



Mammillaria brevipilumosa (Cactaceae, Cacteeae), a new species from Mexico

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Abstract

A new species of *Mammillaria*, named *Mammillaria brevipilumosa*, is described from Mexico (Durango, Municipality of Mapimí). It is morphologically very similar to *M. sanchez-mejoradae*. Diagnostic features of the proposed new species are the cylindrical and apically truncate tubercles, the embedded fruits, the white-magenta striped perianth segments, the small feather-like spines and the helicoidal arrangement of the tubercles on the stem. A diagnostic key for the closest species of *Mammillaria* occurring in northern Mexico is proposed.

Keywords: Chihuahuan Desert, Durango, *Mammillaria* ser. *Lasiacanthae*, taxonomy

Introduction

Mammillaria Haworth (1812: 177) is the largest genus of tribe Cacteeae Rchb. (Cactaceae Juss.), containing an undefined number of taxa (species and subspecies), ranging from 200–450 according to different authors (Craig 1945, Backeberg 1966, Bravo-Hollis & Sánchez-Mejorada 1978, Hunt 1987, 2006, Reppenhagen 1992a, 1992b, Lüthy 1995, Pilbeam 1999, Anderson 2001, Guzmán *et al.* 2003, Hernández & Gómez-Hinostrosa 2015, Villaseñor 2016). The genus is distributed mainly in Mexico, with few species reaching neighboring regions of north South America, Central America, the United States, and the Antilles. In Mexico, most of species occurs in the Sierra Madre Oriental, Sierra Madre Occidental and Sierra Madre del Sur mountain ranges, where they grow mainly on drier slopes and rocky places in tropical forests, oak and pine woodlands and grasslands; few specialized taxa occur elsewhere in the drier Chihuahuan Desert, mostly in flatlands and neighboring low hills (see e.g., Bravo-Hollis & Sánchez-Mejorada 1991, Hernández & Gómez-Hinostrosa 2015).

Mammillaria is a taxonomically problematic genus. Different evolutionary and paraphyletic hypothesis were proposed over the years (see e.g., Butterworth *et al.* 2002, Butterworth & Wallace 2004, Bárcenas *et al.* 2011, Hernández-Hernández *et al.* 2011, Vázquez-Sánchez *et al.* 2013), and the taxonomic status of several taxa (up to section rank) is not still resolved.

As part of the ongoing studies on the cactus flora of Mexico (see e.g., González-González 1992, García-Morales *et al.* 2004, 2014a, 2014b, 2014c, 2015, 2019, Sánchez-Salas *et al.* 2014, González-Elizondo *et al.* 2017), a population of *Mammillaria* was found in Durango State (Mexico), which shows some morphological features not fitting those of any other known taxa. Accordingly, we here propose to describe a new species.

Materials and methods

The work is based on field surveys carried out in the State of Durango (México) in 2016–2019. Relevant literature (cited through the text) was also analyzed, as well as specimens preserved at GBH, HFLA, ITCV, and MEXU (herbarium codes according to Thiers 2020 [continuously updated]) were examined. Spines and seeds were coated with gold and photographed using a SEM Phillips XL30 ESEM at 20 kV. The conservation status was assessed following the guidelines of IUCN (2019).

Taxonomic treatment

Mammillaria brevipilumosa García-Mor., Ramírez-Chap., Sigala-Chav. & Iamónico *sp. nov.* (Fig.1).

Holotype:—MEXICO. Durango State, Municipality of Mapimí, matorral xerófilo micrófilo, 1525 m, 05 December 2016, *García-Morales et al.* 6344 (holotype ITCV!, isotypes CIIDIR!, GBH!, HFLA!).

Diagnosis:—*Mammillaria brevipilumosa* is similar to *M. sanchez-mejoradae* Rodrigo González. (1992: 55) and *M. hermosana* Linzen, Ten Hove & Mart.-Avalos in Linzen (2014: 2–9) from which it differs in having a higher number of radial spines (40–55 vs. 30–40 and 22–30 respectively), the cylindrical tubercles with truncate apices (vs. conical and cylindrical in the other two species), the papillose epidermis of the tubercles (vs. naked), the smaller flowers (14–16 mm in diameter vs. 16–20 mm in *M. sanchez-mejoradae*, and 20–23 mm in *M. hermosana*), smaller and oval areoles (0.8–1.0 × 0.5 vs. 1.3–1.5 circular, and 1 × 2 mm circular), and the fruit ovoid, 3–5 × 2–3 mm (vs. subspherical, and 3–8 mm in diameter in both the other two species).

Description:—Stems simple, 10–25 mm long, 20–30 mm in diameter, depressed usually at soil level, with the older tubercles and most of the stem hypogeous; epigeous chlorophyllic section of the stem 5–10 mm high; roots fibrous, slightly napiform in older plants. Tubercles arranged in 18 or 24 helicoidal series, cylindrical, 3–4 mm high and 1–2 mm diameter; imbricate and flattened when drought, appressed dorsally and ventrally; apices truncate, epidermis papillose, pale green to dark green. Axils naked. Areoles oval, small, about 0.8–1 mm long and 0.5 mm wide, with sparse trichomes in the margins at the base of spines, yellow to pale brown colored when young, later becoming grayish. Spines 40–55, aciculate, all radiated, almost straight except at the slightly deflexed bases, cylindrical, 1.5–2.2 mm long, white, pubescent; trichomes single, flattened, denser, longer and more tortuous at the spine apices, taking shape of a short feather; spine epidermis very finely punctate-striated. Flowers widely infundibuliform-campanulate, 14–16 mm diameter and 12–16 mm long. External perianth segments 10–12, the basal rhomboid to squamiform, the upper oblanceolate, with the apices rounded or obtuse, 7–10 mm long and 2–3 mm wide, white to pale pink, with the external midstripe green to reddish. Internal perianth segments 12, oblanceolate or sometimes spatulate, with rounded apex, margins entire, 7–10 mm long and 2–3 mm wide, white with a midstripe pink to magenta. Stamens 60–100, filaments white, glossy, 5–8 mm long and 0.1–0.2 mm in diameter; anthers pale yellow, 0.6–0.8 mm long. Style green, 8–10 mm long and 0.6–0.8 mm in diameter; stigma lobes 3–5, 1 mm long and 0.5 mm in diameter, dull green. Ovary naked, ovoid, 3–5 mm long, light green, ovary walls 1 mm thick. Fruit embedded in the stem, ovoid, 3–5 mm long and 2–3 mm wide, flattened between the tubercles, green, with membranaceous epidermis. Seeds pyriform, testa black, with a constricted area above the hilum-micropylar region, 0.8–1 mm long, 0.6–0.8 mm in diameter, epidermis rugose, testa cells isodiametric, gradually smaller towards the hilum area, mostly penta-hexahedral in shape, with verrucose surface; hilum basal, medium.

Etymology:—The specific epithet refers to the shape and distribution of the trichomes at the apices of the spines, that resemble a small feather.

Distribution and habitat:—Endemic to a very small area in the Chihuahuan Desert (Municipality of Mapimí, Durango State, north Mexico) between 1450–1550 m elevation. The habitat corresponds to small hills with a transition of *Larrea-Mimosa* shrubland, characterized by mainly *Yucca*, *Opuntia* and *Fouquieria* species. Geology of the area corresponds to Upper Jurassic rocks with soils derived from quartz and limestones (INEGI 1978). Note that the geographic distance between *Mammillaria brevipilumosa* and *M. sanchez-mejoradae* is about 400 km straight line northwards, meanwhile the first from *M. hermosana* is more than 300 km straight line northwards.

Phenology:—*Mammillaria breviplumosa* flowers in winter, in February and early March; fruits seem to mature in the following year, but remains embedded in the stem between the older tubercles for many years until the fruits break up and seeds fall out the stem.

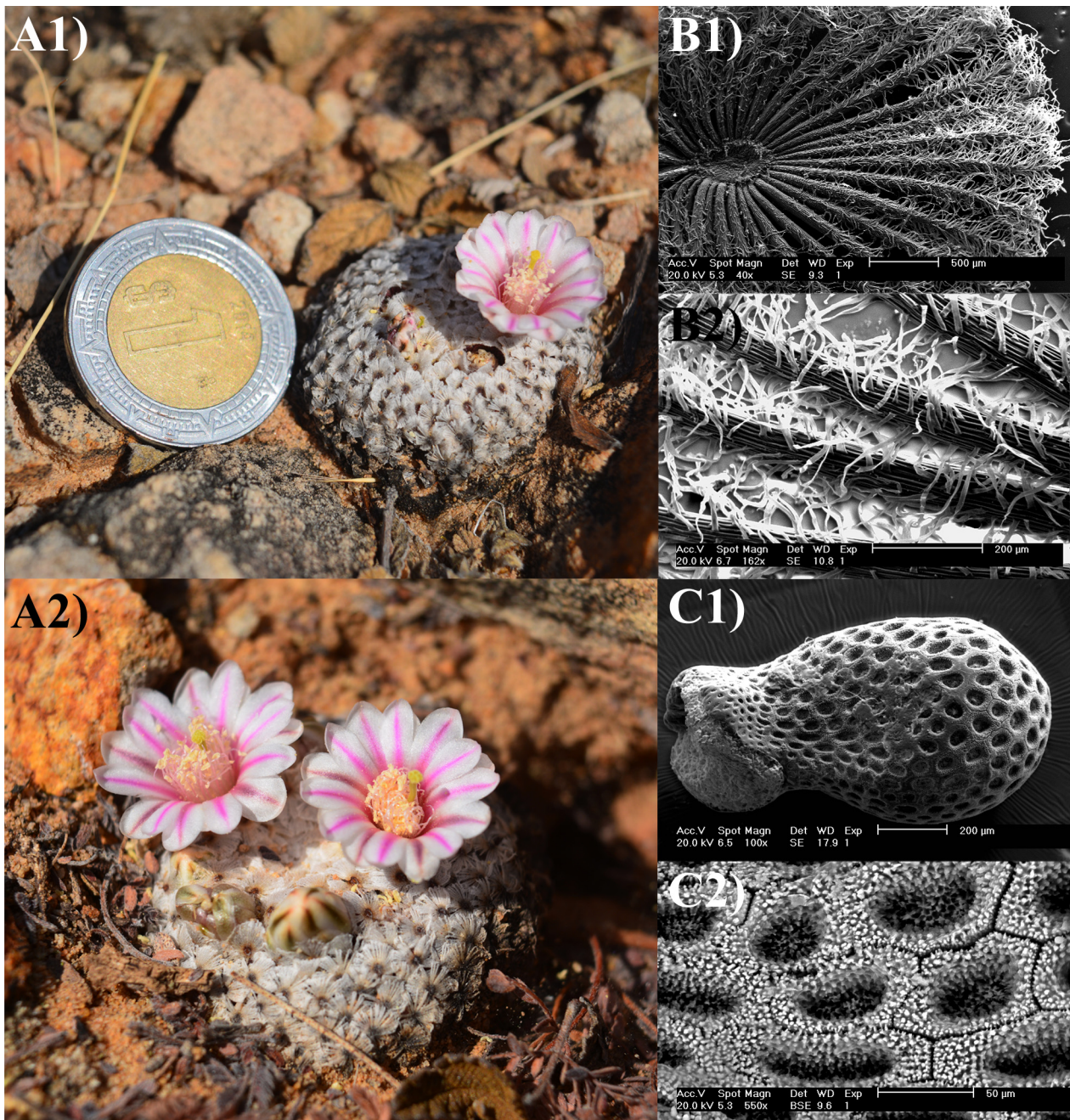


FIGURE 1. *Mammillaria breviplumosa*: A1–A2) habit (diameter of coins = 21 mm in A1; A2 has the same original size of A1), B1–B2) radial spines with details, C1) seed with details of the surface [photos (A1, A2) by R. Ramírez Chaparro].

Conservation status:—The estimated population of *Mammillaria breviplumosa* consists of about 4000 plants. EOO (= Extent of Occurrence) covers about 2.5 km², while the known AOO (= Area of Occupancy) is about 4 km². Based on field observations, threats to the species are mainly by uncontrolled cattle grazing. Because only a single effective population may exist and the habitat is subject to ongoing anthropogenic damage, application of the Red List Criteria of IUCN (2019) yields a conservation status estimate of Critically Endangered [CR B1a(iii)bc+B2a(iii)bc] for *M. breviplumosa*.

Taxonomic notes:—Following the treatments by Hunt (1971, 2006), Luthy (1995), and Pilbeam (1999), *Mammillaria breviplumosa* should belong to the subgen. *Mammillaria* ser. *Lasiacanthae* Hunt (1971: 63). Representatives of this series are usually depressed-globose and clustering plants, with the stems completely hidden or almost so by the numerous radial spines, lacking central spines; the flowers are small (rarely exceeding 20 mm in length), mostly

pale pink, creamy yellow or white; the seeds are black (Hunt 1971). Note, however, that the infrageneric classification of *Mammillaria* is not yet completely resolved (see e.g., Butterworth & Wallace 2005, Bárcenas *et al.* 2011, Vázquez-Sánchez *et al.* 2013) and further investigations are needed to clarify it (García-Morales & al. in prep.).

A diagnostic key for the species of *Mammillaria* ser. *Lasiacanthae* occurring in northern Mexico [*M. brevipilumosa*, *M. hermosana*, *M. roemerii* Wolfg. Krüger & W. Rischer (2002: 96), *M. lasiacantha* Engelm (1856: 5), *M. magallanii* Schmoll ex. R.T. Craig (1945: 225), *M. plumosa* Weber in Bois (1898: 804), *M. sanchez-mejoradae*] is here proposed.

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| 1. | Caespitose (clump-like habit). Sierra Madre Oriental, Coahuila, Nuevo León and Tamaulipas | <i>Mammillaria plumosa</i> |
| 1. | Not caespitose | 2 |
| 2. | Fruits exserted | 3 |
| 2. | Fruits embedded within the stem | 4 |
| 3. | Radial spines 40–60, 3–7 mm long; flowers 8–15 mm long and 10–18 in diameter. Chihuahuan Desert, Chihuahua, Coahuila, Durango, Texas and New Mexico | <i>Mammillaria lasiacantha</i> |
| 3. | Radial spines 70–75, 2.5–3 mm long; flowers 10 mm long and 8–12 mm in diameter. Chihuahuan Desert, SW Coahuila and NE Durango | <i>Mammillaria magallanii</i> |
| 4. | Seed reniform. Sierra Madre Occidental, Western Zacatecas | <i>Mammillaria roemerii</i> |
| 4. | Seed not reniform | 5 |
| 5. | Seed ovoid | <i>Mammillaria lasiacantha</i> |
| 5. | Seed pyriform | 6 |
| 7. | Flowers 20–23 mm in diameter; radial spines 22–30. Chihuahuan Desert, North Zacatecas | <i>Mammillaria hermosana</i> |
| 7. | Flowers 14–20 mm in diameter; radial spines 40–55 | 8 |
| 8. | Stems with conical tubercles; flowers 16–20 mm in diameter; radial spines 30–40. Chihuahuan Desert, Galeana, Nuevo León | <i>Mammillaria sanchez-mejoradae</i> |
| 8. | Stems with cylindrical tubercles; flowers 14–16 mm in diameter; radial spines 40–55. Chihuahuan Desert, Mapimí, Durango | <i>Mammillaria brevipilumosa</i> |

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