LACY PHACELIA

Phacelia tanacetifolia Benth.

Plant Symbol = PHTA

Common Names: tansy phacelia, bee phacelia, facelia, fiddleneck
Scientific Names: Phacelia tanacetifolia var. *cinerea* Brand, *Phacelia tanacetifolia* var. *pseudo-distans* Brand

Figure 1. Lacy phacelia in bloom showing European honey bee foraging on flower. Lockeford Plant Materials Center

Description
General: Lacy phacelia is a native annual forb in the Hydrophyllaceae family. The stems are erect or semi-erect and succulent, glandular with short stiff hairs. The height varies from 1 to 3 feet. Leaves have a petiole and blade, are oblong to ovate and generally compound subdivided into smaller leaflets and toothed lobes, length is variable up to 8 inches in length. The inflorescence is dense with two to four branches, flowers open sequentially on one side, leading to the formation of a curling or curved shape. The five sepals are densely hairy, the blue or purplish bell-shaped flowers have a fused corolla, with five anthers, the style is two lobed and two seeds are produced in the ovoid fruit. Seeds are brown, wrinkled and pitted and 1/8 inch, dropped from the inflorescence once mature (Walden et al., 2016). The plants are tap rooted with branched fibrous roots reported from 10 to 30 inches in depth (Kilian, 2016).

Distribution: The genus *Phacelia* consists of approximately 200 species in North and South America. The center of diversity is in California where 93 taxa occur, of which 39 are endemic (Gilbert et al., 2005). In California, lacy phacelia is widely distributed and found in the Northern and Southern Coastal Ranges, the Sierra Foothills and High Sierra, the Sacramento and San Joaquin Valleys, the mountain ranges of southern California and into the Mojave Desert (Calflora, 1997). Native populations are also found in found in Southern Nevada and Arizona (Walden et al., 2016). Lacy phacelia was taken to Europe in the last century and domesticated for use as a forage and pollinator plant. It is naturalized in Southern Europe, Australia and New Zealand and as a cultivated crop around the world (GRIN, 2007). It is increasing used as a cover crop component in agriculture through the central and eastern US and Canada with germplasm reintroduced from overseas (Kilian, 2016).
For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Habitat: In its native range *Phacelia tanacetifolia* is found in communities of Chaparral, Creosote Bush Scrub, Coastal Sage Scrub, Pinyon-Juniper Woodland, Southern Oak Woodland and Central Oak Woodland (Walden et al., 2016).

Adaptation: Lacy phacelia is drought tolerant and grows well given 7 to 18 inches of annual precipitation or irrigation. It prefers well drained sandy and gravelly soils and does not perform well under waterlogged conditions. The plant grows at a variety of elevations from sea level up to 8,000 feet (Walden et al., 2016). Lacy phacelia winter kills at approximately 18°F and so is not considered winter hardy in many locations. In its native range in California seeds germinate with the first rains in the fall, growing over the fall winter and spring and producing seed and dying back in early summer. In other regions lacy phacelia is spring planted and grows over the summer or may be planted in late summer and then winter kills (Kilian, 2016; Stivers-Young, 1998).

Uses
Pollinator and beneficial insects: Lacy phacelia is listed in the top 20 pollen producing flowers for honeybees and is highly attractive to pollinator insects including bumblebees (Hayden, 2014). It provides a source of high quality nectar and pollen (Williams and Christian, 1991). Bloom season varies with location: April through June in the Mediterranean climate of its

native range in California, in more temperate regions bloom time is extended (Kilian 2016). Beneficial insect populations are also enhanced on lacy phacelia including generalist predators, such as hoverflies and parasitoids (Altieri and Wilson, 2010; Hickman and Wratten, 1996). As part of a mixture including annual buckwheat, sweet alyssum, bishop's weed and wild carrot planted to vineyards in California, there was an increase in generalist predators, such as spiders, and populations of pests including the vine mealy bug declined (Altieri and Wilson, 2010).

Cover crop: Lacy phacelia is effective as a rotational cover crop or short period catch crop. The seedlings are vigorous competing strongly with weeds (Hayden, 2014). The plant is increasingly used a component of cover crop mixes to increase diversity. Soil organic matter is improved, especially when lacy phacelia is used as a mix component along with grasses with fibrous root systems. Lacy phacelia concentrates nitrogen from the soil into the foliage, and the high C/N ration enables rapid decomposition after the plant dies with nitrate nitrogen rapidly available for the crop plant (Jackson, 2000; Kilian, 2016; Stivers-Young, 1998). Under conditions where high nitrates are present in soil after the cash crop, the use of lacy phacelia as a cover crop has been shown to reduce nitrate leaching (Jackson et al., 1993; Wyland et al., 1996). In California, moisture levels in soil planted to lacy phacelia were reduced after mid to late March and (Wyland et al., 1996); it is important to terminate the cover crop at the optimum time to retain soil moisture for the cash crop, especially in dry environments. Use of lacy phacelia was shown to reduce populations of the sugar beet nematode (Gardner and Caswellchen, 1993)

Critical Area Planting: In its native range lacy phacelia establishes rapidly with precipitation following fire and its rapid growth stabilizes the soil especially when used in combination with a grass species. It is a prolific seed producer and will regenerate from seed.

Ethnobotany
There are no ethnobotany uses recorded for this plant.

Status
Lacy phacelia may become weedy or invasive in some regions or habitats and may displace desirable vegetation if not properly managed. Please consult with your local NRCS Field Office, Cooperative Extension Service office, state natural resource, or state agriculture department regarding its status and use.

Please consult the PLANTS Web site (http://plants.usda.gov/) and your state's Department of Natural Resources for this plant's current status (e.g., threatened or endangered species, state noxious status, and wetland indicator values).

Planting Guidelines
Lacy phacelia seeds germinate in 15 to 30 days without treatment. Germination is inhibited by light and high and low temperatures, seeds grow when soil temperatures are between 40 and 68° F (Tiraki and Keles. 2012). Late spring, summer and fall plantings may all be successful depending upon the location. A seeding rate of 26 pure live seeds per square foot, or 4.6 lb. per acre drilled is recommended, broadcast seed should be applied at a higher rate to ensure a successful planting. Seed should be planted into a firm, weed-free seedbed. It is recommended to drill the seed to a ¼-inch depth to ensure good seed to soil contact, although broadcast seeding followed by cultivation may also be successful. Seeding a forb component in alternate-row or cross-planting (forb in one direction and grass in the other) configurations may ensure better forb establishment. Seeding rates should be adjusted according to the type of plantings (Kilian, 2016).

Management
The management of lacy phacelia will depend upon the desired use for the plantings. For pollinator plantings termination should occur post bloom. If a self-regenerating stand is the goal, the plants should be left to senesce and die for maximum seed production. For forage and hay production, plants should be cut prior to bloom to obtain maximum biomass and nutritional value.

Pests and Potential Problems
Lacy phacelia is a host to the soil borne diseases, *Sclerotinia minor* and *Rhizoctonia solani* and should not be grown in rotation with crops on which these pathogens cause disease (Koike et al. 1996; Kluth et al., 2010).

Control
Please contact your local agricultural extension specialist or county weed specialist to learn what works best in your area and how to use it safely. Always read label and safety instructions for each control method.

Seeds Production
Seed production is recommended at a 4.6 lbs pure live seed/acre seeding rate. Harvest by direct combine before more than 10% of the seed heads have turned brown and fluffy. Harvested material must be dried to prevent mold and decay. Seed production rates are highly variable and have been reported from 150 lbs. in eastern Texas to 800 lbs. in eastern Oregon (Garen et al. 2009; Kilian, 2016).

Cultivars, Improved, and Selected Materials (and area of origin)

Cultivars have been developed for use in Europe, but these are not currently available in the US. Cultivars should be selected based on the local climate, resistance to local pests, and intended use. Consult with your local land grant university, local extension or local USDA NRCS office for recommendations on adapted cultivars for use in your area.

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