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MAYFLIES OF SOUTHWESTERN SIBERIA, RUSSIA (EPHEMEROPTERA)

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Mayflies were studied between 54°-56° N lat. and 82°-84° E long. The present list includes 34 spp., referable to 10 families, including the western-most records of *Isonychia ussurica, Rhithrogena bajkovae, Epeorus pellucidus, Ecdyonurus abracadabrus, Ephemerella lenoki, Ephemerella triacantha, Caenis miliaria, Baetis ursinus* and *Baetis bacillus* and the easternmost ones of *Caenis pseudorivulorum, C. robusta* and *Ephemera vulgata*. The studied region is a borderland for both the east- and west-palaearctic spp.

INTRODUCTION

Generally the ephemeropteran fauna of western Siberia was very poorly studied. To the best of our knowledge, only three papers were devoted to the mayflies of this region, viz. NOVIKOVA & KLUGE (1997), BRODSKY (1930) and LEPNEVA (1930). BRODSKY (1930) reported 7 species: *Ephemera orientalis, Siphlonurus alternarus, Ametropus eatoni, Epeorus pellucidus, Heptagenia fuscogrisea, Rhithrogena lepnevae* and

R. sibirica; LEPNEVA (1930) reported *Ephoron virgo, Ephemera orientalis, Heptagenia fuscogrisea, Siphlonurus alternarus, Ametropus eatoni, Baetis* sp., *Caenis* sp. and *Heptagenia* sp. (we use here modern species names rather than those considered synonyms now). The paper by NOVIKOVA & KLUGE (1997) contains a list of 22 species, found in the Khanty-Mansi Autonomous District and Yamalo-Nenets Autonomous District of T'umen' province (between 60°-68° N lat. and 70°-78° E long.); among them there are holarctic, circumarctic, transpalaearctic, west-palaearctic and eastpalaearctic species. KLUGE's (1997) key presents brief information on species distribution.

Our research was conducted southward and to the East of the above mentioned region (between 54°-56° N lat. and 82°-84° E long.). The studied territory is situated in the Ob' river basin, in Novosibirsk province. Larvae and imagoes were collected during 2001 and 2002 by M. Beketov in the rivers Ob', Inya, Berd', Tula, Shipunikha, Ik, Izdrevaya, Nosikha and Mosikha and in various small stagnant water bodies. The territory considered is bordered by the Altai-Sayan Mountain Country in the East and by the West Siberian Lowland in the West, therefore a considerable species diversity might be expected.

SPECIES LIST

B a e t i d a e

- *Cloeon (C.) dipterum* Linnaeus, 1761 (syn. *rufulum* Müller, 1776; *zimini* Tshernova, 1930). Transpalaearctic species.
- *Cloeon (C.) inscruptum* Bengtsson, 1914. Transpalaearctic species.
- *Cloeon (Similicloeon) simile* Eaton, 1870. Transpalaearctic species.
- *Cloeon (Procloeon) bifidum* Bengtsson, 1912 (syn. *ornatum* Tshernova, 1928). Transpalaearctic species.
- *Cloeon (Procloeon) macronyx* Kluge & Novikova, 1992 (syn. *Centroptilum nana* auct.). Possibly a transpalaearctic species; known from the East-European Plain, Kazakhstan and Mongolia.
- *Baetis (Nigrobaetis) bacillus* Kluge, 1983. Eastpalaearctic species; known from Transbaikalia and the Russian Far East.
- *Baetis (Labiobaetis) tricolor* Tshernova, 1928. Transpalaearctic species.

- *Baetis (B.) fuscatus* (Linnaeus, 1761) (syn. *bioculatus* auct.; *venustulus* Eaton, 1885). Transpalaearctic species.
- *Baetis (B.) vernus* Curtis, 1834. Transpalaearctic species.
- *Baetis (B.) ursinus* Kazlauskas, 1963. Eastpalaearctic species; known from the Angara river, Mongolia and from the Russian Far East.

C a e n i d a e

- *Brachycercus harrisella* Curtis, 1834. Transpalaearctic species.
- *Caenis horaria* (Linnaeus, 1758) (syn. *dimidiata* Stephens, 1835). Transpalaearctic species.
- *Caenis lactea* (Burmeister, 1839) (syn. *tumida* Bengtsson, 1912; *nocturna* Bengtsson, 1917; *undosa* Tiensuu, 1939). Possibly a transpalaearctic species; known from Europe, eastern Kazakhstan and Transbaikalia.
- *Caenis miliaria* (Tshernova, 1952). Eastpalaearctic species; known from Altai, Transbaikalia, Mongolia and the Russian Far East.
- *Caenis pseudorivulorum* Keffermuller, 1960 (syn. *beskidensis* Sowa, 1973). Possibly a transpalaearctic species.
- *Caenis robusta* Eaton, 1884 (syn. *incus* Bengtsson; *ulmeri* Brodsky, 1930). Westpalaearctic species; known from Europe, the Caspian Sea and Uzbekistan.

E p h e m e r e l l i d a e

- *Ephemerella ignita* (Poda, 1761) (syn. *lactata* Bengtsson, 1909; *torrentium* Bengtsson, 1917; *sibirica* Tshernova, 1952). Transpalaearctic species.
- *Ephemerella lenoki* Tshernova, 1952 (auct. *rufa* Imanishi; syn. *Uracanthella markevitshi* Belov, 1979). Eastpalaearctic species; known from eastern Kazakhstan, Altai, East Siberia, Mongolia, the Russian Far East and Japan.
- *Ephemerella triacantha* Tshernova, 1949 (syn. *tenax* Tshernova, 1952). Eastpalaearctic species; known from Altai, East Siberia, Mongolia and the Russian Far East.

E p h e m e r i d a e

- *Ephemera orientalis* McLachlan, 1875 (syn. *amurensis* Navas, 1913; *modesta* Brodsky, 1930). Eastpalaearctic species.
- *Ephemera vulgata* Linnaeus, 1758. Westpalaearctic species.

H e p t a g e n i i d a e

- *Heptagenia (Kageronia) fuscogrisea* (Retzius, 1783). Possibly a transpalaearctic species; known from Europe, West Siberia and East Siberia.
- *Heptagenia (H.) flava* Rostock, 1878 (syn. *arsenjevi* Tshernova, 1952). Transpalaearctic species.
- *Heptagenia (H.) sulphurea* (Müller, 1776). Transpalaearctic species.
- *Ecdyonurus (Afghanurus) joernensis* Bengtsson, 1909 (syn. *mongolicus* Bajkova et Varychanova, 1978; *dentatus* Braasch, 1979; *stubbei* Braasch, 1979). Almost a transpalaearctic species; distributed in Scandinavia, East-European Plain, Ural, Siberia, Mongolia, the Russian Far East and Korea.
- *Ecdyonurus (Afronurus) abracadabrus* Kluge, 1983. Eastpalaearctic species; known from Evenkia, Transbaikalia and the Russian Far East.
- *Rhithrogena bajkovae* Sowa, 1973. Eastpalaearctic species; known from Transbaikalia, Mongolia and the Russian Far East.
- *Epeorus (Belovius) pellucidus* (Brodsky, 1930) (syn. *smirnovi* Tshernova, 1978). Eastpalaearctic species; known from eastern Kazakhstan, Altai, East Siberia and Far East.

I s o n y c h i i d a e

- *Isonychia ussurica sibirica* Tiunova et al., (in press). Siberian subspecies of the eastpalaearctic *Isonychia ussurica* Bajkova, 1970.

L e p t o p h l e b i i d a e

- *Choroterpes* (*Euthraulus*) sp. Probably referable to the eastpalaearctic *C. (E.) altioculus* Kluge, 1984.
- *Leptophlebia (Paraleptophlebia) submarginata* (Stephens, 1835). Westpalaearctic species; known from Europe and eastern Kazakhstan.

P o l y m i t a r c y i d a e

- *Ephoron* sp. larvae could not be identified to the species level. LEPNEVA (1930) reported *E. virgo* (Olivier 1791), but at that time

the taxon could be confused with *E. shigae* Takahashi, 1924 or *E. (Eopolymitarcys*) *nigridorsum* (Tshernova, 1934).

P o t a m a n t h i d a e

- *Potamanthus luteus* (Linnaeus, 1767). Transpalaearctic species.

S i p h l o n u r i d a e

- *Siphlonurus alternarus* Say, 1824 (syn. *linnaeanus* Eaton, 1871; *thomsoni* Bengtsson, 1909; *oblita* Bengtsson, 1909). Transholarctic species.

DISCUSSION

The fauna of the region includes 18 transpalaearctic and transholarctic, 1 Scandinavian/eastpalaearctic, 10 eastpalaearctic and 3 westpalaearctic species. *Choroterpes* (*Euthraulus*) sp. and *Ephoron* sp. could not be identified to species level, therefore their ranges are unclear.

The most interesting discoveries are the following:

– *Ephemera vulgata*. – A single male imago near the Berd' river, 22-VI- -2002. As far as we know, this species was not previously recorded for Asia.
– *Caenis pseudorivulorum*. – 119 larvae in the Inya and Berd' rivers throughout the summer of 2002. So far it was known from Europe only, but its transpalaearctic distribution can not be excluded.
– *Caenis robusta*. – Larvae were collected in a pond in the city of Novosibirsk (July 2002), which is the easternmost locality known for this species. The eggs, extracted from a mature female larva, have a reticulated surface, a diagnostic feature that separates this species from the eastpalaearctic *C. miliaria*.

For some species, the westernmost localities were discovered:

– *Isonychia ussurica sibirica*. – 5 imagoes (10-VII-2002) and 3 larvae (14/19-VII-2002) from the Inya river.
– *Rhithrogena bajkovae*. – Larvae from the Inya river in Novosibirsk, 30-V-2002. Subimaginal genitals with pointed titillators, in mature male larva, allow its separation from the related *R. lepnevae*.
– *Epeorus (Belovius) pellucidus*. – Larvae were collected in the Inya (3 specimens, 27-V-2002) and Berd' (6 specimens, 4-IX-2002) rivers.

– *Ecdyonurus (Afronurus) abracadabrus*. – Larvae were collected in the Inya river at Novosibirsk, 19-VII-2002.
– *Ephemerella (Uracanthella) lenoki*. – Larvae and imagoes from the Inya and Berd' rivers (69 specimens, May to September 2002).
– *Ephemerella (Drunella) triacantha*. – Larvae were collected in the Berd' river near Novososedovo, 22-VI-2002.
– *Caenis miliaria*. – 16 larvae from Gluchoe Lake near the Ob' river, 1--VII-2002.
– *Baetis ursinus*. – 1 larva from the Berd' river, 20-VIII-2002.
– *Baetis (Nigrobaetis) bacillus*. – 17 larvae from the Inya river near Novosibirsk city and 10 larvae near Otgonka railway station, 19/27-VII-2002.

Undoubtedly, the occurrence of numerous eastern species in the lowland rivers of southwestern Siberia is affected by the neighbouring Altai-Sayan Mountain Country. The latter is part of a great mountain system stretching from Altai in the SW and Putorana Mountains in the NW, to the Pacific Ocean in the East. This area has a specific rhithral mayfly fauna, while the potamal fauna includes many transpalaearctic species.

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