

# Poaceae

(Grass Family)

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# Cheatgrass



*Bromus tectorum* L.

## Alternate Names

downy brome, downy cheat, downy chess, early chess, drooping brome, cheatgrass brome, wild oats, military grass

## Synonyms

*Anisantha tectorum* (L.)  
Nevski

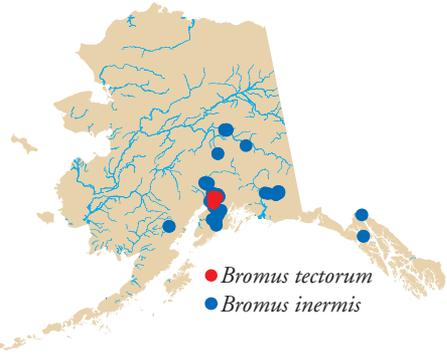
## Related Species

Smooth brome

*Bromus inermis* Leyss. ssp. *inermis*

## Description

Cheatgrass is an annual grass that grows in solitary clumps or tufts. The plant grows 2–28 inches high from a fibrous root system. Stems are smooth, slender, and erect, protruding from a base of many branches. Leaf blades are light green, flat, 2–6 inches long, and covered with soft, white hairs that give the grass its “downy” appearance. As the plant and seed reach maturity, the leaves turn purplish-tan. The panicle is often purple and is 2–6 inches long with several branches dropping to one side. Awns on the lemmas are more than an inch long. Seeds are narrow, about ½ of an inch long, light, and fluffy, and they range from straw-colored to purplish in color. Seedlings are tall with narrow, soft-haired, and twisted first leaves that have a prominent midrib.



*Cheatgrass.*

XID Services photo by Richard Old

Smooth brome is a perennial, rhizomatous grass that grows from an extensive creeping rhizome. Stems are erect, hairless, and up to 5 feet tall. Leaf blades are flat, 6–16 inches long,  $\frac{3}{16}$ – $\frac{5}{8}$  of an inch wide, and nearly hairless. Leaf sheaths are closed and have a small V-shaped notch. Auricles are absent. A nodding, open panicle, 2–8 inches long, has 1–4 branches per node. Each branch has several spikelets, each  $\frac{3}{4}$ – $1\frac{1}{4}$  inches long and purplish-brown. Seeds are elliptical, pale-yellow to dark-brown, and about  $\frac{1}{2}$  of an inch long. A short awn, less than  $\frac{1}{8}$  of an inch long, may or may not be present.

### Similar Species

A number of native and introduced species of *Bromus* are found in Alaska. Cheatgrass is distinct in having very long awns (>1 inch) on the lemmas, drooping heads, and the lower glume with a single, unbranched, ridged vein. Smooth brome grass can be distinguished from other species by its absent to very short awns (< $\frac{1}{8}$  of an inch) and leaves that have a diagnostic W-shaped crease on the blade. A native Alaskan subspecies, *Bromus inermis* Leyss. ssp. *pumpellianus* (Scribn.) Wagnon, can be distinguished from the exotic subspecies by its pubescent nodes and leaf blades, as well as by awns on the lemmas up to  $\frac{1}{2}$  of an inch long.



Photo by Fred Fishel

Leaf blade and sheath of cheatgrass.

### Ecological Impact

Cheatgrass in the intermountain west forms dominant stands in sagebrush, rangelands, and juniper and pine woodlands, displacing native vegetation. It out-competes native species for soil moisture and will invade grasslands and open forests, especially on sandy or gravelly soils. The sharp spikelets and rough awns damage the mouth and eyes of native wildlife species. This species, once established, inhibits the survival of seedlings of peren-

nial herbaceous species. Most importantly, it increases the frequency of wildfires. Over 20 diseases of cheatgrass have been reported.

Smooth brome grass is a highly competitive species that forms a dense sod that often excludes other species, thus contributing to the reduction of species diversity in natural areas. Smooth brome is an alternate host for the viral diseases of crops. It has high palatability for grazing animals. In southern Alaska, a hybrid with *B. inermis* ssp. *pumpe-lianus* occurs (Hultén 1968). Smooth brome grass may inhibit natural succession processes (Densmore et al. 2001, Rutledge and McLendon 1996) and has been observed colonizing a streambank in Alaska with potential impacts on riparian processes.

### Biology and Invasive Potential

Cheatgrass grows rapidly and establishes only by seed, producing up to 300 seeds per plant. Seeds remain viable in the soil for 2–5 years (Butterfield et al. 1996). Open ground created by fire or anthropogenic disturbance can be readily colonized by cheatgrass (Carpenter and Murray 2005). Accumulation of leaf and stem litter promotes its germination and establishment. Cheatgrass is spread by wind or attachment to animal fur or human clothing, and it spreads rapidly along transportation corridors such as highways and railroads. It also contaminates grain seed, hay, straw, and soil. Cheatgrass requires fall, winter, or early spring moisture (Mack and Pyke 1983). It germinates best in the dark or in diffuse light and readily germinates under a wide range of temperatures. Rapid spring growth is followed by mature seed production roughly 2 months later. This grass grows in many climatic areas and is most often found on coarse-textured soils; it does not grow well on heavy, dry, or saline soils. Cheatgrass is listed as noxious in Colorado.



*Smooth brome.*

XID Services photo by Richard Old

Smooth brome reproduces by rhizomes and seeds. The number of seeds produced has a very wide range, from 17 to 10,080 viable seeds per plant (Butterfield et al. 1996, Sather 1987, McKone 1985).

Most studies report a range of seed longevity from 2–10 years. This species maintains and readily expands its population base vegetatively and often aggressively. Smooth brome can establish in undisturbed or lightly disturbed areas. Seeds may be transported short distances by wind and ants



The Nature Conservancy photo  
by John M. Randall

*Smooth brome.*

(Rutledge and McLendon 1996). Often planted as a forage crop or for erosion control, it persists after cultivation and infests surrounding vegetation. Smooth brome can also be transported with contaminated top soil (Densmore et al. 2001). Germination primarily occurs in the early spring but will occur in the early fall if soil moisture is adequate. Adequate soil nitrogen is also necessary for seedling establishment (Butterfield et al. 1996). This species is suited to fine and medium textured soils but not coarse soils. It tolerates pH levels ranging from 5.5 to 8.0 and prefers clays and loamy soils. Smooth brome has low anaerobic-, calcareous-, and saline-tolerance. It grows best in highly fertile soil. It is fire-tolerant, withstands the winter temperatures of interior Alaska, and requires 90 frost-free days for reproduction. It does not require cold-stratification for germination and is not shade-tolerant.

### Distribution and Abundance

Cheatgrass is largely a weed of grazed areas and croplands, and it was first identified in the United States in 1861 in New York and Pennsylvania. It now occurs throughout the United States and is especially prevalent on semi-arid lands of the intermountain west. Originally from the Mediterranean region of Eurasia, it has spread throughout Eurasia, North America, Japan, Iceland, Greenland, South Africa,

Australia, and New Zealand. In Alaska, cheatgrass has only been found in small patches near Anchorage in disturbed areas such as roadsides (AKEPIC Database 2004).

Smooth brome has escaped from cultivation throughout its range and is often considered to be a highly competitive weed of roadsides, forests, prairies, fields, lawns, and lightly disturbed sites. In Alaska, smooth brome has been widely planted as a pasture and forage crop and as a revegetation grass along roadsides and along the Trans-Alaska Pipeline System corridor (Densmore et al. 2001). It is native to Eurasia and has been introduced throughout the United States and Canada, except in the southeastern states. Smooth brome has been reported from all regions of Alaska, generally confined to roadsides and other disturbed areas (Densmore et al. 2001), although it has been observed colonizing a streambank near the town of McCarthy.



USDA Forest Service photo by Tom Heutte

*Typical “nodding” or “drooping” appearance of a cheatgrass inflorescence.*

### Management

Mechanical methods such as fallows, tillage, and mowing are effective in reducing seed production but do not eliminate plants. Cheatgrass can be controlled with herbicides. No biological control agents are known for use on cheatgrass.

Smooth brome can be a good target for selective control because it often occurs in single stands or grows along with Kentucky bluegrass (*Poa pratensis* L.). Chemical and mechanical control methods have been used with varying levels of success. Most herbicides are not specific for smooth brome. Unfortunately, most current control techniques are not effective in natural communities (J. Conn, pers. comm. 2004).

**Notes**

Cheatgrass has cost wheat farmers in the United States approximately \$350 million in control costs and lost yields each year and has irrevocably altered the ecosystems of native grasslands. Although used by some farmers as feed, it can cause serious damage to livestock's mouth, intestines, nostrils, and eyes; sometimes the intestines are pierced and death results.

For years many farmers in the midwestern United States believed that some of their wheat kernels turned into smooth brome grass, as it was such a common pest in wheat fields.



*XID Services photo by Richard Old*

*A field of smooth brome.*

## Quackgrass



*Elymus repens* (L.) Gould

### Alternate Names

Couchgrass, dog grass, quickgrass, scotch, quitch, twitch

### Synonyms

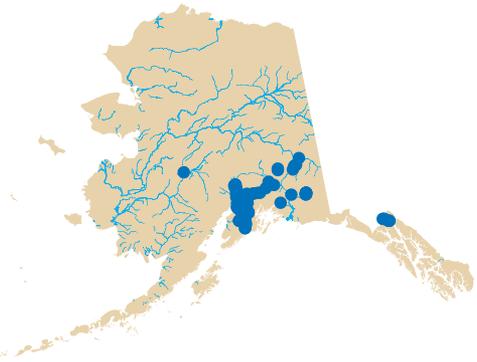
*Agropyron repens* (L.) Beauv.,  
*Elytrigia repens* (L.) Desv.  
 ex B.D. Jackson,  
*Elytrigia vaillantiana*  
 (Wulfen & Schreb.) Beetle, *Triticum repens* L.,  
*Triticum vaillantianum* Wulfen & Schreb.

### Description

Quackgrass is a strongly rhizomatous perennial plant. The rhizomes are long, highly branched, yellowish-white, sharp-pointed, and somewhat fleshy. Stems are erect and usually 1–3 feet tall. Leaf blades are  $\frac{1}{4}$ – $\frac{1}{2}$  of an inch wide, flat, and pointed and have small auricles at the junction of blade and sheath. Leaf blades often have a diagnostic slight constriction near the tip and are sparsely hairy above and hairless below. Spikelets are arranged in two long rows and borne flatwise to the stem. The florets are awnless to short-awned. Seeds are elliptical and pale yellow to brown.

### Similar Species

A number of *Lolium*, *Agropyron*, and *Elymus* grasses can be confused with quackgrass, but quackgrass can be distinguished by light-colored rhizomes that end in a sharp point. Other identifying characteristics include leaves that are broad, flat, and slightly constricted at the tip and solitary spikelets.



National Park Service photo by Penny Bauder

### Ecological Impact

Quackgrass is a strong competitor with cultivated crops, native grasses and forbs in fields and grasslands. It can prevent regeneration of native woody species and also hinder the restoration of cropland, rangeland, pasture (in dense stands), and native grasslands. Additionally, it reduces the availability of soil moisture and limiting nutrients. Quackgrass can photosynthesize and grow during early spring, which may suppress species that photosynthesize and grow during the later, warmer part of the growing season. This grass is allelopathic, producing ethylacetate extracts, cyclic hydroxamic acids, and several other chemicals that may be exuded from its shoots and roots and can suppress the growth or reproductive vigor of competing plants (Whitson et al. 2000, Royer and Dickinson 1999, FEIS 1996). Quackgrass may also alter secondary succession following fires, when its cover can dramatically increase (FEIS 1996).



National Park Service photo by Penny Bauder

*Roots and rhizome of quackgrass.*

### Biology and Invasive Potential

Quackgrass is an aggressive perennial grass that reproduces by seed and spreads by a shallow mass of rhizomes. Each stem can produce up to 400 seeds, although 20–40 is common. Seeds may remain dormant in the soil for 2–3

years (Batcher 2002). An individual plant may spread up to 10 feet and give rise to more than 200 new shoots each year (Royer and Dickinson 1999, Whitson et. al. 2000). Quackgrass is unable to resprout (GRIN 2004). It readily colonizes disturbed bare ground but can also invade undisturbed grassy habitats. Seed dispersal mechanisms are unknown, although seeds remain viable after passing through the digestive systems of many domestic animals (Batcher 2002). Many palatable hybrid crosses of quackgrass and other species have been developed and planted for livestock. Seeds germinate either in the fall or spring. Alternating temperatures are required for germination (59° to 77°F daily fluctuations) (Batcher 2002). Quackgrass is adapted to coarse, medium, and fine textured soils with pH levels ranging from 5.2–7.8. It is shade-intolerant, does not require cold-stratification for germination, withstands temperatures to -43°F, and requires only 90 frost-free days per year. Optimum temperatures for growth are between 65° and 80°F. Rhizome growth seems to be favored by low temperatures (<50°F) and long days (>18 hours). Quackgrass is listed as a noxious weed in 5 Canadian provinces and 27 states, including Alaska (Alaska Administrative Code 1987).



*UAF Cooperative Extension Service photo by Jamie Snyder*

**Distribution and Abundance**

Introduced from Europe as a contaminant in hay or straw, quackgrass has now been reported from every state in the United States and throughout Canada. This invasive grass is found in both natural grassland communities and agricultural fields. It invades gardens, lawns, roadsides, ditches, and other disturbed, moist areas. Quackgrass can

also colonize mixed-grass prairies and open woodlands. It is native from temperate Europe to Central Asia and is now found in North Africa, South America, Australia, New Zealand, and Indonesia (Batcher 2002, Hultén 1968). In Alaska, this plant was first documented in Seward and Haines in 1939 (ALA 2004). More recent records suggest an expanding range, particularly in southcentral Alaska, and it has become a significant agricultural weed in the state. It has been collected from all regions of Alaska (ALA 2004, Densmore et al. 2001, Hultén 1968).

**Management**

Effective control measures include applying herbicides, burning, tilling, and combinations of these 3 methods. Monitoring for 2 years after treatment is recommended (Batcher 2002).

**Notes**

Quackgrass rhizomes have been used medicinally since ancient times, possibly for their rich mucilage content. Before World War I, the United States annually imported a quarter-million pounds from Europe for use in products requiring mucilage. A fluid extracted from quackgrass rhizomes was sold as a remedy for kidney and bladder troubles early in the 20th century. The rhizomes, when dried and ground, can also serve as a source of bread flour for human consumption.

# Reed Canarygrass



*Phalaris arundinacea* L.

## Alternate Names

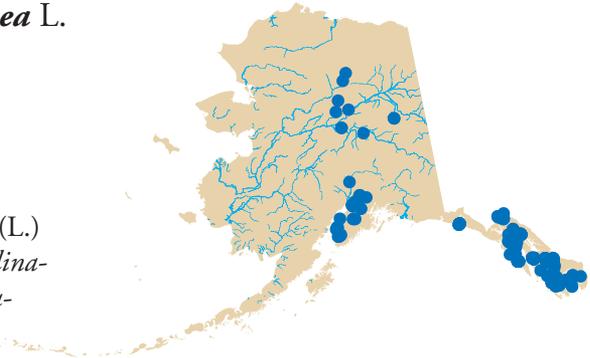
Canarygrass

## Synonyms

*Phalaroides arundinacea* (L.)

Raeusch., *Phalaris arundinacea* L. var. *picta* L., *Phalaroides arundinacea* (L.)

Raeusch. var. *picta* (L.) Tzvelev



## Description

Reed canarygrass is a robust, cool-season, sod-forming perennial plant that produces culms of ½–5 feet in height from creeping rhizomes. Leaf blades are rough, flat, 2–6 inches long, and ¼–½ of an inch wide. Flowers are arranged in dense, branched panicles that are 2¼–7 inches long. Spikelets occur in clusters on short, knobby branches. They are reddish to purplish at the base, become straw colored and compact at first, open at maturity, and become slightly spreading during full bloom. Reed canarygrass is morphologically variable, with more than 10 varieties described. It is unique in having a single flower per spikelet and an open, branched inflorescence rather than a narrow spike as in timothy.



USDA Forest Service photo by Michael Shephard

## Similar Species

Both Eurasian and native ecotypes of reed canarygrass are thought to exist in the United States. The Eurasian variety is considered more aggressive, but no reliable method exists to tell the ecotypes apart in the field. The vast majority of reed canarygrass in Alaska is believed to be derived from the Eurasian ecotype. However, some northern populations

may be native genotypes. Reed canarygrass also resembles another exotic species, orchard grass (*Dactylis glomerata* L., included in this book), but can be distinguished by its wider blades, a narrower, more pointed inflorescence, and the lack of hairs on glumes and lemmas. The native bluejoint grass (*Calamagrostis canadensis* (Michx.) P. Beauv.) may be mistaken for reed canarygrass, especially in the spring, but the highly transparent ligule on reed canarygrass is helpful in distinguishing it from this and other species.

### Ecological Impact

Reed canarygrass forms dense, persistent, monotypic stands in wetlands that exclude and displace other plants and may also slow stream flow, eliminating the scouring action needed to maintain the gravel river bottoms essential for salmon reproduction. Invasive populations of reed canarygrass are believed to be the result of crosses between cultivated varieties and native North American strains (Merigliano and Lesica 1998). Reed canarygrass grows too densely to provide adequate cover for small mammals and waterfowl. When in flower, it may cause hay fever and allergies. It promotes silt deposition and the consequent constriction of waterways and irrigation canals. Reed canarygrass may alter soil hydrology.



USDA Forest Service photo  
by Michael Shephard

### Biology and Invasive Potential

Reed canarygrass reproduces from seed and vegetatively by stout, creeping rhizomes. Invasion is promoted by disturbances such as ditching of wetlands, stream channelization, overgrazing, and alteration of water levels. Furthermore, reed canarygrass has been planted widely for forage and erosion control. Both rhizome fragments and seeds may wash downstream along streams and rivers. Seeds germinate more readily immediately following maturation. Mechanical damage or increased light or oxygen successfully breaks seed dormancy. Reed canarygrass is adapted to fine

and medium textured soils with pH levels ranging from 5.5 to 8.0. It is highly tolerant of anaerobic soils, is shade-intolerant, and no cold-stratification is required for germination. It withstands temperatures to  $-38^{\circ}\text{F}$ , and requires 120 frost-free days. Reed canarygrass is listed as a noxious weed in Washington and as an invasive weed in Nebraska, Tennessee, and Wisconsin.

**Distribution and Abundance**

In the United States, the first agronomic trials of reed canarygrass probably began in the 1830s, and it is now widespread in North America. Reed canarygrass is common in stream banks, logging sites, margins of springs, and wet meadows in Alaska, southern Yukon, and northern British Columbia. Elsewhere it has shown the ability to invade and dominate sedge meadows and wet prairies (Henderson 1991). Reed canarygrass is still planted to stabilize soil along roadsides in Alaska. There is no consensus on the nativity of reed canarygrass in North America (Merigliano and Lesica 1998). According to Hultén (1968), it is native to Europe, but some authors view it as native to Asia and North America as well (Welsh 1974). Its present-day range extends throughout Eurasia and North America, where it is found primarily in northern latitudes.

**Management**

Mechanical control methods may be feasible, but the strategy will be quite labor-intensive and require a long-term time commitment. No herbicides are selective enough to be used in wetlands without the potential for injuring native species, although fire has been used, in combination with other treatments, to control reed canarygrass in wetlands. Plants reestablish quickly from seeds after control methods are used, so areas should be monitored for several years after control events. No biological control methods are known that are feasible for use in natural areas.



USDA Forest Service photo by Tom Heutte

*Variegated leaves of an ornamental cultivar of reed canarygrass.*

**Notes**

Reed canarygrass has been used for roadside revegetation throughout southeast Alaska and appears to be naturalizing in many of the stream systems on various islands. A cultivar called ribbon grass is used by gardeners in Alaska and has green leaves striped with white.



*USDA Forest Service photo by Michael Shephard*

## Smooth Cordgrass



*Spartina alterniflora* Loisel.

### Related Species

Dense-flowered cordgrass

*S. densiflora* Brongn.

Saltmeadow cordgrass

*S. patens* (Ait.) Muhl

English cordgrass

*S. anglica* C.E. Hubbard

### Description

Smooth cordgrass plants grow 2–4 feet tall. Stems are hairless and 2–8 feet long with dense colorless flowers. Leaf blades are 8–24 inches long, tough, greenish-gray in color, and  $\frac{1}{4}$ – $\frac{5}{8}$  of an inch wide becoming folded at the tip. Plants are deciduous, and stems die back at the end of each growing season. Panicles of many spikes are closely appressed and overlapping. The inflorescence is 16 inches long with 5–20 spike-like branches up to 5 inches long each. Flowers occur only on branch undersides. This plant grows in the intertidal zone between mean high water and mean low water.



Georgia Coastal Ecosystems LTER photo by Steven C. Penning

*Smooth cordgrass.*

### Similar Species

There are no native *Spartina* species in Alaska, but 3 other exotic species now occur on the Pacific coast. Dense-flowered cordgrass (*Spartina densiflora* Brongn.) plants are 1–5 feet tall. Leaf blades are narrow, long, inrolled, tough, grayish-green, and between  $\frac{1}{4}$  and  $\frac{3}{8}$  of an inch wide. The inflorescence is 2–12 inches long with dense, compact, and colorless flowers. It grows in the upper intertidal zone near mean high water, among glasswort (*Salicornia* spp.) or just below on open mud.

Exotic saltmeadow cordgrass (*Spartina patens* (Ait.) Muhl.) plants are 1–4 feet tall. The hairless leaf blades are 4 to 20 inches long and  $\frac{3}{8}$ – $1\frac{1}{2}$  inches wide at the base. When fresh, leaf blades are generally inrolled and have ridges on the upper surface. Flowers occur in 2 to several spikes that are appressed to somewhat spreading. The inflorescence is 2–9 inches long with 1–4 inch spikes that ascend or diverge from the stem. The flowers are colorless. Its habitat includes middle to upper salt marsh zones, dunes, swales, sand flats, and coastal scrublands.

English cordgrass (*Spartina anglica* C.E. Hubbard) is a hybrid species with highly variable morphology. Plants are stiff and 1–4 feet tall, with stout stems that are  $\frac{3}{16}$  of an

inch or more in diameter. Leaves protrude at angles more or less perpendicular to the stem. The leaf blades are flat or inrolled, persistent or falling, green or grayish-green, and  $\frac{3}{16}$ – $\frac{1}{2}$  of an inch wide. Flowers are in numerous, erect, contracted panicles, consisting of closely overlapping spikelets in 2 rows on one side of the stalk. The inflorescence is 4–16 inches long with 2–12 spikes. Spikes are 6–8 inches long. Flowers are colorless. Habitats include low to high marsh zones.



Photo courtesy of NRCS Plant Materials Program

*A dense stand of smooth cordgrass.*

## **Ecological Impact**

All *Spartina* species are perennial plants that spread by seeds or rhizomes, grow in ring-shaped clones, coalesce into extensive monospecific stands, and lead to the conversion of mudflats and channels into marsh. The loss of mudflat and channel may impact foraging for numerous shorebirds and waterfowl. Increased rates of sedimentation can lead to clogging of sloughs, raising them to the overall elevation of the marsh plain. Cordgrass can displace glasswort (*Salicornia virginica* L.), which provides habitat for a number of bird and animal species, as well as sea grass

(*Zostera marina* L.) and arrow-grass (*Triglochin maritimum* L.). Studies indicate that populations of invertebrates among smooth cordgrass clones are smaller than populations in intertidal mudflats. Juvenile chum salmon may lose access to important food resources and the benefits of other important attributes of mudflat nurseries.

### **Biology and Invasive Potential**

All 4 species are saltwater-loving grasses that colonize tidal marshes. In its native range, smooth cordgrass exhibits varying growth forms in different salt marsh zones. A tall form occurs along creek banks and drainage channels. Landward of the tall form, an intermediate form occurs that grades into a stunted form at the marsh interior.

### **Distribution and Abundance**

There are no cordgrass species in Alaska as of early 2005, but they are included in this book due to their apparent migration northward into British Columbia and the severity of their impacts.

Smooth cordgrass is native to the east coast of the United States. It is now commonly found on the west coast in marshes of San Francisco Bay in California, Siuslaw Estuary and Willapa Bay in Oregon, and Puget Sound and Juan de Fuca Strait in Washington.

English cordgrass is found in San Francisco Bay and Marin County in California and Skagit, Island, Snohomish, San Juan, Kitsap, Jefferson, and King Counties in Washington. It was recently found in British Columbia.

Dense-flowered cordgrass is native to South America. It is now found in Humboldt Bay, San Francisco Bay, and Marin County in California and Grays Harbor in Washington.

Saltmeadow cordgrass is native to the upper reaches of salt marshes on the east coast of the United States. It now occurs in California, Oregon, Washington, British Columbia,

China, and the Mediterranean.

**Management**

Smooth cordgrass can grow on very soft, deep mud, making infestations inaccessible by foot or boat. Hand-pulling or digging of seedlings is suggested for smaller infestations (< 5 acres). Special care must be taken to remove both shoots and roots. Shading small *Spartina* clones with woven geotextile fabric has been successful in Oregon. Mowing or herbicide treatment can reduce growth and limit seed set (Sytsma et al. 2003, Daehler 2000).

**Notes**

Cordgrass roots are a favorite food of snow geese. *Spartina* species have taken over vast tracts of tidelands along the west coast of the United States, increasing rates of sedimentation and marsh elevation, reducing native biodiversity, and impacting waterfowl habitat. Infestations of cordgrass have irrevocably altered the character of ecosystems in most of these areas. One of the most famous examples of complete alteration by smooth cordgrass comes from San Francisco Bay and its vicinity.



Photo by Jean Everett

*Saltmeadow cordgrass.*

# Kentucky Bluegrass

*Poa pratensis* L.

## Synonyms

*Poa agassizensis* Boivin & D. Love,  
*Poa angustifolia* L., *Poa pratensis*  
 L. ssp. *agassizensis* (Boivin & D.  
 Love) Taylor & MacBryde, *Poa*  
*pratensis* L. ssp. *angustifolia*  
 (L.) Lej., *Poa pratensis* L.  
 var. *angustifolia* (L.)  
 Gaudin, *Poa pratensis*  
 L. var. *domestica* Laestad., *Poa*  
*pratensis* L. var. *gelida* (Roemer &  
 J.A. Schultes) Bocher, *Poa praten-*  
*sis* L. var. *iantha* Wahlenb.

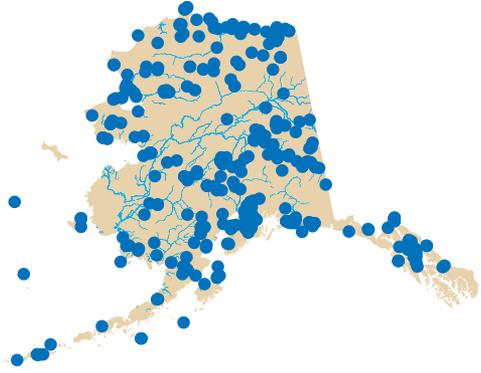
## Description

Kentucky bluegrass is a strongly rhizomatous, mat-forming perennial grass that ranges from 3 inches to 3 feet tall. Its culms are slender and slightly flattened.

Leaf blades are flat to folded and smooth, with a double mid-rib. Leaf tips are prow-shaped as in most *Poa* species. Sheaths are rounded to somewhat keeled, partially closed, and smooth. The inflorescence is a broadly pyramidal compact panicle, and spikelets are coarse and large.

## Similar Species

Kentucky bluegrass can be separated from other Alaskan *Poa* species by a combination of traits. It has large anthers, about 1/16 of an inch long, and a tuft of long, cobweb-like hairs at the base of the lemma but not between the keel and marginal nerve. It has normal glumes (short, broad, and rounded), is rhizomatous and mat-forming with flat leaves, and produces a compact panicle with 3 or more branches in the lowest whorl.



XID Services photo by Richard Old

**Ecological Impact**

Kentucky bluegrass is known to compete with native species, which can reduce species diversity and alter plant community composition (Wisconsin DNR 2003a, Rutledge and McLendon 1996, Sather 1996). It can be an important element in the diets of elk, mule deer, and big-horn sheep, and the leaves and seeds are eaten by numerous species of small mammals and songbirds as well as rabbits, wild turkeys, and grouse. Grasslands dominated by Kentucky bluegrass provide habitat for species of small mammals and birds (Uchytel 1993). It is a host for a number of pest insects and diseases (Butterfield et al. 1996). In Alaska, this species is rarely found in undisturbed sites. Kentucky bluegrass may retard or cause long-term alterations to successional patterns (Butterfield et al. 1996), although it does not appear to seriously hamper succession in Alaska.



*XID Services photo by Richard Old*

**Biology and Invasive Potential**

Kentucky bluegrass is reproductively aggressive, spreading from both seed and rhizomes. It can produce 200 seeds per panicle in the first year, and a maximum of 560 seeds per square meter has been reported from a pasture in the Netherlands (Sather 1996). Rhizomes can extend the horizontal growth of the plant as much as 18 square feet in 2 years. Kentucky bluegrass readily establishes by seed on disturbed sites. It is commonly planted as a lawn and pasture grass, and over 100 cultivars have been developed (Butterfield et al. 1996). It has been used in Alaska, Colorado, and Wisconsin for soil stabilization along highway roadsides (FEIS 1996). Kentucky bluegrass germinates in the fall, and freshly harvested seeds require a cold treatment at 41° to 59°F for 10–14 days for germination. This species can germinate from depths as great as 42 inches within the first

4 years after burial (Sather 1996). Kentucky bluegrass is adapted to fine and medium textured soils with pH levels ranging from 5.0 to 8.4. It is shade-intolerant, withstands the winter temperatures of interior Alaska, and requires 90 frost-free days. It has a relatively high nutrient requirement. Optimum temperatures for growth are between 61° and 90°F, and optimum precipitation ranges from 20–50 inches per year (GRIN 2004). Kentucky bluegrass is listed as an invasive weed in Nebraska and Wisconsin.

**Distribution and Abundance**

Kentucky bluegrass is found in meadows, open woodlands, and prairies outside of Alaska and in disturbed sites throughout the world. In the western United States it frequently occurs as an understory dominant in aspen, ponderosa pine, sagebrush, and riparian habitats (Uchytel 1993). Kentucky bluegrass is generally considered to be exotic to North America, although some botanists argue that populations in remote mountain meadows of the western United States may be native (Gleason and Cronquist 1963). It has naturalized in all states and in Canada from coast to coast and has been introduced into South America, New Zealand, and Australia. Kentucky bluegrass has been collected at many sites from all across Alaska (ALA 2004, Hultén 1968).

**Management**

Kentucky bluegrass does not generally grow in pure stands except when planted as a turf grass. Its rhizomatous habit permits it to penetrate areas between plants. Eradication of the grass may not be feasible, since practices that will damage it generally harm co-occurring species (Sather 1996). Herbicide application and burning may be useful. The only realistic management goals may be to reduce vigor



*U.S. Geological Survey photo by Forest and Kim Starr*

and contain its spread (Butterfield et al. 1996, Uchytel 1993).

**Notes**

Kentucky bluegrass, along with orchard grass, is responsible for the majority of hay fever attacks in the summer in North America. It originally came from Eurasia and northern Africa.

# Orchardgrass

*Dactylis glomerata* L.

## Description

Orchardgrass has tall, erect, and hairless stems growing up to 3 feet high from short rhizomes. Leaves are grayish-green,  $\frac{1}{4}$ – $\frac{3}{8}$  of an inch wide, and flat or folded with a prominent rough-textured midrib and rough margins.

The inflorescence is a panicle that is 1–8 inches long, with the lower 2–3 branches elongate and upper branches short and appressed. Spikelets are tufted panicles of one-sided clusters at the ends of long, stiff, rough branches.

## Similar Species

Reed canarygrass (*Phalaris arundinacea* L., included in this book) has wider leaves and a more narrow and pointed inflorescence and is capable of growing in wetter habitats than orchard grass.

## Management

Orchardgrass tolerates close mowing and may become a problem in lawns. Since its rootstocks do not spread, pulling out young plants can be an effective control method for small infestations. Generally, mechanical methods will not control orchard grass because it has evolved under cultivation. In some cases, repeated mowing may stimulate tillering. Numerous herbicides provide effective control for orchard grass but are not specific to it.

## Notes

The scientific name of this plant is improbably featured as an album name for the British metal band Candlemass,

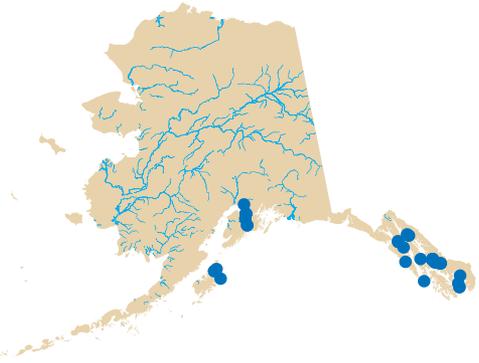


Photo by Paul L. Redfearn, Jr.

## Family: Poaceae

## Orchard Grass

released in the UK in 1998. This plant is native to Europe and has been in cultivation in the United States for over 200 years. It is a folk remedy for tumors and kidney and bladder ailments.



*KULAK photo by Paul Busselen*



*KULAK photo by Paul Busselen*

# Foxtail Barley

*Hordeum jubatum* L.

## Alternate Names

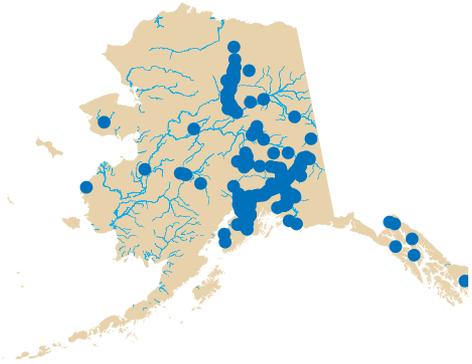
squirreltail barley

## Description

This annual or biennial grass has pale green to reddish spikes on the inflorescence with numerous bristle-like awns. Culms are erect or decumbent at the base. Leaf blades are usually flat,  $\frac{1}{8}$  to  $\frac{1}{4}$  of an inch wide, and glabrous. Sheaths are glabrous, and ligules often appear decayed and terminate abruptly at less than  $\frac{1}{16}$  of an inch long. The inflorescence is a terminal spike, erect to nodding, 1–4 inches long, and bristly due to the long, slender, spreading awns of glumes and lemmas. Awns are 1–2½ inches long.

## Similar Species

Two other *Hordeum* species occur in Alaska. Common barley (*Hordeum vulgare* L.) sometimes escapes cultivation and can be distinguished by its broad, blunt glumes lacking awns. A native grass, meadow barley (*Hordeum brachyantherum* Nevski), looks similar to foxtail barley, but its awns are shorter, about  $\frac{3}{8}$  of an inch long. Foxtail barley may also be mistaken for quackgrass (*Elymus repens* (L.) Gould, included in this book) before the seedheads are present, but it lacks rhizomes.



XID Services photo by Richard Old



USDA Forest Service photo by Elizabeth Bella

**Management**

Foxtail barley is thought to be native to Alaska, but it is also considered a potentially invasive weed that readily colonizes areas of anthropogenic disturbance. Planting disturbed areas with desirable plants and controlling water levels is effective in reducing the amount of foxtail barley (Tesky 1992). It can also be controlled with herbicides (MAFRI 2001).

**Notes**

The barbed awns around foxtail barley seeds can work their way into the gums and digestive tracts of animals when eaten, causing irritation and inflammation. This geographically widespread grass could be indicative of Hudson Bay store activity in an area in the past or Northern Store activity in the present, as freighter canoes built in Quebec near Montreal were packed with straw for shipping and foxtail barley seeds were often present in that straw.



*USDA Forest Service photo by Michael Shephard*



*National Park Service photo by Jeff Heys*

# Italian Ryegrass

*Lolium perenne* L.  
ssp. *multiflorum* (Lam.) Husnot

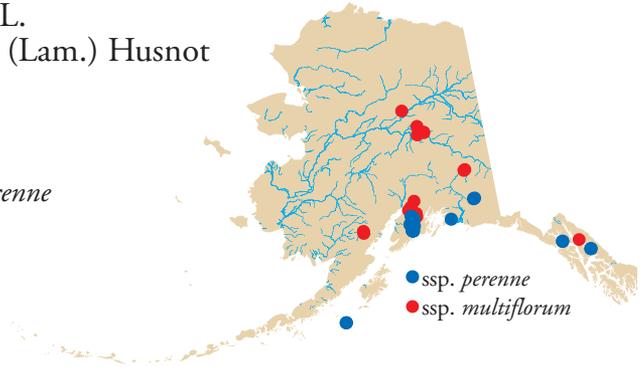
## Related Species

Perennial ryegrass

*L. perenne* L. ssp. *perenne*

Darnel ryegrass

*L. temulentum* L.



## Description

Italian ryegrass is a short rhizomatous annual or biennial bunchgrass that grows 1–3 feet high. Culms are generally erect and often purplish at the base. Leaves are dark green, shiny, and prominently veined with flat blades that are  $\frac{1}{8}$ – $\frac{1}{4}$  of an inch wide and have conspicuous auricles. The spikes are distinctive, with alternately arranged spikelets that are arranged edgewise along the flowering stem, giving the spike a flattened appearance. The lemmas are conspicuously awned.



USDA Forest Service photo  
by Elizabeth Bella

*Italian ryegrass.*

## Similar Species

There are a number of similar looking grasses in Alaska, but *Lolium* species have only one spikelet per node, oriented with the narrow edge towards the main axis of the inflorescence. The red-tinged base of Italian ryegrass, its awned lemmas, and its short glumes distinguish this plant from two other exotic species, perennial ryegrass (*L. perenne* L. ssp.) and darnel ryegrass (*L. temulentum* L.).

**Management**

Herbicides have been used to control plants in agricultural settings, but Italian ryegrass is gaining resistance to several herbicides (Carey 1995). It has not persisted at some sites where it was previously planted in Alaska (Densmore et al. 2000).

**Notes**

Italian ryegrass has been used as an emergency grain crop in times of starvation in Europe.



*XID Services photo by Richard Old*

*Perennial ryegrass.*

# Common Timothy

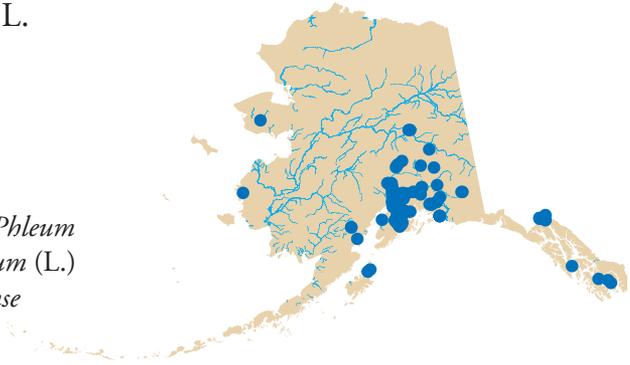
*Phleum pratense* L.

## Alternate Names

timothy

## Synonyms

*Phleum nodosum* L., *Phleum pratense* L. var. *nodosum* (L.) Huds., *Phleum pratense* L. ssp. *nodosum* (L.) Arcang.



## Description

Common timothy is a short-lived perennial bunchgrass with flowers borne in compact, cylindrical panicles that are spike-like, dense, and several times longer than wide. The horned spikelets are distinct. Stems are erect, purple or brown at the nodes, and often bulbous at the base. Leaf blades are flat,  $\frac{1}{8}$ – $\frac{1}{4}$  of an inch wide, and smooth to slightly rough; sheaths are smooth. The spike is 1–5 inches long, very condensed, cylindrical, and  $\frac{1}{4}$ – $\frac{3}{8}$  of an inch thick. Spikelets are one-flowered, compressed, and green or often purple-tipped, and they turn dull brown with age.

## Similar Species

Alpine timothy (*Phleum alpinum* L.) is a common native plant at higher elevations in Alaska. The panicle is less than half as long as that of common timothy, and the uppermost leaf sheath is inflated.



USDA Forest Service photo by Dave Powell

**Management**

Hand pulling can be used for common timothy. Frequent cutting or mowing can weaken overall plant health (Rutledge and McLendon 1996). Common timothy stands also become weak under continuous grazing (GRIN 2004).

**Notes**

Common timothy comes from Europe but is widely naturalized in North America. It was first introduced into the U.S. in 1720 by Timothy Hansen, giving the plant its common name.



*XID Services photo by Richard Old*

*Inflorescence of common timothy.*



*XID Services photo by Richard Old*

