

## *Phacelia submutica* (DeBeque Phacelia)

### Taxonomy

Class: Dicotyledoneae  
Order: Solanales  
Family: Hydrophyllaceae  
Genus: *Phacelia*

**Conservation Status Rank:** G2 S2

### State/Federal Status:

USFS Sensitive  
BLM sensitive

**USESA Listing Status:** Candidate

**Description:** *Phacelia submutica* is a small, summer annual plant. The stems are 2 to 8 cm long, often branched at the base and generally lay flat on the ground surface in a disc-shaped clump. The stems are often a deep red color. The reddish-colored leaves are 5 to 15 mm long, egg-shaped or tending to be almost rectangular with rounded corners, with the bases abruptly tapering to a wedge-shaped point. The leaf margins are smooth or toothed. The stems and leaves are covered by variable numbers of straight, stiff hairs. The root is a tap-root. The very small, tube-shaped flowers are crowded and light-yellow or cream colored, often with a purple tinge. Unlike many *Phacelia* species, the stamens do not protrude beyond the petals. The elongated-egg shaped seeds are 1.5 to 2 mm long with 6 to 12 fine ridges, or corrugations. They are blackish brown and tend to be iridescent.

**Diagnostic Characteristics:** Late in the summer, *P. submutica* shrivels up and may be washed or blown away. No evidence of this annual plant remains from one year to the next. Hence, clearances may only be done when the plant is actively growing (usually April to June). Annual forb, small rosette, stems often deep red, covered with stiff hairs; the leaves are elliptic or oblong, entire or shallowly lobed, leaf edges smooth to having teeth, often becoming reddish at maturity; the flowers are tiny light yellow or cream colored flowers tinged with purple, tube-shaped. Species can be recognized by its compact arrangement of stems forming a flat disc, reddish foliage, and small, densely arranged flowers).

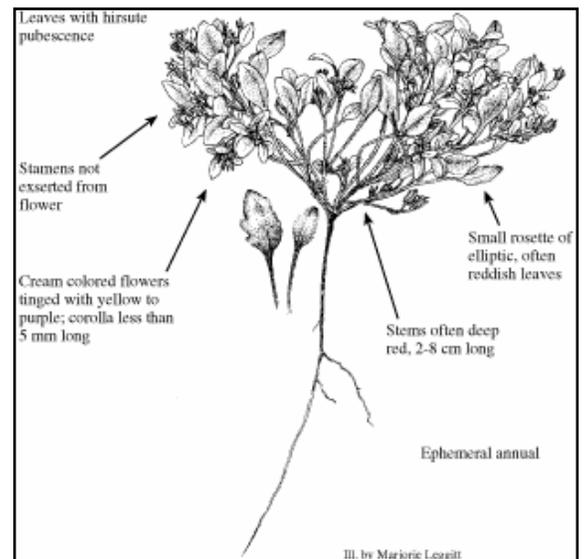
**Phenology:** Vegetative growth probably begins in early April. Flowering late April to late June and fruiting mid-May to late June. Late in the summer, *P. submutica* shrivels up and may be washed or blown away. No evidence of this annual plant remains from one year to the next. Hence,



Photo by B. Jennings



Photo by S. Spackman



Diagnostic Characteristics

clearances may only be done when the plant is actively growing (usually April to June).

**Taxonomic Comments:** Treated as *Phacelia scopulina* var. *submutica* by Kartesz (1994 and 1999); USFWS tracks as *Phacelia submutica* (2004).

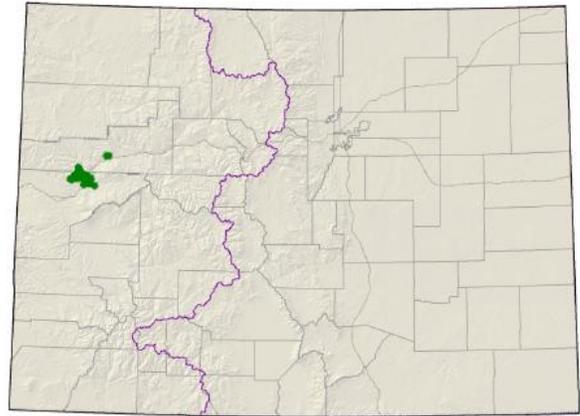
**Look Alikes:** The primary characters by which it is separated from var. *scopulina* are the pubescence on the style and the lack of apiculation of the capsule. The amount of pubescence on the style is a variable character. The apiculation of the capsule is the best character distinguishing the two taxa, although some intergradation is indicated; in var. *submutica* the style base on the capsule may be mucous and in var. *scopulina* the apiculation may be very small.

**Habitat:** Occurs on steep slopes, on xeric sites in chocolate-brown or gray clay or adobe badlands of Western Colorado and Eastern Utah. Often having high shrink-swell potential (large cracks in the soil). It is adapted to grow only in very early pioneer habitats with sparse vegetation cover (Scheck 1994). Occurs on Atwell Gulch and Shire Members of Wasatch Formation (O'Kane 1987). Associated species are *Grindelia fastigiata*, *Sarcobatus vermiculatus*, *Atriplex confertifolia*, *Eriogonum gordonii*, *Monolepis nuttalliana*, *Oenothera caespitosa*, *Astragalus flavus*, *Helianthus* sp., *Lepidium* sp., *Chenopodium* sp., *Rumex* sp., *Cymopterus planosus*, *Sitanion hystrix*, *Ceratocephala testiculata*, *Lactuca serriola*, *Euphorbia fendleri*, *Ascepias cryptoceras*, *Mentzalia* sp., *Thelypodopsis* sp., *Oryzopsis hymenoides*, *Bromus tectorum*, *Sphaeralcea coccinea*, *Gutierrezia sarothrae*. Other endangered species occurring in the area are *Sclerocactus glaucus*, *Astragalus debequaeus*, and *Lomatium eastwoodiae* (O'Kane 1987).

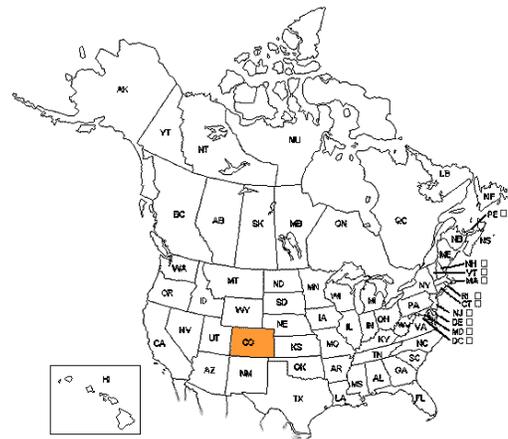
**Elevation Range:**

4980-7086 feet  
1518-2160 meters

**Species Biology:** Because the species is annual, it is likely, as in most annuals, that the species is able to self-pollinate. Potential pollinators have not been studied. It can probably reproduce by out- and in-breeding the small seeds of *P. submutica* are probably dispersed primarily by water running in rills eroded in the clay soils. Gravity, to a lesser degree, also moves seeds. Seeds may also be moved by small insects, probably ants. Seeds self-plant by falling into cracks formed by drying shrink-swell clay



Distribution in Colorado



Global Distribution

**References**

Colorado Natural Heritage Program. 2006. Biological Conservation Datasystem. Colorado State University, Ft. Collins, CO.

Halse, R. R. 1981. Taxonomy of *Phacelia* sect. *Miltitzia* (Hydrophyllaceae). *Madrono* Vol. 28 (3):121-132.

Kartesz, J.T. 1994. A synonymized checklist of the vascular flora of the United States, Canada, and Greenland. Second edition (2 volumes). Timber Press, Inc., Portland, OR.

Kartesz, J.T. 1999. A synonymized checklist and atlas with biological attributes for the vascular flora of the United States, Canada, and Greenland. First edition. In: Kartesz, J.T., and C.A. Meacham. *Synthesis of the North American Flora, Version 1.0*. North Carolina Botanical Garden, Chapel Hill, N.C.

Ladyman, J.A.R. (2003, December 19). *Phacelia scopulina* (A. Nels) J.T. Howell var. *submutica* (J.T. Howell) Halse (Debeque phacelia): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/phaceliascopulinavarsubmutica.pdf> [March 2006].

**Global Range:** A Colorado endemic known from western Colorado. Estimated range is 712 square kilometers (275 square miles), calculated in GIS by drawing a minimum convex polygon around the known occurrences. Reports of this species from Arizona are believed to be erroneous (Ladyman 2003).

**Threats and Management Issues:** Oil and gas development is considered to be the primary threat to the species at this time (CNHP Scorecard 2006). *Phacelia scopulina* var. *submutica* is inherently vulnerable to habitat loss by virtue of it being restricted to barren and semi-barren habitat on only specific members of the Wasatch geological formation that has a limited distribution within the Piceance Basin. This area has high amounts of gas reserves and has historically been impacted by activities associated with resource extraction. Current and future levels of resource extraction activity are likely to be substantial. Activities that lead to significant soil disturbance, or progressive soil erosion, would likely eliminate or sharply reduce the seed bank, which appears to be the mechanism by which populations survive. Therefore, all actions that cause significant disturbances, including mechanized vehicle traffic and intensive hoof action, are threats. *Phacelia scopulina* var. *submutica* has evolved in habitats where interspecies competitive pressures are very low, and evidence suggests that weed infestations are potentially a significant threat. It is likely to be palatable to non-selective herbivores, such as livestock and some species of wildlife and arthropods, but the potential magnitude of the impact is not known. Some evidence suggests that livestock grazing, which includes disturbance as well as herbivory, may be a threat to some occurrences (Ladyman 2003).

**Exemplary Sites:** Coon Hollow and Pyramid Rock Macrosite, also Horsethief Mountain site, Colorado.

**Last Updated:** November 9, 2009

O'Kane, S. L. 1987. Status Report for *Phacelia submutica*. Unpublished report prepared for the Colorado Natural Areas Program, Denver, CO.

Scheck, C. 1994. Special Status Plants Handbook Glenwood Springs Resource Area. Unpublished report prepared for the Bureau of Land Management, Glenwood Springs, CO.