



Wax moth and its control

Wax moth is a serious pest in beehives and can cause substantial losses of combs, damage to beehive material and spoil beehive products.

There are two species of moth - the greater wax moth, *Galleria mellonella* (see Figure 1), and the lesser wax moth, *Achroia grisella*. Neither is native to Western Australia and they were probably introduced with early imports of bees from the United Kingdom.



Figure 1. The greater wax moth is 13 to 19 mm in length. The lesser wax moth looks similar but is 10 to 13 mm long.

Wax moths occur in all beekeeping areas but are more active in the warmer parts of the south-west. They generally cause little damage in temperatures below 27°C, but above this temperature they become active and spread rapidly.

Life cycle

During its life a female wax moth lays 300 to 600 eggs, with some females laying up to 1000 eggs. The eggs are about 0.5 mm long and are laid on combs or in cracks and crevices on the wooden parts of beehives. In warm conditions, the eggs hatch in about five days, but in cool conditions hatching may take 30 days.

When hatched, the larvae are white and about 1 mm long. Fully grown larvae are greyish-white and about 28 mm long.



Figure 2. Wax moth grubs feed on honey, pollen, beeswax and the cocoons of bee larvae.

The larvae feed on pollen and honey before burrowing from the surface of the comb to the midrib. From there they tunnel through the comb, feeding on honey, pollen, beeswax and the cocoons of bee larvae. Their spread depends on the amount of food in the combs and not on the presence of wax. Bee brood (larvae and pupae) may be attacked if the wax moth larvae do not have sufficient food.

As larvae burrow through the combs, their tunnels are lined with silk and spotted with faecal pellets. Infested combs become criss-crossed with silken tunnels and may be reduced to a mass of debris (see Figure 3).



Figure 3. Wax moth infestation can reduce combs to a mass of debris, littered with silk tunnels. Note the cocoons on the outside of the frame.

Important Disclaimer

The Chief Executive Officer of the Department of Agriculture and Food and the State of Western Australia accept no liability whatsoever by reason of negligence or otherwise arising from the use or release of this information or any part of it.

The larvae often occur in bee spaces, especially in the end and top bars of frames. The larvae of the greater wax moth chew a shallow depression in the wooden parts of the beehive before pupation so continual infestation can seriously weaken frames.

The duration of the larval stage depends on temperature and the food supply. It may be six months if the weather is cold and there is a shortage of food. With warm conditions and abundant food, larvae can be fully grown in one month. Comb damage is greatest when they are in larval form.

When fully grown, the larvae move to a wooden part of the beehive to pupate in silken cocoons. With the greater wax moth, many cocoons may be clustered together with the pupal stage lasting about 10 days in warm conditions. The cocoons of the lesser wax moth occur singly rather than in clusters with a pupal stage of about 16 days during warm conditions. After pupation, the adult moth emerges to complete the life cycle.

Wax moth control

The recommended methods of controlling wax moth are beehive management, cool storage and freezing of combs. Fumigants and other chemicals previously used to control wax moth have caused residues in honey and are discouraged.

Do not use naphthalene flakes or common moth balls as a fumigant since wax and honey in the comb absorb the naphthalene. These contaminated combs can repel as well as be toxic to bees.

Beehive management

Apiary hygiene is essential to prevent a wax moth infestation and regular inspection of beehives will enable the wax moth to be easily controlled. Failure to periodically inspect beehives and provide correct beehive management is the main cause of extensive wax moth damage. In most cases, comb losses drop appreciably when better hygiene practices are adopted. It is an offence under Section 19 of the *Western Australian Beekeepers Act (1963-80)* to keep beekeeping equipment in a manner that encourages wax moth infestation.

Strong colonies can often protect themselves from wax moth intrusion, but weak colonies may not be able to control the infestation. In warm weather, the combs in a weak or died out beehive could be destroyed in two to three weeks.

The Italian honey bee is able to control wax moth infestation better than darker European species because of its house cleaning ability. Therefore beekeepers should regularly re-queen with young queens of the Italian strain. This will ensure that all colonies remain strong and prevent wax moth damage. Introduce nucleus colonies to beehives before they become weak. Check all weak or died-out beehives for signs of disease.

If nuclei are not available to immediately restock beehives, the damaged combs and debris should be burnt and buried. Beehives should be sealed and returned to cool storage until they can be restocked with bees.

Died out beehives should be immediately cleaned up and used comb protected.

Surplus supers that require storage and protection from wax moth should be returned to the beehives. The beehive mat should be placed below the super to confine the beehive to its desired size. The mat keeps the colony warm in winter, while the bees retain access to the super above to control wax moth.

Beekeepers should store empty combs in such a way that wax moth is unable to cause problems. Stored combs are particularly susceptible in the warm spring and summer weather. Frames used for pollen storage or brood rearing are most susceptible to attack. Wax moth causes less damage to white combs used for honey storage.

Keep pollen refrigerated as wax moth readily lay eggs in pollen in pollen traps.

Cool storage

Coolrooms are the most convenient means of controlling wax moth for the commercial beekeeper. They are recommended for operator safety, chemical free honey and convenience. Combs can be placed directly into the coolroom following extraction to protect them from wax moth attack. In addition, beehives that have died out or have wax moth infestation can be cleaned out, and sound equipment stored until they can be reused.

The coolroom must be maintained at 10°C to prevent wax moth reproduction and living larvae from becoming active. A thermometer, allowing the apiarist to check the temperature of the coolroom without opening the door, is also a sound investment.

NOTE: Combs stored at low temperatures become brittle and must be handled carefully to avoid damage. Turn the coolroom off or remove stacks of combs from the coolroom the day before use to allow the combs to reach room temperature. This practice will prevent damage during loading or transport.

Freezing

This method provides effective wax moth control for beekeepers with only a few beehives.

The following minimum freezing treatments are required to kill wax moths in all stages of their life cycle:

- minus 7°C for 4.5 hours;
- minus 12°C for 3 hours; or
- minus 15°C for 2 hours.

Bulky materials, containers of pollen or combs containing honey may require longer exposure for the treatment to be effective. Supers can then be stored in sealed stacks using packaging tape to prevent wax moth re-infestation. Alternatively, store the frames and supers or dry pollen in sealed plastic bags after freezing. Ensure that the bags are stored in a cool place to avoid sweating and prevent combs melting especially during summer months.