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Control of pest snails and slugs

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Pest snails and slugs damage plant seeds, seedlings, underground tubers, leaves and fruit. Damage to seedlings often results in the death of the plant, which means major production losses.

Control methods

The effective control of pests involves a combination of measures, including cultural, biological and chemical methods so it is best not to rely on just one method. Set yourself a long term goal to reduce slug and snail pests, rather than relying on a 'knee-jerk' reaction to an immediate problem.

Cultural control

Abundant ground cover and vegetation growth provide ideal moisture levels, shelter and harbourage where snails and slugs thrive. This is why they can be a problem on the edge of a crop with a weedy fenceline.

Good hygiene, weed control and removal of refuges can reduce the problem over time. Be aware, though, that pest problems may increase in the short term after this process, as the pests will no longer have the weeds for food or shelter.

Cultivation of the ground not only kills pests directly, but provides a sterile habitat from which survivors flee. A short fallow period can improve this effect.

Good hygiene will improve the value of other methods, especially baiting.

Some desirable agricultural and gardening practices can regrettably also aid pest molluscs. Minimum tillage and straw-retention techniques can help these pests survive and make seedlings more susceptible to damage. Increasing the organic content of the soil also helps to increase its moisture content and this makes it more attractive to slugs and snails and provides them with more food — they eat soil organic matter. Plants between trees and vines can also allow large populations to develop.

This means that you should be aware of the possible consequences of using these techniques and take measures to overcome any serious problems.



Figure 1. Infestations of common garden snails are a particular problem in citrus and fruit orchards and vineyards.

Barriers

Snails and slugs do not like dry surfaces. Continuous lines of sawdust and ashes can be used as barriers but their effectiveness is drastically reduced once they become wet, which is unavoidable with rain and watering of gardens.

Instead, lines of lime and copper sulphate are pest repellent and can be used to prevent migration into an area.

Superphosphate fertiliser applied in rings around the butts of trees may stop snails reaching the trunks.

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Copper is repellent to snails and slugs and bands of thin copper sheet around tree trunks prevent snails from climbing. This method must be combined with skirt pruning and control of under-canopy vegetation to stop snails getting into the trees by other routes.

Biological control

Since all of our pest snails and slugs are introduced, there are limited agents that control them in Western Australia. This partly explains why they are such pests. Some predatory beetles and lizards feed on them, but birds and rats are the most effective.

Ducks, chickens or Guinea fowl can provide effective, long-term control in orchards and vineyards, if an appropriate breed is chosen and properly cared for.

The biggest problem in using birds is protecting them from foxes. A safe, fox-proof roost to house the birds overnight is essential. They should be released from this pen one hour or more after sunrise and returned at least one hour before sunset, when fox activity is lower but foxes can be active at all times, especially if human activity is low. Keeping vegetation low will also make it difficult for foxes to stalk their prey. For high-value crops, fox-proof fencing may be a commercially viable option.

You should provide an alternative pen, away from plants, so that the birds are not nearby during pesticide applications for other pests, and can be kept off the treated area for the full withholding period. Some common insecticides are particularly toxic to birds—notably, diazinon, fenthion, azinphos-ethyl and azinphos-methyl.

If the birds or their eggs are for human consumption, they should be tested for organochlorine insecticides. These residual insecticides were commonly used for insect control in the past and many old orchards still have detectable levels. A good way to check is to allow the birds to range freely for at least two months and then test their eggs.

As it is not necessary for birds to be present all year round for snail control, they fit in well with a system of production, growth and harvesting.



Figure 2. Poultry are generally a good method of snail control.



Figure 3. Ducks are excellent for snail control.



Figure 4. Geese also do well in snail control.

Ducks are usually considered the best birds for snail control. Khaki Campbell or Indian runner ducks are the best breeds. Khaki Campbells are preferable if egg production is important.

Ducks need to be in a flock to operate efficiently. A flock of two dozen can service an area as large as 20 hectares. Once snail numbers have been reduced, the ducks may stop actively hunting for them. Also, ducks are likely to spend most of their time on or near the dam unless it is inaccessible to them.

Chickens may not forage as widely as ducks, but they can provide good control of snails and many insect pests as well as controlling weeds. However, they can damage fruit and should be moved when it starts to ripen.

Chicken numbers should be managed so that they don't remove enough vegetation to create dust when scratching around, which favours a build up of pest plant mites on orchard trees.

Guinea fowl are mainly used for insect control and it is not known how effective they are in controlling snails. They are less liable to damage fruit than are chickens but they are strong fliers and can be difficult to contain. Because they leave the flock to nest on the ground, they are very susceptible to fox predation.

In the home garden, hand collecting snails and slugs at night can be effective if done consistently. Place them in a jar filled with water to drown them and screw the lid on.



Figure 5. Guinea fowls more for insect control.

Chemical control

Few chemicals are registered in Australia for controlling snails and slugs: methiocarb (Baysol®, Mesuroil®), metaldehyde (various) and Iron EDTA (Multicrop Multiguard®) are mainly used as baits.

Iron EDTA baits pose a reduced risk of poisoning to children and animals.

Since some slug species may be naturally tolerant to methiocarb, metaldehyde baits should be used for slug control, especially in crop situations.

Baits

Timing is the most critical aspect of control when using baits. Trying to control pest snails and slugs when they are a problem, usually in spring, is the least effective method for the following reasons:

- the population is at its greatest at this time;
- most of the population is juvenile and is not very mobile and so has a reduced chance of contacting the baits;
- there is ample alternative feed available, which competes with the baits, so less bait is eaten;
- there is usually an excess of plant growth, so the baits get lost and the chance of a snail or slug coming in contact with them is greatly reduced;
- rainfall is still quite heavy, so the life of baits in the field is reduced.

The best time to bait is in autumn, late March to April, before the break of the season, or as soon after as possible, for the following reasons;

- adult snails and slugs are killed before they get a chance to lay their eggs. (Eggs are laid in soil which is damp enough to germinate grasses.);
- snails and slugs are hungry after spending the summer period inactive and there is little alternative feed to compete with the baits;
- the ground is comparatively bare so the chance of a snail contacting a bait is increased;
- rain is infrequent, so the field life of baits is extended.



Figure 6. Electric fences will deter foxes from eating birds and chickens.

Effective control can also be achieved by opportunistically applying baits when snails or slugs are activated by thunderstorms in summer.

Do not mix copper products (copper sulphate, Bordeaux mixture) or other products with the baits to try to improve their performance — copper is highly repellent to snails and slugs and they will not eat a bait that has been contaminated with it.

If you are using sprays of any kind when you want to bait, apply the spray first, wait for it to dry, then apply the baits so they are not tainted by the spray.

The size of the bait is important, especially for broad scale applications. The smaller the bait pellet, the more baits there are per unit weight and the better the coverage. For instance, if the size of a bait is halved in all three dimensions, there will be eight times as many baits for the same weight.

Clear the ground surface before baiting by mowing or cultivating and spraying weeds along treelines and fencelines. This will improve the performance of the baits.

Applying baits in strips around the perimeter can prevent re-invasion of an area. This is required for vegetable crops and to prevent the spread of white Italian snails. Apply these treatments two to three metres wide to clean-cultivated borders or fire-breaks. Alternatively, apply them in a continuous line along the bottom of a furrow, but only attempt this on level ground, or soil erosion may result.

Warning:

Avoid accidental poisoning of small children and dogs by careful application of baits.

Sprays

Three sprays are registered for snail and slug control: Mesuroil 750 Bird Repellent and Snail and Slug Spray®, Socusil® and Supracide®. Mesuroil® is very restricted in its registration and has a long withholding period when used on fruit producing trees. It must be applied to grapevines only before flowering.

Socusil® acts primarily as a repellent and can be sprayed on tree butts, plant pots and plants.

Supracide® is only registered for the control of slugs and snails in orchids.

Sprays containing copper (Bordeaux mixture, copper sulphate or copper oxychloride) are not registered for snail control, but do have some effect, both in killing snails and slugs (usually juveniles) and in protecting plants by making them repellent. Bordeaux mixture contains one part copper sulphate to one part slaked lime to 100 parts of water.

Sprays are most lethal if they are applied when the snails or slugs are active. This is best achieved very early in the morning when the day is predicted to be fine, so that affected animals dehydrate before they can recover. This can be especially effective when snails or slugs are active on dewy mornings in early summer, when the effect of the sun is much greater.

Copper sprays can cause burning and fruit drop, especially in hot weather, so follow label directions closely.

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Further reading

Gardennote No. 11 Pest snails and slugs of Western Australia.