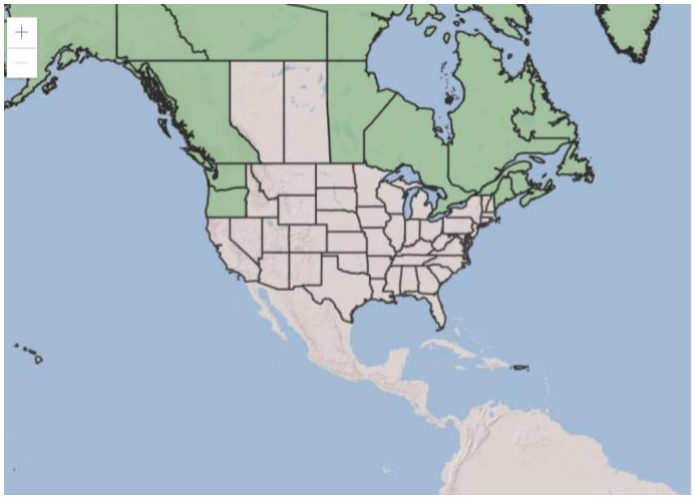
Plant Propagation Protocol for *Stellaria humifusa* Rottb.
ESRM 412 – Native Plant Production
URL: https://courses.washington.edu/esrm412/protocols/*2024*/*STHU.pdf*

TAXONOMY	
Plant Family	
Scientific Name	Caryophyllaceae[1]
Common Name	Pink Family[1]
Species Scientific Name	
Scientific Name	*Stellaria humifusa* Rottb.[1]
Varieties	N/A
Sub-species	N/A
Cultivar	N/A
Common Synonym(s)	*Alsine humifusa* (Rottb.) Britton[1] *Stellaria humifusa* Rottb. var. *oblongifolia* Fenzl[1] *Stellaria humifusa* Rottb. var. *suberecta* B. Boivin[1]
Common Name(s)	Saltmarsh starwort[1] Low sandwort[4]
Species Code	STHU[1]
GENERAL INFORMATION	
Geographical range	Distribution of this plant occurs west of the Cascades along the coast in Washington; Alaska to Oregon and continues east throughout most of Canada reaching to the Atlantic Coast. [2]  (https://plants.usda.gov/home/plantProfile?symbol=STHU)[1]
Ecological distribution	*S. humifusa* has a wide range, but it prefers sites where there is the presence of surface water like flood plains[3]. This plant thrives in imperfectly drained moist areas, seepage slopes; gravel, sand, silt; with a high & low organic content; acidic, or halophytic soil[4]. Seen to be present in riparian, grasslands, wetlands, and sometimes rocky areas.[5]

Climate and elevation range	Prefers northern costal climates and often occurs in wetlands, so this plant has high water needs[4]. However, no information on annual precipitation averages or climate ranges could be found. Except one resource suggested that it can be present in most climate zones[6]. Elevation range has been observed to be about an average of 0-2,000 ft[6].
Local habitat and abundance	Habitat of *S. humifusa* tends to be found along lake shores, sheltered beaches, marshland, salted marshes, tidal flats, grasslands, and occasionally flooded meadows.[4] Tends to associate with sedges and grasses[5].
Plant strategy type / successional stage	This plant can tolerate salinity stress and can germinate in salt marshes. I couldn't find a reference that specifically names the successional stage. However, one source suggests that most salt marsh species have the ability to pioneer and are early successional plants[7].
Plant characteristics	Forb; perennial; glabrous and has a spreading form where stems are freely rooted up to 2.5 dm long. Only fibrous roots are present which leads to a ground level or underground horizontal stem system. Extensive branching occurs which shapes plant habit into a mat. Leaves are opposite, cauline, and somewhat fleshy; lanceolate and pointed to linear or blunt depending; 8-15 mm long. Flowers are axillary on stout pedicels 5-15 mm long; has 5 sepals 3.5-4mm long; 5 petals, white, and slightly longer than the sepals. Fruits are capsule ovoid and are about equal in size to the flowers sepals[2/4]. Blooming generally occurs June to August[2], however, one reference observed later blooming into September[7]. Thus, this may depend on location and continued environmental change.
PROPAGATION DETAILS: FROM SEED (Adapted from species from the Caryophyllaceae family)	
Ecotype	San Francisco, California - Presidio Native Plant Nursery[8]
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)[8]
Stock Type	Treeband (310mL)[8]
Time to Grow	Not specified[8]
Target Specifications	None where targeted since this is based on a general protocol
Propagule Collection Instructions	Collect seeds from 10 targeted sites of interest. Make sure to go during low tides. Seeds may be ready to collect anywhere from June to mid-November[8]. Most species required a 2-week drying period prior to cleaning. Seeds were placed on window screens over large plastic containers to catch died seed and chaff. Once dried, seeds can be cleaned[8].
Propagule Processing/Propagule Characteristics	Once dried, seeds can be cleaned. Seeds can possibly be sieved with a No. 18 sieve or cleaned by hand[8].

	Once seeds are cleaned, they can be placed in paper enveloped and stored at 4°C inside sealed plastic bags. No time maximum for storage is indicated[8]. The reference I used had multiple germination times, but I based this mostly off of Spergularia macrotheca Heynh. (Caryophyllaceae), which had a germination success of 75%[8].
Pre-Planting Propagule Treatments	Seeds that had highest germination rates had no pre-planting treatments conducted[8].
Growing Area Preparation / Annual Practices for Perennial Crops	**Growing Area**: Indoor Nursery Seeds were sown in 39 cm X 44 cm X 5 cm (15.5 X 17.5 X 2 in) flats using Sunshine® Plug Mix #5. This is from SunGro Horticulture, Bellevue, Washington and contains 70% to 80% fine Canadian sphagnum, fine perlite, dolomitic limestone, gypsum, and wetting agent[8].
Establishment Phase Details	Seeds were covered four times their width (about 5 mm) with a light covering of the medium. Sown flats were placed in a greenhouse with a bottom- heated bench system to maintain a target soil temperature of 18˚C (65˚F). Seeds were exposed to six seconds of misting every 20 minutes during daylight hours only[8].
Length of Establishment Phase	Should start to germinate around 15 days[8].
Active Growth Phase	Once true leaves appear after germination, the seedlings can be transplanted into Wheeler-Zamaroni Landscape Materials Soil Mix #4. This is from Santa Rosa, California; contains approximately 30% fir bark, 10% peat, 30% perlite, 30% sand, and 3 kg per m3 (5 lb/yd3) Nutricote® (90 d release at 21˚C /70˚F); 13N:13P2O5:13K2O; Chisso- Asahi Fertilizer Co Ltd, Japan[8]. Containers suggested were 310mL[8]. Transplanted seedlings can be grown on a raised bench in greenhouse until root tips are visible from the exterior of the potting medium when removed from their containers. Irrigation times recommended are three times a week for 15 minutes with an overhead sprinkling system[8].
Length of Active Growth Phase	Up to 4 weeks[8] Determined based on root growth described above in the active growth phase.
Hardening Phase	Move to outdoor shadehouse with about 30% shading. Leave on raised beds until outplanting. Plants should be irrigated 3 times a week for about 20 min with overhead sprinkler system. Watering may need to be adjusted based environmental conditions. However, container should be watered until retension capacity and leaching are apparent at the base of the container pots.[8]
Length of Hardening Phase	This was not specified.

Harvesting, Storage and Shipping	Three months prior to outplanting gradate saltwater into the watering process. Salinity stats at 5 ppt and peaks at 25 ppt and increases 5 ppt ever 2 weeks. However, this salinity is specific to outplanting location and water must be tested at site to know if this step is needed before outplanting[8].
Length of Storage	No length of time was specified for storage, except time needed to accumulate plants to salinity for outplanting[8]. They started outplanting from February to end of March but timing may depend on location[8].
Guidelines for Outplanting / Performance on Typical Sites	Plant during low tides. Hand picks and small bulb planters can be used to dig holes for the plant. Performance observed at outplanting sites was about a 75% survival rate[8].
Other Comments	None
INFORMATION SOURCES	
References	1. USDA Natural Resources Conservation Services. (n.d.-b). *Stellaria humifusa Rottb.* USDA plants database. https://plants.usda.gov/home/plantProfile?symbol=STHU 2. Giblin, D. (n.d.). *Stellaria humifusa*. Burke Herbarium Image Collection. https://burkeherbarium.org/imagecollection/taxon.php?Taxon=Stellaria+humifusa 3. Jefferies, R. L. (1977). The vegetation of salt marshes at some coastal sites in Arctic North America. *The Journal of Ecology*, *65*(2), 661. https://doi.org/10.2307/2259507 4. Aiken, S.G., Dallwitz, M.J., Consaul, L.L., McJannet, C.L., Boles, R.L., Argus, G.W., Gillett, J.M., Scott, P.J., Elven, R., LeBlanc, M.C., Gillespie, L.J., Brysting, A.K., Solstad, H., and Harris, J.G. 2007. Flora of the Canadian Arctic Archipelago: Descriptions, Illustrations, Identification, and Information Retrieval. NRC Research Press, National Research Council of Canada, Ottawa. https://nature.ca/aaflora/data/www/casthu.htm (accessed on 5/21/24.) 5. Porsild, A.E. and Cody, W.J. (1980) Vascular Plants of Continental Northwest Territories, Canada. National Museum of National Sciences, Ottawa. http://dx.doi.org/10.5962/bhl.title.70336 6. Sullivan, S. K. (n.d.). Saltmarsh starwort. Wildflower Identification Website. https://wildflowersearch.org/search?name=Stellaria%2Bhumifusa 7. EcoShape. (2020, August 28). Biosphere - salt marshes. EcoShape. https://www.ecoshape.org/en/concepts/growing-salt-marshes/biosphere/ 8. Heimbinder, E. (2001). Revegetation of a San Francisco coastal salt marsh. Native Plants Journal, 2(1), 54–59. https://doi.org/10.3368/npj.2.1.54
Other Sources Consulted	1. Hinson, Justin, "Developing Best Practices for the Propagation of Spartina alterniflora for use in Salt Marsh Restoration" (2023). Electronic Theses and Dissertations. 2563. https://digitalcommons.georgiasouthern.edu/etd/2563

	2. Minnesota Board of Water & Soil Resources. (2012, October 4). PLANTING WETLAND (NON-WOODY) CONTAINERIZED PLANTS AND ROOTSTOCK TECHNICAL GUIDANCE DOCUMENT. https://bwsr.state.mn.us/sites/default/files/2019-01/5A-12 Planting Wetland (Non-woody) Containerized Plants and Rootstock.pdf
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