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Six-legged friends

Wendy Pyper investigates a wild but friendly backyard alternative.

Above: CSIRO entomologist and native-bee keeper Dr Tim Heard opens a hive.

I'm told that Australian Aborigines used to tie a feather to a wild bee in order to track it back to the hive and extract the honey. How such a tiny insect could be tagged eludes me, but CSIRO entomologist and wild-bee keeper, Dr Tim Heard, assures me it is so. The Aborigines' ability to raid 'sugarbag' hives without being stung is more easily explained: the bees were stingless.

Of the 1600 species of wild bees native to Australia, about 14 are stingless. As these species are harmless to humans, they are an increasingly attractive addition to the suburban backyard or verandah. But most keepers of stingless bees are not after honey. Rather, they enjoy the sense of conserving a native species whose habitat is being increasingly cleared and developed. The bees also pollinate crops and bushland during their search for nectar and pollen, and are fascinating creatures to watch.

According to Heard, stingless bees are the only bee species native to Australia that are social and store pollen and honey (dehydrated nectar). The other species are solitary and eat the nectar they collect immediately, or use it to stock a brood cell.

'Stingless bees represent a peak of insect social organisation rivalled only by ants, termites, some wasps and honey bees,' Heard says.

'Like these insects, they care for their brood cooperatively and have different castes: queens, workers (infertile females) and drones (males).'

The bees are small (about four millimetres) and black and are found in all tropical and subtropical parts of the world. In Australia, most are found in the tropical north, although two species are common in subtropical eastern Australia. The three species most commonly kept by bee keepers are *Trigona carbonaria*, *T. hockingsi* and *Austroplebeia australis*.

***T. carbonaria* queen bee cells. The queen cells are the large, egg-shaped structures. They contain more food than other cells in the hive. The queen lays her eggs on the food, which the larvae eat when they hatch.**

In their natural state, stingless bees nest in hollow trunks and branches of trees, or rock crevices. They also have been encountered in wall cavities, garbage bins, water meters and 44-gallon drums. Most beekeepers, however, keep the bees in their original log hive or transfer them to a wooden box.

Like the European honeybee (*Apis mellifera*), which provides most of Australia's commercially produced honey, stingless bees have enlarged areas on their back legs for carrying pollen back to the hive. After a foraging expedition, these 'corbiculae', or pollen baskets, can be seen stuffed full of bright orange or yellow pollen.

Stingless bees also collect nectar, which they store in a crop: an extension of their gut. Back at the hive, the bees 'ripen' or dehydrate the nectar droplets by spinning them inside their mouthparts until honey is formed.

Top: A new hive with a top chamber allowing easy access to honey and pollen.

Above centre: *T. carbonaria* on a flower.

Above: The brood chamber is located in the centre of the spiral comb. Surrounding the brood comb are glistening pots of honey and bright yellow pollen.

'Ripening concentrates the nectar and increases the sugar content from 20–40% to about 80%,' Heard says.

Unlike honeybees, stingless bees produce only a small amount of honey. A single hive of honeybees can produce 75 kilograms of honey in a year, while a hive of stingless bees usually produces less than one kilogram. Stingless bee honey also has a distinctive bush taste: a mix of sweet and sour with a hint of lemon. The taste comes from plant resins used by the bees to build their hives and honey pots, and varies depending on the flowers and trees visited.

While a number of beekeepers do fill a small niche market for bush honey, the structure of stingless bee hives makes the honey difficult to extract. The bees store pollen and honey in large egg-shaped pots made of 'cerumen', which consists of beeswax mixed with a plant resin called propolis. These pots are irregularly arranged around a central brood comb, where the larval bees are housed.

The central location of this brood comb means that when a man-made hive is opened, the comb is split in half. This is because many hives are based on a design – developed by Heard in 1985 – that enables a colony to be split in two and propagated.

'The design takes account of the stingless bees' natural living pattern, which is to centre their young in the middle of the hive, insulated from major temperature changes,' Heard says. 'When the hive is split, this pattern is retained, allowing a new daughter colony to establish.'

Heard recently designed a new hive which retains the original brood comb space, but incorporates a second space above the chamber, where the bees can build their storage pots. This design allows bee keepers to access the honey pots without damaging the brood comb.

Heard expects that stingless bees will become an increasingly important source of honey and means of crop pollination in tropical areas, as domesticated and wild honey bees face the threat of the parasitic Varroa mite (see story page 21).

More about stingless bees

Heard T (1996) Stingless Bees. *Nature Australia*, Spring pp51–55.

Heard TA and Dollin AE (2000) Stingless bee keeping in Australia: snapshot of an infant industry. *Bee World* 81(3):116–125.