

# DWARF MISTLETOES

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Dwarf mistletoes are parasitic flowering plants that infect conifers, producing characteristic yellow to orange or green to brown leafless aerial shoots on the host plant. They have no developed leaves, and shoots remain short, varying in length from a few inches to several inches. They occur only at higher elevations in Arizona where their conifer hosts grow. Dwarf mistletoes depend on their host trees for their nutrients and water. Infections cause branch swelling, reduced growth, dieback, and abnormal proliferation of host tissue known as “witches’ brooms”. Dwarf mistletoe infections may predispose host trees to other pests and stresses.

Dwarf mistletoes differ from true mistletoes in that they are more damaging to the host, and they are much smaller. Seeds of dwarf mistletoes are forcibly discharged and infect the same tree or trees nearby, while seeds of true mistletoes are spread by birds and infect trees and shrubs in a large area. Dwarf mistletoes are very specific to their hosts while true mistletoes vary in their host specificity, some infecting only one or few host species and others infecting a wide range of host plants. As a result, even though dwarf mistletoes are more damaging to the host, they spread slowly and can be more easily controlled than true mistletoes.

## Pathogen

Dwarf Mistletoe, *Arceuthobium* species

## Host

The following dwarf mistletoes occur in Arizona:

- Southwestern dwarf mistletoe, *Arceuthobium vaginatum* subsp. *cryptopodum*, infects ponderosa pine, Apache pine and Arizona pine; shoots are orange to reddish brown; shoots are the largest of the dwarf mistletoes in Arizona; it causes pronounced swelling and distortion of stems and also witches’ brooms; it is found throughout the mountains of Arizona and is very damaging to ponderosa pine.
- Chihuahua pine dwarf mistletoe, *Arceuthobium gillii*, infects Chihuahua pine; shoots are greenish brown; it causes open witches’ brooms and is characterized by tall, openly branched male plants compared to small, densely branched female plants; it is found throughout Chihuahua pine habitat in southeastern Arizona.

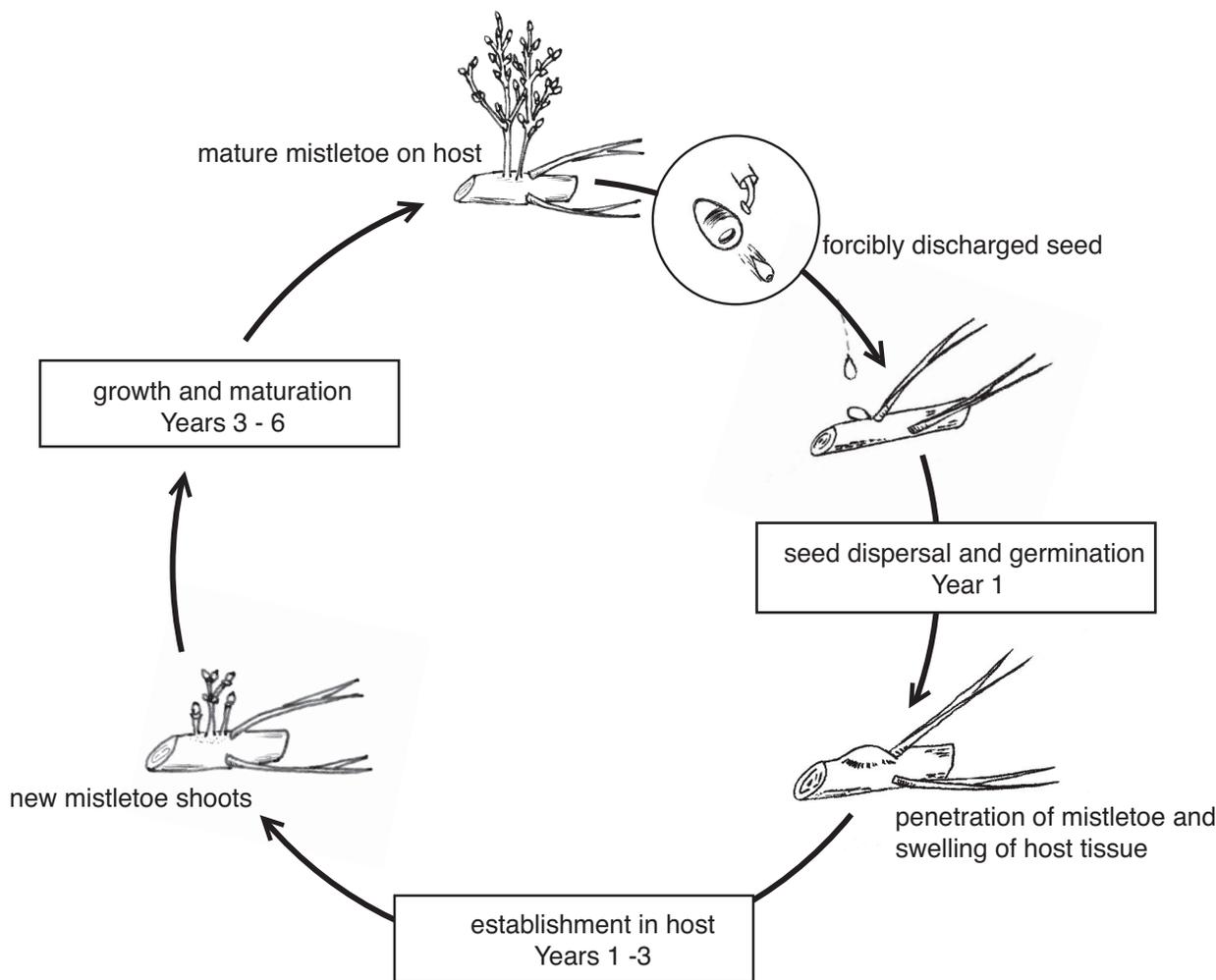


Leafless aerial shoots of dwarf mistletoe on spruce.

## At a Glance

- Dwarf mistletoes are parasitic flowering plants that grow within host plants for about two years before producing characteristic yellow to orange or green to brown leafless aerial shoots on the outside of infected host tissue.
- Dwarf mistletoes occur only on conifers in the pine family in Arizona and are usually host specific.
- Dwarf mistletoe infections cause branch swelling in younger infections and witches’ brooms in older infections.
- Sticky seeds of dwarf mistletoes are forcibly discharged and infect only the same or nearby trees.
- Dwarf mistletoes are controlled by pruning off infected branches at the crotch and by removal of infected trees; complete removal from a stand of trees results in control for decades.

## GENERALIZED LIFE CYCLE OF DWARF MISTLETOE



- Pinyon pine dwarf mistletoe, *Arceuthobium divaricatum*, infects pinyon pine; shoots are olive green to brown; witches brooms are poorly developed; it is found throughout pinyon pine inhabited areas in central and northern Arizona.
- Douglas fir dwarf mistletoe, *Arceuthobium douglasii*, infects Douglas fir; shoots are olive green; it is distinguished by its small size, large witches' brooms and mortality in Douglas fir; it is found throughout mixed conifer forests in Arizona.
- Apache dwarf mistletoe, *Arceuthobium apachecum*, infects southwestern white pine; shoots are yellow, green or reddish; it is distinguished by densely clustered short shoots around host branches; it frequently induces witches' broom; it is found in central and southeastern Arizona.
- *Arceuthobium blumeri* infects southwestern white pine; shoots are gray to light green; it differs from *A. apachecum* in that shoots are not densely clustered around host branch; it occurs in the Huachuca Mountains in southeastern Arizona.
- Western spruce dwarf mistletoe, *Arceuthobium microcarpum*, infects Engelmann spruce, blue spruce and bristlecone pine; shoots are green to purplish; it is distinguished by its restricted distribution in Arizona and New Mexico, small dense witches' brooms and high mortality in hosts; it is found on the mountains of northern, central and southeastern Arizona.
- True fir dwarf mistletoe, *Arceuthobium abietinum*, infects white fir; shoots are yellow-green to yellow; infections cause flagging, a distinctive symptom on true fir, that results from dying branches; it is found in northern and southeastern Arizona.

### Symptoms/signs

The first visible symptom of dwarf mistletoe is swelling of host tissue at the site of infection. Shoots emerge about two years after infection. Within another two to three years, the plants flower and fruits develop. All mistletoes are dioecious, and female plants have flowers and produce seed while male plants have small inconspicuous flowers that produce pollen. Aerial shoots are only a few inches long. Several clumps may appear on one branch, and witches' broom and dieback may develop in older infections.

## Disease

Mistletoe must have a living host plant on which to grow. Although it is a flowering plant, dwarf mistletoe has no true roots and is parasitic on its host. Because the mistletoe competes with host tissue for nutrients and water, infections cause a reduction in host vigor and growth. Young trees infected by dwarf mistletoe are weakened and often predisposed to insect attack or killed directly.

Dwarf mistletoes produce sticky seeds that are forcibly discharged up to ten meters. When moisture is present, they germinate and produce root-like structures that penetrate susceptible young shoots of host plants. Seeds probably do not survive more than one season.

Dwarf mistletoe develops inside the bark and sapwood of the host for about two years before sending out visible shoots on the outside of the host plant. In another two years, flowers and seeds are produced. Individual shoots live for several years. As the host tissue grows, the mistletoe continues to form new shoots.

## Environmental conditions

After infection, dwarf mistletoes do not require special environmental conditions. Since they are parasitic only on conifers, they are found at higher elevations in Arizona.

## Prevention/control

Control of dwarf mistletoe in inhabited areas and managed landscapes depends primarily on repeated physical removal of the shoots from the host plant, by pruning off infected branches and/or by removal of infested trees. Repetitive pruning prevents spread since the mistletoe will not have a chance to produce seeds, but shoot removal does not eradicate the mistletoe. Shoots also may be removed by application of ethefon products (ethylene) that cause abscission of the shoots but do not kill the internal infection.

For removal in lightly infested trees, infected limbs should be pruned at the nearest crotch. Heavily infested trees should be removed and replaced with trees that are not hosts. Completely removing dwarf mistletoe from a stand of trees results in control for many years since new introductions will spread very slowly. Lightly to moderately infested mature trees in which less than 50% of the limbs are infected may survive for decades. However, it is important not to plant susceptible trees under infected trees.



Multiple infections of true mistletoe.



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