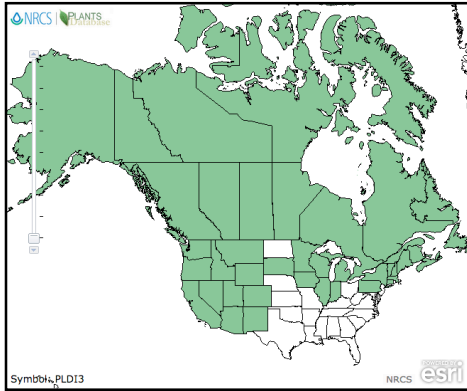


Plant Propagation Protocol for *Platanthera dilatata*
ESRM 412 – Native Plant Production

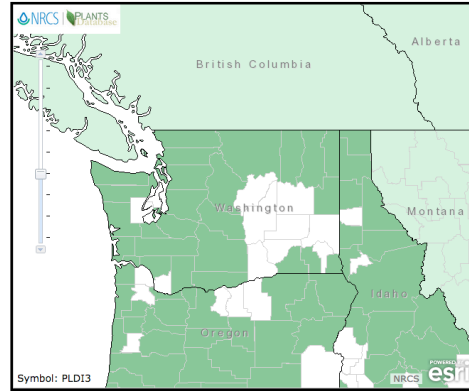
Protocol URL: <https://courses.washington.edu/esrm412/protocols/PLDI3>

Platanthera dilatata* var. *dilatata
North American Distribution

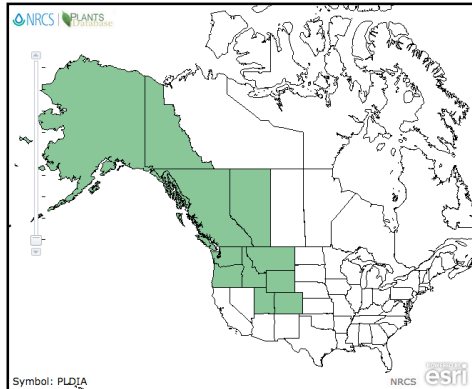


Source: USDA PLANTS Database¹

Washington Distribution

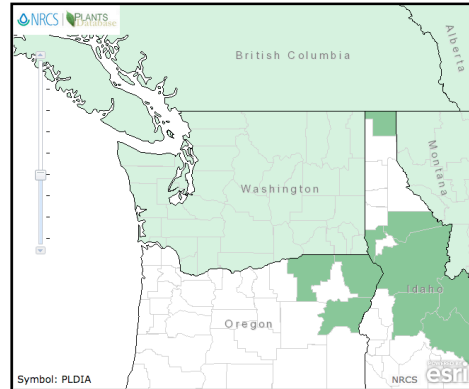


Platanthera dilatata* var. *albiflora
North American Distribution

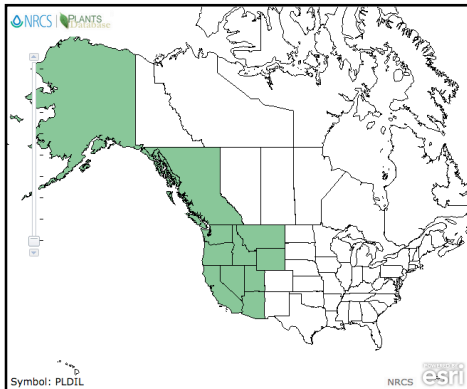


Source: USDA PLANTS Database¹

Washington Distribution

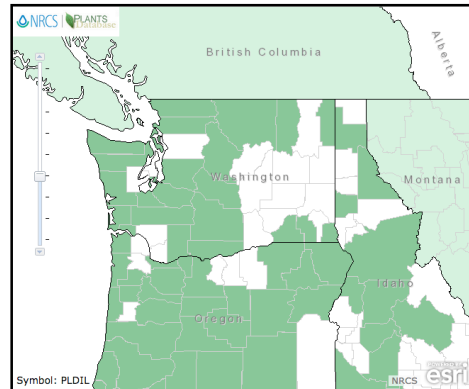


Platanthera dilatata* var. *leucostachys
North American Distribution



Source: USDA PLANTS Database¹

Washington Distribution



TAXONOMY	
Plant Family	
Scientific Name	Orchidaceae
Common Name	Orchid Family
Species Scientific Name	
Scientific Name	<i>Platanthera dilatata</i> (Pursh) Lindl. ex Beck
Varieties	<ul style="list-style-type: none"> • <i>Platanthera dilatata</i> (Pursh) Lindl. ex Beck var. <i>albiflora</i> (Cham.) Ledeb. • <i>Platanthera dilatata</i> (Pursh) Lindl. ex Beck var. <i>dilatata</i> • <i>Platanthera dilatata</i> (Pursh) Lindl. ex Beck var. <i>leucostachys</i> (Lindl.) Luer
Sub-species	N/A
Cultivar	N/A
Common Synonym(s)	<i>Piperia dilatata</i> (Pursh) Szlach. & Rutk.
Common Name(s)	White Bog Orchid, Scentbottle, Fragrant White Rein Orchid <ul style="list-style-type: none"> • <i>Platanthera dilatata</i> var. <i>albiflora</i> – Scentbottle, white bog orchid, bog candles^{2,3} • <i>Platanthera dilatata</i> var. <i>dilatata</i> – Tall white bog orchid, tall white northern orchid, fragrant orchid, leafy orchid^{2,3} • <i>Platanthera dilatata</i> var. <i>leucostachys</i> – Fragrant bog orchid, white-flowered bog-orchid, Sierra rein orchid, Sierra bog orchid^{2,3}
Species Code (as per USDA Plants database)	PLDI3
GENERAL INFORMATION	
Geographical range	<p>Range maps for the three varieties of <i>P. dilatata</i> are provided above. The distribution of <i>P. dilatata</i> is unusual in that there are distinct populations with a distribution pattern split across eastern and western North America. While all three varieties are found in the western United States, only one is found in eastern North America.²</p> <p><i>P. dilatata</i> var. <i>dilatata</i> is found throughout Canada, western North America and east to Great Lakes and parts of the northeastern North America. In eastern North America it ranges from Manitoba and Newfoundland to Illinois and Massachusetts, as far south as Pennsylvania.^{1,2,4} This species is also found within the Arctic circle.³ This variety is found in all but 10 counties in Washington, which are largely east of the Casades.¹</p>

	<p><i>P. dilatata</i> var. <i>albiflora</i> is distributed from British Columbia and southern Alaska to the Rocky Mountains at high elevations. It is also found throughout the Aleutian Islands.³ Population range is not provided in the USDA PLANTS database for Washington.¹</p> <p><i>P. dilatata</i> var. <i>leucostachys</i> is also found from Alaska and British Columbia south into California, and in parts of Arizona and New Mexico.^{1,5} Population range is not provided in the USDA PLANTS database for Washington.¹</p>
Ecological distribution	<p><i>P. dilatata</i> is found primarily in wet areas, such as wetlands, streambanks, marshes, seeps, bogs, and ditches.^{2,3} In California in the southern portion of its range, <i>P. dilatata</i> can be found from valley floors up to subalpine areas; in the Northern part of its range, <i>P. dilatata</i> is found in bogs above the Arctic circle.³</p> <p><i>P. dilatata</i> var. <i>dilatata</i> is common in the northern forests of wetter and colder climates; as noted above, it can be found above the Arctic circle.³ <i>P. dilatata</i> var. <i>albiflora</i> is found in wet meadows and bordering mountain streams.³ <i>P. dilatata</i> var. <i>leucostachys</i> is also common in wet meadows and mountain bogs.³ In warmer and drier parts of its range, it is found in wet bogs marshes, hillside seeps, streambanks, or lacustrine environments. It is usually found in full sun but can occasionally grow in partial shade.⁵</p>
Climate and elevation range	<p><i>P. dilatata</i> var. <i>dilatata</i> can be found in colder wetter climates, at middle to high elevations.^{3,6} <i>P. dilatata</i> var. <i>leucostachys</i> is observed within a wide elevational gradient, from coastal areas to areas above the tree line including up to 3350 m in the Sierra Nevadas.^{3,5} When found in the more southern portion of its range, <i>P. dilatata</i> var. <i>albiflora</i> is found at high elevations within the Rockies.³</p>
Local habitat and abundance	<p>In Washington, the varieties of <i>P. dilatata</i> can be quite common in bogs, seeps and other wet areas. <i>P. dilatata</i> var. <i>dilatata</i> is commonly found in the state, especially in the mountains.⁷ <i>P. dilatata</i> var. <i>albiflora</i> is also frequently found throughout Washington, and <i>P. leucostachys</i> is also widespread and locally common.⁷</p> <p><i>P. dilatata</i> is often associated with the green-flowered orchids <i>P. huronensis</i>, and <i>P. aquilonis</i>. While these species were formerly believed to hybridize often, the green-flowered orchids have evolved self-pollination, reducing hybridization.⁷ This species is also often</p>

	<p>associated with <i>P. hyperborea</i>, which was formerly known to hybridize with <i>P. dilatata</i> resulting in an intermediate group <i>P. x media</i>.³ This hybridization was later determined to be most likely not a hybridization between <i>P. dilatata</i> and <i>P. hyperborea</i>, but representative of hybridization between <i>P. dilatata</i> and <i>P. huronense</i>.⁷</p>
<p>Plant strategy type / successional stage</p>	<p>All orchid species require symbiotic mycorrhizal fungi for seed reproduction. The hyphae of these fungi penetrate the orchid seed and provide it with nutrients.⁷</p>
<p>Plant characteristics</p>	<p>Orchids in the <i>Platanthera</i> genus are fringe or stalk orchids, with tall spikes or racemes of showy flowers, which are often white or green and fragrant.⁸ The spurs of <i>P. dilatata</i> are shaped to accommodate pollination by moths.²</p> <p><i>P. dilatata</i> var. <i>dilatata</i> has fleshy, fibrous roots. The leaves are approximately 3-8 inches long and linear or lanceolate with a rounded apex. The inflorescence can be a spike or raceme 1 to 2 feet in length, with many white, fragrant flowers. Flowers are approximately ½-inch across, with ovate sepals, lanceolate petals, and roughly 3-lobed. The spur is blunt, club-shaped, and incurved.⁹ Flowers are said to have a strong clove smell, though this smell has also been described as a mix of vanilla, cloves, and mock-orange.^{3,6} Flowers are pollinated by moths; the orientation of spurs in <i>P. dilatata</i> requires that nocturnal moths insert their mouthparts into the flowers, assuring pollination.¹⁰ <i>P. dilatata</i> var. <i>dilatata</i> can be distinguished from the other varieties by both geographic range and the spur of its lip petal, which is about the same length as the petal.^{11,12} Flowering occurs from May to September.^{3,8,9}</p> <p><i>P. dilatata</i> var. <i>albiflora</i> is larger and coarser than the other varieties of <i>P. dilatata</i>, and can be an aggressive grower³. It has a more stout growth form, with thicker spurs and larger flowers. Flowers are also denser in the raceme.³ In <i>P. dilatata</i> var. <i>albiflora</i>, the spur length of lip petal is shorter than the lip petal, and has a swollen tip.^{10,12} It flowers from June-August.^{3,8}</p> <p><i>P. dilatata</i> var. <i>leucostachys</i> is distinguishable from other varieties both by its geography and its spur of the lip petal, which is approximately 1.5 times the length of the lip petal.^{11,12} A form with slender and more spaced flowers is also sometimes found.³ It flowers May through August.^{3,8} Pollination occurs by nocturnal</p>

	moth species; the moth's proboscis removes a pollinarium, which is then deposited on the next flower at the stigma, resulting in high pollination rates. ⁵
PROPAGATION DETAILS – SEED	
Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container ¹³
Stock Type	Unknown
Time to Grow	Plants can be outplanted in 1-2 years, and are ready for sale in 3-4 years. ¹³
Target Specifications	Bloomlike but not yet fully mature ¹³
Propagule Collection Instructions	Fruits should be collected as older dried pods, not green pods. ¹³ Allow pods to dry on plant before collection. Some collectors prefer to collect orchid seeds when the pods are still green. ¹⁴
Propagule Processing/Propagule Characteristics	Seeds are extremely small (the size of dust particles) with no endosperm, radicle, or leaf rudiments; the seeds require a fungal symbiont for germination. ^{7, 15} Germination occurs by the swelling of the embryo and the formation of a protocorm. ¹⁵ The duration of <i>P. dilatata</i> seed viability is unknown, but many orchid species have been found to have decreasing viability with increased storage. ¹⁶ Seed viability can be determined by soaking seeds in a solution of sugar water for 24 hours, and observing seeds under a microscope to look for swelling. ¹⁷ Seeds should be treated with 10 percent bleach solution and surfactant for sterilization. ¹³
Pre-Planting Propagule Treatments	Because orchid seeds lack an endosperm, they require either infection by a fungal hyphae or a nutritive agar for germination. ^{7,13} As such, most germination of orchids is done in-vitro. <i>P. dilatata</i> seeds are suspended in a mixture of agar (such as woody plant basal medium), potato cubes, and coconut milk, which has been autoclaved and completed in a laminar flow hood or positive pressure hood to ensure sterility. ¹³ The pH should be at 7 or slightly higher, and germination should be completed in dark conditions. ¹³ Once germination has occurred, the germinated seeds should be re-plated on a fresh agar, with a small amount of charcoal, which aids in initiating root growth in hardy orchid species. ¹³
Growing Area Preparation / Annual Practices for Perennial Crops	Unknown
Establishment Phase Details	The seedlings are grown until large enough to be

	removed from their sterile environment, usually about 1-2 years. ^{13, 17}
Length of Establishment Phase	Unknown
Active Growth Phase	Unknown
Length of Active Growth Phase	Unknown
Hardening Phase	Unknown
Length of Hardening Phase	Unknown
Harvesting, Storage and Shipping	Unknown
Length of Storage	Unknown
Guidelines for Outplanting / Performance on Typical Sites	<i>P. dilatata</i> seedlings must be vernalized by outplanting in the winter. Attempts to prechill <i>P. dilatata</i> to mimic winter have not been successful. ¹³ Plants that have been vernalized will sprout in the spring and will bloom about one and a half years after outplanting, or approximately four years after germination. ¹³
Other Comments	<i>P. dilatata</i> is listed as Endangered in Indiana and Pennsylvania; Threatened in Massachusetts; as a Species of Special Concern in Connecticut; and as Exploitably Vulnerable in New York. ¹ There may be restrictions on collection in these states. Check local restrictions before collection.

PROPAGATION DETAILS – DIVISION

Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Vegetative
Product Type	Container
Stock Type	Unknown
Time to Grow	Unknown
Target Specifications	Unknown
Propagule Collection Instructions	Create divisions from mature plants that are frequently fertilized. ¹³ Collection should be done just before the plant's growth period begins. ¹⁸
Propagule Processing/Propagule Characteristics	Unknown
Pre-Planting Propagule Treatments	Unknown
Growing Area Preparation / Annual Practices for Perennial Crops	Unknown
Establishment Phase Details	Unknown
Length of Establishment Phase	Unknown
Active Growth Phase	Unknown
Length of Active Growth Phase	Unknown
Hardening Phase	Unknown
Length of Hardening Phase	Unknown
Harvesting, Storage and Shipping	Unknown
Length of Storage	Unknown

Guidelines for Outplanting / Performance on Typical Sites	Unknown
Other Comments	Species is listed as Endangered in Indiana and Pennsylvania; Threatened in Massachusetts; as a Species of Special Concern in Connecticut; and as Exploitably Vulnerable in New York. ¹ There may be restrictions on collection in these states. Check local restrictions before collection.
INFORMATION SOURCES	
References	See below
Other Sources Consulted	See below
Protocol Author	Kathryn Cerny-Chipman
Date Protocol Created or Updated	5/19/2015; updated 06/08/15

References:

1. USDA PLANTS database. Available: <http://plants.usda.gov/core/profile?symbol=PLDI3>. Accessed May 17, 2015.
2. Fertig, W. Undated. *White Bog Orchid (Platanthera dilatata)*. Plant of the Week. USDA Website. Available online: http://www.fs.fed.us/wildflowers/plant-of-the-week/platanthera_dilatata.shtml. Accessed May 16, 2015.
3. Luer, C.A. 1975. *The Native Orchids of the United States and Canada excluding Florida*. The New York Botanical Garden, New York.
4. Dennis, L.R.J, and R.R. Halse. 2008. *Aquatic and Wetland Plants of Oregon*. Uncial Press, Aloha Oregon.
5. Coleman, R.A. 1995. *The Wild Orchids of California*. Comstock Publishing Associates (Cornell University Press), Ithaca, NY and London.
6. Pojar J., MacKinnon A., eds. 2004. *Revised Plants of the Pacific Northwest: Washington, Oregon, British Columbia and Alaska*, B.C. Ministry of Forests and Lone Publishing: Canada.
7. Mathis, W. 2005. *The Gardener's Guide to Growing Hardy Perennial Orchids*. The Wild Orchid Company, Doylestown, Pennsylvania.
8. Brown, P.M. 2006. *Wild Orchids of the Pacific Northwest and Canadian Rockies*. University Press of Florida, Gainesville.
9. Hawkes, A.D. 1965. *Encyclopedia of Cultivated Orchids: An illustrated descriptive manual of the members of the Orchidaceae currently in cultivation*. Faber and Faber Limited, London.
10. Larson, R.J 1992. "Pollination of *Platanthera dilatata* var. *dilatata* in Oregon by the Noctuid Moth *Dicestra oregonica*". *Madroño* 39(3): 236-237.
11. Kolzoff, E.N. 2005. *Plants of Western Oregon, Washington & British Columbia*. Timber Press, Portland Oregon.
12. Washington Native Orchid Society. Undated. *The Platanthera Genus*. Available online: <http://www.wanativeorchids.com/Platanthera/index.html>. Accessed May 17, 2015.
13. Fraser, Richard. Fraser's Thimble Farms. Salt Island, British Columbia. Personal Communication. May 19, 2015.
14. Schoser, G. 1993. *Orchid Growing Basics*. Sterling Publishing Company, New York.

15. Arditti, J., Michaud, J.D., and A.P. Oliva. 1981. "Seed Germination of North American Orchids. I. Native California and Related Species of *Calypso*, *Epipactis*, *Goodyera*, *Piperia*, and *Platanthera*. *Botanical Gazette* 142(4): 442-453.
16. Stoutamire, W.P. 1996. "Seeds and Seedlings of *Platanthera leucophea* (Orchidaceae)". *North American Native Terrestrial Orchids – Propagation and Production*. Conference Proceedings, March 16 and 17, 1996.
17. Rittershausen, B., and Rittershausen, W. 1985. *Orchid Growing Illustrated*. Sterling Publishing Co., New York.
18. DeYoung, G., Rowe, B., and E. Runkle. 2011. "Multiplying and Sharing Helps Conserve Species and Hybrids". *Propagating Orchids*. *Orchids* 80(8): 486-489.

Other Consulted Resources:

1. Barbour, M.G., and W.D. Billings, eds. 1988. *North American Terrestrial Vegetation*. Cambridge University Press: Cambridge, New York, Port Chester, Melbourne, and Sydney.
2. Franklin, J.F. and C.T. Dyrness. 1988. *Natural Vegetation of Oregon and Washington*. Oregon State University Press, Oregon.
3. Hitchcock, C.L., and A. Cronquist. 1973. *Flora of the Pacific Northwest: An Illustrated Manual*. University of Washington Press: Seattle and London.
4. Krukeberg, A.R. 1982. *Gardening with Native Plants of the Pacific Northwest: An Illustrated Guide*. University of Washington Press, Seattle and London.
5. Leroy-Terquem, G., and J. Parisot. 1993. *Orchids: Care and Cultivation*. Sterling Publishing Company, New York.
6. Lesica, P. 2012. *Manual of Montana Vascular Plants*. BRIT Press, Fort Worth, TX.
7. Rittershausen, W., Rittershausen, B., and D. Cranch. 2001. *Orchids: The Complete Grower's Guide*. Garden Art Press, Suffolk.
8. Rose, Dr. R, Chachulski, C.E.C, and D.L. Haase. 1998. *Propagation of Pacific Northwest native plants*. Oregon State University Press: Corvallis, OR.
9. Seattle Audubon Society. 1997. *A Field Guide to the Common Wetland Plants of Western Washington & Northwestern Oregon*. Sarah Spear Cooke, ed. Seattle Audubon Society, Seattle, Washington.
10. Willoughby, A.C. 1950. *Orchids and How to Grow Them*. Oxford University Press, New York.

Plant Data Sheet



1



2

Species (common name, Latin name)
White Bog Orchid, *Platanthera dilatata*

Range

Found from Alaska south to Oregon, northern United States and western mountainous states. Endangered in Indiana and Pennsylvania.

Climate, elevation

Found in middle to high elevations in temperate climates.

Local occurrence (where, how common)

Alaska to Oregon, relatively common

Habitat preferences

Found in wet to boggy ground, swamps, marshes, wet meadows, moist seepage slopes, along stream edges in sub-alpine meadows and swampy coniferous forests.

Plant strategy type/successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)

Reportedly has a symbiotic relationship with a soil-inhabiting fungus.

Associated species

Unknown

May be collected as: (seed, layered, divisions, etc.)

P. dilitata may be propagated by dividing rhizomes, tubers, corms or bulbs (including offsets) in autumn or from gathered seeds.

Collection restrictions or guidelines

Endangered or threatened in some states. Collecting seeds is encouraged instead of digging up these threatened plants. If collecting seeds or plants in national parks or forest, please refer to their guidelines for gathering and removing plant materials.

Seed germination (needs dormancy breaking?)

It is recommended that seeds are surface sown in the fall in a greenhouse.

Seed life (can be stored, short shelf-life, long shelf-life)

Not known.

Recommended seed storage conditions

Not recommended.

Propagation recommendations (plant seeds, vegetative parts, cuttings, etc.)

P. dilitata may be propagated by dividing rhizomes, tubers, corms or bulbs (including offsets) in autumn or from gathered seeds.

Soil or medium requirements (inoculum necessary?)

This plant grows best in saturated peat or heavy, wet fertile soil. Prefers acidic to mildly acidic soil. Reportedly has a symbiotic relationship with a soil-inhabiting fungus. Grow with soil from nearby established plants or direct sow around established plants to better make use of this fungus.

Installation form (potential for successful outcomes, cost)

Reported as difficult to grow.

Recommended planting density

Unknown

Care requirements after installed (water weekly, water once etc.)

Keep constantly wet.

Normal rate of growth or spread; lifespan
Unknown

Data compiled by (student name and date)

Photo Sources

¹ <http://www.nawwal.org/~mrgoff/photojournal/2002/sum/08-03bogorchid.html>

² <http://www.cwnp.org/oka/pg/pwind/pldilata.html>

Sources Cited

Edible, medicinal and useful plants for a healthier world. 26 April 26, 2006. Plants for a future. <<http://www.pfaf.org/database/plants.php?Platanthera+dilatata>>.

Dave's Garden, Plant Files. 26 April 2006.
<<http://davesgarden.com/pf/go/64846/index.html>>.

Foster, H. Lincoln. Rock Gardening. A guide to Growing Alpines and Other Wildflowers in the American Garden. New York: Bonanza Books, 1968.

Glicenstein, Leon. Some Native Orchids of Northeastern USA. 26 April 2006.
<http://www.hoosiororchid.com/article_snoneusa.pdf>.

Hitchcock, C. Leo and Arthur Cronquist. Flora of the Pacific Northwest: An illustrated Manual. Seattle: University of Washington Press, 1973.

Plants Profile. 26 April 2006. USDA Natural Resources Conservation Service. <<http://plants.usda.gov/java/profile?symbol=PLDI3>>.