

Preventing beeswax combs from wax moth damage

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The wax moth is a highly destructive insect that attacks and destroys beeswax combs especially those in storage. The moth itself is not a problem; it is the larvae that do the destruction. The moth loves old combs and visits stored combs which are unprotected and could reduce them to a mass of webbing very rapidly. Combs in storage are ideal grounds for the breeding of wax moths. A beekeeper should take preventive action to protect his unused combs against wax moth attack during storage in winter to avoid losing valuable combs.



Wax comb damaged by wax moths
(Photo Courtesy of Dale R. Rohe)

There are two ways of protecting unused combs against wax moth infestation:

1. comb storage
2. Chemical methods

Comb storage

- a. Storing combs in moth-tight cupboard or keeping them in sealed polythene bags. The combs should not be removed from the bag until they are required to be put back on the hive.
- b. Storing boxes of empty combs atop strong colonies.
- c. Some beekeepers in the UK protect their combs by wrapping them in newspaper which the moths dislike its smell, this is done as soon as combs are removed from the hives. This method has been claimed to give good results.

Chemical methods

There are several effective chemical fumigants being employed in treating wax moth, of which the following to be recommended for their safety, convenience and economic.

Paradiclorobenzene (PDB)

Paradiclorobenzene is a fumigant that is widely used to protect stored combs against wax moth. It is a white crystals substance that vaporizes very slowly and produces a gas that is heavier than air. Paradiclorobenzene is non-flammable and non-explosive and is safe to use but it should not be used to fumigate combs of honey that is to be used for human use.

Honey absorbs the odour of PDB and such honey becomes unfit for human consumption. Paradichlorobenzene kills the adult and larvae and does not kill the eggs of the wax moth.

The use of PDB for controlling Wax moth

Combs that have been extracted are returned to the colonies to clean them from the remaining honey. After a day or two they are taken off and stored in hive bodies (supers). Supers full of combs are stacked tightly in a stack of no more or higher than five hive bodies. The joins between the boxes are sealed with tape or paste paper to keep in the fumes. 85 grams or 6 tablespoons of PDB crystals or powder is put on a piece of paper or cardboard 15cm square placed on the top of the frames in the top super. The top super is closed up with outer cover. As PDB evaporates gradually; the fumes will sink down through the boxes, this kills larvae as they hatch from the eggs. The PDB should be replaced when all the crystals have evaporated. The constant presence of PDB in the stack will repel moths and prohibit egg laying and prevent infestation during storage. The treatment should be continued at intervals of 2 or 3 weeks all winter.

The fumigated combs should be aired for at least 24 hours before they are put back in bee colonies in the spring. This is usually sufficient to remove the chemical fumes. The bees will not easily move into combs that smell of PDB.



Stacked boxes of combs being fumigated
(Photo by Paul Hooper, Beekeepers Association of the ATC, Australia)

Acetic acid

Acetic acid 80% can be used for controlling wax moth in stored combs and for cleaning combs from *Nosema* spores. Fumigation with acetic acid will kill moths and their eggs and larvae. After the honey is extracted, boxes of combs are piled in stacks, no more than five high. The seams between the boxes are taped with paste paper to form an air tight seal. A wad of cotton wool 15 by 15 cm or similar absorbent material soaked in 80% acid is placed on top of the uppermost frames in the stack before the lid is sealed, using 25 millilitres 80% acetic acid per box in the stack. The top of the stack is covered with a hive roof and the

stack is left undisturbed for two weeks. The fumigation can be repeated at intervals of 2-3 weeks.

Acetic acid must be handled with caution to avoid splashing the liquid on the hands or on the face or into the eyes. Splashes on the hands should be washed off immediately.

After fumigation the boxes of combs should be aired for about two days before they are used.

Flowers of Sulphur (Sulphur dioxide, SO₂)

Sulphur is an effective repellent used in controlling wax moth, it forms fumes (sulphur dioxide, SO₂) on burning and it is highly volatile. Sulphur kills adults and larvae but is ineffective against eggs.

The combs are treated in the boxes in which they are stored. For this, a top cover of a hive is placed upside down on the floor and an empty box is placed over it to keep the combs from too close contact with the burning sulphur. A vessel or saucer containing burning pieces of coal and sulphur powder is placed in the empty box, using 2 ounces (approximately 60 grams) sulphur powder for every stack of five boxes. Supers or boxes of frames no more than five high are placed above the empty box with burning sulphur and the top box is covered with outer cover after stopping its ventilation holes. The seams between the boxes and any gaps in the stack through which the fumes might escape should be sealed with tapes or gummed papers. Several treatments are repeated with an interval of a fortnight to destroy larvae that hatch during storage. The treated combs must be aired until the smell of sulphur is no longer perceptible before they are put back in the hives.

Naphthalene (moth balls)

Moth balls are sold for the prevention against cloth moth in cupboards. Some individuals use these balls to prevent wax moth infestation from destroying the combs over winter. Some say that they are not effective against wax moth, some that have used them claim success. Others discourage the use of them because Naphthalene leaves harmful residues in the wax and advise the use of those moth balls are made from Paradichlorobenzene.

Supers containing the frames wax are stacked together with a sheet of newspaper laid between supers with a mothball is on each sheet of newspaper to prevent the combs placed above it and to inhibit movement of wax moth adults.

The combs must be thoroughly aired out for several days before use.

Biological control

Certain is a biological insecticide used for the prevention and control of wax moth damage for both stored combs and live colonies. It is a suspension of spores of the bacterium *Bacillus thuringiensis*. Its commercial name is: B401. It is mixed with water and applied as spray on each side of the combs. It can be applied before storage in the fall or before putting combs into the hives in the spring. Certain is non-toxic and does not harm bees or contaminate the honey or wax. The preparation of *Bacillus thuringiensis* is effective against wax moth larvae; when a larva eats the spores they germinate to produce a lethal toxin in the gut that kills the larva.

It should be added here that a British beekeeper claimed that he had no longer problems with wax moth by placing a layer of tobacco leaves between boxes of combs in storage and placing a lid on the top.

It is also said that the herb wormwood (*Artemisia absinthium*) is reputed to deter moths.

Note

In warmer climates, wax moths are more likely to be a serious problem. Warm temperatures ensure a viable wax moth population all year round and accelerate the rate of moth's development and the destruction process in stored combs. It is necessary to inspect the stored combs regularly in warm weather and during hot summer. If a slight damage, the infested parts are cut out and larvae destroyed. If severe infestation, the wax are scraped off the frames and all wax is burnt. The frames are scorched with a blow torch or soaked in hot water containing washing soda or a household detergent compound. The hive body is also cleaned up and scorched.

In regions with cold winters or mountainous areas above altitudes of 1000m, wax moths do not cause much damage because moth's development comes to a standstill at temperature below 9C and all stages of wax moth are destroyed by a severe frost or freezing.

Further reading

1. Wax moth and its control, Department of Agriculture and food, Australia Note: 252 in www.agri.wa.gov.au [\[PDF\] Wax moth](#) - [View as HTML](#)
2. Wax moth, By Doug Someville, Prime fact 658, in www.dpi.nsw.gov.au [\[PDF\] Wax moth and its control](#) - [View as HTML](#)