Hordeum marinum Huds. ssp. *gussonianum* (Parl.) Thell.; Mediterranean barley
Hordeum murinum L. ssp. *leporinum* (Link) Arcang.; hare barley

Mediterranean and hare barley

Family: Poaceae
Range: Mediterranean barley occurs in most western states, except North and South Dakota, Wyoming, Colorado and New Mexico. Hare barley also occurs in most western states, except North and South Dakota, and Colorado.
Habitat: Roadsides, annual grassland, open hillsides, managed forestlands, agronomic crops (especially small grains and alfalfa), orchards, vineyards, waste areas and other disturbed sites. Mediterranean barley is more common in moister areas, including some wetlands.
Origin: These species are indigenous to the Mediterranean region of Europe.
Impact: The weedy annual barleys can persist and become dominant in continuously disturbed areas with a Mediterranean climate (wet winters and dry summers). Both species compete with desirable vegetation for limited spring moisture. They can reduce desirable vegetation cover and prevent establishment of native perennial species.
California Invasive Plant Council (Cal-IPC) Inventory: Both species are listed as Moderate Invasiveness

Mediterranean and hare barley are cool-season annual grasses. Mature plants can reach over 3 ft tall but 1 to 2 ft is much more common. Hare barley is typically taller than Mediterranean barley. Mediterranean barley lacks auricles or they are short, less than 2 mm long. In contrast, hare barley has well-developed auricles that clasp the stem. The leaves are flat and narrow, about 3 to 8 mm wide and typically hairy. Stems are round in cross-section, grow erect to somewhat spreading, and often bend abruptly at the base.

Both species produce a bristly thick spike, 1 to 3 inches long, in April through June. The central axis of the spike breaks apart at the nodes at maturity. Reproduction is only by seed. Most spikelets fall close to the parent plant, but some can also be distributed longer distances by clinging to humans or the wool or fur of animals. Seeds have a short-term dormancy after maturity, which is typically lost after a few weeks with the onset of lower fall temperatures. Most of the seeds germinate in fall the year they are produced, so large persistent seedbanks are unlikely for these grasses. Seed longevity in the soil is expected to be at least a couple of years.

NON-CHEMICAL CONTROL

Mechanical (pulling, cutting, disking)	Small infestations can be removed by digging and hand-pulling. The entire plant should be uprooted before spike formation. Mowing can somewhat suppress Mediterranean and hare barley but results have been variable. The weed typically recovers if mowed before maturity and senescence. However, fewer seedheads are produced when the plant regrows. Mowing and subsequent removal of the biomass can reduce germination the following year. Tillage is effective at controlling emerged plants but can stimulate subsequent emergence.
Cultural	These barley species are sometimes grazed during the immature growth stages before seedhead

	formation. The awns of mature plants can injure the mouth, eyes, nasal passages, feet and skin of grazing animals. Populations can increase in moderately grazed pastures but in some cases heavy grazing has diminished populations. Overall, grazing is marginally effective, with variable results depending on the degree of grazing and on residual soil moisture status. Thick mulches can reduce germination. Fire is an effective control measure for these *Hordeum* species. In one study, burning alone as a control measure reduced the cover of annual barley from 90% to less than 5% cover for approximately 3 years. The timing of burning is in the ripe seed stage before seed disperses from dead plants.
Biological	Because of the close relationship to cultivated barley, there are no known biological controls for either species of weedy annual barley.

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.

ACCASE INHIBITORS	
Clethodim *Select, Envoy*	**Rate:** Broadcast foliar treatment: 6 to 8 oz product (*Select*)/acre (1.5 to 2 oz a.i./acre) for seedlings. Spot treatment: 0.25% to 0.5% v/v solution **Timing:** Postemergence. Best when applications are made before plants are 6 inches tall. It is less effective if applied after a mowing. **Remarks:** Clethodim is grass-selective and safe on broadleaf species. To select for perennial grasses, apply before perennials emerge. It has no soil activity. Use a crop oil surfactant. Registered for fallow and non-crop areas, not generally for rangeland/natural areas, but has specific-use supplemental labels. Note that *Envoy* formulation is 1 lb a.i./gallon, *Select* is 2 lb a.i./gallon.
Fluazifop *Fusilade*	**Rate:** Broadcast foliar treatment: 1 to 1.5 pt product/acre (4 to 6 oz a.i./acre) for established plants, 8 oz product/acre (2 oz a.i./acre) for seedlings. Spot treatment: 0.5% v/v solution **Timing:** Postemergence. Best when applications are made before the boot stage. **Remarks:** Fluazifop is grass-selective and safe on broadleaf species. To select for perennial grasses, apply before perennials emerge. It has no soil activity. Use a crop oil surfactant. Registered for fallow and non-crop areas, not generally for rangeland/natural areas, but has specific-use supplemental labels.
AROMATIC AMINO ACID INHIBITORS	
Glyphosate *Roundup, Accord XRT II*, and others	**Rate:** For foliar broadcast treatment: 1 to 3 pt product (*Roundup ProMax*)/acre (0.56 to 1.7 lb a.e./acre). Spot treatment: 0.5% to 1% v/v solution with the rate depending on weed size. **Timing:** Postemergence when the plants are small and rapidly growing, from seedling to boot stage. Applications at tillering often provide the best control in rangelands. **Remarks:** Glyphosate has no soil activity and will only provide control the year of application. It is nonselective and kills most non-target plants creating bare ground conditions that leave the area susceptible to weed encroachment. In areas with desirable vegetation, use spot treatment. Glyphosate is an effective option when 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	
Imazapyr *Arsenal, Habitat, Chopper, Stalker, Polaris*	**Rate:** 2 to 3 pt product/acre (8 to 12 oz a.e./acre) **Timing:** Preemergence or postemergence. **Remarks:** Imazapyr has fairly long soil residual activity. It is a nonselective herbicide.
Rimsulfuron *Matrix*	**Rate:** 2 to 3 oz product/acre (0.5 to 0.75 oz a.i./acre) **Timing:** Preemergence in fall to early postemergence in early spring. The higher rate is generally needed in spring. **Remarks:** Rimsulfuron controls several annual grasses and broadleaves. Limited data suggests it will

	control these *Hordeum* species. 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 injury or death of the crop. It 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.
Sulfometuron *Oust* and others	**Rate:** 0.75 to 5 oz product/acre (0.56 to 3.75 oz a.i./acre) **Timing:** Preemergence or early postemergence from fall to early spring. Most effective control is with early postemergence treatment after seedlings have emerged. **Remarks:** Sulfometuron has mixed selectivity and is fairly safe on native perennial grasses. It is good for revegetation use. Use lower rates in arid environments and higher rates in wetter areas (> 20" rainfall) and on high organic matter soils. Sulfometuron has fairly long soil residual activity. Higher rates generally result in bare ground.
Sulfometuron + chlorsulfuron *Landmark XP*	**Rate:** 2.25 oz product/acre **Timing:** Preemergence in fall or after soil thaws in spring. **Remarks:** See sulfometuron.
Sulfosulfuron *Outrider*	**Rate:** 0.75 to 2 oz product/acre (0.56 to 1.5 oz a.i./acre) **Timing:** Early postemergence, fall to early spring, when desirable perennials are dormant. **Remarks:** Sulfosulfuron has mixed selectivity, but is fairly safe on native perennial grasses, especially wheatgrasses. It has fairly long soil residual activity. Treatments should include a non-ionic surfactant.
PHOTOSYNTHETIC INHIBITORS	
Hexazinone *Velpar L*	**Rate:** 2 to 6 pt product/acre (0.5 to 1.5 lb a.i./acre) **Timing:** Preemergence to early postemergence. **Remarks:** Hexazinone has both foliar and soil activity. In soil applications, rates will vary with soil texture and soil organic matter. Best results when applied to moist soils. Use rates will also vary depending on the situation. Hardwood trees near application site can absorb this chemical through the roots. 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.