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Original Paper

A taxonomic account of *Myrcia* (Myrtaceae) at the sites of the Biological Dynamics of Forest Fragments Project, Amazonas, Brazil

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Abstract

Myrcia is the sole genus of the Myrciinae, one of the nine subtribes of Myrteae (Myrtaceae). The Amazon forest holds about one-quarter of the Brazilian species of *Myrcia*, but the genus is still understudied in this whole region. In this context, this study presents a floristic survey of *Myrcia* in the permanent plots of the Biological Dynamics of Forest Fragments Project (BDFFP), in Amazonas state, Brazil. The genus is represented by 36 species in the study area, comprehending 32% of its total richness in the Brazilian Amazon forest, with 19 of them endemic to this domain. *Myrcia neospeciosa* is reported as a new occurrence for Amazonas state and *M. grandis* is recorded for the first time from upland *terra firme* forests on clayish soils. *Myrcia cuspidata*, a species with calyptrate flowers, is classified under *Myrcia* sect. *Aulomyrcia*, representing the second taxon of the genus with this feature removed from *Myrcia* sect. *Calyptranthes*. Finally, morphological aspects of the infra-generic categories of *Myrcia* are reported more overlapping than previously thought. A map containing the location of the study area, an identification key, descriptions, comments, and figures are provided.
Key words: Amazonia, *Calyptranthes*, floristic survey, *Marlierea*, Myrteae.

Resumo

Myrcia é o único gênero de Myrciinae, uma das nove subtribos de Myrteae (Myrtaceae). A floresta amazônica detém cerca de um quarto das espécies brasileiras de *Myrcia*, mas este é ainda um gênero pouco estudado em toda a região. Neste contexto, este estudo traz um levantamento florístico de *Myrcia* nas parcelas permanentes do Projeto Dinâmica Biológica de Fragmentos Florestais (PDBFF), no estado do Amazonas, Brasil. O gênero é representado na área de estudo por 36 espécies, compreendendo 32% de sua riqueza total na Amazônia brasileira, com 19 delas endêmicas deste domínio. *Myrcia neospeciosa* é apresentada como uma nova ocorrência para o estado do Amazonas e *M. grandis* é registrada pela primeira vez na floresta de terra firme sobre solos argilosos. *Myrcia cuspidata*, uma espécie com flores caliptradas, é classificada em *Myrcia* sect. *Aulomyrcia*, sendo este o segundo táxon do gênero com esta característica removido de *Myrcia* sect. *Calyptranthes*. Por fim, notaram-se mais sobreposições entre os aspectos morfológicos das categorias infragenéricas de *Myrcia* do que anteriormente em outros trabalhos. São apresentados um mapa com a localização dos sítios de estudo, uma chave de identificação, descrições, comentários e figuras.
Palavras-chave: Amazônia, *Calyptranthes*, levantamento florístico, *Marlierea*, Myrteae.

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Introduction

About 1,200 species of Myrtaceae occur in Brazil, all of them circumscribed in tribe Myrteae (Proença *et al.* 2020). One-third of them belong to *Myrcia*, a genus characterised by embryos with a well-developed hypocotyl and leafy, folded cotyledons surrounded by a soft seed coat (Lucas *et al.* 2019). In addition, flowers usually have 2–3-locular ovaries with two ovules per locule and are usually arranged in well-developed inflorescences; the calyx, however, varies widely, especially since the inclusion of species previously classified under *Calyptranthes* and *Marlierea* (Lucas *et al.* 2011, 2018).

Myrcia is an important group of plants in the Amazon forest (Cardoso *et al.* 2017), frequently reported in floristic surveys (Ferreira 1997; Godoy *et al.* 1999; Rocha *et al.* 2017), occasionally as a relevant structural component (Kunz *et al.* 2008). Even so, few studies have explored local richness of this genus in Amazonian habitats: notable examples are the monographs of Myrtaceae from Peru (McVaugh 1958), the Guayana Highland (McVaugh 1969), the Ducke Reserve, in Brazil (Souza *et al.* 1999), and the Venezuelan Guayana (Holst *et al.* 2003). Although the Amazonian domain holds only ca. 25% of the Brazilian species of *Myrcia* (Santos *et al.* 2020), several studies have described new species and reported new occurrences in the last decade (Santos *et al.* 2015; Sobral & Souza 2015, 2017; Sobral *et al.* 2015, 2019; Gaem *et al.* 2019a, 2020a), increasing the richness of the genus in that region.

Assigning specimens to species in such a knowledge scarcity scenario may be a challenge, as already proven for plants collected at the permanent plots of Biological Dynamics of Forest Fragment Project (BDFFP 2020; Gomes *et al.* 2013). To help fill this gap, a taxonomic treatment of *Myrcia* from the BDFFP sites is presented here.

Material and Methods

Study site

Researchers collaborating with the BDFFP study the effects of fragmentation in tropical forests since 1979 (Laurance *et al.* 2011). This area is located ca. 80 km north of Manaus, Amazonas state, Brazil, and is composed of permanent plots of 1–100 hectares. A federal conservation area called BDFFP Area of Relevant Ecological Interest was created to protect the research sites (ICMBio 2020), although it does not incorporate all plots monitored by the project. The local climate is intermediate between wet and seasonal, with the driest season in June to October and an annual precipitation between 1,900 and 3,500 mm (Laurance *et al.* 2011). The vegetation is mainly formed by *terra firme* forests on clayish soils, with 30–37 m tall canopy and emergent trees to 55 m tall (Laurance *et al.* 2002). These are among the most diverse forests on Earth (Oliveira & Mori 1999; Duque *et al.* 2017). A map with the location of the BDFFP plots was produced using QGIS version 3.4.10 (QGIS Development Team 2020) (Fig. 1).

Floristic survey and taxonomic treatment

The survey comprised material from the BDFFP reference collection and corresponding exsiccatae deposited at INPA, NY, SORO, SPF, and US herbaria (acronyms according to Thiers, continuously updated). Species names were obtained using available bibliography about Amazonian *Myrcia* (McVaugh 1958, 1969; Souza *et al.* 1999; Holst *et al.* 2003) and by comparison with herbarium specimens, or occasionally by consulting specialists.

Morphological terms follow Radford *et al.* (1974) and other cited references about the genus. One-dimensional values of structure measurements refer to length and two-dimensional values indicate length × width, except where otherwise specified. In general, only mature structures were measured. Colours cited in descriptions refer exclusively to herbarium specimens. The presented generic description is based on species found in the BDFFP plots, but it is also complemented by bibliography (Lucas *et al*. 2011; Vasconcelos *et al*. 2015). Synonyms of the accepted species names are listed only if they were formerly widely applied and are still likely to be found in herbarium specimens collected in the study site. Descriptions of species are based on material from the study sites and are supplemented by additional material when needed. In these cases, collections made near the BDFFP area were prioritised. Species are assigned to sections of *Myrcia* according to Lucas *et al.* (2018), but as Amazonian species of the genus occasionally present floral features that are exceptional to its infra-generic classification, a workable identification key based on them is currently unfeasible. In view of these peculiarities, comments concerning each section are presented before the treatment of the species, and species are presented in alphabetical

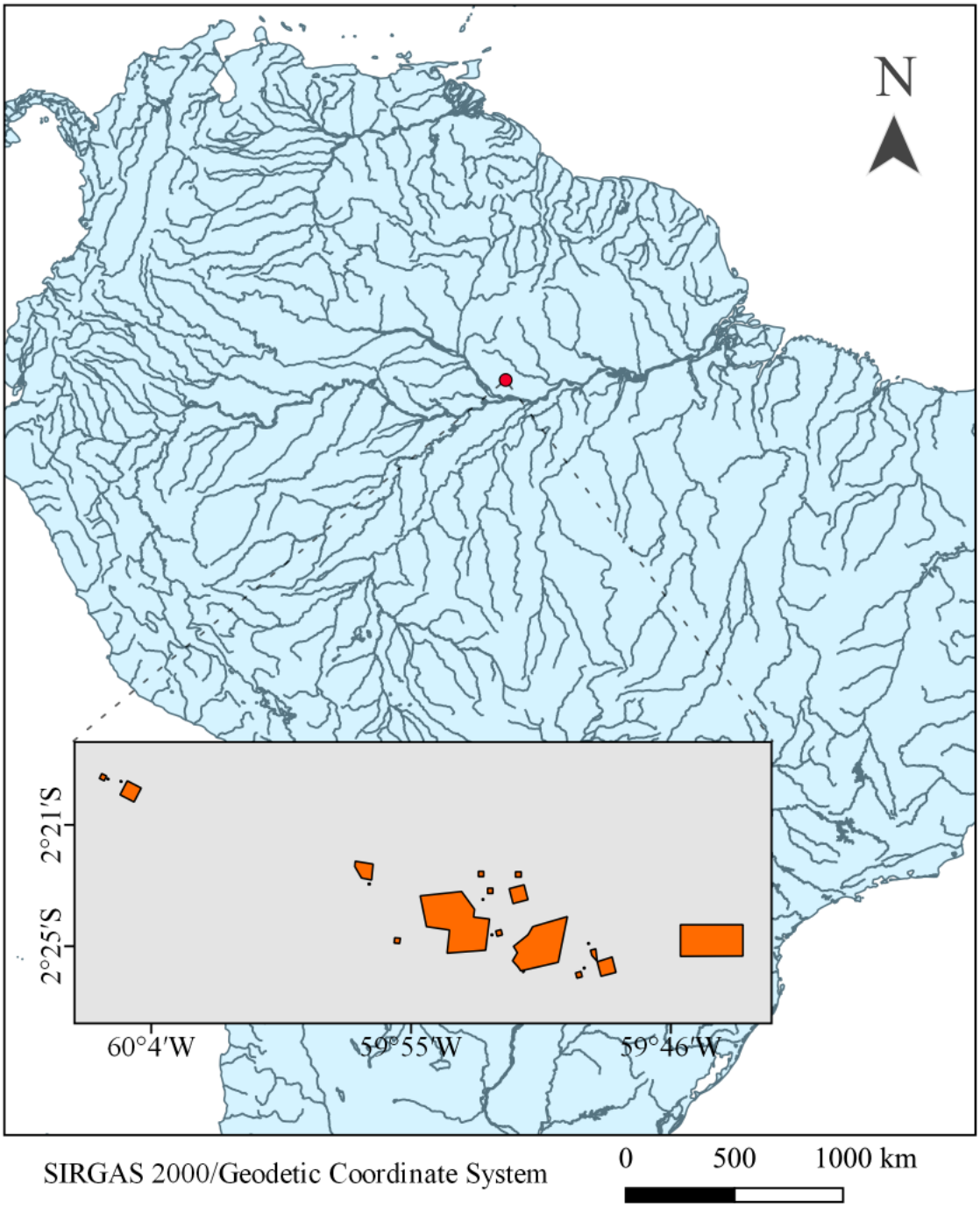


Figure 1 – Location of the Biological Dynamics of Forest Fragments Project in South America (red circle) and detail of the Biological Dynamics of Forest Fragments Project Area of Relevant Ecological Interest (a federal conservation site; orange polygons). Inner blue lines represent watercourses.

order. Two incompletely known species collected without reproductive structures are presented at the end; these are not presented in the identification key nor assigned to infra-generic categories.

Results and Discussion

Myrcia is represented by 36 taxa in the BDFFP permanent plots, comprehending 32% of the total known richness of the genus in the Brazilian Amazon

(Proença *et al.* 2020). In this survey 32 taxa were identified in species level, two in section level (*i.e.*, taxa similar to known species), and two in genus level (*i.e.*, associated with *Myrcia* based on overall vegetative morphology, but without flower or fruits). *Myrcia* sect. *Myrcia* is the richest section of the genus at the BDFFP area (16 species), followed by *M.* sect. *Aulomyrcia* (nine spp.), *M.* sect. *Calyptranthes* (five spp.), *M.* sect. *Aguava* (three spp.), and *M.* sect. *Sympodiomyrcia* (one sp.); two species are unplaced. Nineteen species are exclusively Amazonian and four are endemic to the Manaus region. Almost half (17) of the sampled species also occur in the nearby Adolpho Ducke Forest Reserve (Souza *et al.* 1999). This study records *M. neospeciosa* in Amazonas state and *Myrcia grandis* from upland *terra firme* forests on clayish soils for the first time.

Myrcia DC., Dict. Class. Hist. Nat. 11: 401. 1827, *nom. cons*.
Calyptranthes Sw., Prodr. 5: 79. 1788.
Marlierea Cambess., Fl. Bras. Merid. 2: 373. 1833. Figs. 2-7

Shrubs to trees up to 30 m tall. Branching monopodial or sympodial; cataphylls often present, usually inconspicuous or rarely well-developed and showy. Inflorescences determinate with subunits formed by cymes or dichasia, up to four times compound, monopodial, with a well-developed main axis, or sympodial, with an abortive and congested main axis, sometimes spiciform due to reduction of high-order axes; bracts and bracteoles deciduous or occasionally persistent after anthesis. Flowers sessile, short-pedicellate, or rarely distinctly pedicellate; hypanthium longitudinally extended beyond the summit of the ovary or not; perianth 4–5-merous, calyx lobes free to completely fused in bud, opening in intact lobes, tearing longitudinally and/or parallel to the staminal ring, or detaching transversely as a circular unit (calyptra) at anthesis, corolla present and conspicuous or occasionally absent or inconspicuous; floral disc glabrous to densely covered with trichomes; stamens numerous, strongly incurved centerward before anthesis, anthers symmetrical, reversing curvature at dehiscence; ovary 2–3-locular, with two ovules per locule. Fruits baccate and globose, ellipsoid, or oblong, crowned by the calyx and the hypanthial tube (when present), or calyx occasionally deciduous. Seeds one or two per fruit; embryo with folded, leafy cotyledons and a long hypocotyl; testa soft or papery when dry.

Myrcia sect. ***Aguava*** (Raf.) D.F.Lima & E.Lucas, Kew Bull. 73(9): 7. 2018.

This section is recognised by flowers with longitudinally, regularly opening calyx and internally glabrous, extended hypanthium (Lima 2017). This combination of features is also present in some species of *Myrcia* sect. *Aulomyrcia*, but the latter have 2-locular ovaries (*vs.* 3-locular in *M.* sect. *Aguava*; Lucas *et al.* 2018). All species studied here have leaves with the midvein adaxially raised.

Included species: *Myrcia cuprea*, *M. gigas*, and *M. guianensis*.

Myrcia sect. ***Aulomyrcia*** (O.Berg) Griseb., Fl. Brit. W. I. 234. 1860.

Myrcia sect. *Aulomyrcia* is a taxon of difficult delimitation due to its ultra-variable morphology (Lucas *et al.* 2016, 2018). Contrary to descriptions of this section to date, it can include species with calyptrate flowers in combination with regularly-branching inflorescences (*Myrcia cuspidata*) and flowers with a distinctly pubescent disc (*e.g.*, *M. uaupensis*). Although variable, all species studied here have flowers with extended hypanthium. *Myrcia* sect. *Aulomyrcia* is species-rich in the Amazon forests and it is apparent that poorly understood species complexes are associated with some of the accepted names in the region (*e.g.*, *M. amazonica*, *M. umbraticola*).

Included species: *Myrcia amazonica*, *M.* aff. *amazonica*, *M. cuspidata*, *M. grandis*, *M. magna*, *M. nigrescens*, *M. pyrifolia*, *M. uaupensis*, and *M. umbraticola*.

Myrcia sect. ***Calyptranthes*** (Sw.) A.R.Lourenço & E.Lucas, Kew Bull. 73(9): 3. 2018.

The species of *Myrcia* sect. *Calyptranthes* of the BDFFP plots are recognised by sympodial inflorescences bearing calyptrate flowers with glabrous discs. Indumentum type and colour, dimension of leaves, and inflorescence architecture are important characters for recognition of species of this section in Amazonia.

Included species: *Myrcia crebra*, *M. fasciculata*, *M. lepida*, *M. neospeciosa*, and *M. vexata*.

Myrcia sect. ***Myrcia***.

Species of *Myrcia* sect. *Myrcia* are recognised by dense indumentum on the outer surface of the hypanthium and usually also on the floral disc, and calyx usually opening longitudinally in 5 sepals. In this study some species of *Myrcia* sect. *Myrcia*

show flowers with a glabrescent disc, 4–5-merous calyx, partially fused sepals, and/or hypanthium conspicuously extended above the ovary, features not included in descriptions of the section to date.

Included species: *Myrcia bracteata*, *M. castanea*, *M. deflexa*, *M.* aff. *deflexa*, *M. elevata*, *M. eveae*, *M. fenestrata*, *M. huallagae*, *M. intonsa*, *M. magnoliifolia*, *M. manausensis*, *M. otocalyx*, *M. paivae*, *M. prismatica*, *M. splendens*, and *M. sylvatica*.

Myrcia sect. ***Sympodiomyrcia*** M.F.Santos & E.Lucas, Taxon 65: 768. 2016.

A single species from the study area belongs to *Myrcia* sect. *Sympodiomyrcia*. This section is recognised in the BDFFP plots by showy and conspicuous vegetative cataphylls, sympodial inflorescences, and sepals slightly tearing parallel to the staminal ring.

Sole species: *Myrcia caloneura*.

Key to species of *Myrcia* from the BDFFP plots

1. Abaxial leaf surface completely covered with vestiture, the actual surface not visible, particularly at the most distally positioned leaves on the branches 2
1'. Abaxial leaf surface glabrous to densely covered with vestiture, the actual surface always visible 6
2. Abaxial leaf surface covered with exfoliating, white, waxy vestiture (as in the petioles and branchlets shown in Fig. 4b) ..... 11. *Myrcia elevata*
2'. Abaxial leaf surface covered with brown, coppery, ferruginous, golden, ochraceous, or white indumentum 3
3. Indumentum of abaxial leaf surface brown, coppery, or ferruginous (Fig. 7a), lateral veins 14–18 at each side ..... 7. *Myrcia cuprea*
3'. Indumentum of abaxial leaf surface golden or ochraceous, lateral veins 22–40 at each side. 4
4. Leaves conspicuously reticulated abaxially; sepals distinct, tearing basally at anthesis (Fig. 5d) ..... 19. *Myrcia intonsa*
4'. Leaves usually inconspicuously reticulated abaxially; sepals completely fused (as in Fig. 2b,g), opening as a calyptra at anthesis 5
5. Leaf blades 8–14 × 2.5–5 cm, lateral veins ca. 30 at each side; inflorescences 3–6 cm ..... 13. *Myrcia fasciculata*
5'. Leaf blades 17–28 × 6–11 cm, lateral veins 31–40 at each side; inflorescences 4–11 cm ..... 24. *Myrcia neospeciosa*
6. Branchlets with inter- and intra-petiolar circular domatia at the nodes (Fig. 6d) ..... 21. *Myrcia magna*
6'. Branchlets without domatia at the nodes 7
7. Calyx completely fused in flower bud (*e.g.*, Fig. 2k-l); fruits crowned by remnants of the calyx or these deciduous 8
7'. Calyx formed by distinct sepals in flower bud (*e.g.*, Fig. 2a,j); fruits crowned by sepals or these rarely deciduous 12
8. Outer surface of hypanthium covered with golden trichomes (Fig. 2k); calyx opening irregularly at anthesis .....32. *Myrcia uaupensis*
8'. Outer surface of hypanthium glabrous or covered with brown, ferruginous, or reddish trichomes; calyx opening as a calyptra at anthesis 9
9. Leaves with 10–15 lateral veins at each side of the blade, inner marginal veins 0.4–1.2 cm from leaf margins ..... 8. *Myrcia cuspidata*
9'. Leaves with 15–36 lateral veins at each side of the blade, inner marginal veins 0.1–0.6 from leaf margins 10
10. Abaxial leaf surface and outer surface of the calyx densely covered with trichomes (Fig. 2g).....20. *Myrcia lepida*
10'. Abaxial leaf surface and outer surface of the calyx glabrous or sparsely covered with trichomes 11

11. Inner marginal veins of leaves 0.2–0.6 cm distant from margins; outer surface of hypanthium glabrous (Fig. 2b)..... 6. *Myrcia crebra*
11'. Inner marginal veins of leaves 0.1–0.2 cm distant from margins; outer surface of hypanthium covered with trichomes (Fig. 2l)..... 34. *Myrcia vexata*
12. Abaxial leaf surface raised among impressed reticulations, resembling pebbled leather (Fig. 6a) ..... 9. *Myrcia deflexa*
12'. Abaxial leaf surface with concave spaces among raised reticulations, not resembling pebbled leather (*e.g.*, Fig. 6b) 13
13. Leaves strongly bullate (*e.g.*, Fig. 7f), lateral veins strongly marked, base and margins of blades occasionally folded downward when dry (Fig. 7d) 14
13'. Leaves not bullate, lateral veins usually not strongly marked (*e.g.*, Fig. 7c,g), base and margins of blades never folded downward when dry 15
14. Petioles 0.6–0.9 cm, leaf blades 17–26.4 × 9–15.6 cm (Fig. 7d), lateral veins 22–26 at each side, reticulations adaxially raised; inflorescences 8–15.6 cm ..... 5. *Myrcia castanea*
14'. Petioles 0.1–0.3 cm, leaf blades 7–13.7 × 2.9–5.2 cm (Fig. 7f), lateral veins 16–21 at each side, reticulations adaxially inconspicuous adaxially; inflorescences 3.5–7.2 cm . ..... 14. *Myrcia fenestrata*
15. Indumentum hirsute (Fig. 4d) 16
15'. Indumentum pubescent, sericeous, tomentose, or absent (Fig. 4a,c,e-f) 17
16. Indumentum golden (Fig. 2a); inflorescences 3–5.6 cm ..... 3. *Myrcia bracteata*
16'. Indumentum coppery to reddish (Fig. 2f); inflorescences 1.3–3.7 cm..... ..... 18. *Myrcia huallagae*
17. Mature branches noticeably corky; inflorescences axillary at the terminal and many subterminal nodes, also emerging at leafless nodes (*i.e.*, ramiflorous) (Fig. 5e) ..... 27. *Myrcia paivae*
17'. Mature branches not corky; inflorescences axillary at the terminal and up to two subterminal nodes, never ramiflorous 18
18. Floral disc glabrous, hypanthium extended as a tube beyond the ovary (*e.g.*, Fig. 3a,e-f,h) 19
18'. Floral disc distinctly covered with trichomes, hypanthium not extended as a tube beyond the ovary (*e.g.*, Fig. 3d) 27
19. Vegetative cataphylls conspicuous (up to 4.6 cm; Fig. 6c); leaves with 26–38 conspicuous lateral veins at each side of the blade ..... 4. *Myrcia caloneura*
19'. Vegetative cataphylls absent or inconspicuous (up to 0.3 cm); leaves with 10–17 lateral veins at each side of the blade, or these inconspicuous and difficult to count 20
20. Leaves with corky petiole (*e.g.*, Fig. 6e); flowers 4–5-merous. If petioles smooth (as in Fig. 6d), then flowers consistently 4-merous 21
20'. Leaves with smooth petiole; flowers 5-merous 23
21. Leaves with smooth petiole, midvein raised adaxially; flowers 4-merous ..... 16. *Myrcia grandis*
21'. Leaves with corky petiole, midvein sulcate adaxially; flowers 4–5-merous (frequently variable in a single individual) 22
22. Petioles glabrous to sparsely pubescent, leaf blades with inconspicuous lateral veins; sepals glabrous or inconspicuously ciliate .... 25. *Myrcia nigrescens*

22’. Petioles moderately to densely tomentose, leaf blades with conspicuous lateral veins; sepals conspicuously ciliate ..... 33. *Myrcia umbraticola*
23. Petioles 1.2–1.9 cm, leaf blades 8.4–17.8 × 4.5–8.1 cm ..... 15. *Myrcia gigas*
23’. Petioles 0.2–0.9 cm, leaf blades 2.3–13.5 × 0.8–4.9 cm 24
24. Leaf midvein adaxially flat to sulcate; indumentum of reproductive parts reddish 25
24’. Leaf midvein adaxially raised; indumentum of reproductive parts white 26
25. Petioles glabrous, leaf blades adaxially glabrous, apex acute to acuminate (as in Fig. 7g) ..... 1. *Myrcia amazonica*
25’. Petioles moderately to densely pubescent or tomentose, leaf blades adaxially sparsely pubescent, apex caudate (Fig. 7c) ..... 2. *Myrcia* aff. *amazonica*
26. Petioles 0.4–0.9 cm, leaf blades 1.8–4.6 cm wide, lateral veins 10–15 at each side; inflorescences 1–2 times compound; outer surface of hypanthium glabrous (*e.g.*, Fig. 2e) ..... 17. *Myrcia guianensis*
26’. Petioles 0.2–0.4 cm, leaf blades 0.8–2.1 cm wide, lateral veins ca. 10 at each side; inflorescences 3 times compound; outer surface of hypanthium densely tomentose (*e.g.*, Fig. 2h) ..... 29. *Myrcia pyrifolia*
27. Petioles 0.1–0.3 cm, leaf blades 2.4–7.1 × 0.7–2.2 cm (Fig. 7h), inner marginal veins ca. 0.05 cm distant from margins ..... 31. *Myrcia sylvatica*
27’. Petioles 0.4–1.6 cm, leaf blades 5.7–29.7 × 2–9.1 cm, inner marginal veins 0.1–0.4 cm distant from margins 28
28. Branchlets, inflorescences, and outer surface of hypanthium covered with sericeous indumentum (as in Fig. 2i-j) 29
28’. Branchlets, inflorescences, and outer surface of hypanthium covered with pubescent or tomentose indumentum (as in Fig. 2c,h) 32
29. Flower buds globose, hypanthium smooth (*e.g.*, Fig. 2j) 30
29’. Flower buds obconic, obovoid, or pyriform, hypanthium longitudinally ridged (*e.g.*, Fig. 2i) 31
30. Petioles 0.8–1.6 cm, leaf blades concoloured, oblong, 16.3–29.7 × 4–8.4 cm, lateral veins 26–37 at each side; fruits ca. 1.9 × 1.1 cm ..... 12. *Myrcia eveae*
30’. Petioles 0.5–0.8 cm, leaf blades discoloured, elliptic to ovate, 7.4–17.4 × 2.6–6.1 cm, lateral veins 21–28 at each side; fruits 1–1.3 × 0.6–0.8 cm ..... 30. *Myrcia splendens*
31. Leaves with 21–28 lateral veins at each side of the blade, inner marginal veins 0.2–0.4 cm distant from margins, flower buds obovoid or obconic; fruits 1.3–2 × 1–1.1 cm ..... 23. *Myrcia manausensis*
31’. Leaves with 13–25 lateral veins at each side of the blade, inner marginal veins 0.1–0.2 cm distant from margins, flower buds pyriform; fruits 0.6–0.9 × 0.5–0.8 cm ..... 26. *Myrcia otocalyx*
32. Inner marginal veins of leaves 0.1–0.2 cm distant from margins; inflorescence indumentum tomentose; fruits oblong, length-width proportion at least 2.3:1 (Fig. 5c) ..... 28. *Myrcia prismatica*
32’. Inner marginal veins of leaves 0.2–0.3 cm distant from margins; inflorescence indumentum pubescent; fruits globose to ellipsoid, length-width proportion up to 1.3:1 (*e.g.*, Fig. 5a-b) 33

33. Leaves with 25–33 lateral veins at each side of the blade; flower buds obovoid .... 22. *Myrcia magnoliifolia*

33'. Leaves with 12–23 lateral veins at each side of the blade; flower buds pyriform (Fig. 2c) .... 10. *Myrcia* aff. *deflexa*

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

Trees, trunk height 12–18 m. Mature branches not corky; branchlets glabrous to moderately pubescent; cataphylls ca. 0.3 cm, moderately pubescent; domatia absent. Leaves with petiole 0.2–0.6 cm, smooth, glabrous; blade discoloured, elliptic or slightly ovate to obovate, not bullate, not folded downward, 3.4–12.2 × 1.7–4.2 cm, glabrous on both surfaces, apex acute or acuminate, base cuneate or obtuse; midvein flat or impressed adaxially, lateral veins 11–16 at each side, raised adaxially, not strongly marked, reticulations raised abaxially, marginal veins two at each side, the inner 0.1–0.3 cm distant from margins. Inflorescences 3.1–12.8 cm, axillary at the terminal nodes, three times compound, indumentum absent or reddish, sparsely or moderately pubescent. Flower buds obovoid to obconic; hypanthium smooth, extending as a tube beyond the ovary, indumentum absent externally; calyx open in bud, formed by five free sepals, glabrous externally, moderately or densely pubescent internally; floral disc glabrous, staminal ring glabrous. Fruits globose, 0.5–0.6 cm diameter, crowned by the calyx and the hypanthial tube.

Examined material: Fazenda Dimona, 02°19'S, 60°05'W, 14.VII.1992, fl., *M. Nee 42957* (INPA, NY); Fazenda Porto Alegre, 2°22'S, 59°57'W, 12.VII.1989, fl., *E. Palheta 3304.3760.2* (INPA); 02°25'S, 59°54'W, 22.VIII.1989, fr., *C.F. Silva 3402.481.2* (INPA, NY); 02°25'S, 59°54'W, 24.VIII.1989, fr., *S.S. Silva 3402.2601.2* (INPA, NY).

Myrcia amazonica occurs in moist forests of tropical America (Lucas *et al.* 2016), including extra-Amazonian habitats. This species can be recognised in the study site by reddish-brown colour of herbarium material and multiflorous inflorescences that bear small flowers with glabrous hypanthium externally. [*Myrcia* sect. *Aulomyrcia*].

2. *Myrcia* aff. ***amazonica***. Fig. 7c

Trees. Mature branches not corky; branchlets moderately pubescent to tomentose; cataphylls not seen; domatia absent. Leaves with petiole 0.2–0.4 cm, smooth to rugose, moderately or densely pubescent to tomentose; blade discoloured, elliptic or slightly ovate, not bullate, not folded downward, 5.2–13.5 × 2.7–4.9 cm, glabrous or sparsely pubescent adaxially, sparsely pubescent abaxially, apex caudate, base obtuse or less often cuneate; midvein impressed adaxially, lateral veins 11–17 at each side, raised adaxially, strongly marked, reticulations raised abaxially, marginal veins two at each side, the inner 0.2–0.4 cm distant from margins. Inflorescences 5.5–12.3 cm, axillary at the terminal and subterminal nodes, indumentum reddish, moderately or densely pubescent. Flower buds not seen; hypanthium (observed in fruit) extending as a tube beyond the ovary; calyx (observed in fruit) formed by five free sepals; floral disc (observed in fruit) glabrous, staminal ring (observed in fruit) glabrous. Fruits globose, 0.7–0.9 cm diameter, crowned by the calyx and the hypanthial tube.

Examined material: Fazenda Porto Alegre, 02°25'S, 59°56'W, 19.V.1992, fr., *M. Nee 42729* (INPA, NY).

This species remains without a firm identification and, as such, its distribution is unknown. It shares with *Myrcia amazonica* the reddish-brown colour of herbarium material, but *M.* aff. *amazonica* has caudate leaves that bear indumentum on the petiole and on abaxial blade surface, features not observed in *M. amazonica* in the BDFFP sites. Floral characters were not observed. [*Myrcia* sect. *Aulomyrcia*].

3. *Myrcia bracteata* (Rich.) DC., Prodr. 3: 245. 1828. Figs. 2a; 3b

Treelets or trees 3–20 m. Mature branches not corky; branchlets moderately hirsute; cataphylls ca. 0.3 cm, moderately hirsute; domatia absent. Leaves with petiole 0.1–0.3 cm, smooth, sparsely or moderately hirsute; blade concoloured or faintly discoloured, elliptic, lanceolate, oblong, or rarely ovate or obovate, not bullate, not folded downward, 2.9–14.7 × 1–4.2 cm, with indumentum concentrated along the midvein adaxially, sparsely or moderately hirsute abaxially, apex acute or acuminate, base cuneate or less often obtuse; midvein impressed adaxially, lateral veins ca. 30 at each side, raised adaxially, not strongly marked, reticulations raised abaxially, marginal veins ca. 0.1 cm distant from margins. Inflorescences 3–5.6 cm, axillary at the terminal and many subterminal nodes, twice compound, indumentum golden,

sparsely or moderately hirsute. Flower buds globose; hypanthium smooth, extending as a tube beyond the ovary, indumentum golden, densely hirsute externally (mainly basally); calyx open in bud, formed by four or five free sepals, sparsely hirsute externally, glabrous internally; floral disc moderately hirsute, glabrescent, staminal ring moderately hirsute, glabrescent. Fruits ellipsoid, 0.6–1 × 0.3–0.6 cm, crowned by the calyx and the hypanthial tube.



Figure 2 – a-l. Flower buds of species of *Myrcia* in the BDFFP sites – a. *Myrcia bracteata*; b. *M. crebra*; c. *M.* aff. *deflexa*; d. *M. elevata*; e. *M. gigas*; f. *M. huallagae*; g. *M. lepida*; h. *M. magna*; i. *M. manausensis*; j. *M. splendens*; k. *M. uaupensis*; l. *M. vexata*.

Examined material: Fazenda Dimona, 02°19'S, 60°05'W, 12.II.1992, fl., *M. Nee 42535* (INPA, NY); Fazenda Esteio, 02°24'S, 59°52'W, fr., *P. Stouffer 1202.90308* (NY).
Additional material: BRAZIL. AMAZONAS: Manaus, Reserva Florestal Ducke, Manaus-Itacoatiara, km 26, estrada para o campo de futebol, 24.I.1996, fr., *M.A.D. Souza et al. 208* (INPA); trilha L-O6, km 3.5, 2.XII.2001, fl., *C.V. Castilho 401* (INPA).

Myrcia bracteata occurs from Ecuador to Bolivia, including the Guiana Shield and Amazonian Brazil (Tropicos.org 2020). This species has golden, hirsute indumentum and persistent floral bracts as distinctive features. It resembles *Myrcia huallagae* in indumentum type, but is easily distinguished from the latter species by indumentum colour and inflorescence size in the study area (see the identification key). The presence of indumentum on floral discs, a diagnostic feature of the section to which this species belongs, may not be evident in specimens of the BDFFP plots as trichomes may fall. [*Myrcia* sect. *Myrcia*].

4. *Myrcia caloneura* Sobral, M.A.D.Souza & M.F.Santos, Phytotaxa 400: 181. 2019.
Figs. 4a; 6c

Trees 14–15 m. Mature branches not corky; branchlets moderately to densely tomentose; cataphylls 1–4.6 cm, sparsely to densely tomentose; domatia absent. Leaves with petiole 0.8–1.5 cm, smooth, glabrous to densely tomentose; blade discoloured, elliptic, ovate, or oblong, not bullate, not folded downward, 15.2–27.3 × 5.1–9.3 cm, glabrous adaxially, densely puberulous and sparsely tomentose abaxially, apex acuminate or caudate, base cuneate or obtuse; midvein impressed adaxially, lateral veins 26–38 at each side, raised adaxially, not strongly marked, reticulations raised abaxially, marginal veins two at each side, the inner 0.1–0.3 cm distant from margins. Inflorescences 3.9–6.7 cm, axillary at the terminal nodes, three times compound, indumentum ferruginous, densely pubescent or tomentose. Flower buds not seen; hypanthium (observed in opem flower) smooth, extending as a tube beyond the ovary, indumentum ferruginous, densely pubescent or tomentose externally; calyx (observed in open flower and fruit) probably fused basally in bud, formed by four basally torn sepals after anthesis, glabrous to densely pubescent or tomentose externally, densely pubescent internally; floral disc glabrous, staminal ring glabrous. Fruits globose, 0.9–1.3 cm diameter, crowned by remnants of the calyx and the hypanthial tube.

Examined material: Fazenda Esteio, sítio amostral florestal, reserva 1301, parcela 1301-9, quadrante 208, 02°23'00.4"S, 59°51'00.3"W, 17.V.1989, *Equipe PDBFF 1301.5775* (SORO); Fazenda Porto Alegre, 02°25'S, 59°54'W, 25.II.1992, fr., *M. Nee 42594* (NY); reserva 1501 (km 41), 02°24'26"–02°25'31"S, 59°43'40"–59°45'50"W, 7.XII.1988, fl., *B. Boom et al. 8769* (INPA, NY); sítio amostral km 37, parcela CTFS-25ha, quadrante 280X360, 02°26'00.5"S, 59°47'00.1"W, 10.I.2017, fr., *P.A. Sá 107279* (INPA).

Myrcia caloneura is known from a few collections from *terra firme* forest in Amazonas and Pará states, Brazil (Sobral *et al.* 2019). This species is recognisable by long cataphylls (up to 4.6 cm, Fig. 6c) and long, brown, sparse trichomes among a puberulous, white, dense indumentum on abaxial leaf surface. It was assigned to *Myrcia* sect. *Aulomyrcia* on the protologue, but Santos *et al.* (2020) suggest otherwise. [*Myrcia* sect. *Sympodiomyrcia*].

5. *Myrcia castanea* M.A.D.Souza & Sobral, Phytotaxa 238: 208. 2015. Fig. 7d

Shrubs to trees 5–8 m. Mature branches not corky; branchlets densely tomentose; cataphylls not seen; domatia absent. Leaves with petiole 0.6–0.9 cm, smooth, densely tomentose; blade discoloured, ovate or less often elliptic, bullate, folded downward when pressed, 17–26.4 × 9–15.6 cm, glabrous to moderately pubescent or tomentose adaxially, moderately or densely tomentose abaxially, apex acute or acuminate, base rounded or cordate; midvein impressed adaxially, lateral veins 22–26 at each side, impressed adaxially, strongly marked, reticulations raised abaxially, marginal veins two at each side, the inner 0.2–0.5 cm distant from margins. Inflorescences 8–15.6 cm, axillary at the terminal and subterminal nodes, twice to four times compound, indumentum ferruginous, densely tomentose. Flower buds obovoid to pyriform; hypanthium smooth, extending as a tube beyond the ovary, indumentum ferruginous, densely pubescent externally; calyx open in bud, formed by five free sepals, moderately or densely pubescent externally, glabrous internally; floral disc densely pubescent, staminal ring densely tomentose. Fruits ellipsoid, ca. 1.2 × ca. 0.7 cm, crowned by the calyx and the hypanthial tube.
Examined material: Fazenda Porto Alegre, 02°22'S, 59°57'W, 13.IV.1992, fl., *C. Dick 122* (INPA, NY); 10.IV.1992, fl., *C. Dick 90* (INPA, NY); 02°22'S, 59°56'W, 19.V.1992, fl., *M. Nee 42713* (INPA, NY).

Additional material: BRAZIL. AMAZONAS: Manaus, Estrada ZF-1, estrada que liga a Manaus-Itacoatiara a Manaus-Caracaraí, aprox. no km 53, 30.III.1978, fr., *M. Silva et al. 2340* (INPA).

Myrcia castanea is known to date only from *terra firme* forests in the region of Manaus (Sobral & Souza 2015). This species can be readily identified by strongly bullate, convex leaf blades with rounded or cordate bases that frequently fold downward when pressed (Fig. 7d). This phenomenon is a consequence of the difficulty of pressing those leaves completely flat due to their three-dimensional shape. Indumentum is much evident, formed by long trichomes that persist especially on inflorescences, hypanthia, and along higher order leaf venation. Its flowers have extended hypanthium, an exceptional feature among species of the section to which it belongs. [*Myrcia* sect. *Myrcia*]

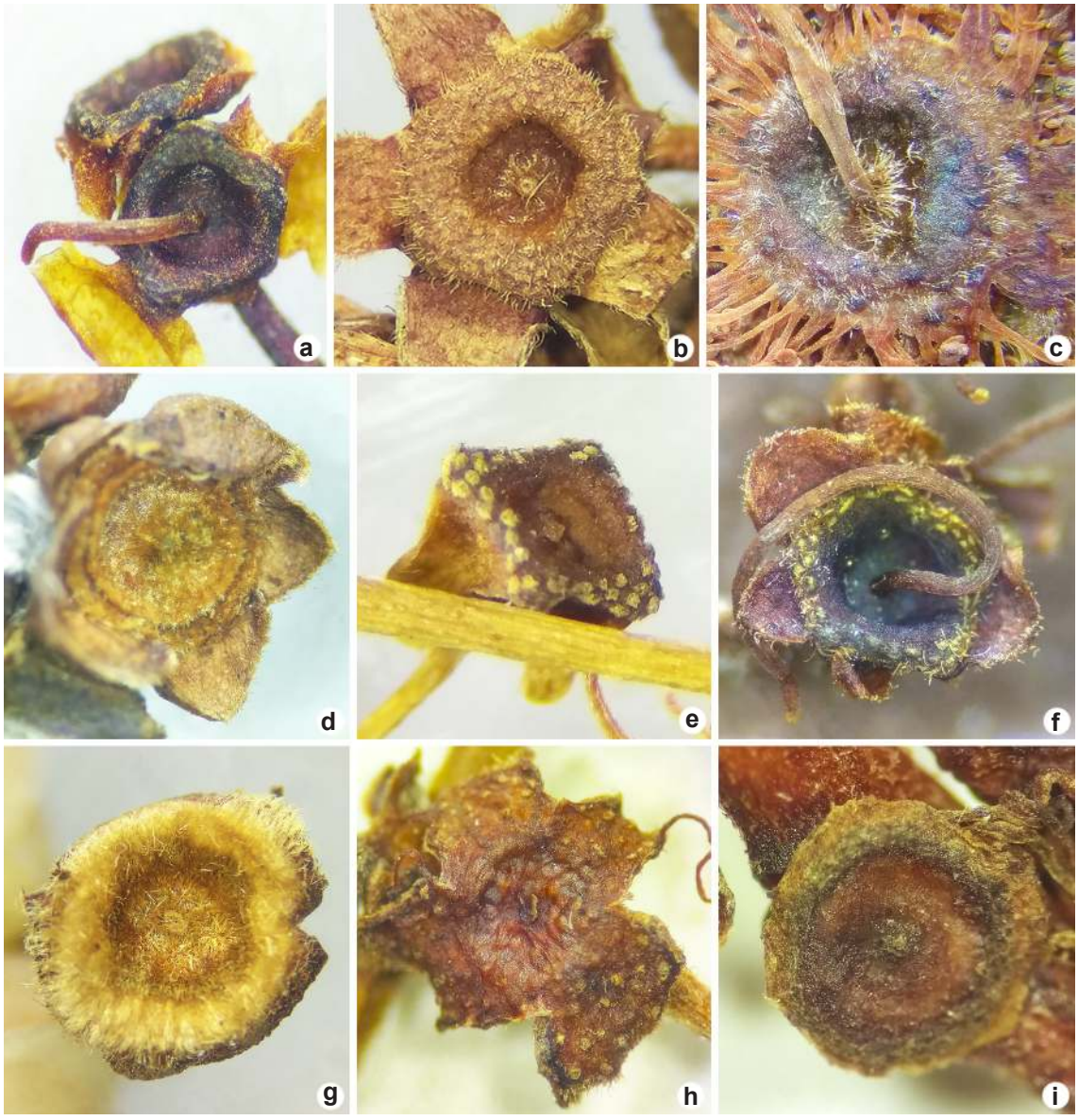


Figure 3 – a-i. Flower discs of species of *Myrcia* in the BDFFP sites – a. *M. amazonica*; b. *M. bracteata*; c. *M. cuspidata*; d. *M. eveae*; e. *M. grandis*; f. *M. pyrifolia*; g. *M. uaupensis*; h. *M. umbraticola*; i. *M. vexata*.

6. ***Myrcia crebra*** (McVaugh) A.R.Lourenço & E.Lucas, Phytotaxa 373: 74. 2018.
Calyptranthes crebra McVaugh, Fieldiana, Bot. 29: 181. 1956. Fig. 2b

Shrubs to trees 4–7 m. Mature branches not corky; branchlets glabrous; cataphylls ca. 0.3 cm, glabrous; domatia absent. Leaves with petiole 0.5–0.9 cm, smooth or rugose, glabrous; blade discoloured, elliptic, ovate, obovate, or oblong, not bullate, not folded downward, 9–17 × 3.3–7.1 cm, glabrous on both surfaces, apex acute or acuminate, base obtuse or attenuate; midvein impressed adaxially, lateral veins 15–36 at each side, raised adaxially, not strongly marked, reticulations raised abaxially, marginal veins three at each side, the inner 0.2–0.6 cm distant from margins. Inflorescences 4.3–7 cm, axillary at the terminal nodes, four times compound, indumentum absent. Flower buds obovoid to claviform; hypanthium glandular, extending as a tube beyond the ovary, indumentum absent externally; calyx completely fused in bud, opening as a calyptra at anthesis, glabrous on both surfaces; floral disc glabrous, staminal ring glabrous. Fruits globose, 1.1–1.4 cm diameter, crowned by the hypanthial tube, calyx deciduous.
Examined material: Sítio amostral, km 37, parcela CTFS-25ha, quadrante 320X520, 02°26'00.5"S, 59°47'00.1"W, 23.X.2017, *Equipe PDBFF 125370* (SORO).
Additional material: BRAZIL. AMAZONAS: Manaus, Manaus-Igarapé Leão road, 5 km from Manaus-Caracaraí road, 21.I.1971, fr., *G.T. Prance et al. 11407* (INPA, NY); Rio Curuquetê, vicinity of Cachoeira Santo Antônio, 16.VII.1971, fl., *G.T. Prance et al. 14272* (INPA).

Myrcia crebra occurs in Amazonian forests in Bolivia, Brazil, Colombia, and Venezuela (Lourenço *et al.* 2018; Tropicos.org 2020). This species is essentially glabrous and has dark, densely distributed oil glands on leaves, visible especially on the abaxial surface. It has sympodial vegetative and reproductive branching; for detailed notes on inflorescence architecture of *Myrcia crebra*, check McVaugh (1958). [*Myrcia* sect. *Calyptranthes*].

7. ***Myrcia cuprea*** (O.Berg) Kiaersk., Enum. Myrt. Bras. 95. 1893. Fig. 7a

Trees ca. 10 m. Mature branches not corky; branchlets densely sericeous; cataphylls absent; domatia absent. Leaves with petiole 0.6–1.1 cm, smooth, densely sericeous; blade discoloured, elliptic or ovate, not bullate, not folded downward, 6.9–12.7 × 2.3–5.6 cm, glabrous adaxially, completely sericeous abaxially, apex acuminate or caudate, base cuneate, obtuse, or attenuate; midvein raised adaxially, lateral veins 14–18 at each side, raised adaxially, not strongly marked, reticulations inconspicuous abaxially, marginal veins ca. 0.1 cm distant from margins. Inflorescences 5.5–7.5 cm, axillary at the terminal and subterminal nodes, three times compound, indumentum coppery, moderately or densely sericeous. Flower buds obovoid; hypanthium glandular, extending as a tube beyond the ovary, indumentum coppery, sparsely or moderately sericeous externally (mainly basally); calyx open in bud, formed by five free sepals, sparsely or moderately sericeous externally, densely sericeous internally; floral disc glabrous, staminal ring glabrous. Fruits globose, ca. 0.6 cm diameter, crowned by the calyx and the hypanthial tube.
Examined material: Sítio amostral, km 37, parcela CTFS-25ha, quadrante 280X360, 02°26'00.5"S, 59°47'00.1"W, 9.VII.2017, *Equipe PDBFF 107279* (SORO).
Additional material: BRAZIL. PARÁ: Bragança, Península de Ajuruteua, Salinas dos Roques/Jabuti, bosque na 4ª ilha de terra firme, 7.IX.2010, fl., *L.O. Santos 552* (INPA). Tracuateua, beira de ramal entre a vila km 14 na estrada Capanema-Bragança (BR-308) e a estrada Pará-Maranhão (BR-316), aproximadamente 600 m ao norte da vila Alsmora, 14.X.2011, fr., *U. Mehlig 1074* (INPA).

Myrcia cuprea occurs in Amapá, Amazonas, Maranhão, and Pará states, in northern and northeastern Brazil (Lima 2017). Most herbarium material of this species was collected in areas of white-sand vegetation, with exception to the BDFFP individuals, which occur on clayish soils. It is recognised by leaves with midvein raised adaxially and branchlets and abaxial leaf surface completely covered by appressed trichomes (Fig. 7b), which are coppery and eventually turn brown with age. [*Myrcia* sect. *Aguava*].

8. ***Myrcia cuspidata*** (Mart. *ex* DC.) A.R.Lourenço & E.Lucas, Phytotaxa 373: 75. 2018.
Calyptranthes cuspidata Mart. *ex* DC., Prodr. 3: 258. 1828. Fig. 3c

Trees 10–20 m, trunk height ca. 15 m. Mature branches not corky; branchlets moderately or densely sericeous or pubescent; cataphylls not seen; domatia absent. Leaves with petiole 0.3–0.6 cm, smooth or rugose, moderately or densely pubescent; blade strongly discoloured, elliptic or rarely obovate, oblong, or lanceolate, not bullate, not folded downward, 6.7–14.7 × 2.2–6.1 cm, glabrous or sparsely pubescent or puberulous on both surfaces, apex acuminate or caudate, base

attenuate; midvein raised adaxially, lateral veins 10–15 at each side, raised adaxially, not strongly marked, reticulations raised abaxially, marginal veins two at each side, the inner 0.4–1.2 cm distant from margins. Inflorescences 5.5–7 cm, axillary at the terminal and subterminal nodes, twice or three times compound, indumentum light reddish-brown, densely pubescent or sericeous. Flower buds obovoid; hypanthium smooth, extending as a tube beyond the ovary, indumentum reddish-brown, densely pubescent or sericeous externally; calyx completely fused in bud, opening as a calyptra at anthesis, moderately or densely pubescent or sericeous externally, glabrous internally; floral disc densely pubescent, staminal ring moderately or densely pubescent. Fruits globose, 0.8–1.3 cm diameter, crowned by the hypanthial tube.

Examined material: Fazenda Esteio, 02°23'S, 59°51'W, 24.XI.1989, fl., *A.P. da Silva 1301.4941.2* (NY); reserva 1501 (km 41), 02°24'26"–2°25'31"S, 59°43'40"–59°45'50"W, 19.XI.1988, fl., *B. Boom et al. 8552* (NY); 27.VII.1989, fr., *N.M.L. da Cunha & P.A.C.L. Assunção 288* (NY); 8.XI.1991, fl., *A.A. Oliveira et al. 213* (INPA, NY, SPF).

Myrcia cuspidata has been recorded only in Amazonian Brazil (Lourenço *et al.* 2018; Tropicos.org 2020). It can be recognised by calyptrate flowers with a pubescent floral disc, a combination of features not yet cited for any section of the genus. Its leaves have 10–15 lateral veins at each side of the blade, these united in showy arches near the margins. Most myrcioid species with calyptrate calyx previously placed in the genus *Calyptranthes* now belong to *Myrcia* sect. *Calyptranthes* (Wilson *et al.* 2016; Lucas *et al.* 2018). However, despite the calyptra, *Myrcia cuspidata* shares morphological features with *M. uaupensis*, a species of *M.* sect. *Aulomyrcia*, with the most notable ones being pubescence on the floral disc (Fig. 3c,g) and flower bud shape. In addition, Holst (2002) briefly discusses the eventual detachment of the calyx as a calyptra in *Myrcia mcvaughii* (B.Holst) E.Lucas & C.E.Wilson, another species of *M.* sect. *Aulomyrcia*. Therefore, *Myrcia cuspidata* is here putatively placed in the latter section, representing the second species of *Calyptranthes* removed from its circumscription as a section of *Myrcia*. [*Myrcia* sect. *Aulomyrcia*].

9. *Myrcia deflexa* (Poir.) DC., Prodr. 3: 244. 1828. Fig. 6a

Treelets or trees. Mature branches not corky; branchlets densely pubescent; cataphylls not seen; domatia absent. Leaves with petiole 0.5–1 cm, smooth, densely pubescent; blade discoloured, elliptic or slightly ovate to obovate, occasionally oblong, not bullate, not folded downward, 10.4–19.1 × 3.6–7.3 cm, glabrous adaxially, glabrous or sparsely pubescent abaxially, apex acuminate or caudate, base obtuse or less often cuneate; midvein impressed adaxially, lateral veins 17–26 at each side, impressed adaxially, not strongly marked, reticulations impressed abaxially, marginal veins 0.1–0.3 cm distant from margins. Inflorescences 5.1–11.6 cm, axillary at the terminal nodes, twice compound, indumentum golden, densely pubescent. Flower buds obovoid; hypanthium smooth, not extending as a tube beyond the ovary, indumentum golden to ochraceous, densely pubescent externally; calyx open in bud, formed by five free sepals, moderately or densely pubescent on both surfaces; floral disc densely pubescent, staminal ring densely pubescent. Fruits globose or slightly ellipsoid, 0.5–0.8 × 0.4–0.6 cm, crowned by the calyx.

Examined material: Fazenda Esteio, sítio amostral Florestal, reserva 1301, parcela 1301-2, quadrante 30, 2.39°S, 59.86°W, 24.II.2006, fr., *Equipe Fito 1301.751* (INPA).

Additional material: BRAZIL. RORAIMA: Serra da Lua, upper slopes of Serra da Lua, 1,200–1,300 m, 25.I.1969, fl., *G.T. Prance et al. 9474* (INPA).

Myrcia deflexa occurs from the Caribbean to Bolivia and Brazil, including the Guiana Shield (Tropicos.org 2020). This is the only species of *Myrcia* collected in the BDFFP plots that bears leaves with impressed reticulations among convex gaps on abaxial surface (Fig. 6a), appearing "minutely pebbled" (Holst *et al.* 2003) or resembling pebbled leather (McVaugh 1958). *Myrcia deflexa* is sometimes considered a synonym of *M. splendens* due to resemblance to stout-pubescent forms of the latter, but recent studies have treated them as independent species (*e.g.*, Rosa 2015, Santos *et al.* 2020). [*Myrcia* sect. *Myrcia*].

10. *Myrcia* aff. ***deflexa***. Fig. 2c

Trees, trunk height ca. 12 m. Mature branches not corky; branchlets moderately or densely pubescent; cataphylls not seen; domatia absent. Leaves with petiole 0.5–0.8 cm, smooth, moderately pubescent; blade discoloured, elliptic, slightly ovate, or less often oblong, not bullate, not folded downward, 6.5–16.4 × 3.1–6.4 cm, glabrous adaxially, glabrous or sparsely pubescent abaxially, apex acute to caudate, base cuneate, obtuse, or slightly rounded; midvein impressed adaxially,

lateral veins 12–23 at each side, raised adaxially, not strongly marked, reticulations raised abaxially, marginal veins two at each side, the inner 0.2–0.3 cm distant from margins. Inflorescences 2.2–7 cm, axillary at the terminal and subterminal nodes, twice or three times compound, indumentum golden, moderately or densely pubescent. Flower buds pyriform; hypanthium undulated, not extending as a tube beyond the ovary, indumentum golden to ochraceous, densely pubescent externally; calyx open in bud, formed by five free sepals, moderately pubescent on both surfaces; floral disc densely pubescent, staminal ring densely pubescent. Fruits globose or slightly ellipsoid, 0.7–1.3 × 0.6–1.2 cm, crowned by the calyx.

Examined material: Fazenda Esteio, sítio amostral km 34, reserva 1302, parcela 1302-3, quadrante 166, fl., *Equipe PDBFF 1302.4092* (INPA); Fazenda Porto Alegre, 02°22'S, 59°57'W, 21.II.1984, *M.J.R. Pereira et al. 3304.4821* (NY); *M.J.R. Pereira et al. 3304.5920* (NY); reserva 3304, parcela 3304-10, quadrante 228, 02°22'00.1"S, 59°58'00.5"W, 10.V.1986, fr., *L.V. Ferreira 3304.5920* (INPA).

The distribution of *Myrcia* aff. *deflexa* is unknown since it is not identified in species level. It can be recognised by leaves with acute to caudate apex, pyriform flower buds (Fig. 2c) with five free sepals, and longitudinally undulated hypanthium. This species can be distinguished from *Myrcia deflexa* mainly by leaves with raised reticulations abaxially (*vs.* impressed in the latter) and flower bud shape (obovoid in the latter). [*Myrcia* sect. *Myrcia*].

11. *Myrcia elevata* M.F.Santos, Phytotaxa 222: 103. 2015. Figs. 2d; 4b

Shrubs to trees 3–6 m. Mature branches not corky; branchlets glabrous or sparsely pubescent and densely covered by epidermal exfoliation; cataphylls not seen; domatia absent. Leaves with petiole 0.5–1.1 cm, smooth, glabrous or sparsely sericeous; blade discoloured, lanceolate or less often elliptic or ovate, not bullate, not folded downward, 7.9–23.7 × 2.8–6.5 cm, glabrous or sparsely pubescent adaxially, completely covered by epidermal exfoliating structure abaxially, apex acute to caudate, base obtuse or attenuate; midvein impressed adaxially, lateral veins ca. 40 at each side, raised adaxially, not strongly marked, reticulations inconspicuous abaxially, marginal vein ca. 0.1 cm distant from margins. Inflorescences 5.5–9 cm, axillary at the terminal and subterminal nodes, twice or three times compound, indumentum ferruginous to golden, densely pubescent. Flower buds ellipsoid to slightly obovoid; hypanthium smooth, extending as a tube beyond the ovary, indumentum ferruginous to golden, densely pubescent or sericeous externally; calyx fused basally in bud, formed by four or five basally torn sepals after anthesis, densely pubescent or sericeous on both surfaces; floral disc densely pubescent, staminal ring densely pubescent. Fruits globose, 0.6–1.2 cm diameter, crowned by the calyx and the hypanthial tube.

Examined material: Fazenda Porto Alegre, 02°25'S, 59°54'W, 10.XII.1989, fl., *M.T. Campos 51* (INPA, NY). **Additional material**: BRAZIL. AMAZONAS: Coari, 0,5 km de Porto Urucu, lado direito da estrada que vai para RUC-3, 22.I.1989, fr., *J.M.S. Miralha et al.* (INPA 160426). Humaitá, road Humaitá to Labrea, km 50, between rios Ipixuna and Itaparana, beside road, 23.XI.1966, fl., *G.T. Prance et al. 3228* (INPA). Manaus, Reserva Florestal Ducke, Manaus-Itacoatiara, km 26, 28.I.1998, fl. and fr., *M.A.D. Souza & E.C. Pereira 552* (INPA). PARÁ: Juruti, 10.III.2007, fr., *M.B. Ramos et al. 148* (INPA).

Myrcia elevata has been recorded in the states of Amazonas and Rondônia, Brazil, in upland *terra firme* Amazonian forest (Santos *et al.* 2015). This species is readily recognisable by the abaxial surface of leaves and branchlets covered with white epidermal exfoliation (Fig. 4b). It presents some uncommon floral characters for the section to which it belongs, such as 4–5-merous perianth, sepals united at the base in flower bud, and conspicuously extended hypanthia. At anthesis, the rips between sepals sometimes extend to the hypanthial tube. [*Myrcia* sect. *Myrcia*].

12. *Myrcia eveae* Gaem & Mazine, Phytotaxa 451: 269. 2020. Fig. 3d

Shrubs to trees 3–12 m. Mature branches not corky; branchlets glabrous or sparsely sericeous; cataphylls not seen; domatia absent. Leaves with petiole 0.8–1.6 cm, smooth or glandular, sparsely sericeous; blade concoloured, oblong, not bullate, not folded downward, 16.3–29.7 × 4–8.4 cm, glabrous on both surfaces, apex caudate, base cuneate, obtuse, or rounded; midvein impressed adaxially, lateral veins 26–37 at each side, impressed adaxially, not strongly marked, reticulations raised abaxially, marginal veins two at each side, the inner ca. 0.1 cm distant from margins. Inflorescences 7–14.4 cm, axillary at the terminal and subterminal nodes, twice or three times compound, indumentum white to golden, sparsely or moderately sericeous. Flower buds globose; hypanthium smooth, not extending as

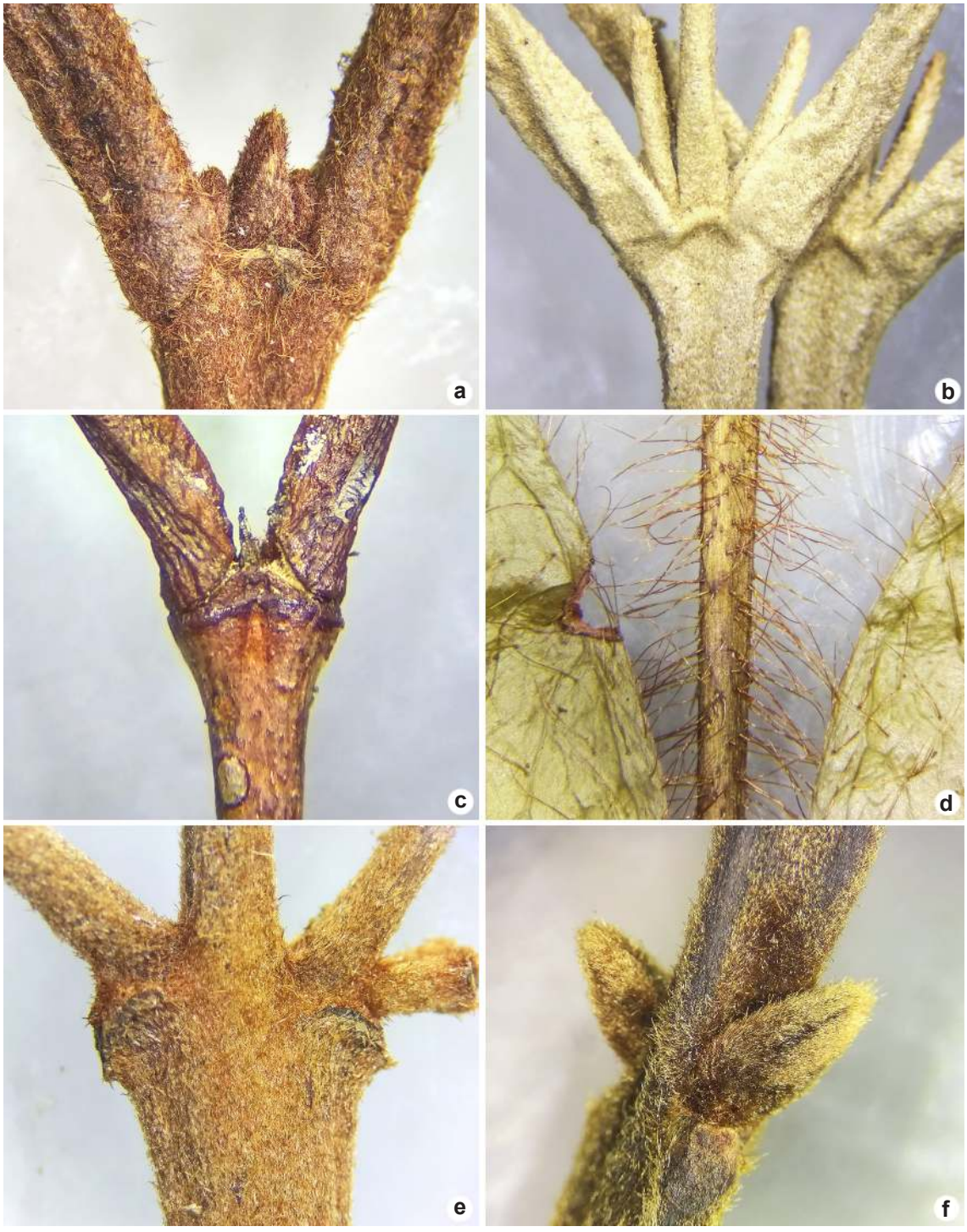


Figure 4 – a-f. Indumentum or vestiture of branchlets of species of *Myrcia* in the BDFFP sites – a. *M. caloneura* – tomentose; b. *M. elevata* – epidermal exfoliation; c. *M. grandis* – lack indumentum or vestiture; d. *M. huallagae* – hirsute; e. *M. neospeciosa* – sericeous; f. *M. prismatica* – pubescent.

a tube beyond the ovary, indumentum golden, densely sericeous externally; calyx open in bud, formed by five free sepals, glabrous or sparsely sericeous on both surfaces; floral disc densely pubescent, staminal ring densely pubescent. Fruits ellipsoid or obovoid, ca. 1.9 × ca. 1.1 cm, crowned by the calyx.

Examined material: Fazenda Dimona, 02°19'S, 60°05'W, 14.II.1989, fl., *M. Pacheco et al. 199* (INPA); 11.II.1992, fl., *M. Nee 42469* (NY); *P. Kukle 65* (INPA, NY); Fazenda Esteio, 02°24'S, 59°52'W, fl., *M. Nee 42388* (INPA, NY); sítio amostral km 37, acampamento km 37, 2.81°S, 60.49°W, 14.XI.2014, fl., *A.L. Correa 501* (INPA).

Additional material: BRAZIL. AMAZONAS: Manaus, estrada Manaus-Caracaraí, km 123, 26.III.1974, fr., *A.A. Loureiro* (INPA 48164).

Myrcia eveae is hitherto known from the states of Amazonas and Rondônia, Brazil (Gaem *et al.* 2020a). The strongly appressed indumentum of this species in combination with globose flower buds recall *Myrcia splendens*, but the former has broader leaves and fruits (see the identification key). *Myrcia eveae* is also similar to *M. madida* McVaugh; see notes on the latter species in Santos *et al.* (2020). [*Myrcia* sect. *Myrcia*].

13. *Myrcia fasciculata* (O.Berg) K.Campbell & K.Samra, Phytotaxa 406: 148. 2019.
Calyptranthes fasciculata O.Berg, Linnaea 27: 31. 1855. Fig. 7e

Trees ca. 12 m. Mature branches not corky; branchlets moderately or densely sericeous or pubescent; cataphylls 0.4–0.6 cm, densely sericeous; domatia absent. Leaves with petiole 0.5–0.7 cm, smooth, moderately or densely sericeous; blade discoloured, elliptic, slightly ovate to obovate, or rarely oblong, not bullate, not folded downward, 7.7–14.3 × 2.6–4.9 cm, glabrous to moderately puberulous adaxially, completely sericeous-puberulous abaxially, apex acuminate or caudate, base cuneate or obtuse; midvein raised to impressed adaxially, lateral veins ca. 30 at each side, slightly raised adaxially, not strongly marked, reticulations inconspicuous abaxially, marginal veins two at each side, the inner ca. 0.1 cm distant from margins. Inflorescences 3–5.7 cm, axillary at the terminal and subterminal nodes, three times compound, indumentum ochraceous, densely sericeous. Flower buds obovoid; hypanthium smooth, extending as a tube beyond the ovary, indumentum ochraceous, densely sericeous externally; calyx completely fused in bud, opening as a calyptra at anthesis, moderately or densely sericeous externally, glabrous internally; floral disc glabrous or glabrate, staminal ring glabrous. Fruits globose, 0.7–1.2 cm diameter, crowned by the hypanthial tube, calyx deciduous.

Examined material: Fazenda Esteio, reserva 1501 (km 41), 02°24'26"–02°25"31"S, 59°43'40"–59°45'50"W, 9.XI.1989, fl., *P. Kukle 10* (INPA, NY).

Additional material: BRAZIL. AMAZONAS: Manaus, estrada Manaus-Itacoatiara, km 150, 12.V.1972, fr., *A. Loureiro et al.* (INPA 35753).

Myrcia fasciculata has been reported in different environments from the Caribbean to the Brazilian state of Mato Grosso (Campbell *et al.* 2019; Santos *et al.* 2020; Tropicos.org 2020). Abaxial leaf surfaces completely covered by ochraceous indumentum and calyptrate flowers are diagnostic features of *Myrcia fasciculata* and *M. neospeciosa* in the study site, but the former is smaller in leaf and inflorescence dimension. [*Myrcia* sect. *Calyptranthes*].

14. *Myrcia fenestrata* DC., Prodr. 3: 251. 1828. Fig. 7f

Shrubs to trees. Mature branches not corky; branchlets glabrous or sparsely pubescent to hirsute; cataphylls not seen; domatia absent. Leaves with petiole 0.1–0.3 cm, smooth, sparsely hirsute to pubescent; blade concoloured or faintly discoloured, elliptic, oblong, or less often ovate or obovate, bullate but not folded downward, 7–13.7 × 2.9–5.2 cm, glabrous adaxially, glabrous or sparsely hirsute to pubescent abaxially, apex acuminate or caudate, base rounded; midvein impressed adaxially, lateral veins 16–21 at each side, raised adaxially, strongly marked, reticulations inconspicuous abaxially, marginal veins ca. 0.1 cm distant from margins. Inflorescences 3.5–7.2 cm, axillary at the terminal and many subterminal nodes, once to three times compound, indumentum golden, sparsely or moderately hirsute-tomentose. Flower buds globose to obovoid; hypanthium smooth, not extending as a tube beyond the ovary, indumentum white to golden, densely hirsute-pubescent externally (mainly basally); calyx open in bud, formed by five free sepals, glabrous or sparsely puberulous on both surfaces; floral disc moderately or densely hirsute-pubescent, staminal ring densely hirsute-pubescent. Fruits globose, 0.5–0.6 cm diameter, crowned by the calyx.

Examined material: sítio amostral km 37, parcela CTFS-25ha, quadrante 140X140, 02°26'00.5"S, 59°47'00.1"W, 7.XII.2005, fl., *J.B.D. Silva & E.A.D. Santos 585* (INPA); 25.I.2006, fr., *C.E. Zartman 5193* (INPA).

Additional material: BRAZIL. AMAZONAS: Manaus, Reserva Florestal Ducke, Manaus-Itacoatiara, km 26, 8.XII.1994, fl., *J.R. Nascimento 684* (INPA).

Myrcia fenestrata occurs in Bolivia, Brazil, and French Guiana (Tropicos.org 2020). In Brazil it occurs upland *terra firme* forests of the Amazonian domain (Santos *et al.* 2020). This species has strongly bullate leaf blades with rounded bases (Fig. 7f), glabrous and shiny on both surfaces. [*Myrcia* sect. *Myrcia*].

15. *Myrcia gigas* McVaugh, Mem. New York Bot. Gard. 18: 88. 1969. Fig. 2e

Trees 10–20 m. Mature branches not corky; branchlets glabrous or glabrate; cataphylls absent; domatia absent. Leaves with petiole 1.2–1.9 cm, striated, glabrous; blade discoloured, ovate or less often elliptic, not bullate, not folded downward, 8.4–17.8 × 4.5–8.1 cm, glabrous or sparsely puberulous on both surfaces, apex acute or obtuse, base obtuse; midvein raised adaxially, lateral veins 10–12 at each side, raised adaxially, not strongly marked, reticulations raised abaxially, marginal veins two at each side, the inner 0.2–0.4 cm distant from margins. Inflorescences 10.2–19 cm, axillary at the terminal and subterminal nodes, three times compound, indumentum absent or white, sparsely pubescent. Flower buds claviform; hypanthium glandular, extending as a tube beyond the ovary, indumentum absent externally; calyx open in bud, formed by five free sepals, sparsely or moderately pubescent externally, densely pubescent internally; floral disc glabrous, staminal ring glabrous. Fruits globose, 0.9–1.1 cm diameter, crowned by the calyx and the hypanthial tube.

Examined material: Fazenda Esteio, sítio amostral Colosso, reserva 1202, parcela 1202-4, quadrante 15, 02°24'00.3"S, 59°52'00.3"W, *Equipe PDBFF 1202.7061* (SORO).

Additional material: BRAZIL. AMAZONAS: Manaus, Reserva Florestal Ducke, 1.X.1964, fl., *W.A. Rodrigues 6739* (INPA); km 26, Igarapé do Barro Branco, 9.XI.1998, fr., *C.A. Sothers 950* (INPA); próximo ao barracão de refeitório, 12.IX.1968, fl., *J. Aluísio 157* (INPA).

Myrcia gigas occurs in Bolivia, Brazil, and French Guiana, in upland *terra firme* forests of the Amazonian domain (Lima 2017). This species is similar to *Myrcia guianensis*, sharing leaves with a raised midvein adaxially and 5-merous flowers with a glabrous and extended hypanthium. They differ in the BDFFP plots, however, by leaf blades with 8.4–17.8 × 4.5–8.1 cm in *Myrcia gigas* (*vs.* 2.9–7.9 × 1.8–4.6 cm in *M. guianensis*) and inflorescences with 10.2–19 cm in *M. gigas* (*vs.* 5.5–8.1 cm in *M. guianensis*). [*Myrcia* sect. *Aguava*].

16. *Myrcia grandis* McVaugh, Mem. New York Bot. Gard. 18: 114. 1969. Figs. 3e; 4c

Trees 10–30 m, trunk height 8–23 m. Mature branches not corky; branchlets glabrous; cataphylls not seen; domatia absent. Leaves with petiole 0.3–0.5 cm, rugose, glabrous; blade discoloured, elliptic or slightly obovate, not bullate, not folded downward, 4.5–10.7 × 1.7–4.5 cm, glabrous on both surfaces, apex caudate, base cuneate, obtuse, or slightly attenuate; midvein raised adaxially, lateral veins not counted, inconspicuous adaxially, not strongly marked, reticulations inconspicuous abaxially, marginal veins ca. 0.1 cm distant from margins. Inflorescences 2.5–8.4 cm, axillary at the terminal and subterminal nodes, twice or three times compound, indumentum absent or white to golden, sparsely or moderately pubescent. Flower buds globose; hypanthium glandular, extending as a tube beyond the ovary, indumentum absent externally; calyx open in bud, formed by four free sepals, glabrous on both surfaces; floral disc glabrous, staminal ring glabrous. Fruits globose, 0.6–1.2 cm diameter, crowned by the calyx and the hypanthial tube.

Examined material: Fazenda Dimona, 02°19'S, 60°05'W, 30.X.1989, fl., *A.P. da Silva 2303.5244.2* (INPA, NY); fl., *A.P. da Silva 2303.5045.2* (INPA, NY); Fazenda Esteio, reserva 1501 (km 41), 02°24'26"–02°25'31"S, 59°43'40"–59°43'50"W, 21.XI.1991, fl., *A.A. Oliveira et al. 243* (NY); 6.II.1990, fr., *N.M. Lepsch Cunha et al. 924* (INPA); sítio amostral km 37, parcela CTFS-25ha, quadrante 220X140, 2.44°S, 59.79°W, 25.V.2009, fr., *J.B.D. Silva 346* (INPA);

Myrcia grandis occurs from Panama to northern Brazil, in *igapós* (black-water flooded forests; Lucas *et al.* 2016) and white-sand vegetation (McVaugh 1969). In this study this species is reported for upland *terra firme* forest on clayish soils for the first time. It may be recognised by leaves with a raised midvein adaxially, inconspicuous secondary veins and reticulations, and caudate apex. Indumentum is absent on vegetative and scarce on reproductive organs. Flowers are consistently 4-merous, a sporadic condition in *Myrcia*, and reveal a squared staminal ring after anthesis (Fig. 3e). Two forms of *Myrcia grandis* are recognised to date (see Gaem *et al.* 2019a); further studies are required to better understand them. [*Myrcia* sect. *Aulomyrcia*].

17. *Myrcia guianensis* (Aubl.) DC., Prodr. 3: 245. 1828. Fig. 6b

Treelets or trees. Mature branches not corky; branchlets moderately or densely pubescent; cataphylls absent; domatia absent. Leaves with petiole 0.4–0.9 cm, smooth or rugose, glabrous to densely pubescent; blade discoloured, elliptic or obovate, not bullate, not folded downward, 2.9–7.9 × 1.8–4.6 cm, glabrous or sparsely pubescent or sericeous on both surfaces, apex acute, rounded, or acuminate, base cuneate or obtuse; midvein raised adaxially, lateral veins 10–15 at each side, raised adaxially, not strongly marked, reticulations raised abaxially, marginal veins a single pair or two, the inner 0.1–0.3 cm distant from margins. Inflorescences 5.5–8.1 cm, axillary at the terminal and subterminal nodes, once or twice compound, indumentum absent or white, sparsely pubescent. Flower buds obovoid; hypanthium smooth or glandular, extending as a tube beyond the ovary, indumentum absent externally; calyx open in bud, formed by five free sepals, glabrous externally, glabrous to moderately sericeous internally; floral disc glabrous, staminal ring glabrous. Fruits globose, 0.6–1 cm diameter, crowned by the calyx and the hypanthial tube.

Examined material: Fazenda Dimona, reserva 2303, parcela 2303-5, quadrante 124, 02°20’00.5”S, 60°05’00.7”W, fr., *Equipe PDBFF 2303.3167* (INPA).

Additional material: BRAZIL. AMAZONAS: Manaus, BR-174, campina do Igarapé do Leão, km 4, 23.VI.1984, fl., *M.P.F. Corrêa 99* (INPA). Santa Isabel do Rio Negro, Temendevi, próximo ao limite com o município de Barcelos, do lado direito descendo o Rio, 19.XI.2003, fr., *J.A.C. Silva 1028* (INPA).

Myrcia guianensis occurs in tropical America, from northern South America to Paraguay and southern Brazil, in diverse habitats (Lima 2017). This species has glabrous or glabrate floral parts, obovoid flower buds, 5-merous calyces with free sepals, and extended hypanthia (Lima 2017). In the BDFFP sites it is most similar to *Myrcia gigas*; for separation check the comments under that species. [*Myrcia* sect. *Aguava*]

18. *Myrcia huallagae* McVaugh, Fieldiana, Bot. 29: 192. 1956. Figs. 2f; 4d

Treelets or trees 2–8 m. Mature branches not corky; branchlets moderately hirsute; cataphylls ca. 0.8 cm, glabrous; domatia absent. Leaves with petiole 0.1–0.3 cm, smooth, sparsely hirsute; blade discoloured, elliptic, ovate, or oblong, not bullate, not folded downward, 4.1–13.1 × 1.6–4.2 cm, sparsely or moderately hirsute on both surfaces, apex acuminate or caudate, base rounded or less often obtuse; midvein impressed adaxially, lateral veins ca. 30 at each side, raised adaxially, not strongly marked, reticulations raised abaxially, marginal veins ca. 0.1 cm distant from margins. Inflorescences 1.3–3.7 cm, axillary at the terminal and many subterminal nodes, once or twice compound, indumentum coppery to reddish, moderately hirsute. Flower buds obovoid; hypanthium smooth, scarcely extending as a tube beyond the ovary, indumentum coppery to reddish, moderately or densely hirsute externally (mainly basally); calyx open in bud, formed by four or five free sepals, moderately hirsute externally, glabrous internally; floral disc moderately hirsute, mainly near the base of the style, staminal ring moderately or densely hirsute. Fruits ellipsoid, ca. 1.2 × ca. 0.8 cm, crowned by the calyx.

Examined material: Fazenda Esteio, reserva 1501 (km 41), 02°24’26”–02°25’31”S, 59°43’40”–59°45’50”W, 17.XII.1991, fl., *A.A. Oliveira et al. 289* (INPA, NY); fazenda Porto Alegre, 02°25’S, 59°54’W, 6.XII.1989, fl., *P. Kukle 157* (INPA, NY); sítio amostral km 37, acampamento km 37, 2.81°S, 60.57°W, 14.II.2014, fl., *A.L. Correa 496* (INPA).

Additional material: BRAZIL. RONDÔNIA: Porto Velho, assentamento, 21.X.2008, fl., *Equipe Resgate 944* (INPA). São Lourenço, vicinity of São Lourenço mines, forest by road, 27.XI.1968, fr., *G.T. Prance et al. 8939* (INPA).

Myrcia huallagae occurs in Brazil and Peru, in the Amazon forest (Tropicos.org 2020). In Brazil it has been collected in Acre, Amazonas, Pará, and Rondônia states (Rosário *et al.* 2017). This species is readily identified by hirsute, coppery or reddish indumentum (Fig. 4d). It resembles *Myrcia bracteata* and is frequently relegated to the synonymy of that species (Santos 2017; Santos *et al.* 2020), a position not followed here: specimens of the two species have considerably different flowers in the BDFFP area (Fig. 2a,f) and they also differ in near-infrared leaf spectrum (Gaem *et al. in prep.*), a taxonomically relevant tool (Durgante *et al.* 2013). A lianescent habit has been reported for *Myrcia huallagae* (McVaugh 1958; Rosário *et al.* 2017), a condition not observed in individuals of the study site. Its flowers have a somewhat extended hypanthium and lack a stoutly pilose flower disc, features not expected in species of the section to which it is assigned. [*Myrcia* sect. *Myrcia*].

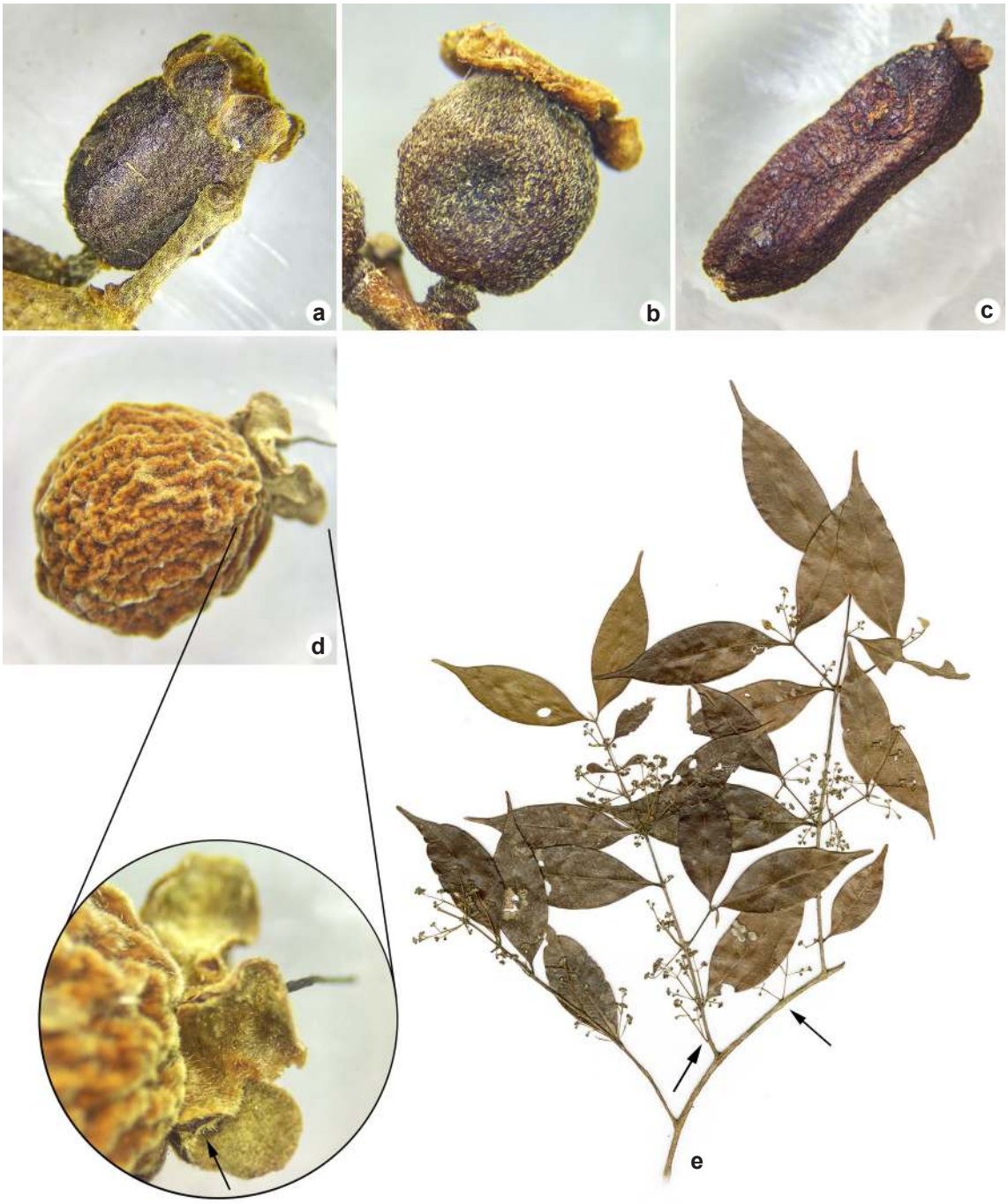


Figure 5 – a-e. Reproductive morphological features of species of *Myrcia* in the BDFFP sites – a. *M. manausensis* – faintly ridged, ellipsoid fruit; b. *M. otocalyx* – globose fruit with patent calyx; c. *M. prismatica* – prismatic-oblong fruit with erect calyx; d. *M. intonsa* – globose fruit with verrucous surface and detail of basally torn calyx indicated by the arrow; e. *M. paivae* – axillary and ramiflorous inflorescences, the latter condition indicated by arrows.

19. *Myrcia intonsa* (McVaugh) B.Holst, Selbyana 23: 152. 2002.
Marlierea intonsa McVaugh, Mem. New York Bot. Gard. 10: 85. 1958. Fig. 5d

Treelets or trees 6–10 m. Mature branches not corky; branchlets densely pubescent; cataphylls not seen; domatia absent. Leaves with petiole 0.8–1.2 cm, smooth, moderately or densely pubescent or puberulous; blade discoloured, elliptic, ovate, or rarely obovate, not bullate, not folded downward, 12.6–20.2 × 3.4–6.9 cm, glabrous or sparsely pubescent adaxially, completely sericeous abaxially, apex acuminate or less often acute, base cuneate or obtuse; midvein impressed adaxially, lateral veins 22–35 at each side, flat or raised adaxially, not strongly marked, reticulations raised abaxially, marginal veins two at each side, the inner 0.1–0.2 cm distant from margins. Inflorescences 4.3–5.1 cm, axillary at the terminal nodes, twice or three times compound, indumentum golden, densely pubescent or sericeous. Flower buds obovoid to pyriform; hypanthium undulated, extending as a tube beyond the ovary, indumentum golden, moderately or densely sericeous externally; calyx fused basally in bud, formed by five basally torn sepals after anthesis, moderately or densely sericeous on both surfaces; floral disc densely pubescent, staminal ring densely pubescent. Fruits globose, 1–1.5 cm diameter, crowned by the hypanthial tube, calyx persisting or deciduous.
Examined material: Reserva 1501 (km 41), 02°24'26"–02°25'31"S, 59°43'40"–59°45'50"W, 26.VI.1989, fr., *S. Mori et al. 20538* (INPA).
Additional material: BRAZIL. AMAZONAS: Presidente Figueiredo, Rebio Uatumã, entorno, lado esquerdo da estrada, indo para a Vila de Balbina, 2.VIII.2006, fl., *J.G. Carvalho-Sobrinho & K.M. Silva 863* (INPA); Estrada da Morena, corredeira da Anta, ca. 40 km de Balbina, 23.III.2007, fr., *J.G. Carvalho-Sobrinho et al. 1503* (INPA).

Myrcia intonsa occurs in Venezuela and the Brazilian state of Amazonas, in upland *terra firme* forests (Santos *et al.* 2020; Tropicos.org 2020). This species can be recognised in the BDFFP area by a sericeous, golden indumentum covering reproductive organs and the whole abaxial surface of leaves. Fruits are verrucous (Fig. 5d) and flowers present features uncommon in *Myrcia* sect. *Myrcia*: sepals are united at the base and tear during anthesis (Fig. 5d), dilacerating the conspicuously extended hypanthium or not. [*Myrcia* sect. *Myrcia*].

20. *Myrcia lepida* (McVaugh) A.R.Lourenço & E.Lucas, Phytotaxa 373: 76. 2018.
Calyptranthes lepida McVaugh, Mem. New York Bot. Gard. 18: 73. 1969. Fig. 2g

Trees ca. 15 m, trunk height ca. 12 m. Mature branches not corky; branchlets densely hirsute-tomentose, early glabrescent; cataphylls ca. 1.2 cm, moderately sericeous; domatia absent. Leaves with petiole 0.6–1.1 cm, smooth, glabrous or sparsely pubescent or tomentose; blade discoloured, elliptic or slightly ovate to obovate, not bullate, not folded downward, 8.2–18.1 × 3.1–6.6 cm, glabrous or very sparsely pubescent adaxially, densely sericeous abaxially, apex acuminate, base cuneate; midvein impressed adaxially, lateral veins ca. 35 at each side, raised adaxially, not strongly marked, reticulations raised abaxially, marginal veins two at each side, the inner ca. 0.1 cm distant from margins. Inflorescences 1.6–3.6 cm, axillary at the terminal nodes, twice or three times compound, indumentum ferruginous, densely hirsute-tomentose. Flower buds claviform; hypanthium smooth, extending as a tube beyond the ovary, indumentum ferruginous, densely hirsute-tomentose externally; calyx completely fused in bud, opening as a calyptra at anthesis, moderately or densely hirsute-tomentose externally, glabrous internally; floral disc glabrous, staminal ring glabrous. Fruits not seen.
Examined material: Fazenda Porto Alegre, 02°22'S, 59°57'W, 11.XI.1989, fl., *C.F. da Silva 3304.3210.2* (INPA).
Additional material: BRAZIL. AMAPÁ: Rio Araguari, vicinity junction of rios Murere and Araguari, 22.VIII.1961, fl., *J.M. Pires et al. 50436* (NY).

Myrcia lepida has been recorded in Brazil, French Guiana, Guyana, and Suriname (Lourenço *et al.* 2018; Santos *et al.* 2020; Tropicos.org 2020). Its distinguishing features in the BDFFP sites are ferruginous indumentum and claviform flower buds (Fig. 2g); McVaugh (1969) also calls attention to its spike-like inflorescences. [*Myrcia* sect. *Calyptranthes*].

21. *Myrcia magna* D.Legrand, Atas Simp. Biota Amazonica 4: 150. 1967. Figs. 2h; 6d

Trees, trunk height ca. 12 m. Mature branches not corky; branchlets glabrous or sparsely puberulous; cataphylls ca. 0.3 cm, densely sericeous; domatia circular, intra- and inter-petiolar. Leaves with petiole 0.5–1.2 cm, smooth, glabrous or sparsely pubescent; blade concoloured or faintly discoloured, elliptic, narrowly elliptic, or oblong, not bullate, not folded downward, 19.5–31.1 × 4.8–9.9 cm, glabrous on both surfaces, apex acute or acuminate, base obtuse, rounded, or occasionally cuneate; midvein raised adaxially, lateral veins

13–23 at each side, raised adaxially, not strongly marked, reticulations raised abaxially, marginal veins three at each side, the inner 0.4–0.9 cm distant from margins. Inflorescences 9.3–15.1 cm, axillary at the terminal and subterminal nodes or ramiflorous, three times compound, indumentum white or less often golden, densely pubescent or tomentose. Flower buds obovoid; hypanthium smooth, extending as a tube beyond the ovary, indumentum white or less often light golden, densely pubescent or tomentose externally; calyx open in bud, formed by five free sepals, sparsely or moderately pubescent externally, glabrous internally; floral disc glabrous or glabrate, staminal ring sparsely or less often moderately pubescent. Fruits globose, 0.4–0.8 cm diameter, crowned by the calyx and the hypanthial tube.

Examined material: Fazenda Esteio, 02.25°S, 59.52°W, 4.II.1991, fr., *E. Setz 990* (INPA, UEC); Fazenda Porto Alegre, 02°22'S, 59°57'W, 23.XI.1984, *M.J.R. Pereira e equipe 3304.4967* (NY).

Additional material: BRAZIL. AMAZONAS: Manaus, km 3 da BR-17, entrada à direita, 20.X.1955, fl., *D. Coêlho* (INPA 2190). Novo Airão, RDS do Rio Negro, 27.I.2018, fr., *P.H. Gaem et al. 148* (SORO). Presidente Figueiredo, Vila de Balbina, próximo à hidrelétrica, na margem esquerda do rio Uatumã, 22.XI.2007, fl., *J.A.C. Silva et al. 1480* (INPA).

Myrcia magna occurs in the states of Amazonas, Rondônia, and Roraima, in upland *terra firme* forests of Amazonian Brazil (Santos *et al.* 2020). This species is readily identified by the presence of domatia in the nodes (Fig. 6d; see also Gaem *et al.* 2019b), a rare condition in Myrtaceae. Leaves are relatively large and have raised venation on both surfaces. [*Myrcia* sect. *Aulomyrcia*].

22. *Myrcia magnoliifolia* DC., Prodr. 3: 248. 1828. Fig. 7g

Treelets or trees ca. 4 m. Mature branches not corky; branchlets moderately pubescent; cataphylls not seen; domatia absent. Leaves with petiole 0.5–1.2 cm, smooth, sparsely or moderately pubescent; blade discoloured, elliptic or ovate, not bullate, not folded downward, 12.2–31.3 × 4.7–8.8 cm, glabrous adaxially, glabrous or sparsely pubescent abaxially, apex acute or acuminate, base cuneate or obtuse; midvein impressed adaxially, lateral veins 25–33 at each side, raised adaxially, not strongly marked, reticulations raised abaxially, marginal veins two at each side, the inner 0.2–0.3 cm distant from margins. Inflorescences 3.6–11.2 cm, axillary at the terminal and subterminal nodes, twice or three times compound, indumentum golden, moderately or densely pubescent. Flower buds obovoid; hypanthium undulated, not extending as a tube beyond the ovary, indumentum golden, densely pubescent externally; calyx open in bud, formed by five free sepals, moderately pubescent on both surfaces; floral disc densely pubescent, staminal ring densely pubescent. Fruits ellipsoid, 1.1–1.5 × 0.8–0.9 cm, crowned by the calyx.

Examined material: Fazenda Esteio, sítio amostral Colosso, reserva 1202, parcela 1202-2, quadrante 102, 02°24'00.3"S, 59°52'00.3"W, 26.IX.1986, fl., *L.V. Ferreira 1202.2352* (INPA).

Additional material: BRAZIL. AMAZONAS: Manaus, Reserva Florestal Adolfo Ducke, na estrada para o alojamento, X.2015, fl., *M.A.D. Souza 2089* (INPA); sede do INPA, mata próxima aos alojamentos, 5.I.1972, fr., *M.F. Silva & O. Monteiro 41* (INPA). RONDÔNIA: Porto Velho, canteiro de obra da UHE Jirau, em frente ao escritório da LEME, 12.VIII.2010, fl., *G. Pereira-Silva et al. 15604* (NY).

Myrcia magnoliifolia occurs from the Guiana Shield to the Brazilian central savannah (Tropicos.org 2020; Holst *et al.* 2003; Silva Júnior & Pereira 2009). It can be recognised by pubescent new growth and reproductive organs, obovoid flower buds with 5 free sepals, and undulated and unextended hypanthia. This species is sometimes considered a large-leaved form of *Myrcia splendens* with stout indumentum (*e.g.*, McVaugh 1958), a position not followed in this study; see Gaem *et al.* (2020a) for further discussion. They also differ in near-infrared leaf spectrum (Gaem *et al. in prep.*), a taxonomically relevant tool to separate between closely related species (Lang *et al.* 2015; Damasco *et al.* 2019). [*Myrcia* sect. *Myrcia*].

23. *Myrcia manausensis* M.A.D.Souza & Sobral, Phytotaxa 238: 218. 2015. Figs. 2i; 5a

Trees 10–15 m. Mature branches not corky; branchlets moderately or densely sericeous; cataphylls not seen; domatia absent. Leaves with petiole 0.5–1.1 cm, smooth, moderately or densely sericeous; blade discoloured, elliptic, ovate, or oblong, not bullate, not folded downward, 11.7–26.1 × 5.1–9.1 cm, glabrous on both surfaces, apex acuminate, base attenuate; midvein impressed adaxially, lateral veins 21–28 at each side, raised adaxially, not strongly marked, reticulations raised abaxially, marginal veins two at each side, the inner 0.2–0.4 cm distant from margins. Inflorescences 3–12.5 cm, axillary at the terminal and subterminal nodes, twice or three times compound, indumentum white to golden, densely sericeous. Flower buds obovoid to obconic; hypanthium longitudinally

ridged, scarcely extending as a tube beyond the ovary, indumentum golden, densely sericeous externally; calyx open in bud, formed by five free sepals, sparsely or moderately sericeous on both surfaces; floral disc densely pubescent, staminal ring densely pubescent. Fruits ellipsoid, 1.3–2 × 1–1.1 cm, crowned by the calyx and the hypanthial tube.
Examined material: Fazenda Porto Alegre, reserva 3402, acampamento Cabo Frio, 02°25'S, 59°54'W, 11.XII.1989, fl., *P. Kukle 178* (INPA, NY); reserva 1501 (km 41), 02°24'26"–02°25'31"S, 59°43'40"–59°45'50"W, 8.XII.1988, fr., *B. Boom et al. 8784* (INPA, NY); 8.III.1992, fr., *C. Dick 25* (INPA, NY); 19.V.1992, fr., *A.A. Oliveira et al. 440* (NY); sítio amostral km 37, parcela CTFS-25ha, quadrante 380X260, 02.44°S, 59.79°W, 20.XI.2008, fr., *J.B.D. Silva et al. 348* (INPA).

Myrcia manausensis is endemic to upland *terra firme* forests of Manaus region (Sobral & Souza 2015). It resembles *Myrcia magnoliifolia* in leaf dimension, differing by sericeous indumentum (*vs.* pubescent in *M. magnoliifolia*), attenuate leaf base (*vs.* acute to obtuse in *M. magnoliifolia*), and longitudinally ridged hypanthium (Fig. 2i) (*vs.* undulated in *M. magnoliifolia*; see Fig. 4 of Gaem *et al.* 2020a). Oil glands in leaves of *Myrcia manausensis* are larger than in other species of the *Myrcia splendens* Amazonian complex (Sobral & Souza 2015). [*Myrcia* sect. *Myrcia*].

24. *Myrcia neospeciosa* A.R.Lourenço & E.Lucas, Phytotaxa 373: 79. 2018.
Calyptranthes macrophylla O.Berg, *Fl. bras.* 14: 45. 1857. Fig. 4e

Trees 7–20 m. Mature branches not corky; branchlets glabrous to densely puberulous; cataphylls not seen; domatia absent. Leaves with petiole 1.1–1.6 cm, smooth, glabrous to moderately puberulous; blade discoloured, oblong or elliptic, not bullate, not folded downward, 16.8–28.2 × 5.8–11.4 cm, glabrous or sparsely puberulous adaxially, completely puberulous abaxially, apex acuminate, base obtuse or rounded; midvein flat or impressed adaxially, lateral veins 31–40 at each side, raised adaxially, not strongly marked, reticulations inconspicuous abaxially, marginal veins ca. 0.1 cm distant from margins. Inflorescences 4.2–11.1 cm, axillary at the terminal and subterminal nodes, three to five times compound, indumentum ochraceous, densely sericeous. Flower buds obovoid; hypanthium smooth, extending as a tube beyond the ovary, indumentum ochraceous, densely pubescent or sericeous externally; calyx completely fused in bud, opening as a calyptra at anthesis, densely pubescent or sericeous externally, glabrous internally; floral disc glabrous or glabrate, staminal ring glabrous. Fruits globose, ca. 1.1 cm diameter, crowned by the hypanthial tube, calyx deciduous.
Examined material: Fazenda Dimona, reserva 2206, parcela 2206-1, quadrante 20, 13.I.1998, fl., *Equipe PDBFF 2206.9298* (INPA).
Additional material: BRAZIL. AMAZONAS: Manaus, Reserva Florestal Ducke, Manaus-Itacoatiara, km 26, próx. ao Igarapé Barro Branco, 2.XII.1997, fl., *M.A.D. Souza & P.A.C.L. Assunção 480* (INPA); próx. à picada da Petrobrás, 6.VIII.1997, fr., *M.A.D. Souza et al. 395* (INPA).

Myrcia neospeciosa has been collected from Ecuador to Bolivia, including Brazil and the Guiana Shield (Santos *et al.* 2020; Tropicos.org 2020); it is here newly reported in the Brazilian state of Amazonas. This species is readily identified by dense puberulous indumentum that covers the abaxial leaf surface in combination with large, mostly oblong blades. The new name of Lourenço *et al.* (2018) is based on *Calyptranthes speciosa* Sagot, but the synonymous name *C. macrophylla* is more common in specimens of Manaus region. [*Myrcia* sect. *Calyptranthes*].

25. *Myrcia nigrescens* DC., Prodr. 3: 246. 1828. Fig. 6e

Trees 7–12 m. Mature branches not corky; branchlets sparsely or moderately pubescent; cataphylls not seen; domatia absent. Leaves with petiole 0.4–0.9 cm, corky and exfoliating, glabrous or sparsely pubescent; blade discoloured, elliptic, ovate, or obovate, not bullate, not folded downward, 3.6–13 × 2.1–5.6 cm, glabrous adaxially, glabrous or sparsely pubescent abaxially, apex acuminate or caudate, base cuneate, obtuse, or less often rounded; midvein impressed adaxially, lateral veins not counted, inconspicuous adaxially, not strongly marked, reticulations inconspicuous abaxially, marginal veins 0.2–0.3 cm distant from margins. Inflorescences 4.6–7 cm, axillary at the terminal and subterminal nodes, twice compound, indumentum white to light golden, sparsely or moderately sericeous. Flower buds globose; hypanthium smooth, extending as a tube beyond the ovary, indumentum absent externally; calyx open in bud, formed by four free sepals, glabrous externally, esparsely to densely pubescent internally, sometimes thinly ciliate; floral disc glabrous, staminal ring glabrous. Fruits globose, 0.5–0.7 cm diameter, crowned by the hypanthial tube, calyx persisting or deciduous.
Examined material: Fazenda Esteio, sítio amostral Colosso, reserva 1202, parcela 1202–5, quadrante 134,

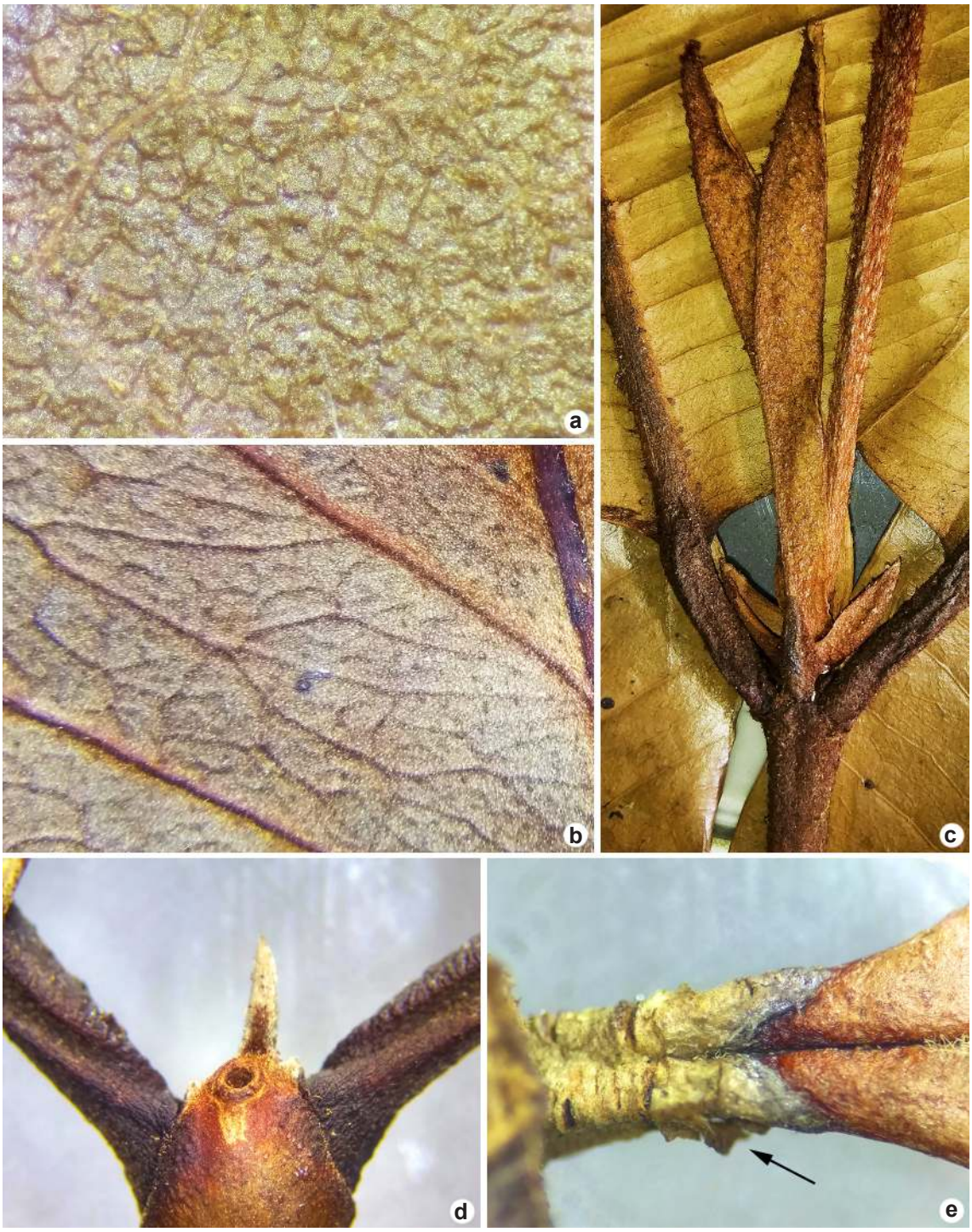


Figure 6 – a-e. Vegetative morphological features of species of *Myrcia* in the BDFFP sites – a. *M. deflexa* – minutely pebbled abaxial leaf surface; b. *M. guianensis* – abaxial leaf surface with raised reticulations; c. *M. caloneura* – conspicuous cataphylls; d. *M. magna* – circular interpetiolar domatium, smooth petiole; e. *M. nigrescens* – corky petiole, arrow indicating exfoliating surface.

02°24’00.3”S, 59°52’00.3”W, 19.IX.2015, *C. Chiva 768* (SORO); Fazenda Porto Alegre, sítio amostral Porto Alegre, reserva 3114, parcela 3114-1, quadrante 15, 02°22’00.4”S, 59°58’00.2”W, 23.IV.1986, fr., *Equipe PDBFF* 3114.349 (INPA).
Additional material: BRAZIL. AMAZONAS: Manaus, Rio Tarumã-Açu, near Manaus yatch club, 15.II.1982, fl., *B.W. Nelson 1225* (INPA, NY).

Myrcia nigrescens is currently accepted under the synonymy of *M. umbraticola* (Santos *et al.* 2020; WCVP 2020), but these two species form clearly separate populations in the BDFFP area, differing in morphology and leaf near-infrared spectrum (Gaem-Barbosa 2019). It is clear that they comprise a species complex that needs further investigation. Both taxa have corky petioles (Fig. 6e), persistent bracts, and globose, sessile flower buds, but the morphotype that carries the name *Myrcia umbraticola* in this study has stoutly pubescent inflorescences contrasting with glabrous outer surface of hypanthia, better matching the detailed description of McVaugh (1958) (under *Marlierea umbraticola* (Kunth) O.Berg). *Myrcia nigrescens* is promptly distinguished from *M. umbraticola* in the BDFFP sites by pale and dull leaf blades in herbarium material (*vs.* shiny in *M. umbraticola*). [*Myrcia* sect. *Aulomyrcia*].

26. *Myrcia otocalyx* Gaem & L.L.Santos, Phytotaxa 451: 271. 2020. Fig. 5b

Trees ca. 6 m. Mature branches not corky; branchlets glabrous or sparsely sericeous; cataphylls not seen; domatia absent. Leaves with petiole 0.4–0.9 cm, smooth, sparsely to moderately sericeous; blade discoloured, elliptic, slightly ovate, or less often oblong, not bullate, not folded downward, 7.5–14.9 × 2–6.2 cm, glabrous adaxially, glabrous to densely sericeous abaxially, apex acute or acuminate, base cuneate or obtuse; midvein impressed adaxially, lateral veins 13–25 at each side, raised adaxially, not strongly marked, reticulations raised abaxially, marginal veins 0.1–0.2 cm distant from margins. Inflorescences 4.8–12.5 cm, axillary at the terminal and subterminal nodes, twice or three times compound, indumentum golden, sparsely or moderately sericeous. Flower buds pyriform; hypanthium longitudinally ridged, not extending as a tube beyond the ovary, indumentum golden, densely sericeous externally; calyx open in bud, formed by five free sepals, moderately sericeous externally, moderately or densely sericeous internally; floral disc densely pubescent, staminal ring densely pubescent. Fruits globose or slightly ellipsoid, 0.6–0.9 × 0.5–0.8 cm, crowned by the calyx.
Examined material: Fazenda Dimona, reserva 2107, 02°19’S, 60°05’W, 13.II.1992, fl., *M. Nee 42554* (INPA, NY); reserva 2303, parcela 2303-3, quadrante 73, 02°20’00.5”S, 60°05’00.9”W, 5.III.1998, fr., *Equipe PDBFF 2303.8524* (INPA).

Myrcia otocalyx is hitherto known only by collections from the BDFFP area (Gaem *et al.* 2020a). This species can be recognised by pyriform flower buds with longitudinally ridged hypanthium and two auricular larger sepals. Hypanthium texture recalls *Myrcia manausensis*; for separation check the identification key. [*Myrcia* sect. *Myrcia*].

27. *Myrcia paivae* O.Berg, *Fl. bras.* 14: 179. 1857. Fig. 5e

Treelets or trees 5–15 m. Mature branches remarkably corky; branchlets moderately sericeous; cataphylls ca. 0.4 cm, moderately sericeous; domatia absent. Leaves with petiole 0.3–0.6 cm, smooth, moderately pubescent or sericeous; blade discoloured, elliptic or ovate, not bullate, not folded downward, 6.1–14.2 × 2.1–4.7 cm, glabrous adaxially, glabrous or sparsely sericeous abaxially, apex acuminate or caudate, base cuneate or obtuse; midvein raised to impressed adaxially, lateral veins 18–25 at each side, flat or raised adaxially, not strongly marked, reticulations raised abaxially, marginal veins two at each side, the inner ca. 0.1 cm distant from margins. Inflorescences 1.2–5.6 cm, axillary at the terminal and many subterminal nodes, twice or three times compound, indumentum white to golden, densely pubescent or sericeous. Flower buds obovoid to obconic; hypanthium smooth, not extending as a tube beyond the ovary, indumentum golden, densely sericeous externally; calyx open in bud, formed by five free sepals, sparsely or moderately sericeous externally, glabrous internally; floral disc densely pubescent, staminal ring densely pubescent. Fruits globose, 0.4–0.8 cm diameter, crowned by the calyx.
Examined material: Fazenda Dimona, reserva 2206, 02°19’S, 60°05’W, 29.XI.1989, fl., *P. Kukle 141* (INPA, NY); reserva 1501 (km 41), 02°24’26”–02°25’31”S, 59°43’40”–59°45’50”W, 21.XI.1991, *A.A. Oliveira et al. 237* (NY).
Additional material: BRASIL. AMAZONAS: Manaus, Reserva Florestal Ducke, Manaus-Itacoatiara, km 26, próx. estrada Petrobrás, 27.II.1996, fr., *M.A.D. Souza et al. 230* (INPA).

Myrcia paivae has been collected from Costa Rica to Bolivia and the state of Mato Grosso in Brazil, in upland *terra firme* and flooded forests (Santos *et al.* 2020; Tropicos.org 2020). The BDFFP morphotype of this species has larger

leaves than the typical one and resembles *Myrcia splendens* in vegetative morphology, except for leaves with midvein usually raised adaxially (*vs.* always impressed in *M. splendens*) and corky, longitudinally fissured mature branches (*vs.* not corky in *M. splendens*). *Myrcia paivae* can be recognisable by relatively small inflorescences positioned at terminal and many subterminal nodes, sometimes also emerging on leafless nodes (ramiflorous inflorescences; Fig. 5e). [*Myrcia* sect. *Myrcia*].

28. *Myrcia prismatica* Gaem, Phytotaxa 451: 273. 2020. Figs. 4f; 5c

Trees ca. 18 m. Mature branches not corky; branchlets moderately or densely pubescent; cataphylls not seen; domatia absent. Leaves with petiole 0.7–1.2 cm, smooth, densely pubescent; blade discoloured, elliptic or ovate, not bullate, not folded downward, 5.7–16 × 3.9–7.6 cm, glabrous or moderately pubescent along the midvein adaxially, moderately or less often densely pubescent abaxially, apex acuminate, base obtuse; midvein impressed adaxially, lateral veins 23–34 at each side, raised adaxially, not strongly marked, reticulations raised abaxially, marginal veins two at each side, the inner 0.1–0.2 cm distant from margins. Inflorescences 2.7–9.8 cm, axillary at the terminal and subterminal nodes, once to three times compound, indumentum golden, moderately or densely tomentose. Flower buds obovoid; hypanthium undulated, not extending as a tube beyond the ovary, indumentum golden, densely pubescent externally; calyx open in bud, formed by five free sepals, moderately pubescent on both surfaces; floral disc densely pubescent, staminal ring densely pubescent. Fruits oblong, 1.4–1.6 × 0.5–0.7 cm, crowned by the calyx.

Examined material: Fazenda Dimona, reserva 2206, parcela 2206-3, quadrante 73, 15.II.1986, fr., *Equipe PDBFF 2206.1980* (INPA, SORO); Fazenda Esteio, reserva 1501 (km 41), 02°24’26”–02°25’31”S, 59°43’40”–59°45’50”W, 8.XII.1991, fl., *A.A. Oliveira et al. 279* (INPA, NY, SPF).

Myrcia prismatica has been registered to date only within the BDFFP plots. It is most similar to *Myrcia deflexa*, being distinguished by leaf blades persistently pubescent abaxially (*vs.* glabrescent or glabrate in *M. deflexa*) with 23–34 at each side of lateral veins (*vs.* 17–26 at each side in *M. deflexa*) and reticulations raised abaxially (*vs.* impressed in *M. deflexa*). Gaem *et al.* (2020a) mistakenly described leaf blade texture of *M. prismatica* as chartaceous, but it is actually better described as coriaceous. [*Myrcia* sect. *Myrcia*].

29. *Myrcia pyrifolia* (Desv. *ex* Ham.) Nied., Nat. Pflanzenfam. 3(7): 76. 1893. Fig. 3f

Trees. Mature branches not corky; branchlets sparsely to densely pubescent; cataphylls not seen; domatia absent. Leaves with petiole 0.2–0.4 cm, rugose, glabrous to moderately pubescent; blade discoloured, elliptic or slightly ovate, not bullate, not folded downward, 2.3–5.3 × 0.8–2.1 cm, glabrous or sparsely pubescent on both surfaces, apex caudate or rarely acute, base attenuate, obtuse, or slightly rounded; midvein raised adaxially, lateral veins ca. 10 at each side, flat or raised adaxially, not strongly marked, reticulations raised abaxially, marginal veins ca. 0.1 cm distant from margins. Inflorescences 1.5–6.5 cm, axillary at the terminal and subterminal nodes, three times compound, indumentum white, moderately tomentose. Flower buds obovoid; hypanthium smooth, extending as a tube beyond the ovary, indumentum white, densely tomentose externally; calyx open in bud, formed by five free sepals, sparsely pubescent externally, glabrous or sparsely pubescent internally; floral disc glabrous, staminal ring glabrous or sparsely tomentose. Fruits not seen.

Examined material: Fazenda Dimona, reserva 2206, parcela 2206-5, quadrante 111, fl., *Equipe PDBFF 2206.3062* (SORO).

Additional material: BRASIL. AMAZONAS: Barcelos, lateral channels of Rio Negro toward entrance to Rio Aracá, 00°45’62”S, 62°57’03”W, 7.VIII.1996, fl., *P. Acevedo-Rodríguez 8059* (INPA, US).

Myrcia pyrifolia occurs in Brazil, French Guiana, Guyana, Suriname, and Venezuela (Lucas *et al.* 2016). In Brazil it is restricted to Amazonia (Santos *et al.* 2020). This species has small, membranaceous leaf blades with raised midvein adaxially and densely white-tomentose outer surface of hypanthia (as in Fig. 2h). The BDFFP samples of this species have somewhat pubescent staminal rings, an uncommon feature in species of the section to which it belongs. [*Myrcia* sect. *Aulomyrcia*].

30. *Myrcia splendens* (Sw.) DC., Prodr. 3: 244. 1828. Fig. 2j

Trees 7–14 m. Mature branches not corky; branchlets glabrous or sparsely sericeous; cataphylls not seen; domatia absent. Leaves with petiole 0.5–0.8 cm, smooth, sparsely to moderately sericeous; blade discoloured, elliptic or ovate, not bullate, not folded downward, 7.4–17.4 × 2.6–6.1

cm, glabrous or sparsely sericeous on both surfaces, apex acuminate or caudate, base cuneate or obtuse; midvein impressed adaxially, lateral veins 21–28 at each side, raised adaxially, not strongly marked, reticulations raised abaxially, marginal veins two at each side, the inner ca. 0.1 cm distant from margins. Inflorescences 5.4–11 cm, axillary at the terminal and subterminal nodes, three times compound, indumentum white to golden, sparsely or moderately sericeous. Flower buds globose; hypanthium smooth, not extending as a tube beyond the ovary, indumentum golden, densely sericeous externally; calyx open in bud, formed by five free sepals, glabrous to moderately sericeous on both surfaces; floral disc densely pubescent, staminal ring densely pubescent. Fruits ellipsoid, 1–1.3 × 0.6–0.8 cm, crowned by the calyx.

Examined material: Fazenda Dimona, 02°19'S, 60°05'W, 7.XI.1988, fl., *M. Pacheco et al. 56* (INPA, NY); 22.XI.1989, fl., *P. Kukle 64* (INPA, NY).

Additional material: BRASIL. AMAZONAS: Manaus, INPA campus 1, Bosque da Ciência, 16.I.2018, fr., *P.H. Gaem & N.B. Cabello 145* (SORO).

Myrcia splendens is distributed from Mexico to subtropical Brazil, including the Caribbean, in diverse vegetation types (Santos *et al.* 2020; Tropicos.org 2020). In the sense here adopted, *Myrcia splendens* is restricted to individuals with strongly appressed indumentum (Fig. 2j), elliptic or ovate leaf blades, and globose flower buds with smooth hypanthium. [*Myrcia* sect. *Myrcia*].

31. *Myrcia sylvatica* (G.Mey.) DC., Prodr. 3: 244. 1828. Fig. 7h

Trees 6–15 m. Mature branches not corky; branchlets sparsely or moderately sericeous; cataphylls not seen; domatia absent. Leaves with petiole 0.1–0.3 cm, smooth, moderately or densely puberulous; blade discoloured, ovate or lanceolate, not bullate, not folded downward, 2.4–7.1 × 0.7–2.2 cm, glabrous adaxially, moderately sericeous abaxially, apex acuminate or caudate, base obtuse, rounded, or less often cuneate; midvein impressed adaxially, lateral veins 20–33 at each side, flat adaxially, not strongly marked, reticulations raised abaxially, marginal veins ca. 0.05 cm distant from margins. Inflorescences 3.2–6.6 cm, axillary at the terminal and subterminal nodes, twice or three times compound, indumentum white, sparsely or moderately sericeous. Flower buds obovoid; hypanthium smooth, not extending as a tube beyond the ovary, indumentum white, golden, or silvery, densely sericeous externally; calyx open in bud, formed by five free sepals, sparsely sericeous on both surfaces; floral disc densely pubescent, staminal ring moderately pubescent. Fruits ellipsoid, 0.7–0.9 × 0.4–0.5 cm, crowned by the calyx.

Examined material: Fazenda Dimona, 02°19'S, 60°05'W, 5.XI.1988, fl., *M. Pacheco et al. 43* (NY); Fazenda Esteio, Reserva 1501 (km 41), 02°24'26"–02°25'31"S, 59°43'40"–59°45'50"W, 6.XII.1988, fl., *B. Boom et al. 8751* (NY).

Additional material: BRASIL. AMAZONAS: Manaus, Reserva Florestal Ducke, Manaus-Itacoatiara, km 26, 17.XI.1996, fl., *M.A.D. Souza & P.A.C.L. Assunção 273* (INPA). PARÁ: Bragança, Comunidade Benjamin Constant, travessa da Tijoca, propriedade de Raimundo Nonato da Silva Ribeiro, 22.II.2000, fr., *M. Rios 738* (INPA).

Myrcia sylvatica occurs in Bolivia, Brazil, and Venezuela, in flooded and *terra firme* forests (Tropicos.org 2020). In Brazil it has a disjoint distribution between north-eastern Atlantic and Amazonian forests (Santos *et al*. 2020). This species can be recognised by small leaf blades with deeply impressed midvein adaxially (Fig. 7h). [*Myrcia* sect. *Myrcia*].

32. *Myrcia uaupensis* (O.Berg) Gaem & E.Lucas, Phytotaxa 474: 299. 2020.

Marlierea spruceana O.Berg, *Fl. bras.* 14: 34. 1857. Figs. 2k; 3g

Trees 7.5–30 m, trunk height ca. 16 m. Mature branches not corky; branchlets glabrous or sparsely sericeous; cataphylls ca. 0.2 cm, moderately to densely sericeous; domatia absent. Leaves with petiole 0.4–0.8 cm, smooth, rugose, or corky and exfoliating, glabrous to moderately sericeous; blade strongly discoloured, elliptic, slightly ovate, or slightly obovate, not bullate, not folded downward, 5.1–14.8 × 1.9–6.2 cm, glabrous adaxially, glabrous or moderately sericeous abaxially, apex acuminate or caudate, base cuneate, obtuse, or slightly attenuate; midvein impressed adaxially, lateral veins 13–18 at each side, slightly raised adaxially, not strongly marked, reticulations raised abaxially, marginal veins two at each side, the inner 0.1–0.3 cm distant from margins. Inflorescences 4.6–11.6 cm, axillary at the terminal nodes, twice or three times compound, indumentum light golden, densely sericeous. Flower buds obovoid; hypanthium smooth, extending as a tube beyond the ovary, indumentum golden, densely pubescent or sericeous externally; calyx completely fused in bud, opening irregularly at anthesis, densely sericeous externally, glabrous internally; floral



Figure 7 – a-i. Vegetative morphological feature of species of *Myrcia* in the BDFFP sites – a-b. branches – a. *M. cuprea*; b. *M.* sp.1; c-i. leaves – c. *M.* aff. *amazonica*; d. *M. castanea*, arrow indicating revolute leaf base; e. *M. fasciculata*; f. *M. fenestrata*; g. *M. magnoliifolia*; h. *M. sylvatica*; i. *M.* sp.2.

disc densely pubescent, staminal ring densely pubescent. Fruits globose, 1.2–2 cm diameter, crowned by the hypanthial tube, calyx remnants persisting or deciduous.

Examined material: Fazenda Esteio, 02°25'S, 59°51'W, 27.VI.1992, fr., *C. Dick 189* (INPA, NY); Fazenda Porto Alegre, 02°22'S, 59°57'W, 11.IV.1992, fr., *C. Dick 110* (NY).

Additional material: BRAZIL. AMAZONAS: Manaus, cachoeira Alta Tarumã, 18.X.1966, fl., *G.T. Prance et al. 2686* (NY). Japurá, Vila Bittencourt, Rio Japurá, margem esquerda, igarapé Patoá, 19.XI.1982, fl., *I.L. Amaral et al. 585* (INPA).

Myrcia uaupensis occurs in Brazil, Colombia, Peru, and Venezuela, in *terra firme* and flooded forests (Lucas *et al.* 2016). This species has flowers with completely closed calyx before anthesis and densely pubescent floral disc (Figs. 2k; 3g), characters shared with *Myrcia cuspidata* (Fig. 3c). It is distinguished from the latter species, however, by golden indumentum (*vs.* reddish-brown in *M. cuspidata*), leaves with impressed midvein adaxially (*vs.* raised in *M. cuspidata*), and calyces opening irregularly at anthesis (*vs.* calyptrate in *M. cuspidata*). The uncommon floral features of this species keep it apart from the morphological circumscriptions of the all the nine currently accepted infra-generic categories of the genus, but its position in *Myrcia* sect. *Aulomyrcia*, as proposed by Lucas *et al.* (2016), is followed here. Although the new combination of Gaem *et al.* (2020b) is based on *Marlierea uaupensis* O.Berg, the synonym *M. spruceana* is widely applied to herbarium specimens of this species. [*Myrcia* sect. *Aulomyrcia*].

33. *Myrcia umbraticola* (Kunth) E.Lucas & C.E.Wilson, Ann. Missouri Bot. Gard. 101: 695. 2016.

Marlierea umbraticola (Kunth) O.Berg, Linnaea 27: 17. 1855. Fig. 3h

Trees, trunk height ca. 15 m. Mature branches not corky; branchlets moderately or densely tomentose; cataphylls not seen; domatia absent. Leaves with petiole 0.3–1 cm, corky and exfoliating, moderately or densely tomentose; blade discoloured, elliptic or obovate, not bullate, not folded downward, 5.4–12.7 × 2.5–5.5 cm, glabrous adaxially, glabrous or sparsely pubescent abaxially, apex acuminate or caudate, base cuneate or obtuse; midvein impressed adaxially, lateral veins 11–16 at each side, raised adaxially, not strongly marked, reticulations raised abaxially, marginal veins two at each side, the inner 0.2–0.4 cm distant from margins. Inflorescences 2.4–8.4 cm, axillary at the terminal or more often the subterminal nodes, twice compound, indumentum ferruginous, densely pubescent or tomentose. Flower buds obovoid; hypanthium smooth, extending as a tube beyond the ovary, indumentum absent or white, very sparsely pubescent externally; calyx open in bud, formed by four or five small free sepals that do or do not tear through the staminal ring at anthesis, glabrous or sparsely pubescent externally, glabrous to densely pubescent internally, ciliate; floral disc glabrous, staminal ring glabrous. Fruits globose, 0.7–1.6 cm diameter, crowned by the hypanthial tube (sometimes torn through), calyx usually persisting.

Examined material: Fazenda Porto Alegre, 02°S, 59°W, *A.J.C. Ferreira et al. 3402.3728* (NY).

Additional material: BRASIL. AMAZONAS: Manaus, Reserva Florestal Ducke, área do projeto TEAM, parcela da Ducke-Sede, sub-parcela 19, indivíduo nº 430, 14.X.2005, fr., *A.B. Azevedo & A.T. Mello 12* (INPA); Manaus-Itacoatiara, km 26, 20.IX.1995, fl., *M.A.D. Souza & E.C. Pereira 107* (INPA).

Myrcia umbraticola occurs in Brazilian, Colombian, and Venezuelan Amazonia, in forests and riverine ecosystems (Lucas *et al.* 2016). This is a species of problematic delimitation (see Lucas *et al.* 2016; Gaem *et al.* 2019a) with considerable variation in floral characters: flowers are 4–5-merous, staminal rings are either intact (as in Fig. 3e) or dilacerated after anthesis (Fig. 3h), and sepals are internally glabrous or hairy. For distinction between *Myrcia umbraticola* and *M. nigrescens* in the BDFFP sites, see the comments under the latter species. [*Myrcia* sect. *Aulomyrcia*].

34. *Myrcia vexata* (McVaugh) K.Campbell & K.Samra, Phytotaxa 406: 155. 2019.

Calyptranthes vexata McVaugh, Fieldiana, Bot. 29: 412. 1963. Figs. 2l; 3i

Trees, trunk height ca. 10 m. Mature branches not corky; branchlets glabrous or sparsely pubescent; cataphylls not seen; domatia absent. Leaves with petiole 0.8–1.5 cm, smooth, glabrous or sparsely pubescent; blade discoloured, elliptic, slightly ovate to obovate, or less often lanceolate, not bullate, not folded downward, 7.4–20.4 × 2.5–6.2 cm, glabrous on both surfaces, apex acuminate or caudate, base cuneate, obtuse, or slightly rounded; midvein raised adaxially, lateral veins ca. 25 at each side, flat or raised adaxially,

not strongly marked, reticulations raised abaxially, marginal veins two at each side, the inner 0.1–0.2 cm distant from margins. Inflorescences 5–9.2 cm, axillary at the terminal nodes, three times compound, indumentum ferruginous to reddish, sparsely or moderately pubescent. Flower buds globose; hypanthium smooth, extending as a tube beyond the ovary, indumentum ferruginous to reddish, densely pubescent externally; calyx completely fused in bud, opening as a calyptra at anthesis, glabrous on both surfaces; floral disc glabrous, staminal ring glabrous. Fruits globose, ca. 0.2 cm diameter (probably before maturity), crowned by the hypanthial tube, calyx deciduous.
Examined material: Fazenda Dimona, 02°19'S, 60°05'W, 12.XI.1982, fl., *J.R.M. Nascimento et al. 2206.3501* (NY); reserva 2206, parcela 2206-5, quadrante 127, fr., *Equipe PDBFF 2206.3501* (INPA); Fazenda Esteio, 02°25'S, 59°51'W, 27.V.1989, *S.S. da Silva 1101.301.2* (INPA).

Myrcia vexata occurs in Guyana and the Brazilian state of Amazonas, in *terra firme* forests (Sobral *et al.* 2015; Campbell *et al.* 2019). It can be easily distinguished from other species of the genus in the BDFFP sites by leaves with faint lateral veins, pubescent hypanthia, and glabrous calyptras. [*Myrcia* sect. *Calyptranthes*].

Incompletely known taxa

35. *Myrcia* sp.1. Fig. 7b

Trees. Mature branches not corky; branchlets densely sericeous; cataphylls not seen; domatia absent. Leaves with petiole 0.3–0.5 cm, smooth, densely sericeous; blade discoloured, elliptic or slightly obovate, not bullate, not folded downward, 4.5–6 × 2.6–3.2 cm, glabrous or sparsely sericeous adaxially, completely sericeous abaxially, apex acuminate, base cuneate or attenuate; midvein impressed adaxially, lateral veins ca. 10 at each side, flat or raised adaxially, not strongly marked, reticulations inconspicuous abaxially, marginal veins ca. 0.1 cm distant from margins. Inflorescences not seen. Flowers not seen. Fruits not seen.
Examined material: Fazenda Esteio, reserva 1501 (km 41), 02°24'26"–02°25'31"S, 59°45'40"–59°45'50"W, III.1993, *A.A. de Oliveira 1361* (INPA, SPF, NY).

Myrcia sp.1 resembles *Myrcia cuprea* in coppery, dense indumentum on branchlets and abaxial leaf surfaces (Fig. 7a-b), but the former can be distinguished by the latter by pruinose adaxial leaf surface (*vs.* shiny in *M. cuprea*) with impressed midvein (*vs.* raised in *M. cuprea*).

36. *Myrcia* sp.2. Fig. 7i

Trees. Mature branches not corky; branchlets moderately or densely pubescent to tomentose; cataphylls not seen; domatia absent. Leaves with petiole 1–1.3 cm, smooth, moderately or densely pubescent or tomentose; blade discoloured, elliptic or ovate, not bullate, not folded downward, 18.2–28.9 × 7.3–10.7 cm, glabrous or sparsely pubescent adaxially, completely pubescent-tomentose abaxially, apex acuminate or caudate, base obtuse or rounded; midvein impressed adaxially, lateral veins 15–25 at each side, raised adaxially, not strongly marked, reticulations inconspicuous abaxially, marginal veins 0.4–0.8 cm distant from margins. Inflorescences not seen. Flowers not seen. Fruits not seen.
Examined material: Fazenda Esteio, sítio amostral Florestal, reserva 1301, parcela 1301-7, quadrante 172, 02°23'00.3"S, 59°51'00.2"W, 24.VIII.2015, *Equipe PDBFF 1301.7558* (SORO).

Myrcia sp.2 can be recognised by flattened branchlets, abaxial leaf surface completely covered by trichomes, and marginal veins 0.4–0.8 cm distant from leaf margins (Fig. 7i).

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