

INTRODUCTION

The almond carpophilus beetle (*Carpophilus truncatus*) was first seen damaging almond kernels in Australia during the 2013 harvest. By the 2014 harvest it had emerged as a major economic pest and is now present across all major almond production regions, although its distribution within and between farms can be patchy. High levels of kernel damage can be experienced particularly after wet seasons and in situations where *C. truncatus* is not actively managed.

This protocol provides guidelines on how to collect fruit samples in-field at harvest to assess for *C. truncatus* infestation and kernel damage.

It is intended for use alongside the 'Almond IPM: Carpophilus beetle and carob moth in almonds - a visual guide' found on the Almond Board of Australia [website](#).

FRUIT COLLECTION

- **When:** Collect fruit **at harvest**, ideally after the trees have been shaken and before the fruit have been swept from the orchard floor.
- **Where:** Collect fruit **from the ground** around specific trees near each monitoring trap.
- **How:** Select **4 Nonpareil trees**.
 - Two trees in the same row, but 4-7 trees away from the trap.
 - Two trees 3-5 rows away from the trap.

The 4 Nonpareil trees will form a cross formation around the trap (Fig. 1).

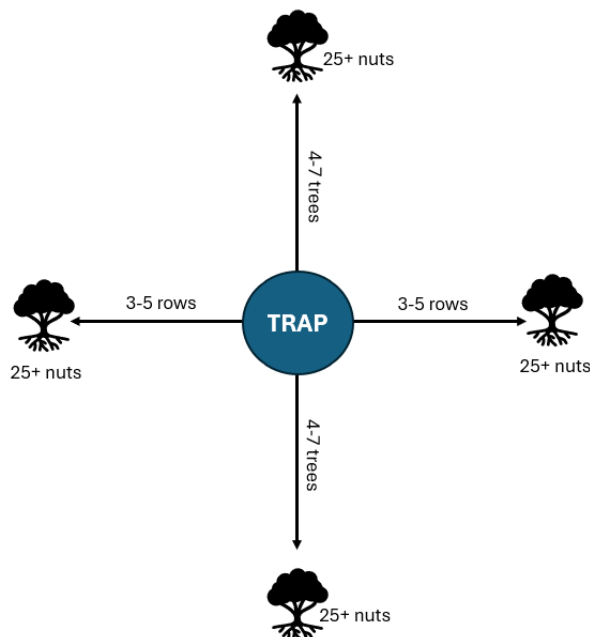


Figure 1. Tree locations for fruit collections.

Collecting fruit in a cross formation ensures that damage assessments are taken at an optimal distance from each trap. Because *Carpophilus truncatus* presence is patchy across orchards, fruit should be collected close to each trap (within 37 m) to accurately reflect damage levels where the trap is situated. However, avoid collecting too close to the trap itself, as the device may interfere with the level of beetle damage in the nearby fruit.

- On the ground around each tree, **collect 25+ fruit**, targeting Nonpareil that are **intact** (i.e. kernel in a shell, in a hull). Collecting a few extra ensures you have 25 intact fruit. Avoid other nut types if windfall is present.
- Put fruit in a container (bag/bucket).
- Repeat this around each of the 4 trees, so there is a **total of 100+ Nonpareil fruit**.
- All fruit from the 4 trees can be placed in the same container and stored in a cool, dry place.
- Record the following information on a piece of paper and attach it securely to the container (e.g., using a staple gun) so that it is not lost during storage:
 - i. **orchard.**
 - ii. **trap ID.**
 - iii. **date collected**
 - iv. **potential mixed varieties: Yes/ No**

If the fruit has dropped or blown into the mid row, some pollinator fruit could be mixed in with Nonpareil which may skew the results. **Record the potential presence of mixed varieties on the container label.**

There can be orchard/block edge effects.

If the trap was positioned near the edge of a block, and fruit cannot be collected from trees in 4 different

directions (Fig. 1), collect 35+ fruit from three trees in the 3 other directions (still 100+ fruit total).

If unable to assess damage within 24 hrs, **store the fruit in a cool and dry area** (~4 °C; fridge/cool room temperature) for up to a month to prevent further kernel damage.

DAMAGE ASSESSMENTS

In many cases the insect and fruit damage can be differentiated with the naked eye. However, sometimes it may be necessary to use a hand lens (at least x10) or a dissector microscope.

- **Print** the '[Almond IPM: Carpophilus beetle and carob moth in almonds - a visual guide](#)' from the [ABA website](#) to assist you with differentiating *C. truncatus* and carob moth damage.
- **Print the recording sheet** provided below to record damage from all fruit collections around a trap.
- **Check each fruit** for signs of carob moth and *C. truncatus* presence/damage. Do not discard the hull and shell until you have finished assessing the kernel.
 - **Remove the shell from the hull. Inspect** the inside of the hull and outside of the shell.
 - **Crack open the shell. Inspect** the kernel and inside of the shell.
 - **Note any live *C. truncatus*** (adults or larvae) that are found anywhere in the fruit by ticking the relevant column in the recording sheet.

*NB: Carob moth and *C. truncatus* can be found together in the one fruit. If carob moth is found, continue to search for *C. truncatus*.*

*NB: *Carpophilus truncatus* larvae are white, whereas carob moth larvae are pink (Fig. 2).*



Figure 2. *Carpophilus truncatus* larva on left and carob moth larva on right.

- **Identify the cause of any kernel damage** (carob moth or *C. truncatus* or both or unknown) using the '[Almond IPM: Carpophilus beetle and carob moth in almonds - a visual guide](#)'. Tick

the relevant column/s in the recording sheet.

- Damaged kernels should be cut or broken open to confirm the presence/absence of *C. truncatus*, if it is not obvious externally.
- **Repeat for all 100 intact fruit.**

Make sure the presence of live *C. truncatus* and/or kernel damage is recorded for each fruit as the sample is sorted.

- Record (i)-(iii) above on the recording sheet and add iv) **date assessed**, and vi) **which fruit have live *C. truncatus* and/or kernel damage**. Ensure you record which trap and date this data relates to.

DATA INPUT AND REPORTING

- **Send the recording sheet for each trap to Peter Jealous (ABA) at** pjealous@australionalmonds.com.au.

NB: For the 2026 harvest season, the Almond Board of Australia will collect and share this information with Agriculture Victoria for analysis as part of the Carpophilus beetle monitoring network. Please note all information will be treated as confidential and used only for the purpose for which it was collected. Data will be presented as a de-identified graph of all participants, to visualise the relationship between beetle catches and kernel damage.

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Almond kernel insect damage assessments– record sheet

Refer to 'Almond IPM: Fruit sample collection and damage assessment' to find out how and when to sample fruit.

Refer to '[Almond IPM: Carpophilus beetle and carob moth in almonds - a visual guide](#)' when identifying pests and assessing kernel damage.

Orchard:
Date collected:
Trap ID:
Date assessed:

Fruit	Live <i>Carpophilus truncatus</i> anywhere in fruit	Kernel damage		
		<i>Carpophilus truncatus</i>	Carob moth	Unknown insect
Example	✓	✓	✓	X
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