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ALL WEATHER SLUG AND SNAIL BAIT
Metarex Inov contains 40 g/kg metaldehyde



The Complete Guide to Snail Control in Grapevines

Snails – A Growing Problem

Snails can be a significant problem in vineyards. With the adoption of measures to conserve soil moisture such as cover crops, surface mulch and decreased cultivation, an ideal environment is created for snails to thrive.

Snails can impact on production in a number of ways, including:

- Contamination of fruit delivered to wineries.
- Contamination of bunches at harvest that reduces the quality of table and dried fruit.
- Damage to buds and young leaves during feeding that reduces shoot growth, fruit yield and plant vigour in severe, long-lasting infestations.

Pest Species

While there are many snail species found in Australia, only a few species introduced from overseas cause problems in vineyards.



White Italian Snail, *Theba pisana*

The white Italian snail is present in WA, SA, VIC, NSW and TAS, occurring in most viticultural regions. The white coiled shell often has broken, thin, dark brown, spiral bands and chevrons. The umbilicus is narrow and semi-closed. Adults have a shell up to 2.5 cm in diameter with 4-5 whorls. They feed on green plants, including vines, cereal and legume cover crops, and weeds like horehound and turnip weed.



The biology and ecology of the white Italian snail is described below and has been well studied in the grains industry.

In summer, most snails will move up to shelter amongst the bunches and vine canopy to escape the heat. Once in the canopy, snails are largely inactive and enter a form of dormancy. This can last for a few days, weeks or months, with relative humidity above 90% in summer triggering activity.

Breeding commences once individuals are hydrated, once conditions are moist (dewy mornings) and snails move out of the canopy to feed. Vegetation type (e.g. broadleaf weeds) and snail growth stage influence movement. Individuals can move over 200 m to find suitable resources.

Once soil is moist, adults lay multiple clutches of eggs in the soil. Egg laying can take place during autumn, winter or spring, as long as the soil is moist. Eggs take about 1 month to hatch depending on temperature, and will not hatch if the soil dries out.

Once egg laying has finished, adults die. Young snails continue to feed and grow whilst vegetation between rows remains actively growing. Once conditions dry, these snails move into the canopy to continue feeding and later on, survive hot ground conditions. It is the number of young snails in early spring that are the problem over summer and at harvest.

The life cycle can be annual or biennial depending on environmental and climatic conditions.

White Italian snails can reach very large numbers, with infestations of 200-250 snails per vine recorded (Sanderson 1995). In a sultana vineyard, 87 kg of snail mass (on-vine) was recorded on vine blocks yielding 30 tonnes of fresh fruit (Sanderson 1995).

Brown Garden Snail, *Cornu aspersus* (syn. *Helix aspersa*, *Cantareus aspersus*)

The brown garden snail is present in all non-arid areas of Australia. This snail is European in origin and is one of the species farmed for food both in Australia and overseas. The light brown shell has darker spiral bands and yellow flecks. Adults have a 4 cm diameter shell with 4-5 whorls.



The brown garden snail feeds on a wide range of plants and occur in most Australian viticultural regions as well as urban garden environments. It is also a pest in citrus and various horticultural crops. In Australia, as many as 70 brown garden snails have been recorded per vine, and these will often feed on developing buds and new foliage (Sanderson 1995).

The biology and ecology of the brown garden snail has been well studied overseas, but less is known in Australia.

Unlike other species found in Australia, this species is long lived; up to 12 years with breeding commencing 2 - 3 years after hatching depending on available calcium and food resources. Brown garden snails can slow their metabolism and go into a semi-dormant state, similar to other snail species. In irrigated crops, snails can be active all year round. Often cold temperatures in winter are more limiting than hot conditions in summer. Like other snails, individuals are hermaphrodites and lay their eggs into crevices in the topsoil, under stones or other sheltered places. In a year, an adult may lay approximately six batches of eggs. Like other species, brown garden snail can have an aestivation stage. This species has a home refuge area from which it moves out and feeds. The feed range can be up to 30 m per night.

Other snails may be found in the vineyard, including the common white snail *Ceruella virgata*, small pointed snail *Cochlicella barbara* and pointed snail *Cochlicella acuta*.





When is the Best Time to Control Snails in Vineyards?



Most growers don't see or think about snails until they start to cause problems with sprinklers; snails may also cause damage in the canopy and contaminate fruit. Control measures are essential long before this time in order to achieve optimum results.

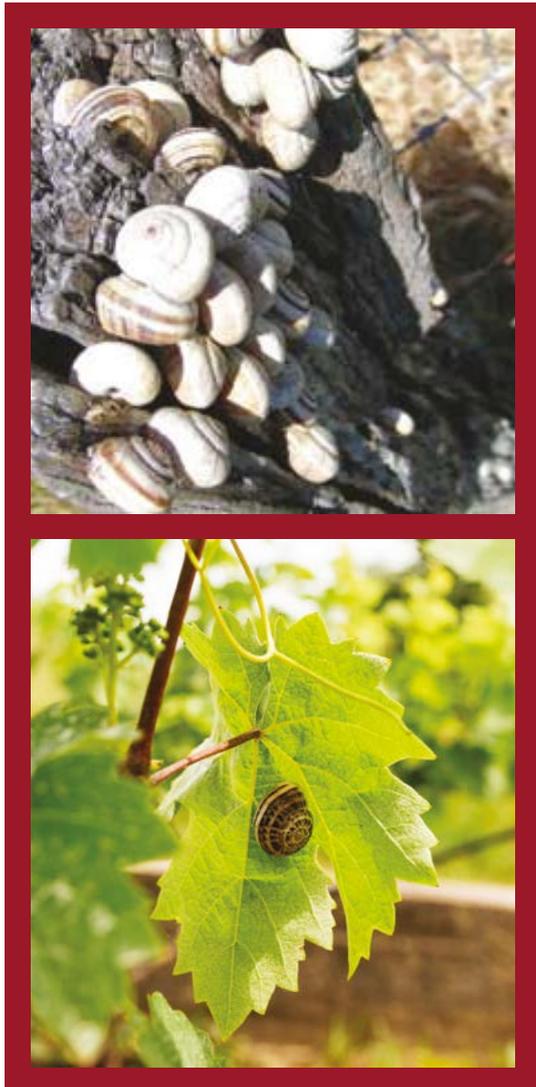
Snails move up into the canopy on posts, around sprinklers, risers etc. during late spring and summer.

This is driven by a search for resources: e.g. no food on the ground, the need to conserve moisture and escape heat over summer.

Once snails have moved up into the canopy, they are very difficult to control. Baits placed on the ground under the vine during this period will not entice snails back down to feed, and the use of chemicals to drive them down often does not work as snails are not feeding. Humid conditions will see snails move down once the vines are heading into dormancy.

Hence it is essential to target snails when they are most active and feeding in the autumn. At this time, snails move down onto the ground again, hydrate and become sexually active. This is when best results are achieved with baits, before egg laying occurs. Timing of sexual activity varies between species and seasons.

The ideal time to target snails is during this period of activity to achieve the greatest population reduction in the vineyard.



All of these species have life cycles with periods of inactivity. These inactive periods vary between 1 and 2 years, depending on the season and available moisture.



Strategies to Reduce Snail Numbers in Vineyards

1.	Use palatable, attractive bait that controls snails quickly	Baits must be both attractive and palatable to snails, as there are many alternative food sources on the vineyard floor. Metarex Inov ® has maximum attractiveness and enhanced palatability to snails thanks to the unique Colzactive ® technology which ensures a lethal dose.
2.	Use rainfast bait	Metarex Inov is a proven wet weather performer, originally developed for very wet European conditions. Metarex Inov will continue to perform long after other baits have collapsed from rain or irrigation.
3.	Carefully time the bait application	After breaking aestivation, snails increase their metabolism prior to egg laying. Movement is traditionally triggered in autumn by the first breaking rains of the season, but can also be prompted by overhead irrigation. Drip irrigation does not normally increase humidity in the canopy enough to trigger snail movement, but does provide for moist soil when snails are laying eggs. Hence bait must be applied on the ground at snail movement, before egg laying. Note: Conditions above 35°C will limit snail feeding despite there being adequate moisture for activity.
4.	Bare ground under vines	Although not always possible, maintaining bare soil under vines with minimal trash reduces shelter and competitive food sources for snails, and thus enhances the uptake of Metarex Inov . An even application of Metarex Inov is important to optimise control. Green plant material between vine rows can also harbour snails and will be attractive to them during the breeding season. Controlling broadleaf weeds should be considered in vineyards where mulching occurs. Where management does not allow for bare soil, applying Metarex Inov when broadleaf weeds have been controlled and once row vegetation is haying off will be more effective; that is, mid-spring when snails are still actively feeding. A continual supply of Metarex Inov on the ground under the vine row throughout autumn, winter and spring will maintain a level of control as snails move around the vineyard floor. With the arrival of summer, snails will again look for off-ground refuge and the baited area under the vine row will offer a last line of defence.
5.	Look beyond the boundary	A maintenance application of Metarex Inov around the vineyard boundary will reduce the likelihood of new infestations of snails from neighbouring properties or roadsides.

Sanderson, G. (1995) Snails in viticulture. Australian Grapegrower and Winemaker 378a, 115-118.

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