

MISTLETOE

Integrated Pest Management for Home Gardeners and Landscape Professionals

Broadleaf mistletoe (*Phoradendron macrophyllum*) is an evergreen parasitic plant that grows on a number of landscape tree species in California. Hosts of broadleaf mistletoe include alder, 'Aristocrat' flowering pear, ash, birch, box elder, cottonwood, locust, silver maple, walnut, and zelkova. Other species of broadleaf mistletoe in California include *P. villosum*, which infests only oaks, and *Viscum album*, which attacks alder, apple, black locust, cottonwood, and maple in Sonoma County only. Conifers are less often attacked by broadleaf mistletoes, but white fir (*Abies concolor*) is significantly infested in the southern Sierra Nevada mountain area. Dwarf mistletoes (*Arceuthobium* spp.) infest pines, firs, and other conifers in forests, and can be a problem in forest landscapes such as in the Sierra Nevada foothills.

IDENTIFICATION

Leafy mistletoes have green stems with thick leaves that are nearly oval in shape. Plants often develop a roundish form up to 2 feet or more in diameter. The small, sticky, whitish berries are produced from October to December. Evergreen clumps of mistletoe are readily observed on deciduous trees in winter when leaves are off the trees.

LIFE CYCLE AND BIOLOGY

Mistletoe plants are either female (produce berries) or male (produce only pollen) (Fig. 1). The berries of the female plant are small, sticky, and whitish; they are very attractive to birds such as cedar waxwings, robins, and others. The birds feed on and digest the pulp of the berries, excreting the living seeds that stick tightly to any branch on which they land. In most cases, the initial infestation occurs on larger or older trees because birds pre-

fer to perch in the tops of taller trees. A heavy buildup of mistletoe often occurs within an infested tree because birds are attracted to the berries, and may spend a good deal of time feeding on them. In addition, seeds may fall from mistletoe plants in the upper part of the tree, creating new infestations on the lower branches. The rapidity with which mistletoe spreads is directly related to the proximity and severity of established infestations, and newly planted trees can be quickly infested if they are growing near old, heavily infested trees.

After the mistletoe seed germinates, it grows through the bark and into the tree's water-conducting tissues, where rootlike structures called haustoria develop (Fig. 2). The haustoria gradually extend up and down within the branch as the mistletoe grows. Initially, the parasitic plant grows slowly; it may take years before the plant blooms and produces seed. Broadleaf mistletoes have succulent stems that become woody at the base. Old, mature mistletoe plants may be several feet in diameter, and on some host species, large swollen areas develop on the infected branches where the mistletoe penetrates. If the visible portion of the mistletoe is removed, new plants often resprout from the haustoria.

Dwarf mistletoes are smaller plants than broadleaf mistletoes, with mature stems less than 6 to 8 inches long.

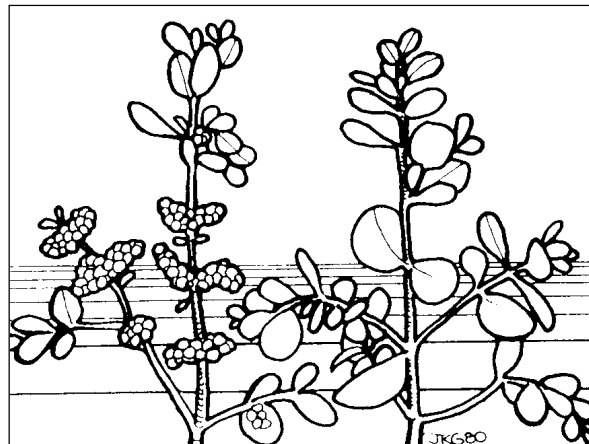


Figure 1. Only the female plant (left) produces berries.

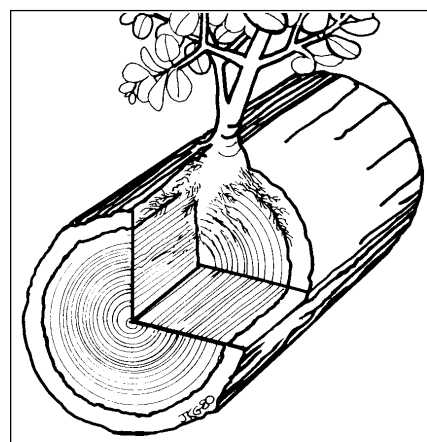


Figure 2. There is no distinct root for mistletoe, only fine threadlike haustoria.

Dwarf mistletoe shoots are nonwoody, segmented, and have small scalelike leaves. While broadleaf mistletoe seeds are dispersed by birds, dwarf mistletoe seeds are spread mostly by their forcible discharge from fruit, which can propel seeds horizontally into trees up to 30 to 40 feet away.

DAMAGE

Broadleaf mistletoe absorbs both water and mineral nutrients from its host trees. Healthy trees can tolerate a few mistletoe branch infections, but individual branches may be weakened or sometimes killed. Heavily infested trees may be reduced in vigor, stunted, or even killed, especially if they are stressed by other problems such as drought or disease.

MANAGEMENT

In newly developed areas or in older established areas where trees are being replaced, the ideal method of controlling or preventing mistletoe is to plant trees believed to be resistant or moderately resistant to mistletoe. Avoid trees like Modesto ash, known to be especially susceptible to mistletoe infestation. Where many new trees are being planted, control mistletoe in any surrounding infected trees to reduce the infection of new trees.

For treatment of existing trees it is important to remove mistletoe before it produces seed and spreads to other limbs or trees. Mechanical control through pruning is the most effective method for removal. Growth regulators provide a degree of temporary control but repeated applications are required. Severely infested trees should be removed and replaced with less susceptible species to protect surrounding trees.

Mechanical Control

The most effective way to control mistletoe and prevent its spread is to prune out infected branches, if possible, as soon as the parasite appears. Using thinning-type pruning cuts, remove infected branches at their point of origin or back to large lateral branches. Infected branches need to be cut at least one foot below the point of mistletoe attachment in order to completely remove embedded haustoria. Done properly, limb removal for mistletoe control can maintain or even improve tree structure. Severe heading

(topping) is often used to remove heavy tree infestations; however, such pruning weakens a tree's structure, and destroys its natural form. In some cases it is best to remove severely infested trees entirely because they are usually a source of mistletoe seed.

Mistletoes infecting a major branch or the trunk where it cannot be pruned may be controlled by cutting off the mistletoe flush with the limb or trunk. Then wrap the area with a few layers of wide, black polyethylene to exclude light. Use twine or tape to secure the plastic to the limb, but do not wrap it too tightly or the branch may be damaged. In some tree species callus tissue will form under the plastic, further weakening the limb. Broadleaf mistletoe requires light and will die within a couple of years without it. It may be necessary to repeat this treatment, especially if the wrapping becomes detached or if the mistletoe does not die.

Simply cutting the mistletoe out of an infested tree each winter, even without wrapping, is better than doing nothing at all. Even though the parasite will grow back (Fig. 3), spread is reduced because broadleaf mistletoe must be several years old before it can bloom and produce seed.

Chemical Control

The plant growth regulator ethephon (Monterey Florel brand) may be used as directed by the label to control mistletoe in *dormant* host trees. To be effective, the mistletoe must also be dormant and the spray must thoroughly wet the mistletoe foliage. Mistletoe comes out of dormancy before most trees, so the ideal time to treat is from November 1 through the end of January. By treating when trees are dormant, the tree foliage will not get in the way of the treatment and the mistletoe clumps are more visible than when leaves are on the tree. Spraying provides only temporary control, especially on well-established infestations,

by causing some of the mistletoe plant to fall off. The mistletoe will soon regrow at the same point, requiring retreatment.

Resistant Species

Some tree species appear resistant to broadleaf mistletoe. Bradford flowering pear, Chinese pistache, crape myrtle, eucalyptus, ginkgo, golden rain tree, liquidambar, sycamore, and conifers such as redwood and cedar are rarely infested. These or other resistant species should be considered when planting in infested areas, or when replacing infested trees.

Integrated Pest Management in a Community

An effective mistletoe control program in a community requires a combination of methods and the cooperation of developers, homeowners, businesses, and public agencies. Property owners can substantially reduce mistletoe infestations in their own trees, but without community cooperation, infestations will recur. Public wooded areas, such as parks and stream banks adjacent to urban areas, can be a continual source of seed and, therefore, mistletoe infestation. For this reason, the planting of tree species not susceptible to mistletoe infestation should be a part of every city and park plan.

The most drastic and possibly the best control measure is to remove severely infested trees and replace them with less susceptible species. Economically,



Figure 3. Mistletoe resprouts after being cut back.

tree removal could be a practical approach for both public agencies and landowners, in addition to providing a source of firewood. To assist citizens in removing mistletoe from less severely infested trees on their property, some cities loan removal tools. In other cases, neighborhood residents may pool resources to hire a tree service to remove all mistletoe in their neighborhood.

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For more information contact the University of California Cooperative Extension or agricultural commissioner's office in your county. See your phone book for addresses and phone numbers.

AUTHORS: E. J. Perry, C. L. Elmore
 EDITOR: B. Ohlendorf
 TECHNICAL EDITOR: M. L. Flint
 DESIGN AND PRODUCTION: M. Brush
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WARNING ON THE USE OF CHEMICALS

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

Do not place containers containing pesticide in the trash nor pour pesticides down sink or toilet. Either use the pesticide according to the label or take unwanted pesticides to a Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Hazardous Waste Collection site nearest you. Dispose of empty containers by following label directions. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

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