

Small Hive Beetle (SHB)

Introduction

The Small Hive Beetle (SHB) is an invasive species of North America that was unknowingly introduced to the United States in the '90s. SHB originates from sub-Saharan Africa where it infects almost all colonies but is not considered a major pest. After its introduction to the USA however, it quickly spread to thirty states and started causing colony damage with economic losses. Its movement was most likely facilitated by human activity (movement of pollinating colonies and packaged bees, etc.). Adult beetles are also strong fliers, travelling up to 10km per day, which aided in the widespread establishment of the species. Soon after, the beetle travelled into Canada across the US border via Ontario and Quebec. In 2016 and 2023, SHB was detected in the Fraser Valley of British Columbia. This area, along with the Okanagan and Creston Valleys are at the highest risk for SHB introduction in western Canada. The economic impact of SHB on western-Canadian apiaries is currently unknown, however good management of honey bee colonies will make it much more difficult for SHB to establish.

What does larvae and adult SHB look like?



Adult SHB in a corner of the hive. *Photo provided by Paul Kozak*



SHB larvae close up side view. *Photo provided by Paul Kozak*



SHB adult next to adult bee. *Photo provided by Paul Kozak*



SHB larvae on a pollen patty. *Photo provided by Paul Kozak*

Description and Lifecycle

Adults

SHB vary in colour from tan, to reddish-brown, to dark brown, to black. Newly hatched beetles are usually lighter, darkening as they mature. They are about a third of the size of a honey bee (5-7mm)

and oval shaped. Distinctive features of adult SHB include clubbed antennae and short wing cases (elytra) that do not entirely cover the abdomen.

Larvae

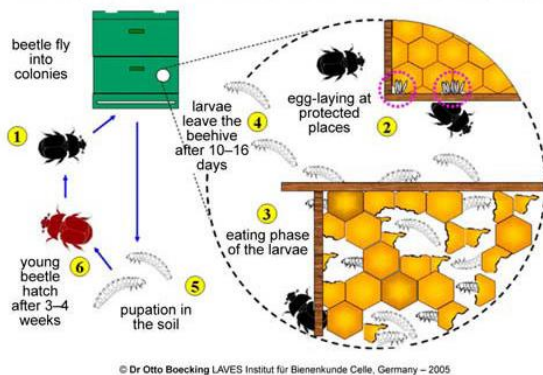
SHB larvae are a beige/cream colour and grub-like, growing to at least 1cm long. SHB have many dorsal spines and three distinct pairs of thoracic legs on the anterior end. SHB larvae are usually found in clusters and produce slime.

Eggs

Eggs are similar in appearance to honey bee eggs but will be laid in clusters called masses. They are about two-thirds the size of a honey bee egg.

Once a mated female has found its way into a colony, she will start laying egg masses in the cracks and crevices away from worker bees. After 2-4 days, the eggs hatch and the larval stage begins feeding on pollen, bee brood, bee eggs and honey. Feeding and development continue for about 10-16 days until the larvae leave the hive to pupate. SHB larvae pupate in the soil, about 10cm below the surface, usually within 1-4ft from surrounding hives. Depending on weather conditions, it can take anywhere from 2-8 weeks for pupae to mature. Once mature, SHB adults will use odor cues and fly to another colony to start the cycle again. Females can start laying eggs within one week of invading a colony.

The lifecycle of the small hive beetle *Aethina tumida* (Murray 1867)



© Dr Otto Boecking LAVES Institut für Bienenkunde Celle, Germany – 2005

Lifecycle of the SHB as it infests a colony (Photo sourced from Dr. Otto Boecking)



Larvae feeding in colony (Photo sourced from Managing SHB, University of Arkansas)

Detection and Monitoring

Visual inspection, especially in the early stages of infestation can be very difficult, as beetles hide from bees in cracks of the hive. Additionally, SHB will flee from direct sunlight as soon as a hive is opened. Therefore, it is important once a hive is opened to watch for beetles running along the top bars of frames and across the inner cover. After opening the top, if beetles are present, they will move down through the hive. You can tilt the entire colony to expose the bottom board and look for adult SHBs. Adult SHBs can also be detected by placing corrugated plastic or cardboard on the bottom board to be checked after at least 48hrs. Beetles will hide in the tunnels of the cardboard or plastic to escape sunlight and honey bees.



Small hive beetle inspection protocol: 1 – remove inner cover and inspect top bars and edges for fleeing beetles. 2 – Separate bottom brood chamber from the bottom board. 3 – Tilt colony to expose the bottom board and check for larvae and adults. If bottom board is full of debris, clean out to remove the possibility of in-hive SHB pupation.

Other examples of traps or monitoring supplies that can be used to detect SHB are:

- Beetle Bee Gone Sheets: Place them underneath the inner covers next to a partial pollen patty.
- Beetle Blaster Traps: Fill the bottle of the traps with apple cider vinegar and vegetable oil and place between frames.
- Swiffer Duster pads: Fold in half lengthwise and place under inner cover next to a partial pollen patty.



Beetle Bee Gone sheets. Photo provided by Julie Ferland



Beetle Blaster Traps. Photo from Vita beehealth

Management and Treatment

Honey House

- Extract harvested honey combs within 1-2 days.
- If possible, manage colonies with queen excluders and, if running honey bee colonies without queen excluders, ensure that no honey bee brood is brought into the honey house in honey supers.
- Return brood combs brought to the honey house immediately back to the field or store at $\leq 10^{\circ}\text{C}$ for 24-48hrs before doing so.
- Store honey comb extracted frames and unused honey supers in a freezer or a cold room ($< 10^{\circ}\text{C}$) and/or a room with low humidity ($< 50\%$ Relative Humidity).
- Remove the following materials, or store in beetle tight containers: unprotected comb, wax capping, slumgum.
- Melt wax capping's each night or store them in tight drums in a cold room ($\leq 10^{\circ}\text{C}$).
- Clean the honey house immediately after every extraction.

Field

- Keep colonies queen-right, strong, and healthy.
- Get rid of weak colonies at any time through the season to reduce potential infestation sites.
- Remove all dead colonies immediately (check for infestation and store in a cold room).
- Use caution when combining colonies or exchanging combs.
- Use queen excluders to prevent bringing brood frames to the honey house.
- Avoid throwing burr comb and broken comb in the bee yard. It should be stored in the cold room until melting.
- For pollen collection, harvest more often and store in a cold room for 24-48hrs.
- Clean all equipment and vehicles so SHB can't use debris to pupate.
- Only buy bees/equipment from SHB-free apiaries.
- If there is an infestation, use SHB traps.

For more information on SHB current situation, e-mail bee@gov.ab.ca

Note: If you suspect the presence of Small Hive Beetles in your colonies, collect some beetles and mail them to the Provincial Apiculturist for identification.

Sources cited:

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