

A new species of *Cupania* sect. *Trigonocarpus* (Sapindaceae) from Brazil

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A new Brazilian species of *Cupania* L., *C. ludowigii* Somner et Ferrucci, is described and illustrated. The species is restricted to Bahia and south-east Brazil, grows in the Atlantic forest and in the gallery forests crossing the 'campo rupestre' vegetation. Diagnostic characters, description, detailed illustration and taxonomic comments are given. Its relationship with *C. emarginata* is discussed. © 2004 The Linnean Society of London, *Botanical Journal of the Linnean Society*, 2004, 146, 217–221.

ADDITIONAL KEYWORDS: *Cupania emarginata* – systematic – taxonomy.

INTRODUCTION

The genus *Cupania* L. is one of several genera belonging to the tribe Cupanieae in the Sapindaceae (Radlkofer, 1879, 1933). *Cupania* comprises around 60 species that are mostly neotropical in distribution, although a few members extend to the New World subtropics. Among the American genera of Cupanieae, *Matayba* Aubl. is the closest to *Cupania*, because they share numerous synapomorphic characters. As a rule *Cupania* has five free sepals, while in *Matayba* these are fused forming a cupular calyx, 5-lobed to near the base; another remarkable distinction is the precocious aperture of the calyx in the latter genus. *Cupania* is not always easily separable from *Matayba* in terms of free sepals vs. connate sepals as these vary to different degrees. However, the precocious aperture of the calyx is a constant feature for *Matayba* species. Within American Sapindaceae this is a character with generic value; it is also present in all the species of two genera of the tribe Paullinieae, *Lophostigma* Radlk. and *Thinnouia* Triana et Planch.

The most recent account of *Cupania* was presented by Radlkofer (1933) in his comprehensive treatment of the family. Following Radlkofer's work several new species have been described in Brazil, one species from Maranhão (Gleason & Smith, 1934) and the other three from Minas Gerais (Guarim Neto, 1993). The present state of knowledge on *Cupania* indicates that the main centre of distribution is in Brazil with 27 species.

During the preparation of Sapindaceae for a number of local projects (e.g. Flora of Morro de Pai Inácio and Serra da Chapadinha, Bahia; Flora of São Paulo) in Brazil, the following new species was found.

MATERIAL AND METHODS

This study is based on the published literature, the analysis of herbarium material and fieldwork. Herbarium material from ALCB, CESJ, CTES, M, R, RB, RBR, P, SPF, SPSF and UEC was used.

Leaf surfaces were sputter-coated with gold and studied with a JEOL 5800 LV scanning electron microscope. Vouchers for these SEM analysis are:

Cupania emarginata Cambess. Brazil. Espírito Santo: Hatschbach & Guimaraes 46995 (CTES).

C. ludowigii Somner & Ferrucci sp. nov. Brazil. Rio de Janeiro: Braga, Somner & Santos 4912 (CTES).

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DESCRIPTION OF THE NEW SPECIES

CUPANIA LUDOWIGII SOMNER & FERRUCCI SP. NOV.
(FIGS 1–3)

Type: BRAZIL: Rio de Janeiro: Resende, Itatiaia National Park, main road, 15.vii.1998 (fr), J. M. Braga, G. V. Somner & I. Santos 4912 (holotype: RBR!; isotypes: CESJ!, CTES!, M!, NY!, R!, RB!, US!).

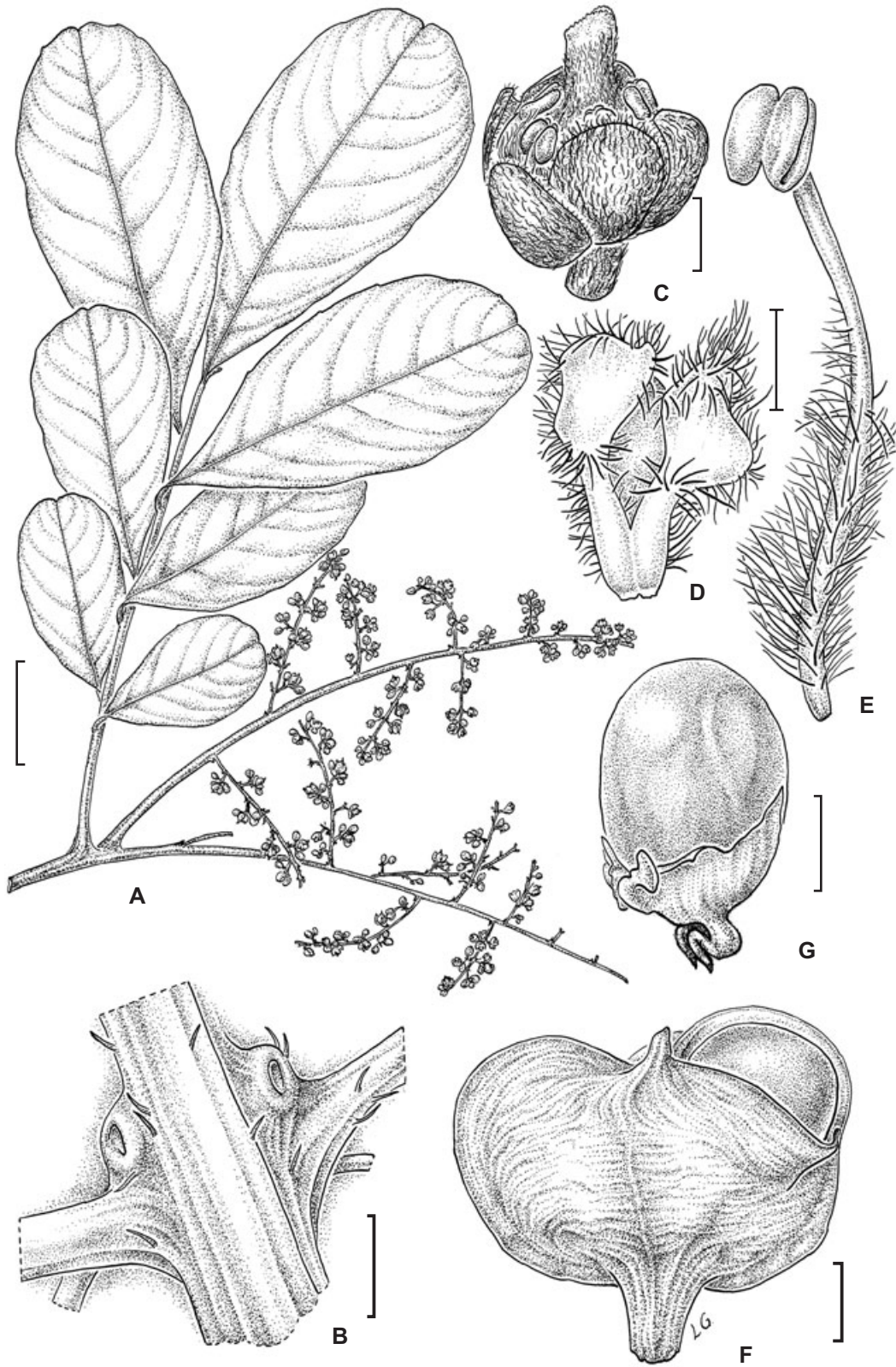
Diagnosis: *C. emarginatae* affinis sed folis 6–13 foliolate, foliolis subtus in axillis nervorum foveolatis, capsulis obtriangularibus, lateribus magis compressis, leviter emarginatis, semine cum arillo eroso, flavo-aurantiaco differt.

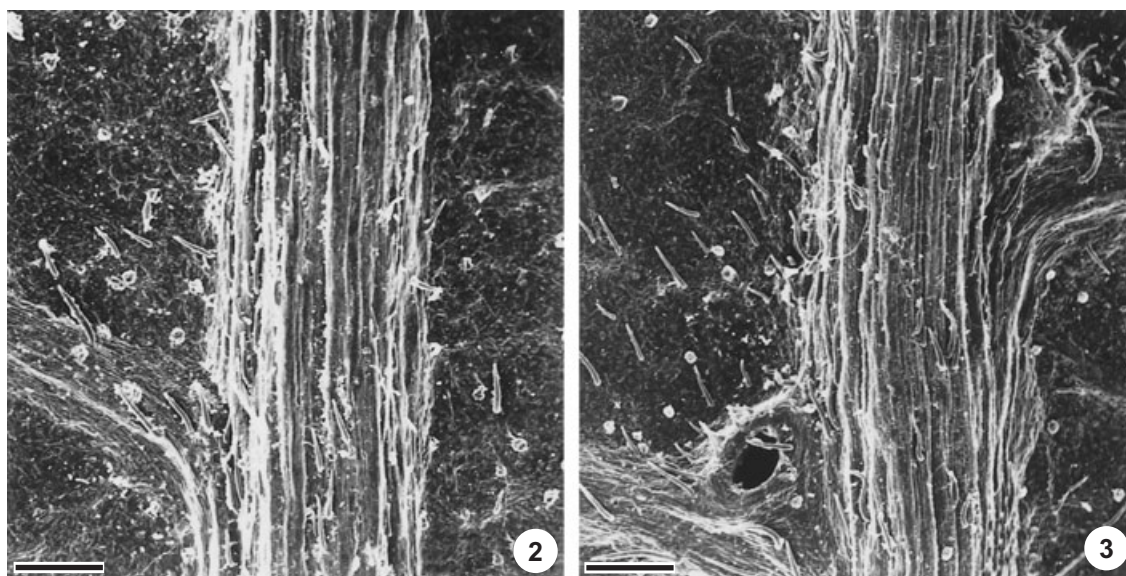
Description: Tree 10–20 m tall, monoecious, with morphologically bisexual flowers, functionally unisexual as pistillate and staminate flowers; cork rough with superficial fissures, bark orange brown and wood yellowish white. Young parts and inflorescences with short, appressed-pubescent, whitish to light brown hairs. Branchlets dark brown, minutely lenticellate. LEAVES alternate, pinnately compound; leaflets 6–13, alternate to opposite; petioles 2.5–5 cm long, bicanaliculate adaxially, swollen toward the base; petiolules 1–5 mm long; rachis 3.7–11.5 cm long, somewhat flattened, bicanaliculate, ending in a short-terminal process; leaflets obovate, elliptic or oblong, 3.5–8.6 × 1.9–4 cm, retuse to emarginate at apex, mostly acute or rounded at base, margin entire, slightly undulate, occasionally subrevolute, subcoriaceous, dull, adaxial surface glabrous, sometimes puberulent on midrib, abaxial surface sparsely appressed-puberulent with pit domatia in the vein axils. Thyrses axillary, double, shorter than the subtending leaf; peduncle 2–4 cm long, rachis 4–10 cm long, angular, striated; cincinnus shortly pedunculate, few-flowered, pedicel < 1.5 mm long, in the fruit < 3 mm long, articulated at the middle, bracts triangular-ovate, 1 mm long, pubescent, bracteoles similar to the bracts but smaller. FLOWERS yellowish white, actinomorphic, 3.5–5 mm long, sepals 5, cucullate, the outer two oblong, 1–1.5 mm long, the inner obovate, c. 2 mm long, outside appressed-hairy; petals 5, obovate, shortly clawed, erose, 1–1.5 mm long, the edge pilose, appendage a little longer than the petal, bifid, villose; nectary disk glabrous; stamens 8, staminate flowers: stamens 3.5–4 mm long, villose in the lower half; pistillode pubescent; pistillate flowers: stamens indehiscent, 1.5–2 mm long; the fila-

ments villose; gynoecium c. 3–4 mm long, ovary obovate, laterally flattened, pubescent. CAPSULES loculicidal, coriaceous, short-stipitate, obtriangular in outline, 2-(3)-valved, hardly flattened laterally, slightly emarginate at apex, 1.9–2.2 × 1.6–2.3 cm, included the stipe 0.3–0.4 cm long; epicarp yellowish brown, black in dried specimens, glabrous, endocarp with pilose septum, exuding a sticky substance. Seeds 1–2, obovoid, c. 1.3–1.6 × 0.8 cm, tegument dark brown, shiny; the lower 2/3 covered with an orange yellow aril, at base two linear appendages. Embryo bent, cotyledons thick.

Specimens examined: BRAZIL: Bahia: Lençóis, Chapadinha, Serra do Brejal, 25.iv.1995 (fl), Melo *et al.* PCD 1786 (ALCB). Espírito Santo: São José do Caparaó, 03.viii.1983 (fr), Hatschbach 46677 (CTES). Minas Gerais: Lima Duarte, Mata do Alfredo, Fazenda da Serra, São José dos Lopes, 22.i.1995 (fl), Almeida 146 (R, RBR); Caratinga, F. M. Claros, 21.iii.1984 (fl), Andrade & Lopes 114 (CTES); Juiz de Fora, Campus da UFJF, 19.xi.1990 (fr), Borges s.n. (CESJ, RBR); Descoberto, Reserva Biológica da Represa do Grama, 7.vii.2001 (fr), Castro *et al.* 505 (CESJ, RBR); Juiz de Fora, 3.ix.1970 (fr), P. L. Krieger & Urbano s.n. (CESJ 9062); Laranjal, 7.ii.1971 (fl), Krieger & Marilene (CESJ 10005); PFE Rio Doce, Marliéria, 18.vii.1993 (fr), Lombardi 378 (CTES); Estação Biológica de Caratinga, 22.iv.1984 (fr), Lopes & Andrade 297 (CTES); Tombos, Fazenda da Limeira, 25.vii.1935 (fr), Barreto 6068 (R); Chácara, 21.i.1977 (fl), Ponce 15613 (RBR); Serra da Mantiqueira, s.d. (fl), Saldanha s.n., Schwacke 4931 (M); Ouro Preto, Serra das Camarinhas, 21.x.1894 (fr), Schwacke 11050 (M); between Rio Novo and Capoeirinha, 21.ix.1895 (fr), Schwacke 11825 (M); Juiz de Fora, Poço d'Anta, forest, 14.iv.1977 (fl), Silva 14866 (CESJ); Juiz de Fora, Morro do Imperador, 1993 (fr), Silveira & Lisboa s.n. (CESJ, RBR). Rio de Janeiro: Resende, Itatiaia National Park, Abrigo, 01.vi.1995 (fr), Braga *et al.* 2447 (RB); Friburgo, Alto Macaé, 11.iv.1885 (fl), Glaziou 17496 (P); Resende, Itatiaia National Park, 29.i.1946 (fl), Lima 26 (RB); idem, 11.ii.1993 (fr), Sylvestre *et al.* 939 (RB); Nova Friburgo, Macaé de Cima, sitio Fazenda Velha, São Caetano, 01.vi.1990 (fl), Lima *et al.* 3778 (RB); Barra Mansa, 10–16.vi.1987 (fr), Mello 5261 (R); São Paulo: São Paulo, Serra da Cantareira, 07.viii.1969 (fr), Braga s.n. (SPSF 7265); São Paulo, Jardim Botânico, 09.v.1940 (fr), Handro s.n. (SPF 106.876); São José dos

Figure 1. *Cupania ludowigii* sp. nov. A, portion of flowering branch. Scale bar = 2 cm. B, leaflet, detail of pits domatia on the abaxial surface. Scale bar = 0.5 mm. C, pistillate flower. Scale bar = 1 mm. D, petal with adnate appendage. Scale bar = 0.5 mm. E, stamen from staminate flower. Scale bar = 0.5 mm. F, fruit showing a seed. Scale bar = 4 mm. G, seed, lateral view. Scale bar = 4 mm. (A, C–E, Andrade & Lopes 114, CTES; B, Krieger & Marilene, 10005 CESJ; F–G, Krieger & Urbano, 9062 CESJ.)





Figures 2–3. Scanning electron micrographs of abaxial surface of *Cupania* leaflets, detail of the intersection of the main and secondary ribs. Fig. 2. *C. emarginata*, domatia absent (Hatschbach & Guimarães 46995, CTES). Fig. 3. *C. ludowigii* sp. nov. showing pit domatia. (Braga *et al.* 4912, isotype CTES). Scale bars = 200 μ m.

Campos, Reserva Boa Vista, 12.i.1986 (fr), Silva & Capellari 1374B (UEC); Idem, 21.vii.1986 (fr), Silva & Capellari 1458 (UEC).

Distribution, habitat, and ecology: Restricted to south-east Brazil, recorded for the states of Bahia, Esp rito Santo, Minas Gerais, Rio de Janeiro and S o Paulo. *Cupania ludowigii* grows in the Atlantic forest and in the gallery forest included in the ‘campo rupestre’ vegetation, occurring on stony hydromorphic soils at an altitude of 660–1100 m a.s.l. Flowering from January to June; fruiting from April to February.

Local names and uses: In Minas Gerais the local name is ‘camboat -vermelho’, and according to the observations of Borges (CESJ 24732) the seeds are consumed by the bird ‘sanha o-de-fogo’ (*Piranga flava*).

DISCUSSION

According to Radlkofer (1879, 1933) the genus *Cupania* consists of four sections based chiefly on fruit morphology. He used characters such as the shape of the fruit and the width of the septal walls to delimit the sections. Moreover, the position of some of the species treated was provisional because no fruiting material was available at the time. The genus is in need of a taxonomic revision, in order to treat correctly the position of the species in the sections. *Cupania ludowigii* on the basis of fruit morphology can be placed in the section *Trigonocarpus* (Vell.) Radlk., characterized by

tri- or bi-winged capsules with narrow septal walls. Flowering and fruiting characters are known for only five out of nine Brazilian species in the section (Radlkofer, 1933; Gleason & Smith, 1934; Guarim Neto, 1993).

Within the section, *C. ludowigii* is closely related to *C. emarginata*, although the two species have rather distinctive characters (see Table 1). *Cupania emarginata* is distinguished from the new species by leaflets lacking domatia (Fig. 2A) and seeds completely covered by a whitish aril; and is always restricted to the restingas (low forest or scrub on sandy formations by the sea shore) of north- and south-eastern Brazil. The examination of some classic material such as Glaziou 17496, Schwacke 4931, 11050 and 11825, all of which are mentioned by Radlkofer (1933) under *C. emarginata*, led us to the conclusion that he overlooked the leaflets with pit domatia (Fig. 2B) and the only slightly flattened capsules present in these samples. Among the others specimens cited under *C. emarginata* by Radlkofer (1933) not yet examined by us, only those collected in the restinga could belong to *C. emarginata*.

The specific epithet honours Ludowig Thimotheus Radlkofer, noted authority on the Sapindaceae.

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Table 1. Comparison of the diagnostic characteristics of *Cupania ludowigii* sp. nov. and *C. emarginata*

Characters	<i>C. ludowigii</i>	<i>C. emarginata</i>
Leaves	6–13-foliolate	4–8-foliolate
Domatia	Pit domatia	Absent
Appendage of the petals	Slightly longer than petals	Equal length to petals
Capsules	Obtriangular, hardly flattened laterally	Obcordiform, flattened laterally
Epicarp	Yellowish brown	Yellowish green
Endocarp	With sticky exudate	Without exudate
Aril	Orange yellow, with two linear appendages at base; covering the lower 2/3 of the seed	Whitish, with a short appendage at base; completely covering the seed
Habitat	Atlantic forest and in the gallery forest of the 'campo rupestre' formations	Restinga (low forest to scrub on sandy formations by the sea shore)

Juiz de Fora (CESJ); Instituto de Botânica del Nordeste, Corrientes (CTES); Botanische Staatssammlung, München (M); Muséum National d'Histoire Naturelle, Paris (P); Museu Nacional, Rio de Janeiro (R), Jardim Botânico do Rio de Janeiro (RB); Departamento de Biologia Vegetal, Universidade Federal Rural do Rio de Janeiro, Seropédica (RBR); Departamento de Botânica, Universidade de São Paulo, São Paulo (SPF); Instituto Florestal, São Paulo (SPSF) and Departamento de Botânica, Universidade Estadual de Campinas, Campinas (UEC). We also thank J. M. Braga for his efforts in providing representative material for describing this new species, J. P. Pereira Carauta for checking the Latin diagnosis, Dr R. Pirani for helpful comments on the manuscript, and to L. Gómez for inking the sketches prepared by M. Ferrucci. Financial support for the second author was provided

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