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Floristic and phytosociology in dense "terra firme" rainforest in the Belo Monte Hydroelectric Plant influence area, Pará, Brazil

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(With 3 figures)

Abstract

The objective of the present study was to characterise the floristic and phytosociological composition on a stretch of dense "Terra Firme" rainforest located in the Belo Monte hydroelectric plant area of influence, located in the state of Pará, Brazil. All trees with DAP > 10 cm situated in 75 permanent plots of 1 ha were inventoried. 27,126 individuals trees (361 ind.ha-1), distributed in 59 botanical families, comprising 481 species were observed. The families with the largest number of species were Fabaceae (94), Araceae (65) and Arecaceae (43), comprising 43.7% of total species. The species *Alexa grandiflora* (4.41), *Cenostigma tocantinum* (2.50) and *Bertholletia excelsa* (2.28) showed the highest importance values (IV). The ten species with greater IV are concentrated (22%). The forest community has high species richness and can be classified as diverse age trees, heterogeneous and of medium conservation condition.

Keywords: floristic survey, diversity, amazon species, rain forest.

Florística e fitossociologia de um trecho de Floresta ombrófila densa de terra firme na área de influência da Usina Hidrelétrica Belo Monte, Pará, Brasil

Resumo

O presente estudo teve como objetivo caracterizar a composição florística e fitossociológica de um trecho de Floresta Ombrófila Densa de terra firme na área de influência da Usina Hidrelétrica Belo Monte, Pará, Brasil. Foram inventariadas todas as árvores com DAP > 10 cm em 75 parcelas permanentes de 1 ha. Foram observados 27.126 indivíduos arbóreos (361 ind.ha-1), distribuídos em 59 famílias botânicas, perfazendo 481 espécies. As famílias com maior número de espécies foram Fabaceae (94), Araceae (65) e Arecaceae (43), perfazendo 43,7% do total de espécies amostradas. As espécies *Alexa grandiflora* (4,41), *Cenostigma tocantinum* (2,50), *Bertholletia excelsa* (2,28), apresentaram os maiores valores de importância (VI), sendo que nas dez espécies com maiores IV, estão concentrados 22%. A comunidade florestal apresenta elevada riqueza florística e pode ser classificada como multiâneas, heterogêneas e com médio estado de conservação.

Palavra-chave: levantamento florístico, diversidade, espécies amazônicas, floresta tropical.

1. Introduction

Phytosociological studies have special interest in tropical forests due to the wide variety of patterns and processes related to their diversity. Tropical forests have gained importance in recent decades not only for their natural aspects but also for their social and economic aspects, leading to discussions in the scientific/ecological and social context (Lima et al., 2012). However, there are just a few studies on the floristic, structural and dynamics composition of these ecosystems. The consequences are major knowledge gaps in geographical terms, especially because there are found many floristically distinct forest formations in regions of apparently homogeneous vegetation (Hopkins, 2007; Lima et al., 2012).

Among the tropical forests, dense rainforest is considered one of the most important 'hot spots' for its greatest richness and diversity (Laurance, 2008). Several studies have shown that plateau and slope forest environments exhibit high species diversity, represented by few individuals of each species and highly variable values of diversity and similarity (Lima Filho et al., 2004).

Information on forest structure and floristic composition obtained through forest inventories are among the main

available tools to assess the potential of a forest and to choose the forest management strategies. In this context, the use of phytosociological criteria increases knowledge of species that belong to significant stretches of tropical forests. They enable the planning and execution of appropriate strategies for biodiversity conservation and development of more efficient environmental practices. Thus, the present study aimed to characterise the floristic and phytosociological composition on a stretch of dense "terra firme" rainforest situated in the Belo Monte hydroelectric plant area of influence, in the state of Pará, Brazil.

2. Material and Methods

The study site is located at a place called Volta Grande do Rio Xingu. It is situated in northern Brazil, at the Xingu River, a tributary on the right bank of the Amazon River in Pará state (03°26' south latitude e 51°56' west longitude). Volta Grande do Rio Xingu is situated between the town of Altamira and the locations of Belo Monte and Belo Monte do Pontal, respectively located in the cities of Vitória do Xingu and Anapu. Forest types under study are characterised as Dense Rain Forest (FOD) "terra firme". It is located in the direct and indirect area of influence of the Belo Monte Hydroelectric Plant (UHE Belo Monte). (Brasil, 2009) (Figure 1).

The region offers a variety of soil types like neossolos fluvic and lithic, ultisols, latosols, cambisoils, Haplic Gleysols and Nitosols Haplic (Brasil, 2009). According to Koppen's classification, the area's climate is tropical with monsoon rainfall. There is a short duration dry season which corresponds to (Am) classification and a humid tropical with a slightly pronounced dry season with very high rainfall (Amw) (Brasil, 2009).

Sampling and data collection followed RAPELD's methodology described by the authors Magnusson et al.

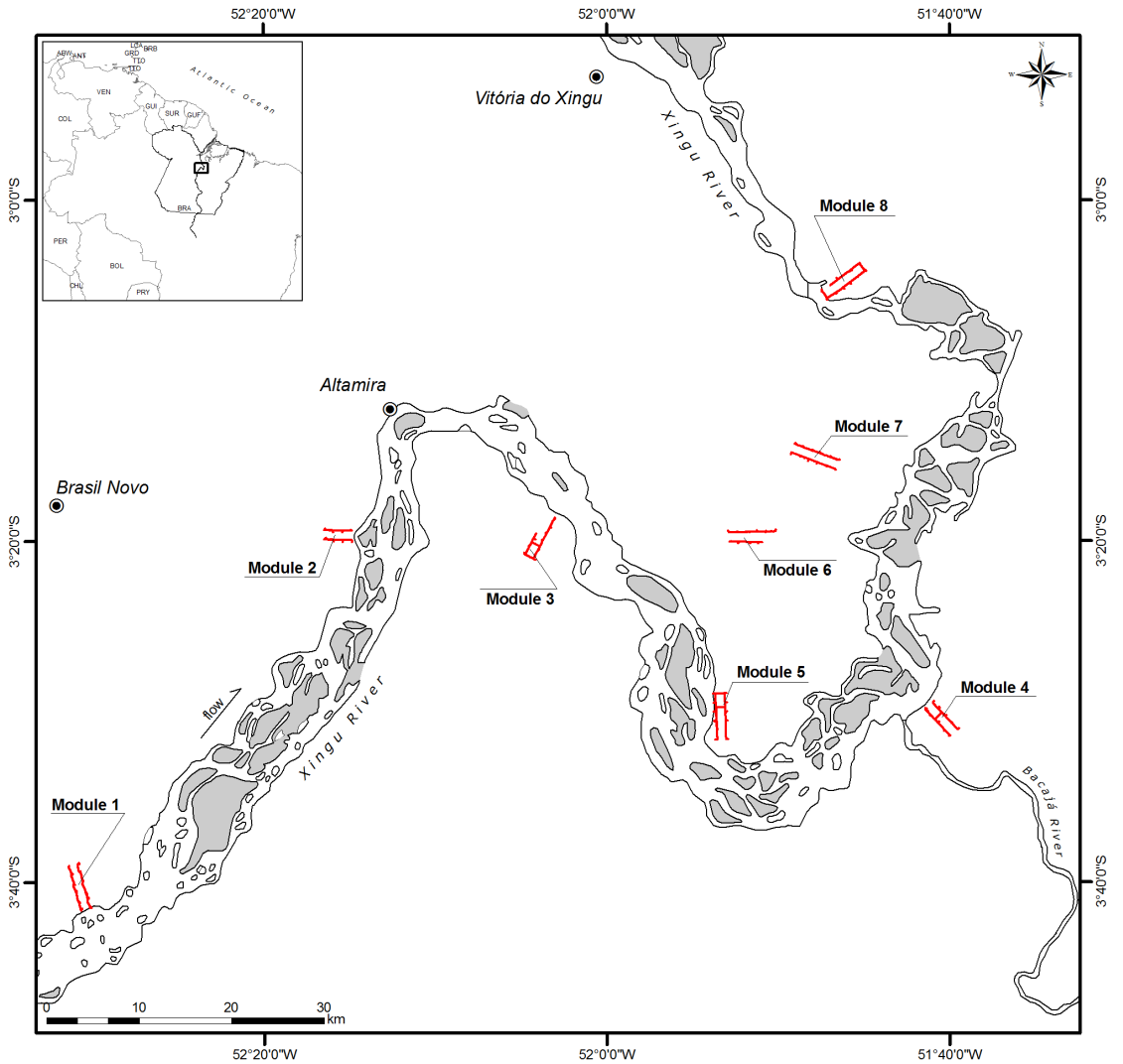

Figure 1. Belo Monte hydroelectric plant's area of influence and location of RAPELD sampling modules.

(2005), which merges rapid assessments with long-term studies.

The sampling units were placed in the four compartments of Belo Monte as shown in Figure 1:

1) Xingu Reservoir (Modules 2/3),
2) Stretch of Low Flow (Modules 4/5),
3) Intermediate Reservoir (Modules 6/7), and
4) Stretch downstream of the main powerhouse (no intervention) (Modules 1/8).

Each RAPELD module is a 5 km^2 area where two 5 km parallel transects were installed, 1 km apart, where 12 permanent 250m plots (6 in each transect) are installed. Those plots are 40 m wide, perpendicular to the transects and with a central axis following the contour line. However, from the 96 plots initially planned and required by the methodology (8 Modules x 12 plots per Module), it was not possible to install 13 due to land problems, thus making a total of 83 sampling units. From those, 75 were distributed in the dense "terra firme" rainforests (FOD). They were distributed in 8 RAPELD Modules. Floristic and phytosociological estimators were performed by sampling 75 permanent plots distributed in eight RAPELD modules. The plots were marked at 10 m from the transect in order to reduce the edge effect from the transect's opening. Each parcel was 250m long and 40m wide (20 m on each side of the centerline) resulting in 1 ha per parcel. Individual trees sampled were at least 10cm breast height diameter (diameter measured at 1.30 m high).

To characterise the floristic composition of Belo Monte's area of influence, the growth habits according to Raunkiaer classification (Raunkiaer, 1934) were considered. This was adapted to Brazilian conditions (IBGE, 2012) as follows: trees, shrubs, grass, holoepiphytes, hemiepiphytes, lianas and palms. Additionally, species richness was analysed based on the number of species and plant families found in this classification.

Data collection was carried out between March and December 2014. The dendometric quantified variables were breast height circumference (circumference at 1.30 m height above the ground) and height. Numbered metallic plates were used to identify the circumference measurements.

Tree species botanical identification occurred from the botanical collection of all sampled individuals. An average of 6 samples from each was collected. The botanical material was classified by family, genus and species. The reference was Angiosperm Phylogeny Group III. The unicata and a duplicate were deposited at the Emilio Goeldi Museum (MPEG); other duplicates were kept for the Federal University of Pará (UFPA) Campus Altamira and for the Botanical Museum of Curitiba City - Herbarium MBM collections.

To characterise the fragment's horizontal structure, the following phytosociological parameters were analysed according to Müller-Dombois and Ellemberg (1974): absolute density (AD), relative density (RD), absolute frequency (AF), relative frequency (RF), absolute dominance (ADo), relative dominance (RDo), coverage value (CV) and importance value (IV). The parameters were calculated at Microsoft Excel for Windows software 2007. Sample sufficiency was calculated by linear regression model with plateau response (REGRELRP), performed by the statistical program R (R Development Core Team, 2008).

3. Results

3.1. Floristic composition

The sampled area revealed the presence of 726 species in 297 genera and 79 botanical families for the eight RAPELD modules. Regarding species richness, families with greater representation were: Fabaceae (94 species) followed by the Araceae (65), Arecaceae (43), Sapotaceae (37), Moraceae (30), Orchidaceae (29), Marantaceae (26), Lauraceae (25), Lecythidaceae (21) and Annonaceae (21).

Rare families are considered those for which only one species was found. Very rare are those with a single species and a single individual found. Overall 26% of families can be classified as rare and 10% as very rare. The Fabaceae family is the botanical family with the greatest abundance.

Analysing grass growth habit species, holoepiphytes, hemiepiphytes, lianas and palms, it is noted that most species are concentrated on frequent and abundant classes (Figure 2). The following species can be highlighted: *Anthurium ernestii* Engl.*, Dieffenbachia humilis* Poepp.*, Epidendrum rigidum* Jacq.*, Philodendron mellinonii* Brongn. ex Regel, *Philodendron pectinathum, Philodendron solimoesense* A.C.Sm., *Bactris acanthocarpa* Barb.Rodr.*, Bactris brongniartii* Mart.*, Chamaedorea pinnatifrons* (Jacq.) Oerst.*, Syagrus inajai* (Spruce) Becc.*, Aechmea longifolia* (Rudge) L.B.Sm. & M.A.Spencer, *Pereskia aff. aculeata* Mill., *Rhipsalis bacifera* (J.M.Muell.) Stearn, *Heliconia densiflora var. densiflora* Verl., *Goeppertia fragilis* (Gleason) Borchs. & S.Suárez, *Brassia lanceana* Lindl.*, Epidendrum cristatum* Ruiz & Pav.*, Epidendrum schlechterianum* Ames, *Lockhartia imbricata* (Lam.) Hoehne, *Ornithocephalus bicornis* Lindl.*, Pleurothallis yauaperyensis* Barb.Rodr.*, Sobralia sessilis* Lindl..

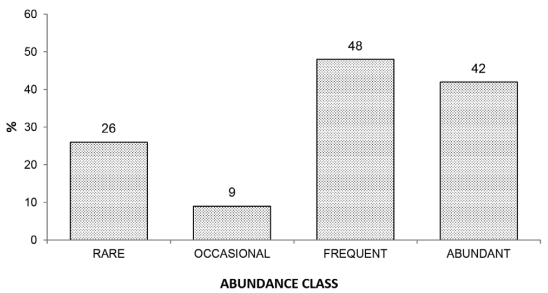

Figure 2. Species of grass growth habit, holoepiphytes, hemiepiphytes, lianas and palms percentages according to the class of abundance for dense "terra firme" rainforest located in Belo Monte Hydroelectric Plant's area of influence, situated in Pará, Brazil.

3.2. Phytosociologycal composition

A total of 27,126 trees (361 ind.ha^{-1}) were identified. They are distributed in 59 families and 481 species. Species sampled on the 75 plots distributed at 8 RAPELD modules which are situated at UHE Belo Monte's influence area are presented in alphabetical order in Table 1.

The highest absolute density species were: *Cecropia obtusa* (13.33), *Theobroma speciosum* (13.07), *Alexa grandiflora* (11.87), *Cenostigma tocantinum* (11.13), *Guapira venosa* (10.92), *Vouacapoua americana* (8.68), *Mabea speciosa* (7.03), *Inga edulis* (6.77), *Cecropia membranacea* (6.27) and *Jacaranda copaia* (6.15) (Table 1).

Overall, 3.4% are considered low occurrence species. In other words 16 species are represented by a single individual, amongst which can be mentioned *Anacardium occidentale*, *Campsiandra laurifolia*, *Cariniana micranta*, *Copaifera multijuga* and *Dussia discolor*. Among the species with higher relative dominance, *Alexa grandiflora* (8.82%), *Bertholletia excelsa* (5.39%), *Cenostigma tocantinum* (4.01%), *Vouacapoua americana* (3.65%), *Cecropia obtusa* (2.42%) and *Inga edulis* (2.01%) stand out.

The average basal area was 13.96 m^2/ha. Basal area values were between 10 and 20 m^2/ha. Distribution of trees by diameter class (Figure 3) demonstrate there is a

Table 1. List of family and species in alphabetical order and phytosociological descriptors estimation for the sampled tree comunities on 75 ha of dense "terra firme" rainforest located in Belo Monte Hydroelectric Plant's area of influence, situated in Pará, Brazil.

FAMILY/SPECIES	AUTOR	N.ind	AD	RD	AF	RF	ADo	RDo	CV	IV
ACHARIACEAE										
Lindackeria paludosa	(Benth) Gilg	86	1.15	0.317	0.301	0.509	1.406	0.129	0.223	0.318
Mayna odorata	Aubl	6	0.08	0.022	0.014	0.023	0.126	0.012	0.017	0.019
ANACARDIACEAE										
Anacardium giganteum	W Hancock ex Engl	12	0.16	0.044	0.096	0.162	1.364	0.125	0.085	0.110
Anacardium occidentale	L	1	0.01	0.004	0.014	0.023	0.078	0.007	0.005	0.011
Anacardium spruceanum	Benth ex Engl	5	0.07	0.018	0.041	0.069	0.354	0.032	0.025	0.040
Astronium gracile	Jacq	17	0.23	0.063	0.110	0.185	0.981	0.090	0.076	0.113
Astronium lecointei	Ducke	71	0.95	0.262	0.342	0.579	5.363	0.492	0.377	0.444
Mangifera indica	L	1	0.01	0.004	0.014	0.023	0.117	0.011	0.007	0.013
Spondias mombin	L	171	2.28	0.630	0.219	0.370	9.057	0.830	0.730	0.610
Tapirira guianensis	Aubl	67	0.89	0.247	0.274	0.463	2.667	0.244	0.246	0.318
Thyrsodium spruceanum	Benth	151	2.01	0.557	0.466	0.787	4.562	0.418	0.487	0.587
ANNONACEAE										
Anaxagorea prinoides	(Dunal) A.DC	6	0.08	0.022	0.027	0.046	0.090	0.008	0.015	0.026
Annona edulis	(Triana & Planch) H Rainer	9	0.12	0.033	0.055	0.093	0.234	0.021	0.027	0.049
Annona exsucca	DC	131	1.75	0.483	0.329	0.555	2.115	0.194	0.338	0.411
Annona hypoglauca	Mart	4	0.05	0.015	0.014	0.023	0.043	0.004	0.009	0.014
Annona montana	Macfad	6	0.08	0.022	0.027	0.046	0.054	0.005	0.014	0.024
Annona mucosa	Jacq	4	0.05	0.015	0.027	0.046	0.047	0.004	0.010	0.022
Cardiopetalum sp		6	0.08	0.022	0.027	0.046	0.072	0.007	0.014	0.025
Duguetia echinophora	R E Fr	12	0.16	0.044	0.027	0.046	0.266	0.024	0.034	0.038
Duguetia flagellaris	Huber	2	0.03	0.007	0.014	0.023	0.022	0.002	0.005	0.011
Duguetia riparia	Huber	4	0.05	0.015	0.027	0.046	0.198	0.018	0.016	0.026
Fusaea longifolia	(Aubl) Saff	74	0.99	0.273	0.178	0.301	2.199	0.202	0.237	0.258
Guatteria poeppigiana	Mart	146	1.95	0.538	0.438	0.741	4.171	0.382	0.460	0.554
Guatteria schomburgkiana	Mart	24	0.32	0.088	0.041	0.069	0.526	0.048	0.068	0.069
Guatteria sp 2		21	0.28	0.077	0.041	0.069	0.434	0.040	0.059	0.062
Oxandra euneura	Diels	232	3.09	0.855	0.288	0.486	3.751	0.344	0.600	0.562

N.ind = number of individuals, AD = absolute density, RD = relative density, AF = absolute frequency, RF = relative frequency, ADo = absolute dominance, RDo = relative dominance, CV = coverage value and IV = importance value.

Table 1. Continued...

FAMILY/SPECIES	AUTOR	N.ind	AD	RD	AF	RF	ADo	RDo	CV	IV
Unonopsis guatterioides	(A DC) R E Fr	16	0.21	0.059	0.068	0.116	0.205	0.019	0.039	0.064
Xylopia amazonica	R E Fr	10	0.13	0.037	0.068	0.116	0.219	0.020	0.028	0.058
Xylopia aromatica	(Lam) Mart	33	0.44	0.122	0.137	0.231	0.816	0.075	0.098	0.143
Xylopia nitida	Dunal	55	0.73	0.203	0.260	0.440	2.179	0.200	0.201	0.281
Xylopia sp 1		2	0.03	0.007	0.014	0.023	0.022	0.002	0.005	0.011
APOCYNACEAE										
Aspidosperma desmanthum	Benth ex Müll Arg	86	1.15	0.317	0.384	0.648	3.706	0.340	0.328	0.435
Aspidosperma excelsum	Benth	58	0.77	0.214	0.329	0.555	5.844	0.536	0.375	0.435
Aspidosperma sandwithianum	Markgr	2	0.03	0.007	0.014	0.023	0.024	0.002	0.005	0.011
Aspidosperma sp		11	0.15	0.041	0.068	0.116	0.477	0.044	0.042	0.067
Geissospermum sericeum	Allemao	17	0.23	0.063	0.082	0.139	1.764	0.162	0.112	0.121
Geissospermum vellosii	(Vell) Miers	25	0.33	0.092	0.137	0.231	0.816	0.075	0.083	0.133
Himatanthus sucuuba	(Spruce ex Müll Arg) Woodson	36	0.48	0.133	0.164	0.278	1.029	0.094	0.114	0.168
Lacmellea aculeata	(Ducke) Monach	13	0.17	0.048	0.055	0.093	0.492	0.045	0.046	0.062
Lacmellea arborescens	(Müll Arg) Markgr	50	0.67	0.184	0.151	0.255	0.692	0.063	0.124	0.167
Parahancornia fasciculata	(Poir) Benoist	1	0.01	0.004	0.014	0.023	0.078	0.007	0.005	0.011
Tabernaemontana siphilitica	(L.f.) Leeuwenb.	6	0.08	0.022	0.027	0.046	0.049	0.004	0.013	0.024
ARALIACEAE										
Schefflera morototoni	(Aubl) Maguire, Steyerm & Frodin	131	1.75	0.483	0.411	0.694	7.046	0.646	0.564	0.608
BIGNONIACEAE										
Handroanthus impetiginosus	(Mart ex DC) Mattos	2	0.03	0.007	0.014	0.023	0.040	0.004	0.006	0.011
Handroanthus ochraceus	(Cham) Mattos	21	0.28	0.077	0.110	0.185	2.111	0.194	0.135	0.152
Handroanthus serratifolius	(A H Gentry) S Grose	30	0.40	0.111	0.123	0.208	1.047	0.096	0.103	0.138
Jacaranda copaia	(Aubl) D Don	461	6.15	1.699	0.493	0.833	17.518	1.606	1.653	1.379
BIXACEAE										
Cochlospermum orinocense	(Kunth) Steud	155	2.07	0.571	0.110	0.185	3.544	0.325	0.448	0.360
BORAGINACEAE										
Cordia exaltata	Lam	248	3.31	0.914	0.548	0.926	5.540	0.508	0.711	0.783
Cordia goeldiana	Huber	62	0.83	0.229	0.041	0.069	1.786	0.164	0.196	0.154
Cordia nodosa	Lam	24	0.32	0.088	0.137	0.231	0.288	0.026	0.057	0.115
Cordia scabrifolia	A DC	32	0.43	0.118	0.068	0.116	0.414	0.038	0.078	0.091
Cordia sellowiana	Cham	24	0.32	0.088	0.096	0.162	0.430	0.039	0.064	0.097

N.ind = number of individuals, AD = absolute density, RD = relative density, AF = absolute frequency, RF = relative frequency, ADo = absolute dominance, RDo = relative dominance, CV = coverage value and IV = importance value.

Table 1. Continued...

FAMILY/SPECIES	AUTOR	N.ind	AD	RD	AF	RF	ADo	RDo	CV	IV
Cordia tetrandra	Aubl	29	0.39	0.107	0.027	0.046	2.242	0.206	0.156	0.120
BURSERACEAE										
Crepidospermum goudotianum	(Tul) Triana & Planch	76	1.01	0.280	0.247	0.417	2.938	0.269	0.275	0.322
Protium apiculatum	Swart	162	2.16	0.597	0.288	0.486	3.686	0.338	0.468	0.474
Protium heptaphyllum	(Aubl) Marchand	2	0.03	0.007	0.014	0.023	0.138	0.013	0.010	0.014
Protium pallidum	Cuatrec	17	0.23	0.063	0.096	0.162	0.461	0.042	0.052	0.089
Protium paniculatum	Engl	2	0.03	0.007	0.014	0.023	0.016	0.001	0.004	0.011
Protium robustum	(Swart) D M Porter	115	1.53	0.424	0.342	0.579	2.215	0.203	0.314	0.402
Protium subserratum	(Engl) Engl	77	1.03	0.284	0.329	0.555	3.681	0.337	0.311	0.392
Protium tenuifolium	(Engl) Engl	110	1.47	0.406	0.219	0.370	2.814	0.258	0.332	0.345
Protium trifoliatum	Engl	7	0.09	0.026	0.027	0.046	0.218	0.020	0.023	0.031
Tetragastris altissima	(Aubl) Swart	130	1.73	0.479	0.329	0.555	4.511	0.414	0.446	0.483
Tetragastris panamensis	(Engl) Kuntze	355	4.73	1.309	0.356	0.602	15.721	1.441	1.375	1.117
Trattinnickia lawrancei	Standl ex Swart	5	0.07	0.018	0.041	0.069	0.191	0.017	0.018	0.035
Trattinnickia rhoifolia	Willd	31	0.41	0.114	0.123	0.208	1.355	0.124	0.119	0.149
CALOPHYLLACEAE										
Caraipa densifolia	Mart	3	0.04	0.011	0.014	0.023	0.123	0.011	0.011	0.015
CANNABACEAE										
Trema micrantha	(L) Blume	12	0.16	0.044	0.027	0.046	0.232	0.021	0.033	0.037
CAPPARACEAE										
Capparis amazonica	(L) J Presl	14	0.19	0.052	0.041	0.069	0.193	0.018	0.035	0.046
CARICACEAE										
Jacaratia spinosa	(Aubl) A DC	329	4.39	1.213	0.479	0.810	16.141	1.480	1.346	1.167
CARYOCARACEAE										
Caryocar glabrum	(Aubl) Pers	4	0.05	0.015	0.027	0.046	0.088	0.008	0.011	0.023
Caryocar villosum	(Aubl) Pers	2	0.03	0.007	0.014	0.023	0.019	0.002	0.005	0.011
CELASTRACEAE										
Maytenus myrsinoides	Reissek	2	0.03	0.007	0.014	0.023	0.094	0.009	0.008	0.013
Maytenus sp 2		1	0.01	0.004	0.014	0.023	0.089	0.008	0.006	0.012
CHRYSOBALANACEAE										
Couepia guianensis	Aubl	19	0.25	0.070	0.027	0.046	0.560	0.051	0.061	0.056
Hirtella bicornis	Mart & Zucc	2	0.03	0.007	0.014	0.023	0.017	0.002	0.004	0.011
Hirtella eriandra	Benth	102	1.36	0.376	0.219	0.370	2.851	0.261	0.319	0.336
Hirtella hispidula	Miq	8	0.11	0.029	0.027	0.046	0.144	0.013	0.021	0.030
Licania apetala	(E Mey) Fritsch	4	0.05	0.015	0.027	0.046	0.074	0.007	0.011	0.023
Licania guianensis	(Aubl) Griseb	15	0.20	0.055	0.110	0.185	0.922	0.084	0.070	0.108
Licania heteromorpha	Benth	113	1.51	0.417	0.384	0.648	3.275	0.300	0.358	0.455
Licania longistyla	(Hook f) Fritsch	22	0.29	0.081	0.055	0.093	0.583	0.053	0.067	0.076
Licania membranacea	Sagot ex Laness	9	0.12	0.033	0.068	0.116	0.269	0.025	0.029	0.058

N.ind = number of individuals, AD = absolute density, RD = relative density, AF = absolute frequency, RF = relative frequency, ADo = absolute dominance, RDo = relative dominance, CV = coverage value and IV = importance value.

Table 1. Continued...

FAMILY/SPECIES	AUTOR	N.ind	AD	RD	AF	RF	ADo	RDo	CV	IV
Licania octandra	(Hoffmanns ex Roem & Schult) Kuntze	19	0.25	0.070	0.068	0.116	0.590	0.054	0.062	0.080
Licania sclerophylla	(Hook f) Fritsch	2	0.03	0.007	0.014	0.023	0.045	0.004	0.006	0.012
Licania unguiculata	Prance	3	0.04	0.011	0.027	0.046	0.223	0.020	0.016	0.026
Parinari excelsa	Sabine	54	0.72	0.199	0.192	0.324	3.086	0.283	0.241	0.269
CLUSIACEAE										
Carapa guianensis	Aubl	157	2.09	0.579	0.260	0.440	10.377	0.951	0.765	0.657
Garcinia gardneriana	(Planch & Triana) Zappi	12	0.16	0.044	0.055	0.093	0.120	0.011	0.028	0.049
Garcinia macrophylla	Mart	45	0.60	0.166	0.164	0.278	0.926	0.085	0.125	0.176
Moronobea candida	Ducke	2	0.03	0.007	0.014	0.023	0.035	0.003	0.005	0.011
Symphonia globulifera	L f	5	0.07	0.018	0.041	0.069	0.259	0.024	0.021	0.037
Tovomita choisyana	Planch & Triana	1	0.01	0.004	0.014	0.023	0.080	0.007	0.006	0.011
COMBRETACEAE										
Buchenavia grandis	Ducke	5	0.07	0.018	0.041	0.069	2.428	0.223	0.121	0.103
Buchenavia oxycarpa	(Mart) Eichler	12	0.16	0.044	0.014	0.023	0.324	0.030	0.037	0.032
Terminalia amazonia	(J F Gmel) Exell	29	0.39	0.107	0.137	0.231	2.668	0.245	0.176	0.194
Terminalia argentea	Mart	20	0.27	0.074	0.110	0.185	1.722	0.158	0.116	0.139
Terminalia dichotoma	E Mey	5	0.07	0.018	0.041	0.069	0.844	0.077	0.048	0.055
CONNARACEAE										
Connarus erianthus	Benth ex Baker	2	0.03	0.007	0.014	0.023	0.016	0.001	0.004	0.011
EBENACEAE										
Diospyros artanthifolia	Mart	12	0.16	0.044	0.055	0.093	0.175	0.016	0.030	0.051
Diospyros capreifolia	Mart ex Hiern	4	0.05	0.015	0.014	0.023	0.073	0.007	0.011	0.015
Diospyros guianensis	(Aubl) Gürke	9	0.12	0.033	0.055	0.093	5.478	0.502	0.268	0.209
Diospyros vestita	Benoist	138	1.84	0.509	0.425	0.717	4.869	0.446	0.478	0.558
ELAEOCARPACEAE										
Sloanea eichleri	K Schum	5	0.07	0.018	0.027	0.046	0.252	0.023	0.021	0.029
Sloanea garckeana	K Schum	2	0.03	0.007	0.014	0.023	0.058	0.005	0.006	0.012
Sloanea grandiflora	Sm	63	0.84	0.232	0.192	0.324	1.429	0.131	0.182	0.229
Sloanea guianensis	(Aubl) Benth	2	0.03	0.007	0.014	0.023	0.075	0.007	0.007	0.012
ERYTHROXYLACEAE										
Erythroxylum amplum	Benth	4	0.05	0.015	0.014	0.023	0.051	0.005	0.010	0.014
EUPHORBIACEAE										
Actinostemon amazonicus	Pax & K. Hoffm.	10	0.13	0.037	0.027	0.046	0.136	0.012	0.025	0.032
Alchornea schomburgkii	Poepp	2	0.03	0.007	0.014	0.023	0.026	0.002	0.005	0.011
Croton glandulosus	L	20	0.27	0.074	0.041	0.069	0.308	0.028	0.051	0.057
Croton sp		10	0.13	0.037	0.027	0.046	0.136	0.012	0.025	0.032
Dodecastigma integrifolium	(Lanj) Lanj & Sandwith	14	0.19	0.052	0.055	0.093	0.150	0.014	0.033	0.053

N.ind = number of individuals, AD = absolute density, RD = relative density, AF = absolute frequency, RF = relative frequency, ADo = absolute dominance, RDo = relative dominance, CV = coverage value and IV = importance value.

Table 1. Continued...

FAMILY/SPECIES	AUTOR	N.ind	AD	RD	AF	RF	ADo	RDo	CV	IV
Glycydendron amazonicum	Ducke	2	0.03	0.007	0.014	0.023	0.090	0.008	0.008	0.013
Hevea brasiliensis	(Willd ex A Juss) Müll Arg	53	0.71	0.195	0.096	0.162	5.165	0.473	0.334	0.277
Mabea nitida	Spruce ex benth.	527	7.03	1.943	0.137	0.231	15.796	1.448	1.695	1.207
Mabea paniculata	Spruce ex Benth.	25	0.33	0.092	0.014	0.023	0.956	0.088	0.090	0.068
Maprounea guianensis	(Miq) T D Penn	12	0.16	0.044	0.055	0.093	0.182	0.017	0.030	0.051
Sagotia racemosa	Baill	2	0.03	0.007	0.014	0.023	0.030	0.003	0.005	0.011
Sapium glandulosum	(L) Morong	6	0.08	0.022	0.027	0.046	0.168	0.015	0.019	0.028
Sapium lanceolatum	(L) Morong	175	2.33	0.645	0.466	0.787	7.491	0.687	0.666	0.706
Sapium marmieri	Huber	164	2.19	0.605	0.342	0.579	4.496	0.412	0.508	0.532
FABACEAE										
Abarema jupunba	(Willd) Britton & Killip	99	1.32	0.365	0.274	0.463	3.674	0.337	0.351	0.388
Abarema mataybifolia	(Sandwith) Barneby & J W Grime	3	0.04	0.011	0.027	0.046	0.149	0.014	0.012	0.024
Albizia niopoides	(Spruce ex Benth) Burkart	3	0.04	0.011	0.027	0.046	0.123	0.011	0.011	0.023
Albizia pedicellaris	(DC) L Rico	31	0.41	0.114	0.137	0.231	3.212	0.294	0.204	0.213
Alexa grandiflora	Ducke	890	11.87	3.281	0.685	1.157	96.202	8.819	6.050	4.419
Amphiodon effusus	Huber	44	0.59	0.162	0.082	0.139	0.601	0.055	0.109	0.119
Andira surinamensis	(Bondt) Splitg ex Amshoff	2	0.03	0.007	0.014	0.023	0.028	0.003	0.005	0.011
Apuleia leiocarpa	(Vogel) J F Macbr	108	1.44	0.398	0.397	0.671	8.428	0.773	0.585	0.614
Bauhinia acreana	Harms	101	1.35	0.372	0.233	0.393	2.235	0.205	0.289	0.324
Bauhinia longicuspis	Benth	59	0.79	0.218	0.082	0.139	1.570	0.144	0.181	0.167
Campsiandra laurifolia	Benth	2	0.03	0.007	0.014	0.023	0.112	0.010	0.009	0.014
Cassia fastuosa	Willd ex Benth	29	0.39	0.107	0.137	0.231	1.334	0.122	0.115	0.154
Cenostigma tocantinum	Ducke	835	11.13	3.078	0.260	0.440	43.725	4.008	3.543	2.509
Chamaecrista bahiae	(H S Irwin) H S Irwin & Barneby	19	0.25	0.070	0.027	0.046	0.408	0.037	0.054	0.051
Chamaecrista xinguensis	(Ducke) H S Irwin & Barneby	172	2.29	0.634	0.329	0.555	5.305	0.486	0.560	0.559
Copaifera martii	Hayne	8	0.11	0.029	0.068	0.116	0.363	0.033	0.031	0.059
Copaifera multijuga	Hayne	1	0.01	0.004	0.014	0.023	0.269	0.025	0.014	0.017
Crudia oblonga	Benth	31	0.41	0.114	0.027	0.046	1.464	0.134	0.124	0.098
Crudia tomentosa	(Aubl) J F Macbr	10	0.13	0.037	0.027	0.046	0.298	0.027	0.032	0.037
Cynometra marginata	Benth	46	0.61	0.170	0.055	0.093	3.952	0.362	0.266	0.208

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Table 1. Continued...

FAMILY/SPECIES	AUTOR	N.ind	AD	RD	AF	RF	ADo	RDo	CV	IV
Dialium guianense	(Aubl) Sandwith	172	2.29	0.634	0.493	0.833	4.863	0.446	0.540	0.638
Diplotropis purpurea	(Rich) Amshoff	11	0.15	0.041	0.068	0.116	0.264	0.024	0.032	0.060
Dipteryx odorata	(Aubl) Willd	16	0.21	0.059	0.110	0.185	0.976	0.089	0.074	0.111
Dussia discolor	(Benth) Amshoff	3	0.04	0.011	0.027	0.046	0.200	0.018	0.015	0.025
Enterolobium maximum	Ducke	12	0.16	0.044	0.110	0.185	1.584	0.145	0.095	0.125
Enterolobium schomburgkii	(Benth) Benth	26	0.35	0.096	0.192	0.324	2.045	0.187	0.142	0.202
Erythrina fusca	Lour	35	0.47	0.129	0.192	0.324	1.306	0.120	0.124	0.191
Hydrochorea corymbosa	(Rich) Barneby & J W Grimes	22	0.29	0.081	0.027	0.046	0.716	0.066	0.073	0.064
Hymenaea courbaril	L	26	0.35	0.096	0.151	0.255	6.594	0.604	0.350	0.318
Hymenaea intermedia	Ducke	22	0.29	0.081	0.096	0.162	1.180	0.108	0.095	0.117
Hymenaea oblongifolia	Huber	17	0.23	0.063	0.055	0.093	0.649	0.059	0.061	0.072
Hymenaea parvifolia	Huber	7	0.09	0.026	0.055	0.093	0.619	0.057	0.041	0.058
Hymenolobium petraeum	Ducke	8	0.11	0.029	0.055	0.093	0.115	0.011	0.020	0.044
Inga alba	(Sw) Willd	327	4.36	1.205	0.603	1.018	13.518	1.239	1.222	1.154
Inga auristellae	Harms	6	0.08	0.022	0.041	0.069	0.079	0.007	0.015	0.033
Inga brachystachys	Ducke	262	3.49	0.966	0.521	0.879	5.876	0.539	0.752	0.795
Inga capitata	Desv	57	0.76	0.210	0.233	0.393	1.181	0.108	0.159	0.237
Inga cayennensis	Sagot ex Benth	39	0.52	0.144	0.151	0.255	0.970	0.089	0.116	0.162
Inga edulis	Mart	505	6.73	1.862	0.712	1.203	21.884	2.006	1.934	1.690
Inga gracilifolia	Ducke	2	0.03	0.007	0.014	0.023	0.016	0.001	0.004	0.011
Inga grandiflora	Ducke	10	0.13	0.037	0.041	0.069	0.154	0.014	0.026	0.040
Inga heterophylla	Willd	115	1.53	0.424	0.397	0.671	2.713	0.249	0.336	0.448
Inga laurina	(Sw) Willd	28	0.37	0.103	0.137	0.231	0.619	0.057	0.080	0.130
Inga nobilis	Willd	16	0.21	0.059	0.055	0.093	0.191	0.018	0.038	0.056
Inga paraensis	Ducke	248	3.31	0.914	0.479	0.810	7.737	0.709	0.812	0.811
Inga rubiginosa	(Rich) DC	195	2.60	0.719	0.205	0.347	8.886	0.815	0.767	0.627
Inga sapindoides	Willd	2	0.03	0.007	0.014	0.023	0.019	0.002	0.005	0.011
Inga sp 3		2	0.03	0.007	0.014	0.023	0.031	0.003	0.005	0.011
Inga splendens	Willd	16	0.21	0.059	0.082	0.139	0.255	0.023	0.041	0.074
Inga thibaudiana	DC	166	2.21	0.612	0.329	0.555	3.061	0.281	0.446	0.483
Machaerium sp 1		1	0.01	0.004	0.014	0.023	0.165	0.015	0.009	0.014
Machaerium sp 2		4	0.05	0.015	0.014	0.023	0.077	0.007	0.011	0.015
Macrolobium acaciifolium	Benth	4	0.05	0.015	0.014	0.023	0.047	0.004	0.010	0.014
Macrolobium bifolium	(Aubl) Pers	4	0.05	0.015	0.027	0.046	0.152	0.014	0.014	0.025
Mora paraensis	(Ducke) Ducke	12	0.16	0.044	0.014	0.023	1.487	0.136	0.090	0.068
Mucuna urens	(L) Medik	4	0.05	0.015	0.027	0.046	0.098	0.009	0.012	0.023
Ormosia coutinhoi	Ducke	2	0.03	0.007	0.014	0.023	0.094	0.009	0.008	0.013
Ormosia flava	(Ducke) Rudd	4	0.05	0.015	0.041	0.069	0.652	0.060	0.037	0.048
Ormosia paraensis	Ducke	6	0.08	0.022	0.041	0.069	0.062	0.006	0.014	0.032

N.ind = number of individuals, AD = absolute density, RD = relative density, AF = absolute frequency, RF = relative frequency, ADo = absolute dominance, RDo = relative dominance, CV = coverage value and IV = importance value.

Table 1. Continued...

FAMILY/SPECIES	AUTOR	N.ind	AD	RD	AF	RF	ADo	RDo	CV	IV
Parkia multijuga	Benth	40	0.53	0.147	0.219	0.370	6.884	0.631	0.389	0.383
Parkia pendula	(Willd) Benth ex Walp	12	0.16	0.044	0.110	0.185	3.865	0.354	0.199	0.195
Parkia ulei	(Harms) Kuhlm	1	0.01	0.004	0.014	0.023	0.081	0.007	0.006	0.011
Parkia velutina	Benoist	2	0.03	0.007	0.014	0.023	0.077	0.007	0.007	0.013
Platymiscium filipes	Benth	13	0.17	0.048	0.096	0.162	0.862	0.079	0.063	0.096
Pseudopiptadenia psilostachya	(DC) G P Lewis & M P Lima	40	0.53	0.147	0.164	0.278	3.796	0.348	0.248	0.258
Pseudopiptadenia suaveolens	(Miq) J W Grimes	3	0.04	0.011	0.027	0.046	0.153	0.014	0.013	0.024
Pterocarpus amazonum	L'Her ex DC	17	0.23	0.063	0.014	0.023	0.576	0.053	0.058	0.046
Pterocarpus officinalis	Jacq	115	1.53	0.424	0.233	0.393	9.248	0.848	0.636	0.555
Pterocarpus rohrii	Vahl	16	0.21	0.059	0.096	0.162	0.624	0.057	0.058	0.093
Samanea saman	(Jacq) Merr	3	0.04	0.011	0.014	0.023	0.287	0.026	0.019	0.020
Schizolobium parahyba var Amazonicum	(Huber ex Ducke) Barneby	315	4.20	1.161	0.315	0.532	18.452	1.691	1.426	1.128
Senegalia polyphylla	(DC) Britton & Rose	155	2.07	0.571	0.247	0.417	4.442	0.407	0.489	0.465
Senna multijuga	(Rich) H S Irwin & Barneby	234	3.12	0.863	0.315	0.532	6.523	0.598	0.730	0.664
Senna silvestris	(Vell) H S Irwin & Barneby	6	0.08	0.022	0.014	0.023	0.136	0.012	0.017	0.019
Stryphnodendron adstringens	(Mart) Coville	45	0.60	0.166	0.137	0.231	0.877	0.080	0.123	0.159
Stryphnodendron guianense	(Aubl) Benth	107	1.43	0.394	0.315	0.532	3.759	0.345	0.370	0.424
Stryphnodendron paniculatum	Poepp & Endl	49	0.65	0.181	0.233	0.393	4.591	0.421	0.301	0.332
Stryphnodendron pulcherrimum	(Willd) Hochr	10	0.13	0.037	0.041	0.069	0.184	0.017	0.027	0.041
Swartzia arborescens	(Aubl) Pittier	14	0.19	0.052	0.041	0.069	0.265	0.024	0.038	0.048
Swartzia flaemingii	Raddi	42	0.56	0.155	0.178	0.301	0.745	0.068	0.112	0.175
Swartzia laurifolia	Benth	85	1.13	0.313	0.425	0.717	2.063	0.189	0.251	0.407
Swartzia polyphylla	DC	6	0.08	0.022	0.055	0.093	0.534	0.049	0.036	0.055
Swartzia sp		5	0.07	0.018	0.041	0.069	0.308	0.028	0.023	0.039
Tachigali chrysophylla	Poepp	7	0.09	0.026	0.027	0.046	1.483	0.136	0.081	0.069
Tachigali myrmecophila	(Ducke) Ducke	326	4.35	1.202	0.712	1.203	9.640	0.884	1.043	1.096
Tachigali paniculata	Aubl	17	0.23	0.063	0.082	0.139	1.489	0.136	0.100	0.113
Vataieropsis sp		19	0.25	0.070	0.055	0.093	0.818	0.075	0.073	0.079
Vatairea guianensis	Aubl	30	0.40	0.111	0.041	0.069	1.732	0.159	0.135	0.113
Vouacapoua americana	Aubl	651	8.68	2.400	0.438	0.741	39.868	3.655	3.027	2.265
Zollernia paraensis	Huber	33	0.44	0.122	0.151	0.255	1.523	0.140	0.131	0.172
Zygia cauliflora	(Willd) Killip	19	0.25	0.070	0.055	0.093	0.305	0.028	0.049	0.064

N.ind = number of individuals, AD = absolute density, RD = relative density, AF = absolute frequency, RF = relative frequency, ADo = absolute dominance, RDo = relative dominance, CV = coverage value and IV = importance value.

Table 1. Continued...

FAMILY/SPECIES	AUTOR	N.ind	AD	RD	AF	RF	ADo	RDo	CV	IV
Zygia inundata	(Ducke) H C Lima ex Barneby & Grimes	5	0.07	0.018	0.027	0.046	0.192	0.018	0.018	0.027
Zygia latifolia	(L) Fawc & Rendle	59	0.79	0.218	0.123	0.208	1.318	0.121	0.169	0.182
Zygia racemosa	(Ducke) Barneby & J W Grimes	16	0.21	0.059	0.041	0.069	0.413	0.038	0.048	0.055
GOUPIACEAE										
Goupia glabra	Aubl	1	0.01	0.004	0.014	0.023	0.179	0.016	0.010	0.014
HUMIRIACEAE										
Endopleura uchi	(Huber) Cuatrec	3	0.04	0.011	0.027	0.046	0.224	0.021	0.016	0.026
Sacoglottis guianensis	Benth	7	0.09	0.026	0.055	0.093	0.458	0.042	0.034	0.053
HYPERICACEAE										
Vismia baccifera	(L) Triana & Planch	136	1.81	0.501	0.274	0.463	1.689	0.155	0.328	0.373
Vismia cayennensis	(Aubl) DC	246	3.28	0.907	0.123	0.208	3.396	0.311	0.609	0.475
Vismia guianensis	(Aubl) Pers	66	0.88	0.243	0.110	0.185	0.921	0.084	0.164	0.171
LAMIACEAE										
Vitex triflora	Vahl	82	1.09	0.302	0.205	0.347	1.732	0.159	0.231	0.269
LAURACEAE										
Aiouea myristicoides	Mez	4	0.05	0.015	0.027	0.046	0.113	0.010	0.013	0.024
Aniba guianensis	Aubl	55	0.73	0.203	0.247	0.417	2.191	0.201	0.202	0.273
Dicypellium caryophyllaceum	(Mart) Nees	4	0.05	0.015	0.027	0.046	0.049	0.004	0.010	0.022
Dicypellium sp		2	0.03	0.007	0.014	0.023	0.018	0.002	0.005	0.011
Endlicheria bracteolata	(Meisn.) C.K. Allen	15	0.20	0.055	0.068	0.116	0.565	0.052	0.054	0.074
Endlicheria williamsii	O Schmidt	8	0.11	0.029	0.027	0.046	0.297	0.027	0.028	0.034
Licaria guianensis	Aubl	6	0.08	0.022	0.027	0.046	0.084	0.008	0.015	0.025
Mezilaurus itauba	(Meisn) Taub ex Mez	19	0.25	0.070	0.110	0.185	1.286	0.118	0.094	0.124
Mezilaurus lindaviana	Schwacke & Mez	6	0.08	0.022	0.041	0.069	0.176	0.016	0.019	0.036
Nectandra cuspidata	Nees	2	0.03	0.007	0.014	0.023	0.054	0.005	0.006	0.012
Nectandra pulverulenta	Nees	20	0.27	0.074	0.110	0.185	0.799	0.073	0.073	0.111
Nectandra sp 1		2	0.03	0.007	0.014	0.023	0.055	0.005	0.006	0.012
Ocotea canaliculata	(Rich) Mez	203	2.71	0.748	0.479	0.810	6.255	0.573	0.661	0.711
Ocotea caudata	(Nees) Mez	88	1.17	0.324	0.356	0.602	2.879	0.264	0.294	0.397
Ocotea cinerea	van der Werff	16	0.21	0.059	0.041	0.069	0.296	0.027	0.043	0.052
Ocotea cujumary	Mart	2	0.03	0.007	0.014	0.023	0.062	0.006	0.007	0.012
Ocotea glandulosa	Lasser	2	0.03	0.007	0.014	0.023	0.076	0.007	0.007	0.012
Ocotea glomerata	(Nees) Mez	2	0.03	0.007	0.014	0.023	0.114	0.010	0.009	0.014
Ocotea longifolia	Kunth	4	0.05	0.015	0.027	0.046	0.079	0.007	0.011	0.023
Rhodostemonodaphne grandis	(Mez) Rohwer	16	0.21	0.059	0.068	0.116	1.073	0.098	0.079	0.091
LECYTHIDACEAE										
Bertholletia excelsa	Bonpl	113	1.51	0.417	0.630	1.065	58.762	5.387	2.902	2.289

N.ind = number of individuals, AD = absolute density, RD = relative density, AF = absolute frequency, RF = relative frequency, ADo = absolute dominance, RDo = relative dominance, CV = coverage value and IV = importance value.

Table 1. Continued...

FAMILY/SPECIES	AUTOR	N.ind	AD	RD	AF	RF	ADo	RDo	CV	IV
Cariniana micrantha	Ducke	1	0.01	0.004	0.014	0.023	1.611	0.148	0.076	0.058
Couratari guianensis	Aubl	68	0.91	0.251	0.260	0.440	5.514	0.505	0.378	0.399
Couratari multiflora	(Sm) Eyma	24	0.32	0.088	0.110	0.185	2.623	0.240	0.164	0.171
Couratari oblongifolia	Ducke & Knuth	3	0.04	0.011	0.014	0.023	0.214	0.020	0.015	0.018
Couratari stellata	A C Sm	13	0.17	0.048	0.027	0.046	0.398	0.037	0.042	0.044
Eschweilera amazonica	R Knuth	2	0.03	0.007	0.014	0.023	0.127	0.012	0.010	0.014
Eschweilera bracteosa	(Poepp ex O Berg) Miers	12	0.16	0.044	0.041	0.069	0.314	0.029	0.037	0.047
Eschweilera coriacea	(DC) S A Mori	196	2.61	0.723	0.452	0.764	7.230	0.663	0.693	0.716
Eschweilera grandiflora	(Aubl) Sandwith	8	0.11	0.029	0.068	0.116	0.471	0.043	0.036	0.063
Eschweilera pedicellata	(Rich) S A Mori	22	0.29	0.081	0.082	0.139	0.503	0.046	0.064	0.089
Eschweilera sp		5	0.07	0.018	0.027	0.046	0.222	0.020	0.019	0.028
Gustavia augusta	L	82	1.09	0.302	0.315	0.532	1.138	0.104	0.203	0.313
Gustavia hexapetala	(Aubl) Sm	246	3.28	0.907	0.521	0.879	3.584	0.329	0.618	0.705
Holopixidium itacaiunensis	Pires	213	2.84	0.785	0.301	0.509	5.488	0.503	0.644	0.599
Lecythis confertiflora	(A C Sm) S A Mori	2	0.03	0.007	0.014	0.023	0.033	0.003	0.005	0.011
Lecythis corrugata	Poit	197	2.63	0.726	0.205	0.347	5.192	0.476	0.601	0.516
Lecythis holcogyne	(Sandwith) S A Mori	4	0.05	0.015	0.014	0.023	0.076	0.007	0.011	0.015
Lecythis idatimon	Aubl	78	1.04	0.288	0.068	0.116	2.140	0.196	0.242	0.200
Lecythis lurida	(Miers) S A Mori	104	1.39	0.383	0.233	0.393	3.464	0.318	0.350	0.365
Lecythis pisonis	Cambess	21	0.28	0.077	0.123	0.208	3.738	0.343	0.210	0.209
MALPIGHIACEAE										
Byrsonima aerugo	Sagot	21	0.28	0.077	0.055	0.093	0.658	0.060	0.069	0.077
Byrsonima chrysophylla	Kunth	9	0.12	0.033	0.068	0.116	0.304	0.028	0.031	0.059
Byrsonima crispa	A Juss	2	0.03	0.007	0.014	0.023	0.016	0.001	0.004	0.011
Byrsonima densa	(Poir) DC	2	0.03	0.007	0.014	0.023	0.083	0.008	0.007	0.013
MALVACEAE										
Apeiba echinata	Gaertn	118	1.57	0.435	0.315	0.532	4.415	0.405	0.420	0.457
Apeiba glabra	Aubl	4	0.05	0.015	0.027	0.046	0.164	0.015	0.015	0.025
Apeiba tibourbou	Aubl	38	0.51	0.140	0.137	0.231	1.545	0.142	0.141	0.171
Ceiba pentandra	(L) Gaertn	40	0.53	0.147	0.274	0.463	6.548	0.600	0.374	0.404
Eriotheca longipedicelata	(Ducke) A Robyns	95	1.27	0.350	0.329	0.555	2.961	0.271	0.311	0.392
Guazuma ulmifolia	Lam	283	3.77	1.043	0.466	0.787	12.724	1.166	1.105	0.999
Luehea grandiflora	Mart & Zucc	3	0.04	0.011	0.014	0.023	0.214	0.020	0.015	0.018
Matisia sp		28	0.37	0.103	0.219	0.370	3.606	0.331	0.217	0.268
Mollia lepidota	Spruce ex Benth	72	0.96	0.265	0.068	0.116	3.825	0.351	0.308	0.244
Pachira aquatica	Aubl	77	1.03	0.284	0.260	0.440	2.056	0.188	0.236	0.304
Patinoa paraensis	(Huber) Cuatrec	121	1.61	0.446	0.110	0.185	5.961	0.546	0.496	0.393
Quararibea guianensis	Aubl	392	5.23	1.445	0.342	0.579	5.672	0.520	0.983	0.848
Sterculia apelata	Ducke	14	0.19	0.052	0.123	0.208	2.228	0.204	0.128	0.155

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Table 1. Continued...

FAMILY/SPECIES	AUTOR	N.ind	AD	RD	AF	RF	ADo	RDo	CV	IV
Sterculia excelsa	Mart	7	0.09	0.026	0.068	0.116	0.599	0.055	0.040	0.065
Sterculia pruriens	(Aubl) K Schum	183	2.44	0.675	0.438	0.741	9.601	0.880	0.777	0.765
Theobroma grandiflorum	(Willd ex Spreng) K Schum	18	0.24	0.066	0.068	0.116	0.383	0.035	0.051	0.072
Theobroma speciosum	Willd ex Spreng	980	13.07	3.613	0.726	1.227	14.562	1.335	2.474	2.058
Theobroma subincanum	Mart	53	0.71	0.195	0.164	0.278	0.947	0.087	0.141	0.187
MARCGRAVIACEAE										
Norantea guianensis	Aubl	2	0.03	0.007	0.014	0.023	0.034	0.003	0.005	0.011
MELASTOMATACEAE										
Bellucia dichotoma	Cogn	24	0.32	0.088	0.082	0.139	0.419	0.038	0.063	0.089
Bellucia grossularioides	(L) Triana	236	3.15	0.870	0.260	0.440	5.613	0.515	0.692	0.608
Miconia affinis	DC	10	0.13	0.037	0.041	0.069	0.109	0.010	0.023	0.039
Miconia minutiflora	(Bonpl) DC	10	0.13	0.037	0.041	0.069	0.106	0.010	0.023	0.039
Miconia pyrifolia	Naudin	58	0.77	0.214	0.219	0.370	1.618	0.148	0.181	0.244
Mouriri brachyanthera	Ducke	22	0.29	0.081	0.055	0.093	0.450	0.041	0.061	0.072
MELIACEAE										
Cedrela fissilis	Vell	2	0.03	0.007	0.014	0.023	0.026	0.002	0.005	0.011
Cedrela odorata	L	19	0.25	0.070	0.082	0.139	0.818	0.075	0.073	0.095
Guarea carinata	Ducke	421	5.61	1.552	0.534	0.903	10.613	0.973	1.262	1.142
Guarea guidonia	(L) Sleumer	34	0.45	0.125	0.137	0.231	1.703	0.156	0.141	0.171
Guarea kunthiana	A Juss	346	4.61	1.276	0.438	0.741	7.618	0.698	0.987	0.905
Guarea silvatica	C DC	2	0.03	0.007	0.014	0.023	0.017	0.002	0.004	0.011
Guarea sp 1		71	0.95	0.262	0.123	0.208	1.473	0.135	0.198	0.202
Trichilia cipo	(A Juss) C DC	85	1.13	0.313	0.110	0.185	1.941	0.178	0.246	0.225
Trichilia lecointei	Ducke	32	0.43	0.118	0.137	0.231	1.073	0.098	0.108	0.149
Trichilia micrantha	Benth	126	1.68	0.464	0.274	0.463	2.569	0.236	0.350	0.388
Trichilia oligantha	C DC	4	0.05	0.015	0.014	0.023	0.055	0.005	0.010	0.014
Trichilia quadrijuga	Kunth	24	0.32	0.088	0.082	0.139	0.542	0.050	0.069	0.092
MORACEAE										
Artocarpus heterophyllus	Lam	2	0.03	0.007	0.014	0.023	0.122	0.011	0.009	0.014
Artocarpus sp	Ducke	12	0.16	0.044	0.055	0.093	0.126	0.012	0.028	0.049
Bagassa guianensis	Aubl	7	0.09	0.026	0.041	0.069	0.319	0.029	0.028	0.041
Batocarpus amazonicus	(Ducke) Fosberg	3	0.04	0.011	0.027	0.046	0.297	0.027	0.019	0.028
Brosimum acutifolium	Huber	32	0.43	0.118	0.205	0.347	2.159	0.198	0.158	0.221
Brosimum guianense	(Aubl) Huber	65	0.87	0.240	0.164	0.278	2.540	0.233	0.236	0.250
Brosimum lactescens	(S Moore) C C Berg	42	0.56	0.155	0.082	0.139	1.594	0.146	0.150	0.147
Brosimum parinarioides	Ducke	4	0.05	0.015	0.027	0.046	0.352	0.032	0.023	0.031
Brosimum potabile	Ducke	8	0.11	0.029	0.068	0.116	0.491	0.045	0.037	0.063
Brosimum rubescens	Taub	2	0.03	0.007	0.014	0.023	0.024	0.002	0.005	0.011
Clarisia racemosa	Ruiz & Pav	5	0.07	0.018	0.027	0.046	0.633	0.058	0.038	0.041
Ficus americana subsp guianensis	(Desv.) C.C. Berg	6	0.08	0.022	0.055	0.093	0.512	0.047	0.035	0.054

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Table 1. Continued...

FAMILY/SPECIES	AUTOR	N.ind	AD	RD	AF	RF	ADo	RDo	CV	IV
Ficus maxima	Mill	25	0.33	0.092	0.123	0.208	4.486	0.411	0.252	0.237
Helicostylis pedunculata	Benoist	22	0.29	0.081	0.096	0.162	0.424	0.039	0.060	0.094
Helicostylis scabra	(J F Macbr) C C Berg	20	0.27	0.074	0.068	0.116	0.371	0.034	0.054	0.074
Helicostylis tomentosa	(Poepp & Endl) Rusby	32	0.43	0.118	0.137	0.231	0.505	0.046	0.082	0.132
Maclura tinctoria	(L) D Don ex Steud	23	0.31	0.085	0.055	0.093	0.612	0.056	0.070	0.078
Maquira calophylla	(Poepp & Endl) C C Berg	6	0.08	0.022	0.027	0.046	0.081	0.007	0.015	0.025
Maquira coriacea	(H Karst) C C Berg	13	0.17	0.048	0.068	0.116	0.231	0.021	0.035	0.062
Maquira guianensis	Aubl	97	1.29	0.358	0.301	0.509	2.167	0.199	0.278	0.355
Maquira sclerophylla	(Ducke) C C Berg	24	0.32	0.088	0.123	0.208	0.817	0.075	0.082	0.124
Naucleopsis caloneura	(Huber) Ducke	27	0.36	0.100	0.096	0.162	0.359	0.033	0.066	0.098
Naucleopsis sp		2	0.03	0.007	0.014	0.023	0.023	0.002	0.005	0.011
Perebea mollis	(Poepp & Endl) Huber subsp mollis	255	3.40	0.940	0.575	0.972	5.087	0.466	0.703	0.793
Pseudolmedia laevigata	Trecul	18	0.24	0.066	0.055	0.093	0.446	0.041	0.054	0.067
Pseudolmedia laevis	(Ruiz & Pav) J F Macbr	10	0.13	0.037	0.055	0.093	0.151	0.014	0.025	0.048
Pseudolmedia macrophylla	Trecul	28	0.37	0.103	0.110	0.185	1.241	0.114	0.108	0.134
Sorocea duckei	W C Burger	4	0.05	0.015	0.027	0.046	0.142	0.013	0.014	0.025
Sorocea guilleminiana	Gaudich	11	0.15	0.041	0.082	0.139	0.175	0.016	0.028	0.065
Trymatococcus amazonicus	Poepp & Endl	14	0.19	0.052	0.096	0.162	0.160	0.015	0.033	0.076
MYRISTICACEAE										
Iryanthera juruensis	Warb	22	0.29	0.081	0.096	0.162	0.370	0.034	0.058	0.092
Iryanthera laevis	Markgr	2	0.03	0.007	0.014	0.023	0.052	0.005	0.006	0.012
Osteophloeum platyspermum	(Spruce ex A DC) Warb	6	0.08	0.022	0.041	0.069	0.136	0.012	0.017	0.035
Virola crebrinervia	Ducke	8	0.11	0.029	0.041	0.069	0.212	0.019	0.024	0.039
Virola elongata	(Benth) Warb	18	0.24	0.066	0.082	0.139	0.271	0.025	0.046	0.077
Virola michelii	Heckel	199	2.65	0.734	0.452	0.764	9.803	0.899	0.816	0.799
Virola pavonis	(A DC) A C Sm	14	0.19	0.052	0.055	0.093	0.741	0.068	0.060	0.071
Virola surinamensis	(Rol ex Rottb) Warb	15	0.20	0.055	0.068	0.116	3.018	0.277	0.166	0.149
MYRTACEAE										
Calyptranthes bipennis	O Berg	67	0.89	0.247	0.205	0.347	1.150	0.105	0.176	0.233

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Table 1. Continued...

FAMILY/SPECIES	AUTOR	N.ind	AD	RD	AF	RF	ADo	RDo	CV	IV
Eugenia coffeifolia	DC	2	0.03	0.007	0.014	0.023	0.048	0.004	0.006	0.012
Eugenia cupulata	Amshoff	30	0.40	0.111	0.055	0.093	0.386	0.035	0.073	0.080
Eugenia flavescens	DC	94	1.25	0.347	0.301	0.509	1.745	0.160	0.253	0.339
Eugenia patrisii	Vahl	8	0.11	0.029	0.041	0.069	0.157	0.014	0.022	0.038
Eugenia ramiflora	Desv	8	0.11	0.029	0.041	0.069	0.076	0.007	0.018	0.035
Myrcia fallax	(Sw) DC	34	0.45	0.125	0.192	0.324	0.626	0.057	0.091	0.169
Myrcia splendens	(Sw) DC	6	0.08	0.022	0.027	0.046	0.089	0.008	0.015	0.026
Psidium guajava	L	10	0.13	0.037	0.055	0.093	0.114	0.010	0.024	0.047
NI	NI	7	0.09	0.026	0.027	0.046	0.429	0.039	0.033	0.037
NYCTAGINACEAE										
Guapira hirsuta	(Choisy) Lundell	25	0.33	0.092	0.082	0.139	0.502	0.046	0.069	0.092
Guapira venosa	(Choisy) Lundell	819	10.92	3.019	0.699	1.180	19.578	1.795	2.407	1.998
Neea floribunda	Poepp & Endl	24	0.32	0.088	0.068	0.116	0.722	0.066	0.077	0.090
OLACACEAE										
Cathedra acuminata	(Benth) Mier	2	0.03	0.007	0.014	0.023	0.046	0.004	0.006	0.012
Chaunochiton kappleri	(Sagot ex Engl) Ducke	40	0.53	0.147	0.233	0.393	1.803	0.165	0.156	0.235
Heisteria acuminata	(Humb & Bonpl) Engl	2	0.03	0.007	0.014	0.023	0.029	0.003	0.005	0.011
Heisteria barbata	Cuatrec	2	0.03	0.007	0.014	0.023	0.078	0.007	0.007	0.013
Minquartia guianensis	Aubl	18	0.24	0.066	0.096	0.162	0.903	0.083	0.075	0.104
OPILIACEAE										
Agonandra brasiliensis	Miers ex Benth & Hook f	14	0.19	0.052	0.082	0.139	0.275	0.025	0.038	0.072
PERACEAE										
Pera cf glabrata	(Schott) Poepp. Ex Baill	2	0.03	0.007	0.014	0.023	0.019	0.002	0.005	0.011
PHYLLANTHACEAE										
Discocarpus essequeboensis	Vahl ex Vent	10	0.13	0.037	0.041	0.069	0.176	0.016	0.027	0.041
Hieronyma alchorneoides	Allemao	4	0.05	0.015	0.041	0.069	0.383	0.035	0.025	0.040
Margaritaria nobilis	L f	54	0.72	0.199	0.164	0.278	1.364	0.125	0.162	0.201
POLYGONACEAE										
Coccoloba mollis	Casar	42	0.56	0.155	0.219	0.370	1.304	0.120	0.137	0.215
Coccoloba ovata	Benth	14	0.19	0.052	0.041	0.069	0.259	0.024	0.038	0.048
Triplaris weigeltiana	(Rchb) Kuntze	6	0.08	0.022	0.041	0.069	0.112	0.010	0.016	0.034
PROTEACEAE										
Roupala montana	Aubl	23	0.31	0.085	0.151	0.255	1.399	0.128	0.107	0.156
QUIINACEAE										
Lacunaria crenata	(Tul) A C Sm	16	0.21	0.059	0.096	0.162	0.176	0.016	0.038	0.079
Quiina sp		2	0.03	0.007	0.014	0.023	0.022	0.002	0.005	0.011
RUBIACEAE										

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Table 1. Continued...

FAMILY/SPECIES	AUTOR	N.ind	AD	RD	AF	RF	ADo	RDo	CV	IV
Capirona decorticans	Spruce	20	0.27	0.074	0.082	0.139	0.440	0.040	0.057	0.084
Chimarrhis turbinata	DC	12	0.16	0.044	0.082	0.139	1.662	0.152	0.098	0.112
Cinchona sp		4	0.05	0.015	0.014	0.023	0.055	0.005	0.010	0.014
Cordiera macrophylla	(K Schum) Kuntze	2	0.03	0.007	0.014	0.023	0.021	0.002	0.005	0.011
Faramea cf. involucellata	Müll.Arg.	14	0.19	0.052	0.096	0.162	0.297	0.027	0.039	0.080
Ferdinandusa chlorantha	(Wedd) Standl	24	0.32	0.088	0.068	0.116	0.840	0.077	0.083	0.094
Genipa americana	L	13	0.17	0.048	0.055	0.093	0.360	0.033	0.040	0.058
Psychotria sp	L	2	0.03	0.007	0.014	0.023	0.023	0.002	0.005	0.011
Randia armata	(Sw) DC	2	0.03	0.007	0.014	0.023	0.046	0.004	0.006	0.012
RUTACEAE										
Raputia sp		12	0.16	0.044	0.014	0.023	0.161	0.015	0.030	0.027
Zanthoxylum rhoifolium	Lam	60	0.80	0.221	0.219	0.370	1.436	0.132	0.176	0.241
Zanthoxylum riedelianum	Engl	77	1.03	0.284	0.247	0.417	2.265	0.208	0.246	0.303
Zanthoxylum sp 1		6	0.08	0.022	0.027	0.046	0.094	0.009	0.015	0.026
SALICACEAE										
Banara guianensis	Aubl	14	0.19	0.052	0.027	0.046	0.154	0.014	0.033	0.037
Casearia grandiflora	Cambess	4	0.05	0.015	0.027	0.046	0.043	0.004	0.009	0.022
Casearia javitensis	Kunth	18	0.24	0.066	0.110	0.185	0.404	0.037	0.052	0.096
Casearia pitumba	Sleumer	32	0.43	0.118	0.055	0.093	0.404	0.037	0.078	0.083
Casearia sylvestris	Sw	4	0.05	0.015	0.014	0.023	0.063	0.006	0.010	0.015
Hasseltia floribunda	Kunth	27	0.36	0.100	0.068	0.116	0.770	0.071	0.085	0.095
Homalium guianense	(Aubl) Oken	14	0.19	0.052	0.041	0.069	0.140	0.013	0.032	0.045
Laetia procera	(Poepp) Eichler	25	0.33	0.092	0.137	0.231	1.314	0.120	0.106	0.148
SAPINDACEAE										
Cupania scrobiculata	Rich	32	0.43	0.118	0.178	0.301	0.621	0.057	0.087	0.159
Matayba inelegans	Spruce ex Radlk	46	0.61	0.170	0.082	0.139	0.617	0.057	0.113	0.122
Matayba sp	Aubl	106	1.41	0.391	0.110	0.185	1.784	0.164	0.277	0.246
Pseudima frutescens	(Aubl) Radlk	30	0.40	0.111	0.137	0.231	0.469	0.043	0.077	0.128
Talisia longifolia	(Benth) Radlk	12	0.16	0.044	0.068	0.116	0.160	0.015	0.029	0.058
Talisia mollis	Kunth ex Cambess	2	0.03	0.007	0.014	0.023	0.029	0.003	0.005	0.011
Talisia veraluciana	Guarim	4	0.05	0.015	0.027	0.046	0.083	0.008	0.011	0.023
Toulicia guianensis	Aubl	69	0.92	0.254	0.205	0.347	1.091	0.100	0.177	0.234
Vouarana guianensis	Aubl	2	0.03	0.007	0.014	0.023	0.022	0.002	0.005	0.011
SAPOTACEAE										
Chrysophyllum argenteum	Jacq	2	0.03	0.007	0.014	0.023	0.030	0.003	0.005	0.011
Chrysophyllum lucentifolium subsp pachycarpum	Pires & T D Penn	106	1.41	0.391	0.384	0.648	4.923	0.451	0.421	0.497
Chrysophyllum prieurii	A DC	4	0.05	0.015	0.027	0.046	0.053	0.005	0.010	0.022
Chrysophyllum venezuelanense	(Pierre) T D Penn	6	0.08	0.022	0.027	0.046	0.470	0.043	0.033	0.037
Ecclinusa guianensis	Eyma	31	0.41	0.114	0.068	0.116	1.239	0.114	0.114	0.115

N.ind = number of individuals, AD = absolute density, RD = relative density, AF = absolute frequency, RF = relative frequency, ADo = absolute dominance, RDo = relative dominance, CV = coverage value and IV = importance value.

Table 1. Continued...

FAMILY/SPECIES	AUTOR	N.ind	AD	RD	AF	RF	ADo	RDo	CV	IV
Manilkara amazonica	(Huber) A Chev	4	0.05	0.015	0.027	0.046	0.042	0.004	0.009	0.022
Manilkara huberi	Chevalier	22	0.29	0.081	0.123	0.208	1.935	0.177	0.129	0.156
Micropholis acutangula	(Ducke) Eyma	44	0.59	0.162	0.164	0.278	2.725	0.250	0.206	0.230
Micropholis egensis	(A DC) Pierre	2	0.03	0.007	0.014	0.023	0.033	0.003	0.005	0.011
Micropholis guyanensis	(A DC) Pierre	14	0.19	0.052	0.082	0.139	0.219	0.020	0.036	0.070
Micropholis venulosa	(Mart & Eichler) Pierre	12	0.16	0.044	0.068	0.116	0.305	0.028	0.036	0.063
Pouteria anibifolia	(Engl) Eyma	6	0.08	0.022	0.041	0.069	0.050	0.005	0.013	0.032
Pouteria anomala	(Pires) T D Penn	5	0.07	0.018	0.027	0.046	0.120	0.011	0.015	0.025
Pouteria caimito	(Ruiz & Pav) Radlk	81	1.08	0.299	0.260	0.440	3.065	0.281	0.290	0.340
Pouteria cladantha	Sandwith	35	0.47	0.129	0.164	0.278	1.264	0.116	0.122	0.174
Pouteria decorticans	T D Penn	19	0.25	0.070	0.082	0.139	0.999	0.092	0.081	0.100
Pouteria elegans	(A DC) Baehni	6	0.08	0.022	0.027	0.046	0.105	0.010	0.016	0.026
Pouteria engleri	Eyma	6	0.08	0.022	0.041	0.069	0.173	0.016	0.019	0.036
Pouteria eugeniifolia	(Pierre) Baehni	12	0.16	0.044	0.068	0.116	0.709	0.065	0.055	0.075
Pouteria filipes	Eyma	33	0.44	0.122	0.192	0.324	1.517	0.139	0.130	0.195
Pouteria gongrijpii	Eyma	68	0.91	0.251	0.151	0.255	1.873	0.172	0.211	0.226
Pouteria guianensis	Aubl	105	1.40	0.387	0.370	0.625	3.048	0.279	0.333	0.430
Pouteria hispida	Eyma	4	0.05	0.015	0.027	0.046	0.111	0.010	0.012	0.024
Pouteria jariensis	Pires & T D Penn	123	1.64	0.453	0.301	0.509	2.634	0.241	0.347	0.401
Pouteria krukovii	(A C Sm) Baehni	2	0.03	0.007	0.014	0.023	0.017	0.002	0.004	0.011
Pouteria macrophylla	(Lam) Eyma	160	2.13	0.590	0.397	0.671	5.564	0.510	0.550	0.590
Pouteria oppositifolia	(Ducke) Baehni	8	0.11	0.029	0.055	0.093	0.318	0.029	0.029	0.050
Pouteria pachycarpa	Pires & T D Penn	16	0.21	0.059	0.096	0.162	0.238	0.022	0.040	0.081
Pouteria venosa	(Mart) Baehn	30	0.40	0.111	0.082	0.139	0.690	0.063	0.087	0.104
Sarcaulus brasiliensis	(A DC) Eyma	17	0.23	0.063	0.068	0.116	0.559	0.051	0.057	0.077
SIMAROUBACEAE										
Picramnia sp		7	0.09	0.026	0.055	0.093	0.160	0.015	0.020	0.044
Simaba cedron	Planch	170	2.27	0.627	0.370	0.625	2.900	0.266	0.446	0.506
Simaba guianensis	Aubl	6	0.08	0.022	0.041	0.069	0.072	0.007	0.014	0.033
Simaba paraensis	Ducke	3	0.04	0.011	0.027	0.046	0.330	0.030	0.021	0.029
Simarouba amara	Aubl	72	0.96	0.265	0.301	0.509	4.995	0.458	0.362	0.411
SIPARUNACEAE										
Siparuna guianensis	Aubl	63	0.84	0.232	0.219	0.370	1.051	0.096	0.164	0.233
Siparuna sp		25	0.33	0.092	0.110	0.185	0.463	0.042	0.067	0.107
SOLANACEAE										

N.ind = number of individuals, AD = absolute density, RD = relative density, AF = absolute frequency, RF = relative frequency, ADo = absolute dominance, RDo = relative dominance, CV = coverage value and IV = importance value.

Table 1. Continued...

FAMILY/SPECIES	AUTOR	N.ind	AD	RD	AF	RF	ADo	RDo	CV	IV
Capsicum sp		2	0.03	0.007	0.014	0.023	0.032	0.003	0.005	0.011
Solanum sendtnerianum	Van Heurck & Müll Arg	4	0.05	0.015	0.014	0.023	0.036	0.003	0.009	0.014
ULMACEAE										
Ampelocera edentula	Kuhlm	72	0.96	0.265	0.301	0.509	3.182	0.292	0.279	0.355
URTICACEAE										
Cecropia distachya	Huber	211	2.81	0.778	0.219	0.370	12.786	1.172	0.975	0.773
Cecropia latiloba	Miq	8	0.11	0.029	0.014	0.023	0.100	0.009	0.019	0.021
Cecropia membranacea	Trecul	470	6.27	1.733	0.411	0.694	14.272	1.308	1.520	1.245
Cecropia obtusa	Trecul	1000	13.33	3.687	0.630	1.065	26.376	2.418	3.052	2.390
Cecropia sciadophylla	Mart	182	2.43	0.671	0.397	0.671	9.200	0.843	0.757	0.728
Pourouma bicolor subsp Digitata	(Trecul) C C Berg & Heusden	19	0.25	0.070	0.123	0.208	0.986	0.090	0.080	0.123
Pourouma cecropiifolia	Mart	22	0.29	0.081	0.110	0.185	0.681	0.062	0.072	0.110
Pourouma guianensis	Aubl	128	1.71	0.472	0.342	0.579	6.381	0.585	0.528	0.545
Pourouma mollis	Trecul	4	0.05	0.015	0.027	0.046	0.057	0.005	0.010	0.022
Urera caracasana	(Jacq) Griseb	6	0.08	0.022	0.027	0.046	0.066	0.006	0.014	0.025
VIOLACEAE										
Paypayrola grandiflora	Tul	4	0.05	0.015	0.014	0.023	0.073	0.007	0.011	0.015
Rinorea guianensis	Aubl	17	0.23	0.063	0.096	0.162	0.598	0.055	0.059	0.093
Rinorea pubiflora var pubiflora	(Benth) Sprague & Sandwith	81	1.08	0.299	0.164	0.278	1.209	0.111	0.205	0.229
Rinorea riana	Kuntze	10	0.13	0.037	0.055	0.093	0.095	0.009	0.023	0.046
VOCHYSIACEAE										
Qualea dinizii	Ducke	5	0.07	0.018	0.041	0.069	0.202	0.019	0.018	0.035
Ruizterania albiflora	(Warm) Marc Berti	2	0.03	0.007	0.014	0.023	0.027	0.002	0.005	0.011
Vochysia obscura	Warm	6	0.08	0.022	0.041	0.069	0.549	0.050	0.036	0.047
Vochysia sp		4	0.05	0.015	0.027	0.046	0.132	0.012	0.013	0.024
TOTAL		27126	361.7	100	59.19	100	1090.90	100	100	100

N.ind = number of individuals, AD = absolute density, RD = relative density, AF = absolute frequency, RF = relative frequency, ADo = absolute dominance, RDo = relative dominance, CV = coverage value and IV = importance value.

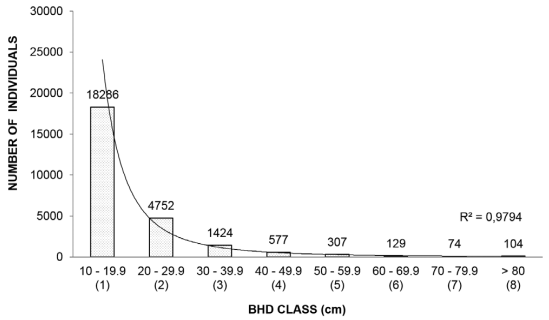

Figure 3. Diameter classes frequency distribution of sampled individuals in 75 ha of dense "terra firme" rainforest located in Belo Monte Hydroelectric Plant's area of influence, situated in Pará, Brazil.

predominance of 10 to 19.9 cm diameter class individuals (71%); 18.5% belongs to 20-29.9 cm class; 5.5% 30-39.9 cm class; others (5.0%) belong to diametric classes above 50 cm. The curve formed by established class values shows an "inverted J configuration" because there is a larger amount of smaller individuals and just emerging individuals.

The ten top species in terms of ecological Importance Value (IV) in descending order were: *Alexa grandiflora* (4.42), *Cenostigma tocantinum* (2.51), *Cecropia obtusa* (2.39), *Bertholletia excelsa* (2.29), *Vouacapoua americana* (2.27), *Theobroma speciosum* (2.06), *Guapira venosa* (1.99), *Inga edulis* (1.69), *Jacaranda copaia* (1.38) and *Cecropia membranacea* (1.24). 22.24% of sampled individuals are concentrated in ten most important species in terms of ecological Importance Value (IV) which demonstrates their importance in the study area. The importance of

most species can be mainly attributed to the high density of individuals. Only one of the ten species with the highest IV showed no high density value: *Bertholletia excelsa*.

Covered Values (CV) were similar to the IV order. There was only one difference: *Vouacapoua americana* was ranked third in covered value order and fourth in importance value.

3.3. Sampling sufficience

Linear regression with plateau response analysis determined among the number of species and sampling area the point of maximum inflection of the curve (X0) between the values of 41 and 42 ha. This value represents the minimum area required to satisfactorily express floristic richness. Therefore, 75 sampling units were satisfactory to represent the stretch of dense "terra firme" rainforest focused on in this study. The adjusted equations are defined by:

$$\text{Line } Y = 133.1427+7.662*X \text{ (when } X \leq 41.2766) \quad (1)$$

$$\text{Plateau } Y = 449.41 \text{ (when } X > 41.2766) \quad (2)$$

$$R^2 = 95.46\% \quad (3)$$

where Y = species amount and X = sampling area (ha).

The survey sampling effort (75 plots) was approximately 44% greater than considered sufficient to express floristic composition by linear regression with plateau response model.

4. Discussion

According to results Fabaceae was the botanical family with the highest species richness (94). Condé and Tonini (2013) also reported the Fabaceae family as the one with more species in dense tropical rain forest in Northern Amazon. The greatest richness of Fabaceae's species corroborates other studies in Amazonia. Those other studies took place in the municipalities of Santa Bárbara do Pará-PA (Santos and Jardim, 2006), Cantá-RR (Silva, 2003) and 90 km from Manaus-AM (Oliveira et al., 2008).

Oliveira and Amaral (2004) found a large number of species from the Fabaceae, Sapotaceae and Lecythidaceae families in Central Amazonia "terra firme" forest. Sapotaceae and Lecythidaceae also presented high species richness in the present study with 35 species for the Lecythidaceae family and 21 for Sapotaceae.

Comparing the absolute total density studies with Condé and Tonini's studies (2013), it was found that the sampled area in the present study has a smaller value. This difference may be due to soil and topographic variations. Soil can act as a limiting factor (Mori et al., 1999). Species richness can vary depending on relief since in regions where the terrain is gentle, there is a lower species richness because the opportunities for niche specialisation get lower. However, this concept can only be confirmed through further studies that relate environmental factors and vegetation. In addition, inventories carried in the Amazon region differ in size and shape of plots, complicating comparisons between results of the several quantitative studies.

According to Oliveira et al. (2008) species with only one individual in sampled area are considered "locally rare". In the present study 16 locally rare species were found. It represents 3.4% of all the species found in 75 ha area. The percentage of 3.4% can be considered low compared to studies in the Amazon region, where we can mention the work done by Lima et al. (2012) which achieved 28%. Higher percentages, ranging from 40 to 60%, can be found in work in different Amazon regions such as the studies conducted by Oliveira and Amaral (2004), Oliveira and Amaral (2005) and Silva et al. (2008)

Just a few species predominated in importance value in sampled area considering the number of individuals (RD) and the basal area (RDo). This relationship was observed by Pires and Prance (1985). According to their study, the physiognomy of a stretch of forest depends heavily on the dominant species and the five or ten most common species usually represent more than half the number of Amazonian forest community. This observation was also verified by Melo (2004), Lima et al. (2007), Lima et al. (2012) and Condé and Tonini (2013).

According to Oliveira and Amaral (2004), estimated importance value for plant species can be used in management plans as an indicator of ecological importance due to the influence of the most frequent and dominant species in the basic flora's balance and maintenance of wildlife processes. It provides shelter and food.

The results for diameter structure show low amplitude along the diameter classes. There are a high number of trees at the beginning of the curve which can be explained by the strong presence of pioneer and opportunistic species. Additionally, diameter distribution was irregular in first classes. Therefore, it can be inferred that the plant community has experienced strong human or natural intervention reflected mainly in up to 30 cm diameter classes.

The diameter distribution "inverted J shaped" curve, demonstrates a greater amount of smaller individuals and few emerging individuals. This configuration was expected since distribution of size classes is a result of the forest dynamics, where the amount of space constricts the number of trees that can be accommodated in certain classes (Swaine, 1989).

Other studies in the region have used the same methodology and found a similar class of diameter distribution values (Salomão et al., 2007; MPEG, 2008). An accurate comparison was enabled due to the use of the same measurement criteria in all studies.

Diameter distribution analysis shows a common configuration in heterogeneous forests with diverse age trees, heterogeneous, and medium conservation condition. However, the large concentration of trees in class 1 may be related to human disturbance of the area. The forest gaps present in the region indicate an increase of pioneering and opportunistic species.

In general, the analysed plots had an average basal area (10 to 20 m^2 / ha) lower than those registered for Amazon

"terra firme" forests (30 to 40 m^2 / ha) (Salomão et al., 2007). It is assumed this condition is related to anthropisation.

The UHE Belo Monte region has undergone considerable change from its original forest cover caused by the Trans-Amazon Highway's (BR-230) zone of influence and its transverse roads. Human occupation has been intensively induced by agrarian colonisation projects in recent years (Salomão et al., 2007). This interference leads to major changes in forest structure.

The floristic and phytosociological survey helped identify, in part, species distribution in the area. Floristic richness and its species diversity are considered high when compared to other studies conducted in nearby areas. This may be due because of ecotonal character as environmental heterogeneity.

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