Online

Field Guide to the Insects of Tasmania

tasmanianinsectfieldguide.com/welcome/find-an-insect/

Ellura Sanctuary

www.ellura.info/

Butterfly House

lepidoptera.butterflyhouse.com.au/imagos.html

Buprestidae of South Australia

syzygium.xyz/buprestidae/introduction.php

Data Recording

iNaturalist Australia: inaturalist.ala.org.au

Atlas of Living Australia: ala.org.au

Victorian Biodiversity Atlas:

environment.vic.gov.au/biodiversity/victorian-biodiversity-atlas

Butterflies

Butterflies and moths (Lepidoptera) are a diverse, beautiful and enigmatic group of flying insects that can be seen day or night across every habitat except extremely cold ones. The name Lepidoptera means “scaly wings”, a fitting description given there may be up to 600 scales per square millimetre of wing!

Butterflies and moths can be hard to tell apart, but butterflies have clubbed antennae, more slender bodies than the plumper moths, fly more in the day, fold their wings straight up when resting and are often more brightly coloured. Of course, there are exceptions to most of these! All moths and butterflies pupate from caterpillars and undergo metamorphosis.

Both butterflies and moths are important pollinators, feeding primarily on nectar. Instead of a mouth, these insects have a long straw-like structure called a proboscis, perfect for sucking.

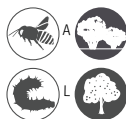
Australia is home to ~400 butterfly and ~11,000 moth species, some of which migrate large distances, while others fly to high points in the landscape (“hill-topping”) to attract mates.

Red-spotted Jezebel



Red-spotted Jezebel | *Delias aganippe*

Larval food plants - Mistletoes esp. *Amyema pendula* and *A. miquelii*, also Cherry Ballart - *Exocarpus cupressiformis*



Imperial Jezebel

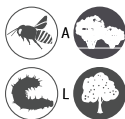
Caper White

Butterflies



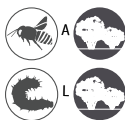
Imperial Jezebel | *Delias harpalyce*

Males especially found soaring amongst the treetops on local highpoints. Larval food plants – Mistletoes esp. *Amyema pendula*, *A. miquelii* and *Muellerina eucalyptoides*.



Caper White | *Belenois java*

Migrant in this district but may breed where larval food plants occur in gardens. Larval food plants – *Capparis* species, also Broom Bush, *Apophyllum anomalum*.



Varied Sword-grass Brown

Ringed Xenica

Butterflies



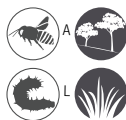
Varied Sword-grass Brown | *Tisiphone abeona*

Flies slowly about a metre above the ground in forested areas in the south of the region. Larval food plants – *Gahnia* species including *G. sieberiana* and *G. radula*.



Ringed Xenica | *Geitoneura acantha*

Found in open forest or woodland with grassy understorey near the slopes of the Great Divide, esp. in Feb. Larval food plants – *Microlaena stipoides*, *Poa sieberiana* and *Themeda*.



Common Brown (female)

Common Brown (male)

Butterflies



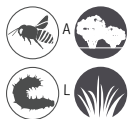
Common Brown (F) | *Heteronympha merope*

Females emerge and mate in spring but delay egg production until the autumn. They can live for several months and aestivate (a form of dormancy) in summer.



Common Brown (M) | *Heteronympha merope*

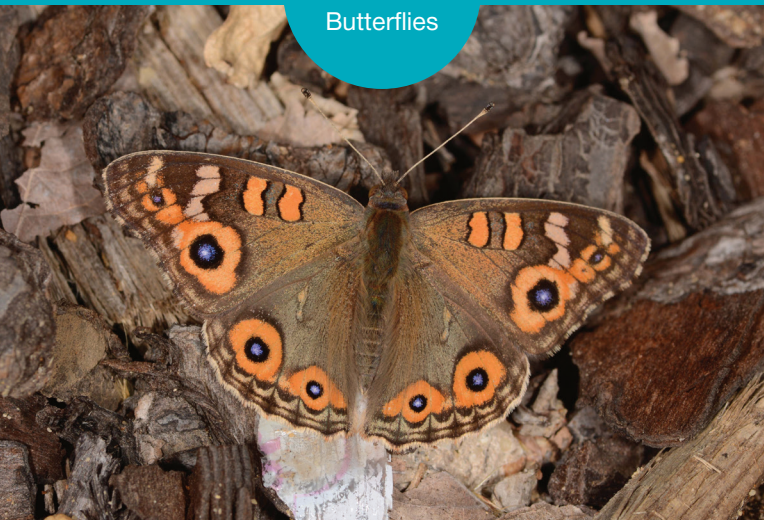
Widespread and common butterfly with the males most common in spring and summer. Larval food plants – Grasses inc. *Microlaena stipoides* and *Themeda triandra*.



Meadow Argus

Shouldered Brown

Butterflies



Meadow Argus | *Junonia villida*

Occurs throughout Australia and is commonly found.

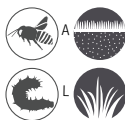
Larval food plants – *Plantago* species but also *Goodenia*, *Veronica* and *Centaureum* species.



Shouldered Brown | *Heteronympha penelope*

Occurs in lowland grassy woodland and dryer open forests.

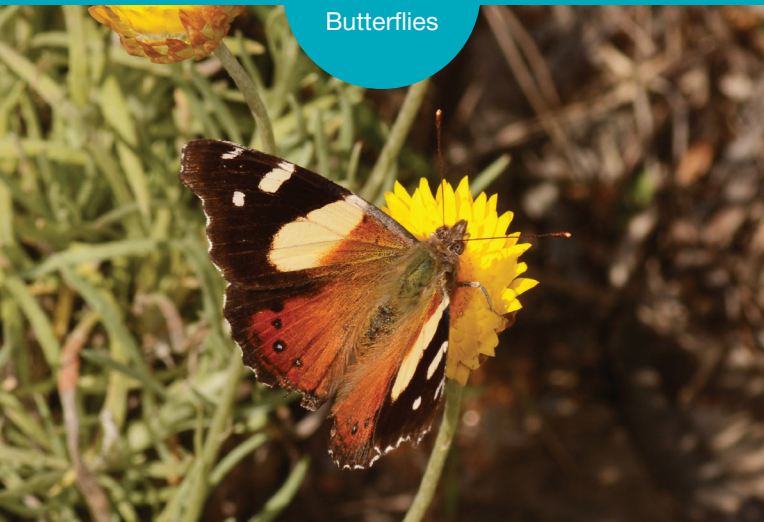
Larval food plants – Wallaby Grasses esp. *Rytidosperma penicillatum* and *R. pilosum*, also *Themeda triandra*.



Yellow Admiral

Australian Painted Lady

Butterflies



Yellow Admiral | *Vanessa itea*

Adults sometimes feed on oozing tree sap as well as on flowers. Frequently seen near Nettle patches. Larval food plants – *Urtica* species.



Australian Painted Lady | *Vanessa kershawi*

Often rests with wings open. A population of Paper Daisies will surely attract this species. Larval food plants – *Chrysocephalum* species, *Xerochrysum*, and Cudweeds.



Tailed Emperor

Dainty Swallowtail

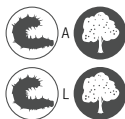
Butterflies



LW

Tailed Emperor | *Charaxes sempronius*

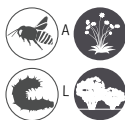
Occasional migrants into Victoria, difficult to photograph as they sit high on foliage. Can be attracted to fermenting fruit or sap. Larval food plants – *Acacia* and *Brachychiton* species.



LW

Dainty Swallowtail | *Papilio anactus*

Males often sit wings outspread on low foliage. Is now found in suburban gardens due to our planting citrus. Larval food plants – *Citrus* species and *Geijera parviflora*.



Common Grass-blue

Saltbush Blue

Butterflies



Common Grass-blue | *Zizina otis* subsp. *labradus*

The underwing patterns are essential for identification of many butterflies, especially the Blues. Larval food plants – Low growing legumes including Clovers and Lucerne.



Saltbush Blue | *Theclinessthes serpentata*

The larvae of most “Blue” butterflies are attended by ants that offer protection for a sugar rich reward. Larval food plants – *Atriplex*, *Einadia*, *Rhagodia* and *Chenopodium*.



Fringed Heath-blue

Two-spotted Line-blue

Butterflies



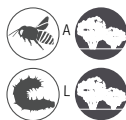
Fringed Heath-blue | *Neolucia agricola*

The two sharp black “Vs” on the hind under wings readily identifies this species. Larval food plants – Various Pea species inc. *Bossiaea*, *Daviesia*, *Dillwynia* and *Pultenaea*.



Two-spotted Line-blue | *Nacaduba biocellata*

The two eye-like spots distinguish this common species from most other local Blues but the Wattle Blue and Bronze Ant-blue are similar. Larval food plants – *Acacia* species.



Imperial Hairstreak

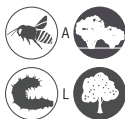
Varied Dusky-blue

Butterflies



Imperial Hairstreak | *Jalmenus evagoras*

Large clusters of larvae, pupae and beautifully marked newly emerged adults are sometimes found covered in ants on the larval food plants – *Acacia mearnsii* and *A. decurrens*.



Varied Dusky-blue | *Erina hyacinthina*

The dark wing spots on this species lack the eye-like pupil and are on the fore wing not the hind. Compare with the two species opposite. Larval food plants – Dodder Laurel *Cassytha melantha*.



EM

Barred Skipper

Barred Skipper (underside)

Butterflies



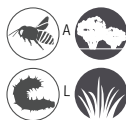
Barred Skipper | *Dispar compacta*

Common in gardens south of Castlemaine, the adults feed on a variety of flowers including Mints and Oregano. In the bush Eucalypts and *Bursaria* provide nectar.



Barred Skipper | *Dispar compacta*

The male (left) in the image shows different underwing patterns to the female (right). Larval food plants – *Poa* species inc. *P. tenera*.



Green Grass-dart

Montane Ochre

Butterflies



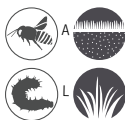
Green Grass-dart | *Ocybadistes walkeri*

Widespread throughout the region. Habitat includes open forest and increasingly in suburban gardens. Larval food plants – Various native and introduced grasses.



Montane Ochre | *Trapezites phigalioides*

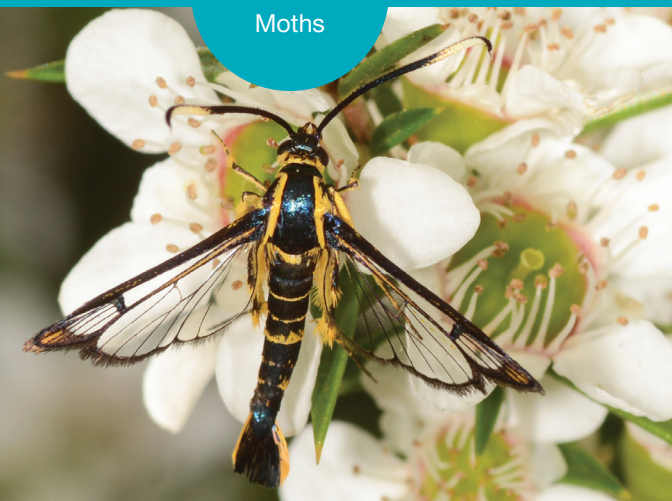
Commonly found on the slopes of the Great Divide and adjoining ranges. Emerging in late November and December. Larval food plants – *Lomandra filiformis*.



Clearwing Persimmon Borer

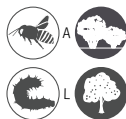
Coprosma Hawk Moth

Moths



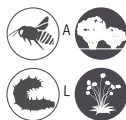
Clearwing Persimmon Borer | *Ichneumenoptera chrysophanes*

This rarely seen moth is found from tropical Qld to southern Victoria. The larvae have been recorded feeding on the bark of Eucalypts, Figs and boring into galls on the Cherry Ballart.



Coprosma Hawk Moth | *Hippotion scrofa*

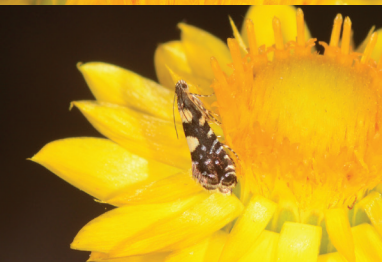
Hawk Moths can feed while hovering like a Hummingbird. Larval food plants – *Epilobium billardioreanum* and *Persicaria prostrata* & introduced *Dahlia*, *Fuchsia*, *Impatiens*.



Glyphipterix Moths

Ceremonial Heath Moth

Moths



Glyphipterix Moths

Glyphipterix moths feed on flowers during the day. From top left (clockwise) is *G. meteora*, *G. sp.*, *G. gonoteles* and *G. chrysoplanetis*. Grasses and Sedges are larval food plants.



Ceremonial Heath Moth *Dichromodes confluaris*

Common in coastal heathlands and a substantial population is found at Lauriston in central Victoria where it is seen on *Leucopogon virgatus* in spring.



Satin-green Forester

Concealer Moth

Moths



Satin-green Forester | *Pollanisus viridipulverulenta*

Two of the nine Forester species found in Victoria are very similar however specimens in central Vic are most likely to be this species. Larvae feed on *Hibbertia* species.



Concealer Moth | *Garrha leucerythra*

Larvae feed on dead Eucalyptus leaves and construct a flattened shelter made from two disks cut from the leaves and connected around the edges with silk.



Blotched Shoulder

Leafroller Moth

Moths



Blotched Shoulder | *Acontia nivipicta*

The common name is perhaps a reference to their description by moth expert I.F.B. Common as resembling bird droppings. Widespread in drier parts of the State.



A



L



Leafroller Moth | *Grapholita zapyrana*

This pretty little species was seen visiting the flowers of the Yellow Wedge-pea and the larvae are recorded as feeding on the seed of *Hardenbergia* and *Glycine* species.

A



L



Willow-herb Day-moth

Boisduval's Autumn Moth

Moths



Willow-herb Day-moth | *Phalaenoides tristifica*

Like the other moths presented here, Day-moths fly during the day. They are more conspicuous however due to their butterfly-like behaviour. Larvae feed on *Epilobium* sp.



Boisduval's Autumn Moth | *Oenosandra boisduvalii*

Many moth species show a large difference in appearance between the sexes. Most observers would think the female (main image) was a different species to the male (inset).



Heliotrope Moth

Pyralid Snout Moth

Moths



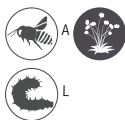
Heliotrope Moth | *Utetheisa pulchelloides*

We have two almost identical species in Victoria, however *U. lotrix* is generally a more northerly species. Larvae feed on Heliotropes, Forget-me-not and Patterson's Curse.



Pyralid Snout Moth | *Oenogenes fugalis*

While this specimen appears to be having a “bad hair day” the species is quite attractive when seen from above. Nothing is recorded about its larval food plants.



Inconspicuous Eublemma

Common Pinara

Moths



Inconspicuous Eublemma | *Eublemma inconspicua*

Was very conspicuous when several hundred appeared on the *Xerochrysum* daisies one evening. The larvae of some species feed on scale insects while others eat plants.



Common Pinara | *Pinara divisa*

A member of the Snout Moth family, this unusual looking male moth is part of a species complex currently listed under this name. The larvae feed of the leaves of Eucalypts.



Black and White Tiger Moth

Golden Sunmoth

Moths



Black and White Tiger Moth | *Ardices glatignyi*

A dark colour form is resting on the violets and the lighter form (inset) is doing its best tiger imitation to scare off the annoying human. Larvae feed on a wide variety of plants.



AG

Golden Sunmoth | *Synemon plana*

Listed as endangered in Victoria, this Sunmoth has recently seen new populations located in central Victoria. The larvae feed on the roots of grasses inc. Wallaby and Spear grasses.



Bees

Bees (Hymenoptera) are a large group, numbering ~2000 species in Australia. The European Honeybee is the best known species, and was introduced for crop pollination and for honey. It can compete with native wildlife for food and nest sites. Most native bees (~70%) live a solitary life, not in hives, but under the ground. The remaining 30% live in small wood cavities, or even mud bricks. During their relatively short adult life, female bees feed on pollen and nectar for energy and protein, find a male mate, then build and provision nests for their young. Some species dig their own holes, while others capitalise on the hard work of others. A ball of pollen and other essential ingredients is deposited into the nest, then an egg is laid on top. This will go through a larval and pupal stage before emerging from the nest as an adult. Most young will not meet their parent.

Bees are truly the best pollinators. With specially designed pollen-carrying hairs on their legs and abdomen, they are built for it! Plant diversity is important for healthy bees and the pollen transferred between similar flowers during visits allows plants to reproduce. A win-win for nature and nature lovers.

Size comparison



Bees vary greatly in size, and many native species are substantially smaller than the introduced European Honeybee, while some species are much larger. Here a medium-sized native *Lasioglossum* species is feeding next to a Honeybee.

Behaviour



If you watch the bees in your garden closely you may spot one “bubbling”. This *Lasioglossum* sp. has regurgitated a drop of nectar to promote evaporation and concentrate the sugars which can then be mixed with pollen and stored in a cell for its larvae to feed on.



Honeybees are cited as key pollinators, but their action does not always benefit the plant. Compare the Honeybee (left) with the native *Megachile* sp. on the right which has deliberately exposed the anthers and is collecting pollen.

Leafcutter Bees

Bees



Leafcutter Bee | *Megachile macularis*

This Leafcutter Bee is collecting pieces of petal to use in its nest construction. The bee makes an urnlike structure to store food, lays an egg on top of the food and seals it off.



Male Leafcutter Bee | *Megachile maculariformis*

The foreleg of some male Leafcutter Bees has ornate flattened structures. They use these when mating to cover the female's eyes. Insets are *M. ferox* (top) and *M. ordinaria* (bottom).



Blue-banded Bees

Bees



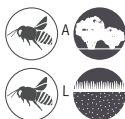
Blue-banded Bee | *Amegilla asserta*

This male also appears on our front cover. While Blue-banded bees are easily recognised by untrained observers, it is difficult to separate the different species.



Blue-banded Bee | *Amegilla chlorocyanea*

The bare triangular patch on the margin of the fourth band of hairs helps identify this bee. Her nest may be in the ground or perhaps in a mud brick on your house.



Yellow-collared Masked Bee

Proximate Masked Bee

Bees



Yellow-collared Masked Bee | *Hylaeus euxanthus*

This male has set up in prime real estate and is on the lookout for females. The face mask on female *Hylaeus* species will generally have less colouration than the males.



Proximate Masked Bee | *Hylaeus proximus*

Hylaeus spp. lack the body hair used by other bees to transport pollen. Instead, they eat the pollen, then regurgitate it to store in their nest for their larvae to feed on.



Littler's Masked Bee

Noble Masked Bee

Bees



Littler's Masked Bee | *Hylaeus littleri*

This species is only 5 mm long. Males and females have different patterning on their abdomen. Main image and lower left are females and top left is male.



Noble Masked Bee | *Hylaeus honestus*

There are several *Hylaeus* species with yellow patches on the upper surface of the mid body, so careful observation of their face mask is also needed to determine the species.



Common Wasp-mimic Bee

Euryglossina Bees

Bees



Common Wasp-mimic Bee | *Hyleoides concinna*

This beautiful bee has a dark band on its wings giving it the appearance of a Vespid Wasp with folded wings. See page 53 for more on wasp/bee mimics.



Euryglossina Bees

Euryglossina includes the world's smallest bee at 1.8 mm. These are 3-4 mm long. From top left (clockwise) is *E. sulcata*, *E. philoxantha*, *E. lynettae* and *E. hypochroma*.



Red-saddled Broad-tongue

Bees



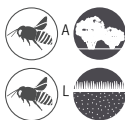
Red-saddled Broad-tongue | *Euryglossa ephippiata*

The common name is quite descriptive of this bee as *Euryglossa* translates as broad tongue. The next image however shows that not all specimens have the red saddle.



Red-saddled Broad-tongue | *Euryglossa ephippiata*

This dark form was photographed alongside the red one above. The inset shows a male with distinctive curled two-tone antennae attempting to mate a dark form female.



Elegant Hairy-cellophane Bee

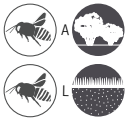
European Honeybee

Bees



Elegant Hairy-cellophane Bee | *Trichocolletes venustus*

The bees of the Colletid family line their brood cells with a cellophane-like substance. You could confuse this bee with a European Honeybee, but it is arguably far more attractive.



European Honeybee | *Apis mellifera*

The left image shows a common colour form, while the top right shows a form that could be confused with a native bee. Lower right has a male Drone (left) and a female Worker (right).



Reed Bee

Robust Reed Bee

Bees



Reed Bee (Female) | *Exoneura* sp.

There are lots of different species of Reed Bees, but they are difficult to tell apart, even for experts. They have a flattened abdomen that is used to block the nest entrance.



Robust Reed Bee (Male) | *Exoneura robusta*

The males of some species have distinctive hairy heads, but most look like the females. *Exoneura* females make their nests in pithy stems where they can easily create a tunnel.



Leioproctus Bees

Bees



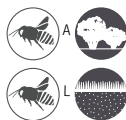
Leioproctus (Euryglossidia) sp.

Leioproctus is a very diverse genus in Australia with almost 200 species. This one was recorded feeding from the glands on the leaves of the Golden Wattle, *Acacia pycnantha*.



Leioproctus sp.

Leioproctus taxonomy needs revision making it difficult to determine different species. Working names like *L.* “Golden Hair” and *L.* “Silver Hair” could be used in the meantime.



Leioproctus Bees

Bees



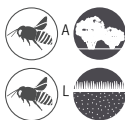
Loveable Leioproctus | *Leioproctus amabilis*

Several *Leioproctus* species have a metallic, olive or bluish sheen. This species can be confused with *L. clarki* and needs examination of tiny features not seen in this image to identify it.



Leioproctus (Cladocerapis) sp.

Members of subgenus *Cladocerapis* are feeders of *Persoonia* species and have a flattened shiny strip on their head that allows better access to the flower's nectar.



Green-and-Gold Nomia Bee

Bees



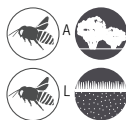
Green-and-Gold Nomia Bee | *Lipotriches australica*

This attractive female bee carries pollen in special hairs on her hind legs. *Megachile* and *Homalictus* species however, collect pollen on the hairy underside of their abdomen.



Green-and-Gold Nomia Bee | *Lipotriches australica*

This male, like males of other bee species, feeds on nectar but lacks the special pollen collection hairs. In *Lipotriches* however, the hind leg often has some unusual shapes.



Halictid Bees

Bees



Halictid Bee (F) | *Lasioglossum (Chilalictus)* sp.

The Halictids are probably the most often seen native bees, inhabiting many diverse environments. While they vary in size, their distinguishing features are best seen via a lens.



Halictid Bee (M) | *Lasioglossum (Chilalictus)* sp.

The previous species is a female with densely hairy hind legs. While this male of a different species has leg hairs, they are sparse when compared to the female's.



Halictid Bees

Bees



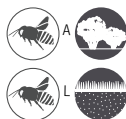
Halictid Bee | *Lasioglossum (Parasphecodes)* sp.

Most of the species in sub genus *Parasphecodes* have a red abdomen. While most of this female's pollen load is held on the legs, there is also a collection under her abdomen.



Halictid Bee | *Lasioglossum (Parasphecodes)* sp.

This *Lasioglossum (Parasphecodes)* is all black and there are also some species with red and black stripes and one with a bluish metallic sheen.



Halictid Bees

Bees



Halictid Bee | *Homalictus* sp.

Homalictus are closely related to the *Lasioglossum* but are often smaller and narrower. While *Lasioglossum* mostly collect pollen on their legs, *Homalictus* collect mainly on their abdomen.



Halictid Bee | *Homalictus urbanus*

It is difficult to separate many species from similar ones using a photo. Most local *Homalictus* species have a greenish or blueish metallic sheen to their back.



Wasps

Wasps (Hymenoptera) are closely related to bees, sharing the membranous wings that give this order its name. In fact, bees are believed to have evolved from wasps. However, while bees developed a strictly vegetarian diet (pollen and nectar from flowers), wasp larvae are often parasites or predators of other insects. Adults will feed on nectar, fruit and plant sap and hunt prey to give to their young. Like bees, wasps can live solitary or social lifestyles with a caste system, often in constructed nests of mud, a papery substance or twigs. Wasps are also excellent navigators, being able to relocate their nest after travelling several kilometres away.

Wasps are good pest controllers, readily eating caterpillars, and parasitising spiders, bees and aphids. They are also effective pollinators. Flower wasps are common plant visitors, while fig wasps are the sole pollinators of fig species, promoting and pollinating seed galls inside the fruit.

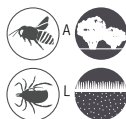
There are believed to be more than 12,000 wasp species in Australia.

Blue Ant



Blue Ant | *Diamma bicolor*

Not an ant but a wasp, the rich blue female (left) is wingless and hunts on the ground for mole crickets on which she lays her eggs. The male (right) looks like a different species.



Thynnid Wasp

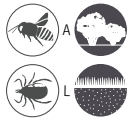
Large Yellow Flower Wasp

Wasps



Thynnid Wasp | Thynninae Subfamily

Like the related Blue Ant, the female is wingless. Both adults feed on nectar and the females are skilled at burrowing and locating cockchafer grubs where they lay their eggs.



Large Yellow Flower Wasp | *Elidothynnus melleus*

Male Thynnids take hold of the females during copulation and transport them to a suitable feeding site such as this Tea-tree. They are pollinators like other nectar feeders.



Tyde's Sand Wasp

Sphex Wasp

Wasps



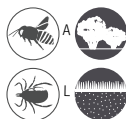
Tyde's Sand Wasp | *Podalonia tydei*

These wasps are closely related to bees, and like bees the adults feed on nectar. They also catch and paralyse insects and stow them in burrows for their larvae to feed on.



Sphex Wasp | *Sphex bilobatus*

Sphex wasps prey on crickets and katydids to feed their larvae, but the adults feed on nectar. They are 25 mm long and are loud in flight - an imposing sight in your garden.



Orange Potter Wasp

Bee Parasitizing Wasp

Wasps



Orange Potter Wasp | *Delta bicinctum*

Potter Wasps construct their nests using mud from a nearby water source. They place their prey and an egg inside and seal it off. The new adults dig their way out when ready.



Bee Parasitizing Wasp | *Labium* sp.

Bees are wasps that have adapted to feed a mixture of pollen and nectar to their larvae instead of the usual insect or spider prey...and sometimes they become the prey!



Aulacid Wasp

Dusky-winged Ichneumonid Wasp

Wasps



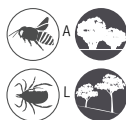
Aulacid Wasp (Male) | Aulacidae Family

These wasps parasitise the larvae of wood boring beetles. The females locate the larvae and then insert their long ovipositor through the wood to lay an egg on it.



Dusky-winged Ichneumonid Wasp | *Lissopimpla excelsa*

Males can be tricked into attempting copulation with *Cryptostylis* orchids in response to a scent released by the orchid. The females behave like the Aulacids above.



Torymid Wasp

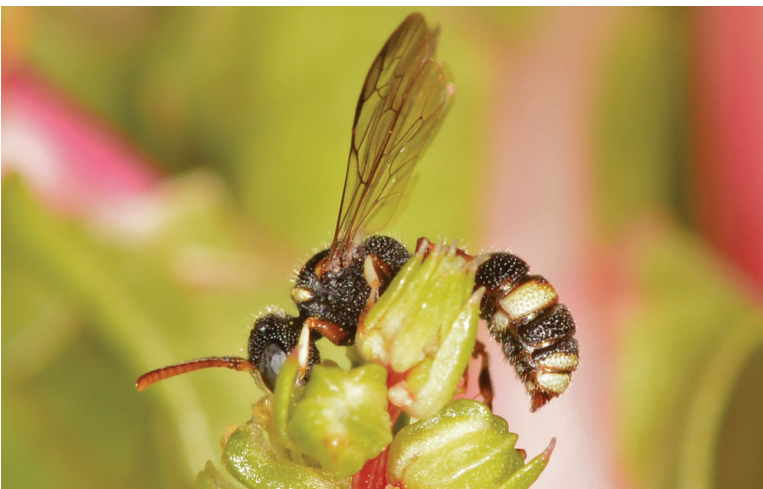
Weevil Wasp

Wasps



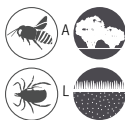
Torymid Wasp | Torymididae Family

Larvae of some of the tiny wasps in this family parasitise the eggs of other insects while some species are parasites of other parasitic wasps. Others eat plant matter like galls.



Weevil Wasp | *Cerceris* sp.

Many *Cerceris* species prey on weevils, though some capture other types of beetles or bees. They place the paralysed prey in their ground nests for their larvae.



Yellow Sand Wasp

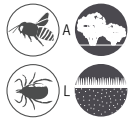
Cuckoo Wasp

Wasps



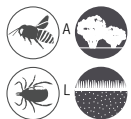
Yellow Sand Wasp | *Bembix palmata*

We have recorded a couple of different species of *Bembix* in the region. This one is readily identified by the enlarged fore tarsi (foot). They nest in tunnels made in sandy soils.



Cuckoo Wasp | Chrysididae Family

As the name suggests, these beautifully coloured wasps invade the nests of other wasps and lay their eggs on the prey that wasp has left for its own larvae to feed on.



Gasteruptiid Wasps

Wasps



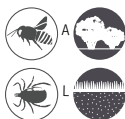
Gasteruptiid Wasp | *Gasteruption* sp.

Another parasitic wasp, this genus lays its eggs in the nests of solitary bees. The wasp larvae eats the egg or larvae of the bee then feeds on the food store left behind.



Gasteruptiid Wasp | *Pseudofoenus* sp.

A close relative of the wasp above. It is thought that *Pseudofoenus* species attack ground nesting bees while the *Gasteruption* species attack bees nesting in wood cavities.



European Wasp

Southern Australian Paper Wasp

Wasps



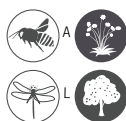
European Wasp | *Vespula germanica*

This wasp was feeding on a flowering *Eucalyptus goniocalyx* in mid-March. The much larger queen in the inset was collected on a nearby *Kunzea* in December.



Southern Australian Paper Wasp | *Polistes humilis*

These social wasps establish smaller colonies than the European Wasp, often under the eaves of houses. They are generally not aggressive, but do take care.



Potter Wasps

Wasps



Potter Wasp | *Paralastor* sp.

There are many examples of mimicry in the insect world, and we can see here the bee *Hyleoides concinna* (inset) has done a great job of copying the *Paralastor* wasp.



Potter Wasp | *Paralastor* sp.

In another example of mimicry, the wasp, also a *Paralastor* sp. and member of the Eumeninae family, is mimicked by the bee *Hylaeus (Analastoroides) foveatus* (inset).



Ants

Ants (Hymenoptera) are highly social relatives of wasps and bees, having evolved from wasps millions of years ago. Australia is home to ~1300 known species, which can live in colonies of tens of thousands of female workers, soldiers, males and a queen.

Ants typically nest in the ground or build anthills. They use very advanced chemical communication to work together to collect food, defend their nest and raise young. Each colony has a unique smell, allowing group members to identify others and exclude intruders. Ants assist plants by dispersing seed, altering soil and are crucial to some insect species survival, feeding and defending their young.

Ants occur in almost every habitat on Earth making them one of the most successful insects on the planet. They are also the most commonly encountered by humans. Most Australian ant species are endemic to Australia, meaning they are only found here.

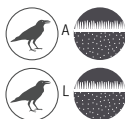
Ants are heavy lifters - they can carry 50 times their own body weight!

Sugar Ant



Sugar Ant | *Camponotus subnitidus*

Ants are often seen foraging on flowers, however they are not seen as important pollinators as they lack the hairs found on other insects that transport the pollen around.



Banded Sugar Ant

Odorous Ant

Ants



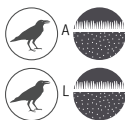
Banded Sugar Ant | *Camponotus consobrinus*

These are common Sugar Ants and are often seen tidying up around their nest entrance after rain. The common worker is on the left and a much larger future queen is on the right.



Odorous Ant | *Dolichoderus scabridus*

These ants are also flower visitors and can be recognised by the two spines midway along their body (see inset). You are likely to notice the odour should you open their nest.



Red-headed Spider Ant

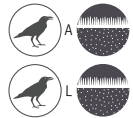
Bull Ant

Ants



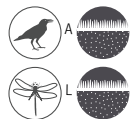
Red-headed Spider Ant | *Leptomymex erythrocephalus*

Spider Ants are distinctive as they often carry their gaster (abdomen) erect when threatened. Winged males like this one are frequent visitors to light traps at night.



Bull Ant | *Myrmecia mandibularis*

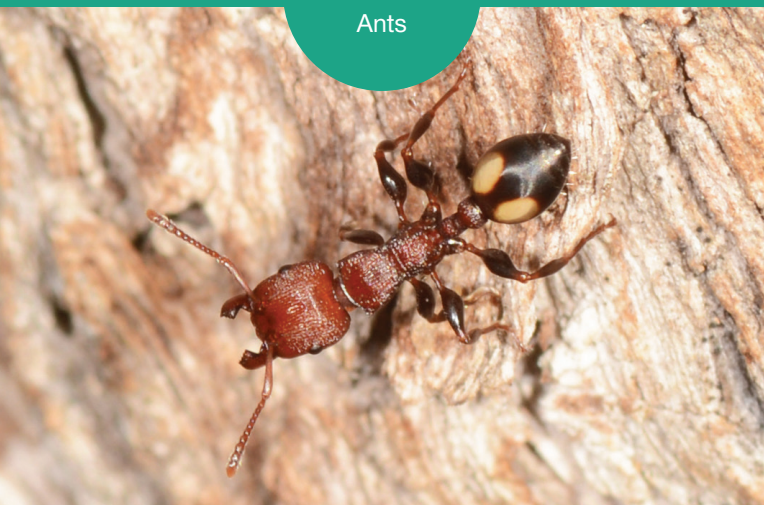
This is one of three golden tipped Bull Ants recorded locally. Despite this, the golden species are infrequently found with the darker species usually making their presence felt.



Spotted Muscleman Tree Ant

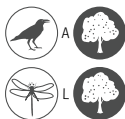
Black Jumper Ant

Ants



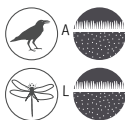
Spotted Muscleman Tree Ant | *Podomyrma adelaidae*

The distinctive light patches on the abdomen readily identify this species. Like most ants, they rarely sit still making them difficult to photograph as they run up the tree.



Black Jumper Ant | *Myrmecia pilosula*

While not as large as some of the Bull Ants, this is still a formidable looking ant. It is part of a group of species that are also known as Jumping Jacks.



Beetles

Over one-quarter of all known animal species are beetles (Coleoptera). With 30,000 species inhabiting all parts of Australia, they are an incredibly diverse, successful and important group of insects.

Beetles have diverse mouthparts and eat a range of foods - fruit, fungi, wood and plant materials, other insects and dead animals. The dung beetle is a well-known and important decomposer of animal waste, while ladybirds control pest insects, such as aphids.

Beetles have two sets of wings, with the front wings forming hard sheaths (called elytra) to protect the membranous hind wings. This also allows beetles to control their body temperature and water retention.

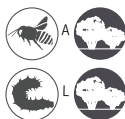
Beetles begin life in a pupal form, often referred to as a “grub”. These live underground or under bark and have large chewing mouthparts to eat roots, leaves and other plant structures, sometimes to the consternation of gardeners.

Jewel Beetle



Jewel Beetle | *Castiarina australasiae*

The Jewel Beetles are among the most interesting and attractive Australian beetles, but most of them have not attracted common names. Perhaps Austral Jewel will do.



Jewel Beetles

Beetles



Jewel Beetle | *Castiarina xanthopilosa*

Adult Jewel Beetles feed on nectar and pollen and the larvae are wood borers in trees and shrubs. Each Beetle species has their favourite plant species.



Jewel Beetle | *Castiarina bicolor*

The pattern of spotting on this species can show subtle differences between individuals. Five variations amongst one hundred individual beetles were recorded at one site.



Jewel Beetles

Beetles



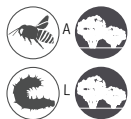
Jewel Beetle | *Castiarina octomaculata*

You can count the macula (spots) on this species and see how the name arose. We have also found a species called *C. decemmaculata* nearby.



Jewel Beetle | *Melobasis propinqua*

All our Jewel Beetles depicted here are recorded on native flora species and they have a close association with our flora. They can be quite specific on which plants they visit.



Eucalyptus Variegated Beetle

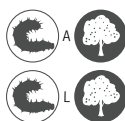
Leaf Beetle

Beetles



Eucalyptus Variegated Beetle | *Paropsisterna cloelia*

We have a very diverse range of Leaf Beetles, with some known to cause defoliation in plantation Eucalypts. They generally do little real damage elsewhere.



Leaf Beetle | *Calomela acaciae*

Despite its name, *Calomela acacia* is not the only *Calomela* species to feed on *Acacia*. However, it is restricted to the foliage of the Rough Wattle *A. aspera*.



Various Lady Beetles

Fiddler Beetle

Beetles



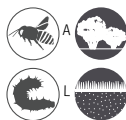
Various Lady Beetles (clockwise from top left)

Tasmanian Ladybird *Cleobora mellyi*, Transverse Ladybird *Coccinella transversalis*, Large Spotted Ladybird *Harmonia conformis*, Spotted Amber Ladybird *Hippodamia variegata*.



Fiddler Beetle | *Eupoecila australasiae*

The beautiful adults are nectar feeders while the larvae feed on rotting fallen timber, thereby helping to recycle the nutrients along the way.



Carrion Beetle

Longhorn Beetle

Beetles



Carrion Beetle | *Ptomaphila lacrymosa*

Large beetles that locate their food via smell. They quickly arrive at a carcass and eat the maggots of various flies as well as the carrion itself. They also come to lights at night.



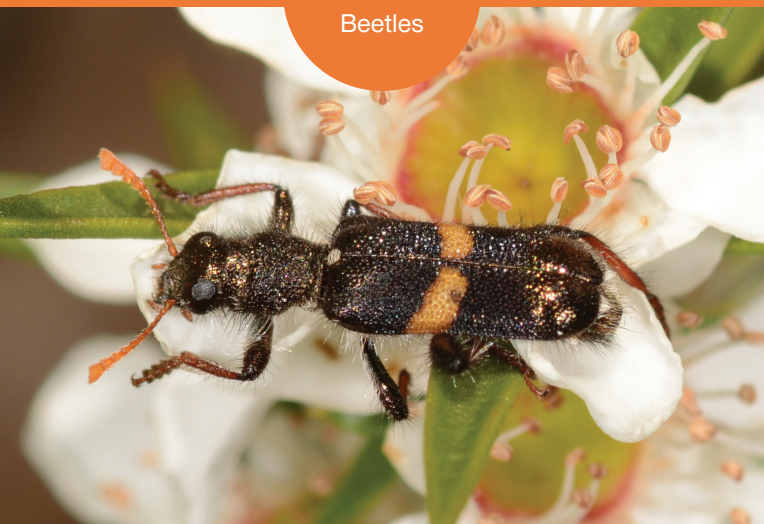
Longhorn Beetle | *Pempsamacra dispersa*

The larvae of some Longhorn Beetles are known as Witchetty Grubs and the larvae of most feed on wood. Some adults are nectar feeders like this species.



Checkered Beetles

Beetles



Checkered Beetle | *Eleale pulcher*

Eleale pulcher is a member of the Cleridae or Checkered Beetle family. They are surprisingly hairy and collect a lot of pollen as they feed on the nectar of various flowers.



GO

Checkered Beetle | *Eleale* sp.

The sparkly metallic colours on *Eleale* beetles are thought to confuse birds. Most Checkered Beetles actively hunt other insects including other beetles.



Net-winged Beetle

Red Weevil

Beetles



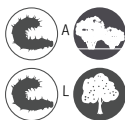
Net-winged Beetle | *Porrostoma* sp.

A mating pair. These beetles are the model for a long line of mimicking species including a Jewel Beetle and even a moth. Birds apparently find *Porrostoma* unpleasant to eat.



Red Weevil | *Rhinotia haemoptera*

This weevil is another mimic of the *Porrostoma* above and relies on the birds thinking it is also unpleasant to eat. The adults feed on pollen and sometimes flower buds.



Pintail Beetle

Various Small Beetles

Beetles



Pintail Beetle | *Hoshihananomia dumbrelli*

The distinctive shape of the Pintail Beetles makes them easy to recognise, especially larger species like this one. The smaller and more common Pintails are *Mordella* species.



Various Small Beetles (clockwise from top left)

Ground Beetle *Sarothrocrepis civica*,
Auger Beetle *Xylobosca* sp.,
Malachite Beetle *Dicranolaius concinicornis* (Male and Fem),
Comb-clawed Darkling Beetle *Atoichus bicolor*.

Nectar Scarab

Botany Bay Diamond Weevil

Beetles



Nectar Scarab | *Phyllotocus* sp.

Scarab Beetles are recognised by the finger-like segments forming a club on the end of their antennae, (see inset). The antennae may be small or hidden beneath the body.



Botany Bay Diamond Weevil | *Chrysolopus spectabilis*

A large beetle that is in the running for the “most photographed” beetle species in Australia. This one was riding the wind on some Spear-grass stems.



Bugs

When we think of bugs, we may think of bed bugs, or aphids destroying our gardens. But there are ~5650 known species of bugs (Hemiptera) that include the true bugs, aphids, cicadas, hoppers and scale insects. Bugs live on land, on the surface of water and underwater. There is no pupal stage in bugs, with young looking like adults. Like many insect groups, more species are being discovered and identified each day.

All bugs have sucking mouthparts that are used to feed on plant and animal juices. This means they can be both beneficial (controlling insect pests) and a crop pest (through herbivory).

Assassin bugs are predatory and paralyse their prey (which are often much larger) with venom. Their saliva can cause temporary blindness in humans.

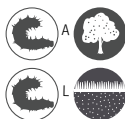
The loud and diverse calls of male cicadas to attract females in warmer months are well known. They do this thanks to drum-like membranes, called timbals, which females lack. You would call loudly too if most of your life was spent underground (in nymph form) and you only had a few weeks to live above-ground as an adult!

Red Scratcher



Red Scratcher | *Popplepsalta rubrigrata*

One of numerous Cicada species found in the region. Sometimes the best opportunity for a closeup image involves accidental human hand interaction!



Red Jewel Bug

Brown Soldier Bug

Bugs



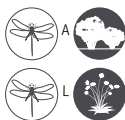
Red Jewel Bug | *Choerocoris paganus*

These beautiful bugs feed on the seed of *Dodonaea* species, both on the bush and on the ground once it has fallen. The nymphs mature in summer and overwinter under rocks.

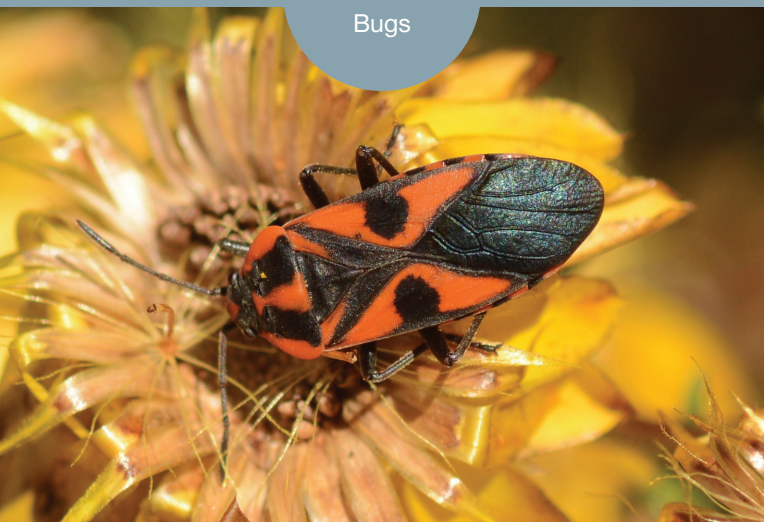


Brown Soldier Bug | *Cermatulus nasalis*

These were initially thought to be different species, but a little research soon confirmed that the nymph in the inset was also a Brown Soldier Bug.



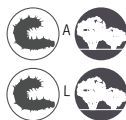
Bugs

**Bug |** *Spilostethus pacificus*

There are lots of black and orange bugs out there, so you need to pay close attention to the patterns when identifying your specimen.

**Plant Bug |** *Pseudopantilius australis*

The multi-coloured specimen on the left is *P. australis*. The red specimen on the right was sitting on an adjoining branch, but we have been unable to confirm its identity.



Leaf-footed Bugs

Assassin Bugs

Bugs



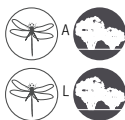
Leaf-footed Bugs | *Amorbus* sp.

Three images and three different looking Leaf-footed Bug nymphs. Are they different stages of the same species? We do not know, but they look amazing!



Assassin Bugs

These bugs are accomplished hunters. The commonly found Orange Assassin Bug *Gminatus australis* is on the left and on the right is an *Oncocephalus* species.



Red Fungus Bug

Plant Hopper

Bugs



Red Fungus Bug | *Achilus flammeus*

The Latin “*flammeus*” translates as “flaming” and the colour of this bug certainly catches your attention. While this is a plant hopper, its larvae apparently feed on fungi.



Plant Hopper | *Siphanta* sp.

Most species of *Siphanta* are tropical or sub-tropical with a few extending into Victoria. It seems that species identification requires close examination of the genitalia.



Tree Hopper

Tropiduchid Plant Hopper

Bugs



Tree Hopper | Membracidae Family

These small hoppers look like something left over from the age of dinosaurs, however the local species we have seen are only a few millimetres in length.



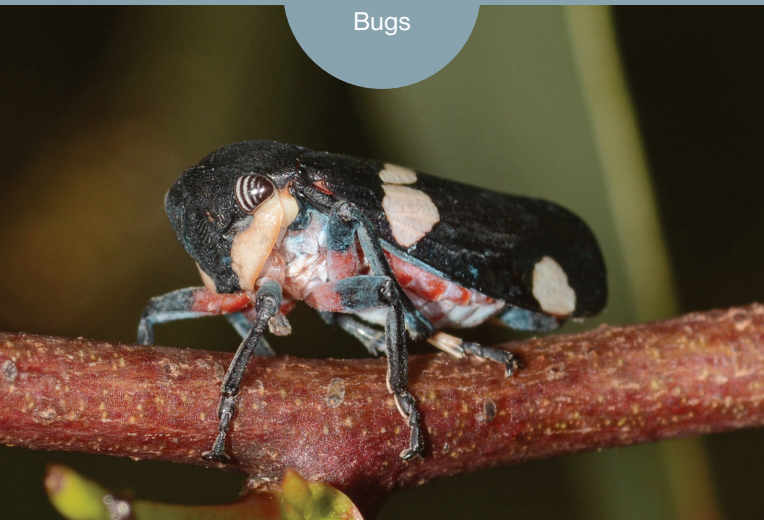
Tropiduchid Plant Hopper | Elicinae Subfamily

The intricate lacework pattern of veins in the wings make this a stand-out specimen even if it is only a little over a centimetre in length.



Gum Leaf Hoppers

Bugs



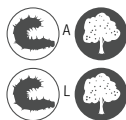
Gum Leaf Hopper | *Eurymela distincta*

A relatively large Gum Leaf Hopper that is found in mixed groups of nymphs and adults attended by ants. They can be found on Swamp Gum, *Eucalyptus ovata* across the region.



Gum Leaf Hopper | Eurymelini Tribe

This appears to be an unidentified species despite its distinctive appearance. It was found feeding on Yellow Box, *Eucalyptus melliodora*.



Two-lined Gum Leaf Hopper

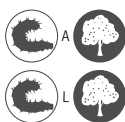
Cicadellidae Leaf Hoppers

Bugs



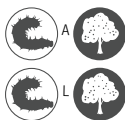
Two-lined Gum Leaf Hopper | *Eurymeloides bicincta*

Ants feed on the sugary excrement passed by the sap feeding Leaf Hopper adults and nymphs. The ants also provide a level of protection to the Hoppers in return.



Cicadellidae Leaf Hoppers (clockwise from top left)

None of the following species have been fully identified.
Cicadellidae sp., Cicadellidae sp. on Red Stringbark,
Cofana sp. and Cicadellidae sp. on Long-leaf Box.



Giant Scale Insect

Felt Scales

Bugs



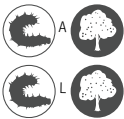
Giant Scale Insect | *Monophlebulus* sp.

Giant in the world of Scale Insects means up to 35 mm long. At around 10 mm, this species is still a good size for this rather immobile group of sap sucking insects.



Felt Scales | *Eriococcus* sp.

Female Felt Scales are wingless and produce a felt-like membranous capsule to protect their soft bodies. Ants are always in attendance to take advantage of the sweet waste.



Psyllids

Bugs



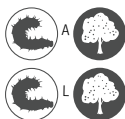
Psyllid | *Australopsylla* sp.

This adult Psyllid is thought to be a species of *Australopsylla*. Most Psyllid nymphs construct a lattice-like lerp for protection, but some create a cottony covering instead.



Psyllid | *Creiis longipennis*

The lerp is attached to the leaf while the tiny nymph (inset) shelters beneath and sucks on the plant fluids. The lerp is made from a sugary substance produced by the nymph.



Flies

Flies (Diptera) are often maligned, as some species (blowfly, sand fly, mosquito) can be an annoyance or a vector for disease, and the crawly larvae (maggots) can look a bit icky. But in reality, flies are a very diverse group of insects (~7000 described species in Australia, but more likely ~30,000 species), responsible for many ecologically important roles. Their mouths have piercing, sucking or spongy mouthparts built for a liquid diet that includes nectar, rotting plants and animals, blood, and there is one group that even specialises on wombat poo! So, they contribute to pollination, predation and nutrient cycling.

Unlike many insects, flies only have two wings (not four), with the missing pair being reduced to structures used for balancing, known as “halteres”.

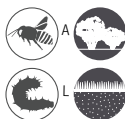
The brightly coloured hoverflies are widely regarded as very effective pollinators (second only to bees), and these and other groups (bee flies, the drone fly) actually mimic bees to avoid predation by birds and other animals. The powerful, elongated robber flies are very adept hunters, catching insect prey in flight.

Soldier Fly



Soldier Fly | *Odontomyia* sp.

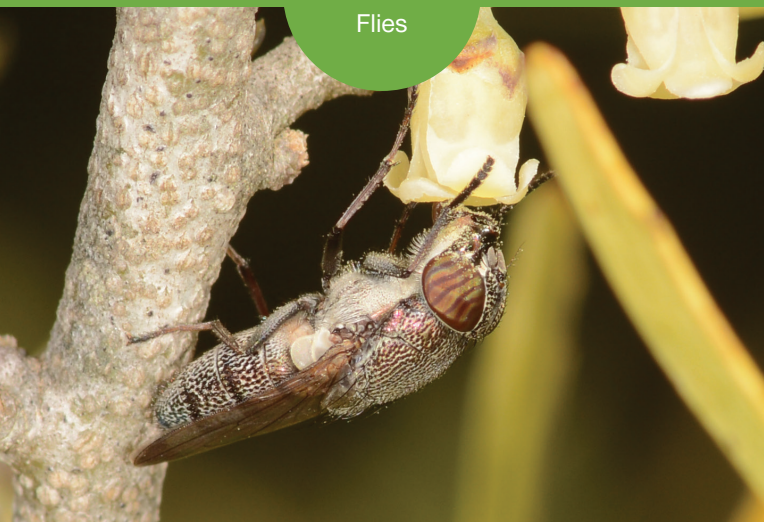
With its unusual eyes and bright green abdomen this Soldier Fly puts on quite a show. It is also a top pollinator, picking up loads of pollen as it moves around the flowers feeding.



Nose Fly

Flower-feeding March Fly

Flies



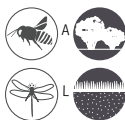
Nose Fly | *Stomorrhina* sp.

Another species with unusual eyes, this Nose Fly has its tongue deep within the Tree Violet flower. The common name is derived from the projection on the lower face.



Flower-feeding March Fly | *Scaptia auriflua*

While the majority of the Tabanid or March Flies are renowned for their blood sucking habits, some members of the *Scaptia* genus are nectar feeders.



Austalis Flies

Flies



Austalis Fly | *Austalis pulchella*

This species is in the same family as the Hoverflies, however this would not be apparent to casual observers. The brilliant colouration justifies the epithet *pulchella* (Latin. beautiful).



Austalis Fly | *Austalis copiosa*

Related to the species above but not as colourful. The common name for this group of flies is Rat-tailed Maggot Flies which does detract somewhat from their visual appeal.



Drone Fly

Native Drone Fly

Flies



Drone Fly | *Cyphipelta rufocyanea*

The Drone flies are also related to the Hoverflies and this species (collected in our survey) is included to illustrate the sometimes-bizarre shapes found in our flies.



Native Drone Fly | *Eristalinus punctulatus*

The speckled eyes readily identify this common fly which is often found feeding on flowers like this Tea-tree and other Myrtaceae, or resting on nearby foliage.



Common Drone Fly

Common Halfband

Flies



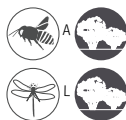
Common Drone Fly | *Eristalis tenax*

This introduced fly is a bee mimic now found throughout the world. Males stake out and defend a high value territory such as a flower bed to increase their chance of mating.



Common Halfband | *Melangyna viridiceps*

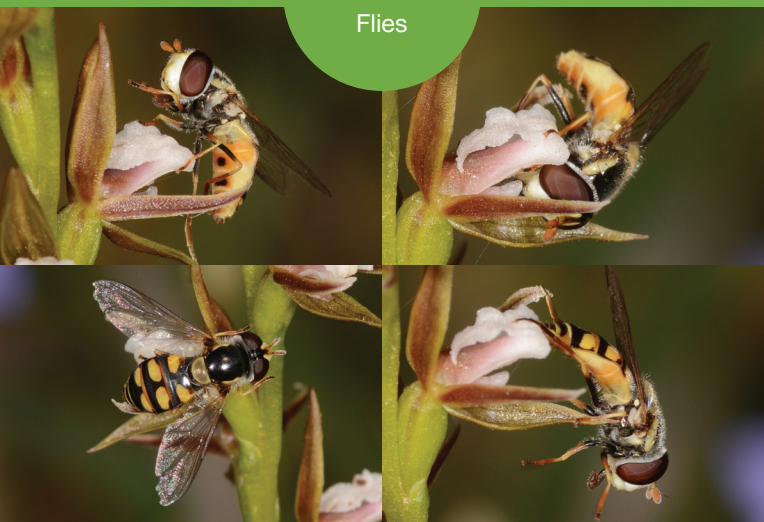
This is the common Hoverfly we see in our gardens and around bush flowers. There is at least one smaller but otherwise almost identical species.



Yellow-shouldered Hoverfly

Hoverfly

Flies



Yellow-shouldered Hoverfly *Simosyrphus grandicornis*

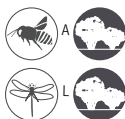
Almost as common as the last species, the yellow “shoulders” stand out. Seen here attending the Leek Orchid *Prasophyllum brevilabre* in the Fryers Ranges.



GO

Hoverfly | *Sphaerophoria macrogaster*

The term “macrogaster” refers to the large abdomen of this widespread species. It is found throughout the east and southeast of Australia.



Robber Flies

Flies



Robber Fly | Asilinae Subfamily

Robber Flies are fierce and fast ambush attack predators that prey on other insects, sometimes including the larger Damselflies and Dragonflies.



GO



GO



SR



GO

Various Robber Fly species (clockwise from top left)

Daptolestes limbipennis, *Cerdistus rusticanoides*, *Laphria rufifemorata*, *Neoaratus hercules* (with a European Wasp). Perhaps there is a niche market for our wasp-eating species.



Various Fly species

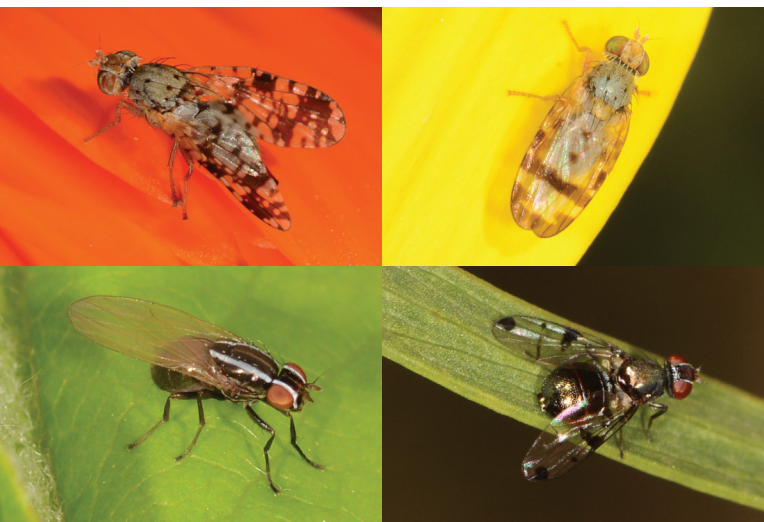
Patterned-winged Flies

Flies



Various Fly species (clockwise from top left)

Chrysomya sp., Sciapodinae Subfamily, *Clogmia albipunctata*, *Sarcophaga* sp. The Umbelliferous herbs like this parsley (top left image) are attractive to pollinators like the *Chrysomya* sp.



Various Patterned-winged Flies (clockwise from top left)

Austrotephritis poenia, *Sphenella ruficeps*, Platystomatinae Subfamily, *Poecilohetaerus* sp. Many of these flies like to display on daisy flowers or prominent leaves.

Bombyliids (Bee Flies)

Flies



Bombyliid (Bee Fly) | *Aleucosia atherix*

The Bee Flies are very hairy and distinctive-looking flies. Many have intricately patterned wings such as this *Aleucosia* species which assists us with identification.



Bombyliid (Bee Fly) | *Sisyromyia* sp.

Unfortunately, we cannot see enough of this specimen to confirm its identity although we have recorded *S. limbata* nearby. Local *Sisyromyia* like our native pea species.



Bombyliids (Bee Flies)

Flies



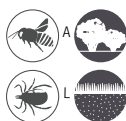
Bombyliid (Bee Fly) | *Geron* sp.

The long legs, long proboscis and hunchback body with a low set head are clear markers of the *Geron* species. The daisy family seems to be their favourite food source.



Bombyliid (Bee Fly) | *Comptosia* sp.

Comptosia are the largest genus of Bee Flies in Australia, both in size (with wingspans up to 70 mm) and in number of species (~138 known).



Tachinid Flies

Flies



Tachinid (Bristle Fly) | *Microtropesa sinuata*

Tachinid flies are generally large and sometimes brightly coloured, especially some of the *Rutilia* genus. While not a *Rutilia* species, this is one of the best-dressed Tachinids.



Tachinid | Complex *Rutilia vivipara-setosa-dentata*

When someone says they have just seen a large fly, this is the species that comes to mind. It is actually a complex of species that needs further research to resolve.



Tangleveined Fly

Large Crane Fly

Flies



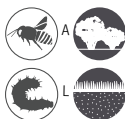
Tangleveined Fly | *Trichophthalma* sp.

Another large fly that “hovers” like a Hummingbird while it feeds on flowers like this Prickly Tea-tree. This fly has a wingspan of 41 mm.



Large Crane Fly | *Leptotarsus clavatus*

Crane flies have extraordinarily long legs which readily detach if you handle them. They are completely harmless and slow fliers.



Caddisflies

Caddisflies (Trichoptera) are less like flies and more like moths. In fact, they are related to the lepidopterans (butterflies and moths) and some caddisflies are difficult to tell apart from moths without the aid of a microscope. One distinguishing feature of this group is their wings that are covered in dense hairs rather than scales. They also often have very long antennae and lack the curled proboscis of moths.

Caddisflies largely consist of dull-coloured adults ranging from 2-40 mm in length that live around freshwater habitats where they can lay eggs, as their young live in water. Caddisfly larvae are good indicators of water quality, as they require certain chemical properties and good oxygen and temperature levels to survive. Adults are nocturnal and will rest on tree trunks by the water during the day.

The short-lived adult caddisflies do not eat, and mate during flight before the female deposits eggs in or around water. The larvae are encased in a silk sheath before pupation occurs underwater. The larvae feed on plant matter, algae and insects.

Long-horned Caddisfly



Long-horned Caddisfly | Leptoceridae Family

Caddisflies, are of course, not flies at all but a distinct insect order that look a bit like moths, to which they are related. And like moths, they are attracted to lights at night.



Long-horned Caddisflies

Caddisflies



Long-horned Caddisfly | Leptoceridae Family

They have hairs on their wings which provide the colour and patterns and the different species do look very much alike.



Long-horned Caddisfly | Triplectidinae Subfamily

The larvae will be known to fishermen who may collect them in a bait net. They resemble a case moth as they shelter within their stick or weed protective covering.



Dragonflies

Dragonflies and damselflies (Odonata) are an ancient group of large, fast-flying insects. There is even a 300 million year old crow-sized dragonfly fossil! Modern day species (~320 in Australia) are much smaller, growing up to 12 cm. They are long-lived for insects, with damselflies living for 1-2 years, while dragonflies can live up to seven years.

Odonata adults often live near water, while their young (nymphs) live underwater. Their diet consists of mosquitos, gnats, flies and other small insects. Brightly coloured adults can often be seen darting or hawking across water in search of prey. Dragonflies are named after their jaws, which are well designed for catching prey. They can fly up to 50 km/h, making them highly efficient hunters. Damselflies are more timid, are not as strong flyers and hold their wings along their body when resting.

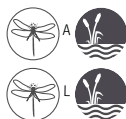
Adults mate while flying, with the female depositing eggs into the water, sometimes in clutches of up to 100,000. Hatched nymphs feed on aquatic insects, tadpoles and small fish. Many adults will hibernate to avoid harsh winters and conserve energy.

Wandering Percher



Wandering Percher | *Diplacodes bipunctata*

Recently emerged male Dragonflies do not immediately develop their full colour and can look like females. This is a female, with a mature male shown in the inset.



Blue Skimmer

Australian Emperor

Dragonflies



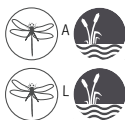
Blue Skimmer | *Orthetrum caledonicum*

Possibly our most common species, this male did not like to be approached. By sitting quietly with a camera next to a log it repeatedly visited, it was eventually captured on film.



Australian Emperor | *Anax papuensis*

Emperors seemingly fly all day and never land. This tired specimen came in with the laundry and provided a rare opportunity to get up close.



Eastern Billabongfly

Blue Ringtail

Damselflies



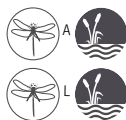
Eastern Billabongfly | *Austroagrion watsoni*

There are lots of blue Damselflies and you need an eye for detail to work out the species. This is a fully mature male. The female has pale yellow instead of the blue seen here.



Blue Ringtail | *Austrolestes annulosus*

An immature male. The light colours are replaced with blue as the males mature. Note that resting Damselflies hold their wings differently to the Dragonflies.



Cup Ringtail

Red and Blue Damselfly

Damselflies



Cup Ringtail | *Austrolestes psyche*

Compare the tip of the abdomen on this female with the abdomen on the male Blue Ringtail opposite. The male has pincer-like appendages.



Red and Blue Damselfly | *Xanthagrion erythroneurum*

In this image you can see the function of the pincers of the red male during mating.



Lacewings

Lacewings (Neuroptera) are another ancient but small insect lineage, with ~600 known species in Australia. Adults range from 5-150 mm in length and are found across Australia, the largest group (antlions) most often inhabit arid and semi-arid regions. They are green or brown in colour, with bright golden yellow or brown eyes. They are most active at night.

Due to their thin translucent wings, adults vary in flying ability, from weak, clumsy fluttering to dragonfly-like agility. They feed on garden pests, such as aphids, caterpillars and scale insects, but many actually feed more on nectar, pollen and honeydew. Adults emit a pungent garlic odour to deter predators, and some will even camouflage themselves with debris to avoid detection.

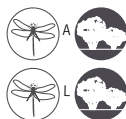
The small white eggs of lacewings are often glued to leaves and other structures on a thin white stalk secreted from the adult. The emerging larvae use a paralysing venom and strong jaws to feed on insects, such as aphids, mealybugs and leafhoppers, so can benefit agricultural producers and gardeners.

Green Lacewings



Green Lacewings

Apertochrysa edwardsi on left, *Plesiochrysa ramburi* on right. Markings on the prothorax (neck) help to identify species, (see insets).



Various Lacewing sp.

Antlions

Lacewings



Various Lacewing species (clockwise from top left)

Stream Lacewing – *Stenosmylus tenuis*

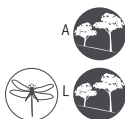
Brown Lacewing – *Psectra nakaharai*

Pied Lacewing – *Porismus strigatus*



Antlions

Antlion larvae are well known for their pitfall traps for ants.
Adults, however, are beautiful insects related to Lacewings.
Dendroleon amabilis (left), *Mossega indecisa* (right).



Grasshoppers

Grasshoppers, katydids, locusts and crickets (Orthoptera) form the common “straight wing” group of insects. As their name suggests, these insects live on the ground, often in fields and forests where there is grass and other plant matter to eat. Being mostly green or brown in colour, these habitats allow them to camouflage easily. They also have powerful back legs which allow them to jump great distances to escape predators. They are preyed upon by many animals, including reptiles, frogs, spiders and flies and can be parasitised by some wasp species, mites and worms.

All groups produce noise to attract mates or scare away rivals. Grasshoppers scrape a row of comb-like pegs on their back legs against the hard edges of their front wings, while crickets and katydids rub their wings together. After mating, a female grasshopper will bury her eggs in the ground, covering them with a hard shell. Katydids glue seed-like eggs to leaves and stems.

In large numbers, Orthopterans can impact food crops, but are also increasingly eaten as part of the “edible insect” movement.

Matchstick Grasshopper



Matchstick Grasshopper | Morabinae Subfamily

The Morabinae do not have wings and are part of a primitive family of Grasshoppers. They also have stripes in their eyes that records their age, one stripe per moult.



Leaf Katydid

Gum-leaf Katydid

Grasshoppers



Leaf Katydid | *Tinzedo* sp.

The distinctive red and white stripes tell us the genus of this specimen, however there are several unnamed species of *Tinzedo* making full identification difficult.



Gum-leaf Katydid | *Torbia viridissima*

This is a more typical looking Katydid that could not be confused with a Grasshopper. It is a widespread species found wherever you find *Eucalyptus* species.



Lesser Meadow Katydid

Raspy Cricket

Grasshoppers



Lesser Meadow Katydid | *Conocephalus* sp.

Some Katydids are readily confused with Grasshoppers and vice versa. There is even a similar looking False Meadow Katydid.



Raspy Cricket | Gryllacrididae Family

The Raspy Crickets do not jump despite their hopper-like legs. They stay in their holes or shelters during the day, coming out at night to feed.



Phasmids

Leaf and stick insects (Phasmatodea) are masters of camouflage, blending in with their surroundings due to their shape and colouration. If an animal is lucky enough to spot one, it will sway in the breeze, imitating a dead leaf or stick, or simply drop to the ground to avoid capture.

Australia is home to ~150 species of phasmid. They often inhabit gum trees as well as some fruit trees and rose bushes in gardens. There is some variation in size, colour and body features, such as horns and spines, even among the same species, likely as a result of geography or habitat. The largest phasmid can grow to 56 cm.

Female phasmids can produce fertile eggs even without mating with a male (a process called parthenogenesis), but all eggs will produce females. If mating occurs, males and females can be born.

Stick insects are so intent on not being seen that they eat entire leaves to remove any traces that can show where they have been. They are most active at night.

Spur-legged Phasmid



Spur-legged Phasmid | *Didymuria violescens*

The violet wings of the male are a real showstopper while the female (see inset) is holding her front legs forward giving her the appearance of having just four legs.



Mantids

Praying mantids (Mantodea) are named for their tendency to hold their front legs up in a posture resembling praying. Like phasmids, they are very well camouflaged, resembling sticks, twigs or leaves and their eggs resemble seeds. However, unlike the vegetarian phasmids, mantids have rows of sharp teeth on their front legs used for clasping prey including grasshoppers, butterflies and moths, but occasionally small lizards, frogs and birds also.

118 species of mantid are found across Australia, often on flowers, tree trunks and grass. They are active both day and night, and while they are relatively weak flyers, they are very good at staying motionless, have excellent vision and their heads can turn a full circle. These help them locate and capture some insect crop pests among other prey.

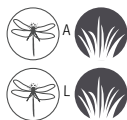
Female mantids are mostly larger than males and will often eat them while mating in autumn. Females lay their eggs inside an egg case and secrete a sticky substance to attach them to plant stems and twigs. Nymphs will hatch from these in the spring.

Purple-winged Mantis



Purple-winged Mantis | *Tenodera australasiae*

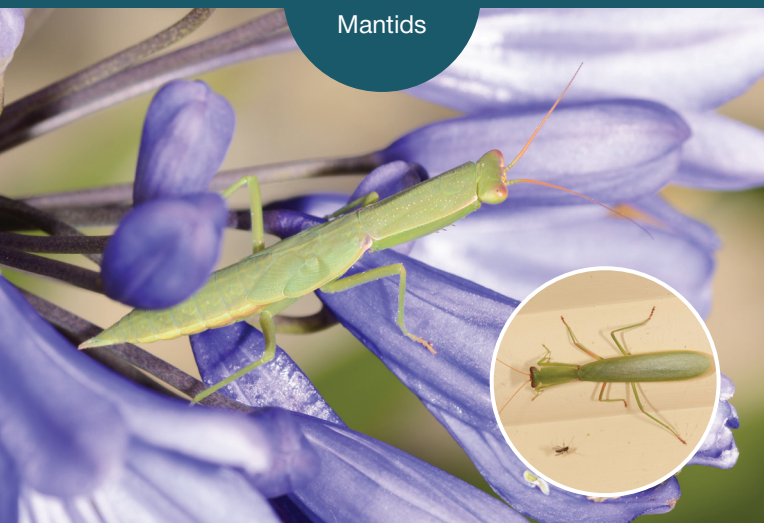
This large Mantis is 100 mm in length and is seemingly very aware of the camera. This species is a frequent garden visitor at night in late summer.



Australian Garden Mantis

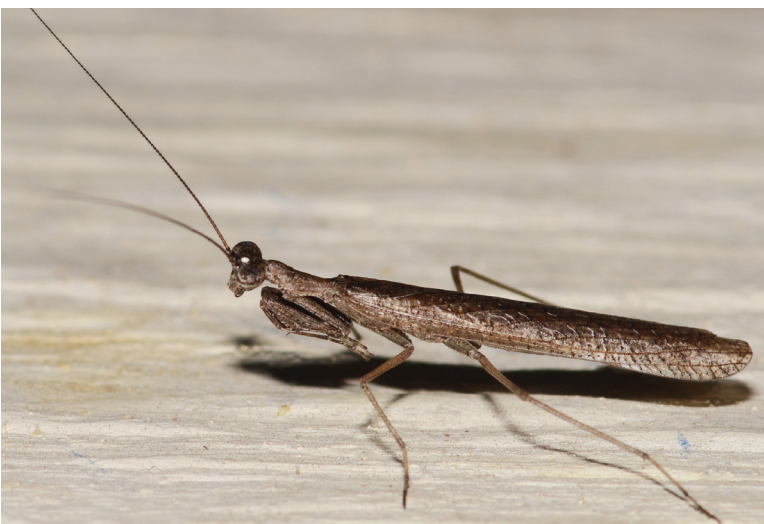
Pygmy Ground Mantis

Mantids



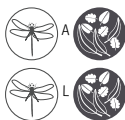
Australian Garden Mantis | *Orthodera ministralis*

The main image shows a late-stage nymph with wing buds and a full adult is shown in the inset. They can be found hunting on a wide variety of garden plants.



Pygmy Ground Mantis | *Bolbe* sp.

These Mantids are from the Nanomantidae family and at approximately 18 mm long, this is certainly a small species. The smallest species however checks in at just 8 mm.



Mayflies

Adult mayflies (Ephemeroptera) are short-lived, their lifespan ranging from a few hours to a few days. This is just long enough to mate and reproduce. The wingless nymphs live for two to three years underwater, feeding on fallen plant matter.

Large swarms of mating mayflies congregate above suitable freshwater environments, where females can dip their abdomen in the water to deposit eggs. Males will attract females through a kind of dance. Adults do not feed.

Mayflies are typically small, having a wingspan of around 15 mm. They have membranous wings, with the hind wings being much smaller. Wings will be held vertically when resting.

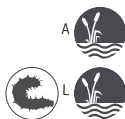
Mayflies are attracted to light, so may be adversely impacted by lights from buildings and along roads close to their preferred habitats.

Prong-gilled Mayfly



Prong-gilled Mayfly | *Atalophlebia* sp.

This male is thought to be an *Atalophlebia* species based on the pattern of the wing venation. Collecting a specimen allows full examination and identification.



Small Mayflies

Mayflies



Small Mayfly | Baetinae Subfamily

A female with regular eyes. Once again, the wing venation guides us to a family group, but it is not possible to determine a species without a specimen to hand.



Small Mayfly | Baetinae Subfamily

The male has the modified turbinate upper section to its eyes. These enlarged eyes are thought to assist the male approach the female from below prior to mating.



Scorpion-flies

Scorpion-flies (Mecoptera) are an ancient insect group, having been around for at least 250 million years. Their name reflects the rear body part of some males, which curls upward like a scorpion but is harmless. They have dark spots on their membranous wings and an elongated head with a long beak and jaws for eating dead insects, nectar, pollen and plant material. Scorpion-flies will sometimes steal food from spiderwebs and are considered beneficial insects given they readily clean up other dead insects.

Scorpion-flies inhabit moist environments near fresh water and are often found living a solitary life on low shrubs and herbaceous plants or on flowers. They are active during the day.

Males offer a gift of sweet saliva or a dead insect while mating. Females lay their eggs in the soil or crevices in wood. Larvae live and pupate in soil and waste and feed on rotten plant and animal matter. Some even feed on small insects.

Scorpion-fly



Scorpion-fly | *Harpobittacus australis*

Sometimes feeding on nectar, male Scorpion-flies also catch prey on the flowers and offer it to females as part of the mating ritual.



Earwigs

Earwigs (Dermaptera) number ~85 known species in Australia and occur in moist habitats with leaf litter and debris, under bark and stones and in crevices. They are often yellow, red-brown or black with a flat slender body up to 30 mm in length. They are most notable for their pincers (called cerci) at the end of their abdomen, which they use to defend themselves in much the same way as a scorpion (although they are harmless to humans). Some species also release a pungent liquid to deter predators.

Earwigs feed on insects, spiders and mites, pollen, fungi, mosses and algae and when in large numbers can damage flowers, fruits and vegetables. One species, *Labidura truncata*, attacks codling moth (*Cydia pomonella*) larvae, so may benefit agriculture.

Female earwigs care for their eggs and nymphs, defending them from intruders. They will clean them by licking off fungus and parasites and feed nymphs up to the second or third moult.

When open, the hind wings are thought to resemble a human ear. It is however, very unlikely an earwig will crawl into your ear!

European Earwig



European Earwig | *Forficula auricularia*

This species is a pest of flower buds, often causing petals to drop. You are more likely to encounter this introduced species than one of the natives.



Cockroaches

There are ~530 cockroach (Blattodea) species in Australia, covering every terrestrial habitat. They range from 5-80 mm long and can be active both day and night, preferring dark, damp places. Their relatively flat bodies and strong legs allow them to hide in narrow spaces and run very fast when disturbed.

Cockroaches will eat almost anything, but usually feed on plant sap, pollen, vegetable matter and dead animals. They play an important role in decomposition that aids natural environments. Cockroaches in the home however can carry bacteria that spread disease and contaminate food. Cockroaches are also an important part of the food web, being eaten by mammals, frogs, reptiles and other invertebrates. Some species produce an odour to deter predators.

Some females may also emit pheromones to attract males. Once mated, females can lay up to 40 eggs, four times a year. Eggs may be carried by the female to a suitable hatching location. Young cockroaches are called nymphs.

Wood Cockroach



Wood Cockroach | *Neotemnopteryx* sp.

While it is a close relative to one of our household pests commonly called the German Cockroach, this native species is unlikely to enter your house.



Bark Cockroach

Giant Cockroach

Cockroaches



Bark Cockroach | *Laxta granicollis*

An adult male. Bark Cockroaches spend most of their time under bark or logs and are only discovered when deliberately searching or perhaps through wood collection.



Giant Cockroach | *Calolampra* sp.

Not really a giant (26 mm long), but this species belongs to the Giant Cockroach family. This is a male which is sometimes attracted to lights at night.



Termites

Termites (Blattodea) are another group of social insects that have distinct castes (queen, king, workers, soldiers) that play different roles within the colony. A colony is formed when winged reproductive individuals fly from the original colony to find a nest site. Once one is located, the mating pair (king and queen) lose their wings and hollow out a nest chamber. As the colony grows, the queen can lay over 1000 eggs a day. No wonder large colonies can have millions of individuals! However, in temperate regions like central Victoria, queens do not lay eggs over winter.

There are two types of termites - ground termites and wood termites. Only a few of the known ~350 species greatly impact human habitations. Most feed on vegetation, shrub roots, decaying wood and tree stumps. Some species also turn to cannibalism if numbers get too high.

Soldier termites have long sharp jaws to defend the colony against ants and other invaders, however they need workers to feed them as they cannot feed themselves. They communicate by leaving scent trails and banging their head against tunnel walls.

Australian Dampwood Termite



Australian Dampwood Termite | *Porotermes adamsoni*

A winged alate (reproductive form) out on a nuptial flight. This species will feed on wood in contact with the ground but is unlikely to attack your house, unlike the next species.



Termites

Termites



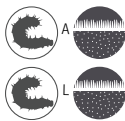
Termite | *Coptotermes* sp.

Image shows workers and nasute soldiers with the pointed rostrum on their head. A gland on the rostrum tip provides the soldier with a chemical weapon to defend the nest with.



Termite | *Nasutitermes* sp.

Nasutitermes build domed mounds 500 mm or more aboveground. They are foragers, storing plant material in their nest. Insets show a worker (top) and nasute soldier.



Other insects

There are a number of other more rarely encountered insect groups, such as Stoneflies, Web-spinners, Dobsonflies, Silverfish, Booklice, Thrips and Fleas.

Stoneflies (Plecoptera) occur near water and are often eaten by fish. They are sensitive to water pollution, so are good indicators of stream health. Dobsonflies (Megaloptera) have similar habits.

Web-spinners (Embioptera) are mostly nocturnal and live most of their lives in silken nests with an array of tunnels spun on bark, rocks or among litter. They are rarely seen.

Silverfish (Zygentoma) are fast, soft-bodied insects that live in dark, warm environments, including kitchens and bathrooms. They can survive months without food.

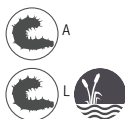
Fleas (Siphonaptera) are tiny insects that feed on the blood of birds and mammals. As such, they are vectors for disease at times and can cause itchy and inflamed skin. However, fleas are also parasitised by mites and nematode worms.

Southern Stonefly



Southern Stonefly | Notonemouridae Family

This specimen of a rarely seen insect group was bycatch in a sweep net survey not far from the Campaspe River. Other individuals were subsequently found nearby.



Web-spinner

Dobsonfly

Other insects



Web-spinner | Oligotomidae Family

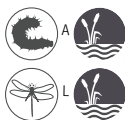
These cryptic insects establish their colonies in crevasses. Only the dispersed males have wings. Inset shows modified left cerci which is important for identification of the species.



RS

Dobsonfly | *Archichauliodes guttiferus*

This beautiful insect represents our final insect order. They are also rarely seen due to their lifestyle and habitat. This specimen was recorded on the Campaspe River.

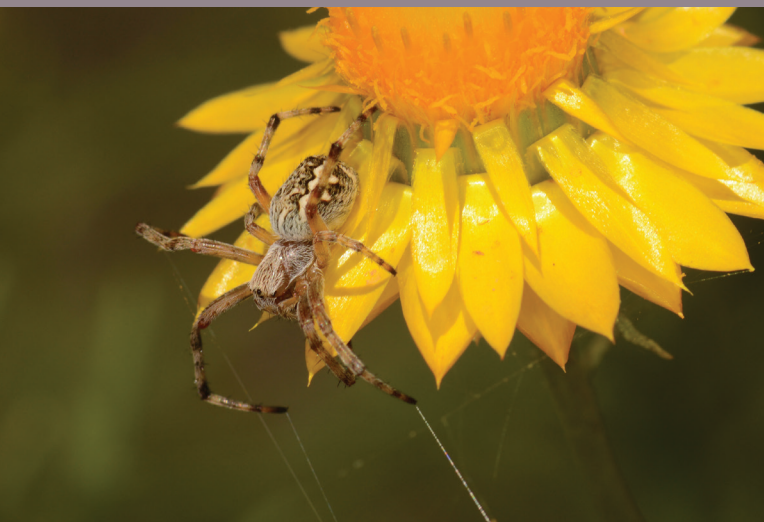


Not insects

It is not only insects that inhabit our parks and gardens and contribute to ecosystem function. Spiders and mites (Arachnida) are commonly encountered groups of non-insects (they have eight legs, not six like insects). While we may not want to get too close to the venomous Red-back Spider (*Latrodectus hasselti*) or the imposing Huntsman spiders (Huntsmen are harmless really - a cold pack will usually suffice for a bite), spiders are a diverse and captivating group. Daddy Long-legs (*Pholcus phalangioides*) are great pest controllers, while the beautiful but well camouflaged flower spiders hide in wait of honeybees, butterflies and beetles in flowers and foliage. Orb-weavers are conspicuous in gardens due to their sticky wheel-shaped webs.

The tiny mites are parasites of many insects and vertebrate animals, but will also feed on bacteria, fungi, plants and waste products. They are found everywhere on land, in soil, leaf litter, plants and water and are active both day and night. They will cling on to their animal host or prey, and some are specialised for particular species or groups of insects; for example bees often carry mites, but can usually tolerate them in low numbers.

Sooty Orb-weaver



Sooty Orb-weaver | *Cyclosa fuliginata*

We have chosen the Sooty Orb-weaver to represent the spiders as it is generally found on flowers where it waits for visiting pollinators to come to lunch.



Pullein's Crab Spider

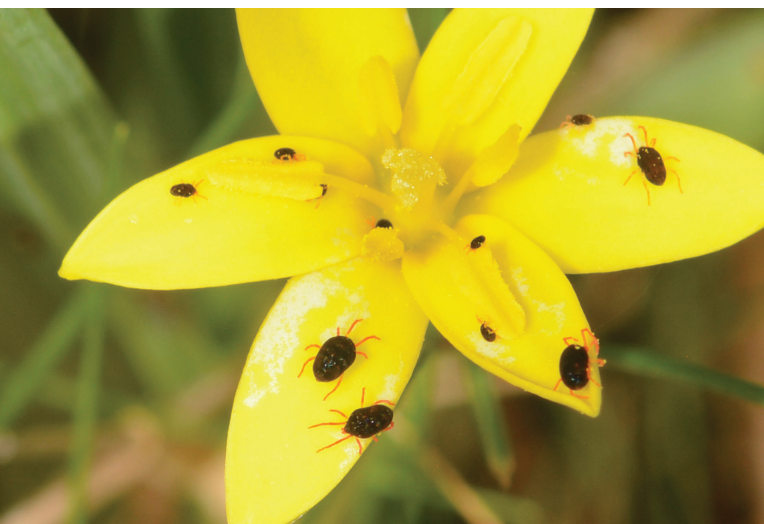
Redlegged Earth Mite

Not insects



Pullein's Crab Spider | *Lehtinelagia pulleinei*

While the spider is not actually sitting on the Bearded Orchid flower, you can see by the colours that it has its camouflage all worked out.



Redlegged Earth Mite | *Halotydeus destructor*

These mites are a pest of pastures and crops like Canola. Seen here on a *Pauridia* (formerly *Hypoxis*) flower, the white patches show where feeding has damaged the tissue.



Community Organisations

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Wombat Forestcare

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