

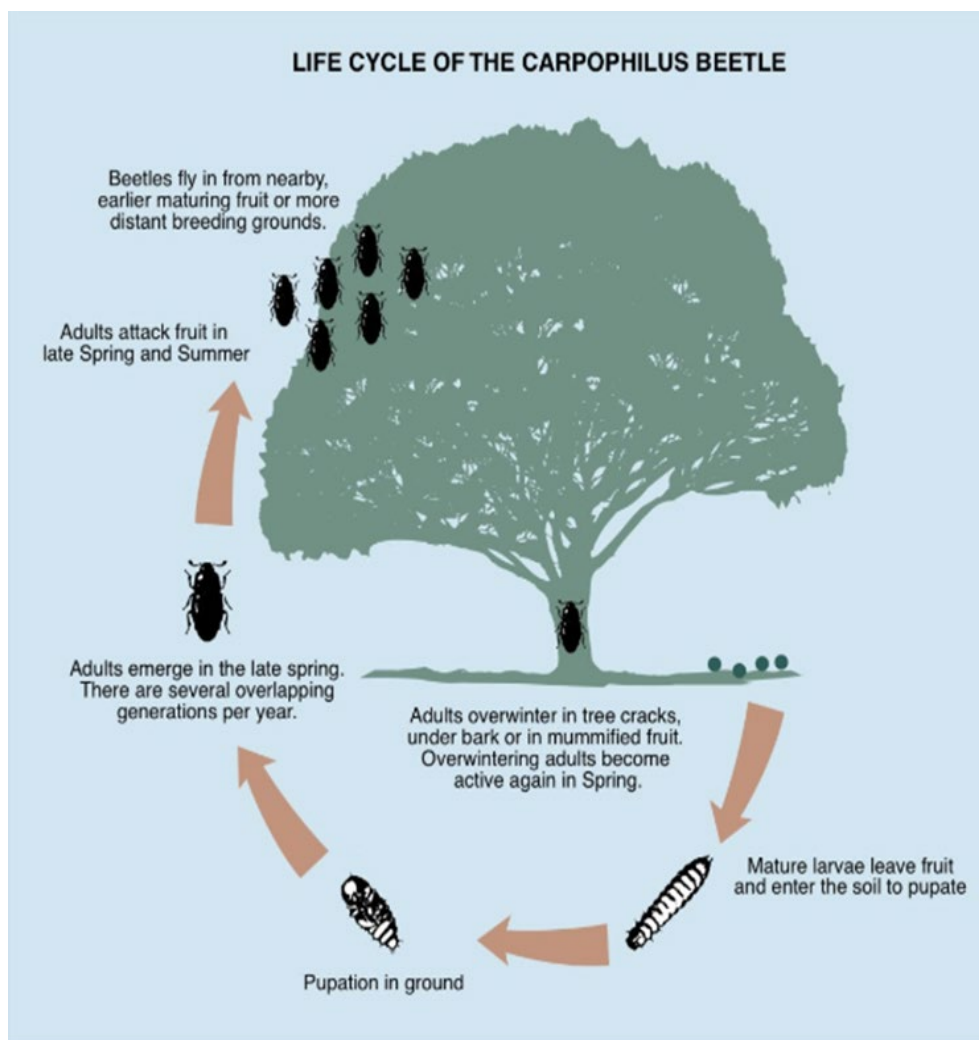
Presented by Rachael Lee

ORCHARD SANITATION AND RECENT RESEARCH



INTRODUCTION

- *Carpophilus truncatus* and Carob moth damage.
- Reducing potential for pest insect invasion and disease outbreaks.
- Research completed this year focusing on Habitat Manipulation to attract and retain beneficial insects in the orchard.
- Additional research to understand when *Carpophilus* beetle can access the kernel.
- Integrated pest and disease management for orchards.



Orchard sanitation and Carpophilus beetle damage – sweeping and mulching to reduce feed sources for the adults and larvae post-harvest.

Pupae busting in orchard rows during winter.

Promoting predatory and parasitic insects in orchards.

Recent research by DEECA suggests majority of Carpophilus adults and pupae are in the top 10cm of soil.

C TRUNCATUS DAMAGE

- Carpophilus larvae can destroy kernel quickly if left unchecked.
- Eggs are 1.5-2mm in size and adult can lay several hundred at a time.
- Difficult to effectively control with insecticide close once broken hull stage reached and larva are semi-protected.
- Effective suppression of any pest combines cultural, biological and chemical controls as part of IPM program.



CAROB MOTH

- Carob moth is one of the most damaging pests in almonds and pistachio orchards.
- Larvae causes significant damage to kernels in orchards after broken hull stage.
- Eggs are laid in mummified nuts left on orchard floor and in trees.
- Monitoring for moth flights for targeted chemical control.



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.

Carob moth damage in almond kernel –
Almond Board

BENEFICIAL INSECTS AS BIOCONTROL



Beneficial insects

Attracting and retaining generalist predatory and parasitic insects in the orchard assists with suppression of soft bodied life stages of pest insects ie eggs and larval stages of Carob moth and Carpophilus beetles.

Ecosystem services

The addition of insectary plantings in farm areas unsuitable for cropping, reduces need for consistent management of wet areas, controlling weed banks and enhances farm biodiversity.

Pest insect reduction

A reduction in impact of pest insect damage to orchard from suppression by predatory and parasitic insects.

ORCHARD SANITATION - WINTER SHAKE, SWEEPING AND MULCHING



Sweeping and mulching

Incorporate with the removal of mummified nuts and rachises from winter shake.

Sweep all leaves, previous season nuts, rachises, winter pruning and debris into the interrow space and mulch.

Removal of potential hosts of fungal infections like Anthracnose, Botryosphaeria and Alternaria from the canopy.

Destroy kernels potentially containing pupae or harboring disease. Removal during post harvest sanitation reduces disease pressure in orchards.

MULCHING

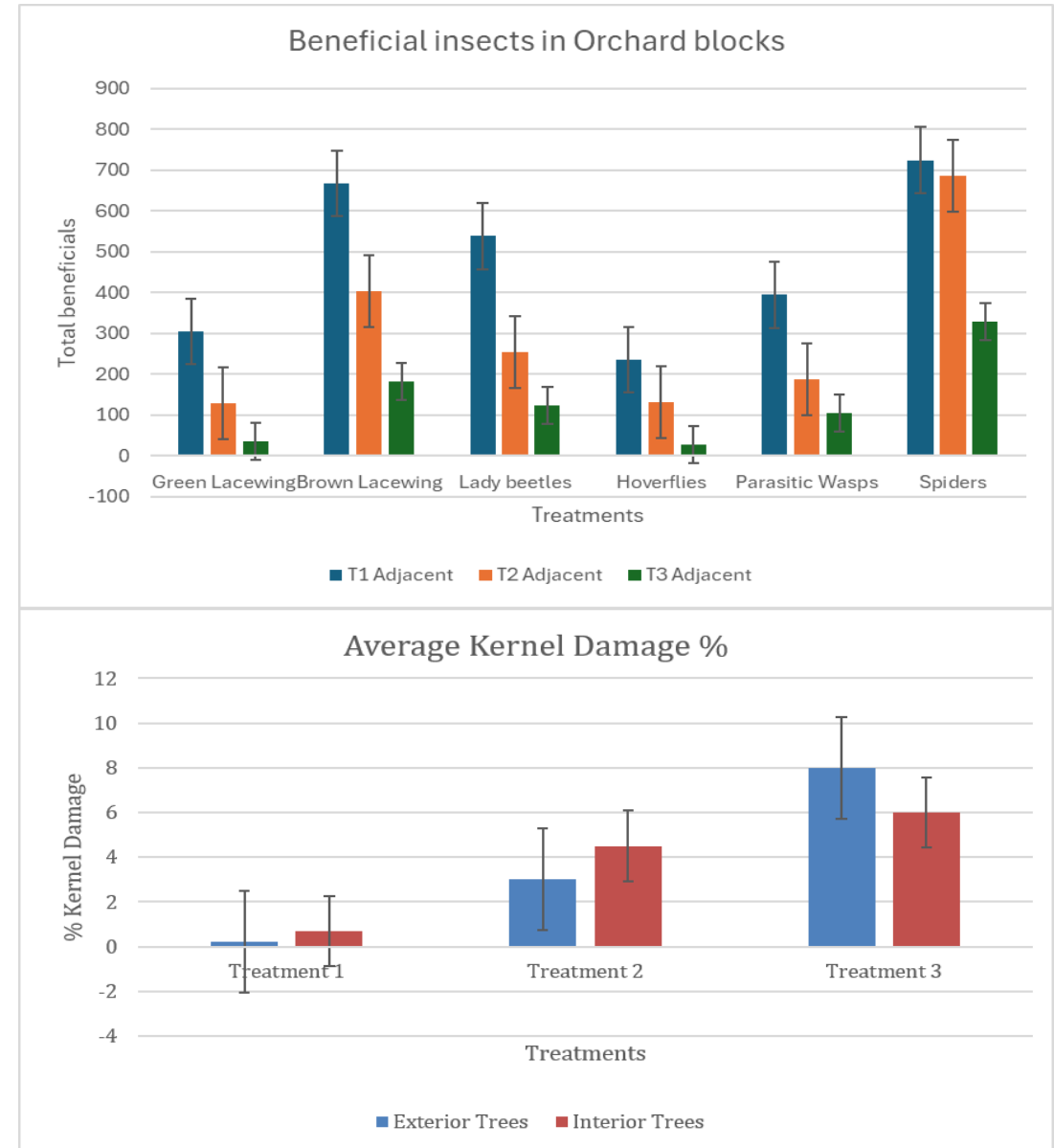


Sweeping mummified nuts and pruning's away from irrigation lines into the centre of rows to be mulched. Nuts are then destroyed and pupae disrupted.



Research:

- Habitat manipulation as a form of biological control for pest insects – presented at 9th Annual Almond and Pistachio Symposium, Lleida, Spain. To be published 2026.
- Completed from October 2025 – March 2026, showed an up to 80% reduction in kernel damage from *Carpophilus* beetle in orchard blocks adjacent to insectary plantings.
- Increase in beneficial insects in orchard blocks of between 64 – 367%. Target insects shown in orchard blocks where, T1 (insectary), T2 (existing scrub) and T3 (control).



Carpophilus beetle and kernel access

Research during 2025/26 season to pinpoint earliest maturity level that *C. truncatus* could access kernel.

Carpophilus alone could only access kernel from Broken Hull stage.

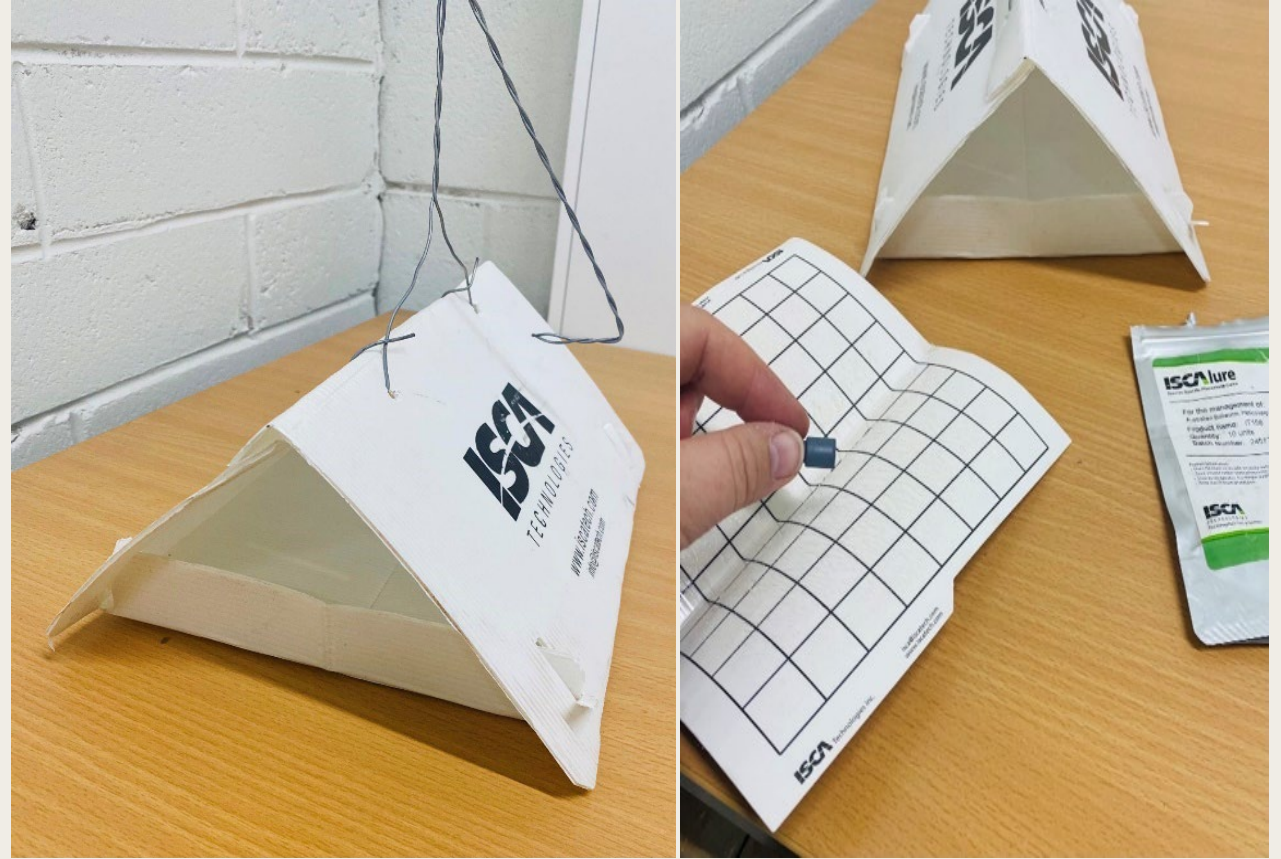
Carob moth larvae accessed kernel from Feathered Hull onwards, allowing Carpophilus to access the kernel earlier.

Suppression of both pests as part of IPM program will reduce crop damage in final stages of production.



MONITORING AS PART OF IPM

- Monitor fortnightly for pest insects in the orchard throughout growing season.
- Use traps with a pheromone lure for pest insects like Carob moth, Light Brown Apple moth and Helicoverpa (cotton bollworm and native budworm)
- Know what pests are in your orchard and their lifecycles to address the issue sooner.
- Visual inspections of orchard blocks for pests and disease.



ISCA traps and lures, Swan Hill Chemicals



ACKNOWLEDGEMENTS

I would like to thank the Pistachio Growers Association for asking me to speak today.

I would also like to sincerely thank Andrew Bowring for allowing me to conduct research on the farm at Kyalite and for answering my many questions.



Q & A