



**ZOOGEOGRAPHICAL DATA ON JULIDA ORDER, DIPLOPODA (MYRIAPODA)  
CLASS OF VLORA REGION, ALBANIA**

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**Key word:**

Diplopodes,  
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**SYNOPSIS**

Subject to this article are zoogeographic and ecological data about the Julida (millipedes) Order, (Diplopoda Class, Myriapoda Group, Phylum Arthropoda) of Vlora region. Studied and recognized fauna of this group in Albania is composed of about 80 species, which is considered to represent approximately 50% of Diplopoda species, where as a whole is thought to be of nearly 50 genus, with about 150 different species and subspecies. Julida order represents one of most spread of Diplopoda class. In this article is discussed for seven species, pertaining to three genus.

**INTRODUCTION**

Julida millipedes (Julida order) represents the most spread order of the Diplopoda class, belonging to Myriapoda group. The species of this order live in decomposed and rich humus environments. Although this order is greatly spread in different regions, they have not any special importance for human economy. As the intensity of their population is limited in our region, they are not known as harmful to agriculture plants and do not serve as vectors of different diseases for the humans.

This article is representing the findings of the research about the fauna of this order in Vlora, Albania. Based on the previous works, this article contributes with an analytical summary of the zoogeographical data of these species compared to other species in Albania and Balkan Peninsula,. (Atems 1959; Qirjo 1996, Mauriès, Golovatch, Stoev 1997, etc)

**SUBJECT AND THE METHOD OF RESEARCH**

The subject to this study is Julida order' species collected in Vlora region. The collection period is from April to November of 2001-2004. Because the influence of humidity, the samples are collected more intensively during months May, June,

September, October and November. The methodology for collecting of individuals is done directly by hand and in some cases by sieving the soil. The common habitats are under stones, under the fallen trees and leaves, as well as in the upper layer of topsoil.

There are 6 stations selected under the following criteria a) type of habitat, b) geographical distribution within the given region c) the typology/category of soil.

Pusi i Mezinitt (Station 1): 10- 50m above sea-level, hilly habitat with low density vegetation, cultivated plants (vineyards, lemon)

Uji i ftohtë (Station 2): 50-100m above the sea-level, plantation terraces of olive trees (*Olea europea*).

Radhimë (Station 3): 20m above the sea-level, cultivated with olive trees, lemon, orange trees and herbaceous plants.

Armen (Station 4): 100-120 meters above the sea-level, herbaceous vegetation

Tërbaç (Station 5): 500-600m above the sea-level, meadow with evergreen short bushes

Sevaster (Station 6): 400m above the sea-level, uncultivated land, covered by graminace negetation.

The individuals are kept in bottles, filled with alcohol 80%, where is added some drops of ether. The determination of species is done through direct observation of their morphological characteristics by using stereomicroscope apparatus. The key element of determination is the gonopode of m#, using the determination key book by Mauries J. (Lab. de Arthropodes, MNHN Paris)

## THE RESULTS AND DISCUSSION

### III.a Taxonomical data

Based on gathered material of Julida order, the following species are found:

Order Julida

Family (or group) Julidae (Meinert 1868)

Genus *Pachyiulus* (Berlese 1883)

There are 6 species of this genus found in Balkans, out of which the following are collected in Vlora region.

1. *Pachyiulus catarensis* (Latz 1884)

Found in four stations. Referred also by Attems 1929; Manfredi 1945; Verhoeff 1901

2. *Pachyiulus dentiger* (Verhoeff 1901)

Found in two stations. Referred also by Attems 1929; Verhoeff 1901.

3. *Pachyiulus varius* (=unicolor) (Fabricius 1781)

Found in three stations, Referred also by Attems 1929; Verhoeff 1901.

4. *Pachyiulus valonensis* (Verhoeff 1901)

Found in one station. Referred also by Attems 1929; Verhoeff 1901

Genus *Brachyiulus* (Berlese 1884)

There are 11 species of this genus known in Balkans, among which the following ones are found in Vlora region.

5. *Anoploiulus apfelbecki* (Verhoeff 1898) [*Brachyiulus apfelbecki* (Verhoeff 1898)]

Found in one station. Referred also by Attems 1929

6. *Anoploiulus pusillus* (Leach 1814) = *litoralis* (Verhoeff. 1898) [*Brachyiulus pusillus* (Leach, 1815); *Julus pusillus* Leach, 1815; *Julus exiguus* Brandt, 1841; *Julus virgatus* Wood, 1864; *Julus stuxbergi* Fanzago, 1875; *Brachyiulus littoralis* Verhoeff, 1898; *Microbrachyiulus littoralis* ; Jawlowski, 1939,

Found in five stations. Referred also by Verhoeff 1901.

Genus *Megaphyllum* (Verhoeff 1894)

There are known 8 species of this genus in Balkans, from which the following one is found in Vlora region

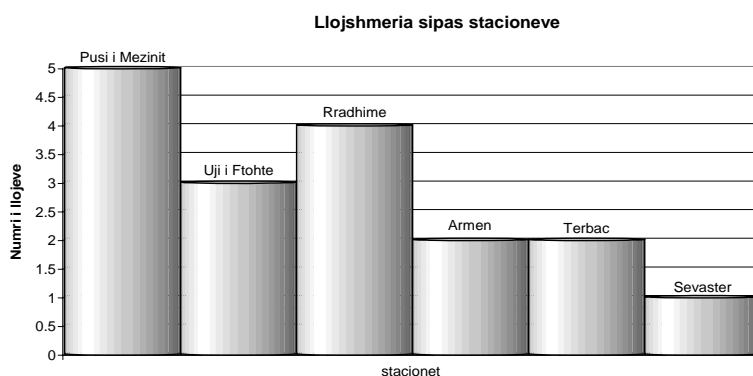
7. *Megaphyllum karschi* (Verhoeff 1901)

Found in one station. Referred also by Attems 1929; Verhoeff 1901.

### III.b Zoogeographical data

#### III.b.1. By stations in Vlora Region

The number of species found in the stations of this research is variable (fig. no.1). Stations with higher number of species are the ones where the soil is richer in nutritious elements.



**Figure 1. Comparison of kinds according to the stations of survey**

Based on the taxonomical data the following table represents the distribution of species in among the considered stations.

Nr	Name of species	Found during this survey (Station Name)	Earlier surveys (Station Name)
1	<i>Pachyiulus cattarensis</i> (Latz 1884)	Pusi i Mezinit, Uji i Ftohtë, Radhimë, Armen	Verhoeff 1901 Attems 1929 Vlorë*) Manfredi 1945 Fushë Dukat
2	<i>Pachyiulus dentiger</i> (Verhoeff 1901)	Pusi i Mezinit, Radhime	Verhoeff 1901 Attems 1929 Vlorë
3	<i>Pachyiulus flavipes</i> (C. L. Koch 1847)	-	Attems 1929 Kaninë
4	<i>Pachyiulus varius</i> (Fabricius 1781)	Pusi i Mezinit, Terbac, Sevaster	Verhoeff 1901 Pashaliman
5	<i>Pachyiulus valonensis</i> (Verhoeff 1901)	Radhime	Verhoeff 1901 Attems 1929 Vlorë
6	<i>Anoploiulus apfelbecki</i> (Verhoeff 1898)	Uji i Ftohtë	Attems 1929 Vlorë
7	<i>Anoploiulus pusillus</i> (Leach 1814)	Pusi i Mezinit, Uji i Ftohtë, Radhimë, Armen, Terbac	Verhoeff 1901 Attems 1929 Vlorë
8	<i>Megaphyllum karschi</i> (Verhoeff 1901)	Pusi i Mezinit	Verhoeff 1901 Attems 1929 Vlorë

\*) undefined survey station in Vlora

**Table 1. Reference to earlier expeditions/surveys for Vlora region.**

In reference to previous surveys, 6 out of seven species are referred, too. The geographical areas of Kaninë, Dukat, Pashaliman mentioned in earlier surveys belong to the same geographical zone of our research area.

### III.b.2. By other regions of Albania

Based on data gathered in Vlora region and the ones from the literature, the following table (Table no.2) presents a comparison of zoogeographical distribution of these species within Albania.

Nr	Name of species	Survey by	Referred to	
			Albania	Vlora
1	Pachyiulus cattarensis (Latz 1884)	Attems 1929	Shkodër, Kulla e Lumës, Burimi i Drinit	+
		Manfredi 1932	Shirokë, Liq i Prespës, Mirakë	-
		Manfredi 1945	Tërpan, Karbunarë	+
		Verhoeff 1932	Korab, Ohrid lake, Ishulli i Prespës	-
		Verhoeff 1901	-	+
		Kiçaj, Qirjo 2004		+
2	Pachyiulus dentiger (Verhoeff 1901)	Attems 1929	-	+
		Verhoeff 1901	-	+
		Kiçaj, Qirjo 2004		+
3	Pachyiulus flavipes (C. L. Koch 1847)	Attems 1929	-	+
		Kiçaj, Qirjo 2004		-
i	Pachyiulus varius (Fabricius 1781)	Attems 1929	Kacanik	-
		Verhoeff 1901	-	+
		Manfredi 1945	Tërpan	-
		Kiçaj, Qirjo 2004		+
5	Pachyiulus valonensis (Verhoeff 1901)	Attems 1929	-	+
		Verhoeff 1901	-	+
		Kiçaj, Qirjo 2004		+
6	Anoploiulus apfelbecki (Verhoeff 1898)	Attems 1929	Orosh	+
		Kiçaj, Qirjo 2004		+
7	Anoploiulus pusillus (Leach 1814)	Attems 1929	-	+
		Verhoeff 1901	-	+
		Kiçaj, Qirjo 2004		+
8	Megaphyllum karschi (Verhoeff 1901)	Attems 1929	-	+
		Verhoeff 1901	-	+
		Kiçaj, Qirjo 2004		+

**Table no. 2. Zoographical distribution of the referred species in Albania.**

Five species found in this work (62% of the total) are not mentioned by other researchers in other regions of Albania.

Pachyiulus flavipes (C. L. Koch 1847)

Pachyiulus dentiger (Attems 1929; Verhoeff 1901)

Pachyiulus valonensis (Attems 1929; Verhoeff 1901)

Anoploiulus pusillus (Attems 1929; Verhoeff 1901)

Megaphyllum karschi (Attems 1929; Verhoeff 1901)

While the other species are mentioned by different researchers as found in other regions of the country:

Pachyiulus cattarensis (Attems 1929: Shkodër; Manfredi 1932: Shkodër, Korçë, Librazhd; Manfredi 1945: Bajram Curri; Verhoeff 1932: Dibër, Pogradec, Korçë),

Pachyiulus varius (Attems 1929, Manfredi 1945: Bajram Curri),

Anoploiulus apfelbecki (Attems 1929: Mirditë)

### III.b.3. By other regions of Balkan Peninsula

Nr	Name of species	ALB	BiH	CRO	MAC	MNE	SER
1	Pachyiulus cattarensis (Latz 1884)	+	-	+	+	-	-
2	Pachyiulus dentiger (Verhoeff 1901)	+	-	-	-	-	-
3	Pachyiulus flavipes (C.L.Koch 1847)	+	-	+ Dalmat e area	-	-	-
4	Pachyiulus varius (Fabricius 1781)	+	+	+	+	-	-
5	Pachyiulus valonensis (Verhoeff 1901)	+	-	-	-	-	-
6	Anoploiulus apfelbecki (Verhoeff 1898)	+	+ Herzeg ovina	+ Dalmat e area	+	-	-
7	Anoploiulus pusillus (Leach 1814)	+	+ Herzeg ovina	+ Dalmat e area	+	-	-
8	Megaphyllum karschi (Verhoeff 1901)	+	-	-	-	-	-

**Tabela 3. Comparison of spreading of species of Julida order found in the region of Vlora with those of Balkan region. (ALB: Albania, BiH: Bosnia and Herzegovina, CRO: Croatia, MAC: Macedonia, MNE: Montenegro, SER Serbia)**

Based on data referred for Albania and other countries of Balkans, table no.3 presents the zoogeographical data of these species. The following species have a wide spreading in all Balkan countries:

Pachyiulus cattarensis (Latz 1884); Pachyiulus varius (Fabricius 1781); Anoploiulus apfelbecki (Verhoeff 1898); Anoploiulus pusillus (Leach 1814)

This result is confirmed by the map of zoogeographical distribution, where these species are found in all European Continent, in Middle East and in North America.

Three species found in Vlora region, and in Albania, are not referred in other Balkan countries:

*Pachyiulus dentiger* (Verhoeff 1901); *Pachyiulus valonensis* (Verhoeff 1901); *Megaphyllum karschi* (Verhoeff 1901)

Because of their sedentary life and their slow movement, the endemic spreading of millipedes is well known. Moreover, by the literature, the Balkan region is referred as a source region for the migration of different species towards other areas of Europe. These reasons explain the finding of some species with limited geographical spreading.

### CONCLUSIONS AND RECOMMENDATIONS

During the period of this study in Vlora region, Albania, out of 106 individuals collected in 6 different stations, 7 species of Julida Order are found. They belong to one family (F. Julidae), and with 3 genus:

Genus *Pachyiulus* (Berlese 1883) with the species: *Pachyiulus cattarensis* (Latz 1884), *Pachyiulus dentiger* (Verhoeff 1901), *Pachyiulus varius* (= *unicolor*) (Fabricius 1781), *Pachyiulus valonensis* (Verhoeff 1901)

Genus *Brachyiulus* (Berlese 1884) with the species *Anoploiulus apfelbecki* (Verhoeff 1898), *Anoploiulus pusillus* (Leach 1814) = *litoralis* (Verhoeff. 1898),

Genus *Megaphyllum* (Verhoeff 1894) with the specie *Megaphyllum karschi* (Verhoeff 1901)

During this study, important changes are observed in the in the number of Julida species inhabiting different habitats. Specific consideration is given to the variation of the soil content and typology, and climatic factors. Areas classified as reach soils in nutritional elements (Rradhimë, Pusi i Mezinit and Uji i ftohtë) have a higher biodiversity compared to the poorer ones (Tërbac and Sevaster). However, the influence of these factors needs further investigation.

Five species found in Vlora region (or 62% of the total) are not referred by other researchers in other areas of Albania.

From the species encountered, 4 of them have a large spreading region. [*Pachyiulus cattarensis* (Latz 1884), *Pachyiulus varius* (= *unicolor*) (Fabricius 1781), *Anoploiulus apfelbecki* (Verhoeff 1898) (= *Brachyiulus*), *Anoploiulus pusillus* (Leach 1814) = *litoralis* (Verh. 1898)(= *Brachyiulus*)]

Furthermore, three species found in Vlora region, and in Albania, are not referred in other Balkan countries. [*Pachyiulus dentiger* (Verhoeff 1901), *Pachyiulus valonensis* (Verhoeff 1901), *Megaphyllum karschi* (Verhoeff 1901)].

These facts constitute important arguments for other deeper studies on fauna of Julida and Diplopods in general, in this region and more.

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