Plant Propagation Protocol for *Polystichum imbricans*

ESRM 412 – Native Plant Production

URL: https://courses.washington.edu/esrm412/protocols/*2026*/POIM.*pdf*

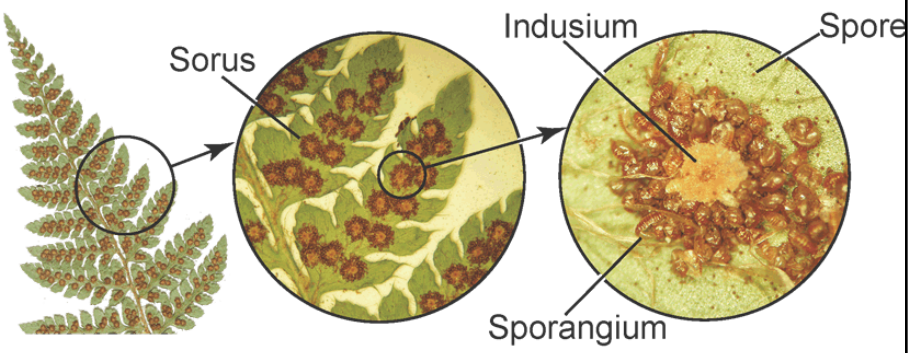
Neal Kramer
Source: Calscape

Keir Morse

North America Distribution
Source: USDA Plants Database

Washington State Distribution

TAXONOMY	
Plant Family	
Scientific Name	Dryopteridaceae
Common Name	Wood Fern Family
Species Scientific Name	
Scientific Name	*Polystichum imbricans* (D.C. Eaton) D.H. Wagner
Varieties	N/A
Sub-species	*Polystichum imbricans* (D.C. Eaton) D.H. Wagner ssp. *curtum* (Ewan) D.H. Wagner *Polystichum imbricans* (D.C. Eaton) D.H. Wagner ssp. *imbricans*
Cultivar	N/A
Common Synonym(s)	N/A
Common Name(s)	Narrowleaf swordfern, cliff sword fern
Species Code (as per USDA Plants database)	POIM
GENERAL INFORMATION	
Geographical range	See the above distribution maps
Ecological distribution	Rocky habitats, inland and coastal mountains, cliffs, and foothills (Calscape 2026, Oregon Flora, 2026)
Climate and elevation range	Full sun to partial shade on exposed rock to thin conifer woods, 50-2400m. USDA zone 6 (LBJWC, 2019; Oregon Flora, 2026)
Local habitat and abundance	Northern Olympic Mountains, Skagit River basin, Cascade Mountains, Mount Rainier. Found north to BC and south to CA. (Oregon Flora, 2026; NRCS, 2026)
Plant strategy type / successional stage	Stress tolerator, competitive early successional on rock outcroppings. (Oregon Flora 2026)
Plant characteristics	Perennial fern, erect blades, brown tufted hair at base, pinnate oblong to lanceolate 20-30 cm fronds with 20-30 pairs of pinnae. Dark brown spores. Closely resembles Polystichum munitum with shortened serrations.

	(FNA, 2026; Stuart, 2025)
PROPAGATION DETAILS: FROM SEED	
Ecotype	Washington Cascades
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (Plug)
Stock Type	6” pot
Time to Grow	24 months
Target Specifications	5-10 inch plant with 5-10 sturdy fronds
Propagule Collection Instructions	Polystichum typically releases spores in June. The exact timing for *imbricans* is not available online. Multiple field visits suggested. The spore indusium will cover maturing spores like a cap and will be sealed. At maturity, coiled sporangia are revealed. Spores are dispersed sporadically by sporangia. To harvest, collect a frond at maturity and store it in a sealed container, bag, or between two sheets of paper. Once dispersed, the spores will collect on paper. (RNGR, 2021)  Source: US Forest Service
Propagule Processing/Propagule Characteristics	Sporangium chaff must be removed from released spores. Stored dry at room temperature, spore germination success quickly degenerates after 6 days. Prompt germination is recommended. Can be ultra-frozen to -80℃ using liquid nitrogen and stored, however, up to 75 months. (RNGR, 2021; Ballesteros, 2006).

Pre-Planting Propagule Treatments	N/A
Growing Area Preparation / Annual Practices for Perennial Crops	Sterilize media (3:1:1 soil, perlite, and coir), moistening and baking it at 180 ℉ for 30 minutes. Then, sterilize spray bottles, 1" flats, and a lidded container with the opening slightly larger than the flats in a dilute bleach solution. Rinse. Fill flats with pre-moistened (distilled) media. Use a fine sieve to distribute spores evenly across the entire media. Water thoroughly with a spray bottle of distilled water, avoiding the formation of droplets. Place sown and watered flats on a face-up lid of the container, using the body of the container as a lid. Water periodically and do not let the flats desiccate. (RNGR, 2021)
Establishment Phase Details	Spores germinate after 30-60 days. From spores emerge a prothallus, a tiny leaf structure which produces sperm and egg, generating a sporophyte. Frequently mist to form a film of moisture on the prothallus, which allows for the movement of sperm to neighboring eggs on the prothalli. Sporophytes will begin to develop, emerging with a single stalked leaf from the base of the prothalli.

	 (RNGR, 2021) Image: Josep Maria Barres/Getty Images
Length of Establishment Phase	30-180 Days. Development of the sporophyte occurs between 120 and 180 days after the development of the prothallus and gametophyte structures. (RNGR, 2021)
Active Growth Phase	Sporophytes can be transplanted once they have 1-2 leaves. Transplant sporophyte clumps into 4” pots in the same media described previously. They are sensitive at this stage and must be protected from environmental extremes. Keep soil evenly moist. (RNGR, 2021)
Length of Active Growth Phase	120-140 days (RNGR, 2021)
Hardening Phase	Keep in a controlled environment till the development of 3-4 fronds, then can be moved to a shaded area of a nursery. (RNGR, 2021)

Length of Hardening Phase	4-6 weeks (RNGR, 2021)
Harvesting, Storage and Shipping	Can be outplanted after 2 full seasons in a nursery setting after sowing. (RNGR, 2021)
Length of Storage	N/A
Guidelines for Outplanting / Performance on Typical Sites	Best planted in groups. Resistant to deer. (LBJWC, 2019)
Other Comments	This propagation protocol is adapted from RNGR's protocol for Polystichum munitum. Polystichum munitum is a very closely related fern to the imbricans, once being classified as the same species (habitatdana, 2017). There is no distinct propagation protocol available for the species within the Polystichum genus. Experimentation can reveal more precise details on the timing of collection and growth stages, and storage of spores.
INFORMATION SOURCES	

References	Ballesteros, D., Estrelles, E., & Ibars, A. (2006). Responses of pteridophyte spores to ultrafreezing temperatures for long-term conservation in Germplasm Banks. *Fern Gazette*, *17*, 293–302. Calscape. (2026). *Cliff Sword Fern*. Calscape.org. https://calscape.org/Polystichum-imbricans-(Cliff-Sword-Fern) FNA. (2026). *Polystichum imbricans in Flora of North America @ efloras.org*. Efloras.org. http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=233500987 habitatdana. (2017, October 30). *Western Sword Fern, Polystichum Munitum*. Native Plants PNW. https://nativeplantspnw.com/western-sword-fern-polystichum-munitum/ LBJWC. (2019). *Lady Bird Johnson Wildflower Center - The University of Texas at Austin*. Wildflower.org. https://www.wildflower.org/plants/result.php?id_plant=POIM NRCS, U. (2026). *USDA Plants Database - Polystichum imbricans*. Usda.gov. https://plants.sc.egov.usda.gov/classification/13807 *OregonFlora- Polysticum imbricans*. (2026). Oregon Flora. https://oregonflora.org/taxa/index.php?taxauthid=1&taxon=11577&cl=10347 RNGR. (2021). *Dryopteridaceae (Polystichum) — Reforestation, Nurseries and Genetics Resources*. Rngr.net. https://rngr.net/npn/propagation/protocols/dryopteridaceae-polystichum Stuart, T. (2025). *Polystichum imbricans*. Hardyfernlibrary.com. https://hardyfernlibrary.com/ferns/listSpecies_Auto_66.html

Other Sources Consulted	Nelson, D. (2020, November 30). *Polystichum imbricans ssp. imbricans*. 10,000 Things of the Pacific Northwest. http://10000thingsofthepnw.com/2020/11/29/polystichum-imbricans-ssp-imbricans/ Schmeckpeper, M., & Barrington, D. (2016). *The Polystichum munitum--Polystichum imbricans alliance in Western North America: evolutionary origins and contributions to the allopolyploid species P. californicum*. https://www.uvm.edu/~dbarring/publications/schmeckpeperMS.pdf
Protocol Author	Kol Timura
Date Protocol Created or Updated	04/27/26