

Plant Propagation Protocol for *Betula occidentalis*

ESRM 412 – Native Plant Production

Protocol URL: <http://courses.washington.edu/esrm412/protocols/BEOC2.pdf>

Male and Female Inflorescences



Source: ¹USDA PLANTS Database

Distinctive Bark



Source: ⁴Robert L. Carr

TAXONOMY

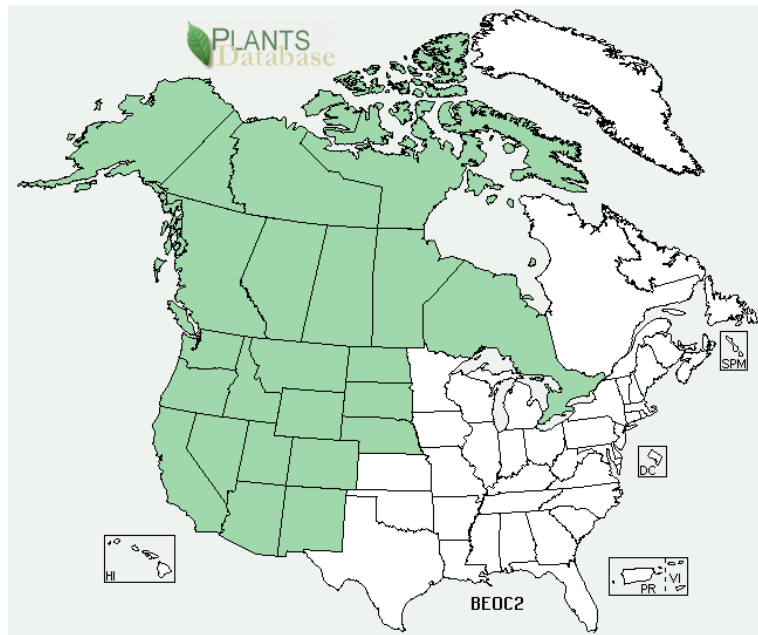
Plant Family	
Scientific Name:	Betulaceae
Common Name:	Birch Family
Species	
Scientific Name	
Scientific Name:	<i>Betula occidentalis</i> Hook.
Varieties:	
Sub-species:	
Cultivar:	
Common Synonym(s):	<i>Betula beeniana</i> A. Nelson ³ <i>Betula elrodiana</i> E.J. Butler ³ <i>Betula fontinalis</i> Sarg. ^{2,3} <i>Betula microphylla</i> Bunge ⁵ <i>Betula microphylla</i> Bunge var. <i>fontinalis</i> (Sarg.) M.E. Jones ⁵ <i>Betula obovata</i> E.J. Butler ³ <i>Betula occidentalis</i> var. <i>inopina</i> (Jepson) C.L. Hitch. ² <i>Betula occidentalis</i> var. <i>inopina</i> ² <i>Betula papyrifera</i> Marsh subsp. <i>occidentalis</i> (Hook.) Hulten ² <i>Betula papyrifera</i> Marsh. var. <i>occidentalis</i> (Hook.) Sarg. ⁵
Common	Water birch, Mountain birch, River birch, Western birch, ² Red Birch ⁴

Name(s):	
Species Code:	BEOC2

GENERAL INFORMATION

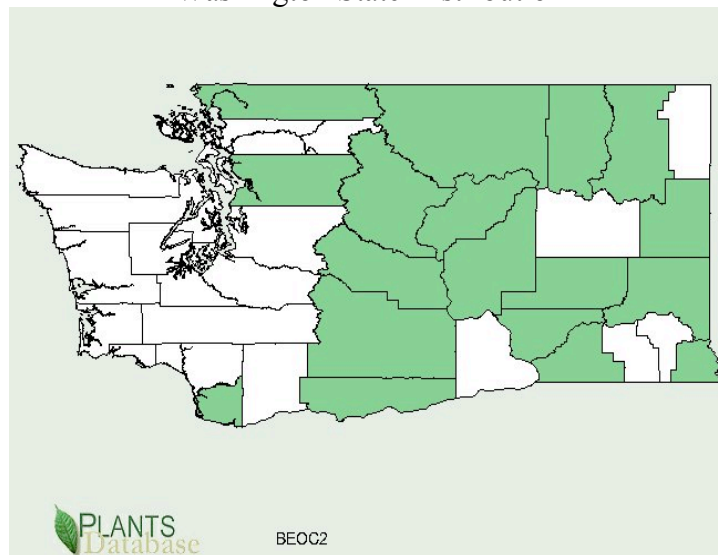
Geographical range: N. America (more sporadic distribution than suggested by the map²); Occurs chiefly east of the Cascades crest in Washington; Alaska south to California, east in Canada to Ontario, in the east U.S. to the Rocky Mountains and northern Great Plains.⁵

North American Distribution



Source: ¹USDA PLANTS Database

Washington State Distribution



Source: ¹USDA PLANTS Database

Ecological distribution: Tolerate a considerable range of climatic conditions. Primarily riparian areas or near waterways or other moist areas such as wet swales, marshes, ravines, bogs, or moist open woodlands.² Occasionally on dry sites. Occurs in prairie

	regions, scattered in the mountains, common along streams connecting mountains and sagebrush steppe or desert regions. ²
Climate and elevation range	Low-mid elevation species, but found in some high elevation desert areas such as the Mojave Desert. ² Found at elevations ranging from 300-2000m ² or 600-2500m. ⁷
Local habitat and abundance; may include commonly associated species	Abundant in their habitat of moist areas or stream banks at low elevations. ⁵ Often in coarse-textured soil such as loamy or sandy soils and associated with alkaline soils. ² Some associated species are; <i>Cornus sericea</i> , <i>Populus</i> spp., <i>Salix</i> spp., <i>Alnus</i> spp., <i>Thuja Plicata</i> , <i>Pseudotsuga menziesii</i> , ² <i>Aknus incana</i> , <i>Purshia tridentata</i> , <i>Balsamorhiza sagittata</i> , <i>Berberis aquifolium</i> , <i>Prunus virginiana</i> , <i>Ribes aureum</i> , <i>Clematis ligusticifolia</i> . ⁶
Plant strategy type / successional stage:	Not restricted to any particular stage of forest or floodplain. ² Fast growing but short lived shrub-tree. ⁸ Abundant seed production but seeds have very low viability. ² Tolerant of flooding for most of a growing season. ² Tolerates strong winds but not maritime environments. ⁸ Also is very shade tolerant. ¹²
Plant characteristics:	Shrub-Tree with a Phanerophyte life form. ² Distinctive bark; thin, red-brown to black and non-peeling (see picture above). ^{2,7} Young twigs have crystalline glands. ^{5,7} Flowers appear in late spring and before the leaves. ² Hybridizes with <i>B. papyrifera</i> . ^{2,9}
PROPAGATION DETAILS (Seeds)	
Propagation Goal:	Plants
Propagation Method:	Seed
Product Type:	Container (plug)
Stock Type:	
Time to Grow:	2 years ⁹ +
Target Specification:	Seedlings that large enough to easily handle or are 18-30 inches tall can be outplanted. ¹² Plants can be transplanted after 1-2 years. ⁹
Propagule Collection:	Can be collected in late summer or fall. ⁹ Collect seeds by picking the catkins while still green enough that they hold together. Spread them out to dry for several weeks until they are fragile, when dry they shatter readily so place into bags. ⁹

	Flailing and shaking the bag can shatter the catkins and release the seeds. Seeds can be separated from most of the scales and debris by air screening and fanning. ⁹
Propagule Processing/Propagule Characteristics:	Seeds are short-lived and rarely remain viable for more than 2-3 days. ² Germination rates are very low due to large amount of non-viable seeds produced and that they are short-lived. ^{2,9,13} Seed can be stored at 1-3% moisture content and temperatures of 2-5°C. Germination may drop even though the seeds are stored at low temperatures. ⁹ Seed density is recorded as 2500 seeds/gram. ¹³
Pre-Planting Propagule Treatments:	Stratification at 36 to 37 °F (2-3 °C) for 30 to 90 days has been recommended ² , but is not necessary if the seeds are germinated with light. The light requirement can be overcome with cool-moist stratification. ⁹ Gravity separation of non-imbibed seeds was found to be an excellent way to improve the percentage of filled and viable seeds. ¹⁰
Growing Area Preparation / Annual Practices for Perennial Crops:	No specifications found.
Establishment Phase:	Sow fresh, ripe seeds in the fall in sandy soil, cover slightly ^{9,12} or press the seeds firmly into the soil. ⁹ Keep cool and moist. ⁹ Can be sown in containers or seed trays containing slow release fertilizer. ¹² If germination is poor, raising the temperature by covering the seeds with glass or plastic can help. ⁸
Length of Establishment Phase:	4-6 weeks after spring sowing ⁹
Active Growth Phase:	Keep soil moist ^{8,9,12} and in part shade ¹² . Shade is required for 2-3 months during the first summer. ⁹ Conflicting information about whether shade or sun is best for seedling growth. ²
Length of Active Growth Phase:	1-2 years before transplanting, after transplanting growth rates are rapid. ⁹
Hardening Phase:	No information is mentioned for hardening of <i>B. occidentalis</i> . If concerned about hardening; <i>B. papyrifera</i> , which is commonly hybridizes with, it is recommended to fertilize the plants with a 10-20-10 liquid NPK at

	200ppm in the fall before leaching the pots with clear water irrigation before overwintering. ¹¹ This may work for <i>B. occidentalis</i> as well since the species so frequently hybridizes into some indistinguishable species.
Length of Hardening Phase:	No information available for hardening of <i>B. occidentalis</i> , but for <i>B. papyrifera</i> 4 weeks is suggested. ¹¹
Harvesting, Storage and Shipping:	Nothing mentioned other than transplanting or outplanting can be done at 1-2 years of age. ^{8,9,12}
Length of Storage:	Nothing mentioned.
Guidelines for Outplanting / Performance on Typical Sites:	Can be outplanted in a total of 2 years in late spring or early summer, after the last expected frosts. ⁸ Best time to outplant is in spring when buds begin to turn green. ¹² Starts to produce seed at 10-12 years of age. ⁹
INFORMATION SOURCES	
References:	<ol style="list-style-type: none"> 1. USDA, NRCS. 2014. The PLANTS Database (http://plants.usda.gov, 12 May 2014). National Plant Data Team, Greensboro, NC 27401-4901 USA http://plants.usda.gov/core/profile?symbol=BEOC2 2. USFS: Gucker, Corey L. 2008. <i>Typha latifolia</i>. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/plants/tree/betocc/all.html [2014, May 12]. 3. The Plant List. 2013. Version 1.1. Published on the Internet; http://www.theplantlist.org/ [Accessed May 12, 2014]. 4. Carr R.L. 2010. Flora of Eastern Washington and Adjacent Idaho – <i>Betula occidentalis</i> Hook. Available: http://web.ewu.edu/ewflora/Betulaceae/Betula%20occidentalis.html [Accessed May, 20 2014] 5. Giblin, David. 2014. Burke Museum of Natural History and Culture. Available: http://biology.burke.washington.edu/herbarium/imagecollection.php?Genus=Betula&Species=occidentalis [Accessed: May 20, 2014] 6. Consortium of Pacific Northwest Herbaria. 2013. Available: pnwherbaria.org [Accessed: May 12, 2014] 7. Sawyer J.O.J. Jepson Flora Project (eds.) 1993. <i>Jepson eFlora</i>, Available: http://ucjeps.berkeley.edu/IJM.html, [Accessed: May 20, 2014]

	<p>8. Plants For A Future. 2012. <i>Betula occidentalis</i> – Hook. Available: http://www.pfaf.org/user/Plant.aspx?LatinName=Betula+occidentalis [Accessed: 20 May, 2014]</p> <p>9. USFS and USDA. Umatilla National Forest. http://www.fs.usda.gov/detailfull/umatilla/learning/nature-science/?cid=stelprdb5251292&width=full</p> <p>10. Jones, C.L., Harrington, J.T., Dreesen, D.R. 2002. Refinement and Stratification of Thinleaf Alder and Water Birch Seeds from New Mexico. <i>Native Plants Journal</i>. 3(2):142-150.</p> <p>11. Wick, Dale; , Joy Hosokawa.; Evans, Jeff.; Luna, Tara. 2008. Propagation protocol for production of container <i>Betula papyrifera</i> Marsh. plants (172 ml container); USDI NPS - Glacier National Park, West Glacier, Montana. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 21 May 2014). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.</p> <p>12. USDA, NRCS. 2014. The PLANTS Database. Plant Guide. (http://plants.usda.gov/plantguide/pdf/pg_beoc2.pdf, Accessed: 21 May 2014). National Plant Data Center, Baton Rouge, Louisiana</p> <p>13. Jones, C.L. 2000. Seed Upgrade and Germination Strategies for <i>Alnus tenuifolia</i> and <i>Betula occidentalis</i>. Thesis submitted for a Master of Horticulture. Available: http://morasc.nmsu.edu/docs/Seed%20Upgrade%20and%20Germination%20Strategies%20for%20Alnus%20Tenuifolia%20and%20Betula%20Occidentalis.pdf [Accessed May 21, 2014]</p>
Other Sources Consulted:	1. Fisher, Brian, editor. "Pogonomyrmex anergismus Cole, 1954." <i>Encyclopedia of Life</i> , available from http://eol.org/pages/460427 . Accessed 15 Jan 2009.
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