Almond carpophilus beetle: Protocol for installing and servicing monitoring traps

AGRICULTURE VICTORIA

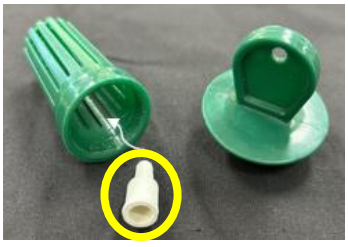
KEY POINTS

- Almond carpophilus beetle (*Carpophilus truncatus*) is a serious pest of Australian almond crops.
- Almonds are vulnerable to attack from the beetle once the hulls have split.
- Blocks most at risk are those with a history of damage by the beetle and where mummy nuts are prevalent.
- A lure that targets this beetle has been developed by Agriculture Victoria through the Hort Innovation Almond Integrated Pest Management projects (AL16009 & AL22003).
- This protocol details the components, including the new lure, and installing and servicing of a trap for monitoring almond carpophilus beetle.

COMPONENTS OF THE ALMOND CARPOPHILUS BEETLE MONITORING TRAP

A plastic funnel trap with a disc of steel mesh in the funnel to exclude larger insects from the trap. To make the surface very slippery and prevent beetles escaping the trap, the lower section of the funnel is coated with fluon paint.

A small container with a screw top lid and mesh gauze to allow liquid ‘co-attractant’ to release a synthetic blend of yeast/fruit odours attractive to almond carpophilus beetles.



A cage holding a rubber plug (septa or lure) impregnated with pheromone compounds. The pheromones are synthetic copies of ‘aggregation pheromones’ that male almond carpophilus beetles produce when they are feeding on a suitable food, such as almond kernels. This attracts carpophilus beetles of both sexes.

A fully assembled trap is illustrated below.

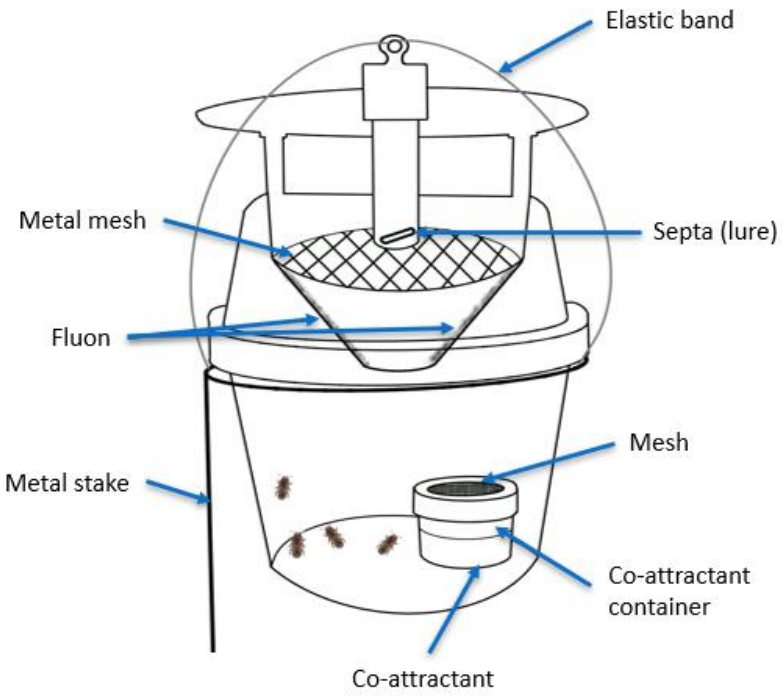


Figure 1. Schematic of an assembled trap.

HOW THE TRAPS WORK

The pheromones and co-attractant odours are attractive to male and female almond carpophilus beetles. These odours work together synergistically to provide a powerful lure that will pull adult beetles into the traps. The funnel's shape and fluon coating help to prevent the beetles from escaping the traps.

HOW TO STORE THE LURE COMPONENTS

- Septa should be sealed in a plastic bag or vial and stored in a freezer away from food.
- During orchard visits for trap maintenance, the septa should ideally be carried in an ice box or car fridge.
- The co-attractant can be stored in sealed drums at room temperature. It does not require refrigeration.
- Do not store the co-attractant in hot situations (>30°C) such as open sheds in summer.
- Do not store the co-attractant in areas that are used to store food or drinks.

Note: the co-attractant is a hazardous substance. Always wear latex/nitrile gloves and eye protection when handling. Refer to the safety data sheets (SDS) before use.

WHEN, WHERE, AND HOW TO INSTALL MONITORING TRAPS

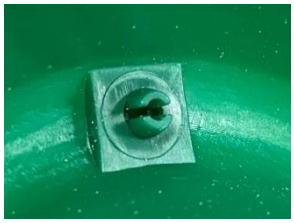
Note: when handling traps, avoid contact with the fluon paint to minimise disruption of the coating.

Site selection

- Although almonds are susceptible to infestation by almond carpophilus beetles from hull split onwards, this pest starts to become active and attracted to traps as temperatures increase in late winter/early spring. Monitoring from this time onwards will provide an indication of activity levels of the pest in the vicinity of the traps.
- Select high priority blocks to monitor. In infested orchards, almond carpophilus beetles can be found in spring in almond mummies on the ground. Inspection of these nuts may help to identify infested blocks and highlight areas where monitoring traps should be installed. Blocks with a history of kernel damage, hull rot and high numbers of mummy nuts should be given special attention.
- Traps are best placed in rows of Nonpareil – the most susceptible variety.
- Avoid installing in the outside tree rows. Select a position at least 10 trees from the start of the tree row.

Trap installation

- When assembling the traps, ensure that the end clips of the rain cap legs are firmly clicked through the top of the funnel, as shown here.



- Install traps in a shady position. Traps in the sun will get hotter which is likely to reduce the effective life of the pheromone and co-attractant.
- Placing traps in the tree line will reduce disruption or damage when using farm machinery.
- Push the metal stake into the ground in the designated place so the trap sits in the ring and rests on the ground. Firm contact with the ground will minimise trap movement due to wind or harvest blowers.
- Attach the trap to the ring of the metal stake using the two rubber bands looped around the ring and hooked over the handle of the septa holder as shown in Figure 2 below.
- Traps will be easier to find if a nearby tree is marked with brightly coloured flagging tape.

Figure 2. Trap installation.

Left: The metal rod with rubber bands in place.

Right: The rubber bands secure the trap to the metal rod.

HOW TO SERVICE THE TRAPS

- Each fortnight the beetle catch in each trap needs to be collected and measured. The septa need to be replaced at the same time.
- Replace the co-attractant every 4 weeks.
- The beetles may be less active and easier to handle if traps are serviced in the morning when it is cooler.
- If possible, service the trap and collect data on the same day of the week. For convenience, a record of the trap servicing history can be kept using the attached service record sheet (examples of data in grey).
- Wear latex/nitrile gloves and eye protection when handling the co-attractant and septa.
- With practice, each trap will take about three minutes to service. The process is detailed below. A checklist of equipment required for trap servicing is provided below.

Note: Handle the trap carefully and on a flat and stable surface to avoid spilling the co-attractant or damaging the fluon coating.

1. Remove the trap from the ring and place it on a stable surface. Unclip the top (green) part of the trap from the bucket and sit the top upside down to avoid wear to the fluon coating.

2. Brush any beetles off the top of the co-attractant container into the trap with a paintbrush and remove the co-attractant container.

3. Check for earwigs under the lip of the trap bucket. If present, brush them off before emptying the trap.

4. If there are too many beetles in the trap to count easily, tip them into an appropriately sized measuring cylinder using a paintbrush and funnel. Carefully tap the cylinder a few times onto a hard surface to settle the sample. If a few beetles are alive and/or are lost in this process, make a note in the ‘comments’ section.

5. Record the count (number) or volume (mL) of beetles captured.

6. A) If the beetle sample is to be kept, pour the beetles into a plastic Ziplock bag with a label inside that clearly lists the farm name, trap number, and date (preferably written in pencil). If a trap contains no beetles, write ‘zero’ on the sample label and include the label with the other samples. This is important to differentiate between zero counts and missed counts. The bagged samples should then be kept cool until they can be stored in a freezer.
   B) If the beetle sample is not required, tip it into a sealable bag for later disposal, e.g. in general household waste.

7. If needed, clean the inside of the trap (using a cloth/brush) and ensure the green cone is free of spider webs.

8. When replacing the co-attractant (every 4 weeks), remove the lid from the co-attractant container and tip the used co-attractant solution into a separate waste container (don't throw it out in the orchard). It is important not to just top up old co-attractant as it will dilute the new solution, making it less attractive.

9. Refill with 250 mL of fresh co-attractant solution (up to the ridge on the container; the black line in the image), replace the lid and place the container back into the trap bucket.

10. Remove the old septum from the cage and replace with a fresh septum, then replace the cage securely into the trap lid. Old septa should be collected in a bag or container and removed from the orchard for disposal.

11. Reclip the top part of the trap securely onto the bucket.

12. Replace the trap into the metal ring and secure with the rubber bands, remembering to handle the trap carefully to avoid spilling the co-attractant.

DISPOSAL OF USED SEPTA AND CO-ATTRACTANT

- Used septa can be discarded in general household waste.
- Used co-attractant can be disposed of by evaporation:
  - Fill the cat litter tray with gravel or cover it with mesh to exclude pets or wildlife
  - Place the tray in an open, sunny position
  - Each time the traps are serviced, tip the collected co-attractant waste into the tray where it will evaporate
- Do not dispose of used co-attractant by tipping it down wastewater or sewer drains or dumping it on the ground in or near the orchard.

MORE INFORMATION

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AGRICULTURE VICTORIA SERVICES

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SERVICE RECORD SHEET

Date	Block	Trap number	Beetle		Changed		Comments
			Count	Volume (ml)	Septa (2 weekly)	Co-attractant (Lure AI) (4 weekly)	
11.12.25	5	3		6	✓	✓	Harvest early pollinator
25.12.25	5	3	30		✓	✓	Harvest early pollinator; two beetles escaped

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CHECKLIST OF EQUIPMENT REQUIRED FOR TRAP SERVICING

- Latex/nitrile gloves
- Eye protection/safety goggles
- Service record sheet and pens/pencils
- Paintbrush
- Funnel
- Measuring cylinders (of different sizes) and stands
- Ziplock bags
- Labels
- Ice box/car fridge
- Cloth
- Waste container
- Co-attractant bottle/s
- Septa (contained in ice box/car fridge)
- Bag/container for old septa