Protocol Information

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United States Department of Agriculture
Natural Resources Conservation Service

Corvallis
Plant Materials Center
Corvallis, Oregon

Family Scientific Name:	**Cyperaceae**
Family Common Name:	**Sedge**
Scientific Name:	***Carex halliana* Bailey**
Common Synonym:	***Carex oregonensis* Olney ex Bailey**
Common Name:	**Hall's sedge**
Species Code:	**CAHA2**
Ecotype:	**Crater Lake National Park; 5,500 to 6,500 ft elevation.**
General Distribution:	**Oregon, Washington, and northern California, on dry, open or thinly wooded meadows, often on pumice soils.**
Propagation Goal:	**Plants**
Propagation Method:	**Seed**
Product Type:	**Container (plug)**
Stock Type:	**1-gallon containers**
Target Specifications:	**Well-developed crowns, roots and rhizomes filling soil profile in container.**
Propagule Collection:	**Seed heads are fairly large, with angular seeds that are rather easily collected at maturity. Seed maturity was quite variable within and between sites. Seed was collected throughout July and August. Seed heads were hand-stripped or carefully clipped and kept in paper sacks out of direct sunlight.**
Propagule Processing:	**The papery hulls are held tightly to the seed and must be mechanically removed with an abrasive dehuller. Seed heads were threshed with a geared-**

	down hammermill with 1/16th inch screen, then run 2 times through a lab-scale oat dehuller. Dehulled seed cleaned with an office clipper (air screen machine) starting with a 1/8th " top screen and 1/20" bottom screen and moderate air flow.
Pre-Planting Treatments:	**Seed dormancy: seed must be dehulled as noted above, and then cold-moist stratified. Germination of a 1-year old seed lot sown into seedling flats and held in cold moist stratification for 68, 173, and 282 days yielded 25%, 46% and 49% germination, respectively. The 173 - and 282-day stratified seed emerged at 14 days, vs. 22 days for the 68-day stratification treatment, and seedling vigor was also increased with the longer stratification times. Seed that was not dehulled had less than 1% germination regardless of length of time held in stratification.**
Growing Area Preparation/ Annual Practices for Perennial Crops:	**Seed was placed directly into Ray Leach "stubby" cones filled with Fisons' sunshine #1 soilless potting mix; or sown into 5" deep starter flats filled with Fisons' #1 and placed into a walk-in cooler for stratification (see above).**
Establishment Phase:	**Flats were fertilized once with Peters' 9 -45-15 starter once after seedling emergence seemed complete.**
Length of Establishment Phase:	**6 weeks**
Active Growth Phase:	**Seedlings were transplanted into Ray Leach “cone-tainers” filled with Fisons Sunshine #1 soilless greenhouse mix for the first season, and moved out to a shade-house with 40% shade cloth in May when the poly greenhouse became too warm. Plants were fertilized every 2 to 3 weeks with half-strength Peters' Triple 20 N-P-K fertilizer and sprinkler irrigated as needed between fertilizations. Some leaf spot occurred transiently in the first year, but did not require treatment. In the spring of the 2nd year, the plants had filled the cones and some had new shoots developing from rhizomes that had grown down through the cones and out the drainage holes at the bottom. These were divided in April and repotted into 1-gallon ribbed containers filled with Sunshine #4 Aggregate-Plus and amended with Slow-release Osmocote and Micromax micronutrients.**
Length of Active Growth Phase:	**April to August**

Hardening Phase: **Fertilization was withheld after July, and irrigation intervals lengthened in August and September to encourage vegetative maturity.**

Length of Hardening Phase: **2 months**

Harvesting, Storage and Shipping: **Plants were stored over winter in an unheated poly greenhouse. In September the 2nd year, plants in one-gallon pots were lightly watered in August and packed in waxed cardboard tree boxes and shipped to Crater Lake in a refrigerated semi. Plants arrived at Crater Lake in good shape and were held near their headquarters for a few additional weeks of acclimation prior to outplanting.**

Length of Storage: **see above**

Outplanting performance on typical sites: **Crater Lake NP reported excellent 1st year survival of these plants which were used to revegetate heavily used social trails at the park.**

Other Comments: **For revegetation purposes, 1-year-old tubelings such as the Ray Leach "stubby" cone-tainers are more efficient, and survival on these is also excellent. Additionally, since these plants produce robust rhizomes which can be divided and planted. It was recommended that plants be salvaged from any areas where Hall's sedge was to be disturbed / destroyed for construction projects.**

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.

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

Citation:

Trindle, Joan DC; Flessner, Theresa R. 2003. Propagation protocol for production of container *Carex halliana* Bailey plants (1-gallon containers); 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.