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MALPIGHIACEAE JUSS. NA SERRA DOS CARAJÁS, PARÁ, BRASIL

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**Dissertação apresentada à Universidade Federal Rural da
Amazônia/Museu Paraense Emílio Goeldi, como parte das
exigências do Curso de Pós-Graduação em Ciências
Biológicas–Botânica Tropical.**

Orientador: Prof. Dr. João Ubiratan Moreira dos Santos

Co-orientador: Dr. Ricardo de S. Secco

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Dissertação apresentada à Universidade Federal Rural da Amazônia/Museu Paraense Emílio Goeldi como requisito para o Título de Mestre do Programa de Pós-Graduação em Ciências Biológicas–Botânica Tropical, área de concentração Taxonomia Vegetal.
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A Serra dos Carajás localizada na região sudeste do estado do Pará, abriga um conjunto de formações vegetais com predominância de floresta ombrófila densa e áreas de cangas. Este conjunto contém diversificada riqueza de espécies vegetais nativas e endêmicas que precisam ser estudadas pela ciência devido à intensa ação antrópica na região, que ao longo do tempo vem devastando a paisagem na região sul paraense através do desmatamento em função da pecuária e na extração dos recursos minerais, causando grandes impactos ambientais. Malpighiaceae apresenta incipientes estudos quando se trata de Amazônia Brasileira, e menos ainda no estado do Pará. Diante deste contexto, este estudo apresenta Malpighiaceae ocorrentes na Serra dos Carajás, Pará, Brasil, com o âmbito de conhecer a diversidade das espécies na área de estudo, contribuindo para a flora do Pará e do bioma Amazônico, além de fundamentar ações de conservação e preservação de espécies raras ou ameaçadas. Decorrente a pesquisa, foram realizados levantamentos de exsicatas da família incorporadas nos herbários BHCB, CEPEC, HCJS, IAN, INPA MG e RB, além de expedições de coleta na área de estudo. O que resultou na confirmação de 39 espécies distribuídas em 17 gêneros ocorrentes na área de estudo.

Palavras-chave: Levantamento florístico, Amazônia, Taxonomia.

ABSTRACT

The Serra dos Carajás is located in the southeastern region of the Pará state, and comprise a group of plant formations with predominantly dense ombrophilous forest and *cangas* areas. This group contains a diversity of native and endemic plant species that need to be studied by the science because of the intense antropic action in the region, which over the course of time has devastated the landscape in the south region of Pará state through deforestation due to the livestock production and the extraction of mineral resources, causing major environmental impacts. Malpighiaceae presents incipient studies when it comes to the Brazilian Amazon, and even less in the Pará state. In this context, this study presents the Malpighiaceae species occurring in Serra dos Carajás, Pará, Brazil, with the purpose of know the diversity of the species in the study area, contributing to the flora of Pará state and the Amazon Biome, in addition to supporting actions for the conservation and preservation of rare or endangered species. Due to the research, were searched by the family exsiccates where are incorporated at the BHCB, CEPEC, HCJS, IAN, INPA MG and RB herbarium, as well as collection expeditions in the study area. This resulted in the confirmation of 39 species distributed in 17 genera occurring in the study area.

Key words: Floristic survey, Amazonian, Taxonomy.

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CONTEXTUALIZAÇÃO

A Serra dos Carajás, situada no interior da Amazônia brasileira e coberta em sua totalidade por vegetação natural (SILVA *et al.* 1996), é banhada pelas bacias dos rios Itacaiúnas e Parauapebas (RIBEIRO *et al.* 1999). Localiza-se no sudeste do estado do Pará, compreendendo partes dos municípios de São Félix do Xingu, Ourilândia do Norte, Curionópolis, Eldorado dos Carajás, Marabá, Parauapebas, Canãa dos Carajás e Água Azul do Norte (SILVA 2006).

A região exibe dois tipos de vegetações distintas, com predominância de formações florestais, que ocupa mais de 95% da área, e vegetação de campos rupestres, também conhecidos como “cangas”, associados às jazidas de ferro, caracterizando-se pela formação herbáceo-arbustiva (Secco & Mesquita 1983, Ab’saber 1986, Mota *et al.* 2015, Viana *et al.* 2016).

Essas vegetações são resguardadas pelas Unidades de Conservação (UCs): Floresta Nacional do Tapirapé-Aquirí, a Reserva Biológica de Tapirapé, Área de Proteção Ambiental do Igarapé Gelado, Floresta Nacional de Carajás, a Reserva Indígena Xikrin do Cateté e Floresta Nacional de Itacaiúnas, formando um bloco contíguo de 1,31 milhões de ha (Rolim *et al.* 2006), e o Parque Nacional dos Campos Ferruginosos, criado recentemente e inclui a serra do tarzam e serra da bocaina (ZAPPI 2017).

Dentre as UCs da região de Carajás, a Floresta Nacional de Carajás (FLONA) apresenta-se como uma das mais importantes do sudeste do Pará, por estar diretamente ligada a empreendimentos de exploração de minérios, principalmente o de ferro (MARTINS *et al.*, 2012).

Carajás apresenta uma amostra do que já foi uma rica vegetação da região sul paraense (MOTA *et al.* 2015), pois ao observar a utilização de terras no contexto histórico da bacia hidrográfica do Rio Itacaiúnas, as áreas florestais adjacentes as UCs representam um terço da cobertura original, devido à conversão de floresta em pastagem (ZAPPI 2017).

Dentre os estudos relacionados à flora local, destacam-se os trabalhos que estão citados em Secco *et al.* (2016) ressaltando a diversidade e importância da vegetação da Serra dos Carajás, incluindo descrições de novos táxons endêmicos para região.

No local de estudo são encontradas diversas famílias, incluindo as Malpighiaceae. Esta família está distribuída em regiões tropicais e subtropicais do Velho e Novo Mundo, com 77 gêneros e cerca de 1.300 espécies (ANDERSON 2004, DAVIS & ANDERSON 2010). Aproximadamente 85% das espécies ocorrem no Novo Mundo e são polinizadas por abelhas

especializadas em coleta de óleo, das quais estão ausentes no Velho Mundo (DAVIS *et al.* 2002).

O Brasil é um dos países que concentra maior número de espécies, com 45 gêneros (três endêmicos) e 572 espécies (345 endêmicas), amplamente distribuídas (BFG 2018).

Malpighiaceae possui espécies com atribuição na economia, destacando-se a acerola (*Malpighia sp.*) e os muricis [*Byrsonima spp.*] (JUDD *et al.* 2009) e ornamental com destaques para algumas lianas, entretanto pouco utilizadas (SOUZA & LORENZI 2012). Algumas espécies dos gêneros *Heteropterys* Kunth, *Banisteriopsis* Rob. ex Small e *Malpighia* L. apresentam potencial farmacêutico para o combate ao câncer e ao Mal de Parkinson (SCHWARZ *et al.* 2003). No âmbito ecológico, *Byrsonima crispera* A. Juss. é alimento para pássaros (LEITE & BARREIROS 2014).

Os trabalhos florísticos e taxonômicos de Malpighiaceae na Região Norte ainda são pouco representativos. Podemos destacar as Malpighiaceae da flora da Reserva Ducke (RIBEIRO *et al.* 1981); estudo taxonômico de Malpighiaceae Juss. nas restingas de Algodual/Maiandea (ALEXANDRINO *et al.* 2011), Malpighiaceae em uma área de savana em Roraima (MANEZES & FLORES 2013) e Malpighiaceae nas cangas da Serra dos Carajás.

Diante desse contexto, este estudo apresenta um tratamento taxonômico das espécies de Malpighiaceae nas formações florestais da Serra dos Carajás, Pará, Brasil, com o âmbito de conhecer a diversidade das espécies na área de estudo, contribuindo para a flora do Pará, do Brasil e do bioma Amazônico.

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**MALPIGHIACEAE NAS FORMAÇÕES FLORESTAIS DA SERRA DOS CARAJÁS,
PARÁ, BRAZIL**

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Malpighiaceae nas Formações Forestis da Serra dos Carajás, Pará, Brazil

Resumo: Esse estudo apresenta o levantamento florístico de espécies de Malpighiaceae ocorrentes nas formações forestis da Serra dos Carajás, Pará, Brazil. Foram identificados 16 gêneros e 30 espécies: *Aenigmatanthera* W.R. Anderson (1 sp.), *Alicia* W.R. Anderson (1 sp.), *Banisteriopsis* C.B. Rob. ex Small (2 spp.), *Bunchosia* Kunth (1 sp.), *Byrsonima* Rich. ex Kunth (6 spp.), *Coleostachys* A. Juss. (1 sp.), *Dicella* Griseb.(2 spp.), *Diplopterys* A. Juss. (1 sp.), *Heteropterys* Kunth (4 sp.), *Hiraea* Jacq. (2 spp.), *Lophanthera* A. Juss. (1 sp.), *Lophopterys* A. Juss. (1 sp.), *Mascagnia* (Bertero ex DC.) Bertero (3 sp.), *Niedenzuella* W.R. Anderson (1 sp.), *Stigmaphyllon* A. Juss. (1 sp.) e *Tetrapteryys* Cav. (2 spp.). Algumas destas e outras espécies são encontradas em ambiente canga, as quais estão apresentadas no projeto “Flora das cangas da Serra dos Carajás”, e por isto, neste trabalho apresentamos também uma lista com todas as espécies ocorrentes na região.

Palavras-chave: Levantamento florístico, Amazon, Taxonomia.

Malpighiaceae in the Forest Formations of Serra dos Carajás, Pará, Brazil

Abstract: This study presents the floristic survey of species of Malpighiaceae occurring in the forest formations of Serra dos Carajás, Pará, Brazil. We identified 16 genera and 30 species: *Aenigmatanthera* W.R. Anderson (1 sp.), *Alicia* W.R. Anderson (1 sp.), *Banisteriopsis* C.B. Rob. ex Small (2 spp.), *Bunchosia* Kunth (1 sp.), *Byrsonima* Rich. ex Kunth (6 spp.), *Coleostachys* A. Juss. (1 sp.), *Dicella* Griseb.(2 spp.), *Diplopterys* A. Juss. (1 sp.), *Heteropterys* Kunth (4 sp.), *Hiraea* Jacq. (2 spp.), *Lophanthera* A. Juss. (1 sp.), *Lophopterys* A. Juss. (1 sp.), *Mascagnia* (Bertero ex DC.) Bertero (3 sp.), *Niedenzuella* W.R. Anderson (1 sp.), *Stigmaphyllon* A. Juss. (1 sp.) and *Tetrapteryys* Cav. (2 spp.). Some of these and other species are found in *canga* vegetation, which are presented in projecto “Flora das cangas da Serra dos Carajás”, and for this reason, we also present a list of all species that occur in the region.

Introduction

Malpighiaceae Juss. comprises 77 genera and nearly 1,300 species distributed in tropical and subtropical regions of Old and New World, being more diverse in South America (Anderson, W. 2004, Davis & Anderson 2010). About 85% of species occur in the New World and are pollinated by oil-collecting bees, which are absent in the Old World (Davis *et al.* 2002, Anderson, W. 2004). Brazil is one of the countries with the highest number of species, 574 (349 endemic) distributed in 45 genera (three endemic) (Flora do Brasil 2020).

Malpighiaceae representatives are trees, shrubs, erects or scandent and liana, characterized by simple and opposite leaves, usually with glands and branched unicellular trichomes (T, V or Y-shape), elaiophores on the abaxial surface of the sepals, five unguiculated petals, gynoeceium 3-carpellate, often with 3 styles and schizocarpic fruits or drupes or nuts (Anderson, W. 1981, Anderson, W. *et al.* 2006).

Despite Amazon's plant richness, the taxonomic and floristic studies of Malpighiaceae in the North region of Brazil are incipient, notably: Malpighiaceae in the Flora da Reserva Duck (Ribeiro *et al.* 1999), Malpighiaceae in the *restingas* of Algodão/Maiandauá (Alexandrino *et al.* 2011), Malpighiaceae in a savannah area of Roraima (Manezes & Floweres 2013) and Malpighiaceae in the *cangas* of Serra dos Carajás (Amorim *et al.* 2018).

Serra dos Carajás, located in the Brazilian Amazon, is a mountainous complex in the southeastern of Pará (Silva *et al.* 1996) and presents two distinct types of vegetation, predominantly forest formations, occupying more than 95% of the area, and vegetation of rupestrian fields also known by *cangas*, characterized by herbaceous-shrub formation (Secco & Mesquita 1983, Ab'saber 1986, Mota *et al.* 2015, Viana *et al.* 2016).

The forest in the Carajás region has been virtually cleared to a large extent, protecting in Conservation Units (UCs) only a sample of what was once a rich vegetation of southeastern Pará that still suffers several environmental pressures (Mota *et al.* 2015, Martins *et al.* 2016) related to livestock activity, exploitation of logging and steelmaking, which have accelerated the process of deforestation and homogenization of the forest landscape adjacent to the UCs, which represent one third of the region's original coverage (Martins *et al.* 2016, Zappi 2017).

Recently, the project "Flora of the "Flora of the *Cangas* of the Serra dos Carajás" was completed, which registered several botanical families, including Malpighiaceae (published by Amorim *et al.* 2018). However, considering that the diversity of species in the region is not

restricted to *canga* vegetation. Given this, the present work aimed to elaborate the taxonomic study of the species Malpighiaceae occurring in the forest formations of Serra dos Carajás, Pará, Brazil, contributing to fully comprehend the diversity of the botanical group in the region.

Material and Methods

1. Study area

The Serra dos Carajás (5°54'-6°33'S e 49°53'-50°34'W) is a mountainous complex located in the southeastern of the state of Pará, comprising parts of the municipalities of São Félix do Xingu, Ourilândia do Norte, Eldorado dos Carajás, Marabá, Parauapebas, Canãa dos Carajás, Água Azul do Norte and Curionópolis (STCP 20016, Silva 2006).

The vegetation is characterized by forest formations ranging from evergreen to seasonal ombrofilous forest and a rich mosaic of predominantly open phytophysionomias, associated with the of ferruginous rocks substrates (Viana et al. 2006).

In the region a mosaic of natural vegetation formed by diferente categories of Conservation Units (UCs) enables the conservation of landscape and biodiversity in the place. This is formed by seven UCs: Floresta Nacional do Tapirapé-Aquirí; Reserva Biológica de Tapirapé; Área de Proteção Ambiental do Igarapé Gelado; Forest Nacional de Carajás; Reserva Indígena Xikrin do Cateté, Floresta Nacional de Itacaiúnas and the recently created Parque Nacional dos Campos Ferruginosos, forming a contiguous block of approximately 12,000 km² (Rolim et al. 2006, STCP 2016, Zappi 2017).

The climate according to the Köppen classification is AWi Tropical rainy with winter drought, anual precipitation ranging from 2,000 to 2,400 mm and average temperature between 25.1° to 26.3°C, with absolute minimum around 15.6°C to 18.3° from July to October, and the maximum between 34.3° to 38.1°, in the outhter months (STCP 2016, Viana et al. 2016).

2. Taxonomy

This work was based on specimens collected in the forest formations of Serra dos Carjás. Botanical materials from occurring *canga* (vegetation associated with ferruginous

rocky substrate) were not included to be taxonomically treated, as they were studied in Amorim et al. (2018).

During the preparation of this study two excursions were conducted (2017 and 2018) and analysis of botanical materials deposited in the herbarium BHCB, CEPEC, HCJS, IAN, INPA, MG and RB (acronyms according to Thiers, 2019). Most of the analyzed specimens come from the Floresta Nacional de Carajás, due to the extensive collection activity previously carried out in the area. Collection, preservation and herborization of specimens followed Fidalgo e Bononi (1984).

The descriptions of the were based on the populations collected in the study area. When necessary, additional botanical materials from regions near to the study area and reference literature were used for the complementary description. Identifications were made based on specialized literature (for example, Anderson, C. 1997, 2001, 2016, Chase 1981, Gates 1982, Anderson, W. 1981, 2006, Anderson & Davis 2001, 2005, Amorim 2003, Carvalho et al. 2010, Pessoa et al. 2014, Almeida et al. 2016, Almeida & Pelegrine 2016, Almeida & Hall 2016, Francener et al. 2016 and Amorim et al. 2018), protologues and images of type specimens. Morphological descriptions followed Anderson, W. (1981) and Harris & Harris (2001).

Results and Discussion

A total of 30 species in 16 genera of Malpighiaceae were recorded for forest formations of Serra dos Carajás. The most diverse genera were: *Byrsonima* Rich. ex Kunth (six spp.), *Heteropterys* Kunth (four spp.) and *Mascagnia* Bertero (three spp.). *Alicia anisopetala* (A. Juss.) W.R. Anderson, *Byrsonima cydoniifolia* A. Juss., *Heteropterys mathewsana* A. Juss., *Heteropterys megaptera* A. Juss., *Hiraea fagifolia* (DC.) A. Juss. and *Mascagnia glabrousta* W.R. Anderson & C.C. Davis are first registered in the state of Pará. *A. macrodisca* and *Heteropterys megaptera*, are new occurrences in phytogeographic dominions Amazon rainforest. In Brazil, *Banisteriopsis schwannioides* (Griseb.) B. Gates, *Coleostachys genipifolia* A. Juss., *Dicella conwayi* Rusby, *Diplopterys lucida* (Rich.) W.R. Anderson & C. Cav Davis, *Heteropterys mathewsana* A. Juss. and *Lophanthera lactescens* Duck are restricted to the Amazon domain.

In the Serra dos Carajás, including the two types of vegetation (*canga* and forest formations), a total of 39 species in 17 genera of Malpighiaceae were recorded (Table 1). Of these species, nine (9) occurs only in *canga* vegetation, twenty five (25) only in foreste

formations and five (5) occurs in both. In the study area, this number corresponds to 37% Malpighiaceae species recorded for Pará.

Table 1: List of species occurring in Serra dos Carajás. F= Forest Formations. C= *Canga*.

Species	Voucher	Herbarium	Vegetation
<i>Aenigmatanthera lasiandra</i> (A. Juss.) W.R. Anderson	Silva, D.F. 983	MG, HCJS	F
<i>Alicia anisopetala</i> (A. Juss.) W.R. Anderson	N.A. Rosa 5260	HCJS, MG	F
<i>Banisteriopsis malifolia</i> var. <i>apressa</i> B. Gates	P.L. Viana 4057	BHCB, IAN, MG	C
<i>Banisteriopsis muricata</i> (Cav.) Cuatrec.	V.S. Silva jr 41	MG	F; C
<i>Banisteriopsis schwannioides</i> (Griseb.) B. Gates	M.C. Amoroso 142	MG	F
<i>Banisteriopsis stellaris</i> (Griseb.) B. Gates	N.F.O Mota 2931	CEPEC, MG	C
<i>Bunchosia apiculata</i> Huber	L.C.B. Lobato 2579	MG	F
<i>Byrsonima arthropoda</i> A. Juss.	C.R. Sperling 6303	MG	F
<i>Byrsonima chrysophylla</i> Kunth	V.S. Silva Jr 13	MG, MG	C
<i>Byrsonima crassifolia</i> (L.) Kunth	D.F. Silva 1	HCJS, MG	F
<i>Byrsonima crispa</i> A. Juss.	V.S. Silva Jr 52	MG	F; C
<i>Byrsonima cydoniifolia</i> A. Juss.	J.P. Silva 520	HCJS, MG	F
<i>Byrsonima spicata</i> (Cav.) DC.	U.N. Maciel 769	MG	F
<i>Byrsonima stipulacea</i> A. Juss.	V.S. Silva Jr 55	MG	F; C
<i>Coleostachys genipifolia</i> A. Juss.	V.S. Silva Jr 59	CEPEC, MG	F; C
<i>Dicella conwayi</i> Rusby	C.R. Sperling 5992	MG	F
<i>Dicella oliveirea</i> M.W. Chase	J.M. Pires 12410	MG	F
<i>Diplopterys lucida</i> (Rich.) W.R. Anderson e C. Davis	V.S. Silva Jr 61	MG	F
<i>Diplopterys pubipetala</i> (A. Juss.) W.R. Anderson e C. Davis	P.L. Viana 5762	MG	C
<i>Heteropterys dumetorum</i> (Griseb.) Nied.	R. Harley 57306	CEPEC, MG	C
<i>Heteropterys macradena</i> (DC.) W.R. Anderson	R.L. Fróes 24343	IAN	F
<i>Heteropterys macrostachya</i> A. Juss.	C.R. Sperling 6372	MG	F
<i>Heteropterys mathewsana</i> A. Juss.	A.S.L. Silva 1987	MG	F
<i>Heteropterys megaptera</i> A. Juss.	V.S. Silva Jr 54	MG	F
<i>Heteropterys nervosa</i> A. Juss.	L.V. Costa 630	BHCB MG	C
<i>Heteropterys trigoniifolia</i> A. Juss.	A.S.L. Silva 1881	MG	C
<i>Hiraea fagifolia</i> (DC.) A. Juss.	C.C. Berg 599	MG	F
<i>Hiraea silvicola</i> C.E. Anderson	C.C. Berg 542	MG	F

Species	Voucher	Herbarium	Vegetation
<i>Lophanthera lactescens</i> Ducke	O.C. Nascimento 1027	MG	F
<i>Lophopterys floweribunda</i> W.R. Anderson & C. Davis	J.P. Silva 53	HCJS, MG	F
<i>Mascagnia cordifolia</i> (A. Juss.) Griseb.,	J.A.A. Bastos 182	HCJS, MG	F
<i>Mascagnia glabrata</i> W.R. Anderson & C. Davis	J.A.A. Bastos 147	HCJS, MG	F
<i>Mascagnia tucuruensis</i> C.E. Anderson	C.R. Sperling 5995	MG	F
<i>Niedenzuella acutifolia</i> (Cav.) W.R. Anderson	V.S. Silva Jr 64	MG	F; C
<i>Peixotoa reticulata</i> Griseb.	L.V.C. Silva 1322	BHCB	C
<i>Stigmaphyllon paraense</i> C.E. Anderson	V.S. Silva jr 37	MG	C
<i>Stigmaphyllon sinuatum</i> (DC.) A. Juss.	O.C. Nascimento 1134	MG	F
<i>Tetrapteryx discolor</i> (G. Mey.) DC.	C.R. Sperling 6117	MG	F
<i>Tetrapteryx mucronata</i> Cav.	C.R. Sperling 6116	MG	F

Malpighiaceae Juss.

Trees, shrubs erect or escandentes and Liana; T, V or Y-shaped trichomes. Leaves simple, opposite or decussate; petioles glandular or eglandular; lamina with margin plane, plane or revolute, entire, abaxial surface glandular or eglandular; stipules epipetiolar or interpetiolar or intrapetiolar, persistent or absent, usually connate or free. Inflorescence of terminal and/or axillary raceme or pseudoraceme or panicle with terminations in umbel; bracts and bracteoles glandular or eglandular; pedicel with peduncle (when articulated and with bracteoles) or sessile. Flowers zigomorfa and bisexual. Sepals 5; lateral sepals (4) usually biglandular or eglandular, rarely 1-glandular (*Lophopterys*); anterior sepal (1) usually eglandular, all eglandular or all biglandular; Petals 5, alvas, pink, lilac or yellow, distinct, unguiculate, alternating with the sepals, posterior petal (1) is usually diferente from lateral petals (4). Androecium bearing 10 estames, sometimes reduced to staminodes; filaments distinct or connate at base; connectives glandular or eglandular; anthers diteca, rimose or rare apical pore (*Coleostachys genipifolia*). Gynoecium 2-3-carpelar, connate; ovary superior, 2-3-locular; styles 2-3, distinct or partially to entirely connate. Fruits durpes or nut or schizocarps (cocci and samaras) usually splitting into 3 winged mericarps.

**Identification key for Malpighiaceae from the forest formations of Serra dos Carajás,
Pará, Brazil**

1. Trees or erects shrubs.
 2. White petals; anthers with apical pore **12. *Coleostachys genipifolia***
 - 2'. Yellow petals; rimose anthers.
 3. Epipetiolar stipules; Ovary with 2 estiletos **5. *Bunchosia apiculata***
 - 3'. Intrapetiolar stipules; Ovary with 3 estiletos.
 4. Pendulum panicle; schizocarp (cocci) splitting 3 mericarps
..... **22. *Lophanthera lactescens***
 - 4'. Erect raceme; fruit drupes.
 5. Leaves abaxial surface velutinous **11. *Byrsonima stipulacea***
 - 5'. Leaves abaxial surfaces tomentose or sericeous to glabrous.
 6. Posterior petal with 2 glands at the apex of the claw or lim base
..... **10. *Byrsonima spicata***
 - 6'. Eglandular posterior petal.
 7. Bracts 4-6 mm long, narrow-triangular to linear, reflexed and
crispa **8. *Byrsonima crispa***
 - 7'. Bracts 2–3.2 mm long, triangular, erect or revolute at the apex.
 8. Sericeous ovary only at the apex, ferruginous leaf trichome.
 9. Leaves abaxial surface tomentose
..... **7. *Byrsonima crassifolia***
 - 9'. Leaves abaxial surface sericeous to glabrescent
..... **6. *Byrsonima arthropoda***
 - 8'. Glabrous ovary; whitish or brown leaf trichome
..... **9. *Byrsonima cydoniifolia***
 - 1'. Lianas or scandent shrubs.
 10. Interpetiolar stipules or absent stipules.
 11. Drupes fruit; sepals becoming long and wide during fruit maturation.
 12. Glabrous anthers **13. *Dicella conwayi***
 - 12'. Pilose Anthers **14. *Dicella oliveirae***
 - 11'. Samaras fruit; Sepals not developing during fruit maturation.
 13. Samaras with developed lateral wings and reduced or absent dorsal wings.

14. Lateral sepals with only one discoide gland.
 **23. *Lophopterys floweribunda***
- 14'. Biglandular or eglandular lateral sepals.
15. X-shaped lateral wings
16. Connate stipules; sepals with sessile glands
 **29. *Tetrapterys dicolor***
- 16'. Free stipules; sepals with stalked auriculate-glands
 **30. *Tetrapterys mucronata***
- 15'. Suborbicular lateral wings.
17. Eglandular petioles **26. *Mascagnia tucuruensis***
- 17'. Biglandular petioles at base.
18. Leaves whit abaxial surface velutinous; V-shaped trichomes
 **24. *Mascagnia cordifolia***
- 18'. Leaves with abaxial surface glabrescent to glabrous; T-shaped trichomes **25. *Mascagnia glabrata***
- 13'. Samaras with developed dorsal wings and reduced or absent lateral wings.
19. Samaras with abaxial margin thicker than adaxial margin.
20. Leaves with abaxial surface densely sericeous
 **17. *Heteropterys macrostachya***
- 20'. Leaves with abaxial surface glabrescente to glabrous.
21. Sessile pedicel **18. *Heteropterys mathewsana***
- 21'. Pedunculate Pedicel.
22. Inflorescence of umbel panicle; posterior styles with rounded apex **19. *Heteropterys megaptera***
- 22'. Inflorescence of raceme panicle; posterior styles with apiculate apex **16. *Heteropterys macradena***
- 19'. Samaras with adaxial margin thicker than abaxial margin.
23. Inflorescence of dichasia umbeliforme; styles with the foliate apex **28. *Stigmaphylon sinuatum***
- 23'. Inflorescence never in dichasia umbeliforme; styles without the foliate apex.
24. Petals with abaxial surface sericeous
 **15. *Diplopterys lucida***
- 24'. Petals with abaxial surface glabrous.

25. Leaves with abaxial surface sericeous
 **3. *Banisteriopsis muricata***
- 25'. Leaves with abaxial surface velutinous
 **4. *Banisteriopsis schwannioides***
- 10'. Epipetiolar stipules.
26. Sepals covering petals in bud.
27. Yellow petals; X-shape lateral wings **27. *Niedenzuella acutifolia***
- 27'. Lilac or pink petals; suborbicular lateral wings suborbicular
 **2. *Alicia anisopetala***
- 26'. Sepals exposing petals in bud.
28. Inflorescence of axillary umbels; conspicuous stipules 1–3.4 mm.
29. Stipules in the middle region of petioles; velutinous petioles
 **21. *Hiraea silvicola***
- 29'. Stipules in the apex of petioles; sericeous petioles ... **20. *Hiraea fagifolia***
- 28'. Inflorescence of panicle; small stipules 0.1–0.3 mm long
 **1. *Aenigmatanthera lasiandra***

1. *Aenigmatanthera lasiandra* (A. Juss.) W.R.Anderson, Novon 16(2): 174, f. 2. 2006. Figure 1A-G

Liana. Leaves chartaceous, opposite, entire; stipules 0.1–0.3 mm long, epipetiolar, persistent; petioles 3–5 mm long, eglandular or biglandular in the median region; lamina 5.5–9.5 × 3–4.8 cm, ovate or elliptic or lanceolate, apex acuminate, base cuneate or rounded, margin plane, bearing 1–3 glands embedded in the margin, adaxial and abaxial surfaces glabrous. Panicle axillary and terminal; bracts 1–2.3 mm long, lanceolate; peduncle 1.5–2 mm long; bracteoles 0.7–1 mm long, ovate to lanceolate, eglandular; pedicel 5–7 mm long. Sepals 1.8–2.5 mm long, exposing petals in buds, abaxial surface sericeous. Stamens 10, connate at the base; filaments 2–2.5 mm long, sericeous; connectives eglandular; anthers densely sericeous. Ovary sericeous; styles 3, 2.2–2.5 mm long, glabrous; stigmas terminal. Samaras butterfly-shaped, chartaceous; lateral wings dominant 5–8 × 7–11 mm long, trapezoidal, margin dentate or lobed; dorsal wing small, 4–7 × 1–2 mm, semicircular; nut with raised ribs present between dorsal and lateral wings.

Specimens examined: Pará, Parauapebas, estrada para o Igarapé Bahia km 38, 6°09'46"S, 50°21'25"W, 5.XII.2007, fr., *D.F. Silva* 983 (HCJS/RB); Marabá, Carajás Serra North,

estrada do N1, 29 km do acampamento, Mata de Terra Firme, Solo com afloramento ferrífero 07.VIII.1982, fr., *U.N. Maciel et al. 782* (INPA).

Material adicional: Pará, Conceição do Araguaia, vegetação de capoeira, 24.IX.2000, fl., *L.C.B. Lobato et al. 2733* (MG).

Aenigmatanthera lasiandra occurs in Bolivia and Brazil (Anderson, W. 2006). In Brazil it is distributed in the North (AM, PA and TO), Midwest (DF, GO, MS and MT) and Northeast regions (MA), associating in the phytogeographic dominions Amazon rainforest and Cerrado (Flora do Brasil 2020). In the Serra dos Carajás the species is found on the forest edges. It was collected with fruit in December.

In the study area it can be recognized by epipetiolar stipules, petioles biglandular in the median region, anthers densely sericeous and samaras burtttefly-shaped.

2. *Alicia anisopetala* (A.Juss.) W.R. Anderson, Novon 16: 176. 2006. Figure 1H-O

Liana. Leaves chartaceous, opposite, entire; stipules 1–2 mm long, epipetiolar; petioles 1.1–1.7 cm long, bearing 6–8 glands in 2 rows; lamina 6.4–11.9 × 4–6.1 cm, ovate to elliptic, apex apiculate, base obtuse, margin plane; adaxial surface glabrous; abaxial surface tomentose, with glands between the midrib and margin. Inflorescence of terminal and axillary panicles; bracts e bracteoles 1.5–2.5 mm long, ovate to lanceolate; peduncle 1–3 mm long; pedicel 3–5 mm long. Sepals 2.5–3 mm long, covering petals in buds, ovate a lanceolate, apex revolute at anthesis, abaxial surface sericeous; lateral sepals biglandular; anterior sepal eglandular. Petals lilac, obovate, fimbriate, abaxial surface sericeous; lateral petals with limb 2.5–3.3 × 2–2.7 mm; posterior petal with limb 4–6 × 2,3–4,8 mm. Stamens 10, connate at the base; filaments 2–2.4 mm long, glabrous; connective eglandular; anthers glabrous. Ovary sericeous; styles 3, 1–2.1 mm long, dorsally rounded or truncate at the apex; stigmas lateral. Samaras suborbicular, sericeous; lateral wings 1.3–2.2 × 1.9–3 cm, connate or not at the base; dorsal wing 0.8–1 × 0.4–0.6 cm.

Specimens examined: Canaã dos Carajás, Aceiro em frente ao viveiro de mudas do Sossego, 06°27'06"S, 50°03'00"W, 30.VI.2010, fr., *L. Tyski 716* (HCJS).

Material adicional: Pará, Tucuruí, estrada para o repartimento, km 25, 05.VI.1980, bot., fl., *M.G. Silva & C. Rosário 5375* (MG).

Alicia anisopetala is a specie of South America (Anderson, W. 2006). In Brazil occurs in the phytogeographic domains of Amazon rainforest, Atlantic Forest and Pantanal (Flora do Brasil 2020). The collection in Serra dos Carajás is a new record for the North region. In the study area the species is found forest margins, collected with fruit in July.

It is recognized by epipetiolar stipules, petioles with 6–8 glands in 2 rows, lamina abaxially tomentose, petals abaxially sericeous and samaras with lateral wings developed, suborbicular, sometimes butterfly-shaped when not connate at the base.

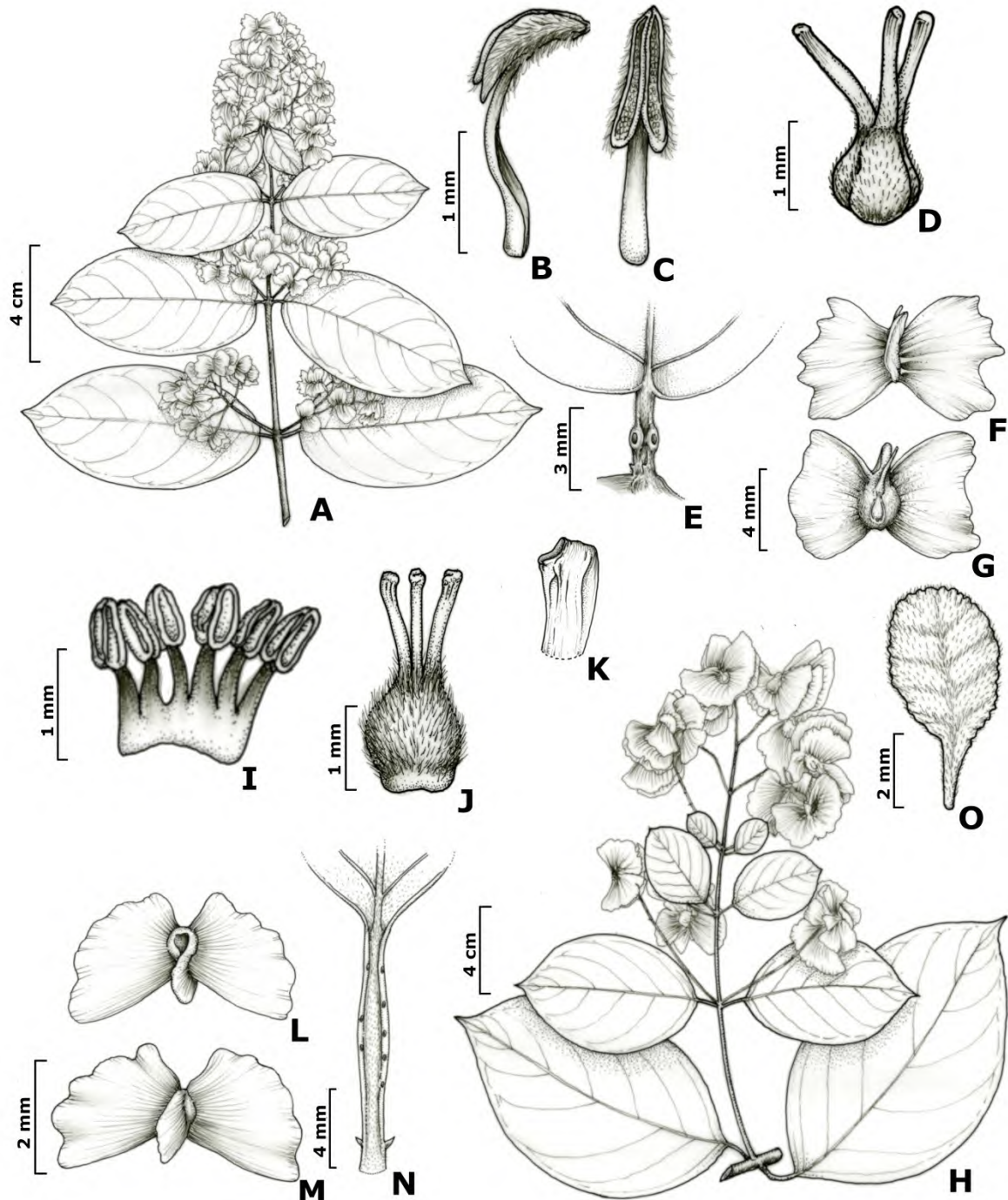


Figure 1. A-G. *Aenigmathanthers lasiandra*. A. flowering branch; B-C. stamens; D. gynoecium; E. petioles with glands and epipetiolar stipules; F-G. fruit. H-O. *Alicia anisopetala*. H. flowering branch; I. stamens; J. gynoecium; K. apex of the style; L-M. fruit; N. petioles bearing epipetiolar stipules and glands; O. posterior petal with basal surface sericeous. A and E-G from D.F. Silva 983; B-D de L.C.B. Lobato 2733; H and L-M from L. Tyski 716; I-K and O from M.G. Silva 5375. Illustration: Carlos Alvarez.

3. *Banisteriopsis muricata* (Cav.) Cuatrec., Webbia 13: 503. 1958. Figure 2A-I

Scandent shrubs. Leaves chartaceous, opposite, entire; stipules ca. 0,5 mm long, interpetiolar; petioles 5–14 mm long, eglandular or with 1–2 glands in the median region or near the apex; lamina 5.5–12.5 × 2.5–6.3 cm, ovate to elliptic, apex acuminate-mucronate, base rounded or cuneate; adaxial surface sericeous to glabrous, margin plane; abaxial surface silver-sericeous, 0–2 glands at base and/or 1–4 glands near or in the secondary veins. Inflorescence of terminal and axillary 4-flowered umbels, silver-sericeous; bracts and bracteoles 0.5–1.5 mm long, ovate to triangular, eglandular; peduncle 2–3 mm long; pedicel 3–9 mm long. Sepals 2–2.2 mm long, exposing petals in buds, ovate or triangular, apex acute, adaxial and abaxial surfaces sericeous, all sepals eglandular or the 4 lateral sepals biglandular and anterior sepal eglandular. Petals pink, abaxial surface glabrous; lateral petals with limb 3–6 × 2.8–6 mm, cupuliforme, margin erosa a fimbriada; posterior petal with limb 5–6 × 4–4.5 mm, obovate, margin fimbriada and with small glands in the base. Stamens 10, connate at the base; filaments 1–3 mm long, glabrous; anthers glabrous; connectives glandular, exceeding the locules by up 1.2 mm long. Ovary sericeous; styles 3, 2–4 mm long; stigmas apical, capitate. Samaras sericeous; dorsal wing 2.2–3.1 × 1–1.5 cm long, adaxial margin thicker than abaxial margin; nut muricate.

Specimens examined: Parauapebas, próximo a antiga PROMON, floresta de terra firme, 22.IV.1987, bo., fl., *C.M. Araújo* 73 (HCJS/RB); Serra dos Carajás, Parque Zoobotânico Vale (PZV), margin da mata, 18.VII.2011, bo., fl., *D.F. Silva* 794(HCJS).

Material adicional: Canaã dos Carajás, Serra da Bocaína, área de canga, 06°17'58''S, 49°54'22''W, 27.VI.2017, fr., *V.S. Silva Jr et al.* 41 (MG).

Banisteriopsis muricata it's the species most widespread in the genus, occurring from Mexico to Argentina (Anderson, W. 2004; Gates 1982). In Brazil it is widely distributed, associating in the phytogeographic dominions Amazon rainforest, Cerrado, Caatinga and Atlantic Forest (Flora do Brasil 2020). In the Serra dos Carajás the species is found on *campo rupestre* and forest edges. It was collected with flowers and fruit in April and July.

The species it can be recognized by leaves with abaxial surface densely silver-sericeous and samaras with a muricate nut. It differ from *B. schwannioides* by leaves with abaxial surface sericeous vs. velutinous.

4. *Banisteriopsis schwannioides* (Griseb.) B.Gates, Fl. Neotrop., Monogr. 30: 114. 1982. Figure 2J-M

Liana. Leaves chartaceous, opposite, entire; stipules ca. 3 mm long, interpetiolar; petioles 0.8–1.2 cm long, biglandular at the apex, velutinous; lamina 11–11.6 × 5.3–6.3 cm, ovate to elliptic, apex acuminate, base obtuse to truncate, margin revolute; adaxial surface tomentose to glabrous; abaxial surface with 6 or more glands, velutinous. Inflorescence of terminal and axillary 4–6-flowered umbels; bracts and bracteoles 1.8–3 mm long, lanceolate; pedicels 10–13 mm long, sessile. Sepals 4–6 × 3–4 mm, exposing petals in buds, ovate to triangular, apex acute, adaxial and abaxial surfaces tomentose. Petals pink, dentate, glabrous; lateral petals with limb 7–8 × 4–6 mm; posterior petal with limb 5–6 × 3–5 mm. Stamens 10, connate at the base; filaments 2–4 mm long, glabrous; connectives of the anterior stamens glandular and very enlarged, exceeding the locules, anthers glabrous. Ovary sericeous; styles 3, 2–3.5 mm long, anterior style greater in length and width than the posterior styles; stigmas apical, capitate.

Specimens examined: Pará, Carajás, Serra Norte, beira da estrada para o rio Itacaiúnas, 06.VIII.1985, bo., fl., *M.C. Amoroso 142* (MG).

Banisteriopsis schwannioides is endemic to Brazil and restricted to the states of Amapá and Pará in the phytogeographic dominion Amazon rainforest (Flora do Brasil 2020). In the study area a single specimen was found in the edge of forest. It was collected with flower in August.

In the study area it can be recognized by leaves with abaxial surface velutinous and anterior style greater in length and width than the posterior styles.

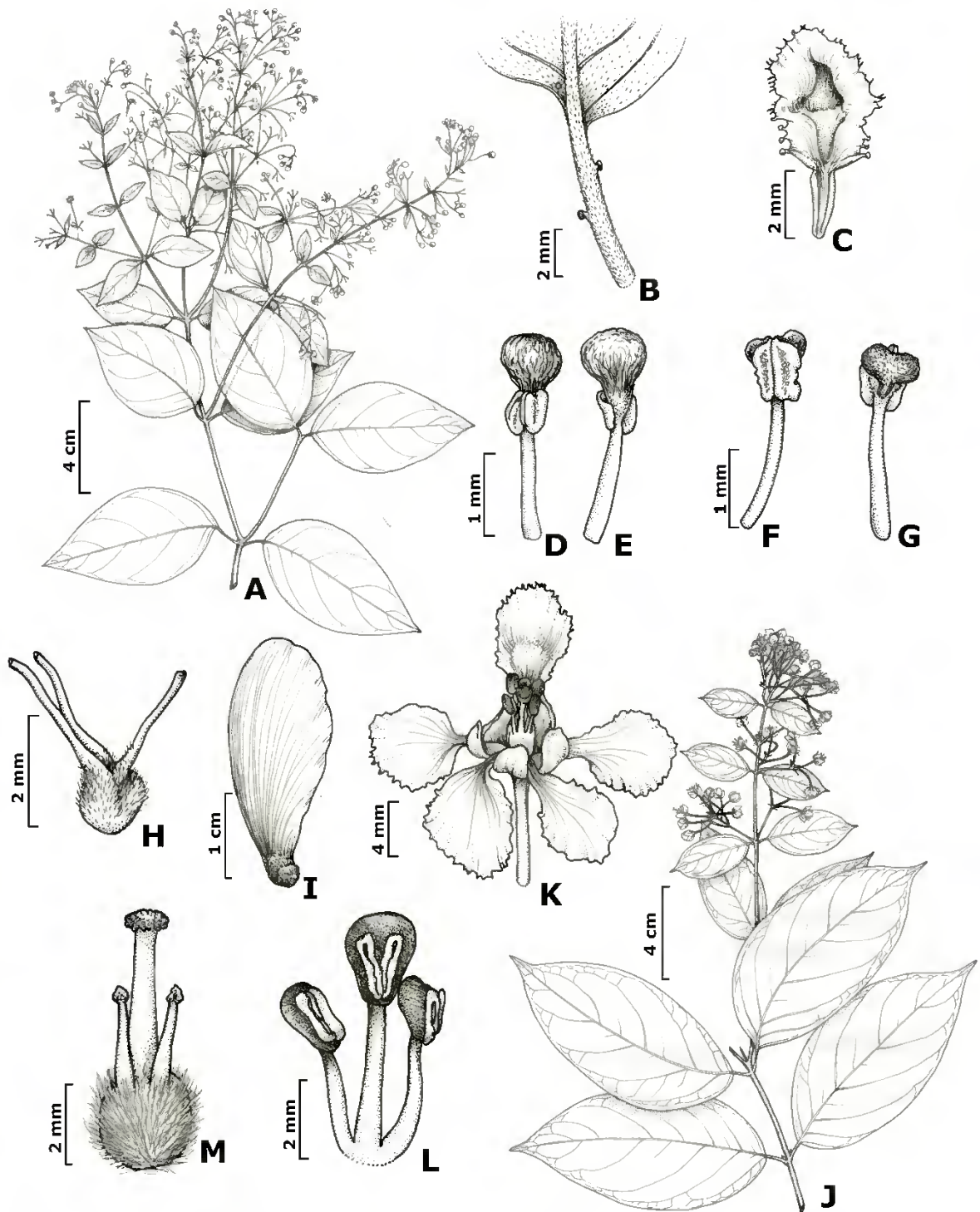


Figure 2. A-I. *Banisteriopsis muricata*. A. flowering branch; B. petioles and abaxial surface for the leaves bearing glands; C. posterior petals with small glands at margin; D-E. anterior stamens with glandular connectives; F-G. posterior stamens; H. gynoecium; I. samara with developed dorsal wing. J-M. *Banisteriopsis schwannioides*. J. flowering branch; K. flower; L. anterior stamens with glandular connectives; M. gynoecium. A-H from C.M Araújo73; I from V.S. Silva Jr 41; J-M from M.C. Amoroso142. Illustration: Carlos Alvarez.

5. *Bunchosia apiculata* Huber, Bull. Herb. Boissier, sér. 2 1: 308. 1901. Figure 3A-D

Shrubs 1–3 m tall. Leaves chartaceous, opposite, entire; stipules 2–2.5 mm long, epipetiolar; petioles 0.5–1.1 cm long, sericeous, eglandular; lamina 8–12 × 3.4–4.5 cm, ovate to elliptic, apex acute-apiculate, base acute to cuneate, margin plane; adaxial surface glabrous; abaxial surface glabrescent, with a pair of glands at the base. Inflorescence of axillary pseudoracemes, erect; bracts and bracteoles 1.7–2 mm long, triangular, margin ciliate; bracteoles 1-glandular; pedicel 5–6 mm long. Sepals 1.7–2.8 mm long, covering petals in buds, apex rounded, margin ciliate; lateral sepals biglandular and anterior sepal eglandular or all biglandular. Petals yellow, fimbriate, glabrous; lateral petals with limb 3–5 × 3–4.7 mm; posterior petal with limb ca. 3.4 × 2.4. Stamens 10, connate at base; filaments 2.8–3 mm long, glabrous; anthers glabrous. Ovary glabrous; 2-styles 1.8–2.3 mm long, glabrous; stigmas terminal. Drupes reddish when mature, 6–10 × 8–10 mm, ovoid.

Specimens examined: Canaã dos Carajás, Serra do Tarzan, 15.X.2008, bot., *L.V Costa et al.* 666 (BHCB).

Material adicional: Pará, município de Nova-Canaã dos Carajás, mata fechada, 27.XII.2000, fr., *L.C.B Lobato et al.* 2579 (MG).

Bunchosia apiculata occurs in Suriname, French Guyana and Brazil (AM, PA, MA and CE), inhabiting in the restinga forests, semi-deciduous and ombrophilous forests on the phytogeographic dominions Amazon rainforest, Caatinga and Atlantic Forest (Almeida & Pellegrini 2016, Mamede et al. 2017). In the Serra dos Carajás the species is found inside and next to the edges of the forest. It was collected with flower in October and fruit in December.

The species it can be recognized by epipetiolar stipules, leaves with abaxial surface containing a pair of glands on the base and ovary with 2-styles.

6. *Byrsonima arthropoda* A. Juss., Ann. Sci. Nat., Bot., sér. 2 13: 335. 1840.

Trees ca. 3 m tall. Leaves chartaceous, decussate, entire; stipules 2–3 mm long, intrapetiolar; petioles 8–12 mm long, glabrous, eglandular; lamina 6.4–13.3 × 2.5–5.8 cm, obovate, apex acuminate, base attenuate, eglandular, margin plane; abaxial and adaxial surfaces sericeous to glabrescents, ferruginous. Inflorescence of terminal pseudoracemes, erect; bracts 1.5–2 mm long, narrow-triangular to linear, apex revolute; peduncle 0.5–1 mm long, tomentose; bracteoles 1–1.5 mm long, ovate to triangular; pedicel 6–8 mm long. Sepals 1–1.5 mm long beyond the glands, exposing petals in buds, triangular, apex rounded, all biglandular, margin ciliate, abaxial surface adpresso tomentose. Petals yellow, glabrous, eglandular; lateral petals with limb 3.2–5.5 × 2.7–4.9 mm, reflexed, cupuliform, margin erose;

posterior petal with limb 3.9–5 × 3.4–4 mm, sagittate, eglandular. Stamens 10, connate at the base; filaments 2–2.2 mm long, hirsute at base; anthers pilose on the locules; connectives equalling or exceeding the locules (up to 0.3 mm long). Ovary sericeous at the apex; styles 3, 3.3–4.2 cm long, subulate, sericeous at base; stigmas apical.

Specimens examined: Serra dos Carajás, control point at entrance to Serra North, ca. 39 km, east of AMZA camp N5, forest on low ground along river, 6°04'00"S, 49°55'00"W, tall. 150 m, 23.VII.1982, bot., fl., fr. *C.R. Sperling et al. 6303* (MG); Parauapebas, ponte sobre o Rio Verde, mata ciliar, estrada para Canaã dos Carajás, 30.VI.2010, bo., fl., *L. Tyski 703* (HCJS).

Byrsonima arthropoda is distributed in Bolivia, Brazil, Colombia, Costa Rica, Ecuador, Guyana, Panama, Peru, Suriname and Venezuela (Anderson, W. 2007, Funk 2007, Monro 2017). In Brazil, occurs in the ciliar forest and *varzea* on the North (AC, AM, PA) and Midwest (MS, MT), associating in the phytogeographic dominions Amazon rainforest and Cerrado (Flora do Brasil 2020). In the Serra dos Carajás is found on forests along the river and forest margin. It was collected with flower and fruit in June and July.

Byrsonima arthropoda is close to *B. crispa*, however, the bracts in the first are short and revolute on the apex, while the second is long, reflexed and *crispa*.

7. *Byrsonima crassifolia* (L.) Kunth, Nov. Gen. Sp. (4 ed.) 5: 149. 1821 [1822].

Trees ca. 5 m tall; branches tomentose. Leaves coriaceous, decussate, entire; stipules 2.2–3 mm long, intrapetiolar; petioles 0.8–1.2 cm long, tomentose, eglandular; lamina 6.9–10.4 × 2.9–5.9 cm, elliptic, apex abruptly acuminate, base attenuate, margin plane, eglandular; adaxial surface glabrous; abaxial surface densely ferruginous-tomentose. Inflorescence of terminal pseudoracemes, erect, tomentose; bracts 2–3 mm long, triangular; peduncle 1–2 mm long; bracteoles 1–1.7 mm, triangular; pedicel 6–11 mm long. Sepals 1.5–2 mm long beyond the glands, exposing petals in buds, ovate, apex rounded, tomentose abaxially, all biglandular. Petals yellow, glabrous, eglandular; lateral petals with limb 5–6 × 5.9–7.8 mm, reflexed, cupuliforme; posterior petal with limb 3.5–5 × 4–5 mm, sagittate. Stamens 10, connate at the base; filaments 1.8–2.3 mm long, hirsute at base; connective not exceeding the locules; anthers pilose on the locules. Ovary tomentose at the apex; styles 3, 3.2–3.8 mm long, subulate, glabrous; stigmas apical.

Specimens examined: Parauapebas, PZC, 23.VII.2007, fl., *D.F. Silva 1* (HCJS).

The species occurs in Belize, Bolivia, Brazil, Caribe, Colombia, El Salvador, Guyanas, Guatemala, Honduras and Mexico (Anderson, W. 2007, Berendsohn 2012, Jorgensen & Beck 2014, Ríos 2016). In Brazil is widely distributed, occurring in various vegetation (Flora do

Brasil 2020). In the study area was found in secondary forest. It was collected with flower in July.

Byrsonima crassifolia it is recognized by leaves coriaceous with abaxial surface densely ferruginous-tomentose.

8. *Byrsonima crispera* A.Juss., Ann. Sci. Nat., Bot., sér. 2. 13: 335. 1840. Figure 3E-K

Trees 6–25 m tall; branches sericeous. Leaves subcoriaceous, decussate, entire; stipules 2.5–4 mm long, intrapetiolar; petioles 1.3–3 cm long, sericeous to glabrescent, eglandular; lamina 11.2–19.3 × 5–8.3 cm, elliptic, apex acuminate, base attenuate, margin plane, eglandular; adaxial surface glabrous; abaxial surface sericeous to glabrous. Inflorescence of terminal pseudoracemes, erect, sericeous; bracts 4–6 mm long, subulate to linear, reflexed and helically revolute (cirspa); bracteoles 1–1.5 mm long, triangular; pedicel 8–11 mm long, sericeous to tomentose. Sepals 1.3–2 mm long beyond the glands, leaving petals expused in buds, all biglandular, triangular, apex revolute, abaxial and adaxial surfaces sericeous. Petals yellow, margin erose, glabrous, eglandular; lateral petals with limb 3–5 × 5–7 mm, reflexed, cupuliforme; a anterior with lamina 4–5 × 3–4 mm, triangular, base sagittate. Stamens 10, basally connate; filaments 1–1.5 mm long, hirsute at base; connectives equalling or exceeding the locules ca. 0.5 mm long, apex rounded; anthers sericeous between locules. Ovary densely sericeous; styles 3, 3–4 cm long, linear, subulate; stigmas terminal. Drupes ca. 6 × 7 mm, globose.

Specimens examined: Parauapebas, Serra dos Carajás, 23.XI.2007, fr., D.F. Silva 187 (HCJS); Parauapebas, FLONA de Carajás, floresta ombrófila densa, 6°06'09"S, 50°95'81"W, 01.VI.2008, bo., C.V. Vidal 677 (BHCB/HCJS); Parauapebas, floresta do Núcleo Urbano, 23.II.1987, bo., C.M. Araújo 017 (HCJS); Serra dos Carajás, estrada para o aeroporto, 29.I.1985, fl, fr, O.C. Nascimento & R.P. Bahia 1051 (MG); Marabá, Serra dos Carajás, 6 km da estrada para o 13, 01.IV.1977, fl., fr., M.G. Silva & R. Bahia 2981 (MG); Canaã dos Carajás, mata baixa S11-D, 6°23'46"S, 50°16'39"W, 17.III.2009, fr., P.L. Viana et al. 4106 (BHCB), Serras dos Carajás, estrada para serraria, 5.IV.1977, bo., fl., M.G. Silva & R.P. Bahia 3039 (MG); Serra dos Carajás, Igarapé Bahia, 04.XI.2017, fl., V.S. Silva Jr et al. 52 (MG).

Byrsonima crispera is a species dispersion in Costa Rica, Panama, Colombia, Peru and Amazon Brasileira (Anderson, W. 2001). In Brazil occurs in the North (except AP), Northeast (AL, BH, MA and PE) Midwest (MT) and Southeastern regions (ES, MG, RJ), associating in the phytogeographic dominions of Amazon rainforest and Atlantic Forest (Flora do Brasil

2020). In the Serra dos Carajás, *Byrsonima crispera* was collected on the edges and adding the forest formations. It was found with flower in January, February, April, July and November and with fruit in January, March and May.

The species is recognized in the study area by being a trees with erects raceme, yellow flowers, and linear and *crispera* bracts.

9. *Byrsonima cydoniifolia* A.Juss., Fl. Bras. Merid. (quarto ed.) 3(22): 77. 1832[1833].

Shrubs ca. 5 m tal. Leaves chartaceous, decussate; stipules 2.5–3 mm long, intrapetiolar; petioles 1–1.3 cm long, tomentose, eglandular; lamina 7.2–9.7 × 2.5–4.2 cm, obovate, apex rounded, base acute to cuneate, eglandular; adaxial surface tomentose to glabrescent; abaxial surface densely tomentose, whitish or brown trichomes. Inflorescence of terminal pseudoracemes, erect, tomentose; bracts and bracteoles 2–6 mm long, narrow-triangular to linear, abaxial surface tomentose; pedicel 10–13 mm long, tomentose. Sepals 1.4–3.5 mm long beyond the glands, exposing petals in buds, ovate, apex revolute, tomentose abaxially, all biglandular. Stamens 10, basally connate; filaments hirsute at base; anthers pilose at the locules. Ovary glabrous. Drupes imature 5–8 mm diameter, globose or ovoid.

Specimens examined: Parauapebas, Serra dos Carajás, Sítio do Chagas, Forest de Terra Firme, 14.VIII.1989, fl., *J.P. Silva 520* (HCJS).

Byrsonima cydoniifolia occurs in the Bolivia pantines (Jorgensen & Beck 2014) and *campo rupestre*, cerrado and *restinga* of Brazil, distributing in the North (TO), Midwest, Northeast (except CE) and Southeastern regions (MG and SP) (Flora do Brasil 2020). In Serra dos Carajás, it was found in the forest. The specimen is the first record in the state of Pará and in the phytogeographic dominions Amazon rainforest. It was collected with flower in August.

It can be recognized by obovate discolor leaves with abaxial surface densely whitish or brown-tomentose.

10. *Byrsonima spicata* (Cav.) DC., Prodr. Syst. Nat. Reg. Veget. 1: 580. 1824. Figure 2L-M

Trees 10–18 m tall. Leaves chartaceous, opposite, entire; stipules 2.5–3 mm long, intrapetiolar, triangular, sericeous abaxially; petioles 4–11 mm long, sericeous, eglandular; lamina 5.2–10.1 × 2.4–4.2 cm, elliptic to obovate, apex acuminate, base attenuate, margin plane; adaxial surface glabrous; abaxial surface sericeous to glabrescent. Inflorescence of terminal pseudoracemes, erect; bracts and bracteoles 0.7–1.8 mm long, ovate to triangular; bracts revolute; peduncle 0.5–1 mm long, sericeous; pedicel 6–9 mm long, recurvado. Sepals 1–1.5 mm long beyond the glands, triangular, all biglandular, abaxial and adaxial surfaces

sericeous. Petals yellow, glabrous; lateral petals with limb $3.2\text{--}5 \times 3.8\text{--}6$ mm; reflexed, cupuliforme, margin erosa; posterior petal with limb $2.7\text{--}3 \times 2.2\text{--}3.3$ mm, sagittate, 2 glands at apex of claw or on base of limb. Stamens 10; filaments 1–1.8 mm long, hirsute at base; connectives equalling or exceeding the locules up to 2 mm long; anthers sericeous between the locules. Ovary sericeous near the apex; styles 3, 3–3.3 mm long, linear, subulate, glabrous; stigmas apical.

Specimens examined: Marabá, Carajás, Serra North, estrada Pa-275, 10 km do acampamento, mata de terra firme, solo argiloso, 07.VIII.1982, bo., fl., *U.N. Maciel et al.* 769 (MG). Serra dos Carajás, km 6 da estrada para o 13, 01.IV.1977, fl., M.G. Silva & R. Bahia 2982 (MG); Serra dos Carajás, 20-25 km NW of Serra North mining camp. Approx. $5^{\circ}55'S$, $50^{\circ}26'W$, Semi-deciduous forest and scrub, 06.XII.1981, fl., D.C. Daly 1781 (MG); Serra dos Carajás, N1, estrada do manganês, 19.I.1985, fr., O.C. Nascimento & R.P. Bahia 921 (MG).

Byrsonima spicata occurs in West Indies and northern South America (Anderson, W. 1981). In Brazil, it is widely distributed in the North region, states of Mato Grosso and Maranhão in the phytogeographic dominions of Amazon rainforest and Cerrado (Flora do Brasil 2020). In the study area, the species is found in forest edge. Collected with flowers in April, August and December and fruits in January.

In the Serra dos Carajás can be differentiated from all congeners by posterior petal bearing 2 glands at apex of claw or on base of limb.

11. *Byrsonima stipulacea* A. Juss., Ann. Sci. Nat., Bot., sér. 2 13: 332. 1840. Figure 3O-U

Trees 6–20 m tall. ramo densely hirsuto. Leaves coriaceous, decussate, entire; stipules 7–12 mm long, intrapetiolar; petioles 0.9–2.4 cm long, velutinous, eglandular; lamina $13.1\text{--}19.2 \times 6.5\text{--}9.1$ cm, elliptic to obovate, apex acuminate, base acute to cuneate, margin revolute; adaxial surface velutinous to glabrescent, rugose; abaxial surface persistently velutinous, stalked stellate trichomes, the midrib and lateral veins prominent. Inflorescence of terminal pseudoracemes, erect, velutinous; bracts and bracteoles 2–8 mm, triangular; pedicel 0.8–1.6 cm long, subsessile. Sepals 3–6 \times 2.2–4 mm, exposing petals in buds, apex revolute, all eglandular or all biglandular, velutinous on both sides. Petals yellow, margin erose, glabrous; lateral petals with limb $4.5\text{--}7 \times 8\text{--}10$ mm, cupuliform; posterior petal with limb 5×6 mm, patente, sagittate. Stamens 10, basally connate; filaments 1.7–2 mm long, adaxially hirsuto at the base; glandular connective exceeding the locules by 0.5–1.3 mm long, rounded or obtuse at the apex; anthers sericeous on the locules. Ovary velutinous; styles 3, 3–5 mm long, subulate; stigmas terminal. Drupes 0.9–1.2 cm diameter, globose.

Specimens examined: Parauapebas, FLONA de Carajás, forest, 6°06'44"S, 50°96'07"W, 01.VI.2008, fr., *C.V. Vidal* 678 (BHCB/HCJS); Parauapebas, estrada Raimundo Mascarenhas, prox. ao Aeroporto, 22.XII.1988, bo., fl., *J.P. Silva* 237 (HCJS); Serra dos Carajás, estrada para Serra Sul, 6°08'41"S, 50°18'47"W, 22.III.2016, fr, *R.M. Harley et al.* 57420 (MG); Serra dos Carajás, estrada para N1, floresta de terra firme, 15.X.1997, bo, *A.S. Silva et al.* 9 (MG); Parauapebas, trilha aguas clara (Peito de Aço), forest, 06°10'04"S, 50°21'02"W, 06.XII.2017, fl., *V.S. Silva Jr.* 56 (MG).

The species occurs in Guyanas, Bolivia, Venezuela and Brazil (Anderson, W. 2001). In Brazil it is distributed in the North (except AC and TO), Northeast (AL, BA, MA and PE) and Southeastern regions (ES, MG and RJ) in the Amazon rainforest and Atlantic Forest (Flora do Brasil 2020). In the Serra dos Carajás, *Byrsonima stipulacea* is found on forest margin. It was collected with floweres in October, November and December and fruit in July.

In the study area it is distinguished from its congeners by stalked stellate trichomes, large stipules 7–12 mm long and glandular connectives glandular connective exceeding the locules by 0.5–1.3 mm long.

12. *Coleostachys genipifolia* A. Juss., Ann. Sci. Nat., Bot., sér. 2 13: 329. 1840. Figure 3V-Z

Shrubs 1–1,5 m tall. Leaves subcoriaceous, decussate; stipules 1.9–2.2 × 0.7–1 cm, intrapetiolar; petioles 1–3 cm long, sericeous, eglandular; lamina 27–38.9 × 6.9–9.5 cm, oblanceolada, apex acuminate, base acute to attenuate, margin plane; adaxial surface glabrous; abaxial surface sericeous. Inflorescence of terminal or axillary spikes, erect; bracts 3.5–5 mm long, triangular to lanceolate; bracteoles 2.5–3 × 1.5–2 mm long, ovate to triangular, apex acute. Sepals 3–5.5 × 2–2.5 mm, exposing petals in buds, ovate, margin ciliate; all eglandular; adaxial surface glabrous; abaxial sericeous. Petals white, abaxially sericeous; lateral petals with limb 5–8 × 7–9.5 mm, cupuliforme, margin erose; posterior petal with limb 9–10.5 × 11–12.2 mm, suborbicular. Stamens 10, distinct at base; filaments 3.1–4.3 mm long, hirsute at base; anthers 5–6 mm long, yellow, lanceolate, apical pore, glabrous. Ovary hirsute; styles 3, 9–11 mm long, subulado, glabrous; stigmas apical. Drupes 9–10 × 9.8–10.2 mm, ovoide to globose.

Specimens examined: Parauapebas, Serras dos Carajás, forest da N1, 19.XII.1989, fr., *N.A. Rosa & J.P. Silva* 637 (HCJS); Pará, Parauapebas, N1, Forest Ombrófila, 6°02'08"S, 50°16'26"W, 11.III.2009, bo, fl, *V.T. Giovani et al* 82 (BHCB/MG). Parauapebas, Trilha será que volta, forest, 07.XII.2017, fl., fr., *V.S. Silva Jr* 59 (CEPLAC/MG).

Coleostachys genipifolia occurs in the understory of *terra firme* forest of Amazon Oriental in Brazil and French Guyana (Almeida & Hall 2016). In Brazil is restricted to the state of Pará and Amapá (Flora do Brasil 2020). In the Serra dos Carajás the species is found on the understory and area of *canga*. It was collected with flower in March and November and fruit in November and December.

It can be recognized by being a shrubs with leaves oblanceolate, inflorescence of terminal and axillary spikes, white petals and yellow anthers with apical pore.

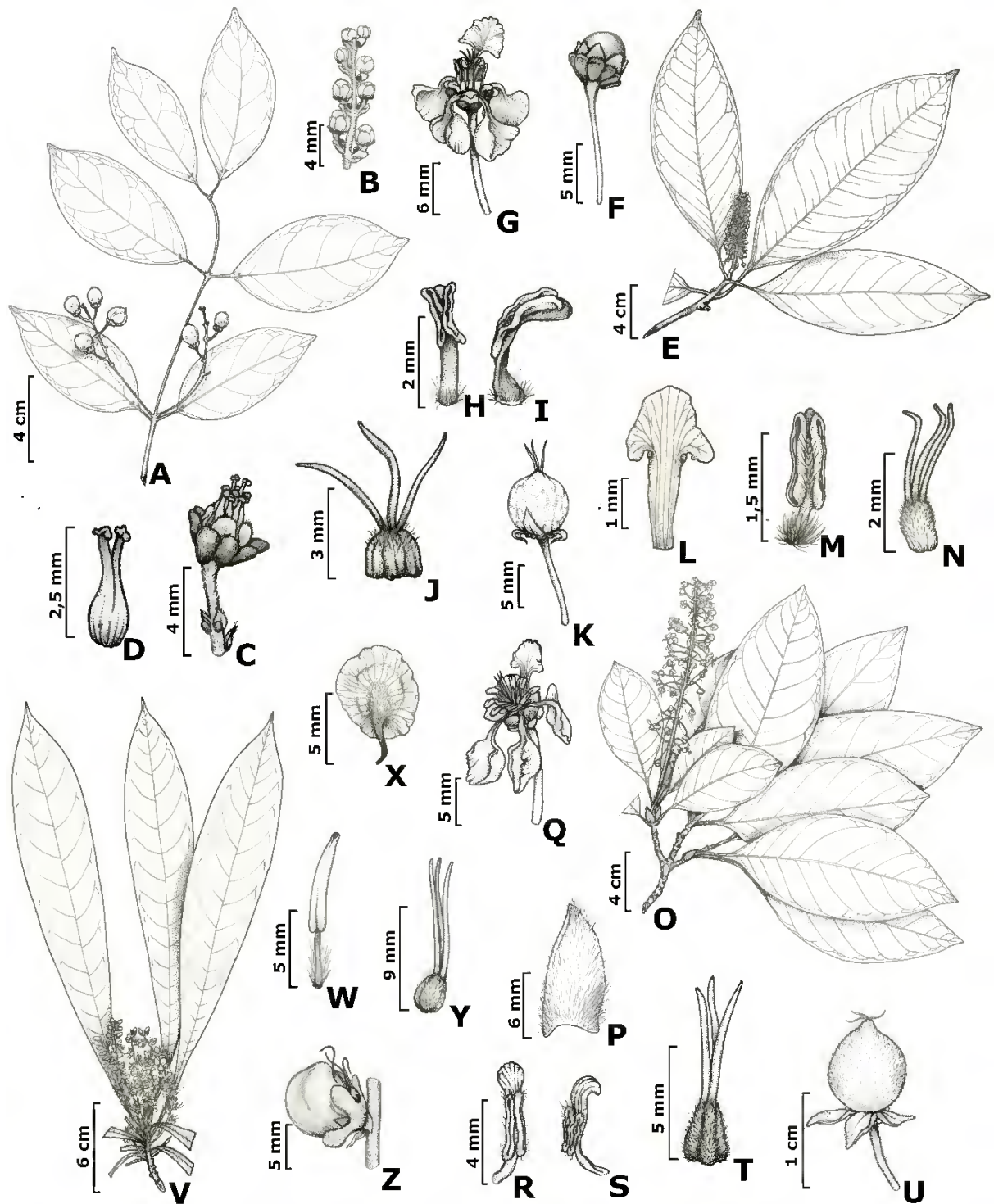


Figure 3. A-D. *Bunchosia apiculata*. A. flowering branch; B. inflorescence; C. flower (absent petals); D. gynoecium. E-K. *Byrsonima crispa*. E. flowering branch; F. floral bud; G. flower; H-I. stamens; J. gynoecium; K. fruit. L-N. *B. spicata*. L. posterior petal with glands in the apex of the claw; M. stamens; N. gynoecium. O-U. *B. stipulacea*. O. flowering branch; P. stipules; Q. flower; R-S. stamens with glandular connectives; T. gynoecium; U. fruit. V-Z. *Coleostachys genipifolia*. V. flowering branch; X. abaxial surface of the posterior petal; W. stamens; Y. gynoecium; Z. fruit. A from L.C.B. Lobato 2579; B-D from L.V. Costa; E-J from V.S. Silva Jr 52; K from P.L. Viana 4106; L-N from U.N. Maciel 769; O-T from V.S. Silva jr 56; U from R.M. Harley 57420; V-Z from V.S. Silva Jr 59. Illustration: Carlos Alvarez.

13. *Dicella conwayi* Rusby, Bull. of the New York Bot. Gard. 8(28): 98. 1912. Figure 6A-C

Liana. Leaves chartaceous, opposite, entire; stipules ca. 0.5 mm, interpetiolar; petioles 0.8–1.1 cm long, densely sericeous, eglandular; lamina 5.8–14.1 × 2.6–6.1 cm, ovate to elliptic, apex acute to acuminate, base acute to cuneate, margin plane; adaxial surface glabrous; abaxial surface sericeous to glabrous, 4–8 glands at the margin. Inflorescence of terminal or axillary panicle; bracts and bracteoles 3.7–5.7 × 2.2–4 mm, obovate, abaxially sericeous; peduncle 2.5–3 mm long; pedicel 4–5 mm long, sericeous. Sepals 2.5–3 mm, exposing petals in buds, ovate, abaxially sericeous, becoming long and broad along with maturation of the fruit; lateral sepals biglandular and anterior sepal eglandular. Petals yellow, abaxially sericeous, margin denticulate to erose; lateral petals with limb 4.2–7 × 3.8–4.8 mm, obovate; posterior petal with limb 2.6–3 × 2.2–4 mm, apex truncate. Stamens 10, connate at the base; filaments 2.1–3 mm long, abaxially pilose at base; connectives glandular, exceeding the locules; anthers glabrous. Ovary sericeous; 3-styles 2–2.3 mm long, canaliculate, glabrous, the anterior reduced; stigmas lateral. Drupes 8–12 mm diameter, ovoid.

Material selecionado: Serra dos Carajás, AMZA camp 3-Alfa, encosta íngreme de floresta, 5°48'S, 50°33'W, 475 m tall., 08.VI.1982, bo., fl., *C.R. Sperling et al.* 5992(MG); Marabá, Serra dos Carajás, margin da estrada para Rio Itacaiúnas, 21.VIII.1984, fr., *N.A. Rosa et al.* 4643 (MG).

Dicella conwayi occurs in Bolivia and Brazil (Chase 1981). In Brazil the species is distributed in the North (AM, PA and RO) and Midwest regions (MT) and is restricted to the phytogeographic dominions Amazon rainforest (Flora do Brasil 2020). In the study area, the species is found on edges of forests formations. It was collected with flower em July e with fruit em August.

It can be recognized by sepals becoming long and wide along with the maturation of the fruit and glabrous anthers.

14. *Dicella oliveirae* M.W. Chase, Syst. Bot. 6(2): 171, 1981. Figure 4D-F

Liana. Leaves chartaceous, opposite, entire; stipules small, interpetiolar; petioles 1.3–2.1 cm long, sericeous, eglandular; lamina 12.4–14.1 × 4.9–6.2 cm, ovate, apex acuminate, base rounded; adaxial and abaxial surfaces sericeous when young, glabrous in maturity; abaxially sericeous to glabrescent on the midrib. Inflorescence of axillary panicle, sericeous; bracts foliosas 1.3–3.3 × 0.7–1.9 cm, abaxially with 4-16 glands on the margin; bracts and bracteoles 3–7 mm long, obovate, abaxially sericeous; peduncle 3–7 mm long, sericeous;

pedicel 7–10 mm long. Sepals $2.5\text{--}3 \times 1\text{--}2$ mm, abaxially sericeous; lateral sepals biglandular; anterior sepal eglandular. Petals yellow, abaxially sericeous; lateral petals with limb $5\text{--}6 \times 3.1\text{--}4$ mm; posterior petal with limb $4\text{--}5 \times 2.8\text{--}3$ mm, obovate, margin fimbriate. Stamens 10, connate at the base, filaments $1.8\text{--}2.8$ mm long, abaxially sericeous; connectives glandular, exceeding the locules, apex apiculate; anthers pilose. Ovary sericeous; 3-styles $1.3\text{--}2.6$ mm long, canaliculate, sericeous at base, the anterior reduced; stigmas lateral.

Specimens examined: Rio Itacaiúnas, Serra Buritirama (B5), região com minério de manganês, $5^{\circ}30'00''\text{S}$, $5015'00''\text{W}$, IX.1970, fl., *J.M. Pires & R.P. Belém 12410* (MG).

The species is endemic to Brazil with geographic distribution restricted to the state of Pará, Tocantins and Piauí in the phytogeographic dominions Amazon rainforest and Cerrado (Flora do Brasil 2020). In the study area *Dicella oliveirae* is found in the forest formations on the margin of river. It was collected with flower and fruit in Setembro.

It is differentiated from its congener by pilose anthers and apiculate connective at apex.

15. *Diplopterys lucida* (Rich.) W.R. Anderson & C. Davis, Harvard Pap. Bot. 11: 10. 2006. Figure 4G-L

Liana. Leaves chartaceous, opposite, entire; stipules $0.5\text{--}0.7$ mm long, interpetiolar; petioles $0.6\text{--}0.9$ cm long, sericeous to glabrous, eglandular; lamina $8.6\text{--}13.5\text{--}(21) \times 3.1\text{--}5.2\text{--}(6.7)$ cm, elliptic, apex acuminate, base cuneate, margin plane; adaxial and abaxial surfaces glabrous. Inflorescence of axillary umbels 4-flowered; bracts and bracteoles $0.6\text{--}1$ mm long, cymbiform; pedicels $6\text{--}12$ mm long, sericeous. Sepals $2.1\text{--}3 \times 2\text{--}2.5$ mm, triangular, abaxially sericeous; lateral sepals biglandular; anterior sepal eglandular. Petals yellow, fimbriate, abaxially sericeous; lateral petals with limb $5.2\text{--}8.7 \times 4.3\text{--}7.5$ mm; posterior petal with limb $4\text{--}5 \times 3\text{--}4$ mm. Stamens 10, connate at the base; filaments $2\text{--}3$ mm long, glabrous; anthers glabrous. Ovary densely sericeous; styles $1.8\text{--}4$ mm long, glabrous; anterior style is greater on length than the anterior styles. Samaras glabrous; dorsal wing $3.2\text{--}4.8 \times 1.1\text{--}1.5$ cm, narrowing of the median region to the base, appendage on the base of the adaxial margin $5\text{--}8 \times 3\text{--}5$ mm, adaxial margin thicker than abaxial margin; nut $5\text{--}8$ mm diameter, globose.

Specimens examined: Parauapebas, 08.I.1992, fr., *J.A.A. Bastos 223* (HCJS); Serra dos Carajás, Estrada Raymundo Mascarenhas Km 07, floresta, 08.XI.1988, fl., *J.A.A. Bastos 53* (HCJS). Parauapebas, trilha águas claras, forest, $06^{\circ}10'04''\text{S}$, $50^{\circ}21'02''\text{W}$, 06.XII.2017, fr., *V.S. Silva Jr 57* (MG). Parauapebas, Serra dos Carajás, mata no Núcleo Urbano, $06^{\circ}03'58''\text{S}$, $50^{\circ}04'03''\text{W}$, 03.II.2018, fl., *V.S. Silva Junior 61* (MG).

Diplopterys lucida occurs in the tropical forests of eastern South America, the low areas of Bolivia and Peru and in the phytogeographic dominions Amazon of Brazil (Carvalho *et al.* 2010). In Brazil it is distributed in the North (AM, AP, PA, RO and RR), Midwest (MT) and Northeast regions (BA) (Flora do Brasil 2020). In the Serra dos Carajás is found on edges of forests formations. It was collected with flower in November and fruit in January and December.

The species it can be recognized by being Liana with yellow floweres, petals with abaxial surface sericeous and samaras with appendege on the base of the adaxial margin.

16. *Heteropterys macradena* (DC.) W.R. Anderson, Mem. New York Bot. Gard. 32: 202. 1981. Figure 5A-C

Liana or scandent shrubs. Leaves cartaceous, opposite, entire; stipules ca. 0.2 mm long, interpetiolar; petioles 3–7 mm long, eglandular, tomentose to glabrescent; lamina 8.1–10.2 × 3.1–4.9 cm, elliptic, apex acuminate, base acute to cuneate, margin plane; adaxial surface glabrous; abaxial surface glabrescent, midrib tomentose to glabrescent. Inflorescence of axillary and terminal racemo, tomentose; bracts 3–5 mm long, ovate, adaxial and abaxial surfaces tomentose, abaxially with 2–4 small glands near margin; peduncle 2.6–3.2 mm long; bracteoles 2–3 mm long, ovate; pedicel 5–6 mm long. Sepals 2.7–4.3 × 1.5–2 mm, covering petals in buds, ovate, apex revolute, abaxially tomentose; all eglandular. Stamens 10, connate at the base; filaments 2–4 mm long, glabrous; anthers glabrous or pilosas on the apex. Ovary sericeous; styles 3, 2.5–3.8 mm long, glabrous, dorsally apiculate at the apex; the posterior styles arched at the base; stigmas lateral. Samaras sericeous to glabrous; dorsal wing 2.8–3.9 × 0.8–1.3 cm, abaxial margin thicker than adaxial margin; nut with inconspicuous lateral ribs.

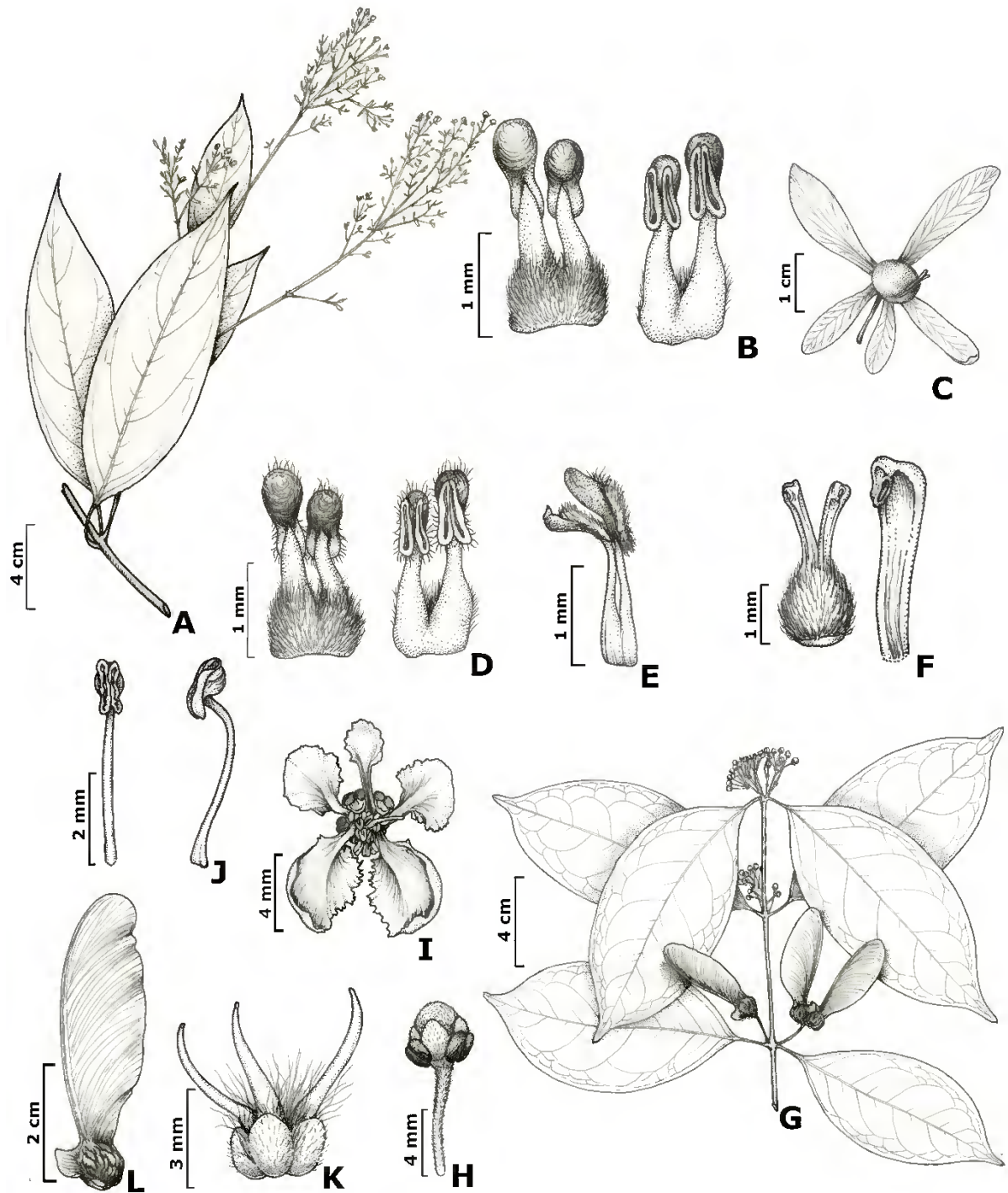


Figure 4. A-C. *Dicella conwayi*. A. flowering branch; B. stamens; C. fruit. D-F. *D. oliveirae*. D. stamens; E. apiculate stamens; F. gynoecium. G-L. *Diplopterys lucida*. G. flowering branch; H. floral bud; I. flower; J. stamens; K. gynoecium; L. fruit. A-B from C.R. Sperling 5992; C from N.A. Rosa 4643; D-F from J.M. Pires 12410; H-L from V.S. Silva Jr 61. Illustration: Carlos Alvarez.

Specimens examined: Cocal do Rio Itacaiúnas, capoeira, 10.VI.1949, fr., R.L. *Fróes & G. A. Black 24403* (IAN).

Material adicional: Marabá, Rio Tocantins, 9.VI.1949, fl., R.L. *Fróes & G. A. Black 24343* (IAN).

In Brazil is distributed in the North (AM, AP, PA and RO), Northeast (MA) and Midwest regions (MS) on the phytogeographic dominions Amazon rainforest and Pantanal (Flora do Brasil 2020). In the study area, *Heteropterys macradena* it was found on *capoeira* vegetation. It was collected with flower and fruit in July.

The species it can be recognized by bracteoles with 2–6 glands on the abaxial surface and posterior arched at the base.

17. *Heteropterys macrostachya* A. Juss., Ann. Sci. Nat., Bot. II, 13: 275. 1840. Figure 5D-H

Liana. Leaves chartaceous, opposite, entire; petioles 0.9–1.7 cm long, sericeous, 2–4 glands distributed in the middle region to apex; lamina 7.8–17 × 4.1–11 cm, ovate, apex emarginado-mucronado, base rounded to obtuse, margin plane; adaxial surface glabrous; abaxial surface densely sericeous, 15 or more mais glands along the margin and intramarginal. Inflorescence of terminal umbels; foliose bracts 3–5 mm long, abaxially biglandular; bracts 1.3–1.7 mm long; peduncle 2.5–5 mm long; bracteoles 1–1.5 mm long; pedicels 4–9 mm long. Sepals 1.9–3 × 1.2–2 mm, leaving exposed petals in buds, abaxially tomentose; anterior sepal eglandular; lateral sepals biglandular. Petals yellow, crassas, abaxially carinate; lateral petals with limb 3.1–4 × 1.8–2.5 mm, margin erose; posterior petal with limb 4–4.3 × 2.4–3 mm, margin fimbriate. Stamens 10, connate at the base; filaments 2.2–3.2 mm long, pilose at base; anthers glabrous. Ovary sericeous; styles 3, 1.1–1.3 mm long, glabrous; stigmass laterais. Samaras sericeous; dorsal wings 2.8–3.7 mm long, abaxial margin thicker than adaxial margin; nut rugose.

Specimens examined: Serra dos Carajás, 16 km a oeste do acampamento ECB na ferrovia, ca. 61 km da estrada BR 150, floresta de terra firme, 5°35'00''S, 49°15'00''W, 150 m, 27.VI.1982, bo, fl, C.R. *Sperling et al. 6372* (MG); Parauapebas, Rio Itacaiúnas, 03.III.2007, fr, D.F. *Silva et al. 225* (HCJS).

Heteropterys macrostrachya is widely distributed in the South America to Nicarágua (Anderson, W. 2013). In Brazil there are records in the states of Acre, Amazonas, Bahia, Espírito Santo, Rondônia and Sergipe in the phytogeographic dominions Amazon raingforest, Caatinga and Atlantic Forest (Flora do Brasil 2020). In the Serra dos Carajás is found in forest formations on the margins of river and roads. It was collected with flowers in July and fruits

in March. The species collected in the study area are the first records confirmed for the state of Pará.

It can be recognized by leaves with abaxial surface densely sericeous, 15 or more glands along the margin and intramarginal and petioles with 2–4 glands distributed in the middle region to apex.

18. *Heteropterys mathewsana* A. Juss., Arch. Mus. Hist. Nat. 3: 454. 1843. Figure 5I-L

Liana. Leaves chartaceous, opposite, entire; petioles 5–8 mm long, glabrescent, biglandular in the median region; lamina 8.2–12.4 × 2.3–4.4 cm, elliptic to lanceolate, apex acute to acuminate, base acute; adaxial and abaxial surfaces glabrous. Inflorescence of axillary and terminal panicle; bracts and bracteoles 2–3.5 mm long; pedicel 6–8 mm long, tomentose, sessile. Sepals 2.1–3.3 × 1.3–1.9 mm, covering petals in buds, ovate, apex revolute, abaxially tomentose. Ovary tomentose; styles 3, 2.2–2.7 mm long, glabrous, dorsally apiculate at apex. Samarídeo sericeous to glabrescent; dorsal wing 4.1–4.6 × 1.7–2 cm, abaxial margin thicker than adaxial margin; nut globose with parallel ribs.

Specimens examined: Pará, Marabá, Serra dos Carajás, margin do Rio Itacaiúnas, mata tallada de terra firme, 24.III.1984, fr., *A.S.L. da Silva et al 1987* (MG); Parauapébas, Serra dos Carajás, bosque próximo à coopjás, Núcleo Urbano, 09.I.1989, fl., *J.P. Silva 280* (HCJS).

Heteropterys mathewsana occurs in Suriname (Funk et al. 2007) and Brazil where it is distributed in the state of Acre and Mato Grosso occurring on ombrofilous forest (Flora do Brasil 2020). In the Serra dos Carajás, is found on forest formations and margin of river. It was collected with flower in January and fruit in March. The species collected in the study area are the first records confirmed for the state of Pará.

It can be differ from its congeners by biglandular petioles biglanduloso in the middle region and absence of floral peduncle, ie sessile peciel.

19. *Heteropterys megaptera* A. Juss., Ann. Sci. Nat., Bot. II, 13: 277. 1840. Figure 5M-S

Liana. Leaves chartaceous opposite, entire; petioles 0.9–1.4 cm long, sericeous to glabrescent; lamina 10.5–21.3 × 3.4–8.3 cm, ovate to lanceolate, apex acuminate, base cuneate, margin plane; adaxial surface glabrous; abaxial glabrescent, 4–5 glands at base; Umbels 4–6-floweras; rache bracts 3–4 mm long, lanceolate, abaxially with 1–3 glands; floral bracts 1–2 mm long, ovate to lanceolate; peduncle 1.5–3 mm long; bracteoles ca. 1 mm long, ovate; pedicel 5–7 mm long. Sepals 1.4–2 × 1.5 mm, triangular, abaxially sericeous. Petals yellow, margin erose; lateral petals with limb 4–5.1 × 3–4.2 mm; posterior petal with

limb 2.2–4 x 2.2–3 mm. Stamens 10, connate at the base; filaments 1.8–2.5 mm long, glabrous; anthers pilosas. Ovary sericeous; styles 3, 2–2.5 mm long, glabrous, dorsally obtuse at apex; stigmas lateral. Samaras sericeous; dorsal wing 4–6 × 2–2.2 cm, abaxial margin thicker than adaxial margin; nut globose, with evident ribs.

Specimens examined: Marabá, Serra dos Carajás, margin da rodovia N1–N5, próximo a entrada H.7, 05.XI.1983, fr., *N.A. Rosa et al.* 4515 (MG); Serra dos Carajás, mina do alemão, floresta, 05.XII.2017, fl., fr., *V.S. Silva Jr 54* (MG).

Heteropterys megaptera occurs in Bolivia, Guyana, Venezuela (Funk *et al.* 2007, Hokch *et al.* 2008) and Brazil where it is distributed in the state of Bahia, Espírito Santo and Rio de Janeiro on the phytogeographic dominions Atlantic Forest (Flora do Brasil 2020). In the Serra dos Carajás is found at the edges of forests formations. It was collected with flower and fruit in December.

It is can be differentiated from its congeners by pilose anthers and anterior style dorsally rounded at apex.

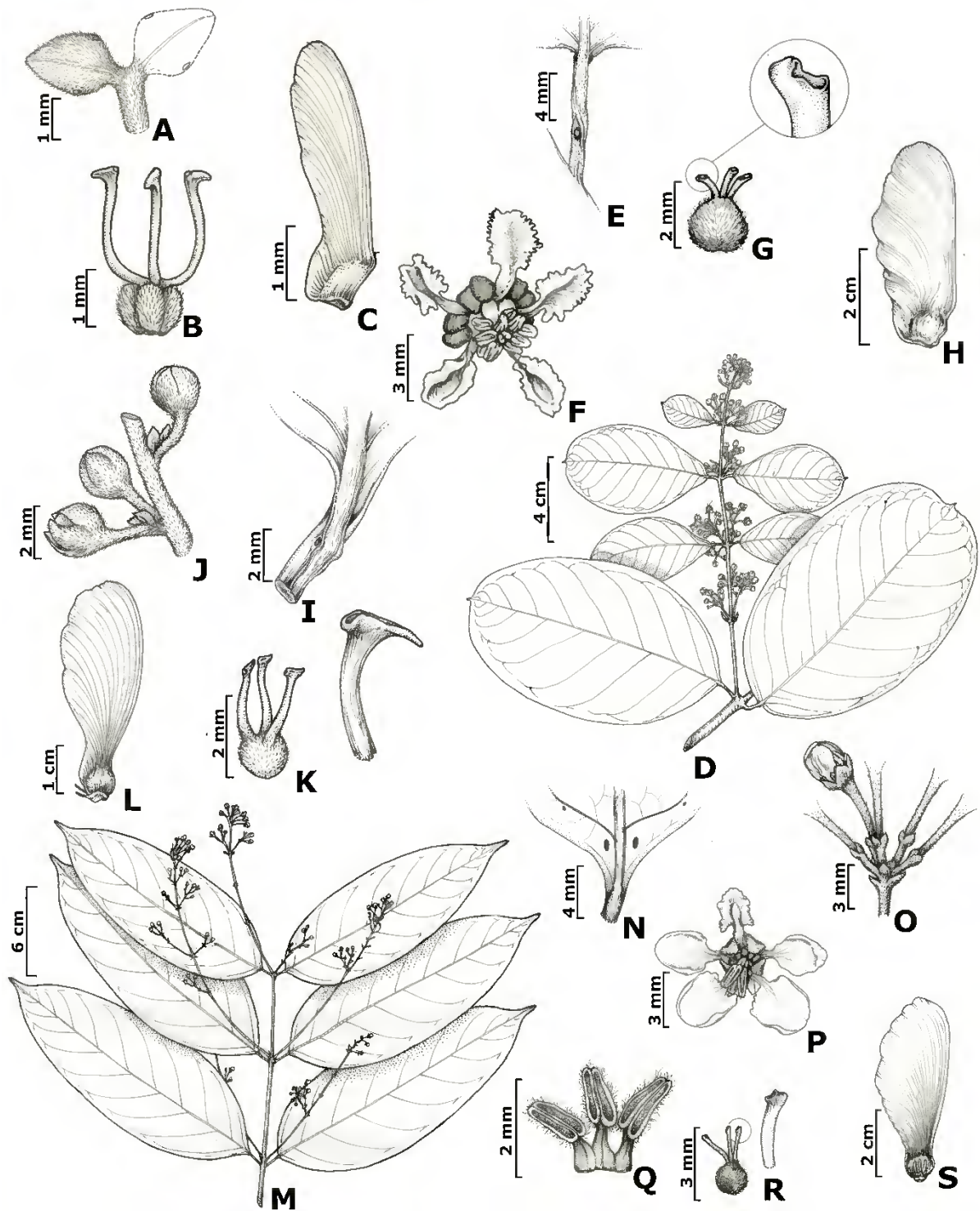


Figure 5. A-C. *Heteropterys macradena*. A. bracteoles B. gynoecium; C. fruit. D-H. *H. macrostachya*. D. flowering branch; E. glandular petiole; F. flower; G. gynoecium and stigma; H. fruit. I-L. *H. mathewsana*. I. glands of the petioles; J. floral bud; K. gynoecium; L. fruit. M-S. *H. megaptera*. M. flowering branch; N. leaves with glands at abaxial surface; O. floral bud; P. flower; Q. stamens; R. gynoecium; S. fruit. A-B from R.L. Fróes 24343; C from R.L. Fróes 24403; D-G from C.R. Sperling 6372; H from D.F. Silva 225; I-K from J.P. Silva 280; L from A.S.L. da Silva 1987; M-S from V.S. Silva Jr 54. Illustration: Carlos Alvarez.

20. *Hiraea fagifolia* (DC.) A. Juss., Ann. Sci. Nat. Bot. Sér. 2, 13: 258. 1840. Figure 6A

Liana. Leaves chartaceous, opposite, entire; stipules 2.2–3.4 mm long, epipetiolar, near the apex of the petioles; petioles 4–7 mm long, sericeous, apex biglandular; lamina 6–12.2 × 2.5–5 cm, elliptic to obovate, apex acuminate-mucronate, base cuneate to rounded, margin plane; adaxial surface glabrous; abaxial surface glabrescent, midrib sericeous. Inflorescence of axillary 4-flowered umbels; bracts and bracteoles 1–1.5 mm long, triangular; peduncle 3–5 mm long; pedicel 6–9 mm long. Sepals 2–2.5 × 1.5–2 mm, exposing petals in buds, triangular, abaxially sericeous; lateral sepals biglandular; anterior sepal eglandular.

Specimens examined: Rio Itacaiúnas, Seco-Grande, 20.VI.1949, bo., *R.L. Fróes & G.A. Black 24585* (IAN); Parauapebas, 08.I.1992, fr., *J.A.A. Bastos 229* (HCJS); Serra dos Carajás, Serra North, ca. 20 km of AMZA Exploration camp., 6°S, 50°15'W, 17.X.1977, bo., *C.C. Berg et al. 599* (MG).

Hiraea fagifolia occurs in southeastern Mexico, Central America and South America, except Chile and Uruguai (Anderson, W. 2007). In Brazil is distributed in the North (AC and RO), Northeast (BA), Midwest (MS), Southeastern (ES, MG, RJ, SP) and Southern regions (PR), associating in the phytogeographic dominions Amazon, Cerrado and Atlantic Forest (Flora do Brasil 2020). In this work, the species was registered in the state of Pará. In the study area is found at the edges of forest formations along the road and river. It was collected with flowers in July and October.

It can be recognized by long stipules inserted into the apex of the petiolo and inflorescence of axillary 4-flowered umbels.

21. *Hiraea silvicola* C.E. Anderson, Blumea 61: 137. 2016. Figure 6B-C

Liana. Leaves chartaceous; stipules 1–1.8 mm long, epipetiolar, borne median region to near the basal of the petioles; petioles 1–1.9 cm long, velutinous, apex biglandular; lamina 10.9–16.7 × 8.3–11.2 cm, large-elliptic to obovate, apex obtuse-mucronate, base cuneate or subcordate, margin revolute with 22–36 glands; adaxial surface glabrous; abaxial surface velutinous, midrib velutinous (trichomes Y e V-shaped). Inflorescence of axillary 4-flowered umbels; bracts and bracteoles ca. 2 mm long; pedicel 1.4–1.7 cm long. Samaras butterfly-shaped, orbicular, membranaceous, glabrescent; lateral wing ca. 2.8 × 1.6 cm; dorsal wing ca. 0.3 × 0.1 mm.

Specimens examined: Serra dos Carajás, Serra North, 5 km NE of AMZA Exploration Camp., ca. 06°S 50°15'W, forest, 15.X.1977, fr., *C.C. Berg et al 542* (MG).

The species occurs in Brazil and is geographically restricted to the state of Maranhão and Pará (Anderson, C. 2016). In the study area it is found at the edges of forest formations. It was collected with fruit in October.

Hiraea silvicola differs from its congener by leaves with abaxial surface velutinous, trichomes V and Y-shape and epipetiolar stipules on the middle region of the petiole.

22. *Lophanthera lactescens* Duck, *Arch. Jard. Bot. Rio de Janeiro* 4: 103. 1925. Figure 6D-K

Trees 4–10 m tall; lactating. Leaves subcoriaceous, decussate, entire; stipules 0.8–1.1 cm long, intrapetiolar; petioles 1.4–2.3 cm long, sericeous to glabrous, median biglandular or eglandular; lamina 11–21.6 × 5.5–10 cm, obovate, apex rounded, base attenuate; adaxial and abaxial surfaces glabrous. Inflorescence of terminal panicle, pendulous; bracts and bracteoles 1–2 mm long, triangular, apex acute; bracteoles with stalked glands; peduncle 2.3–4 mm long; pedicel 5–9 mm long. Sepals 2–3 × 1–2 mm, triangular, leaving petals exposed in buds, margin ciliate, all biglandular. Petals yellow, crassas, abaxially carinate; lateral petals with limb 3–4 × 1.5–2.8 mm; posterior petal with limb 4–5 × 3–3.8 mm. Stamens 10,; filaments 2–3 mm long, hirsute at base. Ovary glabrous; styles 3, 2–2.5 mm long, subulate; stigmas terminal. Drupe of 3-mericarpos 3.7–5.2 × 1.9–3.2 mm, obovoid, glabrous.

Specimens examined: Pará, Marabá, Serra dos Carajás, regeneração próximo ao aeroporto, 28.I.1985, fr., *O.C. Nascimento & R.P. Bahia 1027* (MG). Parauapebas, alojamento da Vale (Igarapé Bahia), forest, 06.XII.2017, fl., fr., *V.S. Silva Jr 58* (MG).

Lophanthera lactescens is endemic to endêmica do Brazil, occurring widely in the North region (Flora do Brasil 2020). The species is found on forest formations and urban landscaping of the region. It was collected with flower in December and fruit in December and January.

It can be recognized by being a trees with inflorescence of terminal pendulum panicle and yellow flowers.

23. *Lophopterys floweribunda* W. R. Anderson & C. Davis, *Contr. Univ. Michigan Herb.* 23: 92-93, f. 1. 2001. Figure 6L-M

Liana. Leaves chartaceous, opposite, entire; petioles 1–1.6 cm long, densely sericeous, eglandular; lamina 11.3–18.7 × 3.2–61 cm, elliptic, short-acuminate, base cuneate; adaxial surface glabrous, midrib sericeous; abaxial surface sericeous. Inflorescence of terminal and axillary panicle; bracts 1–2 mm long, triangular; peduncle 2–3 mm long; bracteoles 0.5–1 mm long, triangular; pedicel 2.8–3.2 mm long. Sepals 1.8–2.3 mm long, exposing petals in buds,

triangular, abaxially sericeous; lateral sepals with 1 circular gland. Stamens 10, connate at the middle to base connate; filaments 1.5–3 mm long, glabrous; anthers pilose at locules. Ovary sericeous; styles 3, 1.2–1.8 mm long, sericeous at base, anterior styles shorter than posterior styles; stigmas terminal. Samaras sericeous; lateral wings 2.1–2.8 × 0.5–0.9 cm, narrow-elliptic; dorsal wing 0.9–1.9 × 0.4–0.8 cm, trapezoidal.

Specimens examined: Parauapebas, via de captação de água do parque botânico, 12.VIII.1987, bo., fl., *J.P. Silva 53* (HCJS); Rio Itacaiunas, afl. do R. Tocantins, Serra Buritirama, Marabá, 05°30'S, 50°15'W, VII.1970, bot., *J.M. Pires & R.P. Belém 12586* (IAN); Serra dos Carajás, 13 km AMZA headquarters, road to sawmill. Forest on terra firme, 18.X.1977, fr., *A.S. Silva et al 71* (MG).

Lophopterys floweribunda occurs in Brazilian Amazon (PA, AM and AP) and southeastern Brazil, border between the states of Bahia, Espírito Santo and Minas Gerais (Anderson & Davis 2001), inhabiting the phytogeographic dominions Amazon rainforest and Atlantic Forest (Flora do Brasil 2020). In the Serra dos Carajás, the species is found on forest formations of *terra firme* and margin of river. It was collected with flower in August and fruits in October.

In the study area, the species can be recognized by leaves with abaxial surface sericeous and each of the lateral sepals with only one discoid gland.

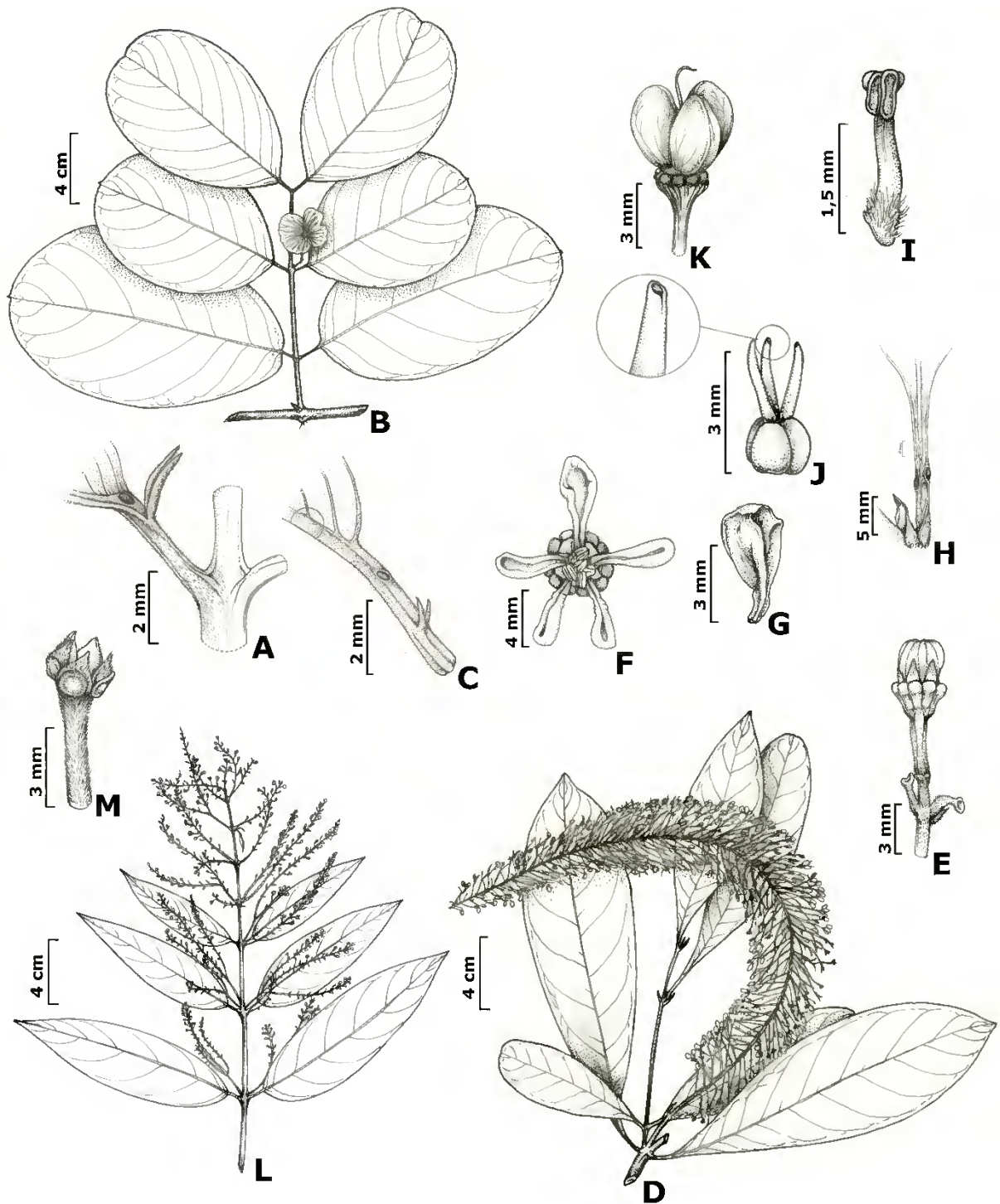


Figure 6. A. *Hiraea fagifolia*. A. petioles with stipules at the apex; B-C. *H. silvicola*. B. flowering branch; C. petioles with stipules near middle region. D-K. *Lophanthera lactescens*. D. flowering branch; E. floral bud with stalked glands; F. flower; G. surface adaxial of posterior petal; H. biglandular petioles; I. stamens; J. gynecium and stigma; K. fruit. L-M. *Lophopterys floweribunda*. L. flowering branch; M. sepals with 1 discoid glands. A from C.C. Berg 599; B-C from C.C. Berg 542; D-K from V.S. Silva Jr 58; L-M from J.P. Silva 53. Illustration: Carlos Alvarez.

24. *Mascagnia cordifolia* (A. Juss.) Griseb., Fl. Bras. 12(1): 95 1858. Figure 7A-E

Liana. Leaves chartaceous, opposite, entire; stipules ca. 2 mm long, interpetiolar; petioles 1.2–2.3 cm long, velutinous, biglandular at base; lamina 7.2–13.4 × 4.7–9.4 cm, ovate to elliptic, apex abruptly acuminate, base cuneate to cordate, margin revolute; adaxial and abaxial surfaces velutinous, trichomes V-shaped, abaxially with 4–7 impressed glands between midrib and margin. Inflorescence of terminal and axillary panicle of 3-pseudoracemes; bracts 1.5–3 mm long, triangular; peduncle 4–8 mm long; bracteoles 1–2 mm long, one of each pair with a prominent discoid gland; pedicel 3–9 mm long. Sepals 1.4–2.9 mm long, exposing petals in buds, triangular, abaxially sericeous; lateral sepals biglandular and anterior sepal eglandular. Petals pink, glabrous, abaxially carinate, margin entire or denticulate; lateral petals with limb 4–5.3 × 3–4 mm; posterior petal with limb 4.3–5 × 2.5–3 mm. Stamens 10, connate at the base; filaments 2–2.5 mm long, glabrous; anthers glabrous. Ovary densely pilose; styles 3, 2–2.8 mm long, glabrous, dorsally rounded at apex; stigmas lateral. Samaras sericeous, orbicular, membranous; lateral wings 2.4–3.6 × 2.5–3.7 cm, continuous at base, emarginate at apex to nut; dorsal wing 3–4 × 7–10 mm; nut tomentose.

Specimens examined: Parauapebas, Serra dos Carajás, área do Parque Botânico, 20.IV.1989, fl., fr., *J.A.A. Bastos 182* (MG/HCSJ); Parauapebas, Serra dos Carajás, área da lixeira do aeroporto, 03.X.1989, bo., *J.P. da Silva 592* (HCSJ).

The species occurs in Bolivia and Brazil (Anderson & Davis 2005). In Brazil is distributed in the North (AC, AM, PA and RO), Northeast (BA), Midwest (DF, GO, MS and MT) and Southeastern regions (ES, MG and SP), inhabiting in the phytogeographic dominions Amazon rainforest, Caatinga, Cerrado and Atlantic Forest (Flora do Brasil 2020). In the study area is found at the edges of forests formations. Collected with flower and fruit in April.

Mascagnia cordifolia differs from its congeners with biglandular petiole at base by leaves with adaxial and abaxial surfaces velutinous and V e Y-shape trichomes.

25. *Mascagnia glabrata* W.R. Anderson & C. Davis, Contr. Univ. Michigan Herb. 24: 43-44, f. 1. 2005. Figure 7F-K

Liana. Leaves chartaceous, opposite, entire; stipules ca. 2 mm long, interpetiolar; petioles 1.4–2 cm, biglandular at base, subsericeous; lamina 11.2–11.5 × 5.5–6.6 cm, ovate, apex acuminate, base cordate, margin revolute; adaxial surface thinly velutinous to glabrescent; abaxial surface glabrate, with 5–8 impressed glands between midrib and margin. Inflorescence of axillary panicle of 3-pseudoracemes; bracts 1.4–2 mm long, narrowly

triangular; peduncle 5–8 mm long; bracteoles 1.2–2 mm long, ovate to triangular, one of each pair with a prominent discoid gland; pedicel 1.3–2.5 mm long. Sepals 1–1.7 × 1–1.3 mm, exposing petals in buds, triangular, abaxially sericeous; lateral sepals biglandular; anterior sepal.

Specimens examined: Parauapebas, Serra dos Carajás, Projeto Bahia, via de acesso ao antigo barracão, floresta, 14.III.1989, bo., *J.A.A. Bastos 147* (HCJS).

The species occurs in Brazil, North Bolivia and Southeastern Peru (Anderson & Davis 2005). In Brazil is distributed in the Mato Grosso and Rondônia in the phytogeographic dominions Amazon rainforest (Flora do Brasil 2020). The record in Serra dos Carajás is the first confirmed occurrence of the species in the state of Pará. In the study area is found on forest formations. It was collected with flowers in March.

The specie is close to *M. cordifolia*, however, can be distinguished by leaves with abaxial surface glabrate.

26. *Mascagnia tucuruensis* C.E. Anderson, *Brittonia* 53(3): 413. 2001. Figure 7L-N

Liana. Leaves coriaceous, oppoite, entire; stipules 1–1.7 mm, interpetiolar; petioles 0.8–2.1 cm long, eglandular at base, velutinous; lamina 8.6–16.2 × 4.9–11.5 cm, elliptic to largoelliptic, apex abruptly acuminate, base rounded to cordate, margin revolute; adaxial surface velutinous on young leaves, bewithing glabrescent on mature leaves, rugose; abaxial surface velutinous, trichomes V and Y-shaped, 1–2 glands at base. Inflorescence of axillary congested corimbose pseudoraceme; bracts 1–2 mm long, linear; peduncle 5–7 mm long; bracteoles 1–1.2 mm long, ovate to triangular, one of each pair with a discoid gland; pedicel 3.5–5 mm long. Sepals 1.5–1.8 mm long beyond the glands, exposing petals in buds, ovate, margin ciliate, adaxially sericeous; lateral sepals biglandular; anterior sepal eglandular. Petals yellow, baxially carinate, margin denticulate to erosa, glabrous; lateral petals with limb 4.5–5 × 3.6–4.6 mm, ovate; posterior petal with limb 4.4–5 × 2.5–3 mm, oblong. Stamens 10, connate at the base; filaments 1.7–2.1 mm long, glabrous; anthers glabrous. Ovary subsericeous; styles 3, 2–2.7 mm long, dorsally rounded at apex, anterior style shorter than the posterior styles. Samaras suborbicular, membranaceous, glabrescent; lateral wings 2.2–2.6 × 2–2.5 cm, continous, emarginate at apex; dorsal wing 6–7.4 × 3.6–5.4 mm.

Specimens examined: Parauapebas, área do parque botânico, acesso a capitação de água, 16.VI.1987, fl., *J.P. Silva 15* (HCJS); Serra dos Carajás, AMZA camp. 3-Alfa. 5°48'S, 50°33'W, 475 m tall., 8.VI.1982, fr., *Sperling et al. 5995* (MG/MICH); Rio Itacaiúnas, Serra do Buritirama (B5), 5°15'S, 50°30'W, VII.1970.fr., *J.M. Pires & R.P. Belém 12535* (IAN);

Canaã dos Carajás, Serra dos carajás, Bocaina, floresta de terra firme, 06°17'38"S, 49°54'39"W, 27.VI.2017, fr., *Silva Jr et al.* 39 (CEPEC).

Mascagnia tucuruensis is endemic to Brazil (PA) and occurs on the ombrophilous forest in the phytogeographic dominions Amazônico (Flora do Brasil 2020). In the Serra dos Carajás, the specie is found in the *terra firme* forest formations and the river bank. Collected with flowerem July e fruit em July e July.

In the study area differ form its congeners by eglandular petiole and inflorescence of axillary corimbose.

27. *Niedenzuella acutifolia* (Cav.) W.R. Anderson, Novon 16(2): 198. 2006. Figure 70-S

Liana. Leaves chartaceous, opposite, entire; stipules epipetiolar, very small; petioles 3–7 mm long, biglandular in the median region or near the apex, sericeous to glabrous; lamina 6.3–11.5 × 2–4.7 cm, elliptic to ovate, apex acute-apiculate, base acute to cuneate. Inflorescence of terminal and axillary pseudoraceme; bracts 1.8–2.8 mm long, narrowly triangular; peduncle 1–2.5 mm long; bracteoles 1–1.3 mm long, ovate; pedicel 6–8 mm long. Sepals 2.7–3.3 × 1–1.5 mm, covering petals in the buds, ovate, revolute. Petals yellow, ovate, abaxially sericeous to glabrouss, margin erose; lateral petals with limb 3.7–5.1 × 2.5–3 mm; posterior petal with limb 2.1–4.2 × 2.2–3.9 mm. Stamens 10, connate at the base; filaments 1.6–2.2 mm long, glabrous; anthers glabrous. Ovary sericeous; styles 3, 1.8–2.5 mm long, dorsally rounded at apex, sericeous at base; stigmas lateral. Samaras X-shaped, chartaceous; lateral wings 7.3–14 × 3–7.6 mm; dorsal wing 5.2–7.7 × 3–4.1 mm; nut with wings between lateral wings and dorsal wing.

Marabá, Serra dos Carajás, 13 km da mina do quartel-general, floresta de terra firme, 16.X.1977, fr., *A.S. Silva et al* 36 (RB); Parauapebas, área do parque botânico, 12.VIII.1987, fl., *J.P. Silva* 56 (HCJS/IAN/RB); Parauapebas, Núcleo Urbano de Carajás, Mata em frente ao clube Sororó, 15.V.2012, fl., fr., *L. tysk* 317(HCJS).

Niedenzuella acutifolia occurs in Bolivia, Peru, Equador and Guyana to southeastern of Brazil (Anderson 2006). In Brazil is distributed in some the states of North and Midwest and widely in Southeastern and Southern in the various plant formations, preferably at the forest edges (Mamede et al. 2017, Amorim et al. 2018). In Serra dos Carajás, the species is found on *terra firme* forest and *canga*. It was collected with flowers in May and August and fruits in May and October.

It can be recognized by being by leaves with glands at margin, epipetiolar stipules ands samaras with lateral wings X-shape. Due to the shape of the fruit, the species can be

confused with species of *Tretapterys* Cav. (Amorim et al 2018). However, it is vegetatively distinct in relation to the position of the stipules, being in *N. acutifolia* it is epipetiolar (vs. interpetiolar).

28. *Stigmaphyllon sinuatum* (DC.) A. Juss., Ann. Sci. Nat. Bot., sér. 2 13: 288. 1840. Figure 7T-Y

Liana. Leaves chartaceous, opposite, entire; stipules ca. 3.5 mm long, interpetiolar; petioles 2.7–3.5 cm long, sericeous, biglandular at apex; lamina 5.7–11.2 × 4.7–8.8 cm, ovate to cordate, apex abruptly acuminate, cuneate to cordada; adaxial surface glabrescent; abaxial surface sericeous, 3–7 glands intramarginal, 10 or more small glands between midrib and margin. Inflorescence of axillary dichasia umbeliforme; foliose bracts 3–4 mm long, abaxially biglandular; bracts and bracteoles 1–1.5 mm long, ovate to triangular; bracteoles with 0–2 small glands; peduncle 4–6 mm long; pedicel 2–4 mm long. Sepals 2–2.5 mm long, exposing petals in buds; lateral sepals biglandular; anterior sepal eglandular. Petals yellow, membranaceous, margin dentate to erose, glabrous; lateral petals with limb 9.4–11 × 7.9–11 mm, orbicular; posterior petal with limb 6.8–9 × 5–7.2 mm, obovate. Stamens 10, connate at the base; filaments 1–3.2 mm long, glabrous; anthers glabrous. Ovary sericeous; styles 3, 2.2–3.7 mm long, pilose at base, dorsally foliar apex; stigmas apical. Samaras sericeous to glabrous; dorsal wing 3.3–4.3 × 0.9–1.2 cm, appendage 1.8–2.4 mm long; nut bearing a pair of the lateral winglets ca. 3 × 4 mm.

Parauapebas, Serra dos Carajás, 5°4'00"S, 50°34'00"W, 250m, 10.VII.1982, fr., C.R. Sperling et al. 6057 (MG); Serra North, N-2, Mata disturbada ao longo da estrada, 30.V.1983, fl., M.F.F. Silva et al. 1373 (MG); Marabá, Serra dos Carajás, estrada do Pojuca, 02.II.1985, bo, fl, O.C. Nascimento & R.P. Bahia 1134 (MG); Parauapebas, serra dos Carajás Parauapebas, serra dos Carajás, mata no Nucleo urbano, 06°04'55"S, 50°04'03"W, fl., V.S. Silva Jr 60 (MG).

Stigmaphyllon sinuatum is in the lowlands of North South America (Anderson, C. 1997). In Brazil occur in all the states of North and Maranhão in the phytogeographic dominions Amazon rainforest (Flora do Brasil 2020). In the study area, the species is found at the edges of forest formations. It was collected with flowers in February to May and fruits in July.

The species is recognized by being a liana with ovate to cordate leaves at the base, biglandular petioles at apex, inflorescence of dichasia umbeliforme, styles with foliaceous apex and nut bearing a pair of the lateral winglets.

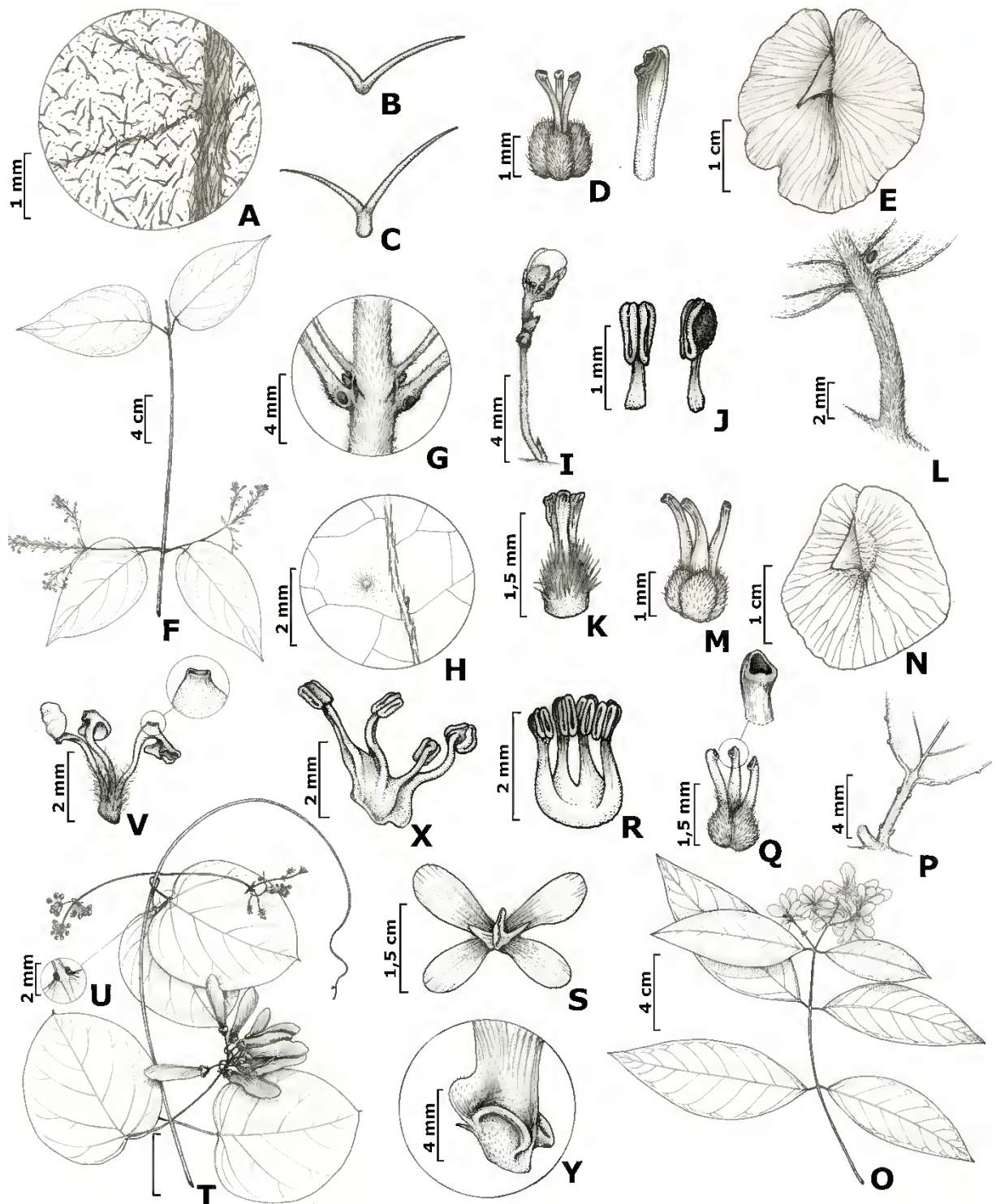


Figure 7. A-E. *Mascagnia cordifolia*. A. leaves with abaxial surface velutinous; B. V-shape trichome; C. Y-shape trichome. F-K. *M. glabrousta*. F. flowering branch; G. biglandular petioles and interpetiolar stipules; H. leaves with abaxial surface glabrous; I. floral bud; J. stamens; K. gynoecium. L-N. *M. tucuruensis*. L. eglandular petiole; M. gynoecium; N. fruit. O-P. *Nidenzuella acutifolia*. O. flowering branch; P. petioles with epipetiolar stipules at base and glands at apex; Q. gynoecium and stigma; R. stamens; S. fruit. T-Y. *Stigmaphyllon sinuatum*. T. flowering branch; U. petioles with 2-glands at apex; V. gynoecium and stigma; X. stamens; Y. fruit. A-E from J.A.A. Bastos 182; F-K from J.A.A. Bastos 147; L-M from J.P. Silva 15; N from V.S. Silva Jr 39; O-S from L. Tyski 317; T-U and Y from C.R. Sperling 6075; V-X from V.S. Silva Jr 60. Illustration: Carlos Alvarez.

29. *Tetrapteryx discolor* (G. Mey.) DC. in Prodr. 1: 587. 1824. Figure 8A-E

Liana. Leaves chartaceous; stipules 1.5–2.5 mm long, interpetiolar, connate; petioles 4–8 mm long, glabrous, eglandular; lamina 5.2–12.9 × 1.7–6.4 cm, lanceolate to elliptic, apex acuminate, base acute or cuneate; adaxial and abaxial surfaces glabrous; abaxial with 4–8 glands between midrib and margin. Inflorescence of axillary panicle of 4-flowered umbels; foliose bracts 4–19 × 3–6.5 mm, obovate to elliptic, abaxially with 2–4 glands; bracts and bracteoles 1–2 mm long, ovate; peduncle 3–5 mm long; pedicel 3–5 mm long. Sepals with sessile glands. 10-Samens connate at the base; filaments 2–2.6 mm long, glabrous. Ovary sericeous; styles 3, 1.5–2 cm long, glabrous. Samaras, glabrous, X-shaped; superior lateral wings 1.4–2.2 × 0.5–0.8 cm; inferior lateral wings 0.9–1.2 × 0.4–0.5 cm; dorsal wing 7–8.3 × 4–6 mm; nut with outgrowths between dorsal and lateral wings.

Specimens examined: Serra dos Carajás, margin do Rio Itacaiúnas perto da travessia da balsa para AMZA camp. 3-Alfa, 5°53'00''S, 50°30'00''W, tall. 150 m, 12.VI.1982, fr., C.R. *Sperling et al.* 6117 (MG); Serra dos Carajás Rio Parauapebas, forest na margin do rio, 6°04'00''S, 49°55'00''W, 23.VI.1982, fr., C.R. *Sperling et al.* 6309 (MG); Parauapebas, Serra dos carajás, vila da N5, final da rua de Angelim, forest de terra firme, 29.III.1989, fl., J.A.A. *Bastos* 162 (HCJS).

The species is found on the forest edges of Bolívia, Brazil, Guatemala and Ocidental Indias (Franceneret *al.* 2015). No Brazil, it is distributed in all states of the North, Maranhão and Mato Grosso, inhabiting in the phytogeographic dominions Amazon rainforest and Cerrado (Flora do Brasil 2020). In the Serra dos Carajás, the species is found at the edges forest formations of roads and rivers. It was collected with fruits in July.

In the study area, *Tetrapteryx discolor* differ from its congener by intepetiolar stipules connate.

30. *Tetrapteryx mucronata* Cav. Monadelphiae Classis Dissertationes Decem 9: 434, tab. 262: 2. 1790. Figure 8F-J

Liana. Leaves chartaceous, opposite, entire; stipules ca. 0.5 mm long, interpetiolar, distinct; petioles 4–8 mm long, glabrous, eglandular; lamina 7.2–11.5 × 3.1–4.7 cm, elliptic, apex acuminate, base acute; adaxial and abaxial surfaces glabrous; abaxial surface biglandular at base. Inflorescence of axillary panicle of 4-flowered umbels; foliose bracts 3–4 × 1–1.5 mm, lanceolate, abaxially biglandular at the base; bracts 1.3–3 mm long, narrowly triangular to lanceolate; peduncle 1.7–3 mm long; bracteoles 0.5–1 mm long, ovate to lanceolate; pedicel 5–6.8 mm long. Sepals 1.5–2 mm long, exposing petals in buds, ovate to triangular; lateral

sepals biglandular, glands auriculate-shape; anterior sepal eglandular. Petals yellow, membranaceous; lateral petals with limb $4-5 \times 3-4$ mm, margin erosa; posterior petal with limb $3.3-3.8 \times 1.5-2$ mm, sagittate, margin erosa. Stamens 10, connate at base; filaments 2–3 mm long, glabrous; anthers glabrous, connectives eglandular. Ovary with lateral wings, sericeous; styles 3, 2–3 mm long, glabrous; stigmas terminal.

Specimens examined: Serra dos Carajás, margin do Rio Itacaiúnas, forest de terreno baixo, $5^{\circ}53'00''\text{S}$, $50^{\circ}30'00''\text{W}$, 150 m tall., 12.VI.1982, bo., fl., *Sperling et al.* 6116 (MG); Rio Parauapebas, forest de terreno baixo a longo do rio, $6^{\circ}04'00''\text{S}$, $49^{\circ}55'00''\text{W}$, 23.VI.1982, bo., fl., *Sperling et al.* 6328 (MG).

Tetrapteryx mucronata is found on the forests of Brazil, Bolivia, Panama and Antilhas (Francener *et al.* 2015). In Brazil is widely distributed, inhabiting in the phytogeographic dominions Amazon, Cerrado and Atlantic Forest (Flora do Brasil 2020). In the Serra dos Carajás, the species is found at the edges forests formations of rivers. It was collected with flowers in July.

In the study, area can be differ form its congener by interpetiolar stipules free, lateral sepals with auriculate glands and ovary with lateral wings.

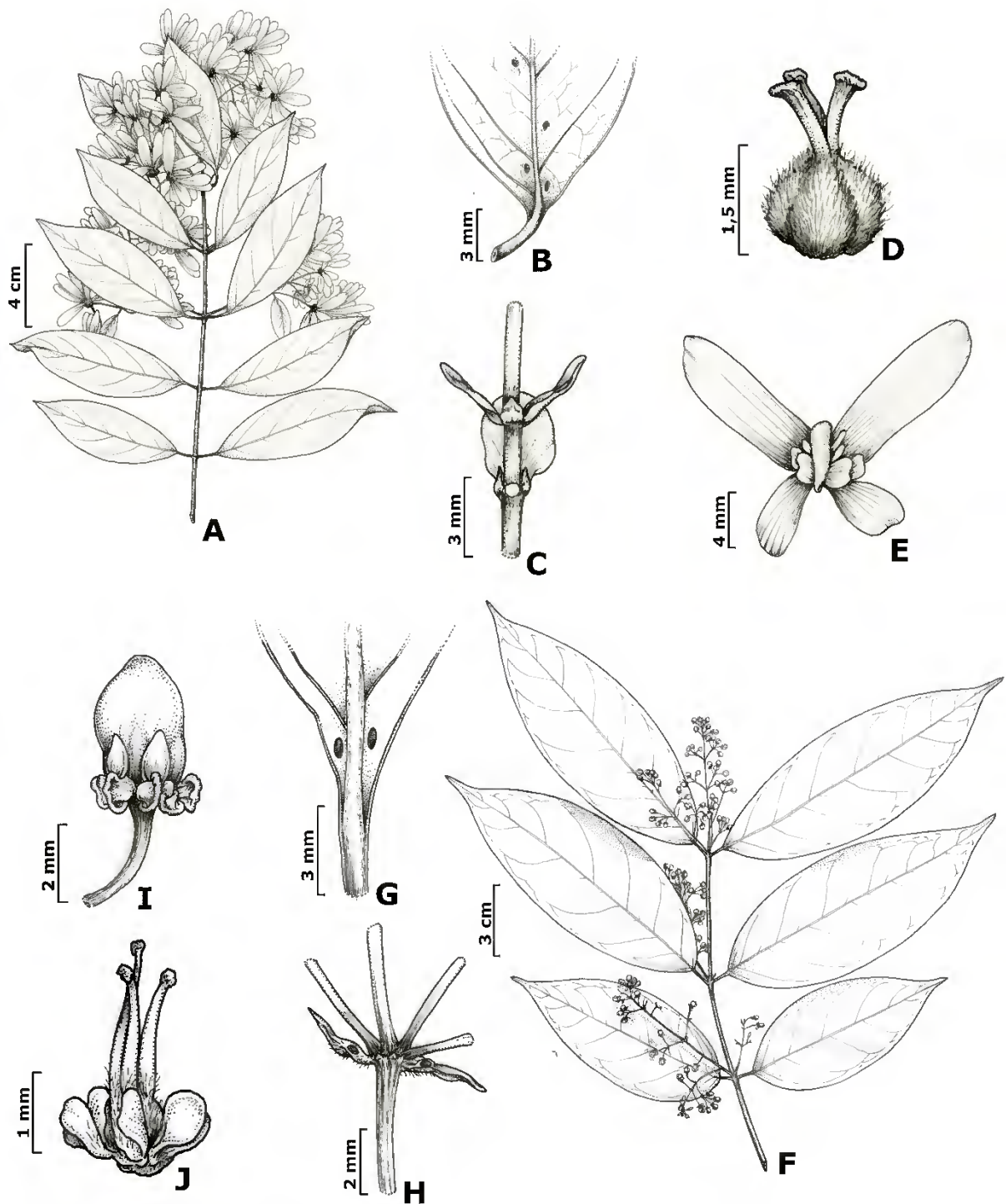


Figure 8. A-E. *Tetrapterys discolor*. A. flowering branch; B. leaves with glands on the abaxial surface; C. connate stipules; D. gynoecium; E. fruit; F-J. *T. mucronata*. F. flowering branch; G. leaves with glands on the abaxial surface; H. distinct stipules between foliose bracts; I. sepals with auriculate-glands; J. gynoecium with winged ovary. A-B and D from C.R. Sperling 6117; C-D from J.A.A. Bastos 162; F-J from C.R. Sperling 6328. Illustration: Carlos Alvarez.

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Lista de exiscatas

Amoroso MC.142 (4). **Araújo CM** 73 (3), 17 (9). **Bastos JAA** 53 (15), 229 (20), 182 (24), 147 (25), 162 (29). **Berg CC** 599 (20), 542 (21). **Costa LV** 666 (5) **Daly DC** 1781 (10). **Fróes RL**. 24343, 24403 (16), 24585 (20). **Giovane VT** 82 (12). **Harley RM** 57420 (11). **Lobato LCB** 2733 (1), 2579 (5). **Maciel UN** 769 (10). **Pires JM** 12410 (14), 12586 (23), 12535 (26). **Nascimento OC** 1051 (9), 921 (10), 1027 (22), 1134 (28). **Rosa NA** 637 (12), 4643 (13), 4515 (16). **Silva AS** 9 (11), 71 (23), 36 (27). **Silva ASL** 1987 (18). **Silva DF** 983 (1), 794 (3), 1 (7). 225 (17). **Silva JP** 520 (8), 237 (11), 280 (18), 53 (23), 592 (24), 15 (26), 56 (27). **Silva Jr VS** 41 (3), 52 (9), 56 (11), 59 (12), 57, 61 (15), 54 (19), 58 (22), 39 (26), 60 (28). **Silva MFF** 1373 (28). **Silva MG** 5375 (2), 2981, 3039 (9), 2982 (10) **Sperling CR** 6303 (6). 5992 (13), 6372 (17), 5995 (26), 6057 (28), 6117, 6309 (29), 6116, 6328 (30). **Tyski L** 716 (2), 703 (6), 317 (27). **Viana PL** 4106 (9) **Vidal CV** 677 (9). 678 (11).