

Plant Propagation Protocol for *Mitella pentandra*

ESRM 412 – Native Plant Production

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

Mitella pentandra



Figure 1 – *Mitella pentandra* flower
Image © 2004, Ben Legler



Figure 2 *Mitella pentandra* Image © 2004, Ben Legler

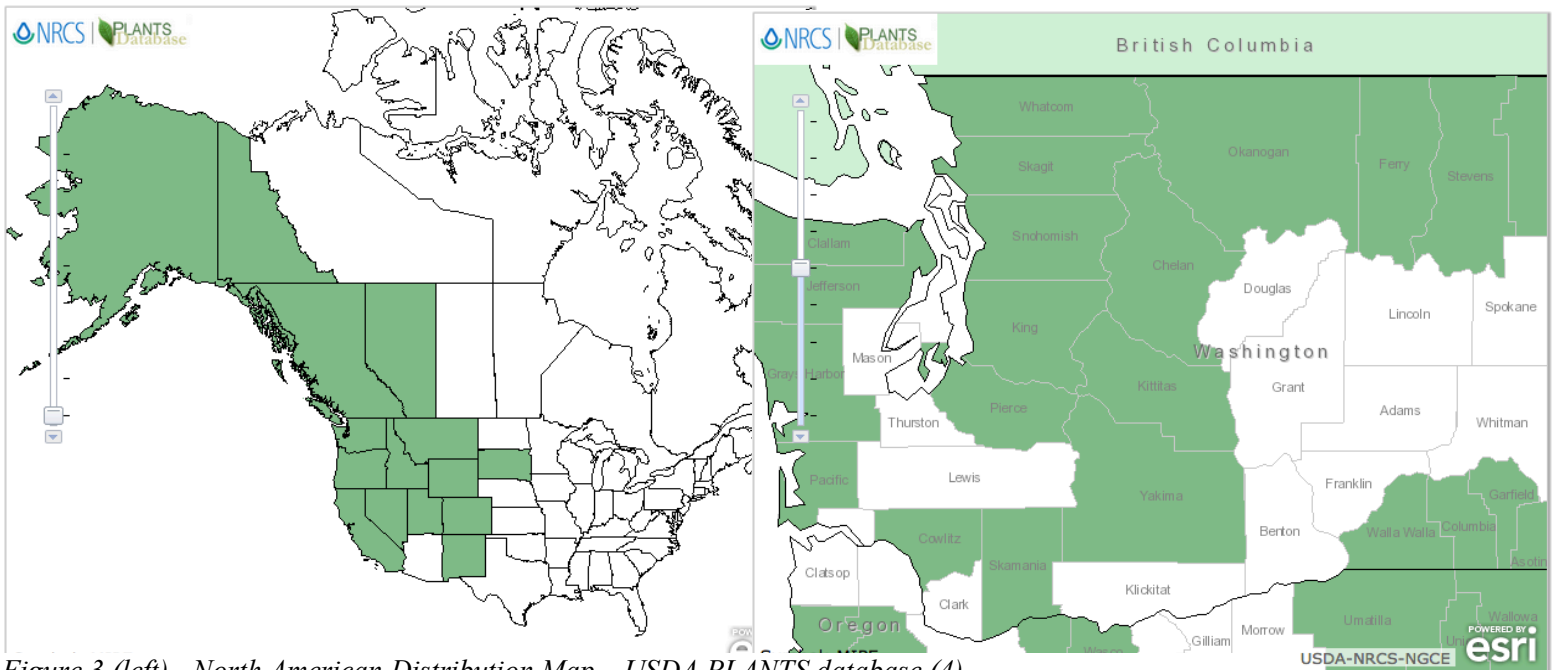


Figure 3 (left) - North American Distribution Map – USDA PLANTS database (4)

Figure 4 (right) – North American Distribution Map – USDA PLANTS database (4)

TAXONOMY	
Plant Family	
Scientific Name	SAXIFRAGACEAE
Common Name	Saxifrage
Species Scientific Name	
Scientific Name	<i>Mitella pentandra</i> Hook. (4)
Varieties	No varieties are currently recognized by the USDA. (4) Two subordinate forms were recorded by C.O. Rosend: (3) 1) <i>Mitella pentandra form. orbiculata</i> 2) <i>Mitella pentandra form. stolonifera</i>
Sub-species	No subspecies are currently recognized by the USDA or other authorities.
Cultivar	There are no recognized cultivars.
Common Synonym(s)	PEPE16 <i>Pectiantia pentandra</i> (Hook.) Rydb.
Common Name(s)	Five-stamen mitrewort, Alpine miterwort, Five Point Bishops Cap
Species Code (as per USDA Plants database)	MIPE
GENERAL INFORMATION	
Geographical range	Occurs along the Pacific coast from Alaska to California, and inland to the Sierra and into Colorado. (4) Occurs in AK, CA , CO , ID , MT , NV , OR , SD , UT , WA , WY, as well as the Canadian provinces of Alberta, British Columbia and Yukon. (6)
Ecological distribution	Occurs in moist woods, stream banks, avalanche tracks, and wet mountain meadows, bogs, fens, and wetlands. (8)(7) In arid sites and Alaska, MIPE is more likely to occur in wetlands. In coastal and moist sites, occurrence is equally likely in wetland and upland locations. (5)(4)
Climate and elevation range	Occurs from 1000m-3700m, frequently in moist, slightly shaded environments. Occasional in middle elevation forests, most common at subalpine elevations (7)(10)
Local habitat and abundance	Commonly occurs with other Saxifragaceae genera, including <i>Tellima</i> , <i>Tolmeia</i> , <i>Tiarella</i> , and <i>Heuchera</i> . In California it occurs most commonly in Red Fir and Lodgepole Pine forests at high elevations. (5) In Washington, herbarium specimens commonly noted amongst diverse forb and graminoid understory, as well as Red Alder or mixed coniferous overstory. (9)

Plant strategy type / successional stage	Locally abundant stress-tolerant, tolerating both high altitudes, fast draining soils in wet environments, and partial shade.
Plant characteristics	Herbaceous, perennial forb. (4)
PROPAGATION DETAILS – VEGETATIVE & SEED	
Ecotype	No information available – there is no published evidence of collections for the purpose of propagation experiments.
Propagation Goal	Live plants Propagation of MIPE has not been common for morphological studies or horticultural practices. It is rarely available commercially from nurseries. (14) Most propagation information for MIPE comes from alpine plant enthusiasts with the goal of reproducing the plant in rock gardens. (1)(2)(12)(15)(16)
Propagation Method	Vegetative: Crown Division (1)
Product Type	Bareroot (direct planting into gardens) Propagules (healthy individuals from crown division)
Time to Grow	No information available from primary sources. In natural setting, it follows the typical pattern of an herbaceous perennial: established plants grow new above ground growth each year from perennial rhizomes and roots, with new foliage emerging in Spring and Summer. Therefore it may be assumed that significant root and rhizome development is essential for success after transplanting.
Target Specifications	No information available from primary resources. For transplanting into natural settings, the desired size and characteristics should be based on local conditions such as climate and competition from other species.
Propagule Collection Instructions	SEED: Seeds are reddish-brown to black, 0.6-0.9 mm. They are held in a capsule which pulls away to reveal the seeds “nesting in a shallow cup.” (10) The seeds emerge in late summer, and should be prepared for germination shortly after collection for best results. (16)
Propagule Processing/Propagule Characteristics	It is interesting to note that MIPE naturally disperses seed partially by a “splash cup” mechanism, in which rain drops that strike the seeds eject them onto the ground. (10) No other information is available.
Pre-Planting Propagule Treatments	Stratification is necessary for germination.

	<p>Sow at 18-22°C (64-71°F) for 2-4 weeks, move to -4 to +4°C (24-39°F) for 4-6 weeks, move to 5-12°C (41-53°F) for germination (16)</p> <p>It is important to not cover the seed. (15)(16)</p>
Growing Area Preparation / Annual Practices for Perennial Crops	<p><i>Mitella</i> prefer soil, specifically a sandy loam. (1)</p> <p>MIPE is adapted to alpine environments, and can therefore tolerate rockier soils than some other species within the genus. (1)(2)</p>
Establishment Phase Details	<p>Temperatures should be gradually increased for 6 weeks after seeding. If germination does not occur within 6 weeks, both the stratification phase and the establishment phase should be repeated. (15)</p>
Length of Establishment Phase	6 weeks (15)
Active Growth Phase	4 to 5 months from germination to development of seed. Plants may remain hardy for another month before senescing, depending on annual conditions.
Hardening Phase	Information not available.
Harvesting, Storage and Shipping	Information not available.
Length of Storage	Information not available.
Guidelines for Outplanting / Performance on Typical Sites	Information not available.
Other Comments	No additional comments

INFORMATION SOURCES

References	<ol style="list-style-type: none"> 1) Rand, E. S. (1866). <i>Garden Flowers: How to Cultivate Them. A Treatise on the Culture of Hardy Ornamental Trees, Shrubs, Annuals, Herbaceous and Bedding Plants</i>. JE Tilton. 2) Cullina, W. (2000). <i>The New England Wild Flower Society guide to growing and propagating wildflowers of the United States and Canada</i>. Houghton Mifflin Harcourt. 3) Tropicos.org. Missouri Botanical Garden. http://www.tropicos.org/Name/29100428 (Accessed: May 15, 2018)
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	<p>4) USDA NRCS National Plant Data Team. (2018, May 15). <i>Mitella pentandra</i>. Retrieved from: https://plants.usda.gov/core/profile?symbol=MIPE</p> <p>5) Calflora: 2018. Berkeley, California: The Calflora Database [a non-profit organization]. Available: http://www.calflora.org/ (Accessed: May 15, 2018).</p> <p>6) Ladybird Johnson Wildflower Center, created 2015-07-15, TWC Staff. https://www.wildflower.org/plants/result.php?id_plant=MIPE (Accessed: May 15, 2018)</p> <p>7) E Flora of North America, FNA Vol. 8 Page 109, 111. http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=250065976 (Accessed: May 15, 2018)</p> <p>8) Turner, M., & Gustafson, P. (2006). <i>Wildflowers of the Pacific Northwest</i>. Timber Press.</p> <p>9) <i>The Herbarium Database</i>, Burke Museum, University of Washington. Published on the http://www.burkemuseum.org/research-and-collections/botany-and-herbarium/collections/database/search.php [accessed on 05/15/18]'</p> <p>10) Pojar, J., & MacKinnon, A. (1994). Plants of the Pacific Northwest Coast. Lone Pine, Vancouver. <i>British Columbia</i>.</p> <p>11) Hitchcock, C., & Cronquist, Arthur. (1974). Flora of the Pacific Northwest; an illustrated manual. Seattle: University of Washington Press.</p> <p>12) Ingwersen, W. (1978). Ingwersen's manual of alpine plants. Eastbourne: W. Ingwersen and Dunnsprint Ltd p.253, General (KR, 197800083).</p> <p>13) Giblin, David. Burke Museum. (2018) <i>Mitella pentandra</i>. Retrieved from: http://biology.burke.washington.edu/herbarium/imagecollection.php?ID=5183</p> <p>14) Calscape. "Pectiantia pentandra" http://calscape.org/Pectiantia-pentandra-() (Accessed: May 15, 2018)</p> <p>15) Ontario Rock Garden and Hardy Plant Society. http://www.onrockgarden.com/category/genera/mitella (Accessed: May 15, 2018)</p> <p>16) http://tomclothier.hort.net/page03.html#m (Accessed: May 15, 2018)</p>
Other Sources Consulted	

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