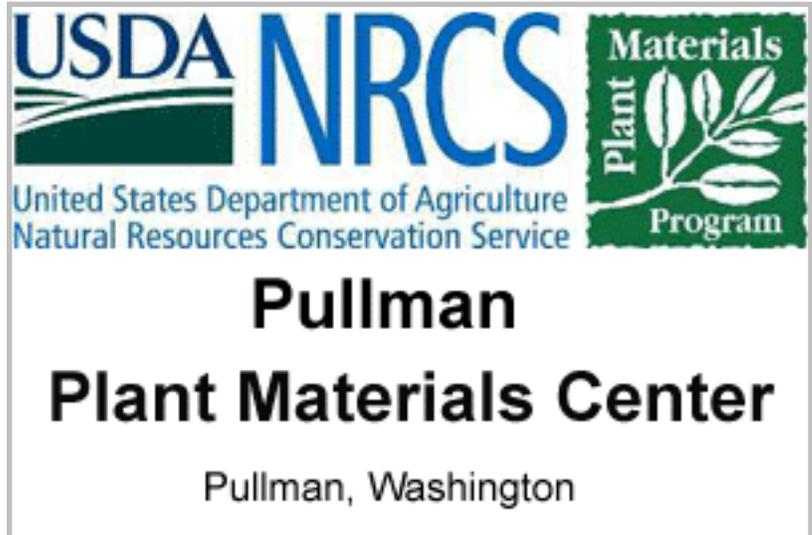


Protocol Information

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Family Scientific Name: **Ranunculaceae**

Family Common Name: **Buttercup**

Scientific Name: ***Delphinium nuttallianum* Pritz.
ex Walp.**

Common Synonym: ***Delphinium nelsonii* Greene**

Common Name: **Upland larkspur, Low larkspur,
Yellow pine larkspur**

Species Code: **DENU2**

Ecotype: **Paradise Creek drainage near
Pullman, WA.**

General Distribution: **Western North America from
British Columbia east to
Alberta and South Dakota and
south to New Mexico and
California. In eastern
Washington it is usually found
in dry areas of open grassland
and Ponderosa pine forest.**

Propagation Goal: **Plants**

Propagation Method: **Seed**

Product Type: **Container (plug)**

Time To Grow: **2 Years**

Target Specifications: **Tight root plug in container.**

Propagule Collection: **Fruit is a follicle and seed is black in color when mature. Seed is collected when the follicles begin to split in June. Seed may be shaken from the follicles into an envelope or whole follicles may be collected. Collected material is stored in paper bags or envelopes at room temperature until cleaned.**

We determined 617,143 seeds/lb for this ecotype.

Propagule Processing: **Seed shaken from follicles needs no cleaning. Follicles are crushed to release the seed and the seed is cleaned with an air column separator. Clean seed is stored at 40 degrees Fahrenheit and 40% relative humidity.**

Pre-Planting Treatments: **Extended cold, moist stratification is needed. Cool spring temperatures may also be necessary. In trials at the Pullman PMC, no germination occurred without stratification and no seed germinated after 30 days cold, moist stratification. Seed sown in late December and left outside did not germinate the first season, but germinated well after a second winter. Seed sown outdoors in November will germinate the following spring. Seedlings which germinated outside died when placed in the greenhouse.**

Growing Area Preparation/
Annual Practices for Perennial Crops:

In mid November seed is sown in 10 cu. in. Ray Leach Super cell conetainers filled with Sunshine #4 and covered lightly. A thin layer of pea gravel is applied to prevent seeds from floating. Conetainers are watered deeply and placed outside.

Establishment Phase: Plants remain outside. They are watered only during dry spells. Germination begins in March and may continue over 2-3 weeks.

Length of Establishment Phase: 1 month

Active Growth Phase: Plants are watered as needed while outside and fertilized once a week with a water soluble, complete fertilizer. They are moved to the lath house in June. Fertilizer is withheld after dormancy and the conetainers are watered only enough to prevent complete desiccation of the soil.

Length of Active Growth Phase: 2 months

Hardening Phase: Hardening is not needed, as plants are grown outside and are dormant as winter approaches.

Harvesting, Storage and Shipping: Plants will go dormant during the summer and begin growing early the following spring. They are stored over the winter in the lath house with no protection except snow cover. Plants exposed to extreme low temperatures with no snow cover should be afforded some insulation. The roots are fleshy and fibrous and a tight root plug was not obtained after 2 years.

Outplanting performance on typical sites: **Transplanting was done in early May by using an electric drill and portable generator to drill 1.5 inch diameter holes at the planting site. Plugs must be handled carefully to protect roots. Growth after transplanting is minimal and the plants will be dormant by late June. The following year they grow vigorously and may flower.**

The perennating organ is a fleshy fascicled portion of the root near the soil surface.

These roots can be removed from the containers in the fall while dormant and outplanted to the field. 4 year old roots thus handled averaged 13.98 mm wide at the widest point and weighed an average of 0.526 grams when outplanted.

Other Comments: **Growth in containers is slow. Using a well drained potting soil improves performance. The plants respond well to being planted out in soil as long as the roots are not disturbed in the process. Plants are apparently short-lived but re-seed readily. Bumblebees and hummingbirds are the principle pollinators (Bosch & Waser 1999, Schulke & Waser 2001). Plants are poisonous to livestock, especially cattle, and may be considered undesirable or invasive for that reason. No insect or disease problems have been noted.**

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