

VARROA DESTUCTOR

THE VARROA MITE

The varroa mite is an organism which is optimally adapted to the honeybee

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HISTORY

The varroa mite (*Varroa jacobsoni*) comes originally from Asia. It has lived here for thousands of years as a parasite on the Asian honey bee (*Apis cerana*). Here there is a harmony between host and parasite, which results in no harm to the bee colony. These colonies live with the varroa mite.

DEFENCE MECHANISMS

The varroa mite bites into the adult bees and pupae, and proceeds to suck their blood. The varroa mite can only propagate itself on the sealed brood. The Asian bee has developed some defence mechanisms towards the varroa mite. The varroa mite only propagates itself on the drone brood, which is only produced in a limited amount and period. It has been observed that the Asian bee is capable of removing the varroa mite from itself or from brood. These and other mechanisms are not present in the European honey bee species. Here bee colonies will collapse in the space of a few years. The numbers of mite present goes out of control.

FOUND IN EUROPE

The varroa mite was first found in Europe in Bulgaria in 1971. Varroa is now found in all European countries, with the exception of Ireland (as published 1998). Varroa was first discovered in Denmark in 1984, and has today spread to all Danish bee colonies, with the single exception of Læsø. As a result of the spread of varroa great losses in bee colonies have been recorded in all areas irrespective of methods of control.

APPEARANCE

Varroa belongs to the arachnids. They have four pair of legs, as against insects three pair. They have no normal eyes. These are not necessary as they live in the darkness of a beehive. On the other hand they have so-called point eyes, which can distinguish between light and dark. They have many fine touch and smell senses on their front legs. The mite has an oval form and can at first glance resemble linseed. They are light brown at an early stage, and dark brown when mature. A mature female measures 1.5 - 1.7 mm. The males are smaller in size and lighter in colour, and are only to be found in sealed cells. They die when the bee crawls out of the sealed cell.

LIFE

The varroa mite can only propagate on brood, sealed in their cells. A female varroa mite stays on the house bees for 5 - 6 days. Thereafter she moves into the worker cells, which are about to be sealed. She moves into these cells from about 15 hours before they are to be sealed, and into the drone cells about 50 hours before sealing. Here she enters and lays up to seven eggs within the space of 36 hours. The first egg develop into a male mite, while the remainder develop into females. Mating goes on in the sealed cell and is a race against the period of sealing: only mated females survive. Males and unmated females die when the bees crawl out of the sealed cells. Therefore only an average of 1.6 mated females emerge from a worker cell (the period of sealing being ca. 12 days) while about 3 mated females come from a drone cell (the period of sealing here being 14 days). A varroa female lives normally for only one generation (on average 1.6) but in laboratory conditions they have lived for up to 7 generations.

THE SPEED OF DEVELOPMENT

Attempts to set up rules for calculating the rate of development of the varroa mite have been tried. We know today that these rules vary a great deal in practice.

Mite development

- Numbers double per month in the egg laying period
- A hundred fold increase per season
- A ten fold increase from year to year
- 50 - 90% die in winter This means that if a bee colony started with a single mite in year 1, the colony would collapse within the next three years, with a mite population of between 5000 and 10,000 mites.

REINVASION

The greatest problem in combating the varroa mite is that our bees fly freely about with a large action radius. This means that healthy bee colonies can rob and destroy families that have been hard hit by mite attack in a very short time. What happens here is that the mites simply jump onto the invading robber - and healthy bees - or that the bees being robbed fly back with their mites to the new bee hives. Badly damaged bees also lose their ability to orientate. This situation can result in the reinvasion of a colony in the summer period, with up to several thousand mites. Reinvasion is a problem especially in areas where treatment has not been extensive enough. This is the main reason why varroa treatment must be supplemented by a late treatment as this reinvasion can continue all the way into the month of October.

COLLAPSE

Earlier it was reckoned that a damage threshold of 12,000 - 20,000 mites were needed before the collapse of a colony. However, over the latter years it has been shown that the damage threshold lies significantly lower, closer to 5,000 mites. This is due to the presence of opportunistic diseases which follow in the wake of varroa damage, in the form of virus (See below).

TOLERANT BEE STRAINS

The Asian Bee is varroa tolerant. It has developed several defence mechanisms towards the varroa mite. Much research has been carried out in an attempt to develop a resistant European Bee. As yet unsuccessfully. One can observe that in the various breeding programmes carried out over the world, some bee strains tackle varroa better than others. However, a tolerance equal to the Asian Bee is yet wishful thinking, and lies far into the future.