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# How to Control Slugs

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



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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 clovers 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 red or black slug, *Arion ater* L., which has become all too common along the Oregon coast and in home gardens of the Willamette Valley, has one generation a year. It lays large white eggs in clumps under leaves or boards, or in soil cavities from late August until freezing weather in the fall. Each slug can lay three or four clutches of 30 to 60 eggs each. Slugs are hermaphrodites (both male and female reproductive organs in the same animal).

Most adult slugs die shortly after egg-laying, although a few may survive until the next spring. With warm weather the eggs can hatch in 2 to 4 weeks, so a great

many small, juvenile slugs can be present 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 garden slug, *Limax maximus* L., seems to be reluctant to feed on green plants, but it will do so if given no choice.

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 (4 to 6 inches long when extended) and must find moist refuges in which to hide during the day. Rock gardens, piles of wood or trash, and deep cracks in the earth serve well for this purpose. Emerging at twilight, these slugs are known to travel 5 to 100 feet from their refuges in search of food.

The most common species of field and garden is the little gray garden slug, *Agriolimax (Deroceras) reticulatus* (Muller). In size, this slug ranges from that of a pinhead with just hatched juveniles to adults 1 to 1½ inches long. Like the large European black slug, the gray garden slug is a hermaphrodite, but unlike the black slug, it can breed at almost any time of the year. Actually, the gray garden slug has two principal breeding seasons: (1) from the start of fall rains until the advent of freezing weather and (2) in the spring when temperatures begin to rise again. The clear, slightly oval eggs are laid in batches under dead leaves, in cavities of the soil, and in other protected places. They hatch in 3 to 6

weeks, 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, sudden cold snaps catch many of them in exposed areas, and winter kill may be higher when the soil freezes 2 or 3 inches deep or more. Gray garden slugs can live as long as a year, but 6 months is their usual life span.

## Slug Control

### Chemical Control

We don't 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 stricken animals 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 (Mesuro), 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.



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.

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#### 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.

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#### Safety with agricultural chemicals

Do not apply slug spray or dust on crops 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 only 4 days and then needs to be replaced. Attracted by the yeasty smell, slugs drink some of the beer or submerge themselves in it. They are killed 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 drawbacks 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

Grossman, J., and H. Olkowski, "Stopping Slugs and Snails," *Common Sense Pest Control*, vol. 6 (1990), no. 1, pages 7-9. *Pacific Northwest Insect Control Handbook*, a Pacific Northwest Extension publication (latest edition, published annually). Sample copy \$15.00 plus \$2.25 shipping and handling. Order from: Publications Orders, Agricultural Communications, Oregon State University, Administrative Services 422A, Corvallis, OR 97331-2119.

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