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Mayflies (Ephemeroptera, Insecta) from Vrachanska Planina Mountains

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Abstract. Eighteen species, belonging to 7 subgenera, 11 genera and 7 families, are currently known from 8 sites of streams and rivers on the territory of Vrachanska Planina Mts. They represent 15,52 % of the mayflies known up to now for Bulgaria. Twelve species are newly reported for the mountain. Brief faunistic and zoogeographical notes are given. The conservation status of the species is also discussed.
Key words: Ephemeroptera, faunistics, Vrachanska Planina Mts., NW Bulgaria.

Introduction

From faunistic point of view Bulgaria is among the countries with relatively well studied mayfly fauna. The known species represent approximately 95 % from the supposed by country (Sartori, 2001). So far, a total of 116 species, belonging to 15 families, 32 genera and 21 subgenera of the order Ephemeroptera are established in Bulgaria (Presolska, 2014). Despite the high level of knowledge on Ephemeroptera in the country as a whole, there are still areas for which no actual data are available.

The main water bodies in Vrachanska Planina Mts. flow into Ogosta and Iskar Rivers watersheds (Hristova, 2012). Although Bulgarian Danube tributaries are objects of long-term hydrobiological investigations (Janeva, 1991; Russev *et al.*, 1994, etc.), there is a lack of faunistic information concerning the above mentioned region. Vidinova & Russev (2009) and Presolska (2014) pointed out single localities of some leptophlebiids and ecdyonurids in the region. Braasch et al. (1985) reported one *Rhithrogena*- species as new for Bulgarian fauna from a locality adjacent to the Vrachanski Balkan Nature Park border.

The aim of the present work is to summarize the literature and recent unpublished faunistic data on Ephemeroptera from rivers and streams in Vrachanska Planina Mts.

Material and Methods

This paper includes faunistical information from both published and unpublished data concerning mayfly fauna of the Vrachanska Planina Mts. The materials are mainly in larval stage and originate from 8 river Sites, which are referred to the relevant UTM code (Fig.1, Table 1).

Newly reported ones are part of hydrobiological samples, collected in June 2013 from the main water catchments in Vrachanski Balkan Nature Park using the adopted multi-habitat sampling technique (Cheshmedjiev *et al.*, 2011).

The specimens were identified using a stereomicroscope Olympus CZ2 and microscope Zeiss Jena Ergaval according to the original descriptions of species as well as the summary works on European species of the genera *Baetis*, *Rhithrogena* and *Ecdyonurus* (Müller-Liebenau, 1969; Hefti, Tomka & Zurwerra, 1989; Tomka & Rasch, 1993; Bauernfeind & Humpesch, 2001).

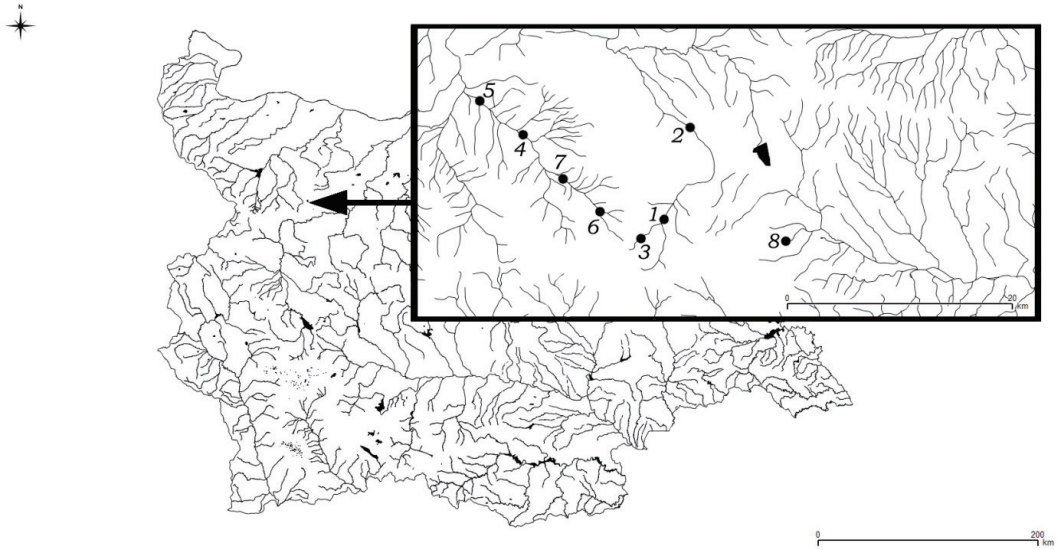

Fig. 1. Map of the localities (The numbers of sites refer to those in Table 1).

The faunal list follows the nomenclature of Bauernfeind & Soldan (2012), as genera and subgenera are listed in alphabetical order. The division of *Baetis*- and *Rhithrogena*-species by groups and subgroups follows Müller-Liebenau (1969) and Tomka & Rasch (1993).

Species distribution is given in the text with reference to their known localities including Site №, UTM-code, finding date and number of specimens.

Table 1. List of the known localities of mayflies in the Vrachanska Planina Mts.

Site №	River	Locality	UTM-Code	Geographical coordinates	Altitude (m a.s.l.)
1	Leva	upstream Zgorigrad	GN08	N 43.169528 E 23.506	564
2	Leva	downstream Vratsa	GN08	N 43.22275 E 23.526639	316
3	Desna	near mine “Mir”	GN08	N 43.158472 E 23.487472	801
4	Cherna	at Gorno Ozirovo	FN98	N 43.218931 E 23.393361	320
5	Cherna	upstream Dolno Ozirovo	FN99	N 43.238389 E 23.359417	278
6	Gluharska	upper part	FN98	N 43.174167 E 23.45425	608
7	Gluharska	lower part	FN98	N 43.193167 E 23.425	412
8	Tributary to Iskar River	downstream Pavolche Village	GN18	N 43.156975 E 23.602778	483

Zoogeographical classification is by Haybach & Jacob (2010) and is based on the current knowledge of species distribution.

The map of the established localities is prepared by Adobe Photoshop CS on GIS-layer covering the river net in Bulgaria.

Results and discussion

Faunistic list

Superfamily Baetoidea

Family Baetidae Leach, 1815

Genus *Baetis* Leach, 1815

***Baetis (Baetis) alpinus* (Pictet,1843)**

Material: Site 1 (GN08): 11.06.2013- 2 la; Site 3 (GN08): 11.06.2013, 4 la; Site 6 (FN98): 12.06.2013, 1 la; Site 7 (FN98): 12.06.2013, 2 la.

Notes: First record for the Vrachanska Planina Mts.

***Baetis (B.) buceratus* Eaton, 1870**

Material: Site 4 (FN98): 12.06.2013, 1 la.

Notes: First record for the Vrachanska Planina Mts.

***Baetis (B.) fuscatus* (Linnaeus, 1761)**

Material: Site 4 (FN98): 12.06.2013, 10 la.

Notes: First record for the Vrachanska Planina Mts.

***Baetis (Nigrobaetis) muticus* (Linnaeus, 1758)**

Material: Site 3 (GN08): 11.06.2013, 3 la.

Notes: First record for the Vrachanska Planina Mts.

***Baetis* (*Rhodobaetis*) *rhodani* (Pictet, 1843)**

Material: Site 1 (GN08): 11.06.2013, 2 la; Site 4 (FN98): 12.06.2013, 18 la; Site 5 (FN99): 12.06.2013, 5 la; Site 6 (FN98): 12.06.2013, 1 la.

Notes: First record for the Vrachanska Planina Mts.

Superfamily Heptagenioidea

Family Oligoneuriidae Ulmer, 1914

Genus *Oligoneuriella* Ulmer, 1924

***Oligoneuriella rhenana* (Imhoff, 1852)**

Material: Site 4 (FN98): 12.06.2013, 39 la; Site 5 (FN99): 12.06.2013, 17 la.

Notes: First record for the Vrachanska Planina Mts.

Family Heptageniidae Needham, 1901

Genus *Ecdyonurus* Eaton, 1868

***Ecdyonurus (Ecdyonurus) dispar* (Curtis, 1834)**

Material: Site 2 (GN08): 06.6.1933, 3 la (Presolska, 2014); Site 4 (FN98): 12.06.2013, 4 la; Site 5 (FN98): 12.06.2013, 2 la.

***Ecdyonurus (E.) insignis* (Eaton, 1870)**

Material: Site 4 (FN98): 12.06.2013, 6 la.

Notes: First record for the Vrachanska Planina Mts.

***Ecdyonurus (E.) venosus* (Fabricius, 1775)**

Material: Site 4 (FN98): 12.06.2013, 1 la.

Notes: First record for the Vrachanska Planina Mts.

***Ecdyonurus (Helvetoraeticus) helveticus* (Eaton, 1883)**

Material: Site 1(GN08): 11.06.2013, 11 la.

Notes: First record for the Vrachanska Planina Mts.

Genus *Epeorus* Eaton, 1881

***Epeorus (Epeorus) assimilis* Eaton, 1885**

Material: Site 6 (FN98): 12.06.2013, 2 la; Site 7 (FN98): 12.06.2013, 15 la.
Notes: First record for the Vrachanska Planina Mts.

Genus *Rhithrogena* Eaton, 1881

***Rhithrogena iridina* (Kolenati, 1839)**

Material:Site 3 (GN08): 11.6.2013, 1 ♂ la.
Notes: Rare species.

Superfamily Leptophlebioidea

Family Leptophlebiidae Banks, 1900

Genus *Choroterpes* Eaton, 1881

***Choroterpes (Choroterpes) picteti* (Eaton, 1871)**

Material: Site 8 (GN18): 24.6.1961, 1 la (Vidinova & Russev, 2009: 152).

Genus *Habroleptoides* Schoenemund, 1929

***Habroleptoides confusa* Sartori & Jacob, 1986**

Material: Site 8 (GN18): 24.6.1961, 2 la (Presolska, 2014).

Genus *Habrophlebia* Eaton, 1881

***Habrophlebia lauta* Eaton, 1884**

Material: Site 2 (GN08): 23.6.1961, 3 la; Site 8 (GN18): 24.6.1961, 2 la (Vidinova & Russev, 2009: 156).

Superfamily Ephemeroidea

Family Ephemeridae Latreille,1810

Genus *Ephemera* Linnaeus, 1758

***Ephemera (Ephemera) danica* Müller, 1764**

Material: Site 6 (FN98): 12.06.2013, 3 la; Site 7 (FN98): 12.06.2013, 13 la;
Notes: First record for the Vrachanska Planina Mts.

Superfamily Ephemerelloidea

Family Ephemerellidae Klapálek, 1909

Geneus *Ephemerella* Walsh, 1863

***Ephemerella ignita* (Poda, 1761)**

Material: Site 2 (GN08): 06.6.1933, 2 la, 23.6.1961, 3 la; Site 8 (GN18): 24.6.1961, 12 la (Presolska, 2014); Site 4 (FN98): 12.06.2013, 8 la; Site 5 (FN99): 12.06.2013, 10 la.

Superfamily Caenoidea

Family Caenidae Newman, 1853

Genus *Caenis* Stephens, 1836

***Caenis macrura* Stephens, 1835**

Material: Site 4 (FN98): 12.06.2013, 1 la; Site 5 (FN99): 12.06.2013, 2 la.
Notes: First record for the Vrachanska Planina Mts.

Faunistic notes

Till now 18 mayfly species are established in the territory of Vrachanska Planina Mts. They belong to 7 families, 11 genera and 7 subgenera and represent 15.52 % of all known Bulgarian species. These are mainly widespread species (as defined in Presolska, 2014), as only *Rh. iridina* represents the group of species with limited distribution. The four mayflies, referred as "widespead" and/or "euribionts" for Bulgaria, are also found here – *E. (E.) assimilis, E. (E.) danica, E. ignita and C. macrura (*Vidinova & Russev, 1997; Presolska, 2014). *The species Ch. (Ch.) picteti* is widely distributed predominantly in the Danube tributaries but less rare in the rest of the country (Vidinova & Russev, 2009).

Due to the mountainous type of the water courses in this area most of the mayflies here are typical rheobionts – these are all heptageniid, leptophlebiid, baetid and *oligoneuriid species.*

Conservation status and zoogeographical notes

Gueorguiev et al. (1998) characterized the level of rarity for Ephemeroptera order in Bulgaria as low and listed 19 species in this category. Presolska (2014) update their number to 25. From all the above listed species, *Rhithrogena iridina* is the only mayfly which is included in this category. Dietrich Braasch *found its male subimago at* Botunja River, near Vratsa (13.5.1969) and later *Braasch et al. (1985: 126)* reported it as new for Bulgarian fauna. The finding of the species nowadays suggests steady populations in this area.

Ephemeroptera is among the orders with moderate to low level of endemism (Gueorguiev et al., 1998; Presolska, 2014). According to data mentioned above, no any endemic or relict mayflies were found to occur in Vrachanska Planina Mts.

From the zoogeographical point of view the Mediterranean complex predominates here, represented by 8 species (*O. rhenana, E.* (*E.*) *dispar, E.* (*E.*) *venosus, E.* (*E.*) *assimilis, Ch.* (*Ch.*) *picteti, H. confusa, E.* (*E.*) *insignis* and *E.* (*H.*) *helveticus*, followed by representatives of the Pontic complex - (*B.* (*B.*) *buceratus, H. lauta* and *C. macrura*. The Siberian and Montano-Mediterranean complexes are presented by 2 species each - *E.* (*E.*) *danica* and *E. ignita*, and *B.* (*B.*) *alpinus* and *R. iridina,* respectively.

As the mayflies constitute a considerable part of the aquatic macroinverterate communities and due to their pollution indicator capacity, further complete faunistic and ecological studies are needed.

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Еднодневки (Ephemeroptera, Insecta) от Врачанската планина

ЯНКА ВИДИНОВА, ЛЮБОМИР КЕНДЕРОВ

(Резюме)

Осемнадесет вида еднодневки, принадлежащи към 7 подрода, 11 рода и 7 семейства, са установени понастоящем от 8 пункта от потоци и реки на територията на Врачанската планина. Те съставляват 15,52 % от известните за страната видове от разред Ephemeroptera. Дванадесет от тях се съобщават за първи път за района. Дават се кратки фаунистични и зоогеографски бележки. Обект на дискусия е също и консервационният статус на някои от установените видове.