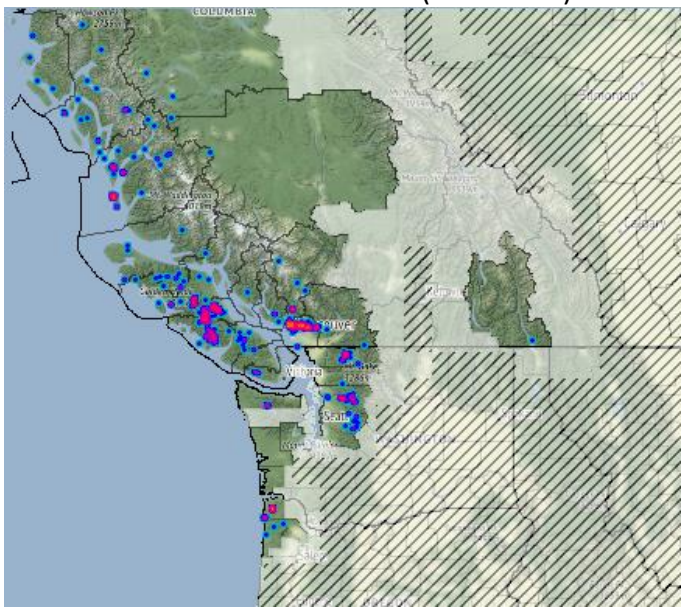
Plant Propagation Protocol for *Elliottia Pyroliflora*

ESRM 412 – Native Plant Production

URL: https://courses.washington.edu/esrm412/protocols/*2024/ELPY.pdf*

TAXONOMY	
Plant Family	
Scientific Name	*Ericaceae Juss.*
Common Name	Heath
Species Scientific Name	
Scientific Name	*Elliottia pyroliflora* (Bong.) S.W. Brim, P.F. Stevens
Varieties	N/A
Sub-species	N/A
Cultivar	N/A
Common Synonym(s)	*Elliottia pyroliflorus* *Cladothamnus pyroliflora* *Leiophyllum pyroliflorum*
Common Name(s)	Copperbush
Species Code (as per USDA Plants database)	ELPY
GENERAL INFORMATION	
Geographical range	From southern Alaska to northwestern Oregon along the coast and as far east as the coastal side of the Cascade mountains (E-Flora BC). 
Ecological distribution	Pacific maritime climate in moist subalpine forests, fields, bogs, and streams, mid to high elevation in mountains (E-Flora BC).

Climate and elevation range	Subalpine boreal, maritime, and cool mesothermal climates with short and cool summers. Commonly mesic soil moisture regimes, on low to moderate south-southwest facing slopes. Ranging from 0-2000 m (FNA 2009).
Local habitat and abundance	Most common in mountain hemlock (T*suga mertensiana)* dominated forests, often with white-flowered rhododendron (*Rhododendron albiflorum)* and false azalea *(Rhododendron menziesii)* (MacKinnon & Pojar, 2016). Prefers acidic soils (FNA 2009).
Plant strategy type / successional stage	Perennial (FNA 2009)
Plant characteristics	Shrub 0.5-3 m, spreading. Older twigs with copper colored, exfoliating bark; new growth of current season is green, smooth, occasionally hairy. Leaves are deciduous in an alternate arrangement with whorled appearance at end of twigs. Single, terminal, 5 lobed flowers 10-15 mm in length with a salmon or coppery color. Flowering Jun-Jul. Seeds 0.5-0.8 mm (FNA 2009). *E. pyroliflora* can be distinguished from rhododendron species it is commonly found with by the fine and waxy powder coating its leaves and flowers (MacKinnon 2016).
PROPAGATION DETAILS: FROM SEED	
NOTE	Little to no propagation information for *Elliottia Pyroflora* exists in literature aside from acknowledgements that it is challenging to grow. Information in the following sections is primarily adapted from propagation procedures for congener *Elliottia Racemosa Muhl.* (Georgia Plume) (Fryer 2019). Propagation by seed is not possible with *E. racemosa* as they produce seeds that rarely survive to the ripening stage (Fryer 2019). It is unclear whether this is true of *E. pyroliflora*. One source describes successful germination of *E. Pyroliflora* seeds after 3 months cold stratification at 40°F (5°C) in a dampened medium. However, this process did not result in viable seedlings (Fordham 1981).
Ecotype	N/A
Propagation Goal	Propagation by seed is not known to result in viable seedlings (Fordham 1991).
Propagation Method	N/A
Product Type	N/A
Stock Type	N/A
Time to Grow	N/A
Target Specifications	N/A
Propagule Collection Instructions	N/A
Propagule Processing/Propagule Characteristics	*E. pyroliflora:* Seeds must begin stratification within 1-3 months of collection, they cannot be stored for long periods (Fordham 1981)
Pre-Planting Propagule Treatments	*E. pyroliflora:* 3 months cold stratification at 40°F (5°C) in dampened medium (e.g. peat moss) (Fordham 1981)

Growing Area Preparation / Annual Practices for Perennial Crops	N/A
Establishment Phase Details	N/A
Length of Establishment Phase	N/A
Active Growth Phase	N/A
Length of Active Growth Phase	N/A
Hardening Phase	N/A
Length of Hardening Phase	N/A
Harvesting, Storage and Shipping	N/A
Length of Storage	N/A
Guidelines for Outplanting / Performance on Typical Sites	N/A
Other Comments	N/A
PROPAGATION DETAILS: VEGETATIVE	
Note	Information in this section is taken from propagation procedures for *E. Racemosa Muhl.*
Ecotype	Plant material in Woo et al. 2008 was collected from the field and from greenhouse grown plants. Leaf cultures from greenhouse collections were generally more successful, however Radcliffe et al. 2011 showed success with this tissue culture procedure with field explants across 34 wild genotypes.
Propagation Goal	Plantlets
Propagation Method	Vegetative (Tissue Culture)
Product Type	Propagules
Stock Type	Tissue culture: 25 x 150mm test tubes containing 20mL tissue culture media, 5.5 x 6cm jars containing 30mL media Greenhouse: 4" pots with lightweight potting soil (e.g. Fafard #3B) (Woo 2008)
Time to Grow	Successful rooting is achieved in the majority of plantlets after 11-20 weeks (Woo 2008). No successful outplanting procedure exists (see below).
Target Specifications	Plantlets exhibiting successful rooting and elongation of shoots (Woo 2008).
Propagule Collection Instructions	Cuttings consisting of leaves from actively growing shoots collected in late summer/autumn (Woo 2008).

Propagule Processing/Propagule Characteristics	Plant material should begin propagation treatment immediately after collection (Woo 2008).
Pre-Planting Propagule Treatments	Explants from the field must be disinfected before beginning tissue culture. Successful disinfection has been achieved with a 30-60 sec ethanol bath, followed by 5-10 min baths in Roccal (an ammonium disinfectant) and NaOCL. Explants were given a 5-minute rinse in sterile, distilled water between each disinfectant treatment. This process yielded as high as 19% healthy cultures from field material and 65% healthy cultures from young greenhouse material (Woo 2008).
Growing Area Preparation / Annual Practices for Perennial Crops	N/A
Establishment Phase Details	Once disinfected, explants are placed in 25 x 150mm test tubes containing 20mL tissue culture media supplemented with thidazuron and indole-3-acetic acid (IAA). Leaf cultures should be kept under light with greatest success occurring with a 16-hour photoperiod. Bud and shoot primordia are typically visible within 3-4 weeks. Cultures are then transferred 5.5 x 6cm jars with 30mL media treated with (2-isopentyl) adenine to promote shoot elongation within 4-8 weeks. After completing shoot elongation, cultures are transferred to media supplemented with IAA and typically achieve root formation within 8 weeks at a rate of approximately 77%. Rooted plantlets are then acclimatized in humidity domes before transferring to 4” pots on flats containing lightweight potting mixture. At this point plants are moved to the greenhouse (Woo 2008).
Length of Establishment Phase	3-4 weeks initial tissue culture 4-8 weeks shoot induction 4-8 weeks rooting
Active Growth Phase	N/A
Length of Active Growth Phase	N/A
Hardening Phase	N/A
Length of Hardening Phase	N/A
Harvesting, Storage and Shipping	N/A
Length of Storage	N/A
Guidelines for Outplanting / Performance on Typical Sites	85% survival of plantlets in greenhouse after 1 month growth (Woo 2008). *Elliottia* species typically do not tolerate transplanting; no information on outplanting could be found (Fryer 2019).

Other Comments	Nursery grown Elliottia (regardless of species) commonly fail possibly due to inability to form mycorrhizal root associations. Plants do not transplant well and as a result are not used in restoration (Fryer 2019). This procedure has been successful across a wide variety of *E. racemosa* wild genotypes (Radcliffe 2011). It is unclear how *E. pyroliflora* would respond to this procedure, but no other definitive propagation procedures exist for the Elliottia genus in the English language. The two other species in the Elliottia genus (*E. bracteata and paniculata* Benth. and Hook f.) are native to Japan and have little documentation in English language material (Fryer 2019).
INFORMATION SOURCES	
References	Flora of North America Editorial Committee. (2009). *Flora of North America north of Mexico. volume 8, Magnoliophyta: Paeoniaceae to Ericaceae*. Oxford University Press. Fordham, A. J. (1981). Elliottia — Propagational Data for Four Species. *The Plant Propagator : Official Publication of the International Plant Propagators' Society.*, *31*, 436–439. Fordham, A. J. (1991). Elliottia Racemosa and Its Propagation. *Arnoldia*, *51, (59-62).* Fryer, Janet L. 2019. Elliottia racemosa, Georgia plume. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Missoula Fire Sciences Klinkenberg, B. (Ed.). (n.d.). *Elliottia pyroliflora (Bong.) S.W. Brim & P.F. Stevens* . E-Flora BC: Electronic atlas of the flora of British Columbia. (Accessed: 4.28.2024) https://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Elliottia+pyroliflora MacKinnon, A., & Pojar, J. (2016). *Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia & Alaska*. Partners Publishing. Radcliffe, C. A., Affolter, J. M., & Wetzstein, H. Y. (2011). In vitro shoot regeneration of Georgia plume, Elliottia racemosa, from multiple genotypes collected from wild populations. *HortScience*, *46*(2), 287–290. https://doi.org/10.21273/hortsci.46.2.287 Woo, S. M., & Wetzstein, H. Y. (2008). An efficient tissue culture regeneration system for Georgia plume, Elliottia racemosa, a threatened Georgia endemic. *HortScience*, *43*(2), 447–453. https://doi.org/10.21273/hortsci.43.2.447

	Distribution Map courtesy of wildflowersearch.org, Map tiles: Stamen Design, Data: OpenStreetMaps. (Accessed 4.28.2024) https://wildflowersearch.org/search?name=Elliottia+pyroliflora
Other Sources Consulted	Bohm, B. A., Brim, S. W., Hebda, R. J., & Stevens, P. F. (1978). Generic limits in the tribe Cladothamneae (ericaceae), and its position in the rhododendroideae. *Journal of the Arnold Arboretum.*, *59*, 311–341. Green, R. N., & Klinka, K. (1994). *A field guide for site identification and interpretation for the Vancouver Forest Region*. Ministry of Forests, Research Program. Sarwar, A. K. M. G., & Takahashi, H. (2014). Pollen morphology of the tribe Phyllodoceae (Ericoideae, ericaceae) and its taxonomic significance. *Bangladesh Journal of Plant Taxonomy*, *21*(2), 129–137. https://doi.org/10.3329/bjpt.v21i2.21351
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