

Pilea carautae (Urticaceae), a new and endemic species from South-eastern Brazil

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Summary. *Pilea carautae* M. D. M. Vianna & R. J. V. Alves (Urticaceae) is described and illustrated. This new species is endemic to the Cabo Frio region in Rio de Janeiro State, Southeastern Brazil. *P. carautae* is considered threatened by IUCN standards due to its extremely restricted geographic area of occurrence.

Key Words. Brazil, Neotropics, *Pilea*, Rio de Janeiro, taxonomy, Urticaceae.

Introduction

With approximately 715 species, *Pilea* Lindl. is the largest genus of the Urticaceae and one of the largest in the Urticales (Monro 2004). The genus occurs in tropical, subtropical and temperate regions with the exception of Australia, New Zealand and Europe. *Pilea* is easily distinguished from other Urticaceae by its opposite leaves with a single ligulate stipule (the latter rarely much reduced or even absent) in each axil.

The main revision of the Urticaceae was carried out by Weddell (1847, 1852). Additional treatments were published by Gaudichaud (1830), Bentham & Hooker (1883), Engler (1894) and Friis (1989). In the Neotropics the family was treated mainly in local floras, (Adams 1970; Burger 1977). Several new species were described from the Andes (Killip 1939), Antilles (Standley & Steyermark 1952) and from Central America by Monro (1999, 2001). Very few treatments exist from Brazil, and these are mainly from the South and Southeast (Brack 1987, 1989, 1993; Rocha 1986).

Miquel (1853) listed 11 species of *Pilea* from Brazil. Afterwards, Brack (1987, 1993) described three new taxa from Brazil and, since then, there has been no new contribution to the genus from this country.

Groult (1999a) studied the neotropical species of *Pilea* from the *P. microphylla* affinity, presenting valuable data which enhance comprehension of this small-leaved group, enumerating the known species, and providing determination keys and comments about their ecology and uses. The new species described and illustrated herein also belongs to this complex (see NOTES). Information on further species of the *P. microphylla* complex can be found in Groult (1999b).

Monro (2006) proposed a phylogenetic framework for the strategic revision of *Pilea*, based on cpDNA, nrDNA and morphology.

Materials and Methods

Several live populations of the new species were studied and sampled in the field. Vouchers were deposited in the R and RB herbaria. The preserved material was compared with all available *Pilea* samples in the herbaria at BHCB, GUA, MBM, MG, R, RB, SP, SPF and UB, and with digital images in online databases (MO, NY, P). In order to establish whether the differential characters of *P. carautae* were not an induced response to the specific, more arid microclimate of Cabo Frio, several plants were cultivated in Rio de Janeiro, side by side with native *P. microphylla*, in two distinct environments, one entirely exposed, and the other partly shaded. Fresh material of both *Pilea microphylla* and the new species were observed under a stereomicroscope at magnifications of 10 – 30×.

Description

***Pilea carautae* M. D. M. Vianna & R. J. V. Alves sp. nov.**
P. microphyllae similis, sed foliis exstipulatis, foliis et caule crassis, habitu fruticoso, pedunculo inflorescentiae masculae longo differt. Typus: Brazil: Rio de Janeiro, Arraial do Cabo, Ilha do Cabo Frio, ponta do Maramutá, 23°01'S, 42°03'W, 1 m, 21 Dec. 2006, M. D. M. Vianna Filho 1450, R. J. V. Alves 6330 (holotypus R!; isotypi RB!, GUA!).

<http://www.ipni.org/urn:lsid:ipni.org:names:77107544-1>

Perennial, terrestrial, monoecious, saxicolous, fruticose, entirely glabrous herbs up to 25 cm, erect when young, later prostrate, rooting at the base and adventitiously when prostrate. Branches fleshy, succulent, prostrate, profusely branched. Stem 1 – 2 mm in diam., internodes

2 – 10 mm long, slightly striate, without visible cystoliths. Leaves without any visible trace of stipules, opposite, anisophyllous, with canaliculate, 3 – 6 mm long petioles, lamina obovate to rarely orbicular, fleshy and succulent, 5.0 – 13 × 2.6 – 7 mm, with a rounded to subacute asymmetrical apex, base slightly cuneate to attenuate, asymmetrical; adaxial surface of lamina light green, drying grey to brown, with linear, slightly curved

cystoliths; margins entire, slightly revolute, primary nerves pinnate with 2 – 3 secondary pairs. Inflorescences unisexual, bracteate, 0.3 mm long, in pairs, either both pistillate or one of each sex. Staminate inflorescences branched, 5 – 10 mm long, dichasia compact, with 5 – 9 flowers, mature peduncle up to 5 mm long, glabrous; pedicels 1 – 2 mm long, 0.5 mm in diam., glabrous. Staminate flowers with 4-lobed perigonium, tepals ovate,

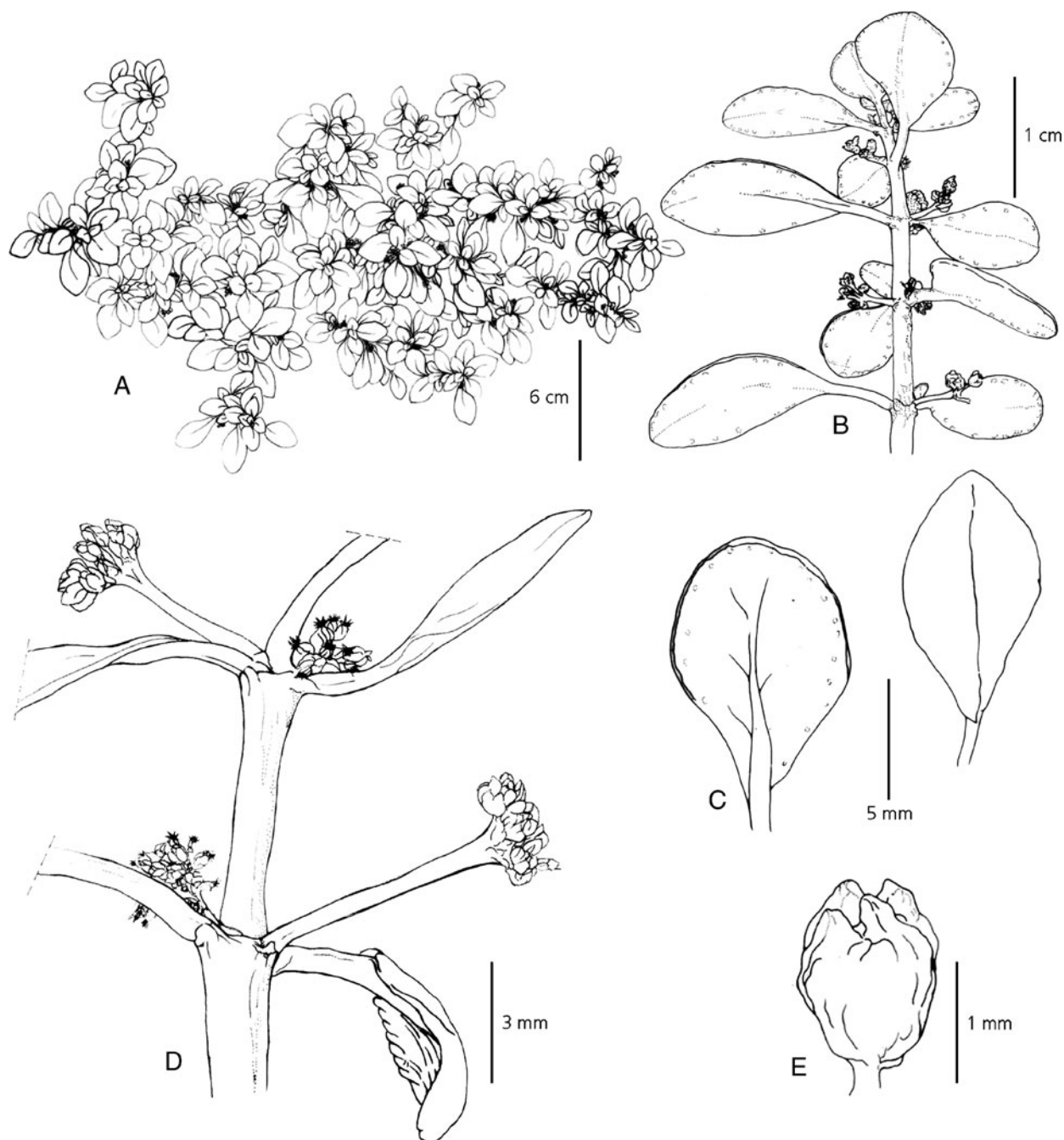


Fig. 1. *Pilea carautae*. A habit; B apex of fertile branch; C abaxial and adaxial leaf surfaces, respectively; D detail of pistillate and staminate inflorescences; E bud of staminate flower. DRAWN BY RACHEL ROSADAS.

subapical appendices c. 0.2 mm. Stamens 4, filaments c. 1.5 mm and anthers c. 0.5 mm long; pistillate inflorescences 1 or 2 per axil, 10 – 25 mm, bearing 11 – 15 flowers in a single compact dichasium, peduncle 0.5 – 1 mm long; pedicels c. 2 mm long, pistillate flowers oval to 0.5 mm long; perigonium unequally 3-lobed; central lobe larger and ovate; lateral lobes smaller and lanceolate; stigma 1, penicillate, hyaline. Achenes c. 0.8 mm long, asymmetric, ovate. Figs 1 and 2.

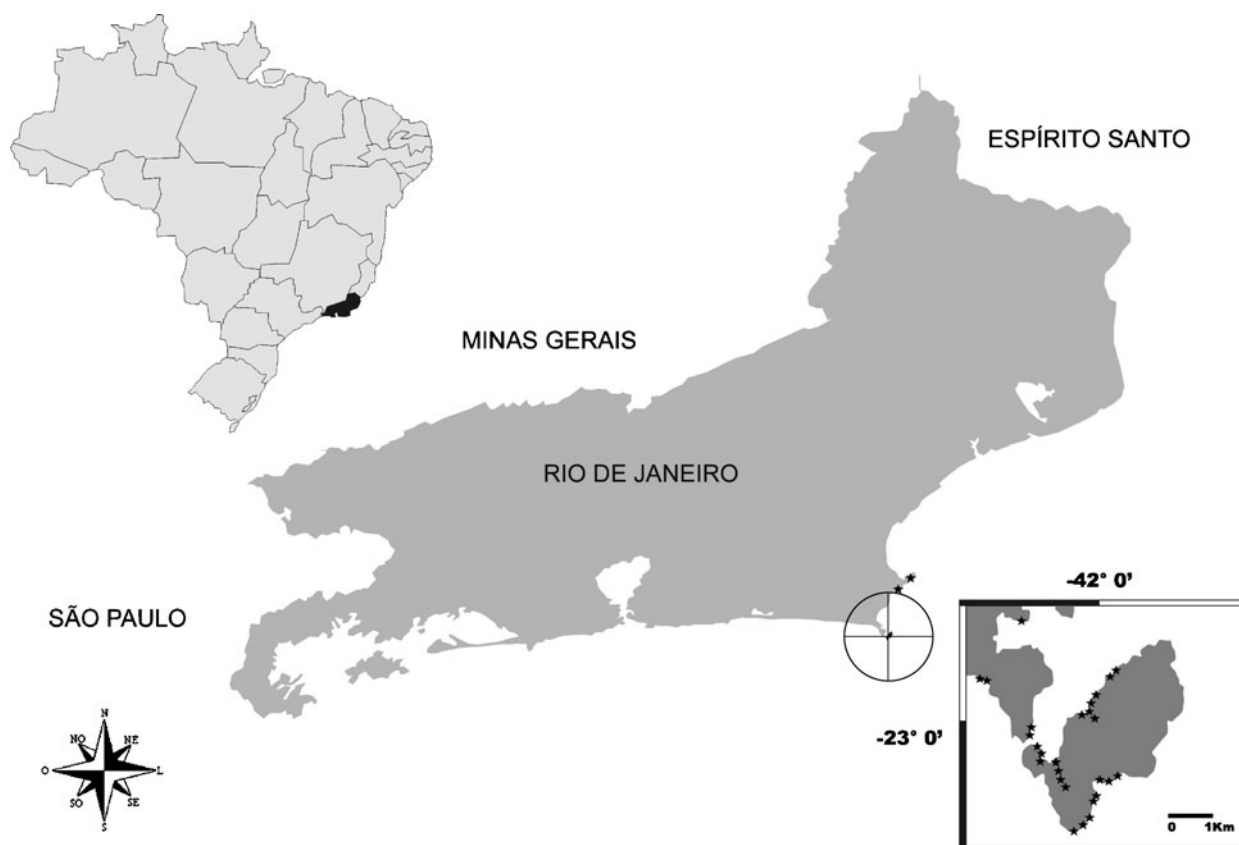
DISTRIBUTION. Brazil: Rio de Janeiro, Mun. Cabo Frio, Arraial do Cabo and Armação dos Búzios (collections marked by stars in Map 1). Known only from the Cabo Frio Diversity Centre, a recognised floristic hotspot, from the municipalities of Cabo Frio, Armação dos Búzios and Arraial do Cabo. The largest known

populations are on the small island of Cabo Frio, which belongs to the latter municipality and from where many cases of endemism have already been reported (Leme 1985; Tatagiba *et al.* 2004).

SPECIMENS EXAMINED. BRAZIL. Rio de Janeiro: mun. Armação dos Búzios. Praia Azeda–Azedinha, 6 June 1991, *D. Sucre* 11459 (RB); restinga da praia de José Gonçalves, 0 – 100 m a.s.l., 11 Jan. 1979, *G. Martinelli* 5567 (RB). Arraial do Cabo, Morro da Álcalis, trilha para as antenas, approx. 150 m, 21 Dec. 2006, *M. D. M. Vianna Filho, A. F. P. Machado & O. A. Santos* (R); Ilha do Cabo Frio, Focinho do Cabo, rochedo adjacente ao heliponto, 15 Dec. 2005 (fl., fr.), *Vianna Filho* 1185 & *al.* (R); Ilha do Cabo Frio, Pedra Vermelha, cult., 15 Dec. 2005 (fl., fr.), *Vianna Filho & N. Silva* (R); Ilha do Cabo Frio, Ponta do Maramutá a 1 m sobre o nível do mar, 21 Dec. 2006, *Vianna Filho & R. J. V. Alves* 6330



Fig. 2. *Pilea carautae*. A habit; B apex of fertile branch; C detail of bud, showing pistillate inflorescences (scale: 1 mm); D detail of bud, showing staminate inflorescences (scale: 3 mm). PHOTOS BY M.D.M. VIANNA FILHO.



Map 1. Location of *Pilea carautae* populations in Brazil, Rio de Janeiro State and Ilha do Cabo Frio, vicinity of Arraial do Cabo.

(GUA, R, RB); Porto da Ilha do Cabo Frio, sobre rocha, 15 Dec. 2005 (fl., fr.), *Vianna Filho* 1216 & *T. T. Carrizo* (R); sob o muro ao lado do Farol da Ilha do Cabo Frio; 15 Dec. 2005 (fl., fr.), *Vianna Filho* 1230 & *T. T. Carrizo* (R); Trilha para o farol da Ilha do Cabo Frio, 2 April 2007 (fl., fr.), *Vianna Filho* 1340 & *al.* (R); rochedos na ilha do Cabo Frio, *E. Ule* s.n., 1899 (R). Cabo Frio. Praia Grande, 15 Jan. 1967, *D. Sucre* 1330 (RB); 17 Dec. 1967, *D. Sucre* 1528 (RB); 10 August 1967, *D. Sucre* 1319 (RB).

HABITAT. Native populations of *Pilea carautae* are abundant as saxicolous on nepheline syenite outcrops (Fig. 2) or terrestrial on slopes, from sea level to c. 150 m a.s.l., on hilltops with xeric vegetation typical of the Cabo Frio Diversity Centre. This species often grows on slopes with a highly saline substrate.

Within its restricted range, *P. carautae* was also collected in fissures of a stone bridge (*D. Sucre* 1528). On Cabo Frio Island, it prefers open xeric vegetation and was also collected on the walls of the old lighthouse at 395 m (*Vianna Filho* 1230 & *T. T. Carrizo*). *P. carautae* was observed on two more islands in the vicinity of Cabo Frio, Ilha dos Franceses and Ilha dos Porcos (*Nilber Silva, pers. comm.*), and in coastal strand vegetation in the same area, although no voucher specimens are available from these localities.

CONSERVATION STATUS. According to IUCN (2001) Red List criteria, this species is considered critically endangered — CR (B1abi.ii) because its known distribution is estimated to be less than 100 km², restricted to the Cabo Frio region.

Diagnostic character key separating *Pilea trianthemoides*, *P. microphylla* and *P. carautae*

1. Cystoliths on both sides of the leaf *P. trianthemoides*
- 1'. Cystoliths on the upper surface of the leaf 2
2. Stipules present, delicate herbs up to 5 cm, staminate inflorescence, peduncle to 0.1 – 0.5 mm *P. microphylla*
- 2'. Stipules absent, suffrutescent herbs up to 25 cm; leaves and stems very succulent, staminate inflorescence peduncle to 5 – 10 mm *P. carautae*

ETYMOLOGY. The species name honours Dr Jorge Pedro Pereira Carauta, Associate Professor, Museu Nacional of Rio de Janeiro, who has dedicated a lifetime of research to the Brazilian species of Urticales.

NOTES. Common characters of both *Pilea carautae* and *P. microphylla* are the prostrate habit, cystoliths in the adaxial leaf epidermis, anisophyllous leaves, pistillate inflorescences sessile to very shortly pedunculate (peduncles much shorter than the petioles) and pistillate flowers with one perianth segment longer than the others. However, *P. carautae* differs from *P. microphylla* by its fruticose habit with opposite branches, fleshy stem, larger, absence of stipules, fleshy and succulent leaves (5.0 – 13.0 × 2.6 – 7.0 mm) with a honey-combed abaxial surface, and by longer staminate inflorescences (5.0 – 10.0 mm long). In herbaria *P. carautae* is sometimes confused with *P. trianthemoides* from which it can be distinguished by the anisophyllous leaves with cystoliths in the adaxial epidermis, fragile, herbaceous and fleshy stems, lack of stipules, larger stature, and by being entirely glabrous.

From the available collections, the distributions of *Pilea microphylla* and *P. carautae* do not overlap, as *P. carautae* is known only from the Cabo Frio micro-region while *P. microphylla* is widespread but has not been registered in the range of the former.

In cultivation, the exposed plants relied on rain-water, while the ones kept inside were abundantly watered. Apart from the expected relatively longer internodes and faster growth of the shaded individuals, which also developed darker green leaves, *Pilea carautae* retained its differential characters. Unlike the cultivated plants of *P. microphylla*, those of *P. carautae*, kept under both conditions, died after several months, first shedding all leaves, then suffering necrosis beginning with the internodes. The difficulties encountered during *ex situ* cultivation of *P. carautae* emphasise the importance of conserving the specialised xerophilous vegetation restricted to the Cabo Frio vicinity. However, as long as the Brazilian Navy continues to guard Cabo Frio Island from economic activities, this locality will remain a safe haven for *P. carautae* and several other rare, endemic and/or endangered species.

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