

**Plant Propagation Protocol for *Cardamine bellifolia***  
ESRM 412 – Native Plant Production  
Spring 2019



Figure 1 Photo by Jason Matthias Mills from CalPhotos Web. 25 May 2019



Figure 2 "*Corallorhiza bellifolia*." Plants Database. USDA, n.d. Web. 23 May 2019



Figure 3 "*Corallorhiza bellifolia*." Plants Database. USDA, n.d. Web. 23 May 2019

## TAXONOMY

<b>Plant Family</b>	
Family Scientific Name	Brassicaceae
Family Common Name	Mustard
<b>Species Scientific Name</b>	
Genus	<i>Cardamine</i>
Species	<i>bellifolia</i>
Authority	L.
Varieties	<i>Cardamine bellidifolia</i> var. <i>bellidifolia</i> <i>Cardamine bellidifolia</i> var. <i>pachyphylla</i>
Sub-Species	
Cultivar	
Common Synonym(s)	
Common Name(s)	Alpine bitter-cress (Plants Database USDA)
Species Code (as per USDA Plants database)	CABE (Plants Database USDA)
<b>GENERAL INFORMATION</b>	
Geographical range	N. America. See above map from USDA Plants Database for N. America and Washington State
Ecological distribution	Moist gravelly and rocky sites in the subalpine and alpine zones. (Pojar)
Climate and elevation range	X < 10,000ft (Ihsan)
Local habitat and abundance	Alaska, arid west, Western Mountains, Valleys, and Coast, northcentral and north east (Pojar)
Plant strategy type / successional stage	Shade tolerant (Turner)
Plant characteristics	Smooth, tufted, dwarf (10cm tall) perennial alpine herb from a taproot. The oval toothed leaves are 3cm long and form a basal rosette. The leaf stalks are 3 times as long as the leaves. The flowers are white with four 5mm long petals and are clustered on the top of the stem. The fruits are 3.5cm erect siliques. (Pojar)(Ihsan)(Turner)
<b>PROPAGATION DETAILS</b>	
<b>(NAME OF PROPAGTION)</b>	
Ecotype	Moist gravelly and rocky sites in high elevations (Consortium of California Herbaria)(Ihsan)
Propagation Goal	Plants
Propagation Method	Seed: Siliques are mature in June/July when the fruits turn a dark brown, become stiff and fall from the plant.

Product Type	Plug container (Bartow)(Baskin)(Young)
Stock Type	N/A
Time to Grow	June/July (Turner)
Target Specifications	Root System is established and roots fill container. (Young)
Propagule Collection Instructions	Collect siliques when they are stiff and dark brown and place in sterilized cheesecloth sac. Pick 3-5 siliques from a single mother plant leaving the rest for natural germination. Only pick from one plant out of 4 species in the collection zone. Siliques are easily split in half revealing seeds. (Young)
Propagule Processing/Propagule	Seeds are rubbed over an air screen machine to remove chaff. (Young) Seeds should be kept dry and stored in a refrigerator at 2 C. (Bartow)(Young)
Pre-Planting Propagule Treatments	Brassicaceae seeds commonly have physiological dormancy. Seeds need to be warm and cold stratified for a month between 6 C and 2 C. (Baskin)
Growing Area Preparation /Annual Practices for Perennial Crops	In early August, sow 1.4 grams of seeds per flat in 5" deep of potting mix of peat moss, fir bark, perlite, and sand. Cover seeds lightly with medium. (Young)
Establishment Phase Details	Transplant seeds 30 days after germination to 2"x7" tubes (Deepot 16) in a potting mix of peat moss, fir bark, perlite, and sand. (Young)
Length of Establishment Phase	2 months (Young)
Active Growth Phase	After seedlings are established, move them to shade house for continued growth. (Young)
Length of Active Growth Phase	N/A
Hardening Phase	N/A
Length of Hardening Phase	N/A
Harvesting, Storage and Shipping	Seeds should be kept dry and stored in a refrigerator. Keep plants in shade house after establishment. (Bartow)(Baskin)(Young)
Length of Storage	N/A
Guidelines for Outplanting / Performance on Typical Sites Other Comments	N/A
<b>INFORMATION SOURCES</b>	
References	Bartow, Amy L. 2006. Propagation protocol for production of Container (plug) <i>Cardamine penduliflora</i> Schulz plants USDA NRCS - Corvallis Plant Materials Center Corvallis, Oregon. In: Native Plant Network. URL: <a href="http://NativePlantNetwork.org">http://NativePlantNetwork.org</a> (accessed 2019/05/02). US Department of Agriculture, Forest

	<p>Service, National Center for Reforestation, Nurseries, and Genetic Resources.</p> <p>Baskin, Jerry M.; Baskin, Carol C.. 2002. Propagation protocol for production of Container (plug) <i>Cardamine concatenata</i> (Michx.) Sw. plants University of Kentucky Lexington, Kentucky. In: Native Plant Network. URL: <a href="http://NativePlantNetwork.org">http://NativePlantNetwork.org</a> (accessed 2019/05/02). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources.</p> <p>Consortium of California Herbaria. 2019. Berkeley, California: The Calflora Database Available: <a href="https://www.calflora.org/">https://www.calflora.org/</a> (Accessed: Apr 27, 2019).</p> <p>"Corallorhiza striata." Plants Database. USDA, n.d. Web. 23 May 2017</p> <p>Ihsan A. Al-Shehbaz 2012, <i>Cardamine angulata</i>, in Jepson Flora Project (eds.) <i>Jepson eFlora</i>, <a href="http://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=17120">http://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=17120</a>, accessed on April 27, 2019.</p> <p>Turner, Mark. "Cardamine Angulata   Angled Bittercress   Wildflowers of the Pacific Northwest." <i>Turner Photographics</i>, Turner Photographics, 2 May 2019, <a href="http://www.pnwflowers.com/flower/cardamine-angulata">www.pnwflowers.com/flower/cardamine-angulata</a>.</p> <p>Pojar J., McKinnon A., 1994 Plants of the Pacific Northwest: Washington, Oregon, British Columbia and Alaska, B.C. Ministry of Forests and Lone Publishing, Canada</p> <p>Young, Betty. 2007. Propagation protocol for production of Container (plug) <i>Cardamine californica</i> (Nutt.) Rollins plants 2-inch pot; San Francisco, California. In: Native Plant Network. URL: <a href="http://NativePlantNetwork.org">http://NativePlantNetwork.org</a> (accessed 2019/05/02). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources.</p>
Other Sources Consulted	
Protocol Author	Kaitlyn Sweeney
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