Phytotaxa 244 (2): 125–144
http://www.mapress.com/j/pt/
Copyright © 2016 Magnolia Press

Article

ISSN 1179-3155 (print edition)
PHYTOTAXA
ISSN 1179-3163 (online edition)

http://dx.doi.org/10.11646/phytotaxa.244.2.2

Taxonomic revision of *Peperomia* (Piperaceae) from Uruguay

PATRICIA MAI[1], ANDRÉS ROSSADO[2], JOSÉ M. BONIFACINO[2,3] & JORGE L. WAECHTER[4]
[1] *Licenciatura en Gestión Ambiental, Centro Universitario de la Región Este, Universidad de la República, Rocha, Uruguay.*
[2] *Laboratorio de Sistemática de Plantas Vasculares, Facultad de Ciencias, Universidad de la República, Montevideo, Uruguay.*
[3] *Laboratorio de Botánica, Departamento de Biología Vegetal, Facultad de Agronomía, Montevideo, Uruguay.*
[4] *Departamento de Botânica, Universidade Federal do Rio Grande do Sul, Porto Alegre, RS, Brasil.*
Corresponding author: patimaimo@gmail.com

Abstract

The genus *Peperomia* is represented by eight species in Uruguay: *P. catharinae*, *P. comarapana*, *P. hispidula*, *P. increscens*, *P. pereskiifolia*, *P. psilostachya*, *P. tetraphylla* and *P. trineuroides*. *Peperomia psilostachya* is reported for the first time for the flora of Uruguay, from material collected in moist hillside and riverside forests from the northeast and east of the country. Three new synonyms are proposed: *P. arechavaletae* var. *arechavaletae* as synonym of *P. trineuroides*, *P. arechavaletae* var. *minor* of *P. tetraphylla* and *P. trapezoidalis* of *P. psilostachya*. Lectotypes for *P. arechavaletae, P. arechavaletae* var. *minor* and *P. tacuariana*, and a neotype for *P. herteri* are designated. The taxonomic treatment includes synonymies used in Uruguay, morphological descriptions, distribution and habitat data, phenology, conservation assesment, observations, and material examined for each species treated. A species identification key, plant illustrations and distribution maps in Uruguay are provided.

Resumen

El género *Peperomia* está representado en Uruguay por ocho especies: *P. catharinae*, *P. comarapana*, *P. hispidula*, *P. increscens*, *P. pereskiifolia*, *P. psilostachya*, *P. tetraphylla* y *P. trineuroides*. *Peperomia psilostachya* es registrada por primera vez para la flora de Uruguay a partir de material colectado en bosques de quebrada y ribereños del noreste y este del país. Se proponen tres nuevas sinonimias: *P. arechavaletae* var. *arechavaletae* como sinónimo de *P. trineuroides, P. arechavaletae* var. *minor* de *P. tetraphylla*, y *P. trapezoidalis* de *P. psilostachya*. Se designan lectotipos para *P. arechavaletae, P. arechavaletae* var. *minor* y *P. tacuariana*, y un neotipo para *P. herteri*. El tratamiento taxonómico incluye para cada especie sinonimias usadas en Uruguay, descripciones morfológicas, datos de distribución y hábitat, fenología, evaluación del estatus de conservación, observaciones y material examinado. Asimismo, se presenta una clave para la identificación de las especies, ilustraciones y mapas de distribución en Uruguay.

Key words: identification key, geographic distribution, conservation assessment, new records, new synonyms, typification

Introduction

Peperomia Ruiz & Pav. (Piperaceae) is one of the largest genera of angiosperms (Frodin 2004), including 1432 species (Mathieu *et al.* 2015) of terrestrial, epipetric or epiphytic herbaceous plants (Guimarães *et al.* 1984). The genus has a pantropical distribution, with the highest diversity in the Neotropics (Wanke *et al.* 2006, Mathieu *et al.* 2015). In America the genus occurs from Bermuda and the southeastern United States (Boufford 1982) to southern Chile, central and littoral Argentina and southern Uruguay (IBODA 2015). Several morphological synapomorphies support this genus, such as a single carpel, unitegmic ovule, 16-nucleate embryo sac, two monothecal bisporangiated stamens, and small non-aperturate pollen (Tucker *et al.* 1993, Jaramillo *et al.* 2004, Wanke *et al.* 2006).

The monophyly of *Peperomia* is supported by molecular and morphological studies (Jaramillo *et al.* 2004, Wanke *et al.* 2006) but the traditionally used infrageneric classification, as proposed by Dahlstedt (1900), has shown some incongruency (Samain *et al.* 2007). Recently a new infrageneric classification was proposed based on morphological and molecular data (Frenzke *et al.* 2015), revealing fourteen monophyletic groups and therefore solving the previous problems regarding the infrageneric classifications.

Accepted by Zhi-Qiang Zhang: 1 Jan. 2016; published: 18 Jan. 2016

Licensed under a Creative Commons Attribution License http://creativecommons.org/licenses/by/3.0

The taxonomy of *Peperomia* is rather complex and controversial (Mathieu & Callejas 2006, Samain *et al.* 2011, Zanotti *et al.* 2012), mainly because the genus has been poorly collected and studies have been largely based on dry herbarium material with distinctive architectural features either missing or deformed (Mathieu & Callejas 2006). These circumstances have led to a confusion in the taxonomy of closely related taxa and to an over-description of species, with numerous synonyms for a given taxon throughout its geographic range (Mathieu & Callejas 2006, Frenzke *et al.* 2015).

Taxonomic revisions of *Peperomia* for Uruguay were published by Trelease (1941[1]), Trelease & Herter (1952[2]) and Marchesi (1968) who cited six taxa: *P. arechavaletae* A. C. P. de Candolle (1917: 466), *P. arechavaletae* var. *minor* Herter (1952: 45), *P. blanda* (Jacq.) Kunth var. *pseudodindygulensis* (C. DC.) Yuncker (1953: 218), *P. catharinae* Miquel (1843: 127), *P. hispidula* (Sw.) A. Dietrich (1831: 165) and *P. reflexa* (L. f.) A. Dietrich (1831: 180). Later on, *P. comarapana* A. C. P. de Candolle (1915: 8) was cited for western Uruguay by Alonso Paz (1989) and *P. pereskiifolia* (Jacq.) Kunth ([1815] 1816: 68) was cited for eastern Uruguay by Zuloaga *et al.* (2008), although the former study does not mention supporting voucher or reference bibliography.

This work aims to update the taxonomic knowledge of *Peperomia* for Uruguay. It provides an identification key for *Peperomia* species occurring in the country and proposes new synonyms, three lectotypes and a neotype. For each taxonomic entity treated synonymies, morphological descriptions, geographic distribution, habitat, phenology information, maps and illustrations are included.

Material and methods

The taxonomic revision was conducted based on herbarium specimens hosted at MVFA, MVFQ, MVHC, MVJB and MVM herbaria and specimens collected in the field. Additional specimens were examined from CTES (Argentina) as well as HAS and ICN (Brazil) (Thiers continuously update). A set of herbarium specimens from different geographical zones of Uruguay was selected and analyzed for each species. Fieldwork was carried out from September 2012 to November 2013 throughout the country. Collected material was deposited at MVJB and was identified according to the following literature: Yuncker (1953), (1958), (1974), Marchesi (1968), Novara (1998), Monteiro & Guimarães (2008) and Zanotti *et al.* (2012).

A key for the identification of species was built based on morphological characters observed in herbarium material and in plants growing *in situ* or *ex situ*. Additionally, an electronic key using Lucid 3.5 (www.lucidcentral.org) was generated and can be accessed at http://www.thecompositaehut.com/www_tch/webinvestigacion/clave_virtual_flora/cvfu_claves.html. The taxonomic treatment includes synonyms used within Uruguay, morphological descriptions, geographic distribution with emphasis in the Southern Cone of South America, habitat, phenology, assessment of conservation status, morphological and taxonomic observations, specimens examined, illustrations and distribution maps within Uruguay.

General geographic distribution was obtained from several sources (Monteiro & Guimarães 2008, Zanotti *et al.* 2012, GBIF 2015, Tropicos 2015) and complemented by the herbarium specimens analyzed. We added detailed information for the Southern Cone, which includes Argentina, southern Brazil (Paraná, Santa Catarina and Rio Grande do Sul), Chile, Paraguay and Uruguay. Geographic distribution information of Brazil was taken from Guimarães *et al.* (2015) and for Argentina, Chile and Paraguay from herbarium specimen labels and the "Flora del Cono Sur" database (IBODA 2015). Geographic distribution within Uruguay was obtained from data present in herbarium material and from specimens collected during fieldwork.

Habitat categories were adapted from Alonso Paz & Bassagoda (2002) and Brussa & Grela (2007) as follows: *hydrophilous forest* ('bosque hidrófilo') occurs in temporally flooded areas dominated by hydrophytes and generally the characteristic species is *Erythrina cristagalli* L.; *open thorn forest* ('bosque parque'), a type of wooded savanna dominated by *Aspidosperma quebracho-blanco* Schltdl., *Prosopis affinis* Spreng., *Prosopis nigra* (Griseb.) Hieron. and *Vachellia caven* (Molina) Seigler & Ebinger, among other species; *psammophilous forest* ('bosque psamófilo') occurs in sandy soils in coastal areas; *riverside forest* ('bosque ribereño') occurs in floodplains of rivers and streams; *xeric hillside forest* ('bosque serrano') occurs on hill slopes (includes rocky escarpment and shrublands) and *moist*

1 Trelease's work was firstly published in 1939, but due to the Second World War was disseminated in 1941. The taxa published in this work have 1941 as publication year, according to Art. 31.1 of ICB (2012).

2 Trelease & Herter appear as the authors of "Piperaceae Uruguayenses Curae Posteriores" in 1952. However Trelease died in 1945, therefore we consider Herter as the author of the new entities proposed in this publication.

hillside forest (‘bosque serrano húmedo’) also called *ravine forest* (‘bosque de quebrada’) occurs on hill slopes with high moisture concentration, steep slopes, sheltered ravines or deep valleys.

Phenology was determined from herbarium specimen data and from *in situ* and *ex situ* living plants. Illustrations were made mainly from living plants thereafter herborized, except the detail of spike with immature fruits of *Peperomia catharinae* (Fig. 1B) and with developing fruits of *P. tetraphylla* Hook. & Arn (1832: 97) (Fig. 4E).

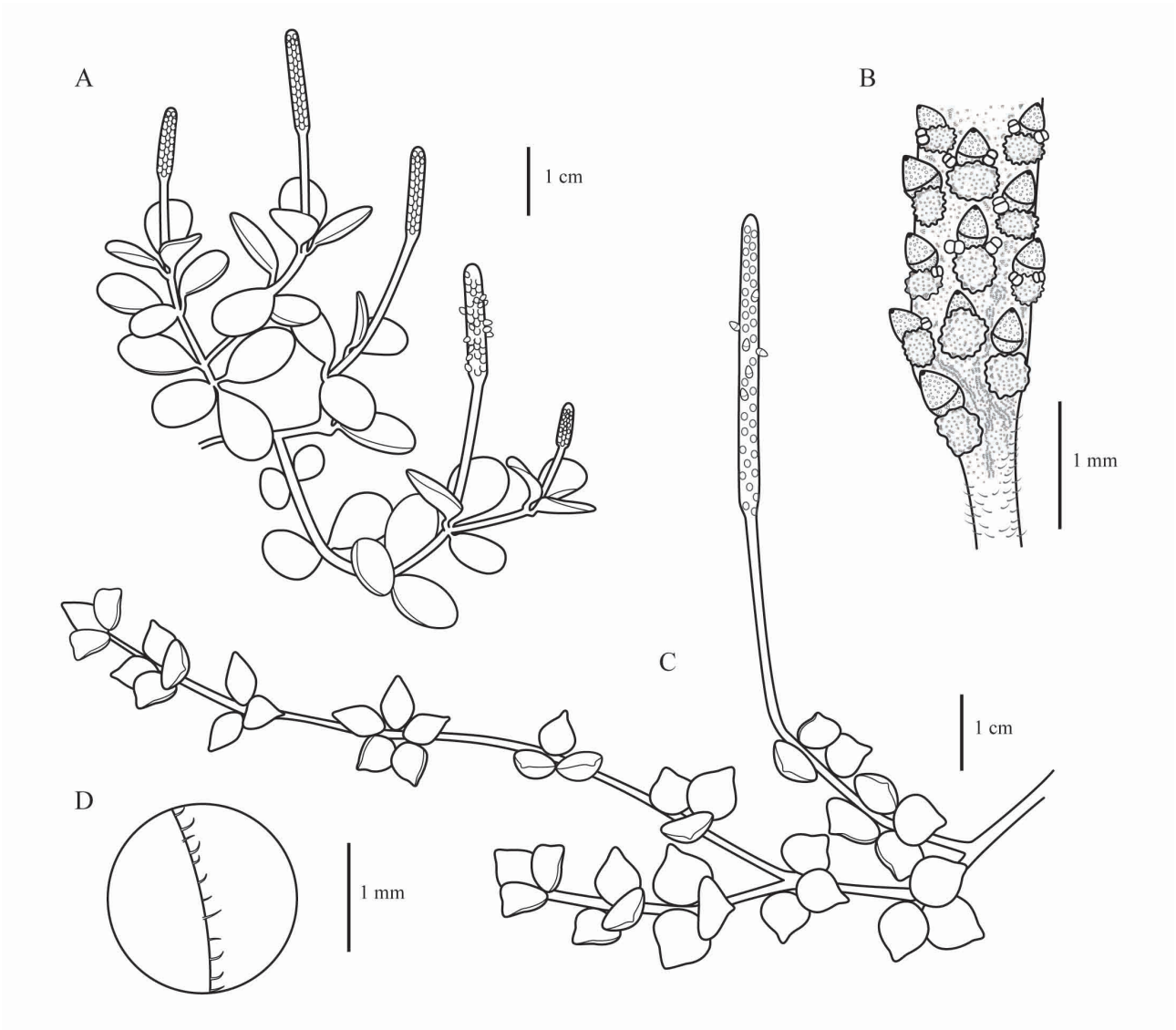


FIGURE 1. *Peperomia catharinae* (A–B) and *P. psilostachya* (C–D). **A.** Habit. **B.** Detail of the spike with immature fruits. **C.** Habit. **D.** Detail of leaf margin. (A *Mai et al. 51* (MVJB); B *Mai et al. 33* (MVJB); C *Mai et al. 347* (MVJB); D *Mai & Rossado 298* (MVJB)). A–C drawn by Patricia Mai, D drawn by Andrés Rossado.

The assessment of the conservation status of each species follows the classification system proposed by the IUCN (2015), from low to high extinction risk: Least Concern (LC), Near Threatened (NT), Vulnerable (VU), Endangered (EN) and Critically Endangered (CR). To evaluate if a taxon belongs to an IUCN threatened category at national level, we applied the criterion of Geographic range, through the assessment of Area of occupancy (AOO) (IUCN 2012). We considered AOO a good predictor of the real geographic distribution of *Peperomia* species in Uruguay, given that most of them show a discontinuous geographic distribution. AOO was estimated using the software GeoCAT—Geospatial Conservation Assessment Tool (Bachman *et al*. 2011) with a cell width of 15 km, except for *Peperomia hispidula var. sellowiana* (Miq.) Dahlstedt (1900: 14) for which a cell width of 5 km was used, due to the habitat where it occurs in Uruguay, has low surface.

Results

In Uruguay *Peperomia* is represented by eight species: *P. catharinae*, *P. comarapana*, *P. hispidula*, *P. increscens* Miquel (1847: 124), *P. pereskiifolia*, *P. psilostachya* A. C. P. de Candolle (1893: 9), *P. tetraphylla* and *P. trineuroides* Dahlstedt (1900: 198). In terms of habit, three species are terrestrial or accidentally epiphytic, four are both epiphytic and epipetric, and one is exclusively epiphytic.

Peperomia catharinae, *P. pereskiifolia*, *P. psilostachya, P. tetraphylla* and *P. trineuroides* belong to the subgenus *Pseudocupula* Frenzke & Scheiris (2015: 436) which is mainly characterized by rooting nodes, flowers crowded along the rachis, pseudopedicel often present in the fruits, and the presence of sticky pseudocupula, which covers the basal part of the fruits (Frenzke *et al.* 2015). *P. comarapana* and *P. increscens* belong to the subgenus *Micropiper* (Miq.) Miquel (1843:76) characterized by a fruit uniformly covered with sticky papillae on a round-conical pseudopedicel (Frenzke *et al.* 2015). *P. hispidula* belongs to the subgenus *Hispidulae* Frenzke & Scheiris (2015: 432), characterized by delicate herbs with a membranous leaf blade, flowers arranged loosely along rachis and fruits pedicellate covered with unicellular trichomes (Frenzke *et al.* 2015).

Regarding the assessment of the conservation status, four species were classified as threatened (three Endangered, one Vulnerable) and four as not threatened (two Least Concern, two Near Threatened). Additionally, five species occurred in protected areas included in the National System of Protected Areas (*Sistema Nacional de Áreas Protegidas*—S.N.A.P.), while three species (identified as threatened) were not present in any protected areas within S.N.A.P.

Taxonomic treatment

Peperomia Ruiz & Pavón (1794: 8)

Herbs, epiphytic, epipetric or terrestrial. Stems erect, decumbent, repent or pendant, filiform to succulent. Leaves alternate, opposite or verticillate, without stipules; leaf blade glabrous or pubescent, with translucent dots. Inflorescences terminal or axillary, spikes or racemes. Flowers bisexual, subtended by peltate bracts, perianth absent; stamens 2, attached to the base of floral bract, filaments short, anthers unilocular, dehiscence longitudinal, extrorse; ovary sessile or inconspicuous pedicellated. Fruits berries or drupes, sometimes with pseudocupule (differential growth of a brown cuticle, which covers the fruit from the base to the middle), often partly immersed in pits of the rachis.

Identification key of *Peperomia* species occurring in Uruguay

1. Leaves alternate, membranous (live); fruits with hispid trichomes ..... 3. *P. hispidula*
1´. Leaves opposite or verticillate, coriaceous to succulent (live); fruits glabrous 2
2. Leaf margins glabrous, mostly revolute; veins on abaxial surface markedly prominent and glabrous 3
2´. Leaf margins with trichomes, flat (live); veins on abaxial surface not prominent, or if prominent then with trichomes 4
3. Stems repent to pendant, cylindrical or slightly angular (live); leaf blades longer than 2.6 cm ..... 5. *P. pereskiifolia*
3´. Stems erect to decumbent, markedly angular (live); leaf blades up to 2.6 cm long ..... 8. *P. trineuroides*
4. Spikes two or more together; flowers loosely arranged; fruits without pseudocupule; leaf baldes mostly more than 2 cm long 5
4´. Spikes solitary; flowers densely arranged; fruits with pseudocupule; leaf blades up to 1.7 cm long 6
5. Leaves verticillate; apical leaf blades length-width ratio > 2.3 ..... 2. *P. comarapana*
5´. Leaves mostly opposite; apical leaf blades length-width ratio < 2.2 ..... 4. *P. increscens*
6. Rachis of developed spikes with trichomes; margin of floral bracts entire; leaf adaxial surface with whitish or light green lines (live) ..... 7. *P. tetraphylla*
6´. Rachis of developed spikes glabrous; margin of floral bracts irregular; leaf adaxial surface evenly colored (live) 7
7. Stems erect or decumbent; leaf blades obovate to orbicular; rachis of developed spikes up to 1.8 cm long, verruculose ..... 1. *P. catharinae*
7´. Stems repent or pendant; leaf blades rhombic or rhombic-elliptic; rachis of developed spikes more than 2.5 cm long, smooth ..... 6. *P. psilostachya*

1. *Peperomia catharinae* Miquel (1843: 127). Type:—BRAZIL. Santa Catarina: Ste Catherine, 1832, *Gaudichaud-Beaupré 282* (holotype G-00438558 on-line image!, isotypes [G-DC] G-00207738 on-line image!, P-00463555 on-line image!, P-00463556 on-line image!, U not seen) (Fig. 1)

= *Peperomia herteri* Trelease (1941: 66). Type:—URUGUAY. Treinta y Tres: In Montevideo culta, e Treinta y Tres, *Herter 15* (holotype

ILL, missing). Neotype (designated here):—URUGUAY. Cerro Largo: Sierra de Ríos, crypt. mont., saxicola loc. umbr., 100–150 m, February 1937, *Herter s.n.* in *Herb. Herter 98388* (ILL-00009103 on-line image!, isoneotype G-00406436 on-line image!).

= *Peperomia uruguayana* Trelease (1941: 66). Type:—URUGUAY. Treinta y Tres: hab. Cebollati. Epiphyte, 18 March 1902, *Berro 2883* (holotype [G-DC] G-00327181 image!, isotype MVFA-0000051!).

Herbs, epiphytic and sometimes epipetric. Stems erect, occasionally decumbent, branching dichotomously, cylindrical (live), puberulous, adventitious roots only present in the base. Leaves 3(4) verticillate or occasionally opposite basally; petiole 0.8–2 mm long, puberulous; leaf blade 0.7–1 × 0.5–0.7 cm, succulent, obovate to orbicular, sometimes elliptic-obovate, 3–veined, veins obscure or main vein notorious (live) but not prominent, abaxial and adaxial surface glabrous or with scarce trichomes, margin with trichomes, base cuneate to rounded, apex rounded. Spikes 1.6–4 cm long, solitary, terminal, straight; peduncle 1.1–2.5 cm long, pubescent; rachis 0.5–1.8 cm long, glabrous, verruculose, densely flowered; bracts ca. 0.5 mm diam., circular, margin irregular. Fruits ca. 0.75 mm long, ovoid, sessile, located in pits of the rachis, verruculose, glabrous, pseudocupule viscose on the basal third.

Subgenus:—This species belongs to the subgenus *Pseudocupula* (Frenzke *et al.* 2015).

Distribution and habitat:—Argentina, Brazil and Uruguay. In the Southern Cone occurs from northeastern to central-eastern Argentina (Buenos Aires, Entre Ríos, Misiones, Santa Fe), southern Brazil (Paraná, Rio Grande Do Sul, Santa Catarina) and eastern and southeastern Uruguay (Cerro Largo, Lavalleja, Maldonado, Rivera, Rocha, Treinta y Tres). Maldonado and Rocha departments represent the southern limit of distribution for this species; Cerro Pan de Azúcar (Maldonado) is the southernmost locality where it was registered (Fig. 2A). In Argentina *Peperomia catharinae* reaches the Paraná River Delta, along with *P. comarapana*, establishing the southern limit of *Peperomia* in this country (Burkart 1945, 1951). In Uruguay *P. catharinae* is the most widely distributed species of the genus, along with *P. tetraphylla*. It occurs in xeric hillside, moist hillside, hydrophilous, and riverside forests. The species grows on rocks but mainly on trunks and branches of various tree species.

Phenology:—Developing spikes were observed from February, flower anthesis from April to November and mature fruits from September. The species shows a wide flowering period and the spikes with mature fruits or without fruits (from the former period) remain on the plant for a long time, and thus co-occur with new spikes in different flowering stages.

Conservation assessment:—This species was categorized in the AOO analysis as Least Concern (LC) for Uruguay. It is a common species with high frequency throughout its distribution range in the country. It occurs in two protected areas ‘Paisaje Protegido Quebrada de los Cuervos’ and ‘Parque Nacional San Miguel’.

Distinctive and field characters:—In Uruguay *Peperomia catharinae* is characterized by its epiphytic or epipetric habit, small size, and obovate to orbicular leaf blade. Moreover it is the only species of *Peperomia* in Uruguay with both verticillate leaves and a rachis less than 1.8 cm long. In shade and wet places the leaves are green to dark-green and thin, while in sunny places the leaves are light green-yellow or sometimes reddish, and are more thickened. Mature fruits are brown and sticky.

Background in Uruguay:—Trelease (1941) and Trelease & Herter (1952) mentioned *Peperomia herteri* and *P. uruguayana* for Uruguay, and later Marchesi (1968) and Yuncker (1974) cited the presence of *P. catharinae*.

Taxonomic observation:—The holotype of *Peperomia herteri* was not found in ILL (David Seigler *com. pers.*), where the Herb. Trel. is located, besides the protologue did not include an illustration. In the species protologue, under a note of the editor the additional herbarium specimen *Herb. Hert. 94032* is indicated, but was also not found. Nevertheless after a thorough review of the diagnosis of *P. herteri* we include this name as a synonym of *P. catharinae* because the diagnosis fits the type of the latter. Additionally, we analyzed some specimens that have typical characteristics of *P. catharinae* (*Herb. Hert. 90961* (ILL, LAU, Z[3]) and *98388* (G, ILL)), specimens deposited at ILL were both identified as *P. herteri* by Trelease. Surprisingly, they were included by Trelease (1941) as paratypes of *P. tacuariana* Trel., and in the present work are discarded as type material of that taxon. Based on these circumstances we decided to designate as neotype of *P. herteri* the specimen *Herb. Hert. 98388* (ILL), as it fits very well the diagnosis and has the seal and handwriting of Trelease identifying the specimen as belonging to *P. herteri*.

Specimens examined:—URUGUAY. Cerro Largo: Aº de la Mina, 31º55’9.3’’S, 54º6’27.7’’W, 24 February 2013, *Mai & Rossado 241* (MVJB); Aº Las Cañas camino a Sierra de Ríos, 32º18’6’’S, 53º52’58’’W, 17 April 1999, *Brussa & Grela s.n.* (MVFA 29106); Sierra de Ríos, 32º14’47.4’’S, 53º46’59.6’’W, 21 September 2013, *Mai et al. 337* (MVJB). Lavalleja: Aº Gutiérrez y Ruta 8, 33º31’30.1’’S, 54º34’6.5’’W, 20 February 2013, *Mai et al. 176* (MVJB);

3 Specimens hosted at LAU and Z are identified as *Peperomia exauctorata*, this name is an unpublished designation, as it was mentioned by Tralease (1941).

Río Cebollatí, cerca Ruta 8, 33º49’47.57’’S, 54º47’24.46’’W, 24 November 2012, *Mai et al. 112* (MVJB). Maldonado: Cerro Pan de Azúcar, [34º48’35’’S, 55º15’26’’W], 27 June 1965, *Marchesi 1380* (MVFA); Gruta de Salamanca, 34º4’45.35’’S, 54º36’30.86’’W, 26 November 2012, *Mai & Rossado 125* (MVJB). Rivera: Cuchilla del Yaguarí, 31º43’33’’S, 55º15’59’’W, en el camino 9 km al N de Ruta 44, 17 May 2014, *Toranza & Haretche s.n.* (MVJB 29167). Rocha: Aº Chafalote, 34º16’49’’S, 54º7’25’’W, 24 September 2012, *Mai et al. 51* (MVJB); Cº del Águila, 34º17’21’’S, 54º7’52’’W, 24 September 2012, *Mai et al. 58* (MVJB); Cº de la Lechiguana, 34º6’43’’S, 53º51’20’’W, 23 September 2012, *Mai et al. 33* (MVJB); Laguna de Castillos, 34º16’19’’S, 53º59’23’’W, 23 September 2012, *Mai et al. 41* (MVJB); Parque Nacional San Miguel, 33º42’48’’S, 53º34’40’’W, 13 October 2012, *Rossado 5* (MVJB); Sarandí del Consejo, Laguna Negra, [34°16’0.01’’S, 53°59’39’’W], 9 June 1995, *Bayce et al. s.n.* (MVFA 26428). Treinta y Tres: Quebrada de los Cuervos, [32º55’30’’S, 54º27’42’’W], 09 April 1936, *Legrand 703* (MVM).

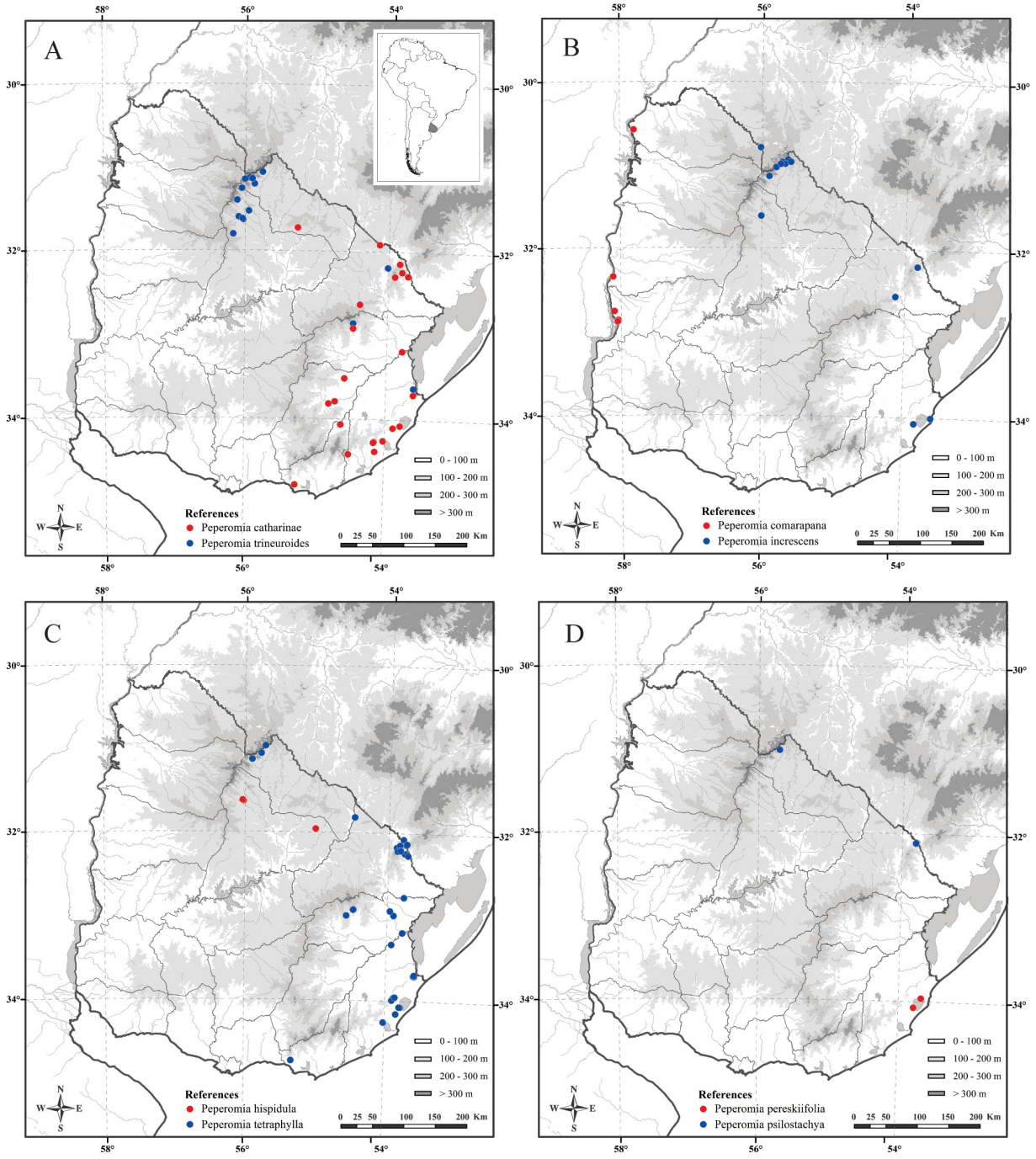


FIGURE 2. Geographic distribution of *Peperomia* species in Uruguay. **A.** *Peperomia catharinae* and *P. trineuroides*; location of Uruguay in South America **B.** *P. comarapana* and *P. increscens*. **C.** *P. hispidula* var. *sellowiana* and *P. tetraphylla*. **D.** *P. pereskiifolia* and *P. psilostachya*.

Additional specimens examined:—ARGENTINA. Misiones: General Belgrano, Bdo. De Irigoyen, 26º16'4.1''S, 53º39'24.5''W, 820 m, 14 January 2011, *Keller & Franco 9449* (CTES); Igauazú, Paraje Aguaray, 7 September 2001, *Keller et al. 1232* (CTES); Predio Guaraní, límite del predio con IPS, 26º54'59''S, 54º12'18''W, 24 August 1996, *Tressens et al. 5656* (CTES); Predio Guaraní, Aº Paraíso, 26º54'59''S, 54º12'18''W, 16 September 1998, *Tressens et al. 6052* (CTES); San Pedro, Aldea aborigen Teko´a Yma, 25 March 2004, *Keller & Benitez 2734* (CTES). BRAZIL. Rio Grande do Sul: Torres, [29º21'4''S, 49º44'55''W], 17 January 1984, *Krapovickas & Cristóbal 39357* (CTES). Santa Catarina: Araranguá, Morro dos Conventos, [28º56'41''S, 49º22'25''W], 26 November 1980, *Krapovickas & Vanni 36942* (CTES).

2. *Peperomia comarapana* A. C. P. de Candolle (1915: 8). Type:—BOLIVIA. Santa Cruz: Comarapa, An Erdabbrüchen in der Felssteppe bei Comarapa, 1900 m, April 1911, *Herzog 1903* (holotype [G-DC] G-00319224 on-line image!, isotypes L-1542134 image!, [S] S-R-4157on-line image!, Z-000019273 on-line image!) (Fig. 3)

Herbs, terrestrial or accidentally epiphytic. Stems erect and stoloniferous, cylindrical (live), densely pubescent, adventitious roots only present in the base. Leaves 3–5(6) verticillate, occasionally opposite basally; petiole 1–8 mm long, pubescent; leaf blade (1) 2–4 × 0.6–1.2 cm, succulent or slightly succulent, elliptic to obovate, 3–veined, veins visible and not or slightly prominent abaxially, branched apically, abaxial and adaxial surface pubescent, sometimes puberulent to glabrescent in apical leaves of flowering stems, margin with trichomes, base cuneate to obtuse, apex acute or sometimes obtuse. Spikes 5–18.5 cm long, 2 to 5 grouped, terminal and axillar in apical and sub-apical leaves, straight or incurved; peduncle 1–2.7 cm long, pubescent; rachis 3.5–16 cm long, glabrous, smooth, loosely flowered; bracts 0.5–0.75 mm diam., circular, margin entire. Fruits ca. 0.75 mm long, globose–ovoid, on a pseudopedicel, not in pits, papillate, glabrous, pseudocupule absent.

Subgenus:—This species belongs to the subgenus *Micropiper* (Frenzke *et al.* 2015).

Distribution and habitat:—Argentina, Bolivia, Paraguay and Uruguay. In the Southern Cone occurs from northern to central Argentina (Buenos Aires, Chaco, Corrientes, Entre Ríos, Formosa, Jujuy, Santa Fe), northern Paraguay (Alto Paraguay) and western Uruguay (Artigas, Paysandú, Río Negro). In Uruguay the distributional range is probably underestimated because the species is poorly sampled (Fig. 2B). It occurs in open thorn forest associated to halomorphic soils, where it grows as a terrestrial plant under trees. Less commonly it has been recorded as an epiphyte on *Prosopis sp*.

Phenology:—Developing spikes were observed from late December, flower anthesis from January to March and mature fruits from March.

Conservation assessment:—This species was categorized in the AOO analysis as Vulnerable (VU) for Uruguay. It shows a restricted distribution in the western of the country, occurring only in open thorn forest associated to halomorphic soils, which is a threatened environment especially for agricultural activities and logging (Marchesi *et al.* 2013). Thus, this species was previously considered a priority for conservation in the country (Marchesi *et al.* 2013). The examined material was from the buffer area of 'Parque Nacional Esteros de Farrapos e Islas del Río Uruguay', thus, in this site the species apparently could have some means of protection.

Distinctive and field characters:—*Peperomia comarapana* is characterized by verticillate and pubescent leaves together with the presence of two or more spikes grouped apically. Moreover, *P. comarapana* is the only *Peperomia* species that develops in the halomorphic soils of western Uruguay. Living plants show reddish stems, petioles and abaxial surface of basal leaves. The basal leaves have longer petioles and smaller and thicker leaf blades than the apical leaves. The central spike is longer and develops earlier than lateral spikes.

Related taxa:—This species is close to *Peperomia santaelisae* C. DC., which inhabits a similar habitat near Uruguay, in Buenos Aires and Entre Ríos provinces (Argentina). According to Burkart (1951), Yuncker (1953) and Zanotti (2012), *P. santaelisae* is mainly separated from *P. comarapana* by shorter petioles and wider leaves.

Background in Uruguay:—It was mentioned for the first time for Uruguay by Alonso Paz (1989).

Specimens examined:—URUGUAY. Artigas: Estancia Silva y Rosas, litoral W del Río Uruguay, [30º34'48"S, 57º47'60"W], 22 January 2013, *Berazategui et al. s.n.* (MVM 23008). Paysandú: San Félix, [32º21'S, 58º6'W], 27 March 1983, *Alonso Paz 750* (MVFA). Río Negro: Estancia Mafalda, [32º52'S, 58º2'W], 20 March 1993, *Marchesi s.n.* (MVFA 21886); Estancia Mafalda, [32º52'S, 58º2'W], 26 March 1993, *Marchesi s.n.* (MVFA 21860); Cultivated plant collected in Estancia Mafalda, [32º52'S, 58º2'W], 19 February 2014, *Fagúndez s.n.* (MVJB 29283); Cultivated plant collected in Zona adyacente al Área Protegida Esteros de Farrapos, 32º45'37''S, 58º5'9''W, 26 February 2014, *Rossado & Mai 350* (MVJB).

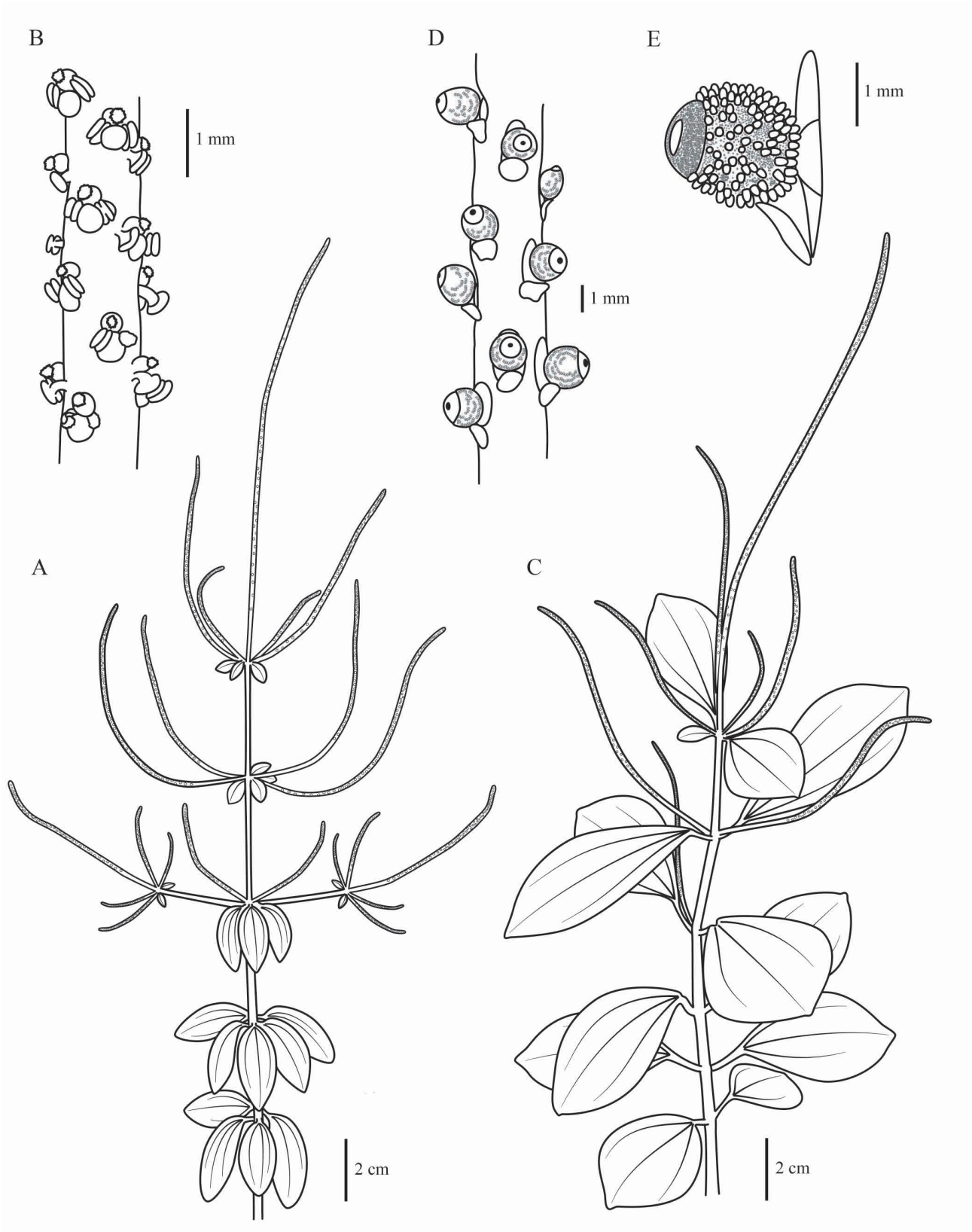


FIGURE 3. *Peperomia comarapana* (A–B) and *P. increscens* (C–E). **A.** Habit. **B.** Detail of the spike with flowers. **C.** Habit. **D.** Detail of the spike with mature fruit. **E.** Detail of a mature fruit. (A, B *Rossado & Mai 350* (MVJB); C *Mai & Delfino 369* (MVJB); D, E *Mai & Gutiérrez 367* (MVJB)). A, C–E drawn by Patricia Mai, B drawn by Andrés Rossado.

Additional specimens examined:—ARGENTINA. Chaco: Colonia Benitez, [27º20’7’’S, 58º57’4’’W], 11 March 1970, *Schulz 17351* (CTES); La Clotilde, [27º10’18’’S, 60º37’53’’W], 17 March 1952, *Schulz 8210* (CTES).

Corrientes: Paso de los Libres, 2 Km NE del Río Miriñay por Ruta 127, [29º57’18’’S, 57º39’29’’W], 16 February 1979, *Schinini et al. 17286* (CTES). Formosa: Bartolomé de las Casas, [25º24’38’’S, 59º34’00’’W], March 1971, *Insfrán 740* (CTES).

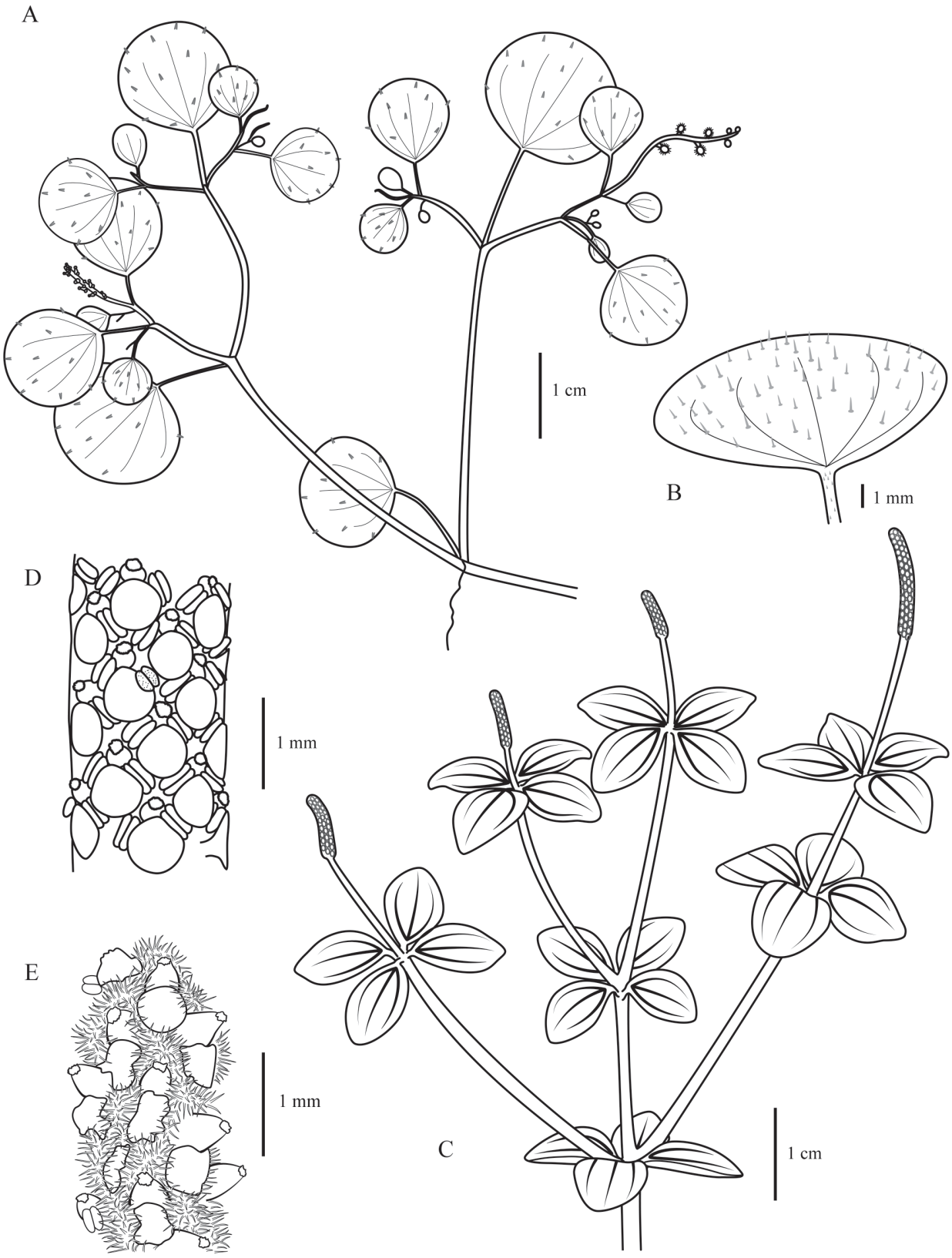


FIGURE 4. *Peperomia hispidula* var. *sellowiana* (A–B) and *P. tetraphylla* (C–E). **A.** Habit. **B.** Detail of the leaf. **C.** Flowering branch. **D.** Detail of the spike with flowers. **E.** Detail of the spike with developing fruits. (A drawing adapted from Marchesi (1968) and *Brussa et al. s.n.* (MVJB 27795); B *Brussa et al. s.n.* (MVJB 27795); D *Haretche 738* (MVJB); E *Mai et al.1* (MVJB)). A–C drawn by Patricia Mai, D–E drawn by Andrés Rossado.

3. *Peperomia hispidula var. sellowiana* (Miq.) Dahlstedt (1900: 14) ≡ *Peperomia tenera* Miquel in Martius (1852: 19) ≡ *Acrocarpidium sellowianum* Miquel (1843: 55). Type:—(holotype B, destroyed). Lectotype (designated by Zanotti *et al.* 2012):—BRAZIL. Brasilia: Sellow s.n (U-0112686 on-line image!, isolectotypes G not seen, K-000324725 on-line image!, W-0059180 on-line image!) (Fig. 4)

Herbs, terrestrial. Stems erect, decumbent or spreading, cylindrical (live), glabrous, nodes pubescent, adventitious roots only present in the base. Leaves alternate; petiole 0.4–1 cm long, with trichomes grouped near the leaf blade; leaf blade 0.6–1.5 × 0.8–1.5 (–2) cm, membranous, thin when dry, orbicular to obovate–orbicular, 5–veined, veins forked towards the apex, prominent abaxially, abaxial and adaxial surface with scattered hispid trichomes, margin glabrous, base rounded, apex rounded to obtuse. Spikes 1–2 cm long, solitary, leaf–opposed or terminal, slender, straight when flowers, curved when fructifies; peduncle 0.7–1 cm long, pubescent; rachis 0.7–0.8 cm long, glabrous, smooth, loosely flowered; bracts 0.2–0.3 mm diam., circular. Fruits ca. 1 mm long, globose, on a stipe when mature, not in pits, smooth with white hispid trichomes, pseudocupule absent.

Subgenus:—This species belongs to the subgenus *Hispidulae* (Frenzke *et al.* 2015).

Distribution and habitat:—Argentina, Brazil and Uruguay. In the Southern Cone occurs in northeastern Argentina (Misiones), southern Brazil (Paraná, Rio Grande do Sul, Santa Catarina) and northeastern Uruguay (Tacuarembó). In Uruguay it is found in moist hillside forests, growing among mud and humus in wet and shady places. Its distribution range in Uruguay is locally restricted, as it was solely recorded within certain ravines of Tacuarembó (Fig. 2C).

Phenology:—Herbarium specimens were observed with flowers in May, October, November and December, and with mature fruits in August, November, December and January.

Conservation assessment:—This species was categorized in the AOO analysis as Endangered (EN) for Uruguay. It shows a restricted distribution in the country, occurring only in some ravines close together. Thus, this species was previously considered a priority for conservation in the country (Marchesi *et al.* 2013). It is not present in any of the protected areas of the S.N.A.P., however one of the ravines in which it develops is appreciated and preserved by the current owner.

Distinctive and field characters:—In Uruguay *Peperomia hispidula* var. *sellowiana* can be easily distinguished from other species of the genus by its alternate leaves. Furthermore, this species is the only taxon in the country with pilose fruits. It presents notorious and characteristic scattered trichomes on the leaf, which stand out on the laminar tissue for their expanded base and whitish color.

Background in Uruguay:—Trelease (1941) and Trelease & Herter (1952) mentioned *Peperomia tenera* for Uruguay, and later Marchesi (1968) cited *P. hispidula* (Sw.) A. Dietr.

Specimens examined:—URUGUAY. Tacuarembó: Gruta de los Cuervos, [31º37’12”S, 56º2’24”W], 3 January 1960, *Rosengurtt B–7947* (MVFA); Gruta de los Cuervos, [31º37’12”S, 56º2’24”W], 9 March 1966, *Rosengurtt et al. 9979* (MVFA); Gruta de los Helechos, [31º37’S, 56º1’W], 24 December 1901, *Berro 1916* (MVFA); Gruta de los Helechos, [31º37’S, 56º1’W], 16 May 1984, *Brussa et al. s.n.* (MVJB *20536*); Gruta de los Helechos, [31º37’S, 56º1’W], 15 October 1986, *Brussa et al. s.n.* (MVJB *20542*); Puntas de Cinco Sauces, 31º57’38.17’’S, 55º00’42.44’’W, 26 August 2010, *Brussa et al. s.n*. (MVJB *27795*); Puntas de Cinco Sauces, 31º58’2.5’’S, 55º1’18.1’’W, 7 November 2013, *Brussa & Álvarez s.n.* (MVJB *28710*).

Additional specimens examined:—BRAZIL. Rio Grande do Sul: Encruzilhada do Sul, [30º33’S, 52º30’W], 16 December 2007, *Grings 442* (ICN); Pessegueiro, Camaquã, [30º36’33”S, 51º50’36”W], October 1983, *Sobral 2413* (ICN); São Francisco de Paula, Floresta Nacional FLONA-SFP, 923 m, [29º25’22’’S, 50º23’11’’W], 19 August 2006, *Seger 245* (ICN).

4. *Peperomia increscens* Miquel (1847: 124). Type:—BRAZIL. Goiás: Ad Eugenio da Verge, Pohl 5040 (holotype W-0024290 on-line image!) (Fig. 3)

= *Peperomia blanda* var. *pseudodindygulensis* (C. DC.) Yuncker (1953: 218) ≡ *Peperomia pseudodindygulensis* A. C. P. de Candolle (1882: 307). Type:—PARAGUAY. Santa-Bárbara, dans les forêts humides, 26 February 1876, *Balansa 2626* (holotype G-00324796 on-line image!).

Herbs, terrestrial, epipetric and sometimes epiphytic. Stems erect and stoloniferous, cylindrical (live), pubescent, adventitious roots only present in the base. Leaves mostly opposite, sometimes 3(4) verticillate towards the apex of flowering stems; petiole 6–12 mm long, tomentose; leaf blade (0.9–) 2–5.7 × 0.9–3.8 cm, slightly succulent, elliptic, rhombic–elliptic, rhombic-obovate or obovate, 3 to 5–veined, veins visible, sometimes prominent abaxially, abaxial

and adaxial surface pubescent, margin with trichomes, base cuneate to rounded, occasionally asymmetric, apex obtuse to rounded. Spikes 7–16 cm long, (1) 2 to 6 (7) grouped, terminal and axillary in apical and subapical leaves, straight when flowers, curved when fructifies; peduncle 0.8–1.7 cm long, with scattered trichomes; rachis (4.7–) 5.7–14.5 cm long, glabrous, smooth, loosely flowered; bracts 0.5–1 mm diam., circular to ovoid, margin slightly irregular. Fruits 0.75–1 mm long., globose, on a pseudopedicel, not in pits, papillate, glabrous, pseudocupule absent.

Subgenus:—This species belongs to the subgenus *Micropiper* (Frenzke *et al.* 2015).

Distribution and habitat:—Argentina, Brazil, Bolivia, Paraguay and Uruguay. In the Southern Cone occurs in northern and central Argentina (Catamarca, Chaco, Córdoba, Corrientes, Entre Ríos, Formosa, Jujuy, Misiones, Salta, Santa Fe, Tucumán), southern Brazil (Paraná, Rio Grande do Sul, Santa Catarina), Paraguay (Alto Paraguay, Cordillera, Guairá, Ñeembucú, Presidente Hayes) and northeastern, eastern and southeastern Uruguay (Artigas, Cerro Largo, Rivera, Rocha, Tacuarembó) (Fig. 2B). In Uruguay it grows in xeric hillside and moist hillside forests, in humid, shady or semi-shaded places. It usually grows on the ground or on rocks and less commonly on tree trunks.

Phenology:—Developing spikes were observed from December, flower anthesis from January to April and mature fruits from February. Fruits remain on the rachis for a long time, as were observed specimens with mature fruits in February, March, April, June and November.

Conservation assessment:—This species was categorized in the AOO analysis as Near Threatened (NT) for Uruguay. In the country, it is present in three disjunct areas with relative low number of records in each one. Although it could be subsampled, the category of NT is reasonable considering the current knowledge of the species for the country. *Peperomia increscens* occurs in the protected area 'Paisaje protegido Valle del Lunarejo'.

Distinctive and field characters:—In Uruguay *Peperomia increscens* differs from other species of the genus by its mostly opposite leaves (the apex of fertile stems sometimes has up to 4 verticillate leaves). Living plants show reddish stems and a velvety leaf surface. The central spike is longer and develops earlier than lateral spikes. Mature fruits are sticky.

Background in Uruguay:—The presence of this species was mentioned for the first time in Uruguay by Marchesi (1968) under the name *Peperomia blanda* var. *pseudodindygulensis*.

Specimens examined:—URUGUAY. Artigas: Cultivated plant collected in Aº Invernada, 30°47'47.9"S, 56°1'38.24"W, 19 February 2015, *Brussa et al. s.n.* (MVJB 29437). Cerro Largo: Camino Sierra de Ríos entre Ruta 7 y cerco de piedra, [32°12'24.3"S, 53°48'12.0"W], 13 June 1999, *Brussa & Grela s.n.* (MVFA 29243). Rivera: Cañada de la Aurora, 30º58'16.75''S, 55º43'33.18''W, 11 April 2013, *Mai & Rossado 297* (MVJB); 12 Km SE de Masoller, [31°08'43"S, 55°56'57"W], 17 February 2010, *Meza Torres et al. 1278* (CTES); Río Tacuarembó (nacientes), 30º56'33.27''S, 55º38'43.92''W, 11 April 2013, *Mai et al. 289* (MVJB); Subida de Pena, Ruta 30 km 109, [31º08'27''S, 55º54'24''W], 11 November 1984, *Bayce et al. s.n.* (MVFA 17275); Valle del Aº Platón, próximo a Escuela Nº 56, [30º59'33''S, 55º41'15''W], 21 February 1966, *Marchesi 1486* (MVFA). Rocha: Santa Teresa, mirador del Mangrullo, 34º0'55.01''S, 53º33'25.43''W, 7 March 2014, *Mai & Gutiérrez 367* (MVJB); Sierra de los Difuntos, 34º05'13''S, 53º47'20.5''W, 22 April 2015, *Rossado et al. 416* (MVJB). Tacuarembó: Cultivated plant collected in Gruta de los Helechos, [31º37'S, 56º1'W], 11 February 2015, *Mai & Delfino 369* (MVJB).

Additional specimens examined:—ARGENTINA. Corrientes: Capital, Aº Riachuelo y Ruta 12, [27º33'13''S, 58º45'03''W], 15 October 1974, *Cristóbal et al. 1162* (CTES); Empedrado, Estancia "La Yeta", 20 May 1965, *Pedersen 3918* (CTES); Saladas, San Lorenzo, [28º07'S, 58º46'W], 20 April 1973, *Schinini 6310* (CTES); San Cosme, Ingenio Primer Correntino, 29 April 1974, *Benitez et al. 147* (CTES); Santo Tomé, Garruchos, costa del Río Uruguay, [28º10'38''S, 55º38'48''W], 12 April 1974, *Krapovickas et al. 22869* (CTES). Formosa: Pilcomayo, Ruta 11 al N del km 103, [25º40'S, 57º57'W], 23 July 1947, *Morel 3590* (CTES). Jujuy: Capital, Tunal, 9 March 1983, *Rotman et al. 644* (CTES). Misiones: Candelaria, El Edén, Bonpland, [27º28'S, 55º28'W], 10 February 1969, *Krapovickas et al. 14829* (CTES). Salta: Orán, Pasando Yaculika a más o menos 5 km Arroyo El Arasayal, 22 February 1977, *Legname et al. 5282* (CTES). Tucumán: Tafí, Camino a Tafí del Valle, [26º51'S, 65º42'W], 21 April 1970, *Meyer & Vaca 23226* (CTES). BRAZIL. Rio Grande do Sul: Pelotas, [31º45'S, 52º17'W], 22 January 1973, *Krapovickas et al. 22869* (CTES).

5. *Peperomia pereskiifolia* (Jacq.) Kunth ([1815] 1816: 68) ("*pereskiaefolia*") ≡ *Piper pereskiifolium* Jacquin (1790: 126). Lectotype (designated by Mathieu & Callejas 2006):—"Hort. Schönbr" [material cultivated in Hortus Botanicus Schoenbrunnensis, Vienna, Austria], *Jacquin s.n.* (W-0024721 on-line image!) (Fig. 5)

Herbs, epiphytic and epipetric. Stems repent and pendant, sometimes decumbent, cylindrical or slightly angular (live), glabrous, adventitious roots present in base and nodes. Leaves (2) 3 to 6 (7) verticillate; petiole 3–12 mm long,

glabrous; leaf blade (2–) 2.6–5.3 × 1.2–2.7 cm, coriaceous and slightly succulent, elliptic, elliptic-rhombic or obovate, sometimes obtuse, 3–veined, veins visible, markedly prominent abaxially, abaxial and adaxial surface glabrous, margin glabrous, base narrowly cuneate to cuneate, apex acute or acuminate. Spikes 9–16 cm long, solitary or 2 to 4 grouped, terminal, curved; peduncle 2–6.2 cm long, glabrous; rachis 7–11 cm long, glabrous, smooth, loosely flowered; bracts 0.3–0.5 mm. diam., circular to elongate, margin entire or slightly irregular. Fruits 0.75–1 mm long, globose–ovoid, sessile but on a pseudopedicel when mature, emerging from pits of the rachis, smooth, glabrous, pseudocupule viscose on the basal half.

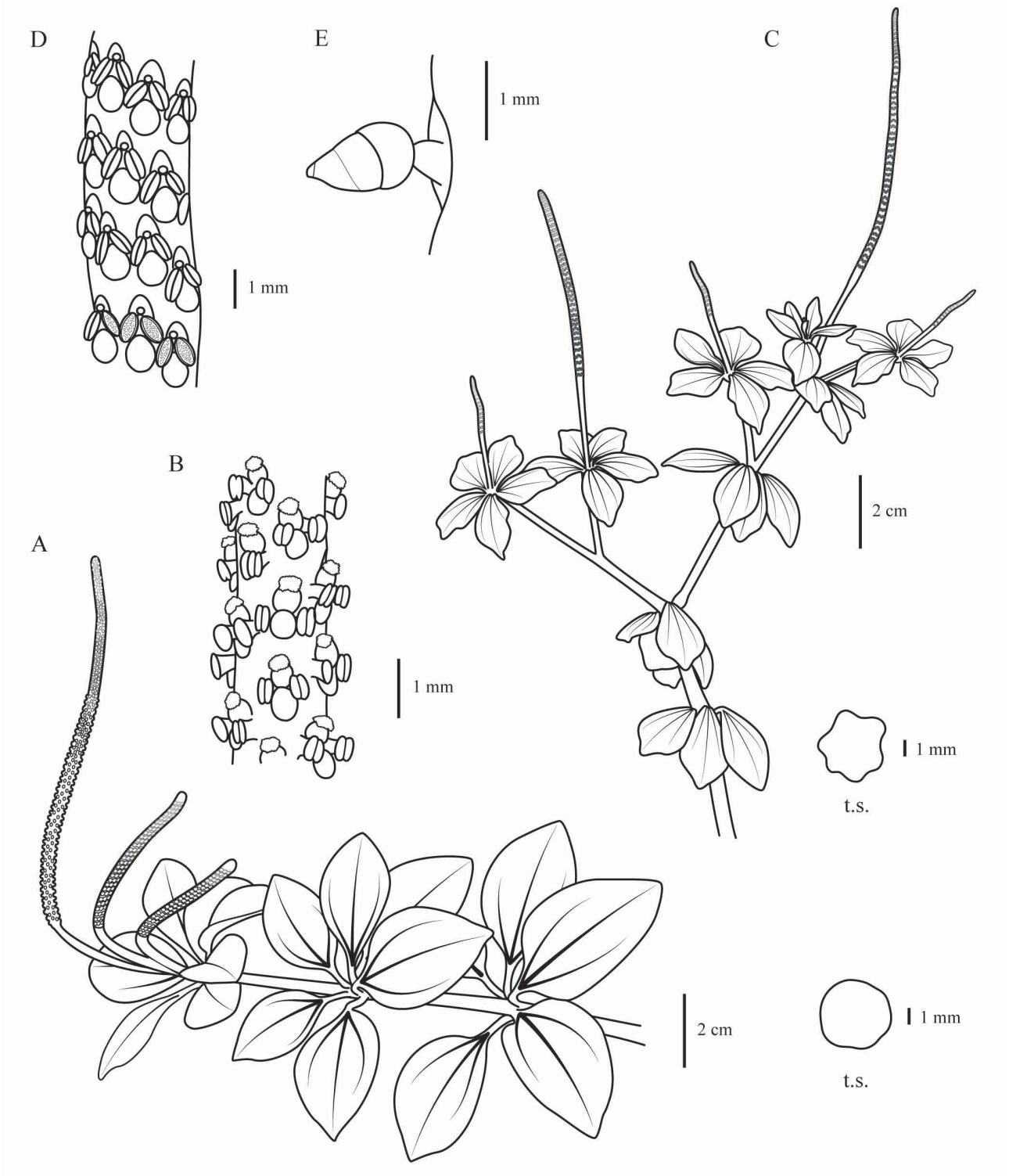


FIGURE 5. *Peperomia pereskiifolia* (A–B) and *P. trineuroides* (C–E). **A.** Flowering branch. **c.s.** Cross-section of the stem. **B.** Detail of the spike with flowers. **C.** Flowering branch. **c.s.** Cross-section of the stem. **D.** Detail of the spike with flowers. **E.** Detail of mature fruit with basal pseudocupule. (A, B *Rossado & Mai 354* (MVJB); C, D *Mai 368* (MVJB); E *Mai et al. 307* (MVJB)). A, C, D drawn by Patricia Mai, B, E drawn by Andrés Rossado.

Subgenus:—This species belongs to the subgenus *Pseudocupula* (Frenzke *et al.* 2015).

Distribution and habitat:—Belize, Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela. In the Southern Cone occurs in southern Brazil (Paraná, Rio Grande do Sul, Santa Catarina), northeastern Paraguay (Canindeyú) and southeastern Uruguay (Rocha). The distribution in Uruguay is currently restricted to forests near Laguna Negra (Rocha), which represents the southern limit of distribution for this species (Fig. 2D). It was found in psammophilous and moist hillside forest growing on rocks, trunks and large branches. The species may occur in other localities along the coastal plain of the country due to the presence of similar vegetation and environmental. Habitat and distribution knowledge of this species in Uruguay could be improved with additional sampling.

Phenology:—Developing spikes were observed from December and flower anthesis from January to April. Fruits were observed only from one herbarium specimen collected in July.

Conservation assessment:—This species was categorized in the AOO analysis as Endangered (EN) for Uruguay. It shows a restricted distribution, occurring only in the forest associated to Laguna Negra. Thus, this species was previously considered a priority for conservation in the country (Marchesi *et al.* 2013). It is not present in any of the protected areas of the S.N.A.P., however the localities where the species occurs in Laguna Negra, are inside the 'Reserva de Biosfera Bañados del Este'—Ramsar Site, and have protection measures.

Distinctive and field characters:—Within Uruguay, *Peperomia pereskiifolia* can be distinguished by its relatively large (longer than 2.6 cm) and completely glabrous leaves. Live plants usually have reddish stems, petioles and peduncles. The central spike is longer and develops earlier than lateral spikes.

Background in Uruguay: The first citation for this species in Uruguay appeared in Zuloaga *et al.* (2008), without mention of a supporting voucher or reference bibliography. The first herbarium sample of this species for Uruguay is from Santa Teresa (Rocha), probably collected from material in cultivation (*Lombardo 4630, MVJB)*. Currently, there are only five herbarium specimens from two localities with natural habitats that confirm the species in the country.

Specimens examined:—URUGUAY. Rocha: Potrerillo, [33º58'25''S, 53º38'52''W], 5 July 1994, *Alonso Paz 4680* (MVFQ); Potrerillo, 33º58'23''S, 53º38'57''W, 28 November 2013, *Fagúndez et al. s.n* (MVJB 29059); Potrerillo, 33º58'23''S, 53º38'53''W, 28 November 2013, *Fagúndez et al.* (MVJB 29060); Cultivated plant collected in Potrerillo, 33º58'23''S, 53º38'57''W, 8 April 2014, *Rossado & Mai 354* (MVJB); Sierra de los Difuntos, [34º05'08''S, 53º45'12''W], 11 February 2006, *Bonifacino & Puppo 2172* (MVFA).

Additional specimens examined:—BRAZIL. Paraná: Ibiporã, Fazenda Doralice, [23º15'S, 51º03'W], 14 November 1989, *Colii et al. s.n.* (ICN 172430); São Pedro do Ivaí, Fazenda Barbacena, [23º51'S, 51º50'W], 11 October 2003, *Ribas et al. 5577* (CTES). Rio Grande do Sul: Tramandaí, [29º57'S, 50º08'W], 19 March 1976, *Citadini et al. 69* (ICN). PARAGUAY. Canindeyú: Lagunita Sendero del Aº Moroti, [24º07'44''S, 55º25'37''W], 3 October 1997, *Marín & Jiménez 632* (CTES); Reserva Natural Mbaracayú, 24º08'34''S, 55º31'60''W, 5 December 2003, *Múlgura de Romero et al. 3531* (CTES).

6. *Peperomia psilostachya* A. C. P. de Candolle (1893: 9). Type:—PARAGUAY. Cerro d'Acahy, Croissant sur le tronc des arbres, 1 December 1883, *Balansa 4533* (holotype P-00468104 on-line image!) (Fig. 1)

= *Peperomia trapezoidalis* Yuncker (1953: 202), *syn. nov.* Type:—ARGENTINA. Misiones: Depto. San Javier, Acaragua (Alto Uruguay), Sobre corteza de arboles corp., 200 m, 30 January 1947, *Bertoni 2339* (holotype LIL-000272 on-line image!, isotype NY-00250678 on-line image!).

Herbs, epiphytic. Stems repent and pendant, cylindrical (live), puberulous, adventitious roots present in base and nodes. Leaves (2) 3 to 5 (6) verticillate; petiole 1–1,5 mm long, puberulous; leaf blade 0.6–0.8 × 0.4–0.6 cm, succulent, rhombic to rhombic–elliptic, 3–veined, midrib prominent on abaxial surface, abaxial surface puberulous, adaxial surface generally glabrous, margin with trichomes, base cuneate, apex obtuse or slightly cuspidate. Spikes 4–8 cm long, solitary, terminal, straight; peduncle 1.8–4 cm long, puberulous; rachis 2.2–4 cm long, glabrous, smooth, densely flowered; bracts ca. 0.5 mm diam., circular, margin slightly irregular. Fruits ca. 1 mm long., globose–conic, sessile but on a pseudopedicel when mature, emerging from pits of the rachis, smooth, glabrous, pseudocupule viscose on the basal half.

Subgenus:—This species belongs to the subgenus *Pseudocupula* (Frenzke *et al.* 2015).

Distribution and habitat:—Argentina, Bolivia, Brazil, Paraguay and Uruguay. In the Southern Cone occurs in northeastern Argentina (Corrientes, Misiones), southern Brazil (Paraná, Rio Grande do Sul), eastern Paraguay

(Canindeyú, Guairá, Paraguarí) and northeastern and eastern Uruguay (Cerro Largo, Rivera). Its distribution range in Uruguay is locally restricted thus far, as it was only recorded at two sites close to the border with Brazil. The record from Río Yaguarón represents the southernmost limit for this species (Fig. 2D). In Uruguay it grows in moist hillside and well-developed riverside forests. It was found in low abundance and growing in semi-shaded places on trunks and large branches of *Luehea divaricata* Martius (1824: 101).

Phenology:—Herbarium specimens were observed with fruits in February.

Conservation assessment:—This species was categorized in the AOO analysis as Endangered (EN) for Uruguay. It shows a restricted distribution in the east of the country, occurring in well-developed forests susceptible to human activities, and is not present in any of the protected areas of the country.

Distinctive and field characters:—This species is characterized by its repent and pendant stems and relatively small rhombic to rhombic–elliptic blades. We observed in the field extensive plants with pendant stems approximately 50 cm long. Occasionally the abaxial surface of some leaves show light green lines along the veins.

Taxonomic observation:—Yuncker (1953) published *Peperomia trapezoidalis* and stated as characteristic features for the species "the small, nearly square leaves, puberulent stems and leaves and slender petiole of varying length, and rather long peduncle". In our opinion all these features are shared with *P. psilostachya.* Additionally, Yuncker (1953) presents a key where he distinguishes both species by the leaf shape, *P. psilostachya* with ovate to rhombic-ovate leaves and obtuse to subcordulate base, while *P. trapezoidalis* with elliptic, rhombic or elliptic-ovate leaves and acute base. He also added herbarium specimen photographs of both species, where these vegetative differences can be observed. Nevertheless, both the selected specimen photograph and the features attributed to *P. psilostachya* (sensu Yuncker 1953) show marked differences from the type material and the original description of the species. Given these differences we conclude that Yuncker (1953) misinterpreted *P. psilostachya* and so described *P. trapezoidalis* as a new species. Interestingly, in Yuncker (1974), *P. psilostachya* is interpreted in accordance with the holotype. In our view, the type materials of *P. trapezoidalis* concur completely with the original description and with the type of *P. psilostachya*, and so we synonymize *P. trapezoidalis* to the earlier name *P. psilostachya*.

Background in Uruguay:—This work is the first citation of this species for Uruguay.

Specimens examined:—URUGUAY. Cerro Largo: Río Yaguarón, cerca Centurión, 32º4'41''S, 53º46'4.5''W, 22 February 2013, *Mai et al. 205* (MVJB); Río Yaguarón, cerca Centurión, 32º4'43''S, 53º46'1''W, 22 September 2013, *Mai et al. 347* (MVJB). Rivera: Cañada de la Aurora, 30º58'22.6''S, 55º43'26.6''W, 11 April 2013, *Mai & Rossado 298* (MVJB).

Additional specimens examined:—ARGENTINA. Corrientes: Estancia Garruchos, Aº Chimiray, [28º8'S, 55º38'W], 8 February 1972, *Krapovickas et al. 21351* (CTES); Río Aguapey y Ruta 38, [29º6'3''S, 56º36'25''W], 27 April 1985, *Schinini et al. 24338* (CTES). Misiones: Aº El Paraíso y Ruta 2, 27º8'S, 54º5'W, 23 September 1993, *Rodríguez et al. 711* (CTES); Camping Municipal de Alem, 22 November 1986, *Cabral & Zamudio 492* (CTES); Parque Nacional Iguazú, [25º41'S, 54º12'W], 22 April 1997, *Morrone et al. 2023* (CTES); Paso Carreta, [27º34'S, 55º19'W], 9 March 1969, *Krapovickas et al. 15001* (CTES); Predio Guaraní, [26º54'59''S, 54º12'18''W], 16 September 1998, *Keller 3069* (CTES). BRAZIL. Rio Grande do Sul: Eldorado do Sul, Estación Experimental Agronomica da UFRGS, [30º5'S, 51º40'W], 19 December 2001, *Waechter & Giongo 223* (ICN); Júlio de Castilhos, [29º13'S, 53º42'W], 2 April 2008, *Grings 488* (ICN); Mun. Dois Irmãos, Rio Feitoria, [29º35'3''S, 51º9'10''W], 27 January 1983, *Bueno & Krapovickas 3606* (CTES); Santa Cruz do Sul, Trombudo, [29º43'S, 52º24'W], 18 February 1980, *Waechter 1558* (ICN); Salto do Jacuí, [29º4'19''S, 53º13'5''W], 5 April 2008, *Grings 490* (ICN). PARAGUAY. Canindeyú: Reserva Natural Mbaracayú, Jejui-mí, [24º7'44''S, 55º25'37''W], 26 March 1996, *Marín & Jiménez 59* (CTES); Guazurí, camino a Puerto Adela, [24º28'S, 54º24'W], 17 March 1982, *Schinini 23154* (CTES).

7. *Peperomia tetraphylla* Hooker & Arnott (1832: 97). Lectotype (designated by Florence 1997):—SOCIETY ISLANDS. August 1885, *Forster s.n*. (K-000820323 on-line image!, isolectotypes C not seen, LE-00018148 image!) (Fig. 4)

= *Peperomia reflexa* (L. f.) A. Dietrich (1831: 180), *nom. illeg.* non Kunth (1815 [1816]: 70–71) ≡ *Piper reflexum* Linnaeus f. (1781: 91). Type:—SOUTH AFRICA. Western Cape: *Thunberg s.n.* (holotype UPS-752 image!).

= *Peperomia berroi* Trelease (1941: 67). Type:—URUGUAY. Cerro Largo: Sierra de Rios, Crescit in rupibus umbrosis, 28 November 1909, *Berro 5753* (holotype K-001089666 on-line image!, isotypes MVFA-0000009!, MVFA-0001047!, MVFA-0001048!).

= *Peperomia tacuariana* Trelease (1941: 66). Type:—*Herter 14* (holotype ILL, missing). Lectotype (designated here):—URUGUAY. Cerro Largo: Sierra de Ríos, February 1937, *Herter s.n.* in *Herb. Herter 98370* (ILL-00009104 on-line image!, isolectotypes MO-1153321 image!, G-00382714 image!, G-00382715 image!).

= *Peperomia americana* (Miq.) Herter (1952: 46) ≡ *Peperomia reflexa* (L. f.) A. Dietrich (1831: 180) fo. *americana* Miquel (1843: 173). Type:—VENEZUELA. Caracas: *Bredemeyer s.n.,* in *Herb. Willd. 753 fo. 3.* (holotype [B] B-W-00753-030 on-line image!).

= *Peperomia arechavaletae* var. *minor* Herter in Marchesi (1968: 10), *syn. nov.* Lectotype (designated here):—URUGUAY. Treinta y Tres: Tacuarí, at Luehean divaricatam ingentem. Magnit. 20 cm. Fl.—Fr. Albid-vir, November 1933, *Herter s.n.* in *Herb. Herter 94031* (LAU image!, duplicate MO, missing). *Peperomia arechavaletae* var. *minor* Herter (1952: 45), *nom. inval.*

Herbs, epiphytic and epipetric. Stems erect, decumbent and sometimes repent, cylindrical (live), puberulous, adventitious roots present in base and nodes. Leaves 3–4 verticillate; petiole 1–3 mm long, pubescent; leaf blade 0.8–1.7 (1.9) × 0.6–1.2 cm, slightly succulent to succulent, rhombic–elliptic, rhombic–obovate, rhombic–ovate or widely elliptic, 3–veined, veins notorious, not prominent, abaxial surface puberulous, adaxial surface glabrous or glabrescent and generally with light green or whitish lines along the veins, margin with trichomes, base cuneate or obtuse, apex rounded or obtuse. Spikes 2.0–6 cm long, solitary, terminal, straight or slightly curved; peduncle 0.8–1.8 cm long, puberulous; rachis (1.2–) 1.8–4.2 cm long, strongly hirsute, densely flowered; bracts ca. 0.5 mm diam., circular to widely rhombic, margin entire. Fruits ca. 1 mm long., globose–cylindrical, sessile, located in pits of the rachis, smooth, glabrous, pseudocupule viscose on the basal half.

Subgenus:—This species belongs to the subgenus *Pseudocupula* (Frenzke *et al.* 2015).

Distribution and habitat:—Pantropical distribution, occurs in tropical Africa, Asia and Oceania, and in America occurs from Mexico to Uruguay. In the Southern Cone occurs in northern Argentina (Catamarca, Jujuy, Misiones, Salta, Tucumán), southern Brazil (Paraná, Rio Grande do Sul, Santa Catarina), northern and eastern Paraguay (Alto Paraná, Caazapá) and northeastern, eastern and southeastern Uruguay (Cerro Largo, Maldonado, Rivera, Rocha, Treinta y Tres). *Peperomia tetraphylla* along with *P. catharinae* are the most widely distributed species of the genus in Uruguay. The southern limit of the distribution in America is in Maldonado and Rocha departments, with Cerro de las Ánimas (Maldonado) the southernmost locality where this species was registered (Fig. 2C). In Uruguay it is found in moist hillside, hydrophilous and riverside forests, where it has variable abundance from rare to very common. It grows on rocks, trunks, branches and bifurcations of branches of several tree species.

Phenology:—Developing spikes were observed from February, flower anthesis from late March to June and mature fruits as of September.

Conservation assessment:—This species was categorized in the AOO analysis as Least Concern (LC) for Uruguay. It is a common species with high frequency throughout its distribution range in the country. It occurs in two protected areas ‘Paisaje Protegido Quebrada de los Cuervos’ and ‘Parque Nacional San Miguel’.

Distinctive and field characters:—*Peperomia tetraphylla* is the only species in the country with trichomes on the spike rachis, especially notorious in the fruiting period. Additionally, the species is easy to recognize in the field by the light green lines along the veins on the adaxial surface of the leaves. In the flowering period, the erect and thick rachis with whitish bracts that contrast with the thin and green peduncle are very characteristic. We observed in some plants that the basal leaves are fleshier than the upper leaves and do not show the light green lines. Mature fruits are brown and sticky.

Background in Uruguay:—*Peperomia tetraphylla* was mentioned for Uruguay as *P. berroi* (Trelease 1941; Trelease & Herter 1952), *P. tacuariana* (Trelease 1941; Trelease & Herter 1952), *P. americana* (Trelease & Herter 1952) and *P. reflexa* (Yuncker 1958; Marchesi 1968).

Taxonomic observation I:—We did not include infraspecific categories since this species shows a wide variation in shape, size and pubescence of leaves and stems, which are the main features used to discriminate the varieties. Here we include *Peperomia americana* as a synonym of *P. tetraphylla* although it is in fact a synonym of *P. tetraphylla var. americana* (Dahlst.) Yunck. (Yuncker 1974).

Taxonomic observation II:—The protologue of *Peperomia arechavaletae* var. *minor* (Trelease & Herter 1952), includes a Latin diagnosis and reference specimens, but the name was not validly published since it was proposed in anticipation “*ad int.*” of the future acceptance of the taxon concerned (ICN Art. 36.1(b); McNeill *et al.* 2012). The designation was validated by Marchesi (1968), as he accepted the name *P. arechavaletae* var. *minor* in reference to Trelease & Herter (1952), excluding the term “*ad int.*”. In our view the type material chosen by Herter in 1952 for *P. arechavaletae* var. *minor* corresponds entirely to *P. tetraphylla.* Therefore we synonymize *P. arechavaletae* var. *minor* to *P. tetraphylla.*

Type observations I:—In the protologue of *Peperomia arechavaletae* var. *minor* the type material is mentioned as *Herb. Hert. 94031* in the herbaria LAU and MO, thus representing two syntypes. The LAU herbarium specimen is a complete sample and now the only available, since the MO syntype was not found (Jim Solomon *com. pers.*). In this context, we designated the LAU specimen as the lectotype for *P. arechavaletae* var. *minor.*

Type observations II:—The holotype of *Peperomia tacuariana* was not found in ILL (David Seigler *com. pers.*), where the Herb. Trel. is located. Nevertheless, after a detailed review of the diagnosis and taking into account the locality of the type material, we include this name as a synonym of *P. tetraphylla*, in agreement with Marchesi (1968). In *P. tacuariana* protologue, under the editor's note, four paratypes are included: *Herb. Hert. 90961* (ILL, LAU, Z); *Herb. Hert 94035a*; *Herb. Hert. 98388* (G, ILL) and *Herb. Hert. 98370* (G, ILL, MO). The herbarium specimen *Herb. Hert 94035a* was not found and *Herb. Hert. 90961* and *Herb. Hert. 98388* correspond to *P. catharinae,* so they are discarded as type material of *P. tacuariana.* Here we designate as a lectotype of *P. tacuariana* the specimen *Herb. Hert. 98370* (ILL), as the size and shape of the leaves clearly fit the diagnosis of the species, despite the absence of reproductive structures.

Specimens examined:—URUGUAY. Cerro Largo: Cuchilla del Yaguarón, 32º10'22.3''S, 53º51'40.6''W, 22 February 2013, *Mai et al. 217* (MVJB); Río Yaguarón, cerca de Centurión, 32º04'41.1''S, 53º46'4.5''W, 22 February 2013, *Mai et al. 204* (MVJB); Sierra de Ríos, [32°12'24"S, 53°48'11"W], 28 December 1909, *Berro 5753* (MVFA). Maldonado: Cerro de las Animas, [34°44'30"S, 55°19'7"W], 14 December 1899, *Berro 1213* (MVFA). Rivera: Aº Rubio Chico, 31º7'56''S, 55º54'47.8''W, 12 April 2013, *Mai et al. 306* (MVJB); Cañada de la Aurora, 30º58'14.5''S, 55º43'33.6''W, 11 April 2013, *Mai & Rossado 299* (MVJB); Río Negro (cerca límite con Brasil), 31º49'8.6''S, 54º27'40''W, 23 February 2013, *Mai et al. 235* (MVJB). Rocha: Estancia el Palmar cerca de Castillos, [34°10'57"S, 53°47'35"W], 20 March 1977, *Marchesi s.n.* (MVFA 14059); Parque San Miguel, [33°42'34"S, 53°34'36"W], 6 October 1965, *Del Puerto & Marchesi s.n.* (MVFA 5261); Parque Nacional San Miguel, 33º42'53''S, 53º33'48''W, 14 October 2012, *Rossado 15* (MVJB); Puerto de la Cristina, Cebollatí, [33°11'37"S, 53°45'4"W], 28 January 1989, *Marchesi et al. s.n.* (MVFA 19432); Sierra de la Blanqueada, 33º58'18''S, 53º51'15''W, 22 September 2012, *Mai et al. 1* (MVJB); Sierra de la Blanqueada, 34º00'8.3''S, 53º52'42.7''W, 3 April 2014, *Haretche 738* (MVJB). Treinta y Tres: costas del Río Cebollatí, frente a la bomba de Ferres, [33°20'11"S, 53°54'12"W], 29 January 1989, *Marchesi et al. s.n*. (MVFA 19435); Quebrada de los Cuervos, [32°55'10"S, 54°27'22.9" W], 1 November 1964, *Marchesi 1286* (MVFA).

Additional specimens examined:—ARGENTINA. Misiones: Cruce Caballero, 26º32'12.5''S, 53º57'38.7''W, 19 March 2011, *Keller & Paredes 10028* (CTES); Eldorado, Ruta provincial 17 Aldea Aborigen Pozo Azul, [26º20'S, 54º27'W], 28 May 2002, *Keller & Gatti 1843* (CTES); General San Martín, Ruta Prov. 220, 21 Km al N acceso a Aristóbulo del Valle, [26º57'S, 54º51'W], 1 Ago 1987, *Vanni et al. 958* (CTES); Iguazú, 25º45'S, 54º15'W, 16 May 1996, *Amarilla et al. 50* (CTES); Paraje Paraíso, Aldea Aborigen Guavira Poty, 5 June 2002, *Keller 1887* (CTES); Parque Provincial Cruce Caballero, Sendero Curi-y, 26º31'8.1''S, 53º59'20.2''W, 626 m, 5 March 2013, *Judkevich et al. 19* (CTES); Predio Guaraní, picada al Aº Soberbio, 26º54'59''S, 54º12'18''W, 23 August 1996, Tressens *et al. 5635* (CTES); Reserva de Biósfera Yabotí, Parque Provincial Esmeralda, [26º50'S, 54º02'W], 30 September 2003, *Keller 2441* (CTES); San Pedro, Parque Provincial Moconá, 26º38'31''S, 53º57'36''W, 16 December 1992, *Seijo et al. 188* (CTES). BRAZIL. Paraná: Alto Paraná, Reserva Biológica Itabo, 3 Km W río Paraná, 25º5'S, 54º5'W, 9 October 1990, *Schinini & Caballero Marmori 27010* (CTES); Marmeleiro, [26º8'S, 53º2'W], 31 March 1983, *Kummrow 2274* (CTES). Rio Grande do Sul: Parque Estadual Turvo, Ten. Portela, [27º11'45''S, 53º53'26''W], 10 July 1980, *Waechter 1640* (CTES).

8. *Peperomia trineuroides* Dahlstedt (1900: 198). Type:—BRAZIL. Rio Grande do Sul: Santo Angelo pr. Cachoeira, Supra terram muscosam, loco subhumido umbroso, 4 February 1893, *Malme 538* (holotype [S] S-R-4371 on-line image!, isotypes ILL-00009131 on-line image!, [S] S-07-12064 on-line image!) (Fig. 5)

= *Peperomia arechavaletae* A. C. P. de Candolle (1917: 466) var. *arechavaletae*, *syn. nov.* Type:—URUGUAY. Tacuarembó: Gruta de los Cuervos, Epiphyte, December 1902, *Berro 1915* (lectotype (designated here) [G-DC] G-00317288 (two sheets) on-line image!, isolectotypes MVFA-0001045!, MVFA-0001046!). Syntypes:—URUGUAY. Tacuarembó: ad truncos (Luehea divaricata Mart. et Zucc), October 1894, *Arechavaleta s.n.* ([G-DC] G-00317286 on-line image!); BRAZIL. Brasilia: *Glaziou 8943* ([G-DC] G00317287 on-line image!, isosyntypes B not seen, G00017074 on-line image!, [F] F0BN010830 on-line image!, P not seen).

– *Peperomia arechavaletae* var. *minor auct. non* Herter in Marchesi (1968: 10), *p.p.*

Herbs, epiphytic and epipetric, occasionally terrestrial. Stems erect or decumbent, angular, glabrous or with scarce minute trichomes, adventitious roots present in base and sometimes in basal nodes. Leaves 4–6 (7) verticillate; petiole 0.5–3 mm long, minutely hirtellous; leaf blade 1.1–2.6 × 0.6–1.4 cm, coriaceous, elliptic–rhombic to rhombic–obovate, 3–veined, veins markedly prominent abaxially, abaxial and adaxial surface glabrous, sometimes adaxial surface with

scarce trichomes toward the base, margin without trichomes, base cuneate, apex acute to obtuse. Spikes 8–16 (–18) cm long, solitary, terminal, straight or slightly curved; peduncle 1.5–3.5 cm long, glabrous or with scarce minute trichomes; rachis 6–13 cm long, glabrous, smooth, loosely flowered; bracts 0.5–0.75 mm diam., circular or sub–triangular, margin entire. Fruits 0.75–1 mm long., globose–conic, sessile but on a pseudopedicel when mature, located in pits of the rachis, smooth, glabrous, pseudocupule viscose on the basal half.

Subgenus:—This species belongs to the subgenus *Pseudocupula* (Frenzke *et al.* 2015).

Distribution and habitat:—Argentina, Brazil, Paraguay and Uruguay. In the Southern Cone occurs in northeastern Argentina (Misiones), southern Brazil (Paraná, Rio Grande do Sul, Santa Catarina), central Paraguay (Presidente Hayes) and northeastern and eastern Uruguay (Cerro Largo, Rivera, Rocha, Tacuarembó, Treinta y Tres). Probably, in Uruguay this species also occurs in the southeast of Artigas, since it is close to the known distribution and has similar vegetation. The eastern Rocha department represents the southern limit of distribution for this species, such that San Miguel National Park is the southernmost locality where this species was registered (Fig. 2A). The species is common in moist hillside forests, often developing large clumps, on rocks, trunks or large branches.

Phenology:—Developing spikes were observed from May, flower anthesis from June to early December and mature fruits from November.

Conservation assessment:—This species was categorized in the AOO analysis as Near Threatened (NT) for Uruguay. *Peperomia trineuroides* has few records in the east of the country, which explains the category suggested for this species. It occurs in three protected areas: 'Paisaje Protegido Quebrada de los Cuervos', 'Paisaje protegido Valle del Lunarejo' and 'Parque Nacional San Miguel'

Distinctive and field characters:—It is a sturdy herb with notoriously marked veins on both leaf surfaces. Within Uruguay *Peperomia trineuroides* differs from the other species of the genus by its verticillate leaves with glabrous margin and intermediate length leaf blades (less than 2.6 cm long). Alive this species is easily recognizable by its angular stems, which are commonly reddish. Mature fruits are brown and sticky.

Related taxa:—*Peperomia trineuroides* is closely related to *P. trineura* Miquel (1843: 175), a species with smaller leaves, shorter spikes and a less sturdy habit. Both species inhabit similar environments and show an overlapping distribution. None of the herbarium specimens from Uruguay show the characteristics described for *P. trineura*, and so the species is considered absent from the country. Nevertheless, morphological differences between both species are weak and some herbarium specimens show intermediate characters (Yuncker 1974). According to Monteiro & Guimarães (2008), accurate studies are necessary in order to elucidate their relationship.

Background in Uruguay:—The presence of this species in Uruguay was mentioned for the first time by Anne Casimir Pyramus de Candolle (1917) under *Peperomia arechavaletae*, in the original publication of the name. Later on, this name was cited by Trelease (1941), Trelease & Herter (1952) and Marchesi (1968).

Taxonomic observation:—The original description and the type materials of *Peperomia arechavaletae* agree with the characteristics given in the protologue and observed in the holotype of *P. trineuroides*, thus we include *P. arechavaletae* var. *arechavaletae* as a synonym of *P. trineuroides*.

Type observation I:—In the protologue of *Peperomia arechavaletae* three syntypes are mentioned: *Arechavaleta s.n.* (G-DC, on-line image!), *Berro 1915* (G-DC, on-line image!), *Glaziou 8943* (G-DC on-line image!). We designated *Berro 1915* as the lectotype for *P. arechavaletae*, because it fits the diagnosis and is a complete specimen herbarium with developed spikes. Additionally, two duplicates are deposited in MVFA. The syntype *Glaziou 8943* was deposited in Herb. Warm. according to the original publication of the species. Currently, this herbarium is included in C, where this sample was not found (Ib Friss *com. pers*.) but two presumed isosyntypes were found in F and G-DC, the latter with a Warming Herbarium label. In the absence of other evidence, we conclude that *Glaziou 8943* (G-DC) must be the syntype.

Type observation II:—The type of *Peperomia arechavaletae* var. *minor* corresponds to *P. tetraphylla.* However, Marchesi (1968) applied this name to samples corresponding to different species. In this sense, *Marchesi 1283* (MVFA) from Treinta y Tres (Uruguay) belongs to *P. trineuroides,* and *Rosengurtt & Del Puerto 8963* (MVFA) from Rio Grande do Sul (Brazil) belongs to *P. trineura*.

Specimens examined:—URUGUAY. Cerro Largo: Sierra de los Ríos, [32º8'35''S, 53º46'28''W], February 1877, *Arechavaleta 3000* (MVM). Rivera: Aº Rubio Chico, 31º7'56''S, 55º54'47.8''W, 12 April 2013, *Mai et al. 307* (MVJB); Cultivated plant collected in Aº Rubio Chico, 31º7'56''S, 55º54'47.8''W, 8 September 2014, *Mai 368* (MVJB); Cuchilla Negra, Bajada de Pena, 31º8'32''S, 55º54'36''W, 5 February 1989, *Alonso Paz 569* (MVFQ). Rocha: Parque Nacional San Miguel, 33º42'49''S, 53º34'41''W, 13 October 2012, *Rossado 6* (MVJB). Tacuarembó: Bañado de Rocha, Paso Lambaré, [31º31'44''S, 55º57'25''W], 28 March 1921, *Osten 16070* (MVM); Gruta de los Cuervos, [31º36'S, 56º6'W], January 1908, *Berro 4334* (MVFA); Gruta de los Cuervos, [31º36'S, 56º6'W], January 1940,

Legrand 1891 (MVM); Gruta de los Cuervos, [31º36'S, 56º6'W], 3 January 1960, *Rosengurtt B—7971* (MVFA); Gruta de los Cuervos, [31º36'S, 56º6'W], 7 December 1963, *Arrillaga 1876* (MVFA); Rincón de Vassoura, 31º15'26.8''S, 56º3'19''W, 10 April 2013, *Mai et al. 280* (MVJB); Sierra del Infiernillo, Estancia El Infiernillo, [31º23'56''S, 56º7'18''W], 4 November 1994, *Bayce s.n.* (MVFA 23924). Treinta y Tres: Quebrada de los Cuervos, [32º55'30''S, 54º27'42''W], 9 April 1936, *Legrand 693* (MVM); Quebrada de los Cuervos, [32º55'30''S, 54º27'42''W], 1 November 1964, *Marchesi 1283* (MVFA).

Additional specimens examined:—ARGENTINA. Misiones: Belgrano, Bdo. De Irigoyen, 26º16'4.1''S, 53º39'24.5''W, 820 m, 6 January 2011, *Keller & Franco 9392* (CTES); Guaraní, Ruta 21 sobre puente Aº Fortaleza, [26º45'57''S, 54º10'55''W], 6 February 2011, *Keller et al. 9604* (CTES). BRAZIL. Rio Grande do Sul: Caçapava do Sul, [30º29'S, 53º29'W], 12 November 1980, *Mattos 21883* (HAS); Caçapava do Sul, [30º29'S, 53º29'W], 12 November 1980, *Mattos 21905* (HAS); Canela, [29º20'S, 50º49'W], 23 September 1997, *Neves 2010* (HAS); Canela, [29º20'S, 50º49'W], 23 September 1997, *Neves 2002* (HAS); Gramado, Parque Knorr, [29º22'S, 50º52'W], 9 January 1982, *Krapovickas & Cristóbal 37601* (HAS); Pelotas na Estaçao experimental Florestal IBDF, 15 January 1981, *Mattos et al. 22220* (HAS); São Jerónimo, [29º57'S, 51º42'W], 11 August 1986, *Ramos 190* (HAS); São Francisco de Paula, [29º27'S, 50º34'W], 24 June 1998, *Neves 2046–B* (HAS); Santa Maria do Herval, [29º29'S, 50º59'W], 01 November 1989, *Silveira 9270* (HAS); Veranópolis no Balneario do Retiro, [28º54'S, 51º34'W], 16 March 1984, *Mattos & Mattos 25938* (HAS); Veranópolis no Balneario do Retiro, [28º54'S, 51º34'W], 28 July 1984, *Silveira 1379* (HAS); Veranópolis no Balneario do Retiro, [28º54'S, 51º34'W], 1 August 1986, *Silveira 3693* (HAS).

Names cited for Uruguay and currently excluded

Peperomia albolineata Trelease (1941: 67). Trelease (1941) in the species publication stated as type locality Treinta y Tres but added a footnote mentioning that the specimen was possibly brought from Paraguay and cultivated in Montevideo, and that the type number is not in his herbarium. Later, Trelease & Herter (1952) indicated that the type locality Treinta y Tres was a mistake and suggested to discard the species from the Uruguayan Flora.

Peperomia hirsuta Miquel (1843:143–144) was mentioned for Uruguay by Trelease & Herter (1952) but the reference specimen was lost by the time of publication. Therefore, it is not possible to know what this name refers to.

Acknowledgements

We are grateful to Guido Mathieu, who provided relevant information regarding type materials and synonyms which clarified the taxonomic situation of many taxa, and the *Taxonomic Repertory of the Genus Peperomia* (http//www.peperomia.net/), where valuable taxonomic data is available. Special thanks are due to Susana Martínez, Nicholas J. Turland and Jefferson Prado who kindly helped us to solve several nomenclatural problems. We also thank the curators of the herbaria contacted who answered queries and sent pictures, and to the willingness of the herbaria visited; especially to the MVJB staff, where the specimens of this research were deposited. To Victoria Valtierra, Verónica Piñeiro, María Zabaleta, César Fagúndez and Natalia Caballero for their participation in fieldwork; Carlos Brussa, César Fagúndez, Eduardo Marchesi and María Puppo for comments and information about certain *Peperomia* species; Christine Lucas for language revision; and Eduardo Marchesi for comments on the final version of the manuscript. Field surveys and herbarium visits in Porto Alegre were funded by the Comisión Sectorial de Investigación Científica (CSIC, UdelaR).

References

Alonso Paz, E. (1989) Notas sobre plantas nuevas o interesantes para la flora Uruguaya. I. *Comunicaciones Botánicas del Museo de Historia Natural de Montevideo* 5 (91): 1–4.

Alonso Paz, E. & Bassagoda, M.J. (2002) Aspectos fitogeográficos y diversidad biológica de las formaciones boscosas del Uruguay. *Ciência e ambiente* 24: 35–48.

Bachman, S., Moat, J., Hill, AW., de la Torre, J. & Scott, B. (2011) Supporting Red List threat assessments with GeoCAT: geospatial

conservation assessment tool. (Version BETA). *In:* Smith V, Penev L (Eds) e-Infrastructures for data publishing in biodiversity science. *ZooKeys* 150: 117–126. Available from: http://geocat.kew.org/ (accessed 23 October 2015)

Brussa, C. & Grela, I. (2007) *Flora arbórea del Uruguay. Con énfasis en las especies de Rivera y Tacuarembó.* Cofusa, Montevideo, 544 pp.

Boufford, D.E. (1982) Notes on Peperomia (Piperaceae) in the southeastern United States. *Journal of the Arnold Arboretum* 63: 317–325.

Burkart, A. (1945) La Piperácea más austral en la República Argentina. *Darwiniana* 7 (1): 171–173.

Burkart, A. (1951) Observaciones sobre una Peperomia terrestre y sus afines en el norte de Buenos Aires y el Chaco. *Boletín de la Sociedad Argentina de Botánica* 4: 95–104.

Dahlstedt, H. (1900) Studien über süd- und central-amerikanische Peperomien mit besonderer Berücksichtigung der brasilianischen Sippen. *Kongliga Svenska Vetenskaps-Akademiens handlingar* 33 (2): 1–218.
http://dx.doi.org/10.5962/bhl.title.15467

De Candolle, A.C.P. (1882) Nouvelles recherché sur les Pipéracées. *Mémoires de la Société de Physique et d'Histoire Naturelle de Genève* 27 (2): 305–318.

De Candolle, A.C.P. (1893) Contributions a la Flore du Paraguay. *Mémoires de la Société de Physique et d'Histoire Naturelle de Genève* 32 (2): 3–9.

De Candolle, A.C.P. (1915) Die von dr. Th. Herzog auf seiner zweiten Reise durch Bolivien in den Jahren 1910 und 1911 gesammelten Pflanzen. *Mededeelingen van's Rijks Herbarium* 27: 1–90.

De Candolle, A.C.P. (1917) Piperaceae Neotropicae. *Notizblatt des Königl. botanischen Gartens und Museums zu Berlin* 6: 465–476.

Dietrich, A.G. (1831) *Species Plantarum*. Ed.6, Vol.1. Berlin, 735 pp.

Frenzke, L., Scheiris, E., Pino, G., Symmank, L., Goetghebeur, P., Neinhuis, C., Wanke, S. & Samain, M.S. (2015) A revised infrageneric classification of the genus Peperomia Ruiz & Pav. (Piperaceae). *Taxon* 64: 424–444.
http://dx.doi.org/10.12705/643.4

Florence, J. (1997) Peperomia. *In*: *Flore de la Polynésie Française*. Vol. 1. Éd. de l'ORSTOM, Montpellier, pp. 169–193.

Frodin, D.G. (2004) History and concepts of big plant genera. *Taxon* 53: 753–776.
http://dx.doi.org/10.2307/4135449

GBIF (2015) *The Global Biodiversity Information Facility:* GBIF Backbone Taxonomy, 2013-07-01. Available from: http://www.gbif.org/species/4190625 (accessed 19 Feburary 2015)

Guimarães, E.F., Carvalho–Silva, M., Monteiro, D. & Medeiros, E.S. (2015) *Piperaceae. In Lista de Espécies da Flora do Brasil*. Jardim Botânico do Rio de Janeiro. Available from: http://reflora.jbrj.gov.br/jabot/floradobrasil/FB12609 (accessed 10 Feburary 2015)

Guimarães, E.F., Ichaso, C.L.F. & Costa, C.G. (1984) Piperáceas. 4. Peperomia. *In:* Reitz, R. (Ed.) *Flora Ilustrada Catarinense*. CNPq, IBDF, HBR, Itajaí, pp. 33–136.

Hooker, W.J. & Arnott, G.A.W. (1832) *The Botany of Captain Beechey's Voyage*. H.G.Bohn, London, 485 pp.

IBODA (2015) *Base de datos. Flora del Cono Sur.* Instituto de Botánica Darwinion. Buenos Aires, Argentina. Available from: http://www2.darwin.edu.ar/ (accessed 10 Feburary 2015)

IUCN (2012) *IUCN Red List Categories and Criteria: Version 3.1. Second edition.* Gland, Switzerland and Cambridge, 32 pp.

IUCN (2015) *The IUCN Red List of Threatened Species*, version 2014.3. Available from: http://www.iucnredlist.org/ (accessed 10 Feburary 2015)

Jacquin, N.J. (1790) Observationes Botanicae. *Collectanea* 4: 126.

Jaramillo, M.A., Manos, P.S., & Zimmer, E.A. (2004) Phylogenetic relationships of the perianthless Piperales: reconstructing the evolution of floral development. *International Journal of Plant Sciences* 165: 403–416.
http://dx.doi.org/10.1086/382803

Kunth, C.S. ([1815] 1816) Piperaceae. *In*: Humboldt, F.W.H.A. von, Bonpland, A.J.A. & Kunth, C.S. (Eds.) *Nova Genera et Species Plantarum (quarto ed.).* Paris, pp. 46–74.

Linnaeus, C. (1781) *Supplementum Plantarum*. Impensis Orphanotrophei, Brunsvigae, 468 pp.

Marchesi, E. (1968) Las Piperáceas del Uruguay. *Boletín Facultad de Agronomía* 104: 1–13.

Marchesi, E., Alonso Paz, E., Delfino, L., García, M., Haretche, F. & Brussa, C. (2013) Plantas Vasculares. *In*: Soutullo, A., Clavijo, C., & Martínez-Lanfranco, J.A. (Eds.) *Especies prioritarias para la conservación en Uruguay. Vertebrados, moluscos continentales y plantas vasculares.* SNAP/DINAMA/MVOTMA and DICYT/MEC, Montevideo, Uruguay. pp. 27–71.

Martius, C.F.P. von (1824) *Nova genera et species plantarum :quas in itinere per Brasiliam MDCCCXVII-MDCCCXX jussu et auspiciis Maximiliani Josephi I., Bavariae regis augustissimi instituto /collegit et descripsit*. Monachii [Munich]: Impensis Auctoris. Vol. I, 158 pp.
http://dx.doi.org/10.5962/bhl.title.450

Mathieu, G. & Callejas Posada, R. (2006) New synonymies in the genus Peperomia Ruiz & Pav. (Piperaceae) – an annotated checklist.

Candollea 61: 331–363.

Mathieu, G., Vergara-Rodríguez, D., Krömer, T. & Karger, D.N. (2015) Peperomia (Piperaceae) novelties from Veracruz State, Mexico. *Phytotaxa* 205 (4): 268–276.
http://dx.doi.org/10.11646/phytotaxa.205.4.6

McNeill, J., Barrie, F.R., Buck, W.R., Demoulin, V., Greuter, W., Hawksworth, D.L., Herendeen, P.S., Knapp, S., Marhold, K., Prado, J., Prud'homme van Reine, W.F., Smith, G.F., Wiersema, J.H. & Turland, N.J. (2012) International Code of Nomenclature for algae, fungi and plants (Melbourne Code) adopted by the Eighteenth International Botanical Congress Melbourne, Australia, July 2011. *Regnum Vegetabile* 154: 1–240.

Miquel, F.A.G. (1843) *Systema Piperacearum*. Roterodami: Apud H. A. Kramers, 575 pp.

Miquel, F.A.G. (1847) Mantissa Piperacearum. *Linnaea* 20: 117–182.

Miquel, F.A.G. (1852) Chloranthaceae et Piperaceae. *In:* Martius, C.F.P. von.(Ed.) *Flora Brasiliensis enumeratio plantarum in Brasilia*. Fasciculus XI. Germany, pp. 1–76.

Monteiro, D. & Guimarães, E.F. (2008) Flora do Parque Nacional do Itatiaia – Brasil: Peperomia (Piperaceae). *Rodriguésia* 51: 161–195.

Novara, L.J. (1998) Flora del Valle de Lerma. Piperaceae. *Aportes Botánicos de Salta – Ser. Flora* 5: 1–24.

Ruiz, H. & Pavón, J. (1794) *Florae Peruvianae et Chilensis Prodromus*. Madrid.

Samain, M.S., Mathieu, G., Vanderschaeve, L., Wanke, S., Neinhuis, C. & Goetghebeur, P. (2007) Nomenclature and typification of the subdivisional names of the genus Peperomia (Piperaceae). *Taxon* 56: 229–236.

Samain, M.S., Mathieu, G., Pino, G., Symmank, L., Cieza, N., Neinhuis, C., Goetghebeur, P. & Wanke, S. (2011) The geophytic Peperomia subgenus Tildenia (Piperaceae) in the Andes with the description of new species in a phylogenetic framework. *Plant Ecology and Evolution* 144: 148–176.
http://dx.doi.org/10.5091/plecevo.2011.470

Thiers, B. (2015) [continuously updated] *Index Herbariorum: A global directory of public herbaria and associated staff*. New York Botanical Garden's Virtual Herbarium. Available from: http://sweetgum.nybg.org/ih/ (accessed 10 Feburary 2015)

Trelease, W. ([1939] 1941) Piperaceae Uruguayenses. *Revista Sudamericana de Botánica* 6: 65–69.

Trelease, W. & Herter, W.G. (1952) Piperaceae Uruguayenses curae posteriors. *Revista Sudamericana de Botánica* 10 (2): 43–47.

Tropicos (2015) *Tropicos.org. Electronic Database.* Missouri Botanical Garden, Saint Louis, Missouri. Available from: http://www.tropicos.org/ (accessed 19 Feburary 2015)

Tucker, S.C., Douglas, A.W. & Liang, H.X. (1993) Utility of ontogenetic and conventional characters in determining phylogenetic relationships of Saururaceae and Piperaceae (Piperales). *Systematic Botany* 18: 614–641.
http://dx.doi.org/10.2307/2419537

Wanke, S., Samain, M., Vanderschaeve, L., Mathieu, G., Goetghebeur, P. & Neinhuis, C. (2006) Phylogeny of the Genus Peperomia (Piperaceae) Inferred from the trnK/matK Region (cpDNA). *Plant Biology* 8: 93–102.
http://dx.doi.org/10.1055/s-2005-873060

Yuncker, T.G. (1953) The Piperaceae of Argentina, Bolivia and Chile. *Lilloa* 27: 8–303.

Yuncker, T.G. (1958) The Piperaceae – A family profile. *Brittonia* 10: 1–7.
http://dx.doi.org/10.2307/2804687

Yuncker, T.G. (1974) The Piperaceae of Brazil III – Peperomia; Taxa of uncertain status. *Hoehnea* 4: 71–413.

Zanotti, C.A., Suescún, M.A. & Mathieu, G. (2012) Sinopsis y novedades taxonómicas de Peperomia (Piperaceae) en la Argentina. *Darwiniana* 50: 124–147.

Zuloaga, F.O., Morrone, O. & Belgrano, M.J. (2008) Piperaceae. *In:* Zuloaga, F.O., Morrone, O. & Belgrano, M.J. (Eds.) Catálogo de las plantas vasculares del Cono Sur. *Monographs in Systematic Botany from the Missouri Botanical Garden* 107: 2712– 2730.