

**Scientific Name:** *Bromus ciliatus* L.

**Family:** *Poaceae*

**Common Names:** fringed bromegrass



***Bromus ciliatus* illustration.**

### **Plant Description**

Loosely tufted perennial grass; robust slender culms 60 to 100 cm high; non-rhizomatous; glabrous or pubescent nodes; glabrous sheaths or short-hairy; flat blades 4 to 8 mm wide; loose, open, drooping panicle 10 to 20 cm long; greenish spikelets 1 to 2 cm long; first glume one-veined and second glume three-veined; long pubescent lemmas 8 to 10 mm long near the edges, glabrous or sparingly hairy on the back with awn 3 to 5 mm long (Tannas 1997).

**Seed:** 8 to 11 mm long; lemma more or less hairy; awn up to five mm long arising between two teeth at tip of lemma; palea adheres to grain (Pahl and Smreciu 1999).

### **Habitat and Distribution**

Shade tolerant; found in open woods, meadows, fescue grassland and riparian habitat, prairies, thickets, climax and seral coniferous forest communities. Found in moist areas at the perimeter of the prairie and at elevated sites below the tree line; requires 40 cm annual precipitation (Pahl and Smreciu 1999).

**Seral Stage:** Early.

**Soils:** Soil pH ranges from 4.8 to 7.9 (Esser 1994). Prefers loam, silty loam and sand, also occurs on stony substrates. Tolerant of moderately acidic soils (Tannas 1997) and has a low tolerance of saline soils (USDA NRCS n.d.).

**Distribution:** Found across Alberta and North America (Tannas 1997).

Alaska, Yukon, southwestern District of Mackenzie to James Bay, Newfoundland south to California, Arizona, New Mexico, Texas, Nebraska, Great lakes, Appalachia (Moss 1983).

### **Phenology**

Flowers from July to August (Esser 1994). Cool-season perennial; starts spring growth in mid-May; seeds mature by mid-August (Pahl and Smreciu 1999).

### **Pollination**

Wind pollinated (Esser 1994).  
Self-pollinating (May et al. 1999).



### Seed Dispersal

Wind dispersed with some animal assisted dispersal (awn sticks to fur).

### Genetics

$2n=14, 28$  (Tannas 1997).

### Symbiosis

Fringed brome is colonized by arbuscular mycorrhizal fungi and exhibits a neutral response (Wolfe et al. 2006).

### Seed Processing

**Collection:** Seeds can be hand harvested. Use of seed strippers has been recommended by Burton and Burton (2003) but Pahl and Smreciu (1999) note that seeds have a high shattering potential.

**Seed Weight:** 306 seeds/g (0.33 g/1,000 seeds) (Gerling et al. 1996). 306 PLS/g (Hammermeister 1998).

547 seeds/g (1.75 g/1,000seeds) (Smreciu et al. 2006).

**Harvest Dates:** August.

**Cleaning:** Air-dry seed heads in paper or Tyvek bags at 15 to 25°C; remove large chaff and crush remaining material; sieve to remove seeds from chaff using 9/64 inch round top screen and 1/16 inch round bottom screen; small chaff and dust can be removed by winnowing (Smreciu et al. 2006).

**Storage Behaviour:** Orthodox; seeds can be dried, without damage, to low moisture contents, their longevity increases with reductions in both moisture content and temperature Royal Botanic Gardens Kew (2008).

**Storage:** Seed can be cold stored up to 3 years (Schultz et al. 2001). Royal Botanic Gardens Kew (2008) recommends that these seeds be stored at IPGRI standards; this involves drying seed to low moisture content (3% to 7% fresh weight, depending on the species) and storing them, in hermetically-sealed containers, at low temperature, preferably at -18°C or cooler (Fassil and Engels 1997).



**Bromus ciliatus flowers.**

**Longevity:** The seeds can be stored in a container and refrigerated for up to three years (Schultz et al. 2001).

### Propagation

**Natural Regeneration:** By seed (Gerling et al. 1996). The non-dormant seeds can produce high germination rates (Esser 1994).

**Germination:** 55.91% after 30 days, fresh seeds and 58.00% after 30 days with one year old seeds (Smreciu et al. 2006).

In his study, Hoffman (1985) reported that *B. ciliatus* germinated to high percentages under various thermaperiods, photoperiods, in darkness, and with or without stratification. The only time it showed less than 100% germination was in light tests following stratification.

Seeds germinated at 24°C (Baskin and Baskin 2001).



**Pre-treatment:** Not all seed lots are dormant. For dormant seed lots use four weeks cold stratification (2 to 4°C) (Smreciu et al. 2006).

In a container, mix an equal amount of seeds with either perlite or vermiculite and add a very small amount of water and place in a refrigerator (0.5 to 5°C) (Schultz et al. 2001).

No stratification required (Baskin and Baskin 2001).

**Direct Seeding:** For nursery production: sow January through late July in deep cell plug trays in growing media containing vermiculite and sphagnum peat moss. Thoroughly moisten the soil without saturating it. Place newly planted trays on south side of the greenhouse. During the active growing phase, move trays to the north side. Mature plants can be moved to a cold frame in early to late spring. Flats can be transplanted into the field from late May to early October (Schultz et al. 2001).

Direct sown seed in northeastern Alberta established and began spreading within three years of sowing.

**Seed Rate:** Three seeds in each plug tray cell (Schultz et al. 2001).

100 seeds/m<sup>2</sup> were sufficient for establishment in northeastern Alberta.

**Planting Density:** No literature found.

### Aboriginal/Food Uses

The grains may become infected with ergot (Claviceps), which is a poisonous fungus. The grain of the infected plants is replaced by a black mass of spores, and this, if eaten by livestock or humans, can cause severe illness or death (Johnson et al. 1995).

### Wildlife/Forage Usage

**Wildlife:** Excellent forage value (Gerling et al. 1996). Small mammals, turkeys and other birds eat the seeds. Highly palatable to deer and elk. Provides excellent cover for rodents, turkeys, quail and band-tailed pigeons (Esser 1994).

**Livestock:** Good forage value, palatable to livestock, makes excellent hay (Tannas 1997).

**Grazing Response:** Fringed brome is a decreaser (Gerling et al. 1996).

### Reclamation Potential

*B. ciliatus* has potential as an early successional reclamation species because of its moderate germination and quick growth, which provide valuable cover until slower growing climax species establish (Tannas 1997).

*B. ciliatus* exhibits medium erosion control and short term revegetation potential as well as high long term revegetation potential (Esser 1994).

Suitable for revegetation of disturbances in the foothills and boreal forests (Pahl and Smreciu 1999). Exhibits phytoremediation potential (Robson et al. 2003).

### Commercial Resources

**Availability:** Available commercially in Alberta (ANPC 2010).



### Notes

*Bromus ciliatus* is listed as 72% intact (more occurrences than expected) in the Alberta oil sands



region (Alberta Biodiversity Monitoring Institute 2014).

In their study, Robson et al. (2003) reported that fringed brome was the species that produced the highest total biomass in their control soil, however, in their contaminated soil (crude oil treatments) its biomass was reduced by more than half.

Because of its high seed yield, fringed brome may have the potential to produce adequate amounts of seeds for revegetation purposes at reasonable prices (May et al. 1999).

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**Illustration:** Hitchcock, A.S. (rev. A. Chase), 1950. Manual of the grasses of the United States. USDA Miscellaneous Publication No. 200. Washington, DC.

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