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THE INFLUENCE OF LIMESTONE EXPLOITATION FROM MATEIAŞU MOUNTAIN (SOUTH ROMANIAN CARPATHIANS) ON FLORISTIC COMPOSITION

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ABSTRACT. Cenote affinities of the species identified in the six areas of evidence allow us to detemine the degree of similarity and difference between these surfaces. Affinity between sample surfaces with deciduous vegetation is the largest index calculated with the lowest values - 33.33. This figure shows that deciduous affected area suffered a much smaller impact than the other two surfaces. Coenotic lowest affinity for surfaces occurs in coniferous vegetation, P3 and P6. Human impact on affected area near career led to drastic changes in the composition of normal specific, which led to a change in the physiognomy of the vegetation groups in relation to vegetation control surface.

Keywords: limestone mining, cement factory, floristic

INTRODUCTION

Limestone quarry operation in Mount Mateiaşu (Delhi Muscel), whose activity is planned for the period 1999-2018 and cement plant located at a distance of 300-400 meters from the quarry is affecting all forms of life, soil, air, water, and plant and animal biocenotic components. Beside these,it is also influenced floristic composition of the limestone extraction area and adjacent areas. In general, any surface mining operations generate dust and various chemicals depending on which minerals are extracted and this is a constant source of pollution. From the existing data in the literature is known that the dust coming from the limestone quarries contain up to 97.5% calcium carbonate,along with free silica, silicates and iron oxides - approx. 2.50%. Besides these compounds, cement plants, which are usually close to quarries,are releasing other pollutants into the atmosphere as lime, with the largest share, silicon dioxide, aluminum trioxide and others, and gases such as sulfur dioxide and chlorine in small amounts, about 1.5% and 0.05% respectively. At the Mateiaşu limestone quarry, cement factory is equipped with specific filters for powder collection, as required by law. Current legislation is drastic, so many of these compounds are retained by special filters.

MATERIALS AND METHODS

Abstract vascular flora of the Mateias was compiled based on personal research in the field and laboratory information from botanical literature, taken critically, as the nomenclature of "Flora Europaea". The research was conducted during the 2012 growing season (May-September) in six areas of evidence: three control surfaces, located at about 2, 3 kilometers from quarry (grassland, deciduous forest, coniferous forest), noted still as P2 and P3 and three surfaces near the Mateias career, under the direct inflence extraction of limestone (grassland, deciduous broadleaf forest, coniferous forest), still denoted by P4, P5 and P6. Were performed six field searching opportunities, in which it were performed every time phytocenologic surveys. Assessing quantitative indices (abundance-dominance) was in the Braun-Blanquet scale (with increments to + 5) and percentage:

5 covers	75-100%	of the average 87.5%
4	50-75%	62.5%
3	25-50%	37.5%
2	10 - 25%	17.5%
1	10- 5%	5%
+	Under 1%	0.5% %

Knowing the degree of similarity between samples investigated is particularly important because the similarity indices can assess the overall homogeneity of the reports and therefore intercenotică variability of plant groups is harder to understand by conventional analyzes. Moreover, by using these indices can be known the dynamic trends of phytocenosis.The data were processed in Microsoft Office Excel 2003 and to establish similarity between sample surfaces, we used free software Biodiversity Pro.Using coenotic affinity index, which reflects a biocoenosis links between species, we can estimate the degree of affinity between samples investigated. To highlight the cenotic affinity can be used several qualitative similarity indices. In determining the degree of similarity between the sample surfaces were used Bray-Curtis index and Jaccard index. By calculating the Bray-Curtis dissimilarity index, which takes into account the presence or absence of species, and the number of species in each sample is obtained by calculating the matrix Bray-Curtis dendrogram on cenotic affinity. The

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name of the state derives from the authors J. Roger Bray and John T. Curtis. Bray-Curtis distance between two samples is to assess disimiliarities data, depending on the abundance of species present in each sample. This distance is non-Euclidean.

RESULTS AND DICUSSIONS

The fundamental objectives of this work was to obtain data on the influence of limestone dust, resulted from the ore blasting process from Mount Mateiaşu and other products released into the atmosphere in the cement, the floristic composition of the six surfaces investigated: three in quarry area (coniferous, deciduous, grassland) and three in the control group (coniferous, deciduous, grassland), located at a distance of 3 km from the quarry. The observed clustering dendrogram of three cores: P2 to P5, P1, P4, P3 to P6, meaning groups of deciduous vegetation, grassland, coniferous respectively.

Stage	Group	Distance	Similarity	Pair 1	Pair 2
1	5	33,33333206	66,66666794	2	5
2	4	64,83516693	35,16483307	1	4
3	3	72,22222137	27,77777863	3	6
4	2	84,61538696	15,38461304	1	3
5	1	85,7142868	14,2857132	1	2

Similarity matrix

	P 1	P 2	P 3	P 4	P 5	P 6
P 1	*	2,3529	5,3333	35,1648	0	6,1538
P 2	*	*	14,2857	0	66,6667	13,0435
P 3	*	*	*	6,4516	8,5106	27,7778
P 4	*	*	*	*	0	15,3846
P 5	*	*	*	*	*	10,8108
P 6	*	*	*	*	*	*

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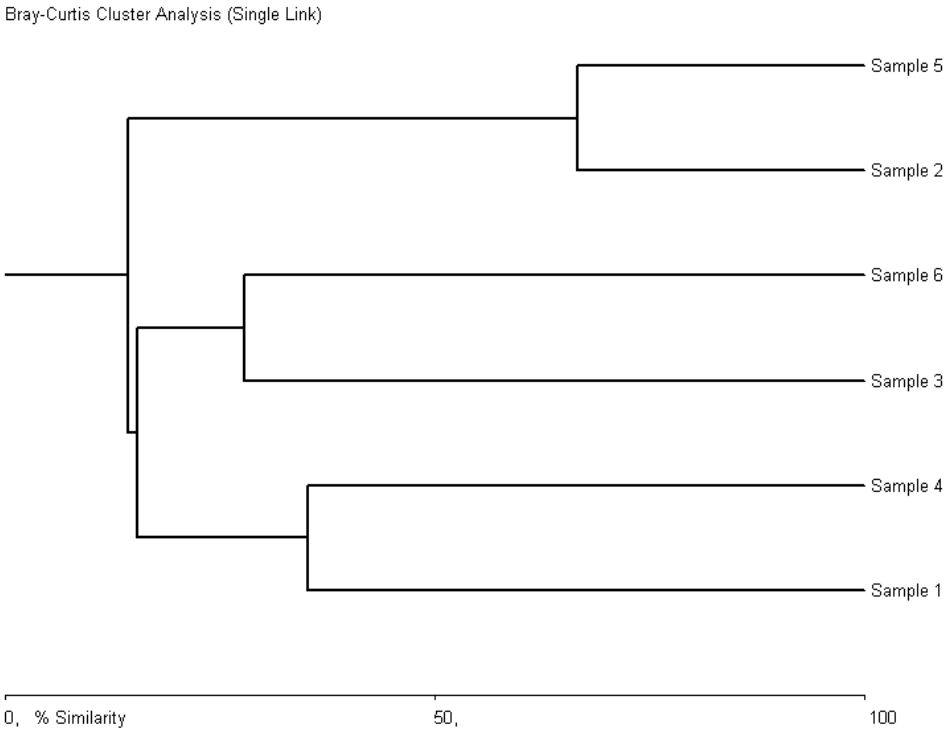

Fig.1 J Bray-Curtis dissimilarity dendrogram of sample surfaces after the number of the species

Unlike Bray-Curtis index, Jaccard index is based only on the presence / absence of species components of the samples analyzed.After Jaccard index, the highest similarity was between two sample surfaces with 5 - deciduous vegetation (50%) but was significant similarity between areas of grassland vegetation sample (21.33%). Lowest similarity corresponded to those found on coniferous vegetation areas (16.13%).

Stage	Group	Distance	Similarity	Pair 1	Pair 2
1	5	50	50	2	5
2	4	78,66666412	21,33333588	1	4
3	3	83,87096405	16,12903595	3	6
4	2	91,66666412	8,333335876	1	3
5	1	92,30769348	7,692306519	1	2

Similarity matrix

	P1	P2	P3	P4	P5	P6
P1	*	1,1905	2,7397	21,3333	0	3,1746
P2	*	*	7,6923	0	50	6,9767
P3	*	*	*	3,3333	4,4444	16,129
P4	*	*	*	*	0	8,3333
P5	*	*	*	*	*	5,7143
P6	*	*	*	*	*	*

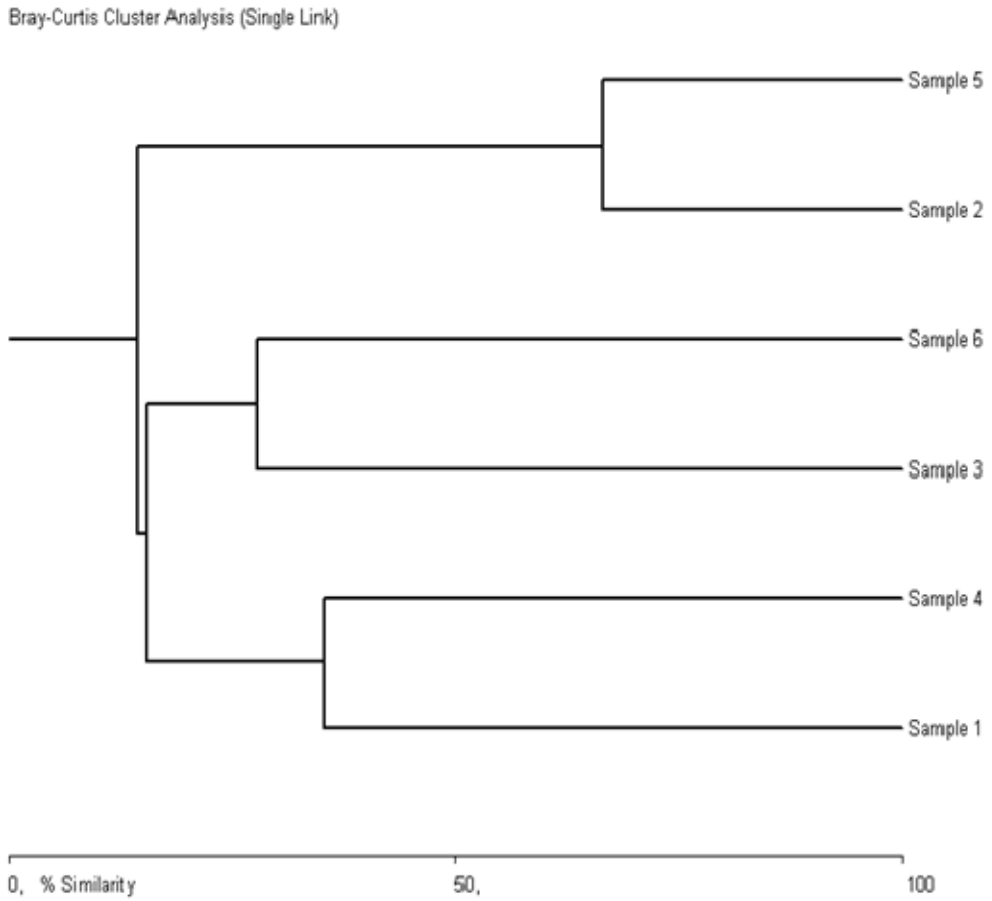

Fig. 2 Jaccard dissimilarity dendrogram of sample surfaces after the number of the species

CONCLUSIONS

Taxonomic analysis:

In the six sample areas were identified 130 species of vascular plants, most (P1 = 50) in control surface praticol vegetation, the fewest (P6 = 13), the affected area with coniferous vegetation. Affected area with most species is P4 = 39 praticol vegetation. In winess surface withl praticol vegetation (P1) was identified the Festuco rubrae-Agrostetum capillaris Horvat 1951 association, framed in habitat association "mountain hayfields 6520 [Mountain hay meadows]". This area is well-knit, with a core characteristic species printing type grassland vegetation. In the affected area, specific variability is much greater, unable to identify a group of species with characteristics Cenote.

In the area of deciduous vegetation witness was identified association Festuco drymejae-Fagetum Morariu et al. 1968, framed in habitat association "type beech forests 9110 Luzulo-Fagetum [Luzulo-Fagetum beech forests]"

The two sample surfaces with deciduous vegetation, reducing the number of species observed, from 34 to 18, and replacing plant species characteristic groups nemoral deciduous species of Poaceae and Fabaceae families with no affinity for such vegetable species .Number of species identified in sample areas with conifers decreases from 26 in the surface of the sample to 18 in the affected area, where only three families, Rosaceae, Lamiaceae and Euphorbiaceae are represented by more than one species.

Analysis bioforms:

Hemicriptofite number decreases in the affected area, which illustrates the degradation of the vegetable group. Also, the increased percentage of terofites presence indicates a strong anthropogenic influence in affected area. Regressive evolution of this type of vegetation in the affected area is indicated by replacing grassland with shrub species of Crataegus monogyna.On deciduous vegetation in the affected area (P5) is observed decline in species hemicriptofite percentage (59%) but significant is the presence of higher weight, shrub species (mezofanerofite), especially after depletion installed tree by deforestation (25%).Regarding coniferous vegetation in the affected area,we can observe decrease of herbaceous layer as well as the wood one. Instead, we can see in a high percentage terofites, category signifying a climate more or less arid and a higher human intervention in the vegetation in this area.

Geoelements analysis

Comparing the witness surface, it appears that in the affected area, Eurasian species that form the basic background in most types of vegetation in our country,

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the category that best represented in cormoflor type, is decreasing, allowing species from Central Europe to have a biger impact.Affected area of nemoral deciduous vegetation (P5),is visible in decline in the Carpathian-Balkan species and in the number of species in the core of the plant groups: Eurasian European and Central Europe.Observations made in pine forests under study illustrates pronounced decrease of Eurasian and Central European species, while increasing the number of European species in the affected area.

Ecological Analysis

Depending on the soil moisture factor (U), we can see: AT the affected area of grassland, the indicator species observed were increasing in dry weight (xero-mesophile and xerofile), decreasing in species with moderate affinity (mesophilic) in the affected area (P4). Eurihide species have the largest share in the control area (P1).

In the sample surface of nemoral deciduous vegetation,the species are mesophilic and mezohigrofile majority due to canopy fitted together to make the humidity to be kept better than in the affected area where the tree layer is much lower, its crown as the minimum (0.5 to 0.6), the prevailing low waist shrub species (mezofanerofitele). In both areas we can see a shortage of eurihidre species (amfitolerante). In Pineta, mesophilic affinities are more evident in the affected area, but the number of species mezoxerofile is decreasing drastically. Factor depending on temperature (T): At the affected area of grassland (P4) the number of species adapted to a micro-mesothermal gradien is increasing, euriterme species being majority in control surface (P1). In witness surface of nemoral deciduous flora (P2) the micromezoterme and microterme species are predominant. Affected area have fewer of these species from both environmental groups, however, amfitolerant species that supports large variation of temperature are present.In Pineta, species micro-mesothermal and microterms are found in both surfaces of the sample, indicating that in affected area, are install three species euriterms (amfitolerants). Depending on edaphic factor (R):To the affected area of grassland (P4) is noticeable decrease in the number of species with affinities acid-neutrophil in affected area (P1). Euriionice species (amfitolerante) remain the dominant control surface (P1). In witness surface of nemoral deciduous vegetation (P2) affinity-acid and low-acid neutrophils neutrophil are the dominate species, and a number of species euiionice.In the affected area (P5), predominate the same category of species, but with a lower weight. Are also present euriionice species.In Pineta, substrate determines the adaptation of most species towards neutrophil-acid, weak acid, neutrophil, and acidophilous in both sample surfaces.Coenotic affinity between sample surfaces with deciduous vegetation is greatest, the Bray-Curtis index and Jaccard calculated with the lowest values: 33.33. This figure shows that deciduous affected area suffered a much smaller impact than the other two surfaces. Coenotic lowest affinity for surfaces occurs on coniferous vegetation, P3 and P6. Human impact on affected area near career led to drastic changes in the composition of normal specific, which led to a change in the physiognomy of the vegetation groups in relation to vegetation control surface.

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