



Transit Mix Concrete Co.

444 E. Costilla Street, Colorado Springs, CO 80903 Office: (719) 475-0700 Fax: (719) 475-0226

November 8, 2018

Colorado Division of Reclamation, Mining and Safety
Attn: Mr. Elliott Russell
1313 Sherman St., Rm 215
Denver, CO 80203

Re: Adequacy Review Response, TR-05, M-1977-573

Dear Mr. Russell,

Following is Transit Mix Concrete Co./Continental Materials Corp. (TMCC/CMC) responses to the Colorado Division of Reclamation, Mining and Safety's (DRMS) adequacy questions, dated October 24, 2018. The DRMS adequacy questions are in italic font and TMCC/CMC responses are in plain text.

- 1. The TR-05 submittal states an organic fertilizer will be used for nitrogen application. In accordance with Rule 6.4.5(2)(f)(iii), please provide the type, mixture, quantity and time of application for this fertilizer. Please also provide details on how and to what depth this fertilizer will be incorporated into the soil.*

Response:

The intent of the slow release fertilizer is to add organic matter ("...a rich amount of Humus", Specification sheet, attached) to the soil. Given the dry climate in the Pueblo area, our hope is that the addition of a slow release organic fertilizer will improve the water holding nature of the soil. The soil is a sandy clay loam.

The organic fertilizer contains 3.0% nitrogen, 6.0% P₂O₅ and 3.0% K₂O, along with 10% calcium and 14% humates. We do not believe there is sufficient nitrogen to produce the typical weed bloom common with chemical fertilizers. In addition, it is a slow release fertilizer.

The proposed organic fertilizer will be applied either right before or after seeding. The application rate will be 1,200 pounds/acre. It will be a top dressing onto the soil surface. If recommended by the commercial reclamation contractor, it may be applied just prior to seeding so that there is a slight incorporation of the organic fertilizer into the soil surface during drill seeding.

- 2. The TR-05 submittal states soils with less than 25 ppm NO₃-N are deficient in nitrogen. Based on the analytical results of the four soil tests (NO₃-N at 89.5, 39.1, and 24.8 ppm), it appears there isn't a nitrogen deficiency, however, the Operator states an organic*



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fertilizer will likely lead to a flush of weedy vegetation which may hinder the establishment and success of the desired reclamation species within the proposed seed mixture.

Response:

You are correct. We do not intend to add a fertilizer which will foster weed growth. The proposed slow release organic fertilizer is not a typical chemical fertilizer with 5% to 33% available nitrogen. The nitrogen content of the organic *slow* release fertilizer is only 3%. (Please see the attached organic fertilizer specification sheet.) However, the fertilizer has "...a rich amount of humus..." which will be a significant benefit to the soils and plant establishment. In addition, as long as the weed infestations are not noxious or result in excessive amounts of annual weeds, weed growth should not be a problem. In addition, we have a weed control program which we will implement as needed. Our method of weed control may include mowing several times per growing season and/or appropriate chemical control by a certified, commercial herbicide applicator.

3. *Please clarify if the proposed TR-05 seed mix will also replace the approved wetland seed mix for the Finger Lakes area of the permit.*

Response:

Our intention for the seed mix proposed in TR-05 is to be specific to the Pueblo West site, including the Wildlife Island. We have had discussions with DMRS Staff regarding whether the Finger Lakes area is still part of the permitted area or not. We have agreed to an inspection of the area and if it is determined the Finger Lakes area has not been released, we will then evaluate the Finger Lakes area reclamation and seed mix needs. Since the original application was approved, there have been advances in the seeding materials (new varieties of species are available) and a seed mix revision may be appropriate.

4. *Please provide the details on how the reservoir's island will be seeded. Please note, if the seed mix is broadcast, the seeding rate is typically recommended to be doubled.*

Response:

We will attempt to transport a rototiller onto the Wildlife Island, if it can be done safely. Once the surface is tilled up, we will broadcast seed the Wildlife Island with the TR-05 seed mix. We will then hand drag or lightly rake the area to slightly cover the seed. If transporting a rototiller cannot be done safely onto and off the Wildlife Island, we will broadcast seed the Wildlife Island and rake the seed in.



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5. *As the sites contain approximately 1.7 miles of shoreline, please clarify if the Operator intends to seed the shoreline of the reservoir with a different seed mix to account for saturated conditions or provide technical justification that the proposed seed contains species which suitable for the shoreline. Please note, in the Division's experience regarding sites with developed water resource post –mining land uses, multiple seed mixtures (wetland, riparian, upland, etc.) tend to have the best success and various shoreline vegetation (bulrush, cattail, willow, cottonwood, etc.) help reduce wave erosion.*

Response:

At this time, we do not intend to have a separate seed mix for the shoreline which is different from the rest of the West Pit. We will seed the entire proposed seed mix (noted below) over the entire site to include the Wildlife Island. However, we reserve the right to just seed the shoreline with the shoreline species, if it is cost effective. As stated above, this mix will not be used to seed the Finger Lakes area if the Finger Lakes require reclamation by TMCC/CMC; we will submit a separate revision for that area.

Replacement Seed Mix for the Pueblo West Gravel Pit:

Species	Best on soil types (SCL)	Saline Soil	(5)Annual Avg. Precip. 12.9"	Alkali Soil	Expected performance	Variety	PLS lbs./Acre
Big bluestem for <i>Tall wheatgrass</i>	Any	Ok	12+	Low	Marginal ₍₄₎	-	1.0
Blue grama for <i>Slender wheatgrass</i>	Any	Ok	8+	Ok	Ok	-	0.75
Pubescent wheatgrass for <i>Newhy Hybrid wheatgrass</i>	Any	low	12+	Ok	Marginal	Luna	1.0
Russian wildrye	Si - C	Ok	10+	OK	Ok		2.0
Streambank wheatgrass for <i>Alkali Sacaton₍₆₎</i>	S - C	Ok	8+	?	Ok	Critana	3.0
Sideoats grama	Any	Low	6+	Ok	Ok	Vaughn	0.75
Buffalo grass	L - C	?	10+	Ok	Ok	-	1.5
Galleta grass	Any	?	5+	Ok	Ok	Viva	2.0
Sand dropseed	G - S	Yes	8+	Ok	Ok	-	0.25
Tufted hairgrass₍₇₎	Any	Low	In the Wet Zone	Low	Ok	—	0.25
Switchgrass₍₇₎	S - LC	Medium	In the Wet	Low	Ok	-	1.0



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			Zone				
<i>Tall wheatgrass</i> ⁽⁷⁾	Any	Ok	In the Wet Zone	Ok	Ok	-	2.0
<i>Canada wildrye</i> ⁽⁷⁾	Any	Medium	In the Wet Zone	Low	Marginal	-	2.0
Total:							17.5

1. Italic font is existing species and is presently approved for the site.
2. Black font is species requested for approval.
3. G = Gravelly, S = sand, Si = silt, C = clay, L = loam
4. The species labeled as marginal are included given they are native to the area and/or based on reasonable performance at other sites.
5. Under "Annual Avg. Precap.", the number in the species row is the lower end of the precipitation range for the species.
6. Streambank wheatgrass is also being proposed as a species for shoreline erosion control. It is listed as a species used to stabilize "...ditch banks, dikes..."
- (7) Shoreline reclamation species.

Best Regards,

Brandon Heser

TMCC Aggregates Production Manager



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Proprietary Richlawn Organic 100 Fertilizer:



RICHLAWN ORGANIC 100

Richlawn 3-6-3 with Mycorrhizae and Humates

Richlawn 3-6-3 is a CDOT Approved Natural, Organic Fertilizer containing a slow release Nitrogen, Organic Phosphorous, Mycorrhizae and a rich amount of Humus. Richlawn 3-6-3 restores depleted soils with essential nutrients to build a sustainable environment in which to establish vegetation quickly.

Manufactured by Richlawn Turf Food, LLC
15121 WCR 32, Platteville, CO 80651
Net Weight 50 Lbs (22.68 Kg.)

Guaranteed Analysis

Total Nitrogen(N)	3.0%
2.90% Water Insoluble Organic Nitrogen*	
.010% Water Soluble Organic Nitrogen	
Available Phosphate	
(P ₂ O ₅)	6.0%
Soluble Potash (K ₂ O)	3.0%
Calcium (Ca)	10.0%

Plant Nutrient Sources: Dried Poultry Manure, Bone Meal and Sulfate of Potash.

*2.90% Water insoluble nitrogen from dried poultry manure and bone meal.

Non-Plant Food Ingredients

Humates	14.0%
Endo Mycorrhizae	30,000
Propagules	
7500 Propagules Glomus mosseae	
7500 Propagules Glomus entunicatum	
7500 Propagules Glomus intradices	
7500 Propagules Glomus aggregatum	

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The Benefits of Richlawn 3-6-3

- Increases the Nutrient and water holding capacity of the existing soil.
- Increases Soil Porosity which promotes superior Root Establishment.
- Mycorrhizae transports nutrients from the soils and delivers them to the plants roots, greatly reducing fertilization and water need.
- Humates add organic material to the soil which increases soil microbiology and water holding capacity.



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NRCS Plant Information Sheets, Additional Species for shoreline Erosion Control:



Plant Guide

STREAMBANK WHEATGRASS

Elymus lanceolatus (Scribn. &
J.G. Sm.) Gould
Plant Symbol = ELLA3

Contributed By: USDA, NRCS, Idaho State Office &
the National Plant Data Center



USDA NRCS Plant Materials Program

Alternate Names

Two subspecies are recognized for this species: Both are known by the common name, streambank wheatgrass *Elymus lanceolatus* ssp. *psammophilus* Gillett & Senn (formerly *Agropyron riparium*) though *Elymus lanceolatus* ssp. *lanceolatus* (Scribn. & J.G. Sm.) Gould (formerly *Agropyron dasystachyum*) sometimes goes by thickspike wheatgrass. This is a perennial, sod-forming grass. It is a long-lived, cool season native with an extensive rhizomatous root system combined with a few deep roots.

Uses

Grazing/rangeland/hayland: Streambank wheatgrass is not recommended for forage production. Streambank wheatgrass is palatable to all classes of livestock and wildlife. It is a preferred feed for cattle, sheep, horses, and elk in spring and is considered a desirable feed for deer and antelope in spring. It is considered a desirable feed for cattle, sheep, horses, and elk in summer, fall, and winter. In the spring, the protein levels can be as high as 20 percent and decreases to about 4 percent, as it matures and cures. Digestible carbohydrates remain about 45 percent throughout the active growth period. This species is generally a relatively low forage producer (exceptions - 'Bannock' and 'Secar'), but can be utilized as native hay when planted in association with other species. It has been noted as one of the highest forage producers in the Red Desert and Big Horn Basin of Wyoming. Streambank wheatgrass can be used for hay production and will make nutritious feed, but is more suited to pasture use.

Erosion control/reclamation: Streambank wheatgrass (*E. lanceolatus* ssp. *lanceolatus*) and (*E. lanceolatus* ssp. *psammophilus*) are well adapted to the stabilization of disturbed soils. They do not compete well with aggressive introduced grasses during the establishment period, but are very compatible with slower developing natives, such as Snake River wheatgrass (*Elymus wawawaiensis*), bluebunch wheatgrass (*Pseudoroegneria spicata*), Western wheatgrass (*Pascopyrum smithii*), and needlegrass (*Stipa* spp.) species. Their drought tolerance combined with rhizomes, fibrous root systems, and good seedling vigor make these species ideal for reclamation in areas receiving 8 to 20 inches annual precipitation. They are commonly used for reclamation in the Red Desert of Wyoming, where annual rainfall is 5 to 9 inches (50 - 70 percent growing season precipitation). Streambank wheatgrass' low growth form, vigorous sod, and low maintenance requirements make it ideal for stabilization and ground cover purposes. These grasses can be used in urban areas where irrigation water is limited to provide ground cover and to stabilize ditchbanks, dikes, and roadsides.

Status

This is a native species. Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status, such as, state noxious status and wetland indicator values.

Plant Materials <<http://plant-materials.nrcs.usda.gov/>>

Plant Fact Sheet/Guide Coordination Page <<http://plant-materials.nrcs.usda.gov/intranet/pfs.html>>

National Plant Data Center <<http://npdc.usda.gov/>>



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Plant Fact Sheet

TUFTED HAIRGRASS

Deschampsia cespitosa (L.) P. Beauv.

Plant Symbol = DECE

Contributed by: USDA NRCS Plant Materials Center,
Corvallis, Oregon



Photo by Dale Darris

Alternate names

Other common names include blue-green hair-grass, fescue-leaved hairgrass, salt and pepper grass, tussock grass, and canche cespitouse.

Uses

Tufted hairgrass is useful for restoring moist to seasonally wet prairies and stabilizing disturbed sites, streambanks, canals, shorelines, and upper tidal marshes. Other applications include acid and heavy metal mine spoil reclamation, alpine and boreal revegetation work, and bio-filtration swales. As a range or pasture grass, it is both a desirable, productive forage for cattle and sheep particularly at higher elevations, and a species of lesser or low value in regions where plants are coarse and less

palatable. The species is sometimes cut for hay. Utilization by deer, elk, pronghorn, bison, bear, horses, and rabbits is variable. Likewise, cover and food values are rated poor to good for small mammals, upland game birds, songbirds, and waterfowl depending on wildlife species and location. Tufted hairgrass is a larval food plant for several butterflies in North America and is host for at least 40 species of Lepidopteran insects world-wide. Varieties have been bred as wear resistant turf for golf courses, sports fields and other uses.

Description

Tufted hairgrass is a highly variable, perennial cool season species that grows 20 to 60 in. tall. Stems are erect and the leaves are .06 to .16 in. wide, flat or rolled, and mostly basal in a dense tuft. The panicle (seed head or inflorescence) is upright to nodding, loosely branched, open, and 4 to 10 in. long. There are two florets (flowers) per spikelet. Flowering occurs from May to September and seeds mature from late June to late September depending on location.

Status

Please consult the Plants Web site and your State Department of Natural Resources for this plant's current status, such as state noxious and wetland indicator values.

Adaptation

Populations occupy moderately moist to seasonally flooded, sunny to partially shaded environments with a wide variety of soil types (fine to coarse, mesic to hydric) and pH ranging from 3.5 to 7.5. Some populations have extreme tolerance to heavy metals and high soil acidity. Salinity tolerance is generally considered low, but plants occurring in coastal estuaries may be slightly more salt tolerant. Crowns typically survive all but the most severe or hottest fires.

Distribution-As one of the most widely distributed grasses on earth, tufted hairgrass is found in many arctic and temperate regions. It occurs from sea level to 14,000 ft in the mountains. Habitats include coastal terraces, upper tidal marshes, seasonally wet prairies, moist subalpine mountain meadows, open forests, and alpine areas above timberline.



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Plant Fact Sheet

SWITCHGRASS

Panicum virgatum L.

Plant Symbol = PAVI2

Contributed by: USDA NRCS Jimmy Carter Plant
Materials Center



Mike Owsley
USDA Natural Resources Conservation Service
Jimmy Carter Plant Materials Center

Alternate Names

Panic raide

Uses

Livestock: Switchgrass produces heavy growth during late spring and early summer. It provides good warm-season pasture and high quality hay for livestock.

Erosion Control: Switchgrass is perhaps our most valuable native grass, adapted to a wide range of sites. It stabilizes soil on strip-mine spoils, sand dunes, dikes, gullies and other critical areas. It is also suitable for low windbreak plantings in crop fields.

Wildlife: Switchgrass provides excellent nesting and cover for pheasants, quail, and rabbits. It holds up in heavy snow (particularly 'Shelter' and 'Kanlow') and is useful on shooting preserves. The seed provide food for pheasants, quail, turkeys, doves, and songbirds. Due to its potential to spread some wildlife biologists have reduced or eliminated the use of switchgrass in some plantings.

Biofuel Source: Switchgrass is a native perennial warm season grass with the ability to produce moderate to high biomass yields on marginal lands. These characters have resulted in the use of switchgrass in several bioenergy conversion processes, including cellulosic ethanol

production, biogas, and direct combustion for thermal energy applications.

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 other vegetation if not properly managed. Please consult with your local NRCS Field Office, Cooperative Extension Service office, state natural resource, or state agriculture department regarding its status and use. Weed information is also available from the PLANTS Web site at <http://plants.usda.gov>. Please consult the Related Web Sites on the Plant Profile for this species for further information.

Description and Adaptation

Switchgrass is native in the continental United States except California and the Pacific Northwest. It is a perennial bunch grass averaging 3 to 5 feet tall and may spread from short, stout rhizomes. The stem (culm) is round and can have a red to straw colored tint. The seed head is an open, spreading panicle.

Switchgrass is climatically adapted throughout most of the United States when planted on suitable soils. Moderately deep to deep, somewhat dry to poorly drained, sandy to clay loam soils are best. It does poorly on some heavy soils. In the East, it performs well on shallow and droughty soils. Switchgrass occurs naturally on prairies, open oak and pine woodlands, shores, riverbanks, and high brackish marshes along maritime forest ecotones.

For updated distribution, please consult the Plant Profile page for this species on the PLANTS Web site.



Switchgrass distribution from USDA-NRCS PLANTS Database



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Plant Guide

TALL WHEATGRASS

Thinopyrum ponticum (Podp.)

Z. -W. Liu & R. -C. Wang

Plant Symbol = THPO7

Contributed by: USDA NRCS Plant Materials
Center, Pullman, Washington



Anna Gardner, Ada Hayden Herbarium, Iowa State University

Alternate Names

Rush wheatgrass, *Agropyron elongatum* (Host) P. Beauv., *Agropyron varnense* (Velen.) Hayek., *Elymus elongatus* (Host) Runemark, *Elymus elongatus* (Host) Runemark var. *ponticus* (Podp.) Dorn, *Elymus varnensis* (Velen.) Runemark, *Elytrigia elongata* (Host) Nevski, *Elytrigia pontica* (Podp.) Holub., *Elytrigia pontica* (Podp.) Holub. spp. *pontica*, *Lophopyrum elongatum* (Host) A. Löve.

Uses

Grazing/pasture/hayland: Tall wheatgrass is used for hay and pasture in the northern Great Plains and

intermountain region. It produces high yields of good quality forage, however it is typically less palatable than other wheatgrasses. It is best suited for early season rotational grazing.

Erosion control: Tall wheatgrass is often used for erosion control along roadsides and other critical areas (Barkworth et al, 2007). It has been recommended in the northern Great Plains for passive terrace formation (Aase and Pikul, 1995).

Saline and sodic soils: Tall wheatgrass is planted as forage on saline and sodic soils where few other species will survive (Roundy, 1985; Retana et al., 1993). It is one of the most saline tolerant grasses commercially available. In the San Joaquin Valley of California, it is used to manage salinity in irrigation water recovery systems (Blunk et al., 2005; Zheng et al., 2005).

Biofuel: Tall wheatgrass is currently being evaluated as a possible source of cellulosic ethanol. Problems may exist, however, with biomass production of tall wheatgrass in saline environments due to high concentrations of salts and heavy metals, as well as potentially high emission levels of nitrous and sulfuric oxides (Blunk et al., 2005).

Nutrient removal: In Texas, applications of composted dairy manure increased dry matter yields and phosphorus and potassium concentrations in tall wheatgrass, indicating it could be used for nutrient removal (Butler and Muir, 2006).

Particleboard: The American Society of Agricultural Engineers (ASAE) has determined high quality particleboard can be produced by using tall wheatgrass (Zheng et al., 2005).

Windbreaks: In a study in Saskatchewan, tall wheatgrass windbreaks with several years' growth improved soil moisture levels and alfalfa yields (Stephuhn and Waddington, 1996).

Wildlife: Tall wheatgrass provides nesting cover and food for upland birds (Asay and Jensen, 1996).

Plant breeding: Tall wheatgrass is used in breeding programs to transfer genes for salinity, drought and disease resistance to annual wheat (Dewey, 1984; Sharma & Gill, 1983; Colmer et al., 2006).

Plant Materials <<http://plant-materials.nrcs.usda.gov/>>

Plant Fact Sheet/Guide Coordination Page <<http://plant-materials.nrcs.usda.gov/intranet/pfs.html>>

National Plant Data Center <<http://npdc.usda.gov>>



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Status

Consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status, such as, state noxious status and wetland indicator values.

Description

General: Grass family (Poaceae). Tall wheatgrass is a tall, long lived perennial bunchgrass reaching 1 to 3 m (3 to 10 ft) tall. Leaves are green or glaucous bluish with blades flat to curling, 2 to 8 mm (0.08 to 0.31 in) wide. The blades are often covered with short, stiff hairs making them scratchy to the touch. Auricles are well developed and ligules reach ca 0.7 mm (0.02 in) long. The inflorescence is a spike with a continuous rachis. Internodes in the spike are about 7 to 20 mm (0.3 to 0.8 in) long. Spikelets are solitary at each node each with five to 18 flowers. Glumes are thick and hardened, 6 to 11 mm (0.2 to 0.4 in) long with 5 to 7 nerves. The tips of the glumes are truncate (abruptly rounded). Lemmas are also thick and hardened, 9 to 13 mm (0.4 to 0.5 in) long with a truncate to acute apex. Anthers are 4 to 7 mm (0.15 to 0.20 in) long. $2n=14, 28, 42, 56$ or 70 (Welsh et al 2003).

Distribution: Tall wheatgrass is originally from Turkey, Asia Minor and Russia. It was introduced to the U.S. from Turkey in 1909 (Weintraub, 1953) and is now found throughout all western states of the U.S. and most Canadian provinces (USDA, 2008; Barkworth, et al., 2007).

Adaption

Tall wheatgrass is adapted to a wide range of soil types and climates. It is often recommended for 12 - 14 inch and higher precipitation zones or sites with high water tables at 4,300 to 6,000 feet elevation zones. It is well adapted to wet, alkaline soils such as greasewood and saltgrass sites where the water table is from a few inches to several feet below ground surface. It is less drought tolerant than crested wheatgrass, however it is adapted to sagebrush, mountain brush and juniper sites. Basin wildrye is a good indicator of where tall wheatgrass will be successful.

Tall wheatgrass is one of the most saline or alkali tolerant cultivated grasses. It can tolerate up to 1% soluble soil salts (Vallentine 1961). Tall wheatgrass increases production yields with salinity levels of 6000 to 18000 ppm and persists in soils with conductivity up to electrical conductivity (EC) of 26 mmhos/cm (Ogle et al., 2008).

Because of its late maturing characteristic, tall wheatgrass provides a long grazing period (USDA, 2005). It has been evaluated in several western states for its potential to extend the grazing season. Studies indicate it performs well in New Mexico and Kansas (Holechek et al., 1989; Harmoney, 2007), but not in Montana (Haferkamp et al., 2005), and results are variable in Oklahoma and Texas (Griggs and Matches, 1991; Malinkowski et al, 2003; Gillen and Berg, 2005; Hopkins, 2005).



Greg Fenchel, USDA NRC's NMPMC, Los Lunas, NM

Establishment

Tall wheatgrass should be planted with a drill into a firm, weed-free seed bed. The drill should be set to a depth of $\frac{1}{2}$ of an inch on medium to fine textured soils and no more than 1 inch deep on coarse textured soils. Recommended seeding rates are 10 pounds Pure Live Seed (PLS) per acre on non-saline soils and 15 pounds PLS per acre on saline soils. It is usually seeded in pure stands or in mixtures with grasses also having moderate palatability. If seeded in a mix, adjust seeding rate accordingly. Under dryland conditions, heavy to medium textured soils should be seeded in the very early spring, and medium to light textured soils should be seeded in the late fall. Irrigated land should be seeded in spring or late summer. Late summer (August - September) seedings are not recommended unless irrigation is available.



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Plant Guide

CANADA WILDRYE

Elymus canadensis L.

Plant Symbol = ELCA4

Contributed by: USDA NRCS, E. "Kika" de la Garza
Plant Materials Center



Shelly D. Maher, E. "Kika" de la Garza PMC

Alternate Names

Elymus brachystachys Scribn. & C.R. Ball
Elymus crescendus L.C. Wheeler
Elymus philadelphicus L.
Elymus robustus Scribn. & J.G. Sm.

Uses

Restoration: Canada wildrye is often an early successional component of prairie mixtures.

Livestock: Canada wildrye provides good forage quality during the early part of the grazing season but is generally considered an inferior forage after it matures. It is fairly palatable to most livestock, and is rated good in energy value but poor in protein value.

Wildlife: Canada wildrye has fair palatability as food for wildlife. It also provides nesting, brood, winter, and escape cover.

Erosion Control: Exceptional seedling vigor and rapid establishment make Canada wildrye an excellent species for use in erosion control seedings. Stands of Canada wildrye typically establish during the 1st year, reach peak production the 2nd or 3rd year, and then rapidly thin out. This species is sometimes used in seeding mixtures where quick establishment and stabilization is needed.

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).

Description

General: Canada wildrye is a native, cool-season perennial bunchgrass that grows 2.5- to 5- feet tall. Plants flower from March to June with seed maturing in July. The seedhead is a thick and bristly spike which can be either erect or nodding and can reach 10 inches in length, leaf blades are .5 inches wide or less. Auricles are claw-like and clasping, arising from a broad, yellowish or light green collar. Spikelets are mostly 3-5 flowered. Glumes are about equal and not bowed out at the base. Lemmas mostly 0.5 inch long with a flexuous awn 0.5 to 2 inches long with a slight outward curve at maturity (Gould, 1975).

Distribution: For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site. Canada wildrye is found throughout the U.S. except in the Southeast

Habitat: Canada wildrye tends to be a short-lived, cool-season grass found growing on shaded stream banks, along fence rows and in open woodlands. It also is found on sandy shores and dunes in the Northeast.

Adaptation

Canada wildrye is adapted to coarse textured sandy, gravelly or rocky soils. It is more tolerant of droughty, poor fertility soils than Virginia wildrye (Stubbendieck et. al, 1992). It has good shade tolerance. It also appears to have moderate salinity tolerance. Lavaca Germplasm Canada wildrye has performed well on both coarse and fine textured soils. Lavaca Germplasm can be used as a cool-season component in native seed mixtures for range restoration. It also can be used as a cool-season pasture. Because of its shade tolerance, Canada wildrye may be best suited for use in shaded areas or riparian zones.

Establishment

Seedbed preparation should begin well in advance of planting. Planting can be scheduled for early spring or early fall. Establish a clean, weed-free seedbed by either tillage or herbicides. Prior to planting, the site should be firm and have accumulated soil moisture.

Canada wildrye is best seeded using a native-grass drill with picker wheels to ensure a good planting of the seed. Broadcast seeding may be used in areas not