SMALL HIVE BEETLE FACT SHEET

The small hive beetle (SHB), *Aethina tumida* Murray, is an exotic invasive beetle that invades honey bee colonies, damaging the bees and honey comb. A native of South Africa, it was first identified in 1996 in South Carolina and is now found in most of the eastern United States. Like their cousins the picnic beetle and others in the Family Nitidulidae, SHB are fruit beetles, however the SHB has evolved to obtain nourishment and shelter in a honey bee colony, to the demise of the bees.

Description:
Adults are black-brown, oval shaped and ¼" (3-6 mm) in diameter. Their size varies depending upon diet and environmental conditions. They are usually seen on the inner cover or tops of frames running frantically when the cover is removed. When threatened, they often tuck their head and legs underneath their domed, hard-shelled body. Their clubbed antennae are specialized to detect honey, propalis and bees wax scents as well as honey bee pheromones.
Larvae are whitish with 2 rows of short stiff spines and a specialized, dark pair at the tip of the abdomen. They are usually found in conjunction with fermented honey. SHB larvae can be confused with wax moth larvae, however SHB larvae reach only about ½' (2 mm) long while wax moth larvae grow larger (~ 2") with 3 pairs of legs in the front of the body and 4 fleshy pairs at the back of the body. They are associated with webbing and cocoons in the hive.

Life Cycle:
Females can lay multiple batches of 1000-2000 eggs in their 4-6 month lifetime. Eggs are deposited directly in the comb as close to bee brood as possible. Within 24-48 hours, the eggs hatch and larvae feed on the bee eggs, larvae, pollen, wax and honey. The warmer the temperature, the faster the development of the SHB. Under ideal conditions the SHB larvae finish eating in 7-10 days then crawl out of the hive in the evening to pupate in the soil. Pupation takes 3-5 weeks after which they emerge as adults and fly to a bee colony at dusk to repeat the cycle. 4-5 generations can occur per season in Ohio.

Both the adult and larvae SHB damage honey bee colonies. The larvae tunnel through the comb as they eat and create a slime. The adults carry a yeast (*Kodamaea ohmeri*) which mixed with pollen, not only produces a pheromone that attracts more SHB but also causes the honey to ferment, providing a moist environment for its larvae. Combined with pollen the yeast produces a scent similar to the honey bee alarm pheromone. The beetles also defecate in the cells.

The combination of a large population of beetles, slime, ruined comb and the smell produced by the yeast repels the bees. As the bees abandon damaged frames, the SHB proceed to take over more frames and boxes in the hive. Large numbers of beetles and damage will force the bees to abscond.

Prevention

Prevention is the most important and effective tactic to keep SHB out of an apiary. Maintaining strong colonies with a high bee to comb ratio is crucial to having low numbers of SHB. This requires monthly monitoring of colonies and a sound pest and disease management strategy. Colonies weak from mites, disease or other stresses are prone to attack from SHB and may be unable to prevent the beetles from advancing to brood frames. Requeen or combine queenless colonies and treat for varroa mites to keep the number below the USDA threshold of 3 mites/100 bees.

Place colonies in full sun preferably away from other apiaries and at least a foot above the ground. SHB prefer shade while honey bees are much healthier and active in full sun. Use weed barriers, gravel or plastic tarp to keep plants and animals away from the hives. Dry soil and soil barriers hinder the SHB larvae from burrowing into the soil.

Only purchase packages, hives and nucleus colonies from producers who have been inspected and have a current Certificate of Health. Always check new packages/colonies before adding them to an apiary.

When working in the apiary, collect any propalis and burr comb that was removed. Do not throw or drop it near the yard because the scents attract the beetles.

Avoid using hive boxes with split top frames, frame spacers and plastic frames that have open slots. Do not place multiple boxes of “wet” (newly spun) frames on hives as the scent of honey attracts large numbers of beetles. Never stack multiple honey supers on a small colony. If stacking on stronger colonies, monitor them several times a month unless the colony has enough bees to cover all the frames.

Management:

In the Apiary

In general, once adult SHB are seen in an apiary, strong tactics must be followed to avoid losing colonies. Maintain a low mite population and keep colonies condensed so that honey bees cover all the frames. In a healthy hive, the worker bees will protect the hive from the invasion of the SHB. Once the worker bees are outnumbered by the beetles, the hive can be destroyed quickly.

Repair boxes so that bees can defend their colonies from beetles as well as yellow jackets and other pests;

Avoid opening boxes more than necessary and only open one colony (or very few) at a time. Limit the time spent in each colony and smoke the outside of the hive(s) when finished to conceal honey scents and the alarm pheromone that attracts SHB;

Never put a colony full of SHB on another colony as the sudden increase in SHB will cause the new colony to collapse;
Do not keep dead hives in an apiary;
Do not leave frames out to be robbed;
Check on newly made colonies and nucs often. Make sure that the bees are covering all the frames.
Pick up and destroy rotting fruit.

Traps can help to reduce SHB populations but will not remove all of them. They can be home-made or purchased. Strips of corrugated cardboard, corrugated plastic or CD cases laid on the bottom board will catch some beetles. Dump the beetles in a bucket of soapy water or bag the traps and replace weekly. Hives with screened bottom boards often have large numbers of beetles on the inner cover. If the bees are in the top super, place the traps in the corners of the inner cover.

Many traps are made for the beetles to fall into. These traps should be checked at least monthly and emptied. Often bees will propalize the openings closed. Place cleaned traps between frames where the bees are actively working, not between empty frames. The traps are much more effective if the bees chase the beetles into the trap. The Freeman beetle trap fits underneath a screened bottom board. Although maybe easier to check and replace, it still does not catch enough beetles to control a high population.

Do not use bee escapes or other techniques to prevent bees from entering honey supers on a hive. Small hive beetle larvae can destroy a box of honey combs in a week!

Frame feeders, pollen traps, trays under screened bottom boards and pollen patties can house a lot of beetle larvae. Remove these or monitor weekly. Kill beetle larvae by dropping in soapy water. Do not knock them on the ground as they can crawl 20 yards to find soil to burrow into. Clean the bottom boards periodically as SHB are attracted to and eat dead bees as well as the other material that fall on it.

Chemical Control

Coumaphos (organophosphate) sold under the brand name CheckMite+ is the only product labeled to be used in bee hives. Staple the plastic strip impregnated with the chemical on corrugated cardboard and insert the cardboard following the instructions carefully. It is not labeled or recommended to place a smaller piece of CheckMite+ strip inside any kind of trap. Remember to remove honey supers before applying this material.

NEVER put roach bait, borax or other products in SHB traps!! Not only is it against the federal label law but it is toxic to honey bees. If the beetles cannot escape the traps, the toxin is not needed. If the beetles **can** leave the traps they will defecate in the comb and poison immature and adult bees!

GuardStar is another insecticide (permethrin) labeled to be drenched in the ground around beehives to kill the pupae. This product is toxic to bees and should be applied when the hives are not present. Because the adults can fly 20 miles or more, the GuardStar has limited effectiveness to keep beetles out of the yard. Another point is that once the beetle larvae are in a hive, burning affected frames and condensing the colony is a far better tactic than treating the ground.

ALWAYS Follow Label Directions!! Misuse of them may result in the contamination of honey and honey comb.

In the Honey House

Extract supers within a week if at all possible if SHB are seen in the colony.
Maintain the relative humidity of the honey house at or below 50% and allow good air circulation.

Remove frames of honey from dead colonies and extract or freeze it as soon as possible.

Rinse off slime and fecal material from salvageable frames and freeze for several days. These can then be placed on a strong colony to clean. Burn badly damaged frames.

Older beetle larvae orient toward light sources. In the honey house, shine a single fluorescent light toward the floor to attract mature beetle larvae as they crawl out of the supers to find a place to pupate. Collect these and drop in soapy water.

Sources:

http://entnemdept.ufl.edu/creatures/misc/bees/small_hive_beetle.htm
https://articles.extension.org/pages/60425/managing-small-hive-beetles
http://www.clemson.edu/extension/beekeepers/factsheets/small_hive_beetle_ap2.html

Above: Honey bee with small hive beetles
Below: Small hive beetle larvae and honey super damaged by small hive beetle larvae.