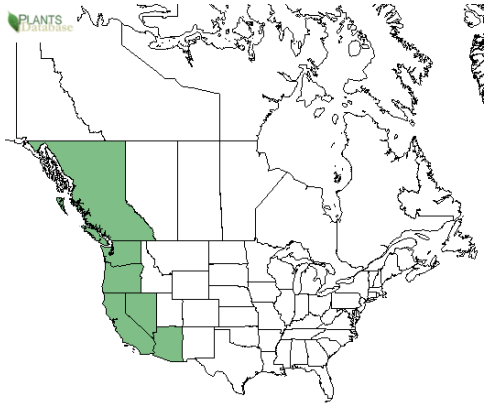
Plant Propagation Protocol for *Woodwardia fimbriata*
ESRM 412 – Native Plant Production

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

TAXONOMY	
Plant Family	
Scientific Name	Blechnaceae
Common Name	Fern Family
Scientific Name	
Species Scientific Name	*Woodwardia fimbriata Sm.* (J.E. Smith - (4))
Varieties	None
Sub-species	None
Cultivar	None
Common Synonym(s)	WOCH - *Woodwardia chamissoi* Brackenridge (4/10)
Common Name(s)	Chain Fern, Giant Chain Fern
Species Code (as per USDA Plants Database	WOFI



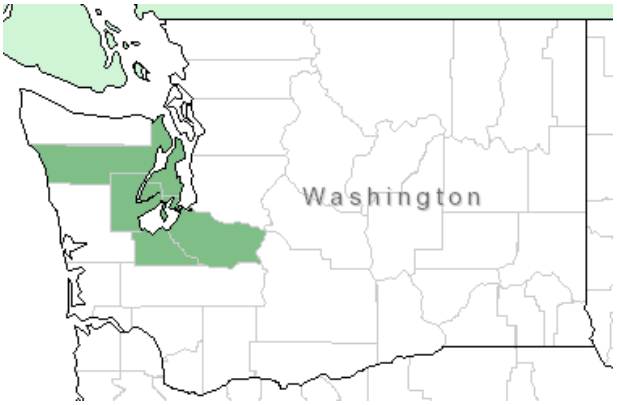


Image 1 (above left): Distribution of *Woodwardia fimbriata* in North America - USDA
Image 2 (above right): Distribution of *Woodwardia fimbriata* in Washington State - USDA

GENERAL INFORMATION	
Geographical Range	Southern Oregon and California, sporadically north of the Umpquah River of Oregon, and sparingly near Puget Sound (6). This species may also be in British Columbia (13), and is native to Southern Arizona (4), and in Northeastern Nevada (3).
Ecological Distribution	Hardiness Zones 8-10: grows in moist coniferous woodlands, especially common in redwood forests (13). Wet, shady woods and stream-banks at low to mid elevations (9).
Climate and Elevation Range	Can tolerate a broad range of temperatures, but may succumb in cold winter temperatures (10). In California, can range from 100 - 5,000 (or even 8,000) feet (2).
Local Habitat and Abundance	Marginal in the Seattle Area (10) Can be found naturally in Jefferson, Mason, Pierce and Thurston Counties in Washington State - See image 2 (11).
Plant strategy type / Successional Stage	Mid to Late Successional
Plant Characteristics	Life form: Forb/Herb (11) or can be considered a Fern (9) Leathery texture, coarsely bipinnate evergreen fronds from 4-6 feet long (Image 3), forms in large clumps and elongate (chain-like) clusters of spore patches (Image 4) near the midrib of the pinnule (6). Fronds are arching and this grows from an ascending rhizome (13). Leaves are lanceolate, light green, turning darker as they mature (1).

Image 3 (left): *Woodwardia fimbriata* - http://plants.usda.gov/gallery/standard/wofi_002_shp.jpg
Image 4 (right): Spores of *Woodwardia fimbriata* - http://www.backyardnature.net/n/09/090927wx.jpg

PROPAGATION DETAILS	
Propagation Goal:	Plants and Spores
Propagation Method	This species has proven difficult to propagate, specifically to obtain spores. Due to this, vegetative propagation is ideal, although no directions on the process of vegetative propagation for this species have been given. (3) It is best obtained from nurseries and does well from spores (6). For the genus *Woodwardia*, (not specific to species fimbriata) propagate by spores and division (8). *W. fimbriata* has been tissue-cultured now (7).
Product Type:	Container
Stock Type	Container
Time to Grow	Slow to grow, especially in warmer winter conditions (7).
Target Specifications	4-6' fronds (6).
Propagule Collection Instructions	Collecting spores after a frost or in the spring time yielded the best results, but even then crops may be lean (10).
Propagule Processing/Propagule Characteristics	***Not specific to Woodwardia fimbriata*** - Some ferns from the group containing genera Blechnum, Doodia, Woodwardia, and Sadleria: Some species will not produce fertile spores every year, and not in large quantities, and it is difficult to determine when fronds are ready for collection (fertile fronds "in which the indusium is just beginning to deteriorate and the sporangia have a crystalline appearance are generally ideal." Some chain ferns in this group produce plantlets on their fronds (5).
Pre-Planting Propagule Treatments	Unknown
Growing Area Preparation / Annual Practices for Perennial Crops	Moist habitats with soil that is on the acidic side (pure earthworm compost is excellent) (10).
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	Woodwardia - named after Thomas J. Woodward, an English Botanist, fimbriata means “fringed” or “cut in shreds”. (3) There was very little information about the propagation and growth phases of this species. I communicated with Sue Olsen, an expert in the field of fern propagation and she relayed the difficulty of propagating, growing, and collecting information about this species. (10)

INFORMATION SOURCES

References

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Protocol Author	Spencer Murray
Date Protocol Created or Updated	6/6/2016

Previously Created Protocol for *W. fimbriata* can be found at:

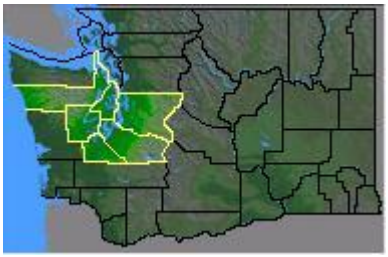
http://depts.washington.edu/propplnt/Plants/Woodwardia%20fimbriata.htm

Plant Data Sheet

Species: *Woodwardia fimbriata,* Giant Chain Fern

Range: Arizona, British Columbia, California, Nevada, Oregon, Washington. (6, 7)

Climate, elevation: USDA zones: 8-9. Elevation from 3ft to 287ft (1to 87 m). (6)



Local occurrence: It's local occurrence is in the counties of Jefferson, Mason, Kitsap, Thurston, Pierce, and King County. (2) It is in the threatened and endangered species and it is classified as a sensitive species by the Washington State Plant list. (7)

Habitat preferences: *Woodwardia* does well in woodlands or next to streams, moist bogs, springs or ponds and even containers. This fern grows in partial shade, but it can grow in full sun if extra moisture is given during summer. *Woodwardia* is not very frost tolerant so grow in a woodland or protected area. (6)

Plant strategy type/successional stage: It is not aggressive in its colonization & usually only a few are encountered at a time. It does not compete well with native swordfern (*Polystichum munitum*)which is more forgiving of imperfect conditions, and it is easily displaced by the many invasive species of weeds. It also vanishes out of eroded or deforested areas. (5)

Associated species: From the family Blechnaceae. Genus: Woodwardia. Species: Frimbriata (6,3)

May be collected as: Ferns don't have seed. They have spores. Collect spores in the summer or division in the spring.

Collection restrictions or guidelines: In my opinion, and since is listed as a sensitive plant in the endanger species list, it should be collected only by spores. But if a friend has one, then it can be collected by division.

Seed germination: It doesn't need dormancy breaking. Spores germinate in about two to three weeks if they are sown in the right medium. (4)

Seed life: N/A

Recommended seed storage conditions: N/A

Propagation recommendations:

By division: Cut the rhizome, which it has a crown or clump. Separate the clump with a knife into 5 in. clumps. Plant the new clump of ferns in the same kind of soil and light/shade conditions in which it was previously growing with the rhizome just below the surface of the soil. (4)

By spores: The spores can be seen arranged in clusters called sori on the underneath side of the leafy fronds. The spores should be black when ripen. Tie a clear plastic bag over a large healthy frond and shake or tap the frond until the spores fall into the bag. Planting the spores: Any sterile flat container may be used for propagating ferns, for example: salad, pastries and pies containers. To sterilize them: Mix 1 part bleach to 9 parts water and wash the container to be used. After the container has dried, fill it with a planting medium. Use a mixture of about 1/2 peat moss and 1/2 perlite or vermiculite which is a very good medium for propagating ferns. It is important to keep the planting medium damp and covered with clear plastic or glass. Put the container in a dark location for a day or two. The disadvantage is that it will take at least two years to have these ferns grow to a medium size and longer to reach a mature size. (4)

Soil or medium requirements: Moist, rich loamy soil. (6,5)

Installation form: It can be purchase through nurseries in 1 gallon containers. The cost range from 12.00-15.00 dollars (1)

Recommended planting density: It depends on the size of the clump. It ranges from 4ft-6ft, 6ft-8ft, 8ft-10ft, and 10ft-12ft. (5,3)

Care requirements after installed: The previous year's fronds on a chain fern last until the new year's fronds are unfurling. It may need some early or mid-spring trimming to tidy it up, removing the older worn-out fronds. Do not let it dry while it is establishing itself. (5)

Normal rate of growth or spread; lifespan: It is a perennial fern with a mature size of 6 feet (2 m) height and a width of 3-9 feet (1-3 m). It will multiply itself by runners in a very slow pace. It is the only North American *Woodwardia* that is evergreen. (6,5)

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Data compiled by: Mercedes Mijares April 22, 2006.