

Plant Propagation Protocol for *Humulus lupulus* L. var. *neomexicanus*
ESRM 412 – Native Plant Production



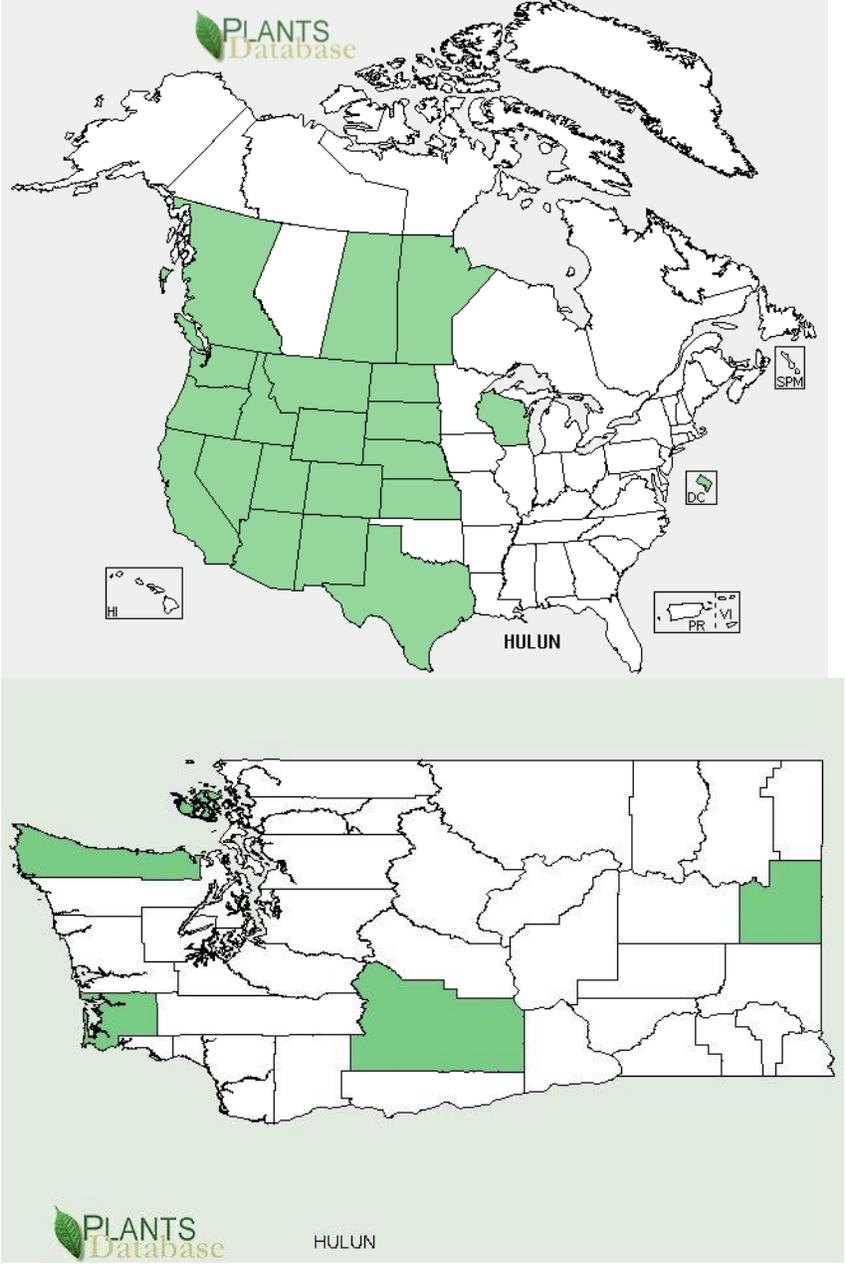
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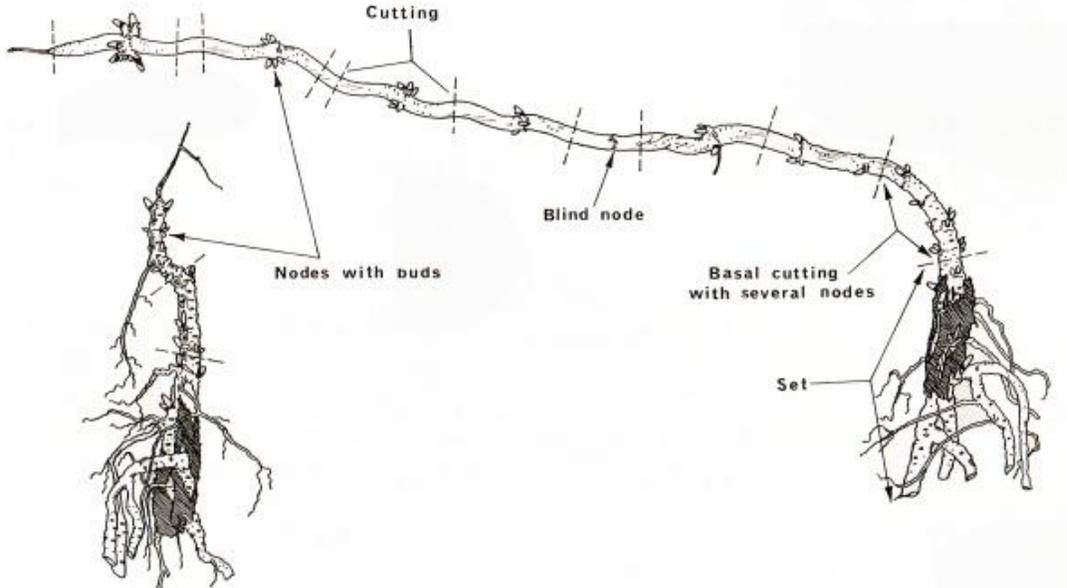
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TAXONOMY

Family Names	
Family Scientific Name:	Cannabaceae
Family Common Name:	Hemp Family
Scientific Names	
Genus:	<i>Humulus</i>
Species:	<i>H. lupulus</i>
Species Authority:	A. Nelson and Cockerell ¹
Variety:	<i>Neomexicanus</i>
Sub-species:	
Cultivar:	
Authority for Variety/Sub-species:	
Common Synonym(s)	
Common Name(s):	Common hop, wild hop ¹
Species Code (as per USDA Plants database):	HULUN
GENERAL INFORMATION	
Geographical range (distribution maps for North America and Washington state)	Maps courtesy of USDA Plant Database ¹

	
<p>Ecological distribution (ecosystems it occurs in, etc):</p>	
<p>Climate and elevation range</p>	<p>300-3000 m⁴</p>
<p>Local habitat and abundance;</p>	<p>On shrubs and trees on slopes, riverbanks, alluvial wood⁴</p>

may include commonly associated species	
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	
Plant characteristics (life form (shrub, grass, forb), longevity, key characteristics, etc)	<p>Forb/Herb, vine</p> <p>“Stems relatively pubescent at nodes, usually more than 15 hairs per 0.1 sq. mm at most pubescent portion (excluding angle of petiole with stem). Leaf blades 10 cm or more usually having at least 5 lobes; smaller blades (ca. 5 cm) usually with more than 3 easily visible veins branching off midrib (excluding proximal branches); surfaces usually more than 20 hairs per cm on length of midrib, more than 25 glands per 10 sq. mm between veins, abaxial glands in exceptionally dense concentration.”⁴</p>
<p>PROPAGATION DETAILS:</p> <p>A note: due to the relative abundance of propagation material as a result of agricultural and gardening usage of <i>H. lupulus</i>, propagation techniques outlined below are not specific to the variety of native North American wild hop (<i>H. lupulus</i> var. <i>neomexicanus</i>), but either refer to the European Common Hop (<i>H. lupulus</i> var. <i>lupulus</i>), or are of an unnoted variety within the <i>H. lupulus</i> species.</p>	
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,	Plants

Cuttings, Seeds, Bulbs, Somatic Embryos, and/or Other Propagules):	
Propagation Method (Options: Seed or Vegetative):	Vegetative
Product Type:	Bareroot stock and/or Propagules (rhizome) collected from mature nursery stock ²
Stock Type:	
Time to Grow (from seeding until plants are ready to be outplanted):	Cuttings are planted and grown for one season. One-year-old sets are transplanted from the nursery in the spring or fall. ²
Target Specification:	
Propagule Collection (how, when, etc):	<p>Hop plants are propagated from runners that arise from the crown just below the soil surface. The runners are cut into pieces 6 to 8 in. long, each bearing at least two sets of buds. Cuttings should be planted immediately or if not, stored in a cool, moist, well ventilated place. Cuttings that are poorly developed, misshapen, damaged or diseased should not be planted. ²</p>  <p>The diagram illustrates the propagation of hop plants. It shows a runner with nodes and buds, a cutting, a blind node, a basal cutting with several nodes, and a set of roots.</p>
Propagule	<i>Diagrams: Hops by A H Burgess³</i>

Processing/Pr opagule Characteristic s (including seed density (# per pound), seed longevity, etc):	
Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):	Dormancy is not inherent in rhizome propagation ³
Growing Area Preparation / Annual Practices for Perennial Crops:	Outdoor growing site: the soil should be tilled to create a weed-free field prior to planting. Cuttings are planted in hills with a spacing of approximately 8 × 8 ft at a planting density of 800 hills/acre ² Site should be cool and moist, but sunny or semi-shaded and not too wet. Soil type: gravelly clay loam ⁵
Establishment Phase (from seeding to germination):	Plant in early May or as soon as the soil can be worked into a fine, mellow condition. Plant 2 to 4 cuttings/hill with the buds pointed up and covered by 1/4 to 1 in. of loose soil. ² , 2-3 months to germination ³
Length of Establishment Phase:	
Active Growth Phase (from germination until plants are no longer actively growing):	
Length of Active Growth Phase:	
Hardening Phase (from end of active growth phase to end of growing	Hop vines die back to the cold-hardy rootstock near end of summer months (September-October climate depending) ^{2 3} No tending is required for this phase.

season; primarily related to the development of cold-hardiness and preparation for winter):	
Length of Hardening Phase:	1-2 months ³
Harvesting, Storage and Shipping (of seedlings):	(See propagule collection above)
Length of Storage (of seedlings, between nursery and outplanting):	
Guidelines for Outplanting / Performance on Typical Sites	<p>Outplanting is best in winter, when plant bines have died back to the hardy root stock or when rhizome propagules can be collected from nursery mature plant and outplanted.²</p> <p>It is best to transplant after one year, during the first year hops may only slow vegetative growth and few flowers as the plant develops its rootstock. Abundant growth can be expected in the second year. Since hops are deep rooting, it is best to transplant them to their native site so they can undergo their abundant growth period there.³</p>
Other Comments (including collection restrictions or guidelines, if available):	

INFORMATION SOURCES

References (full citations):	<p>(1) USDA Plants Database. <i>Humulus lupulus L. var. neomexicanus</i> A. Nelson & Cockerell: http://plants.usda.gov/java/profile?symbol=HULUN</p> <p>(2) <i>Alternative Field Crops Manual</i>. Madison, WI?: University of Wisconsin-Extension, Cooperative Extension, 1990. Print.</p> <p>(3) "Hop Plant Propagation, Planting and Growing". <u>Willingham Nurseries Homepage</u>. Wednesday, December 07, 2011. Willingham Nurseries. May 15. 2012. <http://www.willingham-nurseries.co.uk/propagation.html></p> <p>(4) eFloras (2008). <i>Humulus lupulus var. neomexicanus</i></p>
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	<p>URL:http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=233500679 (May 15, 2012) Missouri Botanical Garden, St. Louis, MO & Harvard University Herbaria, Cambridge, MA</p> <p>(5) Jelitto, Leo, Wilhelm Schacht, Michael E. Epp, John P. Baumgardt, and Alfred Fessler. <i>Hardy Herbaceous Perennials</i>. Portland, Or: Timber Press, 1990. Print.</p> <p>(6) Davis, E. "Morphological Complexes in Hops (<i>Humulus lupulus</i> L.) with Special Reference to the American Race." <i>Annals of the Missouri Botanical Garden</i> , Vol. 44, No. 4 (Nov., 1957), pp. 271-294</p>
<p>Other Sources Consulted (but that contained no pertinent information) (full citations):</p>	<p>Thomas, Graham S. <i>Perennial Garden Plants, Or, the Modern Florilegium: A Concise Account of Herbaceous Plants, Including Bulbs, for General Garden Use</i>. London: Dent [for] the Royal Horticultural Society, 1976. Print.</p> <p>Knoke, Don. "Humulus lupulus". <u>WTU Image Collection: Plants of Washington</u>. May 16, 2012. Burke Museum of Natural History and Culture. May 16, 2012<http://biology.burke.washington.edu/herbarium/imagecollection.php?Genus=Humulus&Species=lupulus>.</p> <p>Hampton, R.; Small, E.; & Haunold, A. "Habitat and Variability of <i>Humulus lupulus</i> var. <i>lupuloides</i> in Upper Midwestern North America: A Critical Source of American Hop Germplasm" <i>Journal of the Torrey Botanical Society</i> , Vol. 128, No. 1 (Jan. - Mar., 2001), pp. 35-46</p> <p>Murakami, A.; Darby, P.; Javornik, B.; Pais, M.; Seigner, E.; Lutz, A.; & Svoboda, P. "Molecular phylogeny of wild Hops. <i>Humulus Lupulus</i> L." <i>Heredity</i>. (2006) Vol .97 pp. 66-74</p>
<p>Protocol Author (First and last name):</p>	<p>Jamie C. Bass</p>
<p>Date Protocol Created or Updated (MM/DD/YY):</p>	<p>05/16/2012</p>

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