Forest Insect
& Disease
Leaflet 164

U.S. Department
of Agriculture
Forest Service

Phoradendron on Conifers

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Many western conifers are parasitized by dawrf mistletoes (genus *Arceuthobium*) but it is less well known that several mistletoes of the genus *Phoradendron* also attack conifers. *Phoradendrons* parasitize *Juniperus, Cupressus, Libocedrus,* and *Abies,* while the dwarf mistletoes occur on *Pinus, Picea, Pseudotsuga, Larix, Tsuga,* and *Abies.* White fir, *Abies concolor,* is the only tree parasitized by both kinds of mistletoe in the United States.

This leaflet considers the six *Phoradendrons* that occur on conifers in the United States. The seven that parasitize hardwood trees are discussed in FIDL 147.

It is not always easy to detect mistletoe on conifers. The main features useful in identification are: presence or absence of leaves, leaf size, hairiness, general shape of the mistletoe plant, geographic distribution (figs. 1-4), and hosts infected (table 1).

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The larger leaved *Phoradendron* are used as Christmas decorations. The conifer mistletoes are either leafless or have small leaves and are not attractive as holiday plants.

Mistletoe berries are a favored food of several species of birds, particularly during winter when other food sources are in short supply. Deer and cattle are

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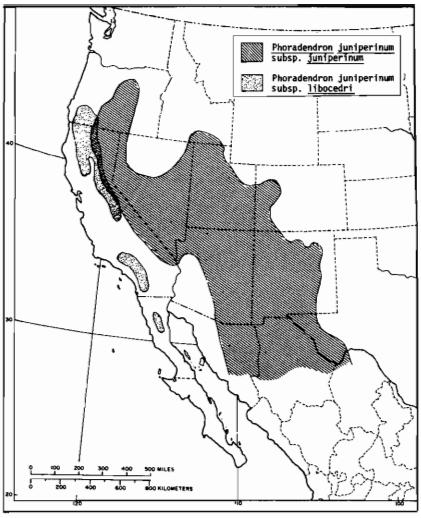

Figure 1.—*Phoradendron juniperinum* ssp.*juniperinum* ssp. *libocedri*

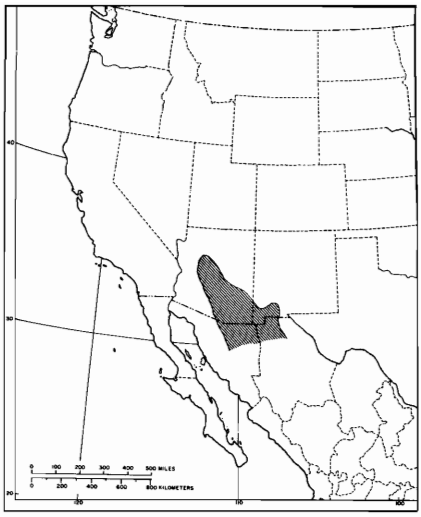

Figure 3.—*Phoradendron capitellatum*

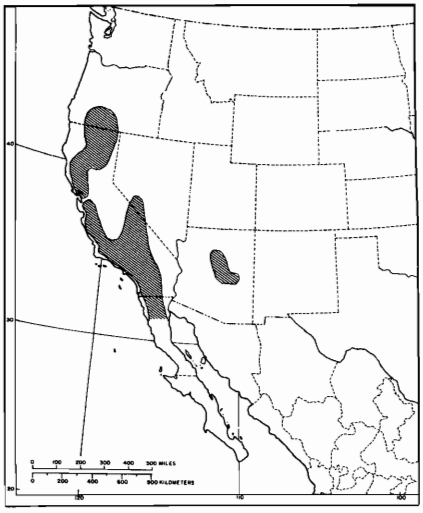

Figure 2.—*Phoradendron densum*

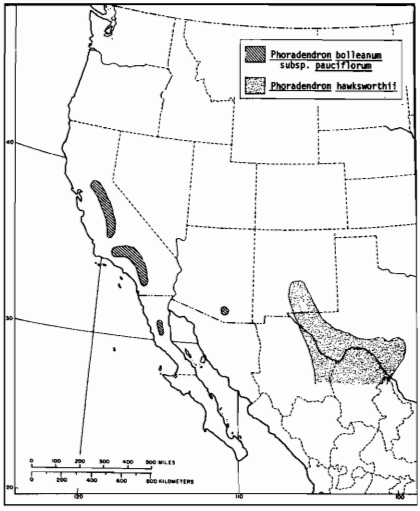

Figure 4.—*Phoradendron bolleanum* ssp. *pauciflorum, p. hawksworthii.*

Table 1. *Phoradendron* on conifers in the United States.

PHORADENDRON	*HOSTS AND DISTRIBUTION*	DESCRIPTION
P. juniperinum ssp. *juniperinum*	The most common mistletoe on juniper, rare on cypress; Oregon and Utah, south from Colorado to Mexico.	Leafless, plants generally in globose clusters.
P. juniperinum ssp. *libocedri*	Only on incense cedar; southern Oregon to Baja California, Mexico.	Leafless, plants tend to be pendulous.
P. densum	Cypress and juniper; southern Oregon to Baja California. Single outlier in central Arizona.	Leaves smooth, 10–20 mm long, 3–5 mm wide.
P. bolleanum ssp. *pauciflorum*	Only on white fir; Central California to Baja California, Mexico. Single outlier in southern Arizona.	Leaves smooth, 15–30 mm long, 5–8 mm wide.
P. capitellatum	A rare southwestern species on junipers; Arizona and southwestern New Mexico.	Leaves hairy, 8–14 mm long, 1–2 mm wide.
P. hawksworthii	Junipers; southern New Mexico to Mexico, common in West Texas.	Leaves smooth, 6–20 mm long, 1.5–3 mm wide.

known to supplement their winter diet with mistletoe on trees and shrubs that are low enough to reach, or from mistletoe that breaks off trees in winter.

Hosts

Mistletoes are green, flowering plants that require a living host. Some grow on only a single species of tree, although most grow on juniper and cypress.

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Figure 5.—*Phoradendron juniperinum*. Heavily infected juniper.

Mistletoes manufacture much of their own food by photosynthesis and generally require only water and mineral elements from the host plant. Without the green aerial portions of the mistletoe plant, however, the root system of the parasite can utilize host nutrients and remain alive within an infected branch for many years.

The mistletoes are dioecious (i.e., male and female flowers are borne on separate plants). Since the male and female

flowers are so similar in appearance, it is difficult to determine the sex of the plant unless fruit are present.

Mistletoe is spread mainly by birds (robins, bluebirds, thrushes, cedar waxwings, phainopeplas) that feed on the mistletoe berries. The berries are round, white to pink in color, occur in spikes, and are about ¼-inch in diameter. A berry usually holds a single seed surrounded by a sticky pulp. Birds digest the pulp of the berry and excrete the living seed. By this means seeds are often deposited on susceptible trees. The viscous coating and hair-like threads on the outer surface of the seeds firmly attach excreted seeds to tree branches. Upon germinating, the growing radicle becomes tightly pressed to the branch surface.

Young or small trees are seldom infected by mistletoe. In nearly all cases, larger or older trees are infected first because birds prefer to perch in the tops of taller trees. Severe buildup of mistletoe is common within an infected tree because birds are attracted to and may spend prolonged periods feeding on the mistletoe berries.

Damage

Trees heavily infected by mistletoe are weakened, subjected to reduced growth rate, and sometimes killed. Weakened trees are predisposed to attack by insects and often succumb during periods of drought or other adverse conditions. The damage caused by *Phoradendron* in conifers is not as serious as that caused by the dwarf mistletoes, but high mortality in certain localities is sometimes associated with *Phoradendron*.

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Figure 6.—*Phoradendron juniperinum* ssp. *libocedri* in incense cedar.

The most severe damage seems to be caused by *P. juniperinum* in junipers in Arizona. The white fir mistletoe, *P. bolleanum* ssp. *pauciflorum*, tends

F-701812

Figure 7.—Utah juniper heavily infected and recently killed by *Phoradendron juniperinum*. Adjacent pinyon is immune to this mistletoe.

to attack or weaken the tops of trees and markedly reduce cone production by infested trees. This mistletoe weakens firs so that they are more susceptible to attacks by the fir engraver beetle.

Life Cycle

Mistletoes infect trees by means of a specialized, penetrating structure that forces its way through the bark and into the living host tissues. After infection, the root system of the parasite grows within the branch. Aerial shoots begin to develop shortly after the root system is well established. Often, several years are required after infection for a new seed-bearing plant to develop. The parasite usually does not spread rapidly, but once a plant is established, the root system gradually extends up and down the branch.

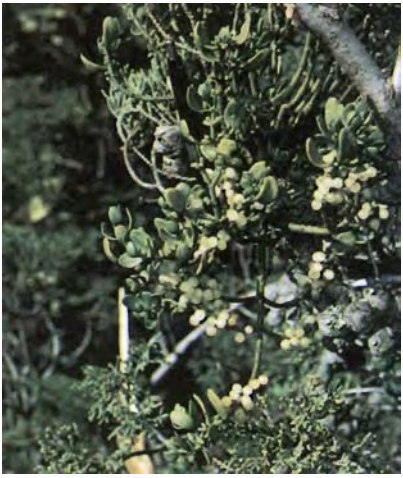

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Figure 8.—*Phoradendron densum* in cypress.

Defoliation or destruction of the aerial shoots does not kill the mistletoe plant. New shoots may be produced from the root system, or the parasite may survive and grow entirely within the infected host tissues. The mistletoe is not killed until either the tree dies, the infected portion dies, or the infected portion is removed.

Mistletoes are rather intolerant of cold, and near their northern limits, aerial shoots are frequently killed by low winter temperatures.

Control

Control of mistletoe is difficult in forests. To eliminate the parasite, the infected limbs must be pruned off, or if badly infected, the tree should be cut. Pruning should be done only when considered economically feasible. Mistletoe that has been removed from the tree cannot cause new infections; therefore, it need not be burned or disposed of. However, eradication of the pest will not insure protection from further infection. Birds are likely to reintroduce the parasite from nearby infected trees. About 5 to 10 years are required, however, for the parasite to build up to damaging proportions before control again is necessary.

Homeowners with only a few infected trees will not find control difficult. Infected limbs can be pruned off. If this is not practical, for esthetic or other reasons, the mistletoe shoots can be broken off periodically.

Figure 9.—*Phoradendron bolleanum* ssp. *pauciflorum* in white fir. F-701815

Shoot removal will not be necessary more than once every 2 or 3 years, since breaking off the foliage and shoots of the mistletoe in itself reduces the drain on the branch by the parasite. It will also prevent localized spread and buildup of mistletoe by reducing the seed source. For valuable trees infected in the trunk, breaking off the mistletoe shoots is the only method of control now available.

Another method of direct control that has been tried is removing shoots and covering the affected part of the branch with creosote or opaque material, such as tar paper. However, this has not been particularly effective. Coverings, such as tar paper, only limit shoot production temporarily, and are not esthetically pleasing.

Planting tree species that are not susceptible to local mistletoes is a sound approach to control.

Figure 10.—*Phoradendron capitellatum* in juniper. F-701816

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January 1981

☆ U.S. GOVERNMENT PRINTING OFFICE: 1980 O—325-428

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