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Banana weevil borer mass trapping: a novel design using long-lasting pheromone lures in NSW

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Banana weevil borer (*Cosmopolites sordidus*) is one of the main issues for the banana industry globally. Banana weevil borer (BWB) infestations affect nutrient uptake, contributing to slow growth, decreased bunch weights and overall poor plant health. High numbers in the field can significantly affect productivity as the weevils create a network of tunnels in the corm, reducing plant growth. This tunnelling weakens the plant, increasing the likelihood of plant blowdowns.

Among the sustainable ways to combat this challenge, mass trapping has been practised as an efficient technique. Mass trapping reduces pest numbers by luring them, with an attractant, in large numbers to a trap that either kills them or prevents their exit (Figure 1). In this fact sheet, we discuss mass trapping systems, how to build them, their upkeep and cost.

Figure 1. A 5-litre bucket trap with hundreds of banana weevil borers.

In practice

Mass trapping of BWB has been made possible by long-lasting (effective for 90 days) pheromone lures containing an aggregation pheromone (sordidin), which attracts both males and females. BWB pheromone lures are available online through most beneficial insect providers.[1]

Using pitfall traps with pheromone lures at a density of 4 traps per hectare was 5–10 times more effective than using traps without pheromone lures (Alpizar et al. 2012).

Compared with standard insecticide treatment programs, when using pitfall traps with a pheromone lure, corm damage was reduced by half to two-thirds after several months (from 20–30% corm tunnelling to 10% or less), which increased bunch weights of Dwarf Cavendish (*Musa acuminata* Colla) by approximately 20%.

Given that trials in Australian growing regions with common varieties have yet to be conducted, caution is needed before assuming similar performance outcomes.

Building a pitfall trap

One method growers have developed is using a modified bucket (the ideal trap size is yet to be determined) to make large-volume pitfall traps.

1 Insecticides are not registered for use in pitfall trapping units, pheromone lures should only be used within pitfall traps. Pheromone lures are commercially available from beneficial insect suppliers.

The following steps are to help guide you build your own trap.

1. Obtain a 5–10 litre bucket with a lid (Figure 2) or a piece of 100 mm PVC pipe.
2. The trap should be black, brown or grey, as this increases capture rates (Fu et al. 2019).
3. Drill 10 mm holes into the side of the trap, approximately in the middle of the bucket or where it will line up with the soil surface once it is in the ground (Figure 3 and Figure 4).
4. Insert a piece of wire into the lid or the sidewall of the trap to attach the pheromone lure (Figure 5 and Figure 6).

Setting the traps

1. Choose a location that is shaded and exposed to rain or water.
2. Dig the trap into the ground so the drilled holes are flush with the soil surface (Figure 2 to Figure 4).
3. Make a soil ramp up to the holes in the bucket so the BWB can enter the trap easily (Figure 4 and Figure 5).
4. To prevent the BWB from getting out of the trap, either place some soapy water in the bottom, or to limit by-catch of other insects, ensure the trap walls are clean and smooth so BWB cannot climb out.
5. Once the trap is in the ground, hang the pheromone bait from a piece of wire at the centre of the lid (Figure 5) or the side of the pipe (Figure 6).
6. Ensure there is banana mulch surrounding and over the trap (Figure 5).
7. Traps should be at least 20 meters away from each other (4 traps per hectare).

Maintaining the traps

Traps typically need to be checked once per month or after severe weather. How often the dead BWB need to be removed from the trap will vary with trap size, population numbers, and BWB seasonal movements. Common maintenance activities include:

- Removing dead BWB from the traps; an easy way to do this is to use a battery-powered wet and dry vacuum.
- Ensuring the soil ramps are maintained and not eroded from the trap entry holes.
- Maintaining coverage of banana mulch surrounding and covering the trap area.
- Replacing pheromone lures every 90 days.

Figure 2. A 5-litre bucket trap.

Figure 3. The pitfall trap has holes on the side to allow the weevils to enter.

Figure 4. A 100 mm PVC pitfall trap with soil ramps for the banana weevil borers to walk up and into the trap.

Cost

The commercially available BWB pheromone costs approximately $11 per bait (tablet) and lasts 90 days. The current recommended density is 4 traps per hectare with one pheromone bait in each trap, totalling 16 pheromone baits per year. Therefore, in 2024, the approximate cost is $176 per hectare per year. This does not include the material to make the pitfall traps or labour costs to install and maintain them, which need to be considered.

If you are interested in more information about BWB mass trapping, contact Steven Norman on steven.norman@dpi.nsw.gov.au

Figure 5. A 5-litre bucket pitfall trap in a hillside.

Figure 6. Inspecting a 100 mm PVC pitfall trap that has an easily removable lid.

References

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