Plant Propagation Protocol for *Lomatium columbianum*

ESRM 412 – Native Plant Production
University of Washington
Spring 2018

Above: © G. D. Carr

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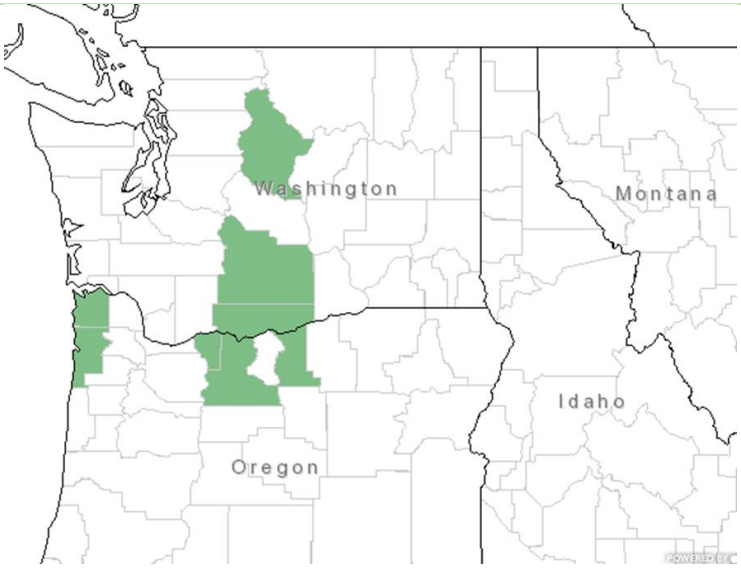
TAXONOMY	
Plant Family	
Scientific Name	Apiaceae (USDA, n.d.)
Common Name	Carrot family
Species Scientific Name	
Scientific Name	*Lomatium columbianum* Mathias & Constance
Varieties	None in USDA database
Sub-species	None in USDA database
Cultivar	
Common	Leptotaenia purpurea (Knoke & Giblin, 2018)

Synonym(s)	
Common Name(s)	Columbia Gorge desert-parsley/purple leptotaenia/Columbia desert-parsley/ purple lomatium
Species Code	LOCO
GENERAL INFORMATION	
Geographical range	 **© NRCS, USDA Plants database** *L. columbianum* is exclusive to the counties in green as seen in this graphic and exist nowhere else in North America. In WA, *L. columbianum* is found only in Central WA in Chelan, Yakima, and Klickitat county (USDA, n.d.). According to another source, this rare native species has only been reliably counted in Yakima and Klickitat county as of late (Knoke & Giblin, 2018)
Ecological distribution	Requires deep soil in shrub-steppe habitats (Knoke & Giblin, 2018) to support its deep taproot, which are dry, meadowlike areas (Matthews, 2017) that receive enough rainfall to support an array of grasses. They are also found in soil rich with volcanic debris (Far Reaches Farm , 2018), and are often on rocky slopes.
Climate and elevation range	Overlaying a DEM layer with the map of consistent sightings (Knoke & Giblin, 2018), *L. columbianum* currently exists at an elevation of 600-3000 ft above sea level, or 180 – 915 m. It is possible that they also can be at higher elevations of 3000-6000 ft (915-1825m), though data has not been recorded there. Since the Columbia River Gorge is a zone with a wide arrange of climate variability and wind conditions, *L. columbianum* is tolerant to desert-like temperature extremes. During germination, seeds require temperatures under 0 degrees Celsius to grow, mimicking snow (Jelito, 2018). In months that are too hot to sustain water loss in photosynthesis, they recede underground (Collector's Nursery, 1999)
Local habitat and abundance	*L. columbianum* is considered a rare species with low abundance rates (Knoke & Giblin, 2018), but in the few places that they are found they can be quite abundant. It can be found in association with a wide variety of shrub-steppe plants such as *Erythronium grandiflorum, Hydrophyllum capitatum var.*

	thompsoni, and *Lomatium grayi* (Collector's Nursery, 1999).
Plant strategy type / successional stage	Though we don't know specifically for *L. columbianum,* its close relative *L. martindalei,* which exists in higher elevations in the Cascade mountains, has been recorded as an early successional species following the Mt. St. Helens eruption in 1980 (del Moral, 1995). *L. columbianum* likely has a similar growth strategy. They are a relatively stress-tolerant species, but their abundance has diminished likely because of lowland development and agriculture and climate change. It enters dormancy after May (Far Reaches Farm , 2018), but if temperatures are hotter than normal before this time they will feel stressed. It is also a perennial, and persists for many years (Knoke & Giblin, 2018).
Plant characteristics	*L. columbianum* is a forb, or an herb, that is characterized by its clusters of pink or purple inflorescences that bloom from March to May (Matthews, 2017). Its leaves are light green, with numerous thin leaflets (Knoke & Giblin, 2018). Belonging to the carrot family, it has a deep taproot that cuts through the rocks to access the nutrient-rich soil underneath. Its stem is aromatic and hairless, and the fruits is produces are oblong and winged. Each cluster of flowers can be between 3-18 inches across, and the plant can get to be over 2 ft tall (Matthews, 2017). Members of the *Lomatium* family were historically used by Native Americans as food, like young taproots, while others were used as poison (Matthews, 2017)
PROPAGATION DETAILS	
Ecotype	*L. columbianum* can be grown with relative ease and is often cultivated for gardens. Seeds are available for purchase on the market. However, for restoration projects of the Columbia Gorge, seeds should be sourced directly from plants in that area.
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	
Time to Grow	1 year
Target Specifications	Small but developed plants that are not flowering and are approximately 6 inches tall.
Propagule Collection Instructions	*L. columbianum* produces medium-sized, oblong, winged seeds that hang off the tips of the plant (Knoke & Giblin, 2018). They end their flowering phase in May and will produce seeds soon afterward, and it is best to collect seeds fresh in the summer (Ingram, 2013). If from wild stock, gently remove seeds from the plant by picking or shaking or collect from the ground.
Propagule Processing/Propagule Characteristi	*L. columbianum* has a high seed density per plant; 20 seeds/gram= 9070 seeds/lb (Jelitto, 2018). The seed, after properly cleaned, can be stored for a couple of months before sowing since it is hydrophobic and has a slow germination period (Ingram, 2013), but for best results should be sowing soon

cs	after collection.
Pre-Planting Propagule Treatments	*L. columbianum* requires minimal cleaning if collected directly from the plant itself. To remove excess dirt, place the seeds in a colander with holes slightly smaller than the seeds themselves, and shake and fan the seeds to remove dirt. Store in a cool, dry place to minimize the risk of fungal growth. No dormancy treatment is needed. Once planted, it will take two seasons for *L. columbianum* to germinate, but otherwise does not require any special treatments.
Growing Area Preparation / Annual Practices for Perennial Crops	You should sow maximum 5 seeds per container, in deep containers that are 4x4x7inches to accommodate taproot growth. The growing media should easily drain (Cochran, 2016) and mimic the natural environment: nutrient rich, arid soil with some rocks, ash, pumice, and other volcanic debris. Seeds should be sown in temperatures of 62-72 degrees F for the first month, but then should transition through season temperatures and simulate snowy conditions until the seeds germinate (Jelito, 2018). This last point is essential because without cold conditions the seed will not break dormancy.
Establishment Phase Details	Late Summer to Spring, or approximately 8 months (Ingram, 2013)
Length of Establishment Phase	1 month
Active Growth Phase	2 months
Length of Active Growth Phase	From sowing to the end of active growth, 10-11 months
Hardening Phase	To complete the yearlong cycle, plants germinate, grow, and harden by June or early July. By this time, they must ready themselves to go into dormancy below ground (Jelito, 2018).
Length of Hardening Phase	About 1 month
Harvesting, Storage and Shipping	Carefully store and ship seedlings in cool, dry conditions in small envelopes or containers
Length of Storage	Maximum: 2 months of seed storage Ideally sow seeds within the week Outplant before summer dormancy, so 9 months after sowing
Guidelines for Outplanting Performance on Typical Sites	About 80% survivorship (Far Reaches Farm , 2018); our outplanted species will be about 6 inches tall, but growers should be aware that the plant over a few years can grow to be 2 ft tall and over a foot wide. Plenty of space should be given for growth both horizontally and vertically, for the plant will develop a deep tap root. It will take a full year after planting *L. columbianum* to grow inflorescences (Cochran, 2016).

INFORMATION SOURCES

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