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Original Paper

Flora of Fazenda Aba, Paraíba, Brazil: Bignoniaceae

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Abstract

We conducted a taxonomic survey of the Bignoniaceae from the "Fazenda Aba," located at the municipality of Passagem, within the state of Paraiba (Northeastern Brazil). This inventory was based on material collected during monthly field expeditions between 2014 and 2017. For all collected species, we provide descriptions, information on the distribution, taxonomic comments, an identification key, illustrations, and photos. We recorded nine species distributed in six genera. The most representative genus is *Tanaecium* with three species, followed by *Anemopaegma*, with two species. The other four genera, *Dolichandra*, *Fridericia*, *Handroanthus*, and *Tabebuia* are represented by a single species each.

Key words: Caatinga, Lamiales, Northeastern Brazil.

Resumo

Realizamos um levantamento taxonômico das Bignoniaceae ocorrentes na Fazenda Aba, localizada no município de Passagem, estado da Paraíba (Nordeste do Brasil). Este inventário foi baseado em materiais coletados em excursões mensais de coleta realizadas entre 2014 e 2017. Para todas as espécies coletadas, apresentamos descrições, informações sobre distribuição, comentários taxonômicos, chave de identificação, ilustrações e fotografias. Registramos a ocorrência de nove espécies distribuídas em seis gêneros. O gênero mais representativo é *Tanaecium* com três espécies, seguido de *Anemopaegma*, com duas espécies. Os outros quatro gêneros, *Dolichandra*, *Fridericia*, *Handroanthus* e *Tabebuia* estão representados por uma única espécie cada.

Palavras-chave: Caatinga, Lamiales, Nordeste brasileiro.

Introduction

Bignoniaceae Juss. is a Pantropical plant family, centered in the Neotropics, with a few representatives in the temperate regions of the World (Lohmann 2004; Lohmann & Ulloa Ulloa 2006, onwards). It comprises approximately 830 species distributed in 82 genera (Lohmann & Ulloa Ulloa 2006, onwards). In Brazil, 417 species and 33 genera have been documented, of which 199 are endemic, being widely distributed predominantly through the Amazon (191 spp.), Atlantic Forest (174 spp.), Cerrado (170 spp.), Caatinga (79 spp.), Pantanal (59 spp.), and Pampa (8 spp.) (Lohmann 2010). Of these, 215 species occur in Northeastern Brazil, and 51 have been recorded for the state of Paraiba (Lohmann 2010; Brito *et al.* 2018; Costa *et al.* 2019).

The Bignoniaceae is mostly composed of trees and lianas, although some taxa are shrubby or herbaceous. Most species have opposite and

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compound leaves, that can be either ternate, pinnate, or palmate, with the terminal leaflet often modified into a tendril in the lianas. The flowers are sympetalous, zygomorphic, and bilabiated, with four stamens and one staminode. The fruits are capsules, bearing winged seeds (Lohmann & Pirani 2003; Lohmann 2004).

The Bignoniaceae represents an important component of Tropical ecosystems (Lohmann 2004). This plant family is also important economically. More specifically, members of the family are used in the civil industry, as ornamentals, and for landscaping. For example, representatives of the genera *Handroanthus*, *Tabebuia*, and *Jacaranda* are commonly used in horticulture and furniture manufacturing, while other members of this family are used to manufacture handcrafts and musical instruments, cooking, and medicine (Gentry 1980).

The Caatinga biome is, proportionally, the least studied natural Brazilian region, with much of the scientific effort concentrated in a few spots of the Northeast region. This situation has changed in recent years, with research projects focused on areas that were not studied before. The Caatinga is the least protected Brazilian natural region, with less than 2% of its territory included in conservation units (Leal *et al.* 2008). This biome continues to undergo an extensive process of alteration and environmental deterioration caused by unsustainable use of its natural resources, which is leading to the rapid loss of unique species, the elimination of key ecological processes, and the formation of extensive desertification spots in many parts of the region (Leal *et al.* 2008).

The main geomorphological feature where the Caatinga vegetation is found corresponds to the great depression, also known as hinterland depression. This is the most typical landscape unit of the Caatinga Biome (Queiroz 2009). The great depression was divided by Velloso *et al.* (2002) in Southern and Northern hinterland depression, the latter occupying most of the northern part of the biome, from the Northern border of Pernambunco extending over most of the states of Paraíba, Rio Grande do Norte and Ceará.

Of the 282 priority areas mapped by the MMA (Ministry of the Environment), the Northern hinterland depression is the largest in extension and is considered of high biological importance. During the course of three years, we conducted an extensive floristic survey of the mountain complex located in the Paraíba hinterlands, Northeast Brazil. Here, we present a section of this survey, and show the results of the Bignoniaceae family. For all taxa, we provide descriptions, information on their distribution, taxonomic comments, identification keys, illustrations, and photos.

Material and Methods

The "Fazenda Aba" is located in the municipality of Passagem (07°05'50"S, 37°01'34"W). This property was acquired by Magno Martins, mayor of the municipality, in the mid-1970s for agriculture. However, the area is now being transformed into a RPPN (Private Reserve of Natural Patrimony). It encompasses an area of 350 ha, of which 120 ha are classified as legal reserve. It is located in the "Depressão Sertaneja Setentrional," which has a Bsh climate type, and an annual average temperature of 25º C and altitudes varying between 250 to 810 m (Francisco 2015; IBGE 2019) (Fig. 1).

The study area mainly includes Caatinga vegetation, although montane forests are also found at higher altitudes. The area includes the Aba Mountain Range, as well as tributaries of the Aba River, which includes persistent springs that continue to run during the dry season. The forests encountered in the region also include algae, mosses, ferns, and lianas, with the lianas being particular abundant through forest edges.

Monthly field expeditions were conducted in the study area between 2014 and 2017. Field trips consisted of random walks through the area, during which time we collected flowering specimens, following usual plants collecting procedures and protocols (Bridson & Forman 1998). The collected specimens were deposited in the Herbarium Rita Baltazar de Lima (HCSTR; Thiers 2020, continuously updated) of the Federal University of Campina Grande, Campus Patos, PB.

The taxonomic treatment was prepared based on the analyses of specimens collected during field-work, and specimens deposited at herbaria from the states of Paraíba (i.e., EAN, HACAM, HCSTR, and JPB) and Pernambuco (i.e., HST, IPA, PEUFR, and UFP). The specimens used in this treatment are listed as "Examined Material." Species identifications were based on specialized literature (Bureau & Schumann 1896; Gentry 1992, 2009; Lohmann 2004; Lohmann & Taylor 2014; Lohmann & Pirani 1996, 1998, 2003; Pereira & Mansano 2008; Pool 2007a, 2007b, 2009; Reiche *et al.* 2020; Scudeller 2004). Morphological structures were described based on the terminology of Harris and Harris (2000), Gonçalves & Lorenzi (2007), and Lohmann & Taylor (2014).

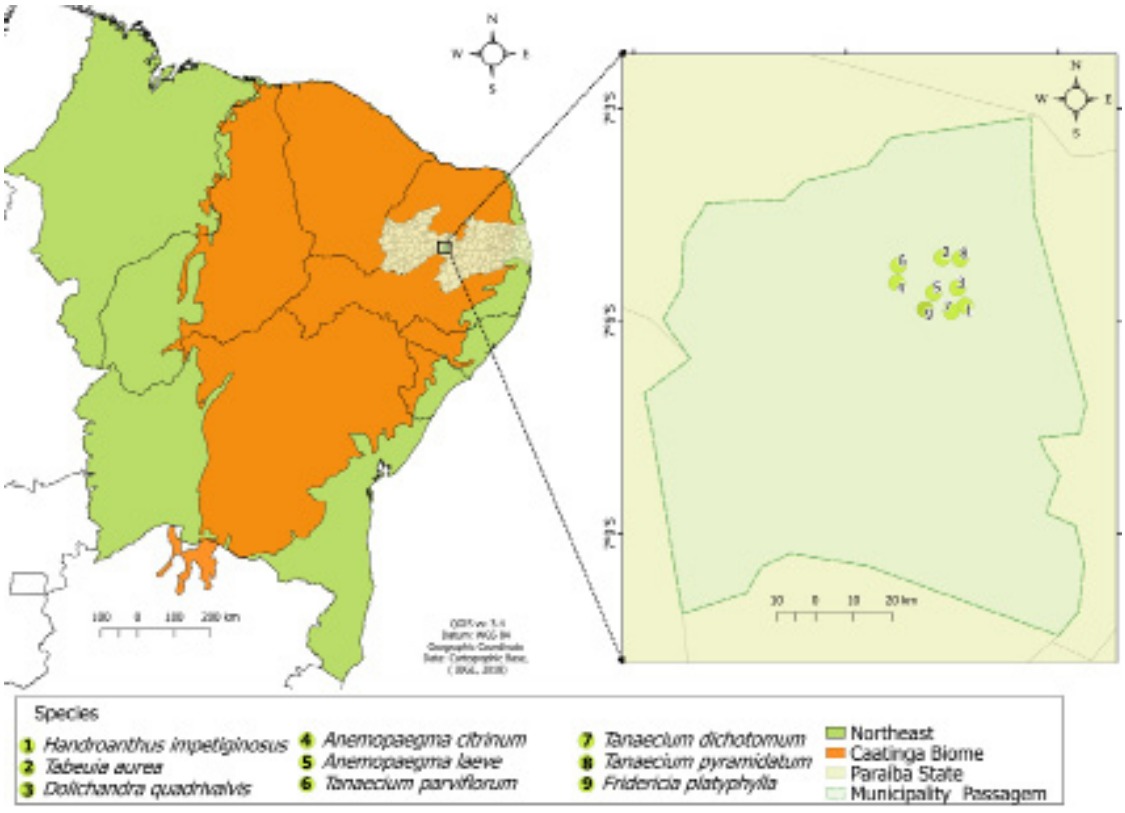

Figure 1 – Location of the study area (Municipality of Passagem in the Paraíba state) and occurrence of the Bignoniaceae sampled.

Results

In this study, we documented nine species of Bignoniaceae distributed among six genera at the "Fazenda Aba." The most representative genus is *Tanaecium* Swartz with three species (i.e., *Tanaecium dichotomum* (Jacq.) Kaehler & L.G.Lohmann, *Tanaecium parviflorum* (Mart. *ex* DC.) Kaehler & L.G. Lohmann, and *Tanaecium pyramidatum* (Rich.) L.G. Lohmann), followed by *Anemopaegma* Martius *ex* Meisner, with two species (i.e., *Anemopaegma citrinum* Mart. *ex* DC., *Anemopaegma laeve* DC.). The other four genera, are represented by a single species each, as follows: *Dolichandra quadrivalvis* (Jacq.) L.G. Lohmann, *Fridericia platyphylla* (Cham.) L.G. Lohmann, *Handroanthus impetiginosus* (Mart. *ex* DC.) Mattos, and *Tabebuia aurea* (Silva Manso) Benth. & Hook. f. *ex* S.Moore.

Identification key to the Bignoniaceae from the Fazenda Aba (Paraíba, Brazil)

1. Small to large trees 2
1'. Lianas 3
2. Leaves 3–5-foliolate; calyx 5-dentate to truncate; corolla pink to lilac, with yellow to orange nectar guides ..... 5. *Handroanthus impetiginosus*
2'. Leaves 5–6-foliolate; calyx irregularly dentate; corolla yellow, without nectar guides ..... 6. *Tabeuia aurea*
3. Trifid tendrils 4
3'. Tendrils simple or bifid 5
4. Tendrils uncinated; calyx spathaceous; fruit oblong, 4-parted..... 3. *Dolichandra quadrivalvis*

4’. Tendrils not uncinated; calyx cupular; fruit elliptic, 2-parted.....1. *Anemopaegma citrinum*
5. Prophylls of the axillary buds wide-elliptic to elliptic; corolla yellow .....2. *Anemopaegma laeve*
5’. Prophylls of the axillary buds triangular; corolla white, pink, or lilac 6
6. Leaflets with margin crenate; corolla white or white pinkish .....8. *Tanaecium parviflorum*
6’. Leaflets with margin entire; corolla lilac or pink.....7
7. Calyx bilabiate and cuspidate.....7. *Tanaecium dichotomum*
7’. Calyx truncate, minutely 5-apiculated, 5-dentate, irregularly divided or 2-lobed.....8
8. Leaves 2–3-foliolate; leaflets pubescent; tendrils bifid.....9. *Tanaecium pyramidatum*
8’. Leaves 1(–2)-foliolate; leaflets glabrous; tendrils simple.....4. *Fridericia platyphylla*

Anemopaegma Mart. *ex* Meisn., Pl. Vasc. Gen. 1:300, 2: 208, 1840.

Lianas; branchlets cylindrical, striated, without lenticels. Leaves 2–3-foliolate, with the terminal leaflet often modified into a simple or trifid tendril, not uncinated. Inflorescence a raceme, axillary. Calyx cupular, coriaceous, with cupular glands; corolla infundibuliform, yellow, without nectar guides, membranaceous; stamens included, staminode shorter than fertile stamens, anthers glabrous, straight; ovary stipitate, smooth, lepidote; disk annular. Capsule elliptic, stipitate, slightly inflated, coriaceous, 2-parted, without lenticels, calyx persistent; seeds winged, wings hyaline.

Anemopaegma includes 45 species distributed through dry to wet forests, from Mexico to Argentina and Brazil (Lohmann & Taylor 2014). In Brazil, 36 species occur, 13 of which are endemic (Lohmann 2010). Two species are found in the study area, *A. citrinum* and *A. leave.*

1. *Anemopaegma citrinum* Mart. *ex* DC., *in* A. DC., Prodr. 9:189, 1845.

Type: BRAZIL. s. loc.: C.F.P. von Martius s.n. (Lectotype designated by Lohmann in Lohmann & Taylor 2014: 411, BR-880372). Figs. 2b; 3a-b

Liana; branchlets glabrous; prophylls of the axillary buds triangular, not foliaceous, ca. 0.2 cm long, glabrous. Leaves 2–3-foliolate, with the terminal leaflet often modified into a trifid tendril, not uncinated; petiole 1.3–2 cm long, glabrous; petiolules 0.2–0.6 cm long, glabrous; leaflets elliptic, chartaceous, 2.3–5.2 × 0.9–2.2 cm, discolor, base obtuse, apex acuminate, margin entire, revolute, adaxial surface sparsely pubescent, glandular trichomes, abaxial surface pubescent, glandular trichomes, venation brochidodromous. Inflorescence a raceme, axillary. Calyx cupular, coriaceous, 0.4–0.9 × 0.4–0.8 cm, truncate, green, glabrous; corolla infundibuliform, membranaceous, 2.3–5.8 × 1.2–2.8 cm, yellow, externally lepidote; stamens included, anthers ca. 0.2 cm long, dorsal filaments 1.5–1.9 cm long, ventral filaments 1.4–1.6 cm long, staminode ca. 0.2 cm long; ovary elliptic, ca. 0.2 × 0.1 cm, style ca. 2.6 cm long, stigma ca. 0.2 cm long, rhombic. Capsule elliptic, 4.2–10.1 × 3.3–7.2 cm, slightly inflated, coriaceous, 2-parted, base and apex obtuse, glabrous, with lenticels, calyx persistent; seeds wide-elliptic, 1.3–1.8 × 1.1–1.5 cm, wings membranaceous.

Examined Material: Passagem, Fazenda Aba, 6.III.2016, fl., *E.M.P. Fernando 419* (HCSTR).

Additional Examined Material: BRAZIL. PERNAMBUCO: Serra Talhada, 21.III.2014, fr., D.N. Silva & A.P.S. Gomes 10 (HESBRA 2876).

Anemopaegma citrinum is found in Cerrado and dry forests, from eastern Bolivia to Brazil (Lohmann & Taylor 2014). In Brazil, it occurs in Caatinga and Cerrado vegetation from the states of Maranhão, Piauí, Paraiba, Pernambuco, Bahia, and Minas Gerais (Lohmann 2010).

The species was collected flowering between March and April.

Anemopaegma citrinum can be easily recognized by the trifid tendrils, minute prophylls of the axillary buds, calyx green cupular and coriaceous, corolla yellow, and elliptic fruits with obtuse bases and apices.

2. *Anemopaegma laeve* DC., *in* A. DC., Prodr. 9:189, 1845.

Type: BRAZIL. Bahia: J.S. Blanchet 3102 (Holotype: G-DC, photo F neg. 7663 at MO-1692840; Isotypes: G, K, P). Figs. 2a; 3c-d

Liana; branchlets glabrous to velutinous, with simple trichomes; prophylls of the axillary buds wide-elliptic to elliptic, foliaceous, 0.2–1.8

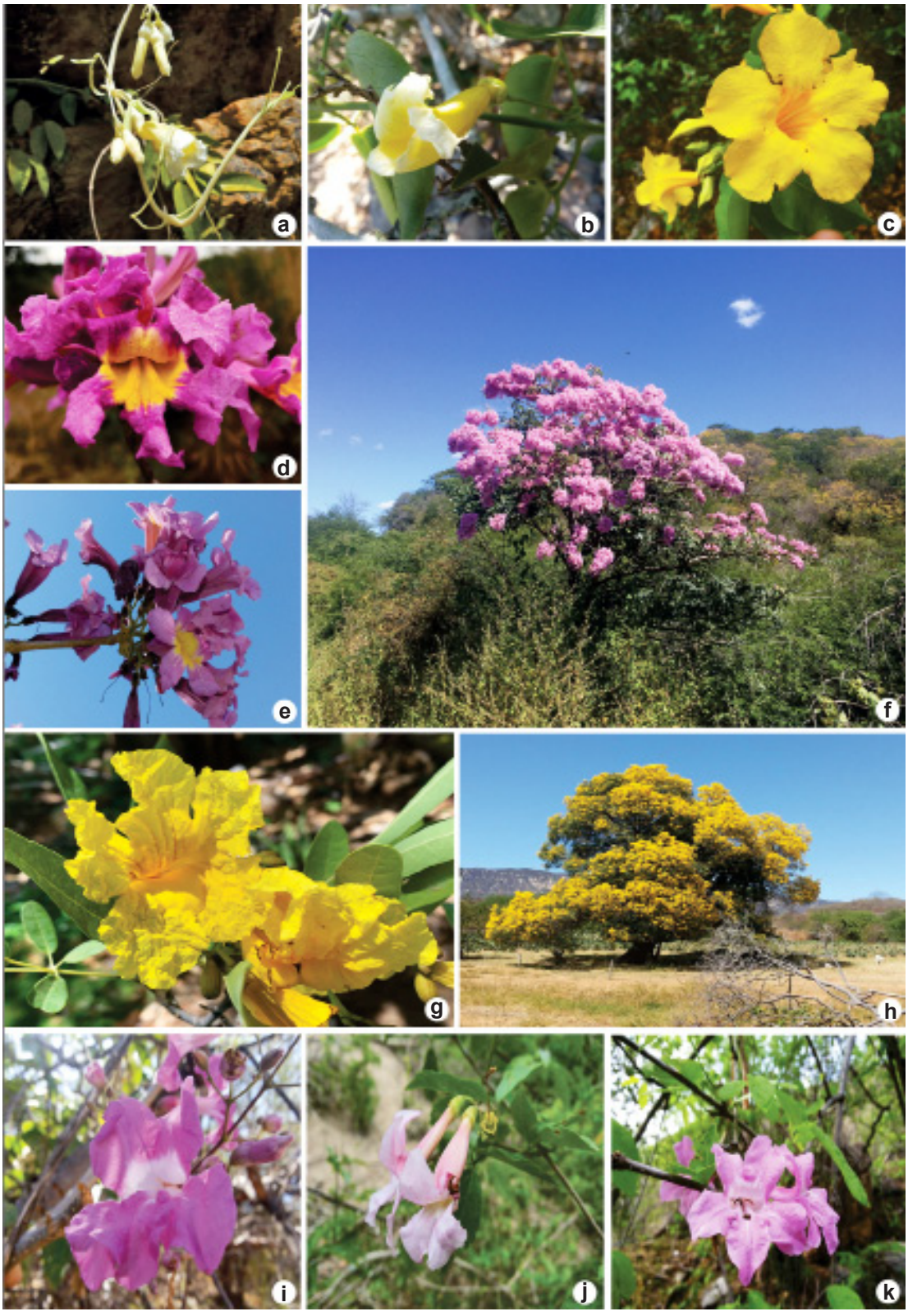

Figure 2 – a. *Anemopaegma laeve*. b. *Anemopaegma citrinum*. c. *Dolichandra quadrivalvis*. d, e-f. *Handroanthus impetiginosus*. g-h. *Tabebuia aurea*. i. *Tanaecium dichotomum*. j. *Tanaecium parviflorum*. k. *Tanaecium pyramidatum*.

× 0.2–1.7, glabrous to velutinous, with simple trichomes. Leaves 2–3-foliolate, with the terminal leaflet often modified into a simple tendril; petiole 1.6–3.7 cm long, glabrous to velutinous, with simple trichomes; petiolules 0.4–0.9 cm long, glabrous to velutinous, simple trichomes; leaflets elliptic to ovate, chartaceous, 2.8–7.1 × 0.7–3.6 cm, slightly discolor, base cordate, apex attenuate to acuminate, margin entire, revolute, both sides glabrous to velutinous, with simple trichomes, venation brochidodromous. Inflorescence a raceme, axillary. Calyx cupular, coriaceous, 0.9–1.2 × 0.4–0.6 cm, truncate, green, glabrous to pubescent, with simple and glandular trichomes; corolla infundibuliform, membranaceous, 2.7–5.9 × 1.4–2.7 cm, yellow, externally lepidote; stamens included, anthers ca. 0.2 cm long, dorsal filaments 2.5–2.9 cm long, ventral filaments 1.8–1.9 cm long, staminode ca. 0.3 cm long; ovary elliptic, ca. 0.3 × 0.1 cm, style ca. 1.9 cm long, stigma ca. 0.2 cm long, rhombic. Capsule elliptic, 5.8–7.4 × 3.8–5.7 cm, slightly inflated, coriaceous, 2-parted, base and apex cuneate, glabrous, with lenticels, calyx persistent; seeds wide-elliptic, ca. 2.9 × 3.6 cm, wings membranaceous.

Examined Material: Passagem, Fazenda Aba, 20.XII.2014, fl. and fr., *E.M.P. Fernando 201* (HCSTR).

Anemopaegma laeve is endemic to Brazil, where it occurs in Caatinga and Cerrado from the states of Maranhão, Piauí, Ceará, Paraiba, Pernambuco, Bahia, and Minas Gerais (Lohmann 2010).

The species was collected flowering and fruiting in November and December.

The indument of *Anemopaegma laeve* ranges from glabrous to densely velutinous. *Anemopaegma leave* is the only species of *Anemopaegma* in Paraíba that bears prophylls of the axillary buds wide-elliptic and foliaceous, and elliptic fruits with cuneate bases and apices.

Dolichandra Cham., Linnaea 7: 657, 1832 emend. L.G. Lohmann *in* Lohmann & Taylor, Ann. Missouri Bot. Gard. 99(3): 428, 2014.

Dolichandra includes 10 species distributed through dry to wet forests from the southeastern U.S.A., Mexico and Antilles to Argentina (Lohmann & Taylor 2014). In Brazil, nine species occur, one of which is endemic (Lohmann 2010). A single species is found in the study area, *D. quadrivalvis*.

3. *Dolichandra quadrivalvis* (Jacq.) L.G. Lohmann, Nuevo Cat. Fl. Vasc. Venezuela 273, 2008.

Type: tab. 40, fig. 3 in Jacq., Fragm. Bot. 37, 1800 [1809] (Lectotype designated by Lohmann *in* Lohmann & Taylor 2014: 430). Figs. 2c; 3e-f

Liana; branchlets cylindrical, striated, with lenticels, glabrous to pubescent, with simple trichomes; prophylls of the axillary buds lanceolate, not foliaceous, ca. 0.4 cm long, glabrous. Leaves 2–3-foliolate, with the terminal leaflet often modified into a trifid tendril, uncinated; petiole 1.4–3.7 cm long, pubescent, with simple trichomes; petiolules 0.9–2 cm long, pubescent, with simple trichomes; leaflets elliptic, oblong-elliptic or ovate, chartaceous, 2.0–8.6 × 1.3–8.1 cm, discolor, base cuneate to rounded, apex attenuate to rounded, margin entire, not revolute, both sides glabrous to lepidote, venation brochidodromous. Inflorescence a thyrse, axillary. Calyx spathaceous, membranaceous, 0.5–3.2 × 0.4–1.2 cm, 1-apiculated, green, pubescent, with glandular trichomes; corolla infundibuliform, membranaceous, 3.2–6.8 × 0.4–1 cm, yellow, without nectar guides, externally glabrous; stamens inserted, anthers ca. 0.2 cm long, glabrous, dorsal filaments 1.9–2 cm long, ventral filaments 0.8–1.3 cm long, staminode ca. 0.3 cm long; ovary elliptic, sessile, ca. 0.3 × 0.2 cm, smooth, glabrous, style ca. 3.1 cm long, stigma ca. 0.2 cm long, rhombic; disk annular. Capsule oblong, 9.8–18 × 2.3–7.5 cm, inflated, woody, 4-parted, base cuneate, apex obtuse, glabrous, with lenticels, calyx persistent; seeds not seen.

Examined Material: Passagem, Fazenda Aba, 17.I.2016, fl., *E.M.P. Fernando 376* (HCSTR).

Dolichandra quadrivalvis is widely distributed through dry to wet forests from Mexico to Argentina (Lohmann & Taylor 2014). In Brazil, it occurs in all states and phytogeographic domains (Lohmann 2010).

The species was collected flowering between January and February.

Dolichandra quadrivalvis can be recognized by uncinated and trifid tendril and the spathaceous and apiculated calyces and the 4-parted oblong fruits.

Fridericia Mart., Nova Acta Phys.-Med. Acad. Caes. Leop.-Carol. Nat. Cur. 13(2): 7, 1827 emend. L.G. Lohmann *in* Lohmann & Taylor, Ann. Missouri Bot. Gard. 99(3): 431, 2014.

Fridericia includes 60 species distributed through dry to wet forests, Cerrado, and Caatinga from Mexico to Argentina and Brazil (Kaehler *et al.* 2019). In Brazil, 54 species occur, 23 of which

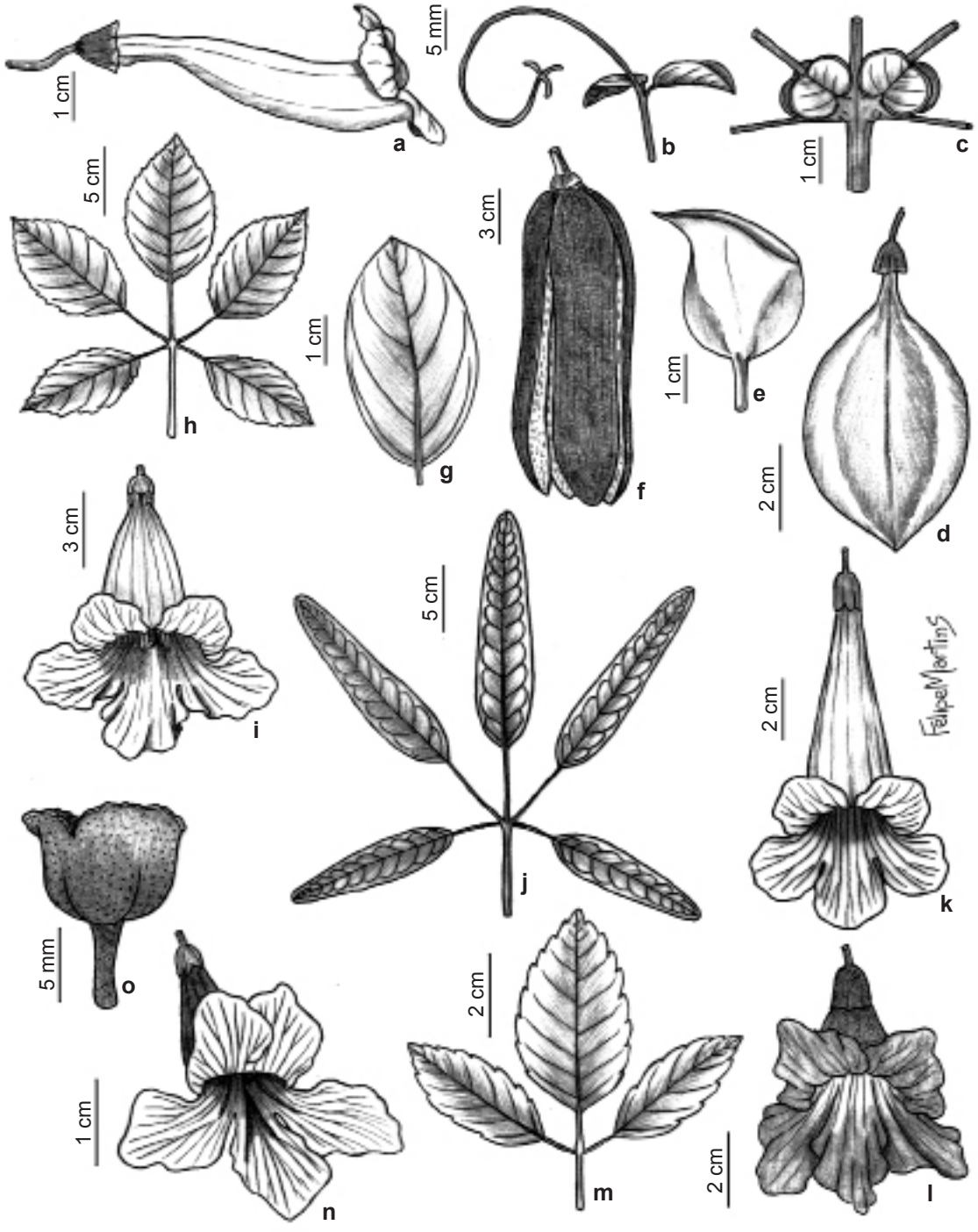

Figure 3 – a-b. *Anemopaegma citrinum* – a. flower; b. trifid tendril. c-d. *Anemopaegma laeve* – c. prophylls of the axillary buds; d. fruit. e-f. *Dolichandra quadrivalvis* – e. calyx; f. fruit. g. *Fridericia platyphylla* – leaf 1-foliolate. h-i. *Handroanthus impetiginosus* – h. leaf; i. flower. j-k. *Tabebuia aurea* – j. leaf; k. flower. l. *Tanaecium dichotomum* – flower. m-n. *Tanaecium parviflorum* – m. leaf; n. flower. o. *Tanaecium pyramidatum* – calyx.

are endemic (Lohmann 2010). A single species is found in the study area, *F. platyphylla*.

4. *Fridericia platyphylla* (Cham.) L.G. Lohmann, Ann. Missouri Bot. Gard. 99(3): 442, 2014.
Type: BRAZIL. F. Sellow s.n. (Holotype: LE; Isotypes: B as photo F. neg. 18452 at MO-1692775, HAL, K, US). Fig. 3g

Liana; branchlets cylindrical, striated, with lenticels, glabrous; prophylls of axillary buds triangular, not foliaceous, ca. 0.1 cm, glabrous. Leaves 1(–2)-foliolate, with the terminal leaflet often modified into a simple tendril, not uncinated; petiole 0.3–0.8 cm long, pubescent, with simple trichomes; petiolules 0.3–0.6 cm long, pubescent, with simple trichomes; leaflets elliptic to obovate, chartaceous, 2.6–5.7 × 0.9–4.4 cm, concolor, base attenuated, apex rounded, margin entire, not revolute, both sides glabrous, venation actinodromous. Inflorescence a thyrse, terminal. Calyx cupular, membranaceous, 0.3–0.5 × 0.3–0.4 cm, truncate to minutely 5-apiculated, pink, densely velutinous, with simple trichomes; corolla infundibuliform, membranaceous, 1.6–3.3 × 0.6–0.9 cm, pink, without nectar guides, externally velutinous, with simple trichomes; stamens included, anthers ca. 0.3 cm long, glabrous, dorsal filaments 1.1–1.3 cm long, ventral filaments 0.8–1.2 cm long, staminode ca. 0.2 cm long; ovary elliptic, sessile, ca. 0.2 × 0.1 cm, smooth, glabrous, style ca. 1.2 cm long, stigma ca. 0.2 cm long, elliptic; disk annular. Fruits and seed not seen.
Examined Material: Passagem, Fazenda Aba, 29.XI.2014, fl., *E.M.P. Fernando 196* (HCSTR).

Fridericia platyphylla is found in Caatinga and Cerrado vegetation in Venezuela, Peru, Bolivia, Paraguay, and Brazil (Lohmann & Taylor 2014). In Brazil, it occurs in almost all states and phytogeographical domains (Lohmann 2010).

The species was collected flowering between November and December.

Fridericia platyphylla can be recognized by the 1(–2)-foliolate and glabrous leaves and the calyx cupular, truncate to minutely 5-apiculated and pink.

Handroanthus Mattos, Loefgrenia, 50: 2, 1970.

Handroanthus includes 30 species distributed through Central and South America and the Antilles (Grose & Olsmtead 2007). In Brazil, 27 species are found, 15 of which are endemic (Lohmann 2010). A single species is found in the study area, *H. impetiginosus*.

5. *Handroanthus impetiginosus* (Mart. *ex* DC.) Mattos, Loefgrenia 50: 2, 1970.
Type: BRAZIL. C.F.P. von Martius s.n. (Lectotype designated as holotype by Gentry 1992: 199).
Figs. 2d-f; 3h-i

Tree, 4-5 m; branchlets cylindrical, striated, with lenticels, glabrous. Leaves 3–5-foliolate; petiole 2–8.1 cm long, glabrous; petiolule 1–3.9 cm long, glabrous; leaflets elliptic, narrow-elliptic or obovate, chartaceous, 1.2–12 × 1.1–5.7 cm, concolor, base rounded, apex acute to acuminate, margin entire, sometimes irregularly serrate, adaxial surface pubescent, with simple trichomes, abaxial surface glabrescent to tomentose, with simple trichomes, venation brochidodromous. Inflorescence a condensed panicle, glabrous to densely tomentose. Calyx cupular, coriaceous, 0.3–1 × 0.3–0.6 cm, 5-dentate to truncate, lilac, densely pubescent, with stellate and simple trichomes; corolla infundibuliform, membranaceous, 2.8–6.9 × 0.6–3.3 cm, pink to lilac with yellow to orange nectar guides, externally pubescent, with simple trichomes; stamens inserted, anthers ca. 0.2 cm long, dorsal filaments ca. 1.7–2.1 cm long, ventral filaments ca. 1.5–1.6 cm long, staminode ca. 0.2 cm long; ovary sessile, oblong, ca. 0.3 × 0.2 cm, lepidote, style ca. 2.5 cm long, stigma ca. 0.2 cm long, lanceolate. Fruits and seeds not seen.
Examined Material: Passagem, Fazenda Aba, 13.VI.2015, fl., *E.M.P. Fernando 337* (HCSTR).

Handroanthus impetiginosus is widely distributed from Mexico to Argentina (Gentry 1992). In Brazil, it occurs in almost all phytogeographical domains and states, except the southern portions on the country (Lohmann 2010).

The species was collected flowering between June to September.

Handroanthus impetiginosus can be recognized by the tree habit and pink to lilac flowers, with yellow to orange nectar guides and 5-dentated and pubescent calyces, with stellate trichomes.

Tabebuia Gomes *ex* A. P. de Candolle, Biblioth. Universelle Genève, ser. 2, 17: 139, 1838.

Tabebuia includes 67 species that are broadly distributed through Central and South America and the Antilles (Gentry 1992). In Brazil, 15 species occur, five of which are endemic (Lohmann 2010). A single species is found in the study area, *T. aurea*.

6. *Tabebuia aurea* (Silva Manso) Benth. & Hook.f. *ex* S.Moore, Trans. Linn. Soc. London, Bot. 4: 423, 1895.

Type: BRAZIL. H.C. Cutler 8249 (Lectotype designated by Gentry 1992: 144).

Figs. 2g-h; 3j-k

Tree, 3–10 m; branchlets cylindrical, striated, with lenticels, glabrous. Leaves 5–6-foliolate; petiole 1.3–7.7 cm long, glabrous; petiolule 1.0–3.4 cm long, glabrous; leaflets elliptic, oblong-elliptic or lanceolate, coriaceous, 4.2–19 × 0.5–8.2 cm, concolor, base rounded to obtuse, apex rounded to cuneate, margin entire, not revolute, both sides glabrescent to lepidote, venation brochidodromous. Inflorescence a panicle, terminal or axillary. Calyx tubular, coriaceous, 0.6–1.5 × 0.5–0.7 cm, irregularly dentate, light brown to yellow, densely lepidote, with sparsely distributed glands; corolla infundibuliform, membranaceous, 3.3–7.4 × 1.1–1.5 cm, yellow, without nectar guides, externally glabrous; stamens inserted, anthers ca. 0.3 cm long, dorsal filaments 1.6–1.9 cm long, ventral filaments 1.4–1.7 cm long, staminode ca. 0.3 cm long; ovary ca. 0.3 × 0.1 cm, densely lepidote, style 2.8–3 cm long, stigma ca. 0.2 cm long, lanceolate. Fruits and seed not seen.

Examined Material: Passagem, Fazenda Aba, 27.IX.2014, fl., *E.M.P. Fernando 160* (HCSTR).

Tabebuia aurea is widely distributed in dry forests of Argentina, Bolivia, Brazil, and Suriname (Gentry 1992). In Brazil, it is found in almost all states and phytogeographical domains (Lohmann 2010).

The species was collected flowering between August to September and fruiting in October and November.

Tabebuia aurea can be recognized by the yellow flowers and calyx irregularly dentate and densely lepidote, with sparse glands.

Tanaecium Sw., Prodr. Veg. Ind. Occ. 6:91, 1788, emend. L.G. Lohmann in Lohmann & Taylor, Ann. Missouri Bot. Gard. 99(3): 463, 2014.

Lianas; branchlets cylindrical, striated, with lenticels. Leaves 2–3-foliolate, with the terminal leaflet often modified into a simple or bifid tendril, not uncinated. Inflorescence a thyrse, axillary or terminal. Calyx cupular, coriaceous, without cupular glands; corolla infundibuliform, white, pink, or lilac, without nectar guides, membranaceous; stamens included, staminode shorter than fertile stamens, anthers glabrous, straight; ovary sessile, smooth, lepidote; disk annular. Capsule linear, not stipitate, flattened or inflated, coriaceous, 2-parted, with lenticels, calyx caducous or persistent; seeds winged, wings hyaline.

Tanaecium includes 21 species distributed through dry to wet forests from Mexico and the Antilles to Argentina (Frazão & Lohmann 2019). In Brazil, 16 species occur, five of which are endemic (Frazão & Lohmann 2019). Three species are found in the study area, *T. dichotomum, T. parviflorum*, and *T. pyramidatum.*

7. *Tanaecium dichotomum* (Jacq.) Kaehler & L.G. Lohmann, Taxon, 68(4): 765, 2019.

Type: COLOMBIA. Magdalena, Cartagena: s. coll. (not located). Figs. 2i; 3l

Liana; branchlets velutinous, with simple trichomes; prophylls of the axillary buds triangular, not foliaceous, ca. 0.2 cm long, glabrous. Leaves 2–3-foliolate, with the terminal leaflet often modified into a simple tendril; petiole 1.2–1.8 cm long, velutinous, with simple trichomes; petiolules 0.4–0.8 cm long, velutinous, with simple trichomes; leaflets oblong to elliptic, membranaceous, 2.1–4 × 1.5–2 cm, discolor, base and apex rounded, margin entire, not revolute, both sides velutinous, with simple trichomes, venation brochidodromous. Inflorescence a thyrse, terminal. Calyx cupular, 0.5–1.3 × 0.3–0.8 cm, bilabiate and cuspidate, lilac, velutinous, with simple trichomes; corolla infundibuliform, membranaceous, 3–6.2 × 0.6–1.3 cm, pink to lilac, internally white, externally velutinous, with simple trichomes; stamens included, anthers ca. 0.3 cm long, dorsal filaments 1.5–1.6 cm long, ventral filaments 1–1.4 cm long, staminode ca. 0.3 cm long; ovary elliptic, ca. 0.3 × 0.2 cm, style ca. 2.0 cm long, stigma ca. 0.3 cm long, elliptic. Capsule linear, 15.1–23.9 × 1–1.4 cm, flattened, coriaceous, base and apex cuneate, densely velutinous, with simple trichomes, calyx persistent; seeds elliptic, 1.9–2.8 × 1.3–1.6 cm, wings membranaceous.

Examined Material: Passagem, Fazenda Aba, 11.IX.2016, fl., *E.M.P. Fernando 467* (HCSTR).

Additional Examined Material: BRAZIL. PERNAMBUCO: Ibimirim, 16.II.1996, fr., A.P.S. Gomes & D.S. Pimentel 279 (MO 1282655).

Tanaecium dichotomum is widely distributed through dry to humid lowland forest vegetation from Mexico to Argentina (Lohmann & Taylor 2014). In Brazil, it occurs in all states and phytogeographical domains, except from the southern states of the country (Lohmann 2010).

The species was collected flowering between September and October.

Tanaecium dichotomum can be recognized by the dichotomic inflorescences, the calyx truncate to

irregularly bilabiate and cuspidate, and the green and densely velutinous fruits.

8. *Tanaecium parviflorum* (Mart. *ex* DC.) Kaehler & L.G. Lohmann, Taxon, 68(4): 765, 2019.
Type: BRAZIL. Bahia: C.F.P. von Martius 1874 (Lectotype designated by Lohmann in Lohmann & Taylor 2014: 441, M-086353). Figs. 2j; 3m-n

Liana; branchlets glabrous; prophylls of the axillary buds triangular, not foliaceous, ca. 0.3 cm long, glabrous. Leaves 2–3-foliolate, with the terminal leaflet often modified into a simple tendril; petiole 0.5–0.7 cm long, pubescent, with simple trichomes; petiolules 0.3–0.6 cm long, pubescent, with simple trichomes; leaflets elliptic, membranaceous, 1–4.8 × 0.7–2 cm, concolor, base rounded to truncate, apex rounded to attenuate, margin crenate, not revolute, adaxial surface pubescent only in main vein, with simple trichomes, abaxial surface pubescent, with simple trichomes, venation actinodromous. Inflorescence a thyrse, axillary. Calyx cupular, coriaceous, ca. 0.4 × 0.3 cm, 5-dentate, green, pubescent, with simple trichomes; corolla infundibuliform, membranaceous, 2.3–4.1 × 1.3–2 cm, white pinkish, internally yellow, externally pubescent, with simple trichomes; stamens included, anthers ca. 0.4 cm long, dorsal filaments 1.3–1.7 cm long, ventral filaments 0.7–1 cm long, staminode ca. 0.3 cm long; ovary elliptic, ca. 0.4 × 0.2 cm, style ca. 2.6 cm long, stigma ca. 0.2 cm long, ellipsoid. Capsule linear, 8.6 × 1.4 cm, flattened, coriaceous, base rounded, apex long attenuate, velutinous, with simple trichomes, calyx persistent; seeds elliptic, 1–1.5 × 1.3–2.2 cm, wings membranaceous.
Examined Material: Passagem, Fazenda Aba, 31.I.2016, fl., *E.M.P. Fernando 380* (HCSTR).
Additional Examined Material: BRAZIL. PERNAMBUCO: Salgueiro, 7º59'04"S 39º07'42"W, 501 m, 31.III.2009, fr., J.G. Carvalho–Sobrinho & G.C. Rodrigues 2102 (IPA 87921).

Tanaecium parviflorum is endemic to Brazil, where it grows in Atlantic forest, Caatinga, and Cerrado from Ceará to São Paulo (Lohmann 2010).

The species was collected flowering in January and February.

Tanaecium parviflorum can be recognized by the membranaceous leaflets with crenate margins, and the corolla white pinkish, yellow internally.

9. *Tanaecium pyramidatum* (Rich.) L.G. Lohmann, Nuevo Cat. Fl. Vasc. Venezuela 274, 2008.
Type: FRENCH GUIANA. Cayenne: *J.B. Leblond 292* (Holotype: P-LA). Figs. 2k; 3o

Liana; branchlets densely pubescent, with simple trichomes; prophylls of the axillary buds triangular, not foliaceous, ca. 0.2 cm long, glabrous. Leaves 2–3-foliolate, with the terminal leaflet often modified into a bifid tendril; petiole 2–2.2 cm long, pubescent, with simple trichomes; petiolules 1.8–2 cm long, pubescent, with simple trichomes; leaflets elliptic to ovate, chartaceous, 2.9–7.7 × 1.6–4.6 cm, concolor, base cuneate to rounded, apex acute to acuminate, margin entire, not revolute, adaxial surface glabrous, abaxial surface pubescent over the main veins, with simple trichomes, venation brochidodromous. Inflorescence a thyrse, terminal. Calyx cupular, 0.5–0.8 × 0.3–0.8 cm, truncate, irregulary divided or 2-lobed, light pink, pubescent, with glandular trichomes; corolla infundibuliform, membranaceous, 2.2–4.5 × 0.9–1.1 cm, light pink, internally white, externally densely velutinous, with simple trichomes; stamens included, anthers ca. 0.2 cm long, dorsal filaments 1.7–2.1 cm long, ventral filaments 1.5–1.7 cm long, staminode ca. 0.2 cm long; ovary elliptic, ca. 0.3 × 0.1 cm, style ca. 2.1 cm long, stigma ca. 0.2 cm long, ellipsoid. Capsule linear, 16–30.1 × 0.9–1.1 cm, inflated, coriaceous, base attenuate, apex acuminate, glabrous, calyx persistent; seeds not seen.
Examined Material: Passagem, Fazenda Aba, 22.II.2015, fl., *E.M.P. Fernando 215* (HCSTR).
Additional Examined Material: BRAZIL. ALAGOAS: Ibateguara, Coimbra, 13.XII.2001, fr., M. Oliveira & A. Grilo 671 (IPA 64091).

Tanaecium pyramidatum is distributed through dry to humid forest vegetation from Mexico to Uruguay (Lohmann & Taylor 2014). In Brazil, it occurs in all states and phytogeographical domains (Lohmann 2010).

The species was collected flowering in February and March.

Tanaecium pyramidatum can be recognized by the bifid tendril, calyx truncate to irregulary divided, and corolla infundibuliform, light pink externally and white internally.

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