

Field Guide for Common California Rangeland and Pasture Plants

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Foreward

Range livestock grazing is California's most extensive agricultural land use. This publication provides the manager with photo aids for identification of the major pasture species and summarizes current information about their characteristics and management. Forage plants and habitats that support grazing are mostly grasses but are otherwise very diverse.

Here we organize 52 of the most common plant taxa into four categories: 1) rangeland pasture grasses; 2) rangeland broadleaved herbs; 3) irrigated pasture grasses; and 4) irrigated pasture broadleaved herbs. Most of these plants were introduced from the old world, both deliberately and by accident. Only a few of the species discussed are native and those are rangeland grasses.



Two excellent but older UC publications partially covered forage plants and their management for California pastures. Sampson et al. (1951) only included range grasses, and George et al. (1983) only commonly seeded grasses and legumes. A new treatment of range ecosystems by Spiegel et al. (2015) includes dryland pastures as synonymous with range and includes information about some of the most important species, but it does not include irrigated pastures. With recent changes in plant names, advances in management practices, and a need for a comprehensive coverage of plants on both dryland and irrigated pastures, an updated print handbook was judged necessary and is presented here.

James Bartolome, January 2016

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Policy and Management

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Rangeland Grasses: Annual Fescue

Common Name(s): Annual fescues (sixweeks fescue and rattail fescue)

Scientific Name: *Vulpia octoflora* (Walter) Rydb. (sixweeks fescue) and *Vulpia myuros* (L.) C.C. Gmel. (rattail fescue)

Life Cycle: Annual

Native or Introduced: Sixweeks fescue is native, rattail fescue is introduced

Site: Annual Rangeland

Elevation Range: Sea level to 4,500 feet

General information: These species were introduced most commonly for erosion control. They have the ability to grow in low moisture areas and shallow soils. One of their greatest assets in reproduction is their early maturity, which ensures seed production even in times of drought. Infestations of rattail fescue can be problematic in alfalfa fields because of the plant's resistance to many grass selective herbicides.

Livestock forage value: There is some value as a grazing plant when vegetative, but consumption is low as they mature due to sharp awns on the spikelet. Neither produce an abundance of biomass.



Annual Fescue (*Vulpia octoflora*)

Annual Ryegrass

Common Name(s): Annual ryegrass, Italian ryegrass

Scientific Name: *Lolium perenne* L. subsp. *multiflorum* (Lam.)

Husnot

Life Cycle: Annual

Native or Introduced: Introduced

Site: Annual Rangeland

Elevation Range: Sea level to 3,000 feet

General information: Annual ryegrass is one of the most desirable grasses on annual rangeland. Seed is readily available for low cost. Stands may need reseeding every several years to remain dominant. The most common variety in California is Gulf annual ryegrass, which is commonly referred to as Oregon annual ryegrass, though many equally productive varieties are available. Seeding rate can vary between 10 and 20 pounds/acre depending on desired stand density and planting method. Drill seeding requires the lower rate. A single fall application of glyphosate is acceptable for preplant weed control. Seed can be broadcast and harrowed or drill seeded.

Livestock forage value: Annual ryegrass is one of the most desirable forages at all stages of production.



Annual ryegrass (*Lolium perenne*)



Annual ryegrass (*Lolium perenne*)

Blue Wildrye

Common Name: Blue wildrye

Scientific Name: *Elymus glaucus*

Life Cycle: Summer dormant, cool season perennial, may begin growing before fall rains

Native or Introduced: Native

Site: Annual Rangeland

Elevation Range: Sea level to 8,000 feet

Drought tolerance: Prefers moisture and may even tolerate short duration flooding but tolerates drought.

General information: Blue wildrye is a tall, perennial bunchgrass. It's found on a variety of sites throughout California's foothills and lower mountain slopes. It can be associated with chaparral, open grasslands, as well as within open stands of oaks and conifers. Blue wildrye may be seeded on streambanks and swales for restoration projects. It germinates easily and has good seedling vigor.

Livestock forage value: It provides good forage quality in the early season, but may become too coarse. It will not tolerate heavy grazing.



Blue wildrye (*Elymus glaucus*)



Blue wildrye (*Elymus glaucus*)

Bottlebrush Squirreltail

Common Name: Bottlebrush Squirreltail

Scientific Name: *Sitanion hystrix* (Nutt) J.G. Sm.

Life Cycle: Cool season perennial

Native or Introduced: Native

Site: Rangeland

Elevation Range: Above 3,500 feet

Drought tolerance: High

General information: Generally not planted for range forage.

Livestock forage value: Considered to be fair forage for livestock grazing.



Bottlebrush squirreltail (*Sitanion hystrix*)

Bulbous Bluegrass

Common Name: Bulbous bluegrass

Scientific Name: *Poa bulbosa*

Life Cycle: Cool season biennial or short lived perennial

Native or Introduced: Introduced

Site: Rangeland

Elevation Range: Below 2,000 feet

Drought tolerance: High

General Information: Bulbous bluegrass is not generally planted for livestock forage. It produces a significant amount of seed and initially becomes established on disturbed sites.

Livestock forage value: Quality and palatability are good in the spring, and livestock will graze it. It generally doesn't produce large quantities of forage.



Bulbous bluegrass (*Poa bulbosa*)



Bulbous bluegrass (*Poa bulbosa*)

California Brome

Common Name: California Brome

Scientific Name: *Bromus carinatus*

Life Cycle: Cool season biennial or short-lived perennial.

Summer active above 5,000 feet

Native or Introduced: Native

Site: Annual Rangeland

Elevation Range: Sea level to 10,500 feet

Drought tolerance: Grows best in moderately dry to moderately moist soils but tolerates drought.

General information: California brome is most common in woodlands in the low-to mid-elevation foothills. Sometimes it can be locally abundant. Because this grass can establish rapidly and competes better than most native grasses with weeds, it is often used in native plantings for erosion control. If seeded too densely it can impede the establishment of other native grasses.

Livestock forage value: New growth is nutritious and palatable, but becomes fibrous when it matures. If grazed too heavy it will decrease in cover.



Joseph DiTomaso

California brome spikelet (*Bromus carinatus*)



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Joseph DiTomaso

California brome plant (*Bromus carinatus*)

California Melic

Common Name: California oniongrass

Scientific Name: *Melica californica*

Life Cycle: Cool season, summer dormant perennial bunchgrass

Native or Introduced: Native

Site: Annual Rangeland

Elevation Range: Sea level to 7,000 feet

Drought tolerance: Requires well-drained soils

General information: Prefers dry, exposed, rocky slopes and full sun to shade. Seedling vigor is weak, so this species may not appear and/or persist if seeded.

Livestock forage value: New growth provides good forage.



California melic (*Melica californica*)



California melic (*Melica californica*)

Cheatgrass

Common Name(s): Cheatgrass, Downy brome

Scientific Name: *Bromus tectorum* L.

Life Cycle: Winter annual

Native or Introduced: Introduced

Site: Intermountain Rangeland

Elevation Range: Above 2,500 feet

General information: Annual grass that has a very short growing period. It displaces desirable perennial species. It provides fuels for wild fire.

Livestock forage value: Most of the forage value for cattle is during its short growing period. After seed set grazing cheatgrass can result in mechanical injury to the grazing animal.



Cheatgrass (*Bromus tectorum*)

Creeping Wildrye

Common Name: Creeping wildrye

Scientific Name: *Leymus triticoides*

Life Cycle: Cool to warm season, long-lived perennial grass

Native or Introduced: Native

Site: Annual Rangeland

Elevation Range: Sea level to 7,500 feet

Drought tolerance: Can tolerate high summer temperatures but prefers wetter sites. It can withstand prolonged inundation.

General information: Creeping wildrye prefers full sun over shade. It grows best in heavy soils in riparian areas, bottomlands and meadows. It is commonly used in native restoration riparian project, although it may be difficult to establish due to delayed germination and poor seedling vigor. It can provide high quality game nesting and waterfowl habitat.

Livestock forage value: It can provide valuable forage because of its long green season; however, it is coarser than annual grasses. It resists trampling, recovers well from grazing and may withstand periodic heavy use.



Creeping wildrye (*Leymus triticoides*)

Crested Wheatgrass

Common Name: Crested wheatgrass

Scientific Name: *Agropyron cristatum* (L.) Gaertn.

Life Cycle: Perennial

Native or Introduced: Introduced

Site: Annual Rangeland

Elevation Range: Arid intermountain rangelands only

General information: Crested wheatgrass is the staple grass planted for erosion control and forage production in arid high elevation rangeland. It does not adapt to foothill and low-elevation areas. Good weed control and grazing deferral are required for stand establishment, but it is very drought tolerant and long-lived once established. Suited for areas not capable of producing stands of intermediate and pubescent wheatgrass, but these should be substituted for planting where possible due to their higher forage production.

Livestock forage value: Excellent forage species when vegetative and fair once mature.



Crested wheatgrass (*Agropyron cristatum*)



Crested wheatgrass (*Agropyron cristatum*)

Deergrass

Common Name: Deergrass

Scientific Name: *Muhlenbergia rigens*

Life Cycle: Warm season, very large perennial bunchgrass.

Native or Introduced: Native

Site: Annual Rangeland

Elevation Range: Sea level to 7,000 feet

Drought tolerance: Tolerates extreme conditions once established.

General information: This large, showy grass is found along streams, on the edge of meadows, in ditches and along roadsides, and in seeps on hillsides. It is long-lived but very difficult to start from seed. Grass culms were an important material for Native American baskets.

Livestock forage value: New foliage may be grazed but mature plants are coarse and not very palatable.



Deergrass (*Muhlenbergia rigens*)



Deergrass (*Muhlenbergia rigens*)

Dogtail Grass

Common Name(s): Hedgehog dogtail, dogtail, dogtail grass

Scientific Name: *Cynosurus echinatus* L.

Life Cycle: Annual

Native or Introduced: Introduced

Site: Annual Rangeland

Elevation Range: Sea level to 3,280 feet

General information: Dogtail is commonly found in areas with limited forage cover from other plants, including heavily grazed areas or shallow soils. It is adaptable to moisture regimes from seasonally wet to dry.

Livestock forage value: There is some value as a grazing plant when vegetative, but consumption is low as it matures due to sharp awns on the spikelet. It is not productive in terms of biomass.



Dogtail grass (*Cynosurus echinatus*)



Dogtail grass (*Cynosurus echinatus*)

Dryland Fescue

Common Name(s): Dryland fescue, Summer dormant tall fescue

Scientific Name: *Schedonorus arundinaceus* (Schreb.) Dumort., nom. cons.

Life Cycle: Cool season perennial

Native or Introduced: Introduced

Site: Annual Rangeland

Elevation Range: Foothill rangelands only. Not suited to high elevations due to winter active growth.

General information: Summer dormant tall fescue is one of the newest releases for range improvement in California. These tall fescue varieties should not be confused with summer active tall fescues commonly planted in irrigated areas and the intermountain region. Summer dormant fescue is winter active and will not take the excessively cold temperatures of high elevations. Likewise, plants are not productive during the warm summer months due to the dormancy required during the rainless summer season. Stands are very long lived, grazing tolerant, and drought tolerant. However, seedlings are very slow to grow during the first year and require complete weed control with a summer fallow prior to planting. Additionally, a deferral from grazing of one year is necessary after planting.

Livestock forage value: Generally very palatable unless allowed to become overgrown and rank.



Dryland fescue (*Schedonorus arundinaceus*)



Dryland fescue (*Schedonorus arundinaceus*)



Dryland fescue (*Schedonorus arundinaceus*)

Dryland Orchardgrass

Common Name: Orchardgrass

Scientific Name: *Dactylis glomerata*

Life Cycle: Summer dormant, cool season perennial

Native or Introduced: Introduced

Site: Annual Rangeland—Berber is the only suitable variety available

Elevation Range: Foothill, valley and coastal annual rangeland.

Not suited to intermountain areas

Drought tolerance: High (Due to summer dormancy)

General information: Commonly planted with the variety 'berber'. Planted at 3-5 pounds per acre. If a no-till drill is used, plant at a depth not to exceed ¼ inch. Excellent preplanting weed control is necessary for stand success. Most failed plantings are due to poor weed control and first season management. Susceptible to stand losses under continuous grazing. Requires 1-2 growing seasons to become grazing ready with deferment necessary during that time. Will go dormant when spring soil moisture is depleted and green back up when fall rains begin. It may persist and spread naturally from historical plantings in coastal grasslands.

Livestock forage value: Very palatable and is sought by livestock.



Dryland orchardgrass (*Dactylis glomerata*)



Dryland orchardgrass (*Dactylis glomerata*)



Dryland orchardgrass (*Dactylis glomerata*)

False Brome

Common Name(s): False brome

Scientific Name: *Brachypodium distachyon*

Life Cycle: Annual

Native or Introduced: Introduced

Site: Annual Rangeland

Elevation Range: Sea level to 2,000 feet

General information: False brome is commonly found in shallow or rocky soils in oak woodland and shrub land areas. The plant does well in a shaded environment and is commonly found in areas with a dense tree canopy, where other species are limited in adaptation.

Livestock forage value: False brome is of limited value as a grazing plant and is not productive.



False brome (*Brachypodium distachyon*)



False brome (*Brachypodium distachyon*)

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Goat Grass

Common Name(s): Barb and jointed goatgrass

Scientific Name: *Aegilops triuncialis* L. and

Aegilops cylindrica Host

Life Cycle: Annual

Native or Introduced: Introduced

Site: Annual Rangeland

Elevation Range: Sea level to 3,600 (Barb) 5,000 (Jointed)

General information: The goatgrass species is one of the worst weeds encountered on annual rangeland. Once invaded both produce a dense monoculture, which eliminates other forage species of value. Goatgrass is a close relative of wheat and occurs in dryland wheat pastures. Its presence greatly decreases the yield of wheat and also becomes a problematic source of infestation when wheat hay is transported and fed. They are difficult to selectively kill, and any control effort must be implemented for two years due to seed dormancy. It is imperative to begin control efforts at first detection to avoid widespread loss of the grazing resource from further infestation.

Livestock forage value: There is little value as a grazing plant when vegetative and no value as the plants mature.



Goat grass (*Aegilops triuncialis*)



Goat grass (*Aegilops triuncialis*)



Goat grass (*Aegilops triuncialis*)

Great Basin Wildrye

Common Name(s): Great Basin Wildrye

Scientific Name: *Elymus cinereus* Scribn. & Merr.

Life Cycle: Perennial

Native or Introduced: Native

Site: Intermountain Rangeland

Elevation Range: Above 4,500 feet

General information: Easily recognized by its tall stature. It is generally considered to be tolerant of fire.

Livestock forage value: It is most palatable in the early spring. It is susceptible to overgrazing because of the position of growing points. It can be grazed with less risk in the winter when the plants are dormant.



Great Basin wildrye (*Elymus cinereus*)

Harding Grass

Common Name(s): Harding Grass, alternative names bulbous canary-grass, koleagrass.

Scientific Name: *Phalaris aquatica* (L.)

Life Cycle: Perennial

Native or Introduced: Introduced

Site: Harding grass is widespread in California because it has been used as a forage species and for revegetating after fires. It is most common in coastal valley and foothill grasslands from Oregon to the Mexican border. Harding grass is typically found along roadsides that are seldom defoliated, allowing this tall, erect, leafy plant to dominate neighboring vegetation. It is also frequently found beside ditches and streams because it tolerates wet soil conditions. However, it also tolerates dry conditions because of its deep root system. It can be found on a wide range of soil types, growing best in high-fertility conditions but tolerating low-fertility soils (Lambrechtsen 1992).

Elevation Range: Sea level to 4,000 feet

General Information: Harding grass is an erect, waist-high, stout perennial grass with grayish to bluish green leaves. Flowering heads are dense, spike-like, and usually two to five inches long. It is slow to develop from seed, but can form large bunches after several years.

Livestock forage value: Forage production comes early in the season and stays green longer; providing adequate forage for livestock. However, this plant may become weedy or invasive in some regions or habitats and may displace desirable vegetation if not properly managed.



Harding Grass (*Phalaris aquatica*)



Harding grass (*Phalaris aquatica*)

Hare Barley and Mediterranean Barley

Common Name(s): Hare barley and Mediterranean barley, foxtails

Scientific Name: *Hordeum murinum* L.
subsp. *leporinum* (Link) Arcang. (hare barley) and
Hordeum marinum Huds. subsp. *gussoneanum* (Parl.)

Thell. (Mediterranean barley)

Life Cycle: Annual

Native or Introduced: Introduced

Site: Annual Rangeland

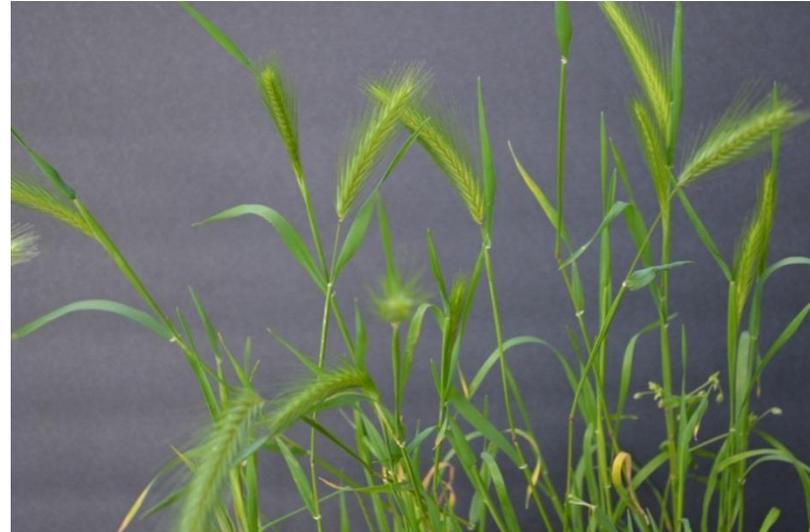
Elevation Range: Sea level to 5,000 feet

General information: These species look somewhat similar and are often confused. The awns of hare barley are much larger and a greater nuisance than Mediterranean. Hare barley is the more productive of the two forage species. Hare barley is common in good soils or areas of high fertility. Mediterranean barley is most often found in shallow soils where standing water is present or soils are saturated for part of the growing season. The bristle awns readily shatter when dry and can be problematic for dogs, livestock, and humans.

Livestock forage value: Both barley species are desirable forage when vegetative. However, they are one of the earlier maturing annuals and produce abrasive awns on their seed heads which make them very unpalatable and can lead to eye and mouth problems in livestock.



Mediterranean barley (*Hordeum marinum gussoneanum*)



Hare barley (*Hordeum murinum leporinum*)



Mediterranean barley (*Hordeum marinum gussoneanum*)

Idaho Fescue

Common Name: Idaho Fescue

Scientific Name: *Festuca idahoensis* Elmer

Life Cycle: Cool season perennial

Site: Intermountain rangeland

Native or Introduced: Native

Elevation Range: Above 5,000 feet

Drought tolerance: Moderate

General information: Some varieties of Idaho fescue are available as seed.

Livestock forage value: It is excellent forage for livestock and wildlife. It is susceptible to overgrazing.



Idaho fescue (*Festuca idahoensis*)

Chuck A. Ingels



Idaho fescue (*Festuca idahoensis*)

Chuck A. Ingels

Intermediate Wheatgrass

Common Name(s): Intermediate and pubescent wheatgrass
Scientific Name: *Thinopyrum intermedium* (Host) Barkworth & D.R. Dewey (intermediate wheatgrass) and *Thinopyrum intermedium* spp *barbulatum* (pubescent wheatgrass)
Life Cycle: Perennial
Native or Introduced: Introduced
Site: Annual Rangeland
Elevation Range: To 7,000 feet

General information: Intermediate and pubescent wheatgrass are the premier range improvement forage of higher elevations. They are not suitable for foothill rangelands and lower elevation areas. Pubescent wheatgrass is slightly more tolerant of dryer areas, though both require deep soils for good stands. Seedlings are generally weak during the planting year and require good weed control prior to planting. Grazing deferral may be required for several years to ensure adequate stand establishment. Once established, stands are long-lived, highly productive, and capable of limiting weed invasion including starthistle and grass weeds.

Livestock forage value: Excellent forage species.



Intermediate wheatgrass (*Thinopyrum intermedium*)



Intermediate wheatgrass (*Thinopyrum intermedium*)

Medusa Head

Common Name(s): Medusahead

Scientific Name: *Taeniatherum caput-medusae* (L.) Nevski

Life Cycle: Annual

Native or Introduced: Introduced

Site: Annual Rangeland

Elevation Range: Sea level to 7,000 feet

General information: Medusahead is one of the only grass species adapted to both the foothills and intermountain areas. In both habitats, it inhibits other species with its thatch that often takes several years to decompose due to its high silica content. It is one of the most widespread rangeland weeds in California. It is capable of displacing both desirable non-native and introduced forages.

Livestock forage value: Medusahead forage quality is very low and very little grazable biomass is produced.



Medusahead (*Taeniatherum caput-medusae*)



Medusahead (*Taeniatherum caput-medusae*)

Pine Bluegrass

Common Name: Pine bluegrass

Scientific Name: *Poa secunda* spp.*secunda*

Life Cycle: Cool season, summer dormant perennial bunchgrass

Native or Introduced: Native

Site: Annual Rangeland

Elevation Range: Sea level to 12,500 feet

Drought tolerance: Dry to moist soils

General information: This shallow-rooted grass grows throughout California on a variety of sites including dry woodlands, rocky slopes in semi-desert areas, foothills and ridgetops. It likes good soil and generally needs more rainfall than Nassellas.

Livestock forage value: High forage value. It can provide good forage throughout the summer.



Pine bluegrass (*Poa secunda*)



Pine bluegrass (*Poa secunda*)

Purple Needlegrass and Nodding Needlegrass

Common Name: Purple needlegrass

Scientific Name: Purple needlegrass: *Nassella pulchra*
(Hitchc.) Barkworth, nodding needlegrass:

Nassella cernua (Stebbins & R.M. Love) Barkworth

Life Cycle: Cool season, summer dormant perennial
bunchgrass

Native or Introduced: Native

Site: Annual Rangeland

Elevation Range: Sea level to 4,200 feet

Drought tolerance: It is adapted to drought and grows well in
full sun or partial shade.

General information: Purple needlegrass is the California State
Grass. These grasses are very similar and distinction between
the two is usually done through differing length of awns once
mature. Otherwise they are nearly identical. They are native
to chaparral, oak woodlands and grasslands in the valleys and
foothill ranges of California. They are very rarely found in
dense stands but can be wide spread. Complete weed control
and bare ground is necessary to establish from seed. An
increase in the stand density is rare with the exception of years
following a spring fire, which increases established plant vigor
and seedling establishment. Once established, the root systems
are extensive and provide excellent erosion control potential.

Livestock forage value: The plants are palatable during fall
green, which can occur prior to annual grass germination, but
become course and unpalatable as the season progresses. Plants
may need protection from grazing during flowering to provide
for seeds and nutrient storage in the crown.



Purple needlegrass (*Nassella pulchra*)



Purple needlegrass (*Nassella pulchra*)

Red Brome

Common Name(s): Red Brome

Scientific Name: *Bromus rubens* L.

Life Cycle: Annual

Native or Introduced: Introduced

Site: Annual Rangeland

Elevation Range: Sea level to 7,000 feet

General information: Red brome's large seed size make it adapted to high thatch areas, thus it proliferates in light- or no-grazing situations. It does very well in drought situations, and its range is expanding.

Livestock forage value: Red brome is fairly palatable when vegetative and growing. The long awns on its seed head can cause eye and mouth problems for livestock.



Red brome (*Bromus rubens*)



Red brome (*Bromus rubens*)



Red brome (*Bromus rubens*)

Ripgut Brome

Common Name: Ripgut Brome

Scientific Name: *Bromus diandrus* Roth

Life Cycle: Annual

Native or Introduced: Introduced

Site: Annual Rangeland

Elevation Range: sea level to 6,500 feet

General information: Ripgut brome is the dominant grass in ungrazed areas. It thrives in heavy thatch and high fertility soils, such as under oak canopy where it utilizes the added nutrients provided by the trees. Populations are high in good soils but much less so in shallow and low fertility soil. It is very productive but cover is lessened with heavy grazing.

Livestock forage value: Ripgut brome is very palatable when vegetative and growing. The long awns on its seed head can cause eye and mouth problems for livestock.



Ripgut brome (*Bromus diandrus*)



Ripgut brome (*Bromus diandrus*)

Sandberg Bluegrass

Common Name(s): Sandberg Bluegrass

Scientific Name: *Poa secunda* J. Presl

Life Cycle: Perennial

Native or Introduced: Native

Site: Intermountain Rangeland

Elevation Range: Above 4500 feet

General information: Bunch grass that is generally not over 12 inches. One of the first plants to start growth in the spring.

Livestock forage value: considered good forage for cattle and fair for sheep. While quality of the forage is generally good, the quantity of forage produced is somewhat low.



Sandberg bluegrass (*Poa secunda*)

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Sandberg bluegrass (*Poa secunda*)

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Silver Hairgrass

Common Name(s): Silver hairgrass

Scientific Name: *Aira caryophyllea* L.

Life Cycle: Annual

Native or Introduced: Introduced

Site: Annual Rangeland

Elevation Range: Sea level to 6,000 feet

General information: Silver hairgrass is highly adapted to shallow soils. It is not tolerant of heavy thatch and is rarely seen on good soils, unless there is a high level of compaction. Due to its low-growing potential, it is not competitive with other grasses and is only usually found when competition is lacking.

Livestock forage value: Silver hairgrass is moderately palatable, but due to its low level of production it offers limited value as forage.



Silver hairgrass (*Aira caryophyllea*)



Silver hairgrass (*Aira caryophyllea*)



Silver hairgrass (*Aira caryophyllea*)

Slender Oat and Wild Oat

Common Name(s): Slender Oat (*A. barbata*), Wild Oat (*A. fatua*)

Scientific Name *Avena barbata*, *Avena fatua*

Life Cycle: Cool-season annual

Native or Introduced: Introduced

Site: Annual Rangeland

Elevation Range: Sea level to about 3,900 feet

General information: Wild oat and slender oat are similar in appearance. They resemble cultivated oats but have finer stems and a smaller grain. Wild oats have a dense root system. A single *Avena* plant can produce $\frac{1}{4}$ mile of roots. They are listed as a noxious weed in 46 states, including California. On California rangeland, *Avena* is considered a desirable forage species.

Livestock forage value: The forage value is similar to cultivated oats. It is most nutritious and palatable when green.



Slender oat (*Avena barbata*)

Soft Chess

Common Name(s): Soft Chess, Blando brome, Bronco grass, Soft brome

Scientific Name *Bromus mollis*

Life Cycle: Annual

Native or Introduced: Introduced

Site: Annual Rangeland

Elevation Range: Sea level to 4,000 feet

General information: Frequently allowed by NRCS for reseeding annual rangeland. Planted at 10-15 lbs per acre most commonly using the variety 'blando'. If a no-till drill is used, plant at a depth not to exceed 1/4". Soft chess can be planted using a harrow and broadcast technique so long as the seed is covered. This species can be planted on poorer sites. Little to no weed control necessary prior to planting.

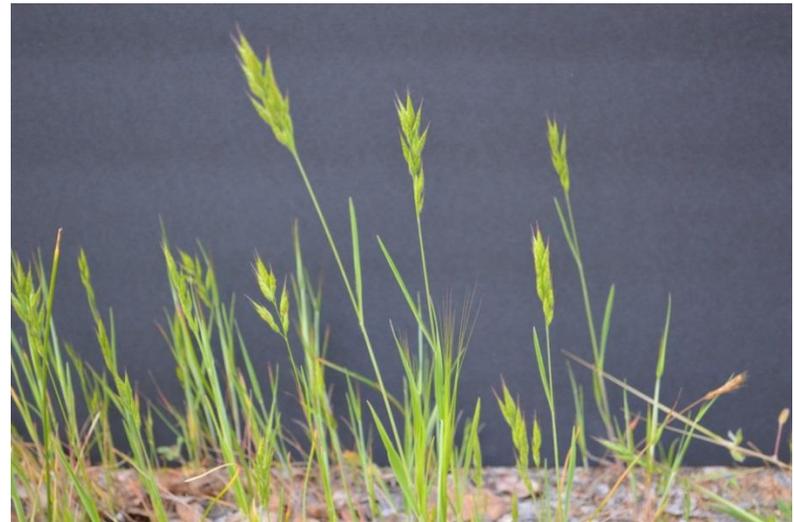
Livestock forage value: Cattle will readily consume soft chess during the green feed season.



Soft chess (*Bromus mollis*)



Soft chess (*Bromus mollis*)



Soft chess (*Bromus mollis*)

Tall Wheatgrass

Common Name(s): Tall wheatgrass

Scientific Name: *Thinopyrum ponticum* (Podp.) Z.-W. Liu & R.C. Wang

Life Cycle: Perennial

Native or Introduced: Introduced

Site: Annual Rangeland

Elevation Range: Sea level to 5,000 feet

General information: Tall wheatgrass is the only wheatgrass which has shown persistence in the lower-elevation foothills of California. However, due to its adaptation to colder climates, it has little winter production. The vast majority of production occurs in late spring and early summer. It has limited utility as a sole planting in lower-elevation foothills, but may be combined with other rangeland perennials because it does stay green well into summer. In the higher elevations better planting options include intermediate and pubescent wheatgrass in good soils, and crested wheatgrass in shallow soils.

Livestock forage value: Palatable when young and growing but becomes very coarse if not mowed or grazed heavily.



Tall wheatgrass (*Thinopyrum ponticum*)



Tall wheatgrass (*Thinopyrum ponticum*)

Western Needlegrass

Common Name(s): Western Needlegrass

Scientific Name: *Stipa occidentalis*

Life Cycle: Perennial

Native or Introduced: Native

Site: Intermountain Rangeland

Elevation Range: Above 4,000 feet

General information: Considered drought tolerant. Generally grows from 1-3 feet in height.

Livestock forage value: Provides good source of forage in the spring before the seeds develop. Once seeds are hard, mechanical injury to livestock can occur. Can be grazed in the fall after rain softens the seeds.



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Western needlegrass (*Stipa occidentalis*)



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Western needlegrass (*Stipa occidentalis*)

Rangeland Broadleaves: California Burclover

Common Name(s): California burclover

Scientific Name: *Medicago polymorpha* L.

Life Cycle: Annual

Native or Introduced: Introduced

Site: Annual Rangeland

Elevation Range: Sea level to Sierra Nevada Mountains

General information: Burclover is a shallow rooted annual legume. The characteristic growth habit of burclover is one of numerous prostrate stems branching from the crown and spreading outward 6 to 30 inches. As a winter annual, burclover germinates in autumn following the first rains of the season and matures early in the summer. It is particularly adapted to mild, moist winters and hot, dry summers. Optimal annual rainfall for burclover is 10 to 25 inches. It will succeed in many soil types, heavy loams are most suitable. This species inhabits all exposures and grows well under light conditions varying from full sunlight to heavy shade. It is tolerant of slightly alkaline conditions and is less acid tolerant than subterranean clover. Favorable growth is usually restricted to a soil pH range of 4.7 to 8.0. Flowering period for burclover commonly begins in February; on very moist soils, plants are later maturing than on well-drained lands. Alafafa weevil can be a devastating pest to Burclover.

Livestock forage value: All classes of livestock except horses and mules will eat burclover readily, especially when the plant is maturing. Mature stands are highly nutritious and, when abundant, may serve as a finishing feed for lambs. Where growth is lush, the herbage has been known to cause bloat in livestock, particularly those unaccustomed to grazing it.



California burclover (*Medicago polymorpha*)

Jack Kelly Clark



California burclover seedling (*Medicago polymorpha*)

Jack Kelly Clark

Crimson Clover

Common Name(s): Crimson clover

Scientific Name: *Trifolium incarnatum*.

Life Cycle: Annual

Native or Introduced: Introduced

Site: Rangeland

Elevation Range: Sea level to 3,000 feet

General information: Showy red clover frequently used as a cover where soil disturbance has occurred. Seeding rates are usually about 10 to 15 pounds per acre. Adequate levels of phosphorus and sulfur are required for optimal production. Does not generally persist as well as rose and sub clovers.

Livestock forage value: Good.



Crimson clover (*Trifolium incarnatum*)



Crimson clover (*Trifolium incarnatum*)

Filaree

Common Name(s): Filaree, storksbill, alfilaria

Scientific Name: *Erodium spp.*

Life Cycle: Annual

Native or Introduced: Introduced

Site: Annual Rangeland

Elevation Range: Sea level to 3,000 feet

General information: Filaree is the most dependable forb species on annual rangeland because of its deep taproot making it very drought tolerant. In heavily-grazed or drought situations it can become the dominant species present. The four species most common to California includes broadleaf, white stem, short fruit, and red stem. Though not highly productive, the forage quality of Filaree is excellent, rivaling clover, though it is a high nitrogen user and is not capable of fixing nitrogen like most trifolium species.

Livestock forage value: Excellent forage species.



Filaree (*Erodium*)

Rose Clover

Common Name: Rose clover

Scientific Name *Trifolium hirtum*

Life Cycle: Annual

Native or Introduced: Introduced

Site: Valley, coastal and foothill annual rangeland. Monte frio variety is variety suitable for mountains

Elevation Range: Sea level to 4,000 feet

General information: Frequently allowed by NRCS for reseeding annual rangeland. Generally planted in a mix with other annual clovers. Total rate for annual five to ten pounds. If a no-till drill is used, plant at a depth not to exceed ¼ inch. Additions of phosphorus and sulfur will help improve success of planting. Rose clover is one of the more hardy legumes for range planning. This species can be planted on poorer sites. Little to no weed control is necessary prior to planting.

Livestock forage value: Rose clover is not as readily consumed by cattle during the green feed season, however, is readily consumed once dry and carries over well for fall feed.



Rose clover (*Trifolium hirtum*)



Rose clover (*Trifolium hirtum*)

Subclover

Common Name(s): Subterranean Clover, subclover

Scientific Name: *Trifolium subterraneum*

Life Cycle: Annual

Native or Introduced: Introduced

Site: Rangeland

Elevation Range: Sea level to 3,000 feet

General information: Subclover is frequently found on range sites below 3,000 feet. It tolerates acidic soils well. Subclover has small, white or pink flowers. After flowering, the seedheads point to the ground. If the head is in contact with the ground, the bristles pull the seed into the ground. Early, midseason, and late maturing subclover varieties are generally planted together to help assure availability for livestock throughout the grazing season. In dryer areas, earlier maturing varieties have a better opportunity to regenerate through seed production. Protein levels in young plants approach 20% and decline to 8% in dry mature forage. Subclover is readily grazed at all stages of production. Adequate levels of phosphorus and sulfur are required for optimal production. Additionally, heavy grazing is required to maintain the stand. Subclover will quickly diminish when thatch is present. Similar to other legumes, subclover will fix nitrogen if properly inoculated and seeded.

Livestock forage value: Good.



Subclover (*Trifolium subterraneum*)



Subclover (*Trifolium subterraneum*)

Vetch

Common Name: Vetch (Lana)

Scientific Name: *Vicia dasycarpa*

Life Cycle: Annual

Native or Introduced: Introduced

Site: Rangeland

Elevation Range: Sea level to 3,000 feet

General information: Vetch is frequently found on range sites below 3,000 feet. It tolerates alkaline and acid soils well. The most commonly planted variety on rangeland is Lana, which reseeds itself well due to its early maturity. Seed is relatively inexpensive and readily available. Other varieties grow well but often don't persist over time. Vetch is high in protein. It is not generally consumed when green; however, once mature it is sought out and readily eaten. Adequate levels of phosphorus and sulfur are required for optimal production. Vetch is one of the highest nitrogen producing legumes if properly inoculated and seeded.

Livestock forage value: Good.



Vetch (*Vicia dasycarpa*)



Vetch (*Vicia dasycarpa*)

Irrigated Pasture



Irrigated Pasture: Barnyard or Watergrass

Common Name (s): Barnyardgrass, water grass

Scientific Name: *Echinochloa crus-gallis*

Life Cycle: Warm season Annual

Native or Introduced: Introduced

Site: Irrigated pasture

Elevation Range: Below 5,000 feet

Drought tolerance: High

General Information: Barnyardgrass is not planted for livestock forage. Stems tend to be reddish to deep purple in color. It can be highly variable in appearance. Barnyardgrass is often found in irrigated pastures that have very heavy clay soils or poor drainage. The first signs of invasion are most often at the end of flood irrigated pastures where standing water is more likely. It also becomes more dominant as a planted stand is diminished, usually from standing water.

Livestock forage value: Quality is poor and palatability moderate. Frequently displaces more desirable forage species.



Barnyardgrass (*Echinochloa crus-gallis*)



Barnyardgrass (*Echinochloa crus-gallis*)



Barnyardgrass (*Echinochloa crus-gallis*)

Bermudagrass

Common Name: Bermuda grass
Scientific Name: *Cynodon dactylon*
Life Cycle: Warm season perennial
Native or Introduced: Introduced
Site: Irrigated pasture
Elevation Range: Below 2,000 feet
Drought tolerance: High

General Information: Generally not planted as part of an irrigated pasture mix in the Sacramento or Northern Central valley of California. It is commonly used in the San Joaquin Valley and Southern California for pastures that require a thick sod to withstand abuse such as horse pastures. Bermudagrass frequently comes into established irrigated pasture through contamination (birds, livestock irrigation water, etc.) and can become a problem as it displaces more productive species, especially desirable clovers. In Northern California plantings remain very short with low yields that spread by seed, stolons, and/or rhizomes. Yields are higher in the San Joaquin Valley and further south. It can be highly invasive in all of California.

General value as forage for livestock: Generally palatable and nutritious during the growing season, but low yielding.



Bermudagrass (*Cynodon dactylon*)



Bermudagrass (*Cynodon dactylon*)



Bermudagrass (*Cynodon dactylon*)

Broomsedge

Common Name: Broomsedge

Scientific Name: *Andropogon virginicus*

Life Cycle: Warm season perennial

Native or Introduced: Native

Site: Irrigated pasture

Elevation Range: Below 2,000 feet

Drought tolerance: High

General Information: Broomsedge is not planted for livestock forage. It is easily distinguished from other species by its reddish orange color in the fall. Some references note it prefers loose, sandy and moist sites with low fertility. Broomsedge is a shallow rooted plant and an indicator of low soil phosphorus.

Livestock forage value: Quality and palatability are poor. Frequently displaces more desirable forage species.



Broomsedge (*Andropogon virginicus*)



Broomsedge (*Andropogon virginicus*)

Dallisgrass

Common Name: Dallisgrass

Scientific Name: *Paspalum dilatatum*

Life Cycle: Warm season perennial

Native or Introduced: Introduced

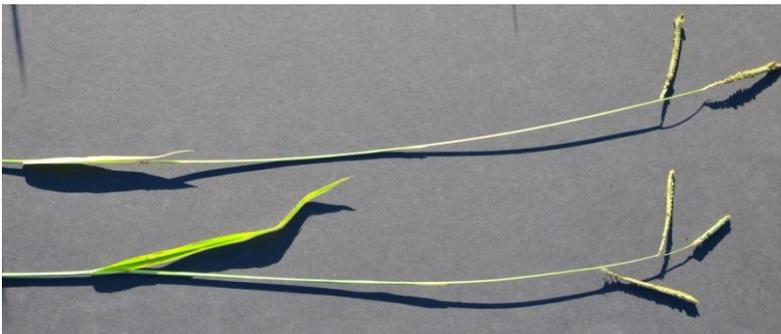
Site: Irrigated pasture

Elevation Range: Below 1,300 feet

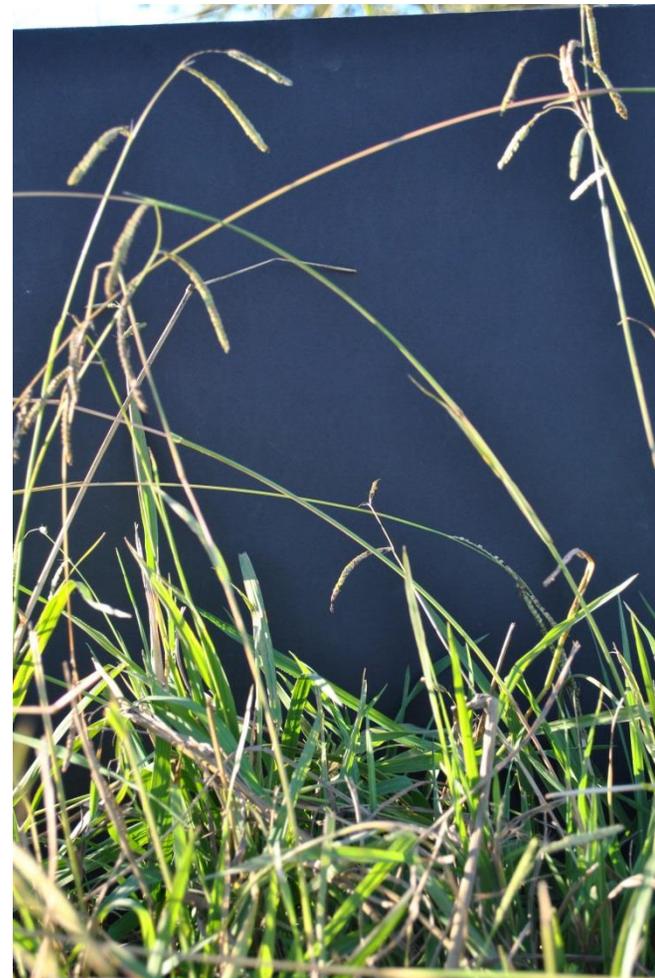
Drought tolerance: High

General Information: Dallisgrass is not planted for livestock forage in the central valley of California. It is a warm season perennial that comes into fields as a contaminant (birds, livestock, water, etc). Most producers don't attempt to remove it from fields because it produces during the hottest months of the summer. It lacks the nutrient quality of orchard grass.

Livestock forage value: Livestock will readily consume dallisgrass. It fills an important production niche during the hot summer months.



Dallisgrass (*Paspalum dilatatum*)



Dallisgrass (*Paspalum dilatatum*)

Johnsongrass

Common Name: Johnsongrass

Scientific Name: *Sorghum halepense*

Life Cycle: Warm season perennial

Native or Introduced: Introduced

Site: Irrigated pasture

Elevation Range: Below 2,600 feet

Drought tolerance: High

General Information: Johnsongrass is not planted for livestock forage. Johnsongrass belongs to the sorghum family, and when stressed by dry weather or cold temperatures it can contain high levels of prussic acid, which is toxic to livestock. It reproduces vigorously both by seed and rhizomes. Once established, it can become a problem in pastures.

Livestock forage value: Less Desirable. Livestock will consume Johnsongrass. It is important to know that Johnsongrass belongs to the sorghum family, and when stressed by dry weather or cold temperatures it can contain high levels of prussic acid, which is toxic to livestock. It has also been reported to be a nitrate accumulator.



Johnsongrass (*Sorghum halepense*)



Johnsongrass (*Sorghum halepense*)

Orchardgrass

Common Name: Orchard grass

Scientific Name: *Dactylis glomerata*

Life Cycle: Cool season perennial

Native or Introduced: Introduced

Site: Irrigated pasture—Potomic is a popular cultivar

Elevation Range: All elevations

Drought tolerance: Low

Suitability for Planting: Generally planted as part of an irrigated pasture mix. Depending upon planting method, the irrigated pasture mix is generally planted at 15-25 lbs per acre with broadcast method at the higher rate. As a cool season plant, this species is more productive in spring and early summer. Orchard grass is much shallower rooted than tall fescue and lacks the drought tolerance. Higher crowns make it susceptible to stand loss from close grazing. Suitable for hay production.

Livestock forage value: Very palatable and is sought by livestock.



Orchardgrass (*Dactylis glomerata*)



Orchardgrass (*Dactylis glomerata*)

Perennial Ryegrass

Common Name(s): Perennial ryegrass

Scientific Name: *Lolium perenne* L.

Life Cycle: Short-lived perennial

Native or Introduced: Introduced

Site: Low elevation irrigated pasture

Elevation Range: Sea level to low-elevation foothills only

General information: Though it is not as productive as other forages available in irrigated pastures, perennial ryegrass is the highest quality forage grass available. It requires ample irrigation for survival and productivity. Reseeding every three to four years is necessary to maintain a stand, as the grass is not long lived and will not maintain itself through seed production. Perennial ryegrass hybridizes with annual ryegrass making it difficult to differentiate after seeding.

Livestock forage value: Excellent forage species.



Perennial ryegrass (*Lolium perenne*)

Pigeongrass

Common Name(s): Pigeongrass, yellow foxtail

Scientific Name: *Setaria glauca*

Life Cycle: Annual

Native or Introduced: Introduced

Site: Irrigated pasture

Elevation Range: Below 5,500 feet

Drought tolerance: Moderate

General Information: Pigeongrass is not planted for livestock forage. It produces a significant amount of seed and initially becomes established on disturbed sites.

Livestock forage value: Quality and palatability are poor—livestock avoid it. Frequently displaces more desirable forage species.



Pigeongrass (*Setaria glauca*)



Pigeongrass (*Setaria glauca*)

Smutgrass

Common Name: Smutgrass

Scientific Name: *Sporobolus indicus*

Life Cycle: Warm season perennial

Native or Introduced: Introduced

Site: Irrigated pasture

Elevation Range: Below 3,900 feet

Drought tolerance: High

General Information: Smutgrass is not planted for livestock forage. At first glance it looks like a desirable bunchgrass but as the season progresses it develops a distinct spike-like seedhead that is not branched. It produces a significant amount of seed and initially becomes established on disturbed sites.

Livestock forage value: Quality and palatability are poor—livestock avoid it. Frequently displaces more desirable forage species.



Smutgrass (*Sporobolus indicus*)



Smutgrass (*Sporobolus indicus*)

Tall Fescue

Common Name: Tall fescue

Scientific Name: *Lolium arundanacie*

Life Cycle: Cool season perennial

Native or Introduced: Introduced

Site: Irrigated pasture

Elevation Range: All elevations

Drought tolerance:

General Information: Generally planted as part of an irrigated pasture mix. Depending upon planting method, the irrigated pasture mix is generally planted at 15-25 pounds per acre with broadcast method at the higher rate. Endophyte infested seed can result in reduced weight gains in cattle and reproductive problems with horses. Endophyte free varieties are available. As a cool season plant, this species is more productive in spring and early summer. Established tall fescue planting are deeper rooted than other irrigated pasture plants and are capable of seeking water from deeper in the soil profile.

Livestock forage value: If not grazed heavily enough can become rank. Stems can cause mechanical injury to eyes.



Tall fescue (*Lolium arundanacie*)

Timothy

Common Name: Timothy

Scientific Name: *Phleum pratense*

Life Cycle: Cool season short perennial

Native or Introduced: Introduced

Site: Irrigated pasture

Elevation Range: Below 2,000 feet

Drought tolerance: Low

General Information: Generally planted as part of an irrigated pasture mix above 2,000 feet in elevation. It is adapted to a cool and humid climate. Timothy is not adapted to foothill or valley locations. It is generally seeded in mixtures with legumes. Common seeding rates are 8-10 pounds per acre. Timothy is responsive to nitrogen fertilizer but is generally only productive for a single cutting. After a first cutting, the residual is generally grazed off, with very little regrowth occurring.

Livestock forage value: Considered to be palatable and nutritious by all livestock species.



Timothy (*Phleum pratense*)



Timothy (*Phleum pratense*)

Irrigated Pasture: Red Clover

Common Name(s): Red clover

Scientific Name: *Trifolium pratense* L.

Life Cycle: Biennial

Native or Introduced: Introduced

Site: Irrigated pasture

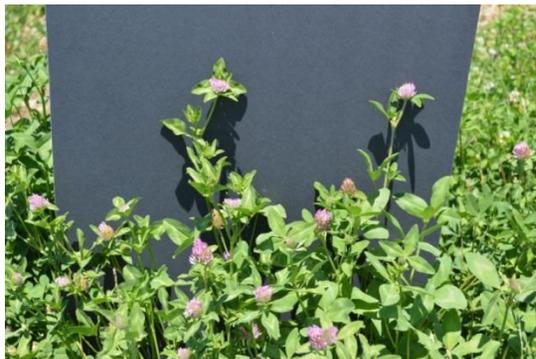
Elevation Range: Sea level to Intermountain irrigated pastures

General information: Red clover is an upright clover with moderate to low ability to reseed itself for persistence. It is most suited to haying, as grazing will severely limit seed production. Seed is easily obtained and very inexpensive. It is generally planted as a companion to a permanent pasture to provide quick cover and a late spring hay crop while the other planted perennial species are establishing the first year. Seeding rates are usually only at one to two pounds per acre.

Livestock forage value: Excellent forage species.



Red clover (*Trifolium pratense*)



Red clover (*Trifolium pratense*)



Red clover (*Trifolium pratense*)

Trefoil

Common Name(s): Birdsfoot trefoil (narrow leaf)

Scientific Name: *Lotus tenuis*

Life Cycle: Perennial

Native or Introduced: Introduced

Site: Irrigated pasture

Elevation Range: Sea level to 3,000 feet

General information: Narrowleaf trefoil is well suited to heavy, poorly drained soils. It is more tolerant of acidic soils. Because it is shallow rooted, it is not drought tolerant. It is not as productive as ladino clover. Trefoil is easily distinguished by the yellow flower located at the extremity of the plant. It sometimes makes up about 10% of an irrigated pasture seed mix. Adequate levels of phosphorus and sulfur are required for optimal production.

Livestock forage value: Good.



Trefoil (*Lotus tenuis*)

White Clover

Common Name(s): White Clover, Ladio clover

Scientific Name: *Trifolium repens*.

Life Cycle: Biennial

Native or Introduced: Introduced

Site: Irrigated pasture

Elevation Range: Sea level to Intermountain irrigated pastures

General information: White clover is a low clover with moderate ability to reseed itself. It spreads with runners that can root from the nodes. It is most suited to haying and/or grazing. Seed is easily obtained and very inexpensive. It is generally planted as a companion to grasses in a permanent pasture seed. Seeding rates are usually about 10% of a pasture seed mix. Adequate levels of phosphorus and sulfur are required for optimal production.

Livestock forage value: Excellent forage species.



White clover (*Trifolium repens*)



White clover (*Trifolium repens*)



White clover (*Trifolium repens*)

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