



Original Paper

Vegetative characterization and key of Myrtaceae species from a remnant of Araucaria Rainforest, Curitiba, Paraná

Ollyver Mauricio Rech Bizarro^{1,3,5}, Daniel Zambiazzi Miller^{1,4} & Christopher Thomas Blum²

Abstract

Myrtaceae is a plant family with outstanding diversity in the neotropics, which species are of difficult identification. Thus, for the differentiation between species to be possible, targeted inventories and detailed descriptions are necessary, to develop accessible and reliable identification tools. The goal of this research is to quantify the species richness and describe vegetative characters of Myrtaceae species from a Araucaria Rainforest remnant, through identification of patterns and the elaboration of a dendrological key. For the characterization of trunk and bark, up to five healthy adult individuals of each species were selected, and for branches and leaves, up to three individuals. The voucher material was deposited at the Herbarium EFC. The vegetative morphology of each species was described and an identification key was prepared. 29 species, belonging to 11 genera, were documented: *Blepharocalyx* (1), *Campomanesia* (3), *Eugenia* (5), *Myrceugenia* (5), *Myrcia* (8), *Myrcianthes* (1), *Myrciaria* (1), *Myrrhinium* (1), *Pimenta* (1), *Plinia* (1) and *Psidium* (2). The main dendrological characteristics used for the species differentiation were: rhytidome aspect, appearance and colour of the internal bark, venation, punctuations, indumentum and dimensions of the leaf blade. Differentiation was possible using vegetative characters, with greater difficulty for two very similar species of *Campomanesia*.

Key words: Araucaria ombrophilous forest, dendrology, dichotomous key.

Resumo

A família Myrtaceae apresenta grande diversidade nos neotrópicos e suas espécies são de difícil identificação, sendo necessários inventários específicos e descrições detalhadas para elaborar ferramentas acessíveis e confiáveis que facilitem sua diferenciação. O objetivo desta pesquisa foi quantificar a riqueza e descrever os caracteres macromorfológicos vegetativos das espécies de Myrtaceae de um remanescente de Floresta Ombrófila Mista, visando identificar padrões e elaborar uma chave dendrológica de identificação. Foram selecionados até 5 indivíduos adultos e sadios por espécie para caracterização de tronco e casca, e até 3 para ramos e folhas. O material testemunho foi depositado no Herbário EFC. Foi descrita a morfologia vegetativa de cada espécie e elaborada uma chave de identificação. Foram encontradas 29 espécies pertencentes à 11 gêneros: *Blepharocalyx* (1), *Campomanesia* (3), *Eugenia* (5), *Myrceugenia* (5), *Myrcia* (8), *Myrcianthes* (1), *Myrciaria* (1), *Myrrhinium* (1), *Pimenta* (1), *Plinia* (1) e *Psidium* (2). As principais características dendrológicas utilizadas para diferenciação das espécies foram: aspecto do ritidoma, aparência e cor da casca interna, venação, pontuações, indumento e dimensões do limbo foliar. Foi possível a diferenciação das espécies utilizando caracteres vegetativos, com ressalva para o gênero *Campomanesia*, que apresenta duas espécies muito similares com maior dificuldade de diferenciação entre si.

Palavras-chave: floresta com Araucária, dendrologia, chave dicotômica.

¹ Universidade Federal do Paraná, Prog. Pós-graduação em Engenharia Florestal, área de Conservação da Natureza, Jardim Botânico, Curitiba, PR, Brasil.

² Universidade Federal do Paraná, Depto. Ciências Florestais, Jardim Botânico, Curitiba, PR, Brasil. ORCID: <<https://orcid.org/0000-0002-1898-3311>>.

³ ORCID: <<https://orcid.org/0000-0002-1800-8591>>.

⁴ ORCID: <<https://orcid.org/0000-0002-3420-4007>>.

⁵ Author for correspondence: ollyver.wald@gmail.com

Introduction

Myrtaceae has its name derived from the Greek word *Myrtus*, due to its aromatic leaves. It is one of the richest families in the neotropics (Wilson *et al.* 2001), and often one of the featured families in floristic and phytosociological studies of the Atlantic Forest. Nonetheless, its specimens are frequently not identified to species level due to its diversity and taxonomic complexity (Souza & Lorenzi 2008). In addition, the identification based on reproductive structures, despite being the most effective, is not always possible due to the difficulty of collecting samples with flowers or fruits. This is due to its seasonality, or to the difficulty of accessing the highest parts of the forest canopy (Roderjan 1987; Marchiori 2013). For this reason, the recognition of dendrological patterns in the vegetative morphology of trunks, bark, branches and leaves, is essential in the preparation of floristic studies (Roderjan 1987; Ribeiro *et al.* 1999; Marchiori 2013).

The family Myrtaceae belongs in the order Myrtales, comprised of 145 genera and 6,019 species accepted in the world (Govaerts *et al.* 2019). In Brazil, it is represented by 1,028 native species belonging in 23 genera (BFG 2018). In the state of Paraná, southern Brazil, there are 231 native species of 18 genera (Kaehler *et al.* 2014), of which at least 49 species occur in Araucaria Rainforest (Scheer & Blum 2011).

In the South of Brazil, the family's reproductive morphology has been studied in the taxonomic works of: Legrand (1961) and Legrand & Klein (1969) in Santa Catarina; Mattos (1983a, 1983b, 1984, 1985), Marchiori & Sobral (1997) and Sobral (2003) in Rio Grande do Sul; Soares-Silva (2000), Romagnolo & Souza (2004, 2006), Lima *et al.* (2011), Sobral (2011), Lima *et al.* (2015) and Rocha (2018) in Paraná. Although it is a less studied topic, some regional works have already given a dendrological focus to the identification of species of Myrtaceae, describing vegetative characteristics of the trunk, bark, branches and leaves (Rotta 1977; Ivanchechen 1988; Cardoso & Sajo 2004).

Given the diversity and difficulty of species identification that are characteristic of this family, this work has aimed to: (1) document the species richness of Myrtaceae present in a remnant of Araucaria Rainforest; (2) identify and describe vegetative morphological patterns that enable the species distinction; (3) propose a dichotomous key based only on vegetative characters.

Material and Methods

The study was conducted in the forest fragment of the Center for Wood and Forest Sciences (Capão do CIFLOMA), a remnant of Araucaria Rainforest with 15,24 ha, located in Campus III (Botanic Garden) of Universidade Federal do Paraná, Curitiba, PR, coordinates 25°26'53.3"S and 49°14'26.5"W. The floristic treatment was conducted between 2014 and 2017, through collection and identification of species, using specialized literature and comparison with specimens deposited at the Herbarium Escola de Florestas Curitiba (EFC) and Museu Botânico Municipal de Curitiba (MBM). The voucher specimens of the collected species were deposited at the Herbarium EFC. All specimens of all species were collected with flower or fruit to confirm identification, with the exception for *Eugenia pluriflora* DC., *Myrcia palustris* DC. and *Plinia peruviana* (Poir.) Govaerts, which, however, have vegetative characters that enable them to be identified with complete certainty.

For the morphological characterization of the trunk and external and internal bark, five trees, of each species, were analysed, except for those for which fewer individuals were available. Selected trees were adult (except for *Eugenia pluriflora* and *Plinia peruviana*, of which only young trees were found), healthy, with similar size and environmental conditions (soil, topography, and sociological position).

For each tree, a dendrological form was filled in, using terminology of trunk, external bark (EB) and internal bark (IB), as proposed by Ivanchechen (1988), Ribeiro *et al.* (1999) and Marchiori (2013). For the morphological characterization of branches and leaves, three trees per species were analysed (preferably); for each tree, four healthy branches from the canopy were analysed, with at least five ramifications and abundance of adult leaves. From each branch, ten mature leaves were systematically selected, in a total of 40 leaves per tree. The characterization of branches and leaves was based on the terminology proposed by Hickey (1973), Ribeiro *et al.* (1999) and Marchiori (2013), with an additional collection of biometric data, standardized according to Miller & Blum (2018) and Rau & Blum (2019). The leaf dimensions presented in the description follow the pattern: (Min-)Med(-Max). Additionally, the leaves were classified according to the visibility of the punctuations: directly visible to the naked eye; visible to the naked eye against the light; or with the assistance of stereo light microscope, against the light.

The morphological characters were recorded in an electronic spreadsheet and analysed with the purpose of recognizing relevant and distinctive characters. From these patterns, an identification key was prepared, as well as image plates of the morphological elements found to be most relevant for each species.

Results and Discussion

In total, 29 species of Myrtaceae were documented, belonging to 11 genera (Tab. 1). The richest genus was *Myrcia*, with eight species, followed by the genera *Eugenia* and *Myrceugenia*, with five species each. Four species were found

Table 1 – List of species in family Myrtaceae recorded in the forest fragment of Araucaria Rainforest named “Capão do Cifloma”, Curitiba, Paraná (Brazil).

Species	Popular name	Voucher	Voucher TCC
<i>Blepharocalyx salicifolius</i> (Kunth) O.Berg	Murta	Blum 1117	EFC 11816
<i>Campomanesia guaviroba</i> (DC.) Kiaersk.	Guabirola	Völtz 729	EFC 14582
<i>Campomanesia guazumifolia</i> (Cambess.) O.Berg	Sete-capotes	Bizarro 125	EFC 14569
<i>Campomanesia xanthocarpa</i> (Mart.) O.Berg	Guabirola	Blum 1885	EFC 14211
<i>Eugenia chlorophylla</i> O.Berg		Bizarro 163	EFC 18718
<i>Eugenia involucrata</i> DC.	Cerejeiro-do-mato	Bizarro 104	EFC 14401
<i>Eugenia platysema</i> O.Berg	Camboim	Blum 1664; Bizarro 105	EFC 13879 / 14402
<i>Eugenia pluriflora</i> DC.		Bizarro 166	EFC 18721
<i>Eugenia uniflora</i> L.	Pitangueira	Blum 2583	EFC 18722
<i>Myrceugenia acutiflora</i> (Kiaersk.) D.Legrand & Kausel		Bizarro 162	EFC 18352
<i>Myrceugenia euosma</i> (O.Berg) D.Legrand	Cambuizinho	Blum 1854	EFC 13584
<i>Myrceugenia miersiana</i> (Gardner) D.Legrand & Kausel		Ribeiro 142; Bizarro 98	EFC 13703 / 14395
<i>Myrceugenia regnelliana</i> (O.Berg) D.Legrand & Kausel	Guamirim	Ribeiro 200	EFC 14496
<i>Myrceugenia glaucescens</i> (Cambess.) D.Legrand & Kausel		Souza 14	EFC 15525
<i>Myrcia amazonica</i> DC.		Bizarro 82	EFC 13346
<i>Myrcia glomerata</i> (Cambess.) G.P.Burton & E.Lucas	Guamirim-ferro	Blum 2387	EFC 14955
<i>Myrcia guianensis</i> (Aubl.) DC.		Bizarro 81	EFC 13345
<i>Myrcia hatschbachii</i> D.Legrand	Caingá	Blum 1104; Miller 67	EFC 11832 / 13415
<i>Myrcia palustris</i> DC.	Guamirim	Bizarro 165	EFC 18720
<i>Myrcia selloi</i> (Spreng.) N.Silveira	Pau-ferro	Bizarro 80; Blum 1858	EFC 13344 / 14585
<i>Myrcia splendens</i> (Sw.) DC.	Guamirim-chorão	Bizarro 84	EFC 13348
<i>Myrcia venulosa</i> DC.		Bizarro 83	EFC 13347
<i>Myrcianthes gigantea</i> (D.Legrand) D.Legrand	Araçá-do-mato	Völtz 759	EFC 12164 / 14629
<i>Myrciaria tenella</i> (DC.) O.Berg	Cambuizinho	Ribeiro 357; Ribeiro 358	EFC 14915 / 15079
<i>Myrrhinium atropurpureum</i> Schott	Murtinho	Blum 1076	EFC 8921
<i>Pimenta pseudocaryophyllus</i> (Gomes) Landrum	Craveiro	Bizarro 126	EFC 14581
<i>Plinia peruviana</i> (Poir.) Govaerts	Jaboticabeira	Bizarro 164	EFC 18719
<i>Psidium cattleianum</i> Sabine	Araçazeiro	Blum 2473	EFC 14970
<i>Psidium guajava</i> L.*	Goiabeira	Blum 1882; Vieira 791	EFC 14481/14571

* Exotic species

exclusively in hydromorphic soil, which is characteristic of alluvial formations: *Blepharocalyx salicifolius*, *Myrcia glomerata*, *Myrcia selloi* and *Myrrhinium atropurpureum*. If our study is compared to the work of Reginato *et al.* (2008), conducted in a nearby area, 19 additional species were encountered. In comparison with yet another large forest remnant studied by Kozera *et al.* (2006) in Curitiba, four additional species were found in our study, albeit the same number of genera. These results demonstrate the importance of new inventories to expand knowledge about the richness and distribution of species in the region.

The main dendrological characteristics used to distinguish the species were: aspect and colour of the external bark, appearance and colour of the internal bark, venation, indumentum, punctuations, and dimensions of the leaf blade and petiole. It was possible to distinguish the species using vegetative

characters, with exception of two species of *Campomanesia*, *C. xanthocarpa* and *C. guavirova*, which presented high morphological similarity and, hence, greater difficulty in their differentiation, as already noted by Lima *et al.* (2011).

All the species presented the following shared characteristics: branches of circular cross section, with apical parts and/or close to the petiole insertion complanate; leaves simple, crossed opposite (even if presenting a distichous arrangement, the insertion of the petiole on the branch is still crossed), translucent punctuations visible to the naked eye, or under stereo microscope, with or without the need to position the leaves against the light, with venation pinnate and brochidodromous.

Below, we present an identification key and description of the vegetative macromorphological characters of each species analysed.

Identification key based on vegetative characteristics of the family Myrtaceae, in the “Capão do CIFLOMA” forest fragment, Curitiba - PR

1. Leaves with two marginal veins (intra- and sub-marginal) 2
 2. External bark cream/white, petioles 7 mm, leaves without undulate margin, translucent punctuations visible to the naked eye, against the light 8. *Eugenia platysema*
 - 2'. External bark green, variegated, petioles 3 mm, leaves with undulate margins, translucent punctuations not visible to the naked eye 27. *Plinia peruviana*
- 1'. Leaves with one marginal vein, or absent 3
 3. Internal bark partly, or entirely, dark red 4
 4. Leaves narrowly lanceolate, with long acuminate apex 21. *Myrcia splendens*
 - 4'. Leaves elliptic, with apex shaped otherwise 5
 5. Petioles longer than 3 mm, leaves longer than 6 cm, on average 18 pairs of secondary veins 18. *Myrcia hatschbachii*
 - 5'. Petioles up to 3 mm long, leaves up to 6 cm, on average 13 pairs of secondary veins 6
 6. Internal bark entirely red, leaves pilose, up to 3 cm long, tertiary veins reticulate, translucent punctuations visible to the naked eye against the light 20. *Myrcia palustris*
 - 6'. Internal bark pink, with red flaring close to the external bark, leaves glabrous, longer than 3 cm, tertiary veins scalariform, translucent punctuations visible to the naked eye 25. *Myrrhinium atropurpureum*
 - 3'. Internal bark coloured otherwise (yellowish, beige, white, cream or pink) 7
 7. Leaves green (fresh ones) with secondary veins inconspicuous (of difficult visualization) 8
 8. Leaves with whitish/ferruginous indumentum on the abaxial face 12. *Myrceugenia euosma*
 - 8'. Leaves glabrous 9
 9. External bark flaky/fissured, peeling into flakes/ribbons, internal bark homogeneous, leaves shorter than 4 cm 17. *Myrcia guianensis*
 - 9'. External bark smooth/laminate, peeling into sheets, internal bark with laminate appearance (along rings), leaves longer than 4 cm 10

10. External bark green, variegated, translucent punctuations visible to the naked eye, petioles up to 5 mm long 7. *Eugenia involucrata*
- 10'. External bark cream/white, translucent punctuations not visible to the naked eye, petioles longer than 6 mm..... 9. *Eugenia pluriflora*
- 7'. Leaves green (fresh ones), with secondary veins raised (of easy visualization)..... 11
11. External bark partly or entirely red, orange or copper-coloured..... 12
12. Leaves and central vein glabrous 13
13. External bark with depressions, internal bark laminated (along rings), translucent punctuations visible to the naked eye against the light 23. *Myrcianthes gigantea*
- 13'. External bark without depressions, internal bark homogeneous, translucent punctuations visible to the naked eye 14
14. Petioles up to 7 mm long, leaves chartaceous 16. *Myrcia amazonica*
- 14'. Petioles longer than 7 mm, leaves coriaceous..... 28. *Psidium cattleianum*
- 12'. Leaves and central vein pilose or sericeous 15
15. Internal bark homogeneous, petioles up to 4 mm long, leaves discoloured with abaxial face whitish/ferruginous, up to 4 cm long and 2 cm wide 12. *Myrceugenia euosma*
- 15'. Internal bark laminate (along rings), petioles longer than 4 mm, leaves concolor, longer than 5 cm and wider than 2 cm 16
16. Trunk channelled, external bark laminate, peeling into overlapping chartaceous sheets, leaves chartaceous, on average 12 pairs of secondary veins 4. *Campomanesia guazumifolia*
- 16'. Trunk cylindrical, external bark smooth/laminate, peeling into non-overlapping coriaceous leaves, on average 19 pairs of secondary veins.... 29. *Psidium guajava*
- 11'. External bark coloured otherwise (grey, white, cream, green, brown) 17
17. Leaves with face and central vein of the abaxial face noticeably lanate, pilose, canescent, sericeous, velvety or with indumentum only in axillary tufts of the veins 18
18. Petioles up to 3 mm long, leaves up to 1 cm wide 12. *Myrceugenia euosma*
- 18'. Petioles longer than 3 mm, leaves wider than 1 cm 19
19. Trunk channelled, internal bark yellow, laminate (along rings), leaves without noticeable intramarginal vein, indumentum only as axillary tufts (central vein with secondary veins)..... 20
20. External bark frequently with copper-coloured patches, laminate (rarely fissured) with peeling into chartaceous sheets (rarely ribbons), petioles (7–) 9(–11) mm, leaves elliptic (3,8–)6,4(–10,5) × (1,9–)2,7(–3,9) cm, base acute, (5–)6(–9) pairs of secondary veins..... 3. *Campomanesia guaviroba*
- 20'. External bark with copper-coloured patches, laminate/fissured, peeling into chartaceous sheets/ribbons, petioles (5–)11(–16) mm, leaves elliptic/ovate/obovate with (4,9–)7,4(–10,8) × (2,6–)3,8(–5,5) cm, base acute/rounded, (7–)9(–11) pairs of secondary veins 5. *Campomanesia xanthocarpa*
- 19'. Trunk cylindrical/elliptic, internal bark coloured otherwise, homogeneous, leaves with a noticeable intramarginal vein, indumentum scattered across the surface and central vein 21
21. External bark light cream/white, laminate/rough, peeling into chartaceous or shattering sheets, internal bark with an internal dark red areola, translucent punctuations not visible to the naked eye..... 22
22. Apical branches sericeous, petioles (3–)4(–5) mm, leaves (2,8–)3,7(–5,0) × (1,3–)1,8(–2,4) cm, abaxial face and central vein sericeous, intramarginal veins at least 1 mm apart from the margin ... 11. *Myrceugenia acutiflora*
- 22'. Apical branches densely lanate, petioles (5–)7(–9) mm, leaves (4,8–) 6,4(–8,2) × (1,9–)2,7(–2,9) cm, abaxial face and central vein velvety, intramarginal veins over 1 mm apart from the margin..... 14. *Myrceugenia miersiana*

- 21'. External bark dark brown/greyish, flaky/fissured, peeling into sheets, internal bark pinkish without a noticeable internal areola, translucent punctuations visible to the naked eye against the light..... 23
23. Petioles longer than 8 mm, leaves with margin entire or slightly crenate, abaxial face and central vein canescent (whitish coloured), central vein with a raised profile 26. *Pimenta pseudocaryophyllus*
- 23'. Petioles up to 8 mm long, leaves with margin entire and revolute, abaxial face and central vein lanate/pilose, ferruginous, central vein depressed or complanate in profile 24
24. External bark flaky/rough, leaves longer than 6,2 cm, abaxial face and central vein pilose, (14-)18(-24) pairs of secondary veins..... 18. *Myrcia hatschbachii*
- 24'. External bark fissured, leaves up to 5,3 cm long, abaxial face and central veins densely lanate, (9-)11(-14) pairs of secondary veins 22. *Myrcia venulosa*
- 17'. Leaves glabrous, glabrescent or waxy 25
25. Leaves very small, up to 3,4 cm long and 1,2 cm wide, petioles up to 3 mm long 26
26. External bark brown, flaky/fissured/rough with peeling into flakes, internal bark pinkish with purplish/dark red areola, homogeneous appearance, petioles (1-)2(-3) mm, leaves discoloured with whitish abaxial face..... 15. *Myrceugenia regnelliana*
- 26'. External bark green variegated, smooth/laminate, peeling into coriaceous sheets, internal bark cream/white, without internal areola and laminate appearance (along rings), petioles (1-)1(-1) mm, leaves concolor 24. *Myrciaria tenella*
- 25'. Leaves longer than 3,1 cm and wider than 1,2 cm, petioles longer/equal to 3 mm 27
27. Internal bark with homogenous appearance, or punctuated..... 28
28. External bark brown/greyish, fissured, ridges wide and deep, with noticeable peeling, leaves with over 15 pairs of secondary veins..... 29
29. Leaves concolor, up to 6 cm long, margin slightly undulate, translucent punctuations visible to the naked eye 1. *Blepharocalyx salicifolius*
- 29'. Leaves discoloured (abaxial face whitish), over 6 cm long, margin entire or slightly crenate, translucent punctuations visible to the naked eye against the light..... 26. *Pimenta pseudocaryophyllus*
- 28'. External bark rough/micro-fissured, peeling into sheets, plates or flakes, leaves with 13, or less, pairs of secondary veins..... 30
30. Internal bark punctuated, petioles longer than 10 mm, leaves elliptic/ovate, waxy, wider than 3 cm, intramarginal vein 3 mm apart from the margin 6. *Eugenia chlorophylla*
- 30'. Internal bark homogeneous, petioles up to 10 mm long, leaves elliptic, without waxy aspect, up to 3 cm wide, intramarginal vein at least 3 mm apart from the margin 31
31. External bark greyish, rough/micro-fissured, peeling into flakes, leaves with acute base, margin entire or slightly crenate, translucent punctuations visible to the naked eye..... 13. *Myrceugenia glaucescens*
- 31'. External bark green, variegated, smooth/laminate, peeling into sheets, leaves with base rounded/acute, margin entire and slightly revolute, translucent punctuations not visible to the naked eye..... 19. *Myrcia selloi*
- 27'. Internal bark of laminate appearance (along rings)..... 32
32. Internal bark yellow with fibrous texture, leaves pilose only on axillary tufts, bullate and without a raised intramarginal vein..... 33
33. External bark frequently with copper-coloured patches, laminate (rarely fissured), peeling into chartaceous sheets (rarely ribbons), petioles (7-)9(-11) mm, leaves elliptic (3,8-)6,4(-10,5) × (1,9-)2,7(-3,9) cm, base acute, (5-)6(-9) pairs of secondary veins 3. *Campomanesia guaviroba*

- 33'. External bark rarely with copper-coloured patches, laminate/fissured, peeling into chartaceous sheets/ribbons, petioles (5–)11(–16) mm, leaves elliptic/ovate/obovate (4,9–)7,4(–10,8) × (2,6–)3,8(–5,5) cm, base acute/rounded, (7–)9(–11) pairs of secondary veins 5. *Campomanesia xanthocarpa*
- 32'. Internal bark coloured otherwise (cream/white or pinkish) with shortly fibrous texture, leaves glabrous, not bullate, and with raised intramarginal vein..... 34
- 34. External bark laminate/fissured, peeling into chartaceous and coriaceous sheets, overlapping into layers, internal bark slightly laminate (along rings), cross section of petioles semi cylindrical, leaf with over 14 pairs of secondary veins..... 2. *Myrcia glomerata*
- 34'. External bark smooth/laminate, peeling into coriaceous, non-overlapping, sheets, internal bark laminate (along rings), well defined, petioles furrowed in cross section, alate, leaves with less than 14 pairs of secondary veins..... 35
- 35. Trunk cylindrical/elliptic, external bark cream/white, petioles (5–)7(–9) mm, leaves chartaceous, (4,8–)7,2(–9,6) cm long, secondary veins inconspicuous..... 9. *Eugenia pluriflora*
- 35'. Trunk channelled (rarely cylindrical/elliptic), external bark cream/white with pinkish areas, petioles (3–)5(–6) mm, leaves membranaceous/chartaceous, (3,3–)4,1(–4,9) cm, secondary veins raised..... 10. *Eugenia uniflora*

Description of the vegetative macromorphological characters

1. *Blepharocalyx salicifolius* (Kunth) O.Berg, *Linnaea* 27: 413. 1856. Fig. 1

Tree 11–13 m high. EB light-brown, fissured with complanate ridges, without peeling. IB beige, homogeneous. Branches light-brown. Leaves crossed opposite, chartaceous, glabrous,



Figure 1 – a-d. *Blepharocalyx salicifolius* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctuations on the leaves (abaxial face, magnification of 0.7x, without light).

elliptic, apex acuminate and base acute, margin entire, slightly undulate, blade (3.7–)4.7(–5.9) × (1.3–)1.8(–2.4) cm, with abundant translucent punctuations, small and visible to the naked eye, adaxial central vein complanate in profile, (14–)17(–23) pairs of secondary veins visible, forming intramarginal veins, approximately 0.9 mm apart from the margin, tertiary veins scalariform and inconspicuous. Petiole (4–)7(–10) mm, yellowish and furrowed.

2. *Myrcia glomerata* (Cambess.) G.P. Burton & E. Lucas, *Phytotaxa* 460(1): 26. 2020. Fig. 2

Tree 8–9,5 m high. EB brown, laminate to fissured, with abundant peeling into chartaceous to coriaceous sheets. IB pinkish, slightly laminate (along rings). Branches greyish. Leaves chartaceous, glabrous, elliptic, apex obtuse/acute and base acute, margin entire, slightly revolute, blade (4–)6(–8.8) × (1.4–)2.2(–3.1) cm, with translucent punctuations visible only under stereo microscope, even without placing it against the light, adaxial central vein complanate in profile,

(15–)18(–23) pairs of secondary veins visible, forming intramarginal veins, approximately 1.5mm apart from the margin, tertiary veins slightly reticulate. Petiole (3–)5(–7) mm, semi cylindrical.

3. *Campomanesia guaviroba* (DC.) Kiaersk., *Enum. Myrt. Bras.*: 8. 1893. Fig. 3

Tree 11–14 m high. Trunk channelled. EB yellowish with patches slightly purplish, laminate, peeling into chartaceous sheets or ribbons (narrow and long). IB white-yellowish, laminate. Branches brown, striate. Leaves chartaceous, pilose with axillary tufts on the abaxial face, elliptic, apex acute/acuminate, base acute, margin entire, surface bullate, blade 6.4(–10.5) × (1.9–)2.7(–3.9) cm, with translucent punctuations visible only on the stereo microscope, without light, adaxial central vein with profile compressed and concave, (5–)6(–9) pairs of secondary veins visible, not forming evident intramarginal veins, tertiary veins reticulate. Petiole (6–)9(–11) mm, profile furrowed.

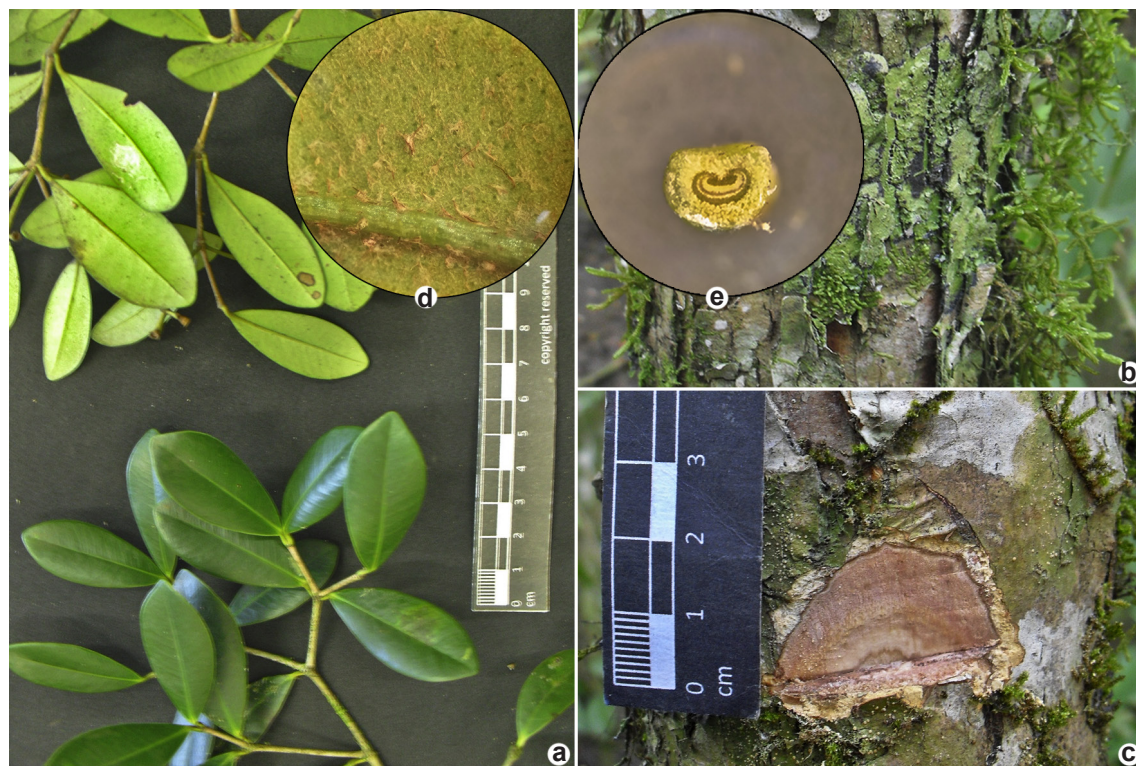


Figure 2 – a-e. *Myrcia glomerata* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctuations and leaf indumentum (abaxial face, magnification of 4,5x, without light); e. detail of the petiole (profile, magnification 4,5x, without light).

4. *Campomanesia guazumifolia* (Cambess.)O.Berg, *Linnaea* 27: 434. 1856. Fig. 4

Tree 11–14 m high. Trunk strongly channelled. EB reddish (copper-coloured), laminate, peeling into abundant chartaceous sheets, in successive layers, forming a “cushioned” texture. IB cream/yellowish, laminate. Branches reddish (cinnamon-coloured). Leaves chartaceous, pilose on the adaxial and abaxial surfaces, elliptic, apex acute, base acute, margin entire, surface bullate, blade (6.6–)10.2(–15) × (2.9–)4.4(–6.3) cm, with translucent punctuations, visible only under the stereo microscope, against the light, adaxial central vein complanate in profile, (8–)12(–17) pairs of secondary veins, not forming intramarginal veins, tertiary veins reticulate. Petiole (5–)9(–12) mm, semi cylindrical.

5. *Campomanesia xanthocarpa* (Mart.) O.Berg,*Linnaea* 27: 431. 1856. Fig. 5

Tree 12–13m high. Trunk channelled. EB yellowish, fissured and/or laminate, peeling into sheets and/or ribbons (in successive layers as in C.

guazumifolia, although less evident). IB yellowish, laminate. Branches brown, striate, with subtle peeling into small sheets. Leaves chartaceous, slightly discoloured, inconspicuously pilose in small axillary tufts on the abaxial face, elliptic/ovate/obovate/orbicular, apex acute/obtuse, base acute/rounded, margin entire, surface bullate, blade (5.2–)7.3(–9.5) × (2.6–)3.6(–4.5) cm, with translucent punctuations visible only under the stereo microscope, without light, adaxial central vein depressed and concave in profile, (7–)9(–11) pairs of secondary veins visible, not forming evident intramarginal veins, tertiary veins reticulate. Petiole (8–)13(–15) mm, semi cylindrical to slightly furrowed.

6. *Eugenia chlorophylla* O.Berg, *Fl. bras.* 14(1):

583. 1859. Fig. 6

Tree 9,5–15 m high. EB white with depressions, peeling into sheets and/or thick plates. IB beige, with perforations. Branches light brown. Leaves chartaceous, waxy on the adaxial face, with a shiny appearance, elliptic/

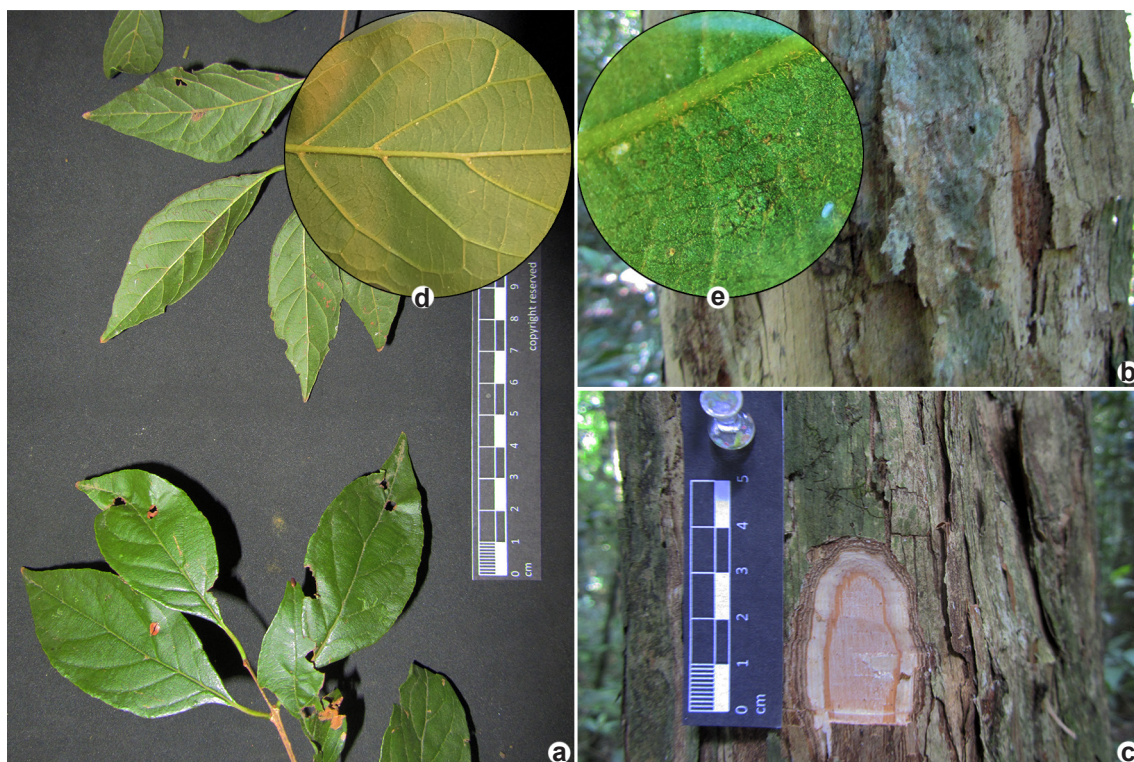


Figure 3 – a-e. *Campomanesia guaviroba* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the indumentum on the axillary tufts (abaxial face, magnification 0.7x, without light); e. detail of the translucent punctuations and indumentum on the leaves (abaxial face, magnification 4.5x, without light).

ovate, apex acuminate/acute, base rounded/acute, rarely asymmetric, margin entire, undulate, blade (6.2–)7.5(–8.9) × (3–)3.7(–4.6) cm, with small translucent punctuations, abundant and visible to the naked eye against the light, adaxial central vein complanate and depressed in profile, (8–)11(–13) pairs of secondary veins visible, forming intramarginal veins, approximately 3 mm apart from the margin, tertiary veins slightly reticulate. Petiole (11–)13(–17) mm, profile furrowed.

7. *Eugenia involucrata* DC., Prodr. 3: 264. 1828.

Fig. 7

Tree 10–14 m high. EB greenish, generally with lighter patches, giving it a variegated appearance, smooth and/or laminate, peeling into coriaceous sheets. IB cream/pinkish, homogeneous or slightly laminate. Branches greenish, laminate/striate, with peeling into sheets. Leaves chartaceous, glabrous, elliptic/ovate, apex acuminate/acute, base acute/attenuate, margin entire, blade (4.9–)6.2(–7.5) × (1.9–)2.4(–2.9) cm, with translucent punctuations visible to the naked eye without light, adaxial central vein depressed and concave in

profile, secondary and tertiary veins inconspicuous (secondary slightly visible on the adaxial face). Petiole (2–)4(–6) mm, profile furrowed.

8. *Eugenia platysema* O.Berg, Fl. bras. 14(1): 276. 1857.

Fig. 8

Treelet 2,5–3,7 m alt. EB cream/white, striate/laminate, with peeling into chartaceous sheets. IB cream/white, homogeneous. Branches brown or cream/white. Leaves chartaceous, glabrous, elliptic, apex acuminate/acute, base acute/attenuate, margin entire, blade (5–)7.3(–11.3) × (1.5–)2.3(–3.4) cm, with translucent punctuations visible to the naked eye against the light, adaxial central vein depressed in profile, (12–)14(–17) pairs of secondary veins visible, forming double veins, intra and sub-marginal, tertiary scalariform. Petiole (5–)7(–8) mm, profile furrowed.

9. *Eugenia pluriflora* DC., Prodr. 3: 270. 1828.

Fig. 9

Tree 6,5–8 m high. EB cream/white, laminate, peeling into coriaceous sheets. IB cream/white, laminate (into rings). Branches brown-



Figure 4 – a-d. *Campomanesia guazumifolia* – a. branch and leaves; b. external bark; c. internal bark; d. detail of translucent punctuations on the leaves (abaxial face, magnification 4.5x, with light).

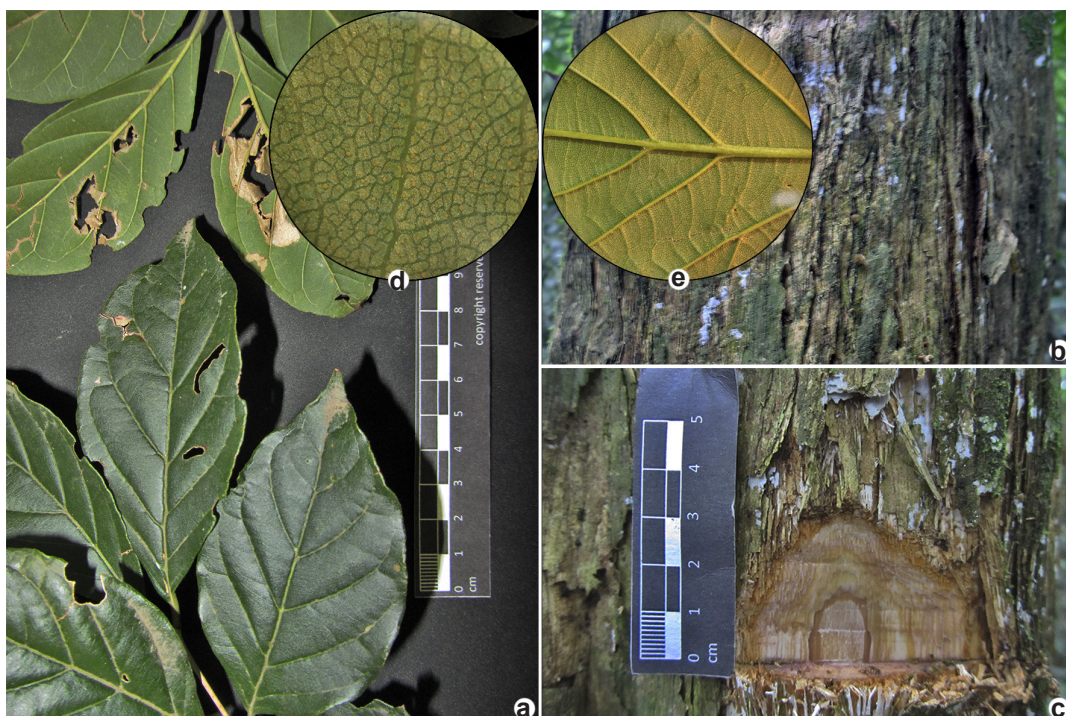


Figure 5 – a-e. *Campomanesia xanthocarpa* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctuations on the leaves (abaxial face, magnification 4.5x, without light); e. detail of the indumentum on the axillary tufts (abaxial face, magnification 0.7x, without light).

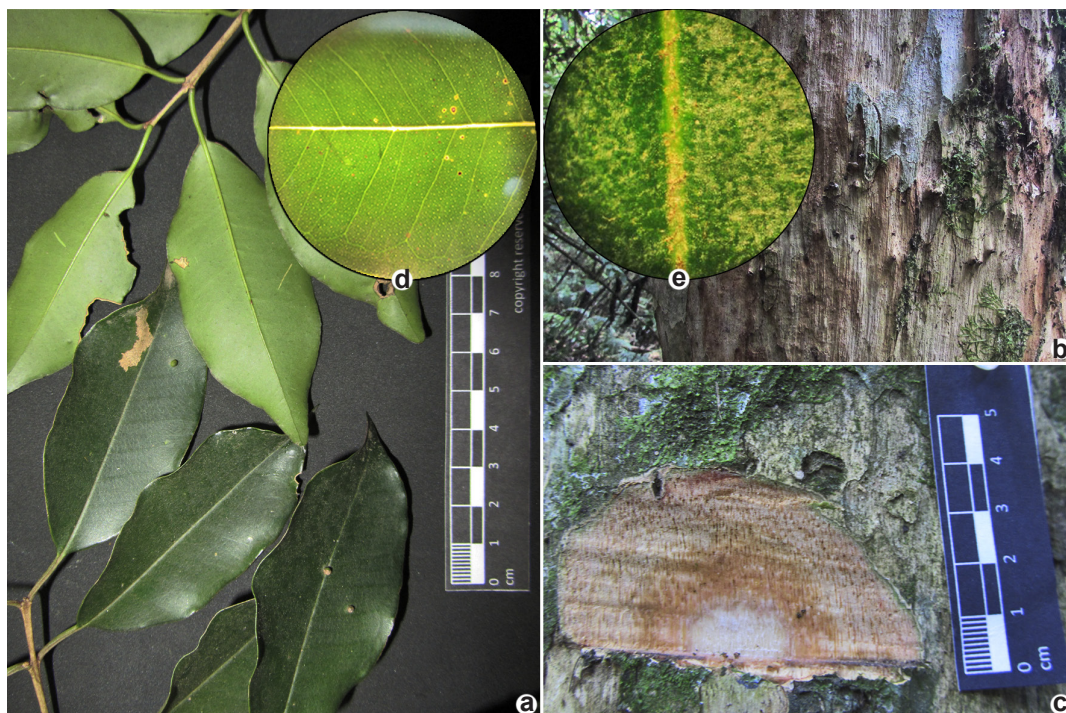


Figure 6 – a-e. *Eugenia chlorophylla* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctuations on the leaves (adaxial face, magnification 4.5x, without light); e. detail of the waxy on the leaves (adaxial face, magnification 4.5x, without light).

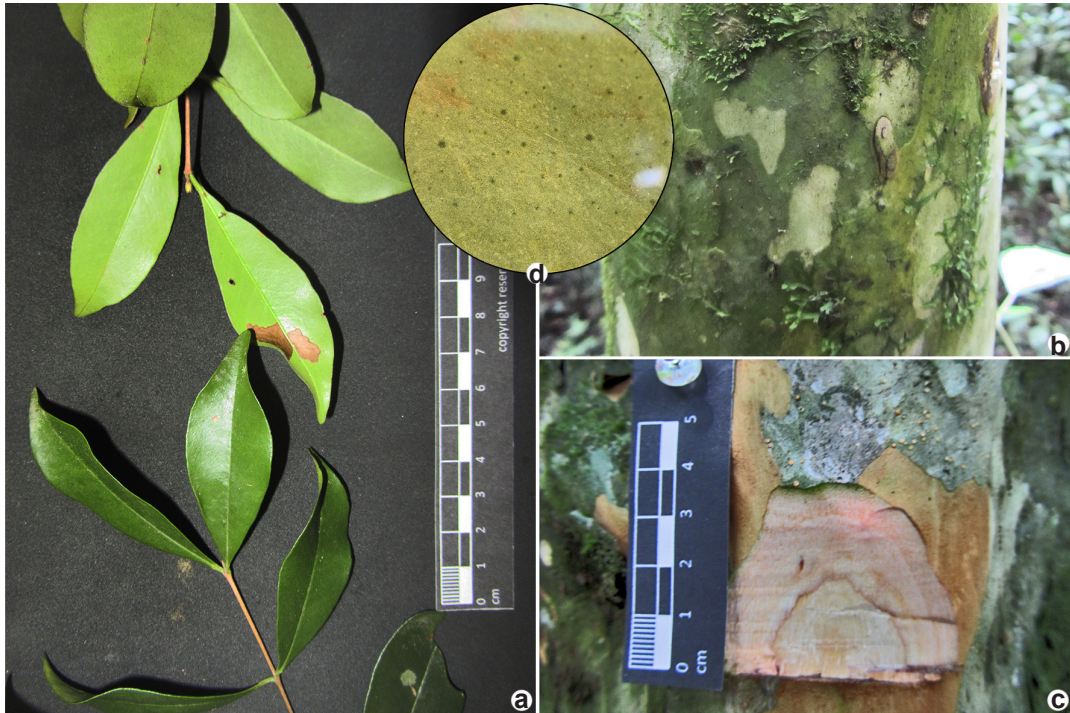


Figure 7 – a-d. *Eugenia involucrata* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctations on the leaves (abaxial face, magnification 4.5x, without light).

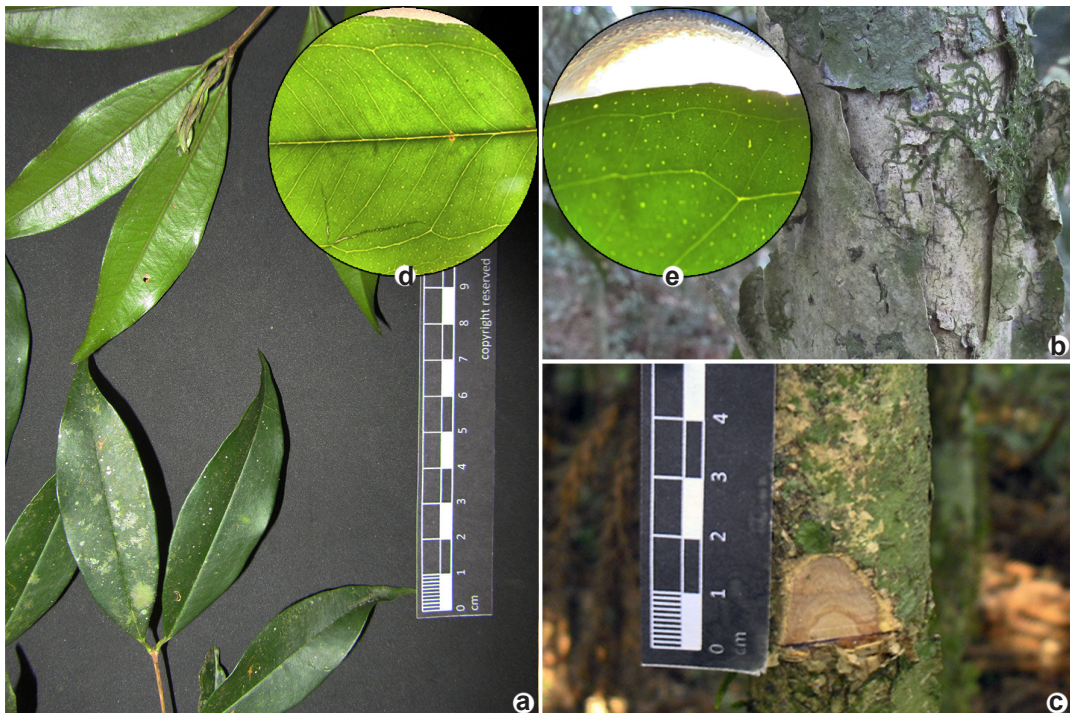


Figure 8 – a-e. *Eugenia platysema* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctations on the leaves (adaxial face, magnification 0.7x, with light); e. detail of the double intramarginal vein (adaxial face, magnification 4.5x, with light).

greyish, smooth/rough. Leaves chartaceous, glabrous, elliptic, apex acute/acuminate, base acute/attenuate, margin entire, blade (4.8–)7.2(–9.6) × (1.3–)2(–3.0) cm, with translucent punctuations visible on the stereo microscope even without being positioned against the light, adaxial central vein with complanate/immersed profile, secondary veins inconspicuous (slightly visible on the adaxial face), tertiary veins scalariform (visible under stereo microscope). Petiole (5–)7(–9) mm, profile strongly furrowed, forming wings.

10. *Eugenia uniflora* L., Sp. Pl.: 470. 1753.

Fig. 10

Tree 7–12 m high. Cross section of the trunk channelled, rarely with nodes. EB beige/greyish, slightly pinkish in areas of recent peeling, laminate, peeling into coriaceous blades. IB beige, laminate (along rings). Branches brown. Leaves membranaceous/chartaceous, glabrous, elliptic, apex acuminate/acute, base acute, margin entire, blade (3.3–)4.1(–4.9) × (1.2–)1.7(–2.1) cm, with translucent punctuations

extremely small, abundant, and visible only under stereo microscope, adaxial central vein with a complanate profile, (6–)8(–10) pairs of secondary veins visible, not forming intramarginal veins, tertiary veins slightly reticulate. Petiole (3–)5(–6) mm, profile furrowed.

11. *Myrceugenia acutiflora* (Kiaersk.) D.Legrand & Kausel, Comun. Bot. Mus. Hist. Nat. Montevideo 2(28): 5. 1953.

Fig. 11

Tree 9–15 m high. Ring-shaped scars on the upper portion of the trunk. EB white/cream, laminate, peeling into chartaceous sheets. IB white/cream, homogeneous, with internal areola (frame), purplish red after oxidation. Branches slightly copper-coloured, with peeling into sheets. Leaves chartaceous, with sericeous indumentum on the abaxial face and central veins (adaxial and abaxial) ferruginous, elliptic, apex acute/acuminate, base acute/attenuate, margin entire, blade (2.8–)3.7(–5.0) × (1.3–)1.8(–2.4) cm, with few translucent punctuations of difficult visualization only on stereo microscope, against the light, adaxial central veins of depressed

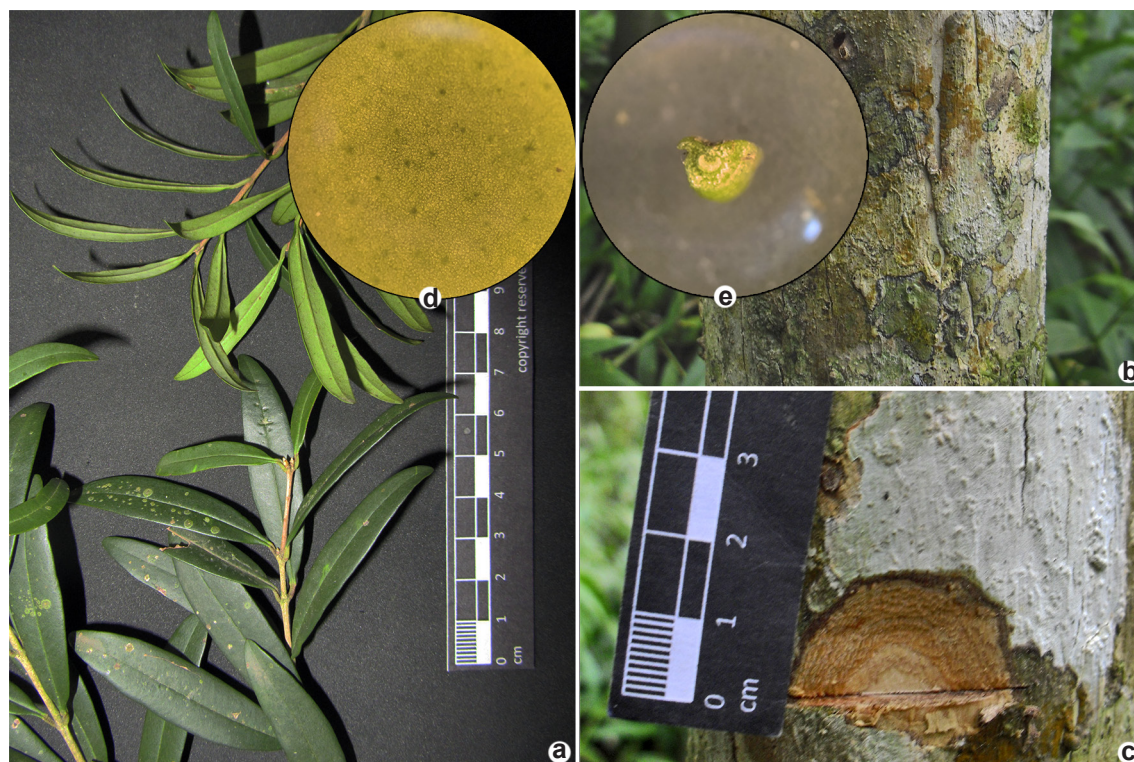


Figure 9 – a-e. *Eugenia pluriflora* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctuations on the leaves (abaxial face, magnification 4.5x, without light); e. detail of the petiole (profile, magnification 4,5x, without light).

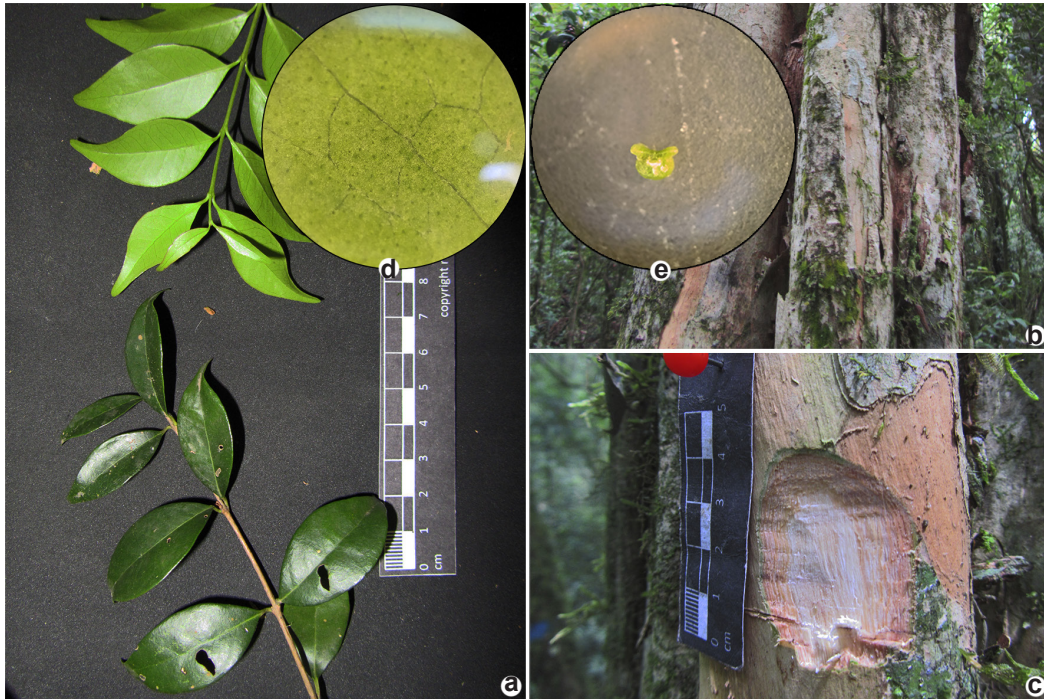


Figure 10 – a-e. *Eugenia uniflora* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctations on the leaves (abaxial face, magnification 4.5x, without light); e. detail of the petiole (profile, magnification 4.5x, without light).

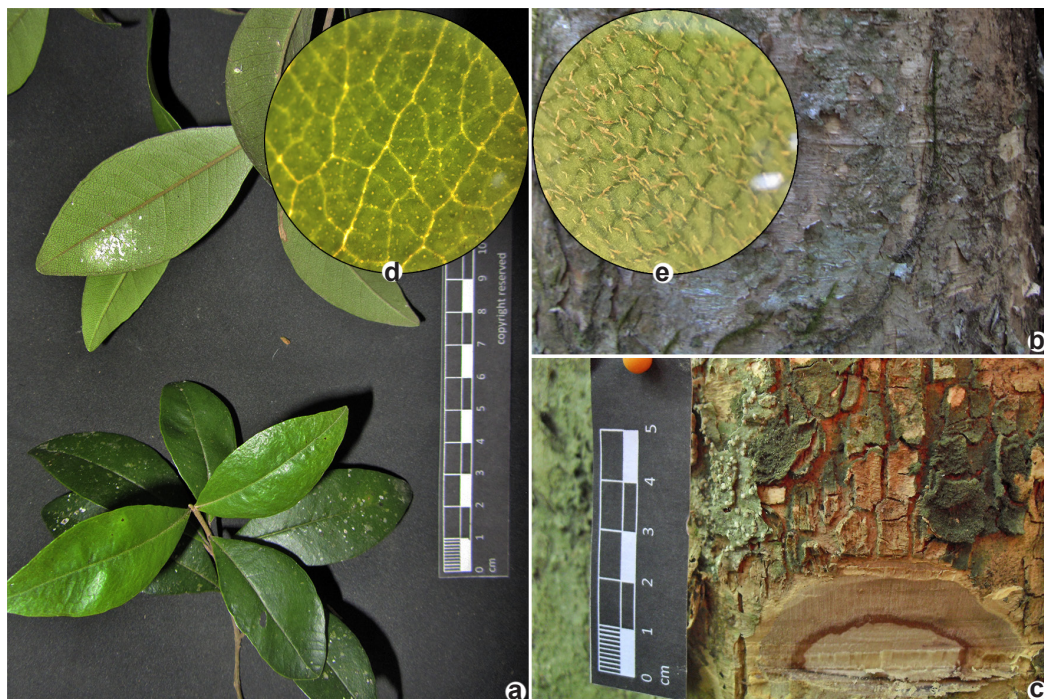


Figure 11 – a-e. *Myrceugenia acutiflora* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctations on the leaves (adaxial face, magnification 4.5x, with light); e. detail of the sericeous indumentum (abaxial face, magnification 4.5x, without light).

concave profile, (7–)9(–13) pairs of secondary veins visible, forming intramarginal veins less than 1 mm apart from the margin, tertiary veins reticulate. Petiole (3–)4(–5) mm, profile furrowed.

12. *Myrceugenia euosma* (O.Berg) D.Legrand, *Anales Mus. Hist. Nat. Montevideo*, ser. 2, 4(11): 40. 1936. Fig. 12

Tree 6–9 m high. EB copper-coloured with reddish and/or brownish regions, laminate/flaky and/or fissured, with peeling into sheets and flakes. IB pinkish, homogeneous. Branches brown, striate, with pilose ends. Leaves chartaceous, discoloured, inconspicuous presence of sericeous indumentum on the abaxial face and central vein (colour whitish/ferruginous), elliptic-elongate, apex acute to slightly acuminate, base acute, margin entire, blade (1.4–)2.4(–3.2) × (0.4–)0.6(–0.9) cm, translucent punctuations visible to the naked eye against the light, adaxial central vein of depressed profile, secondary veins inconspicuous, tertiary veins scalariform (visible under stereo microscope). Petiole (1–)2(–3) mm, profile slightly furrowed.

13. *Myrceugenia glaucescens* (Cambess.) D.Legrand & Kausel, *Comun. Bot. Mus. Hist. Nat. Montevideo* 1(7): 7, 1943. Fig. 13

Tree 6 m high. EB brownish-grey, rough with small fissures, peeling into flakes. IB lightly pinkish coloured, or white, homogeneous. Branches brownish-green. Leaves chartaceous, glabrous, slightly discoloured with abaxial face greyish-white, elliptic, apex acute, base acute to attenuate, margin entire (with portions slightly crenate), blade (3.1–)4.2(–5.2) × (1.1–)1.6(–2.2) cm, with abundant translucent punctuations and clearly visible to the naked eye, adaxial central vein with an depressed profile, (9–)11(–15) pairs of secondary veins visible, forming intramarginal veins less than 1 mm apart from the margin, tertiary veins scalariform. Petiole (2–)3(–4) mm, furrowed (concave).

14. *Myrceugenia miersiana* (Gardner) D.Legrand & Kausel, *Comun. Bot. Mus. Hist. Nat. Montevideo* 2(28): 8. 1953. Fig. 14

Treelet 6,5–8,5 m high. EB white, rough with subtle ridges, peeling into small chartaceous



Figure 12 – a-d. *Myrceugenia euosma* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctuations on the leaves (adaxial face, magnification 0.7x, with light).



Figure 13 – a-d. *Myrceugenia glaucescens* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctuations on the leaves (abaxial face, magnification 4.5x, without light).



Figure 14 – a-e. *Myrceugenia miersiana* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctuations on the leaves (8); e. detail of the velvety indumentum (abaxial indumentum, magnification 4.5x, without light).

and/or dusty (shattering in the hands). IB white/cream of homogeneous appearance, presenting an internal areola of purplish red colour after oxidation. Branches brownish-grey, without peeling or with dusty regions, apical portions with abundant lanate indumentum, giving it a ferruginous colour. Leaves chartaceous, with inconspicuous velvety indumentum on the adaxial face, becoming abundant on the abaxial face and primary adaxial vein, elliptic, apex acute to slightly acuminate, base acute to slightly attenuate, margin entire, blade (4.8–)6.4(–8.2) × (1.9–)2.7(–4) cm, with translucent punctuations visible only under stereomicroscope, against the light, adaxial central vein complanate to slightly depressed (concave) in profile, (9–)11(–15) pairs of secondary veins visible, forming intramarginal veins, on average 1.8 mm apart from the margin, tertiary veins reticulate. Petiole (5–)7(–9) cm, profile cylindrical to semi cylindrical.

15. *Myrceugenia regnelliana* (O.Berg) D.Legrand & Kausel, *Comun. Bot. Mus. Hist. Nat. Montevideo* 2(28): 11. 1953. Fig. 15

Tree 5–6 m high. EB brownish-grey of rough/flaky appearance, peeling absent or in flakes. IB cream/white or lightly pink coloured, homogeneous, presence of a purplish red internall areola. Branches brownish-grey. Leaves chartaceous, glabrous, discoloured with a whitish abaxial face, elliptic-elongate, apex acute, base acute, margin entire, blade (1.2–)2.3(–3.4) × (0.5–)0.8(–1.2) cm, with translucent punctuations on the stereo microscope, without light, adaxial central vein complanate to slightly depressed in profile, secondary veins of difficult visualization, forming intramarginal veins less than 1 mm apart from the margin, tertiary veins scalariform. Petiole (1–)2(–3) mm, profile semi cylindrical to slightly furrowed.

16. *Myrcia amazonica* DC., *Prodr.* 3: 250. 1828. Fig. 16

Tree 12–14 m high. EB reddish, smooth and/or laminate, peeling into coriaceous sheets (younger individuals peeling into flakes). IB lightly pink coloured, homogeneous. Branches reddish, with peeling slightly dusty. Leaves



Figure 15 – a-d. *Myrceugenia regnelliana* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctuations on the leaves (abaxial face, magnification 4.5x, without light).

chartaceous, glabrous, elliptic, apex acuminate/acute, base acute, margin slightly revolute only at the base, blade (4–)5.9(–8.1) × (1.8–)2.5(–3.3) cm, with translucent punctuations visible to the naked eye, without light, adaxial central vein with a concave profile, (8–)11(–16) pairs of secondary veins visible, forming intramarginal veins 2 mm apart from the margins, tertiary veins slightly reticulate. Petiole (4–)5(–7) mm, profile furrowed.

17. *Myrcia guianensis* (Aubl.) DC., Prodr. 3: 245. 1828. Fig. 17

Tree 8 m high. EB brownish to copper coloured, flaky, peeling into flakes and small ribbons. IB pinkish, homogeneous. Branches brown. Leaves chartaceous, glabrous, ovate/elliptic, apex acuminate/acute/obtuse, base attenuate, margin entire, blade (2.9–)3.4(–4.0) × (1.4–)1.7(–2) cm, with abundant translucent punctuations, visible to the naked eye, adaxial central vein slightly raised, secondary and tertiary veins inconspicuous. Petiole (4–)4(–5) mm, profile cylindrical.

18. *Myrcia hatschbachii* D.Legrand, Sellowia 13: 293. 1961. Fig. 18

Tree 7–10 m high. EB dark brown, occasionally presenting copper tones, flaky or rough, peeling into flakes of irregular/rectangular shape. IB pinkish, with marginal regions lighter-coloured and yellowish, homogeneous. Branches brown, apical portions pubescent. Leaves chartaceous, inconspicuously pubescent on the abaxial face, somewhat more evident on the central vein, elliptic, apex acute, base acute, margin entire and slightly revolute, blade (6.2–)8.5(–11.2) × (2.1–)3.1(–4.3) cm, with translucent punctuations visible to the naked eye, against the light, adaxial central vein with depressed profile (V-shaped sulcus), (14–)18(–24) pairs of secondary veins visible, forming intramarginal veins approximately 1 mm apart from the margin, tertiary veins markedly reticulate. Petiole (3–)6(–8) mm, profile furrowed.

19. *Myrcia selloi* (Spreng.) N. Silveira, Lofegrenia 89: 5. 1986. Fig. 19

Tree 7–9 m high. EB green, variegated, smooth and/or laminate, peeling into sheets or

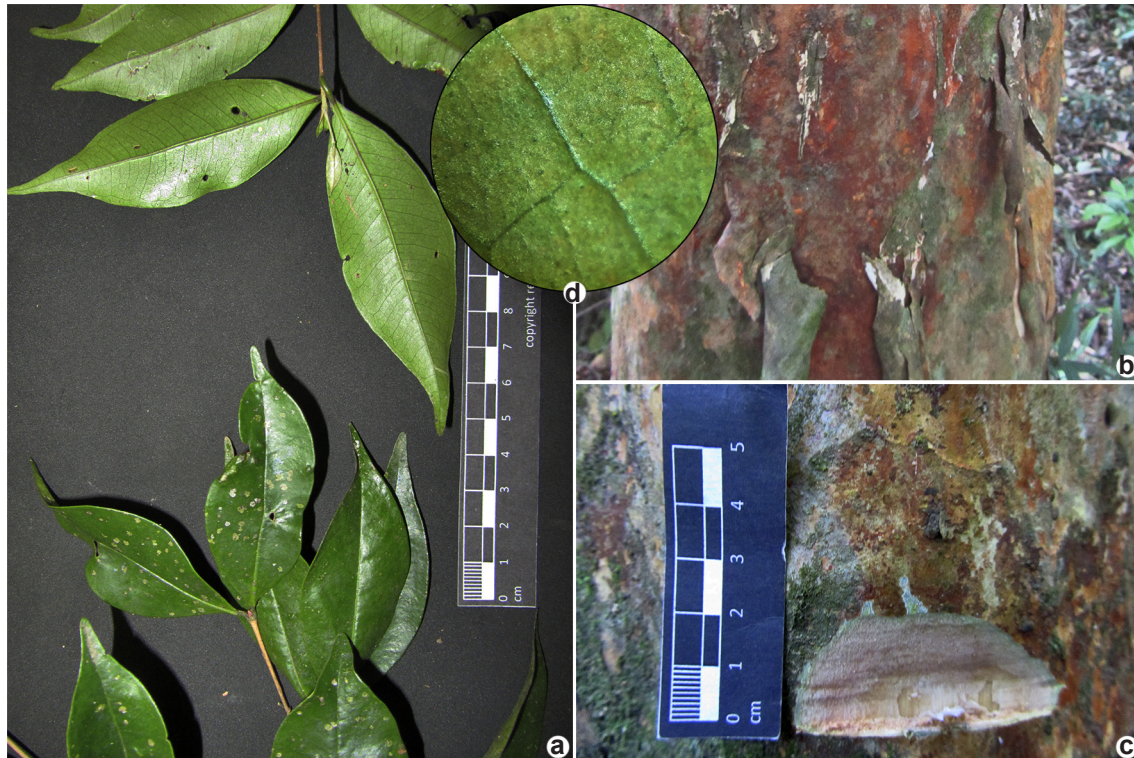


Figure 16 – a-d. *Myrcia amazonica* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctuations on the leaves (abaxial face, magnification 4.5x, without light).

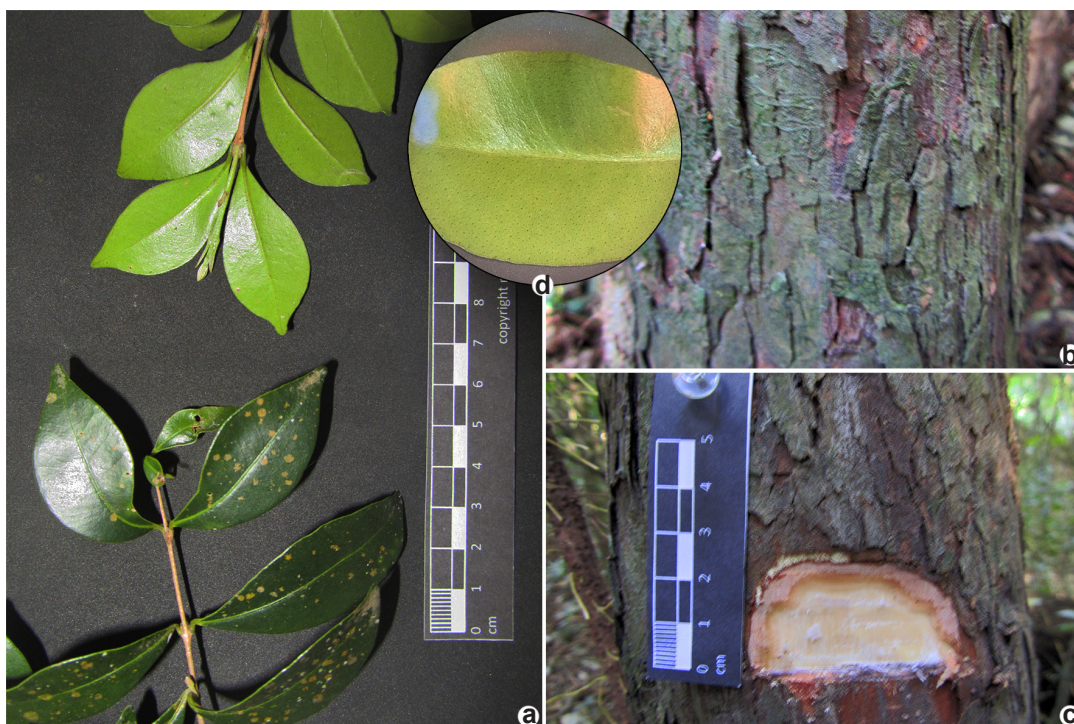


Figure 17 – a-d. *Myrcia guianensis* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctuations on the leaves (abaxial face, magnification 0.7x, without light).

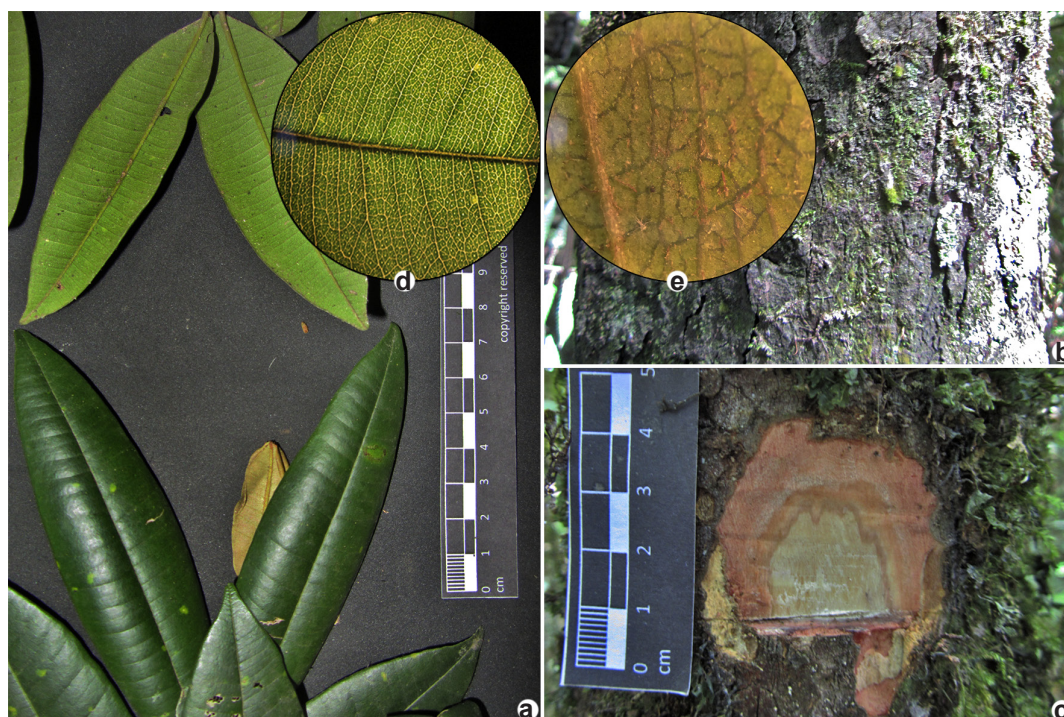


Figure 18 – a-e. *Myrcia hatschbachii* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctuations on the leaves (adaxial face, magnification 0.7x, with light); e. detail of the pilose indumentum (abaxial face, magnification 4.5x, without light).

absent. IB cream/white, homogeneous. Branches green, variegated. Leaves chartaceous, glabrous, elliptic, apex acute, base rounded/acute, margin entire, blade (3.1–)5.2(–7.5) × (1.5–)2.1(–2.9) cm, with abundant translucent punctuations, visible under the stereomicroscope without light, adaxial central vein with an depressed profile, (11–)13 (–17) pairs of secondary veins visible, forming inconspicuous intramarginal veins, tertiary veins reticulate. Petiole (3–)5(–9) mm, profile furrowed.

20. *Myrcia palustris* DC., Prodr. 3: 246 (1828).

Fig. 20

Tree 7 m high. EB greyish, rough/reticulate, peeling into flakes. IB intense dark red, homogeneous. Branches greyish. Leaves chartaceous, with pilose indumentum on the abaxial face, especially abundant on the central vein, elliptic, apex obtuse/acute, base acute/rounded, margin revolute only at the base, blade (2–)2.8(–3.7) × (1–)1.3(–1.7) cm, with translucent punctuations visible to the naked eye against the light, adaxial central vein with a complanate

profile, (7–)11(–15) pairs of secondary veins visible, tertiary veins reticulate. Petiole (1–)2(–2) mm, profile furrowed.

21. *Myrcia splendens* (Sw.) DC., Prodr. 3: 244. 1828.

Fig. 21

Tree 11–15 m high. EB brown, flaky, peeling into small flakes. IB dark red, homogeneous, occasionally bearing light longitudinal stripes and rarely presenting a colourless exudate, forming a sticky layer. Branches brownish-grey, with sericeous indumentum on the apical portions. Leaves chartaceous, abundant sericeous indumentum on the central vein and abaxial face, narrow lanceolate, apex long acuminate, base acute, margin entire, blade (3.4–)4.4(–5.5) × (0.7–)1.0 (–1.4) cm, with sparse translucent punctuations, small and visible only under stereo microscope, against the light, adaxial central vein with a complanate profile, secondary veins with over 30 pairs visible, forming intramarginal veins less than 0.5 mm apart from the margin, tertiary veins markedly reticulate. Petiole (2–)2(–3) mm, profile furrowed.



Figure 19 – a-d. *Myrcia selloi* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctuations on the leaves (abaxial face, magnification 4.5x, without light).

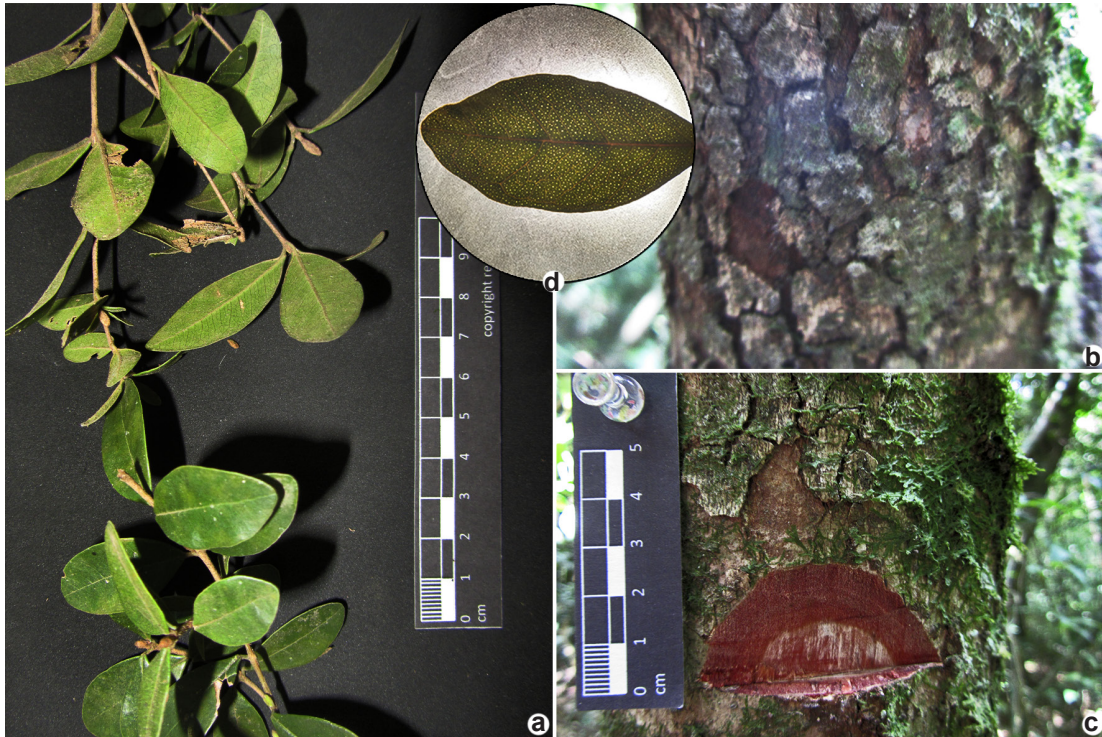


Figure 20 – a-d. *Myrcia palustris* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctations on the leaves (adaxial face, magnification 0.7x, with light).



Figure 21 – a-d. *Myrcia splendens* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctations on the leaves (adaxial face, magnification 4.5x, with light).

22. *Myrcia venulosa* DC., Prodr. 3: 250. 1828.

Fig. 22

Tree 11–14 m high. EB brownish-grey, fissured and/or flaky, peeling into flakes, sometimes dusty. IB pinkish, homogeneous, presenting inconspicuous rings. Branches greyish, striate. Leaves coriaceous, moderate/abundant presence of lanate indumentum on the abaxial face and veins, elliptic, apex obtuse/rounded/acute, base acute, margin revolute, blade (3.2–)4.2(–5) × (1.3–)1.7(–2.0) cm, with translucent punctuations visible to the naked eye, against the light, adaxial central vein with an depressed profile, (9–)11(–14) pairs of secondary veins visible, forming intramarginal veins 1 mm apart from the margin, tertiary veins reticulate. Petiole (4–)5(–7) mm, semi cylindrical to slightly furrowed.

23. *Myrcianthes gigantea* (D.Legrand) D.Legrand, Darwiniana 9: 300. 1950.

Fig. 23

Tree 14–17 m high. EB orange/reddish, smooth with depressions, peeling into plates or coriaceous sheets, depressions with concentric

lines. IB lightly pink coloured or orange/reddish, laminate. Branches greyish. Leaves chartaceous, glabrous, elliptic/obovate, apex acuminate/emarginate/acute, base acute/attenuate, margin entire, blade (4.4–)5.9(–7.8) × (1.9–)3(–4.3) cm, with small translucent punctuations, visible to the naked eye against the light, adaxial central vein with an depressed profile, (11–)13(–16) pairs of secondary veins on the adaxial face and of difficult visualization on the abaxial face, tertiary veins slightly scalariform. Petiole (5–)8(–10) mm, profile furrowed.

24. *Myrciaria tenella* (DC.) O.Berg, Linnaea 27: 328. 1856.

Fig. 24

Treeliet 4–7 m high. EB variegated, greenish coloured with light brown, smooth/laminate, peeling into coriaceous sheets. IB cream/white, laminate. Branches brown, inconspicuously pilose, smooth/laminate. Leaves chartaceous/membranaceous, glabrous, elliptic, apex obtuse/attenuate, base acute, margin entire, blade (1–)1.6(–2) × (0.4–)0.7(–0.9) cm, with translucent



Figure 22 – a-e. *Myrcia venulosa* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctuations on the leaves (adaxial face, magnification 0.7x, with light); e. detail of the lanate indumentum (abaxial face, magnification 4,5x, without light).



Figure 23 – a-d. *Myrcianthes gigantea* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctuations on the leaves (adaxial face, magnification 0.7x, with light).



Figure 24 – a-d. *Myrciaria tenella* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctuations (abaxial face, magnification 4.5x, without light).

punctuations visible under stereo microscope sem luz, adaxial central veins with a complanate/concave profile, secondary veins very small and close together, forming intramarginal veins, approximately 1 mm apart from the margin, tertiary veins scalariform. Petiole (1–)1(–1) mm, inconspicuously pilose, with a semi cylindrical or slightly furrowed profile.

25. *Myrrhinium atropurpureum* Schott, Syst. Veg. [Sprengel] 4(2): 404. 1827. Fig. 25

Treelet 6–7 m high. EB brown and/or greenish, striate or flaky/laminate, peeling absent or in flakes/sheets. IB pinkish, stained with dark red on the outermost surface, homogeneous. Branches brown/copper-coloured. Leaves chartaceous, glabrous, elliptic, apex acute/acuminate/obtuse, base acute, margin entire, blade (3–)4.8(–6.9) × (1.1–)1.7(–2.2) cm, with translucent punctuations visible to the naked eye, adaxial central vein with profile slightly depressed, (9–)13(–16) pairs of secondary veins visible, tertiary scalariform. Petiole (1–)2(–3) mm, profile furrowed.

26. *Pimenta pseudocaryophyllus* (Gomes) Landrum, Brittonia 36: 242. 1984. Fig. 26

Treelet 11–12 m high. EB brown, fissured/flaky, peeling into flakes. IB pinkish (on the margin of the cutting, it forms alternate layers of dark and light brown colour), homogeneous. Branches brown, with apical portions green. Leaves gillyflower-scented, chartaceous, discoloured with the abaxial face greyish/whitish for the abundant presence of canescent indumentum, which is inconspicuous on the central vein, elliptic, apex acute, base acute to attenuate, margin entire (with parts slightly crenate), blade (6.3–)8.5(–9.9) × (2.3–)3.3(–2.4) cm, with translucent punctuations of difficult visualization to the naked eye, against the light, but very visible under stereo microscope, against the light, adaxial central vein raised (convex), (15–)19(–24) pairs of secondary veins visible, forming intramarginal veins, approximately 1 mm far from the margin, tertiary veins reticulate. Petiole (8–)10(–11) mm, profile furrowed (concave).



Figure 25 – a-d. *Myrrhinium atropurpureum* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctuations on the leaves (abaxial face, magnification 0.7x, without light).

27. *Plinia peruviana* (Poir.) Govaerts, World Checkl. Myrtaceae: 344. 2008. Fig. 27

Treelet 3–5 m high (young, not fully matured, individuals). EB variegated, greenish (some regions in yellowish tones), smooth/laminate, peeling absent or in sheets. IB cream/white, inconspicuously laminate. Branches brown. Leaves chartaceous, glabrous to the naked eye, central vein on the abaxial surface inconspicuously sericeous, visible under stereo microscope, elliptic, apex acuminate/acute, frequently sickle-shaped, base acute, margin undulate, blade (4.5–)7.1(–10) × (1.2–)2.1(–3.2) cm, adaxial central vein depressed in profile, (15–)19(–24) pairs of secondary veins visible, forming double intra and sub-marginal veins, 1 and 3 mm apart from the margin, respectively, tertiary veins scalariform. Petiole (2–)3(–5) mm, profile furrowed.

28. *Psidium cattleyanum* Sabine, Trans. Hort. Soc. London 4: 317. 1821. Fig. 28

Tree 9 m high. EB variegated, reddish with light brown regions, smooth/laminate, peeling into

coriaceous sheets. IB pinkish with external green areola, homogeneous. Branches brown/reddish, smooth/laminate. Leaves coriaceous, glabrous, oblanceolate/elliptic, apex acute/obtuse/acuminate, base attenuate/acute, margin entire, blade (6.2–)9.1(–11.1) × (2.6–)4.1(–5.3) cm, with translucent punctuations visible to the naked eye, adaxial central vein with profile complanate/concave, (9–)11(–13) pairs of secondary veins visible, forming intramarginal veins 3 mm apart from the margin, tertiary veins scalariform. Petiole (7–)9(–12) mm, profile semi cylindrical to slightly furrowed.

29. *Psidium guajava* L., Sp. Pl.: 470. 1753. Fig. 29

Tree 4 m high (exotic species). EB variegated, reddish with greenish regions, smooth/laminate, peeling into coriaceous sheets. IB pinkish with external green areola, laminate. Branches brown/reddish, laminate. Leaves chartaceous, with brown sericeous indumentum on the abaxial face and central vein, elliptic/orbicular, apex acute/obtuse/emarginate, base acute/rounded, margin entire,

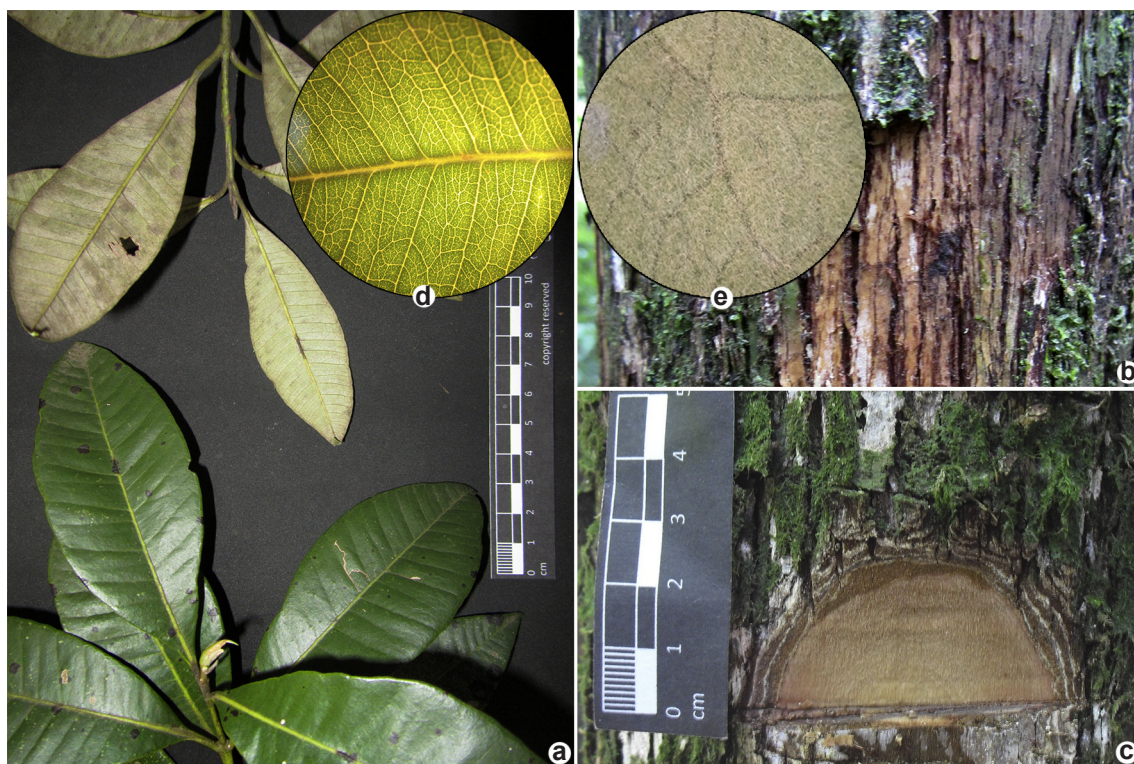


Figure 26 – a-e. *Pimenta pseudocaryophyllus* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctuations on the leaves (adaxial face, magnification 0.7x, with light); e. detail of the canescent indumentum (abaxial face, magnification 4.5x, without light).



Figure 27 – a-e. *Plinia peruviana* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctations on the leaves (adaxial face, magnification 4.5x, with light); e. detail of the double intramarginal vein (adaxial face, magnification 4.5x, with light).

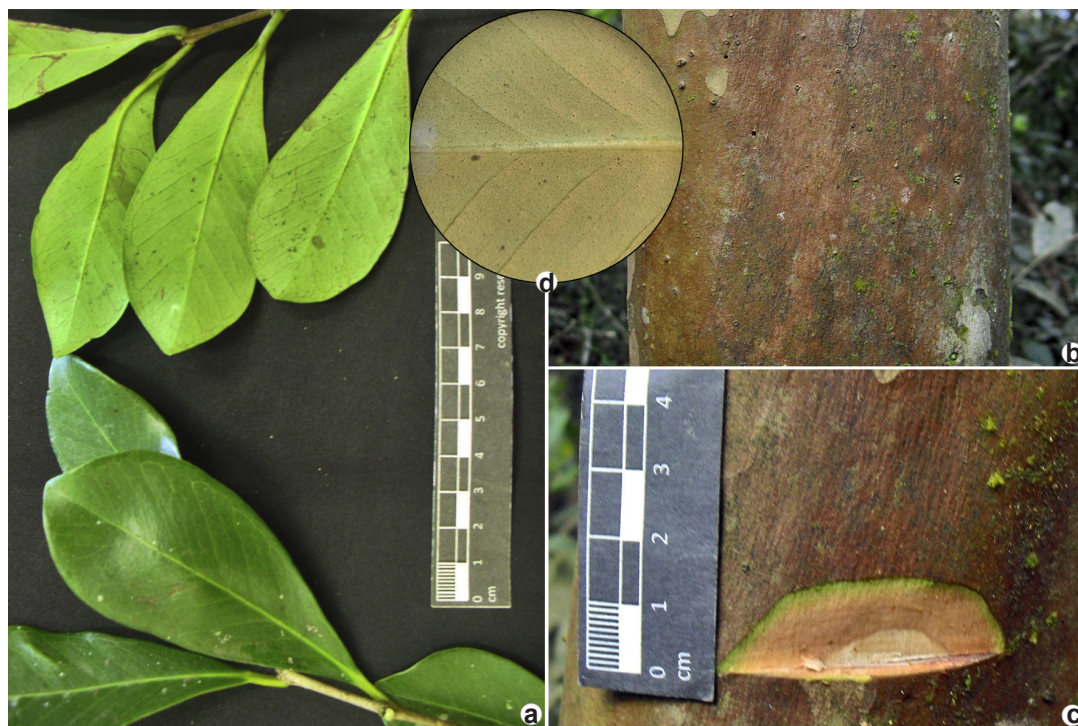


Figure 28 – a-d. *Psidium cattleyanum* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctations of the leaves (abaxial face, magnification 0.7x, without light).



Figure 29 – a-d. *Psidium guajava* – a. branch and leaves; b. external bark; c. internal bark; d. detail of the translucent punctuations on the leaves (adaxial face, magnification 0.7x, with light).

blade (8.3–)11.8(–15.5) × (4.7–)6.4(–7.9) cm, with translucent punctuations visible under stereo microscope, without light, adaxial central vein with a markedly depressed profile, (16–)19(–23) pairs of secondary veins visible, tertiary veins reticulate. Petiole (8–)10(–13) mm, profile furrowed.

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References

BFG - The Brazil Flora Group (2018) Brazilian Flora 2020: innovation and collaboration to meet Target 1 of the Global Strategy for Plant Conservation (GSPC). *Rodriguésia* 69: 1513-1527.
 Cardoso C & Sajo MDG (2004) Vascularização foliar e a identificação de espécies de *Eugenia* L. (Myrtaceae)

da bacia hidrográfica do Rio Tibagi, PR. *Brazilian Journal of Botany* 27: 47-54.

Govaerts R, Sobral M, Ashton P, Barrie F, Holst BK, Landrum LL, Matsumoto K, Fernanda Mazine F, Nic Lughadha E, Proença C, Soares-Silva LH, Wilson PG & Lucas E (2019) World checklist of Myrtaceae. Facilitated by the Royal Botanic Gardens, Kew. Available at <<http://wesp.science.kew.org/>>. Access on 23 October 2019.

Hickey LJ (1973) Classification of the architecture of Dicotyledonous leaves. *American Journal of Botany* 60: 17-33.

Ivanchechen SL (1988) Estudo morfológico e terminológico do tronco e bark de 30 espécies arbóreas em Floresta Ombrófila Mista. Dissertação de Mestrado. Universidade Federal do Paraná, Curitiba. 221p.

Kaehler M, Goldenberg R, Evangelista PH, Ribas OD, Vieira AO & Hatschbach GG (2014) Plantas vasculares do Paraná. Ed. UFPR, Curitiba. 198p.

Kozera C, Dittrich VAO & Silva SM (2006) Composição florística da Floresta Ombrófila Mista Montana do Parque Municipal do Barigüi, Curitiba, PR. *Floresta* 36: 45-58.

Legrand CD & Klein RM (1969) Mirtáceas. In: Reitz PR (ed.) *Flora Ilustrada Catarinense*. Herbário Barbosa Rodrigues, Itajaí. Pp. 45-216.

- Legrand CD (1961) Mirtaceas del Estado de Santa Catarina. *Sellowia* 13: 265-364.
- Lima DF, Goldenberg R & Sobral M (2011) O Gênero *Campomanesia* (Myrtaceae) no estado do Paraná. *Rodriguésia* 62: 683-693.
- Lima DF, Caddah MK & Goldenberg R (2015) A família Myrtaceae na Ilha do Mel, Paranaguá, estado do Paraná, Brasil. *Rodriguésia* 62: 683-693.
- Marchiori JNC & Sobral M (1997) Dendrologia das Angiospermas: Myrtales. Editora UFSM, Santa Maria. 304p.
- Marchiori JNC (2013) Elementos de Dendrologia. 3ª ed. Editora UFSM, Santa Maria. 216p.
- Mattos JR (1983a) Myrtaceae do Rio Grande do Sul. *Roessléria* 5: 75-163.
- Mattos JR (1983b) Myrtaceae do Rio Grande do Sul. *Roessléria* 5: 169-359.
- Mattos JR (1984) Myrtaceae do Rio Grande do Sul. *Roessléria* 6: 3-394.
- Mattos JR (1985) Myrtaceae do Rio Grande do Sul - suplemento. *Roessléria* 7: 3-21.
- Miller DZ & Blum CT (2018) Chave dendrológica e caracterização da morfologia vegetativa de espécies lenhosas de Fabaceae em um fragmento de Floresta Ombrófila Mista de Curitiba, PR. *Rodriguésia* 69: 787-804.
- Rau TG & Blum CT (2019) Caracterização dendrológica da família Salicaceae em um remanescente de Floresta Ombrófila Mista. *Acta Biológica Catarinense* 6: 26-41.
- Reginato M, Matos FB, Lindoso GS, Souza CMF, Prevedello JA, Morais JW & Evangelista PHL (2008) A vegetação na Reserva Mata Viva, Curitiba, Paraná, Brasil. *Acta Biológica Paranaense* 37: 229-252.
- Ribeiro JELS, Hopkins MJG, Vicentini A, Sothers CA, Costa MA, Brito JM, Souza MAD, Martins LH, Lohmann LG, Assunção PACL, Pereira EC, Silva CF, Mesquita MR & Procópio LC (1999) Flora da Reserva Ducke: guia de identificação das plantas vasculares de uma floresta de terra-firme na Amazônia Central. INPA, Manaus. 816p.
- Rocha OH (2018). Myrtaceae no Parque Estadual de Vila Velha, Ponta Grossa, Paraná, Brasil. Dissertação de Mestrado. Universidade Federal de São Carlos, Sorocaba, São Paulo. 64p.
- Roderjan CV (1987) Dendrologia: introdução, terminologia e metodologia. UFPR, Curitiba. 18p.
- Romagnolo MB & Souza MC (2004). Os gêneros *Calycorectes* O. Berg, *Hexachlamys* O. Berg, *Myrcianthes* O. Berg, *Myrciaria* O. Berg e *Plinia* L. (Myrtaceae) na planície alagável do alto Rio Paraná, Brasil. *Acta Botanica Brasilica* 18: 613-627.
- Romagnolo MB & Souza MC (2006). O gênero *Eugenia* L. (Myrtaceae) na planície alagável do alto Rio Paraná, estados de Mato Grosso do Sul e Paraná, Brasil. *Acta Botanica Brasilica* 20: 529-548.
- Rotta E (1977) Identificação dendrológica do Parque Municipal da Barreirinha, Curitiba, PR. Dissertação de Mestrado. Universidade Federal do Paraná, Curitiba. 274p.
- Scheer MB & Blum CT (2011) Arboreal diversity of the Atlantic Forest of Southern Brazil: from the beach ridges to the Paraná river. In: Grillo O (ed.) The dynamical processes of biodiversity - case studies of evolution and spatial distribution. InTech, Rijeka. Pp. 109-134.
- Soares-Silva LH (2000) A família Myrtaceae - subtribos: Myrciinae e Eugeniinae na bacia hidrográfica do Rio Tibagi, estado do Paraná. Tese de Doutorado. Universidade Estadual de Campinas, Campinas. 462p.
- Sobral M (2003) A família das Myrtaceae no Rio Grande do Sul. Editora UNISINOS, São Leopoldo. 215p.
- Sobral M (2011) *Eugenia* (Myrtaceae) no Paraná. Eduel, Londrina. 236p.
- Souza VC & Lorenzi H (2008) Botânica sistemática: guia ilustrado para identificação das famílias de fanerógamas nativas e exóticas no Brasil, baseado em APG II. 2ª ed. Instituto Plantarum, Nova Odessa. 704p.
- Wilson PG, O'Brien MM, Gadek PA & Quinn CJ (2001) Myrtaceae revisited: a reassessment of infrafamilial groups. *American Journal of Botany* 88: 2013-2025.