ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM

Plant Abstract **Element Code:** PDCAC0X0C0
Data Sensitivity: YES

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Coryphantha robbinsorum* (W.H.Earle) A. Zimmerman
COMMON NAME: Cochise Pincushion Cactus, Cochise Foxtail Cactus
SYNONYMS: *Cochiseia robbinsorum* W.H.Earle*; Escobaria robbinsorum* (W.H.Earle) D.R.Hunt; *Escobaria robbinsiorum* (W.H. Earle) D.R. Hunt; *Coryphantha robbinsiorum* (W.H.Earle) A.D. Zimmerman; *Pelecyphora robbinsiorum* (W.H.Earle) D.Aquino & Dan.Sánchez
FAMILY: Cactaceae

AUTHOR, PLACE OF PUBLICATION: Earle. 1976. Saguaroland Bull. 30:64-66.

TYPE LOCALITY: Locality withheld. James A., Jimmy, and John Robbins, 1976.

TYPE SPECIMEN: HT:ASU. J. Robbins s.n., 1 October 1975.

TAXONOMIC UNIQUENESS: Discussion of genus assignment is continuing. Currently this species is assigned to *Coryphantha*. For a broader discussion see Zimmerman (1978), Miller and Hilsenbeck (1993), and Sánchez et al. (2022).

DESCRIPTION: Small 1.0-1.5 cm (0.4-0.6 in.) above ground, unbranched cactus, 1.4-6.0 cm (0.6-2.4 in.) wide. Tubercles tightly packed in 8 and 13 spirals in mature plants (5 and 8 spirals in smaller plants). Stem usually single (sometimes with smaller stems touching larger stems; the smaller stems may be pups or new plants from seed), most of which is underground, only top 1.0 cm (0.4 in.) above ground level. During spring and fall when drought normally occurs, plants shrink. Amount of retraction depends on microsite. Areoles circular to broadly elliptic, conspicuously filled with copious long white trichomes (giving "cottony" appearance). Deep furrow runs on upper portion of tubercle. Radial spines number 11-20 per areole, bright white, stiff and brittle, (8.0-18.0 mm (0.3-0.7 in.) long. Central spines usually lacking, 1-3 slender spines may be present in upper part of areole. The bell-shaped flowers parchment color (pale green-yellow to pale yellow-orange) 10.0-18.5 mm (0.4-0.7 in.) long and 12.0-29.0 mm (0.5-1.1 in) in diameter. Anthers yellow with green stigma lobes and style. Fruits spheroidal to obovoid, 6.0-8.5 mm (0.2-0.3 in.) long, 3.0-4.5 mm (0.1-02 in) thick; orange-red when ripe, turning reddish-brown. Seeds are globular and black, with an average of 20 seeds in each fruit (Fehlberg and Nidley 2015, Radke and Minckley 2014).

AIDS TO IDENTIFICATION: When mature, smaller than any other cacti in area. Cottony areoles, bright white spines are distinctive (no other species in Arizona has "cottony" areole on such a small plant). Spines so dense, stem cannot generally be seen. *C. vivipara* var. *bisbeeana*

occurs in same habitat but does not have cottony areoles and has central spines that are differentiated from radials. However, need to be seen together to distinguish.

ILLUSTRATIONS: Line drawing (USFWS 1993)
Line drawing (Arizona Rare Plant Committee 2001)
Color photo (USFWS 2020)

TOTAL RANGE: Southeastern (Rutman 1989) Cochise County, Arizona. Southwestern Cochise County had been reported in error (Miller and Hilsenbeck 1993). We have at least three anecdotal accounts of its presence in Mexico (Brack email to G. Rink 2023, Eppel letter 1984?, Lopresti 1984, Olwell notes 1984). However, the presence of this species in Mexico has been refuted by Van Devender and Reina after they did not encounter it in their surveys there (2007).

RANGE WITHIN ARIZONA: Southeastern Cochise County

SPECIES BIOLOGY AND POPULATION TRENDS

GROWTH FORM: Succulent Perennial

PHENOLOGY: Obligate outcrosser (Radke and Minckley 2012). Plants achieve sexual maturity at 0.6-1.1 inches (17-28 mm) in diameter. Begins flowering in mid-March extending to mid-April. The number of flowers produced increases with age and size of plant, and is positively correlated with rainfall. Flowers open mid-day. Fruits third week of June through third or fourth week of August. Adequate winter precipitation is required for flowering, germination, and seedling growth (USFWS 2020). It appears that fruits are rarely eaten, and ripen and mature on the plant, with seeds falling onto the ground with a limited distribution distance (Radke and Minckley 2014).

Precipitation, particularly winter precipitation, seems to be a contributing factor to Cochise pincushion germination and seedling growth (USFWS 2020). Additionally, a positive correlation between winter precipitation and larger, more robust plants was noted by Radke and Minckley (USFWS 2020).

BIOLOGY: Plants tend to be solitary or scattered in discrete sub-populations rather than randomly spread out over the seemingly suitable habitat. Prefers areas with good drainage; full sun to light shade. Pollinated by bees. At least 100 species of bees use Cochise pincushion cactus habitat, and four species of bees have been documented on flowers of *C. robbinsorum* (USFWS 2020). It is believed that the cactus specialist bee, *Macrotera parkeri,* is the primary, but not the only, pollinator (Walker 2019). Rodent-caused herbivory was a major cause of damage and death in sample plots (Cajero et al. 2017).

At the end of the first growing season, *C. robbinsorum* plants in cultivation reach a diameter of 3.0-4.0 mm (0.12-0.16 in.). Wild plants average an increase of about 3.0 mm (0.12 in) per year until they are between 6 and 9 years old when their growth slows to about 1.0 mm (0.04 in.) per

year. Measurements of plants in the field suggest "a maximum age of nearly a century under very rare circumstances; alternatively, the largest plants observed are those that have enjoyed faster-than-average growth rates" (US Fish and Wildlife Service 1985b).

Pollinated by bees, primarily by the cactus specialist bee *Macrotera parkeri* (USFWS 2020). Red and fleshy fruit may attract birds which then disseminate seeds (USDI 1993). A multi-year study found that over a hundred bee species occur within *C. robbinsorum* habitat, and 4 species were seen on the cactus flowers (USFWS 2020). Fruits appear to be dispersed primarily via gravity, which limits the dispersal distance of offspring (USFWS 2020).

HABITAT: Primarily near the tops of hills in transition zone between Chihuahuan Desert Scrub and Semidesert Grassland (rocky, transition scrub). Plants are rooted in bedrock cracks or thin soil. Occasionally on lower slopes in low numbers. Vegetation changes abruptly when it hits bedrock. (Habitat visited often by collectors.)

ELEVATION: 4,200 - 4,975 (5,085) feet in U.S. (1,281 - 1,418 m); up to 5,200 feet (1,586 m) in Mexico (Lopresti 1984).

EXPOSURE: Various; nearly flat ridgetops; sometimes in lower numbers on lower slopes of various aspects.

SUBSTRATE: Flattened ridgetops on bedrock and coarse gravels of Permian (grey) Limestone Formation.

PLANT COMMUNITY: Upper Chihuahuan Desertscrub. Associated species include *Muhlenbergia asperifolia, Calliandra eriophylla, Agave palmeri, Vauquelinia pauciflora, Echinocereus fendleri* var. *rectispinus, Dyssodia* spp., *Coryphantha vivipara, Opuntia phaeacantha, Fouquieria splendens*, *Mortonia scabrella*, *Quercus pungens*, etc. *Vauquelinia pauciflora californica* and *Penstemon superbus* may be indicator species.

POPULATION TRENDS: Between 1989 and 2006, a decreasing trend was observed in sampling plots. Random diameter measurements obtained from 2009 through 2019 suggest the population is stable, though no complete census has been conducted (USFWS 2020).

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: LT, without critical habitat (USDI, FWS 1986)
[PT (USDI, FWS 1985a)]
[C1 (USDI, FWS 1983)]
[C2 (USDI, FWS 1980), as *Cochiseia robbinsorum*]

STATE STATUS: Highly Safeguarded (ARS, Arizona Native Plant Law, 1993, 1999, 2016)

OTHER STATUS:
Not Forest Service Sensitive (USDA FS Region 3 1999)
[Forest Service Sensitive (USDA FS Region 3, 1990)]
CITES Appendix I
VU (IUCN, Baker et al. 201), as *Escobaria*

MANAGEMENT FACTORS: Local endemic, substrate specific plant. Potential threats include drought, climate change, pollinator decline, rodent and insect herbivory, livestock trampling, limited access to occupied habitat, increased fire activity due to invasive grasses, illegal collecting, and disturbance from illegal border activity.

In the 5-Year Review (USFWS 2020), it was reported that grazing in the vicinity of known populations increased, beginning in 2014 when ranch ownership changed. Human traffic in the area has also increased, to the extent that permanent plots have been vandalized.

CONSERVATION MEASURES TAKEN: Demographic monitoring plots established by USFWS in 1988. Seed collection was conducted in 2014 and 2018, and provided to the Desert Botanical Garden and the Arizona Sonora Desert Museum. As of March 2020, 113 individuals are growing in captivity between the two botanical gardens (USFWS 2020). Genetic variation was determined from 198 individuals across six population groups. Results indicate the six groups are genetically similar to each other, and the species has overall high genetic diversity (Fehlberg and Nidley 2015).

SUGGESTED PROJECTS: Recommended future actions include several measures, such as fencing of populations, purchase of occupied land by a Federal entity; work to build relationships with landowners; survey appropriate habitats in Arizona, New Mexico, and Mexico for additional populations, continue annual monitoring; increase understanding of stressors, threats, and conservation measures; expansion of botanical garden populations; and increased public and partner education (USFWS 2020).

LAND MANAGEMENT/OWNERSHIP: Arizona State Land Department; Private.

SOURCES OF FURTHER INFORMATION

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ADDITIONAL INFORMATION:

Revised: 1990-12-28 (SR)
1994-12-23 (DBI)
1997-11-05 (SMS)
2001-12-12 (SMS)
2021-03-25 (KSL)
2022-03-04 (TME)
2023-04 (TME&GR)

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