

SLENDER WHEATGRASS

Elymus trachycaulus (Link)
Gould ex Shinnery ssp.
trachycaulus
Plant Symbol = ELTRT

Contributed by: USDA NRCS Idaho State Office



Jeanne R. Janish. 1977.
© The New York Botanical Garden

Alternate Names

Agropyron trachycaulum, *Agropyron caninum* var. *andinum*.

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. 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.

Legal Status

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).

Taxonomy

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 long as opposed to 2mm. More recently, it was decided 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.

Description

General: Grass Family (Poaceae). Slender wheatgrass is an erect, tufted, bunchgrass ranging in

height from 2 to 2-1/2 feet. It 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 meters (20 to 40 inches) tall. Stems are noted as having a characteristic reddish to purplish tinge at the base. The leaves are flat, usually 2 to 8 mm (0.08 to 0.31 inches) wide, stiffly ascending or somewhat lax. Sheaths 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 inches) 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 inches) long. Spikelets overlap along the inflorescence, the rachis internodes being 5 to 8 mm (0.2 to 0.3 inches) 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 inches) long, while second glumes are slightly longer, from 7 to 12 mm (0.3 to 0.5 inches).

Distribution

Slender wheatgrass is found in many plant communities including Wyoming, basin and mountain big sagebrush, mountain brush, aspen, ponderosa pine, spruce-fir and lodgepole pine. It is found from 1300 to 3500 meters (4,500 to 12,000 feet) 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.

Adaptation

Slender wheatgrass grows naturally in moist to dry sites receiving more than 250 mm (10 inches) annual precipitation. This species is not as drought tolerant as crested, thickspike and streambank wheatgrasses and may succumb to drought due to its late maturation. It prefers loamy to clayey soils and grows at elevations from 1,300 to 3,500 meters (4,500 to 12,000 feet). 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.

Establishment

Seeds should be planted in a firm, weed-free seed bed. Dormant fall planting is preferred for dryland seedlings made in areas receiving less than 16 inches

mean annual precipitation. Areas receiving over 16 inches of mean annual precipitation and fields that are irrigated can be seeded in late fall or early spring. (Note: dormant fall seedings are more prone to be negatively affected by soil crusting and mid to late spring seedings are more prone to drying out).

Seeds should be drilled to a depth of 1/4 to 3/4 inch at a Pure Live Seed (PLS) rate of approximately 6 lb PLS/acre for field plantings.

For critical area plantings, turf applications and broadcast plantings the PLS seeding rate should be 1.5 to 2.0 times the drill seeding rate.

For native seed mixtures, limit slender wheatgrass to 1 to 2 pounds PLS/acre because higher rates effect the establishment of slower developing native species.

Fertilizer is not recommended for establishment, as it usually benefits the weeds. On disturbed sites fertilizer should be applied according to soil test results.

Management

Slender wheatgrass is best suited as a filler component in seed mixtures containing slower establishing, long-lived perennials. 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.

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.

Please 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.

Seed 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.

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. Control weeds chemically (Bromoxynil, Metribuzin, 2,4-D or dicamba), by roguing or mechanical cultivating.

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.

Pests and Potential Problems

No insect or disease problems have been noted for this species.

Cultivars, Improved, and Selected Materials

‘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.

‘Elbee’ was released in 1980 by S. Smoliak and A. Johnson of Agriculture Canada Research Station, Lethbridge, Alberta. This is an eight-clone synthetic variety selected for aggressiveness of rhizomes, and forage and seed yields. This variety has excellent germination, high seedling vigor, drought tolerance, early spring growth and an aggressive root system. It is primarily intended for range and pasture seedings in the dark soil zones of the prairies as well as for revegetation of roadsides and industrial disturbances. Breeder seed is available through Agriculture Canada Research Station, Lethbridge, Alberta.

‘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. Breeder seed is maintained by the Alberta Environmental Centre, Vegreville, Alberta. Foundation and Certified seed is maintained by Peace Valley Seeds, Rycroft, Alberta.

‘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 seedings in areas receiving over 16” annual precipitation. Pullman Plant Materials Center maintains Breeder seed and Washington Crop Improvement Association maintain Foundation seed.

‘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.

References

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*. (<http://www.usask.ca/agriculture/plantsci/classes/range/agropyrontrach.html>, 3 December 2004). Department of Plant Sciences. University of Saskatchewan, (insert city).

Cornforth, B., L. St. John and D. G. Ogle. 2001. *Seed production standards for conservation plants in the Intermountain West*. Technical Note 14. USDA-NRCS, Boise.

Cronquist, A., A.H. Holmgren, N.H. Holmgren and J.L. Reveal. 1977. *Intermountain flora: vascular*

plants of the intermountain West, USA. The New York Botanical Garden, Bronx.

Darroch, B.A. and S.N. Acharya. 1996. AEC Hillcrest awned slender wheatgrass. *Can. J. Plant Sci.* 76: 345-347.

Haas, R.J., K.K. Sedivec, & D.A. Tober. 1997. *Grass varieties for North Dakota*. Extension Service Circular R-794. (<http://www.ext.nodak.edu/extpubs/hay.htm>). North Dakota State University, Bismarck.

Hitchcock, A.S. 1951. *Manual of the grasses of the United States*. USDA, Washington, D.C.

Janish, J.R. 1969. *Vascular Plants of the Pacific Northwest, Part 1: Vascular Cryptogams, Gymnosperms, and Monocotyledons*. University of Washington Press, Seattle.

Ogle, D. G., L. St. John, M. Stannard and L. Holzworth. 2003. *Grass, grass-like, forb, legume, and woody species for the intermountain West*. Technical Note 24. USDA-NRCS, Boise.

Poole, B., J. Dickerson, B. Wark, D. Burgdorf, R. Maher, T. Bush, & C. Miller. 1998. *Vegetating with native grasses in northeastern North America*. USDA-NRCS Plant Materials Program and Ducks Unlimited Canada.

Skinner, David M. 2004. Propagation protocol for production of *Elymus trachycaulus* (Link) Gould ex Shinnery seeds; Pullman Plant Materials Center, Pullman, Washington. (<http://www.nativeplantnetwork.org>, 3 December 2004). University of Idaho, College of Natural Resources, Forest Research Nursery, Moscow.

USDA, Forest Service 1996. *Fire effects information system*. Version: 000417. <<http://www.fs.fed.us/database/feis/>>. Rocky Mountain Research Station, Fire Sciences Laboratory, Missoula.

USDA, NRCS. 2004. The PLANTS Database, Version 3.5 (<http://plants.usda.gov>). [National Plant Data Center](#), Baton Rouge.

Van Bruggen, T. 1976. *The vascular plants of South Dakota*. The Iowa State University Press, Ames.

Wark, D.B., W.R. Poole, R.G. Arnott, L.R. Moats, & L. Wetter 1994. *Revegetating with native grasses*. Ducks Unlimited Canada, Stonewall.

Prepared By:

Derek J. Tilley

USDA NRCS Plant Materials Center, Aberdeen, Idaho

Dan Ogle

USDA NRCS Idaho State Office, Boise, Idaho

Loren St. John

USDA NRCS Plant Materials Center, Aberdeen, Idaho

Larry Holzworth

USDA NRCS Montana State Office, Bozeman, Montana

Wayne Crowder

USDA NRCS Plant Materials Center, Pullman, Washington

Mark Majerus

USDA NRCS Plant Materials Center, Bridger, Montana

Species Coordinator:

Dan Ogle

USDA NRCS Idaho State Office, Boise, Idaho

Edited: 10Dec04djt; 21Jan05dgo; 1Jan05lsj; 6Jan05wac; 14Jan05lkh, 20Jan05 rln; 06Jun06 jsp

For more information about this and other plants, please contact your local NRCS field office or Conservation District, and visit the PLANTS Web site <<http://plants.usda.gov>> or the Plant Materials Program Web site <<http://Plant-Materials.nrcs.usda.gov>>

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice or TDD). USDA is an equal opportunity provider and employer.

Read about [Civil Rights at the Natural Resources Conservation Service](#).