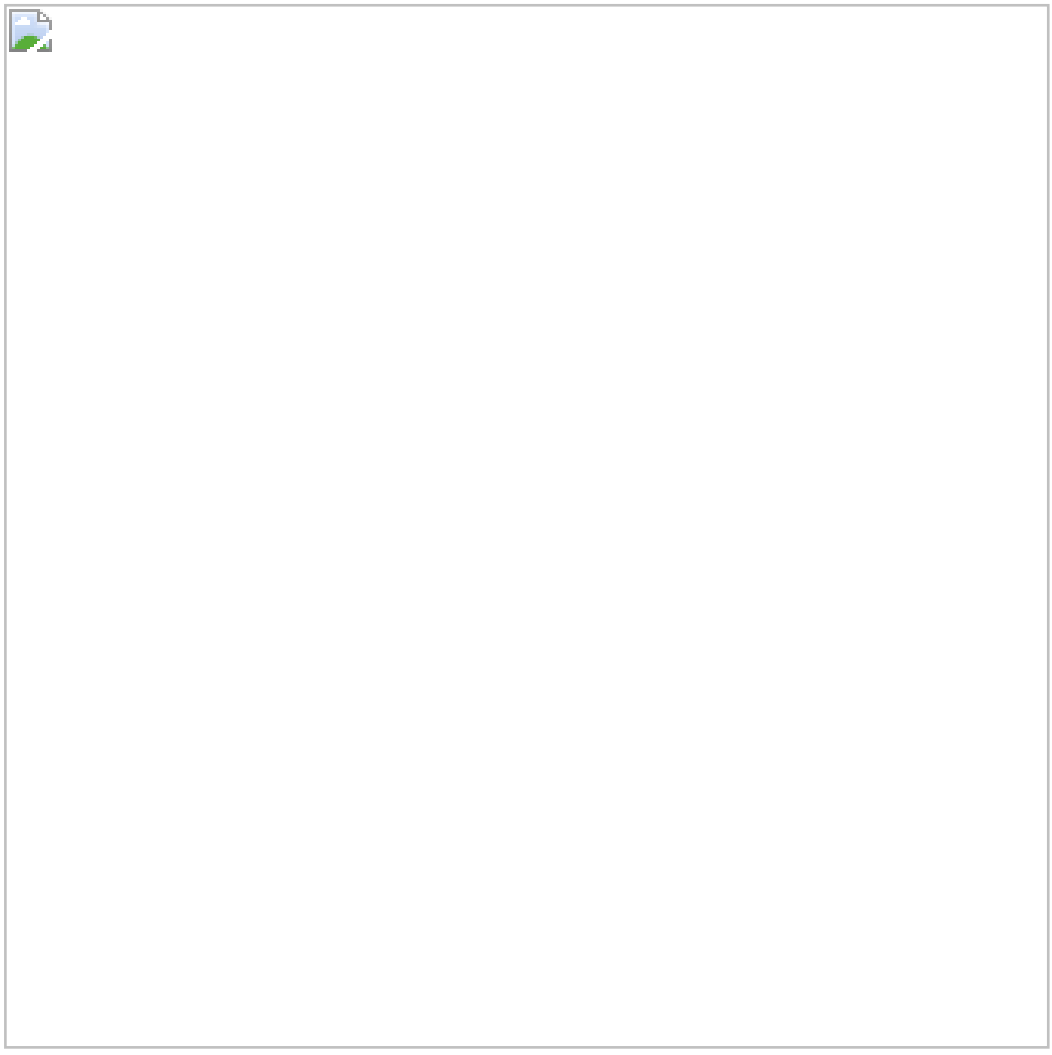

Notes on ‘rabbit tail’ Peperomias (Piperaceae) with description of two new species

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Notes on 'rabbit tail' Peperomias (Piperaceae) with description of two new species

Guido Mathieu

Abstract

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'Rabbit tail' *Peperomia* Ruiz & Pavón *(Piperaceae)* species are peculiar in the ellipsoid or globose shape of their inflorescences. Notes on three species of this group are presented. The taxonomic status of *Peperomia clavigera* Standl. & Steyerm. is discussed and two new species: *Peperomia physostachya* G. Mathieu from Ecuador and *Peperomia sphaerostachya* G. Mathieu from Colombia are described and illustrated.

Keywords

PIPERACEAE – *Peperomia* – Colombia – Ecuador – Mutis – New species – Taxonomy

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Introduction

Plant species belonging to the genus *Peperomia* Ruiz & Pavón (*Piperaceae)* are commonly called 'rat tails' because the inflorescences of many resemble the tail of a rat. Although this similarity is sometimes striking, as in the Malagasy *P. ratticaudata* G. Mathieu (Mathieu, 2003: 78), many species with slender inflorescences rather deserve to be called 'mouse tails' and in several species with compound inflorescences, e.g. *P. pernambucensis* Miq. (Miquel, 1845: 420) there is little that reminds us of any rodent's tail at all. A few rare *Peperomia* species exhibit such atypical inflorescences that it would be more appropriate to call them 'rabbit tails'.

Although the above considerations are of course not scientifically, it is obvious that 'rabbit tail' *Peperomias* are in need of some taxonomical attention. *Peperomia clavigera* Standl. & Steyerm. (Standley & Steyermark, 1952: 240) is a poorly understood species as is illustrated by the several unidentified or misidentified specimens in herbarium collections. *Peperomia sphaerostachya* G. Mathieu, described here as a new species, has never been formally published despite that it was collected more than two centuries ago, during José Celestino Mutis's (1732–1808) "Royal Botanical Expedition to New Granada", and that the type collection has been cited in several publications. *Peperomia physostachya* G. Mathieu was recognized as new by S. Jeppesen in 1968, as is evident from his annotation label on *Holm-Nielsen & Jeppesen 746* at AAU, but has never been described either.

Peperomia clavigera has been collected during the 2007 Peperomia expedition to Mexico. Living plants have been observed *in situ* and in cultivation. Extended work in several herbaria around the world (BH, BR, CAS, ENCB, F, GH, IEB, MEXU, MO, NY, SEL, US, and XAL) revealed c. 50 specimens of this species, about half being not or misidentified. *Peperomia physostachya* G. Mathieu has been found during the 2004 Peperomia expedition to Ecuador. It has been studied *in situ* and the type collection was made. Other herbarium specimens of this rare species have been located (AAU, C, MO, MO, and QCNE). The situation of *P. sphaerostachya* G. Mathieu is quite extraordinary. Although it has been collected by Mutis more than two centuries ago and figured in several publications, it has never been recognized as a distinct species. The original Mutis collection as well as the splendid illustrations that resulted from his expedition have been studied in MA. Special attention is paid to the history of this collection.

Digital images of the types of the species mentioned in this article can be accessed online by the TRGP (Taxonomic Repertory of the genus Peperomia) (Mathieu, 2001–2018).

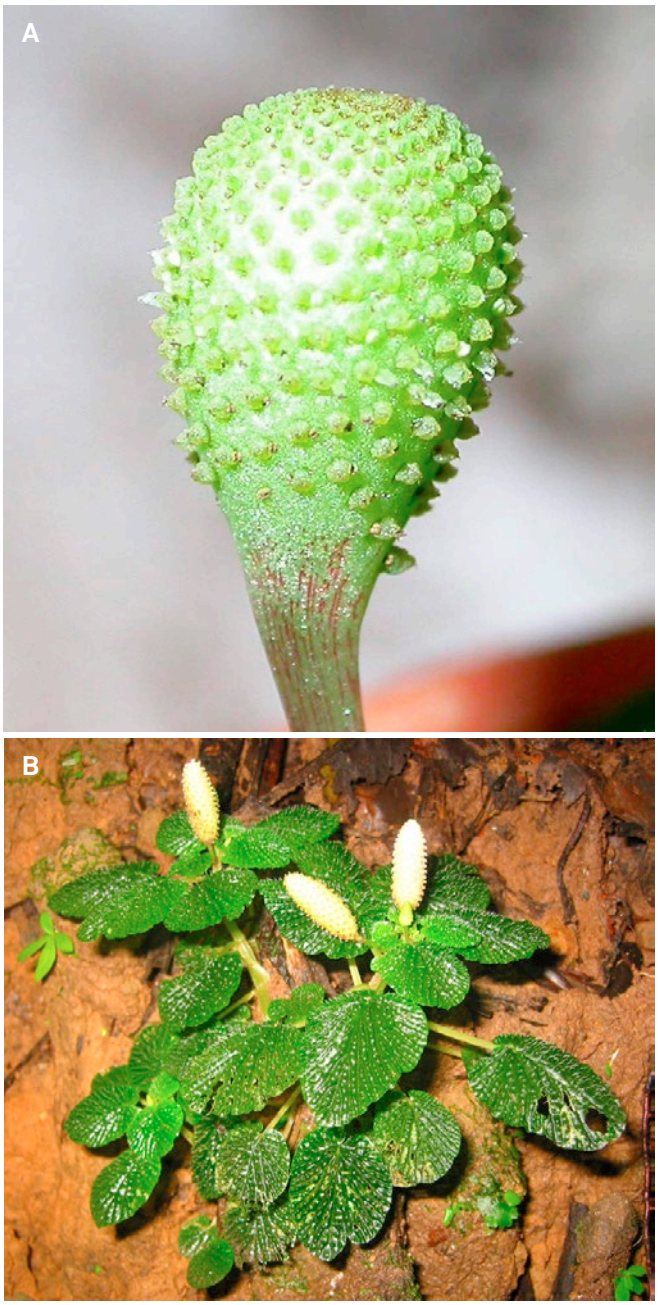

Fig. 1. – A. *Peperomia clavigera* Standl. & Steyerm. Rachis from plant cultivated in the Botanical Garden of Ghent University; **B.** *Peperomia physostachya* G. Mathieu. General habit. [**A:** Acc. 2007–1244; **B:** *G. Mathieu 1052*] [Photo: **A:** M.-S. Samain; **B:** G. Mathieu]

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Taxonomy

Peperomia clavigera Standl. & Steyerm. in Fieldiana, Bot. 34: 240. 1952 (Fig. 1A).

Holotypus: Guatemala. Alta Verapaz: along road Chajmayic-Sebol, 300–500 m, 17.IV.1942, *Steyermark 45738* (F [F0066867F, F0066868F]!; iso-: GH [GH00004951]!, NY!, US [2 sheets]!).

Perennial terrestrial *herb*, up to 10 cm tall. *Stem* glabrous, contorted, composed by the successive leaf nodes, internodes almost virtual or up to 1(–1.5) cm long. *Leaves* alternate; petioles up to 6(–8) cm long, terete, glabrous, green, usually longitudinally reddish striped; lamina round-ovate, 3–5.5(–8) × 3–4(–6) cm, peltate 0.5–1.2 cm from the leaf base, apex usually obtuse, sometimes round or acute, exceptionally broadly acuminate, base round, glabrous, somewhat succulent, adaxially dark to somewhat purplish green, often light to whitish green or silvery along the nerves, abaxially light to whitish green, (7–)9(–11)-palmatinerved. *Inflorescences* solitary, simple, terminal and axillary; peduncle 2–5.5 cm long, usually shorter than petiole, bearing 1(–2) small bract(s) a little above the middle, glabrous, green, usually longitudinally reddish striped; rachis usually ellipsoid-obovoid, sometimes a little fusiform or almost globose, 1–2(–3) cm long and 0.6–1 cm diam., apex round or obtuse, sometimes indented, base cuneate, moderately densely flowered; floral bracts orbicular, centrally peltate, hyaline dotted. *Fruit* ellipsoid, pericarp sticky papillate only apically, style sticky papillate, stigma apical.

Notes. – *Peperomia clavigera* is not to be considered as a synonym of *P. peltilimba* C. DC. ex Trel. (as in Burger, 1971: 58). *Peperomia peltilimba* has a much more trailing habit and does not show the typical ellipsoid rachis.

Several herbarium specimens of *P. clavigera* have been misidentified as *P. dorstenioides* Standl. & Steyerm. and it is inevitable to pay also attention to this more or less similar species. On the label of the holotype of *P. dorstenioides*, the first identification was *P. clavigera*, but it was eventually published as a separate species based on the aberrant shape of the rachis which was described as: "obconic or funnelform, about 9 mm high and broad, subacute at the base, truncate or depressed at the apex, naked outside, the upper or inner surface densely flowered" (Standley & Steyermark, 1952: 244) (Fig. 2). *Peperomia clavigera*, cultivated at Cornell University (New York, USA) from plants collected in the State of Tabasco (Mexico) and collected as *Moore 7168* (BH) shows "clavate fruiting spikes with irregular and often indented tops" as the label says. Also in *P. clavigera* specimens *Hanan et al. 282* (MEXU) and *Ventura 21115* (MEXU) a rachis with flattened or indented apex can be seen. This might support the idea that the aberrant rachis of *P. dorstenioides* only represents an extreme in the morphological variation of the *P. clavigera* rachis. Until now most botanists only knew *P. dorstenioides* from its Guatemalan type collection, *Steyermark 49410* (F, US). Recently identified Mexican *P. dorstenioides* collections like *Hanan 437* (MEXU) and *Hanan 698* (MEXU), both from Tabasco, municipio Teapa, Sierra El Madrigal, illustrate well that *P. dorstenioides* and *P. clavigera* are different entities, distinguishable not only by shape of their rachis but also by some other characters (Table 1).

Specimens examined. – **Mexico. Chiapas:** Municipio de Chilón, terreno Yetalchen (4 km SO del templo de Patatehel), 900 m, 10.II.1991, *Ambriz 139* (XAL); municipio Palenque, tropical rain forest adjacent to small cascading river at Agua Azul, 300 m, 24.V.1973, *Breedlove 35346* (F, MEXU, MO); municipio Ocosingo, lower montane rain forest 70 km SW of Palenque, 550 m, 14.I.1981, *Breedlove 49585* (MEXU); *ibid. loco,* 12.IV.1981, *Breedlove 50832* (MEXU); municipio Ocozocuautla, 17°03'N 93°47'30"W, 300 m, 28.XI.1990, *Alush 9547* (XAL). **Tabasco:** Cultivated at Cornell University from plants collected in the wild by Monroe Birdsey, IV.1955, *Moore 718* (BH); municipio Teapa, 0.34 km E de Chapingo, Universidad Autónoma de Chapingo, 17°31'31"N 92°55'33"W, 28.I.2002, *Calónico 21091* (BR, MEXU, MO); municipio Teapa, Puyacatengo, Cerro El Madrigal, 17°31'38"N 92°55'48"W, 130 m, 2.VIII.2007, *Samain et al. 2007-059* (BR, G, GENT, K, MEXU, MICH, MO, US); municipio Teapa, Cerro del Madrigal, 50 m, 11.IV.1984, *Ventura 21115* (MEXU, XAL); municipio Teapa, ladera NW del Cerro del Madrigal, 5 km E de Teapa, 60 m, 21.VIII.1983, *Zamudio 972* (IEB); municipio Teapa, Sierra El Madrigal, cacaotal enfrente del edificio principal del Centro Regional Tropical Puyacatengo de la Universidad Autónoma de Chapingo, 17°31'02" – 17°32'30"N 92°54'10" – 92°56'W, 2.III.1991, *Hanan et al. 282* (MEXU); *ibid. loco,* 11.IV.1993, *Hanan 745* (MEXU); municipio Teapa, along road Teapa – Tacotalpa, 3.1 km E of Teapa, along stream and limestone cliffs ¼ mi S of highway, 17°33'N 92°59'W, 150 m, 19.II.1987, *Croat et al. 65371* (MEXU, MO); municipio Teapa, Puyacatengo, 60 m, 26.IV.1983, *Curiel 5* (MEXU); municipio Teapa, limestone hills, 150 m, 4.IV.1980, *Madison 7328* (F [2 sheets]); municipio Teapa, a 3 km al E de Teapa, rumbo a Tapijulapa, 16.V.1981, *Zamudio 38* (MEXU); municipio Tacotalpa, cerro 1.5 km NO del Ejido Lázaro Cárdenas, 8.VII.1981, *Cowan 3404* (CAS, MO, NY); municipio Tacotalpa, along road Ejido Lazaro Cardenas-Xitocencatl, c. 1 km W of Ejido Poana, 17°32'58"N 92°45'31"W, 50 m, 2.VIII.2007, *Samain et al. 2007-060* (BR, GENT, MEXU); municipio Tacotalpa, Rancho Javier Mina, 50 m, 14.VII.1983, *Ventura 20421* (MEXU, MO); municipio Tacotalpa, Cerro de Tacotalpa, 100 m, 27.IV.1983, *Ventura 20177* (GH, IEB, MEXU, MO).

Table 1. – Differences between *Peperomia clavigera* Standl. & Steyerm. and *P. dorstenioides* Standl. & Steyerm. apart from the shape of the rachis.

	P. clavigera	***P. dorstenioides***
Leaf base	peltate 0.5–1.2 cm from leaf base	slightly cordate or hardly peltate
First pair of secondary nerves	angle 40–50° with midnerve	angle 30° or less with midnerve
Sticky papillae on fruit	evenly distributed	only apically

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Peperomia physostachya G. Mathieu, **spec. nova** (Fig. 1B).

Holotypus: Ecuador. Prov. Orellana: Yasuni National Park, west side of Maxus road near km 61, 00°41'S 76°26'W, 280 m, 24.X.2001, *G. Mathieu 1052* (BR [BR000000933191]!; iso-: G!, HUA!, MO!, QCNE!).

Peperomia physostachya G. Mathieu differs from its congeners by the particular ellipsoid shape of the inflorescences in combination with the slightly bullate areoles of the leaves, every areole exhibiting 1–3 summits bearing a solitary trichome.

Terrestrial *herb*, up to 20 cm, growing in clayish soil or on clay covered rocks. *Stem* erect, slender, simple to hardly branched, to 0.5 cm diam., internodes (0.8–)1(–1.2) cm, internodal ribs hirsute, light transparent green. *Leaves* alternate to subopposite; petiole (1.5–)3–4 cm, canaliculate, glabrous but hirsute around the attachment of the lamina; lamina (1–)2–4 × (1–)2–4.5 cm, dark green adaxially, light green abaxially, palmately nerved, reticulate between the main nerves, the zones between the reticulate nerves adaxially bullate and abaxially indented, every bullate area culminating in 1–3 summits each bearing a single multicellular trichome, solitary multicellular trichomes abaxially at the main nerves, apex round, base cordate, the basal lobes slightly overlapping. *Inflorescences* solitary or rarely two from a splitting peduncle, terminal and axillary from the upper leaf axils; peduncle up to 1.5 cm long, glabrous; rachis ellipsoid, up to 2.5 cm long and 1 cm diam., glabrous, loosely flowered, greenish white when young, white when mature; floral bracts irregularly orbicular, c. 0.3 mm diam., membranous, centrally peltate, anthers with thick filament. *Fruit* subglobose, the body entirely covered with long sticky papillae, style wide dome shaped, glabrous, stigma apical.

Etymology. – The specific epithet refers to the spongious (air filled) tissue of the rachis. Although *P. physostachya* shares this character with several other species with thick rachis (e.g. *P. clavatispica* Trel. & Yunck., *P. pachystachya* C. DC., *P. sarcostachya* Trel., *P. sulcata* C. DC., and *P. verschaffeltii* Lem.) and the unique form of the rachis could have inspired a fancy form-based name, I deliberately have chosen to stick to this epithet because of the existence of a particular herbarium collection *Holm-Nielsen 746* made in 1968. The AAU specimen bears an annotation label with the name "Peperomia physostachys Jeppeson sp. nov.". This proposed name was never published. It could not be kept literally because it does not comply with the grammatical rules of the ICBN. The epithet should be *physostachyos* (Greek feminine) or *physostachya* (Latinized feminine). I decided however to base the new epithet hereon and by doing so, preventing unnecessary proliferation of names.

Notes. – *Peperomia physostachya* is easily distinguished from other species in the genus by the combination of the particular white ellipsoid inflorescences and the slightly bullate leaves with solitary trichomes.

In a recent molecular phylogenetic analysis, a sample of *Mathieu 1052* was included (Frenzke et al., 2015: 443). It clustered with *P. clavigera* (Frenzke et al., 2015: electronic supplement Fig. 51, 52 [P. species 8]), a species belonging to *Peperomia* subg. *Leptorhynchum* (Dahlst.) Trel. ex Samain (Frenzke et al., 2015: electronic supplement S4).

Paratypi. – **Ecuador. Prov. Orellana:** 60 km W of Coca along Rio Payamino, 00°29'S 77°12'W, 350 m, 16.VI.1968, *Holm-Nielsen & Jeppesen 746* (AAU, C, NY); Yasuni National Park, Maxus road km 60–61, 00°47'S 76°26'W, 250 m, 11.VI.1994, *Pitman 253* (MO, QCNE).

Peperomia sphaerostachya G. Mathieu, **spec. nova** (Fig. 2, 3).

– *Peperomia discilamina* Trel. [nom. nud.].

Holotypus: Colombia: *sine loco,* s.d., *Mutis 581* (MA [MA669847]!; iso-: MA [MA669845, MA669846]!, US [US1560163]!).

Peperomia sphaerostachya G. Mathieu differs from its congeners by the particular globose to ellipsoid shape of the inflorescences in combination with the villous indument of all its parts.

Perennial terrestrial *herb* up to 15 cm tall. *Stem* erect, decumbent at the base, not branching, rooting from the nodes, internodes 1(–2) cm long, villous. *Leaves* alternate; petiole 5–8(–10) cm long, villous, red, arising from the axil of a small ovate bract with acute apex; lamina round-ovate 6–8.5 × 7–9 cm, apex obtuse, base cordate with overlapping lobes, 9-nerved, the most lateral pair of main nerves running into the lobes, adaxially dark green, abaxially light green, margin ciliate, adaxially sparsely villous, abaxially sparsely villous at the nerves. *Inflorescences* solitary, terminal and axillary; peduncle 4 cm long, villous; rachis globose to ellipsoid, 6–8 mm diam. × 6–10 mm long, glabrous, densely flowered; floral bracts orbicular, centrally peltate. *Fruit* globose, stigma apical.

Etymology. – The specific epithet was chosen to point to the particular form of the rachis. The decision is made not to stick to the name proposed by Trelease. The epithet *discilamina* is far too general for a *Peperomia* species with one of the most aberrant inflorescences ever described and this unique character has to find expression in the name of the new species.

Notes. – A strange *Peperomia* was collected during José Celestino Mutis's "Royal Botanical Expedition to New Granada" (1783–1816) in nowadays Colombia and pressed as *Mutis 581*. Three sheets of this collection are preserved in MA. A fourth duplicate was sent to US in 1932. Without doubt

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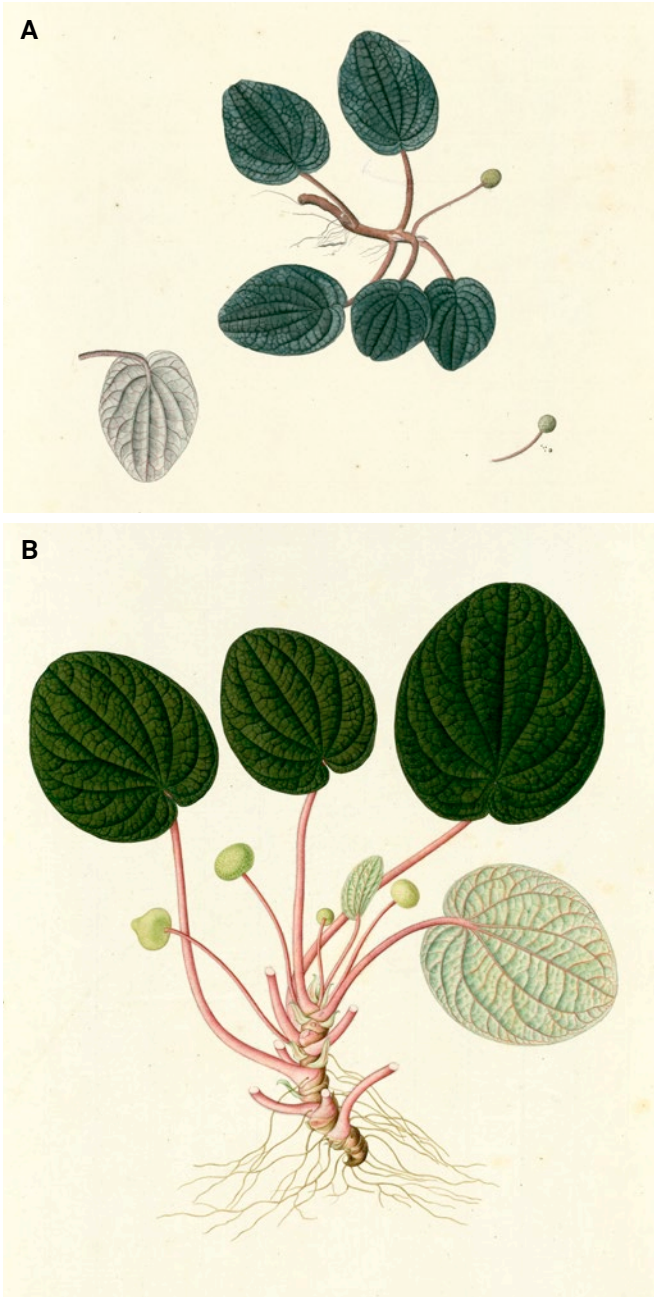

Fig. 2. – *Peperomia sphaerostachya* G. Mathieu in *Iconografia Mutisiana*. **A.** Detail of plate 728; **B.** Detail of plate 729. [**A:** AJB, Div. III, 728; **B:** AJB, Div. III, 729; ©Real Jardín Botanico-CSIC Archives]

it is the same species that is represented in the *Iconografia Mutisiana*, a series of illustrations made during the expedition and now archived in the Royal Botanical Garden in Madrid, by two splendid color paintings (plates 728 and 729; see Fig. 3). A black (plate 779a) and a sepia (plate 779b) copy also exist. The inflorescences do not show the 'rat tail' appearance which is typical in *Peperomia* but are completely globose. For this reason, the unnamed plant was already tentatively put in a new subgenus for which José Jerónimo Triana proposed the *ineditum* name "Sphaeropiper" (Villegas, 1992: 72) when he visited MA in 1865 to study the plates from the expedition (Blanco, 1991: 155).

Trelease put a new name on the US sheet: "Peperomia discilamina Trel." and added "Type". Although a short description of his hand is extant in the NYBG archives, Trelease never published the manuscript and when he died in 1945, the name remained in sched. (a *nomen herbariorum* sensu Mathieu, 2007).

In the *The Piperaceae of Northern South America*, *Mutis 581* is cited under *P. macrotricha* C. DC. (Trelease & Yuncker, 1950: 491). Though similar in its vegetative characters, *P. macrotricha* was described by C. de Candolle as having normal 'rat tail' rachides, 5.5 cm long and 1 mm in diam. (Candolle, 1914: 358). This is very different from what is seen in the Mutis collection. Only when one would consider the globose rachis as a form of cristate inflorescence it could be understandable to take *Mutis 581* for a *P. macrotricha* specimen. But Yuncker did not spend a word to this aspect. Nevertheless, Yuncker is the only author ever having dedicated an article on teratology in *Peperomia* inflorescences (Yuncker, 1937). In that publication, he discusses aberrant forms of the inflorescences of Hawaiian species. Although different kinds are mentioned (from which the hand forming inflorescences of some *P. caperata* cultivars are commonly found in trade nowadays) none of them has a globose habit. Blanco (1991: 161) erroneously considered Trelease's "P. discilamina" (see above) a temporary name that was eventually published as *P. discilimba* Trel. & Yunck. and cited *Mutis 581* under the latter name. Callejas (1997: 27) followed Trelease & Yuncker (1950: 491) to some extent, treating plates 728 and 729 under *P. macrotricha* "aff.". He explicitly paid attention to the aberrant inflorescences. In his opinion, they could be young and would become more elongated with maturity. However, the inflorescences in *Mutis 581* do not seem to be immature at all. Even developing fruits have been seen on one rachis. Moreover, personal observations in other *Peperomia* species with globose to ellipsoid rachis *(P. clavigera*, *P. physostachya)* as well as in species with fusiform *(P. pachystachya)* or cigar shaped (*P. verschaffeltii* Lem.) rachis, demonstrate that young inflorescences reflect quite well their mature shape. Blanco & Del Valle (2009: 230) cited *Mutis 581* under *P. macrotricha* C. DC. referring to Trelease & Yuncker (1950) and Callejas (1997).

Although *P. sphaerostachya* is known from only one historical collection and a few paintings, it deserves to be described. Not only would this put an end to the taxonomic confusion that tends to arise around this plant but it will bring it also under the attention of the botanical community which would increase the chance to rediscover the plant in Colombia.

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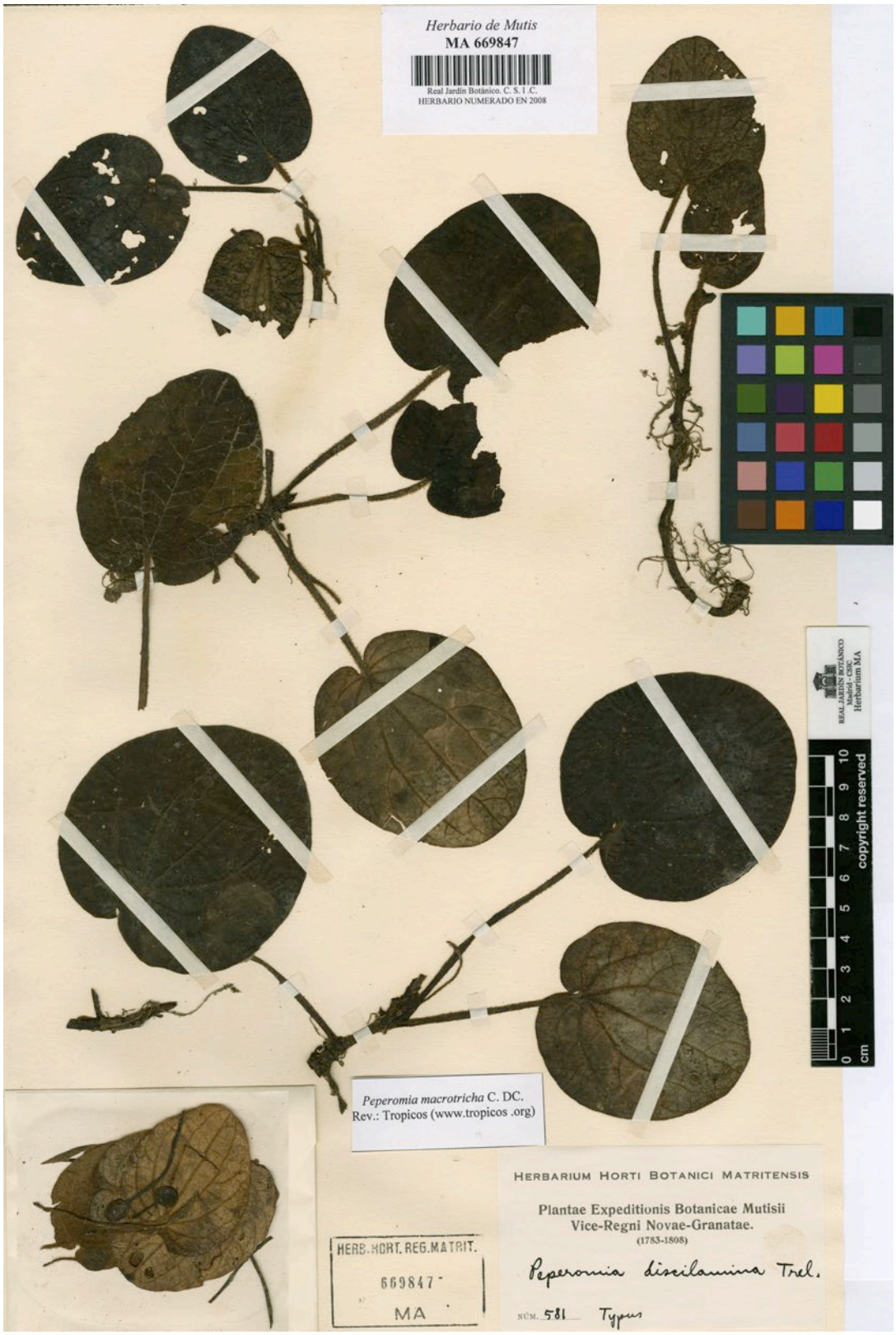

Fig. 3. – *Peperomia sphaerostachya* G. Mathieu. Holotype at MA.
[MA-01-00669847; © RJB-CSIC Herbario]

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