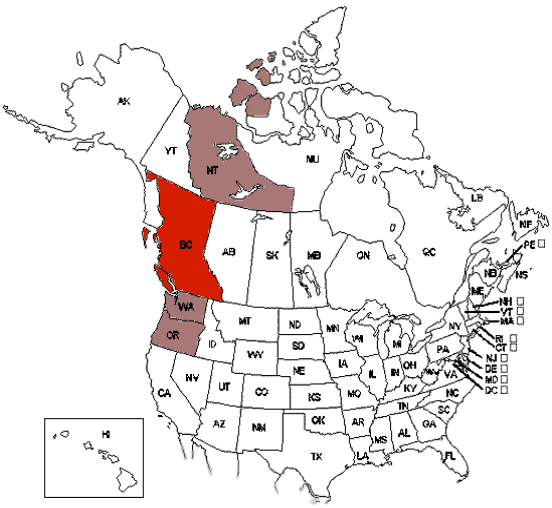
Plant Propagation Protocol for *Coleanthus subtilis*
ESRM 412 – Native Plant Production
Spring 2018
Protocol URL: https://courses.washington.edu/esrm412/protocols/*COSU.pdf*



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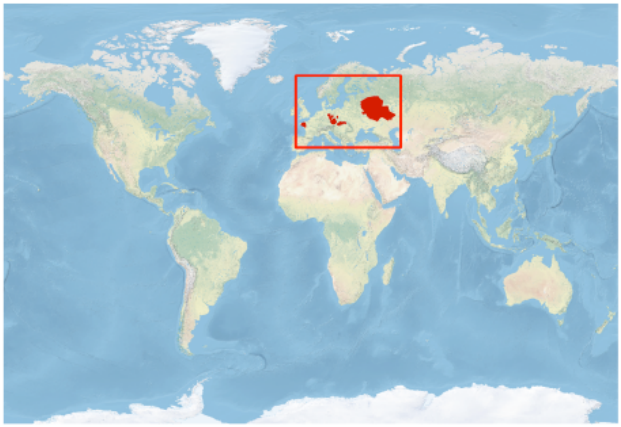
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Source:

TAXONOMY	
Plant Family	
Scientific Name	Poaceae (or Gramineae)[7]
Common Name	Grass[7]
Species Scientific Name	
Scientific Name	*Coleanthus subtilis* Seidl ex Roem. & Schult[6]
Varieties	
Sub-species	
Cultivar	
Common Synonym(s)	*Schmidtia subtilis* Tratt.[10] *Schmidtia utriculosa* Sternb. *Wilibalda subtilis* (Tratt.) Roth *Zizania subtilis* (Tratt.) Raspail[9]
Common Name(s)	Mossgrass[7] or French – Coléanthe Délicat[6]
Species Code (as per USDA Plants database)	COSU[7]

GENERAL INFORMATION	
Geographical range	France, Germany, Austria, Czech Republic, Slovakia, Poland, Italy, Russia, Siberia, China[6] USA, Canada[8] Wide, disjunct, circumpolar population[1]. Maps at top
Ecological distribution	Lakesides, freshwater margins, mineral-rich mud, open spaces, long fluctuating water levels[6]
Climate and elevation range	Found in boreal and temperate zones, preferring continental climates[5]. Lowlands, floodplains, river basins that flood or snow in circumpolar regions[8] Diurnal temperature shifts of 20 degrees Celsius for seeds to germinate[8]
Local habitat and abundance	Habitat 3130: Oligotrophic to Mesotrophic Standing Waters with Vegetation of the Littorelletea Uniflorae and/or of the Isoeto-Nanojuncetea[2]. 7,700-12,000 individuals/square meter in primary habitats[8] Abundance dependent on area of water cycling[6] Community type: *Eleocharition ovatae*[4] Often found with *Bidentetea tripartitae, Littorelletea uniflorae, Phragmito-Magno-Caricetea, Potametea*[8]
Plant strategy type / successional stage	Pioneer, early colonizer of temporary habitats, seeds dormant in stable water or dry soil (for five or more years, if needed); germinate with fluctuating water levels, poor competitor[8]
Plant characteristics	Grass, annual, ephemeral (5-10 week life cycle), generally between March and October. Requires nutrient-rich, saturated mud[8] Up to 12,000 individuals/sq. meter in primary conditions, each can produce more than 2,500 seeds that may remain dormant for decades[8] Small grass plant (2-5cm culm, 1-2cm blades) with solitary, fertile spikelets and panicles whorled at most nodes[3].
PROPAGATION DETAILS: **No Propagation Protocols Existent (at least in English)**	
Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Seeds
Product Type	Bareroot

Stock Type	
Time to Grow	2-4 weeks
Target Specifications	2-10 cm tall Well-stocked seed bed
Propagule Collection Instructions	Seeds may be collected, buried in waterside soils that have harbored *C. subtilis* in the last 5 years.
Propagule Processing/Propagule Characteristics	Seeds remain dormant in consistently flooded or dry soil for up to five or more years
Pre-Planting Propagule Treatments	Keep seeds in cool, dry environment. Clean with slight acidic solution for 24 hours.
Growing Area Preparation / Annual Practices for Perennial Crops	-Sow *C. subtilis* seeds <3cm down in late February in intermittently flooded (or drained), high organic content, wet soil or mud, fertilized with dung or compost. pH 6.5-7. -Regional temperature should vary around 20°C diurnally in a boreal or temperate climate. -Avoid areas rich with calcareous bedrock, pesticides, herbicides. -Draining should occur for 8-10 week periods (Spring to Autumn) at least twice every decade, but every 1-2 years for most abundant community. -Occasional liming to maintain pH and release nutrients from organic material.
Establishment Phase Details	-Select an open waterside plot of desired size that is subject to periodic flooding and draining. -Rake/plough the lake or pond bed to release nutrients. -Fertilize waterside with dung or compost. -Bury seeds <3cm into fertilized, wet soil or mud. -Allow flooding cycle to transpire -Examine the following draining cycle's *C. subtilis* regrowth -Adjust lime or plough (carefully) as necessary to adjust pH or supply additional nutrient.
Length of Establishment Phase	2-5 annual cycles (or 2-5 annually flooded cycles)
Active Growth Phase	3-7 weeks
Hardening Phase	2-6 weeks
Harvesting, Storage and Shipping	Keep seeds in cool, dry environment.
Length of	0-5 years

Storage	
Guidelines for Outplanting / Performance on Typical Sites	-Height: 4-10cm -Present: seeds, flower, blades -Expected lifespan: 5-10 weeks -Expected successful % survival: >5% seeds produced every cycle to be germinated within the following 2 cycles.
Other Comments	Very little information is available in English on mossgrass and its propagation, as the majority of the plant's native domain is in the Eastern hemisphere. More propagation information may be available to Czech, French, and Italian speakers.
INFORMATION SOURCES	
References	• [1]"Comprehensive Report Species - Coleanthus Subtilis." Nature Serve Explorer, Nature Serve, 6 July 2004, explorer.natureserve.org/servlet/NatureServe?searchSpeciesUid=ELEMENT_GLOBAL.2.160581 (accessed 22nd April). • [2]"Oligotrophic to Mesotrophic Standing Waters with Vegetation of the Littorelletea Uniflorae and/or of the Isoeto-Nanojuncetea." EUNIS, European Environmental Agency, eunis.eea.europa.eu/habitats/10065 (accessed 23nd April). • [3]Clayton, W.D., Vorontsova, M.S., Harman, K.T. and Williamson, H. (2006 onwards). GrassBase - The Online World Grass Flora. http://www.kew.org/data/grasses-db.html. [accessed 21 November 2018; 17:35 PST]. • [4]Dykyjová, Dagmar, and J. Kvet. Pond Littoral Ecosystems: Structure and Functioning: Methods and Results of Quantitative Ecosystem Research in the Czechoslovakian IBP Wetland Project. Springer-Verlag, 1978. • [5]Kaplan, Z., et al. "Distributions of Vascular Plants in the Czech Republic. Part 5." Preslia, Česká Botanická Společnost, 2017, repozitar.cz/repo/27286/cs/Kaplan-Danihelka-Sumberova-Chrtek/Distributions-of-vascular-plants-in-the-Czech-Republic-Part-5 (accessed 22nd April). • [6]Lansdown, R.V. 2011. Coleanthus subtilis. The IUCN Red List of Threatened Species 2011: e.T161844A5503147. Downloaded on 25 April 2018. • [7]Plants Profile for Coleanthus Subtilis (Mossgrass)." USDA Plants Database, Natural Resources Conservation Service, plants.usda.gov/core/profile?symbol=COSU (accessed 20nd April). • [8]Richert, Elke & Achtziger, Roland & Dajdok, Zygmunt & Günther, André & Heilmeier, Hermann & Hübner, Annette & John, Henriette & Šumberová, Kateřina. (2016). Rare wetland grass Coleanthus subtilis in Central and Western Europe - Current distribution, habitat types, and threats. Acta Societatis Botanicorum Poloniae. 85(3). 1-16. 10.5586/asbp.3511 (accessed 20nd April). • [9]The Plant List (2010). Version 1. Published on the Internet; http://www.theplantlist.org/ (accessed 22nd April).

	• [10]Vasey, George. Grasses of the Pacific Slope, Including Alaska and the Adjacent Islands: Plates and Descriptions of the Grasses of California, Oregon, Washington, and the Northwestern Coast, Including Alaska. Government Printing Office, 1893.
Other Sources Consulted	
Protocol Author	Michael Van de Brooke
Date Protocol Created or Updated	04-24-2018

This propagation protocol template was modified by J.D. Bakker from that available at: http://www.nativeplantnetwork.org/network/SampleBlankForm.asp