

# Powerful pollinators

Encouraging insect pollinators in rural and urban landscapes



Pollinators are an essential component of healthy, biodiverse landscapes and provide critical pollination services to native flora and agriculture production across the country.

This guide provides information on ways to encourage a diverse range of insect pollinators across all properties, and includes a planting calendar to help select plants to support diverse pollinators throughout the year.



# The power of pollinators

Pollinators – mostly insects, but also birds and mammals – assist the production of seeds and fruit in many plant species by visiting flowers in search of food (nectar and/or pollen). Whilst foraging they transfer pollen from one flower to another, facilitating fertilisation, which results in fruits and seeds.

Honey bees, native bees and other native insects like hoverflies, wasps and butterflies provide essential pollination services for native plants, pastures, crops, fruits and vegetables.



Native vegetation supports pollinators by providing food and nesting sites. Nearby crops and pastures will benefit from the increased abundance and diversity of pollinators in the landscape.

## Pollinators and food security

Without insect pollinators, the quantity and diversity of food grown for humans in contemporary agricultural systems would be severely restricted. Many of the food crops we eat, as well as pasture and fodder crops, benefit from pollination by insects.

Pollinator-dependent crops include apples, pears, avocados and vegetables, as well as many crops grown for seed production, such as canola and lupins.

The quantity and diversity of insect pollinators are key drivers of production as they influence both crop yields and quality. Under-pollination results in smaller and misshapen fruit or seed that isn't viable.

Grazing enterprises can also suffer from a reduction in the abundance or diversity of pollinators, due to the role these insects play in the persistence of nitrogen-fixing pasture legumes such as clover.

A diverse and healthy community of pollinators generally provides more effective and consistent pollination than relying on any single species.

Insect populations are in decline worldwide due to land clearing, intensive or monocultural agriculture, pesticide use, pollution, colony disease, increased urbanisation and climate change. Low pollinator numbers mean not all flowers are pollinated, leading to low fruit or seed set. This in turn reduces fruit and vegetable harvest yields, and decreases food supply.



Under-pollination results in smaller, misshapen fruit such as this strawberry.

## Healthy ecosystems

Pollinators are both essential to, and depend upon, healthy ecosystems. A growing human population and increasing demand for food puts pressure on ecosystems, while declining ecosystem function will in turn negatively impact food production.

Insect pollinators are a prime example of this – without healthy ecosystems and the presence of patches of native vegetation to support insect populations, pollination will decline. This will threaten both crop productivity and the persistence of native, pollinator-dependent flowering plants.

Pollinators require habitat that contains year-round food sources, breeding resources and nesting sites. The presence of pollinator habitat adjacent to food crops has been shown to improve food production by enabling a greater variety and number of pollinators to persist year-round, providing pollination services when required.

**Turn to the centre of this brochure for a guide to planting for pollinators.**

## Diapause or diet? Where are the insects?

Many insect pollinators undergo a diapause during colder winter months. Diapause is a period of suspended development during unfavourable environmental conditions, and during

this period insect pollinators do not need flowers. Birds and other small mammals will continue to benefit from available pollen and nectar during this time.

If there are low numbers of insect pollinators in your local area, it is important to determine whether this is because of diapause, or because of an inadequate availability of nectar and

pollen, creating a 'food desert' where insect pollinators cannot survive.

There are still many unknowns about insect pollinators in Australia. Take part in Australian Pollinator Week or in the annual Australian Pollinator Count to learn more about pollinators in your area – visit:

**[AustralianPollinatorWeek.org.au](http://AustralianPollinatorWeek.org.au) and [AustralianPollinatorCount.au](http://AustralianPollinatorCount.au)**

# Encouraging pollinators on your property

## Create pollination reservoirs

Pollination reservoirs are areas of native plant species that provide floral resources for pollinators. They can be new plantings or existing habitat, such as shelterbelts or remnant vegetation. A high diversity of plant species is essential to provide nectar, pollen and nesting sites throughout the year. Pollination reservoirs need to be close enough to crops to ensure that pollinators can fly easily to them.

## Use existing habitat

Protect and improve existing habitat where possible. Roadsides, shelterbelts, dam margins, woodlands, grasslands, rocky areas, river and creek edges can all be important pollinator-attracting areas, bringing valuable pollination services to your property.

Native vegetation stands provide habitat for pollinators, and special attention should be paid to enhance and protect these areas.

## Get to know your local flora

Each property and region will have distinct populations of insects, based on the plants and climate. Identifying and understanding the insects in your area will help you develop better plantings.

The plants growing in nearby bush will be well suited to the climate and soils in your region. Local community groups and specialist native nurseries can provide useful information and usually produce local plant species.

## Plant trees, shrubs and groundcovers

Planting a variety of species of groundcovers, shrubs and trees on your property will further attract pollinators to your area. Use a combination of direct seed sowing and planting tube stock to establish new vegetation. Initial

watering and protection from grazing will improve the success rate of young plants. Wildflowers, including our native pea species, are excellent at attracting a diverse range of native pollinators.

## Connectivity counts

Insect pollinators benefit from greater connectivity of habitat in a landscape, which allows them to forage over a wider radius and increase in numbers in a local area. Encourage neighbours and other landholders to plant for pollinators and create connections across your landscape.

## Utilise ecotones

Ecotones are the margins between two different habitats. Ecotones often contain a more diverse mixture of pollinator species because they are inhabited by pollinators from both habitats. Protect and utilise ecotones such as the transition zones between woodland and grassland, or heath and shrubland, to create highly diverse floral and insect communities.

## Amplify the flower signal

Plants have evolved large flowers or clusters of smaller flowers which attract more pollinator visits. Large, colourful and diverse plantings attract more pollinators. Ideally, plant in groups that contain different vegetation layers — combine a species-rich mixture of wildflowers, groundcovers, herbs, lilies, rushes, climbers, shrubs and trees.

## Plant for the future

When establishing pollinator habitat, consider including species that are indigenous to your area and can tolerate increasingly warmer and drier (or wetter) conditions, to improve resilience to climate change. Rehabilitate weedy areas into managed pollination reservoirs by introducing lots of flowering plant diversity.

Be careful not to plant invasive or listed weeds, and look for suitable replacements.

## Double the crop value

Plants that are pollinator-attracting may be commercially viable crop species in their own right and can be used to diversify farm production. Bush foods such as Blueberry Lily, Zamia, Christmas Tree and many more are in high demand for use in fresh and manufactured products. Native plant seed is also needed for revegetation projects. Farmers can also support beekeepers by hosting beehives to increase pollinator numbers on a farm.

## Reduce chemical use

Insecticides, fungicides and herbicides all affect the health of bees, bee colonies and native pollinators. Herbicides can impact pollinators by reducing the availability and diversity of flora and removing vegetation that helps support insect life. Some herbicides can also harm the beneficial microbes in the insect gut. In many circumstances, beneficial insects will, in healthy numbers, help control pest insects, ultimately reducing the need for insecticide use.

When chemical pest control is unavoidable, select products that are least harmful for pollinators and apply insecticides in the evening or at night when pollinators are not active.

Always use according to directions, especially for withholding periods, and notify beekeepers a few days before spraying chemicals so beehives can be safely relocated away from harm.

Be a citizen scientist and do some detective work to discover local pollinators on your property. Visit [inaturalist.ala.org.au](http://inaturalist.ala.org.au) to be involved.

**Safeguard the bees?** The best way to 'save the bees' and protect our pollinators is to create an abundance of diverse habitat — from the ground up! There is much interest in keeping a beehive to promote pollinators, but there are serious legal and biosecurity responsibilities that must be considered, and that the introduction of a beehive does not displace existing native pollinators and insects. Be a friend of pollinators and say it with flowers!





A guide to planting for pollinators for the Jarrah Forest region, Western Australia

Healthy populations of insect pollinators are important for sustainable and resilient farms, orchards, gardens, and native flora.

This Guide will help you select plant species to attract and sustain pollinators in agricultural areas and gardens throughout the year.

The Jarrah Forest is confined within the Yilgarn Craton Duricrusted plateau; incorporates the area to the east of the Darling Scarp and extending south of Collie, sloping towards the south coast. The land is capped by an extensive lateritic duricrust, dissected by later drainage, and broken by occasional granite hills. Soil profiles occur across three categories where vegetation assemblages are highly linked based on these profiles. Jarrah-Marri Forest occurs on laterite gravels and, in the eastern part, by woodlands of Wandoo – Marri on clayey soils. Eluvial and alluvial deposits support Agonis shrublands. In areas of Mesozoic sediments, Jarrah forests occur in a mosaic with a variety of species-rich shrublands. The climate is characteristic of coastal Mediterranean seasons – hot dry summers and cool wet winters.

The plants listed in this Guide will help supply rewards to pollinators, with an emphasis on species that are indigenous and suited to local climates.

Garden centres sell many common pollinator-attracting ornamental flowers and herbs labelled as ‘bee-friendly’.

The eucalypt species in this Guide are mostly large trees, and not suitable for all gardens, but have been included for their value as good nectar producing species. Most eucalypts do not flower every year, so choosing diverse species will help create continuously flowering habitat.

The pollinator plant list

To create pollinator-attracting plantings, use the Guide to choose a selection of plants with a variety of flower colours, different growth habits and a range of flowering seasons.

For each species, the planting Guide lists:

- life-form/‘habit’ (climber, herb, shrub or tree) and height (m).
- the vegetation type in which they naturally occur
- flower colour and flowering season
- growth requirements (sun/shade, moist/dry)
- insect groups that may visit each plant and the floral reward (pollen and/or nectar).

The coloured bars indicate the flowering months for each species. Darker shading denotes the peak flowering period, with a lighter shading for non-peak flowering months. Flowering dates may differ between regions and seasons, particularly for non-peak times, if your local climate is consistently warmer or cooler than average, with earlier or later flowering.

Sourcing plants

Most of the plant species listed are available from retail or wholesale nurseries or native plant growers, and local environment groups. If you can't source these plants at your local garden centre, or indigenous nursery, ask them to contact the local wholesale nursery suppliers and plant growers listed online. See the reverse of the Guide for details.



WhenBeeFoundation.org.au

Lifeform	Common name	Scientific name	Family	Vegetation type	Height	Flower colour	Flowering												Aspect	Soil moisture	Pollinator reward		Visitation by pollinator							
Crop plants							Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			Pollen	Nectar	Native bees	Honey bees	Hoverflies	Wasps	Butterflies	Moths	Beetles	Flies
Forb / Herb	Alfalfa / Lucerne	<i>Medicago sativa</i>	Fabaceae	Horticulture	0.6 m	Violet, Purple													Sun	Moist, Well drained										
Tree	Cherry Plum	<i>Prunus cerasifera</i>	Rosaceae	Horticulture	8–12 m	White													Sun	Moist to dry										
Tree	Almonds	<i>Prunus dulcis</i>	Rosaceae	Horticulture	5–7 m	White, Pink													Sun	Well drained										
Herb	White Clover	<i>Trifolium repens</i>	Fabaceae	Horticulture	0.15 m	White													Sun	Moist, Well drained										
Indigenous plants																														
Climber	Old Man's Beard	<i>Clematis pubescens</i>	Ranunculaceae	Coastal Shrubland	Climber	White, Cream													Sun to semi-shade	Well drained										
Climber	Native Wisteria	<i>Hardenbergia comptoniana</i>	Fabaceae	Sandplains, Forest	Climber	Mauve, Purple, Blue													Semi-shade	Well drained										
Climber	Coral Vine	<i>Kennedia coccinea</i>	Fabaceae	Coastal Heath	Climber	Orange, Pink, Red													Sun to semi-shade	Well drained										
Forb / Herb	Swan River Daisy	<i>Brachyscome iberidifolia</i>	Asteraceae	Coastal, Heathlands	< 0.45 m	White, Blue, Purple													Sun	Moist, Well drained										
Forb / Herb	Summer Starflower	<i>Calytrix flavescens</i>	Myrtaceae	Sandplains, Slopes	0.3–0.8 m	Yellow													Sun	Moist, Well drained										
Forb / Herb	Milkwort	<i>Comesperma virgatum</i>	Polygalaceae	Woodland, Forest	0.3–1.6 m	Light Purple													Semi-shade	Moist to dry										
Forb / Herb	Billy Buttons	<i>Craspedia variabilis</i>	Asteraceae	Granite Outcrops	< 0.6 m	Yellow													Sun	Moist to dry										
Forb / Herb	Blueberry Lily	<i>Dianella revoluta</i>	Asphodelaceae	Shrub & Woodland	0.3–1.5 m	Purple, Blue, Violet													Sun to semi-shade	Moist to dry										
Forb / Herb	Purple Chocolate Lily	<i>Dichopogon capillipes</i>	Asparagaceae	Forest	0.3–1 m	Purple, Pink													Sun to semi-shade	Well drained										
Forb / Herb	Morning Iris	<i>Orthrosanthus laxus</i>	Iridaceae	Variable	< 0.55 m	Mauve													Semi-shade	Well drained										
Forb / Herb	Purple Flag	<i>Patersonia occidentalis</i>	Iridaceae	Dunes, Granite Outcrops	< 1.5 m	Purple													Sun to semi-shade	Moist to dry										
Forb / Herb	Circus Triggerplant	<i>Stylidium bulbiferum</i>	Stylidiaceae	Coastal Dunes, Outcrops	< 0.15 m	Pink													Sun to semi-shade	Moist, Well drained										
Forb / Herb	Nodding Blue Lily	<i>Stypandra glauca</i>	Asphodelaceae	Woodland, Forest	< 1 m	Blue													Sun to semi-shade	Well drained										
Forb / Herb	Many-Flowered Fringed Lily	<i>Thysanotus multiflorus</i>	Asparagaceae	Shrubland, Coastal	0.1–0.5 m	Purple, Mauve													Sun to semi-shade	Well drained										
Forb / Herb	Balga / Grass tree	<i>Xanthorrhoea preissii</i>	Xanthorrhoeaceae	Coastal Plains, Forest	3–5 m	White, Cream													Sun to semi-shade	Moist to dry										
Shrub (Small)	Prickly Moses	<i>Acacia pulchella</i>	Fabaceae	Woodland, Forest	1.5 m	Yellow													Sun to semi-shade	Moist to dry										
Shrub (Small)	Prickly Dryandra	<i>Banksia armata</i>	Proteaceae	Shrub & Woodland	< 2 m	Yellow, Cream, Pink													Sun to semi-shade	Well drained										
Shrub (Small)	Aniseed Boronia	<i>Boronia crenulata</i>	Rutaceae	Coastal, Forest	0.25–1.2 m	Pink													Semi-shade	Well drained										
Shrub (Small)	Scented Boronia	<i>Boronia megastigma</i>	Rutaceae	Woodland, Forest	0.2–2 m	Brown													Sun to semi-shade	Moist to dry										
Shrub (Small)	Bossiaea	<i>Bossiaea pulchella</i>	Fabaceae	Woodland	0.4–1.5 m	Yellow, Orange													Sun to semi-shade	Well drained										
Shrub (Small)	One-Sided Bottlebrush	<i>Calothamnus quadrifidus</i>	Myrtaceae	Variable	0.9–2 m	Red, White, Yellow													Sun	Well drained										
Shrub (Small)	Silky-Leaved Blood Flower	<i>Calothamnus sanguineus</i>	Myrtaceae	Sand Plains, Ridges, Outcrops	0.2–2 m	Red, White													Sun	Well drained										
Shrub (Small)	Heart-Leaf Flame Pea	<i>Chorizema cordatum</i>	Fabaceae	Forest, Rocky Outcrops	0.3–1.5 m	Yellow, Orange, Red, Pink													Semi-shade	Moist, Well drained										
Shrub (Small)	Lemon-Scented Darwinia	<i>Darwinia citriodora</i>	Myrtaceae	Granite Outcrops, Hills	0.2–2 m	Red, Yellow, Green													Sun to semi-shade	Well drained										
Shrub (Small)	Bookleaf Pea	<i>Daviesia cordata</i>	Fabaceae	Open Forest, Heath	0.5–2 m	Yellow, Orange, Red, Brown													Semi-shade	Moist, Well drained										
Shrub (Small)	Thorny Bitter-Pea	<i>Daviesia incrassata</i>	Fabaceae	Heath & Woodland, Forest	0.3–1.5 m	Yellow, Orange, Red, Brown													Sun to semi-shade	Moist, Well drained										
Shrub (Small)	Fuchsia Grevillea	<i>Grevillea bipinnatifida</i>	Proteaceae	Open Forest, Heath	0.2–1 m	Orange, Red													Sun to semi-shade	Moist, Well drained										
Shrub (Small)	Yellow Buttercup	<i>Hibbertia hypericoides</i>	Dilleniaceae	Shrub & Woodland	0.2–1 m	Yellow													Sun to semi-shade	Well drained										
Shrub (Small)	Hibbertia	<i>Hibbertia ovata</i>	Dilleniaceae	Coastal, Forest	< 0.6 m	Yellow													Sun to semi-shade	Well drained										
Shrub (Small)	Blue Leschenaultia	<i>Lechenaultia biloba</i>	Goodeniaceae	Sandplain, Hills, Flats	0.15–1 m	Blue													Sun	Well drained										
Shrub (Small)	Silver Teatree	<i>Leptospermum sericeum</i>	Myrtaceae	Shrubland, Granite Outcrops	2 m	Pink													Sun	Well drained										
Shrub (Small)	Hairy Pink-Bells	<i>Tetralochea pilifera</i>	Elaeocarpaceae	Forest, Coastal	0.1–0.3 m	Purple													Sun to semi-shade	Well drained										
Shrub (Small)	Plumed Featherflower	<i>Verticordia plumosa</i>	Myrtaceae	Heath & Shrubland	0.2–1.5 m	Pink, Blue, Purple, White													Sun to semi-shade	Well drained										
Cycad	Zamia	<i>Macrozamia riedlei</i>	Zamiaceae	Forest	< 3 m	Yellow, Green													Sun to semi-shade	Well drained										
Shrub (Large)	Karri Wattle	<i>Acacia pentadenia</i>	Fabaceae	Forest	2–5 m	Yellow													Semi-shade	Moist, Well drained										
Shrub (Large)	Narrow Winged Wattle	<i>Acacia stenoptera</i>	Fabaceae	Heath & Woodland	4 m	Yellow, Cream													Sun to semi-shade	Dry, Well Drained										
Shrub (Small)	Golden Dryandra	<i>Banksia nobilis</i>	Proteaceae	Shrub & Woodland	0.6–4 m	Yellow, Orange, Green, Pink													Sun	Dry, Well Drained										
Shrub (Large)	Parrot Bush	<i>Banksia sessilis</i>	Proteaceae	Shrub & Woodland	< 5 m	Yellow, Cream													Sun to semi-shade	Well drained										
Shrub (Large)	Urchin Dryandra	<i>Banksia undata</i>	Proteaceae	Woodland, Forest	1–3 m	Yellow													Sun	Well drained										
Shrub (Large)	Elegant Beaufortia	<i>Beaufortia elegans</i>	Myrtaceae	Coastal, Forest	1–2.5 m	Red, Purple, Pink, White													Sun	Moist, Well drained										
Shrub (Large)	Albany Bottlebrush	<i>Callistemon glaucus</i>	Myrtaceae	Coastal, Forest	1–3 m	Red													Sun to semi-shade	Moist										
Shrub (Large)	Marno	<i>Daviesia divaricata</i>	Fabaceae	Heath & Woodland	< 3 m	Yellow, Orange, Red, Purple, Brown													Sun	Well drained										
Shrub (Large)	Prickly Poison	<i>Gastrolobium spinosum</i>	Fabaceae	Variable	3.5 m	Yellow, Orange, Red													Sun	Well drained										
Shrub (Large)	Candle Hakea	<i>Hakea ruscifolia</i>	Proteaceae	Heath & Shrubland	0.5–3 m	White													Sun	Well drained										
Shrub (Large)	Swamp Tea-Tree	<i>Homalospermum firmum</i>	Myrtaceae	Shrubland	1–4 m	White, Pink													Sun to semi-shade	Moist to dry										
Shrub (Large)	Tree Hovea	<i>Hovea elliptica</i>	Fabaceae	Slopes, Outcrops, Dunes	0.4–3 m	Blue, Purple, White													Sun	Well drained										
Shrub (Large)	Grey Stinkwood	<i>Jacksonia furcellata</i>	Fabaceae	Shrubland, Sandplains	0.4–4 m	Yellow, Orange, Red													Sun	Moist to dry										
Shrub (Large)	Honeysuckle	<i>Lambertia multiflora</i>	Proteaceae	Variable																										



# Know your pollinators



European honey bee  
(*Apis mellifera*)

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**European honey bees** have two pairs of wings and long, segmented antennae. They are daytime-flying and feed on nectar and pollen. They are generalist pollinators and provide the bulk of pollination services for horticulture and crop plants. Honey bees and native bees are both essential to functioning ecosystems and food security in Australia.

Honey bees have become an important part of the Australian landscape. Honey bees live as colonies, and have a long history of coexistence with humans, including in domestic gardens.



Leafcutter bee  
(*Megachile maculariformis*)

© Karen Retra

**Australian native bees** comprise more than 2000 species, which provide essential pollination services. Native bees are generally solitary and live in nests in the ground or in hollow stems, old borer holes and other cracks and crevices, and some have evolved to pollinate particular native flowers through 'buzz pollination'. Although many Australian native bees are generalist foragers, some species have co-evolved with native plants and adapted to be the most effective pollinators of their flowers. Many native plant species, such as *Dianella* and *Grevillea* require specially adapted insects to access their nectar and enable the transfer of pollen to the stigma. Most native bees are solitary, but some species found in northern Australia (*Tetragonula* sp. and *Austroplebeia* sp.) are social bees and are used for commercial pollination of crops like macadamia nuts.



Bee fly  
(Family Bombyliidae)

© Karen Retra

**Fly** species number up to 30,000 in Australia, and can be identified by having only one pair of flight wings. A second set of wings are modified into club-shaped paddles that allow flies to hover and stabilise their flight. Unlike bees and wasps, many flies (Brachycera) have very small, clubbed antennae at the front of their head. Flies, including blowflies, are often attracted to flowers that smell like carrion. Some flower-flies, have hairy bodies that easily collect pollen while they are feeding. Flies provide a range of services in the garden, including pollination, decomposition and predation.



Hoverfly  
(Family Syrphidae)

© Karen Retra

**Hoverflies** are a type of fly, distinguishable by their large eyes, short antennae, bright black and yellow abdomen and their hovering flight behaviour. Adult hoverflies are nectar and pollen feeders. Hoverfly larvae feed on pests such as aphids, thrips and leafhoppers and are excellent biocontrol agents.



Fiddler Beetle  
(*Eupoecia australasiae*)

© Erica Siegel

**Beetles** have hard outer wings that form their distinctive beetle shape. Their outer wings form a T-shape where they join at the top, unlike bugs where the outer wings make an X- or Y-shape. Some beetles feed on nectar and pollen, usually by crawling over flower surfaces. There are around 30,000 species of beetles in Australia, with many yet to be formally described.



Meadow argus  
(*Junonia villida*)

© J. Hort

**Butterflies** have wings covered in tiny scales. They have clubbed antennae and hold their wings upright when at rest. They are day-flying and have long tongues that they can use to feed on nectar in flowers with deep tubes. Butterflies are usually brightly coloured, with approximately 600 species found in Australia.



Beautiful leaf moth  
(*Gastrophora henricaria*)

© Karen Retra

**Moths** also have wings covered in tiny scales and tend to be subtle in colour. They have antennae without clubs and hold their wings flat when at rest. They are generally dusk- and night-flying but there are some exceptions: the grapevine moth is a commonly seen day-flying moth. Moths feed on nectar. Australia has a high diversity of moth species, with up to 22,000 species thought to exist across the continent.

# Flower forms



© Meredith Cosgrove

**Generalist flowers** can be pollinated by many different insects and animals. They are typically saucer shaped with many stamens and have a surface that insects can walk on. *Eucalyptus* flowers and daisy flowers are generalist flowers – they can be pollinated by bees, flies, beetles and butterflies.



© Meredith Cosgrove

**Specialist flowers** have modifications to their shape and size that only let certain pollinators access the nectar and pollen. These flowers might have deep flower tubes or narrow entry points so that only a select group of pollinators can access them. The advantage of specialisation is that pollination is very targeted and efficient, with accurate pollen placement made possible by co-evolution between flowers and insects. The disadvantage is that if the correct pollinator isn't there, the flowers aren't pollinated. Often, nectar is produced at the base of the flower, forcing pollinators to enter the flower fully and in the process, become covered in pollen.

# Pollinator rewards

**Nectar** is a sugary solution, rich in carbohydrates, vitamins and minerals, produced by flowers and sometimes by glands on leaves or stems (called extra-floral nectaries). Nectar is attractive to insects, and provides an immediate energy source needed for tasks such as hunting pest insects, laying eggs in decomposing organic matter, collecting pollen, or parasitising other insects.

Carbohydrates alone don't support everything needed for health and growth, so insects also need pollen.

**Pollen** is rich in protein, fats and nutrients. Bees are vegetarian, and need to collect pollen to feed their offspring.

## Buzz pollination

Some flowers do not produce any nectar; they specifically target pollen-collecting bees, and only offer pollen rewards. To limit pollen loss and ensure effective pollination, some plants produce flowers with specialised, tubular anthers, that only open at the tip. To extract pollen, bees use vibrations to 'buzz' the pollen grains out of the pores of these anthers. Many crops are buzz pollinated, including tomatoes, potatoes, eggplants, capsicum, chillies, tomatillo and cranberries.

European honey bees are unable to buzz pollinate flowers, but several native bees, such as the blue-banded bee, teddy bear bee (*Amegilla* sp.) and carpenter bee (*Xylocopa* sp.) are exceptionally good large buzz pollinators, and have evolved to pollinate native plants such as flax lilies (*Dianella* sp.). Many of our smaller, ground nesting bees utilise vibration to help them excavate their burrows, and they also

use that skill to buzz pollen from the anthers of native plants.

Planting buzz-pollinated species will encourage populations of buzz pollinators for successful pollination of food crops and ensure seed set in native plants. Many small ground nesting bees also buzz pollinate native flowers.

## Nectar feeding

Grevillea flowers and other tubular flowers are often adapted to be successfully pollinated by birds. Pollen is 'presented' on a floral stigma that extends outside the flower. When birds feed on the nectar, pollen is deposited on their beaks or heads. Bees, also attracted to the sugary nectar, crawl into the side of the flower and feed on the nectar without encountering the pollen-laden stigma. The plant doesn't receive the pollination benefit from the insect, but flowers such Grevillea species can be a very useful source of nectar for insects in the cooler months.



## Nurseries

Most of the plants shown in the planting guide will be available at nurseries that have a good stock of native plants. But if your local nursery doesn't stock the plant you're after, ask them to order it in. For a list of nurseries that stock all the plants shown in the planting guide, plus other useful resources, visit the Wheen Bee Foundation website or scan the QR code.



[WheenBeeFoundation.org.au/our-work/powerful-pollinators](https://WheenBeeFoundation.org.au/our-work/powerful-pollinators)

## Wheen Bee Foundation

Powerful Pollinators Planting Guides are produced by Wheen Bee Foundation. We fund vital strategic research and education initiatives that strengthen bees, improve pollination efficiency, and protect our food security and ecosystem health. Visit the website for more information.

[WheenBeeFoundation.org.au](https://WheenBeeFoundation.org.au)

**Far left:** The spreading flax lily, *Dianella revoluta*, is buzz pollinated.

**Left:** This European honey bee is 'side-working': feeding on the nectar-rich flowers without coming into contact with the plant's pollen.

### Front cover:

1. *Exoneura pictifrons* (female) on *Thryptomene saxicola*. (Photo: Kit Prendergast)
2. Jarrah Forest east of Augusta, WA. (Photo: Richard Jacyno)
3. European honey bees, *Apis mellifera*. (Photo: Kiri Hughes)

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