

Plant Propagation Protocol for [Insert Species]

ESRM 412 – Native Plant Production

URL: [https://courses.washington.edu/esrm412/protocols/\[2025\]/\[PERA.pdf\]](https://courses.washington.edu/esrm412/protocols/[2025]/[PERA.pdf])



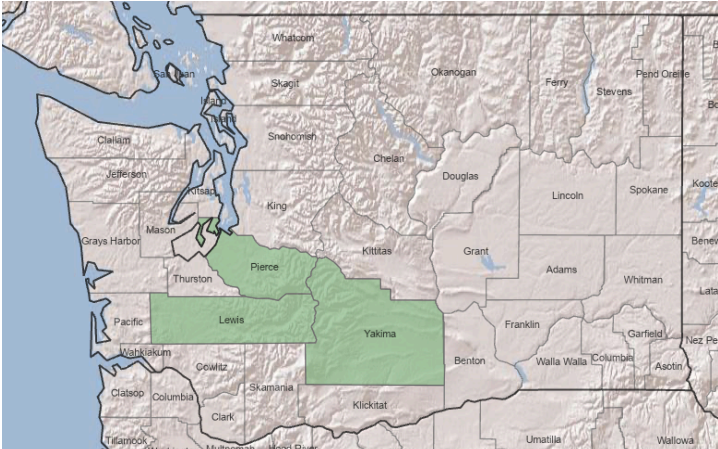
Photo from Washington Native Plant Society and Tim Hagan

TAXONOMY	
Plant Family	Broomrape family
Scientific Name	<i>Orobanchaceae</i>
Common Name	Mount Rainier Lousewort
Species Scientific Name	<i>Pedicularis rainierensis</i>
Scientific Name (A full scientific name consists of <i>Genus</i> , <i>epithet</i> , and authority- e.g., <i>Elymus glaucus</i> Buckley. Protocols are prepared for species, which may include multiple varieties, sub-species, and/or cultivars.)	<i>Pedicularis rainierensis</i> , Pennell & Warren
Varieties (those varieties that are recognized in the USDA)	No varieties are recognized in the USDA Plants database

Plants database; report name and authority for each variety)	
Sub-species (those sub-species that are recognized in the USDA Plants database; report name and authority for each sub-species)	No subspecies are recognized in the USDA Plants database
Cultivar	None
Common Synonym(s) (include full scientific names, including variety or subspecies information)	<i>Pedicularis rainierensis</i>
Common Name(s)	Mount Rainier lousewort/Mt. Rainier lousewort, Rainier lousewort
Species Code (as per USDA Plants database)	PERA6

GENERAL INFORMATION

Geographical range (distribution maps for North America and for the Pacific Northwest (generally available at county level for Washington/Oregon)



Maps courtesy of the USDA Plants database (2)

	<i>Pedicularis rainierensis</i> is found only in Washington state, with a limited geographical range. Some sources indicate it is only found within the boundaries of Mt. Rainier National Park, but others suggest it can occasionally be found outside of the park in surrounding areas (3, 4).
Ecological distribution (ecosystems it occurs in, etc)	<i>Pedicularis rainierensis</i> occurs in moist alpine or subalpine meadow ecosystems (5).
Climate and elevation range	Generally found between an elevation 5,000-7,000 feet in cool, moist meadows (3, 5).
Local habitat and abundance (may include commonly associated species)	Occurs in subalpine/alpine meadows. As a hemiparasite, <i>Pedicularis rainierensis</i> does associate with host plants, however, what plants it associates with are currently unknown.
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	Like all louseworts, <i>Pedicularis rainierensis</i> is a hemiparasite (6), meaning it is partially dependent on a host plant for energy and nutrients, but maintains chlorophyll and the ability to photosynthesize (7).
Plant characteristics (life form (shrub, grass, forb), longevity, key characteristics, etc.)	<i>Pedicularis rainierensis</i> is a perennial forb. It is characterized by a deep purple/red hairless stalk, pinnate compound leaflets that are dark purple to green and fern-like. Flowers are yellow to green and beak-shaped. It ranges from 6-16 inches in height, though generally measures on the shorter side (8).
PROPAGATION DETAILS: FROM SEED (Report one type of propagation in section; duplicate section as needed for multiple types of propagation)	
Ecotype (this is meant primarily for experimentally derived protocols, and is a description of where the seed that was tested came from)	Protocol was not experimentally derived.
Propagation Goal (Options: Plants, Cuttings, Seeds, Bulbs, Somatic Embryos, and/or Other Propagules)	Plants
Propagation Method (Options: Seed or Vegetative)	Seed

Product Type (options: Container (plug), Bareroot (field grown), Plug + (container-field grown hybrids, and/or Propagules (seeds, cuttings, poles, etc.))	Container (plug)
Stock Type	Supercell
Time to Grow (time from seeding until plants are ready to be outplanted)	9 months (9).
Target Specifications (size or characteristics of target plants to be produced)	4 cm in height, strong root structure, firm in container. (9)
Propagule Collection Instructions (how, when, etc.)	<i>P. rainierensis</i> flowers early summer, with seed release occurring late summer to early fall. Once seed capsules are brown and split, seeds can be shaken out and collected. Seeds/capsules should be stored in a dry, well ventilated area to prevent rotting and promote drying (4, 9).
Propagule Processing/Propagule Characteristics (seed density (# per pound), seed longevity, etc)	Seeds should be hand cleaned with screens to remove debris. Seed longevity is unknown. Seed density/pound is approximately 2.6 million, assuming 100% purity and 100% germination (9)
Pre-Planting Propagule Treatments (cleaning, storage, dormancy treatments, etc.)	Treat seeds for 15 minutes in a 500 ppm gibberellic acid solution. Rinse seeds with distilled water. Place cleaned seeds into an open plastic bag, wrapped in damp paper towels and leave in a refrigerator for 90 days for cold stratification. After 90 days, seeds should be planted as germinants (9)
Growing Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc.)	Seeds should be sown in a greenhouse in supercell plugs after cold stratification. Growing medium used is a 6:1:1 milled sphagnum peat, perlite and vermiculite mix, with controlled Osmocote (13N:13P2O5:13K2O; 8 to 9 month release rate at 21C) and Micromax (12%S, 0.1%B, 0.5%Cu, 12%Fe, 2.5%Mn, 0.05%Mo, 1%Zn) fertilizer release. Plugs should be thoroughly irrigated after sowing. Greenhouse temperatures should be between 21-25

	degrees Celsius during the day, and between 12-18 degrees Celsius at night (9).
Establishment Phase Details (cultural practices from seeding to germination)	Seedlings develop cotyledons approximately 3 days after sowing and true leaves within a week (9).
Length of Establishment Phase (time from seeding to germination)	10 days.
Active Growth Phase (cultural practices from germination until plants are no longer actively growing)	Moderate growth during this stage. NPK 20-10-20 fertilizer should be applied during the growing season (approx. 16 weeks) (9). During this time, a host plant should be planted with the seedling. Host preference of <i>Pedicularis rainierensis</i> is currently unknown, but <i>Pedicularis</i> species have a wide variety in hosts, ranging from grasses and sedges, to oaks and spruces (10, 11). Experimentation with different hosts native to Mount Rainier National Park with similar elevation and ecosystems may be prudent.
Length of Active Growth Phase (time from germination until plants are no longer actively growing)	16 weeks.
Hardening Phase (cultural practices from end of active growth phase to end of growing season; primarily related to the development of cold-hardiness and preparation for winter)	Reduce irrigation to induce mild drought-stress. Plants should be leached with clear water, then winterized in outdoor conditions to begin adjustment to outdoor temperatures (12).
Length of Hardening Phase (time from end of active growth phase to end of growing season; primarily related to the development of cold-hardiness and preparation for winter)	5 months.
Harvesting, Storage and Shipping (of seedlings)	Can be stored outside under an insulating foam cover and snow from fall till spring (12). Ship with care, ensuring proper packaging before shipment.

Length of Storage (of seedlings, between nursery and outplanting)	5 months.
Guidelines for Outplanting / Performance on Typical Sites (e.g., percent survival, height or diameter growth, elapsed time before flowering)	No information found.
Other Comments (including collection restrictions or guidelines, if available)	<i>Pedicularis rainierensis</i> is rare and has a very limited geographical range. Due to this, there are currently no resources on propagation protocols for this species, congener <i>Pedicularis contorta</i> and <i>Pedicularis racemosa</i> were used to derive the propagation protocol above, due to their similar morphology and occupation of Mount Rainier National Park.
INFORMATION SOURCES	
References (full citations)	<ol style="list-style-type: none"> 1. Center for Plant Conservation. (n.d.). <i>Pedicularis rainierensis</i>. https://saveplants.org/plant-profile/?CPCNum=3127 2. U.S. Department of Agriculture. (n.d.). <i>Pedicularis rainierensis</i> Pennell: Mount Rainier lousewort. USDA Plants Database. https://plants.usda.gov/plant-profile/PERA6 3. Flowers of Rainier. (n.d.). <i>Mount Rainier lousewort</i>. https://flowersofrainier.com/flower/mount-rainier-lousewort/#:~:text=Although%20P.,5%2C000%E2%80%B2%20to%207%2C000%E2%80%B2%20elevation 4. Turner Photographics. (n.d.). <i>Pedicularis rainierensis</i> (Mount Rainier lousewort). Pacific Northwest Wildflowers. https://www.pnwflowers.com/flower/pedicularis-rainierensis 5. Washington Native Plant Society. (n.d.). <i>Pedicularis rainierensis</i>. https://www.wnps.org/native-plant-directory/179:pedicularis-rainierensis

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Other Sources Consulted (but that contained no pertinent information) (full citations)	
Protocol Author (First and last name)	Stella Christopherson
Date Protocol Created or Updated (MM/DD/YY)	05/19/25