

Varroa mite — what is it and where are we at?

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Varroa mites are the most serious pest of honey bees worldwide. Varroa infects honey bees in every major beekeeping area of the world, except Australia up until recently. Varroa mites include a group of species, including *V. destructor*, *V. jacobsoni*, *V. underwoodi*, *V. rindereri* and un-named species.

V. destructor mite is now widespread throughout Europe, North America and New Zealand. *V. jacobsoni* is a mite infesting Asian bees throughout Papua New Guinea and Indonesia.

Importance

These mites are important because if left untreated in a honey bee colony, they will kill it. The effect of Varroa mite in other countries has seen wild honey bee colonies and managed colonies drastically decline (Cunningham et al. 2002). In the US and Europe, Varroa mite killed 95-100% of unmanaged or wild honey bees within three to four years of infestation (Commonwealth of Australia 2011).

If established in Australia Varroa mite is expected to progressively kill 95-100% of Australia's wild honey bee population, greatly reducing the free pollination service they provide. The effect on commercial beekeepers will be the costs associated with implementing control measures, increased labour requirements, and the need to replace infected colonies (RIRDC 2010). The effect on pollination dependent industries will be the loss of incidental pollination and increases in the direct costs of pollination services and/or the possibility of insufficient number of hives being available (Gordon and Davis 2003).

What do they look like?

Unfortunately, when mites are in low numbers in a colony of honey bees they are difficult to detect. On its own individual mites are easily identifiable to the naked eye. They look like small brown sesame seeds with eight legs. They are flat and about 1.1 mm long and 1.7 mm across (Figure 1).

Varroa mite lifecycle

The female mite enters the brood cell (where rearing of larvae occurs) of an advanced larva just before the cell is capped by nurse bees. The mite sinks itself into the larval food at the bottom of the cell and emerges once the brood cell is fully capped. She will then move onto the developing bee larvae/pupae and feed primarily on fat bodies (Figure 2).

The mother mite may lay up to six eggs at intervals of about 30 hours. The first egg develops into a male mite and the rest are female. Mite development from egg to adult takes about 8-10 days. The first mite (male) mates with the female mites as they mature. On average, 1.5 daughter mites emerge from a worker cell and 2.5 daughter mites emerge from a drone cell along with the mother mite. The male and undeveloped female mites die inside the cell. The mother mite and her daughters are then capable of crawling back into adjoining brood cells to complete the reproduction life cycle again (Figure 3).

Spread

Adult mites are capable of living for more than five days without the presence of honey bees. This means that they can be moved around on used beekeeping equipment, including extracted combs. Varroa mites can also spread through drifting drones and worker bees as well as through swarms and absconding colonies. Foraging worker bees will encounter other bees when visiting blossom for nectar and pollen. Mites are very agile and quick in moving and can transfer between bees in passing (Figure 4).

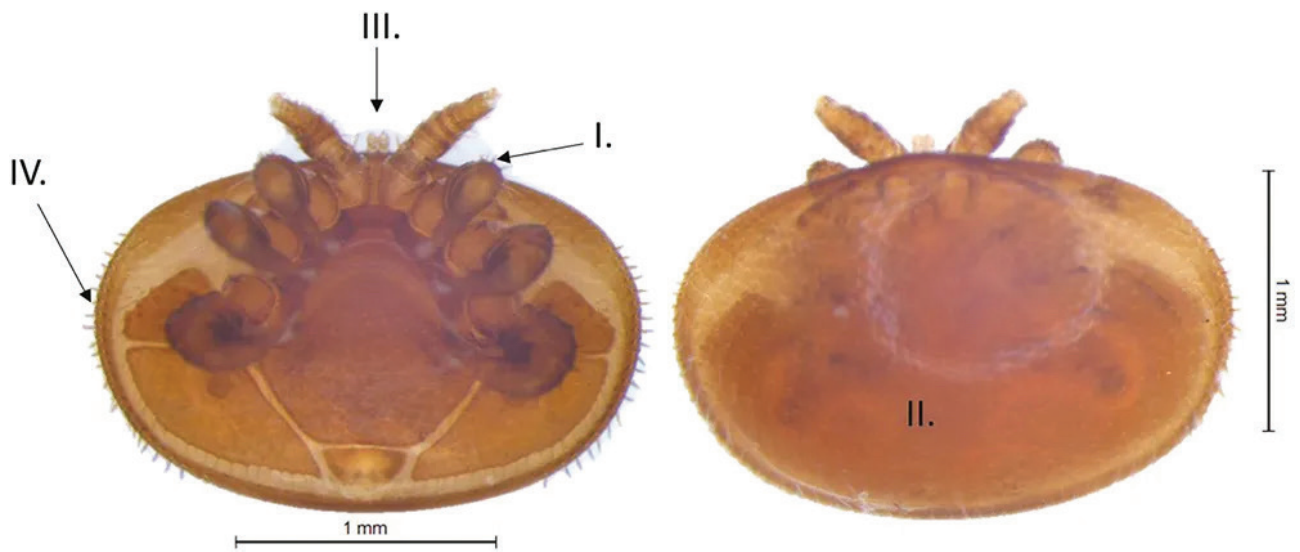


Figure 1. The ventral (bottom) view of *Varroa destructor* shows its legs (I), mouth and feeding parts, which are collectively called the gnathosoma (III), and numerous hairs called setae (IV), while the dorsal (top) view shows its dorsal shield (II). Photo credit: Noble Noble, Ph.D., University of Florida.



Figure 2. An adult female *Varroa* mite feeds on a developing bee.
 Photo credit: Scott Bauer, USDA Agricultural Research Service, Bugwood.org

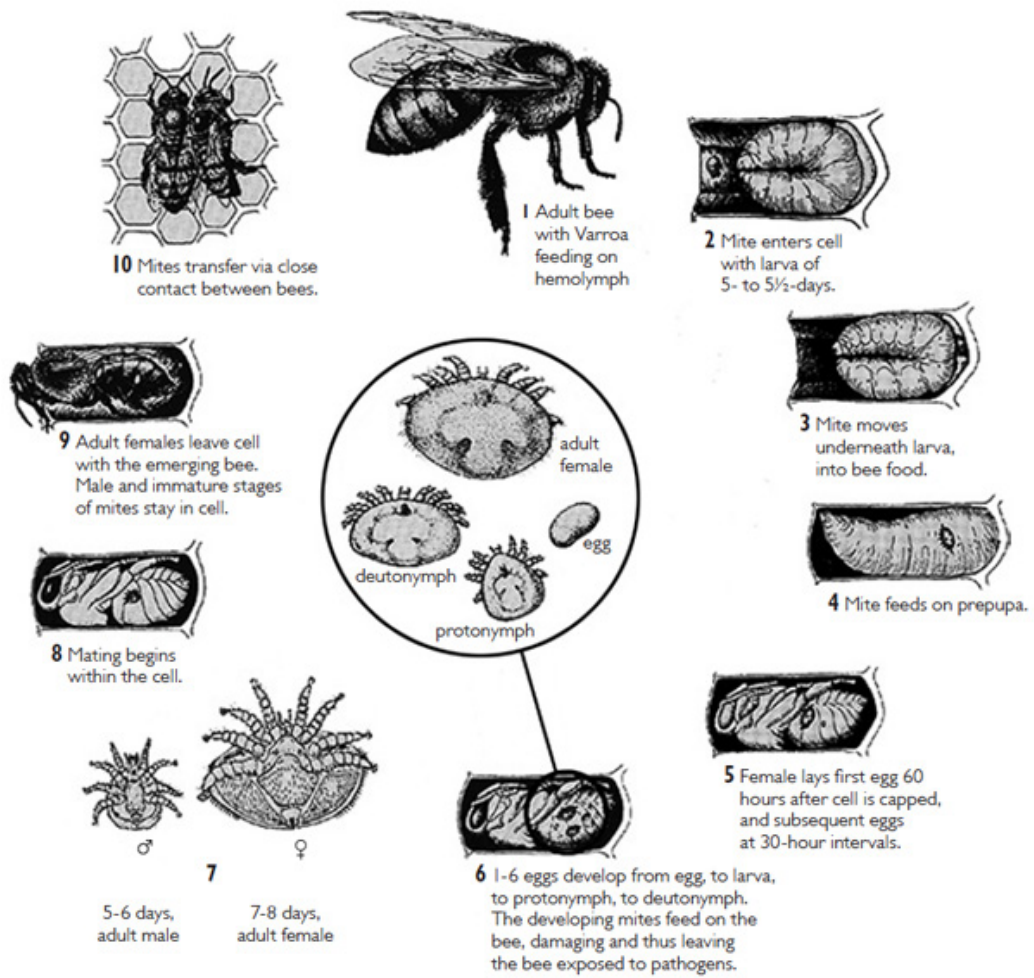


Figure 3. Varroa destructor life cycle. Image credit: Zachary Huang, Department of Entomology, Michigan State University



Figure 4. Varroa mites can spread via attaching to honey bees. Photo credit: Alex Wild

A colony that is heavily infested and collapses will be robbed (of its honey stores) by other bees from nearby colonies. The Varroa will quickly infest these robber bees which will very effectively spread the mites.

Varroa destructor incursion in NSW

On the 22 June 2022 *Varroa destructor* was detected in two of six sentinel hives at the Port of Newcastle in NSW, as a result of routine surveillance. All six hives were euthanised and inspected for mites. Three private hives in the vicinity of the sentinel hives were also euthanised.

The response strategy is being coordinated by NSW DPI.

Three zones were set up around the detection

- A 10km eradication zone - hives within this zone to be euthanised
- A 25km surveillance zone - surveillance and inspection of managed and feral hives
- A 50km biosecurity zone - no movement of hives

Varroa destructor is a category 3 Emergency Plant Pest (EPP) under the Emergency Plant Pest Response Deed (EPPRD) and as such an eradication response has been put in place to delimit and eradicate the mite. As a category 3 EPP, the response is funded 50% by government and 50% by industry.

As Strawberries Australia Inc and RABA are signatories to the EPPRD, and identified as affected industries, they are contributing to the response plan along with 12 other horticulture industries.

Since the initial detection, other infected hives have been found through surveillance and tracing, and at the time of writing there are 99 infected premises in NSW. All confirmed cases, however, have clear links to the original detections through hive movement, or are geographically related, i.e. detected within an existing eradication zone. For this reason, industry and government representatives are still confident Varroa mite can be eradicated at this stage.

As detected infections spread from the initial premises in Newcastle, the entire state was declared a biosecurity zone, and all hive movements were placed under a stand still order.

With the requirement for pollination services in the almond industry initially, followed by other industries including berries, NSW DPI has put in place a permit system for commercial beekeepers in low-risk areas to move honey bees and hives, allowing for business continuity. However, other states have restrictions in place to prevent movement of hives that are based in NSW entering those states. A Biosecurity Emergency Group Permit is in place to allow movement of Queensland hives safely through NSW to Victoria to provide pollination services.

After intensive surveillance around infected premises, the 50km biosecurity zone has been lifted to allow more hive movement within NSW. Bees still cannot be moved out of the 10km eradication zones or the 25km surveillance zones, but can be moved within a zone to ensure continued pollination. Hives cannot be moved at all within the 10km eradication zone.

In addition, a new Biosecurity Emergency Order has been issued to allow beekeepers within the 10km eradication zones to work their hives to prevent swarming as the weather warms up, and to remove honey in the 48 hours before their bees are euthanised.

Of most concern to berry growers is a detection of Varroa mite in hives on one premises in the Coffs Harbour area, at Nana Glen, on 25 July, 2022. A 10km eradication zone has been set up around the detection site, as well as a 25km surveillance zone. The detection has been linked to initial detections in the Newcastle region, through hive movement several months ago. Unfortunately, these zones include a number of berry farms and Berries Australia is working with the NSW DPI to investigate options to allow pollination services to continue in the affected area.

The situation is changing rapidly, and information is constantly updated on the NSW DPI website
bit.ly/VM-NSW

This is the best place to find information about, and apply for, Emergency Permits and Hive Movement Declarations to allow hive movement.

Berries Australia will also continue to keep growers updated as the situation changes.

Growers using pollination services under the Hive Movement Declaration system must ensure that the commercial beekeepers they are using have the appropriate permits in place, as there are hefty fines for both the beekeepers and the growers.