



New records of *Pouteria macrocarpa* (Sapotaceae) from the Brazilian Atlantic forest

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Abstract

We present the first voucher-based record of *Pouteria macrocarpa* for Brazilian Atlantic forest and extend the occurrence area of it. Besides, a brief taxonomic description, an identification key for lignified-fruits *Pouteria* species, and information about phenology and herbarium records are provided. According to the IUCN Red List and the Red Book of the Brazilian Flora, the species is considered Vulnerable (VU). However, facing the new available data, we believe it should be reassessed as Endangered (EN).

Key words: Brazil, Chrysophylloideae, Ericales, Espírito Santo, Neotropics.

Resumo

Este é primeiro registro baseado em vouchers de *Pouteria macrocarpa* para a Mata Atlântica e informações sobre novas áreas de ocorrência da espécie são disponibilizadas. Além disso, são apresentadas uma breve descrição taxonômica, uma chave de identificação de espécies morfológicamente afins e informações fenológicas e das coleções botânicas. De acordo com a Lista Vermelha da IUCN e do Livro Vermelho da Flora Brasileira, a espécie é considerada Vulnerável (VU), no entanto, após re-análise dos dados aqui apresentados, *P. macrocarpa* deve ser recategorizada como Em Perigo (EN).

Palavras-chave: Brasil, Chrysophylloideae, Ericales, Espírito Santo, Neotrópicos.

Atlantic Forest Domain encompasses about 16,000 plant species in a mixture of contrasting vegetation types, which around 45% of them are considered endemic (Stehmann *et al.* 2009). It corresponds to 5% of the global number of species making it as one of the top five world biodiversity hotspots for angiosperms (Mittermeier *et al.* 2005). Facing the importance of knowing its biodiversity, the Atlantic Forest is the second main distribution center in South America for the latescent family Sapotaceae which is often cited in floristic studies (Peixoto & Gentry 1990; Fabris & César 1996; Thomaz & Monteiro 1997; Saiter *et al.* 2011). However, those lists usually show high levels of non-specific determination.

Pouteria Aubl. (Sapotaceae, Chrysophylloideae) is the largest genus in the family and includes ca. 200 species (Anderberg & Swenson 2003; Bartish *et al.* 2005; Swenson & Anderberg 2005; Swenson *et al.* 2007, 2008). The genus is restricted to the Neotropics (Swenson *et al.* 2013) and in Brazil, of 122 registered species, 50 are considered endemic (BFG 2015).

Pouteria shows a great morphological variability but is characterized predominantly by arboreal individuals; absence of stipules; flowers with 4–6 free, imbricate sepals; tubular-cyathiform corolla with six lobes; stamens opposite to the corolla lobes, staminodes alternate to the corolla lobes; ovary 1–6(–15)-locular and seeds with presence of adaxial scar, with or without endosperm (Pennington 1991).

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Indeed, while carrying out a taxonomic survey of *Pouteria* in the Estação Biológica Santa Lúcia Biological (EBSL), a non-official protected area in the Espírito Santo State, Brazil. Fieldwork was performed from September/2013 to July/2014 and a novelty for Atlantic Forest was recognized: *Pouteria macrocarpa* (Mart.) Dietr.

Main herbaria with holdings of Sapotaceae, especially from Espírito Santo State, were visited and/or consulted (CEPEC, CVRD, F, MBML, MO, NY, RB, VIES) (acronyms according to Thiers, continuously updated). For identification, type specimens, herbarium vouchers, and literature data were consulted and analyzed (Pennington 1990, 1991, 2006). For taxonomic description only specimens from Atlantic forest were considered.

The conservation status follow the IUCN red list criteria for assessments (IUCN 2014). Extent of Occurrence (EOO) and Area of Occupancy (AOO) were calculated using GeoCat - Geospatial Conservation Assessment Tool (Bachman *et al.* 2011) for assessments of extinction risk. Herein, only specimens determined by Sapotaceae specialists were considered.

Key to lignified-fruit *Pouteria* species morphologically similar to *Pouteria macrocarpa*

1. Pedicels glabrous.
 2. Leaves elliptic or elliptic-oblong, secondary veins parallel, straight to slightly arcuate, inter-secondary rare, tertiary inconspicuous; pedicels 2–3 mm; seeds-1 *Pouteria foveolata*
 - 2'. Leaves oblanceolate, secondary veins slightly convergent, arcuate, inter-secondary short to moderately long, tertiary open-reticulated; pedicels 0.9–1.2 mm; seeds-several *Pouteria laevigata*
- 1'. Pedicels puberulous.
 3. Leaves eucampto-broquidodromous, marginal veins obscure or absent, petioles length (2.2–)3–4.5 cm; pedicels 0.8–2.1 mm; seeds one-several *Pouteria lucuma*
 - 3'. Leaves eucamptodromous, thin marginal veins present, petioles length 1.3–2.2 cm; pedicels 1–1.5 mm; seeds-several *Pouteria macrocarpa*

The species has a known geographic distribution in Central and South America, from Costa Rica, Colombia (1,800 m alt.) to Brazilian Amazonian forest (Pennington 1991), and despite its geographic distribution, the species is apparently rare. Carneiro *et al.* (2013) barely cited it as occurring in the Atlantic forest when they give status of conservation assessments for several Brazilian plant species. However, this latter work did not mention which specimens were examined

Pouteria macrocarpa (Mart.) Dietr., Syn. pl., 1: 431. 1839. -non *Pouteria macrocarpa* (Huber) Ducke [= *Pouteria multiflora* (A.DC.) Eyma].

Figs. 1; 2

Pouteria macrocarpa is a tree species up to 20 m tall with large lignified globoid fruits (3.5–4.6 × 4.8–6.3 cm), scaling bark, and squamous branches; eucamptodromous leaves arranged in the apical portion of the branch, long petioles (3.2–4.5 cm) and straight secondary veins, often with no inter-secondary, and tertiary oblique.

Specimens examined: BRAZIL. BAHIA: Arataca, PARNA de Serra das Lontras, Trilha do mirante de Seu Artur, fr., 12.IX.2011, *R.O. Perdiz et al.* 940 (CEPEC, RB). ESPÍRITO SANTO: Santa Teresa, São Lourenço, Mata Fria, fr., 27.I.1999, *L. Kollmann 1710* (MBML); Cabeceira do Rio Bonito, fr., 13.VI.2001, *L. Kollmann 3961* (MBML); Estação Biológica de Santa Lúcia, fr., 5.IX.2001, *L. Kollmann 4512* (MBML); fr., 18.IX.2002, *R.R. Vervloet 913* (MBML); Nova Lombardia, Reserva Biológica (Rebio) Augusto Ruschi, fr., 1.IX.2002, *R.R. Vervloet 620* (MBML).

Pouteria macrocarpa is easily recognized from the remaining lignified-fruit *Pouteria* species by puberulous and shorter pedicels (1.3–2.2 cm), and eucamptodromous leaves (see key below) (Fig. 1).

or any literature information they followed to ensure the real identity of the vouchers.

According to BFG (2015), *P. macrocarpa* is recorded to the Brazilian states of Amazonas, Pará, and Roraima. Thus, this is the first voucher-based record from the Brazilian Atlantic forest in the Bahia and Espírito Santo states to *P. macrocarpa* which now bears a disjunct distribution between Amazonian and Atlantic forests (Fig. 2). It endorses the list of *Pouteria* species cited by

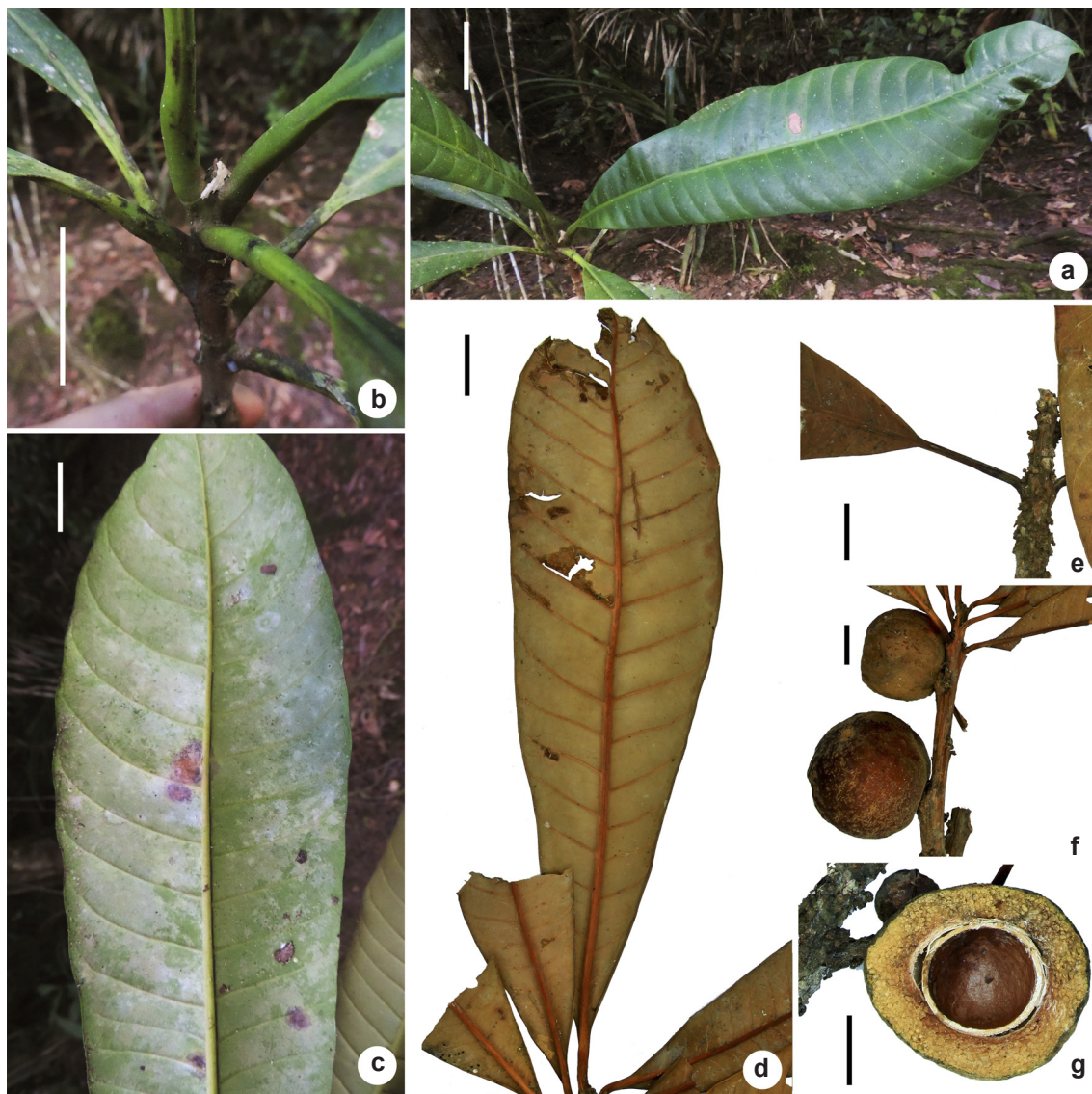


Figure 1 – *Pouteria macrocarpa* – a. leaves; b. petioles; c-d. venation pattern on living and dried samples; e. petiole and buds; f. fruits; g. fruit and seed. [a-c. *Mônico*, A. (MBML); d-g *Vervloet*, R. 913 (MBML)]. Scale bar = 2 cm.

Alves-Araújo *et al.* (2014) and other groups of plants (Alves *et al.* 2003; Marchioretto *et al.* 2004; Melo *et al.* 2009; Pontes & Alves 2011). Additionally, the species is often associated to the lowland forests, with only one record from Colombian mountains.

The new populations are represented by five fertile records from Espírito Santo (four subpopulations) and Bahia states at MBML, CEPEC and RB herbaria (Tab. 1). There is one more specimen from Minas Gerais state at F

herbarium which represents a historical record collected in 1930 (Pennington 1990) (Tab.1). However, the latter has no precise location and therefore was not included during threat assessments.

Pouteria macrocarpa shows an EOO of 5,166,542.196 km² and considering a discontinuous area between the Amazonian and Atlantic forests, the species would fit Least Concern (LC) assessment. In addition, the Red Book of Brazilian Flora (Carneiro *et al.* 2013) and the IUCN Red List

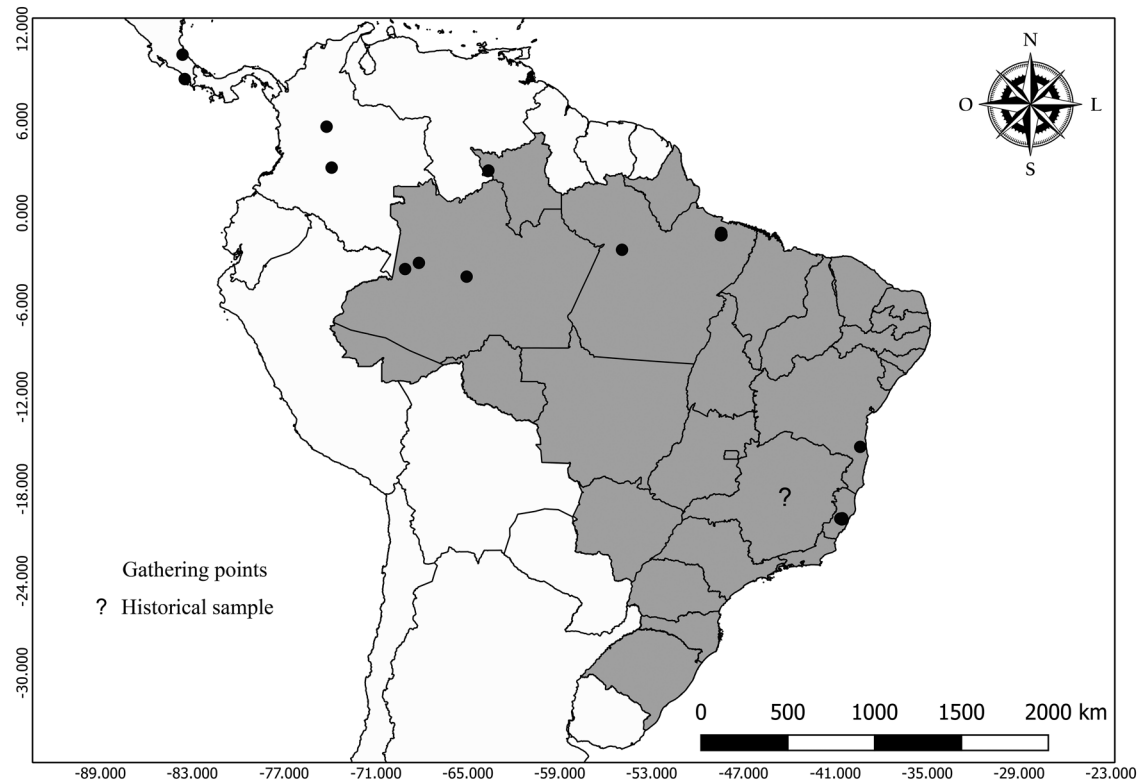


Figure 2 – New records of *Pouteria macrocarpa* (Mart.) Diétr. – (●) historical record with no precise location.

(IUCN 2015), assessed the species as Vulnerable. However, including the newly known records and with an AOO displaying a total of 68,000 km², the species should be, actually, considered as Endangered (EN), according to criteria B2b(iii) and C1 (IUCN 2012, 2013, 2014).

Three out of six specimens from Atlantic forest were mentioned as occurring in the EBSL.

Plant taxonomy researches have been carried out on EBSL and have shown taxonomic novelties (Baitello 2001; Mass *et al.* 2001; Lombardi 2004; Fiaschi & Pirani 2005; Fraga & Saavedra 2006; Goldenberg & Reginato 2006; Alves-Araújo & Mônico 2017).

ESBL is part of one of the most important refuges for Brazilian flora in the Atlantic forest

Table 1 – Details of the new records of the tree species *Pouteria macrocarpa* in southeastern Brazil – (*) Historical record with no precise location.

State/City	Locality	Year	Collector (Herbarium)	Phenology
Minas Gerais*	Distrito Ilheu, Fazenda de Tabunha	1930*	Mexia, Y. 4995 (F)	Fruit
Espírito Santo/Santa Teresa	São Lourenço, Mata Fria	1999	Kollmann, L. 1710 (MBML)	Fruit
Espírito Santo/Santa Teresa	Cabeceira do Rio Bonito	2001	Kollmann, L. 3961 (MBML)	Fruit
Espírito Santo/Santa Teresa	Estação Biológica de Santa Lúcia	2001	Kollmann, L. 4512 (MBML)	Fruit
Espírito Santo/Santa Teresa	Estação Biológica de Santa Lúcia	2002	Vervloet, R. 913 (MBML)	Fruit
Espírito Santo/Santa Teresa	Nova Lombardia, Rebio Augusto Ruschi	2002	Vervloet, R. 620 (MBML)	Fruit
Bahia/Arataca	Parque Nacional de Serra das Lontras	2011	Perdiz, R. 940 (RB)	Fruit
Espírito Santo/Santa Teresa	Estação Biológica de Santa Lúcia	2014	Mônico, A. s.n. (MBML)	Sterile

which constitute a green aisle where there are no high levels of logging. However, this scenario is different for Amazonian populations of *P. macrocarpa* due to the species domestication and its commercially valuable wood which might lead to genetic variability decrease (Carneiro *et al.* 2013).

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