

# TEMPERATE ROUND SNAILS – WHEN IS IT BEST TO BAIT?



## Summary

Snails breed opportunistically, not on a fixed seasonal schedule, so monitoring needs to occur year-round, whenever conditions suit snail activity.

Bait early—before egg laying—because snails are most susceptible to **Metarex Inov**® when they first begin feeding, most often from early autumn for Mediterranean-origin round snails such as common white/vineyard snails and Italian snails.



Plate 1: Common white/vineyard snail\*

Common white vineyard snail (*Ceruella* sp.): breeds autumn–spring; baiting is best in autumn when metabolism peaks; when >50 snails/m<sup>2</sup> before first application, it is important to check within a week and re-bait if no baits remain.

Italian snail (*Theba pisana*): also breeds autumn–spring (sometimes late summer in coastal areas); bait from late summer/early feeding period; baiting is less effective from late winter (more juveniles); when >70 snails/m<sup>2</sup> before first application, it is important to check within a week and re-bait if no baits remain.



Plate 2: Italian snails in grapes\*

## Overview

Snails cause major damage and contamination to Australian crops. Successful management of snails requires understanding of the individual species' biology and of interaction with local conditions. Unlike insects, snails do not have a set seasonal life cycle; they breed when conditions are favourable. They can change their behaviour in response to novel conditions and respond quickly when suitable. Due to their adaptive life history, monitoring should be conducted throughout the year, when conditions are suitable for their activity.

Proactive monitoring ensures baits are applied when snails are most susceptible to **Metarex Inov** or **IRONMAX Pro**®, and before they start laying eggs. For round snails originally from the Mediterranean region, early autumn is the most effective time to bait – as soon as they start to feed (Fig. 1).<sup>1</sup> For the temperate areas of southern Australia, the life history and climatic triggers of most species is known, which is presented below to inform when the right time is to apply **Metarex Inov** or **IRONMAX Pro**.

<sup>1</sup> <https://grdc.com.au/resources-and-publications/grdc-update-papers/tab-content/grdc-update-papers/2020/02/snail-management-learning-from-recent-studies>

\*Images courtesy of Dr Michael A Nash

## Common white or vineyard snail [*Cer­nuella* sp.]

A medium-sized round snail, up to 20 mm in diameter, with an open umbilicus and a white shell with broken brown bands that are variable. Breeding typically occurs from autumn through spring. Found in all agricultural situations across southern Australia, vineyard snails seem to tolerate a wider range of temperatures than Italian snails, hence they have the potential to expand their distribution in Australia. Torpor (a state of lowered metabolism and activity) can be up on plants, on/within structures, or in the ground to escape high temperatures. During the summer, they will move to rehydrate when RH >95%. Recent molecular work suggests more than one clade is present in Australia, and that *Cer­nuella virgata* (Da Costa, 1778) may be comprised of more than one species.

Life history information based on laboratory data suggests the mean annual temperature (BIOCLIM 01) suitable for vineyard snail habitation is 13–18°C. They prefer an annual rainfall of 300–450 mm, and a range of soils with a pH >6. Additionally, minimum optimum moisture for breeding is 1–5 mm of rain, RH >85–90% and soil moisture >9% w/w in sandy soils. Breeding can be delayed, with a typical lifespan up to 1–2 years producing 1,265–1,700 eggs/individual laid over 1–6 weeks, usually from late March onwards. They only breed once in their lifetime, and then die.



Plate 3: Vineyard snail\*

**During torpor, the snails will not consume baits, hence appropriate timing of bait applications is crucial.**

The vineyard snail can be controlled with metaldehyde when baits are applied at the right time and enough bait is applied given their potential to reach extremely high population densities. Based on GRDC research (Fig. 1), baiting with metaldehyde is recommended during the autumn period, when vineyard snail metabolism is greatest, which is correlated to their breeding cycles. Based on results from local trials, it has been determined that the number of adult vineyard snails controlled by **Metarex Inov** at 5 kg/ha would be 72–105/m<sup>2</sup> (95% CI). Due to local paddock conditions influencing control, monitor after bait application and re-apply baits as needed (see decision key below).

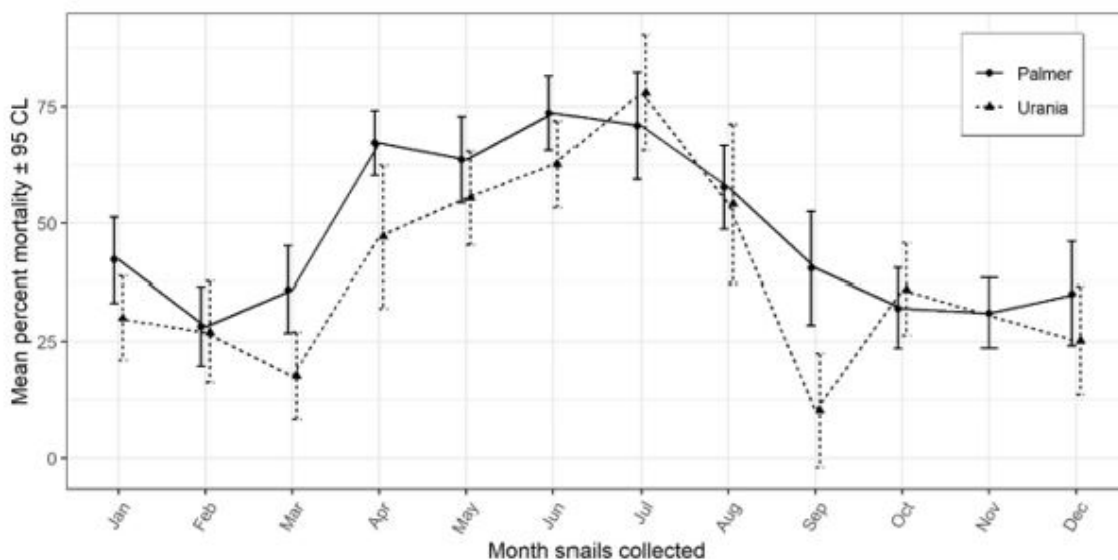


Figure 1. Mortality of vineyard snails exposed to Metarex Inov baits in laboratory trials, for vineyard snails collected in each month of the years. Results from samples taken at Palmer SA included combined data for 2016–2019, Urania SA included combined data for 2018–2019.<sup>1</sup>

## Italian snail [*Theba pisana* (Müller, 1774)]

A medium-sized round snail, up to 25 mm in diameter, with a partially closed umbilicus, white shell with brown bands that are variable. Breeding typically occurs from autumn through spring, however, under ideal conditions has been observed breeding in late summer in coastal climates. Found in all agricultural areas across temperate Australia, this species feeds mainly on green plant material. Torpor can be up on plants or other structures to escape high ground surface temperatures. Snail movement/activity to rehydrate in late summer is triggered when surface relative humidity is >90%.

The mean annual temperature (BIOCLIM 01) suitable for Italian snail habitation is 13–18°C, but they will tolerate temperatures up to 44°C. Additionally, minimum optimum moisture for breeding is 1–5 mm of rain and an RH of 85–90%. In their 1–2-year lifespan, individuals can lay 672–1,525 eggs, taking 2–6 weeks to lay, usually once dews occur from late summer onwards. Breeding is bi-annual but can be annual. The Italian snail is mainly found in coastal environments that are exposed to Mediterranean climates with an annual rainfall of 300–450 mm. They prefer sandy calcareous soil with a pH >7.5, however their distribution has moved into isolated Mallee environments, especially in clayed paddocks.



Plate 4: Italian snail\*

**During torpor, the snails will not consume baits, hence appropriate timing of bait applications is crucial.**

The Italian snail is easily controlled with metaldehyde when baits are applied at the right time and at the correct rate according to the population size, given their potential to reach extremely high population densities. Baiting with **Metarex Inov** is recommended from late summer when Italian snail metabolism is greatest (Fig. 2), which is linked with when they are breeding. Compared to other snail species in the same paddock, Italian snails are often the earliest to feed on baits, especially in coastal environments. Baiting is not as effective from late winter onwards (Fig. 2) when a greater proportion of the population are juveniles, hence less consumption is observed (Fig. 3). Based on results from local trials, it has been determined that the number of adult Italian snails controlled by **Metarex Inov** at 5 kg/ha would be 81–122/m<sup>2</sup> (95% CI). Due to local paddock conditions influencing control, monitor after bait application and re-apply baits as needed (see decision key below).

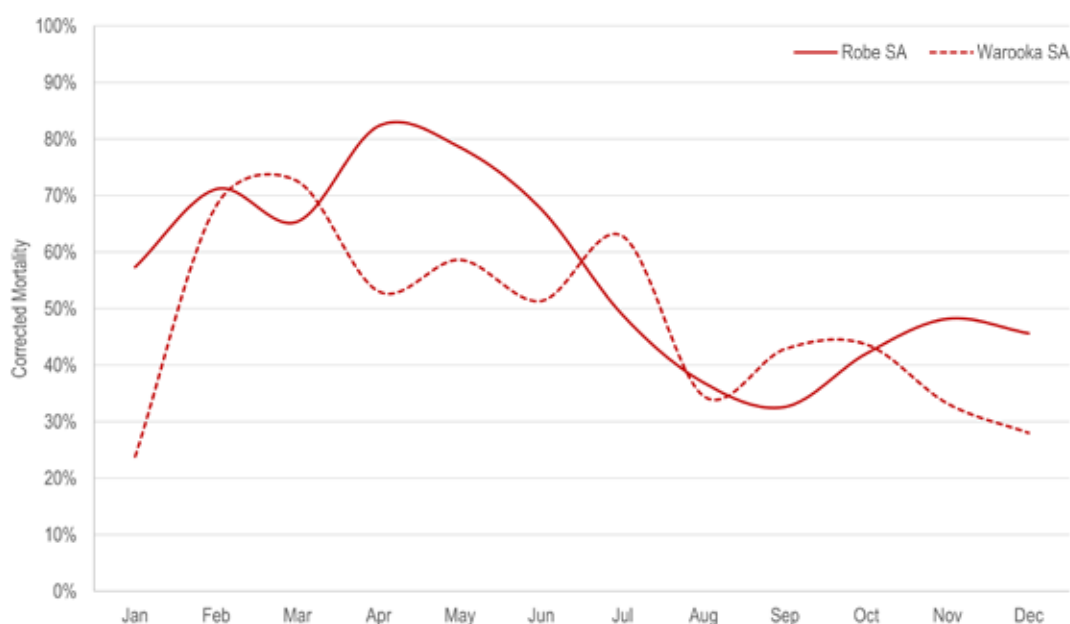


Figure 2. Smoothed line graph of corrected mortality using Schneider-Orelli's formula for Italian snails exposed to Metarex Inov in laboratory trials (22°C, 100% RH), for snails collected in each month of the years. Results from samples taken at Robe SA included combined data for 2017–2025, Warooka SA included combined data for 2020–2025.

\*Image courtesy of Dr Michael A Nash

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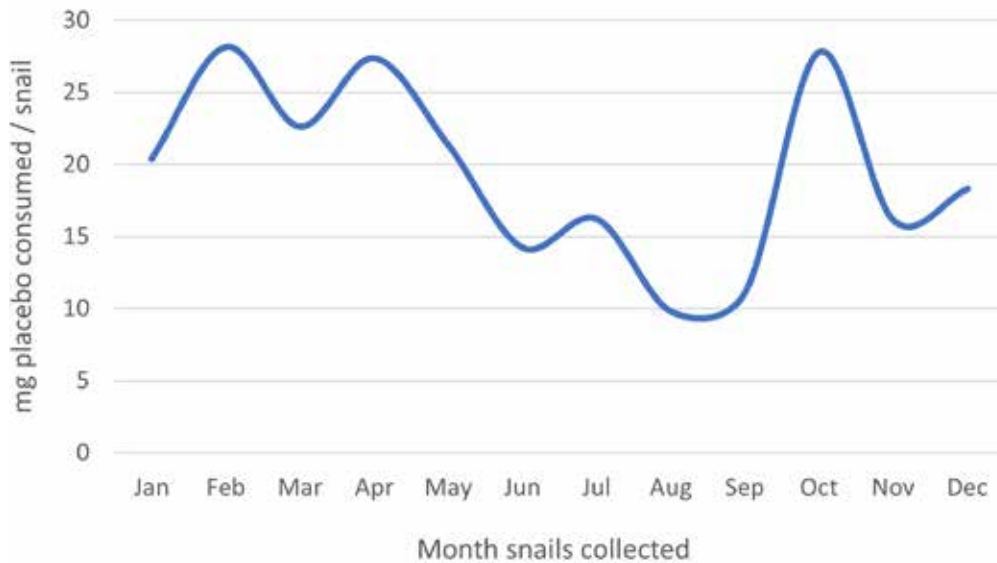


Figure 3. Smoothed line graph of consumption of placebo baits by Italian snails after 3 days in laboratory trials (22°C, 100% RH), for snails collected from Warooka SA in each month of the years combined 2020–2025.

## Decision key for baiting

**STEP 1. Assess snail activity state prior to baiting using indicative test – crush 2–3 snails between thumb and finger.**

- If juicy when crushed, apply bait – go to Step 2
- If paste-like when crushed, continue monitoring weekly, and more frequently when humid – return to Step 1

**STEP 2. Determine species present.**

- Vineyard snail – go to Step 3
- Italian snail – go to Step 4
- Both vineyard and Italian snails – go to Step 3



**STEP 3. Estimate number of vineyard snails and apply bait.**

- If  $>50/m^2$ , apply 5 kg/ha **Metarex Inov** and check within one week of application to assess if bait remains – go to Step 5
- If  $<50/m^2$ , apply 4 kg/ha **Metarex Inov** and check within one week of application to assess if bait remains – go to Step 5

**STEP 4. Estimate number of Italian snails and apply bait.**

- If  $>70/m^2$ , apply 5 kg/ha **Metarex Inov** and check within one week of application to assess if bait remains – go to Step 5
- If  $<70/m^2$ , apply 4 kg/ha **Metarex Inov** and check within one week of application to assess if bait remains – go to Step 5

**STEP 5. If little or no bait remains, reapply Metarex Inov at rates indicated and continue to monitor.**



Plate 5. Open umbilicus of the vineyard snail (above) compared to the partially closed umbilicus of the Italian snail (below)\*



\*Images courtesy of Dr Michael A Nash

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