



Populational Structure of *Eugenia* sp. in Paraban Semiarid of State, Brazil

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Authors' contributions

This work was carried out in collaboration among all authors. Author AJ performed the study or project and performed the statistical analysis. Authors JGD and AAD managed the literature searches. Authors FDOM and ASA carried out the activities related at the results and discussion. Authors FRDA and AGL participated of the normalization of article and reference. All authors read and approved the final manuscript.

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ABSTRACT

The genus *Eugenia* presents one of the most important in Myrtaceae family, expressing a potential nutritional high and in drugs obtaining. The plants are resist and resist disease, their hardwood has been used to produce posts, stakes, poles, firewood and charcoal. The objective of this present work was to conduct a survey of the population structure of *Eugenia* sp. was conducted in caatinga

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area, located in the municipality of Caturité, PB. Were sampled Forty plots of 10x20 m, totaling a sample area of 8.000 m². All shrub-tree individuals were inventoried by the taking the ground level diameter (DNS), height and number of tillers. The vegetation structure was evaluated by basal area, absolute density, absolute frequency and aggregation index of the species. A total of 741 individuals of *Eugenia sp.* Distributed in four vegetation mosaics with a history of different uses, which were conventionally approached as: A I = Abandoned quarry area; A II = Bottom of the valley; A III = Conserved Area and A IV = Capoeira Area. Area I presented a total of 92 individuals sampled in the 10 experimental plots (DA = 460), where in this environment the species tended to cluster, Area II presented 124 individuals (DA = 620) and the McGuines index expressed that in this environment the species finds grouped. In Area III, 480 individuals were sampled with an absolute density of 2,400 ind. ha⁻¹ grouped. The density of *Eugenia sp.* Was performed descriptive statistical analysis. It is different in vegetation mosaics due to the history of land use in the studied areas. The largest number of individuals of *Eugenia sp.* is concentrated in the conserved area showing aggregation pattern. In all areas of study, individuals have low stem diameter, expressing the importance of the species in the regeneration of disturbed areas. In the quarry area are the individuals with higher height.

Keywords: *Caatinga; plant populations; pitanga fruit.*

1. INTRODUCTION

According with the authors [1], botanists have already identified about 1,356 plant species in Caatinga, of which approximately 600 are woody species that are important to the ecosystem. He author also emphasizes that each species in the biome has special characteristics, filling a prominent place in the system. It's can be observed that in the biome there is always a species in flowering or with presence of fruits, even in periods of drought, which ensures the perpetuation of the referred species, besides ensuring food for several animals.

Besides the biological importance, the caatinga biome has an economic potential that is still little valued, as is the case of species in this environment that have substances with medicinal properties, such as the aroeira (*Myracrodruon urundeuva*), the cumaru (*Amburana cearensis*), pine nut (*Jatropha mollissima*), canopy (*Croton campestris*), quince (*Croton sonderianus*) and angico (*Anadenanthera colubrina*), according [2].

The Myrtaceae family has several species that produce edible fruits with a pleasant taste, as some regional plants such as: a guava, araçá, jabuticaba, cagaita, cambuci, cambuí, pitanga and uvaia as stated [3]. The genus *Eugenia* is among the most important in the Myrtaceae family, with species of commercial, nutritional value and potential for use in obtaining drugs according to data from [4]. Among these, the *Eugenia pyriformis* Camb grape can be highlighted for its wide geographical distribution,

being found in different regions of the country and even in other countries.

The genus *Eugenia* can also be known as uvaia, ubaia, uvalha and pitanga do mato. It's is a medium-sized tree species that occurs from São Paulo to Rio Grande do Sul, its growth is relatively fast and its fruiting is early. The plants resist disease well and their hardwood has been used for the production of posts, stakes, poles, firewood and charcoal according [5]. Seedling production is hindered by the short period of seed availability and their short longevity.

Due to the importance of this work, in possibility of identification and use of substances with pharmaceutical purposes, this study aimed to analyze the population structure of *Eugenia sp.*, in Caatinga area, located in the municipality of Caturité, PB.

2. MATERIALS AND METHODS

2.1 Study Area

The area where the study was conducted has approximately 81 ha, located in the municipality of Caturite, Paraíba State, Brazil has an average altitude of 490 m and gently undulating relief and geographical coordinates 7°42'09"N and 36°01'19" W. The climate of the region according to the Köppen classification is Bsh [6], ie, warm semiarid, with average annual rainfall 750 mm and temperature ranging from 18 to 31°C throughout the year. The soils are predominantly the Planosols and Vertisols conform [7]. The vegetation is of the hypoxophilic caatinga type

and has a history of selective logging for use as firewood and extensive livestock.

2.2 Factorial Scheme of Work

To evaluate the population of pitanga fruits (*Eugenia sp.*), were sampled 40 plots of 10x20 m, totaling a sample area of 8,000 m². All shrub-tree individuals were inventoried by taking the ground level diameter (DNS), height and number of tillers. Taxonomic identification was performed through comparisons with material from the Jaime Coelho de Moraes Herbarium (EAN) of the Center for Agrarian Sciences of the Federal University of Paraíba, Areia, PB, specialized literature and consultations with specialists, when necessary. The floristic list was organized according to the APG II System (2003) available from the Missouri Botanical Garden's Tropicos® (2010) database, Saint Louis, Missouri, USA.

Vegetation structure was assessed by basal area, absolute density, absolute frequency and aggregation index of the species [8,9]. Statistical analyzes were performed using the software: Mata Nativa 2[®] [10], MVSP 3.1[®] (MVSP/PLUS, 1998) and BioEstat 4.0[®] [11].

2.3 Statistical Analysis

For data analysis was performed descriptive statistical analysis of the mosaics in area form. The sample areas were named following the following sequence: Area I: Quarry deactivated 20 years ago; Area II: Represented by the lowest and most rugged terrain of the CAC; Area III: Represented by the CAC forest garden; Area IV: Area used for annual crops in the 90s.

3. RESULTS AND DISCUSSION

Were sampled a total of 741 individuals of *Eugenia sp.* distributed in four vegetation mosaics with a history of different uses, which

were conventionally approached as: A I = Abandoned Quarry Area; A II = Vale Fund; A III = Conserved Area and A IV = Capoeira Area. According to Table 1 Area I presented a total of 92 individuals sampled in the 10 experimental plots (DA = 460.0), where in this environment the species tended to cluster, Area II presented 124 individuals (DA = 620.0) and the index of McGuines expressed that in this environment the species finds grouped. In Area III, 480 individuals were sampled with an absolute density of 2,400 ind. ha⁻¹ grouped, contrary to the observation made by Silva et al., 2004 that many species of *Eugenia* have low occurrence density. In Area IV, only 45 individuals with an absolute density of 225 ind. ha⁻¹ spatially grouped.

The high proportion of young and juvenile plants in the lower classes, compared to the percentage of adult individuals, shows a strong imbalance in the distribution of individuals, however it may also indicate that the community has a high and constant potential for rapid natural regeneration.

The population of *Eugenia sp.* Expressing differences in diameter structure, this trend was observed for the four vegetation mosaics studied. In general, individuals are concentrated in the first (0.10-3.0) and second (3.1-6.0) diametric classes (Fig. 1), demonstrating that the vegetation is regenerating, that is, the distribution of individuals by diameter class is represented as inverted and inclined J, characterizing a large number of young individuals in the studied areas.

In general, the amount of plants with a diameter between 3 and 12 cm (in the first three classes) is similar to that found by [12] and [13]. Fig. 2 shows the ipsometric classes of *Eugenia sp.* sampled in the experimental plots. It is observed that in the abandoned quarry area there were few individuals in the first class (0.1-1.0), and predominance in classes two (1.1-2.0), three (2.1-3.0) and four (3.1-4.0).

Table 1. Structural parameters of pitanga (*Eugenia sp.*) occurring in four caatinga environments, Caturité, PB (A I = Abandoned Quarry Area; A II = Vale Bottom; A III = Conserved Area and A IV = Capoeira Area)

Areas	Pitanga (<i>Eugenia sp.</i>)					Classification SAI
	N	U	DA	FA	IGA	
Areas I	92	5	460.0	50.0	1.13	Tend. Grouping
Area II	124	3	620.0	30.0	34.77	Agruped
Area III	480	9	2400.0	90.0	11.35	Agruped
Area IV	45	4	225.0	40.0	8.81	Agruped

(N = number of individuals; U = number of experimental plots where the species occurred; AD = absolute density; AF = absolute frequency; SAI = species aggregation index)

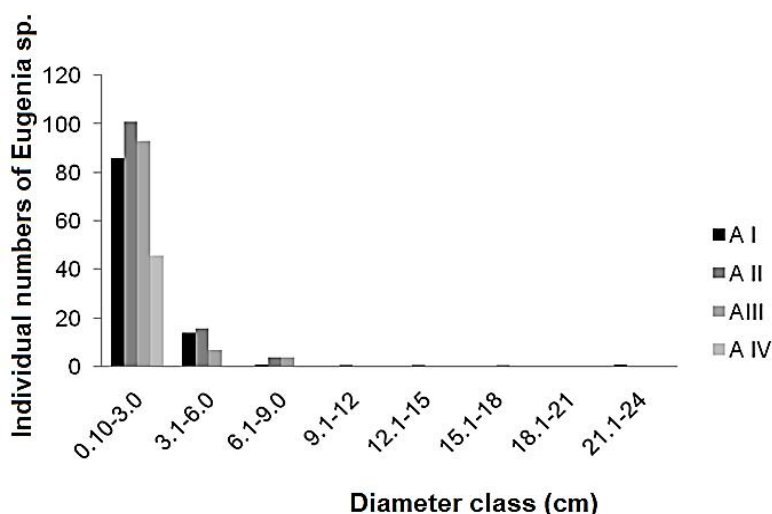


Fig. 1. Diametric structure of the population of *Eugenia* sp. in a caatinga area, municipality of Caturité, PB (A I = Abandoned Quarry Area; A II = Vale Bottom; A III = Conserved Area and A IV = Capoeira Area)

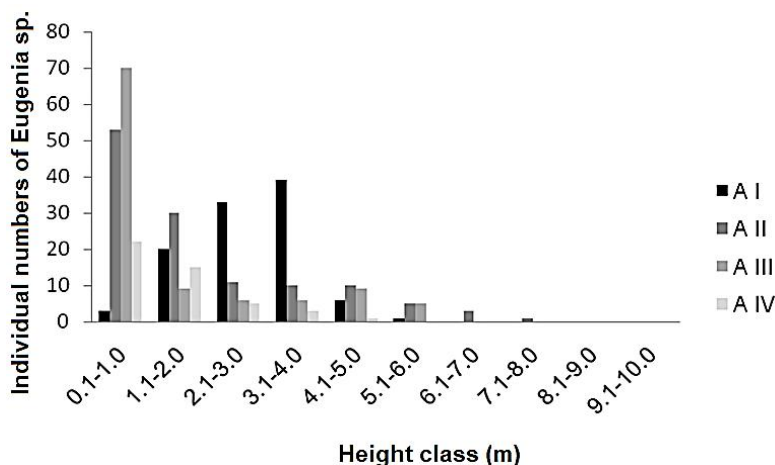


Fig. 2. Height class of a population of *Eugenia* sp. in a caatinga area, municipality of Caturité, PB (A I = Abandoned Quarry Area; A II = Vale Bottom; A III = Conserved Area and A IV = Capoeira Area)

The observed results may be related to the reduced number of species in this area, as well as the non-grouping of individuals, which leads to the reduction of intraspecific competition. Another important factor revealed by the survey of the area's history was the time twenty years since quarry deactivation, which is leading people to reestablish themselves in the area.

A possible explanation for the existence of the great majority of individuals being concentrated in the fourth ipsometric class, leads us to the growth substrate, where, according to [14], the

inert substrates that are poorer in nutrients may be compromised the initial development of grape seedlings.

4. CONCLUSION

The density of *Eugenia* sp. presents larger vegetation mosaics due at the history of land use in these studied areas.

The largest concentration of the individual's number of *Eugenia* sp. was in the conserved area showing aggregation pattern.

In all areas of study, individuals presents low stem diameter, but with expressing the importance of the species in the regeneration of disturbed areas.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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