

Consolea vel Opuntia microcarpa versus picardae

or analysis and resolution of nomenclatural problems of all
these taxa

by Brice P. R. CHÉRON
email : brice.cheron@laposte.net

Abstract: analysis of the nomenclatural validity and linked problems of each of the following taxa: *Consolea microcarpa*, *C. picardae*, *Opuntia microcarpa* and *O. picardae*. Then, a nomenclatural but also taxonomic solution is given for them.

Keywords: *Consolea microcarpa*; *C. picardae*; *Opuntia microcarpa*; *O. picardae*; nomenclature; status; application of the Code.

Résumé : analyse de la validité de chacun des taxons *Consolea microcarpa*, *C. picardae*, *Opuntia microcarpa*, *O. picardae* et de leurs problèmes nomenclaturaux à la suite desquels une solution nomenclaturale mais aussi taxinomique est donnée.

Mots-clés : *Consolea microcarpa* ; *C. picardae* ; *Opuntia microcarpa* ; *O. picardae* ; nomenclature ; statuts ; application du Code.

I° Foreword and methodology

1) Purpose

This paper analyses and aims to solve the different problems of nomenclatural application and the botanical definition of the taxa *Opuntia microcarpa*, *sensu auct. plur.*, *Opuntia picardae* Urb. (1919) -already well discussed-, as well as **their recombination under *Consolea* A.C. Lemaire (1862)**, using the current Shenzhen version of the International Code of Nomenclature for Algae, Fungi and Plants (TURLAND & *al.*, 2018) which will be hereinafter referred to and abbreviated as the “Code”. Then, a solution for the definition of the botanical entities and the concepts that each of them represents is given.

2) Working method used

As usual in these cases discussed and disputed which are consequently very largely on ideas and subjective opinions, it is necessary to start by **consulting the original documents** in competition or contested, without altering your own judgment by any source, points of view, or



Consolea picardae, Bayahibe, Dominican Republic.

© Christian Defferrard

opinions from other authors; at least as far as possible. This may seem simple to say, but this working method is important to strive towards objectivity. Then, progress is made in the knowledge of the file in **chronological order of facts...** as long as we can access documents, publications, herbarium parts, vouchers or boards, etc. involved; which fortunately the Internet allows greatly nowadays. Once your opinion is established on these bases, it becomes possible to search and to consult the other botanical works already carried out on the studied subject. Then, the intermediate result can be re-evaluated if necessary, and the final result finally established.

II°) The actual publishing dates of the involved taxa, in chronological order

1) Principle

One of the fundamental principles of the Code is that each new nomenclatural novelty must be duly published, on a dated document deemed to be tamper-proof (a publication published and printed by a third party, in the most frequent case). This fact allows that the dates of publication of the taxa are generally little debatable or questionable, and I

myself have not found a great ambiguity of dating in the publications of the concerned taxa. Though! In a botanical study about nomenclature, systematics or taxonomy, this is statistically common to find inconsistencies, inaccuracies or even errors. A slight date difference for the actual release of a taxon is here updated and corrected.

2) List of the taxa found during this study

Here is the ordinal list, based on the timeline of the publications of the taxa involved, in which the names of the authorities are given in expanded writing:

- 1st** : *Opuntia microcarpa* G. Engelmann (**1848**) (EMORY 1848 a, 1848 b) ;
2nd : *Opuntia microcarpa* G. Engelmann ex B.D. Jackson (**1894**) (JACKSON 1894-1895)¹
3rd : *Opuntia microcarpa* K.M. Schumann (**1898**) (SCHUMANN 1897-1899)²
4th : *Opuntia picardae* I. Urban (**1919**) (URBAN *in* FEDDE 1919) ;
5th : *Consolea microcarpa* (K.M. Schumann) E.F. Anderson (**1999**) (ANDERSON 1999) ;
6th : *Consolea picardae* (I . Urban) L.A.E. Areces-Mallea (**2000**) (ARECES-MALLEA 2000).

3) Correction of the known publication date of *Opuntia microcarpa* Engelm. ex B.D. Jacks.

For the very few publications where it was considered - for a good reason - (PINKAVA & PARFITT 1988), *Opuntia microcarpa* G. Engelmann ex B.D. Jackson is known to have been published in 1895. However, the fact is that it was published in 1894, at least in some major U.K. universities. This difference in dating is verified in the chronology of the *Index kewensis* available online on the International Plant Names Index, which is its direct continuation, or its heir (IPNI 2019). The information is also found in Taxonomic Literature, Volume II, page 397 (STAFLEU & COWAN 1979). This is explained by the fact that the booklets and volumes of the book were not

¹ This work consists of two instalments or parts : n° III and n° IV. The n° III (pages 1 to 656) was published on October 27, 1894; the n° IV (pages 657 to 1299) was published on October 19, 1895. The treatment of genus *Opuntia* is in the instalment n° III.

² Published in thirteen independent instalments. Their compilation as a book is from the early beginning 1899..

published at the same time nor exactly in the same way: this work of Mr. Jackson, the first and colossal *Index kewensis*, was first published and appeared in four independent instalments (or parts), from 1893 to 1895, before being compiled two by two and slightly repaginated in the form of the two-volumes book that we know, which actually dates from 1895 and was much more widely distributed. Anyway, it does not make it the oldest of the eponymous taxon *sensu* G. Engelmann, nor does it change its temporal and codistic precedence over the taxon of the same name too, but in the sense of K.M. Schumann.

III°) The nomenclatural status of these taxa and their names

1) Verification of official status

First and foremost, it is important to have one fact in mind: there are two different cases of nomenclatural status! The first case concerns those attributed to a taxon based on our own understanding of the Code and of the taxon itself. This is what every botanist does in its own way when ones write, for example: “I consider this taxon to be correct”. Another example: the fact that I consider *Opuntia microcarpa* G. Engelmann (1848) as a *nom. prov.* These are opinions. The second case concerns the nomenclatural statutes defined and voted by the expert nomenclators at international congresses, and those decided irrevocably by the International Nomenclatural Committee during their binding decisions or statutory decisions. Ex.: *Cactaceae* A.L. de Jussieu (1789), *nom. cons.* (WIERSEMA & al. 2015). These statutes are official, always considered correct and definitively established. In addition, there are statutes recognized by the Code, others not; these acceptances of status fluctuate according to the versions of this work. For example, “*nomen provisorium*“, whose official abbreviation is *nom. prov.*, is not an official status (a designative) in the current Code that uses rather “provisional name”, in English (TURLAND & al., 2018), or even in places, “so-called *nom. prov.*” (*ibid.* 2018).

For the books and publications needed and consulted in this study, as well as for all the following taxa, I have found no official decision and therefore no official status concerning them. That is to say, the statutes defining these taxa or publications, which are listed in the published Appendices of the penultimate Code (Melbourne Code) (WIERSEMA & al., 2015), as well as in the online searchable Appendices of the current Code (Shenzhen Code) (WIERSEMA & al., 2019).

2) *Opuntia microcarpa* G. Engelmann (1848)

Status: *nomen [et species] provisorum et nomen invalidum.* It is the oldest taxon and concept but Mr. Engelmann did not recognize them during his lifetime: upon his death, his taxon became a ***nomen invalidum*** according to the Article 36.1 of the current Botanical Code. Normally, publishing in a letter is not valid either. But this was done before January 1, 1953, and Mr. Emory transcribed this letter of George Engelmann by hard copy, which was widely distributed (10,000 copies were printed!). Here we have a special case of “indelible autograph”. For both causes, Article 30.5 does not invalidate this work for purely printing and issuing reasons. In the same way, this preliminary work of Engelmann, considering the date, cannot be invalidated on its form by lack of use of the Latin language, etc. At that time, the Code was not as rigorous, as it did not exist yet. In addition, G. Engelmann quoted the material on which his work was based (the “original material” in the fine sense of the Code): it is about an original drawing of J.M. Stanly, reproduced under the illustration n° 7 *in* Emory, (this one may serve as a lectotype) (EMORY 1848 a, 1848 b). Now, again at that time, producing nomenclatural novelty only on the basis of an illustration was not forbidden.

This taxon is therefore **invalid only because George Engelmann was too hesitant** and can easily be proved by reading it on page 157 (EMORY 1848 b) or page 158 (EMORY 1848 a). In short, he did not recognize his concept or his new taxon. For all the rest, this taxon is absolutely consistent, even though it was founded on a poor illustration.

3) *Opuntia microcarpa* G. Engelmann ex B.D. Jackson (1894)

Status: *species nova et nomen validum.* At the rank of species, this taxon is largely unknown and forgotten. It is true that it goes easily unnoticed, but this is the Botanist and Publisher of the Kew Gardens, Benjamin D. Jackson who, according to the Code, actually validates the *species nova*, the binomial *O. microcarpa*. By this valid nomenclatural act, his species is new. Consulting this publication (JACKSON 1894-1895) provides absolutely no contribution to the biological knowledge of the designated taxon. However, its author clearly indicates the direct reference to Engelmann *in* Emory, so that this work is diagnostically valid by reference citation, in accordance with Art. 38.13 and 38.14 of the Code. The nomenclatural novelty of B.D. Jackson cannot be more concise, marked by the British pragmatism, but everything is correct. In particular, its



Copy of the illustration nr.7 in Emory's Notes milit. rec. [House of Representatives Edition], 1848.

acceptance of the taxon as a valid and real botanical entity suffers no doubt (JACKSON 1893, 1894-1895), contrary to the letter and thoughts of George Engelmann *in* Emory, because in fact at that time, the *Index kewensis* was intended not only to establish an exhaustive list of known taxa, but also to define their validity and synonymies. Thus, the name *Opuntia microcarpa* is applicable only for a taxon living on the banks of the Del Norte and Gila rivers, USA. *O. microcarpa* G. Engelmann ex B.D. Jackson (1894), although with a confused genesis, with a lost holotype, with fuzzy circumscription and concept in the sense of G. Engelmann *in* Emory (1848) is **nevertheless perfectly legitimate and valid**. Its holotype, lost so far, is J.M. Stanly's original drawing, seen by G. Engelmann in 1848 when he wrote his description, in accordance with Article 9.1, Note 1 of the Code (GANDHI, comm. pers. 2019).

On a descriptive matter, the transcription of Engelmann's letter - or somewhere else during the many stages of communication and printing with W. Emory - gave birth to a "3 or 4 inches long" (EMORY 1848 a, 1848 b) for the fruits! This equates to fruit lengths of 7.62 to 10.16 cm long which is totally inadequate for the *microcarpa* concept, especially since the cladodes are set to "1½ to 2½ inches long" [3.81 to 6.35 cm long]. For me, it is certain that

this is a mistake because George Engelmann clearly specifies his thoughts about the anatomical dimensions of the species since one reads in his text the peremptory clue “only about” (*ibid.* 1848 a, b) before the size of the fruits. After research, I think the sentence should have been written: “... only about 3 or 4 lines long”, another unit of measurement used by the author. Which would give us hypothetical fruits of 0.76 or 1.02 cm long, values much more acceptable for small fruits in *Opuntia* P. Miller (1754), but not necessarily relevant... We can doubt about the proportions given by the sketch of Mr. Stanly, something G. Engelmann also does (*ibid.* 1848 a, b).

Finally, given its genesis, there is a difficulty for the citation of the authority of the name of this species. How to correctly quote *O. microcarpa* to comply with the Code? For me, it must be exactly “*Opuntia microcarpa* G. Engelmann ex B.D. Jackson (1894)” or “*O. microcarpa* Engelm. ex B.D. Jacks. (1894)” for the shorthand writing. This is because of the diagnostic reference to Engelmann *in* Emory in the validating publication of the name of this taxon, and also for courtesy. The use of the “ex” in the authority of a botanical name is optionally allowed by the Code, but its use is made more and more complex over the years. It seems to me indispensable here because it provides the only diagnostic elements of the taxon, namely the provisional work of Engelmann where we find the diagnosis, because Mr. Jackson did not bring other diagnostic or descriptive data (something which was still allowed at this time). ***Opuntia microcarpa* G. Engelmann ex B.D. Jackson (1894) is a valid name.**

4) *Opuntia microcarpa* K.M. Schumann (1898)

Status: *species nova et nomen illegitimum.* This is by virtue of the fundamental Principle IV of the Code. The taxon *Opuntia microcarpa* G. Engelmann ex B.D. Jackson (1894) and its name are valid as a nomenclatural act on one hand, and as a species on the other hand (although inaccurately circumscribed), making it the oldest for being published four years prior to ***O. microcarpa* K. Schumann (1898)**, which therefore necessarily takes the status of **illegitimate later homonym** (TURLAND & *al.*, 2018). Herr Schumann’s taxon, although properly designed, also falls under the provisions of Articles 52.1 and 53.1 of the Code. Since the *O. microcarpa* binomial is already linked to Mr. Stanly’s original drawing as a *holotypus* (lost), it cannot be used again to designate a new species of *Opuntia*.

5) *Opuntia picardae* I. Urban (1919)

Status: *nomen novum et nomen validum*. Ignatz Urban's work consisted of a new name replacing an already existing name of a taxon, which the Code refers to as "substitute" or "alternative name". Most of the time, Mr. Urban's work is perceived as this: a vast enumeration of replacement names for valid, already existing names (and taxa). His taxa are therefore mostly *nom. superfl.* and in consequence, mostly *nom. illeg.* However, his publication gives a Latin description, a precise reference to the name he intended to replace, with the removal of the ambiguity relating to the taxon of George Engelmann: "(non Engelm in Emory Rep. 1848, p. 158)" (URBAN 1919). He also gives a *locus classicus*, phenological data, and identified samples that may be used as *typus*... Finally, in his first footnote, page 35, he says in essence: "Since there are now abundant and perfectly coherent materials, as well as concordant information on the shapes [habitus] of plants, the independence of the species can no longer be doubted." (URBAN 1919). By these facts, in terms of codification requirements and fulfilment at this period, his work is entirely valid.

For the occasion and for our studied case, since *Opuntia microcarpa* K.M. Schumann (1898) is illegitimate for the *Opuntioideae* K.M. Schumann (1898) discovered by the missionary father Louis Picarda in Haiti, then *Opuntia picardae* I. Urban (1919) becomes the first legitimate and valid name to be available to designate the Haitian plants of Cul-de-Sac and elsewhere on the periphery of the island of Hispaniola!

6) *Consolea microcarpa* (K.M. Schumann) E.F. Anderson (1999)

Status: *combinatio nova et nomen illegitimum*. The new combination of K.M. Schumann's taxon under *Consolea* Lem. by Edward Anderson is **illegitimate**, because based on a name of a taxon (basionym) already illegitimate. It is invalidated by Article 58.1 (TURLAND & al. 2018).

7) *Consolea picardae* (I. Urban) L.A.E. Areces-Mallea (2000)

Status: *combinatio nova et nomen validum*. Like Herr Urban's *Opuntia* above, it is this new combination that is **legitimate and therefore valid** to designate, under *Consolea* Lem., the endemic taxon that grows here and there in Cul-de-Sac and elsewhere on Hispaniola.

IV°) Taxonomy: what to do with all these names of taxa to define our *Opuntioideae* ?

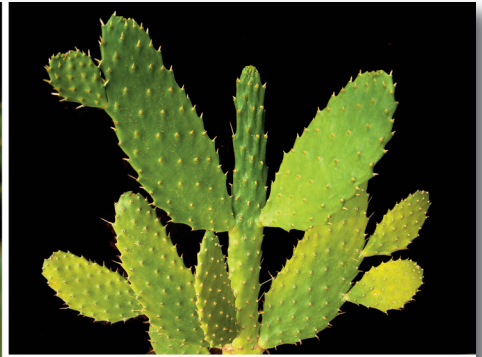
Now that the nomenclature of the six names aforementioned has been solved, there is still a need to treat these entities taxonomically. In this study, there are two of them: the taxon from Arizona and one from the island of Hispaniola.

The taxon from Arizona, *Opuntia microcarpa* G. Engelmann ex B.D. Jackson (1894), is accepted as a good taxon at species rank by David Griffiths, who certified it having seen it in Arizona at the beginning of the 20th Century (GRIFFITHS 1916), but without a formal evidence having reached us. This taxon can also be considered as a complete synonym, since the hypothesis that his illustration was based on and came from an immature individual, or one with abortive fruits, or perhaps one teratologic, cannot be categorically refuted. Or could it be understood as a variety or a form designating the population or individuals which have fruits smaller than the type species and living at least at the diagnostic *locus classicus*. But this species would remain to be defined! Currently, it is mostly placed in synonym of *Opuntia phaeacantha* G. Engelmann (1849) according to the treatment of Britton & Rose (BRITTON & ROSE 1922), or hypothetically under *O. engelmannii* J.F.M. Salm-Reifferscheidt zu Dyck ex G. Engelmann (1850), *sensu lato* according to other authors (LODÉ 2015). The great ambiguity of the protologue of this taxon unfortunately leaves his definition open to a definitive solution, which belongs to local botanists.

As for the **endemic taxon of the island of Hispaniola**, there is no longer any doubt. Recent phylogenetic studies restore *Consolea* Lem. (MAJURE & *al.* 2012, MAJURE & PUENTE 2014, LODÉ 2015) and maintain it as a clearly delimited genus, putting an end to this controversy. Note that this position has been supported by the specialist of the genus for more than twenty years now (ARECES-MALLEA 1996, 2000) and is accepted as correct here. So, for the taxon from Cul-de-Sac discovered by Father Picarda, only **the name *Consolea picardae* (I. Urban) L.A.E. Areces-Mallea (2000) is nomenclaturally and taxonomically correct.**

V°) Conclusion

These cases of nomenclature, to say the least confusing and complex,



Consolea picardae Bayahibe, photo & coll. © JL. Right, in the Jardin Exotique de Monaco

sometimes cryptic and much reworked, were long controversial and discussed chronically for a long time. Nomenclatural and Code ambiguities have been explained and resolved here. *Consolea picardae* (Urb.) Areces (2000) is correct in every respect, and *Opuntia microcarpa* Engelm. ex B.D. Jacks. (1894) is nomenclaturally correct but its exact definition as a taxon remains to be established and a consensus still need to be found. Either it may be admitted as a good species on the good faith of the authors who have recognized it as such (*bona fide*), or placed into synonymy of another taxon, or forgotten as an unsolvable dubious name (*nom. dubium*), or it may even be redefined, what George Engelmann asked to William Emory, by an *emendavit* and a neotypification.

VI°) Acknowledgment

The author is indebted to Professor Kanchi N. Gandhi of the Harvard University, U.S.A., for his teaching and valuable assistance in solving these problems.

VII° Bibliography

ANDERSON Edward F. (1999) : Some nomenclatural changes in the Cactaceae, subfamily Opuntioideae. Cactus and Succulent Journal (U.S.[A.]), vol. 71, n° 6 : p. 324-325.

ARECES-MALLEA [L.] Alberto E. (1996) : New taxa of *Consolea* Lemaire (Cactaceae: Opuntioideae) from Cuba. Brittonia, vol. 48 : p. 224-236.

ARECES-MALLEA [L.] Alberto E. (2000) : *Consolea picardae* (Urban) Areces, comb. nov. – Revalidation of a neglected West Indian opuntiid. Cactus and Succulent Journal (U.S.[A.]), vol. 72, n° 1 : p. 41-46.

BRITTON Nathaniel L. & ROSE Joseph N. (1922) : The Cactaceae. Volume I. Washington : The Carnegie Institution. VII + 236 p. + XXXVI tab.

EMORY William H. (1848 a) : Notes of a military reconnoissance, from Fort Leavenworth, in Missouri, to San Diego, in California, including part of the Arkansas, Del Norte, and Gila Rivers. Ex. Doc. No. 7 [Senate édition]³. Washington : Wendell and van Benthuyesen, printers. 416 p. + 12 tab.

EMORY William H. (1848 b) : Notes of a military reconnoissance, from Fort Leavenworth, in Missouri, to San Diego, in California, including part of the Arkansas, Del Norte, and Gila Rivers. In EMORY W. H., ABERT J. W., COOKE G. & JOHNSTON A. R.† [Auteurs] : Ex. Doc. No. 41 [House of Representatives édition]⁴. Washington : Wendell and van Benthuyesen, printers. 614 p. + 11 tab. + picturae.

JACKSON Benjamin D. (1893) : Index kewensis, Plantarum Phanerogamarum nomina et synonyma omnium generum et specierum a Linnaeo usque ad annum MDCCCLXXXV complectens nomine recepto auctore patria unicuique plantae subjectis. Tome I, fasc. I & II [Vol. 1, pt. 1 & 2]. Oxonii [Oxford, U.K.] : Clarendon Press. 1268 p.

JACKSON Benjamin D. (1894-1895)⁵ : Index kewensis, Plantarum Phanerogamarum nomina et synonyma omnium generum et specierum a Linnaeo usque ad annum MDCCCLXXXV complectens nomine recepto auctore patria unicuique plantae subjectis. Tome II, fasc. III & IV [Vol. 2, pt. 1 & 2]. Oxonii [Oxford, U.K.] : Clarendon Press. 1299 p.

LODÉ Joël (2015) : Taxonomie des Cactaceae. Tomes I & II, version française. Cuevas del Almanzora : Éditions Cactus-Aventures. 1388 p. + XLIV p.

MAJURE Lucas C. & CLASE Teodoro (2018) : Uso del nombre *Consolea microcarpa* versus *Consolea picardae* (CACTACEAE) par una especie endémica de La Española. Journal of the Botanical Research Institute of Texas, vol. 12 (1) : p. 75-80.

MAJURE Lucas C., PUENTE R., GRIFFITH M. P., JUDD W. S., SOLTIS P. S. & SOLTIS D. E. (2012) : Phylogeny of *Opuntia* s.s. (Cactaceae): Clade delineation, geographic origins, and reticulate evolution. American Journal of Botany, vol. 99, n°5 : p. 847–864.

MAJURE Lucas C. & PUENTE Raul (2014) : Phylogenetic relationships and morphological evolution in *Opuntia* s. str. and closely related members of tribe Opuntieae. Succulent Plant Research, vol. 8 : p. 9–30.

PINKAVA Donald J. & PARFITT Bruce D. (1988) : Nomenclatural changes in Chihuahuan Desert *Opuntia* (CACTACEAE). Sida, Contributions to Botany, vol. 13, n° 2 : p. 125-130.

SCHUMANN Karl [M.] (1897-1899) : Gesamteschreibung der Kakteen. (*Monographia Cactacearum*). Neudamm : Verlag von J. Neumann. XI + 832 p.

STAFLEU Frans A. & COWAN Richard S. (1979) : Taxonomic literature. Second edition, vol. II. Utrecht : Bohn, Scheltema & Holkema, publishers. XVIII + 991 p.

TURLAND Nicholas J., WIERSEMA J. H., BARRIE F. R., GREUTER W., HAWKSWORTH D. L., HERENDEEN P. S., KNAPP S., KUSBER W.-H., LI D.-Z., MARHOLD K., MAY T. W., McNEILL J., MONRO A. M., PRADO J., PRICE M. J. & SMITH G. F. (2018) : International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code). Regnum Vegetabile, vol. 159. Glashütten : Koeltz Botanical Books. XXXVIII + 254 p.

URBAN Ignatz (1919) : Sertum Antillanum. VIII. In FEDDE Friedrich [Éditeur] : Repertorium specierum novarum regni vegetabilis, Band XVI, No. 1/4 [Vol. 16, pt. 1] : p. 32-41.

WIERSEMA John H., McNEILL J., TURLAND N. J., BARRIE F. R., BUCK W. R., DEMOULIN V., GREUTER W., HAWKSWORTH D. L., HERENDEEN P. S., KNAPP S., MARHOLD K., PRADO J., PRUD'HOMME VAN REINE W. F. & SMITH G. F. (2015) : International Code of Nomenclature for algae, fungi, and plants (Melbourne Code) ; Appendices II-VIII. Regnum Vegetabile, vol. 157. Königstein : Koeltz Scientific Books. 492 p.

VIII°) Webography

HARTLEY Helen, LINDON H., & al. [collectif] (2004-2019) : The International Plant Names Index [IPNI]. (accessed in January 2019).

WIERSEMA John H. & al. [collectif] (2019) : International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code) ; Appendices I-VIII. [Edition online]. (accessed in February 2019).

3 Even among this same edition, some prints may differ slightly in content and in typography.

4 This edition is considered to be slightly anterior to the edition for the Senate for some of its prints, despite the numbers that suggest the opposite. Among this edition, some prints may differ.

5 This Volume II consists of two instalments or parts (pt. III and pt. IV). Pt. III (pages 1 to 656) was published on October 27, 1894; pt. IV (pages 657 to 1299) was released on October 19th, 1895.