

This WEED REPORT does not constitute a formal recommendation. When using herbicides always read the label, and when in doubt consult your farm advisor or county agent.

This WEED REPORT is an excerpt from the book *Weed Control in Natural Areas in the Western United States* and is available wholesale through the UC Weed Research & Information Center (wric.ucdavis.edu) or retail through the Western Society of Weed Science (wsweedscience.org) or the California Invasive Species Council (cal-ipc.org).

Foeniculum vulgare Mill.

Fennel

Family: Apiaceae

Range: Particularly a problem in California, but found throughout many western states including Washington, Oregon, Arizona, Nevada, Utah, New Mexico and Texas.

Habitat: Fennel prefers open disturbed areas and has invaded roadsides, slopes, fields, grasslands, coastal scrub, riparian and wetland areas, and other natural communities, particularly in coastal regions.

Origin: Native to southern Europe. Birds and rodents consume the seeds, and feral pigs relish the roots.

Impacts: Established plants are competitive, and soil disturbance facilitates the development of dense stands, which can exclude native vegetation in some areas. Unlike the weedy form, cultivated varieties are seldom invasive. Fennel is also rated as a noxious weed in some regions of Australia.

California Invasive Plant Council (Cal-IPC) Inventory: High Invasiveness



Fennel is an aromatic perennial with a deep thick taproot. Plants can grow to 10 ft tall, with finely dissected leaves divided into numerous thread-like segments. Foliage and seeds have a strong licorice or anise scent, especially when crushed. Different varieties are cultivated as a spice or vegetable, for an essential oil used to flavor foods, and in some countries, for medicinal purposes.

The inflorescence consists of several flat-topped compound umbels of small yellow flowers. Fruits separate into two halves (mericarps) at maturity. Plants reproduce by seed and sometimes vegetatively from root or crown fragments. Seeds are dispersed with water, soil movement, animals, human activities, and as a seed contaminant. Seeds appear to survive several years under field conditions. Fragmentation of roots and crowns may occur during flooding events, mudslides, or agricultural operations. New shoots grow from the crown and lower portions of overwintering stems in mid-winter to early spring.

NON-CHEMICAL CONTROL

<p>Mechanical (pulling, cutting, disking)</p>	<p>Hand chop small infestations (large fennel plants have a very substantial root, so this labor intensive). Slashing just before flowering may kill the plants, or repeat slashing of regrowth may be needed. Even if plants recover, slashing the stems at flowering will prevent seed set. The use of a mattock to remove the plant can also be successful, but is very labor intensive. Digging out individual plants is also possible, but also labor intensive.</p> <p>Deep cultivation will also kill the plants but is not practical in most situations.</p>
<p>Cultural</p>	<p>Grazing will not control fennel and often spreads the population. Burning is not effective, as fennel will quickly recover following the fire. However, fall burns followed by herbicide treatment the following two springs reduced fennel cover. Burning can also stimulate the seedbank to germinate, which can reduce the number of years necessary for control.</p>
<p>Biological</p>	<p>Because fennel is the same species as the cultivated fennel, there are no biological control agents available.</p>

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.

GROWTH REGULATORS	
2,4-D Several names	<p>Rate: 0.25 to 0.5% of v/v solution for spot treatment</p> <p>Timing: Postemergence to fully developed leaves but before flowering.</p> <p>Remarks: 2,4-D will damage other broadleaf species and is not as effective as triclopyr.</p>
Triclopyr <i>Garlon 3A, Garlon 4 Ultra</i>	<p>Rate: Broadcast foliar treatment: 1 to 2 qt product/acre (1 to 2 lb a.e./acre). Spot treatment: 0.5 to 1% v/v solution</p> <p>Timing: Postemergence to fully developed leaves but before flowering. The best treatment timing is during the wet season from late February to early March. For spot treatment, lower rates can be used early in the season.</p> <p>Remarks: Triclopyr is a broadleaf herbicide that is the standard for fennel control. It is very effective and can also be used in combination with glyphosate at 1 lb a.e./acre each.</p>
AROMATIC AMINO ACID INHIBITORS	
Glyphosate <i>Roundup, Accord XRT II, and others</i>	<p>Rate: Broadcast foliar treatment: 5 pt product (<i>Roundup ProMax</i>)/acre (2.8 lb a.e./acre). Spot treatment: 2 to 5% v/v solution</p> <p>Timing: Postemergence to fully developed leaves but before flowering. Control is less effective once plant has bolted.</p> <p>Remarks: Glyphosate is nonselective. It gives very effective control and can also be used in combination with triclopyr at 1 lb a.e./acre each.</p>

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.