How to Control Slugs

H. Crowell, B.C. Simko, J. Capizzi, and J.D. DeAngelis

About 40 species of land slugs live in the 48 contiguous states. Only about 16 of these are considered to be of economic importance, and all but one of the 16 species have been introduced from Europe and other foreign areas. (Introduction was, no doubt, by accident—plant material, eggs buried in soil of potted plants, etc.). About 10 pest species are established in Oregon.

Slugs are primarily pests of home gardens, where they find excellent conditions for growth and reproduction. Flowers, herbaceous shrubs, and nutritious vegetables are available; areas are kept moist by irrigation through the drier times of the season; and there are many places slugs can occupy to escape drying conditions. Commercial field crops are also often seriously damaged by slugs during the winter or spring months. In Oregon these include cabbages grown for seed, sweet corn, winter wheat, green beans, potatoes, and strawberries. Effective chemical control methods are often unavailable, unregistered, or undesirable, so a greater knowledge of the biology and life habits of economic species of slugs is useful.

Life History and Habits

The life histories and habits of slugs differ, of course, with the species involved. The introduced (1947) large European black slug, *Arion ater* L., which has become all too common along the Oregon coast and in home gardens of the Willamette Valley, is one generation a year. It lays large white eggs in clumps under leaves of weeds, or in soil cavities from late August until freezing weather in the fall. Each slug can lay from 3 to 4 clutches of 30 to 60 eggs weekly, depending on outside temperatures. The small gray garden slugs can find moist refuges almost anywhere in fields and gardens. Earthworm ("night crawler") holes are often used. The slugs are tolerant of low temperatures and have been seen crawling actively at 32°F. Undoubtedly, underground tunnels catch many of them in exposed areas, and winter kill may be higher when the soil freezes 2 or 3 inches deep. Gray garden slugs can live as long as a year, but 6 months is their usual lifetime.

Slugs continue to grow until, in the case of the European black slug, they reach sexual maturity in late summer. By this time they are quite large (6 to 8 inches extended) and can find more food in which to feed during the night. Rock gardens, piles of wood or trash, and nutritive conditions for growth and reproduction. Effective chemical control methods are often unavailable, unregistered, or undesirable, so a greater knowledge of the biology and life habits of economic species of slugs is useful.

Slugs can overwinter in the field before winter begins. The last-laid eggs can overwinter to hatch in early spring, if not exposed to prolonged freezing weather. The exact temperature and exposure time necessary to kill the eggs are not known.

The immature, overwintering forms of the large European black (or red) slug begin feeding as temperatures rise in the spring. Almost any organic material such as dead plant or animal matter, fungi (toadstools), or algae can serve as food. Of special concern are green plants as they appear in the spring. Of the slugs commonly found in gardens, only the spotted and red slug, *Limax maximus* L., seems to be reluctant to feed on green plants; it will do so if given no choice.

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** Slug Control **

Chemical controls

We do not recommend pesticides for specific situations because both recommendations and regulations change frequently. For the latest information, see your county Extension agent or consult the latest edition of the PNW Insect Control Handbook.

Use of poison baits is still the best method of control, although not totally effective. Many commercial preparations are on the market. Cereal bases seem to be more attractive to slugs than apple pomace. Metaldehyde, the specific chemical used since the early 1930s, paralyzes slugs for about 48 hours. If conditions are moist during that time, 100% of the slugs can recover and crawl off! Baits containing both metaldehyde and carbaryl (Sevin) are considerably more effective. Poisoning with metaldehyde causes slugs to slime heavily and thus reveal their presence. A third type of bait, containing about 2% of methiocarb (Mesorol), is effective even under moist conditions.

Jack D. DeAngelis, Extension entomologist, prepared this revision of an earlier edition by Hamblin H. Crowell, professor emeritus of entomology; Benedict C. Simko. Extension agent, Malheur County, and former Extension pest management specialist; and Joseph Capizzi, Extension entomology specialist emeritus; Oregon State University.

OREGON STATE UNIVERSITY EXTENSION SERVICE
Only about 10 to 20% of slugs poisoned with methiocarb can be expected to recover. Follow label directions carefully when applying baits. Evening is the best time for application, just after a shower if possible. As an alternative, apply bait on warm evenings after irrigating heavily. Late summer and early fall baiting will kill many maturing slugs before they lay their eggs.

Metaldehyde dust or sprays are sometimes available. These should be applied when slugs are active on the ground surface, such as in very early mornings. Contact will paralyze the slugs and they will desiccate during the day. Metaldehyde breaks down rapidly to acetaldehyde when in contact with moist soil, and most of it will be gone in 24 hours.

Use pesticides safely!
- Wear protective clothing and safety devices as recommended on the label.
- Bathe or shower after each use.
- Read the pesticide label—even if you've used the pesticide before.
- Follow closely the instructions on the label (and any other directions you have).
- Be cautious when you apply pesticides.
- Know your legal responsibility as a pesticide applicator. You may be liable for injury or damage resulting from pesticide use.

Safety with agricultural chemicals
Do not apply slug spray or dust over to be eaten or those to be grazed by animals. Follow label directions. Do not place baits in direct contact with edible crops. There have been reports of poisonings of pets, particularly dogs, that have eaten metaldehyde pellets. If pets may have access to baits, substitute flaked baits or liquid baits and put these in refuge areas where slugs are likely to find them. Remember: Slugs thrive in damp, dark areas. Ground cover, boards, and stones offer such shelter. You might consider modifying or removing these slug-protective environments.

Nonchemical controls
In small plantings and home gardens, the use of poison baits may be undesirable for many reasons. A cultural control method that is quite effective, but is tedious and time-consuming, is the use of boards and other lumber scraps on the soil under plants or between rows. Slugs seeking shelter can be collected periodically in a bucket containing water and a thin layer of kerosene. The slugs will drown and can be disposed of later. By keeping the slug population at a low level, other methods of control may not be necessary.

The use of beer to attract and drown slugs has been reported often in newspapers and magazines. To be effective the container should have vertical sides or be sunk flush with the surface of the soil. The depth of beer needs to be 1 to 2 inches depending on the size of slugs present. A dish of beer is effective for 4 to 5 days and then needs to be replaced. Slugs are attracted by the yeasty smell, slugs drink some of the beer and drown rather than drowning. Submergence in beer killed by the alcoholic content, primarily, but also by the carbon dioxide released as it is consumed. Beer will die even if removed and washed off. Attracted by the alcoholic content, primarily, rather than drowning. Submergence in beer for 30 to 60 seconds will render a slug unable to crawl out, and after 1 hour a slug will die even if removed and washed off. The main drawback to the use of beer are the expense and the time and trouble involved.

Natural enemies
Various mammals, such as raccoons and possums, are known to feed on slugs, especially the large species. Garter snakes, mallard ducks, and bantam chickens are effective slug predators. Ground-feeding birds such as starlings feed on juvenile slugs found in grass sod and under wet leaves. A parasitic ciliate protozoan, found in gray garden slugs in the Willamette Valley, is known to be capable of causing disease. How widespread this parasite is active is not known. Weather conditions probably control slug populations more than any other single factor—hot, dry summers and cold winters reduce numbers of slugs, while mild winters and cool, wet springs and summers favor their growth and reproduction. Excessive wet weather or floods can reduce slug populations through flushing or drowning.

For further reading