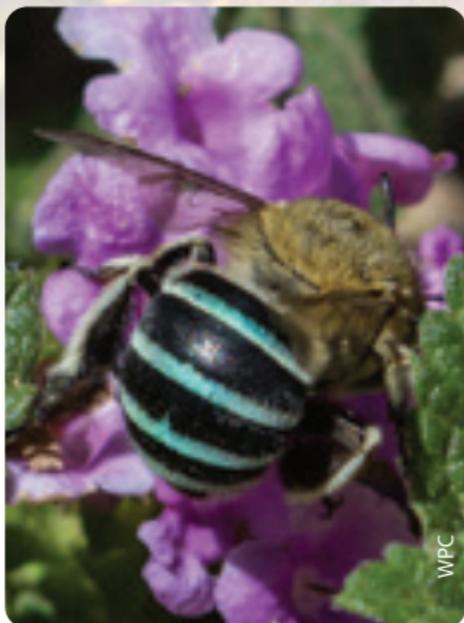


Common Pollinator *and Beneficial Insects* *of Victoria*

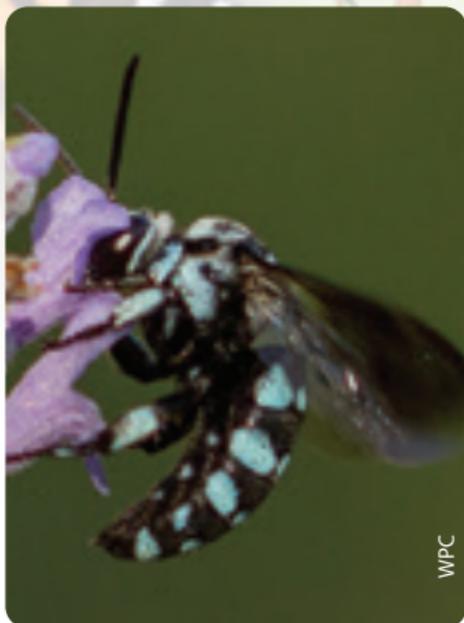
An identification and conservation guide



Hymenoptera: Bees



Blue-banded bee
Apidae



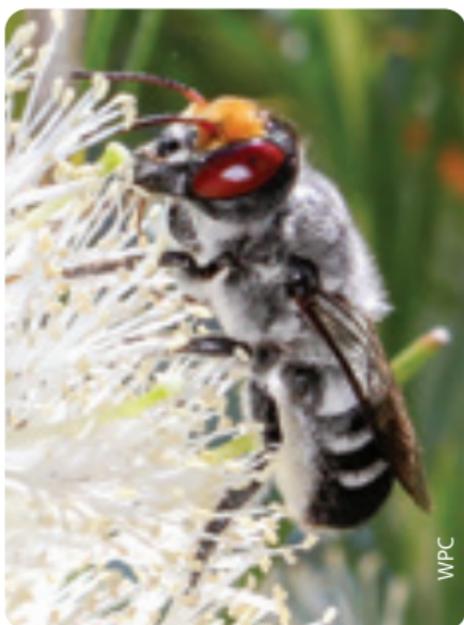
Chequered cuckoo bee
Apidae



Common spring bee
Colletidae



European honey bee
Apidae



Golden-browed resin bee
Megachilidae



Halictid bee (*Lipotriches* sp.)
Halictidae

Hymenoptera: Bees



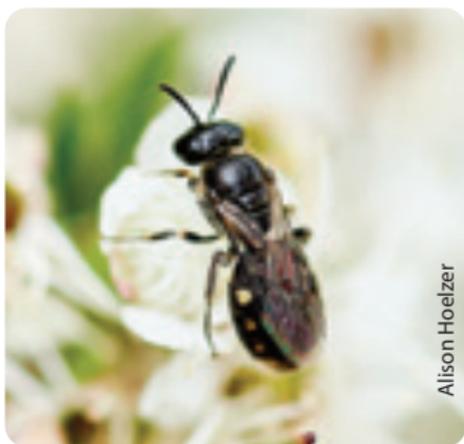
Halictid bee
Halictidae



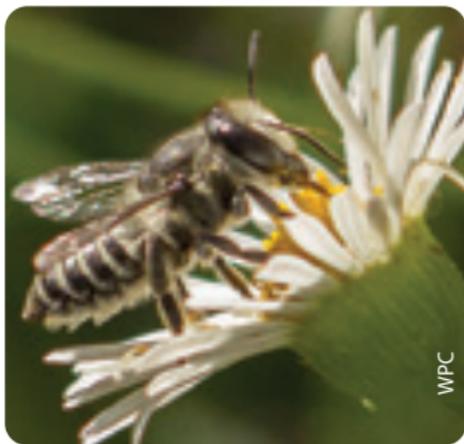
Reed bee
Exoneura



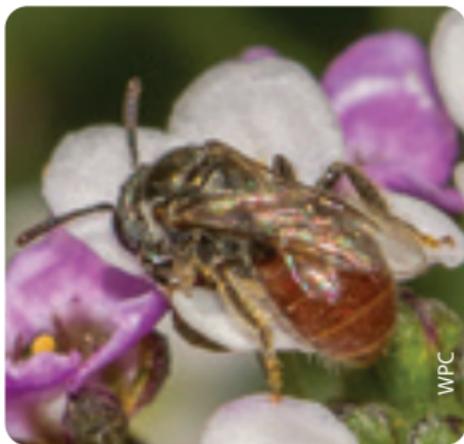
Hyaleus bee (bubbling)
Colletidae



Large Lasioglossum sp.
Halictidae



Leafcutter bee
Megachilidae



Red bee
Halictidae

Hymenoptera: Bees

- Around 2,000 native bee species currently known.
- Mostly found in sunny, open woodlands, gardens and meadows with lots of flowers.
- Active when it is warm, fine and calm or only lightly breezy.
- Nest in bare sandy soil, or cavities of dead wood or stone walls.
- Size range: 5 mm to over 2 cm; colours: black, gold, red, yellow or green, often with stripes on abdomen.

Hymenoptera: Wasps, Ants & Sawflies



Alison Hoelzer

Ant
Formicidae



WPC

Cream-spotted ichneumon wasp
Ichneumonidae



WPC

Cuckoo wasp
Chrysididae



WPC

European wasp
Vespidae



WPC

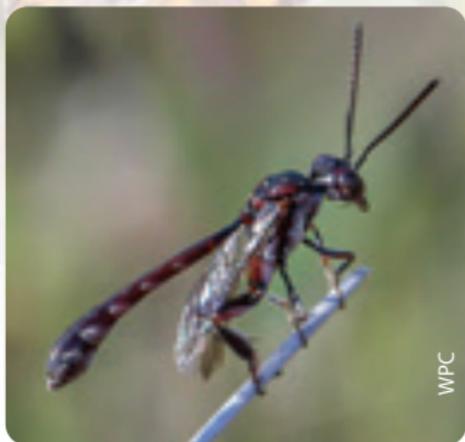
Flower wasp (female, wingless)
Tiphiidae



WPC

Flower wasp (male)
Tiphiidae

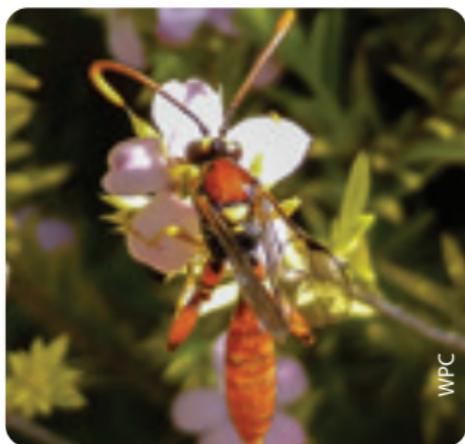
Hymenoptera: Wasps, Ants & Sawflies



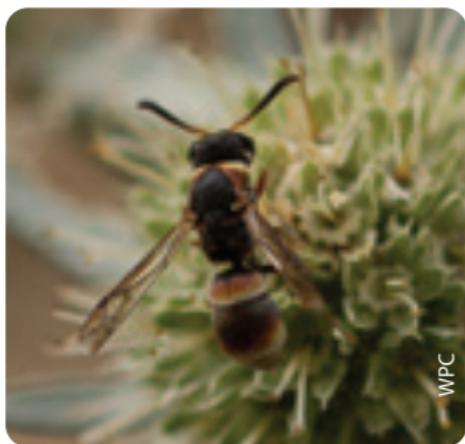
Gasteruptiid wasp
Gasteruptiidae



Hairy flower wasp
Scoliidae



Orange ichneumon wasp
Ichneumonidae



Paper wasp
Vespidae



Paper wasp
Vespidae



Sawfly adult
Tenthredinidae

Hymenoptera: Wasps, Ants & Sawflies

- Around 8,000 native species currently known; many more undescribed.
- Found in all habitats. Wasps lay eggs in leaf litter, cavities, bare soil or other insects; ants build nests underground or in trees; sawflies lay eggs under leaves.
- Size range: 0.1 mm to over 10 cm; colours: black, red, orange, brown, gold.
- Wasps are also predators and parasitoids of other insects; sawfly larvae (some species called 'spitfires') can be pests of eucalypts when abundant; ants are predators of other insects and some species contribute to soil health.

Plant & Insect Relationships

Insects are efficient pollinators and plants have developed many ways of encouraging them to visit. This has led to some strong associations between the lives of plants and insects.

A study by the City of Melbourne found that 60% of insect species in their area live in the mid-storey - the vegetation in between the tree canopy and the ground cover - even though this makes up only a small proportion of vegetation in the city.

This means that planting flowering shrubs should be encouraged in open spaces, gardens and farms to provide the habitat and food supply these important insects need to keep our ecosystems at their best.

In focus: Eltham Copper Butterfly

The Eltham Copper Butterfly is a small and attractive butterfly with bright copper colouring on the tops of its wings, which is visible during the summer flight season.

It is an unusual species due to its close symbiotic association with a group of ants from the genus *Notoncus* and the shrub Sweet Bursaria (*Bursaria spinosa*).

Adult butterflies lay their eggs on the roots and stems of Sweet Bursaria. Once the eggs hatch, the ants guard the caterpillars (providing protection from predators), ushering the larvae to and from the ant nest at the base of the shrub, to feed on the Sweet Bursaria leaves at night.

In return, the ants feed on the sugar secretions exuded from the body of the caterpillar. The adult butterfly is also a pollinator.



Andrea Canzano



Karen Thomas



Steve McNeil

Clockwise from top: Eltham Copper Butterfly;
Eltham Copper Butterfly larvae with *Noctonus* ants; Sweet bursaria.

Habitat and Nectar Plants



Sweet bursaria
Bursaria spinosa



Thryptomene
Thryptomene sp.



Tea tree
Leptospermum sp.



Purple coral pea
Hardenbergia violacea



Kangaroo grass
Themeda triandra



Paperbark flower
Melaleuca sp.

Good native nectar species

A diversity of plant and flower characteristics are important to create a nectar insectary and attract beneficial insects to your garden.

As much as possible, aim for year-round flowering and in particular, spring-summer flowering when insects are in abundance and crop pollination is essential.

Mid-story flowering shrubs and grasses are key to a good nectar insectary. Native grasses provide excellent habitat for pollinator and beneficial insects.

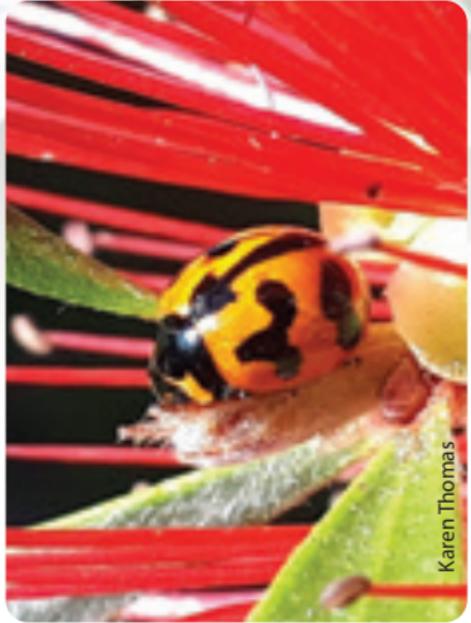
Research conducted by Mary Retallack (Retallack Viticulture), showed that Wallaby grass (*Rytidosperma spp.*) is breeding habitat for brown lacewings. Many horticulture farms are now including insectary plants in shelterbelts and adjoining revegetation areas to support their integrated pest management programs.

Beneficial Insects



Alison Hoelzer

Long-legged fly
Dolichopodidae



Karen Thomas

Transverse ladybird
Coccinellidae



Alison Hoelzer

Jumping spider
Salticidae (Arachnida)



Alison Hoelzer

Brown lacewing
Hemerobiidae



Denis Crawford

Green lacewing
Chrysopidae



Denis Crawford

Parasitic wasp
Braconidae

Beneficial Insects

- Beneficial insects are a key part of the natural food chain - they feed on other pest insects (such as aphids) and many also perform a pollination service.
- Beneficial insects include predatory and parasitic insects such as ground beetles, lacewings, ladybirds, spiders (though technically not insects), predatory thrips, mites, flies and bugs and parasitic wasps, as well as pollinators such as ants, native bees, moths and butterflies.
- Many beneficial insects feed on nectar so it is important to provide year round flowering plants and habitat to support the abundance of these insects in the natural and production landscape.



Dennis Crawford

Predatory ground beetles (Carabidae) live on the surface of soil or mulch and capture and consume a wide variety of ground dwelling insects, many of which are pests.

In focus: Hover fly

Hover flies are a common sight in gardens, especially where aphids are present. This makes them a very beneficial ally to help control pest insects.

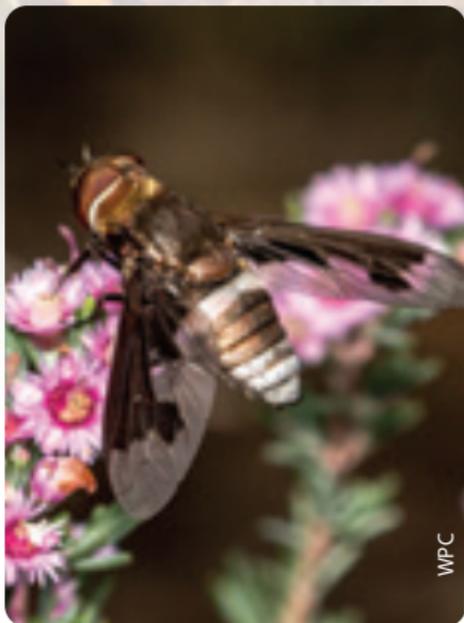
Adult hover flies feed on nectar and pollinate flowers before laying eggs near aphid populations. After they hatch, the predatory hover fly larvae spend several days feeding on the nearby aphids.

Attracting hover flies in abundance requires nectar-producing flowers, ideally flowering in early spring and summer just before the warmer weather leads to aphid incursions.



Allison Hoelzer

Diptera: Flies



WPC

Bee fly (hairy)
Bombyliidae



Denis Crawford

Robber fly
Asilidae



WPC

Blow fly
Calliphoridae



Alison Hoelzer

Scorpion fly
Bittacidae



Alison Hoelzer

Drone fly
Syrphidae



WPC

Flesh fly
Sarcophagidae

Diptera: Flies



Hover fly
Syrphidae



Hover fly
Syrphidae



Lauxaniid fly
Lauxaniidae



March fly
Tabanidae



Rhiniidae fly
Rhiniidae

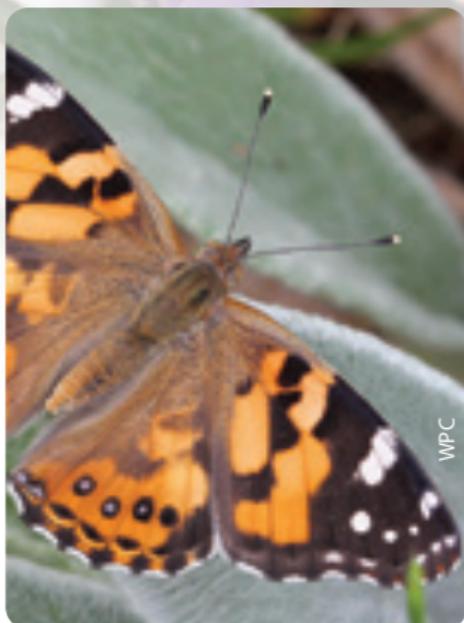


Soldier fly
Stratiomyidae

Diptera: Flies

- About 7,000 native species currently known; many more undescribed.
- Found in all types of habitat; lay eggs in leaf litter, cavities, bare soil, other insects, or rotting organic matter.
- Active through winter and at lower temperatures, compared to native bees.
- Size range: 1 mm to over 3 cm; colours: black, yellow, orange, green, grey, brown. Usually distinguished from bees and wasps by lack of waist and large bulbous eyes.
- Most species are predators or parasitoids of other insects.

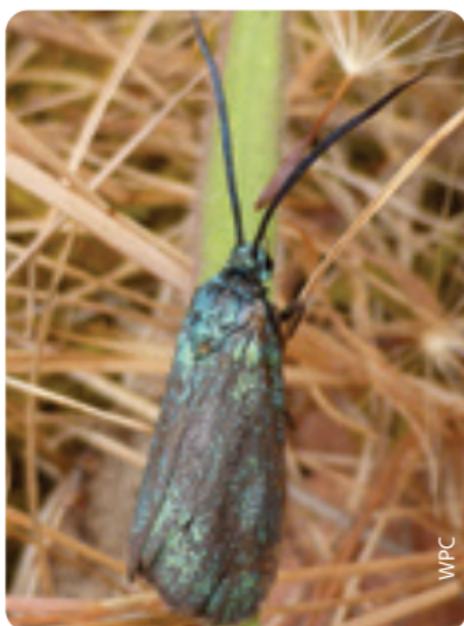
Lepidoptera: Butterflies & Moths



Australian painted lady
Nymphalidae



Bogong
Noctuidae



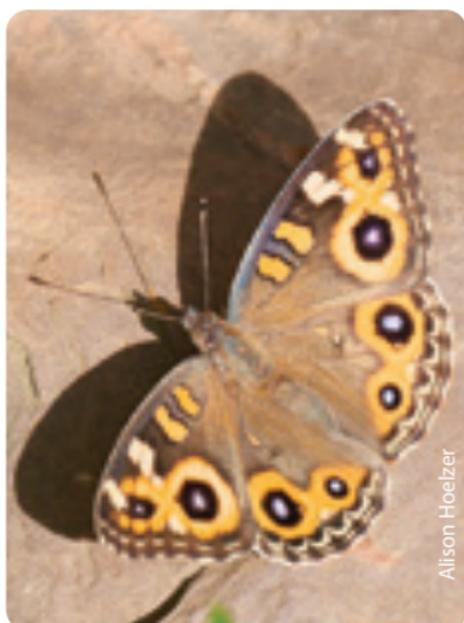
Burnet
Zygaenidae



Cabbage white (potential pest)
Pieridae

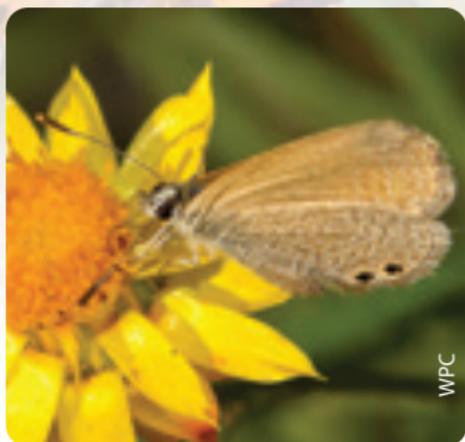


Common grass blue
Lycaenidae



Meadow Argus
Nymphalidae

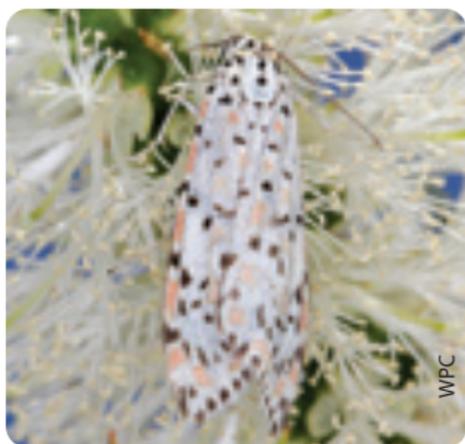
Lepidoptera: Butterflies & Moths



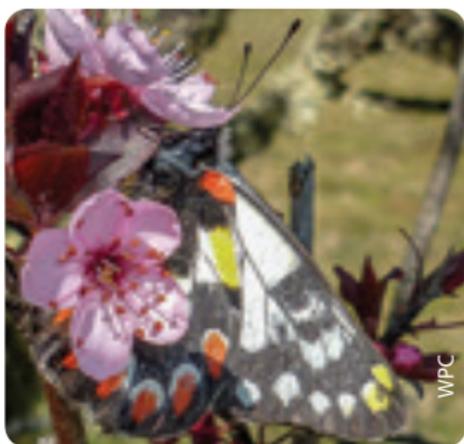
Double-spotted line blue
Lycaenidae



Hawk
Sphingidae



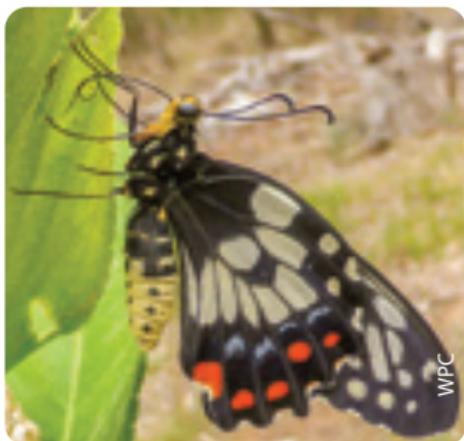
Heliotrope
Arctiidae



Red-spotted Jezebel
Pieridae



Skipper
Hesperiidae



Swallowtail
Papilionidae

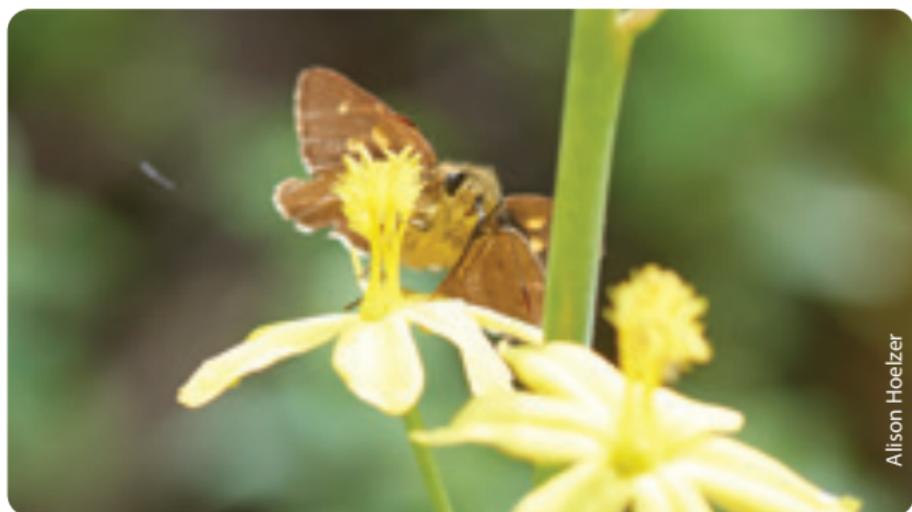
Lepidoptera: Butterflies & Moths

- About 10,000 native species currently known; more undescribed.
- Found in all types of habitat; lay eggs in leaf litter or on plants.
- Pupa stages found hanging from tree stems (butterfly chrysalis) or spun around branches or leaves (moth cocoon).
- Butterflies mostly active in day, moths generally active at night; but many day-flying moths too!
- Most larvae feed on plants (foliage or wood), a few feed on other insects; can be pests when present in high numbers.
- Size range: wingspan 3 mm to over 20 cm.

Pollinators

Why do pollinators matter?

- Many flowering plants (food crops and native plants) rely on insect pollinators to set fruit.
- In Australia, there are many specialised native plant-pollinator relationships, so pollinator conservation is not just about focusing on the most common species.
- While honey bees are perhaps the most recognised pollinators, they are an introduced species and there are thousands of Australian native pollinators that are equally good, if not better, at pollination.
- Many of these insects play other important roles in the ecosystem in addition to pollination, such as biological control or waste decomposition, and are important contributors to biodiversity generally.



Alison Hoelzer

Lepidoptera feeding on pollen and nectar

In focus: trigger plants

Trigger plants (*Stylidium* sp.) are a diverse group of native plants that are aptly named due to the clever way they use insects to exchange pollen.

As an insect browses over the trigger plant flowers, drinking the sweet nectar, it 'triggers' a catapult of pollen from the plant, which covers them. The insect transfers the pollen as it continues foraging. The trigger plant can also use its stigma to collect pollen from the insect.

This shows how important pollinator insects are to our ecosystem and how plants have co-evolved with native pollinators for mutual benefit.



Karen Thomas

Coleoptera: Beetles



Golden stag beetle
Lucanidae



Jewel beetle
Buprestidae



Ladybird
Coccinellidae



Longicorn beetle
Cerambycidae



Pintail
Mordellidae



Plague soldier beetle
Cantharidae

Coleoptera: Beetles

- Over 20,000 native species currently known; many more undescribed.
- Found in all habitats, terrestrial and freshwater; diverse life histories in 3 main groups: herbivores, predators and scavengers.
- Not all species are pollinators, or even flower visitors! Beetles don't fly far, so most potential pollinator beetles will be found on flowers.
- Size range: 0.4-80 mm; characterised by hard forewings (elytra)

Common Pollinator and Beneficial Insects of Victoria

This guide has been prepared to aid identification of a selection of common pollinator and beneficial insects.

This guide provides a good starting point, but many species can look similar. Please see the references and websites listed at ppwcm.vic.gov.au/beneficialinsects if you would like help with accurate species identification.



Denis Crawford

Green lacewings prey on a wide variety of insects and can consume up to 60 aphids per hour! The larvae (pictured) have a spiny back and keep the skeletal remains of their prey pierced onto their spines as camouflage, giving them the name 'junk bug'.

How can I encourage pollinators and beneficial insects?

- Make sure your property supports a diversity of flowering plants that provide flowers throughout the year.
- When flowering nectar plants are in short supply, pollinators can access nectar through the glands of plants such as *Fabaceae* (eg. *Acacias*) so consider planting these as well.
- Provide pollinator nest sites - bee hotels, dead wood or plant stems, small areas of bare sandy ground and leaf litter patches.
- Reduce your use of chemical sprays. Many pesticides will kill pollinators as well as pests; overuse of herbicides can remove many of the flowering herbs that pollinators rely on throughout the year.
- Record and share your observations to help build knowledge about these species. Citizen science projects including websites and mobile apps allow you to share your sightings with others and may help you with identification, e.g. ala.org.au, wildpollinatorcount.com and iNaturalist.org

N.B. Not all insects on flowers are true pollinators. Some might be eating pollen on one flower without transferring it to another (which is how pollination happens). You won't always be able to tell, but you can have an educated guess, and in general, most insects you see on flowers can be considered 'potential' pollinators.

Acknowledgements

This guide was originally compiled by Manu Saunders and Karen Retra with support from the Slopes to Summit Partnership and the NSW Environmental Trust. This version has been adapted by the Port Phillip & Westernport CMA and Agribusiness Yarra Valley with funding from the Victorian Government. Wild Pollinator Count (WPC) images were taken by Manu Saunders, Karen Retra and James Abell.

For more information, including useful websites and resources, go to ppwcm.vic.gov.au/beneficialinsects