

Faunistical records of larvae of Ephemeroptera, Odonata and Plecoptera from the Zakarpats'ka Region, Ukraine

TIBOR KOVÁCS & ROMAN J. GODUNKO

ABSTRACT: This paper provides data on 45 Ephemeroptera, 6 Odonata species and 8 Plecoptera taxa from the Zakarpats'ka Region, Ukraine. The species *Baetis tracheatus*, *Rhithrogena beskidensis*, *Paraleptophlebia werneri* and *Brachyptera risi* are recorded in the first time from Ukraine. The following species are new to Zakarpats'ka Region and Tysa River: *Baetis tricolor*, *Procloeon pulchrum*, *Electrogena affinis*. The pupae of *Symbiocladius rhithrogenae* (Zavřel, 1924) (Diptera: Chironomidae) were found on a few specimens of *R. beskidensis*.

The data provided in this paper come from two sources. The majority is the results of a faunistical research focused on the Tysa river and its tributaries carried out in 6–7 May 2004 and 29–30 June 2004. The water sources investigated are Chorna Tysa, Bila Tysa, Tysa (six sampling spots), Shopurka, Apshytsia, Teresva, Tereblia, Rika, Borzhava. The other four data are from the section of Bratovo (Batár) and Palad' (Palád-patak) that represent the frontier between Ukraine and Hungary.

Methods of collecting see in KOVÁCS *et al.* (1998), the collector is Tibor Kovács. The Ephemeroptera and Plecoptera material on which the present study is based has been preserved in 70% ethanol and housed in the Mátra Museum (Gyöngyös, Hungary). Some specimens each of the species new to Ukraine are deposited in the State Museum of Natural History, National Academy of Sciences of Ukraine (SMNH).

Identification of the genera Plecoptera: *Isoperla*, *Chloroperla*, *Siphonoperla*, *Amphinemura*, *Nemoura*, *Protonemura*, *Leuctra* is still in progress. Larvae of *Dinocras* and some *Perla* species are quite difficult to identify. Therefore in the list of data the name *Dinocras cephalotes-megacephala* and *Perla marginata-pallida* complex are applied.

The geographical and administrative names are transliterated from Ukrainian according to official Ukrainian-English transliteration system (adopted by the Ukrainian Legal Terminology Commission (Decision N 9): <http://www.rada.gov.ua/translit.htm>).

List of sites and dates of sampling

I/1. = Chorna Tysa: Chorna Tysa (Feketetisza: Fekete-Tisza); **a** = 07.05.2004, **b** = 29.06.2004 – **I/2.** = Roztoky: Bila Tysa (Nyilas: Fehér-Tisza); **a** = 07.05.2004, **b** = 29.06.2004 – **I/3.** = Vil'khovatyi: Tysa (Kiscserjés, Tisza); **a** = 07.05.2004, **b** = 29.06.2004 – **I/4.** = Khmeliv: Tysa (Komlós: Tisza); **a** = 06.05.2004, **b** = 29.06.2004 – **I/5.** = Luh: Tysa (Lonka, Tisza); **a** = 06.05.2004, **b** = 29.06.2004 – **I/6.** = Tiachiv: Tysa (Técső: Tisza); **a** = 06.05.2004, **b** = 29.06.2004 – **I/7.** = Tekovo: Tysa (Tekeháza: Tisza); **a** = 07.05.2004, **b** = 30.06.2004 – **I/8.** = Vyshkiv: Tysa (Visk: Tisza); **a** = 06.05.2004, **b** = 29.06.2004 – **II.** = Velykyi Bychkiv: Shopurka (Nagybocskó: Sopurka); **a** = 06.05.2004, **b** = 29.06.2004 – **III.** = Dibrova: Apshytsia (Alsóapsa: Apsica); **a** = 07.05.2004, **b** = 30.06.2004 – **IV.** = Teresva: Teresva (Taracköz: Tarac); **a** = 07.05.2004, **b** = 30.06.2004 – **V.** = Bushtyno: Tereblia (Bustyaháza: Talabor); **a** = 07.05.2004, **b** = 30.06.2004 – **VI.** = Iza: Rika (Iza: Nagy-ág); **a** = 07.05.2004, **b** = 30.06.2004 – **VII.** = Bene: Borzhava (Bene: Borzsa); **a** = 07.05.2004, **b** = 30.06.2004.

The list of data

EPHEMEROPTERA

Baetidae Leach, 1815

- Acentrella sinaica* Bogoescu, 1931 – I/1., b, 1.
Baetis alpinus (Pictet, 1843) – I/1., a, 5 – I/2., a, 2.
Baetis buceratus Eaton, 1870 – VI., a, 2 – VII., a, 1.
Baetis fuscatus (Linnaeus, 1761) – I/3., b, 2 – I/4., b, 4 – I/5., b, 4 – I/6., b, 4 – I/7., b, 1 – I/8., b, 3 – V., b, 1 – VI., b, 1.
Baetis gracilis Bogoescu et Tabacaru, 1957 – I/6., b, 2 – I/7., b, 1 – I/8., b, 7.
Baetis lutheri Müller-Liebenau, 1967 – I/1., a, 1; b, 3 – I/2., b, 2 – I/3., a, 1 – I/5., a, 1 – I/6., a, 1 – II., a, 2.
Baetis muticus (Linnaeus, 1758) – I/1., b, 1 – I/2., a, 2 – I/3., a, 1 – I/4., a, 1 – I/6., a, 1 – I/8., a, 2 – II., a, 4; b, 1 – III., a, 2 – IV., a, 4 – VI., a, 1.
Baetis rhodani (Pictet, 1843) – I/1., a, 2; b, 1 – I/2., a, 1; b, 1 – I/3., a, 1 – I/4., a, 1 – I/5., a, 2 – I/6., a, 1 – I/7., a, 3 – I/8., a, 2 – II., a, 1; b, 1 – III., a, 1 – IV., a, 1 – V., a, 1 – VI., a, 1; b, 1 – VII., a, 2.
Baetis scambus Eaton, 1870 – I/1., b, 2 – I/2., b, 2 – I/3., b, 1.
Baetis tracheatus Keffermüller et Machel, 1967 – Bobove: Bratovo (Tiszabökény: Batár), 16.05.2006, 5 (3 in collection of SMNH) – Vilok: Bratovo (Tiszajlak: Batár), 16.05.2006, 2.
Baetis tricolor Tshernova, 1928 – VII., b, 1.
Baetis vardarensis Ikononov, 1962 – I/4., a, 2 – I/6., b, 1 – I/7., a, 1 – I/8., a, 3; b, 1 – III., a, 2; b, 1 – IV., a, 1 – V., a, 1; b, 6 – VI., a, 2; b, 1.
Baetis vernus Curtis, 1834 – I/1., b, 1.
Centroptilum luteolum (Müller, 1776) – VII., b, 1.
Procloeon bifidum (Bengtsson, 1912) – VII., b, 6.
Procloeon pulchrum (Eaton, 1885) – I/7., b, 2 – I/8., b, 1.

Oligoneuriidae Ulmer, 1914

- Oligoneuriella rhenana* (Imhoff, 1852) – I/2., b, 1 – I/3., b, 4 – I/4., b, 8 – I/5., b, 2 – I/6., b, 17 – I/7., b, 14 – I/8., b, 11 – II., b, 7 – III., b, 8 – IV., b, 6 – V., b, 9 – VI., b, 3.

Heptageniidae Needham, 1901

- Ecdyonurus aurantiacus* (Burmeister, 1839) – I/7., b, 2 – VII., b, 2.
Ecdyonurus dispar (Curtis, 1834) – I/6., b, 1 – I/7., b, 5 – I/8., b, 1 – II., b, 2 – III., b, 5 – VI., b, 10.
Ecdyonurus insignis (Eaton, 1870) – I/8., b, 3 – IV., b, 1 – V., a, 2; b, 2.
Ecdyonurus submontanus Landa, 1969 – V., b, 1.
Ecdyonurus torrentis Kimmins, 1942 – I/1., a, 2 – I/2., a, 1 – I/3., a, 3 – I/4., a, 2 – I/5., a, 4 – I/6., a, 3 – I/7., a, 1 – II., a, 3 – III., a, 3 – IV., a, 3 – VI., a, 1; b, 2 – VII., a, 1.
Ecdyonurus venosus (Fabricius, 1775) – I/1., b, 5.
Electrogena affinis (Eaton, 1883) – I/6., b, 2 – III., b, 1 – IV., b, 1 – VI., b, 1 – VII., b, 2.
Electrogena lateralis (Curtis, 1834) – I/1., a, 1 – I/2., b, 1 – III., a, 2 – V., a, 2 – VI., a, 1.
Epeorus assimilis (Eaton, 1871) – I/1., a, 1 – I/5., a, 2 – II., a, 1 – III., a, 1.
Heptagenia coeruleans Rostock, 1877 – I/6., b, 2 – I/7., b, 3 – I/8., b, 2 – V., b, 1 – VI., b, 1.
Heptagenia sulphurea (Müller, 1776) – I/6., a, 4 – I/7., a, 1 – I/8., a, 2 – I/8., b, 2 – VII., a, 1.
Rhithrogena beskidensis Alba-Tercedor et Sowa, 1987 – I/2., b, 2 – I/3., b, 1 – I/4., b, 1 – I/5., b, 3 – I/6., b, 2 – I/8., b, 3 – II., b, 4 – III., b, 2 – IV., b, 3, + 2 *Symbiocladius rhithrogenae* pupa (2 + 1 *Symbiocladius rhithrogenae* pupa in collection of SMNH) – V., b, 1 – VI., b, 2.
Rhithrogena semicolorata (Curtis, 1834) – I/1., b, 3 – I/2., b, 1 – I/3., a, 2 – I/4., a, 4 – I/5., a, 1 – I/6., a, 1 – I/7., a, 3 – I/8., a, 4 – II., a, 3 – III., a, 2 – IV., a, 3 – V., a, 1 – VI., a, 4 – VII., a, 2.

Leptophlebiidae Banks, 1900

Choroterpes picteti (Eaton, 1871) – III., b, 2.

Habroleptoides confusa Sartori et Jacob, 1986 – I/1., a, 1 – I/2., a, 2 – I/3., a, 1 – I/4., a, 2 – I/5., a, 2 – I/6., a, 1 – I/8., a, 1 – II., a, 1 – IV., a, 1.

Habrophlebia fusca (Curtis, 1834) – III., b, 1.

Habrophlebia lauta Eaton, 1884 – I/1., b, 2 – III., b, 1.

Paraleptophlebia submarginata (Stephens, 1835) – I/1., b, 2 – I/6., a, 1 – I/8., a, 1 – III., a, 1.

Paraleptophlebia werneri Ulmer, 1920 – Bobove: Bratovo (Tiszabökény: Batár), 16.05.2006, 1 (in collection of SMNH) – Velyka Palad': Palad' (Nagypalád: Palád-patak), 16.05.2006, 1.

Ephemeridae Latreille, 1810

Ephemera danica Müller, 1764 – I/2., a, 1 – I/6., a, 2 – II., a, 1; b, 1 – IV., a, 1 – IV., b, 1 – VI., a, 1.

Ephemera lineata Eaton, 1870 – I/6., a, 1; b, 1 – III., a, 1.

Potamanthidae Albarda, 1888

Potamanthus luteus (Linné, 1767) – I/7., a, 1.

Ephemerellidae Klapálek, 1909

Ephemerella ignita (Poda, 1761) – I/1., b, 1 – I/2., b, 3 – I/3., b, 2 – I/4., b, 1 – I/5., b, 1 – I/6., b, 3 – I/7., b, 2 – I/8., b, 2 – II., b, 2 – III., b, 2 – IV., b, 2 – V., b, 3 – VI., b, 1.

Ephemerella mucronata (Bengtsson, 1909) – I/1., a, 1 – I/2., a, 1 – I/3., a, 1 – I/4., a, 3 – I/5., a, 1 – I/6., a, 3 – I/8., a, 2 – II., a, 1 – IV., a, 1.

Torleya major (Klapálek, 1905) – I/1., a, 1; b, 2 – I/2., a, 1; b, 1 – I/3., a, 2 – I/5., a, 1 – I/6., a, 3 – I/7., b, 2 – I/8., a, 1; b, 2 – II., a, 1 – III., a, 1 – IV., a, 4 – V., b, 2 – VI., a, 1.

Caenidae Newman, 1853

Caenis beskidensis Sowa, 1973 – I/6., b, 2 – I/7., b, 1 – I/8., b, 3 – VI., b, 1.

Caenis macrura Stephens, 1835 – I/6., b, 2 – I/7., b, 1 – II., b, 3 – III., a, 2; b, 4 – IV., b, 2 – V., b, 1 – VI., b, 2.

Caenis pseudorivulorum Keffermüller, 1960 – I/7., b, 5 – III., b, 1 – V., b, 1.

ODONATA

Calopterygidae Selys, 1850

Calopteryx splendens (Harris, 1782) – III., a, 1 – V., a, 1.

Calopteryx virgo (Linnaeus, 1758) – II., b, 1.

Platycnemididae Tillyard, 1917

Platycnemis pennipes (Pallas, 1771) – III., a, 1; b, 12 – VII., a, 2; b, 1.

Gomphidae Rambur, 1842

Gomphus vulgatissimus (Linnaeus, 1758) – I/6., a, 1 – I/8., a, 1 – III., a, 10; b, 8 – IV., b, 1 – VI., b, 1.

Onychogomphus forcipatus (Linnaeus, 1758) – I/6., a, 23; b, 3 – I/7., a, 3; b, 1 – I/8., a, 28; b, 5 – II., a, 10; b, 3 – III., a, 33; b, 24 – IV., a, 15; b, 5 – V., a, 7; b, 19 – VI., a, 5; b, 3 – VII., a, 2.

Libellulidae Rambur, 1842

Orthetrum brunneum (Fonscolombe, 1837) – IV., a, 1.

PLECOPTERA

Perlodidae Klapálek, 1909

Perlodes microcephalus (Pictet, 1833) – I/1., a, 1 – I/2., a, 2 – I/3., a, 1 – I/4., a, 1 – II., a, 1.

Perlidae Latreille, 1802

Dinocras cephalotes-megacephala complex – I/1., b, 1 – I/4., a, 1 – I/5., a, 1; b, 1 – I/7., a, 1 – I/8., a, 2 – II., a, 1.

Perla bipunctata Pictet, 1833 – I/4., a, 1 – I/6., a, 1 – I/8., a, 2 – II., b, 1 – IV., b, 1.

Perla burmeisteriana Claassen, 1936 – I/8., a, 1; b, 1.

Perla grandis Rambur, 1842 – I/1., a, 2; b, 1 – I/2., a, 1.

Perla marginata-pallida complex – I/1., a, 1 – I/2., a, 1; b, 1 – I/3., a, 2 – I/4., a, 1 – I/5., a, 1; b, 1 – I/8., a, 1 – II., a, 2; b, 1.

Taeniopterygidae Klapálek, 1905

Brachyptera risi (Morton, 1896) – II., a, 1 (in collection of SMNH) – V., a, 1.

Brachyptera seticornis (Klapálek, 1902) – I/1., a, 3 – I/2., a, 1 – I/3., a, 4 – II., a, 2.

Results and discussion

Forty-five Ephemeroptera, 6 Odonata species and 8 Plecoptera taxa have been recorded from 17 sites sampled between 6th May 2004 and 16th May 2006 from the Zakarpats'ka Region, Ukraine.

The species *Baetis tracheatus*, *Rhithrogena beskidensis*, *Paraleptophlebia weneri* and *Brachyptera risi* are new to Ukraine (cf. GODUNKO & KLONOWSKA-OLEJNIK 2003, GODUNKO & KOVÁCS 2008, GODUNKO *et al.* 2004, KHARCHENKO *et al.* 2003, KOVÁCS 2006, ZHILTZOVA 2003).

The following species represent new records to the Zakarpats'ka Region and Tysa River (cf. CSER 2003, CSER & ANDRIKOVICS 2001, GÁLDEAN 1999, GODUNKO 2000, GODUNKO & KOVÁCS 2008, KOVÁCS 2006, MOCSÁRY 1900): *Baetis tricolor*, *Procloeon pulchrum*, *Electrogena affinis* – Ephemeroptera.

Others are remarkable from both faunistical and conservation points of view: Ephemeroptera – *Acentrella sinaica*, *Baetis gracilis*, *B. tricolor*, *Procloeon pulchrum*, *Ecdyonurus aurantiacus*, *E. insignis*, *Choroterpes picteti* (incl. species new to Ukraine); Plecoptera – *Perla bipunctata*, *P. grandis*.

In the Teresva River (Teresva) we found pupae of *Symbiocladius rhithrogenae* (Zavřel, 1924) (Diptera: Chironomidae) on specimens of *Rhithrogena beskidensis*. This midge species was hitherto unknown from this mayfly species in Ukraine (cf. GILKA *et al.* 2007).

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References

- CSER, B. (2003): Újabb adatok Kárpátalja kérészfauunájának ismeretéhez. [New data to the knowledge of mayflies of the Zakarpats'ka Region, Ukraine.] – In: PENKSZA, K., KORSÓS, Z. & PAP, I. (eds.): III. Kárpát-medencei Biológiai Szimpózium. Magyar Biológiai Társaság, Budapest: 121–124.

- CSER, B. & ANDRIKOVICS, S. (2001): A Tisza-forrásvidek patakjainak gerinctelen makrofaunája. (Invertebrate macrofaunal investigations on the streams of Tisza headwater area) – *Hidrológiai Közlöny* 81(5–6): 346–348.
- GÁLDEAN, N. (1999): Some considerations about the reophilic elements of the bentic fauna (ord. Ephemeroptera, Plecoptera and Trichoptera) of the Upper Tisza Region. – In: HAMAR, J., & SÁRKÁNY-KISS, A. (eds.): *The Upper Tisza Valley*, Tiscia monograph series, Szeged: 413–425.
- GILKA, W., KLONOWSKA-OLEJNIK, M. & GODUNKO, R. J. (2007): On the biology of *Symbiocladius rithrogenae* (Zavrel, 1924) (Diptera: Chironomidae) from the Chornohora Mts., Ukraine. – *Polish Journal of Entomology* 76: 285–291.
- GODUNKO, R. (2000): Historical changes of the fauna and questions of reservation of mayfly (Ephemeroptera, Insecta) of Ukrainian Carpathians. – *Proceedings of State Natural History Museum* 15: 158–168. (in Ukrainian with English summary)
- GODUNKO, R. J. & KLONOWSKA-OLEJNIK, M. (2003): A checklist of the Ukrainian mayflies (Ephemeroptera). – *Polskie Pismo Entomologiczne* 72: 203–210.
- GODUNKO, R. J. & KOVÁCS, T. (2008): Личинки одноденок (Insecta: Ephemeroptera) української частини басейну р. Тиси, зібрані протягом 2006 року. (The mayflies larvae (Insecta: Ephemeroptera) of the Ukrainian section of the Tysa river-basin, collected during 2006). – *Scientific Bulletin of the Uzhgorod University. Series Biology* 23: 164–166. (in Ukrainian with English summary)
- GODUNKO, R. J., KLONOWSKA-OLEJNIK, M. & SOLDÁN, T. (2004): *Ecdyonurus rizuni* sp. nov. (Ephemeroptera: Heptageniidae) from the eastern Carpathians. – *Annales Zoologici (Warszawa)* 54(3): 519–524.
- KHARCHENKO, T. A., KARPEZO, YU. I. & LIASHENKO, A. V. (2003): Гидробиота р. Тисы і ее измененія в условіях антропогенного пресса. – *Gidrobiol. zhurn.* 39(3): 11–26. (in Russian with English summary)
- KOVÁCS, T. (2006): *Cloeon petropolitanum* Kluge et Novikova, 1992 in the Carpathian Basin (Ephemeroptera: Baetidae) – *Folia Historico-Naturalia Musei Matraensis* 30: 139–142.
- KOVÁCS, T., AMBRUS, A., BÁNKUTI, K. & JUHÁSZ, P. (1998): New Hungarian mayfly (Ephemeroptera) species arising from collectings of larvae. – *Miscellanea zoologica hungarica* 12: 55–60.
- MOCSÁRY, S. (1900): Ordo. Pseudo-neuroptera. – In: *A Magyar Birodalom Állatvilága (Fauna Regni Hungariae)* III. K. M. Természettudományi Társulat, Budapest: 23–32.
- ZHILTZOVA, L. A. (2003): Plecoptera, grupe Euholognatha. – *Fauna of Russia and Neighbouring Countries* 145: 1–538.

Tibor KOVÁCS
Mátra Museum
H-3200 GYÖNGYÖS
Kossuth Lajos u. 40
E-mail: koati@t-online.hu

Roman J. GODUNKO
State Museum of Natural History
National Academy of Sciences of Ukraine
UA-79008 LVIV
Teatralna str. 18
Ukraine
and
Biology Centre
Academy of Science of the Czech Republic
Institute of Entomology
CZ-37005 ČESKÉ BUDĚJOVICE
Branišovská str. 31
Czech Republic
E-mail: godunko@museum.lviv.net
godunko@seznam.cz