

**Plant Propagation Protocol for *Sagittaria latifolia***  
ESRM 412 – Native Plant Production



Robert H. Mohlenbrock  
USDA NRCS 1992  
Western Wetland Flora  
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TAXONOMY	
<b>Family Names</b>	
Family Scientific Name:	Alismataceae
Family Common Name:	Water-plantain
<b>Scientific Names</b>	
Genus:	<i>Sagittaria</i>
Species:	<i>latifolia</i>
Species Authority:	Willd.
Variety:	
Sub-species:	
Cultivar:	
Authority for Variety/Sub-species:	
Common Synonyms:	<i>Sagittaria latifolia</i> Willd. var. <i>obtus</i> a (Muhl. ex Willd.) Wiegand <i>Sagittaria latifolia</i> Willd. var. <i>pubescens</i> (Muhl. ex Nutt.) J.G. Sm <i>Sagittaria sagittifolia</i> var. <i>latifolia</i> <sup>10</sup>
Common Names:	Wapato; broadleafed arrowhead, Indian potato, tule potato <sup>5</sup>

Species Code (as per USDA Plants database):	SALA2
<b>GENERAL INFORMATION</b>	
Geographical range:	Low elevations from southern British Columbia, south to California and from the Pacific coast, east across much of North America to the Atlantic. Also found in Western South America, the West Indies, and Hawaii. <sup>8,9</sup>
Ecological distribution:	Obligate wetlands including marshes, ponds, lakes, shorelines, and wet ditches <sup>8</sup>
Climate and elevation range:	Marine – temperate climates at low elevation <1500 m <sup>7</sup>
Local habitat and abundance; may include commonly associated species:	Thrives in fine to medium textured, silty wet soils. Associated with <i>Sagittaria cuneata</i> , <i>Camassia</i> (Camas), and <i>Schoenoplectus acutus</i> (hard stemmed bulrush) <sup>6</sup>
Plant strategy type / successional stage:	Freshwater with full sun exposure, tolerates part shade and anaerobic conditions. Has a high tolerance for CaCO <sub>3</sub> and pollutants. Tolerates pH levels between 4.7 and 8.9 <sup>6</sup>
Plant characteristics:	Forb/Herb, emergent semiaquatic perennial with tuber-producing rhizomes. Basal leaves with arrowheads blades are either submerged in or floating on top of the water. Raceme inflorescence with whorls of white flowers. Flowers consist of 3 white petals and 3 green sepals. Can be monoecious or dioecious. Beaked, winged achenes are single seeded and located in a globular cluster <sup>9</sup>
<b>PROPAGATION DETAILS</b>	
Ecotype:	
Propagation Goal:	Plants
Propagation Method:	Seed
Product Type:	Bareroot or Container (plug) <sup>7</sup>
Stock Type:	Plant
Time to Grow:	2 years <sup>7</sup>
Target Specifications:	5 feet with leaves 4 – 12 inches long and acute <sup>6</sup>
Propagule Collection:	Seeds (achenes) are collected after the seed head turns tan from green. Usually collected through August and September <sup>3</sup>
Propagule Processing/Propagule Characteristics:	Seed density is 67,000. <sup>7</sup>

Pre-Planting Propagule Treatments:	<p>Clean achenes by pressing together and they will separate after a few days of drying. May roll seeds between fingers to further clean or rub seeds on a screen.<sup>3</sup></p> <p>Exhibits physiological double dormancy and need cold/warm/cold treatment.<sup>7</sup></p> <p>Hunter-Cario refrigerated seeds at 41°F for 8 weeks and they remained viable for 3 years.</p> <p>Baskin cold stratified seeds for 150 days. Seeds will germinate in the presence of light with alternating temperatures of 21°C /16°C.</p>
Growing Area Preparation / Annual Practices for Perennial Crops:	<p>Create a washboard in shallow water, with mudflat consistency. Scatter seeds on the surface of the soil since the seeds require sunlight to germinate<sup>3</sup></p> <p>Plant in peat pots or use a fine textured medium such as Redi-Earth Plug and Seeding Mix in 2 inch – 50 TLC Square Plugs Trays. Use 10 seeds per plug due to 55% germination rate<sup>3</sup></p>
Establishment Phase:	
Length of Establishment Phase:	
Active Growth Phase:	
Length of Active Growth Phase:	
Hardening Phase:	
Length of Hardening Phase:	
Harvesting, Storage and Shipping:	
Length of Storage:	
Guidelines for Outplanting / Performance on Typical Sites:	
Other Comments:	Moist soils to standing water is required for successful planting
<b>PROPAGATION DETAILS</b>	
Ecotype:	
Propagation Goal:	Plant
Propagation Method:	Vegetative
Product Type:	Bareroot <sup>7</sup> or Plant in stock box <sup>3</sup>
Stock Type:	Tubers <sup>4</sup> or Bare root <sup>3</sup>
Time to Grow:	One growing season <sup>7</sup>
Target Specifications:	5 feet with leaves 4 – 12 inches long and acute <sup>7</sup>

Propagule Collection:	Collect after the start of Spring and before the end of Autumn. Collect by hand digging in mud. Keep roots moist at all times, possibly in peat moss. Store in cool location. <sup>3</sup>
Propagule Processing/Propagule Characteristics:	
Pre-Planting Propagule Treatments:	
Growing Area Preparation / Annual Practices for Perennial Crops:	
Establishment Phase:	
Length of Establishment Phase:	
Active Growth Phase:	
Length of Active Growth Phase:	
Hardening Phase:	
Length of Hardening Phase:	
Harvesting, Storage and Shipping:	Collect by digging in mud to 6 inch depth and collect only ¼ of plant population. Gently wash in freshwater and submerge in 5% bleach solution for 60 seconds. Store in water or moist container at 41°F <sup>3</sup>
Length of Storage:	8 weeks or longer <sup>3</sup>
Guidelines for Outplanting / Performance on Typical Sites:	
Other Comments:	<p>Propagation of rhizomes is possible: however, no details were provided for propagation techniques.</p> <p>Major food source for aquatic birds and for Chinookan Native Americans near Columbia River in Washington state. Food staple for Lewis and Clark Expedition when they traveled in the Portland Basin.<sup>2</sup></p>
<b>INFORMATION SOURCES</b>	
References:	Listed Below
Other Sources Consulted:	Listed Below
Protocol Author:	Julie Lefaive
Date Protocol Created or Updated:	4/21/10

## References:

<sup>1</sup>Baskin, Carol C. 2003. Propagation protocol for production of container *Sagittaria latifolia* Willd. plants; University of Kentucky, Lexington, Kentucky. In: Native Plant Network. URL: <http://www.nativeplantnetwork.org> (accessed 20 April 2010). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery

<sup>2</sup>Darby, Melissa. "Chapter 7: The Intensification of Wapato (*Sagittaria Latifolia*) by the Chinookan People of the Lower Columbia River." *Keeping It Living: Traditions of Plant Use and Cultivation on the Northwest Coast of North America*. By Douglas Deur and Nancy J. Turner. Seattle: University of Washington, 2005.

- <sup>3</sup>Hunter-Cario, Leslie. "Propagation Protocol for Broadleaf Arrowhead *Sagittaria latifolia*." *Native Plants Journal* 8.2 (2007): 80-83. *Project Muse*. Web. 20 Apr. 2010. <[http://muse.jhu.edu/login?uri=/journals/native\\_plants\\_journal/v008/8.2hunter-cario.html](http://muse.jhu.edu/login?uri=/journals/native_plants_journal/v008/8.2hunter-cario.html)>.
- <sup>4</sup>Michael, Leigh 1999. Grow your own native landscape: a guide to identifying, propagating, and landscaping with Western Washington Native Plants. Native Plant Salvage Project, WSU Cooperative Extension—Thurston County. P. 85.
- <sup>5</sup>Murphey, Edith Van Allen. *Indian Uses of Native Plants*. N.p., 1959.
- <sup>6</sup>USDA, NRCS. 2010. Conservation Plant Characteristics for *Sagittaria latifolia*. Accessed April 17, 2010 at: <http://plants.usda.gov/java/profile?symbol=sala2>
- <sup>7</sup>USDA, NRCS. 2010. Plant Guide for *Sagittaria latifolia*. Accessed April 17, 2010 at [http://plants.usda.gov/plantguide/pdf/cs\\_sala2.pdf](http://plants.usda.gov/plantguide/pdf/cs_sala2.pdf)
- <sup>8</sup>Pojar J., McKinnon A. 1994 *Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia and Alaska*, B.C. Ministry of Forests and Lone Publishing, Canada.
- <sup>9</sup>Robson, Kathleen A., Alice Richter, and Marianne Filbert. *Encyclopedia of Northwest Native Plants for Gardens and Landscapes*. Portland, Or. Timber Press, 2008. 306-07.
- <sup>10</sup>Wunderlin, R. P., and B. F. Hansen. 2008. *Atlas of Florida Vascular Plants* (<http://www.plantatlas.usf.edu/>). [S. M. Landry and K. N. Campbell (application development), Florida Center for Community Design and Research.] Institute for Systematic Botany, University of South Florida, Tampa

**Additional Sources Consulted (no pertinent information):**

Pettinger A, and B. Constanza. 2002. *Native plants in the coastal gardens: A guide for gardeners in the Pacific Northwest*. Timber Press, Portland OR. p100.

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<http://www.ecy.wa.gov/programs/wq/plants/plantid2/descriptions/sag.html>

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