



Spruce budworm

Choristoneura fumiferana

Order Lepidoptera, Family Tortricidae; tortricids

Native pest

Host plants: Balsam fir is preferred, but white, red, and black spruces, larch, pine, and western hemlock are also susceptible.

Description: Adult moths are mostly gray, with a wing-span for males of 24 mm and for females of 26 mm. Forewings are mottled gray and brown. Larvae are 20–33 mm long, yellowish with a dark brown head and with two rows of paired white spots along the back.

Life history: Overwintered larvae emerge in spring before balsam fir buds expand. Adults are active from June to early August. Eggs are deposited in masses under needles. Most larval feeding is on terminal branch tips. There is one generation a year.

Overwintering: Larvae overwinter in silken hibernacula on branches or under bark scales.

Damage symptoms: Larvae prefer buds but will also attack old needles. The first symptoms of damage are usually frass and silk webs in buds or on last year's needles. Tree crowns may appear brown as a result of partly chewed needles, dead buds and frass being webbed together and thus held at branch tips to dry. In light infestations, partial loss of new foliage, particularly in the upper crown, may occur. In heavier infestations, more serious defoliation may result. Defoliation for three years or more will reduce tree vitality and may produce top kill of leaders and some terminal branch shoots. Five to seven successive years of defoliation will lead to tree mortality. A single, complete defoliation commonly kills conifers.

Monitoring: Beginning in May, look for frass and silk webs on buds or on last year's needles. Look for accumulations of frass, dead and chewed buds webbed together, and browning in upper crown.

Chemical control: *Bacillus thuringiensis* is also most effective against young larvae. Apply insecticides in spring (May) when larvae are feeding on old needles and before they enter buds. June to July applications will control larvae on new growth.

Biological control: An important insect in the spruce-fir habitat in the northern states. However, populations may become established in areas where high densities of preferred hosts are used as landscape plants. At high population numbers, natural enemies cannot manage the population. More than 90 species of parasitoids are recorded. Bird predation contributes greatly to population regulation.

Plant mortality risk: High

Biorational pesticides: *Bacillus thuringiensis* var. *kurstaki*, diflubenzuron, insecticidal soap, pyrethrins, spinosad, tenbufenozide



Defoliation damage caused by spruce budworm; note that the foliage is tied together with silk threads. (230)

Photo: Steve Katovich, USDA Forest Service



Needle damage caused by spruce budworm. (230)

Photo: Edward H. Holsten, USDA Forest Service, The Bugwood Network, University of Georgia

Conventional pesticides: acephate, bifenthrin, carbaryl, chlorpyrifos (nursery only), cyfluthrin, deltamethrin, fluvalinate, lambda-cyhalothrin, malathion, permethrin



Spruce budworm (continued)



Spruce budworm larva. (231)
Photo: Steve Katovich, USDA Forest Service



Spruce budworm pupa. (230)
Photo: Edward H. Holsten, USDA Forest Service, The Bugwood Network, University of Georgia