

## THICKSPIKE WHEATGRASS

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

Including

*E. l. subsp. lanceolatus*  
Thickspike Wheatgrass  
Plant Symbol = ELLAL

*E. l. subsp. riparius* (Scribn. &  
J.G. Sm.) Barkworth  
Streambank Wheatgrass  
Plant Symbol = ELLAR

And

*E. l. subsp. psammophilus* (J.M.  
Gillett & H. Senn) Á. Löve  
Great Lakes Wheatgrass  
Plant Symbol = ELLAP

**Contributed by:** USDA NRCS Idaho Plant Materials  
Program

### Alternate Names

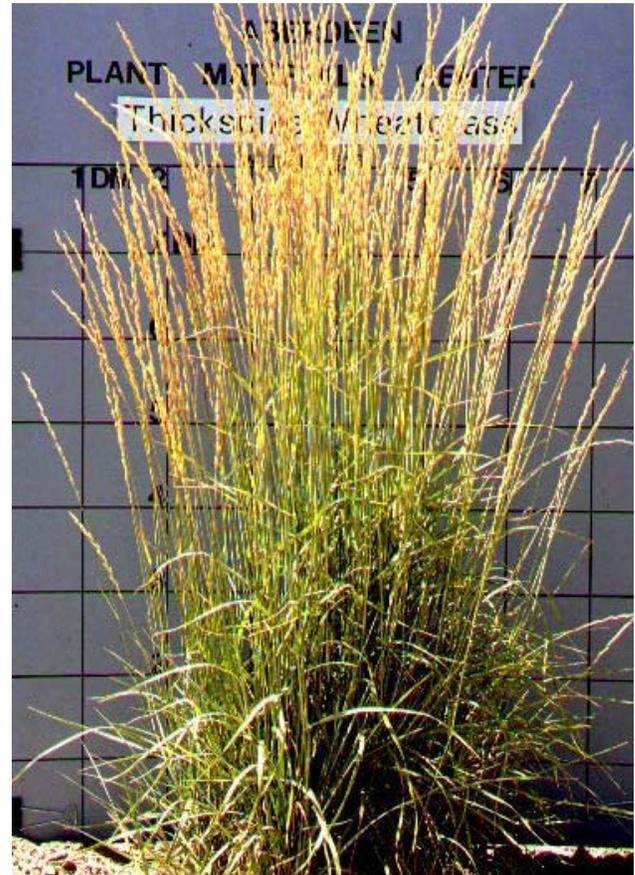
*Common Alternate Names:*

*E. l. subsp. psammophilus* is also known as sand dune  
wheatgrass

*Scientific Alternate Names:*

*Agropyron dasystachyum, A. lanceolatum,*

Although streambank wheatgrass (*E. l. subsp. riparius*) is currently not recognized by the PLANTS Data Center as a valid taxon (USDA NRCS 2012); separation of this subspecies is useful in describing ecological sites, predicting revegetation performance and in making land management decisions. In this light, the authors have decided to follow the treatment of the species following Barkworth et al. (2007).



Thickspike wheatgrass. Loren St. John, USDA NRCS.

### Uses

**Grazing/rangeland/hayland:** Thickspike wheatgrass and its subspecies are 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 (Ogle and Brazee 2009). 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 with the exception of the cultivar, 'Bannock', but can be utilized as native hay when planted in association with other species. It has been noted as one of the highest yielding forage grasses in the Red Desert and Big Horn Basin of Wyoming (Krysl et al. 1984).

**Erosion control/reclamation:** Thickspike wheatgrass and streambank wheatgrass are well adapted for 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 native grasses, such as Snake River wheatgrass (*Elymus wawawaiensis*), bluebunch wheatgrass (*Pseudoroegneria spicata*), western wheatgrass (*Pascopyrum smithii*), and needlegrass (*Stipa* and *Hesperostipa*) species. Their drought tolerance, dense root system and good seedling vigor make these species ideal for reclamation in areas receiving 200 to 500 mm (8 to 20 in) annual precipitation.

The low growth form, vigorous sod, and low maintenance requirements of streambank wheatgrass 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 ditch banks, dikes, and roadsides. It has even been used as cover for grassed airplane runways.

**Wildlife:** Thickspike wheatgrass provides some cover for small mammals and upland birds (Scher 2002). In addition to big game it is also grazed by jackrabbits (Ganskopp et al. 1993).

#### **Status**

Great Lakes wheatgrass (*E. l.* subsp. *psammophilus*) is threatened in Wisconsin (Wisconsin DNR 2012). 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:** Grass family (Poaceae). Thickspike wheatgrass is a long-lived, strongly rhizomatous, perennial grass with erect culms 0.3 to 1.3 m (12 to 50 in) tall. The leaves are involute (rolled) or flat, 1.0 to 3.5 mm (0.04 to 0.14 in) wide and typically stiffly ascending. The leaf sheaths are glabrous or rarely ciliate to long-hairy on the margins (Welsh et al. 2003). Auricles are well-developed, 0.4 to 1.5 mm (0.02 to 0.06 in) long, and the ligule is membranous, 0.3 to 0.5 mm (0.01 to 0.02 in) long (Skinner 2010). The inflorescence is an erect spike, 6 to 22 cm (2.4 to 8.7 in) long with a continuous rachis. The internodes of the spike are approximately 5 to 16 mm (0.2 to 0.6 in) long. Spikelets are solitary at each node of the rachis, bear 3 to 12 florets, and closely overlap. The glumes are 4 to 10 mm (0.16 to 0.4 in) long, acute-acuminate with a 0.5 to 3 mm (0.02 to 0.1 in) awn. Lemmas are 8 to 12 mm (0.3 to 0.5 in) long and awn-tipped. Anthers are 3 to 5 mm (0.1 to 0.2 in) long (Welsh et al. 2003). There are approximately 135,000 seeds per pound (Ogle et al. 2011a).

Thickspike wheatgrass creates a dense rhizomatous matrix. The majority of the root mass is located in the upper 24 cm (9 in) of soil with some roots extending 38 cm (15 in) deep (USDA FS 1937).

The subspecies of *E. lanceolatus* can be separated primarily on the basis of lemma pubescence. Those with densely hairy lemmas with flexible hairs approximately 1 mm (0.04 in) long or longer are considered Great Lakes, or sand dune, wheatgrass (*E. l.* subsp. *psammophilus*). Plants with lemmas pubescent of stiff hairs less than 1 mm (0.04 in) are thickspike wheatgrass (*E. l.* subsp. *lanceolatus*), while plants with lemmas mostly glabrous to scabrous are considered streambank wheatgrass (*E. l.* subsp. *riparius*) (Barkworth et al. 2007).

Streambank and thickspike 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 also 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.

#### **Distribution:**

Thickspike wheatgrass and streambank wheatgrass occur throughout most of western North America with primary distribution in the Intermountain and Rocky Mountain areas. Great Lakes wheatgrass was described around the Great Lakes region; however specimens have also been identified throughout the western range of the species (Barkworth et al. 2007). For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

#### **Habitat:**

Thickspike wheatgrass occurs from near sea level in the Great Lakes region to 10,000 feet in the Rocky Mountains (Scher 2002; Welsh et al. 2003). This 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 (Scher 2002). Thickspike and streambank wheatgrass are components of many western native plant communities and generally occupy a small percentage 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 in the west include 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*).

#### **Adaptation**

Thickspike and streambank wheatgrass prefer medium to coarse textured soils; however, streambank wheatgrass can also be found on slightly fine textured soils. Western wheatgrass may be a better choice on fine textured soils in sites receiving 300 mm (12 in) or more annual precipitation. Thickspike and streambank wheatgrass will

tolerate slightly acidic to moderately saline conditions with a pH of 6.0 to 9.5 (Scher 2002). 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 (Holzworth and Lacey 1993).



Second season 'Sodar' streambank wheatgrass growing in a 6-9 inch precipitation site northwest of Aberdeen, Idaho. Derek Tilley, USDA NRCS.

On native sites, streambank and thickspike wheatgrasses are most abundant in the 200 to 500 mm (8 to 20 in) annual precipitation zones. Seeded varieties do best with 250 to 500 mm (10 to 20 in) of precipitation; however they have been successfully established on sites receiving as low as 125 mm (5 in) of precipitation.

### Establishment

These species should be seeded with a drill at a depth of 1.2 cm (0.5 in) 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 8 pounds Pure Live Seed (PLS) per acre or 20 to 25 PLS per square foot (Ogle et al. 2011a). 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 fine to medium textured soils and in late fall on medium to coarse textured soils. Late summer (August - mid September) seedings are not recommended unless irrigation is available. There are reports of pre-chilling treatments aiding seed germination (Monsen et al. 2004); however others indicate seed is viable and non-dormant at maturation (Zhang and Maun 1994). Seedling vigor is good to excellent, exceeding that of western wheatgrass, but less than crested wheatgrass (*Agropyron cristatum*).

Thickspike and streambank wheatgrass establish more quickly than western wheatgrass. They are the most rapidly establishing native species next to slender wheatgrass (*Elymus trachycaulus*). They are compatible with other native species and can be used in seeding mixtures. They should not be seeded with strongly competitive introduced species.

Stands may require weed control measures during establishment, but application of 2,4-D should not be made until plants have reached the three to five leaf stage (Smith et al. 1996). Mowing the stand when weeds are beginning to bloom will reduce weed seed development.

Always read label and safety instructions for each control method. Trade names and control measures appear in this document only to provide specific information. USDA NRCS does not guarantee or warranty the products and control methods named, and other products may be equally effective.

### 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. Thickspike wheatgrass has good palatability for livestock and wildlife. Livestock and wildlife will graze thickspike wheatgrass throughout the growing season, until the plants become too coarse toward fall. Established stands can withstand heavy grazing.

New stands 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 and four inches of stubble should be left at the end of the grazing season (Ogle, 2011b).

These wheatgrasses are low maintenance plants, requiring little additional care. However, on better sites, stands can become sod-bound and may need attention in the form of fertilization and moderate spring/fall grazing deferment. Stands may also benefit from ripping if sod-bound conditions occur to revitalize plants and to increase forage production. Care should be taken to avoid excessive tillage during ripping because stands may be damaged beyond their ability to respond to the positive influences of ripping.

Thickspike and streambank wheatgrass are competitive with weedy species, but can be crowded out by some aggressive introduced species.

### **Pests and Potential Problems**

Under certain environmental conditions, rust can severely reduce seed yields (Skinner 2004). Head smut has also been noted as a problem in seed production fields (Skinner 2004). Grasshoppers and other insects may also damage new stands and the use of pesticides may be required.

### **Environmental Concerns**

Thickspike wheatgrass are 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 slow.

Thickspike wheatgrass has been shown to form hybrids with bluebunch wheatgrass. The resulting offspring has been described as Montana wheatgrass (*Elymus albicans*) (Dewey 1970).

### **Seed and Plant Production**

Seed production of streambank and thickspike wheatgrass has been very successful under cultivated conditions.

Row spacing of 71 to 91 cm (28 to 36 in) is recommended. The seeding rate for 36 inch row spacing is 3.3 pounds PLS/ac. Row culture via cultivation should be maintained for optimum seed production however this can be difficult because of the rhizomatous nature of the grass. Vigorous mechanical cultivation between the rows is required to reduce the vegetative spread by rhizomes in order to maintain the row culture.

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 355 (14 in) plus rainfall areas. Average production of 200 to 400 pounds per acre can be expected under irrigated conditions (Cornforth et al. 2001; Smith et al 1996). Seed is harvested by swathing, followed by combining of the cured windrows (Smith et al. 1996). The seed heads readily shatter and require close scrutiny of maturing stands. Seed is generally harvested in mid July to mid August.

Clean seed retains high germination for at least ten years under cool, dry storage conditions. High temperatures and/or high humidity reduce seed storage life (Skinner 2004).

### **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.

'**Bannock**' (*E. lanceolatus* spp. *lanceolatus*) was developed by the Aberdeen Plant Materials Center and released in 1995. It is a composite of collections from

near The Dalles, Oregon; Pocatello, Idaho; and Quincy, Washington. It is adapted to the Northwest and Intermountain regions where precipitation averages 200 mm (8 in) 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 and Foundation seed (Kiger et al. 1995). Variety protection has been granted under the Plant Variety Protection Act of 1970. Conditions of this license specify that Bannock seed can be marketed only as a class of certified seed.

'**Critana**' (*E. lanceolatus* spp. *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 (Winslow and Hybner. 2009).

'**Schwendimar**' (*E. lanceolatus* spp. *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 (Alderson and Sharp 1994). Certified seed is limited. Washington State Crop Improvement Association maintains Breeder and Foundation seed.

'**Sodar**' (*E. lanceolatus* spp. *riparius*) was released by the Aberdeen Plant Materials Center in 1954. It is a variety of streambank wheatgrass and is a subspecies of thickspike wheatgrass. 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 Aberdeen PMC maintains Breeder and Foundation seed (Douglas and Ensign 1954).

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#### Citation

Ogle, D., St. John, L., Holzworth, L., Winslow, S., Jones, T. [ed. (rev) Derek Tilley, 2013]. Plant Guide for thickspike, streambank, and Great Lakes wheatgrass (*Elymus lanceolatus*). USDA-Natural Resources Conservation Service, Aberdeen Plant Materials Center. Aberdeen, Idaho 83210.

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Published February 2013

Edited: 19sep00 jsp; 16aug02lkh; 16aug02srw; 23sep02ls; s0sep02taj; 30oct02dgo10feb03 ahv; 10sep03jsp; 06jun06 jsp; 09Nov12djt; 14nov2012ls;17dec2012ls

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