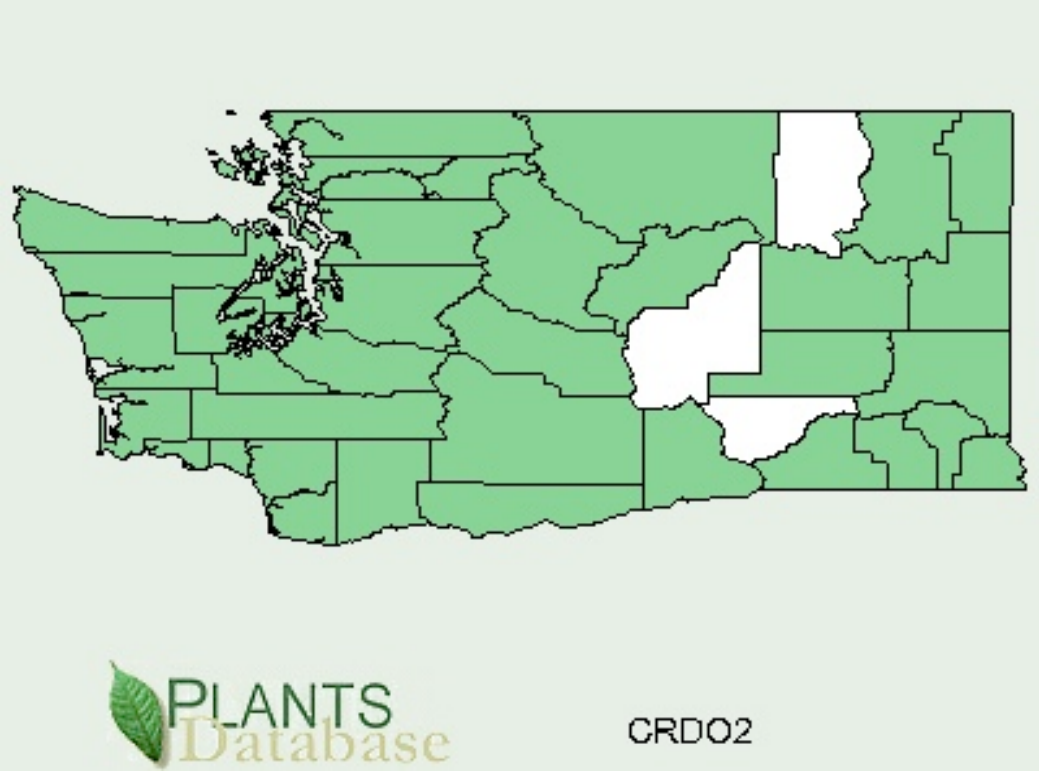
Plant Propagation Protocol for *Crataegus douglasii* (Black Hawthorn)
ESRM 412 – Native Plant Production

TAXONOMY	
Family Names	
Family Scientific Name:	Rosaceae (7)
Family Common Name:	Rose
Scientific Names	
Genus:	*Crataegus* (7)
Species:	*Douglasii* (7)
Species Authority:	Lindl. (7)
Variety:	*Suksdorfii* (4)
Sub-species:	
Cultivar:	
Authority for Variety/Sub-species:	
Common Synonym(s) (include full scientific names (e.g., *Elymus glaucus* Buckley), including variety or subspecies information)	*Crataegus columbiana* Howell (7) *Crataegus douglasii* Lindl. var. *douglasii* (7) *C. brevispina* Dougl. ex Steud. (8) *C. brockwayae* Sarge. (8) C. rivularis (4) *C. punctata* var. *brevispina* (1) *C. sanguinaea* var. *douglasii* (1) *Anthomeles douglasii* (1) *Mespilus douglasii* (1)
Common Name(s):	Black Hawthorn, Douglas hawthorn, River Hawthorn (4) Western Hawthorn, Native Hawthorn, Black Thornberry, Black Thornapple (2)
Species Code (as per USDA Plants database):	CRDO2 (7)
GENERAL INFORMATION	

Geographical range (distribution maps for North America and Washington state)	 

Ecological distribution (ecosystems it occurs in, etc):	*Crataegus douglasii* grows close to streams, meadows, and in the forests of mountains. (5) FRES20 Douglas-fir FRES21 Ponderosa pine FRES28 Western hardwoods FRES29 Sagebrush FRES34 Chaparral - mountain shrub FRES35 Pinyon - juniper FRES36 Mountain grasslands (9)
Climate and elevation range	*Crataegus douglasii* grows at 2,200 – 5,400 ft. It grows best in full sun in a soil with good moisture content. (7)
Local habitat and abundance; may include commonly associated species	Locally it grows in wetland and upland areas as well as on the banks of maintain streams (4) KUCHLER PLANT ASSOCIATIONS : K023 Juniper - pinyon woodland K037 Mountain-mahogany - oak scrub K038 Great Basin sagebrush K051 Wheatgrass - bluegrass K055 Sagebrush steppe (9)
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	It is fire tolerant and mainly an understory species. It forms (7)
Plant characteristics (life form (shrub, grass, forb), longevity, key characteristics, etc)	*Crataegus douglasii* occurs as a large shrub or a small tree depending on the care given to the individual plant. Trimming the lower branches will facilitate a more tree like form. (5) It flowers large white blossoms in April/May that ripen into fruit in late July. It is long lived and can grow up to 20 feet high. (3)
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):	Seed
Product Type (options: Container (plug), Bareroot (field grown), Plug + (container-field grown hybrids, and/or Propagules (seeds, cuttings, poles, etc.))	Containers
Stock Type:	172 ml conetainers
Time to Grow (from seeding until plants are ready to be outplanted):	One year
Target Specifications (size or characteristics of target plants to be produced):	Container Seedlings: height of 7 cm and caliper of 7 mm. (10)
Propagule Collection (how, when, etc):	Seeds are best collected when the fruit ripens in the early fall. (10)
Propagule Processing/Propagule Characteristics (including seed density (# per pound), seed longevity, etc):	Seed per pound is 22,600. Dry seeds are viable 2 to 3 years if they are kept at 41 ° F. Percent germination is very low at 30 %. (8) Number of seeds per Fruit is 4.78. (9)
Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):	Cleaning the seeds from the fruit is required. Mashing the fruit to a pulp and then using water to float off the pulp is a great method. Acid scarification for 0.5 – 3 hours is required for germination, but not until the seeds have dried for several weeks at room temperature or else the acid could destroy the seed embryos. After scarification, stratification for 3 to 4 months at 41° F is necessary. (8)
Growing Area Preparation /	In the nursery seeds should be planted in rows that are 8 to 12 inches apart with a cover soil ¼ of an inch deep. (8)

Growing Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc):	In the nursery seeds should be planted in rows that are 8 to 12 inches apart with a cover soil ¼ of an inch deep. (8)
Establishment Phase (from seeding to germination):	Complete germination happens in about two weeks. (10)
Length of Establishment Phase:	4 weeks (10)
Active Growth Phase (from germination until plants are no longer actively growing):	Plants begin to produce true leaves two weeks after germination. After 13 weeks the plant height in about 16 cm. Plants become root tight at 17 weeks. (10)
Length of Active Growth Phase:	16 weeks (10)
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):	Begin to reduce irrigation in September/October (10)
Length of Hardening Phase:	4 weeks
Harvesting, Storage and Shipping (of seedlings):	Harvest the plants in September, and store them in an outdoor nursery for five months. (10)
Length of Storage (of seedlings, between nursery and outplanting):	Approximately one year. (8)
Guidelines for Outplanting / Performance on Typical Sites (eg, percent survival, height or diameter growth, elapsed	Containerized plants should be outplanted in the Fall or Spring. Trees that are balled or burlaped need to be planted in the spring. The best growing conditions are a fine textured moist soil in full sun. (7)

Other Comments (including collection restrictions or guidelines, if available):	A long taproot devolves quickly so plant should not be kept in the greenhouse for more than a year.
INFORMATION SOURCES	
References (full citations):	1. Freeman, Barbara. Woody Northwestern Native Plants for Urban Landscapes: Ornament and Restoration in the Nature Idiom. 1994. Center for Urban Horticulture, College of forest Resources, University of Washington. 2. Jacobson, Arthur Lee. Trees of Seattle, 2nd Edition. 2006 3. Lyons, C. P. Bill Merilees. Trees, Shrubs and Flowers to know in British Columbia and Washington. 1995. Lone Pine Publishing. 4. Northwest Native Plants: Identification and Propagation for Revegetation and Restoration projects. 1994. King County Department of Public Works, Surface Water Management Division. 5.Scmidt, Majorie G. Growing California Native Plants. 1980. University of California Press. 6. USDA Plant Profile: *Crataegus douglasii* Lindl., Black Hawthorn. http://plants.usda.gov/java/profile?symbol=CRDO2 7. USDA Plant Guide: *Crataegus douglasii* Lindl., Black Hawthorn. PDF format. http://plants.usda.gov/java/profile?symbol=CRDO2 8. U. S Department of Agriculture, Forest Service. Seeds of Woody Plants in the United States. 1974. U. S. Dept. Agric., Agric. Handb. 450. 9. U.S Forest Service Federal Database. *Crataegus douglasii.* http://www.fs.fed.us/database/feis/plants/shrub/cradou/all.html 10. Wick, Dale; Luna, Tara; Evans, Jeff. 2008. Propagation protocol for production of container Crataegus douglasii Lindl. plants (172 ml conetainers); USDI NPS - Glacier National Park, West Glacier, Montana. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 28 April 2009). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.
Other Sources Consulted (but that contained no pertinent	

Other Sources Consulted (but that contained no pertinent information) (full citations):	
Protocol Author (First and last	Lindsay Fitzmorris

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

Previous Protocol:

Plant Data Sheet

Crataegus douglasii Black hawthorn

Range

Southeast Alaska to northern California and east to Colorado.

Climate, elevation

Lower elevations, 670-1645 m.

Habitat preferences

Dry to moist areas, well-drained sandy or gravelly soil. Wetland, riparian and upland sites. Also steep slopes. Full sun to part shade. Takes all exposures if there is enough soil moisture.

Plant strategy type/successional stage

Understory dominant. Most often understory in sites dominated by ponderosa pine or cottonwood. Thicket forming. Pure hawthorn stands have understory of snowberry or chokecherry. Does not occur normally on disturbed sites.

Associated species

Black cottonwood, Eastern cottonwood, quaking aspen, ponderosa pine, snowberry, rose, and chokecherry.

May be collected as:

Seed or a savaged plant. Can also propagate through layering and rooting of suckers.

Collection restrictions or guidelines

Number of seeds per fruit variable. Seeds ripen in July/August and are dispersed in the fall. The seed is quickly taken by birds so try to collect as soon as fruit ripens. If fruit persists, it can be pulled from the tree. Otherwise, pick fruit from the ground. It is best to extract fruit immediately. To extract, macerate fruit in water and let pulp float. If seeds are not to be extracted from the fruit right away, spread the fruit in a single layer to prevent excessive heating.

Seed germination

Cold stratification at 5C for 84-112 days. Some report better results with acid scarification for 0.5 -3 hours before cold stratification. Acid scarification should not be done until seeds have dried for a few weeks. Some seeds may not germinate regardless of treatment. Germination rate is 50-80%.

Seed life

2-3 years in proper storage.

Recommended seed storage conditions

Air-dry and store at 5C.

Propagation recommendations (plant seeds, vegetative parts, cuttings, etc.)

Sow in early fall before the first frost. Sow in trays containing ordinary soil. Sow seeds thickly, some with not germinate until the second spring. Place trays in an unheated area. If seeds have been stored and pre-treated, sow in spring.

Soil or medium requirements

No inoculum necessary.

Installation form

Container plant grown from seed or a savaged plant. Plants quickly grow taproot and should be moved to permanent location as quickly as possible. Seedlings should not be kept in a nursery for longer than 1 year.

Recommended planting density

If sowing directly outside, seed in rows 20-30 cm apart and cover with .6 cm soil.

Normal rate of growth or spread; lifespan

Will grow 2 feet per year in the first few years. Will grow to a 20-30 foot tree or a 10-foot shrub.

Sources cited

Leigh, M. 1997. Grow Your Own Native Plant Landscape. Washington State University Co-operative Extension.

Rose, R., Chachulski, C. and Huose, D. 1998. Propagation of Pacific Northwest Native Plants. Corvallis, OR: Oregon State University Press.

Young, J. and Young, C. 1992. Seeds of Woody Plants of North America. Portland, OR: Dioscorides Press.

http://www.fs.fed.us/database/feis/plants/shrub/cradou/index.html

Data compiled by Katie McGowan May 15, 2003