

Plant Propagation Protocol for *Holodiscus discolor*
 ESRM 412 – Native Plant Production

TAXONOMY

Family Names

Family Scientific Name: Rosaceae

Family Common Name: Rose

Scientific Names

Genus: *Holodiscus*

Species: *discolor*

Species Authority: Pursh

Variety: *Glabrescens*

Sub-species:

Cultivar:

Authority for Variety/Sub-species: Greenm.

Common Name(s):

include full scientific names (e.g., *Elymus laevis* Buckley), including variety or subspecies information

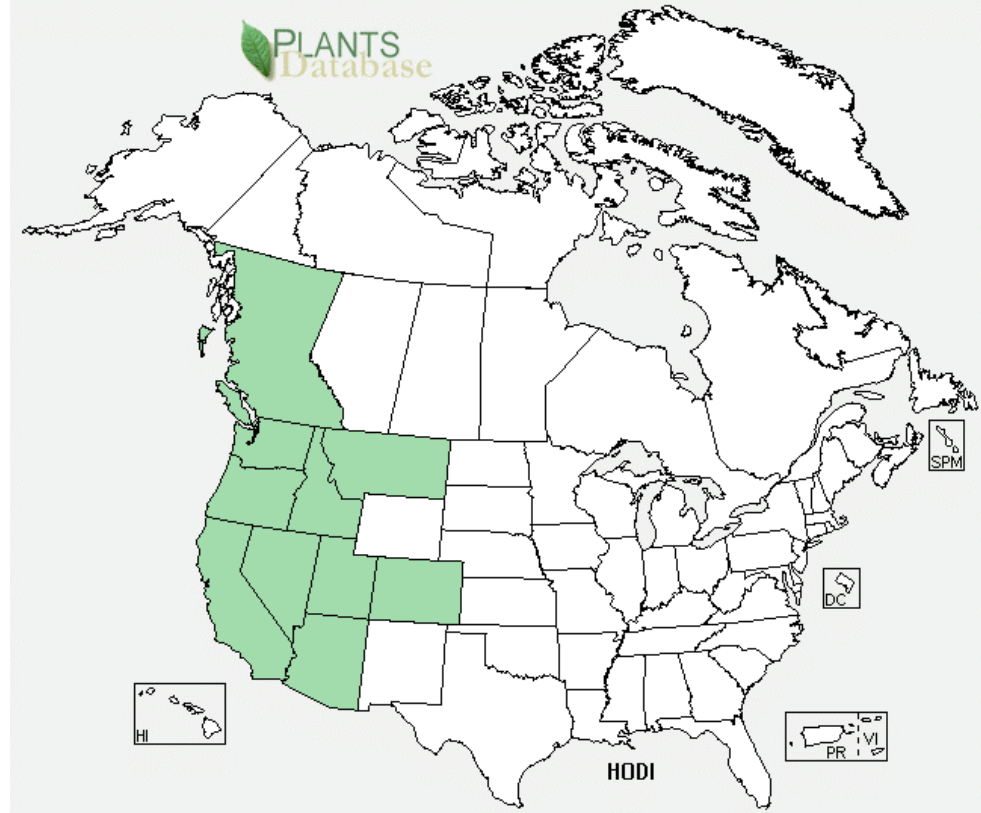
Holodiscus boursieri (Carrière) Rehder
Holodiscus discolor (Pursh) Maxim. ssp. *franciscanus* (Rydb.) Roy L. Taylor & MacBryde
Holodiscus discolor (Pursh) Maxim. var. *ariaefolius* (Sm.) Asch. & Graebn.
Holodiscus discolor (Pursh) Maxim. var. *delnortensis* Ley
Holodiscus glabrescens (Greenm.) A. Heller
Holodiscus dumosus (Nutt. ex Hook.) A. Heller var. *glabrescens* (Greenm.) C.L. Hitchc.
Holodiscus dumosus (Nutt. ex Hook.) A. Heller var. *australis* (A. Heller) Ley
Holodiscus dumosus (Nutt. ex Hook.) A. Heller var. *glabrescens* (Greenm.) C.L. Hitchc.
Holodiscus glabrescens (Greenm.) A. Heller
Holodiscus microphyllus Rydb.
Holodiscus microphyllus Rydb. var. *glabrescens* (Greenm.) Ley
Holodiscus microphyllus Rydb. var. *microphyllus*
Holodiscus microphyllus Rydb. var. *sericeus* Ley
Holodiscus microphyllus Rydb. var. *typicus* Ley
Sericotheca discolor (Pursh) Rydb.
Spiraea discolor Pursh
 (1)

Common Name(s): Oceanspray

Species Code (as per JSDA Plants database): HODI

GENERAL INFORMATION

Geographical range distribution maps for North America and Washington state)



(USDA Plants)
 Documented in Arizona, California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, Washington and British Columbia. Specifically in Washington, *Holodiscus discolor* is found on both sides of the cascades, more frequently on the West and in all counties except Douglas, Grant, Benton, Franklin, Adams and Lincoln. (1,2,4,5)

ecological distribution ecosystems it occurs in, etc):

Occurs most often in dry, opens sites. It is found in opens woods, canyon bottoms, creek banks, river banks, roadsides and disturbed sites. (3,4,5,7)

climate and elevation range

Often occurs from sea level to 5500 feet (1676 m) elevation on hot and dry end of moisture gradient in PNW forest complexes. More often occurs on south facing slopes, which are often warmer and dryer. (3,5)

ecological habitat and abundance; may include commonly associated species

In Southwest Washington, Oceanspray often associates with Grand fir (*Abies grandis*) on southfacing slopes because these slopes are more often snow-free and experience a more extreme summer-drought. Oceanspray is well adapted to dry conditions and is often found on steep slopes in thin, rocky or deep, heavy clay soils. Western hemlock-douglas fir/oceanspray associations are often found in the hottest and driest forests in the western cascade mountains and is an indicator of excessive drainage and solar input. (3)

life history strategy type / successional stage stress-tolerator, competitor, weedy/colonizer,

Oceanspray occupies a variety of successional stages in different areas, for example, late-successional in Glacier National Park's cedar-hemlock forest and climax communities in Idaho's hemlock habitat types. In Washington's Douglas fir/salal forests, Oceanspray has the highest percent cover approximately 20 years after a disturbance and then steadily declines. Oceanspray is a stress-tolerant plant, which can compete well with other shrubs in undesirable growing conditions. (3)

eral, late uccessional)	
nt characteristics life form (shrub, rass, forb), ongevity, key haracteristics, etc)	This native shrub can grown from 3-20 ft tall, but typically grows 10 ft tall. It is moderately shade tolerant, but does best in open areas. Individual species can live for 30 years. They usually grow bu in early spring, often not flowering until June through late-July to August. Its common name, oceanspray, comes from the appearance of its flower, which look like rolling ocean waves. The fru one-seeded achenes, ripen in late August and disperse in November. (3,7)

PROPAGATION DETAILS

otype (this is meant rimarily for xperimentally erived protocols, and s a description of where the seed that was tested came rom):	
opagation Goal Options: Plants, uttings, Seeds, Bulbs omatic Embryos, nd/or Other ropagules):	Plants (6)
opagation Method Options: Seed or egetative):	Seeds- collections made in October and November have been found more viable than those made in August and September. Seed viability of less than 10%. (6,7,9,10) Vegetative – Collections made in early July of summer softwood stems.
oduct Type (options: ontainer (plug), areroot (field grown) lug + (container-field rown hybrids, and/or ropagules (seeds, uttings, poles, etc.))	Plug (6)
ock Type:	1 gallon containers (6)
ne to Grow (from eeding until plants re ready to be utplanted):	18 months (6)
rget Specifications size or characteristics f target plants to be roduced):	Well-developed root systems with sturdy branches (6)
opagule Collection ow, when, etc):	Seeds - Fruits ripen in last August and should be collected September through November. Seeds ca be collected into a paper bag by stripping achenes from inflorescence or taking entire inflorescence. (7)

	Vegetative – cuttings of soft summer stems can be collected in July, and should be kept moist and refrigerated until processed. (6)
Propagule Processing/Propagule Characteristics including seed density (# per pound), seed longevity, etc):	Very small seeds; 5,000,000 seeds/lbs. Seeds, although not examined specifically seemingly follow characteristics of other achene's, and can most likely be stored for many years at low temperatures and water content. Difficult to collect because of size, but technique often used is hand rubbing and sieves. (6,9)
Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):	Seeds - To germinate seeds must be sown outside in the fall or go through 3 hour soak and moist, cold stratification for 15 -18 weeks at 4-5°C. (20+ weeks shown to decrease viability.) After stratification, seeds must be kept at 20-24°C in order to germinate. (6,7,9) Vegetative – stems should be cut to 15 cm and 1/3 basal leaves removed. To clean, place cuttings into fungicide bath for 2 minutes and treated with 2000 ppm IBA powder, then placed into mist bath with bottom heat of 21°C for rooting. (6)
Planting Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc):	Seeds - Seedlings are easily overwatered because of their size. For germination, Sunshine mix #4 aggregate plus has been used as media, it is made of peat moss, perlite, nutrients, gypsum and dolomitic lime. After first transplant it is important to place them in 3 inch containers with light-textured, well draining media. A good draining media that has been used contains peat moss, fir bark, perlite and sand. At the end of the summer they can be placed in larger, 1 gallon containers. (6) Vegetative – Rooting media should be 50% perlite and 50% sand. 1 gallon pots are sufficient for use. (6)
Establishment Phase (from seeding to germination):	Sow 5 grams of seeds per flat by mixing seeds with top layer of media. Seeds should be misted with water until germination. (6)
Length of Establishment Phase:	28 days (6)
Active Growth Phase (from germination until plants are no longer actively growing):	Seeds - Seeds that successfully germinate can be transplanted after 2 weeks to larger pots (3 inch). They should then be grown in a greenhouse until late spring. In the summer they can be moved to a shade house, and by the end of summer should be transplanted to 1 gallon pots. Plant can then overwinter, and are ready to plant late-summer of the 2 nd year. (6) Vegetative – They should be outside under shade cloth for 4 weeks and then moved to full sunlight
Length of Active Growth Phase:	Seeds - May-August (6) Vegetative – 8 weeks (6)
Hardening Phase (from end of active growth phase to end of growing season; primarily related to the development of cold-hardiness and preparation for winter):	Over the first winter plants should be outside in a place that will protect them from heavy rains, but otherwise exposed to the physical elements. Plants should also harden in pots at their planting site for 4-6 weeks. (6)

Length of Hardening phase:	8-9 months. (6)
Harvesting, Storage and Shipping (of seedlings):	Total Harvest time for seeds and vegetative propagation is 1.5 years. 5 months of storage. Plants should be used in the spring after harvest and shipped via refrigerated van. (6,8,9)
Length of Storage (of seedlings, between nursery and outplanting):	Should be shipped a few weeks prior to planting. (6)
Guidelines for Outplanting / Performance on Typical Sites (eg, percent survival, height or diameter growth, elapsed time before flowering):	Fibrous root mass should be scored before planting. Seedlings that have successfully transplanted after germination have a 75% survival rate. Although, only 10% of seeds will initially germinate. (6)
Other Comments including collection restrictions or guidelines, if available	

INFORMATION SOURCES

References (full citation)	<p>(1) USDA, NRCS. 2002. The PLANTS Database, Version 3.5 (http://plants.usda.gov) National Plant Hardiness Zone, LA 70874-4490 USA.</p> <p>(2) Burke Museum - http://biology.burke.washington.edu/herbarium/imagecollection.php?Genus=Holodiscus&Species=discolor</p> <p>(3) USDA Forest Service Fire Effects Information System (FEIS) database. http://www.fs.fed.us/database/feis/plants/</p> <p>(4) Hitchcock, C. Leo and Cronquist, Arthur. Flora of the Pacific Northwest. 1998. University of Washington Press, Seattle and London.</p> <p>(5) Pojar, Jim and McKinnon, Andy, eds. Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia and Alaska. 1994. Lone Pine Press, British Columbia.</p> <p>(6) Native Plants Journal and Network. http://www.nativeplantnetwork.org</p> <p>(7) Rose, Robin, Chachulski, Caryn and Haase, Diane. Propagation of Pacific Northwest Native Plants. 2000. Oregon State University Press, Corvallis.</p> <p>(8) Plants for a Future. http://www.ibiblio.org</p> <p>(9) National Seed Laboratory. http://nsl.fs.fed.us/</p> <p>(10) Golden Gate National Park Conservancy. http://www.parksconservancy.org/</p>
Other Sources Consulted (but that contained no pertinent information)	<p>California Native Plant Link Exchange. http://www.cnplx.info</p> <p>Plants for a future. http://www.pfaf.org</p> <p>Washington Native Plant Society. http://nsl.fs.fed.us/</p>

full citations):	
Protocol Author (First and last name):	Joanne Pontrello
Date Protocol Created or Updated (MM/DD/YYYY)	4/15/09

Note: This template was modified by J.D. Bakker from that available at: <http://www.nativeplantnetwork.org/network/SampleBlankForm.asp>

Species

Oceanspray, *Holodiscus discolor* (Pursh) Maxim. (Rosaceae)

Spreading deciduous shrub 1-6 m tall with slender arching branches with forms ranging from bushy individuals only 0.75 m tall to arborescent coastal forms which may reach heights over 6 m; leaves alternate, ovate to ovate-elliptic or oblong, 4-7 cm long, 2-7 cm wide with 15 to 25 shallow lobes to deep teeth with prominent veins; flowers 5 mm wide white to cream in pyramidal terminal panicles that may reach up to 30 cm in length; fruit tiny brown hairy achenes 2 mm wide, mature fruit/flower clusters persist throughout winter. (3,6,9,10)

Range

Oceanspray occurs at low to middle elevations from the western Cascades to the Pacific coast, from British Columbia south to California, east to northeastern Oregon, northern Idaho and eastern and western Montana. (3,6,9,10)

Climate, elevation

Oceanspray occupies a variety of sites ranging from moist, coastal bluffs and mountains to the dry, coniferous forests of the Intermountain region. Oceanspray favors mostly dry environmental zones, from sea level to 1700 m in elevation and exists primarily at the hot, dry end of the moisture gradient in the Pacific Northwest. (3,6,9,10)

Local occurrence

Common throughout Puget Sound in dry to moist open forests, clearings, bluffs, thickets and ravine edges from sea level to mid elevations. (3,6,9,10)

Habitat preferences

Dry southern exposures in stony, shallow soils in full sun to partial shade typically associated with coniferous stands. (3, 6, 9, 10)

Plant strategy type/successional stage

Oceanspray may occupy many successional stages. In the intermountain west it is commonly mid to late succession or climax though it has been observed to be seral after fire regenerating readily from seeds and underground parts. West of the Cascades oceanspray is seral occurring approximately 20 years after a disturbance and then declining. Given it's propensity for dry sites oceanspray is most likely a stress tolerator. (10)

Associated species

Widely associated with droughty coniferous forests throughout its range it occurs locally with Douglas-fir (*Pseudotsuga menziesii*), grand fir (*Abies grandis*), Engelmann spruce (*Picea engelmannii*), subalpine fir (*Abies lasiocarpa*), ponderosa pine (*Pinus ponderosa*), Sitka spruce (*Picea sitchensis*), western hemlock (*Tsuga heterophylla*), western red cedar (*Thuja plicata*), logdepole pine (*Pinus contorta*) and western larch (*Larix occidentalis*). Also commonly found with big-leaf maple (*Acer macrophyllum*) on drier sites. Occurs with many other understory species tolerant of summer drought such as California hazelnut (*Corylus cornuta*), salal (*Gaultheria shallon*), low Oregon-grape (*Berberis nervosa*), snowberry (*Symphoricarpos album*), and vine maple (*Acer circinatum*). (10)

May be collected as:

Seed – (up to 12 x 10⁶ seeds/kg) ripens October or once seed heads are brown and dry. Seed can be stripped from shrubs by hand into a paper bag or entire seed heads collected to be processed later. Seeds are tiny and hand rubbing of inflorescences through sieve may produce best results. (5,7,8)

Cuttings – One source says summer softwood cuttings 15 cm long with 30% of leaves retained taken in early July root best. Another says softwood cutting do poorly and hardwood cuttings taken in late January to early February work best. Either way, cuttings should be stored in moist cool conditions until potted. (5,7,8)

Perennating buds from the root crowns also can be collected for rooting. (5,7,8)

Collection restrictions or guidelines

Typical conservative collection methods for genetic integrity and minimal ecosystem impact apply.

Seed germination

Seed requires three hour soaking in fresh water and then cold stratification with peat moss at 4-5°C for 3-5 months or until germination begins. (5, 7)

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

Not found in literature. May not store well since fresh seed germination rates average 5-10%. Oceanspray is a profuse seeder and long term storage may not be necessary given its ready availability. (5,7,8,10)

Recommended seed storage conditions

Typical low temp, low humidity conditions.(5,7,8)

Propagation recommendations

Sow post-stratified germinated seed in flats filled with a 6:1:1 peat, perlite, vermiculite mixture with 30% sand. After 2 weeks to a month or sometime after May 1st seedlings may be transplanted to individual pots with standard potting media and moved outside. Plants are mature enough for outplanting 18 months after germination. (5)

Cuttings may have their rooting accelerated by 2 minute pre-treatment in a fungicide bath followed by dusting with rooting hormone (IBA, etc.). When available rooting occurs more rapidly in a mist bed with 21°C bottom heat using a 1:1 perlite:sand media. Over misting may result in rot. Otherwise keeping cuttings moist in the perlite/sand media may result in rooted cuttings. After 8 weeks rooted cuttings maybe potted up and placed under shade cloth outside for 4 weeks. After that they may be put in full sun. gradually begin reducing irrigation in the first fall. Cuttings are generally ready 18 months after rooting (5).

Soil or medium requirements

None in particular though Oceanspray has been noted to be mycorrhizal (vesicular-arbuscular) so may benefit from native soil inoculation. (10)

Installation form

18 month old nursery stock from seed or cuttings in gallon size pots. Seed can be directly sown but has low germination rates and competes poorly with aggressive fast growing species. (5,7,8)

Recommended planting density

4-5 m apart (1)

Care requirements after installed

Moderate watering through first dry season. (1)

Normal rate of growth or spread; lifespan

Oceanspray is a moderately fast grower with a lifespan noted to 30 years or more. (9,10)

Sources cited

- (1) Dave's Garden, Inc. 2003. Plants Database. <http://www.plantsdatabase.com>
- (2) Franklin, Jerry F. & C. T. Dyrness. Natural Vegetation of Oregon and Washington. 1988. Oregon State University Press, Corvallis OR.
- (3) Hitchcock, C. Leo and Cronquist, Arthur. Flora of the Pacific Northwest. 1998. University of Washington Press, Seattle and London.
- (4) Leigh, Michael. Grow Your Own Native Landscape. 1999. Washington State University Cooperative Extension – Thurston County, WA.
- (5) Native Plants Journal and Network. <http://www.nativeplantsnetwork.org>
- (6) Pojar, Jim and McKinnon, Andy, eds. Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia and Alaska. 1994. Lone Pine Press, British Columbia.
- (7) Potash, Laura and Aubry, Carol. Mt. Baker-Snoqualmie National Forest Native Plant Notebook. 1997. North Cascades Institute. Sedro-Woolley WA.
- (8) Rose, Robin, Chachulski, Caryn and Haase, Diane. Propagation of Pacific Northwest Native Plants. 2000. Oregon State University Press, Corvallis.
- (9) USDA, NRCS. 2002. The PLANTS Database, Version 3.5 (<http://plants.usda.gov>) National Plant Database Center, Baton Rouge, LA 70874-4490 USA.
- (10) USDA Forest Service Fire Effects Information System (FEIS) database. <http://www.fs.fed.us/database/feis/plants/>

Data compiled by
Rodney Pond 04.30.03