Controlling small pointed (conical) snails in southern WA

Svetlana Micic[1], Mike Grimm[1], Tony Dore[1], Laurie Wahlsten[1], Stewart Learmonth[2]
Department of Agriculture and Food, Western Australia, Albany[1], Manjimup[2]

KEY MESSAGES

- More than one control strategy is needed to control snails
- Sprays are ineffective in controlling snails
- All bait formulations cause mortality to snails but none result in 100% mortality

BACKGROUND

The small pointed (conical) snail (*Prietocella barbara*) was introduced into Australia from Europe in the early1900's. In Western Australia, these snails extend between Eucla and Karratha. The small pointed snail has been found on all soil types from acidic sands to those with a high pH.

It has been estimated that in 70 % of years at least 5 % of all cropped land in WA is damaged by snails, including the small pointed snail. The potential loss of yield from broad-acre crops due to snail damage, if no control measures are put in place, is conservatively estimated at over 6 million dollars. Whereas, it is estimated that $ 3 million is spent annually on control by growers in WA (Murray *et al.* 2012).

Best practice control strategies for pointed snails involve not just baiting but using other strategies to decrease available food sources eg weed control and by decreasing suitable habitat used for snail survival over the summer period eg through stubble management. See Baker and Hopkins (2003) and Micic *et al.* (2007) for further information.

Furthermore in WA, some growers have found that baits do not effectively control an entire population of snails and have raised concerns over bait choice. There have been a number of enquiries as to whether there was a spray option that was rain-fast and would either cause mortality or repel snails sufficiently to negate economic crop damage.

AIMS

1. Determine efficacy of various baiting options (lab trial)
2. Explore efficacy of sprays on snails (field trial)

METHOD

Lab trials

1) Each treatment consisted of 30 small pointed snails that were placed into tote boxes with 5 cotyledon stage canola seedlings . All the snails were approximately the same size (~8 mm) and were removed after 6 days. Snails were then placed on moist paper towel. Snails that moved after 24 hours were counted as live and those that did not move were counted as dead. Treatments were: a. Metaldehyde bait applied at 5 kg/ha, b. Methiocarb bait applied at 5 kg/ha, c. Fe-EDTA bait applied at 5 kg/ha, d. Barley harvest chaff spread 10 mm in depth over entire tote box, e. 5 radish seedlings f. Control. All baits used were non-rain fast. There were 4 replicates of each treatment.

2) Each treatment consisted of ten small pointed snails, ~0.4 cm in size, were placed into tote boxes with moist paper. Treatments were: a. 7 kg/ha of rain- fast metaldehyde bait, b. 7 kg/ha of non-rainfast metaldehyde bait, c. control (nil bait). There were 4 replicates of each treatment. After 10 days, live and dead snails were assessed as per above.

Field trial

A paddock with 170 pointed snails per square metre was chosen for the trial area. Treatments were: 1. Rain-fast metaldehyde bait applied once at 5 kg/ha, 2. Copper silicate spray applied at 24 L/ha 3. Control. Each plot was 10 m x 15 m, with 4 replicates in a randomised block design. Treatments were applied post seeding, pre-crop emergence to a canola crop seeded at 5 kg/ha.

RESULTS AND DISCUSSION

Are all baits equal?

Baits containing metaldehyde, methiocarb and Fe-EDTA caused similar mortalities in snails, though in all treatments some snails survived (Figure 1). This suggests baits will not cause 100% mortality. Even so, the baits did protect canola seedlings (Figure 2). The lack of 100% mortality suggests that the baits competed with the green plant material as a potential food source for snails. These snails do not have olfactory senses to actively seek food and instead find it by random encounter (Baker *et al*. 2012).

Figure 1: Percentage of live snails in different treatments after 6 days

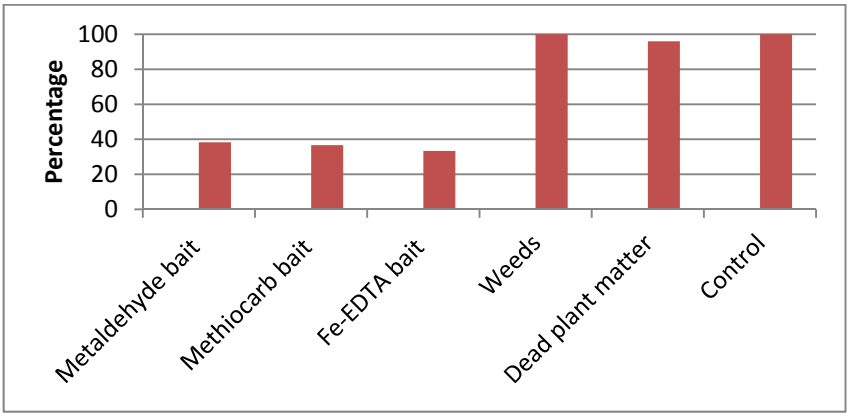
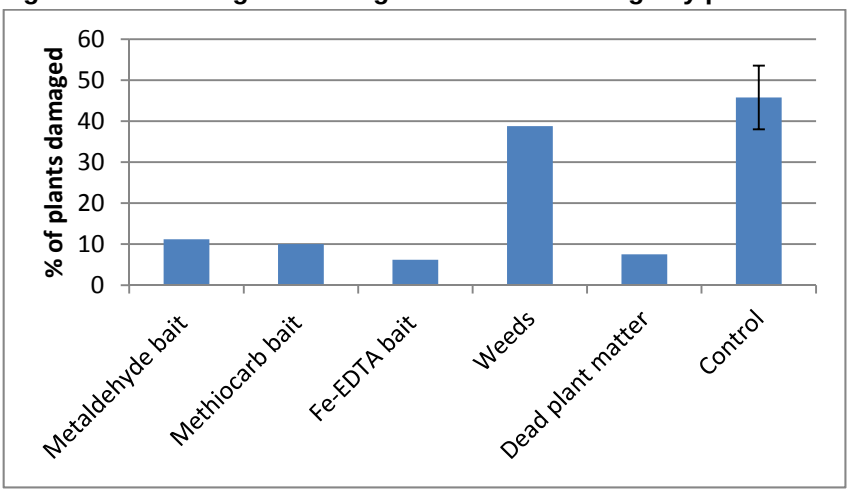


Figure 2: Percentage of damage to canola seedlings by pointed snails exposed to different treatments



The second trial of rain-fast vs non-rainfast metaldehyde baits did not cause any mortality to conical snails. This trial was repeated with the white Italian snail, and the baits caused 100% mortality. The lack of efficacy of the baits on small conical snails is likely due to the maturity of the snails and the trial design. Snails used in this trial were not mature , being less than 0.8 cm in shell height (Baker and Hopkins 2003) and immature snails are more likely to be feed on dead organic matter . It is also plausible that the cellulose in the moist paper towel provided an alternative food source to the baits.

Stubble management

Canola seedlings in treatments with harvest chaff sustained less damage than the control (Figure 2). This is because dead organic matter is an alternative food source for snails (Baker and Hopkins 2003). However field trials have shown that the presence of organic matter i.e. through stubble retention increases snail numbers and leads to more crop damage, whereas treatments that have had their stubble managed e.g. through burning had 90 % less pointed snails (Baker and Hopkins 2003).

Weed control

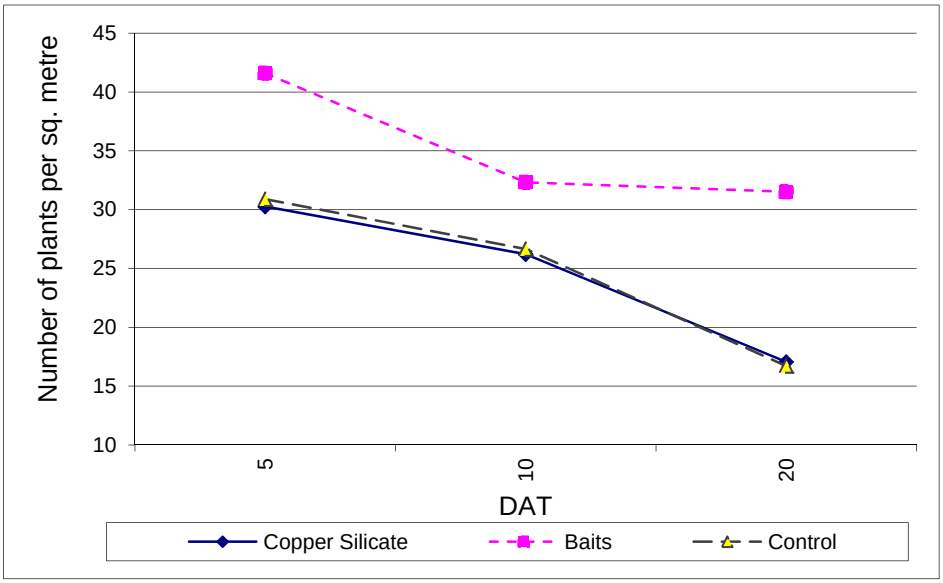
It was hypothesised that the more food choice available to the snails would lead to less crop damage. However canola in the presence of weeds sustained similar levels of damage to the control (Figure 2). Field trials have shown that summer weed control leads to fewer snails in crops (Baker and Hopkins 2003).

Spraying does it work?

Copper silicate as a spray is used as a repellent to stop snail movement in horticulture and is rain-fast. Even though, spray applications of molluscacides are available in horticulture these were not trialed as they are not rain-fast.

Copper silicate was not found to be effective in deterring snails from feeding on emerging crops, rather a single bait application was more effective in protecting crops (Figure 3).

Figure 3: Density of canola plants at 5, 10 and 20 days after treatment (DAT) applications



CONCLUSION

Sprays of copper silicate are ineffective in deterring snails from causing crop damage. Baits are more likely to protect crops from snail damage. All active ingredients found in baits cause mortality to snails, however the maturity of the snail and the presence of other food sources affects whether or not baits are eaten. Also the use of baits alone will not cause 100% mortality to the small pointed snails, so other management strategies need to be used in conjunction with baiting e.g. weed control and stubble management for the control of small pointed snails.

KEY WORDS

Small pointed snails, small conical snails, control, *Prietocella barbara*

ACKNOWLEDGEMENTS

Some of this research was supported by funding from the Grains Research and Development Corporation (GRDC).

REFERENCES

Baker G and Hopkins D(2003) Bash'em, Burn'em, Bait'em. South Australian Research and Development Institute.

Baker G, Beckett S, Thammavongsa B (2012) Are the European snails, *Theba pisana, Cernuella virgata* and *Cochlicella acuta* attracted by potential food odours? *Crop Protection* **42** pp. 88-93.

Micic S, Henry K, Horne P (2007) Identification and control of pests slugs and snails for broad-acre crops in WA. Bulletin 4713. Department of Agriculture and Food, WA.

Murray D, Clarke M, Ronning D (2012) Current and potential costs of invertebrate pests in grain crops. GRDC report.

GRDC Project Nos: DAW00177

Paper Reviewed by: Dr Darryl Hardie