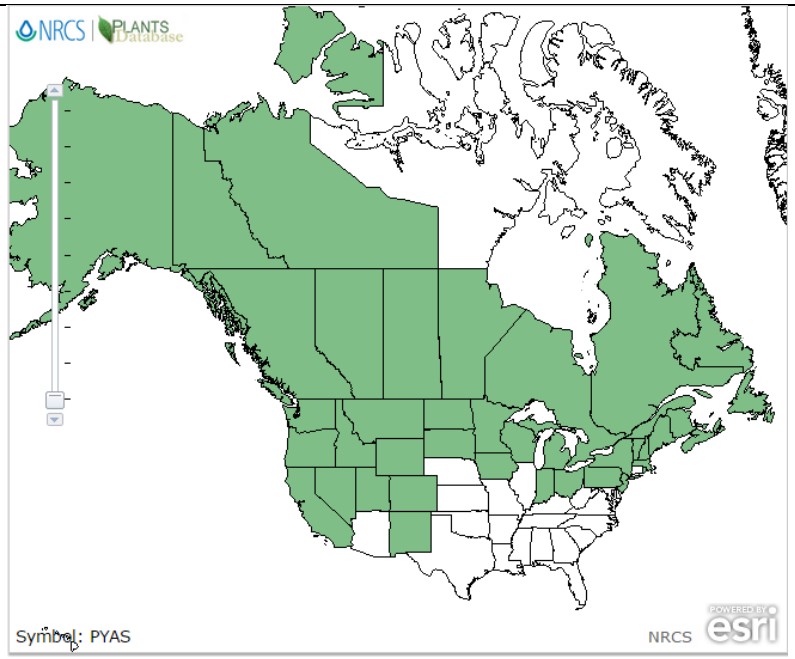
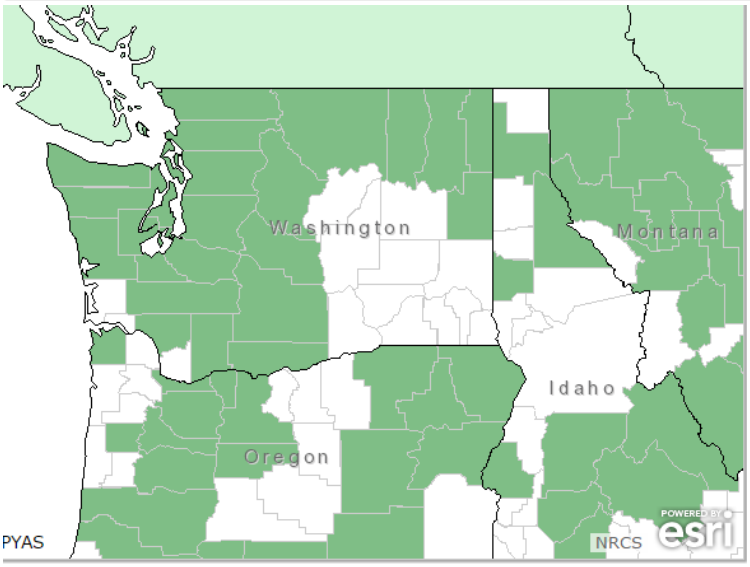
Plant Propagation Protocol for *Pyrola asarifolia* Michx.

ESRM 412 – Native Plant Production

Protocol URL: https://courses.washington.edu/esrm412/protocols/*PYAS.pdf*

Photo credit: Terry Glase 2013.

TAXONOMY	
Plant Family	
Scientific Name	Ericaceae (1) Pyrolaceae (2)
Common Name	Heath Family (1) Wintergreen Family (2)
Species Scientific Name	
Scientific Name	*Pyrola asarifolia* Michx. (1)
Varieties	
Sub-species	Pyrola asarifolia ssp. *asarifolia* Michx. Pyrola asarifolia ssp. *bracteata* (Hook.) Haber (1)
Cultivar	
Common Synonym(s)	*Pyrola asarifolia* var. *bracteata* (Hook.) Jepson *Pyrola asarifolia* subsp. *bracteata* *Pyrola asarifolia* var. *incarnata* (DC.) Fern. *Pyrola asarifolia* subsp. *asarifolia* *Pyrola asarifolia* var. *purpurea* (Bunge) Fern. *Pyrola asarifolia* subsp. *asarifolia* *Pyrola bracteata* Hook. *Pyrola asarifolia* subsp. *asarifolia* *Pyrola californica* Krisa *Pyrola asarifolia* subsp. *asarifolia* *Pyrola rotundifolia* subsp. *asarifolia* (Michx.) A&D Löve *Pyrola asarifolia* subsp. *asarifolia* *Pyrola uliginosa* Torr. & Gray ex Torr. *Pyrola asarifolia* subsp. *asarifolia* (3)
Common Name(s)	Liverleaf wintergreen, bog wintergreen, pink wintergreen, pink shinleaf, alpine wintergreen (3)

Species Code (as per USDA Plants database)	PYAS (2)
GENERAL INFORMATION	
Geographical range	 
Ecological distribution	Coniferous forests, woodlands, meadows, fens, bogs and swamps (4)
Climate and elevation range	Pink wintergreen is found in cool moist climates such as boreal, temperate and cool mesothermal climates (3). In Rainier National Park it is found at mid-elevations of 2,000 to 4,000 ft (5). Herbarium specimens from the Burke Museum record *P. asarifolia* were collected from as low as 100 ft and to as high as 8500 ft (6).

Local habitat and abundance	*P. asarifolia* is a common woodland flower on the slopes of the Cascade and Olympic Mountain ranges (7). *P. asarifolia* grows along streams, and in woodland meadows. It is commonly found growing with *Carex* spp., *Achlys triphylla* and growing under a canopy of *Tsuga heterophylla* and *Picea engelmannii* (6).
Plant strategy type / successional stage	Pink wintergreen is classified as a facultative wetland species for Washington state (2).
Plant characteristics	*P. asarifolia* is an herb distinguished by its racemes of bright pink flowers from June to September. It has thick, round and glossy leaves which form a basal rosette (7). The fruits of pink wintergreen are 5-chambered capsules that contain many seeds. Seeds of pink wintergreen are dust like and similar to many orchid species, in that they require a fungal symbiont in order to germinate (8). Natural regeneration by rhizomes is common (3).
PROPAGATION DETAILS (Seeds)	
Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container
Stock Type	Unknown
Time to Grow	Unknown
Target Specifications	Unknown
Propagule Collection Instructions	Collect whole fruit capsules which contain the dust seeds. Timing is unknown and likely to differ by elevation. It is recommended to collect native soil from an established plant along with the seeds in order to supply the necessary fungi for germination (9).
Propagule Processing/Propagule Characteristics	Unknown
Pre-Planting Propagule Treatments	Unknown
Growing Area Preparation / Annual Practices for Perennial Crops	Most aspects of the propagation of *P. asarifolia* are unknown. Some sources recommend using native soil or peat moss to propagate the seeds (9) (7).
Establishment Phase Details	Unknown

Length of Establishment Phase	Unknown
Active Growth Phase	Unknown
Length of Active Growth Phase	Unknown
Hardening Phase	Unknown
Length of Hardening Phase	Unknown
Harvesting, Storage and Shipping	Unknown
Length of Storage	Unknown
Guidelines for Outplanting / Performance on Typical Sites	Unknown
Other Comments	Additional research on the mycoheterotrophic nature of the germination of *P. asarifolia* is necessary to create a more thorough propagation protocol.
PROPAGATION DETAILS (Crown Division)	
Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Crown Division
Product Type	Container
Stock Type	Unknown
Time to Grow	Unknown
Target Specifications	Unknown
Propagule Collection Instructions	P. asarifolia has shallow rhizomes (3). Asexual propagation by division is possible but as of 2015 the procedure has not been described in detail in any sources (10) (11).
Propagule Processing/Propagule Characteristics	Unknown
Pre-Planting Propagule Treatments	Unknown
Growing Area Preparation /	Unknown

Annual Practices for Perennial Crops	
Establishment Phase Details	Unknown
Length of Establishment Phase	Unknown
Active Growth Phase	Unknown
Length of Active Growth Phase	Unknown
Hardening Phase	Unknown
Length of Hardening Phase	Unknown
Harvesting, Storage and Shipping	Unknown
Length of Storage	Unknown
Guidelines for Outplanting / Performance on Typical Sites	Unknown
Other Comments	
INFORMATION SOURCES	
References	1. **Taxonomy, ITIS.** Integrated Taxonomic Information System. [Online] May 15, 2015. http://www.itis.gov/servlet/SingleRpt/SingleRpt. Search terms: *Pyrola asarifolia* 2. **NRCS, USDA.** *Pyrola asarifolia* Michx. liverleaf wintergreen. *Plants Database.* [Online] May 15, 2015. http://plants.usda.gov/core/profile?symbol=PYAS. 3. **Gucker, Corey L.** *Pyrola asarifolia*. *Fire Effects Information System.* [Online] 2007. http://www.fs.fed.us/database/feis/. 4. **Hickman, James C.** *The Jepson manual: Higher plants of California.* Berkley, California : University of California Press, 1993. p. 1400. 5. *The plants of Mount Rainier National Park, Washington.* **St. John, Harold, Fred, Warren.** 16, 1937, The American Midland Naturalist, Vol. 18, pp. 952-985. 6. **Museum, Burke.** Herbarium Database. *Burke Museum.* [Online] May 19, 2015. http://biology.burkemuseum.org/herbarium/collections/ Search terms: *Pyrola asarifolia*

	7. **Staff, TWC.** *Pyrola asarifolia*. *Lady Bird Johnshon Wildflower Center.* [Online] July 26, 2014. http://www.wildflower.org/plants/result.php?id_plant=PYAS. 8. *Mycoheterotrophic germination of Pyrola asariolia dust seeds reveals convergences with germination in orchids.* **Hasimoto, Yasushi, et al.** 3, 2012, New Phytologist, Vol. 195, pp. 620-630. 9. **Pyrola asarifolia- Michx.** *Plants for a Future.* [Online] May 19, 2015. http://www.pfaf.org/user/Plant.aspx?LatinName=Pyrola+asarifolia. 10. **Lackschewitz, Klaus.** 1991. Vascular plants of west-central Montana--identification guidebook. Gen. Tech. Rep. INT-227. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 648 p. 13798 11. **Charles Cox.** 1849. *Annals of Horticulture*. Strand. London, England
Other Sources Consulted	1. **Dan Moerman.** *Pyrola asarifolia*. *Native American Ethnobotany, University of Michigan.* [Online] May 19, 2015. http://herb.umd.umich.edu/herb/search.pl?searchstring=Pyrola+asarifolia
Protocol Author	Anna Carragee
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