ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM

Plant Abstract **Element Code:** PDCAC05032
Data Sensitivity: Yes

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Echinocactus polycephalus* var. *xeranthemoides* Coult.
COMMON NAME: Cotton-top cactus, Cottontop cactus, Cottontop barrel cactus, Many-headed barrel cactus.
SYNONYMS: *Echinocactus xeranthemoides* (Coult.) Engelm. ex Rydb., *E. polycephalus* subsp. *xeranthemoides* (J.M. Coult.) N.P. Taylor
FAMILY: Cactaceae

AUTHOR, PLACE OF PUBLICATION: J.M. Coult., Contr. U.S. Natl. Herb. 3(7): 358. 1896.

TYPE LOCALITY: Type: 1883, USA: Arizona?
LT: Nov. 1881, "Kanab Wash near the Rio Colorado, northern Arizona", Arizona (Southwestern U.S.A., Northern America).

TYPE SPECIMEN: Type: Siller ? s.n., 1883 (MO). Possible type; J.C. Solomon 1979.
LT: A.L. Siler s.n., Nov. 1881 (MO).

TAXONOMIC UNIQUENESS: *E. polycephalus* is 1 of 3 species in the genus *Echinocactus*, and 1 of 2 in Arizona. Two varieties of *E. polycephalus* occur in Arizona including, *E.p.* var. *polycephalus* and *E.p.* var. *xeranthemoides*.

DESCRIPTION: This is the only barrel in Arizona that branches under normal conditions. Plants branched from the base forming compact mounds of 2-50(-130) branches. Stems are gray-green to yellow-green, spheric to short cylindric, 15-40 x (9-)15-30 cm; 11-25 ribs usually vertical, or somewhat helically curving around the stem, the rib crests not constricted between areoles, sharp, with flat sides. Spines 10-19 per areole, straight to curved but not hooked, often twisted, red to straw colored, flattened to abaxially ridged, annulate-ridged, nearly obscuring stem surfaces, canescent, puberulent, or glabrous. Radial spines 6-14 per areole; central spines 4, abaxial frequently longest, straight to somewhat recurved. Flowers 5.5-5.8 x 4.6 cm, narrower when spines restrict the flower from opening fully; inner tepals bright yellow, color uniform from base to apex, 24-26 mm, sparsely, minutely toothed; stigma lobes bright yellow. Fruits are dehiscent through basal abscission pore, ovoid, surfaces largely hidden by hairs in axils of scales and long areolar trichomes of stem apex, usually drying to tan shell before seed dispersal. Fruit scales are tan, yellow, or reddish, aging yellow, 16-30 mm, usually longer than dried tepals at fruit apex. The seeds are rounded (rarely faceted), and 2.4-3.1 mm, smooth (exposed surfaces of testa cells flat or slightly convex, uniformly shiny). (Benson 1982; Chamberland 1997 in FNA 1993+; FNA 1993+).

AIDS TO IDENTIFICATION: Per FNA (1993+), the fruit scales in var. *xeranthemoides* are 16-30 mm, reddish, tan, or yellow, aging yellow, usually protruding beyond the dried perianth parts on the fruit; seed is smooth (exposed surfaces of testa cells flat or slightly convex, surfaces uniformly shiny). The scales in var. *polycephalus* are 10-14 mm, reddish to maroon, aging tan to black, not protruding beyond the dried perianth parts on the fruit; seed papillate-roughened (exposed surfaces of testa cells protruding, hemispheric to hexagonally faceted, appearing dull except for the microscopically sparkling individual facets).

According to Benson (1982), var. *polycephalus* is found at 30-750 m in altitude in the Mojavean and Sonoran deserts; has stems in clumps of 10-30, the longest in the middle; spines are densely canescent, the felt peeling away in sheets; seeds are irregularly obovoid-oblong, markedly papillate-reticulate, not shiny. Var. *xeranthemoides* is found from 1080-1500 m (3,800-5,000 ft) elevation in the Navajoan Desert and the edge of Northern Juniper-Pinyon Woodland; stems in clumps of 5-12 or solitary, the longest on the margin; spines are glabrous or glabrate with hairs falling away separately; seeds are obovoid, papillate-reticulate but the pattern not prominent, shiny.

ILLUSTRATIONS: Color photos of Type and LT (MO, http://mobot.mobot.org/cgi-bin/search_vast)
Color photo (http://www.calflora.net/)
Color photo of plant in habitat (CA Acad. Sci. 1999, *in* CalPhotos http://elib.cs.berkeley.edu/)
Color photo (http://www.desert-tropicals.com)
Color photo (http://www3.nau.edu/cline/)
B&W drawing (Arizona-Sonora Desert Museum, 2000)
Color photos (Benson, 1982: fig. 750-754)
Color photos (Gary A. Monroe, *in* USDA, NRCS 2004 at http://plants.usda.gov/intellect.html)

TOTAL RANGE: Navajoan Desert in northern Arizona (Coconino, Mohave Co.), and southern Nevada (Clark Co.). According to FNA (1993+), although this variety has "been reported for southern Utah (L.D. Benson 1982; D.J. Ferguson 1992; G. Unger 1992), M. Chamberland (1995, 1997) found neither populations nor herbarium specimens from the past 100 years."

RANGE WITHIN ARIZONA: North and western Arizona in Mohave and Coconino County, including in the vicinity of Lake Mead, on the Grand Canyon NP, base of Vermillion Cliffs, and in the Little Colorado River drainage on the Navajo Nation.

SPECIES BIOLOGY AND POPULATION TRENDS

GROWTH FORM: Perennial stem succulent shrub/subshrub.

PHENOLOGY: Flowers from June to August, with the flowers set into the spines of the plant preventing the flower from fully opening.

BIOLOGY: For the species: This cactus is slow growing and probably very long-lived. For example, plants grown from seed at the Desert Museum are just beginning to branch at nearly 20 years of age. The flowers are pollinated by bees. Though the fruits seem to be imprisoned within the spiny armor, birds and packrats can get to them and disperse the seeds. Bighorn sheep and javelina eat the whole plants and probably function as occasional long-distance seed dispersers. (Arizona-Sonora Desert Museum, 2000). The variety *xeranthemoides* is frost tolerant to 10º F (-12º C).

HABITAT: Rocky hills, slopes, and ledges of canyons, in Great Basin and Mohave Desert scrub. Per Benson (1982), variety *xeranthemoides* is found on rocky, mostly south-facing ledges of canyons or on rocky hillsides in Navajoan Desert or on edge of the Juniper-Pinyon Woodland.

ELEVATION: Based on collection records in SEINet (accessed 2005 & 2006), elevation ranges between 1,803 – 6,479 ft (550-1976 m). FNA (1993+) reports elevation from 500-1700 m (1,639-5,574 ft); Benson (1982) reports 1080-1500 m (3,800-5,000 ft).

EXPOSURE: Open to shaded. Have been collected on south-facing ledges and cliffs, southeast and west-facing slopes; 5-30+% slopes.

SUBSTRATE: Igneous and calcareous substrates; limestone ledges and boulders; sandstone.

PLANT COMMUNITY: Great Basin and Mohave Desert scrub, Navajoan Desert, and in the transition zone from Joshua Tree forest to pinyon-juniper woodland. Associated species include: *Acacia* sp., *Agave* sp., *Agave utahensis utahensis* (Utah Agave), *Ambrosia* (bursage), *Aristida* (three-awn grass), *Artemisia* sp. (sagebrush), *Artemisia tridentata* (big sagebrush), *Atriplex* sp. (saltbush), *Ceratoides* sp. (=*Krascheninnikovia*, winter-fat), *Cirsium* sp. (thistle), *Coleogyne ramosissima* (blackbush), *Coryphantha* sp. (pincushion cactus), *Cryptantha* sp. (cat's-eye), *Dalea* sp. (prairie-clover), *Echinocereus* sp. (hedgehog cactus), *Echinocereus coccineus* (Scarlet hedgehog cactus), *Echinocereus engelmannii* var. *variegatus* (varigated hedgehog cactus), *Echinomastus* (=*Sclerocactus*) *johnsonii* (Johnson's fishhook cactus), *Ephedra* sp. (Mormon-tea), *Ephedra torreyana* (Torrey's Mormon-tea), *Eriogonum* sp. (wild buckwheat), *Fallugia paradoxa* (Apache-plume), *Ferocactus* sp. (barrel cactus), *Forsellesia* sp. (=*Glossopetalon*, greasebush), *Gutierrezia sarothrae* (broom snakeweed, on drier sites), *Juniperus* sp. (juniper), *Juniperus osteosperma* (Utah juniper), *Krameria* sp. (Ratany), *Larrea tridentata* (creosote bush), *Lycium* sp. (desert-thorn), *Nolina* sp. (bear-grass), *Opuntia* sp., *Opuntia erinacea* (old-man prickley-pear), *Perityle congesta* (compacted rockdaisy), *Pinus edulis* (two-needle pinyon pine), *Poa* (bluegrass), *Purshia* sp. (cliff-rose), *Purshia mexicana* (Mexican cliff-rose), *Quercus* sp. (oak), *Shepherdia rotundifolia* (roundleaf buffaloberry), *Stipa* sp. (needlegrass), *Thamnosma* sp.

(desert rue), *Yucca baccata* (fleshy-fruit yucca), *Y. brevifolia* (Joshua tree), and grama grasses. (SEINet, accessed 2005 & 2006)

POPULATION HISTORY AND TRENDS: The species *Echinocactus polycephalus* is geographically stable; its range has not changed for at least the past 30,000 years despite the dramatic climatic swing from ice age to a warm interglacial period (Arizona-Sonora Desert Museum, 2000).

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: None
STATE STATUS: Salvage Restricted (ARS, ANPL 1999)
OTHER STATUS: None

MANAGEMENT FACTORS: Like most cacti, subject to horticultural collecting.

PROTECTIVE MEASURES TAKEN:

SUGGESTED PROJECTS:

LAND MANAGEMENT/OWNERSHIP: BIA – Navajo Nation; BLM – Arizona Strip Field Office; NPS – Grand Canyon National Park and Lake Mead National Recreation Area. Possibly USFS – Kaibab National Forest.

SOURCES OF FURTHER INFORMATION

REFERENCES:

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MAJOR KNOWLEDGEABLE INDIVIDUALS:

Michael Chamberland -

ADDITIONAL INFORMATION:

The name “cottontop” refers to the generous tufts of cottony hairs enveloping the flower base and fruits. This woolliness of the fruits is natural and not due to injury by rodents. (Jaeger, 1969).

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