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NEW DATA ON WATER BUGS (HETEROPTERA) IN SERBIA

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During the hydrobiological studies in the watershed of the Southern Morava River (Southeast Serbia), the collected macrozoobenthos material included specimens of water bugs from 41 localities on 25 rivers. Eleven species were identified: *Sigara* (*Subsigara*) *falleni* (Fieber), *Aphelocheirus aestivalis* (Fabricius), *Notonecta glauca* Linnaeus, *Nepa cinerea* Linnaeus, *Hydrometra stagnorum* (Linnaeus), *Velia caprai* Tamanini (new for the fauna of Serbia), *Velia affinis filippii* Tamanini (new for the fauna of Serbia), *Aquarius najas* (De Geer), *Aquarius paludum* (Fabricius), *Gerris gibbifer* Schummel and *Gerris thoracicus* Schummel.

KEY WORDS: Heteroptera, hydrobiological studies, Serbia, *Velia caprai*, *Velia affinis filippii*

INTRODUCTION

The fauna of aquatic Heteroptera has been insufficiently studied in Serbia. FIEBER (1861), HORVÁTH (1897, 1903), DIVAC (1907), KORMILEV (1936, 1938, 1939, 1943), and CSIKI (1940) made important contributions to present knowledge about the Heteroptera fauna in Serbia. They mostly studied land bugs (Geocorisa).

Data on water bugs (Hydrocorisa) are fragmentary and present in faunistic works or included in results of complex hydrobiological studies by certain researchers (SIMIĆ, 1993; MARKOVIĆ *et al.*, 1997, 1999; STRAHINIĆ, 2000; ŽIVIĆ, 2005; ŽIVIĆ

et al., 2001, 2002, 2004, 2006), but no special attention was given to water bugs. That is one of the reasons why the first records in Serbia for the family Aphelocheiridae and species *Aphelocheirus aestivalis* (Fabricius) were published only in 2007. The record of *A. aestivalis* represents the southernmost boundary of this species' range in Europe ŽIVIĆ *et al.*, 2007).

In the few previous studies on water bugs in Serbia, specimens of Heteroptera were collected at the following localities: Bela Crkva, Deliblatski Pesak, Pančevo, Sombor, Stara Pazova, Titel, Vrdnik, and Zemun (HORVÁTH, 1897); Bela Palanka, Beograd, Golubac, Niš, Pirot, Požarevac, Ripanj, and Žarkovo (HORVÁTH, 1903); Beograd, Čokešina, Ćuprija: Dobričevo, Deli Jovan, Golubac, Kopaonik, Ljubičevo, Negotin, Negotin: Bukovo, Obrenovac, Slatina, and Venčac (DIVAC, 1907); Kačanik (SCHUMACHER, 1916); Bela Palanka, Beograd, Bosilegrad, Crna Reka, Crna Trava, Gnjilane, Leskovac, Niš, Obilić, Pirot, Požarevac, Veliko Gradište, Venčac, Vlasina, and Šabac (KORMILEV, 1936, 1938, 1939, 1943); Avala, Beograd, Gnjilane, Košutnjak, Negotin, Novi Vrbas, Pirot, Prokuplje, Topčider, Trubarevo, Vlasinsko Blato, and Zemun (PROTIĆ, 1990; specimens are in the collection of the Natural History Museum and were collected by Nicholas Kormilev); Đakovica, Kosovo Polje, Kosovska Mitrovica, Peć (CSIKI, 1940), Kučevo, Majdanpek (ŽIVOJINOVIĆ, 1950), the Svrljiški Timok and the Trgoviški Timok (SIMIĆ, 1993); Toplica, a tributary of the Kolubara (ŽIVIĆ *et al.*, 2002, 2006); Borkovački Potok, a creek (ŽIVIĆ *et al.*, 2004); and the watershed of the Southern Morava River (ŽIVIĆ, 2005).

MATERIAL AND METHODS

Hydrobiological studies of the watershed of the Southern Morava River were performed seasonally during the period of 1998 – 2004. Surface area of the studied watershed is 15655 km^2, and length of the Southern Morava River is 232,6 km (if the starting branch Binačka Morava is included, it is 320.56 km). The total length of all studied watercourses is 1432.3 km.

Organisms of macrozoobenthos were collected at 230 localities on 45 rivers in the watershed of the Southern Morava, from Kopaonik in the west to the Stara Planina Mountains in the east; and from Mts. Bukovik, Rožanj, Rtanj and Slemen in the north, to Mt. Ruj in the south (ŽIVIĆ, 2005). Specimens of Heteroptera were recorded at 41 localities on 25 rivers.

The localities were carefully chosen in order to include the whole surface area of the Southern Morava's watershed. Thus, the upper parts of the watercourses covered all the main mountain massifs of the catchment area. With respect to the vertical distribution of localities, the highest point was at 1990 m a.s.l. (Kaludersko Vrelo in the Stara Planina Mountains), the lowest at 129 m a.s.l. (the confluence with the Western Morava near Stalać), so the altitude gradient was

1861 m. These localities included various types of substrates and vegetation associations, as well as confluences of larger tributaries. In all cases, there was at least one locality in the upper, middle, and lower part of the course of each river.

Samples were collected using a Surber net with a catchment surface of 300 cm^2 and mesh size of 250 mm. The study included the taking of 2251 samples for quantitative analysis. A sample was defined as specimens gathered with Surber net from a certain site along the watercourse. The material was fixed on the spot with 96% alcohol and separated from gravel, mud, and detritus using a binocular or plain optical microscope. Water bug taxa were determined with the aid of determination keys (ŠTUSÁK, 1980; SAVAGE, 1989).

RESULTS AND DISCUSSION

In this paper, data on identified Heteroptera specimens are presented according to the locality (river) where they were collected. Rivers are listed in alphabetical order, and data for the locality are listed chronologically. The numbers and abbreviations in the locality descriptions have the following meanings: Arabic numerals beside the locality's name indicate the place where samples were collected along the river course; R. – rock substrate; G. – gravel; Roman numerals indicate the stage of larvae; and Arabic numerals next to the Roman numerals represent the number of specimens.

CORIXIDAE

Sigara (*Subsigara*) *falleni* (Fieber, 1848)

Kamenička Reka River, locality 1. R. 5.8.2001. 1♂, 1♀.

APHELOCHEIRIDAE

Aphelocheirus aestivalis (Fabricius, 1794)

Banjska Reka River (tributary of Toplica River), locality 3. R. 28.4.2003. 1♀; Banjska Reka River (tributary of Jablanica River), locality 1. R. 1 4.8.2001. I/1; locality 3. R. 7.8.2003. 2♂, I/5, II/3, IV/1, V/1; locality 4. R. 7.8.2003. II/1, III/1, IV/1, V/1; Jablanica River, locality 2. R. 4.8.2001. IV/1, V/1; locality 5. R. 26.7.2002. III/1; Kosanica River, locality 4. R. 1.5.2002. 1♂; locality 4. R. 31.7.2002. 1♂; locality 4. R. 20.10.2002. 1♂; the Southern Morava River; locality 16. R.G. 24.7.2000. 1♂, 1♀, II/2; locality 13. R. 1.5.2001. III/1; locality 15. R.G. 1.5.2001. IV/1; locality 13. R.G. 31.7.2001. III/1, IV/2; locality 16. R.G. 27.10.2001. 2♂; locality 15. R.G. 27.10.2001. IV/1; locality 14. R.G. 29.10.2001. III/1; locality 13. R.G. 30.10.2001. II/1, III/1; locality 13. R. 5.2.2002. II/1; locality 13. R.G. 24.7.2002. 1♂, II/1, V/1; locality 12. R.G. 25.7.2002. 1♂;

locality 14. R.G. 19 10.2002. 1♂; locality 11. R.G. 26.4.2003. II/1; locality 12. R.G. 26.4.2003. IV/1; locality 16. R.G. 26.4.2003. 1♂; locality 1. R.G. 1.5.2003. IV/1; locality 12. R.G. 31.7.2003. III/1; locality 8. R.G. 6.8.2003. 3♂; locality 1. R.G. 4.8.2003 I/1, II/1; Nišava River; locality 5. R. 31.7.2001. II/1; locality 5. R. 31.7.2001. II/1; locality 2. R. 30.10.2001. II/1; locality 3. R. 30.10.2001. 1♂, II/1, III/1; locality 3. R. 30.10.2001. 1♂, II/1, III/1; locality 0. R. 30.4.2003. 2♂; locality 4. R. 30.4.2003. 11♂, II/1, III/4,IV/5,V/1; locality 5. R. 30.4.2003. III/1; locality 6. R. 1.8.2003. 2♂, 1♀, V/4; locality 2. R. 1.8.2003. 2♂, V/2; locality 5. R. 1.8.2003. 4♂, 1♀, II/1, III/2, IV/2; locality 4. R. 1.8.2003. 2♂, IV/4, V/4; locality 3. R. 1.8.2003. II/3, III/2, IV/2, V/3; locality 0. R. 1.8.2003. 6♂, 1♀, I/6, III/4, IV/1; Lužnica River; locality 3. R. 2.2.2002. III/1; Pusta Reka River, locality 8. R. 15.4.1998. 1♂; locality 9. G.1 16.4.1998. II/1, III/1, IV/1; locality 6. R. 27.4.2001. I/1, IV/1; locality 11. R. 1.5.2001. II/1, III/2, IV/5, V/1; locality 8. G. 27.5.1998. 3♂, II/3, III/3, IV/1; locality 9. G.1 27.5.1998. 3♂, IV/9, III/1; locality 9. G.2 27.5.1998. II/1, III/1; locality 6. R.2 28.5.1998. 1♂; locality 8. R. 20.6.1998. 2♂, III/2, IV/1; locality 8. G.1 20.6.1998. 2♂; locality 9. G.2 20.6.1998. 4♂, 4♀, III/4, IV/1; locality 9. G.1 20.6.1998. II/1, III/8, IV/1, V/1; locality 9. 20.6.1998. III/1; IV/3; locality 6. R.2 21.6.1998. 1♂; locality 8. 16.8.1998. II/1; locality 7. R. 16.8.1998. V/1; locality 7. G. 16.8.1998. I/1; locality 8. G. 16.8.1998. V/1; locality 9. 16.8.1998. 1♂, 1♀; locality 9. G.1 16.8.1998. 1♂; locality 9. G.2 16.8.1998. 1♂, II/3 locality 8. G. 3.5.2001. II/3. IV/1; locality 11. R.G. 31.7.2001. 1♂, 1♀, I/2, II/5, II/2, V/1; locality 6. R. 3.8.2001. 9♂, 6♀, II/1, III/1, V/3; locality 8. G. 5.8.2001. I/3, III/1; locality 9. G. 5.8.2001. 2♂, I/2; locality 10. R. 5.8.2001. 1♀; locality 11. R.G. 27.10.2001. III/4, IV/14, V/3; locality 6. R. 29,10,2001. 1♂, III/1; locality 8. G. 29,10.2001. I/1, II/2, II/2; locality 10. R. 29.10.2001. V/3; locality 6. R. 3.2.2002. I/1; locality 9. G. 3.2.2002. 3♂, II/1, III/1, IV/1; locality 11. R.G. 3.2.2002. III/1, IV/5; Ribarska Reka River, locality 5. R. 31.7.2003. 1♂, I/2, II/1; Temska Reka River; locality 3. R. 31.7.2001. 1♂, II/1; Toplica River; locality 10. R. 31.7.2001. 1♂, V/1; locality 4. R. 31.7.2002. V/1; locality 11. R. 2.3.2003. 1♂, IV/1; locality 11. R. 31.7.2003. 1♂; locality 4. R. 7.8.2003. 12♂, III/1, IV/1; locality 8. R. 7.8.2003. 1♂, I/1, II/1, III/4, V/2; locality 10. R. 7.8.2003. III/1; Veternica River; locality 4. R. 27.4.2001. 1♂; locality 6. R. 4.5.2002. III/1; locality 7. R. 2.5.2002. 2♂, 1♀, II/2, III/5; locality 7. R. 1 25.7.2002. 1♂, V/1; locality 10. R. 25.7.2002. II/1, V/1; locality 6. R. 29.4.2003. 1♀; locality 9. R. 29.4.2003. 1♂; locality 1. R. 5.8.2003. 1G; locality 6. R. 6.8.2003. 2♂, 2♀, III/1,V/1; locality 7. R. 6.8.2003. 9♂, I/2. III/1; locality 8. R. 6.8.2003. I/1; locality 9. R. 6.8.2003. 2♂, I/4, III/1; locality 10. R. 6.8.2003. I/2, II/1, IV/1; Vlasina River, locality 8. R. 1.8.2002. IV/1; locality 6. R. 20.10.2002. 1♂.

NOTONECTIDAE

Notonecta glauca Linnaeus, 1758

Vošanja River, locality 3. R. 28.7.2001. 2♂; Kamenička Reka River, locality 1. R. 5.8.2001. 4♂, 1♀, V/1; 31.10.2001. 1♂, 1♀; Vujanovačka Reka River, locality 2. 5.8.2001 1♀.

NEPIDAE

Nepa cinerea Linnaeus, 1758

Banjska Reka River, locality 2. 5.8.2003. 1♂; Blatašnica River, locality 1. 1.8.2003. IV/2; 1. 1.8.2003. 1♀; 1. R. 1.8.2003. L; Crvena Reka River, locality 2. R. 31.7.2001. IV/1; Gradska Reka River, locality 1. 29.4.2001. 1♂; Jerma River, locality 4. 31.7.2001. 3♂; the Southern Morava River, locality 15. G. 1.5.2001. 1♂; locality 13. R.G. 2.3.2003. 1♂; locality 3. R.G. 4.8.2003. 3♂, 2♀, II, III; locality 15. 28.7.2001. 4♂; Kosanica River, locality 2. 1.5.2002. 1♂; Lužnica River, locality 3. 30.4.2001. 1♂; Moravica River, locality 5. 28.7.2001. III/1; locality 31. R. 24.7.2002. III/2, IV/1; Nišava River, locality 2. 29.4.2001. 1♂; locality 4. R. 1.8.2003. IV/1; Pusta Reka River, locality 6. 15.4.1998. 1♂; locality 11. 16.4.1998. 1♂; 8. 27.5.1998. 3♂; locality 20.6.1998. IV/1; locality 7. 20.6.1998. V/1; locality 8. 20.6.1998. 1♂, II/1. III/1, IV/1, V/1; locality 11. 20.6.1998. L; locality 6. 21.6.1998. 2♂, IV/1; locality 6. 3.8.1998. 1♂; locality 11. 31.7.2001. IV/1; locality 6. R. 3.8.2001. 1♂; Sesalska Reka River, locality 1. 24.7.2002. V/1; Toplica River, locality 6. R. 28.4.2003. 1♂; locality 11. 31.7.2003. 1♂, IV/1; Veternica River, locality 1. R. 23.10.2002. 1♂; River Visočica, locality V2 R. 14.7.2001. L; Vujanovačka Reka River, locality 2. 5.8.2001. 1♂; locality 1. R. 6.8.2001. 1♂.

HYDROMETRIDAE

Hydrometra stagnorum (Linnaeus, 1758)

Jablanica River, locality 3. 29.4.2003. 1♂; the Southern Morava River, locality 4. R.G. 5.8.2003. 1♂; Kosanica River, locality 2. 1.5.2002. 1♂; Lužnica River, locality 3. 30.4.2001. 1♂; Moravica River, locality 3. 28.07.2001. 1♂; locality 3. 27.4.2002. 3♂, 1♀; locality 3. 24.7.2002. 1♂, 1♀; Pusta Reka River, locality 6. 15.4.1998. 1♂; locality 11. 16.4.1998. 1♂; locality 8. 27.5.1998. 1♂; locality 5. 28.5.1998. 1♂; locality 7. 28.5.1998. 2♂, 1♀; locality 8. 20.6.1998. 1♂; locality 11. 20.6.1998. 2♀; locality 3. 14.8.1998. 1♂; locality 8. 16.8.1998. L; Veternica River, locality 5. 29.7.2002. 2♂.

VELIIDAE

Velia caprai Tamanini, 1947

Pusta Reka River, locality 3. R. 6.8.2001. 4♀.

Velia affinis filippii Tamanini, 1947

Gazdarska Reka River, locality 1. R. 31.7.2001. L; Pusta Reka River, locality 3. R. 6.8.2001. 3♂.

GERRIDAE

Aquarius najas (De Geer, 1773)

Crvena Reka River, locality 2. 30.10.2001. 1♀; Moravica River, locality 2. R. 24.7.2002. 2♂, 1♀; Pusta Reka River, locality 3. 12.10.1998. 8♂, 5♀; Tisovik River, locality 3. R. 27.4.2002. 1♂.

Aquarius paludum (Fabricius, 1794)

The Southern Morava River, locality 3. R.G. 4.8.2003. 1♂, L; locality 4. R.G. 5.8.2003. 2♂.

Gerris gibbifer Schummel, 1832

Kamenička Reka River, locality 1. 28.4.2001. 1♂; Pusta Reka River, locality 3. 14.4.1998. 1♀; locality 8. 15.4.1998. 1♂, 1♀; locality 8. 27.5.1998. 1♀; locality 8. 20.6.1998. 1♂.

Gerris thoracicus Schummel, 1832

The Southern Morava River, locality 2. R.G. 1.5.2003. 1♂; Nišava River, locality 3. R. 1.8.2003. 1♀; Pusta Reka River, locality 3. 14.4.1998. 1♂; Vošanja River, locality 1. R. 1.5.2001. 1♂; Vujanovačka Reka River, locality 2. 5.8.2001. 1♀.

CONCLUSION

During hydrobiological studies in the watershed of the Southern Morava River (Southeast Serbia), in the period of 1998 – 2004, 11 species of Heteroptera were recorded, belonging to seven families. Corixidae: *Sigara* (*Subsigara*) *falleni* (Fieber, 1848), Aphelochiridae: *Aphelocheirus aestivalis* (Fabricius, 1794); Notonectidae: *Notonecta glauca* Linnaeus, 1758; Nepidae: *Nepa cinerea* Linnaeus, 1758; Hydrometridae: *Hydrometra stagnorum* (Linnaeus, 1758); Veliidae: *Velia caprai* Tamanini, 1947 and *Velia affinis filippii* Tamanini, 1947; and Gerridae: *Aquarius najas* (De Geer, 1773), *Aquarius paludum* (Fabricius, 1794), *Gerris gibbifer* Schummel, 1832, and *Gerris thoracicus* Schummel, 1832.

The number of specimens collected during the study was 535, most specimens belonging to the species *A. aestivalis* (398).

The following species of Heteroptera are newly recorded for the fauna of Serbia: *Velia caprai* Tamanini and *Velia affinis filippii* Tamanini.

For *Aquarius najas* (De Geer) this is the second record for Serbia. It was previously collected only at Đerdap: Boljetinska Reka (PROTIĆ, 1998).

The majority of Heteroptera were collected over rocky and gravelly substrates along the watercourse.

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НОВИ ПОДАЦИ ЗА ВОДЕНЕ СТЕНИЦЕ (HETEROPTERA) СРБИЈЕ

ЉИЉАНА ПРОТИЋ И ИВАНА ЖИВИЋ

ИЗВОД

У оквиру хидробиолошких истраживања слива Јужне Мораве (југоисточна Србија), у периоду од 1998. до 2004. године, у материјалу макрозообентоса прикупљене су и јединке водених стеница. Обрађени материјал Heteroptera је из 25 река, са укупно 41 локалитета.

Идентификовано је 11 врста, које су класификоване у седам фамилија - Corixidae: *Sigara* (*Subsigara*) *falleni* (Fieber); Aphelochiridae: *Aphelocheirus aestivalis* (Fabricius); Notonectidae: *Notonecta glauca* Linnaeus; Nepidae: *Nepa cinerea* Linnaeus; Hydrometridae: *Hydrometra stagnorum* (Linnaeus); Veliidae: *Velia caprai* Tamanini, *Velia affinis filippii* Tamanini; Gerridae: *Aquarius najas* (De Geer), *Aquarius paludum* (Fabricius), *Gerris gibbifer* Schummel и *Gerris thoracicus* Schummel. У оквиру истраживања сакупљено је 535 стеница, а највећи број примерака припада *A. aestivalis* (398).

Утврђене су нове врсте Heteroptera за фауну Србије: *Velia caprai* Tamanini и *Velia affinis filippii* Tamanini. Налаз врсте *Aquarius najas* (De Geer), је други налаз у Србији. До сада је ова врста била регистрована на Ђердапу, на локалитету Бољетин (Бољетинска река).

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