



# CONTROLLING SLUGS in Home Gardens

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Slugs are an annual problem in North Dakota gardens. Slugs feed on the leaves and fruits of a wide variety of green plants and are extremely troublesome in vegetable gardens. The gray garden slug, *Agriolimax reticulatum* (Fig. 1), and *Agriolimax laevis* are the two species of slugs found in North Dakota gardens. Foliage, flowers and fruits of plants around the home can fall victim to the slug's voracious appetite. Slugs actively feed from spring thaw until autumn freeze, and wet seasons encourage their proliferation.

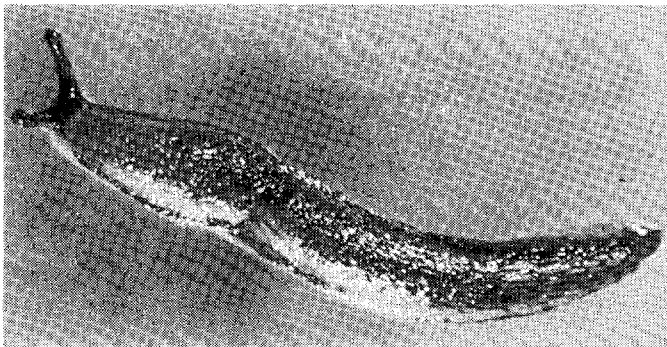


Figure 1. Common garden slug, *Agriolimax reticulatum*

on the side. Slugs move or glide on a ventral organ called the foot. This foot has numerous internal glands which secrete slime, allowing slugs to move across dry surfaces.

Slugs are hermaphroditic, which means that each individual possesses both male and female reproductive systems. Slugs copulate and pass sperm from one animal to another and the eggs they produce are cross fertilized. Slugs live from 12 months to two years. They reach sexual maturity before attaining full development and are capable of laying eggs when they are as young as three months. The rate of their growth and development is related to temperature, available food and moisture. Egg laying can occur any time during the summer months but decreases during dry periods and colder weather.

Each slug is capable of laying up to 400 eggs. Eggs are laid in holes and crevices in the soil or under litter in small groups of three or four or as a mass of 30 to 40. The eggs are covered with a yellowish slime which hardens around them. With ideal environmental conditions, such as an extensive rainy season and gardens with a lot of litter and weeds, two generations in one summer may be possible. Soil moisture levels of 75 percent saturation appear to be ideal for egg laying with a decrease in egg deposition in drier and wetter conditions.

Slug eggs are round to oval in shape, about 1/8 to 1/4 inch in diameter, translucent and colorless to milky white. During warm moist periods they will hatch in two to three weeks. When conditions are hot and dry, hatching may be delayed until weather becomes favorable. Immature slugs resemble adults in body shape but are smaller in size.

As winter approaches, slugs move into the soil or under litter and debris. It is not uncommon to find clumps of slugs containing 20 to 30 individuals in a tight ball under trash and litter. These clumps of slugs are made up of slugs of many sizes, indicating that immature as well as mature slugs pass the winter.

## Crops Damaged

Slugs damage plants by feeding on foliage and fruits of many different horticultural crops. Some commonly

## Description and Biology

Slugs are readily recognized by most gardeners. They vary widely in size, depending on species and age. Slugs leave a slime trail which is shiny when dry, confirming their presence even if the pest is not readily seen. Slugs are a member of a group of animals known as Mollusca. They are closely related to snails but also in this group are oysters, clams and octopuses. Slugs are generally regarded as snails that have lost their shell during the process of evolution.

Slugs vary in color from a charcoal gray to a tawny brown. There are two conspicuous retractable eye stalks on the head that are rapidly contracted when disturbed. Their back has a smooth fleshy elevated area called the mantle and beneath the mantle are the vital organs. A large breathing opening called the operculum is located

affected crops are potatoes, tomatoes (Fig. 2), brussel sprouts, cabbage, lettuce, carrots, strawberries, melons, bulbs, and many different ornamental flowers. Slugs do most of their feeding at night, crawling down from above ground foliage into the litter, dense vegetation and cracks in the soil during the day. This behavior apparently protects slugs from dehydration and extensive exposure to day feeding predators such as birds, garter snakes and frogs.

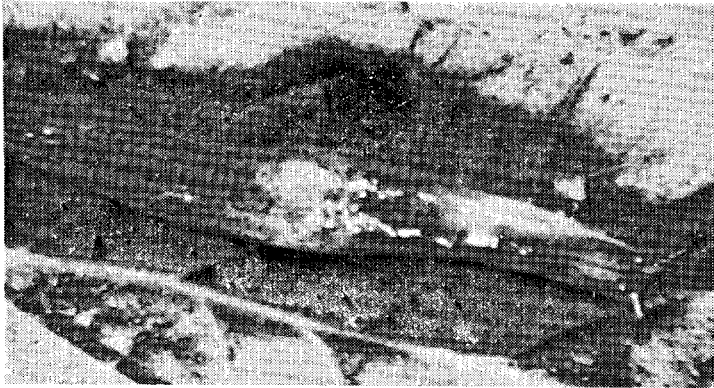


Figure 2. Slug on tomato leaf

Slugs chew holes in leaves and feed on the tender tips of stems. They create ragged holes in leaves which could be confused with caterpillar damage by the casual observer. Caterpillars, however, leave large amounts of droppings on plant foliage, whereas slugs leave only shiny patches or streaks of dried slime on the plants and soil. As tomatoes, strawberries (Fig. 3) and melons ripen, slug feeding will concentrate on the fruits, which usually gets the home gardener's attention and is often the first significant symptom that slugs are present. Slugs also can transmit plant diseases; cabbage leaf spot, downy mildew of lima beans and potato blight have been implicated with their feeding activity.

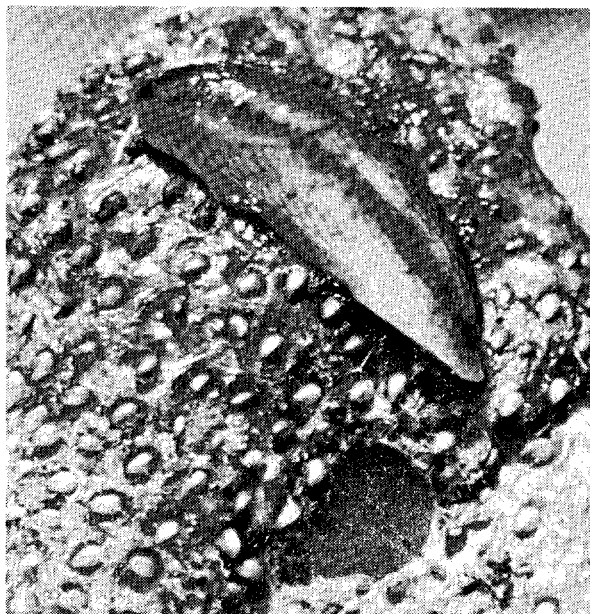


Figure 3. Slug and damage on strawberry

Slug damage is more apparent in the early autumn and may be attributed to the following factors: (1) Gardens are very lush and other food plants are declining in attractiveness, (2) the slug population has increased through the summer along with the increased size and appetite of individual slugs, (3) autumn weather is favorable for greater slug activity, and (4) biochemical changes and increased plant size in certain garden crops like tomatoes, potatoes, and melons may make them more attractive to slug activity.

## Home Garden Control

The best approach to controlling slugs is a combination of actions.

First, good autumn garden sanitation is essential. The removal of organic mulches, leaf litter, weeds, rotting boards, and any stones will give fewer places for the slugs to hide through winter months. This should be done as soon as the garden is done producing so that the slugs are deprived of protective cover as soon as cold fall temperatures arrive. Fall as well as spring garden tillage will reduce slug overwintering survival.

During the growing season, shallow dishes of stale beer buried to ground level will trap a surprising number of slugs and kill them by drowning. The slugs are attracted to the dish by the aromatic smell of hops emanating from the beer.

Young transplants can be protected with barriers of a sealed screen mesh. The material used for common window screening, stapled or nailed to boards at least 4 inches (10 cm) long may be effective in reducing their feeding activity.

Commonly used insecticides such as Sevin, malathion and methoxychlor have relatively little effect in controlling slugs.

The use of molluscicide baits containing metaldehyde or mesurol applied to the soil surrounding plants is the most effective means of controlling slugs. These products can be used in conjunction with mechanical methods.

In gardens where produce is grown for human consumption, metaldehyde is the only molluscicide registered for use. Several different formulations of baits are available. A dry bait formulation called Bug-Geta® is readily available in many stores selling home-garden pesticides. Dried baits are effective if applied to damp ground after watering or a rain. Rebaiting should be done after heavy downpours or as previously dispersed baits begin to decompose or mold. A paste bait formulation of metaldehyde called Deadline® has proven very effective in attracting and killing slugs.

In flower gardens, where no produce is grown for consumption, bait formulations of mesurol may be used. The dry bait Slug-Geta® is one available mesurol molluscicide formulation in North Dakota. Follow label directions on any pesticide for rates and methods of application.

If your garden is annually plagued with slugs, check out your landscape scheme. Extensive use of groundcover plants or large iris and asparagus beds may be providing the ideal breeding place for them. Hoping for natural control from slug predators will not adequately reduce slug populations.