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 carinatus* Hook. & Arn**
Common Name:	**California brome**
Species Code:	**BRCA5**
Ecotype:	**Crater Lake National Park; 6,400 to 7,000 ft**
General Distribution:	**California, Oregon, Washington; with some races occurring as far away as the Dakotas and New Mexico. In Crater Lake, mostly in drier meadows and along roadsides.**
Propagation Goal:	**Seeds**
Propagation Method:	**Seed**
Product Type:	**Propagules (seeds, cuttings, poles, etc.)**
Stock Type:	**Seed**
Target Specifications:	**Clean air-dried seed free of noxious weeds, smut, and excess chaff. Germination has been variable; ranging from 31% (in drought years) to over 63%. Our seed lots ranged from 78,000 to 82,000 seeds / lb.**
Propagule Collection:	**Seed is fairly easily collected by hand-stripping into cloth sacks or by hand -sickle in more solid stands. Smutted seed heads were quite common in some years both in native stands and at the Corvallis PMC in increase fields – in this case selective hand-stripping was chosen to reduce the amount collected along with sound seed. Seed germination of native-collected lots varied widely between lots**

	and years.
Propagule Processing:	**Small lots could be threshed with a geared-down hammermill or small brush machine; larger lots were sent through a Kamas-Westrup or similar brush machine; then run through an air-screen machine with a #14 round screen and medium-high air flow.**
Pre-Planting Treatments:	**Some references have suggested pretreating seed with antifungal seed pretreatments such as "Vitavax" for smut control; otherwise no pretreatment is needed. Seven – day prechill was sometimes used for germination testing but was not necessary for acceptable field emergence.**
Growing Area Preparation/ Annual Practices for Perennial Crops:	**Seed can be direct sown at the rate of 30 to 40 PLS / foot row into a prepared seed bed in spring or early fall. This grass was grown as a short-lived perennial; after the 2nd year the stands became rather weak as they were not very tolerant of the heavy-textured, wet soils in winter. The fungicides propiconazole and chlorothalonil were applied at label rates 3 times in early spring of each year prior to 'boot' stage for rust and other fungi control. Annual applications of light rates of N (50 lbs / ac) and S (15 lbs / ac) fertilizer were applied in early spring and fall.**
Establishment Phase:	**Irrigation was provided after seeding to promote stand establishment. Weed control was provided mostly by manual and mechanical cultivation as there are no selective herbicides available. Broadleaf herbicides – mainly 2,4-D was applied early on to reduce weed competition.**
Length of Establishment Phase:	**Germination is fairly rapid; stand emergence generally is very good at 21 days.**
Active Growth Phase:	**This grass grows fairly slowly at first and is susceptible to weed competition and pathogens especially in wet soils. Boot stage is generally reached by mid May; Seed fill occurs in late May / June in at Corvallis and the crop is harvested at the end of June / early July.**
Length of Active Growth Phase:	**April to June at Corvallis**
Hardening Phase:	**na**
Length of Hardening Phase:	**na**
Harvesting, Storage and Shipping:	**Prior to harvest, while most seed is still in "milk" stage, the field is hand-rogued to reduce the**

number of weedy grasses. This crop was mostly hand-harvested using sickles to avoid weedy grasses and smutted seed heads as much as possible. Ripe seed shatters very easily, so seed heads were collected directly into buckets and barrels and taken to a sheltered location with good air flow to air-dry. Larger lots that were swathed and combined required extensive seed conditioning.

Length of Storage: **Seed stored for a few years at cool dry conditions at the PMC showed acceptable germination, but longer term storage was not conducted.**

Outplanting performance on typical sites: **Direct seeding in early fall at Crater Lake NP was planned for this species.**

Other Comments: **Soft chess (*Bromus secalinus*) seed was especially difficult to remove from these seed lots. In a few lots, the heaviest 5 or 10 % of the crop had to be discarded along with the unwanted chess seeds.**

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).

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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. 2007. Propagation protocol for production of *Bromus carinatus* Hook. & Arn 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.