Introduction to Defoliating Insects

Chewed, mined, and missing foliage

Insects that consume leaves or needles are classified as defoliators and are indicated by chewed, mined, or missing foliage. Damage from defoliating insects varies considerably with tree and insect species, feeding intensity, and the time of year that feeding occurs (table 1, figs. 1-3). Although the effects of most defoliating insects are negligible, some may cause significant damage to individual trees. A few defoliators are important forest pests that can kill trees across large landscapes during outbreaks. Most of the important defoliating insects in conifers are the larval stages of moths, butterflies, or sawflies. In hardwoods, beetle larvae and leaf-cutting bees are also damaging agents. Occasional defoliation is noted from other insects that tend to be more general feeders on rangeland, such as grasshoppers or adult scarab beetles.

General Features

General features of defoliating insects:

- Defoliation can kill trees directly or can predispose trees to other insects or pathogens that can kill the trees.
- Generally, high levels of defoliation will occur for several consecutive years before trees are killed.
- Defoliation that occurs later in the summer is typically less stressful to trees than defoliation that occurs early in the growing season.
- Deciduous hardwood trees are more tolerant of defoliation because they can refoliate after early season defoliation, whereas coniferous tree cannot.
- Repeated years of defoliation become increasingly stressful to both deciduous and coniferous trees.
- A significant amount of defoliation can slow and even stop tree growth.
- Defoliation occurring in drought years or following a late freeze can be more stressful to trees.
- Some defoliators feed while protected in silken tents; in webbed, clipped foliage; or in folded foliage, and some mine while protected in the leaf tissue. Others feed in groups or may be covered with irritating or toxic hairs.
- Some species of defoliators feed in all seasons, including winter.
- Many defoliating insects have a preference for the current or previous year's foliage, and their feeding locations and life cycles are timed accordingly.

Figure 1. Douglas-fir tussock moths feed on foliage of Douglas-fir, true firs, and spruce. *Photo: Ladd Livingston, Idaho Department of Lands, Bugwood.org.*

Figure 2. Western spruce budworm is another important defoliator of spruce, Douglas-fir, and true firs. *Photo: Scott Tunnock, USDA Forest Service, Bugwood.org*

Figure 3. Western tent caterpillar is an important defoliator of aspen in the Rocky Mountain Region. *Photo: Southwestern Region, USDA Forest Service.*

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Table 1. Common defoliating insects in the Rocky Mountain Region and their active feeding seasons.

Defoliator	Host	Feeding occurs
Aspen leafminer (*Phyllocnistis populiella*)	Aspen	Late spring to late summer
Bagworm (*Thyridopteryx ephemeraeformis*)	Junipers, arborvitaes, and various hardwoods	Late spring to late summer
Boxelder leafminer[a] (*Caloptilia negundella*)	Boxelder	Late spring to early fall; two generations per year
Boxelder leafroller[a] (*Archips negunanus*)	Boxelder; sometimes alder and honeysuckle	Late spring to summer
Cottonwood leaf beetle (*Chrysomela scripta*)	Cottonwood	Late spring to early fall
Douglas-fir tussock moth (fig. 1) (*Orgyia pseudotsugata*)	Douglas-fir, true firs, and spruce	Late spring (bud burst) to midsummer
Eastern tent caterpillar[a] (*Malacosoma americanum*)	Chokecherry, fruit trees, and other hardwood trees and shrubs	Spring to midsummer
Elm leaf beetle (*Xanthogaleruca luteola*)	Elm	Late spring to early fall
Elm leafminer (*Kaliofenusa ulmi*)	American elm	Late spring-summer
Fall webworm (*Hyphantria cunea*)	Hardwoods; many species	Mid to late summer
Forest tent caterpillar (*Malacosoma disstria*)	Aspen and other hardwoods	Late spring (bud burst) to early summer
Large aspen tortrix (*Choristoneura conflictana*)	Aspen	Early spring to early summer
Leafcutter bee[a]	Ash, redbud, lilac, rose, and others	Early summer
Needleminers (*Coleotechnites* and others) species	Ponderosa pine, pinyon pine, white fir, and blue spruce	Generally, late summer to late spring; some variation with
Oak Leafroller (*Archips semiferana*)	Gambel oak	Early spring (bud burst) to early summer
Pandora Moth (*Coloradia pandora*)	Lodgepole and ponderosa pines	Mid to late summer to midsummer the next year
Pine butterfly (*Neophasia menapia*)	Ponderosa pine	Late spring (bud burst) to midsummer
Pine sawflies (*Neodiprion* spp., *Zadiprion* spp.)	Ponderosa and pinyon pines	All seasons, depending on species
Sonoran tent caterpillar[a] (*Malacosoma tigris*)	Oaks	Spring to midsummer
Tiger moth (*Lophocampa* spp.)	Ponderosa pine, pinyon pine, Douglas-fir, white fir, and junipers	Fall to early spring
Uglynest caterpillar[a] (*Archips cerasivorana*)	Chokecherry and others	Spring to late summer
Western pine budworm (*Choristoneura lambertiana ponderosana*)	Ponderosa pine	Spring to early or midsummer
Western pine tussock moth (*Dasychira grisefacta*)	Ponderosa pine	Early spring to early summer
Western spruce budworm (fig. 2 (*Choristoneura occidentalis*)	Douglas-fir, true firs, spruce	Spring (bud burst) to early summer
Western tent caterpillar (fig. 3) (*Malacosoma californicum*)	Aspen and other hardwoods	Late spring (bud burst) to early summer

[a] Not discussed in this guide.