

SIBERIAN WHEATGRASS

Agropyron fragile (Roth)
Candargy
Plant Symbol = AGFR

Contributed by: USDA NRCS Idaho State Office



P-27 Siberian Wheatgrass
Loren St. John, USDA NRCS Idaho PMC, Aberdeen, Idaho

Alternate Names

Agropyron sibericum, *Agropyron cristatum* ssp. *fragile*, *Agropyron fragile* ssp. *sibericum*

Uses

Grazing/rangeland/hayland: Siberian wheatgrass is a perennial, introduced grass commonly seeded in the arid regions of the western United States. Siberian wheatgrass is commonly recommended for forage production. It is palatable to all classes of livestock and wildlife. It is a preferred feed for cattle, sheep, horses, and elk in spring and also in the fall, if additional growth occurs from late growing season rainfall.

It is considered a desirable feed for deer and antelope in spring and again in fall, if additional growth

occurs. It is not considered a desirable feed for cattle, sheep, horses, deer, antelope, and elk in the summer. In spring, the protein levels can be as high as 18 percent and levels decrease to about 4 percent when dormant. Digestible carbohydrates remain high throughout the active growth period. It is commonly utilized for winter forage by cattle and horses, but protein supplements are required to ensure good animal health. It is noted for its ability to withstand very heavy grazing pressure (65-70 percent utilization), once stands are established. Siberian wheatgrass produces good forage yields in the areas where it is best adapted and will generally produce from 1.5 to 2 times more forage than native grasses. Siberian wheatgrass is generally not recommended in areas with more than 14 inches of annual rainfall because better, alternative forage species are available.

Erosion control/reclamation: Siberian wheatgrass is well adapted for the stabilization of disturbed soils. It competes well with other aggressive introduced plants during the establishment period. Siberian wheatgrass is generally not compatible in mixtures with native species, because it is very competitive and commonly out-competes the slower developing native species. However, when seeded at low rates with native species, outstanding mixed stands including bluebunch wheatgrass, Snake River wheatgrass, Sandberg bluegrass and big bluegrass have been achieved.

Its drought tolerance, fibrous root system, and excellent seedling vigor make Siberian wheatgrass ideal for reclamation in areas receiving 8 inches or more annual precipitation. This grass can be used in urban areas where irrigation water is limited to provide ground cover, weed control and to stabilize ditch banks, dikes, pipelines, power lines, and roadsides.

Wildlife: Birds and small rodents eat Siberian wheatgrass seed. Deer, antelope, and elk graze it, especially in spring and fall. Upland game birds and songbirds utilize stands for nesting. Where it is planted as a monoculture, the resulting biodiversity is lower than that found in a diverse seeding or native plant community.

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).

Description

General: Family (Poaceae). Siberian wheatgrass is a long-lived, cool season, drought tolerant, introduced, winter hardy grass with an extensive root system.

Siberian wheatgrass is similar to fairway and standard crested wheatgrass, but it has finer leaves and stems, narrower and awnless glumes and lemmas, and the spikelets are more ascending, which gives the spike a narrow, oblong, sub-cylindrical shape. Siberian wheatgrass is more drought tolerant and retains its greenness and palatability later into the summer than either standard or fairway crested wheatgrass.

Distribution: This species was introduced from Asia and is naturalized from the Pacific coast to New York. For current distribution, consult the Plant Profile page for this species on the PLANTS Web site.

Adaptation

Siberian wheatgrass is adapted for non-irrigated seedings where annual precipitation averages 8-14 inches and where the frost-free period is generally less than 160 days.

On droughty sites with 8- 10 inches annual precipitation, Siberian wheatgrass is an excellent choice. It is known to surpass fairway and standard crested wheatgrass in rate of establishment, stand persistence, and total forage yield on more arid sites (8 to 10 inches annual precipitation) and during extended periods of drought.

Siberian wheatgrass is well adapted to sandy, sandy loam, loamy and silt loam droughty soils. Siberian wheatgrass has been seeded in areas with as little as 5 inches of annual precipitation with some success. Siberian wheatgrass is cold tolerant and can withstand moderate periodic flooding, not exceeding 7-10 days in the spring. It will not tolerate long periods of inundation-standing water, poorly drained soils, or excessive irrigation. It is very tolerant of fire.

Establishment

Siberian wheatgrass 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. The seeding rate recommended for Siberian wheatgrass is

6 pounds Pure Live Seed (PLS) per acre or 24 PLS seeds per square foot. This would be equivalent to 1 pure live seed per inch of drill row in drills with 6- 7 inch row spacing.

If used as a component of a mix, with alfalfa (*Medicago* spp.), sainfoin (*Onobrychis viciifolia*), yellow sweetclover (*Melilotus officinalis*), cicer milkvetch (*Astragalus cicer*) or others, adjust to percent of mix desired. For critical areas such as reclaimed mine lands, the seeding rate for Siberian wheatgrass should be increased to 12 pounds PLS per acre or 50 PLS seeds per square foot. Mulching and short-term light irrigation on highly disturbed, droughty areas are beneficial for stand establishment.

The best seeding results are obtained from seeding in very early spring on heavy to medium textured soils and as dormant seeding in late fall (most commonly preferred seeding period) on medium to light textured soils. Late summer (August - mid September) seedings are not recommended unless irrigation for establishment is available.

Siberian wheatgrass establishes quickly, with 'Vavilov II' Siberian wheatgrass noted for having the best seedling vigor and initial stand establishment. Siberian wheatgrass should not be seeded with native species unless seeding rates are very low (generally < 2 pounds per acre). It may compliment native stands that are already partially established. Under favorable conditions it provides good weed competition particularly for winter-annual weedy species such as cheatgrass and medusahead.

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 weed seed development. Grasshoppers and other insects may also damage new stands and use of insecticides may be required. Be sure to read and follow pesticide labels.

Management

Siberian wheatgrass produces new growth in the spring about 10 days after Sandberg bluegrass and about two weeks earlier than most native wheatgrasses. It makes good spring growth, little summer growth and good fall growth if moisture is available.

Siberian wheatgrass has good palatability for livestock and wildlife. Livestock and wildlife will graze Siberian wheatgrass throughout the spring growing season until it matures and becomes too

coarse, and again in fall if re-growth occurs. Established stands can withstand very heavy utilization levels.

New stands of Siberian wheatgrass should not be grazed until they are firmly established and have started to produce seed heads. Six inches of new growth should be attained in spring before grazing is allowed in established stands. Three inches of stubble should remain at the end of the grazing season to maintain the long-term health of the plant. In addition, leaving three inches or more stubble will result in a 10 to 14 day earlier growth period or “green-up” the following spring.

Siberian wheatgrass is a low maintenance plant requiring little additional treatment or care. However, spring/fall deferment or grazing rotations are recommended to maintain plant health and to maximize forage production potential.

Siberian wheatgrass is competitive with weedy species, but can be crowded out by some aggressive introduced weedy species and native woody species.

Siberian wheatgrass is not recommended for hay production, but is more suited to dryland pasture use. Light infrequent applications of nitrogen (25 pounds/acre) and light irrigation will increase total biomass production and lengthen the growing period. Re-growth following grazing is generally poor.

Environmental Concerns

Siberian wheatgrass is long-lived and spreads primarily via seed. It is not considered "weedy" or an invasive species. Most seedings do not spread beyond original plantings. It does not cross with native species.

Siberian wheatgrass resists cheatgrass competition better than most native species, because it germinates earlier and grows more rapidly at colder temperatures. This is an important competitive advantage when dealing with winter annual species such as cheatgrass.

Well established and properly managed (grazed) stands of Siberian wheatgrass generally exclude other grasses and forbs. When inter-seeded into native stands, Siberian wheatgrass commonly co-exists with native grasses, forbs and shrubs. Some native shrubs, such as big sagebrush and rabbitbrush species, often invade Siberian wheatgrass stands if native seed sources are nearby.

Due to commonly being planted in monoculture (single species) stands in the past, some feel Siberian wheatgrass is not ecologically appropriate. It is important to consider this opinion and to plant multiple species mixtures to avoid this perception.



Vavilov II Siberian Wheatgrass
Loren St. John, USDA NRCS Idaho PMC, Aberdeen, Idaho

Seeds and Plant Production

Seed production of Siberian wheatgrasses has been very successful under cultivated conditions. Row spacing of 24 to 36 inches when irrigated and 36 inches under dryland conditions (16 + inches mean annual precipitation) are recommended. Early spring or late fall seedings are recommended under dryland conditions. Early spring seedings are recommended under irrigated conditions. When irrigated, spring seedings consistently yield more seed during the first year of seed production. To obtain maximum seed production, fall plantings are not recommended in irrigated regions.

Control weeds during stand establishment and long term management of stand by cultivation, hand rousing or light rates of herbicide (2,4-D or Bromoxynil according to label) after the five-leaf stage.

Fertilizer is generally not recommended during establishment. If soil nitrogen and phosphorus are low, an application of 10-15 pounds per acre nitrogen and 20-30 pounds per acre phosphorus may be applied prior to planting.

Fertilize for full seed production following the establishment year in early fall or use a split application in early fall and again in early spring. Very early spring application of nitrogen may be beneficial on sandy soils to promote vegetative growth. When irrigated, apply adequate moisture for germination, establishment, and to bring soils to field capacity. Following stand establishment, fertilize and irrigate soon after seed harvest in fall to stimulate seed head primordia development for the subsequent harvest the following year. Do not stress plants during re-growth and tillering in the fall, late boot stage, and during pollination. Avoid sprinkler irrigation during flowering.

Seed fields are productive for four to five years. Average production of 150 to 200 pounds per acre can be expected under dryland conditions in 16 inch plus rainfall areas. Average production of 450 to 600 pounds per acre can be expected under irrigated conditions. The seed heads do not readily shatter, but some shatter can be expected. Harvesting is best completed by direct combining when the top of the seed head begins to shatter or windrowing at hard dough stage and combining with pickup attachment about 5 to 7 days following windrowing operation. Seed is generally harvested in mid July to mid August.

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

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

Agropyron fragile - **Siberian wheatgrass** is similar to crested wheatgrass, but is considered more drought tolerant than fairway and standard crested wheatgrass. 'P27', 'Vavilov' and 'Vavilov II' are Siberian wheatgrass cultivars.

'P27' was selected by the Aberdeen and Pullman Plant Materials Centers from collections originating from Kazakhstan and was released in 1953 by NRCS, Aberdeen and Pullman PMCs, and Idaho Agricultural Experiment Station. The seed is awnless, has finer leaves, and retains greenness and palatability later into the summer than fairway or standard crested wheatgrass. It yields less and has poorer seedling vigor in higher rainfall areas than crested wheatgrass. It yields more than crested wheatgrass varieties in low rainfall areas. It is best adapted to 8 inches and above annual precipitation and is noted for tolerating drought periods better than all other wheatgrasses once established. It is well adapted to light-sandy, droughty soils. Certified seed is available. Breeder

and Foundation seed is maintained by Aberdeen PMC.

'**Vavilov**' was developed from collections originating from the former USSR, Turkey, and from P-27 by ARS in Logan, Utah. ARS and the Utah Agricultural Experiment Station released it in 1994. Seedling vigor is similar to 'Hycrest' and 'Hycrest II' crested wheatgrass and it is consistently better than 'P-27'. It is more drought tolerant and better adapted to sandy soils than other crested wheatgrasses. It is best adapted to 8 inches and above annual precipitation and elevations below 7,000 feet. It is noted for tolerating longer drought periods once established than crested wheatgrass. ARS Logan, Utah maintains Breeder and Foundation seed.

'**Vavilov II**' is a broad based 50 clone synthetic developed from clones from Kazakhstan and genotypes from 'Vavilov'. It was developed and tested for resilient plant characteristics that can tolerate heavy trampling by livestock and from vehicular traffic on sites such as tank training ranges. It was released in 2008. Seedling vigor is commonly superior to 'Hycrest', 'Hycrest II' crested wheatgrass and 'Vavilov' Siberian wheatgrass and it has consistently better seedling vigor than 'P-27'. Siberian wheatgrass is more tolerant of drought and better adapted to sandy soils than other crested wheatgrass types. 'Vavilov II' is also well adapted to sandy loam, loamy and silt loam soils. It has been established in areas with as low as 5 inches of rainfall. It is best adapted to 8 inches and above annual precipitation and elevations below 7,000 feet. It has superior seedling vigor which enables Vavilov II to establish and persist under droughty conditions. This trait has not been fully determined at the date of this publication. Siberian wheatgrass is noted for tolerating longer drought periods once established than crested wheatgrass. It is expected that 'Vavilov II' will eventually replace 'Vavilov' and 'P-27' on the commercial seed market. Breeder seed is maintained by ARS in Logan, UT and Foundation seed is produced by NRCS, Plant Materials Center, Aberdeen, ID. Foundation seed is made available to commercial growers through the University of Idaho - Foundation Seed Program and the Utah Crop Improvement Association.

Contact your local Natural Resources Conservation Service office for more information. Look in the phone book under "United States Government." The Natural Resources Conservation Service will be listed under the subheading "Department of Agriculture."

References

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

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.

Harrison, R.D., N.J. Chatterton, R.J. Page, M. Curto, K.H. Asay, K.B. Jensen, & W.H. Horton 1996. *Competition, biodiversity, invasion, and wildlife use of selected introduced grasses in the Columbia and Great Basins*. Utah Agricultural Experiment Station, Research Report 155, Utah State University, Logan, Utah. Version: 000418.
<<http://agx.usu.edu/agx/ResearchReports/USDAREP/ORT/toc.html>>.

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

Jensen, K.B., D.A. Johnson, K.A. Asay and K.C. Olson. 2001. *Seasonal-accumulated growth and forage quality of range grasses for fall and winter grazing*. Utah Agricultural Experiment Station, Journal Paper 7297, Utah State University, Logan, Utah. Version: 000418.

Tsvelev, N.N. 1983. *Grasses of the Soviet Union. Part I*. Oxonian Press Pvt. Ltd., New Dehli. *Translation of: Zlaki SSSR, Fedorov, A.A. (Ed.) 1976*. Nauka Publishers, Leningrad Section, Leningrad.

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, Montana.

USDA, NRCS 2000. *The PLANTS database*. Version: 000417. <<http://plants.usda.gov>>. National Plant Data Center, Baton Rouge, Louisiana.

Prepared By

Daniel G. Ogle, USDA NRCS Idaho State Office, Boise, Idaho.

Loren St. John, USDA NRCS Plant Materials Center, Aberdeen, Idaho

Dr. Kevin B. Jensen, USDA ARS Forage and Range Research Laboratory, Utah State University, Logan, Utah

Species Coordinator

Daniel G. Ogle, USDA NRCS Idaho State Office, Boise, Idaho.

Edited: 28sept07 lsj; 30april08 dgo; 24jan03 kbj; 29april08 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](#).