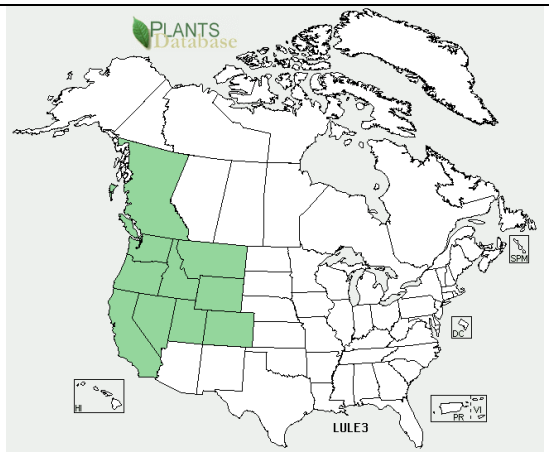
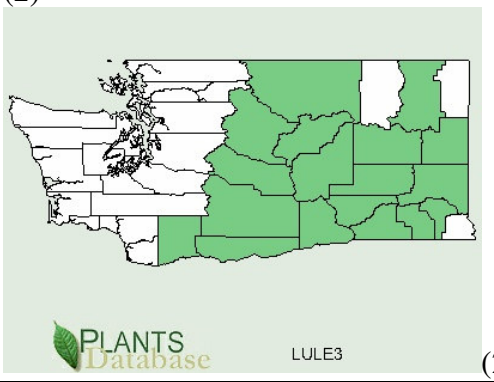
Plant Propagation Protocol for *Lupinus leucophyllus*
ESRM 412 – Native Plant Production
Spring 2008

Photos aquired from http://calphotos.berkeley.edu/cgi/img_query?query_src=photos_index&where-taxon=Lupinus+leucophyllus (4)

TAXONOMY	
Family Names	
Family Scientific Name:	Fabaceae (1)
Family Common Name:	Pea family (1)
Scientific Names	
Genus:	*Lupinus* (1)
Species:	*leucophyllus* (1)
Species Authority:	Dougl. ex Lindl. (1)
Variety:	
Sub-species:	
Cultivar:	
Authority for Variety/Sub-species:	
Common Synonym(s):	• *Lupinus canescens* Howell • *Lupinus cyaneus* Rydb. • *Lupinus erectus* L. F. Hend. • *Lupinus leucophyllus* var. *belliae* C. P. Sm. • *Lupinus leucophyllus* var. *canescens* (Howell) C. P. Sm. • *Lupinus leucophyllus* subsp. *erectus* (L. F. Hend.) Harmon • *Lupinus leucophyllus* subsp. *leucophyllus* (4)
Common	Velvet lupine, Wooly-leaf lupine (1)

Name(s):	
Species Code:	LULE3 (2)
GENERAL INFORMATION	
Geographical range:	 (2)  (2)
Ecological distribution:	In eastern Washington it is common in shrub-steppe, meadow-steppe, and open ponderosa pine forests. (1)
Climate and elevation range	No information found
Local habitat and abundance:	In eastern Washington it is common in shrub-steppe, meadow-steppe, and open ponderosa pine forests. (1)
Plant strategy type / successional stage	No information found
Plant characteristics:	Forb/herb (2)
PROPAGATION DETAILS	
Ecotype:	Paradise Creek drainage near Pullman, WA (1)
Propagation Goal:	Plant (1)
Propagation	Seed (1)

Method:	
Product Type:	Container (plug) (1)
Stock Type:	10 cu. in. (1)
Time to Grow:	4 Months (1)
Target Specifications:	Tight root plug in container. (1)
Propagule Collection:	Seeds are collected when the pods begin to split in July and August. Pods can be collected individually for maximum seed yield or the entire stalk may be cut. Cutting entire stalks results in collection of much immature seed. Ripening is indeterminant and the pods shatter readily when ripe. Seed collection must be done frequently. Use of Spodnam, an abscission layer inhibitor, did not appreciably reduce shattering. Seed is stored in paper bags or envelopes at room temperature until cleaned. There is a wide variation in size, shape, and color of the seed. (1)
Propagule Processing/Propagule Characteristics	Small amounts are crushed by hand to free the seed, then cleaned with an air column separator. Larger amounts can be cleaned with air screen equipment. 70-80% of the seed will shatter free of the pods, and 20-30% can be recovered by hammermilling before cleaning. Use of a hammermill on the shattered portion increases seed damage and is not necessary. Clean seed is stored in controlled conditions at 40 degrees Fahrenheit and 40% relative humidity. (1)
Pre-Planting Propagule Treatments:	The seed coat restricts water uptake and germination is increased by scarification. The seed is brittle and easily damaged by mechanical scarifiers. Even short times in a mechanical scarifier resulted in 77% of the seed being broken or the seed coat entirely removed. Filling the scarifier to capacity may reduce damage. Rubbing the seed by hand between two pieces of sandpaper is effective but it is difficult to control the amount of scarification. Hot water scarification is the most effective method. Water is boiled, then removed from the heat source and seed immediately placed in the hot water. It is allowed to cool for several hours, then planted. Results of trials at the Pullman Plant Materials Center showed 77% emergence by this method, compared to 45% emergence from unscarified seed and 45% emergence from seed stratified for 30 days outdoors during the winter. (1)
Growing Area Preparation / Annual Practices for Perennial Crops:	Seed should be inoculated with the proper Rhizobium species prior to planting. In January scarified 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 prevent seeds from floating during watering. Conetainers are watered deeply. (1)
Establishment Phase	Medium is kept moist until emergence occurs. Emergence usually begins in 5-6 days and continues over a period of 3-4 weeks. (1)
Length of Establishment Phase:	4 weeks (1)

Active Growth Phase:	Plants are watered deeply every other day and fertilized once per week with a complete, water soluble fertilizer containing micro-nutrients. (1)
Length of Active Growth Phase:	2.5-3 months (1)
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. (1)
Length of Hardening Phase:	2-4 weeks (1)
Harvesting, Storage and Shipping:	No information found
Length of Storage:	No information found
Guidelines for 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 averages 95%. Transplanting into sites with existing vegetation reduces survival and vigor depending on weather conditions following planting. (1)
Other Comments:	Flowering and some seed production will occur the year of transplanting and abundant seed is produced the year following transplanting. The plants are short-lived but vigorously reseed themselves. Seed is subject to insect predation and rodents will burrow into and eat the crowns, killing the plants. Lupines contain poisonous alkaloids in varying amounts depending on species, plant part, maturity, and possibly ecotype. Seeds and fruits have the highest concentrations. *L. leucophyllus* is one of the more toxic species. (1)
INFORMATION SOURCES	
References (full citations):	1. Skinner, David M. 2007. Propagation protocol for production of container *Lupinus leucophyllus* Dougl. ex Lindl. plants (10 cu. in.); USDA NRCS - Pullman Plant Materials Center, Pullman, Washington. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 20 May 2008). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery. 2. http://plants.usda.gov/java/county?state_name=Washington&statefips=53&symbol=LULE3 3. http://calphotos.berkeley.edu/cgi/img_query?query_src=photos_index&where-taxon=Lupinus+leucophyllus 4. http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?22833
Other Sources Consulted (but that contained no pertinent	5. Hartmann and Kester., Plant Propagation principles and practices. Courier Westford 2002. 6. Toogood, Alan. **American Horticultural Society, Plant Propagation.** DK publishing 1999, New York

information) (full citations):	7. Phillips, Harry R. **Growing and Propagating Wild Flowers.** The University of North Carolina Press 1985. 8. Arbbury, Jim. Bird, Richard. Honours, Mike. Salmon, Mike. **The Complete Book of Plant Propagation.** Reed International Books Limited 1997. 9. Browse, Philip M. **Plant Propagation: seeds, roots, bulbs and corms, layerings, stem cuttings, leaf cuttings budding and grafting.** Mitchell Beazley Publishers Limited 1979. 10. Adriance and Brison. **Propagation of Horticulture Plants.** McGraw-Hill Book Company New York 1939.
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Date Protocol Created:	05/22/08