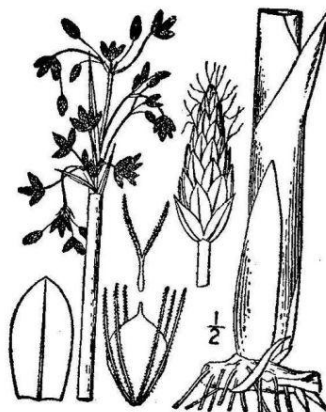


**Plant Propagation Protocol for *Schoenoplectus tabernaemontani***

ESRM 412 – Native Plant Production

Jerry Krajna

May 19, 2010


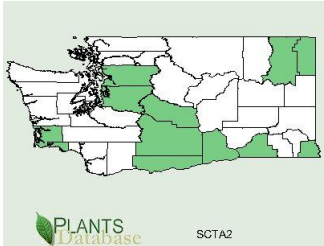


(USDA Plants Database)

**TAXONOMY**

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| <b>Family Names</b>   |  |
| Family Scientific Name:   | Cyperaceae   |
| Family Common Name:   | Sedge  |
| <b>Scientific Names</b>   |  |
| Genus:  | <i>Schoenoplectus</i>  |
| Species:  | <i>tabernaemontani</i>   |
| Species Authority:  | (C.C. Gmel.) Palla   |
| Variety:  |  |
| Sub-species:  |  |
| Cultivar:   |  |
| Authority for Variety/Sub-species:  |  |
| Common Synonym(s)<br>(include full scientific names (e.g., <i>Elymus glaucus</i> Buckley), including variety or subspecies information) | <i>Schoenoplectus lacustris</i> (L.) Palla ssp. <i>creber</i> (Fernald) A. Löve & D. Löve<br><i>Schoenoplectus lacustris</i> (L.) Palla ssp. <i>tabernaemontani</i> (C.C. Gmel.) A. Löve & D. Löve<br><i>Schoenoplectus lacustris</i> (L.) Palla ssp. <i>validus</i> (Vahl) T. Koyama<br><i>Schoenoplectus validus</i> (Vahl) A. Löve & D. Löve<br><i>Schoenoplectus validus</i> (Vahl) A. Löve & D. Löve ssp. <i>creber</i> (Fernald) A. Löve & D. Löve<br><i>Schoenoplectus validus</i> (Vahl) A. Löve & D. Löve ssp. <i>luxurians</i> (Miq.) Soják<br><i>Scirpus lacustris</i> L. ssp. <i>creber</i> (Fernald) T. Koyama<br><i>Scirpus lacustris</i> L. ssp. <i>glaucus</i> (Rchb.) Hartm.<br><i>Scirpus lacustris</i> L. ssp. <i>tabernaemontani</i> (C.C. Gmel.) Syme<br><i>Scirpus lacustris</i> L. ssp. <i>validus</i> (Vahl) T. Koyama<br><i>Scirpus tabernaemontani</i> C.C. Gmel.<br><i>Scirpus validus</i> Vahl<br><i>Scirpus validus</i> Vahl var. <i>creber</i> Fernald |
| Common Name(s):   | great bulrush, soft-stemmed bulrush, common bulrush, giant bulrush, bull whip, <i>Scirpus validus</i> (USDA)   |
| Species Code:   | SCTA2  |

## GENERAL INFORMATION

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| <p>Geographical range:</p>   | <p>Distributed throughout the United States and most Canadian provinces and territories. Distribution maps for North America and Washington State are below.</p>  <p><a href="http://plants.usda.gov/java/profile?symbol=SCTA2&amp;mapType=nativity&amp;photoID=scva_001_avd.tif">http://plants.usda.gov/java/profile?symbol=SCTA2&amp;mapType=nativity&amp;photoID=scva_001_avd.tif</a></p>  <p><a href="http://plants.usda.gov/java/county?state_name=Washington&amp;statefips=53&amp;symbol=SCTA2">http://plants.usda.gov/java/county?state_name=Washington&amp;statefips=53&amp;symbol=SCTA2</a></p> |
| <p>Ecological distribution:</p>  | <p>Populations can be found in periodically or permanently-flooded marshes, in water up to three feet deep. Usually found in areas of full sun.</p>  |
| <p>Climate and elevation range:</p>  | <p>Climate range varies. Populations persist in areas that have at least 80 days free of frost and can supply this species high demand for water resources. It can be found at elevations between 0–2400 m above sea level. (USDA)</p>   |
| <p>Local habitat and abundance; may include commonly associated species:</p>                       | <p>Found in fresh to brackish marshes, fens, bogs, lakes, stream banks and bars, pioneering in disturbed places, and often emergent in water to 1 m. (efloras) Occurs north of Vancouver Island sporadically and locally abundant in the southern half of our region. (Pojar) This species can tolerate a wide range of salinity and grows better in saline conditions than in fresh water. (USDA)</p>   |
| <p>Plant strategy type / successional stage</p>  | <p>This species is often a pioneer in disturbed wetland areas. It is intolerant to shade and drought conditions. (USDA)</p>  |
| <p>Plant characteristics (life form (shrub, grass, forb), longevity, key characteristics, etc)</p> | <p>This emergent perennial grows in a clump from rhizomes, and reaches a height of 4-8 feet. Stems are bright green, cylindrical, erect, often ½ inch wide at the base, with small, poorly-developed leaves clasped around the stem. Flowers appear near the tops of stems, and are contained in compact, grayish-brown spikelets clustered at the ends of short offshoots from the main stem. All are borne open terminal clusters and blooms from June to August. Fruit consists of a brownish-gray bristled achene. (USDA) (WSU Native Plants Database)</p>   |
| <h2>PROPAGATION DETAILS</h2>   |  |
| <p>Ecotype (this is meant primarily for experimentally derived</p>                                 | <p>For the purpose of O.A. Clevering’s experiments with this species 1.75mg of seed was purchased from a commercially grown stand along the Oude Maas tidal river (51°50’N, 4°29’E) which is a Rhine River distributary in the Dutch</p>   |

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| protocols, and is a description of where the seed that was tested came from):                                      | province of South Holland in Europe. The purchased seed was collected in 1986 and allowed to age up to 14 months while held in dry storage at 4°C between experiments.   |
| Propagation Goal:  | Plants   |
| Propagation Methods:   | Seeds, rhizome cuttings are also possible  |
| Product Type:  | Container (plug)   |
| Stock Type:  | 1+0 container  |
| Time to Grow :   | 6 months   |
| Target Specifications (size or characteristics of target plants to be produced):                                   | No information was given.  |
| Propagule Collection (how, when, etc):   | Seeds of soft-stem bulrush vary in ripening dates from early August until the middle of October. Harvesting takes place by cutting or removing fruit clusters from the plant's stem. (Grabowski)   |
| Propagule Processing/Propagule Characteristics (including seed density (# per pound), seed longevity, etc):        | Without allowing seeds to dry out, loosen seeds from cluster using a brush machine (Westrup a/s Slagelse, Denmark). After loosening sieve seeds through a 1.953mm round holed screen to remove any remaining non-seed plant remnants. (Grabowski)  |
| Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):  | Seeds experience physiological dormancy. If planting outdoors, in seed increase beds, seeds should be collected during mid-summer (~July) and immediately scattered on- site. If seeds are to be sown in pots, in the fall or spring, they should be stratified for 80 days in a moist environment (Baskin) (WSU). Seeds germinate at alternating temperatures of 30°/5° C with greater germination experienced in light rather than dark conditions. (Clevering) (Baskin) |
| Growing Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc): | Growing media consists of a water-saturated mix of organic soil and sand.  |
| Establishment Phase (from seeding to germination):   | ~3-4 weeks (WSU) germination is best achieved in a saturated growing medium with water maintained between .25 - .50 inches deep within a temperature range of 55°-100°F. (Grabowski)   |
| Length of Establishment Phase:   | Information found did not provide length of establishment phase but did note that continued seedling growth was achieved by maintaining a moist medium through regular watering of containers (Grabowski).   |
| Active Growth Phase (from germination until plants are no longer actively  | No information found   |

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| growing):  |  |
| Length of Active Growth Phase:   | No specific information was found except generalizations about how this species is easy to cultivate in wetland areas and how it can spread aggressively if not kept in check. (Illinois Wildflowers)  |
| 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): | No time specific information was found for this particular species.  |
| Length of Hardening Phase:   | No information found   |
| Harvesting, Storage and Shipping (of seedlings):   | No information found   |
| Length of Storage (of seedlings, between nursery and outplanting):   | No specific information on length of storage was found however I feel that the less time plants are held in storage the better for restoration project purposes. Less time held in storage can correlate to a decrease in chances of other plant species taking root in the pots, if storage is in an outdoor situation, or issues with the rhizomes growing too big for the container arise.  |
| Guidelines for Outplanting / Performance on Typical Sites :  | Spring and Winter are ideal times for dividing plant stock vegetatively. Divisions or rhizomes should be planted 4-6 inches below saturated or shallowly inundated soils with special attention to be sure that the stem projects above the water surface to prevent suffocation of the roots. The soil around the transplanted division or rhizome should then be firmed. (WSU)   |
| Other Comments (including collection restrictions or guidelines, if available):  | The literature reviewed for the creation of this protocol provided either incomplete information or propagation was initiated for experimental purposes with particular attention paid to the effects of seed treatments on the germination rates within a lab and field setting. Field studies only provided rough time frames from which seeds were sown until seedlings emerged and did not provide specific timeframes for individual plant life stages. |

### INFORMATION SOURCES

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|------------------------------|---|
| References (full citations): | <p>Baskin, Carol C. 2003. Propagation protocol for production of container <i>Schoenoplectus tabernaemontani</i> (K.C. Gmel.) Palla plants; University of Kentucky, Lexington, Kentucky. In: Native Plant Network. URL: <a href="http://www.nativeplantnetwork.org">http://www.nativeplantnetwork.org</a> (accessed 13 May 2010). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.</p> <p>Clevering, 1995. Germination and seedling emergence of <i>Scirpus lacustris</i> L. and <i>Scirpus maritimus</i> L. with special reference to the restoration of wetlands. <i>Aquatic Botany</i> 50, 63-78.</p> <p><i>Flora of North America</i> online: Vol 23: Cyperaceae. Accessed 14 May 2010 from <a href="http://www.efloras.org/florataxon.aspx?flora_id=1&amp;taxon_id=242357954">http://www.efloras.org/florataxon.aspx?flora_id=1&amp;taxon_id=242357954</a></p> <p>Grabowski, Janet M. 2001. Propagation protocol for production of container <i>Schoenoplectus tabernaemontani</i> (K.C. Gmel.) Palla plants (1+0 container); USDA NRCS - Coffeerville/Jamie L. Whitten Plant Materials Center, Coffeerville, Mississippi. In: Native Plant Network. URL: <a href="http://www.nativeplantnetwork.org">http://www.nativeplantnetwork.org</a> (accessed 18 May 2010). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.</p> |
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|                                   | <p>Illinois Wildflowers: Great Bulrush <i>Schoenoplectus tabernaemontani</i>. Accessed 14 May 2010 from <a href="http://www.illinoiswildflowers.info/grasses/plants/gt_bulrush.htm">http://www.illinoiswildflowers.info/grasses/plants/gt_bulrush.htm</a></p> <p>Pojar, J. and A. MacKinnon (1994). <i>Plants for the Pacific Northwest Coast Washington, Oregon, British Columbia, &amp; Alaska</i>. Forest Service of British Columbia and Lone Pine Press; Vancouver, BC</p> <p>WSU CAHE NW Native Plant Database: <i>scirbus acutus</i>. Accessed 14 May 2010 from <a href="http://cahedb.wsu.edu/nativePlant/scripts/webDisplayPlant.asp?ID=nv071">http://cahedb.wsu.edu/nativePlant/scripts/webDisplayPlant.asp?ID=nv071</a></p> <p>Photo: USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. An illustrated flora of the northern United States, Canada and the British Possessions. Vol. 1: 331.</p> |
| Other Sources Consulted:          | AOSA. Updated 2009. <i>Suggested purity and/or germination testing methods for species without AOSA Rules testing procedures</i> . Association of Seed Analysts, Stillwater, OK.   |
| Protocol Author                   | Jerry Krajna   |
| Date Protocol Created or Updated: | May 19, 2010   |

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