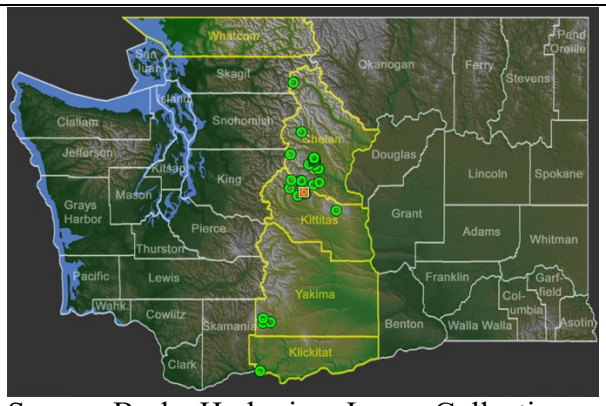
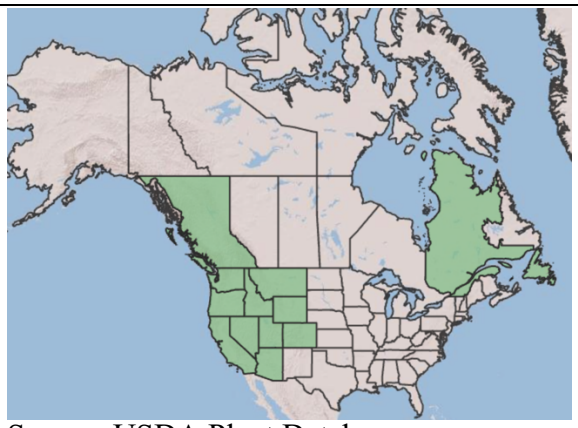
Plant Propagation Protocol for *Polystichum scopulinum*
ESRM 412 – Native Plant Production
URL: https://courses.washington.edu/esrm412/protocols/*2024/POSC5.pdf*

TAXONOMY	
Plant Family	
Scientific Name	Dryopteridaceae
Common Name	Wood fern family
Species Scientific Name	
Scientific Name	*Polystichum scopulinum* Maxon
Varieties	N/A
Sub-species	N/A
Cultivar	N/A
Common Synonym(s)	*Polystichum mohrioides* (Bory) C. Presl var. *scopulinum* (D.C. Eaton) Fernald
Common Name(s)	Mountain hollyfern
Species Code (as per USDA Plants database)	POSC5
GENERAL INFORMATION	
Geographical range	 Source: Burke Herbarium Image Collection

	 Source: USDA Plant Database
Ecological distribution	Rock crevices or ultramafic rock outcrops[7].
Climate and elevation range	700-3000m
Local habitat and abundance	Found east of the Cascades on montane serpentine outcrops in small populations.[5]
Plant strategy type / successional stage	Tolerant of low levels of calcium, nitrogen and phosphorous. Tolerant of high levels of magnesium, chromium, and nickel. Also tolerant of shallow soils.[3]
Plant characteristics	Perennial forb/herb. A tufted fern with a short rhizome, each frond is 10-50 cm long with a width of 3-7 cm. It is pinnate with 20-40 pinnae. Leaflets are lance-shaped or oblong with a length up to 3 cm[6]. Round spore dots on backside of pinnae[8].
PROPAGATION DETAILS: FROM SEED	
Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Seed/spore
Product Type	Container (plug)
Stock Type	4-6” pot
Time to Grow	About 24 months
Target Specifications	A frond around 3 inches tall with a firm plug within the container.
Propagule Collection Instructions	Fronds collected early-June to mid-July when spores are mature and have yet to dehisce. It is important to monitor for maturity starting in early June, but may need to be monitored earlier in spring as *Polystichum scopindilum* is known to hold onto mature seeds through winter, releasing them in late spring[2]. Maturity can be determined by assessing the indusium; It will start to shrivel and roll back, exposing the sorus. Fronds are stored between a folded sheet of paper so the spores can be captured[4].
Propagule Processing/Propagule Characteristics	The fronds are stored in between sheets of paper, spore side down, until spores are released. After the spores are released, the frond is removed along with any detritus present. The spores must be kept dry and can be stored at room temperature[4]. Spores can usually be stored for up to a year[1].

Pre-Planting Propagule Treatments	N/A
Growing Area Preparation / Annual Practices for Perennial Crops	Growing media, spray bottles, flats, and flat coverings should be sterilized using a 10% bleach solution for 10 minutes and then rinsed. Growing media contains 3:1:1 soil, perlite, and coconut coir) pre-moistened with distilled water. Fill flats with 1" of growing media. Spores are top sowed using a fine sieve, sprinkling a fine amount evenly along the surface of the media. After spores have been sowed, water thoroughly with distilled water in a spray bottle. The flats should be placed on the lid of a clear, upside-down plastic container, using the bottom of the bin as the lid[4].
Establishment Phase Details (cultural practices from seeding to germination)	Spores will start to germinate within 30-60 days. Signs of germination include a green 'slime-like' coating on the growing media as well as the development of a cordate prothallus. When the prothalli have grown enough to be visible by eye, they have matured enough to produce sperm and egg cells. Once fertilization has occurred, sporophytes will show. Sporophytes will be a single stalked leaf emerging from the prothallus[4].
Length of Establishment Phase	30-180 days.
Active Growth Phase	The gametophyte generation occurs after 30-60 days. The fertilization and maturation of the sporophyte generation occurs 120-180 days after gametophyte development. The sporophytes can be transplanted once they develop 1 to 2 leaves. They should be placed in 4" pots using the same sterilized media used in previous steps. Each pot contains 3 to 5 sporophytes[4].
Length of Active Growth Phase	16-20 weeks
Hardening Phase	Sporophytes are sensitive to light, frost, and desiccation. Recently transplanted sporophytes should be kept in a greenhouse for at least 2 weeks, keeping them away from environmental extremes. Once 3-5 fronds are developed, the pots can be moved to a shaded area outside of the greenhouse[4].
Length of Hardening Phase	4-6 weeks
Harvesting, Storage and Shipping	Ferns will be ready after spending 2 seasons in the nursery, approximately 3 years[4].
Length of Storage	N/A
Guidelines for Outplanting / Performance on Typical Sites	N/A
Other Comments (including collection restrictions or guidelines, if available)	Propagation protocol is based off information for the species *Polystichum munitum. Polystichum munitum* is a known parent species of *Polystichum scopulinum*[6].

INFORMATION SOURCES	
References (full citations)	1. Ballesteros, D., Estrelles, E., & A. M. Ibars. 2006. Responses of Pteridophyte spores to ultrafreezing temperatures for long-term conservation in Germplasm Banks, The Fern Gazette 17:293-302. 2. COSEWIC 2005. COSEWIC assessment and status report on the mountain holly fern Polystichum scopulinum in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 18 pp. (www.sararegistry.gc.ca/status/status_e.cfm). 3. Giblin, D. (2004). Polystichum scopulinum. Seattle. Retrieved 2024 4. Mcdonough, S. J., & Rising, R. J. (2021). *Dryopteridaceae (polystichum)*. RNGR. https://rngr.net/npn/propagation/protocols/dryopteridaceae-polystichum 5. *Polystichum scopulinum (D.C. Eaton) Maxon*. USDA plants database. (n.d.-a). https://plants.usda.gov/home/plantProfile?symbol=POSC5 6. *Polystichum scopulinum (D.C. Eaton) Maxon*. Polystichum scopulinum in Flora of North America @ efloras.org. (n.d.). http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=200004643 7. Wagner, W. H. (1973). Reticulation of Holly Ferns (Polystichum) in the Western United States and Adjacent Canada. *American Fern Journal*, *63*(3), 99–115. https://doi.org/10.2307/1546186 8. WTU Herbarium, B. M. (n.d.). *Polystichum scopulinum (D.C. Eaton) Maxon*. CPNWH search results. https://www.pnwherbaria.org/data/results.php
Other Sources Consulted	9. Oregon State Universiry. (n.d.). *Polystichum andersonii Hopkins*. Oregonflora. https://oregonflora.org/taxa/index.php?tid=7552 10. Judith Jones | June 15, 2016. (n.d.). *How to grow ferns from spores*. Brooklyn Botanic Garden. https://www.bbg.org/article/growing_ferns_from_spores
Protocol Author	Eva Rueter
Date Protocol Created or Updated	May 1st, 2024

This propagation protocol template was modified by J.D. Bakker from that available at: http://www.nativeplantnetwork.org/network/SampleBlankForm.asp