Cactology

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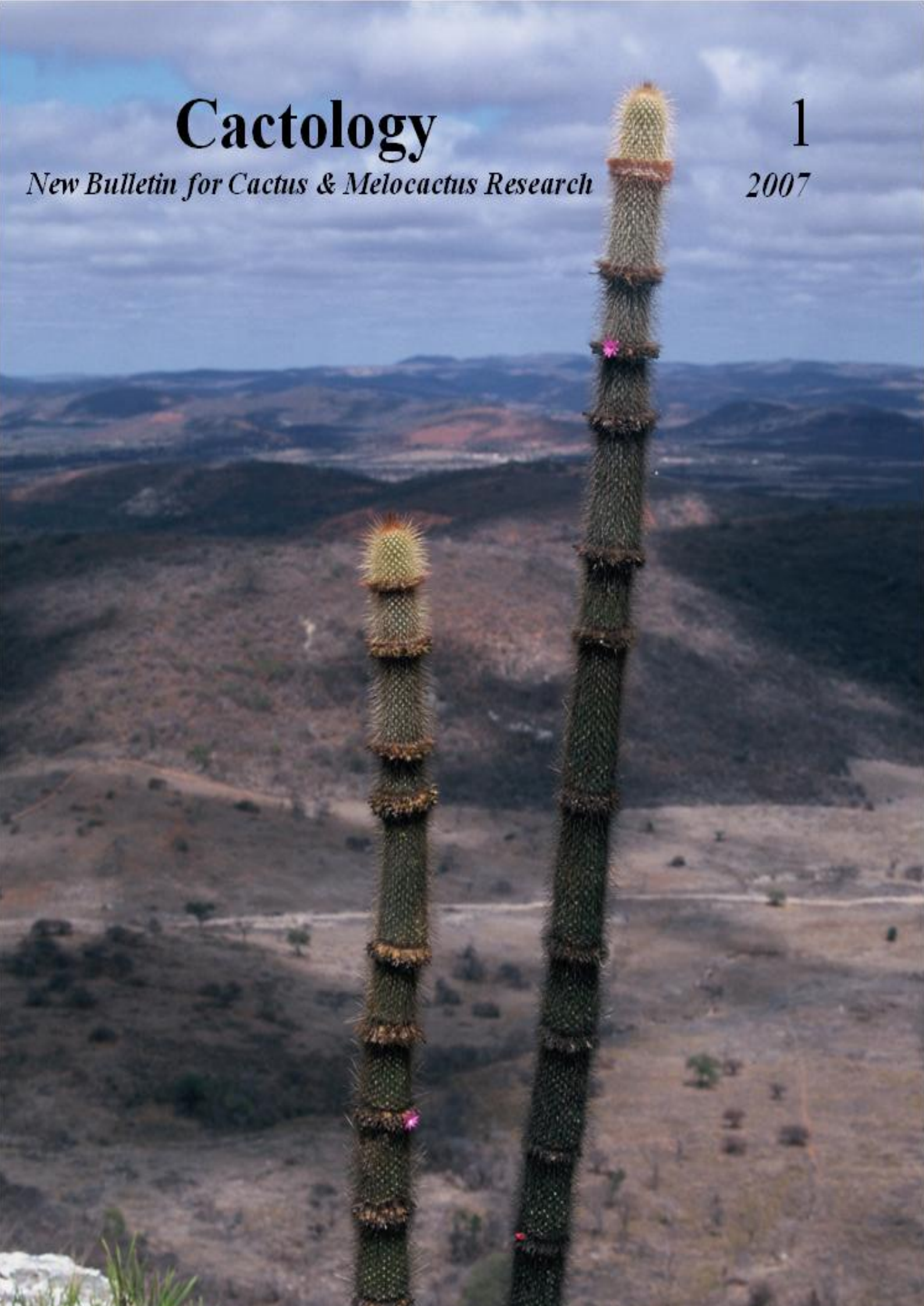
New Bulletin for Cactus & Melocactus Research

2007



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Cover illustration
Adult plant of *Arrojadoopsis marylaniae* with numerous ring pseudocephalia producing the pinkish magenta flowers. Photo by G. Delanoy

Nomenclatural novelties proposed in this issue
Arrojadoopsis Guiggi gen. nov.
Arrojadoopsis marylaniae (Soares Filho & M. Machado) Guiggi comb. nov.
Consolea macracantha subsp. *nashii* (Britton) Guiggi comb. et stat. nov.
Consolea moniliformis subsp. *rubescens* (Salm-Dyck) Guiggi comb. et stat. nov.
Consolea spinosissima subsp. *millspaughii* (Britton) Guiggi comb. et stat. nov.

INDEX

January 2007

EDITORIAL

This new research bulletin, focusing on the family Cactaceae and in particular on the genus Melocactus (Linnaeus) Link & Otto, has been strongly inspired and draws on the "Blatter fur Kakteenforschung" ("Bulletin for Cactus Research") issued in the years 1934-1938 by Curt Backeberg, one of the greatest cactologists, as a method of presenting his systemics, descriptions of new genera and species, accounts of his travels, etc. The idea of the editor and author is, in fact, to propose and collect his own work in a scientific format together with the original contributions of other authors and scientists. This publication is also being created with the object of establishing and promoting an International Research Centre on Cactaceae. Cactology will be issued in two different versions: one will focus on native American plants, the other will refer to plants being naturalized in Italy or other countries in the world. During the starting phase, the bulletin periodicity will be linked to the availability of new scientific material and the submission of original contributions, one or more issues will be publish every year.

Gennaio 2007

EDITORIALE

Questo nuovo bollettino di ricerca sulla famiglia delle Cactaceae ed in modo particolare sul genere Melocactus (Linnaeus) Link & Otto, trae ispirazione e prende spunto dal "Blatter fur Kakteenforschung" ("Bollettino per la Ricerca sui Cactus") che Curt Backeberg, uno tra i più famosi cactologi di tutti i tempi, realizzò negli anni 1934-1938 e nel quale l'autore presentò la sua personale visione sistematica, la descrizione di nuovi generi e specie, il resoconto dei suoi viaggi, etc. L'idea dell'editore è di proporre e raccogliere i propri lavori in formato scientifico insieme ai contributi originali di altri autori. Questa pubblicazione nasce anche con l'ambizione di promuovere e dare voce ad un Centro Internazionale di Ricerca sulle Cactaceae. Cactology avrà alternativamente due differenti versioni: una proporrà materiali di approfondimento sulle piante native americane, l'altra riguarderà invece le piante naturalizzate in Italia o in altri paesi del mondo. Nella fase iniziale, il bollettino avrà una uscita editoriale di uno o più numeri per anno, la sua periodicità sarà legata alla disponibilità di materiale scientifico e di contributi originali.

Janvier 2007

EDITORIAL

Ce nouveau bulletin de recherché, focalisant sur la famille des Cactaceae et en particulier sur le genre Melocactus (Linnaeus) Link & Otto a été fortement inspiré du "Blatter fur Kakteenforschung" ("Bulletin for Cactus Research") publié dans les années 1934-1938 par Curt Backeberg, un des plus grand cactologiste comme une méthode de présentation de ses opinions taxinomiques, ses descriptions de nouveaux genres et nouvelles espèces, ses comptes-rendus de voyage, etc. L'idée de l'éditeur et auteur est, en fait, de proposer et de rassembler son propre travail dans un format scientifique avec les contributions originales d'autres auteurs et scientifiques. Cette publication est créée dans le but d'établir et de promouvoir un Centre International de Recherche sur les Cactaceae. Cactology communiquera sur deux sujets : un axé sur les plantes natives des Amérique, l'autre sur les plantes naturalisées en Italie et dans d'autres régions du monde. Durant la phase de lancement, la périodicité du bulletin sera lié à la disponibilité de nouveau matériel scientifique et à la soumission de contributions originales, un ou plusieurs fascicules seront publiées chaque année.

INFRASPECIFIC TAXONOMY OF *MELOCACTUS CONOIDEUS* BUINING & BREDEROO (*CACTOIDEAE*)

Abstract

After having analysed the infraspecific taxonomy of *Melocactus conoideus* Buining & Brederoo, the author proposes *Melocactus braunii* Esteves a recently described species from northern Bahia (Brazil), as a subspecies of the former taxon. A key to distinguish the two subspecies of *M. conoideus* Buining & Brederoo is presented. A discussion and a table comparing the accepted subspecies are also included.

Riassunto

L'autore dopo aver analizzato la tassonomia infraspecifica di *Melocactus conoideus* Buining & Brederoo, propone *Melocactus braunii* Esteves, una specie recentemente descritta nella parte settentrionale dello stato brasiliano di Bahia, come una sottospecie del primo taxon. Una discussione, chiave e una tabella comparativa sono anche incluse per le sottospecie accettate.

Résumé

Après analyse de la taxinomie infraspécifique de *Melocactus conoideus* Buining & Brederoo, l'auteur propose *Melocactus braunii* Esteves, une espèce récemment découverte dans le nord de Bahia (Brésil), comme une sous-espèce du premier taxon. Une clef pour distinguer les deux sous-espèces est présentée. Une discussion et un tableau comparatif des sous espèces acceptées sont aussi inclus.

Introduction

Melocactus conoideus was described by A.F.H. Buining & A.J. Brederoo in Krainz (Die Kakteen, Lief. 55-56: C VId, 3. XII., with illus., 1973), the etymology of the its name being derived from the conical shape of the plant stem.

The type locality of this species is North Vitória da Conquista in the state of Bahia (Brazil), which represents the centre of biodiversity for the genus, with its 11 endemic taxa including *M. conoideus* and a total of 14 species (Taylor, 1991: 19).

The species is similar to the *Melocactus oreas* Miquél and *M. bahiensis* (Britton & Rose) Luetzelburg, but it is distinguished by the strongly depressed habit that is perhaps an adaptation against the periodical fire of the *cerrado* habitats, for the low ribs, and the seeds with some of the testa-cells strongly convex (Taylor, 1991: 32).

Latin diagnosis

Melocactus conoideus Buining & Brederoo (1973).

Corpus nitide atro-viride applanate rotundum, sursum in conum desinet, sine cephalio ad 10 cm altum et 17 cm diam., radices longae et ramosae; cephalium ad 4 cm altum et ad 7,5 cm diam., albo-lanatum et saetis atrorubris confercitur. Costae 11-13 teretes fere 2,5 cm altae et 4 cm latae. Areolae rotundae lana griseo-alba consitae et 6-7 mm diam. Spinae rectae, interdum paulum curvatae, brunneae acumine atro; marginales 7 in parte superiore 1-2 spinulae adventiciae, una deorsum versa 3,5 cm longa, ceterae 1,7-2,5 cm longae binae in latera distant; una centralis ad 2,2 cm longa. Flores tubulosi, 17 mm longi, 6,5 mm lati, lilacini; pericarpellum conoideum evidenter a receptaculo separatum; caverna seminifera acute cordiformis; folia perianthii interiora exterioraque spathulata lilacina; camera nectarea ventricosa; stamina alba; antherae albae; stylus 10 mm longus, albus et 4 stigmata alba. Fructus inverse clavaeformis nitide lilacinus. Semen galeriforme, 1-1,3 mm longo, 1 mm lato; testa nitide atra loculis maxime concameratis instructa;

hilum basale, cotyledones discerni possunt. Habitat in septentriones Vitoria da Conquista, Bahia, Brasilia, in altitudine fere 1200 m.

Melocactus braunii Esteves (2003).

Affinis M. bahiensis (Britton & Rose) Luetzelburg et M. conoideus Buining & Brederoo, sed caule minore, spinis brevioribus et recurvatis, cephalio minore, floribus minoribus, fructibus dissimili colore et brevioribus. Habitat in regione borealis Serra do Tombador, Bahia, Brasilia, in altitudine c. 1000 m.

Nomenclature & iconography

Melocactus conoideus Buining & Brederoo in Krainz, Die Kakteen, Lief. 55-56: C VId, 3. XII., with illus. (1973). Type: Brazil, Bahia, *HU* 183 (holotype U 531247).

Melocactus conoideus* subsp. *conoideus (Fig. 1-2)

Iconography: Buining, 1973, 1974: 212; Taylor, 1991: 31; Anderson, 1999: 459; Assis *et al*., 2003: 5; Machado, 2004: 139-141, 143-144; Taylor & Zappi, 2004: 400; Delanoy, 2006: 133, 135-142.

Melocactus conoideus* subsp. *braunii (Esteves) Guiggi, in Atti Soc. it. Sci. nat., 147(II): 338 (2006). Basionym: *Melocactus braunii* Esteves in Brit. Cact. & Succ. J. 21 (3): 140, with illus. (2003). Type: Brazil, Bahia, *Esteves* 479 (holotype UFG 27.002).

Iconography: Esteves, 2003: 137, 138, 139.

Key to subspecies of *M. conoideus*

1. Stem strongly depressed, globose to hemispherical; central spine c. 2 cm long, straight to slightly recurved; fruit lilac-magenta, paler in its lower part..……..…...…**1. subsp. *conoideus***
   Stem globular to slightly flattened-conical; central spine c. 1 cm long, curved upwards; fruit lilac-magenta, not paler in its lower part.……...…….……**2. subsp. *braunii***

Discussion & conclusion

The comparative table (Tab.1) shows a very morphological, biogeographical and ecological affinity between *Melocactus conoideus* and *M. braunii*. In particular, both "species" have minute spines in the uppermost part of the areole (Esteves, 2003: 137).

Moreover *Melocactus braunii* has similarities to the *Melocactus oreas* group (central spine significantly shorter than the longest lowermost radial spine, seeds small with some testa-cells elongated and often convex, etc.), which have been described by Taylor (1991: 22).

This group also includes *M. conoideus*, *M. bahiensis* with 2 ssp., *M. ernestii* with 2 ssp. and *M. oreas* with 2 ssp. I believe that the infraspecific rank is more appropriate for *Melocactus braunii* Esteves, which the author considers as a northern subspecies of *M. conoideus* Buining & Brederoo.

The most evident differences consist in: the shorter central spine more curved upwards and the fruit not paler in its lower part. This new subspecies maintains its particular characteristics also in cultivation (Esteves, 2003: 140), and it is isolated from the type subspecies, which is located a few hundred kilometres further south (Esteves, 2003: 139).

Acknowledgements

I wish to thank Christoph Blancy (Jardín Exotique of Monaco) for the photographs of *Melocactus conoideus*, Enrico Banfi (Director of the Natural History Museum of Milan) for the stimulating discussions and Jean-Marie Solichon (Director of the Jardín Exotique of Monaco).

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Table 1. Comparison between the subspecies of *M. conoideus*

	M. conoideus* subsp. *conoideus	***M. conoideus* subsp. *braunii***
Stem	10 x 17 cm, strongly depressed globose to hemispheric	7-8 x 11-15 cm, globular to slightly flattened-conical
Ribs	11-14, very low, up to 25 mm high and 40 mm broad	(10-)13, very low, up to 20 mm high and 30-35 mm broad
Areoles	6.5-7.5 x 6.5 mm, up to c. 15 mm apart	3-6 mm broad, up to c. 15 mm apart
Central spines	1, 20-22 x 1.5 mm, straight to slightly recurved	1, c.10 x c. 1mm, curved upwards
Radial spines	8-11, 1-2 uppermost minute spines, the lowermost 20-35 x 1.5-1.7 mm	(7-) 9, 2-3 uppermost minute spines, the lowermost up to 18 x 0.9-1.2 mm
Cephalium	up to 4 x 7.5 cm, with white wool and reddish bristles	4 x up to 6 cm, with white wool and reddish bristles
Flower	c. 22 x 10 mm, pinkish-magenta	17 up to 21 x 8-11 mm, pinkish-magenta
Nectar chamber	4 x 5 mm	3 x 2.5 mm
Stigma-lobes	4-5, c. 1 mm long, white	5, 1.5 mm long, pale yellow
Fruit	c. 18 x 5-6 mm, lilac-magenta paler in the lower part	17 x 8 mm, lilac-magenta not paler in the lower part
Seeds	1.05-1.25 x 0.9-1.05 mm, lateral testa-cells large and elongate, apical testa-cells convex to tubercled	c. 1 x 0.7-0.8 mm, lateral testa-cells large and elongate, apical testa-cells convex to tubercled
Habitat & distribution	*cerrado de altitudine*, c. 1050 m, in quartz gravel; south-eastern Bahia (Brazil)	*campo rupestre*[1], c. 1000 m, between rocks and gravel; northen Bahia (Brazil)

[1] subform of *cerrado*, restricted to very rocky regions, mostly at high altitudes (Braun & Esteves, 2002: 22).

Figure 1-4. 1: Adult plant of *M. conoideus* subsp. *conoideus* with cephalium (cultivated at the Jardin Exotique of Monaco). Photo: C. Blancy. **2:** Juvenile plant of *M. conoideus* subsp. *conoideus*, M. Machado, Vitoria da Conquista, Bahia, Brazil (cultivated at the Jardin Exotique of Monaco). Photo: C. Blancy. **3:** Neotype of *Cactus intortus* (= *Melocactus intortus* subsp. *intortus*), cephalium and ribs with spines. Photo: © Royal Botanic Gardens, Kew. **4:** Immature plant of *Melocactus intortus* subsp. *intortus*, M. Kroenlein, Les Saintes, Guadeloupe (cultivated at the Jardin Exotique of Monaco). Photo: A. Guiggi.

MELOCACTUS INTORTUS (MILLER) URBAN (*CACTOIDEAE*) AND ITS SUBSPECIES FROM THE CARIBBEAN. TAXONOMY, DISTRIBUTION AND ICONOGRAPHY

Abstract

Analysis of the infraspecific taxonomy, distribution and iconography of *Melocactus intortus* (Miller) Urban, is discussed in this paper. *Melocactus broadwayi* (Britton & Rose) A. Berger is considered by the author as a geographical subspecies of the previously taxon characterized by its short stem, low ribs, and incurved radial spines. A key to distinguish the accepted subspecies is included.

Riassunto

In questo lavoro è stata analizzata la tassonomia infraspecifica, la corologia e l'iconografia di *Melocactus intortus* (Miller) Urban. *Melocactus broadwayi* (Britton & Rose) A. Berger è considerata dall'autore come una sottospecie geografica del precedente taxon, caratterizzata dal suo fusto corto, coste basse e spine radiali incurvate. Una chiave è inclusa per distinguere le sottospecie proposte.

Résumé

L'analyse de la taxonomie infraspécifique, de la distribution et de l'iconographie de *Melocactus intortus* (Miller) Urban, est discutée dans cet article. *Melocactus broadwayi* (Britton & Rose) A. Berger est considéré par l'auteur comme une sous-espèce géographique du précédent taxon caractérisée par sa partie végétative plus courte, ses côtes plus bases et des épines radiales incurvées. Une clef pour distinguer les deux sous-espèces est présentée.

Introduction

Melocactus intortus is the largest of the melocacti, with a cephalium up to 1 metre high, and it is the most widespread species in the Caribbean Islands. *Melocactus intortus* is also known from early times. In fact this taxon was described as *Cactus intortus* in 1768 by P. Miller in his famous Gardeners Dictionary ed. 8, no. 2 . Its type locality is Antigua, in the Lesser Antilles, and its name refers to its ribs which are occasionally spirally twisted.

N.L. Britton studied *Melocactus intortus* on Monas and Desecheo Islands, in the Mona Passage (Puerto Rico), and found a race with elongated and slender spines (Britton & Rose 1922: 231). In 1933 he described this taxon as *Cactus antonii* (= *Melocactus antonii*), but it is universally considered to belong within the infraspecific variability of *Melocactus intortus* (Britton & Rose, 1922: 231; Taylor, 1991: 78; Areces, 1997: 246; Delanoy *et al*., 2003: 23). In 1922 N.L. Britton and J.N. Rose published a new species from the Tobago and Grenada Islands in the Lesser Antilles, *Cactus broadwayi* (= *Melocactus broadwayi*), but Taylor (1991: 78) believes that it should be submerged under *Melocactus intortus* or *Melocactus macracanthos* (Salm-Dyck) Link & Otto.

Recently, in 1997, two other taxa from the Dominican Republic, *Melocactus pedernalensis* M. Mejia & R. Garcia and *Melocactus intortus* subsp. *domingensis* Areces, have been described. In this case the epithets have been referred to the same plant. Hunt has accepted the taxon proposed by A. Areces-Mallea (Hunt, 1999: 228), which has priority at subspecific rank. This subspecies is geographically isolated, and is differentiated by its shorter cephalium, its higher number of spines per areole, its 3-6 central spines, which are recurved and longer than the radials, and its larger flower (Areces, 1997: 245).

Original diagnosis

Cactus intortus Miller (1768)

Fubrotundus quinquedecem angularis, angulis in spiram intortis, ipinis erectis. Indiae occidentalis. Roundish cactus or Melon-thistle, with fifteen angles spirally twisted, and erect spines.

Cactus broadwayi Britton & Rose (1922)

Plant a little longer than thick, 1 to 2 dm high, yellowish green; ribs 14 to 18, sometimes branching above, rather low, 1 to 1.5 cm high, 1 to 2 cm broad at base, rounded, separated from one another by acute intervals; areoles small, depressed, 1 cm apart; spines horn-colored, but often with brownish tips or some, especially the central ones, brown throughout, at least when young; radial spines 8 to 10, 1 to 1.5 cm long, more or less curved inwards; central spines usually one, sometimes 2 or 3, a little stouter than the radials; cephalium small, 6 to 7 cm broad at base, 2 to 3 cm high, made up of soft brown bristles and white wool; flowers small, purplish; fruit clavate, 2.5 cm long, purple; seeds black.

Cactus antonii Britton (1933)

In our account of the geographic distribution of Cactus intortus (The Cactaceae 3:231), record is made of a race with elongated slender spines, growing on the small islands Mona and Desecheo, in the Mona Passage between Porto Rico and Santo Domingo, where the plants were observed by me in 1914… In the Desecheo plant the flowers are light pink, and they project less above the cephalium; the stigmas are narrower and acuminate, merely acute in C. intortus. The fruit of Desecheo plant averages a little larger than that of C. intortus, and has a white base, instead of being pink all over; Professor Anton detected a difference in taste, that of the Desecheo plant being more pungently sour than the other.

Melocactus pedernalensis M. Mejia & R. Garcia (1997)

Planta subglobosa, doliiformis, 45-49 cm alta, 20.5 cm diametro; costae (12)13-15(16), 3 cm profundae; spinae 13-20 in quaque areola, 5-6 cm longae, rectae, pallide roseae, griseae vel leviter glaucae in sicco; cephalium globosum 3.6 cm altum, 6.6 cm latum, spinis numerosis, rubellis gracilibus flexilibus; flores petalis numerosis, 12-16 x 2.0-2.5 mm, acuminatis, roseomagenteis; stamina numerosa seriata, antheris basifixis; stylus 13 mm longus; ovarium, carpellis 7-9; fructus 1.0-1.7 x 1.0-1.3 cm, turbinati, roseo-magentei, nitidi; semina numerosa 1.5-1.0 mm, nigra, rugosa.

Melocactus intortus* subsp. *domingensis Areces (1997)

A subspecies typical caule cupiformi, spinis 14-21, centralibus 3-6 usque ad 7 cm longis, recurvatis, radialibus 11-15, cephalio nunquam cylindrico-elongato, floribus majoribus 2-3 cm longis, stigmatis radiis 7(-9) linearibus ad apicem non attenuates differt.

Nomenclature, distribution & iconography

Melocactus intortus Urban, in Fedde, Rep. Sp. Nov. 16: 35 (1919) . Basionym: *Cactus intortus* Miller, Gard. Dict. ed. 8, no. 2 (1768). Type: Antigua, not preserved. Neotype: Antigua, R.A. Howard 18492 (K, Fig. 3) as *Melocactus intortus* (Miller) Urban (Taylor, 1991: 78).

[2] ***Melocactus intortus* subsp. *intortus*** (Fig. 4)

Synonyms: *Cactus melocactus Linnaeus* var. *communis* Aiton, Hort. Kew. 2: 150. 1789. Type: unknown and not preserved.

Cactus lamarckii Colla, in Mem. R. Acc. Sci. Torino 33: 129, with illus. (1826). Type: India occidentalis (West Indies), assumed not to have been preserved.

Melocactus communis (Aiton) Link & Otto, in Vehr. Ver. Beford. Gartenb. 3: 417 (1827).

Melocactus communis De Candolle in Pfeiffer, Enum. Diag. Cact. 42 (1837).

Melocactus communis De Candolle var. *viridis* Pfeiffer, loc. cit. 42 (1837). Type: St. Thomas, assumed not to have been preserved.

Melocactus atrosanguineus Pfeiffer, loc. cit. 44 (1837). Type: St. Thomas, assumed not to have been preserved.

Melocactus wendlandii Miquél, Monogr. Melocacti, 66 (1840). Type: St. Thomas, assumed not to have been preserved.

Melocactus dichroacanthus Miquél, loc. cit. 67, with illus. (1840). Type: St. Thomas, assumed not to have been preserved.

Melocactus xanthacanthus Miquél, loc. cit. 89 (1840). Type: St. Thomas, assumed not to have been preserved.

Cactus antonii Britton, in J. Cact. Succ. Soc. Amer. 4: 355, with illus. (Fig. 5) (1933). Type: Puerto Rico, Desecheo Island, 18 Feb. 1914, *Britton, Cowell* & *Brown* 1645 (holotype NY). The holotype has not been found either at NY or elsewhere, [3]Dr. Zanoni com. pers.

Melocactus antonii (Britton) F. Knuth, Kaktus-ABC, 342 (1935).

Melocactus intortus var. *antonii* (Britton) Backeberg, Die Cact. 4: 2575 (1960).

Additional herbarium specimens: BAHAMA ARCHIPELAGO: 1 Jun. 1974, *G.R. Proctor* & *W.T.* Gillis 33893 (MO); Turks & Caicos, Grand Turk: 21 Dec. 1975, *D.S. Correll* 46603 (MO). PUERTO RICO: Guianica, in litoralibus: 23 Jan. 1886 [veg.], *Sintenis* 3510 (K); Feb. 1978 [veg.], *R.A. Howard* 18580-18581-18582-18585 (K); 20 m, 17° 56' N, 66° 54' W, 28 Dec. 1980 [seed], *J. C. Solomon* 5706 (MO); Guánica: 30 Aug. 1998, *D.E. Atha & J. Cedeño* 1994 (NY). VIRGINS ISLANDS: St. Croix: 19 Jul. 1970, *W.G. D'arcy* 4695 (MO); St. Croix: Feb. 1978 [veg.], *R.A. Howard* 18554 (MO, K); St. Thomas: Feb. 1978 [veg.], *R.A. Howard* 18565 (K); St. John: 4 Jan. 1992, *P. Acevedo-Rodriguez* & *A. Siaca* 4679 (MO). LEEWARD ISLANDS: Plentiful on E facing slopes, few on crest and very few on top of W facing slopes, more abundant at lower levels: 0-400 m, 17° 10' N, 62° 45'W, Sep.-Nov. 1994, *W.L. Meagher* 4061 (MO). ST. MARTIN: Lug. 1977 [veg.], *R.A. Howard* 18351 (K). BARBUDA: Lug. 1977 [veg.], *R.A. Howard* 18511 (K). ANTIGUA: Lug. 1977 [veg.], *R.A. Howard* 18492 (K). SABA: Lug. 1977 [veg.], *R.A. Howard* 18398 (K). ST. EUSTATIUS: Lug. 1977 [veg.], *R.A. Howard* 18438 (K). ST. KITTS: Lug. 1977 [veg.], *R.A. Howard* 18449 (K). NEVIS: Lug. 1977 [veg.], *R.A. Howard* 18472 (K). MONTSERRAT: 5 Apr. 1979 [veg.], *R.A. Howard* 19157 (MO, K). LA DESIRADE: 28 Feb. 1978 [veg.], *R.A. Howard* 18603 (MO, K)-18605 (K). ISLES DES SAINTES: Mar. 1978 [veg.], *R.A. Howard* 18652 (K). DOMINICA: 29 Jun. 1992, *H.T. Beck, K. Lee & R. Williams* 1701 (NY). ST. LUCIA: Anse Louvert (Anse Lavoutte), top of volcanic sea cliffs, Nov. 1991 [ph., seed], *M. Smith* 2 (K).

Distribution: southern Bahamas (Crooked, Acklins and Mayaguana, Inagua, Turks and Caicos Islands), Puerto Rico (incl. Monas, Desecheo, Culebra and Vieques Islands), Virgins Islands. Lesser Antilles, Anguilla, St. Martin, St. Barthelemy, St. Christopher, Barbuda, Antigua, Saba, St. Eustatius, St. Kitts, Nevis, Redonda, Montserrat, Guadeloupe, La Desirade, Les Saintes, Dominica, Martinique, St. Lucia.

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[2] for a complete list of synonyms see Britton & Rose (1922: 230) and Howard (1989: 408). Britton & Rose have also placed in their list *Melocactus miquelii* Lehmann and *Melocactus macracanthoides* Miquél as synonyms, but their descriptions and iconographies presented in Miquél (1840) appear quite dubious and probably these two taxa are to be referred to other species.

[3] New York Botanical Garden Herbarium.

[4]**Iconography:** Colla, 1826: tab. XII ; De Candolle, 1829: pl. 6; Miquél, 1840: tab. VI; Weber, 1893: frontispiece, 826; Britton & Rose, 1922: 230-231; Berger, 1929: 263; Grant, 1932 : 207-209 ; Britton, 1933: 355; Backeberg, 1960: 2561-2562; Martin, 1966: 124; Martin, 1967: 83, 84; Chalet, 1980: 17, cover illus.; Iverson, 1980: 22-23; Correll & Correll, 1982: 1011; Kummel, 1982: 82-84; Stabler, 1982: 113; Braun, 1983: 210; Schreier, 1983: 131; Thoma, 1988: 270-272; Howard, 1989: frontispiece la-f; Mauseth, 1989: 3, 12; Chalet, 1991: cover illus., 8-9; Renshaw, 1996: 19; Areces-Mallea, 1997: 247; Etter & Kristen, 1997: 97, 100-101 ; Braun & Braun, 1998: 241, 243-245; Illert, 2000: 295-297; Villaderbo, 2000: 1, 10, 12, 15, 18; Anderson, 2001: 31, 462; Mottram, 2002: 96; Delanoy *et al*., 2003: cover illus., 1, 22-25; Scott, 2005: 134-141, 143-144.

Melocactus intortus* subsp. *broadwayi (Britton & Rose) Guiggi, in Atti Soc. it. Sci. nat., 147(II): 338 (2006) (Fig. 6). Basionym: *Cactus broadwayi* Britton & Rose, Cact. 3: 229, with illus. (1922). Type: Tobago, 1921, *W.G. Freeman* (holotype US, Fig. 7; isotype K).

Synonym: *Melocactus broadwayi* (Britton & Rose) A. Berger, Entwicklungsl. Kakt. 103 (1926).

Distribution: Lesser Antilles, St. Lucia, St.Vincent, The Grenadines, Grenada, Tobago.

Iconography: Britton & Rose, 1922: 217, 225; Antesberg, 1994: 109-110 *sub M. communis*; Innes & Glass, 1992: 188; Braun & Braun, 1995: 211-212; Ippolito 2001: 14-16, 18, 21; Mottram, 2002: 95; Delanoy *et al*., 2003: 16.

Melocactus intortus* subsp. *domingensis Areces, in Cact. & Succ. J. (US) 69 (5): 246, with illus. (1997) (Fig. 8). Type: Dominican Republic, Prov. Pedernales: 60 m N of the Oviedo-Pedernales road, 5 km before the town of Pedernales, on a highly karstic limestone plain: 1 Jun. 1991 [fl., fr.], *A.E. Areces* 6380 (holotype JBSD; isotypes NY, Fig. 9; MNHN).

Synonym: *Melocactus pedernalensis* M. Mejia & R. Garcia, in Moscosoa 9: 12-17, with illus. (1997), also published in Succulentes 21(3): 15, with illus. (1998). Type: Dominican Republic, Prov. Pedernales, 8.5 km SE to the locality of Pedernales, N coast of the road toward Oviedo; arid zone, 18°N-17°4'W, presence of the *Leptochloopsis virgata* and *Prosopis juliflora*: 5-10 m, 29 Jul. 1995 [fl., fr.], *R. Garcia, M. Mejia & S. Rodriguez* 5789, (holotype JBSD; isotypes NY, Fig.10; MAPR; US).

Additional herbarium specimens: DOMINICAN REPUBLIC: Cabo Rojo, calcareous rocks, 25 Jun. 1977 [fl., fr.], *A. & P. Logier* (JBSD); to 6 km from Pedernales, at the point of junction with the road toward Cabo Rojo: 18°01'N 71°40'W, 0 m, 16 Jun. 1982 [fl.], *T. Zanoni, M. Mejia & J. Pimentel* 20966 (JBSD, K); Sierra de Bahoruco, Prov. Pedernales, 8.9 km SE from Pedernales, road toward Oviedo: 18°N 71°4'W, 26 Mar. 1985 [fl., fr.], *T. Zanoni* 34098 (JBSD, K).

Distribution: Dominican Republic.

Iconography: M. Mejia & R. Garcia, 1997, 1998: 1, 16-17; Areces-Mallea, 1997: 245-246; Delanoy *et al*., 2003: 25-26.

Key to subspecies of *M. intortus*

1. Cephalium of oldest plants to 12 cm long; stem globose to subcylindric…....……....2
   Cephalium of oldest plants to 100 cm long; stem globose to cylindric, to 100 cm high; ribs 9-25, 2-4 cm high; spines stout, 1.5-7 cm long; central spines 1-3, straight; radial spines 6-14, straight; widespread in Bahamas, Puerto Rico, Virgins Islands and Lesser Antilles……...…..…… ...……...……....…**1. subsp. *intortus***
2. Stem 30-49 cm high; ribs 12-16, 2-3.5 cm high; spines stout; central spines 3-6, recurved downwards, 3.5-7 cm long; radial spines 11-15, straight, 1.5-3.5 cm long; widespread only

[4] as reference for others illustrations see Britton & Rose, 1922: 231 and Britton 1933: 355.

in Dominican Republic……..…...…….……**2. subsp. *domingensis***
Stem 10-20 cm high; ribs 14-18, 1-1.5 cm high; spines not very stout; central spines 1-3, straight, erect, 1-1.5 cm long; radial spines 8-10, curved inward, 1-1.5 cm long; widespread in southern Lesser Antilles……..…...…..……..…...…..**3. subsp. *broadwayi***

Taxonomic discussion & conclusion

Melocactus broadwayi and *Melocactus intortus* subsp. *domingensis*, share some morphological features in common which differentiate them from *Melocactus intortus* subsp. *intortus*, such as the shorter stem and cephalium, fewer ribs, and recurved central or radials spines (Tab. 2). However, the geographic distribution of these taxa could be interpreted as the extreme limits to the range of *Melocactus intortus*, where different environmental pressures could have produced such differentiation.

Following this logic, the author believes it is coherent to propose *Melocactus broadwayi* (Britton & Rose) A. Berger as a southern subspecies of *Melocactus intortus* (Miller) Urban, distinguishable by the smaller stem, the shorter cephalium, the lower ribs and the incurved radial spines.

Melocactus intortus and its subspecies grow in similar habitats, which is usually arid clearings, or volcanic, calcareous, or serpentine rock outcrops. These sites are normally located in a littoral setting, or less frequently, inland. For these reasons, the subspecies *domingensis* and *broadwayi* don't appear to be ecological variants, but only geographic.

As for the geographic distribution, Antesberg (1994) reported the subspecies *intortus* on Tobago Island, which is also the type locality of the subspecies *broadwayi*. The author had the opportunity to study collections of these plants with the Antesberg field number's AHB64 in cultivation at the Jardin Exotique of Monaco (Fig. 6).

These plants, with radial spines recurved, seem to be more close to the subspecies *broadwayi*. The illustrations and the description presented in Antesberg (1994), don't completely clarify the issue. Additional field studies are necessary in order to find a solution to this problem and to understand if an introgression between the two subspecies does exist, when they are present on the same islands as St. Lucia or even Tobago.

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I wish to thank Jean-Marie Solichon (Director of the Jardin Exotique of Monaco) who permitted me to consult the numerous publications which are in the Jardin Exotique library, Sara Edwards (Kew Gardens) for the holotype photo of *M. intortus*, Thomas Zanoni (New York Botanical Garden) for his research and sharing information about the holotype of *M. antonii*.

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Table 2. Comparison between the subspecies of *M. intortus*

	M. intortus* ssp. *intortus	***M. intortus* ssp. *domingensis***	***M. intortus* ssp. *broadwayi***
Stem	up to 100 cm high, globose to cylindric	30-49 cm high, globose to subcylindric	10-20 cm high, globose to subcylindric
Ribs	9-25, 2-4 cm high	12-16, 2-3.5 cm high	14-18, 1-1.5 cm high
Spines	7-15, 1.5-7 cm long, often not differentiated in centrals and radials, stout, yellow to reddish-brown or black	14-21, stout, rose to greyish	9-13, not very stout, reddish–brown to grayish with brown tips
Central spines	1-3, straight	3-6, recurved downwards, 3.5-7 cm long	1-3, straight, erect, 1-1.5cm long
Radial spines	6-14, straight	11-15, straight, 1.5-3.5 cm long	8-10, curved inward, 1-1.5 cm long
Cephalium	up to 100 cm high	3.5-12 cm high	2-8 cm high
Flower	1-2 cm long, rose-magenta	2-3 cm long, rose-magenta	rose-magenta
Fruit	2-2.5 cm long, rose-magenta, often white at base	1-3 cm long, rose-magenta	2.5-3 cm long, rose-magenta

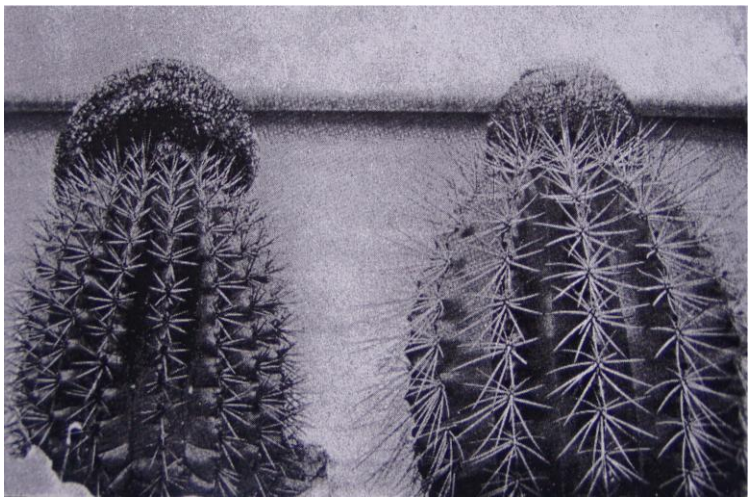

Figure 5-10. **5:** The sterile plant on the right represents a reproduction of *Cactus antonii* (= *Melocactus intortus* subsp. *intortus*). Photo: George F. Anton. **6:** Immature plant of *Melocactus intortus* subsp. *broadwayi*, Antesberg AHB64, Tobago (cultivated at the Jardin Exotique of Monaco). Photo: A. Guiggi. **7:** Holotype of *Cactus broadwayi* (= *Melocactus* i*ntortus* subsp. *broadwayi*), stem of a mature plant and parts of a cephalium. Photo: © New York Botanical Garden. **8:** Immature plant of *Melocactus intortus* subsp. *domingensis*, A. Vilardebo, Pedernales, Dominican Republic (cultivated at the Jardin Exotique of Monaco). Photo: A. Guiggi. **9:** Isotype of *Melocactus intortus* subsp. *domingensis*, ribs with spines. Photo: © New York Botanical Garden. **10:** Isotype of *Melocactus pedernalensis* (= *Melocactus intortus* subsp. *domingensis*), stem sections of a mature plant and neck with roots. Photo: © New York Botanical Garden.

A NEW STATUS FOR *MELOCACTUS PRAERUPTICOLA* ARECES FROM THE DOMINICAN REPUBLIC (*CACTOIDEAE*)

Abstract

Melocactus praerupticola Areces is a recently discovered species described from a remote and inaccessible mountainous region of the Dominican Republic, with a very restricted distribution range. The author felt that this species could be close to *M. lemairei* and after a study of the descriptions, herbarium specimens and illustrations of the analysed taxa, considers *M. praerupticola* to be an ecological subspecies of the former, distinguished by a very different and peculiar habitat, characterized by steep rocky cliffs, higher altitudes and more humid conditions. Compared to *M. lemairei*, its depressed-globose habit, its smaller size of the stem, cephalium and areoles, the less stout spines, and the flowers less exserted from cephalium result from different environmental pressures. An hypothesis is proposed for the genesis of this dwarf subspecies. A comparison table and a dichotomous key to the two recognized subspecies are also provided.

Riassunto

Melocactus praerupticola Areces è una specie recentemente scoperta e descritta da una regione montuosa remota e poco accessibile della Repubblica Dominicana, con una limitata distribuzione. L'autore sentiva che questa specie poteva essere relazionata con *M. lemairei*, e dopo uno studio delle descrizioni, di materiale d'erbario e delle illustrazioni dei taxa analizzati, considera *M. praerupticola* come una sottospecie ecologica della precedente specie, distinta per il suo habitat peculiare caratterizzato da pareti rocciose, maggior altitudine e umidità. Comparato con *M. lemairei*, l'*habitus* globulare-depresso, le inferiori dimensioni del fusto, cefalio e areole, minor robustezza delle spine, i fiori meno estroflessi dal cefalio, di *M. praerupticola* sono da mettere in relazione con le differenti pressioni ambientali. Una ipotesi è anche proposta per la genesi di questa piccola sottospecie. Una tabella comparativa e una chiave per le sottospecie individuate sono anche incluse.

Résumé

Melocactus praerupticola Areces est une espèce récemment découverte originaire d'une région montagneuse éloignée et inaccessible de la République Dominicaine avec une répartition très restreinte. L'auteur à jugé que cette espèce pourrait être proche de *M. lemairei* et, après étude des descriptions, des spécimens d'herbier et des illustrations des taxa en question, considère *M. praerupticola* comme une sous-espèce écologique du précédent s'étant développée dans un habitat très différent et particulier caractérisé par des falaises rocheuses abruptes, une altitude plus élevée et un milieu plus humide. Par comparaison avec *M. lemairei*, son port globuleux à déprimé, la petite taille de sa tige, les épines moins fortes et les fleurs moins saillantes du céphalium résultent de différentes pressions environnementales. Une hypothèse est proposée pour la genèse de cette petite sous-espèce. Un tableau comparatif et une clef dichotomique pour les deux sous-espèces reconnues sont présentés.

Introduction

The Caribbean island of Hispaniola (Haiti and Dominican Republic) is the home of three endemic taxa of the genus *Melocactus* (*M. lemairei*, *M. intortus* subsp. *domingensis*, and *M. praerupticola*, Areces-Mallea, 2000). There is a remarkable biodiversity in the Caribbean region, and it is one of the areas of speciation for the genus *Melocactus* in the Greater and Lesser Antilles, along with Cuba (4 taxa, Hunt, 1999) and Aruba, Dutch islands (3 taxa, Thomson, 2002).

While *M. lemairei* is known for a long time, since it was described by C. Lemaire in 1840, *M. intortus* subsp. *domingensis* and *M. praerupticola* have been described recently in 1997 and 2000 respectively by A.E. Areces-Mallea. In particular *M. praerupticola* was collected for the first time in 1985 by J. Pimentel & R. Garcia, in a single isolated population located in a remote and humid mountainous region of the Cordillera Central, on the steep rocky cliffs of Rio Pantunflas.

A.E. Areces-Mallea emphasized that *M. praerupticola* is related to *M. intortus*, a variable and widely distributed species of the Caribbean region, but distinct from it because of its smaller size,

depressed-globose stem, straight ribs, areoles normally not sunken into notches, spines armament, and flower and seed morphology, deserving to be recognized as a separate species (Areces-Mallea, 2000: 29).

N.P. Taylor in a revision of the recently described *Melocactus* taxa stated that it should be accepted as a good species (Taylor, 2003: 13).

Taxa analysed

Melocactus lemairei (Monville ex Lemaire) Miquél ex Lemaire, Hort. Univ. 1 : 286, with illus. (1840). Basionym: *Echinocactus lemairei* Monville ex Lemaire, Cact. Aliq. Nov. 17 (1838) *"lemarii"*. Original diagnosis: *Sphaeroideus, umbilicatus, validè angulatus, saturatè viridis*. Type: Hispaniola, Santo Domingo, cult. Monville, not preserved but illustrated by Lemaire. Neotype (iconotype, Fig. 11): Lemaire illustration's t. 35, loc. cit (1840), (Taylor, 1991: 78).

Etymology: dedicated to Charles Lemaire (1801-1871), collaborator and cataloguer of the famous Monville collection.

Melocactus lemairei* subsp. *lemairei

Synonyms: *Melocactus communis* var. *oblongus* Link & Otto, Verh. Ver. Beford. Gartenb. 3: 418 (1827). Type: Santo Domingo, assumed not to have been not preserved;

Melocactus communis var. *macrocephalus* Link & Otto, Verh. Ver. Beford. Gartenb. 3: 418 (1827). Type: Santo Domingo, assumed not to have been preserved;

Echinocactus intortus var. *purpureus* De Candolle, Prod. Syst. Nat. 3: 462 (1828). Type: Santo Domingo, assumed not to have been not preserved;

? *Melocactus communis* var. *conicus* Pfeiffer, Enum. Diag. Cact. 43 (1837). Type: unknown;

Melocactus crassispinus Salm-Dyck, Allg. Gartenz. 8: 10 (1840). Type: assumed not to have been preserved;

Melocactus hispaniolicus Vaupel, Monatss. f. Kakteenk. 29: 121 (1919). Type: Haiti, over the hill near Gonaives, assumed not to have been not preserved;

Cactus lemairei (Monville ex Lemaire) Britton & Rose, The Cact. 3: 226 (1922).

Additional herbarium specimens: HAITI: arid thicket at base of mount, Rouge near Cabaret, Baie des Moustiques: 12 Jan. 1929 [veg.], *E.C. Leonard & G.M. Leonard* 12059 (MO, K s.v.). DOMINICAN REPUBLIC: Prov. Peravia, 1.3 km, Sur del Cruce de Las Carreras (Carretera Bani a Azua), en la carretera a Funadacion de Sabana Buey, en el camino este del Rio Ocoa, en las lomas con el bosque seco y no alto, muchas plantas espinosa con Cactaceae, suelo pedroso: 100 m, 18°20'N 70°28'W, 30 Nov. 1982 [veg.], *T. Zanoni & M. Mejia* 24651 (MO; K s.v., Fig. 12); Independencia: 30-100 m, 18°22'N 71°30'W, 14 Dec. 1982, *T. Zanoni et al*. 24800 (MO); 0 m, 18°24'N 71°38'W, 14 Dec. 1982, *T. Zanoni et al*. 24802 (MO); Hoya de Enriquillo, Prov. Independencia, 18.6 km Oeste-Noroeste de Duverge en la carretera a Jimani, zona muy arida, bosque espinoso de *Acacia, Prosopis, Neoabbottia, Melocactus*, y otras *Cactaceae*: c. 0 m, 18°25'N 71°42'W, 30 Jan. 1984 [veg.], *T. Zanoni, J. Pimentel & R. Garcia* 28943-28945-28946(s.v.)-28947(s.v.)-28949-28950 (K); Montecristi: 18 Apr. 1984, *T. Zanoni & J. Pimentel* 29619 (MO); Distrito Nacional: 20 Oct. 2000, *A.L. Ososki & J. Saborío* 126 (NY).

Habitat & distribution: 0-100 m, arid plains, Hispaniola: Haiti, Dominican Republic.

[5]**Iconography:** Britton & Rose, 1922: 225, Pl. XXIV; Moscoso, 1941: Lam. IX; Backeberg, 1960: 2571, 2572; Antesberg, 1996: 133; Mottram, 2002: 97; Delanoy *et al*., 2003: 27-28; Corman, 2005: 13.

[1] as reference for others illustrations see Britton & Rose, 1922: 226.

Melocactus lemairei* subsp. *praerupticola (Areces) Guiggi, in Atti Soc. it. Sci. nat., 147(II): 337-338 (2006). Basionym: *Melocactus praerupticola* Areces, in Cact. Succ. J. (US) 72 (1): 27, with illus. (2000). Original diagnosis: *Ex affinitate M. intorti Urban, speciei variabilis late diffusae, his notulis diversa: statura minor; caulis depresso-globosus; costis rectis et areolis saepissime haud depressis spinisque 11 subincurvis armatis; stamina valde reducta; necnon stigmatis lobi longiores* (*4 mm usque*). Type: Dominican Republic, Cordillera Central, Prov. La Vega, 2 km SW of Constanza, on the steep rocky cliffs of Rio Pantunflas, ca. 800 m downstream from the pumping station: 1000-1050 m, 18°54'N 70°46.5'W, 13 May 1991 [fl., fr.], *A.E. Areces-Mallea* 5801 (holotype JBSD; isotype NY s.v., Fig. 13).

Etymology: Lat. dwelling in steep places.

Additional herbarium specimens: DOMINICAN REPUBLIC: Cordillera Central, Prov. La Vega, 2.5 km al Suroeste de Constanza; El Salto de Constanza en el Rio Pantunflas, rocas debiles, con algunos arbustos, *Agave*, *Sarcopilea*, en zona de pinar: 3330-3450 pies, 2 Apr. 1985, 18°54' N 70°46.5'W, *J. Pimentel* & *R. Garcia* 3181 (K s.v., Fig. 14).

Habitat & distribution: c. 1000 m, on steep rocky cliffs, Hispaniola: Dominican Republic.

Iconography: Areces-Mallea, 2000: 28-30; Corman, 2002: 17-18; Delanoy *et al*., 2003: 34.

Key to subspecies of *M. lemairei*

1. Habitat characterized by arid plains, 0-100 m, Haiti, Dominican Republic; stem short-cylindrical, conical to elongated, 15-30 cm high, 15-20 cm in diameter; cephalium 5.5-10 cm high, 7-10 cm in diameter..……..……...…..…..…..…**1. subsp. *lemairei***
   Habitat characterized by steep rocky cliffs, c. 1000 m, Dominican Republic; stem depressed-globose, 4-8 cm high, 8-10 cm in diameter; cephalium 1-3 cm high, 3-4.5 cm in diameter...…….. ...…….……...……..…..…….……..…**2. subsp. *praerupticola***

Conclusions

M. praerupticola appears morphologically to be very different from *M. intortus*. In particular the seeds of the former present slightly elongated testa cells with their periclinal walls convex to conical (Areces-Mallea, 2000: 29), and they contrast with the flat, almost isodiametric, testa cells of *M. intortus* (Taylor, 1991: 15, 78).

The author believes that the closest relative of *M. praerupticola* is not *M. intortus*, as supposed by A.E. Areces-Mallea, but *M. lemairei* (Tab. 3), which exhibits a similar spine arrangement, number of central spines, number of ribs, and seeds with tuberculate testa cells (Taylor, 1991: 15, 78). After careful study of the descriptions (Britton & Rose, 1922; Moscoso, 1941; Areces-Mallea, 2000; Delanoy *et al*., 2003), herbarium specimens and illustrations of the discussed taxa, the author considers *M. praerupticola* as an ecological subspecies of *M. lemairei*, with a very restricted distribution area.

In the author's view the ornithochorous dispersal of the seeds of *M. lemairei* have produced the colonization of a very different niche, following the adaptation to the new habitat characterized by steep rocky cliffs, higher altitudes and more humid conditions, with different environmental pressures having then originated a new subspecies.

The distinguishing features of the subspecies *praerupticola* like the depressed-globose habit, the smaller dimension of the stem, cephalium and areoles, the lesser stoutness of spines, and the flowers less exserted from the cephalium, could be induced by the new habitat. These adaptations are not only of phenotypic origin but are fixed in the genotype because even in cultivation the seedlings show the same characters of the original population (Areces-Mallea, 2000: 29).

In conclusion *Melocactus hispaniolicus* described from Haiti, near Gonaives by Vaupel in 1919, after an analysis of the descriptions found in Backeberg (1960: 2576, 1977: 312), appears to be conspecific with *M. lemairei* as reported by Britton & Rose (1922: 226).

Other Haitian material available to the author, such as a Hirsch illustration of a plant collected at Port au Prince (Backeberg, 1960: 2572), and a herbarium specimen collected at the Baie des Moustiques by Leonard & Leonard 12059 (MO, K s.v.) seem to confirm it. Anyhow, more field studies are necessary to understand the geographic distribution and the possible variability of the taxon in Haiti.

Acknowledgements

I wish to thank Sara Edwards (Kew Gardens) for the data and digital photo of herbarium specimens.

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Table 3. Comparison between the subspecies of *M. lemairei*

	M. lemairei* subsp. *lemairei	***M. lemairei* subsp. *praerupticola***
Stem	15-30 x 15-20 cm , short-cylindrical, conical to elongated	4 -8 x 8-10 cm , depressed-globose
Ribs	9-11	10-11
Spines	8-13, 1-3 cm long, stout, horn-colored or sometimes brownish	10-13, 1-3 cm long, stout, horn-colored to brownish
Central spines	2-3	2-3
Cephalium	5.5-10 x 7-10 cm	1-3 x 3-4.5 cm
Flower	18-22 x 15 mm, pink, to 13 mm exserted from the cephalium	23-28 x 15-18 mm, pink, to 7 mm exserted from the cephalium
Fruit	20 x 10 mm, red	20-24 x 7-9 mm, red
Seeds	Black, testa cells tuberculate	Brown-black, testa cells slightly elongated, with their periclinal walls convex to conical
Habitat & distribution	0-100 m, arid plains, Haiti, Dominican Republic	c. 1000 m, on steep rocky cliffs, Dominican Republic

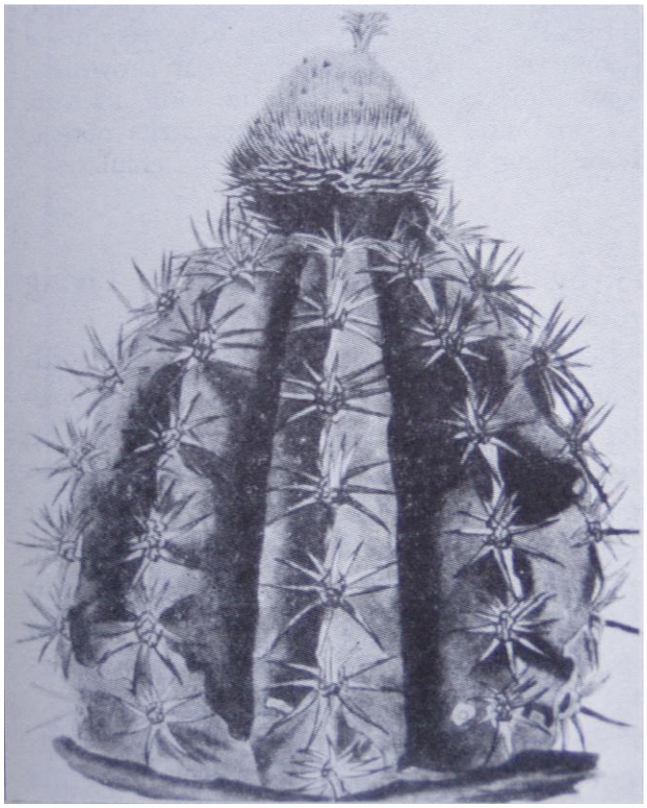

Figure 11-14. 11: Reproduction of the neotype of *Echinocactus lemairei* (= *Melocactus lemairei* subsp. *lemairei*), a fertile plant. Photo from Britton & Rose, 1922: 225. **12:** Herbarium specimen of *Melocactus lemairei* subsp. *lemairei*, parts of stem, detail of the ribs with spines and cephalium. Photo: © Royal Botanic Gardens, Kew. **13:** Isotype of *Melocactus praerupticola* (= *Melocactus lemairei* subsp. *praerupticola*), parts of stem, roots and cephalium. Photo: © New York Botanical Garden. **14:** Additional herbarium specimen of *Melocactus praerupticola* (= *Melocactus lemairei* subsp. *praerupticola*), section of stem with cephalium and roots. Photo: © Royal Botanic Gardens, Kew.

NEW COMBINATIONS IN THE CARIBBEAN GENUS *CONSOLEA* LEMAIRE (*OPUNTIOIDEAE*)

Abstract

The author proposes three new combinations in the Caribbean genus *Consolea* Lemaire belonging to the subfamily *Opuntioideae*. A neotypification for *Opuntia rubescens* Salm-Dyck (= *Consolea moniliformis* subsp. *rubescens*) is proposed.

Riassunto

L'autore propone tre nuove combinazioni nel genere Caraibico *Consolea* Lemaire appartenente alla sottofamiglia delle *Opuntioideae*, una neotipificazione è stata necessaria per *Opuntia rubescens* Salm-Dyck (= *Consolea moniliformis* subsp. *rubescens*).

Résumé

L'auteur propose trois nouvelles combinaisons au sein du genre caribéen *Consolea* Lemaire de la sous-famille *Opuntioideae*. Un néotype est proposé pour *Opuntia rubescens* Salm-Dyck (= *Consolea moniliformis* subsp. *rubescens*).

Consolea macracantha (Grisebach) A. Berger **subsp. *nashii*** (Britton) Guiggi **comb. et stat. nov.** Basionym: *Opuntia nashii* Britton, in Bull. N.Y. Bot. Gard. 3: 446 (1905). Type: Bahamas Arch., Inagua Island, 15 Oct. 1904, *G. V. Nash & N. Taylor* 1063 (NY, holotype n.v.). Synonym: *Consolea nashii* (Britton) A. Berger, Entwickl. Kakteen 94 (1926). Herbarium specimen examined: Bahamas Arch., Navassa Island, vicinity of lighthouse, 2 Aug. 1998, *W.R. Buck & T.A. Zanoni* 34458 *sub Opuntia nashii* Britton (NY, Fig. 15). Note: taxon characterized by its most northern distribution in the Bahaman Archipelago, joints with mostly elevated areoles and shorter spines, and spiny, tuberculate pericarpel.

Consolea moniliformis (Linnaeus) A. Berger **subsp. *rubescens*** (Salm-Dyck) Guiggi **comb. et stat. nov.** Basionym: *Opuntia rubescens* Salm-Dyck in Candolle, Prodr. 3: 474 (1828), emend. Britton & Rose, Cact. 1: 208 (1919). Type: not designated, erroneously hypothesized as Brazil? in Candolle loc. cit. Neotype designed here: Puerto Rico, Mona Island, Sardinera, 20-26 Feb. 1914, *N.L. Britton* 1822 with *J.F. Cowell & W.E. Hess* (NY, holotype, Fig.16). Synonyms: *Consolea rubescens* (Salm-Dyck) Lemaire, in Rev. Hort. 1862: 174 (1862); *Consolea catacantha* (Link & Otto) Lemaire, in Rev. Hort. 1862: 174 (1862). Note: taxon characterized by its most southern distribution in Puerto Rico, Virgin Islands and Lesser Antilles, dark-green or reddish-green joints, less sculptured epidermis and pericarpel with flatter tubercles.

Consolea spinosissima (Miller) Lemaire **subsp. *millspaughii*** (Britton) Guiggi **comb. et stat. nov.** Basionym: *Opuntia millspaughii* Britton, in Smiths. Misc. Coll. 50: 513 (1908). Type: Bahamas Arch., Eleuthera Island, 22 Feb 1907, *C.F. Millspaugh & N.L. Britton* 5578 (NY, holotype, Fig.17). Synonyms: *Consolea millspaughii* (Britton) A. Berger, Entwickl. Kakteen 94 (1926); *Consolea millspaughii* subsp. *caymanensis* Areces, Brittonia 53(1): 100, with illus. (2001), type: Cayman Islands, 13 Nov. 1991, *A.E. Areces* 2402 (K, holotype n.v.; NY, isotype n.v.). **Synon. nov**. Note: taxon characterized by its distribution in Bahaman Archipelago and Cuban Cays, shrubby habit, purplish young spines and yellowish-brown glochids.

Figure 15-17. 15: Herbarium sample of *Opuntia nashii* (= *Consolea macracantha* subsp. *nashii*), two joint sections. Photo: © New York Botanical Garden. **16:** Neotype of *Consolea moniliformis* subsp. *rubescens*, joint and flower sections. Photo: © New York Botanical Garden. **17:** Holotype of *Opuntia millspaughii* (= *Consolea spinosissima* subsp. *millspaughii*), two illustrations of the plant in habitat, joint and flower sections. Photo: © New York Botanical Garden.

ARROJADOOPSIS A NEW GENUS OF THE TRIBE *CEREEAE* FROM BAHIA, BRAZIL (*CACTOIDEAE*)

Abstract

A new genus and combination are published here for a peculiar species previously included in *Arrojadoa* Britton & Rose (*A. marylaniae* "*marylanae"*). The diagnostic characters distinguishing the new genus from *Arrojadoa* are the unbranched and taller habit, thicker stems, higher number of ribs (24-36), flexible spines, flower tube with apical bract-scale reduced, not enclosing the perianth, thin perianth segments, strongly expanded and reflexed, fruits with aqueous and translucent pulp.

Riassunto

Un nuovo genere e combinazione vengono qui pubblicati per una specie peculiare precedentemente inclusa in *Arrojadoa* Britton & Rose (*A. marylaniae* "*marylanae"*). I caratteri diagnostici che distinguono il nuovo genere da *Arrojadoa* sono rappresentati dal suo *habitus* non ramificato, maggior altezza, diametro e numero di coste (24-36) dei fusti, spine flessibili, tubo fiorale con brattee apicali ridotte che non racchiudo il perianzio, segmenti del perianzio sottili, espansi e riflessi, frutti con polpa acquosa e translucida.

Résumé

Un nouveau genre et une nouvelle combinaison sont publiés pour une espèce particulière originellement incluse dans *Arrojadoa* Britton & Rose (*A. marylaniae* "*marylanae"*). Les caractères distinguant le nouveau genre d'*Arrojadoa* sont une partie végétative plus grande non ramifiée, des tiges plus épaisses, un nombre élevé de côtes (24-36), des épines flexibles, des boutons floraux avec des écailles apicales réduites, n'incluant pas le périanthe dont les éléments sont fins fortement saillants et recourbés et des fruits à la pulpe aqueuse et translucide.

In September 2001, during a floristic study on the Serra Escura, a quartz rock hill located in SW Bahia (Brazil), A.O. Soares Filho and M. Coelho discovered by chance a new *cactus* taxon, that was then recognized by M. Machado as belonging to the genus *Arrojadoa* Britton & Rose. Two years later, in September 2003, A.O. Soares Filho and M. Machado described that plant as a new *Arrojadoa* species (*A. marylaniae* "*marylanae"*), distinguished from other species by its greater size, thicker and unbranched stems, higher number of ribs (24-36), flexible spines, woollier cephalia, flowers with thin, spreading perianth-segments, fruits with watery and translucent pulp, flower remnant narrower at its base and shallowly inserted in the fruit apex, seeds with flat testa cells and interstitial pits (Soares Filho & Machado, 2003).

In their paper Soares Filho & Machado (2003: 120) pointed out that *A. marylaniae* is a very peculiar and different species, but justified the status of *Arrojadoa* with the similarity of the flower and seed morphology to those of *A. dinae* subsp. *dinae* Buining & Brederoo. Indeed the similarity of the seeds doesn't seem to be a valid reason to consider the plant as a species of *Arrojadoa*, because the same characters (testa with flat cells and interstitial pits) are also found in *Micranthocereus flaviflorus* Buining & Brederoo (Barthlott & Hunt, 2000: 105). Furthermore, the flowers of *A. marylaniae* have a thin tube, reduced bract-scales, thin and strongly expanded perianth segments, and are therefore quite different from those of other *Arrojadoa* species, as also observed by Taylor & Zappi (2004: 302).

In their website, E. Esteves Pereira and P.J. Braun accepted the inclusion of the taxon in *Arrojadoa*, while N.P. Taylor and D.C. Zappi in their treatment on Eastern Brazil Cacti, reported it as possibly keying out to *Arrojadoa*, with its actual generic status uncertain, and maybe of hybrid origin between *Arrojadoa* and *Coleocephalocereus* Backeberg (Taylor & Zappi, 2004: 302). Indeed *Coleocephalocereus goebelianus* (Vaupel) Buining, which is the only species of the genus in S Bahia, shows contrasting characters as compared to *A. marylaniae*: the tissue is not mucilaginous, the ribs have transverse epidermal folds, the spines are stout, hooked in seedlings, the flowers are

white, nocturnal (bat-pollination syndrome), the seeds have strongly convex testa-cells (Taylor & Zappi, 2004: 362), which seem to eliminate the possibility of a close relationship.

A hybrid origin appears difficult to demonstrate, since *A. marylaniae* shows its own, stabilized characters, high seed production per fruit (>200), and appears dominant in its isolated habitat while there are no potential sympatric ancestors. The author examined the diagnostic characters of *A. marylaniae* and came to the conclusion that both vegetative and reproductive differences with the genus *Arrojadoa* Britton & Rose allow the recognition of a new genus of the tribe *Cereeae*.

A Latin diagnosis follows to validate the genus and a new combination is provided for *Arrojadoa marylaniae*.

Arrojadoopsis Guiggi **gen. nov.**

Latin diagnosis: *Arrojadoopsis ab Arrojadoa Britton & Rose differt majore longitudine et latitudine caulium, carentia ramorum, frequentioribus costis; florum bracteis minimis, perianthii segmentis subtilioribus et latioribus; fructum pulpa acquosa et perlucida*.

Description: a new genus of the tribe *Cereeae* similar to *Arrojadoa* Britton & Rose, but only in appearance. Rupicolous, shrubby, erect, unbranched plant. Stem cylindrical, with uniform, short, unconstricted segments; tissues mucilaginous; ribs low, straight, crenate, very numerous; areoles small, close together, whitish felted and spiny; spines numerous, normally not differentiated, acicular, flexible, not very long; [6]pseudocephalium initially apical, successively lateral and becoming annular after the growth of new segments, composed of white wool and bristles. Roots fibrous. Flower ornithogamous (hummingbird pollination syndrome), actinomorphous, diurnal, slightly exserted from the pseudocephalium; receptacle tubular; pericarpel naked, slightly flattened; tube thin, slender, short, with bract-scale at the apex; bract-scale reduced, not enclosing the perianth; perianth segments thin and strongly expanded, reflexed, the outer ones rounded, the inner acute; stamens and style included. Fruit berry-like, fleshy, small, naked, indehiscent, very aqueous, obovoid to globose, expelled from the pseudocephalium when mature; flower remains normally erect, blackish, narrow at the base and shallowly inserted in the fruit apex. Seeds small, cochleariform; testa cells flat with interstitial pits. Seedlings very spiny; spines porrect.

Typus generis: *Arrojadoopsis marylaniae* (Soares Filho & M. Machado) Guiggi.

Distribution: Brazil.

Etymology: derived from *Arrojadoa* (a Brazilian *cactus* genus dedicated to Dr. Miguel Arrojado Lisboa by Britton & Rose) with the Greek suffix *opsis* = appearance.

Arrojadoopsis marylaniae (Soares Filho & M. Machado) Guiggi **comb. nov.** (Fig. 18-21, front cover).

Basionym: *Arrojadoa marylaniae* (cf. ICBN Art. 60.11, Greuter *et al*., 2000) Soares Filho & M. Machado, in Brit. Cact. Succ. J. 21(3): 114, with illus. (2003) *"marylanae*". Type: Brazil, Bahia, Mun. Tanhaçu, district of Suçuarana, Serra Escura: 19 Apr. 2003, *M. Machado* 28 (holotype HUEFS). Habitat: 550-750 m. a. s. l., on exposed outcrops of white quartz, in *caatinga* vegetation in association with *Espostoopsis dybowskii*, *Pilosocereus pachycladus*, *Melocactus* spp, and *Tacinga inamoena*.

Etymology: dedicated to Marylan Coelho, who discovered the species with Soares Filho.

Illustrations: Soares Filho & Machado, 2003: front cover, frontispiece, 114-119 fig.1-9; Taylor & Zappi, 2004: 252 Pl. 37 fig. 37.3-37.4; Charles, 2005: 3 fig. 1; Machado, 2005: 62-65, 67.

[6] the author has used the term pseudocephalium following the concept of Gibson & Nobel (1986: 272).

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Figure 18-21. 18: A tall plant of *Arrojadoopsis marylaniae* in its type locality. **19:** A plant growing between white quartz rocks. **20:** A juvenile plant with long flexible spines. **21:** Detail of the stem apex with the flowers characterized to perianth segments strongly expanded. All photo by G. Delanoy.