

Factsheet #218

THE SMALL HIVE BEETLE (SHB)

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 primarily spread through human-assisted bee movement. In 2010, infestations in Canada were first detected in Quebec and Ontario near the Canada-U.S. border. SHB was first diagnosed in BC's Fraser Valley in 2015.

Identification



Fig. 1



Fig. 2

Adult SHB are small, about 5 – 7 mm long, black in color and have an oval to oblong body shape. Antennae are distinctly club-shaped (Figure 1). Note that the abdominal cover plates (~elytra) don't cover the entire abdomen. Eggs are pearly-white in colour, similar in appearance to honeybee eggs but smaller (approximately 1.5 mm long). Larvae are similar in appearance to wax moth larvae, whitish with numerous spines. 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 beetles lay 3-5 eggs in masses on or near combs in a hive and she can lay 100 – 1000 egg masses. Eggs hatch in 2 – 3 days. Larvae feed on pollen, honey and brood. The larva goes through a number of larval stages until fully developed in 10 – 16 days and then leaves the hive to pupate in the soil. In 15 – 30 days pupae become adults, emerge from the soil, mate and then enter the hive to start laying eggs after about one week. Adult beetles can live up to 6 months and are capable of wintering inside the honeybee cluster. 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.

Spread

Adults can survive up to 5 days without food in summer temperatures and for longer in beekeeping equipment containing pollen and honey residue. This makes it possible for beetles to be transported over long distances in beehive equipment without bees. 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 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, soil structure and moisture where beetles pupate, and food availability determine the impact SHB has on local beekeeping operations.

The initial diagnosis of SHB in BC was in the central Fraser Valley near the Canada-US border. SHB had been previously reported in Washington State colonies brought up from California. Comprehensive surveys were carried out in the central Fraser Valley in subsequent years without any further detections. Key factors for successful SHB establishment include temperature, humidity and suitable soil type. It appears that BC and indeed, Western Canada doesn't offer the right conditions for this pest. Eastern Canada and most notably Ontario and Quebec have reported ongoing infestations. The pest has not had a major impact on the beekeeping industry.

Impact on the Colony

The larval stage of the Small Hive Beetle causes the most damage. Beetle larvae tunnel through combs feeding on pollen, brood and honey (Figure 3). 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 of rotting fruit and is unsuitable for human consumption. Contaminated equipment cannot be repopulated with bees until the slime and dirt have been removed.



Fig. 3

Small Hive Beetles can be a major problem in honey houses. Beetles may breed in wax cappings, honey supers especially with patches of brood and pollen, and stored comb. High temperatures and humidity in the honey house provide optimal conditions for beetle development.

Prevention and Control

To reduce the spread and damage caused by the Small Hive Beetle, regular inspection must be carried out. For visual inspection, quickly lift the innercover and quickly inspect the topbars where beetles may scurry off. Then, closely inspect the bottom side of the innercover for any beetles. Beetles prefer the warmth of the top brood box and often hide in the top corners of brood frames where bees may ignore them.

In areas where SHB have been established, early detection is important. Start monitoring when temperatures are high enough when colonies are no longer clustered and the bees are using their bottom hive entrance. Cut a piece of corrugated cardboard or corrugated plastic (15 x 15 cm) with one surface peeled off to expose the ridges. Place the piece with the ridges down on the bottom board. One day later, adult beetles may be found hiding under the cardboard. In a heavily infested colony, hundreds of 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. Apivar strips (amitraz) are recommended for control.

For prevention and control of the Small Hive Beetle in honey houses, beekeepers should extract honey supers soon 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 and used as beetle traps and then treated.