



## Synonymies and typification of the Rhamnaceae of Brazil

Rita Baltazar de Lima<sup>1</sup> and Ana Maria Giulietti<sup>2,3</sup>

Received: 26 August, 2013. Accepted: 18 February, 2014

### ABSTRACT

In the course of preparing the taxonomic revision of the Rhamnaceae of Brazil for the Catalogue of Plants and Fungi of Brazil, several problems related to typification were detected. Taxonomic observations and nomenclatural notes are here reported based on the analysis of type material, as well as classic and recent collections, in 63 herbaria in Brazil and abroad, together with analyses of virtual herbaria. Types were sought, the majority of which were located and studied. Eleven synonymies, 37 lectotypes and one neotype are designated and defined for seven genera in the family.

**Key words:** Rhamnaceae, taxonomy, synonymy, lectotypification

### Introduction

The family Rhamnaceae is distributed in tropical, subtropical and temperate areas. In Brazil, it occurs from north to south in forests as well as in open vegetation. The family is characterized by woody, herbaceous and scandent species with flowers with cucullate, convolute or conchiform petals, antipetalous stamens and a nectariferous disc internally enclosing the floral receptacle. The occurrence of 47 species within 14 genera, representing seven of the tribes in the family, have been reported for the Brazilian flora (Lima 2010).

The Rhamnaceae species occurring in Brazil were studied by Reissek (1861), who recognized 47 species in 12 genera. Subsequent studies undertook taxonomic treatments that were more comprehensive for some of these genera, such as *Condalia* (Johnston, 1962), *Colubrina* (Johnston, 1971), *Scutia* (Johnston, 1974), *Rhamnus* (Johnston & Johnston, 1978), *Discaria* (Tortosa, 1983) and *Colletia* (Tortosa, 1989). Lima (2000) produced and presented a taxonomic revision of the Rhamnaceae of Brazil, encompassing the diversity and occurrence of the family in different plant habitats throughout the country. That work and the studies developed thereafter involved analyses of initial descriptions (protologues) and type material of Rhamnaceae species, which led to the detection of nomenclatural problems, mainly regarding typification and synonymy, which are presented here.

### Materials and methods

The nomenclatural revision presented here was based on studies of herbarium collections, of personal field collections throughout Brazil and of the specialized literature. The Rhamnaceae of Brazil were studied in the collections of the following herbaria: ALCB, B, BHCB, BM, BR, C, CEN, CEPEC, CESJ, CH, COL, CVRD, EAC, EAN, ESA, ENCB, FCAB, FLOR, G, GUA, HB, HRB, HRCB, HUEFS, IAN, IBGE, ICN, INPA, IPA, JPB, K, L, LIL, M, MAC, MBM, MBML, MG, MEXU, NY, OXF, P, PACA, PEUFR, R, RB, RBR, RFA, S, SI, SP, SPF, SPSE, TEX, U, UB, UEC, UFP, UPS, US, VEN, VIC, VT and W; which acronyms are in accordance with the Index Herbariorum (Thiers continuously updated). Studies were complemented with field collections by the authors, collections in virtual herbaria, as well as the original descriptions of the species. Exsiccata of the type material examined are indicated with an exclamation mark. Exsiccata of the type material indicated with †, deposited in B was destroyed.

Among the Rhamnaceae species occurring in Brazil, lectotypes were selected for those described by Reissek (1861). Except in specific cases, the selected lectotype was the specimen from W, where Reissek worked and produced the chapter on Rhamnaceae published in *Flora Brasiliensis* (Reissek, 1861).

<sup>1</sup> Herbário JPB, Departamento de Sistemática e Ecologia/Universidade Federal da Paraíba/Campus I/João Pessoa, PB, Brazil. (ritalima\_ufpb@yahoo.com.br)

<sup>2</sup> Programa de Pós-Graduação em Botânica, Herbário HUEFS, Departamento de Ciências Biológicas, Universidade Estadual de Feira de Santana, BA, Brazil. (anagiulietti@hotmail.com)

<sup>3</sup> Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AB, UK

## Results and discussion

Among the 14 Rhamnaceae genera that occur in Brazil, we synonymized or lectotypified taxa within seven genera: *Ampelozizyphus* Ducke, *Colletia* Jussieu, *Colubrina* Brongn., *Crumenaria* Mart., *Gouania* Jacq., *Rhamnidium* Reissek and *Ziziphus* Mill.

### 1. *Ampelozizyphus* Ducke

**1.1. *Ampelozizyphus amazonicus*** Ducke, Arch. Inst. Biol. Veg. 2(2): 158. 1935. Type: Brazil, Amazonas, Manaus, Cachoeira do Mindú, 17 Dec 1929, *Ducke s.n.* (lectotype RB 25654! here designated; isolectotypes RB!, K!, NY!, P!, U!, US!).

Ducke (1935) described this species based on specimens from the state of Amazonas, collected in Manaus at Cachoeira do Mindú, *Ducke s.n.* 17.XII.1929 and at the Cataratas do Rio Tarumã, *Ducke s.n.* 24.XII.1929 (K!, RB!, P!, S!, U!).

### 2. *Colletia* Jussieu

**2.1. *Colletia exserta*** Klotzch ex Reissek, in Martius. Fl. bras. 11(1): 100. 1861. Type: Brazil Meridional, *Sellow 4268* (holotype B†, lectotype W!, designated here; isolectotypes BR!, K!). = *Colletia insidiosa* Reissek, in Martius. Fl. bras. 11(1): 100. 1861. Type: Brazil Meridional, *Sellow 904* (holotype B†, lectotype BR! designated here). **Syn. nov.**

Tortosa (1989) placed *Colletia exserta* in synonymy with *C. paradoxa* (Sprengel) Escalante, explaining that the species proposed was a morphological variant corresponding to the juvenile stage of *C. paradoxa*. Analysis of the type material of both species, together with observations of more recent collections available in Brazilian and Argentine herbaria, as well as from field collections, enabled the recognition of the two species. *Colletia exserta* is distinguished from *C. paradoxa* mainly by presenting narrow, delicate, curved ascending branches and tubular flowers, whereas in *C. paradoxa* the branches are broad, thick, straight and patent, even in young plants, and the flowers are urceolate. The lectotypification of *C. exserta* is required because the holotype in B was destroyed.

The proposal to place *Colletia insidiosa* in synonymy with *C. exserta* is supported by the analysis of the type material, which was collected by Sellow for both taxa, there being no significant differences between the two. As in the case of *C. exserta*, the holotype of *C. insidiosa* (in B) was destroyed, making its lectotypification necessary.

### 3. *Colubrina* Brongn.

**3.1. *Colubrina cordifolia*** Reissek, in Martius. Fl. bras. 11(1): 98. 1861. Type: Brazil, Bahia, Serra d'Açuruá, *Blanchet 2832* (lectotype M! designated here; isolectotypes BM!, BR!, F!, K 2ex!, P 3ex!).

= *Colubrina solanacea* Rizzini, Leandra 3-4 (4-5): 11. 1974. Type: Brazil, Bahia, Campo Formoso, *D. P. Lima 13130* (holotype RB!). **Syn. nov.**

*Colubrina cordifolia* was described without designation of the herbarium where the holotype was deposited, and the selection of a lectotype is therefore necessary. A comparative analysis of the type material of *Colubrina cordifolia* and of *C. solanacea*, both collected in the semi-arid region of Bahia, revealed that these taxa are very similar, mainly in their leaves and flowers, which supports the synonymy between the two.

### 4. *Crumenaria* Mart.

**4.1. *Crumenaria choretroides*** Mart. ex Reissek, in Martius. Fl. bras. 11(1): 114. 1861. Type: Brazil, Goiás, rio São Francisco, *Pohl s.n.* (lectotype W! designated here; isolectotype NY!).

The description of this species was based on the following syntypes: Brazil, Minas Gerais, Serro Frio, Jun, *Martius s.n.* (M!); Brazil, Goiás, Jul 1846, *Gardner 3422* (BM!, BR!, G!, K!, OXF!, NY!, W!); and Brazil, Goiás, rio São Francisco, *Pohl s.n.* (W!, NY!). The material of *Pohl s.n.* is complete and clearly shows the characteristics of the species. In addition, it is deposited in the herbarium where the author of the species worked and therefore for these reasons it is selected as the lectotype.

**4.2. *Crumenaria decumbens*** Mart. Nov. Gen. Sp. Pl. 2(1): 68, t. 160. 1826. Type: Brazil, Piauí, Oeiras, *Martius 2479* (lectotype M! designated here; isolectotypes G!, M!).

= *Crumenaria diffusa* Suess. Lilloa 4: 134. 1939. Type: Brazil, Ceará, Jun 1933, *Luetzelburg 25788* (holotype M!). **Syn. nov.**

= *Crumenaria steyermarkii* Standl. Field Mus. Nat. Hist., Bot. Ser. 22: 156. 1940. Type: Guatemala, Dept. Jutiapa, between Agua Blanca and Amatillo, 950-990 m, 24.X.1939, *J. A. Steyermark 30448* (holotype F; isotype NY!). **Syn. nov.**

The collection of *Martius 2479* in M is composed of two sheets, which were examined by Johnston in 1968. He labeled one as the holotype but made no annotation on the other. Here, the sheet considered by Johnston as the holotype was chosen as the lectotype.

*Crumenaria diffusa* was known only from the holotype. No differences in relation to *C. decumbens* were found, particularly regarding the leaves and flowers, and we therefore propose placing *C. diffusa* in synonymy with *C. decumbens*. Analysis of the types of *C. steyermarkii* and of *C. decumbens* revealed the similarity between these taxa, both in vegetative as well as in reproductive characters, and it was impossible to draw any distinction between the two. Therefore, we propose that *C. steyermarkii* also be placed in synonymy with *C. decumbens*. This concept widens the

area of distribution of *C. decumbens*, previously restricted to the southeast and northeast of Brazil, mainly in areas of *caatinga* (shrublands), and the species now presents disjunct distribution in Guatemala and Honduras.

**4.3. *Crumenaria erecta*** Reissek, in Endlicher. Nov. stirp. dec. Mus. Vind. 4: 28-29. 1839. Type: Brazil, Minas Gerais, rio São Francisco, Pohl *s.n.* (lectotype W! designated here; isolectotypes BR! [2 exs.], C!, G!, OXF!, W! [2 exs.]).

Reissek (1839) described *Crumenaria erecta* based on the collection Pohl *s.n.* from Minas Gerais. The specimen deposited in W, where the author of the species carried out his studies, is composed of three sheets. The same collection is also found deposited in BR, C, G and OXF. The material in W is selected as the lectotype because it best fits the description of the species. Subsequently, when treating *C. erecta* for *Flora Brasiliensis*, Reissek (1861) also cited the material Lhotsky *s.n.*, without indicating its provenance.

**4.4. *Crumenaria glaziovii*** Urb. Bot. Jahrb. 25 (3): 1-2. 1898. Type: Brazil, Goiás, entre a Cabeceira do Rio Samambaia e o Pouzo de Barbatimão, Glaziou 20848 (holotype B†, lectotype R! designated here; isolectotypes BR, C!, G!, K!, S!).

The holotype of *Crumenaria glaziovii* deposited in B was destroyed, necessitating its lectotypification. The specimen found in R is complete and is perfectly diagnostic of the taxon.

**4.5. *Crumenaria polygaloides*** Reissek, in Martius. Fl. bras. 11(1): 113. 1861. Type: Brazil, Paraná, campo, 1828, Sellow 4768 (holotype B†, lectotype US! designated here).

The collection of Sellow 4768 deposited in B was destroyed, requiring that *Crumenaria polygaloides* be lectotypified. Therefore, the duplicate found in US is designated as the lectotype.

## 5. *Gouania* Jacq.

**5.1. *Gouania acreana*** Pilg. Notizbl. Bot. Gard. Berlin-Dahlem 6: 314. 1915. Type: Brazil, Acre, Alto Acre, Seringal São Francisco, VI.1911, Ule 9574 (holotype B†, lectotype G! designated here; isolectotypes K!, L!, NY!, US!).

The holotype of *Gouania acreana* deposited in B was destroyed. Therefore, one of the isotypes was used as the lectotype.

**5.2. *Gouania colurnifolia*** Reissek in Martius. Fl. bras. 11(1): 107. 1861. Type: Brazil, Ceará, Crato, Oct. 1838, Gardner 1523 (lectotype W! designated here; isolectotypes BM! [2 exs.], F!, IPA!, G! [2 exs.], K! [2 exs.], NY! [2 exs.], OXF!, W!).

Reissek (1861) did not cite the herbarium where the holotype of *Gouania colurnifolia* was deposited when he described the species. Therefore, the designation of a lec-

totype is required. The material deposited in W, where the author of the taxon worked, was selected.

**5.3. *Gouania cornifolia*** Reissek in Martius. Fl. bras. 11(1): 107, tab. 26, fig. 4. 1861. Type: Brazil, Amazonas, “in silvis japurensibus”, Martius *s.n.* (lectotype M! designated here; isolectotypes M!, W!).

When Reissek (1861) described *Gouania cornifolia*, he did not cite the herbarium where the holotype was deposited. The lectotype selected here is the collection of M and contains all of the information found in the protologue.

**5.4. *Gouania corylifolia*** Raddi, Quar. Piant. Nuov. Bras. 15. 1820. Type: Brazil, Rio de Janeiro, Monte Corcovado, Raddi *s.n.* (holotype FI; isotype G!).

= *Gouania petiolaris* Reissek, in Martius. Fl. bras. 11(1): 108. 1861. Type: Brazil, Rio de Janeiro, Serra dos Órgãos, Mar. 1838, Gardner 734 (lectotype W! designated here; isolectotypes BM!, G!, K!, NY!, OXF!). **Syn. nov.**

Examination of the type material of *Gouania corylifolia* and *G. petiolaris* showed that there were no differences between the two taxa, both of which had been collected in the Rio de Janeiro state. The main difference was the smaller leaves of *G. petiolaris*. In the many collections of *G. corylifolia* examined, we observed different leaf sizes, all within the range of variation of the two taxa. Taking into account the law of priority, *G. petiolaris* is placed in synonymy with *G. corylifolia*.

When Reissek (1861) described *Gouania petiolaris*, he did not cite the herbarium where the holotype was deposited. Therefore, the lectotype selected is that of W, where the author of the taxon worked.

**5.5. *Gouania hypochroa*** Reissek, in Martius. Fl. bras. 11(1): 106. 1861. Type: Brazil, Maranhão, G. Don *s.n.* (lectotype W! designated here).

Reissek (1861) described *Gouania hypochroa* without mentioning the herbarium where the holotype was deposited. Of the type material of this species, only one sheet was found in W. That sheet had been examined in 1969 by Johnston, who considered it as the holotype and recorded this information on the specimen. Here, that material is regarded as the lectotype.

**5.6. *Gouania inornata*** Reissek, in Martius. Fl. bras. 11(1): 109. 1861. Type: Brazil, Minas Gerais, Martius *s.n.* (lectotype M! designated here; isolectotypes BR!, W!).

The specimen of *Gouania inornata* deposited in M was chosen as the lectotype because it is complete and because part of the collection of Martius for *Flora Brasiliensis* is deposited in that herbarium, where the author worked for many years after returning from Brazil. Although the specimen in W (the isolectotype) bears illustrations and handwritten annotations made by Reissek, it is composed of leaf fragments, flowers and dehiscent fruits.

**5.7. *Gouania latifolia*** Reissek, in Martius. Fl. bras. 11(1): 103. 1861. Type: Brazil, Goiás, Pedro Terceiro do Carretão, *Pohl s.n.* (lectotype W! designated here; isolectotypes BR!, M!).

= *Gouania chrysophylla* Reissek, in Martius Fl. bras. 11(1): 103. 1861. Type: Brazil, Bahia, Rio de Contas, *Martius s.n.* (lectotype M! designated here). **Syn. nov.**  
= *Gouania mollis* Reissek, in Martius. Fl. bras. 11(1): 104. 1861. Type: Brazil, *Martius s.n.* (Neotype W!), designated here.

The specimen of *Gouania latifolia* deposited in W was examined in 1969 by Johnston, who considered it as the holotype, recording this information on the sheet itself, as well as regarding the material deposited in M as an isotype. Here, those specimens are recognized as the lectotype and isolectotype, respectively.

The specimen of *Gouania chrysophylla* examined in M was selected as the lectotype of the species. *Gouania mollis* was described by Reissek (1861) based on the following syntypes: Brazil meridional, *Sellow s.n.*; Brazil, Minas Gerais, *Lhotsky s.n.*; and Brazil, Minas Gerais, *Ackermann s.n.* The material of Sellow in B was destroyed. Of the Lhotsky material, only photographs were found (one in F and other one G), and the Ackermann collection was not located. Therefore selection of a neotype is necessary. The Martius material deposited in W was chosen as the neotype because it contained handwritten annotations and illustrations made on the sheet itself by Reissek, author of the species. According to the diagnosis of *G. latifolia*, the leaves are large, the laminae measuring 8.3-11.0 × 6.8-9.6 cm and the petiole being 1.3-2.0 cm in length, whereas in *G. chrysophylla* the leaves are smaller (laminae 6.8-8.3 × 4.0 cm; petiole, 1.3-1.4 cm). Analysis of several specimens of *G. chrysophylla*, as well as type material, showed that the laminae can be 4.6-11.0 × 3.5-8 cm and the petioles can be 0.5-2.5 cm in length. Therefore, *G. chrysophylla* is here placed in synonymy under *G. latifolia*.

*Gouania latifolia* and *G. mollis* have been treated as distinct species, and the two names are often both accepted as valid in floristic lists. Analysis of the original descriptions, along with studies of classic and recent collections, revealed that the features referred to as characteristic of *Gouania latifolia* overlap with those considered characteristic of *G. mollis*, suggesting that the description of *G. mollis* was based on juvenile material of *G. latifolia*, whose branches display only buds. Therefore, *G. mollis* is regarded as a synonym of *G. latifolia* in this work.

**5.8. *Gouania pyriformis*** Reissek, in Martius. Fl. bras. 11(1): 110. 1861. Type: Brazil, Pará, *Martius s.n.* (lectotype W! designated here; isolectotype M! [2 exs.]).

When Reissek (1861) described *Gouania pyriformis*, he did not mention the herbarium where the holotype was deposited, and lectotypification is therefore required. The specimen selected here is in W, where Reissek worked.

**5.9. *Gouania riparia*** Reissek, in Martius. Fl. bras. 11(1): 104. 1861. Type: Brazil, Amazonas, Tefé, *Martius s.n.* (lectotype M! designated here; isolectotype M! [3 exs.]).

The type collection of *Gouania riparia* was only in M and comprised four sheets. The one containing all of the information cited by the author in the protologue was chosen as the lectotype.

**5.10. *Gouania trichodonta*** Reissek, in Martius. Fl. bras. 11(1): 108. 1861. Type: Peru, Maynas, Yurimaguas, 1830, *Poeppig s.n.* (lectotype W! designated here; isolectotypes F!, G!, W! [2 exs.]).

Three sheets of *Gouania trichodonta* were found and examined in W. The one containing the illustrations and annotations made by the author of the species was selected as the lectotype.

**5.11. *Gouania ulmifolia*** Hook. & Arn., in Hook. Bot. Misc. 3: 174. 1833. Type: Uruguay, *Tweedie s.n.* (lectotype K! designated here; isolectotypes K!, W!).

= *Gouania urticifolia* Reissek, in Martius. Fl. bras. 11(1): 110. 1861. Type: Brazil, Minas Gerais, *Martius s.n.* (lectotype M! designated here). **Syn. nov.**

Although a search was made in different herbaria, only three sheets of the *Tweedie s.n.* collection of *Gouania ulmifolia* were found: two duplicates in K and one in the herbarium in W. One of the specimens in K is selected as the lectotype, because that is where the author of the species worked.

*Gouania urticifolia* was described based on the following syntypes: *Martius s.n.* (M!), from Minas Gerais; *Sellow s.n.* (G!, P!, W!) and *Silva Manso 347* (BR!), from Cuiabá, Mato Grosso. The specimen of *Martius s.n.* in M was selected as the lectotype, because it is the most complete.

Analysis of the type material of *Gouania ulmifolia* and of *G. urticifolia*, revealed close similarity between the two, and there were no consistent differences that could justify maintaining both taxa. Therefore, we propose placing *Gouania urticifolia* in synonymy with *G. ulmifolia*.

**5.12. *Gouania velutina*** Reissek, in Martius. Fl. bras. 11(1): 105. 1861. Type: Guyana, R. *Schomburgk 747* (lectotype W! designated here; isolectotypes BM! 2exs, G! 3exs, K!, L!, OXF!).

When Reissek (1861) described *Gouania velutina*, he did not mention the herbarium in which the holotype was deposited. The sheet in W is selected as the lectotype, because it best displays the characters contained in the description and is at the institute where the author of the species worked.

**5.13. *Gouania virgata*** Reissek, in Martius. Fl. bras. 11(1): 104. 1861. Type: Brazil, Minas Gerais, Barra do rio das Velhas, *Pohl s.n.* (lectotype W! designated here; isolectotype W!).

*Gouania virgata* was described based on the following syntypes: *Pohl s.n.* (W!), collected in Minas Gerais; *Schomburgk 584* (BM!, BR!, G!, K!, L!, OXF!, W!) and

*Schomburgk 711* (BM!, G!, K!, W!), both collected in Guyana; and *Friedrichsthat 646* (BR!, W!), collected in Nicaragua. One of the specimens of *Pohl s.n.* deposited in W is chosen as the lectotype, because it best corresponds to the protologue, contains original illustrations on the sheet itself and is at the herbarium where the author of the species worked.

## 6. *Rhamnidium* Reissek

**6.1. *Rhamnidium elaeocarpum*** Reissek, in Martius. Fl. bras. 11(1): 94-95. 1861. Type: Brazil Meridional, *Pohl s.n.* (lectotype W! designated here; isolectotypes BR!, W!).

= *Rhamnidium cognatum* Reissek, in Martius. Fl. bras. 11(1): 95. 1861. Type: Brazil Meridional, *Sellow s.n.* (holotype B†, lectotype P! designated here). **Syn. nov.**

*Rhamnidium elaeocarpum* was described based on the following syntypes: *Pohl s.n.* (no precise location); and *Riedel s.n.* (P!), *Manso s.n.* and *Lhotzky s.n.*, all three collected in Cuiabá, Mato Grosso, the last two collections not seen. The *Pohl* material deposited in W is selected as the lectotype, because the author of the species worked at that herbarium.

*Rhamnidium cognatum* was a species known only from the original description and the holotype in B, which was destroyed. A duplicate of the holotype, found in P, was chosen here as the lectotype of the species.

When Reissek (1861) described *Rhamnidium cognatum*, based on sterile material, he regarded the species as close to *R. elaeocarpum*. A comparative study of vegetative characters of the types of both taxa indicated that they are in fact similar. There is an overlap between the two taxa in terms of characters such as length, width, number of veins and indumentum of the leaf lamina, as well as length of the petiole. Therefore, *R. cognatum* is here placed in synonymy with *R. elaeocarpum*.

**6.2. *Rhamnidium glabrum*** Reissek, in Martius. Fl. bras. 11(1): 95. 1861. Type: Brazil, Rio de Janeiro, Lagoa Feia, Sep 1835, *Luschnath s.n.* (lectotype BR! designated here; isolectotype BR!).

*Rhamnidium glabrum* was proposed based on the syntypes collected by *Luschnath s.n.* (BR) and *Widgren s.n.* (BR!), both in the city of Rio de Janeiro. Based on analysis of these collections, one of the *Luschnath* specimens was selected as the lectotype because it was more complete.

**6.3. *Rhamnidium molle*** Reissek, in Martius. Fl. bras. 11(1): 95. 1861. Type: Brazil, Bahia, Jacobina, Blanchet 3597 (lectotype W! designated here; isolectotypes BM!, F! [2 exs.], MO!, P! [2 exs.])

When Reissek (1861) described *Rhamnidium molle*, he did not cite the herbarium where the holotype was deposited. Therefore, the lectotype selected here is the specimen from W, where the author of the taxon worked.

## 7. *Ziziphus* Mill.

**7.1. *Ziziphus cinnamomum*** Triana & Planch. Ann. Sci. Nat. 5(16): 380. 1872. Type: Colombia, 1842-1843, *Linden 1548* (lectotype P! designated here; isolectotypes BM! [2 exs.], F! [2 exs.], G! K!, W!).

= *Ziziphus itacaiunensis* Fróes, Bol. Técn. Inst. Agron. Norte 35: 151-152. 1959. Type: Brazil, Pará, Marabá, rio Itacaiuna, a tributary of rio Tocantins, 22 Apr 1951, *R.L. Fróes 26977* (holotype IAN, n.v.; isotypes MG!, K!, U!). **Syn. nov.**

*Ziziphus cinnamomum* was described based on the syntypes: *Linden 1548* (P, BM, F, G, K, W), from Colombia; and *Funk 794* (K!), from Valencia, Venezuela. Therefore, designation of a lectotype is necessary. After analysis of type material, the duplicate of the Linden collection in P, where Triana worked, was selected as the lectotype. That material had also been examined by Johnston, who regarded it as the holotype, in 1961.

Analysis of the type material and more recent collections of *Ziziphus cinnamomum* and of *Z. itacaiunensis* revealed the close similarity of these species, mainly in the floral characters, the flowers being monochlamydeous, with a tricarpellate ovary and a velutinous indumentum, but also in the shape and size of the leaves. Because there are no morphological differences that would support maintaining a distinction between the two taxa, we propose placing *Z. itacaiunensis* (the more recently described species) in synonymy with *Z. cinnamomum*.

**7.2. *Ziziphus cotinifolia*** Reissek, in Martius. Fl. bras. 11(1): 87. 1861. Type: Brazil, Alagoas, Ilha de São Pedro, Rio São Francisco, 1838, *Gardner 1266* (lectotype W! designated here; isolectotypes BM! G!, F!, K! [3 exs.], NY! P!, RB!).

= *Ziziphus pseudojoazeiro* Mansf., Notizl. Bot. Gart. Berlin-Dahlem 9: 39. 1927. Type: Brazil, Bahia, Serra Chaquê, Jan 1919, *Luetzelburg 12396* (lectotype M! designated by Johnston in 1969). **Syn. nov.**

Reissek (1861) described *Ziziphus cotinifolia* but did not mention where the holotype was deposited. Therefore, the specimen in W, where the author of the species worked, is here selected as the holotype.

When Mansfeld (1927) described *Ziziphus pseudojoazeiro*, it is possible that he chose that epithet because he considered the species to be similar to *Z. joazeiro* Mart. Analysis of several specimens of *Ziziphus cotinifolia* collected in the semi-arid region of the Northeast, together with the study of type specimens of both species, revealed that the type of *Z. pseudojoazeiro* are young stems of *Z. cotinifolia* at the beginning of flowering. It is therefore acceptable to place *Z. pseudojoazeiro* in synonymy with *Z. cotinifolia*.

There is no information in the protologue of *Ziziphus pseudojoazeiro* as to where the holotype would be. Of the collection *Luetzelburg 12396*, only one duplicate was found, which was examined by Johnston in 1969, who designated it as the lectotype on that sheet; this view is being followed here.

**7.3. *Ziziphus glaziovii*** Warm. Vid. Medd.: 373. 1880. Type: Brazil, Rio de Janeiro, 1867, *Glaziou 864* (lectotype P! designated here; isolectotypes BR! [2 exs.], K!, NY!, R!, US!).

*Ziziphus glaziovii* was established based on two collections, *Glaziou 864* (P, BR, K, NY, R, US) and *Glaziou 1474* (BR! [3 exs.], K!, P!), both from Rio de Janeiro. After examining these specimens the duplicate in P was selected as the lectotype, because it was the most complete.

**7.4. *Ziziphus guaranitica*** Malme, in Bih. Svensk. Vet-Akad. Handl. 27(11): 20-21. 1901. Type: Paraguay, Colonia Risso, near rio Apa, 30 Oct 1883, *Malme 1108* (lectotype G! designated here; isolectotypes BM! [2 exs.], US! [2 exs.], foto F!, NY!).

Malme (1901) described *Ziziphus guaranitica* without mentioning the herbarium where the holotype was deposited. In this study, the specimen deposited in G is chosen as the lectotype.

**7.5. *Ziziphus joazeiro*** Mart., in Martius. Reise Bras.2: 581.1828. Type: Brazil, Piauí, *Martius 1812* (lectotypes M! designated here).

*Ziziphus joazeiro* was described based on the following syntypes: *Martius 1812* (M) and *Houillet s.n.* (BR!), from Pernambuco; and *Gardner 959* (BM!, K!, SP!, W!), from Ceará. The material collected by Martius deposited in M is here selected as the lectotype.

**7.6. *Ziziphus oblongifolia*** Moore, Trans. Linn. Soc. London, Bot. 4 (2/3): 339. 1895. Type: Brazil, Mato Grosso do Sul, entre Corumbá e Ladário, *Moore 1029* (lectotype BM! designated here; isolectotype NY!).

When Moore (1895) proposed *Ziziphus oblongifolia* he did not cite the herbarium where the holotype was deposited. The specimen at BM, where the author of the species worked, is selected as the lectotype in this study.

**7.7. *Ziziphus platyphylla*** Reissek, in Martius. Fl. bras. 11(1): 87. 1861. Type: Brazil Oriental, entre Vitória e Bahia, Sellow 1240 (holotype B†, lectotype W! designated here; isolectotypes BM!, M!, P!).

The *Sellow 1240* specimen deposited in B was destroyed, and the duplicate in W, where the author of the species worked, is therefore selected as the lectotype.

**7.8. *Ziziphus undulata*** Reissek, in Martius. Fl. bras. 11(1): 88. 1861. Type: Brazil, Ceará, *Gardner 1522* (lectotype W! designated here; isolectotypes BM!, F!, G! [3 exs.], K! [2 exs.], NY! [2 exs.], P! [2 exs.], SP!).

Reissek (1861) described *Ziziphus undulate* but did not cite the herbarium where the holotype was deposited. In this study, the duplicate deposited in W is selected as the lectotype.

## Acknowledgements

We are grateful to the curators of the herbaria consulted and to Dr. Cynthia Sothers for the translation of the manuscript. This study received financial support from the Brazilian CNPq, PQ1A research productivity grant to AMG).

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