

Tropilaelaps

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Summary

Tropilaelaps is caused by mites of the genus *Tropilaelaps*. They are parasites that feed on bee larvae and pupae, *Tropilaelaps spp.* causes malformation, death of bees and subsequent swarming or colony decline.

This information sheet describes shortly the biology, the life cycle of *Tropilaelaps*, how it spreads and how to control it.

Description

1. Biology

Tropilaelaps mites are reddish-brown in colour, about 1 mm long and 0.6 mm wide (Figure 1). They move freely and quickly among the honeycombs and feed on brood. The buccal apparatus is not able to penetrate the cuticle of adult bees, consequently they are not able to survive in colonies without brood (e.g. swarms, natural brood interruption during winter or artificial brood interruption by caging the queen bee).

Figure 1: *Tropilaelaps spp.* adults (seen from above on the left, seen from below on the right)



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The *Tropilaelaps* mite could be confused by the beekeeper with the varroa mite because they look somewhat similar. The body of the female Varroa mite is wider than it is long (measuring 1.1 to 1.2 mm in length and 1.5 to 1.6 mm in width) and it moves quite slowly, whereas the body of *Tropilaelaps* is elongated and females measure about 1 mm in length and 0.6 mm in width (males are a little smaller) and moves much faster. (Figure 2 and Figure 3).

Figure 2. Adults of *Varroa destructor* (left) and *Tropilaelaps spp.* mite (right)



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2. Life cycle

Tropilaelaps mite has some similarities with the Varroa mite. It feeds and reproduces in the bee brood, but unlike Varroa, it cannot feed on adults because its buccal apparatus cannot penetrate the cuticula of honey bees and suck their haemolymph. The *Tropilaelaps* mite has a shorter reproductive cycle and a

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higher reproductive rate but it is not able to survive brood interruption periods of the honey bee (natural absence of brood during the winter or artificially induced by queen caging) due to its inability to feed on adult honey bee.

The adult mites enter the cells containing the bee larvae (both of worker bees and drones) to breed. Eggs hatch after about twelve hours and the larvae feed on the bee hemolymph. The mites cause damage on the larvae which results in high mortality rate of bee brood (up to 50 percent).

The *Tropilaelaps* mite can spread from hive to hive through honey bee drift, looting and swarming. The spread of these parasites however may occur also through common beekeeping practices, such as: moving affected brood combs from one hive to another, migratory beekeeping and buying and selling of parasitized colonies/nucs.

Figure 3: *Varroa destructor* (left) and *Tropilaelaps* spp. (right) seen from below



2. Symptoms

In colonies affected by a large number of mites, *Tropilaelaps* is able to cause damage very similar to varroa with high mortality of brood, weak adults with deformed wings and legs and abdomens smaller than normal. Bees can also be found paralysed at the entrance of the hive. Other symptoms are:

irregular brood pattern, hollow cappings for the attempt of worker bees to clean up sick or dead larvae. In cases of severe infestation, up to 50 percent of the brood may die; in these cases, a bad smell of dead brood associated with the *Tropilaelaps* infestation can be observed. At these levels of infestation bees frequently swarm, contributing to the spread of the mite.

3. Diagnosis and biological control

The diagnosis of this parasitic disease is visual and is carried out through the observation of infected bee brood or by the observation of *Tropilaelaps* fallen on the bottom of the hive after an acaricide treatments.

3.1 Adult honey bee examination

Take a sample of about 300 adult bees (more or less equal to one glass full of bees) from suspected infested colonies and put them into a jar (1 kg jar) with three tea spoons of powder sugar (about 30 g), putting a screen on the top of the jar. Then shake the jar onto a white piece of paper to allow the mites to fall through the screened top. You will be able to count the number of mites fallen onto the paper. This method is very similar to the powder sugar method for diagnosing and quantifying varroa infestation (see: TECA 8663).

Otherwise, the same number of adult bees could be put into a container (e.g. 1 kg jar) with 70 percent ethyl alcohol or with soapy water. After closing the container, shake them, pour the bees into a sieve onto a white paper and the fallen mites can be identified and counted on a white paper.

3.2 Brood examination

When monitoring honey bee colonies for the presence of *Tropilaelaps*, an examination of both drone and worker



brood may provide an early indication of infestation. Mites can be observed inside capped bee brood by using a honey scratcher to pull up capped pupae. The mites are clearly visible.

3.3 Sticky board examination

A precise diagnosis can be made using a sticky board on the bottom of the hive, covered with a mesh with size of 2 mm that prevents the bees from removing the dislodged mites. The mesh of 2 mm is large enough for mites to pass through. Make a sticky board with poster board, cardboard or other white, stiff paper coated with Vaseline or other sticky substance, or use a sheet of sticky shelf paper. Cut the paper to fit the bottom board of a hive. Leave the bottom board in the colony, under the hive for up to three days, collecting and examining the debris for mites.

For faster mite diagnosis, smoke each colony adding 25 g (1 oz) pipe tobacco in the smoker. Puff the bees six to ten times, close up the hive for 10 to 20 minutes. Pull out the sticky board after at least ten minutes and count the mites.

A mite control can be carried out by the queen caging method or through artificial swarming: these techniques allow to reduce the number of *Tropilaelaps* due to its inability to feed on adult bees or to survive for more than two days without the brood.

Even though *Tropilaelaps spp.* has not spread all around the world as other bee pathogens (such as varroa), it represents a potential pathogen for the Western honeybee *Apis mellifera spp.*

4. Further reading

- IZSLT. 2007. Aspetti igienico-sanitari in apicoltura, (27-28).

5. Related/associated technologies

- Good beekeeping practices: 8409.
- Main diseases of honey bees: 8412.
- Nosemosis: 8413.
- Varroa mites (varroaosis or varroosis): 8416.
- AFB (american foulbrood): 8417.
- EFB (european foulbrood): 8418.

6. Objectives fulfilled by the project

- Resource use efficiency
- Pro-poor technology