

Western Balsam Bark Beetle

Star-shaped egg galleries

Name and Description—*Dryocoetes confusus* (Swaine) [Coleoptera: Curculionidae: Scolytinae]

Adult western balsam bark beetles are shiny, dark-colored, and approximately 1/6 inch (3.4-4.3 mm) long. The rear edges of the wing covers are abruptly rounded and do not have spines. Both male and female beetles have patches of “hairs” on the fronts of their heads. Females have a dense and distinctive patch of these “hairs” (fig. 1).

Hosts—Subalpine fir, *Abies lasiocarpa*, other true firs, and very rarely, Engelmann spruce and lodge-pole pine

Life Cycle—The biology of this beetle is not well known, but a 2-year life cycle has been documented in this Region. The first winter is spent beneath the bark as larvae and the second as near fully developed adults. Approximately midsummer, male beetles initiate attacks on trees and construct nuptial chambers beneath the bark. They attract several female beetles. After mating, female beetles construct egg galleries that radiate from the nuptial chamber, forming a stellate gallery pattern (fig. 2). Larvae feed away from the egg galleries. Females are capable of producing eggs during the initial summer of attack and in the following spring. The resulting gallery pattern and brood makeup is often confusing, hence the name, *Dryocoetes confusus*. Two flight periods have been observed in Utah: a large flight in early to midsummer and a smaller flight in the fall.

Damage—The western balsam bark beetle is part of a group of organisms that contribute to large amounts of subalpine fir mortality in the West. Western balsam bark beetles frequent trees weakened by root disease, drought, wind breakage, and other damaging factors. As beetle populations grow, they become more able to take advantage of large areas of susceptible host trees. However, unlike mountain pine beetle and spruce beetle, resulting tree mortality is not usually uniform across the impacted landscape, although cumulative mortality over years can result in extensive landscape mortality (fig. 3). Large concentrations of subalpine fir mortality are particularly troublesome in high-elevation developments such as ski areas.

External evidence of beetle attack is often difficult to find. If beetle attacks are fresh, small amounts of boring dust may be visible along the bark and in proximity to entrance holes. Small amounts of sap may stream for about an inch below the entrance hole, but this symptom is not always present. If a segment of bark can be removed, identification of beetle brood, the stellate gallery pattern, and slight etching of the sapwood will confirm the presence of western balsam bark beetle. Beetle-killed firs retain their red needles for 3 or more years, creating a “signature” that is evident from both the ground and the air. This needle retention characteristic can complicate aerial detection of most recent infestations.

Endemic populations are evident among weakened trees and recently broken branches/tops. Little is known about factors contributing to outbreaks, but McMillin



Figure 1. Western balsam bark beetle adults; female on the left, male on the right. Note the dense patch of “hairs” at front of female’s head. Photo: Rocky Mountain Region, USDA Forest Service, Bugwood.org.



Figure 2. Stellate (star-shaped) gallery pattern of western balsam bark beetle evident on the face of subalpine fir sapwood. Photo: Dave Leatherman, Gillette Entomology Club, Colorado State University.

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Figure 3. Western balsam bark beetle contributed to widespread subalpine fir mortality. *Photo: Mike Blakeman, Rio Grande National Forest, USDA Forest Service.*

and others (ref. 5) documented that windthrown subalpine fir is readily colonized by western balsam bark beetles. The authors (along with Gibson and others, ref. 2) concluded that because western balsam bark beetle responds to windthrow, addressing such material may reduce the possibility of a future epidemic. Beetle activity is often common among trees with *Armillaria* root disease. This beetle and root disease, along with with some lesser known organisms, account for large amounts of mortality among mature subalpine fir stands. Western balsam bark beetle activity has been described as chronic in some locations with abundant numbers of host trees.

Management—Management directed specifically at subalpine fir forest susceptibility and western balsam bark beetle/*Armillaria* root disease activity has been primarily limited to treatments that favor spruce. Dead and dying subalpine fir have been harvested and sites have been prepared to promote residual spruce health and to favor spruce regeneration. Timely salvage of subalpine fir windthrow may help to avoid western balsam bark beetle outbreaks in adjoining forests. Aggregate and anti-aggregate pheromones are known for these beetles, but they are not yet available for operational management purposes.

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