

The Small Hive Beetle: A New Pest of Honey Bees

The small hive beetle (*Aethina tumida* Murray) is a recently discovered pest to honey bees in the United States. The small hive beetle (SHB), originally from South Africa, has established itself in some honey bee colonies in various southeastern, midwestern, and northeastern states. The small hive beetle appears to be primarily a pest of stored equipment—especially full honey supers awaiting extraction. Within a state where the beetle has become established, this pest is a problem in some areas while being of little consequence in others.

Many beekeepers are using the Varroa mite introduction experience as a protocol for the arrival of the small hive beetle. So far, this has not been the case. Though the beetles, under specific conditions, can be very destructive, they have not been as serious as the Varroa mite experience.



Figure 1. The adult and larval stage of the small hive beetle. (Adults are $\frac{3}{8}$ " in length.)

Small Hive Beetle Life Cycle

What They Look Like

The adult small hive beetle (SHB) is dark brown to black and about one third the size of a worker bee. Larvae are elongated, whitish grubs that have three pairs of legs (Figure 1). They can be mistaken for wax moth larvae; however, small hive beetle larvae do not spin cocoons and must complete their development outside the beehive in the soil. In severe infestations, larvae may be seen crawling out of the hive entrance or from stored honey supers.

Eggs to Adults in 45 Days

Beetles, like moths and bees, undergo complete metamorphosis. The beetles' life cycle starts with eggs, which are laid in the hive and hatch into larvae within 2 to 3 days. Ten to 16 days later, the larvae crawl from the hive and drop to the ground outside, where they burrow into the soil and pupate. In about 3 to 4 weeks, they emerge as adult

beetles and re-enter the hive a week later. This process may repeat itself several times a year, especially during the warmer months.

Hive Abandonment

Colony damage does not occur when only a few adult beetles are present in the colony. Before it can take over and destroy a hive, the small hive beetle must build up its population significantly. The beetles, in their various development stages, feed on honey and pollen in the hive, foul the honey, and destroy the comb and bee brood. The beetles' armor protects them from honey bee stings. The destruction eventually causes the bees to leave the hive.

Honey Destruction

Because they defecate in the honey and the resulting fermentation and odor make it unattractive to the bees, larvae of the small hive beetle are most objectionable to adult bees. The SHB larvae also damage wax honeycombs—especially newly drawn, delicate combs. When wax combs stand for a few days to a few weeks in the honey house, ready to be extracted, beetle larvae infestation can be most troublesome. This damage to honey combs happens when beetles are actively reproducing in the colony and are taken into the honey house. Due to this behavior, the small hive beetle is considered to be more of a pest of the honey house than of the hive.



Figure 2. An adult small hive beetle on a screen inner cover

Location of the Beetle in the Hive

Beekeepers are urged to call the Alabama Department of Agriculture at **(334) 240-7225** if they suspect that their colonies are infested by the small hive beetle (Figure 2). Also, all beekeepers should check their colonies at least monthly—especially beekeepers who have purchased packaged bees from outside Alabama.

Difficulty in Finding the Small Hive Beetle

Since the adult beetle is dark-colored, moves fast, and avoids light, looking for small hive beetles may be difficult. Beetles are likely to be found in crevices in the hive or on the bottom board although when temperatures are cooler the beetles remain with the bee cluster and do not move onto the bottom board. Many times when separating a hive consisting of two deep hive bodies, the beetle may be found along the frame rest grooves.



Figure 3. A deep hive body positioned on an outer cover. If present, adult beetles can be seen crawling in the outer cover.

A simple technique used to look for beetles in bee colonies is to remove the outer cover, place the cover upside down on the ground, remove the deep super or brood chamber, and place on the upturned outer cover. If beetles are present, they will move out of the super, away from the light, and into the outer cover. They may be seen crawling in the cover (Figure 3).

How to Rid Hives of the Small Hive Beetle

Proper Diagnosis

Preventative use of unapproved insecticides in and around beehives is potentially risky and not recommended. Beekeepers should become familiar with the small hive beetle so they can properly diagnose and manage the beetle should it occur. Sound pest management begins with positive diagnosis of the pest. Again, for verification of suspected small hive beetles, call the Alabama Department of Agriculture at **(334) 240-7225**.

Good Hive Management

Several colony management tools are effective against infestations when integrated with the use of available insecticides. They are the following:

- Maintaining a strong bee population in each hive
- Inspecting every hive at least once a month
- Moving the hive to disrupt the life cycle of the beetle
- Maintaining close mowing or bare ground around the hive to facilitate chemical controls and provide less shelter for beetle larvae leaving the hive to pupate

Chemical Controls

A pesticide selected for application within or around a beehive must have usage directions specifically for the control of hive beetles. Beekeepers must read and follow all use precautions on the pesticide label to protect themselves, their bee colonies, and the honey crop.

Pesticide Treatment Inside the Hive

The U.S. Environmental Protection Agency (EPA) has approved emergency exemption for beekeepers to use pest control strips containing the chemical coumaphos. The strips can be used in Alabama under the trade name CheckMite+ Bee Hive Pest Control Strip. The insecticide is impregnated into a plastic strip that is placed in the bottom of the hive body. There the beetles absorb a lethal dose of insecticide when they contact the strip.

Basic Precautions for Using CheckMite+

CheckMite+, which can be used for control of Varroa mites, has different use directions for control of the hive beetle. These differences include when and where the chemical should be applied and how long the treatment should last. For example, when treating for the beetle, CheckMite+ strips should be placed in the hive for no more than 7 days at a time. A hive should be treated with this pesticide no more than four times per year. A hive with honey destined for human consumption should not be treated with any chemical including CheckMite+. Specifically, honey supers must not be on the hive during treatment (whether for SHB or Varroa) to avoid the possibility of this pesticide coming in contact with honey intended for human food. Coumaphos works better when the air temperature is over 70 degrees F. Complete use directions are listed on the product label.

Prepare a piece of corrugated cardboard box, approximately 4" x 4" by removing one side, thereby leaving a series of paper ridges. Remove a CheckMite+ strip from the original packaging and cut the strip in half across

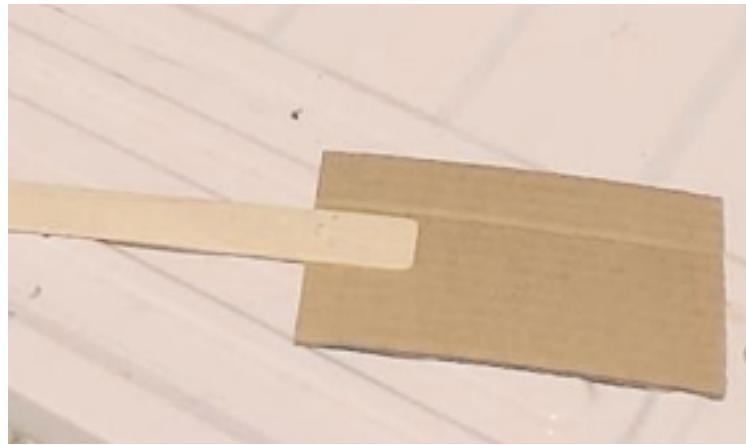


Figure 4. Paint paddle attached to a corrugated board with CheckMite+ strips attached

the center. Staple the CheckMite+ strip halves to the ridged side of the 4" x 4" corrugated cardboard. Place this cardboard as close to the center of the bottom board as possible, with the strips facing down. Leave the cardboard and strips on the bottom board for at least 3 days, but not more than the time specified on the label. For convenience of installation, a paint paddle can be stapled to the cardboard (Figure 4). Again, always follow the directions on the product label. Beetles will crawl beneath the cardboard into the paper ridges to hide and will be exposed to the chemical coumaphos.

Pesticide Treatment Outside the Hive

Beekeepers will also want to exploit a vulnerable point of the beetle's life cycle—when mature larvae enter the soil near the hive to pupate. GardStar 40% EC is a concentrated formulation containing the insecticide permethrin and is commonly used to control fire ants. This product is directed at control of the hive beetle larvae. It kills the larvae when they come into contact with insecticide-treated soil near the hive.

Basic Precautions for Using GardStar 40% EC

GardStar 40% EC poses a higher risk to bees and humans than does CheckMite+. Because it is highly toxic to bees, use extra caution when applying Permethrin around a beehive because it is highly toxic to bees. If a hive is SHB-infested, there are two ways to approach the problem.

- Move a hive to a site where GardStar 40% EC has been previously applied to reduce potential insecticide exposure to bees.
- Dilute GardStar 40% EC in water and apply to soil in front of the hive using a sprinkling can or low-pressure sprayer. Even small amounts of pesticide spilled or sprayed onto the hive can be dangerous to bees. **Caution:** If splashed in the eyes, GardStar 40% EC in concentrated form can cause irreversible eye damage. Wear a face shield or safety glasses when mixing concentrate from the original container.

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Use pesticides **only** according to the directions on the label. Follow all directions, precautions, and restrictions that are listed. Do not use pesticides on plants that are not listed on the label.

The pesticide rates in this publication are recommended **only** if they are registered with the Environmental Protection Agency and the Alabama Department of Agriculture and Industries. If a registration is changed or cancelled, the rate listed here is no longer recommended. Before you apply any pesticide, check with your county Extension agent for the latest information.

Trade names are used **only** to give specific information. The Alabama Cooperative Extension System does not endorse or guarantee any product and does not recommend one product instead of another that might be similar.

For more information, call your county Extension office. Look in your telephone directory under your county's name to find the number.

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