

Plant Propagation Protocol for *Achnatherum thurberianum* (Piper) Barkworth
 ESRM 412 – Native Plant Production

Protocol URL: <https://courses.washington.edu/esrm412/protocols/ACTH7.pdf>

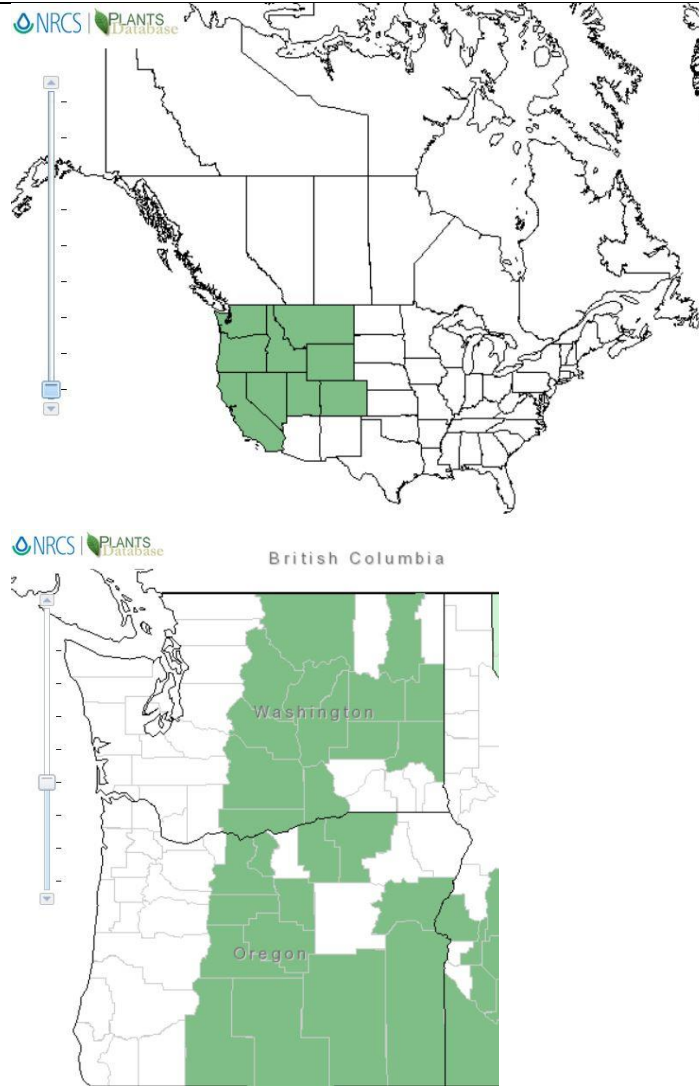


(© Sheri Hagwood)

TAXONOMY	
Plant Family	
Scientific Name	Poaceae ¹
Common Name	Grass family ¹
Species Scientific Name	
Scientific Name	<i>Achnatherum thurberianum</i> (Piper) Barkworth ²
Varieties	No varieties recognized ²
Sub-species	No sub-species recognized ²
Cultivar	No cultivars recognized ²
Common Synonym(s)	<i>Stipa thurberiana</i> Piper ²
Common Name(s)	Thurber's needlegrass ²
Species Code (as per USDA Plants database)	ACTH7 ²

GENERAL INFORMATION

Geographical range



(© USDA PLANTS Database)

Found east of the cascades in Washington and Oregon; spreads into northeastern California, northern Nevada, southwestern Montana, and central Idaho; Colombia Plateau, Blue Mountains (OR), Snake River Plain, and Northern Basin and Range^{3,8,9}

Ecological distribution

Grassland prairies, open coniferous forest (juniper), and sagebrush steppe on rocky slopes³

Climate and elevation range

Semiarid Intermountain west; areas with 7-16 inches of annual precipitation; elevations of 3500 to 6500 feet^{3,5}

Local habitat and abundance

Prevalent on north and east slopes where moisture is maintained and temperatures are more predictable; associated with sagebrush, saltbush, horsebrush, bitterbrush, winterfat, Sandberg bluegrass, Indian ricegrass, bluebunch wheatgrass, and thickspike wheatgrass^{5,9}

Plant strategy type / successional stage

Climax and mid-successional species; cold and drought tolerant; salt and shade intolerant^{2,5}

Plant characteristics	Perennial graminoid; 12-24 inches tall; 3-9 inch long panicles; can root up to 2 feet ²
PROPAGATION DETAILS	
Ecotype	66 source locations (accessions) used to collect seeds from wild plants; located throughout southwest Idaho, eastern Oregon, and northern Nevada ⁴
Propagation Goal	Plants
Propagation Method	Seed ^{4,7,9}
Product Type	Container ^{4,7}
Stock Type	No preferred stock type mentioned ⁴
Time to Grow	9 months ⁴
Target Specifications	Developed enough to conduct study measurements, approximately 15 months ⁴
Propagule Collection Instructions	Collect by hand in July and August; place in paper bag and allow to dry; De-awn and clean with Westrup machine (#14 screen) 3 times with hard brush and a 3 x 5/16 screen on the clipper with ½ airflow ⁹
Propagule Processing/Propagule Characteristics	225,000 seeds per pound; 92% viability using tetrazolium; max germination rate of 25% ^{3,6}
Pre-Planting Propagule Treatments	Low levels of dormancy relative to close relatives ⁹
Growing Area Preparation / Annual Practices for Perennial Crops	<p>13.3x12.7x3.5 cm boxes used to germinate seeds; water saturated vermiculite⁴</p> <p>Plant into firm weed-free seedbeds in late fall as a dormant planting or in very early spring; sow ¼” to ½” deep; 24-36” row spacing; furrowed seeds perform better than broadcasted ones⁹</p> <p>Coarse sandy loam derived from granite parent material; collect beneath sagebrush; artificially burn in furnace for 10 minutes at 250, 350, 550, and 750°C; place 25 seeds on top of 250 cm³ of substrate in plastic pot and then cover with 100 cm³ to a depth of 1cm; keep moist with deionized water and leave at 20°C; use fluorescent lighting⁷</p>
Establishment Phase Details	<p>Place at room temperature (20°C)⁴</p> <p>Irrigation recommended; wait until 3-5 leaf stage before using herbicides or clipping for weed control; row culture needs to be maintained; 15-25°C optimal germination temperature⁹</p>
Length of Establishment Phase	6 weeks ⁴
Active Growth Phase	5x5x5 cm containers in flats; Sunshine #5 Plug Mix (SunGro); grow under greenhouse conditions; water and fertilize as needed ⁴
Length of Active Growth Phase	6-10 weeks ⁴

Hardening Phase	Transplant during the fall; space 0.6 m apart in rows; rows 1.5 m apart from each other; supplement irrigation needed in some sites that are naturally dry; no fertilizer or further irrigation applied ⁴
Length of Hardening Phase	15 months ⁴
Harvesting, Storage and Shipping	Storage and hardening phase involve similar conditions ⁴ Mid-July to mid-August; Direct combining in the hard-dough stage or by windrowing followed by combining; must be dried once harvested; store in plastic woven sacks, not burlap or cotton ⁹
Length of Storage	Genecology measurements done in the spring, storage lasts from winter to when researchers are ready ⁴
Guidelines for Outplanting / Performance on Typical Sites	Outplanting not relevant as plants are propagated for genecology study ⁴
Other Comments	Most protocols are designed for the specific needs of scientific studies. Seed production of Thurber's needlegrass has been difficult under cultivated conditions ^{4,7,9}

INFORMATION SOURCES

References	<p>¹Smith, JP. 1993. Treatment from the Jepson Manual. Regents of the University of California. https://ucjeps.berkeley.edu/cgi-bin/get_JM_treatment.pl?8738,8739,8758</p> <p>²Archer, Amy J. 2000. <i>Achnatherum thurberianum</i>. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). https://www.fs.fed.us/database/feis/plants/graminoid/achthu/all.html</p> <p>³Vance, NC. 2010. Evaluation of native plant seeds and seeding in the east-side central Cascades ponderosa pine zone. Gen. Tech. Rep. PNW-GTR-823. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station</p> <p>⁴Johnson RC, Leger EA, Vance-Borland K. July 2017. Genecology of Thurber's Needlegrass (<i>Achnatherum thurberianum</i> [Piper] Barkworth) in the Western United States. <i>Rangeland Ecology & Management</i>. 70(4):509-517</p> <p>⁵Thurber's Needlegrass – Range Plants of Utah. Utah State University. https://extension.usu.edu/rangeplants/grasses-and-grasslikes/thurbers-needlegrass</p> <p>⁶Monsen SB, Stevens R, Shaw NL. September 2004. Restoring Western Ranges and Wildlands. 2. USDA</p> <p>⁷Blank RR, Young JA. 1998. Heated substrate and smoke: Influence on seed emergence and plant growth. <i>Journal of Range Management</i>. 51(5): 577-583</p>
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	<p>⁸Lambert S. 2005. Guidebook to the Seeds of Native and Non-Native Grasses, Forbs and Shrubs of the Great Basin. Idaho BLM.</p> <p>⁹Thurber's Needlegrass. Plant Guide. USDA NRCS Idaho State Office</p>
<p>Other Sources Consulted</p>	<p>¹⁰Wood MK, Eckert RE, Blackburn W, Peterson FF. 1982. Journal of Range Management. 35(3): 282-286.</p> <p>¹¹Stringham TK, Novak-Echenique P, Blackburn P, Coombs C, Snyder D, Wartgow A. 2015. Final Report for USDA Ecological Site Description State-and-Transition Models, Major Land Resource Area 28A and 28B Nevada. University of Nevada Reno, Nevada Agricultural Experiment Station Research Report 2015-01. p. 1524.</p> <p>¹²Martens E, Palmquist D, Young JA. 1994. Temperature Profiles for Germination of Cheatgrass Versus Native Perennial Bunchgrasses. Proceedings – Ecology and Management of Annual Rangelands. USDA p. 236-243</p> <p>¹³Ganskopp D. 1988. Defoliation of Thurber needlegrass: herbage and root responses. Journal of Range Management 41(6): 472-476</p> <p>¹⁴Columbus JT, Smith JP, Goldman DH. 2012. Stipa thurberiana. Jepson EFlora Project. https://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=45688</p> <p>¹⁵Koniak S. 1985. Succession in pinyon-juniper woodlands following wildfire in the Great Basin. Great Basin Naturalist. 45(3)</p> <p>¹⁶Shock C, Feibert E, Saunders L. 2009. Emergence of Native Plant Seeds in Response to Seed Pelleting, Planting Depth, Scarification, and Soil Anti-Crusting Treatment. Oregon State University</p> <p>¹⁷Harlow N, Jakob K. 2003. Wild Lilies, Irises, and Grasses. University of California Press.</p>
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