

Protocol Information



USDA NRCS
Corvallis Plant Materials Center
3415 NE Granger Ave
Corvallis, Oregon 97330
(541)757-4812

United States Department of Agriculture
Natural Resources Conservation Service

Corvallis

Plant Materials Center

Corvallis, Oregon

Family Scientific Name: **Poaceae**

Family Common Name: **Grass**

Scientific Name: ***Elymus glaucus* Buckl.**

Common Name: **blue wildrye**

Species Code: **ELGL**

Ecotype: **Four accessions were collected; 3 from Mt Rainier National Park at elevations ranging from 2,000 to 5,400 ft; and one accession from Crater Lake National Park at 6,400 to 7,000 ft. At Mt Rainier, seed was 3 collected in 3 zones along Highways 123 and 410.**

General Distribution: **West and central states including Alaska, scattered occurrence in Midwest and east to Michigan and New York in open woods and prairies, dry to moist hillsides, from low to mid-montane elevations.**

Propagation Goal: **Seeds**

Propagation Method: **Seed**

Product Type: **Propagules (seeds, cuttings, poles, etc.)**

Stock Type: **Seed**

Target Specifications: **Agronomic seed increase to provide clean seed free of noxious weeds with initial germination at 80% or higher, to be used in revegetation following road and building construction at National Parks.**

Propagule Collection: **Seeds were hand-stripped at soft – to hard dough stage. Seed can be collected as early as “milk” stage and allowed to mature at moderate to warm temperatures out of direct sunlight; mature seed**

shatters easily. Care was taken during collections not to “over-harvest” any areas, especially where vegetative cover was thin or in high-visibility areas. The fungal diseases smut and ergot were present in some years in the native stands; smut was more prevalent at Mt. Rainier while ergot was a problem in some collection years at Crater Lake.

Propagule Processing: **Seeds have long awns which should be removed for ease in handling, sowing, and storage. Seed must be thoroughly dry for awn removal which can be done with a brush machine or debearder, or geared-down hammer mill for small lots using a 3/16 inch screen. Seed is then air-screened twice; 1st with a #14 to remove awns and stem material, then rescreened with 1/14 x 1/4 inch screen with medium-high air flow. Seeds / lb vary from 124,000 to 155,000.**

Pre-Planting Treatments: **None needed.**

Growing Area Preparation/

Annual Practices for Perennial Crops: **Plantings should be at least 1/4 mile from other accessions; blue wildrye is largely self-fertile and wind-blown pollination is not a significant problem at these isolation distances. Seeds are sown at shallow depths, 50 to 60 pure live seed / ft resulted in good initial stand establishment. For plug transplants; plots had to be deeply tilled when soil moisture was moderate to allow mechanical transplanter to operate.**

Establishment Phase: **Seed can be either spring or fall-sown and germinates within 14 days. Irrigation is supplied to keep the soil moist and prevent crusting over; after seedling emergence irrigation is supplied one or more times during the first season until crowns become established. While initial emergence was fairly good in all plots, weed competition hindered stand establishment, especially for the higher elevation ecotypes. Intensive spot-spraying, hoeing, and weed wicking were needed at this stage to keep weeds in check. The Crater Lake stands were especially sensitive to weed competition and mechanical disturbance during cultivation, resulting in only fair to poor stands for this ecotype.**

Two alternative methods to establish seed increase plots were carbon-band seeding or transplanting 8

to 10-week old plugs. The first method, spring or fall planting with carbon-banding, is experimental only. It consists of overspraying the seed with activated charcoal slurry, followed by an overspray with diuron, a broad-spectrum pre-emergent herbicide (experimental use only). The equipment for applying the carbon slurry was provided on loan from the Agricultural Research Service (ARS) in Corvallis. The system consists of a tank with mechanical agitator to keep the charcoal in solution, and an impeller pump connected to tubing with large-diameter nozzles directed over the seeding row to deposit the slurry in a 1/8 to 1/4 inch band directly over the seeded row. The system is front-mounted on the tractor while seeding equipment is pulled behind.

The 2nd method, plug transplanting, involved growing seedlings for 8 to 10 weeks and outplanting with a Holland “Rotary One” transplanter. Seedling plugs established in Ray Leach “stubby” super cells are removed from the cones and stacked into flats kept cool and covered with wet cloth; the plugs are fed into the mechanical transplanter and planted in rows 28 inches apart. This method both provides the plants with a “head start” over weed competition and the wide row spacing can be mechanically tilled. For the Crater Lake accession, this method provided better stand development than direct seeding methods. However, the resulting stand is not dense enough to be windrowed and combined and was hand-harvested using sickles and collecting onto tarps.

Length of Establishment Phase: **2 months: crowns generally well established by then.**

Active Growth Phase: **Annual practices include early spring fertilization with 50 lbs N and 15 lbs S / acre (on established plantings only: fertilization during establishment allows weeds to overtake crop), three applications of propiconazole and chlorothalonil fungicides at label rates at 3-week intervals in late March – May (final spray must be applied prior to boot stage); 2,4-D herbicide for control of broadleaf weeds, and mechanical tilling, hand-hoeing, and / or spot-spray with roundup for weedy grasses. Annual bluegrass and rattail fescue have been the most serious weeds**

in these stands at Corvallis, and no selective herbicides have been found to control them. In some winters, the crowns became fully dormant and it was then possible to overspray the field in January or February with paraquat to kill germinating annual bluegrass. No labeled treatments are available for ergot or smut; Ergot was much more prevalent in the Crater Lake seedings. Both diseases become evident during seed fill; plantings that become infested may be selectively hand-harvested but should be removed after that.

Length of Active Growth Phase: March – June: boot stage usually occurs in early June with seed ready to swath by early July.

Harvesting, Storage and Shipping: Fields are swathed down when about 50 % of the seed heads are in the “milk” stage. Seed ripening is quite variable from year to year, even within ecotype and seed development must be closely monitored. Windrows are left to cure for 3 to 7 days before combining. Small plots may be hand-stripped; the advantage of this is retrieving a greater percentage of the seed without excessive shattering loss. Flail-vac type harvesters may also be useful for this species. Seed cleaning is again by brush machine to remove awns, followed by one or more runs across an air-screen cleaner. Bottom screens can be used to separate out rattail fescue and annual bluegrass seed. Seed is stored in cloth sacks in a cool, dry storage facility or dry cold-storage room. Initial seed germinations should be high: 85% or better.

Length of Storage: After 3 to 4 years germination at the PMC has generally declined to about 50%; after that it rapidly declines in extended storage.

Outplanting performance on typical sites: Zone-specific accessions of each of the 4 collections were outplanted in test plots at the national parks and their establishment and growth monitored over 3 years. In each plot, seeds were fall-sown at the rate of 35 PLS / sq ft onto bare native soil either in untreated and amended plots (amendment consisted of the addition of organic matter (peat moss), 9-month slow-release N-P-K fertilizer, and straw-blanket erosion control blanketing. Initial seedling emergence was good at all sites in all treatments; however by the first fall the percent

cover was significantly lower in the unamended sites at Crater Lake (24% vs. 48% in fully treated plots), and also higher in all 3 sites at Mt Rainier although percent cover varied from site to site. After 3 years, percent stand cover at the higher elevation plot at Mount Rainier was 72% for the amended plot vs. 10% in untreated soil; the site lower elevation plots also showed a reduction in percent cover for untreated plots. One caution observed at Crater Lake – especially in the first fall after seeding, plants on treated sites were notably more verdant than the untreated sites and similar vegetation in the surrounding area. The plots were fenced to exclude elk and other browsers but this may be a significant hazard in some revegetation programs.

Other comments: Due to changing labels, laws, and regulations, the authors and USDA NRCS assume no liability for pesticide information. Any use of a pesticide contrary to current product label instructions is neither legal nor recommended.

The use of manufacturer and trade names in this document is for clarification only. No discrimination is intended and no endorsement is given by the USDA NRCS.

References: Corvallis Plant Materials Center Technical Report: Plants for Woodland and Rangeland Reclamation and Erosion Control 1980 – 1997 (includes Annual Reports to Mount Rainier National Park from 1990 – 1996).

Link, Ellen, ed. 1993. Native Plant Propagation Techniques for National Parks Interim Guide; Compiled by Rose Lake Plant Materials Center 7472 Stoll Road East Lansing, MI 48823.

Flora of the Pacific Northwest, C. L. Hitchcock and A. Cronquist, University of Washington Press, 1973.

USDA, NRCS. 2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Citation:

Flessner, Theresa R.; Trindle, Joan D.C. 2003. Propagation protocol for production of *Elymus glaucus* Buckl. seeds (Seed); USDA NRCS - Corvallis Plant Materials Center, Corvallis, Oregon. In: Native Plant Network. URL: <http://www.nativeplantnetwork.org> (accessed 30 December 2009). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.