Speaker 1:

Welcome to Urban Plant Health Network's podcast series, The Good, The Bad and The Bug-ly.

Drew Radford:

European honeybees are important pollinators for both crops and gardens, plus they provide beekeepers with honey. However, they can be problematic for urban gardeners, especially around children and pets. Honeybees can also often outcompete our native species of pollinators. So, what can gardeners do to attract more native bees? To answer this, we're joined in the Urban Plant Health Network studio by Robert McDougall from Cesar Australia. He's a research scientist who specialises in sustainable agriculture and has a deep understanding of native bees. Robert, thanks for your time.

Robert McDougall:

Thanks for having me.

Drew Radford:

Robert, native bees, I understand there's a few different species in Australia. How many?

Robert McDougall:

There's around 1700 that have been given names by scientists, but we estimate there's another 3 or 400 more species that just haven't been found yet and probably aren't really known. So yeah, there's potentially as many as 2,000 native bee species out there and we only know about three-quarters of them, so lots of different kinds out there. While there's many species though, there a lot of them to the naked eye may look fairly small and indistinct, just little black specs you might see buzzing around.

But we still do have some pretty dramatic bees of our own here as well, so we have things like the teddy bear bees, which are kind of big and fluffy, which is where they get their name from. We have things like blue banded bees, we can also probably guess how they get their name. They look a bit like the honeybee we'd all be familiar with but with blueish-whiteish bands on them. We also have various shiny, metallic looking bees like the carpenter bees and Halictid bees and that type of thing.

Drew Radford:

Robert, that's an incredible number of bees and an amazing variety. Before we delve into them a little bit further, what actually defines an insect as a bee?

Robert McDougall:

What defines a bee, is that it's a vegetarian wasp. Bees and wasps as well as ants are part of the insect order called the Hymenoptera which is defined by basically having a little, narrow pinched waist that you'd be familiar with. If you kind of imagine the segments of an insect, you've got the head and the thorax, and then behind that they have an abdomen, which is like an extra segment that sticks out the back.

As I said, the Hymenoptera is the bees and the wasps and the ants, and the bees are really defined as the vegetarian group in that. While wasps are predators and ants are obviously carnivorous organisms as well, bees are vegetarian throughout their life cycle, subsisting almost entirely on stuff produced by flowers, so pollen and nectar. And having specific adaptations to collect that, so things like they'll be quite hairy so that they can have pollen and such, stick to their bodies. That's really what defines them as vegetarian wasps.

Drew Radford:

That's a great distinction and easy to understand, so does that mean they're also stingless?

Robert McDougall:

There is a wide range of bees, obviously, out there. Some bees have stingers. We know for example, honeybees have stingers, but no most native bees do have some capacity to sting. They're not likely to do so unless you really annoy them and they're not particularly dangerous, most of them, but most of them do have the capacity to sting.

Stingless, native bees is a concept that a lot of us are probably familiar with, because they're almost the exception to the rule in their lack of sting. And the particular species that people often refer to as native stingless bee, also called the sugarbag bee, is one of the few native bee species that are actually social.

What may, I guess, be a surprise to someone with only an occasional interest in bees, is that most bees actually live solitary lives. We're also familiar with honeybees that live in these big, organized hives and kind of imagine them to be the typical bee, but really, they're very atypical, that we only think about them because they're the cultivated version of them.

Most bees live by themselves or in kind of small groups where each female lays and cares for her own eggs but yeah, honeybees and then the native, stingless bee, *Tetragonula carbonaria*, are kind of exceptions to this. The reason we know about them is because they're able to be cultivated and used by humans. Yeah, *Tetragonula carbonaria* is one of only two species of native bee that are really domesticated to any meaningful extent. They're stingless but they're the exception in multiple ways.

Drew Radford:

Robert, what sort of native bees are most commonly found in Melbourne?

Robert McDougall:

The most common native bees in Melbourne are probably the Halictid bees. These are small bees probably typically averaging around the centimetre long and they have a shiny, metallic look to them. They live not in hives their solitary bees that typically live in burrows, and so they'll burrow in soil and that type of thing.

Other bees that you might find in Melbourne, you might find masked bees. These are also relatively small, probably also about a centimetre long on average. Bees that are mostly black, but some of the most distinctive ones of them have bright yellow patches on them, including patches on their backs, as well as patches across their face, which gives them the name masked bees.

They have quite interesting nests, because another common name for this group of bees is cellophane bees because they cover the inside of their nests with a material that looks a bit like cellophane once it's dried. And so you can sometimes, you might see a little hole in a tree or something like that, and you might say, "Oh, it looks like there's some plastic in there. How did that end up in there?" That's in fact not plastic, but a substance produced by these Colletidae bees.

Another interesting one that's relatively rare in suburban Melbourne, but it can still be found if you're lucky is the leaf cutter bees. Once again, these common names are pretty obvious in their origin. They're called leaf cutter bees because they line their nests with bits they cut out of leaves. You'll maybe notice that you've got a leaf cutter bee in your yard, if you start to see leaves of your various plants with little circular holes cut out of them.

If you're ever lucky enough to see one in the process of actually cutting a leaf, it can look quite humorous. It almost looks like a cartoon character queuing through a corn cob or something. They just go bite, bite, bite, bite, bite, bite, bite in a circle to cut this circle out of these leaves and take them into their nests. This doesn't really harm the plants at all, but can look really cool and can be an interesting sign that these larger, fluffier bees are around in your backyard.

Drew Radford:

Robert, absolutely fascinating. Cellophane bees, leaf cutter bees, I had absolutely no idea this range existed at all. Do they depend upon native plants?

Robert McDougall:

There's quite a lot of diversity within native bees. A lot of them are relatively generalists. Native plants are good for a few specialized species, but for the majority of bees and probably the bees that we're going to be finding in suburban gardens in Melbourne in particular, they can utilize a whole lot of different types of plants.

Native plants are things like eucalypts and banksias that can have large numbers or very large flowers that produce lots of nectar are pretty good for native bees. But many of them can also be quite happy with things we might have planted in our garden, things like tomatoes and eggplants and such that might be attractive to them, flowering plants.

Also, the other thing that can be really useful and helpful in sustaining these bees is flowering weeds. Now this can be particularly important because a lot of the time the things we might call weeds and I'll put that in air quotes there, are going to be some of the earliest flowering plants in the spring.

Things like dandelions that might just pop up in the lawn that a lot of, I guess, keen gardeners might be keen to get rid of. They can actually serve as a really good food source for these bees. They're not native, obviously dandelions. Yeah, like I said, many gardeners will consider them a weed, but they can be really helpful as a food resource to these bees as well, so lots of different things that appeal to them.

Drew Radford:

Robert, what about further up the food chain? Are there native bird species in particular that are dependent upon their continued existence?

Robert McDougall:

We have whole groups of birds that are referred to as the bee eaters. The bees, while obviously being important as pollinators, they do provide an important food source for birds and other native animals to feed on. Unfortunately within urban areas, a lot of these things like the bee eating birds are pretty rare, just because it's not a particularly good environment for them. In part, because bee numbers are probably fairly low compared to natural environments. But yeah, bees certainly form an important part of the ecosystem, both for the plants they pollinate and for the birds and other things that eat them. Yeah.

Drew Radford:

Robert, what then can urban gardeners do to attract native bees? Bee hotels, I hear about those. What are they and what do they achieve?

Robert McDougall:

Bee hotels, I guess, provide one of the two things that bees are going to need to become attracted to your garden. One of the two things is food in the form of flowers and the second thing is habitat. Native bees have a wide range of different habitat requirements so what they're going to nest in effectively. In the case of some bees, a lot of bees will burrow in soil, for example, so having undisturbed soil that they can burrow in might be important habitat to them.

Others will nest in things like cavities in trees or in hollow twigs and that type of thing. It's for bees like this where bee hotels can be potentially helpful, because a lot of yards these days aren't going to have dead trees, which are slowly decaying that bees can nest in and that type of thing.

That's where the idea of an artificial bee hotel comes in. A bee hotel can be super simple. It can be anything, like it can just be a block of wood with some holes drilled in it that take the place of natural hollows in trees that bees can use as a safe place to lay their eggs.

You often see these more complicated, more diverse ones that people will set up in community gardens and such. You'll have a box, which is open at one side and will have a whole lot of different kind of substrates in there. You might have pine cones, you might have dry leaves. You might have some wooden blocks with holes in. And this is all just to provide a diversity of different habitats that bees can use to nest in and provide the second resource they need along with food, that being their nesting resources.

You need to be careful with what they're made of. For example, there was a major retail chain a few years ago that was selling bee hotels made of plastic. That's a terrible idea because of course plastic doesn't really let moisture in and out. And so moisture would build up in these and they would potentially be hot beds for fungus that would kill the bees. That's something you need to be careful about, make sure you make them of something like wood and that type of thing.

Also, if you're expecting your bee hotel to be in use year on year, it might would to put in something like a removable lining to it. For example, if you're going to make a bee hotel by drilling holes in a piece of wood, you can either line those holes with say cardboard cubes or little bits of bamboo, something like that. Something that between years you can remove from it, just to stop a buildup in there of things like fungus and mites and other things that might harm the bees.

I guess something else worth mentioning about bee hotels, they will attract things other than bees. One of the biggest things that I've found to be present in bee hotels in suburban gardens is actually wasps. This is still great, wasps can play an important role in gardens as well. They can act as pollinators. They can act as predators or parasites of various garden pests. If you set up a bee hotel and you end up with wasps in it, I certainly wouldn't complain, but yeah, something else to keep in mind as well.

Drew Radford:

Robert, earlier you mentioned that native bees are essentially solitary creatures. That's an important thing, I imagine, to understand in regards to bee hotels because people will go, "Well, I don't really want a hive in my backyard." It's not a hive at all. It's just an opportunity for individual insects, largely to nest in the one spot and leave you alone I would imagine.

Robert McDougall:

Yeah, exactly. With these solitary bees, you're never going to see a swarm of them. Occasionally the native, stingless bee, if you've got a hive of them they can form a swarm. But given we're mostly focused on Melbourne here, that's irrelevant anyway, because unfortunately Melbourne's too cold for those guys.

What you're just going to get if you set up a bee hotel in your garden and it's working effectively, is you're going to every now and then you might see a little, tiny black bee or something else, maybe something more colorful if you're lucky, flying past or sticking its head out of the little hole and looking around before it goes off on the foraging trip, but it's not going to be anything that might give you a cause to worry.

Even if you get wasps in there, most of these wasps they're not like European wasps. They're not social wasps that are going to swarm. They're just going to be solitary wasps so they're going to go out and hunt their prey to feed to their larvae, whatever that may be, be it caterpillars or spiders or something like that and bring it back into their nests.

You're just going to basically be sharing your backyard with a few small, little native creatures that you may never even see unless you're very observant and looking for them specifically. But will be having a great influence on your backyard through pollinating. And yeah, potentially providing a food source to birds and reptiles and other things that may be in your yard.

Drew Radford:

Are native bees, as well as the European bees, are they the main pollinators that we have in our environment?

Robert McDougall:

They're one of the main pollinators, but they're certainly not the only ones. I've mentioned already that wasps can serve as pollinators, beetles, potentially even ants at certain times of the year can serve as pollinators. But the one I really like and which is probably the most important group of pollinators in backyards after you introduced European honeybees, is actually the hover flies.

These aren't bees, they're true flies so related to the house flies and such, we might see around our homes, but they look a lot like bees. Many of them have the black and yellow coloration we expect of bees, but they're identifiable because as the name implies, they can hover. They're really cool to see them. As you see them approaching a plant, you can see them hanging there completely motionless in the air as they work out how they're going to approach the plant until they go zipping towards it.

They're some of the most abundant pollinators that we find in urban areas. As well as being pollinators as adults, they're also really useful because their larvae, which look like little caterpillar type things, are actually predators of aphids. If you're someone who's got aphids in your yard, you'll be very glad to see a hover fly buzzing around there.

Because it quite possibly means it's going to have laid its eggs and had its larvae hatch out on your roses where your aphids are. And that this veracious little larvae might be crawling around there right now, chomping down on all those aphids you've got. That's another example of an important pollinator that also has other important uses to a backyard garden as well.

Drew Radford:

Robert McDougall from Cesar, Australia, you have a really deep understanding and passion for our native bees. Thanks for sharing many insights with us and joining us for this Urban Plant Health Network podcast.

Robert McDougall:

Thanks very much for your time.

Speaker 1:

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