

Schweinitzii Root and Butt Rot

Red-brown cubical root and butt rot of conifers

Pathogen—Schweinitzii root and butt rot is caused by *Phaeolus schweinitzii*, also known as the velvet-top or cowpie fungus.

Hosts—All conifers are probably susceptible to the disease, but the most common host in the Rocky Mountain Region is Douglas-fir. Infrequent hosts include lodgepole pine and Engelmann spruce.

Signs and Symptoms—Trees infected with *P. schweinitzii* rarely display outward symptoms unless they are in the advanced stages of the disease, so diagnosis often occurs after the tree loses structural support and topples or is windthrown. Possible symptoms may include thinning crowns, poor shoot growth, and/or branch dieback. Wood decay may be visible in openings on the stem or nearby stumps (figs. 1-2). Incipient decay is yellow to red and dry. Advanced decay is red-brown and cubical and sometimes has thin, resinous felts present in the cracks.

Occasionally, fruiting bodies can be seen on the ground emerging from diseased roots of stumps or living trees (figs. 3-5). Infrequently, they emerge directly from the tree's base or stump. Fruiting bodies are annual,



Figure 1. *Phaeolus schweinitzii* decay in a Douglas-fir stem. Photo: Jim Worrall, USDA Forest Service.



Figure 2. Brown cubical rot typical of *Phaeolus schweinitzii*. Photo: Joseph O'Brien, USDA Forest Service, Bugwood.org.



Figure 3. Pore surface of young *Phaeolus schweinitzii* conk. Photo: Jim Worrall, USDA Forest Service.



Figure 4. Typical *Phaeolus schweinitzii* conk with brown, velvety surface; yellowish margin; and greenish undersurface. Photo: Jim Worrall, USDA Forest Service.



Figure 5. Old *Phaeolus schweinitzii* conk that is entirely brown, dry, and brittle. Photo: USDA Forest Service, Bugwood.org.

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spongy, and mushroom-like with large, irregular pores on the undersurface. Caps are red-brown and velvety, margins are yellowish brown, and undersides are green when fresh, becoming brown with age. As they dry, they become entirely brown and brittle and resemble cow pies. Caps are usually 5-10 inches (13-25 cm) in diameter with short stems.

Disease Cycle—Spread of *P. schweinitzii* occurs primarily by means of wind-dispersed spores produced in conks. Root-to-root infection may occur, but it appears to be very uncommon. Therefore, diseased trees are dispersed in stands rather than in discrete disease centers. The fungus gains entry through basal wounds, particularly fire scars or damaged roots. Conks are produced annually from decaying wood. The fungus can persist for many years in stumps and dead trees.

Impact—Schweinitzii root and butt rot is a major disease of mature Douglas-fir. Decay is generally confined to the heartwood and is found in the roots and lower 10 ft (3 m) of the stem. Wood loses its structural integrity rapidly as decay progresses, and susceptibility to breakage and windthrow increases. Infected trees may become more susceptible to Douglas-fir beetle or Armillaria root disease.

Management—Butt rot can be detected by sounding the lower stem with an ax and coring wood. Management strategies include avoiding wounding, removing infected trees, and harvesting on shorter rotations. Remove trees showing evidence of schweinitzii root and butt rot in recreation areas and other developed sites.

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1. Barrett, D.K.; Uscuplic, M. 1971. The field distribution of interacting strains of *Polyporus schweinitzii* and their origin. *New Phytologist* 70:581-598.
 2. Sinclair, W.A.; Lyon, H.H.; Johnson, W.T. 1987. *Diseases of trees and shrubs*. Ithaca, NY: Cornell University Press. 574 p.

