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# Some Systematics and Ecological Data for True Bugs (Hemiptera) in Some Habitats in Fieri

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**Abstract:** This study presents a contribution to the knowledge some the systematics and ecological data on the species true bugs (Hemiptera) collected in some ecosystems in Fieri region.
The collection of biological material is performed during the period 2016-2017 in 6 stations. In this study we report for Fieri's stations 110 individuals, 24 species, 21 genus and 10 families.
By analyzing the collected material, the Miridae is the most represented family with 5 species and a frequency of 20.8% and with 5 genus or 23.8%.
Habitats of Zharrzës station are represented by more species than the other stations, with 10 species or 41.6%. This indicates that these habitats are comparatively more favorable, creating optimal environmental conditions for these species.
Based on the Jaccard Index of Similarity Coefficient, Zharrëz and Ardenica habitats have 3 species in common, and a higher similarity coefficient than the other areas (23.03%), showing a similarity of the ecological factors between these stations, which means a similarity between these habitats.
**Keywords:** Hemiptera, species dominance, habitat

## INTRODUCTION

True bugs are part of the class Insecta. They are inhabitant of terrestrial environments, some families (Notonectidae, Gerridae, etc.) live in freshwater environments. The hemelytra are constituted clavius and corium, and the triangle structure, cuneus [1]. They are phytophags, predators, harmful parasites of crops, aquatic species that feed on with fish larvae damaging this economy [2-4]. They are encountered in all continents, and some species are classified as cosmopolitan [5] . Species of Miridae and Nabidae family are applied as integrated biological weapons for the protection of cultures [6]. Their negative impact in agriculture is mainly encountered in crops, rice, fruit trees, etc. They stand grouped and sack the liquid of the hosted tree and present considerable resistance toward pesticides [7-9]. Also, in this group are included predators that are feed with other insects [3,10].

Our study considers species of this family in the ecosystems with geography of lower to hilly-mountainous altitudes of the Fieri Region, attempting to present a general panorama of this family in this habitat. Conclusions are drawn up through the analysis.

## MATERIAL AND METHODS

Collection of the biological samples was conducted for the period 2015-2017, in different habitats of the Fieri Region, sampling stations of Zharrëz, Seman, Ardenicë, Roskovec, Darzezë and Patos (Fig. 1). The collection of individuals was achieved through random procedures during the warm part of year May-September, for each station, during the day time 09:00-15:00.

Instruments used for collection were mainly entomological nets of 80 cm diameter. Shaving of the insects was conducted in diagonal equal surfaces of 100 $m^2$ (10m x 10m), passing 5 times across each rectangle diagonals [11]. In our field expedites were used also air nets, hydro-biological nets for aquatic insects, en entomological comb, tweezers for insects in the woods etc.

After the field collection, individuals were placed in plastic bottles, and were labelled, by giving information on place and date, respectively, and in special cases also the corresponding habitat description. In some cases, tiny insects and insects with a small size are placed in plastic flacons of 150-

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200cc. The biological material, in scientific laboratory, was kept in bottles with Ethanol solution (95%), acetic acid, distilled water in ratio 80:5:20 (v/v/v) and some ether drops added consequently [11,12]. In order to become soft and ready for the systematic definition, insects were placed for 24 hours at an excitator in the temperature 900C [11].

Taxonomix determination of the biological material was conducted through investigation with stereomicroscope Trinocular stero microscope (with still camera model 50240003 n/s C88794) in the MSN lab. The individuals were determined by using the determination keys for each family, collections and previous scientific publications [13,14].


**Figure 1.** The collection stations

## RESULTS AND DISCUSSIONS

In our study we have defined the species of Hemyptera collected in each station in the study. For these species we have done a qualitative and quantitative analysis by comparing them by families, and by stations where they were found.

We have provided a list of these species (Anex 1) with the respective stations in which we have meet them.

After the complete definition of all the insects collected, we have referred for Hemiptera in Fieri Region 10 families, 21 genus and 24 species (Tab. 2) [15-21]. In that aspect was determined also the frequency per every species according to equation:

$$\boldsymbol{F = \frac{n}{N} \times 100} \qquad \text{(Equation 1)}$$

Where: n- number of species for each family; N- number of species in total encountered

**Table 1**. Distribution of the numbers and percentages of species and genus for each families

| **No.** | Hemiptera Family | No.of species | % species | No.of genus | % genus |
|---|---|---|---|---|---|
| 1 | Pentatomidae | 4 | 16.6% | 3 | 14.2% |
| 2 | Coreidae | 3 | 12.5% | 3 | 14.2% |
| 3 | Lygaeidae | 2 | 8.3% | 1 | 4.7% |
| 4 | Miridae | 5 | 20.8% | 5 | 23.8% |
| 5 | Nabidae | 1 | 4.1% | 2 | 9.52% |
| 6 | Reduvidae | 2 | 8.3% | 1 | 4.7% |
| 7 | Notonectidae | 1 | 4.1% | 1 | 4.7% |
| 8 | Tingidae | 2 | 8.3% | 2 | 9.52% |
| 9 | Scutelleridae | 3 | 12.5% | 2 | 9.52% |
| 10 | Rhopalidae | 1 | 4.1% | 1 | 4.7% |
| | TOTAL | 24 | 100% | 21 | 100 % |

According to species composition, with a greater diversity of all groups referred to by us (Tab.1 Fig. 1), is represented the Miridae family with 5 species or 20.80%, Pentatomidae family, with 4 species or 16.60%, followed by Scutelleridae and Coreidae with 3 species or 12.50%. With fewer species are represented.

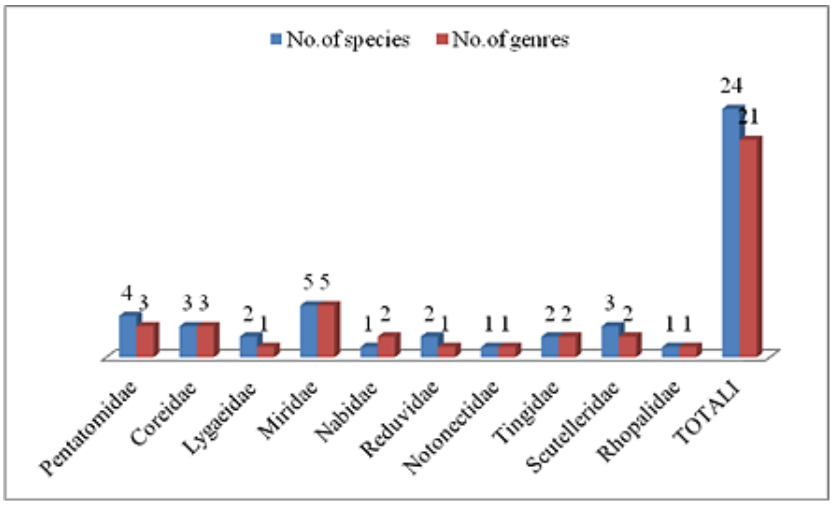


**Figure 1.** Dependence of the number of species and genus for each families

Lygaeidae, Reduvidae and Tingidae family with 2 species or 8.30%. With very few species, only 1 specie or 4.10% are represented Nabidae, Notonectidae and Rhopalidae.

According to genus composition, with a greater diversity is represented the Miridae family with 5 genus or 23.80%, Pentatomidae and Coreidae family with 3 genus or 14.20%. With less genus is represented Reduvidae, Tingidae Scutelleridae family with 2 genus or 9.52%. Whereas Lygaeidae, Nabidae and Rhopalidae are represented only with one genus or 4.70%.

According to species composition Zharëzeza represent a greater diversity, with 10 species or 41.60% and Semani with 8 species ose 33.33%; Ardenica a less diversity with 6 species or 20.8%, Roskoveci and Darëzezës with 5 species or 20.8%; with a fewer number of species is represented Patosi with 4 species or 16.60% (Tab. 2, Fig. 2). This indicates that the habitats of Zharëzeza area are more favorable for the Hemiptera species, this is because of the less impact of the human action in this station, this habitat are less concerned about the human interference, so they represent biocenosis that are more natural. Patosi station has the smallest number of species because of the greatest impact of humans in its habitats, and because of the rapid economic touristic development of this area, bringing ecological concerns for the species of true bugs.

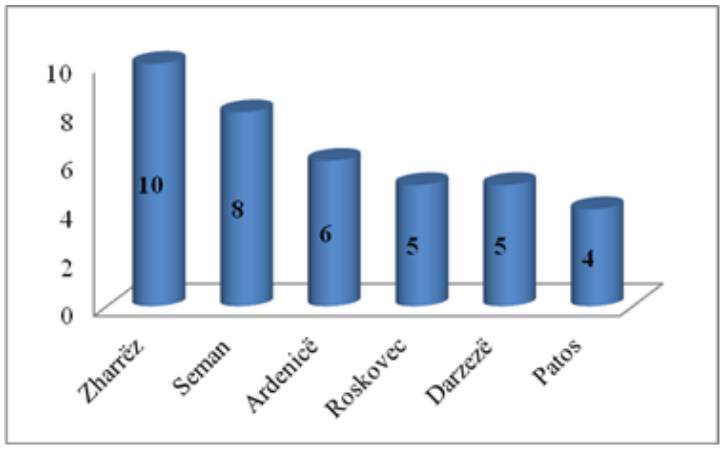


**Figure 2**. The distribution of number of species for each station

**Table 2**. The distribution of the number and percentage of species for each area

| The station | No. of species | % species |
|---|---|---|
| Zharrëz | 10 | 41.6% |
| Seman | 8 | 33.33% |
| Ardenicë | 6 | 25% |
| Roskovec | 5 | 20.8% |
| Darzezë | 5 | 20.8% |
| Patos | 4 | 16.6% |

To compare the similarity of habitats between the stations, we have analyzed the similarity between species, with Jaccard Index of Similarity Coefficient [22], comparing two different areas with each other (Tab. 3, Fig. 3). IJ = Jaccard index C = No. of common species

**Table 3.** Number of common species and similarity coefficient between stations

| The station | No. of common species | Similarity Coefficient |
|---|---|---|
| Zharëza-Ardenica | 3 | 23.03% |
| Semani-Darëzeza | 2 | 18.18% |
| Roskoveci-Patosi | 1 | 12.52% |

We found the highest coefficient, 23.03% and the highest number of common species in the habitats of Zharzëa dhe Ardenica with 3 species in common; a lower coefficient, 18.18% and a lower number of common species is found in the habitats between Semani and Darëzeza, the lowest coefficient 12.52% represented with only one common species, was found in the habitats between Roskoveci and Patosi.

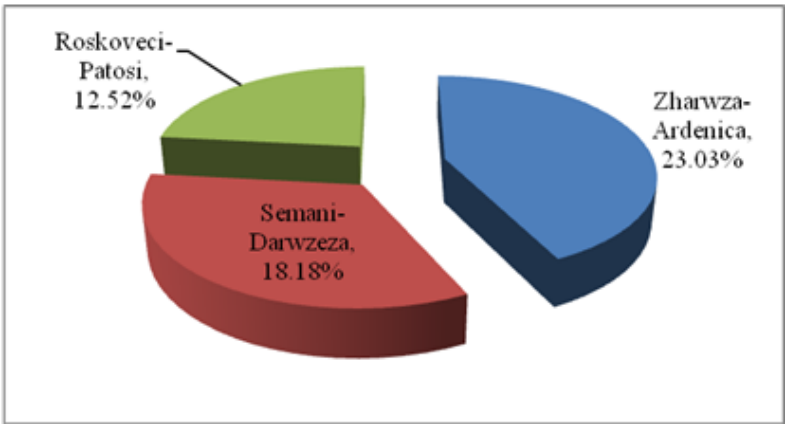


**Figure 3.** The distribution of the similarity coefficient between stations.

These results, are explained by the similarity that exists between habitats conditions of Zharzëa dhe Ardenica as mountain and hilly stations, and with the difference between the mountain and lowland habitats of Roskoveci and Patosi stations, with the height above sea level, with the differences in vegetation, etc.

**CONCLUSIONS**

This study presents a systematic and ecological analysis for exemplars of Hemiptera, in ecosystems of Fieri region. These exemplars represented by 24 species in 21 genus and 10 families.

Results give indication that Miridae is presented with the maximum values of diversity, by 5 species and frequency 20.80% and with 5 genus or 23.8%.

Zharrëza station dominates regarding to the species diversity, by 10 species or 41.6%, followed by Semani station with 8 species or by 33.33%.

Maximum value of coefficient of species' similarity stands between Zharza and Ardenica stations, by 23.03%, this coefficient is lower, 12.52%, among the habitats of Roskovec and Patos stations. Analysis of similarity of species structure, give indication on the affinity regarding to species structure for these stations, as well as impact of ecological factors in general, and particularly the anthropogenic factor impact.

**Anex 1.** List of species for each station: Zharëza S1, Ardenica S2, Seman S3, Darzezë S4, Patos S5 and Roskovec S6

| **List of species** | **S.1** | **S.2** | **S.3** | **S.4** | **S.5** | **S6** |
|---|---|---|---|---|---|---|
| **Pentatomidae** | | | | | + | + |
| *Graphosoma semipunctatum Fabricius*, 1775 | | | | | | |
| *Graphosoma lineatum* Linnaeus, 1758 | + | | + | + | | |
| *Aelia acuminata* Linnaeus, 1758 | + | | + | + | | |
| *Stagonumus amoenus* Brulle, 1832 | | | | + | | |
| **Coreidae** | | | | | | |
| *Gonocerus acuteangulatus* Goeze, 1778 | | | | | + | |
| *Coreus marginatus* Linnaeus, 1758 | + | | + | | | |
| *Coriomeris hirticornis Fabricius*, 1794 | | | | | | |
| **Lygaeidae** | | | | | | |
| *Lygaeus saxatilis* Scopoli, 1763 | + | | | + | | |
| *Lygaeus pandurus,* Scopoli, 1763 | | + | | | | |
| **Miridae** | | | | | | |
| *Macrolophus nubilus* Herrich – Schaffer, 1835 | + | | | | | + |
| *Polymerus vulneratus* Panzer, 1806 | + | | + | | | |
| *Lygus patensis* Linnaeus, 1758 | + | + | | | | + |
| *Adelphocoris lineolatus* Goeze, 1778 | + | + | | | | |
| *Stenodema calcaratum* Fllen, 1809 | | | | | + | |
| **Reduvidae** | | | | | | |
| *Ploearia domestica* Scopoli, 1786 | | | + | | | |
| *Rhynocoris iracundus* Poda, 1761 | | | + | | | |
| **Nabidae** | | | | | | |
| *Dolichonabis linubatus* Dahlbom, 1850 | + | | | | | |
| **Notonectidae** | | | | | | |
| *Notonecta obliqua* Fallen, 1787 | | | | | | + |
| **Tingidae** | | | | | | |
| *Catoplatus fabricii* Stal, 1868 | | | + | | | |
| *Dictula echii* Schrank, 1782 | | + | | | | |
| **Scutelleridae** | | | | | | |
| *Odontotarsus robustus* Jakoeleff, 1883 | + | | | + | | |
| *Eurygaster austrica* Schrank, 1778 | | | | + | | |
| *Eurygaster maura* Linnaeus, 1758 | | + | | | | + |
| **Rhopalidae** | | | | | | |
| *Corizus hyoscyami* Linnaeus, 1758 | + | + | | | | |

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