Yellow-Poplar Weevil

Denver P. Burns [1]

The yellow-poplar weevil (fig. 1), *Odontopus calceatus* (Say), has in recent years injured leaves and defoliated trees of the yellow-poplar, *Lirodendron tulipifera* L., one of the most important hardwoods in the Appalachian Mountain region. The weevil occurred in large numbers in scattered localities before 1960 and was not considered a serious threat to yellow-poplar. But in 1960, 1962, 1965, 1967, and 1968, populations of the insect increased to damaging levels throughout large areas of the Appalachians. The causes of these recent epidemics are not known.

When abundant, the weevils destroy the leaves and buds of terminal and upper branches and may defoliate entire trees. Growth of trees may be slowed because of a reduced leaf area. Tree form may be adversely affected when a natural branch assumes dominance, following terminal bud damage; young trees may become deformed. Defoliation caused by the insect, together with drought or other unfavorable factions, weakens trees and leaves them vulnerable to other insects, to disease, and to competing plants.

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Figure 1.—Adult yellow-poplar weevil on underside of leaf.

Hosts and Distribution

Yellow-poplar has been the principal host during the recent attacks, but sassafras, southern magnolia, and sweetbay have also served as hosts. Accordingly, the weevil has sometime been called the sassafras mining weevil or the magnolia leaf miner.

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The weevil is found from Massachusetts, New York, and Michigan in the North to Missouri and Iowa in the Midwest and to Louisiana and Florida in the South (fig. 2). The insect probably occurs wherever its hosts grow.

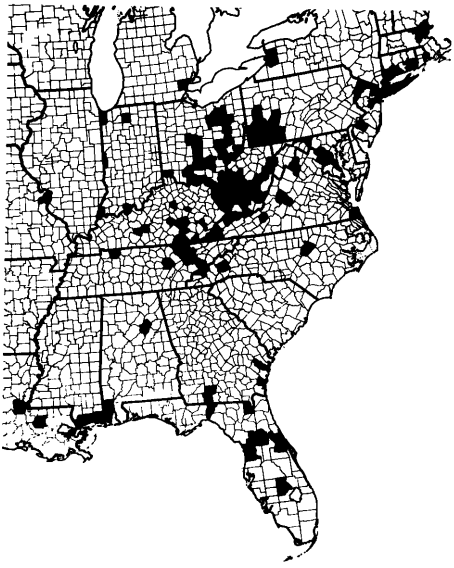

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Figure 2.—Distribution of the yellow-poplar weevil, by counties, in 1968.

Evidence of Attack

When the yellow-poplar weevil is abundant, yellow-poplars througout a large area may be infested. Commonly, however, activity is sporadic; the trees in one valley or on one hill may be severely attacked while those in an adjacent area may escape damage.

Damage occurs first in late April and early May, when the overwintering weevils begin to feed on the buds. Close examination is required to find evidence of this feeding. In May, as the trees leaf out, it is possible to see leaves with the brown feeding marks of the adults (fig. 3). Generally this early damage is important only as an indication of the size of the overwintering population.

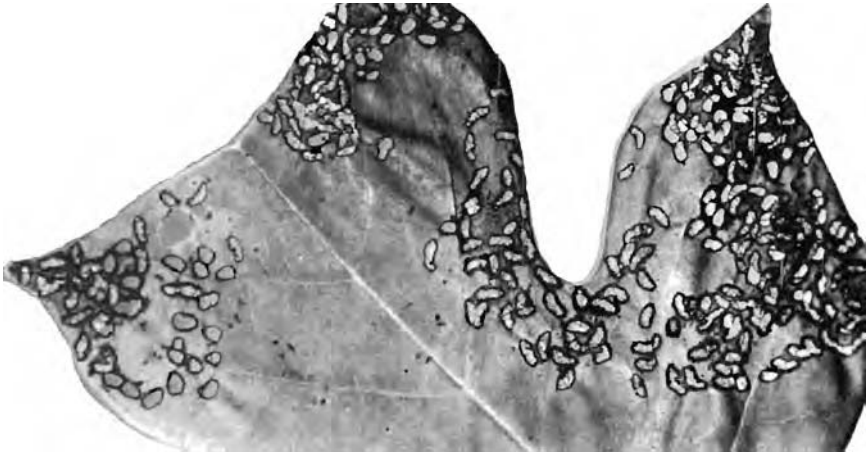

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Figure 3.—Feeding marks of adult weevils on a yellow-poplar leaf.

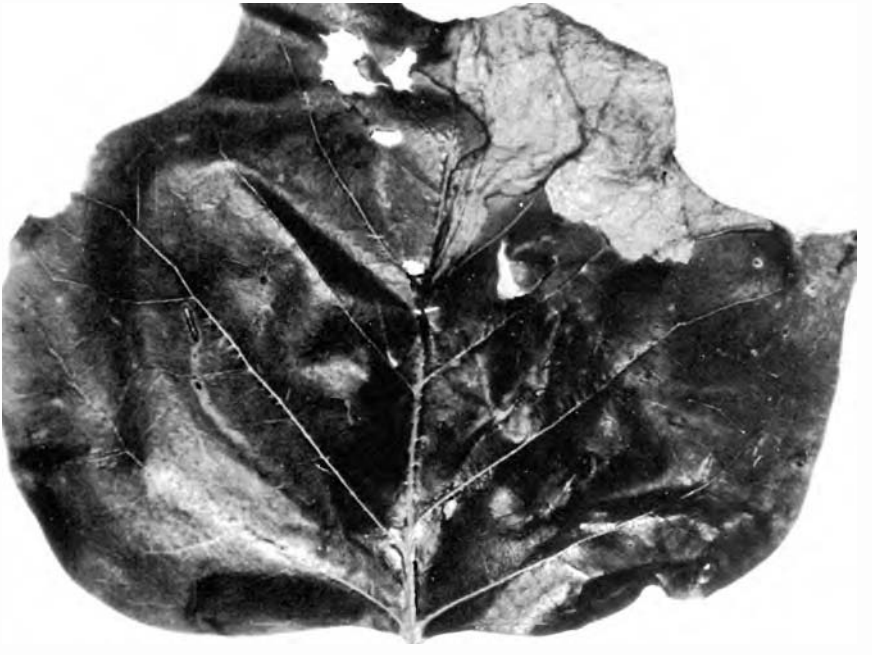

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Figure 4.—The leaf mine produced by larvae.

Brown leaves scattered throughout the tree canopy are evidence of larval mining (fig. 4). Mined leaves are visible in May in the Ohio River Basin. Many mined leaves are broken over because the larvae destroy the midrib as they begin a mine (fig. 5). Affected leaves are hidden from view as the tree continues to grow and produce more foliage.

More-severe damage occurs in June when large numbers of new adults emerge and feed. Adult feeding removes the lower-surface tissue and the middle layer of the leaf, leaving only the upper- surface tissue intact. Numerous discolored spots result, and these give severely attacked trees a burned appearance (fig. 6). Premature dropping of leaves occurs when damaged yellow-poplars are exposed to drought.

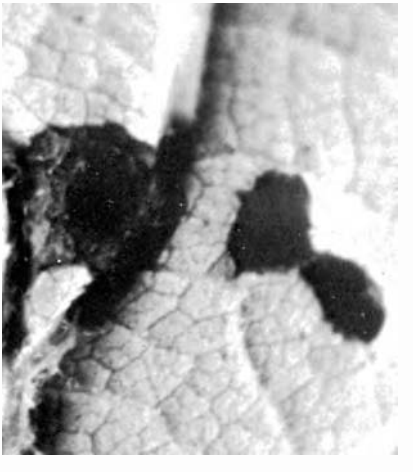

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Figure 5.—Broken midrib resulting from boring by larvae.

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Figure 6.—Severe weevil-feeding damage on terminal leaves and buds.

Description

The adult weevil is about 1/10 inch long. The body is dark brown or black, and the antennae, legs, and mouthparts are usually dark brown. However, some weevils collected from southern areas have yellow antennae, legs, and mouthparts.

Life History

The weevil has one generation a year in the Ohio River Valley. Adults spend the winter under leaf litter. During warm days in late April and early May they emerge and fly about. They can be found crawling on the trunks of yellow-poplar trees. When disturbed they often fly instead of dropping to the ground and playing dead as most other weevils do.

In May and early June the beetles mate, and the female lays eggs in the underside of the midrib of a leaf. In a few days the eggs hatch. The larvae are comma-shaped, white, and legless. They bore into the leaf blade, staying between the upper and lower leaf surfaces. As the larvae feed and grow, they make a mine that turns brown, inflating as it dries.

Each mine contains 1 to 19 larvae, which feed side-by-side in one or two groups. If a leaf contains two mines on the same side of the midrib, only one will be extensive. However, if the mines are on opposite sides of the midrib, both of them may be developed.

When a large mine is opened, it appears to be filled with a black, stringy mass. Larvae and fuzzy brown spheres may be seen in the mine. The stringy mass is composed of strands of silk and fecal material that are continuously extruded by each larva.

The spheres, which are often in groups of three or four, are pupal cocoons that are spun from the silk extruded by the larvae.

Adult weevils, which emerge from the cocoons, cut their way through the leaf surface, and begin to feed on the leaves in early June. By mid-July they drop to the ground and remain inactive, or in diapause, in the leaf litter until the following spring. Rarely, beetles may be seen feeding on the trees until mid-August. Figure 7 shows the generalized life cycle.

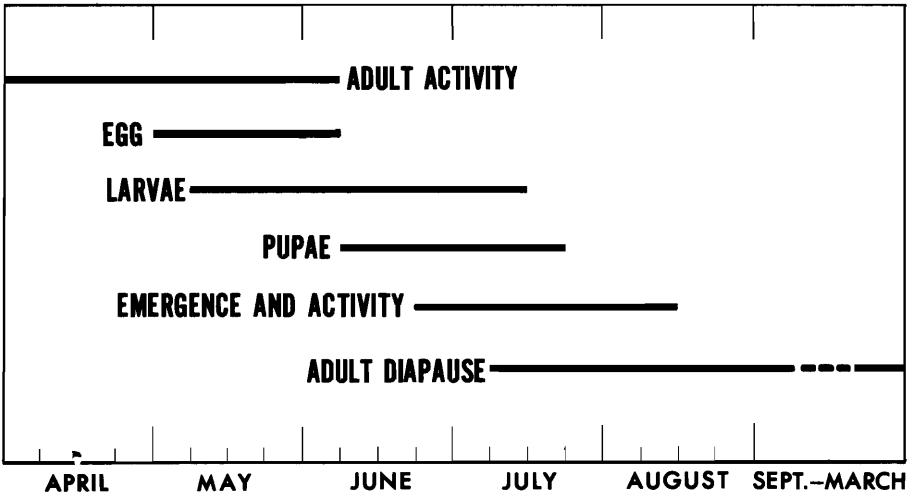

Figure 7.—Generalized life cycle of the yellow-poplar weevil.

Natural Control

Parasites have destroyed more than half of the pupae in some locations. Five Hymenopterous parasites have been found thus far: Two pteromalids, *Heterolaccus hunteri* (Cwfd.) and *Habrocytus piercei* Cwfd.; two eulophids, *Horismenus fraternus* (Fitch) and *Zagrammosoma multilineatum* (Ashm); and one ichneumonid, *Scambus hispae* (Harr.). Frosts in late spring reduce the size of weevil populations by killing adults and larvae. The larvae are destroyed when the leaves they are mining are killed by frost.

Reference

THE LEAF-MINING WEEVIL OF YELLOW-POPLAR. D. P. BURNS, AND L. P. GIBSON. Can. Entomol. 100(4):421-429. 1968.

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