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## **An Overview of the Grasshoppers (Orthoptera, Insecta) in Vlore Area, Albania**

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### **Abstract**

Orthoptera are a group of well-known insects that are found in different ecosystems. They damage cultivations and they are important bioindicators for the environments. The object of this work is studying taxonomy of Orthoptera Order in some stations of Vlore area (Albania). The material is collected during 2022-2023. In this work we refer 5 families, 23 genders and 27 species. By systematic analyzes results that the most represented family is *Acrididae* with 15 species or with a frequency of 55.55%. The least represented families are *Tetrigidae* dhe *Mogoplistidae* with 1 specie or

with a frequency of 3.7 %. This shows that the stations ecosystems where is collected the biological material for *Acrididae* family offer suitable conditions. Lepenica station habitats displayed a bigger diversity compared with other stations, with 16 species or a frequency of 59.25%, while Dukat station fewer species with 6 species 22.22% frequency. This shows that the habitats in Lepenica station offer favorable conditions for the species of Orthoptera Order.

**Keywords:** Orthoptera, Ecology, Habitat, Anthropogenic Factors, Ecosystem, Vlore

### **Introduction**

Orthopteran species are one the largest taxonomic group of diversity (Mutlu *et al.*, 2022) <sup>[12]</sup>. Orthopteran are terrestrial insects which are known for their hind legs, which they use to jump and for their ability to produce sounds (stridulum) (Hoell, 1998) <sup>[8]</sup>. Most of the orthopteran are large or medium insects (Naskrecki 2013) <sup>[13]</sup>.

Orthopteran are a group of well-known insects that are found in different ecosystems, mainly highlands. Besides damaging cultivations and they are important bioindicators for the environments. (Sageer *et al.*, 2023) <sup>[15]</sup>. We can find them in most of the terrestrial habitats and they help in habitat ecosystem preservation and they can also be used as a potential ecologic indicator (Dawwrueng *et al.*, 2017) <sup>[3]</sup>.

In South Albania for Orthoptera has been little research and that little has been referred in the publications before World War Second by foreign researchers and before 90s by local researchers (Murray *et al.*, 1971; Salfi 1937) <sup>[11, 16]</sup>. Recently has been shown a real interest by foreign researchers to study Orthoptera in some highlands areas of Albania which are potentially preferable for these species, where are referred even other species (Lemonnier - Daecemont *et al.*, 2015; Gellért, 2016; Rabl & Kunz, 2018) <sup>[10, 14]</sup>.

Our study refers Vlora area which is situated in south west part of the country with Mediterranean climate which offers a very soft winter and hot summer. It also offers a rich diversity of habitats. These conditions offers very suitable conditions for Orthopteran.

### **Materiale Dhe Metoda**

The collection of Orthoptera species was accomplished during 2022-2023, mainly during summer and fall. The expeditions were done in different habitats of Vlore in the stations: Lepenicë, Dukat and Zvërnec Island (Fig 1). The material was collected during 09.00 -14.00 depending on climatic conditions. For the collection of the species which are preserved in bottles with ether (to preserve colors) are used entomologic arial nets (NET) (Colas, 2000; Halimi *et al.*, 2023) <sup>[1, 7]</sup>. For every station we have specified the date, the location, the coordinates (GPS Coordinates), the height above sea level and vegetation.



Fig 1: Orthoptera collecting stations

The accumulated individuals were determined taxonomically in laboratory, observing with magnifying

glass, with stereomicroscope (Perfex Sciences), by using taxonomic determination keys for these species, by using publications by the border countries with Albania, which offer similar habitats and climatic conditions with the area we are studying (Willemse *et al.*, 2018; Willemes, 1985; Eades *et al.*, 2014) [17, 18, 4] as well as previous publications for Albanian Orthopteran (Csiki, 1922; Ebner, 1910; Lemonnier – Darcemont & Darcemont, 2015) [2, 5, 9].

**Results and discussions**

During this study we determined taxonomically the accumulated individuals of Orthoptera Order. We have referred the Orthoptera species list in seaside and highland Vlore ecosystems, more precisely in 3 stations: Lepenica, Dukat and Zvernec Island where we have accumulated them (Table 1).

Table 1: List of species of the Order Orthoptera in the area of Vlore

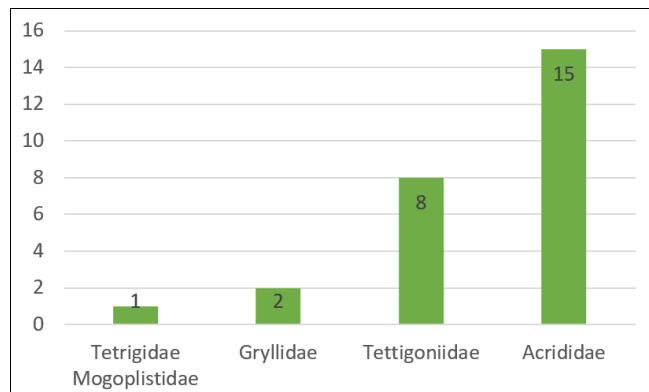
S. No	Scientific name	Lepenica	Dukat	Zvernec Island
<b>1</b>	<b>Familja Tettigoniidae</b> Krauss, 1902			
1	<i>Decticus albifrons</i> Fabricius, 1775		+	+
2	<i>Tessellana orina</i> Burr, 1899	+		+
3	<i>Yersinella raymondii</i> Yersin, 1860		+	
4	<i>Rhacocleis germanica</i> Herrich-Schäffer, 1840	+		
5	<i>Eupholidoptera schmidti</i> Fieber, 1861	+		
6	<i>Tylopsis lilifolia</i> Fabricius, 1793	+	+	
7	<i>Pachytrachis gracilis</i> Brunner von Wattenöyl, 1861	+		
8	<i>Decticus verrucivorus</i> Linnaeus, 1758		+	
<b>2</b>	<b>Familja Acrididae</b> MacLeay, 1819			
9	<i>Acrotylus patruelis</i> Herrich-Schäffer, 1838			+
10	<i>Acrida ungarica mediterranea</i> Herbst, 1786			+
11	<i>Calliptamus italicus</i> Linnaeus, 1758		+	+
12	<i>Dociostaurus brevicollis</i> Eversmann, 1848			+
13	<i>Oedipoda miniata miniata</i> Pallas, 1771			+
14	<i>Oedipoda caerulescens</i> Linnaeus, 1758	+	+	+
15	<i>Locusta migratoria</i> Linnaeus, 1758			+
16	<i>Aiolopus thalassinus thalassinus</i> Fabricius, 1781			+
17	<i>Eyprepocnemis plorans</i> Charpentier, 1825			+
18	<i>Pezotettix giornae</i> Rossi, 1794	+		+
19	<i>Chorthippus mollis mollis</i> Charpentier, 1825	+		
20	<i>Oedipoda germanica</i> Latreille, 1804	+		
21	<i>Omocestus rufipes</i> Zetterstedt, 1821	+		
22	<i>Aiolopus strepens</i> Latreille, 1804	+		
23	<i>Chorthippus dichrous</i> Eversmann, 1859	+		
<b>3</b>	<b>Familja Tetrigidae</b> Rambur, 1838			
24	<i>Paratettix meridionalis</i> Rambur, 1838	+		
<b>4</b>	<b>Familja Mogoplistidae</b> Brunner von Wattenwyl, 1873			
25	<i>Mogoplistes brunneus</i>	+		
<b>5</b>	<b>Familja Gryllidae</b> Laicharting, 1781			
26	<i>Oecanthus pellucens</i> Scopoli, 1763	+		
27	<i>Gryllus campestris</i> Linnaeus, 1758	+		

Our taxonomic analyze refers to Orthoptera in accumulation stations ecosystems 27 species and 5 families (Tab 2, Graphic 1). By the distribution analyze of species numbers according to the Families results that *Acrididae* family is represented with more species, 15 species and a frequency of 55.55% of the total number. *Tettigoniidae* family is represented by fewer species, 8 species and 29.62% frequency, while *Gryllidae* families are represented by 2 species and 7.40% frequency and finally *Tetrigidae* and *Mogoplistidae* is represented each by 1 specie and 3.7 % frequency. By these results we conclude that the habitats of

Lepenice, Dukat and Zvernec Island offer more favorable conditions for the species of *Acrididae* families.

Table 2: Distribution of the number of species and species frequency according to families

S. No	Family	Number of species	Species frequency %
1	<i>Tettigoniidae</i>	8	29.62%
2	<i>Acrididae</i>	15	55.55%
3	<i>Tetrigidae</i>	1	3.70%
4	<i>Mogoplistidae</i>	1	3.70%
5	<i>Gryllidae</i>	2	7.40%

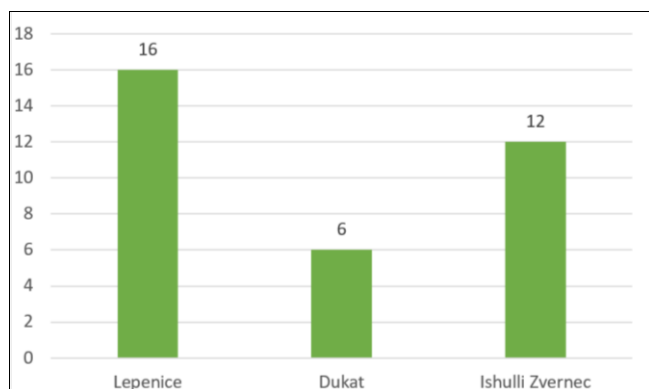


**Graphic 1:** Distribution of the number of species by families

We have analyzed from Table 1 the distribution of the species according to the accumulation stations. From our analysis we refer that Lepenica station has the highest biodiversity with 16 species or 59.25%, frequency of the total number. Fewer species are referred in Zvërnec Island station, 12 species and 44.44 % frequency and fewer in Dukat station, 6 species and 22.22% frequency (Tab 3, Graphic 2). From these dates results that Lepenica station offers more favorable conditions for Orthoptera Order.

**Table 3:** Number of species by stations

Stations	Number of species	Species frequency %
Lepenica	16	59.25%
Dukat	6	22.22%
Ishull Zvërnec	12	44.44%



**Graphic 2:** Distribution of the number of species according to stations

## Conclusions

This study represent the results for Orthoptera Order in some stations of Vlora area. We have referred 5 families and 27 species. The family with the highest number of species is *Acrididae* family with 15 species and a frequency of 55.55%. This shows that the habitats in the stations where we have accumulated Orthoptera species offer favorable ecologic conditions for the species that belong to that family. The analyze of distribution according to the stations refers that Lepenica station has the highest biodiversity with 16 species or 59.25% frequency which shows the presence of suitable habitats for Orthopteran species in this station. While Dukat is referred with the lowest biodiversity with 6 species and 22.22% frequency, which shows that is has a negative effect due to anthropogenic factor and urban development of road network.

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