

**Plant Propagation Protocol for *Sparganium emersum***

ESRM 412 – Native Plant Production

Protocol URL: <https://courses.washington.edu/esrm412/protocols/SPEM2.pdf>



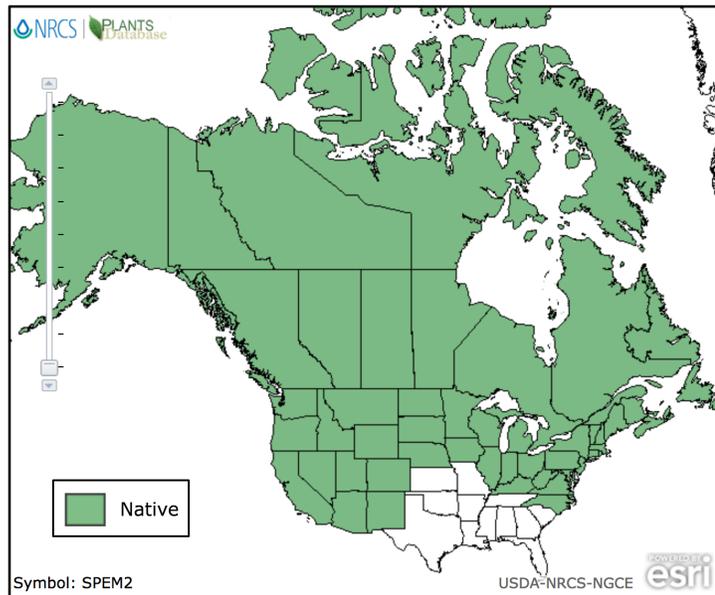
Image Source: <https://plants.usda.gov/core/profile?symbol=spem2#>

<b>TAXONOMY</b>	
<b>Plant Family</b>	
Scientific Name	Sparganiaceae
Common Name	Bur-reed family
<b>Species Scientific Name</b>	
Scientific Name	<i>Sparganium emersum</i> Rehmman
Varieties	<i>Sparganium emersum</i> Rehmman var. <i>angustifolium</i> (Michx.) Roy L. Taylor & MacBryde <i>Sparganium emersum</i> Rehmman var. <i>multipedunculatum</i> (Morong) Reveal
Sub-species	<i>Sparganium emersum</i> Rehmman ssp. <i>emersum</i>
Cultivar	
Common Synonym(s)	<i>Sparganium acaule</i> (Beeby ex Macoun) Rydb. <i>Sparganium chlorocarpum</i> Rydb. <i>Sparganium chlorocarpum</i> Rydb. var. <i>acaule</i> (Beeby ex Macoun) Fernald <i>Sparganium emersum</i> Rehmman ssp. <i>Emersum</i> <i>Sparganium simplex</i> Huds.
Common Name(s)	European bur-reed, simple-stem bur-reed
Species Code (as per USDA Plants database)	SPEM2

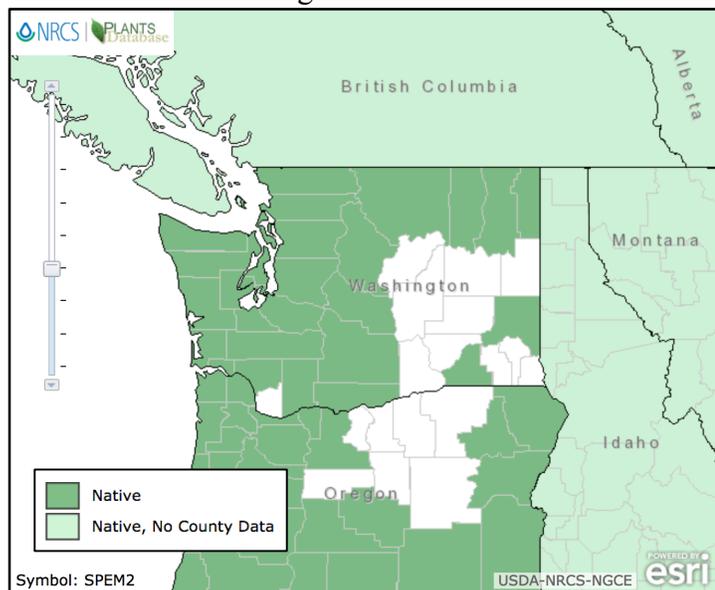
## GENERAL INFORMATION

Geographical range

Distribution in North America



Distribution in Washington State



Ecological distribution

*Sparganium emersum* generally grows out of water, occurring in shallow ponds and marshes, and at edges of ponds, lakes and sloughs (Guard, 1995; Knoke, 2018).

Climate and elevation range

Local habitat and abundance

Plant strategy type / successional stage

As an emergent species, *S. emersum* is speculated to have a high tolerance of anaerobic and low oxygen conditions, and would thus be classified as a stress-

	tolerator. As a rhizomatous species, it is also expected to behave as a colonizer/competitor.
Plant characteristics	<i>S. emersum</i> is an emergent perennial herb/forb that blooms June through September (Knoke, 2018). It spreads rhizomatously (Knoke, 2018). The stems are erect, growing 20-50 cm tall (Guard, 1995; Knoke, 2018). The leaves are alternate, linear (ribbon or strap-like), 20-60 cm in length, and 4-10 cm wide (Guard, 1995; Knoke, 2018). They can be emersed and erect, partially submerged, or floating (Knoke, 2018). They are thick and spongy, with sheaths at bases, parallel veins, and blunt tips (Guard, 1995). <i>S. emersum</i> can be distinguished from grasses by its distinct flowers (Guard, 1995). Flowers are in spherical clusters on short stalks that angle away from the main stem (Guard, 1995). Each plant has 2-5 pistillate heads and 4-8 smaller staminate heads (Guard, 1995). The staminate heads are stalkless and occur above the pistillate heads (Guard, 1995). The fruits are 2-seeded, spindle shaped achenes, 4-5 mm long, with narrowed to stylar beaks (Guard, 1995; Knoke, 2018). They are enclosed in a thick, hard pericarp (Young and Young, 1986).
<b>PROPAGATION DETAILS</b>	
Ecotype	
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	
Time to Grow	Weeks from seeding until plants are ready to be outplanted (Bartow, 2015).
Target Specifications	Well developed crown, with roots and rhizomes filling container.
Propagule Collection Instructions	Seeds reach full maturity and are released in September and October, which is when seeds should be collected (Pollux et al., 2008).
Propagule Processing/Propagule Characteristics	Studies have shown that <i>S. emersum</i> produces two types of seeds: short floating seeds and long floating seeds (Pollux et al., 2008). Short floating seeds have a greater mass, sink within 4 weeks, and account for approximately 71% of all seed (Pollux et al., 2008). Long floating seeds have a lower mass, float for at least 6 months, and account for approximately 28% of all seeds (Pollux et al., 2008). Higher and faster germination rates have been observed in the short floating seeds (89.9% germination compared to 32.6% seen in the long floating seeds) (Pollux et al., 2008).

	These differences could indicate that the long floating seeds experience a higher degree of dormancy or lower viability than the short floating seeds (Pollux et al., 2008).
Pre-Planting Propagule Treatments	<i>S. emersum</i> seeds require cool/moist stratification (Bartow, 2015). Trials have shown germination to be best facilitated by cool/moist stratification for 45 day at 38°F (Bartow, 2015). Studies have shown germination rates to increase after seeds pass through the digestive tract of animals (Baskin and Baskin, 2014), which would suggest chemical scarification may increase germination rates.
Growing Area Preparation / Annual Practices for Perennial Crops	Containers in which <i>Sparganium</i> spp. are grown should remain in several centimeters of water (Heuser, 1997).
Establishment Phase Details	
Length of Establishment Phase	Germination of <i>Sparganium</i> spp. takes three weeks (Heuser, 1997).
Active Growth Phase	
Length of Active Growth Phase	<i>Sparganium</i> spp. reaches full maturity after 12 months (Heuser, 1997).
Hardening Phase	
Length of Hardening Phase	
Harvesting, Storage and Shipping	
Length of Storage	
Guidelines for Outplanting / Performance on Typical Sites	
Other Comments	
<b>INFORMATION SOURCES</b>	
References	<p>Bartow, A. 2015. Propagation protocol for production of container (plug) <i>Sparganium emersum</i> plants. USDA NRCS - Corvallis Plant Materials Center Corvallis, Oregon. In: Native Plant Network. US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources. Accessed: 13 May 2018. <a href="https://npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=sparganiaceae-sparganium-4079">https://npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=sparganiaceae-sparganium-4079</a></p> <p>Baskin CC, Baskin JM. 2014. Seeds: Ecology, Biogeography, and Evolution of Dormancy and Germination. Academic Press, Elsevier Inc.: San Diego, CA.</p> <p>Guard, J. 1995. Wetland Plants of Oregon and Washington. Lone Pine Publishing: Auburn, WA.</p>

	<p>Heuser CW. 1997. <i>The Complete Book of Plant Propagation</i>. Newtown, CT: The Taunton Press.</p> <p>Knoke, D. 2018. <i>Sparganium emersum</i>: simplestem bur-reed. WTU Herbarium Image Collection. Burke Museum of Natural History and Culture. Accessed: 13 May 2018.  <a href="http://biology.burke.washington.edu/herbarium/imagecollection.php">http://biology.burke.washington.edu/herbarium/imagecollection.php</a></p> <p>Pollux BJA, Verbruggen E, Van Groenendael JM, Ouborg NJ. 2008. Intraspecific variation of seed floating ability in <i>Sparganium emersum</i> suggests bimodal dispersal strategy. <i>Aquatic Botany</i>. 90, 199-203. Accessed: 14 May 2018.  <a href="http://bartpollux.nl/Publications_files/14.pdf">http://bartpollux.nl/Publications_files/14.pdf</a></p> <p>USDA, NRCS. 2018. The PLANTS Database. National Plant Data Team, Greensboro, NC. Accessed: 13 May 2018.  <a href="https://plants.usda.gov/core/profile?symbol=SP-EM2">https://plants.usda.gov/core/profile?symbol=SP-EM2</a></p> <p>Young JA, Young CG. 1986. <i>Collecting, processing, and Germinating Seeds of Wildland Plants</i>. Timber Press, Inc.: Portland, OR.</p>
Other Sources Consulted	<p>Bressette, DK. 2018. <i>Native Plants PNW: An Encyclopedia of the Cultural and Natural History of Northwest Native Plants</i>. Accessed: 13 May 2018. <a href="http://nativeplantspnw.com/">http://nativeplantspnw.com/</a></p> <p>Franklin JF, Dyrness CT. 1988. <i>Natural Vegetation of Oregon and Washington</i>. Oregon State University Press: Corvallis, OR.</p> <p>Kruckeberg, AR. 1996. <i>Gardening with Native Plants</i>. 2<sup>nd</sup> ed. Greystone Books/Douglas &amp; McIntyre: Vancouver, BC.</p> <p>Native Plant Database. Ladybird Johnson Wildflower Center. The University of Texas at Austin. Accessed: 14 May 2018.  <a href="https://www.wildflower.org/plants/">https://www.wildflower.org/plants/</a></p> <p>PFAF Plant Database. <i>Plants for a Future</i>. Accessed: 14 May 2018.  <a href="https://www.pfaf.org/user/Default.aspx">https://www.pfaf.org/user/Default.aspx</a></p> <p>Pojar J, MacKinnon A. 2013. <i>Alpine Plants of the Northwest: Wyoming to Alaska</i>. Alberta, Canada: Lone Pine Publishing.</p> <p>Pojar J, MacKinnon A. 1994. <i>Plants of the Pacific Northwest Coast</i>. Vancouver, British Columbia, Canada: Lone Pine Publishing.</p>

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