

ANALYSIS OF ENVIRONMENTAL FACTORS IN SOME ECOSYSTEMS BY STUDYING THE DISTRIBUTION OF SPECIES: PLANT BUGS (MIRIDAE)

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Abstract

This study aim to present a systematic and ecological analysis to the plant bugs (family *Miridae*), in the different ecosystems in Albania. The collection of biological material is performed during the period vere-vjeshte 2011-2013. The study analyzed 103 individuals, which are represented by 16 genus and 24 species. The biological material is collected during of period 2011-2012. The collection of biological samples was achieved through the use of entomological nets of 80cm diameter, and Pitt's traps. The fine biological materials were placed in plastic flacons 150-200 ml. They were preserved to the scientific laboratory in bottles of ethanol solution 95%, acetic acid, and distilled water. The biological samples were analyzed and determined by Stereomicroscope ZEISS. By analyzing the collected material, the genera *Deraeocoris* is the most represented with 4 species and a frequency of 16.67%.

Habitats of Krasta station are represented by more species than the other stations, with 14 species and a frequency of 58.33%, with less species Bradasheshi station with 5 species and a frequency of 20.83%. Based on the "*Jaccard index of similarity coefficient*", Krasta and Peqin stations, have a higher similarity coefficient than the other stations, of 35.29%, with the lowest coefficient Krasta and Bradashesh stations with 5.55%, showing a similarity of the ecological factors between these stations, which means a similarity between these habitats. Zoogeographic regions of Palearctic, representing most of the species of the species *Miridae*, with 9 species and frequency 37.50%. Compared to the elevated number of species for that family, it has been found that thier number is limited in the area of the study. We think that the main reason is the economical development in the Western part of the country.

Key words: *Hemiptera, Miridae, ekosystems, dominance, habitats*

Introduction

The family of *Miridae* Hahn, 1831 (plant bugs), presents a considerable number of species on Hemiptera, approx. 9800 species (Schuh, 1995), but this number can reach up to 20000 (Henry *et al*, 198). It is evaluated that these insects can damage the agricultural crops (Servadei, 1972; Silvestri, 1939). The hemelytra are constituted clavus and corium, and the triangle structure, cuneus (Wagner *et al*, 1978). They are encountered in all continents, and some species are classified as cosmopolitan (Gavin, 2000). Due to their features they are applied as integrated biological weapons (Gennaro, 1977; Miller, 1971; Pollini, 2002; Tremblay, 1990). They possess a number of same characteristics constantly presented in the entire family, with a minimum value of length 2-4 mm to a maximum of 10-11 mm. Some distinguishable characteristics are their oval shape, extended, ellipsoidal, and

colorful from dark, bright and vermilion. In that family dominate phytophagous, but also are present some predators (Tremblay, 1981; Tremblay, 1890; Carvalho *et al*, 1968).

This paper presents our study on the species belonging to this family for the different ecosystems in Elbasan region.

Material and Methods

The biological material is collected during the expeditions of 2011-2013 in habitats in Albania, for the Brrdashesh, Paper, Krasta, Miraka and Peqin stations. Samplings of the biological material were realized randomly in the May-September period, respectively during the 09⁰⁰-15⁰⁰ day hours. Entomological mowing nets of 80cm diameter, aspirators and Pitt's traps were employed. Mowing with Entomological nets is achieved according to the diagonals for surfaces of 100 m² (10m x 10m), passing five times across each square' diagonal according to the applied method of Colas (COLAS, 1969). After collection, the individuals are placed in plastic bottles, labeled with the date and station. The fine biological materials are placed in plastic flacons 150-200 cc. they were sent to the scientific laboratory and preserved in bottles of ethanol solution 95%, acetic acid, distilled water in v:v:v (80:5:20 ml) and some ether drops (Colas, 1969; Chapman, 1985). Determination of the collected material was analyzed by observing with stereomicroscope ZEISS (*Carl Zeiss*), and use of determination keys to this family, previous collections and previous publications for this family (Aukema *et al*, 1999; Dolling, 1991; Drake, 1965; Halimi, 2013; Misja, 1973, Servadei, 1967).

Result and Discussions

In this study are determined species of the *Miridae* family, by listing them in the table according to the encountered species in the ecosystem in Albania, accompanied by the number of individuals and the sites for every station where they encountered Brrdashesh, Paper, Krasta, Miraka and Peqin, and their Zoogeographic region (Table 1).

Tabela 1. : List of species for *Miridae* Family

No.	Scientific Name	No.ekze.	K.Krastës	Brrdashesh	Papër	Peqin	Mirake
1	Genus Anapomella						
1	<i>Anapomella arnoldii</i> V.G Putshkov, 1961	4					+
2	Genus Brachyleus						
2	<i>Brachycoleus decolor</i> Reuter, 1887	4	+				
3	Genus Deraeocoris						
3	<i>Deraeocoris lutescens</i> Schilling, 1837	2	+		+		+
4	<i>Deraeocoris schach</i> Fabricius, 1781.	5			+		
5	<i>Deraeocoris serenus</i> Douglas & Scott, 1868	2		+			
6	<i>Deraeocoris rutilus</i> Herrich-Schäffer, 1839	3	+				+
4	Genus Lopus						
7	<i>Lopus decolor</i> Fallén, 1807	5	+		+	+	
5	Genus Lygus						
8	<i>Lygus pratensis</i> Linnaeus, 1758	6				+	+
9	<i>Lygus punctatus</i> Zetterstedt, 1839	3				+	+
10	<i>Lygus rugulipennis</i> Poppius, 1911	9	+	+			
6	Genus Macrolophus						
11	<i>Macrolophus pygmaeus</i> Herrich – Schäffer, 1835	4		+	+		
7	Genus Macrotylus						
12	<i>Macrotylus atricapillus</i> Scott, 1872	5				+	

8	Genus <i>Megaloceraea</i>						
13	<i>Megaloceraea recticornis</i> Geoffroy, 1787	4	+		+		
9	Genus <i>Notostira</i>						
14	<i>Notostira erratica</i> Linnaeus, 1758	2	+				
10	Genus <i>Oncotylus</i>						
15	<i>Oncotylus punctipes</i> Reuter, 1875	3			+		+
11	Genus <i>Orthocephalus</i>						
16	<i>Orthocephalus brevis</i> Panzer, 1798	4		+	+		
12	Genus <i>Orthops</i>						
17	<i>Orthops kalmi</i> Linnaeus, 1758	4	+				+
13	Genus <i>Phytocoris</i>						
18	<i>Phytocoris insignis</i> Reuter, 1876	2	+		+	+	
19	<i>Phytocoris pini</i> Kirschbaum, 1856	2	+			+	
20	<i>Phytocoris ustulatus</i> Herrich-Schaffer, 1835	5	+		+		
14	Genus <i>Plagiognathus</i>						
21	<i>Plagiognathus fulsipens</i> Kirschbaum, 1856	4	+			+	
15	Genus <i>Polymerus</i>						
22	<i>Polymerus cognatus</i> Fieber, 1858	7	+			+	
16	Genus <i>Stenodema</i>						
23	<i>Stenodema calcaratum</i> Fallén, 1807	11		+	+		
24	<i>Stenodema holstatum</i> Fabricius, 1787	2	+			+	

The scientific determination of the collected materials in this study presents 103 individuals of the *Miridae* family, represented by 16 genera and 24 species (Table 2, Figure 1).

Table 1: Number of species according to their genera

Nr	Emri shkencor	Nr. Llojeve	Frekuenca Llojore
1	<i>Anapomella</i>	1	4.17
2	<i>Brachycoleus</i>	1	4.17
3	<i>Deraeocoris</i>	4	16.67
4	<i>Lopus</i>	1	4.17
5	<i>Lygus</i>	3	12.50
6	<i>Macrolophus</i>	1	4.17
7	<i>Macrotylus</i>	1	4.17
8	<i>Megaloceraea</i>	1	4.17
9	<i>Notostira</i>	1	4.17
10	<i>Oncotylus</i>	1	4.17
11	<i>Orthocephalus</i>	1	4.17
12	<i>Orthops</i>	1	4.17
13	<i>Phytocoris</i>	3	12.50
14	<i>Plagiognathus</i>	1	4.17
15	<i>Polymerus</i>	1	4.17
16	<i>Stenodema</i>	2	8.33

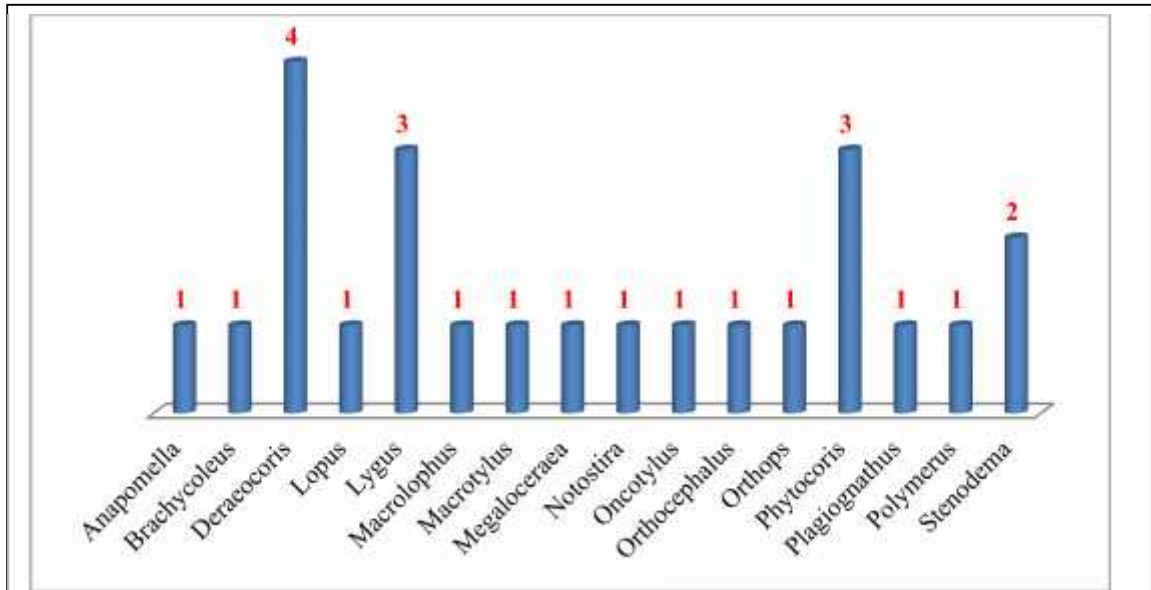


Figure 1: Distribution of the species according to their Genera

Analysis of the data give evidences that based on the diversity, the genera *Deraeocoris* are represented by higher number of species, 4 species or by 16.67 % of the overall species; the genera *Lygus* and *Phytocoris* are represented by 3 species or 12.50%; the genus *Stenodema* with 2 species or 8.33%, while the genera *Brachycoleus*, *Lopus*, *Macrolophus*, *Megaloceraea*, *Macrotylu*, *Notostira*, *Oncotylus*, *Orthocephalus*, *Orthops*, *Plagiognathus* and *Polymerus* are represented by only 1 specie or 4.17%.

Analysis of the diversity of habitats where this study is conducted, base on the number of the species for each station, the station of K. Krasta is presented by 14 species, or 58.33%, followed by Paper with 10 species, or 41.67%, Peqin station by 9 species, with 37.50%, and finally stations of Miraka by 7 species or 29.17% and Bradashesh by 5 species, or 20.83% (Table 3, Figure 2).

Table 2: Number of species according to sampling stations

Stacioni	Nr. Llojeve	Frekuenca Llojeve
K. Krastës	14	58.33
Bradashesh	5	20.83
Papër	10	41.67
Peqin	9	37.50
Mirakë	7	29.17

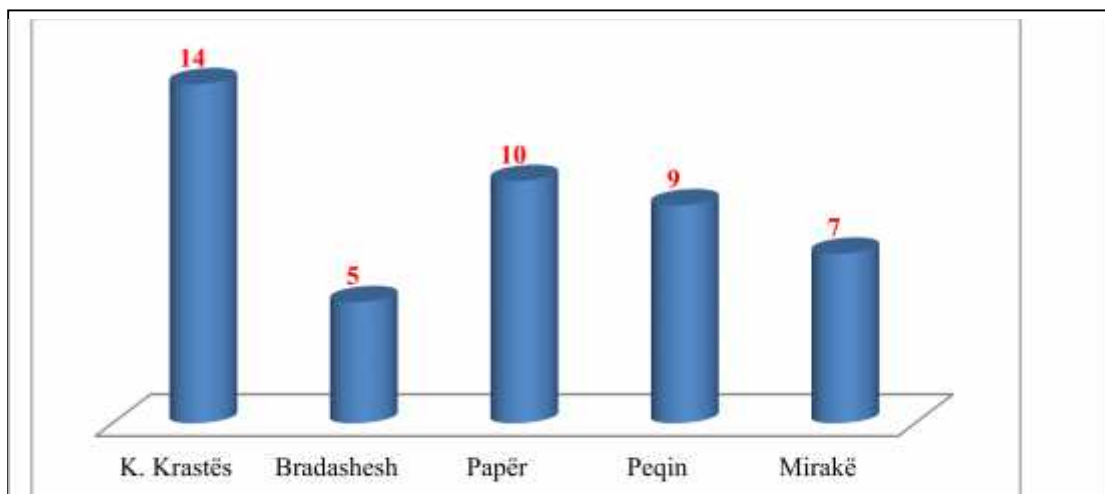


Figure 2: Distribution of no. species according to the sampling stations

Calculation of the coefficient of similarity Jaccard gave an indication on the species similarity among the stations (Jaccard, 1901). In the table are presented the numbers of common species C , according to the stations, and the coefficient of similarity C_j for each station (Table 4).

The stations represent according to their geographical spreading, a high level of diversity in ecological conditions and habitats. Based on that situation, another effort is addressed to the constructing of the correlation among the species to put in light the influence of these conditions in the spreading of the species, by keeping in mind that even the species own their ecological valence.

Table 3: Number of species and similarity coefficient according to the sampling stations

	Bradashesh	Papër	Peqin	Mirakë
K.Krastës	$C = 1$ $C_j = 5.55\%$	$C = 5$ $C_j = 26.31\%$	$C = 6$ $C_j = 35.29\%$	$C = 3$ $C_j = 16.66\%$
Bradashesh		$C = 3$ $C_j = 25\%$	$C = 0$	$C = 0$
Papër			$C = 2$ $C_j = 11.76\%$	$C = 2$ $C_j = 13.33\%$
Peqin				$C = 2$ $C_j = 14.28\%$

Analysis of the data give indication that the highest coefficient of species similarity belongs to the K.Krasta and Peqin stations by 35.29%, followed by similarity among the K.Krasta and Paper by 26.31%, Bradashesh and Paper 25% and K.Krasta and Miraka with 16.66%. The lowest similarity stands among Peqin and Miraka by 14.28%, Paper and Miraka by 13.33%, Paper and Peqin by 11.76% and finally between K.Krasta and Bradashesh by 5.55%

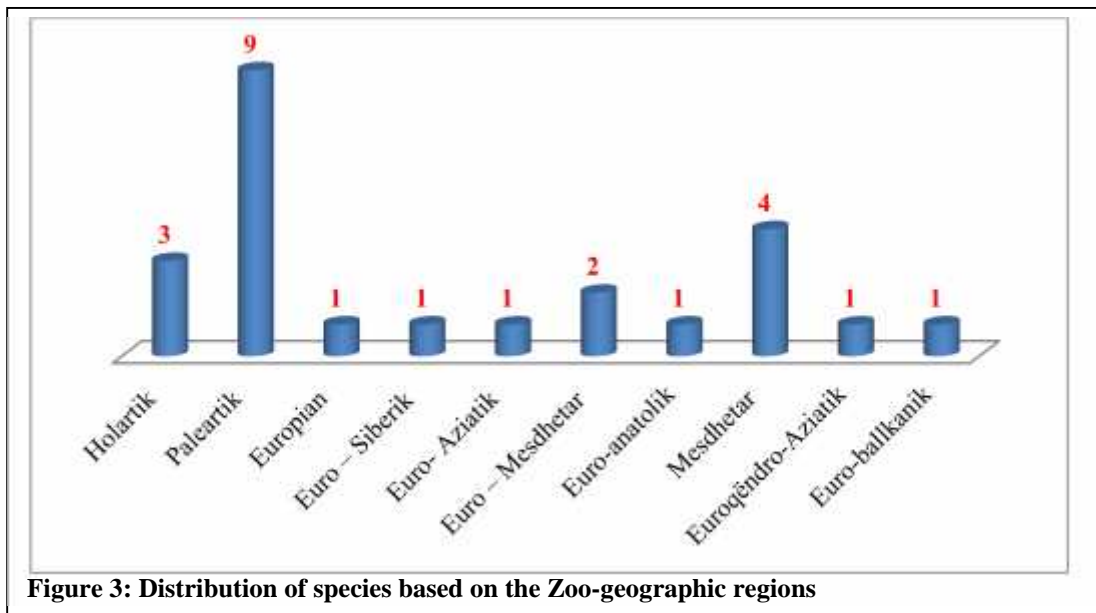
Analysis of the similarity based on the species distribution; give indication on the affinity of species distribution between the studied stations, and impact of the ecological factors in overall, but specially the anthropogenic factor impact.

Analysis of the species distribution for the zoogeographic regions (Table 5, Figure 3), the region presented by the highest level of species, which constitutes the nucleus of the *Miridae* Family is Zoogeographic Regions of *Palaearctic* by 9 species, or 37.50%; and consecutively the Mediterranean region by 4 species or by 16.67%, Holarctic by 3 species, or 12.50%, with few species zoogeographic region of Euro-Mediterranean by 2 species ore 8.33%, while the European, Euro-Asiatic, Euro-Siberian, Euro-anatolic, Centraleuropean-Asiatic and Euro-Balkanica by 1 specie, or 4.17%.

Table 4: The number of species according to Zoogeographic regions

Rajoni Zoogjografik	Nr. Llojeve	Frekuenca llojore
Holarctic	3	12.50
Palaearctic	9	37.50
European	1	4.17
Euro – Siberian	1	4.17
Euro- Asiatik	1	4.17
Euro – Mediterranean	2	8.33
Euro-anatolic	1	4.17
Mediterranean	4	16.67
Centraleuropean-Asiatic	1	4.17
Euro-Balkanica	1	4.17

TOTAL	24	100
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Conclusions

This study presents that analysis of 103 exemplars for the *Miridae* Family, in the habitats in Albania, distributed in 16 genera and 24 species.

It was concluded that a higher diversity belongs to the *Deraeocoris* genera by 4 species or 16.67 % of the overall species encountered.

The Krasta station dominates related to the diversity of species by 14 species or 58.33%, while the Bradashesh station was presented by the smallest number of species, only 5 or 20.83%.

The maximum value of the species similarity belongs to the Krasta and Peqin by 21.42%, while the minimum value of the similarity belongs to the Krasta and Bradashesh by 5.55%.

More represented is the Palearctic Zoogeographic region by 9 species, or 37.50%. the European, Euro-Asiatic, Euro-Siberian, Euro-anatolik, Centraleuropean-Asiatic and Euro-Balcanic regions are represented only by 1 specie, or by 3.23%.

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