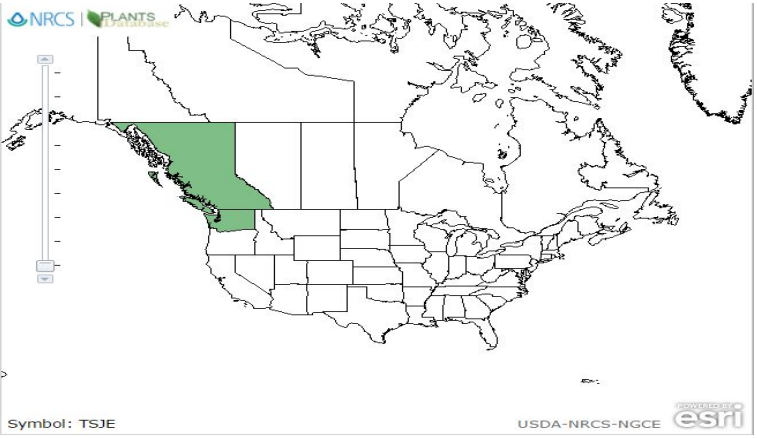


Plant Propagation Protocol for Tsuga X Jefferyi

ESRM 412

Yang Zhou

TAXONOMY	
Plant Family	Tsuga X jeffreyi belongs from kingdom Plantae and it has a Genus of Conifer. It is from a Gymnosperm family and specifically belongs from Pinaceae family.
Scientific Name	Scientific Name of the plant is Tsuga X jeffreyi. (Creek, 2000).
Common Name	Pinaceae.
Species Scientific Name	Species scientific name of the assigned plant is Tsuga X jeffreyi (Henry) Henry [heterophylla X mertensiana] – hybrid hemlock.
Scientific Name	Tsuga X jeffreyi (Taxonomic Hierarchy, 2017).
Varieties	There are not any significant varieties of Tsuga X jeffreyi.
Sub-species	USDA plants database does not depict any database for related sub-species.
Cultivar	
Common Synonym(s)	Common synonym is Jefferyie Hemlock or Tsuga.
Common Name(s)	Jefferyie Hemlock
Species Code (as per USDA Plants database)	USDA code of the plant is TSJE.

GENERAL INFORMATION	
Geographical range	<p>Its geographical origin is North America and jurisdiction origin is Continental US, Native.</p> 
Ecological distribution	<p>This plant has been originated in Native Continental America specifically in Whatcom county, Washington. Apart from this, Tsuga X Jefferyie is also abundantly found in Canadian province of British Columbia (Tsuga ×jeffreyi (Henry) Henry [heterophylla × mertensiana]- General Map).</p>
Climate and elevation range	<p>The temperature of Southern coast of British Columbia is mild summer and daytime temperature is usually 20C.</p>
Local habitat and abundance	<p>Common plants in British Columbia are Heracelum Maximum, Bog Cranberry, Corylus Cornuta, allium Cernum Roth, and Malus fusca. Whereas, in Whatcom county common trees are Veronica Americana, Veronica officinalis, Tsuga Hetrophylla, Salix Lasiandra, and Linnaea Borealis.</p>

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Plant strategy type / successional stage	This is a perennial plant that means it is found throughout the year. And it is able to tolerate almost every kind of climate ranging from hot summers to cold winters (Shibu, Jokela, & Miller, 2007).
Plant characteristics	These are tall plants. Their leaves are needle shaped and almost 1cm long. The stem of Tsuga X Jefferyie is woody. Its flower does not have Corolla and Calyx and male and female plants are present on the same plant. Male plant is formed by bracts whereas the female is formed by fertile and infertile scales (Shibu, Jokela, & Miller, 2007).
PROPAGATION DETAILS	
Ecotype	The seed for experimentation was brought from the forests of Whatcom county of Washington where this plant is abundantly available.
Propagation Goal	Plants
Propagation Method	For Tsuga X Jefferyie sowing of seed in winters is best option. As they cannot germinate unless long cold hours are available to them. So seeding has been opted as a propagation method.
Product Type	Best product types for Tsuga X Jefferyie plant are Propagule (seeds) and container (plug).
Stock Type	Stock type varies but from 1 to 3 gallon containers.
Time to Grow	Seed germination takes 30 to 35 days.
Target Specifications	Pot must be placed in a shaded area so that sunrays could be

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	avoided. And roots of the plant should be totally immersed in soil.
Propagule Collection Instructions	First of all, close cones should be collected to make sure that seeds have not dispersed.
Propagule Processing/Propagule Characteristics	Seeds after extraction from the cone usually have a lifetime of 4-5 years (Shibu, Jokela, & Miller, 2007).
Pre-Planting Propagule Treatments	To provide proper germination condition seed are rinsed and then mixed with peat or sand. It is indispensable to place the seed in refrigerator for three to seven weeks after storing them in a clear plastic bag (Shibu, Jokela, & Miller, 2007).
Growing Area Preparation / Annual Practices for Perennial Crops	Peat and sand are used as the best growing media and the container should be placed in greenhouse. Intensive care is needed at this stage because seeds need light for growth on one hand. While on the other hand excessive care is needed to protect it from harmful sunrays (Service, 2000).
Establishment Phase Details	It took almost 20 to 25 days for germination from seeding.
Length of Establishment Phase	Establishment phase is almost 25 days long.
Active Growth Phase	Soil should be timely watered. So that seeds do not deprive of moisture level. And moreover nutrient content must be properly monitored.

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Length of Active Growth Phase	Length of active growth phase is 4 to 6 months.
Hardening Phase	No data available
Length of Hardening Phase	No data available
Harvesting, Storage and Shipping	It is an evergreen plant so it can be harvested anytime in the year. And must be stored in shaded area.
Length of Storage	Length of storage can be as low as 2 months and can be as high as 6 months.
Guidelines for Outplanting / Performance on Typical Sites	It is desirable to plant it in winters. And roots must be immersed in soil so that xylem and phloem tissue could absorb water as well as organic and inorganic nutrients from the soil.
Other Comments	
INFORMATION SOURCES	
References	<p>Creek, A. (2000). <i>Whatcom County Species Scientific and Common Names</i>. Washington.</p> <p>Service, N. R. (2000). <i>National Forestry Manual</i>.</p> <p>Shibu, J., Jokela, E. J., & Miller, D. L. (2007). <i>The Longleaf Pine Ecosystem: Ecology, Silviculture, and Restoration. Taxonomic Hierarchy</i>. (2017, May 23). Retrieved from ITIS Report: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_to pic=TSN&search_value=505616#null</p> <p><i>Tsuga ×jeffreyi</i> (Henry) Henry [<i>heterophylla</i> × <i>mertensiana</i>]- <i>General Map</i>. (n.d.). Retrieved from Plants Database National Resource Conservation Service: https://plants.usda.gov/core/profile?symbol=TSJE</p>

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Other Sources Consulted	
Protocol Author	Yang Zhou
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