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Original Paper

Flora of Rondônia, Brazil: Malmeeae (Annonaceae)

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Abstract

Annonaceae is the most species-rich family in the order Magnoliales and has a pantropical distribution, includes 109 genera and 2,440 species. It is subdivided into four subfamilies, Anaxagoreoideae, Ambavioideae, Annonoideae and Malmeoideae. The latter comprises eight tribes, including the Malmeeae, the only tribe of Malmeoideae represented in Brazil, with 13 genera and 73 species. The Amazon is the center of diversity of the tribe, with eight genera restricted to this biome, the other five genera having broader distributions. The present study sought to characterize the species of Malmeeae that occur in the state of Rondônia. Seventeen species belonging to eight genera were identified and characterized: *Oxandra* with five species, *Bocageopsis* with three, *Onychopetalum*, *Pseudoxandra* and *Unonopsis* with two, and *Cremastosperma*, *Ephedranthus* and *Klarobelia* with one species each. *Bocageopsis mattogrossensis* and *Pseudoxandra lucida* are recorded for the state for the first time. A key to the species, morphological descriptions, geographical distribution and comments are provided.

Key words: Amazon, Brazilian Flora, Magnoliales, Malmeoideae, taxonomy.

Resumo

Annonaceae é a família de maior riqueza na ordem Magnoliales, com distribuição pantropical, inclui 109 gêneros e 2.440 espécies. É subdivida em quatro subfamílias, Anaxagoreoideae, Ambavioideae, Annonoideae e Malmeoideae. Esta última compreende oito tribos, incluindo Malmeeae, a única tribo de Malmeoideae representante no Brasil, com 13 gêneros e 73 espécies. A Amazônia é o centro de diversidade da tribo, com oito gêneros restritos a este bioma, e cinco gêneros com ampla distribuição. O presente estudo buscou caracterizar as espécies de Malmeeae que ocorrem no estado de Rondônia. Foram identificadas e caracterizadas 17 espécies pertencentes a oito gêneros: *Oxandra* com cinco espécies, *Bocageopsis* com três, *Onychopetalum*, *Pseudoxandra* e *Unonopsis* com duas, e *Cremastosperma*, *Ephedrantus* e *Klarobelia* com uma espécie cada. *Bocageopsis mattogrossensis* e *Pseudoxandra lucida* são citadas pela primeira vez para o estado. São fornecidas uma chave de identificação para as espécies, descrições morfológicas, distribuição geográfica e comentários.

Palavras-chave: Amazônia, flora do Brasil, Magnoliales, Malmeoideae, taxonomia.

Introduction

Annonaceae, a basal family of subclass Magnoliidae, includes 109 genera and 2,440 species (Chatrou *et al.* 2012). It presents a pantropical distribution, with centers of diversity in Central and South America, Africa and Asia, and few genera like *Asimia* Adans. and *Deeringothamnus* Small. occurring in temperate and subtropical eastern North America (Chatrou *et al.* 2004). In the Neotropics it is represented by 35 genera and 914 species (Maas *et al.* 2009).

The Magnoliidae comprise the orders Canellales, Piperales, Laurales and Magnoliales, the latter including Annonaceae, the most species-

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rich family of the order (APG IV 2016). It is subdivided into four subfamilies, Anaxagoreoideae, Ambavioideae, Annonoideae, and Malmeoideae (Chatrou *et al.* 2012; Guo *et al.* 2017). Subfamily Malmeoideae, with 46 genera and 742 species, comprises eight tribes, of which Malmeeae is the only tribe of the subfamily represented in Brazil, comprising 73 species in 13 genera (Lopes & Mello-Silva 2014; Guo *et al.* 2017; Lopes *et al.* 2018; BFG 2018; Flora do Brasil 2020).

Most Malmeeae occur in the Amazon, where eight genera are restricted to this biome: *Cremastosperma* R.E. Fr., *Klarobelia* Chatrou, *Malmea* R.E. Fr., *Mosannona* Chatrou, *Onychopetalum* R.E. Fr., *Pseudephedranthus* Aristeg., *Pseudomalmea* Chatrou and *Ruizodendron* Ruiz & Pav. Meanwhile, *Bocageopsis* R.E. Fr., *Ephedranthus* S. Moore, *Oxandra* A. Rich., *Pseudoxandra* R.E. Fr. and *Unonopsis* R.E. Fr. occur in the Amazon but also in the, Cerrado and Atlantic Forest biomes (BFG 2015; BFG 2018; Flora do Brasil 2020).

The tribe Malmeeae can be recognized by the trees hermaphrodites or androdioecious with indument of simple hairs, leaves with distichous or rarely spiral phyllotaxis, inflorescences in rhipidia, terminal or axillary, bracts present, male and bissexual flowers in diferent individuals, carpels free, placentation basal, lateral or rarely apical, fruits with monocarps apocarpous, with abcission at base of stipe, aril absent, ruminations spiniform, irregular pegs or lamelliform, endosperm glass-like or soft, and pollen monosulcate (Chatrou *et al.* 2012).

The state of Rondônia covering 238,512.80 km², located in the Western Amazon, in Northern Brazil region. It has tropical rainy prevailing climate, hot and humid all year round, with high daily temperature range, is characterized by being a transition area between the geomorphological domains of Central Brazil and Amazonia, it's a meeting place of biomes Cerrado, Pantanal and Amazon (Governo do estado de Rondônia 1998; Fernandes & Guimarães 2002).

The diverse forest formations develop due to the flooding cycles of the rivers that drain the state (Fernandes & Guimarães 2002). Rondônia has seven main types of vegetation: rainforest (136,968.6 km²), is characterized by being areas with high annual precipitation, it has high trees with 30–45 m tall, and including areas locally known as *terra firme*, *igapó* and *várzea*; savanna (13,115.2 km²), known as *cerrado*, are plant formations with xeromorphic features due to the soil; semideciduous seasonal forest (5,024.2 km²), this type of vegetation develops on hydromophilic soils, with low water retention capacity, is characterized by the loss of leaves of many species due to climatic stationability; pioneer plant formation under river influence (8,743 km²), occurs in lands subject to floods, presenting different formations, some of these areas are taken by palm trees, called *buritizal*; alluvial formation of small plants - *Umirizal* (571.1 km²), vegetation that occurs in poor, poorly drained and shallow soils, is located in the basins of the Guaporé and Mamoré rivers; *campinarana* (40.8 km²), are non-forest formations that occur in small and scattered patches in the Amazon, it is characterized by poor soils of white sand (composed by hydromorphic podzol and quartz sand); and transition forest (19,809.2 km²), are transition areas between the *cerrado* and the forest, and have characteristics of these two formations (Veloso *et al.* 1991; Fernandes & Guimarães 2002).

Annonaceae is one of the most diverse families in the state, represented by 16 genera and 68 species (BFG 2018; Flora do Brasil 2020). Silva (2015) inventoried the Annonaceae in Rondônia and found 73 species, including seven species previously unreported for the state.

The present study aimed to verify the richness of the Malmeeae tribe in the state of Rondônia, providing morphological descriptions, identification keys, geographic distribution maps, and selected illustrations.

Material and Methods

The present study was based on collections and field observations and analysis of specimens in herbaria. The field observations occurred from June 2017 to October 2019, in the municipalities of Campo Novo de Rondônia, Candeias do Jamari, Guajará-Mirim, Itapuã do Oeste, Pimenta Bueno, Pimenteiras do Oeste and Porto Velho. Were studied the herbarium collections of IAN, INPA, MG, R, RB and RON (acronyms according Thiers, continuosly updated). The virtual collections available in the SpeciesLink Network (Rede speciesLink 2019) and Reflora (Reflora 2019) databases were also consulted. New specimens collections were deposited in the RON herbarium, with duplicates in RB and NY.

Identifications were carried out using published keys, taxonomic literature (Fries 1930, 1931, 1934, 1937, 1939, 1959; Chatrou 1998; Maas & Westra 2003; Maas *et al.* 2007; Junikka *et al.*

2016; Pirie *et al.* 2018; Lopes & Mello-Silva 2019), comparison with herbarium specimens identified by specialists, and type specimens.

The descriptions, dichotomous keys and illustrations are based on the characters observed in the specimens from Rondônia. Additional material from other states was used only to supplement descriptions when needed. Morphological terminology was based on Hickey (1973), Radford *et al.* (1974), Rizzini (1977), van Heusden (1992) and Barroso *et al.* (1999). Measurements were performed using dry material except for the floral parts, for which hydrated material was used. Distribution maps were prepared using DIVA-GIS 7.5 software, based on locality information available on the labels of the specimens analyzed, and on georeferenced data.

Results and Discussion

The present synopsis of Malmeeae for Rondônia recorded 17 species in eight genera: *Oxandra* with five species; *Bocageopsis* with three; *Onychopetalum*, *Pseudoxandra* and *Unonopsis* with two; and *Cremastosperma*, *Ephedrantus* and *Klarobelia* with one species each. *Bocageopsis mattogrossensis* (R.E. Fr.) R.E. Fr. and *Pseudoxandra lucida* R.E. Fr. are new records for Rondônia. When compared to the Flora of Brazil (BFG 2018; Flora do Brasil 2020), this work corrects the identification of the species *Ephedranthus amazonicus* R.E. Fr. and *Unonopsis duckei* R.E. Fr., previously identified as *E. parviflorus* S. Moore and *U. stipitata* Diels, respectively, which do not occur in Rondônia.

The taxa occur mainly in rainforest (14 of 17 species), transition forests (6 species), semideciduous seasonal forest (*Bocageopsis multiflora* (Mart.) R.E. Fr. and *Onychopetalum amazonicum* R.E. Fr.), and as well as in savana, *cerrado* vegetation, and in the white-sand *campinarana* (*Bocageopsis canescens* (Benth.) R.E. Fr.). Some species are associated with areas under the influence of flooding, such as igapó and várzea, which are formations established along water courses, occupying the plains and terraces. The term várzea is used for the forests of areas periodically flooded by white waters rich in sediments and, igapó for the forests permanently flooded by black water rivers (Prance 1979).

The diversity of Malmeeae species is concentrated in the capital Porto Velho, showing that the distribution information of the tribe is still dispersed, with many areas little sampled (Fig. 1). Thus it's evident that the greatest concentration of collections occurs close to large urban centers, highways, rivers, and related to large enterprises, such as the Santo Antônio and Jirau hydroeletric dams on Madeira River.

Malmeeae

Hermaphrodite or androdioecious trees or shrubs, with simple hairs. Leaves distichous, simple, venation brochidodromous or rarely eucamptodromous. Inflorescences axillary, simple or composed of rhipidia, male or bisexual flowers, with fleshy perianth, sepals 3, petals 6 in two whorls, carpels free. Fruit consisting of apocarpous, indehiscent and stipitate monocarps. Seeds without arils, placentation lateral, basal or rarely apical, with a raphe canaliculate, flat or forming a raised rib encircling the seed, with spiniform, peg-shaped or lamellate endosperm ruminations.

Key to the species of Malmeeae of Rondônia

1. Leaf venation eucamptodromous ..... 6. *Klarobelia inundata*
1'. Leaf venation brochidodromous 2
    2. Leaf midvein raised above 3
        3. Marginal vein present 4
            4. Marginal vein 1–2 mm from margin; monocarps globose; seeds with placentation lateral 5
                5. Leaves coriaceous; stipes of monocarps 2–5 mm long ..... 14. *Pseudoxandra lucida*
                5'. Leaves chartaceous; stipes of monocarps 5–7 mm long ..... 15. *Pseudoxandra polyphleba*
            4'. Marginal vein 3–5 mm from margin; monocarps narrowly oblong-ovoid, elongate, slightly curved; seeds with placentation basal ..... 9. *Oxandra euneura*
        3'. Marginal vein absent 6

6. Flower buds ellipsoid to broadly ellipsoid; inner petals with a distinct, incurved, apical appendage; monocarps 1–2, stipes of monocarps up to 1 mm long 7
   7. Leaves canescent below, 6.5–30 × 3–10 cm, secondary veins 6–25 on either side of midvein ..... 7. *Onychopetalum amazonicum*
   7'. Leaves glabrous below, 3.8–19.5 × 2.2–5.8 cm, secondary veins up to 16 on either side of midvein ..... 8. *Onychopetalum periquino*

6'. Flower buds ovoid to broadly ovoid; inner petals without a distinct, incurved, apical appendage; monocarps 2–36, stipes of monocarps 1–25 mm long 8
   8. Leaf midvein raised on both surfaces, canaliculate above ..... 4. *Cremastosperma monospermum*
   8'. Leaf midvein raised on both surfaces, not canaliculate above 9
      9. Flowers with 2 bracts, 1 at the base and 1 on middle of pedicel 10
         10. Leaves asymmetrical at the base; monocarps 1–6, stipes of monocarps 1–4 mm long 11
            11. Leaf apex acute; branchlets tomentose ..... 2. *Bocageopsis mattogrossensis*
            11'. Leaf apex acuminate; branchlets canescent or glabescent to glabrous 12
               12. Leaf apex short-acuminate, the acumen 3–9 mm long, secondary veins 9–14; monocarps canescent ..... 1. *Bocageopsis canescens*
               12'. Leaf apex long-acuminate, the acumen 5–20 mm, secondary veins 14–20; monocarps glabrescent to glabrous ..... 3. *Bocageopsis multiflora*
         10'. Leaves symmetrical at the base; monocarps 5–36, stipes of monocarps 10–25 mm long 13
            13. Inflorescences 1–3-flowered, tomentose, silver-brown; monocarps 1-seeded, placentation basal ..... 16. *Unonopsis duckei*
            13'. Inflorescences 1(–2)-flowered, sericeous, brown; monocarps 1–4-seeded, placentation lateral ..... 17. *Unonopsis guatterioides*
      9'. Flowers with 4–6 bracts on base of pedicel 14
         14. Leaves coriaceous, base obtuse; young branchlets sparsely sericeous ..... 11. *Oxandra polyantha*
         14'. Leaves chartaceous, base acute to attenuate; branchlets glabrous ..... 12. *Oxandra riedeliana*

2'. Leaf midvein flat or impressed above 15
   15. Leaves with midvein flat adaxially ..... 5. *Ephedranthus amazonicus*
   15'. Leaves with midvein impressed adaxially 16
      16. Leaf base acute without a distinct angular, tooth-like, projections on either side; stipes of monocarps 4–5 mm long ..... 10. *Oxandra mediocris*
      16'. Leaf base obtuse to truncate with a distinct angular, tooth-like, projections on either side; stipes of monocarps 1–3 mm long ..... 13. *Oxandra xylopioides*

1. *Bocageopsis canescens* (Benth.) R.E. Fr., Acta Horti Berg. 10(2): 147. f. 2c. 1931. Fig. 1a

Hermaphrodite tree or shrub, 2–13 m tall, ca. 8 cm diam.; branchlets lenticellate, canescent, soon glabrous. Leaves with petiole 2–6 mm long, semi-terete to canaliculate; lamina 3.5–10.5 × 1.5–4.2 cm, asymmetric at the base, narrowly elliptic to elliptic, base acute, apex acuminate, acumen 3–9 mm long, mostly coriaceous, not verruculose, glabrous above, sparsely sericeous below; venation brochidodromous, midvein and secondary veins raised on both surfaces, secondary veins in 9–14 pairs on either side of midvein, angle with midvein 35–50°, marginal vein absent. Inflorescences on older branchlets, less often leaves branchlets, composed of 2–5 rhipidia, 1–3-flowered, canescent, greyish green *in sicco*; bracts 2, 0.3–0.5 × 0.4–0.6 mm, ovate to broadly ovate, 1 at the base and 1 on middle of pedicel 8–10 mm long; flower buds 1–4 × 1–4 mm, ovoid to broadly ovoid, flowers bisexual, cream *in vivo*, 3.5–4.5 × 3.5–5 mm, sepals 1–1.2 × 1–1.2 mm, ovate to broadly ovate, basally connate to free, petals 2.8–4.5 × 2–2.8 mm, ovate to broadly

ovate, inner ones with a minute apical adaxial outgrowth, ca. 0.3 mm long, without a distinct, incurved, apical appendage; stamens 20–22, 2–2.5 × 0.8–1 mm, elliptic-lanceolate, apex of connective acute; carpels 3–4, 1.9–2 × 0.8–1 mm, sericeous to canescent, stigma ellipsoid. Monocarps 2–4, 7–13 × 9–12 mm, globose to ellipsoid, apex rounded, green, yellow to orange *in vivo*, grey, greyish brown or green *in sicco*, canescent, exocarp rugulose, stipes 2–4 mm long. Seeds 1–2, with placentation lateral, 7–9 × 7–8 mm, vertically flattened, shiny, surface pitted, orange-brown *in sicco*, with a distinct raphe forming a raised rib encircling the seed, ca. 1 mm width, ruminations spiniform.

Material selected: Porto Velho, basin of Rio Madeira, km 214-215, Madeira-Mamore railroad near Abuna, 13.VII.1968, fl., *G.T. Prance et al. 5929* (INPA, K, MG, MO, NY, US).

Bocageopsis canescens occurs in Brazil, Colombia, Peru and Venezuela (Maas *et al.* 2007). In Brazil, it is distributed throughout the Amazon and Cerrado, in the states of Acre, Amazonas and Rondônia (BFG 2018; Flora do Brasil 2020). In Rondônia, it is known only in the municipality of Porto Velho, occurring in white-sand *campinaranas* along the Madeira River. Flowering in July and September; fruiting in February, March, September and November.

Bocageopsis canescens is characterized by the narrowlly-elliptic to elliptic leaves (3.5–10.5 cm long), base acute strongly asymmetric, apex acuminate, inflorescences composed with 2–5 rhipidia, 1–3-flowered, and monocarps globose to ellipsoid canescent. It's distinguished by the canescent indument on the inflorescences and monocarps.

This species is often confused with *B. mattogrossensis* by the inflorescences 1–3-flowered, but differs by the smaller number of secondary veins (9–14) and acuminate leaf apex

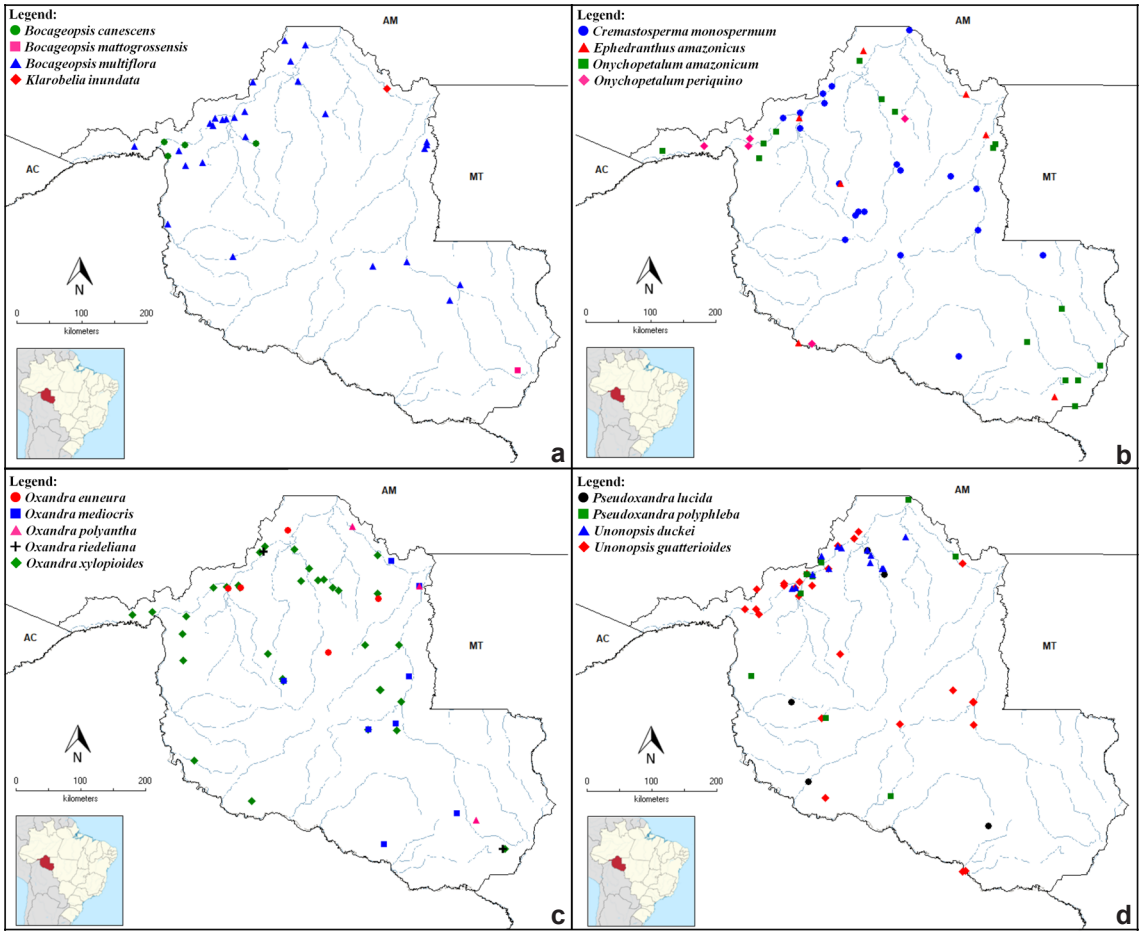

Figure 1 – Geographic distribution of the species of Malmeeae in the Rondônia state with hydrographic layer.

(*vs.* 16–20 secondary veins and acute leaf apex in *B. mattogrossensis*) (Maas *et al.* 2007).

Illustration in Fries (1931) and Maas *et al.* (2007).

2. *Bocageopsis mattogrossensis* (R.E. Fr.) R.E. Fr., Acta Horti Berg. 10(2): 147. f. 2b. 1931. Fig. 1a

Hermaphrodite tree or shrub, ca. 10 m tall, ca. 15 cm diam.; branchlets lenticellate, tomentose, soon glabrous. Leaves with petiole 2–5 mm long, semi-terete to canaliculate; lamina 2.5–10 × 1–2.8 cm, asymmetric at the base, mainly at the base, narrowly elliptic, base acute to obtuse, apex acute, leaves chartaceous, sparsely verruculose near the midvein, glabrous above, sparsely sericeous below; venation brochidodromous, primary and secondary veins raised on both surfaces, secondary veins in 16–20 pairs on either side of midvein, angle with midvein 40–50°, marginal vein absent. Inflorescences on older branchlets, less often on leafy branchlets, composed of 3–5 rhipidia, 1–2-flowered, tomentose, yellowish to brown *in sicco*; bracts 2, 0.9–1 × 1–1.5 mm, broadly ovate, 1 on the base and 1 on the middle of pedicel 5–10 mm long; flower buds 1–3 × 1–2 mm, ovoid to broadly ovoid, flowers bisexual, cream to yellowish *in vivo*, 3–4 × 4–5 mm, sepals 1.2–1.5 × 1.2–1.5 mm, broadly ovate, basally free, petals 1.5–5 × 1.2–4 mm, ovate to broadly ovate, outer ones concave, inner ones without a distinct, incurved, apical appendage; 30–32 stamens, 1–1.5 × 0.3–0.5 mm, elliptic-lanceolate, apex of connective acute; 4–6 carpels, 0.8–1 × 0.4–0.5 mm, sericeous, stigma ellipsoid. Monocarps 2–6, 10–15 × 8–15 mm, globose, stipes 1–1.5 mm long, apex rounded, green, yellow to purplish *in vivo*, brown *in sicco*, glaucous, exocarp smooth. Seeds 1–2, with lateral placentation, 7–9 × 6–8 mm, subglobose, shiny, surface pitted, brown *in sicco*, with a distinct raphe forming a raised rib encircling the seed, ca. 0.5 mm width, ruminations spiniform.

Material examined: Vilhena, Fazenda São Carlos, BR-399, a 8 km do trevo para Colorado do Oeste, sentido Vilhena, 12°48'08"S, 60°21'57"W, 21.III.2015, fl., *H.C. Alencar et al. 10* (INPA, NY, RB, RON).

Additional material: BRASIL. TOCANTINS: (without municipality), road Estreita to Tocantinópolis, 10.VII.1964, fr., *G.T. Prance & N.T. Silva 58645* (NY, RB, SP, UB).

Bocageopsis mattogrossensis occurs in Bolivia and Brazil, and is distributed throughout the Amazon, Cerrado and Atlantic Forest, mainly in the Cerrado (*sensu lato*) and its transition areas with forest (Maas *et al.* 2007; BFG 2018; Flora do Brasil 2020). It was known in the states of Goiás, Mato Grosso, Pará and Paraná, in the present work, its distribution is extended to Rondônia, with a single record in the municipality of Vilhena, in an anthropized transition forest. Flowering in March.

Bocageopsis mattogrossensis is characterized by narrowly elliptic and yellowish leaves (2.5–10 cm long), strongly asymmetric, acute to obtuse base, acute apex, inflorescences composed of 3–5 rhipidia, 1–2-flowered, and monocarps globose, glaucous. It is recognized for glaucous monocarps and leaves with acute apex. It's can be confused with *B. canescens* (see notes under that species). Specimens with fruits from Rondônia were not found in studied herbaria, thus the description of fruits was based on additional material.

Illustration in Fries (1931) and Maas *et al.* (2007).

3. *Bocageopsis multiflora* (Mart.) R.E. Fr., Acta Horti Berg. 10(2): 145. f. 2a. 1931. Figs. 1a; 2a-c

Hermaphrodite tree or shrub, 7–29 m tall, 13–40 cm diam.; stem and branchlets with aqueous colorless exudate, cylindrical trunk, outer bark gray, rhytidome, fissured, inner bark yellowish; branchlets fissured, lenticellate, glabrescent to glabrous. Leaves with petiole 2–6 mm long, canaliculate; lamina 4.5–12 × 1.6–3.5 cm, asymmetric at the base, narrowly elliptic, slightly falcate, base acute to obtuse, apex acuminate, acumen 5–20 mm long, membranaceous to chartaceous, not verruculose, glabrous above, sparsely sericeous below; venation brochidodromous, midvein raised on both surfaces, secondary veins flat to raised on both surfaces, 14–20 pairs on either side of midvein, angles with midvein 55–70°, marginal vein absent. Inflorescences on older branchlets or leafy branchlets, composed of 2–6 rhipidia, 1–6-flowered, sericeous, brownish *in sicco*; bracts 2, 0.5–1 × 0.8–1 mm, broadly ovate, 1 on the base and 1 on middle of pedicel, 7–13 mm long; flower buds 1–3.5 × 1–3.5 mm, broadly ovoid, flowers bisexual, cream *in vivo*, 3.5–5 × 3.5–5 mm, sepals 1–1.2 × 1–1.2 mm, ovate, basally connate to free, petals 3–5 × 2.5–3.5 mm, ovate to broadly ovate, inner ones with a minute apical adaxial outgrowth, ca. 0.3 mm long, without a distinct, incurved, apical appendage; stamens 22–25, 1–1.5 × 0.2–0.5 mm, narrowly elliptic to ovate, apex of connective acute; carpel s 3–6, 1–1.5 × 0.5–0.8 mm, sericeous, stigma ellipsoid. Monocarps 2–6, 5–10 × 3–8 mm, broadly ellipsoid, stipes 1–2 mm long, apex rounded to apiculate, the apiculum up to ca. 0.2 mm, green,

orange to red *in vivo*, brown *in sicco*, glabrescent to glabrous, exocarp rugulose. Seeds 1–2, with placentation lateral, 6–8 × 5–6 mm, ellipsoid, shiny, surface pitted, orange-brown *in sicco*, with a distinct raphe forming a raised rib encircling the seed, ca. 0.5 mm width, ruminations spiniform.
Material selected: Alvorada d'Oeste, rodovia Alvorada-Presidente Médici, km 15, 20.VI.1983, fl. and fr., *M.G. da Silva 6277* (IAN, INPA, MG, RB). Candeias do Jamari, UHE de Samuel, Rio Jamari, 18.I.1989-11.II.1989, fr., *U.N. Maciel 1666* (MG). Guajará-Mirim, Chapada dos Pacaás Novos, em depressão da chapada, projeto de assentamento do INCRA linha 10, a 6 km da cidade de Guajará-Mirim, 9.IV.1987, fr., *C.A. Cid Ferreira et al. 8776* (INPA, K, MBM, MO, NY, UFACPZ, US). Itapuã do Oeste, Floresta Nacional do Jamari, concessão MADEFLONA, 2.7 km do km 602 da BR-364, 30.XI.2011, fr., *W. Castro et al. 05* (RB). Pimenta Bueno, 15 km SW of Pimenta Bueno on alternative route to Cacoal, 10.XI.1979, fl., *W.N. Bruce 408* (INPA, MG, MO, NY, RB). Porto Velho, Canteiro de obras das UHE Jirau, 09°15'32"S, 64°36'52"W, 123 m, 19.X.2010, fl. and fr., *M.F. Simon et al. 1047* (CEN, IAN, INPA, HUEFS, RON, UFACPZ). Presidente Médici, estrada para Costa Marques, linha 7, próximo a Alvorada, 11°16'33"S, 61°55'39"W, 20.IV.1983, fr., *M.G. da Silva 6181* (INPA, MG, UEC). Primavera de Rondônia, coletas realizadas para o PLANAFLORO, 11.III.1997, fr., *DRL 1103-004-1997* (RB, RON). Vale do Anari, Reserva Biológica do Jaru, unidade amostral 1, 09°35'25"S, 61°38'57"W, 20.VII.2017, *W. Castro et al. 2260* (RB).

Bocageopsis multiflora occurs in Bolivia, Brazil, Colombia, Guyana, Venezuela and Suriname (Maas *et al.* 2007). In Brazil it occurs in the Amazon and Cerrado, in the states of Amazonas, Mato Grosso, Pará, Rondônia and Roraima (BFG 2018; Flora do Brasil 2020). In Rondônia has been recorded in the municipalities of Alvorada d'Oeste, Candeias do Jamari, Guajará-Mirim, Itapuã do Oeste, Pimenta Bueno, Porto Velho, Presidente Médici, Primavera de Rondônia and Vale do Anari. It occurs in rainforest, semideciduous seasonal forest and transition forest, in areas near watercourses and in disturbed forest. Flowering in June, October and November; fruiting in January, February, March, April, June, October and November.

The most common species of the genus, *Bocageopsis multiflora* is characterized by narrowly elliptic leaves (4.5–12 cm long), strongly asymmetric, acute to obtuse base, acuminate apex, inflorescences composed of 2–6 rhipidia, 1–6-flowered and monocarps broadly ellipsoids,

Figure 2 – a-c. *Bocageopsis multiflora* – a. trunk; b. branchlet; c. monocarps. Photos: D.C. Daly.

glabescent to glabrous. It is easily recognized by the almost glabrous branchlets, long-acuminate leaf apex (5–20 mm) and glabrescent to glabrous monocarps.

Bocageopsis multiflora it can be confused with *B. canescens* by the acuminate leaf apex, but differs by short-acuminate leaf apex, 3–9 mm long (*vs*. long-acuminate leaf apex, 5–20 mm long in *B. multiflora*).

Illustration in Fries (1931) and Maas *et al.* (2007).

4. *Cremastosperma monospermum* (Rusby) R.E. Fr., Acta Horti Berg. 10(2): 193. 1931. Fig. 1b

Hermaphrodite tree or shrub, 4–28 m tall, 4–20 cm diam.; trunk with outer bark brown, rugulose, shed in scaly, inner bark yellowish-brown; branchlets fissured, lenticellate, glabrous. Leaves with petiole 3–7 mm long, canaliculate; lamina 3–25 × 3–10 cm, symmetric at the base, narrowly elliptic, elliptic or obovate, base acute to obtuse, apex acuminate to caudate, acumen 10–25 mm long, chartaceous, verruculose along the midvein, glabrous on both surfaces; venation brochidodromous, midvein and secondary veins raised on both surfaces, midvein canaliculate above, secondary veins in 7–10 pairs on either side of midvein, angle with midvein 40–50°, marginal vein absent. Inflorescences flowers solitary on leafy branchlets, glabrous; bracts 2, 1–1.2 × 0.7–1 mm, broadly ovate, ciliate, 1 on the base and 1 on the middle of pedicel 40–60 mm long; flower buds 5–7 × 3–5 mm, ovoid, flowers bisexual, yellow *in vivo*, 9–10 × 7–8 mm, sepals 2.5–3 × 3–3.2 mm, ovate, basally connate to free, petals 9–13 × 4–7 mm, elliptic to ovate, inner ones without a distinct, incurved, apical appendage; stamens 150–180, 1.5–2 × 0.8–1 mm, oblong to obovate, apex of connective truncate; 16–18 carpels, 3–4 × 0.5–0.8 mm, glabrous, stigma obovoid. Monocarps 16–18, 10–28 × 10–15 mm, ellipsoid, stipes 10–15 mm long, apex rounded to apiculate, apiculum ca. 0.5 mm, reddish-green, red to vinaceous *in vivo*, brown *in sicco*, glabrous, exocarp rugulose. Seed 1, with placentation apical, 9–11 × 7–9 mm, ovoid to broadly ovoid, shiny, surface pitted, orange-brown *in sicco*, with a canaliculate raphe ca. 0.5 mm width, ruminations spniform.

Material selected: Alta Floresta d'Oeste, III.2004, fr., *A. Oliveira et al. 792* (RB). Ariquemes, Mineração Mibrasa, setor Alto Candeias, km 128, sudoeste de Ariquemes, 10°35'S, 63°35'W, 16.V.1982, fr., *L.O.A. Teixeira et al. 520* (INPA, K, MG, MO, NY, RB, US). Buritis, linha C-34, fazenda do Sr. Lindomar, 24.XI.1996, fr., *L.C.B. Lobato et al. 1318* (MG). Campo Novo de Rondônia, Parque Nacional do Pacaás Novos, 10°47'S, 63°38'W, 3.XI.2018, fl., *K.S. Gonçalves et al. 532* (RON). Espigão do Oeste, BR-364, rodovia Cuiabá-Porto Velho, estrada da FUNAI, km 5, 11°12'S, 60°61'W, 20.I.1984, fr, *C.A. Cid Ferreira et al. 4673* (INPA, K, MG, MO, NY, RB, US). Guajará-Mirim, along the Rio dos Pacaas Novos, between the first and second cachoeiras, elevation ca. 220 m, 20.III.1978, fr., *W.R. Anderson et al. 12202* (NY). Jaru, estrada Porto Velho-Cuiabá, BR-364, km 278, estrada vicinal alimentadora, linha 605 a 1,5 km da BR, margem esquerda, 13.II.1983, fr., *L.O.A. Teixeira et al. 1477* (INPA). Ji-Paraná, BR-364, km 17, estrada vicinal, 17.V.1985, fr., *U.N. Maciel et al. 1481* (MG). Mirante da Serra, Chapada dos Parecis, distrito de Alta Floresta, estrada p-56, km 17, 11°12'S, 62°63'W, 14.VI.1984, fr., *C.A. Cid Ferreira et al. 4507* (INPA, K, MG, MO, NY, RB, US). Porto Velho, área de impacto da Usina Santo Antônio, setor 02, margem direita, parcela 07, 30.XI.2009, fl., *M.P.N. Pereira 50* (CEN, IAN, RB, RON). Theobroma, Inventário Florestal Nacional - Rondônia, conglomerado RO-196, 10°04'48"S, 62°16'48"W, 29.VI.2015, *W.J.M. Geremia et al. 204* (RON).

Cremastosperma monospermum occurs in Amazonian regions of Bolivia, Brazil, and Peru, (Pirie *et al.* 2018). In Brazil occurs in the states of Acre, Amazonas, and Pará (BFG 2018; Flora do Brasil 2020). In Rondônia occurs in the municipalities of Alta Floresta d'Oeste, Ariquemes, Buritis, Campo Novo de Rondônia, Espigão do Oeste, Guajará-Mirim, Jaru, Ji-Paraná, Mirante da Serra, Porto Velho and Theobroma, in rainforest and transition forest, in *terra firme* and *igapó*. Flowering in November and December; fruiting in February, March, April, May, June, July, November and December.

Cremastosperma monospermum is characterized by narrowly elliptic to elliptic or obovate leaves (3–25 cm long), long-acuminate apex (10–25 mm long), midvein canaliculate above, inflorescences in solitary flowers, glabrous. It's recognized by the often long pedicel (40–60 mm long) and ovoid flower buds.

This species is often confused with *C. pedunculatum* R.E. Fr., as both have elliptic or obovate leaves, long pedicels, petals that do not fully open anthesis, and numerous ellipsoid monocarps. *Cremastosperma pedunculatum* differs from *C. monospermum* by the broad ovoid to globose flower buds and the presence of indument on the pedicels (*vs.* only ovoid flower buds and glabrous pedicels in *C. monospermum*).

Illustration in Pirie *et al.* (2018).

5. *Ephedranthus amazonicus* R.E. Fr., Acta Horti Berg. 12(1): 200. 1934. Figs. 1b; 3a-h

Androdioecious tree or shrub, 3–12 m tall, 3–8 cm diam.; trunk with straight base, outer bark grayish-brown, fissured; branchlets fissured, glabrescent to glabrous. Leaves with petiole 3–8 mm long, semi-terete; lamina 7–16 × 2–6.5 cm, asymmetric at the base, narrowly elliptic

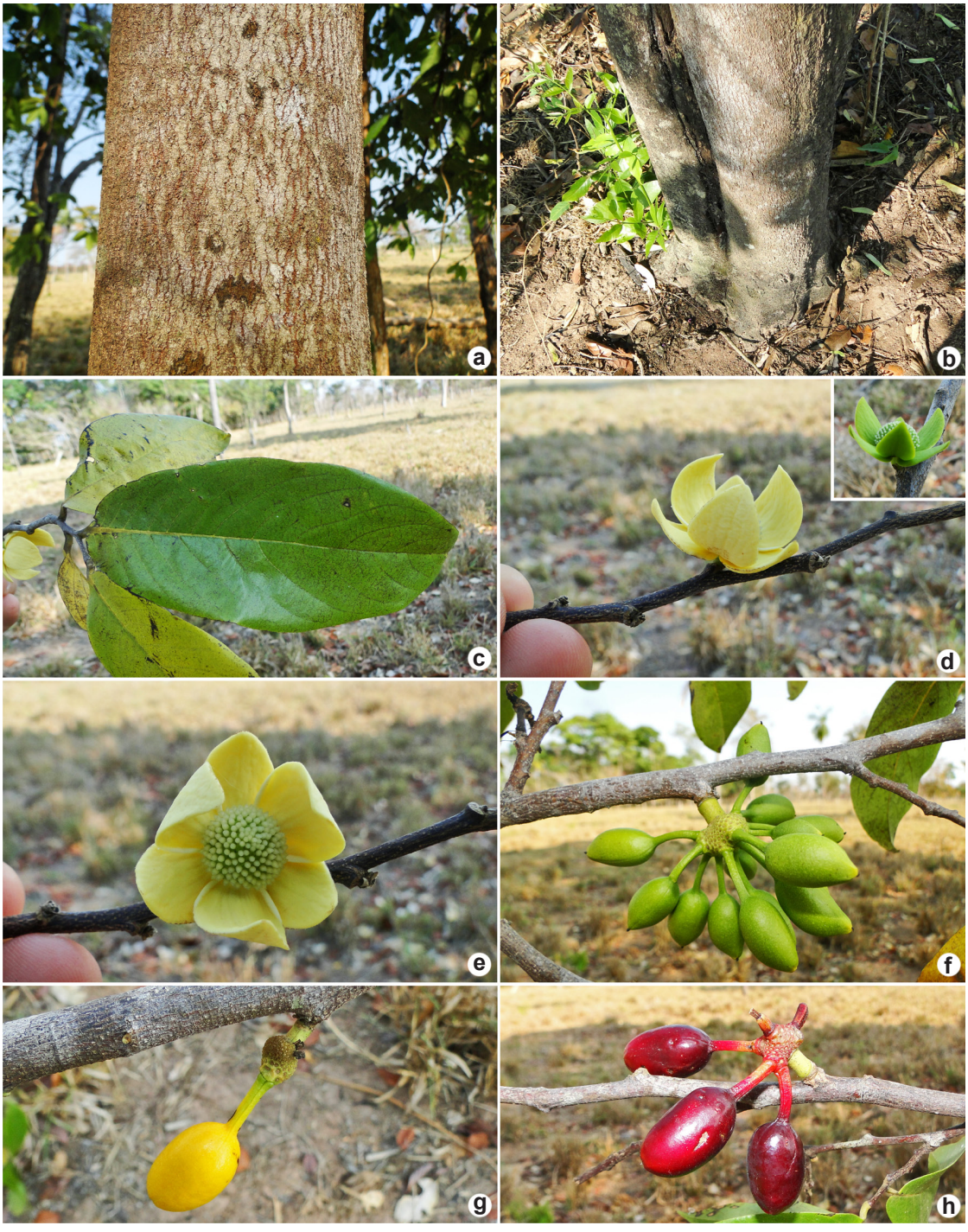

Figure 3 – a-h. *Ephedranthus amazonicus* – a. trunk; b. trunk base; c. leaves; d. flower and detail for immature flower; e. bisexual flower; f. immature monocarps; g. maturing monocarps; h. mature monocarps. (photos: a-h. N.C. Bigio).

to elliptic, base acute to obtuse, apex acute to acuminate, acumen 0–6 mm long, chartaceous to coriaceous, not verruculose, glabrous above, glabrous to tomentose on veins below; venation brochidodromous, midvein and secondary veins flat to impressed above, raised below, secondary veins in 12–18 pairs on either side of midvein, angle with midvein 40–60°, marginal vein absent. Inflorescences flowers solitary on leafy branchlets, sericeous to tomentose, yellowish-brown *in sicco*; bracts 2–3, 1–2 × 1–2 mm, broadly ovate, clasping the base of pedicel 5–6 mm long. flower buds 2–2.5 × 2–2.5 mm, broadly ovoid, flowers bisexual or male, yellowish-cream *in vivo*, ca. 25 × 25 mm, sepals 3–4 × 4–5 mm, elliptic to broadly ovate, basally connate; petals 11–14 × 8–9 mm, ovate, concave, inner ones without a distinct, incurved, apical appendage; bisexual flowers with 40–45 stamens, 2–2.5 × 0.5–1 mm, obovate to oblanceolate, apex of connective truncate; carpels 32–40, 2–3 × 0.8–1 mm, sericeous, stigma ellipsoid; male flowers with 80–150 stamens, 1.8–2.5 × 0.5–1.2 mm, obovate to oblanceolate, connective truncate. Monocarps 6–40, 18–25 × 8–15 mm, ellipsoid, stipes 10–35 mm long, apex rounded to apiculate, apiculum ca. 0.2 mm long, green, yellow or reddish *in vivo*, brown *in sicco*, glabrous, exocarp smooth. Seed 1, with placentation basal, 20–22 × 10–11 mm, ellipsoid, matte, surface transversely striate, brown *in sicco*, with a canaliculate raphe ca. 0.3 mm width, ruminations lamellate, divided in 4 parts.

Material selected: Alta Floresta d'Oeste, Serra dos Parecis, a 27 km de Alta Floresta, na linha 65 da Topografia BASEVI, 29.XI.1982, fr., *P.L.B. Lisboa et al. 2512* (MG). Buritis, Fazenda do Sr. José Vespal, 22.XI.1996, fr., *L.C.B. Lobato et al. 1226a* (MG). Cerejeiras, 2.XII.1996, fr, *H.S. Pereira 2110212-2* (RON). Costa Marques, Forte Príncipe da Beira, Rio Guaporé, 9.I.1962, fr., *W.A. Rodrigues et al. 4279* (INPA, NY). Espigão d'Oeste, 10.XII.2013, fl. and fr., *N.C. Bigio et al. 1488* (RON). Machadinho d'Oeste, source of the Jatuarana River, Machado River region, 21.XII.1931, fr., *B.A. Krukoff 1597* (NY). Pimenta Bueno, Faz. Sulmap, margem do Rio Melgaço, 14.XI.1993, fr., *M. Macedo et al. 3800* (RB). Porto Velho, fragmento florestal próximo à margem esquerda do Rio Jaci-Paraná, 1 km ao sul da BR-364, 09°16'03"S, 64°24'20"W, 4.XII.2012, fr., *N.A. Perigolo et al. 284* (CEN, IAN, INPA, RON, UB).

Ephedranthus amazonicus occurs in Brazil, Colombia, Peru and Venezuela (Lopes & Mello-Silva 2019). It is broadly distributed throughout Amazonian Brazil, occurring in the states of Acre, Amazonas, Mato Grosso, Pará and Rondônia (Lopes & Mello-Silva 2019; BFG 2018; Flora do Brasil 2020). In Rondônia it is recorded in the municipalities of Alta Floresta d'Oeste, Buritis, Cerejeiras, Costa Marques, Espigão d'Oeste, Machadinho d'Oeste, Pimenta Bueno and Porto Velho. It occurs in rainforest, on *terra firme* and *capoeira* (secondary forest). Flowering in December; fruiting in January, November, and December.

Ephedranthus amazonicus is characterized by considerably larger leaves, flowers and flower buds than other species of the genus, as well as the long-stipitate monocarps 35 mm long (*vs.* 5–11 mm long in other species of genus, except *E. guianensis* R.E. Fr. that exceeds this size). It's distinguished by the leaves glabrous above, flowers with broadly ovate and concave petals, differing from other *Ephedranthus* species by the presence of indument along the midvein in the adaxial side and non-concave petals.

It was not possible to find specimens with male flowers; the description this structure was based on Fries (1934) and Lopes & Mello-Silva (2019).

Illustration in Oliveira & Sales (1999) and Lopes & Mello-Silva (2019).

6. *Klarobelia inundata* Chatrou, Changing Gen. Syst. Stud. Neotrop. W. Afr. Annonaceae 131. pl. 3B. 1998. Figs. 1a; 4

Androdioecious tree, 6–8 m tall, ca. 15 cm diam.; branchlets fissured, lenticellate, glabrous to glabrescent near vegetative buds. Leaves with petiole 3–7 mm long, canaliculate; lamina 2.3–11.5 × 0.6–3.5 cm, slightly asymmetrical at the base, narrowly elliptic to narrowly ovate, base acute to cuneate, apex acuminate, acumen 2–10 mm long, chartaceous, not verruculose, glabrous on both surfaces; venation eucamptodromous, midvein flat to impressed above, raised below, secondary veins raised on both sides, 5–11 pairs on either side of midvein, angle with midvein 40–55°, marginal vein absent. Inflorescences flowers solitary on older branchlets and leafy branchlets, sericeous, yellowish-brown *in sicco*; bract 1, 1.5–2 × 1–1.5 mm, ovate, on the base of pedicel 5–6 mm long; flower buds 4–5 × 4–5 mm, ovoid to broadly ovoid, flowers male, cream *in vivo*, 13–15 × 18–20 mm, sepals 3–5 × 4–5 mm, broadly ovate, basally connate to free, petals 13–15 × 10–15 mm, ovate to broadly ovate, inner ones without a distinct, incurved, apical appendage; bisexual flowers not yet known; male flowers with 100–150 stamens, 2–2.5 × 0.5–0.8 mm, oblong to oblanceolate, apex

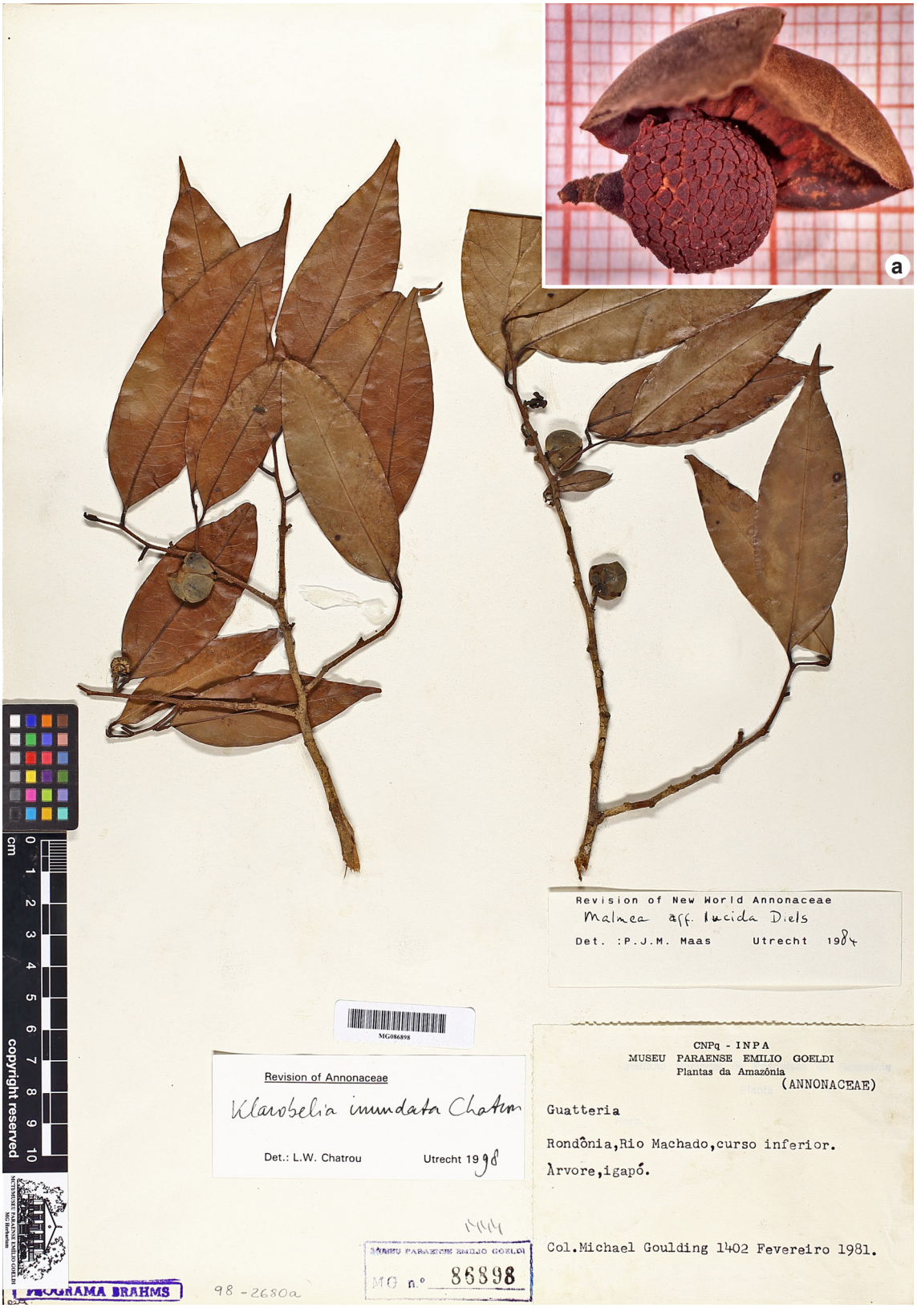

Figure 4 – Exsiccate of *Klarobelia inundata* – a. male flower *in sicco* (*M. Goulding 1402*, MG).

of connective truncate. Monocarps 28–32, 20–25 × 10–15 mm, ellipsoid, stipes 10–15 mm long, apex apiculate, apiculum ca. 0.5 mm, greenish-brown *in vivo*, brown *in sicco*, glabrescent, exocarp slightly rugulose. Seed 1, with placentation basal, 15–16.5 × 4–5 mm, ellipsoid to oblong, shiny, surface transversely striate, light-brown *in sicco*, raphe ca. 0.3 mm width, ruminations lamellate, divided in 4 parts.

Material examined: Machadinho d'Oeste, Rio Machado, curso inferior, II.1981, fl., *M. Goulding 1402* (MG).

Additional material: BRAZIL. ACRE: Marechal Thaumaturgo, basin of Rio Juruá, Rio Tejo, right bank, ca. 09°02'52.92"–09°02'35.46"S, 72°16'24.48"–72°15'59"W, 4.X.2000, fl., *D.C. Daly et al. 10400* (NY). AMAZONAS: Lábrea, Rio Purus, Lago Preto, 2 km north of Lábrea, 25.VI.1971, fr., *G.T. Prance et al. 13698* (INPA, R).

Klarobelia inundata is restricted to the Amazon of Brazil and Peru.; in Brazil it is recorded from the states of Amazonas and Rondônia (Chatrou 1998; BFG 2018; Flora do Brasil 2020). In Rondônia only one record is known in the municipality Machadinho d'Oeste, occurring in rainforest and in *igapó*. Flowering in February.

Klarobelia inundata is unique among Rondônia Malmeeae in having venation eucamptodromous (*vs.* brochidodromous in all others). Being an androdioecious species, it has only description of the male flower, the bisexual flowers is still unknown. We did not locate fruiting specimens; the monocarps description was based on Chatrou (1998).

7. *Onychopetalum amazonicum* R.E. Fr., Acta Horti Berg. 10(2): 149-151, f. 3. 1931. Fig. 1b

Hermaphrodite tree or shrub, 9–30 m tall, 10.6–31.2 cm diam.; stems and branchlets with reddish exudate; trunk cylindrical, outer bark greenish-gray, thick, deeply fissured, inner bark orange with dark striations; branchlets lenticellate, sparsely sericeous to glabrous. Leaves with petiole 5–15 mm long, canaliculate; lamina 6.5–30 × 3–10 cm, slightly asymmetrical at the base, narrowly elliptic, elliptic, ovate or obovate, base acute to obtuse, apex acute to acuminate, acumen 0–5 mm long, chartaceous to coriaceous, densely verruculose, glabrous above, densely canescent below; venation brochidodromous, primary and secondary veins raised on both surfaces, secondary veins in 6–25 pairs on either side of midvein, angle with midvein 35–70°, marginal vein absent. Inflorescences on older branchlets, composed of 2–7 rhipidia, 1–2-flowered, canescent, greyish *in sicco*; bracts 2, 1–2 × 1–2 mm, ovate to broadly ovate, 1 on the base and 1 on the middle of pedicel, 1–2 mm long; flower buds 3–5 × 3–4 mm, ellipsoid to broadly ellipsoid, flowers bisexual, white *in vivo*, 8–10 × 4–5 mm, sepals 1.5–2 × 1.5–2 mm, broadly ovate, basally connate, petals 8–10 × 3–5 mm, narrowly elliptic to elliptic or narrowly ovate to ovate, inner ones with a distinct, incurved, apical appendage, 1.5–2 mm long; stamens ca. 25, 3.5–6 × 0.5–0.9 mm, narrowly lanceolate, apex of connective acute; carpels 1–2, 2.8–3 × 1–1.2 mm, sericeous, stigmas obovoid. Monocarps 1–2, 25–37 × 25–32 mm, globose to ellipsoid, stipes 0.5–1 mm long, apex apiculate, apiculum ca. 0.5 mm, green to reddish *in vivo*, brown *in sicco*, glabrous, exocarp rugulose. Seeds 2–4, with placentation lateral, 15–20 × 8–15 mm, ellipsoid, shiny, surface pitted, brown *in sicco*, with a distinct raphe forming a raised rib encircling the seed, ca. 1.5 mm width, ruminations spiniform.

Material selected: Cabixi, 1.XII.1996, *DRL 0540112-0* (RON e1175). Chupinguaia, Inventário Florestal Nacional - Rondônia, conglomerado RO-523, 12°25'12"S, 61°12'00"W, 20.VII.2015, *W.J.M. Geremia et al. 272* (RON). Corumbiara, Inventário Florestal Nacional - Rondônia, conglomerado RO-578, 12°57'37"S, 60°39'37"W, 20.IV.2016, *E.L. Gonçalves et al. 331* (RON). Itapuã do Oeste, 09°18'64.7"S, 63°01'70.7"W, 2.XII.2011, fr., *W. Castro et al. 43* (RB). Pimenta Bueno, Usina Hidrelétrica Rondon II, margem do Rio Comemoração, abaixo da barragem da usina, 11°57'22"S, 60°42'32"W, 9.XII.2013, fr., *N.C. Bigio et al. 1415* (RON). Porto Velho, km 133 Madeira-Mamore railway, 15.IX.1963, fl., *B. Maguire et al. 56665* (K, MG, NY). Vale do Anari, Reserva Biológica do Jaru, unidade amostral 2, 09°38'05"S, 61°38'40W, 13.VIII.2017, *W. Castro et al. 1939* (RB, RON). Vale do Anari, Reserva Biológica do Jaru, unidade amostral 2, 09°38'10"S, 61°38'39"W, 13.VIII.2017, *W. Castro et al. 1770* (RB). Vilhena, território federal de Rondônia, estrada do Rio Pimenta Bueno, entre os kms 1 a 10, 12°45'S, 60°10'W, 7.XI.1979, fr., *M.G.G. Vieira et al. 978* (INPA, MG, MO, NY, RB).

Onychopetalum amazonicum is restricted to the Amazon of Brazil and Venezuela (Maas *et al.* 2007). In Brazil, it occurs in the states of Amazonas, Mato Grosso, Pará and Rondônia (BFG 2018; Flora do Brasil 2020). In Rondônia it is recorded in the municipalities of Cabixi, Chupinguaia, Corumbiara, Itapuã do Oeste, Pimenta Bueno, Porto Velho, Vale do Anari and Vilhena, occurring in rainforest, semi-deciduous seasonal forest, and transition forest, on *terra firme* and *capoeira*. Flowering in June and September; fruiting in October to January.

Plants of *Onychopetalum amazonicum* are trees up to 30 m tall, narrowly-elliptic, elliptic, ovate or obovate leaves, slightly asymmetrical (6.5–30 cm long), inflorescences composed of 2–7 rhipidia, 1–2-flowered, and 1–2 monocarps, globose to ellipsoid (25–37 × 25–32 mm), short-stipitate (stipe up to 1 mm long). It can be distinguished by the leaves densely canescent below.

Onychopetalum amazonicum can be confused with *O. periquino* by the inner petals with a distinct, incurved, apical appendage, but differs by the long petiole (5–15 mm long), leaves densely canescent bellow, and secondary veins up to 25 pairs (*vs.* short petiole up to 7 mm long, leaves glabrous on both sides, and secondary veins up to 16 pairs in *O. periquino*).

Illustration in Fries (1931) and Maas *et al.* (2007).

8. *Onychopetalum periquino* (Rusby) D.M. Johnson & N.A. Murray, Brittonia 47: 290. 1995. Fig. 1b

Hermaphrodite tree or shrub, 10–25 m tall, 10.6–31.2 cm diam.; stems and branchlets with reddish exudate; trunk cylindrical, outer bark greenish-gray, thick, fissured, inner bark yellowish, fibrous; branchlets fissured, lenticellate, glabrous. Leaves with petiole 3–7 mm long, canaliculate; lamina 3.8–19.5 × 2.2–5.8 cm, slightly asymmetrical at the base, narrowly elliptic to narrowly obovate, base acute to obtuse, apex acute to acuminate, acumen 0–6 mm long, chartaceous to coriaceous, densely verruculose, glabrous on both surfaces; venation brochidodromous, midvein and secondary veins raised on both surfaces, secondary veins in 9–16 pairs on either side of midvein, angle with midvein 40–60°, marginal vein absent. Inflorescences on older branchlets, composed of 2–8 rhipidia, 1–2-flowered, canescent, brownish-grey *in sicco*; bracts 2, 0.5–1 × 0.5–1 mm, broadly ovate, 1 on the base and 1 on the middle of pedicel 3–5 mm long; flower buds 2–3 × 2–2.5 mm, ellipsoid to broadly ellipsoid, flowers bisexual, white *in vivo*, 5–8 × 3–5 mm, sepals 1–1.5 × 1–2 mm, broadly ovate, basally connate, petals 4–5 × 2–3 mm, narrowly elliptic to elliptic, inner ones with a distinct, incurved, apical appendage, ca. 1 mm long; stamens 12–17, 1.5–3 × 0.5–1 mm, oblong to oblanceolate, apex of connective acute; carpel 1, 1–2 × 0.7–1 mm, glabrous, stigma ellipsoid. Monocarps 1, 25–30 × 20–25 mm, globose to broadly ellipsoid, stipes ca. 1 mm long, apex rounded, orange-green, red to vinaceous *in vivo*, brown *in sicco*, glabrous, exocarp slightly rugulose. Seeds 2–3, with placentation lateral, 18–20 × 13–14 mm, ellipsoid, surface shiny, pitted, reddish-brown *in sicco*, with a distinct raphe forming a raised rib encircling the seed, ca. 2 mm width, ruminations spiniform.

Material selected: Costa Marques, BR-429, km 14, 22.V.1982, fl., *M.G. da Silva et al. 5856* (INPA, MG, RB). Itapuã do Oeste, Flona do Jamari, EA-2 Potosi, 09°16'12"S, 62°54'36"W, 21.VII.2017, *D.S. Costa et al. 1395* (RB). Porto Velho, basin of Rio Madeira, km 12, road Guajará-Mirim to Abunã, 5.VIII.1968, fl., *G.T. Prance et al. 6806* (INPA, K, MG, NY, US).

Additional material: BRAZIL. ACRE: Acrelândia, Rio Abunã, projeto de assentamento extrativista (PAE) Porto Dias, km 108 da BR-364 (Rio Branco-Porto Velho), 30 km S on side road, 09°58'46"S, 66°48'05"W, 4.X.2003, fr., *D.C. Daly et al. 12169* (RB).

Onychopetalum periquino is restricted to the Amazon of Bolivia, Brazil and Peru (Maas *et al.* 2007). In Brazil, it occurs in the states Acre, Amazonas, Mato Grosso and Rondônia (BFG 2018; Flora do Brasil 2020). In Rondônia it is recorded from in the municipalities of Costa Marques, Itapuã do Oeste and Porto Velho, in rainforest, on *terra firme*. Flowering and fruiting in January, August and November.

Onychopetalum periquino is characterized by the narrowly elliptic to narrowly obovate leaves (3.8–19.5 cm long), slightly asymmetrical at the base, inflorescences composed of 2–8 rhipidia, 1–2-flowered, and 1 monocarp globose to broadly ellipsoid (25–30 × 20–25 mm), short-stipitate (stipe up to 1 mm long). It can be distinguished by the leaves glabrous on both sides. It's can be confused with *O. amazonicum* (see notes under that species).

Illustration in Maas *et al.* (2007).

9. *Oxandra euneura* Diels, Notizbl. Bot. Gart. Berlin-Dahlem 10: 173. 1927. Fig. 1c

Hermaphrodite tree or shrub, 2.5–8 m tall, 10–15 cm diam.; branchlets fissured, lenticellate, pubescent to glabrous. Leaves with petiole 5–8 mm long, canaliculate; lamina 6.2–25 × 3.5–8 cm, symmetric at the base, narrowly elliptic to narrowly obovate, base acute to obtuse, apex acuminate, acumen 10–20 mm long, chartaceous, slightly verruculose, glabrous above, sparsely sericeous below; venation brochidodromous, midvein and secondary veins raised on both surfaces, secondary veins, 12–14 pairs on either side of midvein, angle with midvein 65–80°, united into a distinct marginal vein of 3–5 mm margin distance. Inflorescences 1–2(–4)-flowered on older branchlets and leafy

branchlets, sparsely sericeous, brownish *in sicco*; bracts 3–5, 1–1.5 × 1–1.5 mm, ovate to broadly ovate, clasping base of pedicel 3–3.5 mm long; flower buds 3–5 × 3–4 mm, ellipsoid to ovoid, flowers bisexual, white *in vivo*, 7–10 × 8–10 mm, sepals 1–1.5 × 1.5–1.8 mm, broadly ovate, basally connate, petals 5–7 × 2–4 mm, narrowly elliptic to elliptic, the inner ones without a distinct, incurved, apical appendage; 13–15 stamens, 3–4 × 0.5–0.7 mm, narrowly lanceolate, apex of connective acute extended; 3–5 carpels, 1–1.5 × 0.2–0.5 mm, glabrescents, stigma globose. Monocarps 1–5, 14–32 × 7–10 mm, narrowly oblong-ovoid, elongate, slightly curved, stipes 1–1.5 mm long, apex apiculate, the apiculum 2–2.5 mm, green, red to dark *in vivo*, dark-brown *in sicco*, glabrescent to glabrous, exocarp rugulose. Seed 1, with placentation basal, 20–27 × 6–7 mm, narrowly ellipsoid to narrowly oblong, shiny, surface slightly transversely striate, dark brown *in sicco*, with a flat raphe, ca. 1 mm wide, ruminations spiniform or peg-shaped.

Material selected: Jaru, BR-364, rodovia Cuiabá-Porto Velho, km 423, linha 603, Theobroma-Anari, km 48, varadouro para o garimpo chamado Serra sem Calça, 10°11'S, 62°63'W, 2.VII.1984, fr., *C.A.C. Ferreira et al. 4974* (INPA, K, MG, RB, US). Machadinho d'Oeste, Vila de Tabajara, 09°25'29"S, 62°17'01"W, III.2013, fr., *T.R.C. Capistrano et al. 15* (RON). Porto Velho, território de Rondônia, basin of Rio Madeira, 8 km NE of Porto Velho, 9.XI.1968, fr., *G.T. Prance et al. 8290* (INPA, K, MG).

Additional material: BRAZIL. AMAZONAS: Rio Negro, near Indian Community of Cama Indans, opposite São Gabriel da Cachoeira, 00°10'S, 67°05'W, 15.X.1987, fl., *P.J.M. Maas et al. 6757* (INPA, RB). Novo Aripuanã, BR-230, rodovia Transamazônia, a 400 km de Humaitá, projeto INCRA-Rio Juma, vicinal Soldado da Borracha a 20 km da rodovia, 07°15'S, 60°00'W, 30.IV.1985, fl. and fr., *C.A. Cid Ferreira et al. 5926* (MO, RB).

Oxandra euneura is restricted to Amazonian Bolivia, Brazil, Colombia, Ecuador, Peru and Venezuela (Junikka *et al.* 2016). In Brazil it occurs in the states of Acre, Amazonas, Pará and Rondônia (BFG 2018; Flora do Brasil 2020). In Rondônia, it is recorded in the municipalities of Jaru, Machadinho d'Oeste and Porto Velho. It occurs in rainforest, on *terra firme* and in *igapó*. Flowering in July; fruiting in March, August, October and November.

Oxandra euneura is characterized by being small trees up to 8 m tall, with leaves narrowly elliptic to narrowly obovate, 6.5–30 cm long, acuminate apex (acumen 10–20 mm long), inflorescences 1–2(–4)-flowered, flowers with 3–5 bracts clasping the base of the pedicel, and 1–5 monocarps elongate, often curved.

It can be distinguished from all other *Oxandra* species by its broader leaves (3.5–8 cm *vs.* up to 4.8 cm wide) and the secondary veins raised above with arches forming marginal vein, elongate, often curved monocarps (up to 32 mm long). In Rondônia, the leaves are sparsely verruculose, not densely verruculose as stated by Junikka *et al.* (2016).

It was not found specimens from Rondônia with flowers, thus the description of this structure was based on additional material.

Illustration in Junikka *et al.* (2016).

10. *Oxandra mediocris* Diels, Verh. Bot. Vereins Prov. Brandenburg 47: 125. 1905. Fig. 1c

Androdioecious tree, 12–20 m tall, 10–45 cm diam.; stem and branchlets with aqueous colorless exudate, trunk cylindrical, outer bark brownish, inner bark yellowish, thin; branchlets fissured, lenticellate, sericeous to glabrous. Leaves with petiole 2–4 mm long, canaliculate; lamina 3–10 × 1–3.6 cm, symmetric at the base, narrowly elliptic to narrowly obovate, base acute, apex acute to acuminate, acumen 0–15 mm long, chartaceous, densely verruculose, glabrous above, sparsely sericeous below; venation brochidodromous, midvein impressed above, raised below, secondary veins raised on both sides, 12–20 pairs on either side of midvein, angle with midvein 45–65°, marginal vein absent. Inflorescences 1(–3)-flowered on older branchlets, sericeous, brownish *in sicco*; bracts 4–5, 0.5–1 × 0.5–1 mm, broadly ovate, clasping base of pedicel 2–3 mm long; flower buds 2–4 × 1–2 mm, ellipsoid, flowers bisexual or male, yellow or white *in vivo*, 5–6 × 2.5–3 mm, sepals 1–1.5 × 1–1.5 mm, broadly ovate, basally connate, petals 4.5–9 × 1.5–3 mm, narrowly elliptic, inner ones without a distinct, incurved, apical appendage; bisexual flowers with 10–12 stamens 2–2.5 × 0.5–1 mm, apex of connective narrowly triangular; carpels 7–12; male flowers not seen. Monocarps 2–6, 10–16 × 9–10 mm, ellipsoid, stipes 4–5 mm long, apex rounded to apiculate, apiculum 0.3–0.5 mm, green or yellow to orange *in vivo*, dark-brown *in sicco*, glabrous, exocarp smooth. Seed 1, with placentation basal, 10–15 × 9–10 mm, ellipsoid, slightly shiny, surface slightly pitted to transversely striate, reddish-brown *in sicco*, with a flat raphe ca. 0.5 mm wide, ruminations spiniform.

Material selected: Alta Floresta d'Oeste, Serra dos Parecis, 27 km de Alta Floresta, linha 65 da topografia

BASEVI, 29.XI.1982, *P.L.B. Lisboa et al. 2487* (MG). Alvorada do Oeste, ca. 10 km da cidade e 6 km da rodovia BR-429, 11°28'33"S, 62°91'66"W, 30.IV.1987, fr., *C.A. Cid Ferreira et al. 8959* (INPA, MBM, UFACPZ). Campo Novo de Rondônia, BR-421, 1.IX.1996, *H.S. Pereira et al. 1601309-1* (RON). Corumbiara, Inventário Florestal Nacional - Rondônia, conglomerado RO-558, 12°27'51"S, 61°10'12"W, 22.VII.2015, *L.A.S. Santos et al. 1780* (RON). Ji-Paraná, linha 56 a 45 km da cidade, 4.V.1987, fr., *C.A. Cid Ferreira et al. 9031* (F, INPA, K, US, UFACPZ). Machadinho d'Oeste, Rio Machado, curso inferior, II.1981, *M. Goulding 1495a* (MG). Rolim de Moura, estrada para Brasilândia, linha 180, 11°12'S, 61°62"W, 18.VI.1984, fr., *C.A. Cid Ferreira et al. 4613* (INPA, K, MG, NY, RB, US).

Oxandra mediocris is restricted to Amazonian Bolivia, Brazil, Colombia, Ecuador and Peru (Junikka *et al.* 2016). In Brazil, it occurs in the states of Acre, Amazonas, Pará and Rondônia (BFG 2018; Flora do Brasil 2020). In Rondônia it is recorded in the municipalities of Alta Floresta d'Oeste, Alvorada do Oeste, Campo Novo de Rondônia, Corumbiara, Ji-Paraná, Machadinho d'Oeste and Rolim de Moura, occurring in rainforest, on *terra firme* and *igapó*. Without registration in flower; fruiting in April, May and June.

Oxandra mediocris is the only androdioic *Oxandra* species in Rondônia. It's characterized and distinguished by having the smallest leaves in the genus (3–10 cm long), which are densely verruculose, and monocarps long stipitate (stipes 4–5 mm long).

It's can be confused with some *Xylopia* species, by the smallest leaves with secondary veins hardly visible, like *X. amazonica* R.E. Fr. and *X. sericea* A. St.-Hil. *Oxandra mediocris* differs by the indehiscent monocarps 1-seeded (*vs.* dehiscent monocarps 2-many-seeded in *Xylopia* species).

It was no possible to observe flowering specimens, just very immature flower buds; the description of the flowers were made based on Diels (1905) and Junikka *et al*. (2016).

Illustration in Fries (1931) and Junikka *et al.* (2016).

11. *Oxandra polyantha* R.E. Fr., Acta Horti Berg. 12: 269. 1937. Fig. 1c

Hermaphrodite tree, 10–15 m tall, 10–15 cm diam.; branchlets fissured, lenticellate, branchlets sparsely sericeous, older branchlets glabrous. Leaves with petiole 3–5 mm long, slightly canaliculate; lamina 10–21.5 × 2.8–4.5 cm, symmetric at the base, narrowly ovate to narrowly obovate, base obtuse, apex acute to acuminate, the acumen 0–15 mm long, coriaceous, verruculose on midvein, glabrous on both sides; venation brochidodromous, midvein and secondary veins raised on both surfaces, secondary veins, 8–14 pairs on either side of midvein, angle with midvein 40–60°, marginal vein absent. Inflorescences 8–10-flowered on leaves branchlets, sericeous to tomentose, brownish *in sicco*; bracts 4–6, 1–1.5 × 1–1.5 mm, broadly ovate, clasping base of pedicel 3–4 mm long; flower buds 3.8–4 × 4–4.2 mm, ovoid to broadly ovoid, flowers bisexual, cream *in vivo*, 8–10 × 7–8 mm, sepals 2.5–3 × 2.5–3 mm, broadly ovate, basally connate, petals 7–10 × 4–5 mm, elliptic, inner ones without a distinct, incurved, apical appendage; stamens 24–25, 3–5 × 0.5–0.8 mm, narrowly elliptic to lanceolate, apex of connective acute; ca. 9 carpels, 1.2–1.5 × 0.4–0.7 mm, glabrous, stigma globose. Monocarps 6–9, 8–15 × 5–10 mm, broadly ellipsoid to globose, stipes 1–2 mm long, apex rounded, green, red to purplish *in vivo*, dark *in sicco*, glabrous, exocarp rugulose. Seed 1, with placentation basal, 10–15 × 5–10 mm, ellipsoid, matte, surface transversely striate, brown *in sicco*, with a canaliculate raphe, ca. 1 mm width, ruminations spiniform or peg-shaped.
Material examined: Chupinguaia, 21.VII.1997, DRL (RON e1712). Machadinho d'Oeste, Rio Machado, curso inferior, I.1981, fr., *M. Goulding 1152* (MG). Porto Velho, Calama, Rio Madeira, IV.1981, fr., *M. Goulding 208* (MG).
Additional material: BRAZIL. ACRE: Sena Madureira, perto do Rio Caeté, 7 km da cidade, 09°05'S, 68°40'W, 1.X.1980, fl., *B.W. Nelson et al. 515* (F, INPA, RB, UB, UFMT).

Oxandra polyantha is restricted to Amazonian Brazil, Colombia, Ecuador and Peru (Junikka *et al.* 2016). In Brazil it occurs in the states of Acre, Amazonas, Pará and Rondônia (BFG 2018; Flora do Brasil 2020). In Rondônia it is recorded in the municipalities of Chupinguaia, Machadinho d'Oeste and Porto Velho, occurs in rainforest, on *igapó*. Flowering period unknown; fruiting in January and April.

Oxandra polyantha is characterized and can be distinguished from other *Oxandra* species by the sparsely sericeous young branchlets, coriaceous leaves with obtuse base and midvein reddish-brown below, even in *sicco*.

It can be confused with *O. riedeliana* by the many-flowered inflroescences. However *O. riedeliana* differs by the glabrous branchlets and leaves, chartaceous leaves with base acute to attenuate, and midvein not reddish-brown, as is found in *O. polyantha*.

It was not find specimens of Rondônia with flower, the description was based on additional material.

Illustration in Junikka *et al.* (2016).

12. *Oxandra riedeliana* R.E. Fr., Ark. Bot. 5(4): 2, t. 2, f. 7-9. 1905. Fig. 1c

Hermaphrodite tree, 7–15 m tall, 10–18 cm diam.; branchlets fissured, lenticellate, glabrous. Leaves with petiole 3–4 mm long, semi-terete to slightly canaliculate; lamina 6.5–13.5 × 2.3–4.8 cm, symmetric at the base, narrowly ovate to narrowly obovate, base acute to attenuate, apex acuminate, acumen 15–25 mm long, chartaceous, verruculose on midvein, glabrous on both surfaces; venation brochidodromous, midvein and secondary veins raised on both surfaces, secondary veins 7–12 pairs on either side of midvein, angle with midvein 45–60°, marginal vein absent. Inflorescences 1–12-flowered on leafy branchlets, tomentose, brownish *in sicco*; bracts 5–6, 0.5–1 × 0.5–1 mm, broadly ovate, clasping base of pedicel 3.5–4 mm long; flower buds 2.5–3 × 2.5–3 mm, ovoid to broadly ovoid, flowers bisexual, white *in vivo*, 2.5–3.5 × 1.2–2.8 mm, sepals 1–1.5 × 1–2 mm, broadly ovate, basally connate, ciliate, petals 5–7 × 2–5 mm, elliptic to obovate, inner ones without a distinct, incurved, apical appendage; stamens 14–16, 2.5–4 × 0.3–1 mm, narrowly oblong to oblanceolate, apex of connective acute; carpels 3–6, 1.2–1.5 × 0.5–0.7 mm, glabrous, stigma obovoid. Monocarps 2–6, 15–20 × 10–15 mm, ellipsoid to broadly ellipsoid, stipes 1–2 mm long, apex rounded, green, red to purplish *in vivo*, dark-brown *in sicco*, glabrous, exocarp rugulose. Seed 1, with placentation basal, 15–18 × 10–13 mm, ellipsoid, matte, surface transversely striate, light-brown *in sicco*, with a flat raphe, ca. 1 mm width, ruminations spiniform.

Material examined: Colorado do Oeste, 1.XII.1996, fl., *DRL* (RON 3701). Porto Velho, Rio Madeira, Rio Preto e Rio Machado, 2.IX.1997, fr., *H.S. Pereira* (RON 3965). **Additional material**: BRAZIL. AMAZONAS: Tefé, Rio Solimões, margem direita, lago Tefé, 03°20'S, 64°44'W, 1.XII.1982, fl., *I.L. Amaral et al. 686* (INPA, RB). Humaitá, near Livramento, on Rio Livramento, 12.X.–6.XI.1934, fr., *B.A. Krukoff 6585* (F, RB, US).

Oxandra riedeliana is restricted to Amazonian Brazil, Colombia, Ecuador and Peru. (Junikka *et al.* 2016). In Brazil, it occurs in the states of Acre, Amazonas, Pará and Rondônia (BFG 2018; Flora do Brasil 2020). In Rondônia it is recorded in the municipalities of Colorado do Oeste and Porto Velho, occurring in rainforest, on *terra firme*, *igapó*, and *várzea*. Flowering in December; fruiting in September.

Oxandra riedeliana is a tree with narrowly ovate to narrowly obovate leaves (6.5–13.5 cm long), and inflorescences 1–12-flowered on leafy branchlets. It's distinguished by the glabrous branchlets and leaves, chartaceous leafs with base acute to attenuate and long-acuminated apex (15–25 mm long). It's can be confused with *O. polyantha* (see notes under that species).

Flowers and fruits are poorly represented in the studied specimens from Rondônia, thus the description was also based on additional material.

Illustration in Fries (1931) and Junikka *et al.* (2016).

13. *Oxandra xylopioides* Diels, Notizbl. Bot. Gart. Berlin-Dahlem 10: 172. 1927. Figs. 1c; 5a-f

Hermaphrodite tree or shrub, 4–22 m tall, 12–26.8 cm diam.; stem and branchlets with reddish exudate, trunk cylindrical, outer bark gray, deeply fissured, shed in papery plates, inner bark reddish-orange, fibrous; branchlets fissured, lenticellate, sparsely sericeous to glabrous. Leaves with petiole 2–5 mm long, slightly canaliculate; lamina 3–13.5 × 1–3 cm, symmetric at the base, elliptic-lanceolate, narrowly elliptic to broadly elliptic, base obtuse to truncate with a distinct angular, tooth-like, projection on either side, apex acute, chartaceous, verruculose, glabrous above, sparsely sericeous to glabrous below; venation brochidodromous, midvein impressed above, raised below, secondary veins flat on both surfaces, 12–22 pairs on either side of midvein, angle with midvein 50–70°, marginal vein absent. Inflorescences flowers solitary on leafy branchlets, sparsely sericeous to glabrous, brownish *in sicco*; bracts 4–6, 1–2 × 1–2 mm, broadly ovate, clasping base of pedicel 0.5–1 mm long; flower buds 1–3 × 1–3 mm, ellipsoid, flowers bisexual, cream to yellow *in vivo*, 7–10 × 3–4 mm, sepals 2–2.5 × 3–3.5 mm, ovate, basally connate, petals 6–8 × 2–4 mm, narrowly elliptic, inner ones without a distinct, incurved, apical appendage; stamens 12–14, 2.5–3 × 0.3–0.5 mm, narrowly lanceolate, apex of connective acute; carpels 8–9, 1.5–1.8 × 0.3–0.4 mm, glabrous, stigma ellipsoid. Monocarps 3–8, 8–15 × 5–10 mm, ellipsoid to broadly ellipsoid, stipes 1–3 mm long, apex rounded to apiculate, the apiculum 0.2–0.3 mm, greenish-orange to vinaceous *in vivo*, dark *in sicco*, glabrous, exocarp smooth. Seed 1, with placentation basal, 7–14 × 5–10 mm, ellipsoid,

shiny, surface slightly pitted to transversely striate outside, brown *in sicco*, with a canaliculate to flat raphe ca. 1 mm width, ruminations spiniform.

Material selected: Alvorada d'Oeste, travessão entre as linhas do INCRA 40 e 44 a 6 km da BR-429 e a 10 km da cidade, 11°17'S, 62°25'W, IV.1987, fr., *C.A. Cid*

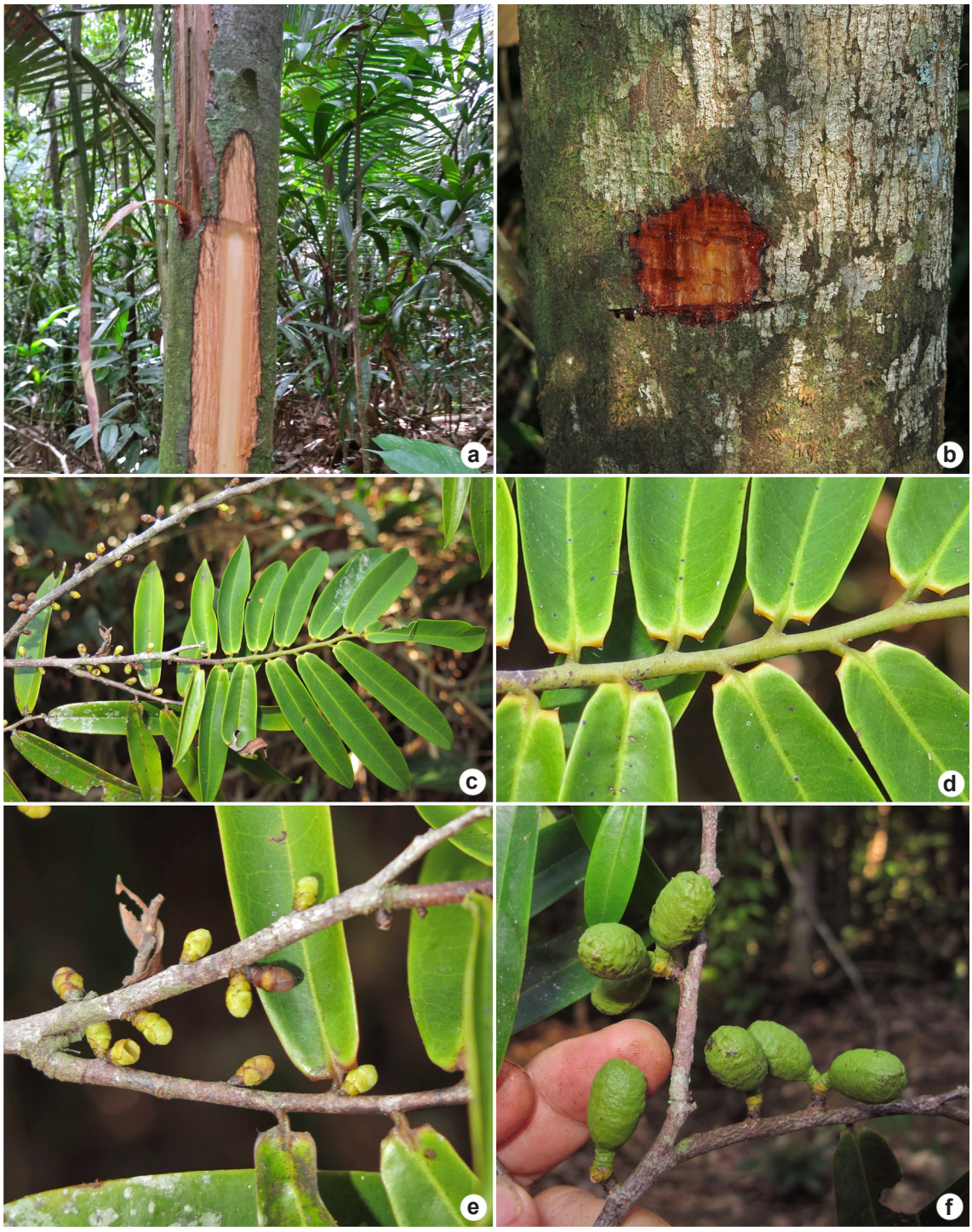

Figure 5 – a-f. *Oxandra xylopioides* – a. trunk with section absent exudate; b. trunk with section showing reddish exudate; c. branchlet; d. leaf base detail; e. inflorescences; f. fruit. (fotos: a. I. Mendes-Silva; c-f. D.C. Daly).

Ferreira et al. 8968 (MBM, INPA, K, UFACPZ). Buritis, coletas realizadas para o PLANAFLORO, 12.XI.1996, fl., *DRL* (RON 3712). Campo Novo de Rondônia, Mineração Campo Novo, ca. 100 km SW de Ariquemes, forest on terra firma, 10°34'S, 63°37'W, 12.X.1979, fr., *J.L. Zarucchi et al. 2752* (INPA, HTSA, RB). Candeias do Jamari, Usina Hidrelétrica de Samuel, Rio Jamari, 18.I–11.II.1989, fr., *U.N. Maciel et al. 1612* (MG). Costa Marques, Parque Estadual Serra dos Reis, posto 1 da SEDAM, 10.XI.1996, fr., *L.C.B. Lobato et al. 1267* (MG). Guajará-Mirim, distrito de Surpresa, Parque Nacional Serra da Cutia, 11°71'32.2"S, 64°86'59.7"W, 149 m, 19.X.2017, fl., *I. Mendes-Silva et al. 323* (RON). Itapuã do Oeste, Floresta Nacional do Jamari, concessão MADEFLONA, 09°17'45.3"S, 63°01'65.8"W, 30.XI.2011, fr., *W. Castro et al. 9* (RB). Ji-Paraná, Reserva Biológica do Jaru, Rio Machado, descendo o rio após a base de fiscalização do ICMBio, 10°00'25"S, 61°58'50"W, 9.VI.2015, fr., *H. Medeiros 1879* (INPA, MG, NY, RB, RON). Machadinho d'Oeste, Inventário Florestal Nacional - Rondônia, conglomerado RO-42, 08°49'12"S, 62°16'48"W, 1.VI.2015, *R.F. Jacobsen et al. 341* (RON). Nova Mamoré, às margens do Rio Ribeirão, 23.XI.1996, fl., *L.C.B. Lobato 1479* (MG). Ouro Preto do Oeste, BR-364, km 478, Reserva de Pesquisa Ecológica do INPA, X.1988, fr., *J.L. dos Santos 1048* (INPA). Porto Velho, margem esquerda do Rio Mutum-Paraná, 09°40'35"S, 64°58'43"W, 20.VIII.2010, fl., *G. Pereira-Silva et al. 15686* (CEN, RB, RON). Presidente Médici, rodovia Presidente Médici-Alvorada, Rio Muqui, 18.VI.1983, fr., *M.G. da Silva 6205* (MG, INPA, UEC). Theobroma, Inventário Florestal Nacional - Rondônia, conglomerado RO-195, 10°04'48"S, 62°27'36"W, VI.2015, *W.J.M. Geremia et al. 191* (RON). Vale do Anari, REBIO Jaru, Rio Machado, margem esquerda, trilha da torre LBA, 10°05'11"S, 61°58'37"W, 9.VI.2015, fr., *N.C. Bigio et al. 1838* (RB, RON). Vilhena, Inventário Florestal Nacional - Rondônia, conglomerado RO-579, 12°57'36"S, 60°28'48"W, II.2016, *E.L. Gonçalves et al. 237* (RON).

Oxandra xylopioides is restricted to Amazonian Bolivia, Brazil, Colombia, Ecuador, French Guiana, Peru and Venezuela (Junikka *et al.* 2016). In Brazil it occurs in the states of Acre, Amazonas, Mato Grosso, Pará and Rondônia (BFG 2018; Flora do Brasil 2020). In Rondônia it is recorded in the municipalities of Alvorada d'Oeste, Buritis, Campo Novo de Rondônia, Candeias do Jamari, Costa Marques, Guajará-Mirim, Itapuã do Oeste, Ji-Paraná, Machadinho d'Oeste, Nova Mamoré, Ouro Preto do Oeste, Porto Velho, Presidente Médici, Theobroma and Vilhena. it is the species of Malmeeae most often collected in Rondônia, occurring in rainforest and transition forest, on *terra firme* and *várzea*. Flowering in June, August, October and November; fruiting in January to July, October and November.

In Rondônia *Oxandra xylopioides* is a tree with reddish exudate on individuals with diameter of the main stem greater than 12 cm, elliptic-lanceolate, narrowly to broadly elliptic leaves (3–13.5 cm long), and inflorescences with solitary flowers. It's distinguished by the leaves with obtuse to truncate base with a distinct angular projections, like a tooths, on either sides and hardly visible secondary veins. Fries (1931) considered the leaf base of *O. xylopioides* to be a rather strange and peculiar character within Annonaceae, still undoubtedly it belongs to *Oxandra* because of its short pedicel with many bracts on the base, giving the impression of scales. The narrow leaves of *O. xylopioides* may be confused with some species of *Xylopia* (Junikka *et al.* 2016), but differ for the pedicel with many bracts on the base (*vs.* pedicel with 1–2 bracts on the base in *Xylopia* species).

Illustration in Fries (1931) and Junikka *et al.* (2016).

14. *Pseudoxandra lucida* R.E. Fr., Acta Horti Berg. 12(2): 230. f. 3a-e. 1937. Figs. 1d; 6

Hermaphrodite tree or shrub, 5–13 m tall, ca. 10 cm diam.; branchlets smooth to fissured, lenticellate, glabrous, branchlets pubescent in leaf axils. Leaves with petiole 2–7 mm long, canaliculate; lamina 5.5–17.5 × 1.6–5.7 cm, symmetric at the base, narrowly elliptic, base acute, apex acute to acuminate, acumen 0–15 mm long, coriaceous, densely verruculose, glabrous on both surfaces; venation brochidodromous, midvein raised on both surfaces, secondary veins flat to slightly raised above, raised below, 15–20 pairs on either side of midvein, angle with midvein 50–60°, united into a distinct marginal vein of 1 mm distance from margin. Inflorescences 1–2-flowered on older branchlets, sericeous, brownish *in sicco*; bracts 2–4, 1.5–2 × 1.5–2 mm, broadly ovate, clasping base of pedicel 3–3.5 mm long; flower buds ca. 0.5 × 0.5 mm, depressed-globose, flowers bisexual, yellowish *in vivo*, 10–15 × 5–10 mm, sepals 3.5–4 × 4.5–5 mm, broadly ovate, basally connate, petals 2.8–10 × 2–9 mm, narrowly elliptic to broadly elliptic, inner ones concave, without a distinct, incurved, apical appendage; stamens 130–140, 2.5–3 × 1–1.2 mm, narrowly oblong to oblanceolate, apex of connective truncate; carpels ca. 22, 3–3.5 × 0.2–0.5 mm, glabrous, stigmas ellipsoid to lanceolate. Monocarps 15–16, 10–25 × 10–25 mm, globose, stipes 2–5 mm long, apex rounded, yellow-greenish to purplish *in vivo*, brown *in sicco*, glabrous, exocarp smooth. Seed 1, with

Figure 6 – Exsiccate of *Pseudoxandra lucida* (*J.G. Kuhlmann 463*, isotype RB).

placentation lateral, 10–12 × 9–10 mm, subglobose, shiny, surface pitted, brown *in sicco*, with a canaliculate raphe, ca. 1 mm width, ruminations spiniform.

Material selected: Alta Floresta d'Oeste, Rio Guaporé, Fazenda Campinho, 7.VII.1997, fr., *J. Oliveira et al. 500* (MG). Alto Alegre dos Parecis, Rio Mequens, antigo seringal, 4.VII.1997, fr., *J. Oliveira et al. 498* (MG). Candeias do Jamari, Represa Samuel, campinarana at the end of E dike road, 09°05'S, 63°13'W, fl., *W.W. Thomas et al. 5087* (INPA, HFSL, K, NY, US). Costa Marques, resex Rio Cautário, Rio Cautário, 26.X.1996, fr., *L.C.B. Lobato et al. 1561* (MG). Guajará-Mirim, Rio Ouro Preto, afluente do Pacaás Novos, 17.IX.1923, fr., *J.G. Kuhlmann 463(RB24264)* (MO, RB, S).

Additional material: BRAZIL. AMAZONAS: Ipixuna, Vila Ecológica Céu do Juruá, comunidade do Igarapé Preto, 06°49'14"S, 71°07'19"W, 19.III.2011, fl., *A. Quinet 2530* (RB, SPF).

Pseudoxandra lucida occurs in Guyana and Amazonian Brazil (Maas & Westra 2003; BFG 2018; Flora do Brasil 2020). In Brazil it is known from the states of Acre, Amazonas and Mato Grosso and, in the present study, its distribution is extended to Rondônia, recorded in the municipalities of Alta Floresta d'Oeste, Alto Alegre dos Parecis, Candeias do Jamari, Costa Marques and Guajará-Mirim, occurring in rainforest, on *igapó*. Flowering in June; fruiting in July to October.

Pseudoxandra lucida is a small tree in Rondônia, 5–13 m tall, with narrowly elliptic leaves (5.5–17.7 cm long), coriaceous and densely verruculose, with numerous (15–16) globose, short-stipitate monocarps. It can be recognized by its coriaceous leaves, brittle, and densely verruculose.

It can often be mistaken for *P. leiophylla* (Diels) R.E. Fr. by their coriaceous leaves, but *P. lucida* differs by the verruculose lamina (*vs.* not verruculose in *P. leiophylla*).

Maas & Westra (2003) stated that specimens *C.A. Cid Ferreira et al. 7427*, *F.A. Dionizia de Mattos et al. 30* and *W.W. Thomas et al. 5087* are aberrant because they have small and short-stipitate monocarps. However, the stipes and monocarps for these specimens are in standard size for all specimens of *P. lucida* collected in Rondônia, even Maas & Westra (2003) considered these specimens aberrant, they are preserving all vegetative characters of this species.

Ilustration in Fries (1937).

The type of *Pseudoxandra lucida* was collected by *J.G. Kuhlmann* (*Kuhlmann 463*) in the municipality of Guajará-Mirim, in Rondônia, but at the time, Rondônia did not exist yet and all the territory belonged to Mato Grosso. To this day, many sources indicate the type of *P. lucida* as having been collected in Mato Grosso. Even suggesting that this species does not occur in Rondônia. In view of this, the location data is updated here.

15. *Pseudoxandra polyphleba* (Diels) R.E. Fr., Acta Horti Berg. 12(2): 230. 1937. Figs. 1d; 7

Hermaphrodite tree or shrub, 6–13 m tall, 5–6 cm diam.; branchlets fissured, glabrous to pubescente in leaf axils. Leaves with petiole 2–5 mm long, canaliculate; lamina 4.8–14.1 × 1.9–4.5 cm, symmetric at the base, narrowly elliptic to narrowly oblong, base acute to obtuse, apex acute to acuminate, acumen 0–20 mm long, chartaceous, densely verruculose, mostly near midvein, glabrous on both surfaces; venation brochidodromous, primary and secondary veins raised on both surfaces, secondary veins in 10–22 pairs on either side of midvein, angle with midvein 45–65°, united into a distinct marginal vein of 1 mm distance from margin. Inflorescences 1–2(–3)-flowered on older branchlets and leafy brachlets, sericeous to glabrous, brownish *in sicco*; bracts 2–4, 0.6–1.2 × 0.6–1.2 mm, broadly ovate, clasping the base of pedicel 4–6 mm long; flower buds ca. 4 × 4 mm, ovoid, flowers bisexual, yellowish *in vivo*, 1.5–2 × 2–2.5 mm, sepals 1–1.2 × 1.2–1.5 mm, broadly ovate, basally connate, petals 5–7 × 4.5–6 mm, ovate to broadly elliptic, inner ones without a distinct, incurved, apical appendage; stamens 100–105, 1.2–1.5 × 1–1.1 mm, oblong to obvate, apex of connective truncate; carpels 15–16, 1.9–2 × 0.4–0.5 mm, glabrous, stigma ellipsoid. Monocarps 5–6, 15–20 × 10–12 mm, globose, stipes 5–7 mm long, apex rounded to apiculate, apiculum ca. 0.3 mm, green, red to vinaceous *in vivo*, brown *in sicco*, glabrous, exocarp sligthly rugulose. Seed 1, with placentation lateral, 10–12 × 10–1 mm, subglobose, shiny, surface pitted, brown *in sicco*, with a canaliculate raphe, ca. 0.8 mm width, ruminations spiniform.

Material selected: Guajará-Mirim, basin of Rio Madeira, Rio Pacaás Novos, 8-25 km above mouth, 5.VI.1968, fl., *G.T. Prance et al. 6841* (INPA, MG, MO). Machadinho d'Oeste, Rio Machado, curso inferior, I.1981, fr., *M. Goulding 1059* (MG). Nova Mamoré, Basin of Rio Madeira, Rio Laje at crossing with road Guajará-Mirim to Abunã, 3.VIII.1968, fl., *G.T. Prance et al. 6699* (INPA, MG). Porto Velho, área de impacto da Usina Santo Antônio, setor 02, margem esquerda, 2.X.2009, fr., *M.P.N. Pereira 107* (CEN, IAN, RB, RON). São Francisco do Guaporé, Porto Murtinho, margem direita do Rio São Miguel, 17.XI.1996, fr., *L.C.B. Lobato et al. 1310* (MG).

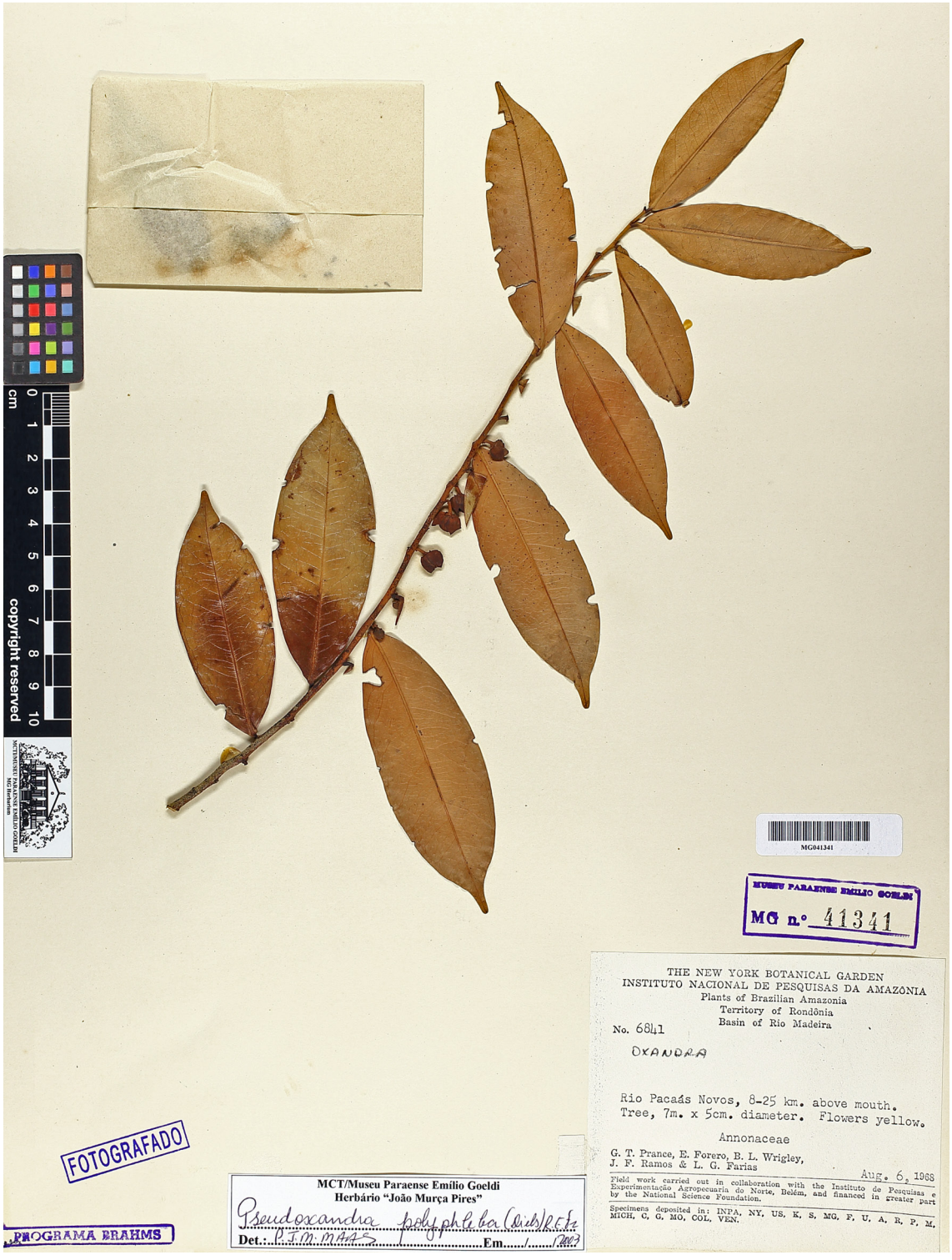

Figure 7 – Exsiccate of *Pseudoxandra polyphleba* (*G.T. Prance 6841*, MG).

Additional material: BRAZIL. AMAZONAS: Humaitá, Rio Madeira, road to Porto Velho, km 27, 1.XII.1966, fr., *G.T. Prance et al. 3511* (RB).

Pseudoxandra polyphleba is restricted to Amazonian Bolivia, Brazil, Colombia, Peru and Venezuela (Maas & Westra 2003). In Brazil it occurs in the states of Acre, Amazonas, Pará and Rondônia (BFG 2018; Flora do Brasil 2020). In Rondônia it is recorded in the municipalities of Guajará-Mirim, Machadinho d'Oeste, Nova Mamoré, Porto Velho and São Francisco do Guaporé; it occurs in rainforest, on *igapó* and *várzea*. Flowering in August; fruiting in January to April, November and December.

Pseudoxandra polyphleba is a small tree up to 13 m tall in Rondônia, with narrowly elliptic to narrowly oblong leaves (4.8–14.1 cm long), chartaceous and densely verruculose mostly near midvein, inflorescences 1–2(–3)-flowered, and monocarps stipitate (stipes 5–7 mm long). It's can be distinguished by the chartaceous and flexible leaves, densely verruculose near the midvein.

This species may be confused with *P. lucida* by their similar monocarps, but *P. lucida* differs by the coriaceous leaves, hard and brittle, and monocarps with stipes up to 5 mm long (*vs.* chartaceous and flexible leaves, which are densely verruculose near the midvein, and monocarps with stipes 5–7 mm long in *P. polyphleba*).

Maas & Westra (2003) cited the specimen *G.T. Prance et al. 6841*, of Rio Pacaás Novos, similar with *P. polyphleba* but differ for glabrous flowers and small leaves (6–7 × 2–2.5 cm). However glabrous flowers in *P. polyphleba* is not uncommon. When Diels (1905) described the species he mentioned that the flowers have short trichomes or are glabrous. The specimens of *P. polyphleba* for Rondônia preserve this characters.

16. *Unonopsis duckei* R.E. Fr., Acta Horti Berg. 12(3): 561. 1939. Figs. 1d; 8a-b

Hermaphrodite tree or shrub, 4–14 m tall, 15–16 cm diam.; branchlets fissured, pubescent to glabrous. Leaves with petiole 4–8 mm long, canaliculate; lamina 7–25 × 3–7.5 cm, symmetric at the base, narrowly elliptic to oblong, base acute to slightly attenuate, apex acuminate, acumen 6–20 mm long, chartaceous, verruculose, glabrous above, sparsely sericeous on veins below; venation brochidodromous, midvein and secondary veins raised on both surfaces, secondary veins in 10–15 pairs on either side of midvein, angle with midvein 40–55°, marginal vein absent. Inflorescences on older branchlets, composed of 1–4 rhipidia, 1–3-flowered, densely tomentose, silver-brown *in sicco*; bracts 2, 1–2 × 1–2 mm, broadly ovate, 1 on the base and 1 on the middle of pedicel 25–30 mm long; flower buds 3–5 × 3–5 mm, broadly ovoid, flowers bisexual, cream to yellowish *in vivo*, 10–20 × 10–20 mm, sepals 3–4 × 4–5 mm, broadly ovate, basally connate, petals 8–15 × 7–12 mm, broadly ovate, concave, inner ones without a distinct, incurved, apical appendage; stamens 200–300, 1–1.2 × 0.5–0.7 mm, oblong to oblanceolate, apex of connective truncate; carpels 150–180, 1–1.5 × 0.8–1.2 mm, sericeous, stigma obovoid. Monocarps

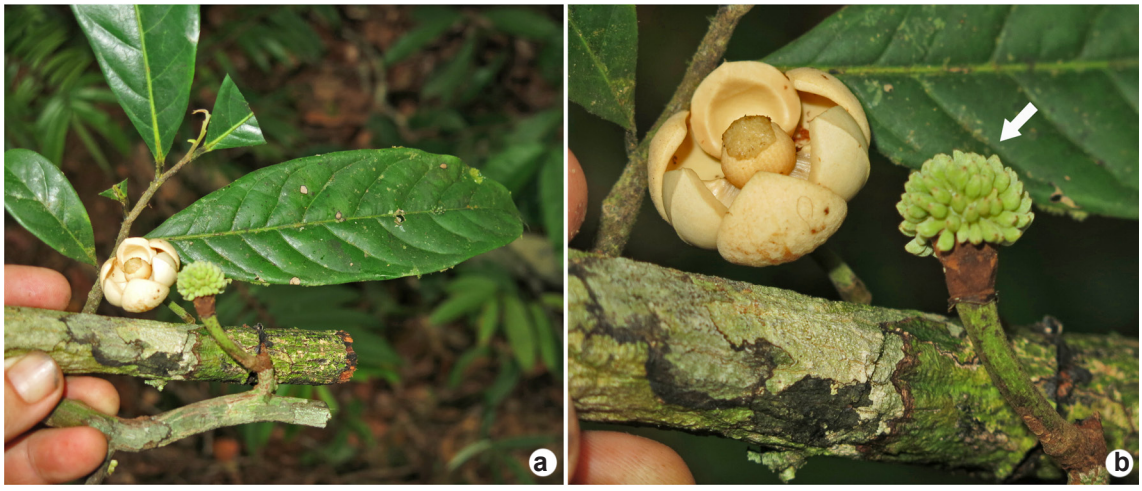

Figure 8 – a-b. *Unonopsis duckei* – a. branchlet; b. flower and immature monocarps (indicated by arrow). Photos: D.C. Daly.

10–36, 15–35 × 5–10 mm, ellipsoid, stipes 10–25 mm long, apex apiculate, apiculum 0.1–0.2 mm, green, yellowish to orange *in vivo*, brown-reddish *in sicco*, sericeous, exocarp slightly rugulose. Seeds 1, with placentation basal, 8–12 × 7–11 mm, broadly ellipsoid, shiny, surface pitted, reddish-brown *in sicco*, with a distinct raphe forming a raised rib encircling the seed, ca. 1 mm width.

Material selected: Candeias do Jamari, reservatório da Usina Hidrelétrica de Samuel, vicinal JL-7, 10.VI.1986, fl. and fr., *C.A. Cid Ferreira et al. 7412* (INPA, K, MO, NY, US). Porto Velho, ao longo da BR-364, 4 km W de Jaci-Paraná, 09°16'10"S, 64°27'32"W, 13.IV.2012, fr., *M.F. Simon et al. 1469* (CEN, HUEFS, IAN, INPA, RB, RON).

Additional material: BRAZIL. AMAZONAS: Reserva Florestal Ducke, Manaus-Itacoatiara, km 26, 02°53'S, 59°58'W, 23.VIII.1997, fl., *P.A.C.L. Assunção et al. 639* (INPA, K, MG, MO, NY, RB, SP, U, ULM).

Unonopsis duckei is restricted to Amazonian Brazil, known from the states of Amazonas, Pará and Rondônia (Maas *et al.* 2007; BFG 2018; Flora do Brasil 2020). In Rondônia, it is recorded in the municipalities of Candeias do Jamari and Porto Velho. It occurs in rainforest, on *terra firme*. Flowering in April, June and October; fruiting in January, March, April, June, October and November.

In Rondônia, *Unonopsis duckei* is a tree 4–14 m tall, with leaves narrowly elliptic to oblong, 7–25 cm long, chartaceous and verruculose, sericeous on venation below, with inflorescences composed of 1–4 rhipidia, 1–3-flowered, densely tomentose with silver-brown trichomes, and ellipsoid monocarps, 1-seeded, basal placentation. It's can be distinguished by the densely tomentose inflorescences with silver-brown trichomes and carthaceous leaves sparsely sericeous below.

It can often be mistaken for *U. stipitata* by their similar ellipsoid monocarps with a single seed of basal pacentation, but *U. stipitata* differs by the subcoriaceous leaves, densely sericeous below and inflorescences with brown trichomes (*vs.* chartaceous leaves sparsely sericeous below and inflorescences with silver-brown trichomes in *U. duckei*).

17. *Unonopsis guatterioides* (A.DC.) R.E. Fr., Acta Horti Berg. 12(2): 241. 1937. Fig. 1d

Hermaphrodite tree or shrub, 3–18 m tall, 7.1–10 cm diam.; outer bark grey, fissured, rugulose, lenticellate, inner bark yellowish; branchlets fissured, lenticellate, tomentose to glabrescent. Leaves with petiole 2–7 mm long, semi-terete to slightly canaliculate; lamina 5–26 × 1.5–7.5 cm, symmetric at the base, narrowly elliptic to narrowly obovate, base acute to obtuse, apex acute to acuminate, acumen 0–25 mm long, chartaceous, verruculose, glabrous above, sometimes sparsely sericeous on veins, sparsely sericeous to tomentose below, sometimes glabrescent; venation brochidodromous, primary and secondary veins raised on both sides, secondary veins in 8–14 pairs on either side of midvein, angle with midvein 30–50°, marginal vein absent. Inflorescences on older branchlets and leafy branchlets, composed of 1–3 rhipidia, 1(–2)-flowered, sericeous, brownish *in sicco*; bracts 2, 1–1.5 × 1–1.5 mm, broadly ovate, 1 on the base and 1 on the middle of pedicel 5–10 mm long; flower buds 5–6 × 5–6 mm, broadly ovoid, flowers bisexual, white to cream *in vivo*, 6–10 × 6–10 mm, sepals 2–4 × 1.5–2 mm, broadly ovate, basally connate to free, petals 8–12 × 7–10 mm, ovate to broadly ovate, inner ones without a distinct, incurved, apical appendage; stamens 26–78, 1–2 × 0.5–1.5 mm, narrowly elliptic to oblong, apex of connective truncate to acute; carpels 7–9, 1.8–3.5 × 0.5–1 mm, sericeous, stigma obovoid. Monocarps 5–15, 20–30 × 10–15 mm, ellipsoid, stipes 10–15 mm long, apex apiculate, apiculum 0.2–0.4 mm, green, orange to reddish *in vivo*, brown-reddish *in sicco*, sericeous to glabrous, exocarp slightly rugulose. Seeds 1–4, with placentation lateral, 10–12 × 10–11 mm, depressed-globose, shiny, surface pitted, reddish-brown *in sicco*, with a distinct raphe forming a raised rib encircling the seed, ca. 1 mm width, ruminations spiniform.

Material selected: Buritis, coletas realizadas para o PLANAFLORO, 31.X.1996, fr., *H.S. Pereira* (RON 4106). Cacoal, BR-364, rodovia Cuiabá-Porto Velho, km 230, Linha 09, 11°12'S, 61°62'W, 22.VI.1984, fl., *C.A. Cid Ferreira et al. 4687* (INPA, MG, NY, RB). Cerejeiras, vila de Pimenteiras, Rio Guaporé, divisa com Bolívia, 14.VII.1991, fr., *G. Martinelli et al. 14447* (RB). Costa Marques, Parque Estadual Serra dos Reis, posto 1 da SEDAM, 10.XI.1996, fr., *L.C.B. Lobato 1268* (MG). Guajará-Mirim, along dos Pacaás Novos, just above and below the first cachoeira, 27.III.1978, fl., *W.R. Anderson et al. 12290* (INPA, RB, NY). Ji-Paraná, Gleba G, km 3-4, 31.III.1983, fr., *H.F. Paulino-Filho et al.* (INPA 116207). Machadinho d'Oeste, distrito de Tabajara, estrada entre a vila Tabajara, 08°55'55"S, 62°06'00"W, 1.VI.2015, fr., *H. Medeiros et al. 1729* (RB, RON). Ouro Preto do Oeste, Reserva de Pesquisa Ecológica do INPA, BR-364, km 478, 2.X.1988, fl. and fr., *J.L. dos Santos et al. 1046* (INPA). Porto Velho, Comunidade Bom Jardim, ilha do Veado, margem direita do Rio Madeira, 08°34'44"S, 63°37'49"W, 11.VIII.2011, fl., *G.P. Viana*

et al. 03 (INPA, RB). Presidente Médici, Rodovia 429, km 15, 25.IX.1984, *U.N. Maciel et al. 1439* (MG).

Unonopsis guatterioides occurs in the Lesser Antilles (St. Vincent), Brazil, Colombia, Guyana, French Guiana, Peru, Suriname and Venezuela (Maas *et al.* 2007). In Brazil, it occurs in the Cerrado, Amazon, and Atlantic Forest biomes, in the states of Acre, Amazonas, Amapá, Espírito Santo, Goiás, Maranhão, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Pará, Paraná, Rondônia, São Paulo and Tocantins (BFG 2018; Flora do Brasil 2020). In Rondônia it is recorded in the municipalities of Buritis, Cacoal, Cerejeiras, Costa Marques, Guajará-Mirim, Ji-Paraná, Machadinho d'Oeste, Ouro Preto do Oeste, President Médici and Porto Velho. It occurs in rainforest and transition forest, on *terra firme*, *igapó* and *varzea*. Flowering in March, May to August and October; fruiting in January to October.

Unonopsis guatterioides is a tree 3–18 m tall in Rondônia, with leaves narrowly elliptic to narrowly obovate, 5–26 cm long, chartaceous and verruculose, sometimes sparsely sericeous on venation or sparsely sericeous to tomentose below, rarely glabrescent, and inflorescences composed of 1–3 rhipidia. It's easily distinguished by the inflorescences with solitary flowers or rarely 2-flowered, which are relatively small for *Unonopsis* species (6–10 × 6–10 mm), and monocarps with 1–4 seeds with lateral placentation.

Illustration in Fries (1937) and Maas *et al.* (2007).

Unonopsis guatterioides is the most variable species of *Unonopsis*, and consequently it has several synonyms: *Annona peduncularis* Steud., *U. angustifolia* (Benth.) R. E. Fr., *U. lindmanii* R. E. Fr., *U. matthewsii* (Benth.) R. E. Fr., *U. antillana* (Rolfe) R. E. Fr., *U. boliviensis* (Britton) R. E. Fr., *U. grandis* (Benth.) R. E. Fr., *U. guaraya* Herzog, *U. buchtienii* R. E. Fr., *U. williamsii* R. E. Fr., *U. guatterioides* f. *elongata* R.E. Fr., *U. gracilis* R. E. Fr. and *U. obovata* R. E. Fr.

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List of exsiccates

Alencar HC 10 (2). **Amaral IL** 1710 (4). **Anderson WR** 12202 (4), 12290 (17). **Antônio M** 0812407-0 (7). **Araújo J** 2006-0122006-0 (13), 2306-0192306-0 (3), 2606-0632606-0 (3), 28070881997 (3), 28071451997 (7), 2807-2031997 (13), 3101-0563101-0 (13), 3101-1313101-1 (7), 3101-1743101-1 (3), 3522012-3 (13), 3732012-3 (7). **Bigio NC** 1415 (7), 1488 (5), 1838 (13). **Bilby R** 78 (4), 123 (13), 137 (4). **Capistrano TRC** 15 (9). **Castro W** 5 (3), 9 (13), 43 (7), 1681 (5), 1770 (7), 1835 (3), 1939 (7), 2075 (3), 2092 (7), 2141 (3), 2260 (3). **Cid Ferreira CA** 4507 (4), 4556 (4), 4590 (4), 4613 (10), 4673 (4), 4687 (17), 4974 (9), 7412 (16), 7423 (14), 7534 (3), 8776 (3), 8959 (10), 8968 (13), 9031 (10). **Cordeiro MR** 554 (17). **Correia B** 126 (7). **Costa DS** 1391 (13), 1395 (8), 1444 (13), 1445 (13), 1468 (13). **Dionizia de Mattos FA** 30 (14), 92 (16), 125 (16). **DRL** 0041103-0 (3), 0332908-0 (13), 0540112-0 (7), 0962908-0 (3), 1252908-1 (7), RONe1712 (11), RONe1993 (16), RON3701 (12), RON3712 (13). **Equipe Resgate** 378 (17), 498 (13), 647 (7), 973 (3), 1160 (9), 1314 (9), 1372 (3), 1498 (13), 1562 (13). **Geremia WJM** 119 (13), 191 (13), 204 (4), 272 (7). **Gomes BM** 549 (16). **Gonçalves EL** 104 (13), 237 (13), 331 (7). **Gonçalves KS** 532 (4), 798 (4). **Goulding M** 1 (4), 24 (15), 31 (15), 34 (10), 105 (15), 208 (11), 1059 (15), 1152 (11), 1268 (17), 1319 (17), 1402 (6), 1436 (17), 1495a (10), 1518 (15). **Jacobsen RHF** 136 (13), 235 (7), 341 (13). **Krukoff BA** 1358 (5), 1597 (5). **Kuhlmann JG** 463 (14). **Lima CBA** 32 (15), 168 (17). **Lima J** 1048 (13). **Lisboa PLB** 2487 (10), 2512 (5). **Lobato LCB** 1226a (5), 1267 (13), 1268 (17), 1310 (15), 1318 (4), 1338 (3), 1479 (13), 1561 (14), 1784 (16), 1908 (17), 2266 (3). **Maciel UN** 1439 (17), 1481 (4), 1612 (13), 1666 (3). **Macedo M** 3800 (5). **Maguire B**, 56665 (7). **Martins** 1223101-1 (13), 1503101-1 (3), 1780111-1 (3). **Martinelli G** 14447 (17). **Melo MFF** 651 (3). **Medeiros H** 1729 (17). **Mendes-Silva I** 323 (13), 631 (13). **Monteiro EF** 76 (17). **Nascimento RF** 85 (3), 92 (17). **Nee MH** 34402 (4), 34771 (3), 34918 (3), 34992 (4), 35033 (4). **Nelson BW** 408 (3). **Oliveira A** 792 (4). **Oliveira J** 498 (14), 500 (14), 506 (9). **Paixão KRC** 5 (17), 66 (3), 393 (16). **Paulino-Filho HF** 83-57 (13), 83-152 (3), INPA116207 (17). **Perigolo NA** 165 (1), 241 (1), 284 (5). **Pinheiro MB** 18 (4). **Prance GT** 5255 (17), 5354 (4), 5618 (17), 5827 (1), 5929 (1), 6198 (17), 6632 (17), 6699 (15), 6748 (15), 6806 (8), 6841 (15), 8250 (16), 8290 (9), 8628 (1), 8730 (17), 8747 (8), 8792 (1), 8958 (8), 20622 (17). **Pena B** RB524430 (17). **Pereira HS** 0023110-0 (17), 0043110-0 (17), 0320209-0 (12), 0731309-0 (13), 1601309-1 (10), 2110212-2 (5), RON4108 (17). **Pereira MPN** 50 (4), 102 (4), 107 (15), 229 (15), 348 (15), 498 (16), 510 (13), 533 (13). **Pereira-Silva G** 13513 (4), 13516 (4), 13529 (13), 13564 (16), 13596 (17), 14051 (17), 14098 (17), 14434 (17), 15686 (13), 15736 (17), 15903 (3), 15956 (1), 16017 (3), 16321 (17). **Rodrigues WA** 4279 (5). **Rosa NA** 811 (4). **Santos AA** 3301 (17), 3312 (17). **Santos JL** 1046 (17), 1048 (13). **Santos LAS** 1780 (10). **Silva JF** 26 (3). **Silva MCR** 100 (3). **Silva MG** 5856 (8), 6063 (13), 6076 (17), 6086 (13), 6181 (3), 6205 (13), 6277 (3). **Silveira ALP** 853 (3), 976 (17), 1020 (17). **Silveira VX** 24 (15), 55 (17), 62 (3), 189 (9), 321 (16). **Simon MF** 1047 (3), 1088 (16), 1135 (16), 1139 (3), 1236 (3), 1363 (3), 1434 (3), 1469 (16), 1837 (13). **Teixeira LOA** 480 (4), 520 (4), 659 (13), 1477 (4). **Thomas WW** 4963 (13), 4984 (7), 4985 (13), 5009 (16), 5087 (14), 5143 (16). **Torres DM** 120 (9), 302 (16), 364 (17), 383 (4). **Viana GP** 3 (17). **Vieira MGG** 978 (7). **Vinha E** 3101-006 (8), 3101-007 (13). **Zarucchi JL** 2752 (13).

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