Plant Propagation Protocol for *Actaea elata*
ESRM 412 – Native Plant Production
Spring 2012

TAXONOMY	
Family Names	
Family Scientific Name:	Ranunculaceae
Family Common Name:	Buttercup family
Scientific Names	
Genus:	*Actae*
Species:	*elata*
Species Authority:	(Nutt.) Prantl
Variety:	
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)	*Actaea elata* (Nutt.) Prantl Cimicifuga elata (Nuttall)J. Torrey and A. Gray;[9] Fl. N. Amer. 1(2): 316 1838. [10] Cimicifuga elata var. alpestris H.W. Lee & C.W. Park, Novon 14(2): 182–184, f.2 200. [10]
Common Name(s):	Tall Bugbane
Species Code (as per USDA Plants database):	ACEL4
GENERAL INFORMATION	
Geographical range (distribution maps for North America and Washington state)	B.C.; Oreg., Wash. See maps above for distribution Found in scattered sites in the Chilliwack valley in B.C.[2] Lower Frasier Valley and the Olympic Peninsula south to NW Oregon . [6]
Ecological distribution (ecosystems it occurs in, etc):	Moist, wooded slopes, damp forest margins and roadsides, along shaded streams, rather open to closed woods, mountain hemlock habitats;[1] wooded areas and stream banks.[5]

Climate and elevation range	60-900 m. [1] *A elata* has the most extensive range of the three western North American species. It is very likely to be threatened by human activities. Even though a number of historic records occur for this species and its preferred habitat is fairly extensive (albeit not undisturbed), the number of colonies actually known to exist is not great. In addition, few of these populations are of sufficient size and extent to be viable over the long term.[1] Moist woods at lower elevation; s BC to NW OR, w Cascadaes[4] and in Skamania Co, WA.[3] Moist forest at low to middle elevations. [6]
Local habitat and abundance; may include commonly associated species	
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	*A elata* has been historically found in lowland old growth forests, which are increasingly rare. [3]
Plant characteristics (life form (shrub, grass, forb), longevity, key characteristics, etc)	Stems 120-180 cm, sparsely puberulent, glandular, or lanate. Leaves: petiole angled, to 40 cm, deeply and broadly grooved adaxially, glabrous or densely pubescent in groove. Leaf blade 2-ternately compound; leaflets 9-27; terminal leaflet of central segment ovate to orbiculate, often 2-3-lobed, 8-18 × 9-23 cm, with 5-7 prominent veins arising basally, base deeply cordate, margins coarsely dentate to serrate, teeth gland-tipped, apex acute to acuminate, surfaces abaxially pubescent, adaxially glabrous; other leaflets 5-15 × 7-20 cm. Inflorescences erect panicles of 4-14 racemelike branches, 7-17 cm, glandular to lanate; bracts 3, subtending pedicel, central bract largest, lance-subulate, lateral bracts ovate-deltate; pedicel 1-8 mm, densely pubescent, bracteoles absent. Flowers: sepals 5, white or pinkish; petals absent; stamens 20-30; filaments 5-6 mm; pistils 1-3, sessile, glandular-pubescent; style short; stigma 0.5 mm wide. Follicles usually 1(-3 in proximal flowers), sessile or nearly sessile (stipe 0-2 mm), oblong, ± laterally compressed, 8-12 mm, thin walled. Seeds reddish to purplish brown, lenticular, 2 mm, usually verrucose, rarely with very short scales. 2 n = 16.[11] Tall (1-2 m)branched stems, large compound leaves, numerous small, white-stamened flowers in a narrow, terminal, branched inflorescence and

	several-seeded follicles. [6]
PROPAGATION DETAILS No methods were found for A. elata. However, protocols are available for *A. rubra*, which is found in rich mixed and coniferous forests and swamps with aspen, oak, cedar, spruce, fir, hemlock or tamarack with average moisture. Rich, well drained loam. (ph 5-6). Light to medium shade. Height 1'-3'.[7]	
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[7,8]
Propagation Method (Options: Seed or Vegetative):	Seed[7,8]
Product Type (options: Container (plug), Bareroot (field grown), Plug + (container-field grown hybrids, and/or Propagules (seeds, cuttings, poles, etc.))	Container (plug) [7,8]
Stock Type:	
Time to Grow (from seeding until plants are ready to be outplanted):	
Target Specifications	

(size or characteristics of target plants to be produced):	
Propagule Collection (how, when, etc):	
Propagule Processing/Propagule Characteristics (including seed density (# per pound), seed longevity, etc):	Remove the pulp as soon as possible afer picking by stripping off the pulp by hand or very gently using a blender with water or rubbing the berry on a sieve and floating off the pulp. Dry seeds for 1 week. Once the seeds have dried begin stratification. [7] Seeds exhibit morpho-physiological dormancy. [8]
Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):	Stratification: Use a Ziploc-style bag or a small Rubbermaid-style container to mix an equal amount of of seeds with either perlite or vermiculite. Add a small amount of water. (There should be no visible water within the bag or container). Place in a refrigerator or cold garage (33-42 degree F) for at least five months. Cold store until planted (up to 3 years). [7] Seeds are placed in cold moist stratification for 112 days. Germination occurs at 22D/17N C alternating temperature cycle. [8]
Growing Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc):	Propagation Environment: Greenhouse film is made of Standard U.V. 3HL Clear 6 mil (J.R. Johnson's Greenhouse Supply Inc.) Fans run continuously to circulate the air. Vents open during the summer months to allow for cooling. Container Type: grows best in 24 cell (2" diameter)14"x8.5"x4" deep flats, and other flats with 2" diameter or more and depths of 4" or more. Sowing Media: Scotts Redi-earth Plug and Seedling Mix. Contains vermiculite, and sphagnum peat moss. Soil is sterile. Thoroughly moisten the soil with water, mixing in the water with a trowel. Cover the holes in the bottom/sides of the plug tray cells with newspaper so that the soil does not fall out. Fill cells with damp soil and press soil down with a spoon. Refill the cell plugs with soil to the top, this time not pressing it down. Water the soil in the plug cells again. Sow the seeds by hand at a rate of about 1 seed in each small cell and 2 seeds in each cell with a diameter greater than 2.5". Cover the seeds with a thin layer of soil or gently press the seeds into the dirt. Sow red baneberry seeds at all times of the year due to their unpredictable germination. [7]
Establishment Phase (from seeding to germination):	From January until August the greenhouse thermostat is set at 65 degree F both day and night. Ambient greenhouse temperatures may reach 100 degrees F during the day in the summer. From September to the end of December the greenhouse thermostat is set at 55 degrees F. During this season ambient greenhouse temperatures may reach 75 degree F during the day. Soil is kept consistently damp during germination. Water using a fine

	mist or light hose setting only. Newly planted trays are placed on the south side of the greenhouse. No artificial light is used. [7]
Length of Establishment Phase:	
Active Growth Phase (from germination until plants are no longer actively growing):	The soil does not need to be kept consistently moist. The greenhouse holds plants at all stages of growth so the temperature setting stays the same for all plants at all stages of growth. Plant trays are moved to cooler north greenhouse tables. No fertilizers are used. [7]
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):	In early-late spring, mature plants can be moved into a cold frame with a cover of material that diffuses sunlight to prevent scorching of the plants. When danger of frost has passed leave plants outside. Water less frequently. [7]
Length of Hardening Phase:	
Harvesting, Storage and Shipping (of seedlings):	In the Upper Peninsula, flats are planted from late May to early October. Flats that are not planted in the summer remain in the greenhouse for another season. [7]
Length of Storage (of seedlings, between nursery and outplanting):	
Guidelines for Outplanting / Performance on Typical Sites (eg, percent survival, height or diameter growth, elapsed time before flowering):	
Other Comments	Berries poisonous. Treatment is the same for white baneberry *(A.*

(including collection restrictions or guidelines, if available):	*pachypoda).* Ideal for shade gardens. Individual plants are relatively long lived (10+years).[7]
INFORMATION SOURCES	
References (full citations):	(1) http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=233500377; (2) http://www.wildflower.org/plants/result.php?id_plant=ACEL4 ; (3) Richard Ellison, personal communication; (4)Hitchcock, C and A. Cronquist, 1981. Flora of the Pacific Northwest. University of Washington Press ; (5) Gilkey, H.M. and L. R. J. Dennis, 2001. Handbook of Northwestern Plants. Oregon State University Press; (6) Pojar, J. and A. Mackinnon,1994. Plants of the Pacific Northwest Coast. Lone Pine Publishing. (7) http://www.nativeplantnetwork.org/Network/ViewProtocols.aspx?ProtocolID=2130; (8) http://www.nativeplantnetwork.org/Network/ViewProtocols.aspx?ProtocolID=1490; (9) http://plants.usda.gov/java/reference?symbol=ACEL4; (10) http://www.tropicos.org/namesearch.aspx?name=cimicifuga+elata.
Other Sources Consulted (but that contained no pertinent information) (full citations):	
Protocol Author (First and last name):	Richard Ellison
Date Protocol Created or Updated (MM/DD/YY):	04/18/12

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http://www.nativeplantnetwork.org/network/SampleBlankForm.asp