

Protocol Information



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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: ***Bromus vulgaris* (Hook.) Shear**

Common Name: **Columbia brome**

Species Code: **BRVU**

Ecotype: **Three accessions were collected from Mount Rainier National Park along Highway 123 and Highway 410 on the east side of the park in elevations ranging from 2,700 to 3,800 feet. All 3 accessions behaved similarly during propagation.**

General Distribution: **Pacific and intermountain northwest; Utah, Wyoming, California in shaded to open woods, moist to dry banks, sea level to 6,000 ft.**

Propagation Goal: **Seeds**

Propagation Method: **Seed**

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

Stock Type: **Seed**

Time To Grow: **2 Years**

Target Specifications: **Agronomic seed increase to provide clean seed free of noxious weed seed; germination 60% or higher (fresh lots at PMC have ranged from 43 to 86%) for use in revegetation following road reconstruction in National Park**

Propagule Collection: **Seeds hand-stripped from native plant stands at seed shatter in hard-dough to mature stage, transported in cloth or paper sacks kept out of direct sunlight. Seed collection along the highways**

was fairly slow because only scattered stands existed, and during collection efforts were made to purposefully allow at least half of the stripped seed to shatter to the ground. Also in some years native stands were infested with smut fungus – avoiding these seeds slowed collection times considerably.

Propagule Processing: For ease of storage, handling, and planting, seeds should be dried and deawned in a geared-down hammer mill (for small lots) or brush machine such as a Kamas-Westrup; 3/16” screen. Deawned seed can then be cleaned with an air screen machine using a #14 screen to scalp, with moderately high air flow. Several lots of seed collected and processed over 3 years had germinations ranging from 43% to 86% Seed size varied from 79,600 to 119,500 seeds / lb.

Pre-Planting Treatments: No pretreatment needed for germination. Smut – infested seed should not be used as there are no labeled fungicides available to treat it.

Growing Area Preparation/ Annual Practices for Perennial Crops: For direct-seeding, two main methods were used at Corvallis. The first was spring sowing in May, into a prepared seed bed at 12” row spacing, 60 to 86 pure live seed / foot, 1/8” deep with a planet Jr. The 2nd direct-seeding method used was experimental for this crop. It consisted of spring-seeding with a Hege precision seeder, overspraying the seed with an activated charcoal slurry (carbon-banding) 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.

Establishment Phase: While initial stand establishment was very good with direct- sowing on 12” spacing, weed seed emergence overtook some of the brome seedlings in the non-carbon banded plots. Weed suppression by the pre-emergent diuron allowed the brome seedlings to become better established. In both

cases however, follow-up mechanical weeding by hand and / or rotary tiller was required to keep grassy weeds from overtaking the seedlings. At this early stage, there were no selective herbicides available to control grassy weeds without injury or death the crop.

Length of Establishment Phase: **Under favorable conditions germination is generally complete within 21 days.**

Active Growth Phase: **Supplemental irrigation was applied when needed; in drier springs this meant as much as 1" / week in early April to May. Weed control was provided by a combination of mechanical (hand-hoeing), overspraying dormant fields in January with the herbicide diuron (experimental use only), one or more applications of 2,4-D plus dicamba for broadleaf weed control in early to mid spring, and spot applications of glyphosate with a hand-held wick-type applicator. Three applications of propiconazole and chlorothalonil at label rates for rust control were made in April and early May on established fields. Fall and spring fertilization with 50 lbs of N/acre and 15 lbs S/acre was provided to maintain fields for subsequent years. Irrigation was provided by sprinkler pipe as needed in April and May, up to 1" per week.**

Length of Active Growth Phase: **April to June**

Hardening Phase: **na**

Length of Hardening Phase: **na**

Harvesting, Storage and Shipping: **Seed heads were hand-harvested (these plots were each ½ acre or less) 2 to 5 times from June 14 to July 20th, using hand sickles and placing cut seed heads into barrels or cloth bags. Mechanical harvesting could be accomplished with a flail-vac type harvester; swathing and combining resulted in fairly high seed loss from uneven maturation and seed shatter. Harvested material was laid out on tarps in the poly greenhouse with doors wide open for air circulation. (During summer, the greenhouse was not used for growing plants, and made an ideal "drying tunnel" with daytime temperatures ranging up to 100 to 105°F for short periods of time). Materials were turned with a pitchfork several times during drying, and shattered seed accumulated on tarps. A stationary thresher was used to separate remaining seed from**

the seed heads. Seeds were treated as described in the seed collection section. Once dried and deawned, seed flows quite easily and was not difficult to clean. Storage was in cloth sacks in a concrete-block warehouse or dry cooler.

Length of Storage: Seeds are fairly short-lived in storage; after 4 to 5 years viability declined to almost nil.

Outplanting performance on typical sites: At Mount Rainier, seed was fall-seeded in test plots to determine the effects of amendment with 9-month slow-release 18-7-10 Sierrablend fertilizer, organic matter incorporation (peat moss) and S-150 straw erosion control blanketing vs. no treatment. Seeds were surface-sown onto seedbeds prepared by hand-rototilling the plots in September and evaluated for 3 years. Although initial stand density was not affected by soil amendment, plant height, vigor and percent stand cover as was significantly enhanced in the treated plots. Seeds sown at the rate of 35 PLS / sq ft had an initial stand density of 35 vs. 31.5 plants / sq ft in treated vs. untreated plots, but by fall the percent cover was 85% vs. 12.5% respectively. The following year stand initial (spring) stand density was 27.5/ sq ft in the treated vs. 14 / ft sq in untreated plots and percent cover was 80% vs. 3.5%, respectively.

Other Comments: Small seed increase blocks were also established by means of plug transplants (see separate protocol for plug production). 8-to 12-week old plugs produced in Ray Leach “stubby” cone-tainers were mechanically transplanted into a deeply tilled field with a Holland Rotary One Transplanter (Holland Mfg Co., Holland MI). Fields were planted in early May and irrigated in May and June, with mechanical / chemical weed control provided as above. 1st year seed yields are better with transplants – partly because the growing season is extended by starting plugs early in the greenhouse, but also because the larger more established plants are much more able to out-compete the weeds.

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).**

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

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Citation:

Flessner, Theresa R.; Trindle, Joan DC. 2003. Propagation protocol for production of *Bromus vulgaris* (Hook.) Shear 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.