

Plant Propagation Protocol for *Typha latifolia*

ESRM 412 – Native Plant Production

Protocol URL: <http://courses.washington.edu/esrm412/protocols/TYLA.pdf>

Mature Inflorescence



Source: ¹USDA PLANTS Database

Rhizome



Source: ²USFS

TAXONOMY

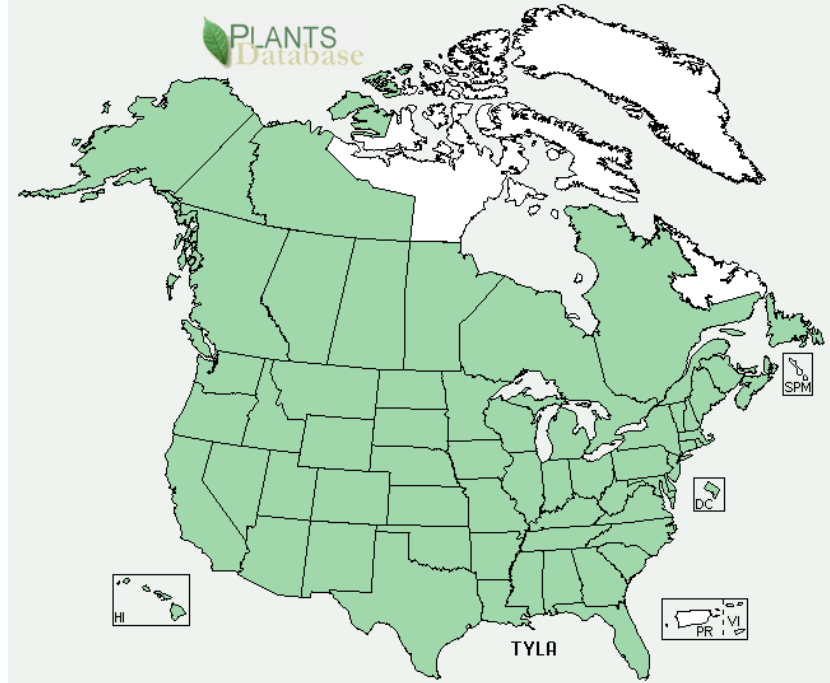
Plant Family	
Scientific Name:	Typhaceae
Common Name:	Cattail Family
Species Scientific Name	
Scientific Name	<i>Typha latifolia</i> Linnaeus (L.)
Varieties	
Sub-species	
Cultivar	
Common Synonym(s)	<i>Massula latifolia</i> (L.) Dulac ^{3,4} <i>Typha ambigua</i> Schur ex Rohrb. ³ <i>Typha crassa</i> Raf. ³ <i>Typha elongata</i> Dudley ³ <i>Typha engelmannii</i> A.Br. ex Rohrb. ³ <i>Typha intermedia</i> Schur ³ <i>Typha major</i> Curtis ³ <i>Typha palustris</i> Bubani ³ <i>Typha pendula</i> Fisch. ex Sond. ³ <i>Typha remotiuscula</i> Schur ³ <i>Typha spathulifolia</i> Kronf. ³
Common Name(s):	cattail, broadleaf cattail, common cattail, soft-flag, Cooper's reed, reedmace, cumbungi (Australia) ^{2,5}
Species Code:	TYLA

GENERAL INFORMATION

Geographical range

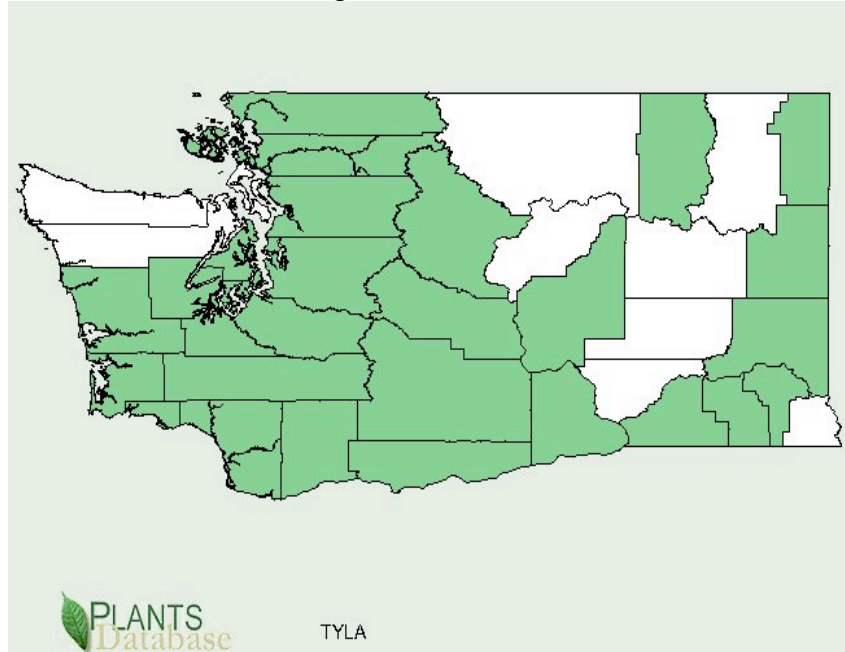
N. America (See distribution maps below), Mexico, Europe, Asia, Africa, India, Australia, and New Zealand²

North American Distribution



Source: ¹USDA PLANTS Database

Washington State Distribution



Source: ¹USDA PLANTS Database

Ecological distribution

Freshwater to slightly brackish wetlands or moist areas with

	open, sunlight-canopies, including; ponds, marshes, lakes, moist ditches, and disturbed wetland areas. ²
Climate and elevation range	<p>Climate has a wide range. Populations are found in temperate, tropical, humid coastal, and dry continental climates. Northern and Southern climates described below represent the wide variation of climates experienced by the species in N America.²</p> <p>Northern climates consist of long, cold, dark winters and cool summers with a long photoperiod. Daily temperatures can range about 20 °F. On average only 120 days are frost-free.²</p> <p>Southern or dry climates have low relative humidity and precipitation, and evaporation is high. There are wide fluctuations in temperature, with only about 6 days of freezing temperatures annually.²</p> <p>Elevation ranges from sea level to 2,300 m (7,500 ft) throughout N. America, but are found in more narrow ranges depending on the state or region.²</p>
Local habitat and abundance;	Found in abundance in permanent and disturbed wetlands throughout N. America and are commonly associated with species such as sedges, hardstem bulrush, common reed, tall wheatgrass, inland saltgrass and alkali cordgrass. ⁴
Plant strategy type / successional stage	<p>Appears early in primary succession and is considered an early- and late-seral species.²</p> <p>Can be weedy because of the dense, monocultural, rhizomatous mats they form.^{2,4}</p> <p>Slight tolerance of salt,^{6,7} but tolerates a wide range of pH levels; has been found growing in 5.7-9.2pH levels and germination is unaffected at 4-12pH.²</p> <p>Tolerant of fluctuating water levels with flood cycles of various ecosystems. This is an important aspect to consider when planting or restoring an area.⁸</p>
Plant characteristics	<p>Semi-aquatic to aquatic emergent perennial graminoid species with a geophyte and helophyte life form.^{2,4}</p> <p>Plants are erect and form dense rhizomatous mats, which can sometimes be floating. Rhizomes are stout and extensive.^{2,4}</p> <p>After bloom, male flowers disperse leaving the tip of the inflorescence naked. Once female flowers below are fertilized they turn brown as the seed matures, forming the characteristic brown, sausage-like spike inflorescence.⁴ (See picture above)</p>

PROPAGATION DETAILS (Seeds)	
Propagation Goal:	Plants
Propagation Method:	Seed
Product Type:	Container (plug)
Stock Type	
Time to Grow:	Anywhere from 100-120days ⁸ to one year.
Target Specifications	Any size can be planted but larger seedlings have better survival rates. Plants should appear to have healthy vegetation and rhizomes before outplanting. ⁸
Propagule Collection	Collect seeds from sites where there are continuous stands but with few intermixed species. Seeds can be harvested once mature in May-July ⁹ , or even while slightly immature. Collection is done by cutting off the seed heads or stripping the seed heads off the stalk and bagging them in paper or burlap bags. ⁸
Propagule Processing/Propagule Characteristics	Seeds are minute with bristly hairs to aid in wind dispersal. When the seeds come in contact with water the pericarp (outer fruit casing) splits open to release the seed, which then sinks. ⁴ Recommended seed density ⁸ remains unknown at this time. Seed longevity ² is largely unknown, but it's been found that some seeds germinated after being stored for 5 years. ¹¹
Pre-Planting Propagule Treatments	Seeds need to be cleaned by separating them from the chaff of the seed head. No dormancy treatments are required. ²
Growing Area Preparation / Annual Practices for Perennial Crops	Greenhouse temperatures should be between 80-95°F ¹⁰ and seeds sown in moist soil in 1" x 1" x 2" pots. ⁸ Soils can vary ^{2,8,11} ; would be best to grow seeds in a similar soil type as the targeted area.
Establishment Phase Details	Seeds should be planted ¼ inch below the soil surface with the soil kept moist but not flooded. ⁸ Light is also required for successful germination. After seeds have imbibed water for 6-24 hours, seeds should be exposed to at least 10 hours of light per day for maximum germination. ¹⁰
Length of Establishment Phase:	It takes a couple weeks from seeding until germination. ⁸
Active Growth Phase Details	Seedlings produce 2-4 small leaves then 2-6 floating leaves before producing any erect leaves. ² Rhizome growth begins once the plant reaches 35-45cm tall. ^{2,11} Plants should simply be cared for until desired size. To do so maintain high soil moisture, high temperatures, and a moderate length photoperiod. ¹⁰
Length of Active Growth Phase:	Variable – Germinates produced in August become ready plugs by the following November, but these are very small plants, higher success rates have been found if plants are allowed to grow larger before outplanting. ⁸ Can be planted at any point in growth, and the activity and conditions of the targeted planting areas should be considered when deciding the duration of growth before outplanting.
Hardening Phase Details:	Plants can be planted shortly after establishment and don't

	require hardening, but it is recommended that plants be allowed to reach a moderate size. ⁸ This may mean letting the plants grow for a year until seasonal conditions are once again favorable for outplanting.
Length of Hardening Phase:	1-12 months
Harvesting, Storage and Shipping (of seedlings):	Plants should be kept moist and stored in a cool location for storage and transporting.
Length of Storage:	Should be as short as possible
Guidelines for Outplanting / Performance on Typical Sites:	<p>Outplanting should be into moist soil just after the first rains of fall (usually late October to November) to establish root systems and prolific clonal growth before dormancy in winter.^{8,11} Plants should be planted approximately 1 meter apart, but closer together if the site has fine soils, steep slopes, or prolonged inundation.⁸</p> <p>As long as soils are not inundated with water, creating anaerobic conditions, than survival rates are high; the larger the plants the higher the survival rate as well.² Highest survival rates are when plants are dormant and soils are moist.⁸ Plants may likely reach flowering size in the first season.¹¹</p>
PROPAGATION DETAILS (Rhizomes)	
Propagation Goal:	Plants
Propagation Method:	Vegetative - rhizomes
Product Type:	Container (plug) or direct on-site planting of propagule
Stock Type	
Time to Grow:	Couple weeks if directly planted, up to one year in a container.
Target Specifications	Rhizomes can be planted directly onto the target site. If grown first, any size plant can be planted, but larger ones have better survival rates. Plants should appear to have healthy vegetation and rhizomes before outplanting. ⁸
Propagule Collection	Collection should be in done in dense stands and no more than ¼ of the plants should be collected. When digging up rhizomes, make sure that there is a growing/live bud on it, and dig 15 cm (6 inches) deep to get the whole rhizome. These should be planted in moist soil as soon as possible.
Propagule Processing/Propagule Characteristics	<p>Tough, stout, and extensive white rhizome just below the surface to 15-20cm deep.² Rhizomes should remain moist or in water before being planted.¹¹</p> <p>Potentially viable for 17-22 months.¹¹</p>
Pre-Planting Propagule Treatments:	No treatments needed; just ensure there is a bud on the rhizome.
Growing Area Preparation / Annual Practices for Perennial Crops	Rhizomes should be planted in very moist soil in pots no smaller than 2.4" x 2.4". ⁸ Soils can vary ^{2,8,11} ; it would be best to grow seeds in a similar soil type as the targeted area.
Establishment Phase	Shallowly plant rhizomes in very moist soil ⁸ to allow some light

	penetration into the soil to help stimulate growth. Keep the soil moist but not flooded.
Length of Establishment Phase:	Couple weeks; varies depending on the habitat and local conditions of the stock population.
Active Growth Phase	Seedlings produce 2-4 small leaves then 2-6 floating leaves before producing any erect leaves. ² Rhizome growth begins once the plant reaches 35-45cm tall. ^{2,11} Plants should simply be cared for until desired size. To do so maintain high soil moisture, and warm temperatures. ¹⁰
Length of Active Growth Phase:	Variable – Can be planted at any point in growth, and the activity and conditions of the targeted planting areas should be considered when deciding the duration of growth before outplanting.
Hardening Phase:	Plants can be planted shortly after establishment and don't require hardening, but it is recommended that plants be allowed to reach a moderate size. ⁸ This may mean letting the plants grow for a year until seasonal conditions are once again favorable for outplanting.
Length of Hardening Phase:	1-12 months
Harvesting, Storage and Shipping (of seedlings):	Plants should be kept moist and stored in a cool location for storage and transporting.
Length of Storage:	Short as possible
Guidelines for Outplanting / Performance on Typical Sites:	<p>If plants are large prior to outplanting, clip the leaves and stems down to 15-25 cm (6-10 inches) to allow more allocation of resources to root growth; otherwise they can be planted as is. Outplanting should be into moist soil just after the first rains of fall (usually late October to November) to establish root systems and prolific clonal growth before dormancy in winter.^{8,11} Plants should be planted approximately 1 meter apart, but closer together if the site has fine soils, steep slopes, or prolonged inundation.⁸</p> <p>As long as soils are not inundated with water, creating anaerobic conditions, than survival rates are high; the larger the plants the higher the survival rate as well.² Highest survival rates are when plants are dormant and soils are moist.⁸</p>

INFORMATION SOURCES

References:	<ol style="list-style-type: none"> 1. USDA, NRCS. 2014. The PLANTS Database (http://plants.usda.gov, 14 April 2014). National Plant Data Team, Greensboro, NC 27401-4901 USA 2. Gucker, Corey L. 2008. <i>Typha latifolia</i>. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2014, April 14]
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	<p>3. The Plant List. 2013. Version 1.1. Published on the Internet; http://www.theplantlist.org/ [Accessed April 14, 2014].</p> <p>4. Pratt, M.S. Utah State University Extension. 2014. Range Plants of Utah. Available: http://extension.usu.edu/rangeplants/htm [Accessed April 14, 2014]</p> <p>5. IUCN/SSC Invasive Species Specialist Group (ISSG) with support from the Terrestrial and Freshwater Biodiversity Information System (TFBIS) Programme. 2006. Available: http://www.issg.org/database/species/ecology.asp?fr=1&si=895 [Accessed April 21, 2014]</p> <p>6. Hootsmans, MJM, Wiegman, F. 1998. Four helophyte species growing under salt stress: their salt of life? <i>Aquatic Botany</i>. 6(2), pp. 81-94</p> <p>7. Konisky, RA, Burdick, DM. 2004. Effects of stressors on invasive and halophytic plants of New England salt marshes: A framework for predicting response to tidal restoration. <i>Wetlands</i>. 24(2), pp. 434-447</p> <p>8. USDA, NRCS. 2014. The PLANTS Database. Plant Guide. (http://plants.usda.gov/plantguide/pdf/cs_tyla.pdf, 21 April 2014). National Plant Data Team, Greensboro, NC 27401-4901 USA</p> <p>9. Ball, D., Freeland, JR., 2013. Synchronous flowering times and asymmetrical hybridization in <i>Typha latifolia</i> and <i>T. angustifolia</i> in northeastern North America. <i>Aquatic Botany</i>. 104, pp. 224-227</p> <p>10. Bonnewell V., Koukkari W. L., Pratt D. C.. 1983. Light, oxygen, and temperature requirements for <i>Typha latifolia</i> seed germination. <i>Canadian Journal of Botany</i>, 61, pp. 1330-1336</p> <p>11. Clements, D. 2010. Invasive Species Compendium. Available: http://www.cabi.org/isc/datasheet/54297 [Accessed April 22, 2014]. Biology and Environmental Studies, Trinity Western University, 7600 Glover Road, Langley, British Columbia, V2Y 1Y1, Canada</p>
Other Sources Consulted:	<p>1. eFloras (2008). Published on the Internet http://www.efloras.org [Accessed 14 April 2014] Missouri Botanical Garden, St. Louis, MO & Harvard University</p>

	Herbaria, Cambridge, MA. 2. Plants For A Future. 2012. Available: http://www.pfaf.org/user/default.aspx [Accessed on 17 April, 2014]
Protocol Author:	Veanna Willard
Date Protocol Updated*:	04/22/14

*See Appendix below for previous protocols of *Typha latifolia*

Appendix

Original *Typha latifolia* protocol from 2003 by Crystal Elliot



Cattail, *Typha latifolia*

Range

- All over the United States and coastal British Columbia (3 and 5)

Climate, elevation

- Moist, mild climate; low to middle elevations (3)

Local occurrence (where, how common)

- Often grows in marshes, lake edges, swamps, wet meadows, forested wetlands, sloughs, and stream banks (1 and 3)
- Highly common

Habitat preferences

- Often found in shallow, standing water (3)
- Can tolerate a variety of soil types, from clays to sands (4)

Plant strategy type/successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)

- Can tolerate inundation up to two feet and fluctuating water levels (2)
- Can often form monocultures, and sometimes push out desirable native sedges and rushes
- Tolerates salinities up to 8000 ppm
- Tolerates a wide range of water pH (4.7-10)

Associated species

- *Carex obnupta*, *Cornus stolonifera*, *Equisetum arvense*, *Rubus spectabilis*, *Lysichitum americanum*, *Nuphar polysepalum* (1 and 4)

May be collected as: (seed, layered, divisions, etc.)

- Seed (1)
- Rhizomes (2)

Collection restrictions or guidelines

- Collect rhizome divisions in winter and spring (4)

Seed germination (needs dormancy breaking?)

- Cold stratification for 2 months (2)

Propagation recommendations (plant seeds, vegetative parts, cuttings, etc.)

- Can sow seeds into flats, but plants remain small for 2 to 3 years (1)

- Rhizomes can be planted immediately on-site (plant rhizome pieces with 3 to 4 nodes into soil 4 to 6 inches deep)
- Rhizomes can also be potted and grown for later division (4)

Soil or medium requirements (inoculum necessary?)

- Can tolerate a wide variety of soil conditions, from clay to sand (2)
- Soil should be saturated (4)

Installation form (form, potential for successful outcomes, cost)

- Divided rhizomes directly installed [best option] (2 and 4)
- Established rhizomes from pots [another good option] (4)
- Established seedlings (1)

Care requirements after installed (water weekly, water once etc.)

- Soil should be kept consistently moist, rhizomes can not dry out; saturate area after planting (4)

Sources cited

1. Guard, B. Jennifer. Wetland Plants of Oregon and Washington. Lone Pine Publishing. Vancouver, B.C. 1995.
2. Leigh, Michael. Grow Your Own Native Landscape. Native Plant Salvage Project, WSU Cooperative Extension-Thurston County. Revised edition, June 1999.

3. Pojar, Jim and Andy MacKinnon. Plants of the Pacific Northwest Coast- Washington, Oregon, British Columbia and Alaska. B.C. Ministry of Forest and Lone Pine Publishing. 1994.

4. Stevens, M. and R. Vanbianchi. 1993. Restoring Wetlands in Washington: A Guidebook for Wetland Restoration, Planning and Implementation. Washington State Department of Ecology Publication 93-17, 110 p.

5. USDA, NRCS. 2002. The PLANTS Database, Version 3.5 (<http://plants.usda.gov>). **National Plant Data Center**, Baton Rouge, LA 70874-4490 USA.

Data compiled by:

Crystal Elliot, 6/3/03