Beyond BEE HOTELS

Expanding bee-friendly gardens to include ground-nesters

by Freya Jackson

In recent years, the 'save the bees' movement has gained remarkable traction, encouraging people to think beyond the European honey bee (*Apis mellifera*). Murdoch University PhD candidate Freya Jackson shines a light on the importance of native pollinators and their surprising underground habits.

The European honey bee was brought to Australia in 1822 from England. Today, Australia is home to 530,000 commercially managed hives.

Australia is home to more than 1700 native bee species, many of which rely on natural soil conditions, free from human disturbance. These bees play a critical role in pollinating wildflowers and food crops, yet their underground habits have kept them out of the limelight.

Previous page
Main Leaf cutter bee (*Megachile* sp.)
Photo – Jiri Lochman
Left Insect hotel in an urban garden.
Photo – DBCA

This page
Top Reed bee (*Exoneura* sp.) foraging on heart leaf poison, a native pea flower (*Gastrolobium bilobum*).
Photo – Freya Jackson

Top right Reed bee.
Photo – Marie Lochman

Above Masked bee (*Hyalaeus* sp.).
Photo – Jiri Lochman

Above right Honey bees live in colonies in beehives.
Photo – Field of Vision/Adobe Stock

Encouragingly, gardens are being transformed with bee-friendly flowers and the installation of bee hotels to support above-ground nesting species.

These efforts represent a positive shift in attitudes toward conserving bees. However, there is a significant gap in these initiatives, one that overlooks a vast majority of Australia's native bee population.

GOING UNDER

What many gardeners and even conservation enthusiasts may not realise is that roughly 70 per cent of Australia's native bees are ground-nesting species. These bees, which include beloved species like the blue-banded bee (*Amegilla* sp.) and the teddy-bear bee (*Amegilla bombiformis*), spend most of their lives beneath the soil.

Beyond these larger, more visually-striking species, there is a diverse array of smaller, often overlooked, bees from genera such as *Lasioglossum*, *Leioproctus*, and *Hylaeus*.

Research is being conducted at Mudoch University on the sweat bee (*Lasioglossum dotatum)*—a very small three-to-four-millimetre bee that has a wide distribution across Australia.

These studies show that while these smaller species may lack the vibrant colours and size of their more recognisable counterparts, they are equally vital to pollination, playing an essential role in sustaining native wildflowers and crops. Despite their inconspicuous appearances, these bees make significant contributions to the health and resilience of Australia's ecosystems.

While ground-nesting bees have started to garner attention in conservation research, they remain an overlooked piece of the puzzle for most gardeners—the very citizen scientists who have the potential to make a significant difference.

Urban and suburban gardens are becoming vital refuges for native pollinators as natural habitats face threats from land clearing, agriculture, and urbanisation. However, without addressing the needs of ground-nesting bees, many of these well-intentioned efforts fall short.

Ground-nesting bee facts

1. Blue-banded bees can buzz pollinate
Blue-banded bees (*Amegilla* spp.) use 'buzz pollination', vibrating at precise frequencies to dislodge tightly packed pollen from flowers. This method is something European honey bees (*Apis mellifera*) are unable to perform. Buzz pollination is essential for many plants, including crops like tomatoes, eggplants, and native Australian flora, which rely on this specialised approach for effective pollination. Without native buzz-pollinating bees, these plants would struggle to reproduce and thrive.

2. They come in all shapes and sizes
Australia's native bees vary greatly in size from the tiny Euryglossina bees (just two millimetres long), to the large Dawson's burrowing bees (*Amegilla dawsoni*), reaching up to 24 millimetres.

3. They're solitary yet social
Most native bees, like *Lasioglossum* and *Leioproctus* species, are solitary, with each female constructing and provisioning her own nest. However, some exhibit semi-social behaviour, where multiple females share a nest or help each other defend it. They do not have a queen, nor do they form colonies or swarm.

4. Some are picky eaters
While most native bees are generalists, some are specialists that rely exclusively on the pollen of specific plants. For instance, *Leioproctus conospermi* only visits *Conospermum* plants.

5. Bees with red eyes and metallic coats
Many native bees, such as some species of *Lasioglossum* and *Homalictus*, have striking metallic green or blue bodies. Others, such as *Megachile aurifrons*, have vivid red eyes—a trait that is unique to the females.

WHAT YOU CAN DO

The good news is that supporting ground-nesting bees doesn't require grand gestures or specialist knowledge. In fact, with a few simple and thoughtful adjustments, gardeners of any skill level can make their outdoor spaces more welcoming to these essential pollinators. Whether your garden is large or small, there are practical ways to create nesting habitats that could make all the difference for these soil-dwelling species.

Perth-based wild bee ecologist, Dr Kit Prendergast, has been researching bees for many years and has demonstrated that native bees rely heavily on domestic gardens in urban areas as critical refuges, particularly as natural habitats continue to be lost due to urbanisation.

Her research shows that, even in densely populated cities, well-planned home gardens can support native bees by providing nesting sites, floral resources, and shelter.

By shining a spotlight on ground-nesting bees, we can inspire gardeners to go beyond flowers and bee hotels and consider the unique and often hidden needs of these vital pollinators. It's time to dig deeper—literally and figuratively—and give ground-nesting bees the attention they deserve.

In doing so, we're not just saving the bees; we're fostering the health of our ecosystems and ensuring future generations will continue to benefit from bees quiet yet crucial work.

Above Female blue-banded bee (*Amegilla chlorocyanea*) foraging on a *Hibbertia racemosa* flower.

Inset Female sweat bee (*Lasioglossum dotatum*) walking across sand towards her nest.
Photos – Freya Jackson

Right Prickly moses (*Acacia pulchella*) are pollinated by native bees.
Photo – Andrew Brown/DBCA

Listen to more about native bees

Scan this QR code to listen to the episode or search for 'Western Australia by nature' wherever you get your podcasts.

How to create bee-friendly gardens:

1. Plant a variety of bee-friendly flowers

- Choose a range of plants that bloom at different times of the year to provide a continuous food source.
- Opt for native wildflowers such as eucalyptus (a keystone species), wattle (*Acacia*), bottlebrush (*Callistemon*), spider flower (*Grevillea*), austral bluebell (*Wahlenbergia stricta*) and everlasting daisy (*Xerochrysum*).
- Bees love herbs such as lavender, thyme, basil, and mint. Let some go to flower to attract pollinators.

2. Avoid pesticides

- Use natural pest control methods and avoid pesticides or herbicides, which can harm bees directly or contaminate their food sources.

3. Create suitable nesting habitat for ground-nesting bees

- Leave patches of bare soil, preferably in sunny, well-drained areas.

How to create a bee habitat for ground-nesting bees:

1. Select an appropriate site with:

- ample sunlight
- well-drained soil
- sparse vegetation.

2. Leave bare or lightly covered soil

Native ground-nesting bees need direct access to open soil for digging nests, as most cannot nest in lawns or areas covered with thick mulch, so:

- clear small patches
- select areas with minimal disturbance from people or animals to protect nests.

Tip: Look for existing nests by spotting small, perfectly round holes in the soil, sometimes clustered together. If you see a bee carrying pollen entering or leaving, avoid disturbing that area.

3. Create artificial soil hills and sand pits

- Construct mounds of soil about 30–60 centimetres high with gentle slopes.
- Dig a pit about 60 centimetres deep in a sunny area and fill it with a mixture of fine, pale-coloured sand and loam.

4. Encourage nesting with edges

- To support species like *Lasioglossum dotatum*, consider placing red paving bricks on sandy soil substrates with sufficient gaps between the pavers. Fill the gaps with sandy substrate to create an inviting nesting environment.

5. Avoid landscaping barriers

- Black plastic sheeting/plastic weed mats and other landscaping fabrics often prevent bees from accessing the soil to dig nests.
- If a barrier is necessary, use biodegradable options like newspaper or coconut fibre, which bees can penetrate and that will naturally decompose over time.

6. Limit pesticide use

- Pesticides can harm or kill bees, so it's best to avoid them entirely.

Tip: Combat aphids naturally by using plant-friendly sticky tape on tree trunks to block ants, allowing beneficial insects like parasitic wasps to control pests.

7. Plant native flowers and vines

- Ground-nesting bees need access to nectar and pollen close to their nests—small bees have very short foraging ranges of up to 75–400 metres (depending on the species).

8. Monitor and maintain the habitat

Once your bee habitat is established, it's important to keep it safe and functional:

- Minimise disturbance.
- Remove debris and weeds.
- Maintain moisture levels. Ground-nesting bees often benefit from damp soil to help them construct and maintain their nests.

9. Observe and enjoy

- Look for bees entering and exiting their nests with pollen, a sure sign your habitat is being used.

10. Educate others

- Share your experience and the importance of ground-nesting bees with your community to promote conservation efforts—and submit observations and insect activity on iNaturalist.

Main A garden rich with a variety of bee-friendly flowers.
Photo – Jacqui Martin/Adobe Stock

Insets: 1) Everlasting daisies (*Rhodanthe chlorocephala*). *Photo – Andrew McInnes.* **2)** Bookleaf mallee (*Eucalyptus kruseana*). *Photo – Karla Forrest.* **3)** Teddy bear bee (*Amegilla bombiformis*). *Photo – Jiri Lochman*

Why domestic gardens matter for native bees

Urban sprawl often fragments and destroys native habitats, leaving bees with fewer options for nesting and foraging. Domestic gardens, however, can act as habitat 'islands', offering a patchwork of resources across urban landscapes.

1. Floral diversity in gardens:
Research has shown that domestic gardens with diverse native flowering plants support higher numbers of native bees compared to gardens dominated by non-native or ornamental species. This is because many native bees are specialists that rely on the pollen and nectar of specific native plants.

2. Accessible nesting sites:
Gardens that leave patches of bare soil, avoid heavy mulching, or incorporate features like hollow stems, compacted soil, or sandy substrates provide crucial nesting sites for ground-nesting and cavity-nesting bees.

3. Urban adaptation:
Research has revealed that some native bees, such as the blue-banded bees (*Amegilla* spp.), are remarkably adaptable and can thrive in urban settings when the right resources are available—reinforcing the idea that even small gardens can support native pollinators.

Main *Polycarpaea longiflora*.
Photo – Karla Forrest

Right Native bee species vary greatly in size, shape and colour.
Photos – Kit Prendergast


Lipotriches flavoviridis


Megachile monstrosa


Megachile chrysopyga


Leioproctus cf. *lanceolatus*


Amegilla chlorocyanea


Thyreus waroonensis

The role of gardeners

The average gardener holds the power to make a significant impact on native bees.

1. Cumulative impact:
With thousands of gardens in every urban area, small individual actions, like planting native flowers or leaving ground for bees to nest in, can collectively create vast networks of habitat for native bees.

2. Accessibility:
Supporting native bees doesn't require large-scale resources or expertise. Simple steps, such as planting native flowering plants or providing suitable nesting areas, can have a profound impact.

3. Shaping urban biodiversity:
By designing gardens with native bees in mind, gardeners contribute to the broader urban ecosystem, supporting other wildlife such as birds, butterflies, and beneficial insects.

4. Education and influence:
Gardeners can inspire neighbours, schools, and local communities to adopt bee-friendly practices, multiplying their impact and building widespread awareness about native pollinators.

Right Cape Range grevillea (*Grevillea variifolia*), Kalbarri beautiforia (*Beaufortia aestiva*) and *Thryptomene strongylophylla*.
Photo – Miles Brotherson/DBCA

Freya Jackson is a conservationist currently researching *Lasioglossum dotatum* while pursuing her PhD at Murdoch University. She can be contacted at Freya.Jackson@murdoch.edu.au