

Biological Varroose control through interference with reproductive behaviour of Varroa bee mites

Field of application

In the European Union alone, over 14 million bee colonies are threatened by the Varroa mite. Once western honey bee colonies are infested, they are ruined within 2-3 years, unless they are treated. Despite the high demand for Varroose treatments that neither harm the bees nor leave residues in apicultural products, so far no biological approach for mite control is available.

State of the art

Conventional controlling agents are either not effective enough, cause resistances in the parasites or leave residues in the apicultural products. Most agents can only be deployed after the honey harvest, which is often too late for successful mite control. Nearly all control methods recommended so far cause side effects, such as harming the bee brood or the adult bees.

Innovation

Scientists at the University of Hohenheim, Germany, have now been able to prove that sex pheromones play a pivotal role for mate finding of the mites in bee brood cells. They have developed a method that allows the isolation and extraction of the biologically active pheromones of the female mite.

This method lays the foundation for biological mite control, as the pheromone may be used to interfere with the mating behavior of male mites.

Varroa mites parasitize adult bees and bee brood. For reproduction, the female mite must invade the bee brood cell before it is capped. She then lays several eggs developing into 1 male and 1-3 females. In the brood cell, the male mites mate with the adult daughter mites. Only the mated daughter mites - together with the original female mite and the hatching young bee - leave the brood cell.

The Hohenheim scientists could demonstrate that after introducing the sex pheromone into the brood cell, the mating behavior of the male is disturbed with the effect that the daughter mites are either not mated at all or that considerably less sperms are transferred. Non-copulated daughter mites are weaker and not capable of laying any female (i.e. fertilized) eggs in the following reproduction cycle. Thus the growth of the Varroa population within the honey bee colony can be sustainably reduced.

As the sex pheromone is harmless to bees and does not leave any residue in apicultural products, this method represents the first biological and bee-friendly Varroose control.

Your benefits at a glance

- ✓ Control of mite infestation through disturbance of mite reproduction
- ✓ First biological approach for the control of Varroa destructor mite
- ✓ Long-term application possible during the honey bee breeding season
- ✓ No residue expected in apicultural products
- ✓ Low risk of the mites developing resistance



Figure 1: Artificial infestation of a honey bee brood cell with Varroa females in a field test

Technology transfer

The Technologie-Lizenz-Büro GmbH is in charge of the exploitation of this technology and assists companies in obtaining a licence.

Patent portfolio

Patent applications lodged in Europe and the US.

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