

# Final Report

## Review of the CITES Appendices on behalf of the Plants Committee: Appendix I-Cactaceae

- *Aztekium ritteri*
- *Obregonia denegrii*
- *Coryphantha werdermannii*
- *Mammillaria pectinifera*
- *Mammillaria solisioides*
- *Strombocactus* spp.
- *Astrophytum asterias*
- *Discocactus* spp.
- *Melocactus conoideus*
- *Melocactus deinacanthus*
- *Melocactus glaucescens*
- *Melocactus paucispinus*

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# Review of the CITES Appendices on behalf of the Plants Committee: Appendix I-Cactaceae, Final Report.

## 1. Introduction

At the 9<sup>th</sup> Meeting of the Plants Committee (PC) of CITES (1999), the PC trusted the CITES Management Authority (MA) of Switzerland with the review of several species of Cactaceae, that are presently listed in Appendix I:

Taxon	App. I-listing	Proposal	Range States
<i>Aztekium ritteri</i>	6.6.81	USA	Mexico
<i>Obregonia denegrii</i>	6.6.81	USA	Mexico
<i>Coryphantha werdermannii</i>	29.7.83	USA	Mexico
<i>Mammillaria pectinifera</i>	29.7.83	USA	Mexico
<i>Mammillaria solisioides</i>	29.7.83	USA	Mexico
<i>Strombocactus spp.</i>	29.7.83	USA	Mexico
<i>Astrophytum asterias</i>	22.10.87	UK	Mexico, USA
<i>Discocactus spp.</i>	11.6.92	Brasil	Bolivia, Brazil, Paraguay
<i>Melocactus conoideus</i>	11.6.92	Brazil	Brazil
<i>Melocactus deinacanthus</i>	11.6.92	Brazil	Brazil
<i>Melocactus glaucescens</i>	11.6.92	Brazil	Brazil
<i>Melocactus paucispinus</i>	11.6.92	Brazil	Brazil

## 2. Consultation of Range States

According to Res. Conf. 11.1, the Swiss MA sent correspondence to the Management and Scientific Authorities of all range states concerned (as listed above) in January 2000. Comments of range states on the compliance of the taxa with the Criteria for an Appendix I-listing (Res. Conf. 9.24), and data on the impact of international trade on the wild populations were sought. Important preliminary data have been summarised and included in this letter dated 19 January 2001:

- the year and proponent of Appendix I listing
- a summary of the statement of the original proposal, justifying Appendix I listing
- a compilation of scientific synonyms
- a summary of all data of registered trade in wild-collected specimens, as provided by WCMC
- some preliminary comments on registered trade, as approved by WCMC

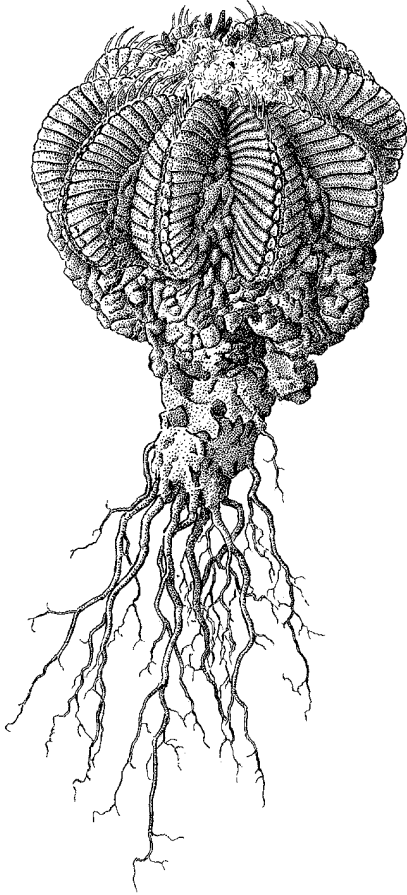
The CITES Authorities of the United States of America responded to this letter prior to the 10<sup>th</sup> Plants Committee Meeting in Shepherdstown, USA (11-15 December 2000), whereas statements of Bolivia, Brazil, Mexico and Paraguay were missing. At the 10<sup>th</sup> PC Meeting, Doc.PC.10.12.2 was on the agenda, and a deadline for submission of statements from range states was set 90 days before the 11<sup>th</sup> PC Meeting. Unfortunately and despite all requests, no further statements of range states have been received up to date.

## 3. Preliminary Evaluation and Recommendations to the Plants Committee (11<sup>th</sup> Meeting)

The attached Final Report relies on the statement received from the CITES Authorities of the United States of America, on comments received from experts and on recent publications. The assessment of the taxa is based on Biological Criteria and Trade Criteria as defined in Resolution Conf. 9.24.

*Aztekium ritteri* (Prop. USA 1981)

*Aztekium ritteri* (Bödeker) Bödeker 1929  
= *Echinocactus ritteri* Bödeker 1928



Distribution: State of Nuevo León, Mexico

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Statement of Range State upon Consultation: None

### International Trade

WCMC data: Virtually no international trade is reported prior to Appendix I-listing. All later trade with very few exemptions is stated to be in artificially propagated specimens and/or the country of origin, Mexico, is not involved. The numbers of specimens per shipment are usually very low. In 1994, a shipment of 10 wild-collected specimens is reported from Belgium to Mexico. This shipment is likely to represent confiscated specimens, which were returned to the country of origin. CITES registered nurseries: P-DE 1001, P-DE-1002, P-ES-1001, P-CZ-1001, P-CZ-1002, P-CZ-1003.

Comments: Available data on international trade in wild-collected specimens are lacking, with the exception of probably returned, confiscated material. This is not likely to reflect all facts. For example, the supporting statement of 1981 reported considerable trade in wild collected specimens in the USA (2-3000 wild collected specimens have been observed in a nursery in Texas). However, international trade in this species has notably changed and no further such reports have been released in recent times. Reported contemporary trade is in artificially propagated specimens (plants and seeds), numbers are generally low.

### Biological Data

Range: The species is a regional endemic of the Valley of Rayones, Nuevo Leon. The total area of potential occurrence estimated at *50 square kilometres*, but suitable habitats within this area are restricted to canyons and cliffs, which however are abundant (Anderson, Arias & Taylor 1994).

Population: The total population remains unknown. Habitats are mostly inaccessible cliffs of loose material. The population was estimated at several thousand individuals on only 3 surveyed surfaces. Inaccessibility renders a formal census impossible. *The species may number in millions* (Anderson, Arias & Taylor 1994). Glass (1997) confirms, that although always heavily exploited by illicit collecting, the species occurs locally in great quantities and often inaccessibly on sheer and crumbly canyon walls and is therefore not unduly threatened. Reproduction is very strong, in adaptation to the dynamic habitat, as can be observed in situ, and populations usually contain a great number of juvenile and subadult specimens (Lüthy, unpubl.).

#### Conservation

None of the sites is reported to be affected in any way by human activities, except through collecting and possibly road construction. Collecting is estimated to be the major potential threat, but is limited to easily accessible surfaces, which is only a rather small proportion of the total habitat. *No major threats exist*. The habitat is not suitable for any form of land use. Regeneration of affected populations is reported (Anderson, Arias & Taylor 1994).

#### Biological Criteria (Res. Conf. 9.24)

- A. i) not met, ii) not met, iii) not applicable, iv) not applicable, v) not applicable (good natural regeneration of impacted sites reported)
- B. i) not met (ca. 50 km<sup>2</sup>), ii) not applicable, iii) not met, iv) not met
- C. i) not met, ii) not met
- D. not met

#### Conclusions

The species is classified as safe (Anderson, Arias & Taylor 1994). Biological criteria are not met. Trade Criteria are not met: No significant shipments of wild-collected specimens have been reported in recent times. The original statement for App. I-listing (Population estimated at 2-3000, App. I-listing is justified by rarity, restricted distribution and high commercial value, significant trade in wild-collected specimens) is no longer valid. In 1992, a new species in the former monotypic genus, *A. hintonii* has been described. It is the only potential look-alike and is listed in Appendix II. Listings within genus *Aztekium* should be harmonised.

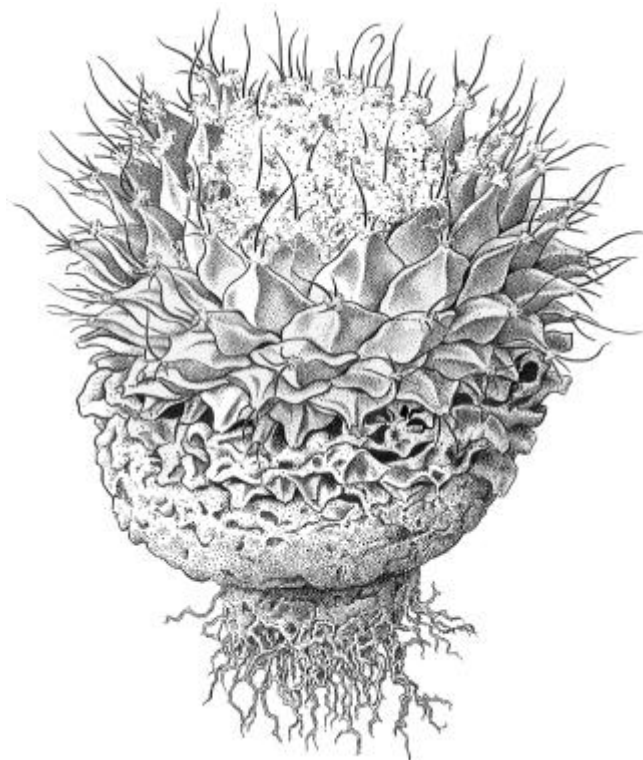
*Recommendation to the Plants Committee: The species should be transferred to Appendix II.*

Obregonia denegrii (Prop. USA 1981)

Obregonia denegrii Fric 1925

= Ariocarpus denegrii (Fric) W. T. Marshall 1946

= Strombocactus denegrii (Fric) Rowley 1974



Distribution: State of Tamaulipas, Mexico

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Statement of Range State upon Consultation: None

#### International Trade

WCMC data: A single shipment of 50 specimens, exported from Mexico to USA, is reported in 1980, prior to Appendix I-listing. All later trade with very few exemptions is stated to be in artificially propagated specimens and/or the country of origin, Mexico, is not involved. Only in 1981, a shipment of 200 specimens, originating from Mexico and stated to be artificially propagated, is reported from the USA to Japan. The numbers of specimens per shipment are usually rather low. In 1994, two shipments of 91 and 86 wild collected specimens are reported from Belgium to Mexico. These were probably confiscated specimens, which were returned to the country of origin. CITES registered nurseries: P-DE-1001, P-DE-1002, P-ES-1001, P-CZ-1002, P-CZ-1003.

Comment: Available data on international trade in wild-collected specimens are not likely to reflect the total trade volume. The supporting statement of 1981 reported, that most specimens in trade in USA have been wild collected and that commercial large-scale exploitation has been observed. Commercial trade in wild-collected specimens has also been observed in Europe until the early 1980s. However, international trade in this species has notably changed and no further such reports have been released in recent times. The reported contemporary trade is in artificially propagated specimens (plants and seeds).

#### Biological Data

Distribution: Regional endemic of the Valley of Jaumave, Tamaulipas. A survey in 1993 reports an occupied area of 6.5 *square kilometres* within the geographical range (Anderson, Arias & Taylor 1994).

Population: Total population unknown, but various reports and observations available. Locally very abundant and well reproducing, wide spread in the region. One single population estimated at 1.7 million individuals. Another

reported to have decreased since 1960 and estimated at several thousand plants. A survey in 1993 reports 7 populations with an estimated total population of *more than 2 million individuals*, the maximum density being 12 individuals per square metre (Anderson, Arias & Taylor 1994).

#### Conservation

Probability of a decrease in area or habitat quality is given mainly due to land use for cattle breeding, leading to erosion. Other impacts are collecting by local residents for medicinal uses and potentially road construction and urban development. The rocky soils are not suitable for agriculture. The impact of the quite intense collecting of plants and seeds for international trade over a long period has not been quantified, but doesn't seem to have severely affected the species. Glass (1997) confirms, that despite being highly prized by collectors, populations seem relatively stable and the plant is locally quite abundant. *No major threats are reported*. The species is not seriously threatened at present, it seems to be widespread and abundant within the Valley of Jaumave and its future seems secure (Anderson, Arias & Taylor 1994).

#### Biological Criteria (Res. Conf. 9.24)

- A. i) not met (former commercial large-scale exploitation has stopped), ii) not met, iii) not applicable, iv) not applicable, v) not applicable
- B. i) not met (widespread and abundant within the Valley of Jaumave), ii) not applicable, iii) not met, iv) not met (former commercial large-scale exploitation has stopped)
- C. i) not met (former commercial large-scale exploitation has stopped), ii) not met
- D. not met

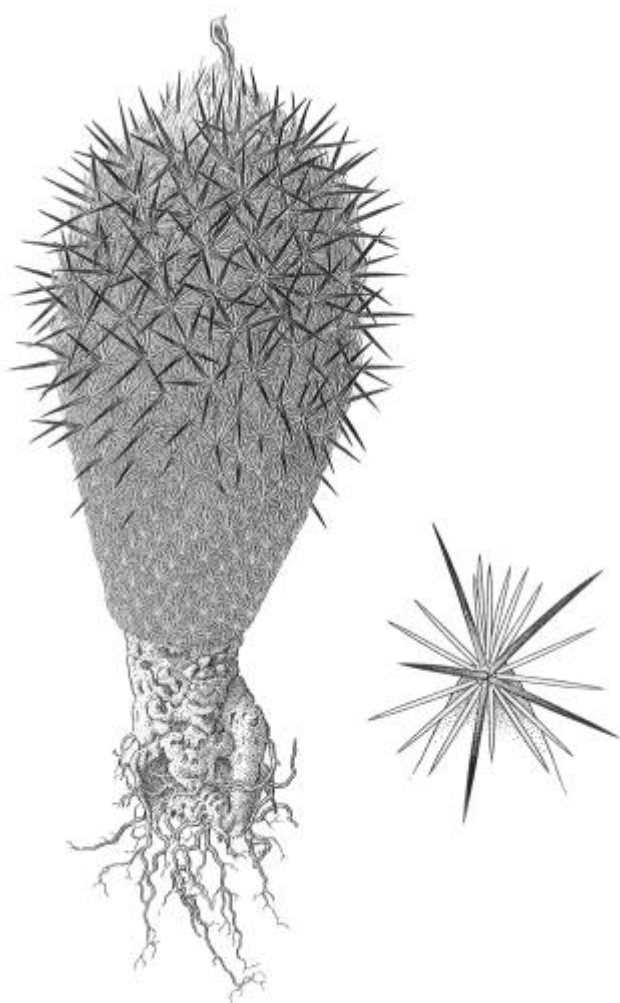
#### Conclusions

The Biological Criteria are not met. Trade Criteria are not met: No significant shipments of wild-collected specimens have been reported in recent times, former commercial large-scale exploitation has stopped and the impact on the species seems to be limited. The original statement for App. I-listing (reported as virtually extinct at the type locality and missing in other sites, though abundant in undisturbed sites, most specimens in trade in USA wild collected, commercial large-scale exploitation, App. I listing justified by rarity, restricted distribution and high commercial value.) is no longer valid. The species is reported to be safe (Anderson, Arias & Taylor 1994).

*Recommendation to the Plants Committee: The species should be transferred to Appendix II.*

*Coryphantha werdermannii* (Prop. USA 1983)

*Coryphantha werdermannii* Bödeker 1929



Distribution: State of Coahuila, Mexico

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Statement of Range State upon Consultation: None

International Trade

WCMC data: No international trade at all is reported prior to Appendix I-listing. Reporting starts in 1986. In 1990, there were 6 shipments with a total of 41 specimens originating from Mexico, re-exported from the USA to Canada, Germany, Italy, United Kingdom, Japan and Switzerland. These were probably wild-collected specimens, as a declaration of artificial propagation is missing. Although this number is low, it reflects earlier trade of an unknown volume from Mexico to USA, most probably in wild-collected specimens. Generally, the data reported from 1990 onwards reflect a very low international trade in artificially propagated specimens. Trade in seeds is reported from 1985 onwards, nearly exclusively originating from USA and it is likely, that specimens, that were earlier imported from Mexico, served as mother plants for production of these seeds. It must be considered, that trade in seeds is especially well documented by USA and not reported by many other parties and it is frequently taking place without permits. CITES registered nurseries: P-CZ-1002.

Comments: Little international trade in this species is reported at all. This seems to reflect a rather low demand, as is generally true for the whole genus *Coryphantha*. Lack of data on trade in wild-collected specimens prior to Appendix I-listing is not likely to reflect the complete facts, as the supporting statement reports “a heavy impact by collectors” (without giving more precise data). The reported contemporary trade is in artificially propagated specimens (plants and seeds).



## Biological Data

Range: Also the species has been described as early as 1929, the extent of the range remains unknown. It is invariably reported from south of Cuatro Ciénegas, near the road to San Pedro de las Colonias in Coahuila. Two sites have been studied in 1997 and 2001. They are ca. 10 km apart and have been investigated over 1 and ca. 3 km respectively (Lüthy, unpubl.).

Population: In the two studied localities, uncountable numbers of plants have been observed in 1997 and 2001 and the population structure looked natural with strong reproduction (Lüthy, unpubl.). Average density is estimated at 1 per 100 square meters. If this is extrapolated only over the investigated part of the range, a very conservative estimate comes already to ca. 200'000 individuals. The species grows in 3 different habitat types: Alluvial plain, gravelly bajada and limestone rocks. Highest population densities are observed on bajadas. These habitat types are available over ca. 80 km along the road in a depth of many kilometres. A place within one locality, that had been stripped for gravel extraction years ago, and the unpaved road leading to it, are now densely populated and show even a higher population density than the surrounding vegetation, including big adult individuals, which indicates rather fast growth in situ. It is not possible to indicate a number for the total population for lack of data, but preliminary estimates rather suggest a very high number.

## Conservation

The habitats are not suitable for agriculture and the vegetation is even too sparse for livestock. The only potential impact probably is further extraction of gravel for road construction, although no irreversible damage has resulted from such activities in the past. The reported heavy impact by collectors can not be evaluated in the studied site, as no reference data are available at all, but the population structure seems to be natural.

## Biological Criteria (Res. Conf. 9.24)

- A. i) decline in the number of individuals: impossible to evaluate, but population structure natural, habitat safe, ii) not met, iii) not applicable, iv) not applicable, v) not applicable
- B. i) not known, ii) not applicable, iii) not met, iv) not met (even regeneration of impacted site)
- C. i) not met (even regeneration of impacted site), ii) not met
- D. not met (habitat safe)

## Conclusions

The species is a regional endemic of Sierra Paila, Coahuila. The population size and geographical distribution are still not well known. It is locally very abundant and well reproducing and shows a natural population structure. Strong recovery of one local population after partial destruction of the habitat has been observed. Probability of a decrease in area or habitat quality is low, as the arid conditions don't allow agriculture and mining is not likely to destroy large areas. The region is hardly accessible and has little infrastructure. Regional human population density is minimal. The only reported impact is former local extraction of gravel for road construction. Impact of international trade must be a subordinate factor and can not even roughly be quantified. The Biological Criteria are not met. Trade Criteria are not met: No significant shipments of wild-collected specimens have ever been reported. The original statement for App. I-listing (restricted range, heavily impacted by collectors) can not be supported by evidence. There is no evident threat; the species can be classified as safe.

*Recommendation to the Plants Committee: The species should be transferred to Appendix II.*

*Mammillaria pectinifera* (Prop. USA 1983)

*Mammillaria pectinifera* Weber 1898

→ *Solisia pectinata* (B. Stein) Britton & Rose 1923

= *Pelecyphora pectinata* B. Stein 1885

= *Neomammillaria pectinata* (Stein) Fosberg 1931

→ *Pelecyphora aselliformis* var. *pectinifera* Rümpler 1885



Distribution: State of Puebla, Mexico



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Statement of Range State upon Consultation: None

#### International Trade

WCMC data: Virtually no international trade is reported prior to Appendix I-listing. All later trade with very few exemptions is consistently stated to be in artificially propagated specimens and/or the country of origin, Mexico, is not involved. The numbers of specimens per shipment is usually very low. In 1995, a shipment of 8 wild-collected live specimens was re-exported to Mexico from Germany. These seem to be confiscated specimens that were returned to the country of origin. CITES registered nurseries: P-DE-1001, P-DE-1002, P-CZ-1001, P-CZ-1002, P-CZ-1003.

Comments: Data on international trade in wild-collected specimens are largely lacking. The supporting statement is rather poor and gives little clues for interpretation of the figures of registered trade. The reported contemporary trade is in artificially propagated specimens (plants and seeds).

#### Biological Data

Range: Valley of Tehuacan-Cuicatlan in the state of Puebla. Bravo-Hollis & Sanchez-Mejorada (1991) indicate two localities: Mesa de El Riego and above Texcala. Anderson, Arias & Taylor (1994) indicate two localities in Puebla without giving more precise information, and refer to reports from the state of Oaxaca, which need to be confirmed. Hofer (unpubl.) indicates Sta. Ana and Tecomachalco. Arias, Gama & Guzman (1997) list samples from Santiago Nopala, Azumbilla, Tecomachalco, San Lucas Tuteletitlan and San Antonio Texcala.

Population: Anderson, Arias & Taylor (1994) conducted a census in the two localities mentioned by them and counted 112 and 46 individuals of all age classes.

#### Conservation

Threats reported by Anderson, Arias & Taylor (1994) in one locality (Tecomachalco, name not indicated by the authors) are mining rock for construction, dumping of rubbish, collecting of plants for horticulture and grazing of cattle and goats. At the second site extensive land use, principally for grazing of cattle and goats is affecting the habitat. Despite of heavy collecting near Tecomachalco over a long period, the species appears to survive and is evidently reproducing effectively, even extending its area into ground that has been disturbed by mining and dumping. *The species is classified as endangered because of habitat destruction.*

#### Biological Criteria (Res. Conf. 9.24)

- A. i) met: decline in the number of individuals: impossible to evaluate and population structure natural, but habitat threatened, ii) possibly met, iii) not applicable, iv) not applicable, v) not applicable
- B. i) probably met, ii) not applicable, iii) not met (well reproducing), iv) met (habitat impacted by land use)
- C. i) not met (even colonisation of impacted sites), ii) met (habitat impacted by land use)
- D. not met (impact of international trade is not a principal factor)

#### Conclusions

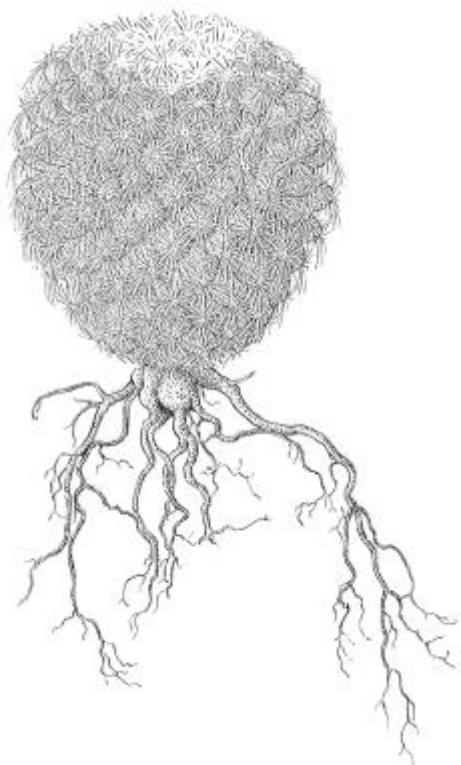
The rather poor original statement for App. I-listing (a rare species restricted to a rather limited area in southern Mexico, desirable as a horticultural plant, though difficult to grow, threatened by collectors) is partly still valid; but artificial propagation is no problem today and many nurseries produce the species (examples see above). International trade in wild-collected plants is apparently not the principal factor threatening this species. Although massive former collecting for horticulture is variously reported (e.g. Bravo-Hollis & Sanchez-Mejorada 1991), though not quantified, and some illicit collecting is evident up to 1995 (see above), the population structure and reproduction is reported not to be affected. Biological Criteria for App. I listing are met, but only because of consideration of habitat destruction in the assessment. Trade Criteria are no longer clearly met. All facts considered, a listing in App. I of CITES can contribute little to successfully conserve *M. pectinifera*. Rather national efforts must be undertaken to prevent further habitat destruction. A listing in App. II would still allow to control international trade, especially exports from Mexico.

*Recommendation to the Plants Committee: The species should be transferred to Appendix II.*

*Mammillaria solisioides* (Prop. USA 1983)

*Mammillaria solisioides* Backeberg 1952

= *Mammillaria pectinifera* fa. *solisioides* (Backeberg) Sanchez-Mejorada 1980



Distribution: states of Oaxaca and Puebla, Mexico

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Statement of Range State upon Consultation: None

#### International Trade

WCMC data: Virtually no international trade is reported prior to Appendix I-listing. A single shipment of 8 live specimens is reported in 1981 from Mexico to the USA for scientific purposes. All later trade with very few exemptions is stated to be in artificially propagated specimens and/or the country of origin, Mexico, is not involved. The numbers of specimens per shipment are usually very low (a single shipment of 17'395 specimens, declared as artificially propagated, from the USA to the United Kingdom in 1983, is remarkable; this figure must be erroneous). In 1994-1996, a total of 44 wild-collected live specimens were re-exported to Mexico from Germany and France. These seem to be confiscated specimens that were returned to the country of origin. CITES registered nurseries: P-DE-1001, P-DE-1002, P-CZ-1001, P-CZ-1003.

Comments: Data on international trade in wild-collected specimens are poor. The supporting statement is rather poor and gives little clues for interpretation of the figures of registered trade. The reported contemporary trade is in artificially propagated specimens (plants and seeds). Demand is rather moderate, as the species doesn't reach its close ally *M. pectinifera* in attractiveness of spines and flowers and is rather difficult to cultivate to flowers, as it flowers in winter.

#### Biological Data

Range: Originally reported from south of the city of Petlalzingo in the state of Puebla (Bravo-Hollis & Sanchez-Mejorada 1991). Anderson, Arias & Taylor (1994) as well as Arias, Gama & Guzman (1997) indicate the species from either side of the state-line between Puebla and Oaxaca. The latter authors list specimens from Huahuapan de Leon (Oaxaca) and Petlalzingo. Hofer (unpubl.) indicates the species from Huahuapan de Leon, from the way to Petlalzingo and from Salitrillo (Puebla).

Population: Glass (1997) states, that the species is locally surprisingly common.

#### Conservation

Glass (1997) reports, that within the expanding area of the city of Huahuapan de Leon, housing developments are built on literally thousands of plants. The botanical garden Cante AC rescued 200 plants from an area of a few square meters in front of a house being built there, and a year later in the exact same area a hundred more (Glass 1997). Anderson, Arias & Taylor (1994) also indicate urban expansion as a threat, apart from collecting and maybe agriculture. However, evidence of grazing is apparently not affecting the plants. There is some evidence of collecting for horticulture in recent time (see above), despite of CITES App. I-listing. The conservation status is to be determined.

#### Biological Criteria (Res. Conf. 9.24)

- A. i) locally met (habitat reduced by land use), ii) not met (locally common), iii) not applicable, iv) not applicable, v) not applicable
- B. i) not obviously met, ii) not applicable, iii) not met, iv) locally met (habitat reduced by land use)
- C. i) unknown, ii) locally met (habitat reduced by land use)
- D. not met (impact of international trade is not a principal factor)

#### Conclusions

The rather poor original statement for App. I-listing (a rare and local plant of restricted distribution in the mountains of central Mexico, desirable pot plant, threatened by collectors) is partly still valid, but artificial propagation is no problem today and many nurseries produce the species, thus meeting the demands of the international market (examples see above). Biological Criteria for App. I listing are met, but only because of consideration of habitat destruction in the assessment. ). Trade Criteria are no longer clearly met. Illicit collecting is evident up to 1996 to a limited extent, but apparently it is not the crucial factor threatening this species. Never a massive collecting for horticulture has been reported. All facts considered, a listing in App. I of CITES can contribute little to successfully conserve *M. solisoides*. Rather national efforts must be undertaken to thoroughly evaluate the conservation status and prevent further habitat destruction. A listing in App. II would still allow to control international trade, especially exports from Mexico.

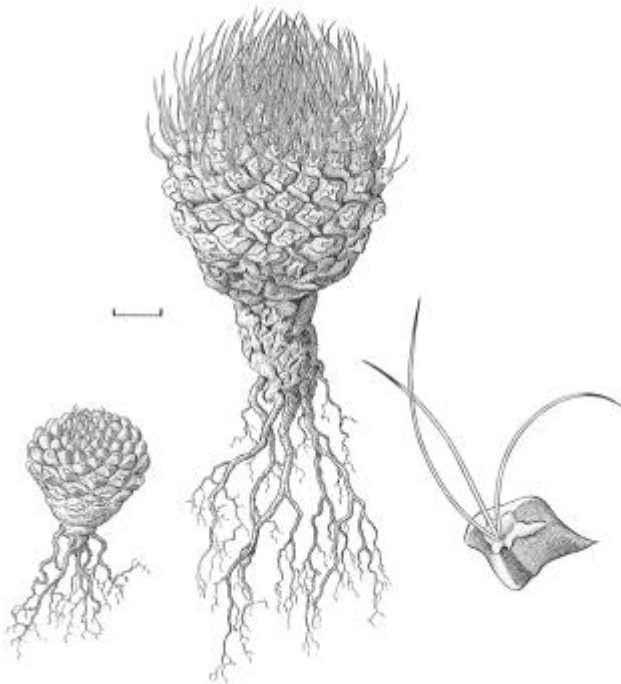
*Recommendation to the Plants Committee: The species should be transferred to Appendix II.*

*Strombocactus disciformis* (Prop. USA 1983; changed to *Strombocactus* spp. in 1997)

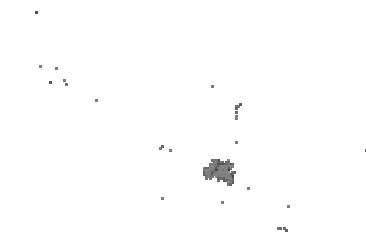
*Strombocactus disciformis* (De Candolle) Britton & Rose 1922

*Strombocactus disciformis* ssp. *disciformis*

- = *Mammillaria disciformis* De Candolle 1828
- = *Cactus disciformis* (De Candolle) Kuntze 1891
- = *Echinocactus disciformis* (De Candolle) Schumann 1894
- = *Ariocarpus disciformis* (De Candolle) W. T. Marshall 1946
- *Echinocactus turbiniformis* Pfeiffer 1838
- = *Echinofossulocactus turbiniformis* (Pfeiffer) Lawrence 1841
- = *Anhalonium turbiniforme* (Pfeiffer) F. A. C. Weber 1893
- *Mammillaria turbinata* Hooker 1843
- = *Cactus turbinatus* (Hooker) Kuntze 1891
- *Strombocactus disciformis* var. *seidelii* (Fric) Crkal 1983
- *Strombocactus jambilae* Halda 1996
- = *Ariocarpus disciformis* ssp. *jambilae* (Halda) Halda 1998
- *Strombocactus disciformis* fa. *minimus* Don Pedro & Riha 1997
- = *Strombocactus disciformis* ssp. *esperanzae* Glass & S. Arias 1996
- = *Strombocactus disciformis* var. *esperanzae* (Glass & S. Arias) don Pedro & Riha 1997
- *Strombocactus pulcherrimus* Halda 1996
- = *Ariocarpus pulcherrimus* (Halda) Halda 1998



Distribution:



ssp. *disciformis*: States of Hidalgo and Querétaro, Mexico



ssp. *esperanzae*: States of Guanajuato and Querétaro, Mexico

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Statement of Range State upon Consultation: None

International Trade

WCMC data: Available data only cover *Strombocactus disciformis* ssp. *disciformis*, whereas ssp. *esperanzae* (= *Strombocactus pulcherrimus*), described in 1996, would have to be assessed separately, but no data exist so far. A total of 6'491 live specimens were reportedly exported from Mexico, mainly to the USA, between 1976 and 1982, before *Strombocactus disciformis* was listed in Appendix I. There are 5 mayor shipments from Mexico to the USA in this period (1979: 1104; 1980: 1700; 1981: 1260 + 600; 1982: 1680). After the listing in Appendix I in 1983, reported exportation from Mexico dropped significantly. Only two less important shipments from Mexico to the USA were reported (1984: 6; 1987: 200). Although the origin of the specimens is not stated, it is most probable, that they were wild-collected. In 1994-1996, a total of 121 wild-collected live specimens were re-exported to Mexico from Belgium, Germany and France. These seem to be confiscated specimens that

were returned to the country of origin. CITES registered nurseries (ssp. *disciformis*): P-DE-1001, P-DE-1002, P-CZ-1001, P-CZ-1002, P-CZ-1003.

Comments: Prior to Appendix I-listing, a considerable trade in wild-collected specimens is reported, that - if continued - may be considered as detrimental to the populations concerned, but rather not to the species, which is wide spread and locally abundant. There still is some illegal collecting up to recent times, as evidence from reported trade shows. However, most reported contemporary trade is in artificially propagated specimens. Wild-collected specimens of the new subspecies *esperanzae* have already been observed in Germany, Czech Republic and Switzerland.

#### Biological Data

Range: Subspecies *disciformis* is reported from the States of Hidalgo and Querétaro, on steep, calcareous, alluvial cliffs along stream beds or canyon walls. The total range has never been measured, but it is estimated to possibly occur in its very specialised habitat over a range of about 250 square kilometres (Anderson, Arias & Taylor 1994). The recently discovered new subspecies *esperanzae* is only reported from around the type locality in the state of Guanajuato.

Population: Subspecies *disciformis* is very abundant and of all age classes in several studied sites, particularly in Querétaro (Anderson, Arias & Taylor 1994). Subspecies *esperanzae* was only found in small numbers at the type locality (Glass 1997).

#### Conservation

Due to the wide distribution, abundant localities, which are not threatened by land use, and healthy, well reproducing populations, subspecies *disciformis* is classified as safe/low risk by Anderson, Arias & Taylor (1994). Subspecies *esperanzae* was never known in big numbers and the observed appearance of wild-collected plants in the international trade is very likely to threaten this taxon. Glass (1997) states, that the few plants known in the 2-3 sparse populations could soon be eradicated by unscrupulous collectors and that subspecies *esperanzae* must be considered extremely highly threatened. The two subspecies can not be told apart with any certainty, when not flowering.

#### Biological Criteria (Res. Conf. 9.24)

##### Subspecies *disciformis*

- A. i) not met (habitat safe), ii) not met (wide spread and locally very abundant), iii) not applicable, iv) not applicable, v) not applicable
- B. i) not met, ii) not applicable, iii) not met, iv) not met (habitat safe)
- C. i) not met, ii) not met
- D. not met

##### Subspecies *esperanzae*

- A. i) met (low number of individuals; appeared in international trade), ii) met, iii) not applicable, iv) not applicable, v) not applicable
- B. i) met, ii) not applicable, iii) not met, iv) met (low number of individuals; appeared in international trade)
- C. i) probably met, ii) not met
- D. met

#### Conclusions

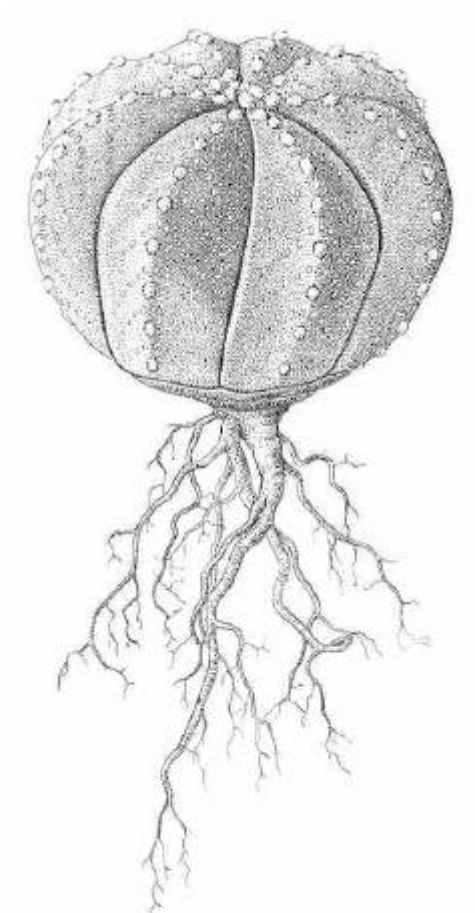
Subspecies *disciformis* does not meet the Biological Criteria. Illicit collecting is evident up to 1996 to a limited extent, but large scale commercial trade has stopped and today, Trade Criteria are no longer clearly met. The subspecies is classified as safe and could well be transferred to App. II, whereas subspecies *esperanzae* does clearly meet the Biological Criteria and is actually observed in international trade and hence qualifies for a listing in CITES Appendix I. As the two subspecies can not be told apart when not flowering, a split listing must be avoided.

*Recommendation to the Plants Committee: The genus should be maintained in Appendix I.*

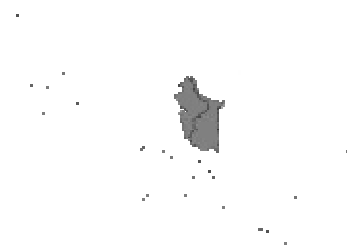


*Astrophytum asterias* (Prop. USA 1987)

*Astrophytum asterias* (Karwinski ex Zuccarini) Lemaire 1868  
= *Echinocactus asterias* Karwinski ex Zuccarini 1845



Distribution:



States of Tamaulipas and Nuevo León, Mexico



State of Texas, USA

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Statement of Range States upon Consultation

Mexico: None

Note: As a result of the ten-years-review, transfer to Appendix II has been proposed at COP 9 (Doc. 9.45, Annex 1; Doc. 9.47) by Mexico and Switzerland, but the proposal has been withdrawn in the conference by Mexico (Com. I 9.6).

USA (SA in lit.): A review has been completed, using the Criteria of Res. Conf. 9.24. United States would oppose the transfer of the species from App. I to App. II. *Astrophytum asterias* was listed as an endangered species under the U. S. Endangered Species Act in 1993 and listed as endangered in the State of Texas in 1994. These listings were in response to the significant habitat reduction and extirpation by collectors for the horticultural market. The Draft Recovery Plan of the U. S. Fish and Wildlife Service (1994) recognises, that the species is still declining in USA due to collection of plants from the wild, and the Texas Department of Parks and Wildlife informed the U. S. Fish and Wildlife Service accordingly. The Texas Department of Parks and Wildlife's Diversity Program monitors *A. asterias* and maintains a database of known sites, both current and historical. The last demographic study was conducted in 1987; at that time the population was estimated at 2'000 individuals. Because of its range restriction and small population size, *Astrophytum asterias* is vulnerable to extinction in USA. Any trade in wild-collected specimens would undermine recovery efforts. In the period between 1991-1997, 22 seeds, 4 dried plants and 6 live plants originating from USA have been seized in international trade (it is not indicated, whether these specimens were wild-collected).

International Trade

WCMC data: In the period of 1980-1986, prior to Appendix I-listing, a total of 38'975 specimens plus one shipment of undetermined number were reportedly exported from Mexico to the USA. Their origin is not stated, but almost certainly they were wild-collected. The two biggest shipments contained 23'970 specimens (1981) and 10'840 specimens (1983) respectively. In 1980, a shipment of 1'500 specimens was exported from USA to Germany. Their origin is not stated and it is possible, that they were wild-collected in the USA or originating from Mexico. After the listing in Appendix I in 1986, no such shipments were reported anymore. CITES registered nurseries: P-DE-1001, P-DE-1002, P-ES-1001, P-CZ-1002, P-CZ-1003.

Comment: Prior to Appendix I-listing, a considerable trade in almost certainly wild-collected specimens is reported, that can safely be regarded as highly detrimental to the survival of the species. The reported contemporary trade is in artificially propagated specimens. The most important production seems to be in Brazil, from where exports of thousands of specimens are reported from 1984 onwards. As reported above, a few specimens have been seized in USA between 1991-1997. Their origin is not stated.

#### Biological Data

Range: This species occurs (or has occurred) on gentle slopes and flat lands of the lower Rio Grande Valley in USA and Mexico, in both grasslands and thorn scrub, then southward along the east side of the Sierra Madre Oriental to south of Ciudad Victoria, at elevations below 200 meters (Anderson, Arias & Taylor 1994). Benson (1982) indicates 2 localities in Starr County, Texas and further the occurrence in the Mexican States of Nuevo Leon and Tamaulipas. It is reported to be extinct in Cameron and Hidalgo Counties in Texas (Hook 1996). Bravo-Hollis & Sanchez Mejorada (1991) report several localities in the States of Nuevo Leon and Tamaulipas: Ciudad Guerrero, Barretillas and Mesa de Llera near the Guayalejo river. Anderson, Arias & Taylor (1994) report it from near Ciudad Victoria in Tamaulipas. Kleszewski (1994) reports it from Tamaulipas, between Llera de Canales and Gonzalez at 200 m. Hook (1996) provides a distribution map with 3 historical localities in USA and 5 historical localities in Mexico, stating that only one population in Starr County, Texas and another south of Ciudad Victoria in Tamaulipas are still confirmed (but not indicated on the map for conservation reasons).

Population: The species was first collected in Tamaulipas in 1843 by Karwinsky (Benson 1982). In USA, it was first reported by Clover in 1933 and two years later already stated to be decimated by traders as reported by the Texan cactus trader Pirtle (Frick 1935 in Hook 1996). The Texas Department of Parks and Wildlife's Wildlife Diversity Program monitors *A. asterias* and maintains a database of known sites, both current and historical. The last demographic study in the State of Texas was conducted in 1987. At that time the population in USA was estimated at 2'000 individuals (US Scientific Authority 2000, in lit.). Hook (1996) reports on field-observations in Starr County, Texas. He counted 200 individuals in one place in 1994, with a diameter up to 10 cm. In Mexico, the species was found in 1986 at only a single locality southeast of Ciudad Victoria. Only 100 plants were located in a wide search of the area (about one square kilometre). At this site, many large specimens with a diameter of up to 15 cm had been observed in 1978, which probably had been removed by collectors and were missing in 1986 (Anderson, Arias & Taylor 1994). Kleszewski (1994) reports specimens of up to 12 cm diameter observed in 1994 in the locality mentioned above. Glass (1997) reports, that the species is locally fairly common in parts of Tamaulipas, without giving further details.

#### Conservation

The original proposal for the listing in App. I states, that only 4 sites were known in Texas in the 1950s and 1960s, but continued existence there would need to be confirmed and that the species *has been collected by the thousands in Texas* for the (national?) cactus trade and that additionally, *the area was cleared for agriculture*. The species was reported to be possibly eliminated in Texas. In Mexico, 5 localities in the states of Nuevo Leon and Tamaulipas were mentioned. All the big specimens were reported to be removed for the cactus trade in one Mexican site studied in 1986 (cf. Anderson, Arias & Taylor, 1994).

In USA, the species is subject to a monitoring and conservation program. It is classified as *vulnerable to extinction and at high risk of extirpation from the wild* (US Scientific Authority 2000, in lit.). Hook (1996) reports the introduced grass *Cenchrus ciliaris* as another threat to the species in Texas, apart from still existing potential treat by collectors, although access to privately owned lands in that state is difficult.

Anderson, Arias & Taylor (1994) indicate, that the species has greatly diminished in the USA and many areas in Mexico as a result of agricultural development as well as collecting. The species no longer exists in much of its former range *primarily because of agricultural development and destruction of the natural vegetation*. A second major factor is stated to be *collecting*, even if in recent times this may have mainly been by individuals

taking plants for personal use, rather than of larger commercial activities. It may sometimes be collected in error for another species, *Lophophora williamsii*. They classify the species as *endangered*. Glass (1997) reports, that the species is *endangered* in Tamaulipas by the fact that local goatherds are aware that this plant which they call "peyote" is sought by many foreign tourists who will pay them a considerable amount of money per plant. Kleszewski (1994) reports, that the site between Llera de Canales and Gonzalez in Tamaulipas is threatened by agriculture.

#### Biological Criteria (Res. Conf. 9.24)

- A. i) met, ii) met, iii) not applicable, iv) not applicable, v) not applicable
- B. i) met, ii) not applicable, iii) not applicable, iv) met
- C. i) met, ii) met
- D. can not be assessed (habitat destruction is the principal threat)

#### Conclusions

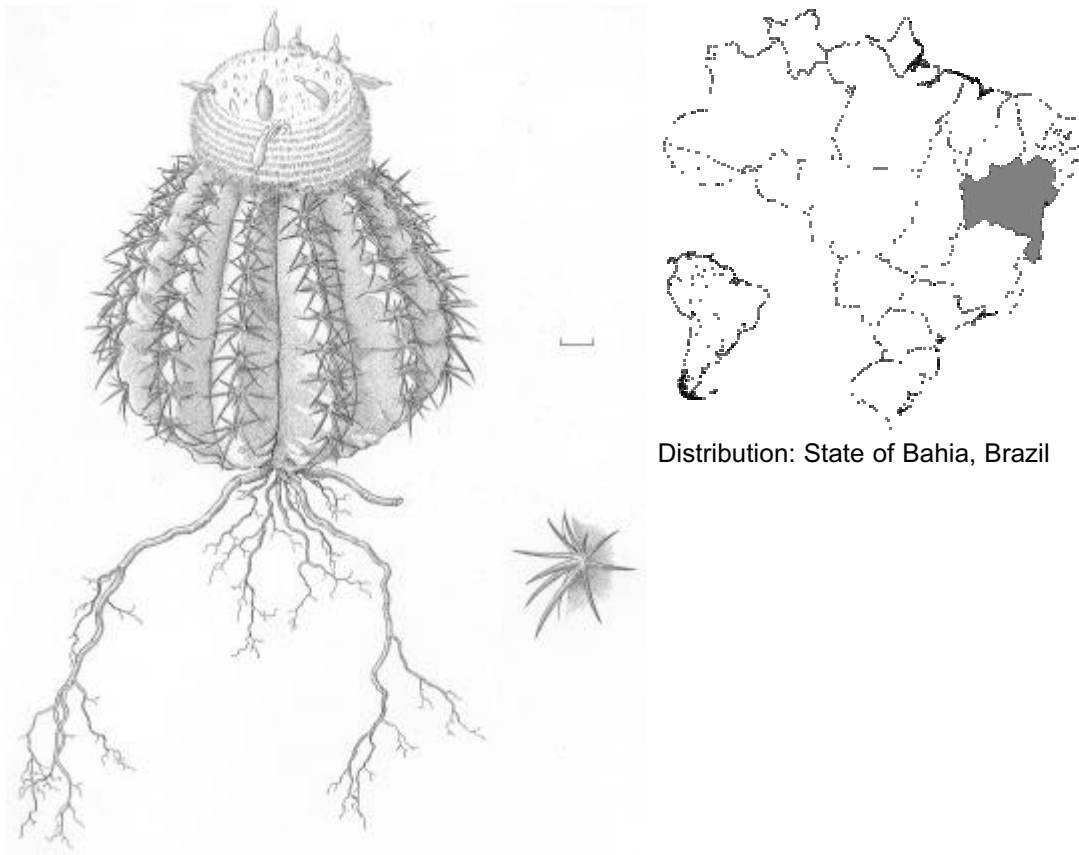
Habitat destruction is consistently reported to be clearly the principal factor threatening this species. This can not be addressed by a CITES App. I listing. However, collection from the wild both private and commercial is variously stated to be an important factor. Large scale commercial exploitation, as documented in the early 1980s, has stopped, but occasional removing of plants from the wild is still reported in Mexico (Glass 1997) and USA (U. S. Fish and Wildlife Service 1994). The only known surviving population in USA is very small and the species is classified as *endangered* in USA. In Mexico, the species is also classified as *endangered*. Only one population is variously confirmed, although Glass (1997) states, that the species is locally fairly common, without giving further details. The status of the species in Mexico needs further investigation. The species meets the Biological Criteria. It is difficult to assess the Trade Criteria for lack of data. It is not known, whether there is still international trade in wild-collected specimens. Any such trade would undermine recovery efforts, as stated by USA. Today, *Astrophytum asterias* is produced in big quantities in many nurseries of the world (examples see above), thus meeting the demand of the international market.

It would be beneficial, if Mexico would join the efforts undertaken by USA and take steps towards the protection of the last surviving populations and habitats of *Astrophytum asterias* in Mexico.

*Recommendation to the Plants Committee: Astrophytum asterias is not safe. Although the actual influence of international trade is unclear, the species should probably best be maintained in Appendix I, as suggested by USA.*

Melocactus conoideus (Prop. Brazil 1992)

Melocactus conoideus Buining & Brederoo 1973



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Statement of Range State upon Consultation: None

International Trade

WCMC data: It has to be taken into account, that especially in this genus, a considerable portion of the reported trade is only defined to genus level and therefore, reported trade in a certain species could be higher than the figures for this species. In the period of 1984-1989, prior to Appendix I-listing, a total of 706 specimens (7 shipments) were exported from Brazil to the USA, Germany and the Netherlands. Their origin is stated to be from artificial propagation or partly not stated at all, but very probably they were at least partly wild-collected. After the listing in Appendix I in 1992, no such shipments were reported anymore. CITES 1registered nurseries: P-DE-1001, P-ES-1001.

Comment: Relatively little international trade in this species is reported. Prior to Appendix I-listing, a considerable trade in probably wild-collected specimens, in comparison with the restricted wild population, is reported, that may have been - if continued - detrimental to the survival of the species. The very limited reported contemporary trade is in artificially propagated specimens (plants and seeds).

Biological Data

Range: Known from a single site at the boundary of a large city, as stated in the original proposal for App. I-listing (1992). Machado (1999) reports on more recent observations; further localities in the Serra do Periperi have been found.

Population: Almost extinct in 1989 at its type locality, but may be expected to occur in other parts of the same mountain ridge, as stated in the original proposal for App. I-listing (1992). The species occurs in larger numbers in the additional localities (Machado 1999). The species seems to recover very well, if mining activities are stopped. Bohle (2000) reports the species to be quite frequent in the type locality, with abundant juvenile individuals and quite a high production of seeds.

#### Conservation

The quartz gravel, on which the species grows, is exploited for local use in the construction industry and the site is extremely disturbed. 101 specimens have been exported from Brazil during the period 1983-1989, but the actual number may be higher, as shipments are often only declared at genus level. Most of the exports took place during the period 1984-1986. About half of these were not declared as artificially propagated and confiscation of plants by Dutch Customs officials during this period indicate, that hundreds of wild-collected *Melocactus* specimens were present in Brazilian shipments. A Swiss nursery company is known to have imported substantial numbers of wild-collected melocacti, including *M. conoideus*, *M. deinacanthus* and *M. glaucescens*, during the 1970s and early 80s, before reliable trade data figures were recorded. It is probable, that all of such trade was based on wild-collected plant material. Trade in wild-collected seeds is probable, but unreported by CITES. National protection status: The export of wild-collected Cactaceae is a violation of the Portaria Normativa 122 (21.03.1985). Although trade in wild-collected specimens may not be taking place at the present time, such trade has certainly occurred in the recent past. The wild population can not withstand further heavy collecting without risking the extinction of the species in the wild, as stated in the original proposal for App. I-listing (1992).

Machado (1999) reports, that habitat destruction by ongoing extraction of quartz sand is still the principal threat to *Melocactus conoideus*. Efforts are made to protect the area, which holds other species in need of protection, and it has been declared a Municipal Park. But extraction of sand still continues and stronger implementation of the Park is needed. Nigel Taylor considered *Melocactus conoideus* Critically Endangered, because at the type locality very few individuals survived. The species occurs in larger numbers in other areas of Serra do Periperi, but unfortunately, these areas are also being subjected to extraction of sand, in fact mining is moving to these areas now.

(Taylor & Zappi 2001) confirm, that the species is critically endangered, and it is severely threatened by extraction of the quartz gravel, in which it grows, and through commercial collection for the European horticultural market, although no evidence for such trade in present times is provided. The authors report, that *Melocactus conoideus* was all but extinct at the type locality, where it is sympatric with the widespread *Melocactus concinnus*, but that Brazilian cactus enthusiasts have recently discovered a healthy extension of this population in an adjacent part of the mountains and this area is now officially protected, although this has so far failed to halt gravel extraction.

#### Biological Criteria (Res. Conf. 9.24)

- A. i) met, ii) unclear (occurs in larger numbers in additional localities, exact data are lacking), iii) not applicable, iv) not applicable, v) not applicable
- B. i) met, ii) not applicable, iii) not applicable, iv) met
- C. i) met, ii) met
- D. can not be assessed (habitat destruction is the principal threat)

#### Conclusions

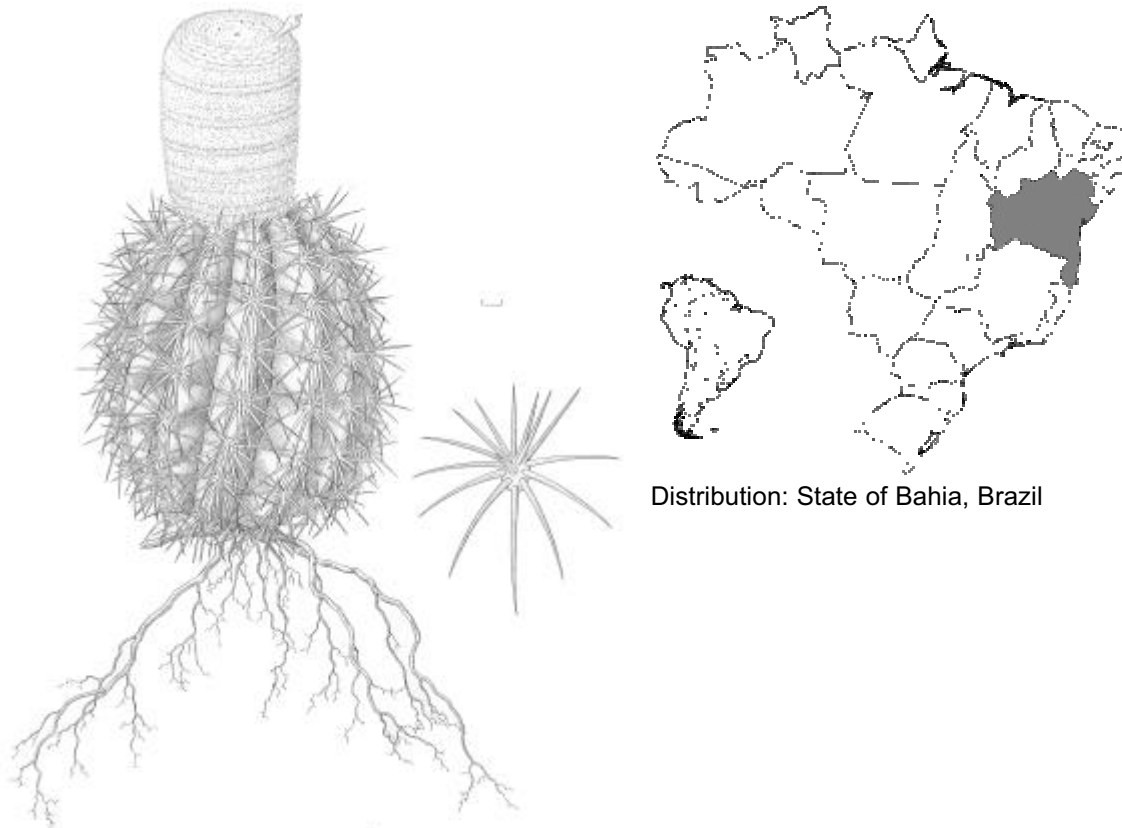
*Melocactus conoideus* is not safe, although the species does no longer clearly qualify for classification as critically endangered, as results from more recent data on distribution and abundance (Machado 1999). The status has to be evaluated. Biological Criteria are met, mainly because of habitat destruction, which is obviously the principal threat. This can not be addressed by a listing in CITES App. I. Although international trade in the 1970s and 1980s severely threatened this species, trade in wild-collected specimens may not be taking place at the present time, as already stated in the original proposal for App. I-listing (1992). Thus, evidence is lacking, that Trade Criteria are still met. There is some trade in artificially propagated specimens (registered nurseries see above).

A stronger implementation and maybe further evaluation of the extension of the recently declared Serra do Periperi Municipal Park is needed to successfully conserve *Melocactus conoideus* (Machado 1999). A listing in App. II would still allow controlling international trade, especially exports from Brazil.

*Recommendation to the Plants Committee: The species should be transferred to Appendix II.*

Melocactus deinacanthus (Prop. Brazil 1992)

Melocactus deinacanthus Buining & Brederoo 1973



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Statement of Range State upon Consultation: None

International Trade

WCMC data: It has to be taken into account, that especially in this genus, a considerable portion of the reported trade is only defined to genus level and therefore, reported trade in a certain species could be higher than the figures for this species. In the period of 1984-1989, prior to Appendix I-listing, a total of 68 specimens (5 shipments) were exported from Brazil to the USA, Germany and the Netherlands. Their origin is not stated, or stated to be from artificial propagation, but very probably they were at least partly wild-collected. After the listing in Appendix I in 1992, no such shipments were reported anymore. CITES registered nurseries: none.

Comment: Extremely little international trade in this species is reported. Prior to Appendix I-listing, some trade in probably wild-collected specimens is reported, that may have been - if continued - detrimental to the survival of the species. The very limited reported contemporary trade is in seeds.

Biological Data

Range: Known from a single site, restricted to a rock outcrop of limited extent situated close to a relatively busy highway on privately owned farmland, as stated in the original proposal for App. I-listing (1992). Braun (2001) states, that the species is only threatened in the type locality, but has a much wider distribution and many further localities. However, he includes *M. longicarpus* Buining & Brederoo, whereas Taylor (1991) excludes this taxon. Bohle (2000) did not investigate the neighbouring hills, but he observed *Melocactus* spec. HU 529 about 7-10 km apart in rather big populations. Uebelmann tentatively compared this taxon with *M. deinacanthus*, but this classification is not confirmed.

Population: Several hundred specimens have been observed in the type locality in 1998; the population has rather decreased between 1994-1998 (Bohle 2000). *Melocactus deinacanthus* is reported by Taylor & Zappi (2001) to be a co-dominant element of the rupicolous vegetation of the type locality.

#### Conservation

Land use is restricted to grazing by goats, due to the rocky nature of the habitat. 10 specimens have been exported from Brazil during the period 1983-1989 (compare with data of WCMC above), but this number may not reflect the actual exports (see above under *M. conoideus*, also for comments on trade in wild collected seeds and national protection status). Although trade in wild-collected specimens may not be taking place at the present time, such trade has certainly occurred in the recent past. The wild population can not withstand further heavy collecting without risking the extinction of the species in the wild, as stated in the original proposal for App. I-listing (1992).

The species is classified as endangered by Bohle (2000) and threatened by Braun (2001, referring to the type locality). Taylor & Zappi (2001) state, that it is critically endangered, because it is known from a single roadside site.

#### Biological Criteria (Res. Conf. 9.24)

- A. i) unclear, lack of valid data, ii) met (only a single population), iii) not applicable, iv) not applicable, v) not applicable
- B. i) met (only a single population), ii) not applicable, iii) not applicable, iv) possibly met (a decline is suspected)
- C. i) possibly met (a decline is suspected), ii) not met (habitat rather safe)
- D. can not be assessed (no reference data available)

#### Conclusions

Assessment of *Melocactus deinacanthus* rather has to follow the taxonomical interpretation of this species in Taylor (1991), only including the population in the type locality. It is still classified as endangered (Bohle 2000) or threatened (in the type locality, Braun 2001) or critically endangered (Taylor & Zappi 2001). This is due to the very limited distribution and rather small population and can not be addressed by a listing in CITES App. I. The habitat seems to be rather safe, as land use is restricted to grazing by goats, due to the rocky nature of the habitat (see above). It is not quite clear, whether Biological Criteria are met, for lack of data on a decline of the population. The fact, that the species is extremely rare, is rather due to the very restricted distribution, as far as known, and thus a natural state. According to available data, a limited number of wild-collected specimens have entered international trade. Such trade may not be taking place at the present time, as already stated in the original proposal for App. I-listing (1992). Thus, there is no evidence that Trade Criteria are still met. The very limited reported contemporary trade is in seeds. No nursery is registered for artificial propagation of *M. deinacanthus*.

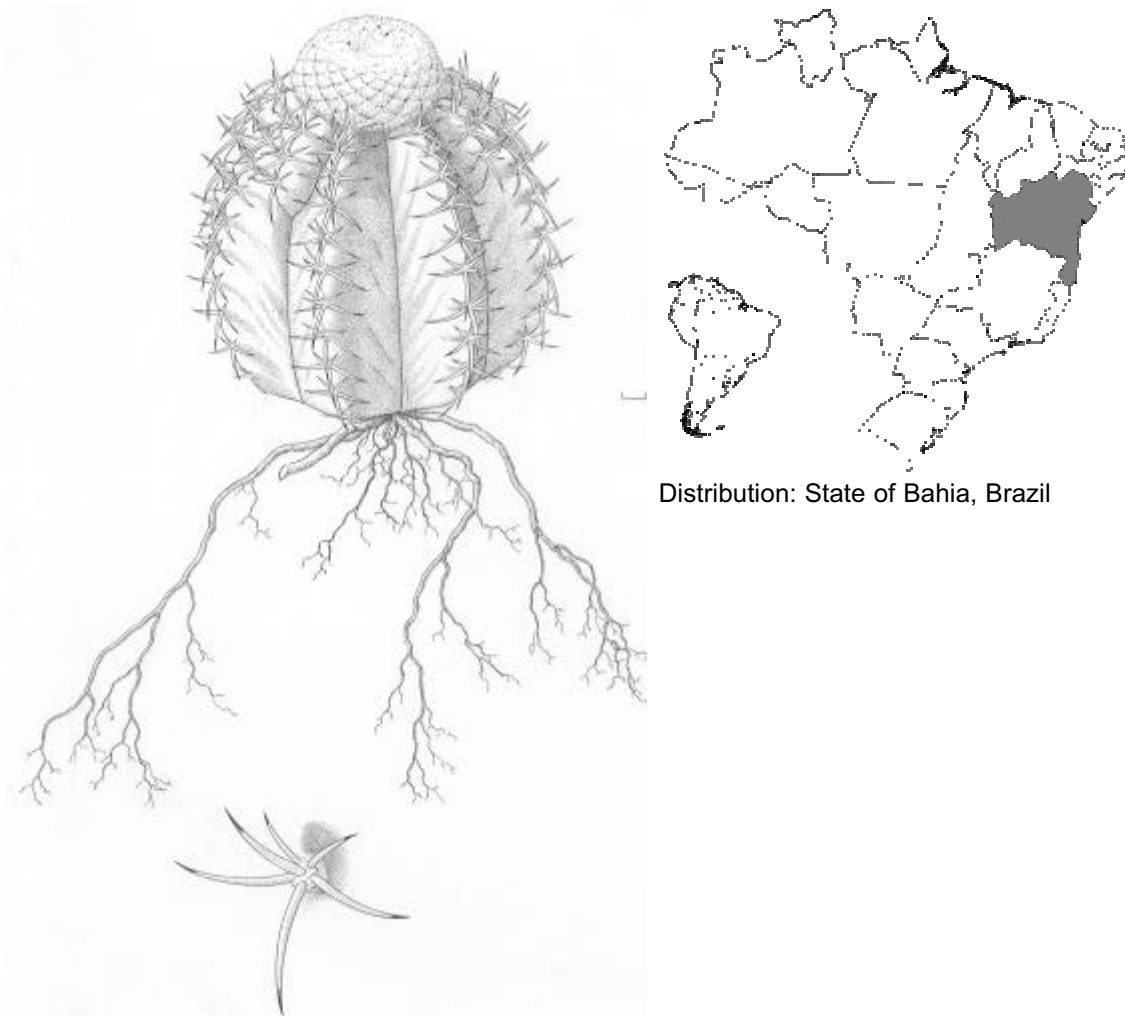
As can be concluded from all available data, protection of the type locality seems the most appropriate measure to successfully conserve *Melocactus deinacanthus*. It is questionable, whether the CITES App. I-listing is effective as an additional measure. Trade even in small numbers of wild-collected specimens however would be detrimental and should be strictly prevented. A potential demand for such specimens can of course never be totally excluded.

*Recommendation to the Plants Committee: Due to the very small population and considering the possibility of trade in wild-collected specimens, though no such trade is documented in recent times, the species may rather be maintained in Appendix I.*



Melocactus glaucescens (Prop. Brazil 1992)

Melocactus glaucescens Buining & Brederoo 1972



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Statement of Range State upon Consultation: None

International Trade

WCMC data: It has to be taken into account, that especially in this genus, a considerable portion of the reported trade is only defined to genus level and therefore, reported trade in a certain species could be higher than the figures for this species. In the period of 1984-1985, prior to Appendix I-listing, a total of 57 specimens (3 shipments) were exported from Brazil to Germany and the Netherlands. Their origin is not stated, or stated to be from artificial propagation, but very probably they were at least partly wild-collected. After the listing in Appendix I in 1992, no such shipments were reported anymore. At the same time, in the period of 1981-1991, a total of 22 shipments containing 2000 artificially propagated specimens are reported, exclusively exported from the USA. CITES registered nurseries: P-DE-1001.

Comment: Little international trade in this species is reported at all. Prior to Appendix I-listing, some trade in probably wild-collected specimens is reported, that may have been - if continued - detrimental to the survival of the species. The very limited reported contemporary trade is in artificially propagated specimens, mainly seeds.

Biological Data

Range: Restricted to two sandstone outcrops separated by only 5 km, on privately owned farmland and close to a main highway, as stated in the original proposal for App. I-listing (1992). Taylor (1991) reports an extremely

restricted distribution and confirmed only from two localities. Bohle (2000) reports the species from an area of 10 x 2 km. Machado (1999) reports, that the species is extremely restricted in distribution and confined to a few places west of the city of Morro de Chapéu. Braun (2000) states, that there are more than two populations.

Population: Bohle (2000) states, that the species is scattered and not very abundant within the known range. Machado (1999) reports, that the number of individuals in each population is low.

#### Conservation

Land use is restricted to grazing by goats, due to the rocky nature of the habitat. 8 specimens have been exported from Brazil during the period 1983-1989 (compare with data of WCMC above), but this number may not reflect the actual exports (see under *M. conoideus*, also for comments on trade in wild collected seeds and national protection status). Although trade in wild-collected specimens may not be taking place at the present time, such trade has certainly occurred in the recent past. The wild population can not withstand further heavy collecting without risking the extinction of the species in the wild, as stated in the original proposal for App. I-listing (1992).

Machado (1999) reports, that the habitats are not likely to suffer much modification, unless miners begin to extract the sandstone where the plants grow, but this is not likely to occur. He considers collecting as the largest potential threat. Taylor & Zappi (2001) classify the species as critically endangered in view of its rarity and the treats from commercial collection. They report, that a local reserve to protect this and other rare species has been proposed.

#### Biological Criteria (Res. Conf. 9.24)

- A. i) most probably not met (no evidence of decline, habitat safe), ii) met, iii) not applicable, iv) not applicable, v) not applicable
- B. i) met, ii) not applicable, iii) not applicable, iv) most probably not met (no evidence)
- C. i) not met (no evidence), ii) not met (habitat safe)
- D. not likely

#### Conclusions

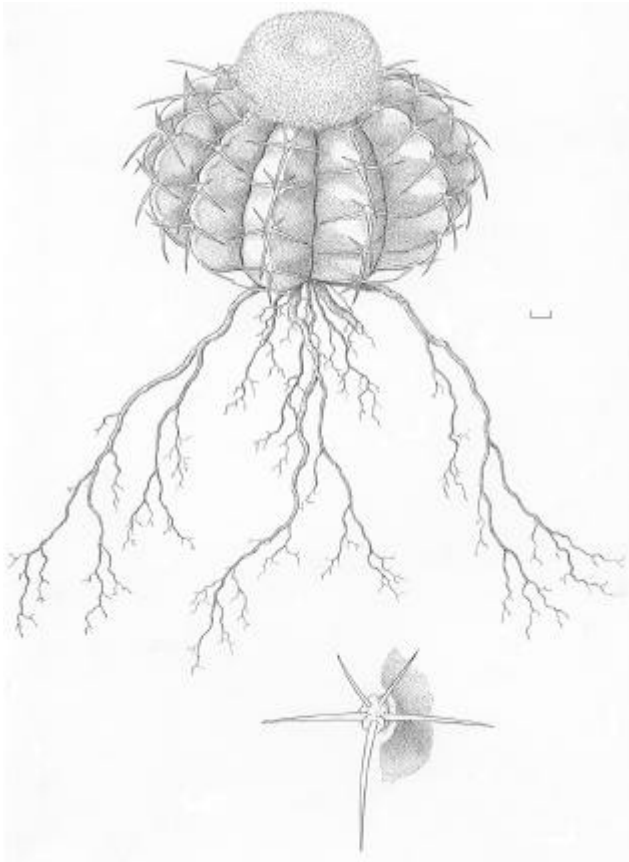
*Melocactus glaucescens* is naturally rare. It fails to clearly meet the Biological Criteria. Its habitat is classified as safe. There is no evidence of contemporary trade in wild-collected specimens, as already stated in the original proposal for App. I-listing (1992), although a rather small number of specimens have been reported in international trade in the early 1980s. Thus, there is no evidence, that Trade Criteria are still met. The scattered occurrence in small numbers rather lowers the risk of overcollecting. The species is artificially propagated today in considerable quantities (see above) and thus readily available to collectors. The species is not reported to be actually threatened and pending reports on contemporary trade in wild-collected specimens, a benefit from a CITES App. I-listing is not very obvious.

Protection of the localities, as proposed (see above) seems the most appropriate measure to successfully conserve *Melocactus glaucescens*.

*Recommendation to the Plants Committee: The species should be transferred to Appendix II.*

Melocactus paucispinus (Prop. Brazil 1992)

Melocactus paucispinus Heimen & Paul 1983



Distribution: States of Bahia and (N) Minas Gerais, Brazil

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Statement of Range State upon Consultation: None

#### International Trade

WCMC data: It has to be taken into account, that especially in this genus, a considerable portion of the reported trade is only defined to genus level and therefore, reported trade in a certain species could be higher than the figures for this species. In the period of 1988-1991, prior to Appendix I-listing, only 2 wild-collected specimens were reportedly exported from Brazil to the United Kingdom for scientific purposes. In the same period, 4 more shipments with a total of 32 specimens of unknown origin were (re?) exported from the USA. After the listing in Appendix I in 1992, only two more shipments of seeds were reported. CITES registered nurseries: none.

Comment: Extremely little international trade in this species is reported. Virtually no contemporary trade is known

#### Biological Data

Range: Reported from three sites of very limited extent in central-southern Bahia, the northernmost (Pico das Almas) being about 120 km from the two southern sites (type locality), which are separated by less than 5 km, as stated in the original proposal for App. I-listing (1992). Braun (2000) reports the species also from northern Minas Gerais, without giving detailed information. Bohle (2000) reports the species from Pico das Almas, 120 km from the type locality, as listed in Taylor (1991), and further from Morro de Chapeu, ca. 140 km north of the type locality, where it has been found in 1998. This last locality is confirmed by Machado (1999). Thus, the total range as presently known is 200 km and further localities between the geographical extremes are to be

expected, as there is still some natural vegetation (Bohle 2000). Machado (1999) confirms, that the species is scattered over a large area in Bahia. Taylor & Zappi (2001) report five known localities. They don't include the population from Morro do Chapeu under *Melocactus paucispinus*, although stating, that the plants have very similar spination.

Population: Bohle (2000) reports, that the species is not rare, but scattered, in the above localities. Detailed population data have not been gathered. Taylor & Zappi (2001) report, that two of five known populations are small, containing less than 50 individuals.

#### Conservation

The northern site (Pico das Almas) is very small and beside a busy main highway. The habitat is not suitable for agriculture other than for goat grazing. This species does not appear in the figures of named melocacti exported from Brazil during the period 1983-1989, but this may not reflect the actually exported specimens (see under *M. conoideus*, also for comments on trade in wild collected seeds and national protection status). *M. paucispinus* has been observed amongst wild-collected cacti confiscated by Dutch Customs. Although trade in wild-collected specimens may not be taking place at the present time, such trade has certainly occurred in the recent past. The wild population can not withstand further heavy collecting without risking the extinction of the species in the wild, as stated in the original proposal for App. I-listing (1992).

Machado (1999) states, that the species seems to have strict habitat requirements and that *habitat modification is the main threat*. Collection of plants and seeds may possibly happen sporadically, but this is not likely to greatly affect the species, as it can recover from the remaining plants and seeds left in the ground. Machado (1999) has not observed systematic collecting of plants in the populations known to him. Some of the southern sites are within the Pico das Almas Park and thus protected. The northernmost site near Morro do Chapeu is potentially threatened by the extraction of the sand, in which the plants grow, as reported by Machado (1999). Taylor & Zappi (2001) classify the species as endangered in view of a restricted distribution, rarity and desirability to collectors.

#### Biological Criteria (Res. Conf. 9.24)

- A. i) most probably not met (insufficiently known), ii) not known, iii) not applicable, iv) not applicable, v) not applicable
- B. i) met (population naturally fragmented), ii) not applicable, iii) not applicable, iv) not met (no evidence)
- C. i) not met (no evidence), ii) not met (habitat safe)
- D. not likely

#### Conclusions

*Melocactus paucispinus* is distributed in a number of populations of unknown size over an area of ca. 200 km. The range is considerably bigger than it was thought in 1992, when the species was listed in Appendix I. The most obvious potential threat is habitat destruction (Machado 1999), but such has not been reported so far and some populations occur within a protected area (Machado 1999, Bohle 2000). Although some former trade in wild-collected specimens is documented, such trade may not be taking place at the present time, as already stated in the original proposal for App. I-listing (1992). Collecting is not regarded as a threat to this species (Machado 1999). The scattered occurrence in small numbers rather lowers the risk of overcollecting. Reported international trade is minimal. From all available data it can be concluded, that *Melocactus paucispinus* seems to be reasonably safe and not specifically threatened by international trade and a benefit from a CITES App. I-listing is therefore not obvious.

*Recommendation to the Plants Committee: The species should be transferred to Appendix II.*

*Discocactus* spp. (Prop. Brazil 1992)

Some general comments

Taxonomy

The taxonomical treatment of the genus in the supporting statement, dating from 1992, and in the data provided by WCMC, are not fully in accordance with the newest taxonomic treatment in the 2<sup>nd</sup> edition of the CITES Cactaceae Checklist (1999). Due to problems related to taxonomy and nomenclature, certain taxa may well have been traded under various species names, e.g. *D. pseudoinsignis* may have been traded under *D. insignis* prior to its description and *D. cephaliaciculosus* and several further taxa are regarded now as a taxonomical synonyms of *D. heptacanthus*.

Trade in specimens only defined to genus level

WCMC data: It has to be taken into account, that especially in this genus, a considerable portion of the reported trade is only defined to genus level and therefore, reported trade in a certain species might well be higher than the figures given for this species. In the period from 1976-1991, prior to Appendix I-listing, a considerable number of shipments that were only declared to the genus level has been reported from the countries of origin, Bolivia, Brazil and Paraguay as well as from neighbouring Peru. The origin of the specimens is often not stated, but most probably these shipments consisted of, or at least partly contained, wild-collected specimens. In 1976 and 1977, two shipments, comprising a single specimen each, went from Bolivia through Peru to the United Kingdom. In 1985, two shipments with a total of 13 specimens were reported from Paraguay to the Netherlands. A shipment of 50 specimens was (re)exported from Peru to the United Kingdom in 1978 and in 1979, another such shipment of 40 specimens was reported. In 1983, two more shipments with a total of 11 specimens went from Peru to the United Kingdom and to the USA respectively. The origin of these shipments, (re)exported from Peru, was probably Bolivia. The reported exports from Brazil in the same period, 1976-1991, are more numerous. In 1977, two shipments of 550 and 100 specimens of undeclared origin went from Brazil to the United Kingdom and USA. In 1978, two shipments of 50 specimens each were exported to the United Kingdom. In 1979, a shipment of 510 specimens went to Denmark and a single specimen to the USA. In 1980, a single specimen was exported to Germany. A shipment of 50 specimens was exported in 1981 to the United Kingdom. They were declared as artificially propagated. In 1984, a shipment of 371 specimens went to Germany and another shipment of 275 specimens, declared as artificially propagated, to the Netherlands. In 1985, 5 specimens went to Switzerland and a shipment of 300 specimens, declared as artificially propagated, to the Netherlands and two more shipments of 100 and 23 specimens to Germany. In 1986, a shipment of 395 specimens was exported to Switzerland and in 1988, another such shipment of 48 specimens. In 1989, a single specimen was exported to the USA and in 1990, 4 more shipments with a total of 25 specimens.

A total of 2'855 specimens of potentially wild-collected *Discocactus* spp. from Brazil (not declared to species level) have been reported. Additionally a total of 116 specimens from other range states or neighbouring states have been reported. After Appendix I-listing in 1992, no shipments originating from these countries were reported anymore.

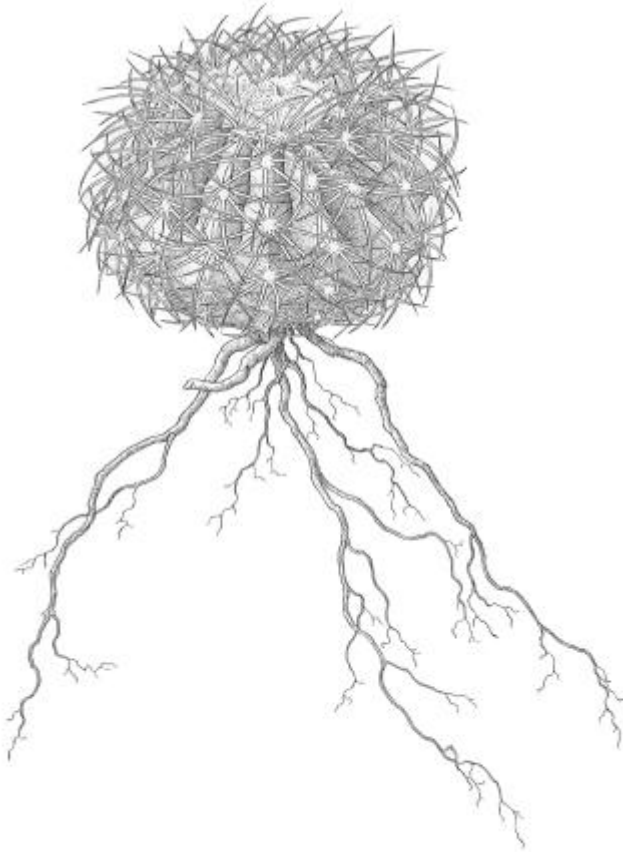
The enumeration of species follows the original proposal (1992).

*Discocactus bahiensis* (Prop. Brazil 1992 under *Discocactus* spp.)

*Discocactus bahiensis* Britton & Rose 1922

→ *Discocactus bahiensis* ssp. *subviridigriseus* (Buining & Brederoo) P. J. Braun & E. Esteves Pereira 1993

= *Discocactus subviridigriseus* Buining et al. 1977



Distribution: State of Bahia, Brazil

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Statement of Range State upon Consultation: None

International Trade

WCMC data: Only a single shipment of 2 specimens for scientific purposes is reported in 1991. They went to the United Kingdom. CITES registered nurseries: *D. bahiensis* P-DE-1001. *D. subviridigriseus* P-DE-1001

Comment: Virtually no data about international trade in wild collected specimens (prior to Appendix I-listing) are available. The reported contemporary trade is in artificially propagated specimens, mainly seeds. Trade in plants is very low.

Biological Data

Range: Known from only two, very disjunct localities in the Brazilian State of Bahia. These populations are maybe distinct on subspecies level, as stated in the original proposal for App. I-listing (1992). The actually known distribution is wider and includes the more wide-ranging *D. subviridigriseus*. Taylor & Zappi (2001) hence indicate occurrence in the states of Ceara, Piaui, Pernambuco with single localities and in Bahia, where various localities are listed. Distribution seems rather disjunct but remains inadequately known at present.

Population: Poorly studied at its northern locality, but the southern Bahian site holds less than 200 individuals, as stated in the original proposal for App. I-listing (1992). Machado (1999) considers the species as rare, with small and disjunct populations.

## Conservation

No specimens have been exported from Brazil during the period 1983-1989, but this may not reflect the actual exports, as 1072 exported specimens of *Discocactus* in this period were only declared at genus level. The majority of these plants were declared to be artificially propagated. However, during 1985 and 1986 Dutch Customs confiscated two Brazilian consignments of this genus containing 100s of habitat-collected specimens. These consignments had been declared as artificially propagated by their exporters. A Swiss nursery company is known to have imported substantial numbers of wild-collected *Discocactus* during the 1970s and early 1980s, before detailed figures were recorded. It is possible, that such shipments were incorrectly declared as artificially propagated. Wild-collected specimens of *Discocactus* have been regularly offered for sale in the Netherlands, Germany and Belgium. Trade in wild-collected seeds is probable, but unreported. National protection status see under *Melocactus conoideus*. Although regular trade in wild-collected specimens of *Discocactus* species may not be taking place at the present time, such trade has certainly occurred in the recent past. The known wild populations can not withstand further heavy collecting without risking their extinction in the wild, as stated in the original proposal for App. I-listing (1992). *D. subviridigriseus* was treated separately in the proposal. It was stated to be known from a single locality, although it may have had a more extensive range in the past, much of its area having disappeared beneath a great dam lake. The population was reported to count a few hundred individuals at most. No specimens have been exported from Brazil during the period 1983-1989.

Machado (1999) states, that the small populations are potentially threatened through commercial collection, the major threat however being agricultural development. Besides, the range and population has been significantly reduced by inundation from the Represa do Sobradinho, a huge dam lake created in the 1970s on the São Francisco river in the states of Bahia and Pernambuco. The species is classified as *endangered* by Taylor & Zappi (2001), who confirm, that part of its range was eliminated by permanent inundation and the remainder has been heavily impacted by agriculture and road/house construction; some of its few sites being accessible by road and visited by collectors (Taylor & Zappi 2001).

## Biological Criteria (Res. Conf. 9.24)

- A. i) met, ii) met, iii) not applicable, iv) not applicable, v) not applicable
- B. i) met, ii) not applicable, iii) not applicable, iv) met
- C. i) met, ii) met
- D. unclear (influence of trade not known)

## Conclusions

*Discocactus bahiensis* is an endangered species and it suffered severe reduction of range and population in recent times by habitat destruction, therefore meeting the Biological Criteria. No international trade is reported, but it is most likely, that wild-collected specimens have been traded at least in the past. Such trade may not be taking place at the present time, as already stated in the original proposal for App. I-listing (1992). Thus, evidence is lacking, that Trade Criteria are still met. Potential influence of such a trade is not the principal factor threatening this species, although immoderate collecting at the few known sites, that are partly easily accessible and visited by collectors (Taylor & Zappi 2001) would be likely to be detrimental, if occurring and this should be prevented. A significant benefit from a CITES App. I-listing is not very obvious and the protection of the remaining habitats seems to be the most effective and urgent measure to successfully conserve *Discocactus bahiensis*.

*Recommendation to the Plants Committee: See recommendations for Discocactus spp.*

*Discocactus buenekeri* (Prop. Brazil 1992 under *Discocactus* spp.)

See *Discocactus zehntneri* ssp. *boomianus*, below.

*Discocactus heptacanthus* (Prop. Brazil 1992 under *Discocactus* spp.)

*Discocactus heptacanthus* (Rodrigues) Britton & Rose 1922

= *Malacocarpus heptacanthus* Rodrigues 1898

→ *Discocactus paranaensis* Backeberg 1960

*Discocactus heptacanthus* ssp. *heptacanthus*

→ *Discocactus boliviensis* Buining et al. 1977

→ *Discocactus cangaensis* Diers & E. Esteves Pereira 1980

→ *Discocactus catingicola* ssp. *griseus* (Buining & Brederoo) P. J. Braun & E. Esteves Pereira 1995

= *Discocactus catingicola* var. *griseus* (Buining & Brederoo) P. J. Braun & E. Esteves Pereira 1993

→ *Discocactus catingicola* ssp. *rapirhizus* (Buining & Brederoo) P. J. Braun & E. Esteves Pereira 1993

→ *Discocactus cephaliaciculosus* Buining & Brederoo 1975

= *Discocactus cephaliaciculosus* P. J. Braun & E. Esteves Pereira 1995

→ *Discocactus cephaliaciculosus* ssp. *nudicephalus* P. J. Braun & E. Esteves Pereira 1992

= *Discocactus cephaliaciculosus* ssp. *nudicephalus* P. J. Braun & E. Esteves Pereira 1995

→ *Discocactus crassispinus* P. J. Braun & E. Esteves Pereira 1994

→ *Discocactus crassispinus* ssp. *araguaensis* P. J. Braun & E. Esteves Pereira 1996

→ *Discocactus diersianus* E. Esteves Pereira 1979

→ *Discocactus goianus* Diers & E. Esteves Pereira 1980

= *Discocactus diersianus* var. *goianus* (Diers & E. Esteves Pereira) P. J. Braun & E. Esteves Pereira 1993

= *Discocactus diersianus* ssp. *goianus* (Diers & E. Esteves Pereira) P. J. Braun & E. Esteves Pereira 1995

→ *Discocactus estevesii* Diers 1978

→ *Discocactus flavispinus* Buining et al. 1977

→ *Discocactus griseus* Buining & Brederoo 1975

→ *Discocactus hartmannii* ssp. *setosiflorus* P. J. Braun & E. Esteves Pereira 1994

→ *Discocactus heptacanthus* ssp. *melanochlorus* (Buining & Brederoo) P. J. Braun & E. Esteves Pereira 1993

→ *Discocactus semicampaniflorus* Buining & Brederoo 1975

= *Discocactus heptacanthus* var. *semicampaniflorus* (Buining & Brederoo) P. J. Braun & E. Esteves Pereira 1993

→ *Discocactus lindaianus* Diers & E. Esteves Pereira 1981

= *Discocactus lindanus* Diers & E. Esteves Pereira

→ *Discocactus melanochlorus* Buining et al. 1977

→ *Discocactus paranaensis* Backeberg 1960 nom. inval

→ *Discocactus prominentigibbus* Diers & E. Esteves Pereira 1988

→ *Discocactus rapirhizus* Buining & Brederoo 1975

→ *Discocactus silicicola* Buining & Brederoo 1975

→ *Discocactus silvaticus* Buining et al. 1977

→ *Discocactus squamibaccatus* Buining et al. 1977

→ *Discocactus subterraneo-proliferans* Diers & E. Esteves Pereira 1980

*Discocactus heptacanthus* ssp. *catingicola* (Buining & Brederoo) N. P. Taylor & Zappi 1997

= *Discocactus catingicola* Buining & Brederoo 1974

→ *Discocactus catingicola* var. *nigrisaetosus* (Buining & Brederoo) P. J. Braun & E. Esteves Pereira 1993

= *Discocactus nigrisaetosus* Buining et al. 1977

→ *Discocactus piauiensis* P. J. Braun & E. Esteves Pereira 1995

→ *Discocactus spinosior* Buining et al. 1977

*Discocactus heptacanthus* ssp. *magnimammus* (Buining & Brederoo) N. P. Taylor & Zappi 1991

= *Discocactus magnimammus* Buining & Brederoo 1974

= *Discocactus hartmannii* var. *magnimammus* (Buining & Brederoo) P. J. Braun 1984

= *Discocactus hartmannii* ssp. *magnimammus* (Buining & Brederoo) P. J. Braun & E. Esteves Pereira 1995

→ *Discocactus hartmannii* (K. Schumann) Britton & Rose 1922

= *Echinocactus hartmannii* K. Schumann 1900

→ *Discocactus hartmannii* ssp. *giganteus* P. J. Braun & E. Esteves Pereira 1996

→ *Discocactus hartmannii* var. *mamillosus* (Buining & Brederoo) P. J. Braun 1984

→ *Discocactus patulifolius* Buining & Brederoo 1974

= *Discocactus hartmannii* var. *patulifolius* (Buining & Brederoo) P. J. Braun 1984

= *Discocactus hartmannii* ssp. *patulifolius* (Buining & Brederoo) P. J. Braun & E. Esteves Pereira 1995

→ *Discocactus hartmannii* var. *bonitoensis* (Buining & Brederoo) P. J. Braun 1984

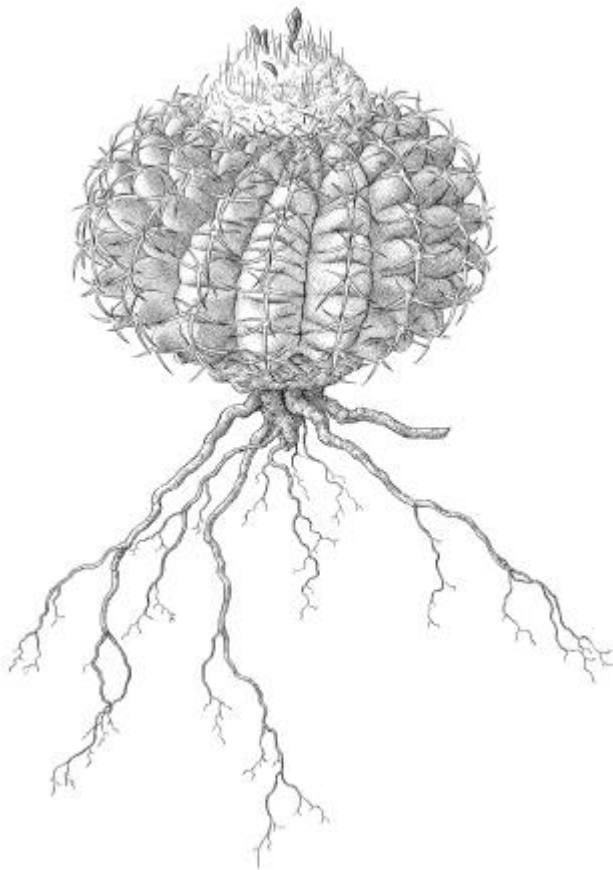
= *Discocactus magnimammus* ssp. *bonitoensis* Buining et al. 1977

→ *Discocactus mamillosus* Buining & Brederoo 1974

→ *Discocactus pachythele* Buining & Brederoo 1975

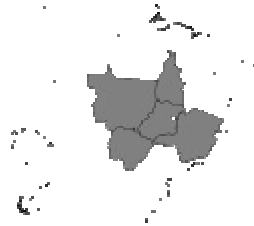
*Discocactus ferricola* Buining & Brederoo 1975



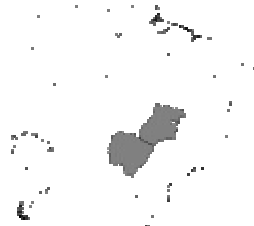


Distribution:

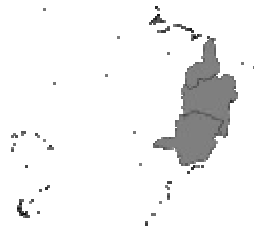
Ssp. *heptacanthus*: States of Mato Grosso, Mato Grosso do Sul, Minas Gerais, Goiás, Tocantins, Brazil. (Eastern) Bolivia.



Ssp. *magnimammus*: States of Mato Grosso do Sul and Goiás, Brazil. (E) Paraguay.



Ssp. *cattingicola*: States of (W) Bahia, Piauí and Minas Gerais, Brazil.



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Statement of Range States upon Consultation: None

International Trade

WCMC data: Various taxa reported by WCMC have to be treated here, as they are considered as taxonomical synonyms in the proposal and partly also in the CITES Cactaceae Checklist (2<sup>nd</sup> edition). *D. cephaliaciculosus* (= *D. heptacanthus* ssp. *heptacanthus*): No international trade prior to Appendix I-listing is reported. Reporting starts in 1993 (seeds) and 1994 (plants). Only 14 shipments totalling 45 artificially propagated specimens of plants have been reported, none originating from Brazil. Seeds are reported more frequently, exclusively originating from the USA. *D. ferricola* (a provisionally accepted species according to the CITES Cactaceae Checklist, 2<sup>nd</sup> edition): Reporting starts in 1995 (plants) and 1993 (seeds). Only 3 shipments totalling 20 artificially propagated specimens of plants have been reported, none originating from Brazil. Seeds are reported more frequently, exclusively originating from the USA. *D. hartmannii* (= *D. heptacanthus* ssp. *magnimammus*): Reporting starts in 1981 (plants). Up to the Appendix I-listing in 1992, 24 shipments totalling 189 specimens of plants have been reported. Of these, only one shipment with two specimens originating from Brazil, went to Germany and another shipment with a single specimen originating from Paraguay went to the Netherlands. These specimens were not declared as artificially propagated. After Appendix I-listing, the reported trade continued at a low level. Seeds are reported more frequently, nearly exclusively originating from the USA. *D. heptacanthus*: Reporting starts in 1980 (plants). There are six shipments originating from Brazil between 1984 and 1985 with a total of 827 specimens. They went to Germany and the Netherlands and were only partly (507 specimens) declared as artificially propagated. After Appendix I listing, no such shipments were reported anymore, trade dropped to a low level and the countries of origin were not involved; specimens were declared as artificially propagated. There is little reported trade in seeds. *D. heptacanthus* ssp. *cattingicola*: Reporting starts in 1993 (seeds) and 1994 (plants). Brazil is not involved in reported trade, numbers of specimens are low (18

shipments, 69 specimens). *D. silicicola* (= *D. heptacanthus* ssp. *heptacanthus*): Reporting starts in 1997 (plants) and 1993 (seeds). No shipments originating from Brazil are reported, numbers of specimens are low (12 shipments, 38 specimens). Seeds are reported more frequently, nearly exclusively originating from the USA. *D. squamibaccatus* (= *D. heptacanthus* ssp. *heptacanthus*): Only 5 shipments of seeds were recorded in 1996, none of them originating from Brazil.

CITES registered nurseries: *D. boliviensis* P-DE-1002, *D. catingicola* P-DE-1001, *D. cephaliaciculosus* P-DE-1001, *D. estevesii* P-DE-1001, *D. hartmannii* P-DE-1001, *D. heptacanthus* P-DE-1001, *D. pachythele* P-DE-1001, *D. placentiformis* P-DE-1001, *D. silicicola* P-DE-1001.

Comment: Taxonomical problems have to be considered when looking at trade data of *Discocactus heptacanthus*. Prior to Appendix I-listing, there was evidence of considerable international trade in possibly wild-collected specimens of taxa that are included in this taxonomical group, especially plants declared as *D. heptacanthus*.

#### Biological Data

Range: Ssp. *heptacanthus* ranges from western Minas Gerais, western Bahia and Piauí to Mato Grosso and eastern Bolivia, ssp. *magnimammus* (syn. *hartmannii*) is reported from north-eastern Paraguay and adjacent Brazil (Mato Grosso do Sul), as stated in the original proposal for App. I-listing (1992). Ssp. *catingicola* is reported from south-western Piauí, western and central-southern Bahia and north-western Minas Gerais; its range is estimated to be less than 2000 square kilometres (Taylor & Zappi 2001). In view of the huge area occupied by this species it is likely that its occurrence has been seriously under-recorded, as stated in the original proposal for App. I-listing (1992).

Population: The species is not well known in terms of population size, but at least some of its habitats are threatened or have been destroyed, as stated in the original proposal for App. I-listing (1992). Machado (1999) reports, that most sub-populations are small. For further information on sub-populations see the comments given by Braun (2001) under Conservation.

#### Conservation

Conservation status depends much of the taxonomical treatment of *Discocactus heptacanthus*.

822 specimens have been exported from Brazil during the period 1983-1989 (compare with the above data), but this may not reflect the actually exported number, which might be higher (see under *D. bahiensis*, also for comments on illegal trade, trade in wild-collected seeds and national protection status). The species is not seriously threatened, as stated in the original proposal for App. I-listing (1992).

But single sub-populations, that are treated as separate species or subspecies by Braun (2001), are reported by him to have other conservation status (synonyms see above): *D. ferricola* has been shipped repeatedly by Knize in Peru under the name *D. heptacanthus* to Europe and USA in the 1970s. *D. melanochlorus* is known from a single locality, that is threatened, *D. piauiensis* is reported to be seriously threatened, *D. cangaensis* is nearly extinct because of habitat destruction, *D. cephaliaciculosus* is reported to be safe, whereas *D. cephaliaciculosus* ssp. *nudicephalus* is extremely threatened, a single small habitat is known, *D. crassispinus* is threatened, most of its small habitats have been destroyed in the 1980s, *D. crassispinus* ssp. *araguaiensis* is nearly extinct today, *D. crytallophilus* is potentially threatened, because it is easily accessible, *D. diersianus* is threatened through grazing cattle, but its range lies in a protected area, *D. diersianus* ssp. *goianus* is nearly extinct because of commercial collecting in the 1980s. *D. estevesii* has nearly vanished because of habitat destruction by agriculture and is extinct in some localities. It was heavily collected in the 1980s. *D. hartmannii* ssp. *patuliflorus* was heavily collected in the 1960s and early 1970s; it is nearly extinct today because of conversion of habitats into pastures. Populations of *D. hartmannii* ssp. *setosiflorus* are successively destroyed by grazing cattle, *D. heptacanthus* ssp. *melanochlorus* is known from a single locality and thus potentially threatened, *D. lindanus* is quite threatened because of its very limited distribution, *D. pachythele* is nearly extinct and has been rediscovered in a single locality in 1988, *D. piauiensis* is rare and has only small habitats, *D. prominentigibbus* is nearly extinct today, only a single habitat is known, where a few individuals have been observed in 1998, *D. silicicola* is known from a single locality, where back in 1983 only a few plants were found, *D. silvaticus* has a small range, but the habitats are still in quite a good condition, *D. squamibaccatus* is nearly extinct and has hardly been found in 1998, *D. subterraneo-proliferans* is reported to be extinct, it has not been found anymore after 1985, the whole region has been converted into pastures.

*Ssp. catingicola* is classified as vulnerable by Taylor & Zappi (2001) due to the fragmented nature of its distribution and small population size; the subspecies is in need of regular monitoring, since the cerrado and caatinga habitats are undergoing much destructive change.

Machado (1999) reports, that most sub-populations have a restricted range and in many places habitats are being lost due to human activities, mainly mining and agricultural development. As in many wide-ranging taxa, there is a lot of variation among the different sub-populations, and such variation should be preserved. Some sub-populations are endangered, such as *D. cangaensis*, which is threatened through extraction of ore, where it grows. Machado concludes, that inclusion of *D. heptacanthus* in App. I is not justified.

Biological Criteria (Res. Conf. 9.24)

The assessment depends on the taxonomical treatment of *Discocactus heptacanthus* (see Braun 2001, above). Here, the species in a broad sense is assessed and the species and subspecies sensu Braun are regarded as sub-populations.

- A. i) not met (the total wild population is not small, although a decline in the number of individuals and the area and quality of habitat is reported), ii) not met (is not true for all sub-populations, although some are reported to be completely or almost extinct), iii) not applicable, iv) not applicable, v) not applicable
- B. i) not met (the total range is not small, although the distribution is fragmented), ii) not applicable, iii) not applicable, iv) met (some sub-populations are reported to be completely or almost extinct)
- C. i) met, ii) met
- D. unclear (habitat destruction seems to be the principal factor)

Conclusions

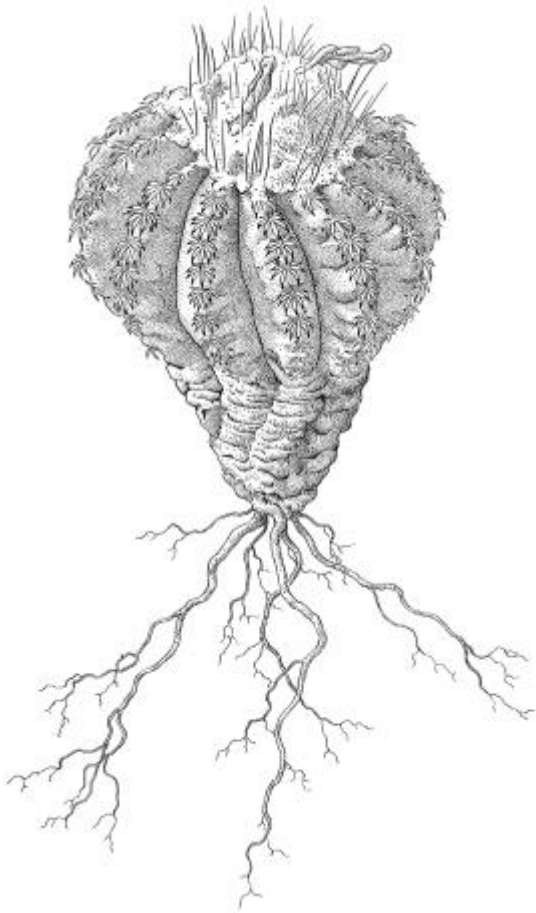
*Discocactus heptacanthus* as it is treated in the CITES Cactaceae Checklist (2<sup>nd</sup> edition) has a huge range in three countries and is not an endangered species. It does not meet the Biological Criteria. But some of its sub-populations, which are treated as separate species or subspecies by some authors, are reported to be endangered or even nearly to completely extinct mainly due to habitat destruction, but also due to collection (Braun 2001). The influence of international trade on the species in a wide sense is difficult to assess. In the absence of actual reports on international trade in wild-collected specimens, Trade Criteria are not obviously met today.

Various taxa of the *Discocactus heptacanthus*-complex are artificially propagated now (registered nurseries see above), but still plant material is very hard to find in collections, and probably most of the many wild-collected plants that have been reported in trade have died since.

*Recommendation to the Plants Committee: See recommendations for Discocactus spp.*

*Discocactus horstii* (Prop. Brazil 1992 under *Discocactus* spp.)

*Discocactus horstii* Buining & Brederoo 1973



Distribution: state of Minas Gerais, Brazil

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Statement of Range State upon Consultation: None

#### International Trade

WCMC data: Reporting starts in 1980 (plants) and 1993 (seeds). Up to the Appendix I-listing in 1992, 53 shipments totalling 3'054 specimens of plants have been reported. There are three shipments originating from Brazil between 1984 and 1985 with a total of 907 specimens. They went to Germany and the Netherlands and were only partly (285 specimens) declared as artificially propagated. After Appendix I listing, trade continued on a comparable level. 18 shipments were reported up to 1998, totalling 2'705 specimens. Four further shipments from Brazil were recorded between 1994 and 1996. They went to Denmark, the USA and the Netherlands and contained 2'510 specimens, declared as artificially propagated. CITES registered nurseries: P-DE-1001, P-CZ-1001, P-CZ-1003

Comment: This is certainly one of the heavily traded species of the genus and probably the most popular with collectors for its small size, decorative shape and fame of rarity and novelty. It is also the only easily identifiable species and has no synonyms. 907 specimens originating from Brazil were reported in international trade prior to Appendix I-listing and 2'510 after listing. It is certain, that at least prior to Appendix I-listing, wild-collected specimens have been exported from Brazil, probably in high numbers.

#### Biological Data

Range: Known from a single locality, population of very limited extent, as stated in the original proposal for App. I-listing (1992). Machado (1999) however reports two localities very close to each other, located in the vicinity of

the city of Grao Mogol in the state of Minas Gerais. The total area occupied by plants at the type locality is not very large, only one or two hectares, and it was undoubtedly larger in the past, but the second locality is much larger (Machado 2000).

Population: Machado (1999) reports, that in both known localities the number of individuals is high, he estimates the population in the type locality at several thousand plants. The density in undisturbed areas of the type locality is very high, with many individuals per square meter (Machado 2000).

#### Conservation

The site was heavily ransacked by commercial collectors in the early 1970s and 80s and the degree to which it has recovered is not known. In 1989, it was not found during extensive field work in the region whence it was originally described. It is probably not extinct, but very rare and, due to its small size, difficult to locate. It was recently observed at the type locality, but the size of the population was not reported. 907 specimens have been exported from Brazil during the period 1983-1989 (compare with the above data), but this may not reflect the actually exported number, which might be higher (see under *D. bahiensis*, also for comments on illegal trade, trade in wild-collected seeds and national protection status). Although regular trade in wild-collected specimens of *Discocactus* species may not be taking place at the present time, such trade has certainly occurred in the recent past. The known wild population can not withstand further heavy collecting without risking extinction in the wild, as stated in the original proposal for App. I-listing (1992).

Machado (1999) reports, that the species is threatened mainly due to collection of plants and seeds, but also due to the mining of quartz crystals at the type locality, in the quartz gravel fields where it grows. The mining activities destroyed part of the type locality, but the area is no longer subjected to mining, although the miners could return to this area. The plants do not occur in the disturbed areas (Machado 2000). The second locality seems to be completely undisturbed and is reported to be much larger. It is not easily accessible (Machado 1999). The species is highly desirable and the wild population is always under the threat of commercial collection. Fortunately, a National Park is being implemented in the region and will hopefully protect this species. Besides, local environmental authorities (IEF) are aware of the uniqueness and rarity of the species and they are in favour of its preservation. Machado concludes, that App. I-listing is still justified.

Taylor & Zappi (2001) state, that the species is critically endangered, only known from two adjacent populations, one heavily impacted by collectors in the recent past and by ongoing habitat modification through quartz extraction. A state reserve has recently been established ("Reserva Estadual da Serra do Barão") and should result in increased protection, the authorities being well aware of the interest in the plant.

#### Biological Criteria (Res. Conf. 9.24)

- A. i) met, ii) met, iii) not applicable, iv) not applicable, v) not applicable
- B. i) met, ii) not applicable, iii) not applicable, iv) met (habitat partly destroyed)
- C. i) met, ii) met
- D. unclear (habitat destruction is an important factor)

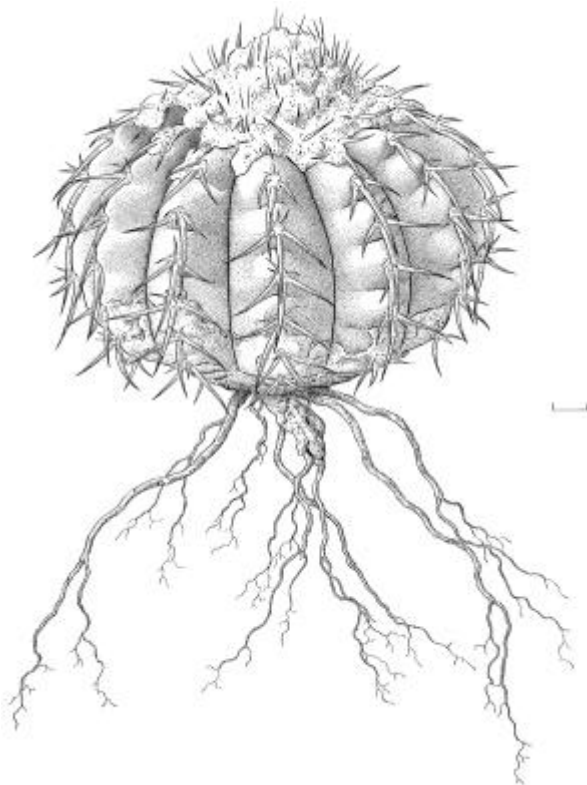
#### Conclusions

*Discocactus horstii* is not safe and clearly meets the Biological Criteria. Apart of massive habitat destruction, international trade is an important factor leading to the present conservation status of being threatened or critically endangered. Regular trade in wild-collected specimens of *Discocactus* species may not be taking place at the present time, as stated already in the original proposal for App. I-listing (1992), but *Discocactus horstii* is at least potentially still threatened through collection. It can be hoped, that the recently established Nature Reserve can effectively protect this species in the future.

*Recommendation to the Plants Committee: See recommendations for Discocactus spp.*

*Discocactus placentiformis* (Prop. Brazil 1992 under *Discocactus* spp.)

*Discocactus placentiformis* (Lehmann) K. Schumann 1894  
= *Cactus placentiformis* Lehmann 1826  
→ *Discocactus alteolens* Lemaire ex Dietrich 1846  
= *Discocactus placentiformis* var. *alteolens* (Lemaire) P. J. Braun & E. Esteves Pereira 1993  
= *Discocactus placentiformis* ssp. *alteolens* (Lemaire) P. J. Braun & E. Esteves Pereira 1995  
→ *Discocactus crystallophilus* Diers & E. Esteves Pereira 1981  
→ *Discocactus insignis* Pfeiffer 1837  
→ *Discocactus latispinus* Buining et al. 1977  
→ *Discocactus pseudolatispinus* Diers & E. Esteves Pereira 1987  
= *Discocactus latispinus* ssp. *pseudolatispinus* (Diers & E. Esteves Pereira) P. J. Braun & E. Esteves Pereira 1993  
→ *Discocactus pulvinicapitatus* Buining & Brederoo 1980  
= *Discocactus latispinus* ssp. *pulvinicapitatus* (Buining & Brederoo) P. J. Braun & E. Esteves Pereira 1993  
→ *Discocactus lehmannii* Pfeiffer 1839 (nom. illegit.)  
→ *Discocactus multicolorispinus* P. J. Braun 1981  
= *Discocactus placentiformis* ssp. *multicolorispinus* (Buining & P. J. Braun) P. J. Braun & E. Esteves Pereira 1993  
→ *Discocactus pugionacanthus* Buining et al. 1977  
= *Discocactus placentiformis* var. *pugionacanthus* (Buining & Brederoo) P. J. Braun & E. Esteves Pereira 1993  
= *Discocactus placentiformis* ssp. *pugionacanthus* (Buining & Brederoo) P. J. Braun & E. Esteves Pereira 1995  
→ *Discocactus tricornis* Monville ex Pfeiffer 1843



Distribution: State of Minas Gerais, Brazil

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Statement of Range State upon Consultation: None

#### International Trade

WCMC data: Reporting starts in 1981 (plants) and 1992 (seeds). Up to the Appendix I-listing in 1992, 32 shipments totalling 1'806 specimens of plants have been reported. There are 5 shipments originating from Brazil between 1984 and 1985 with a total of 1'241 specimens. They went to Germany and the Netherlands and were only partly (910 specimens) declared as artificially propagated. In 1991, 4 wild-collected specimens exported to the United Kingdom have been reported. After Appendix I listing, no big shipments from Brazil were reported anymore. Reported trade in seeds is rather high, most shipments originating from the USA. CITES registered nurseries: P-DE-1001

Comment: 1'124 specimens originating from Brazil were reported in international trade prior to Appendix I-listing, none after listing. It is highly probable, that at least part of the reported exports was in wild-collected specimens.

#### Biological Data

Range: Known from a single region in the Brazilian state of Minas Gerais. About 15 sites reported, as stated in the original proposal for App. I-listing (1992). Reported to be widespread east of the Rio São Francisco in central and northern Minas Gerais by Taylor & Zappi (2001), who list 19 documented sites.

Population: None of the known sites holds more than 500 individuals and the majority are much smaller, as stated in the original proposal for App. I-listing (1992). Machado (2000) knows 7 populations of typical *Discocactus placentiformis*, plus two populations of the variant described as *D. alteolens*, one population of the variant described as *D. latispinus* and one population of the variant described as *D. pulvinicapitatus*, making a total of 11 populations. The majority of the typical *D. placentiformis* populations range in number from a few dozens to a few hundred plants, but at least one population is large and comprises a high number of plants, estimated at a few thousand individuals. The *D. alteolens* populations are reported to be large, comprising a few thousand plants each. The *D. latispinus* population is reported to be small, with maybe 300 plants. The *D. pulvinicapitatus* population is the largest of all, estimated at several thousand plants, occurring over a vast area of several hundred hectares, with a high density. This last population has the advantage of occurring in unfarmable land, on very rocky terrain.

#### Conservation

1241 specimens have been exported from Brazil during the period 1983-1989 (compare with the above data), but this may not reflect the actually exported number, which might be higher (see under *D. bahiensis*, also for comments on illegal trade, trade in wild-collected seeds and national protection status). Although regular trade in wild-collected specimens of *Discocactus* species may not be taking place at the present time, such trade has certainly occurred in the recent past. The known wild population can not withstand further heavy collecting without risking extinction in the wild, as stated in the original proposal for App. I-listing (1992).

Machado (1999) reports, that *Discocactus placentiformis* sensu lato (including *D. alteolens*, *D. tricornis*, *D. pugionacanthus*, *D. pulvinicapitatus*, *D. latispinus*, *D. multicolorispinus*, *D. crystallophilus* and *D. pseudolatispinus*) has a wide distribution, but the populations are small, having strict habitat requirements and growing usually in fields of quartz sand or gravel. They can potentially be destroyed by extraction of sand, mining activities for extraction of crystals, etc. Machado (1999) concludes, that *Discocactus placentiformis* is relatively safe and should not be listed in Appendix I. Taylor & Zappi (2001) classify the species as vulnerable, since most populations are small and isolated from one another.

Braun (2001) reports on taxa, that are treated here as sub-populations: *D. crystallophilus* is easily accessible, *D. latispinus* has relatively intact habitats on rocky terrain, *D. latispinus* ssp. *pseudolatispinus* has nearly disappeared and is known from a single locality, *D. latispinus* ssp. *pulvinicapitatus* has rocky habitats that are quite intact and *D. placentiformis* ssp. *multicolorispinus* is less frequent than the type.

#### Biological Criteria (Res. Conf. 9.24)

- A. i) not met (the wild population is not small, some localities are potentially threatened), ii) not met (some sub-populations are rather big), iii) not applicable, iv) not applicable, v) not applicable
- B. i) not clearly met (the distribution is naturally disjunct, rather than the habitat fragmented, documented localities are quite numerous), ii) not applicable, iii) not applicable, iv) not met (habitats are reported to be intact, some sub-populations may be impacted, but precise data are lacking)
- C. i) unclear (precise data are lacking, a reduction can be inferred from the trade data), ii) not met (habitats are reported to be quite safe)
- D. unclear (no precise reports on collecting are available)

#### Conclusions

*Discocactus placentiformis* has a significantly higher population than it was known at the time of the listing proposal (1992). There is no evidence for a risk of extinction in the wild through collecting, although immoderate collecting probably took place in the past. The species is classified as relatively safe (Machado 1999) or as

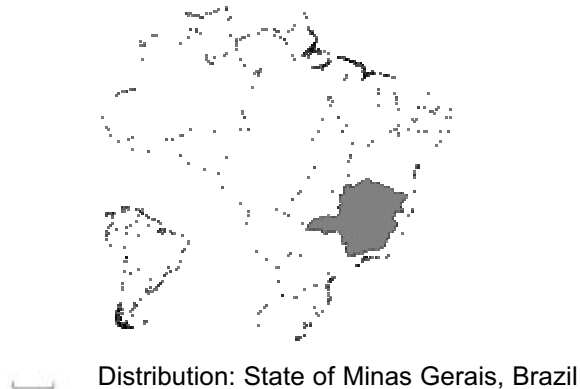
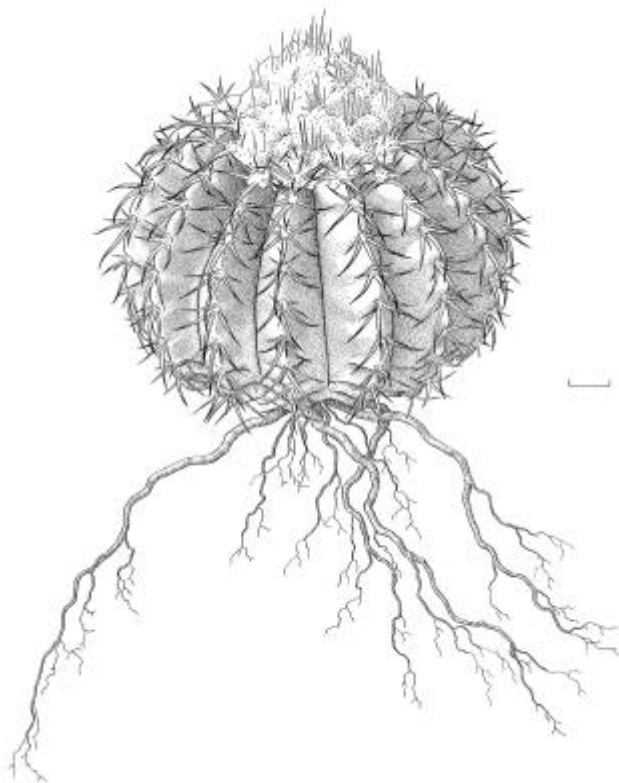
vulnerable due to scattered distribution (Taylor & Zappi 2001). The species fails to clearly meet the Biological Criteria. There is no evidence, that Trade Criteria are still met.

*Recommendation to the Plants Committee: See recommendations for Discocactus spp.*



*Discocactus pseudoinsignis* (Prop. Brazil 1992 under *Discocactus* spp.)

*Discocactus pseudoinsignis* N. P. Taylor & Zappi 1991



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Statement of Range State upon Consultation: None

International Trade

WCMC data: None. CITES registered nurseries: P-DE-1001

Comment: It is highly probable, that a certain number of specimens has been illegally exported from Brazil, but data are lacking.

#### Biological Data

Range: Known from an area of about 20 km, as stated in the original proposal for App. I-listing (1992). Machado (1999) reports, that the species is found around the city of Grao Mogol in the state of Minas Gerais, without giving further details. It is partly sympatric with *Discocactus horstii*, as reported by Machado (1999) and by Taylor & Zappi (2001). The latter authors indicate, that the extent of occurrence is 89 square kilometres and the species restricted to pure quartz sand or sand between arenitic rocks.

Population: In the original proposal for App. I-listing (1992), only 3 or 4 populations of less than 100 individuals each are reported. Taylor & Zappi (2001) list documented collections from 6 sites. They state, that the species is probably underrecorded. No recent data on population numbers are available.

#### Conservation

No specimens have been exported from Brazil during the period 1983-1989, but this must be because of unreported, illegal exports (see under *D. bahiensis* for comments on illegal trade, trade in wild-collected seeds and national protection status). Regular trade in wild-collected specimens of *Discocactus* species may not be taking place at the present time. The known wild populations could not withstand heavy collecting without

risking their extinction in the wild, as stated in the original proposal for App. I-listing (1992). Machado (1999) reports, that currently a National Park is being implemented in the area where the species is found together with *Discocactus horstii* (see above), and this is likely to protect both species. Taylor & Zappi (2001) classify the species as endangered, the population numbers being affected through habitat modification.

#### Biological Criteria (Res. Conf. 9.24)

- A. i) met (habitat modification is reported), ii) met, iii) not applicable, iv) not applicable, v) not applicable
- B. i) met, ii) not applicable, iii) not applicable, iv) met (habitat modification is reported and collecting in the past is certain, although data are not available)
- C. i) uncertain (impact of collecting can not be quantified), ii) met (habitat modification is reported)
- D. unclear (impact of collecting can not be quantified)

#### Conclusions

*Discocactus pseudoinsignis* is very poorly documented and thus difficult to assess. It meets the Biological Criteria because of a naturally very limited range with a disjunct distribution and reported habitat modification. This can not be addressed by a listing in CITES App. I. The species is classified as endangered, due to a restricted range and strict limitation to sandy habitats within its range, and being affected through habitat modification (Taylor & Zappi 2001). Detailed population data are lacking. An early estimate was less than 300-400 individuals, but it is thought now, that the species is probably underrecorded (Zappi & Taylor 2001). Habitats are reported to be at least partly protected today (Machado 1999). Reliable data on collecting and international trade are lacking. Impact of collecting and international trade can not be quantified and it is unclear, whether Trade Criteria are met today.

*Recommendation to the Plants Committee: See recommendations for Discocactus spp.*

*Discocactus subviridigriseus* (Prop. Brazil 1992 under *Discocactus* spp.)

see under *D. bahiensis*, above

*Discocactus zehntneri* (Prop. Brazil 1992 under *Discocactus* spp.)

*Discocactus zehntneri* Britton & Rose 1922

*Discocactus zehntneri* ssp. *zehntneri*

→ *Discocactus albispinus* Buining & Brederoo 1974

= *Discocactus zehntneri* fa. *albispinus* (Buining & Brederoo) Riha 1983

= *Discocactus zehntneri* var. *albispinus* (Buining & Brederoo) P. J. Braun 1990

= *Discocactus zehntneri* ssp. *albispinus* (Buining & Brederoo) P. J. Braun & E. Esteves Pereira 1995

*Discocactus zehntneri* ssp. *boomianus* (Buining & Brederoo) N. P. Taylor & Zappi 1991

= *Discocactus boomianus* Buining & Brederoo 1971

= *Discocactus zehntneri* var. *boomianus* (Buining & Brederoo) P. J. Braun 1990

→ *Discocactus araneispinus* Buining et al. 1977

= *Discocactus zehntneri* var. *araneispinus* (Buining & Brederoo) P. J. Braun 1990

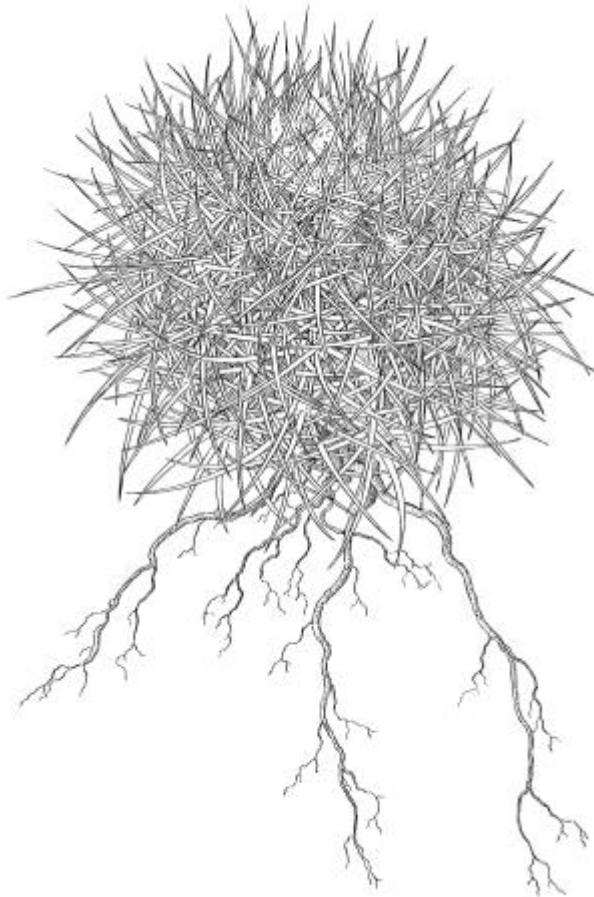
= *Discocactus zehntneri* ssp. *araneispinus* (Buining & Brederoo) P. J. Braun & E. Esteves Pereira 1995

→ *Discocactus buenekeri* Abraham 1987

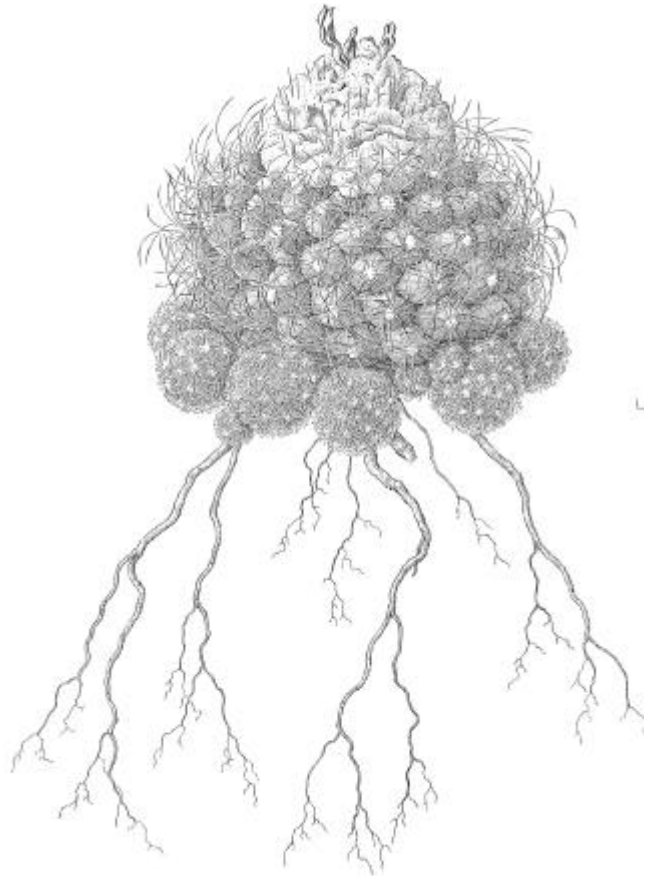
= *Discocactus zehntneri* ssp. *buenekeri* (Abraham) P. J. Braun & E. Esteves Pereira 1993

→ *Discocactus zehntneri* var. *horstiorum* P. J. Braun 1990

= *Discocactus zehntneri* ssp. *horstiorum* (P. J. Braun) P. J. Braun & E. Esteves Pereira 1995



ssp. *zehntneri*



ssp. *boomianus*



Distribution of both subspecies: State of Bahia, Brazil

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Statement of Range State upon Consultation: None

#### International Trade

WCMC data: *D. zehntneri* ssp. *zehntneri*: Reporting starts in 1980 (plants) and 1992 (seeds). Up to the Appendix I-listing in 1992, 56 shipments totalling 1'145 specimens of plants have been reported. There are 7 shipments originating from Brazil between 1984 and 1989, two of them with bigger amounts of plants. One, containing 166 specimens, went to Germany (without declaration of artificial propagation), the other, containing 583 specimens, reported as artificially propagated, went to the Netherlands. After Appendix I listing, trade in partly big shipments continued, but Brazil was not involved. All big shipments, containing up to 700 specimens, originated from the USA. Reported trade in seeds is remarkable, most shipments originating from USA. *D. zehntneri* ssp. *boomianus* (incl. *D. buenekerj*, *D. araneispinus*): 1990-1991, prior to Appendix I-listing, there are only 6 reported shipments totalling 161 specimens, all originating from USA. After listing, there are 3 big shipments originating from Brazil. In 1994, 300 specimens went to USA, in 1995, 2'600 specimens went to the Netherlands and 300 specimens to USA. All were reported as artificially propagated. The majority of the shipments reported after listing originate from Germany and USA. Reported trade in seeds is remarkable, most shipments originating from USA. CITES registered nurseries: *D. zehntneri* P-DE-1001, *D. boomianus* P-DE-1001, P-ES-1001

Comment: It is possible, that considerable amounts of wild-collected plants of *Discocactus zehntneri* sensu lato have been exported from Brazil up to 1989, and maybe re-exported plants originating from Brazil are contained in later reports. However Braun (2001) reports, that ssp. *zehntneri* has only twice been exported from Brazil in small numbers. It is almost absent today from living collections. Regarding ssp. *boomianus*, it is unclear, whether the shipments exported from Brazil after Appendix I-listing have always correctly been declared as artificially propagated. It is certain, that wild-collected plants have been exported from Brazil in considerable quantities. As ssp. *boomianus* can be propagated vegetatively quite easily, later trade is likely to have been in artificially propagated specimens. Consequently this subspecies (incl. *D. buenekerj*, which is very thought after) is quite well represented in living collections and in trade. Reports on trade in seeds, mostly originating from USA are probably due to better reporting on seeds by USA, than by other countries in general.

#### Biological Data

Range: Known from only 5 localities in northern Bahia, as stated in the original proposal for App. I-listing (1992); *D. zehntneri* ssp. *zehntneri* is only documented from two sites, one referring to *D. albispinus*. *D. zehntneri* ssp. *boomianus* sensu stricto is documented from 3 sites (Taylor & Zappi 2001), *D. araneispinus*, *D. buenekerj* and *D. zehntneri* var. *horstiorum* are known from a single locality each (Taylor & Zappi 2001), the latter from a single collection in 1988 (Braun 2001).

Population: Populations of ssp. *zehntneri* are poorly known, those of ssp. *boomianus* include less than 500 individuals and have been visited by collectors with commercial interests in the past; the only known population of *D. buenekerj* (= ssp. *boomianus*) is of a very limited extent; information on the whereabouts and status is not available, as stated in the original proposal for App. I-listing (1992).

Machado (2000) reports on two sites of *D. zehntneri* ssp. *boomianus* near the city of Morro do Chapéu, Bahia, where he investigated population numbers. He estimates the population at the type locality at about 41'000 individuals, extrapolating from an observed average density of 41 plants per square meter and a measured area of 3.5 hectares, of which less than one third has suitable micro-habitats, resulting in an occupied area of about one hectare. If seedlings are not considered, the total population is 15'300. Of 164 plants counted in a four square meters area, 103 were seedlings ranging in diameter from 0.5cm up to 2cm, 20 were juvenile plants from 2cm up to 5cm in diameter, and 41 were larger juveniles or adult (bearing cephalium) plants, all larger than 5cm

in diameter. Thus reproduction is very strong and the population structure seems natural. The total area of the second population, which is about 5km distant, is not yet evaluated, but it is far bigger and is estimated about 150 hectares. However, the density of plants is far lower, because the area has sparse micro-habitats suitable for colonisation by *Discocactus*. The nature of the habitat is different. Whereas in the first area, the plants occur in shallow, large cavities in the rock where sand and gravel accumulates, most of the gravel being composed of particles ranging from 1cm to 3cm in diameter, the plants occur amongst large pieces of stone in the second area, often more than 15cm in diameter, under which sand is accumulated, or the plants grow along fissures of the rock, or in the sand that accumulate in the border of the rocky area. Even so, if only a third of the total area has places suitable for *Discocactus*, and it is assumed, that only one adult plant occurs per square meter, the total population would be 50'000 individuals. Machado however believes, that this number can be at least twice higher.

#### Conservation

742 specimens have been exported from Brazil during the period 1983-1989 (compare with the above data), but this may not reflect the actually exported number, which might be higher (see under *D. bahiensis*, also for comments on illegal trade, trade in wild-collected seeds and national protection status). Although regular trade in wild-collected specimens of *Discocactus* species may not be taking place at the present time, such trade has certainly occurred in the recent past. The known wild populations can not withstand further heavy collecting without risking their extinction in the wild.

Taylor & Zappi (2001) classify ssp. zehntneri as endangered because of habitat loss (inundation by the dam lake Represa de Sobradinho, see *Discocactus bahiensis*, above) and ssp. boomianus as vulnerable because of fragmented habitats and threat from collection, at least one sub-population being directly accessible from a main road, although soon to be designated as a protected area.

Braun (2001) reports, that all taxa but boomianus sensu stricto are very difficult to find in the field. D. zehntneri ssp. zehntneri has only twice been exported from Brazil in small numbers.

Machado (2000) reports, that both populations of D. zehntneri ssp. boomianus he investigated are located very close to main roads, and are of very easy access. Cactus enthusiasts can locate the sites and collect a few plants, but this is rather occasional and probably causes not a big harm to the populations. There are no signs of commercial collection in the recent past, and the population seems to recover very quickly, due to the high reproduction rate. In the region where these two populations are located there are many areas of rock outcrops which are less accessible and thus unexplored; these areas can possibly hold further populations. This remains to be investigated in the future. Recently a large conservation park was created in the region of Morro do Chapéu (see above, under the sympatric *Melocactus glaucescens*); however, this park is still not implemented. The area of the park will embrace at least one of the populations of *Discocactus zehntneri* ssp. boomianus, the type locality and it will hopefully protect this taxon.

#### Biological Criteria (Res. Conf. 9.24)

It seems appropriate to follow the classification of the CITES Cactaceae Checklist (2<sup>nd</sup> edition) and to assess ssp. zehntneri (incl. *albispinus*) and ssp. boomianus (incl. *araneispinus*, *buenekeri* and *horstiorum*) separately.

##### D. zehntneri ssp. zehntneri

- A. i) met (habitat loss is reported), ii) uncertain (populations are poorly known), iii) not applicable, iv) not applicable, v) not applicable
- B. i) met, ii) not applicable, iii) not applicable, iv) met (habitat loss and limited collecting in the past are reported)
- C. i) uncertain (impact of collecting can not be quantified), ii) met (habitat loss is reported)
- D. unclear (impact of collecting can not be quantified)

##### D. zehntneri ssp. boomianus

- A. i) not met (the wild population is not small, the habitat is under way to be protected), ii) not met, iii) not applicable, iv) not applicable, v) not applicable
- B. i) met, ii) not applicable, iii) not applicable, iv) not met (strong reproduction is reported)

- C. i) uncertain (probable former impact of collecting is no longer obvious), ii) not met (strong reproduction is reported, the habitat is under way to be protected)
- D. unclear (impact of collecting can not be quantified)

#### Conclusions

*D. zehntneri* ssp. *zehntneri* is classified as endangered due to habitat loss in the past (Taylor & Zappi 2001); the populations are poorly known and it may only be guessed, that the subspecies meets the Biological Criteria. Trade Criteria have been met in the past, as exportation of a small number of plants is reported (Braun 2001), but today, there is no evidence of trade in wild-collected plants. It would be useful to have accurate population data. From the available information, habitat loss seems to be the principal threat. This can not be addressed by a listing in CITES App. I and the protection of the remaining habitats seems to be the most effective and urgent measure to successfully conserve this subspecies.

*D. zehntneri* ssp. *boomianus* is classified as vulnerable due to disjunct distribution and to potential collection by Taylor & Zappi (2001), but the population has been largely underestimated and the impact of collecting overestimated in the past. New reports on numbers of individuals in two investigated sub-populations, reproduction and partial habitat protection (Machado 2000) suggest, that the subspecies sensu lato is quite safe and fails to clearly meet the Biological Criteria. Trade Criteria have been met in the past, but evidence is lacking, that they are still met today. However, status of relative safety only applies to ssp. *boomianus* sensu stricto, whereas other sub-populations (*D. araneispinus*, *D. buenekeri*, *D. zehntneri* var. *horstiorum*) can not be assessed for lack of data on numbers of individuals, state of habitats and possible impact of trade. They maybe would have to be classified as endangered, although their localities are not easily accessible according to Braun (2001). *D. zehntneri* ssp. *boomianus* is readily available in trade due to relatively easy vegetative propagation. Especially *D. buenekeri* is quite thought after and this taxon is quite well represented in collections.

*Recommendation to the Plants Committee: See recommendations for Discocactus spp.*

#### Conclusions for *Discocactus* spp.

Conservation status varies to quite some extent among the species and subspecies and further depends largely on taxonomical interpretation. Whereas the CITES Cactaceae Checklist (2<sup>nd</sup> edition) follows a rather conservative approach, some authors interpret many sub-populations of wide-spread species as independent species or subspecies. Such a narrow species concept may lead easily to the classification of such sub-populations as endangered species, as they are rather confined to small areas and thus are sensitive to habitat destruction and collection.

Four taxa meet the Biological Criteria: *D. bahiensis* (endangered through habitat destruction, known from few disjunct localities), *D. horstii* (endangered through habitat destruction and former trade in unsustainable numbers, only known from two localities), *D. pseudoinsignis* (endangered through habitat modification, restricted to small habitats within a limited range), *D. zehntneri* ssp. *zehntneri* (endangered through habitat loss, only known from two sites).

The “Disco-fever” of the 1980s, when “new species” were described and introduced in the market, has cooled down and the situation of trade has considerably changed. Today it is not easy to find *Discocactus* spp. in public and private living collections at all and probably most of the wild-collected plants have died since.

Some species of *Discocactus*, especially *D. horstii* and *D. zehntneri* sensu lato have obviously been in international trade in the 1980s in unsustainable numbers and thus clearly qualified for inclusion in CITES Appendix I. As identification is a serious problem, it was well justified to include the whole genus in Appendix I. But generally habitat destruction is a much more important factor and is threatening a considerable proportion of populations of *Discocactus*. This can not be addressed by CITES.

Today, evidence is lacking that *Discocactus* spp. still meet the Trade Criteria. No contemporary trade in wild-collected specimens in unsustainable (or any) numbers is reported, and it is therefore unclear, to what extent a listing in CITES Appendix I can still contribute to the conservation of *Discocactus* today. The protection of habitats is obviously the most urgent and effective measure. It is therefore good to know, that much effort is under way in Brazil (as reported by Machado 1999 and 2000 and by Taylor & Zappi 2001) to protect areas,

where *Discocactus* occur and it can be hoped, that this leads to effective conservation of the taxa concerned. Maybe in some cases, it could be argued, that additional protection through a CITES Appendix I-listing is still desirable as a precautionary measure, but criteria for such a listing are not met.

*Recommendation to the Plants Committee: Some Discocactus spp. are endangered, mainly through limited wild populations and habitat destruction, and four of the species and subspecies (following the classification of the CITES Cactaceae Checklist, 2<sup>nd</sup> edition) meet the Biological Criteria, but there is no evidence, that any taxa still meet the Trade Criteria. Discocactus spp. thus meets the accepted criteria to be transferred to Appendix II.*

## Acknowledgements

I would like to thank Dr. Susan S. Lieberman, Marlon Machado, Nigel Taylor, Dr. Pierre Braun, Bernhard Bohle and Adrian Lüthy for their valuable cooperation.

Bern, 03.07.2001

Jonas M. Lüthy

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## Annex: Biological Criteria for Appendix I (Res. Conf. 9.24, Annex 1)

The following criteria must be read in conjunction with the definitions, notes and guidelines listed in Annex 5. A species is considered to be threatened with extinction if it meets, or is likely to meet, at least one of the following criteria.

- A. The wild population is small, and is characterized by at least one of the following:
- i) an observed, inferred or projected decline in the number of individuals or the area and quality of habitat or;
  - ii) each sub-population being very small; or
  - iii) a majority of individuals, during one or more life-history phases, being concentrated in one sub-population; or
  - iv) large short-term fluctuations in the number of individuals; or
  - v) a high vulnerability due to the species' biology or behaviour (including migration).
- B. The wild population has a restricted area of distribution and is characterized by at least one of the following:
- i) fragmentation or occurrence at very few locations; or
  - ii) large fluctuations in the area of distribution or the number of sub-populations; or
  - iii) a high vulnerability due to the species' biology or behaviour (including migration); or
  - iv) an observed, inferred or projected decrease in any of the following:
    - the area of distribution; or
    - the number of sub-populations; or
    - the number of individuals; or
    - the area or quality of habitat; or
    - reproductive potential
- C. A decline in the number of individuals in the wild, which has been either:
- i) observed as ingoing or as having occurred in the past (but with a potential to resume); or
  - ii) inferred or projected on the basis of any one of the following:
    - a decrease in area or quality of habitat; or
    - levels or patterns of exploitation; or
    - threats from extrinsic factors such as the effects of pathogens, competitors, parasites, predators, hybridization, introduced species and the effects of toxins and pollutants; or
    - decreasing reproductive potential.
- D. The status of the species is such that if the species is not included in Appendix I, it is likely to satisfy one or more of the above criteria within a period of five years.