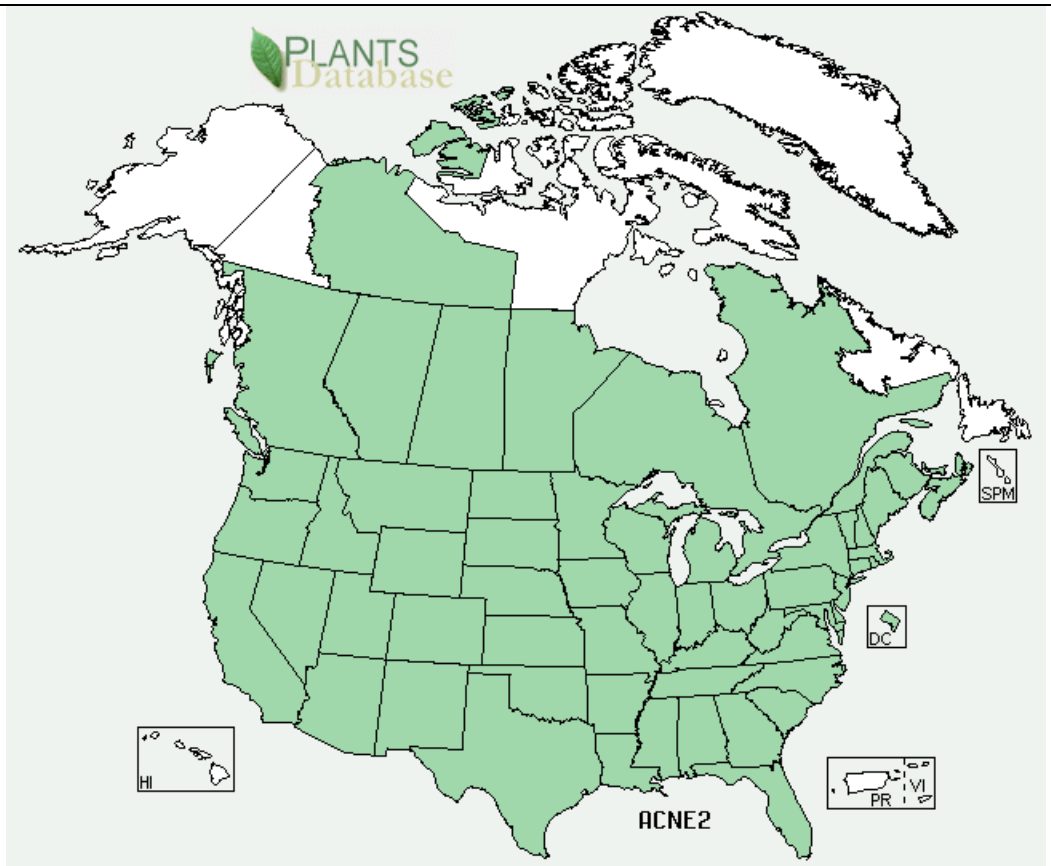
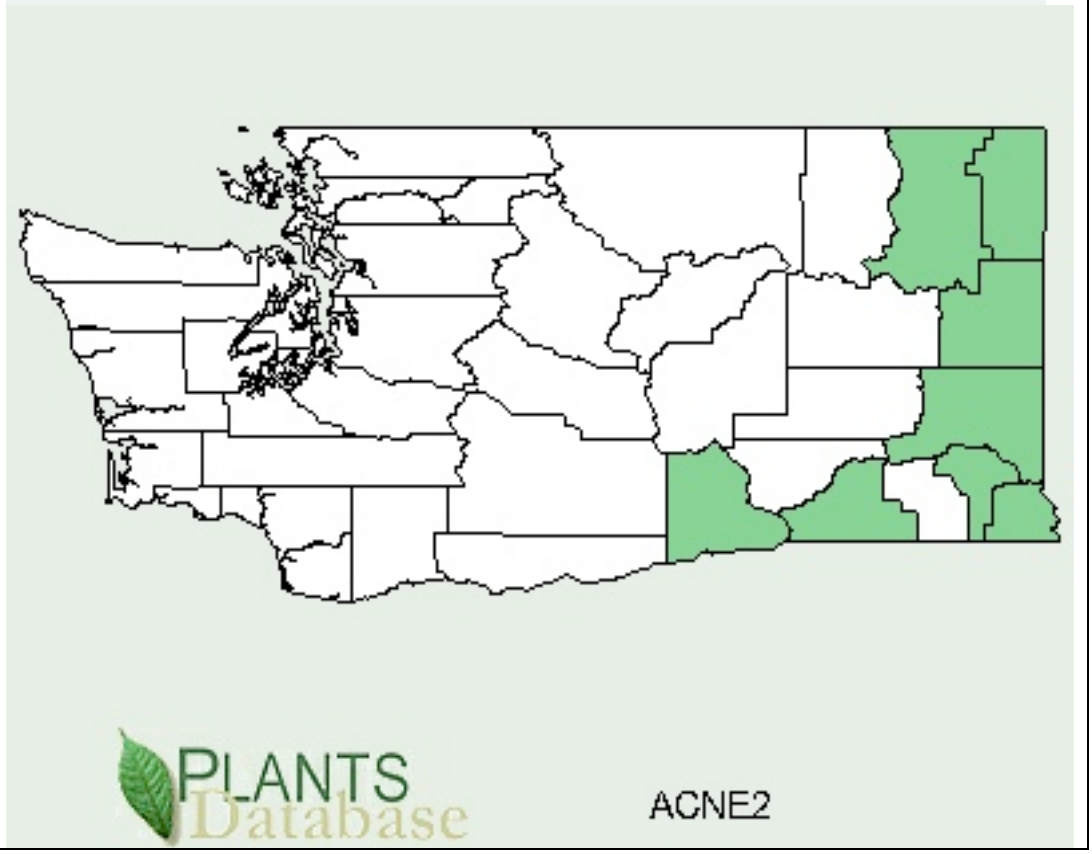
Plant Propagation Protocol for *Acer negundo*
ESRM 412 – Native Plant Production

TAXONOMY	
Family Names	
Family Scientific Name:	*Aceraceae*
Family Common Name:	maple
Scientific Names	
Genus:	*acer*
Species:	*negundo*
Species Authority:	Linnaeus
Variety:	*Acer negundo var. negundo L.* *Acer negundo var. interior (Britt.)Sarg.* *Acer negundo var. violaceum (Kirchn.) Jaeg.* *Acer negundo var. texanum Pax.* *Acer negundo var. californicum Sarg.* *Acer negundo var. arizonicum Sarg.*
Sub-species:	See variety
Cultivar:	none
Authority for Variety/Sub-species:	See variety
Common Synonym(s)	*A. californicum* *A. negundo californicum* *A. striatum Lam.* (4)
Common Name(s):	boxelder inland boxelder California boxelder western boxelder ashleaf maple ash-leaved maple Manitoba maple (8)
Species Code (as per USDA Plants database):	ACNE2 (6)
GENERAL INFORMATION	

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

Ecological distribution:	Mostly found in alluvial soils, but can be found in forests, swamps, and along shorelines. (7)
Climate and elevation range	Found throughout the United States and is classified as an invasive species in some regions. Found in drier areas up to 8,800 feet (7)
Local habitat and abundance; may include commonly associated species	*A. negundo* has been found in western united states to associate with bottomland hardwoods. It is an associate species in the following cover types 235 Cottonwood-Willow 236 Bur Oak (9)
Plant strategy type / successional stage	Box elder can colonize alluvial soils, grows in gaps, and is drought tolerant once established (7)(8)(9)
Plant characteristics	Deciduous tree It is dioecious with imperfect flowers Averages 40-50 feet tall 8-11 years to maturity on average Lives 60-100 years (7)(8)(2)
PROPAGATION DETAILS	
Ecotype :	Not specified but the main experiment referenced in this protocol was done at Cumberland Gap National Historical Park, Maryland. (8)
Propagation Goal :	Plants
Propagation Method :	Seed but vegetative
Product Type	Field grown (bareroot)
Stock Type:	Not specified
Time to Grow:	1 year to 1 year and 3 months depending on time of seeding and stratification methods (4)(7)(8)
Target Specifications:	6’’-4’ (8)
Propagule Collection:	Seeds disperse in september –march, collect in fall and plant in December.
Propagule Processing/Propagule Characteristics:	11,800 seeds per pound (4) 13,400 seeds per pound (9) the seeds do not last long, less than 5 years (4)
Pre-Planting Propagule Treatments :	Scarification: hot water soak, mechanical or chemical is nessesary to break through the impermeable pericarp. (1) mechanical scarification can be done with scissors to open the seed coat or the seed coat can be peeled off completely (5). stratification Three month cold stratification with peat moss or sand(4) or perlite/vermiculite mix. Seeds can also be stratified by nature, plant in December in beds (1)(2)(4). The seeds can also be soaked in cold water for 2 weeks (4)
Growing Area	Outdoor beds should be mulched (8) (4)

Preparation / Annual Practices for Perennial Crops:	
Establishment Phase:	Can sow seeds in ground in December after scarification for natural stratification in which case establishment takes can last from December to around June depending on location. In germination tests with stratified seeds in peat moss the following germination rates were recorded 8-30 days (4) 24-60 days (2) Seeds planted at 1/4"-1/2" depth in mulched soil
Length of Establishment Phase:	3-6 months if planted in ground to stratify 8-60 days if stratified and planted in March
Active Growth Phase:	Early spring to October. Irrigation and fertilization are necessary in dry nutrient poor soils. Boxelder does best on alluvial soils that are both nutrient rich and moist. (8) (4)
Length of Active Growth Phase:	6-8 months (2)
Hardening Phase:	During the hardening phase it is important to cut back any fertilization that was taking place and limit watering to severe need in drought conditions (8)
Length of Hardening Phase:	1-2 months (8)
Harvesting, Storage and Shipping:	Plants can be harvested year to two years in mid December when plant is dormant. Bundle root system with plastic bags or bins, remove longer roots outside of bundle, create drainage holes in plastic containers. Keep plants dormant during winter at around 40ºF (8)
Length of Storage:	3 months, store during winter (8)
Guidelines for Outplanting / Performance on Typical Sites	Outplant in March. Performance of outplants for experiment not specified but most sources say that outplants that remain in soil 2 years have a high success and are easily transported.
Other Comments:	An important note: since the box elder is dioecious some of the trees have only staminate flowers(4). A sample collected in 1990 had 95% empty seed coats and in 1991 50% empty seed coats (5). This would explain why germination rates for most sources are around 5-20%. Check the seed coats during mechanical scarification to ensure seed coats are not empty.
	INFORMATION SOURCES
References (full citations):	1. Dirr, Michael. Reference manual of woody plant propagation from seed to tissue culture : a practical working guide to the propagation of over 1100 species, varieties, and cultivars. Athens, Ga: Varsity P, 1987. Pg 83-86 2. Schopmeyer, C. S. (Tech. Coord.). Seeds of woody plants in the United States. Forest Service, USDA. Agriculture Handbook No. 450. Pg 186-188 3. Young, James A. Seeds of woody plants in North America. Portland, Or: Dioscorides P, 1992. Pg 14-15

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