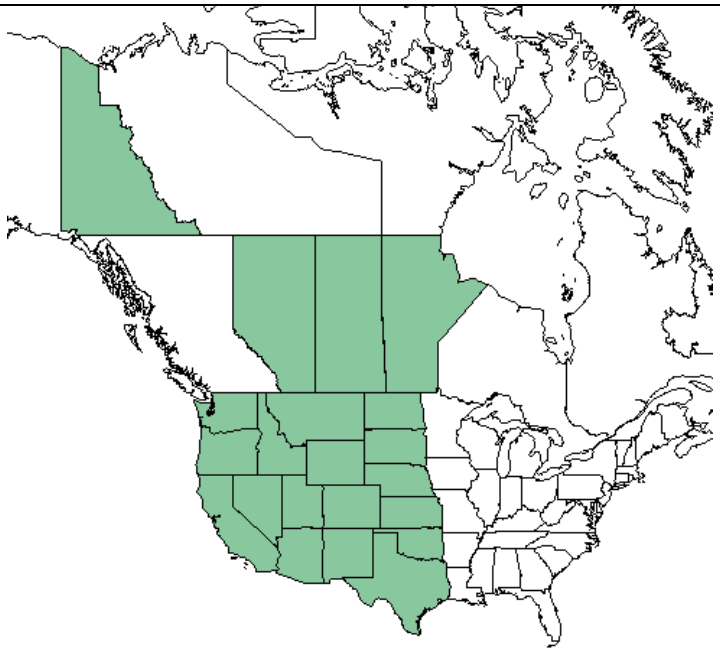
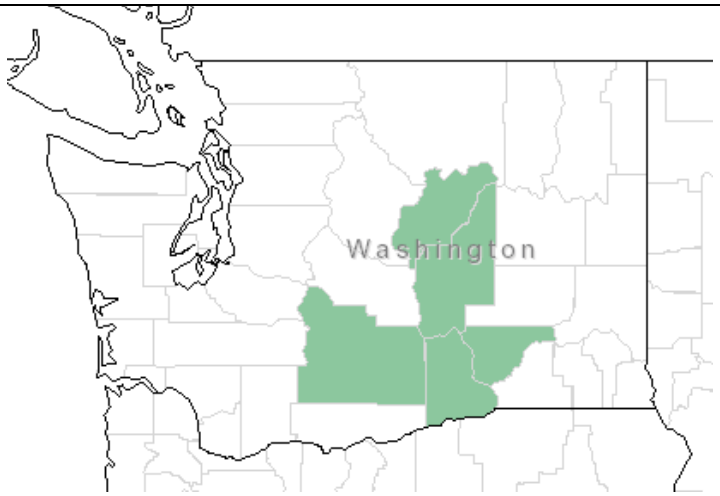
Plant Propagation Protocol for *Krascheninnikovia lanata*
ESRM 412 – Native Plant Production
Protocol URL: https://courses.washington.edu/esrm412/protocols/KRLA2.pdf

TAXONOMY	
Plant Family	
Scientific Name	Amaranthaceae
Common Name	Amaranth family
Species Scientific Name	
Scientific Name	*Krascheninnikovia lanata* (Pursh) A. Meeuse & Smit
Varieties	None
Sub-species	None
Cultivar	None
Common Synonym(s)	Ceratoides lanata (Pursh) J.T. Howell, invalid (Jeps) Diotis lanata Pursh Eurotia lanata (Pursh) Moq., invalid Eurotia lanata (Pursh) Moq. var. *subspinosa* (Rydberg) Kearney & Peebles
Common Name(s)	Winterfat, white sage, winter-sage, feather-sage, sweet sage, lambstail
Species Code (as per USDA Plants database)	KRLA2
GENERAL INFORMATION[1,2,3,4]	
Geographical range	

	 Distribution maps from the USDA Plants Database.
Ecological distribution	*Krascheninnikovia lanata* occurs in the plains and foothills of western North America. It is often found in saline or alkaline soil. This species is not tolerant to floods or acidic soil.
Climate and elevation range	*Krascheninnikovia lanata* grows in arid climates from sea level up to 10,000 feet elevation.
Local habitat and abundance	This species grows east of the Cascades in southern parts of Washington.
Plant strategy type / successional stage	This plant is a drought-tolerant, frost-tolerant perennial shrub. It also tolerates saline and/or alkaline soils.
Plant characteristics	– A wooly, spreading shrub with a woody base up to 2 dm. tall and annual stems up to 5 dm. long. – Flowers are wooly and non-showy. They bloom from May to July in clusters on the leaf axils. – Leaves are numerous, linear, and pubescent; up to 4 cm. long. – The root system is extensive and fibrous with a deep taproot. – Seeds grow in hairy utricles. – This is a momoecious, wind-pollinated plant.
PROPAGATION DETAILS	
Seed Propagation Method[3,5]	
Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	Container
Time to Grow	Approximately six months.
Target Specifications	Firm plugs with well-established roots.
Propagule Collection Instructions	Collect seeds by hand stripping from plants that are 2-3 years old. Dry the collected materials out to prevent

	seeds from molding. Clean seeds using a hammer mill and screen.
Propagule Processing/Propagule Characteristics	Up to 50 percent of seeds may loose viability after one year. Seeds should not be kept for more than two years. Do not remove seed hairs; debearding seeds may speed up loss of viability.
Pre-Planting Propagule Treatments	Allow seeds to after-ripen for 2-3 months at room temperature.
Growing Area Preparation / Annual Practices for Perennial Crops	New plants should be sown and grown in a greenhouse. Sandy loam soil is recommended.
Establishment Phase Details	Sow seeds ¼ inch deep. Use about 15 seeds per 1 square foot of tray. Seeds should germinate within 5 days.
Length of Establishment Phase	5 days
Active Growth Phase	1 month after germination, seedlings may be transplanted into individual containers of sandy loam soil.
Length of Active Growth Phase	3 months
Hardening Phase	N/A
Length of Hardening Phase	N/A
Harvesting, Storage and Shipping	Not found.
Length of Storage	Not found.
Guidelines for Outplanting / Performance on Typical Sites	In spring, plant individuals 4-5 feet apart. A weed tarp may be used to discourage weeds and conserve ground moisture. If plants are being grown for livestock grazing, do not let more than one quarter of the annual growth be consumed. Plants will produce seed after 2-3 growing seasons.
Other Comments	None.
Vegetative Propagation Method[6]	
Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Vegetative
Product Type	Container (plug)
Stock Type	Container
Time to Grow	4 months
Target Specifications	Firm plugs with well-established roots.
Propagule Collection Instructions	Take cuttings of 15-30 cm. Immediately submerse the ends of cuttings in water.
Propagule Processing/Propagule Characteristics	Cuttings may be stored for up to 72 hours wrapped in wet paper towel in a Styrofoam container.
Pre-Planting Propagule Treatments	Wound the basal ends of the cuttings. Dip ends in a commercial talc solution of 0.8% indole-3 butyric acid. Place the finished cuttings in trays of perlite. Store the trays on a mist bench.

Growing Area Preparation / Annual Practices for Perennial Crops	A fungicide may be applied to the mist bench in order to prevent disease.
Establishment Phase Details	When cuttings have produced roots that are 1 cm long, transfer to individual containers filled with sandy loam soil.
Length of Establishment Phase	3-4 weeks
Active Growth Phase	Keep new plants in a greenhouse.
Length of Active Growth Phase	3 months
Hardening Phase	N/A
Length of Hardening Phase	N/A
Harvesting, Storage and Shipping	Not found.
Length of Storage	Not found.
Guidelines for Outplanting / Performance on Typical Sites	In spring, plant individuals 4-5 feet apart. A weed tarp may be used to discourage weeds and conserve ground moisture. If plants are being grown for livestock grazing, do not let more than one quarter of the annual growth be consumed. Plants will produce seed after 2-3 growing seasons.
Other Comments	This species is a good winter grazing plant for livestock and wildlife. It can also be useful for preventing soil erosion. Many native American tribes used this plant for treating a variety of illnesses and skin ailments.
INFORMATION SOURCES	
References	References are listed below.
Other Sources Consulted	Other sources consulted are listed below.
Protocol Author	Kelly Ann Lee
Date Protocol Created or Updated	May 23, 2016

References

1. USDA. *Krascheninnikovia lanata* (Pursh) A. Meeuse & Smit winterfat. Last consulted May 23, 2016. http://plants.usda.gov/core/profile?symbol=krla2

2. Knoke, Don and David Giblin. *Krascheninnikovia lanata* winterfat. *Burke Museum*. Last consulted May 23, 2016. http://biology.burke.washington.edu/herbarium/imagecollection.php

3. USDA NRCS Idaho Plant Materials Program. Winterfat *Krascheninnikovia lanata* (Pursh) A.D.J. Meeuse & Smit. Last consulted May 23, 2016. http://plants.usda.gov/plantguide/pdf/pg_krla2.pdf

4. USDA Fire Effects Information Systems. Species: Krascheninnikovia lanata. Last consulted May 23, 2016. http://www.fs.fed.us/database/feis/plants/shrub/kralan/all.html#INTRODUCTORY

5. Wasser, Clinton H. 1982. "Ecology and culture of selected species useful in revegetating disturbed lands in the West." Washington, DC: US Department of the Interior, Fish and Wildlife Service. 216-219. https://www.fort.usgs.gov/sites/default/files/products/publications/22892/22892.pdf

6. Everett, Richard L. et al. November 1978. "Propagation of Nevada Shrubs by Stem Cuttings." *Journal of Range Management*. 31(6); 426-429.

Other Sources Consulted

7. Utah State University. Winterfat. Last consulted May 23, 2016. http://extension.usu.edu/rangeplants/htm/winterfat

8. National Park Service. Winterfat (White-sage; Eurotia; Ceratoides). Last consulted May 23, 2016. https://www.nps.gov/arch/learn/nature/chenopodiaceae_krascheninnikovia_lanata.htm

9. Texas Native Plants Database. Winterfat, Common Winter Fat, Roemeria, Lamb's Tail, Sweet-sage, White-sage, Feather-sage. Last Consulted May 23, 2016. http://aggie-horticulture.tamu.edu/ornamentals/nativeshrubs/krascheninnikovialanat.htm

10. Romo, J. T. 2004. "Establishing winterfat in prairie restorations in Saskatchewan." Canadian Journal of Plant Science. 84(1); 173-179.