

# Red Brome

[*Bromus rubens* L.] Grass (Poaceae) Family

## General Description

Red brome is a tufted, cool-season annual bunchgrass. The annual growth pattern, hyaline lemma, dense panicle with a purplish tinge and pubescent culms distinguish this species from other bromes. Red brome is an introduced annual grass with little value. It was introduced from southern Europe.

## Mature Plants

Reaches height of 20 cm to 50 cm.

## Habitat

Red brome occurs at low to medium elevations (generally below 5,000 ft), in deserts and chaparral hillsides, and various places where competition from established herbaceous plants is minimal: along roadsides, waste places, rangelands and cultivated fields. It is a dominant species on some rangeland that, previous to the destruction of the vegetation, were abundant in perennial native grasses. Red brome is commonly found growing on shallow, dry soil or poor textured, clayey soils.

## Propagation/Phenology

Red brome is a cool season annual that germinates in the fall and grows slowly until early spring at which time the growth rate rapidly increases, culminating with development of the reproductive structures. Due to the fall germination and winter growth period, red brome grows in locales with hot, dry summers and mild, moist winters. This species is killed by winter freeze and requires between 10 cm and 25 cm of precipitation throughout its growing season. Like all annual grasses, development of Red brome is comprised of six stages: germination, vegetative growth, floral bud development, maturation of flowers, fruiting, and senescence. The prevailing environmental conditions influence the various stages of development in different ways. Germination of red brome seeds is particularly dependent on the moisture level of the soil. The ability to germinate throughout the fall, winter

and spring, provides the seeds an opportunity to maximize the utilization of available moisture in order for a vigorous growth phase early in development of the plant. Flowering starts in late winter and continues throughout the spring. Red brome is a prolific seed producer: an average of 76 seeds per plant in natural populations, 142 seeds per plant in experimental mixed stand plots, or 83,600 seeds per square meter of densely spaced plants. Reproductive capacity is reduced by a low seedling survival rate and by a low maturation probability.

## Control Methods

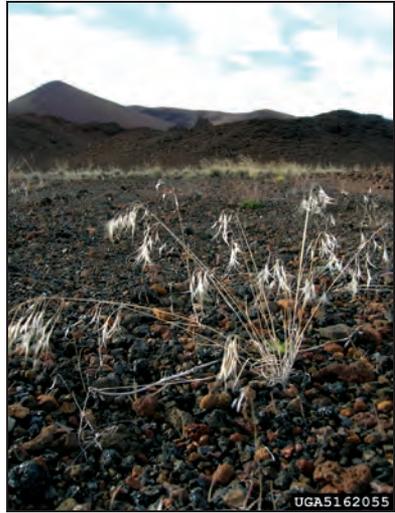
<b>Biological</b>	<b>Chemical</b>
None currently available	Chlorsulfuron, Isoxaben, Pendimethalin and Sulfometuron methyl
<b>Cultural</b>	<b>Mechanical</b>
Maintain healthy stands of native vegetation, revegetation/competitive planting, implement introduction and prevention measures, burning and reseeding, mulching	Hand pulling, grubbing, mowing prior to seed set, manage to reduce seed production





***Cheatgrass Leaf Blades and Ligule***

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***Cheatgrass Plant***

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***Cheatgrass Inflorescences  
and Spikelets***

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***Cheatgrass Inflorescence  
and Spikelets***

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forestryimages.org](http://www.<br/>forestryimages.org)

# Cheatgrass

[*Bromus tectorum* L.] Grass (Poaceae) Family

## General Description

Cheatgrass is an erect winter or spring annual grass. It was introduced from Europe.

## Mature Plants

At maturity the foliage and seed heads often become purplish before drying completely and becoming brown or tan. Panicles are 5 to 20 cm long and rather dense. Cheatgrass panicles change color from green to purple to brown as the plant matures and eventually dries out. Branches are slender, pubescent, flexuous, with up to eight spikelets.

## Seedlings

The seedlings are bright green with conspicuously hairy leaves, hence the alternate common name, downy brome.

## Spikelets

Spikelets including awns are 2 to 4 cm long, nodding, with two to eight pubescent or villous florets. The glumes are villous, the lower ones 5 to 8 mm long, and the upper ones 7 to 11 mm long. Lemmas are toothed, 9 to 12 mm long, lanceolate, and covered with long, soft hairs. Awns are 12 to 14 mm long, slender and straight. The palea is shorter than the lemma. Each floret has three stamens and the anthers are 0.5 to 1 mm long.

## Roots

Cheatgrass has a finely divided root system, which penetrates to depths of around 30 cm (11.8 inches), allowing it to extract most or all of the available moisture from this shallow layer of the soil profile. The roots of *Bromus tectorum* continue to grow during the winter, allowing it to gain control of a site before the seedlings of other species are established.

## Habitat

Cheatgrass occurs in a wide variety of habitats across the continental U.S. Cheatgrass is common in recently burned rangeland and wild lands, winter crops, waste areas, abandoned fields, eroded areas, and overgrazed grasslands.

Although cheatgrass readily invades perennial forage crops and rangeland under poor management, it also invades communities in the absence of disturbance. Cheatgrass can persist in changeable environments because seed germination is staggered from August until May.

### Propagation/Phenology

Cheatgrass reproduces only from seeds, germinates in the fall or winter, expands its roots over winter, and rapidly exploits the available water and nutrients in early spring. Vast numbers of cheatgrass seedlings usually germinate after the first fall rain in infested areas. The root system continues to develop throughout most of the winter and the plant has an extensive root system by spring. This allows it to extract higher levels of soil moisture and nutrients. Cheatgrass has a compressed phenology and usually dries out and casts seeds by mid-June. These dry plants can fuel wildfires. If fires occur frequently, perennials will likely give way to a community dominated by cheatgrass and other annuals.

### Control Methods

<b>Biological</b>	<b>Chemical</b>
None currently available	Chlorsulfuron, Glyphosate, Isoxaben, Pendimethalin, Sethoxydim and Sulfometuron methyl
<b>Cultural</b>	<b>Mechanical</b>
Maintain healthy stands of native vegetation, revegetation/competitive planting, implement introduction and prevention measures, burning and reseeding, mulching	Hand pulling, grubbing, mowing prior to seed set, manage to reduce seed production





***Southern Sandbur Plants***

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***Southern Sandbur Inflorescence***

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***Southern Sandbur Spikelets***

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***Southern Sandbur Spikelets***

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# Southern Sandbur

[*Cenchrus echinatus* L.] Grass (Poaceae) Family

## General Description

Introduced summer annuals, to 0.6 m tall, with loose spikes (racemes) of spiny burs at maturity. Southern sandbur was introduced from the southern U.S., Mexico, Central and South America.

## Seedlings

Leaves folded in bud. Sheaths, ligules, and blades resemble those of mature plants.

## Mature Plants

Loosely tufted. Culms branched and often abruptly bent near the base (geniculate). Ligules consist of a fringe of hairs, 0.5 to 1.5 mm long. Often there is a tuft of hairs ~2 to 3 mm long at the position of the auricles. Sheaths open, flattened, +/- glabrous, margins narrowly membranous, sometimes lined with a few long hairs. Collar narrow, lighter in color. Blades flat, sometimes folded, appear +/- glabrous, but are rough with very short hairs (visible with magnification). Southern sandbur is typically erect. Blades 3.5 to 11 mm wide, 6 to 20 cm long. Upper surfaces of blade bases often sparsely covered with long, soft hairs (pilose). Lower stems often maroon at maturity.

## Roots and Underground Structures

Roots fibrous, shallow. Sometimes roots at the nodes.

## Spikelets/Florets

Spikelets (1 to 8) enclosed by fused, spiny bracts that form a bur. Racemes of burs loosely spikelike, terminal. Main flowering axis (rachis) wavy. Burs disperse as units. Upper leaves sometimes partially enclose the lower burs. Spikelets consist of two florets. Only the upper floret is fertile. October. Bracts (spines) 40 to 60. Lower bracts with slender, flexible spines and clearly in a single whorl. Upper bract spines stiff. Racemes 3 to 8 cm long, spines stiff. Longest bract usually less than 5 mm long. Fertile florets generally 4 to 6 mm long.

## Postsenescence Characteristics

Late in the season, lower foliage becomes straw colored and stems turn reddish or maroon. After a frost, entire plants become straw colored. Stems with burs can persist through winter. Dispersed burs can remain on or near the soil surface through the following summer.

## Habitat

Aggressively colonizes open, disturbed sites in fields, orchards, vineyards, alfalfa, cultivated crops, and ditchbanks. Often infests sandy, well-drained soils.

## Propagation/Phenology

Reproduces by seed. Burs disperse by clinging to skin and fur of animals, shoes and clothing of humans, tires, farm machinery, and by floating on water. Seedlings emerge in spring or early summer, and growth is rapid under moist conditions. Mechanical scarification and the presence of low levels of nitrate appear to stimulate germination. Seedlings can emerge from soil depths to 10 cm.

## Control Methods

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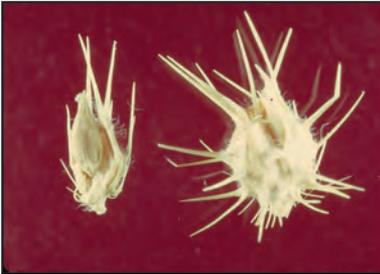
<b>Biological</b>	<b>Chemical</b>
None currently available	Glyphosate, Imazapic, Imazapyr, Isoxaben, Pendimethalin and Sethoxydim

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<b>Cultural</b>	<b>Mechanical</b>
Maintain healthy stands of native vegetation, revegetation/competitive planting, implement introduction and prevention measures	Tillage effective when plants are small and prior to seed-set

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***Field Sandbur Spikelets***

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California Dept. of Food and  
Agriculture, Botany Laboratory @  
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***Field Sandbur Inflorescence***

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***Field Sandbur Plant***

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***Field Sandbur Inflorescence***

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Database @ plants.usda.gov

# Field Sandbur

[*Cenchrus incertus* M. Curtis] Grass (Poaceae) Family

## General Description

Summer annuals, to 0.6 m tall, with loose spikes (racemes) of spiny burs at maturity. Field sandbur was introduced from the southern U.S., Mexico, Central and South America.

## Seedlings

Leaves folded in bud. Sheaths, ligules, and blades resemble those of mature plants.

## Mature Plants

Loosely tufted. Culms branched and often abruptly bent near the base (geniculate). Ligules consist of a fringe of hairs 0.5 to 1.5 mm long. Often there is a tuft of hairs ~2 to 3 mm long at the position of the auricles. Sheaths open, flattened, +/- glabrous, margins narrowly membranous, sometimes lined with a few long hairs. Collar narrow, lighter in color. Blades flat, sometimes folded, appear +/- glabrous, but are rough with very short hairs (visible with magnification). Field sandbur is erect to spreading. Blades 2.5 to 5 mm wide, 4 to 12 cm long.

## Roots and Underground Structures

Roots fibrous, shallow. Sometimes roots at the nodes.

## Spikelets/Florets

Spikelets (one to eight) enclosed by fused, spiny bracts that form a bur. Racemes of burs loosely spikelike, terminal. Main flowering axis (rachis) wavy. Burs disperse as units. Upper leaves sometimes partially enclose the lower burs. Spikelets consist of two florets. Only the upper floret is fertile. July-September. Bracts (spines) 8 to 40. Lower bracts not clearly whorled. All spines stiff. Longest bract usually less than 5 mm long. Fertile florets generally 4 to 6 mm long.

### **Postsenescence Characteristics**

Late in the season, lower foliage becomes straw colored and stems turn reddish or maroon. After a frost, entire plants become straw colored. Stems with burs can persist through winter. Dispersed burs can remain on or near the soil surface through the following summer.

### **Habitat**

Aggressively colonizes open, disturbed sites in fields, orchards, vineyards, alfalfa, cultivated crops, and ditchbanks. Often infests sandy, well-drained soils.

### **Propagation/Phenology**

Reproduces by seed. Burs disperse by clinging to skin and fur of animals, shoes and clothing of humans, tires, farm machinery, and by floating on water. Seedlings emerge in spring or early summer, and growth is rapid under moist conditions. The biology of this species is poorly documented.

### **Management Favoring/Discouraging Survival**

Sandburs compete poorly with dense vegetation and rarely become established in well managed pastures. Disturbances that bury burs and remove existing vegetation stimulate germination and enhance seedling establishment. However, repeated cultivation before burs develop reduces the seed bank and can eventually eliminate an infestation. Under mowing regimes, plants grow low to the ground and can still produce burs.

## Control Methods

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### **Biological**

None currently available

### **Chemical**

Glyphosate, Imazapic, Imazapyr, Isoxaben, Pendimethalin and Sethoxydim

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### **Cultural**

Maintain healthy stands of native vegetation, revegetation/competitive planting, implement introduction and prevention measures

### **Mechanical**

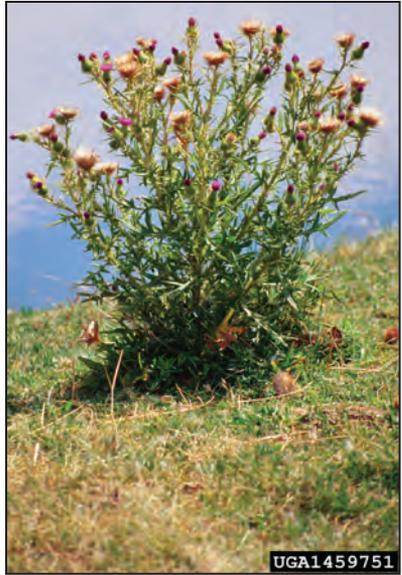
Tillage effective when plants are small and prior to seed-set

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***Bull Thistle Mature  
and Immature Flowerheads***

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Starr, United States Geological Survey  
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***Bull Thistle Plant***

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***Bull Thistle Foliage***

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***Bull Thistle Leaf***

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# Bull Thistle

[*Cirsium vulgare* (Savi) Ten.] Sunflower (Asteraceae)  
Family

## General Description

Erect prickly plants with purple, pink, or white flower heads that consist only of disk flowers. Coarse biennial, annual, or short-lived perennial to ~2 m tall, with stiff, hairy foliage and conspicuous prickly-winged stems. Upper leaf surfaces have stiff bristly hairs. Bull thistles have taproots. Bull thistle is common throughout temperate and mediterranean climate regions of the world. Regional biotypes vary primarily in life cycle patterns and seed dormancy and survival. Introduced from Eurasia.

## Seedlings

Cotyledons oval to oblong, ~7 to 20 mm long, 3 to 7 mm wide, fused at the base, thick, dull, glabrous or slightly granular, paler below. First leaves alternate, elliptic to oblanceolate, tapered at the base into a winged stalk, ~2 to 4 times longer than cotyledons. Margin unevenly toothed teeth terminate with a weak prickle. Leaf surfaces, especially upper, covered with long, stiff, papillae-based hairs. Lower surfaces +/- granular, initially cobwebby. Rosettes often reach a diameter ~60 cm the first spring. Subsequent few to several leaves typically resemble first leaves, except increasingly larger.

## Mature Plants

Leaves variable, +/- sessile, toothed to lobed, sometimes with lobes toothed. Rosette leaves elliptic to oblanceolate, ~10 to 40 cm long. Margins +/- deeply coarse lobed and toothed, with main prickles ~5 to 15 mm long. Stem leaves smaller, more deeply lobed and spinier than rosette leaves. Upper surfaces of all leaves green, evenly covered with stiff, sharp-pointed, papillae-based hairs ~1 mm long, sometimes sparsely cobwebby. Lower surfaces +/- covered with cobwebby hairs. Leaf bases extend nearly all the way down stem internodes as conspicuous prickly wings. Stems coarse, usually single, branched, loosely covered with white cobwebby hairs, +/- glandular.

## **Roots and Underground Structures**

Taproots thick, fleshy, to ~70 cm deep, often branched into several arms.

## **Flowers**

June–October. Heads one to a few, hemispheric to bell shaped, +/- loosely covered with cobwebby hairs, and with at least one bractlike leaf just below. Flower heads consist of several overlapping rows of spine-tipped phyllaries and numerous disk flowers interspersed with bristles on the receptacle. Involucres (phyllaries as units) 2.5 to 4 cm long, 2 to 4 cm diameter. Phyllaries lanceolate to linear, spreading to reflexed. Spines 1 to 5 mm long, +/- yellowish. Corollas purple, ~25 to 35 mm long, lobes mostly 5 to 8 mm long. Insect and self-pollinated.

## **Fruit and Seeds**

Achenes ovate to elliptic, slightly compressed, smooth, glossy, with a basal attachment scar and a short beak (+/- 0.5 mm long) surrounded by a collar at the apex. Achenes 3 to 5 mm long, ~1 mm wide, gray or tan, sometimes with darker longitudinal striations. Pappus bristles ~15 to 30 mm long, +/- white. Pappus bristles plumose and deciduous, forming a ring at the base and falling as a unit. Surface of achenes mucilagenous when wet.

## **Postsenescence Characteristics**

Flower stems typically senesce in fall, often with the onset of frosty nights. Old flower stems with flower head remnants usually persist for an extended period. Dead bull thistle stems may remain standing for 1 to 2 years.

## **Habitat**

Open disturbed sites, roadsides, fields, pastures, hillsides, rangeland, and forest openings. Thistles typically do not tolerate deep shade or constantly wet soils. Also agronomic crops, orchards, recently logged and newly planted forestry sites. Grows best on heavy, fertile soils.

## **Propagation/Phenology**

Bull thistle reproduces by seed. Plants exist as rosettes until flowering stems develop at maturity. Seeds germinate in fall after the first rains or in spring. Fluctuating temperatures and moisture stimulate germination. Germination occurs under a wide temperature range (41 to 104 °F) and with or without light. Compared to other thistles, bull thistle seeds can germinate under low moisture conditions. First year rosettes usually persist through summer, but may dieback during a dry summer and regrow in fall. Rosettes (typically second year) require a cold period (vernalization) and the presence of sufficient soil nitrogen to initiate growth of flower stems. Thus, plants on very poor soil may take more than 2 seasons to mature. Seed and flower head production is highly variable, depending on environmental conditions. Seeds per flower head range from less than 100 to more than 400, with an average of ~200. Most seeds fall near the parent plants or disperse short distances with wind. Some seeds disperse to greater distances with human activities, water, soil movement, and as seed or hay contaminants. Birds and small mammals can consume and disperse some seeds. Seed dormancy at maturity is variable, depending on environmental conditions and biotype. Soil disturbance facilitates seed germination and seedling establishment. Seedlings typically emerge from soil depths to ~5 cm. Rosette foliage may be killed by a hard freeze and regrow from roots in spring. Plants in grazed pastures often produce more seed than plants in adjacent ungrazed areas. Most seeds either germinate within the first year or die, but seeds buried ~15 cm or deeper may survive to ~3 years or more.

## Control Methods

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### Biological

Gallfly

### Chemical

2,4-D, Chlorsulfuron, Clopyralid, Dicamba, Fluroxypyr, Imazapic, Imazapyr, Metsulfuron methyl and Triclopyr

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### Cultural

Maintain healthy stands of native vegetation, revegetation/competitive planting for shade, implement introduction prevention measures

### Mechanical

Repeated hand pulling or grubbing, mowing, disking prior to seed-set

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***Field Bindweed Flower***

©Photo Courtesy of Tom Heutte, USDA Forest Service @ [www.forestryimages.org](http://www.forestryimages.org)



***Field Bindweed Plant***

©Photo Courtesy of Mary Ellen (Mel) Harte @ [www.forestryimages.org](http://www.forestryimages.org)



***Field Bindweed Flowers***

©Photo Courtesy of Chris Evans, University of Georgia @ [www.forestryimages.org](http://www.forestryimages.org)



***Field Bindweed Flower,  
Stem and Leaves***

©Photo Courtesy of Tom Heutte, USDA Forest Service @ [www.forestryimages.org](http://www.forestryimages.org)

# Field Bindweed

[*Convolvulus arvensis* L.] Morning-glory (Convolvulaceae)  
Family

## General Description

Viney perennial with an extensive system of deep creeping roots and rhizomes. Plants typically develop large patches and are difficult to control. Introduced from Europe.

## Seedlings

Cotyledons unequal, +/-square to kidney shaped, indented at the tip, ~8 to 20 mm long, 3 to 10 mm wide, glabrous, dull green with whitish veins, on stalks ~10 to 20 mm long. First leaves +/- arrowhead shaped, blunt at the tip, similar in size to the cotyledons. Subsequent leaves increasingly larger, +/- resemble mature leaves. New leaves loosely creased along the main vein in bud. Taproot grows deep rapidly. By 6 weeks, creeping lateral roots have developed, typically in the top 30 cm of soil.

## Mature Plants

Stems twine around and over other plants or trail along the ground. Leaves alternate, short stalked, arrowhead shaped to +/- oblong or round, tips often rounded, typically 2 to 4 cm long, glabrous or sparsely covered with short hairs, dull green, sometimes covered with a whitish powdery bloom. Basal lobes +/- pointed, often flared outward (hastate). Leaf size and shape vary greatly depending on environmental conditions such as light intensity, soil moisture, and frequency of cultivation or defoliation.

## Roots and Underground Structures

Roots cordlike, white, fleshy, brittle. Root systems consist of a vigorous, extensive network of primary and secondary taproots, numerous short-lived lateral feeder roots, and long-lived horizontal creeping roots that develop rhizomes from endogenous buds. Rhizomes grow to the soil surface and produce new shoots. Roots can penetrate soil to a depth of 3 m or more depending on the availability of soil moisture. Most horizontal creeping roots develop in the top 60 cm of

soil. Root systems competitively extract soil moisture and can survive extended periods of drought and repeated cultivation.

### **Flowers**

April-October or until the first frost. Flowers axillary, solitary or in cymes of two to four, on stalks (peduncles) ~2 to 6 cm long. Corolla white or pinkish, funnel shaped, 1.5 to 3 cm long, pleated and spiraled in bud. Calyx +/- bell shaped, usually less than 5 mm long. Stigmas two, linear, cylindrical, not flattened. Bracts two, linear to narrowly lanceolate, 1 to 10 mm long, attached ~10 to 25 mm below flower. Flowers open for 1 day. Insect pollinated. Self-incompatible.

### **Fruit and Seeds**

Capsules spherical, +/- inflated, +/- 8 mm in diameter. Seeds few per capsule, variable in shape, but typically obovate, slightly compressed, +/- 3-sided in cross-section, 3 to 4 mm long, dull, dark gray brown, covered with small, rough, irregular tubercles.

### **Postsenescence Characteristics**

Shoots typically dieback during the cool season.

### **Habitat**

Cultivated fields, orchards, vineyards, gardens, pastures, abandoned fields, roadsides, and waste places. Grows best on moist, fertile soils. Tolerates poor, dry, gravelly soils, but seldom grows in wet soils. Inhabits regions with temperate, Mediterranean, and tropical climates.

### **Propagation/Phenology**

Reproduces by seed and vegetatively from deep creeping roots and rhizomes. Seeds are hard coated and can survive ingestion by birds and other animals. Most seeds can imbibe water and germinate 10 to 15 days after pollination. However, seed coats mature 15 to 30 days after pollination, and ~80 percent of seeds become impermeable to water. Seeds germinate throughout the growing season, but peak germination usually occurs mid-spring through early summer. Germination can occur under various temperature regimes, from 41 to 104 °F, but is highest and most rapid when temperatures fluctuate from 59 to 68 °F. A large portion of the seed bank remains

dormant from year to year. Under field conditions, seed can survive for 20 years or more. A high percent of seed under dry storage can survive for at least 50 years. Seed production is highly variable. Dry, sunny conditions and calcareous soils favor seed production. Frequent cultivation, rain, or heavy, wet soils can inhibit seed set. One plant can produce up to 500 seeds. Most new shoots appear in early spring. Undisturbed patches can expand their radius up to 10 m per year. Root fragments as small as 5 cm can generate new shoots.

### Management Favoring/Discouraging Survival

Field bindweed’s extensive root system utilizes deep soil moisture and allows the plant to withstand serious drought. Additionally, the plant is capable of summer dormancy and new shoots emerge from adventitious buds on vertical and lateral roots when rainfall returns. It may form small patches but generally does not constitute a serious threat. In rangelands, field bindweed rarely overlaps with winter and spring grazing systems due to its emergence in late spring. It provides very little green summer forage, as sheep and cattle generally avoid it. It is possible to bring bindweed to a manageable level, but it requires intensive effort and a watchful eye. Additionally, even when infestations are reduced to a minimal level, care must be taken to prevent re-establishment from seed, which are capable of persisting in the soil for 30 to 50 years.

### Control Methods

Biological	Chemical
Bindweed gall mite	2,4-D, Chlorsulfuron, Dicamba, Fluroxypyr, Glyphosate, Imazapyr, Isoxaben, Metsulfuron methyl and Triclopyr
Cultural	Mechanical
Maintain healthy stands of native vegetation, revegetation/ competitive planting, implement introduction prevention measures	Repeated hand pulling or grubbing prior to seed-set



***Hounds Tongue Plants***

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Utah State University @ [www.forestryimages.org](http://www.forestryimages.org)



***Hounds Tongue Flowers***

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***Hounds Tongue Basal Rosette***

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Brousseau, Saint Mary's College of  
California, 1995 @ [calphotos.berkeley.edu](http://calphotos.berkeley.edu)



***Hounds Tongue Fruit***

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Planck Institute for Plant Breeding  
Research @ [www.forestryimages.org](http://www.forestryimages.org)

# Hounds Tongue

[*Cynoglossum officinale* L.] Borage (Boraginaceae) Family

## General Description

Erect (30 to 120 cm) biennial or short-lived perennial forb with a thick, black, woody taproot. It forms a rosette in the first year and usually flowers in the second year. Hounds tongue is native to Eurasia.

## Mature Plants

Initial growth is in the form of a basal rosette with a single flowering stem produced the second year. Most plants have one or two stems, although plants with up to eight stems have been reported with a single stem producing up to 300 seeds. The stem is unbranched below the inflorescence and leafy throughout. Basal and lower cauline leaves are petiolate, elliptic to oblanceolate (15 to 20 cm long and 2 to 5 cm wide) and tapering at the base. Upper leaves are alternate, numerous, not reduced or larger, acute to obtuse, and sessile or clasping. All leaves are pubescent on upper and lower surfaces.

## Flowers

May through July. Flowers are perfect and in racemously arranged cymes axillary to the leaves or on terminating short branches, pedicellate, crowded at anthesis, less crowded in fruit. The calyx (4 to 6 mm long in flower, enlarging to 1 cm in fruit) consists of five sepals with triangular lobes fused in the shape of a star. The corolla is a dull reddish purple with five lobes fused at the lower part into a cylindrical tube (5 to 6 mm long) and not exceeding the calyx. The throat of the corolla bears five hairy scales. Five stamens are inserted into the upper part of the tube. The pistil consists of a deeply lobed ovary and simple style.

## Fruit

Fruit is indehiscent and consists of one to four nutlets. Nutlets (5 to 7 mm long) are brown or grayish brown, rounded triangular, dorsally flattened, and covered with short, barbed prickles.

## Habitat

It grows on rangeland, pastures, abandoned cropland, roadsides, and waste places. It is most abundant in areas with more than 10 percent bare ground. It colonizes easily and quickly forms dense monocultures on disturbed habitats. It can become established on rangelands and retard the re-establishment of valuable range species.

## Propagation/Phenology

Reproduces by seed. Seeds mature from July through August. Newly ripened seeds exhibit innate dormancy which is released by a period of vernalization. Most of the seed overwinters in the soil, although some may remain attached to the parent plant. Seed burial depth, ambient temperature and moisture, soil fertility, and light have been found to affect seed germination in Hounds tongue. Maximum germination occurs at 1 cm soil depth; seeds buried 5 cm deep germinate but do not emerge. Seeds on the soil surface desiccate and do not germinate. Seed germination has been found to be stimulated by low (32 to 50 °F, 12 percent soil moisture) and alternating temperatures. Hounds tongue does not produce a large, persistent bank of buried seeds. Research has found that when buried in the soil, no seeds survived 1 year after burial. A persistent seed bank, however, may result from seeds overwintering on the parent plant. Seeds remaining on the parent plant throughout the winter cannot undergo chilling in a moist stratum and, thus, dormancy must be overcome the following year. Estimates of total seed produced per plant range from 50 to more than 2,000. Nutlets remain attached to the parent plant for several months before falling to the ground, generally within a radius of 2 m from the parent plant.

## Control Methods

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### **Biological**

None currently available

### **Chemical**

2,4-D, Chlorsulfuron,  
Dicamba, and Imazapic

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### **Cultural**

Maintain healthy stands of native  
vegetation, revegetation/competitive  
planting, implement introduction  
prevention measures

### **Mechanical**

Repeated hand pulling or  
grubbing prior to seed-set

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***Weeping Lovegrass Plant***

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***Weeping Lovegrass Plant***

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***Weeping Lovegrass Inflorescence***

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***Weeping Lovegrass Infestation***

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# Weeping Lovegrass

[*Eragrostis curvula* (Schrad.) Nees] Grass (Poaceae) Family

## General Description

Weeping lovegrass is a warm season perennial bunchgrass native to central and southern Africa. This grass has invaded degraded pastures and disturbed native grasslands. It is naturalized in a large number of locations. The drooping leaf characteristic gives rise to the name “weeping” lovegrass.

## Mature Plants

Variable, tufted perennial, deep rooted, bunch type, forming large clumps with abundant drooping basal leaves; culms erect, 60 to 120 cm tall, simple; sheaths keeled and densely to sparsely hispidulous basally; blades narrow, ascending, involute, attenuate to a fine point, arcuate spreading, rough on both surfaces; panicles 15 to 40 cm long, 5 to 10 cm broad, open, with numerous ascending branches, the lower ones pilose in axils, with numerous ascending secondary branchlets that bear the sessile spikelets; spikelets grayish green, appressed, 8 to 10 mm long, 7 to 11 flowered; lemmas about 2.5 mm long, falling individually. Seeds 3 to 5 million/kg. The leaf blades are up to 0.5 m long and 4 mm wide, rolled or flat, appearing setaceous. Culms are unbranched and not easily compressed, with glabrous nodes; basal sheaths densely hairy with long hairs. Inflorescence 100 to 300 mm long, much branched, variable from open and spreading to contracted with branches appressed to the main axis. Lowest branches whorled or not whorled. Plants are extremely variable in morphology.

## Spikelets/Florets

Spikelets 4 to 8.2(10) mm long, 1.2 to 2 mm wide, linear lanceolate, plumbeous to yellowish, with 3 to 10 florets; disarticulation irregular to acropetal, proximal rachilla internodes persistent. Glumes lanceolate, hyaline; lower glumes 1.2 to 2.6 mm; upper glumes 2 to 3 mm; lemmas 1.8 to 3 mm, ovate, membranous, lateral veins conspicuous, apices acute; paleas 1.8 to 3 mm, hyaline to membranous, apices obtuse; anthers three, 0.6 to 1.2 mm, reddish brown.

## Habitat

Weeping lovegrass prefers a light-textured, well-drained soil, and will thrive on soils of low fertility often in disturbed, overgrazed or trampled grassland. Climatic conditions determine its range of adaptation. It is quite drought tolerant. Low winter temperatures will prevent regrowth and cause the grass to act as an annual or a short-lived perennial. Usually prefers open habitat and is found in a wide variety of vegetation types. Sea level to 3,500 m.

## Propagation/Phenology

C4 photosynthetic pathway. It starts growing early in the spring and continues until well into the autumn. Minimum temperature for growth is just above freezing, it is frost tolerant. This grass seeds heavily.

## Control Methods

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<b>Biological</b>	<b>Chemical</b>
None currently available	Glyphosate

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<b>Cultural</b>	<b>Mechanical</b>
Maintain healthy stands of native vegetation, revegetation/competitive planting, implement introduction and prevention measures, grazing by goats	Digging out the root system in late winter or early spring, followed by prescribed fire to kill remaining seeds, severe late season defoliation depletes energy reserves

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***Lehmann Lovegrass Plants***

©Photo Courtesy of Michael Schumacher @ [allergy.peds.arizona.edu](mailto:allergy.peds.arizona.edu)



***Lehmann Lovegrass Inflorescence***

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***Lehmann Lovegrass Inflorescence***

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***Lehmann Lovegrass Infestation***

©Photo Courtesy of John M. Randall @ [tncweeds.ucdavis.edu](mailto:tncweeds.ucdavis.edu)

# Lehmann Lovegrass

[*Eragrostis lehmanniana* Nees] Grass (Poaceae) Family

## General Description

Lehmann lovegrass is a warm season perennial bunchgrass native to central and southern Africa. Widely used for forage and soil erosion control, Lehmann lovegrass has aggressively spread into native communities. A strong competitor, especially after disturbance, this species can exclude native recovery. In addition, it is more flammable and fire tolerant than many native species, altering fire frequency and intensity in invaded systems.

## Mature Plants

Plants perennial; cespitose, forming innovations at the basal nodes, without glands. Culms (20)40 to 80 cm, erect, commonly geniculate, sometimes rooting at the lower nodes, glabrous, lower portions sometimes scabridulous. Sheaths sometimes shortly silky pilose basally, hairs less than 2 mm, apices sparsely hairy, hairs to 3 mm; ligules 0.3 to 0.5 mm, ciliate; blades 2 to 12 cm long, 1 to 3 mm wide, flat to involute, glabrous, abaxial surfaces sometimes scabridulous, adaxial surfaces scabridulous. Panicles 7 to 18 cm long, 2 to 8 cm wide, oblong, open; primary branches 1 to 8 cm, appressed or diverging to 40 degrees from the rachises; pulvini glabrous; pedicels 0.5 to 4 mm, diverging or appressed, flexible.

## Roots and Underground Structures

Plants without knotty, rhizomatous base.

## Spikelets/Florets

Spikelets 5 to 12(14) mm long, 0.8 to 1.2 mm wide, linear lanceolate, plumbeous to stramineous, with 4 to 12(14) florets; disarticulation irregular to basipetal, paleas usually persistent. Glumes oblong to lanceolate, membranous; lower glumes 1 to 1.5 mm; upper glumes 1.3 to 2 mm; lemmas 1.5 to 1.7 mm, ovate, membranous, lateral veins inconspicuous, apices acute to obtuse; paleas 1.4 to 1.7 mm, obtuse; anthers three, 0.6 to 0.9 mm, yellowish. Caryopses 0.6 to 0.8 mm, ellipsoid to obovoid, dorsally compressed, sometimes with a shallow adaxial groove, smooth, translucent, mostly light brown.

## Habitat

Lehmann lovegrass has persisted and spread primarily in desert shrub and desert grassland ecosystems of southeastern Arizona at elevations between 3,250 and 4,800 ft. The plant has a narrow range of climatic and edaphic requirements, growing best on sites with sandy to sandy loam-textured soils, and where winter temperatures rarely drop below 32 °F and summer rainfall ranges between 6 and 9 inches.

## Propagation/Phenology

Lehmann lovegrass is a good seed producer. The seeds are small, with 4.2 to 6.5 million per pound. Nearly all fresh seeds are dormant, requiring at least 6 to 9 months of after-ripening. Under natural conditions, seed on the ground may be scarified by fire or by high summertime seed bed temperatures. In southeastern Arizona, high seedling emergence typically occurs following summer rains on sites where the canopy has been removed such as by burning, mowing, or grazing. Vegetative regeneration: Lehmann lovegrass is described as weakly stoloniferous. Stems that come in contact with the ground may root at the nodes.

## Control Methods

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<b>Biological</b>	<b>Chemical</b>
None currently available	Glyphosate

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<b>Cultural</b>	<b>Mechanical</b>
Maintain healthy stands of native vegetation, revegetation/competitive planting, implement introduction and prevention measures, grazing by goats	Digging out the root system in late winter or early spring, followed by prescribed fire to kill remaining seeds, severe late season defoliation depletes energy reserves

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***Redstem Filaree Flowers***

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***Redstem Filaree Plant***

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***Redstem Filaree Plants***

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***Redstem Filaree Fruits and Flowers***

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# Redstem Filaree

[*Erodium cicutarium* (L.) L'Hér. ex Ait.] Geranium  
(Geraniaceae) Family

## General Description

Redstem filaree is a cool season annual herb (winter annual) that was introduced from the Mediterranean region of Europe.

## Mature Plants

Plants develop as a basal rosette. A low and spreading 2- to 5-inch tall plant, growing from a central taproot. The stems are leafy and hairy. Flowers February to May, and plants usually dry up and disappear quickly after maturity. Rosette leaves occur on petioles and are hairy. Individual leaves are divided into three to nine individual leaflets that are arranged oppositely from one another. Individual leaflets are lanceolate in outline and range from 1-1/4 to 8 inches long. Leaflets are deeply lobed and do not have petioles (sessile). It is one of the first plants to germinate in late fall or spring.

## Roots and Underground Structures

Small taproot and fibrous root system.

## Flowers

Clusters of two to eight flowers occur with each individual flower occurring on a relatively long flower stalk (pedicel). Individual flowers are approximately 1/2 inch wide and consist of five bright pink to purple petals.

## Fruit and Seeds

Fruit resembles a bird's beak and is approximately 1/2- to 3/4-inch long. Each seed is tipped with an elongated tail, which coils spirally at maturity, assisting the pointed seed in penetrating the soil.

## Habitat

Redstem filaree is found in oak woodlands, semidesert grassland, and desert shrublands. It is often found in fields, lawns, and waste places. Redstem filaree is adapted to a broad

range of soil types. It grows in well-drained, clayey, loamy, or sandy soil, and is tolerant of moderately acidic to moderately alkaline soils.

### **Propagation/Phenology**

Reproduces from seed.

### **Control Methods**

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<b>Biological</b>	<b>Chemical</b>
None currently available	2,4-D, Clopyralid and Glyphosate

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<b>Cultural</b>	<b>Mechanical</b>
Maintain healthy stands of native vegetation, revegetation/competitive planting, implement introduction and prevention measures	Seed bed tillage in early spring

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***Oxeye Daisy Flowerhead***

©Photo Courtesy of Steve Dewey,  
Utah State University @ [www.forestryimages.org](http://www.forestryimages.org)



***Oxeye Daisy Stem and Foliage***

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***Oxeye Daisy Plants***

©Photo Courtesy of Mary Ellen (Mel)  
Harte @ [www.forestryimages.org](http://www.forestryimages.org)



***Oxeye Daisy Flowerheads***

©Photo Courtesy of Montana Statewide  
Noxious Weed Awareness and Education  
Program Archives, Montana State  
University @ [www.forestryimages.org](http://www.forestryimages.org)

# Oxeye Daisy

[*Leucanthemum vulgare* Lam.] Sunflower (Asteraceae)  
Family

## General Description

A common perennial weed of grassy fields growing to 0.6 m on all the better types of soil, avoiding acid soils and shade. Introduced from Eurasia.

## Mature Plants

Erect perennial herb to 1 m high. Leaves slightly hairy to hairless; basal and lower stem leaves ovate to spoon shaped, to 15 (rarely to 18) cm long, to 2 (rarely to 4) cm wide, on a long stalk; stem leaves smaller, upper ones stem-clasping. Seeds dark brown, grey or black with pale ribs. Stem leaves alternate, toothed to pinnately lobed, upper leaves with base stem-clasping; flower heads one to three (at ends of branches), mostly 3 to 6 cm wide; florets arising from a pitted receptacle without scales; outer petallike ray florets 10 to 35, white, 1 to 1.5 cm long, entire to toothed at the tip; inner florets yellow, tubular; seeds about 2.5 mm long.

## Roots and Underground Structures

Creeping roots.

## Flowers

Many small flowers (florets) in heads surrounded by bracts in several rows, bracts with dark membranous margins, longest bracts 5 to 8 mm long. Flowers most of the year, mainly spring and summer (June to August). The flowers are hermaphrodite (has both male and female organs) and are pollinated by bees, flies, beetles, Lepidoptera (moths and butterflies).

## Habitat

Meadows. Oxeye daisy prefers all types of well drained, but moist soils. The plant prefers neutral and basic soils. It cannot grow in the shade. The plant can tolerate strong winds.

## Propagation/Phenology

Spreads by seed and creeping roots.

## Control Methods

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<b>Biological</b>	<b>Chemical</b>
None currently available	Dicamba, Imazapyr and Sulfometuron methyl

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<b>Cultural</b>	<b>Mechanical</b>
Maintain healthy stands of native vegetation, revegetation/competitive planting, implement introduction and prevention measures, grazing by goats	Digging out the root system in late winter or early spring, followed by prescribed fire to kill remaining seeds, severe late season defoliation depletes energy reserves

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***Bur Clover Flowers and Foliage***

©Photo Courtesy of Steve Matson,  
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***Bur Clover Flower, Stem,  
Foliage and Fruit***

©Photo Courtesy of Ann Dennis, 2002  
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***Bur Clover Fruit***

©Photo Courtesy of Steve Matson,  
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***Bur Clover Flowers***

©Photo Courtesy of Steve Matson,  
2006 @ calphotos.berkeley.edu

# Bur Clover

[*Medicago polymorpha* L.] Pea (Fabaceae) Family

## General Description

A bright green nearly hairless annual or biennial herb. Introduced from Eurasia.

## Seedlings

Cotyledons elliptic to ovate, rounded tip, more or less stalked. First leaf rounded, obtuse at the base; the later three foliolate.

## Mature Plants

Weak stems branch from the base, and spread or lie on the ground with the tips ascending, 8 to 64 cm long. Stem prostrate or ascending, angular, hairless or more rarely with some short hairs, up to 40 cm long and 15 to 50 cm high, branched, subglabrous, with a few long hairs on petiolules, lower surface of leaflets, and calyx. Leaves trefoil which arise from a common point at the end of the leaf stalk, simple, terete. Leaflets toothed about in the upper part, with sometimes a brown or blackish blotch at the base. Stipules acute laciniate. Leaflets obovate-cuneate, 7 to 25 mm long, 5 to 23 mm wide, glabrate, margins dentate in upper half, apex rounded to truncate or emarginate, stipules narrowly elliptic to narrowly ovate, laciniate.

## Roots and Underground Structures

Fibrous root system with small taproot. This species has a symbiotic relationship with certain soil bacteria; these bacteria form nodules on the roots and fix atmospheric nitrogen.

## Flowers

Flowering mostly March to May, but in moist situations it may flower at almost all seasons.

Flowers from May to August and the seeds ripen from July to September. Flowers yellow solitary or usually two to

eight on flowering branches awnless at the top, about equaling the leaf. Standard longer than the keel; (1)3 to 5(8) in racemes; corolla yellow, 3 to 4.5 mm long. The small yellow pealike flowers are borne three to five in a cluster near the end of short stalks.

### **Fruit and Seeds**

Pods 4 to 8(10) mm in diameter, spirally twisted in (1.5)3 to 4(6) turns, glabrous or subglabrous, transverse veins prominent, anastomosing, groove between submarginal and marginal vein wide, with nearly straight prickles 2 to 3 mm long, arising from the submarginal and marginal veins. Seeds several. Pod disk shaped, in a helix of 1.5 to 3.5 turns, 4 to 6 mm in diameter. Sides nearly flat, reticulate, with an outer border thin and with a furrow broken with spines on each side.

### **Habitat**

Naturalized in open, dry to occasionally mesic, disturbed areas such as pastures, and roadsides. The plant prefers light (sandy) and medium (loamy) soils and requires well-drained soil. The plant prefers acid, neutral and basic (alkaline) soils. It cannot grow in the shade. It requires dry or moist soil.

### **Propagation/Phenology**

Reproduces by seed.

## Control Methods

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<b>Biological</b>	<b>Chemical</b>
None currently available	2,4-D, Chlorsulfuron, Clopyralid, Dicamba, Fluroxypyr, Glyphosate, Imazapic, Imazapyr, Isoxaben, Metsulfuron methyl, Sulfometuron methyl, and Triclopyr
<b>Cultural</b>	<b>Mechanical</b>
Maintain healthy stands of native vegetation, revegetation/ competitive planting, implement introduction prevention measures	Repeated hand pulling or grubbing of small infestations to cut and dig out roots and eliminate seed production

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**White Sweetclover Plant**

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**White Sweetclover Foliage**

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**White Sweetclover Flowers**

©Photo Courtesy of Elizabeth Bella, USDA Forest Service @ [www.forestryimages.org](http://www.forestryimages.org)



**White Sweetclover Flowering Inflorescences**

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