

SEARLS' PRAIRIE CLOVER

Dalea searlsiae (A. Gray) Barneby
Plant Symbol = DASE3

Contributed by: USDA NRCS Idaho and Utah Plant Materials Program and USDA-ARS Forage and Range Research Laboratory



Gerald and Buff Corsi © California Academy of Sciences

Alternate Names

Petalostemon searlsiae A. Gray
Kuhnistera searlsiae (A. Gray) Kuntze

Uses

Plants of Searls' prairie clover are grazed by many animals including rabbits, deer, sheep and cattle. This legume forms a symbiotic association with soil bacteria (*Rhizobium spp.*) that allows fixation of atmospheric nitrogen, which can enhance forage nitrogen content for wildlife and livestock. Flowers are visited by pollinators, primarily bees, during bloom from June-July. Searls' prairie clover may have been more widely spread than its current distribution in the Great Basin, Colorado Plateau and the northern Mojave Desert prior to the arrival of

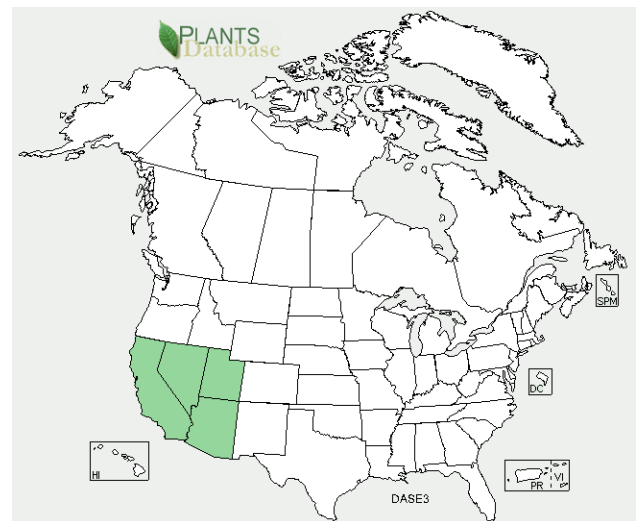
European settlers. The decline may be due to overgrazing. Searls' prairie clover can be used to diversify seeding mixtures for rangeland revegetation as well as for pollinator habitat enhancement, home landscaping and roadside planting.

Status

Consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g., threatened or endangered species, state noxious status, and wetland indicator values).

Description and Adaptation

General: Legume family (Fabaceae). Searls' prairie clover is a native, herbaceous legume with decumbent to erect stems. It was named after Fanny Searls who first collected it near the Pahranaagat Mines in southeastern Nevada in 1871 (Tiehm 1985). Plants range from 10-24 inches tall and arise from a shallow, woody base. The leaves are odd-pinnate with 3 or more glabrous leaflets with glands on the underside. Flower stalks bear a spike-like cluster of small pink- to purple-colored flowers that bloom from the base to the tip of the cluster. Although two ovules are present in each flower, only one seed matures per flower (Barneby 1977). The fruit is a small hairy pod with one seed, and there are approximately 148,000 seeds per pound based on seed counts from 17 wildland collections.



Searls' prairie clover distribution map from USDA-NRCS PLANTS Database.

Distribution: Searls' prairie clover is a perennial legume that occurs in portions of the Great Basin, Colorado

Plateau, and northern Mojave Desert in the states of Arizona, California, Nevada and Utah at elevations ranging from 3,000-7,500 feet above sea level (Barneby 1977, Cronquist et al. 1989, Welsh et al. 2008).

For updated distribution, consult the Plant Profile page for this species on the PLANTS Web site.

Habitat: Searls' prairie clover is commonly found on sandy or gravelly soils on flat areas, slopes and knolls in sagebrush, pinyon-juniper, warm-desert and cool-desert shrub plant communities that receive 6 to 14 inches of annual precipitation.



Kevin Connors USDA-ARS-FRRL, Logan, UT

Establishment

There is little known about direct seeding Searls' prairie clover. The USDA-NRCS Aberdeen, Idaho Plant Materials Center has direct-seeded this species into weed barrier fabric as a dormant planting. Seed was surface-planted by hand and pressed into the soil surface and allowed to naturally stratify over winter.

Transplants can be grown under greenhouse conditions, but seed must be scarified prior to planting to improve germination. As with many native legumes, Searls' prairie clover has a high percentage of hard seed (as high as 90 % or greater in one year old seed). Studies at the USDA-ARS Forage and Range Research Laboratory indicated that germination may be increased to more than 90 % when seed is scarified using a five-minute treatment

in 98 % concentrated sulfuric acid. Germination was also improved when seeds were scarified with sand paper. Additional studies are underway to examine seed treatments and seeding methods to improve germination and seedling establishment in Searls' prairie clover. Rhizobial strains that inoculate other perennial *Dalea* species (*D. purpurea* and *D. candida*) may be effective at nodulating *D. searlsiae*, but has not been evaluated. For details regarding inoculation of legumes refer to Miller et al. 2010.

The recommended full seeding drill rate is 7 pounds Pure Live Seed (PLS) per acre. When used as a component of a seed mix, adjust the rate to the percentage of the seed mix desired. If broadcast seeding, double the recommended seeding rate. Seedbed should be weed free and firm. Place seed to a depth of 1/4-1/2 inch with press wheels to ensure good seed-to-soil contact. Dormant seeding would likely help overcome at least some seed hardness.

Breeding Biology and Pollination

Cane et al. (2011) studied the breeding biology of Searls' prairie clover and found that this species exhibited limited self-compatibility and was primarily out crossing. From 847 flowering plants of Searls' and western prairie clover (*D. ornata*) at six native rangeland sites, Cane et al. (2011) collected 114 bees representing 22 species. The prevalent bees were from the genera *Athidium*, *Bombus*, *Colletes*, *Eucera* and *Melissodes*.

Management

Seedlings of Searls' prairie clover should be protected from grazing until plants are well established. Follow standard grazing practices that maintain the productivity and longevity of the stand.

The USDA-ARS Poisonous Plant Research Laboratory and the Utah Veterinary Diagnostic Laboratory have analyzed collections of Searls' prairie clover for toxicity. All samples had non-detectable levels of swainsonine and nitrotoxins and selenium contents that are well below levels of concern for grazing animals.

Pests and Potential Problems

Similar to western prairie clover, it would be expected that seed beetles (*Acanthoscelides oregonensis* Johnson (Chrysomelidae: Bruchinae) and *Apion (Pseudapion) amaurum* Kissinger (Brentidae: Apioninae) might infest seed and need to be excluded or controlled to productively produce seed of Searls' prairie clover (Cane et al. 2011).

Environmental Concerns

There are no known environmental concerns with Searls' prairie clover.

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

At present, there are no releases of Searls' prairie clover.

Twenty seed collections of Searls' prairie clover from Utah and Nevada were established in northern Utah for phenotypic evaluation by the USDA-ARS Forage and Range Research Laboratory (Bhattarai et al. 2011). Significant variation was detected among the collections for all traits measured in two common gardens. Biomass-related traits were closely associated with collection-site precipitation. Collections from northwestern Utah were genetically differentiated from those of southern Utah and Nevada by amplified fragment length polymorphism (AFLP) markers. Strong isolation by distance was observed between collections suggesting that genetic drift and gene flow are major factors in determining population structure in this species. As a result, two regional seed sources are being developed for Searls' prairie clover, one from northwestern Utah and the other from eastern Nevada and southern Utah.

References

- Barneby, R.C. 1977. Daleae imagines. *Memoirs of the New York Botanical Garden* 27: 232-234.
- Bhattarai, K., B.S. Bushman, D.A. Johnson, and J.G. Carman. 2011. Searls prairie clover (*Dalea searlsiae*) for rangeland revegetation: Phenotypic and genetic evaluations. *Crop Science* 51: 716-727.
- Cane, J.H., M. Weber, and S. Miller. 2011. Breeding biologies, pollinators and seed beetles of two prairie clovers, *Dalea ornata* and *D. searlsiae* (Fabaceae: Amorpheae), from the Intermountain West USA. *Western North American Naturalist* (submitted).
- Cronquist, A., A. H. Holmgren, N. H. Holmgren, J. L. Reveal, and P.K. Holmgren. 1989. *Vascular plants of the Intermountain West*. U. S. A. New York Botanical Garden, Bronx, NY.
- Miller, R., J. Kaiser, and D. Ogle. 2010. Legume Inoculation. USDA-NRCS, Boise, ID. TN 26 5 p.
- Tiehm, A. 1985. Fanny Searls (1851-1939). *Brittonia* 37: 41-43.
- Welsh, S.L., N.D. Atwood, S. Goodrich, and L.C. Higgins (eds.). 2008. *A Utah Flora*. Fourth Edition, Revised. Brigham Young University, Provo, UT.

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Citation

St. John, L, Tilley, D., Ogle, D. Johnson, D., Bushman, S. 2011. Plant guide for Searls' prairie clover (*Dalea searlsiae*). USDA-Natural Resources Conservation Service, Plant Materials Center, Aberdeen, Idaho 83210 and USDA-Agricultural Research Service, Forage and Range Research Laboratory, Logan, Utah 84322.

Published July 2011

Edited: [18 Apr2011ls; 24May2011dt; 24May2011dgo; 23May2011dj; 24May2011sb; 1june2011jab; 9June2011ls]

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