Silybum marianum (L.) Gaertn.

Blessed milkthistle

Family: Asteraceae
Range: Found in much of the western United States, especially southwestern Oregon and western Washington, California, Nevada, Arizona, New Mexico, and Colorado.
0Habitat: Grows in disturbed sites, roadsides, pastures, fields, agronomic crops, waste places, orchards, and trail margins in chaparral and woodlands. Grows best on fertile soils. Blessed milkthistle often occurs in dense, competitive stands. Plant size is very dependent on moisture.
Origin: Native to the Mediterranean region.
Impact: Plants develop large (up to 3 ft in diameter) rosettes that block light to nearby vegetation and suppress germination and growth. Plants can reach 6 to 9 ft in height, and skeletons continue to stand for several months, keeping an area bare of other vegetation. Infestations can be dense and dominant in pastures. The spiny nature of the plant can cause physical injury to livestock.
Western states listed as Noxious Weed: Oregon, Washington
California Invasive Plant Council (Cal-IPC) Inventory: Limited Invasiveness

Blessed milkthistle is an erect winter or summer annual (rarely a biennial) that generally grows to 6 ft tall. The seedlings (first true leaves) and mature plants have prickles and nearly glabrous (smooth), shiny green leaves. The distinguishing characteristic is the upper leaf surfaces, which are conspicuously variegated in white.

The flowerheads consist of numerous large pink to purple disk flowers. Plants reproduce only by seed. Most seeds germinate with the first fall rains, but germination can last through winter until early spring. Seeds disperse only a short distance by wind, but are dispersed longer distances by human movement in crop seed and feed contaminates. Seeds can survive at least 9 years under field conditions.

NON-CHEMICAL CONTROL

Mechanical (pulling, cutting, disking)	Cultivation can control seedlings. Mowing mature plants before flowers open can help control stands. Tillage can be an effective control option for younger plants.
Cultural	Grazing is typically not an option for control, as plants are generally too spiny for animals to use as forage. Because plants develop early in the season, burning is not an effective control option and can encourage seed germination and establishment.
Biological	The seedhead weevil (*Rhinocyllus conicus*) was released in southern California as a biocontrol agent for several thistle species. Although it is fairly common on plants throughout the western United States and can reduce seed production, it has not provided effective control of blessed milkthistle. In addition, the weevil attacks several native thistle species.

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:** 3 to 4 pt product/acre (1.43 to 1.9 lb a.e./acre) **Timing:** Postemergence in spring or fall to young rapidly growing plants. **Remarks:** 2,4-D is a broadleaf-selective herbicide with no soil residual activity. Use fall treatments to control rosettes. Use spring treatments before flower stalk elongates. Annual treatments are needed to control seedlings. Pasture legumes are injured or eliminated at these rates.
Aminocyclopyrachlor + chlorsulfuron *Perspective*	**Rate:** 4.75 to 8 oz product/acre **Timing:** Postemergence when target plants are growing rapidly. **Remarks:** *Perspective* provides broad-spectrum control of many broadleaf species. Although generally safe for grasses, it 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. This product is not approved for use in California and some counties of Colorado (San Luis Valley).
Aminopyralid *Milestone*	**Rate:** 3 to 5 oz product/acre (0.75 to 1.25 oz a.e./acre) **Timing:** Postemergence in spring or early summer to rosettes or bolting plants or in fall to seedlings and rosettes. **Remarks:** Aminopyralid is a broadleaf-selective herbicide. It has moderate soil residual activity. A non-ionic surfactant at 1 to 2 qt per 100 gal of spray solution can enhance control under adverse environmental conditions.
Clopyralid *Transline*	**Rate:** 0.25 to 1 pt product/acre (1.5 to 6 oz a.e./acre) **Timing:** Postemergence from the seedling to the bud stage. Best if applied to rapidly growing weeds. **Remarks:** Clopyralid is very safe on grasses, but will injure many members of the Asteraceae, particularly thistles, and can also injure legumes, including clovers. Most other broadleaf species and all grasses are not injured.
Clopyralid + 2,4-D amine *Curtail*	**Rate:** 1 to 5 qt product/acre **Timing:** Postemergence, to rapidly growing plants after most basal leaves emerge but before bud stage. **Remarks:** With CRP applications, it is used only in established grass. For best results, wait at least 20 days after application before disturbing treated areas (cultivation, mowing, fertilization with shank-type applicators) to allow thorough translocation. Apply in enough total spray volume to ensure good coverage.
Dicamba *Banvel*, *Clarity*	**Rate:** 1 to 2 pt product/acre (0.5 to 1 lb a.e./acre) **Timing:** Postemergence before flower stalk lengthens on established plants and for seedling control. Make fall applications to control rosettes. **Remarks:** Dicamba is a broadleaf-selective herbicide with little soil residual activity. It is safe on grasses. It may be necessary to repeat applications for several years to control new emerging seedlings. Dicamba is available premixed with diflufenzopyr in a formulation called *Overdrive*. Diflufenzopyr is an auxin transport inhibitor which causes dicamba to accumulate in shoot and root meristems, increasing its activity. *Overdrive* is applied postemergence at 4 to 8 oz product/acre to plants in the rosette stage. Add a non-ionic surfactant to the treatment solution at 0.25% v/v or a methylated seed oil at 1% v/v solution. Use higher rates on thistles that have bolted.

Picloram *Tordon 22K*	**Rate:** 1 pt product/acre (4 oz a.e./acre) **Timing:** Postemergence in fall or spring before plants bolt. **Remarks:** Picloram is selective on broadleaf species and has long soil residual activity. Soil residual may last over 1 year after a 0.25 lb a.e./acre application. Follow-up applications may be necessary to control escaped plants. Picloram is a restricted use herbicide. It is not registered for use in California.
AROMATIC AMINO ACID INHIBITORS	
Glyphosate + 2,4-D *Campaign*	**Rate:** Broadcast foliar treatment: 1 to 2 pt product/acre. Spot treatment: 1 to 2% v/v solution. **Timing:** Postemergence, to plants in the rosette stage in spring or before freeze-up in fall. **Remarks:** This combination is a nonselective product and neither compound has soil activity. There are no grazing restrictions if *Campaign* is used for spot treatments in less than 10% of the total grazed area. Do not cut forage for hay within 30 days of application.
BRANCHED-CHAIN AMINO ACID INHIBITORS	
Chlorsulfuron *Telar*	**Rate:** 1 oz product/acre (0.75 oz a.i./acre) **Timing:** Postemergence, to young rapidly growing weeds. **Remarks:** Chlorsulfuron is a broad-spectrum herbicide, but is considered to be relatively safe on most grasses. It has fairly long soil residual activity. Do not apply to frozen ground. Maintain constant agitation while mixing product with water. Add 0.25% v/v of a non-ionic surfactant to spray mixture. Avoid contact with sensitive crops. Do not treat powdery, dry soils and light, sandy soils if rain is not likely after treatment.
Metsulfuron *Escort*	**Rate:** 1 oz product/acre (0.6 oz a.i./acre) **Timing:** Postemergence, to rapidly growing plants. **Remarks:** Metsulfuron is a broadleaf-selective herbicide and is safe on most grasses. It has some soil activity. Using a non-ionic or silicone-based surfactant can increase its effectiveness. Metsulfuron is not registered for use in California.
Rimsulfuron *Matrix*	**Rate:** 4 oz product/acre (1 oz a.i./acre) **Timing:** Preemergence or early postemergence. **Remarks:** Rimsulfuron controls several annual grasses and broadleaves. Perennial grasses are tolerant to fall applications when established and grown under dryland conditions. Application to rapidly growing or irrigated perennial grasses may result in their injury or death. Rimsulfuron provides soil residual control in cool climates but degrades rapidly under warm conditions. Rimsulfuron will not control summer annual weeds when applied in fall or spring. Add a surfactant when applying postemergence. Rimsulfuron must be activated by rainfall or irrigation of at least half an inch. For the best results, rainfall should occur within 2 to 3 weeks of application and under cooler temperatures. Do not apply more than 4 oz product/acre per year.

RECOMMENDED 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.