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Redheaded Pine Sawfly

Louis F. Wilson[1] and Robert D. Averill[2]

The redheaded pine sawfly (*Neodiprion lecontei* (Fitch))[3] is an important defoliator of ornamental, natural-growing, and plantation pines, particularly the hard pines. Although the insect was described in 1858, serious outbreaks and tree mortality were not common until the establishment of pure pine plantations in the 1930's.

This sawfly occurs throughout Eastern United States and the adjacent Canadian Provinces and westward to the Great Plains, wherever its hosts grow.

Heaviest infestations are commonly on pines growing under stress, particularly those at the edges of hardwood forests, on poor soils, and where there is heavy competitive vegetation.

Hosts

The redheaded pine sawfly feeds on many native and exotic pines, but prefers to lay its eggs on hard pines. In general, it infests trees less than 15 feet tall. This insect is often a major problem in young plantations where hard pines predominate. In various parts of its range, certain species of trees are more susceptible to this insect than others. In Canada and the Northern United States, the injured species include mostly jack pine and red pine. In the Central and Southern United States, shortleaf pine, loblolly pine, longleaf pine, and slash pine are more heavily attacked.

Most other hard pines, both native and exotic, may be attacked within the range of the insect. Scots pine, eastern white pine,

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[1] Principal insect ecologist, North Central Forest Experiment Station, Michigan State University, East Lansing.

[2] Entomologist, State and Private Forestry, Forest Insect and Disease Management, Anchorage, Alaska.

[3] Hymenoptera, Diprionidae.

Norway spruce, and tamarack are occasionally attacked when growing with the preferred hosts.

Injury

The insect feeds in colonies containing a few to over a hundred larvae (fig. 1). Early damage, which is similar to that of most other coniferous-feeding sawflies, is evidenced by the reddish-brown, strawlike remains of needles incompletely consumed by the young larvae (fig. 2). Older larvae consume the entire needle, generally stripping a branch of all its foliage before feeding on another. Old needles are eaten first, but the trees may be completely defoliated particularly in areas where two or more generations occur annually (fig. 3). When foliage becomes scarce, the larvae feed upon tender bark. When a tree is completely defoliated, they migrate to adjacent trees and continue feeding until they are fully grown.

Moderate to heavy defoliation stunts height growth of infested trees and forking may result in the upper crown. Complete defoliation is usually sufficient to kill red pine and jack pine. The southern pines, however, often survive complete defoliation, even in areas where several generations of sawflies occur in the same season.

Description

The egg of this insect is smooth, whitish, and has a shining translucent shell. It swells with age and averages 1.8 mm (1/12 in) in length and 0.6 mm (1/40 in) in width just before hatching.

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Figure 1.—A colony of nearly full-grown larvae feeding on needles of a host tree.

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Figure 2.—Remains of needles consumed by young redheaded pine sawfly larvae.

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Figure 3.—Pine tree heavily defoliated by redheaded pine sawfly larvae.

The newly hatched larva is about 3 mm (⅛ in) long and has a brownish, transparent head. When fully grown, the larva is nearly 25 mm (1 in) long and has a bright red head. The body varies in color from pale whitish yellow to deep yellow and is marked by two to four rows of black spots on each side of the abdomen (see cover). The last abdominal segment has a large black patch on each side.

The cocoon (fig. 4) is reddish brown, papery but tough, and cylindrical with rounded ends. Small particles of humus or soil may adhere to it. The cocoon of the male is about 7 mm (¼ in) long; that of the female, about 10 mm (⅜ in) long. Normally, a cocoon from which the adult has emerged has a large, circular hole at one end.

The adult sawflies are four-winged insects that vary from 5 to 10 mm (⅕–⅜ in) in length, the male is smaller than the female. The female is robust, reddish brown, with a head and thorax and an abdomen that is black with whitish sides. The male is more slender, entirely black, and has broad, feathery antenna.

Life History

The sawfly overwinters as a prepupa in a cocoon spun in the litter or topsoil beneath its host. Pupation occurs soon after the advent of warm weather, and emergence of the adult follows in a few weeks. Some prepupae may remain in a resting state called diapause over several seasons before emerging.

The female deposits about 120 eggs in the current or previous year's needles. They are laid individually in a row of slits or pockets cut in the edge of the needle. All the eggs laid by one female are generally clustered on needles of a single twig (fig. 5). Egg laying may occur before mating, and unfertilized eggs produce only male progeny. The eggs hatch in 3 to 5 weeks, depending on temperature and locality. The larvae feed gregariously, remaining on the host for 25 to 30 days. When fully grown, they drop to the ground and spin their cocoons.

A single generation per year occurs in most of Canada and parts of Northern United States (fig. 6). A partial second generation or a complete second genera-

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Figure 4.—Cocoon of redheaded pine sawfly.

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Figure 5.—Redheaded pine sawfly eggs on needles of host pine.

tion may appear at the latitude of Michigan and New York. Farther south there are at least two and frequently three generations per year; up to five have been recorded. Where more than one generation occurs, colonies of different ages may be found at the same time until late fall or early winter.

Control

Outbreaks of the redheaded pine sawfly occur periodically and subside after a few years of heavy defoliation. The decline of these infestations is greatly influenced by rodents that destroy large numbers of cocoons. Diseases often kill tremendous numbers of larvae, and prolonged periods of high summer temperatures, or low temperatures and wet snowstorms in the early fall, also kill many larvae. Numerous parasitoids and predators are known to attack this sawfly in the United States and Canada. An introduced ichneumon wasp, *Exenterus amictorius* Panzer, has recently become established on this sawfly in the Lake States.

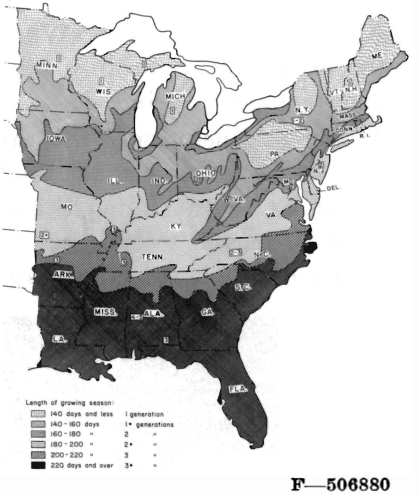

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Figure 6.—Probable number of generations per year of the redheaded pine sawfly in the United States, based on length of growing season.

Outbreaks of the redheaded pine sawfly can usually be minimized by avoiding the planting of susceptible hosts where competition for moisture and nutrients may be great or where soil conditions are marginal for hard pine growth. Nonvigorous hosts are susceptible to this insect, and anything that promotes vigor should be utilized.

When only a few colonies of larvae are present on small roadside, ornamental, or plantation trees, they can be picked off or shaken from the trees and destroyed.

When larvae are numerous, chemical control may be required. Pesticides, applied by mist blower, hydraulic sprayer, or aircraft should be used on the young larvae soon after emergence. Consult your State agricultural experiment station, your county agricultural agent, or other local source of information to obtain current information concerning chemical control of this insect.

References

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