

## Plant Propagation Protocol for *Alisma gramineum*

ESRM 412 – Native Plant Production

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



Image Source: <http://biology.burke.washington.edu/herbarium/imagecollection.php?SciName=Alisma%20gramineum>

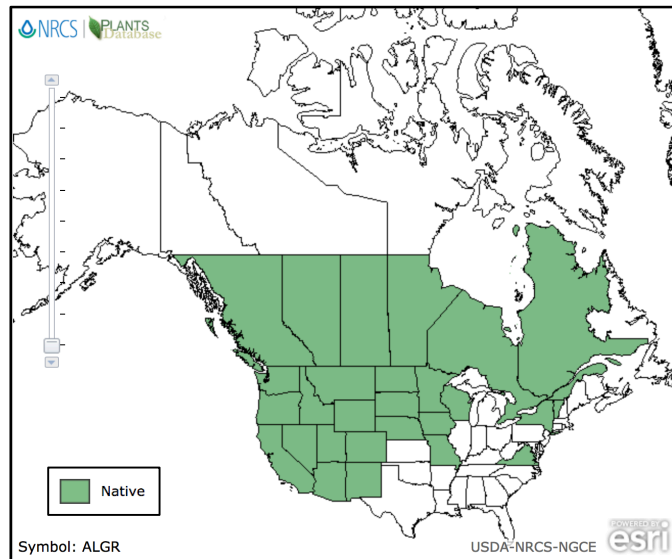
### TAXONOMY

<b>TAXONOMY</b>	
Plant Family	
Scientific Name	Alismataceae
Common Name	Water-plantain family
Species Scientific Name	
Scientific Name	<i>Alisma gramineum</i> Lej.
Varieties	<i>Alisma gramineum</i> Lej. var. <i>angustissimum</i> (DC.) A.J. Hendricks <i>Alisma gramineum</i> Lej. var. <i>geyeri</i> (Torr.) Lam. <i>Alisma gramineum</i> Lej. var. <i>graminifolium</i> (Wahlenb.) A.J. Hendricks <i>Alisma gramineum</i> Lej. var. <i>wahlenbergii</i> auct. non (Holmb.) Raymond & Kucyniak
Sub-species	
Cultivar	
Common Synonym(s)	<i>Alisma geyeri</i> Torr. <i>Alisma gramineum</i> Lej. var. <i>angustissimum</i> (DC.) A.J. Hendricks <i>Alisma gramineum</i> Lej. var. <i>geyeri</i> (Torr.) Lam. <i>Alisma gramineum</i> Lej. var. <i>graminifolium</i> (Wahlenb.) A.J. Hendricks <i>Alisma gramineum</i> Lej. var. <i>wahlenbergii</i> auct. non (Holmb.) Raymond & Kucyniak <i>Alisma lanceolatum</i> A. Gray
Common Name(s)	narrow-leaf water plantain, grass-leaved water plantain, mud plantain
Species Code (as per USDA Plants database)	ALGR

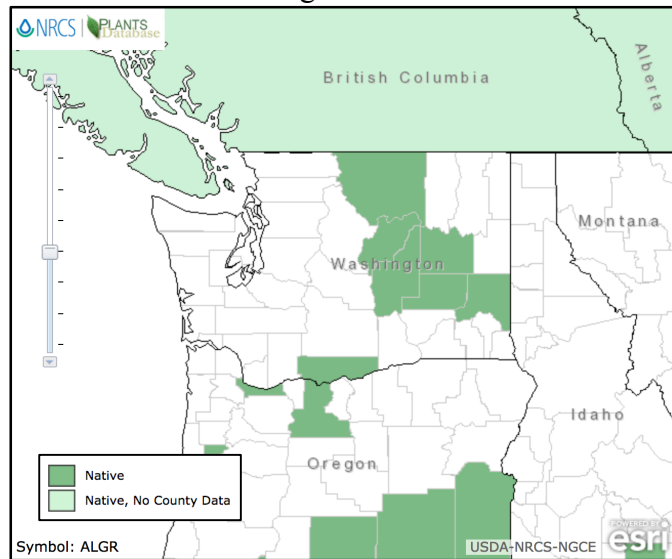
## GENERAL INFORMATION

Geographical range

Distribution in North America



Distribution in Washington State



Ecological distribution

*Alisma gramineum* occurs in marshy areas, often in standing water such as lakes or ponds, or mud at water's edge (Guard, 1995; Knoke and Giblin, 2018).

Climate and elevation range

Local habitat and abundance

The wetland indicator status of *A. gramineum* is obligate wetland, meaning this species almost always occurs under natural conditions in wetlands (estimated probability is greater than 99%) (Guard, 1995).

Plant strategy type / successional stage

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

Plant characteristics	<i>A. gramineum</i> is a perennial emergent forb/herb that grows from a fleshy underground stem (corm) (Guard, 1995). It lacks a true stem, but the flower stalk (scape) is prominent (Guard, 1995). Leaves are narrowly elliptical or linear in shape and are attached to the base of the plant, held stiffly erect out of the water (Guard, 1995). The leaves are about 5 mm wide and usually grow taller than the flowers (Guard, 1995). The flowers are crowded together at the end of the scape in many-flowered panicles with whorled branches (Guard, 1995). Each flower has three, whitish pink or purple petals and three persistent green sepals with purple edges (Guard, 1995; Knoke and Giblin, 2018). The seeds are flat and round, and approximately 2.5 mm across (Guard, 1995). <i>A. gramineum</i> blooms in mid June, and may not appear in dry years (Guard, 1995). The longevity of this species is unknown (Moravcova et al. 2001).
<b>PROPAGATION DETAILS</b>	
Ecotype	
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	
Time to Grow	Seedlings experience rapid growth and development, and do not take long to become fully mature. (Moravcova et al., 2001).
Target Specifications	Well developed scape, with roots filling container.
Propagule Collection Instructions	Submerged plants are able to produce seeds, but seedlings die in deep water, indicating that seed production that occurs after the water level has lowered is frequently the only way for population renewal to occur (Moravcova et al., 2001). With this in mind, collecting seeds when the water level is high is the ideal time, in order to preserve the populations.
Propagule Processing/Propagule Characteristics	
Pre-Planting Propagule Treatments	<i>A. gramineum</i> seeds experience physiological dormancy (Moravcova et al., 2001; Baskin and Baskin, 2014). They require cold stratification over winter as a dormancy-breaking treatment (Moravcova et al., 2001; Baskin and Baskin, 2014). Trials have shown that <i>A. gramineum</i> can germinate after three months of cold stratification (Moravcova et al., 2001). Germination rates increase if kept under stratification for six months, and they increase even more so if stratified for ten

	months (Moravcova et al., 2001). Temperature fluctuation is not required to break dormancy (Moravcova et al., 2001).
Growing Area Preparation / Annual Practices for Perennial Crops	<i>A. gramineum</i> should be planted in soil with a high water holding capacity and kept moist to saturated.
Establishment Phase Details	The optimum germination temperatures are 25/10°C (Moravcova et al., 2001; Baskin and Baskin, 2014). Seeds have been found to have a higher germination percentage when under low oxygen levels, which is associated with flooding (Moravcova et al., 2001; Baskin and Baskin, 2014).
Length of Establishment Phase	Seedlings experience rapid growth and development, (Moravcova et al., 2001). <i>Alisma</i> spp. takes two to five weeks to germinate (Heuser, 1997).
Active Growth Phase	
Length of Active Growth Phase	<i>A. gramineum</i> reaches full maturity quickly (Moravcova et al., 2001). <i>Alisma</i> spp. reaches full maturity after 15 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	Seeds should be collected before the water level has lowered in spring/summer in order to maintain populations.
<b>INFORMATION SOURCES</b>	
References	<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. The Complete Book of Plant Propagation. Newtown, CT: The Taunton Press.</p> <p>Knoke D, Giblin D. 2018. <i>Alisma gramineum</i>: narrow-leaf water plantain, grass-leaved water plantain. 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>Moravcova L, Zakravsky P, Hroudova, Z. 2001. Germination and seedling establishment in</p>

	<p><i>Alisma gramineum</i>, <i>A. plantago-aquatica</i>, and <i>A. lanceolatum</i> under different environmental conditions. <i>Folia Geobotanica</i>. 36, 131-146. Accessed: 14 May 2018.  <a href="https://www.researchgate.net/profile/Petr_Zakravy/publication/225621089_Germination_and_seedling_establishment_in_Alisma_gramineum_A_plantago-aquatica_and_A_lanceolatum_under_different_environmental_conditions/links/53d0d0e90cf2f7e53cfba140.pdf">https://www.researchgate.net/profile/Petr_Zakravy/publication/225621089_Germination_and_seedling_establishment_in_Alisma_gramineum_A_plantago-aquatica_and_A_lanceolatum_under_different_environmental_conditions/links/53d0d0e90cf2f7e53cfba140.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=ALGR">https://plants.usda.gov/core/profile?symbol=ALGR</a></p>
Other Sources Consulted	<p>Bressette, DK. 2018. Native Plants PNW: An Encyclopedia of the Cultural and Natural History of Northwest Native Plants. Accessed: 13 May 2018. <a href="http://nativeplantspnw.com/">http://nativeplantspnw.com/</a></p> <p>Franklin JF, Dyrness CT. 1988. Natural Vegetation of Oregon and Washington. Oregon State University Press: Corvallis, OR.</p> <p>Kruckeberg, AR. 1996. Gardening with Native Plants. 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. Plants for a Future. 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. Alpine Plants of the Northwest: Wyoming to Alaska. Alberta, Canada: Lone Pine Publishing.</p> <p>Pojar J, MacKinnon A. 1994. Plants of the Pacific Northwest Coast. Vancouver, British Columbia, Canada: Lone Pine Publishing.</p> <p>Rose R, Chachulski CEC, Haase DL. 1998. Propagation of Pacific Northwest Native Plants. Oregon State University Press: Corvallis, OR.</p> <p>USDA Forest Service, Southern Regional Extension Forestry. Native Plant Network: Propagation Protocol Database. Accessed: 13 May 2018.  <a href="https://nnp.rngr.net/nnp/propagation">https://nnp.rngr.net/nnp/propagation</a></p>

	Young JA, Young CG. 1986. Collecting, Processing, and Germinating Seeds of Wildland Plants. Timber Press, Inc.: Portland, OR.
Protocol Author	Beth Fancher
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