Almond IPM: Carpophilus beetle and carob moth in almonds - a visual guide

AGRICULTURE VICTORIA

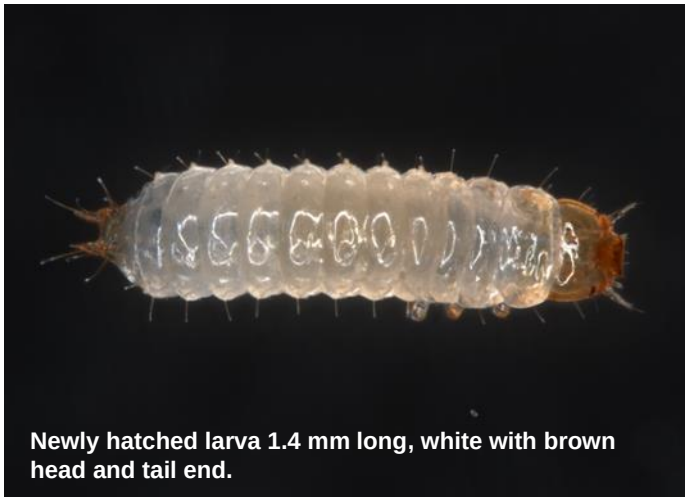
Carpophilus beetle and carob moth are the most damaging insect pests of almonds in Australia. Both pests can infest a new crop of nuts at hull split and cause significant losses in crop value due to kernel damage. Carob moth appears to be present in most of Australia's almond growing districts, but in some areas carpophilus beetle has not yet become a serious pest.

It is important to correctly distinguish between carpophilus beetle and carob moth damage, for informed decision-making regarding the most appropriate pest management strategy. This factsheet provides a visual guide for the identification of both pests and their damage to almonds. In many cases the insects and damage can be differentiated with the naked eye, but in some situations a dissector microscope or hand lens (at least x10) may be necessary.

Carpophilus beetle

Carpophilus species

Eggs are 1.5-2 mm long, creamy/white.



Newly hatched larva 1.4 mm long, white with brown head and tail end.

Carob moth

Apomyelois **(=***Ectomyelois***)** *ceratoniae*

Eggs are 0.7 mm long, white when freshly laid then turn pink.

Newly hatched larva 1 mm long, pink with brown head, and clear empty egg case.

Carpophilus beetle

Mature larvae, creamy white with a brown head and tail end. Up to 5 mm long.

Pupae are white, 3.5 mm long.

Adults are black, 2-3 mm long.

Carob moth

Mature larva, pink with a brown head. Up to 15 mm long.

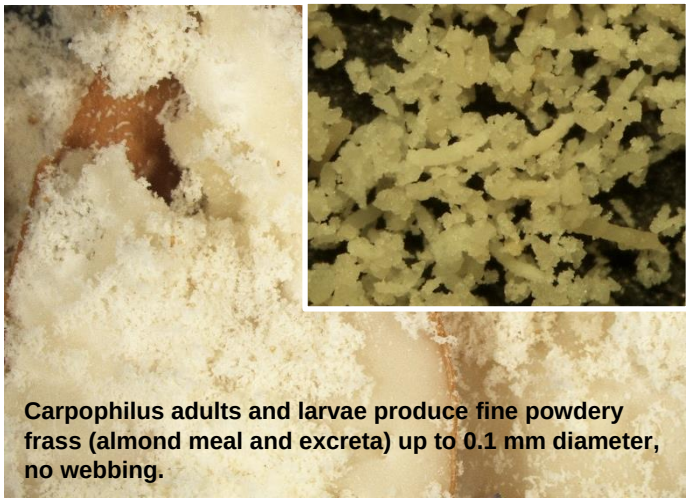
Pupae are pale-dark brown, 10 mm long.

Adults are mottled grey, 8-12 mm long, with a wavy mark across the wings.

AGRICULTURE VICTORIA

Carpophilus beetle

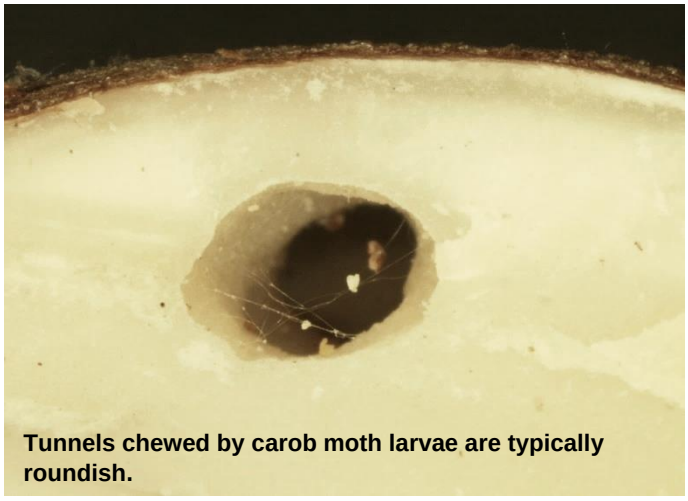
Tunnels chewed by carpophilus larvae are often flattened in cross-section.



Carpophilus adults and larvae produce fine powdery frass (almond meal and excreta) up to 0.1 mm diameter, no webbing.

Carpophilus tend to consume the meat of the kernel and leave the brown skin.

Carob moth



Tunnels chewed by carob moth larvae are typically roundish.

Carob moth larvae can also produce fine almond meal, but this is usually accompanied by lumpy excreta (up to 0.5 mm diameter) and caught in fine silky webbing.

Carob moth larvae consume the skin as well as the meat of the kernel.

AGRICULTURE VICTORIA

Generally, almond kernels will be infested by either carob moth or carpophilus beetle, but both pests can occur together in a single kernel. When assessing damage levels, co-occurrence of pests should be considered so that damage is correctly attributed to each pest.

In some cases, it is difficult to attribute damage to either pest because of the lack of clear evidence (see image to right).

In such cases, signs within the shell or between the hull and shell can help identify the pest (such as lumpy frass or webbing from carob moth or fine powdery frass from carpophilus beetle).

For this reason, the assessment of nuts for kernel damage should include inspection of the whole nut (hull, shell and kernel).

Entrance hole without any distinguishing external or internal features (frass, webbing, powder or insects).

Where confirmation of identification of these pests is required (particularly at the genus and species level), insect specimens need to be sent to an experienced entomologist/diagnostician. It is important to confirm the identification with a physical specimen rather than relying on the symptoms alone.

Prepared by Agriculture Victoria Research (Invertebrate & Weed Sciences) for Hort Innovation project AL16009 'An Integrated Pest Management program for the Australian almond industry'.

Acknowledgements

All photographs by Agriculture Victoria Research.

Hort Innovation Strategic levy investment | ALMOND FUND

This project has been funded by Hort Innovation using the almond research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

AGRICULTURE VICTORIA