Elymus trachycaulus (Link) Gould ex Shinners ssp. *trachycaulus*
slender wheatgrass **Family: Poaceae**

Figure 32. Documented range of *Elymus trachycaulus* in northern British Columbia.

Figure 33. Growth habit of *Elymus trachycaulus* in cultivation.

Figure 34. Harvesting a ripe stand of *Elymus trachycaulus* using a hand sickle.

Elymus trachycaulus ssp. *trachycaulus* slender wheatgrass (continued)

Background Information

Elymus trachycaulus is found north to Alaska, the Yukon and Northwest Territories and east to Newfoundland, south to North Carolina, Indiana, Missouri, California and Mexico. Two subspecies are found in B.C., the awned *E.t.* ssp. *subsecundum*, and the unawned *E.t.* ssp. *trachycaulus*. This discussion refers solely to the unawned subspecies, which is common throughout B.C. (Douglas et al. 2001b).

Growth Form: Flat leaves 2-4 mm wide, with short or no auricles and very short ligules; slender spike with spikelets overlapping, no awns; somewhat rhizomatous; mature plant size: 50 - 90 cm tall (Hitchcock 1971, Hardy 1989, MacKinnon et al. 1992). The root system is dense, with both coarse and fine fibrous roots, which can extend beyond 30 cm in depth (Howard 1992). There are at least three subspecies and six varieties of this species, which differ in awn length, size and culm length and crowding of spikelets (*Kartesz and Kartesz 1980, Hardy 1989, *Lackschewitz 1991). It is both self-pollinated and wind-pollinated (Howard 1992). It is important to differentiate between this native species and the exotic *Elymus repens* (quack grass, also known as *Agropyron repens*), which looks similar. *Elymus repens* has well developed auricles and rhizomes and is considered a regionally noxious weed (Cranston et al. 2002).

Site Preferences: Dry to moist sites in grasslands, meadows, rocky slopes, and open forests at low to medium elevations throughout the northern Interior. In northern B.C., it is reported to be shade intolerant and to be a species of open grasslands and shrub steppes. Grows on xeric to subxeric, medium to very rich sites in the SBSx or SBSd subzones and the BWBSx or BWBSd subzones (Beaudry et al. 1999). In Alberta, reported to grow on medium textured, mesic to dry soils, and to be tolerant of drought, flood, saline and alkaline conditions (Gerling et al. 1996). Reported to generally be a subdominant species in subalpine forests (Willard 1990), it is nonetheless one of the major components of northern British Columbia grasslands (Pojar 1982). It is a pioneer species on gravel slopes, abandoned coal mine sites and burned pine forests (**Ellison 1954, **Bartos and Mueggler 1981, **Russell 1985, **Fox and Allen 1995).

Seed Information

Seed Size: Length: 10.41 mm (8.04 - 12.46 mm)
Width : 1.82 mm (1.31 - 2.63 mm)

Seeds per gram: 353 (range: 266 - 423)

Volume to Weight Conversion: 217.8 g/L at 95.7% purity

Germination Capacity: At 30°/20° C untreated: 72.3% (59 - 94%)
At 25°/15° C untreated: 81.9% (77 - 87%)
stratified: 88.2% (83 – 93%)

Germination Speed: To first germination: 11.4 days
To 50% potential: 16.2 days

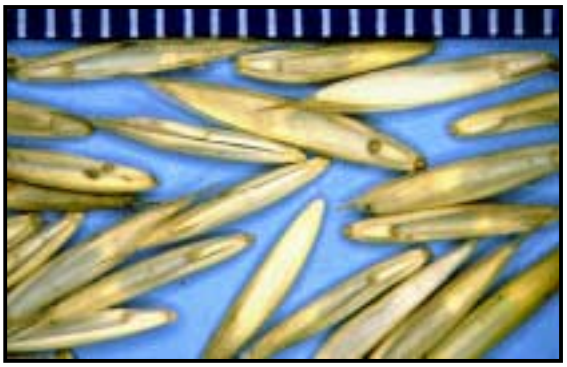

Figure 35. Seeds of *Elymus trachycaulus*. Rule divisions are 1.0 mm.

Seed Longevity: Seed in seed banks is reported to remain viable for three to six years with a germination capacity of 80 to 90% (Howard 1992).

Elymus trachycaulus ssp. *trachycaulus* slender wheatgrass (continued)

Considerations for Growing

Techniques for Seed Production

Seed treatment: Our germination tests indicate that this species responds positively to stratification. This confirms suggestions by Paulsen (*1970) and Fulbright (*1982) that it requires a 1 to 2 month period of short night/long day stratification prior to germination.

Stand establishment: Requires a moderately moist mineral seedbed, or a lightly mulched firm seedbed (*Fulbright et al 1982, Hardy 1989). The site should be free of all weeds, although dicot weeds can be sprayed with a selective broadleaf herbicide with no apparent damage to vegetative or seed yields of *Elymus trachycaulus*.

Row spacing: 30-90 cm (Pahl and Smreciu 1999); Smith and Smith (2000) recommend 90 cm spacing in dryland areas and 60 cm row spacing on irrigated sites.

Seeding density: 82-100 PLS per linear metre.

Seeding depth: 1.2-1.8 cm (Pahl and Smreciu 1999, Smith and Smith 2000); spring seeding is best, and fertilization at the time of planting would be advantageous (Hardy 1989).

Stand maintenance: Regularly cultivate rows and spot spray with herbicide to keep plot weed free; annual fertilization with low N formulations will extend the life of the plot. *Elymus trachycaulus* is generally considered a short-lived perennial with a life span of five years (Knowles 1987).

Harvesting and Seed Processing

Note: It is critical that any quack grass (*Elymus repens*) in the stand be completely rogued out before harvesting, as its seeds cannot be mechanically separated from those of *Elymus trachycaulus* if the crop is contaminated.

Dates of selective harvesting in the Bulkley Valley of northwestern B.C. have ranged from August 25th to August 30th. Timing of harvest is important, as the seed shatters easily when ripe.

Hand clipping: Manual harvest with a hand sickle (Fig. 34) or clippers when the seeds are ripe in late August or early September, followed by drying outdoors in the sun, or indoors in a warm dry area.

Vacuum: This grass species does not release seeds as readily as many others, so it is unlikely that vacuum seeding would be effective. If necessary, use a vacuum cleaner immediately after manual or mechanical harvesting to harvest seed that falls to the ground; plastic placed between the rows will assist this type of salvage harvesting.

Seed stripper: Mechanical harvest when the seeds are ripe. In our experience, a fair amount of seed gets scattered when harvesting with the seed stripper.

Combine/thresher settings: Use rotary flail, holding stalks against the flail until seed is removed.

Seed cleaning: Run through a fanning mill with the following configuration: prescreen 1.8 x 12.7 mm slot; top screen 2.5 x 19 mm slot; bottom screen blank; and with the fan (airflow) on moderate. Run seed through a vacuum separator with high airflow to remove dust and chaff.

Storage requirements: cool dry conditions.

Considerations for Use in Revegetation

- *Elymus trachycaulus* is found growing naturally on coal mine spoils in Alberta, and is tolerant of saline and alkaline soils (*Clements 1910, Strong et al. 1978).
- It may perform well on sites with moderate concentrations of boron and bitumen (Hardy 1989).

Elymus trachycaulus ssp. *trachycaulus* slender wheatgrass (continued)

(Considerations for Use in Revegetation, continued)

- This species is reported to be somewhat drought tolerant; *Fulbright et al. (1982) report that it requires from 25 to 50 cm of annual precipitation.
- Mature plants of *Elymus trachycaulus* can withstand flooding for 49-63 days; seedlings can withstand flooding for 21-35 days. Seeds remain viable after 35-56 days of flooding (**Bolton 1946, **McKenzie 1951, **McKenzie et al.1949).
- It is reported to recover rapidly after fire (*Bartos and Mueggler 1982).
- Fall sowing appears to have higher germinations rates than spring sowing; surface mulching is recommended (*Brown and Chambers 1990).
- Seedlings of this species can be transplanted onto disturbed sites (*Brown et al 1978).
- *Elymus trachycaulus* can be used as a nurse crop with slower growing species (Pahl and Smreciu 1999). Nernberg and Dale (1997) report that under lab conditions it was a good competitor with *Bromus inermis* on dry sites.
- Life span of this species is relatively short; it depends on reseeding to perpetuate a stand, but it establishes rapidly from seed (Jefferson and Irvine 1991, Hardy 1989).
- Nitrogen fertilizer on dryland sites appears to reduce productivity (Block 2002).
- Spring burning is considered detrimental to this species but summer burning is beneficial. (**Namir and Payne 1978).
- The seed of *Elymus trachycaulus* is eaten by various seed predators (*Sampson et al. 1951, *Eckert 1975, *Dittberner and Olson 1983).
- It is considered a good quality crop species that is fairly palatable (Hardy 1989) and it will maintain vigour indefinitely under moderate grazing (*Sampson et al 1951).
- *Elymus trachycaulus* has good forage for livestock and wildlife but tolerance to grazing is low. It is rated as good in energy value and poor in protein value (*Dittberner and Olson 1983, Hardy 1989).
- This species produces natural hybrids with *Elymus glaucus* and other species (*GPFA 1986, *Welsh et al. 1987, and others).
- *Elymus trachycaulus* is widely used for revegetating disturbed land; there are currently cultivars of some subspecies available for reclamation purposes (*Chambers 1989, Darroch and Acharya 1996a).
- If restoring northern B.C. ecosystems to resemble natural grasslands found below the alpine tundra, *Elymus trachycaulus* should be a prime candidate for inclusion as a dominant species.

* *fide* Howard 1992.
** *fide* Block 2000.

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