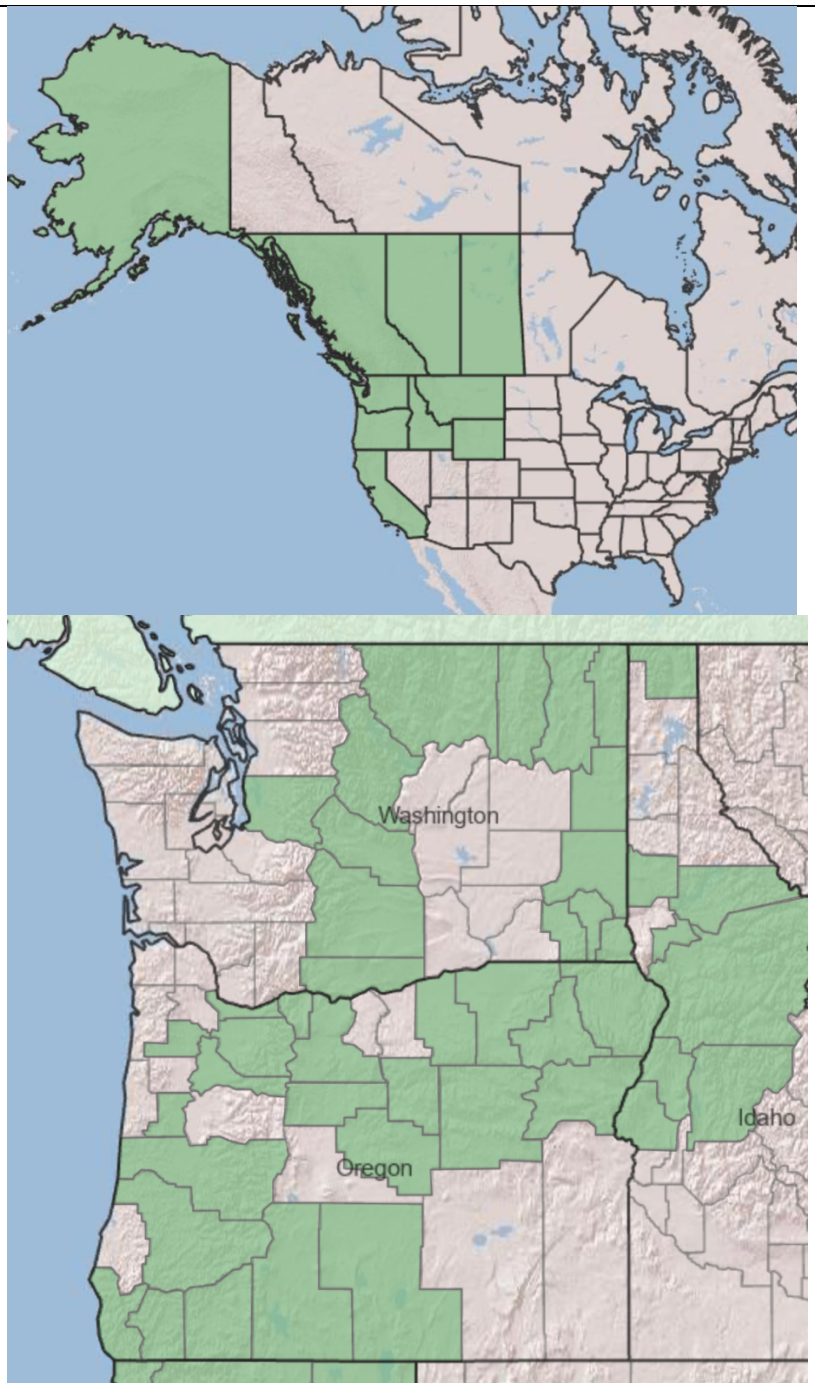
Plant Propagation Protocol for *Cypripedium montanum*
ESRM 412 – Native Plant Production
URL: https://courses.washington.edu/esrm412/protocols/2024/CYMO2.*pdf*

Photos by Bud Kovalchik, WTU Herbarium

TAXONOMY	
Plant Family	
Scientific Name	Orchidaceae
Common Name	Orchid
Species Scientific Name	
Scientific Name	*Cypripedium montanum* Douglas ex Lindl.
Varieties	None listed
Sub-species	None listed
Cultivar	None listed
Common Synonym(s)	Cypripedium occidentale
Common Name(s)	Mountain lady's-slipper, large lady's slipper, white lady's slipper, moccasin flower
Species Code (as per USDA Plants database)	CYMO2
GENERAL INFORMATION	

Geographical range	 Photos courtesy of USDA Plant Database(USDA, 2024).
Ecological distribution	Dry coniferous and deciduous forests, openings, subalpine meadows, thickets, around shrubs on open slopes(Holmes, n.d.).
Climate and elevation range	1600-6900 feet (Holmes, n.d.)
Local habitat and abundance	Douglas-fir, various species of *Abies*, western larch, lodgepole and Ponderosa pine, quaking aspen and oak (Holmes, n.d.)

Plant strategy type / successional stage	Perennial Forb/herb (USDA), old growth & mycorrhizal dependency (Shefferson, 2007).
Plant characteristics	Long-lived perennial orchid (Fulkerson et al., 2015). Long and narrow petals that are spirally twisted. It has brown to purple sepals and petals(North American Orchid Conservation Center, n.d.).
PROPAGATION DETAILS	
Ecotype	Not applicable.
Propagation Goal	Plant
Propagation Method	Seed
Product Type	Direct sowing (Huber, 2002).
Stock Type	3.3 ft^2 plots (Huber, 2002).
Time to Grow	1.5 years (Huber, 2002).
Target Specifications	Not applicable.
Propagule Collection Instructions	Cypripedium seeds are small and light, so are easily blown in the wind. Capsules typically contain thousands of seeds. Huber (2002) air-dried seeds after harvesting. Excise seeds "between 42 and 60 days after pollination, then decreases until 85-100 days after polonization" (Rasmussen, 1995).
Propagule Processing/Propagule Characteristics	0.003 g/1000 seeds (SID, 2024).
Pre-Planting Propagule Treatments	Huber (2002) recommends mixing mountain lady's-slipper seeds with soil from a site with mature plants in order to ensure appropriate mycorrhizae inoculation. Huber did 0.5 l of soil per meter squared.
Growing Area Preparation / Annual Practices for Perennial Crops	Any transplants should be shallow with roots spread out, as deep planting is fatal (Preece, 1937). Provide about 60% shade with few competitors. Plant in vicinity of adult to accommodate mycorrhizal demand or mixed with soil from area populated with adults (Huber, 2002).
Establishment Phase Details	No information found.
Length of Establishment Phase	1.5 years, but potentially longer (Huber, 2002).
Active Growth Phase	Huber reports that a parasitic relationship with an underground fungus is formed after germination. Seedlings were initially weak.
Length of Active Growth Phase	No information found.
Hardening Phase	No information found.
Length of Hardening Phase	No information found.
Harvesting, Storage and Shipping	No information found.

Length of Storage	Huber sows seeds no more than 3 months after collection.
Guidelines for Outplanting / Performance on Typical Sites	Thrives best in areas with enough trees to shade roughly 60% of the ground area, with little competing vegetation and a thick layer of decomposing forest litter. Small forest openings were recommended by Huber for appropriate sunlight and soil moisture. Flowering takes at least 4 years after above-ground growth (Huber, 2002).
Other Comments	
PROPAGATION DETAILS	
Ecotype	N/a
Propagation Goal	Plants
Propagation Method	Vegetative
Product Type	Propagules
Stock Type	N/a
Time to Grow	1.5 years
Target Specifications	Ensure that rhizome is at least 3 years old (Rasmussen, 1995).
Propagule Collection Instructions	Score rhizome during growing season to promote growth, then section after growing season (Rasmussen, 1995). Alternately, tease rhizomes apart. Rhizomes should be processed at the end of the growing season in late summer when foliage has died (Preece, 1937).
Propagule Processing/Propagule Characteristics	No information found.
Pre-Planting Propagule Treatments	Division is easiest if the roots are washed off. Tease them apart and each growth-bud will have its own root-system (Preece, 1937).
Growing Area Preparation / Annual Practices for Perennial Crops	Plant in fairly moist, lime-free soil enriched with humus and partially shaded. Plant in a shallow, flat hole and spread the roots out flat (Preece, 1937).
Establishment Phase Details	Should be left “severely alone”, according to Preece (1937). All that’s required is a top-dressing of leaf litter in autumn.
Length of Establishment Phase	No information found.
Active Growth Phase	Make sure plant isn’t getting direct sun in the heat of day to avoid leaf desiccation (Preece, 1937).
Length of Active Growth Phase	No information found.
Hardening Phase	No information found.
Length of Hardening Phase	No information found.
Harvesting, Storage and Shipping	No information found.
Length of Storage	No information found.
Guidelines for Outplanting /	No information found.

Performance on Typical Sites	
Other Comments	
INFORMATION SOURCES	
References	"Cypripedium Montanum (Mountain Lady's Slipper): Go Orchids." *Goorchids.northamericanorchidcenter.org*, 2024, goorchids.northamericanorchidcenter.org/species/cypripedium/montanum/. Holmes, Russell. "Mountain Lady's Slipper." Www.fs.usda.gov, United States Department of Agriculture, www/fs.esda.gov/wildflowers/plant-of-the-week/cypripedium montanum.shtml#:~:text=Elevation%20ranges%20from%20a pproximately%20500. Accessed 22 May 2024. Huber, Andrew G. 2002 Mountain lady's slipper (*Cypripedium montanum*): Establishment from Seeds in Forest Openings. Native Plants Journal 3 (2) 151 Andrew G. Huber / 151 Preece, W. H. A. 2007. North American Rock Plants. Read Books. Rasmussen, HN. 1995. Terrestrial orchids. From Seed to Mycotrophic Plant. Cambridge University Press. "Seed Information Database." Ser-Sid.org, 2024, ser-sid.org/species/df699f77-c8a4-43f3-8980-b28bde9699bc. Accessed 22 May 2024. Shefferson, Richard P., Weib, M. Kull, T. Taylor, D. 2005 High specificity generally characterizes mycorrhizal association in rare lady's slipper orchids, genus *Cypripedium* Molecular Ecology 14 (2) , 613–626 USDA NRCS National Plant Data Team. "USDA Plants Database." Plants.sc.egov.usda.gov, 2024, plants.sc.egov.usda.gov/home/plantProfile?symbol=CYMO2. Accessed 22 May 2024. [WTU Herbarium]. 2024 Apr 15. WTU Herbarium home <http://biology.burke.washington.edu/herbarium/imagecollection.php >. Accessed 2024 May.
Other Sources Consulted	Doherty, J.W. 1997. The Genus Cypripedium: a botanical and horticultural overview. North American Native Orchid Journal March 5-116. Oliva, Allison P. Arditti, J. A. 1984. Seed Germination of North American Orchids. II. Native California and Related Species of Aplectrum,

	Cypripedium, and SpiranthesSeed Germination of North American Orchids. II. Native California and Related Species of Aplectrum, Cypripedium, and Spiranthes. Botanical Gazette, Vol. 145, No. 4 (Dec., 1984), pp. 495-501
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