



Original Paper

A new species of *Trichilia* (Meliaceae) from the Atlantic Forest of Brazil

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Abstract

A new species of *Trichilia* (Meliaceae) from Southeastern Brazil is here described, illustrated and compared to its closest related species. *Trichilia arenaria* sp. nov. is morphologically similar to *T. casaretti*, *T. elegans* and *T. pallens*. An identification key and comparison table for *T. arenaria* and those three species from Atlantic Forest of Espírito Santo are also presented.

Key words: Espírito Santo, Sapindales, Southeastern Brazil.

Resumo

Uma nova espécie de *Trichilia* (Meliaceae) do sudeste do Brasil é descrita, ilustrada e comparada com as espécies relacionadas. *Trichilia arenaria* sp. nov. é morfologicamente similar a *T. casaretti*, *T. elegans* e *T. pallens*. Chave de identificação e tabela comparativa para *T. arenaria* e essas três espécies da Mata Atlântica do Espírito Santo também são apresentadas.

Palavras-chave: Espírito Santo, Sapindales, sudeste do Brasil.

Introduction

Trichilia Browne belongs to the Meliaceae, which comprises nearly 550 species distributed in about 50 genera. The family has a cosmopolitan distribution (although mostly pantropical) and occurs in various types of habitats, ranging from humid forests to semiarid environments (Pennington & Styles 1975; Pennington *et al.* 1981; Mabberley *et al.* 1995). The Neotropics, African continent and Malaysia region are remarkably important for the diversity in this group (Pennington *et al.* 1981; Mabberley *et al.* 1995). *Trichilia* is a tropical genus of about 103 species, mostly found in humid forests, of these 81 are distributed in the Neotropics with the remaining 22 species from Africa (Wilde 1968; Pennington 2016). *Trichilia* species are distributed in almost all states in Brazil, possessing 46 species (24 are endemic) occurring especially in the Amazon and Atlantic Forest domains (BFG 2018).

Trichilia was described by Browne (1756) and after his publication, Candolle (1878a,b, 1905, 1907) was responsible for publishing a great

number of new species. Aside of these studies, the efforts of Wilde (1968), who presented a synopsis of the genus, were important to the systematic of the African species. We also highlight the works of Pennington *et al.* (1981) and Pennington (2016), which contributed significantly to the taxonomy of *Trichilia* by presenting a treatment of the American species.

Trichilia is recognized by flowers usually unisexual (plants dioecious), less frequently bisexual and then plants polygamous, stamens with filaments completely or partially united, rarely free, with the anthers inserted at the apex of staminal tube or over the free filaments, ovary with 1–2 collateral or superimposed ovules per locule, and loculicidal capsules with unwinged seeds (Wilde 1968; Pennington *et al.* 1981; Pennington 2016).

The new species of *Trichilia* proposed here was found in regions with sandy soils in the coastal plain of Espírito Santo state, located in Southeastern Brazil, during a taxonomic study of Meliaceae (Flores *et al.* 2017).

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Material and Methods

This study is based on the analyses of morphological features of botanical specimens deposited in CVRD, ESA, MBM, SPF, RB, UEC e VIES herbaria (acronyms according to Thiers, continuously updated). Extent of Occurrence (EOO) and Area of Occupancy (AOO) were estimated using the Geospatial Conservation Assessment Tool (GeoCAT, see Bachman *et al.* 2011) in order to evaluate the conservation status of the new species following the IUCN criteria (IUCN 2012). Finally, we obtained the approximate geographic coordinates from the information presented in the specimen labels of the herbaria and then produced a distribution map using QGIS (QGIS 2018).

Taxonomic treatment

Trichilia arenaria T.B. Flores & V.C. Souza, *sp. nov.* Fig. 1a-i

Type: BRAZIL. ESPÍRITO SANTO: Linhares, Reserva Natural Vale, trilha no fundo do viveiro, 23.XI.2001, fl., D.A. *Folli 4124* (Holotype: ESA!; isotypes: CVRD!, RB!).

Trichilia arenaria is positioned in a group of species in which the flowers have imbricate petals and filaments completely united. *Trichilia arenaria* is similar to *T. pallens* because both species have homomorphic leaflets, domatia only on the axils of secondary veins, and papillose fruits. *Trichilia arenaria*, however, differs from *T. pallens* by the unifoliolate or trifoliolate leaves with conspicuous translucent glandular punctations and striations *vs.* (3–)5–7(–9) leaflets, absent or inconspicuous translucent glandular punctations and striations, ovary densely pubescent (*vs.* ovary glabrous), and capsule trigonal (*vs.* broadly ovoid to globose).

Dioecious trees 3–6 m tall, terminal buds without cataphylls, strigose to pubescent, young branches puberulous becoming glabrous. Leaves unifoliolate or trifoliolate, 8–25 cm long; petiole 1.5–5 cm long, cylindrical to compressed, glabrous to sparsely puberulous, un-winged; petiolules terminal 5–15 mm long, lateral 3–6 mm long, canaliculate to compressed, glabrous or puberulous; leaflets 4–18 × 2–7 cm, elliptic to oblong, with conspicuous translucent glandular punctations and striations, glabrous, except for the hairy domatia on the abaxial side of secondary vein axils, midvein prominent or flat on both surfaces, secondary and tertiary veins abaxially prominent and adaxially flat; base attenuate to decurrent; apex acuminate. Inflorescence in axillary cymes, 2–9 cm long,

simple or ramified, lateral branches 0.5–2 cm long, ending in dichasia, glabrous to sparsely strigose. Flowers unisexual, rudiments of opposite sex well-developed; pedicel 0.5–1 mm long, glabrous or sparsely pubescent; sepals free or united only at the base, lanceolate to elliptic, trichomes only at the margins or scattered; corolla imbricate in bud, petals 5, free, 3–4 × 1–2 mm, yellowish to whitish, oblong to lanceolate, outer face densely papillose and sparsely strigose, inner face densely papillose; stamens with filaments completely united forming a tube, 2–3 mm long, outer face densely papillose, inner face papillose and with few strigose trichomes, apex of the tube with acute lobes alternating with the anthers and then smaller, anthers 8–10, pubescent; nectary disc annular or absent; ovary 3-locular, densely pubescent, locule with 2 collateral ovules; style glabrous; stigma 3-lobed, papillose. Capsule trigonal, shortly stipitate, apex acute, 10–15 × 9–13 mm, densely papillose and pubescent, three locular, opening by three reflexed valves. Seeds 7–9 mm long, ellipsoid, 1–2 per locule, arillode covering the lower portion.

The specific epithet refers to its occurrence in sandy substrates.

Flowering between October and January, and fruiting between December and January, with one collection fruiting in May.

Trichilia arenaria occurs in areas with sandy soils in the coastal plain of the state of Espírito Santo, Brazil. The species was found in the “Tabuleiro” Forest from the municipality of Linhares and in the “Restinga” of Guarapari (Fig. 2).

Trichilia arenaria is known by few collections in Linhares and Guarapari municipalities inside protected areas (Reserva Natural Vale e Parque Estadual Paulo César Vinha). Following the IUCN (2012) criteria the species is evaluated as Endangered, ENB1ab(i,iii), based on extent of occurrence (EOO = 593,590 km²), Area of Occupancy (AOO = 36,000 km²) and the declining population and habitat quality due to the expansion of urban and agriculture areas, extraction of sand and cultivation of *Eucalyptus* species.

Trichilia arenaria morphologically resembles *T. casaretti* C. DC., *T. elegans* A. Juss., and *Trichilia pallens* C. DC., which also have imbricate petals, stamens with filaments completely united and are present in Southeastern Brazil. *Trichilia arenaria* is recognized by the unifoliolate or trifoliolate leaves with conspicuous translucent glandular punctations and striations, domatia only on the axils of secondary veins, ovary densely pubescent,

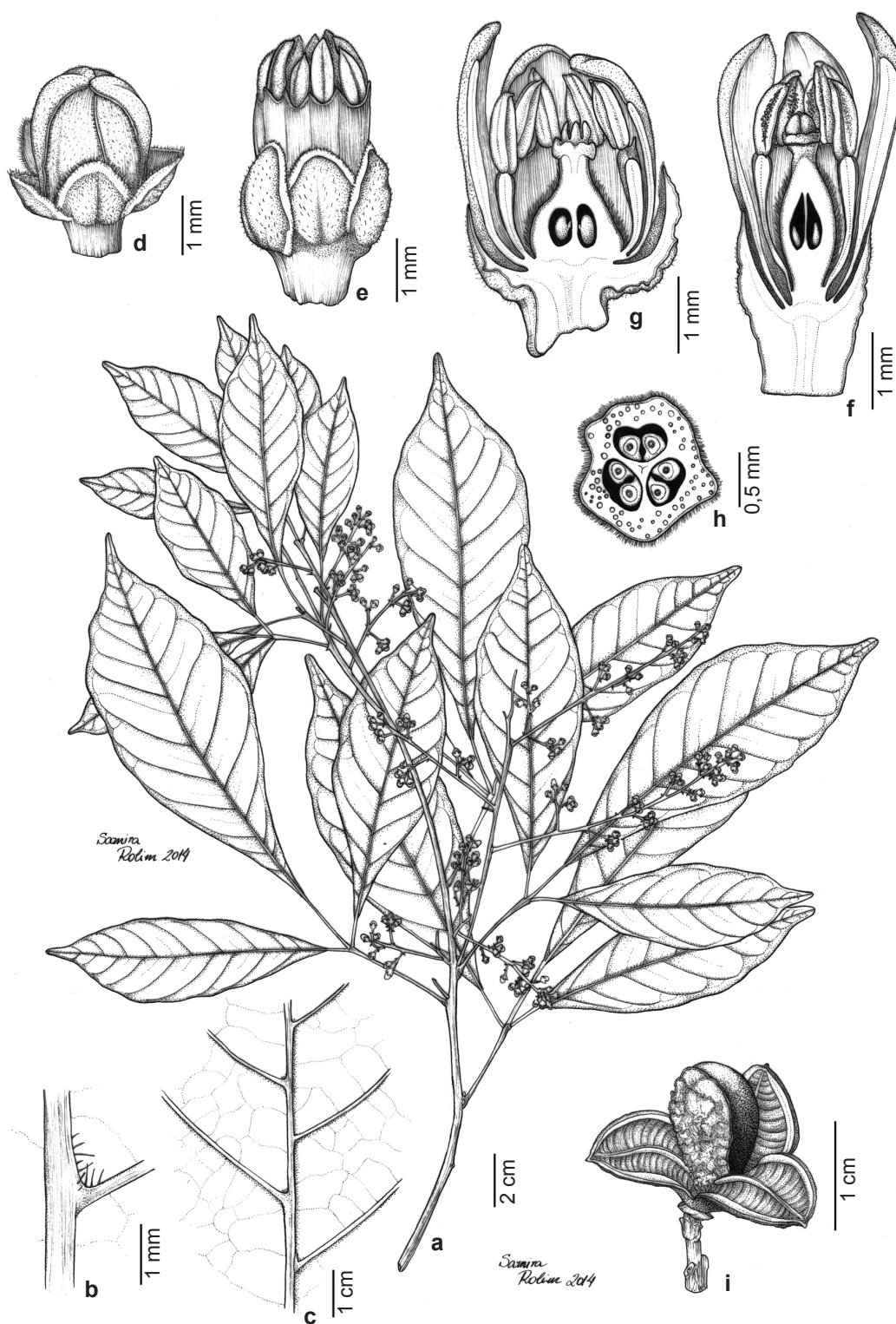


Figure 1 – a-i. *Trichilia arenaria* – a. branch with flowers; b. detail of leaf domatia; c. leaf domatia; d. flower bud; e. external view of staminal tube; f. staminate flower in longitudinal section; g. pistillate flower in longitudinal section; h. ovary in transversal section; i. fruit. (a-c, g-h. *Folli* 4124; d-f. *Folli* 1495; i. *Folli* 2616).

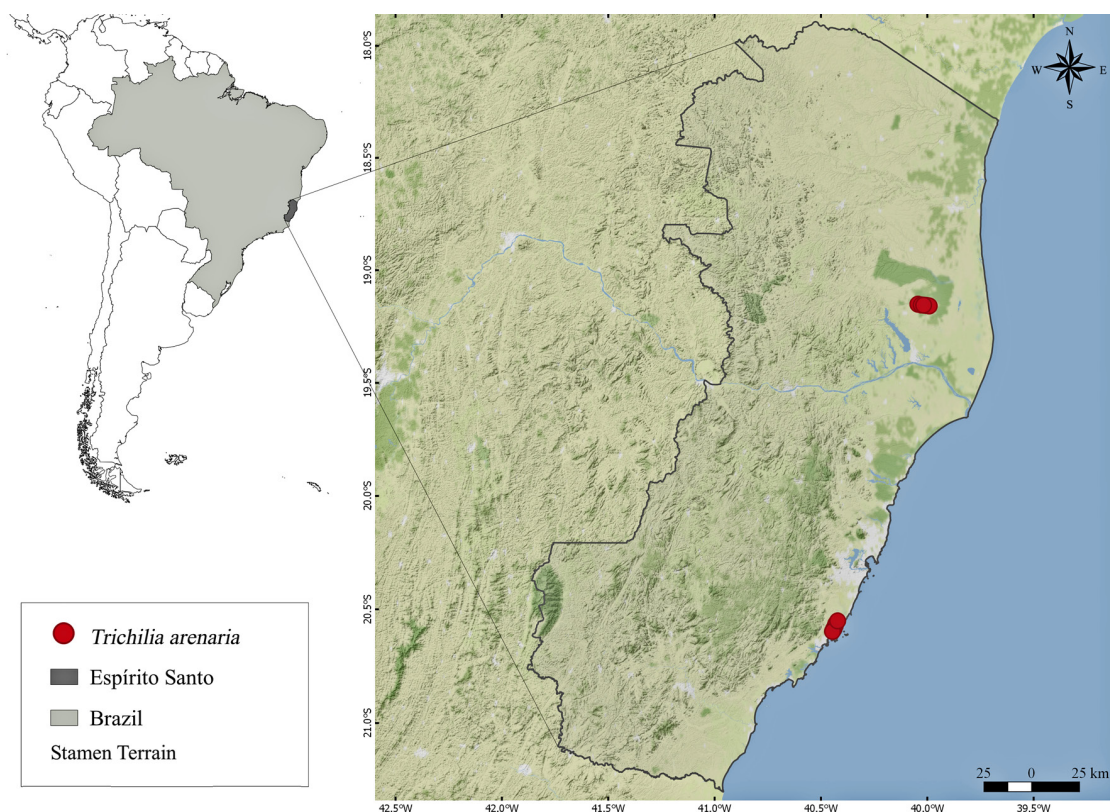


Figure 2 – Geographical distribution of *Trichilia arenaria* in the state Espírito Santo.

and papillose fruits, while in *T. casaretti* the leaves are 3–5(–11)-foliolate, translucent glandular punctations and striations absent or inconspicuous, with domatia on the axils of secondary veins, next to the margin or sparse over the blade, ovary glabrous and non-papillose fruits; in *T. elegans* the leaves are (3–)5–7(–9)-foliolate, translucent glandular

punctations and striations conspicuous, domatia only on the axils of secondary veins, ovary glabrous and papillose fruits; and in *T. pallens* the leaves are (3–)5–7(–9)-foliolate, translucent glandular punctations and striations absent or inconspicuous, domatia only on the axils of secondary veins, ovary glabrous and papillose fruits (Tab. 1).

Table 1 – Comparison of *Trichilia arenaria* morphology and related species (*Trichilia casaretti*, *T. elegans* and *T. pallens*).

	<i>T. arenaria</i>	<i>T. casaretti</i>	<i>T. elegans</i>	<i>T. pallens</i>
Number of leaflets	1–3	3–5(–11)	(3–)5–7(–9)	(3–)5–7(–9)
Translucent glandular punctations and striations	Conspicuous	Absent or inconspicuous	Conspicuous	Absent or inconspicuous
Domatia	Secondary veins	Secondary veins, and sub-marginal or sparse	Secondary veins	Secondary veins
Ovary	Densely pubescent	Glabrous	Glabrous	Glabrous
Capsule	Trigonal, papillose	Ellipsoid, not papillose	Usually ellipsoid, less frequently broadly ovoid, papillose	Broadly ovoid to globose, papillose

Pennington (2016) considered *T. pallens* to be present in the states of Bahia (based on *J.G. Jardim 3072* and *A.M. Amorim 3070*) and Espírito Santo (based on *D.A. Folli 1495*, already treated here as *T. arenaria*). The specimens from Bahia, however, present leaflets with asymmetric bases and dense

translucent glandular punctations and striations, and fruits that are longer than wide, characters that belong to *Trichilia elegans* subsp. *richardiana* (A. Juss.) T.D. Penn. as proposed by Pennington *et al.* (1981). The specimen cited for Espírito Santo is here considered to belong in the new species *T. arenaria*.

Identification key to *Trichilia arenaria* and morphologically similar species

1. Domatia on secondary veins axils, sub-marginal or disperse over the blade; fruits not papillose
.....*Trichilia casaretti*
- 1'. Domatia absent or present only on secondary veins axils; fruits papillose 2
 2. Ovary densely pubescent *Trichilia arenaria*
 - 2'. Ovary glabrous 3
 3. Leaflets with translucent glandular punctations and striations conspicuous; abaxial surface of petals and anthers papillose *Trichilia elegans*
 - 3'. Leaflets with translucent glandular punctations and striations absent or inconspicuous; abaxial surface of petals papillose and strigose, anthers papillose, pubescent or glabrous
.....*Trichilia pallens*

Additional specimens examined: BRAZIL. ESPÍRITO SANTO: Guarapari, Parque Estadual Paulo César Vinha, 14.IX.1999, fl., *A.M. Assis & C.N. Fraga 732* (ESA, VIES); 25.XI.1999, fl., *A.M. Assis & C.N. Fraga 748* (ESA, VIES); 29.XII.1999, fr., *A.M. Assis & M. Canal 764* (ESA, VIES); 4.I.2000, fr., *A.M. Assis 765* (ESA, VIES); V.2000, fr., *A.M. Assis 814* (ESA, VIES). Linhares, Reserva Natural Vale, aceiro com a Fazenda Batista, 9.I.2008, fl., *D.A. Folli 5833* (CVRD, ESA); estrada da Mantegueira, 22.V.1995, fr., *D.A. Folli 2616* (CVRD, ESA); estrada do Flamengo, 25.XI.1991, fl., *D.A. Folli 1495* (CVRD, ESA); 12.XI.2001, fl., *D.A. Folli 4115* (CVRD, ESA, RB); 29.I.2002, fr., *T. Lazzarini 4* (CVRD, ESA).

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