



Dwarf Mistletoes Affecting Pines and Firs of Wyoming

A Cooperative Publication with the University of Wyoming and Utah State University

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Dwarf mistletoes are parasitic flowering plants in the genus *Arceuthobium*. They occur widely on conifers, especially lodgepole pine, Douglas-fir, and ponderosa pine. Trees infected by dwarf mistletoe are unattractive and serve as sources of inoculum that threaten nearby healthy trees. This parasite robs trees of essential water and nutrients. Although an infected tree may survive 20 years or longer, dwarf mistletoe reduces the tree's height and diameter. Infected trees also produce fewer viable seeds and gradually weaken from the crown or top downward and eventually die. Witches' brooms, the large masses of twigs that sometimes form after infection, cause lumber defects by forming large knots. Witches' brooms also are hazardous because they may break off the tree and fall, possibly damaging property or injuring people and pets.

Symptoms

Characteristic symptoms of dwarf mistletoe include branch and trunk swellings and a "many-branched" region on the tree or a "bunched-branch" type of growth called witch's broom (Photo 1). Careful inspection of affected trees will reveal the presence of dwarf mistletoe aerial shoots (Photo 2). These aerial shoots are the flowering structures for the mistletoe plant. Most of the dwarf mistletoe plant remains hidden beneath the tree bark.



Photo 1. Witches' brooms on lodgepole pine caused by the lodgepole pine dwarf mistletoe *Arceuthobium americanum*.

Biology and Reproduction

Dwarf mistletoe plants spread from tree to tree by seeds, which are forcibly discharged from mistletoe fruits during late summer and autumn, and fall toward the forest floor. The presence of a sticky seed coat enables seeds to adhere to needles, twigs, or any other surface contacted during its fall. Moisture during wet weather, plus the effect of gravity, causes seeds to slide down needles and contact the twig.

Seeds germinate during the spring, penetrating through the twig's bark and infecting the host. The twig appears healthy for at least two years after the initial infection. This symptomless span of time is called the latent period. After two or more additional years, branches swell at the point of infection, tree buds break dormancy to produce witches' brooms, and aerial mistletoe shoots form on infected branches. Aerial shoots usually require two additional years to produce flowers, fruits, and seeds. Therefore, the entire life cycle from infection to seed

dispersal requires at least five or six years for completion. Dwarf mistletoe plants are either male or female (dioecious). Pollen is carried from "male" plants to "females" by insects or wind.

Management

Dwarf mistletoes have a long and complex life cycle, and many years are required for infestations to become severe. Therefore, a long-term commitment is needed to ensure an adequate reduction of this parasitic plant. Persistence is the key to dwarf mistletoe control.

Several points in the life cycle of dwarf mistletoe are important from a control standpoint.

1. Dwarf mistletoe (DM) requires a living host to survive.
2. DM is host specific (mistletoe on ponderosa pine will not infect lodgepole pine).
3. DM has a long life cycle.
4. DM spreads relatively slowly.
5. DM is easily detected, which aids in its control.
6. DM has at least a two-year latent period.

Chemicals have not proven effective for dwarf mistletoe control. However, intensive management and proper silvicultural practices can effectively decrease the incidence of dwarf mistletoe. This method is economically feasible for landscape trees, small forest plots, and even for larger forest tracts. Management can be done any time of year.

The first management priority is to remove all severely infected overstory trees. Otherwise, seeds raining down from



Photo 2. Aerial shoots of *Arceuthobium americanum* with mature fruits on a swelling branch.

such trees will land on and infect young trees. Removal also is advised because these overstory trees may be hazardous due to dead branches that may break and fall. Second, lightly or moderately infected trees should be pruned to reduce the number of dwarf mistletoe plants and to increase tree vigor. When removing affected branches, cut flush with the trunk without damaging the branch bark collar. Because the mistletoe plant may be present in areas without visible symptoms or signs, don't limit pruning to obviously infected branches. Instead, remove all live branches up to and including the highest infected branch (Photos 3 and 4). This pruning practice will decrease subsequent production of dwarf mistletoe plants from latent infections. Repeat these practices every two to four years to continuously remove latent infections and minimize seed production. Because dwarf mistletoes spread into adjacent uninfested areas, all treatments should be carried out 70 to 100 feet beyond obvious infections to ensure all infections are eliminated.

Dwarf mistletoes do not attack deciduous trees. Such trees may be substituted for conifers in severely infected areas. Because dwarf mistletoes are host specific, substituting another conifer

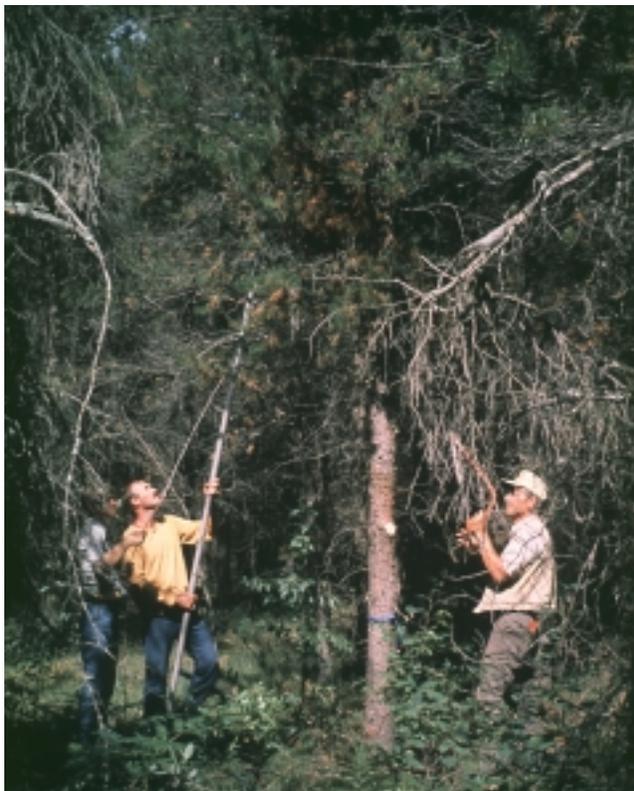


Photo 3. Pruning can remove dwarf mistletoe plants from a tree's crown, reducing the stress on the host.



Photo 4. Pruning also improves the appearance and timber value of the host tree.

species also will reduce losses to that dwarf mistletoe. For example, Douglas fir, white fir, blue spruce, or limber pine may be substituted for ponderosa pine. Engelmann spruce, subalpine fir, and Douglas fir may be substituted for lodgepole pine.

The death or deformation of a tree is important because it takes considerable time and money to grow a suitable replacement. This fact is especially true in Wyoming due to generally adverse growing conditions and the short growing season. Dwarf mistletoes can easily be managed to reduce losses, particularly in landscape or residential trees.

For more information, contact your local Cooperative Extension Service (UW CES) educator, UW CES specialist, or your state forester. This publication is available on the Web at <http://www.uwyo.edu/ces/plantsci.htm>.

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