Plant Propagation Protocol for *Alnus Incana*
ESRM 412 – Native Plant Production
Protocol URL: https://courses.washington.edu/esrm412/protocols/*[ALNINC.pdf]*

TAXONOMY	
Plant Family	Betulaceae
Scientific Name	
Family Common Name	Birch
Species Scientific Name	Alnus L. Incana
Scientific Name (A full scientific name consists of *Genus*, *epithet*, and authority- e.g., *Elymus glaucus* Buckley. Protocols are prepared for species, which may include multiple varieties, sub-species, and/or cultivars.)	Alnus Incana (L.) Moench
Varieties (those varieties that are recognized in the USDA Plants database; report name and authority for each variety)	Alnus incana (L.) spp. Incana, Alnus incana (L.) ssp. Rugosa, Alnus incana (L.) ssp. Tenuifolia Nutt.
Sub-species (those sub-species that are recognized in the USDA Plants database; report name and authority for each sub-species)	Tenuifolia, Rugosa, Incana
Cultivar	
Common Synonym(s) (include full scientific names, including variety or subspecies information)	Alnus Incana (L.) Moench
Common Name(s)	Grey Alder, Thin Leaf Alder, Speckled Alder, Mountain Alder
Species Code (as per USDA Plants database)	ALNINC
GENERAL INFORMATION	
Geographical range (distribution maps for North America and for the Pacific Northwest (generally available at county level for Washington/Oregon)	Alaska, N.W.T. and Yukon, British Columbia, Alberta and Saksatchewan south. It is widely distributed across Canada. Found in Northeastern US Also found South throughout the United States to California, Arizona, and New Mexico

Ecological distribution (ecosystems it occurs in, etc)	Generally Higher elevations with cool or wet areas. Tenuifolia is generally found along stream banks, lake shores, wet meadows, bog margins and muskegs. Near sea level or about 1000m to 3000m
Climate and elevation range	It is common in wet soil of montane swamps, thickets and streambanks. Can be found growing in understory of coniferous forests on moist sites.
Local habitat and abundance (may include commonly associated species)	Typically found near rivers, streams, or springs on moist mountain slopes. Usually on poor developed soil that includes sands, cobbles, or gravels. Remain moist year round because of high water table. (Variety of sites found typically near water)
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	Shade tolerant early successional species that occupies denuded areas. Can improve soil fertility with ability to fix nitrogen. (high flood tolerance)
Plant characteristics (life form (shrub, grass, forb), longevity, key characteristics, etc.)	Tree/shrub with ovate, double-serrated leaves that are pointed at the tip. Fruits are brown, small, scale-like cones produced early in autumn. Bark is thin and smooth with a greyish-green or brown color, it also has been seen with a reddish-brown color.
PROPAGATION DETAILS (Report one type of propagation in section; duplicate section as needed for multiple types of propagation)	
Ecotype (this is meant primarily for experimentally derived protocols, and is a description of where the seed that was tested came from)	Monongahela National Forest (Speckled Alder)
Propagation Goal (Options: Plants, Cuttings, Seeds, Bulbs, Somatic Embryos, and/or Other Propagules)	Plants
Propagation Method (Options: Seed or Vegetative)	Seed (requires cold stratification)
Product Type (options: Container (plug), Bareroot (field grown), Plug + (container-field grown hybrids, and/or Propagules (seeds, cuttings, poles, etc.))	Container-plug
Stock Type	Plug
Time to Grow (time from seeding until plants are ready to be outplanted)	3.5 months to 7 months depending on method and source

Target Specifications (size or characteristics of target plants to be produced)	A well developed plant suitable for transplanting with at least 12" of top growth and a healthy root system.
Propagule Collection Instructions (how, when, etc.)	Mature cones collected in fall of 2017 , Female are borne separately on same plant in late winter/early spring
Propagule Processing/Propagule Characteristics (seed density (# per pound), seed longevity, etc)	Cones were spread out on a table covered with paper to air dry while a fan was used for circulation. Dried cones are processed through brush machine which tumbles cones and allows seed to separate. Then an aspirator was used to separate the good from bad seeds.(Be sure to take measures to make sure seeds aren't over-dried since it could hurt embryos)
Pre-Planting Propagule Treatments (cleaning, storage, dormancy treatments, etc.)	No pre-treatment used, sown as soon as seeds were ready.
Growing Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc.)	Table prepared in greenhouse (2x4) lumber sides and plastic placed underneath. Bottom layer included 2" of black Kow cow manure with 1 1/2" layer of Sun Gro Metro Mix. Compacted for sewing as well.
Establishment Phase Details (cultural practices from seeding to germination)	Seeds historically don't store well so they were sewn as soon as they were cleaned. Spread by hand, covered with sand to help dissipate the impact of irrigation water, and finally the table was water daily to provide adequate moisture for the germination process.
Length of Establishment Phase (time from seeding to germination)	3 months
Active Growth Phase (cultural practices from germination until plants are no longer actively growing)	Started germinating in 7 days, slowly growing at first but were large enough to transplant with sufficient root systems in about 3 months. Seedlings removed by gently pulling them up. Transplanted into SureRoots 50 Cell deep plug trays and placed in greenhouse.
Length of Active Growth Phase (time from germination until plants are no longer actively growing)	3 months
Hardening Phase (cultural practices from end of active growth phase to end of growing season; primarily related to the development of cold-hardiness and preparation for winter)	Trays were moved outside for one month to provide hardening before shipment.
Length of Hardening Phase (time from end of active	1 month

growth phase to end of growing season; primarily related to the development of cold-hardiness and preparation for winter)	
Harvesting, Storage and Shipping (of seedlings)	Shipped back to Monongahela National Forest in trays to prevent over-drying before planting. (Covered with tarps to prevent wind-burn and to protect plants) Cold storage, 33-38 degrees Fahrenheit.
Length of Storage (of seedlings, between nursery and outplanting)	1 day
Guidelines for Outplanting / Performance on Typical Sites (e.g., percent survival, height or diameter growth, elapsed time before flowering)	Speckled Alder is generally found in higher elevations in cool and wet areas. They are also found along stream edges and moist meadows. Adapted to a wide variety of soils and is valuably used for erosion control.
Other Comments (including collection restrictions or guidelines, if available)	Germination has been sporadic across all articles, generally the table used for germination produces seeds every 10 months. It is important to monitor browsing and for the submersion of stem cuttings(if being used) in water prior to greenhouse to help root formation.
INFORMATION SOURCES	
References (full citations)	• Lester, Randall; Vandevender, John. 2018. Propagation protocol for production of Container (plug) Alnus incana (L.) Moench Plants USDA NRCS - Appalachian Plant Materials Center Alderson, West Virginia. In: Native Plant Network. URL: http://NativePlantNetwork.org (accessed 2020/05/03). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources. • Baskin, Jerry M.; Baskin, Carol C.. 2002. Propagation protocol for production of Container (plug) Alnus incana (L.) Moench plants University of Kentucky Lexington, Kentucky. In: Native Plant Network. URL: http://NativePlantNetwork.org (accessed 2020/05/03). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources. • Luna, Tara; Evans, Jeff; Wick, Dale; Hosokawa, Joy. 2008. Propagation protocol for production of Container (plug) Alnus incana (L.) Moench plants 172 ml conetainers; USDI NPS - Glacier National Park West Glacier, Montana. In: Native Plant Network. URL: http://NativePlantNetwork.org

	(accessed 2020/05/03). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources. • Vandevender, John. 2008. Propagation protocol for production of Bareroot (field grown) Alnus incana (L.) Moench plants Bareroot; USDA NRCS - Appalachian Plant Materials Center Alderson, West Virginia. In: Native Plant Network. URL: http://NativePlantNetwork.org (accessed 2020/05/08). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources. • Scianna, Joe. 2003. Propagation protocol for production of Container (plug) Alnus incana (L.) Moench plants 40 cubic inch Dee Pots; USDA NRCS - Bridger Plant Materials Center Bridger, Montana. In: Native Plant Network. URL: http://NativePlantNetwork.org (accessed 2020/05/08). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources. • Barner, Jim. 2008. Propagation protocol for production of Propagules (seeds, cuttings, poles, etc.) Alnus incana (L.) Moench seeds USDA FS - R6 Bend Seed Extractory Bend, Oregon. In: Native Plant Network. URL: http://NativePlantNetwork.org (accessed 2020/05/08). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources. • Plants Database [Internet]. Natural Resources Conservation Service; United States Department of Agriculture. • Uchytil, R.J., 1989.Alnus incana ssp. tenuifolia. In: Fischer, William C. (comp.) The Fire Effects Information System [Monograph Online]. Missoula, MT: USDA Forest Service, Intermountain Fire Sciences Laboratory. http://www.fs.fed.us/database/feis/plants/Tree/Alninc. • USDA NRCS National Plant Data Center, and Jamie Favorite. “Thinleaf Alder Plant Guide.” USDA Plant Database, United States Department of Agriculture, plants.usda.gov/plantguide/pdf/cs_alin2.pdf. • Breen, Patrick. “Landscape Plants.” Alnus Icana Subsp. Tenuifolia | Landscape Plants | Oregon State University, 2020,

	landscapeplants.oregonstate.edu/plants/alnus-icana-subsp-tenuifolia.
Other Sources Consulted (but that contained no pertinent information) (full citations)	
Protocol Author (First and last name)	Jackson Karpicz
Date Protocol Created or Updated (MM/DD/YY)	5/2/2020