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Flora of Espírito Santo, Brazil

Flora of Espírito Santo: Humiriaceae

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Abstract

Belonging to Malpighiales, Humiriaceae has about 65 species in eight genera, distributed almost exclusively in the Neotropics, occurring from southern Brazil to Central America. In Brazil, 35 species have been recorded (ca. 54% of the family's diversity), wherein the greatest diversity is found in the Amazon (27 spp.), Atlantic Forest (9 spp.) and Cerrado (6 spp.) domains. This work is part of the "Flora do Espírito Santo" project, which aims to contribute to the knowledge of the state's floristic diversity. Field expeditions were carried out from January/2019 to March/2020. Humiriaceae, in the state of Espírito Santo, is represented by six species distributed in four genera: *Humiria*, *Humiriastrum*, *Sacoglottis* and *Vantanea*. Among the registered genera, *Vantanea* is the most diversified, with three species. In the dense rain forest, all Humiriaceae species recorded here were found, followed by pioneer formations of restingas, with four species and seasonal semideciduous forest, with one species. The main morphological characters that assist in the delimitation of Humiriaceae species in Espírito Santo, are androecium characteristics, such as length (homodynamous or heterodynamous), number of stamens and the number of their series, as well as anther morphology.

Key words: Atlantic Forest, Brazilian Southeast, Malpighiales, taxonomy.

Resumo

Pertencente a Malpighiales, Humiriaceae possui cerca de 65 espécies em oito gêneros, distribuídas quase exclusivamente na região Neotropical, ocorrendo do sul do Brasil à América Central. No Brasil, foram registradas 35 espécies (ca. 54% da diversidade da família), sendo a maior diversidade encontrada nos domínios da Amazônia (27 spp.), Mata Atlântica (9 spp.) e Cerrado (6 spp.). Este trabalho faz parte do projeto "Flora do Espírito Santo", que visa contribuir para o conhecimento da diversidade florística do estado. As expedições de campo foram realizadas de janeiro/2019 a março/2020. Humiriaceae, no estado do Espírito Santo, está representada por seis espécies distribuídas em quatro gêneros: *Humiria*, *Humiriastrum*, *Sacoglottis* e *Vantanea*. Dentre os gêneros registrados, *Vantanea* é o mais diversificado, com três espécies. Na Floresta Ombrófila Densa foram encontradas todas as espécies de Humiriaceae aqui registradas, seguidas de formações pioneiras de restingas, com quatro espécies, e floresta estacional semidecidual, com uma espécie. Os principais caracteres morfológicos que auxiliam na delimitação das espécies de Humiriaceae no Espírito Santo, são características do androceu, como comprimento (homodínamos e heterodínamos), número de estames e o número de suas séries, além da morfologia das anteras.

Palavras-chave: Mata Atlântica, Sudeste brasileiro, Malpighiales, taxonomia.

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Introduction

Humiriaceae belongs to Malpighiales (APG IV 2016) and has 65 species in eight genera, of which *Endopleura* and *Hylocarpa* are represented by only one species (Wurdack & Zartman 2019). The family is almost exclusively Neotropical, occurring mainly in the tropical forests from southern Brazil to Central America (Cuatrecasas 1961), except for *Sacoglottis gabonenses* (Baill.) Urban (449: 1877) which occurs along the African west coast (Cuatrecasas 1961).

Humiriaceae is composed mostly of shrubs or treelets, with alternate leaves having serrate (*e.g.*, *Humiriastrum* and *Sacoglottis*) or entire (*e.g.*, *Humiria* and *Vantanea*) leaf margins. The most important reproductive structure for genera and/or species delimitation is the morphological variation of the androecium (Wurdack & Zartman 2019).

In Brazil, 35 species are recorded (ca. 54% of the family's diversity) and the greatest diversity is found in the Amazon domain (27 spp.), followed by the Atlantic Forest (nine spp.) and Cerrado (six spp.) domains (BFG 2018).

Available taxonomic information about Humiriaceae in southeastern Brazil can be found in Pereira (1966), with three genera and three species for the state of Guanabara (Rio de Janeiro); Giordano (1996), with four genera and nine species for the state of Rio de Janeiro; Silvestre (1981) for the Fontes do Ipiranga State Park, São Paulo; Mendonça (2004), with three genera and four species for the Flora de Grão-Mogol - Minas Gerais; and Fantinati *et al.* (2004), with three genera and three species for Flora da Serra do Cipó - Minas Gerais.

For Espírito Santo state, Dutra *et al.* (2015) listed five species distributed in four genera. However, until now, there is no direct taxonomic tool for recognizing these species. As part of the "Flora do Espírito Santo" project, this work aims to contribute to the knowledge of the state floristic diversity. To do so, taxonomic descriptions, an identification key, photographs, and the geographical distribution of species throughout the state are provided.

Material and Methods

Study area

Espírito Santo state has an area of approximately 46,078 km^2, equivalent to 0.53% of the area in Brazil. Located in the eastern portion of the Southeast Region, the state is bordered by the state of Bahia to the north, the Atlantic Ocean to the east, the state of Rio de Janeiro to the south and the state of Minas Gerais to the west. The state is located in the tropical region, presenting a hot and rainy climate, with average annual temperatures of 20°–25 °C and a volume of precipitation above 1,400 mm per year, especially concentrated in the summer (Governo do estado do Espírito Santo 2010; Garbin *et al.* 2017).

Although the phytogeographic knowledge of Espírito Santo is scarce and there are inconsistencies in some classifications of the vegetation, Garbin *et al.* (2017) divide the state into five main types of vegetation: pioneer formations of Restingas, Semideciduous Seasonal Forest, Dense Ombrophilous Forest, Open Ombrophilous Forest and Ecological Refuges. This is the most current classification of the vegetation of Espírito Santo.

Field and laboratory studies

Field expeditions were carried out from January/2019 to March/2020 and samples were dried according to the usual fieldwork and herborization procedures (Bridson & Forman 1998). The vouchers were incorporated, primarily, into the VIES collection (Thiers, continuously updated). Specimens from the herbaria VIES, SAMES, MBML, and CVRD were consulted and analyzed, in addition, online samples of the herbaria cited in the examined materials of the species were analyzed.

The identification of taxa was performed using the specialized literature (*e.g.*, Cuatrecasas 1961; Cuatrecasas & Huber 1999; Kubitzki 2014) and protologs. Morphological terminology followed Harris & Harris (2001) and authors' nomenclature, IPNI (2018). For the materials examined, only one specimen per municipality is cited.

Results and Discussion

Humiriaceae, in the state of Espírito Santo, is represented by six species distributed in four genera: *Humiria*, *Humiriastrum*, *Sacoglottis* and *Vantanea* (Fig. 1). Among the genera registered, *Vantanea* is the most diversified, with three species [*V. bahiaensis* Cuactrecasas (263: 1990), *V. compacta* (Schnizlein) Cuactrecasas (65: 1961) and *V. spiritu-sancti* (Cuactrecasas) K. Wurdack & C.E. Zartman (102: 2019)], the other genera

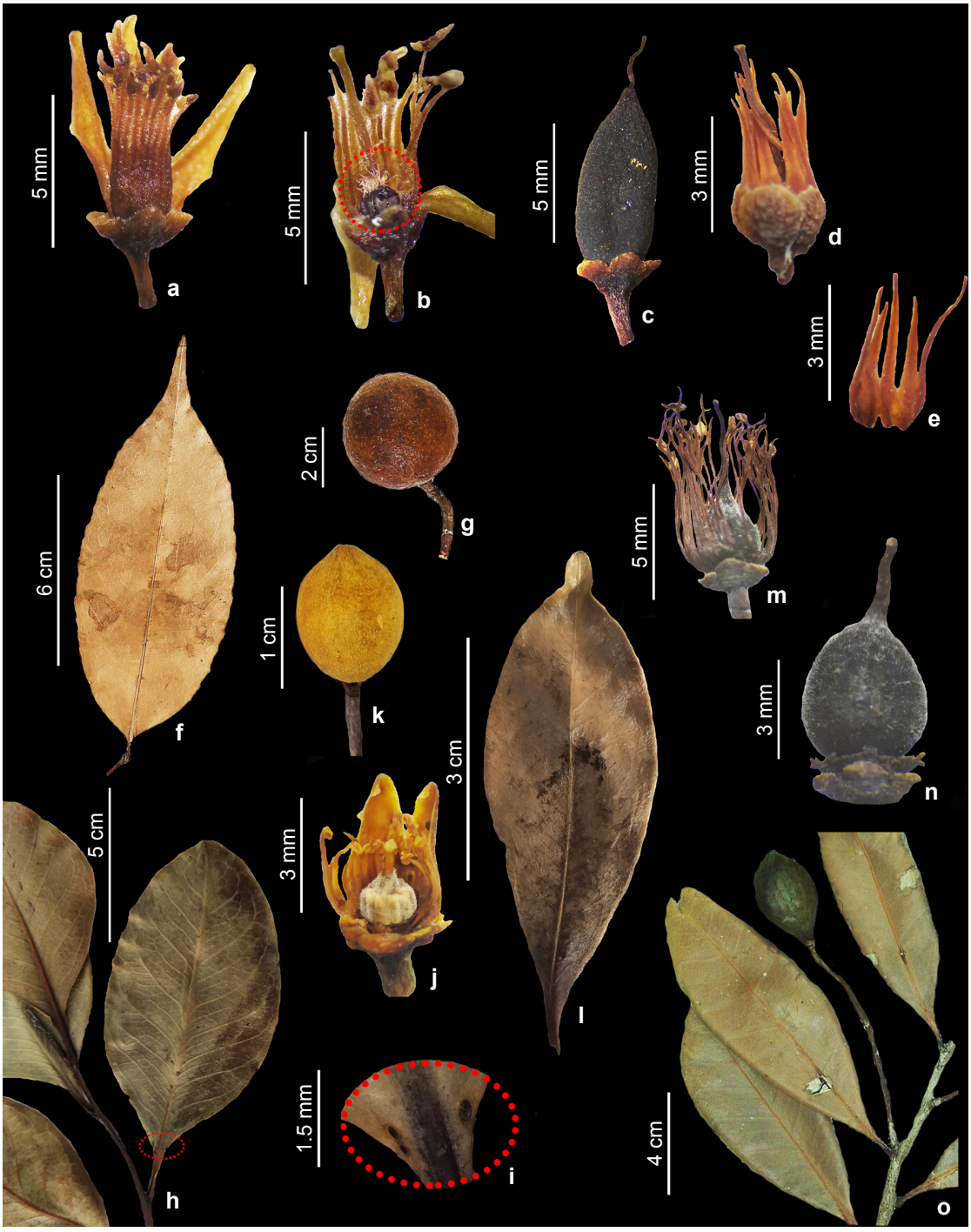

Figure 1 – a-o. Morphological characters of Humiriaceae species occurring in Espírito Santo – a-c. *Humiria balsamifera* – a. open flower showing the union of stamens; b. open flower showing the indument at the apex of ovary; c. ovary after herborization; d-e. *Humiriastrum mussunugense* – d. flower without petals; e. androecium with heterodynamous stamens; f-g. *Sacoglottis matogrossensis* – f. leaf blade; g. drupe; h-k. *Vantanea bahiaensis* – h. leaf blade; i. detail of the glands at the base of leaf blade; j. open flower showing the gynoecium; k. drupe; l-n. *V. compacta* – l. leaf blade; m. flower; n. gynoecium; o. *V. spiritu-sancti* – leaf blade and drupe. (a-c. *R. Nichio-Amaral 29*; d-e. *M.M. Monteiro & A.O. Giaretta 72*; f-g. *J. Freitas et al. 238*; h-k. *A. Nepomuceno et al. 792*; l-n. *L.D.Thomaz 1622*; o. *L.F.T. Menezes 2279*).

are represented by one species each: *Humiria balsamifera* Aublet (564: 1775), *Humiriastrum mussunungense* Cuactrecasas (235: 1993) and *Sacoglottis matogrossensis* Malme (9: 1928).

In the SpeciesLink database (2020), ten species names are listed, however, four were not corroborated in this taxonomic treatment, namely: *Humiriastrum dentatum* (Casaretto) Cuatrecasas (136: 1961), *Humiriastrum glaziovii* (Urban) Cuatrecasas (137: 1961), *Humiriastrum spiritu-sancti* Cuatrecasas (137: 1964) and *Vantanea paraensis* Ducke (99: 1925). The delimitation of *H. dentatum* is mentioned in the comments under *H. mussunugense*. *Humiriastrum glaziovii* was not included in this work, since the only sample collected in Espírito Santo is deposited in the herbarium US, and is probably *H. mussunugense*. In addition, together with *H. dentatum* and *H. mussunungense*, it forms a taxonomic complex, being, according to the specialized literature, delimited by tenuous characteristics of the indument of the leaves and branches of the inflorescence, making a true diagnosis impossible through the examination of images. *Humiriastrum spiritu-sanctii* has undergone nomenclatural combination as *Vantanea spiritu-sanctii* and *Vantanea paraensis* was not confirmed for the state, as no samples were found in the local herbaria, the only existing one being deposited in the herbarium U and without access to the image.

The geographic distribution of the species is shown in Figure 2. The occurrence of species in the vegetation types proposed by Garbin *et al.* (2017) are shown in Table 1, and Figure 3. In the dense rain forest, all the Humiriaceae species recorded here were found, followed by pioneer formations of restingas, with four species and seasonal semideciduous forest, with one species (Tab. 1). In open ombrophilous forests and ecological refuges, no species were registered (Tab. 1).

The most important characters for specific delimitation of Humiriaceae of Espírito Santo are the length (homodynamous or heterodynamous) and number of stamens, as well as the number of stamen series and anther morphology.

According to the most recent list of angiosperm species published for Espírito Santo (Dutra *et al.* 2015), *Vantanea compacta* is a new record for the state. However, considering the data available at BFG (2018), three species are new records (*Sacoglottis matogrossensis*, *Vantanea bahiaensis* and *V. compacta*).

It is worth mentioning that among the six species registered here, four are endemic to Brazil, of which three (*Humiriastrum mussunugense*, *Vantanea bahiaensis*, and *V. spiritu-sancti*) are solely registered for the Atlantic Forest. *Vantanea compacta*, found in the Atlantic Forest, also occurs in the Caatinga and Cerrado (BFG 2018). Among these species, only *Vantanea spiritu-sancti* has a conservation status - Critically Endangered (CNCFlora 2020), the others do not yet have their conservation status assessed.

Taxonomic treatment

Humiriaceae A. Juss. *Fl. bras.* Merid. (4th ed.) 2(13): 87, 1829.

Shrubs or trees. Stipules deciduous or persistent. Leaves alternate, simple, sessile to petiolate, chartaceous to coriaceous, obovate, elliptical to ovate, base attenuate, decurrent, obtuse to cuneate, apex obtuse, rounded, retuse-mucronate, attenuate, acuminate to cuspidate, margin entire, serrate to crenate. Inflorescences racemes, cymes to panicles, terminal and axillary; flowers bisexual, actinomorphic, dichlamydeous; calyx 5-merous, sepals free, corolla 5-merous, petals free, white, greenish to cream, stamens 10 to many, homodynamous or heterodynamous, 1–3-seriate, ovary superior, placentation pendulous, style simple, stigma capitate. Drupes oblongoid, globose, subglobose to ellipsoid. Seeds unseen.

Key to Humiriaceae of Espírito Santo

1. Leaf margin crenulate to serrate.
   2. Stipules persistent; stamens homodynamous ..... 3. *Sacoglottis matogrossensis*
   2'. Stipules deciduous; stamens heterodynamous ..... 2. *Humiriastrum mussunungense*
1'. Leaf margins entire.
   3. Stamens 20, homodynamous, uniseriate ..... 1. *Humiria balsamifera*
   3'. Stamens ≥ 30 (except *Vantanea spiritu-sancti*, which has exactly 20 stamens, biseriate), heterodynamous, 2–3-seriate.

4. Leaf blades 4–8 cm wide, obovate to obovate-elliptical; ovary tomentose.....4. *Vantanea bahiaensis*
4'. Leaf blades 2–4 cm wide, elliptical, elliptical-obovate to oblong-elliptical; ovary hirsute or glabrous.
    5. Leaf blades with apex acuminate to cuspidate, margin plane; petals glabrous; stamens 60, biseriate; ovary hirsute.....5. *Vantanea compacta*
    5'. Leaf blades with rounded apex, margin revolute; petals hirsute; stamens 20, biseriate; ovary glabrous.....6. *Vantanea spiritu-sancti*

1. *Humiria balsamifera* Aubl., Histoire des Plantes de la Guiane Françoise 1: 564–566, t. 225. 1775. Figs. 1a-c; 2a

Shrubs or trees, 1.5–8m tall. Branches cylindrical, glabrous, lenticulate. Stipules deciduous. Leaves alternate, sessile to short petiolate; petiole 1–2 mm long, glabrous to sparsely hirsute, cylindrical; leaf blade 4–8 × 3–5 cm, coriaceous, obovate, base attenuate, apex obtuse to retuse-mucronate, glabrous on both surfaces, margin entire, slightly revolute, midrib slightly prominent adaxially, prominent abaxially, secondary veins 7–9 pairs, impressed on both surfaces. Inflorescences racemose, terminal and axillary; peduncle 0.5–1.5 cm long, cylindrical, sparsely hirsute to glabrous. Flowers with pedicels 2–4(–5) mm long, cylindrical, hirsute; sepals 3–6 × 3–4 mm, ovate, hirsute; petals 5–7 × 1.5–2 mm, deciduous, lanceolate to narrow-ovate, glabrescent; stamens 20, uniseriate, connate at base, homodynamous, filaments 3–5 mm long, glabrous; anthers ovoid, pilose at base; ovary 4–5 × 2.5–3 mm, ovoid, glabrous to pilose towards the apex; style 3–4 mm long, cylindrical, glabrescent; stigma capitate, glabrous. Drupes 5–10 × 2–5 mm, obloid, glabrous, sepals and stigma persistent. Seeds not seen.

Examined material: Aracruz, Coqueiral, 7.XI.1995, fl. and fr., *J.N. Neves 297* (VIES). Conceição da Barra, Parque Estadual de Itaúnas - trilha da Borboleta, 1.V.2015, fl., *R. Nichio-Amaral 29* (VIES). Guarapari, Parque Estadual Paulo Cesar Vinha, 20.IX.2010, fl., *A.S. Zandonadi* & *S.S. Dutra 8* (VIES). Jaguaré, Giral, 16.I.2009, fr., *L. Kollmann & R. Lopes 11498* (MBML). Linhares, Reserva Natural Vale, 18.VI.2010, fr., *V.B.R. Ferreira* 108 (CVRD, SAMES). Presidente Kennedy, Praia das Neves, 7.VIII.1990, fl. and fr., *J.M.L Gomes et al. 1315* (VIES). Santa Teresa, Santo Antônio, 9.II.1999, fl., *L. Kollmann et. al. 1866* (MBML, CEPEC). São Mateus, Bairro Liberdade, 27.IX.2008, fr., *A.O. Giaretta & M.M. Monteiro 339* (VIES). Sooretama, Reserva Natural Vale, 13.V.2009, fl., *G.D. Colleta et al. 290* (VIES, ESA). Vila Velha, Alagados do Vale, Vale Encantado, 1.II.2015, fl., *R.T. Valadares 1332* (VIES). Vitória, Reserva Ecológica de Camburi, 23.XII.1997, fr., *A.M. Assis & I. Weiler-Júnior 318* (VIES).

Species with a Neotropical distribution, from Colombia to Argentina (Cuatrecasas 1961). In Brazil, it occurs in all phytogeographic domains, except in the Pantanal (BFG 2018). In Espírito Santo, the species is mainly distributed in the pioneer vegetation of Restinga, despite having records in areas of higher altitude in vegetation of Dense and Open Rainforest (Tab. 1). *Humiria balsamifera* has ample morphological plasticity, with 13 varieties of the species being classified, in addition to the type variety (Cuatrecasas 1961). However, here in this work we have not adopted the classification of varieties, due to the tenuous nature of the diagnostic morphological characters. Considering the size of the leaves, the species is similar to *Humiria crassifolia* Martius *ex.* Urban (441: 1877), however, it can be distinguished by presenting leaves with a short petiole (1–2 mm long *vs.* petiole > 10 mm long) and sometimes leaves pubescent along the primary vein (*vs.* leaves always glabrous) (Cuatrecasas 1961).

2. *Humiriastrum mussunungense* Cuatrec. Phytologia 75(3): 235-237. 1993. Figs. 1d-e; 2b

Trees 10–20 m tall. Branches cylindrical, glabrous, lenticulate. Stipules deciduous. Leaves alternate, petiolate; petiole 3–11 mm long, glabrous, cylindrical; leaf blade 5–13 × 2.5–5.5 cm, chartaceous to coriaceous, elliptical to elliptical-ovate, base obtuse to cuneate, apex attenuate to acuminate, glabrous on both surfaces, margin crenulate to serrate, slightly revolute, midrib impressed adaxially, slightly prominent abaxially, secondary veins 8–9 pairs, impressed adaxially, slightly prominent abaxially. Inflorescences cymose-paniculate, axillary; peduncle 1–3 cm long, cylindrical, hirsute. Flowers with pedicels 0.5–2 mm long, cylindrical, sparsely hirsute; sepals 1–1.8 × 1–2 mm, orbicular, connate at base, margin ciliate, sparsely pilose abaxially; petals 2.5–4 × 1.3–2 mm, oblong to elliptical, sparsely hirsute; stamens 20, uniseriate, connate at base, heterodynamous, filaments 2.5–3.5 mm long; anthers oblong-lanceolate, glabrous; ovary 1.5–1.8 × 1–1.5 mm, ovate, glabrous; style 0.5–1.2

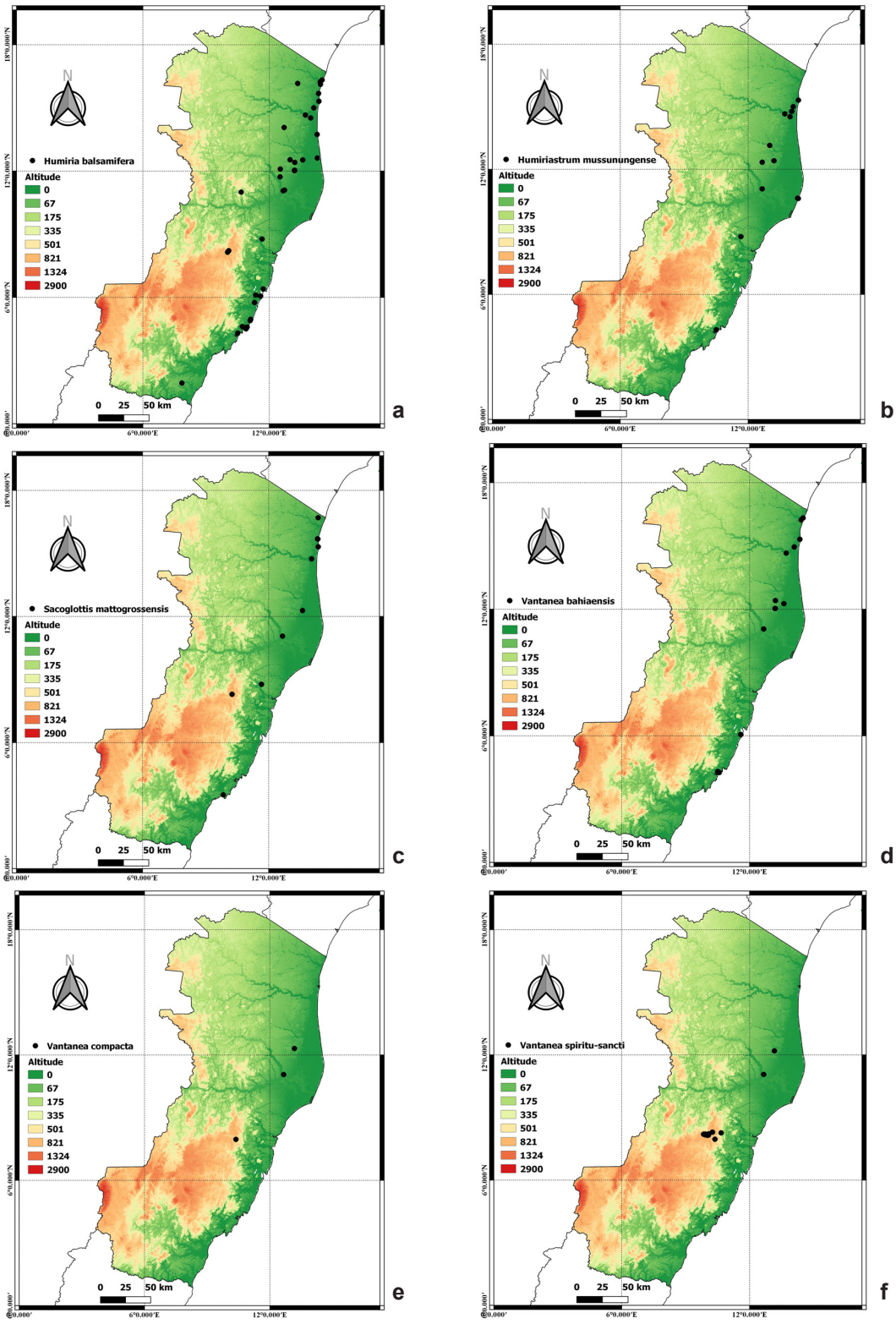

Figure 2 – a-f. Geographic distribution of Humiriaceae species occurring in Espírito Santo – a. *Humiria balsamifera*; b. *Humiriastrum mussunugense*; c. *Sacoglottis matogrossensis*; d. *Vantanea bahiaensis*; e. *V. compacta*; f. *V. spiritu-sancti*.

Table 1 – Geographic distribution of Humiriaceae species occurring in Espírito Santo in the vegetation types proposed by Garbin *et al.* (2017). PFR = pionners formations of *restingas*; SSF = seasonal semi-deciduous forest; OOF = open ombrophilous forest; DRF = dense rain forest; ER = ecological refuge. ● = presence; - absent.

Species	Vegetational types				
	PFR	SSF	OOF	DRF	ER
Humiria balsamifera	●	●	-	●	-
Humiriastrum mussununguense	●	-	-	●	-
Sacoglottis mattogrossensis	●	-	-	●	-
Vantanea bahiaensis	●	-	-	●	-
Vantanea compacta	-	-	-	●	-
Vantanea spiritu-sancti	-	-	-	●	-

mm long, cylindrical, glabrous; stigma capitate, glabrous. Drupes 3.5–4.5 × 3–3.5 cm, subglobose to ellipsoid, glabrescent, sepals and stigma not persistent. Seeds unseen.

Examined material: Aracruz, Retiro, 18.X.1993, fl., *O.J. Pereira et al. 5080* (VIES). Conceição da Barra, Parque Estadual de Itaúnas, 29.IX.2009, fl. and fr., *M. Ribeiro & A.G. Oliveira 29* (SAMES). Guarapari, Setiba, 2.IX.1996, fr., *J.M.L. Gomes 2210* (VIES). Linhares, Reserva Florestal da CVRD, 27.VII.1991, fl., *D.A. Folli 1393* (CVRD). São Mateus, Bairro Liberdade, 27.IX.2008, fl., *M.M. Monteiro & A.O. Giaretta 72* (SAMES).

Species endemic to Brazil, being restricted to the domain of the Atlantic Forest, occurring, until now, only in the state of Espírito Santo, where it is registered from the pioneer vegetation of Restinga and lowland rain forest (Cuatrecasas 1993; BFG 2018; Tab. 1). *Humiriastrum mussununguense* has a tenuous delimitation with *H. dentatum*, which can be distinguished by the inflorescence and leaf blade characteristics. However, these characteristics vary according to the geographic distribution of individuals found in Espírito Santo. As this work does not specifically refer to a greater taxonomic delimitation between *Humiriastrum* species, we decided to keep *Humiriastrum mussununguense* occurring in Espírito Santo, while pointing out the need for a taxonomic revision of the genus aiming to provide new and strong morphological characters for the delimitation of species.

3. *Sacoglottis matogrossensis* Malme, Arkiv för Botanik 22A(7): 9, t. 3. 1928. Figs. 1f-g; 2c

Shrubs or trees, 3–8 m tall. Branches cylindrical, glabrous, lenticulate. Stipules persistent. Leaves alternate, petiolate; petiole 4–10 mm long, glabrous, cylindrical; leaf blade 5–12 × 3–5 cm, coriaceous, elliptical, base cuneate to attenuate in young leaves, apex acuminate, glabrous on both surfaces, margin serrate, slightly revolute, midrib impressed adaxially, slightly prominent abaxially, secondary veins 8–10 pairs, impressed on both surfaces. Inflorescences racemose, terminal and axillary; peduncle 1–2 cm long, cylindrical, pubescent. Flowers with pedicels 1–3 mm long, cylindrical, hirsute; sepals 2–3 × 2–2.5 mm, orbicular to obovate, ciliate; petals 4–7 × 2–2.5 mm, deciduous, lanceolate, glabrous; stamens 10, uniseriate, connate at base, homodynamous, filaments 4–6 mm long, glabrous; anthers ellipsoid, glabrous; ovary 2–3 × 1–2 mm, ovoid, glabrous; style 2–4 mm long, cylindrical, glabrous; stigma capitate, glabrous. Drupes 3–4 × 3–4 cm, globose, glabrous, sepals, filaments and stigma sometimes persistent. Seeds unseen.

Material examined: Anchieta, 10.X.2009, fr., *J.M.L. Gomes et. al. 3463* (VIES). Aracruz, Barra do Riacho, 15.V.1990, fl. and fr., *P.C. Vinha 1013* (CVRD, VIES). Conceição da Barra, Parque Estadual de Itaúnas, 19.V.2014, fl. and fr., *J. Freitas et al. 238* (VIES). Linhares, Reserva Biológica de Comboios, 27.VII.1992, fl., *O.J. Pereira & J.M.L. Gomes2604* (VIES). Santa Teresa, Reserva Biológicas Augusto Ruschi, 13.V.2003, fl. and fr., *R.R. Vervloet et al. 2399* (MBML).

Species with a Neotropical distribution, from Colombia, Venezuela and Brazil, where it has wide distribution, occurring in the phytogeographic domains of the Amazon, Cerrado and Atlantic Forest (Cuatrecasas 1961, BFG 2018). In Espírito Santo, the species is distributed in pioneer vegetation of Restinga and lowland rain forest (Tab. 1). The species also has broad morphological plasticity, being classified into varieties based

on shape, however, *Sacoglottis matogrossensis* is morphologically similar to *S. cydonioides* Cuatrecasas (183: 1961) because they have persistent bracts and globose drupes, however, they can be distinguished by having prominent ribs (*vs.* superficial ribs) (Cuatrecasas 1961).

4. *Vantanea bahiaensis* Cuatrec. Phytologia 68(4): 263-265. 1990. Figs. 1h-k; 2d

Shrubs or trees, 4–6 m tall. Branches cylindrical, glabrous, lenticulate. Stipules deciduous. Leaves alternate, petiolate; petiole 4–8(–10) mm long, glabrous, cylindrical; leaf blade (4–)6–10 × 4–8 cm, coriaceous, obovate to obovate-elliptical, base cuneate, apex rounded to rarely cuspidate, glabrous on both surfaces, margin entire, revolute, midrib slightly prominent on both surfaces, secondary veins 8–12 pairs, slightly prominent on both surfaces. Inflorescences racemose, terminal, peduncle 4–5 cm long, cylindrical, pubescent. Flowers with pedicels 1–2 mm long, cylindrical, pubescent; sepals 1.5–2 × 1–1.5 mm, orbicular to obovate, ciliate; petals 3–4 × 1–2 mm, deciduous, lanceolate, pubescent to glabrescent; stamens 30–40, biseriate, heterodynamous; filaments 2–5 mm long, glabrous; anthers ellipsoid, glabrous; ovary 2–3 × 1.5–2 mm, ovoid, tomentose, style 1–1.5 mm long, cylindrical, glabrous; stigma capitate, glabrous. Drupes 1–1.5 ×1 cm, globose to ellipsoid, velutinous, sepals, filaments and stigma sometimes persistent. Seeds unseen.

Material examined: Conceição da Barra, Parque Estadual de Itaúnas, trilha da Borboleta, 2.IV.2019, fl. and fr., *A. Nepomuceno et al. 792* (VIES). Guarapari, Setiba, 2.IX.1996, fl. and fr., *J.M.L. Gomes 2209* (VIES). Linhares, Reserva Natural Vale, 13.X.2012, fl. *V.B.R. Ferreira 124* (CVRD, SAMES). São Mateus, 10.I.2008, fl. and fr., *A.O. Giaretta et al. 168* (VIES, SAMES). Vila Velha, 21.XI.1983, fl., *P.C. Vinha* (VIES 262).

Species endemic to Brazil, being restricted to the Atlantic Forest domain, occurring, until now, in the states of Bahia and Espirito Santo, where it is registered in pioneer vegetation of Restinga and lowland Ombrophilous Forest (Cuatrecasas 1990; BFG 2018; Tab. 1). Among the Brazilian species of the genus, *Vantanea bahiaensis* has greater morphological similarity to *V. spiritu-sancti*, and can be recognized based on the shape of the leaf blade and type of ovary induction.

5. *Vantanea compacta* Contributions from the United States National Herbarium 35(2): 65. 1961. Figs. 1l-n; 2e

Shrubs or trees, 5–9 m tall. Branches cylindrical, glabrous to hirsute, lenticulate. Stipules deciduous. Leaves alternate, petiolate; petiole 2–3 cm long, glabrous to slightly puberulous, cylindrical; leaf blade 5–7 × 2–4 cm, coriaceous, elliptical to oblong-elliptical, base attenuate to decurrent, apex acuminate to cuspidate, glabrous adaxially, glabrescent abaxially, margin entire, plane, midrib impressed adaxially, prominent abaxially, secondary veins 6–8 pairs, impressed on both surfaces. Inflorescences paniculate, terminal and axillary; peduncle 4–5 cm long, cylindrical, puberulous. Flowers with pedicels 1–1.5 cm long, cylindrical, glabrous; sepals 2–2.5 × 1–1.5 mm, obovate to wide-ovate, ciliate; petals 4–6 × 1.5–2 mm, deciduous, elliptical-lanceolate, glabrous; stamens 60, 2-seriate, heterodynamous; filaments 3–5 mm long, glabrous; anthers ovoid, glabrous; ovary 1–2 × 1–1.5 mm, ovoid, hirsute; style 3–4 mm long, cylindrical, glabrous; stigma capitate, glabrous. Fruits not seen. Seeds not seen.

Material examined: Linhares, Reserva Natural Vale, 3.XI.2014, fl. and fr., *D.A. Folli 7295* (CVRD, HUEFS). Santa Teresa, Estação Biológica Santa Lúcia, 28.X.1992, fl., *L.D. Thomaz 1622* (MBML).

Species endemic to Brazil, where it occurs in the phytogeographic domains of the Caatinga, Cerrado and Atlantic Forest (Cuatrecasas 1961; BFG 2018). In Espírito Santo it is registered in vegetation of Dense Rainforest, from low to high altitudes (Cuatrecasas 1961; BFG 2018; Tab. 1). In addition to being part of the group of species of the genus that has glabrous petals, *Vantanea compacta* is the species of the genus that has the smallest leaf blade measurements, these being fully glabrous with an apiculate, acuminate apex.

6. *Vantanea spiritu-sancti* K. Wurdack & C.E. Zartman, PhytoKeys 124: 2019. Figs. 1o; 2f

Trees 10–15 m tall. Branches cylindrical, glabrous, lenticulate. Stipules deciduous. Leaves alternate, petiolate; petiole 1–2.5 cm long, glabrous, cylindrical; leaf blade 6–9 × 2–3.5 cm, coriaceous, elliptical-obovate, base cuneate, apex rounded, glabrous on both surfaces, margin entire, revolute, midrib impressed on the lower surface, prominent on the upper surface, secondary veins 10–12 pairs, impressed on both surfaces. Inflorescences corymbose, terminal and axillary; peduncle 3–4 cm long, cylindrical, glabrescent. Flowers with pedicels 1–2 cm long, cylindrical, hirsute; sepals 1–1.5 × 1 mm, ovate, ciliate; petals 3–4 × 1–1.5 mm, deciduous, lanceolate, hirsute; stamens 20,

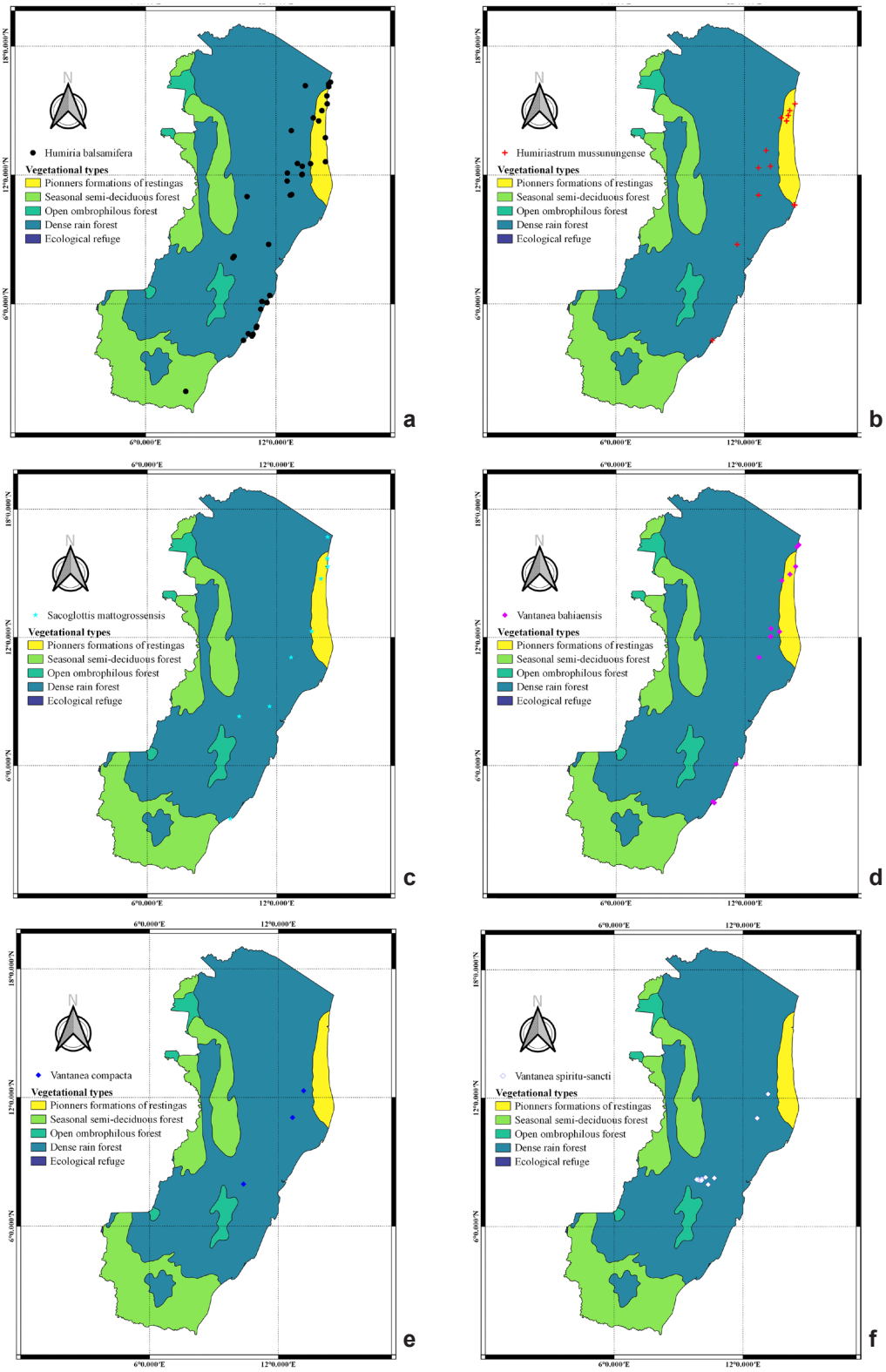

Figure 3 – a-f. Distribution of Humiriaceae species occurring in Espírito Santo in the vegetation types proposed by Garbin e*t al.* (2017) – a. *Humiria balsamifera*; b. *Humiriastrum mussunugense*; c. *Sacoglottis matogrossensis*; d. *Vantanea bahiaensis*; e. *V. compacta*; f. *V. spiritu-sancti*.

biseriate, heterodynamous; filaments 4–5 mm long, glabrous; anthers ovoid, glabrous; ovary 2–3 × 1–2 mm, ovoid, glabrous; style 5–8(–10) mm long, cylindrical, glabrous; stigma 5-lobate, glabrous. Drupes 3–4 × 2–3 cm, ellipsoid, glabrous, filaments sometimes persistent. Seeds unseen.

Material examined: Fundão, APA Goiapaba-Açu, 15.VII.1998, fl. and fr., *L. Kohlmann et al. 223* (MBML). Linhares, Reserva Natural Vale, 20.V.2016, fl. and fr., *L.F.T. Menezes 2279* (SAMES). Santa Teresa, Reserva Biológica Augusto Ruschi, 9.IV.2003, fl. and fr., *R.R. Vervloet et al. 2185* (MBML).

Species endemic to Brazil, being restricted to the Atlantic Forest domain, occurring, until now, in the states of Bahia and Espirito Santo, where it is registered in vegetation of Dense Rainforest from low to high altitudes (Cuatrecasas 1964; BFG 2018; Wurdack & Zartman 2019; Tab. 1), with occurrence records in three conservation units: Goiapaba-Açu Environmental Proctetion Area, Vale Nature Reserve and Augusto Ruschi Biological Reserva. *Vantanea spiritu-sancti* was recently transferred from the genus *Humiriastrum* to *Vantanea*, for presenting anthers with two bisporangiate thecae and palynological characteristics (Wurdack & Zartman 2019). The species has a greater morphological similarity with *V. bahiaensis*, whose morphological delimitation was presented in the comments of that species.

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List of material examined

Alves M 2305 (1). **Amorim BS** 1954 (3), 1977 (1), 2027 (4). **Andrade IR** 225 (1). **Assis AM** 318 (1), 2219 (3), 2844 (1) 3274 (4), 3476 (3). **Belém RP** 3836. **Cândito ES** 718 (1). **Coelho R** 44 (1). **Colleta GD** 289 (1), 290 (1). **Cruz TA** 71 (6). **Silva AF** 1986 (1). **Lima HC** 2918 (4), 2976 (4). **Faria JEQ** 4242 (1). **Farias GL** 65 (4), 83 (1). **Farney C** 4605 (1). **Felitto G** 1208 (1) 1250 (1). **Ferreira VBR** 12 (4), 39 (1), 55 (1), 59 (4), 79 (1), 82 (1), 86 (1), 89 (1), 92 (1), (1), 124 (4), 128 (4), 162 (1). **Folli DA** 1121 (3), 1291 (1); 1377 (3), 1558 (1), 1582 (4), 1683 (4), 2095 (6), 3422 (1), 4547 (4), 4639 (6), 5268 (3), 5376 (1), 5389 (3), 5530 (1), 7295 (5). **Freire GQ** 47 (4). **Freitas J** 238 (3). **Giaretta AO** 168 (4), 232 (1), 339 (1); 490 (1), 531 (4), 540 (4), 1070 (1). **Giordano LCS** 2678 (6), 2679 (1), 2680 (1), 2681 (4). **Gomes JML** 1315 (1), 2209 (4), 3463 (3), 3498 (3), 4111 (1). **Gomes SM** 4 (1). **Groppo M** 997 (1). **Hatschbach G** 58054 (1). **Kollmann L** 223 (6), 265 (6), 293 (6), 707 (6), 1282 (6), 1866 (1), 11498 (1). **Kuhlmann L** 4166 (3). **Lima JCA** 3 (1). **Lombardi JA** 9647 (1). **Lopes LCM** 35 (4), 45 (1), 148 (1), 149 (4). **Luber J** 187 (1), 193 (1). **Lucas E** 897 (1), 929 (4), 984 (1). **Luz AA** 342 (4). **Maas PJM** 9872 (4). **Machado JO** 290 (4). **Martinelli G** 11032 (4). **Martins RFA** 21 (1). **Meireles J** 568 (1), 570 (4), 612 (1). **Menezez LFT** 1654 (3), 1712 (1), 2279 (6). **Monteiro MM** 162 (4), 172 (1). **Moraes PLR** 4608 (1). **Moraes QS** 29 (4), 198 (1). **Nascimento AL** 5 (1). **Nepomuceno A** 792 (4), 793 (1). **Neve JN** 297 (1). **Nichio-Amaral R** 29 (1). **Nunes NL** 29 (1). **Paciencia MB** 2335 (4). **Peixoto AL** 340 (1). **Pereira OJ** 139 (1), 232 (4), 270 (4), 271 (1), 949 (1), 1138 (1), 1718 (1), 1889 (4), 2604, (3), 2927 (1), 3000 (4), 3049 (4), 3092 (1), 3134 (3), 3161 (1), 3171 (4), 3295 (1), 3523 (1), 3792 (1), 3970 (1), 4071 (1), 4244 (1), 4360 (3), 4463 (1), 4568 (1), 4780 (1), 4861 (1), 5349 (1), 5940 (4), 6095 (4), 6104 (1), 6141 (3), 6318 (4), 7614 (1) 7752 (4). **Pirani JR** 2617 (1). **Queiroz LP** 2456 (1). **Reis R** 9 (6). **Romão GO** 1251 (4). **Salim-Filho J** 174 (1), 175 (1). **Silva SS** 16 (1), 17 (1), 21 (1), 24 (4), 37 (1). **Siqueira GS** 847 (6). **Sobral M** 3994 (4). **Souza S** 7 (1), 26 (1), 40 (1). **Souza WO** 284 (1). **Spada J** 8 (6), 233 (5). **Stehmann JR** 4643 (4), 4666 (1). **Thomaz LD** 1339 (6), 1622 (5). **Valadares RT** 1332 (1). **Valdemarin KS** 889 (4). **Vervloet RR** 2156 (6), 2185 (6), 2399 (3). **Vinha PC** 1013 (3), 1245 (1). **Weinberg B** 311 (1), 580 (1). **Zandonadi AS** 7 (1), 8 (1).

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