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Inventory

Updated list of long-term monitored tree species in a forest with high diversity and endemism in the highlands of Espírito Santo, Brazil

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***Abstract**:* The main purpose of this study was to update the list of tree species monitored in an undisturbed forest at the Santa Lúcia Biological Station (SLBS), in the highlands of Espírito Santo, southeastern Brazil. At this site, trees and palms with a DBH ≥ 6.4 cm have been monitored by surveying permanent plots totaling 1.02 ha. Surveys were carried out in 1992–1993 (S1), 2003–2004 (S2), and 2017–2018 (S3), recording high levels of species richness and diversity. We also aimed to identify the threatened species among those monitored, present more accurate values for diversity measures, and compare species diversity across the different surveys. The study was supported by the speciesLink, Jabot, and Flora e Funga do Brasil databases and involved searching for updates on species determinations of 1,233 vouchers from 17 herbaria; updating synonyms and circumscriptions of families and genera; reviewing determinations by examining vouchers in person or through high-resolution images; and adjusting voucher arrangements into morphospecies. We compiled the threat categories of species from the list of threatened species in the state of Espírito Santo, the CNCFlora red list, and the IUCN red list. Richness (number of species), the Shannon diversity index (H'), and Pielou's evenness (J) for each survey were calculated from a species-based abundance matrix. The updated list includes 386 species, 168 genera, and 69 families. Myrtaceae (75), Lauraceae (46), Fabaceae (31), Sapotaceae (25), and Melastomataceae (22) were the richest families. Despite progress in resolving determination issues, 44 morphospecies remained unidentified, 24 of which lack fertile vouchers available for taxonomic evaluation. Richness, diversity, and evenness in each survey were as follows: 365 species, H' = 5.23, and J = 0.89 in S1; 363 species, H' = 5.18, and J = 0.88 in S2; and 358 species, H' = 5.18, and J = 0.88 in S3. Diversity remained high over time, with variation among surveys not being significant. We identified that 88 species (about 23% of the total) were assigned to a threat category in at least one of the consulted lists of threatened species. Surprisingly, 34 new species have been described from vouchers collected at SLBS plots, most of which have been recognized as endemic to the highlands of Espírito Santo. Data highlight SLBS as a refuge for endemic and threatened species in a region officially recognized as of very high priority for conservation.
***Keywords:** floristic richness; tree diversity; Atlantic Forest; biodiversity monitoring; threatened species.*

Lista atualizada das espécies arbóreas monitoradas a longo prazo em uma floresta com alta diversidade e endemismo nas serras do Espírito Santo, Brasil

Resumo: O principal propósito deste estudo foi atualizar a lista de espécies arbóreas monitoradas em uma floresta sem distúrbios na Estação Biológica de Santa Lúcia (SLBS), nas serras do Espírito Santo, sudeste do Brasil. Nesse local, árvores e palmeiras com um DAP ≥ 6,4 cm foram monitoradas por meio de inventários em parcelas

permanentes totalizando 1,02 ha. Os inventários foram realizados em 1992–1993 (S1), 2003–2004 (S2) e 2017–2018 (S3), registrando altos níveis de riqueza e diversidade de espécies. Também objetivamos identificar as espécies ameaçadas entre aquelas monitoradas, apresentar valores mais precisos para medidas de diversidade e comparar a diversidade de espécies entre os diferentes inventários. O estudo foi apoiado pelas bases de dados speciesLink, Jabot e Flora e Funga do Brasil e envolveu a busca por atualizações nas determinações de 1.233 espécimes de 17 herbários; atualização de sinônimos e circunscrições de famílias e gêneros; revisão de determinações através da análise dos espécimes pessoalmente ou por meio de imagens de alta resolução; e ajuste dos arranjos de espécimes em morfoespécies. Compilamos as categorias de ameaça a partir da lista de espécies ameaçadas do estado de Espírito Santo, da lista vermelha CNCFlora e da lista vermelha da IUCN. Riqueza (número de espécies), índice de diversidade de Shannon (H') e equabilidade de Pielou (J) foram calculados para cada inventário a partir da matriz de abundância por espécies. A lista atualizada inclui 386 espécies, 168 gêneros e 69 famílias. Myrtaceae (75), Lauraceae (46), Fabaceae (31), Sapotaceae (25) e Melastomataceae (22) foram as famílias mais ricas. Apesar dos avanços na resolução das determinações, 44 morfoespécies permaneceram não identificadas, 24 delas sem espécimes férteis disponíveis para avaliação taxonômica. Riqueza, diversidade e equabilidade em cada inventário foram: 365 espécies, H' = 5,23 e J = 0,89 em S1; 363 espécies, H' = 5,18 e J = 0,88 em S2; e 358 espécies, H' = 5,18 e J = 0,88 em S3. A diversidade se manteve alta no tempo, com variações não significativas entre inventários. Identificamos que 88 espécies (cerca de 23% do total) estavam atribuídas a alguma categoria de ameaça em pelo menos uma das listas de espécies ameaçadas consultadas. Surpreendentemente, 34 espécies novas foram descritas com espécimes coletados nas parcelas da SLBS, a maioria delas reconhecidas como endêmicas das serras do Espírito Santo. Os dados destacam a SLBS como um refúgio para espécies endêmicas e ameaçadas em uma região oficialmente reconhecida como de alta prioridade para conservação.

Palavras-chave: *riqueza florística; diversidade arbórea; Mata Atlântica; monitoramento da biodiversidade; espécies ameaçadas.*

Introduction

Long-term biodiversity monitoring is a key strategy for generating data for conservation management and is now recognized as a priority by intergovernmental panels (Draper et al. 2020, Dalton et al. 2023). In tropical regions; however, biodiversity monitoring presents some challenges. First, tropical regions are recognized for their high species richness, resulting in a considerable number of species that need to be identified and monitored (Draper et al. 2020, Stropp et al. 2022). Second, there are gaps in taxonomic knowledge, as many species in these regions remain undescribed (Dexter et al. 2010, Joppa et al. 2011), and the complexity of both intra- and interspecific morphological variation can occasionally lead to species misidentification or underlying uncertainties (Dexter et al. 2010, Draper et al. 2020, Stropp et al. 2022). Third, data collection in the field is often time-consuming and physically exhausting due to heat, humidity, and dense vegetation (Jermy & Chapman 2002). With regard to plant monitoring, risky tree climbing is usually required to gain access to the canopy and obtain voucher collections of trees and another life forms (Castilho et al. 2006).

In the Atlantic Forest, the most species-rich biogeographic domain for plants in Brazil (BFG 2022), the monitoring of plant species has been more commonly conducted in tree components (including palms) through successive surveys in permanent plots (see, for example, Saiter et al. 2011, Rolim et al. 2017, Maia et al. 2020, Rocha et al. 2020). In permanent plots, trees are tagged and identified with codes to facilitate the periodic collection of essential population data for studies on forest dynamics, such as diameter at breast height (DBH), height, survival, recruitment, and mortality (Saiter et al. 2011, Rolim et al. 2017).

In the highlands of the state of Espírito Santo, a region located in the central part of the Atlantic Forest, efforts for the monitoring of tree species have been underway since the 1990s at the Santa Lúcia Biological Station (SLBS, Saiter & Thomaz 2014). Three surveys of trees and palms (DBH ≥ 6.4 cm) were conducted there using permanent plots. The first survey took place between 1992 and 1993 (Thomaz & Monteiro 1997), the second between 2003 and 2004 (Saiter et al. 2011), and the third between 2017 and 2018 (E. F. Oza, unpublished data).

Despite some uncertainty caused by insufficient taxonomic knowledge and scarcity of fertile vouchers for some morphospecies, such monitoring has revealed that approximately 380 tree species may occur within just one hectare of the magnificent evergreen forest covering the Timbuí River valley (Saiter et al. 2011, Saiter & Thomaz 2014). Additionally, about 7% of these species have been recognized as regionally endemic (Saiter et al. 2011), and very high values of Shannon diversity index (H' > 5.2) have been reported for trees (Saiter et al. 2011). These characteristics have placed SLBS in the spotlight as one of the most plant-diverse and endemically rich sites in Brazil (Joly et al. 2014, Rolim et al. 2016, Garbin et al. 2017).

More than 30 years after monitoring begun, recent advances in knowledge about the flora of the highlands of Espírito Santo — stemming from updates of taxonomic studies (e.g., Baitello & Quinet 2015, Sobral et al. 2017, Caddah & Meirelles 2018, Mônico & Alves-Araujo 2019, Lírio et al. 2021) and herbarium collections (i.e., through an increase in the number of vouchers from the region) — have provided an opportunity to revisit the floristic data from the permanent plots of SLBS. Fortunately, we had the convenience of online databases on Brazilian biodiversity, which, due to constant improvement, offer

a substantial number of high-resolution voucher images and allow for the remote study of collections.

Thus, the aims of this study were to update the list of tree species monitored over three decades in the permanent plots of SLBS, identify threatened species among them, provide more accurate values of species diversity and evenness, and compare species diversity among surveys. We expect that this new and more comprehensive reference will serve to increase the reliability and utility of data from the ongoing forest monitoring.

Materials and Methods

1. Study area

SLBS is a research station (not categorized within the National System of Nature Conservation Units of Brazil) that is managed by the National Institute of the Atlantic Forest (INMA), an agency of the Brazilian Ministry of Science, Technology, and Innovation, and the Museu Nacional, an institution affiliated with the Federal University of Rio de Janeiro. It encompasses 467.89 ha and includes part of the Timbuí River valley in Valsugana Velha, within the municipality of Santa Teresa, in the highlands of the state of Espírito Santo, southeastern Brazil (19º57′12"–19º59′10" S; 40º31′13"–40º32′32" W; Figure 1). The climate at SLBS is of Cfa type (hot summer without dry season) according to the Köeppen's climate classification map for Brazil (Alvares et al. 2013). The average annual temperature is 20 °C, and the average annual precipitation is 1,868 mm (Mendes & Padovan 2000). Elevation varies from 600 to 900 m.a.s.l. in a hilly terrain. The prevailing soils at SLBS are shallow, dystrophic, acidic, with high aluminum levels and low base saturation (Thomaz & Monteiro 1997). The typical phytophysiognomy in the region is classified as *Floresta Ombrófila Densa Montana* (500–1,500 m.a.s.l.) according to IBGE (2012), or alternatively as Tropical Broadleaved Rain Forest on Lower Highlands (600–1,000 m.a.s.l., *sensu* Oliveira-Filho 2009).

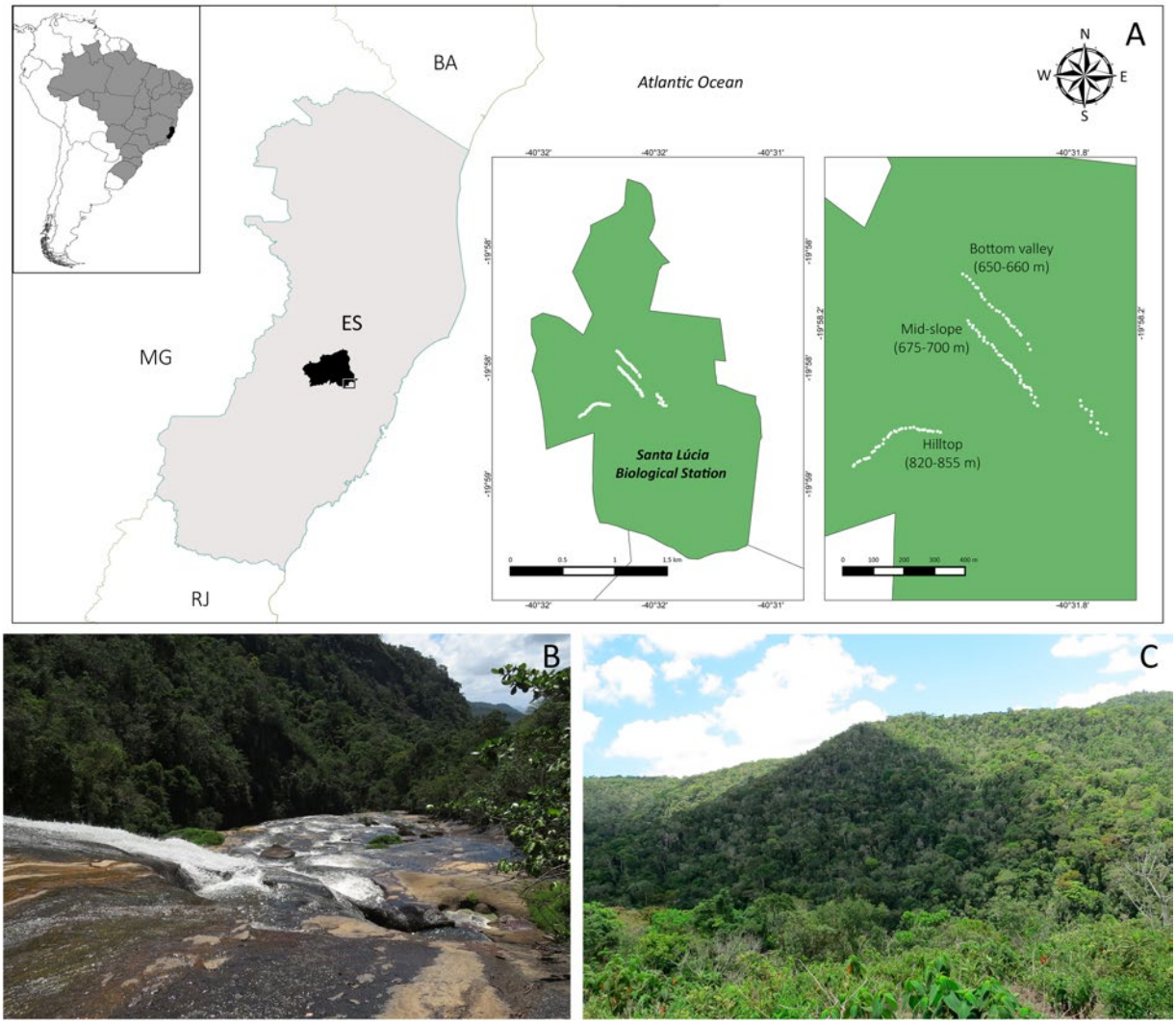

Figure 1. Study area. (A) Location map of the Santa Lúcia Biological Station within the municipality of Santa Teresa, in the highlands of Espírito Santo state, southeastern Brazil. Permanent forest plots are organized into three transects: bottom valley (650–660 m.a.s.l.), mid-slope (675–700 m.a.s.l.), and hilltop (820–855 m.a.s.l.). (B) Waterfalls on the Timbuí River. (C) Overview of the evergreen forest on the slope along the right bank of the Timbuí River.

2. Sampling design and surveys

The permanent forest plots of SLBS have been established since 1992 in an undisturbed forest on the slope at the right bank of the Timbuí River (Thomaz & Monteiro 1997). The initial study performed by Thomaz & Monteiro (1997) aimed to analyze differences in forest structure and diversity among three distinct topographic sectors (see Figure 1): bottom valley (650–660 m.a.s.l.), mid-slope (675–700 m.a.s.l.), and hilltop (820–855 m.a.s.l.). Therefore, plots were organized into three transects with 0.34 ha, totaling 1.02 ha of sample area. In this sampling design, each transect would have 34 contiguous 100 m² square plots (340 × 10 m). However, the presence of a dense *Merostachys fischeriana* Rupr. ex Döll. (a native, thin bamboo species) stand at the bottom valley sector led the transect to be divided into two segments (with 100 and 240 m, respectively), which are separated by a distance of about 100 m.

In transects, all trees and palms with diameter at breast height (DBH) ≥ 6.4 cm were marked with numbered tags, their diameters were measured, and their heights were estimated in the 1992–1993 survey (S1). Then, all surviving trees were remeasured in subsequent surveys (S2, in 2003–2004, and S3, in 2017–2018). The recruited trees (i.e., those that reached 6.4 cm in DBH through growth) were properly included (tagged and measured) in the monitoring.

Here, we consolidated the three transects into a single plot, as previously done in studies on floristics and dynamics of the SLBS forest (Saiter et al. 2011, Saiter & Thomaz 2014). This approach was supported by the close proximity and small elevational differences among transects, as well as the high similarity in their soil features, species richness, and species composition (Saiter et al. 2011).

3. Update procedures and threatened species

The update had deadline of May 2024 and involved four procedures: [a] searching for updates made by taxonomists on voucher determinations; [b] updating synonyms and circumscriptions of families and genera; [c] reviewing species determinations by examining vouchers; [d] adjusting voucher arrangements into morphospecies.

To do this, we examined vouchers in person at the MBML and VIES herbaria, and also checked the metadata and voucher images from the speciesLink Network (CRIA [continuously updated]) and Jabot – Banco de Dados da Flora Brasileira (JBRJ [continuously updated]) when available. We first searched for vouchers from SLBS directly in those databases using the collector numbers from S1 and S2 listed by Saiter & Thomaz (2014) one by one. Additional vouchers were searched using the following terms as filters: *Espírito Santo* (as state or province), *Santa Teresa* (as municipality), and *Estação Biológica de Santa Lúcia*, or alternatively, *Valsugana Velha* (as locality). In total, we analyzed 1,233 vouchers from 17 herbaria (MBML, VIES, RB, SPF, UEC, MO, SPSF, HRCB, RFA, UPCB, ESA, SP, K, NY, CEPEC, IAC, and US; Acronyms according to Thiers et al. [continuously updated]).

We adopted family circumscriptions according to the Angiosperm Phylogeny Group IV (APG IV 2016) and the correct names of genera and species according to the monographs of the Flora e Funga do Brasil [continuously updated] database. We verified names of genera and species using the 'get.taxa' function of the 'flora' package v0.3.4 (Carvalho 2022) in R (R Core Team 2022).

Then, we organized the species into a table, adopting alphabetical order for families, genera, and specific epithets. We also indicated the threat categories (critically endangered, CR; endangered, EN; and vulnerable, VU) of species listed on the list of threatened fauna and flora in the state of Espírito Santo according to Fraga et al. (2019), the CNCFlora Red List (CNCFlora 2023), and the IUCN Red List of Threatened Species (IUCN 2024).

4. Richness, diversity and evenness across surveys

As studies based on the datasets from S1 (Thomaz & Monteiro 1997), S2 (Saiter et al. 2011), and S3 (Oza, unpublished data) revealed levels of diversity that rank among the highest in Brazil, we recognized the need to also update the richness (number of species), Shannon diversity index (H'), and Pielou's evenness (J) (Magurran 1988) for each survey. To achieve this, we used the updated species list to revise the species names across the entire dataset (S1, S2, and S3), and then created a species-based abundance matrix with species in columns and abundances for each survey in rows. We applied this species-based abundance matrix to calculate richness, H', and J using the 'specnumber' and 'diversity' functions from the 'vegan' package v2.6-4 (Oksanen et al. 2024) in R (R Core Team 2022). We also checked the pairwise differences between H' values using the 'Hutcheson_t_test' function from the 'ecolTest' package v0.0.1 in R (Salinas & Ramirez-Delgado 2022), which performs the Hutcheson's t-test (Hutcheson 1970). We adopted the Bonferroni correction ($p < 0.0167$) in order to reduce the type I error (i.e., finding significant difference when there indeed was no difference) in the multiple Hutcheson's t-tests.

Results and Discussion

Table 1 shows the updated list of tree species monitored in permanent SLBS plots. Along three surveys, 386 species have been recorded, of which 44 remain as unidentified morphospecies (24 are not yet represented by a fertile voucher; see the 'phenological stage' column in Table 1). Such a set of species comprises a total of 69 families and 168 genera. The top five families in terms of number of species (Myrtaceae, Lauraceae, Fabaceae, Sapotaceae, and Melastomataceae) encompass slightly more than half of the total species (see Figure 2). These families have often been indicated by floristic studies as among the richest in the tree stratum of highland forests (> 600 m.a.s.l.) on the eastern Brazilian coast (see Amorim et al. 2009, Thomas et al. 2009, Joly et al. 2012). However, we emphasize that the levels of species richness of Lauraceae, Myrtaceae, and Sapotaceae recorded here are unusual for a sample area of about 1 ha in the Atlantic Forest. As references, Araújo et al. (2021) recorded 30 species of both Lauraceae and Myrtaceae, and only one species of Sapotaceae using the walk-over survey method in highland rainforests along an elevation gradient (900–1,600 m.a.s.l.) at the Caparaó National Park, in southern Espírito Santo; Amorim et al. (2009) recorded 29 tree species of Lauraceae, 47 of Myrtaceae, and 13 of Sapotaceae in three rainforests ranging from 300 to 1080 m.a.s.l. in southern Bahia; and Thomas et al. (2009) recorded 12, 31, and 22 tree species of Lauraceae, Myrtaceae and Sapotaceae, respectively, in plots totaling 1 ha that were arranged along an elevation gradient (350–750 m.a.s.l.) with seasonal and rain forests in the Serra da Ouricana, Bahia. Similarly, Joly et al. (2012) recorded 26 tree species of Lauraceae and 49 of Myrtaceae (Sapotaceae

Table 1. Long-term monitored tree species in permanent plots at the Santa Lúcia Biological Station, highlands of Espírito Santo, Brazil. CS, conservation status according to (a) Fraga et al. (2019), (b) CNCFlora (2023), and (c) IUCN (2024); PS, voucher phenological stages; AbS1, abundance in the first survey (1992–1993); AbS2, abundance in the second survey (2003–2004); AbS3, abundance in the third survey (2017–2018); Herbarium acronyms according to Thiers et al. [continuously updated].

N	Families and Species	CS	PS	AbS1	AbS2	AbS3	Voucher Numbers
	Anacardiaceae						
1	*Tapirira guianensis* Aubl.		fruit	4	2	2	MBML 7212; VIES 14600
	Annonaceae						
2	*Anaxagorea dolichocarpa* Sprague & Sandwith		vegetative	0	1	1	VIES 14430
3	*Annona cacans* Warm.		fruit	0	1	1	MBML 8345; VIES 14431
4	*Annona dolabripetala* (Raddi) H. Rainer		fruit	1	0	0	MBML 7196, 7245
5	*Guatteria australis* A. St.-Hil.		flower, fruit	13	12	11	MBML 7261, 7262
6	*Guatteria capixabae* Lobão & J.C. Lopes	EN(a)	flower	1	1	1	MBML 7253; VIES 14457
7	*Guatteria sellowiana* Schltdl.		bud	4	5	6	MBML 7249; VIES 14432
8	*Oxandra espintana* (Spruce ex Benth.) Baill.		vegetative	2	2	1	MBML 7254; VIES 14423
9	*Pseudoxandra spiritus-sancti* Maas	EN(b); EN(c)	bud, flower, fruit	14	13	12	MBML 7250, 7263, 28065
10	*Unonopsis sanctae-teresae* Maas & Westra	CR(b); CR(c)	flower, fruit	45	44	37	MBML 7213, 7239, 7244
11	*Xylopia decorticans* D.M. Johnson e Lobão	EN(b); EN(c)	bud, fruit	4	4	4	MBML 7211, 7217
	Apocynaceae						
12	*Aspidosperma olivaceum* Müll.Arg.		bud, fruit	4	4	3	MBML 7228, 7240
13	*Himatanthus bracteatus* (A. DC.) Woodson		vegetative	1	1	2	MBML 7225
14	*Lacmellea pauciflora* (Kuhlm.) Markgr.	EN(a); EN(b); EN(c)	flower, fruit	3	3	3	MBML 7221, 29130
15	*Rauvolfia capixabae* I. Koch & Kin.-Gouv.	EN(b); EN(c)	fruit	8	7	9	MBML 7210, 7219
	Aquifoliaceae						
16	*Ilex dumosa* Reissek		vegetative	1	0	0	MBML 7264; VIES 14388
17	*Ilex paraguariensis* A. St.-Hil.		vegetative	2	1	5	MBML 7275; VIES 14387
	Araliaceae						
18	*Didymopanax calvus* (Cham.) Decne. & Planch.		fruit	4	4	3	MBML 7266
19	*Didymopanax grandigemmus* (Fiaschi) Fiaschi & G.M. Plunkett	CR(b); CR(c)	bud, fruit	2	2	2	MBML 7273; VIES 14394
20	*Didymopanax kollmannii* (Fiaschi) Fiaschi & G.M. Plunkett	EN(b); EN(c)	bud	1	1	1	MBML 7265
21	*Didymopanax ruschianus* (Fiaschi & Pirani) Fiaschi & G.M. Plunkett	CR(b); CR(c)	fruit	1	3	1	MBML 7274; VIES 14395
	Arecaceae						
22	*Attalea burretiana* Bondar		flower	6	6	6	MBML 29756, 56194
23	*Euterpe edulis* Mart.	VU(a); VU(b)	bud, fruit	170	204	190	MBML 29271, 29276
24	*Geonoma schottiana* Mart.		fruit	16	18	24	MBML 10345, 29275
25	*Syagrus pseudococos* (Raddi) Glassman	VU(a)	flower	4	5	6	MBML 10319; SPF 211263
	Asteraceae						
26	*Vernonanthura spathulata* M. Monge & Semir	EN(a); CR(b)	flower, fruit	5	5	6	MBML 7268, 29141

Continue...

Table 1. ...Continuation

N	Families and Species	CS	PS	AbS1	AbS2	AbS3	Voucher Numbers
	Bignoniaceae						
27	*Jacaranda microcalyx* A.H. Gentry	EN(b)	fruit	5	5	4	MBML 7282
28	*Tabebuia roseoalba* (Ridl.) Sandwith		flower	2	2	2	MBML 53764
	Boraginaceae						
29	*Cordia trachyphylla* Mart.		vegetative	2	1	1	MBML 7288
	Burseraceae						
30	*Protium brasiliense* Engl.	EN(a)	bud	4	4	3	MBML 7287; VIES 14451
31	*Protium heptaphyllum* March.		bud, fruit	6	5	3	MBML 7207; VIES 14407
	Calophyllaceae						
32	*Kielmeyera occhioniana* Saddi	EN(a); EN(b); EN(c)	vegetative	3	4	3	MBML 7226, 7307
	Cardiopteridaceae						
33	*Citronella paniculata* (Mart.) R.A. Howard		vegetative	6	5	6	MBML 7412
	Caricaceace						
34	*Jacaratia heptaphylla* (Vell.) A. DC.		bud	6	5	4	MBML 7202
	Caryocaraceae						
35	*Caryocar edule* Casar.		flower	2	2	1	MBML 7279; VIES 14400
	Celastraceae						
36	*Cheiloclinium cognatum* (Miers) A.C. Sm.		flower	3	3	3	MBML 7400, 11571
37	*Monteverdia brasiliensis* (Mart.) Biral		fruit	15	20	22	MBML 7173, 7231
38	*Monteverdia fugax* (Biral & Lombardi) Biral	EN(a); EN(b)	bud, fruit	12	10	10	MBML 7237, 7238
39	*Salacia elliptica* (Mart. ex Schult.) G. Don		flower	8	6	7	MBML 7403, 18917
40	*Salacia nemorosa* Lombardi	VU(a)	flower	1	0	0	MBML 7401, 11547
41	*Tontelea miersii* (Peyr.) A.C. Sm.		fruit	1	1	1	MBML 7402, 13400
42	*Tontelea* sp		fruit	9	9	8	MBML 7404
	Chrysobalanaceae						
43	*Couepia grandiflora* Benth.		vegetative	2	2	2	MBML 7314
44	*Couepia macrophylla* Spruce ex Hook. f.		vegetative	1	1	1	MBML 7316; RB 415360
45	*Couepia venosa* Prance		vegetative	3	3	3	MBML 7315; RB 415371
46	*Hirtella hebeclada* Moric ex A. DC.		bud, flower	14	15	12	MBML 7323; VIES 14377
47	*Leptobalanus octandrus* (Hoffmanns. ex Roem. & Schult.) Sothers & Prance		vegetative	3	3	4	MBML 7318; VIES 14347
48	*Leptobalanus parvifolius* (Huber) Sothers & Prance		flower	7	6	6	MBML 26949
49	*Licania kunthiana* Hook. f.		vegetative	2	2	3	MBML 7322; VIES 14346
50	*Licania leptostachya* Benth.		flower, fruit	4	3	1	MBML 7320, 7321, 7328
51	*Licania micrantha* Miq.		bud, flower, fruit	14	12	12	MBML 7319, 7326, 7327
52	*Moquilea salzmannii* Hook. f.		flower	1	1	1	MBML 7332; VIES 14373
53	*Parinari excelsa* Sabine		vegetative	1	1	1	MBML 7329; VIES 14425
54	*Parinari obtusifolia* Hook. f.		flower	4	4	4	MBML 7317, 18539
	Clusiaceae						
55	*Clusia melchiorii* Gleason		bud, flower, fruit	4	1	0	MBML 7301, 7304, 29110

Continue...

Table 1. ...Continuation

N	Families and Species	CS	PS	AbS1	AbS2	AbS3	Voucher Numbers
56	*Garcinia brasiliensis* Mart.		vegetative	3	3	3	MBML 7305, 10627
57	*Garcinia gardneriana* (Planch. & Triana) Zappi		fruit	1	2	2	MBML 7306; VIES 14476
58	*Tovomita fructipendula* (Ruiz & Pav.) Cambess.		bud, flower, fruit	3	4	6	MBML 7311, 7312
59	*Tovomita riedeliana* Engl.		fruit	12	12	11	MBML 7308, 7309, 7310
60	*Tovomitopsis saldanhae* Engl.	CR(a)	fruit	4	4	1	MBML 7313, 15225
	Connaraceae						
61	*Connarus detersus* Planch.		vegetative	2	1	0	MBML 7296; RB 319902
	Cunoniaceae						
62	*Lamanonia ternata* Vell.		fruit	4	3	2	MBML 7297; VIES 14433
	Dichapetalaceae						
63	*Stephanopodium blanchetianum* Baill.		bud	2	2	2	MBML 7300; VIES 14369
	Elaeocarpaceae						
64	*Sloanea fasciculata* D. Sampaio & Souza	EN(a); EN(b); EN(c)	flower, fruit	17	16	16	MBML 7358, 26924
65	*Sloanea garckeana* K. Schum.		vegetative	2	2	2	MBML 7355; RB 315598
66	*Sloanea hirsuta* (Schott) Planch. ex Benth.		fruit	4	4	3	MBML 7344, 7345; RB 315596
67	*Sloanea obtusifolia* (Moric.) K. Schum.	EN(a); EN(b)	fruit	2	2	2	MBML 7348; RB 315595
68	*Sloanea* sp1		fruit	3	3	3	MBML 7346
69	*Sloanea* sp2		vegetative	1	1	1	MBML 7354
	Erythropalaceae						
70	*Heisteria perianthomega* (Vell.) Sleumer		bud, fruit	2	2	5	MBML 10539, 10540
71	*Heisteria silvianii* Schwacke		bud, fruit	6	6	5	MBML 10572, 10573
	Erythroxylaceae						
72	*Erythroxylum cuspidifolium* Mart.		bud, flower	1	0	0	MBML 7406, 17573
73	*Erythroxylum pulchrum* A. St.-Hil.		flower, fruit	2	2	2	MBML 7407, 7408
74	*Erythroxylum squamatum* Sw.	VU(a)	fruit	1	1	1	MBML 7405, 10194
	Euphorbiaceae						
75	*Alchornea triplinervia* (Spreng.) Müll. Arg.		fruit	4	3	2	MBML 7419, 16044
76	*Aparisthmium cordatum* (Juss.) Baill.		flower, fruit	8	5	4	MBML 7421, 29132
77	*Croton floribundus* Spreng.		fruit	1	0	0	MBML 4468, 7423
78	*Maprounea guianensis* Aubl.		fruit	4	4	4	MBML 7430, 24667
79	*Pausandra morisiana* (Casar.) Radlk.		bud	2	2	2	MBML 7432; VIES 14203
	Fabaceae						
80	*Andira fraxinifolia* Benth.		flower	1	1	1	MBML 7370, 22336
81	*Copaifera trapezifolia* Hayne		flower	7	8	8	MBML 7367, 10816
82	*Dalbergia foliolosa* Benth.		fruit	3	3	2	MBML 7371, 7373; RB 366110
83	*Diplotropis incexis* Rizzini & A. Mattos	VU(a)	fruit	15	14	13	MBML 7374, 24693
84	*Hymenaea aurea* Y.T. Lee & Langenh.	VU(a)	flower, fruit	8	8	7	MBML 7365, 11449
85	*Hymenaea courbaril* L.		vegetative	1	1	1	MBML 7366; VIES 14207
86	*Hymenolobium janeirense* Kuhlm.	VU(a)	vegetative	1	1	1	MBML 7376; VIES 14216
87	*Inga cabelo* T.D. Penn.	VU(a); VU(c)	bud	1	2	1	MBML 7444

Continue...

Table 1. ...Continuation

N	Families and Species	CS	PS	AbS1	AbS2	AbS3	Voucher Numbers
88	*Inga capitata* Desv.		flower, fruit	23	26	23	MBML 7195, 7438, 7441
89	*Inga cylindrica* (Vell.) Mart.		vegetative	2	3	2	MBML 7501
90	*Inga exfoliata* T.D. Penn. & F.C.P. García		fruit	0	0	1	MBML 7437
91	*Inga flagelliformis* (Vell.) Mart.		flower	4	4	4	VIES 14327, 32097
92	*Inga hispida* Schott ex Benth.	VU(c)	fruit	5	5	5	MBML 7435, 7436; VIES 14401
93	*Inga lenticellata* Benth.	VU(c)	vegetative	3	2	2	MBML 7443
94	*Inga striata* Benth.		fruit	0	0	2	MBML 14937
95	*Inga subnuda* Salzm. ex Benth. subsp. *subnuda*		fruit	6	5	7	MBML 7445, 7448
96	*Inga tenuis* (Vell.) Mart.		fruit	2	2	0	MBML 7449, 7505, 29139
97	*Inga vera* Willd subsp. *affinis* (DC.) T.D. Penn.		flower	1	1	1	MBML 7440
98	*Jupunba brachystachya* (DC.) M.V.B. Soares, M.P. Morim & Iganci		fruit	3	3	4	MBML 7434, 21164
99	*Jupunba rhombea* (Benth.) M.V.B. Soares, M.P. Morim & Iganci		vegetative	1	1	1	MBML 7446
100	*Marlimorimia* sp		flower	2	2	2	MBML 7447, 9648
101	*Melanoxylon brauna* Schott	CR(a); VU(b)	vegetative	2	2	3	MBML 7199, 7200
102	*Ormosia ruddiana* Yakovlev	EN(b); EN(c)	fruit	16	14	13	MBML 7378, 7379, 26951
103	*Peltogyne angustiflora* Ducke		vegetative	2	2	1	MBML 7364; VIES 14197
104	*Senna multijuga* (Rich.) H.S. Irwin & Barneby		flower	1	1	0	MBML 7363, 11681
105	*Swartzia apetala* Raddi		fruit	14	13	14	MBML 6168, 7381, 14385
106	*Swartzia myrtifolia* Sm.		bud, flower	2	2	1	MBML 7383, 11673
107	*Swartzia oblata* R.S. Cowan		flower	2	2	2	MBML 7380
108	*Tachigali* cf. *densiflora* (Benth.) L.G. Silva & H.C. Lima		bud, flower	6	6	6	MBML 7362, 15483
109	*Zollernia ilicifolia* (Brongn.) Vogel		vegetative	3	3	2	MBML 7204
110	*Zollernia magnifica* A.M. Carvalho & Barneby	EN(a); EN(b); EN(c)	vegetative	1	1	1	MBML 7384
	Hernandiaceae						
111	*Sparattanthelium botocudorum* Mart.		fruit	3	3	3	MBML 7359; VIES 14356
	Humiriaceae						
112	*Humiriastrum spiritu-sancti* Cuatrec.	CR(a); EN(b)	bud	19	19	19	MBML 1279, 7411
113	*Vantanea compacta* (Schnizl.) Cuatrec.		vegetative	2	2	1	MBML 7410
	Hypericaceae						
114	*Vismia brasiliensis* Choisy		flower	1	1	1	MBML 26944; VIES 14337
	Lacistemataceae						
115	*Lacistema robustum* Schnizl.		bud, flower	12	16	27	MBML 7416, 7417, 7418
	Lamiaceae						
116	*Vitex orinocensis* H. B. & K.		fruit	2	2	2	MBML 10347
117	*Vitex* sp		vegetative	1	1	0	MBML 10351
	Lauraceae						
118	*Aiouea glaziovii* (Mez) R. Rohde	EN(a)	flower	6	5	6	MBML 7461, 9446

Continue...

Table 1. ...Continuation

N	Families and Species	CS	PS	AbS1	AbS2	AbS3	Voucher Numbers
119	*Aniba firmula* (Nees & Mart.) Mez		fruit	0	2	5	MBML 7483; VIES 14288
120	*Beilschmiedia linharensis* Sa. Nishida & van der Werff		bud, fruit	8	9	8	MBML 7469, 29146
121	*Beilschmiedia taubertiana* (Schwacke & Mez) Kosterm.		bud, flower, fruit	9	9	8	MBML 7842, 9534
122	*Cryptocarya aschersoniana* Mez		fruit	4	4	4	MBML 7459; VIES 14419
123	*Cryptocarya saligna* Mez		bud, fruit	3	4	4	MBML 11345; VIES 14302
124	*Cryptocarya velloziana* P.L.R. de Moraes	EN(b); EN(c)	fruit	3	2	2	MBML 6199, 10675
125	*Endlicheria paniculata* (Spreng.) J.F. Macbr.		bud	1	1	1	MBML 7456, 11775
126	*Licaria armeniaca* (Nees) Kosterm.		vegetative	1	1	1	MBML 7452
127	*Licaria guianensis* Aubl.		vegetative	2	0	0	MBML 7450, 7451
128	*Licaria spiritusanctensis* P.L.R. Moraes & M.R.V. Barbosa		flower	0	0	3	MBML 8074
129	*Mezilaurus glabriantha* F. M. Alves & V. C. Souza	VU(a); CR(b); CR(c)	bud, fruit	44	41	38	MBML 7350, 7504
130	*Nectandra nitidula* Nees & Mart.		vegetative	4	4	4	MBML 7464, 7466
131	*Ocotea aciphylla* (Nees) Mez		bud, flower, fruit	85	77	69	MBML 7478, 7481, 7482
132	*Ocotea* aff. *bicolor* Vattimo		fruit	4	4	6	MBML 7525; UEC 132479
133	*Ocotea brachybotrya* (Meisn.) Mez		flower	1	0	0	MBML 7477, 7490
134	*Ocotea catharinensis* Mez	VU(a); VU(b); VU(c)	flower, fruit	17	16	13	MBML 7488, 9221
135	*Ocotea corymbosa* (Meisn.) Mez		bud	11	11	12	MBML 7527
136	*Ocotea cryptocarpa* Baitello	EN(a); EN(b)	flower, fruit	16	15	14	MBML 7518, 7519, 7520
137	*Ocotea daphnifolia* (Meisn.) Mez		bud, flower, fruit	5	6	4	MBML 7529, 7179, 29826
138	*Ocotea diospyrifolia* (Meisn.) Mez		flower	0	0	1	MBML 10039
139	*Ocotea dispersa* (Nees) Mez		bud, fruit	7	6	4	MBML 7532, 7486, 26935
140	*Ocotea divaricata* (Nees) Mez		flower, fruit	12	11	10	MBML 7474, 7475
141	*Ocotea glaziovii* Mez		flower	3	2	2	MBML 7495; HRCB 23958
142	*Ocotea leucoxylon* (Sw.) Laness		bud, flower, fruit	9	5	5	MBML 7521, 7522, 28055
143	*Ocotea longifolia* H.B. & K.		fruit	3	2	2	MBML 7496; MO 1502821
144	*Ocotea mandioccana* A. Quinet		bud, fruit	5	5	6	MBML 7465; VIES 14306
145	*Ocotea minarum* (Nees & Mart.) Mez		fruit	3	2	2	MBML 15371
146	*Ocotea odorifera* (Vell.) Rohwer	EN(a); EN(b)	flower	10	8	7	MBML 7497, 8124
147	*Ocotea pluridomatiata* Quinet	VU(a); EN(b); EN(c)	bud, fruit	4	4	4	MBML 7526, 11021
148	*Ocotea prolifera* (Nees & Mart.) Mez		flower	0	2	2	MBML 7528
149	*Ocotea puberula* (Rich.) Nees		fruit	2	3	2	MBML 40399
150	*Ocotea silvestris* Vattimo		fruit	5	6	6	MBML 7498; VIES 14289
151	*Ocotea spectabilis* (Meisn.) Mez		flower	2	2	2	MBML 11432; VIES 14240

Continue...

Table 1. ...Continuation

N	Families and Species	CS	PS	AbS1	AbS2	AbS3	Voucher Numbers
152	*Ocotea spixiana* (Nees) Mez		bud	2	2	1	MBML 7499
153	*Ocotea velutina* (Nees) Rohwer		bud	5	5	6	MBML 7453, 7500
154	*Ocotea venulosa* (Nee) Baitello		bud, flower, fruit	9	9	7	MBML 7523, 7524, 28057
155	*Ocotea* sp1		vegetative	2	1	1	MBML 7295, 7485
156	*Ocotea* sp2		flower	17	17	16	MBML 7531; VIES 14259
157	*Ocotea* sp3		bud	4	4	4	MBML 28042
158	*Ocotea* sp4		vegetative	1	3	2	VIES 14305
159	*Ocotea* sp5		vegetative	1	1	0	VIES 14287; SPSF 20610
160	*Ocotea* sp6		fruit	3	3	3	MBML 7285
161	*Persea caesia* Meisn.		fruit	4	4	6	MBML 7503; MO 1898551
162	*Persea* sp		vegetative	3	2	1	MBML 7502
163	*Williamodendron cinnamomeum* van der Werff	CR(a); CR(b)	fruit	1	1	1	MBML 5201
	Linnaceae						
164	*Roucheria* cf. *columbiana* Hallier f.		vegetative	0	1	1	RFA 46885
	Loganiaceae						
165	*Strychnos* sp		vegetative	4	4	3	MBML 7392
	Malphigiaceae						
166	*Barnebya dispar* (Griseb.) W.R. Anderson & B. Gates	EN(a)	vegetative	8	7	6	MBML 7530
167	*Byrsonima alvimii* W.R. Anderson	EN(b);	fruit	6	7	9	MBML 7394, 19464
168	*Byrsonima vernicosa* Nied.	VU(b); VU(c)	flower	11	11	11	MBML 7395; VIES 14366
	Malvaceae						
169	*Eriotheca macrophylla* (K. Schum.) A. Robyns		flower	53	51	53	MBML 7283, 11146
170	*Hydrogaster trinervis* Kuhlm.		fruit	1	1	1	MBML 10346
171	*Pachira calophylla* (K. Schum.) Fern. Alonso	EN(b); EN(c)	flower	6	5	8	MBML 7291
	Melastomataceae						
172	*Meriania tetramera* Wurdack		bud, flower, fruit	6	6	3	MBML 8807, 8808, 8813
173	*Miconia capixaba* R. Goldenberg	EN(a); EN(b)	bud, flower	2	2	9	MBML 9300, 9301, 28053
174	*Miconia cinnamomifolia* (A. DC.) Naud.		bud, fruit	2	2	2	MBML 9190, 9322
175	*Miconia cubatanensis* Hoehne		bud	3	3	3	MBML 9323, 9324
176	*Miconia dodecandra* (Desr.) Cogn.		flower, fruit	5	6	3	MBML 9188, 9326, 29143
177	*Miconia dorsaliporosa* R. Goldenb. & Reginato		fruit	0	2	3	MBML 10126; VIES 14252
178	*Miconia flammea* Casar.		bud, flower, fruit	0	0	1	MBML 25265
179	*Miconia formosa* Cogn.		fruit	0	1	1	MBML 8592; VIES 14250
180	*Miconia goldenbergiana* Caddah		bud, flower, fruit	3	2	0	BML 9185, 9186, 9187
181	*Miconia latecrenata* (DC.) Naudin		bud, fruit	3	3	1	MBML 9307, 9308, 9316
182	*Miconia lepidota* DC.		fruit	1	3	3	MBML 9154; VIES 14255

Continue...

Table 1. ...Continuation

N	Families and Species	CS	PS	AbS1	AbS2	AbS3	Voucher Numbers
183	*Miconia longicuspis* Cogn.		flower, fruit	0	1	0	MBML 8816, 9320, 9321
184	*Miconia mirabilis* (Aubl.) L.O. Williams		flower, fruit	0	0	1	MBML 8513
185	*Miconia octopetala* Cogn.		bud	2	1	1	MBML 9155; UEC 86118
186	*Miconia paniculata* (DC.) Naudin		bud, fruit	1	0	4	MBML 9312, 9313, 9315
187	*Miconia polyandra* Gardner		bud, flower	5	6	5	MBML 8814, 11456
188	*Miconia prasina* (Sw.) DC.		bud	1	1	2	MBML 8812, 28056
189	*Miconia pusilliflora* (DC.) Naudin		bud, flower, fruit	6	5	2	MBML 9152, 9153, 9161
190	*Miconia sellowiana* Naudin		flower, fruit	0	1	0	MBML 9319, 26946
191	*Miconia tristis* Spring		fruit	0	2	4	MBML 26967; VIES 14249
192	*Mouriri doriana* Saldanha ex Gogn.	EN(b); EN(c)	flower	6	7	7	MBML 9310, 9317
193	*Mouriri glazioviana* Cogn.		fruit	2	2	2	MBML 8762, 9309
	Meliaceae						
194	*Cabralea canjerana* (Vell.) Mart.		fruit	1	1	0	MBML 13223, 28100
195	*Guarea macrophylla* Vahl		fruit	1	1	1	MBML 17041, 28101
196	*Trichilia emarginata* (Turcz) C. DC.		flower, fruit	1	1	1	MBML 14585, 28094
197	*Trichilia lepidota* Mart.		flower, fruit	12	12	8	MBML 9106, 26927
198	*Trichilia silvatica* C. DC.	VU(c)	bud, fruit	13	14	14	MBML 28091, 28092, 28097
199	*Trichilia* sp		fruit	13	11	9	MBML 28096, 28095
	Monimiaceae						
200	*Mollinedia dolichotricha* Lírio & Peixoto	EN(a); EN(b); EN(c)	bud, fruit	6	5	5	MBML 10660, 10679
201	*Mollinedia gilgiana* Perkins	CR(c)	bud, fruit	7	5	1	MBML 10657, 10666
202	*Mollinedia pignallii* Lírio & Pauli		fruit	6	5	5	MBML 10656
203	*Mollinedia ruschii* Lirio & Peixoto		fruit	5	4	2	MBML 10663, 10664
204	*Mollinedia salicifolia* Perkins	VU(a)	fruit	7	7	6	MBML 10661
	Moraceae						
205	*Brosimum lactescens* (S. Moore) C.C. Berg		vegetative	1	1	1	MBML 7277
206	*Ficus arpazusa* Casar.		flower, fruit	1	1	3	MBML 7234; VIES 14434
207	*Sorocea guilleminiana* Gaudich.		bud	10	10	9	MBML 7230, 26945
	Myristicaceae						
208	*Virola gardneri* (A. DC.) Warb.		fruit	13	15	15	MBML 10513
	Myrtaceae						
209	*Blepharocalyx eggersii* (Kiaersk.) Landrum		bud, flower	1	1	1	MBML 10523, 26938
210	*Campomanesia aromatica* (Aubl.) Griseb.	VU(c)	fruit	1	1	2	MBML 10906
211	*Campomanesia guaviroba* (DC.) Kiaersk.		fruit	2	3	4	MBML 9560, 10907
212	*Campomanesia laurifolia* Gardner		fruit	1	1	0	MBML 10905, 13483
213	*Eugenia arvensis* Vell.		fruit	1	1	1	MBML 10900
214	*Eugenia botequimensis* Kiaesk.	VU(a); VU(b); VU(c)	flower	1	1	1	MBML 6102
215	*Eugenia candolleana* DC.		flower	2	2	2	MBML 24721
216	*Eugenia cerasiflora* Miq.	EN(a)	fruit	5	4	5	MBML 10901, 17961

Continue...

Table 1. ...Continuation

N	Families and Species	CS	PS	AbS1	AbS2	AbS3	Voucher Numbers
217	*Eugenia copacabanensis* Kiaersk.	EN(a)	fruit	4	4	3	MBML 10729, 10760
218	*Eugenia disperma* Vell.	EN(b)	bud	3	3	2	MBML 10895, 10762
219	*Eugenia egensis* DC.		bud, flower, fruit	6	4	3	MBML 10756, 10759, 10903
220	*Eugenia excelsa* O. Berg		bud, flower	1	1	1	MBML 7148, 14723
221	*Eugenia fusca* O. Berg.	EN(a)	fruit	7	6	5	MBML 43603; ESA 53764
222	*Eugenia goiapabana* Sobral & Mazine	EN(a); EN(b); EN(c)	flower, fruit	8	9	9	MBML 10764, 52002
223	*Eugenia itapemirimensis* Cambess.	EN(a)	fruit	7	8	7	MBML 8308, 10894
224	*Eugenia melanogyna* (D. Legrand) Sobral		fruit	0	1	1	MBML 11469
225	*Eugenia piloensis* Cambess.		flower, fruit	1	2	2	MBML 10755, 26956
226	*Eugenia pisiformis* Cambess.		bud, flower	6	6	4	MBML 10897, 10898, 10899
227	*Eugenia platyphylla* O. Berg		fruit	3	3	3	MBML 11123, 11323
228	*Eugenia* aff. *platysema* O. Berg		vegetative	2	2	2	VIES 62099
229	*Eugenia pruniformis* Cambess.		fruit	9	9	8	MBML 10896, 13474
230	*Eugenia rugosissima* Sobral	EN(a); CR(b); CR(c)	fruit	8	7	7	MBML 7141, 29147
231	*Eugenia stictopetala* DC.		flower, fruit	1	2	2	MBML 5869, 6072
232	*Eugenia subglomerata* (Kuntze) Sobral		fruit	1	0	1	MBML 11018
233	*Eugenia sudestis* Sobral		fruit	3	3	4	MBML 7158
234	*Eugenia valsuganana* Sobral	EN(a); EN(b); EN(c)	fruit	1	2	1	MBML 9561
235	*Eugenia xiriricana* Mattos	EN(a)	flower, fruit	8	8	6	MBML 7155, 7156, 7157
236	*Eugenia* sp1		vegetative	4	5	4	VIES 62100
237	*Eugenia* sp2		vegetative	1	1	1	MBML 7152
238	*Eugenia* sp3		vegetative	16	14	13	MBML 10908, 10909
239	*Eugenia* sp4		fruit	4	4	4	MBML 7723, 10732
240	*Myrcia aethusa* (O. Berg) N. Silveira	VU(c)	flower	1	3	3	MBML 10879, 13849
241	*Myrcia amazonica* DC.		bud, flower, fruit	19	19	15	MBML 10765, 10782, 10784
242	*Myrcia amplexicaulis* (Vell.) Hook. f.	VU(a); EN(b); EN(c)	bud, flower, fruit	10	9	12	MBML 10880, 10886, 10893
243	*Myrcia basicordata* Sobral	VU(a)	flower, fruit	2	1	1	MBML 10761, 10914
244	*Myrcia* cf. *bergiana* O. Berg		vegetative	1	1	1	MBML 10878, 24737
245	*Myrcia bicolor* Kiaersk.	VU(b); VU(c)	flower	3	3	3	MBML 8908, 11035
246	*Myrcia brasiliensis* Kiaersk.		fruit	5	5	6	MBML 10882, 10883
247	*Myrcia crassa* Sobral	EN(a)	fruit	7	6	5	MBML 9761, 10788
248	*Myrcia* cf. *eugenioides* Cambess.		fruit	1	1	1	MBML 6169, 10707
249	*Myrcia excoriata* (Mart.) E. Lucas & C.E. Wilson		flower, fruit	6	7	8	MBML 10738, 26925
250	*Myrcia fria* Sobral	EN(c)	fruit	2	2	1	MBML 11005, 11006
251	*Myrcia glomerata* (Cambess.) G.P. Burton & E. Lucas		bud, flower	3	2	1	MBML 19854, 26939
252	*Myrcia* cf. *guianensis* (Aubl.) DC.		flower, fruit	1	1	1	MBML 10892, 15752, 16150

Continue...

Table 1. ...Continuation

N	Families and Species	CS	PS	AbS1	AbS2	AbS3	Voucher Numbers
253	*Myrcia* cf. *loranthifolia* (DC.) G.P. Burton & E. Lucas		fruit	4	6	3	MBML 8721, 11039
254	*Myrcia montana* Cambess.		flower	3	3	3	MBML 10734
255	*Myrcia morroqueimadensis* Kiaersk.	CR(c)	fruit	2	2	2	MBML 10876, 16156
256	*Myrcia* aff. *neoclusiifolia* A.R. Lourenço & E. Lucas		vegetative	1	1	1	MBML 11038
257	*Myrcia neoobscura* E. Lucas & C.E. Wilson		fruit	4	4	5	MBML 10739, 22580
258	*Myrcia neoregeliana* E. Lucas & C.E. Wilson		fruit	3	3	3	MBML 10737
259	*Myrcia palustris* DC.		bud, flower	3	3	2	MBML 10884, 10885, 11019
260	*Myrcia plusiantha* Kiaersk.		bud, flower, fruit	17	15	10	MBML 9687, 10773, 10774
261	*Myrcia pubipetala* Miq.	VU(c)	fruit	2	0	0	MBML 10771, 10772
262	*Myrcia pulchella* (DC.) A.R. Lourenço & E. Lucas		fruit	6	5	3	MBML 11040, 11041
263	*Myrcia racemosa* (O. Berg) Kiaersk.		fruit	1	0	0	MBML 10904, 11028
264	*Myrcia santalucia* (Sobral) A.R. Lourenço & E. Lucas	CR(c)	fruit	3	3	2	MBML 7153, 10710
265	*Myrcia splendens* DC.		bud, flower, fruit	8	8	8	MBML 11025, 11026, 11027
266	*Myrcia subacuminata* (Kiaersk.) M.F. Santos	EN(c)	flower, fruit	3	2	5	MBML 10438, 10735, 31433
267	*Myrcia* sp1		vegetative	2	1	0	MBML 10877
268	*Myrcia* sp2		vegetative	2	2	1	MBML 11036
269	*Myrcia* sp3		flower	1	1	1	MBML 7154
270	*Myrcia* sp4		vegetative	2	2	2	MBML 10789
271	*Myrcia* sp5		vegetative	3	3	2	MBML 10790, 11016
272	*Myrcia* sp6		vegetative	1	1	1	MBML 10786
273	*Myrcia* sp7		vegetative	1	1	1	MBML 11121
274	*Myrciaria disticha* O. Berg		vegetative	1	1	0	MBML 10714
275	*Myrciaria floribunda* (H. West ex Willd.) O. Berg		flower	2	1	3	MBML 10713
276	*Neomitranthes obscura* (DC.) N. Silveira		flower, fruit	7	6	6	MBML 10709, 10711, 26926
277	*Neomitranthes warmingiana* (Kiaersk.) Mattos		bud, flower, fruit	6	7	7	MBML 7149, 10998, 11011
278	*Pimenta pseudocaryophyllus* (Gomes) Landrum		flower	1	1	1	MBML 8930, 11015
279	*Plinia renatiana* G.M. Barroso & Peixoto	EN(a); EN(b)	vegetative	4	5	6	MBML 11007, 11009
280	*Plinia rivularis* (Cambess.) Rotman		flower	2	2	3	MBML 14584
281	*Psidium cattleyanum* Sabine		bud, flower, fruit	4	4	4	MBML 11002, 11003, 11004
282	*Psidium rufum* Mart. ex DC.		fruit	2	1	1	MBML 15024
283	*Siphoneugena dussii* (Krug & Urb.) Proença		flower	2	0	0	MBML 11000, 21266
	Nyctaginaceae						
284	*Guapira cuneifolia* (Schltdl.) E.C.O. Chagas & Costa-Lima		bud, flower, fruit	26	28	26	MBML 7166, 9874, 9876

Continue...

Table 1. ...Continuation

N	Families and Species	CS	PS	AbS1	AbS2	AbS3	Voucher Numbers
285	*Guapira obtusata* (Jacq.) Little		flower, fruit	26	26	19	MBML 9867, 9873, 10512
286	*Guapira platystemon* (Heimerl) E.C.O. Chagas & Costa-Lima		bud	3	4	2	MBML 7953, 9868
287	*Guapira venosa* (Choisy) Lundell		flower, fruit	20	23	34	MBML 9869, 9871
	Ochnaceae						
288	*Elvasia capixaba* Fraga & Saavedra	VU(a)	bud, fruit	13	10	10	MBML 7734, 21996
289	*Ouratea cuspidata* Engl.		fruit	4	5	6	MBML 10576, 15946
	Oleaceae						
290	*Chionanthus parviflorus* Cornejo, Lombardi & W.W. Thomas	EN(b); EN(c)	flower, fruit	2	2	2	MBML 26923
	Pentaphyllacaceae						
291	*Ternstroemia brasiliensis* Cambess.		fruit	1	1	0	MBML 10303
	Peraceae						
292	*Pera heteranthera* (Schrank) I.M. Johnst.		vegetative	1	1	2	MBML 7433
293	*Pera* sp		bud	2	2	2	MBML 26941
	Phyllanthaceae						
294	*Hieronyma alchorneoides* Allemão		fruit	1	1	0	MBML 7425, 20047
295	*Hieronyma oblonga* (Tul.) Müll.Arg.		flower	4	4	4	MBML 7426, 12119
296	*Margaritaria nobilis* L. f.		fruit	3	3	4	MBML 7427, 7429
	Polygonaceae						
297	*Coccoloba declinata* (Vell.) Mart.		fruit	1	1	1	MBML 7533, 7534
298	*Coccoloba* cf. *glaziovii* Lindau		fruit	3	2	2	MBML 7535, 8139
	Primulaceae						
299	*Myrsine guianensis* (Aubl.) Kuntze		fruit	3	3	3	MBML 10625; RB 345630
300	*Myrsine lancifolia* Mart.		fruit	3	2	1	MBML 10515; RB 345714
301	*Myrsine umbellata* Mart.		bud, flower, fruit	12	11	8	MBML 7162, 7182, 10623
302	*Myrsine venosa* A. DC.		fruit	6	5	4	MBML 10514, 10945
	Proteaceae						
303	*Panopsis* sp		flower	0	1	0	MBML 18253
304	*Roupala consimilis* Mez	EN(a)	bud, flower, fruit	17	14	11	MBML 10321, 10338, 10356
305	*Roupala* aff. *montana* Aubl.		vegetative	1	1	1	MBML 10339
	Putranjivaceae						
306	*Drypetes sessiliflora* Allem.		flower, fruit	2	1	1	MBML 7387, 19534
307	*Drypetes variabilis* Uittien		vegetative	4	4	4	MBML 7424; VIES 14202
	Quiinaceae						
308	*Quiina glaziovii* Engl.		vegetative	5	5	10	MBML 10310
	Rosaceae						
309	*Prunus brasiliensis* (Cham. & Schltdl.) Dietrich.		fruit	2	3	1	MBML 10344, 40952
310	*Prunus myrtifolia* (L.) Urb.		bud, flower, fruit	3	3	1	MBML 10320, 10340, 10341
	Rubiaceae						
311	*Amaioua intermedia* Mart.		flower, fruit	12	11	9	MBML 10559, 10565, 10566

Continue...

Table 1. ...Continuation

N	Families and Species	CS	PS	AbS1	AbS2	AbS3	Voucher Numbers
312	*Amaioua pilosa* K. Schum.		flower	2	2	2	MBML 29148
313	*Bathysa australis* (St. Hil.) Benth & Hook. f.		flower, fruit	6	8	7	MBML 10554, 10570, 10571
314	*Bathysa stipulata* (Vell.) C. Presl		bud, flower, fruit	3	3	2	MBML 10475, 10546, 10557
315	*Cordiera myrciifolia* (K. Schum.) C.H. Perss. & Delprete		flower, fruit	2	2	3	MBML 10535, 10562, 26963
316	*Faramea oligantha* Müll. Arg.		flower, fruit	1	1	1	MBML 10502, 10536, 10552
317	*Faramea pachyantha* Müll. Arg.		flower, fruit	6	6	7	MBML 10564; ESA 118752
318	*Ixora grazielae* Di Maio & Peixoto	CR(a)	flower	1	1	1	MBML 4184, 10544
319	*Palicourea sessilis* (Vell.) C.M. Taylor		bud, flower, fruit	13	15	15	MBML 10498, 10499, 10500
320	*Posoqueria acutifolia* Mart.		flower, fruit	3	3	2	MBML 10543, 10556
321	*Posoqueria latifolia* (Rudge) Roem. & Schult.		fruit	1	1	2	MBML 5680, 10542
322	*Psychotria carthagenensis* Jacq.		bud, flower	5	4	3	MBML 10547, 10551
323	*Rudgea recurva* Müll. Arg.		bud, fruit	3	4	3	MBML 10550, 10626, 29136
324	*Simira* cf. *glaziovii* (K. Schum.) Steyerm.		bud, flower, fruit	1	2	1	MBML 10537, 10538, 10578
325	*Simira* cf. *sampaioana* (Standl.) Steyerm.		fruit	4	3	3	MBML 10553; VIES 11734
326	*Stachyarrhena krukovii* Standl.		bud	1	1	1	MBML 10549
	Rutaceae						
327	*Hortia brasiliana* Vand. ex. DC.		fruit	1	2	3	MBML 4516, 10329
	Sabiaceae						
328	*Meliosma chartacea* Lombardi	VU(b); VU(c)	fruit	3	3	2	MBML 7142, 7143
	Salicaceae						
329	*Banara serrata* (Vell.) Warb.		fruit	4	0	2	MBML 7385, 16797
330	*Casearia arborea* (Rich.) Urb.		bud, flower	3	3	2	MBML 7390, 29112, 26932
331	*Casearia bahiensis* Sleumer.	EN(a)	bud	3	2	2	VIES 14320; IAC 38038
332	*Casearia commersoniana* Cambess.		bud, flower	7	8	8	MBML 7391, 29140
333	*Casearia valenciana* R. Marquete & R.B. Torres		bud, fruit	4	6	6	MBML 7389, 40008
	Sapindaceae						
334	*Allophylus melanophloeus* Radlk.		flower	5	6	4	MBML 10312; US 3321551
335	*Cupania crassifolia* Radlk.	EN(b); EN(c)	fruit	1	1	2	MBML 10313, 15257
336	*Cupania furfuracea* Radlk.		flower	6	5	5	MBML 10337
337	*Cupania ludowigii* Somner & Ferrucci		flower	3	3	2	MBML 25801
338	*Cupania racemosa* (Vell.) Radlk.		flower	2	2	3	MBML 10305, 40945
339	*Matayba guianensis* Aubl.		vegetative	4	4	4	MBML 7215, 10308
340	*Matayba sylvatica* (Casar.) Radlk.	VU(a)	bud	3	3	2	MBML 10307, 10325
341	*Talisia cerasina* (Benth.) Radlk.		vegetative	1	2	2	US 3321548

Continue...

Table 1. ...Continuation

N	Families and Species	CS	PS	AbS1	AbS2	AbS3	Voucher Numbers
342	*Talisia cupularis* Radlk.		vegetative	7	7	7	MBML 10327; VIES 14426
343	*Talisia* sp		vegetative	0	1	1	VIES 14428
	Sapotaceae						
344	*Chrysophyllum lancisepalum* R. Lima		bud	1	1	2	VIES 23930, 62101
345	*Chrysophyllum gonocarpum* (Mart. & Eichler) Engl.		fruit	2	2	2	MBML 9860, 26928
346	*Chrysophyllum januariense* Eichler.	VU(a)	bud, fruit	3	3	2	MBML 28051, 26964
347	*Chrysophyllum splendens* Spreng.	VU(c)	bud, fruit	11	10	10	MBML 6924, 9859, 10328
348	*Chrysophyllum* sp		bud	14	14	11	MBML 28195; VIES 14335
349	*Diploon cuspidatum* (Hoehne) Cronquist		fruit	6	6	6	MBML 10335, 10122
350	*Ecclinusa ramiflora* Mart.		fruit	40	40	32	MBML 6918, 10315
351	*Manilkara longifolia* (A. DC.) Dubard	EN(c)	flower, fruit	13	13	13	MBML 7241, 26950
352	*Manilkara* aff. *subsericea* (Mart.) Dubard		vegetative	1	1	1	MBML 7224; VIES 14385
353	*Micropholis crassipedicellata* (Mart. & Eichler) Pierre		vegetative	9	8	8	MBML 9838, 9839
354	*Micropholis gardneriana* (A. DC.) Pierre		bud	3	3	4	MBML 6923, 9837
355	*Micropholis guyanensis* (A. DC.) Pierre		bud	12	12	12	MBML 9840, 9842, 26936
356	*Micropholis venulosa* (Mart. & Eichler) Pierre		fruit	15	15	14	MBML 9843, 9844
357	*Micropholis* sp		vegetative	8	8	9	MBML 10316, 10317
358	*Pouteria bangii* (Rusby) T.D. Penn.		bud, fruit	22	23	24	MBML 6925, 6927, 11061
359	*Pouteria bullata* (S. Moore) Baehni	EN(a); EN(b); VU(c)	fruit	8	7	6	MBML 6919
360	*Pouteria coelomatica* Rizzini	EN(b); EN(c)	fruit	6	6	6	MBML 9207
361	*Pouteria durlandii* (Standl.) Baehni.		flower, fruit	4	4	4	MBML 6918, 26930
362	*Pouteria gardneri* (Mart. & Miq.) Baehni		fruit	7	7	6	VIES 14336
363	*Pouteria guianensis* Aubl.		bud	2	2	2	MBML 26933
364	*Pouteria macahensis* T.D. Penn.	EN(a); EN(b); EN(c)	fruit	16	12	13	MBML 6920, 10354
365	*Pouteria reticulata* (Engler) Eyma		flower	2	2	3	MBML 9856, 9857
366	*Pouteria samborae* Alves-Araújo & Mônico		flower, fruit	0	0	1	MBML 50683, 50771
367	*Pouteria venosa* subsp. amazonica T.D. Penn.		fruit	3	4	4	MBML 10314
368	*Pradosia lactescens* (Vell.) Radlk.		fruit	1	2	2	MBML 53130
	Simaroubaceae						
369	*Simarouba amara* Aubl.		vegetative	1	1	1	MBML 10302
	Siparunaceae						
370	*Siparuna bifida* (Poepp. & Endl.) A. DC.		bud, fruit	17	21	29	MBML 10650, 10651, 10652
	Solanaceae						
371	*Solanum sooretamum* Carvalho		flower	1	0	1	MBML 8485, 37768
	Strombosiaceae						
372	*Tetrastylidium grandifolium* (Baill) Sleumer		flower	10	10	10	MBML 11862

Continue...

Table 1. ...Continuation

N	Families and Species	CS	PS	AbS1	AbS2	AbS3	Voucher Numbers
	Symplocaceae						
373	*Symplocos celastrinea* Mart. ex Miq.		bud, flower	5	6	6	MBML 10349, 10352, 26955
374	*Symplocos nitens* (Pohl) Benth.		flower, fruit	4	4	2	MBML 10350
375	*Symplocos tetrandra* Mart.		vegetative	1	1	1	MBML 10311
	Theaceae						
376	*Laplacea fruticosa* (Schrad.) Kobuski		flower, fruit	2	3	3	MBML 53136; VIES 14422
	Thymaelaceae						
377	*Daphnopsis martii* Meisn.		bud	1	2	3	MBML 10355; SP 338113
	Urticaceae						
378	*Cecropia hololeuca* Miq.		fruit	1	3	4	MBML 7278, 11201
379	*Coussapoa microcarpa* (Schott) Rizzini		bud, fruit	21	19	19	MBML 7281, 7292
380	*Coussapoa pachyphylla* Akkermans & C.C. Berg	EN(b); EN(c)	fruit	14	11	6	MBML 7208; VIES 14340
381	*Pourouma bicolor* (Trécul) C.C. Berg & van Heusden		vegetative	1	0	0	MBML 7229
382	*Pourouma guianensis* Aubl.		fruit	7	6	4	MBML 7235; VIES 14343
	Vochysiaceae						
383	*Qualea gestasiana* A. St.-Hil.		fruit	0	2	2	MBML 52472; VIES 14429
384	*Vochysia rectiflora* Warm.		flower, fruit	5	3	1	MBML 7540, 16622
385	*Vochysia santaluciae* M.C. Vianna & Fontella	EN(a); EN(b); EN(c)	flower, fruit	13	12	11	MBML 538, 7539, 29133
	Winteraceae						
386	*Drimys brasiliensis* Miers		flower	1	0	0	MBML 10322, 29131

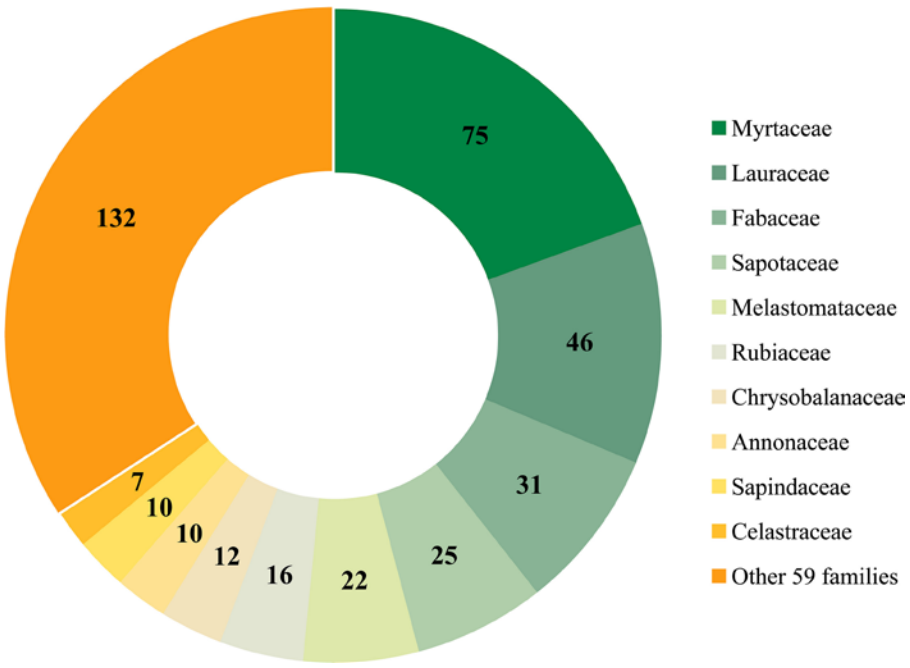

Figure 2. Number of tree species by botanical families in the entire dataset from three subsequent surveys of trees (1992–1993, 2003–2004, and 2017–2018) using permanent forest plots at the Santa Lúcia Biological Station, highlands of Espírito Santo, Brazil.

richness not reported) in a 1-ha forest plot at 1050–1100 m.a.s.l. in the rainforest of Serra do Mar, São Paulo.

The detailed verification of the arrangement of morphospecies was important to unveil misidentifications that were overlooked in previous studies. We identified two main types of misidentifications: (1) vouchers of a single species were incorrectly identified as several species; and (2) two or more morphospecies were incorrectly identified as one single species. These are prevalent errors in surveys of tropical tree communities, which can inflate the number of 'rare' and 'common' species, respectively (Dexter et al. 2010).

For example, in the first type of error, vouchers previously identified as *Mollinedia stenophylla* Perkins and *Mollinedia* aff. *engleriana* Perkins were recognized by Lírio et al. (2021) as belonging to the same new species, *Mollinedia ruschii* Lirio & Peixoto. The rearrangement of vouchers into *Myrcia plusiantha* Kiaersk., in turn, led to the removal of three undetermined morphospecies from the list. Sterile vouchers of these morphospecies were kept in the herbarium with incomplete names of three different genera (*Calyptranthes* sp., *Marlierea* sp., and *Myrcia* sp.) due to supposed differences in leaf characteristics. However, such differences seemed to be gradual when the entire set

Table 2. Thirty-four tree species described from vouchers collected in permanent plots or in the vicinities of the Santa Lúcia Biological Station, highlands of Espírito Santo, Brazil.

New Tree Species	References
Guatteria capixabae Lobão & J.C. Lopes	Phytotaxa 167(2): 205–208 (2014)
Pseudoxandra spiritus-sancti Maas	Blumea 48(2): 249 (2003)
Unonopsis sanctae-teresae Maas & Westra	Blumea 52(3): 521 (2007)
Xylopia decorticans D.M. Johnson & Lobão	Contr. Univ. Michigan Herb. 25: 208 (2007)
Rauvolfia capixabae I. Koch & Kin.-Gouv.	Novon 17(4): 462 (2007)
Schefflera grandigemma Fiaschi	Kew Bulletin 60(1): 78 (2005)
Schefflera kollmannii Fiaschi	Kew Bulletin 60(1): 81 (2005)
Schefflera ruschiana Fiaschi & Pirani	Kew Bulletin 60(1): 83 (2005)
Vernonanthura spathulata M. Monge & Semir	Rodriguésia 69(2): 595–610 (2018)
Salacia nemorosa Lombardi	Novon 14(3): 319 (2004)
Cryptocarya velloziana P.L.R. de Moraes	Taxon. Cryptocarya Spec. Brazil 118 (2007)
Mezilaurus glabriantha F.M. Alves & V.C. Souza	Brittonia 64(3): 257 (2012)
Ocotea cryptocarpa Baitello	Acta Bot. Brasil. 15(3): 446 (2001)
Ocotea pluridomatiata Quinet	Rodriguésia 59(2): 339 (2008)
Miconia capixaba R. Goldenb.	Novon 9(4): 514 (1999)
Miconia dorsaliporosa R. Goldenb. & Reginato	J. Torrey Bot. Soc. 136: 293–301 (2009)
Miconia goldenbergiana Caddah	Phytotaxa 356: 167–173 (2018)
Mollinedia dolichotricha Lírio & Peixoto	Phytotaxa 239: 89–95 (2015)
Mollinedia pignallii Lírio & Pauli	Acta Bot. Brasil. 37: e20230174 (2023)
Mollinedia ruschii Lirio & Peixoto	Pl. Ecol. Evol. 154(1): 151 (2021)
Eugenia goiapabana Sobral & Mazine	Novon 20(3): 348 (2010)
Eugenia rugosissima Sobral	Bol. Mus. Biol. Mello Leitão. Nova Sér. 20: 74 (2006)
Eugenia sudestis Sobral	Phytotaxa 382 (2): 224 (2018)
Eugenia valsuganana Sobral	J. Bot. Res. Inst. Texas 4(1): 136 (2010)
Myrcia basicordata Sobral	Phytotaxa 135: 54 (2013)
Myrcia espiritosantensis B.S. Amorim	Phytotaxa 272(4): 288 (2016)
Myrcia fria Sobral	Phytotaxa 307(4): 240 (2017)
Myrcia santalucia (Sobral) A.R. Lourenço & E. Lucas	Phytotaxa 373: 81 (2018)
Elvasia capixaba Fraga & Saavedra	Novon 16(4): 477 (2006)
Meliosma chartacea Lombardi	Novon 19(1): 63 (2009)
Casearia valenciana R. Marquete & R.B. Torres	Rodriguésia 73: e00782021 (2022)
Chrysophyllum lancisepalum R. Lima	Phytotaxa 478(1): 131–140 (2021)
Pouteria samborae Alves-Araújo & Mônico	Systematic Botany 42(2): 358–363 (2017)
Vochysia santaluciae M.C. Vianna & Fontella	Bol. Mus. Nac. Rio de Janeiro Bot. 117: 1 (2002)

of vouchers was analyzed, including some collected outside the SLBS and with determination confirmed by taxonomists. Conversely, we observed examples of the second type of error in vouchers of *Miconia budlejoides* Triana that were segregated between *Miconia formosa* Cogn. and *Miconia goldenbergiana* Caddah, the latter being a recently described new species (Caddah & Meirelles 2018). We also segregated the vouchers of *Myrcia morroqueimadensis* Kiaersk among those of one of the undetermined morphospecies characterized as *Myrcia* sp.

It was a positive surprise the fact that since the first survey, 34 new tree species have been described with the support of vouchers collected in the permanent plots or in their vicinities within the SLBS (see Table 2). Species described with the support of vouchers from other forest sites in the region of Santa Teresa were also recorded in plots. This applies to *Humiriastrum spiritu-sancti* Cuatrec., *Ixora grazielae* Di Maio & Peixoto, *Myrcia crassa* Sobral, *Sloanea fasciculata* D. Sampaio & Souza, and *Williamodendron cinnamomeum* van der Werff. As many of these new species occur exclusively in the highlands of Espírito Santo, this work emphasizes the high levels of endemism in the region, as reported in other studies (e.g. Werneck et al. 2011, Araújo et al. 2021).

As for species threatened with extinction, 47 monitored tree species are included in the list of threatened flora in the state of Espírito Santo (Fraga et al. 2019), categorized as follows: VU (18), EN (24), and CR (5). In the CNCFlora Red List (CNCFlora 2023), 48 monitored tree species are categorized as: VU (7), EN (34), and CR (7). Similarly, the IUCN Red List of Threatened Species (IUCN 2024) revealed that 48 monitored tree species are threatened: VU (14), EN (26), and CR (8). Thus, we counted 88 monitored species (about 23% of the total) that were assigned to a threat category in at least one of the consulted lists of threatened species (see the 'Conservation status' column in Table 1), some of them iconic species of the Atlantic Forest, such as the palm *Euterpe edulis* and the timber wood species *Melanoxylon brauna* Schott*, Ocotea odorifera* (Vell.) Rohwer*, Diplotropis incexis* Rizzini & A. Mattos, and *Manilkara longifolia* (A. DC.) Dubard. The high number of threatened species reported here provides crucial information for conservation management in the Brazilian Atlantic Forest, positioning SLBS as a refuge for endemic and threatened species within a region defined by MMA (2021) as of very high priority for biodiversity conservation in the biome. This is noteworthy, given that SLBS has less than 500 ha and is not officially recognized as a Nature Conservation Unit in Brazil.

The recalculated species richness, diversity, and evenness in each survey are presented in Table 3. Although the pairwise differences between *H′* values were not significant in the Hutcheson's t-test, richness decreased by 2%. In fact, the expected pattern for an undisturbed tropical forest like that of SLBS would be an increase in, or at least the maintenance of, species richness, diversity and evenness over time (Shima et al. 2018). As diversity and evenness depend on species richness and abundance, such a long-term pattern has been attributed to nonrandom mortality and recruitment processes that enhance the survival of rare species and reduce the dominance of common species (Wills et al 2006, Shima et al. 2018). Thus, the slight, non-significant loss of species and diversity may be a temporary effect of natural fluctuations in the populations of some tree species.

Nevertheless, it must be noted that changes in the ecosystem functioning (i.e., increases in tree mortality and decreases in carbon stock) have been observed in some forests in southeastern Brazil as a result of atmospheric enrichment with CO_2 and extreme climatic events characterized by high temperatures and drought (Maia et al. 2020, Rocha et al. 2020). Therefore, we recognize that analyzing possible changes in richness, diversity, and evenness over time in the monitored forest was beyond the scope of this study. Certainly, future studies will be able to address this with the support of continued monitoring and the use of appropriate methods, thereby confirming or not the expected trend of stability in richness and diversity.

Table 3. Richness (number of species), Shannon diversity index (*H′*), and Pielou's evenness (*J*) in three surveys of trees using permanent forest plots at the Santa Lúcia Biological Station, highlands of Espírito Santo, Brazil. S1, first survey (1992–1993); S2, second survey (2003–2004); S3, third survey (2017–2018).

Survey	Richness	*H′*	*J*
S1 (1992–1993)	365	5.23	0.89
S2 (2003–2004)	363	5.18	0.88
S3 (2017–2018)	358	5.18	0.88

Conclusion

The results presented here have revealed that the updated list of tree species monitored at SLBS is not only a relevant reference about a forest with high diversity and endemism in Brazil but also a testimony of one of the most important initiatives for advancing knowledge on the Atlantic Forest flora. Despite all the technical and financial challenges faced over time, the monitoring has been carried out with relative success, due to the support from INMA and dedication of many researchers.

However, it must be emphasized that new efforts will be required to refine the list. The absence of fertile vouchers for all morphospecies remains the main obstacle and we noted cases where vegetative vouchers from potential new species persist for years as the only representative materials. To achieve such refinement, we could suggest two strategies. The first would be establishing and sustaining a permanent field team dedicated to monitoring the reproductive cycles of species, collecting vouchers, and carrying out fieldwork. The second would be to intensify the taxonomic analysis of both old and new vouchers. Additionally, we recommend creating a digital catalog with high-resolution images and morphometric data of branches, leaves, bark, flowers, and fruits, to facilitate the identification of species reliably, even in the case of vegetative samples.

Finally, we also argue that it is absolutely necessary to investigate the status of threatened species populations in the face of their potential risk of decline. This research focus will be a fundamental contribution of the SLBS monitoring program to the conservation of plant species in the Atlantic Forest biodiversity hotspot.

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Conflicts of Interest

The authors declare no conflicts of interest.

Ethics

This study did not involve human subjects or clinical trials, which require authorization by an Institutional Committee.

Data Availability

The complete dataset of the tree monitoring is available at https://doi.org/10.6084/m9.figshare.26279350.

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