POPULATION STRUCTURE OF *Calyptranthes clusiifolia* O.Berg IN TWO PATCHES IN THE SOUTHERN MINAS GERAIS STATE

ESTRUTURA POPULACIONAL DE Calyptranthes clusiifolia O.Berg EM DOIS FRAGMENTOS FLORESTAIS NO SUL DE MINAS GERAIS

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ABSTRACT: This work intended to study the structure of two populations of *Calyptranthes clusiifolia* in two patches of Semidecidual Seasonal Forest in different anthropic conditions. In each patch we established transections where all the individuals of the species were sampled. We distributed the individuals in height classes and also evaluated their spatial distribution. We found that the first patch possesses a number of 5.28 individuals as high as the ones presented by the second patch. The first patch presented a great number of individuals in all the age classes and aggregated spatial distribution. There were greater concentration of adult individuals on the edges, in agreement with the characteristics of heliophytic species, and greater concentration of young individuals in the interior. The anthropic fragment showed an unstructured pattern with insufficient individuals to characterize the population as in regeneration, for its evidences of past and present disturbances that interfere with the establishment and persistence of species in the area.

KEYWORDS: Plant Ecology. Habitat fragmentation. Atlantic Forest.

INTRODUCTION

Population is as a group of individuals of a species in a given area. Each population, considered in a particular environment, has features which enable it to occupy that place more adequately to the available conditions, that is, the number of individuals in a population ranges according to several ecological factors relative to the habitat occupied (RICKLEFS, 2003; NEWTON, 2007). Those factors, associated with the characteristics of the species, act directly upon the structure of the population, characterized in a simple way from both the density and distribution of individuals, in addition to their proportions in the age classes considered (RICKLEFS, 2003; GUREVITCH et al., 2009). Therefore the population structure is the result of evolutionary and ecological mechanism and can furnish information about the regeneration process, occurrence of disturbances and how the species was exploited in the environment (HARPER, 1977; HUTCHINGS, 1986; CLARK, 1994; NEWTON, 2007; DURIGAN, 2009).

A species can present differences in the population structure among different sites and places, since the adaptation to the natural conditions of the environment in which it occurs provides an excellent functional performance to its population (MILTON et al., 1993; GRAU, 2000; GUREVITCH et al., 2009). Under natural conditions, the population structure will vary based on stochastic events and will correspond to parameters which will be considered characteristic to the species in issue (RICKLEFS, 2003; GUREVITCH et al., 2009). Nevertheless, the intensity and frequency of disturbances will be able to mischaracterize the population structure and endanger its existence in a given location (LAURANCE; BIERREGAARD, 1997; NEWTON, 2007; GHAZOUL; SHEIL, 2010; FRANK; BARET, 2013).

One of the main sorts of disturbance which puts into risk the structure of populations is the fragmentation of their habitat, because it infers the restriction of certain species to the fragmented area (RICKLEFS, 2003; CERQUEIRA et al., 2003; MAUÉS; OLIVEIRA, 2010). The fragmentation of forest habitat, which is widely considered the greatest threat to the biodiversity (NASCIMENTO et al, 1999; NEWTON, 2007; OLIVEIRA FILHO et al., 2007; GUREVITCH et al., 2009), may be concerning the process in which a continuous habitat is divided into small spots or patches more or less isolated (SHAFER, 1990; CERQUEIRA et al., 2003).

Calyptranthes clusiifolia O.Berg is a heliophytic semi-deciduous tree species, without any remarkable differentiation concerning to the soil humidity content and to secondary successional stage. It is considered attractive to the fauna; its flowers are commonly visited by bees and its fruits

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bird-dispersed (LORENZI, 1998). Its geographical distribution in Brazil encompasses the Amazon, Atlantic and Cerrado Domains, but it occurs predominantly in forest phytophysiognomies, both in ombrophilous (rain forest) and in semi-deciduous forests (OLIVEIRA FILHO, 2006; OLIVEIRA FILHO, 2012). The authors Oliveira Filho and Fontes (2000) classify the species as characteristic of montane forest communities of the Atlantic Domain, considered a frequent species in the forest communities of Minas Gerais State (OLIVEIRA FILHO, 2006).

The great frequency of *C. clusiifolia* can also be verified in the Upper Rio Grande Basin, in the southern Minas Gerais State, by the results obtained by Pereira et al. (2007). In this work 20 patches of Semidecidual Seasonal Forest were surveyed with the species occurring in 18 patches and presenting increased relative abundance in patches subjected to the influence of watercourses (PEREIRA, 2003). Nevertheless, this and other works (CHAGAS et al., 2001; SOUZA et al., 2003; CARVALHO et al., 2007; OLIVEIRA FILHO et al., 2007) performed in the region surveyed only adult and established individuals. Works surveying tree populations in all age classes are rare or absent, as well as the ones which relate these parameters to the forest fragmentation.

In order to study some parameters of population structure of *C. clusiifolia* and relate them to the forest fragmentation, we sampled two populations of the species in two patches located in the Upper Rio Grande Basin. Therefore, this study aimed to assess the density, the structuring in phases of development and the spatial distribution of the individuals of species in two patches with the same type of vegetation, where one is natural and the other with occurrence of anthropic disturbances. For this, we started with the null hypothesis that the two populations do not differ structurally and present similar population density, age structure and spatial distribution. The ecological hypothesis that guided this study was that the population in an environment subject to anthropogenic disturbances has different structural parameters relative to a naturally fragmented environment.

MATERIAL AND METHODS

Area of study: In order to evaluate the structure of populations of *C. clusiifolia*, we selected two forest patches in the Upper Rio Grande Basin, located in the south of the state of Minas Gerais, in the southeast of Brazil. Both fragments are located in the original covering region of the Atlantic Forest (Figure 1) and have the same phytophysiognomy, but with distinct fragmentation conditions.

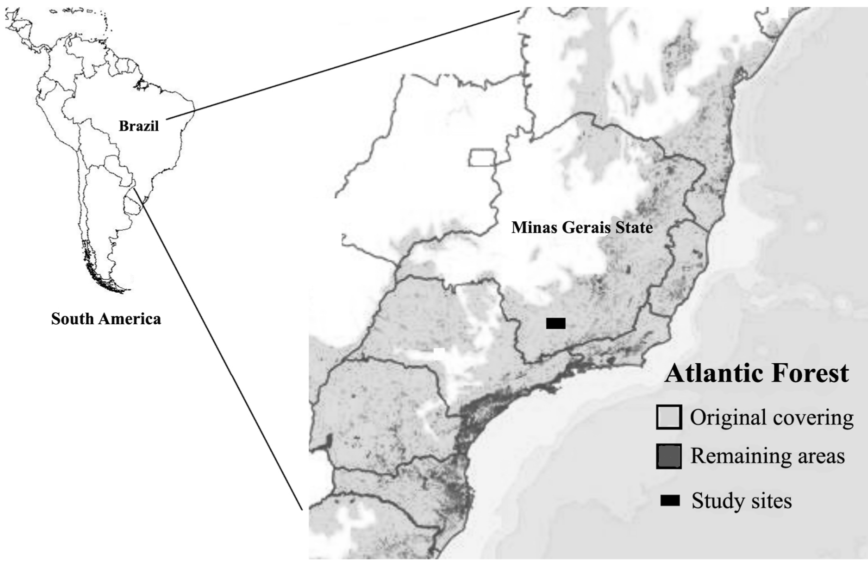

Figure 1. Location of the study sites in Minas Gerais and in relation to the original covering of the Atlantic Forest.

The first patch (Figure 2) is located at the geographical coordinates 21º 27' 12" S and 44º 37' 31" W, at an altitude of 1200m in the municipality of Carrancas, on the range of the same name. According to the Brazilian Vegetation Classification (IBGE, 2012) it is a patch of montane seasonal semideciduous forest. The matrix that surrounds it is composed fundamentally by native grassland communities, such as the rupestrian grasslands, plant communities characteristic and dominant on the tops of the ranges formed by quartzite rocks of Carrancas and Andrelândia Groups, and that occur in the south of Minas Gerais, as presented by Rodela (1998) and Vasconcelos (2011). The isolation of the local forest vegetation, therefore, is not due to clear cutting of the surrounding vegetation but long-term natural processes. The patch is about 14 ha in area and has slightly sloping topographic conditions characterized by a declivity-acclivity, with a watercourse crossing it across in a groove with 2 m in depth. We have not found evidences of anthropization in this fragment – which composes a natural system of corridors.

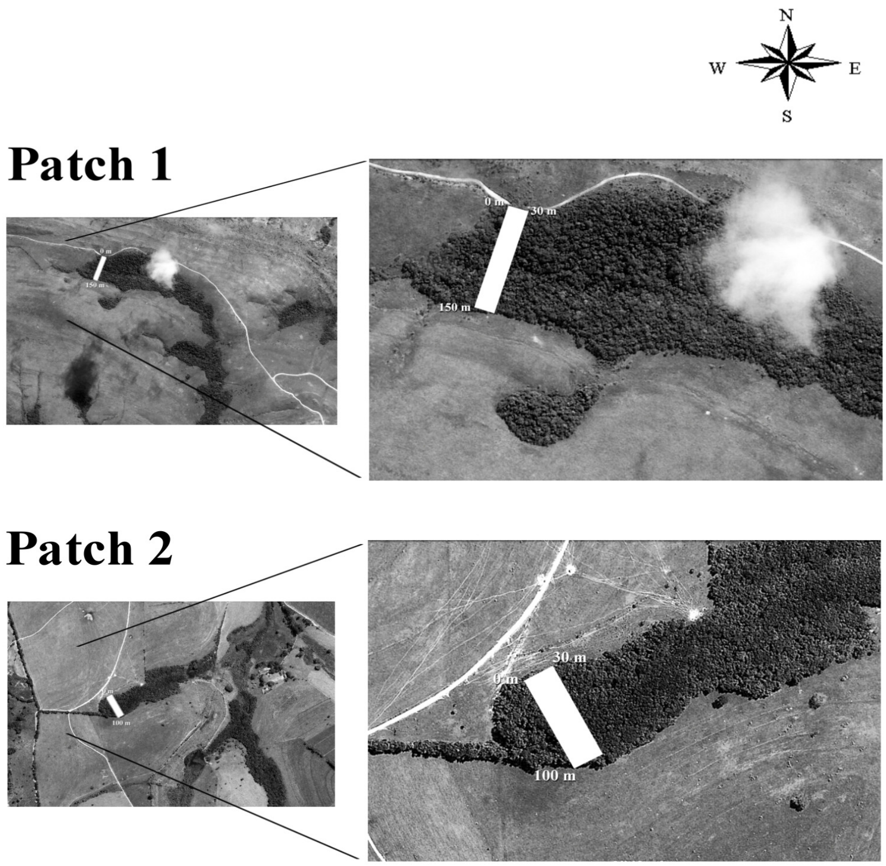

Figure 2. Top view of the two fragments located in the Upper Rio Grande Basin, in the Southeast of Minas Gerais, where we sampled the populations of *Calyptranthes clusiifolia*. Transects can be seen in white. Adapted picture from Landsat images available on Google Earth (2013).

The second patch (Figure 2), at the coordinates 21º 18' 15" S and 44º 59' 21" W, is located close to the range of Carrapato, at an altitude of 1000m, in the municipality of Lavras. The patch is a montane semideciduous forest (IBGE, 2012), and the surrounding matrix is composed by planted pastures with predominantly exotic grasses. We can consider the forest vegetation fragments of bigger areas. The local forest vegetation can be seen as fragments of larger areas, which generally have been felled to make way for crops and pastures. These are common practices that occur in the region since the early days of Portuguese colonization. (OLIVEIRA FILHO et al., 1994; DEAN, 1996). The fragment is about 9 ha in area and its topographic conditions may be considered from flat to slightly sloping, from the final third of the patch a watercourse with deficient drainage crosses it widely, inciting a slight flood of the soil from this stretch on. In this patch several clues of trampling by cattle were found, indicating a great intensity of this kind of disturbance in the site. We checked many cattle grazing in the vicinity, plus many indications that they go in the fragment such as large amount of feces, trails, broken or trampled seedlings and scarified adult plants. This fragment is also part of a system of corridors formed by other small fragments, in general, all very anthropized.

Data collection and survey – In each site we established a transection in order to transpose fragments between opposing edges (Figure 2) to sample individuals under different influences of microenvironmentals. (NEWTON, 2007). We standardized the width of the transections and their length varied agreeing with the dimensions of each patch. The transection in Carrancas (Patch 1) had the dimensions of 30×150m and in Lavras (Patch 2), 30×100m. We subdivided each transection at each 10m lengthwise forming subplots of 30×10m, inside which we measured all the living individuals of *C. clusiifolia*, consisted in the height and their position inside the transection through a system of X-Y coordinates. We made the transections subdivisions to facilitate the sistematization of the coordinates e to establish gradations in between the borders of each fragment.

According to the data obtained and the observations during the field work, we distributed the individuals into five classes of height: <15cm; >15 to 30cm; >30 to 100cm; >100 to 300cm; and >300cm. We chose those classes so that they considered an approximate distribution of the individuals in the phases of development as seedling, regenerating, juvenile, pre-established and established. This is to relate the density of individuals in these classes to historical parameters of the population such as recruitment and susceptibility to disturbances. (NEWTON, 2007). The normality of the data for each class was followed by the quadratic exponential correction of the data which the latter do not possess normal distribution. We did a Chi-Square test to verify whether the distribution of the individuals differ from the expected proportion from the same individuals in each plot. We analyzed the partition of Chi-Square in association with the waste test to verify whether abundances of individuals from different classes of development differed throughout the transects (AYRES et al., 2007). We compared the classes among the patches through a bar chart, and among the subplots of each patch, through a line chart. In order to compare the spatial pattern of the individuals among patches and among classes, verify its horizontal distribution and relate the results to the events that may have caused the patterns obtained (NEWTON, 2007; DURIGAN, 2009), we used the Ripley K function (RIPLEY, 1977). Then we utilized the univariate function for testing the deviations in relation to the Complete Spatial Randomness (CSR) through Confidence Envelopes at 99.9% with 499 Montecarlo simulations which points out whether the individuals are distributed in an aggregated, random or uniform way. In this method, the function K changes into L(t), according to the formula:

$$L(t) = \sqrt{\left(\frac{K(t)}{\pi}\right)} - t$$

By varying the radius (t) it is possible to detect spatial patterns at different scales (CAPRETZ et al., 2012), returning the value 0 for any value of t on the hypothesis of complete spatial randomness (DIGGLE, 1978). We performed these analyzes using the R software, version 2.15.2 (R Core Team, 2012) and Spatstat package (BADDELEY, TURNER, 2005).

RESULTS

In patch 1, 447 individuals were sampled, which is equivalent to an absolute density of 933,33 individuals per hectare. In patch 2, a total of 53 individuals were sampled, corresponding to a 176,67 individuals per hectare. Proportionally, patch 2 presented 18,93% of the number of individuals of patch 1. Comparing the classes of height between the two patches, it is noticed that patch 1 presented a greater number of individuals in all the classes, with greatest absolute density in the class >15 to 30cm (Figure 3). The lowest density was found in class >100 to 300cm, exactly the class where patch 2 presented the greatest density. It is relevant to remark that patch 1 presented a high density in the class which encompasses the individuals larger than 300cm and, thus, already established. At the same time, it is realized that there is a high recruitment of individuals in the population, found through the high density in the smallest class. An opposite pattern was observed for patch 2, where there is low density in the largest class and where the class of individuals smaller than 15cm is absent, there being none of that size.

By the Chi-Square test, we found that the number of individuals observed in the height classes differ significantly from what was expected for each plot in patch 1 (Table 1). The abundances of individuals by height classes also differed significantly along the transect ($X^2_{0,05,\ 56} = 261,5$; p < 0,0001). So, when compared, the distributions of the individuals in the classes has a certain tendency related to the environment is found. The classes <15cm, >15 to 30cm and >30 to 100cm possess a preferential distribution for areas of interior (Figure 4).

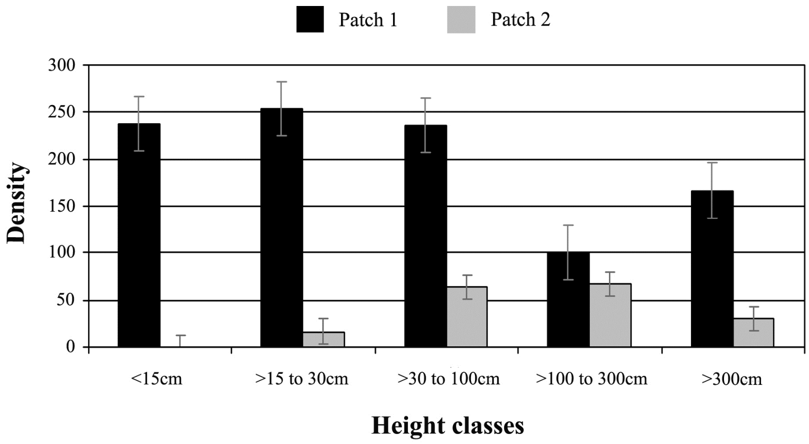

Figure 3. Distribution of the density per hectare of individuals of *Calyptranthes clusiifolia* in classes of height in two forest patches located in the Upper Rio Grande Basin, Southern Minas Gerais State.

Table 1. Comparison between the number of observed and expected individuals of *Calyptranthes clusiifolia* in two forest patches located in the Upper Rio Grande Basin, southearn Minas Gerais State.

		Plots											
		P1	P2	P3	P4	P5	P6	P7	P10	P11	P12	P13	P14
Patch 1	P1	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx
	P2	ns	xx 0.032	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx
	P3	ns 0.019	1 0.009	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx
	P4	5 0.000	5 0.000	ns 0.002	xx	xx	xx	xx	xx	xx	xx	xx	xx
	P5	2	2	6	ns	xx 0.025	xx	xx	xx	xx	xx	xx	xx
	P6	<0.01	<0.01 0.000	<0.01 0.000	ns	7	xx	xx	xx	xx	xx	xx	xx
	P7	<0.01 0.001	3 0.003	7 0.013	ns	ns	ns 0.031	xx	xx	xx	xx	xx	xx
	P10	3	9	8	ns	ns	6	ns	xx	xx	xx	xx	xx
	P11	<0.01 0.002	<0.01 0.001	<0.01	ns	ns	ns 0.037	ns	ns	xx	xx	xx	xx
	P12	8 0.043	8	ns	ns	ns 0.048	6	ns	ns	ns 0.023	xx	xx	xx
	P13	7	ns	ns 0.020	ns 0.004	6	0.023	ns <0.0	ns 0.001	3	ns 0.000	xx	xx
	P14	ns 0.000	ns 0.043	2	7	<0.01	<0.01	1 <0.0	7	<0.01	2	ns <0.0	xx 0.02
	P15	2	1	<0.01	<0.01	<0.01	<0.01	1	<0.01	<0.01	<0.01	1	9
Patch 2	P1	xx	xx	xx	xx	xx	xx						
	P2	<0.05 0.001	xx 0.013	xx	xx	xx	xx						
	P3	6	8	xx	xx	xx	xx						
	P4	ns 0.023	ns	<0.05 0.018	xx	xx	xx						
	P5	4	ns	2 0.018	ns	xx	xx						
	P6	ns	ns	3	ns	ns	xx						
	P10	ns	ns	ns	ns	ns	ns						

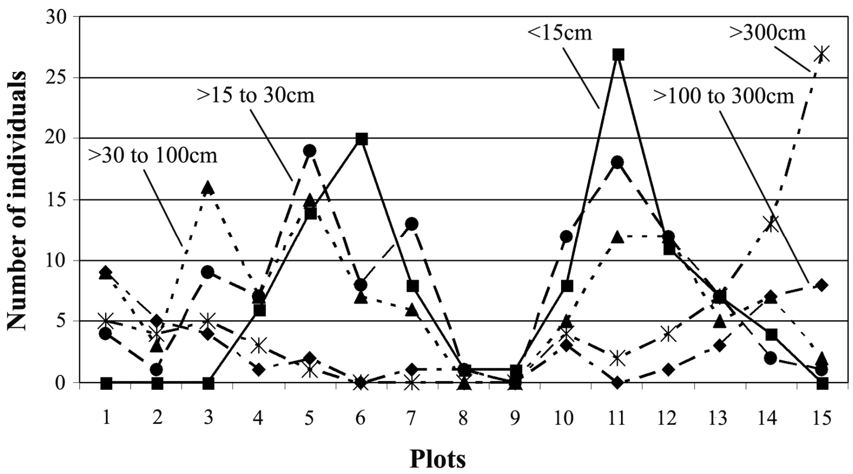

Figure 4. Distribution of individuals of *Calyptranthes clusiifolia* along the plots sampled in patch 1, located in Carrancas, southearn Minas Gerais State.

Considering the perpendicular trace to the watercourse in relation to the patch, we found that it crosses the plots 8 and 9, which does not provide the establishment of the plants. That fact can be found observing the greatest number of individuals of these classes in a region situated between those places and the edges. The opposite prevails for the classes with larger-sized individuals that have preferential occurrence in the ends of the patch.

By using the Chi-Square test, for patch 2 we also found significant differences between the number of observed and the expected individuals for the classes of height in each plot (Table 1), and throughout the transection ($X^2_{0,05,\ 36}$ = 44,1; $0,02<p<0,05$). However, we could not find any clear tendency of distribution of individuals in the classes along the plots which can be due to the anthropic conditions of fragmentation (Figure 5). What is remarkable here is the low number of individuals in the population and the absence of lower height class, which includes regenerating individuals, besides the absence of individuals in the area subject to flooding.

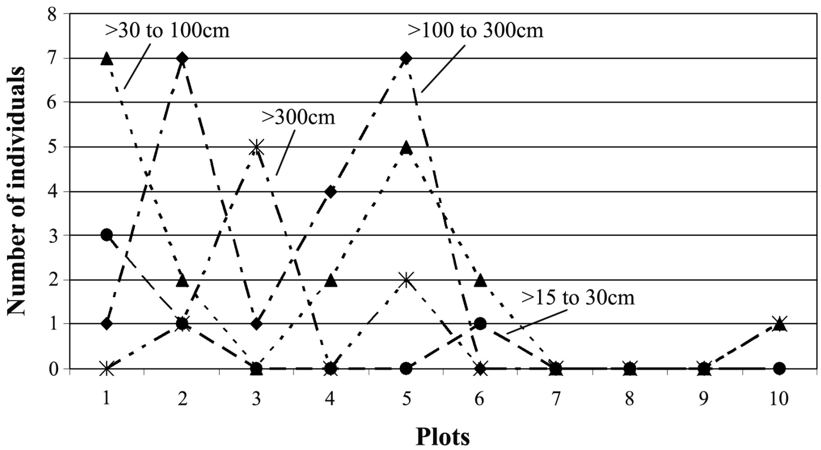

Figure 5. Distribution of individuals of *Calyptranthes clusiifolia* along the plots sampled in an patch 2, located in Lavras, southearn Minas Gerais State.

About the spatial distribution of the individuals, the patch 1 presented aggregated distribution pattern, the same verified in the patch 2 (Figure 6). All the classes of height presented aggregated distribution pattern in patch 1 (Figura 7). Nevertheless, we did not clearly verified an aggregation pattern for the classes of height in patch 2 (Figure 8), because there are only four of the classes evaluated and these do not present parameters which allow inferences about the natural patterns of the species. The smallest class observed, which houses individuals larger than 15cm up to 30cm, contains only five individuals and we could not perform the analysis. The class >30 to 100cm presented an increased number of individuals in an random pattern. The class >100 to 300cm has its individuals distributed in the first five subplots and presented a pattern that oscillates between aggregate and random. The class of individuals over 300cm also possesses a randomized spatial distribution pattern. However, the nine individuals of this class do not provide statistic support to the observed pattern.

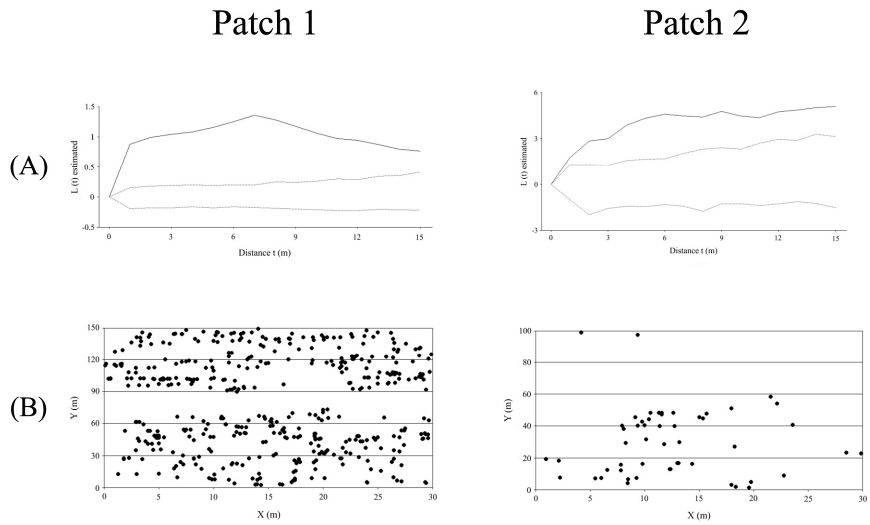

Figure 6. Spatial pattern of the individuals of *Calyptranthes clusiifolia* in two forest patches located in the Upper Rio Grande Basin, Southern Minas Gerais State. (A) Spatial pattern in which: L(t)=0 = random; L(t)>0 = aggregated; L(t)<0 = uniform. (B) Spatial distribution of individuals in which X and Y are the dimensions of the transect in meters.

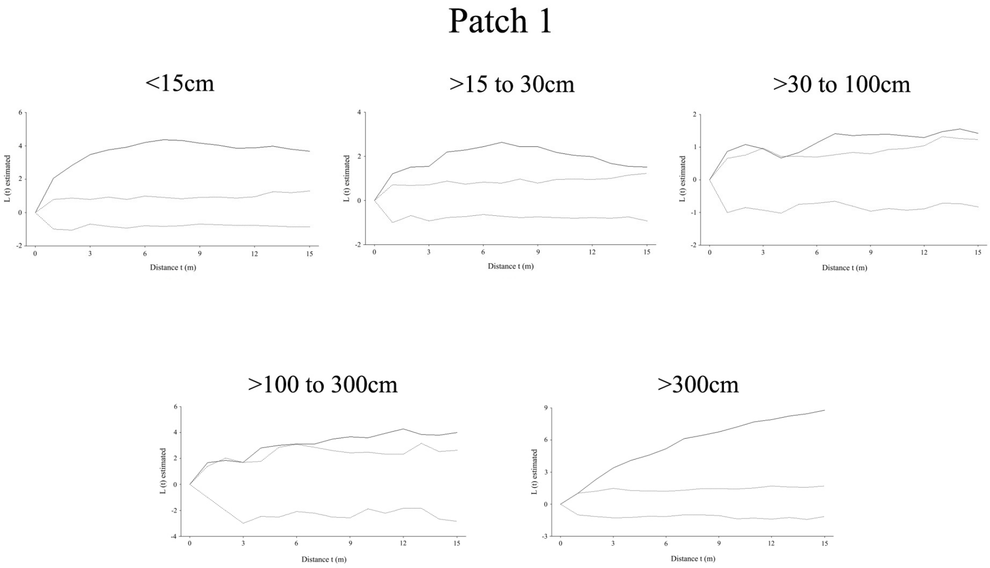

Figure 7. Spatial pattern of the individuals of *Calyptranthes clusiifolia* in different height classes in patch 1, located in Carrancas, Southern Minas Gerais State.

Patch 2

>30 to 100cm >100 to 300cm >300cm

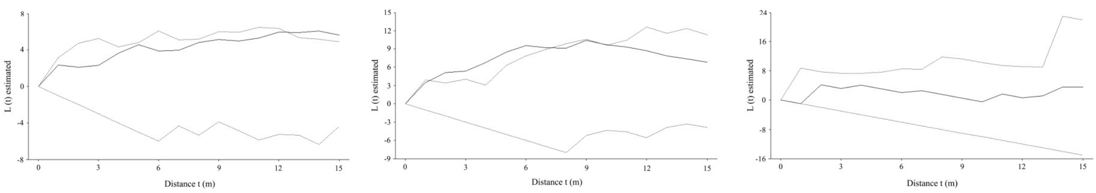

Figure 8. Spatial pattern of the individuals of *Calyptranthes clusiifolia* in different height classes in patch 2, located in Lavras, southearn Minas Gerais State.

DISCUSSION

The patch 1 presented a number of individuals 5,28 like the patch 2. Cerqueira et al. (2003) and Oliveira Filho et al. (2007) state that the decrease of the area of a favorable habitat for a given species takes to a decreased regional abundance of that species, since the decrease of aptitude means decreased survival and reproduction rates. These authors also suggest that the absolute density of species is proportional to the quality of the habitat, with better habitats housing larger absolute densities. The number of individuals in patch 1 is greater in all the height classes compared to patch 2. The greatest density in the shortest class and the high density in the classes of individuals established were also found by Arantes and Schiavini (2011), who found a similar pattern for the population of *Amaioua guianensis* Aubl. in an urban seasonal semideciduous forest patch in Uberlândia, Minas Gerais State, where the species presented a great representativeness of individuals both in the regenerative and the tree stratum. For patch 1, the number of individuals in the different classes suggests a quite structured population. The population presents a great number of individuals considered established, revealing an adult population and at the same time there is a great amount of regenerating individuals that can keep their structure along the years, consisting in a reproductive strategy, since many individuals will not reach the adult phase due to the action of a number of processes such as predation and competition (FELFILI, 1997; SALLES; SCHIAVINI, 2007).

The inverse reasoning can be done for patch 2. The population of that patch presents a few established individuals and insufficient amount of seedlings, suggesting that the disturbances reach directly the lower stratum, consisting of a decreasing population (SALLES; SCHIAVINI, 2007). That structure is common in anthropized environments, because the little representativeness of the individuals in all the age classes of a population increases with the impact intensity (MARCOS; MATOS, 2003; NEWTON, 2007). Felfili and Silva Júnior (1988) further state that when the interruption occurs in some class it is possible to detect the existence of disturbances which were undergone by the species at some point of the period of succession. In this case, the low density of the species may be even more serious when analyzing the results of the study by Pinto et al. (2005). These authors found great abundance of regenerating individuals of C. clusiifolia in degraded sources, considering that the fragment 2 also features conditions of humidity and degradation.

About the distribution of the individuals in the classes and in the different sectors of patch 1, there are clues that the adult individuals of *C. clusiifolia* prefer the edges environment, as other authors suggest (SOUZA et al., 2003; CARVALHO et al., 2007; OLIVEIRA FILHO et al., 2007). According to the authors, that is due to the fact that this species is typical of drier environments and subject to the edge effects. Nevertheless, that is likely to occur only in patches which possess disturbances of less intensity or where there was enough time for the establishment and adaptation of the species, so it cannot be found in patch 2. In this patch the disturbances are intense and show that the environment is already quite modified by them, which could be acting upon the population structure through modifications in the environment which would be more adequate to its development (NEWTON, 2007; DURIGAN, 2009).

Salles and Schiavini (2007), quoting other authors (GUARIGUATA, 2000; MESQUITA, 2000; GUARIGUATA; OSTERTAG, 2001), mention the temporal variations in the environmental conditions as differentiating agents among individuals of different strata, emphasizing that the regeneration process is strongly influenced by the anthropic use, that affects the resources available for the individuals with potential for establishment (AIDE et al., 1995; HOLL, 1999; PASCARELLA et al., 2000; NEWTON, 2007). Many anthropic factors can be acting upon the age structure of the population in patch 2. The great amount of trails and cattle feces in the areas where the population was sampled points out a high trampling intensity, which can be responsible for the absence of individuals less than 15cm tall, since a high trampling degree can influence both in the speed and in the possibility of recovery of the structure of the community (NEWTON, 2007; SALLES; SCHIAVINI, 2007), statement which can be extrapolated to populations. According to Durigan (2009), one of the means of inhibiting the germination of trees and which affects the species population structure is the existence of a large amount of herbivores capable of eliminating seedlings when they germinate, which occurs in the area probably due to the cattle that goes in the fragment. So, species susceptible to that impact present a high mortality of individuals and poor establishment of seedlings, which causes the reduction in the size of their populations (SAMPAIO; GUARINO, 2007). The individuals can be having difficulties to establish themselves, which can be the cause of the irregular distribution pattern in the height classes, taking into account that only the classes >15 to 30cm and >30 to 100cm.

It is not possible, then, to infer about an edge-interior pattern for the species in that patch, it can be concluded that only flooding which occurs from the final part of the plot is unfavorable to the establishment and that, due to the conditions which disfavor the establishment of individuals of the smallest classes, the population in issue will come into decline. In the case of persistence of the adverse conditions, the population will still take a great deal of time to regenerate, since the speed of recovery of ecosystems depends, among other factors, on the presence of seedlings to provide the establishment of individuals (BROWN; LUGO, 1990; TABARELLI; MANTOVANI, 1999; PASCARELLA et al., 2000; GUARIGUATA; OSTERTAG, 2001; SALLES; SCHIAVINI, 2007; GHAZOUL; SHEIL, 2010). The opposite was found by Carvalho et al. (2009) for seven populations of adult tree species in an area close to the study sites, in Luminárias municipality, in southern Minas Gerais State. The authors consider that the populations presented in a balanced structure due to the absence of evidences of anthropic disturbances, because the latter result into the physiognomic decharacterization of the vegetation. Other factor pointed out by those authors as diagnostic agents of structural the decharacterization of populations, is the alteration of the recruitment patterns of individuals, which was verified in a quite striking way for patch 2 through the non-observation of what would be a natural pattern expected for the species, as it occurred in the patch 1.

In relation to the aggregation of individuals in patch 1 there is a great number of individuals in all the age classes. In this patch there was an increased level of aggregation of individuals of the largest classes close to the edges could be found, which is appropriate to the pattern of heliophytic species, already reported for adult individuals of *C. clusiifolia* (LORENZI, 1998; SOUZA et al., 2003). The opposite was found for the smallest classes, which possess increased aggregation of individuals in the interior of the patch, tending towards a larger closeness of the watercourse, situation in which occur more stable conditions of luminosity and humidity (LAURANCE; BIERREGAARD, 1997; NEWTON, 2007; GHAZOUL; SHEIL, 2010).

According to Hubbell (1979), that distribution is common in species which present “points of origin”, which are sites where there are high population densities surrounded by areas of lower density. Marques and Joly (2000), studying both the dynamics and structure of *Calophyllum brasiliense* Camb., a tree species typical of riparian environments, found that the points of origin should be represented by the groupings of seeds and seedlings in the depression, or under adult individuals. In the case of *C. clusiifolia*, that pattern seems to be evident for the patch 1, with the largest distribution of young individuals in the interior, where there are more stable environmental conditions and with the largest proportion of adult individuals on the edges, an environment which supports the establishment of the species at this development stage (SOUZA et al., 2003; CARVALHO et al., 2007; OLIVEIRA FILHO et al., 2007). In the two situations, the population would keep its aggregated pattern, which is common in animal-spread species and consists in the attractive convergence of the individuals to certain parts of the environment (JANSEN et al., 1976; BEGON et al., 2007).

For patch 2, due to the same reasons exposed for the alterations on the patterns of the height classes, we could observe for the spatial distribution, which do not agree with those observed for the populations of the same species in patch 1. The three height classes that we analyzed showed few individuals, what hampered a more detailed analysis of what would be a consistent spatial pattern compared with a natural situation (DURIGAN, 2009). We found an aggregated distribution which was possible merely assessing the population as a whole. So, we cannot expect a structural pattern from the population of patch 2, for disturbance factors, such as cattle presence, coppicing or logging or fires, and other factors which can occur in an anthropized area, harm significantly the predictability of the populations on the basis of point samplings (CARVALHO et al., 2009).

We emphasize that anthropogenic disturbances such as those observed in fragment 2 greatly affect the structure of plant populations because they act directly on the natural regeneration which may even endanger the local occurrence of the species (NEWTON, 2007; DURIGAN, 2009). We observed the opposite in relation to the parameters of patch 1, there are evidences that the sampled population is quite representative of what would be a population of the species under natural conditions. This fragment has population parameters that favor the persistence of the species in the area due to the large amount of regenerating and established individuals (NEWTON, 2007; DURIGAN, 2009). We must consider the aggregate pattern that all classes presented, since the colonization of favorable habitats is one of the factors that conditions it (DURIGAN, 2009). As there are no great discrepancies between the habitats of the two fragments, except for the occurrence of anthropogenic disturbances in fragment 2, we consider that the fragment 1 presents optimal conditions for the establishment, development and permanence of species, since the spatial pattern of mature individuals reflects the pattern of recruitment in these circumstances (DURIGAN, 2009). The parameters observed for the population of C. clusiifolia in this fragment characterize it as structured and highly maintainable, in opposite to what observed in fragment 2, which showed an unstructured population without sufficient individuals to be treated as a regenerating population.

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RESUMO: Este trabalho teve como objetivo estudar a estrutura de duas populações de *Calyptranthes clusiifolia* em dois fragmentos de Floresta Estacional Semidecidual sob diferentes condições de antropização. Em cada fragmento foram estabelecidas transeções onde todos os indivíduos vivos da espécie foram amostrados. Os indivíduos foram distribuídos em classes de altura, sendo também avaliada a sua distribuição espacial. Constatou-se que o primeiro fragmento possui um número de indivíduos 5,28 vezes maior que o apresentado pelo segundo fragmento. O primeiro fragmento apresentou grande número de indivíduos em todas as classes etárias e distribuição espacial agregada. Houve maior concentração de indivíduos adultos nas bordas, condizendo com o padrão heliófito da espécie, e maior concentração de indivíduos jovens no interior. Já o fragmento antropizado apresentou um padrão desestruturado, com indivíduos insuficientes para que a população seja caracterizada como em regeneração, pois nele há indícios de perturbações passadas e presentes que interferem no estabelecimento e permanência da espécie na área.

PALAVRAS-CHAVE: Ecologia vegetal. Fragmentação Florestal. Mata Atlântica.

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