

PHACELIA CILIATA BENTH**COMMON NAME: GREAT VALLEY PHACELIA****FAMILY: BORAGINACEAE****GROWTH FORM: ANNUAL HERB****PLANTING**

Ideally, seeds of this species would be planted during October, before the winter monsoonal period of November through March. However, we have planted the species as late as December. Seeds were hand-sown onto mounded planting beds, and a thin layer of soil was then raked over them. The seeds germinate readily without any form of pre-treatment.

PHENOLOGY

When growing in the San Joaquin Valley, *P. ciliata* germinates as early as mid-January, and will begin flowering in mid-March. April and May are the peak months for seed collection. When water is not limited, *P. ciliata* has the potential to flower for several months. We have collected seeds as late as June or July from plants that were growing on the banks of irrigation ditches.

SEED HARVESTING

Seeds are mature and ready for collection when they are dark brown in color and have a hard consistency. All of the seeds on an individual plant will mature within a relatively short window of time. Therefore, once all of the seeds have matured, the entire plant can be collected. With this approach, it is possible that a fraction of the early maturing seed will have become dispersed before plants are collected. To ensure collection of the early maturing seed, the seeds would need to be selectively harvested while the rest of the plant is still maturing. It is ideal to minimize the amount of soil that is collected along with the plants; soil particles that are of a similar size and weight as the seeds can be very difficult to remove during seed processing. We would transport the harvested plant material to a warehouse and spread it out on tarpaulins to air dry, before seed processing. We would set up a few electric fans to facilitate drying and turn the plant material at least once a day.

SEED PROCESSING METHODS

Using a hammer mill, raw plant material is reduced into a coarse but uniform mixture of seeds and associated chaff

(e.g., pieces of stems, leaves, floral structures). Seeds can then be separated from chaff using either a Clipper Office Tester or Clipper Eclipse (both made by the A.T. Ferrell Company). An air separator (Seed Tech Systems, LLC.) can be used to remove additional lightweight chaff. For relatively small seed lots or in the absence of the equipment mentioned, plant material can be broken up by rubbing it over a screen or sieve. Wire mesh sieves with various screen sizes can then be used to separate seeds from chaff.

Seeds per gram = 619¹

CULTIVATION OVERVIEW

P. ciliata was sown in the nursery for seven consecutive years, and has reliably produced seed each year. The species grows vigorously and has good competitive ability against non-native weedy species. Due to the dispersal of *P. ciliata* seeds throughout the nursery, the species must often be weeded from planting beds sown with other desirable native species. Some degree of browsing by herbivores (presumably jackrabbits) has been observed, but not to an extent that hinders flowering or seed production. This species grows well under dry conditions, but also thrives under high moisture conditions (e.g., the banks of irrigation ditches).

A horticultural entry included in the Jepson Manual recommends that *P. ciliata* requires excellent drainage and does best in full or nearly full sun (Hickman, 1993). The soils at the nursery are Tranquillity clay with poor drainage, but *P. ciliata* individuals growing at the nursery appeared healthy.

The Rancho Santa Ana Botanic Garden has reported success with cultivating *P. ciliata* (Everett, 1957): the species grew well in both sandy loam and heavy clay loam, germination was usually excellent and required from 13-21 days, and they were able to harvest over 18 pounds of seed from just 17 ounces of seed sown in field rows.

RESEARCH ON PHACELIA CILIATA

P. ciliata was utilized in a study that evaluated the potential for activated charcoal to protect native seeds from the effects of pre-emergent herbicides (Lair et al., 2006).

REFERENCES

- Everett, P.C. 1957. A summary of the culture of California plants at the Rancho Santa Ana Botanic Garden 1927-1950. Claremont, CA: Rancho Santa Ana Botanic Garden. 263 p.
- Hickman, J. C. (editor). 1993. The Jepson manual: higher plants of California. University of California Press, Berkeley.
- Lair, K., N. Ritter, and A. Howard. 2006. Use of activated charcoal to protect native seeds from herbicides (California). *Ecological Restoration* 24:122-124.

¹ This figure (n = 5; standard deviation = 46) is derived from a seed lot harvested in 2008 from a wild population.

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PHOTOS



Most of the seedlings shown are *P. ciliata*. One *Phacelia tanacetifolia* seedling is present in the middle of the photo.



P. ciliata foliage.



P. ciliata is shown on the right, *M. elegans* (common madia) is shown on the left.



The flowers have already dropped and the seeds are maturing inside the sepals.



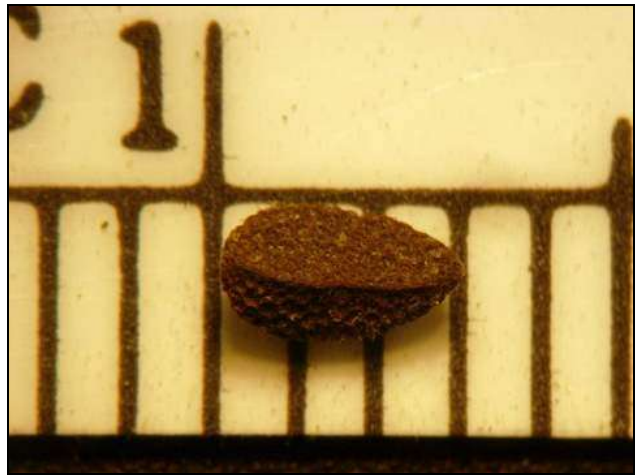
Brassica nigra (black mustard), the yellow-flowered plant, is one of the dominant weed species at the nursery, and would outcompete most of the seeded native species. *P. ciliata* was one native species that had good competitive ability against black mustard.



P. ciliata seeds. Scale shown is millimeters.



P. ciliata near Tranquillity, CA (Fresno County); March 2008



P. ciliata seed. Scale shown is millimeters.



P. ciliata near Tranquillity, CA (Fresno County); March 2008