Pine Sawfly
Neodiprion excitans *Roh.*

Robert C. Thatcher [1]

The sawfly *Neodiprion excitans* Rohwer is an important defoliator of pines in the South from Virginia to Texas. In recent years serious outbreaks have occurred in Florida and Texas. The insect feeds on most of the important species of southern pine. Since most of the defoliation occurs in late summer and early autumn, trees may go through the winter stripped of needles. The resulting loss in vigor many make the trees susceptible to attack by tree-killing bark beetles and wood-boring insects.

Hosts

In the Southeast and Texas, the preferred hosts of *Neodiprion excitans* are loblolly and shortleaf pines. Pond pine is also attacked. Slash (*P. elliottii* Englem.), longleaf, and Sonderegger (*P.* × *sondereggeri* H. H. Chapm.) pines occasionally are attacked, but larvae do not survive well on them, possibly because of heavy resin flow from injured needles.

The adults lay eggs mostly on medium to large trees in moderately to densely stocked forest stands. This sawfly attacks seedlings and saplings from time to time, often in association with the red-headed pine sawfly, *N. lecontei* (Fitch).

Damage

Newly hatched larvae feed close together; often three to five encircle each needle. They eat the outer tissue of a needle at or near the tip, leaving a central light-colored core that gives the affected branch an abnormal appearance. The uneaten part of the needle yellows slightly in the vicinity of feeding, but dead branch terminals—flagging—cannot be discerned.

More advanced larvae feed singly or in pairs on a single needle. They prefer older foliage and often eat most of the needle, leaving only a short stub. Sometimes the bases of needles are eaten first, causing some falling of green needles. When the needles have been removed from a branch, the larvae migrate in groups to other branches or trees.

Since the insect is most active during late summer or fall, heavily infested trees may remain without needles throughout the winter. No tree mortality resulting directly from needle loss has been reported, nor has the effect on tree growth been determined. However, severe defoliation (fig. 1) causes weakening of trees and susceptibility to

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attack by bark beetles, especially *Ips* species. Light loss of older needles early in the season gives the crown a "tufted" or thinned look. New growth usually restores normal appearance of the trees.

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***Figure 1.*—Heavy sawfly defoliation of loblolly pine.**

Description

The adult female is about ⅜-inch long and has a heavy, brownish body and brownish to black, thread-like antennae (fig. 2). The side margins of the thorax and abdomen are dirty white. The male is about ¼-inch long and has a black body and feathery antennae. The adults are flylike in appearance but have four shiny, transparent wings.

Newly hatched larvae are about

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***Figure 2.*—Adult female of *Neodiprion excitans* Rohwer.**

⅛-inch long and have dull black heads and graphite-gray bodies. When feeding starts, the head becomes glossy black and the body yellow green to green. Older larvae also have glossy black heads, but their bodies are olive green. Two longitudinal black stripes on the back, large black spot on the top of the last abdominal segment, and a row of conspicuous black spots on each side of the body (fig. 3) distinguish this species from other sawfly larvae. Fully grown larvae are about 1 inch long.

The cocoon is a tough, light to dark brown, oval capsule—sometimes slightly curved—varying from ¼- to ⅜-inch long. Cocoons containing females are generally larger than those containing males.

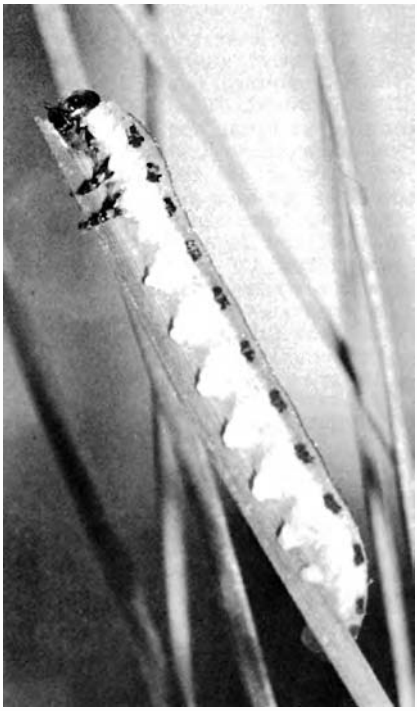

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***Figure 3.*—Late-instar larva of *Neodiprion excitans* Rohwer feeding on loblolly pine needle.**

Life History and Habits

Egg laying begins in late March and continues at irregular intervals throughout the warm season. As many as 184 eggs have been found in the ovaries of a single female. Eggs are deposited in needles closest to the tips of terminal shoots during cool spring and fall weather and in shaded foliage during hot weather. Females prefer places where needles are growing most rapidly and needles that have just completed their growth, next to a bud. Peak egg laying occurs in July or August in east Texas and from late August to early October in the Southeast.

One egg is inserted by the female into a small slit cut near the base of the needle. Where more than one egg is found in a needle, different females probably laid them.

Eggs incubate in 10 to 21 days. The larvae feed for approximately 5 weeks, changing to paler, nonfeeding prepupal larvae, which spin cocoons.

Cocoons usually occur in the surface duff or loose topsoil beneath trees that have lost many needles, but they may be found on twigs or needles or beneath loose bark scales. Typically, the prepupa undergoes a diapause, or resting stage, of a few weeks to many months. The pupal period lasts 2 or 3 weeks.

Peak emergence occurs late in the warm season, but adults emerge from cocoons at almost any time during spring and summer. Consequently, all stages of development may be found on infested trees, particularly during the late summer or early autumn. Under best conditions, a generation may be completed in 8 weeks, and four to five generations may occur each year. Most of the insects overwinter in cocoons, but a few persist as eggs or older larvae.

Natural Control

Outbreaks of *Neodiprion excitans* occur every few years and usually subside after one season. Hogs, armadillos, mice, and shrews destroy cocoons and greatly help to control outbreaks. Virus diseases of larvae provide natural control, as do at least 13 species of insect parasites and predators that feed on the sawfly during all its life stages.

Low winter temperatures do not appear to aid in control. An overnight low of 16° F. in Florida caused larvae to stop eating, but they renewed feeding when the temperature rose.

Direct Control

When needles are removed repeatedly, especially in dry weather, so that the tree is in danger of dying or is susceptible to attack by bark beetles, insecticidal control may be justified. However, no chemical has been adequately tested, and none is registered, for use against this pest. Woodland managers contemplating chemical control should consult their county agricultural agent, State agricultural experiment station, or local forester to learn whether chemical control recommendations have been developed.

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