



Poison Oak

Integrated Pest Management for Home Gardeners and Landscape Professionals

Poison oak, also known as western poison oak (*Toxicodendron diversilobum*), is one of several members of the sumac or cashew plant family (Anacardiaceae) that are native to North America and are known to cause contact dermatitis. Other species include western poison ivy (*T. rydbergii*), eastern poison ivy (*T. radicans*), Atlantic poison oak (*T. pubescens*), and poison sumac (*T. vernix*). The weeping, itchy rash caused by these plants is the most common allergic contact dermatitis in North America, affecting 10 to 50 million Americans per year.

Western poison oak is the only species that occurs in California. Its distribution extends 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 including coastlands, oak woodlands, rangelands, conifer forests, riparian areas, and brushlands, and occurs from sea level to about 5,000-foot elevation. Poison oak can also frequently be found in urban landscapes, parks, gardens, and recreational areas.

Authors:

Scott R. Oneto, UC Cooperative Extension, El Dorado, Amador, Calaveras and Tuolumne counties.

Joseph M. DiTomaso, Plant Sciences, UC Davis.



Figure 1. Poison oak shrub in late summer, showing green foliage on the right and autumn colors (seasonal decline) on the left.

IDENTIFICATION AND BIOLOGY

Being able to identify poison oak will help minimize contact and more importantly lessen the chance of an allergic reaction. In open areas under full sunlight, poison oak forms a dense, leafy shrub usually 1 to 6 feet high (Figure 1). In shaded areas, such as in coastal redwoods and oak woodlands, it grows as a climbing vine, up to 75 feet or more, supporting itself on other vegetation or upright objects using its aerial roots (Figure 2).

Despite its name, poison oak is not a true oak. Leaves of true oaks, which are superficially similar to poison oak, grow singly, not in groups. The adage “leaves of three, let them be” refers to each leaf of poison oak having three leaflets (Figure 3). Although a general



Figure 2. Poison oak growing as a vine.

truth, it is not a rule. Leaves normally consist of three leaflets with the stalk of the central leaflet being longer than those of the other two. Although uncommon, leaves can occasionally have five or seven leaflets, and in rare cases nine.

Each leaflet is 1 to 4 inches long with toothed or somewhat lobed edges. The surface of the leaves can also be varied, ranging from glossy to dull in color, thin to leathery in texture, and sometimes even hairy, especially on the lower surface. The diversity in leaf size and shape accounts for the Latin term *diversilobum* in the species name.

Poison oak is deciduous, which can make detection and identification extremely difficult in the winter and early spring when leaves are absent. In early spring, new leaves are green or sometimes light red. The leaves occur alternately, meaning they grow to the left then to the right along the stem. Plants lack thorns and spines on the leaves and stems, which can aid in identification. Poison oak produces small, white-green flowers at the point where leaves attach to the stem (Figure 4).

Whitish-green, round fruit form in late summer and can persist into fall and winter (Figure 5). The fruit lack hairs. In late spring and summer, the foliage is often glossy green and later turns attractive shades of orange and red (Figure 6). A similar common species, called skunkbush sumac (*Rhus trilobata*), resembles poison oak but does not cause dermatitis. It has hairy fruit and does not have the stalk on the central leaflet.

Poison oak is a long lived woody perennial plant. Seeds have a hard seed coat and can remain viable in the soil for many years. Once seeds germinate and the plants become established, plants can sucker from rhizomes (underground stems) and further spread in the adjacent area. In addition, vines that contact the ground often form roots, creating new plants that contribute to the lateral expansion. Over time

a single plant can cover a very large area.

The leaves and stems provide a valuable food source for many animals including deer and livestock, while birds and other animals forage on berries without adverse effects. The passage of the hard-seeded fruit through the digestive tract facilitates germination by reducing the period of dormancy.

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, rangelands, 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—can cause allergic contact dermatitis in humans. The allergy is caused by the plant oil urushiol (pronounced yoo-ROO-shee-all). Urushiol does not appear to cause serious allergic reactions in cats or dogs. Their coats tend to protect them from the oil, so while it's uncommon for pets to have a reaction to it, an allergic response can occur in areas where there's no hair or in hairless breeds with more exposed skin.

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. Approximately 50% to 75% of the adult population is sensitive to urushiol. In large urban areas, where these plants are less common, the prevalence is closer to 20%. Peak sensitization occurs between 8 and 14 years of age with infants not as easily sensitized as adults. Once a reaction occurs, repeated exposures further increase sensitivity. Conversely, long periods with no



Figure 3. Poison oak showing 3 leaflets with the central leaflet having a longer stalk than the other 2.



Figure 4. Poison oak flowers.



Figure 5. Poison oak fruit.



Figure 6. Poison oak fall foliage.



Figure 7. Blisters of contact dermatitis caused by poison oak exposure.

exposure will reduce an individual's susceptibility. There is also strong evidence to suggest children born to two urushiol-sensitive parents will also be sensitive.

Contrary to popular belief, coming in contact with poison oak doesn't mean a sensitive individual will get a rash. Urushiol is found in the stems, roots, leaves and skin of the fruits of these plants. Usually damage is required for plants to release the oil, therefore slight contact with uninjured leaves is innocuous. More vigorous activities such as weed eating, clearing brush, pruning, or trampling can result in injury and transfer the oil onto the skin, clothing, tools, or pets.

Urushiol is nonvolatile, dries quickly and can persist on objects and retain its ability to cause an allergic response for months or even years. This means that tools, clothing, pets, vehicles, and other objects that come in contact with the oil can continue to spread the oil. When poison oak is burned, the oils can disperse via the smoke particles. Breathing this smoke can cause severe respiratory irritation.

In the fall, leaves turn red and become enriched with urushiol which can result in higher levels of exposure. In winter as the leaves become dry and fall off, the oils are reabsorbed into the stems making the leaves non-allergenic. Bare stems in the winter can result in unintentional contact and if stems are damaged, oil can be released resulting in exposure.

There is currently no preventative treatment for contact dermatitis other than avoidance of exposure (recognition of the plant and wearing gloves, long pants, and long sleeves), use of skin blocking products, and washing quickly after exposure with soap and water.

Hyposensitization using shots or medicine to make one immune to poison oak were available at one time but were taken off the market when they were found ineffective. Other attempts have been made to immunize against poison oak including ingestion of the leaves. None of these measures has definite value either as preventive or as a cure, and sometimes they result in detrimental allergic effect. Research in this area is ongoing and at the time of publication, a new drug (PDC-APB) is undergoing clinical trials as a vaccine to prevent poison oak dermatitis.

Tips for Preventing an Allergic Reaction

When a sensitive individual comes into contact with the allergen, the skin rapidly begins to absorb it. The key in minimizing or preventing an outbreak is to remove the oil from your skin as quickly as possible. Urushiol is easily degraded in water. However, the oil can be removed in significant amounts only if washed off immediately. At 10 minutes, 50% can be removed; at 15 minutes, 25%; at 30 minutes, only 10%; and after 30 minutes, all of the oil has been absorbed.

The best way to remove the oil is forceful unidirectional washing with a damp washcloth and liquid dishwashing soap. The washcloth should be applied with repetitive, high-pressure, single-direction wipes under warm, running water. This provides the friction and heat necessary to remove the glutinous oil. Removing urushiol can be thought of as comparable to removing axle grease. The full-body wash should be performed for 3 rounds of about 3 minutes. Because it doesn't involve violent rapid back-and-forth scrubbing, or irritating

products such as strong soaps, it does not cause significant irritation. This technique is simple, inexpensive and safer than high-potency topical and systemic corticosteroids.

Other research has shown that a mild solvent such as isopropyl (rubbing) alcohol poured over an exposed area then washed with plenty of cold water is also effective. If washing is not possible within 30 minutes, it is still worthwhile to wash at the first opportunity to avoid any continued exposure from contaminated clothing. Be sure to thoroughly wash your hands and especially under the fingernails, since they serve as the major route for transferring the oil to other parts of the body, especially the face. All exposed clothing, equipment, and pets should be washed thoroughly in soap and water.

If you wash with isopropyl alcohol or soap, be sure you are done working outside for the day as these products 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 a washcloth and lots of water. Using only a small amount of water or disposable hand wipes is more likely to spread the oil than remove it.

There are several products available over-the-counter to help remove urushiol from your skin. Some of these include Tecnu, Zanfel, and various soaps. All these products have shown to be effective at removing urushiol oil from the skin.

Tips for Treating an Allergic Reaction

Within 1 to 6 days after exposure, skin irritation and itching will be followed by water blisters, which can exude serum (Figure 7). Contrary to popular belief, the serum does not contain urushiol and does not transmit the rash to other regions of the body or to other individuals. Variations in the

time of appearance of rash and the severity of rash are caused by differences in the amount of oil absorbed and the skin thickness. Contact with latent oil is the reason new lesions develop weeks after first symptoms develop. The most common culprit for re-exposure are fingernails, clothing, tools, and pets. The dermatitis rarely lasts more than 10 days.

Don't scratch the blisters. Bacteria from under your fingernails can get into the wounds and cause an infection. The rash, blisters and itch normally disappear within 1 to 2 weeks without any treatment.

Relieve the itch by:

- Using wet compresses or soaking in cool water.
- Applying over-the-counter (OTC) topical corticosteroid preparations or taking prescription oral corticosteroids.
- Applying topical OTC skin protectants, such as zinc acetate, zinc carbonate, zinc oxide, and calamine to dry the oozing and weeping of poison ivy, poison oak, and poison sumac. Protectants such as baking soda or colloidal oatmeal relieve minor irritation and itching. Aluminum acetate is an astringent that relieves rash.

See a doctor if:

- You have a temperature over 100°F.
- There is pus, soft yellow scabs, or tenderness on the rash.
- The itching gets worse or keeps you awake at night.
- The rash spreads to your eyes, mouth, genital area, or covers more than one-fourth of your skin area.
- The rash does not improve within a few weeks.
- The rash is widespread and severe.
- You are known to have a severe reaction.
- You have difficulty breathing.

MANAGEMENT

The primary ways of managing poison oak plants 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, several indigenous insects and pathogens are already present. Typically, biocontrol is not 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.

Avoid burning poison oak, since it creates a serious health hazard and does not effectively reduce infestations. Grazing by sheep and goats can be effective in small areas. Deer, horses, and cattle will also graze poison oak when the foliage is young, before the plant flowers.

Mechanical Control

Physically remove plants located in a yard or near houses through hand pulling or mechanical grubbing 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 rootstocks. Grubbing when the soil is dry and hard usually will break off the stems, leaving the rootstocks to vigorously resprout. Detached and dried brush can still 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 equipment, tools and all

clothing thoroughly, including shoes, after exposure.

Other forms of mechanical control have not proven successful. Tractors with a brush rake or bucket can be useful for removing the above ground growth, but often leave pieces of roots that can readily resprout. In some cases, brush removal in late summer, when plants experience moisture stress, can slow their ability to recover. However, using large equipment to clear land creates a perfect environment for new seedling establishment, making follow-up control essential.

Mowing is not an effective method for controlling poison oak. Mowing can release oil particles in the air similar to burning, so mowing is not recommended. Lopping mature plants near the base will provide poor control unless performed repeatedly throughout the season. Lopping can lead to vigorous resprouting. Lopping can be combined with an herbicide treatment to increase control.

For home gardeners, using a rototiller repeatedly throughout the year can be an effective technique for controlling poison oak in a garden area. Rototilling or cultivating an area only once can fragment the rhizomes and spread the poison oak.

Chemical Control

Post-emergent herbicides containing the active ingredients triclopyr, glyphosate, or imazapyr are available for controlling poison oak. These herbicides can be used alone or in combination. Pest control companies for hire may have access to several other active ingredients for poison oak control (See RESOURCES). Depending on the product, herbicides may be applied as foliar sprays, cut-stump treatments, or as basal bark treatments.

When using herbicides, be sure to prevent them from getting on desirable plants. Because glyphosate is a nonselective pesticide, it will damage or kill other vegetation. Triclopyr is a

broadleaf herbicide that will not injure grasses but will damage or kill other broadleaf plants. Imazapyr is nonselective, like glyphosate, and applications may also leave an herbicidal soil residue.

Herbicide active ingredients, particularly glyphosate, can readily attach to dust or soil particles, thus reducing their effectiveness. Although not typically a problem, dust can cover plants growing near roadsides. If dust is a concern, time the application after a rain event so the leaves are clean.

The best time to apply triclopyr is late spring or early summer when plants are actively growing. When air temperatures are higher than 80°F, it is better to use glyphosate or the amine formulation of triclopyr, since the ester form is subject to vaporization. Glyphosate is best applied in late summer or early fall, after flowering but before leaves fall.

The effectiveness of herbicides depends on three factors—timing, achieving good coverage, and using a proper concentration.

Foliar Sprays. Depending on the herbicide being used, foliar application to poison oak is either done in late spring when the plant is actively growing or in the late summer after flowering.

Foliar herbicide sprays can be applied using one of two methods. The first is spray-to-wet, where all leaves and stems should glisten following an application. Coverage, however, should not be to the point of runoff.

The other method is a low-volume foliar application called drizzle. This technique uses a higher concentration of herbicide, but sprayed at a lower volume. This method is advantageous in dense shrubbery or where access is limited. To achieve proper coverage, spray the herbicide uniformly over the entire canopy in a “drizzle” pattern, using a spray gun.

For spray-to-wet applications, products containing at least 41% glyphosate as the active ingredient

can provide good to excellent control of poison oak when applied at 2.5 ounces of product per gallon of water (2% of the total solution). Some products available for use in the home landscape with this concentration of active ingredient are Roundup Pro, FarmWorks Grass & Weed Killer 41% Glyphosate Concentrate, RM43 Total Vegetation Control, Compare-N-Save Grass & Weed Killer Concentrate, and Remuda Full Strength.

Glyphosate products that have a lower concentration of active ingredient, such as Roundup Concentrate (18% active ingredient), will require 6 ounces of product per gallon of water (4.5% of the total solution) for effective control using the spray-to-wet application method.

Triclopyr is available over-the-counter in either amine or ester formulations, with triclopyr ester being more effective on poison oak, since absorption of the herbicide into the foliage and stems is not as good with the amine form. Products containing a minimum of 61% active ingredient of the ester formulation can provide good to excellent control when applied at 1.2 to 6.4 ounces of product per gallon of water (1% to 5% of the total solution) as a spray-to-wet application. One such product with this concentration is Brushtox Brush Killer with Triclopyr. Other ester formulations with less concentrate are also available including Crossbow. Mixing triclopyr ester with commercially available seed oils can offer better penetration. One available seed oil product is Hasten-EA modified vegetable oil concentrate. Mix this at 1.25 ounces of product per gallon of herbicide solution (1% of the total solution).

Triclopyr is also available in the amine formulation. Products available include Bayer Bio Advanced Brush Killer Plus, Ortho Brush-B-Gon Poison Ivy and Poison Oak & Brush Killer, and Monterey Brush & Vine Control. These products contain 8% active ingredient and will require 4 to 8 ounces of product per gallon of water (3% to 6%

of the total solution), depending on the product used.

When used in a drizzle application on dense canopies or steep topography, glyphosate formulated as a product with 41% active ingredient can provide good to excellent control of poison oak. It should be applied at 13 ounces of product per gallon of water (10% of the total solution).

Triclopyr ester can also be applied using a drizzle application. Products containing 61% active ingredient should be applied using 13 ounces of product (10% of the total solution) and 25 ounces of seed oil (20% of the total solution) per gallon of water.

Remember that although the drizzle technique uses a higher concentration of herbicide, you are applying it at a lower volume. One gallon of mixed herbicide solution should adequately treat one-half acre of densely populated poison oak.

Cut-Stump Application. Cut-stump treatments are most effective in spring during active plant growth or in the fall. Immediately after cutting, apply the herbicide to the cut surface with a paint brush, spray bottle, or plastic squeeze bottle. Delaying application will result in poor control, because the cut surface will quickly dry, preventing movement of the chemical into the plant. For small diameter stems, cut the stems with loppers or clippers and paint or sponge the herbicide solution onto each cut end.

For triclopyr ester products containing 61% active ingredient, use 1 part product and 4 parts seed oil. The 8% amine formulation works well undiluted.

Glyphosate can be applied as a cut-stump application. If using a product containing 18% glyphosate, use undiluted. For products that contain 41% glyphosate, make a 1:1 solution of the product and water.

Cut stump applications can be made in the spring or fall. Follow similar timelines as given for glyphosate and triclopyr under foliar treatments.

Basal Bark Application. Apply concentrated forms of triclopyr ester to the trunks of poison oak using a backpack sprayer, spray bottle, or wick applicator. Thoroughly cover a 6 -to 12-inch band around the basal section of the stem. Make basal bark applications almost any time of the year, even after leaves have senesced. For triclopyr ester products with 61% active ingredient, the application ratio is 20% product in 80% seed oil carrier. To make a quart (16 oz) of solution in a spray bottle, add 3.2 ounces of product to 12.8 ounces of seed oil. Glyphosate and the amine formulation of triclopyr

provide poor control using this technique.

One application of an herbicide does not always completely control poison oak. Re-treat 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.

In areas near rivers or streams, it is important to use the proper herbicide products. Only a few formulations of glyphosate, triclopyr, and imazapyr are permitted for use in or near bodies of

water. Be sure to read the label for allowed uses. It is a violation of Federal law to use a pesticide in a manner inconsistent with its labeling.

Home gardeners and professional applicators should always wear appropriate protective equipment, as identified in the precautionary statements of the herbicide product label.



RESOURCES

Pacific Poison-oak Weed Report. wric.ucdavis.edu/information/natural%20areas/wr_T/Toxicodendron.pdf

REFERENCES

DiTomaso JM, Kyser GB et al. 2013. *Weed Control in Natural Areas in the Western United States*. Weed Research and Information Center, University of California. UC ANR Publication 3547. Oakland, CA.

Epstein WL, Byers VS. *Poison Oak and Poison Ivy Dermatitis—Prevention and Treatment in Forest Service Work*. USDA Forest Service Equip. Dev. Ctr. Pub. 8167 2803. Missoula, MT, Forest Service Equip. Dev. Ctr.

Neill BC, Neill JA, Brauker J, Rajpara A, Aires D.J. 2018. Post-exposure prevention of toxicodendron dermatitis with early forceful unidirectional washing. *Journal of the American Academy of Dermatology*. Feb 1. pii: S0190-9622(18)30171-3

Pekovic DD. 2016. Vaccine against Poison Ivy Induced Contact Dermatitis, A Lingering Scientific Challenge. *Int J Vaccines Vaccin* 2(1): 00023.

WARNING ON THE USE OF PESTICIDES

Pesticides are poisonous. Some pesticides are more toxic than others and present higher risks to people, nontarget organisms, and the environment. A pesticide is any material (natural, organic, or synthetic) used to control, prevent, kill, suppress, or repel pests. "Pesticide" is a broad term that includes insecticides, herbicides (weed or plant killers), fungicides, rodenticides, miticides (mite control), molluscicides (for snails and slugs), and other materials like growth regulators or antimicrobial products such as bleach and sanitary wipes that kill bacteria.

Always read and carefully follow all precautions and directions provided on the container label. The label is the law and failure to follow label instructions is an illegal use of the pesticide. 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, and animals. Never place pesticides in food or drink containers. Consult the pesticide label to determine active ingredients, correct locations for use, signal words, and personal protective equipment you should wear to protect yourself from exposure when applying the material.

Pesticides applied in your garden and landscape can move through water or with soil away from where they were applied, resulting in contamination of creeks, lakes, rivers, and the ocean. Confine pesticides to the property being treated and never allow them to get into drains or creeks. Avoid getting pesticide onto neighboring properties (called drift), especially onto gardens containing fruits or vegetables ready to be picked.

Do not place containers with pesticide in the trash or pour pesticides down the sink, toilet, or outside drains. Either use all the pesticide according to the label until the container is empty or take unwanted pesticides to your local 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. Follow label directions for disposal of empty containers. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

Produced by the **Statewide Integrated Pest Management Program**, University of California, 2801 Second Street, Davis, CA 95618-7774.

Technical Editor: K Windbiel-Rojas

ANR Associate Editor: AM Sutherland

Editor and Designer: B Messenger-Sikes

ILLUSTRATIONS: Figure 1: J Sachs; Figures 2, 7: SR Oneto; Figures 3, 5: JM DiTomaso; Figures 4, 6: Jack Kelly Clark.

This and other Pest Notes are available at ipm.ucanr.edu.

For more information, contact the University of California Cooperative Extension office in your county. See your telephone directory for addresses and phone numbers, or visit: ucanr.edu/County_Offices.

University of California scientists and other qualified professionals have anonymously peer reviewed this publication for technical accuracy. The ANR Associate Editor for Urban Pest Management managed this process.

To simplify information, trade names of products have been used. No endorsement of named products is intended, nor is criticism implied of similar products that are not mentioned.

This material is partially based upon work supported by the Extension Service, U.S. Department of Agriculture, under special project Section 3(d), Integrated Pest Management.

Suggested citation: Oneto SR, DiTomaso JM. 2021. *UC IPM Pest Notes: Poison Oak*. UC ANR Publication 7431. Oakland, CA.

ANR NONDISCRIMINATION AND AFFIRMATIVE ACTION POLICY STATEMENT

The University of California Division of Agriculture & Natural Resources (UCANR) is an equal opportunity provider. (Complete nondiscrimination policy statement can be found at <http://ucanr.edu/sites/anrstaff/files/215244.pdf>). Inquiries regarding ANR's nondiscrimination policies may be directed to UCANR, Affirmative Action Compliance Officer, University of California, Agriculture and Natural Resources, 2801 Second Street, Davis, CA 95618, (530) 750-1343.

