

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

Plant Abstract

Element Code: PDCAC05022

Data Sensitivity: Yes

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Echinocactus horizonthalonius* var. *nicholii*

COMMON NAME: Nichol Turk's Head Cactus, Nichol's Turk's-head cactus, Nichol's Turk's head cactus, Nichol turkshead, Nichol's echinocactus, Blue Barrel, Devil's Head, Horse Crippler

SYNONYMS:

FAMILY: Cactaceae

AUTHOR, PLACE OF PUBLICATION: L. Benson, The cacti of Arizona, 23, 175, f. 6.2-6.3 3rd edition. 1969.

TYPE LOCALITY: Southwest of Silver Bell, Silver Bell Mts., Arizona.

TYPE SPECIMEN: HT: POM-311314. L. Benson 16663, 3 July 1966.

TAXONOMIC UNIQUENESS: Variety *nicholii* is 1 of 2 varieties of the widespread Chihuahuan *Echinocactus horizonthalonius* Lemaire, and is an isolated variety in Arizona (and probably Sonora). *Echinocactus horizonthalonius* var. *moelleri* Haage Jr., cited by Weniger, is probably a nomen nudum according to Benson (Pinkava). At some time, *E. h. nicholii* split from *E. h. horizonthalonius*.

DESCRIPTION: Small, single stem, blue-green to gray-green succulent barrel cactus, 45 cm (18 in) in height and 20 cm (8 in) in diameter. Often several seedlings around base giving appearance of small clumps. Juvenile stem grows primarily with an increase in diameter; adult stem grows primarily vertically. Eight ribs on plant; ribs spiral on some older plants. Each areole consists of three robust central spines (one curving downward, two upward) about 2.5 cm (1.0 in) long; five radial spines 1.9 cm (0.76 in.) long. Flower pink (magenta) to bright purple, 5-7 cm (2-3 in.) long, developing bud and immature fruit white wooly. Mature fruit briefly fleshy pink, soon drying brown. Seed longer 3.3-4.3 mm than broad 1.25 cm.

AIDS TO IDENTIFICATION: The only small, blue-green, eight-ribbed barrel cactus in Arizona; 8 spines per areole. In all Arizona populations, variation is found among adult plants in rib number, spine length, width, and shape (recurved, straight, or twisted), and flower color.

ILLUSTRATIONS: Line drawings (Lucretia B. Hamilton, *in* Benson 1982: fig. 758 and USFWS).

Color photos (*In* <http://www.mineralarts.com/cactus/turksheadcactus.html>)

Color photo of plant and habitat (Lynda Pritchett-Kozak, *In* http://ridgwaydb.mobot.org/cpcweb/CPC_ProfileImage.asp?FN=1545b)

Color photo (Cooper *in* <http://www.whitethornhouse.com/cacti/cacti05-01.htm>)

Line Drawing (M.S., *in* Falk et al. 2001)

Color photos of plant and habitat (R. Bellsey, *in* Falk et al. 2001)

Color photo of flowering plant (Brooks/TNC, *in* Falk et al. 2001)

Line drawing (*In* <http://www.co.pima.az.us/cmo/sdcp/kids/color/Turk.jpg>)

TOTAL RANGE: Endemic to Arizona in the United States, however, also found in Sierra del Viejo, Sonora, Mexico (Falk, Jenkins, et al 2001).

RANGE WITHIN ARIZONA: Found in the Waterman Mountains in north central Pima County, and the Vekol Mountains in southwestern Pinal County.

SPECIES BIOLOGY AND POPULATION TRENDS

GROWTH FORM: Succulent perennial.

PHENOLOGY: Germination occurs in mid-summer. Vegetative growth primarily March through May. Flowering usually occurs in late-April to mid-July but can flower as late as November. Mass flowering of a population occurs 2 to 3 days after the first warm-weather rain. Flowers open 10 am to 5 pm for one day; two days, if cool and overcast. Flower number coupled to number of areoles produced and dependent on a combination of summer and rain distribution.

BIOLOGY: Very slow growing plants; requires ten to thirty-two years to reach two-inch height (Element Global Ranking Form 1991; Schmalzel and Francisco, in prep.). Pollinated by many species of bees, and also butterflies. Seeds dispersed by birds, mammals, and rainwater. Average of 200 seeds produced per plant per year. Mean age 25, 25, 25, 28, 30, 40, 45, 45, and 50 years for nine studied populations: age estimated using BLM permanent plot growth rates (Schmalzel and Francisco, in prep.). Maximum age estimated to be 85 to 95 years (Schmalzel and Francisco, in prep.). Populations on parent rock differ demographically from bajada populations in density, fecundity, survivorship and probably recruitment. Shaded plants grow, flower, and survive at lower rates than plants in open. Erosion along bajadas appears to increase both seedling survival and adult mortality.

HABITAT: Habitat is characterized by open vegetation, few trees and scattered low shrubs (Phillips et al. 1979). Bedrock habitat at higher elevations; gravelly bajadas with limestone clasts at lower elevations (Van Devender 1994).

ELEVATION: 2,000 - 3,600 ft. (610 - 1,098 m).

EXPOSURE: On all exposures (N, S, E, W); substrate a more critical requirement.

SUBSTRATE: Pennsylvanian and Permian lime siltstones (Schmalzel and Francisco, in prep). Soil texture talus chips (Phillips et al. 1979). At higher elevations, inhabits bedrock habitat, and gravelly bajadas with limestone clasts at lower elevations (Van Devender 1994).

PLANT COMMUNITY: Paloverde-Cactus (*Cercidium-Opuntia*) Shrub community. Dominant associated species include: *Ambrosia deltoidea* (triangle bursage), *Carnegiea gigantea* (saguaro cactus), *Encelia farinosa* (white brittlebush), *Fouquieria splendens* (Ocotillo), *Krameria grayi* (white ratany), *Opuntia acanthocarpa* (stag-horn cholla), *Opuntia phaeacantha* (New Mexican prickly-pear), *Parkinsonia microphylla* (Little-leaf paloverde), and *Tiquilia canescens* (woody tiquilia). Associated species include: *Dasyllirion* sp., *Fouquieria* sp., *Jatropha* sp., *Mammillaria lasiacantha* (lace-spine nipple-cactus), and *Parkinsonia* sp. (paloverde).

POPULATION TRENDS: T. Peebles (unpubl. Notes, and Kearney and Peebles. 1951 p. 573) thought *E. horizonthalonius* was introduced around mines by Mexican-American miners. Van Devender (1990), and Anderson and Van Devender (1991) identified one *E. horizonthalonius* seed from a packrat midden dated at 22,400 years B. P. in the Waterman Mountains. This demonstrates long-persistence of *E. horizonthalonius* for the Waterman Mountains. Benson's first edition of The Cacti of Arizona designated the Slate, Silver Bell, and Sawtooth Mountains as localities for *E. horizonthalonius* and C.H. Lowe (pers. comm. to B. Martin, 1997) remembers the plant from Twin Peaks (north end of Tucson Mountains). These localities were unvouchered and are either in error or represent interesting extirpations within the last 100 years.

Silver Hill Mine on Waterman Peak has good-sized population. "C. Button carried on M. Butterwick's monitoring plots and set up others" (Warren 1994). 1500-1600 plants tagged and plotted as part of Section 7 consultation. The population in the Waterman Mountains is estimated at 10,000.

Direct human interference is the most significant ongoing threat to the populations. Blading a landing strip removed an estimated 350 plants in the early 1980s. Mining and road construction on private patented land has killed a sizeable but unknown number. Persistent illegal collecting of small numbers of plants is well documented for the Waterman Mountains. One institution removed about 200 plants in the early 1990s; one individual removed about 100 plants for a private collection.

According to the Desert Botanical Garden it is estimated that over 10,000 individuals comprise both populations. There is a misconception that threats can be buffered by the number of individual plants. However, considering the advanced ages of sizeable plants, and the rapid decrease in available growing sites, these plants are in imminent danger of being extirpated.

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: LE (USDI, FWS 1985)
 [PE USDI, FWS 1980]
 [PE USDI, FWS 1976]
 [PTN-E USDI, FWS 1975]

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

OTHER STATUS: None

MANAGEMENT FACTORS: Direct human interference is the most significant ongoing threat to the populations. This includes collecting, off road vehicles, copper mining and urbanization. Subsequent erosion after disturbances is highly damaging to these cacti.

PROTECTIVE MEASURES TAKEN: A recovery plan was written in 1986 by the USFWS, however, no formal management plan has been implemented.

SUGGESTED PROJECTS: Detailed germination studies are needed. Research is needed on reproductive biology and ecology, demographic patterns and habitat requirements to aid in conservation efforts.

LAND MANAGEMENT/OWNERSHIP: BIA - Tohono O'odham Nation; BLM - Tucson Field Office; State Land Department; Private.

SOURCES OF FURTHER INFORMATION**REFERENCES:**

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- Robert Schmalzel - Oracle, Arizona.
- Tom Van Devender - Arizona-Sonora Desert Museum, Tucson.

ADDITIONAL INFORMATION:

Clay May (Pima Community College, Tucson) has collected data for many years from *E. horizonthalonius* plants growing on the Schuk Toak District, Tohono O'odham Nation and on private patented land in the Waterman Mountains. Researchers should not cite these data without explicit permission from the Tohono O'odham Nation and private landowners.

Van Devender has seeds 22,000 years old (at that time, Arizona Desert Scrub) from rat middens (Van Devender and Bertelsen 1994).

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 1994-12-20 (DBI)
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AGFD Plant Abstract

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