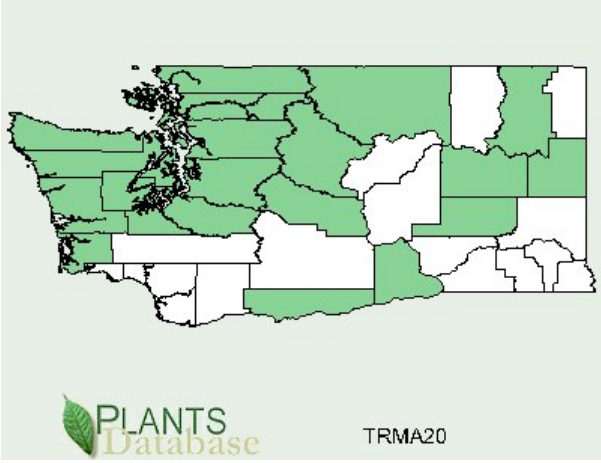
Plant Propagation Protocol for *Triglochin maritima*
ESRM 412 – Native Plant Production

North America Distribution

Washington Distribution



Source: USDA PLANTS Database

TAXONOMY	
Family Names	
Family Scientific Name:	Juncaginaceae
Family Common Name:	Arrow-grass
Scientific Names	
Genus:	*Triglochin*
Species:	*maritima*
Species Authority:	L.
Variety:	
Sub-species:	
Cultivar:	
Authority for Variety/Sub-species:	
Common Synonym(s) (include full scientific names (e.g., *Elymus glaucus* Buckley), including variety or subspecies information)	*Triglochin concinna* Burtt Davy *Triglochin concinna* Burtt Davy var. *debilis* (M.E.Jones) J.T.Howell *Triglochin concinna* var. *concinna* *Triglochin debilis* (M.E.Jones) A.Love & D.Love *Triglochin elata* Nutt. *Triglochin maritimum* L. var. *elata* (Nutt.) A. Gray *Triglochin palustre*
Common Name(s):	seaside arrowgrass
Species Code (as per USDA Plants database):	TRMA20
GENERAL INFORMATION	
Geographical range (distribution	Temperate, subarctic and arctic regions, circumboreal[i].

maps for North America and Washington state)	British Isles, Canada and much of the United States except the south between Virginia and Texas[ii], North Africa coast, South America, and western Asia. In N. America, *T. maritima L.* is found in saline areas along the North Coast, Sierra Nevada, Central Coast, South Coast, San Bernardino Mountains, and the Great Basin Floristic Province. [iii]
Ecological distribution (ecosystems it occurs in, etc):	Tidal marshes and mudflats, brackish meadows, sloughs and gravelly areas[iv]
Climate and elevation range	Low elevations; < 2800 m.[v] Wide climatic tolerances.
Local habitat and abundance; may include commonly associated species	Unavailable
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	Relatively uncompetitive in non-saline environments Resistent to regular human trampling Well-defended against herbivores by cyanogenic glucosides, thus benefiting from selective grazing of competitors.[vi]
Plant characteristics (life form (shrub, grass, forb), longevity, key characteristics, etc)	Glabrous, clonal perennial that forms irregular clumps up to 2 m across and 60 cm high at low to medium height, leaves are basal to the shoots, usually less than 0.3 m tall with flowering stems taller, leaves are fleshy, up to 0.5 m long, with sheaths 5-10 cm long, very fragrant when crushed[vii]. Flowering scapes are 10-90 cm tall, smooth and hollow. Life form is cytologically diverse, consisting of several differentiated races, ranging from diploid to 24-ploid.[viii] Flowers are hermaphrodite and wind pollinated. They are strongly protogynous, shedding pollen only after pollination. All of the flowers in a single inflorescence may be pollinated in a period of 5-8 days. Dispersal of seeds are mainly by flotation in water and tidal currents[ix].
PROPAGATION DETAILS[x]	
Ecotype (this is meant primarily for experimentally derived protocols, and is a description of where the seed that was tested came from):	Presidio, California
Propagation Goal (Options: Plants,	Plants

Cuttings, Seeds, Bulbs, Somatic Embryos, and/or Other Propagules):	
Propagation Method (Options: Seed or Vegetative):	Seed
Product Type (options: Container (plug), Bareroot (field grown), Plug + (container-field grown hybrids, and/or Propagules (seeds, cuttings, poles, etc.))	Container (plug)
Stock Type:	Treeband #5
Time to Grow (from seeding until plants are ready to be outplanted):	Plants cultivated from seed usually begin to flower in the second year, although in a heated glasshouse some will flower in the first year.[xi]
Target Specifications (size or characteristics of target plants to be produced):	Height: N/A Caliper: N/A Root system: Firm plug in container
Propagule Collection (how, when, etc):	Flowering occurs between May and August, and fruiting occurs between July and September. Seeds are collected between July 17 and September 23rd. Mature inflorescences are brown.
Propagule Processing/Propagule Characteristics (including seed density (# per pound), seed longevity, etc):	Rub dry fruits between fingers to extract seeds. Seeds are kept dry and stored at room temperature. Freshly collected seeds enclosed by pericarp show innate dormancy, while those extracted from the fruits germinate readily.
Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):	None required. Salinity-enforced dormancy may be alleviated with proline, hetaine, fusicoccin, kinetin, nitrate, thiourea and ethephon[xii].
Growing Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc):	Under a fully controlled greenhouse, seeds are sown in flats containing Sunshine Mix #4 Aggregate Plus (peat moss, perlite, major and minor nutrients, gypsum and dolomitic lime) by transplanting germinants. Seeds are mixed with media to sow and are covered 4 times the diameter of seed to depth. Flats are watered with an automatic mist and irrigation system, and placed on a heated bench. Percentage of germination is 88%
Establishment Phase (from seeding to germination):	Germinated seedlings are transplanted to individual containers 2”x2”x5” tubes (Treeband #5) containing standard potting mix of peat moss, fir bark, perlite and sand.
Length of Establishment Phase:	Unavailable
Active Growth Phase (from germination until plants are no	After establishment, seedlings are moved to the shadehouse.

longer actively growing):	
Length of Active Growth Phase:	Unavailable
Hardening Phase (from end of active growth phase to end of growing season; primarily related to the development of cold-hardiness and preparation for winter):	Unavailable
Length of Hardening Phase:	Unavailable
Harvesting, Storage and Shipping (of seedlings):	Unavailable
Length of Storage (of seedlings, between nursery and outplanting):	Unavailable
Guidelines for Outplanting / Performance on Typical Sites (eg, percent survival, height or diameter growth, elapsed time before flowering):	Unavailable
Other Comments (including collection restrictions or guidelines, if available):	Unavailable
INFORMATION SOURCES	
References (full citations):	See below
Other Sources Consulted (but that contained no pertinent information) (full citations):	See below
Protocol Author (First and last name):	Sonia Tien
Date Protocol Created or Updated (MM/DD/YY):	5/17/2011

References:

[i] Davy, A.J., G.F. Bishop (1991) "*Triglochin maritima* L." *Journal of Ecology*, Vol. 79, No. 2, British Ecological Society, pp. 531-555, Available online at: http://www.jstor.org/stable/2260731 [Accessed 5/16/2011]

[ii] Knoke, Don. University of Washington Burke Museum "*Triglochin maritima*" Available online http://biology.burke.washington.edu/herbarium/imagecollection.php?Genus=Triglochin&Species=maritima [Accessed 5/16/2011]

[iii] See iii.

[iv] Pojar, J., A. Mckinnon, (1994), Plants of the Pacific Northwest: Washington, Oregon, British Columbia and Alaska, B.C. Ministry of Forests and Lone Publishing, Canada, p. 334

[v] Thorne, Robert F. UC/JEPS: Jepson Manual treatment for *Triglochin maritima* "*Triglochin*" Available at http://ucjeps.berkeley.edu/cgi-bin/get_JM_treatment.pl?Triglochin+maritima [Accessed 5/17/2011]

[vi] See iii.

[vii] Drociak, Jen (2005). "Life in New Hampshire Salt Marshes: A Quick Reference Field Guide", New Hampshire Department of Environmental Services Coastal Program, pp. 33 Available at http://www.google.com/url?sa=t&source=web&cd=1&ved=0CBsQFjAA&url=http%3A%2F%2Fwww.des.state.nh.us%2Forganization%2Fcommissioner%2Fpip%2Fpublications%2Fwd%2Fdocuments%2Fwd-04-19.pdf&rct=j&q=life%20in%20new%20hampshire%20salt%20marshes&ei=GNTSTZvTLJHPiAKiz7zSCg&usg=AFQjCNEF01jbG_Iko65glQSmk2Ohf14_Ew&cad=rja [Accessed 5/17/2011]

[viii] See iii.

[ix] See iii.

[x] Young, Betty (2002). "Propagation protocol for production of container *Triglochin maritimum* L. plants (Treeband #5)"; San Francisco, California. In: Native Plant Network. URL: http://www.nativeplantnetwork.org [5/17/2011]. Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

[xi] See iii.

[xii] Khan, M.A., I.A. Ungar (2001)."Seed germination of *Triglochin maritima* as influenced by salinity and dormancy relieving compounds" *Biologia Plantarum* Vol. 44, No. 2, p.301-303, Available at: www.halophyte.org/pdfs/drkhan_pdfs/27.pdf [Accessed 5/17/2011]

Other Sources Constulted (but that pertained no important information):

Flora of North America "*Triglochin maritima* in Flora of North America" Available online at http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=222000441 [Accessed 5/17/2011]

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