Jack-Pine Budworm

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The jack-pine budworm is a pest of jack and red pines in the Lake States (fig. 1) and adjoining Canadian Provinces. Outbreaks occur somewhere in the region nearly every year. At first the jack-pine budworm was recognized as a variety of the spruce budworm, *Choristoneura fumiferana* (Clem.), but in 1953 it was described as a separate species, *Choristoneura pinus* Freeman. The same author in 1967 gave it a new status, *C. pinus pinus*, to separate it from a closely related form, *C. pinus maritima*, that defoliates Virginia pine and pitch pine in the Middle Atlantic States.

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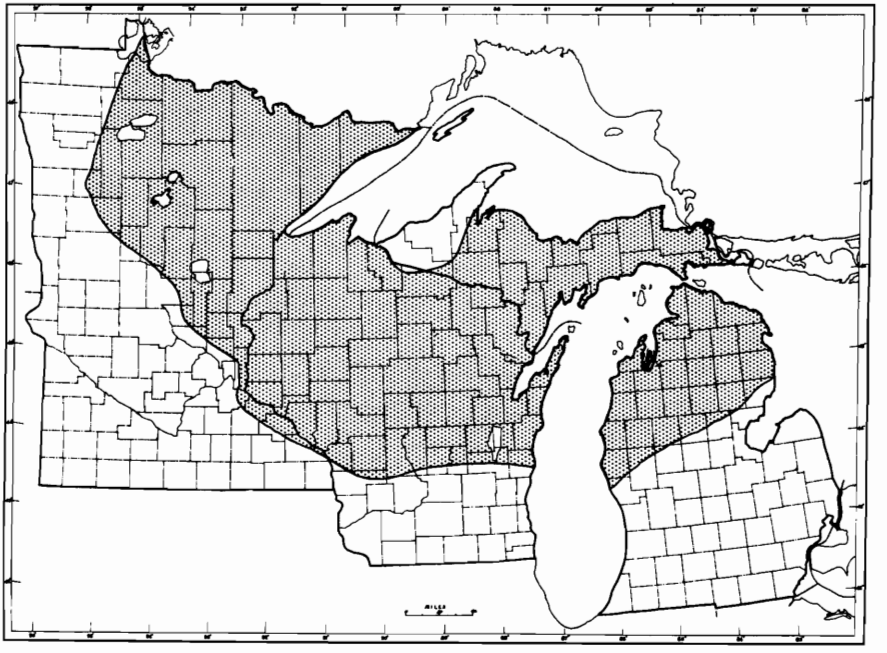

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Figure 1.—Distribution of the jack-pine budworm in the Lake States.

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Host Trees

The principal host of the jack-pine budworm is jack pine, but the insect also feeds readily on red, white, Scotch, mugho, and lodgepole pines. When they are mixed with jack pine, feeding may occur on white, black, and Norway spruces; eastern larch; and balsam fir. The eggs are usually laid on jack and red pines, but caterpillars may drop to understory host trees or be carried on silk threads to trees some distance away.

Evidence of Infestation

The first obvious sign of attacks by the budworm is the browning of pine foliage in July. Chewed-off needles are held together in webbing and after several days turn reddish brown (fig. 2). When budworms are abundant, the browning is very noticeable until heavy rains and high winds dislodge the severed needles. The degree of browning may be used to estimate the intensity of defoliation. Early infestations may be detected on understory or suppressed pines.

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Figure 2.—Feeding damage by jack-pine budworms.

Description

The body of the early instar caterpillar is yellowish orange, the head capsule is blackish brown, and the shield behind the head is pale brown. The mature larva is about 7/8 inch long. Its head is usually brownish yellow with dark brown markings at the side; the shield behind the head is usually dark brown to almost black. The body is dark brown and has brownish-yellow areas around the spiracles. The true legs are dark brown, and the prolegs, light brown.

The pupa is generally reddish brown to yellow (fig. 3). The wingspread of the jack-pine budworm moth is about 3/4 inch. Both the thorax and forewings are reddish brown, and the forewings have silvery white spots. When the adult is at rest, the wings lie tentlike over the body. The eggs are light green and are usually laid in a cluster in two or three overlapping rows on the flat surface of needles; the clusters average about 40 eggs.

Life Cycle

The budworms spend the winter as nonfeeding second-instar larvae in silken cases called hibernacula. These cases are spun under cone and bark scales and in other protected locations. The caterpillars emerge in May and begin to feed. The larvae mature in about 6 weeks after going through six or seven instars. Pupation occurs from mid-June to late July, depending on the locality and weather. Pupae are attached to silk

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Figure 3.—Full-grown caterpillar and pupa of jack-pine budworm.

webbing on the shoots and among the needles. Moths emerge in about a week. Females lay 120 eggs, on the average. Larvae emerge in about 2 weeks, then without feeding, spin hibernacula, molt to the second instar, and hibernate.

Feeding Habits

In the spring, shortly before the jack pine pollen is shed, the small caterpillars begin to feed in the staminate cones (commonly called flowers) and on the surface of the shoots. Most of the larvae migrate to the new foliage after the staminate cones have withered, although some remain in the staminate cones throughout the entire feeding period. Larvae frequently pull chewed-off needles into the retreat shelters formed by loose, silk webbing between and along the shoots, and continue to feed. On trees without staminate cones, larvae bore into the fascicles of new needles and cut them off at the base. After the supply of new foliage is diminished, the large larvae begin to feed on the older needles.

Damage

Budworm defoliation damages shoots and buds; this results in twig mortality and reduction in the number of male and female cones. Tree growth is reduced for 2 or more years after defoliation, and top-killing is common after budworm outbreaks (fig. 4). Tree mortality has been as high as one-third of the merchantable volume and 90 percent of

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Figure 4.—Top-killing of open-growing jack pine.

the intermediate and suppressed trees. The whole stand is rarely killed.

Tree mortality is likely to occur when budworm outbreaks coincide with drought or with outbreaks of other jack pine defoliators, such as the jack-pine sawfly or the pine tussock moth. The most severe damage occurs in jack pine stands that are understocked or overstocked, overmature, or growing on poor sites. Occasionally, pure stands of red, white, or Scotch pine are damaged after outbreaks first develop in nearby jack pine.

Control

Jack-pine budworm losses can be minimized by maintaining vigorous pine stands. Budworm damage tends to develop conditions that favor future outbreaks.

The jack-pine budworm has more than 50 different species of parasites. The most common are the larval parasites *Apanteles fumiferanae* Vier. and *Glypta fumiferanae* (Vier.) and the pupal parasite *Itoplectis conquisitor* (Say). When additional birds are attracted from surrounding areas, they may help to control the budworm in small, isolated pine stands.

Rapid declines in budworm populations have occurred after a reduction in the number of staminate cones. Budworm mortality occurs when small larvae in search of other feeding sites drop and are preyed upon by ants and spiders. Perhaps budworm outbreaks may be minimized through practices that reduce staminate cone production.

Chemical control is sometimes necessary; consult a State or Federal pest-control specialist for the most up-to-date information.

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