

Plant Propagation Protocol for *Cirsium edule* Nutt.
 ESRM 412 – Native Plant Production
 University of Washington, Spring 2018

Previous plant protocol from 2006:

http://depts.washington.edu/propplnt/Plants/cirsium_edule.htm



© Ben Legler

Right photos: © Paul Slichter

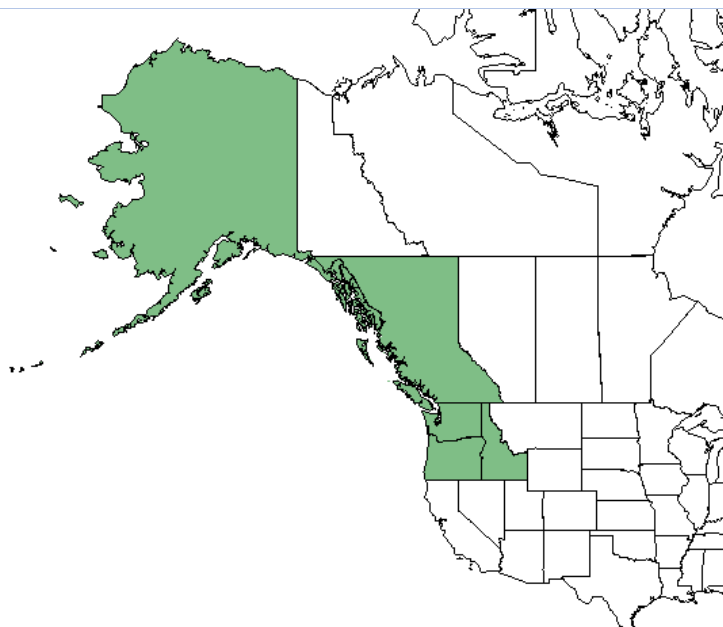
TAXONOMY

Plant Family

Scientific Name	Asteraceae/Compositae (USDA, 2018)
Common Name	Aster family
Species Scientific Name	
Scientific Name	<i>Cirsium edule</i> Nutt.
Varieties	<i>Cirsium edule</i> var. <i>edule</i> ; var. <i>macounii</i> ; var. <i>wenatchense</i> (Burke Museum, 2018)
Sub-species	None reported
Cultivar	none
Common Synonym(s)	<i>Carduus macounii</i> Greene <i>Cirsium hallii</i> (A. Gray) M.E. Jones <i>Cirsium macounii</i> (Greene) Rydb.
Common Name(s)	Edible thistle, Hall's thistle (USDA, 2018), Indian thistle (Washington Native Plant Society, 2013)
Species Code (as per USDA Plants database)	CIED, or for synonyms CAMA31, CIHA, and CIMA7

GENERAL INFORMATION

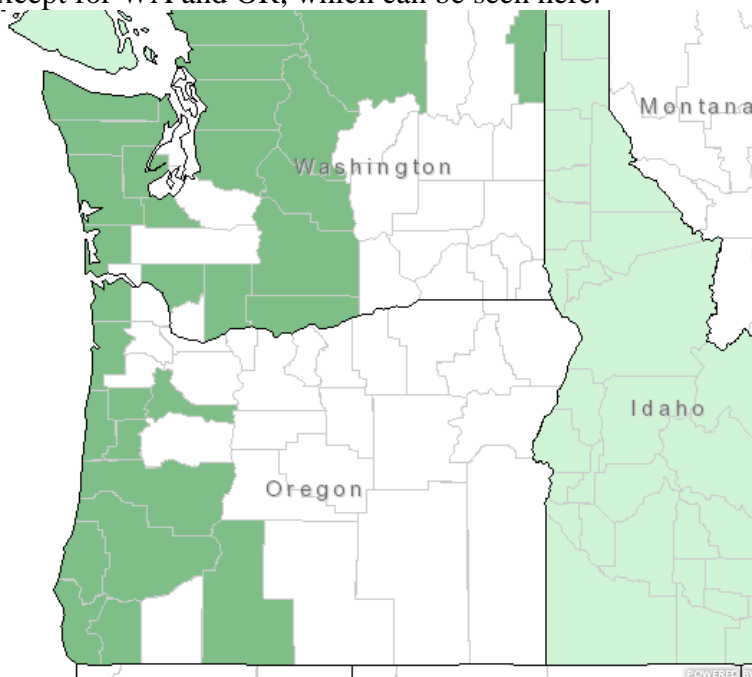
Geographical range



Both maps are ©USDA/NRCS

C. edule Nutt. can be found along the northwest coast of North America, extending north from Oregon and Idaho through Washington, British Columbia, and finally to

Alaska. County by county information is not available in all these territories except for WA and OR, which can be seen here:



This map shows that *C. edule* Nutt. is typically along western coastlines in the Pacific northwest, but has also been documented east and atop of the Cascade mountain crest and in Pend Oreille by Idaho. Counties in WA and OR closer to the coast, like

Pierce, Lewis, Clark, Columbia, Washington, and Yamhill counties, also lack this species likely because of local climatic conditions (USDA, 2018)

Ecological distribution

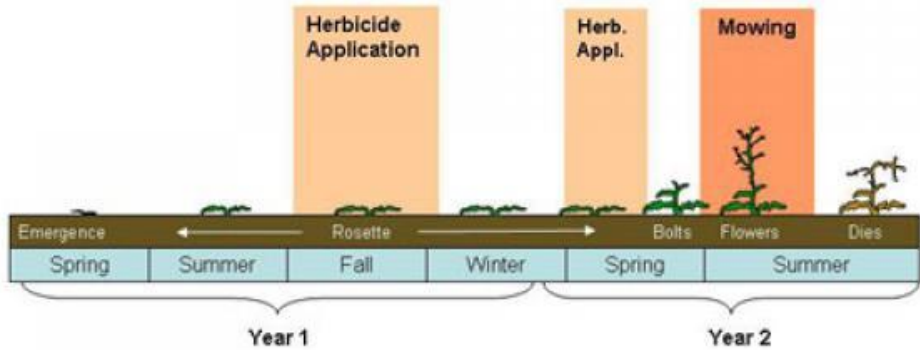
C. edule Nutt. is widespread throughout the coast and is often found in forest openings with high sun exposure and high moisture (Burke Museum, 2018). It morphologically differs depending on the ecosystem it is found in; plants in more extreme environments like sea bluffs or mountains have tightly

	enclosed flower heads, while those in non-mountainous interior sites are taller and branch out more (Flora of North America, 2018).
Climate and elevation range	Is a low to mid elevation species, ranging from the coastlines to mountain slopes. Typically found from 300-2100 + meters in elevation but has also been seen at sea level on rocky outcroppings (Flora of North America, 2018).
Local habitat and abundance	A sun-loving plant, <i>C. edule</i> Nutt. exists in abundance in moist meadows, clearings, and forest openings (Washington Native Plant Society, 2013). It also thrives in edge habitats, occupying roadsides, sea bluffs, and forest edges (Eckberg, 2017). It has been classified as a noxious weed in its non-native range (AR and IA), and only in these areas does it get out of control (USDA, 2018). Otherwise it exists as a stable, controlled population with predators like grazers. It also is in close association to pollinators like bumble bees (Burke Museum, 2018)
Plant strategy type / successional stage	<i>C. edule</i> Nutt. is a weedy colonizer of edge habitats and can quickly grow in difficult areas after disturbances (Eckberg, 2017). Its taproot and fast growth rate give it this classification.

Plant characteristics


C. edule Nutt. is a herbaceous forb that true to its name is edible. Various survival guidebooks and ethnobotanists suggest eating the peeled stem, raw or cooked, for survival or enjoyment purposes (Matthews, 2017). The taproot is also edible, but it should be cooked as it contains a high level of inulin (Plants for a Future, 2018). It can be identified by its pink to purple flower that is segmented like streaming fireworks, pointy bracts that encapsulate the flower with silk-like tendrils, and its lobed leaves which end in thorns (Matthews, 2017). Its stem can grow up to 1.5-7'. They are also biennials, which means that they grow and reproduce over a period of two years, after which they die. They sprout in the first year and staying close to the ground and storing carbohydrates in its taproot (Matthews, 2017). On the second year it sprouts a flower, reproduces, and dies for good.

Figure 1. Life cycle and management calendar for biennial thistles.



©Iowa State University, *Biennial Thistles of Iowa*

PROPAGATION DETAILS

Ecotype	Though <i>C. edule</i> Nutt. is not designated into subspecies, it is important to source your seeds from populations close to your outplanting site. This is because populations have small but important adaptations to the local environment (see “Ecological distribution”). A mountainous <i>C. edule</i> Nutt. will not be best suited or have the competitive advantage on a seaside bluff.
Propagation Goal	Plant
Propagation Method	Seed
Product Type	Container (plugs)
Stock Type	
Time to Grow	2-3 months
Target Specifications	 <p>The propagated plant will be in its first year of growth, meaning it will only be a short <i>rosette</i> (Lym, 2013), as pictured here. It could be anywhere from 10 to 20 cm in diameter depending on the growth rate of the plant before outplanting. At this stage, it will also be less than 8 cm tall.</p> <p>© T. Abe Lloyd</p>
Propagule Collection Instructions	Before the production process, survey the areas that might be a potential seed source. Consult plant survey records, local agencies, and native plant societies to know where you are looking (Eckberg, 2017). <i>C. edule</i> Nutt. will be flowering anytime from July to August, so record these sites to return to collect ripe seeds about a month later (Plants for a Future, 2018). Make sure when collecting seeds to look for signs of hybridization, for this reduces fertility; for this reason, sort seeds by plant of origin and label the collecting bags and subsequent container plugs (Eckberg, 2017). Seeds are atop the fluffy seed head, and can be picked off by hand, perhaps wearing gloves as protection from its thorns.
Propagule Processing/Propagule Characteristics	<i>C. edule</i> Nutt. seeds will not germinate readily after harvest (Eckberg, 2017); therefore, if they are stored in cool, dry conditions like in a fridge, they can maintain viability for about 2 years. Each plant produces hundreds of seeds, but only a small proportion of these native seeds will be viable (Eckberg, 2017). Sort seeds using a hand lens to determine if they are viable after collection, and store. You should have seeds from >1000 plants that are specified for your outplanting site, just so long as you did not remove more than 20% of the genetic diversity of the source site (Eckberg, 2017). This means from one site you could harvest about 100,000 viable seeds.
Pre-Planting Propagule Treatments	Each seed has a tuft of fluff attached to this. You will have to gently remove this fluff and clean the seed to prepare it for storage. To ready the seed for the

	next growing season when it will be planted in the spring, you can either plant it in a medium and keep it outside to overwinter, or you can put it through artificial cold-moist stratification for 50-85 days to break dormancy (Eckberg, 2017).
Growing Area Preparation / Annual Practices for Perennial Crops	The growing medium should mimic natural conditions, containing sand and clay as well as ordinary gardening soil. It can grow in a wide pH range, so no special considerations are needed for acidity (Plants for a Future, 2018). Pots should be about 20 cm deep and 17 cm in diameter to accommodate for the establishment of a deep tap root. Large pots will also give customers a sense of the size of the ultimate thistle, for in the second year its stem can grow to be as tall as a person.
Establishment Phase Details	After dormancy is broken, the plant will germinate and start to grow a small rosette, or cluster of leaves close to the ground. This will begin growing only if there is sun or light exposure and germinates best at 20 degrees C. <i>C. edule</i> Nutt. also starts to establish a deep taproot in this phase, fortified with carbohydrates to withstand overwinter and to prepare for the fast growth phase afterward. Seeds can be sown either in the early spring and/or in the fall (Plants for a Future, 2018).
Length of Establishment Phase	2-8 weeks (Plants for a Future, 2018)
Active Growth Phase	<i>C. edule</i> Nutt. grows as a rosette for about 6-9 months, after which it rapidly grows a tall stem in the span of 2 months (Iowa State University, 2018). Our plants should be outplanted before the rapid growth stage in the fall or early winter to allow the taproot to establish in situ.
Length of Active Growth Phase	9-11 months
Hardening Phase	The plant will reach this stage of development at the end of its lifecycle, growing a thick stalk that supports a tall plant and flowers (Iowa State University, 2018). It will die in the subsequent late summer or early fall. It is important for growers to know that these plants will self-seed, releasing seeds around itself that will remain dormant but viable until the next season. Though the plant has a short lifespan and a short flowering period, it will continue to replenish itself with new seedlings. Alternating planting seasons for <i>C. edule</i> Nutt. could make it so some individuals flower every season.
Length of Hardening Phase	1-2 months
Harvesting, Storage and Shipping	Seedlings are hardy and should be harvested and shipped to outplanting sites before they overgrow their pots. The main condition is to not stress out the plant too much with a lack of water or light.
Length of Storage	1 month; anytime between when seedling reaches the appropriate size and before the early winter
Guidelines for Outplanting / Performance on Typical Sites	Once established, there is a high survival rate. To ensure this, allow <i>C. edule</i> Nutt. enough time to establish its taproot into the outplanting substrate before it must overwinter. Emerging from spring, the rosette will begin to expand outward, and then in a span of 2 months a tall stalk will grow and flower (Iowa State University, 2018). Allow enough room for a deep tap root system

	and a large plant, for it is deceptively small in most of its growth phases. If desired, plant in a site where continued recolonization year after year can occur, for once outplanted it is a self-sustaining population.
Other Comments	NA
Protocol Author	Madison Bristol
Date Protocol Created or Updated	05/15/18

References

- Burke Museum. (2018). *Cirsium edule*. Retrieved from Vascular Plants: <http://biology.burke.washington.edu/herbarium/imagecollection.php?Genus=Cirsium&Species=edule>
- Eckberg, J. (2017). *Native Thistles: A Conservation Practitioner's Guide*. Retrieved from Xerces Society of Invertebrate Conservation: https://xerces.org/wp-content/uploads/2016/10/2016-029_Native-Thistle-Conservation-Guidelines_FINAL_web.pdf
- Flora of North America. (2018). *Cirsium edule*. Retrieved from Flora of North America: http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=250066369
- Iowa State University. (2018). *Biennial thistles of Iowa*. Retrieved from Integrated Crop Management: <https://crops.extension.iastate.edu/biennial-thistles-iowa>
- Lym, R. (2013). *Perennial and Biennial Thistle Control - W799*. (N. D. University, Producer) Retrieved from Publications: <https://www.ag.ndsu.edu/publications/crops/perennial-and-biennial-thistle-control-w799>
- Matthews, D. (2017). *Natural History of the Pacific Northwest Mountains*. Portland: Timber Press Field Guide.
- Plants for a Future. (2018). *Cirsium edule- Nutt*. Retrieved from Plants for a Future: <https://www.pfaf.org/User/Plant.aspx?LatinName=Cirsium+edule>
- USDA. (2018). *Cirsium edule Nutt.* . Retrieved from Plants Database: <https://plants.usda.gov/core/profile?symbol=CIED>
- Washington Native Plant Society. (2013). *Cirsium edule*. Retrieved from Washington Native Plant Society: http://www.wnps.org/plants/cirsium_edule.html

Other Sources Consulted

- Kirmizi, S. et al. (2011). *Germination responses to GA 3 and short-time chilling of three endemic species: Tripleurospermum pichleri, Cirsium leucopsis and Senecio olympicus (Asteraceae)*. Retrieved from Plant Species Biology 26(1): 51-57.
- Strobach, J. et. al. (2008). *Biomass production of Cirsium arvense (L.) Scop. After generative and vegetative propagation in pot experiments*. Retrieved from Journal of Plant Diseases and Protection: 285-289.
- Wyse, Donald L. (1987). *Canada Thistle (Cirsium arvense) Propagation from Stem Sections*. Retrieved from Weed Science 35(5): 637-639.