

New Combinations and clarification attempts in Cactaceae

Joël Lodé (France)

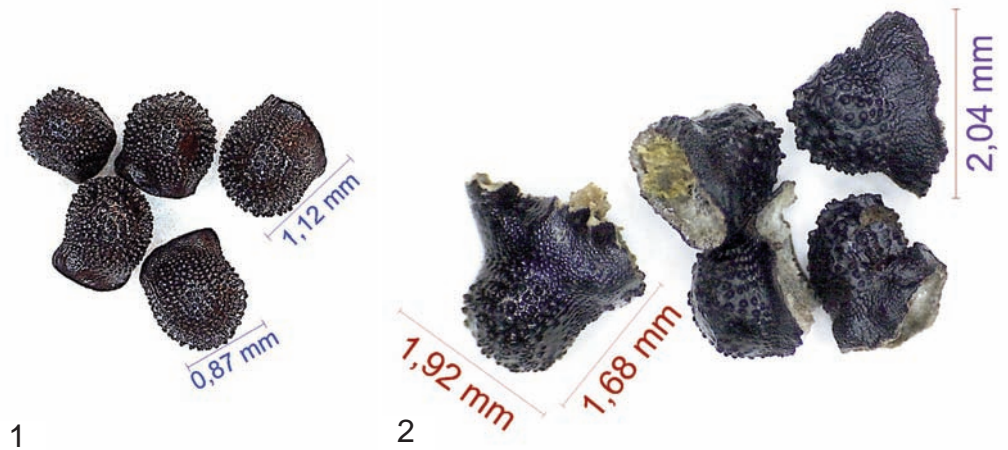
As part of my forthcoming project “Taxonomy of Cactaceae, Description of the Species”, Volumes 3 & 4 and after having studied each taxon and its characteristics, although these modifications may be minimal or crucial, it was sometimes necessary to modify the classification for a better approach of the genera and the taxa which compose them. The segregations of species or subspecies previously regrouped may also prove to be vital for populations that are threatened with extinction within a species whose other subspecies, otherwise, do not suffer any threat in another country: this is the case for *Mammillaria jamaicensis* Areces-Mallea which was lumped into *M. columbiana* subsp. *yucatanensis* (Britton & Rose) Hunt, when it should have been much more advised to create a subsp. *jamaicensis* to represent the plant from Jamaica island.

Although seeds are not a tool for classification, they are often underestimated, like in the case of *Discocactus zehntneri* subsp. *buenekeri* (Abraham) P.J.Braun & Esteves, wrongly lumped into *D. zehntneri*, or *Echinopsis calochlora* subsp. *glatzleana* P.J.Braun & Esteves, erroneously synonymized with *E. calochlora*. In both cases, SEM pictures were published in the articles and perfectly showed that the taxa involved were distinct. It will be noticeable to learn that many of the Brazilian taxa described by Braun & Esteves have been discarded without evidence. In my opinion, seeds are like the cactus “fingerprints”, thus taxa that look alike should not be synonymized before a previous comparative study of the seeds.

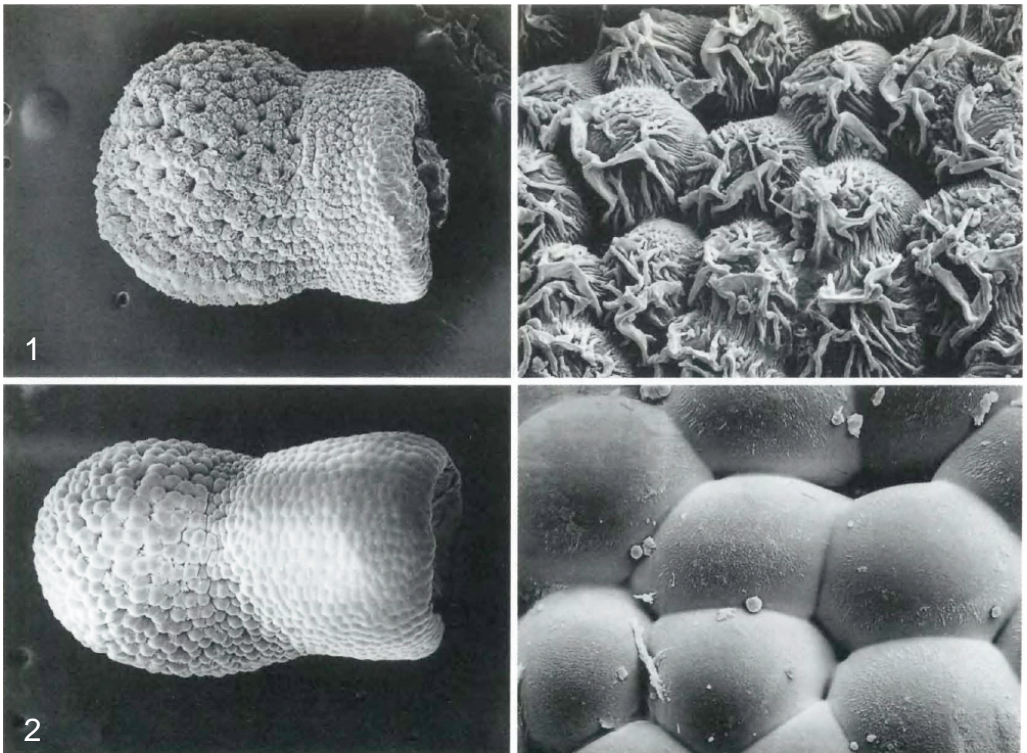
Some spelling errors had also to be corrected, in accordance with the International Code of Nomenclature (ICN, Shenzhen code, 2018). These are named *sphalmate*, a term signifying “in error”, “by mistake”.

A perfect example of this is *Echinocereus pamanesiorum*, which was clearly dedicated by the late Alfred Lau to General Fernando Pámanes Escobedo and not his family: this is why the name was changed into *E. pamanesij*, in accordance with the code. On the contrary, *Echinocereus lindsayi* J.Meyrán has to be changed into *E. lindsayorum* because the author clearly wanted to honour George Edmund Lindsay AND his spouse Geraldine Kendrik Morris.

Remember: *Matucana madisoniorum*, was dedicated by Hutchison to Marshall Pierce Madison and his spouse Elena Eyre Madison.



The quite distinct seed structure, shape and size of these lumped taxa perfectly show the big error that was committed : 1: *Discocactus zehntneri* (subsp. *boomianus*). 2: *Discocactus zehntneri* subsp. *buenekeri*, a mixture of colonial casque and samurai helmet! (photos: X 45) © JL



1: *Echinopsis calochlora* subsp. *calochlora* & testa cells structure. 2: *Echinopsis calochlora* subsp. *glatzleana* & testa cells structure. (Photo SEM: X 300). © Dr Wolfgang Glätzle

The subspecies *glatzleana* honours Dr. Wolfgang Glätzle (1951-), Austrian chemist and cactus hobbyist from Reutte, who helped the authors in the recordings of seeds and pollen with scanning electron microscope. One more time, seeds allowed to confirm that taxa were distinct.

ACANTHOCALYCIUM Backeberg

Various species were considered once as *Echinopsis*, but a DNA study conducted by Schlumpberger & Renner (2012) showed that some are in fact part of a genus amplified *Acanthocalycium* and that the flower, either diurnal or nocturnal, is just an adaptation to a pollinator.

Acanthocalycium klinglerianum (Cárdenas) Lodé **COMB. NOV.**

Basionym: *Echinopsis klingleriana* Cárdenas, Cactus (Paris) 85: 109-110, illustr. (1965).

Type: Bolivia, Santa Cruz, Chiquitos, near Salinas de San José, 450 m, Mar 1963, *E. Klingler* s.n., in Cárdenas 6143 (LIL, not found).

Synonyms: *Echinopsis klingleriana*.

Notes: while Anderson (2011, Eggl. ed.) accept the taxon, Hunt et al. (2006) refer this species to *E. rhodotricha* ssp. *chacoana* = *Acanthocalycium rhodotrichum* subsp. *chacoanum*; however body, ribs, spines, flowers and seeds of *A. klinglerianum* are distinct enough to separate from *A. rhodotricha* and subspecies.

Acanthocalycium rhodotrichum subsp. ***chacoanus**** (K.Schum.) Lodé **COMB. NOV.**

Basionym: *Echinopsis chacoana* Schütz, Kaktusář Listy Heft 1. (1949).

Type: Paraguay, Chaco Boreal, cult. from seed, coll. *Blossfeld*, s.n., not pres. (ZSS, seeds).

Synonyms: *Echinopsis chacoana*, *E. rhodotricha* subsp. *chacoana*, *E. rhodotricha* var. *chacoana*.

Notes: both species and subspecies are apparently found in Paraguay; seeds of the subspecies are much smaller than the type and also differ from those of *A. klinglerianus*, which made me think these are distinct taxa although they pertain to the same group.

DISOCACTUS Lindley

Disocactus blomianus (Kimmach) Lodé **STAT. NOV.**

Basionym: *Heliocereus aurantiacus* var. *blomianus* Kimmach, Cact. Succ. J. (Los Angeles) 62: 270 (1990).

Type: Mexico, Chiapas, Cerro Sabandillo, near río Monoblanco and the border of Oaxaca, Mar 1951, *T. MacDougall* A202 (HNT; isotype: CAS).

Synonyms: *Disocactus aurantiacus* var. *blomianus*, *D. speciosus* subsp. *blomianus*, *Heliocereus aurantiacus* var. *blomianus*.

Notes: in the molecular study of Kotokova et al. (2017), *D. speciosus* subsp. *blomianus* is not related to *D. speciosus*, but with *D. nelsonii* subsp. *hondurensis* (which is also not related with *D. nelsonii*). This is why I considered to accept *Disocactus blomianus* (and *D. hondurensis*) as specific and correct taxa.

Disocactus heterodoxus* (Standl. & Steyermark.) Lodé **STAT. NOV.**

Basionym: *Heliocereus heterodoxus* Standl. & Steyermark., Publ. Field Mus. Nat. Hist., Bot. Ser. 23: 67 (1944).

Type: Guatemala, Dept. San Marcos, along río Vega between San Rafael and the NE portion of Volcán de Tacaná, 2500-3000 m, 21 Feb 1940, *Julian A. Steyermark* 36291 (F).

Synonyms: *Disocactus speciosus* subsp. *heterodoxus*, *Heliocereus heterodoxus*.

Notes: *D. heterodoxus* was and is still considered a synonym of *D. cinnabarinus*; however, the DNA study by Cruz *et al.* (2016) showed without any doubt that *D. heterodoxus* (marked as *D. speciosus* subsp. aff. *cinnabarinus*) is a distinct species not related to *D. cinnabarinus* and well separated from *D. speciosus*. This is a clear example of the danger of regrouping taxa and the errors and confusion that ensue. Curiously enough, in their work, the authors combined this taxon as *D. speciosus* subsp. *heterodoxus*, while p. 153, they write correctly *Disocactus heterodoxus*, however, without using it for combination. This is corrected here.

Disocactus hondurensis (Kimnach) Lodé **STAT. NOV.**

Basionym: *Disocactus nelsonii* var. *hondurensis* Kimnach in Cact. Succ. J. (Los Angeles) 37: 33 (1965).

Type: Honduras, Comayagua, 4 miles beyond El Rincón, on way from Siguatepeque, in canyon along road, 11 Aug 1962, *M. Kimnach* 394 (UC; iso.: HNT).

Synonyms: *Disocactus nelsonii* subsp. *hondurensis*, *D. nelsonii* var. *hondurensis*.

Notes: in the molecular study of Kotokova *et al.* (2017), *D. nelsonii* subsp. *hondurensis* is not related with *D. nelsonii*, but with *D. speciosus* subsp. *blomianus* (which is also not related with *D. speciosus*). This is why I considered to accept *D. hondurensis* (and *Disocactus blomianus*) as a correct and specific taxa.

ECHINOPSIS Zuccarini

After the molecular study of Schlumpberger & Renner (2012) showing that some *Echinopsis* were in fact *Lobivia* and vice versa, Schlumpberger changed *Echinopsis bridgesii* into *Lobivia bridgesii*, for the presence of one “bridgesii” clade basal to *Lobivia*.

Their resemblance is not due to a common ancestor, but of an evolutionary convergence. Flowers, either nocturnal or diurnal are not useful in classification as they only show adaptation to a determined pollinator. However, this doesn't help much to the classification and this is why some hobbyists prefer to cast doubts on molecular analyses and the merits of these drastic changes.

Echinopsis callochrysea* (Ritter) Lodé **STAT. NOV.**

Basionym: *Hymenorebutia aurea* var. *callochrysea* Ritter, Kakteen Südamerika 2: 468 (1980).

Type: Argentina, Prov. Salta, west Alemania, Ritter 985.

Synonyms: *Echinopsis aurea* var. *callochrysea*, *E. fallax* var. *callochrysea*, *Hymenorebutia aurea* var. *callochrysea*, *Lobivia aurea* var. *callochrysea*.

Strangely enough, in the DNA study of Schlumpberger & Renner (2012) *E. aurea* is polyphyletic, with the isolated northernmost form, *E. aurea* var. *callochrysea* close to *E. tubiflora*. Thus, not only this taxon is not a synonym of *E. aurea* subsp. *fallax* as believed before, it is a distinct species not even related to *E. aurea*. In fact, *E. callochrysea* is far away from the distribution area of all other subspecies of *E. aurea*. We have evidences: Rausch (1987) commented: “without the flower this plant looks very much like *Echinopsis tubiflora* with which it grows frequently”; precisely, in the molecular work of Schlumpberger & Renner, we find *E. callochrysea* in a clade between *E. tubiflora* and *E. oxygona*.

EPITHELANTHA Britton & Rose

Epithelantha spinosior* subsp. *huastecana* (D.Donati & Zanovello 2010) Lodé **COMB.NOV.**

Basionym: *Epithelantha unguispina* subsp. *huastecana* D.Donati & Zanov. in *Piante Grasse* 30: 186 (2010).

Type: Mexico, Nuevo León, Mpio. Santa Catarina, Huasteca canyon, calcareous cliffs, Oct 2010, *Hinton et al.* 29228 (GBH, MEXU).

In their DNA study, about *E. spinosior*, Aquino *et al.* (2019), conclude that “there are no differences with respect to *E. unguispina*”. They have chosen *E. spinosior* as the correct name for priority, giving a lectotype and an epitype. Also, they considered *E. unguispina* subsp. *huastecana* to be a synonym of *E. spinosior* although in view of the distinct seeds, it is better to keep it as a subspecies of it.

ERIOSYCE Philippi

As proposed by Kattermann (1994), the genus *Eriosyce sensu lato* is not monophyletic (Nyffeler 2002, Machado 2007, Nyffeler & Egli 2010, Bárcenas *et al.* 2011, Hernández-Hernández *et al.* 2011, Guerrero *et al.* 2011). The cladogram of Hernández-Hernández *et al.* (2011) shows a clade including *Eriosyce aurata* and *Eriosyce islayensis* (= *Islaya islayensis*) well separated from the other *Eriosyce* s.l., a result which we find also in the molecular analyses of Bárcenas *et al.* (2011).

According to Guerrero *et al.* (2019), Kattermann’s broad concept of *Eriosyce* as well as the reduced amount of taxa are disputed (Zuloaga *et al.*, 2007; Duarte *et al.*, 2014; Hernández-Ledesma *et al.* 2015).

Concretely, today we have 7 clades which are separately monophyletic (Guerrero *et al.* 2019) which allow a better classification and comprehensive study and conservation of these genera: *Eriosyce sensu stricto* now includes *Islaya*.

Eriosyce bicolor* (Akers & Buining) Lodé **STAT.NOV.**

Basionym: *Islaya bicolor* Akers & Buining, in *Succulenta* (Netherlands) 4: 38-41 (1951).

Type: Central Perú, mesa between Nazca and Loma, Akers s.n. (DS).

Notes: this taxon is reintegrated because its seeds have nothing to do with *E. islayensis* (see seed gallery). In fact, morphologically, we have more or less 5 different types of seeds within *Islaya*, which represent as many taxa which should be separated and reinstated as correct species. Already in 1994, Kattermann wrote about *Islaya* genus: “*Flower characters suggest the possibility that more than one species exists and seeds observed may support this*”.

I. brevicylindrica, as well as *I. grandiflorens* have seeds which are probably related to *E. bicolor* (not *E. islayensis*), although they are shorter and more globose.

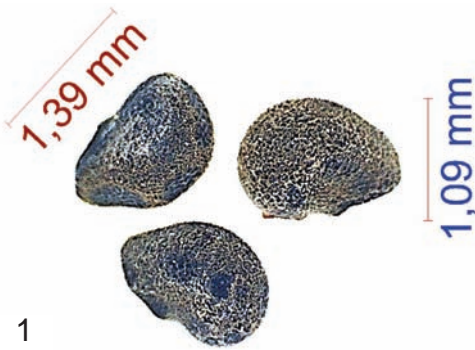
Eriosyce islayensis* subsp. *divaricatiflora (Ritter) Lodé **STAT NOV.**

Basionym: *Islaya divaricatiflora* Ritter, *Taxon* 13 (4), S. 144; 28. 5. (1964).

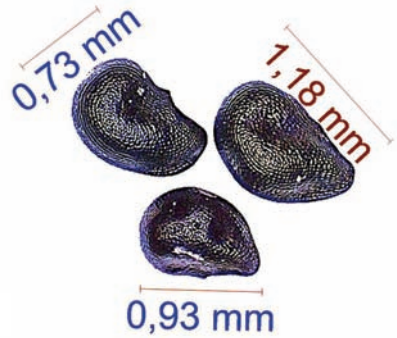
Type: Perú, Arequipa, Camaná, 1956, Ritter FR588 (U).

Synonyms: *Islaya divaricatiflora*, *I. islayensis* var. *divaricatiflora*, *Neoporteria islayensis* var. *divaricatiflora*.

Notes: once more, seeds are quite different from the type as well as the morphology of



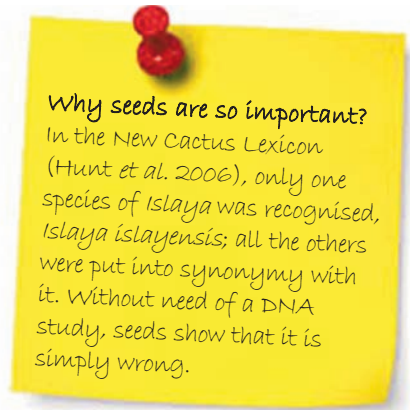
1: *Islaya bicolor*, N. Bella Unión, Dpto Arequipa, 390 m, Perú. X45 (magnification). © JL



2: *Islaya islayensis* subsp. *divaricatiflora*, behind lomas, SE Punta Bombón, Arequipa 920 m, Perú. X45.



3: *Islaya krainziana*, Arica, Chile. X45. © JL



the plants, thus, this taxon cannot be synonymized. Alfred Lau found the plant growing together with *Pygmaeocereus bylesianus*.

Erosyce krainziana (Ritter) Lodé **STAT NOV.**

Basionym: *Islaya krainziana* Ritter, Sukkulentenk. 7-8: 31 (1963).

Type: Chile, Poconchile, Ritter 200 (ZSS).

Synonyms: *Islaya krainziana*, *Neoporteria krainziana*.

Notes: one more time, seeds are quite distinct from the other “islayas”, thus representing a different taxon.

EULYCHNIA Philippi

Eulychnia elata* (Ritter) Lodé **COMB. NOV.**

Basionym: *Eulychnia acida* var. *elata* F.Ritter, Kakteen Südamerika 3: 896 (1980).

Type: Chile, Atacama, W. of Castillo, border of the departments of Freirina and Copiapó, Ritter FR 651 (Z).

Distribution: Chile (Atacama).

Notes: described first by Ritter as a variety of *E. acida*, recent DNA research by Larridon et al. (2019) show this taxon distinct of *E. acida* and should be, like *E. vallenarensis* and *E. chorosensis*, better considered as a species on its own, which is done here.

FEROCACTUS Britton & Rose

Ferocactus echidna subsp. ***victoriensis*** (Rose) Lodé **COMB. NOV.**

(Sphalmate : “echidne”, correctable orthographical error under ICN Art. 60.1).

Basionym: *Ferocactus victoriensis* Rose, Contr. U.S. Natl. Herb. 12: 291 (1909).

Type: Mexico, Tamaulipas, vicinity of Victoria, 320 m alt., *Edward Palmer* 267 (US 572498).

Synonyms: *Echinocactus victoriensis*, *Ferocactus echidne* var. *victoriensis*, *Ferocactus victoriensis*.

Notes: although this taxon is usually considered by some a synonym of ***F. echidna*** (Taylor 1984, Hunt *et al.* 2006), some others think this is a variety of the latter. In my opinion and after studying the seeds, which are distinct, I consider this taxon a subspecies of ***F. echidna***. Although still not currently used and in respect of the International Code of Nomenclature (ICN, Shenzhen code, the correct orthograph for this taxon and the type is ***Ferocactus echidna***, not *echidne*.

LOBIVIA Britton & Rose

Lobivia bridgesii subsp. ***vallegrandensis**** (Cárdenas) Lodé **COMB. NOV.**

Basionym: *Echinopsis vallegrandensis* (as “vellegradensis”, Cárdenas, Cactus (Paris) 64: 163 (1959).

Type: Bolivia, Santa Cruz, Florida, between Mataral and Valle Grande, 2700 m, Apr 1957, *Cárdenas* 5501 (LIL, US).

Synonyms: *Echinopsis bridgesii* subsp. *vallegrandensis*, *E. cochabambensis*, *E. comarapana*, *E. cotacajesii*, *E. huotii*, *E. huotii* subsp. *vallegrandensis*.

Notes: the plant seems to be so variable that many names were given to it. In the molecular work of Schlumpberger & Renner (2012), this taxon is represented by two of the supposed synonyms: *Echinopsis cochabambensis* and *E. cotacajesii*. However, seeds of the type and subsp. ***vallegrandensis*** are characterized by straight margins, while those of subsp. ***yungasensis*** are curved and the hilum-micropylar area is oblique. Seeds of the invalidly published *E. semidenudata* with straight margins seem to pertain to ***E. bridgesii*** although plants do not resemble each other. A great confusion surrounds this group.

Lobivia bridgesii subsp. ***yungasensis*** (F.Ritter) Lodé **COMB. NOV.**

Basionym: *Echinopsis yungasensis* F.Ritter, Kakteen Südamerika 2: 631 (1980).

Type: Bolivia, La Paz, Sud-Yungas, Plazuela, 1100 m, 1953, *Ritter* 331 (U, SGO, ZSS).

Synonyms: *Echinopsis bridgesii* subsp. *yungasensis*, *E. yungasensis*.

Notes: accepted in Hunt *et al.* (2006) and Anderson (2011, Egli ed.), this subspecies is possibly no more than a northern, smaller form of the type.

To be continued...

Aknowledgements: I wish to particularly thank **Brice Chéron**, who helped me to clear up the sphalmates.