

Douglas-Fir Beetle — Biology

Adult Douglas-fir beetles (*Dendroctonus pseudotsugae*) are dark brown to black with reddish wing covers, and measure about 4.4 to 7 mm in length. The life cycle is usually one year, and two broods may be produced. The main flight period usually occurs in May and June; a second flight in July and August may be made by adults developed from overwintering larvae or adults re-emerging after the earlier flight.

Adults lay their eggs in long galleries constructed parallel to the grain of inner bark. Bark beetle species have similar life cycles, progressing from egg through four larval instars to pupa and finally to adult. However, differences in these beetles' timing and duration affect the selection and application of management tools.

The components of the Douglas-fir beetle's life cycle are summarized in the following table. The timing of life-cycle events for any species of bark beetle will vary from year to year and from location to location due to variations in climate and local weather.

Event	Douglas-fir Beetle
Main adult flight	April through July
Host preference	Windfall/slash; or living trees during large outbreaks
Normal life cycle	One year
Overwintering stage	Larvae and adult



"Galleries" under the bark, indicating the tree is infested and should be removed.

A brief synopsis of bark beetles' life cycles is as follows:

- Adult females emerge when ambient air temperature exceeds approximately 16° C, find new suitable host material, and emit aggregating pheromones to initiate mass attack.
- Males join the females and each pair construct an egg gallery under the bark, parallel to the grain.
- The sapwood is inoculated with spores of a blue stain fungus as the egg gallery is built.
- Eggs are laid and hatch into larvae which feed on the phloem in feeding channels constructed at right angles to the egg gallery.
- After four instars, larvae pupate and develop into adults under the bark.
- Young adults pick up blue stain fungal spores while in the pupal chamber.

The action of the larval feeding in the phloem and fungal colonization of the sapwood completely blocks all translocation tissues and kills the infested tree. In some cases only one side of a tree will be successfully attacked (strip attack); this tree will survive unless living portions are reattacked in subsequent years.



Frass (fine sawdust) on a tree trunk indicates beetles have bored into the tree.