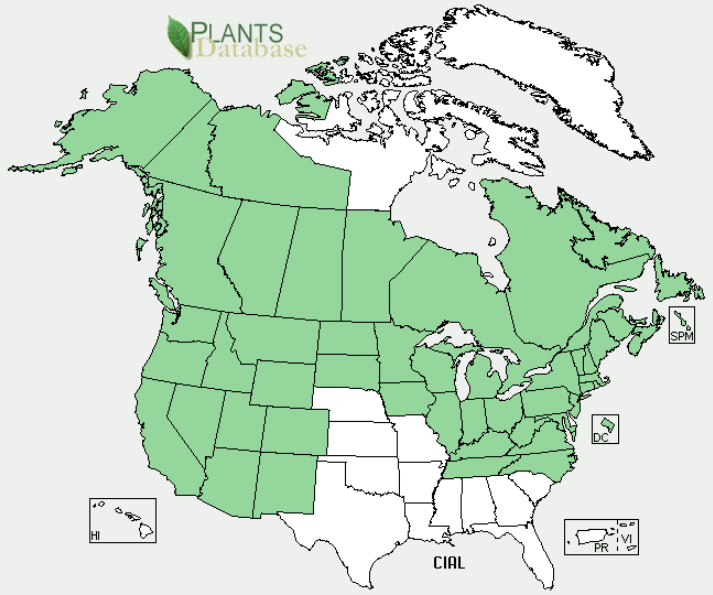
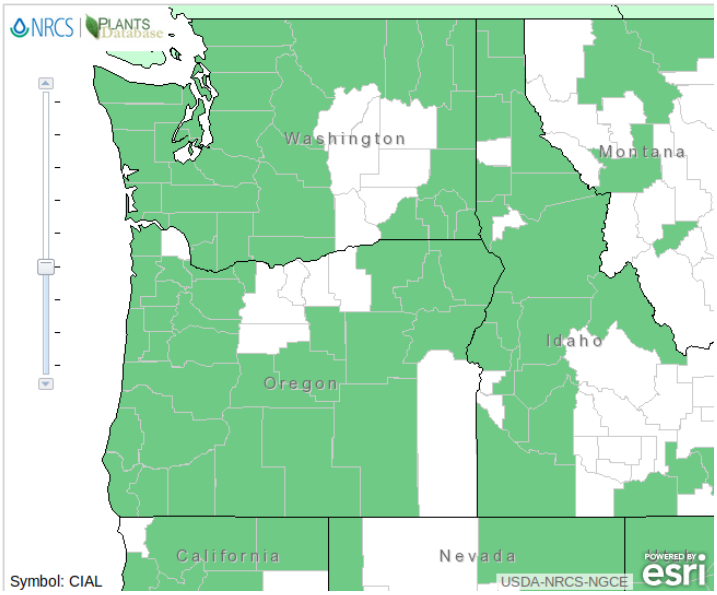
Plant Propagation Protocol for Enchanter's nightshade *(Circaea alpina)*
ESRM 412 – Native Plant Production
Protocol URL: https://courses.washington.edu/esrm412/protocols/CIAL.pdf

(Photo by Thomas Stonehocker, 2019)

TAXONOMY	
Plant Family	
Scientific Name	Onagraceae
Common Name	Evening primrose, willowherb
Species Scientific Name	
Scientific Name	*Circaea alpina* Linnæus
Varieties	No entry
Sub-species	In the Pacific Northwest: *C. alpina ssp. alpina* P.H. Raven C. alpina ssp. pacifica P.H. Raven Globally: *C. alpina caulescens* Peng *C. alpina ssp. imaicola* Jun Wen

	C. alpina ssp. micrantha Jun Wen
Cultivar	No entry
Common Synonym(s)	No entry
Common Name	Small enchanter's nightshade
Species Code (as per USDA Plants database)	CIAL
GENERAL INFORMATION	
Geographical range	Circumboreal distribution, found throughout temperate areas of the northern hemisphere (Xie 2009, Boufford 1982).  In Pacific Northwest:  (USDA 2019)

Ecological distribution	Coniferous and hardwood forests (Pojar 2004, Xie 2009).
Climate and elevation range	Sea level to montane mesophytic forests. Absent from alpine areas, though restricted to higher elevations in the southern part of its range (Pojar 2004, Boufford 1982).
Local habitat and abundance	Locally common in cool, damp forests, in floodplains, near streams (Pojar 2004).
Plant strategy type / successional stage	Mid to late-successional (based on Pojar 2004, Xie 2009).
Plant characteristics	Perennial herb with opposite and often toothed heart- to egg-shaped leaves (2-6 cm long). Small white flowers with two petals, in clusters of 8-12 on a long stalk. 10-50 cm tall growing from rhizomes with tubers (Pojar 2004).
PROPAGATION DETAILS	
Ecotype	Seeds collected by Allamong (1973) were from the central Appalachian mountains near Morgantown, West Virginia at an elevation of about 2000 feet.
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Containers
Stock Type	Not specified
Time to Grow	7 to 10 months (based on Allamong 1973).
Target Specifications	Mature leaves and formation of tubers.
Propagule Collection Instructions	Seeds in experimental trials were collected in August and September, but can be collected after ripening in mid- to late-summer (Allamong 1973).
Propagule Processing/Propagule Characteristics	Seeds can be stored for one or more years. Stored seeds were found to be more viable than seeds collected the same season (Allamong 1973).
Pre-Planting Propagule Treatments	Seeds exhibit physiological dormancy (Baskin and Baskin 1998, Graae 2009) requiring a period of “after-ripening” of at least two months (Allamong 1973).
Growing Area Preparation / Annual Practices for Perennial Crops	Germination trials found successful germination on soil, vermiculite, and moist filter paper in petri dishes (Allamong 1973).
Establishment Phase Details	Cold stratification for 71 to 112 days (Baskin and Baskin 1998). Soaking seeds with growth-promoting plant hormones including kinetin, gibberellic acid, and ethrel for 24 hours all showed minimal increases in germination (Allamong 1973). Seeds can be sown in greenhouse settings in late fall, but the need for “after-

	ripening" combined with low winter temperatures throughout its natural range typically prevent germination until spring (Allamong 1973).
Length of Establishment Phase	Germination at greenhouse temperatures between 4 to 17 °C (Baskin and Baskin 1998, Allamong 1973, McVicar 2008).
Active Growth Phase	Seeds germinated in October become healthy plants by April (Allamong 1973).
Length of Active Growth Phase	6+ months (Allamong 1973).
Hardening Phase	Enters dormancy when shoots detach from rhizomes in late fall. Freezing temperatures are required to stimulate next season's growth (Hertig 1964, Allamong 1973).
Length of Hardening Phase	No entry
Harvesting, Storage and Shipping	One source alluded to transplanting of rhizomes during dormancy, however a search of the literature revealed no further information on vegetative propagation (Allamong 1973).
Length of Storage	6+ months (based on Allamong 1973).
Guidelines for Outplanting / Performance on Typical Sites	Flowers poorly or may not flower at all in stressful conditions (Koop 2000).
Other Comments	Can hybridize with *Circaea lutetiana*, though offspring are usually not fertile (Xie, et al. 2009).
INFORMATION SOURCES	
References	Allamong, J.K. (1973). *An histological and histochemical study of dormancy and germination in shoot tips and seeds of Circaea alpina L. and Circaea quadrisulcata Maxim* (Doctoral dissertation). West Virginia University, Morgantown, West Virginia. Baskin, C.C. and Baskin, J.M. (1998). *Seeds: Ecology, Biogeography, and Evolution of Dormancy, and Germination*. San Diego, CA: Academic Press. Graae, Verheyen, Kolb, Van Der Veken, Heinken, et. al. (2009). Germination Requirements and Seed Mass of Slow- and Fast-Colonizing Temperate Forest Herbs Along a Latitudinal Gradient. *Ecoscience*, 16(2) : 248-257. Boufford, David E. (1982). The Systematics and Evolution of *Circaea* (Onagraceae). *Annals of the Missouri Botanical Garden*, Vol. 69, No. 4, Studies in Onagraceae (1982), pp. 804-994. Koop, H.G.J.M. (2000). Circaea alpina L.

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Other Sources Consulted	Wilkinson, K.M., T.D. Landis, D.L. Haase, B.F. Daley, and R.K. Dumroese. (2014) Tropical nursery manual: a guide to starting and operating a nursery for native and traditional plants. Agriculture Handbook 732. USDA Forest Service, Washington, DC. 376 p.
Protocol Author	Thomas Stonehocker
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