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Source: Tropical Conservation Science, 9(4)

Published By: SAGE Publishing

URL: https://doi.org/10.1177/1940082916668011

Tropical Conservation Science
October-December 2016: 1–19

DOI: 10.1177/1940082916668011
trc.sagepub.com

Paradox Between Species Diversity and Conservation: A Subtropical Atlantic Forest Reserve in Brazil Has Similar Tree Species Diversity to Unprotected Sites in the Same Region

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Abstract

One way to draw attention to an area regarding conservation is to declare it as an Atlantic Forest Biosphere Reserve (RBMA). In this article, we analyzed attributes related to different forest remnants, including the only RBMA of Santa Catarina state (Brazil), a modified old-growth Subtropical Atlantic Forest remnant. We brought evidences that patterns of distribution of species abundance and species diversity are influenced by highly dominant species. We found a relevant proportion of endemic tree/shrub species and three endangered species. These findings demonstrate the relevant biodiversity of the Subtropical Atlantic Forest of Santa Catarina. The diversity profiles of the RBMA and other areas overlapped. This finding, which has an important conservational implication that the tree species diversity in these areas is similar. Therefore, we concluded that the areas considered in our study deserve attention regarding biological conservation. New priority areas for conservation are necessary, and the establishment of new RBMA may be a way to achieve this goal.

Keywords

diversity index, diversity profiles, rarefaction curves, subtropical rainforest, Whittaker plots

Introduction

Biological diversity is a central theme in ecology and is often expressed in terms of species diversity (Liu, Whittaker, Ma, & Malcolm, 2007). This concept considers two attributes: (a) species richness and (b) the uniformity of distribution of species' abundance (Hill, 1978; Hurlbert, 1971; Melo, 2008). Therefore, understanding the interaction between these attributes and their relation with the conservation status of a biological community is crucial, even more when species diversity is regarded as an essential attribute for identifying priority areas for conservation (Buckland, Studeny, Magurram, & Newson, 2011; Durigan et al., 2009).

The growing importance of Brazilian's Atlantic Forest is stimulating the scientific community and government agencies to select priority areas for conservation (Anacleto, Ferreira, Diniz Filho, & Ferreira, 2005; Brasil, 2002, 2007a, 2007b; Durigan et al., 2009; Durigan, Siqueira, Franco, & Ratter, 2006; Galetti et al., 2009; Santos & Mantovani, 1999). These areas are usually selected based on the occurrence of rare and endangered species, species richness, level of endemism, and vegetation types (Joppa, Visconti, Jenkins, & Pimm, 2013; Margules & Pressey, 2000; Mews, Pinto, Eisenlohr, & Lenza, 2014; Pullin, Sutherland, Gardner, Kapos, &

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Received 5 January 2016; Revised 12 July 2016; Accepted 13 August 2016

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Fa, 2013). However, studies in tropical forests have suggested that species diversity is an important criterion, for it can vary among fairly conserved forests (Giam, Scheffers, Sodhi, Wilcove, Ceballos, & Ehrlich, 2012; Gibson et al., 2011; Sevegnani et al., 2013; Sevegnani, Vibrans, & Gasper, 2013). In this sense, species diversity plays a key role in defining the conservation status of tropical forests remnants.

On the other hand, if the community has few species with great abundance, some of the aforementioned issues might become contradictory. Hence, species diversity metrics must be used carefully (Imai et al., 2014). Well-conserved forests, for example, may yield lower species diversity when compared with less conserved forests, especially when using indices that address greater weight to the uniformity of species' abundance distribution (Magurran, 2004; May, 1975; Melo, 2008; Oliveira, 2015). In addition, in some subtropical forests, the abundance and relative dominance of dominant species can be inversely proportional to the values yielded by species diversity indices (Oliveira, 2015).

Patterns of distribution of species abundance should be carefully verified when selecting areas for conservation, as they are related to the vegetation's conservation status (Magurran, 2007). Very altered tropical forests might present few species with great abundance, and this could be related to species' ecological adaptations (Pitman et al., 2001), to interspecific competition for space and resources (McGill et al., 2007) or, still, to processes of ecological succession (Volkov, Banavar, Hubbell, & Maritan, 2007). Meanwhile, these factors can also influence the formation of distribution patterns in conserved forests, where resource-demanding species may present great abundance, such as the brazilian-pine (*Araucaria angustifolia* [Bertol.] Kuntze) and xaxim (*Dicksonia sellowiana* Hook.) in the Mixed Forest with Araucaria and palmiteiro (*Euterpe edulis* Mart.) in the Subtropical Rainforest of Southern Brazil (Klein, 1978).

In Brazil, a program supported by the government called Atlantic Forest Biosphere Reserve (RBMA) has been standing out for selecting priority areas for conservation. The RBMA features a set of guidelines defined by UNESCO (RBMA, 2008) for selecting outposts which are intended to become centers of dissemination of ideas, concepts, programs, and projects developed by the each reserve (RBMA, 2014). One of the priority areas for conservation in the state of Santa Catarina (Southern Brazil) is the RBMA Chácara Edith Private Reserve of Natural Heritage (RPPN Chácara Edith). This reserve is the only RBMA in the state (ICMBio, 2011; RBMA, 2014). In this study, we considered the RPPN Chácara Edith as the reference area regarding ecological aspects of the vegetation. Therefore, due to the high degree of anthropic modification in the Subtropical Rainforest of Santa Catarina, we ask: Would not it be relevant that other areas might be regarded as priorities for conservation? On the basis of this question, we developed a case study involving forests remnants in different conservation status to demonstrate how differences in the patterns of distribution of tree species' abundance—but not in species diversity—would reveal relevant implications for selecting areas for conservation. Our hypothesis was that the conservation status of a given forest remnant is not necessarily related to its species diversity, once dominant species lead to less uniform communities and, therefore, diversity indices would yield small values (Magurran, 2004; May, 1975; Melo, 2008; Oliveira, 2015). In addition, based on data from the considered forests remnants, we listed endemic and endangered tree/shrub species aiming to support the ongoing calling for conservational efforts in the Subtropical Atlantic Rainforest of Santa Catarina.

Methods

Study Area

The study area is inserted in the Coastal Mountain Range of Santa Catarina, Southern Brazil (Figure 1). The Subtropical Rainforest of Santa Catarina (Oliveira-Filho, 2015) state is placed between two different geomorphological units. The first is composed by the Serra do Tabuleiro/Itajaí complex, which is characterized by mountain ranges disposed in form of subplots with dissected relief, deep valleys with steep slopes, separated by sharped ridges; the second geomorphological unit is composed by the *Coal zone depression* in the southern portion of the state, presenting hilly landscape with valleys, steep slopes, and concave–convex relief with open valleys (Santa Catarina, 1986).

According to the Köppen classification, the Subtropical Rainforest of Santa Catarina is influenced by two climate types: Cfa—humid mesothermal subtropical climate without dry season with a hot summer and Cfb—humid mesothermal subtropical climate without dry season with a mild summer (Alvares, Stape, Sentelhas, Gonçalves, & Sparovek, 2013). Due to environmental and altitudinal variations, the average annual temperature ranges from 11°C to 20°C. Rainfall patterns may vary according to the altitude, ranging between 1,100 and 1,300 mm in the northern portion of the state (Pandolfo et al., 2002).

Data Collection

For conducting the analyses, we selected 12 studies carried out in the Subtropical Rainforest of Santa Catarina which adopted a design-based sampling with sampled area of 1.0 ha and inclusion criterion of dbh $\geq$ 5.0 cm measured at 1.3 m from the ground (Table 1). We established the results of Maçaneiro, Seubert, and Schorn

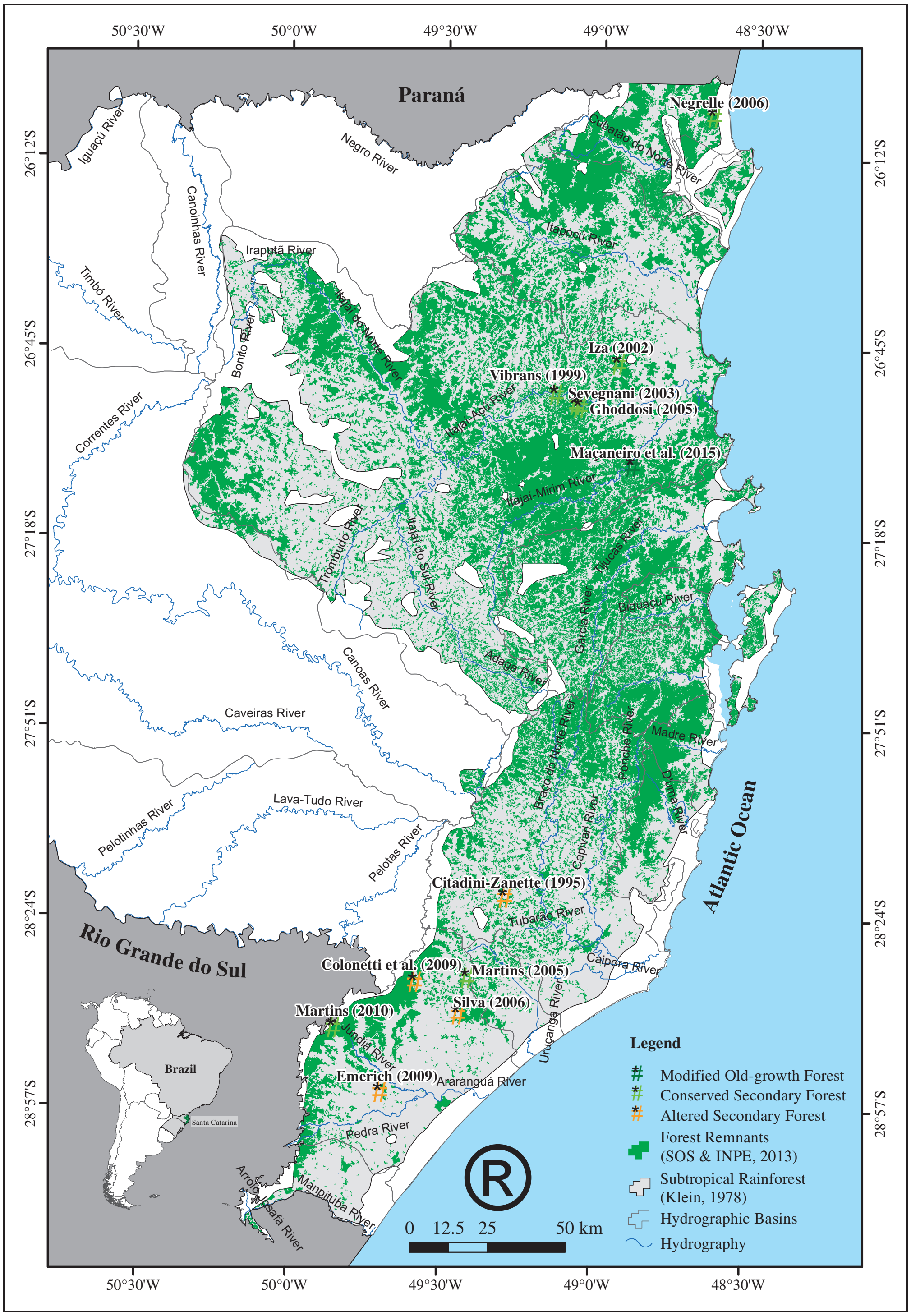

Figure 1. Delimitation of forest remnants of the Subtropical Rainforest of Santa Catarina according to SOS Atlantic Forest Foundation & INPE (2013), and the location of the 12 studies considered in this research.

(2015) as our reference, as their study was conducted at RPPN Chácara Edith, the single RBMA in the state of Santa Catarina.

We classified the conservation status of the vegetation of each study based on the description provided by the author(s). We defined three categories: (a) *Modified old-growth forest*, where selective logging of species of economic interest was conducted, although the forest still presented composition, structure, and physiognomy of an old-growth vegetation; (b) *Conserved secondary*

Table 1. Number of Sampled Individuals (*n*), Species Richness (*S*), Shannon's Index (*H*′), and Simpson's Index (1/*D*) for Different Studies Conducted in the Subtropical Rainforest of Santa Catarina, Southern Brazil.

County/Author	Elevation (m)	*n*	*S*	*H*′	1/*D*	Conservation status
Blumenau						
Vibrans (1999)	28–34	1,809	118	2.38	3.02	Conserved Secondary Forest
Sevegnani (2003)	35–135	1,735	116	2.93	5.28	Conserved Secondary Forest
Ghoddosi (2005)	35–135	1,694	106	2.77	4.67	Conserved Secondary Forest
Brusque						
Maçaneiro et al. (2015)	52–161	1,727	144	3.67	12.54	Modified Old-growth Forest
Criciúma						
Silva (2006)	34	1,409	137	4.16	41.56	Altered Secondary Forest
Ilhota						
Iza (2002)	372–489	1,169	135	4.11	28.99	Conserved Secondary Forest
Itapoá						
Negrelle (2006)	9	1,868	128	3.94	27.77	Conserved Secondary Forest
Orleans						
Citadini-Zanette (1995)	145	2,143	118	3.71	19.83	Altered Secondary Forest
Siderópolis						
Colonetti et al. (2009)	178	1,715	118	3.23	10.78	Altered Secondary Forest
Martins (2005)	170	1,417	115	3.80	22.49	Conserved Secondary Forest
Timbé do Sul						
Martins (2010)	441	3,161	149	3.94	27.68	Conserved Secondary Forest
Turvo						
Emerich (2009)	32	2,390	137	3.64	15.46	Altered Secondary Forest

forest, where more intense logging was conducted when compared with the modified old-growth forest, but due to the abandonment of the area and regeneration time-lapse, the forest presented a well-conserved status; and (c) *Modified secondary forest*, where logging was conducted, although, because of the reduced regeneration time-lapse and other anthropic interventions, the forest still is considerably modified in its composition and structure.

We verified the patterns of distribution of species abundance (PDSA) through the Whittaker's diagrams (Magurran, 2004). The similarities or differences among PDSA were tested by the Kolmogorov–Smirnov test for two samples, with $\alpha = .05$ (Sokal & Rohlf, 1995). The Whittaker's diagram is a useful tool to analyze PDSA in biological communities, such that contrasting patterns of species richness and vegetation uniformity may be addressed (Krebs, 2014; Magurran, 2004; Melo, 2008).

For the purpose of comparing the species richness of the studies, we constructed rarefaction curves using the Mao Tau method (Colwell, Mao, & Chang, 2004). We opted by the individual-based rarefaction, as multiple comparisons could be influenced by the tree density of each area (Gotelli & Colwell, 2001).

We estimated the *heterogeneity* (Krebs, 2014) through Shannon's index (H', ln-base) and the reciprocal of Simpson's index ($1/D$). These two indices differ in the weight given to rare species (Magurran, 2004). For generalizing the comparisons of species richness, H' and $1/D$, we built diversity profiles using the Rényi's series (Tóthmérész, 1995). The diversity profiles allow effective comparisons among communities, because the influence of the weights attributed to rare and dominant species is not fixed (Leinster & Cobbold, 2012; Melo, 2008).

We investigated the relation between species diversity and the abundance of dominant species using Pearson's correlation coefficient (r) and scatterplots through the following steps: (a) we correlated the sum of the relative densities ($RD\%$) of the five species with greater abundance of each study with their respective H' and $1/D$; (b) we tested the significance ($\alpha = .05$) of r through the corrected t test by Dutilleul (1993), which addresses the spatial autocorrelation amid observations, correcting the degrees of freedom; and (c) we built scatterplots of the diversity indices (y-axis) vs. $RD\%$ (x-axis).

To support the necessity of directing efforts towards the conservation of the studied area, we listed the tree/shrub species recorded in the 12 studies and classified them according to their endemism to Brazil and to the Brazilian Atlantic Forest using information from *Flora do Brasil* (Forzza et al., 2012). We defined the conservation status of the species based on the International Union for Conservation of Nature (IUCN) criteria (IUCN, 2003), using the database of *Fundação Biodiversitas* (www.biodiversitas.org.br).

Results

We found similar patterns of species richness among the study areas (Figure 2). According to the Whittaker's diagram, the community sampled by Maçaneiro et al. (2015) presented greater uniformity (less inclined curve) and greater species richness (more extended curve) when compared with the other studies (e.g., Citadini-Zanette, 1995; Colonetti et al., 2009; Ghoddosi, 2005; Martins, 2005; Sevegnani, 2003; Vibrans, 1999). The PDSA found in Maçaneiro et al. (2015) was significantly different (Kolmogorov–Smirnov, $p \leq .05$) when compared with other studies (Citadini-Zanette, 1995; Colonetti et al., 2009; Ghoddosi, 2005; Martins, 2005; Sevegnani, 2003; Vibrans, 1999). On the other hand, considering Emerich (2009), Iza (2002), Negrelle (2006), and Silva (2006), the PDSA found in Maçaneiro et al. (2015) was not significantly different (Kolmogorov–Smirnov, $p > .05$). With the standardization of 1,169 sampled individuals, the rarefaction curves indicated the studies with the greater species richness: Iza (2002) with 135 species; Maçaneiro et al. (2015) and Silva (2006), each one with 130 species, and Martins (2010) with 120 species (Figure 3).

In the diversity profiles (Figure 4), we observed that species diversity varied among sites. Even though Maçaneiro et al. (2015) presented greater species diversity than other studies (e.g., Colonetti et al., 2009; Ghoddosi, 2005; Sevegnani, 2003; Vibrans, 1999), its diversity profile overlapped with the diversity profile of other sites (e.g., Emerich, 2009; Iza, 2002; Martins, 2005, 2010; Negrelle, 2006; Silva, 2006; Vibrans, 1999), suggesting that these sites are *nonseparable* (see Liu et al., 2007; Tóthmérész, 1995).

We found strong and highly significant correlations ($p < .01$) between the diversity indices (H' and $1/D$) and the $RD\%$ of the five most abundant species (Figure 5). Therefore, few dominant species may influence species diversity indices.

Among the 366 tree/shrub species registered in the compiled studies (Appendix), we detected three species classified as *vulnerable* (canela-preta—*Ocotea odorifera* [Vell.] Rohwer and imbuia—*Ocotea porosa* [Nees & Mart.] Barroso) and one species *in danger* (palmiteiro—*Euterpe edulis* Mart.), according to the Red List of *Fundação Biodiversitas*, which follows IUCN criteria (IUCN, 2003). Furthermore, when we analyzed the species' endemism, we found 131 species (35.8%) occurring only in Brazil, 170 species (46.4%) occurring only in the Atlantic Forest, and 11 species (3%) occurring only in the Southern Brazilian Atlantic Forest.

Discussion

The tree species diversity of well-conserved sites in the Brazilian Atlantic Forest is not always superior to the

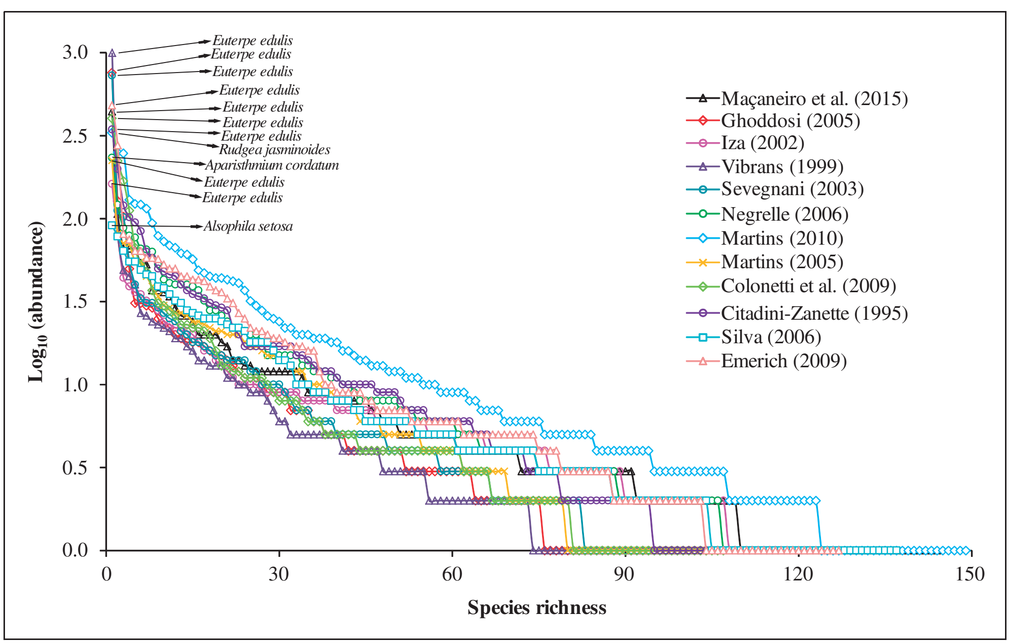

Figure 2. Whittaker's diagram showing the abundance (*y*-axis, Log_{10} scale), species richness, and the dominant species in different studies conducted in the Subtropical Rainforest of Santa Catarina, Southern Brazil.

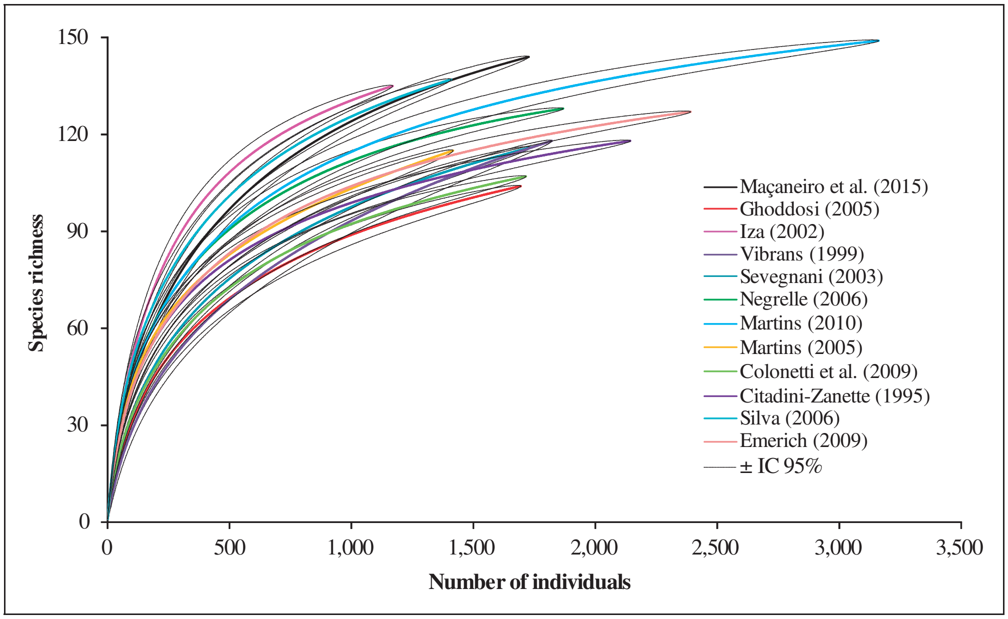

Figure 3. Individual-based rarefaction curves built by Mao Tau's method, with their respective confidence intervals, for different studies conducted in the Subtropical Rainforest of Santa Catarina, Southern Brazil.

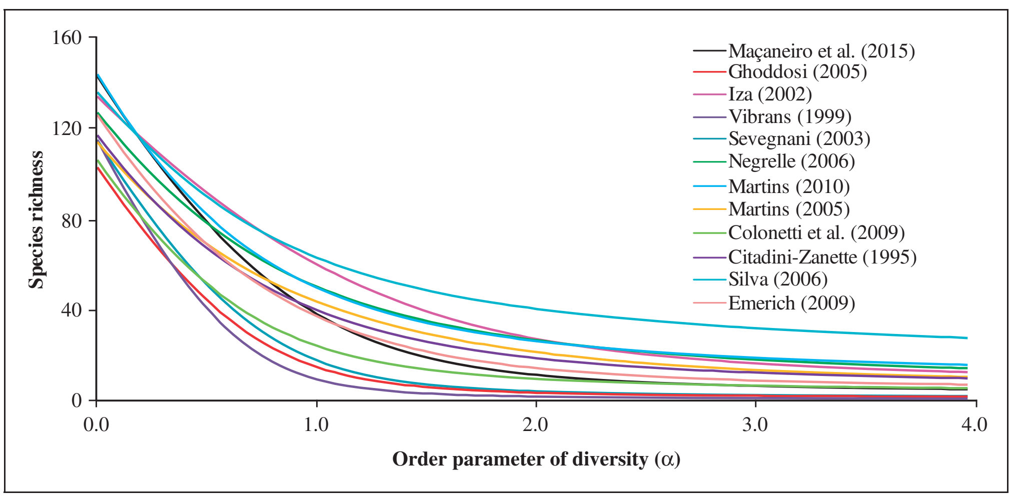

Figure 4. Diversity profiles build using Rényi's series for different studies conducted in the Subtropical Rainforest of Santa Catarina, Southern Brazil. For the parameter $\alpha = 0$, N_0 = species richness; for $\alpha = 1$, $N_1 = \exp(H')$, then, $H' = \ln(N_1)$; for $\alpha = 2$, N_2 = reciprocal of Simpson's index ($1/D$).

diversity of less conserved areas in the same region—the species diversity of the RBMA (modified old-growth forest) is similar to secondary forests with different conservation status. However, it is important to highlight that this conclusion is based solely on tree species diversity with dbh $\geq$ 5.0 cm. Most likely, if other components were to be considered, such as understory plants, epiphytes and lianas, the species diversity would be greater in more conserved sites (Gasper et al., 2014; Leite & Klein, 1990). This hypothesis would be corroborated by studies contemplating various groups of plants using quantitative data collected in sample plots, instead of studies based solely on species checklists.

The translation of forest data into metrics of species diversity depends on the level of uniformity of the vegetation or, still, on the adopted diversity index. Despite the intrinsic characteristics of diversity indices regarding the weight given to rare and dominant species (Buckland et al., 2011; Hurlbert, 1971; May, 1975; Melo, 2008), our study brought evidence that H' and $1/D$ are influenced by dominant species. This issue is relevant when dealing with selection of priority areas for conservation.

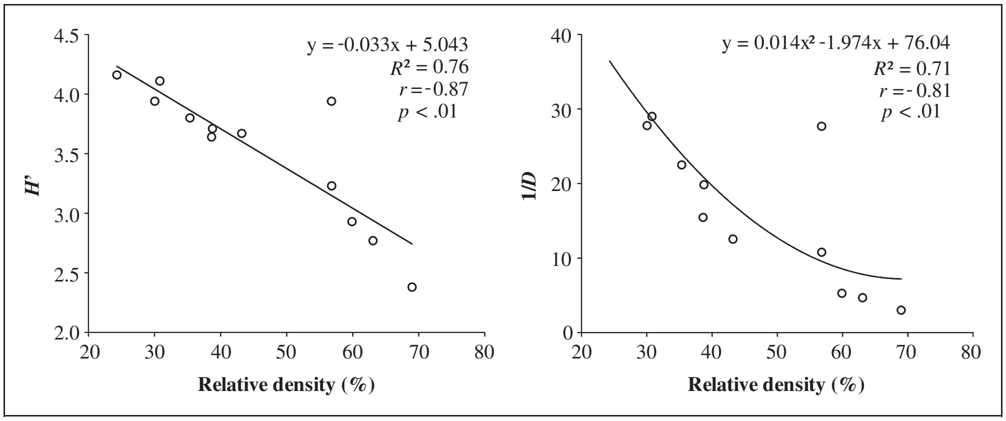

Figure 5. Relation between species diversity (H' and $1/D$) and the sum of the relative density of the five most abundant species in 12 studies conduct in the Subtropical Rainforest of Santa Catarina, Southern Brazil.

In Brazil, for example, the use of diversity indices and their interpretation is not always meaningful. In many studies, the values yielded by diversity indices are simply reported and not discussed in-depth, they are rather merely compared with other studies. It is essential to clarify our perceptions about the concept of species diversity, as stressed by Hurlbert (1971), given the ongoing call for attention on secondary forests and their importance (Costanza et al., 1997; Gibson et al., 2011; Ricketts et al., 2005). Diversity indices could be usable as descriptors of species abundance distribution, especially in forest ecosystems with dominant species. However, multiple criteria must be considered when selecting the most suitable index (Buckland et al., 2011; Magurran, 2004). Although being very popular, the H' is extensively criticized for being derived from the information theory and not from ecological perspectives (Hurlbert, 1971; Magurran, 2004). Thus, its value and unit do not have ecological meaning. Conversely, the Simpson's index is recommended by several authors (Buckland et al., 2011; Hurlbert, 1971; Lande, 1996), for the reason that it generates more meaningful ecological information. Even though, like H', this index is also influenced by dominant species. Therefore, when a more sharpened analysis about the attributes of a community is necessary, diversity profiles (Chao et al., 2014) and diversity partitioning (Lande, 1996) could be useful tools.

Our results revealed that PDSA are influenced by dominant species, such as the palm *Euterpe edulis*. Considering this species, two patterns could be established for the Subtropical Rainforest of Santa Catarina: (a) forests with great abundance of *Euterpe edulis* (e.g., Colonetti et al., 2009; Ghoddosi, 2005; Sevegnani, 2003; Vibrans, 1999) and (b) forests with less abundance of *Euterpe edulis* (e.g., Emerich, 2009; Iza, 2002; Maçaneiro et al., 2015; Martins, 2005, 2010; Negrelle, 2006; Silva, 2006; Vibrans, 1999). These patterns have important implications for the conservation of these areas, for differences in the abundance of *Euterpe edulis* could be related to variations in environmental conditions (Mélo, Budke, & Henke-Oliveira, 2013; Oliveira-Filho & Fontes, 2000; Pitman et al., 2002; Souza, Lelis, Schaefer, Souza, & Meira-Neto, 2012), anthropic influences (Laurance et al., 2006; Pitman et al., 2001; Schorn & Galvão, 2006, 2009), and vegetation type (McGill et al., 2007). For example, Mews et al. (2014) found that species abundance in different environments is a relevant criterion for selecting priority areas for conservation in the Brazilian Savanna (Cerrado), due to the fact that areas with different soil types have particularities regarding species abundance. Besides environmental predictors, the intensity of anthropic activities on the vegetation may also influence PDSA (Pereira, Oliveira-Filho, Eisenlohr, Miranda, & Lemos Filho, 2015), as we found that the compared areas presented distinct conservation status.

In addition to the conservation status of the vegetation, the uniformity of populations might explain the similarities (or differences) in PDSA (Magurran, 2004). According to Melo (2008), communities with greater uniformity will present greater species diversity—dominant species have less chance to be observed. In less uniform communities, the species diversity will always be lower (Melo, 2008).

Even though species diversity is not always related to conservation status, the Subtropical Rainforest of Santa Catarina deserves attention regarding conservational efforts. Our study pointed a significant amount of endemism—46.4% of the listed species occur exclusively in the Atlantic Forest and 35.8% of the species are endemic to Brazil. The Subtropical Rainforest of Santa Catarina is inserted in the Serra do Mar endemism center (Silva & Casteleti, 2003), and the aforementioned statistics seem to support this fact. Our results add dimension to the findings of Rezende, Oliveira-Filho, Eisenlohr, Kamino, and Vibrans (2014), who pointed that ~72% of Santa

Catarina's tree species have restrict geographical distribution (see also Oliveira et al., 2016). The species records summarized in our study corresponds to 65% of the species recorded by the Forest and Floristic Inventory of Santa Catarina, a systematic regional scale survey conduct in 418 sample plots (0.4 ha) among the state (Gasper et al., 2014). Therefore, these areas are relevant for conservation because they support populations of endemic species, including those registered in the IUCN Red List (IUCN, 2003; e.g., *Euterpe edulis*, *Ocotea catharinensis*, *Ocotea odorifera*, and *Ocotea porosa*).

Implications for Conservation

Despite the fact that the species diversity of well-conserved forests may be inferior to the diversity of less conserved ones, such descriptor could be adopted for selecting priority areas for conservation in the neotropics (Gibson et al., 2011). Although, issues like those addressed in this study should be considered. In communities in which species diversity might not be the most adequate descriptor, the PDSA should be carefully analyzed. Facing the few studies regarding the Brazilian Subtropical Rain Forest, new studies, with similar approach, could concentrate efforts in investigating species diversity—especially PDSA—in different successional stages and environments, using a standardized sampling methodology to allow comparisons among sites.

Finally, we will try to conciliate the categories of *less conserved* and *well-conserved* forests, as one may ask: If the tree species diversity of a less conserved forest is greater than a well-conserved forest, is it really less conserved? The underlying issue in this question is that less conserved secondary forests could present greater diversity, yet its physiognomy, structural diversity, and even composition might not resemble a well-conserved forest, due to reasons such those presented in the description of the three categories of conservation (see Data Collection section). We still maintain a skeptic position regarding results generated by diversity indices, especially when they are employed as an isolated criterion to distinguish between different sites' conservation status. If species diversity is a concern for defining reference areas or areas for conservation, we encourage the linking of PDSA to the ecological knowledge about the ecosystem and its historical and current aspects of resources usage. More refined approaches considering structural diversity attributes and anthropic interventions indicators might be useful, indeed (e.g., McRoberts, Winter, Chirici, & la Point, 2012; Pereira et al., 2015). Nevertheless, our findings regarding the relevant tree species diversity of secondary forests bring an encouraging perspective for future conservation.

We conclude that conservation policies should be elaborated for the Brazilian Subtropical Rain Forest remnants, taking the example of the new forest policy of Santa Catarina state, which is grounded on the protection and management of secondary forests (Vibrans & Beilfuss, 2013). Facing the expressive (~29%) native forestland cover of Santa Catarina (Vibrans, McRoberts, Moser, & Nicoletti, 2013), areas destined for biological conservation are mandatory, and there are no reasons for having a single RBMA in the state. Secondary forests also deserve attention because of the environmental services they perform. By these reasons, we encourage the establishment of new RBMAs, which will call for attention to the importance of biological conservation as a whole.

Appendix. List of the Native Tree/Shrub Species Recorded in Different Studies Conducted in the Subtropical Rainforest of Santa Catarina, Brazil

Species	End.	GD	PA
Abarema langsdorffii (Benth.) Barneby & J.W.Grimes	Yes	NE, SE, S	CE, AF
Actinostemon concolor (Spreng.) Müll.Arg.	Yes	N, NE, SE, S	A, CA, CE, AF
Aegiphila brachiata Vell.	No	SE, S	AF
Aegiphila integrifolia (Jacq.) Moldenke	No	All regions	A, CA, CE, AF
Aiouea saligna Meisn.	Yes	All regions	A, CA, CE, AF
Albizia edwallii (Hoehne) Barneby & J.W.Grimes	No	SE, S	AF
Alchornea glandulosa Poepp. & Endl.	No	All regions	A, CA, CE, AF
Alchornea sidifolia Müll.Arg.	No	SE, S	AF
Alchornea triplinervia (Spreng.) Müll.Arg.	No	All regions	A, CA, CE, AF
Allophylus edulis (A.St.-Hil. et al.) Hieron. ex Niederl.	No	N, S	A, CA, CE, AF, PA

(continued)

Continued

Species	End.	GD	PA
Allophylus guaraniticus (A.St.-Hil.) Radlk.	No	S	AF
Allophylus petiolulatus Radlk.	No	SE, S	AF
Alsophila setosa Kaulf.	No	NE, SE, S	AF
Amaioua guianensis Aubl.	No	All regions	A, CE, AF
Andira anthelmia (Vell.) Benth.	Yes	NE, SE	CE, AF
Andira fraxinifolia Benth.	Yes	N, CW, SE, S	CA, CE, AF
Aniba firmula (Nees & Mart.) Mez	Yes	NE, SE, S	A, CE, AF
Annona cacans Warm.	No	NE, CW, SE, S	AF
Annona neosericea H.Rainer	Yes	SE, S	AF
Annona rugulosa (Schltdl.) H.Rainer	No	SE, S	AF
Annona sylvatica A.St.-Hil.	Yes	NE, CW, SE, S	AF
Aparisthmium cordatum (A.Juss.) Baill.	No	All regions	A, AF
Ardisia guianensis (Aubl.) Mez	No	N, NE	A, AF
Aspidosperma australe Müll.Arg.	No	CW, SE, S	A, CE, AF
Aspidosperma parvifolium A.DC.	No	All regions	A, CA, CE, AF
Aspidosperma tomentosum Mart.	No	All regions	A, CA, CE
Attalea dubia (Mart.) Burret	Yes	SE, S	AF
Bactris setosa Mart.	Yes	NE, CW, SE, S	CE, AF
Banara parviflora (A.Gray) Benth.	No	N, SE, S	CA, CE, AF
Bathysa australis (A.St.-Hil.) K.Schum.	Yes	SE, S	AF
Bauhinia forficata Link	Yes	NE, SE, S	CE, AF
Blepharocalyx salicifolius (Kunth) O.Berg	No	NE, SE, S	AF
Brosimum glaziovii Taub.	No	NE, CW, SE, S	CA, CE, AF, P
Brosimum lactescens (S.Moore) C.C.Berg	Yes	SE, S	A, CE, AF
Buchenavia kleinii Exell	No	All regions	A, CA, CE, AF
Bunchosia maritima (Vell.) J.F.Macbr.	Yes	SE, S	AF
Byrsonima ligustrifolia A.Juss.	Yes	SE	AF
Cabralea canjerana (Vell.) Mart.	Yes	SE, S	AF
Calophyllum brasiliense Cambess.	No	All regions	A, CA, CE, AF
Calyptranthes concinna DC.	No	N, CW, SE, S	A, CA, CE, AF
Calyptranthes grandifolia O.Berg	Yes	SE, S	AF
Calyptranthes lucida Mart. ex DC.	Yes	SE, S	AF
Calyptranthes strigipes O.Berg	Yes	N, NE, SE, S	A, AF
Campomanesia guaviroba (DC.) Kiaersk.	Yes	SE, S	AF
Campomanesia guazumifolia (Cambess.) O.Berg	Yes	All regions	CE, AF
Campomanesia reitziana D.Legrand	Yes	NE, SE, S	CA, CE, AF
Campomanesia xanthocarpa (Mart.) O.Berg	Yes	SE, S	AF
Cariniana estrellensis (Raddi) Kuntze	Yes	NE, CW, SE, S	CE, AF
Casearia decandra Jacq.	No	All regions	A, CE, AF
Casearia obliqua Spreng.	Yes	All regions	A, CA, CE, AF
Casearia sylvestris Sw.	Yes	N, NE, SE, S	CE, AF
Cecropia glaziovii Snethl.	No	All regions	All doAFins
Cedrela fissilis Vell.	Yes	NE, SE, S	AF
Centrolobium robustum (Vell.) Mart. ex Benth.	No	All regions	A, CE, AF
Cestrum intermedium Sendtn.	No	NE, SE	AF
Chionanthus filiformis (Vell.) P.S.Green	No	NE, SE, S	AF
Chrysophyllum gonocarpum (Mart. & Eichler ex Miq.) Engl.	Yes	SE, S	AF

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Species	End.	GD	PA
Chrysophyllum inornatum Mart.	No	All regions	A, CE, AF
Chrysophyllum viride Mart. & Eichler	Yes	NE, SE, S	AF
Cinnamodendron axillare Endl. ex Walp.	Yes	NE, SE, S	AF
Cinnamodendron dinisii Schwacke	Yes	SE, S	AF
Cinnamomum glaziovii (Mez) Kosterm.	Yes	SE, S	AF
Citharexylum myrianthum Cham.	Yes	SE	AF
Citronella paniculata (Mart.) R.A.Howard	No	NE, SE, S	CA, CE, AF
Clethra scabra Pers.	No	NE, SE, S	CA, CE, AF
Clusia criuva Cambess.	No	SE, S	CA, CE, AF
Coccoloba warmingii Meisn.	Yes	NE, CW, SE, S	AF
Coffea arabica L.	Yes	NE, SE, S	CA, CE, AF
Copaifera trapezifolia Hayne	No	All regions	A, CA, AF
Cordia sellowiana Cham.	No	NE, SE, S	AF
Cordia silvestris Fresen.	Yes	All regions	A, CA, CE
Cordia trichotoma (Vell.) Arráb. ex Steud.	Yes	SE, S	AF
Cordiera concolor (Cham.) Kuntze	No	NE, CW, SE, S	A, CA, CE
Coussapoa microcarpa (Schott) Rizzini	No	All regions	A, CA, CE, AF
Coutarea hexandra (Jacq.) K.Schum.	Yes	NE, SE, S	CE, AF
Cryptocarya aschersoniana Mez	No	All regions	A, CA, CE, AF
Cryptocarya mandioccana Meisn.	No	SE, S	AF
Cryptocarya moschata Nees & Mart.	Yes	NE, SE, S	AF
Cupania oblongifolia Mart.	Yes	All regions	CE, AF
Cupania vernalis Cambess.	Yes	N, NE, SE, S	A, CE, AF
Cyathea corcovadensis (Raddi) Domin	No	All regions	A, CE, AF
Cyathea delgadii Sternb.	Yes	NE, SE, S	AF
Cyathea phalerata Mart.	No	All regions	A, AF
Cybianthus brasiliensis (Mez) G.Agostini	Yes	All regions	CE, AF
Cybistax antisyphilitica (Mart.) Mart.	No	N, CW, SE, S	CE, AF
Citharexylum myrianthum Cham.	No	All regions	CA, CE, AF, PA
Dalbergia brasiliensis Vogel	No	NE, SE, S	CA, CE, AF
Daphnopsis fasciculata (Meisn.) Nevling	Yes	SE, S	CE, AF
Drimys brasiliensis Miers	Yes	CW, SE, S	CE, AF
Duguetia lanceolata A.St.-Hil.	No	NE, CW, SE, S	CA, CE, AF
Endlicheria paniculata (Spreng.) J.F.Macbr.	Yes	SE, S	CE, AF
Erythroxylum vacciniifolium Mart.	No	All regions	A, CA, CE, AF, PA
Esenbeckia grandiflora Mart.	No	NE, CW, SE, S	CA, CE, AF
Eugenia astringens Cambess.	No	All regions	A, CA, CE, AF
Eugenia bacopari D.Legrand	Yes	NE, SE, S	AF
Eugenia beaurepaireana (Kiaersk.) D.Legrand	Yes	S	AF
Eugenia brasiliensis Lam.	Yes	NE, SE, S	AF
Eugenia brevistyla D.Legrand	Yes	NE, SE, S	A, AF
Eugenia burkartiana (D.Legrand) D.Legrand	Yes	SE, S	AF
Eugenia catharinensis D.Legrand	Yes	SE, S	AF
Eugenia cerasiflora Miq.	Yes	SE, S	AF
Eugenia cereja D.Legrand	Yes	NE, SE, S	CA, CE, AF
Eugenia excelsa O.Berg	Yes	SE, S	AF
Eugenia handroana D.Legrand	Yes	N, NE, SE, S	A, AF

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Species	End.	GD	PA
Eugenia handroi (Mattos) Mattos	Yes	SE, S	AF
Eugenia involucrata DC.	Yes	SE, S	AF
Eugenia joenssonii Kausel	No	SE, S	CE, AF
Eugenia kleinii D.Legrand	Yes	S	AF
Eugenia melanogyna (D.Legrand) Sobral	Yes	SE, S	AF
Eugenia multicostata D.Legrand	Yes	SE, S	AF
Eugenia neotristis Sobral	Yes	SE, S	AF
Eugenia neoverrucosa Sobral	Yes	S	AF
Eugenia platysema O.Berg	Yes	NE, SE, S	AF
Eugenia pluriflora DC.	Yes	S	AF
Eugenia pruinosa D.Legrand	Yes	NE, SE, S	AF
Eugenia subterminalis DC.	Yes	SE, S	AF
Eugenia ramboi D.Legrand	Yes	All regions	A, CA, AF
Eugenia stigmatosa DC.	No	SE, S	AF
Eugenia subterminalis DC.	Yes	NE, SE, S	AF
Eugenia sulcata Spring ex Mart.	Yes	All regions	A, CA, AF
Eugenia ternatifolia Cambess.	Yes	SE, S	AF
Eugenia uruguayensis Cambess.	Yes	CW	CE
Eugenia verticillata (Vell.) Angely	No	S	AF
Euplassa cantareirae Sleumer	Yes	SE, S	AF
Euterpe edulis Mart.	Yes	SE, S	AF
Faramea montevidensis (Cham. & Schltdl.) DC.	No	NE, CW, SE, S	CE, AF
Ficus adhatodifolia Schott ex Spreng.	Yes	SE, S	CE, AF
Ficus cestrifolia Schott ex Spreng.	No	All regions	A, CA, CE, AF
Ficus enormis Mart. ex Miq.	Yes	NE, SE, S	AF
Ficus gomelleira Kunth	Yes	NE, CW, SE	CA, CE, AF
Ficus insipida Willd.	No	All regions	A, CA, CE, AF
Ficus luschnathiana (Miq.) Miq.	No	All regions	A, CE, AF
Garcinia gardneriana (Planch. & Triana) Zappi	No	CW, SE, S	CE, AF
Geonoma gamiova Barb.Rodr.	No	All regions	A, CA, CE, AF
Geonoma schottiana Mart.	Yes	SE, S	AF
Gochnatia polymorpha (Less.) Cabrera	Yes	SE, S	AF
Guadua tagoara (Nees) Kunth	No	NE, CW, SE, S	AF
Guapira opposita (Vell.) Reitz	No	All regions	A, CA, CE, AF
Guarea macrophylla Vahl	No	All regions	A, CA, CE, AF
Guatteria australis A.St.-Hil.	Yes	NE, CW, SE, S	AF
Handroanthus albus (Cham.) Mattos	No	SE, S	AF
Handroanthus impetiginosus (Mart. ex DC.) Mattos	No	N, NE, CW, SE	A, CA, CE, AF, PA
Handroanthus umbellatus (Sond.) Mattos	Yes	NE, CW, SE, S	CA, CE, AF
Heisteria silvianii Schwacke	Yes	SE, S	CE, AF
Hennecartia omphalandra J.Poiss.	No	SE, S	AF
Henriettea glabra (Vell.) Penneys, F.A. Michelangeli, Judd et Almeda	Yes	SE, S	AF
Hyeronima alchorneoides Allemão	No	All regions	A, CA, CE, AF, PA
Hirtella hebeclada Moric. ex DC.	Yes	NE, SE, S	CE, AF
Ilex brevicuspis Reissek	No	SE, S	AF
Ilex dumosa Reissek	No	NE, CW, SE, S	CA, CE, AF
Ilex integerrima (Vell.) Reissek	Yes	NE, SE, S	AF

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Species	End.	GD	PA
Ilex paraguariensis A.St.-Hil.	No	NE, CW, SE, S	CA, CE, AF
Ilex pseudobuxus Reissek	Yes	NE, SE, S	CA, CE, AF
Ilex taubertiana Loes.	Yes	SE, S	AF
Ilex theezans Mart. ex Reissek	No	NE, CW, SE, S	A, CA, CE, AF
Inga edwallii (Harms) T.D.Penn.	Yes	SE, S	AF
Inga heterophylla Willd.	No	NE, CW	A, CE
Inga lentiscifolia Benth.	Yes	S	AF
Inga subnuda subsp. luschnathiana (Benth.) T.D.Penn.	Yes	SE, S	AF
Inga marginata Willd.	No	All regions	A, CE, AF
Inga sellowiana Benth.	Yes	SE, S	AF
Inga sessilis (Vell.) Mart.	Yes	N, NE, SE, S	A, CE, AF
Inga striata Benth.	No	All regions	A, CE, AF
Inga vera Willd.	No	All regions	A, CE, AF, PA
Jacaranda micrantha Cham.	Yes	SE, S	AF
Jacaranda puberula Cham.	Yes	SE	AF
Lamanonia ternata Vell.	Yes	NE, CW, SE, S	CE, AF
Laplacea fructicosa (Schrad.) Kobuski	No	N, CW, SE, S	A, AF
Leandra variabilis Raddi	Yes	NE, SE, S	AF
Leandra regnellii (Triana) Cogn.	No	SE, S	AF
Lonchocarpus campestris Mart. ex Benth.	No	NE, SE, S	CA, AF
Lonchocarpus cultratus (Vell.) A.M.G.Azevedo & H.C.Lima	No	All regions	A, CA, CE, AF
Lonchocarpus muehlbergianus Hassl.	No	SE, S	AF
Luehea divaricata Mart. & Zucc.	No	NE, CW, SE, S	CE, AF
Machaerium aculeatum Raddi	Yes	NE, CW, SE	CE, AF, PA
Machaerium hirtum (Vell.) Stellfeld	No	All regions	A, CA, CE, AF, PA
Machaerium stipitatum (DC.) Vogel	No	NE, CW, SE, S	CE, AF
Maclura tinctoria (L.) D.Don ex Steud.	No	All regions	All doAFins
Magnolia ovata (A.St.-Hil.) Spreng.	Yes	N, CW, SE, S	CE, AF
Manilkara subsericea (Mart.) Dubard	Yes	SE, S	AF
Maprounea guianensis Aubl.	No	*	CE
Marlierea eugeniopsoides (Kausel & D.Legrand) D.Legrand	Yes	SE, S	AF
Marlierea excoriata Mart.	Yes	N, NE, SE, S	AF
Marlierea krapovickae D.Legrand	Yes	S	AF
Marlierea obscura O.Berg	Yes	SE	AF
Marlierea reitzii D.Legrand	Yes	SE, S	AF
Marlierea silvatica (O.Berg) Kiaersk.	Yes	NE, SE, S	AF
Marlierea tomentosa Cambess.	Yes	NE, SE, S	AF
Matayba intermedia Radlk.	Yes	SE, S	AF
Matayba juglandifolia (Cambess.) Radlk.	Yes	NE, SE, S	CE, AF
Maytenus gonoclada Mart.	Yes	NE, SE, S	CE, AF
Maytenus schumanniana Loes.	Yes	SE, S	AF
Meliosma sellowii Urb.	Yes	NE, CW, SE, S	CE, AF
Miconia budlejoides Triana	Yes	NE, SE, S	AF
Miconia cabucu Hoehne	Yes	SE, S	AF
Miconia cinerascens Miq.	No	CW, SE, S	CE, AF
Miconia cinnamomifolia (DC.) Naudin	Yes	NE, SE, S	AF
Miconia cubatanensis Hoehne	Yes	NE, CW, SE, S	CE, AF

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Species	End.	GD	PA
Miconia discolor DC.	No	CW, SE, S	AF
Miconia eichleri Cogn.	Yes	SE	AF
Miconia latecrenata (DC.) Naudin	Yes	NE, SE, S	AF
Miconia pusilliflora (DC.) Naudin	No	NE, SE, S	AF
Miconia sellowiana Naudin	Yes	CW, SE, S	CE, AF
Mimosa bimucronata (DC.) Kuntze	No	NE, CW, SE, S	CE, AF
Mollinedia calodonta Perkins	Yes	S	AF
Mollinedia clavigera Tul.	Yes	SE, S	AF
Mollinedia eugeniifolia Perkins	Yes	S	AF
Mollinedia schottiana (Spreng.) Perkins	Yes	NE, SE, S	AF
Mollinedia triflora (Spreng.) Tul.	Yes	SE, S	AF
Mollinedia uleana Perkins	Yes	SE, S	AF
Mouriri chamissoana Cogn.	Yes	NE, SE, S	AF
Myrceugenia acutiflora (Kiaersk.) D.Legrand & Kausel	Yes	SE, S	AF
Myrceugenia campestris (DC.) D.Legrand & Kausel	Yes	SE, S	AF
Myrceugenia miersiana (Gardner) D.Legrand & Kausel	Yes	NE, SE, S	AF
Myrceugenia myrcioides (Cambess.) O.Berg	Yes	SE, S	AF
Myrceugenia ovalifolia (O.Berg) Landrum	Yes	SE, S	AF
Myrceugenia reitzii D.Legrand	Yes	SE, S	AF
Myrcia aethusa (O.Berg) N.Silveira	Yes	SE, S	AF
Myrcia anacardiifolia Gardner	Yes	SE, S	AF
Myrcia brasiliensis Kiaersk.	Yes	NE, SE, S	AF
Myrcia dichrophylla D.Legrand	Yes	SE, S	AF
Myrcia glabra (O.Berg) D.Legrand	Yes	SE, S	AF
Myrcia guianensis (Aubl.) DC.	Yes	All regions	A, CA, CE, AF
Myrcia hebepetala DC.	Yes	SE, S	AF
Myrcia multiflora (Lam.) DC.	No	All regions	A, CA, CE, AF
Myrcia palustris DC.	No	NE, CW, SE, S	CA, AF
Myrcia pubiflora DC.	Yes	SE, S	CE, AF
Myrcia pubipetala Miq.	Yes	NE, SE, S	AF
Myrcia pulchra (O.Berg) Kiaersk.	Yes	SE, S	AF
Myrcia retorta Cambess.	Yes	SE, S	CE, AF
Myrcia spectabilis DC.	Yes	NE, CW, SE, S	AF
Myrcia splendens (Sw.) DC.	No	All regions	A, CA, CE, AF, PA
Myrcia squamata (Mattos & D.Legrand) Mattos	Yes	SE, S	AF
Myrcia tijucensis Kiaersk.	Yes	NE, SE, S	AF
Myrciaria cuspidata O.Berg	No	All regions	CA, CE, AF, P
Myrciaria floribunda (H.West ex Willd.) O.Berg	No	All regions	A, CA, CE, AF
Myrciaria plinioides D.Legrand	Yes	S	AF
Myrciaria tenella (DC.) O.Berg	No	N, NE, SE, S	A, CA, CE, AF
Myrocarpus frondosus Allemão	No	NE, SE, S	AF
Myrsine coriacea (Sw.) R.Br. ex Roem. & Schult.	No	NE, CW, SE, S	CE, AF
Myrsine gardneriana A.DC.	No	NE, CW, SE, S	CE, AF
Myrsine guianensis (Aubl.) Kuntze	No	All regions	A, CA, CE, AF
Myrsine hermogenesii (Jung-Mend. & Bernacci) M.F.Freitas & Kin-Gouv.	Yes	NE, SE, S	AF
Myrsine parvula (Mez) Otegui	No	SE, S	CE, AF
Myrsine umbellata Mart.	No	All regions	A, CA, CE, AF

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Species	End.	GD	PA
Myrsine venosa A.DC.	Yes	SE, S	CE, AF
Nectandra grandiflora Nees	Yes	CW, SE, S	CE, AF, PA
Nectandra lanceolata Nees	Yes	CW, SE, S	CE, AF
Nectandra megapotamica (Spreng.) Mez	No	All regions	A, CA, CE, AF
Nectandra membranacea (Sw.) Griseb.	No	NE, SE, S	CA, CE, AF
Nectandra oppositifolia Nees	Yes	S	AF
Neomitranthes cordifolia (D.Legrand) D.Legrand	Yes	S	AF
Neomitranthes gemballae (D.Legrand) D.Legrand	Yes	NE, SE, S	AF
Neomitranthes glomerata (D.Legrand) D.Legrand	No	All regions	A, CE, AF
Ocotea aciphylla (Nees & Mart.) Mez	No	SE, S	AF
Ocotea bicolor Vattimo-Gil	No	SE, S	AF
Ocotea catharinensis Mez	No	All regions	CE, AF
Ocotea corymbosa (Meisn.) Mez	Yes	SE, S	AF
Ocotea dispersa (Nees & Mart.) Mez	Yes	NE, SE, S	AF
Ocotea elegans Mez	No	N	A
Ocotea floribunda (Sw.) Mez	Yes	All regions	CA, CE, AF
Ocotea glaziovii Mez	Yes	SE, S	AF
Ocotea indecora (Schott) Mez	Yes	SE, S	AF
Ocotea lanata (Nees & Mart.) Mez	No	All regions	CE, AF
Ocotea lancifolia (Schott) Mez	Yes	SE, S	AF
Ocotea laxa (Nees) Mez	Yes	SE, S	AF
Ocotea mandioccana A.Quinet	Yes	SE, S	AF
Ocotea nectandrifolia Mez	Yes	N, NE, SE, S	A, CE, AF
Ocotea odorifera (Vell.) Rohwer	No	SE, S	AF
Ocotea porosa (Nees & Mart.) Barroso	No	All regions	A, CA, AF
Ocotea puberula (Rich.) Nees	No	N, CW, SE, S	CE, AF
Ocotea pulchella (Nees & Mart.) Mez	Yes	SE, S	AF
Ocotea pulchra Vattimo-Gil	Yes	SE, S	AF
Ocotea silvestris Vattimo-Gil	Yes	SE	AF
Ocotea urbaniana Mez	Yes	SE, S	AF
Oreopanax fulvus Marchal	Yes	NE, CW, SE	CE, AF
Ormosia arborea (Vell.) Harms	Yes	NE, SE, S	AF
Ouratea parviflora (A.DC.) Baill.	No	NE, SE, S	CA, AF
Pachystroma longifolium (Nees) I.M.Johnst.	No	SE, S	AF
Parapiptadenia rigida (Benth.) Brenan	Yes	NE, SE, S	AF
Pausandra morisiana (Casar.) Radlk.	No	All regions	A, CA, CE, AF
Pera glabrata (Schott) Poepp. ex Baill.	Yes	NE, SE, S	CE, AF
Persea major (Meisn.) L.E.Kopp	Yes	SE, S	CE, AF
Persea venosa Nees & Mart.	Yes	NE, SE, S	CE, AF
Persea willdenovii Kosterm.	No	SE, S	CE, AF
Picramnia parvifolia Engl.	Yes	NE, CW, SE, S	AF
Pimenta pseudocaryophyllus (Gomes) Landrum	No	All regions	A, CE, AF
Piper cernuum Vell.	Yes	NE, SE, S	A, CE, AF
Piper gaudichaudianum Kunth	No	NE, CW, SE, S	CE, AF
Piptadenia gonoacantha (Mart.) J.F.Macbr.	Yes	SE, S	AF
Piptocarpha angustifolia Dusén ex Malme	Yes	CW, SE, S	AF
Piptocarpha axillaris (Less.) Baker	No	NE, SE, S	CE, AF

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Species	End.	GD	PA
Pisonia ambigua Heimerl	Yes	All regions	CA, CE, AF
Platymiscium floribundum Vogel	Yes	N, NE, SE, S	AF
Plinia edulis (Vell.) Sobral	Yes	SE, S	AF
Plinia pseudodichasiantha (Kiaersk.) G.M.Barroso ex Sobral	No	All regions	A, CA, AF
Plinia rivularis (Cambess.) Rotman	No	SE, S	AF
Plinia peruviana (Poir.) Govaerts	No	All regions	A, CA, CE, AF
Podocarpus sellowii Klotzsch ex Endl.	Yes	All regions	A, CE, AF
Posoqueria latifolia (Rudge) Schult.	No	All regions	A, AF
Pourouma guianensis Aubl.	Yes	SE, S	AF, P
Pouteria beaurepairei (Glaz. & Raunk.) Baehni	No	NE, CW, SE, S	CA, CE, AF
Pouteria gardneriana (A.DC.) Radlk.	No	N, NE, SE, S	A, CE, AF
Pouteria venosa (Mart.) Baehni	No	SE, S	AF
Protium kleinii Cuatrec.	No	All regions	A, CA, CE, AF
Prunus myrtifolia (L.) Urb.	Yes	NE, CW, SE, S	CE, AF
Pseudobombax grandiflorum (Cav.) A.Robyns	Yes	NE, SE, S	CA, CE, AF
Psidium cattleianum Sabine	Yes	SE, S	AF
Psidium longipetiolatum D.Legrand	No	N	A
Psychotria alba Ruiz & Pav.	Yes	All regions	A, CA, CE, AF
Psychotria carthagenensis Jacq.	Yes	NE, CW, SE, S	A, CA, CE, AF
Psychotria leiocarpa Cham. & Schltdl.	Yes	NE, SE, S	CE, AF
Psychotria nemorosa Gardner	Yes	SE, S	AF
Psychotria nuda (Cham. & Schltdl.) Wawra	No	SE, S	AF
Psychotria suterella Müll.Arg.	No	NE, CW, SE, S	CA, CE, AF
Psychotria vellosiana Benth.	No	All regions	A, CE, AF
Pterocarpus rohrii Vahl	Yes	NE, SE	AF
Quiina glaziovii Engl.	No	SE, S	AF
Randia ferox (Cham. & Schltdl.) DC.	Yes	NE, SE, S	CE, AF
Rhamnidium elaeocarpum Reissek	No	All regions	A, CE, AF
Richeria grandis Vahl	No	All regions	A, CA, CE, AF
Roupala montana var. *brasiliensis* (Klotzsch) K.S.Edwards	No	CW, SE, S	CE, AF
Rudgea jasminoides (Cham.) Müll.Arg.	No	SE, S	AF
Rudgea recurva Müll.Arg.	No	SE, S	AF
Sapium glandulosum (L.) Morong	No	All regions	A, CA, CE, AF
Schefflera angustissima (Marchal) Frodin	Yes	SE, S	AF
Schefflera morototoni (Aubl.) Maguire et al.	No	All regions	A, CA, CE, AF, PA
Schizolobium parahyba (Vell.) Blake	No	N, NE, SE, S	A, AF
Sebastiania argutidens Pax & K.Hoffm.	No	All regions	CA, CE, AF, P
Seguieria langsdorffii Moq.	Yes	NE, SE, S	CE, AF
Senna macranthera (DC. ex Collad.) H.S.Irwin & Barneby	No	All regions	CA, CE, AF
Senna multijuga (Rich.) H.S.Irwin & Barneby	No	All regions	A, CA, CE, AF
Sloanea guianensis (Aubl.) Benth.	No	All regions	A, CE, AF
Sloanea hirsuta (Schott) Planch. ex Benth.	Yes	NE, SE, S	AF
Sloanea lasiocoma K.Schum.	Yes	CW, SE, S	CE, AF
Solanum pseudoquina A.St.-Hil.	No	NE, SE, S	AF
Solanum sanctae-catharinae Dunal	No	SE, S	AF
Sorocea bonplandii (Baill.) W.C.Burger et al.	No	CW, SE, S	CE, AF, PA
Spirotheca rivieri (Decne.) Ulbr.	Yes	NE, SE, S	AF

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Species	End.	GD	PA
Styrax acuminatus Pohl	No	SE, S	AF
Styrax glabratus Schott	No	N, NE, SE, S	A, AF
Syagrus romanzoffiana (Cham.) Glassman	Yes	NE, CW, SE, S	CE, AF
Symplocos tenuifolia Brand	No	SE, S	CE, AF
Symplocos tetrandra Mart.	No	SE, S	AF
Symplocos trachycarpos Brand	Yes	SE, S	AF
Tabernaemontana catharinensis A.DC.	No	NE, CW, SE, S	A, CE, AF
Tapirira guianensis Aubl.	No	All regions	All doAFins
Ternstroemia brasiliensis Cambess.	Yes	NE, SE, S	A, CE, AF
Tetrastylidium grandifolium (Baill.) Sleumer	Yes	NE, SE, S	AF
Tetrorchidium rubrivenium Poepp.	No	N, NE, SE, S	A, CA, AF
Tibouchina mutabilis (Vell.) Cogn.	Yes	SE	AF
Tocoyena sellowiana (Cham. & Schltdl.) K.Schum.	*	NE, SE	CA, CE, AF
Trema micrantha (L.) Blume	No	All regions	All doAFins
Trichilia casaretti C.DC.	Yes	NE, SE, S	CE, AF
Trichilia clausseni C.DC.	Yes	CW, SE, S	CE, AF
Trichilia lepidota Mart.	No	NE, SE, S	AF
Trichilia pallens C.DC.	Yes	NE, SE, S	CE, AF
Vantanea compacta (Schnizl.) Cuatrec.	Yes	NE, SE, S	CA, CE, AF
Vernonanthura discolor (Spreng.) H.Rob.	No	NE, CW, SE, S	CE, AF
Virola bicuhyba (Schott ex Spreng.) Warb.	Yes	NE, SE, S	AF
Vitex megapotamica (Spreng.) Moldenke	No	NE, CW, SE, S	CE, AF
Weinmannia paulliniifolia Pohl ex Ser.	Yes	SE, S	CE, AF
Xylopia brasiliensis Spreng.	Yes	SE, S	AF
Xylosma pseudosalzmannii Sleumer	No	SE, S	CE, AF
Zanthoxylum rhoifolium Lam.	No	All regions	All doAFins
Zollernia ilicifolia (Brongn.) Vogel	No	All regions	CA, CE, AF

Note. The nomenclature adopted for genera and epithets follows the Angiosperm Phylogeny Group IV (2016). Species identification (epithets) follows *Flora do Brasil* (http://reflora.jbrj.gov.br/). End. = endemic to Brazil; GD = geographical distribution; N = North; NE = Northeast; CW = Central West; SE = Southeast; S = South; PA = phytogeographical area; A = Amazon; CA = Caatinga; CE = Cerrado; AF = Atlantic Forest; P = Pampa; PA = Pantanal; * = lacking data for being classified.

Acknowledgments

We are grateful to Luiz Henrique da Silva for reviewing the English language of the manuscript.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: We are grateful to *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* (CAPES) for the scholarship granted to the first author and to *Programa de Pós-Graduação em Engenharia Florestal — Universidade Regional de Blumenau* (FURB) for the financial support.

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