

Asian bees

Doug Somerville, Technical Specialist Honey Bees, Goulburn

Introduction

Asian bees (*Apis cerana*) are not native to Australia and are not regarded as economically viable for honey production when compared to European honey bees (*Apis mellifera*). *Apis cerana* is considered as the most significant pest and competitor for resources of managed honey bees in Asia, according to Dr. Denis Anderson, CSIRO (*pers. com*).

It is possible to keep Asian bees in moveable frame hives similar to honey bees. But when compared to honey bees, Asian bees have an extremely high propensity to swarm and the average honey harvest is extremely poor.

Asian bee colonies have been reported to produce 6 to 10 swarms in a year, compared to honey bees with an average less than one swarm per year. Honey crops from Asian bee colonies are frequently reported to range from a few kilograms (kg) to 10kg. Exceptionally large honey crops may equate to 20kg per colony. In comparison to honey bees the average honey crop per hive in NSW from commercially managed colonies is 100kg with reports of 200 kg per hive common and occasionally 300kg per hive is achieved.

History

The Asian bee (*Apis cerana*) is found throughout Asia and across a diverse range of climatic zones including as far north as Siberia. They are not native to the countries immediately north of Australia, including Irian Jaya and Papua New Guinea (PNG).

Records indicate that Asian bees were moved into Irian Jaya from Java in 1977. By 1987 they had spread into PNG. They proved highly invasive and by 1996 they had established throughout PNG, including the cooler highlands and the tropical lowlands.

In 2003 Asian bees had spread to the Solomon Islands where they effectively out-competed honey bees, decimating the local industry that at the time comprised 2,000 hives.

Varroa mites naturally occur on Asian bees.

Varroa destructor is considered the most damaging parasite of honey bees in the world today, but only occur on some strains of Asian bees. The mite found on the strain of Asian bees to the immediate north of Australia is *Varroa jacobsonii*. *Varroa jacobsonii*, was thought not to reproduce on honey bees (*Apis mellifera*) and therefore not pose a threat.

In 2008 this varroa mite was found in honey bee colonies in the PNG highlands, breeding on honey bee brood. Whether this mite is as damaging as *Varroa destructor* to honey bees remains unknown.

There have been two incursions of Asian bees into Australia where they have established colonies. In 1988 a colony of bees was positively identified and destroyed in Darwin.

A colony of Asian bees was positively identified in Cairns in May 2007 and again destroyed. Unfortunately this was one of many thought to have originated from the one incursion. A response was mounted to eradicate the bee, but by March 2011, 360 Asian bee colonies had been located and destroyed and the bee had spread a considerable distance from its point of entry.



Asian bees (*Apis cerana*)

Biology

The life cycle of Asian bees (*Apis cerana*) is very similar to that of honey bees (*Apis mellifera*). Brood is reared for 21 days from egg to hatching adult. The colony is structured the same with a single fertile female (the queen) several thousand worker bees (sterile females) and seasonally, male bees (drones).

Drone brood cappings have a characteristic pin hole in the middle.

The colour of Asian bees can vary considerably, similar to that of the honey bee. Asian bees have a very distinct stripy abdomen.

The overall size of Asian bees is approximately two-thirds the size of honey bees.

Foraging range is said to be a lot more restricted with Asian bees, with most of the activity occurring within 300 metres of the colony and occasionally up to 1 to 2 km flight range. Whereas foraging ranges for honey bees are considerably greater, with 3 to 4 km common.

Colony population size is a major distinguishing feature between Asian bees and honey bees. Asian bee colonies with a population of 10,000 are considered large colonies. Population sizes of 2,000 to 5,000 are reasonably common, whereas honey bee populations usually range between 30,000 to 60,000 and a colony of 5,000 to 10,000 bees would be considered a nucleus colony.

Swarming activity is extreme in Asian bees when compared to honey bees. Asian bees are said to swarm for a range of reasons other than just for reproduction. Absconding swarms and migrating swarms are common and are induced for a range of reasons including a shortage of food, disturbance or pest pressure (ants, wax moth).

Swarming distances have been reported up to 10km from the original colony.

Asian bees (*Apis cerana*) are a cavity nesting bee which permits them the opportunity to increase their chances of survival in cooler climates. They also appear to favour areas of human habitation, preferring nesting sites 1 to 2 metres off the ground.

Densities of Asian bees will vary according to nesting site availability and feed. High densities of colonies have been reported with up to 22 per km².

The genus *Apis*

The genus of honey bees, *Apis*, is comprised of eight Asian species and one western species (*Apis mellifera*). The Asian species include:

Apis cerana

Apis koschevnikovi

Apis nuluensis

Apis andreniformis

Apis florum

Apis dorsata

Apis laboriosa

Apis nigrocincta

The European species *Apis mellifera* has a natural distribution including the African continent, Mediterranean, Northern Europe and Eastern Europe. *Apis mellifera* has been introduced to all the continents except Antarctica.

There are over 150 subspecies named within this species, of which only a few have been widely propagated for beekeeping. Asian bees (*Apis cerana*) are the next most common *Apis* species around the world. Although it is recognised that there are possibly many subspecies of this bee, only a few are commonly referred to, *Apis cerana indica*, *A.c. japonica*, *A.c. cerana* and *A.c. johni*. *Apis cerana javana* is the strain of Asian bee currently in PNG and northern Australia.

Impact in Australia

The evidence in PNG and Cairns strongly indicates that the Asian bee is a highly invasive insect and has the potential to inhabit most of the Australian landscape.

A report published by the Australian government highlights the public nuisance aspects of the Asian bee. The density of Asian bee colonies is said to be three times greater than honey bee colonies. The propensity of Asian bee colonies to swarm several times per year and their preference for human habitation areas will create significant public nuisance costs in the form of swarm removal and increased levels of stinging events.

The impact of Asian bees on Australia's ecology is likely to be highly significant. There are hundreds of native animals that consume nectar and/or pollen as part of their diet. Asian bees will be a significant competitor for nectar and pollen plus occupy small cavities displacing native birds and possums.

The impact on managed honey bees (*Apis mellifera*) is likely to be two-fold. They will be major competitors for nectar and pollen, thus reducing the honey crops produced by honey bees. Given the evidence gathered in the Solomon Islands, they are also likely to invade honey bee colonies to rob their stored honey during periods of no natural nectar supply.

Asian bees are also potential hosts of varroa mites, which are extremely devastating to honey bee colonies.

How Asian bees perform across the different environments within Australia remains to be seen. Their preference for nesting in cavities ensures that they will be successful at some level at surviving in many environments. What impact endemic pests and diseases of honey bees have on Asian bees is also unknown.

Serious outbreaks of European foul brood in *Apis cerana* in Vietnam have been reported. Asian bees are also particularly vulnerable to wax moth. Infestations of wax moth larvae cause colonies to abscond. Other pests such as the small hive beetle may also have an impact on Asian bees.

No satisfactory method has been developed in controlling Asian bees. Finding the nest and destroying it has been the only control measure used to date.

References

Punchihewa RWK (1994) *Beekeeping for Honey Production in Sri Lanka*; Sri Lanka Department of Agriculture.

Oldroyd BP, Wongsiri S (2006) *Asian Honey Bees, Biology, Conservation and Human Interactions*, Harvard University Press.

Ryan T (2010) *Estimating the Potential Public Costs of the Asian Honey Bee Incursion*. Rural Industries Research and Development Corporation. Pub No. 10/026.

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