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Tree community dynamics of a northern Minas Gerais seasonally dry forest

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ABSTRACT

This study aimed to characterize the dynamics, structural changes and floristics of a Northern Minas Gerais Seasonally Deciduous Forest tree community, in a 5 year interval. In 2005, 10 (20 x 20m) plots were allocated. All trees (CBH > 10 cm) were tagged and measured. A second census was carried out in 2010 in order to measure surviving, new recruits and dead trees. In 2005, 46 species were recorded, moving to 45 in 2010. No significant differences were found for Shannon – diversity ($H' = 2.62$ nats ind^{-1} in 2005; $H' = 2.60$ nats ind^{-1} in 2010) and Pielou eveness ($J = 0.683$ in 2005; $J = 0.682$ in 2010) in the interval. A total of 57 dead records (rate of 1.64% year^{-1}) were found whereas 18 trees were recruited (rate of 0.53% year^{-1}). Despite the higher mortality as compared to recruitment, the results suggest that the community remained stable in both structural and diversity terms in the interval considered.

Keywords: forest dynamics; temporal variation; deciduous forest; ecotonal region.

RESUMO

Dinâmica da comunidade arbórea de uma floresta estacional decidual no norte de Minas Gerais.

Este estudo objetivou caracterizar a dinâmica, além das mudanças estruturais e florísticas em uma comunidade arbórea de Floresta Estacional Decidual, no Norte de Minas Gerais no intervalo de cinco anos. Em 2005, foram alocadas 10 parcelas de 20x20m. Os indivíduos com CAP > 10 cm foram marcados com etiquetas numeradas e mensurados. Em 2010, no segundo inventário, foram incorporados os recrutas, registrados os mortos e remedidos os sobreviventes. Em 2005 foram registradas 46 espécies, e em 2010 foram 45 espécies. O índice de Shannon-Wienner ($H' = 2{,}62$ nats ind^{-1} em 2005; $H' = 2{,}60$ nats ind^{-1} em 2010) e a equabilidade de Pielou ($J = 0{,}683$ em 2005; $J = 0{,}682$ em 2010) não apresentaram diferenças significativas. Foram registrados ao todo 57 indivíduos mortos, com taxa de mortalidade média de 1,64% ano^{-1}. Enquanto ocorreram 18 recrutas, apresentando taxa de recrutamento médio de 0,53% ano^{-1}. Apesar da maior mortalidade, em comparação com o recrutamento, os resultados sugerem que a comunidade se manteve estável tanto em termos estruturais e de diversidade no intervalo considerado.

Palavras-chave: dinâmica florestal; variações temporais; florestas decíduas; região ecotonal.

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INTRODUCTION

Tropical forests are characterized by high floristic diversity, structural and dynamics complexity driven by environmental shifts in both space and time (Oldeman, 1990; Murphy & Bowman, 2012; Cavaleri *et al.*, 2015). Due to Tropical Forest complexity, functional and successional process such as growth, reproduction and nutrient cycling can be distinguished between Seasonally Forests and Ombrophilous Forests once the former are submitted to a water deficit period (Murphy & Lugo, 1986; Pennington *et al.*, 2006; Apgaua *et al.*, 2015). Climate is a key factor in Seasonally Forests distribution since they are mainly submitted to a markedly opposing, well-defined rainy and dry seasons. In addition to climate, edaphic and relief variation are also important in a finer scale for their distribution (Murphy & Lugo, 1986; Pennington *et al.*, 2009; Apgaua *et al.*, 2015).

Brazilian Seasonally Deciduous Forests can commonly be found in Northern Minas Gerais and Central Brazil in both Caatinga and Cerrado domains (IBGE, 2012; Santos *et al.*, 2012). In the Northern Minas Gerais, they usually lie in ecotonal regions presenting high beta diversity (Santos *et al.*, 2012; Apgaua *et al.*, 2014a; b). According to Apgaua *et al.*, (2014b), conservation efforts should be given to these areas as their tree component are important in maintaining ecosystem functions, acting as sources of seeds and propagules to other areas as well as keeping the organic matter cycling which in turn sustains soil fertility. In this last case, it is worth highlighting that it is the very soil fertility that cause these areas to be prone to perturbations from agriculture-related activities (Pennington *et al.*, 2006; Santos *et al.*, 2017).

Because of the continuous risk of anthropic perturbations, studies focusing these communities may be useful for elaborating conservation strategies for the forest remnants. Forests patches of these regions have been studied in the last years, mainly focused on their floristic composition, diversity, structure and distribution (Santos *et al.*, 2007; Santos *et al.*, 2008; Santos *et al.*, 2011; Santos *et al.*, 2012; Apgaua *et al.*, 2014a; b). However, to date, few studies focused on temporal structural changes and dynamics of these tree communities have been reported. In this sense, the purpose of this work was to obtain new information on the demographic and structural changes of the arboreal component of tropical deciduous forests in order to contribute to the expansion of this knowledge, which is still considered a scientific gap. Therefore, our aim is to analyze the tree dynamics of a Northern Minas Gerais Seasonally Deciduous Forest in a 5-year interval.

MATERIALS AND METHODS

Study area

The study was carried out in a 10 ha remnant of a Seasonal Deciduous Forest (sensu IBGE, 2012) in the municipality of Juvenilia, Minas Gerais, in the coordinates 14º 32’ 68" S and 44º 12’ 63" W. According to Koeppen classification, the climate is As (Tropical with dry-summer) with mean annual temperatures of 23 ºC and mean annual precipitation of 1000 mm, and the rainy season being more concentrated from November to January (Santos *et al.*, 2011).

Sampling

In 2005, ten 20 x 20 m permanent plots were allocated along the forest fragment, distributed in a transect running parallel to the longer axis length. Paired plots were distributed each 20 m along the transect, separated 10 m of each other (Santos *et al.*, 2008). All trees with CBH (Circumference at Breast Height) > 10 cm were recorded with numbered aluminum tags and measured. In 2010, a second census was carried out for remeasuring surving trees, counting dead records and new recruits reaching the minimum CBH criteria. New recruits were tagged, identified to species level and had their CBH recorded.

Phytosociological and Floristic composition

In order to describe tree community for each census (2005 and 2010), the following descriptors were employed: richness, absolute and relative density, basal area, absolute and relative dominance, absolute and relative frequency and importance value (Kent & Coker, 1992). Species diversity and dominance were calculated for each census by the Shannon Index (H’) and Pielou eveness (J’) (Magurran 2004). Richness and diversity were compared for each census by means of rarefaction curves. In order to analyze structural changes, T-tests for independent samples were used to compare density and basal area between censuses, following Magurran (2004).

Diameter sizes classes were created by using increasing size bins (1ª class: 3 – 5.9 cm; 2ª class: 6 – 11.9 cm; 3ª class: 12 – 23.9 cm; 4ª class 24 – 47.9 cm; 5ª class: > 48 cm). Observed and expected diameter distributions for each census were statistically compared by Qui-Square test. To test for differences in diameter distribution between the censuses, the G-test was used.

Dynamics

Mean annual rates were used to calculate tree dynamics by using mortality ($M = (1 - [(N_0 - N_m) / N_0] 1 / t) * 100$) and recruitment ($R = (1 - (1 - N_r / N_t) 1 / t)*100$ rates, whereas biomass dynamics were described by basal area loss ($P = (1 - ((AB_0 -(AB_m + AB_d)) / AB_0) 1 / t) *100$) and gain (G = (1

$- (1 - (AB_r + AB_g) / AB_t) 1 / t) * 100)$, where: t is the time elapsed between censuses; N_0 and N_t the initial and final tree counts; N_m and N_r are dead trees and recruit counts; AB_0 and AB_t are the initial and final tree basal area; AB_m is the basal area of dead trees; AB_r is basal area of recruits; and AB_d and AB_g are the increment and decrement in basal area from the surviving trees (Sheil *et al.*, 1995; 2000).

Overall dynamics were described by tree ($T_N = (M + R) / 2$) and basal area ($T_{AB} = (P + G) / 2$) turnover rates from the mean mortality and recruitment, and loss and gain rates as previously described (Oliveira-Filho *et al.*, 1997; Werneck & Franceschinelli, 2004). Additionally, net changes rates were obtained for each period for both trees ($Ch_N = [(N_t / N_0) 1 / t – 1] \times 100$) and basal area ($Ch_{AB} = [(AB_t / AB_0) 1 / t – 1] \times 100$) (Korning & Balslev, 1994).

Gradient analysis

A Detrended Correspondence Analysis (DCA) was performed for each census. Two abundance matrices were obtained, one for each census (2005 and 2010). The software PC-Ord 5 (McCune & Mefford, 2006) was used to run the analysis.

RESULTS

Floristic and phytosociological composition

In 2005, 46 species were recorded, belonging to 40 genera and 16 families and 45 species, 40 genera and 16 families for the 2010 census (Table 1). The main species in terms of importance value (IV) practically kept their ranking in the interval analyzed. The 10 main species ordered by IV in both censuses were *Eugenia uniflora* L., *Pseudopiptadenia contorta* (DC.) G.P.Lewis & M.P.Lima, *Poincianella pluviosa* (DC.) L.P.Queiroz, *Handroanthus ochraceus* (Cham.) Mattos, *Terminalia phaeocarpa* Eichler, *Commiphora leptophloeos* (Mart.) Gillett, *Handroanthus impetiginosus* (Mart. ex DC.) Mattos, *Combretum duarteanum* Cambess., *Myracrodruon urundeuva* Fr. All. and *Ruprechtia laxiflora* Meisn. These species accounted for 69.63% and 69.30% of the total IV for 2005 and 2010 respectively. Only one position changed in the IV ranking as showed by *P. pluviosa* (3^a in 2005 to 4^a in 2010) and *H. ochraceus* (4^a in 2005 to 3^a in 2010).

Richness (S = 46 in 2005; S = 45 in 2010; Figure 1) and diversity (H' = 2.62 nats ind^{-1} in 2005; H' = 2.60 nats ind^{-1} in 2010; Figure 2) were similar for both censuses and were not significantly different as suggested by the rarefactions curves.

Likewise, Pielou evenness (J = 0.683 in 2005; J = 0.682 in 2010) was practically unaltered. Tree density changed from 1845 ind ha^{-1} in 2005 to e 1702 5 ind ha^{-1} in 2010, showing a significant reduction ($t = 2.258$; $p = 0.028$). However, basal area presented the opposite pattern and increased in the interval ($t = -2.172$; $p = 0.035$), changing from 7.66 m^2 in 2005 to 8.30 m^2 in 2010 (Table 2).

The observed frequency distribution by diameter classes showed significant differences from the expected for 2005 ($X^2 = 518.847$; $p < 0.0001$). In addition, the diameter distribution was significantly different between 2005 and 2010 (Figure 3). In both censuses, the second class (6 – 11.9 cm) presented the highest number of individuals. Nevertheless, the first class (3 – 5.9 cm) was reduced by 20% in the number of individuals and the second by 4.25%. The third (12 – 23.9 cm) and fourth (24 – 47.9 cm) classes increased by 5.55% and 45% respectively. The fifth class (> 48 cm) remained with a single individual.

Dynamics

Abundance was reduced from 720 in 2005 to 681 in 2010 as mortality was higher than recruitment in the sampling interval. Dead records reached a total of 57 individuals with a rate of 1.64% $year^{-1}$ (Table 2). Species with high mortality rates were *Eugenia uniflora* (14 individuals), *Pseudopiptadenia contorta* (13) and *Combretum duarteanum* (9). A total of 18 individuals were recruited, reaching a mean recruitment rate of 0.53% $year^{-1}$. *Handroanthus ochraceus* and *Pseudopiptadenia contorta* accounted for the highest number of recruits, with 5 individuals each. Tree turnover was relatively low (1.08%) because of the lower number of recruits as compared to the number of dead trees. However, basal area turnover rate was relatively high (2.14%) because of the balance between basal area loss (1.37%) and gain (2.92%). Net change rates were -1.10% for abundance and 1.60% for basal area.

Gradient analysis

Detrended Correspondence Analysis suggested short gradients in both censuses. In 2005, the eigenvalue reached 0.27 for the first axis and 0.12 for the second (Figure 4). In 2010, the first axis was 0.28 whereas the second 0.07.

DISCUSSION

The overall dynamic rates were below the mean as compared to the ones commonly found in Brazilian Seasonally Deciduous Forests (Werneck & Franceschinelli, 2004; Marin *et al.*, 2005; Carvalho & Felfili, 2011). The decrease in abundance and density was due to the unbalance between mortality and recruitment. Higher mortality was evident in the smaller diameter classes as the first two classes accounted for 90% of the mortality. Conversely, surviving individuals were positively affected by biomass gain. In some undisturbed Tropical Forests, instability or disequilibrium periods involving mortality and recruitment are commonplace and part of their

Table 1: Tree species list from a Northern Minas Gerais Seasonally Deciduous Forests remnant, sampled in two censuses (2005-2010). Species are ranked according to the Importance Value of 2005. Phytosociological parameters are: N: Number of Individuals, AB: basal area basal (m²); DA: Absolute density (ind/ha); IV: importance value

Species	**2005**				**2010**				**2005**	**2010**
	N	**AB**	**DA**	**IV**	**N**	**AB**	**DA**	**IV**	**Position IV**	
Eugenia uniflora L.	184	1.216	460	15.754	172	1.166	430	15.097	1	1
Pseudopiptadenia contorta (DC.) G.P.Lewis & M.P.Lima	147	0.976	367.5	12.999	139	1.148	347.5	13.410	2	2
Poincianella pluviosa (DC.) L.P.Queiroz	54	1.049	135	9.010	50	0.971	125	8.344	3	4
Handroanthus ochraceus (Cham.) Mattos	76	0.629	190	7.619	80	0.814	200	8.581	4	3
Terminalia phaeocarpa Eichler	32	0.463	80	5.444	31	0.453	77.5	5.332	5	5
Commiphora leptophloeos (Mart.) Gillett	9	0.838	22.5	5.229	9	0.909	22.5	5.289	6	6
Handroanthus impetiginosus (Mart. ex DC.) Mattos	35	0.420	87.5	4.811	35	0.472	87.5	5.006	7	7
Combretum duarteanum Cambess.	30	0.103	75	3.592	22	0.077	55	2.984	8	8
Myracrodruon urundeuva Fr. All.	9	0.309	22.5	2.929	9	0.330	22.5	2.964	9	9
Ruprechtia laxiflora Meisn.	9	0.150	22.5	2.239	8	0.174	20	2.287	10	10
Coccoloba schwackeana Lindau	8	0.097	20	1.962	8	0.101	20	1.996	11	11
Pterocarpus zehntneri Harms	4	0.234	10	1.790	4	0.281	10	1.925	12	13
Parapiptadenia rigida (Benth.) Brenan	10	0.026	25	1.748	9	0.032	22.5	1.968	13	12
Syagrus oleracea (Mrt.) Becc.	5	0.121	12.5	1.733	5	0.122	12.5	1.734	14	17
Ceiba pubiflora (A.St.-Hil.) K.Schum.	3	0.228	7.5	1.715	3	0.254	7.5	1.765	15	14
Tabebuia reticulata A.H.Gentry	9	0.071	22.5	1.701	9	0.077	22.5	1.750	16	15
Anadenanthera colubrina (Vell.) Brenan	6	0.184	15	1.664	6	0.212	15	1.742	17	16
Fridericia bahiensis (Schauer ex. DC.) L.G.Lohmann	13	0.061	32.5	1.646	11	0.062	27.5	1.588	18	18
Machaerium acutifolium Vogel	6	0.062	15	1.327	4	0.123	10	1.289	19	21
Sapium obovatum Klotzsch ex Müll.Arg.	5	0.014	12.5	1.268	5	0.014	12.5	1.298	20	20
Lafoensia vandelliana Cham. & Schltdl.	11	0.038	27.5	1.257	11	0.037	27.5	1.288	21	22
Sweetia fruticosa Spreng.	4	0.061	10	1.229	4	0.068	10	1.266	22	23
Casearia selloana Eichl.	5	0.031	12.5	1.146	5	0.035	12.5	1.183	23	24
Luetzelburgia andradelimae H.C.Lima	4	0.084	10	1.136	4	0.134	10	1.332	24	19
Cnidoscolus oligandrus (Müll.Arg.) Pax	3	0.020	7.5	0.811	3	0.029	7.5	0.861	25	25
Mimosa tenuiflora (Willd.) Poiret	6	0.022	15	0.763	4	0.026	10	0.698	26	28
Randia armata (Sw.) DC.	3	0.007	7.5	0.753	3	0.008	7.5	0.776	27	27
Auxemma oncocalyx (Allemão) Taub.	5	0.015	12.5	0.686	6	0.023	15	0.784	28	26
Leucochloron limae Barneby & J.W.Grimes	2	0.029	5	0.609	1	0.029	2.5	0.364	29	31
Machaerium sp nova	2	0.020	5	0.571	1	0.018	2.5	0.321	30	33
Ptilochaeta bahiensis Turcz.	3	0.006	7.5	0.556	3	0.007	7.5	0.574	31	29
Terminalia fagifolia Mart.	2	0.006	5	0.507	1	0.007	2.5	0.277	32	39

Continua...

***Table 1**: continuaação*

Species	2005				2010				2005	2010
	N	AB	DA	IV	N	AB	DA	IV	Position IV	
Stillingia saxatilis Müll.Arg.	2	0.005	5	0.310	2	0.008	5	0.330	33	32
Aspidosperma pyrifolium Mart.	2	0.002	5	0.298	3	0.004	7.5	0.561	34	30
Schinopsis brasiliensis Engl.	1	0.012	2.5	0.295	1	0.013	2.5	0.302	35	35
Pseudobombax marginatum (A.St.-Hil.) A.Robyns	1	0.011	2.5	0.290	1	0.013	2.5	0.302	36	34
Goniorrhachis marginata Taub.	1	0.010	2.5	0.286	1	0.010	2.5	0.290	37	36
Dalbergia cearensis Ducke	1	0.007	2.5	0.273	1	0.009	2.5	0.285	38	37
Chloroleucon tortum (Mart.) Pittier	1	0.007	2.5	0.272	1	0.007	2.5	0.275	39	40
Spondias tuberosa Arruda	1	0.007	2.5	0.271	1	0.008	2.5	0.281	40	38
Blanchetiodendron blanchetii (Benth.) Barneby & J.W.Grimes	1	0.003	2.5	0.256	1	0.006	2.5	0.274	41	41
Machaerium punctatum (Poir.) Pers.	1	0.003	2.5	0.254	-	-	-	-	42	-
Bauhinia catingae Harms	1	0.002	2.5	0.250	1	0.002	2.5	0.258	43	42
Bauhinia aculeata L.	1	0.002	2.5	0.249	1	0.002	2.5	0.257	44	43
Prockia crucis P.Browne ex L.	1	0.001	2.5	0.248	1	0.002	2.5	0.255	45	44
Aspidosperma cuspa (Kunth) S.F.Blake ex Pittier	1	0.001	2.5	0.246	1	0.001	2.5	0.254	46	45

Table 2: Diversity, Structural and Dynamics parameters of two censuses (2005 - 2010) from a Northern Minas Gerais Seasonally Deciduous Forest remant

Parameter	2005	2010
Diversity		
Richness (S)	46	45
Shannon-Wienner Index (H’) [nats ind^{-1}]	2.62	2.60
Eveness (J’)	0.683	0.682
Structure		
Density (ind/ha)	1845	1702.5
Basal area (m²)	7.66	8.30
Dynamics		
Mortality (% year^{-1})	-	1.64
Recruitment (% ano^{-1})	-	0.53
Abundance turnover (%)	-	1.08
Basal area turnover (%)	-	2.14
Basal area Loss (%)	-	1.37
Basal area Gain (%)	-	2.92
Net Change - Abundance) (%)	-	-1.10
Net Change – Basal area (%)	-	1.60

rhythmic cycles and can be illustrated by alternating periods of higher and lower mortality or recruitment, biomass and density (Swaine 1990; Phillips *et al.*, 1994; Felfili, 1995; Sheil *et al.*, 2000; Garcia *et al.*, 2015). Among several candidate factors responsible for such tree community disequilibrium, disturbances can be highlighted as they are commonly the main cause of instability in Tropical Forests (Condit *et al.*, 2006; Santos *et al.*, 2017). High mortality rates in smaller classes has been reported for Tropical Forest submitted to natural (e.g. flooding, natural gaps, storms, climatic instability) or anthropic (fragmentation and edge effect-related processes, selective logging, fire) perturbation (Felfili, 1995; Oliveira-Filho *et al.*, 1997; Taylor *et al.*, 1996; Kellman *et al.*, 1998; Guilherme *et al.*, 2004; Werneck & Franceschinelli, 2004; Van Den Berg *et al.*, 2012; Santos *et al.*, 2017). In Seasonally Deciduous Forests, water stress play a role as a natural disturbance, determining forest dynamics by influencing mortality in the smaller size classes once smaller individuals are more prone to climate seasonality (Condit *et al.*, 1995; Santos *et al.*, 2017).

Richness as reported here is within the range usually found for Neotropical Dry Forests (Gentry, 1995). This is also similar as compared to other studies in Brazilian Seasonal Deciduous Forests, such as the one reported by Santos *et al.*, (2011) in Juvenilia (47 species). Contrasting ranges in species richness can be found throughout these formations such as the higher richness reported by Apgaua *et al.*, (2014 a; b) in the same region (79 species) or lower richness as in Silva & Scariot (2003) in the Rio Paraná basin, Goias state (36 species). Here, no new species in the interval was recorded whereas there

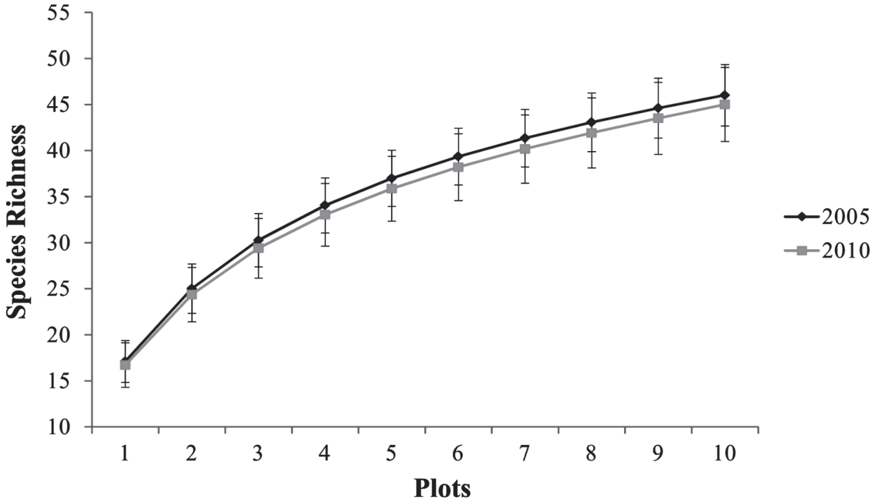

Figure 1: Species accumulation curves of a 5-year long-term study (2005-2010) from a Northern Minas Gerais state Seasonally Deciduous Forest remnant.

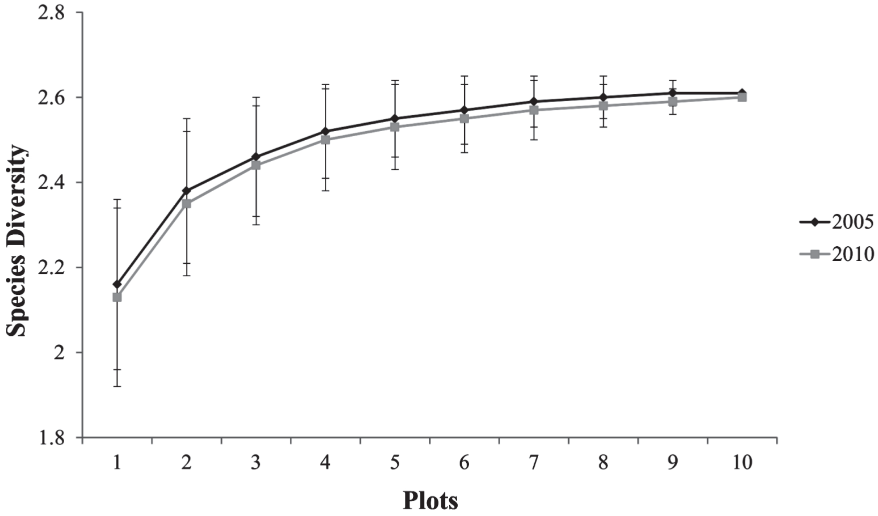

Figure 2: Diversity (Shannon Index) accumulation curves of a 5-year long-term study (2005-2010) from a Northern Minas Gerais state Seasonally Deciduous Forest remnant.

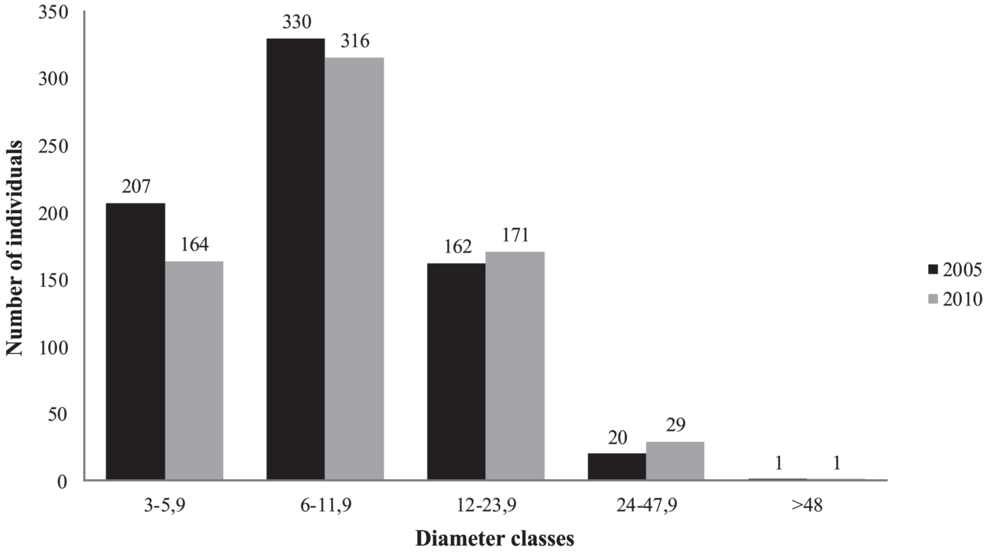

Figure 3: Size distribution by diameter classes (cm) of the trees sampled in a 5-year interval (2005-2010) in a Northern Minas Gerais state Seasonally Deciduous Forest remnant.

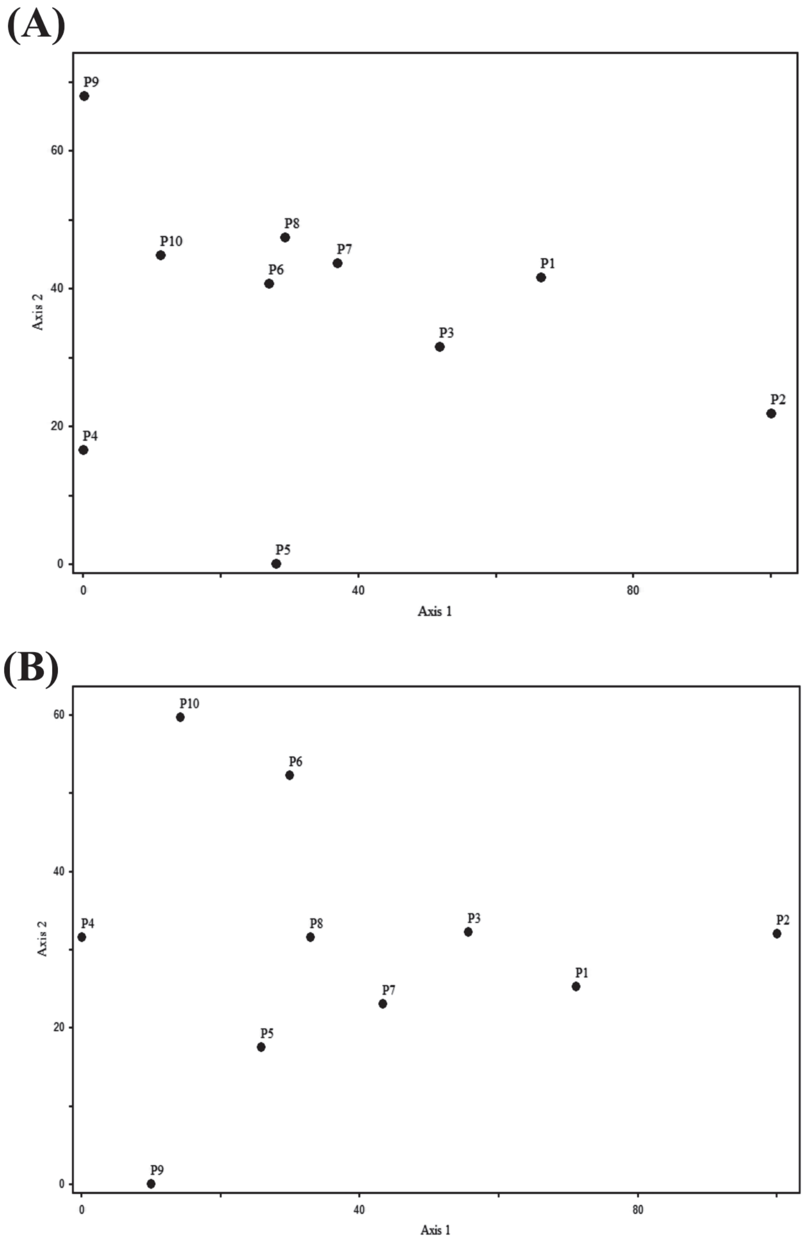

Figure 4: Abundance-based Dentrended Correspondence Analysis (DCA) ordination plot of two censuses (A – 2005; B – 2010) carried out in a Northern Minas Gerais state Seasonally Deciduous Forest remnant.

was the loss of a single species (one individual), *Machaerium punctatum* (Poir.) Pers in the sampling interval considered. According to Werneck *et al.*, (2000), in Tropical Forests, species loss and gain are associated to the less abundant species in the community.

In practical terms, no significant changes occurred along the ranking concerning the main species in terms of IV. Only a single position was changed involving the exchange between *P. pluviosa* (3^a in 2005 to 4^a in 2010) and *H. ochraceus* (4^a in 2005 to 3^a in 2010). The drop of one position of *P. pluviosa* can be attributed to the loss of four large-sized trees and no recruitment for this species that is, decrease in basal area and abundance as directly reflected by density and dominance. On the opposite way, showing increasing density and basal area, *H. ochraceus* lost only one and gained five individuals, rising one position in the IV rank. In the present case, the high-ranked species in terms of IV such as *Eugenia uniflora*, *Poincianella pluviosa*, *Handroanthus ochraceus*, *Combretum duarteanum* and *Myracrodruon urundeuva* can be commonly found in Caatinga and Cerrado and, according to Santos *et al.*, (2011), this may be related to their occurrence in a transition zone in the overlap of both domains.

Shannon-Wiener diversity values in both censuses were inferior as compared to other studies in Brazilian Seasonally Deciduous Forests. However, sampling issues can easily bias this type of diversity metric and thus, comparison involving studies with distinct sampling effort and designs, as in the present case, must be interpreted carefully (Magurran 2004). Pielou evenness remained nearly unaltered and indicated strong dominance in the tree community as illustrated by *E. uniflora*, *P. contorta*, *P. pluviosa*, *H. ochraceus* e *C. leptophloeos* which pooled, accounted for 60% of the overall dominance. Seasonally Deciduous Forests generally hold high dominance, usually triggered by water stress, since it acts as an environmental filter favoring species better adapted to climatic seasonality (Carvalho & Felfili, 2011; Coyle *et al.*, 2014; Santos *et al.*, 2017).

Short eigenvalues (< 0.5 *sensu* Ter Braak, 1995) as displayed by DCA analyses in both censuses suggest low species replacement along this tree community. Such outcome is likely to be related to the strong dominance presented in the community (Kent & Coker, 1992). Furthermore, even with the structural (such as the biomass gain and density loss) as well as the demographic (such as the mortality higher than recruitment) variations, the similar configuration of both DCA's suggest low temporal species turnover during the interval, reflecting in a community remaining relatively stable.

CONCLUSIONS

The data show that in the five years comprised by the sampling interval there were small changes in the structure of the tree community.

There were no significant differences between the richness, diversity and Pielou evenness.

The most representative species in the community, considering their IV, also did not change significantly. The distribution of individuals in diametric classes, on the other hand, showed small differences between the two intervals.

The community also had a higher mortality rate than the recruitment rate. However, these results were not so discrepant as to be considered representative of major changes in the community, which requires a longer follow-up time to verify how these patterns behave for long time periods.

Conservation of these environments is necessary in order to allow long-term studies and monitoring of these communities and consequently, for a better understanding of the dynamics and structural processes concerning Seasonally Deciduous Forests.

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