

First record of *Croton echinocarpus* (Euphorbiaceae: Crotonae) in São Paulo state, Brazil

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Abstract: *Croton* is the second largest genus of Euphorbiaceae with about 1200 species worldwide. Brazil has around 350 species of *Croton* in all kinds of habitats, but with a great number of species concentrated in the eastern part of the country. The present work increases the number of *Croton* species in São Paulo to 38, due to our recent discovery of *Croton echinocarpus* in this state. We also provide comments on the taxonomy, photographs and a distribution map for this species.

Key words: plant distribution extension, new record, Neotropics, South America

Croton L. is a typical genus from dry and moist vegetation in the tropics and subtropics worldwide (van Ee et al. 2011). It is the second largest genus of Euphorbiaceae with about 1200 species (Govaerts et al. 2000), which ranks *Croton* as the 11th largest Angiosperm genus (Frodin 2004). The most species-rich region for this genus is the Neotropics, with main centers of diversity in Brazil, the West Indies, and Mexico (Burger and Huft 1995). The genus has a great morphological diversity, ranging from herbs to trees, and occupies a wide range of habitats (Caruzo et al. 2011). Despite its great morphological diversity, *Croton* species can be easily recognized in the field due to its conspicuous stellate or lepidote trichomes, narrow or condensed thyrsoid inflorescences of unisexual flowers, clear or colored latex, frequent petiolar glands, and senescent leaves that turn orange before abscising (Riina et al. 2009).

In Brazil, *Croton* is represented by around 350 species, including herbs, shrubs, trees, and rarely lianas, in all kinds of habitats, but with a great number of species concentrated in the eastern part of the country (Caruzo et al. 2010). According to Caruzo and Cordeiro (2007), the genus is represented by 37 species in São Paulo state (SP). The present work documents the first record of *Croton echinocarpus* Müll.Arg. (Müller Argoviensis 1865;

88) in SP, which increases the number of *Croton* species that occur in this state to 38.

Our results were based on field observations, in addition to the examination of collections mainly from the following herbaria: BHCN, MBM, SP, SPF (abbreviations according to Thiers 2015). *Croton echinocarpus* was recorded by Müller Argoviensis (1873) only in Rio de Janeiro and Minas Gerais states, both in Southeastern Brazil. However, in March 2014 we discovered a population of *C. echinocarpus* in Atibaia municipality, thus extending the distribution range of this species to SP. This represents an increase of about 400 km relative to the formerly known distribution range of this species.

Important characters for *Croton echinocarpus* (Figure 1) are the following: trees up to 12 m tall, monoecious, brownish to reddish latex, branchlets floccose, ferruginous, covered by stellate, multiradiate and dendritic trichomes. Leaves cordate with apex acuminate, with 1(2) pair of sessile petiolar glands visible from the adaxial side of the leaf, lamina 10.5–22 × 4.5–15 cm, adaxial surface sparsely pubescent, abaxial surface densely pubescent, stellate trichomes, venation brochidodromous; petiole 4–13 cm; stipules subulate. Inflorescences terminal and lax, proximal cymules with both pistillate and staminate flowers, distal cymules only with staminate flowers; bracts lanceolate. Staminate flowers campanulate, pedicellate, calyx lobes 5, basally connate, ovate, petals oblanceolate, 20–34 stamens. Pistillate flowers rotate, subsessile, calyx lobes 5, basally connate, oblanceolate, petals reduced to filiform structures with a gland at the apex, styles united at the base, deeply bifid, with 6 terminal tips. Capsule globose, echinate-muricate, covered by projections ending on a long stipitate multiradiate trichomes; seeds ribbed. *C. echinocarpus* is an arborescent species that produces reddish to brownish latex, found in montane wet forests of southeastern Brazil (Figure 2), at 800–1,000 m asl.

Croton echinocarpus belongs to *Croton* section

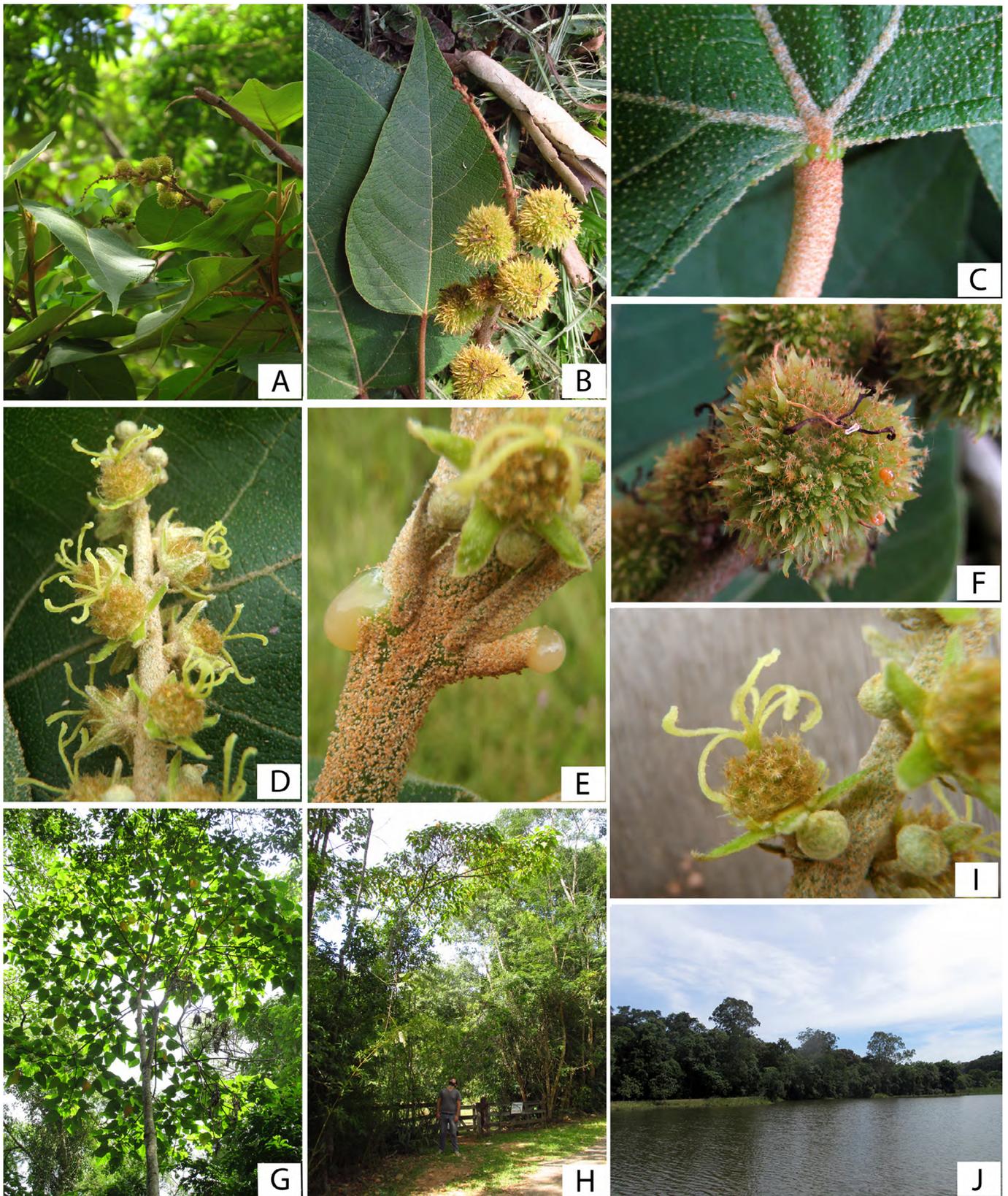


Figure 1. Morphology of *Croton echinocarpus*. A: Branch showing immature fruits. B: Leaf and immature fruits. C: Detail of leaf, showing sessile petiolar glands. D: Detail of inflorescence axis, showing pistillate flowers. E: Young branch exuding brownish latex. F: Immature fruit. G: Detail of habit showing the crown. H: Habit. I: Detail of pistillate flower. J: Locality where *C. echinocarpus* was collected in Fazenda Paraiso, Atibaia – SP (images D, E, F, I, J by O.L.M. Silva and A, B, C, G, H by R.F.Santos and O.L.M. Silva).

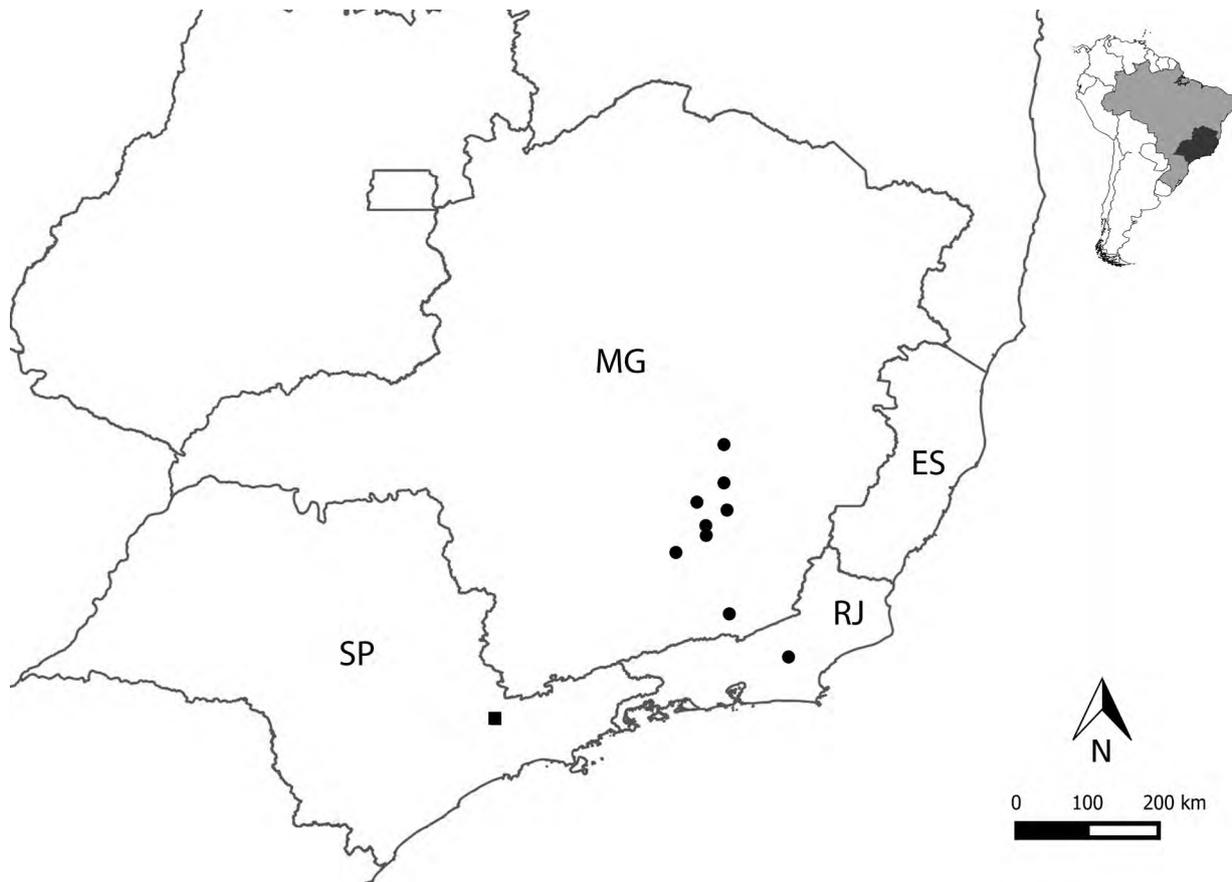


Figure 2. Geographical distribution of *Croton echinocarpus*. The point represented by ■ shows how the population found in São Paulo state is far from formerly known distribution of the species (represented by ●). A small map on right shows the location of Brazil in South America, highlighting the southeastern region of the country. Acronyms for each state: ES=Espírito Santo; MG=Minas Gerais; SP=São Paulo.

Cyclostigma (Riina et al. 2009; van Ee et al. 2011) and is most similar to *C. celtidifolius* Baill. (Baillon 1864: 331), from which can easily be distinguished by its sessile petiolar glands (*vs* stipitate petiolar glands in *C. celtidifolius*), bifid styles, with 6 terminal tips (*vs* tetrafid styles, with 12 terminal tips in *C. celtidifolius*) and capsules echinate-muricate (*vs* smooth in *C. celtidifolius*). Another species morphologically similar to *C. echinocarpus* is *C. urucurana* Baill. (Baillon 1864: 335), however they can be distinguished from each other by the morphology of stipules (not foliaceous and subulate in *C. echinocarpus vs* foliaceous and ovate with a long acuminate apex in *C. urucurana*) and capsules (echinate-muricate in *C. echinocarpus vs* smooth in *C. urucurana*).

The conservation status of *Croton echinocarpus* according to the IUCN criteria (2012) is Data Deficient (DD). Nevertheless, the only population found in SP occurs in a private area and it is not under legal protection, which increases the risk of extinction of *C. echinocarpus* in this state. Our finding provides an important contribution to the knowledge of *Croton* species distribution in Brazil that can help in future studies on the genus distribution in the country. Furthermore, the present work increases the number of known *Croton* species in SP to 38.

MATERIAL EXAMINED: BRAZIL. MINAS GERAIS: Mariana, área samarco, fl., 15 April 2014, A.E. Brina *s.n.* (SP 452663, BHCB 22587); Lagoa Dourada, fl., 16 December 1982, J.R. Pirani *et al.* 308 (SP); Santa Barbara, fr., 2 December 1986, Pedralli *et al.* *s.n.* (SP 221538, CETEC); Itambé do Mato Dentro, Distrito de Santana do Rio Preto (Cabeça de Boi), APA do Parque Nacional da Serra do Cipó, fr., 13 March 2008, M.F. Santos & H. Serafim 263 (SP, SPF); Juiz de Fora, Reserva Biológica, Poço das Antas, fr., 23 October 2006, O. Moreira & S. Borges 23418 (SP, UFJF); Itabirito, Pico do Itabirito, fr., June 1995, W.A. Teixeira *s.n.* (SP 277224, MG, BHCB); Ouro Branco, Serra do Ouro Branco, fr., 9 March 2005, L.R. Lima *et al.* 368 (SP, SPF). RIO DE JANEIRO: Nova Friburgo, fr., fl., 4 February 2006, R. Riina *et al.* 1519 (SP). SÃO PAULO: Atibaia, Fazenda Paraíso, fr., 28 March 2014, R.F. Santos & O.L.M. Silva 2 (SP).

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- Authors’ contribution statement:** MBRC identified the specimen from São Paulo, described the species and wrote the text. RFS collected the specimen in São Paulo and described the species.
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