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THE IMPORTANCE OF SAMPLING ANTHROPIZED AREAS OF ATLANTIC FOREST FOR NEW RECORDS OF WOODY SPECIES[1] (SCIENTIFIC NOTE)

A IMPORTÂNCIA DE AMOSTRAR ÁREAS ANTROPIZADAS DE MATA ATLÂNTICA PARA NOVOS REGISTROS DE ESPÉCIES LENHOSAS (NOTA CIENTÍFICA)

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ABSTRACT - Phytosociological studies are important for the knowledge of biodiversity patterns and help to elucidate of distribution and abundance of species. We aimed to quantify the wood component in areas that had evident anthropic impacts and presence of exotic and invasive species in Ilha Grande, Rio de Janeiro State, Brazil. The shrubby-tree component with Diameter at Breast Height - DBH ≥ 5cm was quantified by means of 16 circular plots with 15m radius, of which eight with presence of invasive species *Artocarpus heterophyllus* Lam. Were identified 19 new occurrences for Ilha Grande-RJ and two endemic species to the Rio de Janeiro State. We concluded the necessity of quantitative studies in anthropized areas, because these also can conserve biodiversity and are neglected in floristic and phytosociological studies.

Keywords: *Artocarpus heterophyllus*; biological invasion; endemic species; exotic invasive species.

RESUMO - Estudos fitossociológicos são importantes para o conhecimento dos padrões de biodiversidade e ajudam a elucidar a distribuição e abundância das espécies. Objetivamos quantificar o componente lenhoso em áreas que tiveram evidentes impactos antrópicos e presença de espécies exóticas e invasoras na Ilha Grande, estado do Rio de Janeiro, Brasil. O componente arbustivo-arbóreo com Diâmetro a Altura do Peito - DAP ≥ 5cm foi quantificado por meio de 16 parcelas circulares com 15m de raio, das quais oito com presença da espécie invasora *Artocarpus heterophyllus* Lam. Foram identificadas 19 novas ocorrências para Ilha Grande-RJ e duas espécies endêmicas do estado do Rio de Janeiro. Concluímos a necessidade de estudos quantitativos em áreas antropizadas, pois estas também podem conservar a biodiversidade e são negligenciadas em estudos florísticos e fitossociológicos.

Palavras-chave: *Artocarpus heterophyllus*; Biologia da Invasão; espécies endêmicas; espécies exóticas invasoras.

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1 INTRODUCTION

In the current scenario of environmental changes where different models have been used to predict changes in patterns of distribution and abundance of species, the importance of phytosociological studies has become even more evident for the knowledge of biodiversity, pointing to areas of high endemism and new record of species (Assumpção and Nascimento, 2000; Martini et al., 2007; Lopes et al., 2015). In this sense, the Atlantic Rain Forest harbors a high biodiversity of plants in Brazil (Martini et al., 2007; Forzza et al., 2012). Factors such as the high geomorphological variation and climatic heterogeneity influence this high richness (Oliveira-Filho and Fontes, 2000; Scarano, 2002; Marques et al., 2016).

The Atlantic Rain Forest is considered one of the biodiversity hotspots, due the high endemism and habitat loss (Myers et al., 2000). The forest fragmentation and habitat loss are considered the major causes of species extinctions in Atlantic Forest (Ribeiro et al., 2009) and these impacts are associated with the human action of converting native forests into plantations, pasture and urban centers (Scarano and Ceotto, 2015). In this way, is important to preserve forests remnants, even with small area or area with high human interference (Hobbs et al., 2006; Scarano, 2006), since these fragments can serve as shelter and dispersion for plants and animals, including endangered species (Scarano, 2006).

Therefore, quantitative research in anthropized areas can provide excellent information about patterns of species distribution, local biodiversity and the conservation at landscape level. We aimed to quantify the shrubby-tree component in area with human disturbance in order to verify the contribution of these areas for biodiversity conservation.

2 MATERIAL AND METHODS

The study area is located in Ilha Grande, Angra dos Reis, Rio de Janeiro State, Brazil. Ilha Grande is part of Green Coast of the Atlantic Forest (Alves et al., 2016) and expressive richness is recorded for different biological groups (Esbérard et al., 2009; Callado et al., 2009; Rocha et al., 2009).

The study area have a high density of exotic species (23°10′59.33″ – 23°11′15.38″S, 44°10′25.1″– 44°12′4.88″W), which jackfruit tree (*Artocarpus heterophyllus* Lam.) is the dominant invasive species (Bergallo et al., 2016).

We allocated 16 circle plots with 15m of radius (706 m² per plot, about 1.13 ha in total). Eight plots were located in areas with jackfruit tree and eight in areas without jackfruit trees. We quantified all shrubby-tree individuals with Diameter at Breast Height - DBH ≥ 5 cm. The individuals sampled were identified at the lowest possible taxonomic level by the authors previous knowledge about plant species and by comparisons at the Herbarium Dimitri Sucre of the Rio de Janeiro Botanical Garden and at the Herbarium of the State University of Rio de Janeiro and plant taxonomists (see acknowledgments). The species listed in this study were verified in previous surveys published for Ilha Grande (Araujo and Oliveira, 1988; Oliveira, 2002; Callado et al., 2009) and the Jabot online database, which belongs to the Rio de Janeiro Botanical Garden (JABOT, 2017).

The correct plant name spelling, species authorship, life form, threat status and occurrence record of each species for each Brazilian state was obtained from the "List of Flora of Brasil" (Forzza et al., 2017). We accessed the information using the package flora (Carvalho, 2017) in software R version 3.2.2 (R CORE TEAM, 2015).

3 RESULTS

We found 19 new records for Ilha Grande (Table 1). Only one new species report remained at genus level (*Ruprechtia* sp. - Polygonaceae). Fabaceae and Myrtaceae were the families with higher species richnness, each one with four species.

Couratari pyramidata (Vell.) Kunth is rare, endemic for Rio de Janeiro state and considered endangered according IUCN (Smith et al., 2016). We sampled one individual of this species in the area dominated for *Artocarpus heterophyllus*. *Pseudopiptadenia inaequalis* (Benth.) Rauschert is also endemic for Rio de Janeiro state (Morim, 2015) and we recorded only one individual of this species. The other species quantified had records in at least two Brazilian States (Table 1).

Table 1. List of shrubby-tree species with first record collected in anthropic area in Ilha Grande, Angra dos Reis, RJ, Brazil. Life forms, threat status (according IUCN) and occurrence in Brazilian states. Brazilian states acronyms: Acre – AC; Alagoas – AL; Amapá – AP; Amazonas – AM; Bahia – BA; Ceará – CE; Distrito Federal – DF; Espírito Santo – ES; Goiás – GO; Maranhão – MA; Mato Grosso – MT; Mato Grosso do Sul – MS; Minas Gerais – MG; Pará – PA; Paraíba – PB; Paraná – PR; Pernambuco – PE; Piauí – PI; Rio de Janeiro – RJ; Rio Grande do Norte – RN; Rio Grande do Sul – RS; Rondônia – RO; Roraima – RR; Santa Catarina – SC; São Paulo – SP; Sergipe – SE; Tocantins – TO. NA – not available; EN – endangered; LC – least concern; VU – vulnerable.

Tabela 1. Lista de primeiros registros de espécies arbustivo-arbóreas reconhecidas em área antrópica na Ilha Grande, Angra dos Reis, RJ, Brasil. Formas de vida, estado de ameaça (segundo IUCN) e a ocorrência nos Estados Brasileiros. Acrônimos de estados Brasileiros: Acre – AC; Alagoas – AL; Amapá – AP; Amazonas – AM; Bahia – BA; Ceará – CE; Distrito Federal – DF; Espírito Santo – ES; Goiás – GO; Maranhão – MA; Mato Grosso – MT; Mato Grosso do Sul – MS; Minas Gerais – MG; Pará – PA; Paraíba – PB; Paraná – PR; Pernambuco – PE; Piauí – PI; Rio de Janeiro – RJ; Rio Grande do Norte – RN; Rio Grande do Sul – RS; Rondônia – RO; Roraima – RR; Santa Catarina – SC; São Paulo – SP; Sergipe – SE; Tocantins – TO. NA – não disponível; EN – em perigo de extinção; LC – menor preocupação; VU – vulnerável.

Family	Species	Life form	Threat status	Occurrence
Annonaceae	*Annona cacans* Warm.	Tree	LC	BA, ES, MG, MS, PE, PR, RJ, RS, SC, SP
Aquifoliaceae	*Ilex cerasifolia* Reissek	Tree	NA	GO, MG, MS, MT, RJ, SP
Asteraceae	*Vernonanthura discolor* (Spreng.) H.Rob.	Tree	NA	BA, DF, ES, MG, PR, RJ, RS, SC, SP
Boraginaceae	*Cordia trichotoma* (Vell.) Arráb. ex Steud.	Tree	NA	AL, BA, CE, DF, ES, GO, MA, MG, MS, MT, PB, PE, PI, PR, RJ, RN, RS, SC, SP, TO
Clusiaceae	*Tovomita leucantha* (Schltdl.) Planch. & Triana	Tree	NA	ES, MG, RJ
Euphorbiaceae	*Caryodendron janeirense* Müll. Arg.	Tree	NA	RJ, SP
Fabaceae	*Andira fraxinifolia* Benth.	Tree	NA	AL, BA, CE, DF, ES, GO, MG, MS, PB, PE, PI, PR, RJ, RN, RS, SC, SE, SP
Fabaceae	*Andira ormosioides* Benth.	Tree	NA	BA, ES, MG, PE, RJ, SP
Fabaceae	*Pseudopiptadenia inaequalis* (Benth.) Rauschert	Tree	NA	RJ
Fabaceae	*Senegalia polyphylla* (DC.) Britton & Rose	Shrub, Tree	NA	AL, AM, BA, CE, DF, ES, GO, MA, MG, MS, MT, PA, PB, PI, PR, RJ, SE, SP
Lecythidaceae	*Couratari pyramidata* (Vell.) Kunth	Tree	EN	RJ
Meliaceae	*Cedrela odorata* L.	Tree	VU	AC, AL, AM, AP, BA, CE, DF, ES, GO, MA, MG, MS, MT, PA, PB, PE, PR, RJ, RO, SC, SE, SP
Myrtaceae	*Campomanesia schlechtendaliana* (O.Berg) Nied.	Tree	LC	BA, ES, MG, PR, RJ, SP

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Family	Species	Life form	Threat status	Occurrence
Myrtaceae	*Eugenia speciosa* Cambess.	Tree	NA	MG, PR, RJ, RS, SC, SP
Myrtaceae	*Eugenia punicifolia* (Kunth) DC.	Shrub, Tree	NA	AC, AL, AM, AP, BA, CE, DF, ES, GO, MA, MG, MS, MT, PA, PB, PE, PI, PR, RJ, RN, RO, RR, SE, SP, TO
Myrtaceae	*Myrcia pubipetala* Miq.	Tree	LC	BA, ES, MG, PR, RJ, RS, SC, SP
Polygonaceae	*Ruprechtia* sp.	Tree	NA	NA
Rutaceae	*Zanthoxylum rhoifolium* Lam.	Tree	NA	AC, AL, AM, AP, BA, CE, DF, ES, GO, MA, MG, MS, MT, PA, PB, PE, PI, PR, RJ, RN, RO, RR, RS, SC, SE, SP, TO
Verbenaceae	*Citharexylum myrianthum* Cham.	Tree	NA	AL, BA, CE, ES, MA, MG, PB, PE, PI, PR, RJ, RN, RS, SC, SE, SP

4 DISCUSSION

Our findings highlights the importance of quantitative studies, even in anthropic areas, because we found 19 new species records. One recent survey also reported new records of birds to the Ilha Grande (Alves et al., 2016). Endemic species of Rio de Janeiro state were also recorded. This fact reinforces the importance of conserving the anthropized areas, because even the community composition altered by exotic species, these areas can possess rare species and provide maintenance of many ecosystems services (D'Antonio and Meyerson, 2002; Lugo, 2004).

In a check list of the Brazilian plants, Zappi et al. (2015) registered 2167 species in anthropized areas. This reinforces the importance of these areas for increasing information of species distribution, their extinction risk and consequently contributes for biological conservation initiatives and management. Moreover, the importance of a list of exotic and invasive species (*sensu* Richardson et al., 2000) has been pointed out by other national and international studies (Pyšek et al., 2004; Moro et al., 2012) and may be fundamental to conservation policy. In addition, quantifying the native species that coexist with the exotic species can bring information of the possible impact of the biological invasion in community, since the works about this subject still are with few empirical data (Scarano, 2006).

Therefore, we conclude that phytosociological studies in anthropized areas are important for the knowledge of biodiversity and can be useful to evaluating possible environmental impacts, as well as in public policy related the management of these areas.

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