

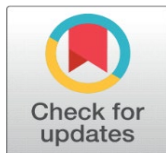
A STUDY ON TRUE BUGS (LYGAEIDAE, INSECTA) IN THE CENTRAL ALBANIAN HABITATS

Eltjon Halimi ¹✉ , Xhuliana Qirinxhi ²✉ , Gerta Subashaj ³✉ , Anila Paparisto ¹✉ 

¹ University of Tirana, Faculty of Natural Sciences, Tirana, Albania

² University “Fan. S. Noli” Korçë, Faculty of Natural Sciences and Social Sciences, Korçë, Albania

³ Reald University College, Faculty of Medical Technical Sciences, Vlora, Albania



Received 14 February 2024

Accepted 15 March 2024

Published 31 March 2024

Corresponding Author

Eltjon Halimi, eltjon.halimi@fshn.edu.al

DOI

[10.29121/ijetmr.v11.i3.2024.1425](https://doi.org/10.29121/ijetmr.v11.i3.2024.1425)

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Copyright: © 2024 The Author(s). This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).

With the license CC-BY, authors retain the copyright, allowing anyone to download, reuse, re-print, modify, distribute, and/or copy their contribution. The work must be properly attributed to its author.



ABSTRACT

The present research examines the ecological and systematic characteristics of true bugs, namely those belonging to the Lygaeidae family, within the central regions of Albania. The study was carried out in four designated sites, namely Dajti, Krraba, Iba, and Vora, which offer favorable environments for the proliferation of Lygaeidae insects. These insects have tiny to medium size, with certain specimens exhibiting vibrant hues like as red, black, and yellow, while red and black are the prevailing colors. A total of 96 biological specimens belonging to this particular family were identified over the period spanning from 2021 to 2023. There were 15 species and 12 genera of the Lygaeidae family observed at these locations. The results of the systematic analysis indicate that the genus *Lygaeus* exhibited the highest level of diversity, consisting of three species with a frequency of 20%. This suggests that the ecological conditions associated with these stations provide the most conducive habitats for this particular genus. The Krraba station displayed the greatest species diversity, with a total of eight species (corresponding to a frequency of 53.33%). In contrast, Dajti and Vora stations had the lowest diversity, each with only four species (corresponding to a frequency of 26.67%).

Keywords: *Lygaeidae*, Habitats, Taxonomy, Albania

1. INTRODUCTION

The Lygaeidae family consists of small to medium-sized species, with some notably small. Many displays bright colors, primarily red and black, though also including yellow [Dolling \(1991\)](#), [Péricart \(1998\)](#).

These insects have two simple eyes and two compound eyes, with a small head. Their mouthparts comprise a single rostrum with four segments, and their antennae are segmented into four parts. Additionally, the scutellum usually displays a Y-

shaped swelling, while their legs have a compound tarsus with three segments [Slater \(1975\)](#).

Lygaeidae species mainly feed on plants, primarily consuming seeds, although some also feed on vegetative parts like flowers. Moreover, certain species within this family display predatory behavior [Servadei \(1967\)](#), [Servadei et al. \(1972\)](#), [Silvestri \(1939\)](#), [Miller \(1971\)](#).

This paper explores Lygaeidae species across four habitats in central Albania, covering Tirana and Elbasan regions [Filipi & Bianchini \(2014\)](#). The aim is to conduct a thorough analysis of the species distribution within this family, considering genera and collection stations.

2. MATERIALS AND METHODS

Biological specimens were gathered during expeditions carried out between 2021 and 2023 in ecological environments at stations located in Central Albania, namely Dajti, Krraba, Iba, and Vora. These stations encompass habitats consisting of mountainous, field, and cultivated agricultural terrain. Biological material was randomly sampled between 09⁰⁰ and 14⁰⁰ hours during the June-August period.

Entomological mowing nets with a diameter of 80cm, aspirators, and Pitt's traps were utilized in this study. The mowing has developed using entomological nets followed a meticulous technique, covering 100 m² (10m x 10m) regions and requiring five passes along the diagonal of each square [Colas \(2000\)](#), [Chapman \(1988\)](#).

Following the collection process, the specimens were carefully placed into plastic bottles that were appropriately labeled with the date and station. Biologically pure substances were preserved in polypropylene flasks with capacities ranging from 150 to 200 cc. Subsequently, the specimens were conveyed to the scientific laboratory and conserved in containers filled with a mixture of 95% ethanol, acetic acid, and distilled water, in addition to a little amount of ether [Colas \(2000\)](#), [Chapman \(1988\)](#).

The taxonomik determination of specimens was performed using a ZEISS stereomicroscope (Uzi Series 240/3 Model 50240003). This was done by utilizing determination keys that are specific to the family, as well as referring to previous collections and relevant articles [Aukema & Rieger \(1999\)](#), [Cağata \(1989\)](#). Additionally, our previous publications on Hemiptera species in our country [Halimi et al. \(2013\)](#), [Halimi et al. \(2023\)](#) were also considered.

3. RESULTS AND DISCUSSION

We taxonomically identified 96 specimens collected from the ecosystems of the Dajti, Krraba, Iba, and Vora stations. [Table 1](#) displays the species that have been recognized, organized according to genera. The table includes the number of specimens collected for each species, accompanied by a "+" symbol denoting the corresponding station where it was encountered.

Table 1

Table 1 List of Species for Lygaeidae Family						
No.	Scientific name	No.ekze.	Dajt	Krrabë	Ibë	Vorë
Family Lygaeidae Schilling, 1829						
1	Genus Beosus					
1	<i>B. quadripunctatus</i> O.F. Müller, 1766	3	1		1	

2	Genus Geocoris			
2	<i>G. erythrocephalus</i> Le Peletier – Serville, 1825	4	1	1
3	Genus Graptopeltus			
3	<i>G. lynceus</i> Fabricius, 1775	5	1	1
4	Genus Heterogaster			
4	<i>H. urticae</i> Fabricius, 1775	2	1	
5	Genus Ischnodemus			
5	<i>Isabuleti</i> Fallén, 1826	2	1	
6	<i>I.hirticornis</i> Herrich-Schäffer, 1850	3		1
6	Genus Kleidocerys			
7	<i>K. resedae</i> Panzer, 1797	2		1
7	Genus Lygaeus			
8	<i>L. equestris</i> Linnaeus, 1758	3		1
9	<i>L. pandurus</i> Scopoli, 1763	5	1	
10	<i>L. saxatilis</i> Scopoli, 1763	49	1	1
8	Genus Metopoplax			
11	<i>M. origani</i> Kolenati, 1845	6	1	
9	Genus Nysius			
12	<i>N. senecionis</i> Schilling, 1829	4	1	1
10	Genus Orsillus			
13	<i>O. maculatus</i> Fieber, 1861	5		1 1
11	Genus Pezocoris			
14	<i>P. apicimacula</i> Costa, 1853	2	1	
12	Genus Tropidothorax			
15	<i>T. eucopterus</i> Goeze, 1778	1	1	1

Based on the taxonomic examination of the Lygaeidae family specimens collected, it is revealed that this family consists of 15 species from 12 genera at the stations in Central Albania (refer to [Table 2](#) and [Figure 1](#)).

Table 2

Table 2 Species Numbers According to the Genera for the Lygaeidae Family			
No	Lygaeidae Genera	No. of Species	Species frequency
1	<i>Beosus</i>	1	6.67%
2	<i>Platyplax</i>	1	6.67%
3	<i>Orsillus</i>	1	6.67%
4	<i>Pezocoris</i>	1	6.67%
5	<i>Nysius</i>	1	6.67%
6	<i>Metopoplax</i>	1	6.67%
7	<i>Lygaeus</i>	3	20.00%
8	<i>Kleidocerys</i>	1	6.67%
9	<i>Ischnodemus</i>	2	13.33%
10	<i>Graptopeltus</i>	1	6.67%
11	<i>Heterogaster</i>	1	6.67%
12	<i>Geocoris</i>	1	6.67%

The table presents the distribution of species across different genera, along with their corresponding frequencies. These frequencies were determined by including the number of specimens for each genus and the overall count of 15

taxonomically determined species by us, in this study. The chart illustrates the number of species by genus, as above.

Figure 1

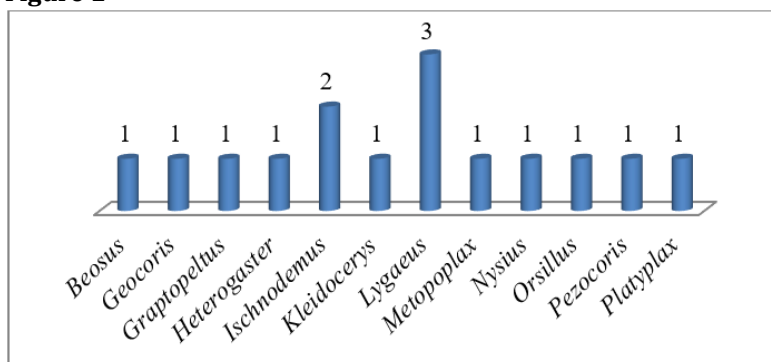


Figure 1 Number of Species According to the Genera

An examination of the distribution of the family Lygaeidae shows that the genus Lygaeus is the most widespread, with 3 species, representing 20% of all species reported by us. It is followed by the genus Ischnodemus which is reported with two species, accounting for 13.33% of the total. The remaining genera, namely Geocoris, Beosus, Heterogaster, Graptopeltus, Kleidocerys, Metopoplax, Nysius, Pezocoris, Orsillus, and Platyplax, have been shown to possess a solitary species, accounting for a mere 6.67% of the overall species count.

This means that the ecological systems in Central Albania offer very favorable environments for species belonging to the genus Lygaeus, which show greater adaptability to different environmental and urban fluctuations within the area.

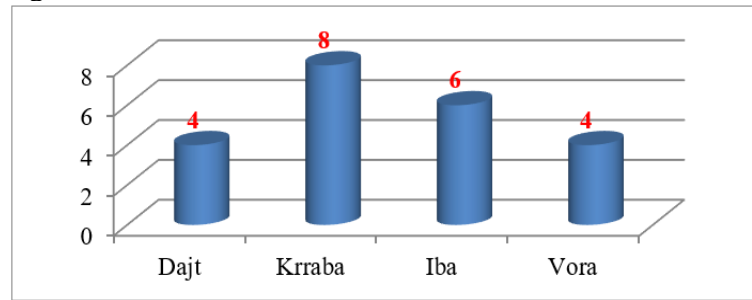
Examination of species diversity in many countries shows significant variation (Table 3, Figure 2). The Krraba station exhibits the highest level of species richness among the Lygaeidae family, including a total of 8 species, representing 53.33% of the total observed species. In contrast, the Iba station exhibits the least amount of diversity, with only 6 species, accounting for 40% of the total. Dajti and Vora stations have a lower level of species variety, where each station has only 4 species, accounting for 26.67% of the total.

The results of this study show that the mountain and plain ecosystems in the Krraba region offer very favorable conditions for the survival of these species. It can be seen that urban developments, especially new constructions, have a somewhat smaller impact on these species compared to other locations. The present study posits that the conversion of highland ecosystems in the Dajti area into winter tourist resorts, along with the growth of industrial activities in the Vora region, has played a role in the documented decrease in the species diversity seen at these two specific locations.

Calculation of species frequency per station was performed using the number of 15 species documented in the four locations included in this research.

Table 3

Table 3 The number of Species According to the Stations		
Station	Species number	Species frequency
Dajti	4	26.67%
Krrabë	8	53.33%
Ibë	6	40.00%
Vorë	4	26.67%

Figure 2**Figure 2** Distribution of Number for Species According to the Stations

4. CONCLUSIONS

This study presents the results gained from the analysis of 96 environmental samples collected from the ecological systems of Central Albania. A total of 15 species of the Lygaeidae family were found, dispersed among 12 genera.

The genus *Lygaeus* exhibits the most variety within the Lygaeidae family, consisting of 3 species, which accounts for 20% of the total. This indicates that these habitats are especially advantageous for this genus.

Krraba is the most abundant station in the Lygaeidae family, with 8 species, accounting for 53.33% of the total. In contrast, Dajti and Vora have fewer species, each with 4 species, indicating a frequency of 26.67%. The aforementioned suggests that Krraba provides more advantageous environments for species belonging to the Lygaeidae family. Conversely, the proliferation of winter tourist resorts in the Dajti region and the establishment of industrial parks in the Vora area could potentially lead to a decline in the observed species diversity.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

REFERENCES

- Aukema, B., & Rieger, C. (1999). *Catalogue of the Heteroptera of the Palearctic Biology and Diversity* (2nd Ed.). Oxford University Press. <https://doi.org/10.1093/aesa/90.6.866>
- Cağata, A. (1989). Systematical Studies on the Heterogasterinae of Turkey (Heteroptera: Lygaeidae). *Türk entomol. Derg.*, 13(1), 5-14.
- Chapman, R.F. (1988). *The Insects: Structure and Function* (4th Ed.). University Press.
- Colas, G. (2000). *Guide de l'Entomologiste*. Editions N. Boubée.
- Dolling, W.R. (1991). *The Hemiptera*. Oxford University Press.
- Filipi, G., & Bianchini, F. (2014). A New Urban-Rural Classification of Albanian Population, the EU Geographical Typology Based on Grid Data. *INSTAT*.
- Halimi, E., Paparisto, A., & Alamei, E. (2023). Taxonomic and Ecological Data on the Hemiptera fauna from Berati Region Habitats in Albania. *Journal of*

- Biological Research–Bollettino della Società Italiana di Biologia Sperimentale, 96(1). <https://doi.org/10.4081/jbr.2023.11105>
- Halimi, E., Paparisto, A., & Topi, D. (2013). A Contribution to the Knowledge of the Seed Bugs (Lygaeidae, Hemiptera) in the Different Ecosystems in Elbasan. *International Journal of Ecosystems and Ecology Science (IJEES)*, 3(1), 131-134.
- Miller, N.C.E. (1971). *The Biology of the Heteroptera* (2nd Ed.). Hill, London.
- Péricart, J. (1998). Hémiptères Lygaeidae Euro-Méditerranéens. Volume Systématique: Seconde Partie. Oxycareninae, Bledionotinae, Rhyparochrominae (1). *Faune de France*, 84B, I-III, 1-453.
- Servadei, A. (1967). *Fauna d'Italia. Rhynchota: Heteroptera, Homoptera, Auchenorrhyncha*. Calderini.
- Servadei, A., Zangheri, S., & Masutti, L. (1972). *Entomologia Generale ed Applicata*. CEDAM.
- Silvestri, F. (1939). *Compendio di Entomologia Applicata. Parte Speciale*. Portici Tipografia Bellavista.
- Slater, J.A. (1975). On the Biology and Zoogeography of Australian Lygaeidae (Hemiptera: Heteroptera) with Special Reference to the Southwest Fauna. *Journal of the Australian Entomological Society*, 14, 47-64. <https://doi.org/10.1111/j.1440-6055.1975.tb02002.x>