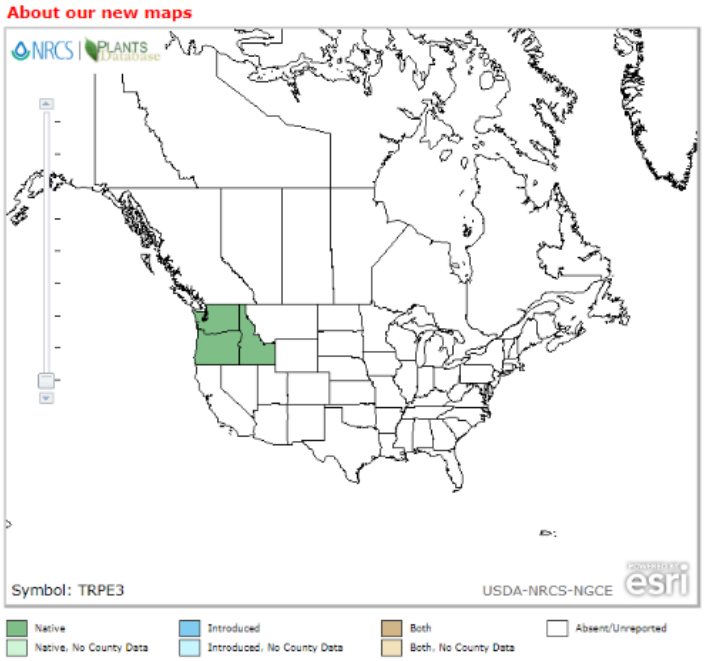
Plant Propagation Protocol for Trillium petiolatum

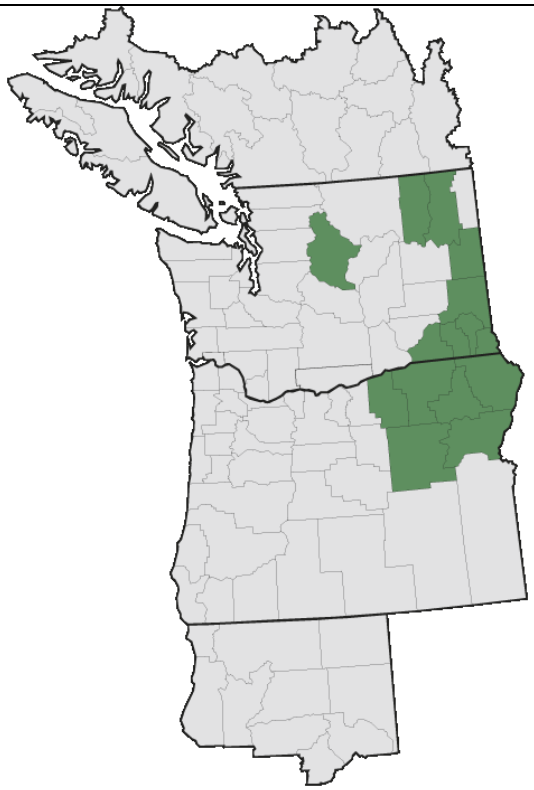
ESRM 412 – Native Plant Production

Plant Database. (n.d.). Retrieved May 29, 2019, from https://www.wildflower.org/plants/result.php?id_plant=TRPE3

Flora of Eastern Washington and Adjacent Idaho. (n.d.). Retrieved May 29, 2019, from http://web.ewu.edu/ewflora/Melanthiaceae/Trillium petiolatum.html

TAXONOMY	
Plant Family	Liliaceae
Scientific Name	*Trillium petiolatum* [3]

Common Name	Idaho trillium[3,5]
Species Scientific Name	
Scientific Name	*Trillium petiolatum*. Pursh,[3]
Varieties	N/A
Sub-species	N/A
Cultivar	N/A
Common Synonym(s)	
Common Name(s)	Idaho Trillium, Idaho Wake-robin, Roundleaf Trillium, Roundleaf Wake-robin[5]
Species Code (as per USDA Plants database)	
GENERAL INFORMATION	
Geographical range	 *Trillium petiolatum Pursh, Idaho trillium. (n.d.). Retrieved May 29, 2019, from https://www.plants.usda.gov/core/profile?symbol=TRPE3*

	 Close up of Oregon and Washington *Trillium petiolatum | roundleaf trillium | Wildflowers of the Pacific Northwest. (n.d.). Retrieved May 29, 2019, from https://www.pnwflowers.com/flower/trillium-petiolatum*
Ecological distribution	Oregon, Washington, Idaho[3,5]
Climate and elevation range	Eastern forests, stream edges.[9] Elevation 400-1400ft[5]
Local habitat and abundance	*Trillium petiolatum* grows on riverbanks, stream edges, river flats, inundated and rocky soils. Tends to grow in forest openings.[9,10] Conservation status not of concern
Plant strategy type / successional stage	Ground cover, late succession [10]
Plant characteristics	Forb, unusual trillium with round leaves, leaves taller than the flower which is also an unusual trait. Flowers in spring in moist well-draining areas. Dark purple flower.[5,10]
PROPAGATION DETAILS	
Ecotype	Slightly above stream flats, on a lower rocky hillside. On the edge of a forest in wet areas that are seasonally inundated[10]
Propagation Goal	Plant with sustainable rhizome and a seasonal flower.[2]
Propagation Method	Seeds, Rhizome divisions,[2,7]
Product Type	Container- Seeds[6,7]
Stock Type	Plug[7]
Time to Grow	3-7 Years to flower[2,7]
Target Specifications	

Propagule Collection Instructions	Typically, mature plants will bloom in spring (April-May)[5] Seed collection should start before the capsule dehisces. Its best to collect when you see that a come seeds have fallen and the capsule is at maturity, they will be brown.[7] It is possible to collect before maturity, it doesn't seem to have much of an effect on the germination rate.[2] When the capsule first opens you'll observe a "glutenous mass of seeds with oily appendages", they will need to be cleaned.[1] The time window at peak capsule maturity will last about two weeks.[7] Monitor plants closely, as their typically propagators are ants.[1,2] They will sow a capsule in 1 day on average.[2] Note: Seed viability is dependent on precipitation amounts during the period when the seed is forming until the time of collections[7]
Propagule Processing/Propagule Characteristics	There are between 10-200 seeds per capsule.[7] Seeds need to be processed immediately and will not survive long outside of wet soil. They are hydrophilic meaning they are water loving.[7] Seeds should not dry out or be stored in a refrigerator for more than two weeks.[7] Typically, seeds are 2 to 4mm long with a sticky appendage.[1,7]
Pre-Planting Propagule Treatments	After harvest, Capsules are best stored in a refrigerator in a clean container such as a plastic bag.[2,7] The most effective way to clean the seeds is to remove the fleshy capsule by hand. While it feels inefficient it tends to warrant the best results.[2] Avoid mechanical methods of cleaning as they will damage the seed coat.[7] Alternatively, you can allow capsules to decay within the bag or container inside the refrigerator. Once the capsules have decayed place them in a fine mesh strainer and wash them.[7] Check that they are thoroughly cleaned of the decayed capsule and pat dry for sowing. Sow seeds as quickly as possible after cleaning. Store in refrigerator until able to sow. Seeds will mold in the refrigerator.[7] Wash them after mold develops and use vermiculate when storing to discourage mold.
Growing Area Preparation / Annual Practices for Perennial Crops	**Planting Medium**: approx. "40% composted pine bark, 25% coir, 15% sphagnum peat moss, 10% bark ash, 10% perlite"[7] The goal of this being an acidic and well-draining while being retaining moisture. Another option is: "30% to 40% medium grade vermiculite, 35% to 55% sphagnum peat moss, 10% to 20% bark ash, and 1% to 15% pine bark;"[2] **Container**: Flats[1,2,7]

	Fertilizer: Use a granular fertilizer in early spring, before active growth. A weak water soluble, all-purpose fertilizer such as 20N:10P2O5:20K2O at 200 ppm N. [2] Note: Most Trilliums have a double dormancy.[5] This means that there needs to be a winter before the seed will germinate and a second winter before the cotyledon will emerge.[2,5]
Establishment Phase Details	Seeds should be planted at a depth twice the diameter of the seeds, with a tendency to go deeper to avoid the radical pushing the seed to the surface.[7] Sow seeds close together to save space and get maximum yield.[2,7] Once planted, place outside in partial shade. An open cloche or irrigated tables are reasonable options. While greenhouses that are well regulated can be effective for faster germination over time, they tend to get to hot which can cause an early dormancy. Outdoor sowing is a more reliable method for *Trillium petiolatum* [2,7] Plant stock will require regular watering for the entirety of the growing season. They will not germinate until after one cold season.[7] After a cold season (winter) a root will emerge and after a rhizome will begin to form.[2,5,7] In most instances, there will not be a cotyledon until after the second winter or a true leaf until after the third.[2] **Transplanting:** Timing is very important when it comes to transplanting. The best survival rates are achieved if transplanting happens on third year seedlings as soon as the leaf is fully expanded.[2] Transplant to a 4in x 4in x 4in container in the same medium used for seeding. Plant the rhizome at a depth of .6 cm-1.2cm depending on the size of the rhizome. As the plant matures the roots will pull the rhizome deeper.[2] Note: keep flats growing for a year or two after expected germination as they will likely germinate the next year. Note: Protect young seeds from insects, Rodents and weed seeds. An open cloche with shade cloth and wire netting could help protect the long investment of propagating trilliums. [2]
Length of Establishment Phase	2-3 Years
Active Growth Phase	By the third year the active growing phase begins, the first true leaf has arrived, and the trillium has been transplanted into its own pot. In most instances by the fourth year a whorl of leaves will emerge.[7] During Active growth phases use fertilizer twice a year. Once before active growth and once after the flower has stopped or the

	plant is beginning to recede .[2] The key to producing flowering trillium is to allow the rhizome to store enough excess energy to flower, this is only possible with a well-maintained nursery stock.[2,7] .
Length of Active Growth Phase	1-2 years
Hardening Phase	Plants do not need to be hardened off as they have never been in the greenhouse. Once plants are flowering, they can be sold to prospective buyers as it is insurance that they are healthy and thriving plants with enough energy to avoid transplant shock.
Length of Hardening	N/A
Harvesting, Storage and Shipping	
Length of Storage	2Years[1]
Guidelines for Outplanting / Performance on Typical Sites	Plant should be 4-10in and flowering[8]
Other Comments	*Trillium petiolatum* are susceptible to over-collecting. Care to vary collection locations and be mindful of slow germination rate in the wild. Limit collection to 5% of stock and if possible collect form nursery stock. [2]
INFORMATION SOURCES	
References	1. Barbara. (n.d.). Growing Native Jewels: Trillium Propagation. Retrieved May 29, 2019, from http://henceforth.barbarareisinger.com/post/1999/01/01/Growing-Native-Jewels-Trillium-Propagation.aspx 2. Collina, W. (2002). Propagation of North American Trilliums. Native Plant Journal, 3(1), 14-17. 3..Plant Database. (n.d.). Retrieved May 29, 2019, from https://www.wildflower.org/plants/result.php?id_plant=TRPE3 4.Flora of Eastern Washington and Adjacent Idaho. (n.d.). Retrieved May 29, 2019, from http://web.ewu.edu/ewflora/Melanthiaceae/Trillium petiolatum.html 4. Plant Database. (n.d.). Retrieved May 29, 2019, from https://www.wildflower.org/plants/result.php?id_plant=TRPE3

	5. SECOND SUPPLEMENT TO SEED GERMINATION THEORY AND PRACTICE. (1998). National Arboretum, 48-223. Retrieved May 29, 2019. 6. Solt, S. (n.d.). PROPAGATION PROTOCOL Trillium L.(Liliaceae). Native Plant Journal, 3(1), 18-20. 7. Trillium petiolatum Pursh, Idaho trillium. (n.d.). Retrieved May 29, 2019, from https://www.plants.usda.gov/core/profile?symbol=TRPE3 8. Trillium petiolatum | roundleaf trillium | Wildflowers of the Pacific Northwest. (n.d.). Retrieved May 29, 2019, from https://www.pnwflowers.com/flower/trillium-petiolatum 9.Trillium petiolatum Pursh. (n.d.). Retrieved May 29, 2019, from http://swbiodiversity.org/seinet/taxa/index.php?taxon=104193
Other Sources Consulted	
Protocol Author	Jessica Chandler
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