Plant Propagation Protocol for *Arctostaphylos Columbiana*, Hairy Manzanita
ESRM 412 – Native Plant Production
Spring 2008

TAXONOMY	
Family Names	
Family Scientific Name:	Ericaceae
Family Common Name:	Heath family
Scientific Names	
Genus:	*Arctostaphylos* Adans.
Species:	*columbiana*
Species Authority:	Piper
Variety:	columbiana var. columbiana columbiana var. tracyi
Sub-species:	
Cultivar:	
Authority for Variety/Sub-species:	(Eastwd.) Adams
Common Synonym(s) (may repeat this section multiple times as needed)	
Genus:	*Arctostaphylos*
Species:	*tracyi*
Species Authority:	(Eastw.) J.E. Adams ex McMinn
Variety:	
Sub-species:	
Cultivar:	
Authority for Variety/Sub-species:	
Common Name(s):	Bristly Manzanita, Madrona, Woollyleaf Manzanita
Species Code (as per USDA Plants database):	ARTR9
GENERAL INFORMATION	
General Distribution (geographical range (states it occurs in), ecosystems, etc):	Occurs in the Coast Ranges from Sonoma County, California, north to Vancouver Island and Vancouver, British Columbia. The larger populations are in southwest Oregon. It also occurs occasionally on western slopes of the Cascade Range of Oregon and Washington. (Kruckeberg, A. R.)
Climate and elevation range	Hairy Manzanita occurs in the under story of western coniferous forests, (Kruckeberg, Arthur R.) and also in small clusters with other shrub species found in clearings.

Local habitat and abundance; may include commonly associated species	Commonly associated species include Oregon-grape (Mahonia nervosa), salal (Gaultheria shallon), whiteleaf manzanita (Arctostaphyloa viscida), snowbrush (Ceanothus velutinus), deerbrush (C. integerrimus), and vine maple (Acer circinatum). (Gratkowski, H.) (Harrington, Timothy B.)
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	Hairy Manzanita can compete with young Christmas trees in plantations and farms. (Kruckeberg, Arthur R.) Aerosol application of 2, 4-D or 2, 4, 5-T will result in an almost 100% death rate in the Pacific Northwest and southwest Oregon. (Stewart, R. E.) It is often a primary or secondary colonizer of disturbed plant communities, and is commonly found in post-logging plant communities. Once established, it will persist if the forest canopy does not grow too dense. (Hansen, W.)
PROPAGATION DETAILS	
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):	Stem and root cuttings are effective, (Kruckeberg, A. R.) or seed.
Product Type (options: Container (plug), Bareroot (field grown), Plug + (container-field grown hybrids, and/or Propagules (seeds, cuttings, poles, etc.))	Propagules.
Stock Type:	
Time to Grow (from seeding until plants are ready to be outplanted):	Cuttings take one year to establish themselves enough to be outplanted. (**F. Chittendon.**)
Target Specifications (size or characteristics of target plants to be produced):	(Cuttings) 5-8 cm.
Propagule Collection (how, when, etc):	The seed disperse beneath the parent plant or is disseminated by Black bear, coyote, black-tailed deer, and various small mammals and birds from late summer until the next spring (Berg, Arthur R.)
Propagule Processing/Propagule	Information on seed not available. Cuttings are more

Characteristics (including seed density (# per pound), seed longevity, etc):	effective and commonly used.
Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):	The seedcoat requires scarification prior to germination, which occurs either in the stomach of animals or by fire (Kruckeberg, A. R.). Fire results in a greater rate of germination (Steen, Harold K.) The outer fleshy part of the fruit can be removed by spraying the fruits with water and separating the nutlets by floating or air-screening.
Growing Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc):	Basal cuttings with wounding at the base of the cutting can be grown in 1:1 perlite/peat moss, after dipped in the rooting hormone 'Stimroot #3 IBA'. Bottom heat of 70 degrees F should be provided.
Establishment Phase (from seeding to germination):	The seed usually germinates in 2 - 3 months at 15°c. **(Rice. G.)**
Length of Establishment Phase:	2-3 months.
Active Growth Phase (from germination until plants are no longer actively growing):	Mature plants are from 2.5 to 16.6 feet (0.8-5.0 m) high.
Length of Active Growth Phase:	
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):	
Length of Hardening Phase:	
Harvesting, Storage and Shipping (of seedlings):	Roots must not be disturbed.
Length of Storage (of seedlings, between nursery and outplanting):	About one year.
Guidelines for Outplanting / Performance on Typical Sites (eg, percent survival, height or diameter growth, elapsed time before flowering):	Shrubs should be installed 3-5 feet on center. Hairy manzanita is typically very drought resistant, but supplemental water after installation will increase percent survival and establishment.
Other Comments (including collection restrictions or guidelines, if available):	
INFORMATION SOURCES	
References (full citations):	Kruckeberg, A. R. 1982. Gardening with native plants of the Pacific Northwest. Seattle: University of Washington Press. 252 p.

Munz, Philip A. 1973. A California flora and supplement. Berkeley, CA:
University of California Press. 1905 p.

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Oregon. Gen. Tech. Rep. PNW-77. Portland, OR: U.S. Department of
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Kruckeberg, Arthur R. 1977. Manzanita (Arctostaphylos) hybrids in the
Pacific Northwest: effects of human and natural disturbance. Systematic Botany. 2(4): 233-250.

Gratkowski, H. 1961. Brush problems in southwestern Oregon. Portland,
OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest
Forest and Range Experiment Station. 53 p.

Harrington, Timothy B.; Tappeiner, John C., II. 1991. Competition
affects shoot morphology, growth duration, and relative growth rates of
Douglas-fir saplings. Canadian Journal of Forest Research.

Stewart, R. E. 1978. Site preparation. In: Cleary, Brian D.; Greaves, Robert D.; Hermann, Richard K., eds. Regenerating Oregon's forests: A guide for the regeneration forester. Corvallis, OR: Oregon State University Extension Service: 99-129.

USDA Plants Database. "Arctostaphylos columbiana Piper hairy manzanita" <http://plants.usda.gov/java/profile?symbol=ARCO3> Accessed 4/29/2008.

Steen, Harold K. 1966. Vegetation following slash fires in one western Oregon locality. Northwest Science. 40(3): 113-120.

	Berg, Arthur R. 1974. Arctostaphylos Adans. manzanita. In: Schopmeyer, C. S., technical coordinator. Seeds of woody plants in the United States. Agric. Handb. 450. Washington, DC: U.S. Department of Agriculture, Forest Service: 228-231. Hansen, W. Native Plants of the Northwest: Hairy manzanita (Arctostaphylos columbiana). http://www.nwplants.com. Retrieved 4/29/2008 Plants for a Future. Arctostaphylos columbiana. http://www.ibiblio.org/pfaf/cgi-bin/arr_html?Arctostaphylos+columbiana 4/29/2008 Rice. G. (Editor) Growing from Seed. Volume 2. Thompson and Morgan. 1988 F. Chittendon. RHS Dictionary of Plants plus Supplement. 1956 Oxford University Press 1951 Howard, Janet L. 1993. Arctostaphylos columbiana. In: Fire Effects Information System. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2008, April 29].
Other Sources Consulted (but that contained no pertinent information) (full citations):	
Protocol Author (First and last name):	Kayti Rodgers
Date Protocol Created or Updated (MM/DD/YY):	4/29/2008

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

Plant Data Sheet: Hairy manzanita *Arctostaphylos columbiana*

Range

Hairy manzanita is found along the Coast Ranges from Sonoma County, California, north to Vancouver Island and Vancouver, British Columbia. The largest population is in southwestern Oregon. It prefers evergreen forested coastal plains from northern California through British Columbia [1].

Local occurrence

This plant is occasionally found on the western slopes of the Cascade Mountains in Washington and Oregon [1].

Climate, elevation

Hairy mazanita grows at elevations up to 2,500 feet in California, 3,750 feet in Oregon and up to 4,950 feet in Washington [1].

Habitat preferences

Hairy manzanita is typically found in rocky areas and steep slopes. It prefers full sun, well-drained, acidic soil, and a southern or western exposure. It is highly drought tolerant [1,3].

Plant strategy type/successional stage

Often a primary or secondary colonizer of disturbed plant communities, hairy manzanita is commonly found in post-logging plant communities. Once established in such a situation, it will persist after forest establishment if the canopy is not too dense [1].

Associated species

Hairy manzanita is often found with other ericaceous plants such as huckleberry, salal and Pacific madrone. Other common species include Oregon grape (*Mahonia* spp.), snowbrush (*Ceanothus* spp.), vine maple (*Acer circinatum*), beargrass (*Xerophyllum tenax*), various penstemon species, Oregon stonecrop (*Sedum oregonese*), and various fern species [1].

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

Hairy manzanita may be propagated by seed, cuttings, layering, or salvaging. The fruit is small, 1/4 - 1/2 inches in diameter, and is smooth and red. It begins to ripen in late June and may stay on the plant until the following spring [1].

Collection restrictions or guidelines

Cuttings are best collected in March, September, October, or November [2].

Seed germination

Hairy manzanita requires fire to break seed dormancy and maximize germination. This can be simulated with a hot water bath. The procedure for a hot water bath is as follows: Boil 3-6 cups of water for every cup of seeds. Avoid using an aluminum pan or softened water, as either might introduce toxic chemicals to the seeds. After the water reaches boiling, let it cool for a minute or two. Pour the seeds into the water and let them sit at room temperature for 24 hours. The seeds may still need to over-winter or be cold-stratified before they will germinate [5]. Other suggested methods include soaking dried seed in boiling water for 10 - 20 seconds or exposing to smoke and then stratifying at 2 - 5°c for 2 months. The seeds will germinate in 2 - 3 months at 15°c [4].

Seed life

Information on seed life is not available.

Recommended seed storage conditions

Information on seed storage conditions is not available.

Propagation recommendations

Recommended propagation is through basal cuttings (from the area close to the previous year's wood, or the base of a long juvenile stem). The cuttings should be dipped in a rooting hormone. Stimroot #3 IBA is recommended. They can then be rooted in 1:1 perlite/peat moss media with bottom heat [2].

Soil or medium requirements

Cuttings should be propagated in a perlite/peat mixture (see above).

Installation form

Installation of plugs or containerized individuals is recommended.

Recommended planting density

Shrubs should be installed 3-5 feet on center, depending on desired density and expected mortality [3].

Care requirements after installation

While hairy manzanita is highly drought resistant, supplemental water after installation increases plant survival and establishment.

Normal rate of growth or spread; lifespan

Hairy manzanita grows quickly and can reach several feet in height [1].

Sources cited

(1) Hansen, W. Native Plants of the Northwest: *Hairy manzanita (Arctostaphylos columbiana).* http://www.nwplants.com. Retrieved May 14, 2003.

(2) Malaspina University-College Horticulture Department. *Abstract on Native Plant Propagation Collaborative Study.* http://www.mala.ca/horticulture/abstract.htm. Retrieved May 14, 2003.

(3) Plants for a Future. *Arctostaphylos columbiana.* http://gardenbed.com/A/448.cfm. Retrieved May 14, 2003.

(4) Sound Native Plants. http://www.soundnativeplants.com. Retrieved May 14, 2003.

(5) Washington State University Cooperative Extension. *Gardening in Western Washington.* http://gardening.wsu.edu/text/nvgrowng.htm. Retrieved May 14, 2003.

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