

BLUE BANDED BEES

by Dr Anne Dollin
Australian Native Bee Research Centre
October 2020



TAKE a close look in your garden this summer! Bright glittering bees may be darting around your flowers with a lively buzz... A row of fat stripy bees may be jostling for position, as they settle to sleep on a vine or dry stem in the evening... You've found some of Australia's most beloved native bees – the Blue Banded Bees!

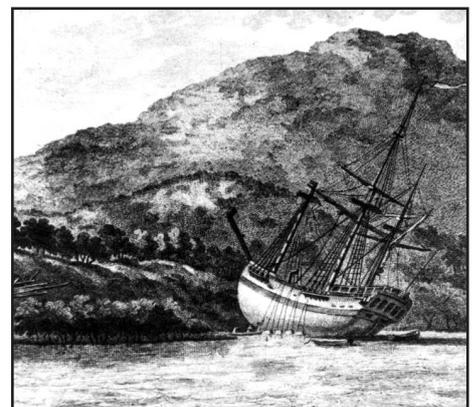


Celebrating their 250th Anniversary!

This year, 2020, is actually the 250th Anniversary of the first scientific study of this popular Australian native bee. In 1770, Joseph Banks and Daniel Solander collected samples of many different plants and animals along the Australian east coast, during their voyage with Captain Cook. In their remarkable collection was a single Blue Banded Bee. It was carefully preserved and taken back in the Endeavour to the Natural History Museum in London.

Above: a male Blue Banded Bee sleeping on a stem.

Right: This drawing, by ship's artist, Sydney Parkinson, shows the HMS Endeavour being repaired near Cooktown, Queensland, in 1770, after it ran aground on the Great Barrier Reef. This is one of the locations from which Joseph Banks and Daniel Solander may have collected their historic Blue Banded Bee specimen.

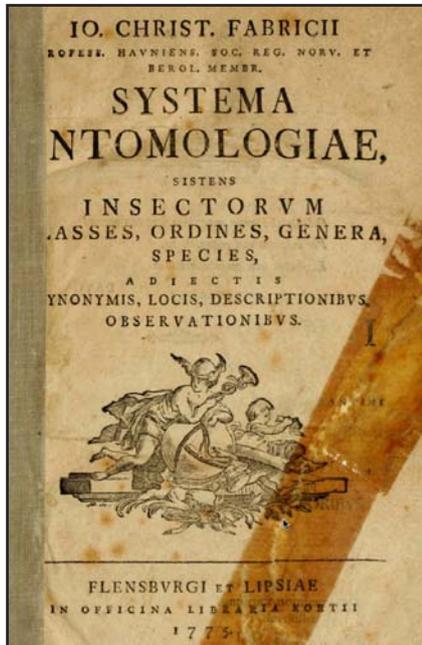


During the next five years, a Danish Zoologist, Johan Christian Fabricius, studied this Australian Blue Banded Bee and the wealth of other specimens brought back from the voyage. Then he wrote the groundbreaking book, *Systema Entomologiae*, containing the first scientific descriptions ever published of our Australian native bees.

Fabricius, writing in Latin (see below), said the Blue Banded Bee had a 'Pale red thorax, black abdomen' and 'Four sky-blue bands'. He gave it the species name, '*cingulata*', meaning 'banded'. This was the first Blue Banded Bee species to be described for Australia.

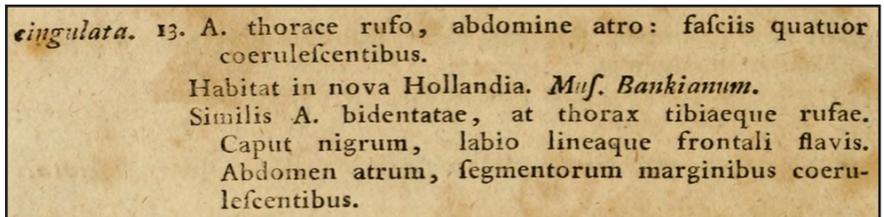
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Left: the front cover of *Systema Entomologiae* written by Johan Christian Fabricius in 1775. This book contains the first scientific descriptions ever written of our Australian native bees.

Below: Fabricius' description, in Latin, of the Blue Banded Bee, *Amegilla cingulata*, collected on Captain Cook's voyage. The collection locality was simply given as 'New Holland' (Australia). Source: [Biodiversity Heritage Library](#).



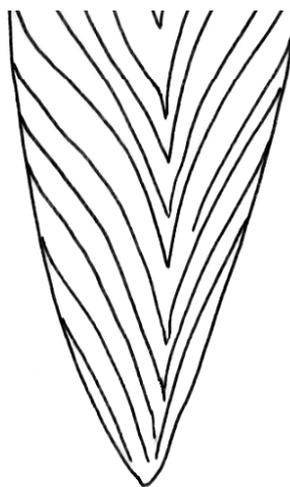
There are now fourteen species of Blue Banded Bees recognised in Australia, ranging in size from about 9 to 14 mm¹ (see page 3). They are classified in two groups, *Zonamegilla* and *Notomegilla*, within the genus *Amegilla*. They are found in every state and territory of Australia, except Tasmania².

Glittering Colours

The common name, Blue Banded Bee, refers to the bold stripes of iridescent or metallic blue fur that many of these bees have across their black abdomens (or tail sections). However, some Blue Banded Bee species actually have green, reddish or white stripes, whilst one species in northern Australia, *A. aeruginosa*, has a nearly uniform coat of metallic greenish or bronzy fur. Blue Banded Bees usually have a thick fleece of red-brown fur on their thoraxes (or mid sections), and yellow, cream or white markings on their faces.

Scanning Electron Microscope studies have revealed that the beautiful metallic hair colours of the Blue Banded

Bees are caused by microscopic diagonal stripes engraved on the surface of each hair³. These lines diffract or break up the light producing glittering colours resembling an exquisite opal.



Above: Diagonal lines can be seen on the surface of individual hairs of a Blue Banded Bee, when magnified thousands of times in a Scanning Electron Microscope. These lines diffract the light, causing the bee's spectacular metallic colours!

Flying Season

Blue Banded Bees may be seen on the wing throughout the year in northern areas of Australia (i.e. north of Coffs Harbour in NSW, and of Green Head in WA)¹.

In more southern areas of Australia, the adults mainly fly from about October to April. During the cooler months, immature Blue Banded Bees rest inside the nest that was dug by their mother. Then when the warm weather returns, they develop into adults and fly off to visit the flowers.

Nests of the Blue Banded Bee

Each female Blue Banded Bee digs her own nest burrow. However, she may be particularly attracted to sites where other females are already building, so these areas become riddled with many adjacent Blue Banded Bee nests. She likes to build in soft sandstone banks, old mortar or even mud bricks, often in a sheltered position. The nests are shallow, usually less than 10 cm deep.

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Australia's Fourteen Species of Blue Banded Bees

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There are currently fourteen species of Blue Banded Bees recognised in Australia, found in every state and territory except Tasmania². The chart below shows the main areas of Australia where each species is now found.

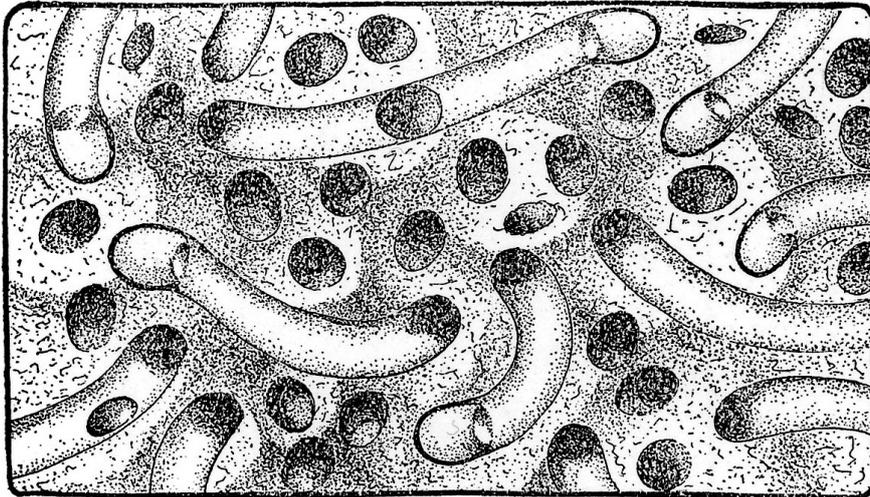
Detailed information and photographs for each of these species and maps of their distributions can be found in the revision paper written by Remko Leijts, Michael Batley and Katja Hogendoorn¹ in 2017. This paper is [available for free download](#).

	QLD	NSW	ACT	VIC	SA	WA	NT
<i>A. adelaidae</i>	✓					Northern	✓
<i>A. aeruginosa</i>	Northern & south-east					Northern	Northern
<i>A. alpha</i>						Northern	Northern
<i>A. asserta</i>	Eastern	Eastern	✓	Eastern	Coastal		
<i>A. chlorocyanea</i>	✓	✓	?	✓	✓	✓	✓
<i>A. cingulata</i>	Coastal	North coast					Northern?
<i>A. indistincta</i>	Coastal						
<i>A. karlba</i>							Northern
<i>A. murrayensis</i>	✓	✓		✓	✓	✓	✓
<i>A. paeninsulae</i>	Far north						
<i>A. pulchra</i>	Coastal	Coastal				Northern	
<i>A. thorogoodi</i>	Coastal						
<i>A. viridicingulata</i>	Coastal						
<i>A. walkeri</i>						Far north	Northern

Note: the ✓ symbol in this table indicates that the species is found in most areas of that state or territory.

The tunnels are 8 mm wide and have many side branches. Take a look at [Aussie Bee Online Article 7](#) to see Mark Greco's remarkable CT scans showing Blue Banded Bee nests in 3D.

The female moistens the soil and digs it out with her jaws. Then she backs out of the tunnel carrying the debris between her middle legs. She constructs a series of oval-shaped cells for her eggs and lines them with a waterproof secretion. She stocks each cell with a liquid mixture of pollen and nectar, deposits her egg, then seals the cell with an earthen cap. When the series of cells is finished, she closes up the nest with layers of soil and goes in search of a new nest site.



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Left: Surprisingly, until the 1930s the nesting habits of Blue Banded Bees were almost unknown. Then Tarlton Rayment published a detailed description, largely based on observations by Phillip Whiteley in Sydney. This is Tarlton Rayment's drawing of a maze of nest galleries constructed by Blue Banded Bees in some decomposing sandstone⁴.

*Right: the stunning Neon Cuckoo Bee, *Thyreus nitidulus*, that stalks the nests of Blue Banded Bees.*



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In a Brisbane species studied by Josephine Cardale⁵, the immature bees took about seven weeks to develop into adults but the adults lived only up to about 40 days. So the mother bees would never have seen their offspring. About three generations of bees hatched during the summer. The immature bees that had still not hatched by late autumn spent the whole winter inside their sealed cells as a 'prepupa' (a full-grown grub not yet at the pupa or final immature stage) waiting for the next spring.

Nest building has its challenges, though, for our Blue Banded Bees.

Australian native Cuckoo Bees, *Thyreus*, seek out Blue Banded Bee nests and try to lay their eggs in the cells. The developing Cuckoo Bee then eats all of the food that was painstakingly stored in the cell for the young Blue Banded Bee. So finally it is an adult Cuckoo Bee that emerges from that nest cell, instead of a Blue Banded Bee. Cuckoo Bees are striking black bees with blue or white polka dots. The stunning Neon Cuckoo Bees (above) have vivid, metallic blue polka dots -- in spite of their devious habits, these are some of Australia's most beautiful bees!

The Expert Female Foragers

The female Blue Banded Bees must forage diligently to collect nectar and pollen for their nests. However, they have a special skill, which helps them in this work: they are able to perform *Buzz Pollination*. In some flowers, the pollen is hidden inside little capsules. Most bees (including our introduced honeybees) cannot reach the pollen in these flowers. Blue Banded Bees, though, wrap their bodies around the flower. They vigorously vibrate their flight muscles, making a loud buzzing noise. The pollen

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Left: an Australian Blue Banded Bee Buzz Pollinating a tomato flower inside a greenhouse.

[See more photos and videos of Blue Banded Bees](#)

inside the capsule flies out and the Blue Banded Bee can collect some for her nests. As she flies, dusted with pollen, from flower to flower, the Blue Banded Bee also [pollinates the flowers](#).

Most Australian native bees are important pollinators for our wildflowers and food crops. However, the ability to perform Buzz Pollination makes the Blue Banded Bee even more valuable. Some wildflowers and crops need to be visited by Buzz Pollinating bees so that their seeds and fruit develop properly. Examples include wildflowers such as *Solanum* and *Hibbertia*, and crops such as tomatoes, eggplants, chilli peppers and capsicums. Research has shown the [potential of our Australian Blue Banded Bees to efficiently pollinate tomato crops inside greenhouses](#).

Blue Banded Bees enjoy other kinds of flowers too and in the bush you may find them on Coastal Native Rosemary (*Westringia*) and Grey Spider Flower (*Grevillea*)⁶. They seem to be attracted to blue flowers, so in many home gardens you may see them on Lavender, Salvia and Buddleja. However, they also love Perennial Basil and Abelia. You can help support Blue Banded Bees and all other kinds of Australian native bees by [planting a Bee-Friendly Garden](#).

Right: eighteen male Blue Banded Bees settle down to roost for the night, clinging onto a dry flower head with their jaws. Photograph by Carol Webster.

The Charming Roosting Males

Male Blue Banded Bees have to 'rough it' at night and sleep under the stars. They often gather in small groups and latch onto the edge of a leaf or a grass stem for the night. Amazingly, they attach themselves by their jaws only, curling their legs under their bodies. They can even do 'push-ups' on their powerful jaws! As they settle down for the night it is [hilarious to watch their group antics](#). As each newcomer approaches, the bees already settled wag their tails up and down and madly wave their hind legs in unison. The newcomer usually gives up and finds a spot further down. It's a real circus in your own backyard! 



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How to Encourage Blue Banded Bees to Nest in Your Garden!

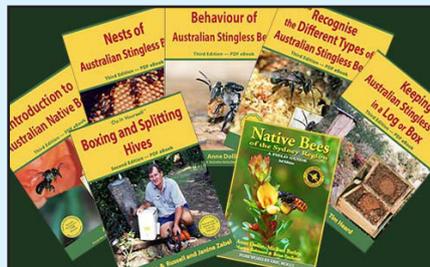
If you have some Blue Banded Bees visiting flowers in your garden, why not try to set up some nest blocks for them? Les Dollin of *Aussie Bee* explains how you can make small portable nest blocks at home, from soft clay soil and short lengths of plastic downpipe. For step-by-step instructions on how to make these blocks and set them up in your garden, download your free copy of [Aussie Bee Online, Article 8](#).



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References

1. Leijs, R, Batley, M and Hogendoorn, K (2017) The genus *Amegilla* (Hymenoptera, Apidae, Anthophorini) in Australia: A revision of the subgenera *Notomegilla* and *Zonamegilla*. *ZooKeys*, 653: 79–140.

2. Although three Blue Banded Bees were collected in Tasmania over 70 years ago, they do not seem to be present in Tasmania today:

– Two *Amegilla asserta* bees and one *A. chlorocyanea* were collected in Kingston, Tasmania, 13 k south of Hobart, in 1948.

– ABC Hobart posted a question on Facebook in May 2020 about whether Blue Banded Bees are found in Tasmania. Simon Grove of the Tasmanian Museum and Art Gallery responded, 'Not present in TAS these days as far as I know, though we have some in the TMAG collections from Kingston from way back - perhaps a failed introduction?' <https://www.facebook.com/abchobart/photos/a.120745234217/10159040763189218> Retrieved 10 October 2020.

3. Brooks, RW (1988) Systematics and phylogeny of the Anthophorine bees (Hymenoptera: Anthophoridae; Anthophorini). *The University of Kansas Science Bulletin*, 53: 436–575.

4. Rayment, T (1935) *A Cluster of Bees*. The Endeavour Press, Sydney.

5. Cardale, J (1968) Nests and behaviour of *Amegilla (Amegilla) pulchra* (Smith) (Hymenoptera : Apoidea : Anthophorinae). *Australian Journal of Zoology*, 16: 689–707.

6. Dollin, A, Batley, M, Robinson, M and Faulkner, B (2017) *Native bees of the Sydney Region: a Field Guide*. 3rd edition, [eBook](#).

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