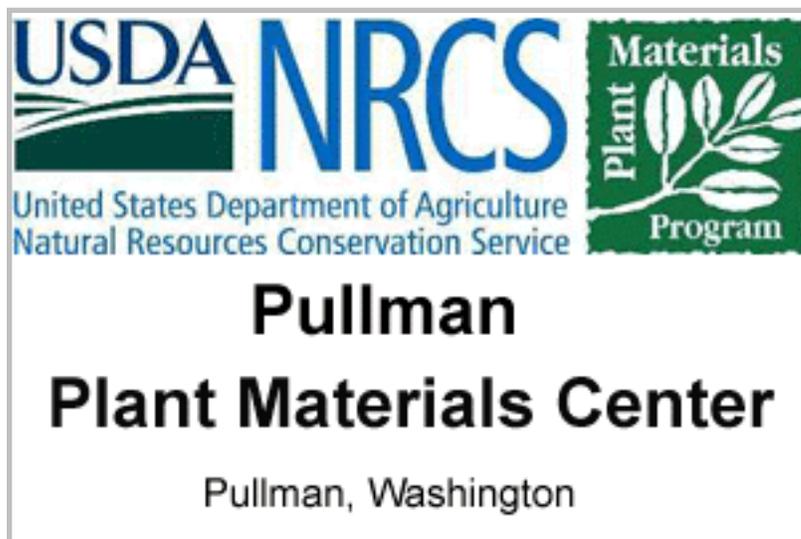


Protocol Information

Dave Skinner
PMC Farm Manager
Pullman Plant Materials
Center
Room 211A Hulbert Hall
WSU
Pullman,
Washington 99163-6211

509-335-9689
509-335-2940 Fax
abbie@wsu.edu



Family Scientific Name: **Rubiaceae**

Family Common Name: **Madder**

Scientific Name: ***Galium boreale* L ' '**

Common Synonym: ' '

Common Name: **Northern bedstraw**

Species Code: **GABO2**

Ecotype: **Paradise Creek drainage near
Pullman, WA.**

General Distribution: **Widespread circumboreal
species. In eastern
Washington it is usually found
on more mesic sites in
grasslands of the Palouse
Prairie and in open coniferous
woods.
Mean annual precipitation
range is from 20-55 inches
(USDA NRCS 2007).
Wetland indicator status is
FACU (US Fish and Wildlife
Service 1988).**

Propagation Goal: **Plants**

Propagation Method: **Seed**

Product Type: **Container (plug)**

Stock Type: **10 cu.**

Time To Grow: **4 Months**

Target Specifications: **Tight root plug in container.**

Propagule Collection: **Seed is collected in September when the inflorescence is dry and the seeds are brown in color. Seed can be stripped from the stalks by hand or entire stalks can be cut. Plants hold their seed well, shattering is not generally a problem. Harvested seed is stored in paper bags at room temperature until cleaned.**

Propagule Processing: **Small amounts are rubbed to free the seed, then cleaned with an air column separator. Larger amounts are threshed with a hammermill, then cleaned with air screen equipment. Clean seed is stored in controlled conditions at 40 degrees Fahrenheit and 40% relative humidity.**

756,000 seeds/lb (Hassell et al 1996).

We determined 725,760 seeds/lb for this ecotype.

Pre-Planting Treatments: **Germination was equally low for seeds from a Wisconsin source either without pretreatment or after 2 months cold moist stratification (Green & Curtis 1950). Maguire and Overland (1959) found 4 weeks of cold moist stratification resulted in 84% germination, while untreated seed germinated at 64%. For this ecotype, germination without pretreatment is high. Trials conducted at the PMC comparing untreated seed with cold, moist stratified seed showed no benefit from stratification.**

Growing Area Preparation/
Annual Practices for Perennial Crops: **In January seed is sown in the greenhouse in 10 cu. in. Ray Leach Super cell conetainers filled with Sunshine #4 and covered lightly. Head space of ¼ to ½ inch is maintained in conetainers to allow deep watering. A thin layer of coarse grit is applied to the top of the planting soil to prevent seeds from floating during watering. Conetainers are watered deeply.**

Establishment Phase: **Medium is kept moist until germination occurs. Germination usually begins in 10-12 days and is complete in 3 weeks.**

Length of Establishment Phase: **3 weeks**

Active Growth Phase: **Plants are watered deeply every other day and fertilized once per week with a complete, water soluble fertilizer containing micro-nutrients**

Length of Active Growth Phase: **2-3 months**

Hardening Phase: Plants are moved to the cold frame in late March or early April, depending on weather conditions. They are watered every other day if the weather is cool, and every day during hot, dry spells.

Length of Hardening Phase: 2-4 weeks

Harvesting, Storage and Shipping:

Length of Storage:

Outplanting performance on typical sites: Transplanting is done in early May by using an electric drill and portable generator to drill 1.5 inch diameter holes at the planting site. Survival in seed increase plantings without competing vegetation exceeds 95%. Transplanting into sites with existing vegetation reduces survival and vigor depending on weather conditions following planting. Flowering and seed production may occur the same year as transplanting.

Other Comments: No insect problems have been noted.

It may also be possible to propagate this species from pieces of the rhizome or from divisions.

References: Chirco, Ellen, and Terry Turnoer. 1986. Species without AOSA Testing Procedures. The Newsletter of the Association of Official Seed Analysts 60 (2):2-66. Available online at <http://www.aosaseed.com/Species%20wo%20AOSA%20list%20plus%20adds.pdf> Updated November 11/10/03.

Craighead, John J., Frank C. Craighead, and Ray J. Davis. 1963. A Field Guide to Rocky

Mountain Wildflowers.
Houghton Mifflin Co. Boston,
MA. 277 pp.

Greene, H.C. and J.T. Curtis.
1950. Germination Studies of
Wisconsin Prairie Plants.
American Midland Naturalist
43:186-194.

**Hassell, Wendell, W. Rocky
Beavers, Steve Ouellette, and
Thomas Mitchell. 1996.**
Seeding Rate Statistics for
Native and Introduced Species.
USDI National Park Service
and USDA Natural Resources
Conservation Service. 25 pp.

**Hitchcock, C. Leo, and Arthur
Cronquist. 1973.** Flora of the
Pacific Northwest. University
of Washington Press. Seattle,
WA. 730 pp.

Kruckeberg, Arthur R. 1996.
Gardening with Native Plants
of the Pacific Northwest. 2nd
ed. University of Washington
Press. Seattle, WA. 282 pp.

**Larrison, Earl J., Grace W.
Patrick, William H. Baker, and
James A. Yaich. 1974.**
Washington Wildflowers. The
Seattle Audubon Society.
Seattle, WA. 376 pp.

Lyons, C.P. 1956. Trees,
Shrubs and Flowers to Know in
Washington. J.M. Dent & Sons
(Canada) Limited. Vancouver,
BC. 211 pp.

Lyons, C.P. 1997. Wildflowers

of Washington. Lone Pine Publishing, Renton, WA. 192 pp.

Maguire, James D. and Alvin Overland. 1959. Laboratory Germination of Seeds of Weedy and Native Plants. Washington State Agricultural Experiment Station Circular 349, Pullman, WA. 15 p.

Mohlenbrock, Robert H. Undated. Western Wetland Flora: A Field Office Guide to Wetland Species. USDA, NRCS Western Region. Sacramento, CA.

Parish, Roberta, Ray Coupe, and Dennis Lloyd (eds.). 1996. Plants of Southern Interior British Columbia. Lone Pine Publishing, Vancouver, BC, Canada. 463 pp.

Patterson, Patricia A, Kenneth E. Neiman, and Jonalea R. Tonn. 1985. Field Guide to Forest Plants of Northern Idaho. General Technical Report INT-180. USDA Forest Service Intermountain Research Station. Ogden, Utah. 246 pp.

Piper, C.V., and R.K. Beattie. 1901. The flora of the Palouse region: Containing descriptions of all the psermatophytes and pteridophytes known to grow wild in the area within 35 kilometers of Pullman, Washington. Pullman, Washington Agricultural College and School of Science.

208 pp.

Piper, C.V., and R.K. Beattie.
1914. The Flora of
Southeastern Washington and
Adjacent Idaho. Lancaster, PA.
Press of the New Era Printing
Company. 296 p.

Rickett, Harold W. 1973.
Wildflowers of the United
States: The Central Mountains
and Plains. Vol. 6. (3 parts).
McGraw Hill, New York.

St. John, Harold. 1963. Flora of
Southeastern Washington and
of Adjacent Idaho. 3rd edition.
Outdoor Pictures. Escondido,
CA. 583 pp.

USDA ARS National Genetic
Resources Program.
Germplasm Resources
Information Network - (GRIN)
[Online Database]. National
Germplasm Resources
Laboratory, Beltsville,
Maryland. URL: <http://www.ars-grin.gov2/cgi-bin/npgs/html/taxon.pl?448068> (01
February 2007).

USDA NRCS. 2007. The PLANTS
Database (<http://plants.usda.gov>, 1 February 2007).
National Plant Data Center,
Baton Rouge, LA 70874-4490
USA.

US Fish and Wildlife Service.
1988. National list of vascular
plant species that occur in
wetlands. US Fish & Wildlife
Service Biological Report 88

Citation:

Skinner, David M. 2007. Propagation protocol for production of container *Galium boreale* L. ' ' plants (10 cu.); Pullman Plant Materials Center, Pullman, Washington. In: Native Plant Network. URL: <http://www.nativeplantnetwork.org> (accessed 2 February 2007). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.