

## **Crustaceans from the groundwaters of Vrachanska Planina Mountains**

IVAN PANDOURSKI, APOSTOL APOSTOLOV

**Abstract.** Thirty one Crustacean species from 21 localities are reported from groundwaters of Vrachanska Planina Mountain. The list of species is completed on the basis of available bibliographic sources and original data of authors. Faunal samples are collected at the natural access to underground ecosystem, caves and springs. Eight species are stygobionts: three cyclopoids, one harpacticoid, three isopods and one amphipod, or 6.6 % of all the Bulgarian stygobiont Crustacean fauna. *Elaphoidella balkanica* Apostolov and *Protelsonia lakatnicensis* (Buresch & Gueorguiev) are local endemic species of the Vrachanska planina Mountains.

**Key words:** Crustaceans, karst, caves, groundwaters, Vrachanska Planina Mountains, Bulgaria.

### **Introduction**

Crustaceans are frequently found in Bulgarian groundwaters and they are one of the most numerous animal groups in the karstic water ecosystem of Vrachanska Planina Mts.. According to some contemporary conception (Valchev et al., 2013), Lakatnik part belongs to Mogilska Formation of the Vrachanska Planina Mts., therefore here we have included the species composition of crustaceans in caves and springs of this area. The present article summarizes all the information concerning the species composition and distribution of the Crustaceans in groundwaters of Vrachanska Planina Mts., including all published data. Fage (1926) described the first stygobiontic crustacean species (*Niphargus bureschi*) in the region of Lakatnik. In the middle of the last century Štěrba (1956) published short note with redescription of stygobiontic cyclopid *Speocyclops infernus* inhabiting the cave water of “Temnata dupka” near Lakatnik. Later, Buresch & Gueorguiev (1962) described the hypogeous endemic isopod *Protelsonia lakatnicensis* from the same cave. During the period 1990 – 2000 more intensive, but of incidental nature investigations were carried out: Pandourski (1991, 1992, 1998, 2000) and Apostolov (1992, 2012).

### **Material and Methods**

The list of Crustacean species in groundwaters of Vrachanska Planina Mts. is completed on the basis of available bibliographic data, mentioned above in Introduction, and

original data of authors. Faunal samples are collected at the natural access to underground ecosystem, caves and springs, by direct filtering of water at the outlet using phreatic net of Cvetkov (1968), plankton nets of mesh size between 38 and 100  $\mu\text{m}$ , and hand-held plankton net. Faunal material is also collected with Bou-Rouch pump or by the methods of artificial substrates or of Karaman-Chappuis (Mathieu et al. 1991). The samples were collected from the different hydrodynamic zones of karst: the infiltration and the saturated zones and during low-water and high-water periods.

The material originates from 21 localities (Table 1). For some of caves and springs their geographic position is mentioned only by topographic names because the accurate coordinates are unknown.

**Table 1.** Collection localities of crustacean species in Vrachanska Planina Mts..

No	Localities	Coordinates (WGS84), topographic name
<b>Caves</b>		
1	<b>"Barkite 14"</b> , Gorno Ozirovo Village	N43° 13' 10.2" E23° 27' 23.1"
2	<b>"Ledenika"</b> , Vratza	N 43° 12' 35.64" E 23° 29' 34.80"
3	<b>"Belyar"</b> , Gorno Ozirovo Village	N 43° 13' 26.70" E 23° 27' 16.50"
4	<b>"Stresherska Jama"</b> , Gorno Ozirovo Village	N 43° 12' 45.59" E 23° 28' 15.82",
5	<b>"25 Godini Akademik" ("Barkite 08")</b> , Gorno Ozirovo Village	N 43° 13' 18.72" E 23° 27' 24.69"
6	<b>"Temnata Dupka"</b> , Lakatnik railway station	N 43° 05' 23.49" E 23° 23' 13.03"
7	<b>"Razhishkata Peshtera"</b> , Lakatnik railway station	N 43° 05' 25.95" E 23° 23' 00.03"
8	<b>"Ezeroto"</b> , Tcherepish railway station	N 43° 05' 56.37" E 23° 36' 35.36"
9	<b>"Kalna Matnitza"</b> , Glavatzi Village	N 43° 15' 54.10" E 23° 20' 47.85",
10	<b>"Dupkata"</b>	Beli izvor village
11	<b>Cave near "St. Ivan Pusti" Monastery</b> , near "St. Ivan Pusti" Monastery	N 43° 14' 35.36" E 23° 27' 43.88"
<b>Karstic Springs</b>		
12	<b>"Jitoljub"</b> , Lakatnik railway station	N 43° 05' 18.66" E 23° 22' 59.63"
13	<b>Karstic spring</b>	Bistretz village
14	<b>"Beli izvor"</b>	Vratza
15	<b>"Kalna Matnitza"</b> , Glavatzi village	N 43° 15' 55.04" E 23° 20' 52.71"
16	<b>"Opletnenski izvori"</b> , Opletnya Village	N 43° 07' 25.81" E 23° 27' 09.69"
17	<b>"Ezeroto"</b> , Tcherepish railway station	N 43° 05' 55.47" E 23° 36' 34.26"
18	<b>"Petrenski izvor"</b>	N 43° 05' 38.56" E 23° 21' 56.55"
<b>Artificial galleries and geologic borehole</b>		
19	<b>Mine "Zgorigrad"</b> , Zgorigrad Village	N 43° 09' 35.19" E 23° 29' 18.17"
20	<b>Artificial gallery</b> , Gorna Bela Retchka Village	N 43° 09' 50.78" E 23° 21' 47.45"
21	<b>Geologic borehole</b>	Beli Izvor Village

## Results and Discussion

### Species composition with number of localities

#### Subphylum Crustacea

##### Class Ostracoda

- Ostracoda gen. sp.: 1, 4, 5, 6, 12, 14, 16, 18;

##### Class Maxillopoda

###### Subclass Copepoda

###### Order Cyclopoida

- Cyclopoida – copepods: 4
- *Paracyclops fimbriatus* (Fischer 1853): 1, 2, 3, 10, 12, 13, 19;
- *Paracyclops poppei* (Rehberg 1880): 21;
- *Eucyclops serrulatus* (Fischer 1851): 6, 12, 19, 21;
- *Cyclops strenuus* Fischer 1851: 14;
- *Megacyclops viridis* (Jurine 1820): 6, 9, 12, 14, 15, 19;
- *Macrocyclus albidus* (Jurine 1820): 10;
- *Acanthocyclops vernalis vernalis* (Fischer 1853): 10, 15, 21;
- *Acanthocyclops* sp. ("kieferi" gr.): 16;
- *Diacyclops languidoides* (Lilljeborg 1901) (s. lat.): 1, 6, 21;
- *Diacyclops languidoides languidoides* (Lilljeborg 1901): 10, 15, 12, 14;
- *Diacyclops clandestinus* (Kiefer 1926): 6;
- *Diacyclops bisetosus* (Rehberg 1880): 1, 21;
- *Metacyclops minutus* (Claus 1863): 21;
- *Speocyclops infernus* (Kiefer 1930): 2, 3, 5, 6, 7, 20;
- *Speocyclops lindbergi* Damian 1957: 8;

###### Order Harpacticoida

- Harpacticoida gen. sp.: 7, 17;
- *Bryocamptus (Bryocamptus) minutus* (Claus 1863): 4;
- *Bryocamptus (Rheocamptus) pygmaeus* Sars 1863: 4, 12, 18;
- *Bryocamptus (Rheocamptus) zschokkei tatrensis* (Minkiewicz 1916): 1;
- *Bryocamptus (Limocamptus) dacicus* (Chappuis 1923): 1;
- *Canthocamptus (Canthocamptus) staphylinus* (Jurine 1820): 1;
- *Pesceus schmeili* (Mrazek 1893): 3, 5;
- *Moraria (Moraria) poppei* (Mrazek 1893): 1;
- *Attheyella (Attheyella) wierzejskii wierzejskii* (Mrazek 1893): 1;
- *Attheyella (Attheyella) crassa* (Sars 1863): 6, 18;
- *Elaphoidella balkanica* Apostolov 1992: 5;

##### Class Branchiopoda

###### Order Dipolstraca

- *Streblocerus serricaudatus* (Fischer 1849): 1;
- *Daphnia (Daphnia) parvula* Fordyce 1901: 14;

##### Class Malacostraca

###### Order Isopoda

- *Asellus aquaticus* (Linnaeus 1758): 14;
- *Bureschia bulgarica* Verhoeff 1926: 3, 6;

- *Sphaeromides bureschi* (Fage 1926): 9, 11;
- *Protelsonia lakatnicensis* (Buresch & Gueorguiev 1962): 6;

#### **Order Amphipoda**

- *Niphargus* sp.: 8, 9, 13, 14, 18, 19, 20;
- *Niphargus bureschi* Fage 1926: 3, 5, 6.

Thirty one species of Crustaceans are known from groundwaters of Vratschanska Planina Mts. but we consider that the faunal list can be enriched by further research. Eight species are stygobionts: three cyclopoids, one harpacticoid, three isopods and one amphipod (6.6 % of the Bulgarian stygobiont Crustacean fauna).

Widely distributed in the karst of Western Stara Planina is the Balkan endemic species *Speocyclops lindbergi*, originally described from Romania. *Elaphoidella balkanica* is a local endemic species, known only from a cave in high part of the Vratschanska Planina Mts.. *Protelsonia lakatnicensis* is also known only from a single locality – the cave “Temnata Dupka” near Lakatnik. This isopod could be considered as an endemic relict species which probably originated during the Upper Cretaceous (Pandourski & Breskovski, 1995).

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## **Ракообразни (Crustacea) от подземните води на Врачанска планина**

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### **(Резюме)**

Съобщават се 31 вида ракообразни от 21 находища в подземните води на Врачанска планина. Списъкът на видовете е съставен въз основа на наличните библиографски източници и оригинални данни на авторите. Фаунистичните проби са събрани в зоните на естествен достъп до подземната екосистема – пещерите и изворите. Осем вида са стигобионти: три циклопиди, една харпактикоида, три изоподи и една амфипода, или 6,6 % от известната досега българска стигобионтна фауна. *Elaphoidella balkanica* Apostolov и *Protelsonia lakatnicensis* (Buresch & Gueorguiev) са локални ендемити за Врачанска планина.