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A Taxonomic List of the Mayflies, Stoneflies and Caddisflies (Insecta: Ephemeroptera, Plecoptera and Trichoptera) of the Sikhote-Alin Biosphere Reserve

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ABSTRACT

Three orders of amphibiotic insects were examined from the eastern and western streams of the Sikhote-Alin State Nature Biosphere Reserve, which is located in the southern Russian Far East in the central portion of a mountain range with the same name. Data were obtained on Ephemeroptera, Plecoptera, Trichoptera (EPT) fauna inhabiting streams in the Sikhote-Alin State Nature Biosphere Reserve and its adjacent area. The data were collected by the author from 1980 to 2013. More than 30 thousand larvae and adult EPT were identified, and a systematic list of 220 species was formed. Among them, Ephemeroptera is represented by 63 species from 18 genera and 8 families. Plecoptera is represented by 61 species from 30 genera and 8 families. Trichoptera is represented by 96 species from 49 genera and 20 families. The EPT biodiversity study in the local protected areas is important for assessing the ecological preferences of aquatic organisms and understanding the formation of ecosystem structures under normal conditions, i.e., without anthropogenic influence. In addition, the EPT list is of great value, as it is widely used to control the quality of the environment via the EPT indicator index. The comprehensive list of Ephemeroptera, Plecoptera and Trichoptera (EPT complex) taxonomic species of Central Sikhote-Alin streams is submitted for the first time. In addition, a brief areal EPT fauna analysis is made.

Introduction

Sikhote-Alin State Nature Biosphere Reserve is located in the southern Russian Far East, in the central part of the Eponymous mountain range and on the shore of the Sea of Japan. Its territory is comprised of two clusters (Fig. 1), which encompass an area of 401.6 sq km. The mountainous terrain of the Sikhote-Alin mountain range is composed of numerous, complex overlapping mountain ridges. The average height of the mountain peaks is 800 m above sea level. The chaotic cluster of hills is dissected by river valleys, forming a dense (0.7 to 0.9 km per 1 sq km), extensive drainage system, with a variety of streams and basins. The rivers are less than 100 km in length, with average slopes of 50–100‰ and upper reach slopes of 150–200‰.

Rivers flowing from the eastern macroslope are fast, with frequent rapids and occasional small waterfalls. The water temperature in summer rarely rises above 16 °C. The river is more tranquil on the smoother, western macroslope, with water temperatures reaching 19–21 °C on hot days. The rivers are mainly fed by rainfall, which accounts for approximately 70–80% of the total annual river flow. According to various estimates, groundwater contributes to 5–20% of the flow, while snowmelt contributes to 10–20%.

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Fig. 1. Terrain features of the study area.

The proximity to the ocean, location on the edge of the huge Eurasian continent and rugged terrain are the reasons for the unique climate of the region, which has a pronounced monsoon season. The annual cumulative temperatures of the growing season, which lasts approximately 150 days, amount to approx. 2000–2500 °C. The annual total precipitation on the eastern macroslope is 800 mm, and 650 mm on the western macroslope, with the majority (75–85%) occurring from April to November.

The watercourses of the Sikhote-Alin mountain range are of mountain and submontane types, with developed alluvial forms. These watercourses are of high commercial fishing value. During the freshwater portion of their lifecycle, juvenile salmon mainly feed on freshwater communities of aquatic insects, including mayflies (Ephemeroptera), stoneflies (Plecoptera) and caddisflies (Trichoptera) (Levanidov, 1969). In addition, representatives of these orders are highly sensitive to various types of pollution and environmental changes. These characteristics are unique to these species, and make it possible for them to act as environmental indicators, including the widely used EPT biotic index (Semenchenko, 2004). In this regard, EPT fauna identification is important for solving a number of fisheries issues, conducting water quality monitoring and assessing ecosystem states. In addition, the benthic communities sampled in this study do not suffer from anthropogenic influences, providing valuable data for the development of scientific methods for forecasting river ecosystem conditions based on various environmental disturbances.

Despite the fact that mayflies, stoneflies and caddisflies in mountain and submontane streams and rivers are characterized by the highest species diversity, the insects in the streams of the reserve remained virtually unstudied until the 1980s. According to the literature, only 4 species of mayflies (Baikova, 1976; Sinichenkova, 1981), 4 species of stoneflies (Zhiltsova et al., 1975; Zhiltsova and Levanidova, 1978; Ricker, 1959) and 16 taxa of caddisflies were known, 4 of which have not received any species affiliation (Timofeeva, 1978).

Based on a comprehensive study of the species compositions of these three orders of amphibiotic insects, the author has obtained lists of Ephemeroptera (Potikha, 1985, 2013), Plecoptera (Potikha, 2014; Potikha and Zhiltsova, 1996, 2001, 2005) and Trichoptera (Potikha, 1991, 2001, 2002; Potikha and Vshivkova, 2013). The list is currently comprised of 220 taxa (Ephemeroptera — 63 taxa from 18 genera and 8 families; Plecoptera — 61 taxa from 30 genera and 8 families and Trichoptera — 96 taxa from 49 genera and 20 families). The complete taxonomic EPT list from watercourses of the Central Sikhote-Alin, as well as a brief areal analysis, is presented in the following sections.

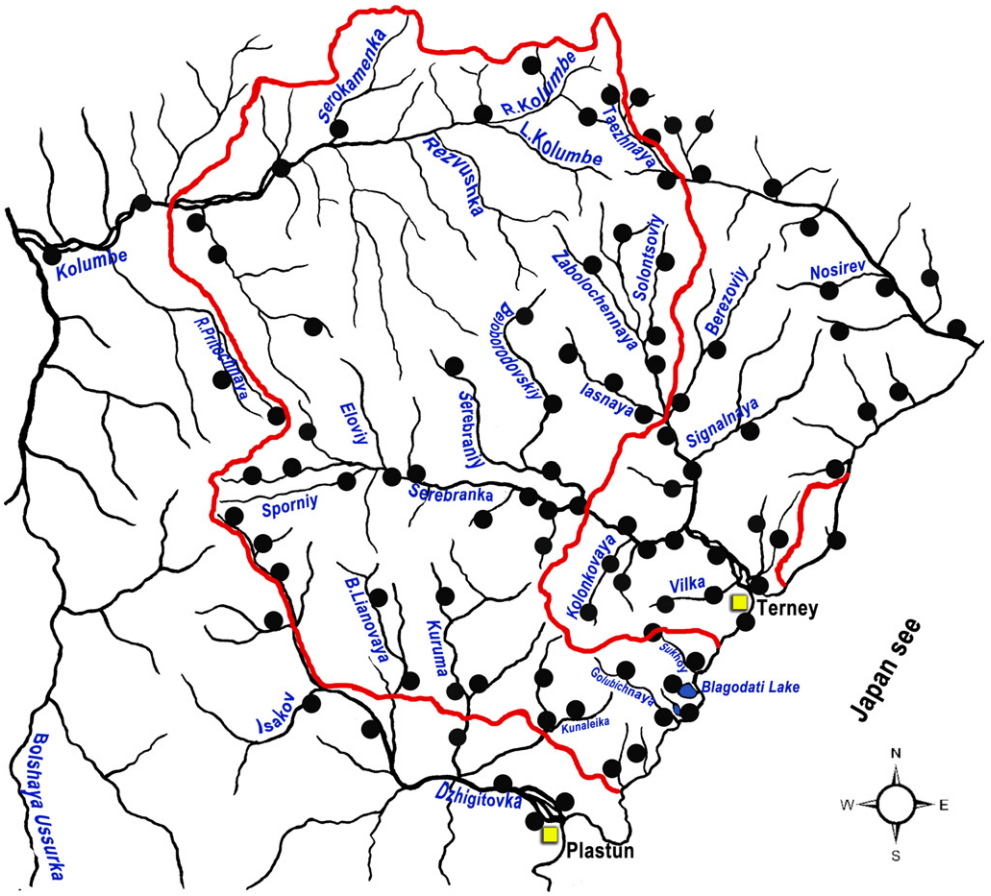

Fig. 2. Map of main sampling locations.

Materials and Methods

From 1980 to 2013, the author studied more than 90 streams and basins in the reserve and adjacent territories (Fig. 2). Over a thousand larvae samples and three thousand adult samples were collected and analyzed. In total, 30 thousand larvae and adults were identified, and over 2.5 thousand individual insects from scientific collections of academic institutions (ZI RAS, BSI FEB RAS) and MSU were studied. Imagoes were collected in coastal vegetation with traps, sweep nets (during swarming) and light traps. Larvae were collected from the surface of substrates via the forced drift method. Qualitative samples were preserved with 75% ethanol, and quantitative with 4% formalin. The samples are stored in the scientific collections of the Sikhote-Alin State Nature Biosphere Reserve, ZI RAS, BSI FEB RAS and MSU.

Distribution types are listed according to Zhiltsova and Levanidova (1984). Information from websites was used for compiling the taxonomic list (Ephemeroptera of The World; Morse; Order Plecoptera). The taxonomic position of mayflies is listed according to Kluge (2004, 2007). The Ephemerellidae family classification of Jacobus and McCafferty (2008) was used. In addition, the Cinygmula classification of Wang and McCafferty (2004) was utilized. The names of families, genera within families and species within genera are listed in alphabetical order.

Table 1
The number of EPT complex taxa in the Sikhote-Alin State Nature Biosphere Reserve and adjacent territories.

Oder	Families	Genera	Species
Ephemeroptera	8	18	63
Plecoptera	8	30	61
Trichoptera	20	49	96
Total	36	97	220

Results and Discussion

The taxonomic EPT complex list from the Sikhote-Alin State Nature Biosphere Reserve can be seen below, with statistics presented in Table 1. The list includes 220 entries belonging to 97 genera and 36 families.

Taxonomic List

Order **Ephemeroptera**
Family **Ephemeridae**
Ephemera orientalis McLachlan, 1875
Ephemera strigata Eaton, 1892
Ephemera sachalinensis Matsumura, 1911
Family **Polymitarcyidae**
Ephoron shigae (Takahashi, 1924)
Family **Heptageniidae**
Cinygmula autumnalis Tiunova et Gorovaya, 2012
Cinygmula cava Ulmer, 1928
Cinygmula hirasana Imanishi, 1935
Cinygmula irina Tshernova et Belov, 1982
Cinygmula kurenzovi (Bajkova, 1965)
Cinygmula levanidovi Tshernova et Belov, 1982
Cinygmula putoranica Kluge, 1980
Cinygmula sapporensis (Matsumura, 1904)
Ecdyonurus (*Afghanurus*) *aspersus* Kluge, 1980
Ecdyonurus (*Afghanurus*) *bajkovae* Kluge, 1986
Ecdyonurus (*Afghanurus*) *scalaris* Kluge, 1983
Ecdyonurus (*Atopopus*) *aurarius* Kluge, 1983
Epeorus (*Proepeorus*) *anatolii* Sinitshenkova, 1981
Epeorus (*Belovius*) *gornostajevi* Tshernova, 1981
Epeorus (*Belovius*) *ninae* Kluge, 1995
Epeorus (*Belovius*) *pellucidus* (Brodsky, 1930)
Epeorus (*Belovius*) *rubeus* Tiunova, 1991
Epeorus (Iron) aesculus Imanishi, 1934
Epeorus (Iron) alexandri Kluge et Tiunova, 1989
Epeorus (Iron) maculatus (Tshernova, 1949)
Heptagenia (*Heptagenia*) *sulphurea* (Müller, 1776)
Rhithrogena bajkovae Sowa, 1973
Rhithrogena lepnevae Brodsky, 1930
Rhithrogena sibirica Brodsky, 1930
Family **Ameletidae**
Ameletus camtschaticus Ulmer, 1928
Ameletus cedrensis Sinitshenkova, 1977
Ameletus inopinatus labiatus Sinitshenkova, 1981
Ameletus longulus Sinitshenkova, 1981
Ameletus montanus arlecchino Kluge, 2007
Family **Siphlonuridae**
Siphlonurus immanis Kluge, 1985
Siphlonurus zhelochovtsevi Tshernova, 1952
Siphlonurus sp.
Family **Baetidae**
Baetis (Baetis) bicaudatus Dodds, 1923
Baetis (Baetis) fuscatus Linnaeus, 1761
Baetis (Baetis) pseudothermicus Kluge, 1983
Baetis (Baetis) ursinus ursinus Kazlauskas, 1963
Baetis (Baetis) vernus Curtis, 1834
Acentrella sibirica (Kazlauskas, 1963)
Baetiella tuberculata (Kazlauskas, 1963)
Cloeon sp.
Family **Leptophlebiidae**
Leptophlebia (*Neoleptophlebia*) *japonica* (Matsumura, 1931)
Leptophlebia (*Paraleptophlebia*) *strandii* Eaton, 1901

Leptophlebia sp. 1
Leptophlebia sp. 2
Family **Ephemerellidae**
Drunella aculea Allen 1971
Drunella cryptomeria (Imanishi 1937)
Drunella lepnevae Tshernova 1949
Drunella solida Bajkova 1980
Drunella triacantha Tshernova 1949
Ephemerella aurivillii Bengtsson 1908
Ephemerella f. *thymalli*
Ephemerella (*Hosoba*) *atagosana* Imanishi 1937
Ephemerella (*Zonadia*) *kozhovi* Bajkova 1967
Ephemerella (*Draeconia*) *mucronata* (Bengtsson 1909)
Cincticostella levanidovae (Tshernova 1952)
Cincticostella tshernovae (Bajkova 1962)
Serratella ignita (Poda 1761)
Serratella setigera (Bajkova 1967)
Serratella zapekinae Bajkova, 1967
Order **Plecoptera**
Family **Taeniopterygidae**
Taenionema japonicum (Okamoto, 1922)
Family **Nemouridae**
Zapada quadribranchiata (Zhiltzova, 1977)
Amphinemura borealis (Morton, 1894)
Amphinemura coreana Zwick, 1973
Amphinemura standfussi Ris, 1902
Amphinemura verrucosa Zwick, 1973
Nemoura arctica Esben-Petersen, 1910
Nemoura despinosa Zhiltzova, 1977
Nemoura geei Wu, 1929
Nemoura nigrodentata Zhiltzova, 1980
Nemoura papilla Okamoto, 1922
Protonemura ermolenkoi Zhiltzova, 1982
Family **Capniidae**
Capnia aligera Zapekina-Dulkeit, 1975
Capnia nearctica Banks, 1918
Capnia potikhae Zhiltzova, 1996
Capniella ghilarovi Zhiltzova, 1988
Capniella nodosa Klapálek, 1920
Eucapnopsis brevicauda (Claassen, 1924)
Isocapnia arcuata Zhiltzova, 1975
Isocapnia guentheri (Joost, 1970)
Isocapnia kudia Ricker, 1959
Paracapnia khorensis Zhiltzova, 1972
Paracapnia sikhotensis Zhiltzova, 1978
Paracapnia leisteri Zhiltzova et Potikha, 2005
Family **Leuctridae**
Leuctra fusca (Linnaeus, 1758)
Paraleuctra cercia (Okamoto, 1922)
Paraleuctra zapekinae Zhiltzova, 1974
Perlomyia levanidovae (Zhiltzova, 1975)
Perlomyia secunda (Zapekina-Dulkeit, 1955)
Perlomyia smithae Nelson et Hanson, 1973
Family **Pteronarcyidae**
Pteronarcys sachalina Klapálek, 1908
Family **Perlodidae**
Arcynopteryx dichroo (McLachlan, 1872)
Arcynopteryx polaris Klapálek, 1912
Diura majuscula (Klapálek, 1912)
Diura nanseni (Kempny,1900)
Megarcys magnilobus Zhiltzova, 1988

Megarcys ochracea Klapálek, 1912
Megarcys pseudochracea Zhiltzova, 1977
Pictetiella asiatica Zwick et Levanidova, 1971
Skwala compacta (McLachlan, 1872)
Stavsolus manchuricus Teslenko 1999
Isoperla eximia Zapekina-Dulkeit, 1975
Isoperla flavescens Zhiltzova et Potikha, 1986
Isoperla lunigera (Klapálek, 1923)
Isoperla maculata Zhiltzova, 1977
Family **Perlidae**
Kamimuria exilis (McLachlan, 1872)
Oyamia nigribasis Banks, 1920
Paragnetina flavotincta (McLachlan, 1872)
Family **Chloroperlidae**
Paraperla lepnevae Zhiltzova, 1970
Utaperla orientalis Nelson et Hanson, 1969
Alloperla deminuta Zapekina-Dulkeit, 1970
Alloperla mediata (Navás, 1925)
Alloperla rostellata (Klapálek, 1923)
Haploperla maritima Zhiltzova et Levanidova, 1978
Suwallia asiatica Zhiltzova et Levanidova, 1978
Suwallia decolorata Zhiltzova et Levanidova, 1978
Suwallia kerzhneri Zhiltzova et Zwick, 1971
Suwallia talalajensis Zhiltzova, 1976
Suwallia teleckojensis (Šámal, 1939)
Sweltsa illiesi Zhiltzova et Levanidova, 1978
Sweltsa lepnevae Zhiltzova, 1977
Order **Trichoptera**
Family **Apataniidae**
Apatania complexa (Martynov, 1935)
Apatania crymophila MacLachlan, 1880
Apatania zonella (Zetterstedt, 1840)
Family **Arctopsychidae**
Arctopsyche palpata Martynov, 1934
Family **Brachycentridae**
Brachycentrus americanus (Banks, 1899)
Brachycentrus japonicus Iwata, 1927
Micrasema (*gelidum*) *primoricum* Botosaneanu, 1990
Family **Ecnomidae**
Ecnomus tenellus (Rambur, 1842)
Family **Glossosomatidae**
Agapetus inaequispinosus Schmid, 1970
Agapetus levanidoruv Vshivkova et Morse, sp.n.
Electragapetus martynovi Vshivkova et Arefina, 1996
Electragapetus praeteritus Martynov, 1934
Glossosoma (Anagapetus) schmidi Levanidova, 1979
Glossosoma (*Synafophora*) *altaicum* Martynov, 1914
Glossosoma (*Synafophora*) *angaricum* (Levanidova, 1967)
Glossosoma (*Synafophora) intermedium* (Klapálek, 1892)
Glossosoma (*Synafophora*) *ussuricum* (Martynov, 1934)
Family **Goeridae**
Archithremma ulachensis Martynov, 1935
Goera parvula Martynov, 1935
Goera squamifera Martynov, 1909
Goera tungusensis Martynov, 1909
Family **Hydrobiosidae**
Apsilochorema sutshanum Martynov, 1934
Family **Hydropsychidae**
Cheumatopsyche infascia Martynov, 1934
Hydropsyche orientalis Martynov, I934
Hydropsyche sp.

Potamyia czekanovskii (Martynov, 1910)
Family **Hydroptilidae**
Hydroptila spinosa Arefina et Armitage, 2003
Orthotrichia tragetti Mosely, 1930
Oxyethira ecornuta Morton, 1893
Family **Lepidostomatidae**
Lepidostoma albardanum (Ulmer, 1906)
Lepidostoma elongatum Martynov, 1935
Lepidostoma sinuatum Martynov, 1935
Family **Leptoceridae**
Ceraclea excisa (Morton, 1904)
Ceraclea sibirica (Ulmer, 1906)
Mystacides bifida Martynov 1924
Mystacides sibirica Martynov 1935
Oecetis lacustris (Pictet, 1834)
Oecetis nigropunctata Ulmer, 1908
Triaenodes (*Ylodes*) *levanidovae* Morse et Vshivkova, 1997
Triaenodes unanimis MacLachlan, 1877
Family **Limnephilidae**
Asynarchus amurensis (Ulmer, 1905)
Brachypsyche rara (Martynov, 1914)
Brachypsyche sibirica (Martynov, 1924)
Brachypsyche sp. N
Chilostigma sieboldi MacLachlan, 1876
Chilostigmodes forcipatus Martynov, 1914
Dicosmoecus jozankeanus (Matsumura, 1931)
Ecclisomyia kamtshatica (Martynov, 1914)
Hydatophylax grammicus (MacLachlan, 1880)
Hydatophylax nigrovittatus (MacLachlan, 1872)
Hydatophylax soldatovi (Martynov, 1914)
Hydatophylax variabilis (Martynov, 1910)
Lenarchus productus (Morton, 1896)
Limnephilus alienus Martynov, 1914
Limnephilus correptus MacLachlan, 1880
Limnephilus fenestratus (Zetterstedt, 1840)
Limnephilus picturatus MacLachlan, 1875
Limnephilus quadratus Martynov, 1914
Limnephilus sericeus (Say, 1824)
Limnephilus stigma Curtis, 1834
Limnephilus sp. aff. *subcentralis* Brauer, 1857
Limnephilus tiunovae Arefina et Levanidova, 1996
Nemotaulius admorsus (MacLachlan, 1866)
Nemotaulius mutatus (MacLachlan, 1872)
Philarctus rhomboidalis Martynov, 1924
Pseudostenophylax amurensis (MacLachlan, 1880)
Family **Molannidae**
Molanna moesta Banks, 1906
Molannodes tinctus (Zetterstedt, 1840)
Family **Philopotamidae**
Dolophilodes (*Dolophilodes*) *affinis* Levanidova et Arefina, 1996
Dolophilodes mroczkowskii Botosaneanu, 1970
Kisaura aurascens (Martynov, 1934)
Wormaldia niiensis Kobayashi, 1985
Family **Phryganeidae**
Agrypnia czerskyi (Martynov, 1924)
Agrypnia picta Kolenati, 1848
Hagenella sibirica (Martynov, 1909)
Oligothricha lapponica (Hagen, 1864)
Semblis atrata (Gmelin, 1789)
Semblis phalaenoides (Linnaeus, 1758)
Family **Phryganopsychidae**

Phryganopsyche latipennis (Banks, 1906)
Family **Psychomyiidae**
Metalype uncatissima (Botosaneanu 1970)
Paduniella uralensis Martynov, 1914
Family **Rhyacophilidae**
Rhyacophila angulata Martynov, 1910
Rhyacophila coreana Tsuda, 1940
Rhyacophila depressa Martynov, 1910
Rhyacophila impar Martynov, 1914
Rhyacophila kardakoffi Navás, 1926
Rhyacophila kawamurae Tsuda, 1940
Rhyacophila lata Martynov, 1918
Rhyacophila lepnevae Levanidova, 1977
Rhyacophila monstrosa Levanidova et Schmid, 1977
Rhyacophila narvae Navás, 1928
Rhyacophila retracta Martynov, 1914
Rhyacophila sutchanica Schmid et Levanidova, 1986
Family **Stenopsychidae**
Stenopsyche marmorata Navás, 1920
Family **Uenoidae**
Neophylax relictus (Martynov, 1935)
Neophylax ussuriensis (Martynov, 1914)

The EPT fauna of the Sikhote-Alin State Nature Biosphere Reserve are characterized by a large species diversity, which is representative of fauna from the Russian Far East. Ephemeroptera comprises approximately 36% (Tiunova, 2012) of the fauna in the Russian Far East, while Plecoptera accounts for nearly 44% (Teslenko, 2007) and Trichoptera roughly 24 (Ivanov, 2011).

The mayfly fauna in Sikhote-Alin State Nature Biosphere Reserve and adjacent territory watercourses are dominated by the Heptageniidae (24 species) and Ephemerellidae (15 species) families, followed by the Baetidae (8 species), Ameletidae (5 species) and Leptophlebiidae (4 species) families. The Ephemeridae and Siphlonuridae families are comprised of 3 species each, while Polymitarcyidae is represented by only one species.

The greatest number of stonefly species were in the Perlodidae (14 species), Chloroperlidae (13 species), Capniidae (12 species) and Nemouridae (11 species) families. The Leuctridae family includes 6 species, Perlidae 3 species and Taeniopterygidae and Pteronarcyidae only one species each.

The greatest number of caddisflies species were registered in the Limnephilidae (26 species) family, followed by Rhyacophilidae (12 species), Glossosomatidae (9 species), Leptoceridae (8 species) and Phryganeidae (6 species). Other families consist of 2–4 species, and the Arctopsychidae, Ecnomidae, Hydrobiosidae, Phryganopsychidae and Stenopsychidae families include only one species each.

Data on taxonomic composition should not be considered definitive, as ongoing research from Kolumbe River (Bolshaya Ussurka River basin), and in a new territory, suggests that the taxonomic list will be further updated with new species.

All amphibiotic insects identified up to the species level are summarized in two groups based on the type of distribution: the Holarctic and Palearctic groups (Table **2**). In the Holarctic group, two types of habitats were identified, the circumpolar type, which widely covers the Palaearctic and Nearctic regions, and the amphi-Pacific type, which is spread throughout the East Asian Palearctic sector and north-western mountainous Nearctic regions, including a strip along the coast of the Arctic Ocean. In the second group, three types of habitats were identified, including the Trans Palearctic, East Palaearctic and Palearchaearctic groups. The Trans

Table 2
Biogeographical composition of the EPT fauna complex of the Sikhote-Alin State Nature Biosphere Reserve.

Distribution type	Mayflies		Stoneflies		Caddisflies		All groups	
	N	%	N	%	N	%	N	%
Holarctic group								
Circumpolar	1	1.7	3	4.9	13	14.0	17	8.0
Amphi-Pacific	1	1.7	2	3.3	1	1.1	4	2.0
Palaearctic group								
Palearchaearctic								
Mainland	10	17.2	20	32.8	14	15.0	44	20.7
Mainland-island	7	12.1	5	8.2	17	18.3	29	13.7
East Palaearctic	33	56.9	28	45.9	30	32.3	91	42.9
Trans Palearctic	6	10.4	3	4.9	18	19.3	28	12.7
Total	58		61		93		212	

Remark. N — number of taxa identified up to the species level.

Palearctic group includes species that are both disjunctive and widespread in the Palearctic, while the East Palaearctic group combines species commonly found to the east of the Yenisei River and inhabiting areas along the west coast of the Pacific Ocean.

In general, the EPT species of rivers and water basins in the Sikhote-Alin State Nature Biosphere Reserve are heterogeneous in biogeographic composition (Table **2**). They are characterized by a high number of Palaearctic group species, nearly 90.0% (191 species). Within the Palaearctic group, the contribution of East Palaearctic species is the most significant at 42.9% (91 species). These are followed by species within the Palearchaearctic distribution (34.4%; 73 species), of which a portion are characterized as mainland subregion distribution dominate (20.7%; 44 species). Species within the Trans Palearctic distribution type occupy a subordinate position at 12.7% (28 species). The Holarctic group is not numerous and is represented by a total of 21 species (10.0%).

A diversity can be observed in the species correlations within the East Palaearctic and Palearchaearctic habitat types. For example, among mayflies, East Palaearctic species significantly dominate over Palearchaearctic species, constituting 56.9% and 29.3%, respectively. Among stoneflies and caddisflies, the species correlations within the East Palaearctic and Palearchaearctic habitat types are insignificant. However, stoneflies are dominated by East Palaearctic species (45.9%), while caddisflies are dominated by Palearchaearctic species (33.3%). Stoneflies (20 species) and mayflies (10 species) prevail among Palearchaearctic species, the distribution of which is limited to the mainland subregion. Species common in the mainland-island subregion are predominantly caddisflies (17 species). Palearctic species, which are widely distributed, constitute only 4.9% of all stoneflies, while their portions of mayflies and caddisflies are higher, at 10.4% and 19.3%, respectively. Only two mayfly species are registered in the Holarctic group (3.4%), including circumboreal *Ephemera mucronata* and amphi-Pacific *Baetis* (B.) *bicaudatus*. Stoneflies are represented by five species (8.2%), and among them there are three species with amphi-Bering distribution and two species with amphi-Pacific distribution. Caddisfly species are the most abundant in the Holarctic group (14 species, 5.1%).

In addition, three species, *Ecnomus tenellus*, *Molanna moesta* and *Oecetis lacustris*, reach beyond the Holarctic region in their distribution. The first species is found in the Oriental and Afrotropical regions, and the other two in the Oriental region (Morse). This species correlation by habitat type is typical of the southern Russian Far East and reflects the general fauna formation laws in this region (Vshivkova, 1995; Sinichenkova, 1981; Tiunova, 2012).

In summary, this study of taxonomic EPT complex diversity at a local scale not only provides valuable information for solving biogeographic problems but also serves as a basis for assessing the ecological preferences of aquatic organisms and understanding the formations of ecosystem structures in a natural environment. Although the Reserve is free of human influence, the results can also be used for monitoring areas subjected to anthropogenic stress.

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