

Redheaded Pine Sawfly

Neodiprion lecontei (Fitch)

Hymenoptera: Diprionidae

Wilson, L. F.; Wilkinson, R. C., Jr.; Averill, R. C. 1992. Redheaded pine sawfly--its ecology and management. Agric. Handbook 694. East Lakewood, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Region; 54 p.

Objectives: To evaluate the risk of potential injury from *N. lecontei*; to detect if *N. lecontei* or its damage is present at any particular time or place; and to evaluate population density or its potential to cause injury.

Abstract: The redheaded pine sawfly, *Neodiprion lecontei* (Fitch), is a major regeneration pest of pines, *Pinus* spp., in the eastern USA. The larvae feed gregariously on new and old needles of most eastern pines and also on the tender bark of young seedlings. The degree of damage is highly variable, depending on stress levels of infested trees. Young pines in plantations and nurseries are particularly susceptible to damage, and therefore need to be monitored regularly.

Several kinds of surveys are available for rating the risk of potential damage from *N. lecontei* and for detecting, evaluating, and suppressing populations. Risk of injury is a concern even before trees are planted because the condition of the site can affect *N. lecontei* fecundity and survival. Should the risk of injury be detected from the survey, management guidelines can be applied that maintain healthy, productive plantations.

Sampling Procedure:

Risk survey: Prospective pine sites should be rated for risk of potential *N. lecontei* injury before planting. Risk ratings on established sites are not necessary if pines are taller than 4.5 m in the North, and taller than 8 m in the South. To evaluate risk, consider proximity to a brood sources (do not plant within 1.6 km), soil type and moisture holding capacity, associated vegetation, and previous land use. Please refer to original publication for more details.

Detection survey: Detection surveys are usually evaluated on the ground either casually or systematically, but can also be done via low flying aircraft when infestation levels are heavy. Once presence of the insect is detected by any one method, cease surveying. Sample high risk areas until one of the following symptoms or signs is found:

Damage: Look for clusters of needles that have been skeletonized and resemble bottle brushes. This type of injury indicates that feeding has

begun recently. In most instances, new and old needles will be missing on portions of the branches.

Eggs: Eggs are laid in the needles and appear as a row of cream yellow spots on the edge of needles growing in a cluster (Fig 1). In the North, eggs are deposited on the old growth needles only. In the South, eggs may also be deposited on newly-formed needles. Egg-bearing new growth needles can often be identified at a distance because they curl in response to infestation.

Larvae: Larvae are observed easily as they tend to feed gregariously. Colonies of *N. lecontei* larvae from a few up to 100 individuals will be found on the edges of defoliated branches feeding on the remaining green foliage (Fig. 2).

Frass: Small piles of frass may be noticeable on the ground below the defoliated branches. Each pellet is cylindrical in shape with oblique ends, and is less than 2 mm in length and 1 mm wide.

Cocoons: To find cocoons, search the upper 5 cm of soil beneath the crowns of defoliated trees.

Adults: Male *N. lecontei* can be monitored by using pheromone-baited sticky traps. Place the trap at 1-2 m intervals within trees before the predicted male flight period and monitor regularly.

Evaluation survey: In order to obtain accurate information, timing is a critical component to evaluation surveys. Since *N. lecontei* phenology follows closely that of its host, the use of indicator plants along with particular events in their life cycle can aid in predicting emergence.

Surveys for eggs and larvae: Samples should be taken systematically along transects every 25 m. Examine each tree carefully for the presence of eggs and larvae, and record each tree as either infested or uninfested (1 = infested and 0 = uninfested). Sampling should continue until all the high risk areas are surveyed. When sampling is complete, calculate the percentage of trees that are infested. Depending upon location and tree size, different decision levels apply:

Location	Tree Height	If the infestation level is . . .	Then . . .
North	<2 m	$\geq 10\%$	CONTROL IS JUSTIFIED
	>2 m	$\geq 20\%$	
South	<3 m	$\geq 10\%$	
	>3 m	$\geq 20\%$	

NOTE: In Christmas tree plantations, control measures should be taken as soon as the insect is detected.

Damage surveys: This survey helps to determine tree mortality and growth loss of northern pines. Unlike most southern pines, northern pine species usually succumb to defoliation levels greater than 90% in a single year (Benjamin 1955). Conduct the survey systematically, recording the nearest tree every 10 paces as either <90% defoliated, or >90% defoliated. At the end of the survey, determine the proportion of trees having >90% defoliation, and consider this figure to represent the expected mortality rate. Trees suffering <90% defoliation eventually recover well enough to avoid significant growth losses at harvest.

Note: The reader must have a significant understanding of the phenology of *N. lecontei* in their region in order to time the sampling of specific life stages properly in the field.

Reference:

Benjamin, D. M. 1955. The biology and ecology of the red-headed pine sawfly. Tech. Bull. 1118. Washington, DC: *U.S Department of Agriculture, Forest Service*; 57 p.

Figures:



Fig. 1—Eggs appear as rows of yellowish-white spots along the edges of individual needles growing in a cluster.



Fig. 2—Colonies of up to 100 larvae are usually found on the needles at the juncture of the foliage and the defoliated branch.