

## IPM & Acarine

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*Acarine Acarapis woodi* is a parasitic disease that has fallen into comparative obscurity since the arrival of *Varroa destructor*. Many beekeepers do not look for infestation, yet when occurring in conjunction with varroa, or virus disease, is invariably fatal. There are no registered medicines available in the U. K. at this time. However aspects of Integrated Pest Management (IPM) can help in control.

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### **Know your mite.**

Develop an understanding of the biology of acarine. This is covered in textbooks, which should be consulted. Simply it is a tracheal mite of honeybees. A young mated female mite enters the trachea of an adult bee aged 0 to 5 days. The younger the bee the easier entry appears to be. It is considered that there is a preference to select drones as hosts due to larger diameter trachea. The mite pierces the tracheal wall and feeds on the bees' haemolymph. She lays eggs in the trachea, which will hatch out and develop into adult mites and mate. As with varroa or other mite species it is normal for brothers to mate with sisters. When mature the female offspring leave the trachea and jump ship, as it were, to a new young host. Mites cannot survive on a dead host so as a rule shorter-lived summer bees support one generation of mites, whilst longer-lived winter bees will support at least two generations. The damage caused to adult bees shortens their lives, which though insignificant in the summer could have major implications during the winter, leading to the colony dwindling out. A sign often associated with acarine is bees crawling up stems outside the hive entrance but this is more likely to be paralysis virus disease, often associated with heavy infestation.

### **Below are chronologically listed aspects of IPM.**

#### **1. Look for plenty of brood.**

Researchers have shown that less infested colonies produce considerably more brood. Selection from these colonies is a key element in control.

#### **2. Preventing the problem.**

a) Queens should be selected to be young and prolific. This causes more bees to be born in a short time in the early season. The mites in the colony can only infest so many bees so the proportion of infested bees becomes smaller. Bees should also be selected for good grooming traits as acarine mites can be dislodged during the transference stage.

b) Set out the apiary in a way to reduce drifting and robbing to an absolute minimum.

c) Manage bees to reduce absconding or swarms. Nearby feral colonies infested with mites or other disease will only exacerbate problems.

#### **3. Identify acarine.**

Years ago most beekeepers checked their bees for evidence annually. We should return to this philosophy by either submitting samples to association microscopist or receive training so that we can check for ourselves.

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#### 4. **Set a treatment threshold.**

This can be difficult. Reports indicate that it can vary depending on local conditions, season and style of bee keeping. It is considered in the U. K. that if 30% of bees in a colony are infested then the colony will die in the following spring. However generally in Europe a realistic threshold could be set at about 10%. Some experimentation would be needed. If migratory bee keeping practices are carried out thresholds should be set lower. This is for two reasons

- a) To reduce the risk of infesting nearby beekeepers.
- b) Because of the risk of infestation from unknown neighbouring colonies.

#### 5. **Euthanasia**

Destruction of heavily infested colonies has benefits in that it removes mites that could infest other colonies and over time will select stocks of acarine tolerant bees.

#### 6. **Bio-technical controls, or good husbandry methods.**

These are manipulations that many beekeepers carry out regularly and with a little thought can be adapted to assist in control. They rely on using colony splits. These are used by most beekeepers to create increase, or for swarm control measures.

When making up nuclei go to strong colonies and select two or three frames of brood, with young bees adhering to it, a queen cell, a frame of stores and a feeder. Move the nuclei to another site to prevent older bees entering from other colonies. Remember that by selecting from stronger colonies the tendency is to select less infested and more prolific stocks. The one-week brood break whilst developing a new queen is also beneficial as new mites emerging from their host only parasitise bees of 0 to 5 days of age. These will be missing for seven days so mites will have no where to go!

This principal can be incorporated when making artificial swarms to reduce mite levels.

#### 7. **Biological controls.**

None are available so research and funding would be needed for development.

#### 8. **Medicinal controls.**

At the current time no medicinal controls are registered for use in the U. K. The use of 'old fashioned' remedies i.e. burning sulphur, 'Frows' mixture, oil of wintergreen, etc. are not acceptable for modern standards of health risk and honey residues. Some varroacides are considered beneficial but it may depend on the method of application. Generally the varroacides 'Apistan®' and 'Bayvarol®' are ineffective for acarine control. However Amitraz has been shown to be effective for acarine control when used as a gas but not in its more usual plastic strip formulation that is currently marketed in Europe as 'Apivar®'. Formic acid has been shown to be a very effective control. Similarly the use of menthol has been found effective in the U. S. A. '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 acarine control would be illegal without a veterinary prescription.*

#### 9. **Your IPM plan.**

Many of these methods are helpful in the control of varroa by IPM. When developing plans try to incorporate factors, which will help control both these and other diseases.

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