

# Tropilaelaps: An Exotic Threat to UK Honey Bees

Gay Marris\*, Mike Brown\*, Selwyn Wilkins\*, Andrew GS Cuthbertson\*\*, Dominic Eyre\*\*\*

(\*National Bee Unit, Fera, \*\*Entomologist, Crop & Food Security, Fera, \*\*\*Plant Health Entomologist, Fera)

*Forewarned is forearmed: we take a close look at a potential threat to our honey bees*

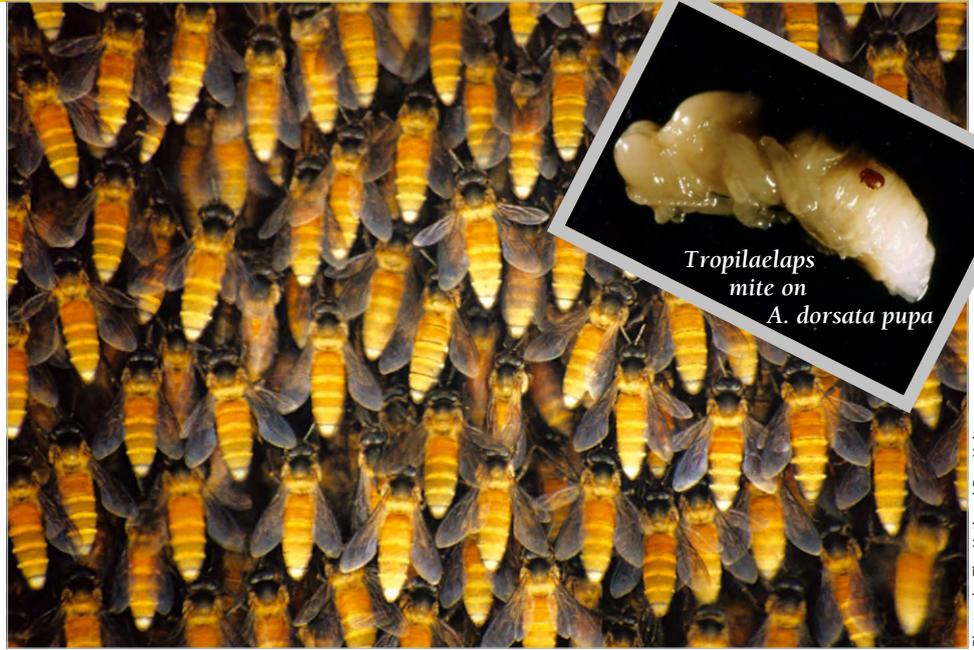
**TROPILAEALAPS MITES** are parasites of honey bee brood. Four species have been documented (*T. clareae*, *T. koenigerum*, *T. thaii* and *T. mercedesae*), all of which use the giant Asian honey bee, *Apis dorsata*, as their natural host. However, it is now known that two of these, *T. clareae* and *T. mercedesae*, also utilise the Western honey bee, *Apis mellifera*.

## The effects of infestation

Parasitisation causes abnormal brood development and death of both brood and bees, leading to colonies declining, absconding or even collapsing altogether. In severe infestations up to 50% of brood dies and there is a noticeable smell of decaying remains in affected hives.

Adult bees damaged during development have reduced life-spans, lower body weights, and wing and leg deformities.

Adult *Tropilaelaps* mite  
(scale: body length 1 mm)



*Apis dorsata*, the natural host of *Tropilaelaps* species

Western honey bees appear to be comparatively more susceptible to the effects of parasitism by *Tropilaelaps* than *A. dorsata* because they lack the behavioural defences of Asian honey bees which are able to remove heavily infested workers from their colony. Also, unlike *A. mellifera*, *A. dorsata* can bite and injure *Tropilaelaps* mites.

*Apis dorsata* colony in Thailand



## Geographical range

The natural geographical range of *Tropilaelaps* is currently largely confined to tropical/sub-tropical zones, where these mites are responsible for very significant economic losses. However, their geographic range has spread dramatically within the past 40 years, with a marked northward and westward expansion.

Species relevant to the UK, because they have been known to parasitise *A. mellifera*, are currently present in Indonesia, the Philippines, Myanmar, China, India, Laos, Malaysia, Papua New Guinea, Sri Lanka, South Korea, Thailand and Vietnam.

At the time of writing, *Tropilaelaps* mites have not been found in the UK or the rest of Europe, but if they were introduced through imports of bees and became established, they have the potential to cause major economic damage and losses to beekeeping and, as a consequence, to agriculture and the environment through disruption to pollination services.

Photos by The National Bee Unit and Claire Waring



*Deformed  
A. dorsata pupa from  
a colony infested with Tropilaelaps mites*

## Could *Tropilaelaps* reach the UK?

Yes. There is a significant risk that *Tropilaelaps* mites could be introduced into the UK. The primary pathway through which the mites could be carried is by movement of honey bees, ie, queens and package bees (workers), for the purposes of international trade. EU legislation now prohibits (with the exception of New Zealand) imports of package bees or colonies from Third Countries.

Import regulations are our main defence against the introduction of *Tropilaelaps* (and other very serious bee pests and diseases) from overseas to the UK and it is absolutely essential that all beekeepers abide by them. If you are going to import queens or bees, make sure that you do so only from countries permitted under current legislation and from reputable producers. Do not be tempted to import bees illegally – the risks are just not worth it.

If you have any queries or need advice or further information, contact the National Bee Unit (NBU), your local Bee Inspector or take a look at the NBU's BeeBase website [www.nationalbeeunit.com](http://www.nationalbeeunit.com)

## Limiting factors

*Tropilaelaps* mites cannot feed on adult bees because their mouthparts are unable to pierce the body wall membrane. As a result, they are completely dependent on the softer developmental stages of their host species for food.

All species of *Tropilaelaps* have an absolute requirement for year-round presence of brood within infected bee colonies in order to survive and spread.

## Could *Tropilaelaps* survive in the UK?

Yes, although the brood requirements of *Tropilaelaps* are the limiting factors in its establishment in the UK. In areas of the UK that are warmer, for example in the south and east, where there is brood in colonies all year round, the mite will survive, even in very small areas of brood. As long as bees rear some brood, the mites can survive and, as the amount of brood reduces, many adults enter single brood cells but do not breed.

*Tropilaelaps* is unlikely to survive where there is a complete interruption to brood rearing during the winter.

## *Tropilaelaps* is a notifiable pest in the UK

*Tropilaelaps* are notifiable pests under EC legislation, so beekeepers are obliged to report any suspected presence to the NBU (England and Wales) or the relevant agriculture department (Scotland and Northern Ireland). Keeping an eye out for exotic pests, including *Tropilaelaps*, must be a routine part of colony management in the UK.

In addition to apiary inspections for statutory bee diseases, the NBU provides advice and assistance to beekeepers on a range of bee health topics and good husbandry and it runs training courses for beekeepers on disease recognition and control, usually in conjunction with local beekeeping associations. These include how to look for and recognise *Tropilaelaps*.

## The biology of *Tropilaelaps*

All beekeepers should be aware of the mites' biology, and how to recognise them.

Adult *Tropilaelaps* mites are light reddish-brown and, depending on the species, between 0.7 and 1.0 mm long and approximately 0.6 mm wide.

They enter cells containing mature bee larvae, where reproduction takes place within sealed brood, particularly that of drones, 48 hours after cell-capping. Each female lays three or four eggs, which hatch within 12 hours. Over the next five days, mite larvae go through

nymphal stages before becoming adults.

*Tropilaelaps*' mouthparts cannot pierce the relatively tough body walls of adult bees, so they depend on softer brood for food. All stages of mites feed on the haemolymph (blood) of developing bees, depriving hosts of the nourishment required for growth.

When the adult bee emerges, the next generation of adult mites (and their mother) exit the cell to search for fresh hosts. Pregnant females will die within two days, so must deposit their eggs quickly in a new cell. Within the hive, *Tropilaelaps* move readily from bee to bee.

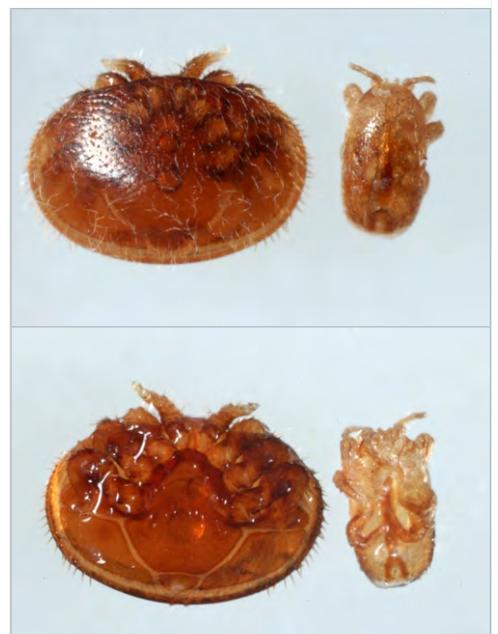
This life cycle is similar to that of *Varroa destructor*, but *Tropilaelaps* develop faster and intervals between successive reproductive cycles are very short. Consequently, when both types of mite are present in the same colony, *Tropilaelaps* populations build up far more rapidly.

Distinguishing between *Varroa* and *Tropilaelaps* is straightforward: *Varroa* is larger, crab-shaped, wider than it is long and relatively slow-moving; the *Tropilaelaps* mite's body is elongate and adults run rapidly across infested brood combs; they also 'hide' in brood cells rather than on adult bees.

## Means of spread

*Tropilaelaps* mites are mobile and can

*Dorsal (top) and ventral (bottom) views of Varroa destructor (left) and Tropilaelaps clareae (right)*





*Migratory beekeeping, for example in heather moors, has the potential to spread pests and diseases rapidly over long distances. It is essential to check that your bees are healthy before moving them*

readily move between bees and within the hive. However, to move between colonies they depend upon adult bees for transport through the natural processes of drifting, robbing and swarming. Mites can spread slowly over long distances in this way. They are also spread within apiaries through distribution of infested combs and bees through beekeeping management.

However, movement of infested colonies of *A. mellifera* to new areas by the beekeeper is the principal and most rapid means of spread. It is essential to check that your bees are healthy before moving them.

### How to check your colonies for *Tropilaelaps* mites

Beekeepers are strongly encouraged to monitor their hives for *Tropilaelaps* as part of routine colony management. Detection techniques used for *Varroa* can equally be applied to look for *Tropilaelaps*. Regular collection and examination of floor debris, hive inserts, bees and brood, and the use of a proprietary acaricide as a diagnostic tool are all helpful approaches.

These methods are familiar to UK beekeepers, but further details are provided in the NBU leaflet

*Tropilaelaps*: parasitic mites of honey bees, which is freely available through the BeeBase website ([www.nationalbeeunit.com](http://www.nationalbeeunit.com)) or by post from the NBU.

### Sending suspect samples to the National Bee Unit

Suspect *Tropilaelaps* adults or larvae should be sent immediately to the NBU for examination. Use a sealed container, such as a plastic tube or stiff cardboard box. Please provide as many details as possible – your name and address, the apiary name and location (including, where possible, the Ordnance Survey map reference).

Do not send live mites in the post. Kill them first by keeping them in a freezer overnight or by putting them in 70% ethanol. A simple-to-use sampling form is available to download directly from the honey bee pests and diseases pages of the NBU's website: [www.nationalbeeunit.com](http://www.nationalbeeunit.com)

### Control methods for *Tropilaelaps*

A combination of both veterinary medicines (acaricides or varroacides) and biotechnical methods can be used to control *Tropilaelaps*.

*Uncapping drone brood to check for the presence of mites. They will be clearly seen against the white background of the pupae*

Acaricides are medicines that kill mites. These are applied either in the feed, directly on adult bees, as fumigants, contact strips or by evaporation. Many of the same acaricides used for *Varroa* are also likely to be effective against *Tropilaelaps*.

Although currently there are no products specifically approved for the control of *Tropilaelaps* in the UK, in the event of the mite being discovered, contingency plans would be implemented and emergency approvals sought from the Defra Veterinary Medicines Directorate (VMD) to use varroacides against *Tropilaelaps*.

Biotechnical Methods use bee husbandry to reduce the mite population through physical means alone. Many of the effective methods involve trapping the mites in combs of brood, which are then removed and destroyed.

*Tropilaelaps* is considered relatively straightforward to control using husbandry methods that simulate broodless periods. The inability of *Tropilaelaps* to feed on adult bees, or to survive outside sealed brood for more than a few days, is a weakness in the mites' life cycle, which can be exploited to control it.

In areas where the mite is present, methods such as queen caging, the use of artificial swarms and comb-trapping methods, to create breaks in the brood, should be effective to reduce numbers of mites.

*[To be continued. Part 2 will cover National surveillance for Tropilaelaps, Sentinel apiaries, Contingency planning, the beekeeper's responsibilities and Tropilaelaps and the UK climate.]*

