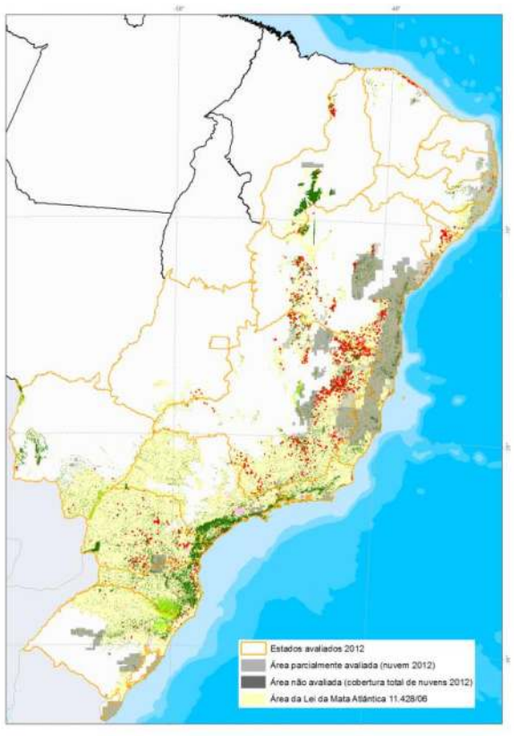
The use of multivariate analysis in the evaluation of mosaics of forest vegetation relating to soil attributes and edge effect

ABDO, M.T.V.N.[1], VALERI, S.V.[2], FERRAUDO, A.S[2], SOUSA NETO, J.[3], SOARES, M.B.B.[1], SANTOS, G.X.L.[1] , OLIVEIRA, M.S.[4], CORDEIRO JUNIOR, P.S.[2], BETTINI, B.A.[5], MARTINS, M.H.[1].Institutions: 1- APTA, Pindorama, Brazil; 2- UNESP, Jaboticabal, Brazil; 3- UNIRP, São José do Rio Preto, Brazil; 4- UNIFEB, Barretos, Brazil; 5- UFSCAR, Araras, Brazil. (Corresponding author: mtvilela@terra.com.br)

INTRODUCTION

Atlantic forest biome in Brazil has high biodiversity that is threated due to fragmentation and its remnants retain important residual flora that should be preserved. Over the years the forest surface of this Biome represents 7% of the original forest .Studies of environmental conditions that influence species occurrence in those areas are very important to preserve them. Multivariate statistical analysis can be a useful tool in the analysis of forest remnants as it allows exploratory data analysis and provides simultaneous interpretation of several variables that influence the ecological processes or provide relevant information about them. Multivariate analysis techniques can be very helpful to explain vegetation mosaics and species interactions in surveys for forest evaluations.



Atlantic Forest Original and left surface

Source: Anne Fontaine Fundation
http://www.annefontainefoundation.org

Fig.1. Atlantic Forest Biome occurrence (SOS Mata Atlântica, 2013)

METHODS AND MATERIAL

The Biological Reserve, Pindorama-SP, Brazil has 131 ha of forest remnants, classified as seasonal semideciduous forest that were characterized by soil attributes and vegetation data using different techniques of multivariate statistical analysis .

Fig. 2. Overview of the Pindorama Biologic Reserve

RESULTS AND DISCUSSION

Hierarchical clustering separated 62 plots from two toposequence in two major groups of plots and five subgroups according to similarity based on vegetation parameters (Figure 3).

Principal component analysis was used to verify correlation between each vegetation characteristic(Figure 4)

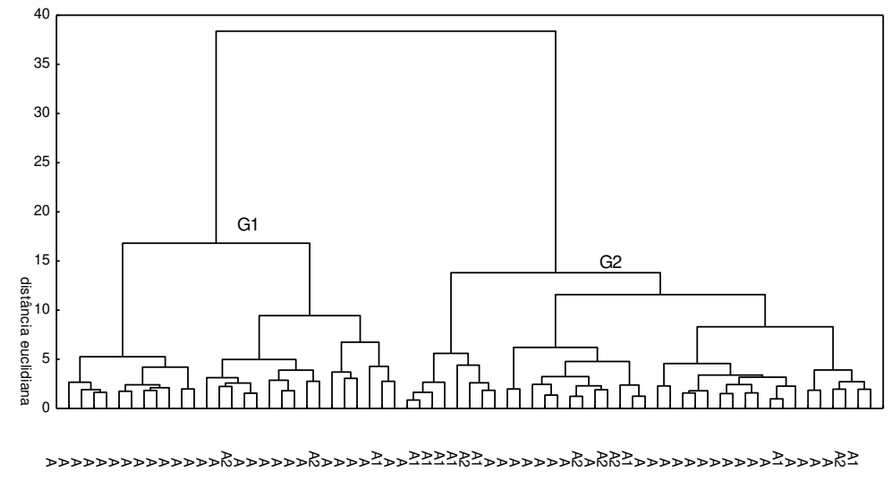


Fig.3 Dendrogram with the structure of two parcels groups - G1' e G2' and 5 sub-groups (G1, G2, G3, G4 e G5) based on trees attribbutes in two toposequences, Pindorama Biological Reserve, Pindorama-SP-Brazil.

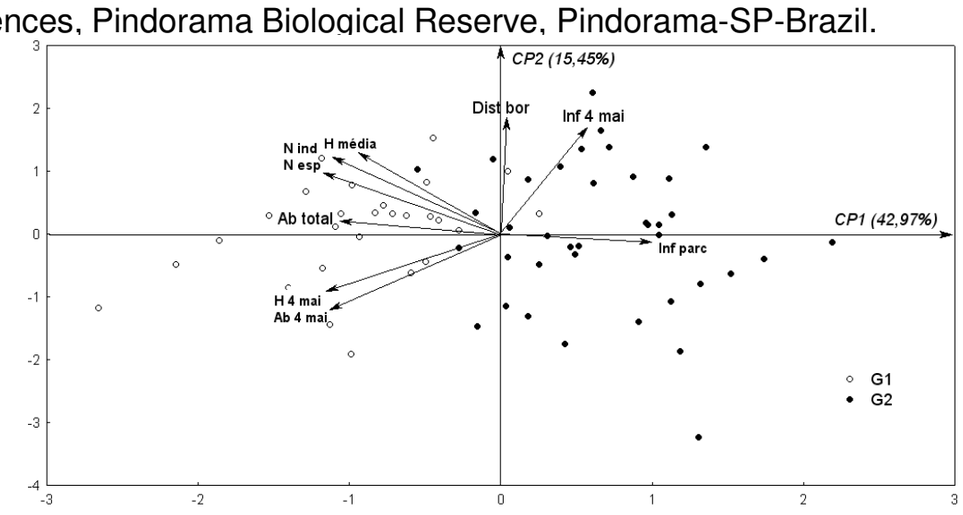


Fig.4. Two-dimensional graph of principal components 1 and 2 showing plot distributions (G1 and G2) and vegetation characteristics.

Table 1. Correlation between each vegetation characteristic and a major component where N species = number of species per plot, N ind = number of individuals per plot, Total Ba = total basal area per plot, H mean = average height of all individuals per plot, Plot Inf = degree of infestation per plot, Edge dist= distance from edge plot, H 4 larger = average height of the 4 largest trees in the plot, Ba 4 larger = basal area of the four largest trees in the plot, Inf 4 larger = average infestation of four largest trees.

CHARACTERISTIC	PC1	PC2
N specie	-0,71	0,30
N ind	-0,76	0,28
Total Ba	-0,74	0,02
H mean	-0,66	0,37
Plot Inf	0,74	-0,06
Edge dist	0,00	0,68
H 4 larger	-0,80	-0,33
Ba 4 larger	-0,69	-0,34
Inf 4 larger	0,36	0,63

In PC1 the variables plot infestation and four largest trees (positive correlations) contrast with the variables N of species and individuals, Ba and H mean of the plots and the four largest trees presented negative correlations.

In PC2 the variables distance from the edge, infestation of the four largest trees, average plot height with positive correlations in contrast with basal area and H of four largest trees and plot infestation that have negative correlations.

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Apoio

Realização

APTA Regional | Agência Paulista de Tecnologia dos Agronegócios | SÃO PAULO GOVERNO DO ESTADO | Secretaria de Agricultura e Abastecimento