



Western Spruce Budworm

Choristoneura freemani (formerly *C. occidentalis*)



HOSTS:

Douglas-fir, grand fir, subalpine fir, spruce, and larch; high populations may spill over into neighboring pine trees

DAMAGE: DEFOLIATION

Caterpillars primarily feed on new needle growth, limiting tree vigor. Repeated, heavy defoliation can cause branch dieback and top kill. Severely defoliated trees in the understory can be killed within a single year.

Ecology

Western spruce budworm (WSBW) is a native moth that causes major defoliation in Montana's forests. West of the divide, populations are cyclical, with outbreaks occurring approximately every 10-15 years. Forests east of the continental divide contend with chronic populations. Outbreaks are most severe on warm, dry sites with dense, multi-layered canopies of host trees. Select harvesting and fire exclusion have shifted species composition and increased stand susceptibility to WSBW. Outbreaks contribute to forest structure, creating snags, woody debris, and canopy openings which in turn increase stand biodiversity and wildlife habitat, WSBW is a major seasonal food source birds, bats, and small mammals. Parasitoids and pathogens like nucleopolyhedrosis virus (NPV) regulate populations.

Identification

- Smooth olive-brown caterpillars with pairs of cream-colored dots along back
- Bronze pupal cases that persist on foliage after moths emerge
- Small, copper-colored moths most visible in August
- Chewed needles bound together by silk on branch tips and terminal leader
- Crowns appearing thinned, scorched or stripped of foliage



Severe WSBW defoliation



WSBW pupal case

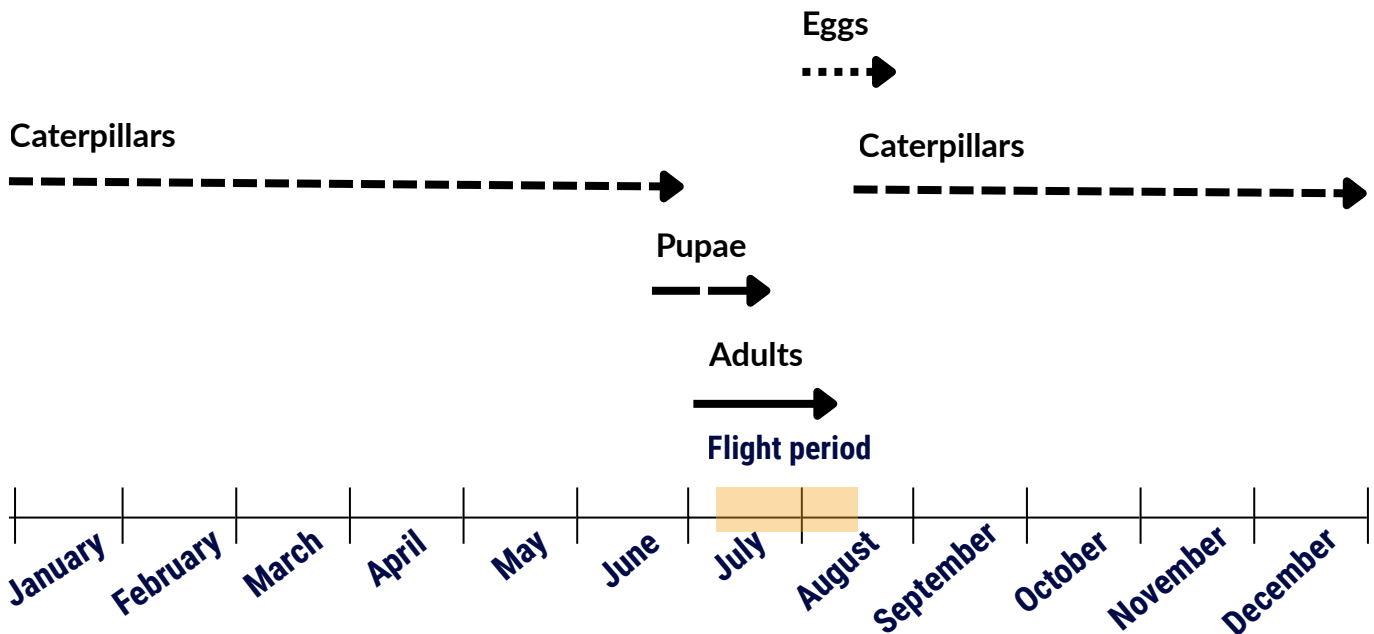
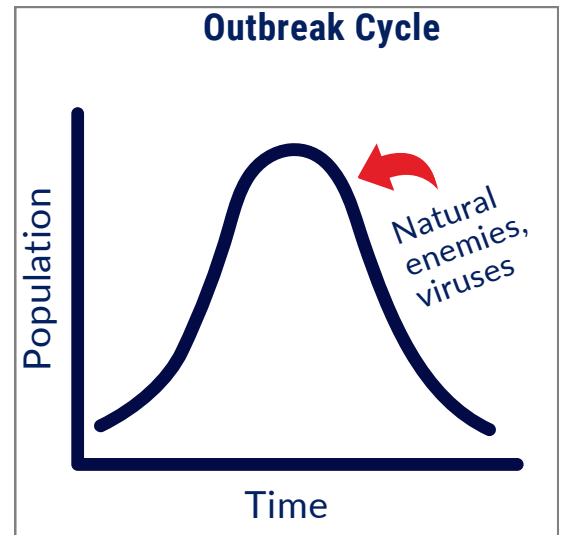


WSBW webbing, feeding damage

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Life Cycle

Western spruce budworm produces one generation per year. Adults typically emerge in late July/early August. Egg masses are light green and found on the underside of conifer needles; eggs are oval and overlap. Immediately after hatching, caterpillars do not feed; they spin silk “hibernacula” shelters in which they overwinter. The following spring, caterpillars begin feeding on needles and occasionally buds. In mid-summer, they spin silken shelters in which they feed and later pupate. Copper-colored moths emerge in August, mate, and the cycle repeats.



Management

- Thin stands to reduce competition and promote individual tree vigor. Defoliation may still occur but trees will be more likely to rebound after outbreak subsides.
- Create a single layer canopy to interrupt dispersal of caterpillars from tree tops to understory.
- Promote non-host species such as pines (lodgepole and ponderosa) and western larch.
- Insecticides may be useful for short-term control of high value trees. Follow the pesticide label and use proper personal protective equipment. A licensed pesticide applicator is encouraged.