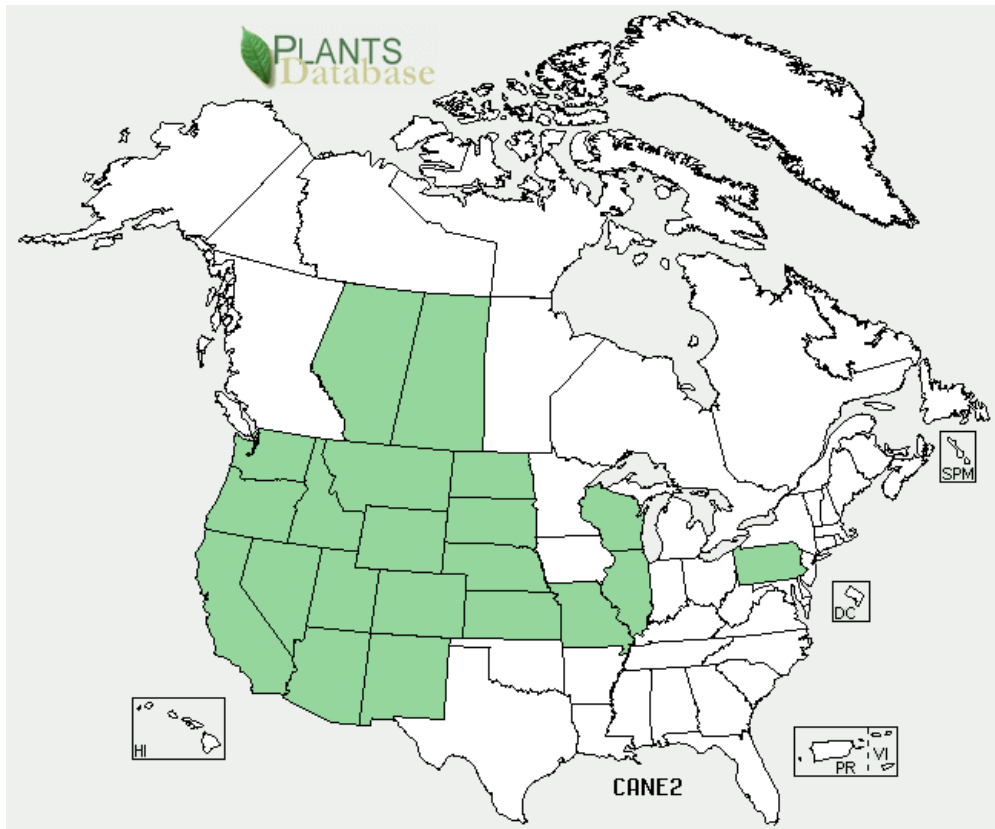
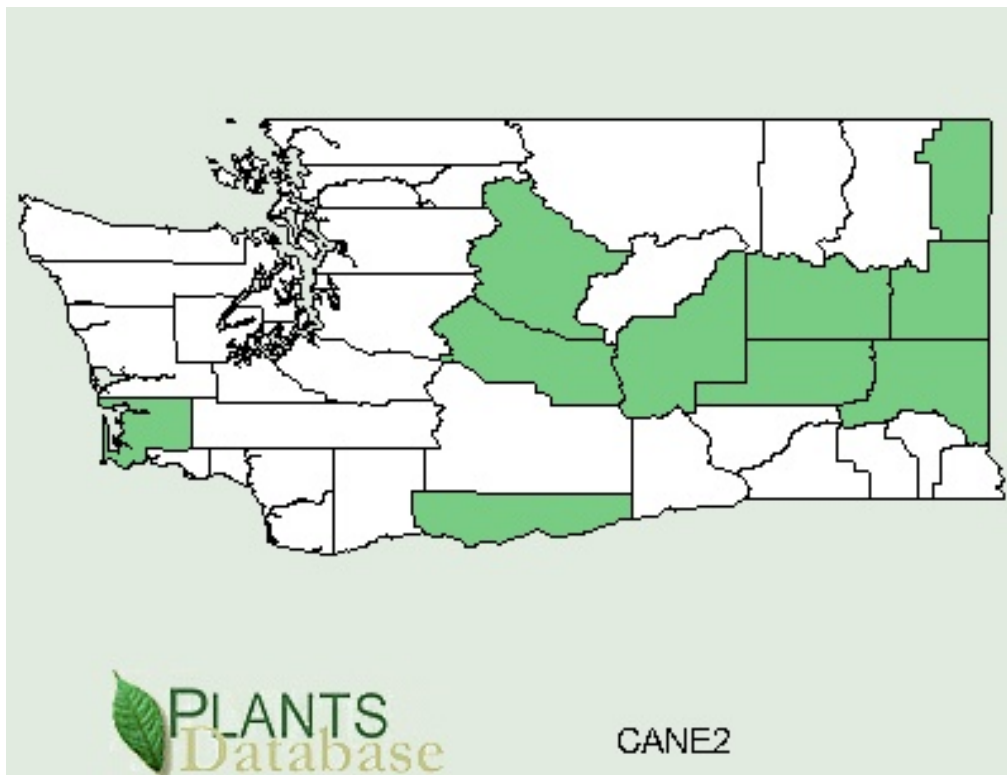


Plant Propagation Protocol for [*Carex nebrascensis* Dewey]
ESRM 412 – Native Plant Production

North America Distribution



Washington State Distribution



TAXONOMY

Family Names	
Family Scientific Name:	Cyperaceae
Family Common Name:	Sedge family
Scientific Names	
Genus:	<i>Carex</i>
Species:	<i>nebrascensis</i>
Species Authority:	Dewey
Variety:	
Sub-species:	
Cultivar:	
Authority for Variety/Sub-species:	
Common Synonym(s) (include full scientific names (e.g., <i>Elymus glaucus</i> Buckley), including variety or subspecies information)	<i>Carex jamesii</i> Torrey, 1836 non Schwein. 1824 (1) <i>Carex nebrascensis</i> Dewey var. <i>eruciformis</i> Suksd. (1) <i>Carex nebrascensis</i> Dewey var. <i>praevia</i> L.H.Bailey(1) <i>Carex nebrascensis</i> Dewey var. <i>ultiformis</i> L.H.Bailey(1)
Common Name(s):	Nebraska sedge (7)
Species Code (as per USDA Plants database):	CANE2

GENERAL INFORMATION

Geographical range (distribution maps for North America and Washington state)	USA (AZ, CA, CO, ID, IL, KS, MO, MT, ND, NE, NM, NV, OR, PA, SD, UT, WA, WI, WY) CANADA (AB, SK)
Ecological distribution (ecosystems it occurs in, etc):	Wet meadows, swamps, and ditches, often in alkaline soil (3,2)
Climate and elevation range	low- to mid-elevation, sea level to 2,500 m (3,8)
Local habitat and abundance; may include commonly associated species	Wire rush, timothy, water sedge, and other native sedges. In disturbed areas, it can be found with Kentucky and redbtop. (4)
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	
Plant characteristics (life form (shrub, grass, forb), longevity, key characteristics, etc)	Perennial, Rhizomatous, dense stands with root biomasses up to 3000g/m ² in the top 20 cm of soil. (7, 5,9) Seedling establishment is rare probably, because it needs freshly deposited, fertile, moist soil. Shoots from rhizomes are produced throughout the growing season and into late fall. (6)

PROPAGATION DETAILS

Ecotype (this is meant primarily for experimentally derived protocols, and is a description of where the seed that was tested came from):	Aberdeen PMC (4)
Propagation Goal (Options: Plants, Cuttings, Seeds, Bulbs, Somatic Embryos, and/or Other Propagules):	Plants (8)
Propagation Method (Options: Seed or Vegetative):	Seed (8)
Product Type (options: Container (plug), Bareroot (field grown), Plug + (container-field grown hybrids, and/or Propagules (seeds, cuttings, poles, etc.))	Container (plug) (8)
Stock Type:	
Time to Grow (from seeding until plants are ready to be outplanted):	
Target Specifications (size or characteristics of target plants to be produced):	Stems are erect and triangular from 20 to 110 cm (8 to 43 in) tall. (5) Leaves alternate, up to 12 mm (0.5 in) wide and can be longer or shorter than the stem. (5)
Propagule Collection (how, when, etc):	Late summer and early fall (9) Mature female spikes containing the achenes can be collected by hand stripping the flowering stems (9)
Propagule Processing/ Propagule Characteristics (including seed density (# per pound), seed longevity, etc):	2.7 million perigynia/kg (9) Seeds may be collected by hand stripping the seed from the plant or clipping it using a pair of hand shears. (6) A hammer mill is used to break up the large debris and knock the seeds loose from the stem. Cleaning can be accomplished using a seed cleaner with screens. Screens should be sized so desired seeds will fall through and debris and weed seeds are removed. Air velocity should be adjusted so chaff and empty perigynia are blown away. Air flow and screen size may require adjustment to optimize the cleaning process for a given situation. (9)

<p>Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):</p>	<p>Removing the perigynia and wet pre-chilling the seeds in a mixture of water and sphagnum moss at 2 C for 30 days will enhance the germination rate. (9)</p> <p>Removal of the perigynium, the saclike structure around mature achenes, either with forceps or sandpaper, provided sufficient scarification to significantly increase total germination about 50% compared with that of nonscarified achenes. (9)</p> <p>A combination of scarification and 32 day of cold, moist stratification can help result in 25% higher total germination than stratification alone. Cold, moist stratification also improved germination rate. (9)</p> <p>Stratification of scarified achenes with <i>Sphagnum</i> peat moss can help increase 17% more germination than when scarified achenes were stratified in distilled water only. (9)</p> <p>Nebraska sedge can be efficiently germinated in nurseries if perigynia are removed by scarification and achenes stratified 32 days at 3°C (37°F) with a <i>Sphagnum</i> peat moss substrate. (9)</p>
<p>Growing Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc):</p>	<p>The soil should be kept saturated with no more than 2.5 to 5.1 cm of standing water until the plants are well established and the aerenchymous material (the above ground biomass) is about 0.3 m tall. (6)</p> <p>Fluctuating the water level during the establishment period may speed establishment and spread. (6)</p>
<p>Establishment Phase (from seeding to germination):</p>	<p>About one week. (6)</p>
<p>Length of Establishment Phase:</p>	
<p>Active Growth Phase (from germination until plants are no longer actively growing):</p>	
<p>Length of Active Growth Phase:</p>	
<p>Hardening Phase (from end of active growth phase to end of growing season; primarily related to the development of cold-hardiness and preparation for winter):</p>	
<p>Length of Hardening Phase:</p>	
<p>Harvesting, Storage and Shipping (of seedlings):</p>	
<p>Length of Storage (of seedlings, between nursery and outplanting):</p>	

Guidelines for Outplanting / Performance on Typical Sites (eg, percent survival, height or diameter growth, elapsed time before flowering):	Planting plugs is the surest way to establish a new stand of this species. (6)
Other Comments (including collection restrictions or guidelines, if available):	
INFORMATION SOURCES	
References (full citations):	<ol style="list-style-type: none"> 1) "Carex nebrascensis Dewey." <i>Robert W. Freckmann Herbarium</i>. 28 Apr 2009 <http://wisplants.uwsp.edu/scripts/detail.asp?SpCode=CARNEB>. 2) "Carex nebrascensis Dewey." <i>www.fs.fed.us</i>. 28 Apr 2009 <http://www.fs.fed.us/rm/pubs/rmrs_gtr010/rmrs_gtr010_nebrascensis.pdf#xml=http://www.fs.fed.us/cgi-bin/teaxis/searchallsites/search.allsites/xml.txt?query=Carex+nebrascensis&db=allsites&id=47c858350>. 3) "FNA Vol. 23 Page 380, 386, 388." <i>Flora of North America</i>. 28 Apr 2009 <http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=242357353>. 4) "Nebraska Sedge." <i>Range Plants of Utah</i>. 28 Apr 2009 <http://extension.usu.edu/range/Grasses/nebraskasedge.htm>. 5) "Plant Fact Sheet." <i>NEBRASKA SEDGE Carex nebrascensis Dewey</i> 23 May 2006 Web.28 Apr 2009. <http://plants.usda.gov/factsheet/pdf/fs_cane2.pdf>. 6) "Plant Guide." <i>NEBRASKA SEDGE Carex nebrascensis Dewey</i> 28 sep 2005 Web.28 Apr 2009. <http://plants.usda.gov/plantguide/pdf/pg_cane2.pdf>. 7) "PLANTS Profile ." <i>USDA</i>. 28 Apr 2009 <http://plants.usda.gov/java/profile?symbol=CANE2>. 8) "Protocol Information." <i>nativeplantnetwork.org</i>. 28 Apr 2009 <http://www.nativeplantnetwork.org/network/view.asp?protocol_id=3517>. 9) "WETLAND PLANT FACT SHEET." <i>Nebraska Sedge (Carex nebrascensis)</i> Web.28 Apr 2009.<http://plant-materials.nrcs.usda.gov/pubs/idpmcfscane2.pdf>.
Other Sources Consulted (but that contained no pertinent information) (full citations):	<p>"aosaseed." Web.27 Apr 2009. <http://www.aosaseed.com/docs/070426_Species_wo_AOSA_list_plus_adds.pdf>.</p> <p>"Native Plant List." <i>King County</i>. 25 Apr 2009 <http://green.kingcounty.gov/GoNative/Plant.aspx?Act=list>.</p> <p>"Native Plants." <i>Washington State University</i>. 27 Apr 2009 <http://cahedb.wsu.edu/nativePlant/scripts/webShowClassification.asp>.</p> <p>"Perigynium removal and cold, moist stratification improve germination of Carex nebrascensis (Nebraska sedge).."</p> <p>"Roadside Use of Native Plants." <i>U.S. Department of Transportation</i>. 25 Apr 2009 <http://www.fhwa.dot.gov/environment/rdsduse/wa.htm>.</p>

	<p>"WTU Image Collection: Plants of Washington Lichens of Washington." <i>The Burke Museum</i>. 29 Apr 2009 <http://biology.burke.washington.edu/herbarium/imagecollection.php>.</p> <p>DARKE, R. (2007). <i>The encyclopedia of grasses for livable landscapes</i>. Portland, Or, Timber Press.</p> <p>DARKE, R., & GRIFFITHS, M. (1994). <i>Manual of grasses</i>.</p> <p>HITCHCOCK, C. L., & CRONQUIST, A. (1973). <i>Flora of the Pacific Northwest; an illustrated manual</i>. Seattle, University of Washington Press.</p> <p><i>Integrated Taxonomic Information System</i>. 26 Apr 2009 <http://www.itis.gov/index.html>.</p> <p>KNOBEL, E., & FAUST, M. E. (1977). <i>Field guide to the grasses, sedges and rushes of the United States</i>. New York, Dover Publications.</p> <p>KOZLOFF, E. N. (2005). <i>Plants of western Oregon, Washington & British Columbia</i>. Portland, Or, Timber Press.</p> <p>MACKINNON, A., POJAR, J., & ALABACK, P. B. (2004). <i>Plants of the Pacific Northwest coast: Washington, Oregon, British Columbia & Alaska</i>. Vancouver, Lone Pine Pub.</p> <p>MOHLENBROCK, R. H. (2008). <i>Acanthaceae to Myricaceae: water willows to wax myrtles</i>. Carbondale, Southern Illinois University Press.</p> <p><i>MsK Rare Plant Nursery</i>. 28 Apr 2009 <http://www.msknursery.com/index.htm>.</p> <p><i>Native Seed Network</i>. 25 Apr 2009 <http://www.nativeseednetwork.org/article_view?id=28>.</p> <p>OAKES, A. J. (1990). <i>Ornamental grasses and grasslike plants</i>. New York, Van Nostrand Reinhold.</p> <p>ONDRA, N. J., & HOLT, S. (2002). <i>Grasses: versatile partners for uncommon garden design</i>. North Adams, Mass, Storey Books.</p> <p>Portland, Or, Timber Press.</p> <p><i>Restoration, Nurseries and Genetic Resources</i>. 25 Apr 2009 <http://www.rngr.net/Publications/fnn/citations/importedz/FNNCitation_10262/view>.</p> <p>SPEDDING, C. R. W., & DIEKMAHNS, E. C. (1972). <i>Grasses and legumes in British agriculture</i>. Slough, Commonwealth Agricultural Bureaux.</p> <p>VASEY, G. (1891). <i>Illustrations of North American grasses</i>. Washington, Govt. Print. Off.</p>
Protocol Author (First and last name):	Alex Win
Date Protocol	4/29/2009

Created or Updated (MM/DD/YY):	
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Note: This template was modified by J.D. Bakker from that available at: <http://www.nativeplantnetwork.org/network/SampleBlankForm.asp>

2003 Protocol

Plant Data Sheet: Nebraska sedge (*Carex nebrascensis*)



Range

Nebraska sedge populations are common in most American states west of the Mississippi ⁽⁵⁾.

Climate, elevation

Nebraska sedge is found at low to mid elevations throughout the mid-west and the arid and semi-arid American west ⁽¹⁾.

Local occurrence (where, how common)

This sedge species is a common dominant in disturbed riparian areas, less commonly forming dense communities in healthy areas. It can be especially dominant in grazed areas because it resists grazing and trampling damage ⁽³⁾.

Habitat preferences

Nebraska sedge is typically found in wet meadows, on the active floodplains of streams, and along the edges of lakes and reservoirs ^(1,3).

Plant strategy type/successional stage

Nebraska sedge tends to occur as a seral to climax species ⁽³⁾.

Associated species

Due to its wide range, species associated with Nebraska sedge include a wide variety of riparian species. Those described for central Oregon, as an example, include willow species such Geyer's willow and Lemmon willow, Baltic rush, and a wide variety of other sedge species⁽³⁾. Nebraska sedge often forms dense communities and prevents other species from dominating.

May be collected as: (seed, layered, divisions, etc.)

Nebraska sedge naturally reproduces by rhizome or seed, although seed germination is low except on freshly deposited and moist sediments. It may be collected as seed, divisions, or wild transplant. There are generally 2.7 million perigyna/kg⁽²⁾.

Collection restrictions or guidelines

Collect the seed from August through October. Seed set may be variable, so verify how much collection is necessary before beginning to harvest^(1,2). Seed may be collected by hand or by clipping off the seed heads. A power harvester can also be used for large-scale harvests of dense communities. Seed should be cleaned using a seed cleaner with a No.8 top screen and a No.20 bottom screen. The screens should be sized so the seed will fall through. Perigynia should be removed using a seed scarifier or sandpaper box, then separated from the seed using screens⁽²⁾.

Seed germination

Germination rate is improved by removing the perigynia and pre-chilling the seeds in wet sphagnum moss at 2°C for 30 days. When germinating seed in a greenhouse, place seeds on the soil surface and lightly press to ensure good contact with the soil. The seed should not be covered and soil should be kept muddy. The greenhouse should be kept hot (32-38°C). Ideally, germination should begin in roughly a week⁽²⁾.

Seed life and storage

No seed life or storage information was available.

Propagation recommendations

Nebraska sedge possesses a thick and spreading rhizome and root system^(1,2). It is an aggressive rhizomatous spreader. Due to its sporadic seed set and germination, vegetative propagation may be the surest method.

Soil or medium requirements

Nebraska sedge prefers wet sediments and does not seem to require high levels of organic matter⁽²⁾.

Installation form (form, potential for successful outcomes, cost)

Planting plugs is the most effective way to establish a stand of Nebraska sedge⁽²⁾.

Recommended planting density

If planted 30-45 cm apart, plugs will fill in the area within one growing season⁽²⁾.

Care requirements after installed (water weekly, water once etc.)

During propagation and after installation the soil should be kept saturated, with the water rarely dropping below the root zone. No more than 2.5-5.1 cm of standing water should be present, however. The species can tolerate both periods of drought and complete inundation once established⁽²⁾.

Normal rate of growth or spread; lifespan

Nebraska sedge is rather fast growing. Stems can reach a height of up to 90 cm⁽²⁾.

Sources cited

- (1) Hurd, E.G. et al (1994). Cyperaceae and juncaceae--selected low-elevation species. Gen-tech-rep-INT. Odgen, Utah : United States Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 380-383.

- (2) Interagency Riparian/Wetland Project. Wetland Plant Fact Sheet: Nebraska sedge. U.S. Department of Agriculture and Natural Resource Conservation Service. Aberdeen, Idaho.

- (3) Kovalchik, B.L. (1987). Riparian zone associations: Deschutes, Ochoco, Fremont, and Winema National Forests. R6-ECOL-TP. United States Department of Agriculture, Forest Service, Pacific Northwest Region.

- (4) Ratliff, R.D. (1983). Nebraska sedge (*Carex nebraskensis* Dewey): observations on shoot life history and management. Journal of Range Management, 36 (4), 429-430.

- (5) United States Department of Agriculture. Nebraska sedge. Plants database. <http://plants.usda.gov>. Retrieved April 29, 2003.

Data compiled by (Sarah Baker 4/29/03)