

PHACELIA TANACETIFOLIA* BENTH*COMMON NAME(S): TANSY-LEAFED PHACELIA,
LACY 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.

GERMINATION

In our experience, *P. tanacetifolia* seeds germinated readily and uniformly without any treatment prior to sowing. Emery (1988) does not recommend any seed treatment to enhance germination of *P. tanacetifolia*. However, research papers by Schulz and Klein (1965) and Chen and Thimann (1966) describe the germination inhibiting effects of light and high temperature on *P. tanacetifolia* seeds.

PHENOLOGY

When growing in the San Joaquin Valley, *P. tanacetifolia* germinates as early as mid-January, and will begin flowering in early to mid-March. The species flowers for several weeks and attracts an abundance of pollinators. April and May are the peak months for seed collection.

SEED HARVESTING

Seeds are mature and ready for collection when they are light to medium 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 = 548¹

CULTIVATION OVERVIEW

P. tanacetifolia was sown in the nursery for five years and we have been able to harvest seed during three of the years. During the 2006-07 growing season, when total precipitation received, 7.1 cm (2.8 in), was approximately one-third of the 30-year annual mean, very few *P. tanacetifolia* seeds germinated. The species does not seem to be susceptible to wildlife herbivory.

With the exception of one dry growing season, *P. tanacetifolia* performed well at the nursery; it germinated readily, grew vigorously, and reliably produced seed. However, weed control was an important factor in our success with cultivating *P. tanacetifolia*. The dominant weed species at the nursery germinate so densely and grow so aggressively that in the absence of weed control, they would have significantly hindered the growth of the planted natives. The use of irrigation in response to seasonally low rainfall was also a contributing factor in our success with cultivating *P. tanacetifolia*.

A horticultural entry included in The Jepson Manual recommends that *P. tanacetifolia* 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. tanacetifolia* individuals growing at the nursery appeared healthy.

The Rancho Santa Ana Botanic Garden reported overwhelming success with cultivating *P. tanacetifolia* (Everett 1957): the species grew well in both sandy loam and heavy clay loam, germination resulted within a few days after sowing, and they were able to harvest over 11 pounds of seed from just 1.75 ounces of seed sown. They described *P. tanacetifolia* as the most vigorous and aggressive of the phacelias, with the tendency to invade

¹ This figure (n = 5; standard deviation = 24) is derived from a seed lot harvested in 2008 from a naturally occurring population.

adjacent cultivated areas and stifle other less aggressive native plants.

RESEARCH ON PHACELIA TANACETIFOLIA

In the United States and abroad, *P. tanacetifolia* has been utilized as bee forage, an insectary plant, and a cover crop (Petanidou, 2003; Small Farm Success Project, 2003). As mentioned previously, some research has been done on *P. tanacetifolia* germination.

REFERENCES

- Emery, D.E. 1988. Seed Propagation of Native California Plants. Santa Barbara, CA. Santa Barbara Botanic Garden. 115 pp.
- 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.

ADDITIONAL INFORMATION ABOUT *PHACELIA TANACETIFOLIA*:

Internet Resources

- Species profile from the Ladybird Johnson Wildflower Center at the University of Texas:
http://www.wildflower.org/plants/result.php?id_plant=PHTA
- Seed photos from the Rancho Santa Ana Botanic Garden:
<http://www.hazmac.biz/020904b/020904bPhaceliaTanacetifolia.html>
- Publications from the Small Farm Success Project:
http://www.smallfarmsuccess.info/Phacelia_research.cfm
http://www.smallfarmsuccess.info/Phacelia_farmer.cfm
- Species Profile from The Seed Site:
<http://theseedsite.co.uk/profile410.html>



P. tanacetifolia seedling at the native plant nursery during February 2008.

Literature

- Brooks, M.L. 2000. Competition between alien annual grasses and native annual plants in the Mojave Desert. American Midland Naturalist 144: 92-108.
- Brown, C.S. and R.L. Bugg. 2001. Effects of established perennial grasses on introduction of native forbs in California. Restoration Ecology 9: 38-48.
- Chen, S.S.C. and K. V. Thimann. 1966. Nature of seed dormancy in *Phacelia tanacetifolia*. Science 153: 1537-1539.
- Petanidou, T. 2003. Introducing plants for bee-keeping at any cost? Assessment of *Phacelia tanacetifolia* as a nectar source plant under xeric Mediterranean conditions. Plant Systematics and Evolution 238: 155-168.
- Schulz, M.R. and R.M. Klein. 1965. On the mechanisms of light-induced germination inhibition of *Phacelia tanacetifolia*. American Journal of Botany 52: 278-281.

PREPARED BY

Brianna D. Borders, Restoration Botanist.

Other Contributors: Dr. Nur Ritter, Justine Kokx, Adrian Howard, and Graham Biddy.

PHOTOS





P. tanacetifolia seedlings at the native plant nursery during January 2008.



In the foreground, *P. tanacetifolia* in cultivation at the native plant nursery. *Monolopia stricta* (Crum's monolopia) and *Phacelia ciliata* (Great Valley phacelia) are growing in the background.



P. tanacetifolia seeds. Scale shown is millimeters.

