*Lupinus* spp.

# Lupines

**Family**: Fabaceae
**Range**: Several species present in all western states.
**Habitat**: Lupines are adapted to dry, relatively infertile soils. They often require ecological disturbance to persist and are common in pasture, rangeland, recent burns, sand dunes, forests, sagebrush communities, and grasslands.
**Origin**: Nearly all species are native plants in the western United States.
**Impacts**: Native lupines are a desirable component in natural communities. Lupines and their ability to fix nitrogen play an important role in colonization of sites following disturbance, and in most cases, lupine control is unnecessary. Lupine control is generally limited to small pastures or rangeland with the major goal of preventing livestock poisoning. Many lupine species contain poisonous alkaloids throughout the growing season that can potentially poison livestock and/or cause birth defects (crooked calf syndrome). Lupine control is also justified to prevent unwanted changes in native plant communities. Yellow bush lupine (*L. arboreus* Sims) has expanded its range in California and can negatively impact coastal dune communities by changing vegetation structure and soil nitrogen levels.

Lupine species are mostly herbaceous perennials, but some can be annuals. They range in size from small plants shorter than 1 ft to large shrubs taller than 8 ft. The leaves are palmate-compound with 5 to 28 leaflets. Roots typically are associated with nitrogen-fixing bacteria.

The flowers are produced in dense or open whorls, racemes or on an erect spike. Each flower is 0.5 to 1 inch long, with a typical pea-flower shape. Flowers can range in color from white to yellow to purple. Due to the flower shape, several species are known as bluebonnets or Quaker bonnets. The fruit is an exploding pod containing several seeds. Seeds are generally dispersed close to the parent plant. Viability of seeds is considered to be similar to most other legumes, i.e., seeds probably survive in the soil for several years.

### NON-CHEMICAL CONTROL

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| **Mechanical** (pulling, cutting, disking) | Hand pulling, tillage, and digging are effective for controlling established plants, but the disturbance from these methods can promote new recruitment. The root system should be severed below the thickened crown. Larger species can be removed with a weed wrench.<br>Most lupine species will quickly regrow following mowing. Mowing is not effective unless done frequently enough to prevent seed production and reduce vigor of established plants. |
| **Cultural** | Grazing is not an effective control method. Some lupine species can be intermittently grazed without problems, but livestock producers should determine the toxicity of the lupine species before grazing. Avoid grazing during times of year that livestock are susceptible to poisoning or birth defects. Populations often increase in heavily grazed systems.<br>Like many other legumes, lupines usually respond positively to fire. Germination of seeds and resprouting of established plants is common post-fire for many lupine species. Several species typically occur in habitats subject to fairly frequent fire.<br>Promoting competitive vegetation can slow spread and help prevent establishment. |
| **Biological** | Several native insects such as beetles, butterflies, and moths feed on lupine species. No introduced biological controls are known or are likely to occur with this group of natives. |

## 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.

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| **GROWTH REGULATORS** | |
| 2,4-D<br>Several names | **Rate:** 1 to 2 qt product/acre (0.95 to 1.9 lb a.e./acre)<br>**Timing:** Postemergence to rapidly growing plants before flowering. In grazed areas, allow enough time for complete burndown before grazing.<br>**Remarks:** 2,4-D is broadleaf-selective and safe on most grasses. 2,4-D has minimal soil activity. Often tank-mixed with chlorsulfuron or dicamba. Do not apply ester formulation when outside temperatures exceed 80°F. |
| Dicamba<br>*Banvel, Clarity* | **Rate:** 0.5 to 2 pt product/acre (0.25 to 1 lb a.e./acre). Use higher rates for large established plants.<br>**Timing:** Postemergence to rapidly growing plants before flowering.<br>**Remarks:** Dicamba is a broadleaf-selective herbicide. Dicamba is often mixed with 2,4-D (0.5 to 1 pt dicamba + 2 pt 2,4-D/acre). |
| **AROMATIC AMINO ACID INHIBITORS** | |
| Glyphosate<br>*Roundup, Accord XRT II*, and others | **Rate:** 1 to 2 qt product (*Roundup ProMax*)/acre (1.1 to 2.25 lb a.e./acre). Spot treatment: 1.5% v/v solution.<br>**Timing:** Postemergence to rapidly growing plants before flowering. In grazed areas, allow enough time for complete burndown before grazing.<br>**Remarks:** Glyphosate will not kill seeds or inhibit germination the following season. Glyphosate has no soil activity and is nonselective. It can create 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., *Rodeo, Aquamaster*). |
| **BRANCHED-CHAIN AMINO ACID INHIBITORS** | |
| Chlorsulfuron<br>*Telar* | **Rate:** 1 to 2.6 oz product/acre (0.75 to 1.95 oz a.i./acre)<br>**Timing:** Postemergence to rapidly growing plants before flowering. In grazed areas, allow enough time for complete burndown before grazing.<br>**Remarks:** Always use a surfactant. Chlorsulfuron can be tank-mixed with 2,4-D for quicker burndown. Included with aminocyclopyrachlor in *Perspective*. |
| Metsulfuron<br>*Escort* | **Rate:** 1 to 2 oz product/acre (0.6 to 1.2 oz a.i./acre)<br>**Timing:** Postemergence to rapidly growing plants before flowering. In grazed areas, allow enough time for complete burndown before grazing.<br>**Remarks:** Similar activity compared to chlorsulfuron. Always use a surfactant. Metsulfuron can be tank-mixed with 2,4-D for quicker burndown. 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. |

**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.