

NEOTYPE OF *ECHINOCACTUS FOSSULATUS* (CACTACEAE)  
AND THE FIRST REGISTER OF *THELOCACTUS HEXAEDROPHORUS*  
IN AGUASCALIENTES, MEXICO

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ABSTRACT

A neotype for the name *Echinocactus fossulatus* is here designated and the first record of *Thelocactus hexaedrophorus*, an endemic species to Mexico, for Aguascalientes is reported.

KEY WORDS: Cactaceae, Chihuahuan Desert, *Echinocactus droegeanus*

RESUMEN

Se designa un neotipo para el nombre *Echinocactus fossulatus* y se presenta el primer registro de *Thelocactus hexaedrophorus*, una especie endémica de México, para Aguascalientes.

PALABRAS CLAVE: Cactaceae, Desierto Chihuahuense, *Echinocactus droegeanus*

INTRODUCTION

*Thelocactus* (K. Schum.) Britton & Rose is a genus of Cactaceae comprising about 13 species distributed in the Chihuahuan desert region, from Texas to north of Mexico (Anderson 1987; Mosco & Zanovello 2000; Mosco 2019), characterized by having tuberculate stems sometimes proximally connated forming ribs, areoles usually developing a short groove, occasionally with extrafloral nectaries, ovary covered with scales, and fruits dehiscing basally with a persistent perianth (Anderson 1987; Mosco & Zanovello 2000).

*Thelocactus hexaedrophorus* (Lem.) Britton & Rose is endemic to Mexico and has been previously registered to Coahuila, Durango, Guanajuato, Jalisco, Nuevo León, Querétaro, San Luis Potosí, Tamaulipas, and Zacatecas (González-Elizondo et al. 2017; Hernández & Gómez-Hinostrosa 2011; Villaseñor 2016).

During August 2021, in a routine collection trip north of Aguascalientes, Mexico, a population of about 15 individuals of a glaucous small cactus was found in Tepezalá municipality, close to the state of Zacatecas. A specimen was collected following the methodology proposed by De Groot (2011), identified using pertinent literature (Anderson 1987; Bravo-Hollis & Sánchez-Mejorada 1991; Mosco & Zanovello 2000) and deposited in the Herbarium of the Autonomous University of Aguascalientes (HUAA, herbarium acronyms follow Thiers 2021). Digital images of specimens deposited in Arizona State University (ASU), Desert Botanical Garden (DES), Luz María Villarreal de Puga (IBUG) and New York Botanical Garden (NY) herbaria were consulted via Red de Herbarios del Noroeste de México (Sánchez-Escalante & Gilbert 2018). The cactus was identified as *Thelocactus hexaedrophorus*, which represents a new register of genus and species for the family Cactaceae in Aguascalientes. For the elaboration of the morphological description, the organ sequence used by Bravo-Hollis & Sánchez-Mejorada (1991) was followed.

**Thelocactus** (K. Schum.) Britton & Rose, Bull. Torrey Bot. Club 49:251. 1922. TYPE: *Thelocactus hexaedrophorus* (Lem.) Britton & Rose.

Shrubs or unbranched plants; stems globose, depressed-globose or subcylindrical, tubercles rounded to conical, sometimes proximally confluent in spiral ribs; areoles on the apices of the tubercles, sometimes with a short adaxial groove that does not extend to the axile of mature tubercles; spines acicular or subulate, smooth or annulated, straight or curved, central and radial spines generally distinguishable, white, yellowish or red; flowers apical, funnel-shaped, pericarpal and receptacular tube scaly, scales more than 3, tepals white, yellow or magenta; fruits ovoid to globose-cylindric, greenish to reddish, semi-fleshy, scaly with the perianth remnants persistent, opening at maturity by a basal pore; seeds pyriform, with a basal hilum, black, testa papillate or smooth.

**Thelocactus hexaedrophorus** (Lem.) Britton & Rose. Bull. Torrey Bot. Club 49:251. 1922. ≡ *Echinocactus hexaedrophorus* Lem., Cact. Gen. Nov. Sp. 27. 1839. TYPE: Iconographie descriptive des Cactees, Pl. 2, Dec 1841 (NEOTYPE, designated by Anderson 1987).

- = *Thelocactus hexaedrophorus* var. *fossulatus* Backeb., Die Cactaceae 5:2800. 1961. *Thelocactus fossulatus* (Scheidw.) Britton & Rose, Cactaceae 4:10. 1923. *Echinocactus hexaedrophorus* var. *fossulatus* (Scheidw.) Salm-Dyck ex Labouret, Monogr. Cact. 251. 1853. *Echinocactus fossulatus* Scheidw., Allg. Gartenzeitung 9:49. 1841. TYPE: Abbildung und Beschreibung bluhender Cacteen Pl. 13, 1843 (NEOTYPE, here designated).
- = *Thelocactus hexaedrophorus* ssp. *loydii* (Britton & Rose) N.P. Taylor, Cactaceae Consensus Init. 5:14. 1998. *Thelocactus hexaedrophorus* var. *loydii* (Britton & Rose) Kladiwa & Fittkau, Kakteen (H. Krainz) 61:CVIII B. 1975. *Thelocactus lloydii* Britton & Rose, Cactaceae 4:11. 1923. TYPE: MEXICO. ZACATECAS: in northern Zacatecas, May 25 1908, F.E. Lloyd 33 (HOLOTYPE: NY, 386187 [digital image!], ISOTYPE: US 3051223 [digital image!], US 3052681 [digital image!]). Note: the collection date of the isotypes is 1909, maybe clones of the holotype.
- = *Echinocactus droegeanus* Hildm. ex Schumann, Gesamtbeschr. Kakt. 438. 1898. TYPE: Not found.

Shrubs or unbranched plants; stems globose, depressed-globose or subcylindrical, up to 20 cm diameter and 8 cm tall, glaucous to grayish green, tubercles rounded to conical, sometimes proximally confluent forming spiral ribs; areoles on the apices of the tubercles, elliptic, woolly when young, usually with a short adaxial groove; spines acicular or subulate, smooth or annulated, central spines usually absent, radial 4–8, (5–)15–35 mm, white or yellowish, commonly with brown-reddish horizontal stripes; flowers apical, funnel-shaped, 80–100 mm diameter and (30–)40–60 mm long, pericarpal and receptacular tube scaly, scales more than 3, tepals white to pinkish; fruits globose-cylindric 8–10(–20) mm long and 6–10(–12) mm diameter, greenish to reddish; seeds 1.5–1.7 mm, black.

*Comments.*—In the protologue of *Echinocactus fossulatus* Scheidweiler (1841) provide a locality (Mexico, San Luis Potosí), but no collector or collection number is mentioned. As no illustration or original material exists, a neotype was designated (Fig. 1).

*Echinocactus droegeanus* Hildm., is accepted as a synonym of *Thelocactus hexaedrophorus* by Korotkova et al. (2021). Tropicos (2022) and the International Plant Names Index (IPNI 2021) show that the name *Echinocactus droegeanus* was published in Gesamtbeschreibung der Kakteen (Schumann 1898), but the only mention of this name appears in a note at the end of *Echinocactus hexaedrophorus* description: “*Echinocactus droegeanus* Hildmann I think it is a form that also belongs to this species”; *E. droegeanus* was also mentioned three years earlier in Monatsschrift für Kakteenkunde (Schumann 1895), but no description provided. However, the original publication where the name *E. droegeanus* was first proposed by Hildmann is unknown, also any morphological description or original material for this name.

The population of *T. hexaedrophorus* found in Aguascalientes (Fig. 2) expands the southwestern limits of the known distribution of this species endemic to Mexico (GBIF 2021). In Aguascalientes, it is distributed at the northeastern border of the state, in the Chihuahuan Desert biogeographic province (Morrone et al. 2017), in microphyllous desert scrub (Siqueiros-Delgado et al. 2017), habitat similar to the previously reported for all the members of the genus *Thelocactus* (Mosco 2019).

Specimens examined: **MEXICO. Central Mexico, no State or municipality defined:** cultivated at Desert Botanical Garden, E.R. Blakley B-121 (DES). **Aguascalientes. Municipality Tepezalá:** Ladera N del cerro Mesillas, 22°19'42.2"N -102°09'12.0"W, 2085 m,



FIG. 1. Noetype of *Echinocactus fossulatus* Scheidw. Illustration from Pfeiffer & Otto (1843), *Abbildung und Beschreibung blühender Cacteen*, Plate XIII





FIG. 2. *Thelocactus hexaedrophorus* in Tepezalá, Aguascalientes, Mexico.

*Sandoval-Ortega 1069* (HUAA). **Durango. Municipality San Juan de Guadalupe:** San Juan de Guadalupe, Estación Symon, 10.5 km al SSW, por el camino a San Juan de Guadalupe, 24°38'29"N -102°42'12"W, 1612 m, *M. González 4753* (CIIDIR); San Juan de Guadalupe, por el camino a El Orégano, 24°30'49"N -102°43'15"W, 1667 m, *M. González 3813a* (CIIDIR). **Nuevo León. Municipio Doctor Arroyo:** near border of San Luis Potosí, on hwy between Matehuala and Doctor Arroyo, 20 hwy-mi E of Matehuala, 1798 m, *A.D. Zimmerman s.n.* (ASU). San Luis Potosí. **Municipality Guadalcázar:** A 2 km E de la carretera San Luis Potosí-Matehuala, rumbo a Guadalcázar, 22.61667 -100.4833, 1510 m, *H. Hernández 1971* (ASU). **Municipality Mezquitic:** A 4 km al NW de Mezquitic sobre la carretera San Luis Potosí-Zacatecas, 22.25 -101.1333, 2020 m, *H. Hernández 1817* (ASU). **Municipality Villa Hidalgo:** 30 KM N of town along Highway 57, 22.404622 -100.739153, 1855 m, specimen grown in cultivation at Desert Botanical Garden originally collected by *E.F. Anderson 3198* (DES). **Zacatecas. Municipality not defined:** in northern Zacatecas, *F.E. Lloyd 33* (NY). **Municipality Mazapil:** 12 km N de Estación Camacho, 24.580861 -102.404167, 1617 m, *D. Sánchez 483* (IBUG).

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