

THE AQUATIC MALACOSTRACEAN FAUNA (CRUSTACEA: MALACOSTRACA) FROM THE MEHEDINTI PLATEAU RIVERS

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SUMMARY. The present paper represents a biogeographically study regarding the distribution of crustacean species from the Amphipod and Decapod groups in the rivers of the Mehedinți Plateau. The georeferenced data can be used in the management policies of the natural protected areas, the *Austropotamobius torrentium* species being „a priority species”, therefore completing the old existing data.

KEYWORDS: *Austropotamobius*, torrentium, stone crayfish, amphipods, Mehedinti Plateau, distribution

Introduction

The Crustacean subphylum represents a relatively small percentage of the entire actual assembly of specific diversity of the Arthropods Phylum. At the same time, the crustaceans occupy a dominant position in the development of the trophic circuit from the aquatic ecosystems, being the main primary trophic resource converters into animal biomass. This is explained by the fact that, the actual biomass of the crustacean populations from the aquatic ecosystems of our planet surpasses the cumulate biomass of the rest of the entire metazoans group (Müller, 2002). They live in all kinds of stagnant or running waters, with shores rich in roots and oozy or stony floors.

In the lattice aquatic ecosystems, the crustaceans from the Malacostraca Class belong to the Isopods, Amphipod and Decapods orders, the Decapods also being water quality indicators and having 8 points by means of species from the *Astacus* and *Austropotamobius* genus, according to Biological Monitoring Working Party Score - BMWP (Chapman and Jackson, 1998). Among Astacidae the Stone Crayfish *Austropotamobius torrentium* is the most relevant species in relation to the habitat's health due to the fact that, it is the most sensitive to pollutants among all crayfishes (Băcescu, 1967). They prefer the upper courses of rivers, being included in the European Council's Directive 92/43 Annex 5 „Plant and animal species of common interest whose sampling from nature and exploitation is making the object of management measures” is rated as „priority species” (Pârvulescu, 2007). According to the Red List of the International Union for Conservation of Nature and Natural

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Resources (IUCN Red List) this species has the „Insufficiently Known” attribute (<http://iucnredlist.org>).

The existing data regarding the distribution of this species are rather old Călinescu (1929) and Băcescu (1967) and for a better management in the region, it is more than required to bring the information up to date.

The analyzed area, the Mehedinți Plateau, is a well individualized region, found at the root of the Mehedinți Mountains, between the Motru Valley in the north-east and the Danube Valley in the south, representing a passage towards the Getic Plateau. The individuality of the landscape is represented by the geographical location, under the influences of the warm Mediterranean air masses, by the direct contact with the mountains, by the geological formation (crystalline schist's and lime stone), tectonically fragmentation, the variety of the relief with gorge-like valleys, dolines, caves, etc, and the hydrographical network characteristic to karst landscapes with numerous underground drainages or dry valleys.

In this paper we intend to make a contribution to the knowledge on the structure of the benthonic fauna of the rivers and especially to the knowledge on the crustaceans from the Malacostraca Class from the area of the Mehedinți Plateau, bringing new data regarding the species distribution in the studied region.

Materials and Methods

Between July and August 2007 and August 2008 qualitative samples have been collected from the rivers and creeks from the Mehedinți Plateau, representing a total of 30 locations.

For the collection of the benthos samples, for the capture of small crustaceans, I have used a net with the dimension of the holes of 350 μm . We have gathered the samples by carting the net on the floor of the water meanwhile, up the river, the rocks and the plants were emboweled and washed. The species identification was accomplished in the laboratory using the optic microscope and the binocular magnifier. For details, micro dissections and microscopic processing were carried out. For the identification of the amphipods we used the determinative manual by Cărașu *et. al.* (1955), bringing up to date the systematic according to the actualized data provided by Fauna Europaea (<http://faunaeur.org>). The collected specimens were kept in alcohol 70% in the collection entitled „Specimens: Lucian Pârvulescu”.

For the accomplishment of the envisaged proposes, in accordance with the decapods distribution, several stages of identification were made: consulting the reference literature regarding the presence of the species in the area, consulting, the river segments where the investigations will be carried out were determined, on a topographical map, gathering of the specimens from the water bed, gathering of the informative data from the local inhabitants (fishermen, hunters etc).

The gathering of the specimens was made directly by hand, covering approximately 200 meters in each investigated river and controlling the shores and the small spaces between the rocks. The longer rivers were investigated in at least 2

parts of the water course. We declared the species as being „*absent*” when, after covering almost 400 meters, no specimen was found, under the reserve that, when, due to the morphological conditions of the substratum, the gathering of the specimens was not possible.

The captured specimens were identified *in situ* taking into account the morphological criteria, then sexed and photographed. After the identification took place, the specimens were set free in the same place from where they were collected. Presently, the photographs, having the RAW format, are stored in the collection „Images: Lucian Pârvulescu”.

For the identification, we have used the Băcescu (1967) and Ingle (1997) determinative manual. In the field, data regarding the aquatic habitats and benthonic biodiversity were collected. For the editing of the maps, we used the Inkscape 0.45 (<http://inkscape.com>) software, using as a basis, a topographical map of the region, scaled 1:50.000.

Results and discussion

Between July-August 2007 and August 2008 the lattice aquatic habitats were investigated in the geographical region of the Mehedinți Plateau, in order to list the malacostraceans species. The investigations contained the middle and upper portion of the rivers (Fig. 1). Hereinafter, we will present a general picture of the four hydrographical basins along with the investigated locations, and also, centralized data in Table 1.

The Motru River hydrographical Basin was investigated from the upper part, on the Valea Carpinei tributary (indicative location 1). At this location the *Gammarus balcanicus* Schäferna, 1922 amphipod was identified. The Left Tributary which drains into the barrier lake (indicative location 2) showed the presence of the amphipods by the means of the *G. balcanicus* species. In none of these locations, the decapods were identified. The upper portion of main course of the Motru River, towards the confluence with the Motru Sec River, was investigated (indicative location 3) and 2 species of amphipods were identified: *G. balcanicus* and *Gammarus fossarum* Koch, 1835. Taking into account the information offered by the local inhabitants, the decapods are present only in the creeks from the upper part of the river.

The Motru Sec River was investigated in three locations, on the main course near Lazului Cave (indicative location 4), on the Capra Tributary (indicative location 5) and up the river towards the Source of the river (indicative location 6). In the Motru Sec River location, the presence of the crustacean species was not identified in the collected samples, but at the other two locations, the amphipod species *G. balcanicus* was found. The presence of the decapods was not found in any of the investigated locations. According to the information provided by the rangers of the Domogled - Valea Cernei National Park, the decapods are present in most of the tributaries of the Capra River, towards the upper part.

The Brebina River (a left tributary of the Motru River) was investigated in only one location, in the lower part, towards the Obârșia Cloșani village (indicative location 7). At this location, species of amphipods by means of *G. balcanicus* were identified, as well as species of decapods, by means of *Austropotamobius torrentium* Schrank, 1803. According to the local inhabitants from the Obârșia Cloșani village (the City Hall secretary) the decapods are also present in the smaller tributaries of the Brebina River: Mazdreana creek, Comănești creek, Valea Seacă creek, Ogașu Bradului creek. In the Bulba tributary (indicative location 8) the presence of the amphipods *G. balcanicus* was identified, as well as of decapods *A. torrentium*.

The left tributary of the Motru River, the Iupca River, was investigated in the upper part near the Băluței Gorges (indicative location 9), identifying *G. balcanicus* amphipod species and *A. torrentium* decapods species. The investigation carried out on the Pistrița River (indicative location 10), as well as those on the Rudina River (indicative location 11) did not show any presence of aquatic malacostracean species.

The Ponoarele Depression, without any exterior link to the Motru River Basin, was investigated, in tree locations. Cracu Muntelui (indicative location 12) showed the presence of amphipods *G. balcanicus* and decapods *A. torrentium*. The tributary which drains into Zăton Lake (indicative location 13) did not show the presence of any malacostraceans in the collected samples, probably due to the weak, intermittent flow of the water course. The Valea Mare creek, which also drains into the Zăton Lake (indicative location 14) showed, in the collected samples, the presence of amphipods species by means of *G. balcanicus* and also of decapods, by means of *A. torrentium*.

The hydrographical Basin of the Coșuștea River was investigated in two locations, Isverna Creek towards the exit from the Isverna Cave (indicative location 15) showed richness in species of amphipods by means of two species: *G. balcanicus* and *G. fossarum*, as well as decapods species represented by *A. torrentium*. The investigations carried out on the left tributary of the Coșuștea River, Brîgleasca creek (indicative location 16) showed the presence of *G. balcanicus* and *G. fossarum* amphipods and of the *A. torrentium* decapods. The left tributary of the Coșuștea River, Turtaba creek, was also investigated (indicative location 17) showing only the presence of decapod species by means of *A. torrentium*. The main course of the Coșuștea River, upwards from Cerna Vârf village was investigated (indicative location 18) and, both amphipod species *G. balcanicus* and *G. fossarum* and decapod species *A. torrentium* were found present.

In the right tributary of Coșuștea, Coșușțița River (indicative location 19) the collected samples showed only *G. balcanicus* amphipods. On the upper course of the river is carried out an operation of gravel.

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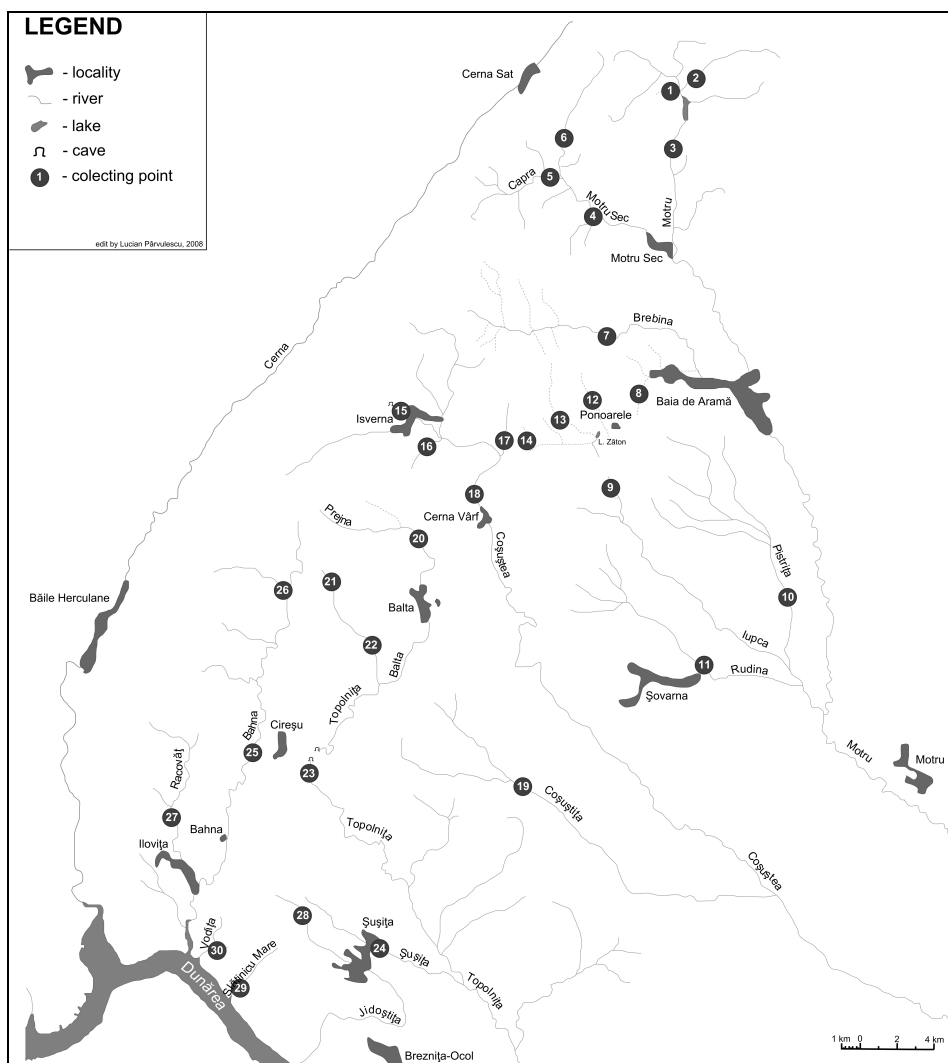


Fig 1. Geographical distribution of the points in which the sampling of the malacostraceans species was made, in the Mehedinți Plateau.

The hydrographical Basin of the Topolnița River was investigated in four locations. Prejna creek, upwards Balta village (indicative location 20), showed the presence of amphipod species *G. balcanicus* and decapod species *A. torrentium*. The locations found at the source of the Topolnița River, upwards from Mălărișca village (indicative location 21) and downwards from Sfodea village (indicative location 22) have shown the presence of amphipods species *G. fossarum*, as well as decapods species *A. torrentium*.

Table 1.

The centralized georeferenced data of the observed species from very location, in DMS system (x: present, -: absent)

| Indicative location | Coordinates (DMS) N/E | <i>Gammarus balcanicus</i> | <i>Gammarus fossarum</i> | <i>Austropotamobius torrentium</i> |
|---------------------|---|----------------------------|--------------------------|------------------------------------|
| 1 | 45 ⁰ 08'16'' / 22 ⁰ 48'13'' | x | - | - |
| 2 | 45 ⁰ 08'13'' / 22 ⁰ 48'39'' | x | - | - |
| 3 | 45 ⁰ 06'29'' / 22 ⁰ 48'08'' | x | x | - |
| 4 | 45 ⁰ 04'24'' / 22 ⁰ 44'51'' | - | - | - |
| 5 | 45 ⁰ 05'34'' / 22 ⁰ 43'33'' | x | - | - |
| 6 | 45 ⁰ 06'09'' / 22 ⁰ 43'37'' | x | - | - |
| 7 | 45 ⁰ 01'16'' / 22 ⁰ 42'40'' | x | - | x |
| 8 | 44 ⁰ 59'44'' / 22 ⁰ 47'16'' | x | - | x |
| 9 | 44 ⁰ 57'11'' / 22 ⁰ 45'26'' | x | - | x |
| 10 | 44 ⁰ 53'48'' / 22 ⁰ 52'55'' | - | - | - |
| 11 | 44 ⁰ 52'21'' / 22 ⁰ 48'20'' | - | - | - |
| 12 | 44 ⁰ 59'04'' / 22 ⁰ 45'44'' | x | - | x |
| 13 | 44 ⁰ 59'06'' / 22 ⁰ 44'37'' | - | - | - |
| 14 | 44 ⁰ 58'46'' / 22 ⁰ 43'57'' | x | - | x |
| 15 | 44 ⁰ 58'45'' / 22 ⁰ 37'21'' | x | x | x |
| 16 | 44 ⁰ 58'05'' / 22 ⁰ 38'37'' | x | x | x |
| 17 | 44 ⁰ 58'16'' / 22 ⁰ 41'26'' | - | - | x |
| 18 | 44 ⁰ 55'45'' / 22 ⁰ 40'48'' | x | x | x |
| 19 | 44 ⁰ 49'02'' / 22 ⁰ 40'51'' | x | - | - |
| 20 | 44 ⁰ 54'58'' / 22 ⁰ 38'09'' | x | - | x |
| 21 | 44 ⁰ 54'09'' / 22 ⁰ 34'12'' | - | x | x |
| 22 | 44 ⁰ 51'35'' / 22 ⁰ 33'13'' | - | x | x |
| 23 | 44 ⁰ 48'48'' / 22 ⁰ 33'37'' | x | x | x |
| 24 | 44 ⁰ 43'37'' / 22 ⁰ 35'51'' | x | - | x |
| 25 | 44 ⁰ 48'51'' / 22 ⁰ 31'07'' | x | - | - |
| 26 | 44 ⁰ 50'22'' / 22 ⁰ 31'43'' | x | - | x |
| 27 | 44 ⁰ 46'21'' / 22 ⁰ 27'44'' | x | x | x |
| 28 | 44 ⁰ 43'46'' / 22 ⁰ 33'29'' | x | - | x |
| 29 | 44 ⁰ 42'12'' / 22 ⁰ 30'36'' | x | - | - |
| 30 | 44 ⁰ 43'24'' / 22 ⁰ 29'12'' | x | - | - |

The river was also searched at the exit of the Topolnița Cave (indicative location 23). In the gathered samples amphipod species *G. balcanicus* and *G. fossarum* were found, as well as decapods *A. torrentium*. The investigations carried on the Șușița River (indicative location 24) showed the presence of amphipods by means of *G. balcanicus* species and decapods by means of *A. torrentium* species.

The direct tributaries of the Danube were investigated, as follows: the Bahna River, near the bridge which makes the connection between Cireșu and Negrușa villages (indicative location 25), showed the presence of malacostracean species only by means of *G. balcanicus* amphipod. In the upper part (indicative location 26), in the collected samples, the *G. balcanicus* amphipod and *A. torrentium* decapod were found; the left tributary of the Bahna River, the Racovăț creek (indicative location 27), shows, in the collected samples, the presence of amphipods by means of *G. balcanicus*, *G. fossarum* and the *A. torrentium* decapod. The Jidoștița River (indicative location 28) was researched in a place located in the upper part of the Jidoștița village and displayed *G. balcanicus* amphipods species and *A. torrentium* decapod species. The investigations carried out in the Slătiniu Mare creek (indicative location 29) showed the presence of the crustaceans only by means of *G. balcanicus* amphipod. This situations is similar to the one obtained from Vodița creek (indicative location 30).

Conclusions

The qualitative researches between 2007 and 2008 in the region of the Mehedinți Plateau offer the possibility of data interpretation regarding the distribution of the aquatic malacostracean species in the studied region.

- There have been collected and identified two species of amphipods from the Gammaridae family: *Gammarus balcanicus* and *Gammarus fossarum*. The most commonly found species *Gammarus balcanicus* was identified in 23 out of 30 locations;
- No aquatic isopods have been found on samples collected in Mehedinti Plateau Rivers;
- According to the field observations, we can easily say that, the populations of the *Austropotamobius torrentium* decapods are small declining, problems being identified mostly in the extreme upper part of the Motru River, where, the species has been identified only in the extreme upper part of the river. The species is absent from the middle and lower course of the river, probably due to forest exploitations. We still have to mention that, the human impact of the near by villages is not related with the presence of the species either on the upper part or on the lower parts of the river; the presence of the species is relatively constant.

Acknowledgements

I would like to take this opportunity to give my regards to the Environmental Ministry and to Natura 2000 Network for the material support, to the Administration of the Mehedinți Plateau Geopark, represented by engineer Cornel Meilescu and to Ms. Adina Lazăr for the English translation of this text.

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