ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM

Plant Abstract **Element Code:** PMAGA010W0
Data Sensitivity: YES

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Agave delamateri*
COMMON NAME: Tonto Basin Agave, Rick's Agave
SYNONYMS: *Agave* sp. nov. /ined
FAMILY: Agavaceae

AUTHOR, PLACE OF PUBLICATION: Hodgson, W.C. and L. Slauson, Haseltonia 3: 133-140, f. 1-5. 1995.

TYPE LOCALITY: Arizona, Gila County, Foothills of the Sierra Ancha Mountains, above Tonto Basin, 5.25 miles E of Hwy. 188 and Punkin Center, 500-700 yards SE of FSR 71.

TYPE SPECIMEN: ASU 20608 (Isotype). Wendy C. Hodgson #5478. July 7, 1989.

TAXONOMIC UNIQUENESS: The species *delamateri* is 1 of 25 in the genus *Agave*. There are another 23 subspecies or varieties. Fourteen of the species are found in Arizona, and eight are only found in the state.

This species was first discovered by Susan McKelvey in the 1920's and rediscovered by Rick Delamater in 1988. It was not formally described until 1995 by Wendy Hodgson and Liz Slauson. "*Agave delamateri* appears to be most closely related to *A. fortiflora* and *A. palmeri*" (Hodgson and Slauson 1995). *Agave delamateri* separated from *A. palmeri* and *A. fortiflora* by distinct distribution and flower morphology and measurements (Hodgson and Slauson 1995). *Agave delamateri* may be another species disseminated further north by man (Hodgson 1994). It hybridizes with *A. chrysantha* in Yavapai County, Arizona (ARPC 2001).

DESCRIPTION: Large, suckering perennial succulent with very tall, open, unfruited flower stalk 4.5 – 6 m (14.75-19.7 ft) tall. Dense rosette of bluish-gray/green leaves with purple/maroon tinge, erect, conspicuously incurved at apex, about 50.0 - 74.0 cm (20.0 - 29.0 in.) long, 7.0 - 9.0 cm (2.8 - 3.6 in.) wide; conduplicate (U-shaped folding one leaf around the next younger leaf). Marginal teeth on leaves are straight to recurved, to 6.0 mm (0.24 in.) long, slender, dark brown or gray in color; terminal spine to 3.5 cm (1.4 in.) long. Inflorescence is broadly paniculate with 12 – 27 widely spaced, long branchlets on the upper half of stalk; without fruits ("naked"). Lateral branches, perpendicular to main flowering stalk. Flowers robust, 4.7-7.0 cm (1.85-2.76 in) long, pale cream tinged with light green, in clusters of 14 - 20. The outer tepals are ovate, longer and narrower than inner tepals, light cream-green with maroon-rust, rugose, hooded tips. The filaments are inserted in the tube at the same level. Closed appearance.

AIDS TO IDENTIFICATION: "*Agave delamateri* is distinguished from *A. fortiflora* and *A. palmeri*, by its numerous rhizomatous offsets, easily cut leaves, and 1-, not 2-seriate filaments. It further differs from *A. fortiflora* in having glaucous purple-tinged leaves, greenish-ochroleucous, apically rusty-maroon tepals and slightly flattened, maroon rather than strap-shaped, yellow filaments. In addition, it differs from *A. palmeri* in having broadly lanceolate, apically **incurved** rather than lanceolate or linear-acuminate straight leaves, more numerous lateral branches in the inflorescence, and in its wider perianth tube and longer tepals" (Hodgson and Slauson 1995). *Agave palmeri* has similar teeth but leaves are more linear, splay out, and not erect. *Agave delamateri* can be confused with *A. chrysantha*, which has leaves 5.0 - 10.0 mm (0.2 - 0.4 in.) long, splayed out and larger marginal teeth. Inflorescence branches of *A. chrysantha* are ascending, not perpendicular. Flower similar to *A. palmeri*, but longer. At a distance, look for isolated stalks not eaten by livestock. Distribution of these species is also distinct.

ILLUSTRATIONS:

Black and White Drawing (Hodgson and Slauson 1995: Fig. 1, P. 131).
Photos (Hodgson and Slauson 1995: Fig. 3-5, Pp. 133-134).
Black and White line drawing (ARPC 2001).
Color photos of plant and habitat (ARPC 2001).
Color photos, plant and habitat: http://swbiodiversity.org/seinet/taxa/index.php?tid=1466.
Color photos: http://www.naturesongs.com/vvplants/tontoagave1.html.

TOTAL RANGE: Small geographic area in Central Arizona.

RANGE WITHIN ARIZONA: Two primary distributions centers: north and northwest, and southeast of Roosevelt Lake in west-central Gila County and northeast Maricopa County, and the Verde Valley from Camp Verde to Cottonwood in northeast Yavapai County.

SPECIES BIOLOGY AND POPULATION TRENDS

GROWTH FORM: Perennial succulent.

PHENOLOGY: Inflorescences begin to emerge in May and early June, and mature in late June through July with flowers on the lowermost lateral branches opening first. This plant is monocarpic with synchronized flowering. Flowers usually abort early. Seed capsules and seeds are not known. No bulbils produced. The Tonto Basin Agave reproduces by pups formed at the base of the parent plant.

BIOLOGY: Occurs as isolated clones. Flowers in summer, with flowers usually aborting early. Flower and fruit development may be inhibited due to climatic conditions. Anthers will not emerge from sepals if season has been dry. Produces rhizomatous off-sets prolifically. Virtually no variation among individual plants. As with most *Agaves*, *A. delamateri* is probably self-incompatible. Clones may be hundreds of years old.

As with other Agaves, roots are shallow and spreading to derive maximum benefit from light rains and other habitat conditions that limit moisture to upper soil layers. The outwardly radial arrangement of leaves intercepts rainfall and conducts it toward the base and roots of the plant center. A thick waxy cuticle covering the leaves conserves moisture. Nighttime opening of leaf stomates also prevents water loss through transpiration during the hotter daylight hours.

The naked flowering stalk is rarely eaten by cattle or wildlife.

HABITAT: Usually found atop benches (often high benches), at edges of slopes, and on open hilly slopes in desert scrub, overlooking major drainages and perennial streams, from 2,350-5,100 ft (725-1554 m) elevation. Occasionally found in chaparral or juniper-grassland. Found in direct or indirect association with archaeological features, including multi-room foundations and also above check dams and linear alignments. As with most *Agaves*, *A. delamateri* requires a well-drained soil, being susceptible to root-rot.

ELEVATION: 2,190 to 5,150 ft. (668 - 1570 m), based on AGFD, HDMS records accessed in 2019.

EXPOSURE: Usually south and southwest facing slope edges (atop benches); also on northeast facing gentle slopes.

SUBSTRATE: Cobbly and gravelly, deep and well-drained soils. These often occur on conglomerate benches in the Tonto Basin area, including limestone soils.

PLANT COMMUNITY: Arizona Upland Subdivision of Sonoran Desertscrub. Associates include *Carnegiea gigantea, Prosopis, Juniperus, Gutierrezia, Fouqueria splendeus, Calliandra eriophylla, Menodora scabra, Echinocereus fasciculatus* (both var. *fasciculatus* and *bonkerae*), *Erodium cicutarium*, and occasionally *Rhus trilobata, Opuntia engelmannii, Canotia holacantha, Yucca baccata*, and *Psilostrophe*. A few sites occur in Interior Chaparral and Great Basin Conifer Woodland as defined by Brown (1982).

POPULATION TRENDS: The greatest concentration of sites occurs near the northwest end of Roosevelt Reservoir in an area referred to as Tonto Basin, situated between the Sierra Ancha and Mazatzal Mountains (Hodgson and Slauson 1995). Approximately 70 plants are known from the Tonto Basin. In all, 90 clones are known, all in direct or indirect association with Mogollon or Salado agricultural and settlement features, suggesting cultivation by pre-Columbian people (DBG 2001). As of 2019, the AGFD HDMS has records of 94 occurrences. The species is considered to be imperiled by NatureServe (2019).

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: None (USDI, FWS 1996)
[C2 under *Agave* sp. nov./ined (USDI, FWS

1990, 1993)]

OTHER STATUS: Highly Safeguarded (ARS, ANPL 2016)
[Highly Safeguarded (ARS, ANPL 1993)]
Forest Service Sensitive (USDA, FS Region 3 2013)
[Forest Service Sensitive USDA, FS Region 3 1990, 1999]

MANAGEMENT FACTORS: *Agave delamateri* is known only from in and around archaeological sites in the Tonto Basin and Verde Valley in the Sonoran Desert in Arizona. It was cultivated during pre-Columbian times when various traits were selected for by the people managing the crop which lead to divergence from its closest wild ancestor (Parker et al. 2007). Referred to as a 'cultigen,' this species is only from approximately 90 clones, does not reproduce sexually and has lower genetic diversity compared to other Agaves. It is threatened by urban sprawl, creation of reservoirs, recreation activities, road improvements and realignments, and a fungus transported by the snout agave weevil (NatureServe 2019).

The arid conditions of May and June can cause physiological stress. Another threat is the snout agave weevil which spreads a fungus which can damage plants. The lack of asexual reproduction and low genetic diversity (Parker et al. 2007) can be problems in among themselves but also make the species more vulnerable to climate change as it occurs in the desert.

CONSERVATION MEASURES TAKEN: The species is classified as "Highly Safeguarded" under the Arizona Native Plant Law, and is listed as a "Sensitive Species" by the USDA Forest Service. Under Arizona Law, it can not be collected or moved without a special permit and the sensitive species status means that the plant must be considered in forest management plans.

SUGGESTED PROJECTS: Expand surveys, on upper cobbly benches by Verde Valley and tributaries; San Carlos Indian Reservation near Gila and upper Salt rivers; especially near archaeological sites along major drainages, including southern Arizona and the Coronado National Forest. Map individual plants within a clone and monitor survival of these plants for population trends; determine evolutionary origin.

LAND MANAGEMENT/OWNERSHIP: BIA – San Carlos Reservation; USFS – Coconino, Prescott, and Tonto National Forests; NPS – Montezuma Well NM; Private.

SOURCES OF FURTHER INFORMATION

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Threatened Species; Notice of Review. Proposed Rule. Federal Register 61(40):7596-7613.

MAJOR KNOWLEDGEABLE INDIVIDUALS:

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ADDITIONAL INFORMATION:

Desert Botanical Garden (Phoenix) conducted pollination studies (using pollen from other clones) which was unsuccessful.

Hodgson (Special Status Plant Workshop, Verde Valley April 17, 1993) suggested that these plants (like *A. murpheyi*) were grown during pre-Columbian times, but were grown on benches above drainages where check dams and alignments were found for growing more drought-intolerant crops. This occurrence of cultivation, was believed to have been grown by Hohokam and Salado cultures for food, fiber, and trade (ARPC 2001)

This species originally found by Susan McKelvey. Trelease wanted to call it *A. repanda*.

Revised: 1990-12-06 (SR)
1991-10-18 (BKP)
1992-09-15 (BKP)
1995-02-28 (WCH)
1997-04-08 (BGP)
1997-04-21 (SMS)
2003-05-08 (SMS)
2019-10-24 (BDT)

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