Plant Propagation Protocol for *Carex pansa*
ESRM 412 – Native Plant Production
URL: https://courses.washington.edu/esrm412/protocols/2023/CAPA16.pdf

Images of *Carex Pansa* courtesy www.waterwisegardenplanner.org

TAXONOMY	
Plant Family	
Scientific Name	Cyperaceae Juss.[1]
Common Name	Sedge family[1]
Species Scientific Name	
Scientific Name	*Carex pansa* L.H. Bailey[1]
Varieties	None Found
Sub-species	The east Asia *Carex arenicola* and North American *Carex praegracillis* have both been proposed as potential sub-species.[4]
Cultivar	None Found
Common Synonym(s)	*Carex arenicola* F. Schmidt (CAAR32) and *Carex arenicola* F. Schmidt asp. *pansa* (L.H. Bailey) T. Koyama & Calder (CAARP)[1]

Common Name(s)	Sanddune sedge[1] Also seen as Pacific dune sedge[6] and California meadow sedge[7]
Species Code (as per USDA Plants database)	CAPA16[1]
GENERAL INFORMATION	
Geographical range	 Image Courtesy the USDA Website[1]
Ecological distribution	Occurs on coastal sand dunes and sandy meadows from British Columbia to California[2], ideally well drained soil with PH between 4.0 - 8.0[3]
Climate and elevation range	Natural Settings consist of: Annual Precipitation: 12.8” - 71.6”[3] Summer Precipitation: 0.17” - 2.14”[3] Cold Tolerance to 15°F[3] Elevation: sea level to 35 feet[10] Plants prefer partial shade but will also perform in full sun if enough water is available.[7]

Local habitat and abundance	Semi-abundant near sandy dunes in open habitats.[4] Can be located with other coastal species such as Verbena (*Abronia sp.*), Beach Evening Primrose (*Camissoniopsis cheiranthifolia*), Silver Beachweed (*Ambrosia chamissonis*), Dune Manzanita (*Arctostaphylos pungenens*), Coast Buckwheat (*Eriogonum latifolium*), or California Sealavender (*Limonium californicum*)[3]
Plant strategy type / successional stage	Rhizomatous[2], wind pollinated & capable of self-pollination[2], groundcover or mowed turf[3]
Plant characteristics	Perennial evergreen grass[6] with thin triangular stems up to 16" in length. Flowers are dark brown and are produced in clusters off of protruding spikes.[3] There is conflicting information on reproducing strategy. One resource said plants have predominantly female or male flowers with often a few flowers of the opposite sex mixed in[2] while another source said plant produce dioeciously with either male or female flowers, but not both[3]. Blackish[13] rhizomes are long and coarse, approximately 1.8-2.6 mm thick, and have unbranched segments which produce singular shoots every few nodes.[4] Leaves are 1.7-3.8 mm wide and cluster at the base of the plant.[13] Plants can be a good alternative to turf in garden settings with well drained and sandy soils if mowed two to three times per year at 3-4" as they have proven to tolerate moderate food traffic. Also used as a year-round unmowed meadow in some locations.[6]

PROPAGATION DETAILS: SEED

Photographs of *Carex pansa* seeds courtesy inaturalist.org

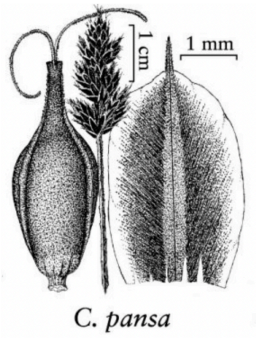

Illustration of *Carex Pansa* courtesy www.eFloras.org

Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Plugs or small pots[5] Plugs result in highest establishment ratings, low when direct sown[2]
Stock Type	Small container such as Ray Leach Cone-tainer™ Cells or 4” x 4” pots[14]
Time to Grow	6 to 11 months[10]
Target Specifications	None Found

Propagule Collection Instructions	Nondormant seeds should be collected late in the season[2] Plants grown from plugs will usually produce seed in their second year. Harvest can be performed after all seeds are mature.[2] This is typically in the summer and early fall. The window for collection could be anywhere from a couple days to several weeks.[8] Effective method of collection is to cut and collect material with a modified swather, lay material to dry, and then feed it into a stationary combine. A stationary combine with high cylinder speed and a tight concave will work moderately well. In a field setting plants are likely to produce much lower yields (1-25 pounds per acre) than in the wild.[2]
Propagule Processing/Propagule Characteristics	500,000 seeds per pound[2]
Pre-Planting Propagule Treatments	To reach desired purity standards, harvested seeds may need to be run through an air-screen machine to remove stems, chaft, and unfilled seeds. Seeds should then be dehulled for optimum germination.[2] Studies have produced low germination rates after 6 months of age in storage. Germination may be increased by storing seeds at 4°C.[9] Cleaned seed can be stored for more than one year, possibly longer in freezer storage.[8]
Growing Area Preparation / Annual Practices for Perennial Crops	Recommend seeds are surface sown into plugs or small containers.[2]
Establishment Phase Details	Start seeds in plugs and keep them in the greenhouse at temperatures of 75-100°F with exposure to light.[2] Carex species of sedges typically exhibit physiological dormancy at maturity.[11]
Length of Establishment Phase	Based on a study of similar species *Carex tumulicola* approximate germination time was around 28 days in the wild.[11]

Active Growth Phase	Fast growing, prefers well-drained soils with regular water.[12] Experiments with different weed treatment techniques have shown herbicides (such as oryzalin and dithiopyr) as well as fir bark mulch to provide reasonably good control of most annual weeds without injuring plants. Prodiamine and pendimethaline herbicides were seen as unsuccessful and experimental fatty acids and ammoniated soap were detrimental to the plants.[5]
Length of Active Growth Phase	If seeds are sown in the winter or spring, plugs will generally be filled in by the end of the first summer.[6]
Hardening Phase	None Found
Length of Hardening Phase	None Found
Harvesting, Storage and Shipping	None Found
Length of Storage	None Found
Guidelines for Outplanting / Performance on Typical Sites	Outplanted in plugs at 9” spacing is likely to take over 1 year to completely fill in as turf.[5] Recommended spacing is from 6” - 12” on center.[6] Weed control can be performed by herbicide application, cultivation between rows, or hand weeding.[2] In the wild: will rarely exceed 8” tall[6] In planted spaces: may reach 8” - 10” tall and 12” - 24” wide[7]
Other Comments	Plants have been shown to produce very little seed in cultivated settings making them unideal for agronomic seed increase. Meanwhile, seeds are often plentiful and easy to collect if gathered from the wild.[2]
INFORMATION SOURCES	

References	1. *Carex pansa L.H. Bailey*. USDA plants database. (n.d.). Retrieved April 26, 2023, from https://plants.usda.gov/home/plantProfile?symbol=CAPA16 2. Bartow, A. (2015). CAREX PANSA. In Native Seed Production Manual for the Pacific Northwest. essay, USDA-NRCS Corvallis Plant Materials Center. 3. Sand Dune Sedge, Carex pansa. California Native Plant Society. (n.d.). Retrieved May 2, 2023, from https://calscape.org/Carex-pansa-(Sand-Dune-Sedge) 4. Carex pansa. Flora of North America @ efloras.org. (n.d.). Retrieved May 2, 2023, from http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=242357385 5. Ingels, C., & Roncoroni, J. (2014). Weed control in dune sedge transplants. HortTechnology, 24(2), 166–170. https://doi.org/10.21273/horttech.24.2.166 6. Amme, D. 2008, Carex pansa (Pacific dune sedge): The sedge with the other name. Grasslands 18(4):7-10 7. California meadow sedge. Waterwise Garden Planner. (2022, September 6). Retrieved May 2, 2023, from https://waterwisegardenplanner.org/plants/carex-pansa/ 8. Native Seed Collection Guide - US Forest Service. (n.d.). Retrieved May 2, 2023, from https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev2_023948.pdf 9. van der Valk, A. G., Bremholm, T. L., & Gordon, E. (1999). The restoration of Sedge Meadows: Seed viability, seed germination requirements, and seedling growth ofCarex species. Wetlands, 19(4), 756–764. https://doi.org/10.1007/bf03161782 10. Plant characteristics and Associations. Calflora. (n.d.). Retrieved May 2, 2023, from https://www.calflora.org/entry/plantchar.html?crn=1611

References	11. Broadlick, K., & Bakker, J. D. (2019). Increasing germination of 2 upland sedges, carex inops ssp.. inops and carex tumulicola. Native Plants Journal, 20(3), 253–266. https://doi.org/10.3368/npj.20.3.253 12. Carex pansa. Carex pansa - Native Plant Database. (n.d.). Retrieved May 2, 2023, from https://theodorepayne.org/nativeplantdatabase/index.php?title=Carex_pansa 13. Wilson, B. L., Brainerd, R. E., Lytjen, D., Newhouse, B., & Otting, N. (2014). Carex pansa L.H.Bailey. In *Field guide to the sedges of the Pacific Northwest* (Second, pp. 298–299). essay, Oregon State University Press. 14. Wilkinson, Kim M. "Chapter 7 Containers." Tropical Nursery Manual: A Guide to Starting and Operating a Nursery for Native and Traditional Plants, U.S. Department of Agriculture, Forest Service, Washington, D.C.?, 2014, pp. 123–139.
Other Sources Consulted	15. John Greenlee | December 31, 2001. (n.d.). *Sedge Lawns: A sustainable, low-maintenance alternative to grass*. Brooklyn Botanic Garden. Retrieved May 2, 2023, from https://www.bbg.org/article/sedge_lawns 16. Wilson, B.L.,R. Brainerd, M. Huso, K. Kuykendall, D. Lytjen, B. Newhouse, N. Otting, S. Sundberg and P. Zika. 1999. Atlas of Oregon Carex. Native Plant Society of Oregon, Occasional Paper No. 1. Corvallis, Oregon, 29 pp.
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