

Biodiversity & Ecosystems

A NEW RECORDS OF *EPEORUS YUGOSLAVICUS* (ŠAMAL, 1935) [EPHEMEROPTERA] IN SERBIA AND MONTENEGRO

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ABSTRACT

During hydrobiological investigations of diversity of rivers and brooks of Serbia and Montenegro, new records of Ephemeroptera species, Epeorus yougoslavicus (12) was ascertained, in period from 2000 to 2005 years. The find of this species, except that it enriches diversity of Ephemeroptera fauna of Serbia and Montenegro, is also important for knowledge of distributions of this species. New biotopes of this species in Gobeljska River on Kopaonik Mountain represents the most northward border of its areal, known until now. On all biotopes where it was found in Serbia and Montenegro, the species occurs in very rare populations, that is a case and with its other until now known finds on Balkan and Apennine peninsula. Small populations and mutually isolated bitope can be taken as parameters on which this species can be consider as endangered for territory of Serbia and Montenegro.

Introduction

During long-year investigations of aquatic ecosystems of Serbia and Montenegro and with aim of identification of rare and endangered taxons of macroinvertebrates, the new find of Ephemeroptera species was ascertained, previously known under the name *Iron yougoslavicus* and now under the present accepted name *Epeorus yougoslavicus*. The find of this species is new for Ephemeroptera fauna of Serbia and Montenegro, and it is stated on two localities in basin of South and West Morava river (Serbia) and one locality in upper course of Moraca river (Montenegro).

Until now, the species was known from mountain streams of Macedonia (12, 5), Bosnia and Herzegovina (10), Greece (8), Bulgaria (11), south and south-east part of Italia and Sicilia (1).

On all mentioned previous occurrences on territory of Balkan and Apennine penin-

sula, the species was ascertained in mountain area in upper courses of rivers and streams. Beside that, on all occurrences, populations of this species are small in number and were recorded on mutually distant localities, so this species can be consider as rare, but because of its steno-valent as endangered, also.

Materials and Methods

In period from 2000 to 2005 years, complete investigations of diversity of aquatic ecosystems of Serbia were performed, in scope of project „*Ex-situ* protection of aquatic ecosystem biodiversity of Serbia“. This project also, included formation of data base about biodiversity of land waters of Serbia, so that data about 916 aquatic residences of all types of land waters are included. It was recorded and described 1190 taxons of macroinvertebrates in period from 1873 to 2005 years. In Ephemero-

TABLE 1
Length body of larvae: *Epeorus yougoslagicus* (out of cerc) from Serbia and Montenegro river

Body size (mm)	Serbia			Montenegro
	Masurička river 13.07.2003	Masurička river 20.08.2005.	Gobeljska river 12.08.2005.	Morača river
	8.7	7.1	8.86 / 7.8 / 8.1	8,1

ptera group, 97 species were identified.

Sampling was done by benthic net according to Surbrer, in time interval of 5 minutes. Material was fixed in 4% formaldehyde. Identified specimens were compared with collection of Museum of Nature in Skopje and determined on the base of descriptions which were done by Šamal (12) and Ikonov (5, 6).

Material from rivers of Montenegro was collected by collaborators of Faculty of Science, Department of biology in Podgorica. Determined material was stored and it is now in collection of Faculty of Science in Kragujevac, under the code AK-111.

Results and Discussion

First find of larvae of species *Epeorus yougoslagicus* on territory of Serbia was recorded on locality of upper course of Masuricka river (42° 36.170' N; 22° 14.561' E), in 13th July 2003. There was found only one larvae of *Epeorus yougoslagicus* (12). On the same locality was found just one more larvae, in 20th August 2005.

Except locality on Masuricka river, three larvae of this species were found during investigations of running waters of NP Kopaonik in upper course of Gobeljska River (43° 23.037' N; 20° 47.397' E), in 12th august 2005 year.

From collected material on territory of Montenegro, from localities of upper course of Moraca river, only one larvae of this species was found. (N ?; E ?)

Dimensions of found bodies and determined larvae of species *Epeorus yougoslagicus* are presented in **Table 1**.

Length of cerci of larvae of *Epeorus yougoslagicus* (12) that was found in Gobeljska river is 12.1 mm, while at rest specimens cerci were more or less

damaged during preparation. Adult forms of species *Epeorus yougoslagicus* (12) were not recorded at investigated localities.

Under data represented of Table 1. to see dimensions of larvae body small at larvae represented in Macedonia (13). However, all other characteristics of larvae, such as: form and size of head, "film" of filament on front side of head shield, form of prothorax, characteristic distribution of hairs on cerci, morphology of mandible, maxilla with maxilar palp and specially morphology of gills, correspond to description that was given by mentioned authors.

Abiotic characteristics of biotopes of species *Epeorus yougoslagicus* (12) on territory of Serbia and Montenegro are presented in **Table 2**.

The species *Epeorus yougoslagicus* (12) was first described by Šamal (12, 13) on the base of caught larvae and adults in streams of upper course of river at Corab mountain (Macedonia). Šamal described this species as new for science and under the name *Iron jugoslavicus*, which is the first original name of this new species of Ephemeroptera. Ikonov (5, 7) has recorded new finds of species *Iron jugoslavicus* for territory of Macedonia, primarily in mountain areas of Šar mountain (altitude above 1200m), but in upper course of Vardar and Crni Drim. Vidinova (11) quoted finds of this species for mountain areas of Vitosa, Rila, Pirina and mid parts of Stara planina, in study of insect diversity of Bulgaria. The same author this species considers very rare and endemic, for Bulgaria, as well as for Balkan Peninsula. During expedition through Albania, from collected material, Puthz (8, 9) has recorded finds of this species for territory of Greece, but he put it in genus

TABLE 2
Abiotic characteristics of biotopes of species *Epeorus yougoslavicus* (Šamal, 1935) (Serbia and Montenegro)

Parameters / Biotopes	Masurička river		Gobeljska river	Morača river
date	13.07.2003.	20.08.2005	12.08.2005.	
Altitude sea-level (m)	1050		1300	1400
Width river (m)	4		5	3
Depth river (m)	0.1-0.60		0.15-0.40	0.20 – 0,60
Velocity (m/s)	1,6		1,5	1,9
Bottom characteristics (%)	rock- 50 stone – 40 others - 10		rock- 70 stone – 20 others - 10	rock- 70 stone – 25 others - 5
Temperature (°C)	15.2	13.9	15.1	13,6
pH value	7.2	7.01	7.54	7,43
Conductivity (µS/cm ³)	60	77	130	90
Oxygen (mg/l)	8.14	11.6	9.94	11,6
Oxygen (%)	95.8	98.8	102.8	100.7

Epeorus. Also, Baurenfeind (4) quotes finds of species *Epeorus yougoslavicus* for territory of Greece. Tanasijević (10) has reported finds of larvae and subimage of species *Epeorus yougoslavicus* in upper course of Neretva river (Bosnia and Herzegovina). Braasch (1) and Belfiore (3) has identified species *Iron yougoslavicus* in mountain streams of south Italia and Sicilia, and by that extends its area of diffusion and out Balkan peninsula. For area of south Italia and Sicilia, Belfiore & Antonio (2) in list of species also, quote finds of larvae of imaga of *Epeorus yougoslavicus*, in biogeographical study of Ephemeroptera.

From given review, it can be seen that some authors align Ephemeroptera species *Epeorus yougoslavicus* taxonomically different, with respect to belonging to corresponding genus. At first, species was described in genus *Iron*, but according to most authors its present taxonomic state is in genus *Epeorus*. Under the taxonomic nomenclature species *Epeorus yougoslavicus* was included in data base Fauna of Europe (www.faunaeur.org), with annotation that it was at first described in genus *Iron*.

In the data base – Fauna of Europe – distribution of species *Epeorus yougoslavicus* is quoted, where also territory of Serbia

and Montenegro is mentioned, but about that there was not any written evidence until to results of this study. New data about finds of this species for Serbia and Montenegro extend its areal of diffusion on Balkan Peninsula, and at the same time, its new biotope in Gobeljska River on Kopaonik Mountain is its endmost north-west border of distribution that is known until now (Fig. 2).

According to already mentioned investigations (12, 7, 8, 1) species *Epeorus yougoslavicus* (12) is classified in stenovalent forms, before all in respect to temperature, oxigen and speed of water stream, that is confirmed on the base of our investigation, too (Table 2).

The finds of this species in waters of Serbia and Montenegro (Masurička river, Gobeljska river, Morača river) confirm states that it populates area of upper and mid ritron, and on the altitude from 1000 to 1500m (Table 2).

State of population of *Epeorus yougoslavicus* (12) in waters of Serbia and Montenegro generally corresponds to state of populations from other territory (Bulgaria, Greece, Macedonia, Italia, Sicilia). The investigations have showed that this species also occurs rarely and occasionally in our

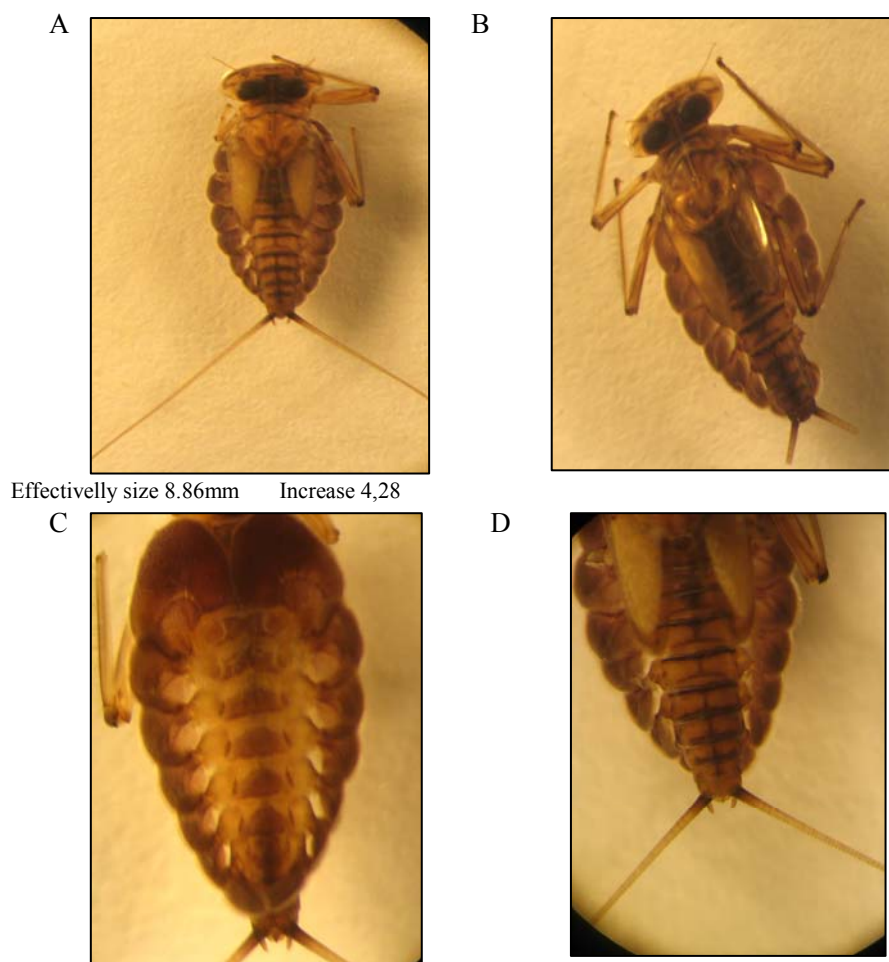


Fig. 1. *Epeorus yougoslavicus* (12), larva: A, B – dorsal view; C,D- ventral view. (exemplars from Gobeljska river, National Park Kopaonik).

waters, and that the areas of rivers where it occurs are relatively small and limited.

On the base of present results, and before all because of small number populations and relatively mutually distant and isolated biotopes, as well as stenovalent (7), this species can be considered endangered for territory of Serbia and Montenegro. Detailed investigations of populations of the species in the waters of Serbia and Montenegro will indicate on category of endangering, and by that on corresponding measures of protection.

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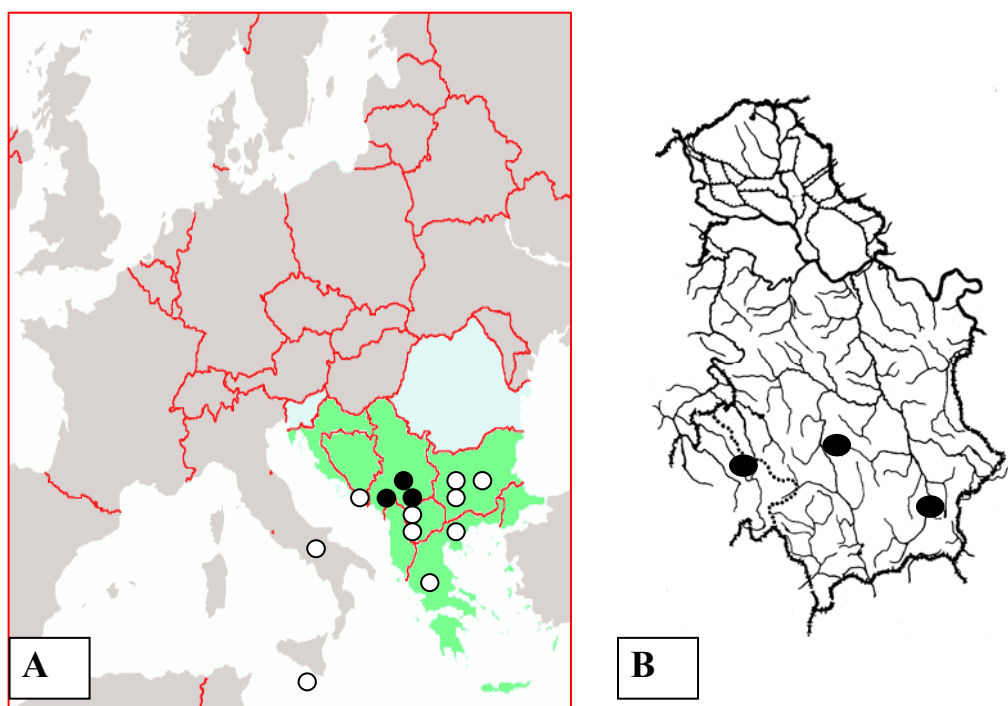


Fig. 2. Distribution *Epeorus yougoslavius* (12). A – Europe, B- Serbia and Montenegro.
○ know records, *Epeorus yougoslavius*; ● new records, *Epeorus yougoslavius*.

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