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A new species of *Cordia* sect. *Gerascanthus* P. Browne (Cordiaceae) to the Brazilian semiarid

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Abstract. A new species of *Cordia* (Cordiaceae) is described, *Cordia rosangelae* J.I.M.Melo, hitherto recorded exclusively in the Brazilian semiarid region. It can be readily recognised by its subcylindrical branches and, mainly, by its lax inflorescences, flowers with an obclavate calyx distinctly smaller than the corolla tube with a reddish stripe in the apical portion, corresponding to the extension of the lacinia, as well as by its corolla up to 5.0 cm long, unguiculate corolla lobes, flattened style, linear, with calluses stigmas and pyriform ovary. A distribution map with known occurrence records as well as data on the habitat, morphological diagnostic characters and reproductive phenology of the species are provided. A key to distinguishing *C. rosangelae* from the other species of *Cordia* sect. *Gerascanthus* from Caatinga domain is presented. In addition, the conservation status of *C. rosangelae* is preliminary assessed according to IUCN criteria and the species has been classified as Least Concern (LC).

Keywords: Boraginales, conservation, Cordiaceae, South America, taxonomy.

INTRODUCTION

Cordiaceae R.Br. ex Dumort. is distributed in almost all regions of the globe, representing a monophyletic group, morphologically supported mainly by its woody habit, bifurcated styles with four stigmatic branches, plicate cotyledons and drupaceous fruit, in addition to standing out as one of the most numerous families of the order, encompassing about 400 species in two genera, *Cordia* L. and *Varronia* P. Browne (Luebert et al. 2016).

There are currently 98 species of Cordiaceae recorded for Brazil, where it is represented in all phytogeographic domains and regions. However, of the total number of species associated to the Brazilian territory, 60 belong to the genus *Cordia* (30 spp. endemic) and 38 belong to the genus *Varronia* (23 spp. endemic) (Stapf et al. 2025 [continuously updated]).

The genus *Cordia* stands out for its pantropical distribution and for its approximately 250 species (Miller and Gottschling 2007), with the New World representing its main center of diversity (Taroda and Gibbs 1986a, b). Its species can be characterized by their shrubby to arboreal habit, flowers generally grouped in terminal multiflorous panicles, with a tubular-campanulate calyx, 3–5–lobed, and stamens ranging from 4 to 5, usually two shorter and two to three longer, villous at the base, and fruits ranging from conical to ovate, with vibrant hues, sometimes with a persistent calyx, constituting an important component in both xeric and humid vegetational formations.

During the 20th century (Johnston 1930; Taroda and Gibbs 1986a, b; Taroda and Gibbs 1987) and, especially, in the 21st century, studies were carried out with the aim of understanding the taxonomic diversity associated with the distribution of Cordiaceae in Brazil, including taxonomic treatments and synopses: Stapf (2007), Vieira et al. (2015), Melo et al. (2018), Melo and Vieira (2021), the revisional study by Silva (2021) and the monograph of Cordiaceae within the scope of "Flora and Funga of Brazil" (Stapf et al. 2025 [continuously updated]), new species discoveries (Guimarães et al. 2015; Melo and Vieira 2015; Silva and Melo 2018, 2022; Pedro-Silva et al. 2021; Silva et al. 2023) and a new record for the Brazilian flora (Melo et al. 2021).

However, new species have been described for other regions of South America: for Colombia (Fernández-Alonso and Melo 2021; Fernández-Alonso and Cogollo-Pacheco 2024) and Colombia, Ecuador and Peru (Miller et al. 2023), in addition to the recent publications of the Boraginaceae monograph for Argentinian flora (Simpson et al. 2022) and nomenclatural (Silva and Melo, 2019) or conservationist approaches (Pedro-Silva and Melo 2024).

During the preparation of the Cordiaceae treatment for the "*Flora of Alagoas, Brazil*" one of the representatives of *Cordia* could not be classified within the conceptual limits of the taxa previously recognized for the genus. In this perspective, a new species of *Cordia* belonging to the section *Gerascanthus* P.Browne, until then presenting distribution restricted to the semi-arid region (Caatinga) of the Northeastern Brazil is described and illustrated here; expanding the taxonomic diversity of this section that is exclusive to the Neotropical region associated especially to the dry habitats and their species are morphologically characterized mainly by its ribbed calyx.

MATERIAL AND METHODS

Morphological analysis

The comparative morphological analyses were carried out during two visits at the Instituto do Meio Ambiente do Estado de Alagoas Herbarium (MAC) in October and December/2024 and at the Manuel de Arruda Câmara Herbarium (HACAM, not indexed by Thiers (2025), based on specimens of the MAC collection, consultation of the study developed by Miller (2013) and POWO (2025) and SpeciesLink (2025) databases. Herbarium acronyms follow Thiers (2025).

The protologues, type specimens and other materials, including historical collections, of the species related to *C. rosangelae* were compared to or taken from GBIF (2025), JSTOR (2025) and Tropicos (2025) databases.

The descriptive terminology used by Hickey (1973), Radford et al. (1974), Payne (1978) and Hewson (1988) were adopted. The distribution map was produced using open source QGis 3.18 software (QGIS 2024). A preliminary conservation assessment was obtained by calculating the extent of occurrence (EOO) and the area of occupancy (AOO) with GeoCAT (Bachman et al. 2011) and applying the IUCN Red List Categories and Criteria (IUCN 2024). The AOO was calculated based on a user defined grid cell of km^2.

TAXONOMIC TREATMENT

Cordia rosangelae J.I.M.Melo, **sp. nov.** (Figure 1).

Type: Brazil, Alagoas: Água Branca, Refúgio da Vida Silvestre (RVS) do Craunã e do Padre, Pedra Montada, 19 Oct 2013 (fl.), *M.C.S. Mota et al.* 12247 (holotype MAC; isotype MAC).

Diagnosis

Cordia rosangelae is morphologically closer to *C. insignis*, a species widely distributed in South America (Brazil, Paraguay, and Bolivia) commonly associated with Cerrado vegetation, in general appearance and leaves, which can be distinguished by its subcylindrical branches and, mainly, by its lax flowers in the inflorescences with an obclavate calyx distinctly smaller than the corolla tube with a reddish stripe in the apical portion, that corresponds to the extension of the calyx lacinia, corolla up to 5.0 mm long, unguiculate corolla lobes, flattened style, linear, with calluses stigmas, and pyriform ovary (vs. slightly angular branches, congested flowers in the inflorescences, tubular calyx evidently

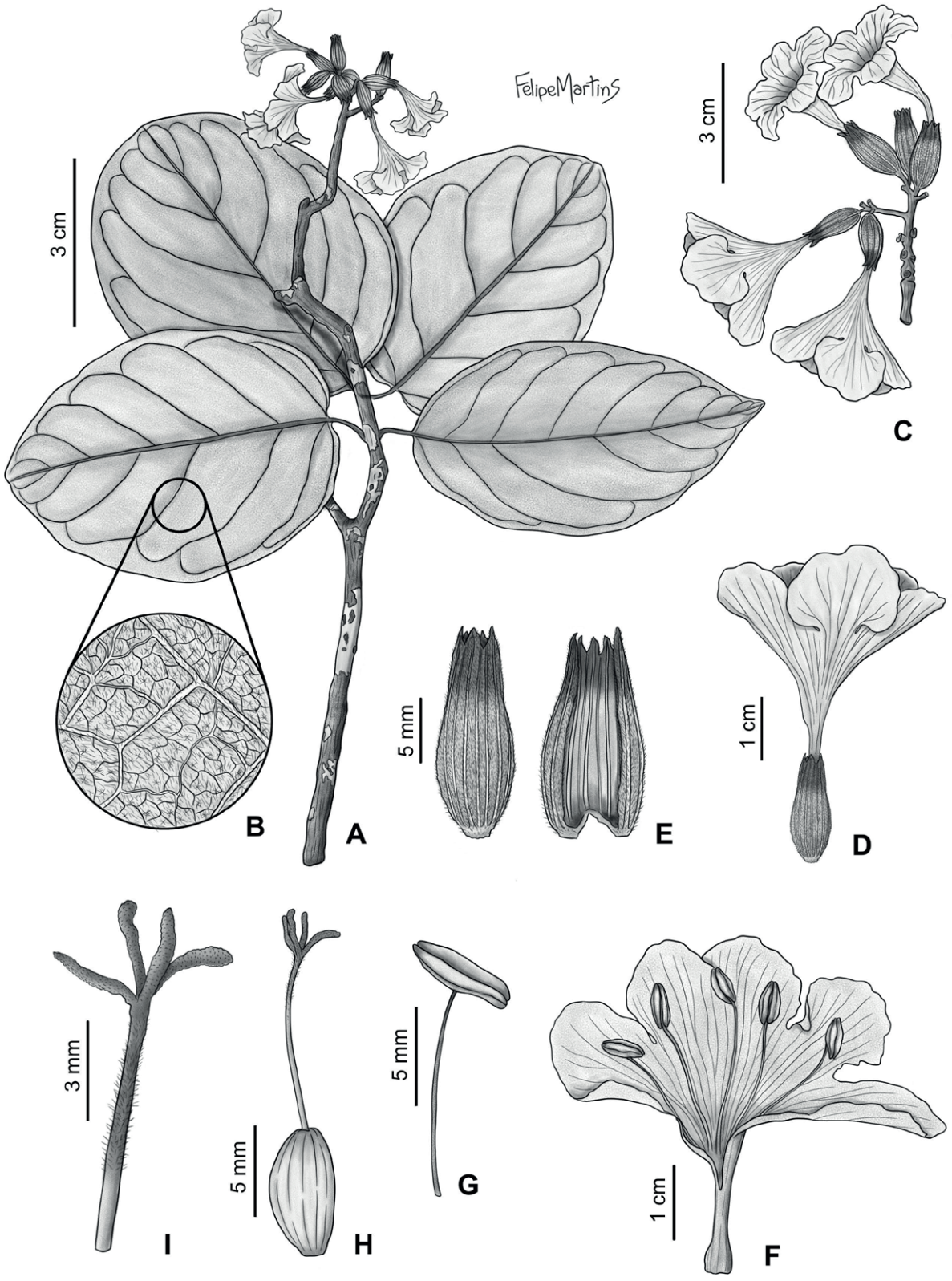

Figure 1. *Cordia rosangelae* J.I.M. Melo. A. Reproductive branch. B. Detail of the venation of the abaxial surface. C. Inflorescence. D. Flower. E. Calyx (outer and inner surface). F. Dissected corolla detaching the androecium. G. Stamen. H. Gynoecium. I. Style and stigmas. (Drawn by F. Martins from *Lyra-Lemos 5126* and *M.C.S. Mota et al. 12247*).

surpassing the corolla tube with the apical portion not having a different color from the rest of the calyx, corolla up to 4.2 cm in length, largely ovate to orbiculate corolla lobes, cylindrical style, clavate, not glandular stigmas, and ovoid ovary in *C. insignis*).

Description

Shrubs to trees, 2.5–6 m tall; subcylindrical branches, with intact rhytidome, glabrous. Leaves alternate, spiral, petiolate; petiole ca. 1 cm long, grooved, glabrescent, trichomes distributed mainly on the right and left margins; leaf blade 6.9–(7.4–7.8)–8.8 × 4.6–(4.9–5.9)–6.1 cm, chartaceous, ovate, broadly ovate to elliptical, base obtuse, margin entire, slightly revolute, ciliate, presenting whitish trichomes, discolor, adaxial surface with impressed veins, balled, glabrescent, sparse trichomes concentrated on the central and secondary veins, abaxial surface with prominent veins, aciculiform trichomes, brochidodromous venation, reticulate tertiary venation. Inflorescences racemes, 4.0–5.0 cm long, terminal, pedunculated, lax; peduncles 2.6–4.0 cm long in 1st order synflorescences, glabrescent, 0.6–1.0 cm long in 2nd order synflorescences, tomentose, rufescent. Flowers 4.1–5.1 cm long, sessile. Calyx up to 1.7 cm long, obclavate, costate, costa–3 per lobe, externally sericeous, internally tomentose in the median and terminal portions, 5–toothed, green to yellowish, apical portion presenting a reddish-brown band with up to 2.5 mm long corresponding to the extension of the lacinia, rufescent along its entire length; lacinia ca. 1.5 mm long, lanceolate. Corolla 4.0–5.0 cm long, infundibuliform, constriction 1.6–2.2 cm from base of tube, white to slightly brown, red when passed, marcescent; lobes 1.8 × 1.6 cm, suborbicular, with irregular or sometimes wavy margin, internally glabrous, externally hairy; tube 1.4–1.5 cm long, sericeous in the lower third. Stamens ca. 2.0 cm long, inserted ca. 1.3 cm from base of corolla; filaments ca. 1.4 cm long, slightly compressed, striate, villous at base; anthers ca. 5.5 mm long, laminar, oblong, cordate base, glabrous, cream, basifixed. Gynoecium up to 3.0 cm long; ovary up to 6.5 mm long, obpyriform, sparsely hairy, with short trichomes, basal disc ca. 0.5 mm high,

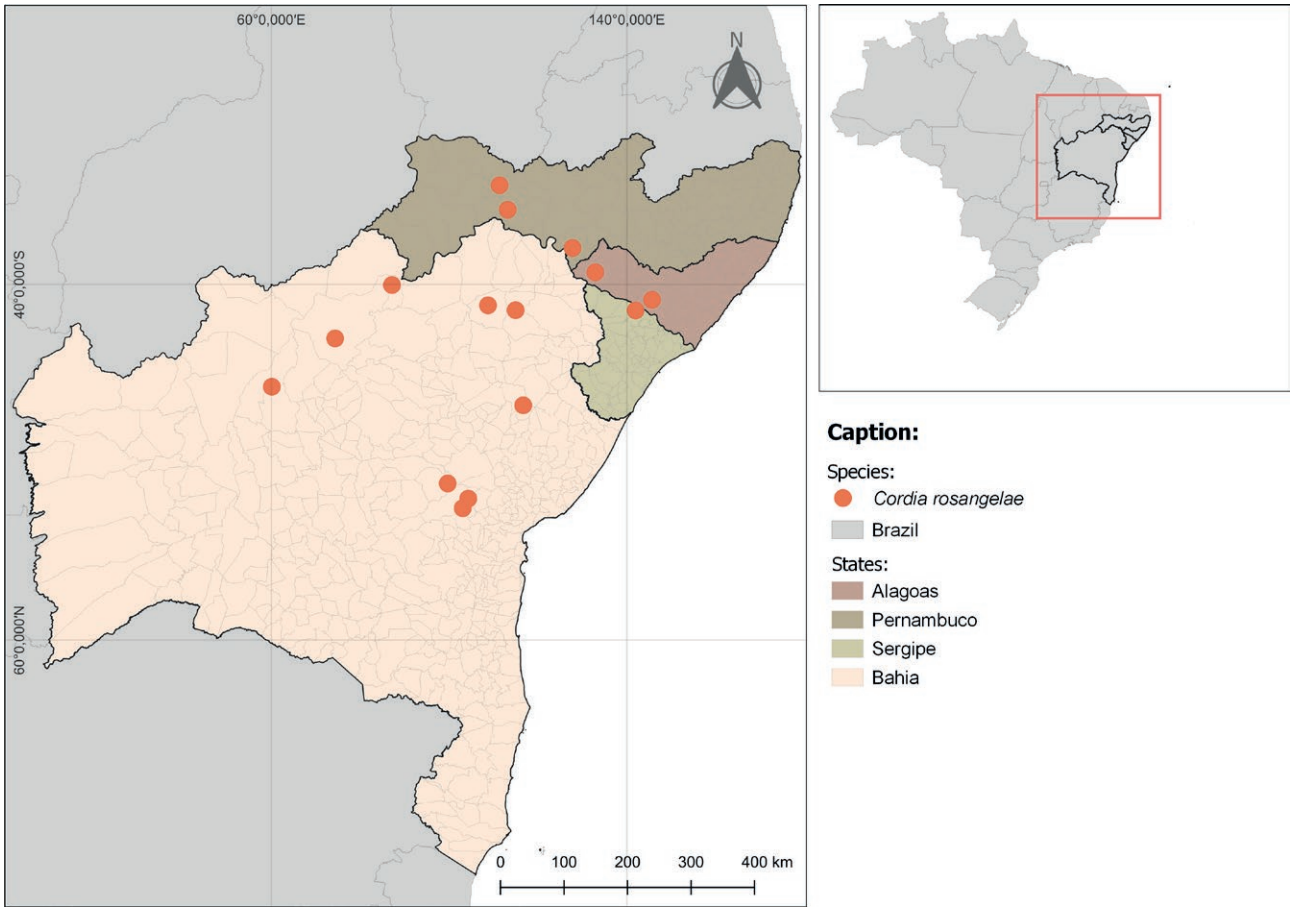

Figure 2. Currently known distribution of *Cordia rosangelae*.

annular; style 2.0–2.2 cm long, slightly compressed, hairy, with short sparse trichomes; stigmas up to 3.3 mm long, linear, ciliate margin, with calluses. Fruits not seen.

Etymology

The specific epithet refers to Rosângela Pereira de Lyra-Lemos, a Brazilian botanist who has inspired various generations of students in Alagoas state and in Brazilian Northeast as a whole. She is curator of the MAC herbarium, of the Instituto do Meio Ambiente do Estado de Alagoas (IMA), being also the project's coordinator "*Flora of Alagoas, Brazil*" and one greatest collector of plants.

Distribution, habitat, and phenology

Cordia rosangelae it is distributed in Brazilian Northeast in the states of Pernambuco, Alagoas, Sergipe and Bahia, associated to the Caatinga vegetation (Fig. 2). It was recorded in remnants near to the roadside (Alagoas state), lake shore (Bahia state) and near to granitic rock outcrops (Bahia state), in eutrophic lithic neosoil, constituting an occasional or rare element in the landscapes to which it is associated, at altitudes ranging from 397 to 680 m. Based on the northern and western limits of geographic distribution originally detected for *C. rosangelae*, it is expected that the species will be recorded in other states that constitute the semiarid region of Northeastern Brazil. Due to the arrangement of stamens and stigmas, it is suggested that this species is pollinated by bees. Specimens with flowers were recorded from June to November.

Assessment of conservation status

Specimens of *Cordia rosangelae* were recorded only in Caatinga vegetation areas, Brazilian Northeastern, including three municipalities in the state of Pernambuco (Cabrobó, Serrita and Petrolândia), two municipalities in the state of Alagoas (Água Branca and Batalha), in a single municipality of the state of Sergipe (Porto da Folha) and in nine municipalities of the state of Bahia (Araci, Canudos, Gentio do Ouro, Itaberaba, Itatim, Milagres, Sento Sé, Sobradinho and Mauá). Based on these records, the Extent of Occurrence (EOO) of the species is 178,339.712 km^2 and its Area of Occupancy (AOO) is 60.000 km^2. The species' population has few individuals at fifteen locations - all of which are threatened by a reduction in the width of the remnants, either by the expansion of urbanization or agricultural and livestock activities. *Cordia rosangelae* and the low number of individuals represents a threat of their survival and only two populations were found in Conservation Units, one of which is under state jurisdiction (Refúgio da Vida Silvestre (RVS) do Craunã e do Padre, Alagoas state) and one under federal jurisdiction (Parque Nacional Boqueirão da Onça, Bahia state). We propose a preliminary conservation assessment of *C. rosangelae* as Least Concern (LC), based on the IUCN criteria and guidelines (IUCN 2012; IUCN 2024), and as it has populations formed by few individuals, occurring so far only in these fifteen locations, and the projected continued decline in the AOO due to the continued degradation of its natural environments.

Comments and morphological affinities

In the herbaria consultation, *Cordia rosangelae* is erroneously identified as *C. insignis* or remains unidentified. However, *C. rosangelae* can be clearly differentiated from *C. insignis* by the shape of the branches, arrangement of the flowers in the inflorescences as well as by characters related to the calyx (shape, size and color), corolla (size and shape of the lobes) and by the gynoecium (shape of the style, shape and stigmatic surface) highlighted in the diagnosis section. Our results increase the number of *Cordia* sect. *Gerascanthus* representatives in the Brazilian flora to nine, of which eight species were previously known, as well as adding the new species to the Caatinga vegetation. Table 1 provides an overview of the morphological differences between these species. See also Fig. 1.

Identification key to the species of *Cordia* sect. *Gerascanthus* recorded in the Brazilian semiarid

1. Multiflorous inflorescences; subsessile to sessile flowers ... **2**
1. Pauciflorous or multiflorous inflorescences; exclusively sessile flowers ... **3**
2. Hirsute petiole; subsessile flowers; obovate corolla lobes with obtuse apex; stamens thickened in the median portion ... ***C. obtusiloba***
2. Glabrescent petiole; sessile flowers; truncate corolla lobes; stamens not thickened in the median portion ... ***C. trichotoma***
3. Pauciflorous inflorescences lax; obclavate calyx, with an apical portion presenting a reddish-brown band up to 2.5 mm long that corresponds to the extension of the lacinia; linear stigmas, with calluses ... ***C. rosangelae***
3. Multiflorous inflorescences congested; erect calyx, never with the above characteristics; stigmas with other shapes, plans ... **4**
4. Calyx ca. 1.5 cm long, tubular calyx evidently smaller than the corolla tube; corolla with oblong lobes; filiform stigmatic branches ... ***C. glabrata***

Table 1. Morphological and distribution comparisons of *Cordia rosangelae* and *C. insignis*.

Character	*Cordia rosangelae*	*Cordia insignis*
Distribution	Brazil (Caatinga)	Brazil, Paraguay, and Bolivia
Branches (shape)	subcylindrical	slightly angular
Inflorescence	pauciflorous, lax	multiflorous, congested
Calyx (shape)	obclavate, distinctly small than the corolla tube	tubular, evidently surpassing the corolla tube
Calyx (color)	presenting a reddish apical portion	entirely green to yellowish-brown
Corola (length)	up to 5.0 mm long	up to 4.2 mm long
Corolla lobes (shape)	unguiculate	largely ovate to orbiculate
Style (shape)	flattened	cylindrical
Stigmas (shape)	linear	clavate
Stigmas (surface)	with calluses	without calluses
Ovary (shape)	pyriform	ovoid

4. Calyx ca. 2 cm long, evidently surpassing the corolla tube; corolla with largely ovate to orbicular lobes; clavate stigmatic branches..... ***C. insignis***

Additional specimens examined (paratypes)

BRAZIL: **Alagoas:** Batalha, 9°45'37"S, 37°01'51"W, pequeno remanescente próximo à estrada, na borda da vegetação, Caatinga, 28 Oct 2000 (fl.), *R.P. Lyra-Lemos 5126* (MAC); **Bahia:** Araci, Fazenda Mulungu, margem de uma lagoa, 11°20'05"S, 38°57'18"W, 257 m, 28 June 2018 (fl.), *M.L. Guedes et al. 30553* (ALCB); Canudos, ca. 5 Km antes de Canudos, 9°54'52"S, 39°04'07"W, 12 Aug 2004 (fl.), *A.A. Santos, A.A. Conceição, F.H.F. Nascimento & J.B. Pereira 2442* (CEN, HUEFS); Gentio do Ouro, Caminho para Santo Inácio, 11°03'28"S, 42°42'37"W, 680 m, 24 June 1996 (fl.), *M.L. Guedes, A.M. Giulietti, M. Hind, S. Smith, R. Harley, E.M. Silva & H.P. Bautista* (PCD) *2992* (HUEFS, SPF); Itaberaba, Fazenda Itaberaba, Morro Itibiriba, 12°30'04"S, 40°04'59"W, 280 m, 23 Oct 2005 (fl.), *E. Melo, A.C. Queiroz, J.M. Rebouças & A.O. Moraes 4134* (HUEFS); Itatim, Morro do Letreiro, 12°43'39"S, 39°46'35"W, 197 m, 3 July 2012 (fl.), *M. Paiva 33* (HUEFS); idem, próximo a inselberg, início da cidade, 12 Sept 2018 (fl.), *G.V. Fonseca, T.T. Silva & L.C. Souza 232* (HURB19917); Milagres, Mata na base do Morro Tyresoles, 30 Aug 1996 (fl.), *M.A. Mayworm 21* (HUEFS). Sento Sé, Parque Nacional Boqueirão da Onça, Povoado Brejo da Brázida, Baixa da Caiçara, 10°20'11,7"S, 41°45'53,9"W, 7 July 2015 (fl.), *D.S. Fernandes & E.D.S. Almeida 254* (HVASF); Sobradinho, Rodovia Sobradinho-Sento Sé, Km 20, 09°32'S, 04°10'W, 24 July 1983 (fl.), *L. Coradin et al. 5986* (CEN, MO, NY, UEC); Uauá, Fazenda Experimental DNOCS, 21 Oct 1981 (fl.), *E.L.P.G. Oliveira 397* (MO2851044, MO2851763); **Pernambuco:** Cabrobó, Serra do Bendó, Eixo Norte, 08°24'55.9"S, 39°11'14.6"W, 570 m, 22 Sept 2009 (fl.), *A.P. Fontana, J.A. Siqueira-Filho, R.C. Forzza, M.M. Coelho & G.C. Rodrigues 6194* (HVASF); Petrolândia, próximo da casa da turbina, hidrelétrica, 21 Nov 1954 (fl.), *D. Andrade-Lima 1940/54* (HUEFS, IPA); Serrita, Sítio Pedra do Cachorro, 08°03'01,2"S, 39°18'27,41"W, 15 Oct 2013 (fl.), *A.C.P. Oliveira, J.R. Silva & R.S. Silva 3019* (HVASF); **Sergipe:** Porto da Folha, 7 Nov 1984 (fl.), *G. Viana 1059* (ASE).

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