



# How susceptible are Australian honeybee stocks to *Varroa*?

## The issue

One of the greatest threats to Australian honeybees is the exotic mite *Varroa destructor*. The mite infests the brood cells of bees, weakening the pupae and making it susceptible to viral diseases. *Varroa* is present in all beekeeping countries world wide, with the single exception of Australia. Where *Varroa* is present, it devastates hives, and requires intensive treatment with miticides to manage mite populations. What level of resistance do Australian bees have to *Varroa*?

## The Project

Seven lines of Australian and three lines of American honeybees were evaluated for their resistance to the parasitic mite *Varroa destructor*. The evaluation shows that Australian stocks lack resistance to *Varroa*, and that an incursion of *Varroa* would have catastrophic effects.

## Background

It is generally agreed that the brood parasite *Varroa destructor* will eventually become established in Australia. The consequences are likely to be severe, with significant colony losses and increased costs. The severity of the impact will depend in part on the level of natural resistance of Australian honeybees to the mite. Because Australian honeybees have never been exposed to *Varroa* it is likely that our stock is highly susceptible. On the other hand, the population of Australian honeybees is massive, and genetically diverse. Thus we may already have some breeding lines and feral populations that will prove to be resistant to *Varroa*. This is especially likely where beekeepers have selected for hygienic behaviour, or have made imports of breeding stock from countries where *Varroa* exists.

It is crucial that the Australian bee industry prepares for the arrival of *Varroa*. An important component to our response to establishment of *Varroa* will be exploitation of natural resistance – either by breeding resistant stocks or by importing them. Prior to this project we had no information about levels of resistance to *Varroa* in Australian bees, and therefore did not understand whether we had a significant problem.

## Methods used

We evaluated the responses of seven lines of Australian honeybees to *V. destructor* and compared their responses to those of a stock of Italian honeybees from the United States known for its susceptibility to *V. destructor* and two stocks known for their resistance to *V. destructor*: Russian honeybees (RHB) and a stock expressing the *Varroa* Sensitive Hygiene trait (VSH).



## Results/key findings

*V. destructor* infestations in the Australian lines and the US Italian stock rose from less than 10% in August to over 25% in October 2011. From August to November, 44% of both the Australian and Italian colonies died while strongly exhibiting symptoms of Parasitic Mite Syndrome. In contrast, RHB and VSH colonies displayed comparative resistance to *V. destructor*. Their infestation rates rose from about 5% in August to 10% (RHB) and 14% (VSH) in October. It is likely that some of this increase resulted from invasion pressure by mites from the dying Australian and Italian colonies. During the August to November period, 4.4% of the RHB and 14.3% of the VSH colonies died.

In comparisons of the seven Australian lines only non-significant and trivial differences were found for infestation and mortality rates. All Australian lines were highly susceptible to *V. destructor*.

Additionally, evaluations of rates of *Nosema ceranae* infections were made throughout the course of the experiment. Although high levels of infection were found across all stocks and lines, no stock or line exhibited an adverse effect from *N. ceranae* infection.

## Implications

Australian stocks, which have not been previously exposed to *Varroa*, have no resistance to it, whereas lines selectively bred showed economically significant resistance. Interestingly, the Australian lines were no less resistant than the unselected American line included in the experiment.

## Recommendations

The authors recommend that urgent steps be taken to implement a quarantine process to permit safe importations of *Varroa*-resistant stocks before *Varroa* arrives in Australia. A secondary benefit of these imports may be increased opportunities for sale of Australian queens in countries where *Varroa* is present.

## For more information

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*Varroa mite on honeybee pupae*



Close up of Varroa mite



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