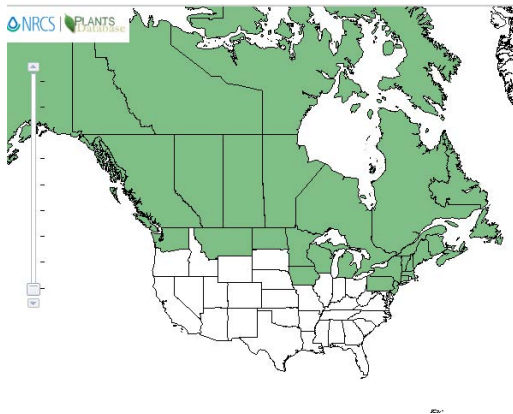


Plant Propagation Protocol for *Mitella nuda*
ESRM 412 – Native Plant Production



Distribution in North America¹



Distribution in Washington state¹

TAXONOMY	
Family Names	
Family Scientific Name:	<i>Saxifragaceae</i>
Family Common Name:	Saxifrage
Scientific Names	
Genus:	<i>Mitella L.</i>
Species:	<i>nuda L.</i>
Species Authority:	Gleason, Henry A. & Cronquist, Arthur J. 1991. ⁹
Variety:	No Varieties Recorded
Sub-species:	No Subspecies Recorded
Cultivar:	No Cultivar Recorded
Authority for Variety/Sub-species:	N/A
Common Synonym(s) (include full scientific names (e.g., <i>Elymus glaucus</i> Buckley), including variety or subspecies information)	No Synonym(s) Recorded ⁶
Common Name(s):	Naked Miterwort Naked Bishop's Cap ² Bare-stemmed mitrewort ⁵
Species Code (as per USDA Plants database):	MINU3
GENERAL INFORMATION	

Geographical range (distribution maps for North America and Washington state)	See above maps Northern United States, Canada, and Alaska ⁵
Ecological distribution (ecosystems it occurs in, etc):	Prefers moist habitats such as swamps, streams, meadows, and forests in lowland and montane zones ³ Common in British Columbia east of the Coast-Cascade Mountains ³
Climate and elevation range	Prefers cool climates and boreal zones. ³ Occurrence increases with high elevations ³ Found from sea level to 2500 m in BC ³
Local habitat and abundance; may include commonly associated species	Location: Prefers water-shedding and water-recieving sites on the east-coast interior ecotone, such as continental forests. ³
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	Shade-tolerant/intolerant ³ Subalpine to montane habitats ³ Occurs on fresh, moist, nitrogen-medium soils ³ Cool, mossy habitats such as mixed wood and cedar swamps ² Propagate by seed and root or runner division. Fresh seeds that are sown at soil level germinate fairly well. A light mulch helps retain soil moisture ² Seedlings start to bloom the third year. ²
Plant characteristics (life form (shrub, grass, forb), longevity, key characteristics, etc)	Perennial ¹ Seedlings start to bloom the third year ² 3-20 cm tall ³

	<p><i>Mitella nuda</i> is a perennial herb from slender rhizomes, usually with stolons. It has erect stems, which reach 3-20 cm tall. Stems are finely glandular-hairy, leafless or with a simple unstalked leaf near the base.</p> <p>Leaves are heart or kidney shaped. They are about 1-3 cm long, hairy above.</p> <p>Inflorescence is a flowered spike-like cluster of 3 to 12 flowers. They bloom upward. Flower stalks are 2-6mm long. Petals are yellow-green and are about 4 mm long. There are about 10 stamens per flower.</p> <p>Fruit is capsules with black seeds and veiny pitts.⁴</p>
Ecotype (this is meant primarily for experimentally derived protocols, and is a description of where the seed that was tested came from):	N/A
Propagation Goal (Options: Plants, Cuttings, Seeds, Bulbs, Somatic Embryos, and/or Other Propagules):	Plant ⁵
Propagation Method (Options: Seed or Vegetative):	Seed ⁵
Product Type	Container Seedling ⁵
Stock Type:	116 ml conetainers
Time to Grow (from seeding until plants are ready to be outplanted):	Establishment: 4 weeks ⁵ , Active growth: 8 weeks ⁵ , Hardening: 4 weeks ⁵
Target Specifications (size or characteristics of target plants to be produced):	Height: 3 cm, 6 to 10 true leaves. Root System: firm plug in conetainer. ⁵
Propagule Collection (how, when, etc):	Seeds should be collected in early fall when capsules and discs turn tan. Seeds are black at maturity. Capsules should be kept in a well ventilated drying shed prior to cleaning. ⁵
Propagule Processing/Propagule Characteristics (including seed density (# per pound), seed longevity, etc):	<p>Seed longevity is unknown.</p> <p>Seed dormancy is classified as physiological dormancy.</p> <p>Seeds/Kg: unknown</p> <p>% Purity: 100%</p> <p>% Germination: 50%⁵</p> <p>Seed density: unknown</p>

Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):	5 months of outdoor stratification ⁵
Practices for Perennial Crops (growing media, type and size of containers, etc):	<p>Sowing method: direct seedling at soil level; seeds are lightly covered with media</p> <p>Growing media used is 6:1:1 milled sphagnum peat, perlite, and vermiculite with Osmocote controlled release fertilizer.</p> <p>Containers should be filled and sown in late fall and irrigated thoroughly prior to winter stratification.</p> <p>Average growing season of nursery is from late April after snowmelt until October 15th.⁵</p>
Establishment Phase (from seeding to germination):	Germination occurs in the fall; following a 160 cold moist stratification and 120 warm moist stratification. ⁵
Length of Establishment Phase:	4 weeks
Active Growth Phase (from germination until plants are no longer actively growing):	Root and shoot development occurs quickly after germination. ⁵
Length of Active Growth Phase:	8 weeks ⁵
Hardening Phase (from end of active growth phase to end of growing season; primarily related to the development of cold-hardiness and preparation for winter):	Plants are fertilized in the fall. Irrigation should be gradually reduced in September and October. Plants are flushed with clear water once before winterization. ⁵
Length of Hardening Phase:	4 weeks
Harvesting, Storage and Shipping (of seedlings):	2 years
Length of Storage (of seedlings, between nursery and outplanting):	5 months
Guidelines for Outplanting / Performance on Typical Sites (eg,	Harvest in September of the 2nd year ⁵

percent survival, height or diameter growth, elapsed time before flowering):	No Information
Other Comments (including collection restrictions or guidelines, if available):	<i>Mitella nuda</i> is rhizomatous and stoloniferous. Established nursery stock can be increased by divisions. ⁵

INFORMATION SOURCES

References (full citations):

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2. "*Mitella nuda* L." ITIS Report. 30 April 2019. <https://www.itis.gov/servlet/SingleRpt/SingleRptsearch_topic=TSN&search_value=24410#null>
3. Klinkenberg, Brian. "*Mitella nuda* L." Electronic Atlas of the Flora of British Columbia. Department of Geography, University of British Columbia. 30 April 2019. <<http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Mitella+nuda>>.
4. Douglas, G.W., G.B. Straley, D.V. Meidinger, and J. Pojar (editors). 1998. Illustrated Flora of British Columbia. B.C. Ministry of Environment, Lands & Parks and B.C. Ministry of Forests. Victoria.
5. "*Mitella* (*nuda*)." Restoration, Nurseries, and Genetic Resources. 30 April 2019. <<https://npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=saxifragaceae-mitella-208&referer=wildflower>>.
6. Luna, Tara. "Propagation Protocol for Production of Container *Mitella nuda* L. Plants 116 ml Conetainers." Native Plant Network. Department of Agriculture, Food Service, National Center for Reforestation. 30 April 2019. <<http://NativePlantNetwork.org>>.
7. "*Mitella nuda* L." Lady Bird Johnson Wildflower Center. 30 April 2019. <https://www.wildflower.org/plants/result.php?id_plant=MINU3>.
8. "*Mitella nuda* L." Natureserve Explorer. 30 April 2019. <<http://explorer.natureserve.org/servlet/NatureServe?searchName=Mitella%20nuda>>.

	<p>9. "Mitella nuda L." NYBG Steere Herbarium. 30 April 2019. <http://sweetgum.nybg.org/science/world-flora/monographs-details/?irn=6793>.</p> <p>10. "Mitella nuda L." Burke Herbarium Image Collection. University of Washington. 30 April 2019. <http://biology.burke.washington.edu/herbarium/imagecollection/taxon.php?Taxon=Mitella%20nuda></p>
	Brenzel, Kathleen Norris. <i>Sunset Western Garden Book</i> . Menlo Park, CA: Sunset Pub., 2007. Print.
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