

ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM

Plant Abstract

Element Code: PDFABOF160

Data Sensitivity: No

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Astragalus beathii* Porter

COMMON NAME: Beath milk-vetch, Beath milkvetch, Beath's milkvetch

SYNONYMS: none

FAMILY: Fabaceae

AUTHOR, PLACE OF PUBLICATION: C.L. Porter, Madroño 6(1): 18-20, pl. 3. 1941.

TYPE LOCALITY: "Two miles south of Cameron, Coconino County, Arizona, June 14, 1939."

TYPE SPECIMEN: HT: RM. L.N. Goodding Sel. 34-39, June 14, 1939. IT: MO.

TAXONOMIC UNIQUENESS: >2,000 species worldwide, 380 in N. America (Hickman 1993), and > 6 dozen in Arizona (Epple 1995). Very difficult to identify, need both flower and fruit (Hickman 1993).

DESCRIPTION: Herbaceous perennial that is strongly malodorous fresh or dried, 2-6 dm (8-24 in) tall. Stems with parallel lines, ridges or furrows. Pinnate leaves 6-12 cm (2.4-4.7 in) long have 11-21 leaflets, with stiff, straight, appressed hairs when young, but hairless when mature; herbage deep green. Racemes 10-27 flowered, rather dense at first anthesis, the flowers ultimately spreading-ascending. Flowers bright purple, occasionally pale blue or white, drying violet; calyx with white hairs; banner recurved, and shallowly or deeply notched. Pods are leathery, hairless, straight or a trifle incurved. Ovules 29-52, seeds ocher- or chestnut-brown, sometimes purple-dotted, smooth but dull, 3.2-4.1 mm long.

AIDS TO IDENTIFICATION: *Astragalus beathii* is similar to *A. praelongus* (stinking milkvetch), and *A. preussii* (Preuss' milkvetch). It is easily distinguished from similar appearing plants by its fetid, ill-smelling scent. It is readily distinguished from its near relatives by the elongated, straight cylindrical, sessile or subsessile pods, white-purple to dark purple flowers and erect many-stemmed growth from a strong taproot (Porter 1941). Roth (2004), reports "*Astragalus beathii* resembles *A. pruessii* in statue and flower size. The closest known populations of *A. preussii* is in northern Coconino Co., in the vicinity of Navajo Bridge at Marble Canyon. The pods of *A. preussii* are stipitate and are erect or ascending."

ILLUSTRATIONS: Line drawing (Falk et al., 2001)

Color photos of plants and habitat (Barb Phillips, *in* Falk et al. 2001)

Color photo of Isotype (MO-1419715, *in*

http://mobot.mobot.org/cgi-bin/search_vast)

Color photos of plants and habitat (Daniela Roth, 2004)

TOTAL RANGE: Arizona, Coconino County: Lower valley of the Little Colorado River, with extant populations located between Gray Mountain and Cameron along US Hwy 89 and ca. 5 miles west of Cameron along State Hwy 64. One new population was found SW of Cameron off the highway. Populations previously reported from Navajo Bridge/Marble Canyon were misidentified, and are the species *A. preussii*. (Roth 2004).

RANGE WITHIN ARIZONA: See “Total Range.”

SPECIES BIOLOGY AND POPULATION TRENDS

GROWTH FORM: Herbaceous perennial.

PHENOLOGY: Flowers from late March through May; fruits persistent. According to Roth (2004), flowering takes place from mid March to early May. Some plants may also germinate and flower during the monsoon season in late July and August.

BIOLOGY: Abundant in wet years, less common in dry years. Forms extensive and conspicuous colonies but extremely local (Barneby 1964). Sexual reproduction can be very successful, given the proper germination moisture. Some adult plants die back to the roots in winter and refoliate the following Spring (Brian and Phillips 1982).

HABITAT: Red clay knolls and gullied dry washes on selenium bearing soils derived from Moenkopi sandstone at 4000-4800 feet. (Roth 2004).

ELEVATION: 4,000 – 4,800 ft. (1220-1464 m). The following elevations are based off the inclusion of the misidentified *A. preussii*: NatureServe (2003) reports 3,934–7,869 ft (1200-2400 m), and Falk et al. (2001) reports 3,385-5,415 ft (1032-1650 m).

EXPOSURE: All. Have been found on slopes of 5-10%.

SUBSTRATE: Gravelly red clay soils. Selenium bearing soils derived from sandstone in Moenkopi formations.

PLANT COMMUNITY: Great Basin desert scrub community (Brown 1994); mixed desert shrub. Associated species include: *Amsonia peeblesii* (Peebles' blue-stem), *Astragalus sophoroides* (Painted Desert milkvetch), *Atriplex confertifolia* (shadscale), *Chrysothamnus* sp. (rabbitbrush), *Cymopterus megacephalus* (large-leaf spring-parsley), *Ephedra torreyana* (Torrey's Mormon-tea), *Gutierrezia sarothrae* (broom snakeweed), *Phacelia welshii* (Welsh scorpion-weed), and *Stanleya pinnata* (desert prince-plume). (Roth 2004).

POPULATION TRENDS: Scarce to locally common. This species forms extensive, conspicuous colonies, but only in an extremely local area (NatureServe 2005). Populations fluctuate; abundant in years with wet winters, with limited germination and growth in dry years. The fungus *Macrophomina phaseoli* (Charcoal rot) invades plants stressed by factors such as frost or drought. (Falk and Jenkins et al., 2001).

Per Roth (2004), "Observations through 2 survey years indicate that although the species is locally much more abundant during wet springs, many of the seedling plants do not reach the reproductive stage and do not survive into the following year. Estimated change in plant numbers from 2003 to 2004 is 70-90% fewer individuals in 2004 over 2003 at all three sites."

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: None
STATE STATUS: None
OTHER STATUS: None (USDI, BLM AZ 2005)
[Bureau of Land Management Sensitive
(USDI, BLM AZ 2000)]
Group 4 (NNDFW, NESL 2005)

MANAGEMENT FACTORS: Habitat modifications are possible through road construction and the introduction of invasive species. Two of the three known populations are bisected by paved roads, one of which is scheduled to be widened within the next several years. Off-road vehicle traffic will likely impact all populations in the future due to the proximity of human inhabitations. Invasive species such as Tamarisk (*Tamarix* sp.), Russian thistle (*Salsola kali*), Camelthorn (*Alhagi maurorum*) and diffuse knapweed (*Centaurea diffusa*) have been observed in close proximity of *Astragalus beathii*. During recent surveys (2003-2004), seed pods were observed to contain a species of weevil which was eating the seeds. No livestock damage other than trampling was observed. In addition, a fungus apparently obliterated a population of *A. beathii* west of Cameron. Future fungus outbreaks could impact the continued existence of this species because the three extant populations lie within 5 miles of each other. (Roth 2004).

PROTECTIVE MEASURES TAKEN: none

SUGGESTED PROJECTS: Long term monitoring studies are highly recommended to track the fate of populations through time (Roth 2004).

LAND MANAGEMENT/OWNERSHIP BIA - Navajo Nation

SOURCES OF FURTHER INFORMATION

REFERENCES:

- Barneby, R.C. 1994. Atlas of North American Astragalus. *In* Memoirs of the New York Botanical Gardens, Vol. 13., Pp. 583-583.
- Brian, N., and B.G. Phillips. 1982. Status report, submitted to Office of Endangered Species, U.S. Fish & Wildlife Service, U.S. Department of the Interior. 12 pp.
- Brown, D. ed. 1994. Biotic Communities of the Southwestern United States and Northwestern Mexico. University of Utah Press. Salt Lake City, Utah. Pp. 145-155.
- Epple, A.O. 1995. A Field Guide to Plants of Arizona, Falcon Publishing Co. Helena, Montana. P. 105.
- Falk, M., P. Jenkins, et al; Arizona Rare Plant Committee. 2001 Arizona Rare Plant Guide. Published by a collaboration of agencies and organizations. Pages unnumbered.
- Hickman, J.C. 1993. The Jepson Manual, Higher Plants of California. University of California Press. Berkeley, California. P. 583.
- Integrated Taxonomic Information System (ITIS). Retrieved 8/12/2003 from ITIS, <http://www.itis.usda.gov>.
- Kearney, T.H., R.H. Peebles with collaborators. 1951. Arizona flora. Second edition with supplement by J.T. Howell, E. McClintock and collaborators. 1960. University of California Press. Berkeley, California. P. 464.
- McDougall, W.B. 1973. Seed Plants of Northern Arizona. The Museum of Northern Arizona. Flagstaff, Arizona. P. 250.
- Missouri Botanical Garden – TROPICOS, Nomenclatural Data Base. *Astragalus beathii* Ch. Porter. http://mobot.mobot.org/cgi-bin/search_vast. Accessed: 12 Aug 2003, 7 Sep 2005.
- NatureServe. 2003. NatureServe Explorer: An online encyclopedia of life [web application]. Version 1.8. Arlington, Virginia. Available: <http://www.natureserve.org/explorer>. (Accessed: August 12, 2003).
- NatureServe. 2005. NatureServe Explorer: An online encyclopedia of life [web application]. Version 4.5. NatureServe, Arlington, Virginia. Available: <http://www.natureserve.org/explorer>. (Accessed: September 7, 2005).
- Navajo Nation Department of Fish and Wildlife. 2005. Navajo Endangered Species List. The Navajo Nation. Window Rock, Arizona. P. 3.
- Porter, C.L. 1941. A new species of *Astragalus* from Arizona. *Madroño*. 6: 18-22.
- Rickett, H.W., W.C. Steere, V.J. Beasely, W.E. Niles, and collaborators. 1970. Wild Flowers of The United States, The Southwestern States, Southern California, Arizona and New Mexico. Volume Four, Part Two of Three Parts. The New York Botanical Garden, McGraw-Hill Book Company. New York. P. 406.
- Roth, D. 2004. Status Report: *Astragalus beathii*, Beath's Milk-vetch. Navajo Natural Heritage Program, P.O. Box 1480, Window Rock, AZ 86515.
- SEINet. Collections Search Result. Accessed 9/7/2005 at <http://seinet.asu.edu/collections/list.jsp>.
- USDA, NRCS. 2002. The PLANTS Database, Version 3.5 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.
- USDI, Bureau of Land Management. 2000. Arizona BLM Sensitive Species List. Instruction

Memorandum No. AZ-2000-018.
USDI, Bureau of Land Management. 2005. Arizona BLM Sensitive Species List.

MAJOR KNOWLEDGEABLE INDIVIDUALS:

Daniela Roth – Navajo Natural Heritage Program, Flagstaff, Arizona.
Dr. Rupert Barneby - New York Botanical Garden, Bronx, New York.
Nancy Brian - Oregon.
Barb Phillips - Botanist, Coconino National Forest, Flagstaff, Arizona.
Dr. James M. Rominger - Biology Department, Northern Arizona U., Flagstaff, Arizona.

ADDITIONAL INFORMATION:

A. beathii is a poisonous malodorous plant avoided by animals (Barneby 1964).
The flower color ranges from dark purple to almost white (Brian and Phillips 1982).

Revised: 1998-12-15(RHB)
2003-08-28 (SMS)
2005-09-09 (SMS)

To the user of this abstract: you may use the entire abstract or any part of it. We do request, however, that if you make use of this abstract in plans, reports, publications, etc. that you credit the Arizona Game and Fish Department. Please use the following citation:

Arizona Game and Fish Department. 20XX (= **year of last revision as indicated at end of abstract**). X...X (= **taxon of animal or plant**). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. X pp.