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# COMPOSITION AND HORIZONTAL STRUCTURE OF THE SHRUSH-TREE COMPONENT OF A SEASONALLY DRY TROPICAL FOREST - SDTF

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**Resumo**

*Composição e estrutura horizontal do componente arbustivo-arboreo de uma floresta tropical sazonalmente seca - SDTF*. O Objetivo deste trabalho foi avaliar a composição florística e estrutura horizontal de um fragmento arbustivo-arbóreo de Floresta Tropical Sazonalmente Seca - (SDTF), de Caatinga conservada, no município de Campina Grande - PB, Brasil. Localizada na Estação Experimental Prof. Ignácio Salcedo, no Instituto Nacional do Semiárido – (INSA) / Ministério da Ciência, Tecnologia e Informação – (MCTI). Em um transecto de (50 m x 100 m), com 50 parcelas de (10 m x 10 m), foram mensurados indivíduos e fustes com CAP ≥ 6 cm.. Verificou a presença de 2.602 indivíduos ha$^{-1}$, com 3.210 fustes ha$^{-1}$, distribuídos em 17 famílias, 34 gêneros identificados, 1 gênero não identificado e 16 espécies. As famílias mais importantes em número de espécies e indivíduos foram Fabaceae e Apocynaceae, principalmente devido a ocorrência das espécies *Cenostigma nordestinum* Gagnon & G.P.Lewis e *Aspidosperma pyrifolium* Mart. & Zucc., respectivamente. A relevância das duas espécies de maior densidade foi percebida com relação a área basal, no qual foi correspondente a 2,12 m$^2$ ha$^{-1}$ e 1,26 m$^2$ ha$^{-1}$, respectivamente, o que evidenciou a contribuição principal das famílias citadas, a área estudada quanto a sua diversidade, foi considerada padrão normal com valor médio superior de 2,42 nats ind$^{-1}$, quando comparado com algumas pesquisas em literatura. À vista disso, este estudo constituem ferramentas-base para seu manejo e conservação, possibilitando a adoção de práticas corretas, comparações entre e dentro de comunidades florestais, além de dar margem à formulação de hipóteses de outros estudos.
*Palavras-chave*: fitossociologia, caatinga, semiárido, biodiversidade.

**Abstract**

The objective was to evaluate the floristic composition and horizontal structure of a shrub-tree fragment of Tropical Seasonally Dry Forest - (SDTF), of conserved Caatinga, in the municipality of Campina Grande - PB, Brazil. Located at the Prof. Ignácio Salcedo, at the National Institute of the Semi-Arid Region – (INSA) / Ministry of Science, Technology and Information – (MCTI). In a transect of (50 m x 100 m), with 50 plots of (10 m x 10 m), individuals and stems with CBH ≥ 6 cm were measured. The presence of 2.602 individuals ha$^{-1}$, with 3.210 stems ha$^{-1}$, distributed in 17 families, 34 identified genera, 1 unidentified genus and 16 species. The most important families in number of species and individuals were Fabaceae and Apocynaceae, mainly due to the occurrence of the species *Cenostigma nordestinum* Gagnon & G.P.Lewis and *Aspidosperma pyrifolium* Mart. & Zucc., respectively. The relevance of the two species with the highest density was perceived in relation to the basal area, which corresponded to 2.12 m$^2$ ha$^{-1}$ and 1.26 m$^2$ ha$^{-1}$, respectively, which showed the main contribution of the mentioned families, the area studied in terms of its diversity, was considered a normal pattern with a higher average value of 2.42 nats ind$^{-1}$, when compared to some studies in the literature. In view of this, this study constitutes basic tools for its management and conservation, enabling the adoption of correct practices, comparisons between and within forest communities, in addition to giving rise to the formulation of hypotheses for other studies.
*Keywords*: phytosociology, caatinga, semiarid, biodiversity.

## INTRODUCTION

The phytogeographic domain of the Caatinga is made up of several heterogeneous forest fragments, vegetation is also known worldwide as Seasonally Dry Tropical Forests – (SDTF). The characteristics of these areas are high water deficit, high insolation rates, high evapotranspiration and irregular rainfall (ARAÚJO *et al.*, 2012; MARENGO; TORRES; ALVES, 2017).

The SDTF areas in Caatinga environments correspond to approximately 844,453 Km2 present in all states of the Semi-Arid region of Brazil – (SAB) (IBGE, 2012), around 46% of the areas in the Caatinga phytogeographic domain were suppressed indiscriminately (MMA, 2020).

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Historically, SAB areas have been exploited to implement agricultural activities in an intensified manner, with degradation occurring in several environments, this production model has shown signs of saturation (BALBINO et al., 2011). In addition to anthropization, the SAB region is affected by adverse climatic conditions, strongly impacting soil use and vegetation cover. (COELHO; DUARTE; COELHO, 2015; ZHAO *et al.*, 2018).

Phytosociological studies aim to understand the composition and changes in vegetation, despite the existence of numerous researches within the scope of phytosociology, studies regarding tree-shrub composition and structure and vegetation formations remain incipient. The most diverse areas of heterogeneous forest fragments have different formations and distributions, this specific information on the SDTF area will provide more information that can be used by decision makers on the management and conservation of these areas (LIMA; COELHO, 2018).

The SDTF will present a diversity and a different horizontal structure in relation to other forest formations in the Caatinga. The research will seek to identify the dominant species, in addition to evaluating the spatial distribution of trees and shrubs, providing important information for understanding biodiversity and the functioning of the SDTF.

The choice of the forest fragment for the development of this study was initially due to the conservation stage of the vegetation. Thus, the present study aimed to evaluate the floristic composition, diversity and horizontal structure of a fragment of Seasonally Dry Tropical Forest (SDTF), of preserved shrub-arboreal size, located in the Caatinga domain, in the municipality of Campina Grande - PB, Brazil.

## MATERIAL AND METHODS

### Characterization of the research area

The study area is located in the mesoregion of the middle Paraíba River basin, in the municipality of Campina Grande – PB, approximately 140 km from the capital of Paraíba. The research was conducted at the Prof. Experimental Station. Ignácio Salcedo, from the National Semiarid Institute – INSA, Research Unit of the Ministry of Science, Technology and Innovation – MCTI, located under the coordinates (171357.19 m E; 9194234.58 m S; 25 M), altitude of 490 m), (Figure 1C). According to the Köppen climate classification, the local climate is of the BSh type, which refers to a hot semi-arid climate characterized by a lack of rainfall and high variability, with average high temperatures above 27 ºC and an average temperature of 22 .4 ºC (Figure 1D), with low cloudiness, strong sunshine and high evaporation. Annual precipitation has a higher concentration of rain, starting in March and a higher concentration between the months of May and July, with an average annual rainfall of more than 700 mm (ALMEIDA; GALVANI, 2021).

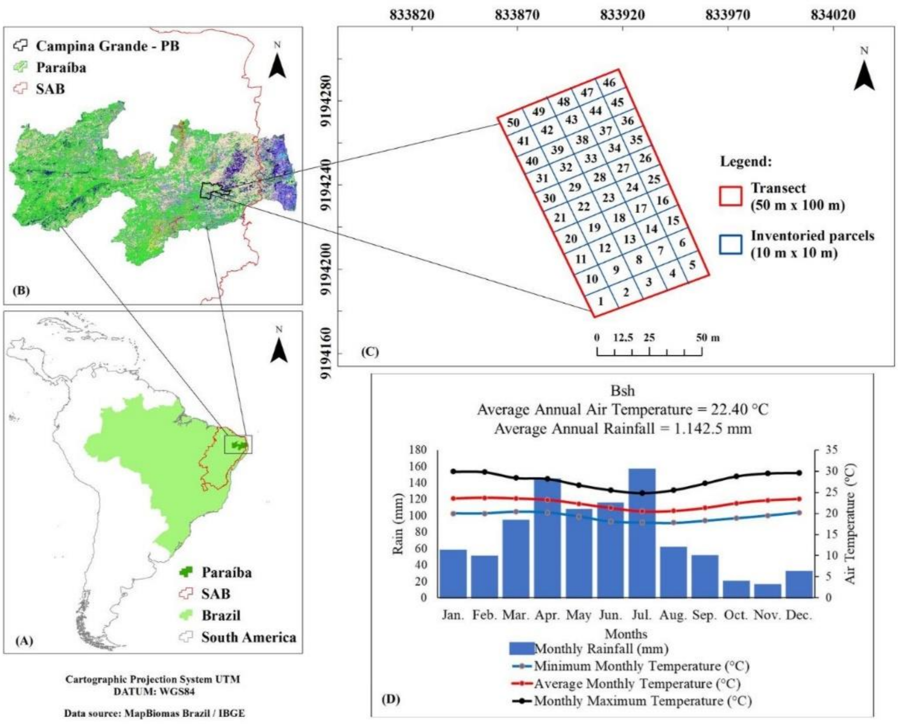


Figure 1. A) Semi-arid region of Brazil – SAB in the continental geographic space; B) State of Paraíba; C) Research area; and D) Köppen climate characterization, Campina Grande – PB, Brazil.

Figura 1. A) Semiárido do Brasil – SAB no espaço geográfico continental; B) Estado da Paraíba; C) Área de pesquisa; e D) Caracterização climática de Köppen, Campina Grande – PB, Brasil.

The local vegetation is of the shrub-tree type, with the occurrence of cacti and herbaceous stratum, in addition to the occurrence of bromeliaceae species, such as macambira (*Bromelia laciniosa* Mart. ex Schultes f.) and caroá (*Neoglaziovia variegata* (Arruda) Mez.). The shrub-tree vegetation in the region is called Hyperxerophilic Caatinga, with the occurrence of deciduous species, typical phytophysiognomy of a steppic savanna (IBGE, 2012).

The vegetation analyzed has been preserved approximately since the mid-1960s, without disturbance. Previously, the area served as a grazing supply for cattle and occasional uses of the vegetation to maintain the property, according to historical reports from nearby inhabitants, residents over past decades and up to the present day.

Regarding the predominant soil, in general in the study area, it is classified as LITHOLIC NEOSSOLO, with predominant characteristics of shallow and stony soils, with abrupt changes in its texture. (EMBRAPA, 2013).

**Data collection**

50 contiguous plots were systematically sampled, in the form of a transect (50 m x 100 m), each plot with dimensions of (10 m x 10 m), area per plot of 100 $m^2$, totaling an inventoried area of 0.5 ha, each plot was georeferenced with the aid of a Global Navigation Satellite System — GNSS device.

Furthermore, the selected individuals had a circumference at breast height - CBH at 1.30 m from the ground, ≥ 6 cm. These were identified, measured, and labeled with identification for each tree and stem (branch). The data were then tabulated in the Laboratory of the Desertification and Agroecology Center at INSA.

The individuals identified were herborized in the Herbarium of the State University of Feira de Santana - HUEF of the Department of Biological Sciences of the State University of Feira de Santana - UEFS, according to the floristic composition list database of the "ForestPlots.Net" project (FORESTPLOTS .NET et al., 2021). As for the synonymy and spelling of the taxonomies, they were updated through consultation of the Virtual Herbarium of the Rio de Janeiro Botanical Garden (REFLORA, 2020). To classify species at family level, the Angiosperm Phylogeny Group system was adopted (APG IV, 2016).

**Data processing and analysis**

Forest inventory data were analyzed descriptively regarding floristic composition and density. For each species, the following horizontal structure parameters were estimated: density, dominance, frequency and importance value (LAMPRECTH, 1964). To assess the level of local heterogeneity, the Shannon-Weaver diversity index (H') was calculated. Because Caatinga species have multi-stem branches, the equivalent average diameter ($d_{eq}$) was calculated, considering all bifurcations, as shown in the expression below:

$$d_{eq} = \sqrt{\sum_{i=1}^{f} DBH_i^2}$$

where: $d_{eq}$: Equivalent diameter of the j-th individual (cm); f: Number of stems of the j-th individual; DBHi: Diameter at 1.30 m from the ground of the ith stem (i= 1, 2, 3, ..., f) of the j-th individual (cm).

Then, all individuals and stems were classified into diameter classes starting at 1.9 cm and with an amplitude equal to 3 cm, obtained using the Sturges formula (FINGER, 1992). The data were processed and analyzed using Microsoft Excel software.

## RESULTS

In the 50 inventoried plots, 1,301 individuals and 1,605 shrub/tree branches were sampled. In general, they were represented by 2,602 individuals $ha^{-1}$ and 3,210 branches $ha^{-1}$, belonging to 35 species, distributed in 34 identified genera and 1 unidentified genus, belonging to 17 botanical families of Angiosperms. The most abundant species in the studied area coincided with those with the greatest number of branches, with the greatest contribution to density being highlighted by species from the Fabaceae and Apocynaceae families, as can be seen in (Table 1).

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Table 1. Floristic composition and density of individuals and stems in Tropical Seasonally Dry Forest.
Tabela 1. Composição florística e densidade de indivíduos e fustes, numa Floresta Tropical Sazonalmente Seca.

| **Family/Species** | **Popular name** | **Habit** | **Ind. ha$^{-1}$** | **Branch ha$^{-1}$** |
|---|---|---|---|---|
| **Anacardiaceae** | | | | |
| *Astronium urundeuva* (Allemão) Engl. | Aroeira | Tree | 4 | 4 |
| *Schinopsis brasiliensis* Engl. | Baraúna | Tree | 12 | 12 |
| *Spondias tuberosa* Arruda | Umbu | Tree | 2 | 8 |
| **Apocynaceae** | | | | |
| *Aspidosperma pyrifolium* Mart. & Zucc. | Pereiro | Tree | 470 | 528 |
| **Bignoniaceae** | | | | |
| *Fridericia* sp. | - | | 4 | 4 |
| *Handroanthus impetiginosus* (Mart. ex DC.) Mattos | Ipê roxo | Tree | 10 | 12 |
| **Burseraceae** | | | | |
| *Commiphora leptophloeos* (Mart.) J.B. Gillett | Imburana de cambão | Tree | 28 | 38 |
| **Cactaceae** | | | | |
| *Cereus jamacaru* DC. | Mandacaru | Shurb | 22 | 26 |
| *Pilosocereus pachycladus* var. *pachycladus* F.Ritter | Facheiro | Shurb | 34 | 60 |
| **Capparaceae** | | | | |
| *Cynophalla flexuosa* (L.) J. Presl | Feijão bravo | Shurb | 146 | 172 |
| *Neocalyptrocalyx longifolium* (Pohl) Baill. | Icó | Shurb | 26 | 32 |
| **Combretaceae** | | | | |
| *Combretum monetaria* Mart. | Mofumbo | Shurb | 326 | 394 |
| *Thiloa glaucocarpa* (Mart.) Eichler. | Sipaúba | Shurb | 2 | 2 |
| **Euphorbiaceae** | | | | |
| *Croton blanchetianus* Baill. | Marmeleiro | Shurb | 142 | 168 |
| *Jatropha mollissima* (Pohl) Baill. | Pinhão bravo | Tree | 20 | 20 |
| *Manihot glaziovii* Müll.Arg. | Maniçoba | Tree | 114 | 134 |
| *Sapium glandulosum* (L.) Morong | Burra leiteira | Tree | 6 | 8 |
| **Fabaceae** | | | | |
| *Bauhinia cheilantha* (Bong). Steud. | Mororó | Tree | 36 | 50 |
| *Cenostigma nordestinum* Gagnon & G.P.Lewis | Catingueira | Tree | 778 | 910 |
| *Chloroleucon dumosum* (Benth.) G.P.Lewis | Jurema branca | Tree | 10 | 22 |
| *Mimosa ophthalmocentra* Mart. ex Benth. | Jurema de embira | Tree | 54 | 90 |
| *Piptadenia flava* (Spreng. ex DC.) Benth. | Acácia | Tree | 130 | 192 |
| *Senegalia polyphylla* (DC.) Britton & Rose | Monjoleiro | Shurb | 8 | 8 |
| *Vachellia farnesiana* (L.) Wight & Arn. | Acácia, esponjeira | Shurb | 54 | 88 |
| **Malpighiaceae** | | | | |
| *Ptilochaeta* sp. | - | Shurb | 14 | 14 |
| **Malvaceae** | | | | |
| *Helicteres eichleri* K.Schum. | Fumo-de-macaco | Shurb | 12 | 20 |
| *Pseudobombax marginatum* (A.St.-Hil., A.Juss. & Cambess.) A.Robyns | Imbiratanha | Tree | 6 | 6 |
| **Myrtaceae** | | | | |
| *Eugenia* sp. | - | Shurb | 4 | 4 |
| Morphospecies 1 | - | Shurb | 2 | 2 |
| **Nyctaginaceae** | | | | |
| *Guapira laxa* (Netto) Furlan | João mole | Tree | 30 | 34 |
| **Rubiaceae** | | | | |
| *Coutarea hexandra* Schum. | Quina-quina | Shurb | 18 | 28 |
| *Guettarda angelica* Mart. ex Müll.Arg. | Angélica brava | Shurb | 42 | 72 |
| **Sapindaceae** | | | | |
| *Allophylus quercifolius* (Mart.) Radlk. | Batinga | Shurb | 26 | 34 |
| **Solanaceae** | | | | |
| *Capsicum parvifolium* Sendtn. | Pimenta de passarinho | Shurb | 8 | 12 |
| **Vitaceae** | | | | |
| *Cissus* sp. | - | Shurb | 2 | 2 |
| **Total** | | | **2.602** | **3.210** |

Caption: Ind. ha$^{-1}$ = Number of individuals ha$^{-1}$; Branch ha$^{-1}$= Number of branches ha$^{-1}$.

Below in (Table 2), the species found can be viewed in descending order in relation to the Importance Value (VI), in which dominance was an important parameter in its composition of the VI obtained for the species present in the area.

Table 2. Horizontal structure of the woody component, in the Caatinga area at the Experimental Station. Prof. Ignacio Salcedo, INSA.
Tabela 2. Estrutura horizontal do componente lenhoso, em área de Caatinga na Estação Experimental Prof. Ignácio Salcedo, INSA.

| Species | Ui | DA | DR | DoA | DoR | FA | FR | VI |
|---|---|---|---|---|---|---|---|---|
| *C. nordestinum* | 49 | 778 | 29.90 | 2.127 | 26.93 | 0.980 | 13.24 | 23.36 |
| *A. pyrifolium* | 30 | 470 | 18.06 | 1.264 | 16.00 | 0.600 | 8.11 | 14.06 |
| *C. monetaria* | 26 | 326 | 12.53 | 0.525 | 6.65 | 0.520 | 7.03 | 8.73 |
| *C. flexuosa* | 32 | 146 | 5.61 | 0.457 | 5.79 | 0.640 | 8.65 | 6.68 |
| *M. glaziovii* | 31 | 114 | 4.38 | 0.374 | 4.73 | 0.620 | 8.38 | 5.83 |
| *P. pachycladus* var. *pachycladus* | 15 | 34 | 1.31 | 0.897 | 11.36 | 0.300 | 4.05 | 5.57 |
| *P. flava* | 29 | 130 | 5.00 | 0.253 | 3.21 | 0.580 | 7.84 | 5.35 |
| *C. blanchetianus* | 22 | 142 | 5.46 | 0.198 | 2.51 | 0.440 | 5.95 | 4.64 |
| *C. jamacaru* | 10 | 22 | 0.85 | 0.561 | 7.10 | 0.200 | 2.70 | 3.55 |
| *M. ophthalmocentra* | 15 | 54 | 2.08 | 0.194 | 2.46 | 0.300 | 4.05 | 2.86 |
| *V. farnesiana* | 13 | 54 | 2.08 | 0.2191 | 2.77 | 0.260 | 3.51 | 2.79 |
| *C. leptophloeos* | 14 | 28 | 1.08 | 0.183 | 2.31 | 0.280 | 3.78 | 2.39 |
| *G. angelica* | 7 | 42 | 1.61 | 0.067 | 0.85 | 0.140 | 1.89 | 1.45 |
| *G. laxa* | 8 | 30 | 1.15 | 0.075 | 0.95 | 0.160 | 2.16 | 1.42 |
| *B. cheilantha* | 6 | 36 | 1.38 | 0.051 | 0.64 | 0.120 | 1.62 | 1.22 |
| *J. mollissima* | 9 | 20 | 0.77 | 0.026 | 0.33 | 0.180 | 2.43 | 1.18 |
| *N. longifolium* | 5 | 26 | 1.00 | 0.058 | 0.73 | 0.100 | 1.35 | 1.03 |
| *S. brasiliensis* | 4 | 12 | 0.46 | 0.112 | 1.42 | 0.080 | 1.08 | 0.99 |
| *A. quercifolius* | 5 | 26 | 1.00 | 0.026 | 0.33 | 0.100 | 1.35 | 0.89 |
| *C. dumosum* | 4 | 10 | 0.38 | 0.061 | 0.77 | 0.080 | 1.08 | 0.75 |
| *C. hexandra* | 2 | 18 | 0.69 | 0.032 | 0.41 | 0.040 | 0.54 | 0.55 |
| *S. glandulosum* | 4 | 6 | 0.23 | 0.022 | 0.28 | 0.080 | 1.08 | 0.53 |
| *P. marginatum* | 4 | 6 | 0.23 | 0.018 | 0.23 | 0.080 | 1.08 | 0.52 |
| *H. impetiginosus* | 3 | 10 | 0.38 | 0.017 | 0.22 | 0.060 | 0.81 | 0.47 |
| *H. eichleri* | 2 | 12 | 0.46 | 0.017 | 0.21 | 0.040 | 0.54 | 0.40 |
| *Ptilochaeta sp.* | 2 | 14 | 0.54 | 0.009 | 0.11 | 0.040 | 0.54 | 0.40 |
| *S. polyphylla* | 2 | 8 | 0.31 | 0.023 | 0.29 | 0.040 | 0.54 | 0.38 |
| *A. urundeuva* | 3 | 4 | 0.15 | 0.008 | 0.10 | 0.060 | 0.81 | 0.35 |
| *C. parvifolium* | 2 | 8 | 0.31 | 0.006 | 0.08 | 0.040 | 0.54 | 0.31 |
| *Eugenia* sp (Myrtaceae) | 2 | 4 | 0.15 | 0.004 | 0.05 | 0.040 | 0.54 | 0.25 |
| *Fridericia* | 2 | 4 | 0.15 | 0.002 | 0.02 | 0.040 | 0.54 | 0.24 |
| *S. tuberosa* | 2 | 2 | 0.08 | 0.004 | 0.05 | 0.040 | 0.54 | 0.22 |
| *T. glaucocarpa* | 2 | 2 | 0.08 | 0.0025 | 0.03 | 0.040 | 0.54 | 0.22 |
| Morphospecies 1 (Myrtaceae) | 2 | 2 | 0.08 | 0.002 | 0.03 | 0.040 | 0.54 | 0.22 |
| *Cissus* sp. | 2 | 2 | 0.08 | 0.002 | 0.02 | 0.040 | 0.54 | 0.21 |
| **Total** | **-** | **2602** | **100** | **7.90** | **100** | **7.40** | **100** | **100** |

Legend: Ui = number of sampling units per species; DA = absolute density (ind ha-1); DR = relative density (ind ha-1); DoA = absolute dominance ($m^2$ $ha^{-1}$); DoR = (%); FA = absolute frequency; FR = relative frequency (%); VI = importance value (%).

Regarding the representativeness of the families found in the area under research, it was found that the five most abundant in terms of number of individuals were the families Fabaceae, Apocynaceae, Combretaceae, Euphorbiaceae and Capparaceae (Figure 2).

The highest dominance values were concentrated in the species *C. nordestium* (26.93%), *A. pyrifolium* (16.00%), *C. monetaria* (6.65%), *C flexuosa* (5.79%) and *M. glaziovii* (4.73%). The ten species with the highest Importance Values (VI) were: *C. nordestium* (23.36%), *A. pyrifolium* (14.06%), *C. monetaria* (8.73%), *C flexuosa* (6.68% ), *M. glaziovii* (5.83%), *P. pachycladus* var. pachycladus (5.57%), *P. flava* (5.35%), *C. blachetianus* (4.64%), *C. jamacaru* (3.55%), and *M. ophthalmocentra* (2.86%).

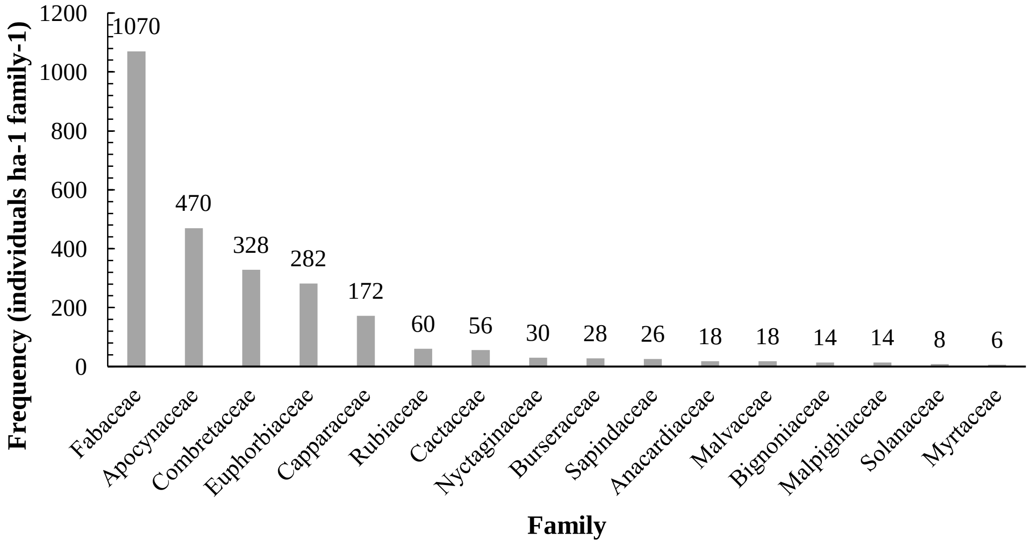


Figure 2. Distribution of individuals by families, in an area of Tropical Seasonally Dry Forest - TSDF.
Figura 2. Distribuição de indivíduos por famílias, numa área de Floresta Tropical Sazonalmente Seca - SDTF.

The results observed regarding the distribution of individuals by diameter classes ($d_{eq}$), a J-reverse trend was obtained, as can be seen in (Figure 3). The same was noticed when analyzing the distribution for shafts (Figure 4).

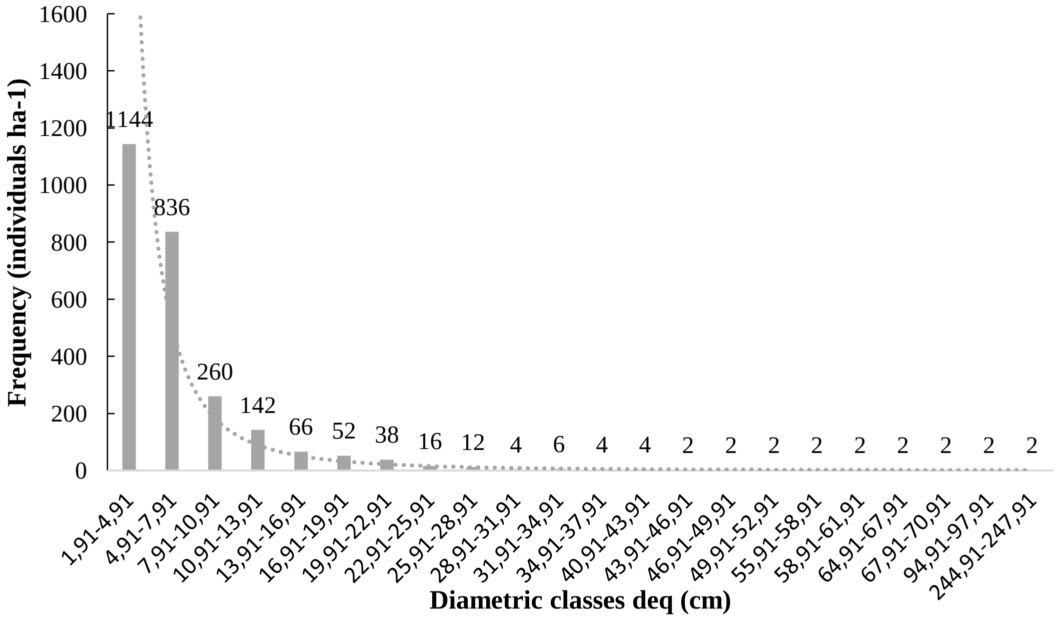


Figure 3. Diametric distribution of shrub-tree individuals in an area of Tropical Seasonally Dry forest - TSDF.
Figura 3. Distribuição diamétrica dos indivíduos arbustivo-arbóreo, numa área de Floresta Tropical Sazonalmente Seca - SDTF.

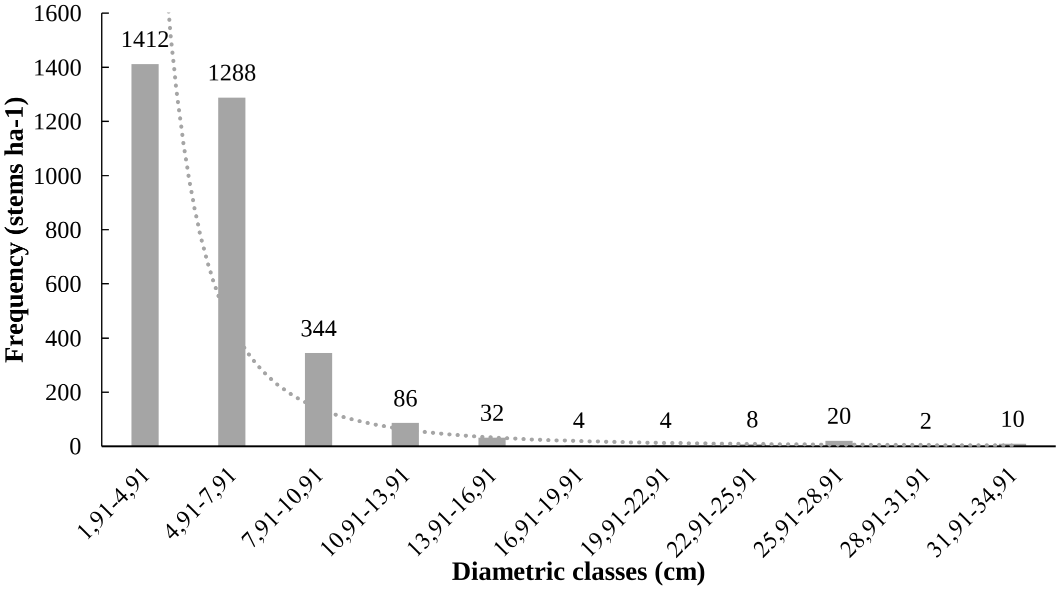


Figure 4. Diametric distribution of shrub-tree stems in an area of Tropical Seasonally Dry forest - TSDF.
Figura 4. Distribuição diamétrica dos fustes arbustivo-arbóreo, numa área de Floresta Tropical Sazonalmente Seca - SDTF.

## DISCUSSION

Data recording was carried out in a single area, this approach brings relevant information to the scope of forestry and conservation management, with results that corroborate several scientific findings on phytogeographic dominoes.

Regarding the metrics analyzed, population density was estimated at 2.602 individuals ha$^{-1}$ and absolute dominance of 7.9 (m$^2$ ha$^{-1}$), according to the forest inventory carried out, when compared to other studies, the value obtained was higher to the studies by Ferraz et al., (2014), in an area considered conserved (without a history of human interventions), whose historical record is similar to that of the researched area, and another area that is highly anthropized (deforestation by currents, in which it is in a regenerative process about 60 years ago). The opposite, when compared with the scientific findings from Lima; Rabbit (2018).

When the same variables were verified in SDTF environments in the Caatinga domain, with signs of anthropogenic disturbances, and without significant interventions for at least 20 years, higher density and dominance values were obtained in this research, as can be seen in the Rodal literature; Coast; Silva (2008). The differentiation and greater values revealed can be explained as a direct reflection of the history of use and conservation over the decades, in order to contribute to greater biodiversity conservation.

It is known that human intervention directly reflects on the population density of a forest, as the more human interventions the lower the absolute values of its density will be. This scenario is revealed mainly when it is possible to prove it through studies of vegetation dynamics, when comparing with previous years, and even research in the surrounding vegetation, when there is a history of use of the area. In summary, the probable causes of reduction in population density are precisely due to human actions, linked to these conditions there is water scarcity and poor rainfall distribution in the SAB region (HOLANDA *et al.*, 2015; COSTA JÚNIOR *et al.*, 2022).

Therefore, the density values obtained provide evidence that the analyzed fragment is considered superior in terms of number of individuals and stems, when compared to several studies in the different types of Caatingas, as can be seen in the literature (RODAL; COSTA; SILVA, 2008; LIMA COELHO, 2018; COSTA JÚNIOR *et al.*, 2022).

As mentioned, the basal area (dominance) found was higher than some results found in the literature for areas considered conserved, according to scientific findings obtained by (RODAL; COSTA; SILVA, 2008; FERRAZ et al., 2014; LIMA; COELHO, 2018 ; COSTA JÚNIOR et al., 2022). However, some forest areas in conserved and anthropized situations present fluctuations in relation to their dominance. Some researchers have presented much higher values, in which Sabino; Wedge; Santana (2016) obtained values of 15.13 m$^2$ ha$^{-1}$ and 18.79 m$^2$ ha$^{-1}$, in two anthropized areas, Lima; Coelho (2018) obtained a value of 28.56 m$^2$ ha$^{-1}$, in a forest with a history of conservation for more than 70 years, without the marked presence of anthropization, thus, when analyzed and compared the average dominance values, the researched area can be considered with a medium level of conservation.

Regarding the contribution of families to the abundance of the studied population, it was found that Fabaceae and Apocynaceae had greater relevance, resulting in 59.18% of individuals ha-1, highlighting the Fabaceae family, in which their relevance coincides, being similar to various results (FERRAZ et al., 2014; BULHÕES et al., 2015; SANTOS et al., 2017; BARBOSA et al., 2020).

Species richness in relation to families in descending order was represented as follows: Fabaceae with seven species; Euphorbiaceae with four species; Anacardiaceae with three species; Bignoniaceae, Cactaceae, Capparaceae, Combretaceae, Malvaceae, Myrtaceae and Rubiaceae with two species; Apocynaceae, Burseraceae, Malpighiaceae, Nyctaginaceae, Sapindaceae, Solanaceae and Vitaceae with one species.

The species *C. nordestium*, popularly known as Catingueira, was the densest in the area, presenting the highest relative density, followed by *A. pyrifolium*, *C. monetaria*, *C flexuosa* and *M. glaziovii* (Table 2). The Shannon index of species diversity was 2.421 (nats ind$^{-1}$).

The density values found show that the vegetation analyzed can be considered preserved, in relation to the number of individuals and stems, as well as the variation in floristic composition, according to various scientific findings. (FERRAZ *et al.*, 2014; LIMA; COELHO, 2018; SANTOS *et al.*, 2017; BARBOSA *et al.*, 2020).

As for the highest density species, *C. nordestium* is one of the most frequent in seasonally dry tropical forest environments in the Caatinga, its record is verified in several areas of forest cover, according to Reflora data (2020), the species is recorded in herbarium, occurs throughout Northeast Brazil, except the state of Maranhão.

As for the diameter distribution by classes of the population of individuals and stems, it indicated that the size of the verified diameters are concentrated in the first classes, which emphasizes the normal pattern of a forest with unknown tree ages (uneven forest) (RODAL; COSTA ; SILVA, 2008; SOUZA et al., 2020). It is worth highlighting that the highest frequency behavior in the initial classes was precisely due to the two most abundant species in the area, *C. nordestium* and *A. pyrifolium*, where the results of Santana et al., (2021) corroborate the similarity of the curve, with strong influence of individuals in the first diameter classes in relation to the species *C. northeastium*.

In phytosociological surveys in various Caatinga environments (anthropized and conserved), an inverse J-shaped diametric distribution curve was obtained, however with a greater presence of individuals in the smaller diameter classes, which corroborates and characterizes it in a forest unfair (RODAL; COSTA; SILVA, 2008; SABINO; CUNHA; SANTANA, 2016; LIMA; COELHO, 2018).

## CONCLUSIONS

- This work highlights the vegetation of the Seasonally Dry Tropical Forest analyzed, presenting 35 shrub-tree species belonging to 17 families.
- The presence of the species *C. bracteosum* and *A. pyrifolium* draws attention due to their dominance, as a result of their great potential for propagation in the region.
- The diversity and dominance observed in the forest fragment presented higher and lower values when compared to other vegetation formations.
- The vegetation analyzed was still regenerating, indicating through the parameters examined, such as the diametric behavior in inverted J, which reports as an indicator of vegetation in a constant regenerative process and the expressed intra and interspecific competition.

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