

Section 4 – Molluscicide baiting

Overview

Molluscicide baiting aims to kill mature snails before they breed (Figure 4.1). Accurate bait timing and application are essential for control. Bait as soon as snails begin feeding at the end of their summer dormancy and before they lay eggs. Broadcast pellets

evenly using a calibrated spreader to deliver the label rate of product. Baiting provides partial control and is best used in combination with other physical controls (Section 5).

Figure 4.1: Snails consuming bait.



Image: Helen Brodie



Image: Kym Perry

BOX 4.1: FACTORS AFFECTING BAITING PERFORMANCE

Molluscicide baiting relies on snails encountering bait pellets and ingesting a lethal dose of toxin. Baiting efficacy can vary widely as many factors are involved in the chance of encounter and bait ingestion, including weather conditions, snail behaviour, bait product attributes and [application](#) (see table below). Baiting performance is maximised by accurate timing of bait application, and spreading pellets evenly. Baits are most toxic to snails during

autumn and early winter, just before and early in the breeding season¹ ([Figure 4.3](#)). Baits kill both adult and juvenile snails, but juveniles are less likely to encounter pellets². Controlling mature snails at the end of summer, as soon as they start feeding, provides the best return on investment in molluscicide baiting. This is after natural mortality and cultural control has already reduced populations and before they lay eggs.

Chance of encounter depends on:

- Level of snail movement
- Weather
- Snail species and life stage

- Attractiveness of bait
- Product formulation
- Amount and type of alternative food (plants, dead plant matter)

- Bait points per unit area
- Application rate (kg/ha and pellets per m²)
- Evenness of application

- Habitat complexity
- Presence of stubble, trash, crop plants

Ingestion of a lethal dose depends on:

- Snail physiological state
- Time of year
- Snail hunger levels and metabolism

- Bait palatability
- Product formulation
- Product hardness (snails prefer soft pellets)

- Bait points per unit area
- Application rate (kg/ha and pellets per m²)
- Pellet size

- Active ingredient (a.i.) concentration
- Product formulation (g a.i./kg)
- Product integrity and persistence (a.i. loss via temperature, moisture or microbial breakdown)

Table 4.1: Key actions.

| Actions | Considerations |
|--------------------------------------|--|
| Late summer to autumn | |
| Monitor snail densities | <ul style="list-style-type: none"> • Monitor snail densities (Section 3) • Identify areas with snails; all infested areas should be baited • Identify hotspots of higher snail density, such as fencelines, that require border baiting or higher application rates |
| Monitor snail activity | <ul style="list-style-type: none"> • Monitor snail movement (Section 3) • Relative humidity above 90% encourages movement |
| Apply bait before eggs are laid | <ul style="list-style-type: none"> • Apply bait as soon as snails start moving and feeding • Apply bait effectively using a calibrated spreader. See Snail Bait Application Fact Sheet (GRDC 2015) and the SnapBait app. <p><i>If mice are present:</i></p> <ul style="list-style-type: none"> • Bait mice prior to baiting snails to avoid mice consuming snail bait |
| Autumn to early winter | |
| Monitor and re-apply baits as needed | <ul style="list-style-type: none"> • Consider live snail densities and observed crop damage • Quadrat counts can be used to assess the efficacy of baiting • After early winter, baiting efficiency declines • Cease baiting at least two months before harvest; there is zero tolerance for baits in grain <p><i>If both round and conical snails are present:</i></p> <ul style="list-style-type: none"> • Consider a second bait application around sowing time due to later onset of conical snail activity |

Apply bait effectively

Many factors affect baiting efficacy ([Box 4.1](#)). To maximise control, ensure effective application by following these steps:

1. **Select a suitable bait product using the product selection guide ([Table 4.2](#))**
2. **Apply bait at the right time**
3. **Apply and re-apply bait to achieve sufficient bait points**
4. **Broadcast pellets evenly using a calibrated spreader; and**
5. **Avoid applying bait in very hot or wet weather.**

The above five points are described further in the remainder of this section.

1. Select a suitable bait product

Three active ingredients are registered for snail control in Australian crops and pastures:

- metaldehyde (15 to 50g/kg)
- chelated iron (60g/kg)
- iron phosphate (9g/kg iron)

Select a bait product according to your preferences ([Table 4.2](#)). Always adhere to directions on product labels, including application rates and withholding periods for harvest (including windrowing) and grazing.

2. Apply bait at the right time

Baiting before snails lay eggs is critical to suppress snail populations.

Bait should be applied as soon as snails commence feeding at the end of their summer dormancy. At this time, snails are hungry and feed voraciously as they prepare for reproduction³, and bait toxins are rapidly metabolised ([Figure 4.3](#)). Snails breed from autumn to spring, but most eggs are laid by early winter ([Figure 2.4](#)). The onset of peak activity may be two or more weeks later for conical snails than round snails¹. If conical snails are present, an additional bait application around sowing time may be necessary.

Bait must be applied when snails are moving and feeding.

Effective baiting relies on snails encountering and consuming pellets ([Box 4.1](#)). From late summer onwards, monitor weather conditions and snail movement (Section 3, page 21). Snail movement activity is greatest when relative humidity at ground level exceeds 90 to 95 per cent in summer or 80 to 95 per cent in autumn ([Table 2.1](#) and [Box 3.2](#)). Most movement occurs at night to early morning when moisture is present. Before widespread bait application, bait can be applied in small areas infested with snails and checked daily. The presence of dead snails indicates feeding activity.

3. Apply and re-apply bait to achieve sufficient bait points

Always apply bait at application rates as stated on the product label. Pellet densities above 30 per m² are preferred to maximise the chance of snails encountering pellets². For your selected bait product, consider the pellet density (per m²) when applied at the label rate (kg/ha) ([Table 4.2](#)). Re-apply bait according to product label directions as needed. Re-application may be needed in areas of higher snail density, such as fencelines.

4. Broadcast pellets evenly using a calibrated spreader

Always calibrate the spreader for the selected bait product to ensure even spread. Manually check the spread width and drive at pass widths (swaths) no larger than the effective spread width. See the [Snail Bait Application Fact Sheet](#) (GRDC 2015). The [SnapBait app](#) can assist with estimating bait pellets applied per m².

Spreaders calibrated for fertiliser application can result in spread widths of snail bait up to 69 per cent less than expected and distribute pellets unevenly⁵. Uneven spread results in poor efficacy in the underdosed strips. Ute spreaders provide uneven spread⁵ and are best limited to fencelines where larger spreaders are unsuitable. Bait fragmentation affects spread. Smaller bait fragments (<1.5mm) fall close to the spreader, are unlikely to deliver a lethal dose of toxicant to an individual snail and will degrade rapidly.

5. Avoid applying bait in very hot or wet weather

Field exposure of bait pellets causes degradation of the physical integrity and active ingredient concentration in pellets. High temperatures can degrade the concentration of metaldehyde, but trials found no effect of UV exposure². Exposure to temperatures above 50°C can cause a 12 to 25 per cent loss of metaldehyde in pellets in seven days². The effect of rainfall varies for different bait

formulations. Applying bait prior to light rain (<10mm) can soften pellets and enhance palatability. Heavy rain (>35mm) can rapidly break down bran-based formulations.

Store unused bait as per label instructions, in the closed original container in a dry, cool, well-ventilated area and out of direct sunlight to maintain quality.

Table 4.2: Bait product selection guide[†].

| Product name | Active ingredient A.I. | A.I. g/kg | APVMA Product No. | Label rate kg/ha | No. pellets / m ² at label rates | Pellet type |
|---|--------------------------------|-----------|-------------------|------------------|---|--------------------|
| Sabakem® Metaldehyde Snail and Slug Pellet | Metaldehyde | 15 | 86284/115239 | 10 | 25 | dry bran |
| Snailex Slug and Snail Pellets | Metaldehyde | 15 | 68580/110574 | 5–7.5 | 13–20 | dry bran |
| SlugOut® All Weather Slug and Snail Bait | Metaldehyde | 18 | 49324/58633 | 10 | 88–112 | granule |
| Delicia® SLUGGOFF® Lentils | Metaldehyde | 30 | 60931/0409 | 3 | 30 | wet extruded |
| Axcela® Slug and Snail Bait | Metaldehyde | 30 | 87576/118701 | 5–7 | 36–51 | wet extruded |
| Metarex Inov® Slug and Snail Bait | Metaldehyde | 40 | 88160/120463 | 4–5 | 24–30 | wet extruded |
| Metarex® Micro Slug Bait | Metaldehyde | 50 | 68958/59492 | 5 drilled | – | wet extruded |
| Imtrade Metakill Snail and Slug Bait | Metaldehyde | 50 | 64990/117488 | 5–8 | 30–60 | wet extruded |
| Imtrade Transcend® Molluscide and Insecticide | Metaldehyde + 1.5g/kg fipronil | 50 | 87832/125262 | 4–8 | 28–55 | wet extruded |
| Multicrop® Multiguard® snail and slug killer | Iron EDTA complex | 60 | 60104/0905 | 5–16 | 9–38 | dry bran |
| Eradicate® Snail and Slug Killer | Iron EDTA complex | 60 | 68634/58804 | 5–16 | 14–45 | steam process bran |
| IRONMAX Pro® Slug and Snail Bait | Iron as iron phosphate | 9 | 89908/126325 | 5–7 | 31–43 | wet extruded |
| Protect-us® Mineral Snail and Slug Killer | Iron powder | 10 | 81712/103787 | 50 applied @ 15 | 110 @ 15kg/ha | wet extruded |

[†] Last updated August 2022. Data from testing conducted by Michael Nash and SARDI. Pesticide labels must be consulted for full application instructions. Adhere to all label directions including constraints and withholding periods. Refer to APVMA's PubCRIS database for current registrations and product labels (portal.apvma.gov.au/pubcris). Pellets per m² varies depending on the rate (kg/ha) applied, the number of pellets/kg, and the pellets' ability to remain intact when broadcast as determined by hardness.

Figure 4.2: Mice can consume snail bait (left). Higher bait rates may be needed along fencelines where snails aggregate (right).



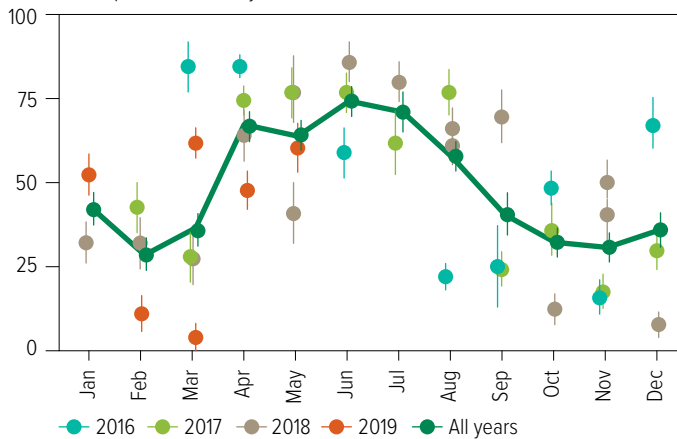
Image: Emma Leonard



Image: Nicole Fechner

Figure 4.3: Metaldehyde baits were most toxic to vineyard snails from autumn to mid-winter (assay results from Palmer, SA)¹.

Mean \pm SEM per cent mortality



References

1. Perry, K.D., Brodie, H., Muirhead, K.A., Fechner, N.K., Baker, G.J., Nash, M.A., Micic S., Ruggiero K., et al., 2020. Biology and management of snails and slugs in grains crops (DAS00160). Final report for GRDC. South Australian Research and Development Institute.
2. Baker, G.J., Brodie, H., Nash, M.A., Cunningham, N., and Perry, K.D., 2017. Improved management of snails and slugs (DAS00134-BA). Final report for GRDC. South Australian Research and Development Institute.
3. Rodríguez, M., Álvarez, B. and Loy, I., 2019. Hunger and satiety determine foraging decisions in land snails: Evidence from the invasive species *Theba pisana*. *Behavioural Processes*, 164, pp. 230-236. <https://doi.org/10.1016/j.beproc.2019.05.013>
4. Wakefield, A., Nichol, R., DeGraaf, H., Nash, M. & Baker, G. Improving snail bait distribution (YPA00002). Final report for GRDC. Yorke Peninsula Alkaline Soils Group, and South Australian Research and Development Institute.
5. GRDC 2015. Snail bait application Fact Sheet. URL: <https://grdc.com.au/resources-and-publications/all-publications/factsheets/2015/01/snail-bait-application>. YouTube: <https://www.youtube.com/watch?v=UWeoUUnzc2Q>