CHILOPODA FROM THE EDAPHIC AND SUBTERRANEAN ENVIRONMENTS IN THE REȘIȚA – CARAŞOVA AREA (BANAT, ROMANIA). A PRELIMINARY NOTE

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Abstract — The author presents new data regarding the Chilopoda species collected from the edaphic and subterranean environments in the Carasova-Reșita area (Banat, Romania).

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INTRODUCTION

The Carasova – Reșita area was investigated from a faunistic point of view mostly by the specialists from the Speleological Institute "Emile Racovitza". Papers concerning the fauna from this area were published by Dancău and Tabacaru (1964) and Negrea (1962-1963, 1965, 1994). Some studies investigated the cave fauna from the area are interesting for us and their results were published by Negrea and Negrea (1971, 1977); Negrea et al. (1994) and Senco et al. (1971). However, none of these studies included the mesovoid shallow substratum fauna.

In the present study preliminary data concerning the Chilopoda species from the edaphic and mesovoid shallow substratum (MSS = milieu souterrain superficiel) from the Reșita – Carasova area are given. The material was collected from the Caras Keys (the area between Peștera Liliicilor and Carasova) and the Doman Valley (from the confluence of the Stânică Valley and the Doman Valley to the town of Reșita) (Fig. 1).

From a geological point of view, the studied area belongs to the Northern part of the great folded synclinorium Reșita-Moldova Nouă with a NNE-SSW orientation. This synclinorium is made by Paleozoic and Mesozoic deposits that have at their basis the crystalline schists of the Semenic. The Paleozoic is represented by the Carboniferous and the Permian (by the presence of the conglomerates, the gritstones and the argillaceous schists) and the Mesozoic by the Jurassic and the Cretaceous sediments (especially by limestones). On these limestones developed a karstic relief, extended on the greatest limestone surface from Romania (Puşcariu et al. 1964).

The climate is temperate continental but with various Mediterranean influences from one zone to another. On this basis some topoclimates were differentiated defined in the first place by the relief forms. The data from the Reșita Meteorological Station (situated at 283 m altitude) shows an yearly average temperature of about 10.3°C and a yearly average rainfall of about 704 mm (uniformly distributed throughout the year). Maximum average temperature was recorded in July and maximum rainfall in May – June.

There are also microclimates determined by the limestone substratum that frequently appears at the surface and determines a strong heating of the soil and rock fragments levels, but also microclimates determined by the position and inclination.

The whole study area represents a part of a deciduous forest level: the sublevels of Fagus sylvatica, Quercus cerris and Quercus petraea. We noticed the association of Carpinus – Fagetum with Fagus sylvatica and Carpinus betulus as codominant species. They can be found on mild slopes and plateaus of different exposition. Also, at low altitudes, we can find the species like Fagus taurica. On the edges of the shrub phytocoenosis or on the rocky slopes Cornus mas, Cornus sanguinea, Crataegus monogyna, Corylus avellana, Staphylea pinnata, etc. occur.

Cornus mas and Fraxinus ornus were found on the Northern slopes while on the Southern or South-Western slopes there is Syringa vulgaris associated with Fraxinus ornus, Cotinus coggyria, Carpinus orientalis, Cotoneaster tomentosa and Crataegus monogyna. The herbaceous floor is characterised by Southern species like: Ceterach officinarum, Scabiosa banatica, Echinops banaticus, Dianthus banaticus, Asperula tenella and many species characteristic for limestone rocks like: Carex humilis, Asplenium trichomanes, Asplenium rutamuraria, Centaurea atropurpurea, Tunica saxifraga, Draba lasiocarpa and Helianthemum canum.
Fig. 1. The Reșița – Carașova area and the locations of the drillings.
In the deforested zones from the lower hills, the presence of *Carpinus orientalis* was noticed together with *Syringa vulgaris* and *Fraxinus ornus* as codominant species, as well as the species like *Inula conyza*, *Echinops bannaticus*, *Calamintha acinos*, *Teucrium chamaedrys*, *Ceterach officinarum*, etc. (Grigore and Coste 1979; Schrött 1972, 1978).

**MATERIAL AND METHODS**

Between August 2001 and April 2003, the author collected centipedes from the Reșita – Carașova area, from the endogenous and subterranean habitats (especially the mesovoid shallow substratum).

The edaphic species were collected directly by using tweezers. The litter was sifted with a Winkler sieve and the soil samples were dried with a Tullgren apparatus.

For the mesovoid shallow substratum Barber traps with olfactory attractant were used. They were placed in a microcave and at the bottom of 12 drillings (depth of 0.5 – 0.8 m, placed in 3 sites). The material from the traps was collected periodically, once a month.

In order to investigate the MSS fauna we dug one microcave and 12 drillings in 3 locations. The microcave (MCV1-CC), 1.3 m long was situated on the left bank of the Caraș river, nearby the entrance of the cave Peștera de după Cârșă, at the basis of a limestone wall with deep fissures.

The three locations of the drillings were:

- **St1: left bank of the Caraș river** - with a N-W exposition, on a limestone substratum in places with a denuded colluvium or a colluvium clogged by soil in its upper part. Seven drillings were dug in this location: S1-CC (- 0.8 m), S2-CC (- 0.7 m), S3-CC (- 0.5 m), S4-CC (- 0.5 m), S5-CC (- 0.5 m), S6-CC (- 0.8 m) and S7-CC (- 0.5 m);
- **St2: left bank of the Caraș river** - nearby the entrance of the cave Peștera de după Cârșă with a N-W exposition, on a limestone substratum in a colluvium covered with moss, only with a few hours of sunlight during the day and a high relative humidity. Here 2 drillings were dug: S8-CC(- 0.8 m) and S9-CC (- 0.7 m);
- **St3: Domän Valley** on both banks of the river as follows: S1-VD (- 0.5 m) on the left bank of the river in a forested zone with a W exposition; S2-VD (- 0.8 m) on the left bank of the river with a W exposition, in a sunny colluvium clogged by soil in its upper part and S5-VD (- 0.8 m) with an E exposition in a denuded sunny colluvium.

**RESULTS AND DISCUSSION**

Abbreviations: m. s. = maturus senior; m. jun. = maturus junior; S = drilling; CC = Cara Keys (Cheile Caraului); VD = Domänul Valley (Valea Domänului). For the persons that collected the material we will use their initials: VI = Victoria Ilie, CI = Ciprian Ilie, CT = Cristian Tencușe, VR = Romulus Vuia.

The Chilopoda species are represented by 18 species as follows:

- *Eupolybothrus transylvanicus* (Latzel) 1880 1♂ m. s., leg. VI, CT, 24.04.2002, in MCV1-CC; 2♂ m. s., leg. VI, CT, 27.07.2002, in S1-CC; 1♀ m. s., leg. VI, CT, 27.07.2002, in S2-CC; 1♂ m. s., leg. VI, CT, in MCV1-CC; 1♂ m. s., leg. VI, CI, 22.08.2002, in S4-CC.
- *Harpolathobius intermedius* Matic 1958 1♂ m. s., leg. CT, 2.10.2002, in S4-CC.
- *Lithobius forcatus* (Liné) 1758 2♂ m. s., leg. VI, 27.08.2001, in soil nearby the entrance of the cave Peștera Mică de sub Peștera Vrașka (Carașova village); 2♀♂ m. jun., leg. VI, 11.04.2003, in leaf-litter in the Caraș Valley (Caraș Keys).
- *Lithobius erythrocephalus* C. Koch 1847 1♂ m. s., leg. VI, 23.04.2002, under stones nearby the old limestone quarry in the Domän Valley.
- *Lithobius erythrocephalus erythrocephalus* C. L. Koch, 1847 1♀ m. s., leg. VI, 11.04.2003, leaf-litter in the Caraș Valley (Caraș Keys).
- *Lithobius erythrocephalus schuleri* Verhoeff, 1925 4♀♂ m. s., leg. VI, in detritus and leaf-litter in the Caraș Valley (Caraș Keys).
- *Lithobius mutabilis* L. Koch, 1862 2♀♂ m. s., leg. VI, 11.04.2003, in leaf-litter in the Caraș Valley (Caraș Keys).
- *Lithobius muticus* C. L. Koch 1847 1♀ m. jun., leg. VI, 23.04.2002, under stones nearby the old limestone quarry in the Doman Valley; 1♂ m. jun., 1♀ m. jun., 1♀ m. s., leg. VI, 11.04.2003, in detritus in the Nermed Valley; 2♂♂ m. s., leg. VI, 11.04.2003, in detritus in the Caraș Valley (Caraș Keys); 1♀ m. jun., 1♂ m. jun., 1♀ m. jun., 2♀♂ m. s., leg. VI, 16.04.2003, in leaf-litter in the Dealul Goli near Reșita.
- *Monotarsobius crassipes* L. Koch 1862 1♂ m. s., leg. VI, in soil nearby the entrance of the cave Peștera Mică de sub Peștera Vrașka (Carașova village).
• Monotarsobius cf. microps (Meinert, 1868) 1 ♂ immat.-praematur., leg. VI, 11.04.2003, in leaf-litter in the Caraș Valley (Caraș Keys).

• Monotarsobius putatosus Matic 1964 1 ♀ m. jun., leg. VI, CȚ, 24.04.2002, in MCV1-CC.

• Scutigera coleoptrata (Linne) 1758 1 ♀ adult, leg. VI, CȚ, 27.07.2002, in S2-VD; 5 larva II, 1 larva III, leg. VI, Cl, 22.08.2002; in S2-VD; 1 ♀ pseudomaturus, leg. VI. CȚ, 24.10.2002, in S2-VD; 1 ex., leg. VI, CȚ, 4.01.2003, in S2-VD.

• Dicellophilus carniolensis (C. L. Koch, 1847) 1 ♀, leg. VI, 23.04.2002, in leaf-litter in the Doman Valley.

• Strigamia engadina (Verhoeff, 1935) 1 ♂, leg. VI, Cl, 22.08.2002, in S8-CC; 1 ♂, leg. VI, 11.04.2003, under rocks in the Nermed Valley.


• Cryptops cf. trisulcatus (Brolemann, 1902) 1 juv., leg. VI, 11.04.2003, leaf-litter in the Caraș Valley (Caraș Keys).

• Cryptops hortensis Leach, 1814 2 juv., leg. VI, 11.04.2003, in leaf-litter in the Caraș Valley (Caraș Keys).

• Cryptops sp. 1 adult (indet. without P21 of legs), leg. CȚ, 23.05.2002, in S4-CC; 1 juv. leg. VI, 11.04.2003, in detritus in the Caraș Valley (Caraș Keys); 4 juv., 4 adults, leg. VI, 16.04.2003, in leaf-litter and under rocks in the Dealul Gol near Reșița.

In the samples from Carașova-Reșița area we identified 18 species of Chilopoda belonging to all orders of Chilopoda. Their abiotic preferences (subterranean categories given according to Negrea 1994) and chorology (the terms proposed by Taglianti et al. 1992) are presented in Table 1.

Table 1. Chilopoda species in the edaphic and subterranean environments of Carașova-Reșița area; TF = troglophilous, STF = subtroglophilous, TX = troglobxene.

<table>
<thead>
<tr>
<th>Taxa</th>
<th>Chorology</th>
<th>Abiotic preferences</th>
<th>Edaphic</th>
<th>MSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eupolypholis transylvanicus (Latreille) 1800</td>
<td>South-European</td>
<td>Edaphic, TF</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Harpuliobius intermedius Matic 1958</td>
<td>European</td>
<td>Edaphic, TF</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Lithobius fenestrosus Meinert 1872</td>
<td>European</td>
<td>Edaphic, detriticolous</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Lithobius erythrocephalus erythrocephalus C. L. Koch, 1847</td>
<td>European</td>
<td>Edaphic, detriticolous</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Lithobius erythrocephalus schuleri Verhoef, 1925</td>
<td>South-East European</td>
<td>Edaphic, detriticolous, TF</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Lithobius mutabilis L. Koch, 1862</td>
<td>South-European</td>
<td>Edaphic, STF</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Lithobius matutis C. L. Koch 1847</td>
<td>Centrl European</td>
<td>Edaphic, STF</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Monotarsobiida crassipes L. Koch 1862</td>
<td>Euro-Siberian</td>
<td>Edaphic, TF</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Monotarsobius cf. microps (Meinert, 1868</td>
<td>European</td>
<td>Edaphic, TX</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Monotarsobius putatosus Matic 1964</td>
<td>Endemic for Romania</td>
<td>Edaphic, STF</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Scutigera coleoptrata (Linne) 1758</td>
<td>Mediterranean</td>
<td>Edaphic, TF</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Dicellophilus carniolensis (C. L. Koch, 1847</td>
<td>Holartic</td>
<td>Edaphic, STF</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Strigamia engadina (Verhoef, 1935</td>
<td>Central-European</td>
<td>Edaphic, STF</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Cryptops anomalans Newport 1844</td>
<td>European</td>
<td>Edaphic, depressicolous, TX</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Cryptops croaticus Verhoef 1931</td>
<td>South-East European</td>
<td>Edaphic, depressicolous, STF</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Cryptops cf. trisulcatus (Brolemann, 1902</td>
<td>West-Mediterranean</td>
<td>Edaphic, STF</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Cryptops hortensis Leach, 1814</td>
<td>Turano-Euro-Mediterranean</td>
<td>Edaphic, STF</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
Among the collected species, *Harpolithobius intermedius* and *Lithobius mutabilis* were recorded for the first time in the studied area.

Until now *Harpolithobius intermedius* was regarded as an endemic species for the limestone masses of the Apuseni Mts.: Orășanu Valley at Șcarisoara and Turzii Keys (Matic 1966). Recently, it was collected also in MSS at Cloșani (Oltenia) (Ilie *et al.* in press). By this record, we extend the known range of *Harpolithobius intermedius* distribution to the South-Western part of Romania, in Banat.

Up to now, *Lithobius mutabilis* was known to occur in soil of Transylvania, Maramureș and Moldova and three caves in the Virghișului Keys (Matic 1966). So, our study extends the range of *Lithobius mutabilis* distribution to the South-Western part of the Romanian Carpathians.

Among the 18 species identified in the studied area, 7 species were collected in the MSS (see Table 1). We noticed the presence of a great number of *Cryptops anomalans* individuals (41.5%) and of *Cryptops croaticus* (24.52%), as well. They were followed by *Scutigera coleoptrata* (16.98%), *Eupolyarthrus transylvanicus* (11.32%), *Lithobius forcatus*, *Monotarsobia pastulatus* and *Strigamia engadina* (1.88% each).

Our results demonstrate that in the Carașova – Reșița area, the Chilopoda fauna is composed mainly of European species (22.22%). They are followed by Central-European species (16.66%) and South and South-East European species (11.11% each).

Our study on the Chilopoda species from Banat is still under way and we expect the diversity of the Chilopoda species to be increased soon.

**Acknowledgements** - We express our gratitude to Dr. Șt. Negrea for his help in our study; we are grateful to the Speleological Association "Exploratorii" Reșița for the help in digging the drillings in the Carașova – Reșița area; we are also obliged to Ciprian Ilie, Cristian Țencușe and Romulus Vuia for their help during our field examinations and to our colleague Andrei Giurginca who improved the language.

**REFERENCES**


ЕДАФСКЕ И ПОДЗЕМНЕ ХИЛОПОДЕ ИЗ ПОДРУЧЈА РЕШИЦА–КАРАШОВА (БАНАТ, РУМУНИЈА). ПРЕЛИМИНАРНИ ИЗВЕШТАЈ

ВИКТОРИЈА ИЛИЈЕ

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Током истраживања фауне опилиона у подручју Решица–Карашина (Банат, Румунija) утврђено је укупно 18 врста ових арахнида, од којих је 7 пронађено у тзв. површинским подземним стаништима (MSS). Досадашње студије указују на чињеницу да је диверзитет опилиона Баната значајно већи него што је то било до сада познато.