

Dwarf Mistletoe of Conifers

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Dwarf Mistletoe is a major problem in conifer species throughout the world. It is considered to be a serious problem mostly in North America (western Canada, western USA, and Mexico) where all six genera of the Pinaceae are affected: *Pinus*, *Picea*, *Abies*, *Tsuga*, *Larix*, and *Pseudotsuga* (2). Although it is mainly thought of as a disease of forests causing major losses in the timber industry, it can also be a very serious problem in the home or commercial landscape.

Dwarf mistletoe can greatly affect the growth of trees. Infected trees typically have reduced size and diameter, large knots, spongy weakened wood, swelling of infected sites, reduced seed production, and death of parts or the



whole tree. One of the most noticeable symptoms is the heavy branching of limbs referred to as witches brooms (Fig. 1). These symptoms can produce a very unhealthy tree that not only can be an eyesore, but also can be a very dangerous element in a landscape.

Dwarf mistletoe is a disease caused by parasitic plants of the genus *Arceuthobium*. These pathogens are obligate parasites, surviving only on host trees and are typically host specific infecting one or a few species. Signs of the pathogen are stubby brown or yellow stems 1.5-10 cm tall with scale like leaves. They are dioecious plants with flowers and sticky seeds (Fig 2).

Fig.1 (4).

The disease cycle begins in late summer or autumn as a single seed is forcefully ejected from the fruit of a

mature plant at a velocity of up to twenty-seven meters per second. Seeds can travel as far as sixteen meters before landing on host where a sticky coating holds them in place (3). They can also be dispersed by birds and by sticking to animals. When the seed is attached to the epidermis of host plant, it produces a germ tube that grows along the surface until it reaches a bud or leaf base. Haustoria penetrate the bark and reach the cambium to produce systems of longitudinal strands and radial sinkers (1). Once infection is established there is a latent period of two to five years before tissues swell and new shoots occur (3). New shoots occur near the infection site and spread out with time. The center of infection usually deteriorates leaving the site susceptible to infection by other pathogens (1). The haustorial strands and sinkers absorb all the water and nutrients from the host that the parasite needs to survive. As a result, parts of the tree beyond the infection sites receive insufficient water eventually lose vigor and die. The parasite also induces hormonal imbalances within the tree causing swelling, deformities, and stimulation of dormant buds producing dense growths such as witches brooms (Fig.1). Flower development begins after the plants are four to six years of age. After flowering, male plants die and the female plants live on and produce mature fruit five to sixteen months after pollination. After

seed is dispersed female plants die (1).

Because *Arceuthobium sp.* can only survive on living tissues, it can be eradicated from individual trees by removing all infected limbs.



Fig. 2 (4).

Pruning will probably need to be repeated multiple times to eradicate all infection. If infection is within one foot of trunk however, the tree is most likely lost and should be removed (4). Because they are host specific, disease occurrence can be limited or increased in a landscape situation based on quantity and type of conifer species present. Therefore if you are in an area where a particular species of *Arceuthobium* is known to be present, consider using conifer species that are not susceptible to that particular pathogen. No conclusive evidence is available for chemical or biological control methods.

Works Cited

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