



The Orchid Snail as a Pest of Orchids in Hawaii

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With a little practice and knowledge of pest management, orchids can be grown generally free of serious pests. But in recent years there has been an upsurge in problems caused by a root-feeding pest called the orchid snail or bush snail, *Zonitoides arboreus* (Say).

Description

Adult orchid snails are yellow-brown and about an eighth of an inch in diameter. The body of the snail is dark grayish-blue. They damage plants by feeding on the thick, corky roots that grow from the base of the plant (Fig. 1). Ordinarily these roots grow down into the media, holding the plant firmly within the pot. However, plants infested with snails become unstable. They cannot be sold until the pests have been controlled and the roots have re-grown. It only takes two or three adult snails in the medium of a 4-inch pot to cause serious root damage.

Figure 1. Two orchid snails near a new root emerging from the base of an orchid plant. The hollowed-out root (arrow) was damaged by snails.



Photo by Scott Bauer, USDA Agricultural Research Service.

Pest status

In a 1999 survey of commercial orchid growers in Hawaii, 44% of the 64 respondents reported this snail species as a pest in their greenhouses, costing them an average of \$503 per year in control costs and \$5,708 in lost sales during the previous 12 months (unpublished survey data). Growers reported damage on nine different types of orchids, particularly in the genera *Oncidium*, *Dendrobium*, *Cattleya*, *Phalaenopsis*, and *Vanda*. Orchids in the *Oncidium* alliance were mentioned most frequently as being susceptible to attack (42% of the instances reported). The disparity between the amount of money these growers spent to control the pest and the value of lost sales indicates the insidious nature of the damage. In many cases, by the time the grower discovers the problem, serious damage has already occurred.

It is not clear why problems with orchid snails are increasing, because this snail species is not new to Hawaii. According to Dr. Robert Cowie of the Bishop Museum, the orchid snail has been present in Hawaii since at least 1928. In its native range (North America and Central America), this snail is commonly found under the loose,

Figure 2. An orchid snail and eggs on a piece of coir.



moist bark of decaying trees, or in decaying wood or vegetable matter. Pest interception records kept by quarantine inspectors indicate that potted orchids are the most common commercial host for this snail. Orchid snails have also been reported as a pest of sugarcane roots in Louisiana.

The recent increase in snail damage in Hawaii may be related to the rapid growth of the commercial potted orchid industry since 1990. Most potted orchid growers use bark or coir media, which provide a moist environment conducive to snail growth. Previously in Hawaii most orchid growers were cut-flower producers and used cinder or basaltic rock as the growing medium. Some growers have suspected that purchased bark or coir media may be the source of their snail problem. However, we were unable to recover any snails from several types of bark and coir media that we purchased and tested for the presence of snails. Further, we discovered that fresh snail eggs allowed to dry for a week will not hatch, even when re-wetted.

In addition to the damage they cause, snails are a concern because shipments of potted orchids may be rejected if snails are found by plant quarantine inspectors. Although the orchid snail is widely distributed on the mainland United States and in other parts of the world, this would not necessarily prevent quarantine inspectors on the mainland from taking quarantine action if snails were found.

Biology

In laboratory and greenhouse studies, we have discovered that orchid snails develop slowly, despite their small size. A snail completes its life cycle in about three months. Adults lay small white eggs (about $\frac{1}{25}$ inch in diameter) in clutches within the pots of orchid plants (Fig. 2). These hatch in about two weeks. No one has measured how long these snails live outdoors or under greenhouse conditions. In the laboratory, orchid snails have lived more than 16 months. Their shells contain calcium, and laboratory-reared snails fed lettuce or cabbage grow faster when given supplemental calcium in the form of crushed oyster shell.

Control

In general, this snail species is difficult to control with chemicals, and the best method of control is prevention—sanitation and exclusion. Snails usually come into the greenhouse with infested plant material and then spread to other plants. Growers should keep snail-infested plants on

separate benches from plants known to be clean (such as those from flasks). The supports of greenhouse benches should be treated to prevent the spread of snails by attaching copper bands or applying molluscicides. Re-potting plants into clean media after bare-rooting them is a time-consuming but effective method of reducing the pest problem in extreme cases.

Commercial pesticides registered for slug and snail control in Hawaii include formulations containing metaldehyde, iron phosphate (Sluggo®), and methiocarb (Mesuro®). Although some growers have recommended dust applications of diatomaceous earth, these proved ineffective in our tests. We did not do any greenhouse tests using iron phosphate pellets, but in the laboratory they did not attract or have an effect on snails.

Orchid snails are susceptible to products containing metaldehyde and methiocarb. Regardless of the product used, a single application is unlikely to kill all of the snails. The key is to use repeated applications at regular intervals (every three to four weeks) until all the snails have been killed. Products containing metaldehyde may be more effective if watering is withheld for a while after treatment. This is because metaldehyde products cause slugs and snails to secrete excess mucus, causing their dehydration and death. Growers must decide for themselves what period of time water can safely be withheld without risking injury to the plants.

The effectiveness of pesticide applications can be determined by removing and searching the planting medium from a number of orchid plants that were known to be infested previously. Place the collected shells in a clean jar with a few drops of water or with a piece of moist paper towel. Living snails will readily emerge from the shell and begin moving about. In our studies, the three products that were most effective against orchid snails were Slug-fest®, a liquid concentrate containing 25% metaldehyde, Durham® 7.5% metaldehyde granules, and Mesuro®, a wettable powder containing 75% methiocarb.

Surprisingly, none of the metaldehyde-containing baits we tested actually attracted snails. Those that had some effect did so because snails accidentally contacted the baits. Growers are cautioned that baits containing metaldehyde products are very attractive and highly toxic to dogs, and Mesuro is a potent nerve poison and thus is classified as a restricted-use pesticide.

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