Slugs and Snails:

Constant Nemeses of Ornamentals

They're not one of the most common pests, but they're pests in their own right. Find out how to prevent and eliminate slugs and snails.

By Ron Oetting

Slippery! Slimy! Creepy things, yuck! This pretty much describes the general opinion of what a slug or snail is. These pests fall under the general responsibility of entomologists when it comes to who has to deal with calls and questions concerning their control, but they are far from being an insect. In fact, they are not even in the same phylum.

Slugs and snails belong to the phylum Mollusca, which puts them in the same grouping as oysters, octopods, crustaceans and clams. They are in the subgroup Gastropoda, which includes animals with a head, a ventral muscular foot attached to the abdomen and a shell. In fact, most of the seashells you collected walking on the beach during your last vacation were members of Gastropoda. No, slugs do not have a visible shell, though they actually have a much-reduced internal shell. Snails have an obvious external shell that is large enough to hold the entire body. The bodies of both groups are soft, unsegmented and yes, slimy. The head has two pairs of tentacles: one pair is short, located on the front of the head and used for touch and smell; the other pair of tentacles is longer, located on top of the head, with an eye at the distal end of each tentacle. Slugs and snails are hermaphrodites, possessing both male and female organs. Even though they can be self-fertilized, they usually mate with another slug or snail and may use both male and female organs during mating. In some situations, they may be male or female during part of their life, in addition to being a hermaphrodite.

All photos courtesy of Ron Oetting.

There are many more species of land snails than slugs, and most do not cause noticeable damage to ornamental plants. However, the many that do are among the most damaging pests in the greenhouse, garden and landscape. The slugs and snails that cause most of the damage are introduced species that are not native to the area. They are usually gregarious and build up large populations in a localized area, potentially causing severe damage. Even though slugs and snails are not insects, they are very similar in their biology and behavior.

Many species of slugs and snails are economic pests of ornamental plants. The most noteworthy snail species is the brown garden snail (*Helis aspersa*), which was initially introduced into California from France in the 1850s. It was brought into the United States to be used as food but escaped into the environment and has been a major pest since then. There are several species of snails that are common in moist areas, but most of the damage is from their presence on plants that are being shipped to market. Some snails are predators and feed on other snails, while others feed primarily on algae and other vegetative material common in wet areas. In much of the Southeast, slugs are the most damaging group. Some of the important species are brown slug, garden slug, gray garden slug, greenhouse slug, Lehmannia slug and spotted garden slug.

A SLUG/SNAIL LIFE

Slugs and snails move by sliding along on a muscular foot. Wave-like movements on the contact portion of the muscular foot on the mucus layer secreted by a gland behind the

mouth and smaller glands on the foot propel them along. The protection of the slippery mucous allows them to move over very rough surfaces. This foot is very sensitive to particles and chemicals, and it is a common target to many of the home remedies used against snails and slugs. Once the animal has passed, the mucus dries leaving the telltale shiny slime trail that is characteristic of these pests and is the key to identifying that they are the villain that chewed holes in your plants the night before.

Snails and slugs are most active at night, but they can be out during the day if it is overcast and especially if it is foggy or rainy. When the sun is out, they seek a hiding place out of the dryness and heat. As the temperature increases, they seek shelter in a cooler area to protect themselves from desiccation during the day. They can commonly be found under boards, leaves, rocks and any other dark cool place that is protected from the sun. Some species will even burrow into the soft earth where they will rest and feed. Eggs are laid in these protected areas, reducing the chance of predation by their natural enemies. They are active spring through fall and hibernate in protected areas during the winter. In warmer climates and greenhouses, they can be active all year.

The damage caused by slugs and snails is a result of chewing mouthparts. The mouthparts consist of numerous strong teethlets that allow them to remove chunks of plant material. On plants, they chew irregular holes with smooth edges very similar to some caterpillars, making it difficult to distinguish the culprit. With slugs and snails, there is that famous slime trail that can be used to determine which pest caused the damage. They prefer succulent plant material, so damage is most common on seedlings and herbaceous plants. They can clip seedlings off by eating through the stem and then eating the small leaves. Soft, ripe fruit is also attractive to slugs and snails, and they are very damaging to strawberries, tomatoes and other soft fruit that is close to the ground. Some species will actually burrow into soft earth and feed on the succulent roots of herbaceous plants.

Top: Slugs cause damage by chewing. Bottom: They seek cool, moist areas such as under pots, as seen here.

CONTROL

Control is a major problem in all habitats. There are many things that can be done to reduce the potential of a problem occurring. A major source of infestation in greenhouses is the movement of plant material. Growers need to inspect plant material as it arrives at the greenhouse for the presence of pests that can establish themselves and become a major problem. It is a lot easier to prevent bringing in a pest than to control it once it is in the greenhouse. Conversely, shippers need to make sure their plant material is clean before it is shipped out to growers or consumers.

If slugs and/or snails are already present, there are still measures that can be taken to prevent or reduce damage. Eliminate, as much as possible, the areas where slugs hide during the day. Anything that is sitting on the ground is a possible resting place for these slimy pests, such as boards, boxes, stones, debris, weeds, plants in pots that have runners on the ground or any other items that provide shelter. Reducing hiding places decreases slug and snail survival. Of course, the potted plants that are set on the ground will also provide harborage for these mollusks. Placing pots on raised benches will reduce the numbers of slugs and snails that are present on the pots and plants. Keeping things dry will also decrease the survival and reproduction of slugs and snails and discourage them from staying in the area; consequently, they may move out of the greenhouse to find a better habitat.

BAIT OR TRAPS

The reduction of hiding places decreases the numbers of slugs and snails, but if you are going to use bait or traps for control, hiding places can be used as a location for baits. Slugs and snails will be attracted to these areas, increasing the probability of them eating the bait. Traps can be constructed of boards with runners on each side to allow room for entry, or old pieces of wet carpet might be used. Traps are then checked regularly, and the slugs are removed and destroyed. Some people recommend the use of beer, cooked cabbage, dog food, grape juice, veggie mix, etc., to attract slugs and snails to an area. These methods have been reported with various claims of success. Some studies have even looked at different brands of beer and whether it is best used fresh or stale. You will need to monitor and refresh baits at regular intervals. The use of a food source under a trap board should increase the numbers of these pests collected.

Traps can also be sunken into the ground and coated with soap or grease to trap slugs and snails. Once they enter the slippery-sided jar or plastic container, they cannot climb back out. The addition of your favorite bait should increase the catch. In landscape situations when you are trying to protect a small area, barriers can be placed around the area to reduce movement into it. Some of the barriers used are coffee grounds, copper strips, diatomaceous earth, horseradish roots, lava rock, lint from the dryer, nut shells, rosemary sprigs, salt, sand, sandpaper, the spiny fruit of sweet gum trees, wood ashes and many more home remedies. These do not have much practicality when trying to protect a large area of plants. There are many natural predators of slugs and snails, including insects such as ground beetles, snakes, frogs and toads, turtles, lizards and other snails. One of the major groups of predators is birds. Many birds feed on slugs and snails, and I have visited greenhouses where quail are kept inside the greenhouses to feed on slugs, snails and other ground pests.

CHEMICAL CONTROL

Chemical control is the common method used when protecting ornamental plants. There are very few pesticides registered for use against ➧

slugs and snails, so the common method of application is spreading baits. The key to control is the attractiveness of the bait. To obtain mortality, the bait must attract the mollusk and stimulate it to consume the bait containing the pesticide. If the bait is old, stale or rancid, it will be less likely to succeed. The most common bait on the market is metaldehyde, and there are different formulations available. The attractiveness of the bait is the most important factor; good bait can attract slugs and snails from a meter or farther. Metaldehyde does not kill slugs and snails by poisoning them, but kills them by stimulating

the mucous-producing cells to over produce, so they die of desiccation. If they do not consume enough bait, they will recover.

Another bait is methiocarb, marketed as Mesural. Care must be taken to make sure these baits are not deployed in piles where a pet would be likely to consume the bait or where children could come in contact with it. The placement of baits in traps, as mentioned above, reduces the hazard of the wrong animal coming in contact with it. A fairly new bait, iron phosphate (Sluggo or Escar-Go) is less toxic to mammals, reducing the concern for human or animal safety. It causes slugs to stop feeding and will take a longer period of time for them to die.

Baits are most effective under moist conditions, so consider the locations where baits are placed. The placement of baits in traps or in areas where slugs and snails are more likely to hide or feed will increase the control with less bait. Sunlight will break down some of the chemicals, and some bait breaks down faster than others. Mesural, carbamate (Sevin) and copper sulfate can be applied as a spray of the foliage or ground. These chemicals kill by poisoning the slimy pest.

Slugs and snails are very difficult to manage once they are well-established. Most of the damage to ornamentals is a result of slug feeding, but some snails, especially the brown garden snail, are just as damaging. There are several university and industry Web sites that address these pests if more information on the biology and management of slugs and snails is needed. GPN

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