Plant Guides Highlighting Introduced Plant Varieties

United States Department of Agriculture

NRCS Natural Resources Conservation Service

Releases from the NRCS Lockeford, California Plant Materials Center

Plant Materials Program

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ORCHARDGRASS

Dactylis glomerata L.

plant symbol = DAGL

Contributed by: USDA NRCS Pullman Plant Materials Center, Rose Lake Plant Materials Center, Idaho State Office & Aberdeen Plant Materials Center; USDA ARS Forage & Range Laboratory

Robert Mohlenbrock
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@ PLANTS

Alternate Names
Cocksfoot

Uses
Grazing/Hayland: The primary use of orchardgrass is for forage production. It is used for pasture, hay and silage. It is highly palatable to all classes of livestock. Orchardgrass is one of the best forage grasses for use in the Northern states under intensive rotational grazing systems.

Erosion control: Because of its dense network of non-rhizomatous roots, orchardgrass provides good erosion control on those soils to which it is adapted.

Wildlife: Elk and deer find orchardgrass highly palatable and will utilize it most of the year. Orchardgrass is sometimes used in grass-legume mixes for nesting brood rearing, and escape and winter cover in upland wildlife and conservation plantings. However, upland birds and waterfowl prefer taller grasses that develop sparser stands such as basin wildrye and tall wheatgrass.

Status
Consult the PLANTS Web site and your State Department of Natural Resources for status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Description
Dactylis glomerata, orchardgrass, is a long-lived, introduced, cool season bunchgrass. Under dryland conditions, it usually develops distinct clumps and flower culms 15 to 18 inches tall. Leaves usually stand less than 12 inches in height. When grown under irrigation or in moist-fertile situations, it attains a much larger stature and grows in a more closed stand. Orchardgrass is one of the earliest species to initiate growth in the spring and makes tremendous growth during cool conditions. Due to deep roots (most within 2 feet of the surface) it is also capable of strong summer growth when conditions are favorable (i.e. somewhat cool). Under extremely hot conditions, orchardgrass will have a bigger production slump than meadow brome. Orchardgrass has 540,000 seeds per pound.

Adaptation
Orchardgrass is found from Maine to the Gulf Coast states and from the Atlantic Coast to the Pacific Coast. It is common throughout the Appalachian Mountains and is especially well adapted to Maryland, Pennsylvania, West Virginia, Virginia, Kentucky, and Tennessee. It is also found in the high-rainfall regions of the western mountains and in irrigated areas throughout the West. Areas of greatest adaptability in the West are soils that had supported the sagebrush, grass, pinyon-juniper, ponderosa pine, aspen and Douglas fir communities.

Orchardgrass is winter hardy and is adapted to moderate to well-drained basic to acidic soils. It will not tolerate soils that are saturated for extended periods of time. It produces best in areas with very little frost in the spring. Spring frost will not kill orchardgrass, but it does reduce overall production. In areas with significant spring frost such as mountain valleys, meadow brome is a better species selection.

Orchardgrass performs well on soil textures ranging from clay to gravely loams and on shallow to deep soils. It does not grow well in saline soils and areas with high water tables within the rooting zone. It has the ability to establish and persist in areas that receive as little as 16 inches of annual precipitation, but performs best with 18 inches of rainfall.

Orchardgrass performs best in a pH range of 5.8 – 7.5, but will tolerate pH as high as 8.5. It is adapted to shady areas or areas with reduced light.

Establishment
A clean, firm, weed-free seedbed is recommended. Dryland and erosion control seedings should be made in the late fall or very early spring. Irrigated seedings should be made in early to mid spring. Do not seed after the spring moisture period is well advanced or a failure may occur because of dry seedbed conditions and hot summer temperatures before the grass is well established. A deep furrow or double disc drill with press wheels may be used, however, orchardgrass is easily established with common agricultural drills. The recommended seeding rate for orchardgrass is 4 pounds pure live seed (PLS) per acre. If broadcast seeded or planted for critical area treatment, double the seeding rate. Adjustments in seeding rate should be made when seeding in mixtures. Seeding depth should be 1/4 to 1/2 inch.

Management
Under dryland conditions the new planting should not be grazed until late summer or fall of the second growing season. The plants may be severely damaged by overgrazing especially in the seedling year. Under irrigated conditions the new planting should not be grazed until late summer or fall of the first growing season. The plants may be severely damaged by grazing too soon.

Use no more than 60% of the annual growth during the winter season or 50% during the growing season. Close grazing in the fall is consistently associated with winterkill. This plant responds well to rotation-deferred grazing systems. Periodically the grass should be allowed to mature and produce seed for continuation of the stand.

Orchardgrass responds very well to good fertility management. It is one of the most responsive pasture grasses to nitrogen applications. One strategy to even out the forage production is to fertilize the stand after the first and second cutting or grazing period to boost late spring and summer production. Apply fertilizer based on soil tests.

Seed Production
When planting for seed increase, recommended row spacing is 28 to 40 inches. Seeding rate is 1.5 to 2 pounds PLS per acre to seed 25 to 30 PLS per linear foot of row. Irrigated seed yields are commonly 250 to 300 pounds per acre. Seed matures evenly and is ready for harvest in mid-July. Windrowing followed by combining is the preferred method of harvest. When direct combining the seed should be dried to 12 percent moisture in bins and 15 percent moisture in sacks before storing.

Pests and Potential Problems
Brown stripe, scald, rust and leaf spot are the most prevalent and destructive disease in orchardgrass. Resistance to these varies among cultivars. Japanese and green June beetle larvae feed on orchardgrass roots; sawflies feed on their tops. Little is known, however, about the economic loss caused by these insects.

Orchardgrass does not spread vegetatively and is much less invasive than many other grasses. Consult the PLANTS Plant Profile for references pertaining to invasive qualities. Seeds can collect on animal coats and be transported long distances. Watering and bedding areas are typical sites where orchardgrass may colonize.

Orchardgrass seed is a common contaminant of turfgrass seed. While mowing prevents further spread, individual orchardgrass plants persist and lower the aesthetic value of the turf.

Cultivars, Improved, and Selected Materials (and area of origin)
There are many orchardgrass releases available. Consult local experts to select the best release for your area. Orchardgrass cultivars fall into two types: early maturing and late maturing. The late maturing cultivars are more common. The most common releases used in the Intermountain West are described below.

'Latar' was released in 1957 and is still commonly seeded in pasture and hayland plantings. It has a low lignin (fiber) content and digestibility is very high. It matures 10 to 14 days later than common orchardgrass and is usually in the pre-bloom stage when alfalfa is at the optimum growth stage for cutting hay. Therefore a mixture of 'Latar' and alfalfa makes a high quality hay. Forage yields of 'Latar' are at least as much per acre as the earlier maturing varieties and forage quality is generally superior. The venerable old 'Latar' has lost some of its market-share to newer cultivars, which exhibit

disease tolerance and winter hardiness. 'Latar' Breeder seed is maintained by the Pullman, Washington Plant Materials Center.

'Paiute' is a cultivar that produces an abundance of basal leaves and leafy upright stems. Its intended use is for forage production on arid lands. 'Paiute' is considered somewhat more drought tolerant than other varieties of orchardgrass. However, it generally does not perform well below 16-inch rainfall areas. At very high elevations (6500 feet plus), it may perform well at slightly lower rainfall amounts. It matures too early to be compatible with alfalfa. 'Paiute' Breeder and Foundation seed is maintained by the Aberdeen, Idaho Plant Materials Center.

'Potomac' is a productive, persistent, rust-resistant cultivar that produces good yields but matures too early to be compatible with alfalfa for hay. When alfalfa is ready to cut, 'Potomac' is too mature to produce good quality hay. When seeded in a monoculture, 'Potomac' often produces very high yields. This variety should be used where early maturity is needed and as a single species hay. Oregon Foundation Seed and Plant Materials Project and Washington Crop Improvement Station maintain Breeder and Foundation seed.

'**Berber**' is a long lived, drought resistant, cool season perennial bunchgrass, native to Europe. It has been tested in the mediterranean climate area of California for erosion control on natural and man-made disturbed areas, and for dryland range use. It appears that Berber could be used for erosion control and fire control in areas adjacent to housing developments. It is very drought tolerant and would remain green throughout the summer with small amounts of supplemental water. Berber seed is maintained by the Lockeford Plant Materials Center in California.

Control

Contact your local agricultural extension specialist or county weed specialist to learn what works best in your area and how to use it safely. Always read and follow label and safety instructions for each control method. Trade names and control measures appear in this document only to provide specific information. USDA NRCS does not guarantee or warranty the products and control methods named and other products may be equally effective.

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Plant Guide

ROSE CLOVER

Trifolium hirtum A

Plant Symbol = TRHI4

Contributed by: USDA NRCS California State Office and Lockeford Plant Materials Center, California

@ Oklahoma Forages
Oklahoma State University

Alternate Names
Trebol rosa

Uses
Range Improvement: The principal use of rose clover in California is for dryland pasture seedings. Low producing annual range overseeded with rose clover or other annual legumes improves the quantity and quality of low producing annual range sites and increases the protein content of harvested forage. Annual legumes also supply nitrogen to stimulate annual grasses. The protein content of rose clover is equal to other annual legumes and is superior to non-legume forage.

Cover Crop: Rose clover is used in vineyards as a winter cover crop where a low-growing, low-volume, self-perpetuating legume is needed. For this use, it is inferior to subclover.

Wildlife: Upland game and deer use the nutritious rose clover forage in mid-winter and early spring. Various birds eat the seed.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Weediness
This plant may become weedy or invasive in some regions or habitats and may displace desirable vegetation if not properly managed. Please consult with your local NRCS Field Office, Cooperative Extension Service office, or state natural resource or agriculture department regarding its status and use. Weed information is also available from the PLANTS website.

Description
Rose Family (Rosaceae). Rose clover, a freely-branching, introduced, winter growing annual legume is three to twenty-four inches tall. The branches are covered with short, stiff hairs and the rest of the plant is less hairy. The wedge-shaped leaflets are alternate, about ½ to ¾ inches long. Petioles are 1 to 4 times as long as the leaflet. Stipules are membraneous, ovate to lanceolate and terminate in a fine hair-like point. The globular, ¾ inch diameter flowers are stalkless and sheathed at the base by the two utmost leaves. There are 20-30 flowers in each head. Seeds are ovoid, yellow and weigh about 3.0 grams per one thousand. Rose clover was introduced from Turkey in 1944.

Distribution
Rose clover is found in the California Floristic Province, but is also sporadically located in the eastern United States. It is usually found in disturbed areas and roadsides. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Adaptation
In California, rose clover is widely adapted to climates below 6000 feet elevation except the coastal fog belt and areas receiving less than 10 inches of rain. It is adapted to well-drained soils. It does well on strongly acidic to moderately alkaline soils, but does best if the pH ranges between 6 and 7. It germinates as well as other legumes in the cold, fall weather, but not as well as annual grasses. It performs best when fall rains occur while the weather is still relatively warm, enabling it to compete favorably with grasses. It is less tolerant to low pH, but tolerates drier conditions than subclover.

Establishment
Rose clover establishment is improved with some type of seedbed preparation. Several methods have been used successfully. The conventional system of plowing and disking in the spring prior to

establishment and before native annual species set seed is highly successful. The site is then fallowed during the summer. After the first effective fall rains when native vegetation is at least one-inch high, rework the site, prepare a firm seedbed and drill or broadcast pellet inoculated clover. If broadcasting, cover the seed lightly. Rose clover germinates best in warmer weather. For this reason, it may be advisable to plant before fall rains, but weed problems may be more severe. On many California foothill soils, a trashy seedbed helps prevent serious frost heaving damage. Light summer disking of cereal hay or grain stubble makes an ideal seedbed with phosphate applied before disking. Rose clover's seed is broadcast just before the fall rains and covered with a ring roller or harrow.

Management

Range Improvement: In California, graze newly planted areas as soon as annual grasses and forbs are 6 to 8 inches and graze to 3 inches for a one-month period. Continue grazing, but remove stock before last spring rains to allow for seed set. Graze again before fall rains to trample seed into soil. Long-term rotation grazing should be practiced and tailored to the range conditions. Re-fertilize every two to three years with superphosphate and sulfur as needed.

Cover Crop: Rose clover requires very little management in vineyards, except for infrequent mowing and additional fertilizer. Usually one mowing in early spring is all that is needed. In raisin vineyards, the cover is usually turned under after seed set.

Seeds and Plant Production

To prepare seedbeds in California, disk or chisel the site in the early fall and broadcast by mid-October without additional preparation. Use 200-300 pounds per acre of superphosphate on most soils. Tests have shown that most soils planted to rose clover benefit from an application of sulfur if the 12 percent in superphosphate is inadequate. Additional gypsum will correct this deficiency. Rose clover must be pellet inoculated with the improved strain of bacteria to ensure good germination. Rose clover can be seeded alone at 8 pounds per acre, but is usually seeded at 3 pounds per acre in a mixture with subterranean clover (*Trifolium subterraneum*) at 4 pounds per acre and crimson clover (*Trifolium incarnatum)* at 3 pounds per acre. When used as a cover crop, broadcast seed rose clover at 8 pounds per acre and drill the seed at 5 pounds per acre with the recommended superphosphate application. Sow on moist pre-irrigated seedbed or dry seedbed and irrigate for establishment. Plant in the early fall.

Cultivars, Improved, and Selected Materials (and area of origin)

'Wilton' Cultivar: In 1949, the University of California and the Natural Resources Conservation Service release Wilton, an upright variety with adaptation and good seed production. Wilton is adapted to lower elevations below 3000 feet.

'Monte Frio' Cultivar: This cultivar is comprised of equal composites of seed collected from naturalized stands of rose clover in Hornbrook, Siskiyou County; Covello, Mendocino County and Viola, Shasta County, California. Each site is located at elevations of 3,000 to 6,500 feet and naturalized stands have persisted for a minimum of 10 years. Selection has been made on the basis of survival, growth, and reproduction at six major trial sites in California. It was compared to over 26 different commercial and experimental strains of subterranean clover, rose clover, barrel medic (*Medicago truncatula*), cupped clover (*Trifolium cyathiferum*), arrowleaf clover (*Trifolium vesiculosum*), and 'Spreader' alfalfa (*Medicago sativa*). It proved superior in withstanding the cold and dry conditions and was more persistent than the subterranean clovers.

'Kondinin' Cultivar: An early to mid-season maturing variety with a semi-erect growth.

'Hykon' Cultivar: This cultivar has an early season maturity with vigorous spring growth, is well adapted to poor fertility and acidic soils, grows slowly in cold districts, but is tolerant to frosts, is always very palatable, and not suited to waterlogged soils. This cultivar is a heavy re-seeder with slow establishment. Hykon is adapted to elevations below 3,000 feet.

Control

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Plant Guide

WOOLLYPOD VETCH

Vicia villosa Roth ssp. *varia* (Host) Corb.

Plant Symbol = VIVIV8

Contributed by: USDA NRCS California State Office and Lockeford Plant Materials Center, California

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Alternate Names
Hairy vetch, winter vetch, woolly vetch

Uses
Range Improvement: Woollypod vetch is particularly valuable for improving the quantity and quality of annual range in the Mediterranean-like climatic zone.

Noxious Weed Control: Woollypod vetch has been used successfully to suppress such weeds as star thistle and medusahead, an unpalatable grass invading annual range. Because Woollypod vetch can be established from direct seeding without seed preparation, it offers a very practical method of weed control on rough terrain.

Erosion Control and Beautification: Woollypod vetch has been widely used for revegetating critical areas and stabilizing soils on roadbanks, channel banks, dikes, and dams. In these situations, it has added attractiveness because of the beauty of its flowers.

Wildlife: Woollypod vetch seed is utilized by most seed-eating birds. It is especially attractive to doves, quail and pigeons. The vine-like growth provides excellent nesting cover for many ground-nesting birds. It is especially valuable for pheasant habitat along ditches and fence lines in cropland areas.

Covercrop: Woollypod vetch may be used as a substitute for purple vetch in cover crop and green manure seedings. Because it matures relatively early and reseeds well, Woollypod vetch can be used where a perpetuating annual cover is desired.

Ethnobotanical Uses: Woollypod vetch, part of the Fabaceae family was used as a dematological and gastrointestinal aid taken for sores and stomach pain respectively.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Weediness
This plant may become weedy or invasive in some regions or habitats and may displace desirable vegetation if not properly managed. Please consult with your local NRCS Field Office, Cooperative Extension Service office, or state natural resource or agriculture department regarding its status and use. Weed information is also available from the PLANTS website.

Description
Legume Family (Fabaceae). Woollypod vetch is an introduced, self-seeding, cool season annual legume similar in appearance to other annual and perennial vetches. The leaves are compound and each usually possess 10-20 narrowly oval, pointed leaflets. Flowers are born in long clusters called racemes. Each raceme usually has 5-15 flowers. The color of the flowers is pinkish-purple compared with the reddish-purple of purple vetch. The growth form of woollypod vetch is semi-prostrate with trailing stems up to three feet long. It will climb on a any available support, such as brush or the stiff stems of grass and grain.

Distribution
Woollypod vetch is found in the California Floristic Province and throughout the rest of the United States. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Adaptation

Woollypod vetch performs well on light to heavy textured soils when the annual rainfall is 14 inches or more. It can be grown in low rainfall desert areas when irrigation water is applied. It is adapted to moderately acid to moderately alkaline soils. In California, it can grow in the coastal and central valleys up to about 3000 feet. In other parts of the United States, it grows along roadsides, fields and urban waste areas.

Establishment
A seedbed should be prepared for the best establishment of Woollypod vetch. Drilling at one inch depth with or without seedbed preparation has been superior to broadcast seeding. All broadcast seeding should be harrowed or lightly disked after planting. Woollypod vetch is drilled 12 pounds per acre and broadcast at 16 pounds per acre. Seed should be inoculated with the proper bacteria before planting.

Management
Range Improvement: As forage, Woollypod vetch is best used when mature. Deferment insures maximum production and seed set for perpetuation. The high protein content of mature, dry Woollypod vetch contrasts with the lower nutritive value of dry annual range. Woollypod vetch provides high quality feed in the summer and early fall when native annual range requires supplementation. On most soils in California, a significant response is obtained when Woollypod vetch is fertilized with phosphorus and sulfur. A general recommendation is to fertilize with 200-500 pounds per acre of single superphosphate at the time of planting with a similar application every two or three years following. Treble superphosphate can be used in areas where no sulfur deficiency exists.

Noxious Weed Control: Studies have shown that the keys to weed suppression using Woollypod vetch are annual fetilization with phosphorus and sulfur, deferred grazing, and broadcast seeded at a rate of 20 pounds per acre.

Critical Area Stabilization: Woollypod vetch can be broadcast seeded at 15 pounds per acre and drilled at 10 pounds per acre with an annual grass. The following seeding rates for grasses in the mixture are recommended: Blando brome- broadcast-seeded at 9 pounds per acre and drilled at 6 pounds per acre; Cucamonga broadcasted-seeded at 25 pounds per acre and drilled at a rate of 16 pounds per acre.

Pests and Potential Problems
Woollypod vetch stands have been injured by a disease known as black stem, *Micospharella ssp*. in certain areas along the North Coast in California. The effects have been sporadic. Some years no damage is observed. If the disease is suspected, the seed should be treated with a fungicide at the time of planting. In stands where it occurs, a one year rotation with another crop will generally destroy the residue which harbors the pathogen.

Cultivars, Improved, and Selected Materials (and area of origin)
'Lana' Cultivar- is a commercially available variety of Woollypod vetch. Lana is the earliest maturing vetch available. It blooms about two weeks earlier than hairy vetch and produces a moderate amount of hard seed. These characteristics are responsible for the ability of Lana to perpetuate under range conditions. Lana was selected and developed at Pleasanton by the USDA Soil Conservation Service Plant Materials Center in cooperation with the University of California Agronomy Department, Davis, from material introduced from Turkey in 1937.

Control
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References
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Plant Guide

ANNUAL FESCUE

Vulpia myuros (L.) K.C. Gmel.

Plant symbol = VUMY

Contributed by: USDA NRCS California State Office and Lockeford Plant Materials Center, California

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Other Common Names
rat-tail fescue, foxtail fescue

Key Web Sites
Extensive information about this species is linked to plants.usda.gov--PLANTS web site. To access this information, go to the PLANTS web site, select this plant, and utilize the links at the bottom of the Plants Profile for this species.

Uses
Erosion Control: Annual fescue has an excellent fibrous root system that provides soil stabilization on natural and man-made disturbed areas. It will provide initial erosion control and as the site improves in condition, will allow climax species to invade.

Cover Crop: Annual fescue has proved to be a valuable cover crop in almonds and other crops where a shorter height is required and mowing is frequent. It increases water penetration in problem orchards and provides a self-perpetuating cover. In comparison trials, it took more abuse than Blando brome (*Bromus mollis*) and produced less residue.

Wildlife: Its early green growth provides some value for wildlife food, nesting and good cover in the spring season.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Weediness
Annual fescue is irregularly scattered in the West in wasteland, fields, and overgrazed areas. This plant may become weedy or invasive in some regions or habitats and may displace desirable vegetation if not properly managed. Please consult with your local NRCS Field Office, Cooperative Extension Service office, or state natural resource or agriculture department regarding its status and use. Weed information is also available from the PLANTS Web site. Please consult the Related Web Sites on the Plant Profile for this species.

Description
General: Grass Family (Poaceae). Annual fescue is an introduced, short, aggressive, early maturing cool season annual grass with many fibrous roots. It has excellent seedling vigor and emerges in fall very soon after the first rain. It matures seed earlier than most annual grasses, assuring perpetuation. It can tolerate soil problems of acidity, serpentine, and low fertility. This species is native to Asia and Europe.

Distribution: This species can be found in California, Oregon, Washington, Idaho, Nevada, Arizona, Texas and in several localities on the East Coast. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Adaptation
Annual fescue is a drought tolerant grass that will persist and provide good erosion control cover with an annual precipitation of at least 25cm. (10 in.), or on areas receiving extra run-in moisture, and on areas receiving some supplemental irrigation. It has persisted on sites up to 1365 m. (4500 ft) and tolerates highly acid sedimentary soils and acidic mine spoils (pH 4.5). It germinates and grows in low fertility and shallow soils.

Establishment
The optimum time for seeding is between October 1 and November 15. Loosening the soil surface before

seeding and covering lightly produces the best stands. Seed can be hydro-seeded, but best establishment occurs when the seed is in contact with the soil. Recommended seeding rates on critical areas are: broadcast, hydroseeded-3 pounds pure live seed per acre; drilled- 2 pounds pure live seed per acre and depth should be 1 to 2 cm (0.5 to 1 inch). Seed can be drilled or broadcast, but because of its size and shape, it tends to stick together. Rice hulls and/or a good companion seed will help prevent "bridging over," and allow proper dispersion of seed. There are about 993,700 seeds per pound.

Management
Applying 40 pounds of nitrogen per acre every other season during October or November will maintain healthy, erosion resistant stands. Annual fescues are initial invaders, so as sites improve, taller, more enduring plants will probably replace annual fescue, unless the area is mowed or grazed. In cover crop planting, annual fescue can be mowed frequently, but should be allowed to produce mature seed for continued perpetuation. It is readily controlled by several herbicides, providing assurance that it will not become a troublesome weed.

Pests and Potential Problems
None

Seeds and Plant Production
Annual fescue has been grown in large-scale seed increase blocks at the Lockeford Plant Materials Center for the last three years. Seed was planted at a 3 lb./acre rate in 30 inch rows with a Planet Junior planter. Broad-leaf weed control herbicides are used. Seed is combined directly with an Allis Chalmers All-Crop Harvester, Model 72. Shattering is a problem at harvest time, so the seed is usually harvested while still a little green. Therefore, seed has to be dried in the field or a dryer before cleaning. Also, seed can be harvested using a flail-vac harvester.

Cultivars, Improved, and Selected Materials (and area of origin)
'Zorro' Cultivar- Seed for this cultivar was collected from native plants on droughty strips of a Colombia fine sandy loam at the Plant Materials Center, Lockeford, California. This collection was assigned as P1-109-71 and named Zorro in December 1976. It has excellent seedling vigor and has shown superior seedling establishment compared to 'Blando' soft brome (*Bromus mollis*) on infertile, shallow or droughty soils where erosion control is critical. It matures seed about 10 days to two weeks earlier than Blando (in May-June) if moisture conditions are normal. This earlier maturity assures perpetuation in droughty and low rainfall areas.

Control
Please contact your local agricultural extension specialist or county weed specialist to learn what works best in your area and how to use it safely. Always read label and safety instructions for each control method. Trade names and control measures appear in this document only to provide specific information. USDA, NRCS does not guarantee or warranty the products and control methods named, and other products may be equally effective.

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USDA NRCS. 1977. *Management and uses of Zorro annual fescue.* Davis, CA.

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SOFT CHESS

Bromus hordeaceus L. ssp. *hordeaceus*

Plant Symbol = BRHOH

Contributed by: USDA NRCS California State Office and Lockeford Plant Materials Center, California

From Hitchcock (1950)
@ plants.usda.gov

Alternate Names
Soft brome, *Bromus mollis*

Uses
Livestock: Soft chess is rated highly in California as an important forage plant. It ranks highest of the annual bromes in forage rating, producing excellent forage when young and is grazed heavily up to the time of reaching maturity. Seed does not shatter readily and the plants are grazed extensively during the summer with the livestock getting more nutrients than they would otherwise from the dry stalks and leaves alone.

Erosion Control: The ease with which it can be established and its outstanding reseeding ability contributes to its suitability for seeding natural or man-made disturbed areas to protect them from soil erosion and producing sediment. These include bare un-vegetated slopes, such as brush burn areas, newly constructed roads, driveways, housing and industrial developments, gullies, drainages, ditch and channel banks, dikes, levees, dams, reservoirs, and other types of construction on sloping land.

Wildlife Food and Cover: During the winter and spring months when the leaves of soft chess are green and succulent, it is an important component in the diets of both deer and quail. Quail use a small amount of the seed after maturity. It also furnishes good nesting cover for quail in areas that are protected from grazing, which will occur normally if ranges are properly used.

Soil Improvement: It is especially adapted for reseeding use as an annual cover crop on orchard and vineyard land, because of its ability to withstand excessive mowing better than other grasses and maturing to seed under minimum watering.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Weediness
This plant may become weedy or invasive in some regions or habitats and may displace desirable vegetation if not properly managed. Please consult with your local NRCS Field Office, Cooperative Extension Service office, or state natural resource or agriculture department regarding its status and use. Weed information is also available from the PLANTS website.

Description
Grass Family (Poaceae). Soft chess is widely distributed on the annual rangeland in the southwestern United States. It is a winter growing, self-seeding, annual grass. It has strong seedling vigor, is suberect in growth habit, medium early in maturity, and has an outstanding reseeding ability. Its growth starts in the fall of the year and it matures in April and May.

Distribution
Soft chess, a native of Europe, is widespread throughout much of western North America, Hawaii, South America and Asia. Soft chess may have

become widely established no later than the end of the 19th century. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Adaptation
Soft chess is adapted to the Mediterranean climatic zone from sea level to approximately 3,000' and in areas with an annual rainfall above 10 inches. It grows well on low fertility sites, but responds exceptionally well to applications of nitrogen-phosphorus fertilizers. It requires good drainage, is adapted on coarse to fine textures soils, and does best on neutral or slightly acid to mildly alkaline soils.

Establishment
Seedbed: Areas to be seeded should have a firm seedbed, which has been previously roughened by disking, harrowing, raking, or otherwise worked to a depth of approximately 2 inches (5 cm).

Seeding: Seeding should be made in the fall of the year. The preferred method of seeding is with a drill. Good stands have been obtained from broadcast seeding, followed by a cultipacker, spiketooth harrow, or similar tool to cover the seed. Seed should be planted uniformly over the area and covered to a depth of ½ inch (1.25cm).

The seeding rate for pasture or range seeding is 4 pounds per acre drilled or 6 pounds per acre if broadcast planted. An annual legume like 'Lana' vetch (*Vicia villosa*) at the rate of 10 pounds per acre drilled is frequently planted with soft chess. For critical area planting, the seedling rate is 10 pounds per acre broadcast. When used in cover crop planting, soft chess is seeded at 5 pounds per acre broadcast.

Management
Livestock: When using soft chess for forage production, do not graze until plants are 4 to 6 inches (10cm to 15cm) tall. On newly seeded stands, withhold grazing until a seed crop has matured. In subsequent years, at the end of the grazing season, adequate seed will have been produced if the pasture has a uniformly patchy appearance.

Erosion Control: On critical areas, the plants can be left to grow to maturity. The seed and its stalks and leaves from the one year's growth will provide plants and protection of the slopes for next year's stand. Soft chess responds very well to applications of nitrogen-phosphorus fertilizers, particularly on the low fertility sites of natural or man made disturbed areas.

Soil Improvement: When using soft chess for cover crops in orchards and vineyards, the area under the trees and vines can be kept clean by spraying a strip 2 to 6 feet (.61cm to 1.83m) wide with an approved herbicide. This leaves a strip of cover between the tree or vine rows. During the growing season, the cover can be left to grow to seed set or it can be mowed as frequently as necessary.

Mowing height should be kept at 4 inches (10cm). Soft chess must not be mowed later than 3 to 4 weeks prior to seed maturity. This will allow the plant to set seed for next year's cover. Following seed set, the cover can be mowed as close as desirable or disked under. Regular cultural operations are then carried on throughout the year.

Cultivars, Improved, and Selected Materials (and area of origin)
'Blando' Cultivar-Collected May 21, 1940, from winter annual rangeland near San Ramon, CA, by D.J. Vanderwal. Used for range reseeding, cover crop, revegetation of disturbed areas, and wildfire burn rehabilitation. Primary advantage over other strains is its consistent forage and seed production from year to year. During low rainfall years, its superiority was demonstrated by out-performing all other strains. In relation to the other strains tested, it is intermediate in maturity and sub-erect in growth habit. 'Blando' is a reliable, intermediate strain of soft chess that was selected for its consistent production of forage and seed, especially under adverse soil and variable climatic conditions.

Control
Please contact your local agricultural extension specialist or county weed specialist to learn what works best in your area and how to use it safely. Always read label and safety instructions for each control method. Trade names and control measures appear in this document only to provide specific information. USDA, NRCS does not guarantee or warranty the products and control methods named, and other products may be equally effective.

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Alderson, J. and C. Sharp. 1994. Grass varieties in the United States. USDA NRCS, Washington DC.

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<www.usgs.nau.edu/SWEPIC/factsheets/Bromus_spp.pdf>

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Plant Guide

KOLEAGRASS

Phalaris aquatica L.

Plant symbol = PHAQ

Contributed by: USDA NRCS California State Office and Lockeford Plant Materials Center, California

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CalPhotos

Other Names

Bulbous Canarygrass, Hardinggrass, *Phalaris tuberosa* var. *hirtiglumis* (koleagrass), *Phalaris tuberosa* var. *stenoptera* (Harding grass), Towoomba Canary grass, alpiste bulbeaux, phalaris tubereux, herbe de Harding, knolliges Glanzgras, capim-doce, rabillode cordero

Key Web Sites

Extensive information about this species is linked to plants.usda.gov--PLANTS web site. To access this information, go to the PLANTS web site, select this plant, and utilize the links at the bottom of the Plants Profile for this species.

Uses

Koleagrass was developed for improvement of annual grass range. Its forage production is typically no greater than can be expected from native range. However, this perennial produces forage earlier in the season and stays green longer. Fertilized Koleagrass can extend the green feed period two months or more in the winter compared to unfertilized native grasses, and can add about one month to the green feed period in spring when moisture is not limiting.

Koleagrass is now considered the standard perennial grass for improvement of annual grass range in California.

NOTE: This species has been known to have toxic effects on sheep and cattle. Please consult the Related Web Sites on the Plant Profile for further information on this species.

Status

Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Weediness

This plant may become weedy or invasive in some regions or habitats and may displace desirable vegetation if not properly managed. Please consult with your local NRCS Field Office, Cooperative Extension Service office, or state natural resource or agriculture department regarding its status and use. Weed information is also available from the PLANTS Web site. Please consult the Related Web Sites on the Plant Profile for this species for further information.

Description

General: Grass Family (Poaceae). Koleagrass is an introduced, tall, robust, rapid-developing bunchgrass with short rhizomes. This species includes both *Phalaris tuberosa* var. *stenoptera* (previously known as Harding grass) and *Phalaris tuberosa* var. *hirtiglumis* (previously known as koleagrass). P.t. var. *hirtiglumis* was recognized to have bigger seeds, more vigorous seedlings, yellow-green leaves, and hairy glumes. Both of these varieties have been submerged taxonomically into *Phalaris aquatica*.

Distribution: Koleagrass was introduced from Morocco. Used for pasture and erosion control in California and sparingly in other parts of the southwestern U.S. Consult the PLANTS Web site for its U.S. distribution.

Adaptation

Koleagrass is adapted in California below 2,000 feet to the Mediterranean-like climatic zone or where frost heaving is not a problem. It will grow where there is 12 inches of annual rainfall and there is soil profile development (clay layer). Moisture holding capacity of the soil becomes less critical as rainfall increases. It establishes itself early, grows well during cold winter months, and reseeds readily.

Establishment

Seedbed Preparation: Good stands require a spring-summer fallow to reduce competition from annuals in

fall. Fall seeding is done on a firm, weed-free seedbed prepared after the first effective rains (1.5-2.0 inches). This ensures adequate moisture to support seedling growth and destroys the first crop of volunteer annuals. If fallow is prepared before weed species produce seed, the fall weed competition is reduced, but not eliminated. Fall seeding can follow a summer clean-up crop of Sudangrass *(Sorghum bicolor* ssp. *drummondii*). Planting is accomplished directly in the Sudangrass stubble.

Method of Seeding: Best results are obtained by drilling the seed. Use of a common grain drill is possible if the seed is first mixed with rice hulls as a dilutor and the drill is properly calibrated. If seed is broadcast and covered by harrowing or dragging, the seeding rate is increased 1.5 times. Seeding depth should be ¼-1/2 inch in all cases.

Weed Control: During the establishment season, mowing may be necessary to reduce competition from annuals. Set the mower at a height compatible with regrowth of the koleagrass and other perennials. Remove as little leaf area of the koleagrass and other perennials as possible so that development will not be retarded.

Fertilization: Do not apply fertilizer in the establishment year. In the second and subsequent years, 200 pounds per acre 16-20-0 (ammonium-phosphate-sulfate) is recommended in the fall.

Management

Koleagrass should not be grazed until completion of growth the first season. At the end of the green feed period, dry forage can be grazed if the plants are large enough to resist pulling by livestock. An average stubble height of three to four inches should be maintained.

Established Stands: Koleagrass starts growth in fall coincident with the first rains. Mature stands of koleagrass should be ready for grazing (6-8 inches high) by early January. The amount of growth depends on the amount of rain, its distribution, temperature and soil fertility. Cold tolerance is improved by the inclusion of phosphorus with nitrogen during fall fertilization. Grass can be grazed at range readiness without harm to the plant so long as the ground is firm and not so wet that damage from trampling might occur. Grazing should stop when fertilized annual range is ready for use or when there is a three-inch average stubble height. Grazing will normally end in late February. However, lack of moisture or poor growing conditions may require earlier termination. Infrequently, when abundant rainfall occurs in late winter, grazing can continue through mid-March. Following winter grazing, the perennials, including koleagrass, must be rested to allow recovery and re-growth. This deferment period should continue until the annual range grasses begin to dry up and lose their high feed value. By the time the annual range is dry, koleagrass will have produced seed and stored food reserves in the roots. The leaves will still be green and will remain green for about one month after the annuals are dry. This palatable forage can be grazed heavily until the average stubble height is three inches. When grazing ends, many plants will be heavily used, others partially grazed, and there will be numerous seed stalks left.

Pests and Potential Problems

None

Seeds and Plant Production

Koleagrass can be grown as an annual for purposes of seed production. At the Lockeford Plant Materials Center, irrigated rows spaced 30 inches apart yield 400-600 pounds per acre of seed when harvested with a binder in late spring following fall seeding. Koleagrass seed averages 267,000 seeds per pound.

Cultivars, Improved, and Selected Materials (and area of origin)

'Perla' Cultivar- This cultivar was introduced from Morocco. It is easy to establish, grows well during cold winter months, and produces good seed crops. Stands frequently improve through natural reseeding. Also, it's adapted to soils with restricting layer in Mediterranean climatic zone wherever average annual rainfall is 400mm or more.

Control

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References

Alderson, James and Sharp, Curtis. November 1994. *Grass Varieties in the United States.* USDA NRCS, Washington, DC.

USDA NRCS. 1974. *Management and uses of Perla Koleagrass.* USDA NRCS, Davis, CA.

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