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New records of tribe Bignonieae (Bignoniaceae) for Paraiba, northeastern Brazil

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Abstract

This study reports eight new records of the tribe Bignonieae (Bignoniaceae) for Paraiba state, northeastern Brazil: *Anemopaegma album* Mart. ex DC., *Anemopaegma gracile* Bureau & K. Schum., *Bignonia corymbosa* (Vent.) L.G. Lohmann, *Bignonia ramentacea* (Mart. ex DC.) L.G. Lohmann, *Bignonia sciuripabulum* (K. Schum.) L.G. Lohmann, *Cuspidaria argentea* (Wawra) Sandwith, *Cuspidaria lateriflora* (Mart.) DC., and *Fridericia conjugata* (Vell.) L.G. Lohmann. These species were found in the Caatinga and/or the Atlantic Forest, growing on sandy and clay soils of dry and humid forests, from lowlands to high altitudes. For each new occurrence for the state of Paraiba, we present a detailed description, taxonomic notes, and information on phenology, geographic distribution, illustrations, and photographs.

Keywords: Neotropics, Lamiales, Caatinga, Atlantic Forest.

Novos registros da tribo Bignonieae (Bignoniaceae) na Paraíba, Nordeste do Brasil

Resumo

Este estudo reporta oito novos registros da tribo Bignonieae (Bignoniaceae) para o estado da Paraíba, nordeste de Brasil: *Anemopaegma album* Mart. ex DC., *Anemopaegma gracile* Bureau & K. Schum., *Bignonia corymbosa* (Vent.) L.G. Lohmann, *Bignonia ramentacea* (Mart. ex DC.) L.G. Lohmann, *Bignonia sciuripabulum* (K. Schum.) L.G. Lohmann, *Cuspidaria argentea* (Wawra) Sandwith, *Cuspidaria lateriflora* (Mart.) DC. e *Fridericia conjugata* (Vell.) L.G. Lohmann. Estas espécies são encontradas na Caatinga e/ou Mata Atlântica, crescendo em solos arenosos e argilosos de florestas secas e úmidas, desde áreas baixas até altas altitudes. Para cada novo registro do estado da Paraíba, apresentamos descrições detalhadas, notas taxonômicas e informações sobre fenologia, distribuição geográfica, ilustrações e fotografias.

Palavras-chave: Neotrópicos, Lamiales, Caatinga, Mata Atlântica.

Introduction

Bignoniaceae is a pantropical family of flowering plants that includes 82 genera and 827 species (Lohmann & Ulloa, 2016). The family is predominantly Neotropical with a few species in temperate regions (Lohmann, 2004). The family was traditionally included in the order Scrophulariales (Cronquist, 1981), and more recently transferred to the Lamiales (APG IV, 2016). Six monophyletic tribes (Bignonieae, Catalpeae, Jacarandeae, Oroxyleae, Tecomeae and Tourrettieae) and two informally named clades (*Tabebuia* Alliance and Paleotropical clade) are currently recognized in the family (Olmstead et al., 2009).

Of these eight clades, Bignonieae is the largest and includes 393 species and 21 genera of Neotropical lianas and shrubs (Lohmann & Taylor, 2014). Tribe Bignonieae represents the most ecologically important clade of lianas in tropical America (Gentry, 1990), constituting an excellent model to study the great diversity of tropical plant communities. Representatives of this tribe are characterized by an irregular growth of the cambium that leads to the formation of 4-32 wedges of phloem, terminal leaflets modified in tendrils, and fruits that dehisce parallel to the septum (Lohmann, 2006; Lohmann & Taylor, 2014).

Tribe Bignonieae is centered in Brazil, where all 21 genera and 317 species are found (Lohmann & Taylor, 2014). Members of the tribe occurr in all states and major Biomes (i.e., Amazonia, Atlantic Forest, Pantanal, Cerrado, and Caatinga), growing on sandy and clay soils, dry and humid forests, lowlands and highlands (Lohmann, 2015). While tribe Bignonieae has already been relatively well studied in selected areas of Brazil (e.g., Lohmann & Pirani, 1998; Scudeller, 2004), the group still requires additional studies in other

regions, especially in the northeastern Brazil (Colombo, Kaehler, & Calvente (2016); Brito et al., 2018).

As part of ongoing taxonomic studies of tribe Bignonieae for the Flora of Paraiba, we encountered eight species that had not been reported in the synopsis of tribe Bignonieae (Lohmann & Taylor, 2014), nor in the most recent checklist of the Brazilian Bignoniaceae (Lohmann, 2010). These records are shown here for the first time and described in detail.

Materials and Methods

The state of Paraiba is one of the eight states located in northeastern Brazil. It is located within 06º02'12"-08º19'18"S, 34º45'54"-38º45'45"W and includes 223 counties and 56,469.46 km² of extension (Figure 1) (IBGE, 2016). To date, botanical efforts in the state were most intensive in selected areas, such as the Pico do Jabre (Pontes & Agra, 2001; Rocha & Agra, 2002), "Protected Area (APA) of Cariri" (Lima, Machado-Filho, & Melo (2013); Ferreira, Trovão, & Melo (2015), Biological Reserve of Guaribas (Barbosa & Pereira, 2006; Barbosa et al., 2011), and Private Natural Reserve (RPPN) Fazenda Almas (Lima & Barbosa, 2014).

However, inventories of entire botanical clades for the whole state are still scarce (Cabral & Agra, 1999; Pontes & Barbosa, 2004; Silva, Agra, Basílio, & Baracho (2005); Loiola, Agra, Baracho, & Queiroz (2007), Loiola, Rocha, Agra, Baracho, & Queiroz (2009); Costa, Nunes, & Melo (2015); Vasconcelos & Melo, 2015; Vasconcelos, Caires, & Melo (2015)).

Monthly excursions were carried out through several counties of Paraiba to collect fertile specimens between 2014 and 2017. Collected samples were pressed in the field, while flowers and fruits were stored in 70% alcohol. Samples were dried at the Department of Biology of the Universidade Estadual da Paraíba (UEPB), and specimens were incorporated into Herbarium Manuel de Arruda Câmara (HACAM, not indexed).

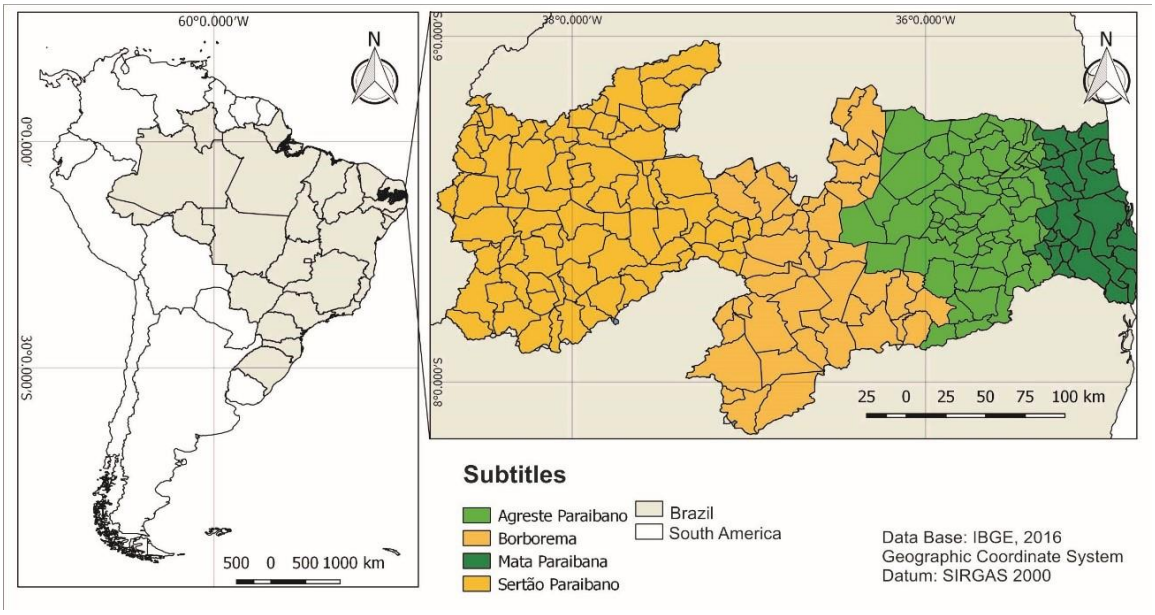

Figure 1. Location map of the study area, state of Paraiba, northeastern Brazil. (Prepared by: E. Rodrigues)

Apart from the specimens collected during this study, we also visited eight national herbaria in search for additional specimens of the tribe Bignonieae, namely the herbaria: EAN (Jayme Coelho de Moraes), JPB (Lauro Pires Xavier), CSTR (Centro de Saúde e Tecnologia Rural), UFP (Herbarium Geraldo Mariz), HVASF (Herbarium Vale do São Francisco), HUEFS (Herbarium da Universidade Estadual de Feira de Santana), IPA (Herbarium Dárdano de Andrade Lima), and RB (Herbarium do Jardim Botânico do Rio de Janeiro). Identifications were based on specialized literature, and morphological comparisons were conducted with type specimens and images deposited at REFLORA, Missouri Botanical Garden and The New York Botanical Garden.

Results and Discussion

During this study, we encountered eight species belonging to tribe Bignonieae for the state of Paraiba that had not been reported previously (Figure 2A-C) (Lohmann & Taylor, 2014; Lohmann, 2010). Below we describe each of these taxa, as well as present taxonomic notes, and information on their distribution within the state of Paraíba.

1. *Anemopaegma album* (Mart. ex DC.), Prodr., 9:188. 1845. (Figures 2A and 3A)

Shrub, 1.0–2.0 m long; branchlets cylindrical, without interpetiolar gland fields, with discontinuous interpetiolar ridge, without lenticels, pubescent with simple trichomes; prophylls of the axillary buds triangular and minute. Leaves 3–foliolate; without tendrils; petiole ca. 1.3–3.7 cm long, pubescent, with simple trichomes; petiolules ca. 0.4–1.0 cm long, pubescent, with simple trichomes; leaflets ovate to elliptic, base rounded to obtuse, apex retuse to attenuate, chartaceous, ca. 2.0–6.5 x 1.1–3.5 cm, margins entire, densely pubescent, simple and glandular trichomes on both surfaces,

discolor, venation brochidodromous. Inflorescence axillary, a raceme; bracts cymbiform, ca. 0.2 cm long. Calyx cupular, ca. 0.4-0.9 x 0.3-1.0 cm, green, when dried has a gradient from dark brown at the base to yellow in the apex, membranaceous, 2-lobed, pubescent, simple and glandular trichomes; corolla infundibuliform, white with a yellow tube internally, ca. 2.0-6.2 x 1.5-2.0 cm, lepidote externally, sparsely glandular trichomes; stamens included, anthers ca. 0.3 cm long, glabrous, dorsal filaments ca. 1.7-1.9 cm long, ventral filaments ca. 1.5-1.7 cm long, staminode ca. 0.3 cm long; ovary ca. 0.2 x 0.2 cm, glabrous, stipitate, stigma rhombic, glabrous, style ca. 1.5-2.8 cm long. Fruits and seeds not seen.

Material examined: BRAZIL. Paraíba: Monteiro, Fazenda Olho d'agua, 13 Mar 2010, fl., *D. Araújo et al. 1362* (HVASF); Monteiro, Serra do Cruzeiro, 06 May 2010, fl., *D. Araújo 1576* (HVASF).

Taxonomic notes: *Anemopaegma album* can be recognized by the triangular and minute prophylls of the axillary buds, 3-foliolate leaves that lack tendrils, bracts cymbiform, and calyx cupular, 2-lobed and pubescent with simple and glandular trichomes.

2. *Anemopaegma gracile* Bureau & K. Schum., Fl. bras., 8(2):132. 1896. (Figure 2A)

Liana, 2.0–3.0 m long; branchlets cylindrical, without interpetiolar gland fields, with discontinuous interpetiolar ridge, without lenticels, glabrous to sparsely pubescent, simple trichomes; prophylls of the axillary buds minute and cymbiform, ca. 0.1 cm long. Leaves 2–3–foliolate; terminal leaflet often replaced by a trifid tendril; petiole ca. 1.5–2.7 cm long, pubescent, simple trichomes; petiolules ca. 0.4–0.5 cm long, pubescent with simple trichomes; leaflets elliptic to oblong-elliptic, base obtuse, apex acuminate to obtuse, chartaceous, ca. 2.0–5.5 x 1.0–2.5 cm, margins entire, sparsely pubescent, simple trichomes and discoid glands on both surfaces, discolor, venation brochidodromous. Inflorescence axillary, a raceme; bracts lanceolate, ca. 0.2 cm long. Calyx wide cupular, ca. 0.6–1.0 x 0.8–1.3 cm, green, membranaceous, truncate, glabrous; corolla infundibuliform, white with yellow on the inside of the tube, ca. 3.0–6.0 x 0.5–1.4 cm, lepidote externally; stamens included, anthers ca. 0.2 cm long, glabrous, dorsal filaments ca. 1.4–1.7 cm long, ventral filaments ca. 1.2–1.3 cm long, staminode ca. 0.3 cm long; ovary ca. 0.3 x 0.1 cm, glabrous, sessile, stigma rhombic, glabrous, style ca. 2.0 cm long. Capsule wide elliptic, 3.0–4.9 x 2.8–4.7 cm, inflated, woody, with calyx persistent, glabrous; seeds winged, 1.4–2.6 x 1.3–2.3 cm, wings hyaline.

Material examined: Brazil. Paraíba: Areia, 08 Nov 1953, fl., *J.C. Moraes 1511* (RB); Teixeira, Serra de Teixeira, 29 Nov 1971, fl., *Acad. Bras. de Ciências 1079* (HUEFS); Monteiro, 04 Nov 2009, fl., *D. Araújo et al. 948* (HVASF); Monteiro, 19 Mar 2010, fl. fr., *D. Araújo & J.T.B. Jorge 1421* (HVASF); Maturéia, Pico do Jabre, 05 May 2010, fl., *D. Araújo 1546* (HVASF).

Taxonomic notes: *Anemopaegma gracile* can be recognized by the prophylls of the axillary buds minute and cymbiform, bracts lanceolate, and calyx wide cupular, truncate and glabrous.

3. *Bignonia corymbosa* (Vent.) L.G. Lohmann, Nuevo Cat. Fl. Vasc. Venezuela 272. 2008. (Figures 2B and 3B)

Liana, 2.0–3.0 m long; branchlets cylindrical, without interpetiolar gland fields, with interpetiolar ridge, with lenticels, densely lepidote; prophylls of the axillary buds orbicular. Leaves 2–foliolate; terminal leaflet sometimes replaced by a simple tendril, without adhesive disks; petiole 1.8–2.1 cm long, lepidote; petiolules 0.5–0.8 cm long, lepidote; leaflets elliptic, base rounded to truncate, apex atenuate, chartaceous, 6.9–7.7 x 3.1–3.6 cm, margins entire, lepidote on both surfaces, venation brochidodromous. Inflorescence axillary, a cyme, with flattened peduncles. Calyx spathaceous, 3.0 x 0.8 cm, white, apiculate on the apex, lepidote and puberulous, glandular trichomes; corolla infundibuliform, light-pink, ca. 5.9 x 3.0 cm, puberulous, glandular trichomes externally; stamens included, anthers ca. 0.3 cm long, glabrous, dorsal filaments 1.7–1.9 cm long, ventral filaments ca. 1.5–1.6 cm long, staminode ca. 0.3 cm long; ovary ca. 0.4 cm long, smooth, glabrous, stigma rhombic, glabrous, style ca. 3.1 cm long; nectar disc poorly developed. Fruits and seeds not seen.

Material examined: BRAZIL. Paraíba: João Pessoa, 26 June 1984, fl., *E.S. Santana 28* (IPA).

Taxonomic notes: *Bignonia corymbosa* can be recognized by the prophylls of the axillary buds orbicular, leaflets lepidote on both surfaces, and spathaceous calyx.

4. *Bignonia ramentacea* (Mart. ex DC.) L.G. Lohmann, Ann. Missouri Bot. Gard. 99: 422. 2014. (Figure 2B and 3C)

Liana, 2.0–3.0 m long; branchlets cylindrical to tetragonal, without interpetiolar gland fields, with interpetiolar ridge, with sparsely distributed lenticels, pilose, simple trichomes; prophylls of the axillary buds subulate. Leaves 2–foliolate; terminal leaflet sometimes replaced by a simple tendril, without adhesive disks; petiole 1.6–2.5 cm long, pilose, simple trichomes; petiolules 0.4–0.9 cm long, pilose, simple trichomes; leaflets elliptic to oblong, base rounded to cuneate, apex acuminate to rounded, chartaceous to membranaceous, 5.5–12.3 x 3.2–6.5 cm, margins entire, puberulous on both surfaces, simple trichomes, venation brochidodromous. Inflorescence terminal, a raceme, pilose, simple trichomes. Calyx campanulate, 0.2–0.8 x 0.2–0.4 cm, green, chartaceous, 5–apiculate, pilose, simple trichomes; corolla infundibuliform, lilac to magenta, white internally, ca. 4.2 x 0.9 cm, pilose externally; stamens included, anthers ca. 0.4 cm long, glabrous, dorsal filaments 0.9–1.2 cm long, ventral filaments ca. 0.5–0.6 cm long, staminode ca. 0.3 cm long; ovary ca. 0.4 cm long, verrucose, glabrous, stigma rhombic, glabrous, style ca. 2.5 cm long; nectar disc poorly developed. Fruits and seeds not seen.

Material examined: Brazil. Paraíba: São José de Piranhas, Sítio Serrinha, 08 jan 2013, fl., *A.C.P Oliveira et al. 2130* (HVASF); Bom Jesus, Sítio São Félix, 23 jan 2013, fl., *F.F.S. Silva 693* (HVASF); São João do Rio do Peixe, 21 nov 2014, fl., *A.P. Fontana 8765* (RB); Lagoa Seca, Cachoeira do Pinga, 14 aug 2015, fl., *T.S. Silva, H.C.S. Araújo & S.L. Costa 80* (ACAM).

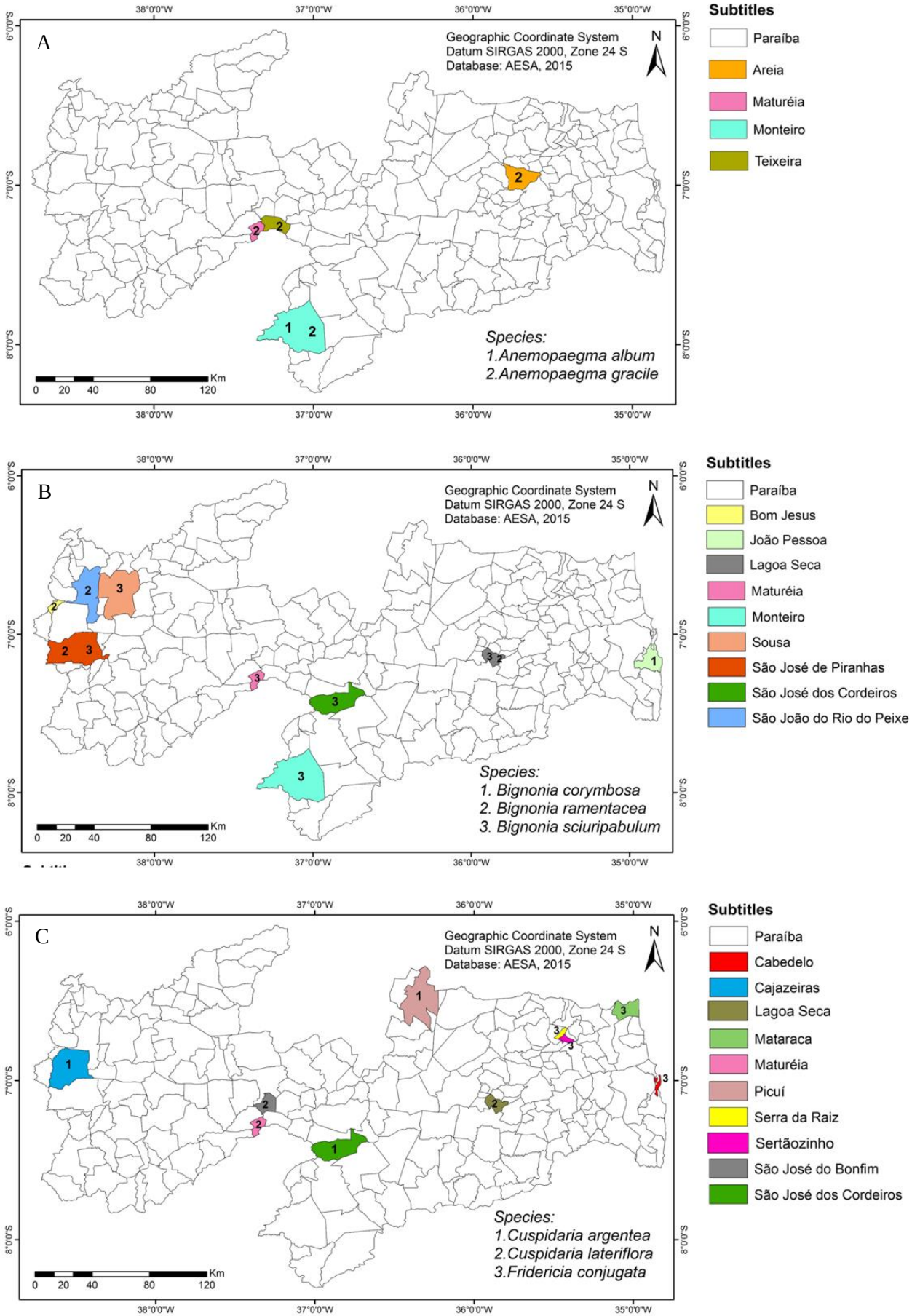

Figure 2. Map showing the location of the new records of members of *Anemopaegma* (A), *Bignonia* (B), *Cuspidaria* and *Fridericia* (C) for the state of Paraiba, northeastern Brazil. Map prepared by T.M.S. Pereira.

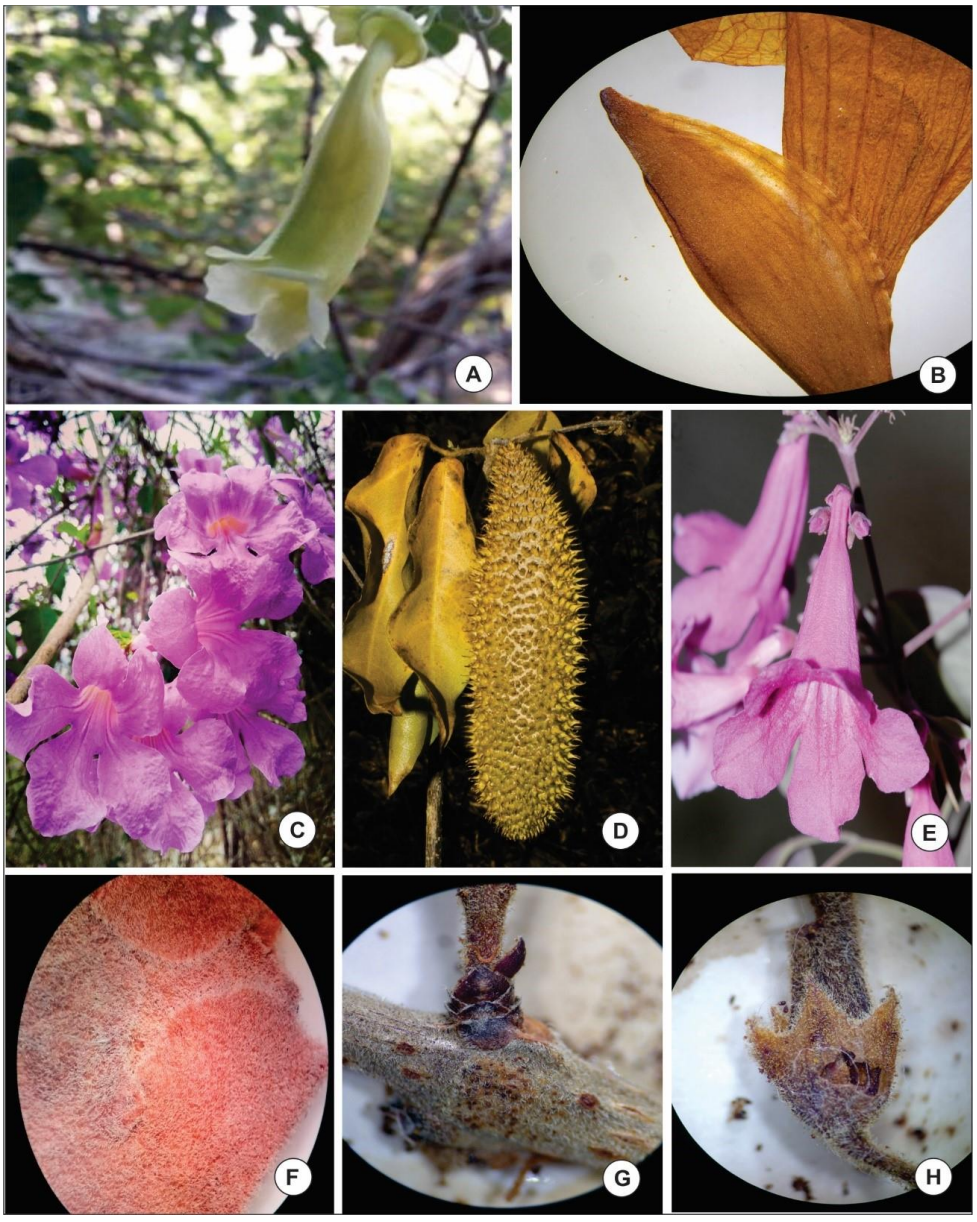

Figure 3. *Anemopaegma album* A. Flower; *Bignonia corymbosa* B. Detail of the spathaceous calyx; *Bignonia ramentacea* C. Inflorescence; *Bignonia sciuripabulum* D. Fruit; *Cuspidaria argentea* E. Flower, F. Detail of the external surface of the corolla; *Cuspidaria lateriflora* G. Detail of the prophylls of axillary buds, H. Detail of the calyx; Photos by: S.L. Costa and F.C.P. Costa.

Taxonomic notes: *Bignonia ramentacea* may be recognized by the pilose branchlets, leaflets, calyx and corolla; calyx with 5-apiculated lobes; and corolla lilac to magenta, with verrucose ovary.

5. *Bignonia sciuripabulum* (K. Schum.) L.G. Lohmann, Nuevo Cat. Fl. Vasc. Venezuela: 272. 2008. (Figure 2B and 5D)

Liana, 2.0-3.0 m long; branchlets tetragonal, without interpetiolar gland fields, with interpetiolar ridge, with sparsely distributed lenticels, glabrous; prophylls of the axillary buds foliaceous. Leaves 2-foliolate; terminal leaflet sometimes replaced by a simple tendril, without adhesive disks; petioles 1.2-1.8 cm long, glabrous; petiolules 0.4-1.5 cm long, glabrous; leaflets ovate to obovate, base rounded, apex attenuate, chartaceous, 4.5-10.3 x 2.2-5.5 cm, margins entire, glabrous on both surfaces, venation brochidodromous. Inflorescence terminal, a thyrse, glabrous. Calyx cupular, 0.9-1.2 x 0.4-0.8 cm, green, chartaceous, 5-apiculated, lepidote; corolla infundibuliform, lilac, ca. 4.2 x 0.9 cm, lepidote externally; stamens included, anthers ca. 0.4 cm long, glabrous, dorsal filaments ca. 0.8 cm long, ventral filaments ca. 0.4-0.6 cm long, staminode ca. 0.2 cm long; ovary ca. 0.3 cm long, verrucose, glabrous, stigma rhombic, glabrous, style ca. 2.3 cm long; nectar disc poorly developed. Capsule elliptic, 6.5-8.0 x 2.1-3.0 cm, inflated, echinate, coriaceous, without lenticels; seeds not seen.

Material examined: BRAZIL. Paraíba: Lagoa Seca, Fazenda Ipuarana, 16 June 2001, fl., *C.E.L. Lourenço & M.C. Carneiro 205* (JPB); Maturéia, Pico do Jabre, 18 Jan 1997, fl., *M.F. Agra et al. 3935* (MO); Monteiro, Serra de Jabitacá, 12 June 2008, fr., *M.C. Pessoa et al. 429* (JPB); Monteiro, Serra

do Peru, 21 May 2008, fr., *P.C. Gadelha-Neto & M.C. Pessoa 2282* (JPB); São José de Piranhas, 22 July 2016, fr., *I.J.N. Brito & F.C.P. Costa 29* (ACAM); São José dos Cordeiros, RPPN Fazenda Almas, 7 Sep 2002, fr., *M.R. Barbosa 2583* (JPB); São José dos Cordeiros, RPPN Fazenda Almas, 23 Feb 2005, fr., *A.V. Lacerda & F.M. Barbosa 347* (JPB); Sousa, Fazenda Jangada, 12 Mar 1995, fr., *P.C. Gadelha-Neto 172* (JPB).

Taxonomic notes: *Bignonia sciuripabulum* can be recognized by the glabrous branchlets, leaflets, calyx and corolla, tetragonal branchlets, and echinate capsule, with long spines when mature.

6. *Cuspidaria argentea* (Wawra) Sandwith, Kew Bull. 9: 606. 1954. (Figure 2C and 3E-F)

Liana, 2.0-3.0 m long; branchlets cylindrical, with interpetiolar gland fields, with discontinuous interpetiolar ridge, with sparsely distributed lenticels, puberulous; prophylls of the axillary buds triangular and minute. Leaves 2-3-foliolate; terminal leaflet often replaced by a simple tendril, without adhesive disks; petiole 2.3-3.0 cm long, puberulous; petiolules 0.9-1.6 cm long, puberulous; leaflets ovate to elliptic, base rounded to cuneate, apex cuneate to attenuate, chartaceous, 0.8-1.5 x 0.6-3.5 cm, margins entire, villose on both surfaces, venation brochidodromous. Inflorescence terminal, a compound thyrse, pubescent, simple trichomes. Calyx cupular, 0.4-0.5 x 0.3-0.4 cm, magenta, membranaceous, shortly 5-lobed, villose; corolla infundibuliform, magenta, 1.5-2.0 x 0.5-0.7 cm, villose externally; stamens included, anthers ca. 0.3 cm long, glabrous, dorsal filaments ca. 0.7-0.8 cm long, ventral filaments ca. 0.5-0.7 cm long, staminode ca. 0.3 cm long; ovary ca. 0.3 cm long, smooth, glabrous, stigma rhombic, glabrous, style ca. 2.5 cm long; nectar disc well-developed. Capsule oblong to elliptic, 7.0-9.0 x 4.5-5.5 cm, inflated, with four winged projections, coriaceous, with lenticels; seeds winged, 1.0-1.5 cm long, wings hyaline.

Material examined: BRAZIL. Paraíba: Cajazeiras, 08 Jan 2015, fl. fr., *A.N.T. Bandeira, F.C.P. Costa & F.M. Sobreira 88* (ACAM); Cajazeiras, Serra de Santa Catarina, 16 July 2014, fr., *L.B Pimentel & V.M. Cotarelli 98* (HUEFS); São José dos Cordeiros, RPPN Fazenda Almas, 15 Feb 2003, fl., *M.R. Barbosa et al. 2675* (HUEFS); Picuí, Serra de Picuí, 08 Mar 2002, fl., *M.F. Agra et al. 5669* (HUEFS);

Taxonomic notes: *Cuspidaria argentea* is recognized by the densely villose leaflets, calyx, and corolla, as well as by the oblong to elliptic capsules with four conspicuous wings.

7. *Cuspidaria lateriflora* (Mart.) DC., Prodr. 9: 179. 1845. (Figures 2C and 3G-H)

Liana, 2.0-3.0 m long; branchlets cylindrical, with interpetiolar gland fields, with discontinuous interpetiolar ridge, with sparsely distributed lenticels, puberulous; prophylls of axillary buds triangular and minute. Leaves 2-3-foliolate; terminal leaflet often replaced by a simple tendril; petiole 3.5-4.0 cm long, puberulous; petiolules 1.0-2.7 cm long, puberulous; leaflets elliptic, base rounded, apex attenuate to acuminate, chartaceous, ca. 6.0-8.0 x 3.3-3.9 cm, margins entire, puberulous, simple and glandular trichomes, venation brochidodromous. Inflorescence terminal, a compound thyrse, villose, simple trichomes. Calyx cupular, 0.4-0.5 x 0.3-0.4 cm, wine-colored, membranaceous, 5-cuspidate, puberulous; corolla infundibuliform, magenta, 1.5-3.2 x 0.4-0.8 cm, puberulous externally; stamens included, anthers ca. 0.2 cm long, glabrous, dorsal filaments ca. 0.6-0.7 cm long, ventral filaments ca. 0.4-0.5 cm long, staminode ca. 0.3 cm long; ovary ca. 0.4 cm long, smooth, glabrous, stigma rhombic, glabrous, style ca. 1.7 cm long; nectar disc well-developed. Capsule linear, 7.0-9.0 x 4.5-5.5 cm, flattened, margin entire, valves with a longitudinal constriction, coriaceous, with lenticels, calyx deciduous; seeds winged, 0.5-1.0 cm long, wings hyaline.

Material examined: BRAZIL. Paraíba: Lagoa Seca, Fazenda Ipuarana, 10 Dec 2000, fl., *M.C. Carneiro & C.E.C. Lourenço 57* (JPB); Maturéia, Pico do Jabre, 18 Jan 1997, fl., *M.F. Agra et al. 3932* (MO); São José do Bonfim, 19 Apr 2005, fr., *E. Melo et al. 3857* (HUEFS).

Taxonomic notes: *Cuspidaria lateriflora* can be recognized by the calyx with five cuspidate lobes and chartaceous leaflets, with simple and glandular trichomes.

8. *Fridericia conjugata* (Vell.) L.G. Lohmann, Ann. Missouri Bot. Gard. 99(3): 435. 2014. (Figure 2C)

Liana, 2.0-3.0 m long; branchlets cylindrical, with interpetiolar gland fields, with discontinuous interpetiolar ridge, with lenticels, glabrous; prophylls of axillary buds triangular and minute. Leaves 2-3-foliolate; terminal leaflet often replaced by a simple tendril; petiole 1.9-5.7 cm long, glabrous; petiolules 1.9-2.2 cm long, glabrous; leaflets elliptic, base rounded, apex attenuate to acuminate, coriaceous, 3.5-9.5 x 1.7-5.0 cm, margins entire, glabrous, venation brochidodromous. Inflorescence terminal, a compound thyrse, pubescent, simple trichomes. Calyx cupular, 0.8-1.0 x 0.7-0.9 cm, lilac, coriaceous, 5-apiculated, puberulous; corolla infundibuliform, pink, 2.6-3.2 x 0.8-1.0 cm, puberulous externally; stamens included, anthers ca. 0.2 cm long, glabrous, dorsal filaments ca. 0.6-0.7 cm long, ventral filaments ca. 0.4-0.5 cm long, staminode ca. 0.2 cm long; ovary ca. 0.3 cm long, smooth, lepidote, stigma elliptic, glabrous, style ca. 2.0 cm long; nectar disc well-developed. Capsule linear, ca. 11.5 x 1.4 cm, flattened, smooth, coriaceous, with lenticels; seeds winged, ca. 2.9 x 0.9 cm, wings hyaline.

Material examined: BRAZIL. Paraíba: Cabedelo, 01 Oct 1999, fl., *A.F. Pontes & M.C. Santos 187* (JPB), 05 Jan 2000, fr.; Ibidem, 12 Dec 1999, fl., *A.F. Pontes & G. Costa 361* (JPB); Mataraca, 29 Jan 2008, fl. fr., *P.C. Gadelha-Neto et al. 2049* (JPB); Mataraca, 26 Feb 2009, fr., *P.C. Gadelha-Neto et al. 2540* (JPB); Serra da Raiz, Sítio Boa Ventura, 13 Oct 2014, fr., J.*M.P. Cordeiro 453* (EAN); Sertãozinho, Sítio Canafístula, 23 Feb 2014, fl., *J.M.P. Cordeiro 249* (EAN).

Taxonomic notes: This species can be recognized by the flowers with pink corollas and coriaceous calyces arranged in dense, compound thyrses. The strong sweet odor of branchlets, leaflets and flowers is also characteristic of this species.

In this study, we document eight new occurrences of the tribe Bignonieae for the state of Paraiba. A good knowledge

of species geographic distributions is critical for the understanding of species distribution patterns, the biogeographical history of taxa, and patterns of endemism (Sylvestre, 2002). As such, taxonomic studies of tribe Bignonieae for the state of Paraiba represent an important step towards an improved understanding of plant distribution patterns in northeastern Brazil. The species recorded in this study reinforce the need for additional studies on dry vegetation types such as the cerrados and caatingas from Paraíba. Below, we summarize the distribution patterns of the eight species newly documented for the state.

Out of the eight species newly documented here, only *Anemopaegma album*, *A. gracile*, *Bignonia ramentacea*, and *Cuspidaria argentea* are endemic to Brazil and restricted to dry environments. While *A. album* and *B. ramentacea* are found in the states of Minas Gerais, Bahia, Pernambuco, and Ceará, *A. gracile* is found in the states of Goiás, Minas Gerais, and Rio de Janeiro, with its disjunct distribution likely resulting from a lack of botanical effort. *Cuspidaria argentea* is found in caatinga vegetation, where it occurs from Maranhão to Bahia (Lohmann, 2010). In Paraiba, *A. album* and *B. ramentacea* were only collected in areas of Caatinga (Figures 2A and 2B), with the former flowering from March to May, and the latter flowering in November, January, and August. *Anemopaegma gracile* and *C. argentea*, on the other hand, were collected growing in rocky outcrops and granitic rocks with high elevations (600-1200 m) (Figures 2A and 2C), with the former flowering from November to May and fruiting in March and the latter flowering from January to March and fruiting from January to July.

Of the remaining species: *Bignonia corymbosa*, *B. sciuripabulum*, and *F. conjugata* are more broadly distributed, and known to occur in a variety of forest environments (Lohmann & Taylor, 2014). These three species are found in Colombia, Venezuela, Guyana, Ecuador, Peru, and Bolivia. *Bignonia corymbosa* and *F. conjugata* also occur in Panama, Costa Rica, and Guatemala in Central America, while *B. sciuripabulum* also occurs in Paraguay and Argentina (Lohmann & Taylor, 2014). These three species are broadly distributed throughout Brazil, where they occur in all major Biomes (e.g., Caatinga, Cerrado, Amazonia, Atlantic Forest, and Pantanal) (Lohmann, 2010). In Paraiba, these three species were found growing in humid forests, while *B. sciuripabulum* was also recorded in areas of Caatinga, including mountains with high elevations (600-1000 m) in sandy clay substrate (Figures 2B and C). *Bignonia corymbosa* was collected with flowers in June, *B. sciuripabulum* was collected with flowers from January to June and fruits from February to September, and *F. conjugata* was collected with flowers and fruits from October to February.

Cuspidaria lateriflora is found in dry to wet forest vegetation from Brazil, Peru, Bolivia and Paraguay (Lohmann & Taylor, 2014). In Brazil, it is known to occur in almost all states except from Rio Grande do Norte, Alagoas and Sergipe, where it has been found growing in Amazônia, Caatinga, Cerrado and Atlantic Forest (Lohmann, 2010). In Paraiba, *C. lateriflora* was collected in Caatinga-Atlantic Forest transition areas and in humid forest associated to high altitudes (700-800 m) (Figure 2C), flowering from December to January and fruiting in April.

Conclusions

Studies on the Bignoniaceae from the Brazilian northeast are still scarce, with taxonomic studies in this poorly known state being greatly needed. New species records are common, even within relatively well-studied groups such as tribe Bignonieae. This study represents the first step towards an improved understanding of the tribe Bignonieae for Paraiba. Ongoing studies aim to further describe patterns of geographic distribution of this tribe for the state, as well as to provide a detailed account for the whole Bignonieae for Paraiba.

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References

APG IV. (2016). An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV. *Botanical Journal of Linnean Society*, *181*(1), 1-20. doi:10.1111/boj.12385

Barbosa, M. R. V., & Pereira, M. S. (2006). A família Rubiaceae na Reserva Biológica Guaribas, Paraíba, Brasil: subfamília Rubioideae. *Acta Botanica Brasilica*, *20*(2), 455-470. doi:10.1590/S0102-33062006000200021

Barbosa, M. R. V., Thomas, W. W., Zárate, E. L. P., Lima, R. B., Agra, M. F., Lima, I. B., Pessoa, M. C. R, Lourenço, A. R. L., Delgado-Júnior, G. C., Pontes, R. A. S. et al. (2011). Checklist of the vascular plants of the Guaribas Biological Reserve, Paraíba, Brazil. *Revista Nordestina de Biologia*, *20*: 79-106.

Brito, I. J. N., Costa, S. L., Cordeiro, J. M. P., Lohmann, L. G., & Melo, J. I. M. (2018) New Records of the *Tabebuia* alliance (Bignoniaceae) for the state of Paraíba, northeastern Brazil. *Revista Mexicana de Biodiversidad*, *89*(3), 625-630. doi:10.22201/ib.20078706e.2018.3.2297

Cabral, S. C. M. & Agra, M. F. (1999). Flora Paraibana: Olacaceae Mirb. ex DC. *Revista Nordestina de Biologia*, *13:*1-11.

Colombo, B., Kaehler, M, Calvente, A. (2016). An inventory of the Bignoniaceae from the Brazilian state of Rio Grande do Norte highlights the importance the importance of small herbaria to biodiversity studies. *Phytotaxa*, *278*(1), 19-28. doi:10.11646/phytotaxa.278.1.2

Costa, E. C. S., Nunes, T. S., Melo, J. I. M. (2015). Flora da Paraíba, Brasil: Passifloraceae Juss. ex Roussel sensu stricto. *Rodriguésia*, *66*(1), 271-284. doi:10.1590/2175-7860201566117

Cronquist, A. (1981). *An Integrated System of Classification of Flowering Plants*. New York: Columbia University Press.

Ferreira, P. S. M., Trovão, D. M. B. M., Melo, J. I. M. (2015). Leguminosae na APA do Cariri, Estado da Paraíba, Brasil. *Hoehnea*, *42*(3), 531-547. doi:10.1590/2236-8906-04/2015

Gentry, A. H. (1990). Evolutionary patterns in Neotropical Bignoniaceae. *Memoirs of the New York Botanical Garden*, *55*, 118-129.

IBGE. (2016). Atlas Nacional Digital do Brasil 2016. Instituto Brasileiro de Geografia e Estatística, Brasilia. recovered from http://www.ibge.gov.br/apps/atlas_nacional

Lima, I. B. & Barbosa, M.R.V. (2014). Composição Florística da RPPN Fazenda Almas, no Cariri Paraibano, Paraíba, Brasil. *Revista Nordestina de Biologia*, *23*, 49-67.

Lima, E. A., Machado-Filho, H. O., & Melo, J. I. M. (2013). Angiospermas aquáticas da Área de Proteção Ambiental (APA) do Cariri, Paraíba, Brasil. *Rodriguésia*, *64*(4), 667-683. doi:10.1590/S2175-78602013000400001

Lohmann, L. G. (2004). Bignoniaceae. In N. Smith, S.A. Mori, A. Henderson, D.W.M. Stevenson, & S.V. Heald (Eds.), *Flowering Plants of the Neotropics* (pp. 51-53). Princeton: Princeton University Press.

Lohmann, L. G. (2006). Untangling the phylogeny of Neotropical lianas (Bignonieae, Bignoniaceae). *American Journal of Botany*, *93*(2), 304-318. doi:10.3732/ajb.93.2.304

Lohmann, L. G. (2008). Bignoniaceae. In O. Hotchke, P. Berry, & O. Huber (Eds.), *Nuevo Cat Fl Vasc Venezuela* (p. 272). Caracas: Fundación Instituto Botánico de Venezuela.

Lohmann, L. G. (2010). Bignoniaceae. In *Flora do Brasil 2020 (em construção)*. Rio de Janeiro: Instituto de Pesquisas Jardim Botânico do Rio de Janeiro. Recovered from http://floradobrasil.jbrj.gov.br/reflora/floradobrasil/FB112305

Lohmann, L. G & Taylor, C. M. (2014). A new generic classification of tribe Bignonieae (Bignoniaceae). *Annals of the Missouri Botanical Garden*, *99*(3), 348-489. doi:10.3417/2003187

Lohmann, L. G. & Ulloa-Ulloa, C. (2016). Bignoniaceae (iPlants prototype Checklist). Recovered from http://www.iplants.org

Lohmann, L. G. & Pirani, J. R. (1998). Flora da Serra do Cipó, Minas Gerais: Bignoniaceae. *Boletim de Botânica da Universidade de São Paulo*, *17*, 127-153. doi:10.11606/issn.2316-9052.v17i0p127-153

Loiola, M. I. B., Agra, M. F., Baracho, G. S., & Queiroz, R. T. (2007). Flora da Paraíba, Brasil: Erythroxylaceae. *Acta Botanica Brasilica*, *21*(2), 473-487. doi:10.1590/S0102-33062007000200020

Loiola, M. I. B., Rocha, E. A., Agra, M. F., & Baracho, G. S. (2009). Flora da Paraíba: Combretaceae. *Acta Botanica Brasilica*, *23*(2), 330-342. doi:10.1590/S0102-33062009000200005

Olmstead, R.G. et al. (2009). A molecular phylogeny and classification of Bignoniaceae. *American Journal of Botany*, *96*(9), 1907-1921. doi:10.3732/ajb.0900004

Pontes, R. A. & Agra, M. F. (2001). Flora do Pico do Jabre, Paraíba, Brasil: Acanthaceae. *Leandra*, *16*(1), 51-60. doi:10.1590/S0102-33062002000100004

Pontes, A. F. & Barbosa, M. R. V. (2004). Flora Paraibana: Annonaceae Juss. *Acta Botanica Brasilica*, *18*(2), 281-293. doi:10.1590/S0102-33062004000200008

Rocha, E. A. & Agra, M. F. (2002). Flora do Pico do Jabre, Paraíba, Brasil: Cactaceae Juss. *Acta Botanica Brasilica*, *16*(1), 15-21. doi:10.1590/S0102-33062002000100004

Scudeller, V. V. (2004). Bignoniaceae Juss. no Parque Nacional da Serra da Canastra - Minas Gerais. *Iheringia, Série Botânica*, *59*, 59-73.

Silva, K. N., Agra, M. F., Basílio, I. J. L. D., Baracho, G.S. (2005). Flora da Paraíba, Brasil: Loganiaceae. *Acta Botanica Brasilica*, *19*(2), 407-416. doi:10.1590/S0102-33062005000200024

Sylvestre, L. S. (2002). Estudos taxonômicos e florísticos das pteridófitas brasileiras: desafios e conquistas. In Araújo EL, Moura AN, Sampaio EVSB, Gestinari LMS, Carneiro JMT. (Eds.), *Biodiversidade, conservação e uso sustentável da flora do Brasil* (pp. 194-195). Recife: LIII Congresso Nacional de Botânica/XXV Reunião Nordestina de Botânica.

Vasconcelos, G. C. L. & Melo, J. I. M. (2015). Flora of Paraíba state, Brazil: Loranthaceae Juss. *Acta Scientiarum Biological Sciences*, *37*(2), 239-250. doi:10.4025/actascibiolsci.v37i2.26246

Vasconcelos, G. C. L., Caires, C. S., Melo, J. I. M. (2015). Flora da Paraíba, Brasil: Santalaceae R. Br. *Iheringia, Série Botânica*, *70*, 203-215.