

**Plant Propagation Protocol for *Polystichum Kruckebergii***

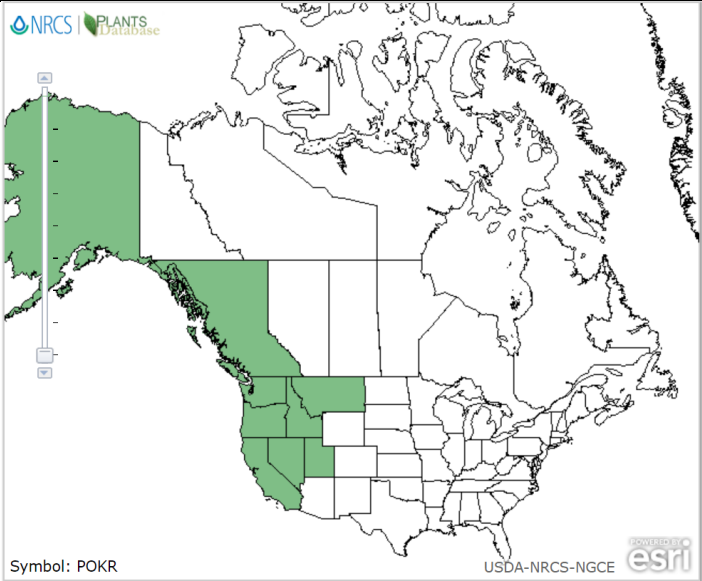
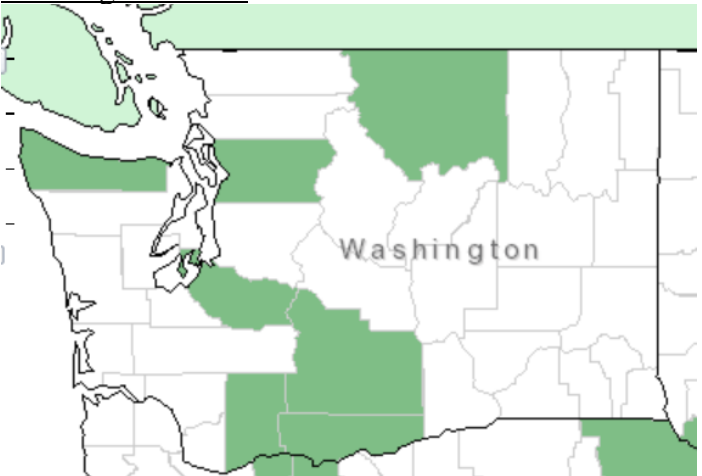
ESRM 412 – Native Plant Production

Protocol URL: <https://courses.washington.edu/esrm412/protocols/POKR.pdf>



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<b>TAXONOMY</b>	
<b>Plant Family</b>	
Scientific Name	Dryopteridaceae
Common Name	Wood Fern Family
<b>Species Scientific Name</b>	
Scientific Name	<i>Polystichum Kruckebergii</i> W.H. Wagner
Varieties	
Sub-species	
Cultivar	
Common Synonym(s)	
Common Name(s)	Kruckeberg's Hollyfern, Kruckeberg's Sword Fern <sup>2</sup>
Species Code (as per USDA Plants database)	POKR
<b>GENERAL INFORMATION</b>	
Geographical range	B.C., Washington, Oregon, Idaho, Nevada, Utah, Montana and California <sup>3</sup> . Present in the Washington state counties: Clallam, Snohomish, Pierce, Skamania, Yakima, Klickitat, and Okanogan <sup>3</sup> . See maps for distributions:  <u>North America<sup>3</sup>:</u>

	 <p>Symbol: POKR</p> <p>USDA-NRCS-NGCE esri</p> <p><u>Washington State<sup>3</sup>:</u></p> 
Ecological distribution	<p><i>P. kruckebergii</i> are found on rocky slopes and in rock crevices<sup>4</sup>, which occur in many subalpine coniferous forests and upper montane coniferous forests<sup>5</sup>.</p>
Climate and elevation range	<p>Elevation: 2100 – 3200 meters (6720 – 10240 ft)<sup>2</sup>.</p> <p>Climate: similar to the Cascades, Sierras, and Rocky Mountains<sup>2</sup>.</p>
Local habitat and abundance	<p>This species prefers to grow between or near sheltered cracks in ultramafic outcrops<sup>6</sup>, as well as on subalpine cliffs and talus slopes<sup>7</sup>. Additionally, <i>P. kruckebergii</i> is often found in mesic—moderate to well-balanced supply of moisture—soils<sup>8</sup>.</p>

	Abundance: Global status G4 (apparently secure), national status of N4 in the United States and N2N3 in Canada <sup>7</sup> .
Plant strategy type / successional stage	<p>This species is known for living between and amongst rocks as well as on relatively steep slopes<sup>7</sup>, which places this herb in regions with low levels of competition. Additionally, <i>P. kruckebergii</i> is tolerant of serpentine soils—low calcium-to-magnesium ratio, lack of essential nutrients (nitrogen, potassium, and phosphorous), and often high concentrations of heavy metals (nickel, iron, cobalt, and chromium)—which is associated with poor plant productivity in a majority of species<sup>1</sup>.</p> <p>As an evergreen rhizomatous herb<sup>5</sup>, <i>P. kruckebergii</i> can develop and disperse itself below ground and away from nearby above ground competitors and herbivory.</p> <p>Fire regimes are lethal<sup>9</sup>.</p>
Plant characteristics	<p>Perennial forb/herb, with ascending stems, lanceolate erect leaves (10-40 cm by 3-7 cm)<sup>8</sup>, and bulblets absent. The petiole is sparsely scaly and gradually diminishing in size distally<sup>10</sup>. Fronds are 9-35cm long and clustered on top of a small, ascending rhizome. Each frond contains a scale-covered petiole (stipe) and narrowly lance-shaped blade (lamina) that is lobed into 20-40 leaflets (pinnae)<sup>7</sup>, which range from oval to triangular shaped<sup>2</sup>. Each pinna has a toothed, spiny margin, and the lower pinna are lobed at the base.</p> <p>Blooming period: June – August<sup>5</sup></p>
<b>PROPAGATION DETAILS</b>	
Ecotype	
Propagation Goal	Plants
Propagation Method	Spore
Product Type	Container
Stock Type	Growing season: 1-2 months <sup>11</sup>
Time to Grow	
Target Specifications	
Propagule Collection Instructions	<i>P. kruckebergii</i> spores are located in small clusters (sori) and are partially covered by a membranous disk (indusium) on the underside of the upper pinnae <sup>7</sup> .

	Spores may be collected in the spring <sup>12</sup> .
Propagule Processing/Propagule Characteristics	All chaff should be cleaned from spores prior to storage, where they are stored in a dry refrigerator <sup>13</sup>
Pre-Planting Propagule Treatments	Sterilize media, containers, and other materials that may come in direct contact with the spore/plant prior to sowing to prevent disease and pests <sup>13</sup> .
Growing Area Preparation / Annual Practices for Perennial Crops	<p>Naturally occurs in open and often rocky areas—subalpine and alpine regions<sup>9</sup>—and in regions with a mesic soil moisture regime<sup>8</sup>. Therefore, moist, but well drained humus-rich soil is required for successful germination and growth<sup>12</sup>.</p> <p>Using sand, or maybe pumice, mixed into regular germination media may be used to mimic subalpine to alpine soil conditions. Additionally, care should be taken to ensure a non-saline environment as this species has a max salinity of 1<sup>11</sup>.</p>
Establishment Phase Details	
Length of Establishment Phase	
Active Growth Phase	<p><i>P. Kruckebergii</i> naturally lives in regions of sun, with partial shade, where annual precipitation is between 22 and 103 inches. Throughout the course of a year the temperature experienced ranges from 10.8 °F–64.6°F<sup>14</sup>.</p> <p>To mimic the natural annual precipitation observed, the soil should be kept moist for the majority of the year.</p> <p>Since this species is a rhizomatous herb<sup>5</sup>, space should be provided to allow for sufficient horizontal belowground growth. Containers that are wider—flats or wide pots—are recommended after germination.</p>
Length of Active Growth Phase	
Hardening Phase	
Length of Hardening Phase	
Harvesting, Storage and Shipping	
Length of Storage	
Guidelines for Outplanting / Performance on Typical Sites	<i>P. kruckebergii</i> has been commonly found in regions with hardiness zones of 6b to 7b, and an average soil pH of 6.8 <sup>11</sup> .

	Sites should be selected to adequately match the hardiness zones, and average soil pH to increase chance of success. Other soil properties and habitat conditions previously listed should also be considered.
Other Comments	
<b>INFORMATION SOURCES</b>	
References	See endnotes below
Other Sources Consulted	See consultation list below
Protocol Author	Jordan Drugge
Date Protocol Created or Updated	06/03/18

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