



Managing Slugs in the Greenhouse

Introduction

Slugs, although a minor pest, occasionally can be troublesome to greenhouse growers and retailers. The moist, humid greenhouse environment, with its abundance of plant material, often makes greenhouses a favorable habitat for slugs.

Soft-bodied slugs are close relatives of clams, mussels and other mollusks. They move with a muscular foot covering the underside of their body that secrete mucus. Slime trails on plants are an important indicator of their presence. This coating of slime also helps protect slugs from desiccation.

Description

Slugs are from ½ inch up to 1.5 inches in length. They are often gray or brown and may have darker spots. Slugs also have two sets of tentacles on their head. Slug eyes are on the tips of the upper tentacles. The lower tentacles are for tasting and smelling. Slugs also have a fold of skin, known as a mantle, on their back, with a breathing pore at the edge of this mantle. Their size, color, location of the mantle, and color of the mucous are some of the characteristics used to identify the different species. Some species of slugs secrete a clear slime, others a milky slime. The [Terrestrial Mollusca Tool](#) website is a helpful tool to identify slugs to species.



Figures 1 & 2: Slug feeding on a Perennial Sunflower and Agastache. Photos by L. Pundt

Biology and Life Cycle

Slugs contain both male and female organs and may alternate sexes at different times during their adulthood. Self-fertilization is also possible. They

lay clusters of about 20 to 100 pearl-shaped eggs in moist locations under containers or debris. Eggs hatch in less than 10 days at 50 °F. Newly hatched slugs are smaller and lighter than the adults are. Slugs mature in about 3 months to a year (depending upon the species). In greenhouses, slugs feed and reproduce year round. Adults may live for a year or more.

Slugs have a tooth-covered radula that works like a rasp to grate plant tissue. At night, slugs feed upon a wide range of plants including annuals, perennials, orchids, fruits and vegetables. They can destroy tender young seedlings. Slugs chew holes in the leaves by rasping away the surface of the plant tissue, often leaving larger veins behind. Slime trails also reduce the marketability of plants.



Figure 3 & 4: Slime trails are an important indicator of slugs. Photos by L. Pundt

Slugs may also eat fungi, dead worms, and dead insects in addition to plants. During the day, they hide under debris, pots, flats, boards etc.

Monitoring

- Check damp, moist areas for slugs and their egg clusters that are covered with a gelatinous shell giving them a somewhat milky appearance.
- Slug feeding damage is often confused with caterpillar feeding damage.
- However, caterpillars typically feed on all but the largest veins, may be more active during the day, and leave fecal droppings.
- To distinguish slug feeding from caterpillar feeding, look for slug slime trails on plants or on the ground. These may be more evident when slugs

are most active -- in the evening or early morning hours, or after a rain or watering. Slugs may also be active during cool, cloudy, overcast days.

- Check for slugs under pots, containers, flats, boards, stones, and dense foliage.
- A shingle, with the top covered with aluminum foil reflecting light to keep the board cool, can provide a daytime hiding place.



Figure 5: Check for slugs under pots. Photo by L. Pundt

Management Options

A combination of **proper sanitation**, **barriers**, and **baits** may be used to help manage slugs. Overuse of poison baits may result in the development of populations that ignore or are resistant to the baits.

Proper Sanitation

Proper sanitation practices combined with cultural controls are the first line to defense to control slugs.

- Slugs hitchhike into the greenhouse on equipment or containers and flats that have been stored outdoors, or on unsterilized growing media (soil and sand)
- Carefully inspect incoming plants and containers for their presence.
- Carefully clean equipment and supplies before introducing into the greenhouse.
- Remove weeds in and around the greenhouse. Weeds provide a good hiding place and alternative food source for slugs.
- Eliminate favorite hiding places; remove debris, boards, empty containers, pet plants, etc.
- Keep areas under the greenhouse benches clean and dry.
- If possible, grow plants on expanded metal benches, not on wooden benches or on the ground. Wooden benches are difficult to sanitize and as they rot, provide a good hiding place for slugs.

- Water early in the day, so foliage dries before nightfall, to help discourage slug activity.
- In small areas, it may be possible to handpick and destroy the slugs. Handpicking is best done in the evening, about two hours after sunset.
- **Barriers**
Slugs avoid crossing copper barriers. They receive an electric shock when their moist bodies contact the copper.
- Copper tape, flashing or strips are available from many different suppliers. Wrap copper tape on bench legs, or surround raised beds with flashing to help exclude slugs.
- If areas are already infested, kill the slugs first, and then install the copper strips.
- Slugs also avoid crossing abrasive materials, as long as these materials remain dry. They may be less likely to crawl across dry gravel, or diatomaceous earth, **if** it remains dry.

Biological Control

Although there are parasites, predators and pathogens of slugs, few have been investigated for commercial biological control in greenhouses. A nematode parasite of slugs, *Phasmarabditis hermaphrodita* is commercially available in Europe, but this non-native nematode is not commercially available in the U.S.

Outdoors, toads, several species of lightning bug larvae, garter snakes, ground beetles, and marsh flies may help provide some level of natural control.

Chemical Management

Baits containing iron phosphate and metaldehyde are commercially available. Poison baits tend to work better than sprays. Poison baits are formulated in bran and must be eaten by the slugs to work. Apply baits in the evening when slugs are active. Irrigating before placement also helps promote slug activity and their contact with the bait.

Baits containing iron phosphate are stomach poisons. Iron phosphate is a naturally occurring soil component. Slugs consume the iron, a toxic heavy metal, and immediately stop feeding. They crawl away to die, usually within 3 to 6 days. Sluggo is also less toxic to cats and dogs than other poison baits. There are also combination productions containing iron phosphate and spinosad.

Baits containing metaldehyde do not directly kill slugs but stimulate water loss in slugs through excessive mucus secretion. Slugs stop feeding; produce large amounts of mucous, dehydrate and die. Metaldehyde baits may be more effective if applied when days are warm and dry, so slugs desiccate and die. During cool, wet days, slugs may recover from exposure to metaldehyde. Re-

applications may then be needed. Metaldehyde can be harmful to children and is fatal to domestic animals when ingested.

Methiocarb is available as a wettable powder that is mixed with water and applied as a spray. This product works better under cool, damp conditions. Methiocarb products are federally restricted, so can be purchased only by licensed pesticide applicators.

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