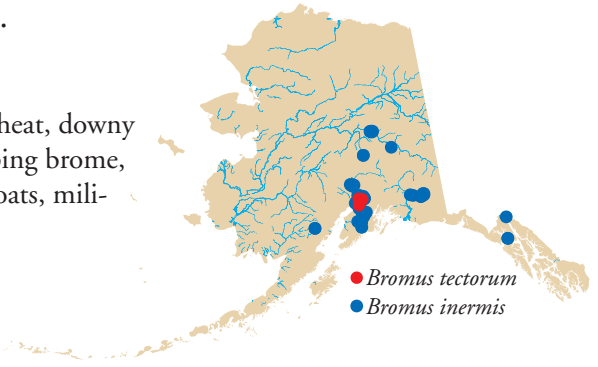
Cheatgrass

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, 3⁄16–5⁄8 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 ¾–1¼ inches long and purplish-brown. Seeds are elliptical, pale-yellow to dark-brown, and about ½ of an inch long. A short awn, less than ⅛ 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 (<⅛ 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 ½ 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 gravely 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. *pumpellianus* 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 (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.

The Nature Conservancy photo by John M. Randall

Smooth brome.

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.