ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM

Plant Abstract **Element Code:** PDCAC0J0V0

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Sclerocactus whipplei*
COMMON NAME: Whipple Fishhook Cactus
SYNONYMS: *Echinocactus whipplei, Ferocactus whipplei, Pediocactus whipplei*
FAMILY: Cactaceae

AUTHOR, PLACE OF PUBLICATION: Britton, Nathaniel Lord and Joseph Nelson Lord. The Cactaceae, descriptions and illustrations of plants of the cactus family 3: 149. 1922.

TYPE LOCALITY: United States: Colorado Chiquito

TYPE SPECIMEN: MO 313090. John M Bigelow (#SN). 1852.

TAXONOMIC UNIQUENESS: The most recent classification review of *Sclerocactus* is by Heil and Porter in 2001. They recognize four species within Arizona: *S. papyracanthus, sileri, whipplei* and *parviflorus*.

DESCRIPTION: Stem usually unbranched, depressed-spheric, or spheric to elongate-cylindric, 3-7(-14) × 4-9(-11) cm; ribs 13-15, tubercles usually evident on ribs. Spines densely covering stem; radial spines (5-)7-12 per areole, white except for abaxial 2 that are usually purplish pink, 0.6-27 mm; central spines 4(-5) per areole, terete to angled; abaxial central spine 1 per areole, purplish pink or reddish brown, somewhat angled, hooked, 16-45(-55) × 0.5-1 mm; lateral central spines 2 per areole, directed toward stem apex, purplish pink to white, 14-45 × 0.5-1 mm; adaxial central spine white, usually flat, ribbonlike or dagger-shaped, 17-65(-70) × 1.5-2(-3) mm. Flowers funnelform to campanulate, (1.5-)2.2-3.2 × 1.5-3.5 cm; outer tepals with greenish or reddish midstripes and yellow margins, oblanceolate, to 24 × 5 mm; inner tepals yellow, oblanceolate, to 30 × 6 mm; filaments yellow; anthers yellow; ovary minutely papillate, appearing smooth. Fruits irregularly dehiscent, green to tan, often reddish at maturity, ovoid, 10-25 × 6-15 mm, dry; scales few, scarious margined, minutely toothed, membranous-fringed. Seeds black, 2 × 2 mm, shiny; testa with rounded papillae.

AIDS TO IDENTIFICATION: The key provided by Heil and Porter (2001) can be used to distinguish *S. whipplei* from the other three species:

Central spines round to rhomboidal in cross section (not papery, flattened and flexible), the lower centrals strongly hooked.

Fruit indehiscent or dehiscing along a basal suture, flowers rose to purple, pink, yellow or rarely white; stems 3-27cm tall; upper central spine flat and ribbon-like in cross section, flower buds rounded apically, stems mostly 3-7 cm long……*S. whipplei*.

ILLUSTRATIONS:

Photos, Herbarium Mounts: http://swbiodiversity.org/seinet/taxa/index.php?taxon=Sclerocactus whipplei.
Photos, Herbarium Mounts: http://eol.org/pages/587488/media.

TOTAL RANGE: Southern and southeast Utah, northern and northeast Arizona, extreme northwest New Mexico, and also reported from extreme southwest Colorado.

RANGE WITHIN ARIZONA: Extreme northeast Mohave County, mostly north of Cedar Ridge and Pipe Springs NM but also found further south in Hack Canyon; north-central Coconino County around the Vermillion Cliffs/ Paria Plateau locality; the northern two-thirds of Navajo County, from Winslow-Holbrook north to Kayenta; and the northern half of Apache County, around Canyon de Chelly and Lukachukai.

SPECIES BIOLOGY AND POPULATION TRENDS

GROWTH FORM: Perennial succulent.

PHENOLOGY: Flowering late April-May (eFlora 2015). Flowers were noted from Arizona collections as early as March 29 to June 8-9. Fruits were noted from May 10 to July 18.

BIOLOGY:

HABITAT: Great Basin desert scrub, open pinyon-juniper woodland and desert grassland communities on gravelly or sandy hills, canyon rims, mesas. Cryptogamic (microbiotic) soil cover may be very high, in the neighborhood of 80 percent (EOL 2015).

ELEVATION: 4900 to 5900 or 7200 feet (1500-1800 or 2200m) have been reported in the literature (eFloras, EOL). Collections made in Arizona range from 3800 – 7200 feet (1160-2200m).

EXPOSURE: Not defined, but sometimes noted as southerly.

SUBSTRATE: Most often associated with sandy or sandy-gravelly areas (Navajo and Chinle sandstones mentioned, as well as Moenkopi formation substrates).

PLANT COMMUNITY: Great Basin desert scrub, open pinyon-juniper woodland and desert grassland communities. Associated species: *Gutierrezia sarothrae, Atriplex, Sporobolus cryptandrus, Artemisia bigelovii, A. tridentata, A. campestris, A. carruthii, Opuntia polyacantha, Ephedra viridis, Tiquilia latior, Bouteloua gracilis, Pinus edulis, Chrysothamnus nauseosus, Yucca baccata, Bromus tectorum, Chaetopappa ericoides, Streptanthella longirostris, Yucca angustissima, Pleuraphis jamesii, Juniperus osteosperma, Fallugia brachycrea, Eriogonum corymbosum glutinosum, E, microthecum, Muhlenbergia arsenei, Yucca baileyi, Echinocereus mojavensis, Eremogone eastwoodiae, Pectis angustifolia, Portulaca oleracea, Monroa squarrosa, Sphaeralcea ambigua, Physaria arizonica, Thamnosma montana, Rhus trilobata, Townsendia incana, Achnatherum hymenoides, Cryptantha flava, C. cinerea, Krascheninnikovia lanata, Muhlenberia pungens, Oenothera pallida pallida, Dimorphocarpa wislizeni, Ipomopsis longiflora neomexicana, Erysimum captiatum, Mirabilis linearis, Portulaca halimoides, Cuscuta occidentalis, Helianthus petiolaris fallax, Penstemon ambiguous, Chrysothamnus greenei, Abronia elliptica, Ambrosia acanthicarpa, Stephanomeria exigua, Dieteria canescens aristata, Tradescantia occidentalis, Artemisia filifolia, Opuntia aurea, Schkuhria multiflora, Townsendia incanum, Chrysopsis villosa, Astragalus tephrodes, A. ceramicus, Trtradymia canescens, Quercus turbinella, Q. gambelii, Dasyolchloa pulchella, Achnatherum hymenoides, Euphorbia parryi, Heliotropium convolvulaceum, Coleogyne ramosissima, Hilaria jamesii, Frasera paniculata, Malacothrix glabrata, Pinus monophylla*

POPULATION HISTORY AND TRENDS: The 2013 status review for IUCN stated that the species is locally abundant, however the subpopulations are scattered. The population size is of thousands of individuals. It was classed as a species of Least Concern. The trend was indicated as stable. *S. whipplei* is widely distributed throughout northern Arizona with 32 known collection sites. Collectors ranked the populations from rare or scarce to fairly common. Although the Arizona collections do not appear to reflect the "locally abundant" description, many of the collections were found on protected lands (e.g., National Monuments), which should help to maintain the species.

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: None.
STATE STATUS: Salvage Restricted (ARS, ANPL 1999)
OTHER STATUS: Appendix II (CITIES, 1975)

MANAGEMENT FACTORS: Grazing, oil and gas exploration are major threats to this species.

PROTECTIVE MEASURES TAKEN: Plants in the Navajo Indian Reservation are provided some protection (Canyon de Chelly NM). It also occurs in Painted Desert National Park. However, the subspecies *heilii* and *brackii* have no protection. Other populations are found on other protected lands such as Pipe Springs N.M., Vermillion Cliffs NM, Paria-

Vermillion Cliffs Wilderness Area, Cottonwood Point WA, Lone Butte ACEC, and within Grand Canyon NP.

SUGGESTED PROJECTS:

LAND MANAGEMENT/OWNERSHIP: About one-third of the known collection sites are within the BIA- Navajo Nation. Another third are found within the combined Vermillion Cliffs NM and Paria-Vermillion Cliffs Wilderness Area. Six more sites are on National Park lands. The remaining sites are on BLM, State Land Trust, or private land holdings.

SOURCES OF FURTHER INFORMATION

REFERENCES:

Encyclopedia of Life (EOL), accessed 4/1/2015, http://eol.org/pages/587488/details.
Flora of North America (eFlora), accessed 4/1/2015, http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=242415283.
Heil, Kenneth D, and J. Mark Porter. 2001. Vascular Plants of Arizona: Cactaceae Part Five: *Pediocactus* and *Sclerocactus*. Jouor. Ariz-Nev Aca Sci. 33(1): 9-18.
JStor|Global Plants, accessed 4/1/2015, http://plants.jstor.org/stable/10.5555/al.ap.specimen.mo-313090.
Tropicos, accessed 4/1/2015, http://www.tropicos.org/Name/5100458.

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ADDITIONAL INFORMATION: *Sclerocactus whipplei*, is one of the more distinctive species, characterized by yellow flowers and the flattened, somewhat daggerlike, adaxial central spine directed toward the stem apex. Similar species are *S. sileri*, of northeast Coconino County, Arizona , and the yellow-flowered populations of *S. parviflorus*, often referred to as subspecies *terrae-canyonae* (K. D. Heil) K. D. Heil & J. M. Porter. However, *S. sileri* lacks the daggerlike adaxial central spines, has fruits that dehisce by vertical slits and flowers that are usually a more pale yellow to nearly white, often suffused with brown. *Sclerocactus parviflorus* similarly lacks the daggerlike adaxial central spines and possesses larger stems and flowers (eFloras 2015).

Chloroplast DNA sequence data (J. M. Porter et al. 2000) support close relationships among *Sclerocactus whipplei*, *S. parviflorus*, and *S. cloverae*. Both *S. whipplei* and *S. parviflorus* possess identical DNA profiles for the gene studied (eFloras 2015).

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