ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM

Plant Abstract **Element Code:** PDCAC0D1N1
Data Sensitivity: No

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Cylindropuntia multigeniculata*
COMMON NAME: Blue Diamond Cholla
SYNONYMS: *Opuntia whipplei* var. *multigeniculata, Opuntia multigeniculata* (basionym), *Opuntia* x *nultigeniculata*.
FAMILY: Cactaceae

AUTHOR, PLACE OF PUBLICATION: Benson, Lyman David. The Cacti of Arizona 20. 1969.

TYPE LOCALITY: Nevada: Clark County: Charleston Mountains. East of Wilson's Ranch, road from Blue Diamond mine to mill. Rocky ridge. 1400m.

TYPE SPECIMEN: Univ. of Colo. Mus. Herb. COLO 387159 (isotype of *Opuntia multigeniculata*). I.W. Clokey, #8430. July 13, 1939.

TAXONOMIC UNIQUENESS: NatureServe recognizes 70 species of *Opuntia* in the continental U.S. and Canada. There are an additional 54 varieties and another eight recognized hybrids. *Opuntia whipplei* is one of 31 species that can be found in Arizona, along with two of its varieties: *O.w. multigeniculata* and *O.w. whipplei*. Some treatments consider this variety to be a hybrid, although this hypothesis has been largely discounted (NatureServe 2015).

DESCRIPTION: For the species, *Opuntia whipplei*: Bushy, mat-forming, or sometimes erect and shrubby, 30-60cm (rarely 1.5-2m) high; stems numerous, erect, arranged compactly, the longer with numerous short lateral branches; larger terminal joints (2.5)7.5-15cm long, to 1-2cm diam; tubercles clearly raised, length 1.5-3 times breadth, 2.5-9mm long, 3-4.5mm broad, protruding 3-4.5mm; leaves conical, +/-1.5mm long; areoles 1.5-2.25mm diam; spines whitish-pink or pinkish-tan at maturity (sheaths becoming loose and flattening out, conspicuous, white, silvery, light tan, or yellow, usually persistent for a season), spines 4-14 per areole, mostly horizontal or deflexed, straight, the longer 2-2.5(5)cm long, basally to 0,.8mm diam, acicular, elliptic to nearly circular in corss section, not strongly barbed; glochids yellow, more prominent than those of most chollas, 1.5-2.25mm long; flower 2-3cm diam, 3-4cm long; sepaloids yellowish-green, cuneate-obovate, 6-9mm long, 6-8mm broad, rounded to nearly truncate, crenate; petaloids pale- to lemon-yellow, narrowly obovate, 10-15mm long, 6-8mm broad, acute or obtuse and mucronate, somewhat crenate; filaments +/- 6mm long; anthers yellow, 3mm long; style green or yellowish, 9-12mm long, 1.5-2mm diam; stigmas apparently 5, 1.5mm long; ovary in anthesis with a few slender spines; fruit yellow, fleshy at maturity, strongly

tuberculate (except in parasitized fruits), spineless but at first with glochids, obovoid or subglobose, 2-3cm long, 1.2-1.9(2.2)cm diam, with a deep, cuplike umbilicus (except in parasitized fruits), fruit persistent through winter, not proliferous; seeds pale tan, flattened, +/-3mm long, 2.5-3mm broad, +/-2mm thick (Benson 1982, p. 304).

AIDS TO IDENTIFICATION: The original key to the 22 species of the subgenus *Cylindropuntia* recognized by Benson is presented in Benson 1982. A more modern treatment is presented in Pinkava 1999.

The following distinguishing characteristics of the three varieties of *Opuntia whipplei* are taken from Benson 1982.

Characteristic	var. *whipplei*	var. *multigeniculata*	var. *viridiflora*
Larger terminal joints	7.5 – 15 cm long	2.5 – 5 cm long	5-7 cm long
Tubercle length	3-9mm, 2-3x breadth	4.5-6mm, 1-5x breadth	+/-2.5mm, 3x
Spine density	sparse to moderate	crowded	moderate
Spines per areole	4-7	10-14	5-7
Color of spine sheath	white to silvery or sometimes light tan or yellow	tan to yellowish pink	brown
Petaloid color	pale to lemon yellow	light greenish-yellow	green tinged with red
Altitude	1350-2400m 4500-8000 feet	1000-1400m 3300-4700 feet	1800-2100m 6000-7000 ft
Floristic Association	Various deserts, Grasslands, woodlands	Mohave Desert	Grasslands and S P-J woodland

From a distance the shrubs are inconspicuous among the other low shrubs of the Mohave Desert hillsides, but from nearby, each one is a striking, spiny, irregular mass. It is low and compact, and the very short, thick, spiny joints are crowded into dense clusters (Benson 1982).

According to the map in Benson 1982, *O. w. multigeniculata* is found in NW Arizona and S Nevada, *O.w.whipplei* is more broadly distributed from SW Utah, throughout much of Arizona, western New Mexico and the extreme SW corner of Colorado. *O.w.viridiflora* is found only in NE New Mexico.

ILLUSTRATIONS:

Herbarium Mount:
http://swbiodiversity.org/seinet/taxa/index.php?taxon=Opuntia%20whipplei%20var.%20multigeniculata.

B&W Photo: Benson 1982, p. 309.

Photo:
http://explorer.natureserve.org/servlet/NatureServe?sourceTemplate=tabular_report.wmt&loadTemplate=species_RptImages.wmt&selectedReport=RptImages.wmt&summaryView=tabul

ar_report.wmt&elKey=140833&paging=home&save=true&startIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=156255&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=156255&selectedIndexes=140833&selectedIndexes=136389.

TOTAL RANGE: Nevada (Nye and Clark Counties), Utah (Washington County) and Arizona (Mohave County).

The typical form of the species is endemic to Clark County, Nevada; from north of Las Vegas, near Gass Peak, in the Las Vegas Range; southwest into the La Madre Mountain area; south to Blue Diamond; and then southeast into the McCullough Range. Populations of the spiny-fruited form occur from Bonelli Peak, Gold Butte area of eastern Clark County, Nevada, south into the White Hills and Black Mountains of Mojave County, Arizona (Baker 2005).

RANGE WITHIN ARIZONA: Mohave County: central Hurricane Cliffs, south of Twist Hills, and White Hills south of Lake Mead.

SPECIES BIOLOGY AND POPULATION TRENDS

GROWTH FORM: Bushy, mat-forming, sometimes erect and shrubby; perennial succulent.

PHENOLOGY: New growth of stems and small leaves occurs between late spring and fall. The leaves fall soon after the new stem ceases to grow. Flowers appear from April to May, depending upon the amount of precipitation and spring warming. Fruits generally follow the maturation of flowers by several weeks. The bony seed may persist for several years before germinating and some degree of mechanical sclerification is necessary. Although seedlings have not been observed in the field, most cholla seeds require summer temperatures for germination, thus germination probably occurs after the onset of summer rains (Baker 2005). One Arizona collection observed both flowers and fruits on May 28.

BIOLOGY:

HABITAT: Rocky and sandy soils of desert slopes. Mohave Desert.

Plants generally prefer steep, dry, rocky slopes with minimal vegetative competition (shrub cover about 5-15%, and annual plants <25% although the latter can vary depending on amounts and timing of rainfall) Baker 2005.

Individuals of both forms occur must abundantly where average precipitation is approximately 10 in (25.4 cm) and where annual average minimum temperatures do not fall below 46.5 º F (8.1º C), Baker 2005.

ELEVATION: 3300 – 4700 feet (1000-1400m), per Benson 1982. Arizona collections have been made from 5080 and 5300 feet (1550 and 1615m), thus extending the upper elevation limit.

EXPOSURE: Aspect varies depending on the location. Collections made in Arizona are from SE, S, and NW facing slopes, ranging from 5-30%. The Nevada Natural Heritage Program Rare Plant Fact Sheet (2001) for *O. w. multigeniculata* states that although the plant can be found on all aspects, it prefers the northerly or other cooler or more protected exposures.

SUBSTRATE: Rocky-loam limestone (Benson 1982). Soil types include sandy-loam, gravel, coarse cobbled soils, silty alluvial fan terraces, decomposed granite and schist, and clays of volcanic origin (Baker 2005). The typical form occurs on both volcanic and sedimentary soils. The spiny-fruited form (Arizona) are primarily volcanic but vary between extrusive (basaltic and rhyolitic) to intrusive (granitic).

PLANT COMMUNITY: *Opuntia whipplei* var. *multigeniculata* populations are found within the succulent scrub, also referred to as Mohave desertscrub, usually associated with variations of the *Larrea tridentata-Ambrosia dumosa, Larrea tridentata-Yucca, Coleogyne ramosissima-Yucca, Yucca brevifolia-Coleogyne ramosissima, and Yucca brevifolia-Larrea tridentata* plant associations (Baker 2005). In Arizona, both the Sagebrush-shrub and Black Brush scrub communities have been recognized by collectors. The following plant species were also noted: *Colegyne ramossisima, Aristida purpurea, Artemisia ludoviciana, Atriplex canescens, Brickellia californica, Cylindropuntia acanthocarpa, Echinocereus engelmannii, Echinomastus johnsonii, Ephedra nevadensis, Eriogonum wrightii, Erioneuron pulchellum, Gutierezia sarothrae, Muhlenbergia porteri, Stanleya pinnata, Thamnosma montana, Yucca brevifolia, Cowania, Artemisia, Chrysothamnus, Chamebatiaria, Bouteloua, Hilaria, Sitanion.*

POPULATION HISTORY AND TRENDS: *O. w. multigeniculata* is known from three collections in Arizona. Two of these collections noted that the variety was either "locally common" or "locally abundant." According to Baker (2005), populations appear stable at this time with both young and old individuals and there is no indication that populations are declining or increasing in size. No formal studies have been done on changes in demography through time.

NatureServe (2015) reported that throughout its range, there are about 10 populations. The primary populations largely occur on BLM lands and have been estimated at 6250 individuals. Another 10-15% of the plants occur on private land.

In 1982, Benson considered this variety to be rare and local.

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: SC (USDI, FWS 2001)

STATE STATUS: Salvage Restricted (ARS, ANPL 1999)
Threatened, Fully Protected (Nevada Native Plant Society 2015)

OTHER STATUS: CITIES Appendix II (UNEP WCMC 2013)
BLM Special Status Species (Baker 2005)

MANAGEMENT FACTORS: Baker (2005) summarizes the causes of impacts and threats to survival for *Opuntia whipplei* var. *multigeniculata*. Overall, very little disturbance has occurred within populations of either form, and, to date, disturbances have not led to a high degree of mortality of individuals. Road construction and mining have been the prominent historical impacts. These impacts, along with potential commercial development, may increase in the near future, especially at the type locality on Blue Diamond Hill, Nevada. His comments on more specific threats are as follows:

- Road development and maintenance and off-road vehicle use: Above Elephant wash, Hualapai Wash area, AZ, the individuals of the spiny form may have been affected by mining. Several roads in the Hualapai Wash area have undoubtedly taken individuals.
- Animal grazing or trampling: There have been no visible effects from animal grazing or trampling. Historically, overgrazing is known to increase densities of individuals of at least some cholla cacti.
- Mineral exploration and development: Mining activity is evident in the Hualapai Wash area.
- Urban and residential development: Private land occurs in the Black Mountains and Hualapai Wash areas, AZ.
- Invasion of exotic plant species: Although some exotic weed species, such as *Bromus rubens* (red brome), have been recorded for areas within populations, no direct impacts have been recorded.
- Over Utilization for Commercial, Recreational, Scientific, or Education Purposes: In general, entire individuals of cholla cacti are rarely collected by enthusiasts, and few such incidences have been recorded. Nearly all cactus collectors would sample a few stems, which are easily rooted. It is doubtful that the removal of a few stems from a population would have a noticeable impact. Some commercial cactus dealers suggest that over-regulation leads to a lack of commercial availability and thus to a higher degree of poaching from the wild.

PROTECTIVE MEASURES TAKEN: Although considered a species of concern by the USFWS (and was previously withdraw from a proposed listing), Baker (2005), after his review of the plant, states that listing is not recommended. He believes the populations are healthy, population densities are adequate, habitat is inaccessible to ORVs and major populations in Nevada are protected by the Red Rock and Sloan Canyon NCAs and the Desert National Wildlife Range. He believes the BLM "special status species" listing in Nevada and the fact

that it is "fully protected" and considered threatened by the Nevada Native Plant Society is necessary to insure continued scrutiny.

In Arizona, it is considered "salvage restricted," a designation that applies to all cacti, but not "highly safeguarded" which is a listing that provides a higher level of protection. For this reason, Baker (2005) feels that continued monitoring in the State is recommended. The Hualapai Wash area population of the spiny form is susceptible to future mining operations. It is listed as a CITIES Appendix II species.

SUGGESTED PROJECTS: Baker (2005) suggests that critical habitat be designated for areas of high population density in the Hualapai Wash population. He does not believe that further survey work is necessary unless there are impending threats (e.g., mining, newly proposed commercial developments, etc.) He also recommends occasional monitoring (e.g. every 5-10 years).

LAND MANAGEMENT/OWNERSHIP: All three of the Arizona collection sites are found on USDI Bureau of Land Management lands. Baker (2005) states that the extreme northern portion of the Hualapai Wash site enters within the USNPS Lake Mead NRA.

SOURCES OF FURTHER INFORMATION

REFERENCES:

Arizona Revised Statutes. 1999. Arizona Native Plant Law, Appendix A.

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ADDITIONAL INFORMATION:

Revised: 2015-09-01 (BDT)

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