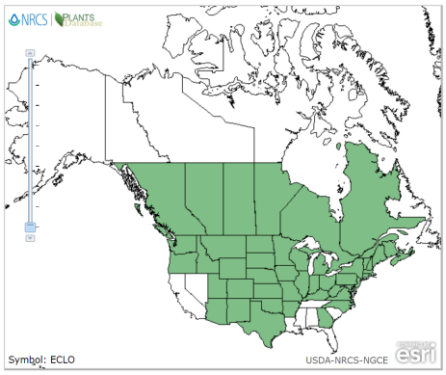
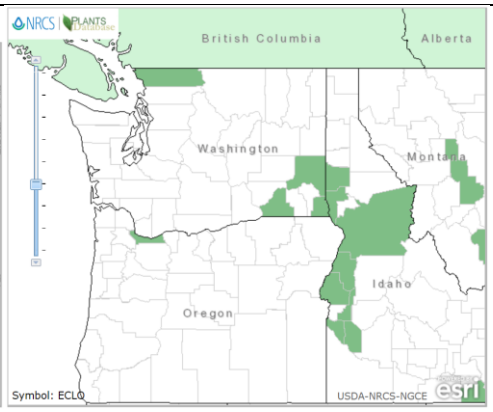
Plant Propagation Protocol for *Echinocystis lobata*

ESRM 412 – Native Plant Production

Protocol URL: https://courses.washington.edu/esrm412/protocols/ECLO.pdf

Photo by Stevens Co. Noxious Weed Control Board

TAXONOMY	
Plant Family	
Scientific Name	Cucurbitaceae
Common Name	Gourd Family
Species Scientific Name	
Scientific Name	*Echinocystis lobata* (Michx.) Torr. & A. Gray
Varieties	None recognized by USDA plant database
Sub-species	None recognized by USDA plant database
Cultivar	None specified
Common Synonym(s)	*Micrampelis lobate* (Michx.) Greene *Sicyos lobate* Michx.
Common Name(s)	Wild balsam apple Wild cucumber Wild mock cucumber Prickly cucumber
Species Code (as per USDA Plants database)	ECLO
GENERAL INFORMATION	
Geographical range	Throughout most of North America, within Washington it occurs primarily east of the Cascades.[3] Occurs as an introduced invasive in many European countries as well[4] Note: although the USDA plants database categorizes this plant as Native[1] to the areas shown below, the Burke Herbarium qualifies it as introduced[3], and the Invasive Species Compendium categorizes it as naturalized to Western North America[4]

	  *Maps courtesy of USFS plants database*
Ecological distribution	Moist bottomlands and thickets[3] with rich moist soil, riparian areas, and forest edges[4]
Climate and elevation range	Low elevations
Local habitat and abundance	Associated with lowland forests and stream banks[4]
Plant strategy type / successional stage	Weedy[4], rapid growing[5] In areas where it is categorized as invasive, it occurs in productive habitats where competitors have been limited by disturbance (a competitive-ruderal)[7]
Plant characteristics	The sole species of its genus, it is a monoecious annual vine with a wide and high reaching vine of branched tendrils.[2, 3] Leaves are 5-15 cm long, with 5 connected (palmate) lobes that are triangular.[3] Male flowers (having stamens) are on smaller branches off a main leafing axis.[3] Female flowers (having pistils) are usually solitary and originating on the leafing axis.[3] The fruits are covered in weak spines and contain flat oval seeds 1.5 cm long.[3] They resemble short fat pickling cucumbers with spikes – see picture at top.
PROPAGATION DETAILS	
Ecotype	Wild material collected during successive years at Essex, Massachusetts, and from plants grown in the Botanical Garden, Smith College, Northampton, Massachusetts – no significant difference shown between the two collections[8]
Propagation Goal	Plants
Propagation Method	Seeds
Product Type	Containers
Stock Type	Not specified
Time to Grow	Not specified
Target Specifications	Not specified
Propagule Collection Instructions	Flowers occur form July-September.[3] After growing season dried fruits remain attached to the vine while the seeds fall to the ground, and (if not

	collected) overwinter as seeds where dropped (they have no dispersal method).[6] Collected in October[2]
Propagule Processing/Propagule Characteristics	Dry storage for 1 or two years does not affect germination rates[8] mean seed mass = 0.33 g; length = 17 mm; width = 8 mm[6]
Pre-Planting Propagule Treatments	Cold moist stratification at 5-10 degrees Celsius for 26 weeks is the preferred method of breaking dormancy (rather than damaging the seed coat in some way, which yielded very low germination rates), yielding nearly 100% germination[8]
Growing Area Preparation / Annual Practices for Perennial Crops	Seeded into soil[2]
Establishment Phase Details	Seeds mixed with soil placed outdoors and subject to the oscillating daily and seasonal temperatures common to Pennsylvania until 90% had germinated in March and April[2] Note: this seeding method does not require stratification before seeding – the stratification occurs during the exposure occurring during the winter months.
Length of Establishment Phase	6-7 months, for example October until March or April[2] will satisfy both dormancy and establishment phase Note: assuming the two sources are compatible with each other, subtracting the 26 weeks from 7 months yield an establishment phase length of approximately 2 weeks.
Active Growth Phase	Thin seedlings (or plant germinated seeds) to one per pot[9]
Length of Active Growth Phase	No information found
Hardening Phase	No information found
Length of Hardening Phase	No information found
Harvesting, Storage and Shipping	No information found
Length of Storage	No information found
Guidelines for Outplanting / Performance on Typical Sites	Outplant after last frost[9]
Other Comments	The study done by Choate (source 8) tested seeds from a California sources with slightly different findings, including faster after-ripening rates (dormancy being broken in as little as 2 weeks), which may be tied to the age of the seeds, with older seeds having a higher rate As the plant is an annual, the length of active growth and hardening may be of lesser consequence as the plant does not need to survive winter, thus why no information for these phases was found
INFORMATION SOURCES	

References	[1]USDA. "Echinocystis lobata." *USDA Plants Datatbase*, https://plants.usda.gov/core/profile?symbol=PEHE4 [2]Love, Stephen L and Candace J Akins. "Second summary of the native seed germination studies of Norman C Deno: species with names beginning with letters *C* through *E*." *Native Plants Journal*, vol. 20 no. 1, 2019, p. 65-97. *Project MUSE* muse.jhu.edu/article/723142. [3] Giblin, David. "Echinocystis lobata." *Burke Herbarium*, https://biology.burke.washington.edu/herbarium/imagecollection/taxon.php?Taxon=Echinocystis%20lobata. Accessed May 26, 2020. [4] Tokarska-Guzik, Barbara. "Echinocystis lobata (wild cucumber) data sheet." *Invasive Species Compendium*, https://www.cabi.org/isc/datasheet/113998#top-page. Accessed May 26 2020. [5] Stocking, Kenneth M. *Some Taxonomic and Ecological Considerations of Marah, Echinopepon, and Echinocystis in Canada, the United States, and Northern Mexico,* University of Southern California, Ann Arbor, 1950. *ProQuest*, https://search.proquest.com/docview/1561150529?accountid=14784. [6] Łukasz Dylewski, Łukasz Myczko, & Dean E. Pearson. (2019). Native generalist consumers interact strongly with seeds of the invasive wild cucumber (Echinocystis lobata). *NeoBiota, 53*(53), 25-39. [7] Dylewski, Ł., Maćkowiak, Ł. & Myczko, Ł. Physical defence of the wild cucumber *Echinocystis lobata* in an invasive range changing seed removal by rodents. *Plant Ecol* **219,** 863–873 (2018). https://doi-org.offcampus.lib.washington.edu/10.1007/s11258-018-0842-2 [8] Choate, Helen A. "Dormancy and Germination in Seeds of Echinocystis Lobata." *American Journal of Botany*, vol. 27, no. 3, 1940, pp. 156–160. *JSTOR*, www.jstor.org/stable/2436478. Accessed 27 May 2020. [9] Plants For a Future. "Echinocystis lobata – (Michx.)Torr.&A.Gray." https://pfaf.org/user/Plant.aspx?LatinName=Echinocystis+lobata. Accessed on May 26, 2020.
Other Sources Consulted	Torrey J, Gray A, 1840. A flora of North America: containing abridged descriptions of all the known indigenous and naturalized plants growing north of Mexico, arranged according to the natural system. Volume 1(3): 542 https://www.biodiversitylibrary.org/item/27717#page/564/mode/1up. Accessed May 26 2020.
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