

Small Hive Beetle

Aethina tumida

Description:

Immature stages: Eggs are smaller than honey bee eggs, often laid in disorganized clumps in crevices around hive or in suitable food.

Larvae are elongate, whitish grubs with rows of small spines along back. Newly hatched larvae are small, about 1mm long, marginally smaller than a honey bee egg. Larvae grow to approximately 1cm (10mm, or 3/8th of an inch). Pupae are whitish brown.

Adult stages: Adults are broad, flattened beetles about 5.7 mm (1/4 inch) long, 3.2 mm wide and dark brown to nearly black in color. Adults are red just after pupation and soon thereafter become blackish. Adult antenna appear clavate ('clubbed').

Biology:

Life Cycle: Beetle larvae do not spin webs or cocoons in the bee hive but rather pupate in the soil outside the hive. The small hive beetle requires 38-81 days to develop from egg to adult, and five generations per year are possible. Larvae grow rapidly under ideal conditions, reaching full size in less than 14 days, and can be easily visually identified within 3-4 days of hatching in the field.

Distribution: SHB are native to southern Africa. The first record of this beetle in the western hemisphere was determined from a commercial apiary in Florida in May 1998. Beetle specimens were found from bee hives near Atlanta, Georgia in June 1998 and confirmed as *A. tumida* on July 13, 1998.

Damage:

SHB are not considered a major pest in most of their native range Africa, or much of their range in the U.S., but is a considerably damaging pest in Southeastern U.S. apiaries. Beetle larvae tunnel through combs, killing bee brood and ruining combs. Larvae can heavily damage delicate, newly drawn-out comb; however, old sturdy comb can withstand moderate infestation. Bees are known to abandon combs and entire colonies (abscond) once they are infested. Beetles defecate in honey and cause it to ferment, producing a 'slime' in supers and honey houses. Contaminated honey is no longer marketable and is rejected by the bees within infested hives.

Diagnosis:

The majority of colonies in the southeast will contain identifiable adult SHB. This is not a lone cause for concern, although large numbers of adult beetles may indicate likelihood of future larval infestation. Infestation by larvae is apparent from visual inspection of frames, which may show evidence of the 'sliming' caused by the beetles, initially appearing a shiny, sticky sheen over frames and capped honey. This may be especially apparent under protein patties provided to colonies. Young larvae may be visible in capped honey. The smell of fermenting honey may also alert beekeepers to



Larvae inside combs



Severe infestation



Adult beetles

infestation. Destruction of comb and large larvae questing in the colony typically indicate a severe infestation requiring transplantation of the bees into a new hive in order to treat or destroy infested frames.

SHB larvae can be differentiated from wax moth larvae based on the size of the larvae (wax moth larvae are significantly larger), the clearly apparent legs on the frontal section of the SHB larvae (absent from wax moths) and the presence/absence of webbing and slime in the colony, with webbing indicative of wax moths while sliming is indicative of small hive beetles.

Management & Treatment:

If *A. tumida* is suspected or detected, the following precautions are suggested:

1. Be clean around the honey house. Do not leave filled supers standing long before extraction. Do not leave cappings exposed for long periods. Beetles can build up rapidly in stored honey, especially away from protective bees.
2. Do not stack or store infested supers onto strong colonies.
3. Be aware that supering colonies, making splits, exchanging combs, or use of Porter bee escapes can spread the beetles or provide room for beetles to become established away from the cluster of protective bees.
4. Feeding of supplementary protein patties to colonies can cause severe infestation by providing a protected environment for SHB to lay eggs in and larvae to grow.
5. Monitor colonies for hygienic behavior; ie., the ability to actively rid themselves of both larval and adult *A. tumida*. Propagate those queen lines found to be beetle-resistant.
6. Experiment with trapping or cultural control measures.
- 6a. Moving colonies may be advisable to keep a beetle population from building up in any particular apiary. The ability of beetles to complete development may vary according to different soil conditions and beekeepers may find some locations naturally less prone to beetle infestation, especially drier bare soils in full sunlight. Impermeable (e.g. concrete, asphalt) surfaces will prevent SHB pupation. Fire ants may be a beneficial insect in this context if they are found to prey on pupating beetles.
- 6b. Commercial traps are available to place in the colony, usually filled with vegetable oil or soap water. Traps are built with apertures large enough for SHB adults to enter but small enough to keep honey bees out; hygienic bees will chase SHB adults into these traps where the beetles die by drowning.
7. Bees will normally not clean up equipment or supers full of beetle-fermented honey. However, bees may finish the job if the beekeeper first washes out as much honey as possible with a high-pressure water hose.
8. Treat soil in front of affected hives with predatory soil nematodes, *Steinernema riobrave* or *Heterorhabditis indica*. These can either be purchased from suppliers or maintained by beekeepers themselves according to available protocols. Purchased or raised nematodes should ideally be inspected under a microscope for movement to ensure they are alive at the point of deployment around colonies.
9. Certain soil drenches to kill SHB are currently available, but must be used with extreme caution as the insecticides currently licensed for use are highly toxic to bees.
10. Few in-hive deployable treatments labelled for SHB control show consistent effective control. Bee-safe insecticides which can target SHB are currently in development, and beekeepers should check for recently labelled products in the future.

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