Plant Propagation Protocol for *Corylus Cornuta*
ESRM 412 – Native Plant Production

TAXONOMY	
Family Names	
Family Scientific Name:	Betulaceae
Family Common Name:	Birch
Scientific Names	
Genus:	Corylus
Species:	cornuta
Species Authority:	Marsh
Common Synonym(s) (include full scientific names (e.g., *Elymus glaucus* Buckley), including variety or subspecies information)	Corylus cornuta Marsh var. californica Sharp (COCOC)
Common Name(s):	California hazelnut, beaked hazelnut
Species Code (as per USDA Plants database):	COCO6
GENERAL INFORMATION	
Geographical range (distribution maps for North America and Washington state)	Corylus cornuta is found sporadically all across North America in suitable habitats, while Var. californica is the Pacific Northwest Coast variety.
Ecological distribution (ecosystems it occurs in, etc):	Forest understory. Does not tolerate strong windbreaks.
Climate and elevation range	Cool temperate regions, at low to middle elevations (below 2000m in California, below 800m in B.C.) (Zimmerman, 1991)
Local habitat and abundance; may include commonly associated species	Dry sites or moist sites, if soil is well drained. Full sun to part shade, South and West slopes. Burned or logged areas, and along streams. Sometimes removed in closely managed forests due to aggressive competition with timber trees.
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	Ruderal, can colonize disturbed areas / seral to late successional, can tolerate mature forest understory
Plant characteristics (life form (shrub, grass, forb), longevity, key characteristics, etc)	Shrub, normally grows about 18 years and can reach up to 5 meters in height. Late frosts can kill flowers that appear in early spring. Mature seeds (when sheath turns brown in autumn) are quickly harvested by forest fauna, making collection difficult.

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	Seed
Product Type	Container (plug)
Stock Type:	
Time to Grow (from seeding until plants are ready to be outplanted):	90 days to germinate, 90 days to establish
Target Specifications (size or characteristics of target plants to be produced):	Firm root plug in container
Propagule Collection (how, when, etc):	Collect mature seeds as sheath turns brown between August and September.
Propagule Processing/Propagule Characteristics (including seed density (# per pound), seed longevity, etc):	Seeds should be cleaned of their sheaths promptly after collection. Seeds must not dry out after collection. Viability after long-term storage is low. Germination rates vary from 20%, (Zimmerman, 1991), or 40%-75%, (Young, 2001)
Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):	Soak seeds for 24 hours, discarding any that float. Place remaining seeds in cold stratification and check for germination every two weeks. Germination begins after 90-180 days of refrigeration.
Growing Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc):	After seed has germinated and 1/4 inch radicle is visible, sow individually in standard potting mix in greenhouse. Suitable container may be Deepot 40 (2"x10" tubes)
Establishment Phase (from seeding to germination):	90 days after germination, seedlings may be transplanted with 90% survival.
Length of Establishment Phase:	90 days
Active Growth Phase (from germination until plants are no longer actively growing):	3 months after transplanted seedlings are established, fertilize with NPK 13-13-13
Propagation method	Vegetative
Product type	Propagule (cutting)
Propagule collection	This shrub naturally produces new shoots when cut off at the root crown. May be propagated by simple layering, or by cuttings.

	From, Young, 2001 working in California: Semi-Hardwood cuttings are collected between July 1st and November 1st. Cutting diameter, 1.2 cm; length, 12.5 cm with min. 3 nodes Cuttings kept moist and cool prior to treatment: dipped in a mild bleach solution for 30 seconds, then treated with Hormex (3000 ppm IBA) rooting powder and stuck 30/flat, 5cm deep Flats in greenhouse and watered with automatic mist until roots develop. Cuttings grown for 50 days then transplanted. ~50% rooting success
INFORMATION SOURCES	
Protocol Author (First and last name):	Alan O'Neil (based on a 2003 protocol by Matthew Ramsay)
Date Protocol Created or Updated (MM/DD/YY):	Updated 14 April 2009

References (full citations):

Franklin, Jerry and C.T. Dyrness. Natural Vegetation of Oregon and Washington. Oregon State University Press, Corvalis, OR 452 p.

Leigh, Michael. 1999. Grow your Own Native Landscape A Guide to Identifying, Propagating & Landscaping with Western Washington Native Plants. Native Plant Salvage Project WSU Cooperative Extension-Thurston County Olympia, WA. 116 p.

Pojar, Jim and Andrew MacKinnon. 1994. Plants of the Pacific Northwest Coast Washington, Oregon British Columbia & Alaska. BC Ministry of Forests and Lone Pine Publishing, Vancouver, British Columbia, Canada 527 p.

Young, Betty. 2001. Propagation protocol for vegetative production of container Corylus cornuta (A. DC.) Sharp var. californica (A. DC.) (Deepot 40 and Treeband #10); Golden Gate National Parks, San Francisco, California. In: Native Plant Network. URL: http://www.nativeplantnetwork.org. Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery. [Accessed 14 April 2009]

Zimmerman, Mary Lou. 1991. Corylus cornuta var. californica. U.S. Department of

Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (2003, March). Fire Effects Information System, [Online]. Available: http://www.fs.fed.us/database/feis/ [accessed 14 April 2009]

Baskin, Carol C.; Baskin, Jerry M. 2002. Propagation protocol for production of container Corylus cornuta Marshall ssp. cornuta plants; University of Kentucky, Lexington, Kentucky. In: Native Plant Network. URL: http://www.nativeplantnetwork.org [accessed 14 April 2009]

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