

The Small Hive Beetle (SHB)

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The small hive beetle *Aethina tumida* Murray is native to tropical and subtropical regions of Africa. It was first identified in North America in Florida in 1996 and is being spread by human-assisted bee movement. In 2010, infestations were identified in Quebec and Ontario apiaries near the Canada-U.S. border. Its potential impact on Canadian beekeeping is unknown as it remains unclear how well SHB can establish itself as a reproductive, viable population under Canadian conditions. For British Columbia, the Canada-US border area of the Fraser Valley, Okanagan and Creston Valley are most at risk to beetle introduction. Although it is not considered a major pest of beehives in Africa, some U.S. beekeepers in southern states have reported large losses.

Identification



Fig. 1



Fig. 2

Adult SHB are small, only about 5 – 7 mm long, dark brown to black in colour and have an oval to oblong body shape. Antennae are distinctly club-shaped (Figure 1). Eggs are pearly-white in colour, similar in appearance to honey bee eggs but smaller (approximately 1.5 mm long). Larvae are similar in appearance to wax moth larvae, whitish with numerous spines (i.e. protuberances). SHB larvae do not produce silk (Figure 2). Pupae are the same size as adults, at first white in colour but darkening as they mature.

Life Cycle

Female adult beetles lay eggs in masses (3 – 5 eggs/mass) on or near combs in a hive (Figure 3). Most often, egg masses are laid in crevices, for protection. A female beetle can lay from 100 – 1000 egg masses. Eggs hatch in 2 – 3 days. Larvae feed on pollen, honey and brood. When the larvae are fully developed (10 – 16 days), they must leave the hive to pupate in the soil, usually within 30 cm of the hive and in the top 10 cm. In 15 – 30 days pupae become adults, emerge from the soil, enter hives and start laying within one week. Adult beetles can live up to 6 months and are capable of wintering inside the cluster of a honey bee colony. Developmental rate of beetles varies depending on soil structure, moisture level and temperature. Life cycle from egg to adult may range from 38 – 80 days, with several generations per year.

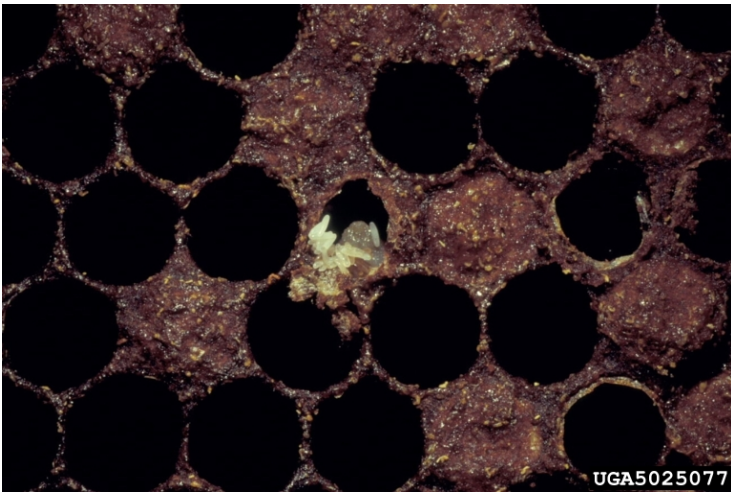


Fig. 3

Spread

Adults may survive up to 5 days without food in summer temperatures and longer in beekeeping equipment containing pollen and honey residue, which makes it possible for beetles to be transported over long distances in bee equipment without bees. Potential geographical limits of the small hive beetle are unknown. Beetles can be spread via the movement of infested honey bee colonies for pollination, shipment of packaged bees and queens, and swarming of feral and commercial colonies. Adult beetles can disperse quickly after pupation in the soil and emergence. They can also survive on a number of alternative food sources and hosts such as rotting fruit (e.g. cantaloupe) and other bee species (bumble bee colonies). Environmental conditions such as climate, structure and moisture content of the soil where beetles pupate, and food availability determine the impact SHB has on local beekeeping operations.

Impact

The larval stage of the Small Hive Beetle causes the most damage. Beetle larvae tunnel through combs feeding on pollen, brood and honey. Weak or small colonies are most at risk. Since beetles are not easily controlled by bees, even strong colonies can be affected once the beetles gain access. For this reason, it is not recommended to place infested supers on strong colonies for pest control and clean up. When the larvae feed, they contaminate the honey, causing fermentation with oozing and bubbling. The resulting slime eventually drives the bees from the hive. The fermented honey smells like rotting fruit and is unsuitable for human consumption. Contaminated equipment cannot be repopulated with bees until the slime and dirt have been removed.

Small Hive Beetles can be a major problem in honey houses, which may be of greatest concern to beekeepers in Canada. Beetles may breed in wax cappings, honey supers (especially those containing patches of brood) and stored comb. Environmental conditions generally associated with honey houses, such as high temperature and humidity provide optimal conditions for beetle development.

Prevention and Control

To reduce the spread and damage caused by the Small Hive Beetle, beekeepers should regularly inspect their colonies to detect early infestations. To detect the beetles, place a piece of corrugated cardboard or corrugated plastic (15 x 15 cm), with one surface peeled off to expose the ridges, on the bottom board of a bee hive with the ridged side down. Begin monitoring when temperatures are warm enough that colonies are no longer clustered during the day and when bees are using their bottom hive entrances. One day later, adult beetles can be found under the cardboard if they are present. In a heavily infested colony, hundreds of beetle larvae and adults can be seen on the comb and bottom boards,

especially towards the rear of the hive. The odour of fermented honey is another sign of beetle infestation. CheckMite+™ (10% Coumaphos) strips are recommended for in-hive control.

For prevention and control of the Small Hive Beetle in honey houses, beekeepers should promptly extract their supers as soon as possible after they have been pulled from bee hives. Honey should be stored in tightly sealed drums and wax cappings should be quickly processed. Honey houses and extracting equipment must be kept clean. Beekeepers should store their honey supers in closed, cool rooms or place them back on hives as soon as the honey has been extracted. Nucleus hives can be placed near honey houses as traps then treated. Pheromone traps and alternative chemical controls are being investigated.

Photos appear courtesy of University of Georgia and University of Florida. For more information, contact Apiculture Program office at the BC Ministry of Agriculture.

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