Tammy Currey

Plant Propagation Protocol 4: *Mahonia repens* (Creeping Oregon Grape)

ESRM 412 – Native Plant Production JD Bakker Spring 2007

TAXONOMY	
Family Names	
Family Scientific Name:	*Berberidaceae*
Family Common Name:	Barberry family
Scientific Names	
Genus:	*Mahonia*
Species:	*ripens*
Species Authority:	(Lindl.) G. Don
Variety:	
Sub-species:	
Authority for Variety/Sub-species:	
Common Synonym(s)	
Genus:	*Berberis*
Species	*amplectens*
Authority for variety/Sub-species:	(Eastw.) L.C. Wheeler
Genus:	*Berberis*
Species:	*aquifolium* var. *repens*
Authority for variety/Sub-species:	(Lindl.) Scoggan
Genus:	*Berberis*
Species	*pumila*
Authority for Variety/Sub-species:	Greene
Genus:	*Berberis*
Species	*repens*
Authority for Variety/Sub-species:	Lindl.
Genus:	*Berberis*
Species	*sonnei*
Authority for Variety/Sub-species:	(Abrams) McMinn
Genus:	*Mahonia*
Species	*amplectens*
Authority for Variety/Sub-species:	Eastw.
Genus:	*Mahonia*
Species	*pumila*
Authority for Variety/Sub-species:	(Greene) Fedde
Genus:	*Mahonia*
Species	*sonnei*
Authority for Variety/Sub-species:	Abrams
Genus:	*Odostemon*
Species	*pumilus*
Authority for Variety/Sub-species:	(Greene) Heller
Genus:	*Odostemon*

Species	*repens*
Authority for Variety/Sub-species:	(Lindl.) Cockerell
Common Name(s):	
Species Code (as per USDA Plants database):	Creeping Oregon Grape (Hosokawa, 2001). Creeping Hollygrape (USDA, 1988). Creeping Mahonia (Dirr et. al, 1987) Creeping barberry USDA, 2007).
	MARE11
General Distribution (geographical range (states it occurs in), ecosystems, etc):	Ranges from B.C. and Alberta in the north down through California, east to Arizona and Western Texas (Rose et. al, 1998). It may also be found further east in the United States. The USDA (2007) reports this plant in: AZ CA, CO, ID, MN, MT, NE, NM, NV, OR, PA, SD, TX, UT, WA, and WY. Found on shaded or wooded hillsides. Occasionally found on hillsides in the open (Rose et. al, 1998).
Climate and elevation range	Sea level to 3050 feet (Rose et. al, 1998).
Local habitat and abundance; may include commonly associated species	This plant is found in northeast and central Washington state in the forested slopes and lower foothills (Hitchcock et. al, 1964). The USDA (2007) reports this plant to be present in the following counties: King, Chelan, Kittitas, Yakima, Klickitat, Okanogan, Ferry, Stevens, Pend Orville, Lincoln, Spokane, Whitman, Walla Walla Columbia, Garfield, Asotin (USDA, 2007; USDA, 1988).
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	Climax Dominant species (Walkup, 1991)
Ecotype (this is meant primarily for experimentally derived protocols, and is a description of where the seed that was tested came from):	
Propagation Goal (Options: Plants, Cuttings, Seeds, Bulbs, Somatic Embryos, and/or Other Propagules):	Plants
Propagation Method (Options: Seed or Vegetative):	Seed
Product Type (options: Container (plug), Bareroot (field grown), Plug + (container-field grown	Container (plug)

hybrids, and/or Propagules (seeds, cuttings, poles, etc.))	
Stock Type:	172 ml pots
Time to Grow (from seeding until plants are ready to be outplanted):	1 year
Target Specifications (size or characteristics of target plants to be produced):	Root system should be a firm plug in the container with a height of 4 cm and caliper of 4 mm (Hosokawa et. al, 2001)
Propagule Collection (how, when, etc):	Collect seeds in early August when the fruit are ripe and have turned blue to purplish in color ((Rose et. al, 1998; Toogood, 1999; *Mahonia* in general; Hosokawa et. al, 2001). Hand-strip the berries into hoppers. They may be stored in a plastic bag in a refrigerator until cleaning (Rose et. al, 1998; Hosokawa et. al, 2001). Clean them by macerating them in water and allowing the fruit pulp to float off. Dry the seeds and use a fanning mill to blow of any remaining debris (Rose et. al, 1998).
Propagule Processing/Propagule Characteristics (including seed density (# per pound), seed longevity, etc):	At maturity the seeds are brown and will survive in storage for up to five years if they are sealed in dry storage and kept slightly above freezing (Hosokawa et. al, 2001). There are approximately 119,045-156,525 seeds per kilogram (Rose, et. al, 1998; Hosokawa et. al, 2001).
Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):	Seeds should be thoroughly cleaned before planting (Dirr et. al, 1987; Toogood, 1999: *Mahonia* in general). Separate seeds from the fruit and should have growth inhibitors leached out by running them under water for a week (Hartmann et. al, 2002). It should then be cold stratified for 3-5 months (Hartmann et. al, 2002; (Dirr et. al, 1987). Rose et. al (1998) found good result by having them moist stratified for 30 days at 1 degree Celsius, then warm stratified for two months at 20 degrees C and then moist chilled again for 196 days at 1 degree above freezing. As an alternative they also suggest cold stratifying them at 2 degrees Celsius in gibberellic acid (Rose et. al, 1998). Hosokawa et. al (2001) found success with a 48 hour water-soaking followed by warm, moist stratification (buried in peat enclosed in fine mesh bags). This was followed by five months of cold, moist stratification in containers that are ventilated at 3 degrees C (Hosokawa et. al, 2001).

	Seed may also be directly sown in the late fall when ripe at densities of 100-200 seeds/acre (Clarke, et. al, 1990; Rose, et. al, 1998) or in the mid- to early spring (Clarke, et. al, 1990). Sow into well-drained soil and apply a thin cover of soil or sand (Rose, et. al, 1998).
Growing Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc):	The seeding method for outdoor nurseries and greenhouses is to either direct seed, or to plant germinants (germinants are preferred due to lengthy stratification) (Hosokawa et. al, 2001). Seed are covered with a growing media of 50% 6:1:1 milled sphagnum peat, vermiculite and perlite. Also 50% washed sand that contains time release Osmocote fertilizer at a 0.25g rate with Micromax fertilizer at 0.20g rate for each 172 ml container (Hosokawa et. al, 2001).
Establishment Phase (from seeding to germination):	Germination was found to be best outdoors in spring with fluctuating day and night temperatures. Media should be kept evenly moist by misting the media twice each day (Hosokawa et. al, 2001).
Length of Establishment Phase:	Eight Weeks (Hosokawa et. al, 2001)
Active Growth Phase (from germination until plants are no longer actively growing):	During active growth the seedlings will grow 4 to 6 true leaves. Seedlings may be fertilized during the growing season with 100 ppm liquid NPK (Hosokawa et. al, 2001).
Length of Active Growth Phase:	Eight weeks
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):	Two to four weeks before the seedlings are outplanted the seedlings may be fertilized with a 200 ppm liquid 10-20-20 NPK (Hosokawa et. al, 2001).
Length of Hardening Phase:	Two to four weeks
Harvesting, Storage and Shipping (of seedlings):	You may harvest when the seedlings are a year old, generally in September. They may be winterized by insulating them with a foam cover and then placed under snow (Hosokawa et. al, 2001).
Length of Storage (of seedlings, between nursery and outplanting):	Five Months
Guidelines for Outplanting / Performance on Typical Sites (eg, percent survival, height or diameter growth, elapsed time	Best grown in moist, well-drained, fertile soils. It will tolerate sun if the soil is not overly dry but prefers shade (Heuser, 1997; *Mahonia* in general).

before flowering):	In its natural habitat this plant is found in silty to sandy loams, sedimentary shale or sandstone. It grows well in sun or shade (Rose et. al, 1998). Mahonia in general may flower three years after propagation (Toogood, 1999)
Other Comments:	This species is both drought and heat tolerant when it is established and the berries are forage for many species. This species gets its creeping nature from its ability to spread itself through layering and its rhizomes (Hosokawa et. al, 2001).
References:	Clarke, G. and Toogood, A. 1990. The complete book of plant propagation. Ward Lock. London, England. Dirr, M.A. and Heuser, C.W. 1987.The reference manual of woody plant propagation: From seed to tissue culture. Varsity Press. Athens, GA. Hartmann, H.T., Kester, D.E., Davies, F.T. and Geneve, R.L. 2002. Plant propagation: Principles and practices. Prentice Hall. Upper Saddle River, NJ. Heuser, C.W. (ed.) 1997. The complete book of plant propagation. Taunton Press. Newtown, Connecticut. Hitchcock, C.L., Cronquist, A., Ownbey, M., and Thompson, J.W. 1964. Vascular plants of the Pacific Northwest. University of Washington Press. Seattle, WA. Hosokawa, Joy; Luna, Tara; Wick, Dale. 2001. Propagation protocol for production of container *Mahonia repens* (Lindl.) G. Don plants (172 ml containers); Glacier National Park, West Glacier, Montana. In: Native Plant Network. Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery. http://www.nativeplantnetwork.org. Accessed May 22, 2007. Rose, R., Chachulski, C. and Haase, D. 1998. Propagation of Pacific Northwest Native Plants. Oregon State University Press. Corvallis OR. Toogood, A. 1999. American Horticultural Society Plant Propagation. DK Publishing. New York, NY.

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