

VARROOSIS

Etiological agent:

Varroosis is caused by the ectoparasitic bee mite *Varroa destructor*, which original host is the Eastern honey bee *Apis cerana*.

After host-shift to *Apis mellifera*, the mite has spread almost worldwide. It is currently present everywhere in Europe with the exception of isolated areas such as islands. Varroosis is considered to be one of the major factors for honey bee colony losses. Without *Varroa* treatment, most colonies in Europe would collapse within 1-4 years.

Therefore, periodic treatments are necessary and *Varroa* mite levels of honey bee colonies should be monitored regularly.

Damage in colonies: *Varroa* mites primarily feed on the fat body tissue of honey bees. Honey bees are damaged during development within the brood cells, resulting in dead pupae or emerging adults showing low weight, small abdomen and/or deformed extremities. If colonies are highly infested, the brood pattern is scattered and *Varroa* mites are frequently seen on the adult bees.

Varroa and honey bee viruses: Prior to the first occurrence of *Varroa* mites in Europe, honey bee viruses have only been a minor problem to colonies. However, *Varroa* has been proven to vector several honey bee viruses and the direct injection of virus particles into the bees haemocoel have changed the prevalence, titre (viral load), and strain diversity of these honey bee viruses.

EU legislation has officially recognized certain territories of EU Member States free from varroosis (Åland islands in Finland and six islands in Portugal) for protection purposes. *Varroa* is classified in the C, D and E category in EU Animal Health law

Varroa infestation cannot be eradicated. However, Varroa populations can be kept at a low level through monitoring and subsequent application of appropriate control methods.

How to recognize *Varroa destructor*?

- The oval, reddish-brown body of the adult mite is flat, about 1.1 mm long and 1.5 mm wide (a).
- It is visible to the naked eye and has eight legs.
- Its flat body (b) enables the mite to fit in between the abdominal sternites of adult honey bees, where they are protected from the bees cleaning habits.



Varroa biology

Varroa mites are able to feed on honey bee brood and on adult honey bees. This allows the mites to overwinter on the bodies of adult bees (in between their abdominal sternites) within the winter bee cluster until spring. The mites lifespan may vary from some days to a few months, depending on temperature and humidity, and two to three reproductive cycles can be accomplished by a single female adult.

Means of spread. Dissemination between colonies occurs on adult honey bees (dispersal phase) by natural processes of honey bee drifting, robbing, and swarming. Beekeepers can also spread *Varroa* mites through the distribution of infested combs and bees during colony management. However, movement of infested colonies to new areas by beekeepers is considered as the principal and most rapid mean of spread.

It is essential to check honey bees before moving the colonies to ensure that the colonies are healthy.

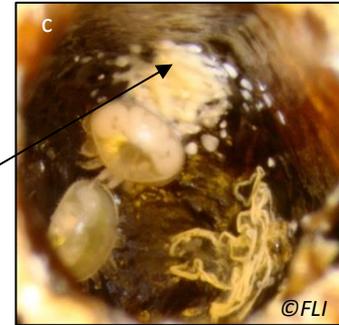
Biological cycle

The *Varroa*'s life cycle entirely takes place within the colony. The female enters a brood cell shortly before the cell is sealed. After the cell capping, the female mite lays eggs that hatch into typically one male and several females. The mites that reach the adult stage emerge from the cell together with their host after pupation. Males and any remaining immature females die, unable to survive outside the sealed cell. The mite preferentially infests drone cells because the honey bee male development takes longer than worker bees.

Detection and consequences of infestation for the colony

Clinical signs for varroosis and associated viruses are:

- Honey bees with shrunken and deformed wings and legs
- Honey bees with a deformed abdomen
- Honey bee brood cappings with small holes
- Spotty brood pattern (irregular brood)
- Dead brood
- Brood cells with white patches (mite faeces) on the cell wall (c)
- Honey bees crawling at the entrance of the hive, unable to fly
- Mites walking on honey bee brood or adult honey bees
- Winter mortality of colonies



How to check the presence of *Varroa* mites in your hive:

Regular examination of floor debris: 1. Maintain the colony on a screen floor (commonly known as a “*Varroa* floor”, with a 3 mm mesh to stop the bees from removing dead mites) and place a sticky board inserted below the screen floor for monitoring purpose. 2. Remove floor debris regularly (e.g. every week). 3. If there is a lot of debris (e.g. after winter), the mites will be very difficult to find. Examine the debris very carefully for dead mites –the washing technique can be used: put the debris into a fine sieve that will collect any mites and wash thoroughly with running water. Drop the sieve in a bowl of methylated spirits. The mites will float to the surface of the liquid.

Use of authorised acaricide as a diagnostic tool: 1. Use a mesh floor, and a sticky board to cover the existing hive floor (see first method for checking *Varroa* mites). 2. Apply the acaricide treatment, following the label instructions. 3. Look for dead or dying mites on the floor on a daily basis.

Examination of the bee brood (e.g. uncapping brood): 1. Select an area of sealed brood (drones or workers) at an advanced stage of development (pink-eyed), as it is least likely to disintegrate when removed. 2. Slide the prongs of a honey uncapping-fork under the cappings, parallel to the comb surface, and lift out the pupae in a single scooping motion. The younger mite stages are whitish and may be almost motionless while feeding on their hosts bodies, as their mouthparts and front legs are fixed to the cuticle of the bee host. Mature mites, which are darker, are easily seen against the pale bodies of the pupae.

What to do in case of suspicion? Recommendation for controlling *Varroa* infestation

According to *Varroa* infestation rates (local data), beekeepers can use:

- Authorised veterinary medicinal products (Regulation (EU) 2019/6)
- Biological treatments
- Apicultural techniques such as drone removal or caging of the queen

Given the efficiency decrease of certain treatments due to resistance, the combination of different treatments/techniques to limit the infestation by *Varroa destructor* is advisable.

Varroa mites should not be confused with *Tropilaelaps* mites.

Tropilaelaps mites are not yet present in Europe, they are restricted to Asia. They live and feed on honey bee colonies too and are visible to the naked eye like *Varroa* mites, although they are smaller(d). European legislation requires that any observation of *Tropilaelaps* mites be immediately notified to regulatory bodies.

