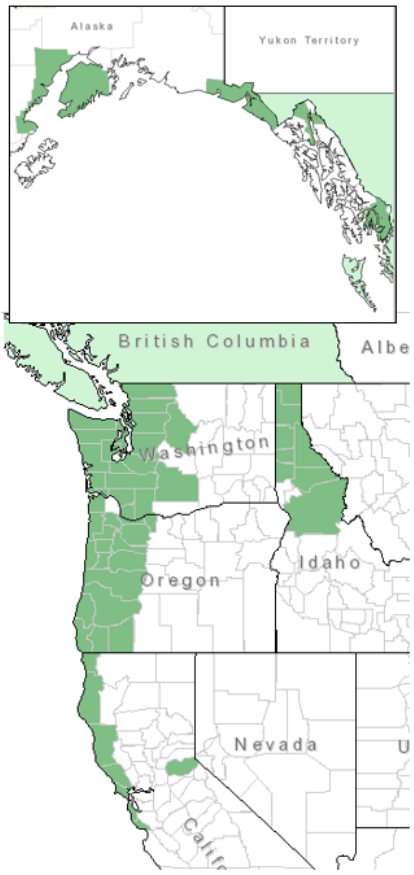
Plant Propagation Protocol for *Blechnum spicant*
ESRM 412 – Native Plant Production
URL: https://courses.washington.edu/esrm412/protocols/*2022*/BLSP.*pdf*


Figures 1 & 2: Deer Fern by Nikkie West, Sparrowhawk Native Plants

TAXONOMY	
Plant Family	
Scientific Name	*Blechnaceae*
Common Name	Chain Fern Family
Species Scientific Name	
Genus	*Blechnum* L.
Species	Blechnum spicant (L.) Sm.
Species Authority	(Linnaeus) Smith
Sub-species	Belchnum spirant (L.) Sm. ssp. Nipponicum
Authority for Varieties/Sub-species	(Kunze) Á. Löve & D. Löv
Sub-species	Belchnum spirant (L.) Sm. var. elongatum
Authority for Varieties/Sub-species	(Hook.) B. Boivin
Cultivar	Not found

Common Synonym(s)	Lomaria spicant (L.) Desv. Osmunda spicant L. Struthiopteris spicant (L.) Weiss
Common Name(s)	Deer Fern, Hard Fern, Ladder Fern, Rough Spleenwort
Species Code (as per USDA Plants database)	BLSP
GENERAL INFORMATION	
Geographical range	 *Figure 3:Distribution of Deer Fern from USDA Plants Database*
Ecological distribution	Moist to wet forest floors, wet slide areas under alder, stream banks, occasionally in bogs; lowlands to middle or even subalpine elevations. (Pojar et. al, 2004)

Climate and elevation range	Moist places in old growth forests, woodlands and wetlands below 3,000 ft (https://calscape.org/Blechnum-spicant-()).
Local habitat and abundance	Scattered to abundant and occasionally dominant. Inhabits wet forests growing in nutrient-rich to nutrient-poor soils. Associated species: Alaska cedar (*Chamaecyparis nootkatensis*) noble fir (*Abies procera*), lodgepole pine(*Pinus contorta*), Alaska blueberry (*Vaccinium alaskensis*), red huckleberry (*V. parviflorum*), thimbleberry (*Rubus parviflorus*), salmonberry (*R. spectabilis*), devil's club (*Oplopanax horridus*), menziesia (*Menziesia ferruginea*), salal (*Gaultheria shallon*), Oregon oxalis (*Oxalis oregana*), bunchberry (*Cornus canadensis*), false lily-of-the-valley (*Maianthemum dilatatum*), twisted stalk (*Streptopus spp.*), threeleaf foamflower (*Tiarella trifoliata*), woodnymph (*Moneses uniflora*), pioneer violet (*Viola glabrella*), western swordfern (*Polystichum munitum*), ladyfern (*Athyrium filix-femina*), bracken fern(*Pteridium aquilinum*), oakfern (*Gymnocarpium dryopteris*), woodfern (*Dryopteris spp.*), stiff clubmoss (*Lycopodium annotinum)* (Matthews Robin, 1993).
Plant strategy type / successional stage	Found in old-growth and climax Western hemlock, Sitka spruce, Western redcedar, Douglas-fir, and Pacific silver fir forests. After a disturbance the deer fern forms into dense clumps if tree regeneration is sparse. After 50 to 60 years from disturbance, ferns including deer ferns begin to increase in abundance and cover and eventually dominate the understory (https://www.fs.fed.us/database/feis/plants/fern/blespi/all.html).

Plant characteristics	Forb/Herb The Deer Fern makes a small rosette of neat, broadly radiating, leathery green fronds only about 6 in (15 cm) long, from the center which arise a vertical group of very different spore-bearing fronds up to 30 in (75 cm) high (R. G. Turner Jr, 1997).
PROPAGATION DETAILS	
Method: Spores	
Ecotype	Not found
Propagation Goal	Plants
Propagation Method	Sexual propagation by spores
Product Type	Single free-standing containers
Stock Type	6-8" Round pots.
Time to Grow	It can take up to 12 month to grow from spores.
Target Specifications	Plants to be grown when they are four to six inches tall.
Propagule Collection Instructions	Collect ripe spores from June to August. Lay a mature frond (with obvious sori underneath) between two sheets of paper. Allow to dry in a warm, dry and draft free area for about two weeks. The take off the top sheet, remove the old withered frond. Holding the bottom sheet at an angle, lightly tap the paper, causing debris to fall off, leaving spores. They will collectively look like dust. Now fold the paper in half, tap more vigorously (https://ucanr.edu/sites/UC_Master_Gardeners/files/287093.pdf).

Propagule Processing/Propagule Characteristics	Two days after collection, the frond has shed and the outline of its structure can be seen in the pattern on the paper. The contents include spores and paler chaff. To clean, gently fold the paper and tilt 30 degrees horizontally. Gently tap the paper to bring down the dark fine spores into the fold. Doing the same motion, separate the courser paler chaff (https://ebps.org.uk/ferns/growing/spore-exchange/cleaning-spores/).
Pre-Planting Propagule Treatments	Add a humus-rich sterilized soil into a microwavable plastic bag and microwave for 2-3 minutes. Internal temperature should be 150°F to ensure all pathogens are killed. Let soil cool down before use (https://www.nativeplanttrust.org/documents/713/Growing_Ferns_from_Spores.pdf).
Growing Area Preparation / Annual Practices for Perennial Crops	Prepare the mix of sterilized humus-rich sterilized soil and fill a 3 to 4 inch diameter plastic pot to the top (use a new pot or throughly scrub used ones with a 10% bleach solution and rinse well). Gently but firmly tap the mix down and water it throughly so it is well-dampened all the way through. Gently sift the spores into the soil and seal the pot with a plastic bag and place in a location that gets plenty of light. Keep the growing medium damp, and prevent mold form forming (https://www.nativeplanttrust.org/documents/713/Growing_Ferns_from_Spores.pdf).
Establishment Phase Details	In time perhaps as soon as several weeks a thin, green haze will form on the mix. This will grow into a carpet of prothallia, which are small, green, heart-shaped structures and contain the sperm and the egg. When the prothallia are approximately ¼ inch, they should be lightly misted to hasten fertilization. If no little sporelings appear in several weeks, mist again (https://hardyferns.org/propagation/).
Length of Establishment Phase	2-3 weeks (https://hardyferns.org/propagation/).

Active Growth Phase	Move small clumps of prothallia/sporelings to a mix of peat, vermiculite, and compost potting soil in a covered mini-greenhouse. Place under fluorescent lighting where the sporelings are grown on until they are about one inch tall (https://hardyferns.org/propagation/).
Length of Active Growth Phase	12 months.
Hardening Phase	Blechnum spicant can be hardened by gradually lifting the lid of the greenhouse. Transplant into larger pots, and move out of doors when they are four to six inches tall preferably during rainy seasons (https://hardyferns.org/propagation/).
Length of Hardening Phase	Hardening can take up to several weeks in nurseries. Constant monitoring is recommended to prevent injury to the plant (https://hardyferns.org/wp-content/uploads/2020/07/Spring-1998.pdf)
Harvesting, Storage and Shipping	Waxy envelopes or tight containers stored in cool conditions away from direct sunlight is optimal (https://www.nativeplanttrust.org/documents/713/Growing_Ferns_from_Spores.pdf).
Length of Storage	*Blechnum spicant* does not have a recommended length of storage. In general, spores from ferns can be stored in a refrigerator until needed. The spores typically stay viable for several years (https://www.nativeplanttrust.org/documents/713/Growing_Ferns_from_Spores.pdf).
Guidelines for Outplanting / Performance on Typical Sites	*Blechnum spicant* is happiest planted in the shelter of rocks that have a constant supply of dripping water, but will grow in full sun if assured of permanent moisture (R. G. Turner Jr, 1997).
Other Comments	Not available
Method: Rhizomes	
Ecotype	Not found
Propagation Goal	Plants
Propagation Method	Asexual propagation by rhizome division
Product Type	Single free-standing containers + Rhizomes

Stock Type	Mum pan
Time to Grow	1-2 years
Target Specifications	Individual plants grown from split rhizomes should have the appearance of tightly coiled fonds (fiddleheads) indicating maturity (http://npj.uwpress.org/content/1/1/5.full.pdf+html).
Propagule Collection Instructions	When collecting *Blechnum spicant* during the spring, wait until a cloudy day, ideally with several days of light rain in the forecast. Use a sharp pointed shovel or spading fork to dig out as much root ball and soil possible (https://hgic.clemson.edu/factsheet/dividing-perennials/).
Propagule Processing/Propagule Characteristics	Prior to spring or just after the emergence of the fiddleheads. Individual sections of the rhizome with 1 non-dormant lateral bud are made using sharp knife, one-third of the fronds are removed (http://npj.uwpress.org/content/1/1/5.full.pdf+html).
Pre-Planting Propagule Treatments	Prior to planting inspect rhizomes for disease and insect damage. Damaged rhizomes should be trimmed and treated, or discarded if too badly damaged (https://hgic.clemson.edu/factsheet/dividing-perennials/).
Growing Area Preparation / Annual Practices for Perennial Crops	Fill container with the same soil the original plant came from. Place just under the top of the soil.
Establishment Phase Details	Not found
Length of Establishment Phase	Not found
Active Growth Phase	*Blechnum spicant* cut from rhizomes do not have a specified growth phase, in general individual fern plants grow from the split rhizomes the following year it was collected (http://npj.uwpress.org/content/1/1/5.full.pdf+html).
Length of Active Growth Phase	1-2 years
Hardening Phase	Not found

Length of Hardening Phase	Not found
Harvesting, Storage and Shipping	Not found
Length of Storage	Not found
Guidelines for Outplanting / Performance on Typical Sites	The plant should be planted at the same soil level the original fern came from (https://ask2.extension.org/kb/faq.php?id=742271).
Other Comments	Not available
INFORMATION SOURCES	

References	*Cleaning spores*. The British Pteridological Society. (2020, January 1). Retrieved June 9, 2022, from https://ebps.org.uk/ferns/growing/spore-exchange/cleaning-spores/ Cullina, W. (n.d.). *Growing Ferns from Spores*. Native Plant Trust. Retrieved June 9, 2022, from https://www.nativeplanttrust.org/documents/713/Growing_Ferns_from_Spores.pdf "Integrated Taxonomic Information System - Report." ITIS. Accessed May 3, 2022. https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=17866#null. Luna, Tara. "Native Fern Propagation in Glacier National Park's Native Plant Nursery." Native Plants Journal, 2000. http://npj.uwpress.org/content/1/1/5.full.pdf+html MacKinnon, A., Jim Pojar, and A. MacKinnon. *Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia & Alaska*. Vancouver, British Columbia: Partners Publishing, 2016. Matthews, Robin F. "Fire Effects Information System (FEIS)." Blechnum spicant, 1993. https://www.fs.fed.us/database/feis/plants/fern/blespi/all.html#:~:text=Struthiopteris%20spicant%20(L.),21%2C22%2C31%5D. "Plant Database." Lady Bird Johnson Wildflower Center - The University of Texas at Austin. Accessed May 3, 2022. https://www.wildflower.org/plants/result.php?id_plant=BLSP. Polomski, Original Author(s)Robert F., Robert F. Polomski, and Karen Russ. "Dividing Perennials." Home & Garden Information Center	Clemson University, South Carolina, September 6, 2019. https://hgic.clemson.edu/factsheet/dividing-perennials/. Roth, L. "Plants For A Future." Pfaf Plant Search. Accessed May 3, 2022. https://pfaf.org/user/plant.aspx?latinname=Blechnum%2Bspicant. Sabalis, Patricia. "Transplanting Ferns #742271." Transplanting ferns #742271 - Ask Extension, April 3, 2021. https://ask2.extension.org/kb/faq.php?id=742271. Turner , R.G. *Botanica: The Most Complete Garden Encyclopedia Ever Published*. NY: BARNES & NOBLES, 1997. USDA plants database. Accessed May 3, 2022. https://plants.usda.gov/home/plantProfile?symbol=BLSP. "WNPS Discussion Group." WNPS. Accessed May 3, 2022. https://www.wnps.org/component/finder/search?q=DEER%2BFERN&Itemid=101.
Other Sources Consulted	

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