

WHITE PINE WEEVIL

By Douglas C. Allen

In 1917, Julia Ellen Rogers published a book on the common trees of North America. Her description of white pine invites the reader to "study a sapling pine and see in its vigorous young growth the fulfillment of nature's plan, before storms have broken any of the branches and changed the mathematics of the pattern." Those of you who have seen virgin stands of white pine at the Pack Forest in Warrensburg or at isolated locations throughout the Adirondacks, have some appreciation for the straight and vigorous image that Rogers portrayed for this "prince of the forest." Little did she know, nor did anyone else for that matter, that once the original "ancient" pineries were cut a small snout beetle would forever alter the mathematics of young white pine growth throughout much of the tree's range.



Fig. 1. White pine weevil adult

The Insect

White pine weevil adults (Fig. 1) are one-quarter of an inch long and brown with distinct patches of whitish to reddish brown scales. The head is tapered anteriorly and the mouthparts occur at the end of a slender beak or snout. This insect is considered the greatest obstacle to growing quality white pine in the eastern United States.

Life History

Adults overwinter in the litter and emerge from late March through April. In the northeast, emerging females seek white pine or Norway spruce where they feed on the inner bark tissue of shoots and deposit eggs in punctures that they excavate in the bark immediately below the terminal bud. White, grub-like larvae hatch from the eggs

and feed downward beneath the bark, which quickly girdles and kills the leader (Fig. 2A). Before feeding ceases, they also destroy the previous one to two years' increment of height growth in white pine. When feeding is completed, larvae pupate in coffin-like cavities excavated in the center of the dead leader. The cavities are lined with small, excelsior-like wood shavings. These "chip cocoons" protect the immobile pupa. The next generation of adults emerges between late July and early September, at



Fig. 2A. White pine leader (current year's ht. growth, black arrow) and whorl of lateral branches killed by weevil. White arrow indicates extent of feeding.

which time the new weevils feed on the inner bark of branch tips before descending to the litter.

The Damage

Weevil injury is important if a landowner wants to manage white pine for sawtimber. Attacks are usually confined to young trees less than 20 feet tall. Larval feeding significantly reduces merchantable height and causes a sweep or crook in the butt log, the most valuable section of the tree bole. A crook results in white pine when the terminal shoot dies and one of the lateral shoots in the second or third whorl of branches (depending on how far down the stem larvae feed) takes over as the leader. In Norway spruce a new bud below the dead terminal forms a new leader, prevent-

ing the crook that is so damaging in white pine.

Value

Wood from white pine is light and durable, but soft and easily worked. During the 1950s, '60s and early '70s, stumpage prices of white pine sawtimber were dismal, fluctuating between \$8 to \$50 per thousand board feet. Prices have crept upward in the last couple of decades and during the late 1980s and early 1990s average value was \$75 to \$120 per thousand. As sources of western softwoods become off limits to harvesting, the value of our eastern pines may continue to increase. Recently, 6.9 million acres of spotted owl habitat in the pacific northwest, the most productive forestland in the world and a major source of our softwood lumber, was taken out of production. The demand for this material is not likely to decrease, so markets will look elsewhere.

Stewardship Recommendations

If your objective is to grow commercially valuable white pine, there are a number of ways to minimize weevil damage.

Direct Control:

1. In young plantations, physically remove (clip and destroy) infested leaders as soon as they begin to wilt or turn color, usually in early July. The most effective method of pruning is to also remove all lateral shoots except one in the whorl immediately beneath the dead or injured portion of the stem (Fig. 2B). This eliminates competition for the leader position and accelerates straightening of the new terminal.

2. Treat the leader and adjacent lateral branches with an appropriate insecticide in late March-early April (when adults emerge and seek egg laying sites) or early fall (when adults feed prior to wintering in the litter). Studies in Maine suggest that fall treatment may be more effective, because weevils are accessible for a longer time, timing is not as critical, weevils are exposed on more horizontal targets (lateral branches) than in the spring, and beneficial insects inside infested leaders are protected from the insecticide.

(Cont'd)



Fig. 2B. White pine after weevil damage has been pruned.

Indirect Control:

1.) Shading of white pine by a hardwood overstory has long been recognized as a viable silvicultural method that discourages weevil attack. Shading makes terminals less attractive to weevils, but it also retards height growth.

2.) A recent analysis of plantations in Quebec suggests that cumulative weevil damage is less on well to moderately drained sandy loam soils. White pine grows most rapidly under this condition, which decreases the probability of weevil attack. That is, trees are more likely to grow out of the susceptible height range in a shorter period of time.

Final Option

Landowners who have no interest in the

commercial value of their white pine can ignore the weevil. Even though tree form may suffer and height growth is impeded, weevil damage will not kill the host. Most trees eventually overcome an attack and attain a reasonably stately appearance.

[I thank Mike Greason, NYS, DEC, Albany for information on stumpage prices and Larry Abrahamson, SUNY, CESF, Syracuse for reviewing an early draft of this article.] ▲

Douglas C. Allen is Professor of Forest Entomology in the Faculty of Forestry at the State University of New York, College of Environmental Science and Forestry (SUNY/ESF); 146 Illick Hall, One Forestry Drive, Syracuse, NY 13210. All photos are by Professor Allen unless acknowledged otherwise.