

SMALL HIVE BEETLE

NOT KNOWN TO
OCCUR IN IDAHO



Common Name: Small Hive Beetle

Scientific Name: *Aethina tumida*

Description

Adults and larvae of the small hive beetle are found in active bee hives and stored bee equipment where they feed on honey and pollen. Adults are broad, flattened beetles about 5.7 mm ($\frac{1}{4}$ 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. They move rapidly across combs and are difficult to pick up. The larvae are elongate whitish grubs with rows of small spines along the back. Larvae look superficially like wax moth larvae, but the legs of beetle larvae are larger, more pronounced, and restricted to near the head. Beetle larvae do not spin webs or cocoons in the bee hive, but rather pupate in the soil outside the hive. Pupae are whitish brown. The small hive beetle is native to southern Africa where it requires 38-81 days to develop from egg to adult, and five generations per year are possible. 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 in bee hives near Atlanta, Georgia in June 1998 and confirmed as *A. tumida* on July 13, 1998.

Life Cycle

The small hive beetle undergoes complete metamorphosis, passing through the egg, larva, pupa, and adult stages. Only one concentrated study has been conducted on this creature by A.E. Lundie in 1940. Most of the life cycle information comes from his study.

Eggs:

Eggs of *Aethina tumida* are pearly-white, 1.4 m.m. long by .26 mm wide, similar in appearance to honey bee eggs, but smaller, being approximately two-thirds the length of the latter. Eggs are deposited in irregular masses. The female appears to prefer some crevice or cavity. Comb is not required and often ignored when females lay eggs as they can be found anywhere within the hive. Incubation period varies from one to six days, with most hatching between two to four days. The number of eggs a single female can lay has not been determined, however, Lundie has shown that two or three beetles in a pile of supers can cause a heavy infestation. Females are also relatively long-lived (ranging from a few days to several months) which adds to their egg-laying capacity.

Larvae:

The larva of the small hive beetle is the damaging stage of this pest. Larvae emerge from the egg shell through a longitudinal slit. Newly-emerged larvae have relatively large heads and numerous protuberances all over their bodies. This may protect them from being smothered in honey. Beetle larvae may be confused with those of the greater wax moth (*Galleria melonella*), however, they can easily be distinguished by the presence of six prominent anterior legs. Wax moth larvae have a number of smaller less-developed, uniform prolegs. Both organisms may be found simultaneously in the same colony. There is great variation of growth rate of same-aged larvae. Generally it is 10 to 14 days, but may be a week or longer. Slower maturing larvae are smaller and give rise to small adults. Many die soon after pupation, whereas mortality is less in quicker maturing individuals. Larvae grow to $\frac{3}{16}$ to $\frac{1}{4}$ inch by day four, reaching $\frac{7}{16}$ inch with a $\frac{1}{16}$ inch diameter when fully grown. Larvae

entering the soil make a smooth-walled earthen cell to pupate. In damp soil, these may be connected by a tunnel to the surface and larvae may return to the surface before pupating. It is during transition from larva to pupa that the insect is vulnerable. The nature of the soil is also thought to be a variable in successful development.

Pupae:

Pearly white color predominates in newly formed pupae. Pigmentation begins with transformation to adult, first in the eyes and then the wing base, before encompassing the whole body. Frequent twitching of legs is observed as maturing occurs within the pupal skin. The period spent in the soil varies greatly from 15 to 60 days. The majority of beetles emerge after three to four weeks in the ground.

Adults:

The newly-matured adult is light, yellowish brown and becomes brown, dark brown and finally black at full maturity. This change take place during pupation and brown or black adults may be seen emerging from the ground. During the first day or two after emergence, young beetles are active, take flight readily and orient toward light. Later, they become less active and keep to less illuminated portions of the bee colony. Adults are covered with fine hair, which makes them difficult to pick up by hand. Females begin to lay eggs about a week after emergence. Adults show great size variability, but most are approximately 3/16 inch long and 2/3 broad as long. They are about one-third the size of a honey bee worker. Longevity appears to be evenly distributed across ages, ranging from only a few days to six months. Forty of sixty-eight individuals in Dr. Lundie's study lived over two months. Longevity and overlapping of generations makes the beetle a constant source of annoyance to beekeepers.

Damage

In Africa, the small hive beetle behaves as a scavenger of weakened colonies, much like the greater wax moth, and it is relegated to secondary pest status. However that has not been the experience of Florida beekeepers in whose apiaries the beetles have caused considerable damage and colony loss. Beetle larvae tunnel through combs, killing bee brood and ruining combs. Larvae can heavily damage delicate, newly drawn-out comb; however, old sturdy brood comb seems to withstand heavy larval infestation without disintegrating. Bees in Florida have been found to abandon combs and entire colonies once they are infested. Beetles defecate in honey and cause it to ferment, producing a frothy mess in supers and honey houses. Honey thus contaminated is no longer saleable, and moreover, it is unpalatable to bees and cannot even be used as bee feed. Florida observers report that the fermented honey smells like rotting oranges. In heavily-infested operations in Florida, larvae by the thousands have been observed crawling out of colony entrances or across honey house floors in an effort to reach soil to dig in and complete their development. It is cause for concern that the beetle's behavior in Florida has been much more virulent than that reported from Africa. Such is often the case with pest organisms when they are imported to new locations without their natural assembly of diseases, predators and parasites that keep their populations in check.

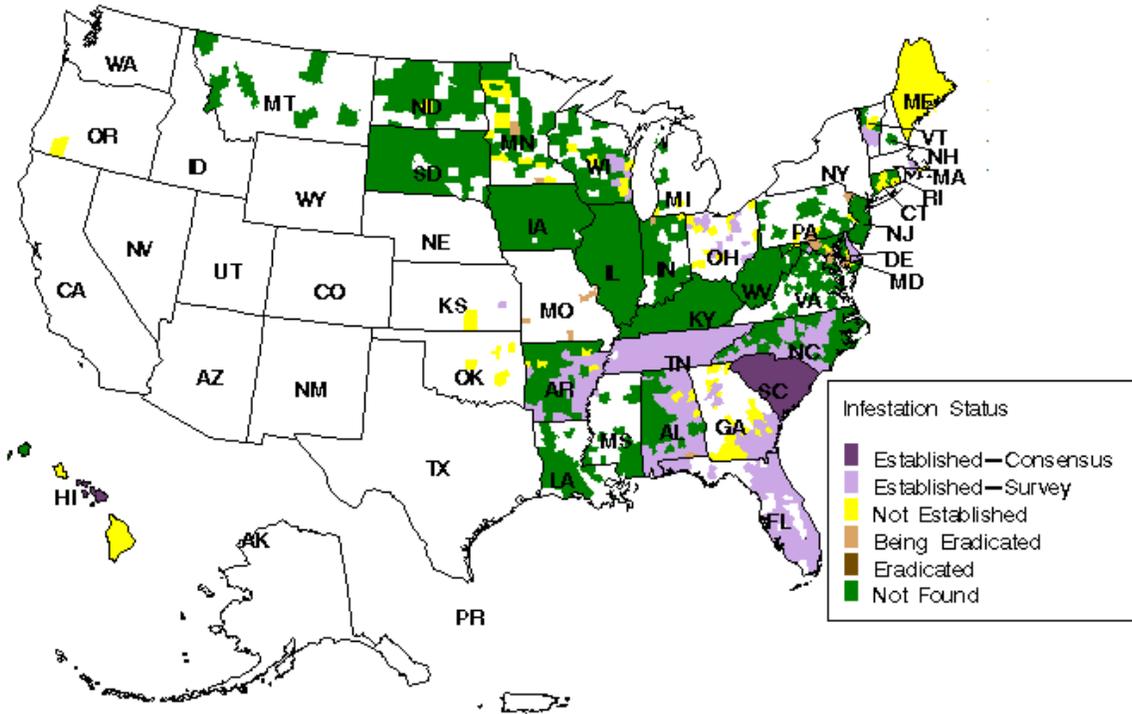
Other Resources:

<http://edis.ifas.ufl.edu/AA257>

www.agric.wa.gov.au/content/pw/ins/ap/1/fn2007_smhivebeetle_btrend.pdf

Reported Status of
Small Hive Beetle , *Aethina tumida*
in US and Puerto Rico

Data retrieved from National Agricultural Pest Information System on 01/17/2012



The Center for Environmental and Regulatory Information Systems does not certify the accuracy or completeness of the map.