

## CHAPTER TWENTY-FOUR

# Root Weevils

## *Otiorhynchus sulcatus*; *O. ovatus*; *Sciopithes obscurus*

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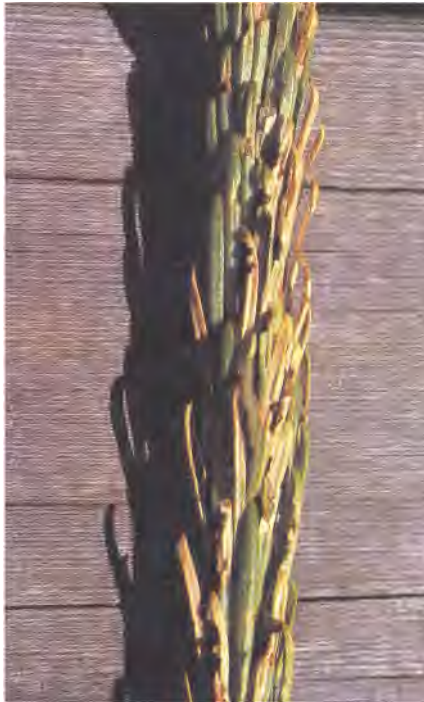
### Insects and hosts

Root weevils, primarily the black vine weevil, *Otiorhynchus sulcatus*; the strawberry root weevil, *O. ovatus*; and the obscure root weevil, *Sciopithes obscurus*, damage true firs and Douglas-fir in Northwest forest nurseries. These weevils have much in common: all females incapable of flight, they have a single generation of offspring per year, they lay up to several hundred eggs, they feed in darkness or subdued light, and they attack both roots (as larvae) and foliage (as adults) of conifer seedlings. Besides conifers, hosts in the Northwest are berries and rhododendrons.

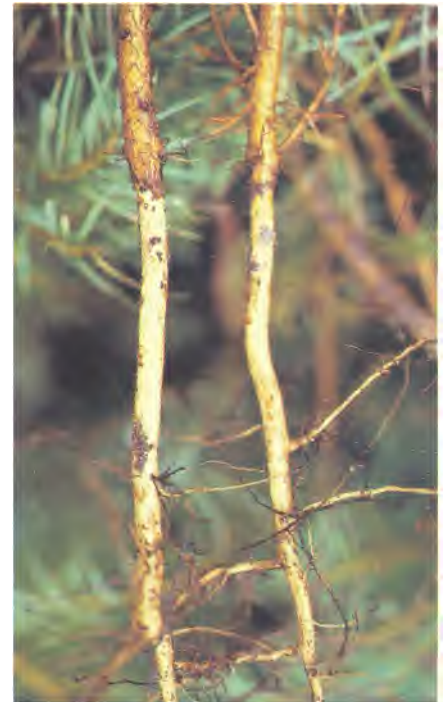
### Symptoms

Adult weevils notch the edges of the leaves of host plants (Figure 24-1). Signs of their feeding are very apparent in broadleaf plants but less so in conifers because the degree of injury per feeding incident is less. Often needles are severed and drop from the tree immediately, or are so damaged that they drop in a short time.

Adults feed mainly on new growth, resulting in sparse foliage. Larvae feed on small feeder roots first. As they grow, they feed on larger roots, often severely damaging or even killing plants by girdling their roots in the spring (Figure 24-2). Injured plants develop a greenish-yellow cast that does not respond to fertilization or watering.



**Figure 24-1.** The feeding of adult root weevils produced notches on the edges of these noble fir needles.



**Figure 24-2.** Damage from root weevil larvae on Douglas-fir. The cortical layer has been completely removed from most of the root system.

### Insect biology

These insects overwinter in the larval stage (Figure 24-3). Larvae are legless, C-shaped, and cream-colored with brown heads.

They quickly complete their development, pupate (Figure 24-4), and emerge as adults in the spring (Figure 24-5); or in the case of *Sciopithes obscurus*, in mid-summer.

Three to 4 weeks after adults emerge they begin to lay eggs. Eggs are laid singly or in small clumps. They are oval, sticky, and white at first but turn brown in a few days (Figure 24-6). They hatch in about 10

days. Young larvae then attack roots, feeding until the onset of cool weather in the fall. In *Otiorhynchus*, egg laying peaks in early July; in *Sciopithes obscurus* it peaks in August. The insects stop laying eggs in late September.

Some natural mortality of adults occurs throughout the summer following egg laying. Some adults overwinter in protected areas. The number of survivors depends on the severity of the winter weather and the shelter and moisture available. Adults that have overwintered are capable of laying eggs and do so in

the second spring of their lives. The impact of this overwintering adult population is not well understood.

## Loss potential

Root weevil larvae can be devastating to conifer seedlings. Adult damage is far less severe by comparison.

## Management

Since both larvae and adults usually go undetected until considerable damage is evident, a thorough knowledge of the insects and their habits is important. Also, because they are all female, their ability to multiply is great. The discovery of even a few weevils is cause for alarm.

### Root weevil larvae damage

appears:

**2+0, transplants**

**Summer to lifting**

### Root weevil adult damage

appears:

**1+0**

**Summer**

The search for emerging adults should begin in early spring when nights begin to get warm. The time of emergence must be determined in each nursery for best control. There are no sex pheromones—remember, these insects are all female. Deadfall traps are ineffective and time-consuming. Most effective is the use of an insect net and a head lamp. Sweep the insect net firmly across the conifer beds without damaging the seedlings. Weevils drop to the ground when disturbed and remain motionless for several seconds. This behavior and their color make them difficult to see and collect.



Figure 24-3. Root weevil larvae. Approximate size is 5 mm (1/4 inch) long.



Figure 24-4. Pupa of typical root weevil. Approximate size is 8 to 12 mm (5/16 to 1/2 inch) long.

Control measures should be initiated within 4 weeks of emergence, in order to kill weevils before they start to lay eggs.

### CULTURAL CONTROL

These pests are not in every forest nursery. Every effort should be made to keep them out if they are not present. Any movement of soil into noninfested areas should be restricted. These weevil species

cannot fly, but they can crawl. Keep native hosts away from nursery beds. Transplant beds should be cultivated and allowed to remain fallow between plantings. Mature larvae are quite susceptible to insect-eating nematodes, but the placement of the nematodes and the soil characteristics—particularly the moisture requirements for nematode survival—are critical.

**CHEMICAL CONTROL**

Adults—Chemicals may be used to reduce adult populations in the spring when the insects are feeding on new growth and before they have a chance to lay eggs. The chemicals will remain effective for several days. Even if weevils are not directly contacted, they feed at least every other day and thus will ingest treated foliage. Treatments should be repeated monthly throughout the egg-laying season. If damage is slight, adult populations are low, or sprays cannot be applied as often as indicated, most of the spraying should be done beginning 3 to 4 weeks after the first adults emerge and continuing through the peak emergence period.

Acephate, bendiocarb, parathion, and several synthetic pyrethroids have been found effective. Some trials indicate longer residual activity with synthetic pyrethroids. Parathion is a restricted-use insecticide that is extremely toxic. It may be used only by or under the super-

**Root weevil damage may be confused with:**  
**Fusarium root rot**  
**Grasshopper damage**  
**June beetle larvae damage**  
**Mechanical damage**

vision of a licensed applicator. Seedbeds may also be fumigated before sowing.

Larvae—Because larvae are hidden underground, control of them is more difficult than control of adults. Larvae may be controlled any time they are in the soil, but unfortunately, mature larvae and the pupal stage of the insect respond at best only slightly to chemical insecticides. In addition, the soil type may prevent penetration of chemicals, and organic matter in the soil may bind pesticides, reducing their effectiveness.



**Figure 24-5. Typical adult root weevils. Approximate size is 5 to 8 mm (1/4 to 5/16 inch) long.**



**Figure 24-6. Root weevil eggs. They are typically less than 1 mm (1/16 inch) in diameter.**

Spraying is recommended in summer, or fall, or both. Orthene and bendiocarb are recommended. The soil must be drenched through the root zone for the insecticide to be effective. Treating foliage and drenching soil results in control of both adults and larvae. Read and follow label directions for proper use.

Spraying for adult weevils is best done on warm nights when they are actively feeding. A high-pressure handgun offers the best application

method because it penetrates the foliage and provides good coverage. A boom with nozzles directed down over the beds, set at sufficient pressure and volume to wet them thoroughly, also offers effective application. Air applicators, mist blowers, and low-volume/low-pressure sprayers are less effective.

**Selected references**

- Antonelli, A.L.; Campbell, R.L. 1980. Root weevil control on rhododendrons. Bulletin 0970. Pullman, WA: Washington State University Extension Service. Reprinted June 1986. 4 p.
- Furniss, R.L.; Carolin, V.M. 1977. Western Forest Insects. Misc. Publ. No. 1339. Washington, DC: U.S. Department of Agriculture, Forest Service. 654 p.
- Schuh, J.; Mote, D.C. 1948. Forest pests of nursery and ornamental trees and shrubs in Oregon. Bulletin 448. Oregon State Agricultural College Experiment Station. 164 p.
- Wilcox, J.; Mote, D.C.; Childs, L. 1934. The root weevils injurious to strawberries in Oregon. Bulletin 330. Corvallis, OR: Oregon State Agricultural College Experiment Station. 109 p.