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Flora of Baturité, Ceará: a Wet Island in the Brazilian Semiarid

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Abstract

The biota of the humid mountain ranges of the Brazilian semiarid is still poorly understood. In order to fill this scientific gap, we carried out an extensive survey along altitudinal ranges (400m – 1,000 m) on both the windward and the leeward slopes of the Baturité Mountain Range, in the state of Ceará state. We registered 400 plant species and 92 families. The Myrtaceae (36 spp.), Fabaceae (25 spp.), Rubiaceae (20 spp.) and Bromeliaceae (15 spp.) families predominated on the windward slope; while Fabaceae (19 spp.), Myrtaceae (14 spp.) and Euphorbiaceae (11 spp.) were the most abundant on the leeward slope. As we expected, the species richness of trees, shrubs, subshrubs, epiphytes and terrestrial herbs was positively correlated with the altitude ($R^2 > 0.60$). Above 800 m, we registered 273 species exclusive to the windward slope, 81 exclusive to the leeward slope, and 46 shared species. Therefore, management actions must consider the spatial heterogeneity, distribution and taxa richness.

Keywords: Deciduous Tropical Forest, Evergreen Tropical Forest, Semideciduous Tropical Forest, Steppic Savanna.

1. INTRODUCTION AND OBJECTIVES

The mountain ranges in the semiarid domain of Northeastern Brazil stand out from the surrounding flattened landscape expressing a climatic exception (Mantovani et al., 2017; Moro et al., 2015). They occupy approximately 5% of the northeastern surface, being scattered throughout the states of Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Alagoas and Bahia (Souza & Oliveira, 2006). On windward slopes and at higher altitudes, the climate is cooler and wetter, whereas drier climates occur on leeward slopes and at lower altitudes (Nimer, 1989). This climatic variation leads to a spatially heterogeneous flora along the altitudinal gradient, consequently increasing the local species richness (Ferraz & Rodal, 2006; Homeier et al., 2010).

Evergreen and Semideciduous Forests have been commonly reported along this altitudinal gradient (Rodal & Sales, 2008;

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Silva & Figueiredo, 2013). Since this flora is a remnant of the Brazilian Atlantic Rain Forest (Barbosa et al., 2004), these mountain ranges have been considered a priority for the conservation of Brazilian biodiversity (Lopes et al., 2017; MMA, 2000). Especially in the Brazilian Northeast, the mountainous areas are critically important for the preservation of regional ecosystems, because they represent natural refuges for biota (Silva et al., 2014).

Thirty-five percent (35%) of the mountain ranges are located within Ceará State (Sobrinho, 1971), but information on its biota composition is still incipient (Bétard et al., 2007; Kamimura et al., 2017; Lima & Mansano, 2011). Plant cover and soils of most local wetlands have suffered from intensive and chronic anthropogenic disturbances (Souza & Oliveira, 2006). Therefore, reports on floristic composition are crucial for implementing sustainable use actions, since the biodiversity degradation on the Baturité Mountain Range has been happening since the colonial period (Mantovani, 2006; Oliveira et al., 2006). Our study shows the need for registering, cataloguing and presenting the biodiversity of such peculiar environments. Thus, we aim to analyze the plant composition and species richness along the altitudinal gradient on the windward and leeward slopes of Baturité Mountain Range, in Ceará State. We also intend to spread information on the local flora and on the protected areas of Northeastern Brazil.

2. MATERIALS AND METHODS

2.1. Study site

The Baturité Mountain Range is a residual relief with an extension of 800 km^2 and moderate altitudes (800 – 1,115 m). It is a Precambrian crystalline complex located in the northeast of Ceará State, 70 km from the coast (Bétard et al., 2007; Souza & Oliveira, 2006). From the elevation of 600 m up, the mountain range is a strict protected area, the APA de Baturité. The first protected area was established by state law no. 20,956, on September 18, 1990, which was later altered by state law no. 27,290, on December 15, 2003. Currently, it encompasses 32,690 hectares.

Both the altitude and the geographical position favor an orographic effect at the top and on the windward slope (north-eastward) of the mountain, whereby a humidity of > 1,000 mm × year^{-1} is carried by South Atlantic trade winds. On the leeward slope (westward), the precipitation is below 1,000 mm × year^{-1} (Mantovani, 2006; Santos et al., 2012; Souza & Oliveira, 2006). In order to register the local species composition and richness, we selected three well-conserved areas on each slope, at the following altitudinal ranges: 400 – 600 m a.s.l., 600 – 800 m a.s.l. and above 800 m a.s.l. We chose these areas in order to comprise the climatic and physiognomic variations along the altitudinal range on both slopes (Table 1).

Table 1. Location and characterization of the studied areas on the Baturité Mountain Range, Ceará State, Brazil.

Location – municipality – coordinates	Vegetation* – altitude – slope – precipitation	Soil type (Oliveira et al., 2006)	Species richness per GF**
Salva-Vidas Guaramiranga 4° 15' 32" S 38° 58' 1,3" W	FSS – SDSF 400 – 600 m Leeward 608 mm	Cambic eutrophic red argisol	tre = 29; shr = 16; subshr = 01; vi = 01; th = 01; eh = 01; hm = 00
Jardim Mulungu 4° 17' 10" S 39° 00' 3,8" W	SDMF 600 – 800 m Leeward 1,130 mm	Abruptic eutrophic yellow argisol	tre = 66; shr = 19; subshr = 04; vi = 02; th = 10; eh = 00; hm = 00
Lagoa Guaramiranga 4° 12' 21" S 38° 58' 16" W	SEMF > 800 m Leeward 1,646 mm	Humic sandy soil	tree = 105; shr = 30; subshr = 04; vi = 06; th = 19; eh = 14; hm = 01
Arvoredo Guaramiranga 4° 13' 50" S 38° 55' 54" W	SEMF > 800 m Windward 1,646 mm	Dystrophic yellow Argisol	tre = 84; shr = 28; subshr = 05; vi = 00; th = 20; eh = 10; hm = 00
Sinimbu Guaramiranga 4° 17' 49" S 38° 55' 59" W	SEMF 600 – 800 m Windward 1,471 mm	Dystrophic yellow latosol	tre = 74; shr = 21; subshr = 00; vi = 08; th = 15; eh = 06; hm = 02
Taveiras Baturité 4° 17' 54" S 38° 55' 10" W	SSSF 400 – 600 m Windward 1,079 mm	Typical dystrophic haplic Tb Cambisol	tre = 77; shr = 14; subshr = 01; vi = 00; th = 05; eh = 05; hm = 03

* FSS: Forested Steppic Savanna "caatinga"; SDSF: Seasonal Deciduous Submountain Forest "dry forest"; SDMF: Seasonal Deciduous Mountain Forest "dry forest"; SEMF: Seasonal Evergreen Mountain Forest "humid mountain forest"; SSSF: Seasonal Semidecidous Submountain Forest "humid mountain forest" (according IBGE, 2012). ** GF: growth form; tre: tree; shr: shrub; subshr: subshrub; vi: vine; th: terrestrial herb; eh: epiphytic herb; hm: hemiparasite.

The Forested Steppic Savanna (FSS; "Caatinga") is composed of a thorny deciduous vegetation, predominant at lower altitudes. Along the altitudinal range, the FSS is gradually replaced by a forest vegetation along the altitudinal range. On the windward slope, there are: i) a Seasonal Semidecidous Submountain Forest (SSSF) 400 – 600 m; and ii) a Seasonal Evergreen Mountain Forest (SEMF) above 600 m. On the leeward slope, there are: i) a transition from the FSS to the SDSF (Seasonal Deciduous Submountain Forest) 400 – 600 m; ii) a Seasonal Deciduous Mountain Forest (SDMF) 600 – 800 m; and iii) a Seasonal Evergreen Mountain Forest (SEMF) above 800 m (see Table 1).

2.2. Data collection

In order to list the plants, we sampled 200 quadrants in each of the six areas, according to the procedures suggested by Araújo et al. (2006). In addition, we completed our list researching the samples of the EAC Herbarium of the Universidade Federal do Ceará. We also revised and updated the taxonomic identifications with the aid of specialists from the following herbaria: EAC, PEUFR, IPA and CEPEC. The taxonomic classification that we used follows the APG IV system (2016). The names of botanical families, genera, species and authorships were confirmed in the International Plant Names Index (Royal Botanic Gardens, Kew et al., 2015) and in the list of Brazilian Flora 2020 (JBRJ, 2016).

To categorize the vegetation physiognomy, we used Whittaker's classification of plant growth forms (1975). The growth forms are adequate indicators of communities, since they can reflect global and local climatic conditions. We adjusted Whittaker's (1975) system as following: i) trees: > 3 m-height woody plants; ii) shrubs: > 3 m-height woody plants with main branches developing at approximately 50 cm above ground; iii) subshrubs: < 2 m-height plants with a woody main stem and herbaceous secondary branching; iv) terrestrial herbs: land plants with herbaceous aerial stems; v) epiphytes: plants with herbaceous stems that use other plants as support; vi) vines: plants with prolonged stems that twine around a substrate; and vii) hemiparasites: photosynthetic plants that withdraw sap from their host plants.

We obtained precipitation data from the Fundação Cearense de Meteorologia e Recursos Hídricos (FUNCEME, 2017), at the following local stations, close to our studied areas: Baturité-n22, Pacoti-n105, Guaramiranga-54, Mulungu-n98 and Caridade-n31. Data showed a seasonal rainfall regime with precipitation concentrated from January to May, driven by the Intertropical Convergence Zone. However, stations located at distinct altitudes and different mountain slopes showed remarkable differences in the annual rainfall regime. Greater precipitation was found in the northeastern slope and at higher portions of the mountain range. The soil classification of the studied areas followed that of Oliveira et al. (2006). Altitudinal ranges and coordinates were measured in the field with a GPS navigation device (Table 1).

2.3. Data analysis

We organized our list by family, species, vernacular name, growth form, altitudinal range, phytophysiognomy and collector number. Samples are deposited at EAC. We estimated the global richness, as well as the richness at family and species levels, and by phytophysiognomy. We analyzed the relationship between species richness, growth form (dependent variable), and altitude (independent or predictive variable) through a simple linear regression using the Bioestat 5.0 Software (Ayres et al., 2007)

3. RESULTS AND DISCUSSION

We registered 400 morphospecies distributed within 92 families. A total of 23 taxa (13%) were identified only to the genus due to the lack of or inadequacy of reproductive organs. The families with greatest species richness were Myrtaceae (43 spp.), Fabaceae (38 spp.), Euphorbiaceae (21 spp.), Rubiaceae (20 spp.), Melastomataceae (14 spp.), and Bromeliaceae, Erythroxylaceae and Orchidaceae, with 10 species each (Appendix A). The high richness of vascular plants confirms the documented pattern for mountainous areas of the Brazilian semiarid: they are more diverse than the surrounding Caatinga, since they contain a mix of Caatinga and Atlantic Forest species (Carnaval et al., 2009; Leite et al., 2016; Lopes et al., 2017). In addition, the richness of 400 species of vascular plants, found on the Baturité Mountain Range, is higher than the species richness registered for other similar Brazilian forests, e.g., Pau-Ferro Ecological Reserve, with 309 species, in Paraíba State (Barbosa et al., 2004), Brejo Madre de Deus, with 293 species, in Pernambuco State (Nascimento et al., 2012) and Meruoca Sierra, with 100 species, in Ceará State (Silva & Figueiredo, 2013), highlighting the importance of this montane forests for the conservation of tropical biodiversity.

Our results show that the richness increases towards the top of the mountain, and that it is greater on the windward slope at the Evergreen Forest. We registered a total of 255 species (64%) and 69 families (75%) at higher altitudes, above 800 m in the Baturité Mountain Range – joined data from Arvoredo and Lagoa sites. On the windward slope, below 800 m—on Sinimbu and Taveiras sites together—, we registered 175 species (44%) and 62 families (67%); whereas, on the leeward slope,

below 800 m—on Jardim and Salva-Vidas sites together—, we registered 127 species (32%) and 50 families (54%) (Appendix A). Such differences reflect the combined effects of ocean winds, altitudinal variation and position of the slope. These results also corroborate the pattern documented by Lopes et al. (2008), Lima et al. (2011), Kamimura et al., (2017) and BFG (2015), that indicates dry forests have significantly less species and families compared to humid-forests.

In the Seasonal Evergreen Forest located both on the windward and leeward slopes—above 600 m and 800 m, respectively (Table 1)—, the most diverse families were Myrtaceae (36 spp.), Fabaceae (25 spp.), Rubiaceae (20 spp.), Bromeliaceae (15 spp.), Melastomataceae (14 spp.), Euphorbiaceae (13 spp.) and Orchidaceae (10 spp.). On the leeward slope, where a Seasonal Deciduous Forest and a Forested Steppic Savanna predominate, Fabaceae (19 spp.), Myrtaceae (14 spp.) and Euphorbiaceae (11 spp.) were the most diverse families. In the Fabaceae family, the subfamilies presented distinct species richness on windward and leeward slopes. In the former, Mimosoideae (8 spp.) and Faboideae (7 spp.) predominated, whereas in the latter the most representative were Mimosoideae (13 spp.) and Caesalpinioideae (11 spp.).

In the Baturité Mountain Range leeward slope, where Deciduous Forests and Forested Savannas were the most representative (see Alcoforado-Filho et al., 2003; Cestaro & Soares, 2004; Ferraz et al., 2004), the subfamilies Mimosoideae and Caesalpinioideae, predominated. Even though Myrtaceae was among the most diverse families on the leeward slope, its richness was higher on the windward slope. Furthermore, most of its species (84%) occur above 600 m, indicating that the richness of Myrtaceae in the Brazilian semiarid is more associated with areas with higher water availability than with the surrounding Caatinga. The area of occurrence of Myrtaceae in the Evergreen Forest, both on the windward and on the leeward slopes, above 600 m and 800 m, respectively, confirms the pattern reported by Peixoto & Gentry (1990), also observed in the Atlantic Domain as a whole. Furthermore, Myrtaceae, Fabaceae, Rubiaceae, Bromeliaceae, Melastomataceae, Euphorbiaceae and Orchidaceae are abundant in Tropical Rainforests as well, including lowland and highland Seasonal Evergreen Forests in the States of Pernambuco and Paraíba (Rodal & Nascimento, 2002; Andrade & Rodal, 2004; Barbosa et al., 2004; Ferraz & Rodal, 2006; Nascimento et al., 2012; Rodal & Sales, 2008). Species and family similarities to this type of forest are likely associated with water availability on the soil, from rainfall or dew.

Aspidosperma pyrifolium Mart., *Bauhinia cheilantha* (Bong.) Steud., *Cordia glazioviana* (Taub.) Gottschling & J. S. Mill., *Croton blanchetianus* Baill., and *Mimosa caesalpiniifolia* Benth. occurred below 600 m on the windward slope. These taxa are commonly found in the Caatinga. Some species are strictly distributed in wetter areas, above 800 m on the windward slope and above 600 m on the leeward slope, such as: *Albizia polycephala* (Benth.) Killip ex Record, *Apeiba tibourbou* Aubl., *Byrsonima crispa* A. Juss., *Cassia ferruginea* (Schrad.) Schrad. ex DC. var. *ferruginea*, *Cupania racemosa* (Vell.) Radlk., *Guazuma ulmifolia* Lam., *Inga marginata* Willd., *Myrciaria ferruginea* O.Berg, *Ouratea polygyna* Engl., *Podocarpus sellowii* Klotzsch ex. Endl., *Pouteria macrophylla* (Lam.) Eyma, *Vismia guianensis* (Aubl.) Choisy and *Zanthoxylum rhoifolium* Lam. We note that *Podocarpus sellowii* was found at one collecting site only (Arvoredo). At lower altitudes of the windward slope, some exclusive species occurred, such as: *Alchornea glandulosa* subsp. *iricurana* (Casar.) Secco, *Attalea speciosa* Mart. ex Spreng., *Casearia grandiflora* Cambess., *Chrysophyllum gonocarpus* (Mart. & Eichler ex Miq.) Engl., *Coccoloba parimensis* Benth., *Coussarea contracta* (Walp.) Müll.Arg. var. *contracta*, *Oreopanax capitatus* (Jacq.) Decne. & Planch., *Parkia pendula* (Willd.) Benth. ex Walp., *Protium warmingianum* Marchand., *Pseudobombax marginatum* (A.St.-Hil.) A. Robyns and *Zizyphus undulata* Reissek.

Concerning growth forms, the studied flora was composed of 214 trees (54%), 82 shrubs, 49 terrestrial herbs, 23 epiphytic herbs, 18 vines, 10 subshrubs and 4 hemiparasites. There was a positive correlation between altitude and richness of trees, shrubs, subshrubs, epiphytic herbs and terrestrial herbs ($R^2 > 0.60$ and $p < 0.05$). However, for vines and hemiparasites, the correlation was not statistically significant (Figure 1). The richness of tree species is one of the most striking characteristics of the Tropical Forest typologies, a pattern documented in other Brazilian Atlantic forests (BFG, 2015; Nascimento et al., 2012).

The species richness and composition found in our study showed that, on the windward slope above 600 m, and on the leeward slope above 800 m, the flora is more similar. In contrast, below these altitudinal levels, on both slopes, the flora differed. The positive correlation between diversity and altitude is likely a response to greater water availability in higher elevations of the altitudinal gradient. The mountains of Northeastern Brazil are relatively low, with some altitudes of approximately 1,000 m a.s.l. However, they have a more favorable water balance, milder temperatures, and lower rates of evapotranspiration and evening condensation than the lower area of the countryside depression (Mantovani et al., 2017; Moro et al., 2015; Souza & Oliveira, 2006). This may explain why the plant species richness in the semiarid domain of Northeastern Brazil increases with higher altitudes.

It is also worth mentioning that the greater richness of epiphytic herbs (18 out of 23 species) at altitudes above 800 m reflects a higher humidity. According to Gentry (1988), there is a positive correlation between diversity and

precipitation in the Neotropical Region. In addition, our results are in accordance with those found in other studies on the Mountain Forests of Pernambuco State (Ferraz et al., 1998; Ferraz et al., 2003; Rodal & Nascimento, 2002). According to Ferraz et al. (2004) and Lopes et al. (2008), under similar climatic and edaphic regimes, the Evergreen and the Semidecidous Montane Forests can be found closely associated in Northeastern Brazil, but demonstrate different floristic and structural compositions. Thus, protection efforts must contemplate both humid and dry forest areas.

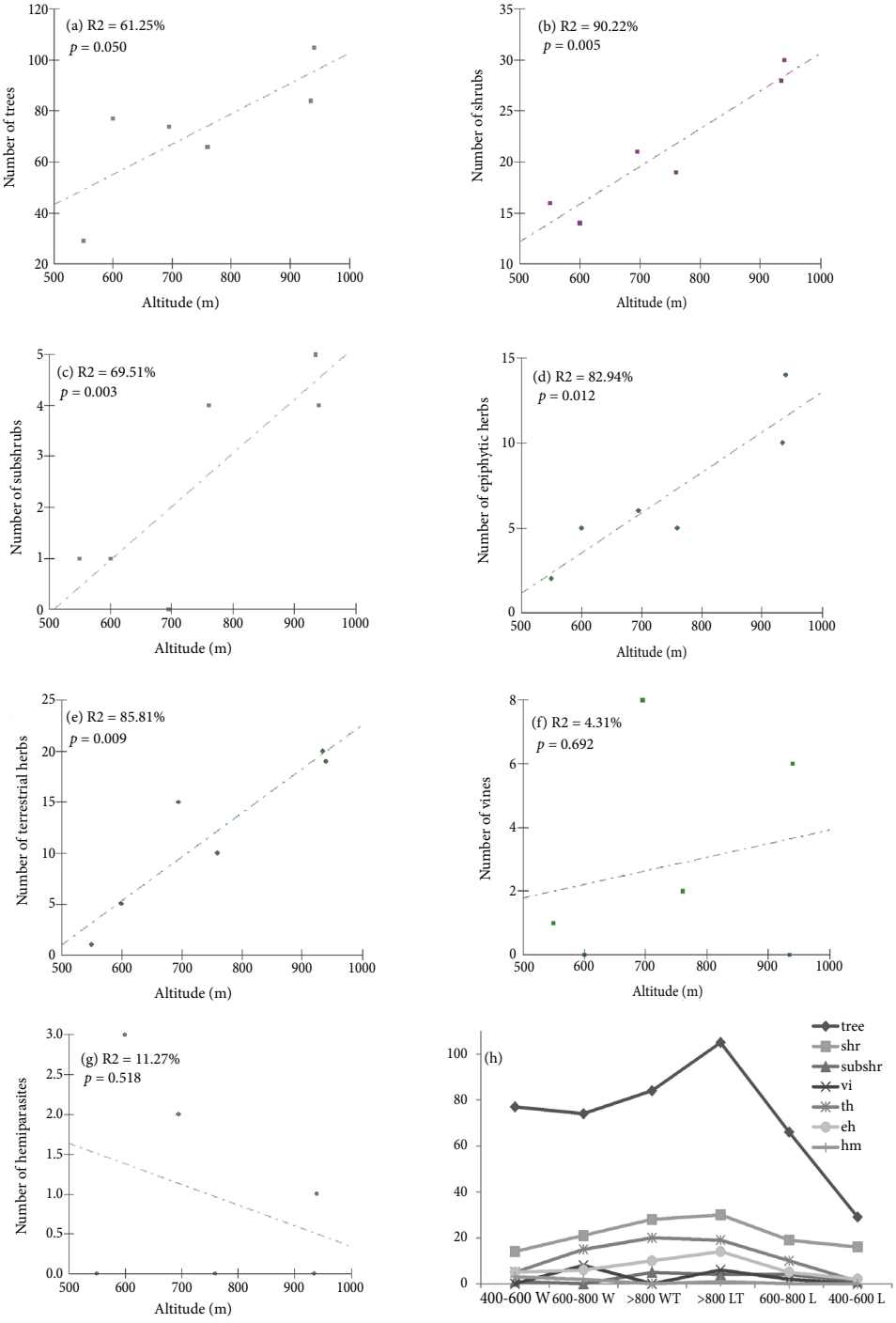

Figure 1. Linear regression of altitude and number of plants of each growth form [(a), (b), (c), (d), (e), (f), (g)] and dispersion diagrams (h) of plants.

shr: shrub; subshr: subshrub; vi: vine; th: terrestrial herb; eh: epiphytic herb; hm: hemiparasite; W: windward; L: leeward; T: top.

4. CONCLUSION

In conclusion, 273 species (68%) were found exclusively at the top of the mountain and on the windward slope; 81 species (20%) were exclusively found on the leeward slope; and 46 species (12%) were found on both slopes, with a total of 400 species on the Baturité Mountain Range, in Ceará State. Our results highlight that the management actions, the restoration of degraded areas and the establishment of integral conservation on the Baturité Mountain Range must consider the spatial heterogeneity described in our work; that is, the differential plant distribution and richness both along the altitudinal gradient and between slope positions. Adequate conservation efforts should consider the total richness and the local heterogeneity.

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Appendix A. List of families and species registered at distinct altitudinal levels on the Baturité Mountain Range, Ceará, Brazil.

WINDWARD			ALTITUDE						
			TOP		LEEWARD				
FAMILY/SPECIES/AUTHOR	VN	GF	400-600 TAV	600-800 SIN	> 800B ARV	> 800S LAG	600-800 JAR	400-600 SAL	C
1. Acanthaceae									
Dicliptera ciliaris Juss.		subshr				x			V. Gomes, 912.2
Justicia aequilabris (Nees) Lindau		subshr					x		V. Gomes, 562.2
Justicia sp.		shr						x	V. Gomes, 2109-8
Ruellia bahiensis (Nees) Morong		subshr					x		V. Gomes, 398
2. Alstroemeriaceae									
Bomarea edulis (Tussac) Herb.		th					x		V. Gomes, 1271
3. Amaranthaceae									
Alternanthera brasiliana L.		th						x	V. Gomes, 2109-1
Cyathula achyranthoides (Kunth) Moq.		th				x			V. Gomes, 737
Iresine diffusa Humb. & Bonpl. *ex* Willd.	Cabeça-branca	th				x			V. Gomes, 744
4. Amaryllidaceae									
Hippeastrum stylosum Herb.	Açucena	th		x			x		F. S. Araújo, 1612
5. Anacardiaceae									
Astronium fraxinifolium Schott	Gonçalo-alves	tre			x				M.A.Figueiredo, 18463
Myracrodruon urundeuva Allemão	Aroeira	tre						x	L.W.Lima-Verde, 3526
Thyrsodium spruceanum Benth.	Cajazeira-brava	tre	x	x	x	x			V. Gomes, 1113
6. Annonaceae									
Cymbopetalum brasiliense (Vell.) Benth. *ex* Baill.	Gitó-da-mata	shr	x	x	x	x			V. Gomes, 766
Duguetia riedeliana R.E.Fr.	Ata-brava	tre					x		V. Gomes, 936
Guatteria pogonopus Mart.	Sabonete	shr			x	x			V. Gomes, 1274
Xylopia frutescens Aubl.	Imbiriba	tre			x				A. Silveira, 470
Xylopia sericea A.St.-Hil.	Imbiriba	tre	x	x					A. Silveira, 144
7. Apocynaceae									
Aspidosperma multiflorum A.DC.	Piquiá	tre					x	x	V. Gomes, 61-3
Aspidosperma pyrifolium Mart.	Pereiro	tre						x	V. Gomes, 2109-4
Aspidosperma ulei Markgr.	Piquiá	tre						x	V. Gomes, 5-32
Blepharodon bicolor Decne.		vi		x					A. Silveira, 744
Condylocarpon isthmicum (Vell.) A.DC.		vi			x	x			V. Gomes, 1029
Macoubea sp.		vi			x				A. Silveira, 948
8. Aquifoliaceae									
Ilex sapotifolia Reissek	Pinho-branco, Pereira	tre	x	x	x	x			V. Gomes, 1011-03
9. Araceae									
Anthurium scandens (Aubl.) Engl.		eh			x	x			V. Gomes, 1129
Anthurium sinuatum Benth. *ex* Schott		th		x					V. Gomes 1205-9

Appendix A. Continued...

WINDWARD			ALTITUDE						
			TOP		LEEWARD				
FAMILY/SPECIES/AUTHOR	VN	GF	400-600 TAV	600-800 SIN	> 800B ARV	> 800S LAG	600-800 JAR	400-600 SAL	C
9. Araceae									
Monstera adansonii var. *klotzchiana* (Schott) Madison		th				x			V. Gomes, 2209-1
Monstera praetermissa E.G.Gonç. & Temponi		eh		x					V. Gomes, 780
Philodendron pedatum (Hook) Kunth		th			x				V. Gomes, 902-1
Philodendron ornatum Schott		th			x				V. Gomes, 902-2
Anthurium pentaphyllum (Aubl.) G.Don		th				x			V. Gomes, 1026
10. Araliaceae									
Oreopanax capitatus (Jacq.) Decne. & Planch.	Piroá	tre	x						V. Gomes, 2704-2
Schefflera morototoni (Aubl.) Maguire *et al.* var. *morototoni*	Gargaúba	tre	x	x		x			V. Gomes, 1003
11. Arecaceae									
Attalea speciosa Mart. *ex* Spreng.	Babaçu	tre	x						Lima, J. R., 1127
Geonoma pohliana Mart.	Palmeirinha-da-serra, Guaricana	tre		x	x	x			V. Gomes, 663
Syagrus comosa (Mart.) Mart.	Coco-babão, Catolé	tre					x	x	V. Gomes, 4-278
12. Asteraceae									
Cyrtocymura scorpioides (Lam.) H.Rob.	Assa-peixe	subshr	x						L.W. Lima-Verde, 3479-8
Gymnanthemum amygdalinum (Delile) Sch.Bip. ex Walp.	Boldo	shr			x				A. Silveira, 388
Trichogoniopsis adenantha (DC.) R.M.King & H. Rob.		th				x			A. Silveira, 969
Vernonanthura brasiliana (L.) H.Rob.	Catirina	shr			x		x		A. Silveira, 459
Wedelia alagoensis Baker	Camará-de-flecha	subshr						x	V. Gomes, 6-2
13. Balanophoraceae									
Langsdorffia hypogaea Mart.		th				x			V. Gomes, 707-1
14. Begoniaceae									
Begonia reniformis Dryand.	Begônia	th				x			A. Silveira, 300
15. Bignoniaceae									
Handroanthus impetiginosus Mattos	Pau-d'arco-roxo	tre		x		x	x		A. Silveira, 863
Handroanthus serratifolius (A.H.Gentry) S.Grose	Pau-d'arco-amarelo	tre	x	x		x			V. Gomes, 597
Jacaranda brasiliana (Lam.) Pers.	Caroba	tre	x	x	x	x			A. Silveira, 219
Lundia cordata (Vell.) DC.	Cipó-de-cesta	vi				x			A. Silveira, 295
Lundia sp.		vi		x					V. Gomes, 894
16. Bixaceae									
Cochlospermum vitifolium (Willd.) Spreng.	Pacotê	tre				x	x	x	L. W. Lima-Verde, 3515
17. Boraginaceae									
Cordia alliodora (Ruiz & Pav.) Cham.		tre					x		V. Gomes, 4-338
Cordia anabaptista Cham.	Freijó	tre				x			V. Gomes, 495
Cordia glazioviana (Taub.) Gottschling & J.S.Mill.	Pau-branco-louro	tre						x	L. W. Lima-Verde, 3492

Appendix A. Continued...

WINDWARD			ALTITUDE						
			TOP		LEEWARD				
FAMILY/SPECIES/AUTHOR	VN	GF	400-600 TAV	600-800 SIN	> 800B ARV	> 800S LAG	600-800 JAR	400-600 SAL	C
17. Boraginaceae									
Cordia rufescens A.DC.		tre				x			A. Silveira, 355
Cordia taguahyensis Vell.		tre			x	x			A. Silveira, 817
Cordia toqueve Aubl.		tre				x			V. Gomes, 1235
Cordia trichotoma (Vell.) Arráb. *ex* Steud.	Freijó	tre			x	x	X	x	A. Silveira, 1605
18. Bromeliaceae									
Aechmea aquilega (Salisb.) Griseb.	Croatá	eh	x	x	x	x	x		V. Gomes, 546
Aechmea bromeliifolia (Rudge) Baker	Croatá	eh		x	x				V. Gomes, 712
Guzmania lingulata (L.) Mez	Croatá	eh			x				A. Silveira, 1029
Guzmania monostachia (L.) Rusby *ex* Mez	Croatá	eh		x	x	x			V. Gomes, 307
Racinaea spiculosa (Griseb,) M.A.Spencer & L.B.Sm.	Croatá	eh			x				V. Gomes, 0607-15
Tillandsia juncea (Ruiz & Pav.) Poiret.	Croatá	eh				x			V. Gomes, 899
Tillandsia recurvata (L.) L.	Croatá	eh	x				x	x	V. Gomes, 2109-9
Tillandsia stricta Sol. var. *stricta*	Croatá	eh	x		x	x			V. Gomes, 2209-11
Vriesea oleosa Leme	Croatá	eh			x				V. Gomes, 726
Vriesea rodigasiana E. Morren	Croatá	eh				x			V. Gomes, 376
19. Burseraceae									
Commiphora leptophloeos (Mart.) J. B. Gillett	Imburana	tre					x	x	A. Silveira, 947
Protium heptaphyllum (Aubl.) Marchand subsp. *heptaphyllum*	Almécega	tre	x	x	x				V. Gomes, 1120
Protium warmingianum Marchand.	Almécega	tre		x					V. Gomes, 887
20. Cactaceae									
Cereus jamacaru DC. subsp. *jamacaru*	Cardeiro, Mandacaru	shr					x	x	V. Gomes, 4-399
Epiphyllum phyllanthus (L.) Haw.		eh				x			V. Gomes, 625
Hylocereus setaceus (Salm – Dyck) R. Bauer		vi					x		Lima-Verde, 3472
Pereskia aculeata Mill.		vi				x			Lima-Verde, 3596
Pilosocereus catingicola subsp. *salvadorensis* (Werderm.) Zappi	Cardeiro	shr						x	V. Gomes, 5-277
Rhipsalis baccifera (J.M.Muell.) Stearn. subsp. *baccifera*	Chororongo	eh		x		x			A.Silveira, 406
21. Capparaceae									
Cynophalla flexuosa (L.) J.Presl.	Feijão-bravo	tre					x	x	V. Gomes, 1160
22. Caricaceae									
Jacaratia spinosa (Aubl.) A.DC.	Jacaratiá	tre	x			x			A. Castro, 30996
23. Celastraceae									
Maytenus distichophylla Mart. *ex* Reissek	Folha-dura	tre					x		V. Gomes, 442
Maytenus erythroxyla Reissek	Jerimum	tre		x		x	x		A. Silveira, 851
Maytenus gonoclada Mart.	Folha-dura	tre					x		V. Gomes, 912
Maytenus impressa Reissek		tre	x			x	x		V. Gomes, 2009

Appendix A. Continued...

FAMILY/SPECIES/AUTHOR	VN	GF	ALTITUDE						C
			TOP		LEEWARD				
			400-600 TAV	600-800 SIN	> 800B ARV	> 800S LAG	600-800 JAR	400-600 SAL	
23. Celastraceae									
Maytenus obtusifolia Mart.	Jerimum	tre	x	x	x	x	x		V. Gomes, 2704-5
Maytenus schumanniana Loes.	Jerimum	tre			x				V. Gomes, 1-273
Maytenus sp.		tre	x			x			
24. Chrysobalanaceae									
Hirtella racemosa var. *hexandra* (Willd. *ex* Roem. & Schult.) Prance		shr		x		x			V. Gomes, 779
Licania sp.		tre					x		V. Gomes, 924
25. Clusiaceae									
Clusia dardanoi G.Mariz & Maguire	Gitó-da-mata	tre				x	x		V. Gomes, 1144
Clusia nemorosa G.Mey.	Orelha-de-burro	tre	x	x	x	x			A. Silveira, 815
Garcinia gardneriana (Planch. & Triana) Zappi	Bacupari	tre	x	x	x	x			V. Gomes, 1014
26. Combretaceae									
Buchenavia tetraphylla (Aubl.) R.A.Howard.	Amarelão	tre		x	x	x	x		A. Silveira, 182
27. Commelinaceae									
Aneilema brasiliense C.B.Clarke		th					x		V. Gomes, 1305-9
Commelina benghalensis L.		th		x	x				V. Gomes, 665
Dichorisandra hexandra (Aubl.) Kuntze *ex* Hand.-Mazz.		th					x		V. Gomes, 1270
28. Costaceae									
Costus spiralis (Jacq.) Roscoe		th	x	x	x	x			V. Gomes, 666
29. Cyperaceae									
Becquerelia cymosa Brongn.		th			x				V. Gomes, 798
Cyperus cf. ligularis L.		th		x					V. Gomes, 719
Rhynchospora cephalotes (L.) Vahl		th		x					V. Gomes, 336
Scleria latifolia Sw.		th			x				A. Silveira, 78
30. Dilleniaceae									
Doliocarpus dentatus (Aubl.) Standl. subsp. *dentatus*		vi		x					V. Gomes, 776
31. Elaeocarpaceae									
Sloanea garckeana K.Schum.		shr		x					V. Gomes, 883
32. Erythroxylaceae									
Erythroxylum affine A.St.-Hil.		tre	x			x			A. Silveira, 809
Erythroxylum citrifolium A. St.-Hil.		tre		x	x	x			A. Silveira, 418
Erythroxylum macrochaetum Miq.	Café-bravo	shr				x			V. Gomes, 1002-1
Erythroxylum mucronatum Benth.		tre	x	x	x	x			V. Gomes, 112
Erythroxylum pulchrum A.St.-Hil.		tre					x		V. Gomes, 1093
Erythroxylum simonis Plowman		shr				x			V. Gomes, 1095

Appendix A. Continued...

WINDWARD			ALTITUDE						
			TOP		LEEWARD				
FAMILY/SPECIES/AUTHOR	VN	GF	400-600 TAV	600-800 SIN	> 800B ARV	> 800S LAG	600-800 JAR	400-600 SAL	C
32. Erythroxylaceae									
Erythroxylum squamatum Sw.		shr		x	x				A. Silveira, 111
Erythroxylum subrotundum A.St.-Hil.		shr					x		V. Gomes, 209-6
Erythroxylum tenue Plowman		shr				x			A. Silveira, 317
Erythroxylum sp.1		shr					x		A. Silveira, 923
33. Euphorbiaceae									
Acalypha sp.		shr				x			V. Gomes, 739
Acalypha villosa Jacq.		shr			x				A. Silveira, 427
Actinostemon concolor (Spreng.) Müll. Arg.		tre				x			A. Silveira, 807
Actinostemon klotzschii (Didr.) Pax		shr					x		A. Silveira, 580
Actinostemon verticillatus (Klotzsch) Baill.		shr					x		A. Silveira, 549
Alchornea glandulosa subsp. *iricurana* (Casar.) Secco	Murici-de-jacu, Sabiá-timbú	tre		x					A. Silveira, 891
Aparisthmium cordatum (A.Juss.) Baill.	Piroá	tre			x				V. Gomes, 774
Bernardia tamanduana (Baill.) Müll. Arg.		shr				x			V. Gomes, 738
Croton argyroglossus Baill.	Marmeleiro	tre					x	x	V. Gomes, 698
Croton blanchetianus Baill.	Marmeleiro-preto	tre					x	x	V. Gomes 1102-4
Croton floribundus Spreng.	Marmeleiro-da-serra	tre		x	x				A. Silveira, 739
Croton sp. 1	Marmeleiro-da-serra	tre	x	x	x				V. Gomes, 1138
Croton sp. 2	Marmeleiro	shr						x	V. Gomes, 1-3
Hieronyma oblonga (Tul.) Müll Arg.	Sabiá-da-mata	tre		x	x				A. Silveira, 442
Jatropha mollissima (Pohl) Baill.	Pinhão-bravo	shr					x	x	A. Silveira, 611
Manihot carthaginensis subsp. *glaziovii* (Müll Arg.) Allem.		tre	x		x	x	x	x	A. Silveira, 873
Sapium obovatum Klotzsch ex Müll. Arg.	Burra-leitera	tre				x	x		A. Silveira, 854
Sebastiania commersoniana (Baill.) L.B.Sm. & Downs		shr					x		V. Gomes, 0404-1
Sebastiania jacobinensis (Müll.Arg.) Müll.Arg.	Pau-de-leite	tre					x		A. Silveira, 849
Sebastiania macrocarpa Müll.Arg.		shr	x				x	x	V. Gomes, 2009-5
Tragia volubilis L.		vi				x			A. Silveira, 742
34. Fabaceae									
34.1 Caesalpinioideae									
Bauhinia cf. *cheilantha* (Bong.) Steud.	Mororó, Capa-bode	shr						x	V. Gomes, 402
Bauhinia sp.	Capa-bode	shr	x				x		V. Gomes, 5-217
Cassia ferruginea (Schrad.) Schrad. *ex* DC. var. *ferruginea*		tre			x				M.A.Figueiredo, 15951
Cassia grandis L. f.		tre			x				M. A. Figueiredo, 11711
Chamaecrista duckeana (P. Bezerra & Afr. Fern.) H.S. Irwin & Barneby	Canafístula-brava	th				x			V. Gomes, 548

Appendix A. Continued...

FAMILY/SPECIES/AUTHOR	VN	GF	WINDWARD ALTITUDE TOP 400-600 TAV	WINDWARD ALTITUDE TOP 600-800 SIN	LEEWARD ALTITUDE > 800B ARV	LEEWARD ALTITUDE > 800S LAG	LEEWARD ALTITUDE 600-800 JAR	LEEWARD ALTITUDE 400-600 SAL	C
34.1 Caesalpinioideae									
Chamaecrista zygophylloides var. colligans (H.S.Irwin & Barneby) H.S.Irwin & Barneby		shr					x	x	J.R.Lima, 862
Chamaecrista sp.		subshr					x		A. Silveira, 943
Copaifera langsdorffii Desf.	Pau-d'óleo	tre	x	x	x	x			A. Silveira, 884
Hymenaea eriogyne Benth.	Jatobá	tre	x			x			V. Gomes, 6-54
Libidibia ferrea (Mart. ex Tul.) L.P.Queiroz var. *ferrea*	Jucá, Pau-ferro	tre					x		A. Silveira, 951
Libidibia ferrea var. *leiostachya* (Benth.) L.P.Queiroz	Pau-ferro	tre					x		V. Gomes, 1162
Poincianella bracteosa (Tul.) L.P.Queiroz	Catingueira	tre					x	x	V. Gomes, 5-411
Senna quinquangulata (Rich.) H.S.Irwin & Barneby	Besouro	tre			x				A. Silveira, 362
Senna splendida (Vogel) H.S.Irwin & Barneby	São-João	shr				x			M.A.Figueiredo, 8920
34.2 Faboideae									
Andira cf. nitida Mart. *ex* Benth.		tre					x		V. Gomes, 850
Desmodium procumbens (Mill.) Hitchc.		th			x				M.A.Figueiredo, 17662
Dioclea grandiflora Mart. *ex* Benth.	Mucunã	vi		x	x				V. Gomes, 0903-2
Dioclea virgata (Rich.) Amshoff	Mucunã	vi			x				L.W. Lima-Verde, 110
Lonchocarpus sericeus (Poir.) Kunth *ex* DC.	Ingá-brava	tre	x		x				M.A.Figueiredo, 15938
Machaerium hirtum (Vell.) Stellfeld	Chifre-de-bode	tre	x			x			A. Silveira, 1001
Myroxylon peruiferum L.f.	Bálsamo	tre					x		V. Gomes, 4-778
Ormosia sp.		tre	x	x	x	x			V. Gomes, 1-221
Platymiscium floribundum Vogel		tre	x				x		V. Gomes, 907-1
34.3 Mimosoideae									
Abarema jupunba (Willd.) Britton & Killip var. *jupunba*		tre	x	x	x	x	x		J.R.Lima, 385
Albizia polycephala (Benth.) Killip *ex* Record	Camuzé	tre	x	x	x	x	x		A. Silveira, 348
Anadenanthera colubrina var. *cebil* (Griseb.) Altschul	Calumbi	tre					x	x	L.W.Lima-Verde, 3570
Chloroleucon dumosum (Benth.) G.P. Lewis	Arapiraca	tre					x	x	A. Silveira, 867
Inga bollandii Sprague & Sandwith	Ingaí	tre	x	x		x			A. Silveira, 357
Inga ingoides (Rich.) Willd.	Ingá	tre	x	x	x	x			V. Gomes, 329
Inga laurina (Sw.) Willd.	Ingá	tre				x			V. Gomes, 4-751
Inga marginata Willd.	Ingá	tre			x				M.R.Oliveira, 20976
Mimosa arenosa (Willd.) Poir. var. *arenosa*		tre					x	x	L.W.Lima-Verde, 3621
Mimosa caesalpiniifolia Benth.	Sabiá	tre	x				x	x	V. Gomes, 4
Parkia pendula (Willd.) Benth. *ex* Walp.	Visgueiro	tre		x					A. Silveira, 379
Piptadenia stipulacea (Benth.) Ducke	Saia-velha	tre					x		V. Gomes, 436
Senegalia polyphylla (DC.) Britton & Rose	Espinheiro, Espinheiro-preto	tre					x	x	V. Gomes, 4-773
Senegalia riparia (Kunth) Britton & Rose *ex* Britton & Killip	Unha-de-gato	shr						x	V. Gomes, 5-689

Appendix A. Continued...

WINDWARD			ALTITUDE						
			TOP		LEEWARD				
FAMILY/SPECIES/AUTHOR	VN	GF	400-600 TAV	600-800 SIN	> 800B ARV	> 800S LAG	600-800 JAR	400-600 SAL	C
34.3 Mimosoideae									
Stryphnodendron guianense (Aubl.) Benth. subsp. *guianense*	Favinha	tre	x	x	x				A. Silveira, 403
35. Gentianaceae									
Chelonanthus purpurascens Aubl.		shr			x				A. Silveira, 160
Voyria flavescens Griseb.		th		x					V. Gomes 1127-2
36. Heliconiaceae									
Heliconia spathocircinata Aristeg.	Cana-de-macaco	th			x				L.W.Lima-Verde, 316
Heliconia pendula Wawra	Heliconia	th				x			V. Gomes 523
Heliconia psittacorum L. f.	Pacavira	th	x	x	x	x	x		V. Gomes, 338
37. Humiriaceae									
Sacoglottis sp.	Folha-dura	tre		x					V. Gomes,1205-3
38. Hypericaceae									
Vismia guianensis (Aubl.) Choisy	Lacre-vermelho	tre	x	x	x				V. Gomes, 761
39. Hypoxidaceae									
Hypoxis decumbens L.		th		x					V. Gomes, 1102-8
40. Iridaceae									
Cipura paludosa Aubl.		th		x					V. Gomes, 1102-7
41. Lamiaceae									
Aegiphila integrifolia (Jacq.) Moldenke	Orelha-de-onça	tre				x			V. Gomes, 1102-3
Hyptis pectinata (L.) Poit.	Canela-de-juriti	th				x			V. Gomes, 743
Vitex cf. *capitata* Vahl	Guabiraba	tre					*x*		A. Silveira , 557
Vitex flavescens Kunth	Chapéu-de-sol	tre	x						V. Gomes, 1305-1
Vitex cf. panshiniana Moldenke	Gargaúba	tre	x						V. Gomes, 277
Vitex triflora Vahl	Guabiraba	tre					x	x	A. Silveira , 637
Vitex sp.	Guabiraba	tre	x						A. Silveira, 886
42. Lauraceae									
Cinnamomum triplinerve (Ruiz & Pav.) Kosterm.	Louro-eucalipto	tre			x	x			A. Silveira, 771
Endlicheria sp.		tre			x				V. Gomes, 1-331
Nectandra cuspidata Nees	Louro	tre	x		x				V. Gomes, 1252
Ocotea daphnifolia (Meisn.) Mez	Louro	tre				x			A. Silveira, 339
Ocotea glauca (Ness & Mart.) Mez		tre				x			V. Gomes, 913
Ocotea glomerata (Nees) Mez	Louro	tre	x		x	x			A. Silveira, 149
Ocotea longifolia Kunth	Louro	tre		x	x	x			V. Gomes, 83-2
Ocotea puberula (Rich.) Nees	Jenipapo-bravo	tre			x				V. Gomes, 1404-8
Ocotea sp.	Louro	tre			x	x			V. Gomes, 501

Appendix A. Continued...

FAMILY/SPECIES/AUTHOR	VN	GF	WINDWARD ALTITUDE TOP 400-600 TAV	WINDWARD ALTITUDE TOP 600-800 SIN	LEEWARD > 800B ARV	LEEWARD > 800S LAG	LEEWARD 600-800 JAR	LEEWARD 400-600 SAL	C
43. Lythraceae									
Lafoensia pacari A.St.-Hil.		tre					x		V. Gomes, 2009-13
44. Malpighiaceae									
Bunchosia acuminata Dobson		tre		x	x	x			V. Gomes, 1303-5
Byrsonima crispa A.Juss.	Murici	tre			x				A. Silveira, 206
Byrsonima sericea DC.	Murici	tre	x	x	x	x	x		V. Gomes, 1112
Byrsonima stipulacea A.Juss.	Murici	tre			x				M. A. Figueiredo, 17050
Heteropterys tricanthera A.Juss.		vi		x					V. Gomes, 1102-3
Tetrapterys mucronata Cav.	Canela-brava	vi		x					A. Silveira 436
45. Malvaceae									
Apeiba tibourbou Aubl.	Jangada, Pau-de-jangada	tre	x	x	x	x			A. Silveira, 861
Callianthe bezerrae (Monteiro) Donnel		subshr				x			M.A. Figueiredo, 349
Ceiba glaziovii (Kuntze) K.Schum.	Barriguda	tre					x	x	V. Gomes, 508-3
Helicteres baruensis Jacq.	Maria-preta	shr						x	V. Gomes, 1102-5
Helicteres velutina K.Schum.	Maria-preta	shr					x	x	V. Gomes, 795
Helicteres sp.		shr						x	V. Gomes, 1102-6
Pseudobombax marginatum (A.St.-Hil.) A. Robyns	Imbiratanha	tre	x					x	V. Gomes, 1103-6
Sida urens L.		th			x	x			M. A. Figueiredo, 15249
46. Marantaceae									
Calathea cylindrica (Roscoe) K.Schum.	Bananinha	th					x		V. Gomes, 2604-4
Calathea sp.	Bananinha-de-salão	th	x		x				A. Silveira, 972
Ischnosiphon puberulus Loes.	Taquari	th	x	x	x				V. Gomes, 1119
Maranta leuconeura E. Morren	Baratinha	th				x	x		A. Silveira, 971
47. Marcgraviaceae									
Norantea guianensis Aubl.		shr					x		V. Gomes, 903
48. Melastomataceae									
Aciotis sp.		th		x					V. Gomes, 778
Clidemia debilis Crueg.	Lava-mato	shr				x			V. Gomes, 2604-3
Clidemia dentata D.Don	Lacre-branco	shr			x				A. Silveira, 161
Clidemia hirta (L.) D.Don		shr			x				V. Gomes, 2704-2
Miconia affinis DC.		shr	x	x	x	x			A. Silveira, 903
Miconia alata (Aubl.) DC.	Canela-de-veado	tre	x	x	x				A. Silveira, 404
Miconia aff. *caudigera* DC.	Lacre-branco	shr				x			A. Silveira, 353
Miconia holosericea (L.) DC.		tre		x	x				V. Gomes, 767
Miconia hypoleuca (Benth.) Triana		shr	x	x					V. Gomes, 1109
Miconia minutiflora (Bonpl.) DC.	Lacre-branco	shr		x	x				A. Silveira, 10

Appendix A. Continued...

WINDWARD			ALTITUDE						
			TOP		LEEWARD				
FAMILY/SPECIES/AUTHOR	VN	GF	400-600 TAV	600-800 SIN	> 800B ARV	> 800S LAG	600-800 JAR	400-600 SAL	C
48. Melastomataceae									
Miconia nervosa (Sm.) Triana	Língua-de-vaca	shr		x					Silveira, 626
Miconia prasina (Sw.) DC.	Lacre-branco	tre	x	x	x	x			A. Silveira, 380
Miconia sp.		shr	x						V. Gomes, 2704-7
Tibouchina heteromalla (D.Don) Cogn.		shr	x						A. Silveira, 894
49. Meliaceae									
Cedrela odorata L.	Cedro	tre					x		A. Silveira, 635
Trichilia emarginata (Turcz.) C.DC.		tre		x			x		V. Gomes, 2009-18
Trichilia ramalhoi Rizzini		tre				x			V. Gomes, 1068
50. Menispermaceae									
Cissampelos andromorpha DC.		vi		x					A. Silveira, 906
51. Moraceae									
Brosimum gaudichaudii Trécul	Inharé	tre	x	x		x			A. Silveira, 419
Ficus guianensis Desv.	Gameleira	tre	x	x	x	x	x	x	V. Gomes, 797
52. Myrsinaceae									
Myrsine guianensis (Aubl.) Kuntze	Cajueiro-bravo	tre					x		V. Gomes, 700
Myrsine umbellata Mart.	Coração-de-nego; Mium-de-sangue	tre	x	x	x	x			A. Silveira, 304
53. Myrtaceae									
Campomanesia aromatica (Aubl.) Griseb.	Guabiraba	tre	x	x	x	x			Silveira, 902
Campomanesia ilhoensis Mattos		tre					x		V. Gomes, 1002-9
Campomanesia sp1.	Guabiraba	tre		x	x	x			V. Gomes, 609
Campomanesia sp2.		tre				x			
Eugenia acutata Miq.		tre				x			V. Gomes, 1140
Eugenia aurata O.Berg.	Café-bravo	tre					x		A. Silveira, 871
Eugenia cf. cachoeirensis		tre	x	x	x				A. Silveira, 976
Eugenia cf. *egensis* DC.	Folha-miúda	tre					x		A. Silveira, 612
Eugenia cf. schottiana O. Berg		tre		x			x		A. Silveira, 924
Eugenia cf. *uniflora* L.		shr					x		V. Gomes, 598
Eugenia flavescens DC.	Folha-miúda	tre					x		A. Silveira, 586
Eugenia florida DC.	Café-bravo	tre	x	x		x			V. Gomes, 438
Eugenia ligustrina (Sw.) Willd.	Folha-miúda	tre		x	x	x	x		V. Gomes, 1079
Eugenia cf. paraensis O. Berg		tre						x	A. Silveira, 607
Eugenia piresii Mattos		tre				x	x		V. Gomes, 790
Eugenia punicifolia (Kunth) DC.	Folha-miúda	tre		x	x				V. Gomes, 49
Eugenia sp.1		tre		x		x	x		V. Gomes, 771-1
Eugenia sp. 2	Café-bravo	tre				x	x		A. Silveira, 949

Appendix A. Continued...

FAMILY/SPECIES/AUTHOR	VN	GF	ALTITUDE						C
			WINDWARD		TOP	LEEWARD			
			400-600 TAV	600-800 SIN	> 800B ARV	> 800S LAG	600-800 JAR	400-600 SAL	
53. Myrtaceae									
Eugenia sp. 3		shr		x					V. Gomes, 775
Marlieria sp1		tre		x					V. Gomes, 1176
Marlieria sp2		tre				x			V. Gomes, 1-207
Myrcia alagoensis O. Berg		tre	x	x	x	x			V. Gomes, 1041
Myrcia multiflora (Lam.) DC.		shr		x		x			V. Gomes, 935
Myrcia pubiflora DC.		tre		x					V. Gomes, 875
Myrcia rostrata DC.		tre	x	x	x	x			V. Gomes, 1147
Myrcia splendens (Sw.) DC.	Folha-miúda	tre		x	x	x			V. Gomes, 1197
Myrcia sylvatica (G.Mey.) DC.	Folha-miúda-preta	tre		x	x	x			A. Silveira, 458
Myrcia tomentosa (Aubl.) DC.	Goiabinha	tre		x	x				A. Silveira, 387
Myrcia sp. 1		shr				x	x		V. Gomes, 2009-23
Myrcia sp. 2	Cabacinha	tre		x	x	x			V. Gomes, 1152
Myrcia sp. 3		tre				x			V. Gomes, 2-561
Myrcia sp. 4		tre				x			V. Gomes, 2-230
Myrcia sp. 5		tre				x			V. Gomes, 2-798
Myrcia sp. 6		tre	x	x					A. Silveira, 999
Myrciaria ferruginea O.Berg		tre				x			A. Silveira, 808
Myrciaria sp1		tre	x		x	x			A. Silveira, 338
Myrciaria sp2		tre				x			V. Gomes, 1205
Myrciaria sp3		tre					x		A. Silveira, 923
Myrciaria tenella (DC) O. Berg	Sangue de boi	tre			x				V. Gomes, 1216
Psidium guianense Sw.		tre						x	V. Gomes, 1228
Psidium sartorianum (O.Berg.) Nied.		tre				x			V. Gomes, 0206-15
Siphoneugenia sp.		shr			x				A. Silveira 779
Syzygium jambos (L.) Alston		tre		x					V. Gomes, 695
54. Nyctaginaceae									
Guapira sp.	João-mole	tre					x		V. Gomes, 1-462
Neea obovata Spruce ex. Heimerl	João-mole	tre	x	x	x	x	x	x	V. Gomes, 1153
55. Ochnaceae									
Ouratea hexasperma (A.St.-Hil.) Baill.	Cajuzinho	tre		x	x	x			A. Silveira, 399
Ouratea polygyna Engl.	Cajuzinho	tre			x				V. Gomes, 726-1
56. Olacaceae									
Heisteria blanchetiana (Engl.) Sleumer		tre	x						V. Gomes, 20-6
Heisteria perianthomega (Vell.) Sleumer	Mium-de-sangue-branco	tre	x			x			A. Silveira, 973
Schoephia obliquifolia Turcz.		tre		x					V. Gomes, 764

Appendix A. Continued...

WINDWARD			ALTITUDE						
			TOP		LEEWARD				
FAMILY/SPECIES/AUTHOR	VN	GF	400-600 TAV	600-800 SIN	> 800B ARV	> 800S LAG	600-800 JAR	400-600 SAL	C
56. Olacaceae									
Ximenia americana L.		tre					x		V. Gomes, 4-449
57. Oleaceae									
Chionanthus sp.		tre				x			V. Gomes, 462
58. Opiliaceae									
Agonandra brasiliensis Miers. *ex* Benth. & Hook.f.	Juá-mirim	tre						x	V. Gomes, 72
59. Orchidaceae									
Alatiglossum barbatum (Lindl.) Baptista		eh				x			V. Gomes, 523
Catasetum macrocarpum Rich. *ex* Kunth		eh			x		x		V. Gomes, 1009-1
Epidendrum armeniacum Lindl.		eh				x			V. Gomes, 0607-3
Epidendrum nocturnum Jacq.		eh	x						V. Gomes, 299
Gongora quinquenervis Ruiz & Pav.		eh				x	x		V. Gomes, 3031
Notylia lyrata S. Moore		eh			x		x		V. Gomes, 2209-16
Polystachia concreta (Jacq.) Garay & Sweet		eh	x			x		x	A. Silveira, 897
Preschottia stachyodes (Sw.) Lindl.		th		x	x	x	x		V. Gomes, 716
Specklinia trifida (Lindl.) F.Barros		eh		x		x			V. Gomes, 621
Trichocentrum fuscum Lind.		eh				x			V. Gomes, 716
60. Oxalidaceae									
Oxalis alstonii Lourteig.		th				x			A. Silveira, 804
61. Passifloraceae									
Mitostemma brevifilis Gontsch.	Maracujá-suspiro	vi		x					A. Silveira, 741
62. Peraceae									
Pera glabrata (Schott) Poepp. *ex* Baill.	Casquim	tre		x	x	x			V. Gomes, 991
63. Phyllanthaceae									
Phyllanthus acutifolius Poir. *ex* Spreng.		subshr					x		A. Silveira, 855
64. Phytolaccaceae									
Hilleria latifolia (Lam.) H.Walter		th				x			A. Silveira, 829
65. Picramiaceae									
Picramnia gardneri Planch.		tre				x			V. Gomes, 488
Picramnia glazioviana Engl.		tre				x			V. Gomes, 922
66. Piperaceae									
Piper aduncum L.		shr			x				A. Silveira, 463
Piper arboreum Aubl.		shr		x	x				A. Silveira, 390
Piper ovatum Vahl.		subshr				x			V. Gomes, 0707-3
Peperomia circinnata Link		th		x					V. Gomes, 0707-2

Appendix A. Continued...

WINDWARD			ALTITUDE						
			TOP		LEEWARD				
FAMILY/SPECIES/AUTHOR	VN	GF	400-600 TAV	600-800 SIN	> 800B ARV	> 800S LAG	600-800 JAR	400-600 SAL	C
67. Plumbaginaceae									
Plumbago scandens L.		subshr				x			V. Gomes, 735
68. Poaceae									
Merostachys sp.	Taquara	th			x				V. Gomes, 1124
Olyra latifolia L		th			x				V. Gomes, 15-3
Parodiolyra micrantha (Kunth) Davidse & Zuloaga		th			x				V. Gomes, 545
69. Podocarpaceae									
Podocarpus sellowii Klotzsch *ex.* Endl.		tre			x				A. Silveira, 239
70. Polygalaceae									
Acanthocladus albicans A.W.Benn.	Ameixa	shr					x		V. Gomes, 793
Polygala paniculata L.	Vique	th			x	x	x		A. Silveira, 447
71. Polygonaceae									
Coccoloba parimensis Benth.		tre		x					A. Silveira, 729
Coccoloba sp.1.		tre	x						V. Gomes, 1197
Coccoloba sp. 2		shr						x	A. Silveira, 494
Ruprechtia laxiflora Meisn.	Tubibeira	tre					x		A. Silveira, 924
72. Portulacaceae									
Talinum paniculatum (Jacq.) Gaertn.		th					x		A. Silveira, 953
73. Proteaceae									
Roupala sp.	Carne-de-vaca; Rabugem	tre			x	x			V. Gomes, 729
74. Rhamnaceae									
Colubrina glandulosa Perkins	Sabiaguaba	shr	x	x					V. Gomes, 1205-1
Ziziphus undulata Reissek	Juá-mirim	tre	x						V. Gomes, 6-26
75. Rosaceae			r						
Prunus myrtifolia (L.) Urb.	Pau-de-soinho	tre	x	x	x	x			V. Gomes, 2209-3
76. Rubiaceae									
Alseis floribunda Schott	Guabiraba	tre	x			x	x	x	A. Silveira, 850
Amaioua intermedia Mart. *ex* Schult. & Schult. f	Casquim	tre	x	x	x	x			V. Gomes, 1087
Chiococca alba (L.) Hitchc.		shr			x				M.A.Figueiredo, 16670
Coussarea contracta (Walp.) Müll.Arg. var. *contracta*	Folha-dura	tre	x						V. Gomes, 6-42
Coutarea hexandra (Jacq.) K.Schum.	Quina-quina	tre				x			A. Silveira, 909
Faramea hyacinthina Mart.	Folha-dura	tre	x	x	x	x			V. Gomes, 1003-5
Faramea sp. 1	Violeta, Folha-dura	tre	x			x			V. Gomes, 916
Faramea sp. 2	Folha-dura	tre	x		x	x			A. Silveira, 774
Gonzalagunia dicocca Cham. & Schltdl.	Canela-de-juriti	th			x				V. Gomes, 1048
Guettarda angelica Mart. *ex* Müll.Arg.	Espinho-branco	shr	x		x	x	x		A. Silveira, 721

Appendix A. Continued...

WINDWARD			ALTITUDE						
			TOP		LEEWARD				
FAMILY/SPECIES/AUTHOR	VN	GF	400-600 TAV	600-800 SIN	> 800B ARV	> 800S LAG	600-800 JAR	400-600 SAL	C
76. Rubiaceae									
Hamelia patens Jacq.		th				x			A. Silveira, 827
Palicourea guianensis Aubl.	Sombrião, Erva-de-rato-grande	shr		x	x	x			V. Gomes 1103
Palicourea marcgravii A.St.-Hil.		shr		x					V. Gomes, 1205-7
Psychotria bracteocardia (DC.) Müll.Arg.	Sorriso-de-viúva	th	x	x	x				V. Gomes, 0902-1
Psychotria capitata Ruiz & Pav.		shr			x	x	x	x	A. Silveira, 759
Psychotria carthagenensis Jacq.		shr	x	x	x	x			A. Silveira, 767
Psychotria colorata (Willd. *ex* Schult.) Müll. Arg.	Erva-de-rato-falsa	shr			x				A. Silveira, 734
Psychotria deflexa DC.		shr			x				A. Silveira, 733
Psychotria hoffmannseggiana (Willd. *ex* Schult.) Müll. Arg		shr		x	x				A. Silveira, 742
Randia armata (Sw.) DC.	Veludo-preto	tre	x			x	x	x	V. Gomes, 1102-4
77. Rutaceae									
Esenbeckia grandiflora Mart.		tre	x	x	x	x			A. Silveira, 811
Pilocarpus spicatus A.St.-Hil.		tre					x		A. Silveira, 845
Rauia sp.		tre	x						V. Gomes, 772
Zanthoxylum petiolare A.St.-Hil & Tul.	Limãozinho	tre	x		x	x			V. Gomes, 466
Zanthoxylum rhoifolium Lam.	Limãozinho	tre			x				A. Silveira, 908
78. Salicaceae									
Banara guianensis Aubl.	Farinha-seca	tre	x	x	x		x		V. Gomes, 1125
Casearia commersoniana Cambess.		shr				x			V. Gomes, 0607-1
Casearia grandiflora Cambess.		shr		x					V. Gomes, 1114
Casearia sylvestris Sw.		shr	x	x	x	x			A. Silveira, 826
Casearia sp. 1		shr				x			V. Gomes, 2-753
Casearia sp. 2		shr	x			x			V. Gomes, 6-263
Prockia crucis P.Browne *ex* L.		shr					x		A. Silveira, 726
Xylosma ciliatifolia (Clos) Eichler	Espinho-de-judeu	shr	x			x			V. Gomes, 0306-1
79. Santalaceae									
Phoradendron crassifolium (Pohl *ex* DC.) Eichler		hm	x	x					V. Gomes, 727
Phoradendron mucronatum (DC.) Krug & Urb.		hm	x						V.Gomes, 2009-14
Phoradendron sp. 1		hm	x	x					V. Gomes, 1130
Phoradendron sp. 2		hm				x			A. Silveira, 975
80. Sapindaceae									
Allophylus edulis (A.St.-Hil. *et al.*) Hieron. *ex* Niederl.		shr				x			A. Silveira, 822
Aparisthmium cordatum (A.Juss.) Baill.	Piroá	tre	x						V. Gomes, 774
Cupania impressinervia Acev.-Rodr.		tre				x			Araújo, F. S. 1604
Cupania racemosa (Vell.) Radlk.	Cajueiro-bravo	tre			x				V. Gomes, 736

Appendix A. Continued...

WINDWARD			ALTITUDE						
			TOP		LEEWARD				
FAMILY/SPECIES/AUTHOR	VN	GF	400-600 TAV	600-800 SIN	> 800B ARV	> 800S LAG	600-800 JAR	400-600 SAL	C
80. Sapindaceae									
Cupania longifolia Benth.	Cajueiro-bravo	tre	x			x			V. Gomes, 0902-1
Paullinia uloptera Radlk.		vi					x		V. Gomes, 441
Serjania hebecarpa Benth.		vi				x			V. Gomes, 751
81. Sapotaceae									
Chrysophyllum flexuosum Mart.		tre				x			V. Gomes, 580
Chrysophyllum gonocarpum (Mart. & Eichler *ex* Miq.) Engl.	Jitó	tre	x						V. Gomes, 1204-3
Chrysophyllum sp.	Folha-dura	tre				x			A. Silveira, 982
Manilkara rufula (Miq.) H.J.Lam	Maçaranduba	tre	x	x	x	x	x		A. Silveira, 537
Micropholis aff. *guyanensis* (A.DC.) Pierre		tre				x	x		V. Gomes, 504
Pouteria bangii (Rusby) T.D.Penn.	Engasga-vaca	tre				x			V. Gomes, 0206-3
Pouteria macrophylla (Lam.) Eyma		tre				x			V. Gomes, 1002-1
Pouteria peduncularis (Mart. & Eichler *ex* Miq.) Baehni		tre			x				A. Silveira, 108
Pouteria venosa (Mart.) Baehni subsp. *venosa*		tre				x			V. Gomes, 1002-15
82. Schoepfiaceae									
Schoepfia brasiliensis A.DC.		tre		x		x			V. Gomes, 764
83. Simaroubaceae									
Simarouba amara Aubl.	Paraíba	tre	x	x	x	x			A. Silveira, 1112
84. Siparunaceae									
Siparuna guianensis Aubl.	Sabonete	shr				x			V. Gomes, 1116
85. Smilacaceae									
Smilax sp.	Japecanga	vi			x	x			V. Gomes, 1028
86. Solanaceae							x		
Acnistus arborescens (L.) Schltdl.		shr				x			V. Gomes, 1002-52
Brunfelsia uniflora (Pohl) D.Don		shr			x	x			A. Silveira, 749
Cestrum axillare Vell.	Dominguinho	shr			x				Araújo, F.S. 1608
Cestrum schlechtendalli G.Don.	Dominguinho	shr			x				V. Gomes, 1003
Solanum caavurana Vell.		shr		x	x				A. Silveira, 772
Solanum campaniforme Roem. & Schult.	Caninana	shr		x					A. Silveira, 426
Solanum paniculatum L.		shr				x			A. Silveira, 491
Solanum rhytidoandrum Sendtn.	Boldo, Jurubeba-preta	shr			x	x			V. Gomes, 1102-5
87. Sterculiaceae									
Basiloxylon brasiliensis (All.) K. Schum.	Piroá	tre	x		x				V. Gomes, 1103-1
Guazuma ulmifolia Lam.	Mutamba-brava	tre				x			V. Gomes, 2-289
88. Symplocaceae									
Symplocos nitens (Pohl) Benth.		tre				x			V. Gomes, 1143

Appendix A. Continued...

WINDWARD			ALTITUDE						
			TOP		LEEWARD				
FAMILY/SPECIES/AUTHOR	VN	GF	400-600 TAV	600-800 SIN	> 800B ARV	> 800S LAG	600-800 JAR	400-600 SAL	C
89. Thymelaeaceae									
Daphnopsis racemosa Griseb.	Embira-branca	shr	x	x	x	x			V. Gomes, 1106
90. Urticaceae									
Cecropia palmata Willd.	Embaúba, Torém	tre	x	x	x				A. Silveira, 11
Urera baccifera (L.) Gaudich. *ex* Wedd.	Urtiga	tre	x						V. Gomes, 1203-5
91. Verbenaceae									
Lantana camara L.	Camará	shr						x	A. Silveira, 732
Lantana radula Sw.	Camará	shr						x	V. Gomes, 2109-5
92. Zingiberaceae									
Renealmia chrysotricha Petersen	Colônia-brava	th			x				V. Gomes, 455

VN: vernacular name; GF: growth form; ter: tree; shr: shrub; subshr: subshrub; vi: vine; th: terrestrial herb; eh: epiphytic herb; hm: hemiparasite; C: main collector's name and number; x: present species. Surveyed sites: TAV: Taveiras; SIN: Sinimbu; ARV: Arvoredo; LAG: Lagoa; JAR: Jardim; SAL: Salva-Vidas.