Acta Botanica Brasilica, 2022, 36: e20210360
doi: 10.1590/1677-941X-ABB-2021-0360

Original article

Synopsis of the *Piper* subgenus *Ottonia* Spreng. (Piperaceae) from Brazil

Micheline Carvalho-Silva[1*], Paulo Eduardo Aguiar Saraiva Câmara[1] and Elsie Franklin Guimarães[2]

Received: December 07, 2021
Accepted: September 19, 2022

ABSTRACT

Piper is a large genus in the Piperaceae family, with the subgenus *Ottonia* having about 30 species distributed in the Neotropics, most of which occur in Brazil (26 species). *Ottonia* is characterized by the flower densely papillate, pedicellate or sessile, with four stigmas, four stamens and 4-ribbed fruits with persistent stigmas. The recent global studies of *Piper* propose that all the species of *Ottonia* should be considered a subgenus of *Piper*. Beacause Brazil doesn't have a revisionary study with the subgenus or with *Piper*, most of the names of the *Piper* subgenus *Ottonia*, about 100 names, need to be re-evaluated. We presented 26 species of *Piper* subgenus *Ottonia*, which one three are new species from Brazil ***Piper brumadinense*** M. Carv.-Silva & E.F. Guim., ***Piper cariacicaense*** M. Carv.-Silva & E.F. Guim., and ***Piper moringanum*** E.F. Guim. & M. Carv.-Silva. A synopsis of the *Piper* L. subgenus *Ottonia* Spreng. (Piperaceae) is presented, including diagnostics aspects and comments on species, descriptions of the new species, synonyms, lectotypes, and a key to the species and illustrations.

Keywords: jaborandi, new taxa, lectotypification, morphology, nomenclature, synonyms.

Introduction

The genus *Piper* Linnaeus contains 2,000-2,600 species worldwide (Callejas 2020, Quijano-Abril *et al*. 2006) and is the tenth largest angiosperm genus in number of species (Frodin 2004). A total of 289 species are recognized for Brazil, with 183 endemic species. Most of Brazilian species occur in the Amazon Forest (185 species), the Atlantic Forest (159 species), and Cerrado (68 species) (Guimarães *et al*. 2020).

Since the original description of *Piper* by Linnaeus (1753), new species and new classifications have been proposed for the genus. Sprengel (1820) described the genus *Ottonia* Spreng. based on the species *Ottonia anisum* Spreng. with inflorescence as raceme. Kunth (1839) and Miquel (1847, 1852) subsequently accepted *Ottonia* as a genus distinct from *Piper* and described new and included species of *Piper* into the genus *Ottonia*. De Candolle (1869), used the number of stamens as 4, the pedicellate flower and pinnate leaf to separate the species of *Ottonia*, but included these species in the genus *Piper*. Later, Trelease and Yuncker (1950), Burger (1971), and Yuncker (1972, 1973) adopted *Ottonia* as a genus and used the vegetative characters to identify species. Trelease (1935) also accepted *Ottonia* as a genus and described 47 new taxa.

1 Departamento de Botânica, Instituto de Biologia, Universidade de Brasília, 70910–900, Asa Norte, Brasília, DF, Brazil.
2 Instituto de Pesquisas Jardim Botânico do Rio de Janeiro, Diretoria de Pesquisas, 22460–030, Jardim Botânico, Rio de Janeiro, RJ, Brazil.

* Corresponding author: silvamicheline@gmail.com

Yuncker (1972, 1973) studied the Brazilian Piperaceae and circumscribed the genus *Ottonia* as shrubs or subshrubs with leaves lanceolate to broadly ovate or elliptic, inflorescence racemose and opposite the leaves, flowers with 4 stamens and 4 stigmas. Callejas (1986), studied the *Ottonia* and considered it a subgenus of *Piper*. In addition, this study proposed new names and combinations that are not available since they were not validly published.

Tebbs (1989) started a revision of the genus *Piper* from the New Word and adopted infrageneric classification of *Piper* using genera of Miquel (1844) and included seven sections into the key to the sections to New Word. As such, *Ottonia* section was recognized based on its racemose inflorescence with spathulate to cupulate bracts and fruits globose to subglobose.

Using molecular data, Jaramillo and Manos (2001) and Jaramillo *et al*. (2008) confirmed *Ottonia* as an independent linage within *Piper*. The authors included 11 species and suggested the monophyly of the *Piper* section *Ottonia*. Molina-Henao *et al*. (2016) confirmed the monophylly of *Ottonia* clade, but considered it a subgenus of *Piper* and demonstrated two main linages from Brazilian species—Amazonian and Atlantic lineages — and suggested that *Piper* sugenus *Ottonia* originated in the early Eocene.

Piper subgenus *Ottonia* has about 23 species in Brazil, most of which occur in the Atlantic Forest (Guimarães *et al*. 2020). The plants are small shrubs characterized by pinnately nerved leaves with ovate to lanceolate leaf-blades and a frequently persistent prophyll. The floral bracts are saccate-galeate, pubescent or glabrous. The flowers are organized in a raceme or spike, with four stamens and the ovary has four carpels with four stigmas with or without a style. The fruits are globose or subglobose and four-angulous or sulcate, and the stigma is persistent.

With most of the species of *Piper* subgenus *Ottonia* occurring in Brazil, and the works of regional flora and the list of Flora of Brazil 2020, we noticed many unidentified and misidentified specimens from *Piper* subgenus *Ottonia*. This study aims to revise the nomenclature of taxa of *Piper* subgenus *Ottonia* that occur in Brazil.

Methods

We analyzed the morphological characters of specimens for the studied taxa at the herbaria ALCB, BR, BHCB, C, CEN, ESA, FLOR, G, G-DC, HEPH, HRCB, HTO, HUFU, IAC, IAN, ILL, INPA, K, L, LE, MBM, MBML, MO, NY, PRC, R, RB, SP, SPF, U, UB, UEC, UFMT, VIES, VIC, and W, as well as type specimens. Herbarium acronyms are according to Thiers (2019). We were not able to analyze all the specimens of B herbarium, so part of the specimens of Sellow and Lushnat was not examined.

All material was compared with appropriate protologues and types and, when possible, synonymizations were proposed. For the species we provide diagnosis and comments on identification issues. The examined material is in a list called List of material examined, when the collector name is in bold, and the number of the species is in bracket. To morphological nomenclature we used Radford *et al*. (1974), Rizzini & Rizzini (1983), and Stearn (2004).

Names proposed by Trelease (1935) were lectotypified when: 1) the protologue cites two or more specimens as a type (syntypes); 2) the protologue cites only one specimen as the type without reference to herbarium where it is deposited, and we found two or more sheets in different herbaria; 3) the protologue cites one specimen as the type with reference to an herbarium, but we found two or more sheets at the cited herbarium.

Extent of occurrence (EOO) and area of occupancy (AOO) were calculated using GeoCAT (Bachman *et al*. 2011) and applied IUCN Red List Categories and Criteria, version 3.1 (IUCN 2017) to determine conservation status. Calculation of AOO was based on a user defined grid cell of 2 km. The extinction risk for each species was evaluated according to IUCN criteria (2017).

Results and discussion

Taxonomic treatment

Piper subgenus *Ottonia* (Spreng.) Standley, Contr. U.S. Natl. Herb. 23(1): 146. 1920.

=*Ottonia* Spreng., Neue Entdeck. Pflanzenk. 1: 255. 1820. Type: *Ottonia anisum* Spreng.

=*Serronia* Guill., Icon. Sel. Pl. 3: 54, t 90. 1837[1838]. Type: *Serronia jaborandi* Guill.

Shrubs 0.80–6 m tall. Leaves alternate, pinnately nerved throughout, frequently brochidodromous, with intramarginal nerves on abaxial surface. Prophyll persistent, rarely caducous. Inflorescence solitary, raceme or rarely spike, opposite from leaves. Floral bract saccate-galeate, stalked or sessile. Flowers densely papillate, pedicellate or sessile, 4 stamens, and ovary with 4 stigmas. Fruits 4-ribbed with persistent stigmas. Seeds 4 deeply sulcate.

In field, roots and aerial parts could be eaten and are commonly used to relief toothache, usually as alcoholic macerates (mouth washing) or by chewing parts of the plant (Cunico *et al*. 2004).

*Key to the species of the **Piper** subgenus **Ottonia** from Brazil*

1. Leaves peltate or short peltate 2

1'. Leaves not peltate 7

2. Inflorescence as spike 3

2'. Inflorescence as raceme 4

3. Leaves short peltate (until 0.5 mm), with visible idioblast near to nerves ..... 15.*P. klotzschianum*

3'. Leaves long peltate (up 0.8 mm), without visible idioblast ..... 23. *P. scutifolium*

4. Foliar lamina villous at least on the abaxial surface 5

4'. Foliar lamina glabrous in both surface, except for intramarginal nerves on abaxial surface 6

5. Floral bracts glabrous ..... 7. *P. carautensei*

5'. Floral bracts with trichomes ..... 8. *P. cariacicaense*

6. Pedicel shorter than fruit ..... 19. *P. ovatum*

6'. Pedicel longer than fruit ..... 6. *P. brumadinense*

7. Inflorescence as raceme (flowers pedicellate) 8

7'. Inflorescence as spike (flowers sessile) 17

8. Foliar lamina with trichomes or at least on abaxial nerves 9

8'. Foliar lamina glabrous on both surfaces (except intramarginal nerve hirtellous, ... 12

9. Foliar margin ciliate; floral bract long-villous ..... 9. *P. duartei*

9'. Foliar margin glabrous; floral bract pubescent to glabrous 10

10. Foliar lamina villous on abaxial surface; rachis glabrous ..... 22. *P. riodocense*

10'. Foliar lamina glabrous, but central nerves sparse-pubescent, dense-pubescent, sparse-villous; rachis hirtellous or pubescent 11

11. Foliar lamina with nerve below the surface dense-pubescent, base without a lobule covering the petiole; floral bract hirtellous ..... 3 *P. anisum*

11'. Foliar lamina with nerve below the surface sparse-pubescent or sparse-villous, base with the one lobule covering the petiole; floral bract glabrous ..... 15. *P. miquelianum*

12. Leaves with 16–26 secondary nerves 13

12'. Leaves with 8–15 secondary nerves 14

13. Plants with abundant visible idioblasts ..... 11. *P. eucalyptophyllum*

13'. Plants without visible idioblasts or inconspicuous ..... 25. *P. strictifolium*

14. Pedicel longer than fruit 15

14'. Pedicel shorter than fruit ..... 19. *P. ovatum*

15. Leaves without visible idioblasts ..... 12. *P. grazielae*

15'. Leaves with abundant visible idioblasts, at least with translucent idioblasts 16

16. Leaves with translucent idioblasts; rachis pubescent ..... 13. *P. hayneanum*

16'. Leaves with brown idioblasts, not translucent; rachis glabrous ..... 10. *P. eucalyptophyllum*

17. Plant with heteromorphous trichomes; prophyll apex long acuminate or attenuate ..... 11. *P. francovilleanum*

17'. Plant with homomorphous trichomes or glabrous; prophyll apex acute or obtuse 18

18. Ovary style as 4-alate ..... 17. *P. moringanum*

18'. Ovary with style cylindric or sessile 19

19. Ovary with style up to 0.6 mm long ..... 24. *P. setebarraense*

19'. Ovary with style sessile or subsessile (0-0.3 mm long) 20

20. Prophyll apex bifid ..... 5. *P. bicorne*

20'. Prophyll apex entire 21

21. Fruit apex truncate, with four prominent bulges at distal portion ..... 2. *P. alatabaccum*

21'. Fruit apex obtuse or acute, without bulges at distal portion 22

22. Petiole piloso; ovary pubescente, pilose or papillose ..... 20. *P. piliovarium*

22'. Petiole glabrous; ovary glabrous 23

23. Leaf lamina hirtellous on the adaxial surface ..... 21. *P. piscatorum*

23'. Leaf lamina glabrous 24

24. Leaf base cordate to lobate 25

24'. Leaf base acute to rounded 26

25. Leaves with observable idioblasts near to the central nerve; stalk of floral bract glabrous; fruit umbonate ..... 18. *P. ottonoides*

25'. Leaves without visible idioblasts; stalk of floral bract fimbriate; fruit oblong to ovoid-oblong ..... 1. *P. aghaense*

26. Prophyll glabrous 27

26'. Prophyll pubescent, hirtellous 28

27. Foliar lamina totally covered by brown or black visible idioblasts, especially on the lower surface; rachis dense-tomentous ..... 4. *P. bartlingianum*

27'. Foliar lamina with brown or yellow visible idioblasts along the midvein; rachis sparse-hirtellous or glabrous ..... 15.*P. klotzschianum*

28. Rachis dense-fimbriate ..... 14. *P. hoffmannseggianum*

28. Rachis glabrous ..... 26. *P. transluscens*

1. ***Piper aghaense*** E.F. Guim. & M. Carv.-Silva, Phytotaxa 212 (4): 296. 2015. — Type: BRAZIL. Espírito Santo: Piuma–Sopé do Morro Aghá, 16 February 1999, M.C. Assis *et al.* 584 (**holotype**: SPF! [00135018]; **isotypes**: NY! [01522560], RB! [00302976], SP [334842], UB! [0312305]). Figure in Carvalho-Silva *et al.* (2015, p. 294).

The foliar lamina of *Piper aghaense* is about 5-7 times longer than wide, glabrous and lanceolate with asymmetric, cordate or lobate base, one side overlapping the petiole, not peltate. There are 11-15 pairs of secondary veins and the primary vein is dense-pubescent on the abaxial surface. The prophylls are ovate, apex acute, reflex, pubescent on abaxial surface and glabrous on adaxial. The inflorescence is a spike with rachis glabrous or slightly fimbriate. The stalk of floral bract is fimbriate, the fruit is oblong to ovate-oblong with obtuse apex and sessile stigma. It is similar to *P. eucalyptophyllum* C. Candolle, but the inflorescence of the latter is a raceme. *Piper aghaense* also resembles *P. piscatorum* Trelease & Yuncker, but the latter has ovate leaves with an acute base vs. lanceolate leaves with cordate or lobate base.

The species is endemic to Brazil and occurs in the states of Espírito Santo and Rio de Janeiro. It has an EOO of 756km^2 and an AOO of 12Km^2, and thus is considered Endangered (EN) according to criteria B2ab(ii, iii) of IUCN (2017). The species has been found only in three localities in two states of Brazil (Espírito Santo – Guarapari and Piúma, and Rio de Janeiro – Campos dos Goytacazes), only one of which is included in a conservation unit (CU), Reserva Biológica do Tinguá (Tinguá Biological Reserve). The other two localities are on a farm and a touristic area and very close to the center of a city.

2. ***Piper alatabaccum*** Trel. & Yunck., Piperac. N. South Amer. 1: 408. 1950. — TYPE: GUYANA. Labbakabra Creek, Tiger Creek, Essequibo river, 24 August 1937, N.Y. Sandwith 1191 (**holotype**: NY! [00251080], **isotypes**: K! [000324115, 000324116], U! [0046579]).

Piper alatabaccum is characterized as a glabrous shrub with foliar lamina symmetric, 1,5-3 times longer than wide, and obtuse, acute to decurrent base, not peltate, with 5-10 secondary nerves. The prophyll is glabrous, entire, agute to obtuse apex. The inflorescence is a spike with glabrous or fimbriate rachis, and the fruits have four prominent bulges at the apex, truncate. The ovary has sessile stigma. It is similar to *Piper bartlingianum*, but the rachis of spike of the latter is visible between fruits, and the fruits are narrower than fruits of *P. alatabaccum*. In *P. alatabaccum* the rachis is not apparent and the fruits are longer than fruits of *P. bartlingianum,* and the base leaf is acute decurrente.

The species occurs in Bolivia, French Guiana, Guyana, Suriname, Venezuela and the Brazilian states of Amazonas, Amapá, Pará and Rondônia. Although it is not common in Brazil, with an EOO of about 2,980,454 km^2 and an AOO of about 36 km^2, we found numerous specimens of the

species. According to IUCN (2017) the species should be considered of Least Concern (LC).

2. ***Piper anisum*** (Spreng.) Angely, Flora descritiva do Paraná 2: 387. 1978. *Ottonia anisum* Spreng., Neue Entdeck. Pflanzenk. 1: 255. 1820. —TYPE: BRAZIL. Rio de Janeiro, D. Kulenkamp s.n. (**lectotype here designaded:** LE! [00001499!]; **isotype**: LE! [00001498!]. Figure in Miquel (1852, plate 22 as *Ottonia anisum*).

=*Ottonia anisum* f. *glabrior* Miq., Linnaea 20: 175. 1847. — TYPE: BRAZIL. J.B.E. Pohl s.n. (**lectotype designated here**: U! [0005555], **isolectotype**: BR! [0000013537623]).

=*Ottonia armondii* Trel., Proc. Amer. Philos. Soc. 75. 697. 1935. — TYPE: BRAZIL. Rio de Janeiro, Carmo, A.F.N. Armond 156 (**lectotype designated here**: ILL! [00009088]; **isolectotypes**: NY! [00222462], R! [000028322]).

=*Ottonia burchellii* Trel., Proc. Amer. Philos. Soc. 75. 699. 1935. — TYPE: BRAZIL. Rio de Janeiro, Corcovado, Burchell 1127 (**lectotype designated here**: K! [000324126]; **isolectotype**: GH! [00004914]).

=*Ottonia carpinifolia* f. *hirtipedicellata* Yunck., Bol. Inst. Bot. São Paulo 3: 134. 1966. —TYPE: BRAZIL. Rio de Janeiro, Serra dos Orgãos, Parque Nacional, 4 October 1953, E. Pereira 702 (**lectotype designated here**: RB! [00533740]; **isolectotypes**: NY! [00222463], RB! [00533723, 00533724]).

=*Ottonia carpinifolia* C. Presl, Epimel. Bot. 229. 1849. *Piper carpinifolium* (Presl.) C. DC., Prodr. 16(1): 155. 1869. — TYPE: BRAZIL. Rio de Janeiro, J. Beske s.n. (**holotype**: PRC! [452852]).

=*Ottonia consanguinea* C. Presl, Epimel. Bot. 230. 1849. *Piper punctatissimum* C. DC., Prodr. 16(1): 255.1869. — TYPE: BRAZIL. Rio de Janeiro, Corcovado, J.C. Mikan s.n. (**holotype**: PRC! [450202]).

=*Ottonia glazioui* Trel., Proc. Amer. Philos. Soc. 75. 704. 1935. — TYPE: BRAZIL. Rio de Janeiro, Serra da Estrela, 15 October 1872, A.F.M. Glaziou 6001 (**holotype**: B; **isotypes**: C! [10016517], K! [000324127]; P! [02025196]).

=*Ottonia hookeriana* Miq., London J. bot. 4: 470. 1845. *Piper gardnerii* C. DC., Prodr. 16(1): 254. 1869. — TYPE: BRAZIL. Minas Gerais, Ouro Fino, October 1840, G. Gardner 5186 (**lectotype designated here**: K! [000324113]; isolectotype: BM, K! [000324124]).

=*Ottonia mexiae* Trel., Proc. Amer. Philos. Soc. 75. 709. 1935. — TYPE: BRAZIL. Minas Gerais, Viçosa, Barbada, 680m, 9 October 1930, Y. Mexia 5160 (**lectotype** designated by Jones (1985).: ILL [00009075]; **isolectotypes**: BM [000993824], F, G! [00438515], GH [00004919], NY! [00222473, 00222474, 00222475], PH [00017704], S, US, U! [0005553], VIC!).

=*Ottonia mexiae* f. *fertilior* Trel., Proc. Amer. Philos. Soc. 75. 709. 1935. Pro part. Synonym — TYPE: BRAZIL. Minas Gerais, Viçosa, Barbado, 170m, 9 April 1930, Y. Mexia 4587 (**lectotype** designated by Jones (1985): ILL [00009072]; **isolectotypes**: AA [00004921], BM, F, G! [00438516], GH [00004920], NY! [00222476, 00222477, 00222478], PH [00017706], U! [0005554], UC [476734], US).

=*Ottonia pteropoda* Moric., Pl. Nouv. Amer. 88. 1840. *Piper pteropodon* (Moric.) C. DC., Prodr. 16(1): 255. 1869. — TYPE: BRAZIL. Bahia, J.S. Blanchet 1946 (**lectotype designated here**: G! [00438514]; **isoloectotype**: G! [00438513]).

=*Ottonia santaritana* Trel., Proc. Amer. Philos. Soc. 75. 714. 1935. — TYPE: BRAZIL. Rio de Janeiro, Serra dos Orgãos, C.A.W. Schwacke 4289 (**lectotype designated here**: G-DC! [00320101]).

=*Ottonia taperana* Trel., Proc. Amer. Philos. Soc. 75. 715. 1935. — TYPE: BRAZIL. Pernambuco, Tapera, Palmares October 1931, Pickel 2789 (**holotype**: US! [00107732]; **isotype**: ILL! [00009221]).

=*Piper praecox* C. DC., Annuarie Conserv. Jard. Bot. Geneve 2: 254. 1898. *Ottonia praecox* (C. DC.) Trel., Proc. Amer. Philos. Soc. 75. 712. 1935. — TYPE: BRAZIL. Minas Gerais, 1844, Claussen and Weddell s.n. (**holotype**: P [02141605]-photo!).

=*Serronia jaborandi* Guill., Icon. Sel pl. 3: 54, pl. 90. 1837. *Ottonia jaborandi* (Guill.) Kunth, Linnaea 13: 579. 1839. *Piper jaborandi* Vell., C. DC. In Prodr. 16(1): 252. 1869. —TYPE: BRAZIL. Rio de Janeiro, 1831-1833, C. Gaudichaud 1102 (**lectotype designated here**: P [01716933]; **isolectotypes**: G! [00441347, 00441348, 00441349], NY! [00555800])

=*Ottonia diversifolia* Kunth, Linnaea 13: 578. 1839. *Piper selloi* C. DC. Prodr. 16(1): 252. 1869. — TYPE: BRAZIL. Rio de Janeiro, F. Sellow s.n. (**holotype**: B; **isotype**: K! [000324114]).

Piper anisum is a shrub pubescent to glabrescent, with leaf ovate to lanceolate and obtuse to cordate base, without a lobe covering the petiole, frequently symmetric, not peltate and not ciliate. The species is recognized by densely short-pubescent central nerve on abaxial surface, inflorescence as raceme with long pedicellate flowers and fruits. The rachis and peduncle are hirtellous and the floral bracts are short-pubescent with short and hirtellous stalk. It is similar to *P. miquelianum*, the latter has the floral bracts sessile becoming pedicellate in fruit and are glabrous while the leaves blade are strongly asymmetric with cordate base with the one lobule covering the petiole.

The species occurs in the Brazilian states of Bahia, Espírito Santo, Minas Gerais, Paraíba, Pernambuco, Rio de Janeiro, and São Paulo. The EOO is 861,032 km^2 and AOO is 276km^2, however, the species is common in Atlantic Forest, mainly in the states of Rio de Janeiro, Espírito Santo and Minas Gerais, and occurs in many Cus. According to IUCN (2017), the species is Least Concern (LC).

Taxonomic notes

Ottonia anisum – We found two specimens in LE herbarium, one (LE 00001498) indicated by Yuncker (1973) as isotypes, and specimen filed as LE 00001499 without any type indication, however LE00001499 was verified by

Sprengel and has a label in handwrite including locality and collector as Kulenkamp and Herb Mertens. In this sheet has another annotation including description of *Ottonia* genus and *O. anisum*, and indication of new species "spc. Novi", so we choose as a lectotype LE 00001499.

Ottonia anisum f. *glabrior* – We found two specimens identified by Miquel as *O. anisum* f. *glabrior*, one in U and other in BR. However, we choose the specimen at U as lectotype because it is the most complete specimen and Miquel worked at U.

Ottonia armondii – The protologue did not mention the herbarium where the type specimen was deposited, so the lectotype of ILL herbarium was chosen because the specimen was verified by Trelease. It bears an original label, it is the most complete specimen and fits the protologue.

Ottonia burchellii – The protologue cites two syntypes, the first of which, Burchell 1127, was cited for herbaria at K by Trelease (1935), and its locality as Rio de Janeiro, Mt. Corcovado. The other specimen, is cited with locality "Brazil" (?v. Martius 1210) and was not found. Thus, we chose Burchell 1127 at K as lectotype because it is complete, and has an annotation about locality. The sheet at GH herbarium is a duplicate of the specimen at K.

Ottonia carpinifolia f. *hirtipedicellata* – Yuncker designed the type at RB, but there are three specimens. We chose RB -00533740 because the other specimens are sterile.

Ottonia hookeriana – We found two samples of Gardner 5186 housed at K, and one at BM. The lectotype at K 000324113 was chosen because this sample is the best fits with the protologue and was verified by Miquel.

Ottonia pteropoda – The specimen of the Blanchet collection was studied by Moricand and held at the Moricand herbarium, a botanical associate of A.P. De Candolle. We chose G-00438514 as lectotype because there are two specimens at G herbarium and this is the more complete sample.

Ottonia santaritana – Trelease (1935) cited two syntype: one from Serra dos Orgãos (no 4289) and the other Schwacke 11326 at G-DC herbarium, from Santa Rita, Minas Gerais. The specimen of Schwacke 11326, housed at G-DC herbarium is from Santa Rita, Minas Gerais, but is in the same sheet has another specimen (schwacke 5038), from Santa Catarina. The latter specimen is identified as *Piper machadoense* and don't have annotation of Trelease. In this sheet, the number Schwacke 11326 is only two leaves. We found only one number 4289 collected by Schwacke, from Serra dos Orgãos, housed at G-DC herbarium. The sheet doesn't have any annotation by Trelease and the the identification label says *Piper machadoense*, however the specimen is complete and includes the racemes and fruits as observed by Trelease (1935), thus we chose the Schwacke 4289 (G00320101) as the lectotype

Serronia jaborandi – The protologue cited two syntypes (one collected by Gaudichaud and other by Vauthier). We chose as a lectotype a specimen of Gaudichaud, number 1102 at P herbarium. This specimen has a fruit and fits best with the protologue.

4. ***Piper bartlingianum*** (Miq.) C. DC., Prodr. 16(1): 257. 1869. *Artanthe bartlingiana* Miq., Syst. Piperac. 2:510. 1844. — TYPE: FRENCH GUIANA, Cayenne, 1819-1821, P.A. Poiteau s.n. (**holotype**: G-DC! [00311733]; **isotype**: U! [0118489]). Figures: Steyermark (1984 p. 353), Melo *et al*. (2014, p. 462).

=*Artanthe warakabacoura* Miq., London J. bot. 4:469. 1845. *Ottonia warakabacoura* (Miq.) Miq., Linnaea 20: 180. 1847. *Piper warakabacoura* (Miq.) C. DC., Prodr. 16(1): 257. 1869. — TYPE: GUYANA, J. Parker s.n. (**lectotype designated here**: U! [0118490]); **isolectotype**: K! [000324041].

Piper bartlingianum is glabrous shrubs, with ovate to lanceolate or elliptic leaves, not peltate. The foliar lamina is symmetric, 1,5-4 times longer than wide, with long acuminate apex and acute or obtuse base. The nervous are glabrous with 8-10 pairs of secondary nerves, impressed on the adaxial surface. The inflorescence are spikes and the species is characterized by flowers and fruits inserted into a fovea. The fruit is obovoid, glabrous, with obtuse apex. The fovea margin is densely fimbriate. It is similar to *P. alatabaccum*, but the fruits of the latter species are not inserted into a fovea and have four prominent bulges at the apex, and the leaf veins are raised on the adaxial surface.

The species occurs in Bolivia, Colombia, French Guiana, Guyana, Surinam Venezuela, and the Brazilian states of in Acre, Amapá, Amazonas, Mato Grosso, Pará, Rondônia, and Roraima. The species is common in the Amazon Forest and has an EOO of 4,891,793 km^2 and an AOO of 56 km^2, and so, according to IUCN (2017), the species is Least Concern (LC).

Taxonomic notes

Artanthe warakabacoura – Miquel (1845) cited only the Parker specimen without reference to an herbarium. Later, Miquel (1847) cited three specimens including Parker's, but now the author mentioned the herbarium as hb Hooker. We found two samples of Parker's specimen, but the specimen at K is sterile. We chose as lectotype the specimen at U because Miquel worked there and the specimen is complete, including the spike with floral bracts described in the protologue.

5. ***Piper bicorne*** M. Carv.-Silva, E.F. Guim. & L.A. Pereira, Phytotaxa 212 (4): 297. 2015.— TYPE: BRAZIL. Espírito Santo, Santa Leopoldina, Chaves, Cachoeira Véu de Noiva, 17 January 2008, L.A. Pereira *et al*. 1572 (**holotype**: RB! [00518216]; **isotypes**: HAMAB!, MBLM!, UB! [213232]). Figure Carvalho-Silva *et al*. (2015, p. 296).

Piper bicorne is a shrub with abundant observable idioblasts, characterized by prophylls with a bifid obtuse apex and membranaceous, glabrous and elliptic leaves with yellow and brown idioblasts, not peltate. The inflorescence is

a spike, with fimbriate rachis and pilose floral bracts. Ovary with subsessile style. It is similar to *Piper klotzschianum* (Kunth) C. DC., but that species has prophylls with an entire apex, and a longer inflorescence (7–11cm long) while the inflorescence of *P. bicorne* is shorter (3–4.5 cm long).

The species Is endemic to Brazil and the state of Espírito Santo. Although the EOO and AOO are small, 383km^2 and 16km^2, respectively. We found numerous specimens representing at least six localities and four municipalities. Most of the specimens is from protected areas such as CUs (Reserva Biológica de Duas Bocas, Estação Biológica Caixa d'água). According to the IUCN (2017), the species is Least Concern (LC).

6. ***Piper brumadinense*** M. Carv.-Silva & E.F. Guim., **sp. nov.** — TYPE: BRAZIL. Minas Gerais, Brumadinho, Inhotim, 20°08'21"S, 44°14'13"W, 870m, 05 December 2009, H.E.S. Costa and R.C. Mota 106 (**holotype**: BHCB! [052556]; **isotype**: UB! [0312466]) Fig. 1.

P. brumadinense is characterized by translucid and brown idioblasts on the leaves. It is similar to *P. anisum*, but *P. brumadinense* has a glabrous central nerve.

Shrub 1–1.5 m tall. Branches glabrous, striate and with sparsely brown idioblasts or papillate. Prophylls persistent, 2–4 mm long, filiform, glabrous, papillate, apex obtuse or acute. Leaves 5.2–9(–10) x 1.8–3.5 cm, elliptic, membranaceous to papyraceous, discolorous, asymmetric, glabrous in both surface, with translucent observable idioblasts frequently closer to the base, base short-peltate, obtuse, sometimes slightly cordate, base slightly asymmetric with one side 1mm longer than the other; margin non-revolute, marginal veins glabrous; apex acute to acuminate; veins brochidodromous, 10–11 pairs, midvein slightly impressed or conspicuous on the adaxial surface, prominent on the abaxial surface, secondary veins conspicuous on both surface, prominent on abaxial surface; petiole 3.5–4 mm long, glabrous, vaginated towards the base. Inflorescence as a raceme, 2.5–5.7 cm long, erect, green-brown; peduncle 5–8 mm long, glabrous, with brown idioblasts, or papillate; rachis with visible idioblasts, papillate, striate, visible; floral bracts ca. 0.5 mm long, glabrous, saccate-galeate, stalks short, 0.1 mm long, slightly triangular, with observable idioblasts; floral pedicel 0.5–1.5 mm long. Fruit 1.0–2 x 0.8–1 mm, elliptic, 4-sulcate, brownish, papillate, apex short apiculate, 4 stigmas, persistent.

Etymology: The epithet refers to the type locality in the municipality of Brumadinho. Part of the municipality was recently destroyed by a mining dam disaster (Meira *et al*. 2016).

Piper brumadinense has congested and delicate leaves, similar to *P. anisum*; however, this latter species has a densely short-pubescent central nerve on the adaxial surface. The inflorescence of *P. brumadinense* is slender and delicate, with short pedicellate flowers (0.5–1.5 mm long) and glabrous rachis, while the pedicel in flowers and fruits of *P. anisum* is longer (1.5-5mm long) with a hirtellous rachis.

The species is only known from three municipalities in the state of Minas Gerais. Two of the specimens were collected in a CU (Parque Estadual do Rio Doce) while the other two were collected in private areas. Although the type locality of the species, Inhotim in the municipality of Brumadinho, was not destroyed by the mining dam disaster, it is close to the capital of Minas Gerais and receives many tourists. According to the IUCN (2017) criteria, the species is Data Deficient (DD), however the species might be at risk because above statement.

Additional specimens examined: BRAZIL. Minas Gerais, Marliéria, Parque Estadual do Rio Doce, 26 May 2001 (fr.), J.R. Stehmann *et al*. 2950 (BHCB052558). Igarapé, Nossa Senhora da Paz, Fazenda da Mata. 11 January 2000 (fr), A. Salino and P.O. Morais 5031 (BHCB052555).

7. ***Piper carautensei*** E.F.Guim. & M. Carv.-Silva, Hoehnea 36 (3): 432. 2009. *Ottonia peltata* E.F. Guimarães & Ichaso, Arq. Jard. Bot. Rio de Janeiro 20:355.1977. Not *Piper peltatum* L. — TYPE: BRAZIL. Espírito Santo, Domingo Martins, Campinho, rod. Do Chapéu, 15 September 1975, P. Carauta 1808 (**holotype**: RB! [00533741]; **isotype**: W! [20050002804]). Figure Guimarães & Ichaso (1974, p. 39 and 40).

Piper carautensei is villous shrub with leaves ovate or elliptic, 2-2.5 times longer than wide, and acuminate apex. The prophylls are villous with long-acuminate apex. The species is recognized by having peltate leaves with long-villous abaxial surface and the inflorescence is a raceme with a glabrous floral bract and the rachis hirtellous. It is similar to *P. duartei*, but the leaves of the latter are not peltate. It is also similar to *P. scutifolium*, but the leaves of the latter are totally glabrous and the flowers and fruits are sessile.

The species occurs in the Brazilian states of Espírito Santo, Rio de Janeiro, and São Paulo. To Espírito Santo state, Kollmann *et al*. (2007) and Fraga *et al*. (2019) considered the species as Vulnerable (VU), and Guimarães *et al*. (2013) included the species as Endangered (EN) according Red List Book to Brazil Flora, however new specimens was collected. Although it is not a common species, the AOO is 52Km^2 and EOO is 46,904Km^2; however, we found the species in about seven different places (Cariacica, Marechal Floriano, Mimoso do Sul, Santa Maria de Jetibá, and Santa Teresa, in Espírito Santo state, Rio de Janeiro and Guaraguatatuba in São Paulo) and most of the specimen came from cUs. According to the IUCN (2017) criteria it is Least Concern (LC).

8. ***Piper cariacicaense*** M. Carv.-Silva & E.F. Guim., **sp. nov.** — TYPE: BRAZIL. Espírito Santo, Cariacica, Reserva Biológica Duas Bocas, localidade de Alegre, trilha do Pau Oco, 20°17'29"S, 40°31'10"W, 608 m, 15 February 2008, L. Kollmann *et al*. 10626 (**holotype**: RB! [00522000]; **isotype**: MBML) Fig. 2.

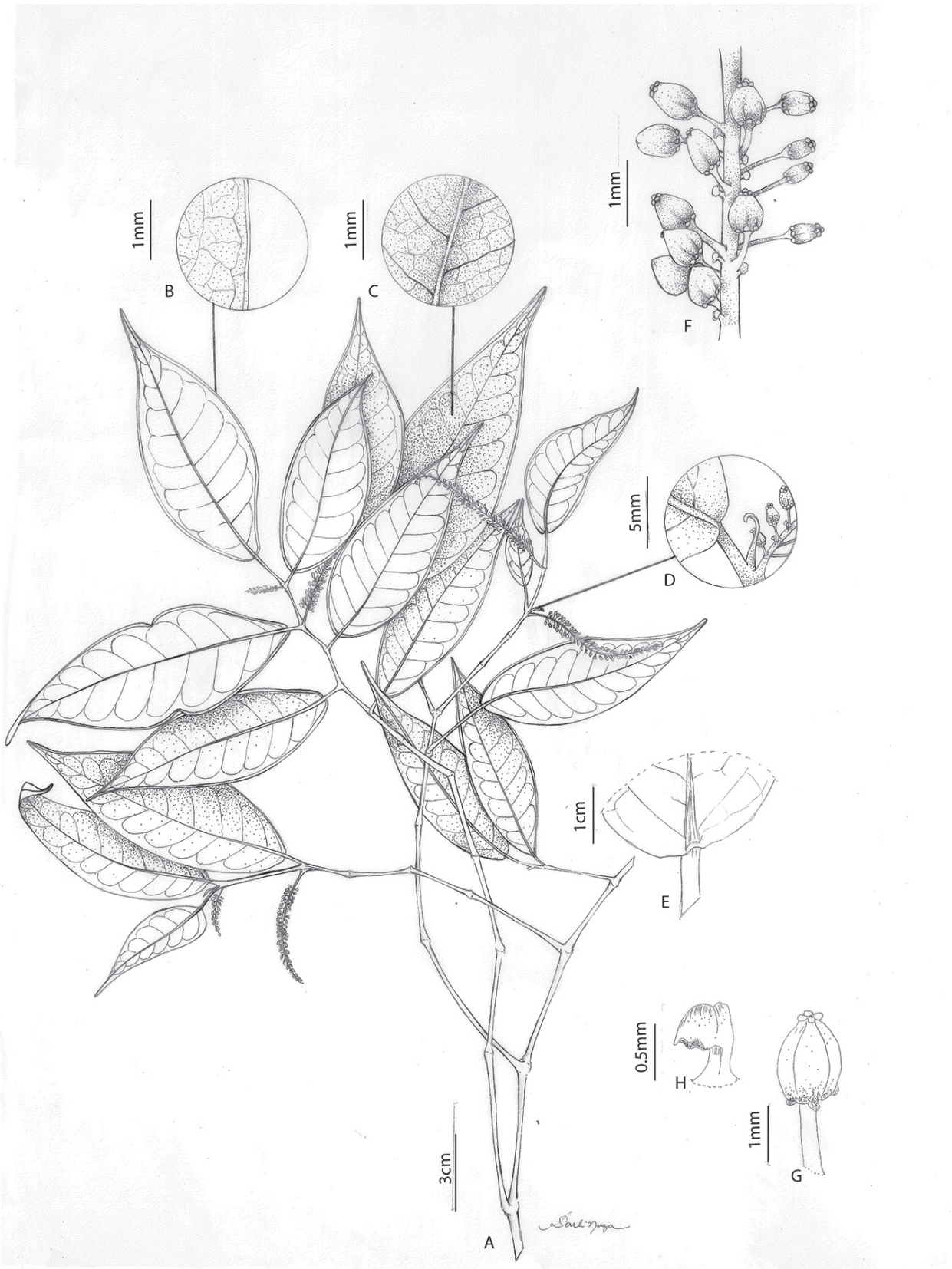

Figure 1. *Piper brumadinense* M.Carv.-Silva and E.F. Guim.: **A** habit, **B** detail of abaxial surface of leaf with intramarginal nerve, **C** detail of lamina with translucid observable idioblasts, **D** leaf base and prophyll glabrous, **E** leaf base short-peltate, **F** detail of raceme with fruits and floral bracts, **G** fruit in lateral view with stigma persistent, and **H** floral bract saccate-galeate, glabrous with short stalk. (Salino & Moraes 5031 BHCB, Costa & Mota H106 UB).

Piper cariacicaense is similar to *P. carautensei* and *P. duartei*, but differs in that the first has glabrous floral bracts and the latter has a non-peltate leaf base, while *P. cariacicaense* has floral bracts with trichomes on dorsal face, pilose, and peltate leaf base. It is also similar to *P. scutifolium*, but the inflorescence of *P. cariaciaense* is a raceme vs. spike in *P. scutifolium*.

Shrub ca. 1 m tall. Branches villous, trichomes multicellular, slightly striate. Prophylls persistent or caducous, 1–2 mm long, ovate, pilose, apex obtuse. Leaves 10–15 x 3.5–6.5 cm, elliptic to ovoid-elliptic, membranaceous to papyraceous, discolorous, villous on both surfaces, idioblasts visible on both surfaces, base peltate, leaf base extension 9 mm long, obtuse, rounded and sometimes truncate, slightly asymmetric, one side 1 mm longer than the other; margin revolute, apex acuminate; veins brochidodromous, 11–16 pairs, midvein plane or impressed on the adaxial surface, prominent on the abaxial surface, secondary veins conspicuous on both surfaces; petiole 1–1.5 cm long, villous, vaginated towards the base. Inflorescence in a raceme, 10–12 cm long, erect, green, peduncle 8–10 mm long, villous, with brown idioblasts visible, striate; rachis sparse hirtellous to glabrous; floral bracts ca. 1 mm long, saccate-galeate, trichomes on abaxial surface, pilose, stalk 0.3 mm long, floral pedicel 4–5 mm long, glabrous. Fruit 1.5–2 x 1.2–1.4 mm, ovate, 4-sulcate, brownish, with visible idioblast, glabrous, apex long, acute, 4 stigmas, persistent.

Etymology: The epithet refers to the type locality.

Piper cariacicaense was collected to the municipality of Cariacica in central Espírito Santo, in the Reserva Biológica Duas Bocas in 2008. Other species are described from Duas Bocas: *Eugenia amorimii* Fraga & Giaretta (Giaretta and Fraga, 2014), *Leandra magnipetala* R. Goldenb. & E. Camargo (Camargo and Goldenberg, 2011), and *Ouratea cauliflora* Fraga & Saavedra (Fraga and Saavedra, 2014) and *Bertolonia duasbocaensis* Bacci & R.Goldenb. (Bacci *et al*. 2016). The reserve is a fully protected area managed by the state government (IEMA/ES). It is located in the municipality of Cariacica in central Espírito Santo, between 20°14′40′′S–20°18′30′′S and 40°28′01′′W–40°32′07′′W. The Reserva Biológica Duas Bocas encompasses 2,910 ha, which are covered with well-preserved Atlantic Forest that protects threatened species of both fauna and flora (Novelli, 2010). Although the area is protected, we found only one specimen for the species, and according to the IUCN (2017) the species is Data Deficient (DD).

9. ***Piper duartei*** E.F.Guim. & M. Carv.-Silva, Hoehnea 36 (3): 432. 2009. *Ottonia villosa* Yunck., Bol. Inst. Bot. São Paulo. 3:139. 1966. non *Piper villosum* C. DC., J. Bot. 4: 212. 1866.— TYPE: BRAZIL. Espírito Santo: Santa Tereza, 25 November 1953, A.P. Duarte 4012 (**holotype**: RB! [00533719]; **isotypes**: NY! [222489], RB! [00533744]). Figure in Guimarães (1988).

=*Ottonia villosa* var. *minensis* E.F.Guim., Napaea 5:13-15. 1988. TYPE: BRAZIL. Minas Gerais, Caratinaga, Est. Biol. Caratinaga, 21 September 1984, P.M. Andrade and M.A. Lopes 334 (**holotype**: RB! [00285469]).

Piper duartei is a villous shrub with visible idioblasts, and with leaves ovate to elliptic, not peltate, not bullate, 2-2.5 times longer than wide, with lobulate base, strongly villous on abaxial surface, and ciliate margin. The prophylls are villous and the inflorescence is a raceme with glabrous rachis and the floral bracts is long-villous. It is similar to *P. carautensei*, but the latter has peltate leaves.

Piper duartei occurs in the Brazilian states of Espírito Santo and Minas Gerais. Guimarães *et al*. (2013) included the species as Vulnerabele (VU) according Red List Book to Brazil Flora. To Espírito Santo state, Kollmann *et al*. (2007) considered *Piper duartei* as Vulnerable (VU), however new specimes was added. The species is known from 16 samples for the species from about six different localities (Espírito Santo- Cariacica, Itarana, Lima Duarte, Santa Leopoldina, Santa Teresa, and Minas Gerais- Caratinga). Some collections were made in cUs, such as Reserva Ecológica de Duas Bocas. The EOO is 29,536 km^2 and the AOO is 32 km^2. According to the IUCN (2017), the species is Near Threatened (NT).

10. ***Piper eucalyptophyllum*** C. DC., Prodr. 16(1):252. 1869. *Ottonia eucalyptifolia* Kunth, Linnaea 13: 582. 1839, non *Piper eucalyptifolium* Rudge. — TYPE: BRAZIL. Rio de Janeiro, C. Gaudichaud 1100 (**lectotype designed here**: G! [0002392]; **isolectotypes**: G-DC! [00203552], P [00578206, 00578207]). Figure Monteiro and Guimarães (2009, p. 1011).

=*Ottonia eucalyptifolia* f. *angustifolia* Miq., In Martius Fl. Bras. 4(1): 66.1852. — TYPE: BRAZIL. Rio de Janeiro, M. Houllet s.n. (**holotype**: U!).

=*Piper eucalyptifolium* var. *glaucescens* C. DC., Candollea 1: 247. 1923. *Ottonia eucalyptifolia* Kunth var. *glaucescens* (C. DC.) Trel., Proc. Amer. Philos. Soc. 75: 703. 1935. — TYPE: BRAZIL. Rio de Janeiro, A.F.M. Glaziou 6805 (**holotype**: P; **isotype**: C! [10016548]).

=*Piper janeiroense* C. DC., Linnaea 37: 339. 1872. *Ottonia janeiroense* (C. DC.) Trel., Proc. Amer. Philos. Soc. 75: 706. 1935. — TYPE: BRAZIL. Rio de Janeiro, Lund s.n. (**lectotype designated here**: C! [10016551]; **isolectotypes**: C [10016549, 10016550], GDC [00315908]).

Piper eucalyptophyllum is recognized by glabrous and not peltate leaves, densely covered by brown idioblasts. The inflorescence is a raceme with flowers with long pedicels and rachis glabrous, covered by brown idioblasts. The leaves are (2.8) 3–4.4 (4.8) longer than wide with a long acuminate apex, about 16–18 secondary nerves and not peltate lamina. It is similar to *P. strictifolium*, but the leaf of the latter does not have visible idioblasts, is 6.5–11 times longer than wide and has 17–26 secondary nerves vs. in *P. eucalyptophyllum* leaves have brown idioblasts, are ca. 3-5 times longer than wide, and have 16-18 secondary nerves.

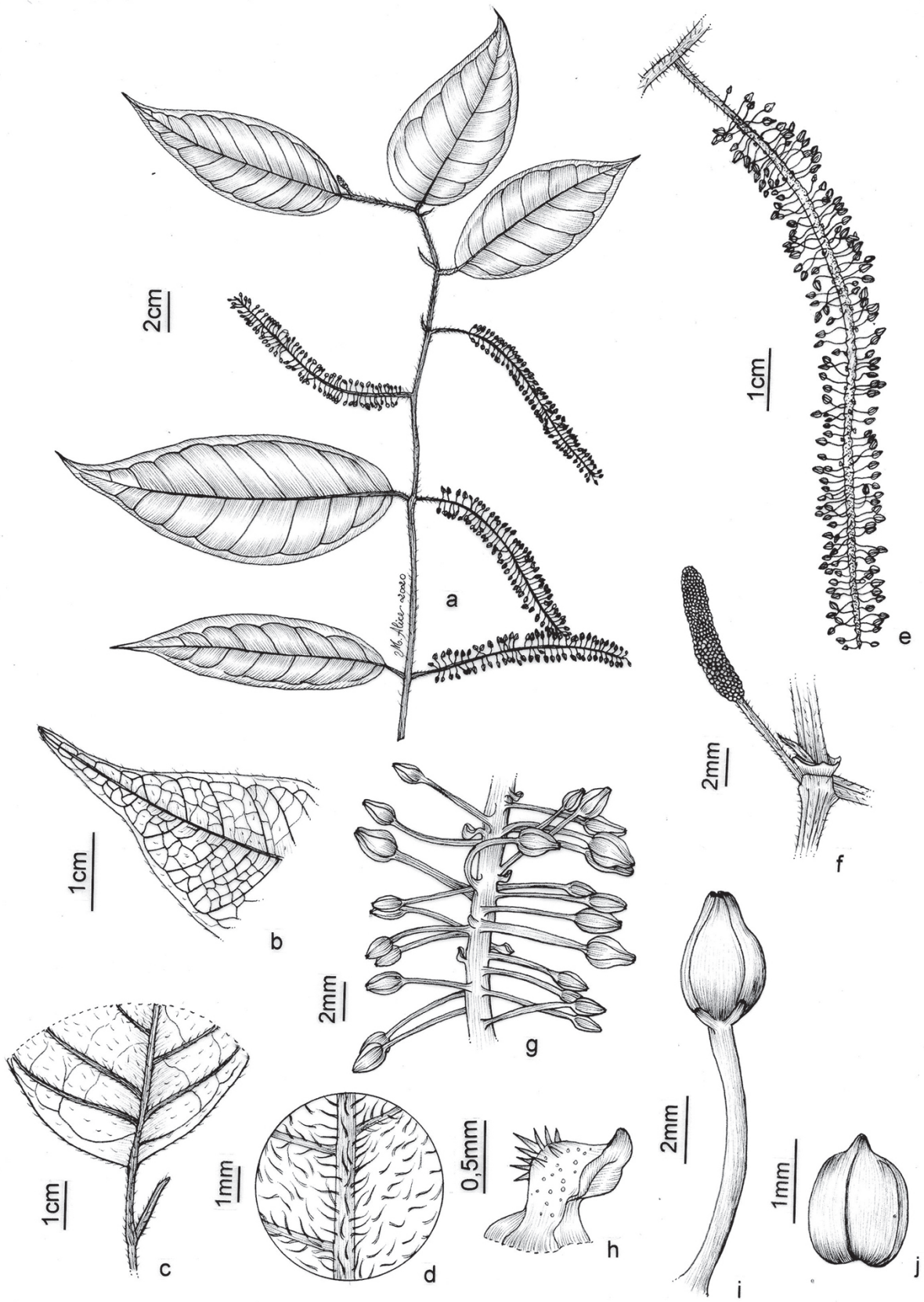

Figure 2. *Piper cariacicaense* M.Carv.-Silva and E.F. Guim.: **A** habit, **B** detail of leaf apex, **C** leaf base and prophyll, **D** detail of abaxial leaf surface, **E** Inflorescence with fruits, **F** detail of branch and inflorescence in flower, **G** detail of incflorescence with floral bracts, **H** floral bract, **I** fruit with pedicel, and **J** seed (L. Kollmann 10626 RB).

Occurs in the Brazilian states of Bahia, Espírito Santo, Minas Gerais, Rio de Janeiro, and São Paulo. Is very common in these states of Brazil and according to the IUCN (2017), the species is Least Concern (LC).

Taxonomic notes

Ottonia eucalyptifolia–- The protologue mentions two syntypes, (of Luschnath and Gaudichaud) but none of them has information on collection number. We found one specimen of Luschnath at BR herbarium, but it doesn't have mature fruits. Gaudichaud's specimen identified as *Ottonia eucalyptifolia* is number 1100 and we found five duplicates of the number Gaudichaud 1100. One sheet at P is not a *Piper eucalyptophyllum*, and we did not include it here. We chose Gaudichaud 1100 at G [G-0002392] as a lectotype because in protologue Kunth (1839) described the fruit of this specimen and the other parts of the plants and it is the specimen that best fits the protologue.

Piper janeiroense – Casimir De Candolle (1872) cited the Lund specimen at herb. Warming and fragment in herb DC (today included at C and G-DC respectively). We found three duplicates of the specimen at C and one at G-DC. We chose the number C10016551 because it is complete, fits with the protologue and has the best label.

11. ***Piper francovilleanum*** C. DC., J. Bot. 4: 219. 1866. — TYPE: BRAZIL. Amazonas: Rio Negro, near São Gabriel da Cachoeira, 1 August 1852, R. Spruce 2362 (**lectotype designeded here**: G-DC! [00203515]; **isolectotypes**: BM, BR! [000006599751], K! [000324028], NY! [00251310], W!). Figure Steyermark (1984, p. 425).

The species is characterized by the presence of heteromorphous trichomes and prophylls with long acuminate or attenuate apex. The leaves are ovate to lanceolate, frequently bullate, with 8-12 pairs of secondary veins. The lamina is long-villous to glabrescent, not peltate, with base cordate or lobate and with basal lobes frequently harboring ants as domatia. The inflorescences are spike, with rachis glabrous to fimbriate and the floral bracts are pubescent at base. *Piper francovilleanum* has fruits similar to *P. hoffmannseggianum,* but the latter species is glabrous and doesn't have leaves with basal lobes as domatia.

The species occurs in Venezuela and the Brazilian states of Amazonas and Roraima. There are about seven specimens of the species collected in Brazil, most of them from Serra dos Surucucus, Roraima and none in CU. The AOO is 16km^2 and the EOO is 106,632 km^2. According to the IUCN (2017) the species is Vulnerable (VU) in Brazil.

Taxonomic notes

Piper francovilleanum – Casimir De Candolle (1866) cited two specimens, Spruce 1784 (at Francov. Herbarium, today included in K) and Spruce 2362 (at G-DC herbarium). We chose Spruce 2362 (G-DC 00203515) as the lectotype because in the protologue De Candolle (1866) described a fruit of this material and the specimen has fruits and bears the handwriting of Casimir de Candolle.

12. ***Piper grazielae*** M. Carv.-Silva & E.F. Guim., **nom. nov.** *Ottonia propinqua* Kunth, Linnaea 13:583. 1839. non *Piper propinquum* C. DC. — TYPE: BRAZIL. F. Sellow s.n (**holotype**: B, **isotype**: K! [000324119]). Figure: Guimarães *et al*. (1978, p.9 as *Ottonia propinqua*), Guimarães and Monteiro (2006, p. 575 as *Ottonia propinqua*), and Medeiros and Guimarães (2007, p. 241 as *Piper corcovadensis*)

=*Piper corcovadense* (Miq.) C. DC., Prodr. 16(1): 255.1869. *Ottonia corcovadensis* Miq., Linnaea 20: 175. 1847.— TYPE: BRAZIL. Rio de Janeiro, Corcovado, J.B.E. Pohl 4776 (**lectotype designated here**: U! [0005579]).

=*Ottonia aguadana* Trel., Proc. Amer. Philos. Soc. 75: 696. 1935. — TYPE: BRAZIL Minas Gerais, Viçosa, fazenda da Aguada, 5 km beyond Yute, 700m, 15 December 1930, Y. Mexia 5178 (**lectotype** designated by Jones (1985): ILL; **isolectotypes**: BM, F, G! [000424829], NY! [000222458], PH, S, U! [0005574], US, VIC!),

=*Ottonia albopunctata* Trel., Proc. Amer. Philos. Soc. 75: 696. 1935. —TYPE: BRAZIL. Minas Gerais, Congonhas do Campo, near Ouro Preto, A.F.M. Glaziou 15436 (**lectotype designated here**: P! [01719740]; **isolectotypes**: C, K! [000324118], P! [01719739], NY! [000222459, 000222460]).

=*Ottonia blanchetii* Moric., Pl. Nouv. Amer. 87. 1840. —TYPE: BRAZIL. Bahia, Blanchet s.n. (**holotype**: G! [00424831]).

=*Ottonia clausseni* Trel., Proc. Amer. Philos. Soc. 75: 699. 1935. —TYPE: BRAZIL. Minas Gerais, 1840, P. Claussen s.n. (**holotype**: K! [000324117]; **isotype**: U! [0005570]).

=*Ottonia colliculorum* Trel., Proc. Amer. Philos. Soc. 75: 699. 1935. — TYPE: BRAZIL. Rio de Janeiro, Niterói, Morro do Carvalão, perto de Santa Rosa, C.A.W. Schwacke s.n. (**lectotype designated here**: ILL! [00009086], **isolectotypes**: NY! [00222464]; R! [000028315]).

=*Ottonia ituana* Trel., Proc. Amer. Philos. Soc. 75: 706. 1935. —TYPE: BRAZIL. São Paulo, Itu, 25 March 1897, A. Russell 199-SP18268 (**lectotype designated here**: ILL! [00009077]; **isolectotype**: SP! [001456]).

=*Ottonia lancifolia* Trel., Proc. Amer. Philos. Soc. 75:706. 1935. —TYPE: BRAZIL. Minas Gerais, Viçosa, Agricultural College lands, 700m, 22 March 1930, Y. Mexia 4499 (**lectotype** designated by Jones (1985): NY! [00957318]; **isolectotypes**: BM, G! [00424828], GH, MO! [3054868], NY! [00957318], PH [00017701], U! [0005575], US [1544140], VIC! [183]),

=*Ottonia miguelitensis* Trel., Proc. Amer. Philos. Soc. 75: 709. 1935. —TYPE: BRAZIL. Minas Gerais, Viçosa, rd. São Miguel, 4km from São Miguel, 690m, 4 April 1930, Y. Mexia 4564 (**lectotype** designated by Jones (1985): US [1544167]; **isolectotypes**: BM, G! [00424830], GH, ILL! [00009070], MO [3057417], NY! [00222480], NY [009577535], NY [00957317], S [3833], U! [0005576]; US [1544168]),

=*Ottonia miguelitensis* var. *longipes* Trel., Proc. Amer. Philos. Soc. 75: 710. 1935. —TYPE: BRAZIL. Minas Gerais, Viçosa, fazenda de Graziuma, 700m, 15 May 1930, Y. Mexia 4702 (**lectotype** designated by Jones (1985): ILL [00009231]; **isolectotypes**: F [0465233], G! [00438962], ILL [00009232], MO [3057318], NY! [222481], M, U! [0005577], US, VIC! [189]).

=*Ottonia miguelitensis* var. *parcepilosa* Trel., Proc. Amer. Philos. Soc. 75: 710. 1935. —TYPE: BRAZIL. Minas Gerais, rod. Areponga-Sao Miguel, 850m, 5 May 1930, Y. Mexia 4676b (**lectotype** designated by Jones (1985): ILL [0009229]; **isolectotype**: UC [476764])

=*Ottonia novaesii* Trel., Proc. Amer. Philos. Soc. 75: 711. 1935. —TYPE: BRAZIL. São Paulo, Campinas, October 1900, J. C. Novaes 504 (**holotype**: US [00107734]; **isotype**: SP! [02023]).

=*Ottonia peruibensis* Trel., Proc. Am. Philos. Soc. 75:712. 1935. — TYPE: BRAZIL. Peruíbe, October 1891, A. Loefgren 1625-SP12677 (**lectotype designated here**: ILL! [00009226]; **isolectotypes**: C! [10016595], NY! [00222485], SP! [001459]).

=*Ottonia propinqua* f. *longiracemosa* Yunck., Bol. Inst. Bot. (São Paulo) 3: 137, fig. 28ª, 1966. *Piper corcovadensis* var. *longiracemosum* (Yunck.) E.F. Guim & M. Carv.-Silva, Flora de São Paulo 7. 299. 2012. —TYPE: BRAZIL. Jardinópolis, margem do Rio Pardo, 20 November 1947, M. Kuhlmann 1603 (**holotype**: SP! [001460]; **isotypes**: HAS [40420], NY! [01795750, 00222482], RB! [00720831]).

=*Ottonia riedelii* Trel., Proc. Amer. Philos. Soc. 75: 713. 1935. — TYPE: BRAZIL. L. Riedel s.n. (**lectotype** designated by Jones (1985): ILL [00009224]; **isolectotype**: NY! [00251688]).

=*Ottonia sampaioi* Yunck., Bol. Inst. Bot. São Paulo 3: 138, fig. 122. 1966. — TYPE: BRAZIL. Minas Gerais, November 1905, A.J. Sampaio 305 (**holotype**: R! [000038846]; **isotype:** NY! [00222487]).

=*Ottonia stationis* Trel., Proc. Amer. Philos. Soc. 75: 714. 1935. —TYPE: BRAZIL. Bahia, J.S. Blanchet s.n. (**holotype**: P; **isotype**: BR! [000013537393]).

=*Ottonia usterii* Trel., Proc. Amer. Philos. Soc. 75: 716. 1935. —TYPE: BRAZIL. São Paulo, São Caetano, 16 November 1907, P. Usteri 12683 (**holotype**: SP!; **isotype**: ILL [0009220]).

=*Piper corcovadense* var. *petiolatum* Miq. ex C. DC., Prodr. 16(1): 255.1869. — TYPE: BRAZIL. Rio de Janeiro, 1833, C. Gaudichaud 1101 (**holotype**: G-DC! [00203531]; **isotypes**: G [00438963], NY! [00251239], U! [0005578]).

=*Piper corcovadense* var. *sessilifolium* C. DC., Prod. 16 (1): 255. 1869. —TYPE: BRAZIL. Bahia, 1834, J.S. Blanchet 1094 (**holotype**: G-DC! [00203538], P! [02025178]).

=*Piper frutescens* var. *microcarpum* C. DC., Linnaea 37: 338. 1872. *Ottonia frutescens* var. *microcarpa* (C. DC.) Trel., Proc. Amer. Philos. Soc. 75: 704. 1935. —TYPE: BRAZIL. Minas Gerais, Lagoa Santa, 11 November 1864, E. Warming s.n. (**lectotype designated here**: G-DC! [00314911]; **isolectotypes**: G-DC! [00314899], C! [10016535]).

=*Piper selloi* var. *latilimbum* C. DC., Notizbl. Bot. Gart. Berlin-Dahlem 6:464. 1917. *Ottonia latilimba* (C. DC.) Trel., Proc. Amer. Philos. Soc. 75: 706. 1935. — TYPE: BRAZIL. 1892, A.F.M. Glaziou 19865 (**holotype**: B; **isotypes**: C [10016536], K! [000324121], P [019814444], P! [02025181]).

=*Piper subglaucum* C. DC., Linnaea 37: 337. 1872. *Ottonia subglauca* (DC.) Trel., Proc. Amer. Philos. Soc. 75: 715. 1935. —TYPE: BRAZIL. 28 February 1864, E. Warming s.n. (**lectotype here designated**: C![10016538]; **isolectotypes**: C! [10016537], G-DC! [00323288]).

Piper grazielae is morphologically very variable, but the species is recognized by glabrous, without visible idioblast, ovate to lanceolate or elliptic leaves with glabrous, 12-14 secondary nerves and frequently intramarginal hirtellous and not peltate lamina. Prophyll is glabrous, 1cm long. The inflorescence is a raceme, with long pedicels (0.5-3mm long) in flower and in fruit, longer than fruit. The rachis is glabrous or rarely pubescent and the floral bracts glabrous with long stalk. It is similar to *Piper ovatum*, but the latter has pedicels shorter than the fruits vs. pedicels longer than fruits in *P. grazielae*. Is similar to *Piper hayneanum,* but the latter has leaf with translucid visible idioblasts vs. leaf without visible idioblasts in *P. grazielae*.

The new name is in honor a great brazilian botanist Graziela Maciel Barroso (1912-2003).

Piper grazielae occurs in the Brazilian states of Bahia, Ceará, Espírito Santo, Minas Gerais, Paraná, Pernambuco, Rio de Janeiro, Santa Catarina, and São Paulo. *Piper grazielae* is widespread in Brazil and according to the IUCN (2017), the species is Least Concern (LC).

Taxonomic notes

Ottonia albopunctata–- In the protologue there are two syntypes mentioned for this species; we chose the Glaziou 15436 at P herbarium (P-01719740), because it is the best preserved and fits well with the description even though there was no evidence of the identification of the new species as *O. albopunctata* by Trelease, as in most species described by the author. The other syntype, St. Hilaire 28 at P herbarium is filed under *Ottonia baptisiana* (C. DC.) Yunck and has no evidence of identification by Trelease as *O. albopunctata*.

Ottonia corcovadensis – The protologue mentions two syntypes (Pohl 4776 and 3030); however, there are two speimens at U herbarium, one of them without numbers and the other specimen with the numbers Pohl 4776 and 3030. This sheet has two branches. We chose as a lectotype Pohl 4776, barcode U0005579, the plant of the left, because it is more similar to the description, including immature fruits. The plant of the right is other species.

Ottonia colliculorum – The protologue cites two syntypes, Schwacke 28315 and Hoehne 24733. The numbers cited

after the collector's name are not collector's number, but a number of the R herbarium and SP herbarium, respectively. We chose the specimen Schwacke 28315 from ILL herbarium as lectotype because this specimen was verified by Trelease and it fits the protologue.

Piper frutescens var. *microcarpum*–- The protologue cites the specimen Warming, but it did not mention the collection. We chose that of G-00314911 herbarium as lectotype because it was identified by De Candolle and fits with the protologue, including description of fruits.

Ottonia ituana–- The protologue cites specimen number 18268, mar.25, 1897, from São Paulo, Itu but don't mention herbaria. We found two specimens, number 18268, from Itu, São Paulo, one at ILL and the other at SP herbarium. We chose ILL-00009077 as the lectotype because was verified by Trelease as a type and fits with the protologue. The duplicate at SP was designated as isolectotype

Ottonia peruibensis – The protologue cites the specimen of Loefgren 1625=12677 and didn't mention the herbarium. We found four specimens with this collector's number in four different herbaria (C, NY, ILL, SP). We chose the duplicate at ILL, ILL-00009226 as the lectotype because was verified by Trelease as a type and is in excellent conditions.

Piper subglaucum – Casimir De Candolle (1872) cited specimen of Warming at herb Warming (now housed at C) and herb DC (now housed at G-DC). We found three specimens at these herbaria and we chose as a lectotype duplicate C-10016538 because it was determined by C. De Candolle, is complete and all parts of the plant are together.

13. ***Piper hayneanum*** C. DC., Prodr. 16(1): 253. 1869. *Ottonia macrophylla* Kunth, Linnaea 13: 583. 1939. Non *Piper macrophyllum* Humbold, Bonpland & Kunth — TYPE: BRAZIL. Rio de Janeiro, F. Sellow s.n. (**holotype**: B; **isotype**: GH! [0004918]). Figure Miquel (1852, plate 22, as *Ottonia macrophylla*).

=*Ottonia macrostachya* Martius ex Miq., Linnaea 20:176. 1847. *Piper sebastioanopolitense* C. DC., Prodr. 16(1): 252. 1869.— TYPE: BRAZIL. Rio de Janeiro, Sebastianopolis, in forest VIII.XI, C.F.P. Martius s.n. (**holotype**: W; **isotype**: U![0004775]).

=*Piper hayneanum* var. *macrophyllum* C. DC., Prodr. 16(1): 253. 1869. *Ottonia grandifolia* Trel., Proc. Amer Philos. Soc. 75:705. 1935. — TYPE: BRAZIL. Minas Gerais, C.F.P. Martius s.n. (**holotype**: M; **isotype**: U!).

Piper hayneanum is a glabrous shrub with visible idioblasts. The leaves are ovate to lanceolate, 1.5-4 times longer than wide, symmetric, densely covered with translucid idioblasts, and not peltate and glabrous lamina, with 10-15 secondary nerver and the intramarginal nerve is hirtellous. The prophylls are glabrous, with visible idioblasts. The inflorescence is a raceme with a fimbriate rachis, with visible idioblasts and glabrous floral bracts. The floral pedicel is longer than fruit. The species is similar to *P. klotzschianum*, but the latter does not have translucid idioblasts on leaves and the inflorescence is a spike, vs. *P. hayneanum* densely covered with translucid idioblasts and inflorescence as a raceme.

The species occurs in the Brazilian states of Bahia, Espírito Santo, Minas Gerais, Paraíba, Pernambuco, Rio de Janeiro, and São Paulo. According to the IUCN (2017), the species is Least Concern (LC).

14. ***Piper hoffmannseggianum*** Schult., Mantissa 1: 242. 1822. — TYPE. BRAZIL. J.C. Hoffmannsegg s.n. (**holotype**: B). Figure in Miquel (1852, plate 23 as *Ottonia pohliana*).

=*Artanthe divergens* C.Presl, Epimel. Bot. 228. 1849. *Piper divergens* (C.Presl) C. DC., Prodr. 16(1): 371. 1869. — TYPE: BRAZIL. Rio de Janeiro, J.B.E. Pohl s.n. (**holotype**: PCR [455084]).

=*Ottonia laeta* Kunth, Linnaea 13:587. 1839. *Piper laetum* (Kunth) C. DC., Prodr. 16(1): 256. 1869. — TYPE: BRAZIL. C. Gaudichaud 1113 (**syntype**: P, US! [01330585]); BRAZIL. Sellow and Luschnat sn. (**syntype**: not found)

=*Ottonia laeta* var. *latifolia* Kunth, Linnaea 13:587. 1839.— TYPE: BRAZIL. Rio de Janeiro, Corcovado, 1833, B. Luschnath s.n. (**lectotype designated here**: BR! [0000013537074]).

=*Ottonia pohliana* Miq., Linnaea 20:179. 1847. *Piper pohlianum* (Kunth) C. DC., Prodr. 16(1): 256. 1869. — TYPE: BRAZIL. Rio de Janeiro, forests in Coralfalga, II.1818, J.B.E. Pohl 5033 (**holotype**: W; **isotype**: F, ILL, PCR, U! [0117329]).

=*Piper quadratiovarium* Yunck., Bol. Inst. Bot São Paulo 3:118. 1966. — TYPE: BRAZIL. Pernambuco 25.IX.1935, Pickel 4038 (**holotype**: IPA!; **type fragment**: NY! [00251682]).

=*Piper regelii* C. DC., Prodr. 16(1): 309. 1869. — TYPE: BRAZIL. [Bahia, Ilhéus, June to August 1822], *L. Riedel* 79 (**holotype**: LE!; **isotype**: G-DC! [00315977]).

Piper hoffmannseggianum is glabrous shrub, with elliptic, ovate or lanceolate leaves, 1.5-4.8 times longer than wide and not peltate lamina. The foliar leaves are symmetric, not peltate with obtuse or acute base on both sides and the apex is acute to acuminate, with hirtellous intramarginal nerves. Prophylls and nerves on abaxial surface are hirtellous, prophyll entire, with acute apex. The species is recognized by having an inflorescence as a spike with congested flowers, rachis denso-fimbriate and glabrous floral bracts with a hirsute stalk. The fruit is ellipsoid and glabrous, sessile stigma and the seed is symmetric. *Piper hoffmannseggianum* is similar to *P. klotzschianum* but the latter has glabrous prophlls with visible idioblasts vs. hirtellous prophylls without visible idioblasts in *Piper hoffmannseggianum*

The species is endemic to Brazil occurring in the states of Bahia, Espírito Santo, Mato Grosso, Minas Gerais, Pará, Pernambuco, and Rio de Janeiro. According to the IUCN (2017), the species is Least Concern (LC), with an AOO of 299,111km^2 and an of EOO 85km^2.

Taxonomic notes

Piper regelii – We found two specimens identified as Riedel 79 at LE herbarium, but only one ot them shares the morphology of *P. regelli*. Unfortunately, the herbarium does not have a barcode and we are unable to specify any further its identity.

Ottonia laeta var. *latifolia* – The protologue cites three syntypes, ollected by Gaudichaud, Sellow and Luschnath. We chose as lectotype the Luschnath's specimen (at BR) because it is complete and fits the description in the protologue.

15. ***Piper klotzschianum*** (Kunth) C. DC., Prodr. 16(1): 257. 1869. *Ottonia klotzschiana* Kunth, Linnaea 13: 589. 1839. —TYPE: BRAZIL. Bahia, 1835-1837, B. Luschnath s.n. (B. type not found). Figure in Queiroz *et al.* (2020).

=*Piper cosmianum* C. DC., Prodr. 16(1): 257. 1869. — TYPE: BRAZIL. Bahia, Cruz de Cosme, 23 November 1835, number 153 (**lectotype designated here**: LE! [00001475]; **isolectotypes**: G, LE! [00001473, 0001474], W!)

=*Piper pseudottonia* E.F. Guim. & Ichaso, Rev. Brazil. Biol. 34 (2):203. 1974. —TYPE: BRAZIL. Rio de Janeiro, Forest Reserve Tijuca, Grajau, 160-220m, 25 November 1969, D. Sucre *et al*. 6365 (**holotype**: RB! [00549679]; **isotypes**: K! [000786730], NY! [01085709], RB! [00549678])

Piper klotzschianum is a glabrous shrub with visible idioblasts, at least when young. The leaves are ovate or lanceolate, frequently short-peltate, 1.5-3 times longer than wide, asymmetric base with base acute on one side and obtuse on the other side, glabrous. The prophylls are glabrous and have visible idioblasts. The inflorescence is a spike, so the flowers are sessile with sparsely pubescent stalked floral bracts. The rachis is densely pubescent to glabrescent. It is similar to *P. ottonoides*, but the latter has prominent nerves on both surfaces vs. impressed nerves above in *P. klotzschianum*. Differ of *Piper ovatum* because it has rachis glabrous and flowers subsessile vs. rachis pubescent to glabrescent and sessil flowers in *Piper klotzschianum*.

Piper klotzschianum occurs in the Brazilian states of Bahia, Espírito Santo, Mato Grosso, Minas Gerais, and Rio de Janeiro. Two specimens are registered for the state of Acre, but we did not have access to the material to confirm their identification. With about 150 exsiccates divided among five states of Brazil, the species is Least Concern (LC) according to the IUCN (2017).

Taxonomic notes

Piper cosmianum – Casimir De Candolle (1869) cited the specimen number 153 at h. Fischeri in h. Petrop. (currently included in LE). We found three exsiccates with the number 153 at LE herbarium and we chose the number LE-00001475 as a lectotype because is the most complete specimen and the label and was verified by De Candolle.

16. ***Piper miquelianum*** C. DC., Prodr. 16(1): 254. 1869. *Ottonia martiana* Miq., Linnaea 20 :178.1847. — TYPE: BRAZIL. C.F.P. von Martius s.n. (**holotype**: M; **isotype**: U! [0005607]). Non *Piper martianum* Kunth, Linnaea 13: 691. 1839[1840]. Figure in Guimarães *et al*. 1978, p.13 as *Ottonia martinana*), Medeiros and Guimarães (2007, p. 242).

=*Ottonia apodostachya* Trel., Proc. Amer. Philos. Soc. 75: 697. 1935. —TYPE: BRAZIL. Santa Catarina, Jaraguá, 11 October 1929, F.C. Hoehne s.n. – SP24388 (**lectotype designated here**: ILL! [00009090]: **isolectotypes**: ILL [00009091], SP! [011271]).

=*Ottonia apodostachya* var. *vidali* Trel., Proc. Amer. Philos. Soc. 75: 697. 1935. — TYPE: BRAZIL. Espírito Santo, Vidal 138 (**lectotype** designated by Jones (1985): ILL [00009089]).

=*Ottonia cordulatifolia* Trel., Proc. Amer. Philos. Soc. 75: 700. 1935. — TYPE: PARAGUAY, Alto Paraná, 1909-1910, K. Fiebrig 5625 (**lectotype designated here**: K! [000324122]; **isolectotypes**: BM! [000092717, 000092718], G! [00381656], GH [00004915], US [00107740], P [01717921], SI [092199]).

=*Ottonia dusenii* Trel., Proc. Amer. Philos. Soc. 75: 702. 1935. — TYPE: BRAZIL. Paraná, Jaguariahyva, 23 October 1910, P. Dusén 10456 (**lectotype designated here**: S! [SR3828]; **isolectotype**: US [00107737]).

=*Ottonia dusenii* var. *heterophylla* Trel., Proc. Amer. Philos soc. 75: 702. 1935. — TYPE: BRAZIL. Paraná, Pinhais, 12 February 1914, P. Dusén 14506 (**holotype**: S! [S-R3829]).

=*Ottonia dusenii* var. *variifolia* Trel., Proc. Amer. Philos. Soc. 75: 702. 1935. — TYPE: BRAZIL. Paraná, Jaguariayva, 16 April 1911, P. Dusén s.n. (**lectotype designated here**: S! [SR3827]).

=*Ottonia edwallii* Trel., Proc. Amer. Philos soc. 75: 702. 1935. — TYPE: BRAZIL. São Paulo, Ipiranga, 29 October 1894, A. Loefgren 2814-SP12679 (**lectotype designated here**: ILL![00009084]; **isolectotypes**: ILL [00009095], SP! [001453])

=*Ottonia elocalis* Trel., Proc. Amer. Philos soc. 75: 703. 1935. — TYPE: BRAZIL. São Paulo, Ipiranga, March 1912, H. Luederwaldt s.n.- 12675 (**lectotype designated here**: ILL! [0009082]; **isolectotypes**: ILL [0009083], SP! [001910]).

=*Ottonia hammari* Trel., Proc. Amer. Philos. Soc. 75: 705. 1935. — TYPE: BRAZIL. São Paulo, Coafuerao, Cantareira, 4 April 1901, Hammar 4551-12669 (**lectotype designated here**: ILL! [0009080]; **isolectotypes**: ILL! [0009081], SP! [001454]).

=*Ottonia hoehnei* Trel., Proc. Amer. Philos. Soc. 75: 705. 1935. — TYPE: BRAZIL. São Paulo, Butatan, 14 October 1918, F.C. Hoehne s.n.-SP2480 (**lectotype designated here**: SP! [001455]; **isolectotypes**: ILL [00009079], ILL! [00009078].

=*Ottonia loefgreni* Trel., Proc. Amer. Philos. Soc. 75: 707. 1935. — TYPE: BRAZIL. São Paulo, Pirituba, 30 October 1893, A. Loefgren 1552-SP12681 (**lectotype designated here**: SP! [001457]; **isolectotypes**: C, NY! [00222470]).

=*Ottonia martiana* var. *latifolia* Yunck., Bol. Inst. Bot. São Paulo 3: 135. 1966. — TYPE: BRAZIL. São Paulo, Ipiranga, 28 October 1943, B.J. Pickel 287 (**holotype**: NY! [00222472]; **isotype**: SPSF! [00287]).

=*Ottonia muelleri* Trel., Proc. Amer. Philos. Soc. 75: 710. 1935. — TYPE: BRAZIL. Santa Catarina, Blumenau, F. Mueller 459 (**holotype**: B; **isotype** G, K! [000324123]).

=*Ottonia palhosana* Trel., Proc. Amer. Philos. Soc. 75: 712. 1935. — TYPE: BRAZIL. Santa Catarina, Florianopolis, Palhoça, 22 October 1929, F.C. Hoehne s.n.-SP24462 (**lectotype designated here**: SP! [001458]; **isolectotype**: ILL! [00009227]).

=*Ottonia pickelii* Yunck., Bol. Inst. Bot. São Paulo 3:136. 1966. — TYPE: BRAZIL. São Paulo, 6 October 1941, Pickel 5443 (**holotype**: US [00107733]; **isotype**: HB!).

=*Ottonia riofeioana* Trel., Proc. Amer. Philos. Soc. 75: 713. 1935. — TYPE: BRAZIL. São Paulo, Rio Feio, Edwall s.n. SP12666 (**lectotype designated here**: ILL! [00009223]; **isolectotype**: NY! [00222486], SP! [001461]).

=*Ottonia santa-annae* Trel., Proc. Amer. Philos. Soc. 75: 713. 1935. — TYPE: BRAZIL. São Paulo, Santa Annna, November 1912, A.C. Brade 5786 -SP7183 (**lectotype designated here**: SP! [001462]; **isolectotype**: NY! [00232488]).

=*Ottonia schwackeae* Trel., Proc. Amer. Philos. Soc. 75: 714. 1935. — TYPE: BRAZIL. Santa Catarina, Blumenau, 14 September 1884, C.A.W. Schwacke 5038 (**lectotype designated here**: G-DC!; **isolectotype**: RB! [00304567]).

= *Piper ovatum* var. *hirtellum* C. DC., Bull Herb. Boissier, sér. 2, 3: 396. 1903. *Ottonia cordulatifolia* var. *hirtella* (C. DC.) Trel., Proc. Amer. Philos. Soc. 75: 702. 1935..—TYPE: PARAGUAY, "Sierra de Maracuayú, November 1898-1899, E. Hassler 5383 (**lectotype** designated by Zanotti and Keller (2017): G [00307069], **isolectotypes**: BM! [000092719], G! [00307065], G [00307067], NY! [00251557].

Piper miquelianum is pubescent when young to glabrescent when mature. The foliar leaves are asymmetrics at base, with one of the lobes partially covering the petiole, and not peltate lamina. Are glabrous except by central nerve on the abaxial surface sparsely pubescent and intramarginal nerves hirtellous. Inflorescence is a raceme and the flower pedicel 2–3x longer than fruit. The peduncle and rachis are pubescents. It is similar to *P. grazielae* but the latter has a glabrous central vein and the lobes of the base leaf never cover the petiole vs. central nerve on the abaxial surface sparsely pubescent and with one of the lobes of the base leaf partially covering the petiole.

The species occurs in the Brazilian states of Bahia, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Paraná, Rio Grande do Sul, Santa Catarina, and São Paulo. With more them 400 exsiccates from Brazil, and occurring in at least eight states, the species is Least Concern (LC) according to the IUCN (2017) criteria.

Taxonomic notes

Ottonia apodostachya – Trelease (1935) cited specimen Hoehne 24388, but this number is an herbarium number. We found three specimens with this number at ILL and SP, but we chose the ILL- 00009090 as a lectotype because it was verified by Trelease and the label is complete.

Ottonia cordulatifolia – The protologue cites two syntypes of *O. cordulartifolia*, but only for the first one the author cited the herbarium, Fiebrig 5625 at K herbarium. We chose this specimen as the lectotype because it fits well with the protologue.

Ottonia dusenii – The protologue cites six syntypes, of which we chose the first one mentioned by the author, Dusén 10456 at S, because it fits the protologue and has a handwritten note by Trelease.

Ottonia dusenii var. *variifolia* – The protologue mentions five specimens collected by Dusén. We could only find one of them at S, Dusén April 16/1911. It was cited in the protologue, and it was verified by Trelease.

Ottonia edwallii – The protologue cites one specimen as the type, but does not cite the herbarium. We found three duplicates identified as Loefgren 2814-SP12679. We chose the specimen at ILL, ILL-00009084, as the lectotype because it was verified by Trelease and has the best label among all duplicates.

Ottonia elocalis – The protologue mentions one specimen, but does not cite the herbarium. We found three duplicates of Luderwaldt s.n. with SP herbarium number 12675. We chose the specimen at ILL, ILL-0009082 as lectotype because this specimen was verified by Trelease and has the best label.

Ottonia hammari – The protologue cites one specimen, but does not cite the herbarium. We found three specimens of Hammar 4551-12669 and we chose the duplicate ILL-0009080 as a lectotype because this specimen was verified by Trelease.

Ottonia hoehnei – The protologue cites two syntypes (Hoehne 2480 and Loefgren 1425- 12672). Hoehne specimen is in excellent conditions and it fits the protologue. We chose specimen SP-001455 as a lectotype, although it has only two inflorescence it is the only duplicate with field data "Mata. Inflorescência alva."

Ottonia martiana – The type specimen of this specie is part of Martius Herb (currently housed at M). Although the duplicate at U has been labeled as holotype, that specimen is an isotype of the real holotype at M herbarium.

Ottonia loefgreni–- The protologue cites only one specimen, but don't cite the herbarium. We found two duplicates of Loefgren 1552- 12681, one of them at SP and the other at NY. We chose the specimen at SP, SP- 001457 as a lectotype because it bears the original label and fits with the protologue. This specimen was identified by Trelease, but don't have his handwriting.

Ottonia palhosana–- The protologue cites only Hoehne 24462 as the type specimen, but does not cite any herbarium. We found two duplicates with this identification, one at SP

and another at ILL. We chose SP! [001458] as the lectotype. Althouth the specimen SP! [001458] does not have Trelease handwriting, it is a better quality specimen.

Ottonia riofeioana – The protologue mentions a specimen from Rio Feio expedition 12666, The number refers to numbering of the SP herbarium collection. We chose the specimen of ILL-00009223 at ILL herbarium because it was verified by Trelease and it is fits well with the protologue.

Ottonia santa-annae – The protologue cites a specimen collected in Sta. Anna with identification number 5758=7183. We found an exsiccate collected by Brade with number 5786 -SP7183. We chose the duplicate at SP, SP-001462 as the lectotype because it is more complete and bears the original label. This specimen was identified by Trelease (see label) although it does not have his handwriting.

Ottonia schwackeae – The protologue cites two syntypes Schwacke 5038 and Ule 200, the best of which is Schwacke 5038, and the author cites the De Candolle herbarium. Although there two branches on the herbarium sheet, the branch associated with Schwacke 5038 is complete and the specimen fits well the protologue. This specimen was verified by Trelease.

17. ***Piper moringanum*** E.F. Guim. & M. Carv.-Silva, **sp. nov** . — TYPE: BRAZIL. Espírito Santo, Santa Teresa, Mata do IFES, São João de Petrópolis, 22 December 2011 (fl., fr.), F. Z. Saiter, J. Gurtler and M. Perini 381 (**hototype**: MBML! [00046053]; **isotypes**: RB, UB![0311306]) Fig. 3.

Piper moringanum is recognized by the canaliculate petiole with two lines of villous trichomes, intramarginal nerve hirtellous and fruit with style dilatate as 4 alate. It is similar to *P. klotzschianuma*and *P. hoffmanseggianum* due to the sessile flowers and the hirtellous intramarginal nerve, but *P. klotzschianum* and *P. hoffmanseggianum* has glabrous petiole don't have style dilatate as 4 alate.

Shrub 0.5–1 m tall. Branches 2–3 mm diam, glabrous, yellow visible idioblasts. Prophylls 0.5–1.1 cm, hirtellous to glabrescent, chartaceous, filiform, apex acute. Leaves 10–15.3 x 5.9–8.6 cm, not peltate, elliptic, ovate-elliptic, papyraceous, discolorous, glabrous, except submarginal nerves hirtellous on abaxial side, sometimes midvein hirtellous to glabrescent on adaxial surface, base acute to subrounded, apex acute; veins brochidodromous, 6–9 pairs of secondary veins, primary and secondary nerves raised on both surfaces; petiole 0.7–1.2 cm long, hirtellous to glabrous on the dorsum, sulcate, with two lines of villous to glabrescent trichomes, vaginated towards the base, canaliculate. Inflorescence as a solitary spike, 3–6.2 cm long, 0.2–0.3 cm diam., erect, brown idioblasts; peduncle 3–5 mm, hirtellous to glabrescent; rachis glabrous, brown observable idioblasts; floral bracts 0.7–1 mm long, saccate-galeate, hirtellous, apex convex, stalk 0.20–0.6 mm long, hirtellous. Ovary with dilatate style, as 4-alate, stigmas 4. Fruits 1–1.4 mm long, 1.2–1.5 mm diam., ovate or globose, 4-ribbed angular.

Etymology: The specific epithet is due the similarity the fruit has to a moringa, a type of water storage vessel.

Additional specimens examined: BRAZIL. Espírito Santo, Santa Teresa, Mata do IFES, São João de Petrópolis, 21 november 2011 (fr.), J. Gurtler, F. Z. Saiter, M. Perini and José 9 (MBML).

Piper moringanum is described only from two collections in the same locality, Santa Teresa municipality. This area houses many samples of Piperaceae, and many collectors have worked there. Nonetheless, *P. moringanum* has not been found again. According to the IUCN (2017) the species is Data Deficient (DD).

18. ***Piper ottonoides*** Yunck., Bol. Inst. Bot. São Paulo, 3 :109. 1966. —TYPE: BRAZIL. Pará, Remansão do Centro, E of the Tocantins railroad, 1 October 1966. R.L. Froes 23592 (**holotype**: IAN! [42242], **isotype:** NY! [00251553]).

Piper ottonoides is a glabrous shrub, recognized by leaves with a prominent central nerve on both surfaces and with visible idioblasts near to central vein. The leaves are ovate to lanceolate, with 11-13 pairs of secondary veins, base cordate, and not peltate. The prophyll is entire, filiform and pubescent, with acute to obtuse apex. The inflorescence as a solitary spike with flowers sparsely arranged on a glabrous rachis and floral bracts decurrent into the rachis, glabrous. The fruits are umbonate, strongly sulcate, apex obtuse and sessile stigma. It is similar to *Piper klotzschianum,* but it is not observable idioblasts vs. leaves with visible idioblasts in *P. ottonoides*. Is similar to *Piper transluscens,* but it has base leaf acute to obtuse, and *Piper ottonoides* the base leaf is cordulate.

The species occurs in in the Brazilian states of Amazonas, Mato Grosso, Maranhão, Minas Gerais, Pará, and Rondônia, but only one specimen was found for each of Minas Gerais, Mato Grosso and Maranhão. None of the specimens were found in a CU, however, the species is Least Concern (LC) according to the IUCN (2017) with an EOO of 1,116,000km^2 and an AOO of 32km^2.

19. ***Piper ovatum*** Vahl, Ecolog. Am. 1: 3. 1796. — TYPE: Trinidad, J. Ryan s.n. (**lectotype designated here**: C! [10016610]; **isolectotypes**: BM [000993705], C!). Figure in Vahl (1807, plate 1); Guimarães *et al*. 1978, p.6 as *Ottonia frutescens*).

= *Ottonia leptostachya* Kunth, Linnaea 13: 586. 1839. *Piper boucheanum* C. DC., Prodr. 16(1): 254.1869. non *Piper leptostachyon* Nutt, Amer. J. Sci. Arts 5(2): 287. 1822. — TYPE: BRAZIL. F. Sellow s.n. (**holotype**: B; **isotype:** K! [000324094]).

=*Ottonia leptostachya* var. *glandulosa* Yunck., Bol. Inst. Bot. (São Paulo) 3: 135, fig. 27ªa. 1966. —TYPE: BRAZIL. Espírito Santo, Rio Doce, Bueno and Emygdio 181 (**holotype**: R! [000037636]; **isotype**: NY! [00222469]).

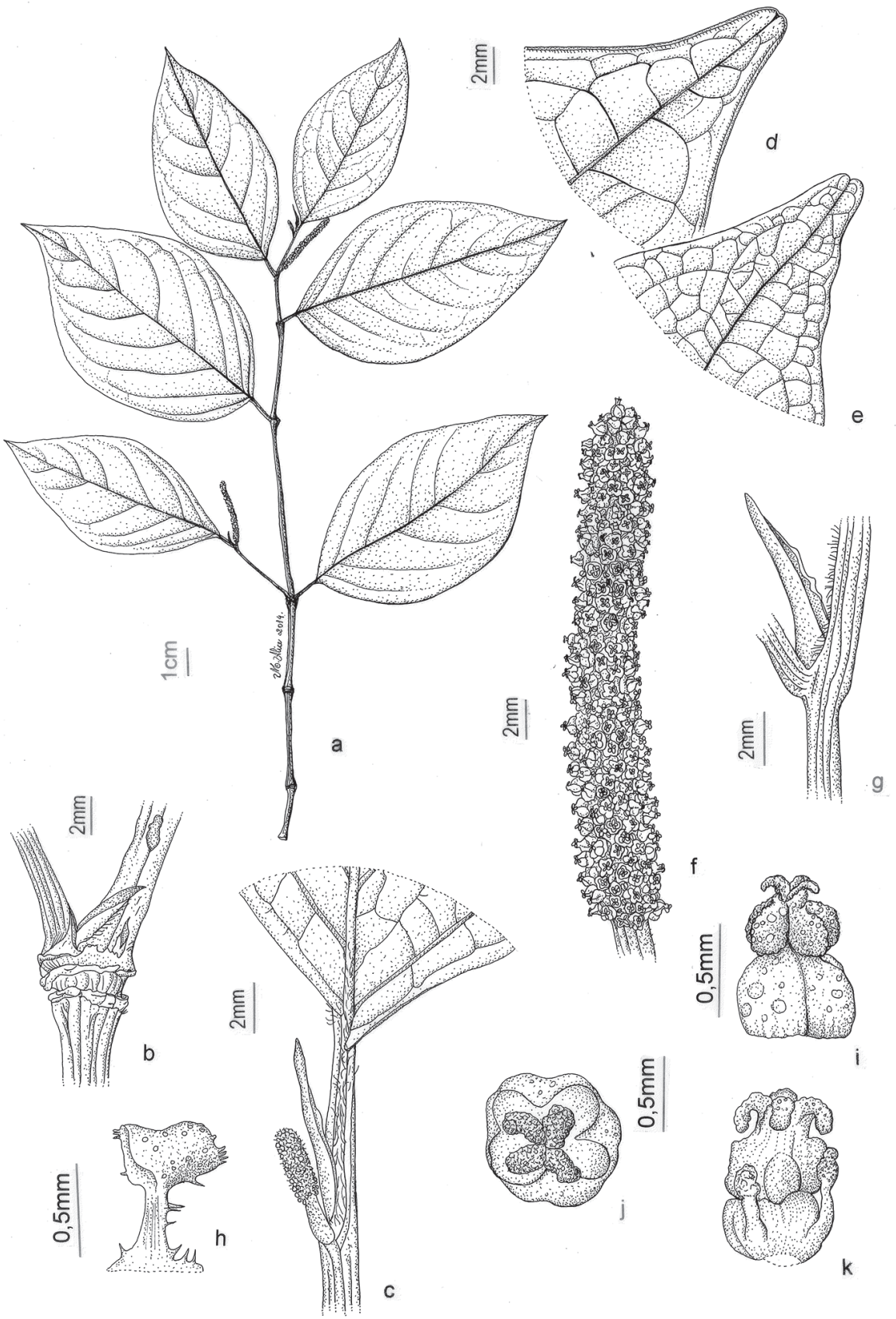

Figure 3. *Piper moringanum* E.F. Guim. and M.Carv.-Silva: **A** habit, **B** detail of glabrous branch, **C** glabrous prophyll and acute leaf base, **D** abaxial surface of leaf apex, **E** adaxial surface of leaf apex, **F** spike, **G** prophyll, **H** floral bract, **I** fruit with alate apex, lateral view, **J** fruit in apical view, and **K** flower and stamens (Saiter *et al*. 381 RB).

=*Ottonia mosenii* Trel., Proc. Amer. Philos. Soc. 75: 710. 1935. —TYPE: BRAZIL. São Paulo, 20 December 1873, H. Mosén 1689 (**holotype**: S; **isotype**: NY! [00222483]).

=*Piper atrosanguineum* C. DC., Linnaea 37: 338. 1872. *Ottonia atrosanguinea* (C. DC.) Trel., Proc. Amer. Philos. Soc. 75: 698. 1935.— TYPE: BRAZIL. Minas Gerais: Lagoa Santa, 17 December 1863, E. Warming s.n. (**lectotype designated here**: G-DC! [00328047]; **isolectotypes**: C! [10016607, 10016608, 10016609], LE!, S [07-16970]).

=*Piper brevistipatum* C. DC., Linnaea 37: 338. 1872. *Ottonia brevistipitata* (C. DC.) Trel., Proc. Amer. Philos. Soc. 75: 698. 1935. *Ottonia leptostachya* var. *brevistipitata* (C. DC.) E.F. Guim., Bol. Mus. Bot. Kuhlmann 7(3): 71. 1984. — TYPE: BRAZIL. Minas Gerais, Lagoa Santa, October 1863, E. Warming s.n. (**lectotype designated here**: C! [10016606]; **isolectotypes**: C! [10016605], G-DC! [00328816], LE! [00001470]).

=*Piper frutescens* C. DC., Linnaea 37: 337. 1872. *Ottonia frutescens* (C. DC.) Trel., Proc. Am. Philos. Soc. 75: 706. 1935. — TYPE: BRAZIL. Minas Gerais, Lagoa Santa, quebra, E. Warming s.n. (**lectotype designated here**: G-DC! [00314911]; **isolectotypes**: C! [10016604], LE!, US [00106416],US[00106416]).

Piper ovatum is a glabrous shrub with leaves short peltate or not peltate and with acute or obtuse base. The leaves are glabrous on adaxial surface and with intramarginal hirtellous nerves on abaxial surface. The inflorescence is a raceme with short pedicels. Pedicels are frequently shorter than fruit, sometimes appearing like a spike. The floral bracts are glabrous, but the rachis can be sparsely pubescent. The species is quite variable including the pedicel and pelta size. The species is more like *Piper grazielae*, but the latter has pedicels longer than fruits vs. P. ovatum that has pedicels shorter tham fruits.

The species occurs in Brazilian states of Bahia, Ceará, Distrito Federal, Espírito Santo, Goiás, Minas Gerais, Pará, Paraíba, Pernambuco, Rio de Janeiro, Santa Catarina, and São Paulo. The species is the most widespread species of the section in Brazil, occurring in 12 states with more than 300 records. Fraga *et al*. (2019) included *Piper frutescens*, synonym of *Piper ovatum* as vunerable (VU), however to Espirito Santo state we can found about 40 specimens. According to the IUCN (2017), the species is Least Concern (LC).

Taxonomic notes

Piper ovatum – Vahl (1796) cites the specimen of Ryan, but did not cite any herbarium. We chose Ryan s.n. specimen from the Valh herbarium (currently at C) as the lectotype. The specimen at C, C![10016610] fits is complete and it fits the description in the protologue.

Piper atrosanguineum – Casimir De Candolle (1872) cites the specimen Warming s.n. in Warming (currently at C) and DC (today G-DC) herbaria. There are three duplicates in C herbarium and one in G-DC herbarium. We chose the the duplicate at GDC, G-DC00328047, as lectotype because it was verified by De Candolle and it fits well the protologue, including the description of the fruits.

Piper brevistipatum – Casimir De Candolle (1872) cites the specimen Warming s.n. in Warming (currently at C) and DC (today G-DC) herbaria. We found three duplicates, but with name *Piper brevistipitatum* collected by Warming in that herbaria. We didn't find the name "brevistipatum" name and agree is a misspelling in the label. We chose the material of herbarium C-10016606 as a lectotype because is complete and was verified by De Candolle.

Piper frutescens – Casimir De Candolle (1872) cited the specimen in Warming (currently at C) and DC (today G-DC) herbaria. We found four duplicates, two of them at G-DC herbarium and chose as lectotype the duplicate at GDC, because this specimen fits well with the protologue including description of inflorescence and fruits. The duplicate at C does not have fruits.

Ottonia santaludoviciana- Although we didn't find the holotype, we can sinonimize the name according the protologue.

20. ***Piper piliovarium*** Yunck., Bol. Inst. Bot. São Paulo 3: 111. 1966. — TYPE: BRAZIL. Rio de Janeiro, 1838-1842, U.S. Exploring Expedition s.n. (**holotype**: GH! [00005803]).

Piper piliovarium is characterized by a striate and pilose petiole, glabrous foliar lamina with asymmetric obtuse to acute base on both sides, and not peltate lamina. The venation is eucamptodromous, with 7–9 pairs of secondary veins. The prophyll is entire and with obtuse apex. The inflorescence is a spike, peduncle glabrous, ovary and fruits pubescent, pilose or papillose, globose or ovoide, obtuse apex, stigma sessile, and floral bract triangular, pubescent or fimbriate. It is similar to *P. hoffmannseggianum* but differs by acute apex leaves and glabrous fruits in *P. hoffmannseggianum* while acuminate apex leaves and pilose fruits in *P. piliovarium*.

The species occurs in Mato Grosso, and Rio de Janeiro. Some specimens are cited to Espírito Santo, but we could not confirm the identification. To Mato Grosso we found anly one speciemen and The EOO is 293,632.982 km^2 and the AOO is 24,000 km^2. According to IUCN (2017), the species is Data Deficient (DD).

21. ***Piper piscatorum*** Trel. & Yunck., Piperaceae of Northern S. Amer 1:395. 1950. — TYPE: VENEZUELA, Bolivar, La prision, middle Caura River, 120m, 3 April 1939, L. Williams 11685 (**holotype**: US [00106856]; **isotypes**: F, ILL! [00008683]).

Piper piscatorum is a shrub, sparsely pubescent to glabrescent, characterized by glabrous and entire prophyll with obtuse or acute apex, leaf base hirtellous on the adaxial surface, asymmetric, acute to obtuse, hirtellous intramarginal nerve, and not peltate lamina. The petiole is glabrous, and leaves have 9–13 pairs of secondary veins,

and the inflorescence is a solitary spike with floral bracts pubescent to glabrescent. Tho fruit is glabrous, ovoide, obtuse apex, with sessile stigma. The seeds are obovoids and asymmetric and the species is similar to *P. hoffmannseggianum* but differ in the ellipsoide and symmetrical seeds.

The species occurs in Bolivia, Colombia, Venezuela and the Brazilian states of Acre, Amazonas, Mato Grosso, Maranhão, Pará, and Rondônia. Although the species has been registered in six large Brazilian states, we could not confirm the identification of the samples from Mato Grosso and Acre. The EOO is 1,342,726km^2 and the AOO is 60 km^2 with at least 12 specimens from about nine localities. According to the IUCN (2017) the species is Least Concern (LC).

22. ***Piper riodocense*** E.F. Guim. & M. Carv.-Silva, Hoehnea 36 (3): 433. 2009. —TYPE: BRAZIL. Minas Gerais: Parque Estadual do Rio Doce, trilha do Vinhático, 11 December 1999, (fl), G.E. Valente *et al*. 430 (**holotype**: VIC!; **isotype**: RB!). Figure: Guimarães and Carvalho-Silva (2009).

Piper riodocense is a long-villous shrub, characterized by bullate and villous leaves on abaxial surface. The leaf base is lobate to cordate with one lobe covering on the petiole, and not peltate lamina. The prophyll is villous on the adaxial surface with an acuminate apex. The inflorescence is a raceme with a glabrous rachis and the floral bract is pubescent to glabrescent. *Piper riodocense* is similar to *P. duartei*, but the latter does not have bullate leaves.

The species is endemic to the Brazilian state of Minas Gerais and occurs only in the municipalities of Marlieria and Açucena. Three specimens were collected from the CU Parque Estadual do Rio Doce. According to the IUCN (2017) criteria B1 a, b(ii, iii) and B2 a, b(ii,iii), and with an EOO of 735 Km^2 and an AOO of 24 Km^2, the species is Endangered (EN).

23. ***Piper scutifolium*** Yunck., Bol. Inst. Bot. São Paulo 3:123.1966. — TYPE: BRAZIL. Rio de Janeiro, Fazenda Boa de Teresópolis, 11 November 1942, L. Emydio 80 (**holotype**: R! [000038599]; **isotype**: NY! [00251759]). Figure: Guimarães and Monteiro (2006, p. 583), Carvalho-Silva *et al*. (2013, p. 35)

Piper scutifolium is a glabrous shrub characterized by foliar laminas long peltate glabrous on adaxial surface, hirtellous or pubescente along the nerves on the abaxial surface, with 9-10 pairs of secondary nerves. The leaves are 2-4 times longer than wide, ovate to lanceolate, and obtuse base. The prophylls are glabrous and the inflorescence is a spike with a glabrous rachis. It is similar to *P. ovatum*, but the latter is short peltate or not peltate and the inflorescence is a raceme vs. long peltate leaves and inflorescence as a spike in *P. scutifolium*.

The species occurs in the Brazilian states of Minas Gerais, Rio de Janeiro, and São Paulo. We found about 35 specimens, most of them from Rio de Janeiro state, and only one specimen from São Paulo. The species occurs in one CU in Minas Gerais and two in Rio de Janeiro. According to the IUCN (2017), the species is Least Concern (LC), although its EOO is 57,257 Km^2 and its AOO is only 40km^2.

24. ***Piper setebarraense*** E.F. Guim. & L.H.P. Costa, Bradea 8(27): 149-153. 1999. — TYPE: Sete Barras (Saibadela), September 1994, M. Galetti *et al*. 751 (**holotype**: HRCB!; **isotypes**: ESA!, RB! [00533780]). Figure in Guimarães and Costa (1999).

= *Piper setebarraense* var. *pilosum* E.F. Guim. & L.H.P. Costa, Bradea 8(27): 150. 1999. — TYPE: Sete Barras (Saibadela), September 1994, R.J. Almeida-Scabbia *et al*. 666 (**holotype**: SP!).

Piper setebarraense is a pubescent shrub, tricome homomorphous, leaves 3-5 times longer than wide, not peltate, lanceolate, with an attenuate apex and a base with lobes overlapping the petioles. The prophylls are sparse pubescent, apex acute, and the inflorescence are spikes with rachis glabrous to fimbriate. The species is characterized by having a long (0.6-1.2 mm long) and cylindrical style in flowers and fruits. It is similar to *P. eucalyptophyllum,* but it has densely visible idioblasts on leaves and short or not observable style vs. *P. setebarraense* does not have idioblasts on leaves and long style.

The specie is endemic to Brazil, where it occurs in the states of Espírito Santo, Rio de Janeiro, and São Paulo. Although the species has been recorded in three states, most of the samples are from São Paulo. The species has an EOO or 62,126 km^2 and an AOO of 48 km^2. According to the Fraga *et al*. (2019), in Espírito Santo state, the taxa is Endangered (EN), but according to the IUCN (2017), the taxa is Least Concern (LC).

25. ***Piper strictifolium*** D. Monteiro & E.F. Guim., Rodriguesia 60(4):1018. 2009. *Ottonia angustifolia* Rizzini, Dusenia 2: 265. 1952. non *Piper angustifolium* Lamark. — TYPE: Rio de Janeiro, Itatiaia, Altamira, 24 October 1945, A. Barbosa and W. Barbosa 106 (**holotype**: RB! [00533739]; **isotypes**: NY! [000222461], RB! [00533721]). Figure in Monteiro and Guimarães (2009, p. 1020).

Piper strictifolium is glabrous and the leaves are long-lanceolate and glabrous, not peltate, 6.5–11 times longer than wide, with revolute margin and 17–26 raised, and very closely positioned pairs of veins on the adaxial surface. The inflorescence is a raceme and the rachis of the inflorescence is hirtellous to glabrescent. The species is similar to *P. eucalyptophyllum*, but the latter has densely visible idioblasts on leaves and 16-18 pairs of nerves.

The species occurs in the Brazilian states of Bahia, Espírito Santo, Minas Gerais, Rio de Janeiro, and São Paulo. The EOO is 122,238 km^2 and the AOO is 36,000 Km^2. We found 17 samples in herbaria from 10 different localities, only one of which, Itatiaia (RJ), is in a CU. According to

the Fraga *et al*. (2019), in Espirito Santo state, the taxa is Vulnerable (VU) and according to the IUCN (2017), the species is Least Concern (LC).

26. ***Piper transluscens*** Yunck., Bol. Inst. Bot. São Paulo 3:130. 1966. — TYPE: Rio de Janeiro, Monte Corcovado, Sebastianopolis, C.F.P. von Martius s.n. (**holotype**: M; **isotypes**: M, NY! [00283815]). Figure in Monteiro and Guimarães (2009, p 1020).

Piper transluscens is recognized by not peltate, elliptic to lanceolate leaves, with long acuminate to falcate apex, obtuse base, frequently with visible translucid idioblasts, membranaceus. The inflorescence is a spike with glabrous rachis. The species is similar to *P. hoffmanseggianum* but the latter has leaf apices acuminate, not falcate and raquis is fimbriate, vs. the leaf apices are long-acuminate to falcate, the rachis is glabrous.

The species is endemic to the state of Rio de Janeiro, Brazil, with about six specimens in herbaria. According to the IUCN (2017), the species is Data Deficient (DD).

Types not seen

Ottonia douglasii Trel., Proc. Amer. Philos. Soc. 75. 701. 1935. – TYPE: BRAZIL. Rio de Janeiro Douglas s.n. (K). Also, "Brazi" Riedel s n. (?).

Ottonia warakabacoura var. *latifolia* Miq., Fl. Bras. 4 (1): 222. 1853 – TYPE: BRAZIL. Pará, Óbidos, *R. Spruce* s.n. (?)

Ottonia diversifolia var. *grandifolia* Miq., Martius Fl. Bras. 4 (1): 63. 1868. —TYPE: BRAZIL. Rio de Janeiro, Sebastianopolis, Scoule s.n. (**syntype**: probably in B); BRAZIL. Rio de Janeiro, Sebastianopolis, Sellow s.n (**syntype**: probably in B).

Ottonia gibbimontis var. *acuta* Trel., Proc. Amer. Philos. Soc. 75: 704. 1935. —TYPE: BRAZIL. Rio de Janeiro, Corcovado, J.B.E. Pohl 5030 (**holotype**: W).

Ottonia padifolia Kunth, Linnaea 13: 580.1839. *Piper padifolium* (Kunth) C. DC., Prodr. 16(1): 253. 1869. — TYPE: BRAZIL. *F. Sellow* s.n. (**holotype**: B).

Ottonia santaludoviciana Trel., Proc. Amer. Philos. Soc. 75: 714. 1935. —TYPE: BRAZIL. Maranhão, Santo Ludovicus island, VI, C.F.P. Martius s.n. (**holotype**: M).

Piper baptisianum C. DC., Prodr. 16(1): 253. 1869. *Ottonia baptistiana* (DC.) Trel., Proc. Amer. Philos. Soc. 75: 698. 1935. —TYPE: BRAZIL. Minas Gerais, São João Batista, C.F.P. von Martius 434 (**holotype**: M).

Piper hirtellum C. DC., J. Bot. 4: 218. 1866. — TYPE: BRAZIL. Brazil, F. Sellow 228 (**holotype**: B).

Piper machadoense C. DC., Prod. 16(1): 254. 1869. *Ottonia machadoensis* (C. DC.) Trel. — TYPE: BRAZIL. Minas Gerais, Caldas, Batista, 1854-1855, G.A. Lindberg s.n. (**holotype**: BR).

Piper mendoncae Trel., Proc. Amer. Philos. Soc. 75: 708. 1935. — TYPE: BRAZIL. Rio de Janeiro, Corcovado, Mendonça 669 p.p (**holotype**: B).

Piper padifolium var. *corcovadensis* Miq. ex C. DC., Prodr. 16(1): 253.1869. *Ottonia gibbimontis* Trel., Proc. Amer. Philos. Soc. 75: 704. 1935. — TYPE: BRAZIL. Rio de Janeiro, Sebastianopolis, Corcovado, C.F.P. von Martius (**holotype**: M).

List of material examined

Agra, M.F.: s.n.-RB224310 (19). **Aizzo, J.R.S.:** 122 (4). **Almeida-Scabbia, R.J.** *et al*.: 666 (24). **Almeida, C**. *et al*.: 229 (13). **Almeida, J.J.**: 2074 (3). **Almeida, T.E.** *et al*.: 1004 (16). **Almeida, V.C.**: 05 (13). **Alvarenga, D. & Lopes, C.**: 235 (19). **Alves, B.A. & Jascone, C.E.**: 05 (14). **Alves, R.:** 895(3). **Alves, S.A.M.**: 47 (3), 63 (3). **Amaral, I.L.** *et al*.: 112176 (4). **Amorim, A.M.** et. al.: 4727 (10), 4752 (1). **Amorim, A.M.A.** *et al*.: 1687 (19), 7107 (5), 7319 (7), 7320 (10), 7333 (7). **Amorim, A.M.A**.: 7093 (3). **Amorim, P.R.F.** *et al*.: 29 (23), 30 (23). **Andrade, P.**: 1148 (12). **Andrade, P.M. & Lopes, M.A**.: 334 (9), 338 (9) ,7732 (12). **Andrade P.M.** ***et al.***: 1095 (12). **Andrade, P.M.**: 1481 (19), 1480 (19), 1482 (19) 1483, (19), s.n.-BHCB052537 (12). **Antunes, K.** et. al.: 39 (3), 191 (3). **Aragaki, S.**: 605 (16). **Aranha, B.A.**: 351 (23). **Arantes, L.**: 1 (16). **Araújo, D. & Peixoto, A.L.**: 177 (16), 799 (19). **Araujo, D.** *et al*.: 1387 (3) 1853 (14), 1918 (15) 6842 (14). **Araújo, G.M.** *et al*.: s.n.-HUFU1788 (19), 999 (19). **Arruda, R.** *et al*.: 253 (12). **Assis, L.C.S. & Magalhães, M.S.**: 549 (19). **Assis, M.A. & Guilherme, F.A.G.**: 1461 (24), 1474 (24). **Assis, M.C.** *et al*.: 194 (19), 236 (19), 288 (19),571 (13), 573 (5), 584 (1). **Assunção, P.A.C.L.** *et al*.: 259 (2). **Atala, F.**: 324 (13). **Azevedo, I.N.C.** et. al.: 366 (19). **Baber, K.**: KB319 (23), KB328 (23), KB357 (23). **Baber, K. & Wesenberg, J**.: KB032 (3), KB056 (3), KB057 (3), KB 061 (23), KB062 (23). **Baez, C.** et. al.: 935(3). **Balle, W.L.**: 630 (21). **Barbosa, A**.: 106 (25). **Barreto, K.D.:** 3050 (24). **Barros, A.A.M.** *et al*.: 1312 (3), 1326 (3), 2448 (14), 2662 (14), 3187 (14), 3211 (14), 4232 (10), 4548 (14), 4549 (15), 4572 (14), 4663 (14), 5446 (3), 5517 (14). **Barros, W.D.**: 1021(3). **Belem, R.P. & Magalhães, M**.: 604 (15), 713 (15). **Belem, R.P. & Pinheiro, R.S.:** 2330 (19). **Berg, C.C.** *et al*.: P18572 (4), BG458 (21). **Berger, M.V.S. & Fraga, C.N.**: 24 (10). **Bigio, N.C.** et. al.: 955 (4). **Biral, L. & Marcusso, G.**: 1041 (12). **Bisby, F.** *et al*.: P18069 (4), P18080 (4). **Boaventura, M**.: 48 (19). **Bocayuva, M.** et. al.: 79 (10). **Borges, R.A.X.** *et al*.: 450 (10). **Bovini, M.G. & Marquinhos**: 1516 (22). **Bovini, M.G.** *et al*.: 100 (15), 351 (3), 595 (10), 918 (13), 1535 (15), 3093 (4). **Brade, A.C. & Duarte, A.P.:** 18709 (3). **Brade, A.C.:** 12667 (25), 14082 (25), 18717 (16). **Braga, J.M.A. & Bovini, M.G.:** 975 (3), 3316 (19), 3528 (10), 3907 (19). **Braga, J.M.A. & Schuback, P.:** 4793 (3). **Braga, J.M.A.** *et al*.: 484 (19), 561 (20), 906 (23) 1099 (3), 1611 (3), 2620 (25), 2833 (3), 2904 (3), 3961 (15), 4596 (25) 4793(3), 7634 (1)7994 (4). **Braga, J.M.A**.: 661 (20), 1561 (26), 3961 (15). **Braga, P.I.S.:** 2107 (14), 2319 (16), 2429 (3). **Brina A.E.**: s.n. (12), s.n. (3). **Bringel, J.B.** *et al*.: 439 (19). **Brito, A.L.V.** *et al*.: 2(14), 3(10). **Cabral, F.N.** *et al*.: 244 (4). **Callejas, R.** *et al*.: 1556 (13), 1585 (19), 1602

(13), 1637 (3), 1639 (3), 1905 (16). **Campbell, D.G**. *et al*.: P21823(4). **Campos, M.D.** *et al*.: 05 (13). **Carauta, J.P.P. & Conceição, L.:** 2342 (13). **Carauta, J.P.P.** et. al.: 2394 (20), 2439(3). **Carauta, J.P.P.:** 161 (13), 1746 (13), 1830 (13), 12829 (20). **Carmo, F.F.**: 541 (12). **Carneiro, J.:** 353 (12). **Carrijo, T.T.** *et al*.: 1530 (7), 1543 (14), 1614 (3), 1654 (3), 1690 (3), 1693 (3), 2030 (3). **Carrijo, T.T**.: *1632* (5). **Carvalho-Silva, M.** *et al*.: 269 (3), 364 (13), 389 (15), 404 (14), 442 (7), 614 (12), 1088 (22), 1972 (14), 1988 (23). **Carvalho, A.F.:** 126 (3), 683 (19). **Carvalho, A.M. & Hollowell, V**.: 1144 (19). **Carvalho, A.M.** et. al.: 1448 (15), 2048 (15), 2313 (19), 2455 (19), 7005 (25). **Carvalho, A.M.V. de**: 7005 (25). **Carvalho, F.A. & Lopes, J.S.:** 558(4). **Carvalho, W.B. & Sousa, L.O.F.:** 174 (14). **Carvalho, W.B.** et. al.: 230 (3). **Castellar, A.** *et al*.: 26 (13). **Castro, R & Gomes P.:** 2609 (19). **Catharino, E.L.M.** et. al.: 2052 (10). **Cavalcanti, D.C.:** 121 (3). **Cavalcanti, P. & Silva, M.**: 1475(4), 1567 (4). **Cavallin P.O.:** 40 (24). **Caxambu, M.G.** *et al*.:1390 (16), 4925 (16). **Cervigne, N.S. & Franscisco, E.M.:** 165 (16). **Chacon, R.G. & Dourado, B.:** 872 (25), 873 (3). **Chacon, R.G.** *et al*.: 483 (19). **Chacon, R.G**.: 871 (13), 872 (1). **Chiea, S.A.C.:** 146 (16). **Christ, J.A**. *et al*.: *04* (3), *05* (3), *06* (3), *16* (16), *59* (3). **Christ, J.A.:** 15 (15), 18 (5), *25* (16), *28* (16), *48* (16), *65* (16). **Cid, C.A. & Lima, J.:** 3794 (4). **Cid, C.A. & Mota, C.D.A.**: 1126 (4). **Cid, C.A.** *et al*.: 866 (4). **Cid. C.A. & Ramos, J.**: 1058 (4), 1164(4). **Cleuza & Junia**: 95 (3). **Coelho, B.B.:** 242 (10). **Collares J.E.R.:** 21 (24), 39 (24). **Constantino, M.:** 3 (16). **Correa, J.A.:** 21 (16), 105 (16). **Costa, D.S**. *et al*.: 74 (4). **Costa, F.:** 190 (2). **Costa, H.E.S.**: H106 (6), H115 (3). **Costa, L.V. & Atalla, N.C.:** s.n.-BHCB22273 (23), s.n.-RB366151 (15). **Costa, L.V.** *et al*.: 185 (12). **Costa, L.V.**: s.n.-BHCB 19710 (3), BHCB22313 (13), 34671 (12). **Costa, M.T.R.** *et al*.: 596 (14). **Cotarelli, V.M. & Franscisco, E.M.:** 223 (16). **Couto, D.R.:** 1921 (7). **Cowan, R.S.:** 38697(4). **Crepaldi, M.O.S. & Carvalho, J.:** 163 (3). **Cunha, N.M.L.** *et al*.: 116 (13). **Daly, D.** *et al*.: 955 (4), 13672 (4). **Damasio, L.**: 2040 (3). **Davidse, G. & D'Arcy, W.G.:** 10455 (16). **Dayli, D.C**.: 1377 (21), 1540 (21). **Delfini**: 813 (24). **Dreveck, S. & Carneiro, F.E.:** 1599 (16), 1651 (16). **Duarte, A.P.:** 4249 (3), 6149 (16). **Ducke, A. & Kuhlmann, J.G.:** s.n-RB16410 (3). **Echternacht, L. & Dornas, T.**: 450 (19), 676 (25). **Echternacht, L.A.** *et al*.: 122 (3). **Egler, W.A. & Irwin, H.S.**: 46422 (2). **Emelen, D.A.:** 66 (16). **Emidio, L.**: 80 (23). **Engelmann, R.A.** et. al.: RE 128 (23), RE614 (23) RE1024 (13), RE1292(3), RE1429(3), RE1432 (3), RE1653 (23). **Eupunino, A.**: 200 (3), 288 (3). **Falcão, M.J.** *et al*.: 18 (18). **Faria, J.E.Q. & Bausen, E**.: 1217 (13). **Faria, J.E.Q. & Lima, M.E.L.:** 3032 (24). **Faria, J.E.Q.** *et al*.: 943 (3). **Faria, R.:** 32 (16). **Farney, C.** *et al*.: 926 (14). **Felfili, J.** ***et al*.:** 129 (19). **Felix, D.F.**: 128 (19). **Fernades, M.G.C.**: s.n.-BHZB2110 (12) BHZB2624 (3). **Fernandes, H.Q. B.**: 1524 (7), 2540 (7). **Fernandes, D. & Ribeiro, R.:** 771 (19). **Fernandes, L.F.G.:** 3 (16). **Ferreira, C.A.C.:** 6420 (14). **Ferreira Junior, C.A**.: 1443 (16), 1508 (16), 1527 (3), 1538 (3). **Ferreira, V.F. & Briolanjo**: 145 (3). **Ferreira, V.F**. et. al.: 239 (10), 436 (13). **Ferreira, V.F.:** 3375 (3). **Fiaschi, P**. et. al.: 1758 (10), 3538 (3). **Figuereido F.O.G.** *et al*.: 1940 (4). **Flores, T.B. & Campos, O.R.:** 1653 (12). **Flores, T.B.** *et al*.: 1480 (10). **Folli, D.A**.: 906 (19), 5873 (15). **Fonseca, A.S.:** 263 (14). **Fontana, A.P.** et. al.: 2588 (5), 2717 (13), 2847 (13). **Fontella, P.J.** *et al*.: 523 (14). **Fontes, C.G.** *et al*.: 113 (19). **Forero, E.** *et al*.: 7132 (21), 8368 (16). **Forzza R.C.** *et al*.: 2910 (23), 3126 (16), 5215 (5), 5285 (16), 5518 (19), 6407 (3), 9263 (20). **Fraga, C.N.** *et al*. 2494 (9), 3482 (3). **Frame** *et al*.: 149 (2). **Franca, G.S. & Stehmann, J.**: 311(19). **Froés, F.L. & Black, G.A.:** 24493 (21). **Froés, R.L.**: 23592 (18). **Frutuoso, L.C.F.**: 72 (23), 73(24). **Galetti, M.** et. al.:751 (24). **Garcia, R.** *et al*.: 6 (14). **Gaudichaud, C.:** 1111 (14), 1118 (14). **Gaui, T.D.**: 355 (14). **Giacomin, L.L.** *et al*.: 852 (19). **Giordano, L.C. & Klein, V.L.G.**: 542 (3). **Giordano, L.C.** et. al.: 483 (3), 546 (14), 789 (3), 954 (10), 1175 (14), 1263 (14),1425 (10), 1436 (14), 1454 (13), 1457 (14), 1492 (23), 1720 (10), 2032 (3), 2134 (3), 2318 (23), 2402 (7), 2580 (14), 2649(14), 2653 (14). **Giordano, L.C.**: 789 (3), 1103 (14), 1490 (23), 2319 (3). **Giorgini, V.T.**: 163900 (3), BHCB163886 (3). **Goldenberg, R.** et. al.: 1061 (10). **Goldenberg, R.**: 2071(12). **Gomes-Costa, G.A.**: 134(4). **Gomes, J.M.L.**: 3555 (3). **Gomes, M.:** 430 (20). **Gonçalves, A.C.** *et al*.: 4575 (15). **Gonçalves, E.G.** *et al*.: 561 (3). **Gontijo, F.D.** *et al*.: 160117 (15). **Gontijo, F.D.**: 190 (15). **Gorenstein, M.R.** *et al*.: 45 (24), 48 (24). **Gottsberger, G.:** 16-241066 (16). **Greco, A.V.** *et al*.: 23 (14). **Guedes, R.R. & Gonzaga, L.P.**: 642 (3). **Guedes, R.R.** *et al*.: 343 (3), 923 (3), 2505 (3). **Guimarães, E.F. & Mautone, L.**: 90 (13). **Guimarães, E.F. & Sucre, D.:** 104 (13). **Guimarães, E.F.** *et al*.: 978 (15), 1332 (19), 1340 (19), 1359 (19), 1379 (19), 1440 (3) , 1442 (19), 1450 (19), 1459 (10), 1612 (14). **Guimaraes, E.F.**: 1392 (23), 1601 (23). **Guimarães, E.F.:** 153 (3)154 (3), 159 (3), 164 (3). **Guimarães, L.G.L.:** 29 (19). **Guimarães, M.T.R. & Rezende, T.P.:** 596 (3). **Hage, J.L. & Brito, H.S**.: 1478 (19). **Hage, J.L.:** 1552 (19). **Hatschbach G. & Silva, J.M.**: 59725 (13). **Hatschbach, G.:** 43603 (16) 71480 (3). **Hatschbach G**. *et al*.: 57971 (3), 68297, (16). **Hatschbach G. & Silva, J.M.**: 61164 (7). **Heringer, E.P.**: 409 (3), 9516 (12). **Heyde, N.H. & Lindeman, J.C.:** 53 (4). Hoehne: 13489 (23). **Hoffmann, W.A.:** 213 (10). **Hopkins M.J.C.**: 2299 (2). **Horta, M.B.** et. al.: 017 (3) 286 (19). **Horta, P. & Brade, A.C.**: 14958 (3). **Irwin, H.S.** et. al.: 10179 (19), 13609 (19), 19742 (12), 34353 (19), 47625 (4). **Jangoux, J.:** 23ªA (21). **Jangoux, J. & Bahia, R.P.**: 529 (18). **Jaramillo, M.A. & Kollmann L.**: 952 (19), 953 (19), 954 (3), 955 (3), 956 (9). **Jaramillo, M.A. & Leoni, L.S.:** 1005 (3). **Jaramillo, M.A. & Matheus, R.**: 972 (10), 977 (3). **Jaramillo, M.A.** *et al*.: 790 (19), 843 (19), 920 (3), 923 (15), 928 (9), 932 (3), 934 (3), 942 (9). **Jaramillo, M.A.:** 954 (3). **Jardim, J.G.** *et al*.: 367 (15). **Jesus, J.A. & Laroche, R.:** 1374 (13). **Jesus, J.A.:** 1878

(13), 1949 (13), 2073 (13), 2074 (3). **Joffily, A.** *et al*: 10 (14). **Jogaib, M.B & João A.:** 06 (15). **Jouvin, P.P.:** 509 (13), 518 (13). **Jung-Mendaçolli, S.L.** *et al*.: 864 (13), 971 (16). **Junior Mattos, C.F. & Cardoso, L.J.T.:** 17 (13). **Junior, C.A.F.:** 1463 (25). **Kamino, L.H.Y.** *et al*.: 358 (19). **Kato, M.** *et al*.: 1027 (26), 1450 (2). **Kato, M.J.:** 281 (23), 862 (16), 920 (24), 1164 (16). **Kirisawa, M. & Kawasaki, L.:** 2939 (24). **Kiyama, C.Y.** *et al*.: 108 (19). **Klein, V.L.G. & Mamiya, M.A.A**.: 570 (3). **Klein, V.L.G.:** RB299.304 (3), 1079 (14). **Kollmann, L. & Bausen, E.:** 3316 (19), 3397 (19), 4539 (19), 4816 (3), 5375 (24). **Kollmann, L. & Berger, M.V.S.:** 5991 (5), 6105 (10). **Kollmann, L. & Fontana, A.P.:** 10111 (25). **Kollmann, L. & Krauser, S.:** 8987(5). **Kollmann, L. & Magnago, L.:** 10493 (15), 10529 (19). **Kollmann, L.** et. al.: 699 (3), 867 (3), 1153 (9), 1696 (9), 2119 (5), 3103 (19), 3772 (19), 4700 (7), 4816 (3), 4976 (24), 5047 (24), 5093 (7), 5148 (7), 5682 (19), 5768 (7), 5964 (3), 7794 (10), 8401 (5), 9451 (10), 9452 (5), 10580 (10), 10605 (3), 10626 (8), 10662 (5), 11217 (3), 11243 (7). **Korte, A. & Kniess, A.:** 249 (19), 517 (16), 1619 (16). **Korte, A.:** 5606 (16). **Krieger, P.L.:** CESJ16777 (3), 7690 (3), 11558 (3), 11752 (3), 13137 (3),13142 (3), 16562 (3). **Kuhlmann, J.G. & Brade, A.C.:** 15744 (3). **Kuhlmann, J.G**.: 1676 (4), s.n.-RB80760 (3). **Kuhlmann, M.:** 1550 (16), 3959 (16). **Kullamp, J.** et. al: 602 (15). **Leitão-Filho, H.F. & Martins, F.R.**: 5989 (19). **Leitão-Filho, H.F.** *et al*.: 33112 (16). **Leite, K.B.** et. al.: 139 (19). **Leoni, L.S.**: 126 (3), 470 (3), 3169 (12), 4892 (3), 5503 (3), 5774 (13), 6062 (3), 6298 (25), 6647 (15), 6694 (10), 7043 (3), 7511 (12). **Lertman, M.** *et al*.: 38 (13). **Lima, A**.: 48-131 (3). **Lima, H.C.** et. al.: 337 (3), 3824 (3). **Lima, L.R.** et. al. 412 (10). **Lins & Silva, A.C.B.** *et al*.: 160 (19). **Lira, C.** *et al*.: 399 (14). **Lira Neto, J.A**. et. al.: 718 (23). **Lírio, E.J. & Sarnaglia, V.B.:** 177 (10). **Lleras, E.** *et al*.: P16650 (4). **Lobão, A. & Fiaschi, P.:** 1296 (13). **Lobão, A.** et. al.: 499 (15),696 (10), 2185 (13). **Lombardi, J.A. & Oliveira, A.P.C.:** 7695 (19). **Lombardi, J.A. & Temponi, L.G.:** 1068, (19), 1126 (5). **Lombardi, J.A.** *et al*.: 2367 (9), 4636 (15), 5416(19), 8029 (24). **Lombardi, J.A.:** 4495 (12). **Lopes, M.A. & Andrade, P.M.:** 180 (9), 255 (9), 256 (19), 551 (9), 7733 (12). **Lorenzoni, D.:** 11 (13). **Loureiro, R & Marquete, R.**: 13 (14). **Lourenço, A.R.** et. al.: 395(4). **Lucas, E.J.:** 657 (3). **Maas P.J.M. & Carauta, J.P.P.:** 3119 (10), 3123 (3). **Macedo, L.C.C.** *et al*.: 92 (16). **Machado, D.N.S.** *et al*.: 619 (14). **Magalhães, M.:** s.n. (UB 156536) (19), 5521 (19). **Magnago, H.:** 253 (19). **Maioli, V.** *et al*.: 576(4). **Manhães, V.C.:** 249 (3). **Mansano, V.F. & Paviotti, A.**: 461 (5), 462 (10). **Mansano, V.F.** et. al.: 515 (3). **Mansano, V.F.**: 07-436(3). **Marassi, R.**D. *et al*.: 06 (16). **Marilene, M.N.B.** et. al.: 11558 (3). **Marques, M.C.** *et al*.: 249 (13). **Marquete, N.** et. al.: 158 (3). **Marquete, R. & Caruso, J.:** 638 (14). **Marquete, R.** *et al*.: 03 (13), 239 (3), 545 (14), 583 (10), 738 (14), 800 (14), 1449 (14), 1551 (13), 1713 (14), 1802 (3), 2160 (14), 2866 (14), 3764 (3), 3874 (3), 3901 (7), 3996 (3). **Marquete, R.**: 928 (23), 1247 (3), 1747 (14), 3874 (3), 3996 (3). **Martinelli, G. & Soderstrom, T.:** 9736 (19). **Martinelli, G.** *et al*.: 2049 (19), 2821 (14), 7069 (4), 7106 (2), 10369 (3), 13279 (14), 19866 (13). **Martinelli, G.:** 782 (13), 4131 (3). **Martins, G.N.:** 108 (5), 129 (5), 145 (7). **Martins, G.N.& Gomes, J.M.L.:** 3 (5), 6 (5), 9 (5). **Matos Silva, P.J. *et al***.: 2143 (19). **Mattos J.:** 9513(3), 12528 (16). **Mautone, L. & Miguel, J.R.:** D10 (3). **Mautone, L.** et. al.: 294 (3), 317 (14). **Medeiros, D.A.** *et al*.: 114 (24). **Medeiros, E. von S.**: 452 (23). **Meira Neto, J.A.A**.: 891 (12), 898 (2). **Mello-Barreto**: 306 (3), 7255 (19). **Mello-Silva, R.** *et al*.: 1578 (19). **Mello-Silva, R.:** 848 (23). **Mello-Silva, R.:** 929 (24). **Melo, A. & Pessoa, E.:** 924 (4). **Melo, A.** *et al*.: 797 (19), 838 (4), 844 (4), 91ªA (4), 924 (4). **Melo, E. & França, F.:** 2472 (19). **Melo, E.** *et al*.: 9565 (19). **Melo, J.Q. & Giordano, L.C.:** 43 (14). **Melo, M.R.F.** *et al*.: 243 (16). **Melo, P.H.A. & Santos, G.P**.: 1013 (19). **Mendes, M.S & Pena, F.S.R.:** s.n.-BHCB163949 (15). **Mendes, M.S. & Pena, F.S.R.**: 163949 (15). **Mendes, M.S.** *et al*.: s.n.-BHCB052492 (12). **Mendes, M.S.:** BHCB152057 (12). **Mendonça, R.C.** *et al*.: 388 (19), 1326 (19), 4727 (19). **Menezes, C.** *et al*.: 2 (14). **Menezes, L.F.T. & Sousa, M.C.:** RBR 10013 (3). **Mexia, Y**.: 4499 (12). M.F.B.: 721 (7). **Ming, L.C.** et. al.: 717 (3). **Monteiro, D. & Costa, S.G.:** 795 (12). **Monteiro, D. & Mollino, J.:** 738 (19). **Monteiro, D.** *et al*.: 04 (10), 278 (24), 354 (10), 363 (19), 367 (5), 379 (9), 527 (3), 560 (13), 654 (3). **Monteiro, D.**: 278 (24), 287 (7), 608 (3), 654 (3), 748 (7). **Monteiro, D. & Gianerine, A.C.:** 213 (26), 235 (3). **Monteiro, J.:** 361 (10). **Monteiro, P.V.:** 2646 (3). **Moraes, A.M.**: 15 (13). **Moraes, G.A.P.:** 18 (22). **Moraes, M.:** 674 (3). **Moraes, P.L.R.:** 237 (24), 857 (24), 1069 (24). **Moraes, P.O.** *et al*.: 136 (10). **Moreira, B.A.** *et al*.: 14 (13), 20 (14). **Moreira, N.**: BHCB16957 (12). **Moreira, N.C.** *et al*.: 47 (12). **Moreira, O. & Borges, S.:** 23410 (3). M**ori, S.A. & Stehmann, J.R.:** 391 (3). **Mori, S.A.** *et al*.: 8787 (4), 9083 (4), 9166 (4), 9719 (16). **Mosqueira, V.C.F.**: BHCB11494 (12). **Mota, N.F.O. & Stehmann, J.R.**: 391 (3). **Mota, N.F.O. & Viana, P.L.:** 136 (3) 137 (3). **Mota, R.C.** *et al*.: 2340 (19), 2341 (19). **Mota, R.C.:** 2325 (3). **Mota, R.C.:** 306 (25). **Myssen, C.** et. al.: 351 (10), 743 (19). **Nadruz, M.** *et al*.: 1917 (26), 1929 (14), 1931, 1991 (3), 2076 (14), 2279 (3) 2425 (13), 3288 (12), 3437 (12). **Nakajima, J.N.:** 106 (19). **Nardin, C.F.** *et al*.: 128 (23). **Nascimento, J.C. & Edísio**: 47 (19). **Nascimento, J.C.:** 01 (15), 02 (15),04 (15), 05 (19), 06 (15), 32 (19). **Neto, S.N.:** 248 (16). **Noblick, L.R. & Nishida, F.:** 4377 (15). **Nogueira, C.** *et al*.: 8 (14). **Occhioni, P.:** 1184(3). **Occhioni, P**.: 4336 (25). **Oliveira, A.** *et al*.: 709 (19). **Oliveira, J.G. & Rodrigues. F.M.**: 90 (19), 399 (19). **Oliveira, M.C.C.:** 6 (10). **Oliveira, M.G.:** s.n.-RB296508 (3). **Ordones, J.** *et al*.: BHZB 867 (12), BHZB 918 (23), BHZB 3039 (3), BHZB 7051 (1612) (16), BHZB 7061 (1622) (16), BHZB 7482 (1678) (16), BHZB 12099 (25), CVJBFZB 1806 (23), CVJBFZB 1917 (23). **Pascotto, C.R.:** 63 (16). **Pastore J.A. & Moura. C.:** 888

(24), 1119 (24), 1203 (24). **Paula-Sousa, J.** *et al*.: 3727 (16). **Paula, G.B.N**.: 50 (16). **Pedersoli, J.L.:** 54 (12). **Peixoto, A.L**.: 438 (7). **Pelegrini, M.O.O.** et. al.: 333 (3). **Pena, F.S.R.**: BHCB188194 (12). **Pequeno, P.H.A.** *et al*.: 209 (3). **Perdiz, R.O.** *et al*.: 1408 (4), 1867 (4), 1876 (4). **Pereira L.A.** et. al.:1570 (3), 1574 (9), 1576 (3) 1579 (3), 1584 (24). **Pereira-Neto, M.** *et al*.: 218 (19). **Pereira-Silva, G.** *et al*.: 10823 (3), 16529 (4), 16066 (4). **Pereira, E.:** 2311 (3), 2328 (10), 8765 (16). **Pereira, G.F**.: 512 (16). **Pereira, L.A**.: 741 (4), 845 (4), 865 (4), 868 (2), 908 (4), 909 (4), 1050 (4), 1051 (2), 1052 (4), 1061 (2), 1062 (2), 1067 (4), 1071 (4), 1072 (4), 1113 (4), 1140 (2), 1344 (4), 1572 (5) 1579 (3), 1581 (3), 1584 (24), 1930 (12). **Pereira, O.J.** *et al*.: 1177 (19). **Periglo, N.A.** *et al*.: 287 (4). **Pessoa, E.** et. al.: 398 (4). **Pessoa, S.V.A.** *et al*.: 584 (13). **Pietrobon, M.R. & Maciel, S.:** 8245 (18). **Pimentel, L.B.** et. al.: s.n.-RB6890 (3). **Pinheiro, F.C. & Marquete, R.**: 8 (14). **Pinheiro, M.H.O.:** 142 (19). **Pinheiro, R.S. & Santos, T.S**.: 2270 (19). **Pinheiro, R.S.:** 1220 (19), 1241 (15), 1535 (19), 1744 (13), 2050 (19). **Pirani, J.R. & Yano, O**: 717 (25). **Pires, J. M. & Cavalcante, P.B.:** 1194 (18), 52111(4), 52256 (4), 52258 (2). **Pires, M.J. & Silva, N.:** 1463 (4). **Pires, M.**: 526 (11). **Pizziolo, W**.: 176 (7), 238 (10). **Plkrieger.:** 11147 (16). **Plowman, T.** *et al*.: 12524 (4). **Polisel, R.T.** *et al*.: 633 (10), 761 (25). **Ponte, A.C.E.** *et al*.: 29168 (23). **Poole, J.M.:** 1660(4). **Porto, C.:** 16517 (3). **Prance, G.T. & Pennington, T.D.:** 1981 (18). **Prance, G.T. & Ramos, J.F.**: 23617 (4), 23619 (4). **Prance, G.T. & Silva, N.T.**: 58876 (18), 59567 (19). **Prance, G.T.** *et al*.: 2431 (4), 3215 (4), 3462 (4), 3909 (4), 5027 (2) 6150 (18), 24322 (4), 3215 (4), 2431 (4), 3462 (4), 8205 (4), 3909 (4), 13885 (4), 13932 (21) 23619 (4), 24322 (4), P25830 (4), P25354 (4), P25396 (4). **Prance, G.T.**: 9732 (11), 10105 (11), 10779 (11), 13932 (21), 16387 (21), 23983 (11), 24009 (11), 58876 (18). **Prata, E.M.B.** *et al*.: 603 (4). **Queiroz, G.A. & Machado, D.N.S.:**75 (3). **Queiroz, G.A.** et. al.: 3 (15), 81 (3), 124 (14), 118 (14), 140 (23), 158(14), 246 (3), 282 (3), 302 (3) , 359 (19), 418 (14). **Queiroz, G.A.**: 21 (3), 48 (3), 50 (3). **Quinet, A.** *et al*.: 1878 (4), 1899(4). **Raimundo, S.P.**: 1146 (19). **Ramalho, A.J.** *et al*.: 81 (12). **Ramalho, R.S.** et. al.: 1362 (3). **Ramos, J.:** 02 (3). **Rando, J.G.** et. al.: 261 (19). **Reis Santos, R.P.** *et al*: 148 (13). **Rezende, M.A.:** s.n.-RB467293 (14). **Rezende, S.G. & Justo, A.G**.: 6704 (3), 6705 (3), 6706 (3), 6709 (3), 6966 (3). **Rezende, S.G. & Mendes, M.S.**: 3821 (3). **Rezende, S.G.** *et al*.: 4133 (12), 4165 (12). **Ribas, O.S.** *et al*.: 3199 (16). **Ribeiro, E.A.:** 25 (3). **Ribeiro, J.E.L.S.** *et al*.: 710 (19). **Ribeiro, R.:** 377 (13). **Riedel, L**.: 293 (14). **Rigon, L.G.C.:** 1129 (3). **Rizzini, C.H.:** 1105 (13), 215 (20). **Rodrigues, D.:** 04 (19). **Rodrigues, F.M. & Oliveira, J.G.:** 177 (19). **Rodrigues, I.A.** *et al*.: 130 (13), 180 (14). **Rodrigues, M.C.**: 402 (2). **Rodrigues, R.R.** *et al*.: 171 (24). **Rodrigues, R.R.:** s.n.-RB663166 (24). **Romagnolo, M.B**.: 2041 (16). **Romão, G.O & Duarte, A.R**.: 224 (16), 273 (16). **Rosa, P.** *et al*.: 737 (10). **Rossi, L.**: 508 (16), 1361 (24). **Saavedra, M.M.** et. al.: 1061 (3). **Saiter, F.C.** *et al*.: 381 (17). **Saka, M.N.** *et al*.: 515 (15). **Salgado, C.S.:** 125 (19), 280 (3). **Salimena, F.R.**: 1203 (13). **Salino, A. & Melo, L.C.N.:** 5914 (12). **Salino, A. & Morais, P.O.:** 5022 (3), BHCB052555 (6). **Salino, A. & Mota, R.C.**: 6951 (3), 8257 (19). **Salino, A. & Salgado, C.S.:** 280 (3). **Salino, A.** et. al.: 3741 (18), 9218 (3), 29948 (13). **Salino, A.**: 3741 (15), 8997 (3). **Sampaio, A.:** 7302 (19). **Santos, E.B. & Alves M.C.**: 130 (15), 169 (15), 200 (15). **Santos, E.B. & Judziewick, E.J.:** 4120 (12). **Santos, M.C.F.** *et al*.: 1631 (3), 1677 (20). **Santos, M.R.O.**: 49 (16). **Santos, N**.: s.n.-RB140560 (10). **Santos, T.S. & Mattos Silva, L.A.**: 3715 (19). **Santos, T.S.**: 3555 (3). **Santos, T.S.**:637 (13), 1183 (13), 1540 (19), 1656 (13), 3555 (3). **Saraiva, R.S.**: 1742 (15). **Sarmento**: 66 (3). **Sarnaglia, V.B. & Chagas, A.P.**: 531 (12), 567 (10). **Sarnaglia, V.B. & Sarmento, S**.: 406 (19), 466 (15), 478 (10), 487 (7), 505 (7), 519 (5), 531 (13), 565 (19), 567(10),695 (15). **Sarnaglia, V.B.** *et al*.:460 (19), 478 (10), 494 (5), 548 (5),565 (19),601 (19). **Sarnaglia, V.B.**: 396 (15), 406 (19), 466 (15), 478 (10), 531 (13), 695 (15), 567(10). **Satto, D. & Silva, F.G.:** s.n-RB148569 (3). **Schwacke, C.A.W.:**1062 (3), 3349 (3). **Schwirkowski, P.:** 2072 (16). **Senduski, T.:** 857 (12). **Siloa, L.A. & Brito, H.S.:** 1043 (15). **Silva-Neto, S.J.:** 467 (3). **Silva, B.R.** *et al*.: 1023 (14). **Silva, C.A.**: 46 (18). **Silva, F.G.** *et al*.: 15 (19). **Silva, G.M.** *et al*.: 24 (14). **Silva, I.M**.: 820 (3). **Silva, J.M. & Barbosa, E**.: 2389 (16). **Silva, J.M.** *et al*.: 2514 (16). **Silva, J.S.:** 393 (16). **Silva, L.:** 861(14), 1043 (15). **Silva, L.V.C.** *et al*.: 1143 (14). **Silva, M.A**.: s.n.-RB748289 (21). **Silva, M.G.** *et al*.: 7112(4). **Silva, P.G**.: 16546 (15). **Silveira, A.L.P.** *et al*.: 859 (4). **Simon, M.F.** *et al*.: 1520 (4), 1746 (18). **Simonelli, M.**: 333 (3), 358 (3). **Siqueira, L.C de**: L750 (12). **Sobral, M.** *et al*.: 13997 (16), 14021 (3). **Sousa, L.A.S.**: 269 (3). **Souza, H.H.C de.:** BHCB05212 (12). **Souza, J.A.M.** *et al*.: 98 (3). **Souza, J.P.** *et al*.: 3306 (23). **Souza, S.A.M.** *et al*.: 696(4), 1157(4). **Souza, T.D.**: 987 (3). **Souza, V.C. & Flores, T.B.**: 40720 (12). **Souza, V.C.** *et al*.: 9224 (24), 10380 (16), 33594 (3), 35440 (16). **Spruce**: 1784 (11), 2342 (11), 2362 (11). **Stehmann, J.R. & Arantes, A.A.**: BHCB 20.849 (10). **Stehmann, J.R.** *et al*. 3590 (19), 3657 (19), 4988 (12), s.n.-RB 319356 (15), BHCB 19532 (15). **Stehmann, J.R.**: s.n.-BHCB052531 (12), 3459 (19), 5850 (12). **Steward, W.C.** *et al*.: P20426 (4). **Stival-Santos, A.** *et al*.: 905 (16), 1194 (16), 1250 (16), 2706 (16). **Strudwick, J.J.:** 3236 (21), 3650 (21). **Sucre, D. & Braga, P.S.I.**: 2364 (12), 6276 (14). **Sucre, D. & Ichaso, C.L**.: 6576 (3). **Sucre, D. & Silva, J.F**.: 9517 (13), 9618 (10). **Sucre, D.** *et al*.: 10133 (22). **Sucre, D.**: 1026 (3), 1429(3), 2419 & 262 (3), 2366(3), 2817 (33573 (13), 4339 (13), 4408 (13), 4544 (3), 6367 (14), 6576 (3), 7391 (13), 7461(13), 7539 (14), 7710 (13), 7818 (3), 7821 (13), 7824 (3), 8025 (13), 11086 (14), 10133 (22). **Sugiyama, M.**: 1067 (24). **Sylvestre, L.** *et al*.: 678 (23), 783 (23). **Tameirão Neto E.**: 187 (16), 427(19), 547 (12), 1030 (19), 2650 (19), 2709 (3), 2796 (3). **Tameirão Neto,**

E. & França, G.S.:427 (19). **Tameirão Neto, E. & Mansur, T.**: 5226 (12). **Tameirão Neto, E. & Werneck, M.S.**: 722 (19), 1030 (19). **Tameirão Neto, G.S. & Franca**: 859 (12). **Teixeira, E.M. & Brina, A.E.**: s.n.-BHCB35718 (3), BHCB35721 (12). **Teixeira, L.O.A.** *et al.*: 447 (21), 103863(4), 104682 (4). **Thomas, W.W.** *et al.*: 4376 (21), 10067 (19), 10243 (19), 11980 (13), 12619 (19), 13901 (19), 14145 (15), 14234 (10). **Tomasulo, P.L.B. & Nicolau, S.A.**: 126 (12). **Torres, D.M.:** s.n. BHCB188297 (12). **V.C.F.M.** sn. (RB331775 (9). **Valdemarin, K.S.** et. al.: 286 (10). **Valentin-Silva, A.**: 64 (3), 69 (3). **Vasconcelos, M.F.**: s.n.-BHCB40283 (19), 31 (15). **Vaz, A.F.**: RB 668079 (3). **Vaz. A.**: 535 (14). **Velozo, L.S.M.**: 07(3), 37 (14). **Verdi, M.** et. al.: 2669 (19), 3283 (16), 3545 (16), 4382 (19). **Verdieux, L.M.:** 7 (15). **Vervloet, R. R. & Bausen, E.**: 104 (24), 141 (7), 1435 (24). **Vervolet R. R.** et. al.: 1041 (7), 3317 (3). **Viana, F.M.F.** et. al.: 17 (3). **Viana, P.L.** *et al.*: 2666 (4). **Viana, P.L.**: 523 (3). **Vidal, W.N.** et. al: 473 (3). **Vieira, M.F.**: 437 (15). **Vimercat, J.M.**: 79 (3). **Wanderley, M.G.L.**: 2122 (16). **Wurdack. J.J.**: 43537 (11). **Yano, T. & Yano,** O.: 55 (16). **Zappi, D.C**.: 3271 (14). **Zarucchi, J.L.** *et al.* 2985(4). **Zarucchi, J.L.** *et al.*: 2985 (4). **Zborowcki, M.** *et al.*: 07 (3). **Zemy**: s.n (26). **Zipparro, V.P. & Almen, C.**: 1991 (24). **Zorzanelli, S.P.F.**: 809 (15), 1589 (10).

Legend of species number: (1) ***Piper aghaense*** E.F. Guim. & M. Carv.-Silva; (2) ***Piper alatabaccum*** Trel. & Yunck.; (3) ***Piper anisum*** (Spreng.) Angely; (4) ***Piper bartlingianum*** (Miq.) C. DC.; (5) ***Piper bicorne*** M. Carv.-Silva, E.F. Guim. & L.A. Pereira; (6) ***Piper brumadinense*** M. Carv.-Silva & E.F. Guim.; (7) ***Piper carautensei*** E.F.Guim. & M. Carv.-Silva; (8) ***Piper cariacicaense*** M. Carv.-Silva & E.F. Guim.; (9) ***Piper duartei*** E.F. Guim. & M. Carv.-Silva; (10) ***Piper eucalyptophyllum*** C. DC., (11) ***Piper francovilleanum*** C. DC.; (12) ***Piper grazielae*** M. Carv.-Silva & E.F. Guim.; (13) ***Piper hayneanum*** C. DC.; (14) ***Piper hoffmannseggianum*** Schultes; (15) ***Piper klotzschianum*** (Kunth) C. DC.; (16) ***Piper miquelianum*** C. DC.; (17) ***Piper moringanum*** E.F. Guim. & M. Carv.-Silva; (18) ***Piper ottonoides*** Yunck.; (19) ***Piper ovatum*** Vahl; (20) ***Piper piliovarium*** Yunck.; (21) ***Piper piscatorum*** Trel. & Yunck.; (22) ***Piper riodocense*** E.F. Guim. & M. Carv.-Silva; (23) ***Piper scutifolium*** Yunck.; (24) ***Piper setebarraense*** E.F. Guim. & L.H.P. Costa***;*** (25) ***Piper strictifolium*** D. Monteiro & E.F. Guim.; (26) ***Piper transluscens*** Yunck.

Acknowledgements

We are grateful to the directors and curators of the herbaria (ALCB, BR, BHCB, C, CEN, ESA, FLOR, G, G-DC, HEPH, HRCB, HTO, HUFU, IAC, IAN, ILL, INPA, K, L, LE, MBM, MBML, MO, NY, PRC, R, RB, SP, SPF, U, UB, UEC, UFMT, VIES, VIC, and W for their permission to study the Piperaceae of their collections and Maria Alice Rezende for providing the illustrations.

References

Bacci LF, Amorim AM, Goldenberg R. 2016. Three new species of *Bertolonia* (Melastomataceae) from Espírito Santo, Brazil. PeerJ 4: e2822.

Bachman S, Moat J, Hill AW, Torre J, Scott B. 2011. Supporting Red List Threat assessments with GeoCAT: geospatial conservation assessment tool. Zookeys 150: 117-126.

Burger WC. 1971. Piperaceae. In: Burger WC (ed). Flora Costaricensis. Fieldiana Botany 35: 5-227.

Callejas R. 1986. Taxonomic revision of Piper subgenus Ottonia (Piperaceae) South America. PhD thesis. City University of New York, New York.

Callejas R. 2020. Piperaceae. In: Davidse G, Ulloa Ulloa C, Hernández Macías HM, Knapp S (eds.) Flora Mesoamericana. Vol. 2, pt. 2 (pp. i–xix; 1–590). St. Louis, Missouri Botanical Garden Press.

Camargo AC, Goldenberg R. 2011. Two new species of *Leandra* from Espírito Santo, Brazil. Brittonia 63: 220–226.

Carvalho-Silva M, Guimarães EF, von Sohsten Medeiros E. 2013. Flora da Serra do Cipó, Minas Gerais: Piperaceae. Boletim de Botânica Universidade de São Paulo 31: 27-40. doi: 10.11606/issn.2316-9052.v31i1p27-40

Carvalho-Silva M, Guimarães EF, Pereira LA, Sarnaglia Junior VB. 2015. Two new species of *Piper* section *Ottonia* (Piperaceae) from southeastern Brazil. Phytotaxa 212: 293-299. doi: 10.111646/phytotaxa.212.4.5

Cunico MM, Carvalho JLS, Kerber VA, Higaskino CEK, Almeida SCC, Miguel MD, Miguel OG. 2004. Atividade antimicrobiana do extrato bruto etanólico de raízes e partes aéreas de *Ottonia martiana* Miq. (Piperaceae). Revista Brasileira de Farmacognosia 14: 97-103. doi: 10.1590/S0102-695X2004000200002

De Candolle C. 1866. Piperacae novae. The Journal of Botany, British and Foreing 4: 210-218.

De Candolle C. 1869. Piperaceae. In: Candolle A. De Prodromus Systematis Naturalis Regni Vegetabilis. Vol. 16. Lipsiae, Parisiis. p. 235-471.

De Candolle C. 1872. Piperaceae Novae. Linnaea 37: 333-390.

Fraga CN, Formigoni MH, Chaves FG. 2019. Fauna e Flora ameaçadas de extinção no estado do Espírito Santo. Santa Tereza, Instituto Nacional da Mata Atlantica. 434 p.

Fraga CN, Saavedra MM. 2014. A new cauliflorous white-flowered species of *Ouratea* (Ochnaceae) from the Brazilian Atlantic Forest. Phytotaxa 167: 119–126. doi: 10.11646/phytotaxa.167.1.8.

Frodin DG. 2004. History and concepts of big plant genera. Taxon 53: 753-776. doi: 10.2307/4135449

Giaretta A, Fraga CN. 2014. Two new *Eugenia* species (Myrtaceae) from the Brazilian Atlantic Forest. Phytotaxa 163: 113–120. doi: 10.11646/phytotaxa.163.2.5.

Guimarães EF, Carvalho-Silva M. 2009. Uma nova espécie e novos nomes em *Piper* seção *Ottonia* (Piperaceae) para o Sudeste do Brasil. Hoehnea 36: 431-435. doi: 10.1590/S2236-89062009000300004

Guimarães EF, Costa LHP. 1999. Bradea. Boletim do Herbário Bradeanum 8: 149-153.

Guimarães EF. 1988. Uma nova variedade de *Ottonia villosa* (Notas em Piperaceae III). Napaea 5: 13-15.

Guimarães EF, Ichaso CLF, Costa CG. 1977. *Ottonia peltata* (Piperaceae): Uma nova espécie do Estado do Espírito Santo. Arquivos do Jardim Botânico do Rio de Janeiro 20: 35-40.

Guimarães EF, Ichaso CLF, Costa CG. 1978. Piperaceae 1. *Ottonia,* 2. *Sarcorhachis,* 3. *Potomorphe*. In: Reitz PR (ed.). Flora Ilustrada Catarinense. Itajaí (SC), Herbário Barbosa Rodriques. p. 1-26

Guimarães EF, Maurenza D, Kutschenko DC, Prieto PV, Barros FSM, Messina T, Pessoa SVA. 2013. Piperaceae. In: Martinelli G, Moraes MA (eds.). Livro Vermelho da Flora do Brasil. Rio de Janeiro, Centro Nacional de Conservação da Flora/Secretaria do Meio Ambiente do Rio de Janeiro. 1100 p. http://dspace.jbrj.gov.br/jspui/handle/doc/26

Guimarães EF, Monteiro D. 2006. Piperaceae da Reserva Biológica de Poço das Antas, Silva Jardim, Rio de Janeiro, Brasil. Rodriguésia 57: 567-587. doi: 10.1590/2175-7860200657312

Guimarães EF, Queiroz GA, Medeiros E Von SS. 2020. *Piper*. In: Flora do Brasil 2020. Jardim Botânico do Rio de Janeiro. http://floradobrasil.jbrj.gov.br/reflora/floradobrasil/FB12735

IUCN. 2017. The IUCN Red List of Threatened Species. Version 2014.3. http://www.iucnredlist.org

Jaramillo MA, Manos PS. 2001. Phylogeny and patterns of floral diversity in the genus *Piper* (Piperaceae). American Journal of Botany 884: 706–716.

Jaramillo MA, Callejas R, Davidson C, Smith JF, Stevens AC, Tepe EJ. 2008. A Phylogeny of the Tropical Genus *Piper* using ITS and the Chloroplast Intron psbJ–petA. Systematic Botany 33: 647–660.

Jones AG. 1985. An annotaded catalogue of type specimens in the University of Illinois herbarium (ILL) – 1. Piperaceae, except *Peperomia*. Phytologia 58: 5

Kollmann LJC, Fontana AP, Simonelli M, Fraga CN. 2007. As Angiospermas ameaçadas de extinção no Estado do Espírito Santo. Espécies da flora ameaçadas de extinção no Estado do Espírito Santo. Vitória (ES), Ipema. p. 105-137.

Kunth CS. 1839. Bemerkungen über die familie der Piperaceen. Linnaea 13: 561-726.

Linnaeus C. 1753. *Species Plantarum* 1. Stockholm, Laurentius Salvius. 28 p.

Medeiros E von SS, Guimarães EF. 2007. Piperaceae do Parque Estadual de Ibitipoca, Minas Gerais, Brasil. Boletim de Botânica Universidade de São Paulo 25: 227-252. doi: 10.11606/issn.2316-9052.v25i2p227-252

Meira RMSA, Peixoto AL, Coelho MAN, Ponzo APL, Esteves VGL, Carvalho-Silva M, *et al*. 2016. Brazil's mining code under attack: giant mining companies impose unprecedented risk to biodiversity. Biodiversity and Conservation 25: 407–409. doi: 10.1007/s10531-016-1050-9

Melo A, Guimarães EF, Alves M. 2014. Piperaceae do Parque Nacioanl do Viruá, Roraima, Brasil. Rodriguésia 65: 455-470. doi: 10.1590/S2175-78602014000200010

Miquel FAW. 1852. Piperaceae. In: von Martius CFP (ed.) Flora Brasiliensis. Monachii and Lipsiae, F. Fleischer. [I].ª 4 (1A): 5–76, t. 1–24

Miquel FAW. 1847. Mantissa Piperacearum. e speciminibus musei vindobonensis, regii monacensis et Martiani. Linnaea 20: 117-182

Miquel FAW. 1844. Systema Piperacearum. Roterodami apud H.A. Kramers 1: 1-575. Rotterdan.

Miquel FAW. 1845. Animad versiones in Piperaceae Herbarii Hookeriani. The London Journal of Botany 4: 410-470.

Molina-Henao F, Guerrero-Chacón AL, Jaramillo MA. 2016. Ecological and Geographic Dimensions of Diversification in *Piper* subgenus *Ottonia*: A Lineage of Neotropical Rainforest Shrubs. Systematic Botany 41: 253-262. doi: 10.1600/036364416X691777

Monteiro D, Guimarães EF. 2009. Flora do Parque Nacional do Itatiaia-Brasil: Manekia e Piper (Piperaceae). Rodriguésia 60: 999-1024. doi: 10.1590/2175-7860200960413.

Novelli FZ. 2010. A Reserva Biológica de Duas Bocas e seus vínculos à história da conservação no Espírito Santo. Natureza on-line 8: 57-99.

Queiroz GA, Barros AAM, Guimarães EF. 2020. Piper (Piperaceae) do Parque Estadual da Serra da Tiririca, Niterói/Maricá, RJ, Brasil. Rodriguésia 71: e01992018. 10.1590/2175-7860202071062

Quijano-Abril MA, Callejas R, Miranda-Esquiel DR. 2006. Areas of endemism and distribution patterns for neotropical *Piper* species (Piperaceae). Journal of Biogeography 33:1266-1278. doi: 10.1111/j.1365-2699.2006.01501.x

Radford AE, Dickinson WC, Massey JR, Bell CR. 1974. Vascular plant systematics. New York, Harper & Row.

Rizzini CT. 1952. De piperaceis tribus, nova minusque cognitis ad genus Ottoniam relatis. Dusenia 3: 263-267.

Rizzini CT, Rizzini CM. 1983. Dicionário botânico clássico latino-portugues abonado. Rio de Janeiro, IBDF. 283 p.

Sprengel K. 1820. Species Plantarum minus cognitae. Neue Entdeckungen im Ganzen Umfang der Pflanzenkunde. Leipzig. 452p.

Stearn WT. 2004. Botanical Latin. 4th edn. Portland, Timber Press.

Steyermark JA. 1984. Piperaceae. Flora de Venezuela. Caracas, Editorial Fundación Caracas. p. 5-619.

Tebbs MC. 1989. Revision of *Piper* (Piperaceae) in the new World 1. Review of Characteres and taxonomy of *Piper* section *Macrostachys*. Bulletin of the British Museum (Natural History) Botany 19: 117-158.

Thiers B. 2019. Index herbariorum: a global directory of public herbaria and associated staff. New York, New York Botanical Garden's Virtual Herbarium. http://sweetgum. nybg. org/ih/

Trelease W, Yuncker TG. 1950. Piperaceae Northern South America. Vol 1. Urbana (US), University of Illinois Press. pp. 395-408.

Trelease W. 1935. The Pedicellate Peppers of South America. Proceedings of the American Philosophical Society 75: 691- 716.

Vahl M. 1796. *Piper*. Eclogae Americanae Vol. 1.

Vahl M. 1807. Piperaceae. Ecologae Americanae. Vol. 3.

Yuncker TG. 1972. The Piperaceae of Brazil. I. Piper-Group I, II, III, IV. Hoehnea 2: 19-366.

Yuncker TG. 1973. The Piperaceae of Brazil II: –iper - Group V; *Ottonia*; *Pothomorphe*; *Sarcorhachis*. Hoehnea 3: 29-284.

Zanotti CA, Keller HA. 2017. Nuevo registro y novidades taxonômicas de *Piper miquelianum* (Piperaceae), secc. *Ottonia* para la Flora Argentina. Bonplandia 26: 51-56.