
POISON OAK

Integrated Pest Management for Home Gardeners and Landscape Professionals

Poison oak, also known as Pacific poison oak or western poison oak (*Toxicodendron diversilobum*), is native to western North America with a distribution extending from British Columbia to the Baja California peninsula. In Washington and Oregon, poison oak is found mainly in the western regions of the states. In California it is widespread and grows in a wide range of habitats from sea level to the 5,000-foot elevation and in areas including open woodland, grassy hillsides, coniferous forests, and open chaparral.

IDENTIFICATION

Poison oak is a woody shrub or vine that loses its leaves in winter. In open areas under full sunlight, it forms a dense, leafy shrub usually 1 to 6 feet high (Fig. 1). In shaded areas, such as in coastal redwoods and oak woodlands, it grows as a climbing vine, supporting itself on other vegetation or upright objects using its aerial roots (Fig. 2).

Leaves normally consist of three leaflets with the stalk of the central leaflet being longer than those of the other two (Fig. 3); however, leaves occasionally are comprised of 5, 7, or 9 leaflets. Leaves of true oaks, which are superficially similar, grow singly, not in groups. Poison oak leaves alternate on the stem. Each leaflet is 1 to 4 inches long and smooth with toothed or somewhat lobed edges. The diversity in leaf size and shape accounts for the Latin term *diversilobum* in the species name. The surface of the leaves can be glossy or dull and sometimes even somewhat hairy, especially on the lower surface.

In spring, poison oak produces small, white-green flowers (Fig. 4) at the point where leaves attach to the stem. Whitish-green, round fruit (Fig. 5) form in

late summer. In early spring the young leaves are green or sometimes light red. In late spring and summer the foliage is glossy green and later turns attractive shades of orange and red (Fig. 6).

IMPACT

Poison oak thrives along roadsides and other areas where established vegetation is disturbed, in uncultivated fields, and on abandoned land. It also is a problem in wood lots, Christmas tree plantations, rangeland, and recreation areas. While it can reduce optimal grazing area in rangeland or pastures, the primary concern associated with poison oak is the allergic reaction it causes in many people.

All members of the genus *Toxicodendron*—which includes poison oak, poison ivy, and poison sumac—cause allergic contact dermatitis. About 2 million cases of skin poisoning are reported in the United States each year, primarily from these three species. In California, the number of working hours lost as a result of dermatitis from poison oak makes it the most hazardous plant in the state.

Contact with poison oak leaves or stems at any time of the year can cause an allergic response. When the allergen contacts the skin surface of sensitive individuals, the surrounding cells rapidly absorb it. Within 1 to 6 days, skin irritation and itching will be followed by water blisters, which can exude serum. Contrary to popular belief, the exuded serum does not contain the allergen and does not transmit the rash to other regions of the body or to other individuals. The dermatitis rarely lasts more than 10 days. Only about 15 to 20% of the population is immune to the allergenic reaction caused by poi-



Figure 1. Poison oak as a shrub.



Figure 2. Poison oak as a vine.

son oak and show no symptoms when exposed to the plant. Once a reaction occurs, repeated exposures further increase sensitivity. Conversely, long periods with no exposure will reduce an individual's susceptibility. Animals with fur usually don't suffer skin irritation, although a dog can develop symptoms on its nose or underbelly.

PEST NOTES

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Livestock can graze on the tender foliage with no adverse effects.

In addition to direct contact with the plant, transmission of the allergen can occur by touching contaminated clothing, gloves, tools, or animals, particularly pets. When poison oak is burned, the oils can disperse via the smoke particles. Breathing this smoke can cause severe respiratory irritation.

After coming in contact with the allergen, the best way to prevent skin irritation is to pour a mild solvent such as isopropyl (rubbing) alcohol over the exposed area then wash with plenty of cold water; avoid using warm water, since it enhances the penetration of the oil. If isopropyl alcohol is not available, use cold water by itself to help dilute the oil, so it no longer is as harmful.

Perform these steps within five minutes of exposure. Even if it's too late to prevent the rash, washing the skin to remove excess plant oil will keep the rash from spreading. Be sure to thoroughly wash your hands, since they serve as the major route for transferring the allergen to other parts of the body, especially the face.

Using only a small amount of water or disposable hand wipes is more likely to spread the toxin than remove it. You can use soap but only if you also use copious amounts of water.

If you wash with isopropyl alcohol or soap, be sure you are done working outside for the day, since these products also will remove your skin's protective oils, which help repel the plant toxin; your body will not regenerate these protective oils for 3 to 6 hours. If re-exposure could occur within 6 hours, you will have better results washing with lots of water.

The product Tecnu, which most drug stores sell, will remove the poison oak oil from your skin. You should wash the contacted areas within 2 to 8 hours after exposure. You also can use Tecnu to decontaminate laundry, pets, and tools.

BIOLOGY

A variety of birds will eat poison oak fruit, and establishment of this plant in new locations generally is from seeds these birds have transported. The passage of the hard-seeded fruit through the bird's digestive tract facilitates germination by reducing the period of dormancy. Once established, the plant spreads slowly using its underground horizontal rootstalks, which actually are stem tissue. A single root system can cover a very large area, several feet in diameter.

Poison oak can survive under a wide range of temperatures, elevations, soil types, moisture conditions, and light intensities. However, it is most commonly found on hillsides with shallow soils.

MANAGEMENT

The primary ways of managing poison oak are mechanical removal by hand pulling, which is not recommended for individuals who are sensitive to this plant, and treatment with herbicides. Maintaining a healthy cover of desirable vegetation will reduce potential invasion. This is easiest where you have available irrigation and regularly cultivated soil.

Poison oak is a native species in the western United States. As such, a number of indigenous insects and pathogens already are present. Typically, biocontrol isn't an option with a native species. Furthermore, in most areas, poison oak is not a pest, but rather a natural component of the plant community.

Don't burn poison oak, since it creates a serious health hazard and doesn't effectively reduce infestations. Grazing by sheep and goats can be effective in small areas. Deer or horses also will graze poison oak when the foliage is young, before the plant flowers.

Mechanical

You can physically remove plants located in a yard or near houses through hand pulling or mechanical grubbing



Figure 3. Poison oak leaves and flower.



Figure 4. Poison oak flowers.



Figure 5. Poison oak fruit.



Figure 6. Poison oak fall foliage.

using a shovel or pick. It is essential to remove the entire plant including its roots. Remove plants in early spring or late fall when the soil is moist and it is easier to dislodge rootstalks. Grubbing when the soil is dry and hard usually will break off the stems, leaving the rootstalks to vigorously resprout. Detached and dried brush still can cause dermatitis, so bury or stack the plant material in an out-of-the-way location, or take it to a disposal site. Again, never burn poison oak.

Ideally, anyone engaged in hand pulling poison oak should have a high degree of immunity to the allergen. Whether you are sensitive or believe you are immune, wear appropriate protective clothing, including washable cotton gloves over plastic gloves. Wash all clothing thoroughly, including shoes, after exposure.

Other forms of mechanical control have not proven to be successful. Brushrakes and bulldozers often leave pieces of rootstalks that readily can resprout. In some cases, brush removal late in summer, when plants are experiencing moisture stress, can slow their ability to recover. Mowing has little effect in poison oak control, unless you perform it at least four times during the growing season. Within 2 months of germination, young plants usually have produced underground rootstalks large enough to recover from mowing damage. A single plowing is of no value and often serves to propagate the shrub. However, good seedbed preparation and planting cultivated crops for a year or more will control poison oak infestations.

Chemical Control

Herbicides used to control poison oak in California include glyphosate (Roundup, etc.) and the auxinic herbicides triclopyr (Garlon, Ortho Brush-B-Gon, etc.), 2,4-D (Brush Buster Woody Plant Herbicide, etc.), a combination of 2,4-D and dicamba (Spectracide Brush Killer Spray Concentrate, Spectracide Poison Ivy & Poison Oak Brush Killer, and Ortho Weed B Gon Max), or a combination of glyphosate and imazapyr

(Ortho Groundclear Vegetation Killer). You can apply some of these herbicides as stump or basal applications, but all are applied as a foliar spray.

Glyphosate is one of the most effective herbicides for controlling poison oak. However, effective control depends upon proper timing of the application. Apply glyphosate late in the growth cycle, after the fruit has formed but before leaves have lost their green color. If you are using hand-held equipment, you can apply glyphosate as a 2% solution in water. Products or spray mixtures containing less than 2% glyphosate may not effectively control poison oak. It is important to note that glyphosate is a nonselective compound and will damage or kill other vegetation it contacts.

Auxinic herbicides such as triclopyr, 2,4-D, dicamba, and combinations of these herbicides also control poison oak. You can apply these herbicides earlier than glyphosate, when plants are growing rapidly from spring to midsummer.

Triclopyr is the most effective auxinic herbicide for poison oak control. It has a wider treatment window than glyphosate, and it often gives more consistent control. Two formulations of triclopyr are available. Triclopyr amine is the least effective of the formulations and requires relatively high rates. Triclopyr ester or triclopyr ester plus 2,4-D ester gives better herbicide absorption into the foliage and is more effective.

When 2,4-D is combined with dicamba, it provides much better control than if it is used alone in a 1% solution. Premixed combinations of these herbicides are available. Dicamba applied at 0.5% gives better long-term control of poison oak than 2,4-D.

A new herbicide in California, imazapyr, also is very effective for controlling poison oak, but it is available for application only by licensed pesticide applicators. In forestry, two formulations are available. The water-soluble formulation (Arsenal) is effective as a foliar treatment at 1% plus a 0.25% surfactant.

A similar treatment with an emulsifiable concentrate formulation (Chopper, Stalker) will control poison oak at a 2% solution in water or a 1% solution plus 5% of a methylated or ethylated seed oil. The best timing is in either spring after full leaf expansion or in mid-August through September.

Stump Application. Stump treatments are most effective during periods of active growth. Cut poison oak stems 1 to 2 inches above the soil surface, and immediately after cutting, treat the stump. A delay in treatment will result in poor control. Apply an herbicide such as glyphosate, triclopyr, or combinations of triclopyr with 2,4-D (or 2,4-D and 2,4-DP) with a paint brush that is 1 to 2 inches wide or with a plastic squeeze bottle that has a spout cap. Treatment solutions should contain either undiluted glyphosate (use a product that contains at least 20% glyphosate), triclopyr amine, or a 20 to 30% triclopyr ester solution mixed with 70 to 80% methylated or ethylated seed oil.

Be sure to completely cover all surfaces of the stumps with the herbicide until it runs down the base of the stubs. Spray any regrowth from cut stumps with a foliar spray when the leaves fully expand.

Basal Application. Basal bark applications can be made almost any time of the year, even after leaves have discolored or dropped. Apply triclopyr to basal regions of poison oak using a backpack sprayer with a solid cone, flat fan, or a straight-stream spray nozzle. Thoroughly cover a 6- to 12-inch basal section of the stem, but not to the point of runoff.

Foliar Sprays. The effectiveness of herbicides applied to poison oak foliage depends upon the plant's growth stage and whether spray-to-wet coverage and proper concentration occurred. Foliar application is most effective after leaves are fully developed and when the plant is actively growing. This period is normally from April into June or July, when soil moisture is still adequate. The flowering stage is the optimum

time to spray. Do not apply herbicides before plants begin their spring growth or after the leaves have begun to turn yellow or red in late summer or fall.

To achieve spray-to-wet coverage, all leaves and stems should be glistening following herbicide application. However, coverage should not be to the point of runoff. One application of an herbicide usually doesn't completely control poison oak. Treat again when new, sprouting leaves are fully expanded,

generally when the plants are about 2 feet tall. Watch treated areas closely for at least a year, and re-treat as necessary.

REFERENCES

- Epstein, W. L. and V. S. Byers. *Poison Oak and Poison Ivy Dermatitis—Prevention and Treatment in Forest Service Work*. USDA Forest Service Equip. Dev. Ctr. Pub. 8167 2803, Forest Service Equip. Dev. Ctr. Missoula, MT 59801.

Hauser, S. C. 1996. *Nature's Revenge: The Secrets of Poison Ivy, Poison Oak, and Poison Sumac, and their Remedies*. N.Y.: Lyons & Burford. ❖

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Pesticides applied in your home and landscape can move and contaminate creeks, rivers, and oceans. Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

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