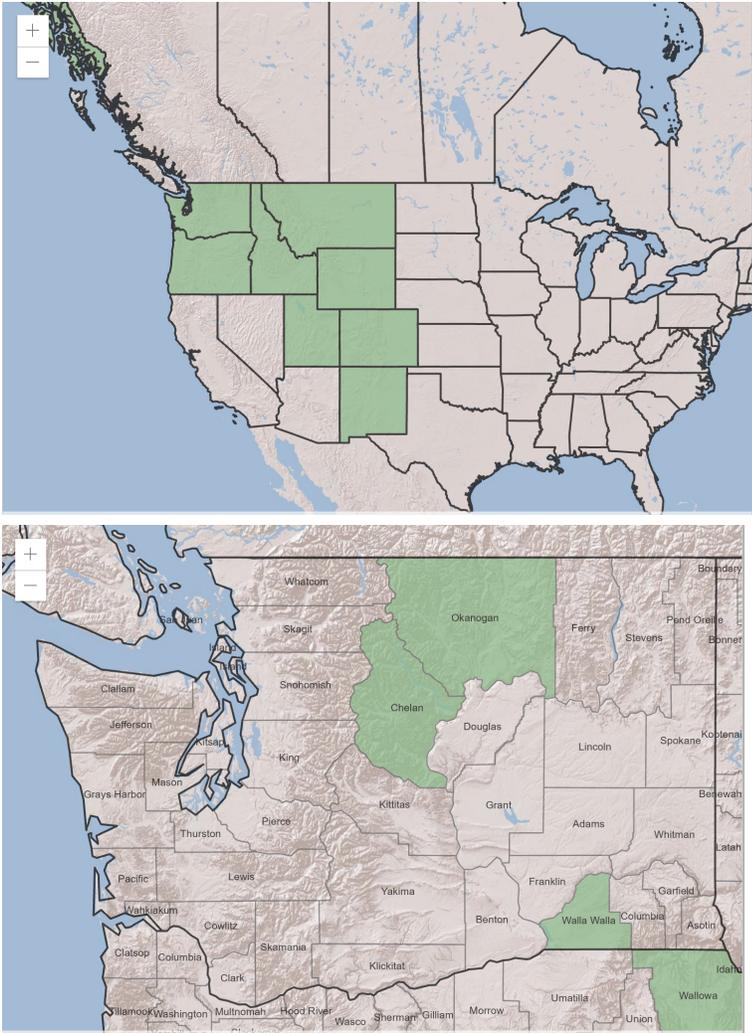


**Plant Propagation Protocol for *Eritrichium nanum*
Arctic Alpine Forget-Me-Not**

ESRM 412 – Native Plant Production

URL: <https://courses.washington.edu/esrm412/protocols/2022/ERNA.pdf>

TAXONOMY	
Plant Family	
Scientific Name	Boraginaceae
Common Name	Borage Family
Species Scientific Name	
Scientific Name	<i>Eritrichium nanum</i> (Vill.) Schrad. ex Gaudin
Varieties	
Sub-species	
Cultivar	
Common Synonym(s)	<i>Eritrichium nanum</i> (Vill.) Schrad. ex Gaudin [HC] <i>Eritrichium nanum</i> (Vill.) Schrad. ex Gaudin, misapplied [HC] <i>Eritrichium nanum</i> (Vill.) Schrad. ex Gaudin var. <i>elongatum</i> (Rydb.) Cronquist, misapplied [HC] (5)
Common Name(s)	Arctic Alpine Forget-me-not, Alpine Forget-me-not
Species Code (as per USDA Plants database)	ERNA
GENERAL INFORMATION	

<p>Geographical range</p>	
<p>Ecological distribution</p>	<p>This plant is common in high elevations across the Pacific Northwest as it is natively found in open rocky places high in the mountains (1). In the USA it is found in “Northern New Mexico to western Montana and northeastern Oregon; north to Alaska” (1). In Washington state it is found native to the counties of Chelan, Okanogan, and Walla Walla.</p>
<p>Climate and elevation range</p>	<p>Occurs in alpine plant communities at 2200-2600 m in elevation (6). They prefer colder high elevation climates that mimic a tundra.</p>
<p>Local habitat and abundance</p>	<p>Habitat consists of areas with “coarse, rocky soils of alpine slopes and summits” (5). Found in open meadows, subalpine rock faces, and rocky garden beds. They are commonly associated with butterflies and bees because their bright colors are found to be highly attractive to pollinators. Other associated species includes “prairie lupine, alpine smelowskia, Henderson’s phlox, Brewer’s sedge, arctic sandwort, spike woodrush, alpine</p>

	fescue, alpine yellow daisy, cut-leaved daisy, Salish daisy, and snow douglasia (6).
Plant strategy type / successional stage	This plant is drought tolerant, cold tolerant, hardy, and a weedy colonizer that takes up sunny open spaces in high elevated areas. It is snow tolerant and can live in dormancy under a large amount of snow pack.
<p>Plant characteristics</p> <p>Image above provided by wildflowers.org (1).</p> <p>Image below provided by Alaskawildflowers.us (8).</p>	  <p>The arctic forget-me-not is a perennial herb that flowers in June, July, and August. The flowers are corolla funnel-shaped and are about a quarter inch wide. The flowers are 4-8mm wide 5-lobed with bright blue petals and yellow to red circular pads around the opening of the tube (1). The leaves are oblong to obovate shaped with a blunt tip and are typically 1 cm x 2mm (6). They have</p>

	mature loosely long-hairy leaves, with the surface of the leaf readily visible between the hairs (6). The leaves are attached alternatively up the stem with diffuse root systems (7).
PROPAGATION DETAILS - Full details found in citation 2	
Ecotype	Open alpine scree slope in southwestern Montana (2)
Propagation Goal	Seeds
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	
Time to Grow	Nine months
Target Specifications	
Propagule Collection Instructions	“Seeds are collected in late August. Hand collect mature seed capsules when they begin to split and turn tan in color. Seeds are black at maturity” (2).
Propagule Processing/Propagule Characteristics	“seeds are hand cleaned by screening. Seed longevity is unknown. Seed dormancy type is unknown, but many genera in this family are reported to be non dormant. Seeds/Kg: unknown % Purity: 100% % Germination: 80 to 90%” (2).
Pre-Planting Propagule Treatments	Six months cold, moist stratification (2)
Growing Area Preparation / Annual Practices for Perennial Crops	Outdoor nursery growing facility, “Sowing Method: Direct Seeding. Seed is lightly covered with medium. Growing medium used is 6:1:1 milled sphagnum peat, perlite, and vermiculite with Osmocote controlled release fertilizer (13N:13P2O5:13K2O; 8 to 9 month release rate at 21C) and Micromax fertilizer (12%S, 0.1%B, 0.5%Cu, 12%Fe, 2.5%Mn, 0.05%Mo, 1%Zn) at the rate of .8 gram of Osmocote and 0.15 gram of Micromax per 160 ml container. Containers are filled and sown in late fall and irrigated thoroughly prior to winter stratification” (2).
Establishment Phase Details	In late fall containers are filled and sown followed by a thorough irrigation prior to winter stratification. The soil is consistently a little moist throughout germination. “Germination is uniform under fluctuating temperatures during spring months and seedlings must dry down between irrigations” (2).
Length of Establishment Phase	Four Weeks
Active Growth Phase	Root development happens soon after germination. 10-12 leaves form a tight rosette seven weeks after germination (2).

Length of Active Growth Phase	Eight weeks
Hardening Phase	“Irrigation is gradually reduced in September and October. Plants were fertilized with 10-20-20 liquid NPK at 200 ppm once before winterization. Plants are leached with clear water prior to winterization” (2).
Length of Hardening Phase	Four weeks
Harvesting, Storage and Shipping	“Total Time To Harvest: 9 months Harvest Date: July Storage Conditions: Overwinter in outdoor nursery under insulating foam cover and snow” (2).
Length of Storage	Five Months
Guidelines for Outplanting / Performance on Typical Sites	Make sure that the landscape is rocky and well drained. It must match a typical elevation range and have access to direct sunlight. Do not plant anywhere that would be potentially shaded.
Other Comments	

INFORMATION SOURCES

References	<ol style="list-style-type: none"> 1. “Eritrichium Nanum.” Lady Bird Johnson Wildflower Center - The University of Texas at Austin, https://www.wildflower.org/plants/result.php?id_plant=ERNA. 2. “Native Plant Network — Reforestation, Nurseries and Genetics ... - RNGR.” <i>Native Plant Network Propagation Protocol Database and Protocol Information</i>, https://npn.rngr.net/. 3. Luna, Tara; DeSanto, Jerry; Wick, Dale. 2008. Propagation protocol for production of Container (plug) <i>Eritrichium nanum</i> (Vill.) Schrad. ex Gaudin plants 160 ml containers; USDI NPS - Glacier National Park West Glacier, Montana. In: Native Plant Network. URL: https://NativePlantNetwork.org (accessed 2022/06/10). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources. 4. <i>USDA Plants Database</i>, https://plants.usda.gov/home/plantProfile?symbol=ERNA. 5. WTU Herbarium, Burke Museum. “Eritrichium Nanum.” <i>Burke Herbarium Image Collection</i>,
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	<p>http://biology.burke.washington.edu/herbarium/imagecollection/taxon.php?Taxon=Eritrichium+argenteum.</p> <p>6. <i>Eritrichium Nanum</i> Var. <i>Elongatum</i> - <i>Wa</i> - DNR. https://www.dnr.wa.gov/publications/amp_nh_ernae.pdf.</p> <p>7. "U.S. Forest Service." <i>Alpine Forget-Me-Not</i>, https://www.fs.fed.us/wildflowers/plant-of-the-week/myosotis_asiatica.shtml#:~:text=They%20are%20usually%20flat%2Dfaced,root%20systems%20are%20generally%20diffuse.</p> <p>8. "Eritrichium Nanum (Vill.) Schrad. Ex Gaudin." <i>Alaska Wildflowers.us - Eritrichium Nanum (Vill.) Schrad. Ex Gaudin</i>, http://www.alaskawildflowers.us/Kingdom/Plantae/Magnoliophyta/Magnoliopsida/Boraginaceae/Eritrichium_nanum/index.html.</p> <p>9. "Plantfiles: Eritrichium Species, Alpine Forget-Me-Not, Arctic Forget-Me-Not." <i>Dave's Garden</i>, https://davesgarden.com/guides/pf/go/94534/.</p> <p>10. "Eritrichium Nanum (Vill.) Schrad. Ex Gaudin." <i>ITIS - Integrated Taxonomic Information System - Report</i>, https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=31904#null.</p> <p>11. "Arctic Forget-Me-Not." <i>NatureServe Explorer 2.0</i>, https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.139878/Eritrichium_nanum.</p>
Other Sources Consulted	<p>1. Young, James A., and Cheryl G. Young. <i>Collecting, Processing, and Germinating Seeds of Wildland Plants</i>. Timber Press, 1999.</p> <p>2. "Wildflowers of the Southern Rocky Mountains." <i>Alpine Forget-Me-Not : Eritrichium Nanum</i>, https://rockymountainsflora.com/details/Blue%20Simple/Alpine%20Forget-me-not.htm.</p> <p>3. "Alpine Forget-Me-Not - Eritrichium Nanum." <i>Alpine Forget-Me-Not</i>, 10 June 2022, https://fieldguide.mt.gov/speciesDetail.aspx?elcode=PDBOR0F030.</p>
Protocol Author	Cassidy Pearson

Date Protocol Created or Updated	05/21/22
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