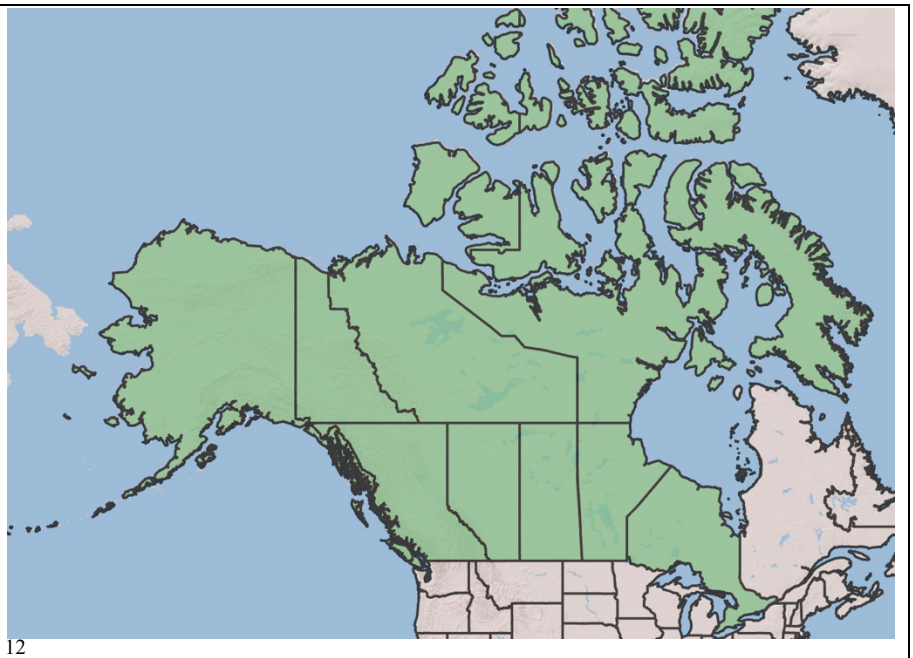
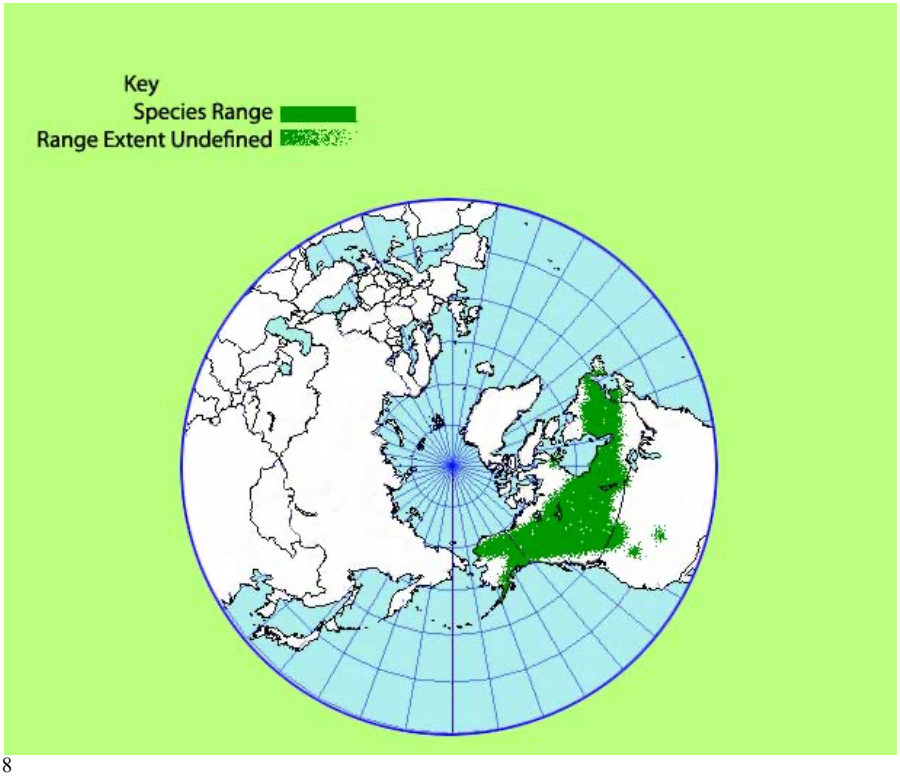
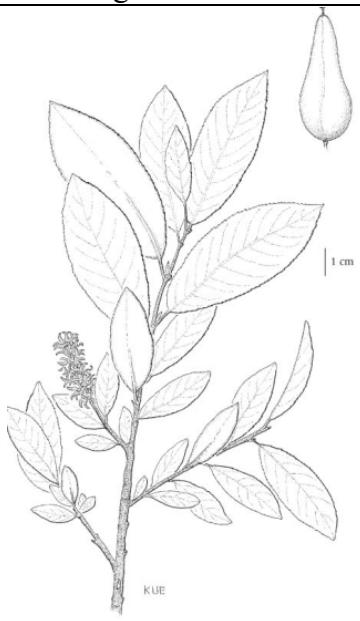
Plant Propagation Protocol for *Salix pseudomyrsinite*
ESRM 412 – Native Plant Production
URL: https://courses.washington.edu/esrm412/protocols/2023/SAPS8.pdf

TAXONOMY	
Plant Family	
Scientific Name	Salicaceae[7]
Common Name	Willow[7]
Species Scientific Name	
Scientific Name	*Salix pseudomyrsinites* Andersson[12]
Varieties	*Salix pseudomyrsinit*es var. aequalis Andersson ex C.R. Ball *Salix pseudomyrsinites* var. cordata Andersson[10]
Sub-species	No subspecies but known to hybridize with *Salix barrattiana*[1]
Cultivar	None
Common Synonym(s)	*Salix novae-angliae* auct. non Andersson *Salix novae-angliae* ssp. pseudomyrsinites (Andersson) Andersson *Salix myrtillifolia* var. cordata (Andersson) Dorn *Salix myrsinites* var. pseudomyrsinites Andersson *Salix myrtillifolia* var. pseudomyrsinites (Andersson) C.R. Ball ex Hultén *Salix novae-angliae* var. pseudomyrsinites (Andersson) Andersson *Salix pseudocordata* var. cordata (Andersson) C.R. Ball Salix boothii Dorn[4]
Common Name(s)	Firmleaf Willow[4] Tall Blueberry Willow[1] K'aii [Fist Nation Name] [8] Saule faux-myrte [French][2]
Species Code (as per USDA Plants database)	SAPS8[12]
GENERAL INFORMATION	

Geographical range (distribution maps for North America and for the Pacific Northwest (generally available at county level for Washington/Oregon)	 12  8
Ecological distribution	Inland Forests and Wetlands, especially on the banks of lakes, rivers, and bogs[5]
Climate and elevation range	Elevation: 390 to 1645m Slope Gradient: 0 to 10 degrees[6]
Local habitat and abundance	Commonly found in temperate wetland forests[5] Classified by The Xercex Society as a plant with special value to native bees[7]

	Moose, caribou, and deer commonly consume small twigs and branches of Salix pseudomyrsinites [8]
Plant strategy type / successional stage	Early seral species and usually the first willow to inhabit land following a disturbance[11]
Plant characteristics	 *Salix pseudomyrsinites* [3] Shrub, around 1 to 7 m tall with flexible yellow to red-brown branches. The leaves are 3-11cm long alternating ovals. The fruits are capsuled shape, commonly seen split open, with seeds covered in tufts of hair. [3]
PROPAGATION DETAILS for genus *Salix* from Steinfeld[9]	
Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (Plug)
Stock Type	1,2,3,4 gallon containers
Time to Grow	1 year
Target Specifications	Seedlings have reached target when roots have fully occupied the container but not to the amount where seedlings are root-bound.
Propagule Collection Instructions	Seedlings are started from cuttings collected from either stooling beds or from the wild. Collections are made after leaves have fallen from the stems in late fall or early winter and before buds begin to swell in the spring. Only current years growth is collected from stems that have diameters between 3/8 and 5/8 inch diameters. Stems with healthy, intact vegetative buds are collected, while those with broken buds and obvious disease and insect damage are avoided. Cuttings/stems sections are sealed in plastic and stored at temperatures slightly below freezing (28 to 30 degress F). Care is taken to collect material from equal numbers of male and female

	parents representing as many individuals as possible or required in genetic standards.
Propagule Processing/Propagule Characteristics	None
Pre-Planting Propagule Treatments	Prior to sticking stems are cut into 4 to 6" long sections with at least 2 buds. The stem is cut so that a terminal bud is within 1/2 " from the top of the cutting.
Growing Area Preparation / Annual Practices for Perennial Crops	Containers used are TreepotsTM distributed through Stuewe & Sons, Inc. Sizes used are 1, 2, 3, 4 gallon capacity. Media is Grower's Gold Mix #1 (from SunGro Horticulture), which is composed of 40% composted pine/fir bark (fine 3/8" minus), 35% Canadian sphagnum peat moss (growers grade) and 25% screened volcanic pumice (3/8"minus). The media is pre-moistened and contains a starter fertilizer (6-10-6 with fritted trace elements). Containers are filled with media prior to sticking and lightly tamped to reduce large pores spaces, then filled to 1" below the top of the container. The containers are used more than once but pressure washed at 160 oF to remove media and clean containers between crops. Most seedlings are grown outside without shade on drivable-gravel surfaced pads. The surface is graded and sloped to allow rain or irrigation water to not puddle. Climate at the nursery is hot and dry in the summer with average maximum temperatures in July and August of 87.5oF. Spring temperatures are moderate with frost in the upper 20's uncommon. Fall temperatures are warm with average maximum highs in October of 67oF and maximum lows of 37.5oF. Frosts in the low 20's is uncommon in October.
Establishment Phase Details	Cuttings are pushed into the media with only the terminal bud just above the media surface. Containers are placed on transportable steel racks (6.5' by 3.5'). The racks include a hardware cloth for the bottom of the container to rest on and a wire mesh top with 4" by 4" openings to support the one-gallon containers. 8" by 8" openings are used for three and four-gallon containers. Eight-gallon containers are free standing and do not require support. Nearly all containers are placed so that there is a space or opening between every container. The lower density gives seedlings more light and space for growth. Several weeks after seedlings have been transplanted, a isobutylidene diurea top dressing is applied to each container. Wil-Gro (Wilbur-Ellis), a 18-6-12 with Mg, S and Fe elements, is applied as follows: 1/16 cup for 1-gallon containers, 1/8 cup for 2, 3 and 4-gallon containers. Seedlings are only fertilized one time per year. If a

	seedling is held over for a second year, controlled-release fertilizer is again applied as a topdress in the spring. During the establishment phase, seedlings are irrigated 1 to 2 times per week. Watering is accomplished through overhead fixed irrigation system. Sprinkler head nozzles are a Rainbird BR5 and are placed on 5 to 7 foot-high risers to accommodate tall seedlings. Risers are on a square grid pattern with a 20' by 30' spacing.
Length of Establishment Phase	1 month
Active Growth Phase	Seedlings are irrigated in the early morning when the wind is at a minimum. Irrigation scheduling is based on the moisture content of the plug. Generally, the plug is not allowed to dry down much below field capacity. With maximum summer temperatures in the high 80's, seedlings are irrigated every 2 to 3 days for up to 4.5 hours per irrigation. Seedlings are not cooled in the afternoon with overhead irrigation. Seedlings are monitored for pests but generally insects and diseases do not occur in this species and stocktype. Seedlings must be hand-weeded every 6 weeks.
Length of Active Growth Phase	3 months
Hardening Phase	Hardening begins in the late summer with a reduction in the frequency of irrigations. Generally seedlings are hardy to any nighttime low temperatures that are encountered in the fall and winter months. For winter freezes where temperatures reach into the low teens, seedlings are either brought into unheated greenhouses or tree storage facilities until the event has passed. Roots will circle and amass at the bottom of the containers due to the container design. Per client request, the bottom inch of the root plug will be pruned during the hardening phase. This is accomplished by pulling the plug from the container and cutting off the end of the plug with an industrial-strength paper cutter. Clients with containers that will remain for two years will often chop the bottom inch of the container off using a chop saw with an abrasive blade. This leaves the bottom of the container completely open, which prevents spiraling the second year but makes the container unusable after extraction.
Length of Hardening Phase	3 months
Harvesting, Storage and Shipping	Seedlings are not extracted from their container or stored prior to shipping. Containers are stood up in cardboard are transported in enclosed refrigerated and non-refrigerated trucks. Many orders are simply shipped on the transportable steel racks. Empty containers are returned in the summer after the seedlings have been planted.
Length of Storage	N/A

Guidelines for Outplanting / Performance on Typical Sites	None
Other Comments	
PROPAGATION DETAILS for *Salix boothii* Dorn, a known synonym, from Zeidler, Scott[13]	
Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Vegetative
Product Type	Bareroot (field grown)
Stock Type	1 + 0
Time to Grow	1 year
Target Specifications	Height: 12 in. Caliper: 3/16 in. Root System: Root system must balance top growth.
Propagule Collection Instructions	Cuttings are collected from stooling beds that are hedged to maintain juvenile wood that is straight and for ease of handling and sticking in field beds. Wild collections are also grown at our nursery and kept separated according to source.
Propagule Processing/Propagule Characteristics	Hardwood cuttings are collected from stooling beds or from wild collections in late winter before budbreak and cut to 8 to 10 inch lengths. Cuttings can be wrapped, bundled and stored in the cooler until they are stuck into field beds.
Pre-Planting Propagule Treatments	N/A
Growing Area Preparation / Annual Practices for Perennial Crops	Soils: Our field soils are Taylorsville Sandy clay loam with Cca horizon shallower than 12", Taylorsville sand clay loam variant with Cca deeper than 12",Taylorsville Clay loam variant with Cca horizon shallower than 12" and Taylorsville Clay loam variant with Cca horizon deeper than 12". Field Bed Preparation: We mark out and form beds as needed; and apply 0-45-0 (N:P:K) in April. 2 to 3 inches of compost are applied to cutting beds prior to sowing. Sulfur is applied during May. Fields are cultivated for weeds as needed throughout the growing season. Irrigation: We use overhead irrigation with two inch aluminum pipe that can be moved from field to field each year. Our principle water source is from a canyon stream to the north of here and is very good quality water.
Establishment Phase Details	Cuttings are stuck by hand in prepared field beds during early spring to a depth of 6 inches. Soil is firmed around stems after sticking to remove air pockets and irrigated after planting. Beds are irrigated as surface begins to dry. Rooting occurs when field soils warm in later spring and rapidly produce root growth.
Length of Establishment Phase	1 month after rooting in the spring

Active Growth Phase	Fertilization: We apply Morgro 21-0-0 (N:P:K) with the Gandy spreader (setting 18, speed 2 mph, rpm 1100 to 1200) the second week of each month during the growing season; from April to August. We apply fertilizer at the rate of 120 lbs/acre. We irrigate for at least 45 minutes following all fertilizer applications. This insures that foliage will not burn and incorporates fertilizer into the root zone. Fertilizer is not applied when foliage is wet. All sulfur and 0-45-0 (N:P:K) applications must be mechanically incorporated since these amendments are not mobile in the soil. ROOT PRUNING PROCEDURES: Cuttings are root pruned after they are well established in June. Test an area to see if cuttings can handle root pruning. If excessive wilting occurs, do not prune. Irrigate heavily for 2 to 3 days prior to pruning to saturate the root zone. Set pruning blade to slightly wrench seedlings as they are pruned. Check pruning depth frequently and adjust as needed. Irrigate for a minimum of 2 hours following root pruning to settle soil back around roots. This step is critical to eliminate post root pruning mortality. Irrigate field heavily for 2 to 3 days to further settle the soil. Top Pruning: Top pruning is typically done with sickle bar mower attached to the 656. Operational speed varies, but is not done above 1200 rpm. Cut at the desired height; constantly checking and adjusted the cut during the process. Keep field workers behind the cutting head.
Length of Active Growth Phase	4 months
Hardening Phase	Hardening begins during the third week of August or when dormancy is induced. No fertilizer is applied after August 28th. Irrigation frequency and duration is shortened and applied only when needed.
Length of Hardening Phase	1 months
Harvesting, Storage and Shipping	Lifting window is during mid November when cuttings are completely dormant. Cuttings are hand lifted after the beds have been undercut at a depth of 12 inches using a lifter. Fall lifted stock are "heeled in" in sandy soils after we have graded and bundled them in bundles of 25. They are lifted in spring before they break dormancy then stored in our cooler on stacked pallets. We keep lifted stock in our cooler at between 36 to 42 degrees F and at a relative humidity of 92 to 98% with good air circulation.
Length of Storage	N/A
Guidelines for Outplanting /	None

Performance on Typical Sites	
Other Comments	
INFORMATION SOURCES	

References	[1]Argus, W.George 2007. "Salix Pseudomyrsinites" JSTOR Global Plant Compilation. https://plants.jstor.org/compilation/Salix.pseudomyrsinites [2]Brouillet et al. 2010+. Salix pseudomyrsinites Andersson in VASCAN, the Database of Vascular Plants of Canada. http://data.canadensys.net/vascan/taxon/9147 (consulted on 2023-04-18) [3]Douglas, G.W., G.B. Straley, D.V. Meidinger, and J. Pojar (editors). 1998. Illustrated Flora of British Columbia. Volume 1: Gymnosperms and Dicotyledons (Aceraceae Through Asteraceae). B.C. Ministry of Environment, Lands & Parks and B.C. Ministry of Forests. Victoria. [4]Holmgren, N. H., P. K. Holmgren & A. J. Cronquist. 2005. Vascular plants of the intermountain west, U.S.A., subclass Dilleniidae. 2(B): 1–488 Integrated Taxonomic Information System. ITIS - Report: Salix Pseudomyrsinites. www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=565483#null. Accessed 24 May 2023. [5]IUCN. 2020. The IUCN Red List of Threatened Species. Version 2020-2. Available at: www.iucnredlist.org. (Accessed: 13 June 2020). [6]Klinkenberg, Brian. (Editor) 2020. E-Flora BC: Electronic Atlas of the Plants of British Columbia [eflora.bc.ca]. Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia, Vancouver. [Accessed: 2023-05-24 7:21:55 PM] [7]"Lady Bird Johnson Wildflower Center - the University of Texas at Austin." *Lady Bird Johnson Wildflower Center - the University of Texas at Austin*, www.wildflower.org/plants/result.php?id_plant=SAPS8. [8]"Salix Pseudomyrsinites." Friends of Dempster Country, www.flora.dempstercountry.org/0.Site.Folder/Species.Program/Species2.php?species_id=Salix.novae. Accessed 24 May 2023. [9]Steinfeld, David. 2003. Propagation protocol for production of Container (plug) Salix plants 1,2,3 and 4 gallon containers; USDA FS - J Herbert Stone Nursery Central Point, Oregon. In: Native Plant Network. URL: https://NativePlantNetwork.org (accessed 2023/05/24). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources. [10]"Tropicos." Tropicos, tropicos.org/name/Search?name=Salix%20pseudomyrsinites.

	[11]Uchytil, Ronald J. 1992. Salix myrtillifolia. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: https://www.fs.usda.gov/database/feis/plants/shrub/salmyr/all.html [2023, May 25]. [12]USDA Plants Database." *USDA Plants Database*, plants.usda.gov/home/plantProfile?symbol=SAPS8 [13]Zeidler, Scott; Justin, John. 2003. Propagation protocol for production of Bareroot (field grown) Salix boothii Dorn plants 1+0; Utah Division of Forestry, Fire and State Land - Lone Peak Nurse Draper, Utah. In: Native Plant Network. URL: https://NativePlantNetwork.org (accessed 2023/05/25). US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources.
Other Sources Consulted	None
Protocol Author	Austin Lincoln Obermeyer
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