



National Bee Unit

Control of Small hive beetle

January 2022

If Small hive beetle (SHB) *Aethina tumida* arrives in the United Kingdom and eradication is not possible, beekeepers will have to put in place measures to control infestations. There is no simple way to control this bee pest and an Integrated Pest Management (IPM) system will have to be used. To control infestations, it is necessary to disrupt or prevent the completion of the life cycle of beetles. This sheet gives an outline of measures that may be used.

What is the single most important measure?

Following experience in USA it is clear that cleanliness in the extraction area is most important. As with many pests strong healthy colonies can exert considerable control over this pest. Weak colonies, supers or crates empty of honey bees are a prime target for rapid infestation. Ensure that the extraction area is kept clear of hive debris, supers should be extracted quickly and stored in a suitable manner to prevent infestation. Removal and destruction of any comb infested with this pest is similarly a primary control measure.



Fig. 1: the life stages of the Small hive beetle (excluding eggs)

In Fig. 1 above, at the bottom is the larva, distinguished from wax moth by the protruding spines on its back and the three pairs of legs near the front. From left to right are the different developmental stages of the pupa, with the top image showing ventral view of a fully developed adult.

What chemical control methods are available?

In the USA the varroacide 'CheckMite+' is used to control Small hive beetle (SHB). Should this pest be confirmed in the UK, it is most probable that this product will be used for control, initially by means of a Special Treatment Authorisation. At the time of writing this product is not approved for any use in the UK (updated March 2014) but can be applied for under the cascade system for prescribing unapproved veterinary medicines. A single strip is cut in half and stapled to a square of corrugated material. This square is placed strip-side down onto the floor of the hive so that when beetles burrow under the ridges they contact the strip. Beekeepers in North America report that this treatment is insufficient to control beetles if used alone. The treatment period is six weeks. It must not be carried out with supers on the hive, and these cannot be placed on the hive for at least two weeks after removal. Strips of corrugated plastic that bees don't chew are available.



Fig. 2: CheckMite+ used in a simple trap

What management techniques are there?

Many techniques have been proposed and are being developed. The most basic husbandry techniques such as the maintenance of strong colonies and good apiary hygiene are simple but essential when combating SHB. Boosting natural hygienic behaviour in honey bee colonies will also help and narrowing hive entrances to suppress beetle access is important.

The Hood Small hive beetle trap

This trap is used in colonies where Small hive beetles are actively moving around, which is generally at temperatures in excess of 18C. The container is half filled with food grade mineral oil or cider vinegar and placed where the beetles are most active. This can be in

the brood nest adjacent to brood combs or in honey supers. Traps can be fitted to either brood or super frames. Bees often block the funnel slot at the top with propolis so it will need to be cleared regularly using a hive tool. If used in the brood box, the space around the trap can be used for drone brood removal as a control measure for Varroa.

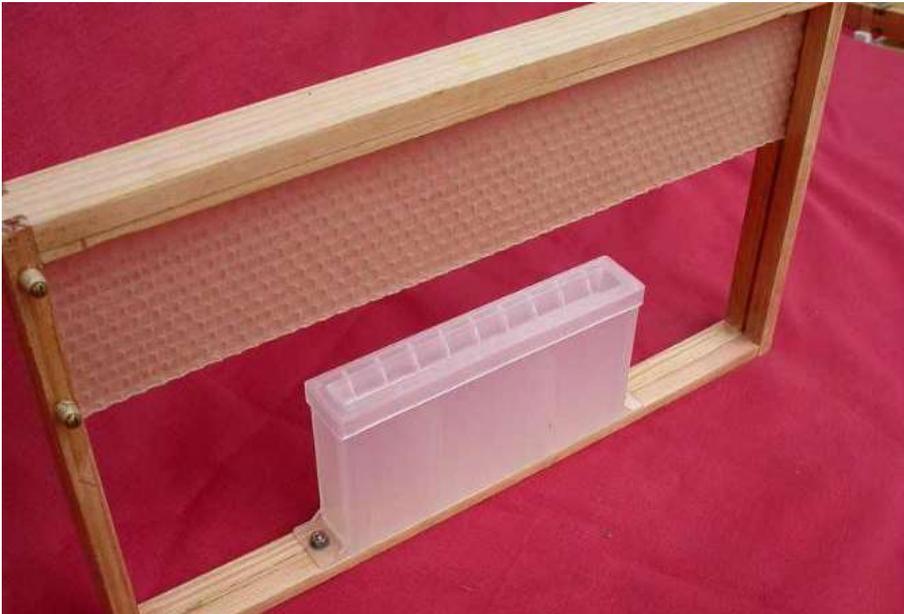


Fig. 3: the Hood SHB trap in a brood frame.

The West beetle trap

This plastic floor tray is marketed and used in the USA. It is made for the Langstroth hive but could be adapted for use with other hives. The under tray is filled with vegetable oil and covered with a plastic mesh grid so that when beetles go down to the floor they drop through the slots and drown in the oil. Any Small hive beetle larvae leaving the hive to pupate would similarly drop through the slots. The floor is only used during active beetle periods and is easily cleaned if it has not dried out. The floor needs to be maintained in a level position and unless the hive is truly watertight, may flood out when it rains.

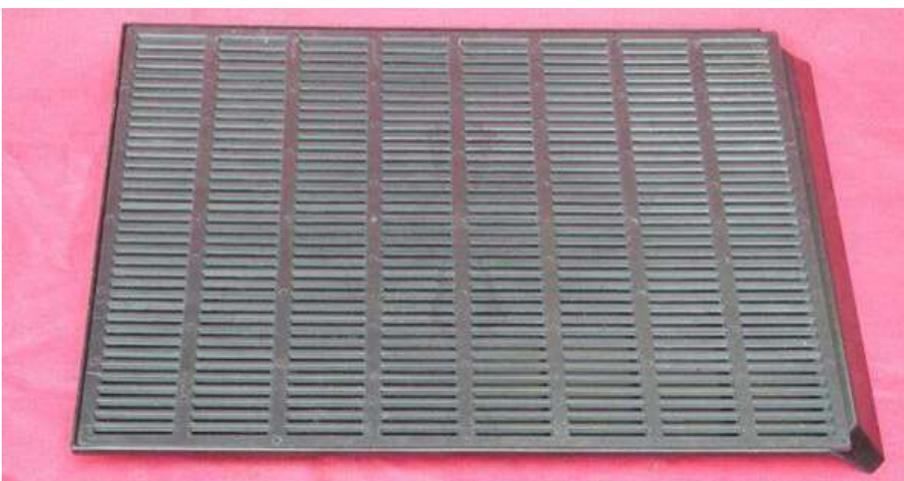


Fig. 4: the West plastic floor tray

Is there anything else that I should be aware of?

Since its arrival into Southern Italy in 2014 and its persistent presence, the SHB has proven that once established, it can spread fast and is difficult to eradicate. Should the beetle arrive in the UK, it is unlikely that we will be able to eradicate it, unless we find it quickly. Instead we will have to adapt the way we manage our colonies and use proven IPM methods to control beetle populations. Research is being carried out to develop alternative control techniques such as pheromone traps.

Investigating the use of nematodes

Nematodes are the most numerous multicellular animals on earth. A handful of soil will contain thousands of the microscopic worms, many of them parasites of insects, plants or animals. At the Food and Environment Research Agency (Fera), the Pest Management department are investigating three nematodes for their ability to infect and kill pupating Small hive beetle larvae in the soil. More information about this can be found in articles on the popular press pages of BeeBase:

<https://secure.fera.defra.gov.uk/beebase/index.cfm?pageid=166>. In short, three species of nematodes were used, *Steinernema feltiae*, *S. kraussei* and *S. carpocapsae*. Results proved extremely effective at infesting beetle larvae with the best control obtained by using *S. kraussei* and *S. carpocapsae*. Beetles exposed to these nematodes gave 100% mortality under laboratory conditions.

Soil treatments

The use of permethrin, fenitrothion, chlorpyrifos and methomyl have been shown to work. Fenitrothion proved most toxic to larvae and it was concluded that these chemicals were more toxic than coumaphos (the active ingredient in CheckMite+). However, many (including permethrin) are also very toxic to other (non-target) insect species as well as honey bees and can lead to the development of resistant populations of beetles.

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