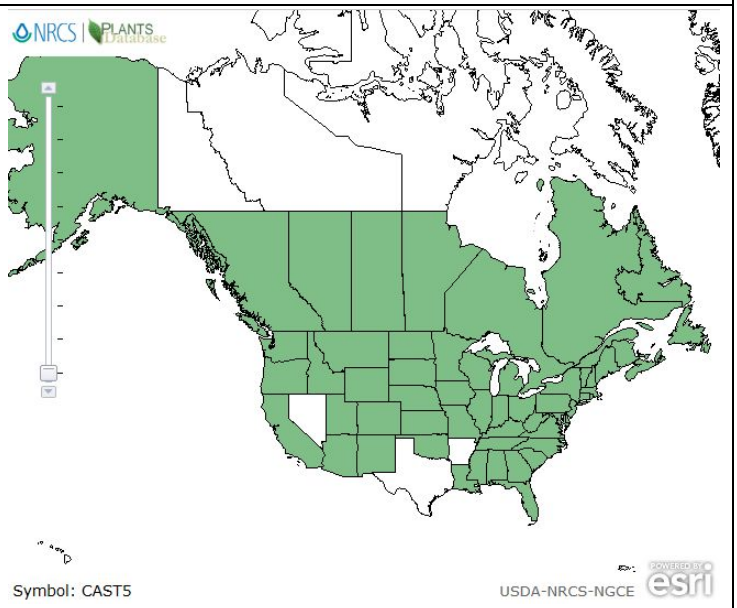
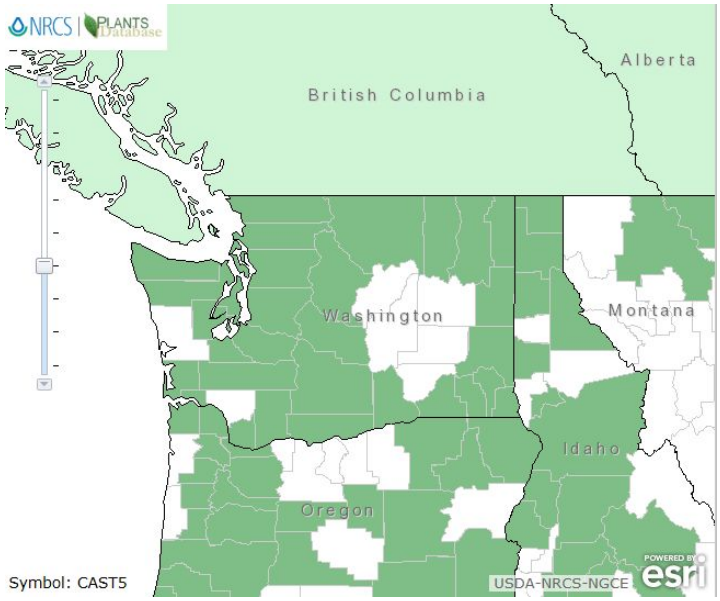
Plant Propagation Protocol for *Carex stipata*
ESRM 412 – Native Plant Production

Image © 1991, Clayton J. Antieau
http://biology.burke.washington.edu/herbarium/imagecollection.php?Genus=Carex&Species=stipata

Protocol URL: https://courses.washington.edu/esrm412/protocols/*CAST5.pdf*

TAXONOMY	
Plant Family	
Scientific Name	Cyperaceae[1]
Common Name	Sedge[1]
Species Scientific Name	
Scientific Name	*Carex stipata* Muhl. ex Willd[1]
Varieties	*Carex stipata* Muhl. ex Willd. var. maxima[1] *Carex stipata* Muhl. ex Willd. var. stipata[1]
Sub-species	N/A
Cultivar	N/A
Common Synonym(s)	*Carex stipata* Muhl. ex Willd. var. maxima[1] *Carex stipata* Muhl. ex Willd. var. stipata[1]
Common Name(s)	awlfruit sedge[1] stalkgrain sedge[1] owlfruit sedge[1] awl-fruited sedge[2] owl-fruited sedge[2] sawbeak sedge[2]
Species Code (as per USDA Plants database)	CAST5

GENERAL INFORMATION	
Geographical range	 Source: https://plants.usda.gov/core/profile?symbol=CAST5  Source: https://plants.usda.gov/core/profile?symbol=CAST5
Ecological distribution	*Carex stipata* is found in saturated, moist habitats including: wet meadows, swamps, streamsides, lakeshores, and in ditches and clearings.[3]
Climate and elevation range	*Carex stipata* is can tolerate a minimum temperature of -38° F (-38.89° C).[1] It is typically found in lowland to mid-montane elevations.[5]

Local habitat and abundance	In Washington *Carex stipata* is found in lowland wet areas, especially west of the Cascades up to mid-elevations in the mountains.[2]
Plant strategy type / successional stage	Slow seed spread rate[1] Shade tolerant[1] Thrives in disturbed sites.[4]
Plant characteristics	Growth habit: Graminoid[1] Duration: Perennial[1] Group: Monocot[1] Leaves are yellow-green, about as long as stems, flat, and 4-10m wide.[3] Inflorescences several to many spikes, stalkless in dense clusters 3-10 cm long.[3]
PROPAGATION DETAILS	
Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	10 inch cone
Time to Grow	*Carex stipata* can be propagated during summer for fall and winter outplanting (4-6 months).[5]
Target Specifications	Well developed root systems, without being root bound within container.[6]
Propagule Collection Instructions	In the *Carex* genus, the seed is in an achene, enclosed by a perigynium.[7] The perigynia are arranged in different forms on inflorescences (spikes), depending on the species.[7] *Carex stipata* blooms from May to August.[2] Seeds should be collected in the late summer to fall when the perigynia turns from green to a tan or brown color.[5] Similar to *C. rostrata*, one can press the perigynia between your fingers to test for the presence of an achene inside.[8] Seeds are collected by stripping the inflorescence or cutting off the inflorescence (spikes) for further subsequent cleaning.[5]
Propagule Processing/Propagule Characteristics	Seed viability is unknown
Pre-Planting Propagule Treatments	*Carex* species' achenes within the perigynia should be air-dried for two weeks.[7] A possible barrier to *Carex stipata* germination is the thick perigynia that encloses the seeds.[5] A razor blade may be used to cut off the perigynia by hand to improve germination rates.[5] Similar to *C. rostrata*, one can clean the seed by hand stripping the spikes (if not done during collection).[8]

	Then use a sieve to remove dried chaff.[8] If available, a thresher is useful to break seeds from stems/perigynia (especially for large quantities of seed).[9] The material should then be run through an air-screen machine.[9] *Carex stipata* seed can be germinated without stratification.[5]
Growing Area Preparation / Annual Practices for Perennial Crops	*Carex spicata* should be germinated in a sterilized sand (30%), sphagnum (40%), and perlite (30%) mixture.[5] No specific container size is mentioned in literature as being more optimal for growth and development.
Establishment Phase Details	*Carex* species' seeds generally need warm conditions and light to germinate, and should only be covered with a very light layer of mulch.[9] Germination begins to occurs about two weeks after sowing.[7]
Length of Establishment Phase	Seedling growth in *Carex* species is generally rapid after germination.[7]
Active Growth Phase	Active growth phase unknown
Length of Active Growth Phase	Active growth phase unknown, but generally graminoids require 3-4 months to reach maturity.[6]
Hardening Phase	Hardening phase unknown
Length of Hardening Phase	Length of hardening phase unknown, but generally graminoids require 1-2 weeks minimum for hardening.[6]
Harvesting, Storage and Shipping	N/A
Length of Storage	N/A
Guidelines for Outplanting / Performance on Typical Sites	Transplanting success is high.[4] Elapsed time to flowering after planting unknown.
Other Comments	According to the USDA, *Carex spicata* can be propagated by bare roots or sprigs.[1] However, propagation by seed was the only method suggested from the information sources cited.
INFORMATION SOURCES	
References	(1) USDA, Natural Resources Conservation Service. The PLANTS Database- Carex stipata Muhl. ex Willd. https://www.plants.usda.gov/core/profile?symbol=CAST5 Accessed 19, April 2018. (2) Burke Museum of Natural History and Culture. Carex stipata.

	http://biology.burke.washington.edu/herbarium/imagecollection.php?Genus=Carex&Species=stipata. Accessed 21, April 2018. (3) Pojar, J, Mackinnon, A. Alaback, P.B. *Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia and Alaska.* Auburn, WA. Lone Pine Publishing; 1994. (4) Cooke, S. *A Field Guide to the Common Wetland Plants of Western Washington and Northern Oregon*. Seattle, WA. Seattle Audubon Society, Washington Native Plant Society; May, 1997. (5) Hough-Snee, N, Cooper, D. *Perigynium removal improves seed germination in awl-fruit sedge (Carex stipata)*. Madison, WI. Native Plants Journal, Volume 12, Number 1. University of Wisconsin Press; Spring 2011. (6) Toogood, A. *The Royal Horticultural Society Propagating Plants*. London, England. Dorling Kindersley; 1999. (7) Houseal, G. Tallgrass Prairie Center, University of Northern Iowa. Propagation and agronomic seed increase of native sedges (Carex). https://tallgrassprairiecenter.org/sites/default/files/pdfs/houseal.pdf Accessed 21, April 2018. (8) Rose, R, et al. *Propagation of Pacific Northwest Native Plants*. Corvallis, Oregon. Oregon State University Press; 1998. (9) USDA NRCS - Corvallis Plant Materials. Native Seed Production Manual for the Pacific Northwest. https://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/orpmcpu12767.pdf Accessed 19 April, 2018.
Other Sources Consulted	Flora of North America. http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=200026649 . Accessed 21, April 2018.

	Leigh, M. *Grow Your Own Native Landscape*. Lacey, WA. WSU Cooperative Extension-Thurston County; Revised ed. June 1999.
Protocol Author	Jon Backus
Date Protocol Created or Updated	04/21/2018

Plant Data Sheet

Species (common name, Latin name)
Sawbeak sedge, *Carex stipata*

Range
Worldwide; in lowland to midmontane moist soils.

Climate, elevation
Lowland to midmontane (Cooke)

Local occurrence (where, how common)
Common along western Washington, north through British Columbia (Pojar)

Habitat preferences
Disturbed wet meadows, shores, stream banks and swamps. Requires full sun, grows as scattered individuals (Cooke)

Plant strategy type/successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)
Adapted to fine to medium textured soils with a high tolerance for anaerobic conditions, Disturbed sites (Cooke) (Vegspec)

Associated species
Carex spp., Salix spp., Cornus spp., Juncus spp., Scirpus spp. (Wetland)

May be collected as: (seed, layered, divisions, etc.)
Seed, rhizome, division (Leigh)

Collection restrictions or guidelines
Blooms late May through August (Cooke), low seed/fruit availability (Vegspec)

Seed germination (needs dormancy breaking?)
No cold stratification required, wet stratification (Rose) (Vegspec)

Recommended seed storage conditions
Keep wet outdoors for natural stratification or stratify wet in refrigerator (Rose)

Propagation recommendations (plant seeds, vegetative parts, cuttings, etc.)
Grown from seed, by sowing in the fall, either on site or in trays after overwintering. Collect in June to July, remove seed from seedhead. Rhizome cuttings can be propagated easily. Also multiplied by division. (Leigh) (Rose)

Soil or medium requirements (inoculum necessary?)
(Based on other *Carex* spp.) After stratifying wet in refrigerator, sow in February in potting soil and place in hoop house (Rose)

Installation form (form, potential for successful outcomes, cost)
$10in^3$ plug, $0.75 (Sound Native Plant)

Recommended planting density
2700-4800 per acre (Vegspec)

Care requirements after installed (water weekly, water once etc.)
Moist to inundated soil (Rose)

Normal rate of growth or spread; lifespan
3.5’ at maturity, moderate (Vegspec)

Sources cited

Cooke, Sarah. A Field Guide to the Common Wetland Plants of Western Washington and Northern Oregon. Seattle Audubon Society, Washington Native Plant Society. May 1997.

Leigh, Michael. Grow Your Own Native Landscape. Native Plant Salvage Project, WSU Cooperative Extension-Thurston County. Revised ed. June 1999.

Pojar, Jim and Andy MacKinnon. Plants of the Pacific Northwest Coast-Washington, Oregon, British Columbia and Alaska. B.C. Minisrtyof Forest and Lone Pine Publishing. 1994.

Rose, Robin, Caryn Chachulski, and Diane Haase. Propagation of Pacific Norhtwest Native Plants. Oregon State University Press, Corvallis, OR. 1998.

Sound Native Plants, May 1, 2003. http://soundnativeplants.com/

VegSpec. Phil Smith, Project Manager. http://ironwood.itc.nrcs.usda.gov/Netdynamics/Vegspec/pages/HomeVegspec.htm, USDA, Natural Resource Conservation Service. May 1, 2003.

Wetland Plants, May 1, 2003. http://www.mde.state.md.us/assets/document/wetlandswaterways/wetplant.pdf