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Fauna and distribution of the Orthocladiinae (Diptera: Chironomidae) of the Russian Far East

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Abstract An updated list of Orthocladiinae species and their distribution in the Russian Far East is given and discussed. Three hundred and forty-eight species in 64 genera are recorded. During the period of investigation, since 2000, 1 genus and 100 species in 32 genera have been described as new to science. The highest number of species (190) was found in the Amur River basin, the lowest (23) in Kamchatka. Most recorded species (63%) are Palaearctic in distribution, 37% are Holarctic.

Key words Chironomidae, Orthocladiinae, list of species, distribution, Russian Far East

Introduction

The Far East is the easternmost part of Russia; it includes the Chukotka, Kamchatka, Magadan, Khabarovsk, Amur and Primorye regions, and the Sakhalin and Kurile Islands. This territory occupies an area of about 3.2 million square km representing 19.5% of Russia. In the North and East, the Far East of Russia borders on the Arctic and Pacific Oceans, in the West on Eastern Siberia, in the South on China, North Korea and Japan (Fig. 1).

In the beginning of our studies on chironomids in the Russian Far East, in 1974, some lists of species identified from larvae existed for Kamchatka (Kurenkov, 1967), the Amur River basin (Konstantinov, 1950, 1952a, 1952b; Levanidov & Levanidova, 1962; Levanidov, 1969), Sakhalin Island (Zhuikova, 1974, 1975; Zhulkov & Shershnev, 1975) and for some lakes on Kunashir Island in the Kurile Islands (Kluchareva *et al.*, 1969). Relatively poor data were available on chironomid imagines from Kamchatka (Edwards, 1928), Sakhalin Island (Tokunaga, 1940) and the Amur River basin (Konstantinov, 1948a, 1948b; Shilova, 1952).

In 2005 we published preliminary data on the fauna and taxonomy of chironomids from the Russian Far East (Makarchenko *et al.*, 2005). The list of species in that paper was prepared as a summary table for the main subregions and included all our original results from thirty years of investigations of male imagines, pupae and larvae, and other information which had been published in Russian and international publications. At that time, 734 species from 155 genera of 6 subfamilies were specified (Makarchenko *et al.*, 2005), as follows: Podonominae (4 genera, 9 species), Tanypodinae (20 genera, 49 species), Diamesinae (13 genera, 50 species), Prodiamesinae (3 genera, 6 species), Orthocladiinae (60 genera, 299 species) and Chironominae (55 genera, 321 species).

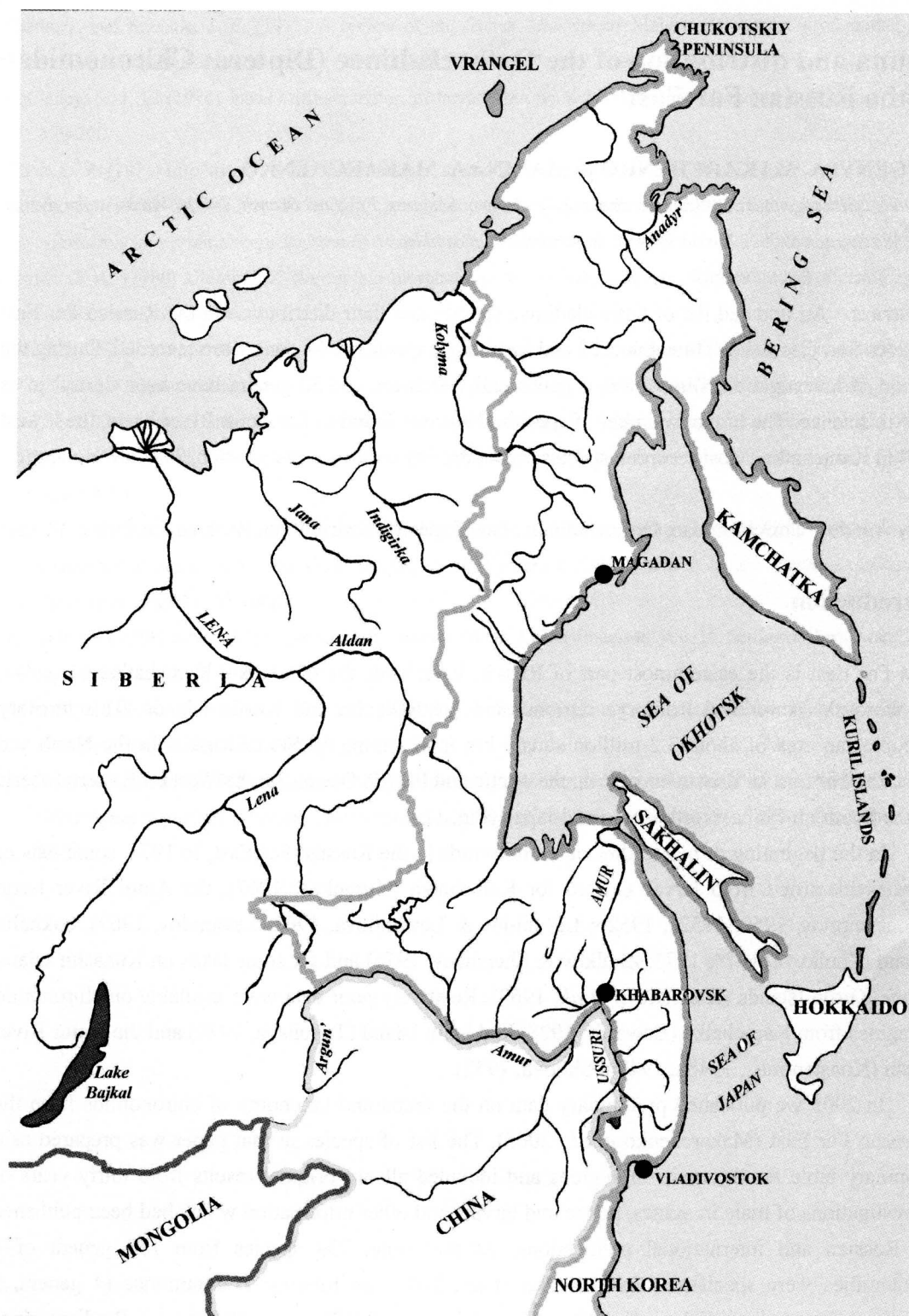


FIGURE 1. Schematic map of the Russian Far East and bordering territories.

Later, during preparation of the chironomid part for the “Key to the Insects of the Russian Far East”, the local members of some the genera were revised, especially of all poorly studied Orthocladiinae. Changes to erroneous taxon definitions as well as updated synonymies led to the number of species in that subfamily being reduced to 268 (Makarchenko & Makarchenko, 2006).

Since the latter work, corrections to the Orthocladiinae list have continued, and new genera and species have been discovered. The 6 genera newly recorded from the Russian Far East are *Boreosmittia* Tuiskunen, *Doithrix* Sæther et Sublette, *Eurycnemus* van der Wulp, *Paralimnophyes* Brundin, *Platysmittia* Sæther, and *Trichosmittia* Yamamoto. The seventeen species described as a new to science are *Boreosmittia aurora* Makarchenko et Makarchenko, 2008; *B. elevata* Makarchenko et Makarchenko, 2008; *B. khehtsyrika* Makarchenko et Makarchenko, 2009; *Chaetocladius amurensis* Makarchenko et Makarchenko, 2007; *C. magnalobus* Makarchenko et Makarchenko, 2009; *Cricotopus* (s.str.) *pseudopolitus* Makarchenko et Makarchenko, 2007; *C.* (s.str.) *samargaensis* Makarchenko et Makarchenko, 2007; *C.* (s.str.) *tshukoticus* Makarchenko et Makarchenko, 2007; *C. (Isocladius) amurensis* Makarchenko et Makarchenko, 2007; *Doithrix doriceni* Makarchenko et Makarchenko, 2008; *Orthocladius (Euorthocladius) subbullatus* Makarchenko et Makarchenko, 2008; *O. (Mesorthocladius) klishkoe* Makarchenko et Makarchenko, 2008; *O. (s.str.) linevitshae* Makarchenko et Makarchenko, 2008; *Parametriocnemus zorinae* Makarchenko et Makarchenko, 2008; *Paraphaenocladius sonah* Makarchenko et Makarchenko, 2007; *Paratrithocladius orientalis* Makarchenko et Makarchenko, 2009; *Prosilocerus amurensis* Makarchenko et Makarchenko, 2009 (Makarchenko & Makarchenko, 2007a, 2007b, 2007c, 2008a, 2008b, 2008c, 2008d, 2009a, 2009b, 2009c, 2009d, 2009e).

Some species that had been misidentified earlier have been excluded from the Far Eastern list. Also, after revision of some Orthocladiinae genera and taking into account the latest data on synonyms, the status of 25 species from 15 genera has changed (Makarchenko & Makarchenko, 2008a).

Taking into account all the above, and also taxonomic analysis of additional material of male imagines (see below), we present the current species list of Orthocladiinae in a tabular overview across the main regions of the Russian Far East.

Results and discussion

For the Russian Far East currently 348 species of Orthocladiinae in 64 genera are registered (Table 1). One genus (*Ninelia* Makarchenko et Makarchenko) and 100 species in 32 genera have been described as new to science. The highest numbers of species have been described in the genera *Bryophaenocladius* (12 species), *Chaetocladius* (11), *Hydrobaenus* (8), *Orthocladius* (8), *Cricotopus* (6) and *Tokunagaia* (5 species) (Table 2).

TABLE 1. Chironomids of the Orthocladiinae subfamily of the Russian Far East

Taxa	Vrangel Island	Chukotka	Kamchatka	Kurile Islands	Sakhalin and Moneron Islands	Okhotsk Sea Basin	Japanese Sea Basin	Amur River Basin	Khanka Lake Basin	Type of distribution
1	2	3	4	5	6	7	8	9	10	11
<i>Aagaardia oksanae</i> Makarchenko et Makarchenko, 2005							+	+		EPC
<i>Abiskomyia virgo</i> Edwards, 1937		+	+			+		+		HOL
<i>Acricotopus lucens</i> (Zetterstedt, 1850)							+	+	+	HOL
<i>Antillocladius scalpellatus</i> Wang et Sæther, 1993							+			EPC
<i>Boreosmittia aurora</i> Makarchenko et Makarchenko, 2009							+			EPC
<i>B. elevata</i> Makarchenko et Makarchenko, 2009							+			EPC
<i>B. khehtsyrika</i> Makarchenko et Makarchenko, 2009								+		EPC
<i>Brillia bifida</i> (Kieffer, 1909)				+	+					PTT
<i>B. flavifrons</i> (Johannsen, 1905)				+	+	+	+	+		HOL
<i>B. laculata</i> Oliver et Roussel, 1983**							+			HOL
<i>Bryophaenocladus akiensis</i> (Sasa, Shimomura et Matuo, 1991)				+	+	+	+	+		ECI
<i>B. auritus</i> Makarchenko et Makarchenko, 2006		+								EPA
<i>B. dentatus</i> (Karl, 1937)					+					PAE
<i>B. distinctus</i> Makarchenko et Makarchenko, 2006							+			EPC
<i>B. doriceni</i> Makarchenko et Makarchenko, 2009							+			EPC
<i>B. flavoscutellatus</i> (Malloch, 1915) **					+		+	+		HOL
<i>B. kobayashii</i> Makarchenko et Makarchenko, 2006					+					EPI
<i>B. korkishkoi</i> Makarchenko et Makarchenko, 2006							+			EPC
<i>B. lanceolatus</i> Makarchenko et Makarchenko, 2006							+			EPC
<i>B. moneronus</i> Makarchenko et Makarchenko, 2006					+					EPI
<i>B. nadezhdae</i> Makarchenko et Makarchenko, 2009								+		EPC
<i>B. nitidicollis</i> (Goetghebuer, 1913)	+						+	+		PAE
<i>B. piltunensis</i> Makarchenko et Makarchenko, 2006					+					EPI
<i>B. pleuralis</i> (Malloch, 1915) **						+	+	+		HOL
<i>B. pseudosetosus</i> Makarchenko et Makarchenko, 2009								+		EPC
<i>B. psilacrus</i> Sæther, 1982**					+					HOL
<i>B. setosus</i> Makarchenko et Makarchenko, 2009								+		EPC
<i>B. subparallelus</i> (Malloch, 1915) **							+	+		HOL

Table 1 Cont'd

Taxa	Vrangel Island	Chukotka	Kamchatka	Kurile Islands	Sakhalin and Moneron Islands	Okhotsk Sea Basin	Japanese Sea Basin	Amur River Basin	Khanka Lake Basin	Type of distribution
1	2	3	4	5	6	7	8	9	10	11
<i>B. vernalis</i> (Goetghebuer, 1921)				+	+		+	+		PAE
<i>B. vrangelensis</i> Makarchenko et Makarchenko, 2009	+									EPI
<i>Camptocladius stercorarius</i> (Geer, 1776)					+	+	+	+		HOL
<i>Cardiocladius fuscus</i> Kieffer, 1924					+		+	+		PAE
<i>Chaetocladius amurensis</i> Makarchenko et Makarchenko, 2007								+		EPC
<i>C. autumnalis</i> Makarchenko et Makarchenko, 2004							+			EPC
<i>C. elegans</i> Makarchenko et Makarchenko, 2001	+					+				EPA
<i>C. holmgreni</i> (Jacobson, 1898)	+							+		PAA
<i>C. insularis</i> Makarchenko et Makarchenko, 2004				+						EPI
<i>C. ketoiensis</i> Makarchenko et Makarchenko, 2004				+						EPI
<i>C. ligni</i> Cranston et Oliver, 1988**							+			HOL
<i>C. magnalobus</i> Makarchenko et Makarchenko, 2009								+		EPC
<i>C. nudisquamis</i> Makarchenko et Makarchenko, 2003						+				EPC
<i>C. perennis</i> (Meigen, 1930)								+		PAE
<i>C. pseudoligni</i> Makarchenko et Makarchenko, 2001	+									EPA
<i>C. tatyanae</i> Makarchenko et Makarchenko, 2006			+							EPA
<i>C. tenuistylus</i> Brundin, 1947		+								PAE
<i>C. unicus</i> Makarchenko et Makarchenko, 2001	+									EPA
<i>C. variabilis</i> Makarchenko et Makarchenko, 2003		+				+		+		EPA
<i>Comptosmittia toyamaopea</i> (Sasa, 1996)					+		+			ECI
<i>C. virga</i> Wang, 1998							+			EPC
<i>Corynoneura arctica</i> Kieffer, 1923	+	+			+		+	+		HOL
<i>C. doriceni</i> Makarchenko et Makarchenko, 2006							+		+	EPC
<i>C. edwardsi</i> Brundin, 1949							+			PAE
<i>C. fittkaui</i> Schlee, 1968							+			HOL
<i>C. gratias</i> Schlee, 1968					+		+		+	PAE
<i>C. kedrovaja</i> Makarchenko et Makarchenko, 2006							+	+		EPC

Table 1 Cont'd

Taxa	Vrangel Island	Chukotka	Kamchatka	Kurile Islands	Sakhalin and Moneron Islands	Okhotsk Sea Basin	Japanese Sea Basin	Amur River Basin	Khanka Lake Basin	Type of distribution
1	2	3	4	5	6	7	8	9	10	11
<i>C. lacustris</i> Edwards, 1924							+			HOL
<i>C. lobata</i> Edwards, 1924				+			+	+		HOL
<i>C. minuscula</i> Brundin, 1949							+			HOL
<i>C. prima</i> Makarchenko et Makarchenko, 2006					+		+	+		ECI
<i>C. secunda</i> Makarchenko et Makarchenko, 2006					+		+	+		ECI
<i>C. scutellata</i> , Winnertz, 1846					+	+	+	+	+	HOL
<i>C. tenuistyla</i> Tokunaga, 1936***					+		?+	?+		ECI
<i>Cricotopus</i> (s.str.) <i>albiforceps</i> (Kieffer, 1916)							+	+		HOL
<i>C.</i> (s.str.) <i>annulator</i> Goetghebuer, 1927							+	+		HOL
<i>C.</i> (s.str.) <i>beringensis</i> Oliver et Dillon, 1988**		+								HOL
<i>C.</i> (s.str.) <i>bicinctus</i> (Meigen, 1818)				+	+	+	+	+	+	HOL
<i>C.</i> (s.str.) <i>bimaculatus</i> Tokunaga, 1936***					+			+		ECI
<i>C.</i> (s.str.) <i>breviantennatum</i> Zelenzov, 2001								+		PTT
<i>C.</i> (s.str.) <i>claripes</i> Hirvenoja, 1973							+	+		PAE
<i>C.</i> (s.str.) <i>cylindraceus</i> (Kieffer, 1908)								+		HOL
<i>C.</i> (s.str.) <i>cumulatus</i> Hirvenoja, 1973		+								HOL
<i>C.</i> (s.str.) <i>festivellus</i> (Kieffer, 1905)		+		+	+				+	HOL
<i>C.</i> (s.str.) <i>flavocinctus</i> (Kieffer, 1924)					+		+	+	+	HOL
<i>C.</i> (s.str.) <i>metatibialis</i> Tokunaga, 1936***							+	+		ECI
<i>C.</i> (s.str.) <i>pilosellus</i> Brundin, 1956					+					HOL
<i>C.</i> (s.str.) <i>pseudopolitus</i> Makarchenko et Makarchenko, 2007							+	+		EPC
<i>C.</i> (s.str.) <i>pulchripes</i> Verral, 1912					+			+		HOL
<i>C.</i> (s.str.) <i>reissi</i> Makarchenko, 2000		+								EPA
<i>C.</i> (s.str.) <i>samargaensis</i> Makarchenko et Makarchenko, 2007							+			EPC
<i>C.</i> (s.str.) <i>septentrionalis</i> Hirvenoja, 1973							+	+		PAE
<i>C.</i> (s.str.) <i>tibialis</i> (Meigen, 1804)	+	+			+			+		HOL
<i>C.</i> (s.str.) <i>togacutus</i> Sasa et Okazawa, 1992***										EPI
<i>C.</i> (s.str.) <i>tokunagai</i> Hirvenoja, 1973					+					EPI

Table 1 Cont'd

Taxa	Vrangel Island	Chukotka	Kamchatka	Kurile Islands	Sakhalin and Moneron Islands	Okhotsk Sea Basin	Japanese Sea Basin	Amur River Basin	Khanka Lake Basin	Type of distribution
1	2	3	4	5	6	7	8	9	10	11
<i>C. (s.str.) tremulus</i> (Linnaeus, 1758)					+		+	+		HOL
<i>C. (s.str.) triannulatus</i> (Macquart, 1826)					+		+	+	+	HOL
<i>C. (s.str.) trifascia</i> Edwards, 1929					+			+		HOL
<i>C. (s.str.) tristis</i> Hirvenoja, 1973								+		HOL
<i>C. (s.str.) tshukoticus</i> Makarchenk● et Makarchenko, 2007		+								EPA
<i>C. (Isocladius) amurensis</i> Makarchenko et Makarchenko, 2007								+		EPC
<i>C. (I.) anatolii</i> Makarchenko et Makarchenko, 2009					+					EPI
<i>C. (I.) intersectus</i> (Staeger, 1839)								+	+	HOL
<i>C. (I.) laetus</i> Hirvenoja, 1973				+			+	+		HOL
<i>C. (I.) obnixus</i> (Walker, 1856)					+	+	+			PAE
<i>C. (I.) ? ornatus</i> (Meigen, 1818)							+			HOL
<i>C. (I.) perniger</i> (Zetterstedt, 1850)							+			PAE
<i>C. (I.) reversus</i> Hirvenoja, 1973							+	+		PAE
<i>C. (I.) sylvestris</i> (Fabricius, 1794)			+	+	+		+	+	+	HOL
<i>C. (I.) trifasciatus</i> (Meigen, 1813)					+	+	+	+		HOL
<i>C. (Nostococcladius) lygropis</i> Edwards, 1929							+	+	+	PAE
<i>C. (Pseudocricotopus) montanus</i> Tokunaga, 1936				+						EPI
<i>C. (P.) tamadigitatus</i> Sasa, 1981***							+	+		ECI
<i>Diploccladius cultriger</i> Kieffer, 1908		+			+	+	+	+		HOL
<i>Doncricotopus bicaudatus</i> Sæther 1981		+								HOL
<i>Doithrix doriceni</i> Makarchenko et Makarchenko, 2008							+			EPC
<i>Epoicoccladius flavens</i> (Malloch, 1915)							+			HOL
<i>Eukiefferiella brehmi</i> Gouin, 1943							+			HOL
<i>E. brevicealcar</i> (Kieffer, 1911)							+	+		PAE
<i>E. chuzeoctava</i> Sasa, 1984***					+		+	+		ECI
<i>E. claripennis</i> (Lundbeck, 1898)				+		+	+	+		HOL
<i>E. clypeata</i> (Kieffer, 1923)					+	+	+	+		PAE
<i>E. obergi</i> Makarchenko et Makarchenko, 2005				+						EPI

Table 1 Cont'd

Taxa	Vrangel Island	Chukotka	Kamchatka	Kurile Islands	Sakhalin and Moneron Islands	Okhotsk Sea Basin	Japanese Sea Basin	Amur River Basin	Khanka Lake Basin	Type of distribution
1	2	3	4	5	6	7	8	9	10	11
<i>E. togaeutertia</i> Sasa et Okazawa, 1992***				+				+		EPI
<i>Eurycnemus nozakii</i> Kobayashi, 1998***							+			ECI
<i>Euryhapsis cilium</i> Oliver, 1981					+	+		+		HOL
<i>E. fuscipropes</i> Sæther et Wang, 1992							+	+		EPC
<i>E. subviridis</i> (Siebert, 1979)			+		+	+	+	+		PAE
<i>Georthocladius</i> sp.*							+	+		
<i>Gymnometriocnemus brumalis</i> (Edwards, 1929)							+			HOL
<i>G. subnudus</i> (Edwards, 1929)							+			HOL
<i>Heleniella osarumaculata</i> Sasa, 1988***					+		+			ECI
<i>Heterotrissocladius changi</i> Sæther, 1975		2+			+	2+	+	+		HOL
<i>H. ? grimshawi</i> (Edwards, 1929)								+		PAE
<i>H. maeaeri</i> Brundin, 1949		+								HOL
<i>H. marcidus</i> (Walker, 1856)						2+	+	+		HOL
<i>H. subpilosus</i> (Kieffer, 1911)		+	+							HOL
<i>Hydrobaenus biwaquartus</i> Sasa et Kawai, 1987***								+	+	ECI
<i>H. conformis</i> (Holmgren, 1869)		+	+				+	+		HOL
<i>H. fusistylus</i> (Goetghebuer, 1933)	+	+				+	+			HOL
<i>H. kisoecundus</i> (Sasa et Kondo, 1991) ***							+			ECI
<i>H. laticaudus</i> Sæther, 1976**								+		HOL
<i>H. maladistinctus</i> Makarchenko et Makarchenko, 2009								+		EPC
<i>H. monodentatus</i> Makarchenko et Makarchenko, 2005							+			EPC
<i>H. parvacaudatus</i> Makarchenko et Makarchenko, 2009								+		EPC
<i>H. pseudoconformis</i> Makarchenko et Makarchenko, 2009								+		EPC
<i>H. septentrionalis</i> Makarchenko et Makarchenko, 2005		+								EPA
<i>H. sigaensis</i> Makarchenko et Makarchenko, 2009								+		EPC
<i>H. sikhotealinensis</i> Makarchenko et Makarchenko, 2006							+	+		EPC
<i>H. sirikus</i> Makarchenko et Makarchenko, 2005								+		EPC
<i>Krenosmittia borealpina</i> (Goetghebuer, 1944)					+		+	+		HOL

Table 1 Cont'd

Taxa	Vrangl Island	Chukotka	Kamchatka	Kurile Islands	Sakhalin and Moneron Islands	Okhotsk Sea Basin	Japanese Sea Basin	Amur River Basin	Khanka Lake Basin	Type of distribution
1	2	3	4	5	6	7	8	9	10	11
<i>K. halvorseni</i> Cranston et Sæther, 1986		+				+	+	+		HOL
<i>K. toyamaquerea</i> Sasa, 1996***								+		ECI
<i>K. zhiltzovae</i> Makarchenko et Makarchenko, 2006							+			EPC
<i>Limnophyes aagaardi</i> Sæther, 1990		+								PAE
<i>L. ? anderseni</i> Sæther, 1990					+					HOL
<i>L. akannonus</i> Sasa et Kamimura, 1987***				+	+	+	+	+		ECI
<i>L. asquamatus</i> Andersen, 1937		+		+	+	+	+	+		HOL
<i>L. brachytomus</i> (Kieffer, 1922)	+						+			HOL
<i>L. ? cranstoni</i> Sæther, 1990					+		+	+		PAE
<i>L. difficilis</i> Brundin, 1947							+			PAE
<i>L. edwardsi</i> Sæther, 1990				+	+	+	+	+		PAE
<i>L. eltoni</i> (Edwards, 1922)	+					+		+	+	HOL
<i>L. gelasinus</i> Sæther, 1990							+	+		EPC
<i>L. minimus</i> (Meigen 1818)		+		+	+	+	+	+	+	HOL
<i>L. natalensis</i> (Kieffer, 1914)			+	+	+		+	+		HOL
<i>L. okhotensis</i> Makarchenko et Makarchenko, 2003						+				EPC
<i>L. pentaplastus</i> (Kieffer, 1921)				+	+		+	+		HOL
<i>L. pseudopumilio</i> Makarchenko et Makarchenko, 2001	+									EPA
<i>L. pumilio</i> (Holmgren, 1869)	+	+	+	+	+	+	+	+		HOL
<i>L. schmeli</i> Sæther, 1990			+	+						PAE
<i>L. strobilifer</i> Makarchenko et Makarchenko, 2004				+	+			+		ECI
<i>L. tamakitanaides</i> Sasa, 1981***						+				EPI
<i>L. verpus</i> Wang et Sæther, 1993									+	EPC
<i>L. wrangelensis</i> Makarchenko et Makarchenko, 2001	+									EPA
<i>Mesocricotopus thienemanni</i> (Goetghebuer, 1940)		+								HOL
<i>Mesomittia patrihortae</i> Sæther, 1985							+	+		HOL
<i>Metriocnemus amurensis</i> Makarchenko et Makarchenko, 2009					+			+		EPC
<i>M. beringiensis</i> (Cranston et Oliver, 1988)					+					HOL

Table 1 Cont'd

Taxa	Vrangel Island	Chukotka	Kamchatka	Kurile Islands	Sakhalin and Moneron Islands	Okhotsk Sea Basin	Japanese Sea Basin	Amur River Basin	Khanka Lake Basin	Type of distribution
1	2	3	4	5	6	7	8	9	10	11
<i>M. bilobatus</i> Makarchenko et Makarchenko, 2004					+		+			ECI
<i>M. brusti</i> Sæther, 1989		+								HOL
<i>M. caudigus</i> Sæther, 1995							+	+		PAE
<i>M. eurynotus</i> (Holmgren, 1883)	+	+		+	+	+	+	+		HOL
<i>M. fuscipes</i> (Meigen, 1818)		+	+	+	+		+			HOL
<i>M. intergerivus</i> Sæther, 1995	+							+		HOL
<i>M. picipes</i> (Meigen, 1818)				+	+		+	+		HOL
<i>M. rufulus</i> Makarchenko et Makarchenko, 2009					+					EPI
<i>M. ursinus</i> (Holmgren, 1869)	+									HOL
<i>Nanocladius</i> (s.str.) <i>balticus</i> (Palmen, 1959)							+	+		PAE
<i>N.</i> (s.str.) <i>dichromus</i> (Kieffer, 1906)					+					PAE
<i>N.</i> (s.str.) <i>distinctus</i> (Malloch, 1915)					+	+	+	+		HOL
<i>N.</i> (s.str.) <i>minimus</i> Sæther, 1977								+		HOL
<i>N.</i> (s.str.) <i>palpideminutus</i> Makarchenko et Makarchenko, 2001								+	+	EPC
<i>N.</i> (s.str.) <i>pubescens</i> Makarchenko et Makarchenko, 2004					+					EPI
<i>N.</i> (s.str.) <i>spinipennis</i> Sæther, 1977**							+	+		HOL
<i>N.</i> (s.str.) <i>tamabicolor</i> Sasa, 1981***					+		+	+	+	ECI
<i>N. (Plecopteracoluthus) asiaticus</i> Hayashi, 1998***					+					EPI
<i>Ninelia proboscidea</i> (Makarchenko et Makarchenko, 2003)							+			EPC
<i>Orthocladius</i> (<i>Eudactylocadius</i>) <i>dubitatus</i> Johannsen, 1942**					+					HOL
<i>O. (E.) gelidorum</i> (Kieffer, 1923)								+		PAE
<i>O. (E.) gelidus</i> Kieffer, 1922	+									HOL
<i>O. (E.) olivaceus</i> (Kieffer, 1911)			+	2+	2+					HOL
<i>O. (E.) subletteorum</i> Cranston, 1988				2+						HOL
<i>O. (Euorthocladius) abiskoensis</i> Thienemann et Krüger, 1937							+			HOL
<i>O. (E.) insolitus</i> Makarchenko et Makarchenko, 2006	+	+								EPA
<i>O. (E.) kanii</i> (Tokunaga, 1939) ***					+	+	+			ECI
<i>O. (E.) rivicola</i> Kieffer, 1921						+	+	+		HOL

Table 1 Cont'd

Taxa	Vrangel Island	Chukotka	Kamchatka	Kurile Islands	Sakhalin and Moneron Islands	Okhotsk Sea Basin	Japanese Sea Basin	Amur River Basin	Khanka Lake Basin	Type of distribution
1	2	3	4	5	6	7	8	9	10	11
<i>O. (E.) rivulorum</i> Kieffer, 1909						+	+	+		HOL
<i>O. (E.) saxosus</i> (Tokunaga, 1939)					+		+	+		HOL
<i>O. (E.) subbullatus</i> Makarchenko et Makarchenko, 2008							+			EPC
<i>O. (E.) thienemanni</i> Kieffer, 1906							+	+		HOL
<i>O. (Mesorthocladius) frigidus</i> Zetterstedt, 1838)		+	+	+	+	+	+	+	+	HOL
<i>O. (M.) klishkoe</i> Makarchenko et Makarchenko, 2008								+		EPC
<i>O. (M.) lamellatus</i> Sæther, 2005**							+	+		HOL
<i>O. (M.) roussellae</i> Sopenis, 1990**	+	+			?+					HOL
<i>O. (M.) vaillanti</i> Langton et Cranston, 1991							+			PAE
<i>O. (s.str.) appersoni</i> Sopenis, 1977**						+				HOL
<i>O. (s.str.) chuzesectus</i> Sasa, 1984							+	+		ECI
<i>O. (s.str.) cognatus</i> Makarchenko et Makarchenko, 2006		+								EPA
<i>O. (s.str.) defensus</i> Makarchenko et Makarchenko, 2006							+	+		EPC
<i>O. (s.str.) hazenensis</i> Sopenis, 1977**	+									HOL
<i>O. (s.str.) nitidoscutellatus</i> Lundsöm, 1915		?+	?+	?+						HOL
<i>O. (s.str.) linevitshae</i> Makarchenko et Makarchenko, 2008			+							EPC
<i>O. (s.str.) oblidens</i> (Walker, 1856)					+					HOL
<i>O. (s.str.) sakhalinensis</i> Makarchenko et Makarchenko, 2006					+					EPI
<i>O. (s.str.) pedestris</i> Kieffer, 1909							+	+		PAE
<i>O. (s.str.) rubicundus</i> (Meigen, 1818)							+	+		PAE
<i>O. (s.str.) setosus</i> Makarchenko et Makarchenko, 2006					+	+	+	+		ECI
<i>O. (s.str.) yugashimaensis</i> Sasa, 1979***			+				+	+		ECI
<i>O. (Pogonocladius) consobrinus</i> (Holmgren, 1869)	+	+								HOL
<i>O. (Symposiocladius) lignicola</i> Kieffer, 1915			+		?+	+	+			HOL
<i>O. (S.) schnelli</i> Sæther, 2004						+		+		PAE
<i>Parachaetocladius akanoctavus</i> Sasa et Kamimura, 1987***							+			ECI
<i>Paracladius conversus</i> (Walker, 1856)			+				+	+		HOL
<i>P. omolonus</i> Makarchenko et Makarchenko, 2006		+								EPA

Table 1 Cont'd

Taxa	Vrangel Island	Chukotka	Kamchatka	Kurile Islands	Sakhalin and Moneron Islands	Okhotsk Sea Basin	Japanese Sea Basin	Amur River Basin	Khanka Lake Basin	Type of distribution
1	2	3	4	5	6	7	8	9	10	11
<i>P. seutacanus</i> Makarchenko et Makarchenko, 2006		+								EPA
<i>Paracricotopus</i> sp.							+			
<i>P. tamabrevis</i> (Sasa, 1983) ***							+	+		ECI
<i>Parakiefferiella bathophila</i> (Kieffer, 1912)		+		+	+	+		+		HOL
<i>P. bilobata</i> Tuiskunen, 1986								+		PAE
<i>P. coronata</i> (Edwards, 1929)					+		+	+		HOL
<i>P. chuzeundecima</i> (Sasa, 1984) ***								+		ECI
<i>P. rara</i> Makarchenko et Makarchenko, 2007						+	+			EPC
<i>P. scandica</i> Brundin, 1956		+								PAE
<i>P. smolandica</i> (Brundin, 1947)							+	+		PAE
<i>P. triquetra</i> (Pankratova, 1970)*					+	+	+			PTT
<i>P. vshivkova</i> Makarchenko et Makarchenko, 2001								+	+	EPC
<i>Paralimnophyes longiseta</i> (Thienemann, 1921)								+		PAE
<i>Parametriocnemus borealpinus</i> Gouin, 1942						+	+			PAE
<i>P. biappendiculatus</i> Makarchenko et Makarchenko, 2006		+								EPA
<i>P. graminicola</i> (Lundbeck, 1898)								+		HOL
<i>P. kurilensis</i> Makarchenko et Makarchenko, 2006				+			+			ECI
<i>P. stylatus</i> (Kieffer, 1924)					+		+		+	HOL
<i>P. zorinae</i> Makarchenko et Makarchenko, 2009							+			EPC
<i>Parametriocnemus</i> sp.*							+			
<i>Paraphaenocladus exagitans</i> (Johannsen, 1905)								+		HOL
<i>P. impensus</i> (Walker, 1856)				+	+	+		+		HOL
<i>P. kunashiricus</i> Makarchenko et Makarchenko, 2006				+						EPI
<i>P. penerasus</i> (Edwards, 1929)				+	+			+		PAE
<i>P. sonah</i> Makarchenko et Makarchenko, 2007								+		EPC
<i>Parasmittia carinata</i> Strenzke, 1950								+		PAE
<i>Paratrichocladus orientalis</i> Makarchenko et Makarchenko, 2009							+	+		EPC
<i>P. rufiventris</i> (Meigen, 1830)				+	+		+	+		HOL

Table 1 Cont'd

Taxa	Vrangel Island	Chukotka	Kamchatka	Kurile Islands	Sakhalin and Moneron Islands	Okhotsk Sea Basin	Japanese Sea Basin	Amur River Basin	Khanka Lake Basin	Type of distribution
1	2	3	4	5	6	7	8	9	10	11
<i>P. skirwithensis</i> (Edwards, 1929)			+	+		+				HOL
<i>Paratrissocladius excerptus</i> (Walker, 1856)				+						PAE
<i>Parorthocladius nudipennis</i> (Kieffer, 1908)		+			+	?+	+	+		PAE
<i>Platysmittia bilyji</i> Sæther, 1985**								+		HOL
<i>Prosilocerus akamusi</i> (Tokunaga, 1938)								+		ECI
<i>P. amurensis</i> Makarchenko et Makarchenko, 2009								+		EPC
<i>P. paradoxus</i> (Lundström, 1915)								+		PTP
<i>Prosmittia anyuica</i> Makarchenko et Makarchenko, 2009								+		EPC
<i>P. kamiqurta</i> (Sasa et Hirobayashi, 1991) ***				+	+	+				ECI
<i>P. rectangularis</i> Tuiskunen, 1985		+						+		PAE
<i>P. tauiensis</i> Makarchenko et Makarchenko, 2007						+				EPC
<i>Psectrocladius</i> (<i>Allopectrocladius</i>) <i>obvius</i> (Walker, 1956)		+		+	+			?+		HOL
<i>Psectrocladius</i> (s.str.) <i>bisetus</i> Goetghebuer, 1942								+		PAE
<i>P.</i> (s.str.) <i>fennicus</i> Storå, 1939		+		+						HOL
<i>P.</i> (s.str.) <i>sokolovae</i> Zelentsov et Makarchenko, 1988		+								EPA
<i>P.</i> (s.str.) <i>sordidellus</i> (Zetterstedt, 1838)						+	+	?+	+	PAE
<i>P.</i> (s.str.) <i>zelentzovi</i> Makarchenko, 2003					+		+			ECI
<i>P.</i> (s.str.) <i>zetterstedti</i> Brundin, 1949							+	+		HOL
<i>Pseudorthocladius barbatus</i> Makarchenko et Makarchenko, 2006				+			+			ECI
<i>P. curtistylus</i> Goetghebuer, 1921					+			+		HOL
<i>P. fujiqintus</i> (Sasa, 1985) ***							+			ECI
<i>P. rectilobus</i> Sæther et Sublette, 1983**					+					HOL
<i>Pseudosmittia angusta</i> (Edwards, 1929)								+		PAE
<i>P. bothnica</i> (Tuiskunen, 1984)							+	+		PAE
<i>P. brundini</i> Makarchenko et Makarchenko, 2008							+	+		EPC
<i>P. danconai</i> (Marcuzzi, 1947)					+		+	+		PAE
<i>P. forcipata</i> (Goetghebuer, 1921)					+	+	+	+		HOL
<i>P. holsata</i> Thienemann et Strenzke, 1940						+		+		PAE

Table 1 Cont'd

Taxa	Vrangel Island	Chukotka	Kamchatka	Kurile Islands	Sakhalin and Moneron Islands	Okhotsk Sea Basin	Japanese Sea Basin	Amur River Basin	Khanka Lake Basin	Type of distribution
1	2	3	4	5	6	7	8	9	10	11
<i>P. mathildae</i> Albu, 1968							+	+		PAE
<i>P. nanseni</i> (Kieffer, 1926)	+				+		+		+	HOL
<i>P. nishiharaensis</i> Sasa et Okazawa, 1988***							+			ECI
<i>P. oxoniana</i> (Edwards, 1922)	+			+	+	+	+	+		HOL
<i>P. rostriformis</i> Makarchenko et Makarchenko, 2006							+	+		EPC
<i>P. rutneri</i> Strenzke et Thienemann, 1942		+						+		PAE
<i>P. trilobata</i> (Edwards, 1929)					+		+			PAE
<i>Rheocricotopus</i> (s.str.) <i>effusus</i> (Walker, 1956)					+		+	+		HOL
<i>R.</i> (s.str.) <i>eminellus</i> Sæther, 1969**							+			HOL
<i>R.</i> (s.str.) <i>pauciseta</i> Sæther, 1969**				+	+	+				HOL
<i>R.</i> (s.str.) <i>reduncus</i> Sæther et Schnell, 1988	+									PAE
<i>R.</i> (s.str.) <i>tshernovskii</i> Makarchenko et Makarchenko, 2005					+		+	+		ECI
<i>R. (Psilocricotopus) glabricollis</i> (Meigen, 1830)									+	HOL
<i>R. (P.) imperfectus</i> Makarchenko et Makarchenko, 2005					+					EPI
<i>R. (P.) insularis</i> Makarchenko et Makarchenko, 2005				+						EPI
<i>R. (P.) nigrus</i> Wang et Zheng, 1989								+		EPC
<i>R. (P.) nudisquamis</i> Makarchenko et Makarchenko, 2009							+			EPC
<i>Rheosmittia arcuata</i> Coldwell, 1996**								+		HOL
<i>R. languida</i> (Brundin, 1956)		+	+	+			+			PAE
<i>R. spinicornis</i> (Brundin, 1956)						+	+	+		PAE
<i>Sasacricotopus jintusecundus</i> (Sasa, 1990) ***							+			ECI
<i>Smittia admiranda</i> Makarchenko et Makarchenko, 2003							+			EPC
<i>S. akanduodecima</i> Sasa et Kamimura, 1987***				+	+	+		+		ECI
<i>S. aterrima</i> (Meigen, 1818)		+	+	+	+	+	+	+	+	HOL
<i>S. controversa</i> Makarchenko et Makarchenko, 2005						+		+	+	EPC
<i>S. extrema</i> (Holmgren, 1869)	+				+	+	+	+	+	HOL
<i>S. hakusansecunda</i> Sasa et Okazawa, 1994***			+							ECI
<i>S. joganbrevicosta</i> Sasa et Okazawa, 1991***							+	+		ECI

Table 1 Cont'd

Taxa	Vrangel Island	Chukotka	Kamchatka	Kurile Islands	Sakhalin and Moneron Islands	Okhotsk Sea Basin	Japanese Sea Basin	Amur River Basin	Khanka Lake Basin	Type of distribution
1	2	3	4	5	6	7	8	9	10	11
<i>S. leucopogon</i> (Meigen, 1804)							+	+	+	PAE
<i>S. nudipennis</i> Goetghebuer, 1913							+	+		PAE
<i>S. pratorum</i> (Goetghebuer, 1927)				+		+	+	+		HOL
<i>S. rostrata</i> Wang, 1996		+					+	+		EPC
<i>S. vesparum</i> Goetghebuer, 1921 (after Tokunaga 1940)					+					PAE
<i>Stilocladius intermedius</i> Wang, 1998				+	+	+	+	+		ECI
<i>S. orientalis</i> Makarchenko et Makarchenko, 2003							+	+		EPC
<i>Symbiocladius rhitrogenae</i> (Zavtseva, 1924)					+	+	+	+		PIT
<i>Synorthocladius semivirens</i> (Kieffer, 1909)						+	+	+		HOL
<i>Thienemanniella chuzeduodecima</i> Sasa, 1984***				+	+	+	+	+		ECI
<i>T. majuscula</i> (Edwards, 1924)		+		+			+			HOL
<i>T. oyabedilata</i> Sasa, Kawai et Ueno, 1988***					+		?+	+		ECI
<i>T. tiunovae</i> Makarchenko et Makarchenko, 2006					+	+		+		ECI
<i>T. xena</i> (Roback, 1957) **						+	+	+		HOL
<i>Tokunagaia ambigua</i> Makarchenko et Makarchenko, 2007					+		+	+		ECI
<i>T. biconvexa</i> Makarchenko et Makarchenko, 2007				+						EPI
<i>T. chuzenona</i> (Sasa, 1984) ***					+					EPI
<i>T. ikip</i> Makarchenko et Makarchenko, 2007				+						EPI
<i>T. kibunensis</i> (Tokunaga, 1939)	+					?+				ECI
<i>T. oleantoni</i> Makarchenko et Makarchenko, 2007			+			+	+			EPC
<i>T. paraexcellens</i> (Brundin, 1956)		+						+		PAE
<i>T. pseudorowensis</i> Makarchenko et Makarchenko, 2004					+					EPI
<i>T. rectangularis</i> (Goetghebuer, 1940)	+	+	?+					+		PAE
<i>T. rowensis</i> (Sæther, 1969)**							+			HOL
<i>T. scutellata</i> (Brundin, 1956)								+		PAE
<i>Tokunagaia</i> sp.								+		EPC
<i>T. tonollii</i> (Rossaro, 1983)				+						PAE
<i>Trichosmittia hikosana</i> Yamamoto, 1998***								+		EPI

Table 1 Cont'd

Taxa	Vrangel Island	Chukotka	Kamchatka	Kurile Islands	Sakhalin and Moneron Islands	Okhotsk Sea Basin	Japanese Sea Basin	Amur River Basin	Khanka Lake Basin	Type of distribution
1	2	3	4	5	6	7	8	9	10	11
<i>Tsudayusurika fudosecunda</i> Sasa, 1985***							+			ECI
<i>Tvetenia boreomontana</i> Makarchenko et Makarchenko, 2006		+						+		EPC
<i>T. duodenaria</i> Kieffer, 1922					+					HOL
<i>T. tamaflava</i> Sasa, 1981***					+	+	+	+		ECI
<i>T. vitracies</i> (Sæther, 1969) **					+	+	+	+		HOL
<i>Vivacricotopus ablusus</i> Schnell et Sæther, 1988								+		PAE
<i>Vivacricotopus elgandzha</i> Makarchenko et Makarchenko, 2005						+	+	+		EPC
<i>V. piloculus</i> Cranston et Oliver, 1988						+				HOL
<i>Vivacricotopus</i> sp.1 (Makarchenko et Makarchenko 2005)								+		EPC
<i>Zalutschia tatrica</i> (Pagast, 1935)		+								HOL
<i>Z. trigonacies</i> Sæther, 1976		+						+		HOL
<i>Z. zalutschicola</i> Lipina, 1939						+				HOL
<i>Zalutschia</i> sp.						+				
Total: 348 species	28	54	23	57	111	72	181	190	27	

Comments Types of distribution (after Gorodkov 1984): ECI – East Palaearctic Continental Island, EPA – East Palaearctic Arctic, EPC – East Palaearctic Continental, EPI – East Palaearctic Island, HOL – Holarctic, PAA – Palaearctic Arcto-Alpine, PAE – Palaearctic Amphieurasian, PTP – Palaearctic Transpalaearctic, PTT – Palaearctic Temperate; + –present, * – known as larva, ** –first record in Palaearctic region; *** – first record outside of Japan.

Twenty two species had been known only from North America and were newly recorded in the Palaearctic region, 34 species were found outside of Japan for the first time, and 6 species (*Antillocladius scalpellatus*, *Comptosmittia virga*, *Euryhapsis fuscipropes*, *Rheocricotopus* (*P.*) *nigrus*, *Smittia rostrata*, *Stilocladius intermedius*) had been unknown outside of China before (see Table 1).

TABLE 2. Numbers of new species described in Orthoclaadiinae genera

Genus	New species	Genus	New species
<i>Aagaardia</i> Sæther	1	<i>Parakiefferiella</i> Thienemann	2
<i>Boreosmittia</i> Tuiskunen	3	<i>Parametriocnemus</i> Goetghebuer	3
<i>Bryophaenocladus</i> Thienemann	12	<i>Paraphaenocladus</i> Thienemann	2
<i>Chaetocladus</i> Kieffer	11	<i>Paratrichocladus</i> Santos Abreu	1
<i>Corynoneura</i> Winnertz	4	<i>Prosmittia</i> Brundin	2
<i>Cricotopus</i> van der Wulp	6	<i>Psectrocladius</i> Kieffer	2
<i>Doithrix</i> Sæther et Sublette	1	<i>Pseudorthocladus</i> Goetghebuer	1
<i>Eukiefferiella</i> Thienemann	1	<i>Pseudosmittia</i> Edwards	2
<i>Hydrobaenus</i> Fries	8	<i>Rheocricotopus</i> Brundin	4
<i>Krenosmittia</i> Thienemann et Krüger	1	<i>Smittia</i> Holmgren	2
<i>Limnophyes</i> Eaton	4	<i>Stilocladus</i> Rossaro	1
<i>Metriocnemus</i> van der Wulp	3	<i>Thienemanniella</i> Kieffer	1
<i>Nanocladus</i> Kieffer	2	<i>Tokunagaia</i> Sæther	5
<i>Ninelia</i> Makarchenko et Makarchenko	1	<i>Tvetenia</i> Kieffer	1
<i>Orthocladus</i> van der Wulp	8	<i>Propsilocerus</i> Kieffer	1
<i>Paracladius</i> Hirvenoja	2	<i>Vivacricotopus</i> Schnell et Sæther	2
Total: 100 new species in 32 genera			

In the southern part of the Far East, the highest number of species (190) were found in the Amur River basin, in streams and lakes of the Sea of Japan basin (181 species), and on Sakhalin and Moneron Islands (111 species); the lowest species number (57) was recorded from the Kurile Islands. In the northern part of the Far East, the highest number of species (72) was identified for the Okhotsk Sea basin and Chukotka region (54 species), the lowest (23) in Kamchatka. The distribution of species in other areas is shown in Table 1. Naturally, the data in the table still have preliminary character, as extensive territories of the Magadan region, the northern part of Khabarovsk Territory, the upper course of the Amur River, etc., have not been investigated.

Most of the recorded species (63%) are Palaearctic in distribution, 37% are Holarctic. Sixty-one species are amphi-Euroasian in distribution, 63 species East Palaearctic continental, 45 species are distributed in the continental and island parts of the Far East, 25 species are known only from islands. Other types of distribution are rare (see Table 1).

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