Potentilla recta L.

Sulfur cinquefoil

Family: Rosaceae
Range: Most western states except Arizona, New Mexico, and Utah.
Habitat: Open canopy forests, grasslands, and shrubby areas. Commonly associated with disturbed areas, although populations are also found in healthy plant communities.
Origin: Native to the eastern Mediterranean region of Eurasia.
Impacts: Sulfur cinquefoil is primarily a problem in pastures, rangeland, and wildlands. Little information is available on the ability of sulfur cinquefoil to compete with other plant species. Reports from Montana suggest it can become a significant component of the plant community and has become dominant on some sites. Sulfur cinquefoil canopy cover on most sites in Montana ranged from 5 to 15%. It is not readily grazed by livestock and wildlife.
Western states listed as Noxious Weed: Colorado, Montana, Nevada, Oregon, Utah, Washington

Sulfur cinquefoil is an herbaceous perennial with one to several slender, erect, hairy stems that grow to 2 ft tall. The stems have perpendicular hairs, which differentiate this from most native *Potentilla* species. Sulfur cinquefoil grows as a loosely tufted rosette before flowering stems develop. The leaves are palmate compound with 5-7 leaflets. Leaflets are oblanceolate, the margins coarsely narrow-toothed halfway or slightly less to the midvein, covered with stiff hairs. The lower leaves have long petioles and upper leaves have shorter or no petioles and fewer leaflets. The foliage is sparsely glandular. Sulfur cinquefoil can resemble some native *Potentilla* species, so identification should be accurate before initiating a control program. Plants develop a woody taproot that eventually rots at the core as it enlarges. New shoots grow from the root perimeter. Plants do not have rhizomes.

Sulfur cinquefoil bears many pale to sulfur-yellow flowers in open branched, flat-topped inflorescences. Flowers are about an inch in diameter with five petals. Plants may produce over 1,500 seeds. Most mature seed is dispersed near the parent plant. In a lab experiment, seeds remained viable after 28 months of burial at 3 inches deep in the soil. Other reports suggest seed longevity may exceed 3 to 4 years.

NON-CHEMICAL CONTROL

Mechanical (pulling, cutting, disking)	Small infestations can be removed by manual methods such as hand-pulling and digging. Remove the entire root crown to prevent resprouting. Plants regrow after mowing. Mowing is not recommended as it can stimulate lateral branching and root growth. Plowing and deep disking can control emerged plants but can stimulate recruitment. These types of tillage are not typically practical in most natural areas. Reseeding with other species following tillage resulted in complete control in one study.
Cultural	Sulfur cinquefoil has a tannin content of 17 to 22% dry weight and has low palatability. Utilization by cattle was less than 1% on 83 of 85 sites studied in Montana. There are no reports of toxicity. Little information was found on fire or burning effects. In one study, fire did not result in mortality of large plants. The study also suggested fire may enhance recruitment. Sulfur cinquefoil is intolerant of shade, thus land management strategies should promote competitive vegetation and shading.

Biological	No biological controls are available for the control of sulfur cinquefoil in the United States. This is likely due to the high number of native species within the *Potentilla* genus. Several insects and fungi associate with sulfur cinquefoil, including root and crown boring insects and fungi that cause crown rot.

CHEMICAL CONTROL

The following specific use information is based on published papers and reports by researchers and land managers. Other trade names may be available, and other compounds also are labeled for this weed. Directions for use may vary between brands; see label before use. Herbicides are listed by mode of action and then alphabetically. The order of herbicide listing is not reflective of the order of efficacy or preference.

GROWTH REGULATORS	
2,4-D Several names	**Rate:** 1 to 2 qt product/acre (0.95 to 1.9 lb a.e./acre) **Timing:** Postemergence when plants are in the pre-bud stage. **Remarks:** 2,4-D is broadleaf-selective and safe on most grasses. It has minimal soil activity. Repeat application is usually required. Do not apply ester formulation when outside temperatures exceed 80°F.
Aminocyclopyrachlor + chlorsulfuron *Perspective* Aminocyclopyrachlor + metsulfuron *Streamline*	**Rate:** 4.75 to 8 oz product (*Perspective*)/acre or 4.75 to 9 oz product (*Streamline*)/acre **Timing:** Postemergence when plants are in the pre-bud stage. **Remarks:** These products provide broad-spectrum control of many broadleaf species. Although generally safe to grasses, they may suppress or injure certain annual and perennial grass species. Do not treat in the root zone of desirable trees and shrubs. Do not apply more than 11 oz product/acre per year. At this high rate, cool-season grasses will be damaged, including bluebunch wheatgrass. Not yet labeled for grazing lands. Add an adjuvant to the spray solution. These products are not approved for use in California and some counties of Colorado (San Luis Valley).
Aminopyralid *Milestone*	**Rate:** 4 to 7 oz product/acre (1 to 1.75 oz a.e./acre) **Timing:** Postemergence when plants are in spring rosette to pre-bud stage. **Remarks:** Aminopyralid is safe on most grasses, although preemergence application at high rates can greatly suppress some annual grasses, such as medusahead. Applications can decrease seed production in some annual and perennial grass species. For postemergence applications, adding a non-ionic surfactant (0.25 to 0.5% v/v spray solution) enhances control under adverse environmental conditions or when weeds are heavily pubescent. Other premix formulations of aminopyralid can be used. These include *Opensight* (aminopyralid + metsulfuron) at 2 to 2.5 oz product/acre and *Forefront HL* (aminopyralid + 2,4-D) at 1.2 to 1.5 pt product/acre. *Opensight* is not registered for use in California.
Picloram *Tordon 22K*	**Rate:** 1 pt product/acre (4 oz a.e./acre) **Timing:** Postemergence when plants are in the pre-bud stage or to fall regrowth. **Remarks:** Picloram controls a wide range of broadleaf species and has relatively long soil residual activity. Although well-developed grasses are not usually injured by labeled use rates, some applicators have noted that young grass seedlings with fewer than four leaves may be killed. Do not apply near trees, or where soil is highly permeable and where water table is high. Picloram is a restricted use herbicide. Picloram is not registered for use in California.
Triclopyr *Garlon 4 Ultra*	**Rate:** 1 to 2 pt *Garlon 4 Ultra* product/acre (0.5 to 1 lb a.e./acre) **Timing:** Postemergence when plants are in the rosette stage. **Remarks:** Triclopyr controls several woody plants and broadleaf forbs, but is safe on most grass species. Add 0.25 to 0.5% non-ionic surfactant.
AROMATIC AMINO ACID INHIBITORS	
Glyphosate *Roundup*, *Accord XRT II*, and others	**Rate:** Broadcast treatment: 1 to 2 qt product (*Roundup ProMax*)/acre (1.1 to 2.25 lb a.e./acre). Spot treatment: 1.5% v/v solution **Timing:** Postemergence when plants are in the pre-bud stage. **Remarks:** Glyphosate will not injure or kill germinating seedlings because it has no soil activity. It is, however, nonselective; overspray will kill most non-target plants, creating bare ground conditions that are susceptible to weed recruitment. In areas with desirable vegetation, use spot treatment.

	Glyphosate is a good control option if reseeding is planned shortly after application, as it will not injure seedlings emerging after application. Add a surfactant when using a formulation where it is not already included (e.g., *Accord XRT II*, *Rodeo*, *Aquamaster*).
BRANCHED-CHAIN AMINO ACID INHIBITORS	
Chlorsulfuron *Telar*	**Rate:** 1 to 2.6 oz product/acre (0.75 to 1.95 oz a.i./acre) **Timing:** Postemergence in the rosette stage. **Remarks:** Always use a surfactant. Chlorsulfuron is effective on other species of *Potentilla*, and although sulfur cinquefoil is not on the label, it is expected to have activity.
Metsulfuron *Escort*	**Rate:** 1 to 2 oz product/acre (0.6 to 1.2 oz a.i./acre) **Timing:** Postemergence in the rosette stage. **Remarks:** Metsulfuron has mixed selectivity, but is considered fairly safe on most grasses. Metsulfuron has some soil residual activity. Always use a surfactant. Other premix formulations of metsulfuron can be used at similar application timing. These include *Cimarron Max* (metsulfuron + dicamba + 2,4-D) and *Cimarron X-tra* (metsulfuron + chlorsulfuron). Metsulfuron is not registered for use in California.
PHOTOSYNTHETIC INHIBITORS	
Hexazinone *Velpar L*	**Rate:** 4 to 7 qt product/acre (2 to 3.5 lb ai/acre) **Timing:** Preemergence in fall. **Remarks:** Hexazinone is listed on the label as an effective control option for *Potentilla* species in blueberry, and it is expected to also control sulfur cinquefoil in natural areas. Can give total vegetation control, so generally should be used in a spot treatment at the base of target plants. Mobile in the soil. High rates of hexazinone can create bare ground, so only use high rates in spot treatments.

ECOMMENDED CITATION: DiTomaso, J.M., G.B. Kyser et al. 2013. *Weed Control in Natural Areas in the Western United States*. Weed Research and Information Center, University of California. 544 pp.