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Contribution to the Caddisfly fauna of the Southern Urals

Juha SALOKANNEL, Alexander LAGUNOV, Markus P. RANTALA, Kari NUPPONEN & Kimmo SILVONEN

Abstract

This article is a contribution to the caddisfly fauna of the Southern Urals region in Russia. The material was collected between 1981 and 2018, mostly from lepidopterologists' light traps. Collected caddisflies were identified as 116 species, many were new to the area and some extended their known distribution area either to the west, east or south. A new species of Triaenodes was discovered among the material. Taxon is described formally in a separate article (SALOKANNEL & IVANOV, in prep.).

Аннотация

Статья посвящена фауне ручейников (Trichoptera) Южного Урала и основана на материалах, собранных в 1981-2018 гг. в 33 локалитетах региона (20 площадок – Челябинская область; 6 –Оренбургская область; 6 – Республика Башкортостан; 1 – Курганская область). Основная часть материала собрана с помощью светоловушек различной конструкции. Всего выявлено 116 видов ручейников, из которых 52 вида указаны впервые для Южного Урала, а 13 видов – впервые для Урала в целом (*Oxyethira distinctella*, *Oecetis testacea*, *Setodes viridis*, *Triaenodes reuteri*, *Tr. simulans*, *Triaenodes* sp., *Ironoquia dubia*, *Limnephilus auricula*, *Limnephilus germanus*, *Limnephilus sibiricus*, *Philarctus bergrothi*, *Cyrnus fennicus*, *Polycentropus irroratus*). В целом фауна ручейников Южного Урала носит европейский характер, т.к большинство зарегистрированных видов имеют либо оценъ широкое, либо западно-палеарктическое распространение. Лишь 4 вида (*Asynarchus amurensis*, *Limnephilus sibiricus*, *Philarctus bergrothi* and *P. rhomboidalis*) находятся на западной границе их известного ареала.

Introduction

The Southern Urals refer to the southern quarter of the Ural Mountains and its nearby areas within the Russian borders (see the map). It is a relatively low mountain range where biotopes at higher elevations are mostly taiga forests gradually turning into lowland steppe (JUNNILAINEN et al. 2010). Most of the area belongs to the basin of the Ural River that flows into the Caspian Sea. In this region, the presence of several rather large tributaries of the Ural River (Utva, Ilek, Hobda, Kumak, Suundyk, Tamlyk, Sakmara, Salmych) increases the diversity of nature. In the eastern parts of the region, there are plenty of mid-sized and small lakes also, some of them situated in saline areas. The Southern Urals lies on the border of the Western and Eastern Palearctic ecoregions.

The diversity of caddisflies in the Southern Urals has been discussed in the recent literature. In the overview of Russian caddisflies, IVANOV (2011) lists 103 species of caddisflies from the Urals, the area ranging from the Polar Urals to the border of Kazakhstan. PAN'KOV & KRASHENINNIKOV (2016) enhance the caddisfly list of the Urals and its neighboring regions up to 169 species and divide the Urals into four areas from north to south. A total of 83 species are specified in the southernmost part of the area, the Southern Urals. The neighboring Russian areas, the Middle Urals (80 species), the Central Volga region (40) and the West Siberia (94) are known to be similar with relatively low numbers of caddisflies (IVANOV 2011, PAN'KOV & KRASHENINNIKOV 2016). In the south, the fauna of Kazakhstan contains at least 148 species (SMIRNOVA et al. 2016) while only some tens of species are known from northern Kazakhstan.

Material and Methods

This contribution is based on the material collected by the authors and their colleagues during several expeditions to the southern Urals between 1981 and 2018. Caddisflies were of secondary interest and only occasionally retained between 1981 and 2009, but collected every year from 2010 onwards. Almost all the material was collected using various light traps primarily meant for nocturnal Lepidoptera, and only occasionally with a sweep net. Most samplings were limited to short time periods, ranging from one to a few nights. In general, the samples are dated from late May to late September which covers most of the adult caddisfly season in the area. However, only a few sites have been sampled at different times of the season.

The collecting sites were situated in four oblasts: Chelyabinsk (20 sites), Orenburg (6), Bashkortostan (6) and Kurgan (1). The site information is given in the following order: site number, oblast, site name, WGS84 N coordinate, WGS84 E coordinate, altitude (meters a.s.l.), collection dates (collectors). The collector acronyms are Mikael Englund (ME), Janne Jokinen (JJ), Ksenia Khristina (KK), Heikki Kronholm (HK), Alexander Lagunov (AL), Kari Nupponen (KN), Markus P. Rantala (MR), Juha Salokannel (JS), Kimmo Silvonen (KS), and Pekka Tokola (PT).

1) Orenburg; Pokrovka, Schibendy valley; 50.66N, 54.45E; 180 m; 2.VII.2003 (KN), 29.VII.2003 (KN)
2) Orenburg; Melovoy Zavod, dam; 51.0799N, 55.7167E; 190 m; 19.IX.2016 (MR,JJ,JS)
3) Orenburg; Melovoy Zavod, chalk hills; 51.0849N, 55.6534E; 220 m; 5.VII.2015 (MR), 18.IX.2016 (MR,JJ,JS), 4.-6.VI.2018 (MR,HK,KK)
4) Orenburg; Verbljushka; 51.3818N, 56.7993E; 155 m; 23.-24. VII.2014 (MR), 14.-16.IX.2016 (MR,JJ,JS), 10.-13.VI.2018 (MR,HK,KK)
5) Orenburg; Guberlya river, near Beloshapka village; 51.2450N, 58.0790E; 215 m; 26.-27.VI.2010 (AL), 12.-13.VII.2015 (MR), 20.IX.2016 (MR,JJ,JS)
6) Orenburg; Kuvandyksky, Small Churaeva village, Sakmara river; 51.690200N; 57.459800E; 387 m; 23.-24.VI.2010 (AL)
7) Bashkortostan; Sakrama river, Jantyshevo village; 51.9N, 57.716E; 450 m; 20.-21.VI.1996 (KN)
8) Bashkortostan; Burzyan, Shulgantash, Kapova caves; 53.036133N, 57.071283E; 300 m; 20.-21.VII.2012 (KS,MR)
9) Bashkortostan; Baskirian Reserve, Sargaya; 53.368333N, 57.730833E; 678 m; 17.-19.VII.2012 (MR)
10) Bashkortostan; near Moscow village; 53.9808N, 59.0833E; 450 m; 21.IX.2016 (MR,JJ,JS)
11) Bashkortostan; Beloretsk, South Ural State, Revet village, river Inzer; 54.177N, 57.612E; 288 m; 15.-17.VII.2012 (AL,MR)
12) Bashkortostan; Satka, Sikiyaz Tamak village; 55.184833N, 58.588917E; 300 m; 15.VII.2011 (PT)
13) Chelyabinsk; Medvedka river, Sukhaya Atya; 54.85N, 57.39E; 200 m; 9.VI.1997 (AL)
14) Chelyabinsk; near Sibirka village; 54.816270N, 59.002404E; 630 m; 16.-18.VII.2017 (MR)
15) Chelyabinsk; Sibirka village; 54.865234N, 59.000964E; 560 m; 15.VII.2017 (MR)
16) Chelyabinsk; Iremel natural park; 54.55N, 58.816E; 900 m; 13.VII.1997 (KN)
17) Chelyabinsk; Zyuratkul, Nurgush, Kalagaza river; 54.8118N, 59.033917E; 638 m; 14.VII.2011 (KS,ME)
18) Chelyabinsk; Uchaly village; 54.55N, 59.68E; 500 m;

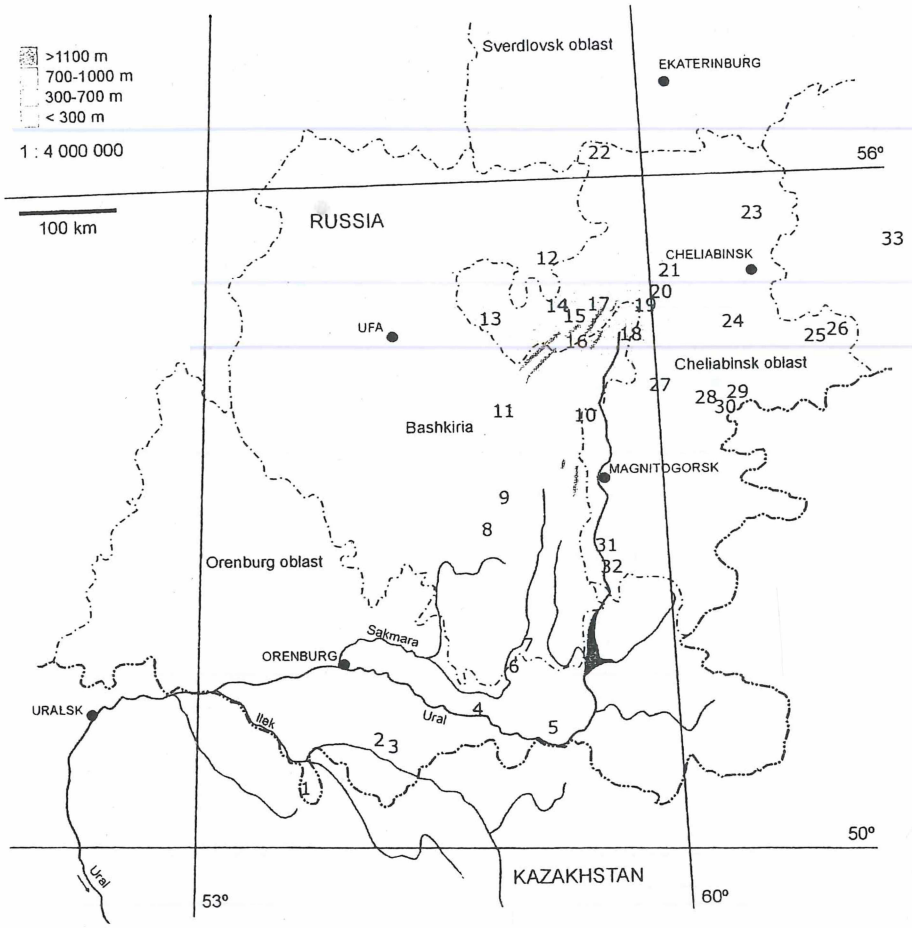

Figure 1. Map of the Southern Urals region. Numbers indicate the collecting sites (see the site list).

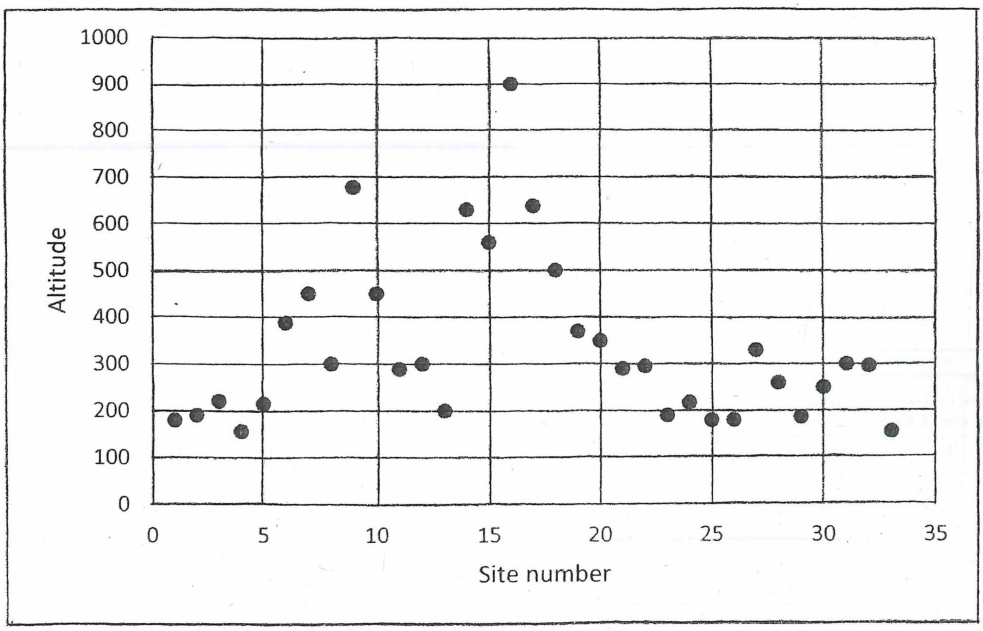

Figure 2. The altitude distribution of the collecting sites.

4.IX.2009 (KN)
19) Chelyabinsk; Ustinovo, Miass river; 54.86565N, 59.966783E; 370 m; 31.VII.2014 (KS), 12.IX.2016 (AL,MR,JJ,JS), 22.IX.2016 (MR,JJ,JS), 4.VIII.2018 (KS,PT,JS), 12.-13.VIII.2018 (KS,PT,JS)
20) Chelyabinsk; Miass, Ilmen State Reserve; 55.0172N, 60.16415E; 350 m; 27.VI.1997 (AL), 21.VIII.-7.IX.2000 (AL), 1.-11.IX.2002 (AL), 15.VII.2003 (KN), 19.VI.2004 (AL), 15.-17.- 25.VI.2015 (AL), 12.-23.IX.2016 (AL,MR,JJ,JS)
21) Chelyabinsk; Ilmen State Reserve, Miassovo lake; 55.15N, 60.27E; 290 m; 17.VII.1981 (AL), 20.VII.1981 (AL), 5.-23.VIII.1985 (AL)
22) Chelyabinsk; Nyazepetrovsk, Shemakha village, Ufa river; 56.25315N, 59.275067E; 296 m; 18.-19.VII.2011 (KS,ME)
23) Chelyabinsk; Kunashaksky, Chebakul lake; 55.667033N, 61.387833E; 190 m; 23.VII.2013 (KS)
24) Chelyabinsk; Uvelsky, Suharysh estuary, Uvelka river; 54.5915N, 61.084667E; 218 m; 27.VI.2008 (AL)
25) Chelyabinsk; Oktyabrskoye, lake Kartabyz; 54.516224N, 62.572967E; 180 m; 1.VIII.2016 (KS,PT), 21.VII.2017 (MR)
26) Chelyabinsk; Oktyabrskoye, Zagrebino, lake Solonoye; 54.546475N, 63.082377E; 178 m; 30.-31.VII.2016 (KS,PT)
27) Chelyabinsk; Kopalovskiy, river Kurasan; 54.05305N, 60.10638E; 330 m; 26.-27.VII.2016 (KS,PT)
28) Chelyabinsk; Stepnoye, river Uy; 54.0548N, 60.4797E; 260 m; 15.-16.V.2015 (AL,HK,JS), 19.VII.2017 (MR), 11.VIII.2018 (KS,PT,JS)
29) Chelyabinsk; Osipovka, river Uy; 54.121N, 61.094E; 186 m; 28.-29.VII.2016 (KS,PT), 5.VIII.2018 (AL,KS,PT,JS)
30) Chelyabinsk; Troitsky State Reserve, lake Kukay; 53.946008N, 61.241443E; 250 m; 25.-26.VI.1986 (AL)
31) Chelyabinsk; Kizilskoye; 52.7469N, 58.8729E; 300 m; 28.VI.2010 (AL), 13.IX.2016 (MR,JJ,JS)
32) Chelyabinsk; Ural river, near Kamenka village; 52.5355N, 59.0672E; 296; 12.IX.2009 (KN)
33) Kurgan; Yurgamysh, Shchuchye lake; 55.464933N, 64.507233E; 154 m; 18.VII.2013 (AL)

Most samples were stored in a freezer after the field expedition and later either placed in ethanol or pinned. All the species were identified using genital and secondary characters using MALICKY'S (2004) atlas as the main reference work. In some groups like the Hydroptilidae, Polycentropodidae and Hydropsychidae females were often ignored due to difficulties in making definite identifications. Even if every species from each sample was confirmed using genital structures, the specimen count was estimated from the secondary characters when it came to the most numerous samples. The total number of specimens in the material was about 8500. The nomenclature follows the Trichoptera World Checklist (2019), except that it adopts the usage of the genus *Agrypnetes* as in RINNE & WIBERG-LARSEN (2017).Selected specimens of the material are stored in the research collections of the authors and the collection of the St. Petersburg Zoological Museum. Tissue samples (legs) of a few specimens were shipped to the Canadian Centre for DNA Barcoding in Guelph for DNA sequence (COI) analysis. The barcodes are preserved in the Barcode of Life Data Systems (BOLD; see http://v4.boldsystems.org); each sampleID contains code "JSLK-URAL-T" concatenated with the record number.

Results

The list of the identified species is presented here appended with the site numbers as in the site list. The species new to the Southern Urals compared with PAN'KOV & KRASHENINNIKOV (2016) are preceded by an asterisk (*) and the species new for the whole Urals area are preceded by a double asterisk (**). Species with annotations at the end of the list are preceded by †.

Apataniidae
Apatania stigmatella (ZETTERSTEDT, 1840); 17
† *Apatania zonella* (ZETTERSTEDT, 1840); 10, 18, 30, 32

Brachycentridae
Brachycentrus subnubilus CURTIS, 1834; 28

Ecnomidae
Ecnomus tenellus (RAMBUR, 1842); 4, 20, 23

Glossosomatidae
* *Agapetus ochripes* CURTIS, 1834; 17

Goeridae
Goera pilosa (FABRICIUS, 1775); 4, 17, 19, 20, 22, 28, 31
Silo pallipes (FABRICIUS, 1781); 14

Hydropsychidae
Cheumatopsyche lepida (PICTET, 1834); 4, 5, 6, 7, 8, 11, 12, 22, 24, 31
Hydropsyche angustipennis (CURTIS, 1834); 19, 20, 28
Hydropsyche bulgaromanorum MALICKY, 1977; 3
Hydropsyche contubernalis MCLACHLAN, 1865; 3, 4, 8, 20, 24, 28, 29, 31
* *Hydropsyche newae* KOLENATI, 1858; 8, 11
Hydropsyche pellucidula (CURTIS, 1834); 3, 4, 5, 6, 8, 12, 20, 22, 24, 28, 29, 31

Hydroptilidae
Agraylea multipunctata CURTIS, 1834; 19, 28
* *Agraylea sexmaculata* CURTIS, 1834; 5, 25, 28
* *Allotrichia vilnensis* RACIECKA, 1937; 5
* *Hydroptila forcipata* (EATON, 1873); 11, 12
* *Hydroptila lotensis* MOSELY, 1930; 6, 8, 9, 11, 12, 22, 28
* *Hydroptila occulta* (EATON, 1873); 9, 22
Hydroptila pulchricornis PICTET, 1834; 19
* *Hydroptila simulans* MOSELY, 1920; 22
Hydroptila sparsa CURTIS, 1834; 19, 28
Ithytrichia lamellaris EATON, 1873; 4, 8, 9, 11, 12, 28, 29, 31, 32
** *Oxyethira distinctella* MCLACHLAN, 1880; 28
Oxyethira flavicornis (PICTET, 1834); 19, 20, 28, 29
† * *Oxyethira tenuella* MARTYNOV, 1924; 8, 11

Lepidostomatidae
Lepidostoma hirtum (FABRICIUS, 1775); 8, 11, 17, 22, 29

Leptoceridae
* *Athripsodes albifrons* (LINNAEUS, 1758); 5, 8, 12, 22, 29, 31
Athripsodes cinereus (CURTIS, 1834); 8, 19, 20, 24, 28, 29
* *Ceraclea albimacula* (RAMBUR, 1842); 19, 22, 28, 29
* *Ceraclea dissimilis* (STEPHENS, 1836); 5, 8, 9, 11, 19, 20, 21, 24, 25, 28, 29, 31
Ceraclea fulva (RAMBUR, 1842); 19, 21, 25, 27, 28, 29, 30
* *Ceraclea senilis* (BURMEISTER, 1839); 19
* *Leptocerus tineiformis* CURTIS, 1834; 19, 20, 24, 25, 28, 29, 31
Mystacides azurea (LINNAEUS, 1761); 4, 5, 8, 9, 11, 12, 24, 29
Mystacides longicornis (LINNAEUS, 1758); 19, 20, 28
Mystacides nigra (LINNAEUS, 1758); 28, 29
Oecetis furva (RAMBUR, 1842); 19, 29
†* *Oecetis intima* MCLACHLAN, 1877; 25, 26, 28, 29
* *Oecetis notata* (RAMBUR, 1842); 4, 5, 8, 11
* *Oecetis ochracea* (CURTIS, 1825); 3, 19, 20, 23, 24, 25, 26, 27, 28, 29, 30, 33
** *Oecetis testacea* (CURTIS, 1834); 5, 8, 11, 19
* *Oecetis tripunctata* (FABRICIUS, 1793); 31
** *Setodes viridis* (FOURCROY, 1785); 31

Triaenodes bicolor (CURTIS, 1834); 25
†** *Triaenodes reuteri* MCLACHLAN, 1880; 25, 30
** *Triaenodes simulans* TJEDER, 1929; 28, 29, 31
* *Triaenodes unanimis* MCLACHLAN, 1877; 20, 21, 28
** *Triaenodes* sp. SALOKANNEL & IVANOV in prep.; 19

Limnephilidae
* *Anabolia brevipennis* (CURTIS, 1834); 11, 19, 20, 29
* *Anabolia concentrica* (ZETTERSTEDT, 1840); 18, 19, 20
Anabolia furcata BRAUER, 1857; 19, 28
* *Asynarchus amurensis* (ULMER, 1905); 19, 20
* *Colpotaulius major* MARTYNOV, 1909; 3, 4, 19, 25, 28, 29
Glyphotaelius pellucidus (RETZIUS, 1783); 19
Grammotaulius nitidus (MUELLER, 1764); 1, 4, 5, 28, 29
* *Grammotaulius sibiricus* MCLACHLAN, 1874; 19, 28
* *Halesus digitatus* (SCHRANK, 1781); 4, 20
Halesus radiatus (CURTIS, 1834); 4
* *Halesus tessellatus* (RAMBUR, 1842); 3, 5, 19, 20, 31
* *Hydatophylax infumatus* (MCLACHLAN, 1865); 15
** *Ironoquia dubia* (STEPHENS, 1837); 19
** *Limnephilus auricula* CURTIS, 1834; 20, 31
* *Limnephilus binotatus* CURTIS, 1834; 3, 19, 21, 27, 28
Limnephilus borealis (ZETTERSTEDT, 1840); 19
* *Limnephilus coenosus* CURTIS, 1834; 14
Limnephilus decipiens (KOLENATI, 1848); 2, 4, 10, 19, 20, 28, 31
* *Limnephilus elegans* CURTIS, 1834; 19, 21, 28
* *Limnephilus externus* HAGEN, 1861; 2 0
Limnephilus extricatus MCLACHLAN, 1865; 19, 27, 28, 31
Limnephilus flavicornis (FABRICIUS, 1787); 5, 19, 20, 21, 27, 28, 29, 31
* *Limnephilus fuscicornis* (RAMBUR, 1842); 8, 28
* *Limnephilus fuscinervis* (ZETTERSTEDT, 1840); 19, 26, 28, 29
** *Limnephilus germanus* MCLACHLAN, 1875; 18, 19
Limnephilus griseus (LINNAEUS, 1758); 3, 10, 20, 31
* *Limnephilus ignavus* MCLACHLAN, 1865; 2, 3, 4, 19, 20, 27
* *Limnephilus lunatus* CURTIS, 1834; 2, 3
Limnephilus nigriceps (ZETTERSTEDT, 1840); 19
Limnephilus politus MCLACHLAN, 1865; 2, 4, 19, 20
Limnephilus rhombicus (LINNAEUS, 1758) 8, 18, 19, 20, 21, 27, 28, 29
Limnephilus sericeus (SAY, 1824); 19, 20, 21, 28, 29
†** *Limnephilus sibiricus* MARTYNOV, 1929; 28
* *Limnephilus sparsus* CURTIS, 1834; 10, 19, 20, 28
Limnephilus stigma CURTIS, 1834; 19, 20, 28, 31
Limnephilus vittatus (FABRICIUS, 1798); 10, 19, 20, 21, 28, 31
Micropterna sequax MCLACHLAN, 1875; 29
Nemotaulius punctatolineatus (RETZIUS, 1783); 19, 21, 28
** *Philarctus bergrothi* MCLACHLAN, 1880; 19, 25
* *Philarctus rhomboidalis* MARTYNOV, 1924; 19, 20, 30
Potamophylax latipennis (CURTIS, 1834); 9, 16, 19
Potamophylax nigricornis (PICTET, 1834); 17, 20, 22
Potamophylax rotundipennis (BRAUER, 1857); 18, 19
* *Rhadicoleptus alpestris* (KOLENATI, 1848); 20

Molannidae
Molanna albicans (ZETTERSTEDT, 1840); 28
Molanna angustata CURTIS, 1834; 19, 27, 28, 29, 30

Phryganeidae
Agrypnetes colorata HAGEN, 1873; 19, 20, 21
† *Agrypnetes crassicornis* (MCLACHLAN, 1876); 30
Agrypnia obsoleta (HAGEN, 1864); 19, 25, 26, 27, 28
Agrypnia pagetana CURTIS, 1835; 3, 19, 23, 25, 26, 28, 29
* *Agrypnia picta* KOLENATI, 1848; 28, 29
Agrypnia varia (FABRICIUS, 1793); 1, 19, 20, 23, 25, 26, 27, 28, 29, 31, 33
Oligotricha striata (LINNAEUS, 1758); 14
Phryganea bipunctata RETZIUS, 1783; 20
† *Phryganea grandis* LINNAEUS, 1758; 6, 19, 20, 23, 28, 30, 33
Semblis atrata (GMELIN, 1789); 13

Polycentropodidae
Cyrnus crenaticornis (KOLENATI, 1859); 20
** *Cyrnus fennicus* KLINGSTEDT, 1937; 26, 29
Cyrnus flavidus MCLACHLAN, 1864; 19, 28, 29
Holocentropus dubius (RAMBUR, 1842); 20
Neureclipsis bimaculata (LINNAEUS, 1758); 4, 19, 20, 28
Plectrocnemia conspersa (CURTIS, 1834); 14, 17
Polycentropus flavomaculatus (PICTET, 1834); 8, 17, 19, 28, 29
** *Polycentropus irroratus* (CURTIS, 1835); 11

Psychomyiidae
Psychomyia pusilla (FABRICIUS, 1781); 4, 5, 8, 11, 12, 20, 22, 29

Rhyacophilidae
Rhyacophila nubila (ZETTERSTEDT, 1834); 29

Sericostomatidae
Sericostoma personatum (KIRBY & SPENCE, 1826); 14, 17

Species annotations

Apatania zonella (ZETTERSTEDT, 1840)
The species was recorded from four sites at altitudes between 296 and 500 meters. However, the majority of populations may live at the less studied higher altitudes as they do in northern Europe. A low percentage of males are a characteristic of the populations (SALOKANNEL & MATTILA 2018), all the seven recorded specimens are females.

Oxyethira tenuella MARTYNOV, 1924
O. tenuella is generally rare (NEU et al. 2018), it is only known from two regions in Russia (IVANOV, 2011). The species was recorded from two rivers at altitudes of 288m and 300m. The previously unknown female was described on the basis of the present material (SALOKANNEL & MATTILA 2018).

Oecetis intima MCLACHLAN, 1877
The species was recorded from four lowland sites, all located in saline areas or their vicinity, close to the Kazakhstan border. *O. intima* seems to tolerate, or even favor somewhat saline lakes; the clearest example is the catch of about 200 specimens at saline Lake Solonoye 30.VII.2016. LEPNEVA (1970) states that the species is halobiont.

Triaenodes reuteri MCLACHLAN, 1880
Seven specimens were recorded from two sites, both sites located in saline areas close to the Kazakhstan border. The species was also found in large numbers from two saline lakes in Qostanay area in northern Kazakhstan during a short visit during the Urals expedition in 2018. All the recorded male specimens belonged to the nominal form. Accordingly, no specimens of the subspecies *T. reuteri turkestanicus* MARTYNOV, 1928 were recorded.

Ironoquia dubia (STEPHENS, 1837)
This west palearctic, relatively rare species was previously only known from four western regions of the former USSR (IVANOV, 2011, NEU et al. 2018). The record of one male from Ustinovo 4.VIII.2018 extends the known distribution range considerably eastwards. Larvae live in small or very small brooks. A more frequent sampling at such habitats in August could reveal more sites.

Limnephilus sibiricus MARTYNOV, 1929
One female of this species was caught by a sweep net together with *L. fuscicornis* on the bank of the small, sand and gravel-bottomed River Uy 11.VIII.2018 (site 28). The species is only

reported from three regions in Russia (IVANOV, 2011), and the record from the River Uy is clearly the most western. The identification is based on the articles of MARTYNOV (1929) and CLOE et al. (1999) as well as the *L. sibiricus* samples from the St. Petersburg Zoological Museum. The specimen is DNA-barcoded (sampleID: JSLK-URAL-T423).

Agrypnetes crassicornis (MCLACHLAN, 1876)
One male and five females were recorded at Lake Kukay 25.VI.1986 in Troitsky State Reserve, close to the Kazakhstan border (A. Lagunov leg.). A striking character of these females was that their forewings were abnormally long (20,6-22,3mm) compared to the lengths given in the literature: MALICKY (2004) gives a range of 15-18mm, SALOKANNEL & MATTILA (2018) 12,0-18,3mm. The species is known for its poor flying capability and a skating behaviour (MORSE & CHULUUNBAT 2007, SALOKANNEL & MATTILA 2018). However, such specimens with long wings are most likely able to fly well. Therefore, a closely related flying species *A. hayfordae* (MORSE & CHULUUNBAT, 2007) was considered also, although it is only known from Mongolia, so far. Morphological characters of the Troitsky specimens appeared to be contradictory between *A. crassicornis* and *A. hayfordae*. Therefore, we are not sure whether these specimens represent a previously unknown long-winged form of *A. crassicornis* or *A. hayfordae*. Thus, we retain the record as *A. crassicornis* and suggest a wider study of Central Asian specimens.

Phryganea grandis LINNAEUS, 1758
The possible presence of subspecies *P. grandis rotundata* Ulmer, 1905 was not studied.

Discussion

Altogether 116 species of caddisflies belonging to 16 families were identified, and one of them proved to be undescribed (SALOKANNEL & IVANOV in prep.). The most species-rich families were Limnephilidae (44 species), Leptoceridae (22) and Hydroptilidae (13). A total of 52 species are new to the Southern Urals and 13 species new to the whole Urals region compared with PAN'KOV & KRASHENINNIKOV (2016). However, it is to be noted that the numbers are dependent on the definition of the borders of the areas.

The species with the most site-records can be considered as very common in the Southern Urals: *Hydropsyche pellucidula* (12 sites), *Ceraclea dissimilis* (12), *Oecetis ochracea* (12), *Agrypnia varia* (11), *Cheumatopsyche lepida* (10), *Ithytrichia lamellaris* (9), *Hydropsyche contubernalis* (8), *Mystacides azurea* (8), *Limnephilus flavicornis* (8), *L. rhombicus* (8) and *Psychomyia pusilla* (8). Half of these species are confined to rivers and brooks, the rest live in stagnant or slow-flowing waters. These species are common in most of the European Plain, too. In general, our results support the conclusion of Pan'kov & Krasheninnikov that the Urals fauna of caddisflies is generally European: most of the recorded species have either a very wide or west Palearctic distribution. The eastern fauna is in a minority, since only four recorded limnephilids, *Asynarchus amurensis*, *Limnephilus sibiricus*, *Philarctus bergrothi* and *P. rhomboidalis* are at the western border of their known distribution ranges.

The material may initially reveal some distribution patterns within the Southern Urals region. Some of the species were only recorded on sites above 500 meter altitude: *Agapetus ochripes*, *Apatania stigmatella*, *Hydatophylax infumatus*, *Oligotricha striata*, *Plectrocnemia conspersa*, *Sericostoma personatum* and *Silo pallipes*. Five of these species are confined to cool water streams and brooks that are more common in the uplands. The four east palearctic limnephilids were all recorded from the northeast part of the region. The three species (*Agrypnetes crassicornis*, *Oecetis intima* and *Triaenodes reuteri*) associated with salinity were only found from the saline areas close to the border of Kazakhstan.

The material is too unevenly sampled to compare the diversity of the sites. However, it should be mentioned that the highest amount of species (56) was recorded at Ustinovo (site 19), and the most diverse one-night result, 42 species, was recorded at Stepnoye (site 28) 11.VIII.2018. Both sites comprise the lotic and lentic habitats.

It must be emphasized that even though the number of collection sites (33) was rather high and the amount of material large, it is evident that everything has not been found yet. The material contains probably most of the common species and some of the rare ones. Only a handful of records was made at altitudes above 500 meters whereas the highest elevation in the Southern Urals is at 1640m. Also, the collection sites and times were mostly not chosen on a trichopterological basis. Altogether 20 species were recorded as a single specimen indicating that the number of species not yet found is likely to be significant. These results summed up with those of Pan'kov & Krasheninnikov increase the number of caddisflies in the Southern Urals to 135 species.

Even if the Urals is not rich in endemic species of caddisflies (PAN'KOV & KRASHENINNIKOV 2016), the contours of the low mountain range create plenty of various aquatic freshwater habitats providing living conditions for a caddisfly fauna that is not poor. Very interesting records like the *Triaenodes* n.sp. or the long-winged *Agrypnetes crassicornis* are examples of the treasures of nature in the area.

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Authors: Juha Salokannel, Siikinkatu 13, 33710 Tampere, Finland (juha.salokannel@gmail.com)
Alexander Lagunov, Miass, Russia (lagunov@mineralogy.ru)
Markus P. Rantala (perhosmaailma@luukku.com)
Kari Nupponen (kari.nupponen@faunatica.fi)
Kimmo Silvonen (silvonen@kolumbus.fi)

For supplemental material (photos or data in Microsoft excel format), contact Juha Salokannel, juha.salokannel@gmail.com.

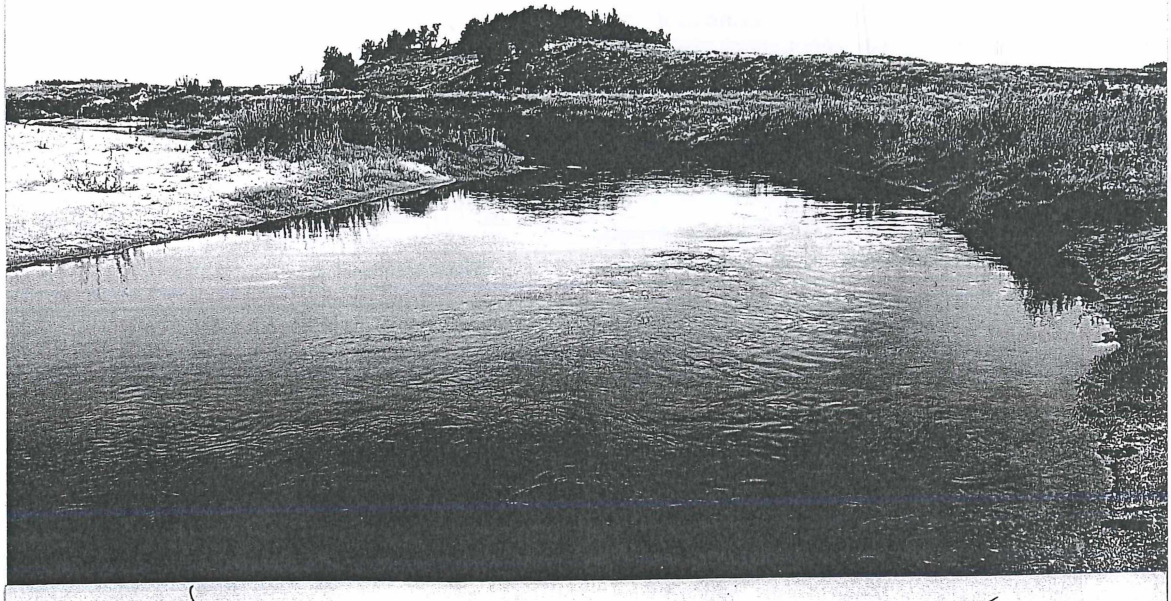

Figure 3. Stepnoye, the River Uy (site 28). *Limnephilus sibiricus* was found on this spot. Photo: Juha Salokannel.

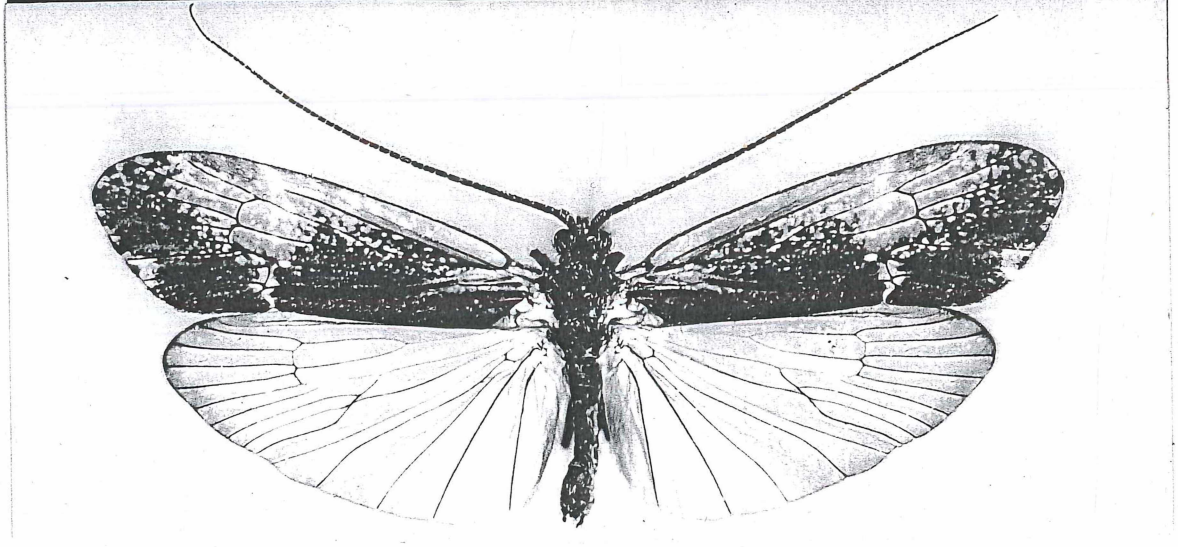

Figure 4. *Asynarchus amurensis* (ULMER, 1905), collected from Ustinovo (site 19). Photo: Keijo Mattila.