# Submission to the Senate Standing Committee on Rural Affairs and Transport re: Asian Bee Eradication

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I am the manager of the Australian Native Bee Research Centre at North Richmond, NSW. I have been researching Australian native bees for over thirty years, specialising in the taxonomy and behaviour of the social stingless native bees, genera *Trigona* and *Austroplebeia*. Our Centre has also assisted the development of various species of Australian native bees for the pollination of agricultural crops. The Australian Native Bee Research Centre runs Australia's largest website on native bees: www.aussiebee.com.au

I wish to submit the following information to the Committee's inquiry into the Science Underpinning the Inability to Eradicate the Asian Honeybee, addressing point (c) *"the science relating to the impacts of the spread of the Asian honey bee on biodiversity, pollination and the European honey bee"*.

## Value and Importance of Australian Native Bees

### (a) To Maintain the Diversity of Australian Native Plants

Australia has over 1,500 species of native bees. These species have evolved with Australia's diverse flora and play a major role in the pollination of native plants throughout the country.

Australian native bees range in size from 2mm to 24 mm and have developed a wide range of pollination strategies that are adapted to suit flowers of various sizes and structures. For example:

-- plants with deep floral structures require pollination from appropriately sized long-tongued species of bees; and

-- plant genera such as *Solanum* and *Senna*, that trap their pollen inside small capsules, require bees capable of buzz pollination for effective pollination.

Many species of Australian native plants are dependent on the pollination provided by Australian native bees. Maintaining the diversity of Australian native bee species is important to supporting the current diversity of Australian native plants.

### (b) As Supplementary Pollinators for Australian Agriculture

In addition to this, recent work is demonstrating the value of Australian native bees as pollinators of agricultural crops. Australia is currently heavily dependent on the European honey bee, *Apis mellifera*, for crop pollination. However, this bee is not always the most suitable insect to pollinate particular crops[1]. Furthermore Australia's populations of European honey bees are under serious threat of decline with the likely arrival of the devastating mite, *Varroa destructor*.

Overseas, various species of native bees are successfully used as supplementary pollinators for agricultural industries. For example, the Blue Orchard Bee *Osmia lignaria*, the alkali bee *Nomia melanderi* and the leafcutter bee *Megachile rotundata* are used overseas for crop pollination.

Similarly in Australia, some native bee species are already showing great potential as supplementary pollinators for our agricultural industries:

-- the native stingless bees, *Trigona carbonaria* and *T. hockingsi*, are currently being successfully used for the pollination of field crops such as macadamia, watermelon and lychee;

-- the native stingless bee, *Austroplebeia australis*, is being trialed at the University of Western Sydney, Hawkesbury, for the pollination of greenhouse crops; and

-- the native blue banded bee, *Amegilla chlorocyanea* is being developed at Adelaide University as a pollinator of greenhouse tomatoes[2]. This native blue banded bee is capable of the special strategy called buzz pollination that is necessary for effective pollination of the tomato flower. European honey bees cannot perform buzz pollination.

We need to maintain the diversity of Australia's native bee species and further research their potential as supplementary pollinators to support the future of Australian agriculture.

**Impact of the Spread of Asian Honey Bees on Australian Native Bees**

The Asian honey bee is a highly invasive species that may be capable of spreading to most areas of Australia if not eradicated now. Such a spread is likely to have a severely detrimental effect on the population sizes and diversity of our Australian native bee species.

**(a) Depletion of Nectar and Pollen Resources**

Asian honey bees are capable of rapidly depleting local resources of nectar and pollen to the detriment of other bee species. This was demonstrated by their devastating effect on other bee species when they spread to the Solomon Islands in 2003.

Most Australian native bees are solitary species with brief life spans. They emerge as adults in the warm months and die off when the weather becomes cool. If they cannot obtain sufficient nectar and pollen to provision viable brood cells during that limited period, the local population will decline or be lost. Competition for nectar and pollen resources with a vigorous species such as the Asian honey bee is likely to cause the loss of many populations, or even species, of Australian native bees.

**(b) Loss of Nesting Sites**

The majority of our social native bee species, *Trigona* and *Austroplebeia*, nest in small to medium sized cavities. They use narrow hollows in trees, as well as cavities in buildings and other man made structures. These cavities are too small to be occupied by the European

honey bee, *A. mellifera*, however many of these cavities are within the size range occupied by the Asian honey bee, *A. cerana*. The Asian honey bee propagates prolifically, producing up to ten swarms per year. Hence if the Asian honey bee is not eradicated, these social native bee species are likely to face new and severe competition for nesting sites.

**(c) Expanded Competition with Feral Species**

The current distribution of the feral European honey bees, *A. mellifera*, within Australian is very extensive. However, a lack of large sized nesting cavities has limited their spread in some areas. Most Australian native bees nest in burrows in the ground and in these areas they were relatively free of competition from feral honey bees. The Asian honey bee, *A. cerana*, however, is capable of nesting in small to medium sized tree cavities and could potentially invade areas not previously occupied by feral European honey bees. Hence if the Asian honey bee is not eradicated, Australian native bee species in these areas are likely to be affected for the first time by competition from feral honey bees. Once again this will threaten the diversity of our Australian native bee species.

**Conclusion**

Australia's 1,500 species of native bees are valuable as pollinators of Australian native plants and as potential pollinators for Australian agriculture. Native bee species are already under great pressure from land clearing and pesticide use. The spread of Asian honey bees is likely to cause further severe damage to these vital species. It is crucial to protect and conserve the remaining populations and the diversity of our Australian native bee species.

If the Asian honey bee is not eradicated, it is likely to compete with Australia's native bee species for nectar and pollen resources, as well as nesting sites, throughout large areas of Australia. Furthermore, the nesting biology of the Asian honey bee would allow it to impact native bees in new areas not previously occupied by feral honey bees. All of these factors are likely to have a severe detrimental effect on the diversity of Australian native bees, with flow on impacts on the diversity of Australian native plants and Australian agriculture.

The eradication of the current population of Asian honey bees in Queensland is a matter of great urgency. All attempts should be made to achieve this and thus avert serious damage to Australian biodiversity and pollination.

**References**

1. Cunningham SA, Fitzgibbon F and Heard TA. 2002. The future of pollinators for Australian agriculture. *Aust. J. Agric. Res*. 53: 893-900.
2. Hogendoorn K, Coventry S and Keller MA. 2007. Foraging behaviour of a blue banded bee, *Amegilla chlorocyanea* in greenhouses: implications for use as tomato pollinators. *Apidologie*. 38: 86-92.

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31 March 2011