



## Large aspen tortrix



### Distribution and Hosts

The large aspen tortrix (*Choristoneura conflictana* [Walker]) is a major defoliator of trembling aspen but feeds on other associated broad-leaved species when epidemic; secondary host species include balsam poplar, birch, and willow. In Canada, the range of the large aspen tortrix extends from coast to coast; in the three prairie provinces and southern parts of the Northwest Territories, outbreaks are known to have occurred in practically all areas where trembling aspen grows. This insect periodically erupts into outbreaks over hundreds of square kilometres of aspen forests, often in association with concurrent infestations of the forest tent caterpillar. The outbreaks of the large aspen tortrix, however, tend to be short-lived, lasting only 2-3 years in any one location.

### Symptoms and Damage

Damage by the large aspen tortrix results mainly from the larvae feeding on leaves, beginning in the early spring, just before the aspen bud break. The young larvae mine into the buds and can destroy bud and leaf tissue, often before bud expansion. Later stages of larvae continue to feed more openly within rolled leaves or within two or more leaves pulled together and secured with silken webbing. These provide protective shelters while the larvae feed on the leaf tissue. Feeding is usually completed by mid-June and is followed by pupation, which takes place within leaf clusters, on the foliage, or in the undergrowth. The empty pupal cases are often seen protruding from the rolled leaves or leaf clusters. The feeding may cause partial or complete defoliation of trees for 1-3 years and result in reduced tree vigor and stem growth, occasionally killing the treetop and upper branches. Tree mortality rarely occurs directly from larval feeding

because aspen trees usually refoliate within 4-6 weeks after feeding is complete.

Mature larvae are easily disturbed and drop from the leaves on silken threads. When population levels are high, they may disperse from trees and wander in search of food. Occasional massive silk webbing and crawling larvae are an annoyance in high-use recreation areas and at picnic sites.

### Causal Agent

Adult moths are brownish gray in color, with a wing span of 25-35 mm. They have darker markings on their fore wings and a fringe of hairs along the posterior edges of their hind wings. The adult stage lasts from about the third week of June to mid-July, when the female moths each lay eggs in clusters of 50-450, usually on the upper surface of leaves. Individual eggs are oval, pale green, about 1 mm long, and appear as overlapping scales within the egg cluster. These eggs hatch within 10 days and the larvae begin to feed gregariously on epidermal leaf tissue between two leaves webbed together with silk; this feeding injury is relatively insignificant. In mid-August they leave the leaf shelters as small, pale green larvae, 2-3 mm long, and seek out protective overwinter locations under bark scales and other hibernation sites on the lower tree stems. There, they each spin a protective cell and hibernate until spring.

Larvae emerging in the spring are a pale yellow-green color; as they mature they gradually darken to a deep green or almost black color, with head capsules of reddish brown to black. Full-grown larvae are 15-21 mm in length. The pupae are 9-17 mm long, spindle-shaped, and bright green at first, then turn brown or black. Throughout its range the large aspen tortrix has a life cycle of 1 year.

### Prevention and Control

Control of the large aspen tortrix is usually unnecessary because of the short duration of outbreak periods and because many natural biological agents combine to help keep populations in check. In the prairie provinces, over 20 species of native parasitic insects are known to attack the large aspen tortrix at various life stages. Some predatory insects, including ants, wasps, and species of large ground beetles, regularly prey upon the larval stages. A disease-causing parasitic fungus will sometimes kill hibernating larvae, while viral diseases have been isolated from larval populations. Several bird species, including woodpeckers, vireos, and chickadees, are known to eat large numbers of larvae, and these birds may also prey upon the moths.

Other natural factors contribute substantially to the regulation of populations of the large aspen tortrix. The starvation of larvae after they have depleted their aspen food supply has often been cited as a main cause of population collapse. Poor weather conditions—especially late spring frosts—may kill young larvae directly or kill their food source, aspen leaves, causing the larvae to starve. High winds and rainfall may also cause a delay in or prevent some egg laying. Areas of infestation of the large aspen tortrix have often been overshadowed by the concurrent presence of the forest tent caterpillar, whose larvae may be more competitive and deplete the food source. A synthetic sex pheromone (an attractant to the male moth) has recently been identified for the large aspen tortrix and could be used for early detection of population buildup and for measurement of relative population abundance.

Insecticidal sprays, including the bacterial insecticide *Bacillus thuringiensis* (Bt), have been used to control the large aspen tortrix,

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