Plant Propagation Protocol for *Artemisia pycnocephala*
ESRM 412 – Native Plant Production
URL: https://courses.washington.edu/esrm412/protocols/2022/ARTPYC.pdf

Left: Distribution map of *A. pycnocephala*[1]. Right: Mature *A. pycnocephala*[2].

TAXONOMY	
Plant Family	
Scientific Name	Asteraceae / Compositae
Common Name	Aster family / Sunflower family
Species Scientific Name	
Scientific Name	*Artemisia pycnocephala* (Less.) DC.
Varieties	None
Sub-species	None
Cultivar	None
Common Synonym(s)	None
Common Name(s)	Beach Wormwood, Beach Sagewort, Coastal Sagewort, Dune Sagewort
Species Code (as per USDA Plants database)	ARTPYC
GENERAL INFORMATION	
Geographical range	CA, OR[1]. See above for USDA Distribution map[1].
Ecological distribution	Found in sandy beaches and dunes[2], and in rocky or sandy soils[3].
Climate and elevation range	Found in elevation range of 0-200m[3].
Local habitat and abundance	Prefers dry, sandy soils[2] and full to partial sun[5].
Plant strategy type / successional stage	*A. pycnocephala* is tolerant to frost[5].

Plant characteristics	*A. pycnocephala* is a perennial subshrub[1]. It is faintly aromatic[4] with evergreen leaf retention and alternating leaf arrangement[2]. Can be propagated by seed or by root crown division[2].
PROPAGATION DETAILS	
Young: Seed Propagation of *A. pycnocephala*[6]	
Ecotype	Marin County, CA
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	Deepot 16
Time to Grow	Not specified
Target Specifications	Height: none specified; caliper: none specified; root system: firm plug in container.
Propagule Collection Instructions	Seeds collected from September 1st to November 1st. Mature inflorescences should be light brown, dry and slender. Seeds are <1mm and silver.
Propagule Processing/Propagule Characteristics	To clean seeds, rub them over sieve. Seeds stored dry and under refrigeration.
Pre-Planting Propagule Treatments	None required.
Growing Area Preparation / Annual Practices for Perennial Crops	Grown in a fully controlled greenhouse. 4 grams of seeds are surface sown onto flats containing Sunshine Mix #4 Aggregate Plus (peat moss, perlite, major and minor nutrients, gypsum, and dolomitic lime). Flats are misted with an automatic irrigation system until germination. Germinants are transplanted.
Establishment Phase Details	Seeds take 14 days to germinate. 14 days after germination they are transplanted into 2"x7" tubes (Deepot 16). Potting mix contains peat moss, fir bar, perlite, and sand. The germinants are then moved to a shade house during establishment. Transplant survival averages at 95%.
Length of Establishment Phase	1 month.
Active Growth Phase	Seedlings should be kept evenly moist and prevented from drying out for easy growth.
Length of Active Growth Phase	Not specified
Hardening Phase	None specified
Length of Hardening Phase	Not specified
Harvesting, Storage and Shipping	None specified
Length of Storage	Not specified
Guidelines for Outplanting / Performance on Typical Sites	None specified
Other Comments	N/A
Holte: Seed Propagation of *A. pycnocephala*[7]	

Ecotype	Marina State Beach
Propagation Goal	Plants
Propagation Method	Seed
Product Type	None specified
Stock Type	Supercell® planters
Time to Grow	None specified
Target Specifications	None specified
Propagule Collection Instructions	Collect from a variety of dune sites along southern Monterey Bay.
Propagule Processing/Propagule Characteristics	None specified
Pre-Planting Propagule Treatments	None specified
Growing Area Preparation / Annual Practices for Perennial Crops	Plants grown in greenhouse them moved to an outdoor holding area before being moved into the study site.
Establishment Phase Details	None specified
Length of Establishment Phase	None specified
Active Growth Phase	Plants were grown in Supercell® planters in the greenhouse for 10 weeks. The planting mixture contained 1-part sterile sand and 3-parts Sunshine® #3 potting mix. Sand was sterilized by autoclaving twice per hour with 8 hours between sterilizations. At weeks 4 and 7, plants were fed a 20-20-20 Miracle-Gro liquid fertilizer.
Length of Active Growth Phase	10 weeks
Hardening Phase	Plants were moved to an outdoor holding area to harden.
Length of Hardening Phase	2 weeks
Harvesting, Storage and Shipping	None specified
Length of Storage	Not specified
Guidelines for Outplanting / Performance on Typical Sites	Subjected to fertilization and inoculation treatments at outplanting site.
Other Comments	None
Marvier: Seed Propagation of *A. pycnocephala*[8]	
Ecotype	Franklin Point State Reserve, San Mateo County, CA
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container
Stock Type	Horticultural pots (height: 17.2 cm, width at top: 15.2 cm).
Time to Grow	Not specified
Target Specifications	None specified
Propagule Collection Instructions	Seeds were collected on August 30, 1993.
Propagule Processing/Propagule Characteristics	None specified

Pre-Planting Propagule Treatments	Seeds were refrigerated from collection date until February 5th, 1994 (159 days, about 23 weeks). Seeds were placed in wet paper towels for germination.
Growing Area Preparation / Annual Practices for Perennial Crops	Plants grown in a temperature-regulated greenhouse. Natural light in the greenhouse is supplemented with metal halide lamps (15 L:9 D).
Establishment Phase Details	Two weeks after germination, seedlings were transplanted into 5 cm x 5 cm pots. Soil consisted of approximately 75% peat moss, 15% sand, and 10% perlite. Each pot was inoculated with a dilute solution of pulverized nodules collected from the roots of L. arboreous at Franklin point to introduce nitrogen-fixing symbionts.
Length of Establishment Phase	1 month
Active Growth Phase	Seedlings were transplanted into horticultural pots (height: 17.2 cm, width at top: 15.2 cm). each pot was spaced 30 cm away from each other on greenhouse benches. Plants were fertilized with 20-20-20 Peters soluble fertilizer every other week for the first 6 weeks of growth.
Length of Active Growth Phase	3 months
Hardening Phase	None specified
Length of Hardening Phase	Not specified
Harvesting, Storage and Shipping	None specified
Length of Storage	Not specified
Guidelines for Outplanting / Performance on Typical Sites	None specified
Other Comments	None
INFORMATION SOURCES	
References	See below
Other Sources Consulted	See below
Protocol Author	Alexandria Crabtree
Date Protocol Created or Updated	05/16/2022

References:

[1] "Artemisia Pycnocephala (Less.) DC." USDA plants database. Accessed May 16, 2022. https://plants.usda.gov/home/plantProfile?symbol=ARPY3.

[2] TWC Staff. "Artemisia Pycnocephala." Lady Bird Johnson Wildflower Center - The University of Texas at Austin, December 23, 2007. https://www.wildflower.org/plants/result.php?id_plant=arpy3.

[3] Shultz, Leila M. "Artemisia Pycnocephala." Jepson Flora Project (eds.), 2012. https://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=1235.

[4] "Artemisia Pycnocephala." Flora of North America . Accessed May 16, 2022. http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=250066161.

[5] "Artemisia Pycnocephala 'David's Choice'." Artemisia pycnocephala 'David's Choice' - Native Plant Database, September 27, 2009. https://theodorepayne.org/nativeplantdatabase/index.php?title=Artemisia_pycnocephala_%27David%27s_Choice%27.

[6] Young, Betty. "Artemisia (Pycnocephala)." Native Plant Network . US Department of Agriculture, Forest Service, National Center for Reforestation, Nurseries, and Genetic Resources, 2001. https://npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=asteraceae-artemisia-557.

[7] Holte, Jane E. "Effects of Vesicular-Arbuscular Mycorrhizae on Growth, Reproduction and Survival in Three Plant Species in a Sand Dune Restoration Site in Monterey, California." Dissertation, ProQuest Dissertations Publishing , 1994. https://www.proquest.com/dissertations-theses/effects-vesicular-arbuscular-mycorrhizae-on/docview/304192917/se-2?accountid=14784

[8] Marvier, Michelle A. "Parasitic Plant-Host Interactions: Plant Performance and Indirect Effects on Parasite-Feeding Herbivores." *Ecology* 77, no. 5 (July 1996): 1398+. https://doi.org/https://doi.org/10.2307/2265537.

Consulted Sources:

[9] Caster, Eryn L. "Dune Restoration at Sunset State Beach in Northern California." Dissertation, ProQuest Dissertations Publishing , 2001. https://s3.wp.wsu.edu/uploads/sites/2076/2017/07/C101-Propagating-Perennials-15a.pdf

[10] Southward, D, and D Branton. “Freeze-Etched Pollen Walls of Artemisia Pycnocephala and Lilium Humboldtii.” *Journal of Cell Science* 9, no. 1 (1971): 193–207. https://doi.org/https://doi.org/10.1242/jcs.9.1.193.