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Original Paper
Terminalia s.s. (Combretaceae) in Maranhão state, Brazil

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Abstract

We present the floristic treatment of the *Terminalia* species occurring in the state of Maranhão. This study was based on the analysis of national and international herbaria. Six species were recorded from the state: *Terminalia actinophylla*, *T. amazonia*, *T. dichotoma*, *T. fagifolia*, *T. glabrescens*, and *T. lucida*, with one endemic (*T. actinophylla*) to Brazil. Taxa were commonly recorded in dry Savanna environments (cerrado). Only the species *Terminalia fagifolia* and *T. lucida* occur in conservation units in Maranhão, specifically in Mirador State Park, Chapada das Mesas National Park and Ecological Sanctuary of Pedra Caída. In addition to morphological descriptions, this study includes an identification key, illustrations, and comments about taxonomic affinities, geographical distribution, ecology, conservation status, and phenology of the species.

Key words: cerrado, conservation, diversity, flora, Myrtales.

Resumo

Apresentamos o tratamento florístico das espécies de *Terminalia* ocorrentes no estado do Maranhão. Este estudo foi baseado na análise de herbários nacionais e internacionais. Seis espécies foram registradas para o estado: *Terminalia actinophylla*, *T. amazonia*, *T. dichotoma*, *T. fagifolia*, *T. glabrescens* e *T. lucida*, sendo uma endêmica do Brasil. Os táxons foram registrados, preferencialmente em ambientes secos de Savana (cerrado). Apenas as espécies: *Terminalia fagifolia* e *T. lucida* ocorrem em unidades de conservação no Maranhão, especificamente nos Parque Estadual do Mirador, Parque Nacional da Chapada das Mesas e Santuário Ecológico Pedra Caída. Além das descrições morfológicas, o estudo inclui chave de identificação, ilustrações e comentários sobre afinidades taxonômicas, distribuição geográfica, ecologia, status de conservação e fenologia das espécies.

Palavras-chave: cerrado, conservação, diversidade, flora, Myrtales.

Introduction

Combretaceae, which belongs to Myrtales, is represented in Brazil by 62 species and five genera: *Buchenavia* (17 spp.), *Combretum* (22 spp.), *Conocarpus* (1 sp.), *Laguncularia* (1 sp.), and *Terminalia* (21 spp.). Among these, *Terminalia* stands out as it occurs in different Brazilian phytogeographical domains, such as the Amazon, Caatinga, Cerrado, and Atlantic Forest (BFG 2018). *Terminalia* includes trees with simple and alternate leaves, arranged at the apex of the branches; flowers monoclinous or unisexual, apetals with stamens exserts, inserted in two whorls in the upper hypanthium and versatile anthers; fruits dried, rounded or complanate, 2–5 alates (Marquete *et al.* 2003; Stace 2010; BFG 2018).

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Classic works for the genera include Brown (1810), Eichler (1867), Engler & Diels (1900), Exell (1931), Exell & Stace (1966) and Stace (2010). In Brazil, taxonomic and floristic studies with species of Combretaceae, or specifically *Terminalia*, from different regions of Brazil were developed by Marquete (1984), Marquete & Valente (1997), Marquete *et al.* (2003), Linsigen *et al.* (2009), Loiola *et al.* (2009), Soares Neto *et al.* (2014) and Ribeiro *et al*. (2017, 2018a). Different uses were found for some *Terminalia* species, highlighting their importance as ornamentals and food (Stace 2010; Souza *et al*. 2016). Furthermore, medicinal and pharmacological properties have been recognized and tested in *T. actinophylla* Mart. (Fogaça *et al.* 2013), and *T. fagifolia* Mart. (Nunes *et al.* 2014).

In order to contribute to the study of *Terminalia* taxa in Brazil, especially in the Northeastern region, a floristic survey of its species in the state of Maranhão is presented here. This study includes descriptions, identification key, illustrations, photographic plate, as well as distribution and richness maps of recorded species.

Material and Methods

This study was based on the analysis of herbarium specimens from ALCB, ASE, CEN, EAC, HDJF, HRCB, HUCPE, HUEFS, HUTO, IAN, IPA, INPA, K, LTR, MFS, MG, MO, NY, PEUFR, R, RB, SP, TEPB, UB, US (acronyms according Thiers, continuously updated), and HST (not indexed) herbaria.

The morphological descriptions (vegetative and reproductive features) adopted were based on Radford *et al.* (1974) and Gonçalves & Lorenzi (2007) and the leaf pattern on Hickey (1973). Descriptions of the genus and species are based on material analyzed for the state, including material from other states only in the absence of flowers or fruits. In addition, the relationships between taxa were only mentioned when necessary.

In this floristic survey, only native Brazilian species are described, thus excluding *T. catappa* L., a naturalized exotic species.

The distribution of taxa was elaborated using geographic information obtained from exsicate labels and from the *species*Link (CRIA 2019) and Herbário Virtual Reflora (REFLORA 2019) websites, with visualization through a map generated in the program Quantum GIS 3.6 (QGIS 2019). Species richness was obtained by delimiting the area of occurrence in a grid of 1º latitude by 1º longitude squares with the DIVA-GIS 7.5 program (Hijmans *et al.* 2001). Vegetation types were defined based on the Brazilian Vegetation Technical Manual (IBGE 2012).

Results and Discussion

Terminalia comprises tree species occurring in the following environments: Savanna (cerrado) and, less often, in Ombrophilous Dense Forest (Amazon), Coastal Lowland Semideciduous Forest or Riparian Forest in Maranhão state. The genus is represented by six species: *Terminalia actinophylla*, *T. amazonia* (J.F. Gmel.) Exell., *T. dichotoma* G.Mey., *T. fagifolia*, *T. glabrescens* Mart. and *T. lucida* Hoffmanns. *ex* Mart., with only *T. actinophylla* restricted to Brazil (Fig. 1). It is worth to note that some analyzed specimens could correspond to *T. argentea* Mart. & Zucc. Unfortunately, the lack of fertile specimens did not confirm the occurrence of the taxon in the state and, therefore, this species was not treated here.

Regarding the analysis of the species richness pattern of *Terminalia* in Maranhão, the state presents high variation of vegetation formations and a clear presence of *Terminalia* representatives in dry areas of Savanna or transition zones of Savanna and Seasonal Forest

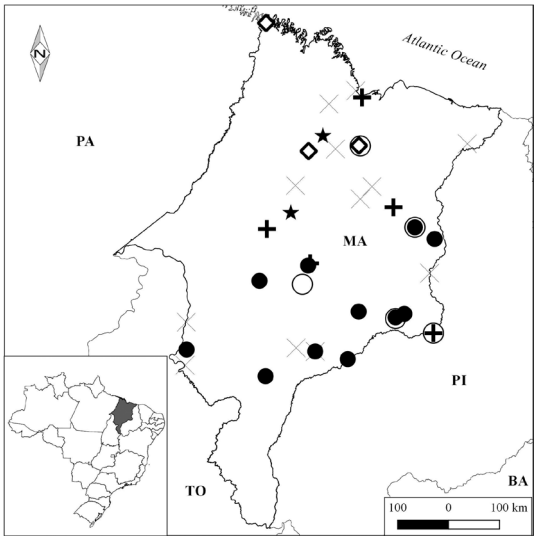

Figure 1 – Distribution of *Terminalia* species recorded in Maranhão state, Brazil. ○ = *T. actinophylla*; ◇ = *T. amazonia*; ★ = *T. dichotoma*; ● = *T. fagifolia*; + = *T. glabrescens*; × = *T. lucida*; BA = Bahia; PA = Pará; PI = Piauí; TO = Tocantins.

in Maranhão (Fig. 2). In the southeastern region of the state that borders with Piauí, five species (higher density grid, highlighted in red) were recorded in areas of Savanna and Riparian Forest, while in the northern region of Maranhão four species (in orange grid) were recorded in Ombrophilous Dense and Coastal Lowland Semideciduous Forests. In central areas of the state three species were registered (in yellow) in Savanna. *Terminalia lucida* and *T. fagifolia* presented the greatest distributions in the state and contribute significantly to the species richness pattern of the genus in Maranhão, appearing in almost grids, including two and one species recorded (in green and light green), respectively.

Only *Terminalia fagifolia* and *T. lucida* were registered in three conservation units in Maranhão, specifically in Mirador State Park, Chapada das Mesas National Park and Ecological Sanctuary of Pedra Caida. Furthermore, *T. amazonia* occurs in the Ka'apor Indigenous Reserve, a region of preserved Amazon Forest.

In the ambit of the Northeast region, some floristic treatments with records of representatives of *Terminalia* have already been developed for the states of Alagoas (2 spp.) (Ribeiro *et al.* 2020), Ceará (4 spp.) (Soares Neto *et al.* 2014), Pernambuco (5 spp.) (Ribeiro *et al.* 2018b), Piauí (7 spp.) (Ribeiro *et al.* 2020) and Rio Grande do Norte (2 spp.) (Sousa *et al.* 2018), respectively. In addition to the study for the state of Piauí which included seven species of *Terminalia*, this taxonomic treatment for Maranhão comprise six species, with *T. dichotoma* not found in the neighboring state. The floristic treatment presented here fills out a gap of knowledge about records for *Terminalia* in Mid-North region, which includes Maranhão and western Piauí.

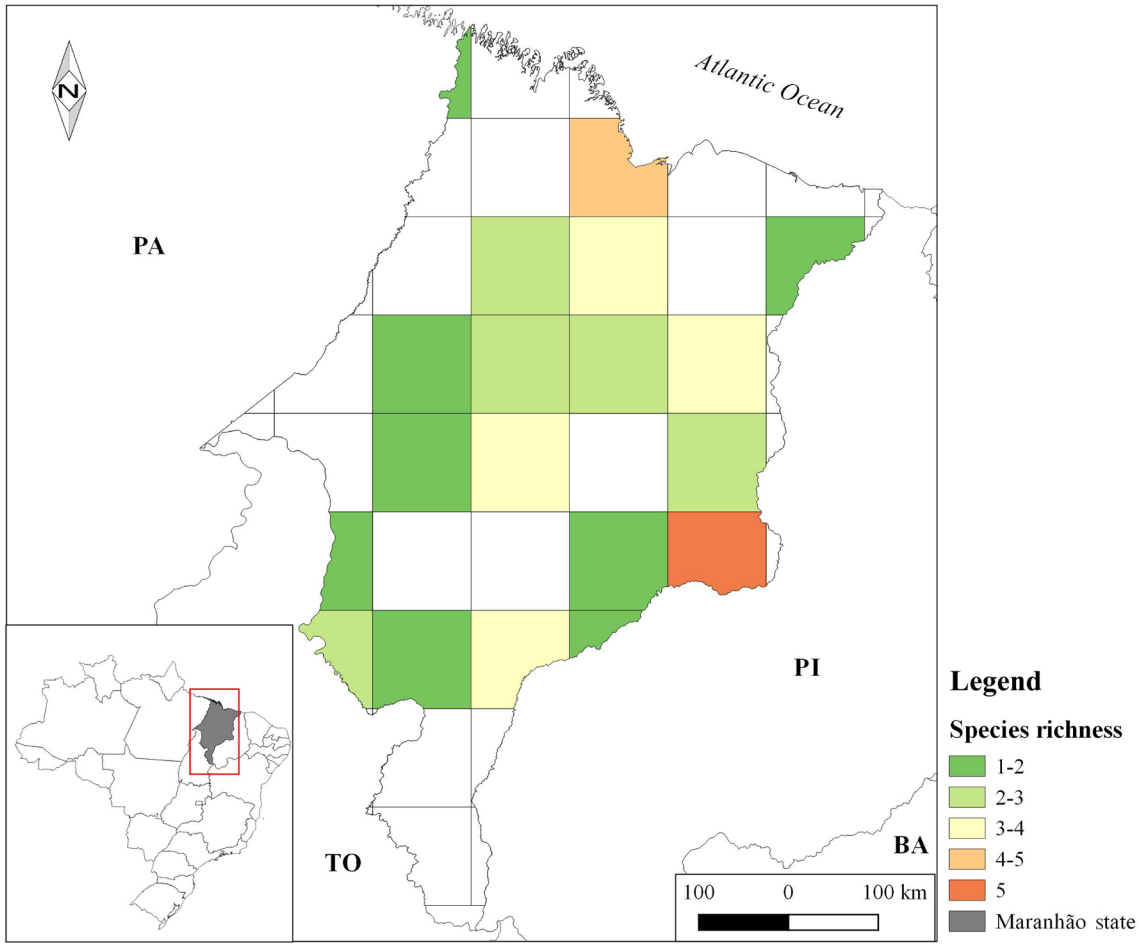

Figure 2 – Species richness of the *Terminalia* in Maranhão state, grids of one degree coordinates. BA = Bahia; PA = Pará; PI = Piauí; TO = Tocantins.

Taxonomic treatment

1. *Terminalia* L. Syst. Nat. 12.(2): 674. 1767.

Shrub to tree, branches glabrous. Galls present or absent. Leaves alternate, arranged at the end of the branches. Glands 2 or absent. Inflorescences in subcapitate or elongated spikes, axillary or terminal. Flowers unisexual or bisexual. Calyx 5-lobed, developed lobes, reflexed or not. Petals absent. Stamens 10, inserted in two whorls; anthers versatile. Nectariferous disk generally developed, ringlike, margin free. Fruit betulid, dried, 2–(4)5-alate.

Key to *Terminalia* species occurring in Maranhão state

1. Leaves coriaceous; style dense-villous, except glabrous only at apex .....1.6. *Terminalia lucida*
1'. Leaves chartaceous to subcoriaceous; style glabrous or villous in proximal half.
    2. Leaves with abaxial surface sericeous with ferrugineous tricomes; fruit 5-alate ....1.5. *Terminalia glabrescens*
    2'. Leaves with abaxial surface glabrous to sericeous or strigose with hyaline trichomes; fruit 2−4-alate.
        3. Venation craspedodromous-eucamptodromous; spike subcapitate, unisexual (only staminate flowers) or bisexual flowers ..... 1.4. *Terminalia fagifolia*
        3'. Venation eucamptodromous-brochidodromous to brochidodromous; spike elongated, only bisexual flowers.
            4. Petiole biglandular; style villous in proximal half; fruit with body prominent in both sides.....1.3. *Terminalia dichotoma*
            4'. Petiole eglandular; style glabrous; fruit with body prominent in one side or not.
                5. Venation eucamptodromous-brochidodromous, 4−5 pairs of secondary veins; fruit 4-alate, wings unequal..... 1.2. *Terminalia amazonia*
                5'. Venation brochidodromous, 6−9 pairs of secondary veins; fruit 2-alate, wings equal .....1.1. *Terminalia actinophylla*

1.1. *Terminalia actinophylla* Mart., Flora 24(2, Beibl.): 22. 1841. Figs. 1; 3a-c

Shrub to tree 2.5−20 m tall. Galls 2.5−3.5 mm long in the abaxial or adaxial surfaces, conical. Petiole 1−3.5 mm long, glabrous to sericeous, eglandular. Leaf 3.2−5 × 1−2.4 cm, elliptic to obovate, base attenuate, apex acute or rounded, abaxial and adaxial surfaces sericeous, when young dense-sericeous, hyaline trichomes, chartaceous; venation brochidodromous, 6−9 pairs of secondary veins. Inflorescence 3−4 cm long, elongated spike, axillary or terminal, only bisexual, peduncle 1.5−2.1 cm long, rachis 1.1−3.1 cm long. Bracteole 0.6−0.9 mm long, ovate, sericeous; flower bud ca. 2.1−2.6 × 1.2 mm, capitate. Bisexual flower 3.5−4.6 mm long; lower hypanthium ca. 1.4−2 × 0.4 mm, claviform; upper hypanthium ca. 1.6−1.8 × 3 mm, campanulate; calyx lobes 0.5−0.7 mm, triangular, reflexs; filaments of external whorl 6−8 mm long, filaments of internal whorl 5−7 mm long, anthers ca. 0.3 mm diam., cordiforms; nectariferous disk ca. 1 mm diam.; ovary ca. 0.7 mm long, style 7−10 mm long, glabrous, filiform, distinct lengths on the flowers of the same inflorescence, stigma truncate. Fruit 4−7 × 10−17 mm, 2-alate, wings 5−7 × 4−8 mm, rounded, equal; body 3−6 × 2−3 mm, prominent only in one side; peduncle 1−2 mm long.

Examined material: Barão de Grajaú, 6°77'13"S, 43º02'83"W, VII.1979, *I.C. Nascimento Júnior et al. 1738* (HDJF, UB). Barra do Corda, Cachoerinha, 5°88'S, 45º37'W, 2.III.1983, fr., *E.G. Schatz et al. 780* (INPA, K, LTR, MG, MO, NY, US). Caxias, margem Igarapé dos Caldeirões, 16.VI.1976, fr., *J.E. Paula 799* (UB). Itapecuru Mirim, Fazenda Sobradinho, 18.IX.1975, fl., *F. Paiva 38* (HUCPE, IPA). São João dos Patos, 14.XII.1979, fl., *P. Martins & E. Nunes* (EAC 7780).

Terminalia actinophylla is a well defined species characterized by the leaves with brochidodromous venation, style with distinct lengths on the flowers of the same inflorescence and fruits with equal wings.

Terminalia actinophylla is an endemic species of Brazil and is distributed in the states of Bahia, Goiás, Maranhão, Minas Gerais, Piauí and Tocantins (BFG 2018). In Maranhão, it occurs in Savanna and Riparian Forest vegetation. The taxon was not registered in any conservation unit in the state.

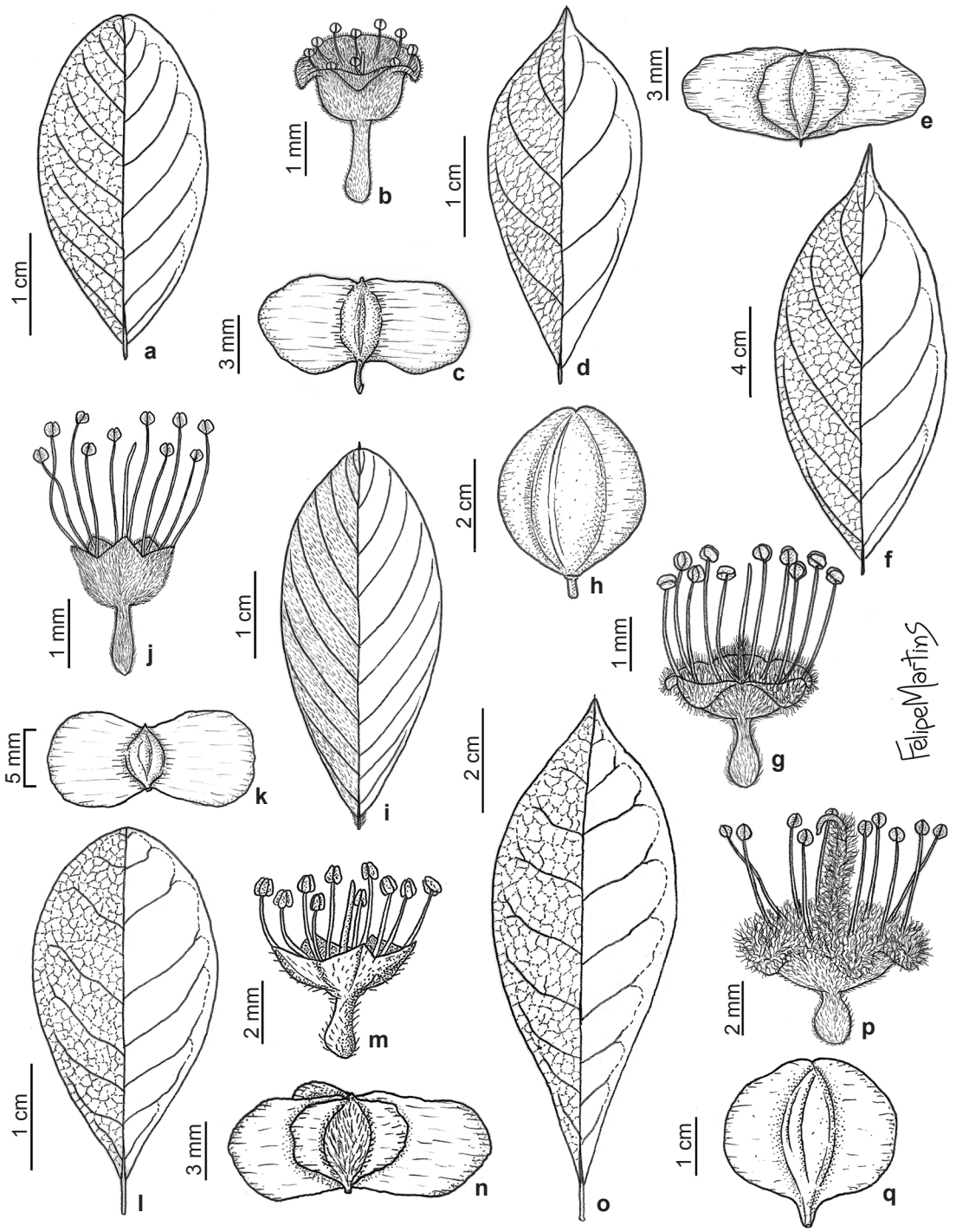

Figure 3 – a-q. Morphological features of *Terminalia* taxa registered in Maranhão state – a-c. *Terminalia actinophylla* – a. leaf; b. flower; c. fruit; d-e. *T. amazonia* – d. leaf; e. fruit; f-h. *T. dichotoma* – f. leaf; g. flower; h. fruit; i-k. *T. fagifolia* – i. leaf; j. flower; k. fruit; l-n. *T. glabrescens* – l. leaf; m. flower; n. fruit; o-q. *T. lucida* – o. leaf; p. flower; q. fruit. [b. *P. Martins & E. Nunes* (EAC 7780); c. *J.E. Paula 799*; d-e. *D.P. Lima 13401*; f. *R.L. Fróes 34929*; g. *R.L. Fróes 34929*; h. *M.R. Cordeiro 4930*; i. *M.L. Guedes et al. 23992*; j. *A.M. Carvalho 205*; k. *M.L. Guedes et al. 23992*; l. *Miguel 37*; m. *Miguel 37*; n. *F.H. Muniz 250*; o. *F.M.T. Freire* (TEPB 938); p. *G. Eiten & L.T. Eiten 5412*; q. *F.M.T. Freire* (TEPB 938)].

This species is flowering from March to June and fruiting from September to December.

The popular name is Bacuri da mata.

1.2. *Terminalia amazonia* (J.F. Gmel.) Exell., Fl. Suriname, 3(1): 173. 1935. Figs. 1; 3d-e

Tree. Galls absent. Petiole ca. 6−9 mm long, glabrous, eglandular. Leaf 2.7−6.7 × 1.4−2.7 cm, obovate, base attenuate, apex rounded, acute or acuminate, abaxial and adaxial surfaces glabrous, chartaceous; venation eucamptodromous-brochidodromous, 4−5 pairs of secondary veins. Inflorescence 4−7.7 cm long, elongated spike, axillary or terminal, only bisexual, peduncle 2−2.8 cm long, rachis 3.7−5.1 cm long. Bracteole ca. 1.2 mm long, ovate, sericeous; flower bud ca. 1 mm long, capitate. Bisexual flower 4.4−6.1 mm long; lower hypanthium 1.2−1.7 mm long, narrow-elliptic; upper hypanthium 1.6−1.7 mm long, cupuliform; calyx lobes 0.5−0.7 × 0.6−0.7 cm, triangular, erects; filaments of external whorl 3.8−4.2 mm long, filaments of internal whorl 5−6 mm long, anthers 0.5−0.6 mm diam., cordiforms; nectariferous disk ca. 1 mm diam.; ovary ca. 0.7 × 0.8 mm long, style 2.2−3.3 mm long, glabrous, filiform, stigma truncate. Fruit 6−7 × 10−11 mm, 4-alate, wings ca. 4 × 1−7 mm, rounded, unequal; body 4 × 2 mm, no prominent; peduncle inconspicous.

Examined material: Carutapera, Gurupiuna, Reserva Indígena Ka'por, 02º43'12"S, 46º25'48"W, 09.XI.1986, *W.L. Balée & B.G. Ribeiro 3043* (NY). Itapecuru Mirim, Fazenda São Benedito, 29.XI.1975, fl. and fr., *D.P. Lima 13401* (PEUFR). Monção, Bacia do Rio Turiaçu, Reserva Indígena Ka'por, 03º29'31"S, 45º15'33"W, 1.II.1985, *W.L. Balée & B.G. Ribeiro 173* (NY).

Terminalia amazonia is similar to *T. glabrescens* in morphological aspects related to the leaves, pattern of the inflorescence and fruits, and it can be differentiated by the leaves glabrous on the abaxial face (*vs.* leaves sericeous with ferrugineous trichomes), 4−5 pairs of secondary vein pairs (*vs.* 6−9 pairs of secondary vein pairs) and fruits 4-alate (*vs.* fruits 5-alate).

It is distributed from Mexico to Bolivia, according to Stace (2010). In Brazil, it has been confirmed in the Northern and Northeastern regions, in the states of Maranhão, Pernambuco and Piauí (BFG 2018; Ribeiro *et al.* 2018b; Ribeiro *et al.* 2020), occurring only in Ombrophilous Forest vegetation. The species was found in the area of the Ka'apor Indigenous Reserve, a region of preserved forest.

This species is flowering in November.

The popular names are Chapada, Tukury'y, Tukur-y-wa-'y.

1.3. *Terminalia dichotoma* G.Mey. Prim. Fl. Esseq. 177. 1818. Figs. 1; 3f-h

Tree ca. 25 m tall. Galls absent. Petiole ca. 7−10 mm long, glabrous, biglandular. Leaf 5.3−15.2 × 2.9−6.6 cm, obovate, base cuneate, apex short-acuminate, abaxial and adaxial surfaces glabrous, chartaceous to subcoriaceous; venation eucamptodromous-brochidodromous, 6−8 pairs of secondary veins. Inflorescence 6.7−14.5 cm long, elongated spike, axillary or terminal, only bisexual, peduncle 2.5−4 cm long, rachis 4.7−12 cm long. Bracteole ca. 1 mm long, eliptic, sericeous; flower bud 3−3.5 mm long, capitate. Bisexual flower 4.5−6.1 mm long; lower hypanthium ca. 1.3 mm long, ovate; upper hypanthium ca. 1.7 mm long, campanulate; calyx lobes ca. 1−2 × 2 mm, triangular, reflexs; filaments of external whorl 3.5−4.2 mm long, filaments of internal whorl ca. 4 mm long, anthers ca. 0.4 mm diam., cordiforms; nectariferous disk ca. 1 mm diam.; ovary ca. 0.8 mm long, style ca. 4 mm long, villous in proximal half, filiform, stigma truncate. Fruit 32−36 × 27−29 mm, 2-alate, wings 30−34 × 5−6 mm, rounded, equal; body 29−33 × 10−12 mm, prominent in both sides; peduncle 5−8 mm long.

Examined material: Marajá do Sena, próximo à praia, XI.1937, fl., *B. Maurício* (MO, MG, RB 72739). Viana, Boiciquara, beira do lago, 26.XI.1959, fl., *R.L. Fróes 34929* (IAN).

Additional material examined: BRASIL. PARÁ: Belém, Rio Guamá, várzea, 29.VI.2010, fr., *M.R. Cordeiro 4930* (IAN, MFS).

Terminalia dichotoma is simliar to *T. lucida* due to leaf shape and fruit consistency. However, *T. dichotoma* is distinguished from *T. lucida* by leaves chartaceous to subcoriaceous (*vs.* leaves coriaceous), style villous in proximal half (*vs.* dense-villous, except glabrous only at apex), and fruit with 32−36 × 27−29 mm (*vs.* 17−24 × 18−22 mm).

It is often found near rivers in flooded regions of South America (Stace 2010). In the Brazilian territory, it is registered in different states in the Northern region and only in Bahia and Maranhão in the Northeastern region. In Maranhão, *T. dichotoma* was found in Riparian forest, however, there is no record of this species in any conservation unit and its conservation status has not yet been reported in the literature.

This species is flowering in November.
The popular name is Cuiarana.

1.4. *Terminalia fagifolia* Mart., Nov. Gen. Sp. 1:42, pl. 27. 1824. Figs. 1; 3i-k

Shrub to tree 2−15 m tall. Galls 2−3.5 mm long in the abaxial or adaxial surfaces, conical. Petiole 1−2 mm long, dense-sericeous, eglandular. Leaf 3.2−6.4 × 1.2−2.4 cm, elliptic, base cuneate, apex acute, frequently with an apiculi; abaxial surface sericeous to dense-sericeous or strigose, concentrated on the midrib and adaxial surface sericeous, hyaline trichomes, chartaceous; venation craspedodromous-eucamptodromous, 6−10 pairs of secondary vein pairs. Inflorescence 1.6−2.7 cm long, subcapitate spike, axillary or terminal, unisexual (only staminate flowers) or bisexual (unisexual and bisexual flowers), peduncle 0.9−1.5 cm long, rachis 0.7−1.3 cm long. Bracteole ca. 1 mm long, lanceolate, sericeous; flower bud ca. 2 mm long, subcapitate. Staminate flower 6−7 mm long; lower hypanthium 0.7−1.5 mm long, elliptic; upper hypanthium ca. 1.6 mm long, campanulate; calyx lobes ca. 0.6−0.7 × 0.5 mm, triangular, erects; filaments of external whorl ca. 5 mm long, filaments of internal whorl ca. 4.5 mm long; anthers ca. 0.4 × 0.3 mm, cordiforms; nectariferous disk ca. 0.8 mm diam. Bisexual flower ca. 7.5 mm long; lower hypanthium ca. 1.8 mm long, elliptic; upper hypanthium ca. 3 mm long, campanulate; calyx lobes ca. 0.5 × 0.5−0.6 mm, triangular, erects; filaments of external whorl 4−4.2 mm long, filaments of internal whorl ca. 6.5 mm, anthers ca. 0.6 × 0.3 mm, cordiforms; nectariferous disk ca. 1.4 mm diam.; ovary ca. 0.4 × 0.3 mm; style 1.5−2 mm long, glabrous, filiform; stigma ca. 0.1 mm diam., truncate. Fruit 6−8 × 12−16 mm, 2-alate; wings 6−8 × 5−6 mm, rounded or oblongs, equal; body 4−6 × 2−3 mm, prominent only in on side; peduncle 3−4 mm long.

Examined material: Balsas, Lote 19, depois da escarpa, 5.VII.1998, fr., *R.C. Oliveira et al. 1269* (RB). Barra do Corda, loteamento cidade universitária, 5°54'41"S, 45º26'63"W, 5.X.2015, fr., *M.L. Guedes et al. 23992* (ALCB, EAC). Benedito Leite, estrada de barro, 22.XI.2005, fr., *A.M. Miranda et al. 5313* (EAC, HST, HUTO). Carolina, Santuário Ecológico Pedra Caída, trilha para a torre, 07°05'19"S, 47º44'27"W, 10.IV.2016, fr., *M.F. Simon 2850* (EAC, CEN). Caxias, Propriedade Simplícia, 26.IX.2002, fl., *A.M. Carvalho 205* (EAC). Grajaú, Chapada do Grajaú, 3.VIII.1907, fl., *M. Arrojado Lisbôa 2508* (RB). Loreto, Ilha de Balsas, 07°38'S, 47º07'W, 13.II.1970, fr., *G. Eiten & L.T. Eiten 10588* (ASE, EAC, INPA, K, NY, US). Mirador, Parque Estadual do Mirador, 5.XI.1996, fr., *G.M. Conceição 387* (PEUFR). São João dos Patos, 14.XII.1979, fr., *P. Martins & E. Nunes* (EAC 47086). Sucupira do Riachão, 06°29'99"S, 43º37'99"W, 24.VIII.2017, *R.M. Silva IFN-625782.1* (UB). Timon, 05°06'88"S, 43º00'25"W, 29.X.2002, *C.G. Lopes et al. 193* (EAC).

Terminalia fagifolia is morphologically close related to *T. eichleriana* Alwan & Stace, the latter not recorded in Maranhão state. They are very distinct from the other species in the genus and assemble an exclusive section *Eichlerianae* Alwan & Stace. *T. fagifolia* is distinguished by having a craspedodromous-eucamptodromous venation with 6−10 pairs of secondary vein pairs (*vs.* eucamptodromous with 3−5 pairs of secondary vein pairs).

Terminalia fagifolia presents a wide distribution from Eastern Brazil to Western Bolivia (Stace 2010). In Brazil, the species occurs in the Central-Western, Northeastern and Southeastern (restricted to Minas Gerais) regions. In Maranhão, the species was found in areas of Savanna and pasture (Silva-Moraes *et al.* 2019). It is worth mentioning that the species occurs in three conservation units in the state: Mirador State Park, Chapada das Mesas National Park and Ecological Sanctuary of Pedra Caída.

This species is flowering in September and Fruiting from February to December.

The popular names are Chapada, Chapadeiro, Tingidor.

1.5. *Terminalia glabrescens* Mart., Flora 20(2): 124. 1837. Figs. 1; 3l-n

Tree 5−23 m tall. Galls absent. Petiole 3−6 mm long, dense-sericeous, eglandular. Leaf 4−11.4 × 2.4−5.4 cm, obovate, base cuneate, apex acute, rounded or retuse; abaxial surface sericeous with ferrugineous tricomes, concentrated on the mid and secondaries ribs and adaxial surface sericeous, subcoriaceous; venation eucamptodromous-broquidodromous, 6−9 pairs of secondary vein pairs. Inflorescence 2.8−12.2 cm long, elongated spike, axillary or terminal, bisexual, peduncle 0.8−6.1 cm long, rachis 1.9−9.7 cm long. Bracteole 1.2−1.5 mm, narrow-triangular, villous; flower bud 2−3 mm, subcapitate. Bisexual flower 6−7 mm long; lower hypanthium 3−3.2 mm, eliptic; upper hypanthium 2−2.2 mm, campanulate; calyx lobes 0.5−0.8 × 0.5−0.7 mm, triangular, erects; filaments of external whorl 3.5−4.5 mm long, filaments of internal whorl 3.5−4 mm long, anthers 0.7−0.9 mm diam., cordiforms; nectariferous disk ca. 1

mm diam.; ovary ca. 0,5 × 0,3 mm; style ca. 4 mm long, glabrous, filiform; stigma truncate. Fruit 4−6 × 8−11 mm, 5-alate, wings 4−5 × 1−4 mm, rounded or oblongs, unequal; body 4−5 × 1−2 mm, prominent only in on side; peduncle 1−2 mm long. **Examined material**: Arame, mata da restinga indígena, VII.2004, *L.G. da Silva 03* (RB). Barão de Grajaú, VII.2005, *I.C. Nascimeto Junior et al. 1531* (UB). Barra do Corda, estrada Grajaú, 14.VII.1976, fl., *Miguel 37* (PEUFR). Codó, 4°5'S, 43º74'W, 12.IX.2017, *C.A. Sousa IFN-3567713.7* (UB). São Luís, Reserva Florestal do Sacavem, 08.X.1992, fl. and fr., *F.H. Muniz 250* (HRCB, RB).

Terminalia glabrescens, species related to *T. amazonia*, distinguishable due to its your leaves sericeous with ferrugineous trichomes, 6−9 pairs of secondary vein pairs and fruits 5-alate. For full comparison see above *T. amazonia*.

Terminalia glabrescens occurs in South America and has been recorded in Bolivia, Brazil and Paraguay only (Stace 2010). In the Brazilian territory, it has a wide distribution, occurring in all geographic regions of the country (BFG 2018). In Maranhão, it was found in Riparian forest. The taxon was not registered in conservation units in the state.

This species is flowering from July to October and Fruiting in October.

This species don't have popular names.

1.6. ***Terminalia lucida*** Hoffmanns. *ex* Mart., Nov. Gen. Sp. Pl. 1(3): 43. 1824. Figs. 1; 3o-q

Tree 6−20 m tall. Galls absent. Petiole 5−11 mm long, glabrous, eglandular. Leaf 3.7−10.1 × 1.5−4 cm, obovate-elliptic to obovate, base attenuate, apex acuminate to short-acuminate, abaxial and adaxial surfaces glabrous, when young both surfaces sericeous, coriaceous; venation brochidodromous, 7−10 pairs of secondary veins. Inflorescence 5.2−6.9 cm long, elongated spike, axillary or terminal, bisexual, peduncle 1.6−3.8 cm long, rachis 2.5−4 cm long. Bracteole 0.6−0.9 mm, ovate, villous; flower bud ca. 2.1−2.6 × 1.2 mm, capitate. Bisexual flower ca. 4.8 mm long; lower hypanthium ca. 1−2 × 0.5 mm, widely elliptic; upper hypanthium ca. 2 × 2.7 mm, campanulate; calyx lobes ca. 1.5 mm, triangular, reflexs; filaments of external whorl ca. 3.2 mm long; filaments of internal whorl 2.5 mm long, anthers ca. 0.5 mm, cordiforms; nectariferous disk ca. 1.5 mm diam.; ovary ca. 0.7 mm long, style ca. 3.5 mm long, dense-villous except glabrous near to apex, filiform, stigma truncate. Fruit 17−24 × 18−22 mm, 2-alate, wings 16−23 × 5−7 mm, rounded, equal; body 18−20 × 4−5 cm, prominent for both sides; peduncle 5−6 mm long.

Examined material: Alcântara, Praia de Itaperei, campo de dunas, 28.I.1993, fr., *F.C. Sá Dorothy Araújo 9730* (RB). Arari, 23.XI.1985, fr., *J.G. Silva & J.A.F. da Costa 1574* (R). Brejo de Areia, Rio Xingu, 2.II.1986, fr., *M. Sérgio Augusto et al. 990* (RB). Carolina, margem direita do Rio Farinha, 06°99'5"S, 47º16'55"W, 15.I.2001, fr., *G. Pereira-Silva 12703* (CEN). Coroatá, 04°44'89"S, 44º37'79"W, 17.II.1983, fr., *G.T. Prance 28149.0* (NY). Estreito, barragem ao lado da encosta da fazenda Fronteira Alegre, 06°55'38"S, 47º45'38"W, 21.II.2005, fr., *G. Pereira-Silva 9521* (CEN). Independência, 17.II.1983, fr., *G.T. Prance & W.E. Kerr 28149* (NY, US). Loreto, costa sul do Rio das Balsas, 04.IX.1963, fl., *G. Eiten & L.T. Eiten 5461* (K, SP, US). Palmeirândia, 16.VIII.2011, fl., *M. Ribeiro PM21* (IAN, MAR). Parnarama, Mirindiba, 1.III.2005, fr., *A.M. Miranda et al. 4926* (HST). São Bernardo, 16.XII.1979, fr., *F.M.T. Freire* (TEPB 938). São Raimundo das Mangabeiras, Lagoa Grande na margem sul do Rio Balsas, 07°13'S, 45º37'33"W, 26.VIII.1963, fl., *G. Eiten & L.T. Eiten 5412* (K, US).

Terminalia lucida is markedly distinct by its leaves coriaceous, style dense-villous, except glabrous only at apex and fruit with 17−24 × 18−22 mm. For full comparison see above *T. dichotoma*.

Terminalia lucida has a disjunct distribution, occurring in South America (Brazil, Colombia, French Guiana, Guyana, and Suriname) and Africa (Guinea, Guinea Bissau, and Sierra Leone) (Stace 2010). In Brazil, the species presents records for Bahia, Goiás, Maranhão, Mato Grosso, Pará, Piauí, and Tocantins (BFG 2018). In Maranhão, it was found in areas of Coastal Lowland Semideciduous and Savanna formations. It is only registered in the Chapada das Mesas National Park conservation unit.

This species is flowering from August to September and Fruiting from November to March.

The popular names are Bambural, Pau-d'água, Tanimbuca.

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List of exsicates

Alencar ME 2567(1.1). **Arrojado Lisbôa M** 2508(1.4), US 01891238(1.5), US 1040268(1.5). **Balée WL & Ribeiro BG** 173(1.2), 3043(1.2). **Barbosa M** 1648(1.3). **Barbosa RAA** IFN-625782.1(1.4). **Black GA** 16716(1.4). **Black GA** *et al.* 54-16640(1.2). **Carvalho AM** 205(1.4), 218(1.4). **Castro AJ** *et al.* TEPB 18061(1.4), TEPB 18231(1.4). **Conceição GM** 387(1.4), 341(1.4). **Ducke A** 2187(1.5), RB 72090(1.4). **Eiten G** 419(1.3), 10588(1.3), 10467(1.3). **Eiten G & Eiten LT** 5412(1.6), 5447(1.4), 28149(1.6). **Freire FMT** TEPB(938). **Fróes RL** 28538(1.5). **Guedes ML** *et al.* 23992(1.4). **Konopczyk RMG** IFN-3854932.1(1.4). **Lima DP** 13401(1.2). **Lopes CG** *et al.* 193(1.4). **MAL** 2465(1.5). **Martins P & Nunes E** EAC 7780(1.1), EAC 47086(1.4). **Maurício B** RB 72739(1.3). **Mendes I** *et al.* HST16113(1.4). **Miguel** 37(1.5). **Miranda AM** 4926(1.3). **Miranda AM** *et al.* 4755(1.4), 5313(1.4). **Muniz FH** 250(1.5), SLUI 1756(1.5). **Nascimento Júnior IC** 1738(1.1). **Nascimento Júnior IC** *et al.* 1531(1.5). **Noberto F** 15(1.4). **Oliveira RC** *et al.* 1269(1.4). **Paiva F** 38(1.1). **Paula JE** 799(1.1). **Pereira-Silva G** 9521(1.6),11350(1.6), 12703(1.6), 13679(1.6). **Prance GT** 28149.0(1.6). **Ramalho FB** 394(1.4), 422(1.4). **Rodrigues L** HST16128(1.4). **Rodrigues L** *et al.* HST16128(1.4). **Sá Dorothy Araújo FC** 9730(1.6). **Saraiva RVC** 209(1.4). **Schatz EG** 780(1.1). **Sérgio Augusto M** RB 990(1.3). **Serra FCV** 149(1.3). **Sevilha AC** 5437(1.6), 5441(1.6), 5464(1.4). **Silva LG** 03(1.5). **Silva RM** IFN-625782.1(1.4), IFN-7012641.3(1.5). **Simon MF** 2850(1.4). **Sobrinho JS** 205(1.4). **Sousa CA** IFN-3567713.7(1.5), IFN-4465411.10(1.4). **Walter BMT** 3553(1.4).

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