Plant Propagation Protocol for *Spiranthes romanzoffiana*
ESRM 412 – Native Plant Production

A. 

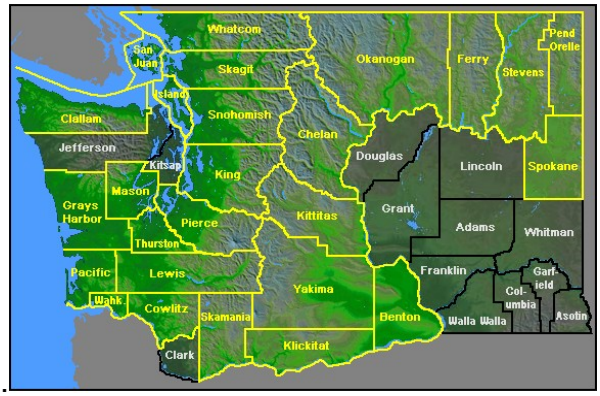
B. 

FIGURE A. North America Distribution (USDA PLANTS database) **FIGURE B**. Washington State Distribution (University of Washington Burke)

TAXONOMY	
Family Names	
Family Scientific Name:	Orchidaceae
Family Common Name:	Orchid
Scientific Names	
Genus:	*Spiranthes*
Species:	*romanzoffiana*
Species Authority:	Cham.
Variety:	*Spiranthes romanzoffiana* Cham. var. *romanzoffiana*
Sub-species:	
Cultivar:	
Authority for Variety/Sub-species:	Cham.
Common Synonym(s) including variety or subspecies information)	*Gyrostachys stricta* Rydberg (Giblins & Knoke 2011) *Ibidium strictum* (Rydb.) House *Spiranthes stricta* Rydb.
Common	Hooded lady's tresses (USDA PLANTS database)

Name(s):	Ladies' tresses (Pojar and MacKinnon 1994) Pearltwist (Burbridge, 1989)
Species Code:	SPRO
GENERAL INFORMATION	
Geographical range (distribution maps for North America and Washington state)	Alaska and Canada to California (Clark, 1973)
Ecological distribution (ecosystems it occurs in, etc):	Riparian systems, beaches, lakeshores, wetlands, dry to moist woodlands and meadows (Clark, 1973 & Pojar & MacKinnon, 1994) Most occurs south of 55˚N (Pojar & MacKinnon, 1994)
Climate and elevation range	**Climate**: Warmer winters, cooler summers and year round rainfall (Pojar & MacKinnon, 1994) **Elevation range**: Low to medium elevations (Lyons, 1997 & Pojar and MacKinnon, 1994)
Local habitat and abundance; may include commonly associated species	- Open moist meadows, bogs, open wooded areas, dry woods, sandy and gravelly beaches and streamsides (Burbridge, 1989 & Clark, 1973) - Rare species (Duffy & Stout, 2008) - Commonly associated species include: *Spiranthes cernua* (Piper, 1906)
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	Seral (Piper, 1906)

Plant characteristics (life form (shrub, grass, forb), longevity, key characteristics, etc)	**Life form**: Forb **Duration**: Perennial **Longevity**: **Blooming period**: Late bloomer August-September (Clark, 1973) **Leaves**: Basal, narrow, lance-shaped leaves (7.2-20 cm) 1-2 leaf-like bracts can form on stem. (Burbridge, 1989) **Flowers**: Each creamy-white to greenish-white flower is situated above a bract and has converging sepal and petals that form a hood and a lip curved downwards pointed tip. 1-4 rows of flowers compactly spiral into a spear-like shape at the ends of stems. (Burbridge, 1989; Pojar & MacKinnon, 1994) Flowers have a distinct vanilla-like fragrance. (Jennings, 2006) **Stems**: Round, green, and smooth (Burbridge, 1989) **Height**: 10-46 cm (Burbridge, 1989)
1. PROPAGATION DETAILS	
Ecotype:	
Propagation Goal:	Plants
Propagation Method:	Vegetative
Product Type	Container
Stock Type:	
Time to Grow:	
Target Specifications:	
Propagule Collection:	Sprouts from roots collected from mother plant
Propagule Processing/Propagule Characteristics (including seed density (# per pound), seed longevity, etc):	
Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):	
Growing Area	Standard peat-bark-perlite growing mix in 6-inch container

Preparation / Annual Practices for Perennial Crops:	
Establishment Phase:	- Separate sprouts from mother plant in early summer and replant. (Cullina, 2000) - Crown divisions also can be done and replanted (Cullina, 2000)
Length of Establishment Phase:	
Active Growth:	
Length of Active Growth Phase:	
Hardening Phase:	
Length of Hardening Phase:	
Harvesting, Storage and Shipping:	
Length of Storage (of seedlings, between nursery and outplanting):	
Guidelines for Outplanting / Performance on Typical Sites (eg, percent survival, height or diameter growth, elapsed time before flowering):	
Other	Planting near mother plant may increase propagation success, due to the fungal

Comments (including collection restrictions or guidelines, if available):	association
2. PROPAGATION DETAILS	
Ecotype:	
Propagation Goal:	Plants
Propagation Method:	Seed
Product Type:	Container
Stock Type:	
Time to Grow:	~90 days
Target Specifications:	Germinants
Propagule Collection:	Collected in late fall when the fruit become dry, many seeded capsules (Cullina, 2000 & Pojar &MacKinnon 1994)
Propagule Processing/Propagule Characteristics:	
Pre-Planting Propagule Treatments:	- Pollination treatment done for fruit-bearing (Duffy & Stout, 2008) - Seeds extracted from fruit capsules (Duffy & Stout, 2008) - Cold-moist stratification of seeds at 40˚C for 90 days then shift to 70˚C with light initiation (Cullina, 2000)
Growing Area Preparation / Annual Practices for Perennial Crops:	Filter paper strips soaked in water in 9-cm petri dishes (Stewart & Kane, 2007) Standard peat-bark-perlite growing mix (Cullina, 2000)
Establishment Phase:	Fungal action needed for germination. (Cullina, 2000) 1. Plant adjacent to mother plant 2. Fungal microbiont inoculation treatment: Sterilize seeds in 9-cm petri dish with 25 mL of 5.8 pH OMA for 40 minutes at 117.7kPa and 121˚C. Inoculate seeds transferred to filter paper strips with fungal mycobiont Sbrev-266. Incubate in the dark for several weeks until germinants arise (Stewart & Kane, 2007)

Length of Establishment Phase:	
Active Growth Phase:	
Length of Active Growth Phase:	
Hardening Phase (from end of active growth phase to end of growing season; primarily related to the development of cold-hardiness and preparation for winter):	
Length of Hardening Phase:	
Harvesting, Storage and Shipping (of seedlings):	
Length of Storage (of seedlings, between nursery and outplanting):	
Guidelines for Outplanting / Performance on Typical Sites (eg, percent survival, height or	

diameter growth, elapsed time before flowering):	
Other Comments (including collection restrictions or guidelines, if available):	
INFORMATION SOURCES	
References (full citations):	Burbridge, J. (1989). Wildflowers of the Southern Interior of British Columbia. Manitoba, Canada: Frisen Printers. Clark, L.J. (1973). *Wildflowers of British Columbia*. Vancouver, B.C.: Evergreen Press Limited. Cullina, W. (2000). *The New England wild flower society guide to growing and propagating wildflowers of the United States and Canada*. New York, NY: Houghton Mifflin Harcourt. Giblins, D. & Knoke, D. (2011). *Spiranthes romanzoffiana*. Retrieved from Burke Museum of Nature History and Culture. < http://biology.burke.washington.edu/herbarium/imagecollection.php?Genus=Spiranthes&Species=romanzoffiana> Jennings, N.L. (2006). *Uncommon Beauty: wildflowers and flowering shrubs of southern Alberta and southeastern British Columbia*. Surrey, BC: Rocky Mountain Books. Lyons, C.P. (1997). *Wildflowers of Washington*. Renton, WA: Lone Pine Publishing. Piper, C. (1906). *Flora of the state of Washington*. Washington D.C.: Government Printing Office. Pojar, J. & MacKinnon, A. (1994). *Plants of the Pacific Northwest coast: Washington, Oregon, British Columbia, and Alaska*. Vancouver, BC: B.C. Ministry of Forests and Lone Pine Publishing. Stewart S., & Kane, M. (2007). Symbiotic seed germination and evidence for *in vitro* mycobiont specificity in *Spiranthes brevilabris* (Orchidaceae) and its

	implications for species-level conservation. *In Vitro Cellular and Developmental Biology - Plant*, 43(3), 178-186. Duffy, K. & Stout J. (2008). The effects of plant density and nectar reward on bee visitation to the endangered orchid *Spiranthes romanzoffiana*. *Acta oecologica*. 34: 131–138.
Other Sources Consulted (but that contained no pertinent information) (full citations):	Kruckeberg, A.R. (1996). *Gardening with native Plants of the pacific northwest*; *second edition.* Seattle, WA: University of Washington Press. Nau, J. (1996). *Ball perennial manual: Propagation and production*. Batavia, IL: Ball Publishing. Rose, R., Chachulski, C.E.C. & Hasse, D.L. (1998). *Propagation of Pacific Northwest native plants*. Corvalis, OR: Oregon State University Press.
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