

# 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

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Family Scientific Name: **Fabaceae**

Family Common Name: **Legume**

Scientific Name: *Lupinus latifolius* Lindl. ex J.G. Agardh

Common Name: **broadleaf lupine**

Species Code: **LULA4**

Ecotype: **Crater Lake National Park at 6,000 to 6,700 ft elevation.; Mt Rainier National Park- 3 collections along highways on the east side of Park at elevations of 2,000 to 5,400 ft.**

General Distribution: **Washington, Oregon, California - east to Utah and Arizona. In Cascade Mountains, B.C. to California; ranges from subalpine to lowland elevations.**

Propagation Goal: **Plants**

Propagation Method: **Seed**

Product Type: **Container (plug)**

Stock Type: **7 or 10" cones**

Time To Grow: **5 Months**

Target Specifications: **Healthy crowns, root development with some branching (tap-root habit; roots not expected to form a solid "plug").**

Propagule Collection: **Seed pods hand-stripped just as they begin to turn brown (ripened seed pods shatter very quickly); placed into cloth seed sacks and held in a cool, shaded location until they can be spread out on benches in the poly house to dry. Ripened seed will have a duller, whitish appearance; seed collected too "green" tends to shrivel on drying. Pods**

**contain high levels of moisture initially and these collections need to be handled carefully to keep from overheating during transit. Seed pods were plentiful in most years except for 2 seasons that were exceptionally warm in early spring.**

**Propagule Processing: Pods should be spread in a thin layer to dry in an area with good air flow and turned frequently; on paper or cloth to catch seed as it shatters from the drying pods. Small lots can be threshed with a geared-down hammermill; larger lots in a stationary thresher. Threshed lots air-screened with #10 round screen, medium-high air flow. Clean seed averaged 38,000 / lb. Germination rates have been quite variable between years as well as lots; ranging from 18% germination plus 3% hard seed to 27% germination with 42% hard seed.**

**Pre-Planting Treatments: Scarification with a hot water (pour hot tap water over seed a few times and then allow seed to steep in water while it cools) or mechanical scarification in a seed tumbler seems to aid in germination. Even with such treatment, there will be varying levels of hard seed that remains impermeable.**

**Growing Area Preparation/**

**Annual Practices for Perennial Crops: Seeds sown singly into cone-tainers filled with Sunshine #1 soil-less potting mix amended with Micromax trace elements, covered with 1/8" soil and placed into greenhouse at moderate temperatures (75 F days / 55 to 60 F nights). Seed can be inoculated with *Rhizobium lupini* inoculant (Nitragin Corp., Wisconsin, US) at sowing time. Four inch deep peat pots have also been used for producing spring transplants if established seedlings can be outplanted within 3 or 4 months.**

**Establishment Phase: Germination will be scattered; some seedlings emerging up to 45 days after sowing. During this time, medium is kept moist but good air flow is also important to prevent mildew.**

**Length of Establishment Phase: 6 weeks**

**Active Growth Phase: Seedlings fertilized once or twice with Peters' 9-45-15 NPK starter fertilizer at half rate; seedlings need to be watched closely for powdery mildew. Mildew is mostly a problem if leaves are allowed to remain wet over night. Plants moved to an outdoor shade house (cloth providing 50% shade) in May on elevated benches to allow good drainage. By mid-**

**summer, cones may need to be spread out to every other cell in the racks to allow room for leaf / crown growth.**

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

**Hardening Phase: no fertilizer after July 1; irrigation intervals lengthened in August and shade cloth removed late August / September for full sun acclimation.**

**Length of Hardening Phase: 6 weeks**

**Harvesting, Storage and Shipping: Plants shipped via refrigerated van or in protected, cool boxes in their cones in August / early September to parks for further acclimation prior to outplanting.**

**Length of Storage: not recommended to overwinter in pots.**

**Outplanting performance on typical sites: Seedlings have initially transplanted well at Corvallis and at a test site at Mt Hood National Forest as 2-to 3-month-old seedlings in the 4" peat pots which provide for minimal root disturbance during transplanting. Irrigation was provided to the spring-transplants which produced excellent first-season survival. Conversely, cones have not proved to be an ideal container - the taproots do not adapt well to the cones and rootlets don't tend to fill out the cone and hold the soil plug together. To avoid more trauma to the roots, many of the cones were cut open with a sharp knife rather than pulling the root plugs from cones.**

**Other Comments: Seed increase trials have also been conducted at PMC (see separate protocol), and direct-reseeding at test plots at Crater Lake and Mt Rainier National Parks have shown that seedlings can establish well by fall-sowing into amended plots (addition of organic matter and straw erosion control blankets). Results of direct seeding also detailed in Lupine seed production protocol.**

**Cones do not store well over winter outdoors at Corvallis; but if needed should be held in a walk-in cooler or other controlled, cold location where they will be sheltered from heavy winter rains. Seed can be stored for several years; some germination will be retained due to presence of "hard seed" as is common for other legumes.**

**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.**

**Rose, Robin, C.E.C. Chachulski and D. Haase. Propagation of Pacific Northwest Native Plants 1998. Or. State Univ. Press, Corvallis, OR.**

**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 D.C.; Flessner, Theresa R. 2003. Propagation protocol for production of container *Lupinus latifolius* Lindl. ex J.G. Agardh plants (7 or 10" cones); USDA NRCS - Corvallis Plant Materials Center, Corvallis, Oregon. In: Native Plant Network. URL: <http://www.nativeplantnetwork.org> (accessed 6 January 2010). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.