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Diversity of Angiosperms in Fragments of Atlantic Forest in the State of Pernambuco, Northeastern Brazil

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ABSTRACT

This paper provides a floristic inventory of Angiosperms reported from six fragments of Atlantic Forest in the State of Pernambuco, northeastern Brazil. The fragments studied are of different sizes and shapes (from 12 to 380 ha) and are embedded within a matrix of sugarcane plantation. The inventory was made from 2005 to 2008, with a more intensive effort from February 2007 to May 2008 with an average of 5 days of fieldwork a month. The samples collected are available at the herbaria IPA, UFP, and ULM. Six categories of life-forms were established: terrestrial herbs and shrubs; aquatic herbs and shrubs; epiphytes and hemiepiphytes; parasites, hemiparasites and saprophytes; herbaceous and woody climbers; and treelets and trees. A checklist with 650 species, from 379 genera and 105 families of Angiosperms is presented. Fabaceae, Poaceae, Cyperaceae, Asteraceae, Euphorbiaceae, Myrtaceae, Rubiaceae, Melastomataceae, Araceae, Malvaceae, Apocynaceae, Sapindaceae and Sapotaceae presented the greatest species richness. Among the fragments, Zambana had 266 species, followed by Piedade with 236 species and Macacos with 228 species. Herbs and shrubs with 274 species, treelets and trees with 212 species and herbaceous and woody climbers with 94 species are the richest life-form categories. This floristic inventory confirms the ecological value of the fragments of Atlantic Forest located at Usina São José. Previous checklists elaborated in the northeastern Atlantic forest have underestimated plant species diversity.

Keywords: conservation, floristic inventory, fragmentation, Neotropics, rainforest

INTRODUCTION

The Brazilian Atlantic forest is one of the richest biogeographic zones in terms of plant species and endemism in the world, but has been heavily impacted by human development (Mittermeier *et al.* 1999; Prance *et al*. 2000; Silva and Tabarelli 2000; Lewinsohn and Prado 2002; Grillo *et al.* 2003; Tabarelli *et al*. 2004). According to Meyers *et al*. (2000), the Atlantic forest is a hot spot of diversity and for this reason is considered one of the highest priority areas for conservation in the country.

In most of northeastern Brazil, the Atlantic Forest is restricted to a strip of vegetation with an average of 100 m elevation along the coastline. Veloso *et al.* (1991) called this strip of vegetation "low-land forests". However, some areas of Atlantic forest are located in the middle of the semi-arid domain. These areas are above 100 m elevation and more humid than the coastal vegetation. They are recognized as exceptional areas and are distributed as islands of moist vegetation in the "caatinga" vegetation type. They are also called "brejos de altitude", montane or submontane forest (Andrade-Lima 1982; Veloso *et al.* 1991; Tabarelli and Santos 2004).

Brown and Brown (1992) consider the Atlantic Forest of today to be an excellent example of an extremely fragmented environment. Metzger (2003) and other authors have pointed out that species richness can be strongly affected by the size and shape of the fragment, the history of land use, and the degree of connectivity among fragments.

The biogeographic unit which is formed by the narrow strip of Atlantic Forest north of the São Francisco River ("Northeastern Atlantic Forest"), is called the Pernambuco Endemism Center (sensu Prance 1987) – "PEC". It is considered one of the most heavily impacted areas of the Atlantic forest. Coimbra-Filho and Câmara (1996), Silva and Tabarelli (2000) and Tabarelli *et al.* (2003) suggested that only around 2% of the original vegetation remains. These authors also pointed out that the vegetation is restricted to small fragments (10 ha on average) located in a sugarcane matrix. Only 7% of the remaining fragments are larger than 100 ha (Ranta *et al.* 1998). The economy of this area is based on sugarcane plantations and has had a very aggressive relationship with the natural environment since colonial times (Dean 1996). This historical background has seriously compromised the native vegetation.

The biota of the Atlantic forest of the Northeast has been clearly influenced by the biota of the Amazon forest (Prance 1982) and that of the Atlantic forest of the South and Southeast (Andrade-Lima 1960, 1982) that produced a unique plant composition that is distinct from other areas of the Atlantic forest.

Recently, characterization of plant diversity from the PEC has been a priority. Good examples of studies conducted recently are, among others, those of Barbosa (1996), Guedes (1998), Agra *et al.* (2004), Andrade and Rodal (2004), Barbosa *et al.* (2004), Cestaro and Soares (2004), Silva (2004), Barreto *et al.* (2006), Ferraz and Rodal (2006), Grillo *et al.* (2006), Araújo *et al.* (2007), Barbosa (2008) and Thomas and Barbosa (2008). Most of these papers include a checklist of Angiosperms from the area. However, most of them report exclusively on the arboreal component.

Considering this fact, the aim of this paper is to provide a floristic inventory including Angiosperms of different life-forms. This inventory is critical to support other re-

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search already underway in the forest fragments at Usina São José. Additionally, this inventory will aid studies of species richness and similarity among different fragments, provide information about endemic and rare species, and also identify possible species to be used as bioindicators of the conservation status of forest fragments. These data will support new environmental proposals focused on the sustainability of biological diversity from a local and regional point of view.

MATERIALS AND METHODS

The inventory of Angiosperms is based on collections from six forest fragments located at Usina São José (07° 50′ S, 35° 00′ W), Igarassu county, State of Pernambuco. The area studied is 50 km away from Recife (the state capital). It is embedded in a sugarcane matrix and impacted the urbanization of the surrounded areas.

The selection of fragments was based on previous indicators of the Project "Sustainability of remnants of the Atlantic rainforest in Pernambuco and its implications for conservation and local development" of which this research is a part. The fragments studied are: Zambana (380 ha), Macacos (310 ha), Piedade (298 ha), Pezinho (22 ha), Vespas (14.5 ha) and Santa Helena (12 ha). For details about the location and shape of the fragments, indicators and habitat characterization and distribution in the fragments see Rodal *et al.* (published in this special issue).

Samples were collected during randomized walks in the fragments. The aim was to sample the largest possible area in each one. The collections were made from 2005 to 2008. From February 2007 to May 2008, monthly field trips were conducted. Each one took 4-6 days with at least 6 hours a day of field collection. During these 16 months, 100 days of field work were accomplished. The largest fragments were visited more times to provide a better sampling of each one.

The collection methodology used was standard for taxonomic work. The samples were deposited in the herbaria IPA, UFP and ULM, and duplicates, when available, were sent to the herbaria CEN, CEPEC, HUEFS, MO, NY, RB and, SP. The herbarium acronyms follow Holmgren and Holmgren (2008).

Aiming to better understand the structural taxonomic and ecological diversity of plants in the study area, each species collected was categorized according to its life-form. Six categories were adopted: (1) terrestrial herbs and shrubs; (2) aquatic herbs and shrubs; (3) epiphytes and hemi-epiphytes; (4) hemiparasites, parasites and saprophytes; (5) herbaceous and woody climbers; and (6) treelets and trees.

The identification of material was made possible by referring to the specialized literature and by consulting herbaria with important collections from the Atlantic Forest in the State of Pernambuco, in Brazil, and abroad (IPA, UFP, PEUFR and HST, in addition to CEPEC, JPB, MAC, NY and RB). Whenever possible, species identifications within several families were, at least in part, confirmed by specialists. The taxonomic arrangement follows that proposed by APG (2008, www.mobot.org), the specific epithets and author abbreviations follow W^{3}Tropicos (2008, www.mobot.org), and in some cases as Euphorbiaceae, follows Govaerts *et al.* (2000).

RESULTS

In the six studied fragments of Atlantic Forest around 5,200 samples were collected. A checklist with 650 species, from 379 genera and 105 families of Angiosperms is provided. Fabaceae (77 spp.: 16 Caesalpinoideae, 24 Mimosoideae, 37 Faboideae), Poaceae (46 spp.), Cyperaceae (41 spp.), Euphorbiaceae + Phyllanthaceae (23 + 8 = 31 spp.), Asteraceae (26 spp.), Rubiaceae (23 spp.), Myrtaceae (22 spp.), Melastomataceae (19 spp.), Araceae (17 spp.), Malvaceae (16 spp.), Apocynaceae (14 spp.), Sapindaceae and Sapotaceae (11 spp. each), and Boraginaceae, Convolvulaceae and Cucurbitaceae (10 spp. each) are among the most species rich families in the area. The species rich genera are *Cyperus* L. (Cyperaceae) and *Miconia* Ruíz and Pav. (Melastomataceae) with 14 species each, *Philodendron* Schott (Araceae) with 9 species, and *Passiflora* L. (Passifloraceae) and *Myrcia* DC. *ex* Gill. (Myrtaceae) with 8 species each (List of Species, **Table 1**).

Among the fragments, Zambana (Fragment 3) had the greatest species richness with 266 species, followed by Piedade (Fragment 1) with 237 species and Macacos (Fragment 2) with 229 species. However, among the smaller fragments, Pezinho (Fragment 4) with 168 species had species richness values closer to those of larger fragments (Fragments 1, 2 and 3). The smallest fragments, Vespas (Fragment 6) and Santa Helena (Fragment 5) had 54 and 33 species each.

Terrestrial herbs and shrubs is the most species rich life-form category in the area with 280 species. Treelets and trees are also well represented with 213 species. The category which includes herbaceous and woody climbers has 96 species and epiphytes and hemi-epiphytes have 31 species. Aquatic herbs and shrubs (category 2) and saprophytes, hemiparasites and parasites (category 4) are the least diverse groups with 17 species and 13 species, respectively.

The relation of species richness of treelets and trees among the fragments has similar values to the values found for richness of species among the fragments. Zambana has 85 arboreal spp., Piedade 76 spp. and Macacos 73 spp. Among the smallest fragments, Pezinho has 51 spp., Vespas has 16 spp., and finally, Santa Helena with 14 spp.

Among the 96 species of climbers, 32 species are woody. The most representative families are Fabaceae with 17 spp., and Cucurbitaceae, Passifloraceae, and Convolvulaceae with 8-7 spp. each. *Aristolochia pappillaris* Mast. (Aristolochiaceae), *Phryganocydia corymbosa* (Vent.) Bureau *ex* K. Schum. (Bignoniaceae), and *Phanera trichosepala* L.P. Queiroz (Fabaceae) are recorded for the first time to the northeastern flora.

The low species richness of epiphytes and hemi-epiphytes found is peculiar. Araceae (15 spp. excluding the terrestrial and with no indication as hemi-epiphytes), Orchidaceae (6 spp.), Bromeliaceae (5 spp.), Marcgraviaceae (3 spp.), and Cyclanthaceae and Piperaceae (1 sp. each) are families represented.

Saprophytes and parasites (holo- and hemi-) are also rare in the fragments studied. This group is represented by only 13 species (Loranthaceae with 5 spp., Burmanniaceae and Gentianaceae with 3 spp. each, and Lauraceae and Santalaceae with 1 sp. each). The saprophytic species are restricted to the fragments with small streams. As usual, Loranthaceae was collected along the margins of the fragments. More species of this category are expected to be found during the next field trips, especially other species of *Voyria* Aubl. (Gentianaceae) and *Langsdorffia* Mart. (Balanophoraceae).

The grasses (Poaceae) which occur in the fragments studied are mainly species of wide geographic distribution. The greatest richness is found in the borders of forests, where several species of *Ichnanthus* P. Beauv., *Olyra* L., *Lasiacis* (Griseb.) Hitchc. among others, are found. However, this work has produced the first record of the occurrence of *Merostachys* aff. *bifurcata* Send. for northeastern Brazil.

Euphorbiaceae and Phyllanthaceae (31 species and 16 genera) occurred in different habitats in the study area. *Amanoa* Aubl., *Chaetocarpus* Thwaites, *Mabea* Aubl., *Pera* Mutis and *Pogonophora* Miers *ex* Benth. are common in the interior of the fragments. *Euphorbia* L. and *Phyllanthus* L. are often found along the border. However, *Phyllanthus gradyanus* M. J. Silva and M. Sales is rare and endemic to the States of Alagoas and Pernambuco. It is found exclusively in Piedade (Fragment 1).

Sapotaceae is a woody family common in lowland tropical forests as we confirmed here. *Diploon cuspidatum* (Hoehne) Cronq. and *Chrysophyllum cainito* L. have a disjunct distribution between the Atlantic Forest and the Amazon Basin. The occurrence of *Micropholis compta* Pierre and *Pouteria peduncularis* (Mart. and Eich.) Baehni provides an extension of the former geographic distribution known for both species.

Table 1 List of Angiosperms from six forest fragments at Usina São José, Igarassu, State of Pernambuco, Brazil.

Acanthaceae	*Mendoncia blanchetiana* Profice	*A. Alves-Araújo et al. 661*
	Ruellia cf. paniculata L.	*N. Albuquerque et al.468*
	Thunbergia alata Bojer *ex* Sims	*D. Araújo et al. 468*
Amaranthaceae	*Alternanthera ficoidea* (L.) P. Beauv.	*A. Melquíades and G. Bezerra 42*
	Amaranthus lividus L.	*D. Araújo et al. 346*
Amaryllidaceae	*Hippeastrum stylosum* Herb.	*A. Melo and N. Albuquerque 205*
Anacardiaceae	*Anacardium occidentale* L.	*P. Ojima 101*
	Mangifera indica L.	*H. Silva et al. 122*
	Tapirira guianensis Aubl.	*D. Araújo and A. Alves-Araújo 502*
	Thyrsodium schomburgkianum Benth.	*P. Ojima 88*
	Thyrsodium spruceanum Benth.	*A. Alves-Araújo et al. 218*
Annonaceae	*Anaxagorea dolichocarpa* Sprague and Sandwith	*A. Alves-Araújo et al. 537*
	Annona coriacea Mart.	*I. Sá e Silva and H. Silva 174*
	Annona montana Macfad.	*A. Alves-Araújo et al. 629*
	Annona salzmannii A. DC.	*A. Silva 1*
	Cymbopetalum brasiliense (Vell.) Benth. *ex* Baill.	*A. Alves-Araújo et al. 517*
	Guatteria australis A.St.-Hil.	*J. Marques et al. 55*
	Guatteria pogonopus Mart.	*A. Melo et al. 138*
	Guatteria schomburgkiana Mart.	*A. Alves-Araújo et al. 807*
	Xylopia frutescens Aubl.	*A. Alves-Araújo et al. 803*
Apiaceae	*Centella asiatica* (L.) Urb.	*N. Albuquerque 472*
	Spananthe paniculata Jacq.	*D. Araújo et al. 466*
Apocynaceae	*Aspidosperma discolor* A.DC.	*K. Rocha and C. Melo 24*
	Aspidosperma spruceanum Benth. *ex* Müll. Arg.	*H. Silva et al. 151*
	Blepharodon nitidum (Vell.) J.F. Macbr.	*J. Marques and N. Albuquerque 116*
	Ervatamia coronaria (Jacq.) Stapf	*J. Marques and N. Albuquerque 233*
	Hancornia speciosa Gomes	*A. Alves-Araújo et al. 896*
	Himathanthus phagedaenicus (Mart.) Woodson	*J. S. Marques and N. Albuquerque 200*
	Mandevilla moricandiana (A. DC.) Woodson	*A. Alves-Araújo et al. 553*
	Mandevilla scabra (Hoffmanns. *ex* Roem. and Schult.) K. Schum.	*A. Alves-Araújo et al. 192*
	Matelea nigra (Decne.) Morillo and Fontella	*D. Araújo et al. 405*
	Rauwolfia grandiflora Mart. *ex* A. DC.	*A. Alves-Araújon 570*
	Tabernaemontana affinis Mull. Arg.	*N. Albuquerque et al.478*
	Tabernaemontana flavicans Willd. *ex* Roem and Schult.	*P. Ojima 116*
	Tabernaemontana muricata Link *ex* Roem. And Schult.	*A. Melquíades and G. Bezerra 83*
	Temnadenia odorifera (Vell.) J.F. Morales	*A. Alves-Araújo and J. Marques 880*
Araceae	*Anthurium pentaphyllum* (Aubl.) G. Don	*A. Melquíades and G. Bezerra 97*
	Anthurium scandens (Aubl.) Engl.	*A. Melquíades and G. Bezerra 237*
	Caladium bicolor (Aiton) Vent.	*A. Melo and A. Alves-Araújo 50*
	Heteropsis oblongifolia Kunth	*A. Melquíades and G. Bezerra 86*
	Monstera adansonii Schott	*A. Alves-Araújo and D. Araújo 759*
	Philodendron acutatum Schott	*A. Alves-Araújo et al. 315*
	Philodendron blanchetianum Engler	*T. Arruda et al. 54*
	Philodendron fragrantissimum (Hook.) Kunth	*A. Melo et al. 102*
	Philodendron imbe Schott	*A. Melquíades and G. Bezerra 135*
	Philodendron ornatum Schott	*T. Arruda et al. 55*
	Philodendron pedatum (Hook.) Kunth	*T. Arruda et al. 45*
	Philodendron propinquum Schott	*A. Alves-Araújo et al. 214*
	Philodendron rudgeanum Schott	*T. Arruda 46*
	Philodendron scandens K. Koch and Sellow	*T. Arruda et al. 69*
	Syngonium podophyllum Schott	*T. Arruda et al. 67*
	Taccarum ulei Engl. and K. Krause	*digital image collection*
	Xanthosoma sagittifolium Schott	*T. Arruda et al. 61*
Araliaceae	*Hydrocotyle umbellata* L.	*N. Albuquerque et al. 629*
	Hydrocotyle verticillata Thunb.	*A. Alves-Araújo et al. 602*
	Schefflera morototoni (Aubl.) Maguire, Steyerm. and Frodin	*A. Alves-Araújo et al. 473*
Arecaceae	*Bactris pickelii* Burret	*D. Araújo et al. 309*
	Cocos nucifera L.	*digital image collection*
	Desmoncus cf. orthacanthos Mart.	*D. Araújo et al. 180*
	Desmoncus polyacanthos Mart.	*D. Araújo et al. 392*
	Elaeis guineensis Jacq.	*D. Araújo et al. 272*
Aristolochiaceae	*Aristolochia brasiliensis* Mart. and Zucc.	*A. Melquíades and G. Bezerra 199*
	Aristolochia papillaris Mast.	*D. Araújo and A. Alves-Araújo 503*
Asteraceae	*Acanthospermum australe* (Loefl.) Kuntze	*A. Alves-Araújo et al. 419*
	Bidens pilosa L.	*G. Bezerra and M. Dantas 070*
	Blainvillea acmella (L.) Philipson	*J. Marques and N. Albuquerque 178*
	Centratherum punctatum Cass.	*N. Albuquerque and F. Rocha 373*
	Conocliniopsis prasiifolia (DC.) R.M. King and H. Rob.	*N. Albuquerque et al. 362*
	Conyza bonariensis (L.) Cronquist.	*A. Melqueades and G. Bezerra 40*
	Eclipta prostrata (L.) L.	*N. Albuquerque 385*
	Elephantopus mollis Kunth	*N. Albuquerque 480*
	Eleutheranthera ruderalis (SW.) Sch. Bip.	*A. Melquíades and G. Bezerra 169*
	Emilia fosbergii Nicolson	*N. Albuquerque and F. Rocha 395*

Table 1 (Cont.)

	Emilia sonchifolia (L.) DC.	*N. Albuquerque 357*
	Erechtites hieraciifolius (L.) Raf. *ex* DC.	*N. Albuquerque and F. Rocha 377*
	Eupatorium pauciflorum Kunth	*A. Melquíades and G. Bezerra 169*
	Gnaphalium indicum L.	*J. Marques et al. 212*
	Melanthera latifolia (Gardner) Cabrera	*N. Albuquerque and F. Rocha 390*
	Mikania obovata DC.	*N. Albuquerque et al. 228*
	Porophyllum ruderale (Jacq.) Cass.	*N. Albuquerque et al. 303*
	Praxelis clematidea (Griseb.) R.M. King and H. Rob.	*N. Albuquerque 368*
	Pterocaulon alopecuroides (Lam.) DC.	*N. Albuquerque 215*
	Pterocaulon interruptum DC.	*J. Marques and N. Albuquerque 274*
	Sphagneticola trilobata (L.) Pruski	*I. Sá e Silva and M. Silva 284*
	Synedrella nodifllora (L.) Gaertn	*I. Sá e Silva et al. 255*
	Tilesia baccata (L.) Pruski	*N. Albuquerque et al. 302*
	Tridax procumbens L.	*N. Albuquerque 301*
	Vernonia brasiliana (L.) Druce	*N. Albuquerque 548*
	Vernonia scorpioides (Lam.) Pers.	*N. Albuquerque 339*
Bignoniaceae	*Adenocalymma hypostictum* Bureau and K. Schum.	*D. Araújo et al. 397*
	Lundia cordata (Vell.) A. DC.	*P. Ojima 40*
	Phryganocydia corymbosa (Vent.) Bureau *ex* K.Schum.	*A. Alves-Araújo et al. 655*
	Tabebuia roseoalba (Ridl.) Sandwith	*N. Albuquerque 567*
Bixaceae	*Cochlospermum vitifolium* (Willd.) Spreng.	*A. Melo et al. 172*
	Cochlospermum cf. insigne A. St.-Hil.	*N. Albuquerque 549*
Boraginaceae	*Cordia multispicata* Cham.	*A. Alves-Araújo et al. 289*
	Cordia nodosa Lam.	*A. Alves-Araújo and N. Albuquerque 348*
	Cordia rufescens A. DC.	*G. Bezerra and A. Melquíades 130*
	Cordia sellowiana Cham.	*N. Albuquerque et al. 484*
	Cordia superba Cham.	*I. Sá e Silva et al. 09*
	Cordia verbenaceae DC.	*A. Alves-araújo et al. 359*
	Heliotropium elongatum Hoffm. ex Roem. and Schult.	*G. Bezerra 086*
	Heliotropium indicum L.	*D. Araújo and A. Alves-Araújo 516*
	Tournefortia bicolor Sw.	*D. Araújo 451*
	Tournefortia candidula (Miers) I.M. Johnst.	*D. Araújo and A. Alves-Araújo 532*
Bromeliaceae	*Aechmea mertensii* (G. Mey.) Schult. And Schult. f.	*N. Albuquerque et al. 499*
	Hohenbergia ridleyi (Baker) Mez	*A. Melo et al. 27*
	Tillandsia bulbosa Hook.	*A. Alves-Araújo and D. Araújo 751*
	Tillandsia striata Willd. *ex* Schult.	*N. Albuquerque et al. 590*
	Tillandsia stricta Sol. ex Sims	*A. Alves-Araújo and D. Araújo 756*
Burmanniaceae	*Apteria aphylla* (Nutt.) Barnhart ex Small	*A. Melo et al. 101*
	Gymnosiphon divaricatus (Benth.) Benth. and Hook. f.	*A. Melo et al. 90*
	Gymnosiphon sphaerocarpus Urb.	*A. Melo et al. 113*
Burseraceae	*Protium arachouchini* March.	*A. Silva and I. Sá e Silva 609*
	Protium heptaphyllum (Aubl.) Marchand	*A. Alves-Araújo et al. 780*
	Protium sagotianum Marchand	*A. Silva 62*
	Tetragastris catuaba Soares da Cunha	*I. Sá e Silva et al. 03*
Campanulaceae	*Hippobroma longiflora* (L.) G. Don	*A. Alves-Araújo and J. Marques 870*
	Lobelia cf. xalapensis Kunth	*A. Alves-Araújo et al. 508*
Cannabaceae	*Trema micrantha* (L.) Blume	*A. Melo et al. 44*
Cannaceae	*Canna indica* L.	*N. Albuquerque and F. Rocha 378*
Caricaceae	*Carica papaya* L.	*digital image collection*
Celastraceae	*Hippocratea volubilis* L.	*D. Araújo and A. Alves-Araújo 498*
	Maytenus distichophylla Mart.	*A. Silva and A. Anderson 617*
	Maytenus erythroxylon Reissek	*G. Bezerra and A. Silva 266*
	Prionostemma asperum (Lam.) Miers	*A. Alves-Araújo et al. 301*
Chrysobalanaceae	*Couepia rufa* Ducke	*H. Silva and J. Gomes 393*
	Hirtella racemosa Lam.	*A. Melo and N. A. Albuquerque 175*
	Licania kunthiana Hook. f.	*J. Gomes and H. Silva 44*
	Licania octandra (Hoffmanns. *ex* Roem. and Schult.) Kuntze	*H. Silva and J. Gomes 388*
Cleomaceae	*Cleome diffusa* Banks *ex* DC.	*G. Bezerra and M. Silva 65*
Clusiaceae	*Clusia nemorosa* G. Mey	*I. Sá e Silva and H. Silva 208*
	Symphonia globulifera L. f.	*I. Sá e Silva and A. Sillva 167*
	Tovomita mangle G. Mariz	*S. Freire and K. Rocha 80*
Commelinaceae	*Commelina benghalensis* L.	*P. Ojima 52*
	Commelina rufipes Seub.	*A. Alves-Araújo 788*
	Dichorisandra thyrsiflora J.C. Mikan	*A. Alves-Araújo and D. Araújo 737*
Connaraceae	*Connarus blanchetii* Planch.	*D. Araújo et al. 585*
Convolvulaceae	*Bonamia maripoides* Hallier f.	*N. Albuquerque et al. 493*
	Ipomoea bahiensis Willd. *ex* Roem. and Schult.	*P. Ojima 115*
	Ipomoea hederifolia L.	*A. Melo et al. 141*
	Ipomoea obscura (L.) Ker Gawl.	*A. Alves-Araújo et al. 565*
	Ipomoea quamoclit L.	*A. Alves-Araújo et al. 531*
	Jacquemontia menispermoides Choisy	*A. Alves-Araújo et al. 668*
	Merremia macrocalyx (Ruiz and Pav.) O'Donell	*A. Melo and N. Albuquerque 191*
	Merremia umbellata (L.) Hallier f.	*A. Alves-Araújo et al. 665*

Table 1 (Cont.)

	Operculina altissima (Mart. ex Choisy) Meisn.	*G. Bezerra 111*
Costaceae	*Costus scaber* Ruiz and Pav.	*N. Albuquerque 367*
	Costus spiralis (Jacq.) Roscoe	*A. Alves-Araújo and D. Araújo 705*
Cucurbitaceae	*Cayaponia tayuya* (Vell.) Cong.	*I. Sá e Silva 321*
	Cucumis anguria L.	*D. Araújo et al. 608*
	Gurania acuminata Cogn.	*A. Oliveira and A. G. Silva 16*
	Gurania bignoniaceae (Poepp. and Endl.) C.Jeffrey	*G. Bezerra and M. J. Silva 69*
	Gurania spinulosa (Poepp. and Endl.) Cogn.	*D. Araújo et al. 402*
	Luffa cylindrica M. Roem.	*D. Araújo et al. 424*
	Melothria fluminensis Gardner	*G. Bezerra and M. Silva 073*
	Momordica charantia L.	*I. Sá e Silva and A. Silva 154*
	Psiguria triphylla (Miq.) C. Jeffrey	*G. Bezerra and A. Melquíades 123*
	Psiguria umbrosa (Kunth) C. Jeffrey	*D. Araújo et al. 400*
Cyclanthaceae	*Asplundia gardneri* (Hook.) Harl.	*A. Melo et al. 112*
Cyperaceae	*Becquerelia cymosa* Brongn.	*A. Alves-Araújo et al. 540*
	Bulbostilys junciformis (Kunth) C.B. Clarke	*D. Araújo et al. 463*
	Bulbostylis vestita (Kunth) C.B. Clarke	*D. Araújo et al. 462*
	Calyptrocarya glomerulata (Brongn.) Urb.	*A. Alves-Araújo and D. Araújo 744*
	Cyperus aggregatus (Willd.) Endl.	*A. Alves-Araújo et al. 239*
	Cyperus compressus L.	*A. Melo et al. 22*
	Cyperus cuspidatus Kunth	*D. Araújo et al. 302*
	Cyperus diffusus Vahl	*A. Melo et al. 84*
	Cyperus distans L. f.	*A. Alves-Araújo et al. 355*
	Cyperus cf. friburgensis Boeck.	*N. Albuquerque 516*
	Cyperus haspan L.	*A. Alves-Araújo et al. 558*
	Cyperus iria L.	*A. Alves-Araújo et al. 429*
	Cyperus laxus Lam.	*A. Alves-Araújo et al. 349*
	Cyperus ligularis L.	*A. Alves-Araújo et al. 829*
	Cyperus luzulae (L.) Rottb. *ex* Retz.	*N. Albuquerque 515*
	Cyperus odoratus L.	*N. Albuquerque 524*
	Cyperus rotundus L.	*A. Alves-Araújo et al. 427*
	Cyperus sphacelatus Rottb.	*A. Alves-Araújo and N. Albuquerque 344*
	Eleocharis atropurpurea (Retz.) J. Presl and C. Presl	*A. Alves-Araújo et al. 675*
	Eleocharis confervoides Poir.	*A. Alves-Araújo et al. 684*
	Eleocharis geniculata (L.) Roem. and Schult.	*A. Alves-Araújo et al. 422*
	Eleocharis interstincta (Vahl) Roem. and Schult.	*A. Alves-Araújo et al. 557*
	Eleocharis maculosa (Vahl) Roem. and Schult.	*A. Alves-Araújo et al. 680*
	Eleocharis montana (Kunth) Roem. and Schult.	*A. Alves-Araújo et al. 676*
	Eleocharis sellowiana Kunth	*A. Melo et al. 26*
	Fimbristylis dichotoma (L.) Vahl	*A. Alves-Araújo et al. 541*
	Fimbristylis littoralis Gaudich.	*A. Alves-Araújo et al. 425*
	Fuirena umbellata Rottb.	*A. Alves-Araújo et al. 305*
	Hypolytrum bullatum C.B. Clarke	*A. Alves-Araújo et al. 505*
	Kyllinga odorata Vahl	*A. Alves-Araújo et al. 513*
	Kyllinga squamulata Thonn. ex Vahl	*A. Alves-Araújo et al. 354*
	Lipocarpha micrantha (Vahl) G.C. Tucker	*A. Alves-Araújo et al. 524*
	Rhynchospora cephalotes (L.) Vahl	*D. Araújo et al. 314*
	Rhynchospora comata (Link) Roem. and Schult.	*D. Araújo et al. 315*
	Rhynchospora holoschoenoides (Rich.) Herter	*A. Alves-Araújo et al. 185*
	Rhynchospora marisculus Lindl. ex Nees	*A. Alves-Araújo et al. 683*
	Rhynchospora nervosa (Vahl) Boeck.	*J. Marques and N. Albuquerque 6*
	Rhynchospora tenuis Willd. ex Link	*A. Alves-Araújo et al. 884*
	Scleria bracteata Cav.	*D. Araújo et al. 164*
	Scleria mitis P.J. Bergius	*D. Araújo and A. Alves-Araújo 541*
	Scleria secans (L.) Urb.	*A. Alves-Araújo et al. 313*
Dilleniaceae	*Davilla aspera* (Aubl.) Benoist	*A. Melo and N. Albuquerque 200*
	Davilla kunthii A. St.-Hil.	*D. Araújo et al. 456*
	Doliocarpus dentatus (Aubl.) Standl.	*D. Araújo et al. 483*
	Tetracera breyniana Schltdl.	*D. Araújo et a. 350*
Dioscoreaceae	*Dioscorea marginata* Griseb.	*N. Albuquerque 588*
Elaeocarpaceae	*Sloanea garckeana* K.Schum	*N. Albuquerque 641*
	Sloanea guianensis (Aubl.) Benth.	*G. Bezzera and A. Melquíades 206*
Eriocaulaceae	*Paepalanthus bifidus* (Schrader) Kunth	*A. Alves-Araújo et al. 421b*
	Paepalanthus cf. myocephalus Mart.	*A. Alves-Araújo et al. 641*
	Paepalanthus parvus Ruhland	*A. Alves-Araújo et al. 421*
	Paepalanthus polytrichoides Kunth	*D. Araújo et al. 461*
	Paepalanthus cf. tortilis (Bong.) Koern. in C. Martius	*A. Alves-Araújo et al. 477*
	Tonina fluviatilis Aubl.	*A. Alves-Araújo et al. 682*
Erythroxylaceae	*Erythroxylum cuspidifolium* Mart.	*J. Gomes and H. Silva 14*
	Erythroxylum citrifolium A.St.-Hil.	*A. Alves-Araújo and D. Araújo 703*
	Erythroxylum distortum Mart.	*A. Melo et al. 15*
	Erythroxylum flaccidum Salzm. ex Peyr.	*A. Alves-Araújo et al. 786*
	Erythroxylum mucronatum Benth.	*D. Araújo et al. 286*

Table 1 (Cont.)

	Erythroxylum squamatum Sw.	*A. Melo and T. Arruda 226*
Euphorbiaceae	*Actinostemon verticillatus* (Klotzsch) Baill.	*A. Melo et al. 10*
	Aparisthimium cordatum (A. Juss.) Baill.	*I. Sá e Silva and M. Silva 285*
	Astrea lobata (L.) Klotzsch	*A. Alves-Araújo et al. 224*
	Bernardia sidoides (Klotzsch.) Müll. Arg.	*A. Melquíades and G. Bezerra 51*
	Chaetocarpus myrsinites Baill.	*A. Alves-Araújo et al. 211*
	Croton sellowii Baill.	*A. Alves-Araújo and J. Marques 852*
	Croton glandulosus L.	*B. Amorim et al. 215*
	Dalechampia brasiliensis Lam.	*D. Araújo et al. 284*
	Dalechampia convolvuloides Lam.	*G. Bezerra 96*
	Dalechampia pernambucencis Baill.	*A. Alves-Araújo et al. 256*
	Euphorbia heterophylla L.	*A. Melquíades and G. Bezerra 164*
	Euphorbia hirta L.	*A. Alves-Araújo et al. 594*
	Euphorbia hyssopifolia L.	*P. Ojima 42*
	Euphorbia thymifolia Aiton	*A. Melo et al. 65*
	Mabea piriri Aubl.	*S. Freire and K. Rocha 74*
	Microstachys corniculata (Vahl) Griseb.	*D. Araújo et al. 201*
	Pera glabrata (Schott) Poepp. ex Baill.	*A. Alves-Araújo et al. 765*
	Pogonophora schomburgkiana Miers ex Benth.	*A. Alves-Araújo et a. 883*
	Ricinus communis L.	*A. Alves-Araújo and D. Araújo*
	Sapium glandulosum (L.) Morong.	*J. Marques and N. Albuquerque 111*
	Senefeldera verticillata (Vell.) Croizat	*K. Rocha and S. Freire 100*
	Tragia lessertiana (Baill.) Müll. Arg.	*A. Alves-Araújo et al. 799*
	Tragia volubilis L.	*D. Araújo et al. 604*
Fabaceae-Caes	*Apuleia leiocarpa* (Vogel) J.F. Macbr.	*N. Albuquerque 247*
	Bauhinia raddiana Bong.	*J. Marques 68*
	Chamaecrista desvauxii (Collad.) Killip	*A. Alves-Araújo et al. 438*
	Chamaecrista diphylla (L.) Greene	*J. Marques and N. Albuquerque 77*
	Chamaecrista ensiformis (Vell.) H.S. Irwin and Barneby	*A. Alves-Araújo et al. 621*
	Chamaecrista cf. pascuorum (Mart. ex Benth.) H.S. Irwin and Barneby	*J. Marques and N. Albuquerque 76*
	Chamaecrista repens (Vogel) H.S. Irwin and Barneby	*D. Araújo et al. 323*
	Dialium guianense (Aubl.) Sandwith	*N. Albuquerque 486*
	Hymenaea courbaril L.	*J. Marques et al. 283*
	Phanera outimouta (Aubl.) L.P. Queiroz	*D. Araújo and A. Alves-Araújo 513*
	Phanera trichosepala L. P. Queiroz	*J. Marques and N. Albuquerque 68*
	Sclerolobium densiflorum Benth.	*J. Marques 292*
	Senna georgica H.S. Irwin and Barneby	*A. Alves-Araújo et al. 670*
	Senna macranthera (DC. ex Collad.) H.S. Irwin and Barneby	*P. Ojima 94*
	Senna obtusifolia (L.) H.S. Irwin and Barneby	*J. Marques and N. Albuquerque 185*
	Senna quinquangulata (Rich.) H.S. Irwin and Barneby	*A. Alves-Araújo and J. Marques 839*
	Senna spectabilis (DC.) H.S. Irwin and Barneby	*N. Albuquerque 513*
Fabaceae-Mim.	*Abarema cochliacarpos* (Gomes) Barneby and J.W. Grimes	*D. Araújo et al. 306*
	Abarema filamentosa (Benth.) Pittier	*J. Marques and N. Albuquerque 197*
	Acacia paniculata Willd.	*D. Araújo et al. 603*
	Acacia polyphylla DC.	*J. Marques and N. Albuquerque 64*
	Albizia polycephala (Benth.) Killip	*T. Kimel s.n. (IPA-78780)*
	Albizia saman (Jacq.) F.Muell.	*T. Kimel s.n. (IPA-78779)*
	Inga blanchetiana Benth.	*A. Alves-Araújo and D. Araújo 711*
	Inga capitata Desv.	*J. Marques and N. Albuquerque 258*
	Inga flagelliformis (Vell.) Mart.	*J. Marques et al. 171*
	Inga ingoides (Rich.) Willd.	*J. Marques et al. 41*
	Inga laurina (Sw.) Willd.	*J. Marques et al. 03*
	Inga thibaudiana DC.	*J. Marques and N. Albuquerque 257*
	Inga cf. striata Benth.	*J. Marques and A. Bocage 204*
	Macrosamanea pedicellaris (DC.) Kleinhoonte	*J. Marques and N. Albuquerque 195*
	Mimosa caesalpiniifolia Benth.	*J. Marques and N. Albuquerque 07*
	Mimosa camporum Benth.	*J. Marques 249*
	Mimosa polydactyla Humb. and Bonpl. ex Willd.	*J. Marques and N. Albuquerque 255*
	Mimosa quadrivalvis L.	*D. Araújo et al. 288*
	Mimosa sensitiva L.	*J. Marques and N. Albuquerque 74*
	Mimosa somnians Humb. and Bonpl. ex Willd.	*J. Marques 142*
	Parkia pendula (Willd.) Benth. ex Walp.	*N. Albuquerque 573*
	Pithecellobium cochliocarpum (Gomes) J.F. Macbr	*N. Albuquerque 564*
	Plathymenia reticulata Benth.	*A. C. Souto et al. 04*
	Swartzia pickelii Killip ex Ducke	*J. Marques and N. Albuquerque 271*
Fabaceae-Fab.	*Andira nitida* Mart. ex Benth.	*A. Alves-Araújo et al. 827*
	Bowdichia virgilioides Kunth	*A. Alves-Araújo et al. 646*
	Canavalia brasiliensis Mart. ex Benth.	*J. Marques and N. Albuquerque 261*
	Canavalia dictyota Piper	*D. Araújo et al. 690*
	Canavalia parviflora Benth.	*N. Albuquerque et al. 495*
	Centrosema brasilianum (L.) Benth.	*P. Ojima 104*
	Centrosema plumieri (Turpin *ex* Pers.) Benth.	*D. Araújo et al. 470*
	Centrosema pubescens Benth.	*A. Melo et al. 136*

Table 1 (Cont.)

	Cleobulia cf. multiflora Mart. ex Benth.	*J. Marques 295*
	Clitoria falcata Lam.	*D. Araújo et al. 440*
	Clitoria laurifolia Poir.	*N. Albuquerque 359*
	Collaea speciosa (Loisel.) DC.	*D. Araújo et al. 565*
	Cratylia mollis Mart. *ex* Benth.	*N. Albuquerque 501*
	Crotalaria holosericea Ness and C. Mart.	*A. Alves-Araújo et al. 433*
	Crotalaria retusa L.	*J. Marques et al. 134*
	Crotalaria stipularia Desv.	*J. Marques and N. Albuquerque 268*
	Desmodium barbatum (L.) Benth. and Oerst.	*D. Araújo et al. 168*
	Desmodium distortum (Aubl.) J.F. Macbr.	*D. Araújo 449*
	Dioclea violacea Mart. *ex* Benth.	*D. Araújo 448*
	Dioclea virgata (Rich.) Amshoff	*D. Araújo et al. 484*
	Diplotropis incexis Rizzini and A. Mattos	*N. Albuquerque 613*
	Indigofera suffruticosa Mill.	*J. Marques 145*
	Machaerium aculeatum Raddi	*D. Araújo et al. 603*
	Machaerium salzmmannii Benth.	*A. Melo et al. 07*
	Machaerium brasiliense Vogel	*A. Alves-Araújo and J. Marques 845*
	Macroptilium prostratum (Benth.) Urb.	*D. Araújo et al. 438*
	Mucuna pruriens (L.) DC.	*D. Araújo et al. 377*
	Pterocarpus violaceus Vogel	*J. Marques and A. Alves-Araújo 309*
	Rhynchosia phaseoloides (Sw.) DC.	*D. Araújo 280*
	Stryphnodendron pulcherrimum (Willd.) Hochr.	*J. Marques and N. Albuquerque 183*
	Stylosanthes capitata Vogel	*N. Albuquerque 475*
	Stylosanthes guianensis (Aubl.) Sw.	*A. Alves-Araújo et al. 479*
	Stylosanthes scabra Vogel	*A. Melo 119*
	Tephrosia cinerea (L.) Pers.	*P. Ojima 48*
	Vigna luteola (Jacq.) Benth.	*A. Alves-Araújo et al. 567*
	Vigna peduncularis (Kunth) Fawc. and Rendle	*J. Marques 247*
	Vigna vexillata (L.) A. Rich.	*A. Alves-Araújo et al. 581*
Gentianaceae	*Coutoubea spicata* Aubl.	*A. Melo et al. 129*
	Voyria caerulea Aubl.	*digital image collection*
	Voyria obconica Progel	*A. Melo et al. 116*
	Voyria tenella Hook.	*A. Andrade-Lima 6456*
Gesneriaceae	*Drymonia coccinea* (Aubl.) Wiehler	*D. Araújo et al. 387*
Heliconiaceae	*Heliconia psittacorum* L. f.	*A. Alves-Araújo et al. 777*
	Heliconia spatho-circinada Aristeg.	*A. Alves-Araújo and D. Araújo 738*
Hernandiaceae	*Sparattanthelium botocudorum* Mart.	*D. Araújo et al. 403*
	Sparattanthelium tupiniquinorum Mart.	*I. Sá e Silva and H. Silva 170*
Humiriaceae	*Sacoglottis matogrossensis* Malme	*A. Alves-Araújo and J. Marques 856*
Hydrocharitaceae	*Elodea densa* Planch.	*A. Alves-Araújo et al. 691*
Hypericaceae	*Vismia guianensis* (Aubl.) Pers.	*I. Sá e Silva and H. Silva 223*
Lacistemataceae	*Lacistema robustum* Schnizl.	*S. Freire 70*
Lamiaceae	*Aegiphila chrysantha* Hayek.	*D. Araújo et al. 491*
	Aegiphila pernambucensis Moldenke	*N. Albuquerque and J. Marques 226*
	Aegiphila racemosa Vell.	*N. Albuquerque and F. Rocha 405*
	Marsypianthes chamaedrys (Vahl.) Kuntze	*N. Albuquerque et al. 298*
Lauraceae	*Cassytha americana* Nees	*A. Alves-Araújo et al. 640*
	Ocotea acutangula (Miq.) Mez	*S. Freire and K. Rocha 133*
	Ocotea gardneri (Meisn.) Mez.	*N. Albuquerque et al. 325*
	Ocotea glomerata (Nees) Mez	*A. Alves-Araújo and D. Araújo 707*
	Ocotea cf. limae Vattimo	*A. Alves-Araújo et al. 620*
Lecythidaceae	*Eschweilera ovata* (Cambess.) Miers	*A. Alves-Araújo et al. 769*
	Gustavia augusta L.	*A. Melo et al. 143*
	Lecythis pisonis Cambess.	*A. Melo et al. 143*
Lentibulariaceae	*Utricularia gibba* L.	*A. Alves-Araújo et al. 690*
	Utricularia pusilla Vahl	*A. Alves-Araújo et al. 420*
Loganiaceae	*Mitreola petiolata* (J.F. Gmel.) Torr. and A. Gray	*A. Melo et al. 139*
	Spigelia anthelmia L.	*D. Araújo et al. 336*
	Strychnos parvifolia A. DC.	*J. Marques and N. Albuquerque 16*
Loranthaceae	*Phthirusa pyrifolia* (Kunth) Eichler	*J. Marques and N. Albuquerque 46*
	Psittacanthus bicalyculatus Mart.	*J. Marques and N. Albuquerque 14*
	Psittacanthus dichrous Mart.	*D. Araújo et al. 327*
	Strutanthus marginatus (Desr.) Blume	*D. Araújo et al. 593*
	Struthanthus polyrhyzus (Mart. *ex* Roem. and Schult.) Martius ex G. Don	*A. Alves-Araújo and J. Marques 878*
Lythraceae	*Cuphea calophylla* Cham. and Schltdl.	*D. Araújo et al. 417*
	Cuphea flava Spreng.	*A. Alves-Araújo and J. Marques 860*
	Rotala ramosior (L.) Koehne	*A. Alves-Araújo et al. 543*
Malpighiaceae	*Bunchosia maritima* (Vell.) J.F. Macbr.	*A. Alves-Araújo and J. Marques 881*
	Byrsonima crispa A. Juss.	*H. Silva 225*
	Byrsonima sericeae DC.	*A. Alves-Araújo and D. Araújo 704*
	Heteropterys nordestina Amorim	*D. Araújo et al. 389*
	Niedenzuella acutifolia (Cav.) W.R. Anderson	*D. Araújo and A. Alves-Araújo 533b*
	Stigmaphyllon blanchetii C.E. Anderson	*A. Melo et al. 04*

Table 1 (Cont.)

	Stigmaphyllon salzmannii A. Juss.	*A. Alves-Araújo and D. Araújo 727*
	Tetrapterys phlomoides (Spreng.) Nied.	*A. Alves-Araújo et al. 259*
Malvaceae	*Apeiba albiflora* Ducke	*J. Marques 143*
	Apeiba tibourbou Aubl.	*P. Ojima 13*
	Eriotheca crenulaticalyx A. Robyns	*A. Alves-Araújo and J. Marques 855*
	Guazuma ulmifolia Lam.	*J. Marques and N. Albuquerque 115*
	Luehea ochrophylla Mart.	*D. Araújo and A. Alves-Araújo 500*
	Pavonia cancellata (L.) Cav.	*A. Melo and N. Albuquerque 154*
	Pavonia malacophylla (Link and Otto) Garcke	*D. Araújo et al. 592*
	Sida cordifolia L.	*A. Melo et al. 43*
	Sida glomerata Cav.	*J. Marques 242*
	Sida linifolia Cav.	*A. Melo et al. 132*
	Sidastrum micranthum (A. St.-Hil.) Fryxell	*A. Alves-Araújo and D. Araújo 701*
	Triumfetta abutiloides A. St.-Hil.	*A. Alves-Araújo et al. 496*
	Urena lobata L.	*P. Ojima 68*
	Waltheria communis A. St.-Hil.	*J. Marques and N. Albuquerque 122*
	Waltheria indica L.	*B. Amorim et al. 211*
	Waltheria viscosissima A. St.-Hil.	*B. Amorim et al. 212*
Marantaceae	*Calathea cf. brasiliensis* Körn.	*N. Albuquerque et al. 605*
	Ctenanthe cf. pernambucencis Yoshida-Arns and Mayo	*K. Rocha and S. Freire 114*
	Ischnosiphon gracilis (Rudge) Körn.	*J. Marques and N. Albuquerque 227*
	Maranta arundinacea L.	*N. Albuquerque et al. 327*
	Monotagma plurispicatum (Körn.) K. Schum	*D. Araújo and A. Alves-Araújo 537*
	Stromanthe porteana Griseb.	*A. Alves-Araújo et al. 792*
Marcgraviaceae	*Marcgravia cf. coriacea* Vahl	*N. Albuquerque 532*
	Marcgravia umbellata L.	*A. Alves-Araújo et al. 686*
	Souroubea guianensis Aubl.	*A. Alves-Araújo et al. 636*
Melastomataceae	*Aciotis longifolia* (Mart. *ex* DC.) Triana	*A. Alves-Araújo et al. 196*
	Clidemia capitellata (Bonpl.) D. Don	*A. Alves-Araújo et al. 385*
	Clidemia debilis Crueg.	*A. Alves-Araújo et al. 510*
	Clidemia hirta (L.) D. Don	*J. Marques and N. Albuquerque 101*
	Henriettea succosa (Aubl.) DC.	*D. Araújo et al. 616*
	Miconia albicans (Sw.) Triana	*A. Alves-Araújo et al. 766*
	Miconia amoena Triana	*N. Albuquerque et al. 631*
	Miconia ciliata (Rich.) DC.	*A. Melo 218*
	Miconia compressa Naudin	*A. Alves-Araújo and D. Araújo 757*
	Miconia cuspidata Mart.. *ex* Naudin	*N. Albuquerque et al. 238*
	Miconia cf. discolor DC.	*A. Alves-Araújo et al. 890*
	Miconia francavillana Cogn.	*H. Silva and K. Rocha 117*
	Miconia cf. hypoleuca (Benth.) Triana	*A. Alves-Araújo et al. 622*
	Miconia ligustroides (DC.) Naudin	*J. Marques and A. Alves-Araújo 306*
	Miconia minutiflora (Bonpl.) DC.	*J. Marques et al. 154*
	Miconia multiflora Cogn.	*J. Marques et al. 154*
	Miconia nervosa (Sm.) Triana	*A. Alves-Araújo et al. 787*
	Miconia prasina (Sw.) DC.	*A. Alves-Araújo et al. 790*
	Miconia tomentosa (Rich.) D. Don. *ex* DC.	*N. Albuquerque 569*
Meliaceae	*Guarea kunthiana* A. Juss.	*A. Cavalcanti 176*
	Guarea macrophylla Vahl	*A. Oliveira et al. 93*
	Guarea guidonia (L.) Sleumer.	*D. Araújo and A. Alves-Araújo 552*
	Trichilia lepidota Mart.	*A. Silva 55b*
	Trichilia quadrijuga Kunth	*I. Sá e Silva et al. 97*
Menispermaceae	*Cissampelos andromorpha* DC.	*A. Alves-Araújo et al. 613*
	Cissampelos glaberrima A. St.-Hil.	*J. Marques and N.Albuquerque 175*
Molluginaceae	*Mollugo verticillata* L.	*A. Alves-Araújo and D. Araújo 717*
Moraceae	*Artocarpus heterophyllus* Lam.	*H. Silva et al. 175*
	Brosimum discolor Schott	*J. Marques and N. Albuquerque 66*
	Brosimum gaudichaudii Trécul	*A. Silva and I. Sá e Silva 600*
	Brosimum guianense (Aubl.) Huber	*J. Marques and N. Albuquerque 65*
	Brosimum rubescens Taub.	*A. Alves-Araújo and J. Marques 865*
	Helicostylis tomentosa (Poepp. and Endl.) Rusby	*A. Melquíades and G. Bezerra 85*
	Sorocea hilarii Gaudich.	*G. Bezerra and A. Silva 197*
	Sorocea ilicifolia Miq.	*A. Alves-Araújo and J. Marques 867*
Musaceae	*Musa x paradisiaca* L.	*digital image collection*
Myristicaceae	*Virola gardneri* (A. DC.) Warb.	*H. Silva et al. 291*
Myrsinaceae	*Rapanea acuminata* Mez.	*N. Albuquerque and F. Rocha 444*
	Rapanea guianensis Aubl.	*A. Alves-Araújo et al. 468*
Myrtaceae	*Calyptranthes clusiifolia* (Miq.) O. Berg.	*D. Araújo et al. 157*
	Calyptranthes dardanoi Mattos	*A. Alves-Araújo et al. 635*
	Calyptranthes widgreniana O. Berg.	*A. Alves-Araújo et al. 819*
	Campomanesia dichotoma (O. Berg.) Mattos	*G. Bezerra and A. Melquíades 184*
	Campomanesia triflora (O. Berg) Baill.	*A. Alves-Araújo and J. Marques 877*
	Eugenia bimarginata DC.	*A. Melo et al. 49*
	Eugenia punicifolia (Kunth.) DC.	*D. Araújo et al. 621*

Table 1 (Cont.)

	Eugenia umbrosa O. Berg.	*A. Alves-Araújo and J. Marques 875*
	Gomidesia blanchetiana O. Berg	*K. Rocha and S. Freire 107*
	Guajava cattleyana (Sabine) Kuntze	*A. Alves-Araújo et al. 281*
	Myrcia cf. crassifolia (Miq.) Kiaersk.	*A. Melo et al. 32*
	Myrcia fallax (Rich.) DC.	*A. Alves-Araújo et al. 180*
	Myrcia hirtiflora DC.	*A. Melo et al. 215*
	Myrcia bergiana O. Berg.	*A. Alves-Araújo et al. 800*
	Myrcia guianensis (Aubl.) DC.	*A. Alves-Araújo et al. 627*
	Myrcia multiflora (Lam.) DC.	*J. Silva Filha and J. Silva Júnior 44*
	Myrcia sylvatica (G. Mey.) DC.	*A. Alves-Araújo 573 et al.*
	Myrcia tomentosa (Aubl.) DC.	*A. Silva and I. Sá e Silva 622*
	Myrciaria ferruginea O. Berg.	*A. Melo et al. 54*
	Psidium araca Raddi	*A. Melquíades et al. 26*
	Psidium guajava L.	*I. Sá e Silva 314*
	Psidium guineense Sw.	*A. Alves-Araújo et al. 281*
Nyctaginaceae	*Guapira nitida* (Schmidt) Lundell	*I. Sá e Silva and M. Silva 277*
	Guapira obtusata (Jacq.) Little	*A. Alves-Araújo et al. 399*
	Guapira opposita (Vell.) Reitz	*A. Alves-Araújo et al. 199*
Ochnaceae	*Ouratea hexasperma* (A. St.-Hil.) Baill.	*H. Silva and K. Rocha 251*
	Ouratea castaneifolia (DC.) Engl.	*K. Rocha and C. Oliveira 131*
	Ouratea crassa Tiegh.	*A. Alves-Araújo et al. 826*
	Sauvagesia erecta L.	*A. Alves-Araújo et al. 482*
Olacaceae	*Ximenia americana* L.	*P. Ojima 112*
Orchidaceae	*Dimerandra emarginata* (G. Mey.) Hoehne	*A. Melquíades and G. Bezerra 239*
	Epidendrum rigidum Jacq.	*A. Melquíades and G. Bezerra 250*
	Erytrhrodes densiflora (Lindl.) Ames	*K. Rocha and S. Freire 18*
	Oeceoclades maculata (Lindl.) Lindl.	*D. Araújo and A. Alves-Araújo 506*
	Prescottia stachyodes (Sw.) Lindl.	*K. Rocha and S. Freire 115*
	Sarcoglottis grandiflora (Hook.) Klotzsch.	*N. Albuquerque 489*
	Vanilla bahiana Hoehne	*D. Araújo et al. 186*
Oxalidaceae	*Oxalis cratensis* Hook	*J. Irapuan 28*
Passifloraceae	*Passiflora alata* Curtis	*A. Alves-Araújo et al. 687*
	Passiflora cincinnata Mast.	*N. Albuquerque 457*
	Passiflora edmundoi Sacco	*A. Silva s.n. (IPA-61585)*
	Passiflora edulis Sims	*D. Araújo et al. 577*
	Passiflora galbana Mast.	*D. Araújo et al. 478*
	Passiflora misera Kunth	*D. Araújo et al. 348*
	Passiflora ovalis Vell. *ex* M.Roem.	*D. Araújo et al. 576*
	Passiflora watsoniana Mast.	*A. Melo et al. 125*
Phyllanthaceae	*Amanoa guianensis* Aubl.	*A. Alves-Araújo and J. Marques 857*
	Margaritaria nobilis L. f.	*A. Melo et al. 08*
	Phyllanthus gradyanus M.J. Silva and M. Sales	*M. Silva 305*
	Phyllanthus juglandifolius Willd.	*A. Souto et al. 14*
	Phyllanthus niruri L.	*G. Bezerra and M. Silva 041*
	Phyllanthus orbiculatus Rich.	*D. Araújo et al. 409*
	Phyllanthus tenellus Roxb.	*D. Araújo et al. 420*
	Richeria grandis Vahl	*H. Silva and J. Gomes 383*
Piperaceae	*Peperomia magnoliifolia* (Jacq.) A.Dietr.	*A. Alves-Araújo et al. 484*
	Peperomia pellucida (L.) Kunth	*A. Melo et al. 133*
	Piper aduncum L.	*A. Alves-Araújo et al. 793*
	Piper arboreum Aubl.	*A. Alves-Araújo and J. Marques 866*
	Piper hispidum Sw.	*A. Alves-Araújo et al. 824*
	Piper marginatum Jacq.	*J. Marques et al. 157*
Plantaginaceae	*Scoparia dulcis* L.	*P. Ojima 43*
Poaceae	*Andropogon leucostachyus* Kunth	*J. Marques and A. Alves-Araújo 296*
	Andropogon selloanus (Hack.) Hack.	*D. Araújo et al. 166*
	Aristida adscensionis L.	*D. Araújo et al. 452*
	Axonopus capillaris (Lam.) Chase	*D. Araújo 623*
	Axonopus purpusii (Mez) Chase	*D. Araújo 622*
	Cenchrus echinatus L.	*D. Araújo and A. Alves-Araújo 511*
	Chloris elata Desv.	*N. Albuquerque et al. 313*
	Chloris orthonothon Döll	*D. Araújo et al. 356*
	Dactyloctenium aegyptium (L.) Willd.	*D. Araújo et al. 300*
	Digitaria ciliaris (Retz.) Koeler	*D. Araújo et al. 394*
	Digitaria horizontalis Willd.	*D. Araújo et al. 597*
	Digitaria insularis (L.) Mez *ex* Ekman	*D. Araújo et al. 611*
	Digitaria nuda Schum.	*D. Araújo et al. 600*
	Echinochloa colona (L.) Link	*D. Araújo and A. Alves-Araújo 497*
	Echinochloa cruz-pavonis (Kunth) Hitch.	*D. Araújo et al. 496*
	Echinolaena inflexa (Poir.) Chase	*D. Araújo et al. 562*
	Eragrostis articulata (Schrank) Nees	*D. Araújo et al. 494*
	Eragrostis ciliaris (L.) R.. Br.	*A. Melo and N. Albuquerque 161*
	Eragrostis maypurensis (Kunth) Steud.	*A. Alves-Araújo et al. 638*

Table 1 (Cont.)

	Eriochloa punctata (L.) Desv. ex Ham.	*J. Maciel et al. 554*
	Eustachys retusa (Lag.) Kunth	*N. A. Albuquerque et al. 202*
	Gymnopogon foliosus (Willd.) Nees	*D. Araújo et al. 453*
	Homolepis isocalycia (G. Mey.) Chase	*J. Maciel et al. 555*
	Ichnanthus calvescens (Nees) Döll	*D. Araújo et al. 454*
	Ichnanthus dasycoleus Tutin	*D. Araújo et al. 289*
	Ichnanthus leiocarpus (Spreng.) Kunth	*A. Alves-Araújo et al. 885*
	Ichnanthus pallens (Sw.) Benth.	*D. Araújo et al. 414*
	Lasiacis ligulata Hitchc. and Chase	*N. Albuquerque et al. 315*
	Lasiacis sorghoidea (Desv. *ex* Ham.) Hitchc. and Chase	*A. Alves-Araújo et al. 559*
	Megathyrsus maximus (Jacq.) B. K. Simon and S. W. L. Jacobs	*D. Araújo et al. 495*
	Merostachys aff. bifurcata Send.	*J. Maciel et al. 547*
	Olyra latifolia L.	*D. Araújo et al. 583*
	Panicum pilosum Sw.	*A. Alves-Araújo et al. 285*
	Pappophorum papiferum (Lam.) Kuntze	*D. Araújo et al. 305*
	Parodiolyra micrantha (Kunth) Davidse and Zuloaga	*D. Araújo et al. 407*
	Paspalum conjugatum P.J. Bergius	*A. Alves-Araújo et al. 307*
	Paspalum convexum Humb. and Bonpl. *ex* Flüggé	*D. Araújo et al. 353*
	Paspalum maritimum Trin.	*J. Maciel et al. 124*
	Paspalum millegrana Schrad.	*A. Melo and N. Albuquerque 165*
	Paspalum oligostachyum Salzm. *ex* Steud.	*D. Araújo et al. 441*
	Paspalum paniculatum L.	*D. Araújo and A. Alves-Araújo 515*
	Piresia leptophylla Soderstr.	*J. Maciel et al. 548*
	Setaria vulpiseta (Lam.) Roem. and Schult.	*P. Ojima 18*
	Streptogyna americana C.E. Hubb.	*J. Maciel et al. 562*
	Streptostachys asperifolia Desv.	*A. Melo et al. 99*
	Urochloa fusca (Sw.) B.F. Hansen and Wunderlin	*A. Alves-Araújo et al. 351*
Polygalaceae	*Bredemeyera floribunda* Willd	*A. Melo et al. 35*
	Bredemeyera cf. kunthiana Klotzsch	*A. Alves-Araújo et al. 238*
	Polygala brizoides A.St.-Hil. and Moq.	*P. Ojima 39*
	Polygala longicaulis Kunth	*A. Melo et al. 98*
	Polygala paniculata L.	*P. Ojima 18*
	Securidaca diversifolia (L.) S.F. Blake	*A. Alves-Araújo and D. Araújo 728*
Polygonaceae	*Coccoloba alnifolia* Casar.	*A. Alves-Araújo et al. 644*
	Coccoloba cf. confusa R.A. Howard	*N. Albuquerque et al. 485*
	Coccoloba cf. guianensis Meisn.	*A. Alves-Araújo et al. 207*
	Coccoloba cf. latifolia Lam.	*N. Albuquerque 561*
	Coccoloba mollis Casar.	*A. Melo and N. Albuquerque 182*
	Coccoloba ochreolata Wedd.	*A. Melo et al. 137*
	Coccoloba striata Benth.	*A. Alves-Araújo et al. 448*
Pontederiaceae	*Heteranthera oblongifolia* C. Mart.. *ex* Roem. and Schult.	*A. Alves-Araújo et al. 497*
Portulacaceae	*Portulaca oleracea* L.	*A. Alves-Araújo and J. Marques 874*
	Talinum triangulare (Jacq.) Willd.	*I. Sá e Silva and M. Silva 273*
Ranunculaceae	*Clematis dioica* L.	*A. Alves-Araújo et al. 604*
Rhamnaceae	*Gouania blanchetiana* Miq.	*P. Ojima 87*
Rubiaceae	*Alseis pickelii* Pilger and Schmale	*N. Albuquerque and J. Marques 251*
	Borreria humifusa Mart.	*A. Melo et al. 120*
	Borreria latifolia (Aubl.) K. Schum.	*A. Alves-Araújo et al. 384*
	Borreria ocymifolia (Willd. *ex* Roem. and Schult.) Bacigalupo and E.L. Cabral	*A. Alves-Araújo and J. S. Marques 862*
	Borreria verticillata (L.) G.Mey.	*P. Ojima 09*
	Coccocypselum lanceolatum (Ruiz and Pav.) Pers.	*A. Alves-Araújo et al. 458*
	Coussarea nodosa (Benth.) Müll. Arg.	*A. Melo et al. 148*
	Coutarea hexandra (Jacq.) K. Schum.	*A. Melo et al. 1*
	Diodia setigera DC.	*N. Albuquerque and F. Rocha 402*
	Gonzalagunia dicocca Cham. and Schltdl.	*D. Araújo et al. 595*
	Palicourea crocea (Sw.) Roem. and Schultes	*A. Alves-Araújo et al. 891*
	Palicourea marcgravii A.St.-Hil.	*A. Alves-Araújo et al. 453*
	Posoqueria latifolia (Rudge) Roem. and Schult.	*A. Alves-Araújo et al. 195*
	Psychotria barbiflora DC.	*J. Marques and N. Albuquerque 198*
	Psychotria bracteocardia (DC.) Mull.Arg.	*A. Alves-Araújo and J. Marques 844*
	Psychotria capitata Ruiz. and Pavon.	*A. Alves-Araújo et al. 395*
	Psychotria carthagenensis Jacq.	*J. Marques and N. Albuquerque 192*
	Psychotria erecta (Aubl.) Standl. and Steyerm.	*A. Alves-Araújo et al. 532*
	Psychotria hoffmansenggiana (Willd. *ex* Roem and Schult.) Mull. Arg.	*A. Melo et al. 17*
	Psychotria platypoda DC.	*N. Albuquerque 257*
	Richardia grandiflora (Cham. and Schltdl.) Steud.	*P. Ojima 10*
	Salzmannia nitida DC.	*A. Alves-Araújo et al. 628*
	Sabicea grisea Cham. and Schltdl.	*D. Araújo et al. 563*
Rutaceae	*Conchocarpus insignis* Pirani	*N. Albuquerque et al. 633*
	Ertela trifolia (L.) Kuntze	*A. Alves-Araújo et al. 250*
	Esenbeckia grandiflora Mart.	*N. Albuquerque and J. Marques 460*
	Hortia arborea Engl.	*H. Silva 194*
	Pilocarpus microphyllus Staff *ex* Wardleworth	*A. Alves-Araújo et al. 503*

Table 1 (Cont.)

Salicaceae	*Casearia arborea* (Rich.) Urb.	*A. Alves-Araújo et al. 216*
	Casearia grandiflora Cambess.	*N. Albuquerque 253*
	Casearia javitensis Kunth	*A. Alves-Araújo and J. Marques 871*
	Casearia sylvestris Sw.	*A. Alves-Araújo et al. 279*
Santalaceae	*Phoradendron coriaceum* Mart. *ex* Eichler	*A. Alves-Araújo et al. 469*
Sapindaceae	*Allophylus edulis* (A. St.-Hil., Cambess. and A. Juss.) Radlk.	*A. Alves-Araújo 797*
	Cupania emarginata Cambess.	*A. Alves-Araújo et al. 552*
	Cupania racemosa (Vell.) Radlk.	*A. Melo et al. 144*
	Cupania revoluta Rolfe	*A. Silva 592*
	Matayba cf. guianensis Aubl.	*A. Alves-Araújo et al. 235*
	Paullinia pinnata L.	*D. Araújo et al. 442*
	Paullinia racemosa Wawra	*A. Melquíades and G. J. Bezerra 116*
	Paullinia cf. trigonia Vell.	*N. Albuquerque and F. Rocha 450*
	Serjania salzmanniana Schltr.	*D. Araújo and A. Alves-Araújo 523*
	Serjania subimpunctata Radlk.	*D. Araújo and A. Alves-Araújo 499*
Sapotaceae	*Chrysophyllum cainito* L.	*A. Alves-Araújo and D. Araújo 733*
	Chrysophyllum splendens Spreng.	*H. Silva 77*
	Diploon cuspidatum (Hoehne) Cronquist	*K. Rocha and C. Oliveira 62*
	Manilkara salzmannii (A. DC.) H. J. Lam.	*H. Silva and J. Gomes 380*
	Micropholis compta Pierre	*A. Oliveira et al. 86*
	Pouteria bangii (Rusby) T.D. Penn.	*A. Alves-Araújo et al. 607*
	Pouteria glomerata (Miq.) Radlk.	*A. Alves-Araújo et al. 472*
	Pouteria grandiflora (A. DC.) Baehni	*A. Alves-Araújo et al. 539*
	Pouteria peduncularis (Mart. and Eichler *ex* Miq.) Baehni	*A. Cavalcanti 136*
	Pouteria venosa (Mart.) Baehni	*A. Alves-Araújo et al. 300*
	Pradosia lactescens (Vell.) Radlk.	*G. Bezerra and A Lima*
Schoepfiaceae	*Schoepfia brasiliensis* A. DC.	*A. Alves-Araújo et al. 545*
Scrophulariaceae	*Capraria crustacea* L.	*D. Araújo et al. 358*
Simaroubaceae	*Picramnia gardneri* Planch.	*A. Alves-Araújo et al. 197*
	Simarouba amara Aubl.	*S. Freire and K. D. Rocha 77*
Siparunaceae	*Siparuna guianensis* Aubl.	*A. Alves-Araújo et al. 202*
Smilacaceae	*Smilax syphilitica* Griseb.	*D. Araújo et al. 481*
Solanaceae	*Cestrum sendtnerianum* Mart.	*N. Albuquerque and J. Marques 237*
	Schwenckia americana L.	*A. Alves-Araújo et al. 605*
	Solanum americanum Mill.	*G. Bezerra 88*
	Solanum asperum Rich.	*A. Alves-Araújo et al. 909*
	Solanum paludosum Moric.	*A. Alves-Araújo et al. 908*
	Solanum paniculatum L.	*A. Alves-Araújo et al. 617*
	Solanum rhytidoandrum Sendtn.	*P. Ojima 57*
Teophrastaceae	*Clavija caloneura* Mart. and Miq.	*A. Alves-Araújo et al. 226*
Trigoniaceae	*Trigonia nivea* Cambess.	*N. Albuquerque and J. Marques 248*
Turneraceae	*Piriqueta racemosa* (Jacq.) Sweet	*D. Araújo et al. 427*
	Turnera ulmifolia L.	*P. Ojima 58*
Urticaceae	*Cecropia pachystachya* Trécul	*A. Alves-Araújo and D. Araújo 736*
	Laportea aestuans (L.) Chew.	*A. Melquíades and G. Bezerra 231*
	Pilea pumila (L.) A. Gray	*A. Alves-Araújo and D. Araújo 718*
	Pouroma mollis Trécul	*S. Freire et al. 76*
Verbenaceae	*Citharexylum pernambucense* Moldenke	*A. Alves-Araújo and J. Marques 864*
	Lantana camara L.	*P. Ojima 49*
	Lantana radula Sw.	*A. Melo and N. Albuquerque 194*
	Stachytarpheta angustifolia (Mill.) Vahl	*N. Albuqeuerque and F. Rocha 409*
	Stachytarpheta elatior Schrad. *ex* Schult.	*J. Marques and N. Albuquerque 44*
	Stachytarpheta cf. subulata Moldenke	*N. Albuquerque 436*
	Tamonea spicata Aubl.	*A. Melo et al. 70*
Violaceae	*Amphirrhox longifolia* (St. Hil.) Spreng	*A. Alves-Araújo and J. S. Marques 876*
	Paypayrola blanchetiana Tul.	*D. Araújo and A. Alves-Araújo 546*
Vitaceae	*Cissus erosa* Rich.	*A. Alves-Araújo et al. 637*
	Cissus verticilata (L.) Nicolson and C.E. Jarvis	*D. Araújo et al. 437*
Vochysiaceae	*Qualea cryptantha* (Spreng.) Warm.	*N. Albuquerque 259*
Xyridaceae	*Xyris anceps* Lam.	*A. Alves-Araújo et al. 663*
	Xyris jupicai Rich.	*A. Alves-Araújo et al. 897*
Zingiberaceae	*Alpinia zerumbet* (Pers.) B.L. Burtt and R.M. Sm.	*A. Melo and N. Albuquerque 166*

DISCUSSION

The species richness is considered low when compared with other known hotspots such as the Atlantic Forest from southern Bahia and southeastern Brazil (Thomas *et al*. 2003; Amorim *et al*. 2005, 2008). However, this value is higher than that reported in most of the checklists of fragments in the Pernambuco Endemism Center. Barreto *et al.* (2003) studied twelve fragments in the States of Alagoas and Pernambuco. They provided a checklist with 403 species from 206 genera. Barbosa *et al.* (2003) and Agra *et al.* (2003) also found lower values than presented here studying fragments of "Brejos de Altitude" (Montane Atlantic forest) in the State of Paraíba.

The difference among the fragments (richness of species and richness of the arboreal component) corroborates the findings of several other works that stressed the positive correlation between size of the fragment area and species richness. However, among the smaller fragments, Pezinho had the richness values closer to those of larger fragments.

This could be explained by the variability of habitats found in Fragment 4, as well as by its land use history. In this aspect, we believe that this fragment has been drastically reduced in size in recent years, which would explain the greater richness that still exists.

The number of families found in several checklists for the Atlantic forest of the Northeast is clearly different. However, those data need special taxonomic interpretation because of the differences between the systems of classification used by the different authors and cannot be easily considered here. Nevertheless, it is important to point out that most of the species rich woody plant families are also reported in several checklists done previously (Guedes 1998; Agra *et al.* 2004; Barbosa *et al.* 2004; Oliveira *et al.* 2004; Barreto *et al.* 2006; Ferraz and Rodal 2006; Grillo *et al.* 2006; Araújo *et al.* 2007; Oliveira 2007; Barbosa 2008).

Guedes (1998) cited 170 species of treelets and trees in a large fragment (> 300 ha) in an urban fragment of Atlantic Forest in Pernambuco. Later, Grillo *et al.* (2003) provided a checklist of trees from twelve fragments of Atlantic Forest from the States of Alagoas and Pernambuco. They cited 130 species (102 of them identified to species level). Oliveira (2007), working with 38 fragments of Atlantic Forest in the southern area of State of Pernambuco, found 146 arboreal species. Even with the differences in the methodological criteria for inclusion of species, the data presented show how important and species rich the flora of Angiosperms is in the studied area. All of these checklists have a smaller number of species of trees than found here.

Andrade-Lima (1970) and Tavares *et al.* (1971) commented on the occurrence of emergent trees 30-35m tall in forest fragments located inside the limits of PEC. They documented the presence and abundance of "sapucaias" (*Lecythis pisonis* Cambess., Lecythidaceae), "urucubas" [*Virola gardneri* (A.DC.) Warb., Myristicaceae], "visgueiros" [*Parkia pendula* (Willd.) Benth. *ex* Walp., Fabaceae], and "amarelos" [*Plathymenia reticulata* Benth. (= *P. foliolosa* Benth.), Fabaceae], all of which have also been found in the fragments studied.

In general, Annonaceae, Euphorbiaceae, Fabaceae and Sapotaceae have been cited as families rich in woody plants (trees) in previous papers related to the northeastern Atlantic forest (Guedes 1998; Agra *et al.* 2004; Barbosa *et al.* 2004; Oliveira *et al.* 2004; Barreto *et al.* 2006; Ferraz and Rodal 2006; Grillo *et al.* 2006; Araújo *et al.* 2007; Barbosa 2008; Thomas and Barbosa 2008). The results presented here clearly confirm their importance.

The occurrence of trees of exotic species in the interior of forest fragments from the PEC was also pointed out by Oliveira (2007). *Mangifera indica* L., Anacardiaceae (mango), *Artocarpus heterophyllus* Lam., Moraceae (jack-fruit), *Musa xparadisiaca* L., Musaceae (banana), and two Arecaceae: *Elaeis guineensis* L. (dende-palm) and *Coccus nucifera* L. (coconut), which were also found by Oliveira (2007), are species used as food sources by people. Their presence suggests a long history of forest management by the local people in the area studied.

The diversity of climbers is weakly known in Brazil. Little information is available and it is from the southern part of the Atlantic forest (Morellato and Leitão-Filho 1998; Tiribiçá *et al*. 2006). Despite the high diversity and abundance of climbing plants in dry forests in northeastern Brazil, there are no records of checklists or of serious efforts to collect them. The species richness of climbers in the fragments at Usina São José is higher than expected and with more species listed than any other checklist published about the plants from the Atlantic Forest in the PEC. The diversity of *Passiflora* L. (Passifloraceae) with 8 species and of the family Cucurbitaceae with 10 species is surprising. Both families, like other climbing groups, are often not included in checklists because of the difficulties to collect them.

Epiphytes and hemi-epiphytes are very common and with a high diversity in the Neotropics. Barreto *et al.* (2003) and Siqueira Filho and Félix (2003) also found low species richness in some of the cited families in fragments of Atlantic forest relatively close to the studied area. However, these same authors found a higher number of species of bromeliads and orchids than reported here. Therefore, the low diversity of epiphytes and hemi-epiphytes cannot be considered only a consequence of low precipitation and low variability of habitats found in the northern part of the PEC. We believe that several other aspects are involved in this circumstance, such as a reduction of pollinators and dispersers, reduction of trees appropriate for colonization by epiphytes, higher luminosity and higher rates of commercial exploitation. Together, they could produce the low diversity values found to this category of life-form.

Despite the Atlantic Forest being considered an important center of diversity for the subfamily Bambusoideae (Judziewicz *et al.* 1999), not many species have been recorded in this work. However, the first record of *Merostachys aff. bifurcata* Send. to northeastern Brazil shows how important inventories as this one can be.

Although Cyperaceae has one of the highest values for species richness among families in the study area, the species found are often associated with fragmented forests in lowland Atlantic Forest in northeastern Brazil (Luceño *et al.* 1997, Alves 2003). The occurrence of *Rhynchospora cephalotes* (L.) Vahl and *Rhynchospora comata* (Link) Roem. and Schult. in the understory with some level of disturbance and *Scleria bracteata* Cav. and *Scleria secans* (L.) Urb., abundant along margins and tree-fall gaps, is expected and confirm the level of disturbance of the area. However, among the 42 species of Cyperaceae found, some of them indicate a better degree of conservation of the forest. *Calyptrocarya glomerulata* (Brong.) Urb., *Becquerelia cymosa* Brongn., and *Hypolytrum bullatum* C.B. Clarke are species sensitive to changes in luminosity and humidity in the forest. They were found in habitats with dense understory and high levels of humidity. They can be used as possible bio-indicators of habitats and quality of conservation of the Atlantic Forest fragments in northeastern Brazil.

Despite Amaryllidaceae *s.s.* (*Griffinia* subg. *Griffinia*, for example) being considered a possible bio-indicator of degree of conservation of fragments of northeastern Atlantic Forest, only *Hippeastrum stylosum* Herb., a taxon distributed widely in northeastern Brazil (Alves-Araújo and Alves pers. comm.), was reported in the study area.

According to Ferreira *et al.* (2005) and Figueroa *et al.* (2005), among other authors, several species listed in the present inventory are commonly used as sources for timber, medicine or edible fruits. *Manilkara salzmannii* (A. DC.) H.J. Lam. ("maçaranduba"), *Plathymenia reticulata* Benth. ("amarelo") and *Simarouba amara* Aubl. ("caixeta") are common species in the fragments that are used for timber. *Bowdichia virgilioides* Kunth ("sucupira", "sucupira-preta") and *Hymenaea courbaril* L. ("jatobá") are used by locals as timber and medicinal sources. And finally, *Psidium guianeense* Sw. ("araçá"), *Psidium guajava* L. ("goiaba"), *Anacardium occidentale* L. ("caju"), *Hancornia speciosa* Gomes ("mangaba"), *Inga blanchetiana* Benth. ("ingá-caixão"), *Lecythis pisonis* Cambess. ("sapucaia"), and *Passiflora alata* Curtis ("maracujá-açú") are some examples of wild edible fruits with a high research priority to improve an already established local trade.

The checklist presented here confirms the ecological value of the fragments of Atlantic Forest located at Usina São José. It also shows how incomplete are most of the previous checklists from the Atlantic forest of northeastern Brazil. And finally, it reinforces the importance of floristic inventories in providing real parameters for prioritizing and assessing programs for conservation of the Atlantic forest.

Further work will produce a complementary checklist. Around 150 morphospecies are already collected and waiting to be identified. Some of them are sterile samples and need more collections. It is estimated that the final list will comprise ca. 800 species. These data will be used for an analysis of floristic similarity. This study is going to be based on a presence-absence matrix of the taxa found in the studied fragments. In the present analysis, only samples

identified to the species level were used.

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