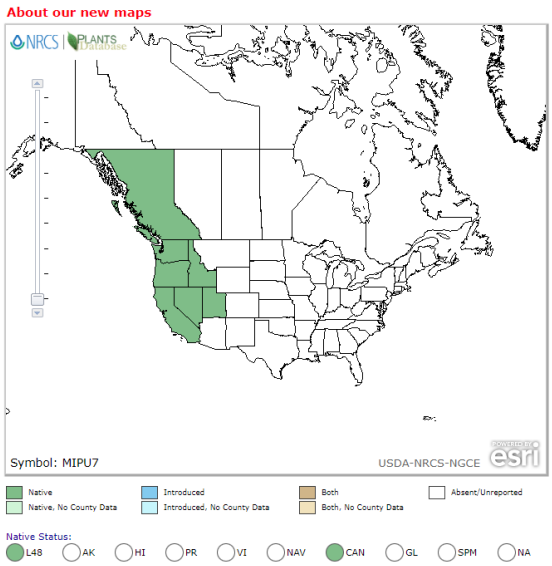
Plant Propagation Protocol for *Minuartia pusilla*
ESRM 412 – Native Plant Production
Protocol URL: https://courses.washington.edu/esrm412/protocols/MIPUP

Calflora Taxon Report 5577. (n.d.). Retrieved May 29, 2019, from https://www.calflora.org/cgi-bin/species_query.cgi?where-calrecnum=5577

Minuartia pusilla ANNUAL SANDWORT. (n.d.). Retrieved May 29, 2019, from http://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=33767

TAXONOMY	
Plant Family	Caryophyllaceae
Scientific Name	Minuartia pusilla
Common Name	annual sandwort
Species Scientific Name	Minuartia pusilla

Scientific Name	Minuartia pusilla (S. Watson.) Mattf.[2]
Varieties	Minuartia pusilla var. diffusa[2] Minuartia pusilla var. pusilla [2]
Sub-species	
Cultivar	
Common Synonym(s)	Minuartia pusilla var. pusilla[1] Sabulina pusilla[1] Arenaria pusilla S. Watson[4]
Common Name(s)	dwarf sandwort, annual sandwort, small sandwort, stitchwort, sandwort, sand-wort[3]
Species Code (as per USDA Plants database)	MIPUP[2]
GENERAL INFORMATION	
Geographical range	North America and British Columbia. Idaho, Arizona, northwestern California, southwestern British Columbia, Washington State, Nevada, Idaho, Utah[3]  *Minuartia pusilla (S. Watson) Mattf. Show All annual sandwort. (n.d.). Retrieved May 29, 2019, from https://plants.usda.gov/core/profile?symbol=MIPUP*
Ecological distribution	Coastal regions, plains, open pine forest, chaparral slopes, and dry rock cliffs[5]
Climate and elevation range	25 to 7900 feet[5]
Local habitat and abundance	In Washington *Minuartia pusilla* has been identified in: Grant, Chelan, Whitman, Spokane, Walla Walla, and Klickitat counties.[5] Rare in Washington[5], Endangered in Canada[4]
Plant strategy type / successional stage	Late stage

Plant characteristics	*Minuartia pusilla* is an annual herb. It has a weak tap root with some upright stems.[4] The height is 2-5 cm tall. The stems are branched and smooth, they are white in color and waxy in temperature.[4] There are typically few leaves and the flowers bloom in clusters. The flowers are most of the height and biomass of the plant. The fruits are oval capsules that have 3 valves.[4]
PROPAGATION DETAILS	
Ecotype	Prefers specific habitats with soil types that are rapidly draining sandy humus. They prefer vernal environments meaning periods of seasonal dryness and typically xeric.They prefer soil with low nutrient content. Typical habitat is open, dry soil near sage brush and pine species.[4] *Minuartia pusilla* flowers in April through June[5] *Minuartia pusilla* germinates in December or January and reaches reproductive age in one year.[4]
Propagation	Seeds and annual plants
Propagation Method	Seed- to create a stock plant to cultivate seeds
Product Type	Container plants and seeds
Stock Type	
Time to Grow	One season [7]
Target Specifications	*Minuartia pusilla* grown to fit container[8]
Propagule Collection Instructions	Collect seeds when capsules dehisced. Seeds are 4--0.7 mm; margin thick, purple-brown.[3] Seeds are ready to be collected after flowers bloom from April-July and capsules begin to split[5,8] Collect and store in a breathable bag or container such as a paper bag until seeds are cleaned. [8] Note: *Minuartia pusilla* are self-pollinating.[5]
Propagule Processing/Propagule Characteristics	Clean seeds of debris with an air column separator. Starting with a hammermill and then finishing with an air screen equipment. Store clean seeds in a controlled environment. 40 degrees F and 40% humidity.[8]
Pre-Planting Propagule Treatments	Stratify seeds in moist, dark conditions for 3 to 8 weeks at 2-3°C.[5] In trials, germination decreased without stratification. Trials with 90 days of cold, moist stratification resulted in 60% germination. After this, seeds were sown in containers in November and left outdoors under cool, fluctuating temperatures with positive results.[8]
Growing Area Preparation / Annual Practices for Perennial Crops	Sow seeds in fall (Oct-Nov) in tray 10x10in. Adding a sand or pea gravel to prevent seeds from blowing away. Water thoroughly and keep outside until January when winter weather becomes severe. [8]
Establishment Phase Details	Plants typically emerge in 1-2 days.[8]
Length of Establishment Phase	1 Week[8]

Active Growth Phase	Make sure plants don't experience drought, water often (every other day) and fertilized weekly. **Fertilizer:** water soluble fertilizer that contains micronutrients. [8]
Length of Active Growth Phase	3 months[8]
Hardening Phase	Move plants out of greenhouse in early spring (March-April) depending on weather. Water frequently, every other day on cool days and daily on hot days.[8]
Length of Hardening Phase	2-4 weeks[8]
Harvesting, Storage and Shipping	Do not store beyond one season
Length of Storage	Do not store more than 2 months after hardening phase.
Guidelines for Outplanting / Performance on Typical Sites	Transplant directly to the site for optimal success. The goal being to introduce this species back to native habitats that have been restored. Use a drill to make 1.5 in holes at the planting site.[8] Choose sites lacking severe competition from invasive and established vegetation. Plan planting according to forecast and look rainy and overcast conditions to establish. [8]
Other Comments	
INFORMATION SOURCES	
References (full citations)	1. Calflora Taxon Report 5577. (n.d.). Retrieved May 29, 2019, from https://www.calflora.org/cgi-bin/species_query.cgi?where-calrecnum=5577 2.Minuartia pusilla (S. Watson) Mattf. Show All annual sandwort. (n.d.). Retrieved May 29, 2019, from https://plants.usda.gov/core/profile?symbol=MIPUP 3. Minuartia pusilla ANNUAL SANDWORT. (n.d.). Retrieved May 29, 2019, from http://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=33767 4.Rep. at 3-10 (2004).COSEWIC (COMMITTEE ON THE STATUS OF ENDANGERED WILDLIFE IN CANADA)-Assessment and Status Report on the Dwarf Sandwort Minuartia pusilla in Canada 5. Minuartia pusilla var. pusilla (Rep.). (2005). Retrieved May 29, 2019, from Washington Department of Natural Resources, Washington Natural Heritage Program and the U.S.D.I. Bureau of Land Management website: https://www.dnr.wa.gov/publications/amp_nh_minpus.pdf

	6. Pearion, M. (2013). The reproductive ecology of Minuartia patula Michx. Mattf. (Caryophyllaceae) (Unpublished master's thesis). University of Illinois. 7. Nelson, T. W., & Nelson, J. P. (1981). A New Species of Minuartia (Caryophyllaceae) from Northwest California. Brittonia, 33(2), 162. Retrieved May 29, 2019. 8. Skinner, D. (2006). Protocol Information (Rep.). Duvall, WA: United States Department of Agricultural.
Other Sources Consulted	
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