Typifications and new synonyms of South American species of *Sebastiania* (Euphorbiaceae), including nomenclatural clarification of the generic type

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Abstract. We present 21 new synonyms and 15 lectotypifications associated with South American species of *Sebastiania*. We also clarify the identity of the type species of the genus, *S. brasiliensis*, and make a new combination, ***S. ramosissima***. These nomenclatural changes are based on study of the protologues and original material, of the treated species.

Keywords: Hippomaneae, lectotypification, *Microstachys*, synonym.

Sebastiania Spreng. was established by Sprengel (1821: 118) based on the Brazilian species, *S. brasiliensis* Spreng. Müller (1863) synonymized *Sebastiania* under *Gymnanthes* Sw., and Baillon (1864) included its species in *Stillingia* Gard. ex L. *Sebastiania* was resurrected and its circumscription broadened by Pax & Hoffmann (1912, 1914), who recognized 79 species in the genus and considered *Adenogyne* Klotzsch, *Clonostachys* Klotzsch ex Klotzsch, *Cnemidostachys* Mart. & Zucc., *Dendrocousinsia* Millsp., *Ditrysinia* Raf., *Elachocroton* F. Müll., *Gussonia* Spreng., *Microstachys* A. Juss., *Sarothrostachys* Klotzsch, and *Tragiopsis* Karst. to be synonymys of *Sebastiania*. Molecular data (Wurdack et al., 2005) indicated that *Sebastiania* sensu Pax & Hoffmann (1912, 1914) is polyphyletic, with ten of its species that were sampled in their analysis emerging in at least four distinct (non-sister) clades.

Esser (1998) narrowed the circumscription of *Sebastiania*, restricting it to taxa previously assigned to the typical section of the genus (at the time known as *S.* sect. *Eusebastiania*, nom. Inval.). He excluded from its synoymy the aforementioned genera placed there by Pax & Hoffmann (1912, 1914). Melo (2006) adopted this more narrow concept of *Sebastiana* in his taxonomic review of the genus, in which he recognized only 17 neotropical species distributed from Mexico to northern Argentina, Chile, and Uruguay. In this new concept of *Sebastiania*, the genus is characterized by the lack of foliar glands, achlamydeous or monochlamydeous staminate flowers with free sepals, sessile or shortly pedicellate pistillate flowers, persistent columella with fleshy excrescences, and seeds lacking a caruncle. Other recent studies have helped to further clarify the limits of *Sebastiana* (Silva & Esser, 2011; Melo et al., 2013a, b; Oliveira et al., 2013; Melo et al., 2017).

Within the genus a number of unresolved nomenclatural issues persist. Notably, the name, *Sebastiania brasiliensis*, the generic type, has been applied indiscriminately for decades and is in need of lectotypification. In order to stabilize the application of this and other names, in the present work we make 21 typifications in accordance with Article 9 of the International Code of Nomenclature (ICN; Turland et al., 2018) and designate 20 new synonyms for *Sebastiania ramosissima* and one for *S. brasiliensis*.

Brittonia 72(3):232–240 (2020), DOI 10.1007/s12228-020-09618-9

Published Online: 14 May 2020

Materials and methods

The present study forms part of the doctoral dissertation of Melo (2006), a taxonomic review of *Sebastiana*. The nomenclatural treatment that follows is based on study of primary literature and type and other specimen images available in the JSTOR Global Plants database [https://plants.jstor.org/]. Specimens in the following herbaria (or images of them) were consulted: A, B, BA, BHCB, BM, BR, C, CORD, ESA, F, G, G-DC, G-Boiss, GH, GOET, GUA, HBG, HUEFS, HXBH, IAC, IBGE, ICN, IPA, JE, JPB, K, L, LD, LIL, LL, MICH, MO, MPU, NDG, NO, NY, P, PEUFR, PH, RB, S, SI, TEX, TUB, U, UB, UC, US, W, WIS, Z, and ZT (acronyms according to Thiers, 2019). Numbers following cited herbaria in specimen citations are specimen barcode numbers, unless otherwise indicated.

Nomenclatural and taxonomic treatment

Sebastiania brasiliensis Spreng., Neue Entdeck. Pflanzenk. 2: 118, t. 3. 1821. *Gymnanthes brasiliensis* (Spreng.) Müll. Arg., Linnaea 32: 104. 1863. *Gymnanthes brasiliensis* var. *genuina* Müll. Arg., Linnaea 32: 105. 1863, nom. Inval. *Stillingia brasiliensis* (Spreng.) Baill., Prodr. 15(2): 328. 1864. *Sebastiania brasiliensis* var. *genuina* (Müll. Arg.) Müll. Arg. in DC., Prodr. 15(2): 1187. 1866, nom. Inval. Type: (lectotype, **here designated:** [Illustration] Spreng., Neue Entdeck. Pflanzenk. 2: 118, t.3. 1821).

Sebastiania rhombifolia Müll. Arg. in Mart., Fl. Bras. 11(2): 590. 1873. Type: Brazil. Minas Gerais: prope Lagoa Santa, 20 Sept 1864, *J. E. B. Warming 1600* (lectotype, **here designated:** C [10011379]; isolectotype: C [10011378]). **syn. nov.**

Distribution.—Restricted to Southeast Brazil, in the states of Minas Gerais and Espírito Santo.

Selected specimens examined. BRAZIL. Espírito Santo: "Frutex, in arenosis, Prov. Espirito Santo, Bras.", 1850 [fl], *M. Z. W. Neuwied s.n.* (BR-855527); "in arenosis prov. Espirito Santo", s. data (fl.), *M. Z. W. Neuwied s.n.* (BR-855441). **Minas Gerais:** Arcos, Fazenda Corumbá, 7 Oct 1992 [fl, fr], *S. T. Meyer* et al. *s.n.* (HXBH-9457); Braúnas, 15 Oct 1997 [fl], *E. Tameirão Neto 2569* (BHCB); Caira do Nery, Sete Lagoas, 30 Oct 1957 [fl], *E. P. Heringer 5800* (UB). Without specific locality, without date, *F. Sellow s.n.* (G-DC, K 2x, MPU, P).

Sprengel (1821) described and illustrated *S. brasiliensis* but did not cite any representative collections. In this sense, we consider that the illustration of *S. brasiliensis* that was cited by Sprengel in the protologue is the only irrefutable original material for the species. In accordance with articles 9.3, 9.4 and 9.11 of the International Code of Nomenclature for Algae, Fungi and Plants, we designate as the lectotype the published illustration.

Simultaneously with the description of the new combination *Gymnanthes brasiliensis*, Müller (1863) also proposed *G. brasiliensis* var. *genuina* (*nom. Inval.*), referencing only the collection *Sellow s.n.* connected to this variety. Specimens of *Sellow s.n.* identified as *S. brasiliensis* var. *genuina* were found in the herbaria G-DC, K, MPU and P, donated by herbarium B. These specimens are in accordance with the original description and illustration in Sprengel (1821).

According to the protologue, *Sebastiana rhombifolia* was based on a specimen from "*Minas Geraes, prope Lagoa Santa*" collected by *Warming*, but without reference to a collection number or herbarium where the specimen was deposited. Two duplicates of *Warming 1600*, annotated as *S. rhombifolia*, were found at C. Although the collection number was not cited in the protologue, we are confident that these duplicates represent original material for *S. rhombifolia*, as the collector and collection locality on the specimen labels agree with those cited in the protologue. Of the two duplicates, we chose the specimen C 10011379 as the lectotype because it is in a better state of conservation and contains vegetative and reproductive parts.

Spherical, urceolate glands on the bracts of both staminate and pistillate flowers and opposite to alternate leaves are diagnostic characters of *Sebastiania brasiliensis* and were clearly described and illustrated by Sprengel (1821). These characteristics are also present in the collection of *Sellow s.n.* cited in the description of *Gymnanthes brasiliensis* var. *genuina*, as well as in some specimens cited by Müller (1866) as *S. brasiliensis* var. *genuina* (e.g. *Princ. Neuwied s.n.* of the herbarium BR) and in *Warming 1600*, the type of *Sebastiania rhombifolia*.

Sebastiania longispicata Pax & K. Hoffm. in Engler, Pflanzenr. IV (Heft 152): 142–143. 1912. Type: Paraguay. "Amambay, in altiplanitie et declivibus, Sierra de Amambay", 1907–1908, *E. Hassler 10,612* (holotype: B, destroyed [photo at F, negative 5503];

lectotype, **here designated**: G [00307063]; isolectotypes: A [00056545], G [00307203], G [00307205], K [000253536], LIL [000794], LIL [000793], MICH [1104968], MPU [015211], NO [0109899], NY [00273258], P [00716928], S [R-10737], SI [001401], UC [001401], US [00096620]).

Although they cited the collection *Hassler 10,612* as the type of *Sebastiania longispicata,* Pax & Hoffmann (1912) did not indicate a herbarium for the holotype in the protologue. However, it is possible that it was deposited at B, where the authors worked, and that it was destroyed. Up to the present time, this species is known only by the type collection which is represented by 16 specimens (A, G, K, LIL, MICH, MPU, NO, NY, S, SI, P, UC, US). Most of the specimens are well preserved and contain several inflorescences and numerous staminate cymules. The original protologue has a reasonable description, but lacks information on the fruits. The specimen G 00307063 is chosen as the lectotype because it appears to have an original label and Pax's handwritten annotation.

Sebastiania macrocarpa Müll. Arg. in DC., Prodr. 15(2): 1188. 1866. Type: Brazil. Ceará: *C. Kalkman 144* (lectotype, **here designated:** G-DC [00316616]). Remaining syntypes: Brazil. Ceará: confines of Piauhy do Cavalo, *C. A. Gardner 2443* (B, destroyed, K [000253537], K [000253538]).

Sebastiania catingae Ule in Engler, Bot. Jahrb. Syst. 42: 222. 1908. Type: Brazil. Bahia: "Caatinga bei Tambury", *E. H. G. Ule 7055* (lectotype, **here designated:** K [000253521]; isolectotypes: G [00414524], HBG [515815], L [0022722], fragment F [0092802F]). **syn. nov.**

Distribution.—Sebastiania macrocarpa occurs exclusively in Northeast Brazil, in the states of Bahia, Ceará, Paraíba, Pernambuco and Rio Grande do Norte.

Selected specimens examined. BRAZIL. Bahia: Cadeirão da Serra, 9°42'S, 39°43'W, 4 Nov 1978 [fl, fr], *Walmor 8* (IPA); Irecê, Alto da Gabriela, 10 May 1984 [fr], *G. Fotius 3857* (IPA); Livramento do Brumado, 13°43'S, 41°50'W, 17 Apr 1991 [fr], *G. P. Lewis & S. M. M. Andrade 2001* (UB). **Ceará:** Quixadá, Fazenda Não Me Deixes, 16 Mar 2000 [fr], *A. M. Carvalho 46* (EAC, PEUFR). **Paraíba:** Areia, Cuité ou Campina Grande, 26 May 1978 [fr], *D. Andrade-Lima 78–8429* (IPA); São Gonçalo, Sítio Lamarão, 17 Jan 1999 [fl], *A. C. A. Moura 206* (JPB). **Pernambuco:** Betânia, Fazenda Olho d'Água, Serra do Olho d'Água, 4 Apr 2001 [fr], *A. Laurênio* et al. *1787* (PEUFR); Ibimirim, Faz Mandacarú, 28 May 1996 [fr], *M. Rodal* et al. *641* (PEUFR); Santa Maria da Boa Vista, em direção a Jutaí, 29 Apr 1971 [fl], *E. P. Heringer* et al. *383* (IPA, PEUFR, UB); Serra Talhada, E. E. do IPA, Pimenteira, 07°59'S, 38°19'16"W, 30 Jan 1996 [fl, fr], *A. P. Gomes 130* (IPA). **Rio Grande do Norte:** Açu, EFLEX-IBDF, 27 Feb 1987 [fr], *R. L. C. Ferreira 68* (IPA); EFLEX-IBDF, 26 Feb 1987 [fr], *R. L. C. Ferreira 69* (IPA); EFLEX-IBDF, 28 Feb 1987 [fr], *R. L. C. Ferreira 11* (IPA).

Since Müller (1866) did not specify a holotype for *S. macrocarpa* – only two syntypes, *Gardner 2443* at B and *Kalkman 144* in the Sonder Herbarium – it was necessary to select a lectotype. The Gardner specimen at B was presumably destroyed during the Second World War, and we were unable to locate any duplicates of the collection at other herbaria. The Sonder Herbarium, which comprised ca. 250,000–300,000 specimens, is today divided mainly between S and MEL (http://www.rbg.vic.gov.au/science/information-and-resources/national-herbarium-of-victoria/otto-sonder-herbarium2), but we were unable to locate duplicates of *Kalkman 144* at either herbarium. It is worth noting that at MEL only 10% of the Sonder Herbarium specimens are mounted and databased, and the remainder are unavailable for consultation. However, a duplicate of *Kalkman 144* was located at G-DC, the herbarium housing most of the *Prodromus* material used by Müller, and is designated the lectotype of *S. macrocarpa*.

Ule (1908) described *S. catingae* based on his own collection from Brazil, *Ule 7055*. Although the author did not indicate the herbarium where the holotype was deposited, a photo (negative No. 5496) of a specimen at B identified as the holotype was found at F. Duplicates of *Ule* 7055 were found at K, G, HBG and L, in addition to a fragment at F. The specimen deposited at K was selected as the lectotype due to its good state of preservation (it has both leaves and inflorescences) and high degree of compliance with the protologue.

In the protologue of *Sebastiania catingae*, Ule (1908) did not distinguish it from *S. macrocarpa*. A comparative analysis of the types and other specimens of *S. macrocarpa*.and *S. catingae* showed that both names refer to the same species. Original material for both names share obovate leaves, with strongly ascending veins and plicate-rugose inflorescence glands. *Sebastiania*

macrocarpa is the oldest epithet and has priority over *S. catingae.*

Sebastiania pteroclada (Müll. Arg.) Müll. Arg. in DC., Prodr. 15(2): 1190. 1866. *Gymnanthes pteroclada* Müll. Arg., Linnaea 32: 107. 1863. *Stillingia pteroclada* (Müll. Arg.) Baill., Adansonia 5: 329. 1865. Type: Brazil. Rio de Janeiro: 1834, *C. Gaudichaud 1150* (holotype: G-DC [00316632]; isotypes: B, destroyed [photo F F0B005506, not seen], F [0093707F], P [00716936], P [00716937], P [00716938], P [00716939], W [1889–0114114]).

Sebastiania rupicola Pax & K. Hoffm. in Engl., Pflanzenr. IV. 147, V: 151. 1912. Type: Brazil. Rio de Janeiro: restinga, Copacabana, an Felsen, *C. A. W. Schwacke 5566* (lectotype, **here designated:** RB [78704]). Remaining syntype: Brazil, Rio de Janeiro: Felsen am Meere, *Ule s.n.* (B, not found). **syn. nov.**

Distribution.—Sebastiania pteroclada occurs exclusively in Southeast Brazil, in the state of Rio de Janeiro.

Selected specimens examined. BRAZIL. Rio de Janeiro: Araruama, próximo a Lagoa Pitanguinha, 29 Aug 1983 [fr], *D. Araújo* et al. *5657* (GUA); Cabo Frio, Arraial do Cabo, Pontal do Atalaia W22, 8°52'54"S, 74°55'55"W, 26 Sept 2002 [fl], *Viana* & *Oliveira 2587* (GUA); Rio de Janeiro, Morro do Leme, 4 Oct 1972 [fl], *D. Sucre & Silva 9682* (RB); Saquarema, Reserva Ecológica Estadual de Jacarepaguá, próximo a Itaúna, 29 Oct 1991 [fl], *D. Araújo 9480* (GUA); Restinga de Marambaia, 17 Mar 1994 [fr], *D. Araújo 9975* (GUA).

In the protologue of *Sebastiania rupicola* Pax & Hoffmann (1912) cited the syntypes *Ule s.n.* and *Schwacke 5566*, without indication of herbarium in which the specimens were deposited. However, it seems likely that these collections were deposited at B, and indeed a photograph of a duplicate of *Schwacke 5566* was found in the Berlin Negatives collection of the Field Museum (http://emuweb.fieldmuseum.org). We also searched the HBG collection as duplicates of several Brazilian species collected by *Ule* were sent to this herbarium (Borges & Pirani, 2014), but no material of *S. rupicola* was found at HBG. A duplicate of *Schwacke 5566*, identified anonymously as *Sebastiania brasiliensis* var. *robusta*, was found at RB and was selected as lectotype. RB houses the largest existing collection of *Schwacke* specimens [see http://kiki.huh.harvard.edu/databases/botanist].

The lectotype of *S. rupicola* has thicker leaves than most of the material of *S. pteroclada*. However, analysis of a number of specimens demonstrated a continuum in leaf thickness between the lectotype of *S. rupicola* and other specimens of *S. pterocarpa*. We conclude that such variation is interspecific and closely associated with the openness of the habitat, the *S. rupicola* type having been collected in a rocky coastal environment. All of the specimens here identified as *S. pterocarpa* have in common alternating, elliptic, usually acuminate leaves and smooth, spherical inflorescence glands.

Sebastiania ramosissima (A. St.- Hil.) A. L. Melo & M. F. Sales, **comb. nov.** *Microstachys ramosissima* A. St.-Hil. Hist. Pl. Remarq. Bresil 242. 1824. *Stillingia ramosissima* (A. St.-Hil.) Baill. Adansonia 328. 1864. *Sebastiania brasiliensis* var. *ramosissima* (A. St.-Hil.) Müll. Arg. in DC., Prodr. 1187. 1866. *Sebastiania brasiliensis* var. *ramosissima F. genuina* Müll. Arg. in DC., Prodr. 1187. 1866, nom. Inval. Type: Brazil, Rio Grande do Sul: bords du ruisseau de Guabiju, without date, *A. Saint-Hilaire cat. C 22559* (holotype: P [00716913]; isotypes: P [00716915], P [00716914], MPU [011330]).

Gymnanthes brasiliensis var. *obovata* Müll. Arg., Linnaea 104. 1863. *Sebastiania brasiliensis* var. *obovata* (Müll. Arg.) Müll. Arg. in DC., Prodr. 1187. 1866. Type: Brazil. without specific locality: without date, *J. E. B. Pohl 1687* (holotype: G [00414487]; isotypes: A [00106934], F [713347]). **syn. nov.**

Gymnanthes brasiliensis var. *obovata F. rufescens* Müll. Arg. Linnaea 104. 1863. *Sebastiania brasiliensis* var. *obovata F. rufescens* (Müll. Arg.) Müll. Arg. in DC., Prodr. 1187. 1866. *Sebastiania brasiliensis* var. *rufescens* (Müll. Arg.) Müll. Arg. in Mart., Fl. Bras. 585. 1873. Type: Brazil. [Minas Gerais?]: without date, *P. Claussen s.n.* (lectotype, **here designated**: G [00316583]; isolectotype: GH [00106938]). Remaining syntype: Brazil. *In meridionali ad Barbacena*, without date, *F. Sellow s.n.* (not found). **syn. nov.**

Gymnanthes brasiliensis var. *obovata* f. *microphylla* Müll. Arg. Linnaea 105. 1863. *Sebastiania brasiliensis* var. *obovata* f. *microphylla* (Müll. Arg.) Müll. Arg. in DC., Prodr. 1187. 1866. *Sebastiania brasiliensis* var. *microphylla* (Müll. Arg.) Müll. Arg. in Mart., Fl. Bras. 585. 1873. Type: Brazil. Minas Gerais: 1845, *J. F. Widgren s.n.* (lectotype, **here designated**: G [00316613]). Remaining syntypes: without locality, without date, *G. W. Freyreis s.n.* (S [2666]); without locality, without date, *P. Claussen 744* (not found). **syn. nov.**

Gymnanthes brasiliensis var. *robusta* Müll. Arg. Linnaea 104. 1863. *Sebastiania brasiliensis* var. *robusta* (Müll. Arg.) Müll. Arg. in DC., Prodr. 1186. 1866. Type**:** Brazil. "Prope

Caété in fruticosis", without date, *L. Riedel s.n.* (holotype: B, destroyed; lectotype, **here designated:** G [00414601]; isolectotype: GH [00106937]). **syn. nov.**

Gymnanthes brasiliensis var. *spathulata* Müll. Arg. Linnaea 105. 1863. *Sebastiania brasiliensis* var. *spathulata* (Müll. Arg.) Müll. Arg. in DC., Prodr. 1187. 1866. Type: Brazil. Minas Gerais: ad Caldas inter Sa. [Santa] Rita et Tijuco, without date, *A. F. Regnell s.n.* (I. 414) (lectotype, **here designated:** G [00414488]; isolectotypes: G-DC [00316586], S [07–12,828], BR [0000008554918], BR [0000008555243], K [000253511]). Remaining syntype: Brazil. Minas Gerais: Aug–Apr 1840, *P. Claussen 481* (BR [0000008553928]). **syn. nov.**

Gymnanthes brasiliensis var. *divaricata* Müll. Arg. Linnaea 105. 1863. *Sebastiania brasiliensis* var. *divaricata* (Müll. Arg.) Müll. Arg. in DC., Prodr. 1187. 1866. Type: Brazil. without locality, without date, *F. Sellow s.n.* (holotype: G-DC [00316594]; isotypes: HBG [515816], P [00716907], TUB [009180]). **syn. nov.**

Gymnanthes brasiliensis var. *sellowiana* Müll. Arg., Linnaea 105. 1863. *Gymnanthes brasiliensis* var. *sellowiana F. reticulata* Müll. Arg., Linnaea 105. 1863. Type: Brazil. without locality, without date, *F. Sellow s.n.* (holotype: B?, destroyed; lectotype, **here designated:** G-DC [00316582]; isolectotypes: BR [0000008553775], G-DC [00316629], P [00716910], P [00716911], P [00716912], TUB [009187]). **syn. nov**.

Gymnanthes brasiliensis var. *sellowiana* f. *foveata* Müll. Arg., Linnaea 105. 1863. *Sebastiania brasiliensis* var. *ramosissima* f. *foveata* (Müll. Arg.) Müll. Arg. in DC., Prodr. 1187. 1866. Type: Brazil. without specific locality, without date, *F. Sellow s.n.* (holotype: G-DC [00316589]; isotypes: P [00716908], TUB [009181]). **syn. nov.**

Gymnanthes granatensis Müll. Arg., Linnaea 107. 1863. *Sebastiania granatensis* (Müll. Arg.) Müll. Arg. in DC., Prodr. 1189. 1866. Type: Colombia. Nuevelle Grenade, "Ocanã, 3900 ft.", May 1853, *L. J. Schlim 586* (holotype: G-DC [00316623], F-photo negative 7177; isotype: P [00716922]). **syn. nov.**

Excoecaria bridgesii Müll. Arg., Linnaea 124. 1863. *Sebastiania bridgesii* (Müll. Arg.) Pax, in Engl., Pflanzenr. 143. 1912. Type: Bolivia. without specific locality, without date, *T. C. Bridges s.n.* (holotype: G-Boiss., not seen; isotypes: BM [000799985], BM [000799983], G-DC [00316907]). **syn. nov.**

Stillingia weddelliana Baill. Adansonia 329. 1864. *Sebastiania weddelliana* (Baill.) Müll. Arg. in DC., Prodr. 1188. 1866. Type: Brazil. Mato Grosso: Jun–Oct 1845, *H. A. Weddell 3514* (holotype: P [00716957]; isotypes: F [V0092809F], P [0716958], P [00716959]). **syn. nov.**

Sebastiania brasiliensis var. *rigida* Müll. Arg. in Mart., Fl. Bras. 585. 1873. Type: Brazil. "habitat ad Villa do Principe", without date, *J. E. B. Pohl 1683* (lectotype, **here designated:** G [00414604]; isolectotype: K [000253518]). Remaining syntype: Brazil. "habitat ad Villa do Principe", without date, *J. E. B. Pohl 305* (not found). **syn. nov.**

Sebastiania brasiliensis var. *polymorpha* Müll. Arg. in Mart., Fl. Bras. 586. 1873. Type: Brazil. without locality, without date, *J. F. Widgren s.n.* (lectotype, **here designated**: (BR [0000008555069]). Remaining syntypes: Brazil. Minas Gerais: without date, *P. Claussen 483* (BR [0000005110001]); Habitat in silva primaeva prope urbem S. Paulo, without date, *C. F. P. Martius s.n.* (not found); ad Camapuam, without date, *C. F. P. Martius s.n.* (not found); prope Caldas in silvis primaevis, without date, *G. A. Lindberg 440* (BR [0000008555052]); without locality, without date, *A. F. Regnell 414* (BR [0000008554406]);; ad Lagoa Santa, without date, *J. E. B. Warming s.n.* (MPU [015190]). **syn. nov.**

Sebastiania brasiliensis var. *polymorpha F. viridis* Müll. Arg. in Mart., Fl. Bras. 586. 1873. Type: Brazil. Minas Gerais: "prope Caldas", without date, *A. F. Regnell 414* (holotype: BR [0000008553751]). **syn. nov.**

Excoecaria warmingii Müll. Arg. in Mart., Fl. Bras. 626. 1873. *Sapium warmingii* (Müll. Arg.) Chodat & Hassl., Bull. Herb. Boissier, sér. 2. 677. 1905. *Sebastiania warmingii* (Müll. Arg.) Pax, Pflanzenr. 143. 1912. Type: Brazil. Minas Gerais: without date, *J. E. B. Warming s.n.* (holotype: C [10011385]; isotype: F [0092789F]). **syn. nov.**

Dactylostemon anisandrus Griseb., Abh. Königl. Ges. Wiss. Göttingen 61. 1879. *Actinostemon anisandrus* (Griseb.) Pax, Pflanzenr. 79. 1912. *Sebastiania anisandra* (Griseb.) Lillo, Seg. Contr. Arb. Argentina 16. 1917. Type: Argentina. Salta: San Ramón de la Nueva Orán, without date, *P. G. Lorentz* & *G. H. E. W. Hieronymus 34* (lectotype, **here designated**: GOET [006423], isolectotypes: GOET [006422], B [100086956], CORD [00005973], F [0092781], G [00383749]). **syn. nov.**

Actinostemon luquense Morong, Ann. New York Acad. Sci. 228. 1893. Type: Paraguay. Central Paraguay, near Luque, 12 May 1889, *T. Morong 720* (holotype: NY [00246171]; isotypes: GH [00056536], LL, MO [266505], NDG [29372], PH [00050351], TEX [00371608], US [00096707], US [00096710]). **syn. nov.**

Sebastiania brasiliensis var. *brevispicata* Pax & K. Hoffm., Pflanzenr. 140. 1912. Type: Argentina. Entre Ríos: without specific locality, October 1878, *P. G. Lorentz 104* (lectotype, **here designated:** B [100460405], isolectotype: L [0138704]). Remaining syntypes: Argentina. Entre Ríos, without specific locality, without date, *P. G. Lorentz 461* (JE [00013334], US [00096615], Z [000000627], Z [000000628]); Argentina. Entre Ríos, without specific locality, without date, *P. G. Lorentz 1720* (L [0138705]); Uruguay. Rio Santa Luzia, without date, *J. Arechavaleta 54* (not found). **syn. nov.**

Sebastiania brasiliensis var. *brachystachya* Pax & K. Hoffm., Pflanzenr. 142. 1912. Type: Paraguay. Concepción, without date, *E. Hassler 7351* (holotype B, destroyed, lectotype, **here designated:** W [1904–0000156], isolectotype: F [0092784]). **syn. nov.**

Sebastiania fiebrigii Pax, Pflanzenr. 142. 1912. Type: Bolivia. Bermejo, 1400 m, 16 Nov 1903, *K. Fiebrig 2073* (holotype: probably at B, destroyed [photo negative F 005497!]; lectotype, **here designated:** SI [001400]). **syn. nov.**

Distribution.—Bolivia, Brazil (South, Southeast, and Midwest), Paraguay, Uruguay, northern Argentina, and Chile.

Selected specimens examined. ARGENTINA. Buenos Aires: Mercedes, Reserva S Nacional Iberá, 5 Sept 1997 [fl], *M. S. Ferrucci* et al. *1286* (F, HUEFS); Quilmes, 30 Jan 1946 [fr], *A. Krapovickas 2813* (F); Chaco, Colonia Benítez, 10

Feb 1966 [fl], *A. G. Schulz 9506* (F); San Martín, 3 Cerros, 15 Sept 1979 [fl], *A. Schinini* et al. *18,448* (F, ICN). **Corrientes:** berón de Astrada, 9 Dec 1945 [fl, fr], *T. Ibarrola 3846* (F); Curuzú Cuatiá, 3 Mar 1945 [fl], *T. Ibarrola 2573* (LD); Empedrado, río Empedrado, 26 Nov 1971 [fl], *A. Krapovickas* et al. *19,880* (F, ZT); Ituzaingó, camino a San Carlos, Feb 1971 [fr], *A. Krapovickas* et al. *17,958* (ZT); Saladas, Pago de los Deseos, 3 Dec 1949 [fl], *G. J. Schwarz 8966* (LD); Santo Tomé, Estancia San Francisco, 2 Dec 1970 [fl], *A. Krapovickas* et al. *16,880* (IAC). **Formosa:** Formosa, Pilcomayo, Sep 1946 [fl, fr], *H. Morel 1407* (F). **Jujuy:** Capital, Zapla, 9 Nov 1974 [fl], *A. Burkart 30,509* (F); Valle Grande, camino de V. Grande a S. Francisco, 18 Nov 1958 [fl], *M. E. Villa & P. R. Legname 751* (WIS). **Misiones:** Apóstoles, Tres Capones, 31 Aug 1979 [fl], *M. M. Arbo* et al. *2294* (RB); Cainguás, Mineral, 10 Dec 1984 [fl, fr], *J. E. Montes 27,654* (UB); Candelaria, Loreto, 16 Feb 1958 [fl, fr], *J. E. Montes 27,423* (F); Concepción de la Sierra, without date [fl], *A. G. Schulz 6913* (ICN); Guaraní, Predio Guaraní, camino a arroyo, 4 Nov 1999 [fr], *S. G. Tressens* et al. *6526* (HUEFS); Iguazú, Cataratas del Iguazú, 2 Mar 1982 [fl], *L. Ferraro 2426* (ICN); Posadas, prope La Osranja, 16 Dec 1907 [fl], *E. L. Ekman 505* (LD); San Ignacio, Hacanguagú, 22 Oct 1947 [fl], *G. J. Schwarz 4991* (BR); San Javier, Acaragua, 5 Feb 1947 [fl], *M. D. Bertoni 3292* (F); Santa Ana, 3 Mar 1910 [fr], *Rodriguez 163* (BA); **Salta**: Araú, El Cedral, 14 Oct 1913, *Rodriguez 1016* (BA); San Ramón de la Nueva Orán, Oct-Nov 1873 [fl], *P. G. Lorentz & G. H. E. W. Hieronymus s.n.* (BR-855423). **Tucumán:** Burruyacú, La Ramada, 2 Oct 1921, *S. Venturini 1350* (BA); Concepción, Carambola, 26 Aug 1971 [fl], *T. M. Pedersen 9827* (ICN). **BOLIVIA**. **Santa Cruz:** Velasco, Parque Noel Kempff, 28 Aug 1993 [fl], *B. Mostacedo* et al. *972* (F); Cercados, Montecitos del Rio Piray, 24 Aug 1916 [fl], *J. Steinbach 2723* (BA); Wäldchen beim Rio Pirai, Nov 1907 [fr], *T. Herzog 224* (Z); **Tarija**: Aniceto Arce, Reserva Nacional de Flora y Fauna Tariquía, 15 Nov 1998 [fl], *N. Paniagua & K. Rodrigues 1305* (F); Aniceto Arce, 6,3 km N of bridge at Emborozú on road to Bermejo, 8 Oct 1983 [fl], *J. C. Solomon 11,086* (F); Bermejo, without place, 17 Nov 1903 [fr], *K. A. G. Fiebrig 2113* (F, Z). **BRAZIL**. **Distrito Federal:** APA de Cafuringa, faz. Palestina, 8 Oct 1992 [fr], *B. A. S. Pereira & D. Alvarenga 2277* (IBGE, RB). **Goiás:** Alto Paraíso, entre Alto Paraíso e Nova Roma, Nov 1996 [fr], *R. C. Mendonça* et al. *2938* (IBGE); Niquelândia, após a mina da CNT, 12 Apr 1996 [fr], *R. C. Mendonça* et al. *2430* (IBGE); Serranópolis, Pousada das Araras, 21 Aug 1998 [fl], *M. L. Fonseca* et al. *2030* (IBGE). **Mato Grosso:** Aquidauana, 5 km de Aquidauana, 20 Oct 1938 [fl], *J. E. Rombouts 294* (IAC). **Mato Grosso do Sul**: Corumbá, Morro de Zé Feliciano, 9 Oct 1985 [fl], *J. A. Ratter* et al. *5131* (UB). **Minas Gerais:** Arcos, Calciolândia, 13 Oct 1940 [fl], *J. E. Oliveira 177* (BHCB). **Paraná:** Colombo, EMBRAPA-CNP Florestal, Nov 1995 [fr], *W. Maschio & A. M. Souza 124* (ESA); Curitiba, Jardim Botânico, 11 Out 1991 [fr], *J. M. Silva & E. Barbosa 1048* (HXBH). **Rio Grande do Sul**: Agudo, 27 Sept 1985 [veg.], *J. R. Stehmann* 782 (ICN); Alegrete, Arroio Regalado, Oct 1985 [fl], *M. Sobral & E. Moraes 4399* (ICN). **Santa Catarina:** Curitibanos e Campos Novos, 5 Dec 1956 [veg], *L. Smith 8286* (RB). **São Paulo**: Apiaí, estrada para Pinhalzinho/Apiaí, 13 Dec 1997 [fl, fr], *J. M. Torezan* et al. *619* (ESA, PEUFR). **PARAGUAY. Alto Paraná:** Ciudad del Este, Vivero Florestal Itaipu, 12 Oct 1990, *A. Schinini & G. C. Marmori 27,251* (F); **Paraguari:** Cerro Acahay, 24 Sept 1985 [fl], *R. Spichiger & P. A. Loizeau 1567* (F). **URUGUAY**. Artigas, Nov 1927 [fr], *W. G. Herter 82,771* (Z). **Durazno**: Rincón de Cabrera, Dec 1934 [veg], *D. Legrand 340* (F); Rincón de Cabrera, Dec 1934 [fr], *D. Legrand 320* (F).

Müller (1863) published several varieties and formae of *Gymnanthes brasiliensis* that are here synoymized to *Sebastiania ramosissima*. While he cited one or more specimens for each of these names, in most cases he did not distinguish a holotype from the among syntypes or designate the herbarium where the type was located. *Gymnanthes brasiliensis* var. *obovata F. rufescens* was based on the syntypes *Claussen s.n.* and *Sellow s.n.* Duplicates of *Claussen s.n.* were found at G and GH. The specimen at G was selected as lectotype since that herbarium houses the Müller collection. *Gymnanthtes brasiliensis* var. *obovata* f. *microphylla* was based on three syntypes, *Widgren s.n., Freyreis s.n.* and *Claussen 744*, thus requiring lectotypification. A specimen of *Widgren s.n.* at G and another of *Freyreis s.n.* at S were both equally well preserved, and the former was chosen as lectotype.

Gymnanthes brasiliensis var. *robusta* was based on the collection *Riedel s.n.* at B (cited as "Berol." by Müller, 1863). Although the holotype was destroyed, duplicates were located at G and GH, thus the specimen at G was selected as lectotype. *Gymnanthes brasiliensis* var. *spathulata* was based on the syntypes *Regnel s.n.* and *Claussen s.n.* A *Claussen* specimen at BR bears the number *481* and is presumably a duplicate of the latter collection, although Müller (1863) did not cite the collection number. Duplicates of the former collection were found at BR, G, G-DC, K, and S, and the specimen at G bearing both an inflorescence and fruits, was chosen as lectotype. *Gymnanthes brasiliensis* var. *sellowiana F. reticulata* was based on the collection *Sellow s.n,* from Brazil. Among the seven duplicates located, the specimen deposited at G-DC (00316582) was selected as lectotype since it is best conserved and closely agrees with the protologue.

Müller (1873) also published two varieties of *Sebastiania brasiliensis*, here synonomized to *S. ramosissima*, but again he did not designate holotypes from among the syntypes or cite the herbaria where the syntypes were deposited. *Sebastiana brasiliensis* var. *rigida* was based on the syntypes *Pohl 1683* and *Pohl 305*; considering that we did not find *Pohl 305*, we designated *Pohl 1683* at G lectotype because this herbarium

is the main collection examined by Müller. *Sebastiana brasiliensis* var. *polymorpha* was based on the syntypes *Claussen 483*, *Martius s.n* (two collections from São Paulo state), *Lindberg 440*, *Regnell 414*, *Widgren s.n.,* and *Warming s.n.* At G there is the collection *Regnell & Widgren s.n.*, which is identified as the type of *S. brasiliensis* var. *polymorpha*, but it does not agree with the protologue. The specimens cited in the protologue were collected by *Regnell* or *Widgren*, and no mention was made of specimens collected by both together. As such, it was preferable to designate *Widgren s.n.* at BR as lectotype since it has more leaves and inflorescences and because it is better preserved relative to the other specimens.

When Grisebach (1879) proposed *Dactylostemon anisandrus*, he gave the locality which the species was known, 'Oran', but did not provide further details. In the GOET herbarium where Grisebach worked there are two specimens identified as *Dactylostemon anisandrus* from Oran, so it was necessary to designate a lectotype. The specimen GOET 006423 was chosen because it has a larger number of inflorescences and is well preserved. *Sebastiania brasiliensis* var. *brevispicata* was described by Pax & Hoffmann (1912) based on the syntypes *Lorentz 104*, *Lorentz 461*, *Lorentz 1720* and *Arechavaleta 54*. We located duplicates of each of the three *Lorrentz* collections but have been unable to find any duplicates of the *Arechavaleta* collection. The duplicate of *Lorentz 104* at B was chosen as lectotype, since this herbarium is one of the main institutions housing material studied by Pax & Hoffmann. In the protologue of *S. brasiliensis* var. *brachystachya*, Pax & Hoffmann (1912) cited the collection *Hassler 7351* as the type, without indication of the herbarium where the specimen was deposited. However, it is probable that it was at B and subsequently destroyed. The duplicate located at W was selected as lectotype because the material is more complete, with bigger branches and more leaves, relative to the other duplicates. *Sebastiania fiebrigii* was based on *Fiebrig 2073,* collected in "Südbolivien, Bermejo, Talwiesen am Wasser" (Pax & Hoffmann, 1912). The duplicate at B was presumably destroyed, but a second duplicate was located at SI and is designated the lectotype.

Microstachys ramosissima was established by Saint-Hilaire (1824) based on the collection *Saint-Hillaire cat. C*^{2} *2559* from Rio Grande do Sul. Subsequently, Baillon (1864) proposed the combination *Stillingia ramosissima* based on the same collection. Müller (1866) recognized *M. ramosissima* and *S. ramosissima* as synonyms of *Sebastiania brasiliensis* var. *ramosissima F. genuina*. Analyzing the types and protologues of these names, and a vast number of collections (see selected specimens examined), it was evident that *M. ramosissima* is distinct from *S. brasiliensis* in having the bract glands oblong and plicate-rugose (vs. round to urceolate and smooth in *S. brasiliensis*) and the leaves always alternate (vs. opposite to alternate on the same branch). Therefore, it was necessary to establish the new combination *Sebastiania ramosissima*. Most of the varieties and forms proposed by Müller (1863; 1866; 1873) and Pax & Hoffmann (1912) for *Gymnanthes brasiliensis* and *Sebastiania brasiliensis* present the aforementioned characteristics of *S. ramosissima*, and are therefore synonymized to that species in our treatment.

Gymnanthes granatensis was proposed by Müller (1863), based on the collection *Schlim 586* and was recognized three years later by the same author (Müller, 1866) as *Sebastiania granatensis*. Müller (1863) characterized the new species by having oval or elliptic-lanceolate leaves, solitary staminate flowers on the bracts, and the staminate calyx with two subulate sepals. These characters form part of a morphological continuum within *S. ramosissima*, in which leaf shape ranges from ovate-lanceolate to ovate, elliptic or obovate, the number of flowers per bract from one to seven (usually 3), and the sepals of the staminate flowers from one to three and subulate or lobed. Similarly, Müller (1863) based his *Excoecaria bridgesii* (basionym of *Sebastiania bridgesii*) on the collection *Bridges s.n.*, from Bolivia and distinguished it based on its obovate leaves, plicate-rugose glands, and bracts with 3–5 staminate flowers, all features that fall within the range of variation encompassed by *S. ramosissima*. Likewise, the specimen *Warming 1603*, the type of Muller's (1863) *Excoecaria warmingii*, does not differ from *Sebastiania ramosissima* and is herein recognized as another synonym of this species.

Several other names published by other authors also clearly belong within the synonymy of *S. ramossissima*. When establishing *Stillingia weddelliana*, Baillon (1864) did not present any distinctive characters in relation to *Sebastiania ramosissima*, and we noted no taxonomically

significant morphological differences between the original material of the two names. *Dactylostemon anisandrus* was treated as a synonym of *Sebastiania brasiliensis* by O'Donnell & Lourteig (1942). Likewise, *Actinostemon luquense* Morong was recognized by Jablonsky (1969) as a species of *Sebastiania*, and duplicates of *Morong 720* deposited at GH, NY and US were annotated by him as *S. brasiliensis*. However, the original material for both names possesses the diagnostic characters of *S. ramosissima* (glands of the bracts plicate-rugose and alternate leaves). The type collection of *Sebastiania fiebrigii* is incomplete, without flowers or fruits. Nevertheless, the protologue description does not present any characters that would distinguish *S. fiebrigii* from *S. ramosissima*, and the analyses of other specimens (*B. Mostacedo* et al. *972* – F; *K. Fiebrig 2113* – F) from the same region (Bermejo, Bolivia) with similar leaves and branches further supports the synonymization of *S. fiebrigii* to *S. ramosissima*.

Sebastiania subsessilis (Müll. Arg.) Pax in Engl., Pflanzenr. IV. 147, V: 145. 1912. *Excoecaria subsessilis* Müll. Arg. in DC., Prodr. 15(2): 1223. 1866. *Sapium subsessile* (Müll. Arg.) Chodat & Hassl., Bull. Herb. Boiss. 2, sér. 5: 677. 1905. Type: "ohne nähere Standortsangabe", *Sellow s.n.* (holotype: B, destroyed [photo at F, negative 5514], lectotype, **here designated:** G [00414512]).

In the protologue of *Excoecaria subsessilis*, Müller (1866) indicated that the type (*Sellow s.n.*) was deposited at B, but the specimen was apparently destroyed. Although quite fragmentary, an isotype at G was located, and, it being the only known duplicate of the type, is designated lectotype.

Sebastiania venezolana Pax & K. Hoffm. in Engl., Pflanzenr. Euphorb.-Addit. 7: 200. 1924. Type: Venezuela. Caracas: Middle Catuche wood, above Caracas, in forest, altitude 1200–1400 m, June 1912, *Pittier 6304* (holotype: B, destroyed; lectotype, **here designated:** P [04864631]; isolectotypes: F, MO).

Sebastiania venezolana was described by Pax & Hoffmann (1924) based on the specimen *Pittier 6304* at B. This specimen was destroyed during World War II, for which reason a duplicate of the type at P was chosen as lectotype because it is in a better state of preservation and it contains a greater number of inflorescences than the other duplicates of the type collection.

Acknowledgements

The authors are thankful to the REFLORA project "Sistemática, filogenia e acervo virtual de coleções tipo de Euphorbiaceae, com ênfase nas tribos Hippomaneae, Hureae e Crotoneae" (CNPq proc.: 563571/2010–1) and to the curators of the cited herbaria for access to the collections studied.

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