Salsola tragus L.; Russian-thistle
Salsola paulsenii Litv.; barbwire Russian-thistle

Russian-thistle (tumbleweed) and barbwire Russian-thistle


S. tragus


S. paulsenii

Family: Chenopodiaceae
Range: Russian-thistle is found in all contiguous states except Florida. Barbwire Russian-thistle is found in Arizona, California, Colorado, Nevada, New Mexico, Oregon, and Utah.
Habitat: Disturbed sites, waste places, roadsides, fields, disturbed natural and semi-natural plant communities. Grow best on loose, sandy soils. Can tolerate arid and alkaline soils; competitive where moisture limits growth of other species.
Origin: Native to Eurasia.
Impact: Both plants are invasive in arid natural areas. They often grow along roads, creating a visual barrier. The blowing skeletons interfere with traffic and can lodge against fences and structures, creating a fire hazard. Russian-thistle is an alternate host for the beet leafhopper (*Circulifer tenellus*) that can carry beet curly-top virus. Some populations in the Pacific Northwest are resistant to sulfonylurea herbicides (e.g., chlorsulfuron, sulfometuron); resistance to triazines (atrazine, simazine) also is suspected.
Western states listed as Noxious Weed: Both species are listed in California
California Invasive Plant Council (Cal-IPC) Inventory: Limited Invasiveness

Russian-thistle and barbwire Russian-thistle are bushy, spiny summer annuals. Russian-thistle grows to 3 ft tall or more, often more or less spherical in shape. Barbwire Russian-thistle grows to 20 inches tall and is usually wider than tall. They are not true thistles in the Asteraceae. The two species are similar and can hybridize. They have rigid, upward-curving branches and reduced, stiff, prickly upper stem leaves (bracts) at maturity. Russian-thistle usually appears bluish-green while barbwire Russian-thistle is more yellow-green. These plants have a deep taproot and spreading lateral roots, and are able to extract deep soil moisture. Under certain conditions, both can accumulate oxalates to levels that are toxic to livestock, especially sheep, but immature plants in moderation can provide an extra source of forage for livestock on arid rangeland.

Both species flower in summer to early fall. Flowers are small and inconspicuous, without petals, mostly solitary in leaf axils. The sepals are wing-like, often brownish to pinkish to deep red. At senescence, plants become gray to brown. The main stems of Russian-thistle break off at ground level, allowing plants to disperse seeds as they tumble with the wind. Skeletons can persist for a year or more and are often found along fences and other structures, where they can pose a fire hazard. Barbwire Russian-thistle is less likely to become a tumbleweed and most seeds fall near the parent plant. Most seeds germinate the following spring and survive only 1 year in the field. A few seeds may survive up to 3 years. Seeds require very little moisture to germinate. Seedlings require loose soil for successful establishment.

NON-CHEMICAL CONTROL

Mechanical (pulling, cutting, disking)	Russian-thistle plants can be pulled out or hoed just below ground level before seed set. Hand-pulling or hoeing is effective in small infestations. Mowing older plants tends to cause the plants to grow low, but repeated mowing may provide control. Mowing just before flower maturation has worked in some cases. Mowing after seed set will disperse the seed. Tillage will control both seedling and larger plants, but to control an infestation cultivation must be

	repeated until the short-lived soil seed bank (< 2 years) becomes depleted. However, tillage increases disturbance, which favors Russian-thistle germination and establishment.
Cultural	Livestock can graze and suppress young plants, but this should not be their only forage. Both species do poorly in areas with other vegetation. Establish desirable plants such as competitive perennial grasses in disturbed or open areas or after controlling Russian-thistle. Russian-thistle competes poorly in situations with firm, regularly irrigated soil and is rarely a problem in managed landscapes. Monitor areas downwind of existing infestations, particularly at obstructions like fences and washes. To prevent opening up new invasion sites, avoid disking in abandoned areas.
Biological	The leaf mining moth *Coleophora klimeschiella* and the stem boring moth *Coleophora parthenica* have been released as biocontrol agents, but control of Russian-thistle with these insects has been poor.

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. *Salsola* plants are difficult to control with postemergence herbicides late in the season, when plants are spiny and hardened off. 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, to young plants. Plants should be rapidly growing and unstressed. **Remarks:** 2,4-D is broadleaf-selective with no soil activity. It is often combined with other active ingredients, e.g., chlorsulfuron, dicamba. Do not apply when outside temperatures exceed 80°F.
Aminocyclopyrachlor + chlorsulfuron *Perspective*	**Rate:** 4.75 to 8 oz product (*Perspective*)/acre **Timing:** Postemergence or preemergence. Postemergence applications are most effective when applied to plants from the seedling to the mid-rosette stage. **Remarks:** 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:** 7 oz product/acre (1.75 oz a.e./acre) **Timing:** Preemergence only; does not control Russian-thistle as a postemergence application. **Remarks:** Can be used in combination with other herbicides such as *Accord XRT II* or *Landmark XP* for total vegetation control.
Dicamba *Banvel*, *Clarity*	**Rate:** 1 to 4 pt product/acre (0.5 to 2 lb a.e./acre) **Timing:** Postemergence, to rapidly growing plants. More effective on smaller plants. Use higher rates for larger plants. **Remarks:** Broadleaf-selective herbicide often combined with other active ingredients. May injure grasses at higher rates. Do not apply when outside temperatures exceed 80°F. *Overdrive,* a premix of dicamba with diflufenzopyr, has been reported to be effective on Russian-thistle. 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 rapidly growing plants. Higher rates should be used on large annuals. Add a non-ionic surfactant to the treatment solution at 0.25% v/v or a methylated seed oil at 1% v/v solution.
Picloram *Tordon 22K*	**Rate:** 8 to 12 oz product/acre (2 to 3 oz a.e./acre) **Timing:** Postemergence, to young, rapidly growing plants. **Remarks:** Broadleaf selective. Relatively safe on established grasses, but may injure young or germinating grasses. Long residual activity, may leach. Use non-ionic surfactant at 0.25%. Also effective mixed with dicamba or 2,4-D. Do not apply near trees, or where soil is highly permeable and where water table is high. Restricted use herbicide. Not registered for use in California.
Triclopyr *Garlon 3A*, *Garlon 4 Ultra*	**Rate:** 1.33 to 2.67 qt *Garlon 3A*/acre, 1 to 2 qt *Garlon 4 Ultra*/acre (1 to 2 lb a.e./acre) **Timing:** Postemergence to rapidly growing plants. Most effective on smaller plants. Use higher rates for larger plants.

	Remarks: Broadleaf-selective, safe on most grasses. Little or no residual activity. *Garlon 4 Ultra* is formulated as a low volatile ester. However, in warm temperatures, spraying onto hard surfaces such as rocks or pavement can increase the risk of volatilization and off-target damage.
AROMATIC AMINO ACID INHIBITORS	
Glyphosate *Roundup*, *Accord XRT II*, and others	**Rate:** 1 to 1.5 qt product (*Roundup ProMax*)/acre (1.1 to 1.7 lb a.e./acre) for seedlings; 1.5 to 4 qt product (*Roundup ProMax*)/acre (1.7 to 4.5 lb a.e./acre) for larger plants and plants under stress; 0.5% to 1% v/v solution for spot treatments. **Timing:** Postemergence to rapidly growing plants before seed set. **Remarks:** Glyphosate is a nonselective herbicide. It has no soil activity. Drought stress will reduce glyphosate activity. Its effectiveness is increased by addition of ammonium sulfate.
BRANCHED-CHAIN AMINO ACID INHIBITORS	
Chlorsulfuron *Telar*	**Rate:** 1 to 2 oz product/acre (0.75 to 1.5 oz a.i./acre) **Timing:** Preemergence to early postemergence. **Remarks:** Mixed selectivity; generally safe on grasses, but fall application may injure bromes. Most effective preemergence. Use a surfactant for postemergence applications. It has long soil residual activity. Some populations have developed resistance to related herbicides; where resistance is suspected, use other herbicides or combinations.
Imazapic *Plateau*	**Rate:** 8 to 12 oz product/acre (2 to 3 oz a.e./acre) **Timing:** Fall or spring, from preemergence until plants are 3 inches tall. **Remarks:** Mixed selectivity; tends to favor species in the Asteraceae, as well as some grasses. It has some soil residual activity. In postemergence applications, use a methylated seed oil surfactant at 0.25%. Some populations have developed resistance to related herbicides; where resistance is suspected, use other herbicides or combinations. Not registered for use in California.
Imazapyr *Arsenal*, *Habitat*, *Stalker*, *Chopper*, *Polaris*	**Rate:** 2 to 3 pt product/acre (0.5 to 0.75 lb a.e./acre) **Timing:** Preemergence or postemergence. **Remarks:** Nonselective herbicide with long soil residual activity. Leaves more bare ground than other treatments, even a year after application. Some populations have developed resistance to related herbicides; where resistance is suspected, use other herbicides or combinations.
Propoxycarbazone-sodium *Canter R+P*	**Rate:** 0.9 to 1.2 oz product/acre (0.63 to 0.84 oz a.i./acre) **Timing:** Postemergence to small, rapidly growing plants. **Remarks:** A broad-spectrum herbicide that will control many species. Provides only partial control of Russian-thistle. Perennial grass species vary in tolerance. A non-ionic surfactant should be added at 0.25 to 0.5% v/v solution. Some populations have developed resistance to related herbicides; where resistance is suspected, use other herbicides or combinations.
Sulfometuron *Oust* and others	**Rate:** 2 to 8 oz product/acre (1.5 to 6 oz a.i./acre) **Timing:** Preemergence to early postemergence. **Remarks:** Mixed selectivity; fairly safe on native perennial grasses, especially wheatgrass. Other desirable grasses may be stunted, stressed, or injured. Good for revegetation use. Fairly long soil residual activity. Some populations have developed resistance to related herbicides; where resistance is suspected, use other herbicides or combinations.
PHOTOSYNTHETIC INHIBITORS	
Hexazinone *Velpar L*	**Rate:** 4 to 6 pt product/acre (1 to 1.5 lb a.i./acre) **Timing:** Preemergence to early postemergence. **Remarks:** Mixed selectivity, fairly long soil residual activity. Active both foliar and soil applied. In soil applications, rates will vary with soil texture and soil organic matter. Best results are obtained if applied when soil is moist. Hardwood trees near application site can absorb this chemical through the roots and may be injured or killed. Do not spray near the root zone of desirable hardwood trees or shrubs. High rates of hexazinone can create bare ground, so only use high rates in spot treatments.

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.