



# National Bee Unit

# Tracheal mites

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Tracheal mites, *Acarapis woodi*, are parasitic mites which invade and infest the respiratory system of adult bees. They have fallen into comparative obscurity since the arrival of *Varroa destructor* and generally beekeepers do not look for an infestation, which can only be diagnosed by looking down a microscope at the breathing tubes of a dissected bee. There are no registered medicines available in the UK for its control. However, aspects of beekeeping husbandry can help to minimise its effects on a colony.

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## Know your mite

The respiratory system of the adult bee consists of a complex arrangement of breathing tubes (trachea) and air sacs. These carry air to all organs of the body, from ten pairs of openings (spiracles) situated along each side of the thorax and abdomen. Acarapisosis is an infestation of the tracheae by tracheal mites. A young mated female mite enters the trachea of an adult bee aged 0 to 5 days where she pierces the tracheal wall and feeds on the bees' haemolymph. She lays eggs in the trachea, which hatch out and develop into adult mites which then mate. When mature, the female offspring leave the trachea to infest a new young host. Mites cannot survive on dead bees and will only survive for a few hours outside their host.

## Symptoms of Acarapisosis

Infestations shorten the life of adult bees and symptoms vary, depending on the number of mites infecting a bee. Symptoms are noticed in early spring, when the colony slowly begins to dwindle. Adult bees infested with tracheal mites will cluster on the ground in front of the hive, appearing disorientated and unable to return to the colony. Large numbers of bees may also be seen crawling up stems of grass in front of the hive, however, these symptoms are also associated with other paralysis viruses.

**Down the microscope:** Healthy tracheal walls are normally whitish and translucent but become opaque and discoloured with blotchy black areas due to melanin crusts.

## Control

### 1. Look for plenty of brood

Research has shown that those colonies which have low infestations produce considerably more brood. Selection from these colonies is a key element in control.

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## 2. Preventing the problem

- A. Colonies should be headed by young and prolific queens because their egg laying ability is greater than older queens. Therefore an increased number of bees come through early in the season. Tracheal mites can only infest so many bees so the proportion of infested bees becomes smaller.
- B. Colonies should also be selected for good grooming traits as tracheal mites can be dislodged during the transference stage.
- C. Set out the apiary in a way to reduce drifting and robbing. Manage bees to reduce absconding or swarming. Nearby feral colonies infested with mites or other disease will only exacerbate problems.

## 3. Using biotechnical controls, or good husbandry methods to control mites

Biotechnical methods such as artificial swarm control are used by most beekeepers to create increase, for swarm control measures or for controlling *Varroa*. The one week brood break whilst developing a new queen is also beneficial as a control against tracheal mites as new mites emerging from their host can only parasitise bees of 0 to 5 days of age. With an artificial swarm, young, emerging bees will be missing for a period of time so tracheal mites will have no new host to infest. As the mites can only survive for a few hours outside their host, they will die and mite populations will be reduced. When developing an IPM plan, try to incorporate factors which will help control both mites and other diseases. Destruction of heavily infested colonies has benefits as it removes mites that could infest other colonies and over time will select stocks of acarine tolerant colonies.

## 4. Medicinal controls

Currently, there are no authorised treatments for tracheal mites in the UK. The use of 'old fashioned' remedies such as burning sulphur, 'WD40, oil of wintergreen, etc. are not acceptable as modern practices due to health risks and tainting honey. Some varroacides are considered beneficial but it may depend on the method of application. Generally the varroacides 'Apistan®' and 'Bayvarol®' are ineffective for the control of tracheal mites. Amitraz has been shown to be effective for mite control when used as a gas but not in its more usual plastic strip formulation marketed as 'Apivar®'. Formic acid has been shown to be a very effective control. Similarly the use of menthol has been found effective in the USA. 'Apiguard®' an approved varroacide in the UK is reported to have beneficial effects. For academic information or debate on these methods, check textbooks, such as 'Mites of the Honeybee' published by Dadant, or the Internet. *Current interpretation of the Veterinary*

*Medicines Regulation indicates that application of these medicines, or chemicals, for tracheal mite control would be illegal without a veterinary prescription.*

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