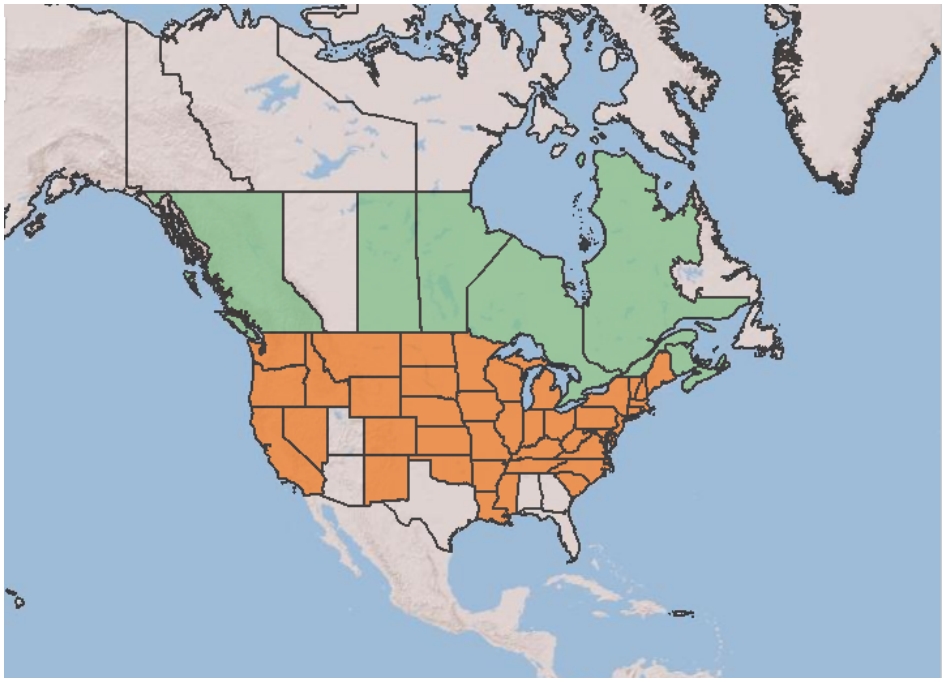
Plant Propagation Protocol for *[Typha angustafolia]*
ESRM 412 – Native Plant Production
URL: https://courses.washington.edu/esrm412/protocols/*2021/TYAN.pdf*

Range:



(Image Source: USDA PLANTS Database, *Typha angustifolia* L.)

TAXONOMY	
Plant Family	
Scientific Name	Typha angustifolia
Common Name	Narrowleaf cattail
Species Scientific Name	
Scientific Name	*Typha angustifolia* L.
Varieties	
Sub-species	
Cultivar	
Common Synonym(s)	TYANC *Typha angustifolia L. var. calumetensis* Peattie TYANE *Typha angustifolia var. elongate* (Dudley) Wiegand
Common Name(s)	Narrowleaf cattail, narrow-leaved cattail, flags, rushes, bulrushes, cat o'nine tails, Cossack asparagus, reed mace, baco
Species Code (as per USDA Plants database)	TYAN

GENERAL INFORMATION	
Geographical range	N. America, S. America, Europe, Eurasia, and Africa. Widespread in Eastern and Northern N. America and Europe.
Ecological distribution	Marshes, wet meadows, fens, estuaries, bogs, ditches, lake shores, brackish environments[5]. Restricted to unstable basic, calcareous, and salty soils[1]
Climate and elevation range	Prefers warm temperate climates with cold average temperatures 32 degrees F (0C) to 64 degrees F (18C). Prefers climates which are wet all year or have a wet season. Tolerates continental climates which are wet all year or have a dry summer. Tolerates cold average temperatures below 32 degrees F (0C)[2]. Elevation ranges from sea level to 2,000 m (7,500 ft) in North America.
Local habitat and abundance	Dominant species in permanent and disturbed wetlands, occur in >99% of wetlands where population is established[6]. Associated with: sedges (Carex spp.), bulrushes (Scirpus spp.), rushes (Juncus spp.), sphagnum mosses (Sphagnum ssp.), lichens (Cladonia spp.), kalmia (Kalmia spp.), foxtail barley (Critestion jubatum), reed canarygrass (Phalaris arundinaceae), oakleaf goosefoot (Chenopodium glaucum), curled dock (Rumex crispus), panicgrass (Panicum spp.), cottonsedge (Eriophorum spissum), buttonbush (Cephalanthus occidentalis), spiraea (Spiraea spp.), blueberries (Vaccinium spp.), viburnum (Viburnum spp.), chufa flatsedge (Cyperus esculentus), and dwarf huckleberry (Gaylussacia dumosa)[5]
Plant strategy type / successional stage	Weedy/colonizer when influxes of nutrients or freshwater enter brackish salt marshes or freshwater wetlands. Easily becomes a monoculture in disturbed wetlands[6]. Tolerant of saline and alkaline environments[5]. Early-mid seral species[5].
Plant characteristics	Rhizomatous perennial forb with long green stalks which have at their top end a brown flowering head with tightly packed, fluffy seeds. This plant is 3-10 ft in height. The inflorescence has staminate flowers separated by 1-8 cm from the pistillate flowers. Basal leaves are 4-12 mm wide, and have long parallel veins. Typically occurs in water up to 50 cm deep[6]. Reproduces readily rhizomatously and by seeding. Germination occurs in August and September[5]. In late summer, flowers dry and blow away, allowing for wind pollination[6].

	 (Image Source: Barnes, T.G., and S.W. Francis, 2004, Wildflowers and ferns of Kentucky)
PROPAGATION DETAILS (SEED)	
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)
Time to Grow	100-120 days
Target Specifications	Larger seedlings have higher rates of outplanting success, but any size may grow readily[6].
Propagule Collection Instructions	Collect seeds with hand clippers, cutting the stem off below the seed heads, or strip seed heads off the stalk. Collect seeds from April through June, when they are slightly immature. Staminates must be harvested before they dry and blow away. Select site where continuous stands with few intermixed species are found. Drought stressed donor plants have been shown to produce seeds with higher rates of germination[6].
Propagule Processing/Propagule Characteristics	Viable *T. angustifolia* seeds have been found in 70-year-old drained wetland seedbanks[5]. Seeds are very small, weighing 0.055 mg each[1] In preferable conditions, seeds will germinate within 2-20 days[6].
Pre-Planting Propagule Treatments	Seeds are non-dormant and require no pre-planting treatment. A seed cleaner can be used to process seeds in order to remove fluff. Store clean and dry seeds in brown paper or burlap bags[6].

Growing Area Preparation / Annual Practices for Perennial Crops	Prepare a 1" x 1" x 2" sized plug container in summer[6]. Water covering substrate is required at a depth of 2.54 cm for germination and may be brackish[5]. A slightly alkaline pH is preferred for *T. angustifolia,* so lime may be added to substrate to gain a pH of 6.5-7[1]. Propagation site for seeds should be exposed and sunny, and water should be clear. This species does not require oxygen for germination[5].
Establishment Phase Details	In greenhouse, keep at a temperature of 100 (+/- 5) degrees F to encourage germination in 2-20 days. Sow seeds May through September, depending on the target size required for outplanting, so long as 100 days separate the date of sowing and date of first frost[6]. Plant seeds ¼ inch below surface of soil[1].
Length of Establishment Phase	2-20 days
Active Growth Phase	Maintain high temperatures, clear water, and high levels of sunlight throughout active growth phase[4].
Length of Active Growth Phase	3.5 to 4 months (100-120 days)
Hardening Phase	Hardening is not required for outplanting, but hardening will increase number of rhizomes and larger plants have been shown to be more successful than smaller plants. In order to produce larger plants, sow seeds earlier in the summer or wait until the next Autumn to outplant[6].
Length of Hardening Phase	1-12 months
Harvesting, Storage and Shipping	Keep cool and moist or with roots submerged in water during transportation[6].
Length of Storage	As short as possible
Guidelines for Outplanting / Performance on Typical Sites	Plant in late October to November or after the first fall rain to allow roots to take hold before the season's first frost. Plugs may be split into smaller units no smaller than 2.4" x 2.4" with healthy rhizomes and tops. Include growing bud on plugs. Plant seedlings 1 m apart or closer in clay, silt or steep slopes, or where there is prolonged inundation. Survival is highest when plants are dormant, and soil is moist[6].
Other Comments	This species easily invades disturbed wetland situations and becomes a monoculture. Obtain permission for seed collection, specific restrictions exist for many states due to this plant's invasive characteristics[7].
PROPAGATION DETAILS (VEGETATIVE)	
Propagation Goal	Plants
Propagation Method	Vegetative
Product Type	Container or direct transplanting
Time to Grow	Variable
Target Specifications	Healthy rhizomes and vegetation are required for successful outplanting[6].

Propagule Collection Instructions	Select site where continuous stands with few intermixed species are found. Collect no more than ¼ of plants in the area. Dig plugs out of soil 15cm deep so rhizomes may grow back during next growing season[6].
Propagule Processing/Propagule Characteristics	Rhizomes should extend 15cm or more beneath the surface of the soil. Include a growing bud on each rhizome[6].
Pre-Planting Propagule Treatments	Live transplants should be planted in moist soil as soon as possible. Roots should always be moist or in water until planted. Clip leaves and stem from 6-10" to reduce stress on plant[3].
Growing Area Preparation / Annual Practices for Perennial Crops	Plugs may be split into smaller units no smaller than 2.4" x 2.4" with healthy rhizomes and tops[6]. May be in basic, calcareous, or salty soil[1].
Establishment Phase	Plant rhizomes in soil with water covering the soil at least 2.54 cm (1 inch) but up to 40 cm(16 inches) deep[5].
Length of Establishment Phase	2 weeks
Active Growth Phase	Maintain high temperatures, clean and/or moving water, and high levels of sunlight throughout active growth phase[6].
Length of Active Growth Phase	Variable as *T. angustifolia* rhizomes may be planted at any point in growth phase.
Hardening Phase	Hardening is not required for outplanting, but hardening will increase number of rhizomes and larger plants have been shown to be more successful than smaller plants[6]. In order to produce larger plants, sow seeds earlier in the summer or wait until the next Autumn to outplant[6].
Length of Hardening Phase	1-12 months
Harvesting, Storage and Shipping	Keep cool and moist during transport. Keep rhizomes in water or moist[6].
Length of Storage	As short as possible[6].
Guidelines for Outplanting / Performance on Typical Sites	Plant in late October to November or after the first fall rain to allow roots to take hold. Plant 1 m apart or closer in clay, silt or steep slopes, or where there is prolonged inundation. Survival is highest when plants are dormant and soil is moist[6].
INFORMATION SOURCES	
References	[1]Apfelbaum, S. and Motivans, K. Typha. Global Invasive Species Team, The Nature Conservancy. https://wiki.bugwood.org/Typha [2]2019. Typha angustifolia (lesser bulrush). Invasive Species Compendium. CABI. https://www.cabi.org/isc/datasheet/54294 [3]Miklovic, Stefanie. 2000. Typha angustifolia Management: Implications for Glacial Marsh Restoration. Restoration and Reclamation Review Vol. 6, No.

	2 https://conservancy.umn.edu/bitstream/handle/11299/59714/6.2.Miklovic.pdf [4]2020. Flora: Typha angustifolia. Singapore National Parks Flora & Fauna Web. https://www.nparks.gov.sg/florafaunaweb/flora/2/5/2536 [5]Snyder, S. A. 1993. Typha angustifolia. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: https://www.fs.fed.us/database/feis/plants/graminoid/typang/all.html [6]2021. USDA PLANTS Database Plant Guide: Typha angustifolia L. https://plants.sc.egov.usda.gov/core/profile?symbol=TYAN [7]2013. Written Findings of the Washington State Noxious Weed Control Board Draft: Non-native Typha spp. WSNWCB. https://www.nwcb.wa.gov/images/weeds/Draft_written_findings_Non-native_typha.pdf
Other Sources Consulted	Bansal, S., Lishawa, S.C., Newman, S. et al. 2019. Typha (Cattail) Invasion in North American Wetlands: Biology, Regional Problems, Impacts, Ecosystem Services, and Management. Wetlands 39, 645–684 https://link.springer.com/article/10.1007/s13157-019-01174-7#Sec2 Duke, James A. 1983. Typha spp. Handbook of Energy Crops. Unpublished. Purdue University Center for New Crops & Plants Products. https://www.hort.purdue.edu/newcrop/duke_energy/Typha.html Narrow-leaved Cattail — Typha angustifolia. Montana Field Guide. Montana Natural Heritage Program. http://fieldguide.mt.gov/speciesDetail.aspx?elcode=pmtyp01020 Narrow-leaved Cattail (Typha angustifolia). North Dakota Department of Agriculture. https://www.nd.gov/ndda/sites/default/files/legacy/resource/NARROWLEAVEDCATTAIL.pdf Smith, Galen. 2000. Typha angustifolia L. Jepson eFlora. Vascular Plants of California. FNANM 22:278—285 https://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=47462
Protocol Author	Hannah Carter
Date Protocol Created or Updated	04/26/21