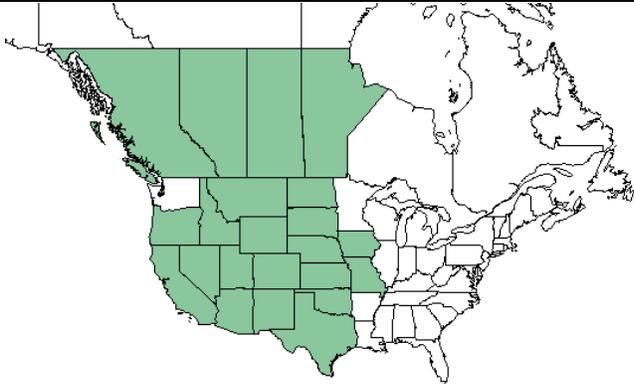


Plant Propagation Protocol for *Lomatium foeniculaceum*

ESRM 412 – Native Plant Production

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

TAXONOMY	
Plant Family	
Scientific Name	Apiaceae / Umbelliferae
Common Name	Carrot family
Species Scientific Name	
Scientific Name	<i>Lomatium foeniculaceum</i> (Nutt.) J.M. Coult. & Rose
Varieties	N/A
Sub-species	<i>Lomatium foeniculaceum</i> subsp. daucifolium, <i>Lomatium foeniculaceum</i> subsp. fimbriatum, <i>Lomatium foeniculaceum</i> subsp. foeniculaceum, <i>Lomatium foeniculaceum</i> subsp. inyoense, <i>Lomatium foeniculaceum</i> subsp. macdougallii [8]
Cultivar	N/A
Common Synonym(s)	N/A
Common Name(s)	Desert biscuitroot, Iyo biscuitroot, Macdougall's biscuitroot, biscuitroot [7], Carrot leaf desert parsley [4], Whiskbroom parsley, hairy parsley [6]
Species Code (as per USDA Plants database)	LOFO
GENERAL INFORMATION	
Geographical range	 <p>[8] Note: This combines all of the ranges for the different subspecies listed above.</p>

Ecological distribution	The ecological distribution of this species is varied, due to the many subspecies. It grows in bristlecone pine forests (subsp. inyoense), the subalpine zone (all subsp.), rocky slopes and flats (all subsp.), and desert scrub lands (all subsp.). [3]
Climate and elevation range	LOFO grows in very dry conditions and prefers to grow in well-drained soils in very open, sunny areas like rocky flats and open patches in pine forests. As such, the climate it tends to grow in is harsh and dry with very cold winters and hot sunny summers [2]. LOFO's elevation range is mid- to high, as it can grow in dry valleys and in the subalpine zone; it can grow between 1,700m and 3,350m [3].
Local habitat and abundance	Grows in open sunny areas with well-drained soil. Abundant in the Western half of the U.S. Some commonly associate species are Black sagebrush, Pinyon pine, and Utah juniper. (Utah state university)
Plant strategy type / successional stage	LOFO is a perennial with a thick taproot that sends out leaves and an inflorescence in the spring, and then dies back underground during the winter. It is a stress-tolerator that grows well in very sunny, dry patches of soil; competes well with other weeds because of its long taproot, but needs time to establish. [10]
Plant characteristics	LOFO is a small, flowering herb in the Apiaceae family. It is a perennial; it has a thick taproot underground that stores energy over winter to send up leaves and flowers in the spring. It has a short growing season, emerging in the early spring and flowering by April. It is a low-growing, prostrate herb with finely dissected leaves that look fern-like; the leaves grow about 8cm high and 25cm wide and are hairy, giving them a grayish-green color. In April, the plant sends up a single umbel of yellow flowers on a stalk, which has up to 15 individual flowers on it. The plant then produces winged seeds in May and June, then dies back to its taproot. [10]
PROPAGATION DETAILS	
Ecotype	N/A
Propagation Goal	Plants (with taproot)
Propagation Method	Seed
Product Type	Container or direct seeding into site [2]
Stock Type	N/A
Time to Grow	3-4 years, when plant has a sizeable taproot. Direct seeding into a site will result in lower success rates, but seeds that germinate will grow to maturity and set flower in 3-4 years. [9]
Target Specifications	N/A
Propagule Collection Instructions	Collect seeds in May, June, and July after flowering has finished and fruits have split open to reveal winged seeds. Seeds are simple to collect; shaking the fruits over a bag or tarp has been shown to be very effective at releasing seeds. [2]
Propagule	Seed density varies based on subspecies. Seeds can be stored in low humidity,

Processing/Propagule	cool temperatures, but do not have long life spans. Should be planted the fall after they are collected for highest germination rates. [2]
Pre-Planting Propagule Treatments	Cleaning is simple, as only a small amount of removal of twigs and fruit husk debris needs to be removed from the winged schizocarps. Seeds are not long lasting, and must be sown immediately after collection. [2] Treatments should include a three-month cold/moist stratification period; this can be done in a lab or, if direct-seeding, seeds should be sown in early fall for natural stratification in the site. [2,9]
Growing Area Preparation / Annual Practices for Perennial Crops	Growing media should be sandy and well-drained; LOFO does not like wet soil. Seedlings should be grown in full sun with at least 8 hours of sunlight every day. They can be container grown or sown directly into a site. [4]
Establishment Phase Details	N/A
Length of Establishment Phase	Seeds sown in fall should germinate in March the following year (6 month establishment phase). [9]
Active Growth Phase	Germination begins in early spring (March) and plant continues to grow until mid-summer (June/July), when it again goes dormant. In the wild, LOFO will only actively grow during the spring when water is available. [9]
Length of Active Growth Phase	LOFO actively grows between March and June, or 3-4 months, when water is readily available; after it flowers, it dies back down to the taproot. [9]
Hardening Phase	N/A
Length of Hardening Phase	N/A
Harvesting, Storage and Shipping	N/A
Length of Storage	N/A
Guidelines for Outplanting / Performance on Typical Sites	Trials show that outplanting the taproots in autumn is successful at establishing the plants. [9]
Other Comments	Some information above was pulled from closely related species such as <i>Lomatium grayi</i> ; these species share the same genus and many characteristics, and have been propagated for restoration to a higher degree than <i>Lomatium</i>

foeniculaceum.

INFORMATION SOURCES

References	<p>[1] Emery, D. E. (1988). <i>Seed propagation of native California plants</i>. Santa Barbara Botanic Garden.</p> <p>[2] Encyclopedia of Life. <i>Lomatium foeniculaceum</i>. Desert Biscuitroot. http://eol.org/pages/581651/data?toc_id=4#1456</p> <p>[3] Hall, C. A. (Ed.). (1991). <i>Natural History of the White-Inyo Range, Eastern California</i> (Vol. 55). Univ of California Press.</p> <p>[4] Kansas Native Plants. Landscaping with native wildflowers, grasses, trees, and shrubs of Kansas. Desert Biscuitroot. <i>Lomatium foeniculaceum</i>. http://www.kansasnativeplants.com/storedetail.php?plnt_id=430</p> <p>[5] Lincoln Constance & Margriet Wetherwax 2016. <i>Lomatium foeniculaceum</i>, in Jepson Flora Project (eds.) Jepson eFlora, http://ucjeps.berkeley.edu/cgi-bin/get_IJM.pl?tid=31412, accessed on May 23, 2016.</p> <p>[6] Lommasson, R. C. (1973). <i>Nebraska wild flowers</i>. U of Nebraska Press.</p> <p>[7] Plants For a Future. <i>Lomatium foeniculaceum</i> – (Nutt.) Coult. & Rose. http://www.pfaf.org/user/Plant.aspx?LatinName=Lomatium+foeniculaceum</p> <p>[8] USDA Plants Database. <i>Lomatium foeniculaceum</i> (Nutt.) J.M. Coult. & Rose. http://plants.usda.gov/core/profile?symbol=LOFO</p> <p>[9] USDA Plants Database. Gray's Biscuitroot. <i>Lomatium grayi</i>. http://plants.usda.gov/plantguide/pdf/pg_logr.pdf</p> <p>[10] Utah State University, 4H Extension. Range Plants of Utah. Desert Parsley. http://extension.usu.edu/rangeplants/htm/desert-parsley</p>
Other Sources Consulted	<p>Lady Bird Johnson Wildflower Center. The University of Texas at Austin. NPIN: Native Plant Database. <i>Lomatium foeniculaceum</i> (Nutt.) J.M. Coult. & Rose. ssp. <i>daucifolium</i>. Desert biscuitroot. http://www.wildflower.org/plants/result.php?id_plant=LOFOD</p> <p>Nelson, R. A., & Williams, R. L. (1992). <i>Handbook of Rocky Mountain Plants</i>(Vol. 911797963). Niwot, Colo.: Roberts Rinehart Publishers xviii, 444p.-illus.. ISBN.</p> <p>Baskin, C. C., & Baskin, J. M. (1998). <i>Seeds: ecology, biogeography, and evolution of dormancy and germination</i>. Elsevier.</p> <p>Stern, Rebecca. Bureau of Land Management, Wyoming. (2012).</p>

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