

## Description

*General:* Grass Family (Poaceae). Streambank wheatgrass has moderately short stems and seedheads. *E. lanceolatus* ssp. *lanceolatus* grows from 1 to 3 feet tall and under ideal conditions seed spikes may be 10 inches long. The auricles of both are pointed and semi-clasping. Leaves are 4-8 mm wide and green to blue-green in color. The lemmas, paleas, and glumes are generally pubescent. Streambank wheatgrass has no pubescence in the inflorescence.

## Distribution

This species is common to the northern Great Plains and Intermountain regions of the western United States. For current distribution of this species and its relatives, please consult the Plant Profile page for this species on the PLANTS Web site.

## Establishment

*Adaptation:* Streambank wheatgrasses are similar to western wheatgrass in appearance, except they are not as coarse, their rhizomatous trait is not as aggressive, and their coloration is somewhat greener. They are more drought tolerant than western wheatgrass. In comparison to western wheatgrass, they “green up” and “head out” earlier and total biomass production is generally lower. Both wheatgrasses do better on medium to coarse textured soils. Subspecies *psammophilus* can be found on slightly heavy to medium to coarse textured soils. Western wheatgrass may be a better choice on heavy textured soils if rainfall is high enough. They will tolerate slightly acidic to moderately saline conditions. They are cold tolerant, can withstand moderate periodic flooding in the spring, are moderately shade tolerant, and very tolerant of fire. They will not tolerate long periods of inundation, poorly drained soils, or excessive irrigation. Snake River wheatgrass prefers deep to shallow medium to coarse textured soils.

On native sites, streambank and Snake River wheatgrasses are most abundant in the 8 to 20 inch annual precipitation zones. Seeded varieties do best with 10 to 20 inches of precipitation. They have been seeded as low as 5 to 9 inches of precipitation with some success. The natural geographic range of *E. lanceolatus* ssp. *lanceolatus* is from near sea level in the Great Lakes region to 10,000 feet in the Rocky Mountains. The natural range of streambank wheatgrass is primarily the intermountain west. Subspecies *lanceolatus* is a very polymorphic species and is a component of the vegetation on such diverse sites as stabilized sand dunes in eastern Washington,

glacial outwash fans in Montana and loess (wind blown silt loam) soils in southern Idaho. They are components of many native plant communities and generally occupy less than 10 percent of the overall composition. An exception to this may be short periods following fire in Juniper stands, when they may nearly dominate the site.

Species often associated with these wheatgrasses include the following: the big sagebrush (*Artemisia tridentata*) complex, juniper (*Juniperus* spp.), needlegrasses, sand dropseed (*Sporobolus airoides*), prairie sandreed (*Calamovilfa longifolia*), bluebunch wheatgrass, Snake River wheatgrass, and Idaho fescue (*Festuca idahoensis*).

*Planting:* These species should be seeded with a drill at a depth of 1/2 inch or less on medium to fine textured soils and 1 inch or less on coarse textured soils. Single species seeding rates recommended for both grasses are 6 to 8 pounds Pure Live Seed (PLS) or 20 to 25 PLS per square foot. If used as a component of a mix, adjust to percent of mix desired. For mined lands and other harsh critical areas, the seeding rate should be increased to 40 to 50 PLS per square foot. Mulching and light irrigation are beneficial for stand establishment.

The best seeding results are obtained from seeding in very early spring on heavy to medium textured soils and in late fall on medium to light textured soils. Late summer (August - mid September) seedings are not recommended unless irrigation is available. Pre-chilling seed aids germination. Seedling vigor is good to excellent, exceeding that of western wheatgrass, but less than crested wheatgrass (*Agropyron cristatum*).

Both wheatgrasses establish fairly quickly, more quickly than western wheatgrass. They are the most rapidly establishing native species next to slender wheatgrass (*Elymus trachycaulus*). They are compatible with other species and can be used in seeding mixtures. They should not be seeded with strongly competitive introduced species. Under favorable conditions, they can become a good weed barrier.

Stands may require weed control measures during establishment, but application of 2,4-D should not be made until plants have reached the four to six leaf stage. Mow when weeds are beginning to bloom to reduce seed development. Grasshoppers and other insects may also damage new stands and the use of pesticides may be required.

## Management

This grass begins growth in the spring about 2 weeks after bluegrass (*Poa* spp.) species and about 3 weeks earlier than western wheatgrass. They make good spring growth, fair summer growth, and good fall growth if moisture is available.

Streambank wheatgrass is not recommended for forage production. Streambank and Snake River wheatgrass have good palatability for livestock and wildlife. Livestock and wildlife will graze streambank and Snake River wheatgrass throughout the growing season, until they become too coarse toward fall. Established stands can withstand heavy grazing.

Stands of these wheatgrasses should not be grazed until they have firmly established and have headed out. Six inches of new growth should be attained in spring before grazing is allowed in established stands.

These wheatgrasses are low maintenance plants, requiring little additional treatment or care. However, on better sites, stands can become sodbound (exception Snake River wheatgrass) and may need attention in the form of fertilization and moderate spring/fall deferment. Stands may also benefit from ripping if sod-bound conditions occur to increase forage production. Care should be taken to avoid excessive tillage because stands may be damaged.

Both wheatgrasses are competitive with weedy species, but can be crowded out by some aggressive introduced species.

*Environmental Concerns:* Streambank wheatgrass is long-lived, spread primarily via vegetative means (rhizomes), but also spread via seed distribution. They are not considered "weedy" or invasive species, but can spread into adjoining vegetative communities under ideal climatic and environmental conditions. Most seedlings do not spread from original plantings, or if they do spread, the rate of spread is not alarming. They will probably cross with each other, but are not noted for crossing with other natives.

Snake River wheatgrass is long lived and spreads primarily via seed distribution. It is not considered a "weedy" or invasive species, but can spread into adjoining vegetative communities under ideal climatic and environmental conditions. Most seedlings do not spread from original plantings. It is a cross-pollinating species and is known to cross with bluebunch wheatgrass, quackgrass (*Elymus repens*),

and bottlebrush squirreltail (*Elymus elymoides*). These crosses broaden the gene pool and do not generally dominate a site or crowd out the native ecotype and in many cases are sterile.

## Seed Production

Seed production of streambank wheatgrass has been very successful under cultivated conditions. Row spacing of 28 to 36 inches are recommended (although rhizomatous, they should be maintained in rows). Cultivation may be needed to maintain rows.

Seed fields are productive for two to four years. Average production of 100 to 250 pounds per acre can be expected under dryland conditions in 14 inch plus rainfall areas. Average production of 200 to 400 pounds per acre can be expected under irrigated conditions. Swathing, followed by combining of the cured windrows, best completes harvesting. The seed heads readily shatter and require close scrutiny of maturing stands. Seed is generally harvested in mid July to mid August.

Foundation and registered seed is available through the appropriate state Crop Improvement Association or commercial sources to grow certified seed.

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

Wheatgrass seed should be available through your local vendor.

'Bannock' (*E. lanceolatus* ssp. *lanceolatus*) was developed by the Aberdeen Plant Materials Center and released in 1995. It is a composite of collections from The Dalles, Oregon; Pocatello, Idaho; and Quincy, Washington. It is adapted to the Northwest and Intermountain regions where precipitation averages 8 inches or above. It prefers moderately deep loamy soils, but does grow in sandy to clayey soils. It is noted for rapid establishment, moderate formation of sod, high forage production and ability to survive and thrive under dry conditions. Certified seed is available and Aberdeen PMC maintains breeder seed.

'Critana' (*E. lanceolatus* ssp. *lanceolatus*) was developed by the Bridger Plant Materials Center and released in 1971. The original collection site was in north central Montana near Havre. It is drought tolerant, has good seedling vigor and readily establishes on critically disturbed sites. It is especially good as a sand dune stabilization species. 'Critana' is noted for its variable genetic expression. Certified seed is available and Bridger PMC maintains breeder seed.

'Schwendimar' (*E. lanceolatus* ssp. *lanceolatus*) was developed by the Pullman Plant Materials Center and released in 1994. It was collected on wind blown sands along the Columbia River near The Dalles, Oregon. It is adapted to northwest sites with 8 inches or greater precipitation and is recommended primarily for quick stabilization of coarse textured soils. Certified seed is limited and Pullman PMC maintains breeder seed.

'Secar' (*E. wawawaiensis*) is a cultivar of Snake River wheatgrass and was originally identified as a variety of bluebunch wheatgrass. The original collection site is along the Snake River gorge near Lewiston, Idaho. It was released by the Pullman Plant Materials Center in 1980. It is adapted to 8 inch plus rainfall zones. It is a bunchgrass with good seedling vigor and establishes well under drought conditions. See bluebunch wheatgrass Plant Guide for discussion on management and use. Certified seed is available and Pullman PMC maintains breeder seed.

'Sodar' (*E. lanceolatus* ssp. *psammophilus*) was released by the Aberdeen Plant Materials Center in 1954. The original collection was made in Grant County, Oregon. Its drought tolerance, excellent seedling vigor, vigorous rhizomatous trait once established, and ability to compete with weeds characterizes it. It is most commonly used for stabilization of critical sites. Certified seed is available and breeder seed is maintained by Aberdeen PMC.

## References

Alderson, J. & W.C. Sharp 1994. *Grass varieties in the United States*. Agriculture Handbook No. 170. USDA, SCS, Washington, D.C.

Carlson, J.R. & M.E. Barkworth 1997. *Elymus wawawaiensis: a species hitherto confused with Pseudoroegneria spicata (Triticeae, Poaceae)*. Phytologia 83:312-330.

Cronquist, A., A. H. Holmgren, N. H. Holmgren, J. L. Reveal, & P. K. Holmgren 1977. *Intermountain flora*. Vol. 6. The New York Botanical Garden. Columbia University Press, New York, New York.

Hitchcock, A. S. 1950. *Manual of the grasses of the United States*. USDA, Washington, DC.

Powell, A.M. 1994. *Grasses of the Trans-Pecos and adjacent areas*. University of Texas Press, Austin, Texas.

USDA, Forest Service 1996. *Fire effects information system*. Version: 000413.

<<http://www.fs.fed.us/database/feis/>>. Rocky Mountain Research Station, Fire Sciences Laboratory, Missoula, Montana.

USDA, NRCS 2000. *The PLANTS database*. Version: 000413. <<http://plants.usda.gov>>. National Plant Data Center, Baton Rouge, Louisiana.

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# SLENDER WHEATGRASS

## *ELYMUS TRACHYCAULUS* (LINK) GOULD EX SHINNERS

Plant Symbol = ELTR7

**Common Names:** Slender wheatgrass, Bearded wheatgrass, Rough-stemmed wheatgrass

**Scientific Names:** *Elymus trachycaulus*,  
*Agropyron trachycaulum*

### Description

**General:** Grass Family (Poaceae). Slender wheatgrass is a relatively short-lived (3 to 5 years) perennial, cool-season C3 type, bunchgrass native to Western North America. Plants are perennial, occasionally

producing short rhizomes. Culms are erect or decumbent at the base, reaching a height of 0.5 to 1.0 m (20 to 40 in) tall. Stems are noted as having a reddish to purplish tinge at the base. The leaves are flat, usually 2 to 8 mm (0.08 to 0.31 in) wide, stiffly ascending or somewhat lax. Sheathes are commonly glabrous or somewhat scabrous with auricles short or lacking. The inflorescence is a long, spicate raceme ranging from 5 to as much as 25 cm (2 to 10 in) long. Spikelets are solitary at each node of the rachis, 3 to 7 flowered and about 10 to 20 mm (0.4 to 0.8 in) long. Spikelets overlap along the inflorescence, the rachis internodes being 5 to 8 mm (0.2 to 0.8 in) long. Glumes are lanceolate to oblong with 5 to 7 nerves. The first glume ranges from 6 to 10 mm (0.24 to 0.4 in) long, while second glumes are slightly longer, from 7 to 12 mm (0.3 to 0.5 in) (Cronquist et al., 1997). Slender wheatgrass is self-pollinated and chromosome number is  $2n=28$  (Heath, et al, 1985). Historically, slender wheatgrass has borne many different names. Carl Linnaeus originally placed all wheatgrasses in the genus *Triticum* along with cultivated wheat. Later authors classified slender wheatgrass as *Agropyron caninum*, however, it was separated to *A. trachycaulum* from that Old World species by having broader glumes (5 to 7 nerves instead of 3), glumes with membranous margins (not rigid), and having anthers averaging 1.5 mm (0.06 in) long as opposed to 2mm (0.08 in). More recently, it was determined through the use of molecular, morphological and cladistic analysis that in North America, the genus *Agropyron* should be left to the introduced crested wheatgrass complex (*A. cristatum*, *A. desertorum* and *A. fragile*), which moved slender wheatgrass to the genus *Elymus*. This move also required the change of the epithet to *trachycaulus* in order to match the Latin genders (Barkworth, 1997).

**Distribution:** Slender wheatgrass is found from 1,300 to 3,500 m (4,300 to 11,500 ft) in elevation. The species range includes Canada, Siberia, Mexico and all states except those in the southeastern U.S. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

**Habitat:** Slender wheatgrass is found in many plant communities including Wyoming, basin and mountain big sagebrush, mountain brush, aspen, ponderosa, spruce-fir and lodge pole pine.

### Adaptation:

Slender wheatgrass grows naturally in moist to dry sites receiving more than 25 cm (10 in) annual precipitation. This species is less drought tolerant than crested and thickspike wheatgrass and may succumb to drought due to its late maturation. It prefers loamy to clayey soils. Slender wheatgrass is well adapted to basic soils (up to pH=8.8) and moderately saline conditions with a salinity tolerance ranging from 10 to 20 mmhos/cm.



## Uses

### *Grazing/rangeland/pasture:*

Slender wheatgrass is both palatable and nutritious to livestock. Crude protein averages 22 to 25% in the spring and drops below 10% in late summer to fall. Average dry matter yield is between 1000 and 2300 lb/acre.

### *Wildlife:*

Upland game birds and small mammals utilize the seed for food and the foliage for cover. Large ungulates, especially elk and bighorn sheep at higher elevations, readily graze this species.

### *Erosion control:*

Slender wheatgrass is a short-lived perennial with good seedling vigor. It germinates and establishes quickly when seeded making it a good choice for quick cover on disturbed sites. It persists long enough for other, slower developing components of seeding mixtures to establish.

### *Reclamation:*

Slender wheatgrass was among the first native grasses widely used for reclamation seedings in western Canada and the U.S (Alderson and Sharp, 1994). It has been successfully used for the reclamation of mine spoils, oil sands, roadsides right-of-ways, wildfire areas and other disturbed sites. It is especially valuable for use in saline soils. Slender wheatgrass is often chosen as a nurse crop in restoration seedings where it is included at low percentages in a mix (10-15%).

## Status

Slender wheatgrass is considered a species of special concern in Connecticut, endangered or extirpated in Maryland, endangered in New Jersey, and threatened in Ohio (USDA-NRCS, 2011).

Please consult the PLANTS Web site (<http://plants.usda.gov/>) and your state's Department of Natural Resources for this plant's current status (e.g., threatened or endangered species, state noxious status, and wetland indicator values).

## Management

Full stand seeding rate is 6 lb/ac with a recommended seeding depth of ¼ to ½ inch. Slender wheatgrass is best suited as a filler component in seed mixtures containing slower establishing, long-lived perennials (Ogle et al., 2010). It does well for hay and pasture when combined with legumes. Because this species is short-lived and only moderately tolerant of grazing, stands should be managed carefully to ensure seed production occurs every other year for long-term survival. Weeds in slender wheatgrass can be controlled chemically (Bromoxynil, Metribuzin, 2, 4-D or dicamba), by roguing or mechanical cultivating. Always read and follow label and safety instructions for each control method.

## Pests and Potential Problems

Slender wheatgrass is susceptible to head smut (*Ustilago bullata*) and stripe smut (*U. striiformis*) (Wheeler and Hill, 1957) and may be susceptible to infestations of the grass billbug (Heath, et al., 1985).

## Environmental Concerns

Although slender wheatgrass is native to Western North America, it can be viewed as “weedy” due to its ability to quickly establish in disturbed areas. Consult with your local NRCS Field Office, Cooperative Extension Service Office or state natural resource or agriculture department regarding this species' status and use. Weed information is also available from the PLANTS Web site.

## Seeds and Plant Production

Plant at a rate of approximately 3.4 pounds PLS/acre or 25 to 30 seeds per linear foot of drill row at 36 inch row spacing (Ogle et al., 2010). For stand establishment, apply 55 lb/acre of 11-55-0 (high phosphorus fertilizer) as a soil amendment prior to planting or during seeding. If planting into grain stubble, after initial seedling establishment, apply 30 lb/acre nitrogen for dryland or 60 to 80 lb/acre nitrogen for irrigated fields. No additional nitrogen is necessary if planting into summer fallow. Irrigate enough to keep soil moist for establishment and to prevent soil crusting. Seeds should germinate within 8 to 10 days. Weeds can be controlled after the 3 to 5 leaf stage with low rates of Bromoxynil. Be sure to read and follow all label directions when using any pesticide. Caution should be exercised when using cultivation on young seedlings because of the possibility of uprooting.

For established stands, apply 50 lb/acre nitrogen each year in late fall on dryland and 60 to 80 lb/acre nitrogen in late fall under irrigation. On established stands keep soil moisture above fifty percent field capacity during the growth period. Before the flowering stage apply enough water to carry plants through pollination. After pollination, irrigate to recharge the soil profile for seed set (Cornforth and Ogle, 2001).

Seed is ready for harvest in late July to early August. The recommended harvest method is by direct combining or by swathing followed by combining. Windrows should be allowed to dry in the field for 6 to 7 days before combining.

Seed yields range from 200 to 400 lb/acre in dryland to 500 to 600 lb/acre under irrigation. Seed should be dried to 12 percent or less moisture prior to storage. When stored properly, cleaned seed should retain its viability for about five years. Stands can be expected to survive for 3 to 5 years.

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

‘Adanac’ was released by the Agriculture Canada, Saskatoon Research Station and the Agriculture Canada Experiment Farm in 1990. Plants are taller than those of Revenue, but have fewer leaves. Adanac averaged 7% higher hay yields than Revenue during a four-year study. Adanac also rated higher than Revenue in establishment, persistence, seed yield and productivity under saline conditions. However, digestibility and protein content are somewhat below those of Revenue. This release is recommended for use in Saskatchewan, Canada. Breeder seed is maintained by the Agriculture Canada, Saskatoon Research Station and the Agriculture Canada Experiment Farm, Indian Head.

‘AEC Hillcrest’ was released by the Alberta Environmental Centre in 1994. Its primary uses are in reclaiming and revegetation of disturbed sites in the mountains and foothills of Alberta. This cultivar belongs to a different subspecies than the others discussed here (*Elymus trachycaulus* ssp. *subsecundus*) and is therefore difficult to compare directly. Data show AEC Hillcrest producing similar plant cover to Revenue at elevations around 1800 meters. Hillcrest seeds also tend to ripen two weeks earlier than Revenue, an important quality in the shortened growing season of Alberta (Darroch and Acharya, 1995). Breeder seed is maintained by the Alberta Environmental Centre, Vegreville, Alberta. Foundation and Certified seed is maintained by Peace Valley Seeds, Rycroft, Alberta.

‘Copperhead’ Selected Class Germplasm was officially released in 2007 by the Bridger, Montana Plant Materials Center. This release is from a collection of at least 20 plants originating from approximately one-half mile north of Highway 1 across from the junction to Wisdom, Montana. The collection site was severely impacted by smelter fallout, surface wind, and water transported contaminants, as well as historic overflow from the canal transporting waste material to sediment ponds. The original collection site had a soil surface pH of 4.3, an average annual precipitation of 13.93 inches and an elevation of 5,000 feet. The accession was compared to two other collections from acid/heavy-metal impacted sites and four released cultivars: ‘Pryor’ (Montana), ‘San Luis’ (Colorado), ‘Revenue’ (Canada), and ‘Highlander’ (Canada). Copperhead germplasm has been field tested at three impacted sites in the Anaconda area and in a controlled greenhouse environment utilizing contaminated soil. Copperhead germplasm has exhibited superior emergence, survival, and biomass production on amended acid/heavy metal impacted soil. Copperhead germplasm is intended for use on severely impacted sites with low pH and high concentration of heavy metals. G1 seed of Copperhead germplasm slender wheatgrass is available from the USDA-Natural Resources Conservation Service (NRCS) Plant Materials Center (PMC) in Bridger, Montana, through the Foundation Seed Program at Montana State University-Bozeman or the University of Wyoming.

‘First Strike’ was released in 2006 by the USDA-Agricultural Research Service and the US Army-Engineer Research and Development Center for use on arid and semiarid rangelands as a rapidly establishing revegetation grass in the Intermountain Region and Northern Great Plains of the western U.S. First Strike was selected for persistence and overall plant vigor in response to drought. In seeded trials at Yakama Washington, Guernsey, Wyoming, Fillmore, Utah and Malta, Idaho, First Strike had significantly more seedlings per unit area than Pryor during the establishment year. At Guernsey, Wyoming, forage production was 27% greater in First Strike than Pryor (Jensen et al., 2007). Foundation seed is available through the Utah Crop Improvement Association.

‘Primar’ was released by the NRCS Plant Materials Center in Pullman, Washington in 1946. Originally collected near Beebe, Montana, Primar was selected for use in sweetclover-grass conservation mixtures for pasture, hay and green manure. Plants are high in vegetative production and show resistance to leaf rust, stem rust and stripe rust. This cultivar is adapted to short-lived dryland seedlings in areas receiving over 16” annual precipitation. Pullman Plant Materials Center maintains Breeder seed and Washington Crop Improvement Association maintain Foundation seed. ‘Primar’ was discontinued in 1997.

‘Pryor’ was released cooperatively by the NRCS Plant Materials Center in Bridger, Montana and the Montana and Wyoming Agricultural Experiment Stations in 1988. The original collection was made in Carbon County, Montana, five miles north of Warren. It is superior to other previously released slender wheatgrasses in drought tolerance, saline tolerance and seedling vigor. It also matures earlier and has a larger mean seed size (213,000 seeds/kg compared to 320,000 seeds/kg). For these reasons it is used primarily in mixtures for reclamation and conservation plantings in low precipitation, alkali conditions. Breeder and Foundation seed are maintained by the NRCS Plant Materials Center, Bridger, Montana.

'Revenue' was originally collected in Saskatchewan in 1961. It was selected from over 750 native and introduced collections evaluated between 1959 and 1969 and released in 1970 by the Canada Department of Agriculture. Revenue is said to be superior to Primar in establishment, forage and seed yield and in salinity tolerance. It also has a higher leaf-to-stem ratio, better digestibility and greater smut resistance than Primar. It is similar to Primar in maintaining good stands for three to five years. It is adapted for use on saline soils and in short pasture rotations. Breeder seed is maintained by the Canada Department of Agriculture.

'San Luis' was released cooperatively in 1984 by Colorado, and New Mexico Agricultural Experiment Stations, NRCS, and the Upper Colorado Environmental Plant Center. The original collection was made by Glenn Niner in 1975 near Center, San Luis Valley, Rio Grande County, Colorado. Due to its outstanding rapid establishment and longevity it is well suited for soil stabilization on slopes and disturbed sites. It performs best above 1,800 meters elevation in areas receiving over 35 cm (14 inches) of annual precipitation. It is recommended for ski slopes, roadsides, mine land reclamation, and transmission corridors. Breeder and Foundation seed is maintained by the Upper Colorado Environmental Plant Center, Meeker, Colorado.

'Charleston Peak Germplasm' is a selected class, genetically manipulated track pre-variety germplasm released by the USDA Agricultural Research Service. It is unique in that it exhibits short rhizomes not typically found in standard slender wheatgrass and appears to have the ability to accumulate cadmium (Cd) from the soil in its above ground tissue. It is currently the only slender wheatgrass plant material that originates in the Great Basin. The intended use of this wheatgrass is on arid and semiarid rangelands for revegetation in the Great Basin and Intermountain Regions of the western US (Jensen et al., 2016).

Cultivars should be selected based on the local climate, resistance to local pests, and intended use. Consult with your local land grant university, local extension or local USDA NRCS office for recommendations on adapted cultivars for use in your area.

#### Literature Cited

- Alderson, J. and W. C. Sharp 1994. *Grass varieties in the United States*. Agriculture Handbook No. 170. USDA, SCS, Washington, DC.
- Barkworth, M.E. 1997. Taxonomic and nomenclatural comments on the Triticeae in North America. *Phytologia*. 83(4): 302-311.
- Block, D.N. Rangeland Ecosystems and Plants: *Elymus trachycaulus*. URL: <http://www.usask.ca/agriculture/plantsci/classes/range/agropyrontrach.html> (accessed 3 December 2004). Department of Plant Sciences. University of Saskatchewan.
- Cornforth, B., L. St. John and D. G. Ogle. 2001. Technical Note 14: Seed production standards for conservation plants in the Intermountain West. USDA-NRCS, Boise, ID. 15p.
- Cronquist, A., A.H. Holmgren, N.H. Holmgren and J.L. Reveal. 1977. *Intermountain Flora: Vascular Plants of the Intermountain West*, U.S.A. The New York Botanical Garden.
- Darroch, B.A. and S.N. Acharya. 1996. AEC Hillcrest awned slender wheatgrass. *Can. J. Plant Sci.* 76: 345-347.
- Heath, M.E., Barnes, R.F. and Metcalfe, D.S. 1985. Eds. *Forages – The Science of Grassland Agriculture*, Fourth Edition. Iowa State University Press, Ames, IA. 643 p.
- Jensen, K.B., Palazzo, A.J., Waldron, B.L., Bushman, B.S. 2007. Registration of 'FirstStrike' Slender Wheatgrass. *Journal of Plant Registrations* 1:25.
- Jensen, K.B., S.R. Larson, B.S. Bushman, J.G. Robins. 2016. Notice of release of Charleston Peak germplasm slender wheatgrass: A selected class, genetically manipulated track pre-variety germplasm. *Native plants journal* 17(2): 127-133.
- Ogle, D. G., L. St. John, M. Stannard and L. Holzworth. 2010. Technical Note 24: Grass, grass-like, forb, legume, and woody species for the intermountain west. USDA-NRCS, Boise, ID. 46p.
- Peterson, J. 2000. Slender Wheatgrass. NRCS Plant Guide. USDA, NRCS, Idaho State Office & the National Plant Data Center. 3p.
- Skinner, David M. 2004. Propagation protocol for production of *Elymus trachycaulus* (Link) Gould ex Shinners seeds; Pullman Plant Materials Center, Pullman, Washington. In: *Native Plant Network*. URL: <http://www.nativeplantnetwork.org> (accessed 3 December 2004). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.
- USDA, NRCS. 2011. The PLANTS Database, Version 3.5 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.
- Wheeler, W. and Hill, D. 1957. *Grassland Seeds*. D. Van Nostrand Company, Inc, Princeton, NJ 734 p.

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For any other information dealing with Supplemental Nutrition Assistance Program (SNAP) issues, persons should either contact the USDA SNAP Hotline Number at (800) 221-5689, which is also in Spanish or call the [State Information/Hotline Numbers](#). For any other information not pertaining to civil rights, please refer to the listing of the [USDA Agencies and Offices](#) for specific agency information.

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## BLUE FLAX LEWIS FLAX

*Linum perenne* L.  
*Linum lewisii* Pursh

Plant Symbol = LIPE2 & LILE3

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



Derek J. Tilley  
Fig. 1: Maple Grove Lewis flax  
*Linum lewisii*

### Alternate Names

Prairie flax

### Uses

**Ethnobotanic:** Cultivated flax (*Linum usitatissimum*) is grown both for fiber (flax) and seed oil (linseed). Linseed oil may cause skin irritation upon contact.

Ingestion causes difficulty of breathing, paralysis, and convulsions (Russell et al. 1997).

**Grazing/rangeland:** Blue and Lewis flax are noted to have fair forage value for livestock and wildlife during spring and winter. Plants stay green throughout the growing season providing some forage value. Birds use the seed and capsules in fall and winter. All species provide diversity to the seeded plant community.

### United States Department of Agriculture-Natural Resources Conservation Service

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>>

**Erosion control/reclamation/greenstripping:** All flax species are noted for their value in mixes for erosion control and beautification values. The six week flowering period and showy blue flowers make seedlings more aesthetically pleasing and increase plant biodiversity. Due to the semi-evergreen nature of the species, flax can also be used as a fire suppressant species in greenstrip plantings.

**Wildlife:** Flax is considered desirable forage for deer, antelope, and birds, either as herbage or seed. They may also provide some cover for selected small bird species.

### 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:** Flax Family (Linaceae). *Linum perenne* is introduced from Eurasia. *Linum lewisii* is a comparable U.S. native plant (figure 1). In general, flax is an annual or short-lived, semi-evergreen perennial forb, sometimes semi-woody at base with attractive flowers ranging from white to blue to yellow to red in color. Common in the western United States, blue flax is considered a woody subshrub in the PLANTS database (USDA, NRCS 2000). According to Cronquist et al. (1997), "the only significant difference between *Linum lewisii* and the Eurasian *Linum perenne* appears to be that the former is homostylic, and the latter heterostylic."

Flax plants have many narrow, small, alternate (rarely opposite), simple and entire leaves that are sessile (lacking stalks) on the stems. The perfect and regular, generally showy flowers are borne in racemes or cymes. The sepals, petals, and stamens are five, the fruit a capsule, and the seeds in most species are mucilaginous when wet.

### Distribution

Lewis flax can be found from Alaska to California and east to Minnesota in mixed grass, sagebrush, shadscale, piñon-juniper, mountain brush and aspen communities and in openings in coniferous forests. Blue flax is native to Eurasia and has been planted successfully throughout the United States. For current distribution, consult the Plant Profile page for this species on the PLANTS Web site.