

Mistletoes in Southern California Forests

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INTRODUCTION

Mistletoes are parasitic flowering plants commonly found throughout North America. Two types of mistletoes found in the western United States are broadleaf mistletoe (*Phoradendron spp.*), also known as true mistletoe, and dwarf mistletoe (*Arceuthobium spp.*). Broadleaf mistletoe is an evergreen parasitic plant that grows on a number of conifers (cone producing trees) and broadleaf trees (non- cone producing trees) in California. Dwarf mistletoes infect pines, firs, and other conifer species.

IDENTIFICATION

Broadleaf mistletoes have green stems with thick leaves. Broadleaf mistletoes often grow up to 2 feet or more in diameter and may form dense clusters known as “witches’-brooms.”

Dwarf mistletoes are usually smaller, leafless, and orange in color and produce berries that explosively discharge their seed.

LIFE CYCLE AND BIOLOGY

Broadleaf mistletoe plants are either female which produce berries or males which produce pollen. The berries of the female plant are small, sticky, and white in color. Birds digest the berries, excreting the living seeds that stick to branches. After the seed germinates it infects the tree, which becomes its host, by growing through the bark and developing “longitudinal strands” known as haustoria, which function like roots for nutrient and water uptake from the tree’s tissue (xylem). Several years may pass before the parasitic plant blooms and produces seed. On some host species, large swollen areas (galls) develop on the infected branches where the mistletoe is attached to the branch.

Dwarf mistletoe plants are either female or male as well. The female plants produce seeds in the sixth year of growth. The seeds are explosively discharged during late summer at velocities of 88ft/sec. Maximum dispersal distance is 52feet, but most are dispersed 33 feet or less. The seeds have a viscous coating (viscin) that adheres to any object they strike, especially conifer needles. Gravity pulls the seed to the base of the needle and as the viscin dries the seed is cemented to the needle surface. The seeds germinate and develop a “holdfast” where a root-like structure penetrates through the bark and embeds itself in the xylem with sinkers. Swellings from the dwarf mistletoe on the branch are seen in year 2 and will continue to become larger as the parasite grows on the host.

DAMAGE

Mistletoes are completely dependent on their host for survival. They absorb food, water, and mineral nutrients from their host trees. This is usually not a problem assuming the tree is healthy. Individual branches may be weakened or sometimes killed if the infection is significant to the point where the branch is not retaining enough water and nutrients. Mistletoes cause growth reduction, loss of tree vigor, poor wood quality, and undesirable tree appearance. Tree mortality may occur especially if the tree is stressed due to competition resulting from dense growing conditions, drought, disease or insect infestations.

MANAGEMENT

It is important to remove mistletoe before it produces seeds to prevent the spread to other limbs or trees. Pruning is the most effective method for removal. Infected branches should be pruned as soon as the parasite appears. Infected branches should be removed at their point of origin or where they connect to lateral branches. If the branch is connected to the main stem, then it should be pruned at the main stem. Infected branches should be cut at least one

foot below the point of mistletoe attachment to increase the likelihood of complete removal of the haustoria. Pruning major infected branches may result in topping which compromises the tree's structure or destroys its natural form. In some cases it may be best to remove the entire tree. At a minimum, if pruning or tree removal cannot be accomplished, mistletoe may be controlled by cutting it flush with the limb or trunk which would reduce the growth and dispersal of seeds. However, if this is done, mistletoe will re-sprout which requires constant maintenance and is less effective. Severely infected trees should be removed completely.

Dwarf mistletoes tend to be very host specific with one species of mistletoe only attacking one or very few conifer host species. Therefore maintaining a mixed species stand is beneficial for dwarf mistletoe control. The chances of a mistletoe seed landing on the correct host species are reduced in mixed species stands. Also when regenerating conifer stands it is important to be certain that any overstory conifers are mistletoe free if trying to establish the same species under them. Overstory mistletoe plants can rain seed down on regeneration causing infection of highly vulnerable young trees. It may be beneficial to plant non-host species under conifer species that are highly impacted by dwarf mistletoe.

Chemical control has not proven effective, however the ethylene-releasing growth regulator – Florel has proven to be somewhat effective for inducing dwarf mistletoe shoot abscission. Florel is approved by the EPA and by California Department of Pesticide Regulation for use on dwarf mistletoes.

REFERENCES

- Adams, David. *Tree Notes- Dwarf Mistletoes in California*. California Department of Forestry and Fire Protection. 1991.
- Edmonds, Robert L., James K. Agee, and Robert I. Gara. "Chapter 14." *Forest Health and Protection*. Boston: McGraw-Hill, 2000. 333-40. Print.
- Hawksworth, F.G., Weins, D., Geils, B.W. and Nisley, R.G. *Dwarf Mistletoes: Biology, Pathology, and Systematics*. Washington, DC Agriculture Handbook 709, USDA Forest Service, 1996. Print.