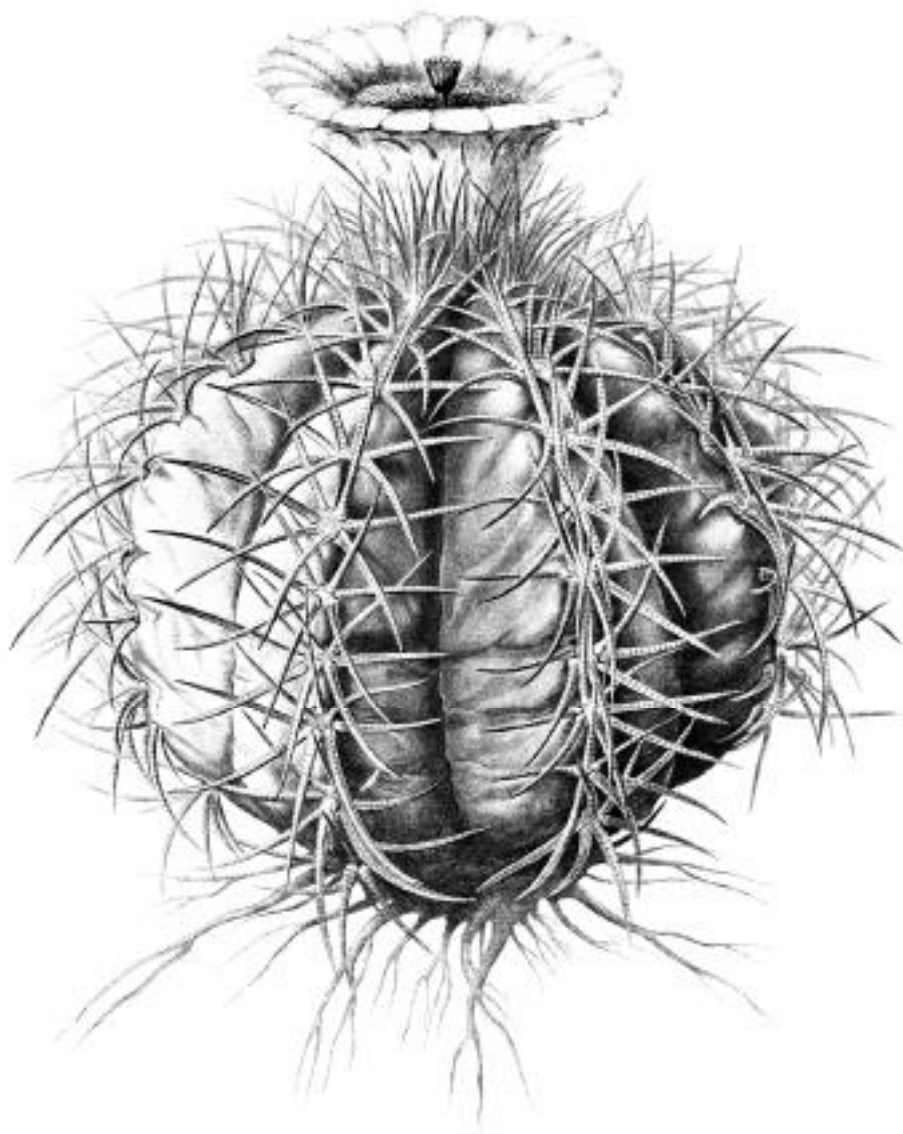


CHECKLIST OF CHIHUAHUAN DESERT CACTACEAE

Héctor M. Hernández, Carlos Gómez-Hinostrosa and Bárbara Goettsch



From: George Engelmann. 1858. Cactaceae of the Boundary.
Report on the United States and Mexican Boundary Survey, Washington.

CHECKLIST OF CHIHUAHUAN DESERT CACTACEAE

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AND BÁRBARA GOETTSCHE^{1,2}

Abstract. The Chihuahuan Desert Region gives refuge to the richest assemblage of Cactaceae in the world. We present a checklist of the cactus species reported for this region. The list contains species names, information on their geographical distribution at the state and country levels, and herbarium vouchers. A categorization of their conservation status is also provided. A total of 324 cactus species and five confirmed hybrids, distributed in 39 genera, are included in the list. *Mammillaria* (79 spp.), *Opuntia* s. str. (46 spp.), *Coryphantha* (36 spp.), and *Echinocereus* (30 spp.) are the best represented in terms of numbers of species. As far as species richness and endemism is concerned, the most important states are San Luis Potosí, Coahuila, Nuevo León, and Tamaulipas. With 17 cactus genera (43.6% of total) and 229 species (69.8% of total) geographically restricted to the Chihuahuan Desert Region, it is confirmed that the rate of endemism in this region is outstanding.

Resumen. La Región del Desierto Chihuahuense da refugio al más rico ensamblaje de especies de Cactaceae en el mundo. En esta contribución presentamos un listado de las especies de cactus reportadas para esta región. La lista contiene los nombres de las especies, información sobre su distribución geográfica a nivel de estados y países, y ejemplares de referencia. Además, se proporciona una categorización de su estado de conservación. La lista incluye un total de 324 especies, más cinco híbridos, distribuidos en 39 géneros. Los géneros mejor representados en términos de su número de especies son *Mammillaria* (79 spp.), *Opuntia* s. str. (46 spp.), *Coryphantha* (36 spp.) y *Echinocereus* (30 spp.). Por otra parte, San Luis Potosí, Coahuila, Nuevo León y Tamaulipas son los estados más importantes por su riqueza de especies y alto nivel de endemismo. Con 17 géneros (43.6% del total) y 229 especies de cactáceas (69.8% del total) restringidos geográficamente a la región, se confirma que el Desierto Chihuahuense es notable por su alta tasa de endemismo.

Keywords: Cactaceae, Chihuahuan Desert, Mexico, floristic checklist, cactus hybrids, succulents.

The family Cactaceae comprises about 100 genera and 1500 species, primarily confined to the New World (Barthlott and Hunt, 1993). General accounts on this family have shown that Mexico harbors the richest assemblage of cacti in the world (Bravo, 1978; Bravo and Sánchez-Mejorada, 1991a,b; Hunt, 1999; Anderson, 2001), and the most conservative taxonomic view (Hunt, 1999) suggests that there are in this country about 50 genera and 550 species.

The richest areas of cactus diversity and endemism are centered in the major arid and semi-arid regions of Mexico, namely the Chihuahuan Desert, the Sonoran Desert, and the Tehuacán Valley. Of these, the Chihuahuan Desert in particular is prominent for having the highest diversity of Cactaceae, both at the

national and global levels (Hernández and Godínez, 1994; Hernández and Bárcenas, 1995; Gómez-Hinostrosa and Hernández, 2000; Hernández et al., 2001).

Despite the importance of the Chihuahuan Desert as a center of diversity and endemism of Cactaceae, a comprehensive catalog of the cactus species occurring in this region has not been published so far. However, a number of partial listings have been produced as a result of floristic work carried out in particular areas within this region (Sánchez-Mejorada, 1978; Benson, 1982; Pinkava, 1984; Cornet, 1985; Argüelles et al., 1991; Villarreal, 1994). In addition, our knowledge on the diversity of the Cactaceae in the Chihuahuan Desert has increased by recent studies primarily aimed at understanding its diversity and distribution patterns at the local

We are grateful to Professor Donald Pinkava and Raul Puente for reviewing the checklist, and to Rolando Bárcenas, W. A. Fitz Maurice, and Antonio Reyes for providing information on *Grusonia*, *Mammillaria* ser. *Stylothelae*, and *Opuntia*, respectively. We also would like to thank Fernando Chiang for constructive comments to the manuscript and Silvia Zumaya for helping us to process the information. Fieldwork associated with this project was carried out under SEMARNAT collecting permit FLOR-0004.

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and regional scales (Hernández and Godínez, 1994; Hernández and Bárcenas, 1995, 1996; Bárcenas, 1999; Gómez-Hinostrosa and Hernández, 2000; Hernández et al., 2001; Goettsch, 2001). As a result of extensive explorations carried out throughout the Chihuahuan Desert during the last 12 years, we have incorporated more than 6000 cactus specimens in the National Herbarium of Mexico (MEXU). Overall, this herbarium currently holds more than 14,000 cactus specimens and probably contains the largest collection of North American Cactaceae. All of these herbarium

data have improved our knowledge on the diversity and distribution patterns of the Cactaceae.

This contribution includes the first complete catalog of the cactus species occurring in the Chihuahuan Desert. A preliminary version of this list, which contains species names, information on their geographical distribution, herbarium vouchers, and a categorization of their conservation status, served as a basis for analyzing the diversity, endemism and spatial patterns of the Cactaceae in this desert region (Hernández and Gómez-Hinostrosa, in press).

THE CHIHUAHUAN DESERT REGION

The precise delimitation of the Chihuahuan Desert has been subject to debate. The Sierra Madre Occidental and Sierra Madre Oriental have usually been considered as the western and eastern boundaries of the region; however, opinions have differed regarding its southern and northern limits (Shreve, 1942; Contreras, 1955; Henrickson and Straw, 1976; Johnston, 1977; Morafka, 1977a,b; Schmidt, 1979; Medellín-Leal, 1982; Muldavin, 2002). According to Henrickson and Straw (1976), the region has an estimated area of 507,000 km², and extends from southern San Luis Potosí, at about 21° 40' N latitude, into a small portion of Arizona and into the Rio Grande and Pecos River Basins in New Mexico and Texas, at about 34° 30' N latitude.

In many parts of its range, the Chihuahuan Desert proper is interspersed with non-desert areas, typically higher-elevation mountains, subject to the strong influence of the nearby desert (Shreve, 1942; Morafka, 1977a,b; Medellín-Leal, 1982). This situation, which results in vegetation and climatic gradients, and large ecotonal areas, has led researchers (Henrickson and Straw, 1976; Morafka, 1977a,b; Medellín-Leal, 1982) to consider the typical desert formations, and associated less-arid areas, under a larger eco-geographic unit called the Chihuahuan Desert Region (CDR). This concept provides a more natural framework for the study of typical desert organisms that extend their ranges into ecotonal areas or onto the lower slopes of associated mountains, as is the case with many cactus taxa. For a more detailed discussion on the delimitation of the CDR and its vegetation and climatic characteristics, refer to Hernández and Gómez-Hinostrosa (in press).

According to the above definition, we have recently proposed the existence in the CDR of three subregions (Hernández and Gómez-Hinostrosa, in press). These are largely delineated on the basis of the distribution ranges of endemic Cactaceae (Fig. 1).

1. The Main Subregion, also known as the main body of the CDR, is roughly equivalent to the large area defined by Henrickson and Straw (1976). The extensive arid or semi-arid plains within this subregion are intermixed with non-desert areas (i.e., sky island mountains), where xerophytic associations intergrade with more mesic vegetation types. The ecotonal areas located at the lower slopes of the Sierra Madre Occidental, which are dominated by grasslands, and pine-oak-juniper woodlands, are also considered within this subregion.

2. To the south of the Main Subregion there are several geographically and climatically isolated, dry depressions and valleys, collectively referred by Hernández and Gómez-Hinostrosa (in press) as the Meridional Subregion of the CDR (Fig. 1). This subregion partially matches the area considered by Medellín-Leal (1982) as the Queretaroan-Hidalgoan Arid Zone (e.g., Barranca de Metztlán, Valle del Mezquital, Valle de Actopan in Hidalgo, and the Extóraz River Basin in Querétaro), but also includes all the dry portions of Guanajuato (e.g., Xichú and Atarjea) and a small region located at the southern extreme of San Luis Potosí. This relatively small subregion is outstanding by virtue of the presence of numerous narrowly endemic cactus species.

3. The Eastern Subregion (Fig. 1) includes the valleys and depressions located in the Sierra Madre Oriental, at the southeastern extreme of the Main Subregion. This peripheral subregion

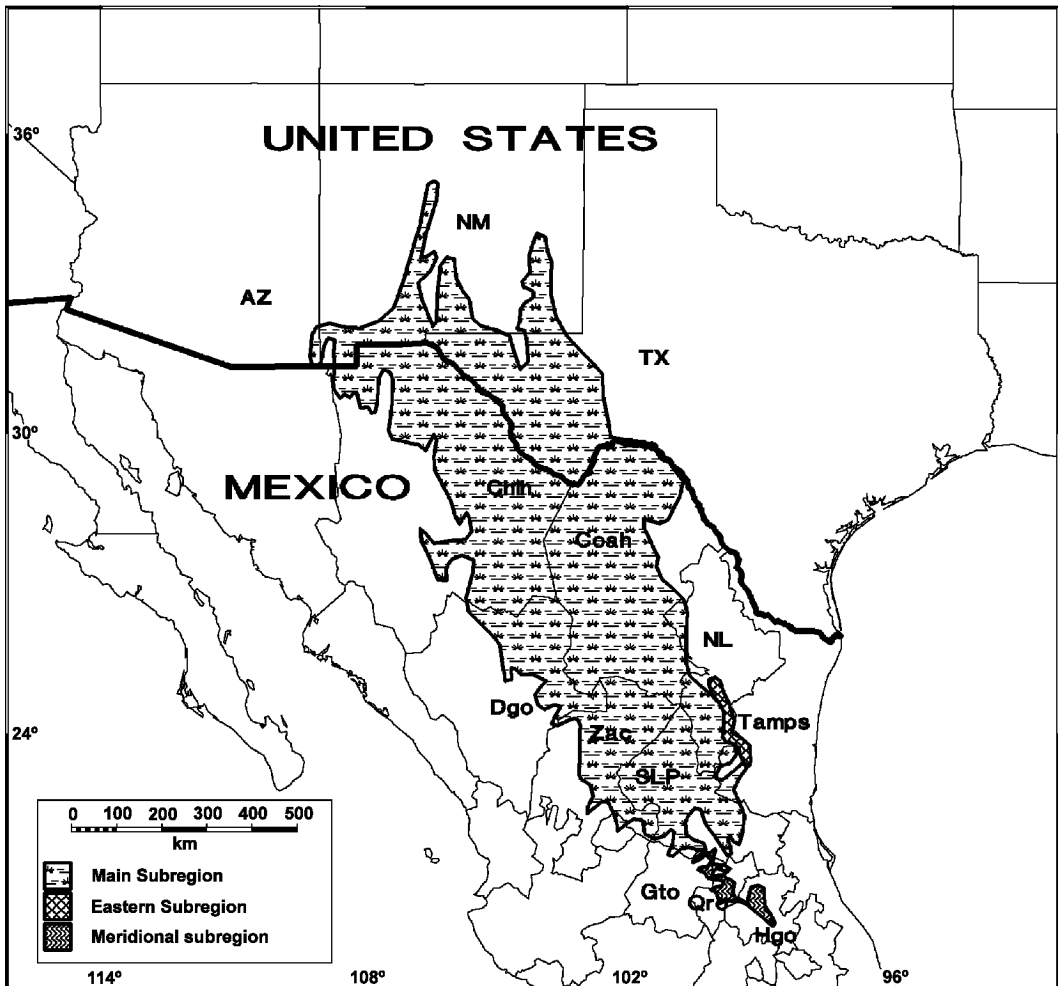


FIGURE 1. The Chihuahuan Desert Region with its three subregions. AZ = Arizona, NM = New Mexico, TX = Texas, Chih = Chihuahua, Coah = Coahuila, NL = Nuevo León, Tamps = Tamaulipas, Dgo = Durango, Zac = Zacatecas, SLP = San Luis Potosí, Gto = Guanajuato, Qro = Querétaro, Hgo = Hidalgo. (Reprinted with permission from Hernández and Gómez-Hinostrosa, in press).

includes several disjunct areas sharing vegetational and climatic characteristics with the Main Subregion. This includes the intermontane valleys and canyons located within the Sierra Madre Oriental (e.g., Rayones, Jaumave, and Aramberri valleys), where several endemic species and even genera of Cactaceae restrict their distribution range. A few cactus species, clearly closely related to Chihuahuan Desert taxa, occurring further east of the Sierra Madre

Oriental (e.g., *Astrophytum asterias*, *A. caput-medusae*, *Echinocereus papillosus*, and *Mammillaria anniana*) were included within this subregion.

The ascription of each of the cactus species to one of the subregions usually was a simple decision. However, due to the individualistic nature of the distribution pattern of the species, the assignment was in some instances somewhat subjective.

METHODS

With the purpose of compiling the list of Cactaceae from the CDR, we consulted the relevant bibliographic references (e.g., Sánchez-

Mejorada, 1978; Bravo, 1978; Bravo and Sánchez-Mejorada, 1991a,b; Benson, 1982; Pinkava, 1984; Cornet, 1985; Argüelles et al.,

1991; Villarreal, 1994; Bárcenas, 1999; Gómez-Hinostrosa and Hernández, 2000; Hernández et al., 2001; and Anderson, 2001). The preliminary bibliographic list was collated and complemented with the information of our Database of Cactus Collections from North and Central America. This database currently contains over 23,000 specimen records from 35 national and international herbaria. With a few exceptions, we followed the taxonomic criteria of Hunt (1999) and Anderson (2001). However, it has to be considered that, given the fact that most cactus genera still await taxonomic revision, there are still numerous taxonomic problems. We excluded from the list all the entirely cultivated species [e.g., *Hylocereus undatus* (Haw.) Britton & Rose and *Opuntia ficus-indica* (L.) Mill.]; however, species such as *Pachycereus marginatus* were maintained, as we suspect the existence in the region of wild populations of such species. Likewise, *Stenocereus griseus* was included because we found extensive, presumably naturalized, populations of this species.

For each of the species in the list, the general geographical distribution at the state and country levels is indicated. The presence of each species in a particular state was corroborated by herbarium specimens; however, some state records, those marked in **bold face**, come exclusively

from bibliographic sources. Doubtful state records are marked with a question mark (?). In addition, species were categorized according to their geographical affinities as follows: Main Subregion endemic, Meridional Subregion endemic, Eastern Subregion endemic, and not Chihuahuan Desert Region endemic. A number of species were endemic to the Main and Meridional subregions combined. State and subregion abbreviations are indicated at the beginning of the checklist.

Only one or two herbarium vouchers are cited for each species. All specimens are deposited at the National Herbarium of Mexico (MEXU), unless otherwise indicated. Specimens that come exclusively from bibliographic sources are marked in bold face.

A significant number of species are included in national (Norma Oficial Mexicana-059; SEMARNAT, 2002) or international listings of endangered species (IUCN Red List of Threatened Species; IUCN, 2002). Also, several species are listed in Appendix I of the Convention on International Trade in Endangered Species (CITES, 1990). When applicable, the categories of threat assigned to individual species are indicated at the end of each entry. The categories in **bold face** correspond to infraspecific taxa.

RESULTS AND DISCUSSION

In a separate publication (Hernández and Gómez-Hinostrosa, 2005, in press) we provide a detailed description of the diversity, endemism, distribution patterns, and conservation status of the cactus species occurring in the CDR. Here, we briefly summarize the results of that contribution.

There are in the Chihuahuan Desert Region a total of 324 cactus species, plus 5 described hybrids, distributed in 39 genera. Four genera, *Mammillaria* (79 spp.), *Opuntia s. str.* (46 spp.), *Coryphantha* (36 spp.), and *Echinocereus* (30 spp.), account for 58% of the total diversity in the region. The states with the highest numbers of species are San Luis Potosí, Coahuila, Nuevo León, and Tamaulipas, each of which has more than 100 cactus species (Table 1).

As far as endemism is concerned, 17 (43.6%) of the 39 cactus genera recorded are restricted to the CDR. Likewise, a total of 229 species (69.8%) are strictly endemic to the region.

TABLE 1. Total number of cactus species and number of endemic species by state in the Chihuahuan Desert Region.

	SPECIES	STATE ENDEMICS
San Luis Potosí	141	17
Coahuila	127	14
Nuevo León	114	14
Tamaulipas	104	8
Zacatecas	94	5
Querétaro	93	8
Guanajuato	90	6
Texas	83	6
Durango	82	2
Hidalgo	72	3
Chihuahua	65	1
New Mexico	47	1

On the other hand, the analysis of endemism at a subregional scale revealed that 152 cactus species, representing 46.3% of the total cactus diversity in the region, are restricted to the Main Subregion. In addition, 41 species (12.5%) are endemic to the Meridional Subregion, with 13 (4%) more species found exclusively in the two subregions combined. Finally, 23 (7%) species turn out to be endemic to the Eastern Subregion. It is interesting to point out that the Eastern Subregion, which has a relatively small area, is home to 3 endemic cactus genera: *Aztekium*, *Geohintonia*, and *Obregonia*.

The cactus species endemic to single states are concentrated in the more diverse states. Thus, 85 of the total number of species in the CDR are endemic to single states, and San Luis Potosí (17 spp.), Nuevo León (14 spp.), and Coahuila (14 spp.) are the ones with the highest numbers of state endemics (Table 1). These three account for 45 species (53%) of Cactaceae endemic to one state.

The Cactaceae is the most endangered plant family in the CDR in particular (Hernández and Godínez, 1994; Hernández and Bárcenas, 1995,

1996; Gómez-Hinostrosa and Hernández, 2000; Hernández et al., 2001; Hernández and Gómez-Hinostrosa, in press). Cacti from the CDR tend to be geographically and ecologically rare, as are many of the Mexican species. Humans have exacerbated this phenomenon by disturbing the natural habitat and by over-collecting many of the commercially important species. A total of 136 species of Cactaceae from the CDR are included in Mexico's official list of "species at risk of extinction" (SEMAR-NAT, 2002). On the other hand, 63 species have already been included in the IUCN Red List of Threatened Species (IUCN, 2002). Many species of Cactaceae are currently being reevaluated by IUCN for possible inclusion in the new Red List Categories. It is expected that as the reevaluation progresses, the Red List will be the most useful reference on the conservation status of cactus species and many other plant families. Finally, due to its commercial importance, the entire cactus family is included in Appendix II of the Convention of International Trade of Endangered species (CITES, 1990), and 40 cactus species from the CDR are currently listed in Appendix I.

CHECKLIST OF CHIHUAHUAN DESERT CACTACEAE

State and country abbreviations: Ags = Aguascalientes, AZ = Arizona, BC = Baja California, BCS = Baja California Sur, CA = California, Camp = Campeche, CH = Chile, Chih = Chihuahua, Chis = Chiapas, CO = Colorado, Coah = Coahuila, COL = Colombia, CR = Costa Rica, CU = Cuba, DF = Distrito Federal, Dgo = Durango, EC = Ecuador, FL = Florida, Gro = Guerrero, Gto = Guanajuato, GUAT = Guatemala, HA = Haití, Hgo = Hidalgo, HON = Honduras, IA = Iowa, ID = Idaho, IL = Illinois, Jal = Jalisco, KS = Kansas, LA = Louisiana, Mex = State of Mexico, MI = Michigan, Mich = Michoacán, MN = Minnesota, MO = Missouri, Mor = Morelos, MT = Montana, Nay = Nayarit, ND = North Dakota, NIC = Nicaragua, NL = Nuevo León, NM = New Mexico, NV = Nevada, Oax = Oaxaca, OH = Ohio, OK = Oklahoma, PAN = Panama, Pue = Puebla, QR = Quintana Roo, Qro = Querétaro, SAL = El Salvador, SD = South Dakota, SLP = San Luis Potosí, Sin = Sinaloa, Son = Sonora, Tamps = Tamaulipas, Tlax = Tlaxcala, TRI = Trinidad, TX = Texas, UT = Utah, VEN = Venezuela, Ver = Veracruz, WA = Washington, WY = Wyoming, Yuc = Yucatán, Zac = Zacatecas.

Subregion abbreviations: CD = Main Subregion endemic, M = Meridional Subregion endemic, CD+M = Main Subregion endemic plus Meridional Subregion endemic, E = Eastern Subregion endemic, NE = Not Chihuahuan Desert Region endemic.

Conservation status: NOM—A = Threatened, Pr = Under special protection, P = Endangered. IUCN—EW = Extinct in the Wild, CR = Critically Endangered, EN = Endangered, VU = Vulnerable, NT = Near Threatened, DD = Data Deficient. CITES—I = Appendix I.

Acanthocereus tetragonus (L.) Hummelinck, Camp, Chis, Oax, Qro, QR, SLP, Tamps, Ver, Yuc; FL, TX; CU; TRI; GUAT; HON; NIC; SAL; CR; PAN; VEN; COL (NE). *H. M. Hernández 1626, González-Medrano 570.*

Acharagma aguirreana (Glass & R. A. Foster) Glass, Coah (CD). *Glass 3044* (DES), *Pinkava s.n.* (ASU). NOM (Pr), IUCN (CR).

A. roseana (Boed.) E. F. Anderson, Coah (CD). *Anderson 3186* (US, DES), *H. M. Hernández 3407*. NOM (Pr).

- Ariocarpus agavoides* (Castañeda) E. F. Anderson, **NL**, SLP, Tamps (CD). *H. M. Hernández* 2054, *Sánchez-Mejorada* 3628. NOM (Pr), IUCN (VU), CITES (I).
- A. bravoanus* H. M. Hern. & E. F. Anderson, SLP (CD). *H. M. Hernández* 1790, *H. M. Hernández* 1977. NOM (P), IUCN (**CR**, VU), CITES (I).
- A. fissuratus* (Engelm.) K. Schum., **Chih**, Coah, Dgo, Zac; TX (CD). *H. M. Hernández* 2182, *H. M. Hernández* 2295. CITES (I).
- A. kotschoubeyanus* (Lem.) K. Schum., Coah, **NL**, Qro, SLP, Tamps, Zac (CD+M). *Goetsch* 99, *H. M. Hernández* 1921. NOM (Pr), IUCN (NT), CITES (I).
- A. retusus* Scheidw., Coah, **NL**, SLP, Tamps, Zac (CD). *Goetsch* 317, *Gómez-Hinostroza* 585. NOM (Pr), CITES (I).
- A. scaphirostris* Boed., **NL** (E). *Anderson* 1695 (DES), *Sánchez-Mejorada* 3736. NOM (P), IUCN (VU), CITES (I).
- Aztekium hintonii* Glass & Fitz Maurice, **NL** (E). *Hinton s.n.*, *Hinton* 21528. NOM (Pr).
- A. ritteri* (Boed.) Boed., **NL** (E). *Sánchez-Mejorada* 3723, *H. M. Hernández* 2147. NOM (A), CITES (I).
- Cephalocereus senilis* (Haw.) Pfeiff., Hgo, Ver (M). *Gómez-Hinostroza* 61, *Gómez-Hinostroza* 1802. NOM (A).
- Coryphantha clavata* (Scheidw.) Backeb., Ags, Gto, Qro, SLP, Zac (NE). *H. M. Hernández* 2461, *Bárcenas* 1512.
- C. cornifera* (DC.) Lem., **Chih**, Coah, **Dgo**, Gto, Hgo, Jal, Mex?, Qro, Ver?, Zac; TX (NE). *Scheinvar* 5139, *Bárcenas* 464.
- C. delaetiana* (Quehl) A. Berger, **Chih**, Coah, Dgo (CD). *Bravo* 78, *McGill* P9258 (DES).
- C. difficilis* (Quehl) Orcutt, Coah, **NL** (CD). *H. M. Hernández* 2242, *Elizondo s.n.*
- C. durangensis* (Schum.) Britton & Rose, Coah, Dgo (CD). *H. M. Hernández* 2300, *Johnston* 10400b. NOM (Pr), IUCN (**EN**).
- C. echinoidea* (Quehl) Britton & Rose, Dgo, **SLP**, **Zac** (CD). *Anderson* 4956 (DES).
- C. echinus* (Engelm.) Orcutt, **Chih**, Coah, SLP; TX (CD). *Zimmerman* 2420.1 (ASU), *Zimmerman* 2753 (ASU).
- C. elephantidens* (Lem.) Lem., Gro, Gto, Jal, Mich, Mor, Oax, **Qro** (NE). *Bárcenas* 165, *Bárcenas* 22. NOM (A), UICN (**EN**).
- C. erecta* (Pfeiff.) Lem., Gto, Hgo, Qro, SLP (M). *H. M. Hernández* 1703, *Bárcenas* 834.
- C. georgii* Boed., **NL**, SLP, Tamps (CD). *Goetsch* 390, *H. M. Hernández* 1963.
- C. glanduligera* Lem., **NL**, Dgo, SLP, Tamps, Zac (CD). *Gómez-Hinostroza* 566, *Goetsch* 320. NOM (A).
- C. glassii* Dicht & A. Lüthy, **Gto**, **SLP** (M). *Arredondo* 527 (SLPM).
- C. gracilis* L. Bremer & A. B. Lau, **Chih** (CD). *Lau* 645. NOM (P).
- C. guerkeana* (Boed.) Britton & Rose, Ags, Coah, Dgo, Jal, **NL**, SLP, Tamps, Zac (CD). *Gómez-Hinostroza* 1030, *Gómez-Hinostroza* 998.
- C. hintoniorum* Dicht & A. Lüthy, **NL** (CD). *Hinton* 27111 (**Hinton Herb.**). IUCN (VU).
- C. jalpanensis* Buchenau, Gto, Qro, SLP (M). *H. M. Hernández* 1728, *Gómez-Hinostroza* 387.
- C. longicornis* Boed., **Dgo**, **Chih** (CD).
- C. macromeris* (Engelm.) Lem., **Chih**, Coah, Dgo, **NL**, SLP, Zac; NM, TX (CD). *Goetsch* 169, *Gómez-Hinostroza* 1737.
- C. maíz-tablasensis* Fritz Schwarz ex Backeb., SLP (CD). *Gómez-Hinostroza* 391. NOM (A), UICN (**EN**).
- C. nickelsiae* (K. Brandege) Britton & Rose, Coah, **NL**, Tamps; TX (CD). *Bravo s.n.*, *Barkley* 7157. NOM (A).

- C. octacantha* (DC.) Britton & Rose, Ags?, Gto, Hgo, Qro (M). *R. Hernández 4621, Scheinvar 2361*.
- C. odorata* Boed., NL, SLP, Tamps (CD). *Gómez-Hinostrosa 1655, Gómez-Hinostrosa 1288. NOM (Pr), UICN (VU)*.
- C. ottonis* (Pfeiff.) Lem., Ags, **Dgo?**, Gto, Hgo, Jal, Mex?, **Qro, SLP, Zac** (NE). *Bárcenas 603, Bárcenas 1000*.
- C. poselgeriana* (Dietr.) Britton & Rose, Chih, Coah, Dgo, NL, SLP, Zac (CD). *Gómez-Hinostrosa 1745, H. M. Hernández 2124. NOM (A)*.
- C. pseudoechinus* Boed., Coah, NL (CD). *Anderson 5012 (DES). NOM (Pr)*.
- C. pulleineana* (Backeb.) Glass, SLP, Tamps (CD). *Gómez-Hinostrosa 1183, Bárcenas 1027. NOM (Pr)*.
- C. radians* (DC.) Britton & Rose, Ags, Gto, Hgo, Oax, Pue, Qro, SLP, Zac (NE). *Gómez-Hinostrosa 1610, Bárcenas 66*.
- C. ramillosa* Cutak, Coah; TX (CD). *H. M. Hernández 3379, Pinkava P13017 (ASU). NOM (A)*.
- C. robustispina* (Ant. Schott ex Engelm.) Britton & Rose, **Chih**, Coah, **Dgo**, Son, Zac; AZ, **NM, TX** (NE). **Lloyd 31b (US), Palmer 566 (US). IUCN (EN)**.
- C. salinensis* (Poselg.) A. D. Zimmerman ex Dicht & A.Lüthy, **Coah, NL** (CD). **Wooton s.n. (US)**.
- C. sulcata* (Engelm.) Britton & Rose, Coah, **NL**; TX (CD). *Bravo s.n., Wehbe 173 (ANSM). NOM (A)*.
- C. sulcolanata* (Lem.) Lem., Ags, Gto, Gro, Hgo, Mor, **Oax, Ver**, Zac (NE). *Anderson 4980 (US), Scheinvar 4712*.
- C. unicornis* Boed., **Coah** (CD).
- C. vogtherriana* Werderm. & Boed., **SLP** (CD). NOM (A), IUCN (CR).
- C. werdermannii* Boed., Chih, Coah (CD). *Elizondo s.n. (ANSM), Chiang 9030 (LL). NOM (P), CITES (I)*.
- C. wohlschlagerei* Holzeis, SLP (CD). *Gómez-Hinostrosa 1500, H. M. Hernández 2927. NOM (Pr)*.
- Cylindropuntia antejoensis* (Pinkava) E. F. Anderson, Coah (CD). *Sánchez-Mejorada 4120, Pinkava P13661 (ASU). NOM (Pr)*.
- C. imbricata* (Haw.) F. M. Knuth, Ags, BCS, Chih, Coah, DF, **Dgo**, Gto, Hgo, Mex, NL, Pue, Qro, SLP, Son, Tamps, Ver, Zac; AZ, CO, KS, NM, OK, TX (NE). *H. M. Hernández 3350, H. M. Hernández 2861*.
- C. kleiniae* (DC.) F. M. Knuth, Coah, **Dgo**, Hgo, NL, Pue, Qro, SLP, Tamps, Zac; AZ, **NM, TX** (NE). *Goettsch 271, Gómez-Hinostrosa 1117*.
- C. leptocaulis* (DC.) F. M. Knuth, BCS, Chih, Coah, Dgo, Gto, Hgo, NL, Pue, Qro, SLP, Son, Tamps, Zac; AZ, CO, **NM, OK, TX** (NE). *Goettsch 22, Gómez-Hinostrosa 1472*.
- C. rosea* (DC.) Backeb., Hgo, **Mex**, Pue, **Tlax** (NE). *Guízar 5152, Guízar 5266*.
- C. spinosior* (Engelm.) F. M. Knuth, Chih, Son; AZ, NM (NE). *Reid s.n. (ASU), Worthington 8133 (ASU)*.
- C. tunicata* (Lehm.) F. M. Knuth, Ags, Coah, Gto, Hgo, Jal, **Mex**, NL, Pue, SLP, Tamps, Ver, Zac; **NM, OK, TX; CU; COL; EC; CH** (NE). *Goettsch 29, H. M. Hernández 2754*.
- Disocactus flagelliformis* (L.) Barthlott, Gto, Hgo, Qro, Oax, Pue, SLP, Ver (NE) *Scheinvar 4808, Gómez-Hinostrosa 1623. NOM (Pr)*.
- Echinocactus grusonii* Hildm., **Hgo**, Qro (M). *H. M. Hernández 2442, Scheinvar 3177. NOM (P), IUCN (CR)*.
- E. horizonthalonius* Lem., Ags, Chih, Coah, Dgo, Gto, NL, Qro, SLP, **Son**, Tamps, Zac; AZ, **NM, TX** (NE). *Goettsch 246, H. M. Hernández 1993*.
- E. parryi* Engelm., Chih, Coah (CD). *Worthington 7270 (ASU), Corral 89 (ASU). NOM (A)*.
- E. platyacanthus* Link & Otto, Coah, Gto, Hgo, NL, Oax, Pue, Qro, SLP, Tamps, Zac (NE). *Goettsch 235, Gómez-Hinostrosa 577. NOM (Pr)*.
- E. texensis* Hopffer, Coah, **Dgo**, NL, Tamps, Zac; **NM, TX** (CD). *H. M. Hernández 2146, H. M. Hernández 3523*.
- Echinocereus berlandieri* (Engelm.) F. Haage, **Coah, NL**, Tamps; TX (NE). *Bravo s.n., White 15*.
- E. chisoensis* W. T. Marshall **Coah, Dgo**; TX (CD). *Anderson 5123 (DES), Blakley 1442 (DES)*.
- E. cinerascens* (DC.) Lem., DF, Gto, Hgo, Mex, NL, Qro, SLP, Tamps, Zac (NE). *Goettsch 111, Gómez-Hinostrosa 794*.

- E. coccineus* Engelm., **Chih, Coah, Son**; AZ, CO, NM, TX (NE). *Worthington 28151* (ASU), *Miller 925* (ASU).
- E. dasyacanthus* Engelm., **Chih, Coah, Son**; AZ, NM, TX (NE). *Hodgson 9007* (ASU), *Hodgson 9054* (ASU).
- E. enneacanthus* Engelm., **Chih, Coah, Dgo, NL, SLP, Tamps, Zac**; NM, TX (CD). *H. M. Hernández 2655*, *Gómez-Hinostrosa 851*.
- E. fendleri* (Engelm.) Seitz, **Chih, Coah, Son**; AZ, CO, NM, TX (NE). *Zimmerman 2472* (ASU), *Worthington 9929* (ASU).
- E. knippelianus* Liebn., **Coah, NL, Tamps** (CD). *Scheinvar 4968*, *Sánchez-Mejorada 3800*. NOM (A).
- E. longisetus* (Engelm.) Lem., **Coah, NL** (CD). *Taylor 265*, **McDowell s.n. (US)**. NOM (Pr).
- E. mapimiensis* E. F. Anderson, W. Hodgson & P. Quirk, **Coah** (CD). *Keil 8136* (ASU, DES).
- E. nivosus* Glass & R. A. Foster, **Coah** (CD). *Fitz Maurice 1802*, *Sánchez-Mejorada 3799*. NOM (Pr).
- E. palmeri* Britton & Rose, **Chih, Dgo, Zac** (CD). *H. M. Hernández 3528*, *Gómez-Hinostrosa 1930*. NOM (P).
- E. papillosus* Linke ex Rümpler, **Tamps**; TX (E). **Martínez-Ávalos 407 (UAT)**, **Martínez-Ávalos 522 (UAT)**.
- E. parkeri* N. P. Taylor, **Coah, NL, SLP, Tamps, Zac** (CD). *Goettsch 82*, *Gómez-Hinostrosa 1231*.
- E. pectinatus* (Scheidw.) Engelm., **Ags, Chih, Coah, Dgo, Gto, NL, SLP, Son, Tamps, Zac**; AZ, NM, TX (NE). *Goettsch 210*, *Gómez-Hinostrosa 300*.
- E. pentalophus* (DC.) Lem., **Coah, Gto, Hgo, Jal, NL, Qro, SLP, Tamps**; TX (NE). *Gómez-Hinostrosa 1349*, *H. M. Hernández 3234*.
- E. poselgeri* Lem., **Coah, NL, Tamps**; TX (CD). *H. M. Hernández 3329*, *Bravo 3115*. NOM (Pr).
- E. primolanatus* Fritz Schwarz ex N. P. Taylor, **Coah** (CD). **Johnston 7700 (TEX)**, **Parker 1985 (K, spirit coll.)**.
- E. pulchellus* (Mart.) Seitz, **Hgo, Jal, NL, Oax, Pue, Qro, SLP, Zac** (NE). *H. M. Hernández 1528*, *Sánchez-Mejorada 2168*. NOM (Pr).
- E. rayonesensis* N. P. Taylor, **NL** (E). *González-Medrano 14621*, *Hinton 22637* (ASU).
- E. reichenbachii* (Terscheck ex Walp.) F. Haage, **Coah, NL, Tamps**; CO, NM, OK, TX (NE). *Taylor 256*. NOM (A).
- E. rigidissimus* (Engelm.) F. Haage, **Chih, Dgo, Son**; AZ (NE). *Hodgson 6379* (DES), *Hodgson 6658* (DES).
- E. rusanthus* Weniger, **Chih**; TX (CD). **Weniger 712 (UNM)**.
- E. schmollii* (Weing.) N. P. Taylor, **Qro** (M). **Schwarz s.n. (UC)**, *Scheinvar 5761*. NOM (P), CITES (I).
- E. stramineus* (Engelm.) Seitz, **Chih, Coah, Dgo, NL, SLP, Tamps, Zac**; NM, TX (CD). *Gómez-Hinostrosa 1815*, *Gómez-Hinostrosa 1912*.
- E. triglochidiatus* Engelm., **Ags, BCS?, Chih, Coah, Dgo, SLP, Tamps**; AZ, CO, CA, NM, NV, TX, UT (NE). **McGill 2078 (ASU)**, **Wislizenus s.n. (MO)**.
- E. viereckii* Werderm., **NL, Tamps** (CD). *Sánchez-Mejorada 2064*, *Scheinvar 739*.
- E. viridiflorus* Engelm., **Chih, Coah**; CO, KS, NM, OK, SD, TX, WY (NE). *Mielke 3710* (DES), *Worthington 19487* (DES).
- E. waldeisii* Haugg, **SLP** (CD). *Gómez-Hinostrosa 1554*, *H. M. Hernández 2688*. NOM (Pr), IUCN (EN).
- E. xroetteri* (Engelm.) Rümpler, **Chih**; NM, TX (CD). *Zimmerman 2409* (ASU), *Zimmerman 2413* (ASU).
- Epithelantha micromeris* (Engelm.) F. A. C. Weber, **Chih, Coah, Dgo, NL, SLP, Zac**; AZ, NM, TX (CD). *H. M. Hernández 2329*, *Sánchez-Mejorada 2564*. NOM (A, Pr), IUCN (CR, DD).
- Escobaria chihuahuensis* Britton & Rose, **Chih, Dgo** (CD). *Eggl 2107*, *Eggl 2131*.
- E. dasyacantha* (Engelm.) Britton & Rose, **Chih, Coah**; TX (CD). *Guzmán 936*, *Hodgson 3703* (DES). NOM (Pr).
- E. duncanii* (Hester) Buxb., **NM, TX** (CD). *Anderson 5122* (DES), *Anderson 5080* (DES).
- E. emskoetteriana* (Quehl) Borg, **Coah, NL, Tamps**; TX (CD). *H. M. Hernández 2331*, *Anderson 5016* (DES).

- E. hesteri* (Y. Wright) Buxb., TX (CD). *Anderson 5091* (DES), *Hodgson 3687* (DES).
E. laredoi (Glass & R. A. Foster) N. P. Taylor, Coah, Zac (CD). *H. M. Hernández 2166*, *Sánchez-Mejorada 3792*. NOM (Pr).
E. lloydii Britton & Rose, **Coah?**, Zac (CD). *Engard 7a* (DES).
E. minima (Baird) D. R. Hunt, TX (CD). *Hodgson 3686* (DES).
E. missouriensis (Sweet) D. R. Hunt, **Coah, NL; AZ, ID, KS, ND, MT, NM, TX, UT** (NE). *Zimmerman 2633* (DES).
E. orcuttii Boed., AZ, NM, **TX** (CD). *Worthington 9963* (ASU), *Worthington 9781* (ASU).
E. robbinsorum (Earle) D. R. Hunt, **Son; AZ** (NE). ***Robbins s.n.*** (ASU).
E. sneedii Britton & Rose, Chih, **Coah?**, NL; **AZ, NM, TX** (CD). *Anderson 5043* (DES), *Worthington 21630* (DES).
E. tuberculosa (Engelm.) Britton & Rose, Chih, Coah, Dgo, NL, Zac; **NM, TX** (CD). *Worthington 19518* (DES), *Hodgson 5310* (DES).
E. vivipara (Nutt.) Buxb., Chih, Coah, NL, Son, Zac; **AZ, CA, CO, MN, NM, OK, TX, UT** (NE). *Worthington 23670* (DES), *Anderson 5071* (DES).
E. zilziana (Boed.) Backeb., Coah, Dgo, NL (CD). *Sánchez-Mejorada 4089*, *Anderson 5013* (DES).
Ferocactus echidne (DC.) Britton & Rose, Gto, Hgo, NL, Qro, SLP, Tamps (CD+M). *Goettsch 85*, *Gómez-Hinostrosa 1496*.
F. glaucescens (DC.) Britton & Rose, Gto, Hgo, Qro (M). *H. M. Hernández 2452*, *Bárcenas 880*.
F. hamatacanthus (Muehlenpf.) Britton & Rose, **Chih**, Coah, Dgo, NL, SLP, Tamps, Zac; **NM, TX** (CD). *Goettsch 401*, *Gómez-Hinostrosa 678*.
F. histrix (DC.) G. E. Linds., Ags, Dgo, Gto, Hgo, Jal, Qro, SLP, Ver, Zac (NE). *H. M. Hernández 1771*, *Bárcenas 803*. NOM (Pr).
F. latispinus (Haw.) Britton & Rose, Ags, Coah, **Dgo**, Gto, Hgo, Jal, Mex, Oax, Pue, Qro, SLP, Zac (NE). *H. M. Hernández 2400*, *Bárcenas 949*.
F. macrodiscus (Mart.) Britton & Rose, Gto, Oax (NE). *H. M. Hernández 1975*, *Bárcenas 131*.
F. pilosus (Galeotti ex Salm-Dyck) Werderm. Coah, **Dgo**, NL, SLP, Tamps, Zac (CD). *Goettsch 225*, *Gómez-Hinostrosa 1367*. NOM (Pr).
F. wislizeni (Engelm.) Britton & Rose, BCS, Chih, Sin, Son; **AZ, NM, TX** (NE). *Eggl 2158*, ***Jones s.n.*** (CAS, UC).
Geohintonia mexicana Glass & Fitz Maurice, NL (E). *Hinton s.n.*, *Hinton 21527*. NOM (Pr).
Grusonia aggeria (Ralston & Hilsenb.) E. F. Anderson, Chih, Coah; **TX** (CD). *Bárcenas 1557*, *Powell 6078* (SRSC).
G. bradtiana (J. M. Coult.) Britton & Rose, **Coah**, Dgo (CD). *H. M. Hernández 3412*, *H. M. Hernández 3358*.
G. bulbispina (Engelm.) H. Rob., Coah (CD). *Gregg 669* (MO).
G. clavata (Engelm.) H. Rob., NM (CD). *Blakley 1954* (DES).
G. emoryi (Engelm.) Pinkava, Son; **AZ, NM, TX** (NE). *Powell 5996* (SRSC), *Palmer 600* (MO).
G. grahamii (Engelm.) H. Rob., Chih, Coah, Dgo; **TX** (CD). *Bárcenas 1546*, *Palmer 386* (MO).
G. moelleri (A. Berger ex Y. Wright) E. F. Anderson, Coah, Dgo (CD). *Lehto 5062*, *Johnston 7785* (LL).
G. schottii (Engelm.) H. Rob., Chih, Coah, Dgo, NL, **SLP**, Tamps; **TX** (CD). *Rose 11602* (US), *Ralston 100* (SRSC).
G. vilis (Rose) H. Rob., Coah, NL, SLP, Zac (CD). *Gómez-Hinostrosa 444*, *Gómez-Hinostrosa 755*.
Hamatocactus crassihamatus (F. A. C. Weber) Buxb., Gto, **Qro?** (M). *H. M. Hernández 2526*, *Bárcenas 409*. NOM (A).
Isolatocereus dumortieri (Scheidw.) Backeb., Ags, DF, Gto, Hgo, Jal, Mich, Mor, Oax, Pue, Qro, SLP, Ver (NE). *H. M. Hernández 1869*, *Bárcenas 354*.
Leuchtenbergia principis Hook., Coah, Dgo, NL, SLP, Tamps, Zac (CD). *Goettsch 101*, *H. M. Hernández 2900*. NOM (A).
Lophophora diffusa (Croizat) Bravo, Qro (M). *H. M. Hernández 1523*, *Bárcenas 308*. NOM (A), IUCN (VU).
L. williamsii (Lem. ex Salm-Dyck) J. M. Coult., Chih, Coah, **Dgo**, NL, SLP, Tamps, Zac; **TX** (CD). *Goettsch 100*, *Gómez-Hinostrosa 686*.

- Mammillaria albicoma* Boed., NL, SLP, Tamps (CD). *Gómez-Hinostrosa* 509, *H. M. Hernández* 2956. NOM (Pr), IUCN (EN).
- M. albiflora* (Werderm.) Backeb., Gto (M). *Scheinvar* 6151, *Gómez-Hinostrosa* 380. IUCN (CR).
- M. anniana* Glass & R. A. Foster, Tamps (E). *Fitz Maurice* 2193. NOM (Pr), IUCN (CR).
- M. aureilanata* Backeb., SLP (CD). *Gómez-Hinostrosa* 413, *H. M. Hernández* 1537. NOM (Pr), IUCN (VU).
- M. barbata* Engelm., Chih, Dgo; NM (NE). *Finley s.n.*
- M. baumii* Boed., Tamps (E). *Goetsch* 292, *H. M. Hernández* 2549. NOM (Pr).
- M. bocasana* Poselg., SLP, Zac (CD). *H. M. Hernández* 1484, *H. M. Hernández* 1900. NOM (Pr).
- M. carmenae* Castañeda & Núñez, Tamps (E). *Lau* 1223, *Martínez-Ávalos* 601 (UAT). NOM (P).
- M. carretii* Rebut ex K. Schum., **Coah, NL** (CD). *Safford* 1250 (US). NOM (Pr).
- M. coahuilensis* (Boed.) Moran, Coah, Dgo (CD). *Schwarz* 1 (US), *Gómez-Hinostrosa* 2158. NOM (A).
- M. compressa* DC., Gto, Hgo, NL, Qro, SLP, Tamps (CD+M). *Gómez-Hinostrosa* 107, *H. M. Hernández* 3288.
- M. crinita* DC., Ags, Gto, Hgo, Jal, Mich, Qro, SLP, Zac (NE). *H. M. Hernández* 2541, *Fitz Maurice* 1995. NOM (Pr), IUCN (**EW, EN, DD**).
- M. decipiens* Scheidw., Gto, **Qro**, SLP, Ver? (M). *H.M. Hernández* 1830, *Bárcenas* 560. NOM (Pr).
- M. densispina* (J. M. Coult.) Orcutt, Ags, **Dgo**, Gto, Jal, **Qro**, SLP, **Zac** (NE). *Bárcenas* 774, *Bárcenas* 810.
- M. elongata* DC., Gto, Hgo, Qro (M). *Gómez-Hinostrosa* 1609, *H. M. Hernández* 2448.
- M. erythrosperma* Boed., Gto, Jal, Qro, SLP, Zac (CD+M). *Fitz Maurice* 1985, *H. M. Hernández* 1629. NOM (A).
- M. formosa* Galeotti ex Scheidw., Coah, NL, SLP, Tamps, Zac (CD). *Goetsch* 389, *Gómez-Hinostrosa* 1474.
- M. geminispina* Haw., Gto, Hgo, Qro, SLP, Tamps?, Ver (CD+M). *Gómez-Hinostrosa* 460, *H. M. Hernández* 1722.
- M. gigantea* Hildm. ex K. Schum., Gto, Qro, SLP (M). *H. M. Hernández* 1530, *Bárcenas* 490.
- M. glassii* R. A. Foster, Coah, NL (CD). *Scheinvar* 4730, *Scheinvar* 5583A.
- M. grahamii* Engelm., **Chih**, Son; AZ, **NM**, TX (NE). *Worthington* 19864 (DES), *Worthington* 9529 (ASU).
- M. grusonii* Runge, Coah, **Dgo** (CD). *H. M. Hernández* 2281, *Pinkava* 6138 (ASU). NOM (Pr).
- M. guelzowiana* Werderm., Dgo (CD). *Guzmán* 1223. NOM (A), IUCN (CR).
- M. hahniana* Werderm., Gto, Qro (M). *Gómez-Hinostrosa* 467, *Bárcenas* 866. NOM (A).
- M. herrerae* Werderm., Qro (M). *Schmoll s.n.*, *Scheinvar* 5735. NOM (P), IUCN (CR).
- M. heyderi* Muehlenpf., Chih, Coah, Dgo, NL, SLP, Son, Tamps, **Ver**, Yuc, Zac; AZ, **NM, OK**, TX (NE). *Goetsch* 182, *Gómez-Hinostrosa* 859.
- M. humboldtii* C. Ehrenb., Hgo (M). *Sánchez-Mejorada* 3432. NOM (A).
- M. jaliscana* (Britton & Rose) Boed., Dgo, Gto, Jal, **Mich**, Zac (NE). *Bárcenas* 450.
- M. klissingiana* Boed., **NL, SLP**, Tamps (E). *Goetsch* 265, *Bravo s.n.* NOM (A).
- M. lasiacantha* Engelm., **Chih**, Coah, Dgo, **NL, SLP, Son, Zac**; AZ, **NM**, TX (NE). *Gómez-Hinostrosa* 1902, *H. M. Hernández* 2279.
- M. laui* D. R. Hunt, Tamps (E). *Martínez-Ávalos* 153, *Lau* 1171. NOM (P).
- M. lenta* K. Brandegee, Coah (CD). *H. M. Hernández* 2299, *Gómez-Hinostrosa* 1830. NOM (A).
- M. longiflora* (Britton & Rose) A. Berger, Chih, Dgo (CD). *Guzmán* 1218. NOM (A).
- M. longimamma* DC., Gto, Hgo, Qro, Ver? (M). *H. M. Hernández* 1505, *Bárcenas* 291. NOM (A, Pr).
- M. luethyi* G. S. Hinton, **Coah** (CD). *Hinton* 25771 (**Hinton Herb.**). IUCN (EN).
- M. magnimamma* Haw., DF, Gto, Hgo, Jal, Mex, NL, Pue, Qro, SLP, Tamps, Tlax, Ver, Zac (NE). *Goetsch* 180, *H. M. Hernández* 2650.
- M. marcosii* Fitz Maurice & Glass, Gto (M). *Fitz Maurice* 2364, *Bárcenas* 1490. IUCN (CR).
- M. mathildae* Kraehenb. & Krainz, Qro (M). *Rivas* 2895. NOM (P), IUCN (VU).
- M. melaleuca* Karw. ex Salm-Dyck, Tamps (E). *Anderson* 1749, *Goetsch* 377. NOM (A).
- M. melanocentra* Poselg., Coah, **Dgo, NL, Tamps**, Zac (CD). *Wehbe* 134 (ANSM), *Bravo s.n.*
- M. mercadensis* Patoni, Ags, Dgo, Jal, Mich, Nay, SLP, Sin, Zac (NE). *Fitz Maurice* 1971d, *Fitz Maurice* 2345. NOM (Pr).

- M. microhelia* Werderm., Qro (M). *Rivas* 2896, *Guzmán* 577. NOM (Pr), IUCN (VU).
M. microthele Muehlenpf., SLP, Tamps (CD). *Gómez-Hinostrosa* 1142, *H. M. Hernández* 3176. IUCN (EN).
M. moelleriana Boed., Dgo, Zac (CD). *Taylor* 216, *H. M. Hernández* 2518. NOM (Pr).
M. muehlenpfordtii Foerster, Gto, Qro, SLP (M). *H. M. Hernández* 2399, *Bárcenas* 539.
M. parkinsonii C. Ehrenb., Hgo, Qro (M). *Scheinvar* 5940, *Scheinvar* 5616. NOM (Pr).
M. pennispinosa Krainz, **Coah**, Dgo, SLP (CD). *Lau* 1350, *Lau* 1177. NOM (Pr), IUCN (CR, EN).
M. perbella Hildm. ex Schum., Gto, **Hgo**, Qro, Tamps? (M). *Bárcenas* 194, *Sánchez-Mejorada* 2187.
M. perezdelarosae Bravo & Scheinvar, Ags, Jal, Zac (NE). *Fitz Maurice* 2416, *Fitz Maurice* 2422. NOM (Pr), IUCN (EN).
M. petterssonii Hildm., Ags, **Dgo**, Gto, Jal, **Qro**, **SLP**, **Zac** (NE). *Bárcenas* 979, *Martínez Cruz* 497.
M. picta Meinsh., NL, SLP, Tamps (CD). *Goettsch* 385, *Gómez-Hinostrosa* 139. IUCN (DD).
M. pilispina J. A. Purpus, NL, SLP, Tamps (CD). *Gómez-Hinostrosa* 1275, *H. M. Hernández* 3073. NOM (Pr).
M. plumosa F. A. C. Weber, Coah, NL (E). *H. M. Hernández* 2162, *H. M. Hernández* 2328. NOM (A).
M. polythele Mart., Gto, Hgo, Qro (M). *H. M. Hernández* 2069, *Bárcenas* 317.
M. pottsii Scheer ex Salm-Dyck, Chih, Coah, Dgo, SLP, Zac; TX(CD). *H. M. Hernández* 2260, *H. M. Hernández* 3502.
M. prolifera (Mill.) Haw., Coah, NL, Qro, SLP, Tamps; TX; **CU**; **HA** (NE). *Gómez-Hinostrosa* 1160, *H. M. Hernández* 2999.
M. rettigiana Boed., Gto, Hgo (M). *Bárcenas* 18. NOM (Pr), IUCN (VU).
M. rhodantha Link & Otto, Ags, DF, Mex, Gto, **Hgo**, Jal, Mich, Qro, Ver (NE). *Bárcenas* 1484, *H. M. Hernández* 1498.
M. rosealba Boed., NL, Tamps (E). *Goettsch* 259, *Goettsch* 267. NOM (Pr).
M. sanchez-mejoradae R. González G., NL (E). *R. González* 4300. NOM (P), IUCN (CR).
M. schiedeana Ehrenb., Gto, Hgo, SLP, **Tamps** (CD+M). *Gómez-Hinostrosa* 383, *Bárcenas* 729. NOM (A, Pr).
M. schwarzii Shurly, **Gto** (M). *Fric s.n.* (US). NOM (Pr), IUCN (CR).
M. sempervivi DC., Hgo, Qro, SLP (CD+M). *H. M. Hernández* 1832, *Sánchez-Mejorada* 2197.
M. sinistrahamata Boed., **Coah**, **Dgo**, **Zac** (CD).
M. sphaerica Dietr. ex Engelm., SLP, Tamps; TX (E). *H. M. Hernández* 3315, *Bárcenas* 1287.
M. stella-de-tacubaya Heese, **Coah**, **Dgo** (CD). *Westlund s.n.* (ASU). NOM (Pr), IUCN (VU).
M. surculosa Boed., SLP, Tamps (CD). *H. M. Hernández* 3299, *H. M. Hernández* 2648. NOM (Pr).
M. tezontle Fitz Maurice, SLP (CD). *Fitz Maurice* 1983. NOM (P), IUCN (CR).
M. theresae Cutak, Dgo (CD). *M. González* 2360. NOM (A).
M. uncinata Zucc. ex Pfeiff., Ags, Coah, DF, Gto, Hgo, Jal, Mex, **NL**, Pue, Qro, SLP, Zac (NE). *H. M. Hernández* 2356, *Bárcenas* 593.
M. vetula Mart., Hgo, Qro (M). *Bárcenas* 1494, *Arias* 1218.
M. wagneriana Boed., **Dgo?**, **Zac** (CD).
M. weingartiana Boed., NL (CD). *Glass* 3170, *Scheinvar* 4959. NOM (A), IUCN (VU).
M. wiesingeri Boed., Hgo (M). *Sánchez-Mejorada* 2872, *Hunt* 8520. NOM (Pr).
M. winterae Boed., Coah, NL, **Tamps** (CD). *H. M. Hernández* 2150, *Elizondo s.n.*
M. wrightii Engelm., Chih, Son; **AZ**, **NM**, **TX** (NE). *Zimmerman* 2523 (ASU).
M. zeilmanniana Boed., Gto (M). *Fitz Maurice* 1698. NOM (Pr), IUCN (EN).
M. zephyranthoides Scheidw., Gto, Hgo, Mex, Oax, **Pue**, Qro (NE). *Bárcenas* 120, *Bárcenas* 763. NOM (A).
M. sp., Zac (CD). *H. M. Hernández* 3679.
Mammilloidya candida (Scheidw.) Buxb., Coah, Dgo?, Gto, NL, SLP, Tamps, Zac (CD+M). *Goettsch* 311, *Gómez-Hinostrosa* 1268. NOM (A).
Myrtillocactus geometrizans (Mart.) Console, Ags, DF, Dgo, Gto, Hgo, Jal, Mex, Mich, NL, Oax, Pue, Qro, SLP, Tamps, Ver, **Zac** (NE). *Goettsch* 282, *Bárcenas* 1162.

- Neobuxbaumia euphorbioides* (Haw.) Buxb. ex Bravo, Tamps, Ver (E). *Valiente-Banuet 132, Valiente-Banuet 194.*
- N. polylopha* (DC.) Backeb., Gto, Hgo, Qro (M). *Bárceñas 900, Sánchez-Mejorada 70-0406.*
- Neolloydia conoidea* (DC.) Britton & Rose, Ags, Coah, Dgo, Gto, Hgo, NL, Qro, SLP, Tamps, Zac; TX (CD+M). *Goettsch 388, Gómez-Hinostrosa 773.*
- Obregonia denegrii* Fric, Tamps (E). *H. M. Hernández 2037, White 26.* NOM (A), IUCN (VU), CITES (I).
- Opuntia arenaria* Engelm., Chih; NM, TX (CD). *Worthington 14427* (ASU). NOM (Pr).
- O. atrispina* Griffiths, TX (CD). **Griffiths 9411** (US).
- O. aureispina* (S. Brack & Heil) Pinkava & Parfitt, **Coah**; TX (CD). *Hodgson 5237* (ASU), *Hodgson 7198* (DES).
- O. azurea* Rose, Chih, Coah, Hgo?, **Dgo**, SLP, Tamps, Zac (CD). *Elizondo 470, Scheinvar 3296.*
- O. chaffeyi* Britton & Rose, Zac (CD). *Gómez-Hinostrosa 1732, H. M. Hernández 3525.* IUCN (CR).
- O. chihuahuensis* Rose, **Chih, Dgo** (CD). *Anderson 286* (ASU), *Pinkava P13378* (ASU).
- O. chisosensis* (M. S. Anthony) D. J. Ferguson, **Coah; TX** (CD). **Anthony 223** (MICH).
- O. chlorotica* Engelm. & Bigelow, Chih, Coah, BC, BCS, Son; AZ, CA, NV, NM, UT (NE). *Spellenberg 12046.*
- O. dejecta* Salm-Dyck, Chis, Gro, Nay, Oax, Qro, SLP, Sin?, Tamps, Ver; SAL; GUAT (NE). *Scheinvar 5910.*
- O. durangensis* Britton & Rose, Ags, Dgo, Jal, SLP, Zac (NE). *Worthington 7880* (ASU), *Pinkava 13387A* (ASU).
- O. elizondoana* Sánchez & Villaseñor, Qro (M). *Sánchez 4.*
- O. ellisiana* Griffiths, TX (CD). **Griffiths 8626** (US).
- O. engelmannii* Salm-Dyck ex Engelm., Ags, BC, Chih, Coah, Dgo, Gto, Hgo, **Jal, Mex**, NL, Qro, SLP, Sin, Son, Tamps, Tlax, Ver, Zac; AZ, CA, TX (NE). *Goettsch 263, Gómez-Hinostrosa 1562.*
- O. fuliginosa* Griffiths, Hgo, Gro, Gto, Jal, Mich, Mor, Nay, Oax, Qro (NE). *Scheinvar 4095a, Colunga 68.*
- O. guilanchi* Griffiths, Gto, Mex, Qro, Zac (NE). *Bárceñas 998, Bárceñas 594.*
- O. hyptiacantha* F. A. C. Weber, Ags, Gto, Hgo, Jal, Mex, Oax, Pue, Qro, SLP, Tlax, Zac (NE). *Rivera 44, Scheinvar 3765.*
- O. joconostle* F. A. C. Weber ex Diguét, Ags, Gto, Jal, Mex, Qro, SLP, Tlax (NE). *Scheinvar 2332, Navarro 85.*
- O. lasiacantha* Hort. Vindob. ex Pfeiff., DF, Gto, Gro, Hgo, Mex, Mich, Oax, Pue, Qro, SLP, Tamps, Tlax, Zac (NE). *Gómez-Hinostrosa 1535, Gómez-Hinostrosa 695.*
- O. leucotricha* DC., Ags, **Dgo**, Gto, Hgo, Jal, NL, Qro, SLP, Tamps, Zac (NE). *Goettsch 387, H. M. Hernández 3046.*
- O. macrocentra* Engelm. Chih, Coah, **Dgo**, Son; AZ, **NM**, TX (NE). *H. Bravo s.n., H. M. Hernández 3519.*
- O. macrorrhiza* Engelm., Chih, Coah, Dgo, NL, SLP, **Son**; AZ, CA, CO, ID, IA, IL, LA, MI, MN, NM, OH, TX, UT, WY (NE). *Elizondo 468, Torres 931.*
- O. megacantha* Salm-Dyck, Ags, Dgo, Gto, Hgo, Mex, Qro, SLP, Son, Zac (NE). *M. González 5, M. González 20.*
- O. megarrhiza* Rose, SLP (CD). *Gómez-Hinostrosa 1770, H. M. Hernández 3203.* IUCN (EN).
- O. microdasys* (Lehm.) Pfeiff., Coah, **Dgo**, Hgo, Jal, NL, Qro, SLP, Tamps, Zac (CD+M). *Goettsch 395, H. M. Hernández 2975.*
- O. neochrysacantha* Bravo, **Ags, SLP, Zac** (NE). *Sánchez-Mejorada 4028, Scheinvar 3136.*
- O. pachyrrhiza* H. M. Hern., Gómez-Hin. & Bárceñas, SLP (CD). *Gómez-Hinostrosa 1669, Bárceñas 1291.* IUCN (VU).
- O. pailana* Weing., **Coah** (CD).
- O. phaeacantha* Engelm., BC, Chih, Coah, Dgo, Gto, SLP, Sin, Son, Zac; AZ, CA, CO, KS, NV, MO, NM, OK, TX, SD, UT (NE). *H. M. Hernández 3417, Gómez-Hinostrosa 1877.*
- O. polyacantha* Haw., Chih, **Dgo; AZ, CA, CO**, NV, NM, **OK**, SD, TX, UT, WA, WY (NE). *Pinkava 13203* (ASU), *Pinkava 13827* (ASU).

- O. puberula* Pfeiff., Chis, Gro, Jal, Mich, Nay, Oax, Pue, Qro, Sin (NE). *Scheinvar* 4096, *Scheinvar* 4118.
- O. pubescens* H. L. Wendl. ex Pfeiff., Gto, Hgo, Jal, Oax, Pue, Qro, SLP, Son, Tamps (NE). *Goettsch* 284, *Bárcenas* 716.
- O. pyriformis* Rose, Zac (CD). **F. E. Lloyd 62 (US)**.
- O. rastrea* F. A. C. Weber, Coah, **Dgo**, Gto, NL, Qro, SLP, Tamps, Zac (CD+M). *Gómez-Hinostrosa* 1591, *H. M. Hernández* 3436.
- O. robusta* H. L. Wendl. ex Pfeiff., Chih, Coah, DF, Gto, Hgo, Jal, Mex, NL, Pue, Qro, SLP, Tlax, Zac; AZ (NE). *H. M. Hernández* 3132, *Guízár* 5153.
- O. rufida* Engelm., Chih, Coah, Dgo, Zac; TX (CD). *Gómez-Hinostrosa* 1726, *H. M. Hernández* 3341.
- O. santa-rita* (Griffiths & Hare) Rose, **Son; AZ, NM, TX (NE)**. **Griffiths 8157 (US)**.
- O. scheeri* F. A. C. Weber, Ags, Gto, Jal, Qro (NE). *Scheinvar* 4704, *Bárcenas* 202.
- O. spinulifera* Salm-Dyck, DF, Gto, Hgo, SLP, **Qro** (NE). *Scheinvar* 6172, *Scheinvar* 1544 (DES).
- O. stenopetala* Engelm., Coah, Gto, Hgo, NL, Qro, SLP, Tamps, Zac (CD+M). *Goettsch* 69, *H. M. Hernández* 2744.
- O. streptacantha* Lem., Ags, DF, Dgo, Gto, Hgo, Jal, Mex, Mich, NL, Oax, Pue, Qro, SLP, Tamps, Tlax, Zac (NE). *Goettsch* 186, *Gómez-Hinostrosa* 1055.
- O. strigil* Engelm., **NM, TX (CD)**. **Wright s.n. (MO)**.
- O. tomentosa* Salm-Dyck, DF, Gto, Hgo, **Jal**, Mex, Mich, NL, Oax, Pue, Qro, SLP, Sin, Tamps, Tlax, Ver (NE). *H. M. Hernández* 3114, *Bárcenas* 997.
- O. aff. velutina* F. A. C. Weber ex Rol.-Goss., Gto, Gro, **Hgo**, Mich, Mor, Oax, Pue, SLP, Zac (NE). *Gómez-Hinostrosa* 1537, *H. M. Hernández* 3189.
- O. xandersonii* H. M. Hern., C. Gómez-Hin. & Bárcenas., SLP, Tamps (CD). *Gómez-Hinostrosa* 1451, *H. M. Hernández* 2673.
- O. xrooneyi* M. P. Griffith, TX (CD). **Griffith 71 (RSA)**.
- O. xspinobacca* M. S. Anthony, TX (CD). *Hodgson* 8952 (ASU), *Hodgson* 8992 (ASU).
- Pachycereus marginatus* (DC.) Britton & Rose, Ags, DF, Gto, Hgo, Jal, Mich, Mex, Mor, Oax, Pue, Qro, SLP, Tamps, Ver, Zac. *H. M. Hernández* 2454, *Scheinvar* 3478.
- Pelecyphora aselliformis* Ehrenb., SLP (CD). *Gómez-Hinostrosa* 764, *H. M. Hernández* 1536. NOM (Pr), CITES (I).
- P. strobiliformis* (Werderm.) Fric & Schelle ex Kreuz., NL, Tamps, **SLP (CD)**. *Gómez-Hinostrosa* 887, *H. M. Hernández* 2554. NOM (A), CITES (I).
- Peniocereus greggii* (Engelm.) Britton & Rose, Chih, Coah, Dgo, Son, Tamps, Zac; AZ, NM, TX (NE). *H. M. Hernández* 3527, *Gómez-Hinostrosa* 2148. NOM (Pr).
- P. serpentinus* (Lag. & Rodr.) Britton & Rose, Gto, Hgo, Jal, Mex, Mich, Qro (NE). *H. M. Hernández* 1872, *Bárcenas* 657.
- Pereskopsis diguetii* (F. A. C. Weber) Britton & Rose, Gto, Gro, Jal, Mich, Mor, Nay, Oax, Qro (NE). *Sánchez* 35, *Arias* 1214.
- Pilosocereus leucocephalus* (Poselg.) Byles & G. D. Rowley, Tamps, Ver; GUAT; HON (NE). *Goettsch* 289, *Gómez-Hinostrosa* 1704.
- Sclerocactus brevihamatus* (Engelm.) D. R. Hunt, Coah, **NL, Tamps**; TX (CD). *H. M. Hernández* 3384, *Westlund s.n. (ASU)*.
- S. intertextus* (Engelm.) N. P. Taylor, Chih, **Coah, Son**; AZ, NM, TX (NE). *Zimmerman s.n. (ASU)*, *Worthington* 7991 (ASU). NOM (A).
- S. mariposensis* (Hester) N. P. Taylor, Coah; TX (CD). *Hodgson* 9039 (ASU), *Zimmerman s.n. (ASU)*. NOM (A), CITES (I).
- S. papyracanthus* (Engelm.) N. P. Taylor, AZ, NM, **TX (CD)**. *Anderson* 5059 (ASU), *Anderson* 1578 (ASU). CITES (I).
- S. scheeri* (Salm-Dyck) N. P. Taylor, Coah, NL, Tamps; TX (CD). *H. M. Hernández* 2544, *Sánchez-Mejorada* 4068.
- S. uncinatus* (Galeotti) N. P. Taylor, Chih, Coah, Dgo, NL, SLP, Son, Tamps, Zac; **NM, TX (NE)**. *Gómez-Hinostrosa* 957, *H. M. Hernández* 2287. NOM (A).
- S. unguispinus* (Engelm.) N. P. Taylor, Chih, Coah, Dgo, SLP, Zac (CD). *H. M. Hernández* 2500, *H. M. Hernández* 3471. NOM (A, Pr).

- S. warnockii* (L. D. Benson) N. P. Taylor, Chih, Coah; TX (CD). *Worthington 13563* (ASU), *Worthington 8021* (ASU). NOM (Pr).
- Selenicereus spinulosus* (DC.) Britton & Rose, **Chis**, Gto, Hgo, NL, Oax, Qro, SLP, Tamps, Ver; TX (NE). *Gómez-Hinostrosa 1179*, *H. M. Hernández 1733*.
- Stenocactus coptonogonus* (Lem.) A. Berger ex A. W. Hill, Gto, Hgo, SLP, Zac (CD+M). *H. M. Hernández 1773*, *Bárceñas 419*. NOM (Pr).
- S. crispatus* (DC.) A. Berger ex A. W. Hill, Gto, Hgo, Mex, Oax, Pue, Qro, SLP, Tamps, Ver (NE). *Martínez-Ávalos 92* (UAT), *Martínez-Ávalos 443* (UAT).
- S. multicostatus* (Hildm. ex K. Schum.) A. Berger ex A. W. Hill, Ags, **Chih**, Coah, Dgo, Gto, Jal, NL, Qro, SLP, Tamps, Zac (NE). *Sánchez-Mejorada 3801*, *Anderson 5032* (DES).
- S. obvallatus* (DC.) A. Berger ex A. W. Hill, Ags, DF, Dgo, Gto, Hgo, Mex, Oax, Qro, SLP, Tamps (NE). *Bárceñas 146*, *Bárceñas 199*.
- S. ochoteranans* Tiegel, Ags, Gto, Hgo, Jal, Qro, SLP, Zac (NE). *Scheinvar 5799D*, *Taylor 212*.
- S. phyllacanthus* (A. Dietr. & Otto) Lawr., Ags, Gto, Hgo, Jal, NL, SLP, Zac (NE). *Navarro 92*, *Scheinvar 762*.
- S. vaupelianus* (Werderm.) F. M. Knuth, **Hgo** (M).
- Stenocereus griseus* (Haw.) Buxb., Gto, Gro, Jal, NL, Oax, Pue, Qro, SLP, Tamps, Ver, Yuc; COL, **VEN** (NE). *Goettsch 286*, *H. M. Hernández 2997*.
- S. pruinosus* (Otto ex Pfeiff.) Buxb., Chis, Gro, Gto, Mex, Mich, Oax, Pue, SLP, Tamps, Ver (NE). *Bárceñas 278*, *Bárceñas 1276*.
- S. queretaroensis* (F. A. C. Weber) Buxb., Ags, Gto, Jal, Mex, Mich, Nay, Qro, Zac (NE). *H. M. Hernández 1871*, *Bárceñas 612*.
- Strombocactus disciformis* (DC.) Britton & Rose, Gto, Hgo, Qro (M). *H. M. Hernández 1707*, *Scheinvar 5805*. NOM (A), CITES (I).
- Thelocactus bicolor* (Galeotti ex Pfeiff.) Britton & Rose, Chih, Coah, Dgo, NL, SLP, Tamps, Zac; TX (CD). *Goettsch 110*, *H. M. Hernández 3207*. NOM (A).
- T. conothelos* (Regel & Klein) F. M. Knuth, NL, SLP, Tamps (CD). *Goettsch 55*, *Gómez-Hinostrosa 1222*. IUCN (**CR, EN**).
- T. hastifer* (Werderm. & Boed.) F. M. Knuth, Qro (M). *Gómez-Hinostrosa 1608*, *Arias 81*. NOM (Pr), IUCN (VU).
- T. heterochromus* (F. A. C. Weber) Oosten, Chih, **Coah, Dgo** (CD). *Pinkava P13381* (ASU). NOM (A).
- T. hexaedrophorus* (Lem.) Britton & Rose, Coah, NL, SLP, Tamps, Zac (CD). *Gómez-Hinostrosa 581*, *H. M. Hernández 1539*.
- T. lausseri* Riha & Busek, **Coah** (CD). *Lauser s.n.* (ANSM).
- T. leucacanthus* (Pfeiff.) Britton & Rose, Gto, Hgo, Qro (M). *Hernández 2460*, *Bárceñas 901*. NOM (**Pr**).
- T. macdowellii* (Rebut ex Quehl) W. T. Marshall, Coah, NL (CD). *Anderson 3182* (DES). NOM (A).
- T. rinconensis* (Poselg.) Britton & Rose, Coah, NL (CD). *H. M. Hernández 2131*, *Sánchez-Mejorada 3784*. NOM (A).
- T. setispinus* (Engelm.) E. F. Anderson, **Coah**, NL, SLP, Tamps; TX (CD). *Anderson 5035* (DES), *Torres 925*.
- T. tulensis* (Poselg.) Britton & Rose, NL, SLP, Tamps (CD). *Gómez-Hinostrosa 429*, *H. M. Hernández 2772*. NOM (A, **Pr**).
- Turbincarpus alonsoi* Glass & S. Arias, Gto (M). *Bárceñas 1488*. IUCN (**CR**), CITES (I).
- T. beguinii* (N. P. Taylor) Mosco & Zanov., Coah, NL, SLP, Tamps, **Zac** (CD). *Gómez-Hinostrosa 1050*, *H. M. Hernández 3193*. NOM (Pr), CITES (I).
- T. bonatzii* G. Frank, **SLP** (CD). NOM (A), IUCN (EN), CITES (I).
- T. booleanus* G. S. Hinton, **NL** (CD). *Hinton 2185* (**TEX**). IUCN (CR), CITES (I).
- T. gielsdorfianus* (Wederm.) V. John & Riha, SLP, Tamps (E). *Fitz Maurice 2011*, *Sauer 5002* (HNT). NOM (P), IUCN (CR), CITES (I).
- T. hoferi* Lüthy & A. B. Lau, **NL** (CD). NOM (A), IUCN (CR), CITES (I).
- T. horripilus* (Lem.) V. John & Riha, Hgo, **Qro** (M). *H. M. Hernández 1510*, *Anderson 2299* (DES). IUCN (VU), CITES (I).

- T. jauernigii* G. Frank, **SLP** (CD). NOM (P), IUCN (CR), CITES (I).
- T. knuthianus* (Boed.) V. John & Riha, SLP (CD). *Gómez-Hinostrosa 1480*, *H. M. Hernández 2681*. NOM (Pr), IUCN (NT), CITES (I).
- T. laui* Glass & R. A. Foster, SLP (CD). *Anderson 4954* (DES), *Bárcenas 1495*. NOM (Pr), IUCN (VU), CITES (I).
- T. lophophoroides* (Wederm.) Buxb. & Backeb., **SLP** (CD). *Frank s.n.* (**POM**). NOM (Pr), IUCN (VU), CITES (I).
- T. mandragora* (Fric ex A. Berger) A.D. Zimmerman, Coah (CD). *Gómez-Hinostrosa 2297*. NOM (A), IUCN (CR), CITES (I).
- T. pailanus* Halda & Panar., **Coah** (CD). CITES (I).
- T. pseudomacroechele* (Backeb.) Buxb. & Backeb., Qro (M). *Anderson 4971* (DES), *Guzmán 581*. NOM (P), IUCN (**CR**, VU), CITES (I).
- T. pseudopectinatus* (Backeb.) Glass & R. A. Foster, NL, SLP, Tamps (CD). *H. M. Hernández 1545*, *Gómez-Hinostrosa 1000*. NOM (Pr), IUCN (VU), CITES (I).
- T. rioverdensis* G. Frank, **SLP** (M). NOM (P), IUCN (CR), CITES (I).
- T. saueri* (Boed.) V. John & Riha, Tamps (E). *Fitz Maurice 1702*, *Fitz Maurice 2009*. NOM (A), IUCN (CR), CITES (I).
- T. schmiedickeanus* (Boed.) Buxb. & Backeb., NL, SLP, Tamps (CD). *Goettsch 340*, *Gómez-Hinostrosa 1128*. NOM (**P**, **A**, **Pr**), IUCN (**CR**, **EN**, **NT**), CITES (I).
- T. subterraneus* (Backeb.) A. D. Zimmerman, NL (CD). *Goettsch 40*, *Gómez-Hinostrosa 315*. NOM (A), IUCN (VU), CITES (I).
- T. swoboda* Diers & Esteves, **NL** (CD). NOM (A), IUCN (CR), CITES (I).
- T. valdezianus* (H. Moeller) Glass & R. A. Foster, Coah, NL, SLP, **Zac** (CD). *H. M. Hernández 2002*, *Anderson 3178* (DES). NOM (Pr), IUCN (VU), CITES (I).
- T. viereckii* (Wederm.) V. John & Riha, NL, SLP, Tamps (CD). *Gómez-Hinostrosa 545*, *Gómez-Hinostrosa 1368*. NOM (**A**, **Pr**), IUCN (NT), CITES (I).
- T. ysabelae* (Schlange) V. John & Riha, Tamps (CD). *H. M. Hernández 2049*, *Fitz Maurice 2008*. NOM (A), IUCN (CR), CITES (I).
- T. zaragozae* (Glass & R. A. Foster) Glass & A. Hofer ex Glass, NL (E). *Anderson 3207* (DES), *H. M. Hernández 1948*. NOM (A), IUCN (VU), CITES (I).
- T. xomobergeri* Riha, SLP (CD). *Bárcenas 1497*.

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