CHAPTER TWENTY-TWO

June Beetle; White Grubs

Polyphylla spp.

David L. Overhulser

Insect and hosts

June beetles are common throughout the Pacific Coast states. The larvae, called white grubs, feed voraciously on the roots of a wide variety of ornamental and agricultural crops. Douglas-fir and true fir bareroot seedlings can be heavily damaged by white grubs, and most other conifer seedlings are probably also susceptible. Damage is often reported when conifer seedlings are grown in or transplanted into fields with sandy soil in which grass and weeds were previously growing.

June beetle larvae damage may be confused with:
Fusarium root rot
Mechanical damage
Root-lesion nematode damage
Root weevil damage

Figure 22-1. Noble fir seedlings in November with yellowing foliage from root damage caused by white grubs. USDA Forest Service photo.

Symptoms

Damage to seedlings normally occurs in late spring and summer. If it occurs late in the growing season, the seedlings may not turn yellow until fall or winter (Figure 22-1). Root damage is often so extensive that seedlings are easily pulled from the ground (Figure 22-2). White grubs are large enough to be visible to the unaided eye; they can often be located in the soil around damaged seedlings in the fall (Figure 22-3). Holes approximately 1 cm in diameter are sometimes visible on the soil surface. These are made by the adult beetles when they emerge from the ground.

Insect biology

The typical life cycle for June beetles in the Pacific Northwest takes 3 years to complete. Female beetles lay their eggs in June or July in the soil of grass fields or other areas with heavy vegetation. Eggs hatch in 3 to 4 weeks. The young larvae feed on decaying organic matter and fine roots. As winter approaches, larvae burrow 20 to 55 cm into the soil and remain inactive. During the spring months, larvae move upward to feed on roots.

This pattern of seasonal migration in the soil is repeated the following year. Older larvae cause most of the damage to conifer seedlings. Pupation occurs in late May and June of the second year. Adult June beetles develop 6 to 8 weeks later but remain in the pupal cell beneath the soil until the following spring, when they emerge to mate and lay eggs. Adult beetles occasionally feed on conifer foliage, but cause negligible damage.

The immature and mature forms of June beetle are all quite distinctive

Figure 22-2. Nursery stock with extensive root damage from the feeding of white grubs. USDA Forest Service photo.

in appearance. Older white grubs, the type associated with the most extensive damage to seedlings, are approximately 2 to 5 cm long. These larvae are C-shaped, with a brown head and three prominent pairs of legs on the thorax. The adult beetle is 2 to 3.5 cm long and dull brown or metallic brown in color, with distinctive club-shaped antennae. Two common *Polyphylla* species have yellowish-white scales arranged in longitudinal stripes on their wing covers (Figure 22-4).

June beetle larvae damage appears:
All ages
Late spring through summer

Loss potential

Seedling losses are greatest when stock is introduced into an area of light soils in which grass or weeds have been growing for 2 or more years. Under these conditions, even large seedlings can be severely damaged. Seedling losses of up to

Figure 22-3. White grub larvae have a characteristic C shape and three prominent pairs of legs. Larvae are typically 2 to 5 cm (7/8 to 2 inches) long. USDA Forest Service photo.

30 percent have been reported in British Columbia nurseries.

Management

CULTURAL

Seedling beds with a history of continuous cropping rarely suffer damage from white grubs. Areas converted to nursery beds after being in sod for 2 or more years should be tilled several times in April to May or in September. Tilling or disking soils macerates grubs and exposes them to predators such as birds.

Figure 22-4. Adult female June beetles have large, club-like antennae. Beetles are 2 to 3.5 cm (7/8 to 1-1/2 inches) long. Oregon State University photo.

Cover crops can either encourage or discourage white grub infestations—grass supports white grub larvae, while legume crops do not.

CHEMICAL

Soil fumigation will eliminate white grub populations. Fumigation is recommended if seedlings are transplanted into formerly grassy or weedy areas. Drenching infested seedling beds with insecticides is not recommended because insecticides usually do not penetrate the soil well enough to kill the grubs.

Selected references

Berry, R.E. 1978. Insects and mites of economic importance in the Northwest. Corvallis, OR: Oregon State University, Department of Entomology. 189 p.

Sutherland, J.R.; Shrimpton, G.M.; Sturrock, R.N. 1989. Diseases and insects in British Columbia forest seedling nurseries. FRDA Report, ISSN 0835-0752; 065. 85 p.

Yalpani, N. 1980. An analysis of methods of pest management in British Columbia Forest Service tree nurseries. Pest Management Paper No. 18. Burnaby, BC: Simon Fraser University. 97 p.