

Slugs and Snails

Phylum: Mollusca

Class: Gastropoda

Metamorphosis: None

Mouthparts: Rasping

Slugs Sawflies

Phylum: Arthropoda

Class: Insecta

Family: Tenthredinidae

Metamorphosis: Complete
(egg-larva-pupa-adult)

Mouthparts: Chewing

Slugs, Snails and Slug Sawflies

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Slugs are often present in the garden or greenhouse environment, occasionally becoming pests of landscape, vegetable, and greenhouse plants in our area. These animals are usually of little concern, but can sometimes cause damage when present in high numbers. Snails are rare in our region, but may occasionally become abundant in greenhouse settings. Pearslug, roseslug, bristly roseslug, species of sawflies, are included in this bulletin because they superficially resemble slugs and attack many flowering shrubs and trees in the rose family, including plum, apple, crabapple, hawthorn, rose, and bramble-fruit

plants. They may not be recognized as insects and will not be managed effectively by the same chemical and cultural controls that eliminate slugs.

Body Form

Snails and slugs

Egg: Eggs are whitish or translucent and are quite small. They are laid in masses in depressions in the soil and are covered with soil or debris.

Immature and Adult: Snails are easily identified by the spiral shell. Slugs lack the protective shell, but have similar life histories. Slugs in Wyoming are usually grayish in color, and up to 1½ inch long. They are elongate in shape and have two or four antennae that can be retracted into the head in some species.

The eyes, which appear as tiny black dots,

may appear either at the end or at the base of the antennae. Those slugs and snails whose eyes are on the tips of the upper antennae have a smaller pair of antennae low on the head near the mouth. Terrestrial snails and slugs secrete a covering of mucus, which protects them from rapid water loss. They also produce mucus at the front of the foot to crawl on. The trails of mucus, which sometimes glisten and stand out from the surrounding soil and vegetation, are often the first evidence of snail or slug populations.



Figure 1. Slugs.

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Slug Sawflies

Egg: Eggs are laid singly into slits cut into the underside of leaves.

Larva: Pearslug larvae are covered with mucus and have dark green bodies lacking visible segmentation. The three pairs of true legs and false abdominal legs are very short. The body narrows from the somewhat bulb-shaped head. Fully developed pearslug larvae are about 3/8 of an inch long. Roseslug larvae are about 1/2 inch long when fully developed; they are light green and slimy, with yellow heads visible under close observation. Bristly roseslug larvae are slimy and light green, measure about 5/8 inch long when fully developed, and are covered with fine hairs. Roseslug and bristly roseslug have somewhat longer legs and appear more “caterpillar-like” than pearslug.

Slug sawflies are easily distinguished from slugs by the following characteristics:

Sawfly larvae have three pairs of thoracic legs and several pairs of fleshy “prolegs” on the abdomen, although they may be very small. Slugs lack legs.

Slug sawflies do not have antennae, and close observation will reveal the presence of a head capsule with the eyes on the upper sur-



Figure 2. Pearslug larvae and damage to leaves caused by feeding.

face and feeding structures (jaws) on the lower surface. Slugs have antennae and the head is not separated by any segmentation from the body.

Adult: Adult slug sawflies are small, thick-waisted wasps that measure 1/4 to 3/8 inch long.

Life History

Slugs and snails

Snails and slugs are gastropods that have adapted to life out of the oceans; they are still dependent on high moisture conditions and are most common where organic material and water are plentiful, temperatures are cool, and suitable ground covering and soil are available for their protection. Many snails are adapted to survive periods of drought by sealing themselves in their shells, but slugs are quite restricted by the amount of water in their environment. The body water content of snails and slugs is over 80 percent. Slugs and snails rarely survive the winter outdoors unless they are able to hibernate in a well-protected space, which stays at least a few degrees above freezing throughout the winter. They may congregate in cellars and similar places occasionally. Egg laying begins in the spring, after temperatures warm to about 50 degrees Fahrenheit. Eggs are laid in masses in small moist holes, or under pieces of wood, stones, or plant residue in the soil. The eggs may incubate a month or more at temperatures of 60 to 70 degrees Fahrenheit. Terrestrial snails and slugs grow steadily until sexually mature, and don't change body form. After reaching maturity, the animals continue to grow at a slower rate. The common slug species in our area usually have two generations per year.

Slugs and snails spend their days in hiding; most movement on the surface and feeding are at night, and if the environment is suitable populations may increase rapidly. Slugs and snails eat living plant material. If conditions become unsuitable, the snail and slug

populations will decline rapidly. The distances traveled by the slugs between the individual resting spots and the sites of feeding vary between a few inches and several yards, according to the size of the animal, the temperature, the soil type, moisture, and other environmental factors.

Slug sawflies

Slug sawflies usually spend the winter as fully developed larvae in the soil, pupating and emerging in the spring. Adult females cut small pockets in the leaves of host plants and deposit one egg in each pocket. After hatching, the larvae skeletonize the leaf surface, leaving the leaf veins intact. Large holes, cutting across the veins, may be made as the larva grows larger. The fully developed larva goes into the soil to pupate. Pearslug and roseslug have two generations per year, and bristly roseslug may complete several generations during the growing season before hibernation.

Plant Injury

Snails and slugs are a symptom of high moisture when damage to garden, greenhouse, or ornamental plants occurs. Different species of snails and slugs show preferences for some types of food plants, but usually are thought of as generalist herbivores. Slugs can destroy entire plantings of seedlings overnight. Foliage is rasped away, leaving brown lesions, or can be eaten from the edge inwards, especially in tender, thin leaves such as lettuce. Additionally, the wounds caused by feeding are entry sites for other plant consumers, such as fungal and bacterial pathogens, viruses, and insect herbivores and scavengers. For example, the roots of radish, turnip, and carrot have cavities eaten out of them by slugs. These cavities, if unnoticed for some time, usually harbor rot.

Slugs may hide in the protective crown of succulent plants, like lettuce and cabbage, so the damage is hidden until harvest, or rot

reveals the pest's activity. Mulches also can hide slug feeding until damage is advanced. Beside feeding and opening plant tissue to pathogens, slugs and snails cover plants with mucus and excrement, which may make the plant unattractive, inedible or unmarketable.

Small slug sawfly larvae skeletonize leaves, leaving small brown lesions. As the insect larvae grow, holes may be chewed. This attack may cause leaves to brown and fall early, and causes an unsightly appearance of the host plant. Cottoneaster, rose, raspberry, chokecherry, sweet cherry, pear, plum, apple, hawthorn, and other members of the rose family are hosts. Most of the time, feeding by the sawfly larvae causes no health problems for the plant, but may be aesthetically undesirable in well-kept landscapes. For this reason, slug sawfly larvae are often considered important pests in park and residential settings.

Management

Overwatering and use of mulches create the most common conditions by which slug and snail populations grow to damaging levels. Unfortunately, in our arid climate, creating conditions that lower slug populations also may also increase water demands of the plants, increase soil temperature and evaporation, lower rates of decomposition of the organic matter in the soil, and reduce the quality of the topsoil's texture and fertility. Mulches, for example, are excellent in cooling the soil and conserving water, but harbor slugs. If slugs have been problems previously, the use of mulches should be delayed as long as possible to reduce early buildup in the summer. Removal of boards, stones, and plant residue from the area also reduces the number of slugs. On the other hand, boards or stones can be used as attractants for slugs. These are put in the garden overnight or for a few days, then turned over during the hottest part of the day and the slugs under them destroyed.

Adequate spacing of plants and trellising them to increase air movement also help reduce slug damage. Irrigation techniques designed to limit water consumption, such as soaker hoses and drip irrigation, also decrease moisture while supplying water to the plant. Methaldehyde is the molluscicide used most for controlling slugs and snails, which are not affected by most insecticides. Methaldehyde is both attractive and toxic to slugs and snails. Methaldehyde application should occur during warm, dry weather. The methaldehyde is inactivated by sunlight, so it should be spread under leaves or other cover. Pets can be poisoned by the chemical: follow all label precautions. Slugs and snails avoid moving on dry, abrasive, acidic, or caustic materials. Wood ashes, diatomaceous earth, fine silica sand, and similar materials can be used in a band around plants. These barriers become less effective if they are wetted, so reapplications may be necessary. Salt is toxic to slugs, but should be used sparingly in garden soil. Strips of copper repel slugs, but should be inspected regularly to remove sticks or other potential pathways by which slugs can get past the barrier.

Chemicals produced during fermentation are attractive to slugs—pans of beer or sugar water attract slugs, which are then drowned. These should be placed throughout the infested area, spaced no more than a few feet

apart. Hand picking is another effective way to get rid of the pests, if done early in the morning, when the slugs are still on the plants. Valuable plants can also be protected by surrounding them with a attractive trap crop such as lettuce.

Slug sawfly damage should be evaluated in terms of the value of the plants' appearance and the extent of the defoliation. If moderate damage is tolerable, the best decision is often to do nothing. If control measures are necessary, many garden and landscape insecticides, such as pyrethroids, carbaryl and chlorpyrifos, are available for both ornamental, tree and shrub host plants. These products should be applied when young larvae are feeding actively in early summer before much skeletonizing of leaves has occurred.

Sources of further information

Insects that Feed on Colorado Trees and Shrubs (PSIS-4) and *Management Recommendations for Insect Pests of Trees and Shrubs* (PSIS-5) are available from the University of Wyoming Bulletin Room, Merica Hall (307-766-2115). These guides provide information on snail, slug, and slug sawfly biologies not covered in this bulletin. Other guides on horticultural pests and their control are available from various sources. University of Wyoming or Wyoming Department of Agriculture representatives may help locate literature.

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Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Edna L. McBreen, Director, Cooperative Extension Service, University of Wyoming, Laramie, WY 82071.

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