

Plant Propagation Protocol for *Dodecatheon dentatum*
 ESRM 412 – Native Plant Production

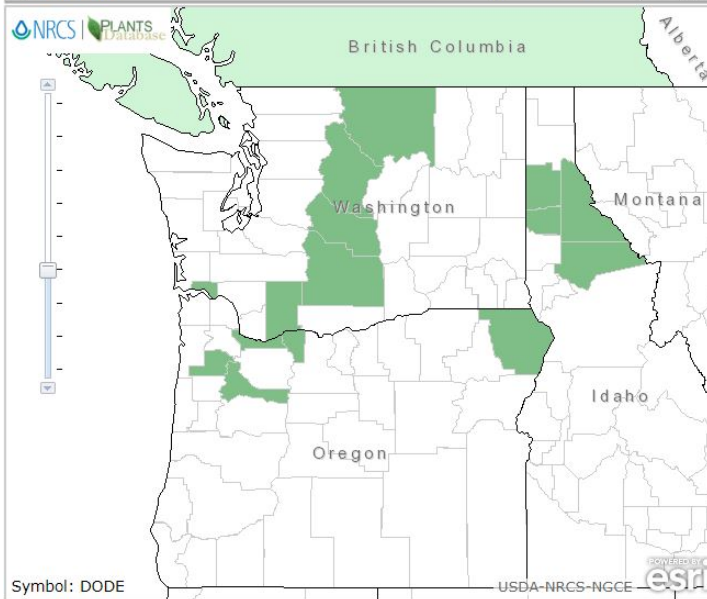
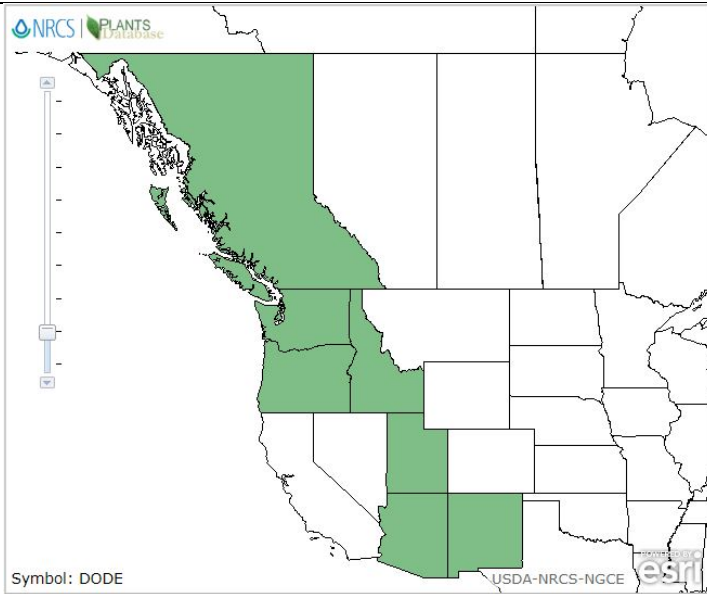


"Dodecatheon Dentatum | Wild Ginger Farm". Wildgingerfarm.Com, 2019, <http://wildgingerfarm.com/plant-list/plants-d/dodecatheon-dentatum.html>. Accessed 24 May 2019.

TAXONOMY	
Plant Family	
Scientific Name	PRIMULACEAE
Common Name	Primrose Family
Species Scientific Name	
Scientific Name ⁸	<i>Dodecatheon dentatum</i> Hook.
Varieties ⁷	<i>Dodecatheon dentatum</i> Hook. var. <i>utahense</i> N.H. Holmgren
Sub-species ⁷	<i>Dodecatheon dentatum</i> Hook. ssp. <i>dentatum</i> <i>Dodecatheon dentatum</i> Hook. ssp. <i>ellisiae</i> (Standl.) H.J. Thomp. <i>Dodecatheon dentatum</i> Hook. ssp. <i>utahense</i> (N.H. Holmgren) Kartesz
Cultivar	
Common Synonym(s)	
Common Name(s)	White shootingstar, Ellis' shootingstar, dwarf shootingstar, dentate shootingstar, toothed American cowslip ¹
Species Code (as per USDA Plants database)	DODE

GENERAL INFORMATION

Geographical range⁸



Ecological distribution

D. dentatum primarily grows along the east side of the Cascade Mountain Range from central Washington to south-central British Columbia and commonly occurs near the Columbia River in southwestern Washington and Columbia River Gorge².

Other populations of *D. dentatum* can be found in northern Idaho, northeastern Oregon, northwestern New Mexico, eastern Arizona, and northern Utah⁵.

Climate and elevation range

D. dentatum can be found in elevations ranging from 60-2600 m (200-8,500 feet)².

It is found in USDA Zones 4-7 and needs partial shade to full sun to be successful with moist yet well-drained soils¹.

Local habitat and abundance	<p><i>D. dentatum</i> often grows along moist stream banks, cliffsides, and steep slopes where there is consistent shade and moisture and well-drained soils⁴. Meadows and open oak and/or conifer woodlands are common growing grounds for the species as well². These conifer woodlands are often composed of <i>Pinus ponderosa</i>, <i>Abies grandis</i>, and <i>Pseudotsuga menziesii</i> while the wet meadows that <i>D. dentatum</i> grows in is characterized by stands of <i>Pinus contorta</i> and a variety of shrubs⁴.</p> <p><i>D. dentatum</i> provides a special value to native bumblebee species⁵.</p>
Plant strategy type / successional stage	<i>D. dentatum</i> can be considered a primary successional to seral species as it occurs in healthy meadows, streams, and woodlands ¹ .
Plant characteristics	<p><i>D. dentatum</i> is a clump-forming, herbaceous perennial¹⁰ that grows to be 15- 40 cm (6-15 in) tall². It grows rosettes of toothed (crenate to dentate margins), mid-green ovate leaves¹ that are 8-20 cm long and 2.5-6 cm wide². The petiole is mildly winged, and the leaf surface is glabrous².</p> <p>The slender stems sprout nodding, dart-like, white flowers with prominent, dark purple anthers in late spring to early summer (sometimes flowers are purple-spotted)¹. Each plant can bear 2-5 inflorescences that have a light green calyx². <i>D. dentatum</i> goes dormant after it is done flowering⁵.</p> <p>After flowering it bears pale greenish to tannish capsules that are ovoid in shape and its seeds do not possess a membrane along the edges².</p>
PROPAGATION DETAILS	
Ecotype	Subalpine meadows ⁶
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	172 ml containers ⁶
Time to Grow	8 months
Target Specifications	Target specifications for <i>D. dentatum</i> are plants with 4-6 true leaves and a firm root system in the container for higher success in outplanting ⁶ .
Propagule Collection Instructions	When capsules turn tan, the seeds can be collected from the plants, often occurring mid to late summer. Capsules can be easily removed from plants and cleaned by opening capsules ⁶ .
Propagule Processing/Propagule Characteristics	<p>Seed longevity of <i>D. dentatum</i> is not known⁶.</p> <p>Seed dormancy is characterized by a physiological dormancy that requires several months of cold stratification³.</p> <p>Seeds/kg is not known, however with a seed purity of 100% there is a germination rate of 65%⁶.</p>
Pre-Planting Propagule Treatments	Before sowing <i>D. dentatum</i> seeds, treat them with 5 months of cold, moist stratification in an outdoor environment ⁶ .
Growing Area Preparation / Annual	<i>D. dentatum</i> is most successful in an outdoor nursery growing facility. Directly sow the seeds and cover with the specified growing medium ⁶ .

Practices for Perennial Crops	<p>The recommended growing medium for <i>D. dentatum</i> is 6:1:1 milled sphagnum peat, vermiculite and perlite⁶. Use with Micromax fertilizer (12%S, 0.1%B, 0.5%Cu, 12%Fe, 2.5%Mn, 0.05%Mo, 1%Zn) and Osmocote controlled release fertilizer (13N:13P2O5:13K2O) with the rate of 0.20 gram of Micromax and 1 gram of Osmocote per 172 ml container⁶.</p> <p>Sow the containers in late fall and irrigate them thoroughly before stratification in the winter⁶.</p> <p>Germination of seedlings occurs in spring with fluctuating outdoor temperatures and full exposure to the sun. In early morning, irrigate the seedlings with Rainbird automatic irrigation system until water leaches thoroughly through containers⁶.</p>
Establishment Phase Details	<p>Germination occurs during May there are fluctuating temperatures⁶.</p> <p>Medium is kept slightly moist during germination with same irrigation practice mentioned above⁶.</p>
Length of Establishment Phase	4 weeks
Active Growth Phase	<p>Following germination, development of the roots and shoots rapidly occurs and 3 weeks after germination 4 to 6 true leaves became evident on the plants⁶.</p> <p>4 weeks after germination seedlings were root tight⁶.</p>
Length of Active Growth Phase	12 weeks
Hardening Phase	During August and September, the plants are fertilized with 10-20-20 liquid NPK at 200 ppm. Gradually reduce the irrigation starting in late September and early October. Prior to winterization, plants were given one final irrigation that leached through containers ⁶ .
Length of Hardening Phase	4 weeks
Harvesting, Storage and Shipping	<p>Plants are ready to be harvested in July⁶.</p> <p>If the plants are going to be stored in an outdoor nursery over the winter, cover them with an insulating foam cover and snow⁶.</p>
Length of Storage	5 months
Guidelines for Outplanting / Performance on Typical Sites	Plants will be close to their mature height of 6 in when outplanted when dormant in late summer to early fall. Outplant in sites with well-drained, moist soils that get ample sun exposure. If planting in early spring after storing over winter, plants can be effectively divided at this time and outplanted accordingly ⁹ .
Other Comments	Most <i>Dodecatheon</i> species, such as <i>D. jeffreyi</i> , <i>D. conjugens</i> , <i>D. pulchellum</i> have been reported to germinate most successfully after being subjected to a cold, moist stratification for a minimum of 90 days, so it can be inferred that it would be similar for <i>D. dentatum</i> ⁶ .

	When plants go dormant in autumn, they can be easily divided by the side rosettes and be used for vegetative propagation ³ .
INFORMATION SOURCES	
References	<p>¹"Dodecatheon Dentatum (Toothed American Cowslip)". Shootgardening.Co.Uk, 2019, https://www.shootgardening.co.uk/plant/dodecatheon-dentatum. Accessed 23 May 2019.</p> <p>²"Dodecatheon Dentatum In Flora Of North America @ Efloras.Org". Efloras.Org, 2019, http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=250092212. Accessed 24 May 2019.</p> <p>³Druse, Kenneth. Making More Plants. Stewart Tabori & Chang, 2012.</p> <p>⁴Franklin, Jerry F, and C. T Dyrness. Natural Vegetation Of Oregon And Washington. Pacific Northwest Forest And Range Experiment Station, Forest Service, U.S. Dept. Of Agriculture [For Sale By The Supt. Of Docs., U.S. Govt. Print. Off., Washington], 1973.</p> <p>⁵"Lady Bird Johnson Wildflower Center". Wildflower.Org, 2019, https://www.wildflower.org/plants/result.php?id_plant=DODE. Accessed 25 May 2019.</p> <p>⁶Luna, Tara. "Native Plant Network — Reforestation, Nurseries And Genetics Resources". Npn.Rngr.Net, 2006, https://npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=primulaceae-dodecatheon-133. Accessed 24 May 2019.</p> <p>⁷"Name Search Results USDA PLANTS". Plants.Sc.Egov.Usda.Gov, https://plants.sc.egov.usda.gov/java/nameSearch. Accessed 24 May 2019.</p> <p>⁸"Plants Profile For Dodecatheon Dentatum (White Shootingstar)". Plants.Sc.Egov.Usda.Gov, https://plants.sc.egov.usda.gov/core/profile?symbol=DODE. Accessed 22 May 2019.</p> <p>⁹Toogood, Alan. Plant Propagation The Fully Illustrated Plant-By-Plant Manual Of Practical Techniques. American Horticultural Society.</p> <p>¹⁰Young, James A, and Cheryl G Young. Collecting, Processing, And Germinating Seeds Of Wildland Plants. Timber Press, 1999.</p>
Other Sources Consulted	<p>Browse, Philip McMillan. Hardy, Woody Plants from Seed. Grower Books, 1979.</p> <p>Hammett, K. R. W. Plant Propagation. Drake, 1977.</p>

	<p>Hartman, Hudson T. Plant Propagation: Principles and Practices. Prentice Hall India, 2002.</p> <p>Hill, Lewis. Secrets of Plant Propagation ; Starting Your Own Flowers, Vegetables, Fruits, Berries, Shrubs, Trees, and Houseplants. Way, 1985.</p> <p>MacDonald, Bruce. Practical Woody Plant Propagation for Nursery Growers. Timber Press, 1986.</p> <p>MAHLSTEDDE, John Peter, and Ernest Straign. HABER. Plant Propagation. John Wiley & Sons, 1957.</p>
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