



Field Diagnosis of Exotic Honey Bee Parasites and Pests in Beehives

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Introduction

The exotic honey bee parasites and pests described below are a serious threat to Australian honey bee colonies kept by commercial and hobby beekeepers. For these notes, the term exotic means 'not occurring in Australia'.

If these parasites and pests were to establish in Australia, severe losses of colonies would occur, putting at risk the livelihoods of sideline and commercial beekeepers.

Early detection of these parasites and pests in Australia will be extremely important in limiting their spread and impact on beekeepers. The authors encourage readers to study these notes so that they can recognise these parasites and pests.

It may be necessary to confirm a field diagnosis using laboratory tests. Apiary officers are able to provide advice on the correct procedures for this to be done.

Varroa mite

Description

The adult female varroa mite (*Varroa destructor*) is reddish-brown and shaped like a scallop shell. It is about 1.1 mm long and 1.7 mm broad, and can be seen with the naked eye.



Photo 1. Varroa on pupa of worker bee. Photo courtesy Denis Anderson. CSIRO Entomology, Canberra.

The mites spend most of their life inside sealed brood cells where they multiply and feed on developing pupa. In lightly infested colonies this is the most likely place to find them.

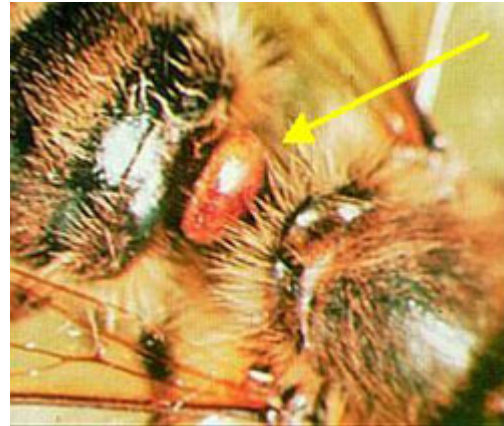


Photo 2. Varroa mite on adult bee. Photo copyright NSW Agriculture.



*Photo 3. An open honey bee (*Apis mellifera*) brood cell showing adult varroa and offspring.*

Female mites may also be found on adult bees. They often hide between the hardened abdominal segments closest to the thorax. The mites may be found on adult bees in overwintering colonies that have no honey bee brood.

Mite numbers increase slowly within a hive and it may not be until the fourth year of infestation that mite numbers are sufficiently high for bee larvae to be parasitised by several females. When this occurs, newly emerged adult bees with deformed wings, legs and abdomens may be found at the hive entrance. Patchy brood patterns may also be evident in advanced infestations.

The females of another species, *V. jacobsoni*, are slightly smaller than females of *V. destructor*. *V. jacobsoni* may be found, but does not reproduce, in *Apis mellifera*

colonies. A laboratory diagnosis is necessary to confirm the presence of these mites.

Field diagnosis

Beekeepers are encouraged to conduct field tests for varroa on at least one hive in each apiary, every 3-6 months. We suggest that the following tests be conducted. If you normally wear reading glasses, wear them while looking for these mites.

Examination of honey bee brood

Varroa have a preference for drone pupae at the edge of the brood nest. If there are drone pupae, use a pair of tweezers or a hive tool to remove individual pupae from their cells. Examine 50-100 of these for reddish-brown mites. When removing a pupa, carefully examine inside the brood cell, especially the base, for any mites. This is important, because varroa may remain in the cell when brood is removed. Worker pupae should be examined if there are no drone pupae present in the hive.



Photo 4. Varroa jacobsoni on emerging Eastern honey bee (Apis cerana javana) drones. Photo courtesy Denis Anderson, CSIRO Entomology, Canberra.

Icing sugar dusting of adult bees

When varroa are dusted with icing sugar, the fine granules stick to their pads (feet) and they are no longer able to grip the surface on which they cling. The dusting of adult bees with icing sugar causes mites to fall off the bee into the white sugar where they are more easily seen. A simple detection method using this fact is now used by many beekeepers throughout Australia. The method is described by the following points:

- obtain a 500 gram or 750 gram jar with a plastic or metal lid
- drill 50-70, 3-4 mm holes in the lid
- place a heaped tablespoon of icing sugar into the jar
- light a smoker and open a hive in the normal manner
- find the queen and temporarily place the comb that she is on in a spare hive box beside the hive. Place a lid on the box to keep the queen safe
- shake some bees from three combs of brood onto a double thickness of newspaper
- scoop or pour about 300 bees into the jar. Place the lid on the jar
- gently rotate the jar so all bees are dusted with sugar. Wait a few minutes, and rotate the jar a second time ensuring all bees are dusted again

- shake the icing sugar through the holes in the lid onto a sheet of stiff white paper. It is important to do this in a sheltered position protected from strong wind
- gently shake the bees from the jar onto the ground in front of the hive entrance
- carefully examine the sugar, white paper, jar and lid for mites and insects. If you find any, carefully tip them into a small jar and place this in a cool position away from sunlight. Refer to notes 'Steps if you find or suspect presence of an exotic parasite or pest in your apiary'
- return the comb with the queen to the hive and reassemble the opened hive to its normal position.

Tropilaelaps mite

Description

This mite (sometimes known as the Asian mite) is a parasite of brood only and causes death of brood or reduced longevity of adult bees that survive the parasitised brood stage. It will breed and survive in bee colonies as long as brood is present. The adult female mite is light reddish-brown, with an oval shaped body about 0.96 mm in length and 0.55 mm in width.

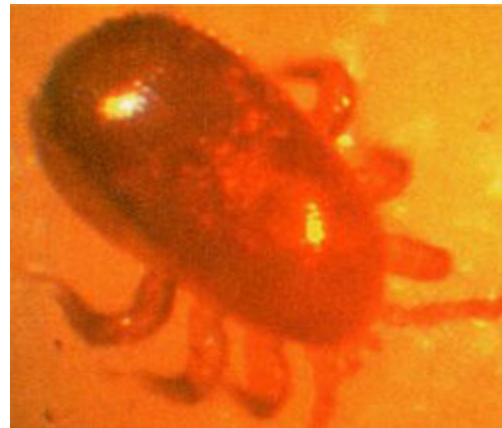


Photo 5. Tropilaelaps mite. Photo copyright NSW Agriculture.

Field diagnosis

Initial signs of infestation are an irregular pattern of sealed and unsealed brood; newly emerged adult bees with deformed wings, legs and abdomens at the hive entrance, and deformed pupal remains also at the hive entrance.

Examine 50-100 pupa for reddish mites. If you normally wear reading glasses, wear them while looking for these mites. Use a pair of tweezers or a hive tool to remove individual pupae from their cells and examine them carefully. A laboratory diagnosis is necessary to confirm the presence of this mite.

Braula fly

Description

This insect, a flattened wingless fly (*Braula caeca*), is often incorrectly called bee louse. It is found in Tasmania, but not on the Australian mainland.

Adult braula are reddish-brown and measure 1.2-1.5 mm long, and 0.75 mm wide. They are found on the head and

thorax, and between the thorax and abdomen of adult bees of all castes.



Photo 6. *Braula* fly. Photo copyright NSW Agriculture.

Field diagnosis

Braula may be found on both honey bee workers and queen. They feed on nectar and pollen (and possibly saliva) at the host bee's mouth. *Braula* larvae are not found on brood combs, but tunnel under the cappings of honey combs producing raised lines which damages the appearance of the comb.

Other mites

The pollen mite (*Mellitiphis alvearius*) is also found in beehives in Australia. The mite is brown, smaller than Varroa, measuring 0.75 x 0.75 mm. It is not a parasite of honey bees. A laboratory diagnosis is necessary to confirm the presence of this mite.

Steps if you find or suspect presence of an exotic parasite or pest in your apiary

It is important that when an exotic parasite or pest is found or even suspected to be present in an apiary that it is not spread to another apiary. The following steps will help to reduce the risk of spreading a parasite or pest that might occur through any beekeeper activity.

- collect a specimen of the parasite or pest and place it in a small jar of methylated spirits. Keep the jar in a cool, safe place away from sunlight. Don't mail or forward any samples until advised by a Department of Primary Industries (DPI) apiary officer. Never take live specimens from the apiary as this may help to spread the parasite or pest
- reassemble the opened hive to its normal position
- mark the hive with a water proof felt pen (or similar) so it can be easily identified later. Mark the lid and all the boxes of the hive with the same identification number
- thoroughly wash hands, gloves (and gauntlets), hive tool, smoker and any other equipment to ensure any parasite or pest is not carried from the apiary
- place overalls, veil and hat in plastic bag and leave at the apiary site until advised by a DPI apiary officer
- don't remove bees or any hive components from this apiary as this could help spread any parasite or pest
- before leaving the apiary, inspect your vehicle to make sure there are no bees trapped inside or on the radiator. Check the tray of the truck, ute or trailer as well. Boxes of combs and other hive material on your vehicle which bees might enter must be left at the apiary.

Notifiable disease

If you see or suspect varroa is present in your apiary, you must notify an Inspector of Livestock (DPI apiary officer, animal health officer or veterinary officer) without delay and by the quickest means possible. The easiest way to do this is to ring the Disease Watch Hotline 1800 675 888 (24 hours a day, every day of the year).

Notification is required by the Livestock Disease Control Act (1994). To not notify is to break the law.

Early recognition of these parasites is one of the most important factors influencing the chance of controlling them and reducing their economic and social impact on the whole community.

Apiary officers

The following Department of Primary Industries apiary officers are available to provide advice on sample collection and diagnosis of exotic honey bee parasites and pests:

- Bairnsdale
Ray Gribbin (Sept - April)
Telephone 5152 0600
Mobile 0428 399 105
- Bendigo
Bill Shay
Telephone 5430 4495
Mobile 0419 337 276
- Wangaratta
Joe Riordan
Telephone 5723 8668
Mobile 0417 348 457
- Knoxfield
Russell Goodman (Tuesdays and Wednesdays)
Telephone 9210 9324

The previous version of this Information Note was published in June 2007.

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