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## THE GARDEN SLUG AND ITS CONTROL

by

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The flower and vegetable gardener of the Willamette Valley and other sections of Oregon with similar weather conditions is confronted with a most persistent and exasperating problem in combating the garden slug. Climatic conditions in the Willamette Valley seem particularly favorable for the growth and reproduction of the slug. This lowly animal has marvelous powers of adaptation, a great variety of tastes, an insatiable appetite and sometimes a malicious character. They are capable, under favorable conditions of inflicting such wholesale havoc, from the time of their attack on small plants just pushing through the soil until they complete their malicious work by feeding on and tunneling through mature plants, fruits, vegetables, and flowers, that their total injury probably outranks that of any garden pest.

### Slugs Eat Irregular Holes in Foliage.

The injury caused is mainly the gnawing of large irregular holes in the leaves or by cutting off the plants at or near the surface of the soil, and by leaving a trail of sticky mucus on the plants and along the ground. The slugs confine their attacks usually to young tender seedlings or to young transplanted plants. Young plants just pushing through the ground are consumed entirely; the foliage of plants in cold frames and of newly transplanted vegetable and flowering plants is devoured, or great ragged holes eaten through it. The culprit usually leaves telltale glistening, whitish trails of slime on the plant or nearby soil, and search under clods, stones, old boards, grass borders and rubbish will disclose the offender.

### Slugs Omniverous Feeders.

In the garden and field practically all crops are attacked. Among the vegetables the Cruciferae seem the favorite host. Among field crops, peas and beans are most generally injured, although rape, clover, hops, wheat and many other crops suffer. Of the small fruits, the strawberry and gooseberry are most frequently attacked. Almost all plants grown under glass, including vegetables, flowers and ornamentals, are often seriously injured. In the flower garden various annuals and perennials may be eaten down to the surface of the ground, and the slugs may even continue their tunnelling into the stems below the ground. Such flowers as the chrysanthemum, marigold, snapdragon, cineraria, coleus and geranium are not immune from their ravages. The slug displays considerable fondness for the foliage of violets. Among the native host plants, mustard, dock, honeysuckle and stinging nettle are mentioned at random from an almost limitless list. Various species of mushroom, both poisonous and edible, are fed upon. Although showing a decided preference for a plant diet, the slugs may be observed at times

devouring small life, such as disabled earthworms, crippled members of their own species, sowbugs, aphids, and lowly insects.

### Life Habits of Slugs

Slugs belong to the phylum Mollusca of the animal kingdom along with the snails, clams and oysters. The three species of slugs of economic importance in Oregon in order of frequency of occurrence are: the gray garden slug (Agriolimax agrestis); the greenhouse slug (Milax gagates); and the reticulated slug (Prophysaon andersoni).

They have soft bodies covered with a sensitive, moist skin provided with numerous minute glands from which they expel a mucus slime. This material is produced in abundance when they are disturbed and is exuded on objects over which the slugs crawl, remaining as a dried mucus trail behind them.

They are typically nocturnal in habit and by far the majority of their activities are carried forward at night. During the day they normally conceal themselves in dark moist places in basements, under boards, rocks and trash, and in tunnels and crevices in the soil. During our protracted periods of dark, cloudy, moist weather, however, the slugs remain active throughout the day, and during periods of protracted precipitation become unusually abundant in slightly elevated areas, such as walks.

The information at hand regarding the detailed life history of the slug is rather meager. It is not known definitely just how long a slug may live, but the estimated span of life ranges from 18 months to 2 years. The period of development from egg to a mature slug will vary with the season and quantity of food but is probably from 90 days to 1 year. The number of eggs laid by one female is estimated from 600 to 800. Thus the garden slug is very prolific. Eggs are produced at about every season of the year, though reduced in numbers during August when the season is exceptionally dry and during the more extreme portions of the winter. They mate often and egg laying is frequent and abundant.

### Control Measures.

In planning the control campaign against the garden slug, it is usually not advisable to rely upon any single control measure alone. The slugs are not easy to combat and a combination of two or more methods of fighting them is usually necessary for effective results.

1. One of the most important measures in combating slugs is cleanliness about the yard and garden.

Destroy, burn or clean fence rows, waste areas and uncultivated tracts adjacent to cultivated fields.

Remove all crop remnants as early in the fall as at all practicable; practice fall cultivation where feasible.

Clean up all trash, brush, burlap, boards and unsightly material about the house, yard, outbuildings and garden. It is a good practice on general principles and it destroys a slug paradise.

2. The collection and destruction of the slugs and their eggs is of value. If only a few hiding places, these may be visited during the day and the slugs, and sometimes their eggs that are found there, can be destroyed. Many slugs can be found feeding on the plants at night by the aid of a flashlight; a persistent search for them at night will often be well rewarded.
3. Poultry, including ducks, geese, chickens and bantam chickens feed on slugs. Ducks and geese seem especially fond of them, devouring great numbers where allowed access to infested areas.
4. In tests conducted by the Oregon Experiment Station, a combination of a repellent and a poison bait gave good results. The repellent used was bordeaux mixture sprayed on the foliage of the plants. Slugs apparently eat foliage sprayed with bordeaux only under stress from lack of other food. The bordeaux mixture may be made at home or purchased from your dealer in spray materials. The formula for a small amount of bordeaux mixture is as follows:

Copper sulfate -----	1 pound
Quicklime -----	1 pound
Water -----	12 1/2 gallons

Use only wooden or earthenware vessels in preparing bordeaux. Dissolve the copper sulfate in 2 gallons of water in one vessel. Slake the lime and make up 2 gallons in another vessel. Pour the two solutions simultaneously through a strainer into a container holding 8 1/2 gallons of water. Should you not care to bother with mixing up the bordeaux at home, it can be purchased from your dealer in insecticides already prepared as a powder.

5. A poison bait for use in combination with the bordeaux spray consists of calcium arsenate 1 ounce; chopped lettuce leaves 1 pound. Mix well and scatter in small protected heaps about the area to be safeguarded. In case lettuce is not available, tender foliage of cabbage, clover or other succulent leaves may be used. Raw diced carrots or potatoes covered with calcium arsenate have been recommended. Of nearly equal value is the poison bran mash as recommended for cutworms.

Care must be exercised in using these poison baits. Poultry, birds and even children may be poisoned if the baits are scattered promiscuously and carelessly around the premises in large heaps. As an extra precaution it has been suggested that the bait be placed in small piles upon pieces of shingles, boards or tin and covered carefully with a box or large board. There is still another and important reason for this precaution - many tender plants apparently are very sensitive to the presence of arsenic in the soil. Collect and destroy, by burying or burning, all bait that is not consumed. These precautions not only protect the birds and tender plants, but the slugs are more apt to find the bait, as they crawl under the box or board for protection during the day.

6. Lime, soot, ashes, salt, powdered copper sulfate and lime, copper carbonate or dry bordeaux mixture periodically dusted on the soil about the plant and also lightly hoed in between the rows gives temporary protection. Care should be exercised in application as some of these substances may burn the plant.