



Small hive beetle

DAI-288, Revised June 2005

MJ Fletcher
Principal Research Scientist

LG Cook
Veterinary Officer, Chemical Control



www.agric.nsw.gov.au

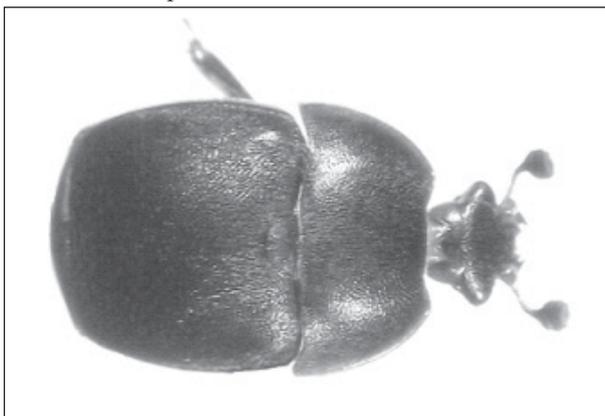
The Small hive beetle, *Aethina tumida* (Murray) (Coleoptera: Nitidulidae) is native to South Africa but is not regarded as a serious pest there. It reached prominence as a pest when it was found in Florida in 1998 and it has now spread to fifteen states in the eastern half of the United States where it sometimes does serious damage to beehives. The pest was confirmed in beehives in the Sydney region in October 2002. It is thought that the Small hive beetle (SHB) will thrive in tropical, semi-tropical and temperate climates although there is little confirmatory information on this available.

The larvae contribute to hive death and damage stored hive materials, though damage seen locally has been minimal. They feed on live brood and honey and their excrement contaminates the honey, causing fermentation.

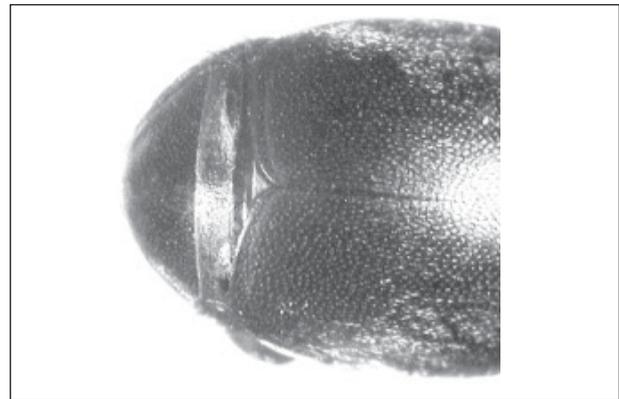
IDENTIFICATION

The adult beetle, which is the stage most commonly seen, is black or dark brown, ovoid in outline and about 5–7 mm long (Figure 1). They have clearly clubbed antennae and wing cases (elytra) shortened so that the apical few segments of the abdomen are visible (Figure 2).

Figure 1. The Small hive beetle, *Aethina tumida*. The head has been pulled out to show the antennae.



NSW AGRICULTURE



NSW AGRICULTURE

Figure 2. The Small hive beetle, posterior end of the body, showing shortened wing cases.

In general, the adult beetles are about one third the size of a worker honeybee. The adult beetles lay small elongate whitish eggs in clumps in beehives. The eggs are smaller than honeybee eggs but similar in shape and colour.

The larvae grow to 10–13 mm long, cigar-shaped and pale whitish cream (Figure 3). Their most distinctive feature is the presence of two rows of short spines along the centre of the back, with the last two projecting beyond the rear end of the larva (Figure 4). When fully grown, the larvae enter the soil in front of and beneath the hive to pupate.

The SHB larva should not be confused with the Wax moth larva, which has a number of prolegs (see Figure 5) in addition to its thoracic legs and also spins web or cocoons.

Other beetles in the family Nitidulidae include *Carpophilus* species (the dried fruit beetles) and *Aethina concolor* (the hibiscus flower beetle), a very common species in hibiscus and magnolia flowers. These species differ from *A. tumida* in size and shape and, in *Carpophilus* species at least, in coloration.

 Actual size of Small hive beetle

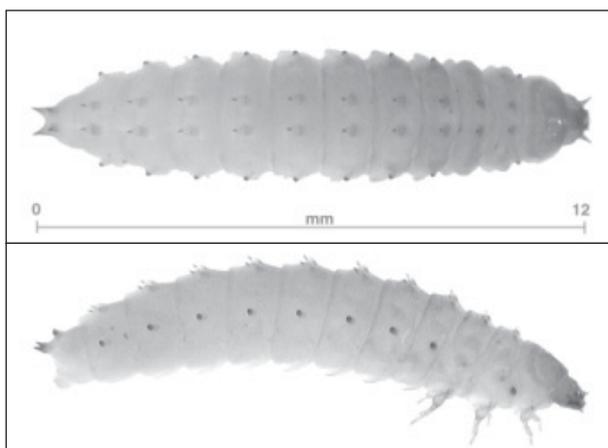


Figure 3. The mature Small hive beetle larva is 10–13 mm long.



Figure 5. The mature Wax moth larva is up to 25 mm long.

HOW TO CHECK YOUR BEEHIVES

The steps below outline the method by which a beekeeper should inspect hives for the presence of SHB. Note that beetles will move quickly away from the light when the hive lid is opened.

1. Initially, remove the lid and place it on the ground upside down. Place the super on top of the lid and leave it for about a minute. Lift the super off the lid and quickly look for beetles, which will have moved onto the lid away from the light.
2. If no beetles are seen, remove brood combs one at a time, examine all surfaces and place each frame outside the hive. Continue until all frames have been examined and the brood chamber is empty.
3. Examine the floor of the brood chamber, particularly looking in the rear corners of the bottom board where the beetles will hide from the light.
4. If the bottom is not attached, remove the brood chamber and examine the bottom board. Again, the beetles will tend to run away from the light, so be quick.
5. Pick up the beetles either using fine-tipped tweezers or in your fingers. Place the beetles in a sealed container and put them in a freezer overnight to kill them.
6. Supers/frames held for extraction could be infested with larvae – check them too.

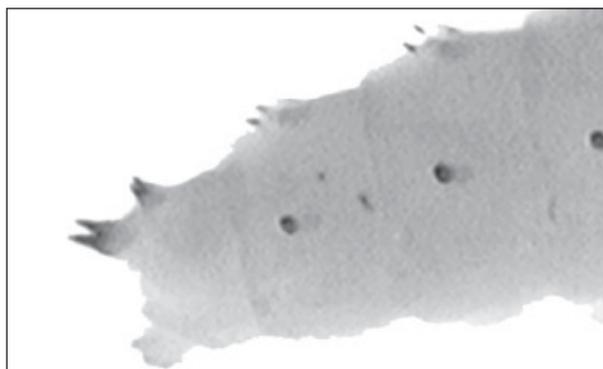


Figure 4. Larva, hind end of body showing spines.

LIFE CYCLE OF SHB

Adult beetles live primarily in the hives, where they feed on bee eggs, pollen and rubbish within the hive. They lay their eggs, usually out of the way of bees, within hives. These eggs, which are 1.2 mm long and white, can be found anywhere in a hive – including on wax – and are difficult to find. The eggs usually hatch into larvae after 2–4 days, but up to 6 days is reported.

Larvae grow in the hives and mature by 21 days at most. They feed on pollen and brood in particular, but burrow through wax and can feed on, and contaminate, honey as well. The mature larvae are attracted to light and leave the entrance of the hive to find soil in which to pupate. They burrow up to 200 mm deep into the soil, depending on the soil type. They prefer soft, sandy soil. In the USA, 100% of pupating larvae have been found within 900 mm of the hive. Not all larvae leave the hive – pupae can be found lodged in hives or stored material as well as soil.

Most pupae hatch and beetles emerge within 60 days unless conditions are very cold (up to 100 days at less than 10°C). Emergent beetles are pale yellowish brown at first but darken quickly. They fly readily and are attracted to light.

Beetles are strongly attracted to bees (even more so than hives/honey/pollen) and enter nearby hives where they feed. Beetles can fly well but technical detail on this is scarce. They are reported overseas as travelling with swarming bees. Adults can survive only about 5 days without food or water, but when removed from hives can complete a life cycle on various tropical and other fruits, including rockmelon, but this is not considered important in their spread.

SPREAD OF SHB

While the beetle is spread mainly by the movement by beekeepers of beehives and bees, direct spread by flying beetles up to seven kilometres has now been seen in Australia.

The beetle pupates in the soil, so the movement of soil from apiary sites could possibly spread infestation.

Wherever possible, contaminated hives should not be placed within 5–10 kilometres of other hives, to protect the uncontaminated hives from infestation by flying beetles. Weak hives and larger apiaries are more attractive to beetles.

The life cycle and multiplication of the beetle can be disrupted by appropriate treatments.

MANAGING SHB

Larvae

Consideration should be given to preventing the larvae that leave the hives from developing. Placing hives on impervious material can help, though the larvae can crawl long distances seeking soil. Larval ‘traps’ could be devised for positioning at the entrance of hives to catch larvae as they crawl out and attempt to fall to the ground.

Soil can be treated around the front of hives to reduce development of pupae. A Permit (PER 7347) has been issued for off-label use of permethrin, but you must obtain a copy of the Permit, available from offices of NSW Department of Primary Industries, from www.agric.nsw.gov.au/smallhivebeetle, or go to www.apvma.gov.au, select ‘Search for a permit’ from the panel on the left, and search under ‘Pest/Purpose’ for ‘small hive beetle’. Or you could enter the Permit number.

Adult beetles

No beetle baits are yet approved for use in hives. Apiarists will be advised as soon as possible of approved treatments and their availability.

Traps for adult beetles could be made by cutting a hole in the bottom board and attaching a glass jar with some irradiated pollen or honey in it. Jars would have to allow for forklifts used to move hives. The entrance to the hole should be covered so that beetles can get in, but not bees. An ideal cover would be corrugated plastic (in the long term bees will eat cardboard) with the lower side removed, since beetles find the corrugations attractive for cover, but a solid cover may be required to allow it to be kept in place and to prevent bees from getting into the jar. Honey and pollen (both irradiated) might be a better bait – the beetles would get stuck in the honey and not be able to fly out.

Extraction and storage facilities

Stored supers and frames contaminated with beetle eggs and larvae could be seriously damaged by developing larvae, particularly if pollen or brood are present in the comb, and if they are kept for more than a couple of days away from the bees (which protect them). All honey should be extracted as soon as possible.

If eggs or larvae are present on supers stacked awaiting honey extraction, covering

them to keep out bees or rodents will encourage rapid beetle/larval activity. Use of a fan to circulate air around and through stored supers should dry eggs sufficiently to kill them. Fibreglass fly mesh could be used as an alternative cover to allow light and air to continue to penetrate the supers.

Fumigation of extracted supers for wax moth may control SHB, but this is unknown at present. Dry air (not necessarily hot) or chilling (less than 50% humidity) will kill off eggs and slow down larvae and so prevent damage to supers and frames. Freezing at –12°C will kill all stages of beetle as well as control wax moth.

Only ‘dry’ supers should be stored if chillers are not available and supers have not been frozen.

Hive management

Contaminated supers should not be re-used until they have been decontaminated by heating, freezing or fumigation for wax moth as they can allow beetle numbers to build up without the protection of the bees.

Hives where bees do not exhibit good hygienic behaviour (attempt to remove beetle adults or larvae) could be replaced with bees that do.

Strong hives protect against SHB – weak hives should be combined or re-queened or excess supers removed to reduce the comb surface.

IF YOU DON'T HAVE SHB

- Don't buy infested hives/nucleus hives/hive material
- Don't buy infested package bees or queens (banked queens or queen cells are much higher risk than caged queens)
- Only buy queens in new cages with hand-caught escorts
- Don't place hives within 5–10 km of infested hives, or on ground where infested hives have been in the past 3 months (this may not prevent infestation from SHB in feral colonies nearby).
- Don't move stressed hives until a good nectar flow is available.

Agdex 481/20

© State of New South Wales (2005)

NSW Department of Primary Industries

The information contained in this publication is based on knowledge and understanding at the time of writing (December, 2004). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of New South Wales Department of Agriculture or the user's independent adviser.