



Varroa destructor management in Australia

A pre-trial of Varroa management in 55 *Apis mellifera* hives using chemical free biotechnical methods in a subtropical climate during the initial spread of Varroa



Varroa control method used

Two frame queen isolator
Autumn: 1 frame with no foundation + 2 empty brood frames used
Winter: 3 empty worker brood frames used



Isolator varroa method Two frame method

What seems to be complicated, is actually very simple. You catch about 80% of both phoretic and reproductive mites. This is possible when you concentrate the queen on 2 frames, in the isolator for 2 or 3 frames. Mites are killed - they starve via small of open brood and phoretic mites. That is why mites are attracted to get caught in the middle of the brood. Do not change the details of the method: the efficiency depends on accuracy...

ADJUST THE LENGTH OF THE METHOD TO THESE TEMPERATURES:
Normal temperature (below 30°C/86°F) 12-24 days
Higher temperature (30°C/86°F or more) 11-22 days
*Capping of the cells is clearly shorter. Take special care when hives are produced in the sun.

Day 1: Place the cage in the MIDDLE of the brood box. Think of the centrifugal spreading of phoretic mites. Put one frame with ~~no foundation~~ inside, as well as a frame with a fresh foundation. Find the queen and put her carefully inside, close the lid softly and carefully. Eventually use smoke and a crush to move the bees away. Transport of the hives with the queen in the isolator is a risk.

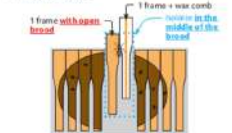


Figure 5

Average Varroa % infestation 1 Feb - 1 Aug 2025

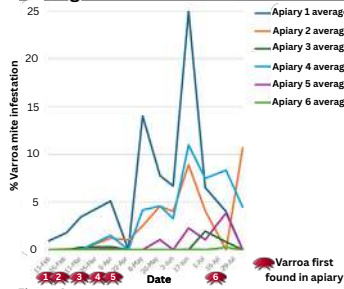


Figure 6



This trial is run and funded by Jackie Morrison at Ballina Honey, NSW Australia goodlifeatballinahoneyfarm.com.au www.ballinahoney.com.au www.honeyvalefarm.com.au

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Jackie's Nuffield report on IPM for Australian beekeepers is available free at www.nuffieldscholar.org/reports

Introduction

Varroa destructor was first detected in Australia on 22 June 2022 at Newcastle (Figure 1). Prime *Apis mellifera* breeding conditions year round and high temperatures with honey harvested winter and summer limit chemical control options for beekeepers. Varroa may quickly breed resistance to synthetic chemicals through overuse. *Aethina tumida* (Small Hive Beetle) is endemic and quickly causes the death of weak hives (Figure 2).

The Varroa destructor "invasion phase" in Australia has seen extreme reinvasion numbers up to 100% infestation due to very high densities of feral (wild) hives. Near Newcastle 90% of feral hives have died within 6-12 months of varroa invasion. Some managed hives have died 6 weeks after varroa infestation.

Many Australian beekeepers are hesitant to try chemical free Varroa control methods due to a lack of knowledge and fears these methods will be ineffective or take too much time and labour. This pre-trial was undertaken to test the suitability of two frame queen isolators for autumn and winter use in subtropical Australian conditions.

Method

55 hives on 6 stationary apiary sites near Ballina NSW (Figure 3) had mite infestations counted monthly using an alcohol wash of approximately 300 bees. Hives are timber with 9 frames of brood and 1-2 super boxes of honey. Varroa first arrived in each apiary at different times between February and June 2025.

Integrated Pest Management of Varroa followed the IPM Broodcomb developed by Ballina Honey (Figure 4). Hives were requeened in May 2024 using queens from Australia's fledgling Varroa resistant breeding program run by the Australian Queen Bee Breeder's Association (AQBB). *Dolotia coriaria* beetle were released into each apiary to control Small Hive Beetle pupae in the soil around hives. Drone brood removal was undertaken on all hives whenever the provided drone frame was capped off.

Varroa reproduction was interrupted and phoretic mites trapped out using a two frame queen isolator purchased from Lyson Australia (Figure 5). In late summer and autumn an empty frame of worker brood and an empty frame for building out drone comb were used in the isolator, which was installed when a 3% mite threshold was reached. Two worker brood frames were used in the isolator over winter, installed at a 0.3% mite threshold.

Result

This trial is ongoing. Hive health and production have been severely impacted by record wet weather throughout the trial period. Mite numbers have been extremely variable within and between apiaries due to the initial invasion (Figure 6). There has been a loss of 16.36% of hives, with 12.73% of this loss at Apiary 1. This has included 0% deaths directly from varroa, with 12.73% absconded (bees left hive) and 3.64% death by Small Hive Beetle slime out (both at Apiary 1). 47.27% of hives superceded (replaced) their original queen (Figure 7). Average mite count when installing isolators was 6.89% and when releasing the queen 11.27%. 10.91% of hives had too few bees in the hive to alcohol wash when releasing the queen, 7.27% at Apiary 1 and 3.64% at Apiary 2.

Conclusion

The two frame queen isolator cage method has proven convenient to use in this trial, but is struggling to keep mite numbers down under the very high reinvasion numbers seen in the initial varroa invasion phase. Higher than average rainfall and number of rain days has potentially caused more issues for the hives in the trial than varroa. However, the late arrival of varroa at Apiary 6 shows that hive death and supercedure issues can be attributed to varroa mite. Small Hive Beetle pressures have been less than expected compared to other local beekeepers. Local beekeepers were not overwhelmingly inclined to try these methods due to a reluctance to find and handle the queen as well as concerns around cutting back brood numbers.

Full trial starting October 2025

From October 2025 200 hives across 10 stationary apiaries will be used to trial chemical free biotechnical and low chemical use varroa control methods. All hives will be requeened using queens from the AQBB varroa resistant queen breeding program. Drone brood removal will be used in all hives using a drone frame uncapped every 24 days. *Dolotia coriaria* beetle will be released into each apiary to control Small Hive Beetle. Oxalic Acid sponges will be used to assist in keeping mite numbers below threshold. When hives reach a threshold of 3% in a monthly alcohol wash two vertical queen excluders will be used to separate the brood into three sections without finding the queen. The same sequence as above will be used using only the section holding the queen (determined by the presence of eggs after 11 days).

Follow the QR code to www.honeyvalefarm.com.au for updates on this trial



Beekeeping in tropical & subtropical Australia

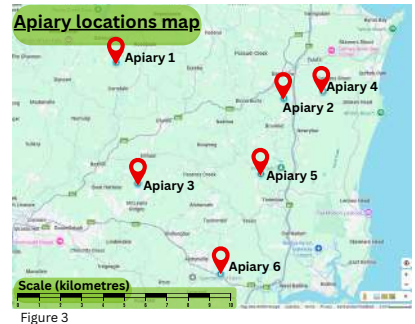
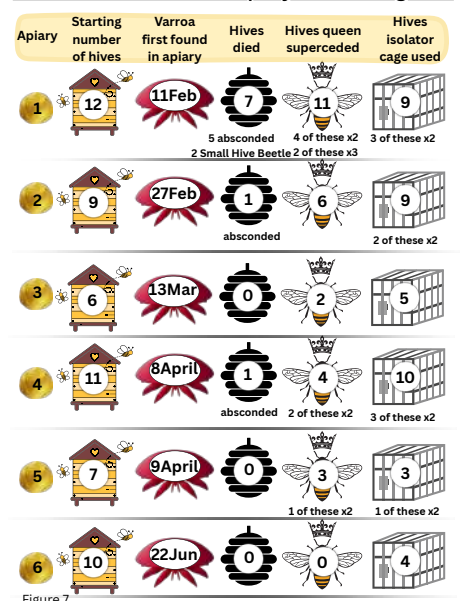


Figure 4. Varroa Integrated Pest Management in this trial follows the IPM Broodcomb developed by Ballina Honey for Australian beekeepers

Effects of Varroa on each apiary 1 Feb - 1 Aug 2025



Comparing *Apis mellifera* health outcomes using biotechnical methods, organic chemicals or synthetic chemicals to manage *Varroa destructor* during the initial invasion phase in subtropical Australia

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Varroa destructor is the most damaging pest of *Apis mellifera* world wide. Australia is the last large scale beekeeping industry to have to alter management practices to accommodate *Varroa destructor*. The presence of both worker and drone brood year-round as well as the need to keep supers on for honey production year-round in subtropical Australia present challenges for conventional chemical *Varroa* management. This is further compounded by Australian consumer perceptions and beekeeper preferences against the use of chemicals in beekeeping. This presents opportunities for Australian beekeepers to take advantage of recent research into biotechnical methods of *Varroa* management. This will also be imperative in the high risk event of a *tropilaelaps clareae* incursion into Australia. However, extremely high infestation rates during the initial invasion period caused by up to 150 feral colonies per square kilometre question the viability of biotechnical methods or even organic acid management under these challenging conditions. A comparison is underway at the *Varroa* invasion front in subtropical New South Wales comparing the effect of biotechnical, organic chemical and synthetic chemical management methods on colony survival and health. This will also compare alcohol wash and natural mite fall as viable monitoring methods during the invasion period. A two frame queen isolator trap cage will be used for biotechnical methods. Sublimation of Api-bioxal oxalic acid and FormicPro formic acid pads will be rotated for organic acid treatment. Bayvarol (active ingredient flumethrin) and Apivar (active ingredient amitraz) strips will be rotated for synthetic chemical treatment. All hives will have a monthly alcohol wash and daily mite drop calculated to compare these methods of monitoring under heavy invasion conditions. Initial results will be available for analysis in August 2025. These results will have major implications for both recreational and commercial beekeepers assessing the viability of different management methods in their apiaries as *Varroa* continues to spread in Australia. Extension activities will be undertaken throughout 2025 to assist local beekeepers managing *Varroa destructor* for the first time. Wider extension activities will be undertaken in 2026.