

**ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM**

Plant Abstract

Element Code: PMAGA01030
Data Sensitivity: YES

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Agave arizonica*
COMMON NAME: Arizona Agave, Arizona century plant
SYNONYMS: *Agave x arizonica*
FAMILY: Agavaceae

AUTHOR, PLACE OF PUBLICATION: Gentry, H.S. and J.H. Weber, Cactus and Succulent Journal [U.S.] 42: 223, f. 1-2. 1970.

TYPE LOCALITY: Near the summit of the New River Mountains, Arizona, near Maricopa-Yavapai county line.

TYPE SPECIMEN: HT: US. J.H. Weber s.n. Live plant collected; flowered at Desert Botanical Garden (60-6628), Phoenix, 1-7 June 1968. Specimen prepared from transplant: leaf and flower. Clonal type is still living. IT: ASU, DES.

TAXONOMIC UNIQUENESS: Species *arizonica* is 1 of 34 in the genus *Agave*. Within the Urceolatae Group of *Agave*, distinguished by their small size, subspicate inflorescence, small flowers and urn-shaped flower form. Per NatureServe (2002), "Recognized in Kartesz (1999 Synthesis) as a species. The US Forest Service believed to be a hybrid, and petitioned the US Fish and Wildlife Service to delist it from the ESA. The USFWS did not find conclusive evidence supporting the USFS view, and the federal Endangered status was not changed (Federal Register Vol. 52, No. 13, 1987). Proposed federal policy on hybrids (2/96 FR) also maintain ESA protection. Kartesz (pers. comm. to L. Morse, 12/99) noted that his treatment is following H.S. Gentry's 1982 *Agave* book. DeLamater and Hodgson (1987) considered the entity a species of recent hybrid origin." This hybrid origin is between *A. chrysantha* and *A. toumeyana* var. *bella*, and based on controlled pollination studies done at the Desert Botanical Garden (DBG). See **BIOLOGY** for further discussion.

DESCRIPTION: Small, dense rosette, 40 cm (15.7 in) wide, and 30 cm (11.8 in) high. Leaves deep green with a reddish-brown (mahogany) to light gray callose margin (although considerable variation in color may occur) extending nearly to the base; 13.0-31.0 cm (5-12.2 in) long, 2.0-4.0 cm (0.8-1.6 in.) wide; broadest at middle of leaf. Marginal teeth curve downward, denser toward the base, to 5.0 mm (0.2 in.) long; terminal spine 1.0-2.5 cm (0.4-1.0 in.) long. Inflorescence is borne on stalks 3-4 m (9.8-13 ft) tall, with 35-50 short, lateral branches. Pale yellow um-shaped flowers, in dense clusters of 10-20, are 25.0-32.0 mm (1.0-1.28 in.) long; tepals clasping filaments. Fruits are dry pods, 2 cm long; splitting into three sections when dry.

AIDS TO IDENTIFICATION: The larger *A. chrysantha* is a central Arizona endemic; flowers deep yellow, leaves pointing out, a deep green to glaucous-blue with faint coloration on the leaf margin, with large teeth; occurs in Arizona Upland habitats. *A. toumeyana* var. *bella* is a small, dense rosette, small white flowers off stalk (spicate) with fibers on the leaf margin; occurs in chaparral and pinyon-juniper woodland. Habit suggests that of Organ Pipe National Monument *A. schottii treleasei*.

ILLUSTRATIONS: Line drawings of leaf, flower and capsule (Gentry 1980 Fig. 11.4:255).
B&W photos of inflorescence (Gentry 1982 Figs. 11.5-11.6:256).
B&W photo of natural habitat (Gentry 1982 Fig 11.7:256).
Line drawing. USFWS.
B&W line drawing of plant and parts (FWS in ARPC 2001)
Color photo (ARPC 2001)
Color photo (DBG 1999,
http://www.dbg.org/Collections/agave_arizonica.html)
Color photos (Faucon 1998-2003, in
http://www.desert-tropicals.com/Plants/Agavaceae/Agave_arizonica.html)
Color photo (Lynda Pritchett-Kozak, accessed 4/30/2003 from
http://ridgwaydb.mobot.org/cpcweb/CPC_ProfileImage.asp?FN=44a)

TOTAL RANGE: Central Arizona. New River Mountains, Maricopa and Yavapai counties; Green Valley Hills (SE of Payson) and Sierra Ancha Mountains, Gila County.

RANGE WITHIN ARIZONA: See "Total Range."

SPECIES BIOLOGY AND POPULATION TRENDS

GROWTH FORM: Perennial succulent; monocarpic.

PHENOLOGY: Flowers May to July. Hummingbirds, insects (sweat bees, halactids, and bumblebees) major pollinators.

BIOLOGY: Plants mature in 22-35 years; flower once, then die. Suckers produced (producing of pups from base of mother plant) sparingly. Seed production, albeit low, known in wild. Tolerates poor soil and drought, but requires good drainage. Has been suggested to be hybrid. Yatskiyevych (198?) collected plant resembling *A. arizonica* (probably a hybrid involving *A. palmeri* and *A. parviflora* resulting in a plant morphology similar to *A. arizonica*) along Ruby Road; identification in question and additional plants not relocated. According to Hodgson, 1994, this plant morphologically similar to *A. arizonica*. However, putative parents not the same raising taxonomic questions.

HABITAT: Open, rocky slopes and mesas in Sonoran desertscrub, chaparral, or juniper-grassland, 3,600-5,800 ft (1095-1765 m) elevation (ARPC 2001).

ELEVATION: 3,600 – 5,820 ft. (1098 - 1,775 m).

EXPOSURE: Various. In Gila County, this species was found on an east-facing slope with about a 50% grade.

SUBSTRATE: Mixed gravelly loam from Mazatzal quartzite and other parent materials of volcanic origin including basalt. Granitic outcrops.

PLANT COMMUNITY: Open chaparral; Desert Grassland; transition between grassland and pinyon-juniper zone. Associated plant species include: *Agave chrysantha*, *Agave toumeyana* var. *bella*, *Cheilanthes* spp., *Echinocereus fasciculatus*, *Opuntia* spp., *Quercus turbinella*, *Q. dunnei*, *Q. engelmannii*, *Juniperus monosperma*, *Juniperus deppeana*, *Juniperus* spp., *Cercocarpus montanus*, *Prosopis velutinus*, *Pinus edulis*, *Yucca baccata*, *Eriogonum wrightii*, *Dasyilirion wheeleri*, *Gutierrezia sarothrae*, *Bromus rubens*, *Festuca pacifica*, *Muhlenbergia* sp., and *Sporobolus* sp.

POPULATION TRENDS: Very poor reproduction, cloning evident. Stability of population unknown. As of December 1990, 62 clones (sites) were known. This included one clone southeast of Payson, two clones in Parker Creek and the remainder in New River Mountains, primarily in upper Cave Creek drainage. Densest area of *A. arizonica* is in Benchmark Mountain vicinity. Two additional clones in New River Mountains located during 1992.

SPECIES PROTECTION AND PRESERVATION

ENDANGERED SPECIES ACT STATUS: LE (USDI, FWS 1984, without Critical Habitat)
[C1 USDI, FWS 1980]
[PE USDI, FWS 1976]
[PT-E USDI, FWS 1975]

STATE STATUS: Highly Safeguarded (ARS, ANPL 1999)
[Highly Safeguarded (ARS, ANPL 1993)]

OTHER STATUS: Forest Service Sensitive (USDA, FS Region 3
1999)
[Forest Service Sensitive, USDA FS Region 3
1990]

MANAGEMENT FACTORS: Limited distribution and low numbers (50-60 clones). Herbivore of flower stalks by cattle and deer; loss of flower stalk before maturity prevents potential seed production, decreasing reproductive rates. Rodents tunnel up caudex and eat roots and caudex. Snout-weevil beetles damage plants and transmit (or make the plant susceptible to) a fungal disease which can kill the plant within a single year. Plants are "collectible" but difficult to find. They are extremely slow to reproduce, and will not repopulate an area easily.

CONSERVATION MEASURES TAKEN: A Cooperative Agreement between Tonto National Forest and Desert Botanical Garden (DBG) signed in 1990. DBG constructed an enclosure around transplants in a 20m x 30m square area to study factors influencing transplanted plants. To be an experimental plot in the New River Mountains at Little Squaw Peak monitored by Liz Slauson of the DBG.

Benchmark Mountain enclosure, containing individual clones, fenced in 1990/1991; monitoring plots established here by DBG. One clone (8-12 plants) at Parker Creek, Sierra Ancha Mountains also fenced.

Allotment Management Plan for New River Allotment (signed 1989) requires water developments to be placed greater than one-half mile from *A. arizonica* clones, fences to be one-quarter mile from clones keeping cattle out of pastures where clones are present during flowering periods. These considerations made to reduce livestock density and trailing in close proximity to *A. arizonica* clones.

Agave arizonica is considered Endangered² by the IUCN (Walter and Gillett 1998), and is also listed on Appendix I of CITES as of July 29, 1983 (Mathew 1994).

SUGGESTED PROJECTS: Investigations to determine taxonomic status; cross-pollination studies; electrophoretic DNA studies. Monitoring of known clones and fencing to protect from livestock. Determine effect of fire on *A. arizonica*.

Additional surveys, especially on the east flank of the Mazatzal Mountains (along the route of Highway AZ 87 from the Verde River to the top of the pass) where no specimens have yet been found; more surveys in Star Valley. Surveys in areas where the presumed "parent" plants (*A. chrysantha* and *A. toumeyana bella*) are sympatric should receive highest priority; generally between 3,400 - 5,500 feet elevation.

Development of *A. arizonica* management plan on the Tonto National Forest by the Forest Service.

LAND MANAGEMENT/OWNERSHIP: USFS - Tonto National Forest (Grazing Allotments: New River; Star Valley; and Bronco); Private.

SOURCES OF FURTHER INFORMATION

REFERENCES:

- Andersen, L. and P. Fenner. 1992. *Agave arizonica* study 1992. Six Bar Allotment. U.S. Forest Service, Tonto National Forest, Cave Creek Ranger District.
- Arizona Rare Plant Committee (ARPC). 2001. Arizona Rare Plant Field Guide. A Collaboration of Agencies and Organizations, U.S. Government Printing Office.
- Arizona Revised Statutes. 1993. Arizona Native Plant Law, Appendix 5.

- Arizona Revised Statutes. 1999. Arizona Native Plant Law, Appendix 5.
- Burgess, T. 1985. *Agave* adaptation to aridity. *Desert Plants* 7(2):39-50.
- Day, B. and P. Fenner. 1990. *Agave arizonica* survey on Bronco, Six Bar and Ike's Backbone Allotments. U.S. Forest Service, Tonto National Forest, Cave Creek Ranger District.
- DeLamater, R., and W. Hodgson. 1987. *Agave arizonica*: an endangered species, a hybrid, or does it matter? Proceedings of a California conference on the conservation and management of rare and endangered plants. Thomas Elias, ed. Publication of the California Native Plant Society. pp. 305-309.
- Desert Botanical Garden (DBG). 1999. *Agave x arizonica* Gentry & J. Weber, Arizona *Agave*, web publication. http://www.dbg.org/Collections/agave_arizonica.html. Accessed: 4/30/2003.
- Fletcher, R. 1978. USFS Status Report. U.S. Forest Service, Region 3, Albuquerque, New Mexico.
- Gentry, H.S. 1970. Two new agaves in Arizona. *Cactus and Succulent Journal of the Cactus and Succulent Society of America*. 42:223-228.
- Gentry, H.S. 1982. *Agaves of continental North America*. University of Arizona Press, Tucson. pp. 254-257.
- Hodgson, W. 1994. Bureau of Land Management Safford District Rare Plant Workshop. November 14-16. Tucson, Arizona.
- Hodgson, W. and R. DeLamater. 1988. *Agave arizonica* Gentry & Weber. Summary of status and report on recent studies. Desert Botanical Garden, Phoenix, Arizona. 11 pp.
- Hurd, . and L. Albee. 1976. Report on *Agave arizonica* submitted to USDA Forest Service. Integrated Taxonomic Information System (ITIS). Retrieved 4/30/2003 from ITIS, <http://www.itis.usda.gov>.
- Kvale, R., G. Boice, P. Fenner, and D. Rhea. 1989. New River allotment management plan. Tonto National Forest, Cave Creek Ranger District.
- Lehr, J.H. 1978. A catalogue of the flora of Arizona. Desert Botanical Garden, Phoenix, Arizona. p. 33.
- Mathew, B., ed. 1994. CITES Guide to Plants in Trade. CITES Department of Environment. Missouri Botanical Garden – TROPICOS, Nomenclatural Data Base. *Agave arizonica* Gentry & J.H. Weber. <http://mobot.mobot.org/>. Accessed: 30 Apr 2003.
- NatureServe Explorer: An online encyclopedia of life [web application]. 2002. Version 1.6. Arlington, Virginia, USA: NatureServe. Available: <http://www.natureserve.org/explorer>. (Accessed: April 30, 2003).
- USDA, Forest Service Region 3. 1990. Regional Forester's Sensitive Species List.
- USDA, Forest Service Region 3. 1999. Regional Forester's Sensitive Species List.
- USDA, NRCS. 2002. The PLANTS Database, Version 3.5 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.
- USDI, Fish and Wildlife Service. 1975. Threatened or Endangered Fauna or Flora: Review of Status of Vascular Plants and Determination of A Critical Habitat@; Notice of Review. *Federal Register* 40(127):27828.
- USDI, Fish and Wildlife Service. 1976. Endangered and Threatened Wildlife and Plants: Proposed Endangered Status for some 1700 U.S. Vascular Plant Taxa; Proposed Rule. *Federal Register* 41(117):24551.

- USDI, Fish and Wildlife Service. 1980. Endangered and Threatened Wildlife and Plants: Review of Plant Taxa for Listing as Endangered or Threatened Species; Notice of Review; Proposed Rule. Federal Register 45(242):82485.
- USDI, Fish and Wildlife Service. 1983. Proposal to determine *Agave arizonica* to be an endangered species. Federal Register. 48(99):22757-22760.
- USDI, Fish and Wildlife Service. 1984. Final rule to determine *Agave arizonica* (Arizona agave) to be an endangered species. Federal Register 49(98):21055-21058.
- USDI, Fish and Wildlife Service. 1986. Findings on petitions and initiation of status reviews. Federal Register 51(85):16363-16365.
- U.S. Fish and Wildlife Service, International Affairs. Web publication. *Agave arizonica*, Arizona Agave. <http://international.fws.gov/animals/agarizon.html>. Accessed: 4/30/2003.
- U.S. National Herbarium Type Specimen Register (US). <http://rathbun.si.edu/botany/types/>. Accessed: 4/30/2003.
- Walter, K.S. and H.J. Gillett, Eds. 1998. 1997 IUCN Red List of Threatened Plants. Compiled by the World Conservation Monitoring Center. IUCN – The World Conservation Union, Gland, Switzerland. 1xiv + 862 pp.

MAJOR KNOWLEDGEABLE INDIVIDUALS:

- Patti Fenner - Cave Creek Ranger District, Tonto National Forest, Cave Creek, Arizona.
- Reggie Fletcher - USFS Regional Ecologist, Albuquerque, New Mexico.
- Wendy Hodgson - Desert Botanical Garden, Phoenix, Arizona.
- Art Phillips - Private Consultant, Flagstaff, Arizona.
- Barb Phillips - USFS Zone Botanist, Coconino, Kaibab and Prescott National Forests, Flagstaff, Arizona.
- Liz Slauson - Desert Botanical Garden, Phoenix, Arizona.

ADDITIONAL INFORMATION:

Revised:	1990-03-09 (SST)
	1990-10-15 (SR)
	1991-10-18 (BKP)
	1992-09-16 (BKP)
	1995-02-28 (WCH)
	1997-11-05 (SMS)
	2003-05-01 (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.