Everyone who has lived in North America or northern Europe for any length of time knows mistletoe and its association with Christmas and kissing under the mistletoe. Its thick green leaves with white fruits are on Christmas cards, and many businesses and non-profit organizations sell it during the holidays.

Mistletoe is generally described as an aerial perennial flowering shrub that is parasitic on trees. There are over 1,300 species worldwide that have evolved over millions of years from several different ancestors, so it is difficult to have a more precise definition. They have “learned” through natural selection that it is easier to live parasitically on a tree than it is to set their own roots in the ground and live independently.

There are two main types of mistletoe in northern California: hemi-parasites, often called “true mistletoes,” and complete parasites, called dwarf mistletoes. All are in the mistletoe family, Viscaeeae.

Oak or hairy mistletoe (Phoradendron leucarpum ssp. tomentosum), which is common in our area, is a hemi-parasite. It gets all of its water and essential elements such as nitrogen, potassium, and phosphorus from the water-conducting vascular tissue of a tree—the lighter wood that you see in a cut log, immediately interior to the bark. Hemi-parasites have photosynthetic green leaves and stems, indicating that they produce their own food, so all they need from their host tree is water and minerals from the soil.
Oak mistletoe grows almost exclusively on oak trees. It especially likes the large spreading valley oaks growing in deep moist soils and the familiar blue oaks that can grow in the poorest soils. It will also infect interior live oak, black oak, and canyon live oak. It has thick oval leaves up to 1½ inches long, and both the stems and the leaves are a dull green. The shrub can be up to two to three feet in diameter.

To understand how a mistletoe grows, it is best to start with the seed. When the white fruits of the mistletoe are ripe, the seeds need to be dispersed and that is usually done by birds or small mammals. Many different species of birds eat the fruit and then disperse the seeds by running them through their digestive tract and depositing the seeds on a stem, or by having seeds stick to their feet. This is one reason why certain areas have a concentration of mistletoe infestations. The birds love the fruit and fly from tree to tree in an area to get more, leaving deposits of seeds in droppings on nearby trees.

Once on a tree, the seed sticks to the bark held by viscin, a sticky substance in the fruit, and waits for winter rain. Unlike most plant seeds, these require sunlight to germinate as the seeds have small amounts of chlorophyll that they use to produce food to grow their haustoria (root-like “sinks”) into the tree branch. Once the haustorium mechanically pushes its way into the tree’s vascular tissue, it will slowly grow, and three to five years later it will produce its first leaves. Five to seven years later it will have flowers and, once pollinated by insects (or for some species, wind), it will produce seeds, ready for the next generation.

Bigleaf mistletoe (Phoradendron leucarpum ssp. macrophyllum) is closely related to oak mistletoe, but it prefers alder, ash, cottonwood, locust, sycamore, walnut, and some willows. It has shinier and larger leaves than oak mistletoe.

Dwarf mistletoe (Arceuthobium campylopodum) is essentially a wholly parasitic plant that infects conifers and is common throughout California. It is a perennial plant that is yellow, orange, or brown to olive green, up to eight inches long with scale-like leaves under ⅛ inch long. It not only takes water and minerals from...
a host tree, it takes all of its food from the tree too. Its haustoria not only enter the water-conducting cells, but also the sugar-conducting tissue that contains sugar produced in the tree leaves.

This dwarf mistletoe was once considered to be different species, but research has shown that it just affected each conifer species differently. On ponderosa pines, it produces witches’ brooms, which are thick jumbled masses of pine needles and stems at the end of a branch, sometimes many on a tree. On gray pine, an infestation usually just slowly kills the needles on a branch. At Lassen Volcanic National Park, many red firs are infected with dwarf mistletoe and the many dead branches randomly scattered throughout the tree are quite noticeable.

Dwarf mistletoe has a unique seed dispersal system. Its fruits, which look similar to but darker than oak mistletoe, will explode when ripe and project the seed up to 50 feet onto another branch or tree. If it lands on a branch, it will germinate when it rains, like oak mistletoe. If you are lucky enough to find some you can hold in your hand, the fruits may start to explode from the change in humidity and you will soon have a sticky, gooey hand.

Mistletoes can weaken a tree and eventually aid in its death during a time of stress such as a drought or severe insect infestation, but usually the tree can tolerate it and will sometimes outlive the mistletoe. Dwarf mistletoes seem to harm trees more than true mistletoes. They are the bane of timber companies as they will retard the growth of valuable trees.

Despite their parasitic nature, mistletoes are a natural part of an ecosystem. They provide food for birds, small mammals, and insects. Large mistletoe shrubs and witches’ brooms can provide a safe nesting place for birds.

Dwarf mistletoe (*Arceuthobium campylopodum*) in fruit. CalPhotos photo © Keir Morse, used with permission.