

**A CONTRIBUTION TO THE KNOWLEDGE OF AQUATIC HETEROPTERA IN ŠAR PLANINA MTS. AND PEŠTER PLATEAU (SERBIA)**Ljiljana PROTIĆ<sup>1</sup> and Nebojša ŽIVIĆ<sup>2</sup><sup>1</sup>Natural History Museum, Belgrade, Serbia

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**Abstract** - New data on 10 species of aquatic Heteroptera in glacial lakes of the Šar Planina Mts. and Pešter Plateau are presented. Three species new to Serbian fauna are recorded: *Callicorixa praeusta praeusta* (Fieber, 1848) from Pešter and the vicinity of Belgrade, *Hesperocorixa parallela* (Fieber, 1860) (Corixidae) and *Notonecta maculata* Fabricius, 1794 (Notonectidae) from Šar Planina Mts. and Pešter.

KEY WORDS: Heteroptera, Nepomorpha, Gerromorpha, fauna, Serbia

**Izveček – PRISPEVEK K POZNAVANJU VODNIH STENIC ŠAR PLANINE IN PLANOTE PEŠTER (SRBIJA)**

Predstavljeni so novi podatki o 10 vrstah vodnih stenic (Heteroptera) v ledeniških jezerih Šar planine in planote Pešter. Zabeležene so tri nove vrste za srbsko favno: *Callicorixa praeusta praeusta* (Fieber, 1848) s Peštra in iz okolice Beograda ter *Hesperocorixa parallela* (Fieber, 1860) (Corixidae) in *Notonecta maculata* Fabricius, 1794 (Notonectidae) s Šar planine in Peštra.

KLJUČNE BESEDE: Heteroptera, Nepomorpha, Gerromorpha, favna, Srbija

**Introduction**

The fauna of aquatic Heteroptera of Serbia was treated in several articles (Kment 2006; Protić, Živić 2007; Živić *et al.*, 2007; Protić 2011). The zoological and hydrological studies, including collection of aquatic specimens of Heteroptera, were per-

formed in various parts of Serbia (Strahinić 2000; Šeat 2011; Živić 2005; Živić *et al.* 2001, 2002, 2004, 2006). Ecological and taxonomic studies of invertebrate benthic macrofauna in water ecosystems of the southwestern part of the Republic of Serbia were performed in the period 1996–2010 (Živić *et al.* 1996, 2010). Among the macroinvertebrate groups collected there, aquatic Heteroptera are represented.

Particularly interesting Heteroptera communities are found in isolated aquatic ecosystems, lakes and springs at higher altitudes. This paper presents the list of Heteroptera distributed in the glacial lakes of Šar Planina and springs of the Pešter Plateau.

### Material and methods

Studies at Šar Planina were performed in the period September 1<sup>st</sup> 1996 – September 5<sup>th</sup> 1996, including research of glacial lakes, peat bogs and ponds. In addition to other groups of macrozoobenthos, aquatic Heteroptera were collected in five glacial lakes. The geological substrate of undulating high plain of Šar Planina, where the studied lakes are situated at the altitude of 2000–2100 m (occasionally up to 2400 m above sea level), is composed of glacial deposits – moraines (Čukić 1983), while the pedologic substrate of the terrain is typical ranker on schist (Pavičević *et al.* 1974). The saprobiological index for the studied lakes was calculated according to the algological studies (Urošević 1997a, 1997b, 1997c, 1997d). The substrate of the studied lakes of Mt. Šar-planina was overgrown with thick macrophytic vegetation. It turns certain parts of lakes into real peat bogs, which are different from the similar peat bogs of Northern and Central Europe and Central Balkans. The representation of species of Arcto-Alpine range type indicates the glacial origin of the lakes with peat domination. Peat vegetation is characterized by strong acidic reaction, which was also recorded in lakes of Šar Planina (Randjelović *et al.* 1997).

Šar Planina: Donje Tupankaminsko Jezero is situated at the altitude of 1560 m above sea level (41°54'36'' N, 20°43'27'' E). The lake is about 1 m deep, 20.5 m long and 20.7 m wide. The perimeter of the lake is approximately 29 m. It belongs to solifluction type of lakes. Water temperature was 13.6<sup>0</sup> C, while saprobic level was 1.66, representing the oligo-beta meso-saprobe range.

Šar Planina: Mala Vraca (Donje Veljinbeško Jezero) is situated toward northeast, at the foothills of massif Mala Vraca (41°33'41'' N, 20°44'00'' E). This lake is about 11 m long and 7 m wide. Water depth is 30–50 cm. The substrate of the lake is mostly mud, partially overgrown in peat vegetation. Saprobic index was 1.59.

Šar Planina: Gornje Veljinbeško Jezero is situated on the plateau Veljin Beg, at the altitude of 2085 m above sea level (41°53'26'' N, 20°43'25'' E). This lake has no tributaries and is fed by snow thawing. Peat deposits are present in certain parts. The banks of the lake are overgrown with moss and sedge, while the lake is surrounded by meadow associations formed by species *Nardus stricta*. The water temperature as 9.3<sup>0</sup> C while the saprobic index was 1.42 (oligo-beta mesosaprobe range of water quality) and pH was 3.5.



**Fig. 1:** Pešter Plateau: Spring Braćak.  
Foto: N. Živić



**Fig. 2:** Pešter Plateau: Spring Dobra Voda.  
Foto: N. Živić

Šar Planina: Gornje Defsko Jezero is situated at the altitude of 2100 m above sea level (41°52'49'' N, 20°43'04'' E). It is almost circular in shape, 100 m long, 80 m wide and 50 cm deep. The bottom was mud-based, overgrown in sphagnum mosses. Water temperature was 12 C°.

Šar Planina: Srednje Defsko Jezero is situated at the altitude of 2080 m above sea level (41°53'16'' N, 20°43'21'' E). This lake is 120 m long, 60 m wide and about 50 cm deep. The substrate is composed of mud and sphagnum moss. Water temperature was 12.3 C° while the saprobic index was 1.37.

Studies on macroinvertebrate fauna in springs at Pešter Plateau were performed from July 5<sup>th</sup> to July 10<sup>th</sup> 2010, including 24 springs situated toward northwest from town of Tutin, at the altitude of about 1200 m above sea level.

Spring: Braćak (Fig. 1), situated close to the village with the same name. The width of the spring is about 60 cm, depth about 20 cm, and water is slightly cloudy. The substrate of the spring is mud-based, with no submerged vegetation. The dominant plant species around the spring belong to the family of grasses.

Spring: Dobra Voda (Fig. 2), situated close to the village Naboje. The width of the spring is 50 cm and water depth is 15 cm. The bottom of the spring is covered in sand, and water is clear, cool and transparent. This spring is surrounded with beech and conifer forest.

Spring: Donje Djerekarsko Vrelo (Fig. 3), situated close to village Djerekare at the foothills of mountain peak Strašijevac. The width of the spring is 1.7 m while water depth is 40 cm. The spring erupts from within a rocky cliff. The bottom of the spring is rock-based. Water is clear and cool.

Spring: Djerekarsko Vrelo (Fig. 4), situated above the village Djerekare at the foothills of Mt. Krstača. The spring comes out of the cave rearranged in the capture area of Pešter water industry. The bottom is covered in stone and gravel. Water is fast-flowing and clear.



**Fig. 3:** Pešter Plateau: Spring Donje Djerekarsko Vrelo. Foto: N. Živić



**Fig. 4:** Pešter Plateau: Spring Djerekarsko Vrelo. Foto: N. Živić

Spring: Kamenjača (Fig. 5), situated in the village Suvi Do, at the foothills of Jagodnje Brdo. The width of the spring is about 2 m and water depth is about 65 cm. The bottom of the spring is mud-based and water is slightly cloudy. There is an abundance of green algae at the surface of the water. The spring is encircled by massive limestone rocks surrounded by meadows on peat-rich soil.

The collected specimens are deposited in the Natural History Museum in Belgrade, preserved in 80 percent ethyl alcohol. The first author identified the specimens using the keys by Stichel (1955-1956), Jansson (1986), Savage (1989, 1990), Savage, Swift (1997).



**Fig. 5:** Pešter Plateau: Spring Kamenjača. Foto: N. Živić

## Results

### **Nepidae Latreille, 1802**

*Nepa cinerea* Linnaeus, 1758

Šar Planina Mts.: Donje Tupankaminsko jezero 1560m 02.09.1996. 3m leg. N. Živić;

Pešter: Spring Dobra Voda - 09.07.2010. 2 larvae, leg. N. Živić.

Distribution in Serbia: Divac (1907), Kormilev (1936), Csiki (1940), Protić (1987, 1990), Protić, Živić (2007), Šeat (2011).

In the neighboring countries it was recorded in Albania (Josifov 1986), Bosnia and Herzegovina (Apfelbeck 1891), Bulgaria (Josifov 1986), Croatia (Merdić *et al.* 2005, Protić 1998), Greece (Josifov 1986), Hungary (Boda, Soós 2010), Macedonia (Grupče 1961, Wagner 1962, Protić 1998), Montenegro (Schumacher 1914), Romania (Ilie, Ban-Calefariu 2010, Berchi *et al.* 2011) and Slovenia (Gogala 2003).

### **Corixidae Leach, 1815**

*Callicorixa praeusta praeusta* (Fieber, 1848)

Pešter: Spring Braćak - 08.07.2010. 1m leg. N. Živić.

The Study Collection at the Natural History Museum in Belgrade includes a previously unpublished record from the vicinity of Belgrade: Veliko Selo, 08.07.2006, 3f leg. Aleksandar Stojanović.

In the neighboring countries it was recorded in Bulgaria (Josifov 1986), Hungary (Boda, Soós 2010), Macedonia (Grupče 1961, Wagner 1962) and Romania (Ilie, Ban-Calefariu 2010).

*Hesperocorixa linnaei* (Fieber, 1848)

Šar Planina Mts.: Mala Vraca (Donje Veljinbeško Jezero) 03.09.1996. 4m leg. N. Živić.

The only previous record from Serbia was from Kovin (Protić 2011).

In the neighboring countries it was recorded in Bosnia and Herzegovina (Grupče 1961), Bulgaria (Josifov 1986), Croatia (Kment, Beran 2011), Greece (Josifov 1986), Hungary (Boda, Soós 2010), Macedonia (Grupče 1961, Protić 1990), Montenegro (Horváth 1918) and Romania (Ilie, Ban-Calefariu 2010).

*Hesperocorixa parallela* (Fieber, 1860)

Šar Planina Mts.: Gornje Veljinbeško jezero (lake) 02.09.1996. 1m, 2f leg. N. Živić.

Pešter: Spring Dobra Voda - 09.07.2010. 1f, Spring Djerekarsko Vrelo 09.07.2010. 1f, Spring Kamenjača - 09.07.2010. 1f leg. N. Živić.

New species for Serbian fauna.

In the neighboring countries it was recorded in Albania (Josifov 1986), Bosnia and Herzegovina (Apfelbeck 1891), Bulgaria (Josifov 1986), Croatia (Merdić *et al.* 2005, Protić 1998), Greece (Josifov 1986), Macedonia (Protić 1998), Romania and Slovenia (Jansson 1995).

*Sigara (Pseudovermicorixa) nigrolineata* (Fieber, 1848)

Pešter: Spring Kamenjača - 09.07.2010. 1f leg. N. Živić.

The Study Collection at the Natural History Museum in Belgrade includes a previously unpublished record from the vicinity of Belgrade: Mala Moštanica: Žuto Brdo, 14.04.2007, 1f leg. Aleksandar Stojanović.

The only previous record from Serbia was from the valley of Pčinja river (Šeat 2011).

In the neighboring countries it was recorded in Albania (Josifov 1986), Bosnia and Herzegovina (Protić 1998), Bulgaria (Josifov 1986), Croatia (Protić 1998, Merdić *et al.* 2005), Hungary (Boda, Soós 2010), Macedonia (Protić 1998), Romania (Ilie, Ban-Calefariu 2010) and Slovenia (Gogala 2003).

*Sigara (Vermicorixa) lateralis* (Leach, 1818)

Pešter: Spring Donje Djerekarsko Vrelo - 09.07.2010. 10m 12f leg. N. Živić.

The Study Collection at the Natural History Museum in Belgrade includes a previously unpublished record from the vicinity of Belgrade: Mala Moštanica: Žuto Brdo, 14.04.2007, 1f, leg. Aleksandar Stojanović.

Distribution in Serbia: Divac (1907), Kormilev (1936), Živojinović (1950), Protić (1990), Šeat (2011).

In the neighboring countries it was recorded in Albania (Josifov 1986), Bosnia and Herzegovina (Jaczewski 1934, Protić 1998), Bulgaria (Josifov 1986), Croatia (Protić 1998), Greece (Josifov 1986), Hungary (Soós *et al.* 2009), Macedonia (Protić 1998), Romania (Ilie, Ban-Calefariu 2010) and Slovenia (Gogala 2003).

**Notonectidae Latreille, 1802***Notonecta glauca* Linnaeus, 1758

Šar Planina Mts.: Donje Tupankaminsko jezero 1560 m, 02.09.1996, 4 m, 9 f, leg. N. Živić; Šar Planina Mts.: Gornje Veljinbeško jezero 02.09.1996. 1m, 1f leg. N. Živić; Šar Planina Mts.: Srednje Defsko jezero 2080 m, 03.09.1996, 2 m 7 f, leg. N. Živić; Šar Planina Mts.: Malo Vrac jezero, 03.09.1996, 2 m 7 f, leg. N. Živić.

Distribution in Serbia: Horváth (1903), Divac (1907), Kormilev (1936), Živojinović (1950), Protić (1990), Protić, Živić (2007).

In the neighboring countries it was recorded in Albania (Josifov 1986), Bosnia and Herzegovina (Apfelbeck 1891), Bulgaria (Josifov 1986), Croatia (Merdić *et al.* 2005, Protić 1998), Greece (Josifov 1986), Hungary (Boda, Soós 2010), Macedonia (Horváth 1918, Wagner 1962, Göllner-Scheidig 1978, Protić 1998), Montenegro (Schumacher 1914), Romania (Ilie, Ban-Calefariu 2010, Berchi *et al.* 2011) and Slovenia (Gogala 2003).

*Notonecta maculata* Fabricius, 1794

Šar Planina Mts.: Donje Tupankaminsko jezero 1560m 02.09.1996, 1m 1f, leg. N. Živić; Gornje Veljinbeško jezero 02.09.1996, 1f, leg. N. Živić.

Pešter: Spring Braćak - 08.07.2010. 2 m, leg. N. Živić; Spring: Djerekarsko Vrelo 09.07.2010, 1 m 1 f, leg. N. Živić; Spring: Kamenjača 09.07.2010, 1 f, leg. N. Živić.

New species for Serbian fauna.

In the neighboring countries it was recorded in Albania (Josifov 1986), Bosnia and Herzegovina (Polhemus *et al.* 1995), Bulgaria (Josifov 1986), Croatia (Novak, Wagner 1951, Protić 1998, Merdić *et al.* 2005), Greece (Josifov 1986), Hungary (Soós *et al.* 2009, Boda, Soós 2010), Macedonia (Kormilev 1938, Grupče 1961, Wagner 1962, Göllner-Scheiding 1978), and Slovenia (Gogala 2003).

### Gerridae Leach, 1815

*Gerris (Gerris) odontogaster* (Zetterstadt, 1828)

Šar Planina Mts.: Donje Tupankaminsko jezero, 1560 m, 02.09.1996, 1 m, leg. N. Živić.

Distribution in Serbia: The Collection of Heteroptera by Nikola Kormilev includes several specimens from Serbia (Protić 1990).

In the neighboring countries it was recorded in Bosnia and Herzegovina (Apfelbeck 1891), Bulgaria (Josifov 1986), Croatia (Strpić 1997, Merdić *et al.* 2005), Hungary (Boda, Soós 2010), Macedonia (Grupče 1961, Wagner 1962, Protić 1998), Montenegro (Schumacher 1914) and Romania (Ilie, Ban-Calefariu 2010, Berchi *et al.* 2011).

*Gerris (Gerriselloides) asper* (Fieber, 1860)

Šar Planina Mts.: Gornje Defsko jezero, 2100 m, 1m, leg. N. Živić.

Distribution in Serbia: The only previous record from Serbia was from Prokuplje (Protić 1990).

In the neighboring countries it was recorded in Bosnia and Herzegovina (Apfelbeck 1891), Bulgaria (Josifov 1986), Croatia (Horváth 1897, Strpić 1997), Hungary (Boda, Soós 2010), Macedonia (Wagner 1962) and Romania (Ilie, Ban-Calefariu 2010).

**Table 1:** Distribution of aquatic Heteroptera species recorded at Šar Planina and Pešter Mts. in neighboring countries: AL - Albania, BH - Bosnia and Herzegovina, BU - Bulgaria, CR - Croatia, GR - Greece, HU - Hungary, MC - Macedonia, MN – Montenegro, RO - Romania, SL - Slovenia, RS - Serbia. • recorded species, ◦ not recorded, asterisk \* - new record for Serbia.

Species	AL	BH	BU	CR	GR	HU	MC	MN	RO	SL	RS
<i>Nepa cinerea</i> Linnaeus	•	•	•	•	•	•	•	•	•	•	•
<i>Callicorixa praeusta praeusta</i> (Fieber) *	◦	◦	•	◦	◦	•	•	◦	•	◦	•
<i>Hesperocorixa linnaei</i> (Fieber)	◦	•	•	•	•	•	•	•	•	◦	•
<i>Hesperocorixa parallela</i> (Fieber)*	•	•	•	•	•	◦	•	◦	◦	◦	•
<i>Sigara (Pseudovermicorixa) nigrolineata</i> (Fieber)	•	•	•	•	◦	•	•	◦	•	•	•
<i>Sigara (Vermicorixa) lateralis</i> (Leach)	•	•	•	•	•	•	•	◦	•	•	•
<i>Notonecta glauca</i> Linnaeus	•	•	•	•	•	•	•	•	•	•	•
<i>Notonecta maculata</i> Fabricius*	•	◦	•	•	•	•	•	◦	◦	•	•
<i>Gerris (Gerriselloides) asper</i> Fieber	◦	•	•	•	◦	•	•	◦	•	◦	•
<i>Gerris (Gerris) odontogaster</i> (Zetterstadt)	◦	•	•	•	◦	•	•	•	•	◦	•
	6	8	10	9	6	9	10	4	8	5	10

## Discussion and conclusions

This paper presents records of 10 species of aquatic Heteroptera collected in Šar Planina and Pešter during the complex studies of Invertebrata at these localities. The identified species belong to the families: Nepidae (1: *Nepa cinerea*); Corixidae (5: *Callicorixa praeusta praeusta*, *Hesperocorixa linnaei*, *Hesperocorixa parallela*, *Sigara (Pseudovermicorixa) nigrolineata*, *Sigara (Vermicorixa) lateralis*); Notonectidae (2: *Notonecta glauca*, *Notonecta maculata*); Gerridae (2: *Gerris asper*, *Gerris odontogaster*).

*Callicorixa praeusta praeusta* (Fieber), *Hesperocorixa parallela* (Fieber) and *Notonecta maculata* Fabricius are new species for Serbian fauna.

Out of the small number of species recorded in Šar Planina (7) and Pešter (6), three are common for both areas: *Nepa cinerea*, *Hesperocorixa parallela* and *Notonecta maculata*. Species *Hesperocorixa linnaei*, *Notonecta glauca*, *Gerris asper* and *Gerris odontogaster* were recorded only in Šar Planina, while following species were recorded only in the Pešter Plateau: *Callicorixa praeusta praeusta*, *Sigara (Pseudovermicorixa) nigrolineata* and *Sigara (Vermicorixa) lateralis*.

Data for three species: *Callicorixa praeusta praeusta*, *Sigara (Pseudovermicorixa) nigrolineata* and *Sigara (Vermicorixa) lateralis*, deposited in the Study Collection of Heteroptera at the Natural History Museum, are published in this paper for the first time. All these specimens were collected in 2006 and 2007 in the vicinity of Belgrade by Aleksandar Stojanović, and were also recorded in Pešter.

Table 1 presents the distribution of aquatic Heteroptera in certain neighboring countries. Only two species (*Nepa cinerea* and *Notonecta glauca*) are present in all countries of the region. The smallest number of species was recorded in Montenegro due to the smallest number of studies except for the Durmitor Mt. massif (Protić *et al.* 1990).

Šar Planina is situated on the Serbian-Macedonian border. The specimens studied were collected in the Serbian territory. There are some literature data from previous explorers who have collected material in Macedonia, and they are also citing data from Šar Planina. Horváth (1918) cites following species for this mountain: *Sigara (Vermicorixa) lateralis*, *Velia rivulorum* (Fabricius, 1775); Grupče (1961), *Arctocorisa carinata* (C. Sahlberg, 1819) while Wagner (1962) cites: *Arctocorisa carinata*, *Notonecta glauca*, *Notonecta obliqua obliqua* Thunberg, 1787 and *Gerris costae costae* (Herrich-Schaeffer, 1850).

This paper represents a contribution to the knowledge of aquatic Heteroptera in Serbia. Each new locality is important for determination of the present range of each species. Due to the altitude and geological history of studied localities it may be assumed that further systematic studies would lead to discovery of many other interesting species.

## References

- Apfelbeck, V. 1891. Popular zoological discussions. I. Bugs (Hemiptera-Heteroptera) [Popularne zoološke rasprave. I. Stjenice (Hemiptera-Heteroptera)]. *Glasnik Zemaljskog muzeja Bosne i Hercegovine* 1: 404-412 [In Serbo-Croatian]



- Berchi, G. M., Petrovici, M., Ilie, D. M.** 2011. Aquatic and semiaquatic true bugs (Heteroptera: Nepomorpha) of Cefa Nature Park (North-Western Romania). *Analele Universitatii din Oradea, Fascicula Biologie*, 18: 29-33.
- Boda, P., Soós, N.** 2010. Checklist of aquatic and semiaquatic bugs of Hungary (Heteroptera: Nepomorpha, Gerromorpha). Version 2010.12.17. [[http://www.mavige.hu/dokument/hungarian\\_aquatic\\_semiaquatic\\_heteroptera\\_checklist.pdf](http://www.mavige.hu/dokument/hungarian_aquatic_semiaquatic_heteroptera_checklist.pdf)]
- Csiki, E.** 1940. Féliszárnyúrovarok. Hemipteren. Csiki Ernőállatanikutatásai Albániában. *Explorationes zoologicae* E. Csiki in Albaniaperactae 17. A Magyar Tudományos Akadémia Balkán-kutatásainaktudományos Eredményei, Budapest 1: 289-315.
- Ćukić, D.** 1983. Tourist valorization of natural ethnographic and other cultural potential of Šar Planina Srpsko geografsko društvo. [Turistička valorizacija prirodnih etnografskih i drugih kulturnih potencijala Šar-planine.]. Posebna izdanja, knjiga 55, Beograd: 81-85.
- Divac, N.** 1907. Contribution to knowledge on Serbian hemipteran fauna. *Radovi iz zoološkog instituta u Univerzitetu, Beograd* 1 (1): 4-14. [Prilog poznavanju srpske hemipterske faune]. [in Serbian].
- Horváth, G.** 1918. Adatok a Balkán Félisziget Hemiptera Faunaja-nak Ismerétéhez. *Annales Musei Nationalis Hungarici* 16: 321-340.
- Gogala, A.** 2003. Heteroptera of Slovenia, I: Dipsocoromorpha, Nepomorpha, Gerromorpha and Leptopodomorpha. *Annales, Annals for Istrian and Mediterranean Studies, Series historia naturalis*, 13 (2): 229-240.
- Grupče, R.** 1961. Beitrag zur Kenntnis der Heteroptera Aquatica (Corixinae) von Mazedonien. *Fragmenta Balcanica. Musei Macedonici Scientiarum naturalium*, Skopje 4, 4 (88): 29-36.
- Ilie, D. M., Ban-Calefariu, C.** 2010. Faunistic and ecological characterization of aquatic and semiaquatic Heteroptera (Insecta) communities in permanent swamps situated in Făgăraș Depression and Sibiu Depression (Romania). *Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa"* 53: 181-190.
- Jaczewski, T.** 1934. Notes on some Palaearctic aquatic and semi-aquatic Heteroptera, chiefly from South-Eastern Europe. *Annales Musei Zoologici Polonici*, 10: 267-288.
- Jansson, A.** 1986. The Corixidae (Heteroptera) of Europe and some adjacent regions. *Acta Entomologica Fennica*, 47, 1-94.
- Jansson, A.** 1995. Family Corixidae Leach, 1815 - water boatmen, pp. 26-56. In: Aukema, B. & Ch. Rieger (eds): Catalogue of the Heteroptera of the Palaearctic Region. Vol. 1. Enicocephalomorpha, Dipsocoromorpha, Nepomorpha, Gerromorpha and Leptopodomorpha. The Netherlands Entomological Society, Amsterdam, 222 pp.
- Josifov, M.** 1986. Verzeichnis der von der Balkanhalbinsel bekannten Heteropterenarten (Insecta, Heteroptera). *Faunistische Abhandlungen Staatliches Museum für Tierkunde Dresden*, 14, 61-93.

- Kment, P.** 2006. On the distribution of *Micronecta carpatica* Wróblewski, 1958 (Heteroptera: Corixidae). *Acta entomologica Serbica*, 11, 1-2: 101-104.
- Kment, P., Beran, L.** 2011. Check-list of water bugs (Hemiptera: Heteroptera: Nepomorpha) in Croatia with two new records and four rediscoveries. *Natura Croatica*, 20, 1: 159–178, Zagreb.
- Kormilev, N.** 1936. I Beitrag zur Kenntnis der Verbreitung Jugoslawischer Hemiptera-Heteroptera (Süd Serbien und Serbien). *Glasnik skopskog naučnog društva* 17 (5): 29-54. [1. prilog poznavanju Hemiptera - Heteroptera Jugoslavije (Južna Srbija i Srbija) ] [Serbian w. German sum.].
- Merdić, E., Keža, N., Csabai, Z.** 2005. Aquatic insects in Kopački Rit Nature Park (Heteroptera: Nepomorpha, Gerromorpha and Coleoptera: Hydradephaga, Hydrophiloidea). *Natura Croatica*, 14, 263–272.
- Novak, P., Wagner, E.** 1951. Beitrag zur Kenntnis der Hemipteren-Fauna Dalmatiens (Hemiptera - Heteroptera). *Godišnjak Biološkog instituta u Sarajevu* 4 (1): 59-80. [Serbian w. German sum.]
- Pavićević, N., Grujić, Lj., Milošević, Lj., Katalina, P., Vasić, G.** 1974. Pedological map of SAP Kosovo and Metohija, ratio 1:50,000, Jaroslav Černi. Beograd. [Pedološka karta SAP Kosova i Metohije, razmera 1:50.000] [In Serbian].
- Polhemus, J. T., Jansson, A., Kanyukova, E.** 1995. Infraorder Nepomorpha – water bugs, pp. 13–76. In: Aukema, B. & Ch. Rieger (eds): Catalogue of the Heteroptera of the Palaearctic Region. Vol. 1. Enicocephalomorpha, Dipsocoromorpha, Nepomorpha, Gerromorpha and Leptopodomorpha. The Netherlands Entomological Society, Amsterdam, 222 pp.
- Protić, Lj.** 1990. Collection of Hemiptera – Heteroptera of Nicholas A.Kormilev in the Natural History Museum in Belgrade. Second Part [Zbirka Hemiptera - Heteroptera Nikole A. Kormileva u Prirodnjačkom muzeju u Beogradu. Drugi deo]. Habilitacioni rad za zvanje viši kustos (unpublished). [In Serbian].
- Protić, Lj.** 2011. New Heteroptera for the fauna of Serbia. *Bulletin of the Natural History Museum*, 4: 119-125.
- Protić, Lj., Gogala, A., Gogala, M.** 1990. Heteroptera (Insecta) In: Nonveiller, G. (ed.): *Fauna Durmitora* 3: 279-313. Crnogorska Akademija nauka i umjetnosti, Titograd. Posebna izdanja 23(14).
- Protić, Lj., Živić, I.** 2007. New data on water bugs (Heteroptera) in Serbia. *Acta entomologica serbica* 12 (2): 17-26.
- Randjelović, V., Zlatković, B., Amidžić, L.** 1997. Flora and Vegetation of High-mountain Peat-bogs of Mt. Šar-planina. *The University Thought*, 4 (1), Priština: 23-27.
- Savage, A. A.** 1989. Adults of the British aquatic Hemiptera Heteroptera. A key with ecological notes. Freshwater Biological Association, Ambleside, 173 pp.
- Savage, A. A.** 1990. A key to the adults of British lesser water boatmen (Corixidae). *Field Studies*, 7: 485-515.
- Savage, A. A., Swift, E. J.** 1997. The identification of British adult specimens of *Sigara lateralis* (Leach), *Sigara concinna* (Fieber), *Callicorixa praeusta* (Fieber)

- and *Callocorixa wollastoni* (Douglas & Scott) (Hemiptera Heteroptera: Corixidae). *Freshwater Forum*, 9: 25-34.
- Schumacher, F.** 1914. Hemipteren aus Montenegro. Sitzungsberichte der Gesellschaft Naturforschender Freunde zu Berlin: 166-176.
- Soós, N., Boda, P., Csabai, Z.** 2009. First confirmed occurrences of *Notonecta maculata* and *N. meridionalis* (Heteroptera: Notonectidae) in Hungary with notes, maps, and a key to the *Notonecta* species of Hungary. *Folia Faunistica Hungarica*, 60, 67–78.
- Strahinić, I.** 2000. Faunistic and ecological Analysis of macrozoobenthos of the river Pusta Reka [Faunistička i ekološka analiza makrozoobentosa Puste reke]. Magistarski rad. Biološki fakultet Univerziteta u Beogradu, Beograd. 185 pp (unpublished) [In serbian].
- Strpić, V.,** 1997. Four species of semiaquatic bugs (Heteroptera, Gerromorpha) new for Croatian fauna. *Natura Croatica*, 6, 451–455.
- Stichel, W.,** 1955–1956. Illustrierte Bestimmungstabellen der Wanzen. II. Europa (Hemiptera- Heteroptera Europae). Vol. 1. Wolfgang Stichel, Berlin – Hermsdorf, 168 pp.
- Šeat, J.** 2011. True bugs (Heteroptera) of Pčinja valley (Serbia). *Acta entomologica serbica*, 16 (1/2): 9-24.
- Urošević, V.** 1997a. Overgrowth algae of the Gornje Veljinbeško Jezero lake at Šutman (Šar Planina) [Obraštajne alge Gornjeg Veljinbeškog jezera na Šutmanu (Šar-planina). V simpozijum o flori jugoistočne Srbije], Zbornik radova, Zaječar: 8-18. [In Serbian].
- Urošević, V.** 1997b. Overgrowth algae of the Gornje and Donje Tupankamensko Jezero lakes at Šar Planina. [Obraštajne alge Gornjeg i Donjeg Tupankamenskog jezera na Šar-planini.] [Zbornik radova: Fizičko-geografski procesi na Kosovu i Metohiji II, Univerzitet u Prištini, PMF, Odsek za geografiju: 49-58. In Serbian].
- Urošević, V.** 1997c. The Ginevodna Lakes algae on Šar-planina. *University Thought. Natural Sciences*, 4 (2), Priština: 79-87.
- Urošević, V.** 1997d. Peryphyton Algae in two small Lakes on the Spring Branch of Crnkamenska reka river on Šar-planina Mt. *University Thought. Natural Sciences*, 4(1), Priština: 15-21.
- Wagner, E.** 1962. 2. Beitrag zur Heteropteren - fauna Macedoniens (Hem. Het.).- *Fragmenta Balcanica. Musei Macedonici Scientiarum naturalium*, Skopje 4, 15 (99): 115-122.
- Živić, I.** 2005. Faunistic and ecological studies of macrozoobenthos of streamlet valley of the river Južna Morava with specially view on taxonomy of larvae Trichoptera (Insecta) [Faunistička i ekološka studija makrozoobentosa tekućica sliva Južne Morave sa posebnim osvrtom na taksonomiju larvi Trichoptera (Insecta)]. Doktorska disertacija. Biološki fakultet Univerziteta u Beogradu, Beograd, 508 pp. (unpublished) [in Serbian].
- Živić, I., Marković, Z., Brajković, M.** 2001. Bottom fauna of the river Kudoška reka [Fauna dna Kudoškog potoka.]. *Zaštita prirode*, 53, 1, 79-87 [In Serbian].

- Živić, I., Marković, Z., Brajković, M.** 2002. Dynamics and distribution of macrozoobenthos in the Toplica River, a tributary of the Kolubara. *Archives of Biological Sciences*, Belgrade, 54 (1-2), 19-27.
- Živić I., Marković, Z., Brajković, M.** 2004. The change of the qualitative and quantitative composition of macrozoobenthos in the Borkovački brook under the influence of pollution. Proceedings 2<sup>nd</sup> Congress of ecologists of the Republic of Macedonia with International Participation: 252-256.
- Živić, I., Marković, Z., Brajković, M.** 2006. Influence of the temperature regime on the composition of the macrozoobenthos community in a thermal brook in Serbia. *Biologia*, Bratislava, 61(2): 179-191.
- Živić, I., Protić, L.J., Marković, Z.** 2007. Southernmost finding in Europe of *Aphelocheirus aestivalis* (Fabricius, 1794) (Hemiptera: Heteroptera: Aphelocheiridae). *Zootaxa*, 1496: 63–68.
- Živić, N., Miljanović, B., Labus, N., Jakšić, T.** 1996. Composition of Zooplankton and Macrozoobenthos in Big and Small Djeravica Lake. *University Thought, Natural Sciences*, Priština, 3(2): 51-56.
- Živić, N., Miljanović, B., Vukanić, V.** 2010. Fauna of Oligochaeta in the High-mountain lakes of Mt. Šištavica, Serbia. P. 564. In: BALWOIS Conference. Ohrid, Republic of Macedonia.
- Živojinović, S.** 1950. La faune des insectes du Domaine foresiter de Majdanpek. Monographie entomologique. Académie Serbe des Sciences, [Fauna insekata šumske Domene Majdanpek. Entomološka monografija]. *Srpska Akademija nauke i umetnosti, Institut za ekologiju i biogeografiju, Posebna izdanja* 160(2): 211-225. [Serbian w. French sum.]

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