

Mayfly, stonefly and caddisfly fauna (Insecta: Ephemeroptera, Plecoptera, Trichoptera) of the southern spurs of the Chersky Range in Magadanskaya Oblast and Republic of Sakha (Yakutia), Russia

Фауна подёнок, веснянок и ручейников (Insecta: Ephemeroptera, Plecoptera, Trichoptera) южных отрогов хребта Черского в Магаданской области и Республике Саха (Якутия)

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Ключевые слова: амфибиотические насекомые, Северо-Восток Азии, фауна, биоразнообразие, хребет Черского, оледенение, климат, биотоп, Магаданская область, Республика Саха (Якутия).

Abstract. Data on the biodiversity of aquatic insect fauna of the orders Ephemeroptera, Plecoptera and Trichoptera, inhabiting lotic and lentic environments in the southern spurs of the Chersky Range (Magadanskaya Oblast and the Republic of Sakha, Yakutia), are provided for the first time. The species richness of these groups is modest, despite the biotopes' considerable diversity. Some reasons explaining the sparse fauna of the study area are discussed.

Резюме. В статье впервые приводятся данные о разнообразии основных отрядов амфибиотических насекомых: подёнок, веснянок и ручейников, обитающих в водотоках и водоёмах южных отрогов хребта Черского в Магаданской области и Республике Саха (Якутия). Показано, что, несмотря на значительное разнообразие типов обследованных биотопов, видовое богатство рассматриваемых групп в районе работ невелико. Приводится анализ возможных причин бедности фауны обследованного района.

Introduction

Northeast Asia, the territory east of the Lena River, attracts the attention of entomologists due to the insufficient study of this remote and climatically challenging region. Research on the fauna biodiversity and species richness is often considered, in one way or another, in the

context of Beringia. In one way or another, research on the species richness and faunal biodiversity is frequently taken into consideration in relation to Beringia. As a result, any effort to close current gaps in different groups of animals is crucial, as is the chance to both enhance and broaden our basic knowledge of Beringia and its function in the faunal interchange between Eurasia and North America.

Therefore, any attempt to fill existing gaps in various groups of organisms is of great importance, as is the opportunity not only to supplement but also to expand existing fundamental understanding of Beringia and its role in faunal exchange between Eurasia and North America.

The aquatic insect fauna of Northeast Asia is poorly studied. Despite its predominantly mountainous nature, existing information is primarily confined to rivers and lakes in lowlands and coastal areas. Meanwhile, the fauna of mountainous regions remains very limited.

This paper presents the results of a study of the fauna of the aquatic insect's mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Trichoptera) in the southern spurs of the Chersky Range on the border of the Magadanskaya Oblast and Yakutia. The Chersky Range is one of the main mountain systems in Northeast Asia,

extending for nearly 1,200 km from the lower reaches of the Yana River in the north to the upper reaches of the Kolyma River in the south. The southern spurs of the range were covered with glaciations during each cooling period of the late Pleistocene and are currently represented by the main landscape forms and water bodies, the origin and appearance of which are associated with past glacial processes typical of the mountainous regions of Northeast Asia.

Materials and methods

SAMPLING METHODS

The material consisted of adults, pupas and larvae of mayflies, stoneflies, and caddisflies, collected by the first author during fieldwork conducted in the vicinity of the Omulevsky Middle Mountains (southern spurs of the Chersky Range) in June–August 2018, 2020–2021, 2023–2024, and 2025.

Sampling was carried out at more than 30 sites, grouped by biotope type for convenience (Fig. 1). A total of 92 samples of benthos and adult aquatic insects were collected.

CHARACTERISTICS OF THE STUDY AREA

According to geographer N.A. Gvozdetsky and geobotanist B.A. Yurtsev, Northeast Asia includes the Verkhoyansk Range and the Upper Kolyma Highlands in the west [Yurtsev, 1974; Gvozdetsky, 1978]. Northeast Asia is washed by the seas of the Arctic Ocean in the north, and by the seas of the Pacific Ocean in the east. The Kamchatka Peninsula is not included in Northeast Asia [Yurtsev, 1974]. The territory is characterised by diverse and contrasting relief, formed primarily by mountain ranges and plateaus, and by flat lowlands in the north, stretching along the valleys of large rivers far to the south. The main processes of relief formation occurred in the second half of the Mesozoic, but the modern appearance of the region is determined mainly by the latest tectonic movements [Gvozdetsky, 1978; Fradkina, 1999].

It is known that the diversity and complexity of relief and landscapes contribute to the richness of flora and fauna. In Northeast Asia, the complex topography, the abundance of lakes of various origins, and rivers and streams of various orders can be considered factors that contribute to increased biodiversity in freshwater ecosystems. At the same time, this territory is characterised by a harsh, extra continental climate and the widespread occurrence of permafrost, which, by limiting the ridge of environmental conditions within the ‘cold spectrum’, undoubtedly constrains the biodiversity of the biota.

As noted above, the modern topography of the territory is closely linked to the Upper Pleistocene (from 130,000 years ago), characterized by the advance and retreat of glaciers and marine transgression, which caused the emergence and disappearance of the Bering Land Bridge. Two glaciation stages can be distinguished in this

period: the Early Zyryan (approximately 90,000 years ago) and the Late Zyryan or Sartan (after 23,000–22,000 years ago). Despite the fact that most of Northeast Asia was ice-free during the Neopleistocene, during cooling periods, mountain-valley glaciers actively developed here, while the Verkhoyansk Range and part of the Chersky Range system (the southern spurs, including the study area) were likely centers of reticulated and semi-sheath glaciation. One of these centers was located directly in the Okhandya Range [Khvorostova, 1970; Velichko, 2002].

Our research was carried out in a section of one of the described regions, covering a zone of low relief, framed by the Ulakhan-Chistay and Okhandya ranges from the west, the Omulevsky middle mountains from the east, and the Cherge range from the southeast, as well as the Omulevsky lowland on the western slopes of the Omulevsky middle mountains and some rivers on the western slopes of the Omulevsky middle mountains (Fig. 1).

The main watersheds range in elevation from 900 to 1,500 meters above sea level. The region has an extra continental climate, characterised by cold, low-snow winters and dry, warm summers. Annual air temperature fluctuations can reach 100 °C. The mountainous terrain creates an altitudinal temperature inversion between winter and summer; winter in the intermountain valleys can be noticeably colder than in the mountains, and vice versa in summer.

According to a meteorological station operating on Lake Darpir from 1941 to 1994, the average annual air temperature was –13.1 °C (with an absolute minimum of –61 °C and a January average of –38.4 °C). The maximum temperature occurs in July and can reach over 30 °C (the average for this month is +12.6 °C). The average daily temperature drops below zero in mid-May and mid-September [Scientific and Applied Handbook..., 1989]. The period of above-zero temperatures lasts no more than a third of the year. Snow cover begins in late September. Ice on lakes begins to form in October and melt in May. Large ice fields persist on large lakes until the end of June, significantly reducing the air temperature near them (Fig. 2).

Rivers are typically fed primarily by meltwater, with significant fluctuations in water levels throughout the summer, in some cases (for first-order rivers) ranging from the complete disappearance of river flow underground to floods completely inundating the river valley. Many rivers develop aufeis, which may not melt throughout the summer; extensive aufeis alter the riverbed profile (Fig. 3).

During research, various types of watercourses and water bodies were surveyed: large mountain glacial oligotrophic lakes, mesotrophic lakes, small mountain oligotrophic lakes, secondary thermokarst tundra lakes, tundra reservoirs with and without moss-covered bottoms, springs, waterfalls, first-order rivers whose runoff goes underground during low-water periods, high-order cold-water mountain rivers, tundra rivers, etc. (Figs 4–13). These lakes, reservoirs, waterfalls, streams, and rivers are located over an area of at least 420 km².

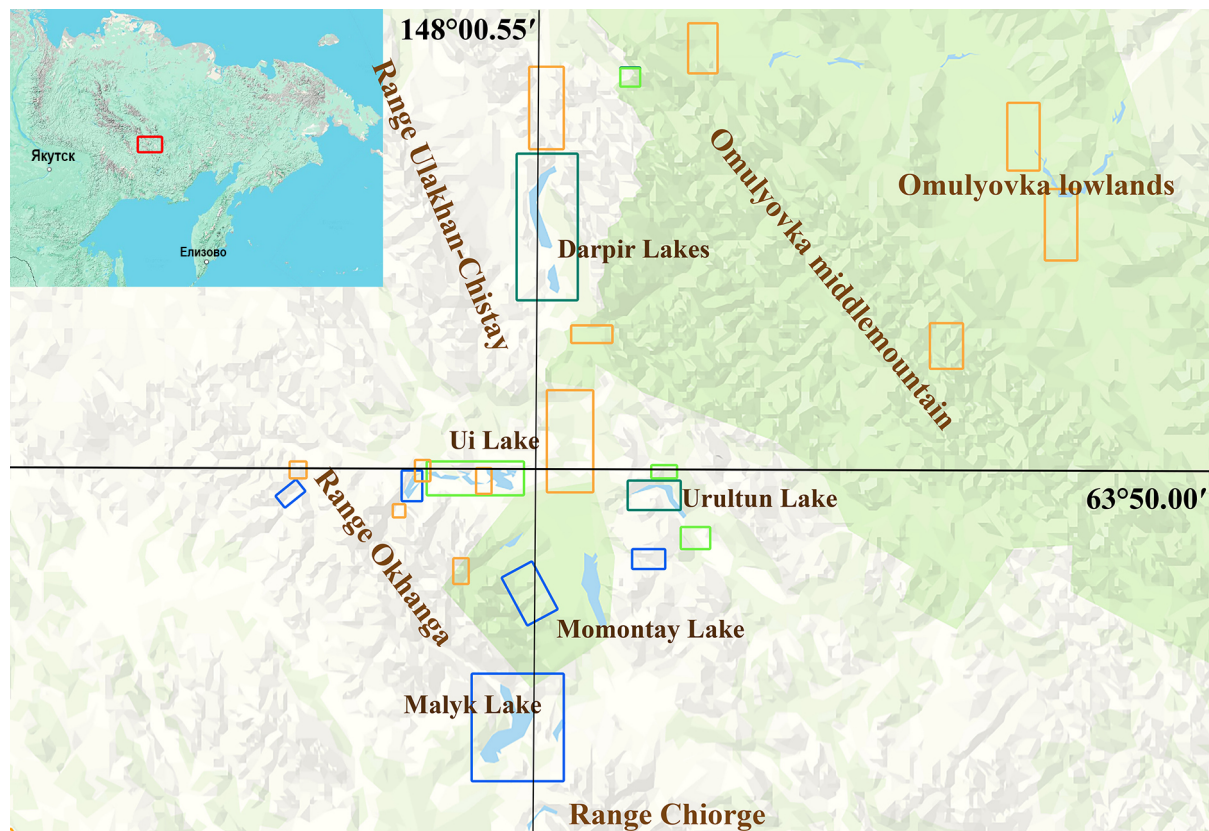


Fig. 1. Study area, vicinity of the Omulevsky midlands. Note: blue color indicates collection sites in oligotrophic lakes, dark green — mesotrophic lakes, bright green — tundra lakes of various origins, and orange color indicates rivers and streams.

Рис. 1. Район работ, окрестности Омuléвского среднегорья. Примечание: синим цветом выделены участки сбора материала в олиготрофных озёрах, тёмно-зелёным цветом в мезотрофных озёрах разного генезиса, ярко-зелёным цветом в тундровых озёрах различного генезиса, оранжевым — в реках и ручьях.

The list of sampling localities and collection dates of the mayflies, stoneflies, and caddisflies in the southern Chersky Ridge in Magadanskaya Oblast, Susuman district (MO), and Sakha Republic, Moma district (SR) is provided in the Appendix (p. 1–7). The present work is registered in ZooBank (www.zoobank.org) under urn:lsid:zoobank.org:pub:86F5DEF5-51E5-4F3D-B0CF-8F2A99FCC81D

Results and discussion

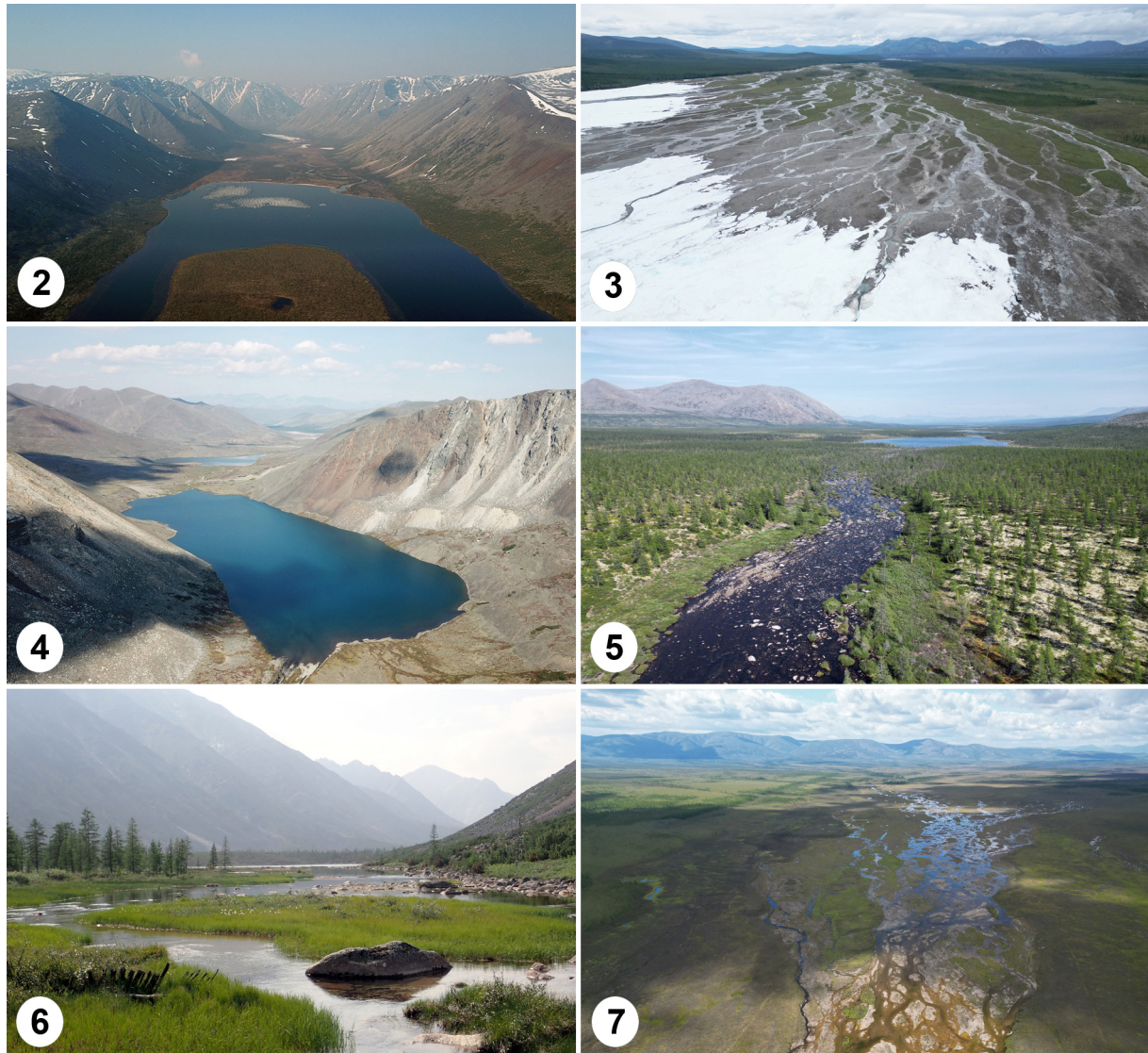
Despite of the long period of data collection, the wide range of water body types surveyed, and the large study area, the number of identified taxa in the orders mayflies, stoneflies, and caddisflies was modest. Thirty-six caddisfly species belonging to 21 genera and 9 families were identified; 16 mayfly species from 10 genera and 6 families; and 15 stonefly species from 13 genera and 4 families (excluding taxa not identified to species level — «sp.»). One mayfly taxon, *Semilicloen* sp. Kluge et Novikova, 1992, was first identified in the Magadanskaya Oblast and Northeast Asia and requires further clarification and genetic analysis. For the first time, two caddisfly species are reported for the Magadanskaya Oblast: *Micrasema extremum* Botosaneanu, 1990, 1876 and *Limnephilus femoralis* Kirby, 1837. The identified species list represents 34 % of the caddisfly fauna, 29 % of the mayfly fauna, and 27 %

of the stonefly fauna, out of the total number of species from these orders known for the whole of Northeast Asia.

The ratio of species discovered in the considered orders of the southern spurs of the Chersky Range is comparable to that for Northeast Asia as a whole, where 55–56 mayfly and stonefly species are known, which is half as many as for caddisflies [Moor, Ivanov, 2008; Teslenko, Khamenkova, 2023; Tiunova, Khamenkova, 2023]. Moreover, the species in these orders found in Northeast Asia constitute a quarter of the fauna of these groups known for the Russian Far East as a whole.

In terms of distribution patterns in the study area, representatives of the Holarctic group predominate among caddisflies (33 %), while mayflies and stoneflies are dominated by the East Palaearctic group (8 and 6 taxa, respectively). Species of the southern Palaearctic complex of the orders under consideration were not found in the southern spurs of the Chersky Range.

Among mayflies, stoneflies, and caddisflies, taxa common to Northeast Asia and North America were found. Their number in each order varied. Mayflies have two taxa: *Baetis macani* Kimmins, 1957 and *Paraleptophlebia falcula* Traver, 1934. Stoneflies have six species: *Capnia nearctica* Banks, 1919, *Mesocapnia variabilis* (Klapálek, 1920), *Nemoura arctica* Esben-Petersen, 1910, *Amphinemura palmeni* (Koponen, 1917), *Plumiperla diversa* (Frison, 1935) and *Podmosta weberi*



Figs 2–7. Habitats of mayfly, stonefly, and caddisfly in the southern spurs of the Chersky Range. 2 — remnants of an ice floe on Lake Yug, 25.VI.2024; 3 — aufeis and aufeis field on the Darpir-Yuryakh River; 4 — Gorondinskaya lake system, h~1200 m a.s.l.; 5 — Ui River valley between Lake Yug and Lake Valunnoye; 6 — Bystryi Stream; 7 — Nerega River valley, Omulevsky Lowland.

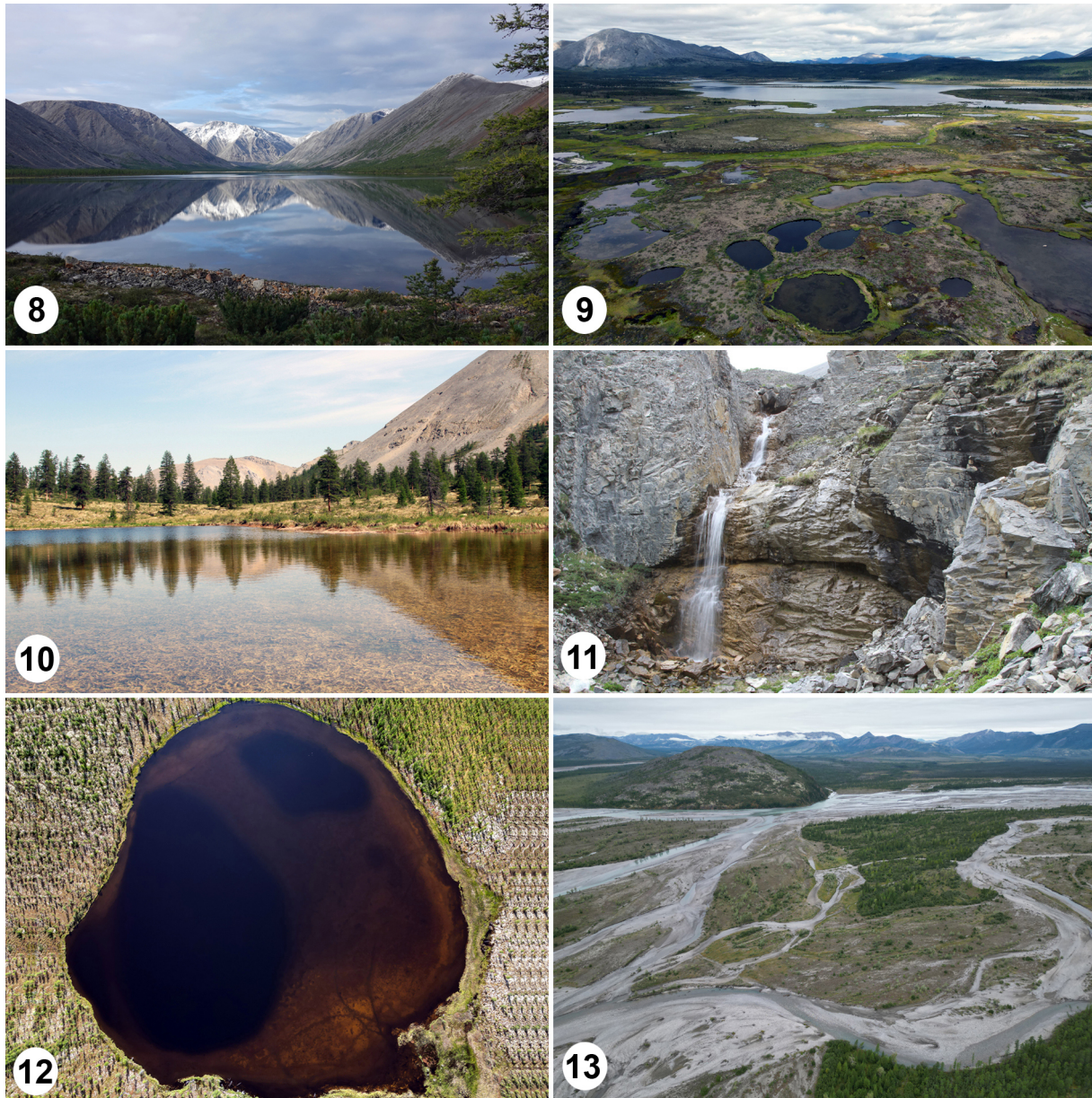
Рис. 2–7. Местобитания подёнок, веснянок и ручейников в районе южных отрогов хребта Черского. 2 — остатки ледового поля на оз. Юг, 25.VI.2024; 3 — наледь и наледная поляна на р. Дарпир-Сиен; 4 — Горондинская система озёр, h~1200 м н.у.м.; 5 — долина реки Уи между озёрами Юг и Валуное; 6 — ручей Быстрый; 7 — долина реки Нерега в Омудёвской низменности.

(Ricker, 1952). However, the number of such species in mayflies and stoneflies throughout Northeast Asia is not much greater: 7–8 species in each order [McCafferty, 1985; Harper, Harper, 1997; Jakobus, 2019; Teslenko, Khamenkova, 2023; Tiunova, Khamenkova, 2023; Semenchenko, Tiunova, 2025]. The intercontinental fauna of the surveyed region exhibited significantly higher commonality within the caddisfly order. In our collections, such species comprised over 50 % of the taxa (13 species), which is comparable to, and even slightly higher than, their share in the caddisfly fauna of Northeast Asia as a whole, where they comprise approximately 43 %.

In our opinion, the low species diversity, approximately 30 % of the fauna of Northeast Asia, can be at-

tributed to two main factors: the glacial past and climatic conditions after the last glaciations, complicated by local characteristics of past and present environmental conditions.

As noted above, the study area is located in a zone of mountain-valley or reticulated glaciations that occurred during the last global cooling [Velichko, 2002]. Comprehensive examination of sediments in Lake Vodorazdelnoye (Lake Momontai basin) revealed that the lake formed approximately 17,000 years ago as a result of glacial processes and was characterised by extremely low biological productivity until the beginning of the Holocene [Minyuk et al., 2023]. Thus, it can be assumed that the fauna of these regions likely became extinct during the period of maximum cooling



Figs 8–13. Habitats of mayfly, stonefly, and caddisfly in the southern spurs of the Chersky Range. 8 — mountain glacial lake Yug; 9 — secondary thermokarst lakes in the valley of the lake-river system Ui; 10 — the small lake in the valley of the Singami River, filled with moss *Sarmentyppnum* sp.; 11 — a waterfall in the valley of the Singami River; 12 — a lake on the pass between the Darpir-Yuryakh River and the Nyuchaga River, the shallow part of the lake is also filled with moss *Sarmentyppnum* sp.; 13 — the Omulevka River.

Рис. 8–13. Местобитания подёнок, веснянок и ручейников в районе южных отрогов хребта Черского. 8 — горное ледниковое озеро Юг; 9 — вторично термокарстовые озёра в долине озёрно-речной системы Уи; 10 — небольшое озеро в долине р. Сингами, заполненное мхом *Sarmentyppnum* sp.; 11 — водопад в долине р. Сингами; 12 — озеро на перевале между реками Дарпир-Юрях и Ньючага, мелководная часть озера также заполнена мхом *Sarmentyppnum* sp.; 13 — река Омулёвка.

as a result of glacier development and was restored during their retreat.

It is known that the Pleistocene past has had a significant impact on the modern diversity and distribution of flora and fauna in the Northern Hemisphere. Arctic islands, which fell under the dome of sheet glaciations, can be a radical example of the influence of glacial processes. These include Greenland, the Svalbard archipelago, and Franz Josef Land. As a result, the modern flora and fauna of these Arctic landmasses can

be considered among the youngest, where it is currently possible to observe and study the processes of recent (approximately 8,000–9,000 years) and modern natural species reintroduction [Govorukha, 1986; Makarova, 2011]. Glaciers also developed on the continents, but they manifested themselves differently in different parts.

In the absence of maritime barriers, the process of postglacial reintroduction on continental lands should be easier and faster. A striking example of that is North America which was once covered by gigantic ice sheets.

In modern history, however, the diversity of flora and fauna on this continent significantly exceeds that of Northeast Asia (where glaciers of even comparable scale were absent).

Northeast Asia differs from the North American continent in its consistently cold climate, which is largely due to the influence of the cold seas washing this region from the north, east, and south (the East Siberian, Chukchi, Bering, and Okhotsk seas). To the west, it is bounded by the Verkhoyansk Range, home to the coldest points in the Northern Hemisphere: the village of Oymyakon (the pole of cold) and the town of Verkhoyansk. Cold conditions in the Northeast persisted throughout the Pleistocene-Holocene, despite climate fluctuations during certain historical periods, with warming trends. Indirect evidence of past climate variability and/or stability comes from data on vegetation dynamics obtained through palynological and carpological studies. Available materials confirm alternating warming and cooling periods in the past, but also indicate that the overall diversity of vegetation in the past was represented by the same complexes and their components that are currently common in Northeast Asia (tundra, sparse forests, etc.) [Climate Change, 1999; Lozhkin et al., 2005, 2007].

It should be noted that aquatic insects, which spend most of their life cycles in water, are sometimes considered better adapted to harsh northern climates than terrestrial invertebrates [Theissinger et al., 2013]. This position is difficult to agree with. A wide range of adaptations are known in terrestrial invertebrates that allow them to tolerate extremely low winter temperatures [Meshcheryakova et al., 2023; Bulakhova et al., 2024; Bulakhova et al., 2025]. In this sense, aquatic development is probably more accurately viewed as a variation of such adaptations in invertebrates in general.

As with any other living organisms, aquatic insects differ in their response to environmental conditions, particularly temperature, which is one of the key indicators for them, as for all poikilothermic animals.

Lower air and water temperatures in the north, on the one hand, limit the distribution of warm-water species; on the other hand, they allow cold-water species, highly specialised to a particular type of biotope in the south, to become conditionally eurybionts in the north, where they can be found both in rivers and in some lakes. There is little data reflecting the ecological characteristics of certain species and their confinement to stagnant or running waters at different latitudes. Meanwhile, it is known, for example, that the mayflies *Cinygmula malaisei* and *Iron maculatus* in the rivers of the southern Far East inhabit cold-water streams (mountain and spring streams, as well as the upper reaches of mountain rivers) [Tiunova, 2005]. Whereas in the Ola River basin (Magadanskaya Oblast), *C. malaisei* is found both in the cold-water sections of the upper reaches of the Ola River and in the moderately warm-water Lankovaya River, which is similar to lowland rivers and resembles the potamal zone in its hydrological characteristics. The mayfly *I. maculatus* in the Ola River is found exclusively in the lower reaches

(meta- and hyporhithral zones), corresponding to the category of moderately cold-water rivers [Khamenkova et al., 2017]. Another example is the stonefly *Arcynopteryx dichroa* (not found in our collections, but known for the Magadanskaya Oblast), which usually inhabits rivers. In the north, when the ambient temperature drops, this species can live and develop in lakes [Theissinger et al., 2013; Loskutova, Zhiltsova, 2016].

According to available literature, further north, in tundra streams along the Arctic coast, the abundance of mayflies, stoneflies, and caddisflies in the macrozoobenthos declines sharply. Studies of tundra aquatic biotopes in the lower reaches of the Lena River (51 water bodies of various types) revealed the absence of mayflies in benthic communities. Representatives of stoneflies from the Perlodidae and Nemouridae families (the number of species is unknown) were encountered rarely. Caddisflies, however, were found almost everywhere, but their species identity was also unknown [Burnasheva, Potapova, 2019].

On results of our investigations, mayflies and stoneflies were found primarily in running waters and oligotrophic lakes. Larvae of these groups were not detected during a survey of thermokarst (alas) lakes in tundra areas of the study region. Caddisflies are known to be limnophilic and rheophilic. It has been established that in the north of the Palearctic and Nearctic, species that prefer slow-flowing or stagnant water bodies (limnophiles) predominate [Wiggins, Parker, 1998; Moor, Ivanov, 2008]. In this regard, it is generally accepted that limnophile species are better adapted to survival in the harsh climate conditions of the Pleistocene epoch [Moor, Ivanov, 2008]. The territory we surveyed was no exception; where half of the caddisflies identified (13 species) belong to the family Limnephilidae.

It seems that, for the fauna of various groups of living organisms in Northeast Asia, the low species diversity observed should be considered normal, reflecting the particular climatic conditions of the region. Any deviations that arise, such as extremely low or unexpectedly high values, should be explained.

Conclusion

This study analysed the fauna of aquatic insects, mayflies, stoneflies, and caddisflies, in a previously unstudied region of Northeast Asia, characterised by cold conditions during the Pleistocene-Holocene. It was shown that the identified fauna represents approximately 30 % of the total known for all of Northeast Asia. It includes species common to Northeast Asia and North America. These species are quite rare in mayflies, while in stoneflies they comprise six of the 15 species (40 %), and in caddisflies, they account for up to 50 % of the identified species. Analysing the faunal similarities between the surveyed region and the North American continent is unlikely, especially given the generally poor knowledge of aquatic insects in Northeast Asia. However, the resulting material could be an important input for

further generalisations in analysing the diversity and biogeography of individual orders. The fauna is completely devoid of species from the southern Palearctic complex. This depletion of species composition is likely due to the harsh climatic conditions characteristic of all of Northeast Asia and, in our case, exacerbated by their local characteristics, including proximity to the Cold Pole and altitudinal zonation.

Acknowledgements

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Appendix to the article: Khamenkova E.V., Teslenko V.A., Tiunova T.M., Vshivkova T.S. 2026. Mayfly, stonefly and caddisfly fauna (Insecta: Ephemeroptera, Plecoptera, Trichoptera) of the southern spurs of the Chersky Range in Magadanskaya Oblast and Republic of Sakha (Yakutia), Russia // Euroasian Entomological Journal. Vol.25. No.2. P.83—90.

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The list of mayfly, stonefly and caddisfly species and sampling localities and dates from the southern Chersky Ridge in Susuman district of Magadanskaya Oblast and Moma district of Sakha Republic (Yakutia)

Список видов подёнок, веснянок и ручейников и мест отбора проб с датами в южной части хребта Черского в Сусуманском районе Магаданской области и Моманском районе Республики Саха (Якутия)

SAMPLING LOCALITIES AND DATES

ДАТЫ СБОРА И МЕСТА ОТБОРА ПРОБ

Abbreviations: MO — Magadanskaya Oblast, SR — Sakha Republic (Yakutia).

CH01: MO, Lake Bliznetsy, upper stream of Ulbutakan river, 63°43.632' N, 148°18.180' E, 23.VIII.2021;

CH02: MO, Lake Malyk (south-west coast) 63°29.139' N, 147°53.231' E, 21–27.VII.2020;

CH03: MO, Lake Yug, 63°49.431' N, 147°40.054' E, 30.VII.2024;

CH03: MO, Lake Yug, 63°49.431' N, 147°40.054' E, 3.VII.2025;

CH03: MO, Lake Yug, 63°49.431' N, 147°40.054' E, 6.VII.2025;

CH04: MO, Ulbutakan river, downstream, 63°43.874' N, 148°25.857' E, 18.VIII.2021;

CH05: MO, Omulyovka river, downstream, Nerega river, 64°10.673' N, 149°21.126' E, 5–9.VIII.2023;

CH06: MO, Lake Gorandya, Perevalniy river, 63°46.409' N, 147°18.745' E, 14.VIII.2023;

CH07: MO, east slopes of the middle mountains Omulyovskoye, Ina river, 64°05.988' N, 149°22.454' E, 8.VIII.2023;

CH08: MO, Lake Gorandya, 63°47.722' N, 147°19.929' E, 8.VIII.2023;

CH09: MO, Nyuchaga river, left-bank tributary of the Omulyovka river 64°23.299' N, 148°13.075' E, 10.VIII.2023;

CH10: MO, east slopes of the middle mountains Omulyovka, Singamy river (aufeis), 63°54.213' N, 148°13.075' E, 30.VI.2023;

CH11: MO, Lake Urultun, 63°48.231' N, 148°14.599' E, 19–20.VIII.2021;

CH12: SR, Lake Darpir, 64°05.826' N, 148°01.148' E, 31.VII–4.VIII.2018;

CH12: SR, Lake Darpir, 64°05.826' N, 148°01.148' E, 12.VIII.2023;

CH13: SR, Lake Darpir, Naledniy stream, 64°05.324' N, 148°14.599' E, 5.VIII.2018;

CH14: SR, Lake Darpir, Svyaznoy stream, 64°08.788' N, 147°59.848' E, 4.VIII.2018;

CH15: MO, Lake Yug, 63°49.409' N, 147°40.034' E, 25.VI.2021;

CH16: MO, Ui river, outlet from Lake Yug, 63°49.692' N, 147°40.827' E, 25.VI.2021;

CH17: MO, unnamed stream, left-bank tributary of Ui river (close to Yug Lake), 63°49.765' N, 147°41.167' E, 26.VI.2021;

CH18: MO, Lake Valunnoye (Ui river basin), 63°49.527' N, 147°47.905' E, 26.VI.2021;

CH19: MO, Ui river, between Lake Valunnoye and Lake Ui, 63°48.968' N, 147°50.539' E, 27–28.VI.2021;

CH20: MO, Gorandya pass, Gorandya river, 63°47.158' N, 147°24.728' E, 29.VI.2021;

CH21: MO, source of Malik-Siyen river, 63°29.128' N, 147°51.446' E, 14.VIII.2021;

CH22: MO, Momontay river, 63°51.275' N, 148°09.388' E, 30.VI.2023;

CH23: MO, unnamed lake close to path along Omulyovka river to Margarito camp, 63°58.611' N, 148°10.315' E, 30.VI.2023;

CH24: SR, Lake Darpir, Stream 1, 64°06.343' N, 148°01.807' E, 4.VIII.2018;

CH25: SR, Darpir-Siyen river, 64°16.710' N, 147°59.974' E, 11.VIII.2023;

CH26: SR, Darpir-Yuryakh river (aufeis), 64°19.769' N, 148°01.890' E, 10.VIII.2023;

CH27: MO, Lake Gorandya, Perevalniy stream, 63°48.490' N, 147°19.785' E, 14.VIII.2023;

CH28: MO, Lake Bliznetsy, upper stream of Ulbutakan river, 63°44.068' N, 148°15.769' E, 15.VIII.2021;

CH29: MO, east slopes of the middle mountains Omulyovskoye, Utuy river, 63°59.650' N, 148°10.397' E, 28.VI.2023;

CH30: MO, Zima river, Lake Momontay basin, 63°46.239' N, 148°00.345' E, 25.VIII.2021;

CH31: MO, small unnamed lake, close to Lake Urultun, 63°48.634' N, 148°13.194' E, 15.VIII.2021;

CH32: MO, Lake Yug, camp, 63°49.431' N, 147°40.054' E, 9–24.VII.2024;

- CH33:** SR, Lake, Darpir, stomachs of thymallus, 63°50.403' N, 148°21.128' E, 6.VIII.2018;
- CH34:** MO, Momontay river, 63°44.385' N, 148°07.163' E, 30.VI.2023;
- CH35:** MO, Lake Valunnoye, 63°49.627' N, 147°48.505' E, 27.VI.2021;
- CH36:** MO, Omulyovka river, Margarito camp, 63°59.092' N, 148°08.236' E, 29.VI.2023;
- CH37:** SR, 64°16.413' N, 148°00.204' E, 11.VIII.2023;
- CH38:** SR, Darpir-Yuryakh river, 64°21.129' N, 148°02.224' E, 10.VIII.2023;
- CH39:** MO, east slopes of the middle mountains Omulyovskoye, near the Omulyovka river coming out from gorge, 64°18.167' N, 148°37.197' E, 1.VIII.2023;
- CH40:** SR, Darpir-Siyen river, 64°16.413' N, 148°00.204' E, 11.VIII.2023;
- CH41:** SR, Darpir-Yuryakh river, 64°21.129' N, 148°02.224' E, 10.VIII.2023;
- CH42:** MO, Lake Urultun, 63°48.223' N, 148°14.620' E, 19.VIII.2021;
- CH43:** MO, east slopes of the middle mountains Omulyovskoye, Inanya river, 63°57.751' N, 149°12.828' E, 8.VIII.2023;
- CH44:** MO, Gremuchiy river (Mirniy) left bank tributary of Ina river, 64°10.673' N, 149°21.126' E, 6–9.VIII.2023;
- CH45:** MO, Omulyovka river uppstream from Inanya river mouth, 64°09.251' N, 149°23.896' E, 9.VIII.2023;
- CH46:** MO, Ulbutakan river, 63°44.124' N, 148°27.672' E, 18.VIII.2021;
- CH47:** MO, Urultun river basin, Lake Easter Urultun, 63°46.292' N, 148°24.646' E, 18.VIII.2021;
- CH48:** MO, Lake Urultun basin, unnamed stream, 63°48.431' N, 148°13.936' E, 19.VIII.2021;
- CH49:** MO, Omulyovka river, 64°23.327' N, 148°27.854' E, 1.VIII.2023;
- CH50:** MO, 64°18.282' N, 148°37.249' E, 3.VIII.2023;
- CH51:** MO, Lake Tobandya basin, on the path to Lake Momontay, 63°30.622' N, 148°1.512' E, 15.VIII.2021;
- CH52:** MO, Zima river, 63°45.888' N, 147°59.946' E, 25.VIII.2021;
- CH53:** MO, Omulyovka river, 64°18.282' N, 148°37.249' E, 3.VIII.2023;
- CH54:** MO, Lake Kemkinya, 63°42.952' N, 148°30.309' E, 18.VIII.2021;
- CH55:** MO, unnamed lake on the path to Razdelnoe Lake, 63°41.897' N, 148°01.488' E, 27.VIII.2021;
- CH56:** MO, Lake Pogranichnoye (Nyuchaga river basin), 64°21.399' N, 148°05.803' E, 10.VIII.2023;
- CH57:** MO, unnamed lake between Lake Malyk and Missurio river, 63°30.369' N, 147°46.160' E, 21–26.VII.2020;
- CH58:** MO, Lake Sapog, Lake Malyk basin, 63°29.395' N, 147°50.458' E, 29.VII.2020;
- CH59:** MO, Urultun river, 63°44.602' N, 148°28.497' E, 18.VIII.2021;
- CH60:** MO, Lake Kemkinya, Urultun river basin, 63°43.027' N, 148°30.318' E, 18.VIII.2021;
- CH61:** MO, Lake Malyk, the south-east coast (archeology camp), 63°29.139' N, 147°53.210' E, 28.VII.2020;
- CH62:** MO, Lake Ui, N coast, 63°49.579' N, 147°48.605' E, 27.VII.2021;
- CH63:** MO, Ui river, close to Lake Krugloye (Top on maps) area, 63°49.602' N, 147°45.237' E, 25.VI.2021;
- CH64:** MO, Lake Geologist (unnamed), Lake Momontay basin, 63°45.083' N, 148°10.276' E, 24.VIII.2021;
- CH65:** MO, Lake №1 unnamed, Urultun river basin, 63°44.456' N, 148°27.646' E, 18.VIII.2021;
- CH66:** MO, Lake unnamed, Urultun river basin, 63°43.881' N, 148°29.772' E, 18.VIII.2021;
- CH67:** MO, Lake Treugolnoye (headwaters of Torniy river), Lake Urultun basin, 63°50.403' N, 148°21.128' E, 21.VIII.2021;
- CH68:** MO, Lake Uochat (Urultun river basin), to N from Lake Treugolnoye, 63°50.403' N, 148°21.128' E, 21.VIII.2021;
- CH69:** MO, Lake Uenda, 63°30.325' N, 148°00.278' E, 19–20.VII.2025;
- CH70:** MO, Ui river, downstream from Lake Krugloye, 63°49.470' N, 147°45.559' E, 7.VII.2025;
- CH71:** MO, Lake Momontay basin, unnamed stream, 63°40.501' N, 148°08.259' E, 18.VII.2025;
- CH72:** MO, Lake Malyk basin, Yagodniy stream, 63°34.973' N, 148°07.390' E, 18.VII.2025;
- CH73:** MO, Lake Uenda basin, Goluboy stream, 63°29.100' N, 148°04.053' E, 19.VII.2025;
- CH74:** MO, Lake Momontay, 63°43.983' N, 148°07.444' E, 17.VII.2025;
- CH75:** MO, Lake Krugloye, Ui river basin, 63°49.756' N, 147°43.855' E, 06.VII.2025;
- CH76:** MO, Lake Seledka, Zima river basin, 63°47.217' N, 148°06.138' E, 13.VII.2025;
- CH77:** MO, Lake Figurnoye, Ui river basin, 63°47.217' N, 148°06.138' E, 09.VII.2025;
- CH78:** MO, Ui river downstream from Lake Ui, 63°49.536' N, 147°57.919' E, 09.VII.2025;
- CH79:** MO, Lake Vetrov, Zima river basin, 63°47.678' N, 148°05.971' E, 13–14.VII.2025;
- CH80:** MO, Lake Urultun, 63°48.231' N, 148°14.599' E, 20.VIII.2023;
- CH81:** MO, Lake Yug, 63°49.409' N, 147°40.034' E, 2.07.2025;
- CH82:** MO, Ui river, outlet from Lake Yug, 63°49.692' N, 147°40.827' E, 3.VII.2025;
- CH83:** MO, Lake Valunnoye (Ui river basin), 63°49.527' N, 147°47.905' E, 10.VII.2025;
- CH84:** MO, Zima river, Lake Momontay basin, 63°46.239' N, 148°00.345' E, 19.VII.2025;
- CH85:** MO, Momontay river, 63°44.385' N, 148°07.163' E, 18.VII.2025;
- CH86:** MO, Lake Tobandya basin, on the path to Lake Momontay, 63°30.622' N, 148°1.512' E, 18.VII.2025;
- CH87:** MO, Lake Sapog, Lake Malyk basin, 63°29.395' N, 147°50.458' E, 13.VIII.2021;

CH88: MO, Lake Ui, N coast, 63°49.579' N, 147°48.605' E, 8.VII.2025;

CH89: MO, Lake Okhota na obed, 63°43.877' N, 148°29.806' E, 18.VIII.2021;

CH90: MO, Gorandya river, 63°47.940' N, 147°23.884' E, 28.VI.2024;

CH91: MO, Lake Ui, 63°49.761' N, 147°51.664' E, 24.VI.2021;

CH92: MO, Ui river, outlet from Lake Yug, 63°49.581' N, 147°40.538' E, 17–20.VII.2024.

AN ANNOTATED LIST OF EPHEMEROPTERA, PLECOPETRA AND TRICHOPTERA

АННОТИРОВАННЫЙ СПИСОК ЭФЕМЕРОПТЕРА, ПЛЕКОПЕТРА И ТРИХОПТЕРА

Abbreviations used: L — larva; subim — subimago; im — imago.

Ephemeroptera Heptageniidae

Cinygmula putoranica Kluge, 1980

Material. 6L — CH01, 9♂♂ im, 2♀♀ im — CH30, 1♀ sim, 1L — CH46, 1♂ im, 2♀♀ im — CH47, 20L — CH48.

Distribution. East Palaearctic species.

From Primorye to Taimyr Peninsula, including Chukotskii Autonomous Okrug, Magadanskaya Oblast, Khabarovskii and Primorskii Krai, Sakhalinskaya Oblast, Eastern Siberia, Mongolia (Khubsugul Lake and its tributaries), Japan (Hokkaido).

Cinygmula unicolorata Tshernova, 1979

Material. 15L — CH10, 4♂♂ im — CH40, 3♂♂ im — CH41, 1♂ im, 1♂ sim — CH44, 16♂♂ im, 2♀♀ im — CH49, 4♂♂ im — CH53.

Distribution. East Palaearctic species.

Notes. The species was described from a male imago [Chernova, 1979] collected in the Chukotka Autonomous Okrug on the Omolon River (Kolyma River basin). It is also known from the upper reaches of the Amguema River and the Khasyn River (Magadanskaya Oblast) [Chernova, Belov, 1982]. According to our data, it inhabits the watercourses of the Khabarovskii Krai [Tiunova, Gorovaya, 2015], Kamchatka [Chebanova, 2009; Tiunova, 2022], South Yakutia [Tiunova et al., 2009] and the Amurskaya Oblast [Tiunova, Tiunov, 2010].

Rhithrogena (Sibirigena) sibirica Brodsky, 1930

Material. 1♂ im — CH44, 1♂ im — CH53.

Distribution. East Palaearctic species that is distributed in East Siberia, Altai, Magadanskaya Oblast, South Yakutia, Kamchatka, Mongolia, Kazakhstan (Irtysh basin) [Evseeva, 2021].

Baetidae

Baetis (Baetis) macani Kimmins, 1957

Material. 2♂♂ im, 1♂ subim — CH51.

Distribution. Circumboreal species.

Notes. For the watercourses of the Magadanskaya Oblast, it was first indicated in the work of Tiunova and Khamenkova [2023].

Baetis (Rhodobaetis) molecularis Tiunova et Semenchenko, 2020

Material. 3♀♀ im, 7L — CH48.

Distribution. East Palaearctic species. Russian Far East: Chukotka Autonomous District, Kamchatskii and Khabarovskii Krai, Magadanskaya, Amurskaya and Jewish Autonomous Oblast.

Notes. Previously, it was represented for watercourses of the Russian Far East as *Baetis bicaudatus* Dodds, 1923 [Tiunova and Semenchenko, 2020].

Baetis (Baetis) vernus Curtis, 1834

Material. 3♂♂ im — CH52.

Distribution. Transpalearctic species.

Notes. Further molecular genetic studies are needed.

Baetis sp.

Material. 2♂♂ im, 4♀♀ im — CH05, 3♂♂ im, 1L — CH10, 3♀♀ im, 3♀♀ subim — CH12, 2♀♀ im — CH21, 9♀♀ im, 1♀ subim — CH38, 2♂♂ im — CH40, 1♂ subim — CH43, 3♀♀ im, 2♀♀ subim — CH44, 1♂ im — CH53.

Notes. Further molecular genetic studies are needed.

Acentrella fenestrata (Kazlauskas, 1963)

Material. 1♂ im — CH22, 3♀♀ im, 25♀♀ im — CH69, 1♂ im — CH73, 1♀ im — CH79.

Distribution. East Palaearctic species that is distributed in East Siberia, Altai, Magadanskaya Oblast, Chukotka, South Yakutia, Kamchatka, Mongolia.

Similicloeon sp.

Material. 2♂♂ im, 2♀♀ subim — CH51, 1♀ im — CH54.

Notes. Further molecular genetic studies are needed.

Ameletidae

Ameletus allengaensis Tiunova, Semenchenko et Velyaev, 2017

Material. 2L — CH21, 1♂ subim, 1L — CH46, 2L — CH51, 1♀ im — CH55, 1♂ im — CH73.

Distribution. East Palaearctic species. Russian Far East: Chukotka Autonomous District [Tiunova, Khamenkova, 2023], Magadanskaya Oblast, Khabarovskii Krai, Amurskaya Oblast, Sacha Yakutia.

Ameletus sp.

Material. 1♀ im, 1L — CH05, 2♀♀ im CH40, 1L — CH44.

Notes. Further molecular genetic studies are needed.

Leptophlebiidae

Paraleptophlebia falcata Traver 1934

Material. 6♂♂ im, 2♀♀ im, 2♂♂ subim — CH05, 1♂ im — CH11.

Distribution. Circumboreal species.

Notes. For the watercourses of the Magadanskaya Oblast, the species was first indicated in the work of Tiunova and Khamenkova [2023]. In the Russian Far East, the species was previously recorded for watercourses of the Amurskaya Oblast and Sacha (Yakutia) [Tiunova, Kluge, 2016]. In 2023, the species was collected by N. Yavorskaya in the Badjalsky Reserve (Khabarovskii Krai) (unpublished data).

Leptophlebia strandii Eaton 1901

Material. 2L — CH56.

Distribution. Transpalearctic species.

Notes. In the Russian Far East, the species is known from the streams of Magadanskaya Oblast, Khabarovskii Krai,

Amurskaya, Jewish Autonomous and Sakhalinskaya Oblast, and Primorskii Krai. Mongolia, Kazakhstan (Irtysh basin).

Ephemerellidae

Drunella triacantha Tshernova, 1949

Material. 1L — CH05, 2L — CH10,

Distribution. East Palaearctic species.

Notes. From Primorye to Chukotka, the Kamchatka Peninsula, the Kuril Archipelago, Sakhalin Island, Siberia, and Altai. Mongolia, Korea, and Japan. In the Russian Far East, it is a common inhabitant of moderately cold-water watercourses of all types.

Siphonuridae

Siphonurus zhelochovtsevi Tshernova, 1952

Material. 2♀♀ im — CH47.

Distribution. East Palaearctic species.

Notes. In the Russian Far East, it was noted for the watercourses of the Khabarovskii and Primorskii Krai, South Yakutia; for the watercourses of the Magadanskaya Oblast, it was first noted in the work of Tiunova and Khamenkova [2023]; Transbaikalia. Mongolia.

Siphonurus sp.

Material. 1♀ im. — CH05.

Notes. Further molecular genetic studies are needed.

Plecoptera Capniidae

Capnia nearctica Banks, 1919

Material. 1♀ — CH36.

Distribution. Amphiberingian. Alaska, northern Canada, and the United States. In the Russia in the Far East from Chukotka and Kamchatka to Primorskii Krai.

Mesocapnia variabilis (Klapálek, 1920)

Material. 1♂ im, 1♀ im — CH04, 9♂♂ im, 41♀ im — CH05, 1♂ im — CH06, 1♂, 1♀ — CH89.

Distribution. Holarctic, species reported from north of the USA and Canada; Mongolia; northern Europe; in Russia spread in Chukotskii Autonomous Okrug, Magadanskaya Oblast, Kamchatka, and Yakutia.

Mesocapnia sp.

Material. 11L — CH06, 3♀♀ im — CH07, 1♀ im, 11L — CH08, 1♀ im — CH09, 2♀♀ — CH25, 1♀ — CH43, 1♀ — CH53.

Mesocapnia silvatica Raušer, 1968

Material. 3♂♂ im, 2♀♀ im — CH05, 1♂ im, 24L — CH10, 1♂ im, 2♀♀ im — CH11, 24♂♂ im, 28♀♀ im — CH12, 2♂♂ im, 2♀♀ im — CH13, 1♂ im — CH14, 1♂ im — CH30, 1♀ im — CH34, 1♂ 1♀ — CH48, 3♂♂ im, 1♀ im — CH69, 3♀♀ im — CH71, 1♂ im — CH73.

Distribution. East Palaearctic species with distribution from East Siberia (Putorana) to Wrangel Island, including Chukotskii Autonomous Okrug, Magadanskaya Oblast, Khabarovskii Krai, Primorskii Krai, and Sakhalinskaya Oblast. China and Mongolia.

Nemouridae

Nemoura arctica Esben-Petersen, 1910

Material. 2♂♂ im — CH15, 7♂♂ im, 3♀♀ im — CH16, 1♂ im — CH17, 2♂♂ im, 2♀♀ im — CH18, 31♂ im, 28♀♀ im — CH19, 1♀ im — CH20, 1♀ im — CH21, 1♂ im, 3♀♀ im — CH22, 2♂♂ im — CH23, 1♂ — CH32, 23♂♂ 18♀♀ 1L — CH35, 1♂ 1♀ — CH90, 1L♂ — CH91.

Distribution. Holarctic, circumpolar species, distributed extensively at mid and northern latitudes across Northern Hemisphere. Known from USA, Canada, Finland, Norway, Mongolia and Russia (Kola Peninsula, Republic of Komi, in Polar Urals, Krasnoyarskii Krai, Eastern Sayan, Altai, Chukotskii Autonomous Okrug, Magadanskaya Oblast, Kamchatskii Krai, Khabarovskii Krai, Primorskii Krai, and Sakhalinskaya Oblast).

Nemoura sirotskii Teslenko, 2018

Material. 1♂ im — CH14.

Distribution. East Palaearctic rare species occurs in cold mountain stream and rivers of the Amurskaya Oblast and Magadanskaya Oblast.

Nemoura sp.

Material. 1♀ im — CH02, 1♀ im — CH03, 15L — CH06, 6L — CH10, 2♀♀ — CH20, 1♀ — CH21, 1♀ im — CH24, 2♀♀ im — CH25, 2♀♀ — CH26, 15L — CH27, 1L — CH28, 1L — CH29, 1L — CH31, 2♀♀ — CH41, 2♀♀ — CH62, 1♀ — CH69, 3♀♀ — CH70, 2♀♀ — CH073, 2♀♀ — CH92.

Amphinemura palmeni (Koponen, 1917)

Material. 9♂♂ 55♀♀ — CH01, 2♂♂ 3♀♀ — CH30, 2♀♀ — CH31, 4♀♀ — CH60.

Distribution. Holarctic species. Northern USA and Canada, Norway, Finland. Russia (Murmansk Region). Recently reported for Altai and Khabarovskii Krai. Little information about its distribution in Siberia and the Russian Far East is due to taxonomic confusion. Until recently, both male and female *A. palmeni* were confused with individuals of the northern Trans-Palaearctic species *A. standfussi* Ris.

Podmosta weberi (Ricker, 1952)

Material. 1♂ im, 1L — CH10.

Distribution. Transberingian arctic species occurs in USA in Alaska and Yukon; in Russia recorded in the northeast tributaries of the Baikal Lake, Cukhotka, Magadanskaya Oblast, and Kamchatskii Krai.

Perlodidae

Arcynopteryx polaris Klapálek, 1912

Material. 1♂ im, 1♀ im — CH10, 1♂, 1L♂ — CH22, 1♂ im — CH29, 5♂♂ im, 3♀♀ im — CH33, 2♂♂ — CH34, 1♂ im, 5♀♀ im, 1L — CH69, 1♀ im — CH70.

Distribution. East Palaearctic species known from Russia (Siberia from the Sayan and Altai Mountains to the Russian Far East from Chukotskii Autonomous Okrug and Yakutia to Primorskii Krai and Jewish Autonomous Oblast), Mongolia, China, and Korea.

Arcynopteryx sp.

Material. 4L — CH04, 1♀ im — CH18, 1 Exuv — CH21, 3♀♀ im — CH32, 1♀ — CH35, 3L — CH46.

Diura nanseni (Kempny, 1900)

Material. 1♂ im — CH10, CH23, 1♂ — CH29, 1L — CH31, 1♂ 1♀ — CH36.

Distribution. Transpalaearctic species Norway, Finland, Russia, and China. In Russia registered from Altai Mountains and Yenisey River to Lena River basin, including Yakutia, Magadanskaya Oblast, Khabarovskii Krai, and Jewish Autonomous Oblast.

Isoperla obscura (Zetterstedt, 1870)

Material. 1L — CH53.

Mayfly, stonefly and caddisfly fauna of the southern spurs of the Chersky Range Russia

Distribution. Transpalearctic species inhabited streams and large rivers of the north of the Palearctic. Europe: Sweden, Norway, Finland, Austria, Switzerland, France, Germany, Italy, and rarely in the Balkans. Bulgaria. Russia: North-East, Komi Republic, and Nenets Autonomous Okrug; Asia, Siberia: Krasnojarskii Krai, Altai, Sayan, and Transbaikalia; Far East: Southern Yakutia, Magadanskaya Oblast, Amurskaya Oblast, Jewish Autonomous Region, Khabarovskii Krai, Primorskii Krai, and Chukotka Autonomous Okrug. East Kazakhstan. Mongolia.

Chloroperlidae

Alloperla rostellata (Klapálek, 1923)

Material. 1♀ — CH25, 1♂ im — CH26, 1L — CH04.

Distribution. East Palearctic species known from Krasnoyarskii Krai, the Sayan and Altai Mountains, Irkutskaya Oblast, Zabaikalskii Krai, southern Yakutia, Jewish Autonomous Oblast, Magadanskaya Oblast, Sakhalinskaya Oblast, Khabarovskii Krai, and Primorskii Krai. Mongolia and Korea.

Alaskaperla longidentata (Raušer, 1968)

Material. 2♂♂ im — CH01, 2♂♂ im, 1♀ im — CH03, 1L — CH04, 1♂ im — CH18, 2♀♀ im — CH25, 1♂1♀ — CH32, 1♂ im — CH38, 1♂ im, 1♀ im — CH70, 5♂♂ im, 1♀ im — CH72, 3♂♂7♀♀ — CH92.

Distribution. East Palearctic species spread from Mongolia to Russian Far East including Jewish Autonomous Oblast, Khabarovskii Krai, Magadanskaya Oblast, Yakutia, and Kamchatka.

Haploperla lepnevae (Zhiltzova et Zwick, 1971)

Material. 1♀ im — CH08, 1♀ im — CH53.

Distribution. East Palearctic occurs from Mongolia through Siberia and Russian Far East to China. Occurs in the Russian Far East in Amurskaya Oblast, Jewish Autonomous Oblast, Khabarovskii Krai, Primorskii Krai, Yakutia, Magadanskaya Oblast, and Kamchatka.

Plumiperla diversa (Frison, 1935)

Material. 1♀ im — CH08, 2♀♀ im — CH39.

Distribution. Transberingian rare species distributed in West Nearctic in Alaska and Yukon; in East Palearctic registered in Chukotka, Magadanskaya Oblast, and Kamchatka.

Suwallia kerzhneri Zhiltzova et Zwick, 1971

Material. 4♂♂ im, 16♀♀ im — CH05, 2♂♂ im — CH08, 10♂♂ — CH26, 1♀ im — CH31, 14♂♂ im, 3♀♀ im, 2♂♂1♀ — CH38, 3♂♂ im — CH39, 12♂♂ im, 10♀♀ im, 14L — CH40, 1♂ im, 8♀♀ im — CH42, 2♀♀ im — CH43, 1♂ im, 1♀ im — CH44, 1♀ im, 4L — CH45, 1♂ 8♀♀ — CH48, 2♂♂ — CH53.

Distribution. East Palearctic species, distributed from Mongolia to the Russian Far East; occurs in Chukotka, Magadanskaya Oblast, Kamchatskii Krai, Yakutia, Khabarovskii Krai, Primorskii Krai, and Sakhalinskaya Oblast.

Trichoptera

Apataniidae

Apatania crymophila McLachlan, 1880

Material. 1♀ im — CH57, 1♂ im, 5 ♀ im — CH74, 1♂ im, 1♀ im — CH81.

Distribution. Holarctic [Lepneva, 1966; Levanidova et al., 1995; Wiggins, Parker, 1997; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022; Rasmussen, Morse, 2023].

Ecology. It inhabits mountain and foothill rivers and streams, along the coasts of large rivers and oligotrophic lakes.

Notes. In the Yenisei River below the Krasnoyarsk hydroelectric power station, larvae were observed to be confined to aquatic mosses, where their maximum density increased by October (up to 1084 specimens per 1 kg of fresh moss) [Konovalova et al., 2024].

Apatania aff. *forsslundi* Tobias, 1981

Material. 1♀ im — CH02.

Distribution. East Palearctic species. The species has been collected only in the CH02 locality up to now. The species closely related to *Apatania forsslundi* Tobias, 1981 which is known for W. PA: Norway, Sweden, Finland [Andersen, Wiberg-Larsen, 1987; Salokannel et al., 2010].

Ecology. The only female was found in light trap collections near Lake Malyk.

Notes. The female belongs to *Apatania zonella* Species Group, the genital configuration is similar to *A. forsslundi*, shown in the figure by Salokannel et al. [2010]. Confirmation of species status is possible after collecting additional material and studying DNA. It is known that males of *A. forsslundi* (as well as some other species of this Group) have never been encountered in collections, so the species is considered to be completely parthenogenetic [Malicky, 2005; Salokannel et al., 2010].

Apatania stigmatella (Zetterstedt, 1840)

Material. 1♂ im, 2♀♀ im — CH02, 1♂ im, 2♀♀ im — CH11, CH21, 3♂♂ im — CH58, 2♀♀ im — CH74.

Distribution. Holarctic [Lepneva, 1966; Levanidova et al., 1995; Wiggins, Parker, 1997; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022; Rasmussen, Morse, 2023].

Ecology. In mountain and foothill rivers and streams, in the open littoral of lakes.

Notes. Variations in genital configuration have been noted in males, and females.

Apatania zonella (Zetterstedt, 1840)

Material. 1♀ im — CH11, 16♀♀ im — CH02, 4♀♀ im — CH58, 3♀♀ im — CH74.

Distribution. Holarctic [Lepneva, 1966; Levanidova et al., 1995; Wiggins, Parker, 1997; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022; Rasmussen, Morse, 2023].

Ecology. Spring-fed streams, small rivers, oligotrophic lakes with cool water.

Notes. Variations in the configuration of female genitalia have been noted. Populations partially parthenogenetic, with females dominating.

Apatania sp.

Material. 3 empty cases — CH01.

Ecology. Collected on the shore of this oligotrophic lake.

Apataniana tschuktschorum Levanidova, 1979

Material. 3♂♂ im, 1♀ im — CH73.

Distribution. East Palearctic species [Levanidova, 1982; Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016].

Ecology. Springs or small cold-water streams.

Brachycentridae

Brachycentrus americanus (Banks, 1899)

Material. 10L — CH16, 14L — CH28, 4♂♂ im, 2♀♀ im — CH74.

Distribution. Holarctic [Lepneva, 1966 (as *Oligoptelectodes potanini* Martynov, 1910); Levanidova et al., 1995; Wiggins, Parker, 1997; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022; Rasmussen, Morse, 2023].

Ecology. It inhabits mountain and foothill rivers and streams and is found in the littoral zone of oligotrophic lakes.

Micrasema extremum Botosaneanu, 1990*

Material. 19♂♂ im — CH74.

Distribution. East Palearctic species [Levanidova et al., 1995; Zasyapkina, 2016; Rasmussen, Morse, 2023 (as *Micrasema gelidum* *prospecies extremum* Botosaneanu, 1990 in the frame of *Micrasema gelidum* McLachlan, 1876 superspecies)].

Ecology. In shallow waters of oligotrophic lakes.

Notes. Until now, the species was reported from lakes of the Chukotka Peninsula.

Micrasema gelidum McLachlan, 1876 closed

Material. 1♂ im — CH02, 3♂♂ im — CH52.

Distribution. Holarctic [Levanidova et al., 1995; Wiggins, Parker, 1997; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022; Rasmussen, Morse, 2023].

Ecology. In rithral zones of rivers, oligotrophic lakes, as well as in oxbow lakes and thermokarst lakes.

Notes. The superspecies *Micrasema gelidum* McLachlan, 1876 includes several closely related *prospecies* [Botosaneanu, 1988]. These *prospecies* sometimes are difficult to distinguish due to the high variability of male genitalia. In our study, we separate *M. extremum* from other *prospecies* of the superspecies *M. gelidum*.

Goeridae

Goera tungusensis Martynov, 1909

Material. 1♂ im — CH03, 1♀ im — CH62, 2♂♂ im — CH70, 14♂♂ im, 7♀♀ im — CH75.

Distribution. Holarctic [Levanidova et al., 1995; Wiggins, Parker, 1997; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022; Rasmussen, Morse, 2023].

Ecology. In the rithral zones of cold-water streams and small rivers.

Hydroptilidae

Hydroptilidae gen. sp. indet

Material. 1♀ im — CH59.

Notes. The female could not be identified to the genus level.

Leptoceridae

Ceraclea excisa (Morton, 1904)

Material. 1♂ im — CH59.

Distribution. Holarctic [Lepneva, 1966 (as *Athripsodes*); Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022; Rasmussen, Morse, 2023].

Ecology. It is found in the rithral zones of rivers, as well as in the littoral zone of oligotrophic lakes.

Mystacides bifidus Martynov, 1924

Material. 5♂♂ im — CH60, 5♂♂ im — CH76, 1♂ im, 2♀♀ im — CH83, 2♂♂ im — CH77, 14♂♂ im, 3♀♀ im — CH88.

Distribution. East Palearctic species [Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2016, 2022].

Ecology. Lotic depositional and stagnant habitats of streams and lakes.

Notes. The species close to Nearctic *Mystacides sepulchralis* (Walker, 1852), but Wiggins, Parker [1997], and Ivanov [2011] considered them as different sister species. Zasyapkina I.A. recorded *M. bifidus* as *M. sepulchralis* in the review

[2016]. Chuluunbat et al., 2022 recorded both species from Mongolia: *M. bifidus* and *M. sepulchralis*. To determine relationships and clarify species status, it is necessary to conduct a molecular genetic analysis of species within their Holarctic distributional range.

Limnephilidae

Arctopora trimaculata Zetterstedt, 1840

Material. 1♂ im, 2♀♀ im — CH79, 4♂♂ im, 2♀♀ im — CH88.

Distribution. Holarctic [Levanidova et al., 1995; Wiggins, Parker, 1997; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022; Rasmussen, Morse, 2023].

Ecology. Marshy habitats, small lakes, ponds, temporary reservoirs.

Asynarchus iteratus McLachlan, 1880

Material. 1♂ im — CH02, 1♂ im, 2♀♀ im — CH54, 1♂ im — CH57, 26♂♂ im — CH58, 1♂ im, 2♀♀ im — CH60, 3♂♂ im — CH61.

Distribution. Holarctic [Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022; Rasmussen, Morse, 2023].

Ecology. Littoral areas of lakes, tundra pools; slow streams.

Asynarchus lapponicus (Zetterstedt, 1840)

Material. 1♀ im — CH01, 3L — CH62.

Distribution. Holarctic [Lepneva, 1966; Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022; Rasmussen, Morse, 2023].

Ecology. Littoral areas of slow streams, lakes, swampy places.

Dicosmoecus obscuripennis Banks, 1938

Material. 2L — CH01, 1L — CH16, 1♂ im — CH76.

Distribution. Holarctic [Nagayasu, Ito, 1993; Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016; Rasmussen, Morse, 2023].

Ecology. Oligotrophic lakes, mountain streams and rivers.

Ecclisomyia kamshatica (Martynov, 1914)

Material. 2L — CH01.

Distribution. East Palearctic species [Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022].

Ecology. Found in cold-water streams and rivers, in the littoral zone of oligotrophic lakes.

Hydatophylax nigrovittatus McLachlan, 1872

Material. 1♂ im — CH57.

Distribution. East Palearctic species [Lepneva, 1966; Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022].

Ecology. In the coastal zone of streams, small and medium-sized rivers, on rocky substrates and in quiet areas.

Lenarchus expansus Martynov, 1914?

Material. 1L — CH63.

Distribution. Holarctic [Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022; Rasmussen, Morse, 2023].

Ecology. Larva is collected at the lake shore.

Notes. The larva, probably, belongs to *L. expansus*, which is noted from the close regions. However, to confirm the species status, imaginal material is required.

Limnephilus borealis (Zetterstedt, 1840)

Material. 1♀ im — CH60, 1♀ im — CH64.

Mayfly, stonefly and caddisfly fauna of the southern spurs of the Chersky Range Russia

Distribution. Palearctic [Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016].

Ecology. Found in lakes among vegetation in quiet areas.

Limnephilus diphyes McLachlan, 1880

Material. 1♂ im — CH88.

Distribution. Holarctic [Levanidova et al., 1995; Ivanov, 2011; Vshivkova, 2013; Zasyapkina, 2016; Chuluunbat et al., 2022; Rasmussen, Morse, 2023].

Ecology. Slow water and swampy areas.

Limnephilus femoralis Kirby, 1837*

Material. 1♂ im — CH51.

Distribution. Holarctic [Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016; Rasmussen, Morse, 2023].

Ecology. Marshy habitats, small standing waters.

Notes. This is the first time we've listed it for the Magadanskaya Oblast; it was previously listed for Kamchatka, the Kuril Islands, and the Baikal region [Ivanov, 2011; Zasyapkina, 2016].

Limnephilus fenestratus (Zetterstedt, 1840)

Material. 1♂ im — CH01, 1♀ im — CH65.

Distribution. Holarctic [Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022; Rasmussen, Morse, 2023].

Ecology. Found in small standing waters and lakes.

Limnephilus nigriceps (Zetterstedt, 1840)

Material. 16♂♂ im, 1♀ im — CH60, 1♀ im — CH64, 1♂ im — CH65, 1♀ im — CH66, 1♂ im — CH67, 5♂♂ im — CH68.

Distribution. Holarctic [Lepneva, 1966; Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016; Rasmussen, Morse, 2023].

Ecology. It is found in shallow waters of lakes and slow-flowing rivers in thickets, sometimes in the open littoral of lakes.

Limnephilus rhombicus (Linnaeus, 1758)

Material. 2♂♂ im — CH67.

Distribution. Holarctic [Lepneva, 1966; Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022; Rasmussen, Morse, 2023].

Ecology. In small, well-warmed bodies of water, in lentic-littoral and lotic-depositional habitats.

Molannidae

Molanna albicans (Zetterstedt, 1840)

Material. 1♂ im, 1♀ im — CH51, 3♂♂ im, 4♀♀ im — CH62, 4♂♂ im — CH76, 11♂♂ im, 2♀♀ im — CH77, 3♂♂ im, 3♀♀ im — CH88.

Distribution. Palearctic [Lepneva, 1966; Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022].

Ecology. In lakes on sandy, sandy-silty soils with detrital deposits.

Molanna submarginalis McLachlan, 1872

Material. 1♂ im, 2♀♀ im — CH62, 1♀ im — CH73.

Distribution. Palearctic [Lepneva, 1966; Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022].

Ecology. In lakes, in coastal areas and at depths of 10 m; on sandy, sandy-salty soils [Lepneva, 1966].

Molannodes tinctus (Zetterstedt, 1840)

Material. 12♂♂ im, 1♀ im — CH70, 1♀ im — CH88.

Distribution. Holarctic [Lepneva, 1966; Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022; Rasmussen, Morse, 2023].

Ecology. In lakes, river estuaries, in quiet areas with sandy, sandy-silty soil.

Phryganeidae

Agrypnia pagetana Curtis, 1835

Material. 3♂♂ im, 1♀ im — CH88.

Distribution. Holarctic [Lepneva, 1966; Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022; Rasmussen, Morse, 2023].

Ecology. In still and slow-moving waters, in thickets.

Agrypnia sahlbergi (McLachlan, 1880)

Material. 3♂♂ im — CH18, 6♂♂ im, 1♀ im — CH58, 2♂♂ im, 1♀ im — CH77, 3♂♂ im — CH83, 1♂ im — CH88.

Distribution. Holarctic [Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016; Rasmussen, Morse, 2023].

Ecology. In small water bodies and marshy habitats.

Oligotricha lapponica (Hagen, 1864)

Material. 1♂ im — CH63.

Distribution. Holarctic [Lepneva, 1966; Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022; Rasmussen, Morse, 2023].

Ecology. Stagnant and slowly flowing shallow streams, marshy habitats.

Phryganea bipunctata Retzius, 1783

Material. 3♂♂ im, 1♀ im — CH51, 1♂ im, 2♀♀ im — CH77.

Distribution. Palearctic [Lepneva, 1966 (as *Phryganea* sp.); Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022].

Ecology. Stagnant and slowly flowing streams, in thickets and at the bottom.

Rhyacophilidae

Rhyacophila egijnica Schmid, 1968

Material. 2♂♂ im — CH73.

Distribution. East Palearctic species [Levanidova et al., 1995; Ivanov, 2011; Zasyapkina, 2016; Chuluunbat et al., 2022].

Ecology. In fast-flowing cold-water streams and rivers.

Rhyacophila mongolica Levanidova, 1993

Material. 1♂ im, 2♀♀ im — CH74, 3♂♂ im — CH73.

Distribution. East Palearctic species, Nearctic [Levanidova et al., 1995; Wiggins, Parker, 1997; Ivanov, 2011; Morse et al., 2011; Zasyapkina, 2016; Chuluunbat et al., 2022; Rasmussen, Morse, 2023].

Ecology. In fast-flowing cold-water streams and rivers.

Rhyacophila gr. *sibirica*

Material. 1L — CH01.

Ecology. The only larva of this species was collected by us in the vicinity of Lake Bliznetsy.