Elymus glaucus Buckl. ssp. *glaucus*
blue wildrye **Family: Poaceae**

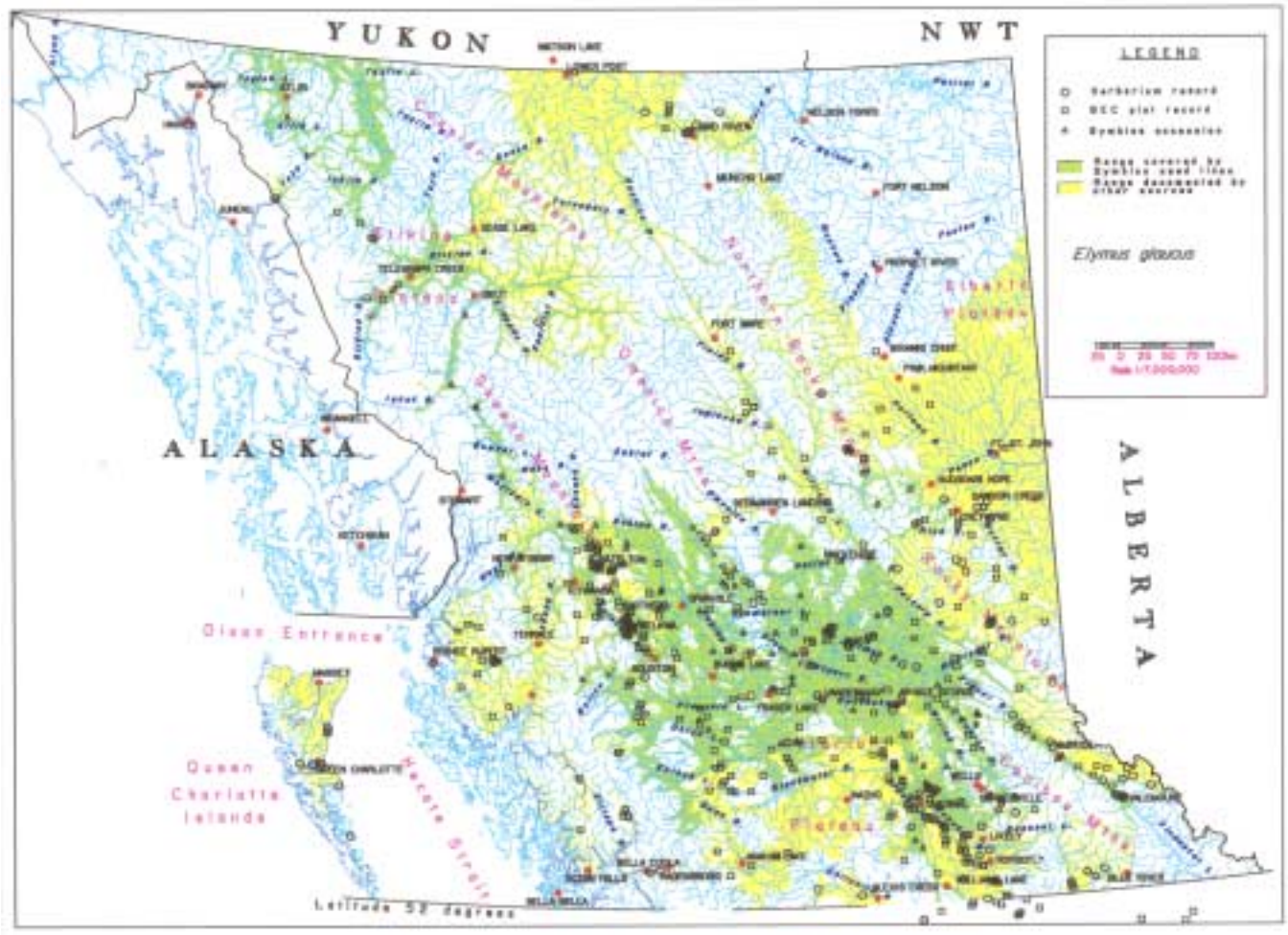

Figure 28. Documented range of *Elymus glaucus* in northern British Columbia.

Figure 29. Cultivated stand of *Elymus glaucus*.

Figure 30. Close-up of *Elymus glaucus* seed heads.

Elymus glaucus Buckl. ssp. *glaucus* (continued) — blue wildrye

Background Information

Elymus glaucus is found in southeast Alaska and the Yukon, east to Ontario and south to New York, Illinois, Arizona, Texas, New Mexico, Arkansas, and California. There are three subspecies: *E.g.* ssp. g*laucus* is common in southern B.C., but is less frequent north of 55°; the short-awned *E.g.* ssp. v*irescen*s (Piper) A. Love is more likely to be found on the coast (Douglas et al. 2001b); and *E.g.* ssp. *jepsonii* (Burtt Davy) Gould is not recognized in B.C. (*Hickman 1993, *Kartesz 1994). In northern B.C., our plants are largely *E.g.* ssp. *glaucus*, and all of those with which we have worked have had characteristically long awns, but we do not distinguish among subspecies in this treatment or in the range mapped in Figure 28. In the United States, this species has been considered the most widely distributed of the western wildryes (*USDA 1937, Hoover et al. 1948).

Growth Form: Culms in loose to dense tufts, often bent at the base (Hitchcock 1971); forms small clumps; leaves broad (4-13 mm wide) lax, flat or slightly inrolled; has well-developed claw-like clasping auricles; ligules a uniform 1 mm; stiff inflorescence 5-15 cm long, conspicuous awned spikes, sometimes purplish but dense; mature plant size: 50-150 cm tall (MacKinnon et al. 1992). *Elymus glaucus* may produce rhizomes (*GPFA 1986), or stolons (*Hickman 1993).

Site Preferences: Moist to dry slopes, meadows and open forests at low to medium elevations (Douglas et al. 1994, MacKinnon et al. 1992). It has a tendency to decrease in frequency with increasing elevation (Klinka et al. 1989). In B.C. it is reported to be shade-tolerant to very shade-tolerant, to persist in deciduous young and mature seral forests (Beaudry et al. 1999). In northern B.C. it is found on mesic to hygric medium to very rich soils in the SBSx or SBSd subzones, subhygric to hydric medium to rich sites in the SBSm subzones, subhygric rich to very rich sites in the SBSw or SBSv subzones, and on mesic to hygric, medium to very rich sites in the SBPSmk (Beaudry et al. 1999). In coastal B.C. it is reported to grow on moderately dry to fresh nitrogen-rich soils (moder and mull humus forms), is sporadic in coniferous forests, on floodplain and stream-edge sites (Klinka et al. 1989).

Seed Information

Seed Size: Length: 29.98 mm (20.91 - 38.88 mm)
Length without awn: 11.35 mm (9.98 - 13.34 mm)
Width: 1.75 mm (1.47 - 2.14 mm)

Seeds per gram: 219 (range: 189 - 243)

Volume to Weight Conversion: 149.2 g/L at 93.8% purity

Germination Capacity: At 30°/20° C untreated: 74.1% (52% - 89%)
At 25°/15° C untreated: 79.2% (75 - 83%)
stratified: 82.0% (75 – 89%)

Germination Speed: To first germination: 9.5 days
To 50% potential: 9.7 days

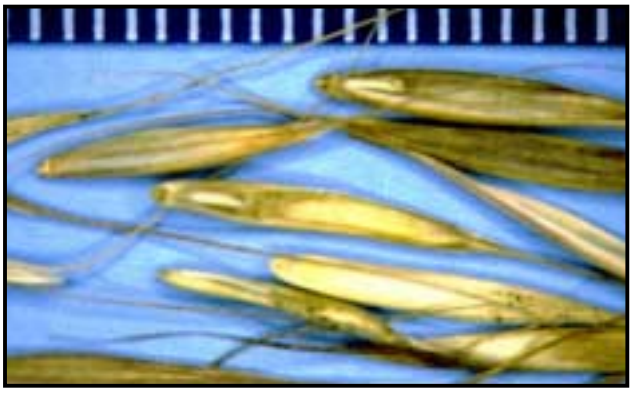

Figure 31. Seeds of *Elymus glaucus*. Rule divisions are 1.0 mm.

Seed Longevity: Link (1993) reports that seeds can be stored at least four to five years in controlled low temperature, under low humidity conditions. Archibald et al. (2000) report that seed has remained viable for at least eight years if stored at +1°C or –17°C.

Elymus glaucus Buckl. ssp. *glaucus* blue wildrye (continued)

Considerations for Growing

Techniques for Seed Production

Seed treatment: Germinates well under most conditions, though we have found stratification to be marginally beneficial. Other researchers report that seeds generally do not need pretreatment to successfully germinate (Young and Young 1986, Rose et al. 1998, Archibald et al. 2000).

Soil considerations: Establish on loamy, well-prepared soils with a firm seedbed.

Stand establishment: Site should be free of all weeds. Broadleaf weeds can be controlled using a selective broadleaf herbicide without damage to grass seedlings or the established plants. Link (1993) reports that weed control is most critical during seedling establishment. A high-N starter fertilizer is recommended, followed by a complete fertilizer when plants are well established (Darris et al. 1996). Archibald et al. (2000) have employed multiple fertilizer applications per season.

Row spacing: Suggest 30 to 90 cm; Archibald et al. (2000) use 30 cm spacing in raised beds.

Seeding density: 25-50 PLS per linear metre; Archibald et al. (2000) use 33-40 PLS/m.

Seeding depth: 0.6-2.5 cm, spring or fall seeding (Plummer 1943, Rose et al. 1998); Archibald et al. use surface sowing followed by a 6-8 mm top dressing of sawdust.

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. We noted seed production decreasing after five years, primarily due to ingrowth by other grasses; Archibald et al. (2000) report fairly constant yields of approximately 220 kg/ha for four years. When grown on moist sites, *Elymus glaucus* is apparently susceptible to ergot infection; no control is recommended, but ergoty seeds should be screened from seed lots as soon as possible to minimize contamination.

Harvesting and Seed Processing

Dates of selective harvesting in the Bulkley Valley of northwestern B.C. range from August 9th to October 25th. Watch carefully for seeds to ripen (harden), as they shatter very easily.

Hand clipping: Harvest with a hand sickle or clippers when seeds are ripe in late August followed by drying outdoors in the sun, or indoors in a warm dry area. Link (1993) and Knapp and Rice (1996) report that seed collected prematurely develop to maturity after harvesting, better than many other grass species; this makes clipping or swathing followed by curing a practical means of facilitating a single seed harvest (Archibald et al. 2000). Plastic placed between rows will enable you to harvest shattered seeds with a vacuum.

Vacuum: It is unknown at present if seed can be efficiently harvested directly from the stock with a vacuum. If necessary, use a vacuum immediately after manual or mechanical harvesting to glean seed fallen to the ground; plastic placed between the rows will assist this type of salvage harvesting.

Seed stripper and mechanical harvesting: In our experience, a fair amount of seed gets scattered when harvesting with the seed stripper, but this might be dealt with using softer threads, lower rpm, or an auxiliary vacuum attachment. Use of a sickle-bar mower or swather when approximately half of the seeds are ripe, followed by field curing, is recommended for larger fields.

Combine/thresher settings: 1548 rpm with 10 mm gap.

Seed cleaning: Rotary flail works best when seed is harvested with long stalks. Then run through a fanning mill twice with the following configurations: prescreen 4 x 19 mm slot; top screen 2.5 x 19 mm slot; bottom screen 1.2 x 7.1 mm slot. Then run through a vacuum separator at near-high suction. Archibald et al. (2000) recommend de-awning prior to additional seed handling.

Elymus glaucus Buckl. ssp. *glaucus* blue wildrye (continued)

(Harvesting and Seed Processing, continued)

Storage requirements: Cool dry conditions; Archibald et al. (2000) dry seed to 5-8% moisture content first, and then store in coolers (1°C) or in freezers (-17°C).

Considerations for Use in Revegetation

- This species grows best on moderately moist soils (*USFS 1937, *Hoover et al. 1948, *Sampson et al. 1951).
- In Alberta this species is reported to grow on medium to coarse textured mesic to dry soils and to be tolerant of alkaline soil conditions (Gerling et al. 1996).
- Others report that *Elymus glaucus* is sensitive to saline soils and not tolerant of shallow soils (*Plummer et al. 1968 and *Hassell et al. 1983).
- This species has a hardy fibrous root system which penetrates deeply so is good for erosion control (*Hickman 1993).
- *Elymus glaucus* is recommended for erosion control on steep, eroded slopes, roadsides or fire damaged sites as a pioneer species (Darris et al. 1996). Our field trials have corroborated these recommendations, with *E. glaucus* establishing well over two growing seasons on steep gravelly slopes.
- *Elymus glaucus* has a well developed root system, but it is intolerant of continued heavy grazing (Johnson 1999).
- *Elymus glaucus* provides forage for domestic stock and wildlife, especially its new growth. (*Hoover et al. 1948, Hitchcock 1971, *Hassell et al. 1983, MacKinnon et al. 1992). But its forage value is only rated as fair because of its coarse foliage.
- This species is rated good for energy value and poor for protein value (*Dittberner and Olson 1983).
- In our research trials, *Elymus glaucus* appears to compete well with *Phleum pratense.*
- Stands are reported to decline dramatically after three to four years (*Hassell et al 1983).
- *Elymus glaucus* hybridizes with *E. elymoides*, *E. stebbinsii* and *E. trachycaulus* (*Hickman 1993).
- Although this species is available through commercial producers, *Libby and Rodrigues (1992) caution that such seed should be used sparingly to avoid genetic dilution of local populations.
- According to Knapp and Rice (1996) this species is predominantly self-pollinating, but Ie (2000) reports that B.C. populations exhibit up to 50% outcrossing (Ie 2000).
- *Hassell et al. (1983) report that *Elymus glaucus* is compatible with tree regeneration.
- This species is very promising; it is easy to grow and the seed is of a good size and is easy to harvest and clean; it establishes well from seed under a wide range of environmental conditions. It can fill the role of a tall-statured grass species for most revegetation purposes in northern B.C.

**fide* Johnson 1999.

Other Considerations

- The seeds of *Elymus glaucus* were used historically as food by the Salish people on Vancouver Island (Turner and Bell 1971).