



## Original Paper

# Floristic inventory of Melastomataceae of the Iguaçu National Park, Paraná, Brazil

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### Abstract

Melastomataceae is one of the richest families in Brazil, with 1,436 species, 158 occurring in the state of Paraná. Many of the species are pioneers and zoochoric, essential for regeneration and floristic composition of the Atlantic Forest, which is the phytogeographic domain covering the Iguaçu National Park (ParNa Iguaçu). We present the floristic inventory of Melastomataceae of ParNa Iguaçu. Three areas in the park were sampled from May 2019 to March 2020, where two are covered with Seasonal Semideciduous Forest (SSF), and the other in a transition between SSF and Mixed Ombrophilous Forest (MOF). Seventeen species of Melastomataceae in four genera were recorded: *Miconia* (14 spp.), *Acisanthera*, *Chaetogastra*, and *Pleroma* (with only one species each). Seven species occur in the two vegetation types in ParNa Iguaçu, while six occur only in MOF and four only in SSF. Of the 17 species, six are endemic to Brazil, four of which occur only in the south and southeast regions of the country. This study registers nine new records for the ParNa Iguaçu. Furthermore, the *Miconia leaeichleri* was collected for the first time in the western region of Paraná, which suggests the necessity for more collection efforts in the western region of the state.

**Key words:** Atlantic Forest, diversity, floristic survey, *Miconia*.

### Resumo

Melastomataceae é uma das famílias com maior riqueza de espécies no Brasil, formada por 1.436 espécies, com 158 ocorrendo no estado do Paraná. Muitas espécies são pioneiras e zoocóricas, sendo essenciais na regeneração e composição florística na Mata Atlântica, que é a cobertura do domínio fitogeográfico do Parque Nacional do Iguaçu (ParNa Iguaçu). Nós apresentamos o inventário florístico de Melastomataceae do Parque Nacional do Iguaçu. Foram amostradas três áreas do Parque no período de 2019 a fevereiro de 2020, onde duas são cobertas por Floresta Estacional Semidecidual (FES) e a outra em transição entre FES e Floresta Ombrófila Mista (FOM). Dezesete espécies de Melastomataceae distribuídas em quatro gêneros foram registrados: *Miconia* (com 14 spp.), *Acisanthera*, *Chaetogastra* e *Pleroma* (com apenas uma espécie cada). Sete espécies ocorrem nos dois tipos de vegetação do ParNa Iguaçu, enquanto seis ocorrem apenas em FOM e quatro apenas em FES. Das 17 espécies encontradas, seis são endêmicas do Brasil e quatro ocorrem somente nas regiões sul e sudeste do país. Este estudo registra nove novos registros para o ParNa Iguaçu. Além disso, *Miconia leaeichleri* foi coletada pela primeira vez na região oeste dos estado do Paraná, o que sugere a necessidade de um maior esforço de coleta na região oeste do estado.

**Palavras-chave:** Mata Atlântica, diversidade, levantamento florístico, *Miconia*.

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## Introduction

Melastomataceae is one of the largest families of Myrtales, with 5,860 species worldwide (Michelangeli *et al.* 2020; Ulloa *et al.* 2022). It can be recognized by the opposite, exstipulate, acrodromous leaves and dichlamideous flowers with free petals, stamens usually twice as the petals, with poricidal or seldom rimose anthers (Judd *et al.* 2009). It is monophyletic (Maurin *et al.* 2021), but recent phylogenetic studies, based on molecular and morphological evidence, have proposed a new circumscriptions for the tribes (Penneys *et al.* 2010, 2020; Michelangeli *et al.* 2011; Bacci *et al.* 2019; Bochner *et al.* 2019) and genera, such as the polyphyletic *Tibouchina*, which was recently broken down into other genera (Michelangeli *et al.* 2013; Guimarães *et al.* 2019) and *Miconia* and *Microlicia*, with recent broader circumscriptions that include other former genera (Michelangeli *et al.* 2016, 2019; Versiane *et al.* 2021). In these cases, *Pleroma* came to be treated as a genus, resulting in several nomenclatural changes (Guimarães *et al.* 2019), while *Clidemia*, *Leandra*, and *Ossaea* are now included in a broader *Miconia* (Michelangeli *et al.* 2016, 2019).

In Brazil, Melastomataceae is one of the top 10 families of Angiosperms (BFG III 2021). It is represented in the country by 69 genera, 1,436 species, from which 929 (64.69%) are endemic to the country (Goldenberg *et al.* 2020a). *Miconia*, *Leandra*, *Microlicia* and *Pleroma* are the genera with the highest species richness and/or a high degree of endemism (Goldenberg *et al.* 2020a). Out of the 69 genera present in Brazil, 22 occur in the state of Paraná, distributed in 158 native species (Goldenberg *et al.* 2020a). Although several genera have already been studied for Paraná (Goldenberg 2004; Goldenberg *et al.* 2005; Camargo & Goldenberg 2007; Camargo *et al.* 2009; Meyer *et al.* 2010; Meyer & Goldenberg 2012; Goldenberg *et al.* 2015, 2016), the study of local floras are still important (see Maia & Goldenberg 2014). Taxonomic studies are of great relevance for obtaining knowledge about a biological group (Silva *et al.* 2017), especially in National and State Parks, such as the Iguazu National Park (ParNa Iguazu).

Some floristic surveys (Cervi & Borgo 2007; Rodolfo *et al.* 2008; Lautert *et al.* 2015; and Trochez *et al.* 2017) or floras for ParNa Iguazu (Hammes *et al.* 2021; Rauber *et al.* 2021a, b; Hentz Junior *et al.* 2022; Conceição *et al.* 2023;

Vieira *et al.* 2023) have already been published or submitted to scientific journals, however, for Melastomataceae, specific studies have not been carried out yet. This family includes many pioneer, zoochoric species, they are essential for regeneration and floristic composition in the Atlantic Forest (Tabarelli & Mantovani 1999). This study has as objective to elaborate the floristic inventory of Melastomataceae from the ParNa Iguazu, presenting an identification key to the species, their phenology, preliminary conservation status evaluation and their distribution in the different areas and vegetation types in the Park.

## Material and Methods

### Survey area

The Iguazu National Park (ParNa Iguazu) is a conservation unit with 185,262 hectares, 420 km perimeter and is located at the coordinates 25°05' to 25°41' South and 53°40' to 54°38' West (ICMBio 2018). According to Köppen's classification, the region's climate is humid subtropical (Cfa), with no dry season and with a hot summer (Alvares *et al.* 2013), with a 20.1–22 °C annual average temperature and 1,600–2,000 mm annual precipitation (Nitsche *et al.* 2019).

The ParNa Iguazu comprises one of the remnants of the largest area of Submontane and Montane Seasonal Semideciduous Forest (SSF) of central and southern Brazil. There is an area with Mixed Ombrophilous Forest (MOF) in the northern region of the park, at elevations above 700 m (ICMBio 2018). The Park can be divided into three large areas (Hammes *et al.* 2021): area 1 ("Céu Azul" administrative headquarters) to the north, with a transition between SSF and MOF; area 2 ("Capanema" administrative headquarters) to the south, composed exclusively of SSF; and area 3 ("Foz do Iguazu" administrative headquarters), located in the southwest region of the park, also represented solely by SSF (Fig. 1).

### Data collection and analysis

The collections have been gathered by other researchers since August 2007 and were intensified through the walking method (Filgueiras *et al.* 1994), between May 2019 and March 2020. These collections were made in different trails of ParNa Iguazu in 17 expeditions. Reproductive branches of Melastomataceae were collected and photographed in the field with a CANON DC 8.1V camera.

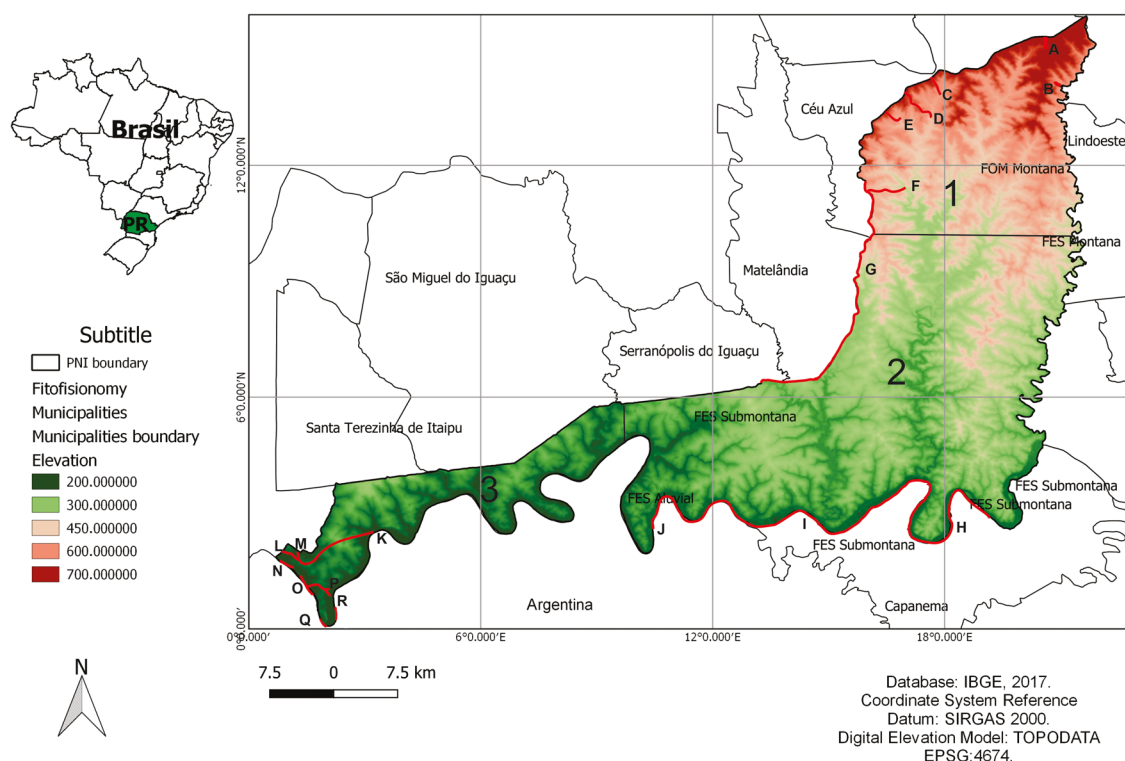
The specimens were collected according to herborization techniques (Bridson & Forman 2004), the exsiccates were deposited in the UNOP herbarium with duplicates sent to EVB, FLOR, HCF, HUEM, MBM, RB, UFMT, and UPCB herbaria. In addition to these samples, images from the herbaria ASE, DVPR, EVB, HCF, HUCP, HUCS, HVC, IPA, IRAI, MBM, NY, RB, SHPR, UNOP, UPCB, and US herbaria (acronyms according to Thiers, continuously updated) were examined through SpeciesLink (<<https://specieslink.net>>) and Jabot (<<http://jabot.jbrj.gov.br>>).

The species identification was carried out with the assist of taxonomic references (Martins 2009; Goldenberg 2004; Goldenberg *et al.* 2005; Camargo & Goldenberg 2007; Camargo *et al.* 2009; Meyer *et al.* 2010; Meyer & Goldenberg 2012; Goldenberg *et al.* 2020a).

The identification key was based on vegetative and reproductive morphological

characters observed in the examined materials. The species were presented in alphabetical order and the spelling of scientific names and authors were verified in Goldenberg *et al.* (2020a), but differently from what is presented in flora, the genera *Leandra* and *Ossaea* were considered synonym under *Miconia*, following the circumscription proposed by Michelangeli *et al.* (2016, 2019). The genera *Chaetogastra* and *Pleroma* were considered distinct from *Tibouchina*, following the circumscription proposed by Guimarães *et al.* (2019).

Based on the collected, examined materials, and data from labels, the information about phenology, elevation and area of occurrence in ParNa Iguaçu of each species was described. Species distribution data and the phytogeographic domains in which the species inhabit were obtained from Flora do Brasil 2020 platform (Goldenberg *et al.* 2020a). The species conservation status was verified at the National Center for the Conservation of Flora website (CNCFlora 2023), and for the



**Figure 1** – Map of the Iguaçu National Park with the trails that were sampled – Area 1: Céu Azul (A = Fazenda Rio Butu; B = Nascentes do Jumelo; C = Araucárias; D = Cachoeira Rio Azul; E = Manoel Gomes; F = Jacutinga). Area 2: Capanema (G = Margens do Rio Iguaçu do lado brasileiro; H = Cachoeira Rio Silva-Jardim; I = Ilha do Sol). Area 3: Foz do Iguaçu (J = Poço Preto; K = Represa São João; L = Antiga Usina; M = Escola Parque; N = Macuco Safari; O = Bananeiras; P = Cataratas; Q = Hidrante) (Hammes *et al.* 2021).

species not yet assessed, a preliminary assessment was carried out. For this, it was downloaded the distribution data from records of each species for Brazil on SpeciesLink and Jabot, prioritizing specimens with original geographic coordinates. The data were analyzed through GeoCAT (Bachman *et al.* 2011), following the IUCN Red List Criteria Application Guidelines for Regional and National Levels (IUCN 2021). These records were identified with support by specialist and selected, with the removal of points considered suspicious or invalid, such as coordinates located in the ocean or in places where the species does not occur. Finally, the extent of occurrence (EOO) and conservation status were inferred into consideration only the number of collections of each of the species.

## Results and Discussion

Seventeen native species were found in the ParNa Iguaçú, distributed in four genera: *Acisanthera* (Fig. 2a-d), *Chaetogastra* (Fig. 2e-f), *Miconia* (Figs. 2g-n, 3a-n, 4a-g), and *Pleroma* (Figs. 3o-p, 4h). *Miconia* was the richest genus with 14 species while the other three present one species each. This study presents nine new records of Melastomataceae for ParNa Iguaçú: *C. herbacea*, *M. alterninervia*, *M. cinerascens*, *M. latecrenata*, *M. leamarginata*, *M. leaeichleri*, *M. microstachya*, *M. sublanata*, and *M. theaezans*, representing an increase of 53% of Melastomataceae for the area and the first collection of *M. leaeichleri* in the west region of Paraná. Among the Melastomataceae from ParNa Iguaçú, six species are endemic to Brazil (*M. amygdaloides*, *Miconia latecrenata*, *Miconia leaeichleri*, *Miconia microstachya*, *Miconia xanthocoma* and *Pleroma fothergillii*) and six species occur only in the south and southeast regions of the country (*M. alterninervia*, *M. australis*, *M. leaeichleri*, *M. microstachya*, *M. xanthocoma* and *P. fothergillii*) (Goldenberg *et al.* 2020a).

In the ParNa Iguaçú Management Plan (ICMBio 2018) and the floristic and phytosociological surveys by Gris *et al.* (2014), Gris & Temponi (2017), and Souza *et al.* (2017), there were no records for species of Melastomataceae, mostly because this family usually has herbaceous and shrubby species, and these studies focus on trees. However, Souza *et al.* (2019) reported the names *Miconia pusilliflora* (DC.) Naudin, and *M. hymenonervia* (Raddi) Cogn. in SSF areas of the park, but both are today treated as synonyms (Goldenberg *et al.* 2020c) and despite that, we

were unable to find vouchers in herbaria for these registers. In a general checklist of phanerogams for the ParNa Iguaçú, Trochez *et al.* (2017) pointed out nine names for Melastomataceae, namely, *A. variabilis*, *M. amygdaloides*, *M. australis*, *M. collatata*, *M. discolor*, *M. pusilliflora*, *M. xanthocoma*, *M. xanthostachya*, and *P. fothergillii*, totaling nine species already reported for the study area.

As for the distribution of these 17 species in the vegetation types in the ParNa Iguaçú, seven occur both in SSF and MOF, but six species were found only in MOF (Tab. 1), this being the first record of *A. variabilis*, *M. latecrenata*, *M. leaeichleri*, *M. sublanata* and *M. theaezans* for this vegetation type. Furthermore, it was observed that four species occur only in SSF, from which three (*M. amygdaloides*, *M. leamarginata*, and *P. fothergillii*) were found only in the area 3 (Tab. 1). These species were previously only recorded in Ombrophilous Forest areas and were recorded for the first time for SSF, contributing with updates to the Flora e FUNGA do Brasil.

Maia & Goldenberg (2014) pointed in their study with Melastomataceae, in the Parque Estadual do Guartelá, a higher number of species (36 spp.) in relation to the ParNa Iguaçú (17 spp.). This difference probably reflects on the higher diversity of the family in grassland formations present in Guartelá (“Grassy-Woody Steppe”, “Humid Grassland” and “Rupestrian Field”), in addition to areas of Cerrado and Mixed Ombrophilous Forest (Veloso *et al.* 1991 and Carmo *et al.* 2012), while in the ParNa Iguaçú there is a predominance of Seasonal Semideciduous Forest and a transition area with Mixed Ombrophilous Forest.

The results of the preliminary assessment of the conservation status, based only on the extent of occurrences criterion (EOO), indicate that all the 17 species of Melastomataceae non evaluated by CNCFlora (2023) are of Least Concern - LC, due to the EEO higher than 20,000 km<sup>2</sup>, but despite this conservation status, some species have a more restricted distribution locally, in a specific area or vegetation formation of the ParNa Iguaçú.

Thus, these results demonstrate the importance of collections directed to a specific taxonomic group and expanding knowledge about the flora of the region, which will be useful for studies in other areas, improvement of management plans, as well as pointing out priority areas for the conservation of these species within the Conservation Unit.



**Table 1** – Distribution of Melastomataceae species in the areas of the Iguaçú National Park. (\* = endemic species to Brazil, according to Goldenberg *et al.* 2020a).

Species of Melastomataceae	Céu Azul		Capanema	Foz do Iguaçú
	FOM	FES	FES	FES
<i>Acisanthera variabilis</i> (Naudin) Triana	X			
<i>Chaetogastra herbacea</i> (DC.) P.J.F.Guim. & Michelang.	X	X	X	X
<i>Miconia alterninervia</i> (Cogn.) R.Goldenb.	X	X		
<i>Miconia amygdaloides</i> (DC.) R.Goldenb.*				X
<i>Miconia australis</i> (Cham.) R.Goldenb.	X		X	X
<i>Miconia cinerascens</i> Miq.	X	X	X	
<i>Miconia collatata</i> Wurdack			X	X
<i>Miconia discolor</i> DC.	X	X		X
<i>Miconia latecrenata</i> (DC.) Naudin*	X			
<i>Miconia leaeichleri</i> R.Goldenb.*	X			
<i>Miconia leamarginata</i> R.Goldenb.				X
<i>Miconia microstachya</i> (Naudin) R.Goldenb.*	X			
<i>Miconia pusilliflora</i> (DC.) Naudin	X		X	X
<i>Miconia sublanata</i> (Cogn.) R.Goldenb.	X			
<i>Miconia theaezans</i> (Bonpl.) Cogn.	X			
<i>Miconia xanthocoma</i> (Naudin) R.Goldenb.*	X		X	X
<i>Pleroma fothergillii</i> (Schrank et Mat. ex DC.) Triana*				X
<b>Total species</b>	<b>13</b>	<b>4</b>	<b>6</b>	<b>9</b>

### Identification key for the Melastomataceae from the Iguaçú National Park

1. Branches quadrangular; corolla pink or purple; fruit capsular ..... 2
- 1'. Branches cylindrical; corolla white; fruits bacaceous..... 4
  2. Petals pink; connectives 0.7–3 mm long..... 1. *Acisanthera variabilis*
  - 2'. Petals purple, connectives 1.7 mm long..... 3
    3. Anthers purple; calyx lobes more with more than 4 mm long, deciduous in the fruits ..... 17. *Pleroma fothergillii*
    - 3'. Anthers yellow; calyx lobes up to 2 mm long, persistent in the fruits..... 2. *Chaetogastra herbacea*
  4. Petals with rounded or retuse apex..... 5
    - 4'. Petals with acute, acuminate to rarely apiculate apex..... 10
      5. Adult leaves with the abaxial surface densely covered with trichomes; panicles glomerulate..... 6
      - 5'. Adult leaves with glabrous abaxial surface, sometimes with trichomes only on the veins, panicles never glomerulate ..... 7
        6. Acrodromous veins more than 1.8 cm distant from the base (suprabasal); inflorescences with secondary branches with 1(–2) glomerules or branchings ..... 8. *Miconia discolor*
        - 6'. Acrodromous veins starting from the base (basal), or less than 1.8 cm distant from the base (suprabasal); inflorescences with secondary branches in sequences of 3 to more glomerules branchings..... 6. *Miconia cinerascens*

7. Inflorescences terminal and lateral; fruits with 10–20 seeds .....9. *Miconia latecrenata*
- 7'. Inflorescences exclusively terminal; fruits with 2–6 seeds ..... 8
8. Central vein joined to the inner pair by a membrane on the abaxial face; anthers dehiscent through a longitudinal opening..... 13. *Miconia pusilliflora*
- 8'. Central vein not joined to the inner pair by a membrane on the abaxial face; anthers dehiscent through 1–4 apical pores ..... 9
9. Branches reddish at the apex; leaf margins serrate-ciliate; anthers dehiscent through 4 pores ..... 15. *Miconia theaezans*
- 9'. Branches not reddish at the apex, leaf margins repand-denticulate and eciliate; anthers dehiscent through 1–2 pores.....7. *Miconia collatata*
10. Inflorescences lateral ..... 11
- 10'. Inflorescences terminal or pseudolateral ..... 12
11. Mature branches glabrescent; leaf blade glabrous on both sides or with trichomes concentrated near the margin, forming bands on the adaxial surface of the leaf .... 11. *Miconia leamarginata*
- 11'. Mature branches not glabrescent; leaf blade densely covered with simple trichomes on both surfaces .....4. *Miconia amygdaloides*
12. Bracts and bracteoles involucral; anthers white .....10. *Miconia leaeichleri*
- 12'. Bracts and bracteoles reduced and not involucral; anthers yellow, pinkish or purplish ..... 13
13. Young branches with only unbranched trichomes, 1–3,5 mm long .... 14
- 13'. Young branches with stellate or dendritic trichomes, apart from unbranched ones, the latter less than 1 mm ..... 15
14. Anther 4.5–5 mm long; ovary 4–5 locular ..... 16. *Miconia xanthocoma*
- 14'. Anthers 2.5–3.8 mm long; ovary 3-locular .....5. *Miconia australis*
15. Branches with dendritic trichomes; anthers pinkish..... 14. *Miconia sublanata*
- 15'. Branches with stellate trichomes; anthers yellow ..... 16
16. Leaf blade abaxial surface with only unbranched tortuous trichomes ..... 12. *Miconia microstachya*
- 16'. Leaf blade abaxial surface with the unbranched straight trichomes .....3. *Miconia alterninervia*

**1. *Acisanthera variabilis*** (Naudin) Triana, Trans. Linn. Soc. London 28(1): 34. 1871. Fig. 2a-d

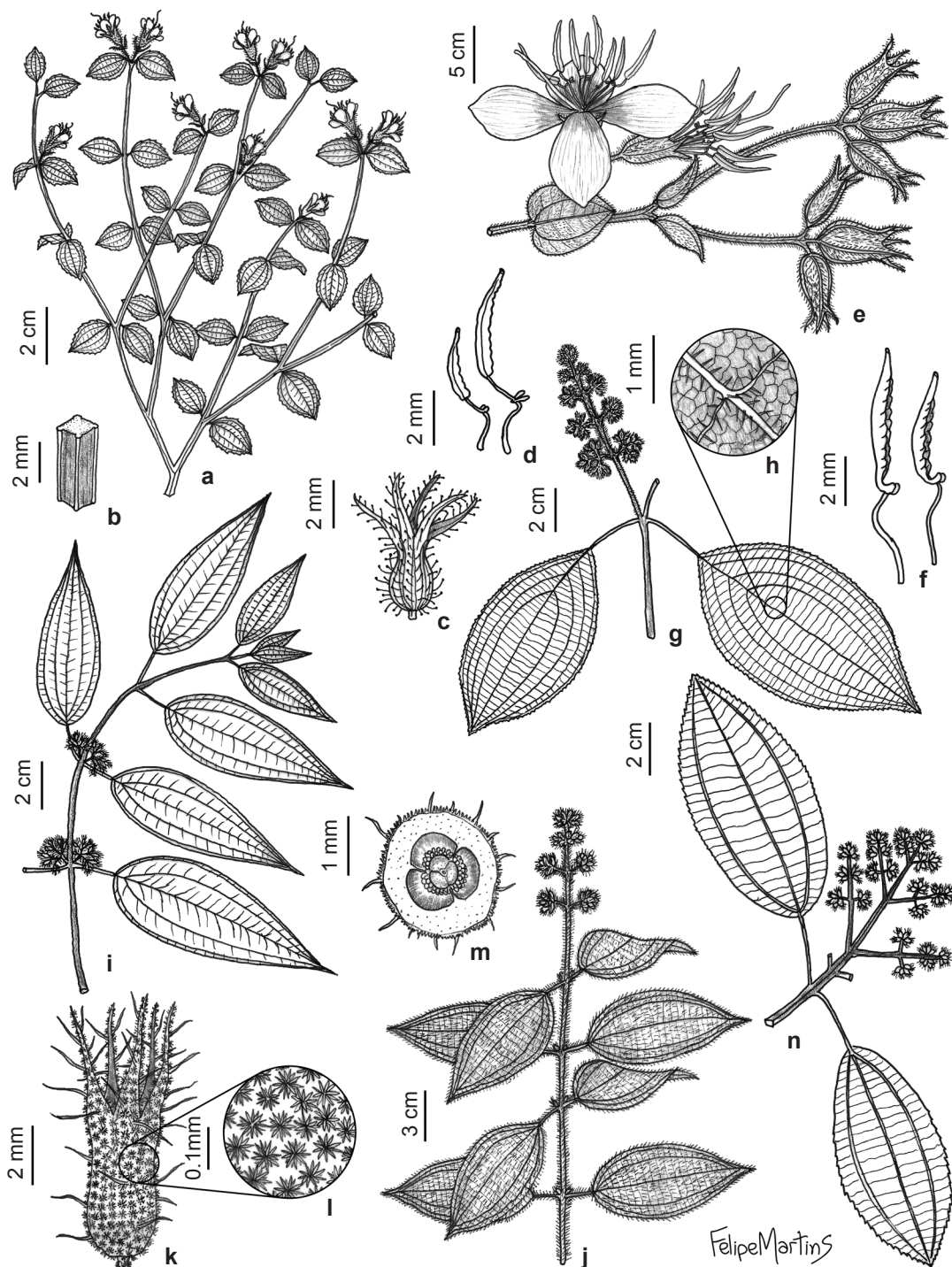
**Examined material:** Area 1, 25°03'07.9"S, 53°37'59.2"W, 3.V.2013, fl., *M.L. Toderke et al. 66* (EVB, HCF, MBM, UPCB, UNOP); trilha do Rio Butu, Lagoa Azul, 25°05'22.4"S, 53°40'09.1"W, 2.VI.2017, fl., *M.G. Caxambu et al. 7831* (HCF, HUCP); 25°05'23.1"S, 53°40'09.9"W, 22.II.2018, fl., *E.L. Siqueira et al. 2441* (HCF).

*Acisanthera variabilis* occurs in Amazonas, Bahia, Distrito Federal, Espírito Santo, Goiás, Mato Grosso do Sul, Mato Grosso, Minas Gerais, Paraíba, Paraná, Piauí, Rio de Janeiro, São Paulo, and Santa Catarina (Guimarães *et al.* 2020). In the ParNa Iguaçu, it was registered only in area 1, mostly in MOF and was collected with flowers in February, May and June. *Acisanthera variabilis*

is a highly polymorphic species regarding morphological features of the leaves and stamens (Meyer & Goldenberg 2012; Kriebel & Almeda 2013), but it can be easily differentiated in the ParNa Iguaçu by the herbaceous habit, pink corolla, and capsular fruits (Fig. 2a).

**2. *Chaetogastra herbacea*** (DC.) P.J.F.Guim. & Michelang., Taxon 68(5): 962, 2019. Fig. 2e-f

**Examined material:** Area 1, 25°03'07.9"S, 53°37'59.2"W, 3.V.2013, fl., *M.L. Toderke et al. 67* (UNOP); trilha da Jacutinga, 25°14'24.0"S, 53°49'12.0"W, 20.V.2013, fl., *L.G. Temponi et al. 1255* (UNOP, UPCB); 397 m, 25°14'05.5"S, 53°49'08.9"W, 23.III.2018, fl. *E.L. Siqueira et al. 2530* (HCF); trilha do Rio Butu, Lagoa Azul, 699 m, 25°05'22.5"S, 53°40'09.1"W, 4.IV.2018, fl., *M.G.*



**Figure 2** – a-d. *Acisanthera variabilis* – a. habit; b. quadrangular stem; c. hypanthium; d. anthers. e-f. *Chaetogastra herbacea* – e. inflorescence; f. anthers. g-h. *Miconia alterninervia* – g. cylindrical branches and leaf blade with 7 + 2 suprabasal veins; h. abaxial surface of the blade with straight simple trichomes. i. *Miconia amygdaloides* – branch with lateral inflorescence. j-m. *Myconia australis* – j. branch with opposite crossed leaves and terminal inflorescence; k. hypanthium; l. hypanthium with stellate trichomes; m. trilocular ovary. n. *Miconia cinerascens* – inflorescence with secondary branches with sequences of 3 or more glomeruli or branch points. (a-d. Toderke et al. 66; e-f. Toderke et al. 67; g-h. Caxambu et al. 7473; i. Temponi et al. 624; j-m. Wink et al. 27; n. Siqueira & Chagas 1823).

*Caxambu et al.* 8077 (HCF). Area 2, 25°17'43.1"S, 54°05'38.0"W, 8.XII.1966, fl., *J. Lindeman & H. Haas* 3475 (MBM, NY). Area 3, 25°32'52.1"S, 54°35'17.2"W, 23.V.1979, fl., *N. Buttura* 67 (US); 186 m, 25°38'32.0"S, 54°24'37.6"W, 12.X.2017, fl., *M.G. Caxambu et al.* 7809 (HCF, UPCEB).

*Chaetogastra herbacea* occurs in Mato Grosso do Sul, Minas Gerais, Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina, and São Paulo (Goldenberg *et al.* 2020b). In the ParNa Iguaçú, it was found in the three areas, in SSF and MOF, and was collected with flowers between March and May, and between October and December. This species can be recognized by the subshrub habit, elliptical to oval leaves, and purple corolla. It differs from *Pleroma fothergillii*, the only other species with purple corolla, by the yellow stamens.

**3. *Miconia alterninervia* (Cogn.) R.Goldenb.,** Brittonia 71(1): 86. 2019. Fig. 2g-h

**Examined material:** Area 1, 25°14'26.9"S, 53°59'47.0"W, 2.XII.1966, fr., *J. Lindeman & J. Haas* 3564 (MBM); 25°08'48.1"S, 53°50'55.0"W, VIII.1997, fl., *M. Sobral & J.A. Jarenkow* 8582 (MBM); Serranópolis do Iguaçú, 673 m, 25°14'11.9"S, 53°52'19.4"W, 17.XI.2015, fr., *E.L. Siqueira & M.P. Chagas* 1783 (DVPR, HCF); 25°11'15.0"S, 53°52'20.0"W, 26.VIII.2016, fl. and fr., *M.G. Caxambu et al.* 7473 (HCF, HVC); trilha de Educação Ambiental, 25°08'48.1"S, 53°50'55.0"W, 12.X.2009, fl., *L.G. Temponi et al.* 575 (UNOP); trilha da Jacutinga, 25°14'29.0"S, 53°51'27.0"W, 10.X.2009, fl. and fr., *L.G. Temponi et al.* 588 (IRAI, UNOP); trilha do Rio Butu, 25°04'52.0"S, 53°40'09.0"W, 12.XII.2018, fr., *Mano et al.* 89 (EVB, UNOP); 25°05'22.0"S, 53°40'09.0"W, 13.XII.2019, fl. and fr., *J.G. Wink et al.* 42 (UNOP); trilha Manoel Gomes, 25°09'00.0"S, 53°05'00.0"W, 25.VI.2019, fl., *L. Biral & A.M. Pedrosa* 1647 (SHPR, UNOP).

*Miconia alterninervia* occurs in Argentina and Brazil, it is found in Minas Gerais, Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina and São Paulo (Goldenberg *et al.* 2020c; Martins 2009). In the ParNa Iguaçú, it was found only in area 1, in MOF and SSF, and was collected with flowers in July, August, October, and December and with fruits in August between October and December. *Miconia alterninervia* is recognized by the generally large leaves (up to 23 cm long), with 5+2 to 7+2 long suprabasal veins and stellate trichomes on the branches (Fig. 2g). *Miconia sublanata* is very similar to this species, differing by the 5 to 5+2 short suprabasal veins and dendritic trichomes on the branches (Fig. 3i-j).

**4. *Miconia amygdaloides* (DC.) R.Goldenb.,** Brittonia 71(1): 86 (2019). Fig. 2i

**Examined material:** Area 3, trilha do Poço Preto, 25°39'00.0"S, 52°25'00.0"W, 15.XI.2008, fl., *P. Oro et al.* 9 (UPCEB, UNOP); 25°34'00.0"S, 54°25'00.0"W, 12.XI.2009, fl., *P. Oro & L.P. Poli* 18 (RB, UNOP, UPCEB); 25°37'18.0"S, 54°26'45.0"W, 11.X.2009, fl., *L.G. Temponi et al.* 624 (EVB, HUCCS, IPA, IRAI, UFMT, UNOP); 193 m, 25°59'55.0"S, 54°39'38.0"W, 15.XII.2016, fl. and fr., *M.G. Caxambu et al.* 7702 (ASE, HCF, HUCCP).

*Miconia amygdaloides* is endemic to Brazil and occurs in Bahia, Ceará, Espírito Santo, Minas Gerais, Paraná, Rio de Janeiro, Rio Grande do Norte, Rio Grande do Sul, Santa Catarina and São Paulo (Goldenberg *et al.* 2020c). In the ParNa Iguaçú, it was found only in area 3, in SSF, and collected with flowers in October and December and fruits in December. *Miconia amygdaloides* stands by the mature branches with persistent indument and dense indument on both sides of the leaves, and exclusively lateral inflorescences. *M. leamarginata* R. Goldenb. (2019:101) is very close to this species, differing by the glabrescent branches (Fig. 2i).

**5. *Miconia australis* (Cham.) R.Goldenb.** Brittonia 71(1): 87. 2019. Figs. 2j-m; 4c-d

**Examined material:** Area 1, 727 m, 25°03'42.0"S, 53°38'53.4"W, 11.XII.2015, fl. and fr., *M.G. Caxambu et al.* 7139 (HCF); Santa Tereza do Oeste, 547 m, 25°08'40.0"S, 53°39'24.0"W, 1.X.2015, fl., *M.G. Caxambu et al.* 6942 (DVPR, HCF); trilha do Rio Butu, 25°08'48.1"S, 53°50'55.0"W, 12.XII.2018, fl., *G.B. Mano et al.* 99 (EVB, UNOP); 25°05'22.0"S, 53°40'10.0"W, 12.XII.2018, fr., *G.B. Mano et al.* 96 (EVB, UNOP); 25°04'34.0"S, 53°40'09.0"W, 21.XI.2019, fl., *J.G. Wink & L.H.S.M. Conceição* 17 (UNOP); 25°04'37.0"S, 53°40'11.0"W, 21.XI.2019, fl., *J.G. Wink & L.H.S.M. Conceição* 18 (EVB, UNOP); 25°04'53.0"S, 53°40'08.0"W, 21.XI.2019, fl., *J.G. Wink & L.H.S.M. Conceição* 20 (UNOP, UPCEB); 25°05'21.0"S, 53°40'09.0"W, 13.XII.2019, fl., *J.G. Wink et al.* 39 (UNOP); 13.XII.2019, 25°05'21.0"S, 53°40'09.0"W, fl. and fr., *J.G. Wink et al.* 40 (UNOP, UPCEB); 25°05'22.0"S, 53°40'09.0"W, 13.XII.2019, fl., *J.G. Wink et al.* 41 (UNOP). Area 2, 25°17'43.1"S, 54°05'38.0"W, 23.X.1969, fl., *G. Hatschbach* 22619 (MBM, US); Serranópolis do Iguaçú, 25°14'26.9"S, 53°59'47.0"W, 12.XII.2019, fl. *J.G. Wink et al.* 35 (UNOP). Area 3, 25°32'52.1"S, 54°35'17.2"W, 7.X.2016, fl., *T. Machado-Silva* 206 (UNOP, UPCEB); trilha do Poço Preto, 25°34'00.0"S, 54°25'00.0"W, 15.XI.2008, fl., *P. Oro et al.* 12 (UNOP); 25°34'00.0"S, 54°25'00.0"W, 12.II.2009, fl., *P. Oro & L.P. Poli* 19 (RB, UNOP, UPCEB); 25°35'43.0"S, 54°23'38.0"W,



1.XII.2018, fl. *C.R. Rauber et al. 218* (FLOR, UNOP); represa São João, 25°32'52.1"S, 54°35'17.2"W, 15.XII.1992, fl., *A.C. Cervi et al. 3892* (MBM, UP CB); 25°32'52.1"S, 54°35'17.2"W, 27.I.2010, fl. and fr., *L.G. Temponi et al. 706* (EVB, RB, UFMT, UNOP, UP CB); 25°39'40.0"S, 54°22'24.0"W, 18.II.2010, fl. and fr., *C. Snak et al. 315* (UP CB); 25°37'15.0"S, 54°28'11.0"W, 6.XII.2019, fl. *J.G. Wink et al. 27* (UNOP); 25°37'14.0"S, 54°28'13.0"W, 6.XII.2019, fl. *J.G. Wink et al. 28* (UNOP).

*Miconia australis* occurs in Argentina, Paraguay and Brazil, it is distributed in Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina and São Paulo (Goldenberg *et al.* 2020c; Reginato & Goldenberg 2012). In the ParNa Iguaçu it was found in all areas, in MOF and SSF, collected with flowers between October and February and with fruits between December and February. This species is recognized by the dark green leaves, inflorescences with reddish trichome, and yellow anthers (Fig. 4c-d). This species is very similar to *Miconia xanthostachya*, differing by the smaller anthers and three locules on the ovary. The sample *G.B. Mano 99*, according to Marcelo Reginato, specialist of the genus *Leandra*, belongs to the group *M. australis*, *M. xanthostachya*, and *M. xanthostachya*, since it presents an urceolate hipanthus. Comparing the leaves, it could be *M. xanthostachya* or *M. australis*, but the indument of the hipanthus does not correspond with any of them. If it did not present a triangular calyx tooth it could be identified as *M. australis* or *M. xanthostachya*, however, the flowers buds are larger than the usual for *M. xanthostachya*. The best thing is to leave it as *Miconia* aff. *australis*, making it interesting to carry out more collections of the material (Marcelo Reginato personal communication). This sample mentioned is deposited in the EVB herbarium and is treated in this work as *Miconia australis*. In addition, two more records identified as *M. xanthostachya* are found in the virtual herbaria, *Cervi et al. 3892* (MBM) and *Braga 3052* (UP CB) and have already been confirmed by the specialist that it is *M. australis*. Therefore, we did not confirm the presence *M. xanthostachya* in the study area.

#### 6. *Miconia cinerascens* Miq., Linnaea 22: 543. 1849. Fig. 2n

**Examined material:** Area 1, 26.V.1949, fr., *A.P. Duarte 1918* (RB); 25°08'48.1"S, 53°50'55.0"W, 19.III.2004, fl. and fr. *O.S. Ribas et al. 6292* (MBM); 743 m, 25°03'22.9"S, 53°38'23.9"W, 2.X.2015, fl., *M.G. Caxambu et al. 6953* (HCF); Santa Tereza do Oeste, 25°03'07.9"S, 53°37'59.2"W, 30.VII.2012, fr.,

*M. Lautert et al. 294* (UNOP); Lindoeste, Park edge, 25°15'36.0"S, 53°34'34.0"W, 12.II.2013, fr., *M. Lautert & V.G. Krepeschi 150* (UNOP); Matelândia, 25°25'41.0"S, 53°54'37.0"W, 8.V.2015, fr. *R. Cielo-Filho 1695* (SPSF, UNOP). Area 2, Serranópolis do Iguaçu, Matelândia, 310 m, 25°25'40.0"S, 53°54'37.0"W, 3.III.2015, fr., *R. Cielo-Filho 1696* (MBM, SPSF, UNOP); 334 m, 25°20'06.3"S, 53°52'35.1"W, 13.XI.2015, fl., *E.L. Siqueira & M.P. Chagas 1823* (HCF); 25°14'26.9"S, 53°59'47.0"W, 12.XII.2019, fl., *J.G. Wink et al. 36* (EVB, UNOP, UP CB); 25°14'26.9"S, 53°59'47.0"W, 12.XII.2019, fl., *J.G. Wink et al. 37* (UNOP).

*Miconia cinerascens* occurs in northern Argentina, Paraguay and Brazil, being distributed in Mato Grosso do Sul, Minas Gerais, Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina and São Paulo (Goldenberg 2004; Goldenberg *et al.* 2020c). In ParNa Iguaçu, it was found in area 1 and 2, in MOF and SFF, collected with flowers between October and December and with fruits in February, May and June. This species presents acrodromal basal venation, leaves with dentate margin except for the base, panicles in glomeruli and white stamens (Fig. 2n). *Miconia discolor* is the closest species in the Park, differing mainly by the presence of suprabasal veins on the leaves (Fig. 3a).

#### 7. *Miconia collatata* Wurdack, Phytologia 29(2): 145. 1974. Fig. 4e

**Examined material:** Area 2, 209 m, 25°34'07.7"S, 53°56'33.4"W, 29.X.2015, fr., *M.G. Caxambu et al. 7040* (HCF); trilha da Taquara, 25°40'18.8"S, 53°48'32.0"W, 7.XI.2013, fr., *M.L. Toderke et al. 119* (RB, UNOP, UP CB); 25°34'11.0"S, 53°55'59.0"W, 27.VIII.2019, fl., *E.J. Hentz Junior et al. 120* (EVB, UNOP). Area 3, 25°32'53.2"S, 54°35'17.2"W, 8.XII.1966, fr., *J.C. Lindeman & J.H. Haas 3488* (NY, US); 25°32'52.1"S, 54°35'17.2"W, 22.VIII.1985, fl., *G. Hatschbach & A.C. Cervi 49564* (MBM, UP CB, US); 246 m, 25°38'49.0"S, 54°26'19.0"W, 15.IX.2018, fl. and fr., *Mano et al. 25* (EVB, UNOP); Cataratas, 23.X.1990, fr., *A.C. Cervi 3162* (NYBG, UP CB); 170 m, 25°36'06.0"S, 54°21'40.0"W, 3.X.2006, fr., *P.H. Labiak 3831* (MBM, UP CB); 25°41'07.0"S, 54°26'23.0"W, 18.X.2019, fl. and fr., *C.R. Rauber et al. 150* (EVB, FLOR, HCF, UNOP, UP CB); Poço Preto, 25°35'41.0"S, 54°23'18.0"W, 24.VIII.2019, fl., *J.G. Wink et al. 4* (EVB, HCF, UNOP); 192 m, 25°36'00.0"S, 54°26'00.0"W, 13.IV.2009, fl., *P. Oro et al. 25* (RB, UNOP, UP CB); trilha do Mirante, 25°32'52.1"S, 54°35'17.2"W, 24.VIII.2019, fl., *J.G. Wink et al. 6* (UNOP, UP CB); Hotel Vicinity, 25°41'04.0"S, 54°26'22.0"W, 24.IX.2019, fr., *J.G. Wink et al. 7* (EVB, FLOR, HCF, UNOP); trilha das Bananeiras, 25°39'00.0"S, 52°25'00.0"W, 2.X.2009, fl. and fr., *P. Oro et al. 30* (HUEM, UFMT, UNOP); 25°39'22.0"S, 54°26'01.0"W, 12.X.2009, fr., *L.G. Temponi et al. 667*



**Figure 3** – a. *Miconia discolor* – inflorescence with secondary branches with 1 (2) glomeruli or branch points. b. *M. leaeichleri* – inflorescence with involucral bracts and bracteoles. c-d. *M. microstachya* – c. branch with lanceolate leaves; d. abaxial leaf surface with tortuous trichomes. e-h. *M. pusilliflora* – e. branch; f. membrane on the abaxial surface of the leaves; g. hypanthium; h. stamens with a longitudinal opening. i-j. *M. sublanata* – i. branch with leaves with 5 or 5+2 shortly suprabasal veins; j. dendritic trichomes on branches. k-l. *M. theazeans* – k. hypanthium with stamens; l. anthers with 4 pores at the apex. m-n. *M. xanthocoma* – m. hypanthium with stamens; n. ovary with 5 locules. o-p. *Pleroma fothergillii* – o. flower; p. falciform stamens with glandular trichomes. (a. Temponi et al. 881; b. Wink et al. 43; c-d. Caxambu et al. 7867; e-h. Siqueira et al. 1965; i-j. Wink & Conceição 21; k-l. Caxambu et al. 7832; m-n. Wink et al. 55; o-p. Rauber et al. 177).

(FUEL, ICN, IRAI, JOI, RB, UNOP); 25°32'52.1"S, 54°35'17.2"W, 2.IX.2016, fl., *L.C.P. Lima 737* (EVB, HUFU); 25°35'39.0"S, 54°23'15.0"W, 5.XI.2016, fr., *L.C.P. Lima 774* (EVB, HUFU, UNOP); 25°39'11.0"S, 54°25'32.0"W, 8.XII.2016, fr., *L.C.P. Lima 814* (EVB, UNOP); 25°39'20.0"S, 54°25'46.0"W, 27.X.2018, fr., *C.R. Rauber et al. 187* (UNOP); Rio Iguaçu, 186 m, 25°35'59.8"S, 54°21'10.5"W, 16.X.2015, fr., *M.G. Caxambu et al. 7022* (DVPR, HCF); close to Cataratas, 186 m, 25°41'02.1"S, 54°26'24.2"W, 2.VII.2015, fl., *M.G. Caxambu et al. 6606* (FUEL, HCF, MBM).

*Miconia collatata* occurs in Argentina, Paraguay and Brazil, it is distributed in Goiás, Mato Grosso do Sul, Minas Gerais, Paraná, Rondônia and São Paulo (Goldenberg 2004; Goldenberg *et al.* 2020c). In the ParNa Iguaçu it was found in areas 2 and 3, in SFF, and collected with flowers in April and between July and October, and with fruits between September and December. This species is a tree with glabrous adult leaves or with trichomes on the veins, terminal inflorescences, rounded petals, white anthers (Fig. 4e), and fruits with 2–6 seeds. *Miconia latecrenata* is very similar to this species, differing by the berries with 10–20 seeds.

#### 8. *Miconia discolor* DC. Prodr., 3: 114. 1828.

Fig. 3a

**Examined material:** 25°32'52.1"S, 54°35'17.2"W, IX.1992, fr., *M. Sobral 7663* (MBM); Area 1, 25°08'48.1"S, 53°50'55.0"W, August.VIII.1997, fl., *J.A. Jarenkow & M. Sobral 3649* (FLOR, PEL); 25°14'23.0"S, 53°49'18.0"W, trilha da Jacutinga, 6.IX.2011, fl., *L. Boff et al. 7* (UNOP, UPCB); 25°14'29.0"S, 53°50'59.0"W, 24.V.2018, fr., *C.R. Rauber et al. 47* (UNOP). Area 3, 25°32'53.2"S, 54°35'17.2"W, 12.V.1949, fr., *A.P. Duarte 1759* (NY, RB); trilha do Poço Preto, 25°32'52.1"S, 54°35'17.2"W, 12.X.1986, fl., *G. Hatschbach et al. 50633* (ASU, MBM, UPCB); 25°37'30.0"S, 54°25'30.0"W, 2.X.2006, fl., *P.H. Labiak 3786* (MBM, SPF, UPCB); 25°32'52.1"S, 54°35'17.2"W, 3.X.2006, fl., *O.S. Ribas et al. 7411* (ALCB, FURB, HCF, HUCCS, HUEFS, ICN, MBM, SPSF); 25°36'00.0"S, 54°26'00.0"W, 14.XI.2008, fl. and fr., *P. Oro et al. 8* (UNOP, UPCB); 25°34'00.0"S, 54°25'00.0"W, 11.II.2009, fr., *P. Oro et al. 17* (MBM, UNOP, UFMT); 192 m, 25°36'00.0"S, 54°26'00.0"W, 29.X.2009, fr., *P. Oro et al. 31* (UNOP); 25°32'52.1"S, 54°35'17.2"W, 18.II.2010, fr., *C. Snak 308* (UPCB); 25°37'18.0"S, 54°26'45.0"W, 17.VIII.2010, fl., *L.G. Temponi et al. 881* (FLOR, HUCCS, RB, UNOP); 25°32'52.1"S, 54°35'17.2"W, 25.X.2010, fr. *O.S. Ribas et al. 8479* (MBM); 204 m, 25°35'39.0"S, 54°23'58.3"W, 5.VI.2015, fr., *M.G. Caxambu 6514* (FUEL, HCF, MBM); 25°35'46.0"S, 54°23'27.0"W, 5.VII.2018, fl. and fr., *C.R. Rauber et al. 113* (UNOP); Macuco Safari, trilha da Cachoeira, 134 m, 25°38'51.3"S,

54°27'26.5"W, 3.IX.2015, fl., *E.L. Siqueira et al. 1596* (DVPR, HCF); Rodovia das Cataratas, 25°32'52.1"S, 54°35'17.2"W, 7.X.2019, fl. *J.G. Wink et al. 13* (UNOP); 25°40'48.0"S, 54°26'18.0"W, 25.I.2020, fr., *J.G. Wink et al. 50* (UNOP).

*Miconia discolor* occurs in northern Argentina, Paraguay and Brazil, it is distributed in Espírito Santo, Mato Grosso do Sul, Minas Gerais, Paraná, Rio de Janeiro, Santa Catarina and São Paulo (Goldenberg 2004; Goldenberg *et al.* 2020c). In the ParNa Iguaçu it was found in area 1 in both types of formations and in area 3, in SSF, and collected with flowers in August to November, and fruits in January, February, and between May to July and September to November. *Miconia discolor* is recognized by the leaves with abaxial face covered with indument providing a whitish appearance. In addition, it has long suprabasal veins and flowers in glomeruli (Fig. 3a). It is similar to *Miconia cinerascens*, see comments above.

#### 9. *Miconia latecrenata* (DC.) Naudin, Ann. Sci. Nat., Bot. 16(3): 239. 1851.

**Examined material:** Área 1, trilha da cachoeira do Rio Azul, 643 m, 25°08'00.0"S, 53°49'12.0"W, 28.I.2020, fl., *J.G. Wink et al. 53* (UNOP).

*Miconia latecra* is endemic to Brazil and is found in Bahia, Espírito Santo, Minas Gerais, Paraná, Pernambuco, Rio de Janeiro, Rio Grande do Sul, Santa Catarina and São Paulo (Goldenberg *et al.* 2020c). In the ParNa Iguaçu it was found only in area 1, in MOF, and collected with flowers in January. It stands out by the terminal and lateral inflorescences, and anthers with wide and tilted pores, similar to a rhyme. It differs from *Miconia collatata* by the number of seeds as reported above. Many collections were previously wrongly identified as *Miconia latecrenata* in the Park and with this study these identification were verified by the specialist Renato Goldenberg and confirmed as *Miconia collatata*.

#### 10. *Miconia leaeichleri* R. Goldenb., Brittonia 71(1): 100. 2019.

Figs. 3b; 4b,g

**Examined material:** Area 1, trilha do Rio Butu, 25°05'22.0"S, 53°40'10.0"W, 12.XII.2018, fl., *G.B. Mano et al. 97* (EVB, UNOP); 25°05'22.0"S, 53°40'09.0"W, 13.XII.2019, fl., *J.G. Wink et al. 43* (UNOP).

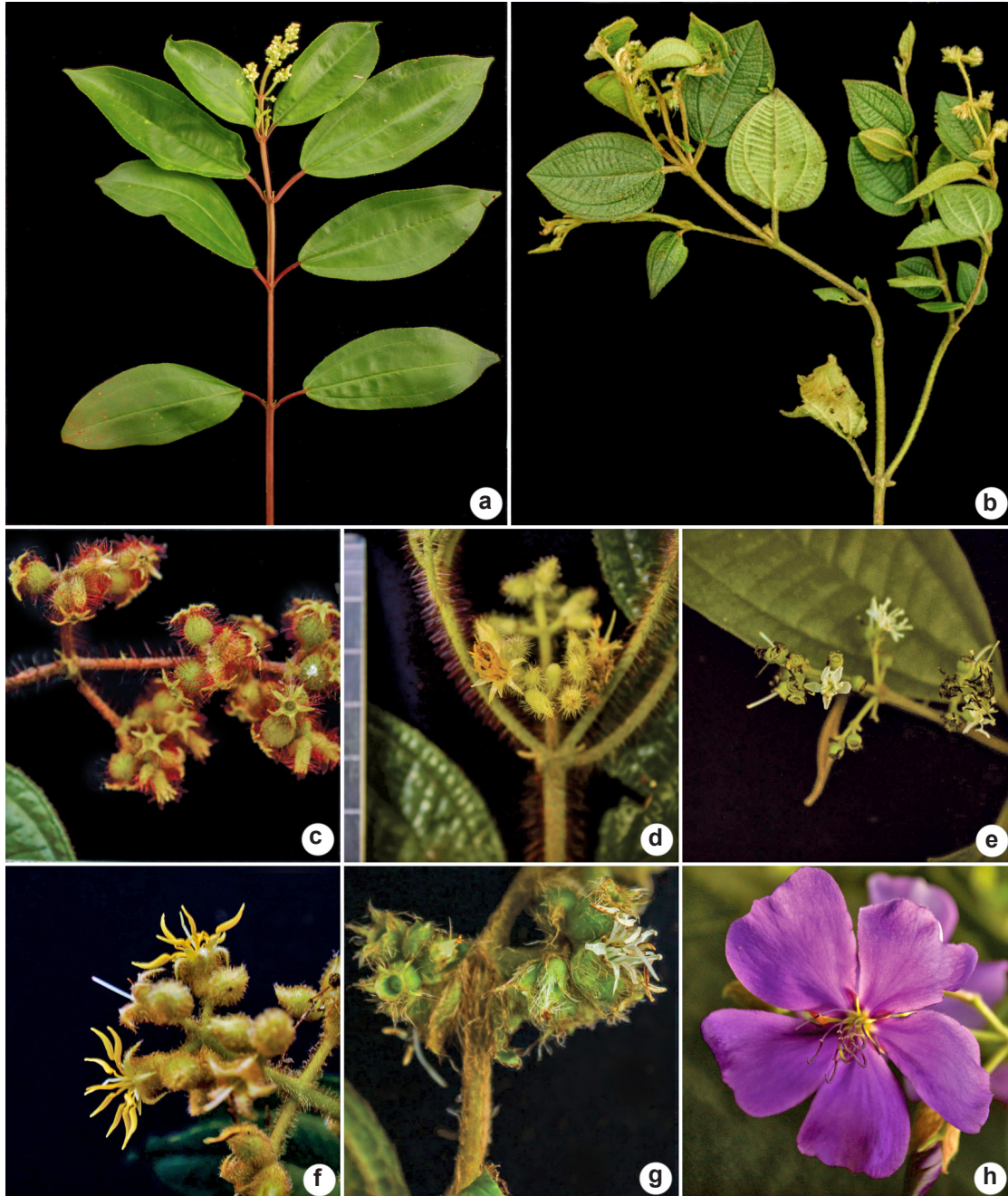
*Miconia leaeichleri* is endemic to Brazil and is present in Minas Gerais, Paraná, Rio de Janeiro and São Paulo (Goldenberg *et al.* 2020c). In the ParNa Iguaçu it was found only in area 1, in MOF, and collected with flowers in December. This



species is recognized by the oval leaves with basal veins and white anthers (Fig. 4b,g). This is the only species in ParNa Iguacu that presents panicles with flowers surrounded by involucre bracts (Fig. 3b).

**11. *Miconia leamarginata*** R. Goldenb., Brittonia 71(1): 101. 2019.

**Examined material:** Area 3, Cataratas, 1.I.1963, fl., G. Hatscbach 10436 (NL, US).



**Figure 4** – a-h. Habit and reproductive structures of Melastomataceae from the Iguacu National Park – a. *Miconia theaezans* – habit with reddish branches at the apex; b. *M. leaeichleri* – habit with oval leaves and basal veins; c-d. *M. australis* – c. reddish trichomes on the fruits; d. flowers with yellow stamens; e. *M. collatata* – flowers with white petals; f. *M. xanthocoma* – flowers with yellow stamens; g. *M. leaeichleri* – flowers with white stamens; h. *Pleroma fothergillii* – purple corolla. (Pictures: a-b, d-f, h. Wink JG 2019-2020; c,g. Rauber CR 2018).



*Miconia leamarginata* occurs in northeastern Argentina, Paraguay, and Brazil, it is distributed in Espírito Santo, Mato Grosso do Sul, Minas Gerais, Paraná, Rio de Janeiro, Santa Catarina and São Paulo (Goldenberg *et al.* 2005, 2020c). In the ParNa Iguaçu it was found in area 3, in SSF, and collected with flowers in January. *Miconia leamarginata* is recognized by the glabrescent branches. Trichomes are observed in greater concentration near the margin and forming bands on the adaxial surface of the leaf.

**12. *Miconia microstachya*** (Naudin) R. Goldenb., Brittonia 71(1): 105. 2019. Fig. 3c-d

**Examined material:** Area 1, nascentes do Rio Floriano, 727 m, 25°04'37.0"S, 53°40'11.1"W, 10.VIII.2017, fl., *M.G. Caxambu et al.* 7867 (HCF); trilha do Rio Butu, 25°03'08.0"S, 53°24'03.0"W, 12.XII.2018, fr., *G.B. Mano et al.* 98 (EVB, UNOP); 25°05'21.0"S, 53°40'09.0"W, 13.XII.2019, fl., *J.G. Wink et al.* 38 (UNOP).

*Miconia microstachya* is endemic to Brazil and occurs in Minas Gerais, Paraná, Rio Grande do Sul, Santa Catarina and São Paulo (Goldenberg *et al.* 2020c). In the ParNa Iguaçu it was found only in area 1, in MOF, and collected with flowers in August and December and fruits in December. *Miconia microstachya* presents lanceolate leaves, usually with three suprabasal veins, where the lateral veins are tenuous and close to the leaf margin (Fig. 3c). The inflorescences have yellowish trichomes, large stamens (approximately 5 mm) with yellow anthers.

**13. *Miconia pusilliflora*** (DC.) Naudin, Ann. Sci. Nat., Bot. 16(3): 171. 1851. Fig. 3e-h

**Examined material:** 2016, fl., *E.J. Hentz Junior* 32 (FLOR, UNOP). Area 1, 25°08'48.1"S, 53°50'55.0"W, 1.VIII.1997, fr., *J.A. Jarenkow & M. Sobral* 3650 (FLOR, PEL); trilha do Rio Azul, 25°08'31.0"S, 53°43'51.0"W, 19.II.2020, fl., *H.T.P. Vieira et al.* 62 (EVB). Area 2, 283 m, 25°24'54.0"S, 53°54'02.0"W, 3.VI.2015, fl. and fr., *R. Cielo-Filho et al.* 1685 (MBM, SPSF, UNOP); Capitão Leônidas Marques, 25°28'45.1"S, 53°36'51.1"W, 27.VI.2004, fr., *P. Labiak et al.* 3371 (MBM); trilha do Macuco, 25°38'51.0"S, 54°27'25.0"W, 15.II.2020, fl., *J.G. Wink et al.* 61 (RB, UNOP, UPGB). Area 3, trilha do Poço Preto, 25°32'52.1"S, 54°35'17.2"W, 5.VIII.2007, fr., *A.M. Rodolfo* 35 (EVB, FLOR, MBM, UNOP); 25°37'02.1"S, 54°26'26.0"W, 21.V.2015, fl., *M.G. Caxambu et al.* 6392 (HCF); 195 m, 25°35'44.1"S, 54°23'38.3"W, 4.IV.2016, fl., *E.L. Siqueira et al.* 1965 (HCF).

*Miconia pusilliflora* occurs in Argentina, Paraguay and Brazil, it is found in Alagoas, Bahia,

Espírito Santo, Minas Gerais, Paraná, Pernambuco, Rio de Janeiro, Rio Grande do Sul, Santa Catarina and São Paulo (Goldenberg 2004; Goldenberg *et al.* 2020c). In ParNa Iguaçu it was found in all areas, in MOF and SSF, collected with flowers in February, and between April and June, and with fruits in May, June and August. *Miconia pusilliflora* differs from the other species by the membranes joining the veins on the abaxial side of the leaf, exclusively terminal inflorescence and by the rimose anthers with dehiscence from the base to the apex of the theca (Fig. 3e-h). It has berries with 2–3(–6) seeds, which differentiates it from *Miconia collatata* and *Miconia latecrenata*.

**14. *Miconia sublanata*** (Cogn.) R. Goldenb., Brittonia 71(1): 115. 2019. Fig. 3i-j

**Examined material:** Area 1, trilha do Rio Butu, 25°04'54.0"S, 53°40'08.0"W, 21.XI.2019, fl. and fr., *J.G. Wink & L.H.S.M. Conceição* 21 (RB, UNOP, UPGB); 25°05'22.0"S, 53°40'09.0"W, 13.XII.2019, fr., *J.G. Wink et al.* 47 (UNOP).

*Miconia sublanata* occurs in Bolivia and Brazil, it is distributed in Bahia and Piauí, and in the entire south and southeast region (Goldenberg *et al.* 2020c; Martins 2009). In the ParNa Iguaçu it was found only in area 1, in MOF, and collected with flowers and fruits in November and December. This species presents shrub habit with branches with dendritic trichomes, leaves with abaxial face covered by stellate trichomes, short suprabasal veins and flowers with pinkish anthers (Fig. 3i-j). It may be confused with *Miconia alterninervia*, which has long suprabasal veins and yellow anthers (Fig. 2g).

**15. *Miconia theaezans*** (Bonpl.) Cogn., Fl. bras. 14(4): 419. 1888. Figs. 3k-l; 4a

**Examined material:** Area 1, trilha do Rio Butu, Lagoa Azul, 695 m, 25°05'22.4"S, 53°40'09.1"W, 2.VI.2017, fl., *M.G. Caxambu et al.* 7832 (HCF); 25°05'22.0"S, 53°40'10.0"W, 12.XII.2018, fl., *G.B. Mano et al.* 92 (EVB, UNOP); 25°05'22.0"S, 53°40'08.0"W, 13.XII.2019, fl., *J.G. Wink et al.* 46 (UNOP, UPGB).

*Miconia theaezans* occurs throughout South America (Rodrigues *et al.* 2020). In Brazil, it can be found in, Bahia, Distrito Federal, Espírito Santo, Goiás, Minas Gerais, Paraná, Rio de Janeiro, Santa Catarina, São Paulo and Tocantins (Goldenberg *et al.* 2020c). In ParNa Iguaçu it was found only in area 1, in MOF, collected with flowers in June and December. This species is recognized by the concolor leaves with serrated margin, branches reddish at the apex and by the flowers with

dehiscent anthers through four apical pores, also observed by Bacci *et al.* (2016) (Figs. 3k-l; 4a).

**16. *Miconia xanthocoma*** (Naudin) R. Goldenb., Brittonia 71(1): 118. 2019. Figs. 3m-n; 4f

**Examined material:** Area 1, cachoeira Rio Azul, 25°09'18.0"S, 53°47'44.0"W, 28.I.2020, fl., *J.G. Wink et al.* 54 (UNOP); 25°09'18.0"S, 53°47'44.0"W, 28.I.2020, fl., *J.G. Wink et al.* 55 (UNOP); trilha do Rio Butu, 25°04'52.0"S, 53°40'09.0"W, 12.XII.2018, fl., *G.B. Mano et al.* 88 (EVB, UNOP); 25°05'22.0"S, 53°40'10.0"W, 12.XII.2018, fl., *G.B. Mano et al.* 95 (EVB, UNOP); 25°05'22.0"S, 53°40'10.0"W, 12.XII.2018, fl., *G.B. Mano et al.* 100 (EVB, UNOP); 25°04'38.0"S, 53°40'11.0"W, 21.XI.2019, fl., *J.G. Wink & L.H.S.M. Conceição* 19 (UFMT, UNOP). Area 2, 25°17'43.1"S, 54°05'38.0"W, 23.X.1969, fl., *G. Hatschbach* 22614 (MBM, NYBG, US). Area 3, trilha do Poço Preto, 25°34'00.0"S, 54°25'00.0"W, 15.XI.2008, fl., *P. Oro et al.* 13 (RB, UNOP).

Despite being cited by Martins (2009) as occurring in Argentina and Uruguay, *Miconia xanthocoma* is currently considered an endemic species to Brazil, occurring in Minas Gerais, Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina, and São Paulo (Goldenberg *et al.* 2020c). In the ParNa Iguaçu it was found in all areas, in MOF and SSF, collected with flowers in January and between October and December. *Miconia xanthocoma* is recognized by the leaves with short suprabasal veins, large stamens (anthers up to 5 mm) and four to five locules on the ovary (Figs. 3m-n; 4f). Resembles *Miconia australis*, see comments above.

Even though the sample *J.G. Wink & L.H.S.M. Conceição* 19 presents three ovary locules, which is more common in *Miconia australis*, and larger anthers (4 to 4,5 mm long), as in *M. xanthocoma*. In this study, it was treated as *Miconia* aff. *xanthocoma*. As well as the samples *Mano et al.* 88, 95 and 100, confirmed by the specialist Renato Goldenberg, based on virtual herbaria images.

**17. *Pleroma fothergillii*** (Schrank *et Mat. ex DC.*) Triana, Trans. Linn. Soc. London 28(1): 42. 1872. Figs. 3o-p; 4h

**Examined material:** Area 3, 25°22'13.9"S, 54°17'01.0"W, 8.II.2018, fl. *M.G. Caxambu et al.* 8055 (ASE, HCF); 25°37'23.0"S, 54°28'36.0"W, 26.X.2018, fl., *C.R. Rauber et al.* 177 (UNOP); 25°36'00.0"S, 54°25'00.0"W, 13.IV.2019, fl., *P. Oro et al.* 23 (FLOR, HCF, UFMT, UNOP, UPCB); 25°37'03.0"S, 54°28'36.0"W, 25.I.2020, fl., *J.G. Wink et al.* 49 (HCF, UNOP, UPCB).

*Pleroma fothergillii* is endemic to Brazil, occurring in Espírito Santo, Minas Gerais, Rio de Janeiro, and São Paulo (Guimarães 2020), however, it is widely cultivated in Paraná (Meyer *et al.* 2010). In the ParNa Iguaçu it was found in area 3, in SSF, and collected with flowers in January, April, October, and November and fruits in November. This species presents shrub habit with lanceolate and pilose leaves, purple flowers, stamens with glandular trichomes on the appendages and capsular fruits (Figs. 3o-p; 4h). In the ParNa Iguaçu, *Chaetogastra herbacea* is the most similar species, differing by the subshrub habit and the yellow anthers, while *Pleroma fothergillii* has purple anthers.

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## Data availability statement

In accordance with Open Science communication practices, the authors inform that all data used in this manuscript is publicly available.

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