Plant Propagation Protocol for *Agastache uticifolia*
ESRM 412 – Native Plant Production
Protocol URL: https://courses.washington.edu/esrm412/protocols/*AGUR.pdf*

Fig 1. Map highlighting areas where Agastache uticifolia is found[1]

Top Row: Withered Flower, Leaf Veins[6]
Bottom Row: Top of flower cluster, Flower Spike[6]

TAXONOMY	
Plant Family	
Scientific Name	Lamiaceae
Common Name	Mint
Species Scientific Name	
Scientific Name	*Agastache urticifolia* (Benth.) Kuntze
Varieties	
Sub-species	
Cultivar	
Common Synonym(s)	
Common Name(s)	Giant Hyssop[2] Nettleleaf giant hyssop[2] Nettleleaf Horsemint[3] Horsemint Giant Hyssop[7]
Species Code (as per USDA Plants database)	AGUR
GENERAL INFORMATION	
Geographical range	East of the Cascades in WA, British Columbia to California, east to Colorado[4] Specifically: Southeastern British Columbia, South through Eastern Washington, Eastern Oregon to Southern California, and East to Western Colorado, Western Montana[5] [refer to map at beginning of protocol]
Ecological distribution	Woodland, meadows and riparian locations between 1,000-10,000 feet[6] Open slopes in woods[5] Areas where the mean annual precipitation ranges from 18-24 inches[3]
Climate and elevation range	Dry open slopes and draws, foothills to mid-elevations in mountains[4] foothills about 2,500 meters[2]
Local habitat and abundance	Commonly found in meadows and sunny areas with sagebrush, mountain brush, ponderosa pine, aspen, woodlands, and spruce-fir communities[1]
Plant strategy type / successional stage	Unknown
Plant characteristics	Aromatic, upright, perennial ranging from 3 to 4 feet.[1] Perennial herb has fibrous roots with a branching, woody base, and numerous stems (diameters of 4-15 dm)[4] The leaves are opposite, petioles of 1-5cm long.[4]They are 4-sided stems, with a large flower spike near the top.[5] Flower is a bilaterally symmetrical flower, in a dense circle, forming a tight spike.[5] [reference images above for flower spike]. Flower spike ranges from a pale pink to lavender[5] color, and are typically .5 to .75 inches long.[1] Flowers

	bloom late spring to early summer, around Jun-August.[1, 5, 6] Seeds form as four nutlets.[1, 4]
PROPAGATION DETAILS	
Ecotype	Ecotypes referenced: • Lane County, Oregon[3] • Paradise Creek drainage near Pullman, WA[8] • Jackson, Co. Oregon[9] • Western North America from Colorado, Wyoming and Montana[10] • Boise County, ID at 5801 ft elevation[11] Note: all studies referenced utilize seeds with propagation goals being plants
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	10 cubic inch container[10] 252 ml container (16 cubic inches)[3]
Time to Grow	4-5 months[3, 8, 10]
Target Specifications	Container seedling, with firm plug[3] Well-developed crowns, roots, and rhizomes[9]
Propagule Collection Instructions	Seeds are collected in August, when the inflorescence dries and seeds harden. Small amounts of seeds can be collected via shaking a paper bag. Seeds are stored in paper bags at room temp until cleaned.[3] Seeds are also collected in small lots, 2.5lbs, via hand collection into woven plastic bags.[11]
Propagule Processing/Propagule Characteristics	Remove seed from plant material with a screen. Air cleaners are used to clean the seed: with 1.40 mm top screen, a bottom screen and light air. Store in cool-dry contitions.[3]
Pre-Planting Propagule Treatments	Seeds are placed in a solution of 1000 mg/L of GA3, soaked for at least 24 hours. Rinsed seeds are then soaked for an additional 6 hours in water. No stratification is necessary.[3] Seeds can be stored in cool-dry locations with temperatures approximately 50F, with relative humidity of 20-30%.[10] Germination was greater in light than dark.[12] Seeds are nondormant.
Growing Area Preparation / Annual Practices for Perennial Crops	Grown in a greenhouse setting, with seeds directly sown into the containers. Cover lightly with nursery grit. Specific medium used is 40:20:20:20 of peat:composted fir bark:perlite:pumice with a Nutricote released fertilizer (1.5 g Nutricote per 262ml Container).[3] Average growing season is mid-March to early October.[3] Seeds can be sown in January, covering the seeds lightly, with a thin layer of pea gravel. Water the containers deeply.[8]

Establishment Phase Details	Germination is uniform, and typically 2-3 weeks[3] Germination typically occurs within 5 days and is completed in 12-14 days.[8] Day time greenhouse temps should range from 75-85F, with night temps averaging 70F.[10] Medium is kept moist until germination occurs.[8]
Length of Establishment Phase	2 weeks[3] 4 weeks[10]
Active Growth Phase	Rapid growth through active growth phase. Plants are fertilized with 12-2-14-6Ca-3Mg at 100 ppm for 2 weeks. Flowering occurs within 3 months.[3] Plants are watered deeply every other day, fertilized once per week. Fertilizers used: slow releasing fertilizer[3], water soluble fertilizer[8], Miracle Grow All Purpose Plant Food[10]
Length of Active Growth Phase	10-12 weeks[3]
Hardening Phase	No dry-down is done to induce dormancy – seedlings are moved to an outdoor growing area in early-September.[3]
Length of Hardening Phase	2-3 weeks[3] 1 week[10] was reported from one study
Harvesting, Storage and Shipping	Harvest: Mid-October[3] Storage Conditions: Outplanted in fall to early winter[3] No storage except in outdoor growing area. Plants are well irrigated prior to shipping and shipped in containers[3] If storing, place in cold storage (33-38F)[11] Plants can be shipped in a refrigerated truck for 2 days, with temp 50F[10]
Length of Storage	N/A
Guidelines for Outplanting / Performance on Typical Sites	Plants grown outdoors are not ready to be transplanted to fields the same spring. They must be held until fall for outplanting or held until the following spring.[8]
Other Comments	Germination trials show that higher germination was observed when seeds were germinated in a warm environment (75F).[9] Lower germination was observed with seeds that were placed in cold-moist stratification for 45-90 days – with decreasing germination rates for longer exposure to stratification.[9]
	INFORMATION SOURCES
References	1. Natural Resources Conservation Service Plant Guide. (n.d.). Retrieved May 26, 2020, from https://plants.usda.gov/plantguide/pdf/pg_agur.pdf 2. Agastache urticifolia - (Benth.)Kuntze. (n.d.). Retrieved May 26, 2020, from https://pfaf.org/user/Plant.aspx?LatinName=Agastache urticifolia

	3. Lamiaceae (Agastache). (n.d.). Retrieved May 26, 2020, from https://npn.rngr.net/npn/propagation/protocols/lamiaceae-agastache-1/?searchterm=lamiaceae 4. Recently added species and species descriptions - Burke ... (n.d.). Retrieved May 26, 2020, from https://biology.burke.washington.edu/herbarium/imagecollection/updates.php?Show=Taxa&Added=Y 5. Plant Database. (n.d.). Retrieved May 26, 2020, from https://www.wildflower.org/plants/result.php?id_plant=thpl 6. Southwest, T. A. (n.d.). Agastache Urticifolia, Horsemint Giant Hyssop. Retrieved May 26, 2020, from https://www.americansouthwest.net/plants/wildflowers/agastache-urticifolia.html 7. Nettle Leaf Giant Hyssop, Agastache urticifolia. (n.d.). Retrieved May 26, 2020, from https://calscape.org/Agastache-urticifolia-(Nettle-Leaf-Giant-Hyssop)?srchcr=sc560fdd591767c 8. Lamiaceae (Agastache). (n.d.). Retrieved May 26, 2020, from https://npn.rngr.net/npn/propagation/protocols/lamiaceae-agastache-2915/?searchterm=lamiaceae 9. Lamiaceae (Agastache). (n.d.). Retrieved May 26, 2020, from https://npn.rngr.net/npn/propagation/protocols/lamiaceae-agastache-4006/?searchterm=Agastache urticifolia 10. Lamiaceae (Agastache). (n.d.). Retrieved May 26, 2020, from https://npn.rngr.net/npn/propagation/protocols/lamiaceae-agastache/?searchterm=lamiaceae 11. Lamiaceae (Agastache). (n.d.). Retrieved May 26, 2020, from https://npn.rngr.net/npn/propagation/protocols/lamiaceae-agastache-3750/?searchterm=lamiaceae 12. Lamiaceae (Agastache). (n.d.). Retrieved May 26, 2020, from https://npn.rngr.net/npn/propagation/protocols/lamiaceae-agastache-1658/?searchterm=lamiaceae
Other Sources Consulted	
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