

Allophylus exappendiculatus (Sapindaceae), a new species from Rio de Janeiro, Brazil

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A new species *Allophylus exappendiculatus* Somner, Ferrucci & Frazão (Sapindaceae) from a remnant fragment of seasonal semideciduous forest in Rio de Janeiro, Brazil, is here described and illustrated. It can be distinguished from other known species of *Allophylus* by the simple axillary thyrses closely arranged at the base of young shoots, and by the petals without appendages or rarely with vestigial ones. It is here compared with its putative closest relatives *A. edulis* and *A. puberulus*. In addition, the micro-morphological characters of the pollen grains are described. *Allophylus exappendiculatus* is a narrow endemic currently known from six collections from the municipalities of Engenheiro Paulo de Frontin, Itaguaí and Santa Maria Madalena.

Allophylus (Sapindaceae) is a tropical genus that belongs to the tribe Paullinieae in the subfamily Sapindoideae (Acevedo-Rodríguez *et al.* 2011). Although *Allophylus* with nearly 250 species represents about 13% of the Sapindaceae, it is still a poorly studied group. The genus has never been satisfactorily monographed and the most comprehensive treatment is the work of Radlkofer (1932).

Allophylus contains monoecious or dioecious small trees or shrubs, the species being mostly distinguished by their reproductive features. Depending on circumscription, the genus contains anything from a single polymorphic species to nearly 255 species (Leenhouts 1967, Somner *et al.* 2009, Acevedo-Rodríguez *et al.* 2011). Within the Neotropics, *Allophylus* is well represented in Brazil, where 31 (11 endemic) species are known to occur (Ferrucci 1991, Somner *et*

al. 2010). The state of Rio de Janeiro alone contains eleven species, three of which are endemic (Radlkofer 1932, Somner *et al.* 2010).

The species described here occurs in a remnant fragment of the Brazilian Atlantic forest which is part of the biodiversity corridor of Serra do Mar. Pollen analysis is included in this paper to complement the characterization of this species. Pollen grains were extracted from the anthers of one collection. Samples for light microscopy (LM) were acetolyzed according to the procedure of Erdtman (1966) and mounted in glycerine jelly. Permanent slides were deposited at the Palynological Laboratory of the Universidad Nacional del Nordeste, Corrientes, Argentina (PAL-CTES). The polar axis and equatorial diameter were measured on 20 grains per specimen using a Leica DM LB2 microscope. The terminology used to describe pollen grains

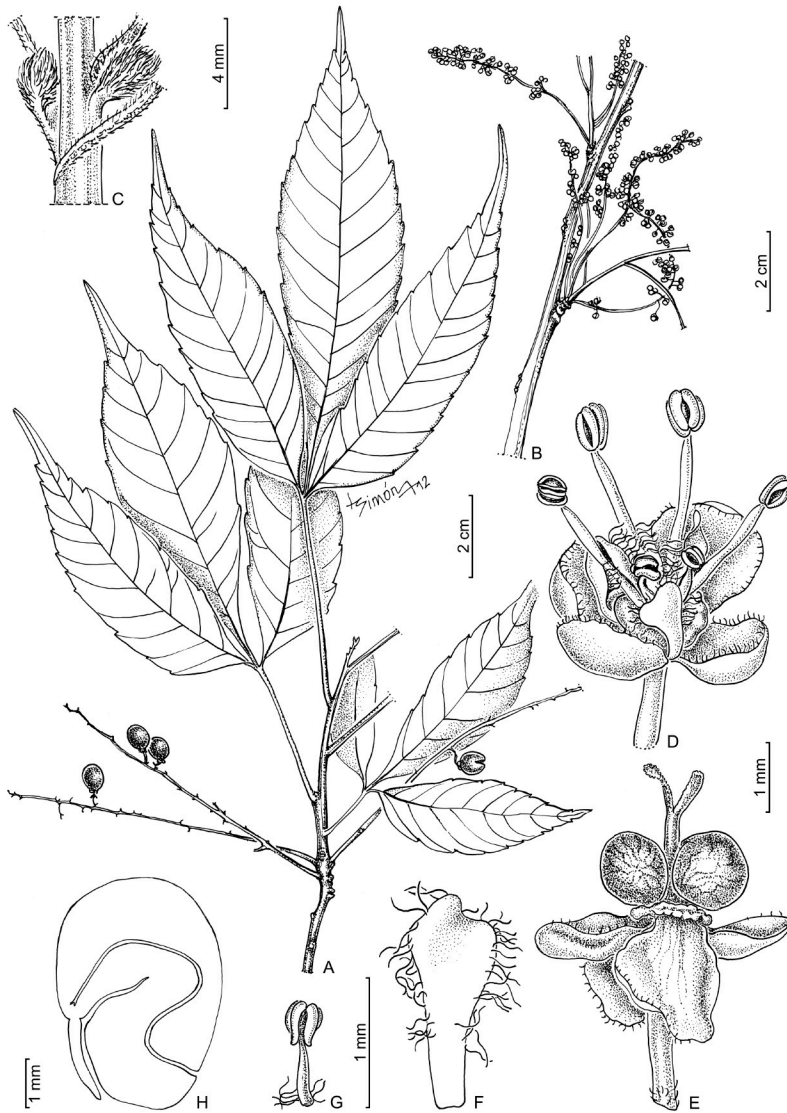


Fig. 1. *Allophylus exappendiculatus* (A, E, G and H from Lobão 491, RB; B–D and F from the holotype, RBR; C from Santos Lima 400, RB). — A: Fruiting branch. — B: Flowering branch. — C: Portion of shoot showing two prophylls. — D: Staminate flower. — E: Pistillate flower, devoid of petals and stamens. — F: Petal, ventral face. — G: Stamen of the pistillate flower. — H: Embryo (median longitudinal section).

follows that of Erdtman (1966) and Punt *et al.* (2007). Scanning electron micrographs (SEM) were made on acetolyzed pollen grains coated with gold/palladium. The equipment used was a JEOL 5800 LV scanning electron microscope operating at 20 KV.

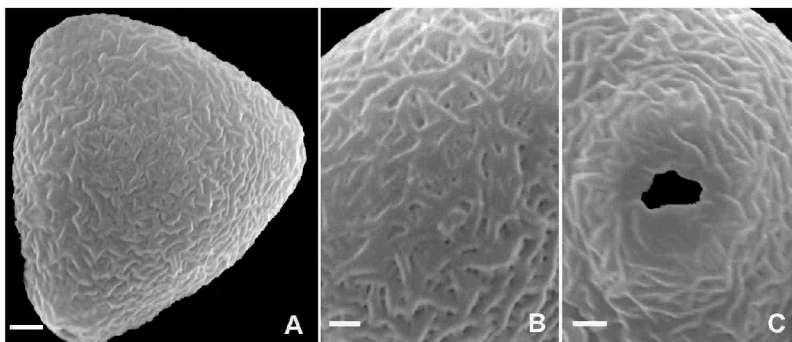
***Allophylus exappendiculatus* Somner, Ferrucci & Frazão, *sp. nova* (Figs. 1 and 2)**

TYPE: Brazil. Rio de Janeiro: Município Engenheiro Paulo de Frontin, Morro Azul do Tinguá, estrada do Pau-ferro,

Instituto Zoobotânico de Morro Azul, próximo ao alojamento, 22°29'41.1''S, 43°34'03.5''W, 7 Sep. 2009 (fl ♂), A. F. Nunes & H. F. Santos 42 (holotype RBR). — PARATYPES: Brazil. Rio de Janeiro: Mun. Engenheiro Paulo de Frontin, Morro Azul do Tinguá, estrada do Pau-ferro, Instituto Zoobotânico de Morro Azul, ao lado do alojamento, 26 Aug. 2009 (fl ♂), A. F. Nunes *et al.* 38 (RBR); same locality, subindo, lado esquerdo, atrás do alojamento, próximo ao corpo d'água, 30 May 2010 (st), A. F. Nunes *et al.* 67 (RBR), próximo ao laguinho, 27 Aug. 2010 (fl ♂), A. F. Nunes *et al.* 96 (CTES, RBR). Mun. Itaguaí. Serra do Caçador, s.d. (fl ♀, ♂, fr), J. Lobão 491 (RB). Mun. Sta. Maria Madalena, Pedreira, 28 July 1937, (fl ♀, ♂), J. Santos Lima 400 (RB).

ETYMOLOGY: The specific epithet refers to the petals lacking ventral appendages.

Fig. 2. SEM figures of pollen grains of *Allophylus exappendiculatus* (from the holotype). — **A:** Polar view. — **B:** Detail of mesocolpe. — **C:** Detail of pore. Scale bars: 2 μm for **A**, 1 μm for **B** and **C**.



Tree 4.5–9 m tall, monoecious. Outer bark flaking, light brown, inner bark cream; branches brown with whitish linear or verrucous lenticels. Leaves 3-foliolate; petioles pilose, subterete furrowed along adaxial surface, becoming glabrous, terete and slightly constricted at base, 1.5–10.2 cm long; petiolules to 1 cm long on distal leaflets, and to 0.8 cm on lateral ones; leaflets chartaceous, distal leaflet elliptic, narrow-elliptic, narrow-ovate or sub-rhomboidal, 7–17.5 $\times$ 3–7 cm, base cuneate decurrent onto petiole, lateral leaflets asymmetrical with narrower acroscopic side, obtuse- or acute-decurrent at base, 8.6–12.5 $\times$ 2.9–8 cm; apex long acuminate, often falcate, margins dentate-serrate with 16 or more acute glandular teeth, adaxial and abaxial surface glabrous except for sparse trichomes along prominent main veins, venation craspedodromous, secondary veins 7–14 pairs, straight or curved, abaxial surface with pilose domatia at angle between primary and secondary veins. Thyrses axillary, simple, spiciform, produced at very short internodes at bases of young shoots, prophylls ca. 5 mm long, villose, ochraceous, ephemeral; peduncle quadrangular, 1.5–3 cm long, rachis angular, striate, 4–10.9 cm long, pubescent (short, erect, whitish hairs); cincinni 2–6-flowered; pedicels ca. 2.5 mm long in flower, 3.5–4 mm long in fruit, articulate near middle; bracts ovate-triangular, ca. 2 mm long, bracteoles triangular, ca. 1 mm long, persistent. Flowers fragrant; sepals 4, subchartaceous, orbicular or obovate, 1–1.5 $\times$ 1–2 mm, glabrous, ciliate; petals 4, white, obovate, unguiculate, rounded or emarginate apex, 1–2 $\times$ 0.6–1 mm, ciliate, lacking appendages or these vestigial on ventral margin; nectary disk glabrous, dish-shaped; staminate flower: stamens

6–8, 2.5–3 mm long, filaments pubescent at basal 1/3, pistillode inconspicuous; pistillate flower: staminodes ca. 1 mm long, pilose at base, gynoeceum ca. 2 mm long, ovary 2-carpellate, bilobed, appressedly pubescent, style ca. 1.2 mm long, glabrous, stigmatic branches ca. 0.7 mm long. Fruits 2-coccate; cocci obovoid, ca. 7 mm in diam, pericarp glabrous, drying brown and smooth. Seeds obovoid, glabrous. Embryo with curved outer cotyledon and biplicate inner one, ca. 4.6 mm diam. Pollen grains triporate, isopolar, oblate, polar axis 17.5 (19.6) 22.5 [min (mean) max] μm , equatorial diameter 25 (27.6) 30 [min (mean) max] μm ; sexine tectate perforate, rugulate. Flowering from August to September.

DISTRIBUTION AND HABITAT. Endemic to seasonal semideciduous forest in the State of Rio de Janeiro. The species is known from a narrow area in the south-east and north of the State, where it thrives on the mountains.

Allophylus exappendiculatus resembles *A. edulis*, a species widely distributed in South America, and *A. puberulus*, a species restricted to sandy coastal plain habitats in the Brazilian states of Paraná, Rio de Janeiro and Espírito Santo (Somner *et al.* 2009, 2010). However, *A. exappendiculatus* can be distinguished from both species by the inflorescences and petal morphology. The chief distinguishing character of *A. exappendiculatus* is the presence of petals lacking appendages or having vestigial appendages as observed in the paratype *Santos Lima 400*.

An interesting trait regarding to young inflorescence-bearing shoot is the morphology of the prophyll, which has a stalk and three distal lobules resembling a reduced leaf, although the shoot frequently shows only prophyll scars. The

flowering is synchronized with the production of new leaves in late July through August.

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