Dittrichia graveolens (L.) Greuter

Stinkwort

Family: Asteraceae
Range: In the western United States, stinkwort is only found in California. It is also found in a few northeastern states.
Habitat: Disturbed soils of roadsides, wasteland, gravel areas, levees, and washes; sometimes in pastures, fields, riparian woodlands, and margins of tidal marshes or vernal pools. Grows best on well-drained, sandy or gravelly soils. Thrives in areas with hot, dry summers, but does not require them. Can grow on serpentine, saline, and metal-contaminated soils.
Origin: Native to southern Europe.
Impacts: Stinkwort is rapidly expanding its range. Often found in disturbed sites on the urban fringe, where its sticky, smelly foliage interferes with human activity. In Australia, where stinkwort has been for 150 years, it has naturalized in many habitats. It causes allergic contact dermatitis in humans; it also has been implicated in livestock deaths by enteritis owing to the barbed pappus bristles puncturing the small intestine. Its impact in natural areas is not known, but it is just beginning to invade open riparian or grazing areas.
California Invasive Plant Council (Cal-IPC) Inventory: Moderate Invasiveness (Alert)

Stinkwort is an erect, fall-flowering annual growing up to 3 ft tall. A recent introduction to the west coast, stinkwort was first reported in California in the mid-1980s. Its sticky, glandular-hairy foliage is intensely aromatic. The oils on the foliage, especially on mature plants, make it difficult to control with postemergence herbicides. Stinkwort germinates during winter but remains small until spring. During late spring and summer, it develops into a shrubby, pyramid- or sphere-shaped plant which superficially resembles Russian-thistle or kochia. Stinkwort is a member of the Inuleae tribe and is related to the cudweeds (*Gnaphalium* spp.), but more closely resembles native tarweeds (*Holocarpha*, *Hemizonia*). Its leaves are linear to lance-shaped, typically 0.5 to 1 inch long by only 1 to 3 mm wide.

Unlike most annual, and particularly winter annual weeds, it flowers from September to December, producing small yellow flowerheads around 0.25 inch diameter. The flowerheads turn reddish as they age. Its seeds are tiny, with a barbed pappus, and are readily distributed by wind, water, or by sticking to fur or clothing. The seeds reportedly have a short life in the soil, probably less than 3 years.

NON-CHEMICAL CONTROL

Mechanical (pulling, cutting, disking)	Stinkwort has a relatively shallow root system, so it can be controlled by hoeing or pulling. When doing any kind of mechanical control of stinkwort, wear appropriate protective clothing (long sleeves, long pants, gloves) to minimize exposure to the irritating oils. Once stinkwort goes into flower, plants should be bagged and taken off site, because seeds may ripen on the cut plants. Mowing can give partial control, but this plant often has low branches below the level of most mowers, so it may regrow. Mowing a second time, especially in mid- to late summer after the soil has dried out, may give improved control.
Cultural	There is no information available on grazing for the control of stinkwort. It is likely that the plant is not very

	palatable to livestock. Burning alone is not likely to be a good control for stinkwort. It usually grows in locations without enough grasses for dry fuel. Even so, if a burn was successful in controlling the current year's plants, this would likely just clear off the site for a subsequent flush of stinkwort the following winter. Potentially, this could be followed with herbicide treatment as part of an integrated management strategy as with yellow starthistle. Stinkwort establishes and thrives in open, disturbed sites. To limit its chances for establishing, minimize disturbances such as overgrazing and soil manipulation. Pastures should be managed for dense, competitive stands; aim for maximum ground cover in spring, when stinkwort seedlings are trying to establish.
Biological	No biocontrol agents are presently known for this species.

CHEMICAL CONTROL

The following specific use information is based on 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.

Because of stinkwort's sticky foliar oils, many sources recommend using ester formulations of growth regulator herbicides (2,4-D, MCPA, triclopyr, etc.)

GROWTH REGULATORS	
2,4-D Several names	**Rate:** 2 to 4 pt product/acre (0.95 to 1.9 lb a.e./acre) **Timing:** Postemergence to rapidly growing plants. Smaller plants are easier to control. **Remarks:** 2,4-D is a broadleaf-selective herbicide with no soil activity. Ester formulations appear better at cutting through the oils on the foliage, but do not apply ester formulations when outside temperatures exceed 80°F. A related chemical, MCPA, is commonly used for control of stinkwort in Australia at rates of 25 oz product/acre (0.75 lb a.e./acre). Timing and remarks are similar to 2,4-D.
Aminocyclopyrachlor + chlorsulfuron *Perspective*	**Rate:** 4.75 to 8 oz product/acre **Timing:** In spring either preemergence or postemergence. For postemergence applications, treat until bolting. **Remarks:** Controls many broadleaf species. Although generally safe to grasses, it may suppress some 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. Not approved for use in California and some counties of Colorado (San Luis Valley).
Aminopyralid + 2,4-D, *Forefront HL*; Aminopyralid + metsulfuron, *Opensight*; Aminopyralid + triclopyr, *Capstone*	**Rate:** 1.5 to 2.1 pt *Forefront HL*/acre; 2.5 to 3.3 oz *Opensight*/acre; 4 to 6 pt *Capstone*/acre **Timing:** Postemergence to plants in the rosette to bolting stages. **Remarks:** These combinations are broadleaf-selective. Recommended rates based on those reported for knapweeds or perennial thistles. *Opensight* is not registered for use in California.
Dicamba *Banvel*, *Clarity*	**Rate:** 2 to 4 pt product/acre (1 to 2 lb a.e./acre) **Timing:** Postemergence to rapidly growing plants. **Remarks:** Broadleaf-selective herbicide often combined with other active ingredients. Also effective tank-mixed with 2,4-D. It will kill above-ground parts of the plant, but new rosettes will regenerate from the root system. Its use may require repeat applications. Avoid drift to sensitive crops. Do not apply when outside temperatures exceed 80°F. Dicamba + MCPA (3 to 5 oz dicamba product plus 14 to 20 oz MCPA product) is a standard treatment for stinkwort in Australia.
Triclopyr *Garlon 4 Ultra*	**Rate:** 2 to 4 pt product/acre (0.75 to 1.5 lb a.e./acre) **Timing:** Postemergence to rapidly growing plants before flowering. Smaller plants are easier to

	control. **Remarks:** Broadleaf-selective, generally safe on established grasses. It has little to no soil 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:** 2 to 4 pt product (*Roundup ProMax*)/acre (1.1 to 2.25 lb a.e./acre) **Timing:** Postemergence to rapidly growing plants in late spring to early summer, after desirable competitors have senesced. **Remarks:** Nonselective, no soil activity. Effectiveness may be increased by adding ammonium sulfate.

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.