

## NEW TRICHOPTERA (INSECTA) FOR THE FAUNA OF SERBIA

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ABSTRACT. Thirteen species of Trichoptera new for the fauna of Serbia were identified during investigation of macrozoobenthos in the watershed of the Southern Morava River in the period from 1998 to 2003 and in the Trešnjica River in 2003 and 2004.

The species *Rhyacophila torrentium* Pictet, 1834; *Rhyacophila glareosa* McLachlan, 1867; *Rhyacophila intermedia* McLachlan, 1868; *Glossosoma conformis* Neboiss, 1834; *Micropterna lateralis* Stephens, 1874; *Oecetis testacea* Curtis, 1834; *Micrasema longulum* McLachlan, 1876; *Chimarra marginata* Linnaeus 1767; *Cyrnus flavidus* McLachlan, 1864; *Brachycentrus subnubilus* Curtis, 1834; *Ecclisopteryx madida* McLachlan, 1867; *Melampophylax mucoreus* Hagen, 1861; and *Grammotaulius nigropunctatus* Retzius, 1783 are new for the fauna of Serbia.

The genera *Chimarra*, *Melampophylax* and *Oecetis* are new for the fauna of Serbia.

Together with those registered for the first time, the number of Trichoptera species recorded to date in Serbia now comprises a total of 186.

KEY WORDS: Trichoptera, macrozoobenthos, Serbia, Southern Morava River, Trešnjica River

## INTRODUCTION

After publication of the first comprehensive results (MARINKOVIĆ-GOSPODNETIĆ, 1980), 154 species of Trichoptera were known in the fauna of Serbia. Intensive research on Trichoptera (primarily larvae) in Serbia over the next 20 years contributed greatly to our understanding of relations between families, genera, and species. The results of this research were presented in the first checklist, which included 19 species new for the fauna of Serbia, raising the total number of Trichoptera species to 173 (ŽIVIĆ *et al.*, 2002).

In investigations of highland streams in Serbia carried out during the period from 2001 to

2004, 20 species were recorded in the Toplica River (ŽIVIĆ *et al.*, 2002a), 11 species in the Pčinja River (SIMIĆ and SIMIĆ, 2003), 17 species in the Gazradska River and its tributaries (ŽIVIĆ *et al.*, 2004), and six species in the Borkovački Brook (ŽIVIĆ *et al.*, 2004a).

In view of the central position of Serbia on the Balkan Peninsula and owing to the fact that four regions of the freshwater fauna of Europe [(faunistic regions 5, 6, 7, and 11 according to ILLIES 1978)] meet on the territory of Serbia, study of the Trichoptera fauna of Serbia can be expected to expand significantly our knowledge of the history of aquatic organisms in the Balkans and Southeast Europe.

## MATERIAL AND METHODS

The present work treats species of Trichoptera larvae new for the fauna of Serbia that were found in research carried out over the course of several years (1998-2003) on rivers of the watershed of the Southern Morava and in investigation of the Trešnjica River (a tributary of the Drina) conducted during 2003-2004. Samples of macrozoobenthos including Trichoptera larvae were collected with a Surber net having a catchment area of 300 cm<sup>2</sup> and mesh size of 250 µm. The collected material was fixed in the field with 96% alcohol. Binoculars and a microscope were used to separate it in the laboratory from gravel, sludge, and detritus. Trichoptera larvae were identified with the aid of relevant literature (LEPNEVA, 1964, 1966; HICKIN, 1967; SEDLAK, 1980; WARINGER and GRAF, 1997; WALLACE *et al.*, 2003).

## RESULTS AND DISCUSSION

Ninety-two species, 44 genera, and 14 families of the order Trichoptera were identified in the watershed of the Southern Morava, while 34 species, 20 genera, and nine families were recorded in the Trešnjica River. Thirteen species new for the fauna of Serbia were identified in these investigations, so the Trichoptera fauna of Serbia now numbers a total of 186 species.

The genera *Chimarra* Linnaeus, *Melampophylax* Hagen and *Oecetis* Curtis are new for the fauna of Serbia. Larvae were identified for the first time in eight species (*Rhyacophila laevis* Pictet, 1834; *Wormaldia occipitalis* Pictet, 1834; *Cyrnus trimaculatus* Curtis, 1834; *Brachycentrus montanus* Klapalek, 1892; *Drusus biguttatus* Pictet, 1834; *Limnephilus vittatus* Fabricius, 1798; *Stenophylax permistus* McLachlan, 1895; and *Athripsodes aterrimus* Stephens, 1836) whose adults were previously found in our fauna (MARINKOVIĆ-GOSPODNETIĆ, 1975, 1980).

Of the 13 species recorded for the first time in Serbia, no differences of discriminative characters in relation to other European populations were noticed in the species *Rhyacophila torrentium* Pictet, 1834 (Blaževska and Mala Reka Rivers); *Rhyacophila glareosa* McLachlan, 1867 (Nišava River, Jerma River, Blatašnica River, Toplica River, ĐeRekarska Reka River, Mala Reka River, Vučjanska Reka River, Banjska Kuršumlijska River, Banjska Vranjska River, Veternica River); *Rhyacophila intermedia* McLachlan, 1868 (ĐeRekarska Reka River); *Glossosoma conformis* Neboiss, 1834 (Nišava River, Gradska Reka River, Veternica River, Mala Reka River, Banjska Vranjska River, Jerma River, Toplica River, ĐeRekarska Reka River, Duboka River); *Micropterna lateralis* Stephens, 1874 (Vošanja River, Vlasina River); *Oecetis testacea* Curtis, 1834 (Southern Morava River); and *Micrasema longulum* McLachlan, 1876 (Trešnjica River). On the other hand, Serbian specimens of the species *Chimarra marginata* Linnaeus 1767; *Cyrnus flavidus* McLachlan,

1864; *Brachycentrus subnubilus* Curtis, 1834; *Ecclisopteryx madida* McLachlan, 1867; *Melampophylax mucoreus* Hagen, 1861; and *Grammotaulius nigropunctatus* Retzius, 1783 differed from other European populations in certain characters. For the latter group of species, drawings of the most significant diagnostic characters are given below, together with the localities where they were found in the study area and indication of their distribution in the rest of Europe.

***Chimarra marginata* Linnaeus, 1767**

**Where found in study area:** Temska (locality Te1), Pusta Reka (locality Pr9), Vlasina (localities V11 and V12), and Vrla (localities Vr1 and Vr2).

**Serbian distribution:** Registered in Serbia only from the above-indicated localities.

**Distribution elsewhere in Europe:** Iberian Peninsula, Pyrenees, Alps, medium-high mountains of Western and Central Europe, Carpathians, Western and Central European plains, Baltic Province, Ireland, England, Iceland, Boreal Plateau, Northern Sweden, taiga.

**Comments:** The thick powerful mandibles are asymmetric and twisted, light-yellow in color (Fig. 1A), in contrast to members of most other European populations (in which the mandibles are brown). The anterior edge of the labrum is extended in a pair of long lateral outgrowths (Fig. 1B) capable of folding ventrally under the central part (this position is assumed when the labrum is drawn in). The coxa is of a pale color and dorsally carries a long terminal outgrowth with a black hair on its tip (a on Fig. 1C), a similar hair being found near the base of the outgrowth (b on Fig. 1C). The indicated hairs are 2-3 mm longer in specimens from our populations than in ones from other European populations. The anal claw (Fig. 1D) is slightly more bent than in the genus *Wormaldia*.

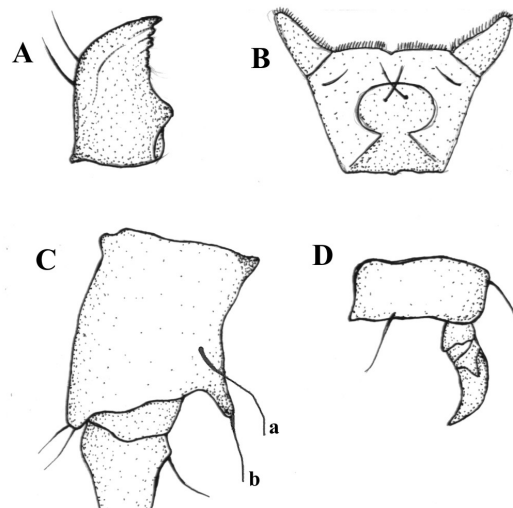


Fig. 1. *Chimarra marginata*. A) Mandible; B) labrum; C) coxa of right hind leg; D) anal claw.

***Cyrnus flavidus* McLachlan, 1864**

**Where found in study area:** Crvena Reka (locality Cr1, 17.07.1999, two specimens).

**Serbian distribution:** Registered in Serbia only from the above-indicated locality.

**Distribution elsewhere in Europe:** Alps, medium-high mountains of Western and Central Europe, Western and Central European plains, Baltic Province, England, Boreal Plateau, Northern Sweden, taiga.

**Comments:** Comparison with Hickin's drawing (HICKIN, 1967) shows that one specimen from locality Cr1 differs in that edges of the four teeth on its anal claw are serrated and sharp (Fig. 2A), in contrast to the anal claws in most specimens from neighboring faunas, which carry four blunt teeth on the concave edge. The appearance of the head (the dorsal surface of the head has no markings in the form of black bands) (**a** on Fig. 2B) and that of the second and third pairs of thoracic legs (**b** and **c** on Fig. 2B) fully correspond to the drawings given by Hickin (HICKIN, 1967) for populations from England. The form and arrangement of teeth on the asymmetric mandibles are the same as in the mentioned populations from England. To be specific, the left mandible has four teeth on the upper side (Fig. 2C) and three on the lower side (two of the teeth on the lower side are very small). The right mandible has three teeth on the upper side (Fig. 2D) and three on the lower side (two of those on the lower side are very small). However, in specimens from the Crvena Reka population, the left mandible has an inner brush consisting of 4-5 hairs (**a** on Fig. 2C), whereas the inner brush has three hairs in most other European populations.

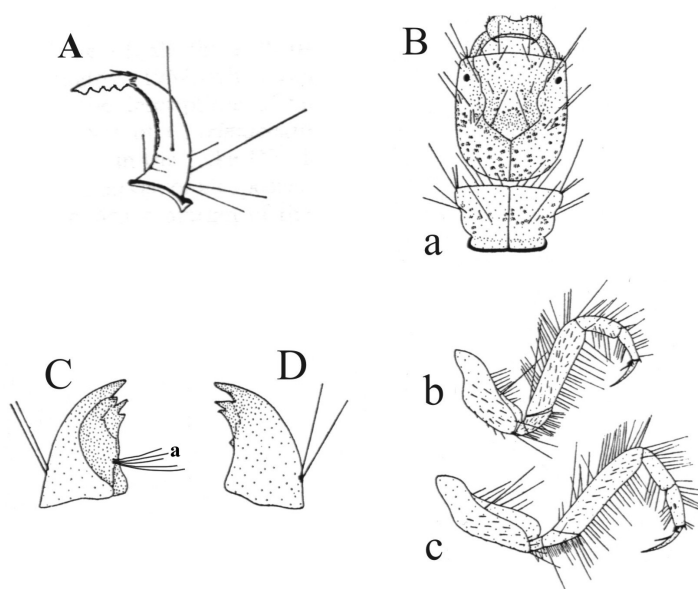


Fig. 2. *Cyrnus flavidus*. A) Side view of anal claw; B) head and prothorax (a) with second (b) and third (c) pairs of thoracic legs; C) dorsal view of left mandible; D) dorsal view of right mandible.

***Brachycentrus subnubilus* Curtis 1834**

**Where found in study area:** Jerma (locality Je3, 29.04.2002, one specimen; locality Je3, 07.03.2003, one specimen); Toplica (locality To1, 31.07.2002, one specimen; locality To1, 03.03.2003, one specimen); Dojkinačka Reka (locality Doj2, 26.10.2002, 19 specimens; locality Doj3, 26.10.2002, 23 specimens); Kosanica (locality Ko4, 20.10.2002, one specimen).

**Serbian distribution:** Registered in Serbia only from the above-indicated localities.

**Distribution elsewhere in Europe:** Pyrenees, Alps, Dinaric West Balkans, medium-high mountains of Western and Central Europe, Carpathians, Hungarian Depression, Pontic Province, Western, Central, and Eastern European plains, Baltic Province, Ireland, England, Boreal Plateau, tundra, Northern Sweden, taiga, Caucasus.

**Comments:** In stages IV and V the mesonotum is clearly divided into four rectangular sclerites, while the metanotum has four sclerites arranged in the form of a transverse curve (in earlier larval stages, the sclerites are pale and difficult to discern, their position being marked by hairs found on tergites of the metadorsum, Fig. 3A). In later stages, specific markings are evident on the head (Fig. 3B). The second and third pairs of legs have distal-ventral tibial extensions ending in a powerful hair. The hair on tibiae of the second pair of legs in populations from the Jerma River (arrow on Fig. 3C) is twice as long as in most other European populations, while the hair on tibiae of the third pair of legs in populations from the watershed of the Toplica River (arrow on Fig. 3D) is 1.5 times longer than in most other European populations. The very good coincidence of body proportions indicates that the mentioned differences depend on the season of sampling and geomorphological characteristics of the substrate. The cases are rectangular, sometimes with rounded edges, often wholly enclosed in secretion (Fig. 3E).

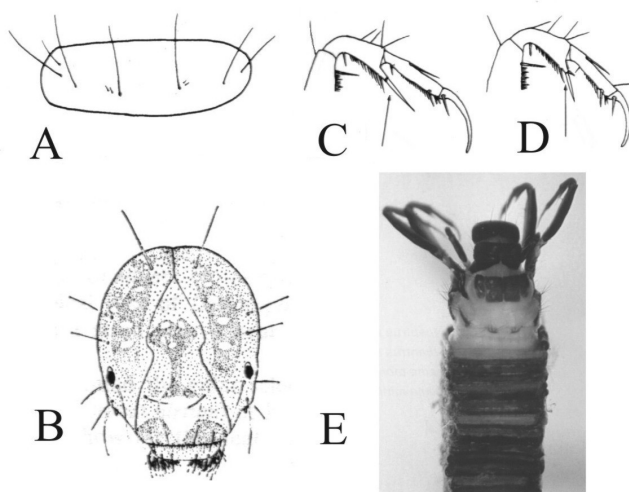


Fig. 3. *Brachycentrus subnubilus*. A) Metadorsum of larval stage II; B) head; C) tibia and tarsus of second pair of extremities; D) tibia and tarsus of third pair of extremities; E) case.

***Ecclisopteryx madida* McLachlan, 1867**

**Where found in study area:** Jerma (locality Je4, 07.03.2003, one specimen; locality Je5, 07.03.2003, two specimens).

**Serbian distribution:** Registered in Serbia only from the above-indicated localities.

**Distribution elsewhere in Europe:** Alps, medium-high mountains of Central Europe, Carpathians, Hungarian Depression.

**Comments:** The species *Ecclisopteryx madida* was identified by Professor Wolfram Graf (Austria). The collected samples were left for further analysis, since in regard to characteristics of the pronotum (which has a clear dorsal ridge) and cephalic capsule (which is normally overgrown with brushes having shorter or longer sharp black thornlets, arrow on Fig. 4) they fully agree with the drawings given for populations from Austria. However, characteristic extensions are discernible on the pronotum (such extensions are lacking in *Ecclisopteryx madida*), and Professor Graf expressed doubt that this perhaps is not the species *Ecclisopteryx madida*, but potentially a species new to science instead. It remains for future research to confirm or refute the stated hypothesis after collection of adults and more detailed analysis of larval stage V.



Fig. 4. *Ecclisopteryx madida*. Cephalic capsule (the position of short and long black thornlets is marked by an arrow).

***Melampophylax mucoreus* Hagen, 1861**

**Where found in study area:** Jugbogdanovačka Reka (locality Jb1, 03.08.2001, one specimen).

**Serbian distribution:** Registered in Serbia only from the above-indicated locality.

**Distribution elsewhere in Europe:** Iberian Peninsula, Pyrenees, Italy, Alps, medium-high mountains of Western and Central Europe, Carpathians, Hungarian Depression, Western, Central,

and Eastern European plains, Baltic Province, Ireland, England, Boreal Plateau, tundra, Northern Sweden, taiga, Caucasus, Caspian Depression.

**Comments:** In the only specimen found, the case was partially destroyed, but characteristic details of femur structure (the sides of all femurs of the middle and hind legs were without supplementary hairs, Fig. 5A) and structure of the mandible (lacking teeth along the edges, except for one tooth-t on the dorsal edge) indicate with certainty that we are dealing with a stage V larva of *Melampophylax mucoreus*. The t tooth is very well expressed in the specimen from locality Jb1 (Fig. 5B), whereas it is barely discernible in most populations from the rest of Europe (Fig. 5C). The case is twisted and mainly composed of mineral particles in stage V, but plant particles sometimes predominate in stage III.

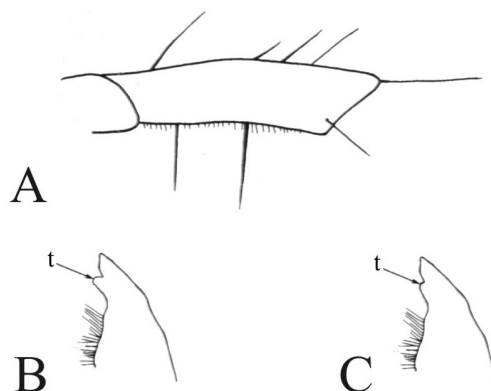


Fig. 5. *Melampophylax mucoreus*. A) Dorsal view of femur of second pair of extremities; B) dorsal view of right mandible.

#### ***Grammotaulius nigropunctatus* Retzius, 1783**

**Where found in study area:** Presevška Moravica (locality PM1, 03.05.2002, two specimens); Moravica (locality Mo1, 02.03.2003, one specimen); Kamenička Reka (locality Ka2, 02.05.2001, two specimens); Vujanovačka Reka (locality Vuj2, 31.10.2001, three specimens).

**Serbian distribution:** Registered in Serbia only from the above-indicated localities.

**Distribution elsewhere in Europe:** Throughout Europe, except the Pyrenees and tundra.

**Comments:** All hairs on the ventral side of femurs of the second and third pairs of legs (vs on Figs. 6A and 6B) are dark-colored and similar in size. The ninth dorsal abdominal sclerite has eight hairs in the populations from localities Ka2 and Vuj2 and nine hairs in those from localities PM1 and Mo1, numbers that correspond to the interval of variation (8-9 hairs) in populations from England, the Czech Republic, and Russia (Fig. 6C). The only deviation is in length of the middle hair (a on Fig. 6C), which is twice as long in our populations as in populations from the rest of Europe. The distal region of trochanters of the second and third pairs of legs is with a ventral row

of long bent thorns (lp, Fig. 6D). Gills are almost always present in two or more places on the eighth abdominal segment. The case (often much longer than the larva) is made out of parts of plant material that overlap (Fig. 6E).

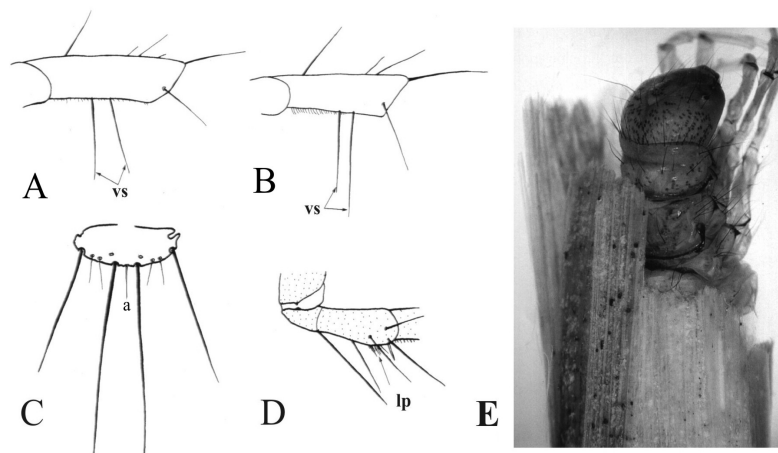


Fig. 6. *Grammotaulius nigropunctatus*. A) Dorsal view of femur of second pair of extremities; B) dorsal view of femur of third pair of extremities; C) ninth dorsal abdominal sclerite; D) dorsal view of trochanter of third pair of extremities; E) case.

## CONCLUSIONS

Thirteen species of Trichoptera new for the fauna of Serbia were identified during investigation of macrozoobenthos in the watershed of the Southern Morava River in the period from 1998 to 2003 and in the Tresnjica River in 2003 and 2004. Together with those registered for the first time, the number of Trichoptera species recorded to date in Serbia now comprises a total of 186.

The genera *Chimarra*, *Melampophylax*, and *Oecetis* are new for the fauna of Serbia.

Of species recorded for the first time in Serbia, seven species (*Rhyacophila torrentium* Pictet, 1834; *Rhyacophila glareosa* McLachlan, 1867; *Rhyacophila intermedia* McLachlan, 1868; *Glossosoma conformis* Neboiss, 1834; *Micropterna lateralis* Stephens, 1874; *Oecetis testacea* Curtis, 1834; and *Micrasema longulum* McLachlan, 1876) show no differences of discriminative characters in comparison with populations from the rest of Europe, whereas differences of certain characters are discernible in six species (*Chimarra marginata* Linnaeus 1767; *Cyrnus flavidus* McLachlan, 1864; *Brachycentrus subnubilus* Curtis, 1834; *Ecclisopteryx madida* McLachlan, 1867; *Melampophylax mucoreus* Hagen, 1861; and *Grammotaulius nigropunctatus* Retzius, 1783).

In addition to the 13 species new for the fauna of Serbia, eight species of Trichoptera are identified for the first time in the larval stage (*Rhyacophila laevis* Pictet, 1834; *Wormaldia occipitalis* Pictet, 1834; *Cyrnus trimaculatus* Curtis, 1834; *Brachycentrus montanus* Klapalek, 1892; *Drusus biguttatus* Pictet, 1834; *Limnephilus vittatus* Fabricius, 1798; *Stenophylax permistus* McLachlan, 1895; and *Athripsodes aterrimus* Stephens, 1836).



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## НОВЕ ВРСТЕ TRICHOPTERA (INSECTA) ЗА ФАУНУ СРБИЈЕ

ИВАНА ЖИВИЋ, З. МАРКОВИЋ И М. БРАЈКОВИЋ

### ИЗВОД

Током истраживања макрозообентоса слива Јужне Мораве у периоду од 1998 до 2003. године и реке Трешњице у 2003 и 2004. години идентификовано је 13 нових врста Trichoptera за фауну Србије.

Нове врсте за фауну Србије су: *Rhyacophila torrentium* Pictet, 1834; *Rhyacophila glareosa* McLachlan, 1867; *Rhyacophila intermedia* McLachlan, 1868; *Glossosoma conformis* Neboiss, 1834; *Micropterna lateralis* Stephens, 1874; *Oecetis testacea* Curtis, 1834; *Micrasema longulum* McLachlan, 1876; *Chimarra marginata* Linnaeus 1767; *Cyrnus flavidus* McLachlan, 1864; *Brachycentrus subnubilus* Curtis, 1834; *Ecclisopteryx madida* McLachlan, 1867; *Melampophylax mucoreus* Hagen, 1861; *Grammotaulius nigropunctatus* Retzius, 1783.

Родови *Chimarra*, *Melampophylax* и *Oecetis* су нови за фауну Србије.

Заједно са ново идентификованим укупан број врста Trichoptera забележених до сада је 186.

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