

## Plant Propagation Protocol for *Clarkia purpurea*

ESRM 412 – Native Plant Production

Protocol URL: <https://courses.washington.edu/esrm412/protocols/CLPU2.pdf>

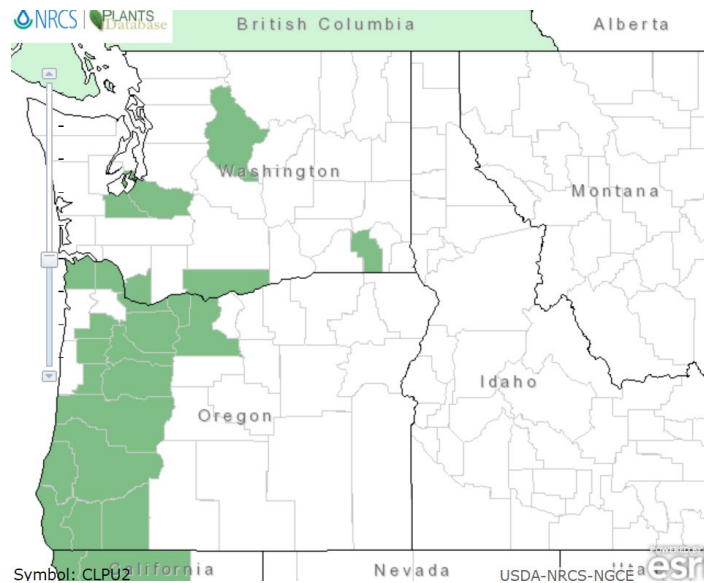
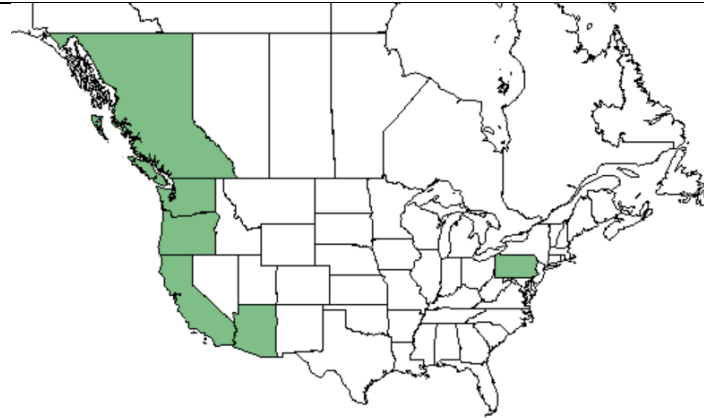


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<b>TAXONOMY</b>	
<b>Plant Family</b>	
Scientific Name	<i>Onagraceae</i>
Common Name	willowherb family/evening primrose family
<b>Species Scientific Name</b>	
Scientific Name	<i>Clarkia purpurea</i> (W. Curtis) A. Nelson & J.F. Macbr.
Varieties	<i>Clarkia purpurea</i> var. <i>arnottii</i> (Torr. & A.Gray) Hoover <i>Clarkia purpurea</i> var. <i>hirsuta</i> (Kellogg) Hoover
Sub-species	<i>Clarkia purpurea</i> ssp. <i>purpurea</i> <i>Clarkia purpurea</i> ssp. <i>quadrivulnera</i> <i>Clarkia purpurea</i> ssp. <i>viminea</i>
Cultivar	n/a
Common Synonym(s)	<i>Godetia purpurea</i> var. <i>parviflora</i> <i>Godetia quadrivulnera</i> <i>Godetia quadrivulnera</i> var. <i>vacensi</i>
Common Name(s)	winecup clarkia, winecup fairyfan, purple clarkia, purple godetia
Species Code	CLPU2

## GENERAL INFORMATION

Geographical range



Map source: USDA Plant Database<sup>1</sup>

Ecological distribution

*Clarkia purpurea* is distributed along western North America, including British Columbia, Washington, Oregon, California, and Arizona.<sup>1</sup> It was introduced to Pennsylvania by ship ballast dirt dumped into Port of Philadelphia. First record of *Clarkia purpurea* was made in 1877 near solid ballast in Port of Philadelphia, and it remains the only record of the species in Pennsylvania (For reference please see Other Sources Consulted section at the end of the document).

Climate and elevation range

*Clarkia purpurea* can be found in dry, grassy slopes in the lowland zone as well as other open, dry areas.<sup>2</sup> The elevation ranges from sea level to 5,000 ft.<sup>3</sup>

Local habitat and abundance

In Washington, *Clarkia purpurea* can be found in habitats like dry, open ground, often at the edge of vernal pools.<sup>4</sup> In terms of abundance, *Clarkia purpurea* can be found sparsely in the state, including Chelan,

	Clark, Columbia, Klickitat, Pierce, and Thurston counties. <i>Clarkia purpurea</i> is more widely abundant in western Oregon and most of California. <sup>1</sup>
Plant strategy type / successional stage	n/a
Plant characteristics	<i>Clarkia purpurea</i> is an annual forb that is 10 to 70 cm tall with an erect stem and four-petal flower. The inflorescence color can range from purple, lavender, to deep wine red <sup>2</sup> and blooms from April to July. <sup>5</sup>
<b>PROPAGATION DETAILS: by Baskin, Jerry M., 2002<sup>6</sup></b>	
Ecotype	<i>C. purpurea</i> is found within matorral vegetation association of California.
Propagation Goal	plants
Propagation Method	seed
Product Type	Container (plug)
Stock Type	n/a
Time to Grow	n/a
Target Specifications	n/a
Propagule Collection Instructions	n/a
Propagule Processing/Propagule Characteristics	n/a
Pre-Planting Propagule Treatments	Seed germination is stimulated by the presence of charred wood or aqueous extracts of it: 32% increase in germination as compared to control.
Growing Area Preparation / Annual Practices for Perennial Crops	n/a
Establishment Phase Details	n/a
Length of Establishment Phase	n/a
Active Growth Phase	n/a
Length of Active Growth Phase	n/a
Hardening Phase	n/a
Length of Hardening Phase	n/a
Harvesting, Storage and Shipping	n/a
Length of Storage	n/a
Guidelines for Outplanting / Performance on Typical Sites	n/a
Other Comments	n/a
<b>PROPAGATION DETAILS: by Russell, Michael, 2011<sup>7</sup></b> *This is not a propagation protocol specifically for <i>Clarkia purpurea</i> , but a study that includes information on germination of <i>Clarkia purpurea</i> under different conditions.	
Ecotype	Willamette Valley, OR
Propagation Goal	This study focused on difference in dormancy and germination of 30 native grasses and forbs from the Willamette Valley, including <i>Clarkia purpurea</i> . Six experiments were done with different set of species that

	were given different factors like temperature, scarification, and stratification.
Propagation Method	Seed
Product Type	Plant
Stock Type	Filter paper in plastic Petri dishes.
Time to Grow	n/a
Target Specifications	Germination was defined as the emergence of a recognizable radical from the seed coat.
Propagule Collection Instructions	Collected from commercial seed production fields in the Willamette Valley.
Propagule Processing/Propagule Characteristics	n/a
Pre-Planting Propagule Treatments	Stored in a cabinet at room temperature for at least three months.
Growing Area Preparation and Establishment Phase Details	<p>In experiment 1, seeds were germinated on filter paper in plastic Petri dishes. The dishes were placed in a greenhouse where temperatures remained between 15 °C and 25°C. Most of the germinations took place under natural light between January and May, but the last stratification treatments germinated in June through September. No stratification or scarification was done on the seeds. The forbs had 50 seeds in each dish.</p> <p>In experiment 1, 95% of <i>Clarkia purpurea</i> seeds germinated.</p> <p>In experiments 2 to 5, <i>Clarkia purpurea</i> was not included as these experiments targeted species that showed low germination rate in experiment 1.</p> <p>In experiment 6, seeds were placed in two greenhouses with different temperature following cold moist stratification in refrigerator set for 5 °C. The cool greenhouse was set to maintain 18 °C in the daytime and 13 °C at night. The warm greenhouse was set to maintain 24 °C daytime temperatures and 18 °C at night.</p> <p><i>Clarkia purpurea</i> germination rates in experiment 6 are shown in the table below. From the results of experiment 6, it can be concluded that <i>Clarkia purpurea</i> germinates best in cool temperatures between 13 °C and 18 °C. Stratification increased germination rate but not significantly, adding only 2% more to total germination rate.</p>

	Stratification duration (days)	62	62	0	0
	Greenhouse temperature	cool	warm	cool	warm
	Mean proportion seeds germinating	0.8	0.68	0.78	0.08
Length of Establishment Phase		n/a			
Active Growth Phase		n/a			
Length of Active Growth Phase		n/a			
Hardening Phase		n/a			
Length of Hardening Phase		n/a			
Harvesting, Storage and Shipping		n/a			
Length of Storage		n/a			
Guidelines for Outplanting / Performance on Typical Sites		n/a			
Other Comments		n/a			
<b>INFORMATION SOURCES</b>					
References	<p><sup>1</sup> USDA. "Clarkia purpurea (winecup clarkia)." USDA Plant Database. Accessed May 18, 2020. <a href="https://plants.usda.gov/core/profile?symbol=CLPU2">https://plants.usda.gov/core/profile?symbol=CLPU2</a>.</p> <p><sup>2</sup> E-Flora BC. "Clarkia purpurea." Electronic Atlas of the Flora of British Columbia. Accessed May 17, 2020. <a href="https://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Clarkia%20purpurea">https://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Clarkia%20purpurea</a></p> <p><sup>3</sup> Begley, Eva. <i>Plants of Northern California: A Field Guide to Plants West of the Sierra Nevada</i>. (Helena, MT: Falcon Guides, 2018), 220.</p> <p><sup>4</sup> Knoke, Don and Giblin, David. "Clarkia purpurea." Burke Herbarium Image Collection. Accessed June 7, 2020. <a href="http://biology.burke.washington.edu/herbarium/imagecollection/taxon.php?Taxon=Clarkia%20purpurea">http://biology.burke.washington.edu/herbarium/imagecollection/taxon.php?Taxon=Clarkia%20purpurea</a></p> <p><sup>5</sup> Lady Bird Johnson Wildflower Center. "Clarkia purpurea." University of Texas at Austin. Accessed May 25, 2020. <a href="https://www.wildflower.org/plants/result.php?id_plant=CLPU2">https://www.wildflower.org/plants/result.php?id_plant=CLPU2</a></p> <p><sup>6</sup> Baskin, Jerry M.; Baskin, Carol C., "Propagation protocol for production of Container (plug) Clarkia purpurea (W. Curtis) A. Nel. &amp; J.F. Macbr. plants." Native Plant Network. Accessed May 19, 2020. <a href="https://nbn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=onagraceae-clarkia-2087&amp;referer=wildflower">https://nbn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=onagraceae-clarkia-2087&amp;referer=wildflower</a></p> <p><sup>7</sup> Russell, Michael. "Dormancy and Germination Pre-Treatments in Willamette Valley Native Plants." <i>Northwest Science</i> 85, no. 2 (2011): 389-402.</p>				
Other Sources Consulted	<p>Ruiz, Gregory M., and Carlton, James T. <i>Invasive Species: Vectors and Management Strategies</i>. (Washington, DC: Island Press, 2003), 11-12.</p> <ul style="list-style-type: none"> <li>Used as reference in Ecological distribution section for information on introduction of <i>Clarkia purpurea</i> in Pennsylvania</li> </ul>				
Protocol Author		Joseph Yunha Kim			
Date Protocol Created or Updated		06/08/20			