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A Review of the Chironomidae (Diptera) from the Kuril Islands, Kamchatka Peninsula and Bordering Territories

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Abstract The species of chironomids (Diptera, Chironomidae) occurring in the Kuril Islands, Kamchatka Peninsula and bordering territories are briefly reviewed. Based on material and the literature, 102 species and larval forms are recorded from the Kuril Islands and 164 species and larval forms from the Kamchatka Peninsula and bordering territories. Lists are given for these regions. There are no previous record of chironomids from the Iturup, Urup, Simushir, Ketoi, Rasshua, Onekotan, Shiashkotan, Paramushir and Shumshu Islands in the Kuril Islands. Taxonomic confusion between the three species of the genus *Pagastia, P. nivis* (Tokunaga), *P. orientalis* (Tshernovskij) and *P. lanceolata* (Tokunaga) is clarified, and a key for separating the male imagines of these species is given. The biogeography of chironomids in the Kuril Islands and Kamchatka is briefly discussed.

Key words: Chironomidae; fauna; taxonomy; Kuril Islands; Kamchatka.

Adults of the family Chironomidae (Nematocera, Diptera) are known as chironomids, midges, non-biting midges or chironomid midges, and the red larvae of some groups are called bloodworms. The larvae live in a wide range of freshwater habitats. Benthic communities of lakes and rivers are dominated by their larvae, in terms of number of species, biomass, or both. They are important in the breakdown of organic material, and as food for fish and aquatic invertebrates. Some species can tolerate severely polluted conditions, whereas others have very special requirements and quickly disappear when their habitats are stressed. Thus chironomid larvae can be used as biological indicators of water quality. Chironomid larvae have polytene chromosomes in the salivary glands and thus are convenient experimental animals for cytology and genetics.

We have studied the taxonomy of Chironomidae of the Kuril Islands since 1976. Prior to our study, the local chironomid fauna had received little attention. A few publications on the larvae were available (Miyadi, 1938; Kluchareva et al., 1969). Recently, the chironomid material from Kunashir Island, South Kuril Islands, collected during an expedition conducted by the staff of the Laboratory of Freshwater Hydrobiology, Institute of Biology and Soil Sciences, Far East Branch of Russian Academy of Sciences, has been studied extensively (Makarchenko, 1980; E. Makarchenko and M. Makarchenko, 1994). A total of 65 species, including one new species, *Syndiamesa mira* (Makarchenko, 1980), were recorded. However, no information on chironomids has been available for other islands of the Kurils.

The first report of chironomids from the Kamchatka Peninsula was published by Edwards (1928), recording 11 species based upon entomological samples collected during the Swedish Kamchatka Expedition 1920–1922. Later, Kurenkov (1967) added 42 taxa and noted that most had been identified from larval material only. Subsequent to Kurenkov (1967), several authors (Levanidov et al., 1978; Chebanova and Nikolaeva, 1981; Makarchenko, 1985) have made new findings in the last 20 years. Recently, Makarchenko et al. (1997) compiled all available data on the taxonomy and biogeography of chironomids from the Kamchatka Peninsula and Koryak Mountain Ridge. They recorded 146 taxa of

adult and larval forms belonging to 65 genera and six subfamilies, including 48 taxa which were recorded from the regions for the first time.

The present paper provides a preliminary review of the chironomid species from the Kuril Islands and Kamchatka Peninsula based on material kept in the collection of the Institute of Biology and Soil Sciences, Far East Branch of the Russian Academy of Sciences, Vladivostok, and on the literature. The material contains that collected during the Biological Expedition to the North Kuril Islands and Kamchatka in 1996–1997 of the Natural History Museum and Institute, Chiba (Japan) and the International Kuril Islands Project (IKIP) 1994–1997. Study of this material is still is in progress, and future research may reveal a more diverse chironomid fauna in the region.

Material examined in this study was collected by E. A. Makarchenko from Kunashir Island in 1976, 1978 (Expeditions of the Institute Biology and Soil Sciences of the Far East Center of Academy of Sciences of the USSR); Paramushir, Shumshu Islands and Kamchatka in 1996–1997 Kamchatka-North Kuril expeditions of Institute and Museum of Natural History, Chiba, Japan); by Drs. I. M. Levanidova, T. S. Vshivkova, L. A. Zhiltsova from Kunashir Islands in 1976, 1978; by Drs. V. Ya. Levanidov, I. M. Levanidova, E. A. Nikolaeva, A. Yu. Semenchenko, T. S. Vshivkova, V. V. Chebanova, V. P. Luferov, E. T. Nikolaeva, A. N. Smetanin, T. N. Travina and T. L. Vvedenskaya from Kamchatka in 1978–1997 (Figs. 1–2).

We have had a good opportunity to examine chironomid material from South Kurils (Zelionyi, Yury, Polonskogo, Kunashir and Iturup Islands), Middle Kurils (Urup, Shimushir, Ketoi, Rasshua, Shiashkotan and Onekotan Islands) and North Kurils (Paramushir and Shumshu Islands) (Fig.1), collected during the IKIP by the following scientists: Drs. T. I. Arefina, Yu. Marusik, V. A. Teslen-

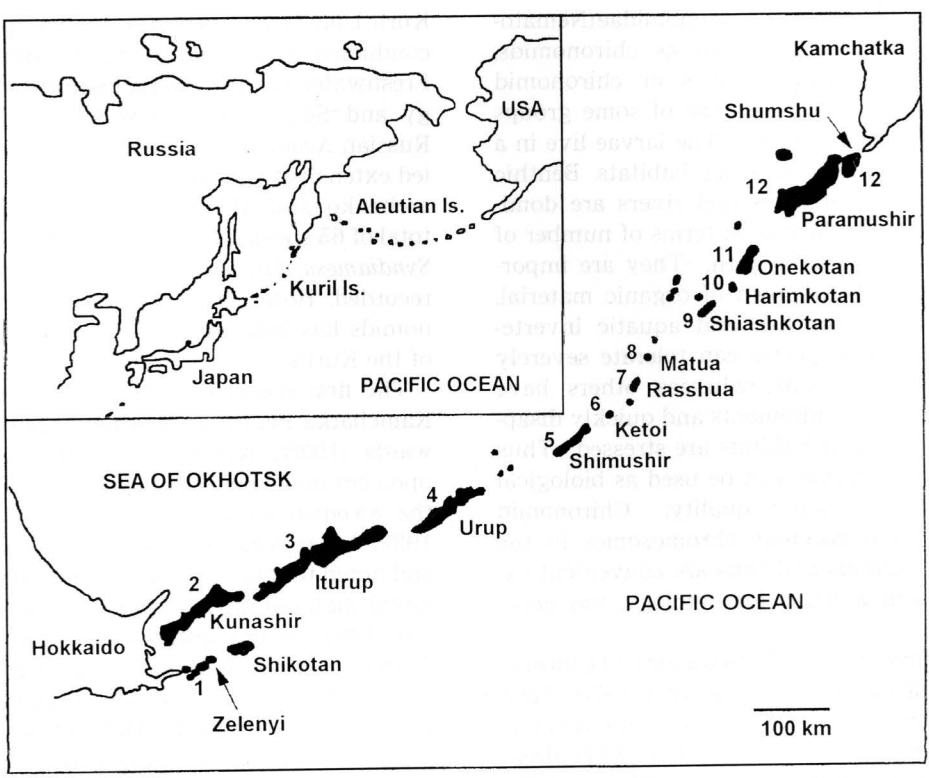

Fig. 1. The Kuril Archipelago. 1, Yury, Polonskogo and Zelionyi Islands; 2, Kunashir Island; 3, Iturup island; 4, Urup Island; 5, Simushir island; 6, Ketoi Island; 7, Rasshua Island; 8, Matua Island; 9, Shiashkotan Island; 10, Kharimkotan island; 11, Onekotan Island; 12, Paramushir and Shumshu Islands

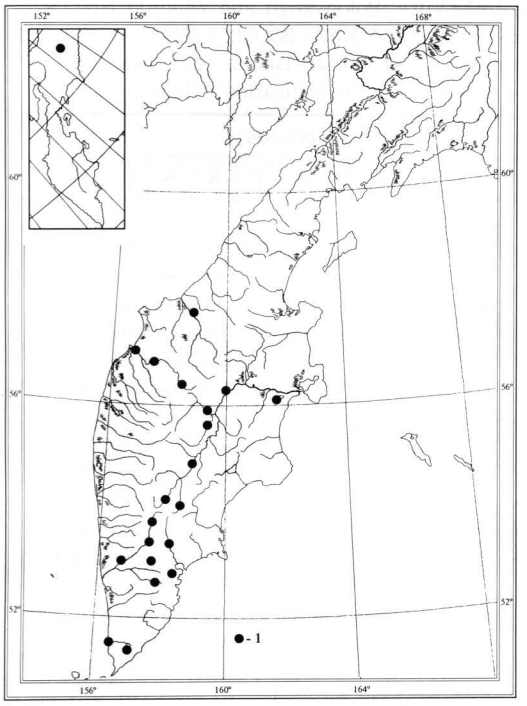

Fig. 2. Map of the Kamchatka Peninsula and Koryak mountain ridge, shoeing sampling locations (solid circles).

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Results and Discussion

1. Species from the Kuril Islands

A total of 102 species of adult and larval forms of chironomids, belonging to 53 genera and five subfamilies, are recorded from the Kuril Islands (Table 1). The largest number of species (64 spp.) occurred on Kunashir Island. Several species from this island have restricted distributions (Table 2). *Macropelopia paranebulosa* (Fittkau) is known from Kunashir, Sakhalin and Honshu Islands (Makarchenko, Petrova, 1988). *Diamesa japonica* Tokunaga occurs on Kunashir, Honshu, Hokkaido Islands and in North America (Makarchenko, 1996). *Syndiamesa mira* (Makarchenko) for a long time was known only from the type locality, the Tyurino River at Sernovodsk village. We believed that this species was endemic to Kunashir Island (Makarchenko, 1980, 1985; Makarchenko E. A., Makarchenko M. A., 1994), but recently it has been recorded from Hokkaido (Endo, 1999).

There is no previous published information on chironomids on other islands of the Kuril Archipelago. The distribution of some species is summarized in Table 2.

An analysis of the geographic distribution of the Chironomidae from the Kuril Islands indicates that the South and Mid Kuril Islands were probably colonized from Honshu and Hokkaido, while the North Kuril Islands were permeated from Kamchatka. Only a few species, e.g., *Diamesa tsutsuii* Tokunaga, *D. alpina* Tokunaga, were distributed from Honshu to Kamchatka.

The present material led us to change our opinion on the distribution of *Pagastia nivis* (Tokunaga) and *Pagastia orientalis* (Tshernovskij). In previous papers we stated that the continental species *P. orientalis* occurs in South Sakhalin and Kunashir (Makarchenko, 1981, 1985). However, after a more detailed study of adult and larval morphology, as well as karyotypes of specimens from continental and island populations we realized that *P. orientalis* lives only on Paramushir and Shumshu Islands, Kamchatka and the mainland from the Altai Mountains to Chukotka. Honshu, Hokkaido, South Sakhalin, Kunashir, Iturup and Urup are inhabited by *Pagastia nivis* (Tokunaga) (Kerkis, 1992; Kerkis et al., 1994; Makarchenko, 1994; Makarchenko et al., 1997).

During this study, it was found that Makarchenko (1994) had confused *P. nivis* (Tokunaga, 1936), *P. angarensis* (Linevich, 1953) and *P. lanceolata* (Tokunaga, 1936). The holotype of *P. lanceolata* was lost, and only female specimens were available to the author. These led Makarchenko (1994) to confuse the three species. After an examination of additional material and discussion with Dr. H. Niitsuma of Shizuoka University, we have been able to establish the specific identities of the three taxa. In order to clarify the taxonomic status of *P. nivis, P. lanceolata* and *P. orientalis*, we give a brief systematic account below. The terminology and abbreviations follow Sæther (1980).

Table 1. List of the Chironomidae of the Kuril Islands. 1, Yury, Polonskogo and Zelionyi Islands; 2, Kunashir Island; 3, Iturup Island; 4, Urup Island; 5, Simushir Island; 6, Ketoi Island; 7, Rasshua Island; 8, Matua Island; 9, Shiashkotan Island; 10, Kharimkotan Island; 11, Onekotan Island; 12, Paramushir and Shumshu Islands; gr, group of species; +, present; —, absent; ? doubtful identification; *, larval taxa.

Taxa	Islands											
	1	2	3	4	5	6	7	8	9	10	11	12
Subfamily Tanypodinae												
1. *Ablabesmyia* gr. *monilis**	—	+	—	—	—	—	—	—	—	—	—	—
2. *Ablabesmyia* sp.*	—	+	+	—	—	—	—	—	—	—	+	+
3. *Apsectrotanypus* sp.*	—	+	—	—	—	—	—	—	—	—	—	—
4. *Clinotanypus* gr. *nervosus**	—	+	—	—	—	—	—	—	—	—	—	—
5. *Macropelopia paranebulosa* (Fittkau)	—	+	—	—	—	—	—	—	—	—	—	—
6. *Meropelopia* sp.*	—	+	—	—	—	—	—	—	—	—	—	—
7. *Procladius choreus* Meigen	—	+	—	+	—	—	—	—	+	+	+	+
8. *Procladius* sp.*	+	+	—	—	—	—	—	—	—	—	—	—
9. *Psectrotanypus* sp.*	—	—	+	—	—	+	+	—	+	—	+	+
10. *Rheopelopia* sp.*	—	+	—	—	—	—	—	—	—	—	—	—
11. *Thienemannimyia* sp.*	+	+	—	—	—	—	—	—	—	—	—	—
12. *Zavrelimyia* sp.*	—	+	—	—	+	—	—	—	—	—	—	—
Subfamily Diamesinae												
13. *Diamesa alpina* Tokunaga	—	+	—	—	—	—	—	—	+	—	+	+
14. *D.* ? *davisi* Edwards	—	—	—	+	+	—	—	—	—	—	—	—
15. *D. gregsoni* Edwards	—	—	+	+	+	+	—	—	—	—	—	—
16. *D. japonica* Tokunaga	—	+	—	—	—	—	—	—	—	—	—	—
17. *D. tsutsuii* Tokunaga	+	+	+	+	+	—	+	—	+	—	+	+
18. *Pagastia lanceolata* (Tokunaga)	—	+	+	—	—	—	—	—	—	—	—	—
19. *P. nivis* (Tokunaga)	—	+	+	+	—	—	—	—	—	—	—	—
20. *P. orientalis* (Tshernovskij)	—	—	—	—	—	—	—	—	—	—	—	+
21. *Protanypus morio* (Zetterstedt)	—	—	—	—	—	—	+	—	—	—	—	—
22. *Pseudodiamesa branickii* (Nowickii)	—	+	+	+	—	—	—	—	—	—	—	—
23. *Syndiamesa mira* (Makartshenko)	—	+	—	—	—	—	—	—	—	—	—	—
24. *S. yosii* Tokunaga	—	—	+	—	—	—	—	—	—	—	—	—
Subfamily Prodiamesinae												
25. *Monodiamesa bathyphila* Kieffer	—	+	—	—	—	—	—	—	—	—	—	—
Subfamily Orthocladiinae												
26. *Brillia flavifrons* (Johannsen)	—	+	+	—	—	—	—	—	—	—	—	—
27. *B. modesta* (Meigen)	—	+	+	+	—	—	—	—	—	—	—	—
28. *Chaetocladius* sp.*	—	—	—	+	+	+	—	—	—	+	—	—
29. *Coryoneura scutellata* Winnertz	—	+	—	—	+	—	+	—	—	—	—	+
30. *Cricotopus* (*C.*) *annulator* Goetghebuer	—	—	—	—	—	—	—	—	—	—	—	+
31. *C. montanus* (Tokunaga)	—	—	—	—	—	—	—	+	—	—	—	—
32. *C.* gr. *tremulus**	—	—	—	+	+	—	—	—	—	—	—	—
33. *C.* gr. *sylvestris**	—	+	—	—	—	—	—	—	—	—	—	—
34. *Cricotopus* (*I.*) sp.*	—	—	—	—	—	—	—	—	—	—	—	+
35. *Epoicocladius flavens* (Malloch)*	—	+	—	—	—	—	—	—	—	—	—	—
36. *Eukiefferiella* gr. *brehmi**	—	+	+	—	+	—	+	—	—	+	+	—
37. *E.* gr. *claripennis**	—	+	+	—	+	—	—	—	+	—	+	—
38. *E.* gr. *coerulescens**	—	+	—	+	—	—	—	—	—	—	—	—
39. *E.* gr. *gracei**	—	+	+	+	+	—	—	—	+	—	+	+
40. *E.* gr. *rectangularis**	—	+	—	+	—	—	—	—	—	—	—	—
41. *Eukiefferiella* sp.*	—	+	—	—	—	—	—	—	—	—	—	—
42. *Heleniella* aff. *ornaticollis* (Edwards)*	—	—	—	+	—	—	—	—	—	—	—	—
43. *Heterotrissocladius* gr. *marcidus**	—	+	—	+	—	—	—	—	—	—	—	—

Table 1. Continued

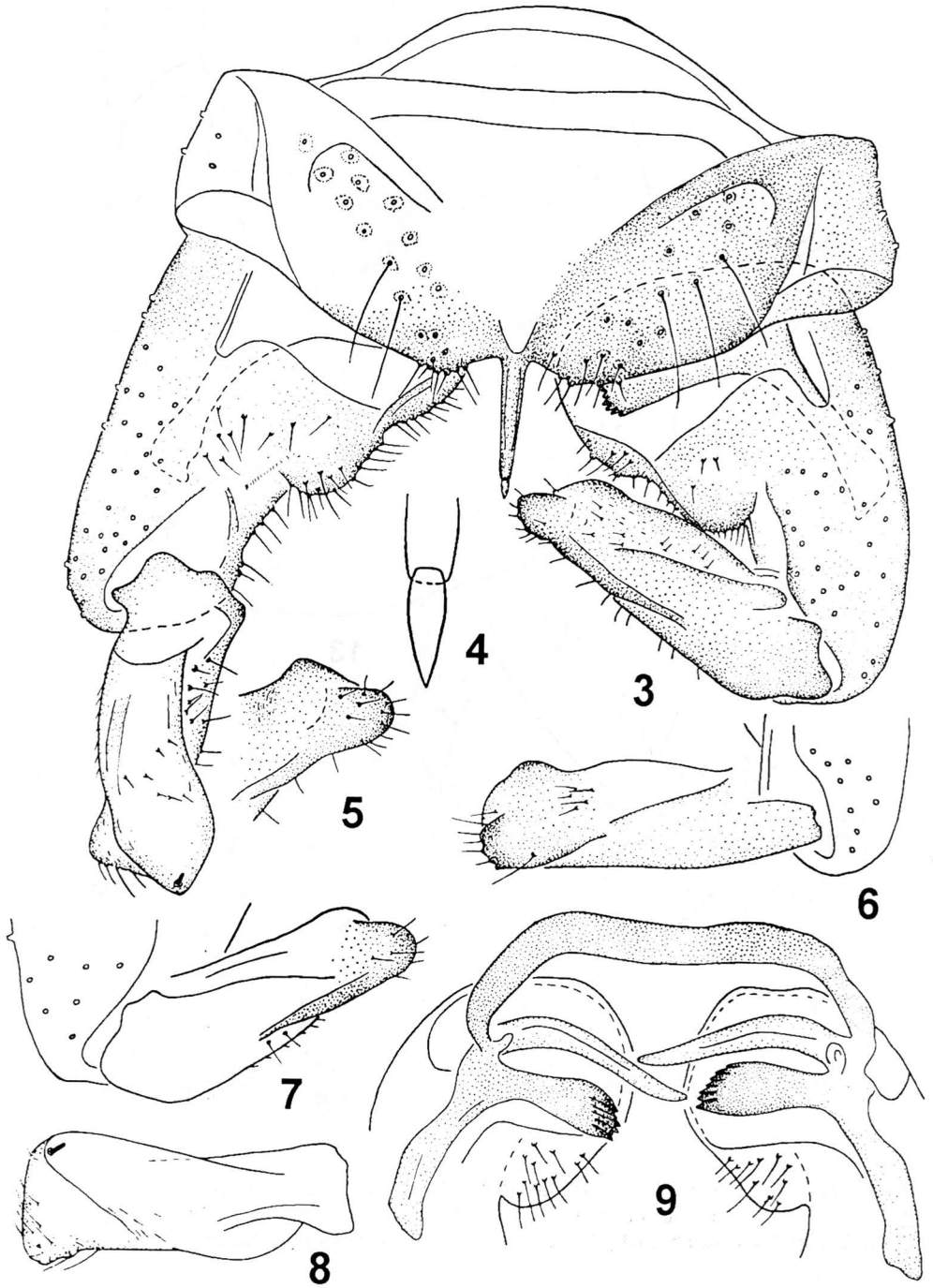
Taxa	Ialands											
	1	2	3	4	5	6	7	8	9	10	11	12
44. *Krenosmittia camptophleps* (Edwards)*	—	+	—	—	—	—	—	—	—	—	—	—
45. *Limnophyes akannonus* Sasa et Kamimura	—	—	—	—	—	+	—	+	—	—	—	+
46. *Metriocnemus* gr. *eurynotus**	—	—	—	+	—	—	—	—	—	—	+	+
47. *M.* gr. *fuscipes**	—	+	—	—	—	—	—	—	—	—	—	—
48. *M. eurynotus* (Holmgren)	—	—	—	—	—	—	—	—	—	—	—	+
49. *Orthocladius* sp. 1*	—	+	+	—	—	—	—	—	—	—	—	—
50. *Orthocladius* sp. 2*	—	+	—	—	—	—	—	—	—	—	—	—
51. *Orthocladius* sp. 3*	—	—	—	—	—	—	—	—	—	—	+	—
52. *O.* (*Euorthocladius*) sp.1*	—	—	+	+	—	—	—	—	—	—	—	+
53. *O.* (*E.*) *saxosus* (Tokunaga)	—	+	+	—	—	—	—	—	—	—	—	—
54. *O.* (*E.*) sp. 4*	—	+	+	—	+	+	—	—	—	—	—	+
55. *O.* (*E.*) sp. 5*	—	—	—	+	—	—	—	—	—	—	—	—
56. *O.* (*Eudactylocladius*) sp. 1*	—	+	+	+	+	+	—	—	—	—	+	+
57. *O.* (*E.*) sp. 2*	—	—	—	—	—	—	—	—	—	—	+	—
58. *O.* (*O.*) *subletti* Soponis	—	—	—	—	—	—	—	—	—	—	—	+
59. *Paracricotopus* sp.*	—	+	—	—	—	—	—	—	—	—	—	—
60. *Parakiefferiella bathophila* (Kieffer)*	—	—	—	—	—	—	—	—	—	—	—	+
61. *Parametriocnemus stylatus* (Kieffer)*	—	+	—	—	—	—	—	—	—	—	—	—
62. *Paraphaenocladius irritus* (Walker)	—	—	—	—	—	—	—	—	—	—	—	+
63. *Parorthocladius* sp.*	—	—	—	—	—	—	—	—	—	—	+	—
64. *Psectrocladius* (*A.*) *obvius* (Walker)*	—	—	—	—	—	—	—	—	—	—	—	+
65. *P.* (*P.*) *simulans* (Johannsen)	—	—	—	+	—	—	—	—	—	—	+	+
66. *P.* (*P.*) *sordidellus* (Zetterstedt)	—	—	—	—	—	—	—	+	—	—	—	—
67. *P.* (*P.*) *delatoris* Zelentsov	—	—	+	—	—	—	—	+	—	+	—	+
68. *P.* (*P.*) gr. *psilopterus**	+	—	—	—	—	—	—	—	—	—	—	—
69. *Psectrocladius* (*P.*) sp.*	—	—	—	—	—	—	—	—	—	—	—	+
70. *Rheocricotopus* sp.*	—	—	—	—	—	—	—	—	+	—	+	+
71. *R.* (*R.*) *eminellobus* (Sæther)	—	+	+	—	—	—	—	—	—	—	—	—
72. *Stilocladius* sp.*	—	+	—	+	—	—	—	—	—	—	—	—
73. *Thienemanniella* gr. *clavicormis**	—	+	—	+	—	—	—	—	—	—	—	—
74. *Tvetenia* gr. *bavarica**	—	+	+	+	—	—	—	—	+	—	+	+
Subfamily Chironominae												
75. *Camptochironomus tentans* (Fabricius)	+	—	—	—	—	—	—	—	—	—	—	—
76. *C. biwaprimus* Sasa et Kawai	+	—	—	—	—	—	—	—	—	—	—	—
77. *Chironomus* spp.*	+	+	+	+	+	+	+	+	+	+	+	+
78. *Cryptochironomus* gr. *defectus**	—	+	—	—	—	—	—	—	—	—	—	+
79. *Cladopelma* gr. *viridula**	—	+	—	—	—	—	—	—	—	—	—	—
80. *Dicrotendipes* gr. *nervosus**	—	+	—	—	—	—	—	—	—	—	—	—
81. *D.* gr. *tritomus**	—	+	—	—	—	—	—	—	—	—	—	—
82. *Dicrotendipes* sp.*	—	—	—	—	—	—	—	—	—	+	—	—
83. *Einfeldia* gr. *carbonaria**	—	+	—	—	—	—	—	—	—	—	—	—
84. *Endochironomus* sp.*	—	—	—	—	—	—	—	—	—	—	+	—
85.*Glyptotendipes glaucus* (Meigen)	—	—	+	—	—	—	—	—	—	—	—	—
86. *G.* gr. *gripekoveni**	+	+	—	—	—	—	—	—	—	—	—	—
87. *Glyptotendipes* sp.*	—	—	—	+	—	—	—	—	—	—	—	—
88. *Micropsectra* sp.*	—	+	+	+	+	—	—	—	+	+	+	—
89. *Paratanytarsus* sp.*	—	—	—	—	—	—	—	—	—	+	—	—
90. *Paratendipes albimanus* (Meigen)*	—	+	—	—	—	—	—	—	—	—	—	—
91. *Phaenopsectra* sp.*	—	—	—	—	—	—	—	—	—	—	+	—
92. *Pentapedilum* ? *sordens* (van der Wulp)*	—	—	+	—	—	—	—	—	—	—	—	—
93. *Polypedilum convictum* (Walker)*	+	+	+	+	—	—	—	—	—	—	—	+

Table 1. Continued

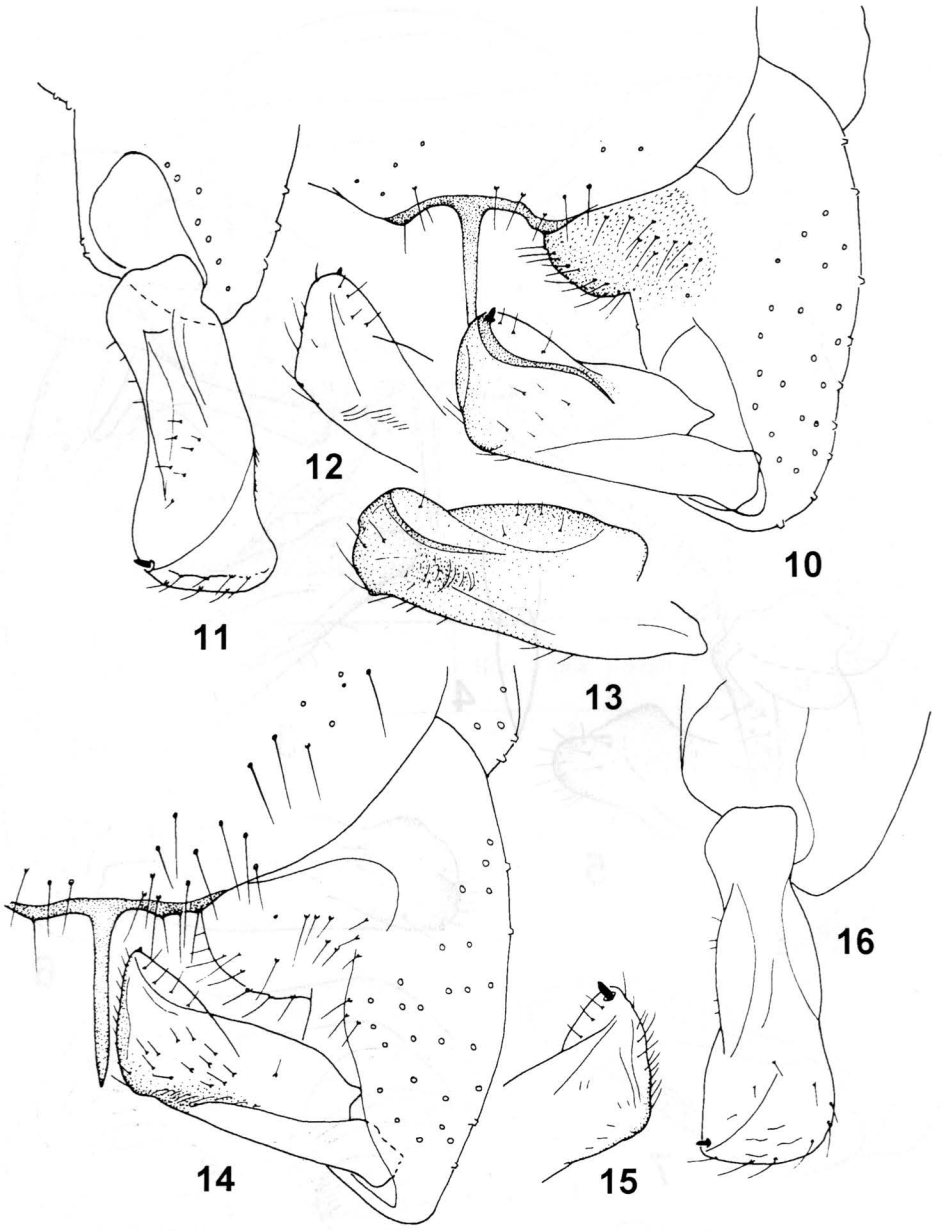
Taxa	Ialands											
	1	2	3	4	5	6	7	8	9	10	11	12
94. *P.* gr. *nubeculosum**	—	+	—	—	—	—	—	—	—	—	—	—
95. *Polypedilum* sp. (gen. N 3) Lipina	—	+	—	—	—	—	—	—	—	—	—	—
96. *P. scalaenum* (Schrank)*	—	+	—	—	—	—	—	—	—	—	—	—
97. *P. bicrenatum* Kieffer*	—	+	—	—	—	—	—	—	—	—	—	—
98. *Rheotanytarsus* sp.*	+	+	—	—	—	—	—	—	—	—	—	—
99. *Stictochironomus* sp.*	—	+	—	—	+	—	—	—	—	—	—	—
100. *Tanytarsus* gr. *bathophilus**	—	+	+	—	—	—	—	—	—	—	—	—
101. *T.* gr. *gregarius**	—	+	—	—	—	—	—	—	—	—	—	—
102. *Tanytarsus* sp.*	—	—	—	—	—	+	—	+	—	—	+	—
Number of species	**9**	**64**	**26**	**26**	**15**	**8**	**6**	**5**	**10**	**8**	**21**	**28**

Table 2. Distribution of some chironomid species of Kuril Islands, Kamchatka and bordering territories. Hon, Honshu; Hok, Hokkaido; Sakh, Sakhalin; Kam, Kamchatka; S, South; M, Mid; N, North. Other abbreviations as in Table 1.

Taxa	Hon	Hok	Sakh	Kurils			Kam
				S	M	N	
1. *Macropelopia paranebulosa* (Fittkau)	+	?	+	+	—	—	—
2. *Diamesa alpina* Tokunaga	+	+	—	+	+	+	+
3. *D. davisi* Edwards	—	—	—	—	+	—	+
4. *D. japonica* Tokunaga	+	+	—	+	—	—	—
5. *D. gregsoni* Edwards	—	—	—	+	+	—	+
6. *D. tsutsuii* Tokunaga	+	+	+	+	+	+	+
7. *Pagastia lanceolata* (Tokunaga)	+	+	+	+	—	—	—
8. *P. nivis* (Tokunaga)	+	+	+	+	+	—	—
9. *P. orientalis* (Tshernovskij)	—	—	—	—	—	+	+
10. *Pseudodiamesa branickii* (Nowickii)	+	+	+	+	+	—	+
11. *Syndiamesa mira* (Makartshenko)	—	+	—	+	—	—	—
12. *S. yosii* Tokunaga	—	+	—	+	—	—	—
13. *Brillia flavifrons* (Johannsen)	—	—	+	+	—	—	+
14. *B. modesta* (Meigen)	+	+	+	+	+	—	—
15. *Corynoneura scutellata* Winner	—	—	+	—	+	+	+
16. *Chaetocladius* sp.	—	—	—	—	+	—	+
17. *Heleniella ornaticollis* (Edwards)*	—	—	—	—	+	—	—
18. *Krenosmittia camptophleps* (Edwards)*	—	—	+	+	—	—	—
19. *Limnophyes akannonus* Sasa et Kamimura	—	+	—	—	+	+	—
20. *Orthocladius subletti* Soponis	—	—	—	—	—	+	—
21. *Parakiefferiella bathophila* (Kieffer)*	+	—	—	—	—	+	—
22. *Parametriocnemus irritus* (Walker)	—	—	—	—	—	+	—
23. *Protanypus morio* (Zetterstedt)	+?	—	—	—	+	—	—
24. *Psectrocladius delatoris* Zelentzov	—	—	—	+	+	+	—
25. *P. obvius* (Walker)*	—	—	—	—	—	+	—
26. *Rheocricotopus eminellobus* (Sæther)	—	—	—	+	—	—	—
27. *Camptochironomus tentans* Fabricius	—	—	—	+	—	—	—
28. *C. biwaprimus* Sasa et Kawai	+	—	—	+	—	—	—



Figs. 3–9. *Pagastia nivis* (Tokunaga, 1936). Fig. 3, hypopygium; Fig. 4, distal part of anal point; Figs. 5–8, gonostylus: Fig. 9, basal part of hypopygium, terdite IX omitted. Figs. 3, 4, specimen from Honshu (Kibune Stream, Kyoto); Fig. 5, specimen from Hokkaido (stream of Hokkaido Fish Hatchery, Eniwa); Fig. 6, specimen from Honsu (Toyamazawa River, Nikko National Park); Fig. 7, specimen from Sakhalin (Belaya River, Dolinsk region); Fig. 8, specimen from Kunashir Island (Andreevka River, Sernovodsk Village); Fig. 9, specimen from Sakhalin Island (Belaya River).



Figs. 10–16. *Pagastia orientalis* (Tshernovskij, 1949). Fig. 10, 14, entire hypopygium; Figs. 11–13, 15,–16, gonostylus. Figs. 10–13, specimens from Kamchatka (Paratunka River); Figs. 14, 15, specimen from Amur River basin (Teploy Lake, Khabarovky Territory); Figs. 16, specimen from North Sakhalin (Tym River).

***Pagastia nivis* (Tokunaga, 1936)**

Sydiamesa (*Lasiodiamesa*) *nivis* Tokunaga, 1936: 535; 1937: 44; 1964: 21.
Pagastia nivis: Hashimoto, 1985: 347, fig. 10.
Pseudodiamesa (*Pagastia*) *orientalis insularis* Makarchenko, 1989: 268.
Pagastia lanceolata: Makarchenko, 1994: 825.

Material examined. See Makarchenko (1994).

Additional material. Kuril Islands: 2 males, environs of Tokotan Lake, Otkrytaya Bay, Urup Island, 4. VIII. 1995 (leg. O. Pontus); 3

larvae, Bystraya River, Novo-Kurilskyi Bay, Urup Island, 8. VIII. 1995 (leg. O. Pontus); 8 larvae, same river, Urup Island, 24. VIII. 1995 (leg. V. Teslenko).

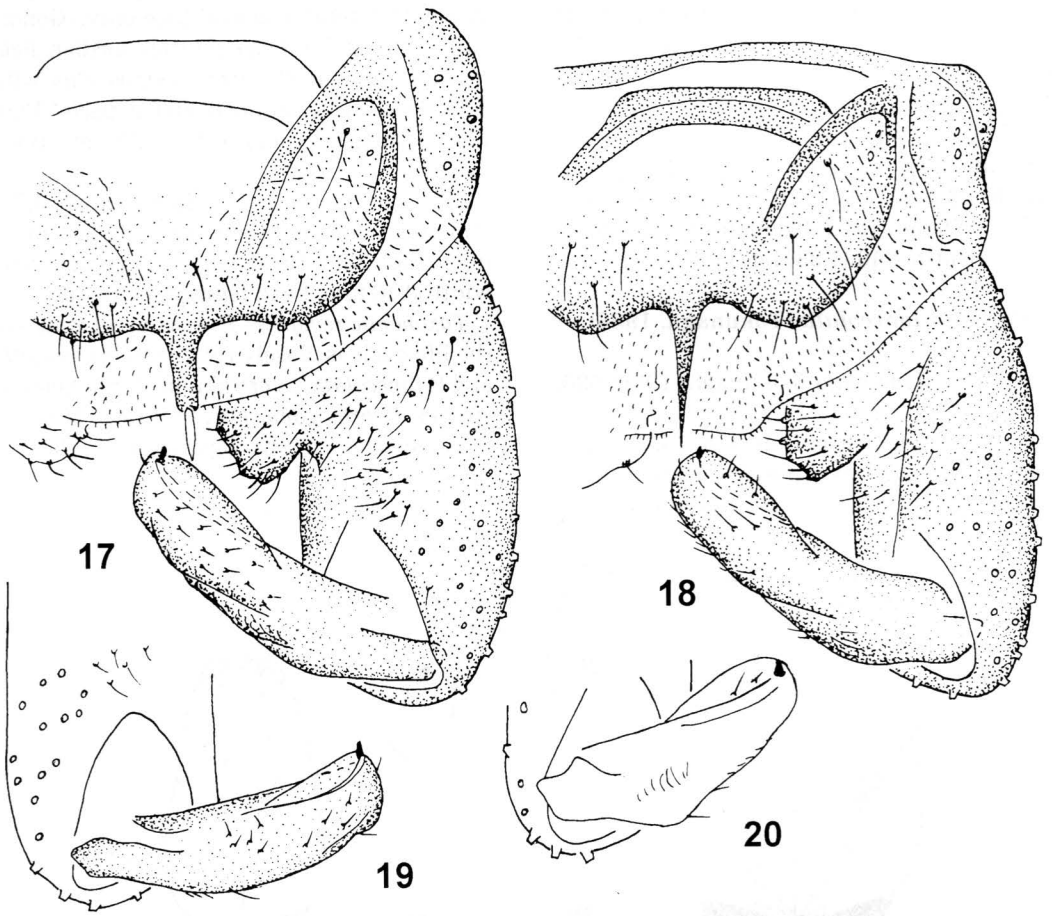
Description. Male hypopygium (n=10) (Figs. 3–9). Anal point narrow, with apical peg (Fig. 4), 118–144 μm long. Phallapodeme with median and lateral aedeagal lobes (Fig. 9). Median aedeagal lobe length 256–262 μm, apex digitated; lateral aedeagal lobe length 131–147 μm. Tergite IX with 18–33 (35–141 μm long) setae, laterosternite IX with 18–29 setae. Basal plate and lobe-like median field of gonocoxite with numerous setae. Gonostylus costated, subapically with "heel" (height 15 μm) (Figs. 5–7), megaseta length 19 μm. Gonostylus length/width: 2.87–3.30. HR =1.3–1.5.

Fourth instar larva. Body length 11.2 mm (10.2–12.0 mm) (n=12). Head capsule with dorsal and dorsolateral dark markings (Fig. 21). Head length 1.06 mm (1.0–1.1 mm) (n=12); head width 0.75 mm (0.70–0.80 mm) (n=12); head length/width 1.40 (1.33–1.47).

Pagastia orientalis (Tshernovskij, 1949)

Syndiamesa orientalis Tshernovskij, 1949: 99; Linevich, 1959: 21; Pankratova, 1970: 72; Makarchenko, 1977: 118.

Pagastia orientalis: Makarchenko, 1981: 93; 1985: 46; Linevich and Makarchenko, 1989: 21.



Figs. 17–20. *Pagastia lanceolata* (Tokunaga, 1936). Figs. 17, 18, entire hypopygium; Figs. 19, 20, gonostylis. Figs. 17, 18, specimens from Honshu (Ikawa, Shizuoka City); Fig. 19, specimen from Baikal Lake basin (Angara River); Fig. 20, specimen from Primorye Territory of Russia (Yasnaya River, Sikhote-Alin Preserve).

Material examined. See Makarchenko (1981).

Additional material. Kuril Islands: 28 larvae, 1 mature pupa, Utesnaya River, Paramushir Island, 13. VII. 1997 (leg. E. Makarchenko); 4 larvae, Shelehova River, Paramushir Island, 16. VII. 1997 (leg. Makarchenko); 8 larvae, stream near Betobe Lake, Shumshu Island, 23. VII. 1997 (leg. E. Makarchenko).

Description. Male hypopygium (n=4) (Figs. 10–16). Anal point long and thin, with pointed apex, without apical peg (Fig. 14). Phallapodeme with median and lateral aedeagal lobes. Median aedeagal lobe digitated in distal part. Tergite IX with 22–27 setae, laterosternite IX with 16–24 setae. Basal plate and lobe-like median field of gonocoxite with numerous setae. Gonostylus costated, subapical without "heel" (Figs. 11–16), megaseta length 10–18 μm. Gonostylus length/width: 2.87–3.3. HR=1.4–1.7.

Fourth instar larva. Body length 10.8 mm (7.3–12.0 mm) (n=18). Head capsule yellow, without dark markings (Fig. 22). Head length 1.1 mm (1.10–1.25 mm) (n=18); head width 0.76 mm (0.51–0.85 mm)(n=18); head length/width 1.40 (1.33–1.47).

Pagastia lanceolata (Tokunaga, 1936)

Syndiamesa lanceolata Tokunaga, 1936: 530, 1937: 47.
Syndiamesa angarensis Linevich, 1953: 162.
Potthastia angarensis: Linevich, 1984: 127.
Pagastia lanceolata: Hashimoto, 1985: 347, fig. 10.
Pseudodiamesa (*Pagastia*) *oliveri* Makarchenko, 1989: 270.
Pagastia angarensis: Makarchenko, 1994: 832.

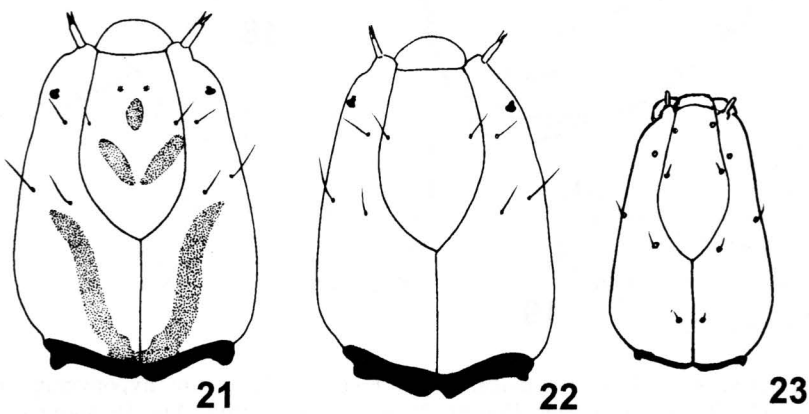
Material examined. See Makarchenko (1994).

Additional material. Japan: 7 males, 3 females, Ikawa, Shizuoka City, Japan, 15. IX. 1996–5. I. 1997 (leg. H. Niitsuma). All adult were raised from larvae and pupae by Dr. H. Niitsuma.

Description. Male hypopygium (Figs. 17–20). Anal point wide in basal part and thin, lanceolate apically, usually without peg, but rarely with apical peg (Fig. 17), length 86.4 μm. Tergite IX with 10–17 setae (28–77 mm), laterosternite IX with 9–11 setae. Phallapodeme with lateral aedeagal lobe only. Gonocoxite typical for *Pagastia*, but median field smaller than in *P. nivis*. Gonostylus with wide basal and rounded apical parts (Figs. 17–20), megaseta length 9.6–12.8 μm. HR=1.5.

Larva of fourth instar. Body length 4.5–8 mm. Head capsule yellow, without dark mark ings (Fig. 23). Head length 0.59 mm, head width 0.36 mm; head length/width 1.6.

Taxonomic remarks. P. nivis at all stages of the life cycle is closely related to *P. orientalis*, and *P. lanceolata* is very similar to the Nearctic species *P. orthogonia* Oliver, 1959. Males of these species can be separated by the key below.



Figs. 21–23. Larval head capsules. Fig. 21, *Pagastia nivis* (Tokunaga, 1936); Fig. 22, *Pagastia orientalis* (Tshernovskij, 1949); *Pagastia lanceolata* (Tokunaga, 1936).

Table 3. List of the Chironomidae of the Kamchatka Peninsula and Koryak mountain ridge. 1, Kurilskoe Lake basin; 2, Karymaisky Brook basin; 3, Dalnee Lake basin; 4, Kirpichnaja River; 5, northwest coast; 6, Kamchatka River basin; 7, northeast part of Koryak mountain ridge (Khatyrka and Velikaya River basin). Other abbreviations as in Table 1.

Taxa	Regions of Kamchatka						
	1	2	3	4	5	6	7
Subfamily Podonominae							
1. *Trichotanypus arctoalpinus* Makartshenko	—	—	—	—	—	—	+
2. *T. posticalis* (Lundbeck)	—	—	—	—	—	—	+
Subfamily Tanypodinae							
3. *Ablabesmyia* gr. *lentiginosa**	—	+	—	+	—	+	—
4. *Procladius ferrugineus* Kieffer	—	—	+	—	—	+	+
5. *Rheopelopia* sp.*	—	—	—	—	+	—	—
6. *Thienemannimyia geijeskesi* (Goetghebuer)	—	—	+	—	—	—	—
Subfamily Diamesinae							
7. *Diamesa alpina* Tokunaga	+	—	+	+	—	+	+
8. *D. amplexivirilia* Hansen	—	—	—	—	—	—	+
9. *D. davisi* Edwards	?	—	—	—	—	—	+
10. *D. gregsoni* Edwards	+	—	—	—	+	+	+
11. *D. insignipes* Kieffer	+	—	—	—	—	—	—
12. *D. leona* Roback	+	—	+	—	—	+	+
13. *D. steinboeki* Goetghebuer	—	—	—	—	—	—	+
14. *D. tsutsuii* Tokunaga	+	+	+	+	+	+	+
15. *D. zernyi* Edwards	—	+	+	—	—	+	+
16. *Pagastia orientalis* (Tshernovskij)	+	+	+	+	+	+	+
17. *Potthastia gaedii* (Meigen)	—	—	+	—	—	—	+
18. *P. longimana* Kieffer	+	+	+	—	+	—	—
19. *Protanypus caudatus* Edwards	—	+	—	—	—	—	—
20. *Protanypus* sp.*	—	—	+	—	—	—	—
21. *Pseudodiamesa branickii* (Nowickii)	+	—	—	—	—	+	+
22. *P. nivosa* Goetghebuer	+	+	+	—	+	+	—
23. *Pseudokiefferiella parva* Edwards	—	—	—	—	—	—	+
24. *Pseudokiefferiella* sp.*	—	—	—	—	—	—	+
Subfamily Prodiamesinae							
25. *Monodiamesa* gr. *bathyphila**	—	—	—	—	+	—	—
26. *Prodiamesa olivacea* Meigen	+	—	—	—	—	—	+
27. *Odontomesa fulva* Kieffer	+	+	—	—	—	—	—
Subfamily Orthocladiinae							
28. *Abiskomyia virgo* Edwards	—	+	—	—	—	—	+
29. *Brillia flavifrons* Johannsen	—	—	+	—	—	+	+
30. *B. pallida* Sprck*	—	+	+	—	—	—	—
31. *Bryophenocladius subvernalis* (Edwards)	—	—	—	—	—	—	+
32. *Chaetocladius piger* Goetghebuer	—	—	+	—	—	—	—
33. *Chaetocladius* sp.*	+	—	—	—	—	+	—
34. *C.* sp. 1*	—	—	—	—	—	—	+
35. *C.* sp. 2*	—	—	—	—	—	—	+
36. *Cricotopus* gr. *algarum**	+	+	+	—	—	—	—
37. *C. biformis* Edwards	—	—	+	—	—	—	—
38. *C. maritimus* Tshernovskij*	—	—	+	—	—	—	—
39. *C. sylvestris* (Fabricius)	—	+	+	+	—	+	+

Table 3. Continued

Taxa	Regions of Kamchatka						
	1	2	3	4	5	6	7
40. *Cricotopus* sp.*	—	—	+	—	—	—	—
41. *C. trifascia* Edwards	—	—	+	—	—	—	—
42. *C.* (*Nostococladius*) sp.*	+	—	—	—	+	—	—
43. *Corynoneura* gr. *scutellata**	+	—	—	—	—	+	—
44. *Corynoneura* sp.*	—	—	—	+	—	—	+
45. *Diplocladius cultriger* Kieffer	+	+	—	+	—	+	+
46. *Eukiefferiella* gr. *brehmi**	+	—	—	—	—	—	+
47. *E.* gr. *claripennis**	+	—	—	—	+	—	+
48. *E.* gr. *cyanea**	—	—	—	—	+	—	—
49. *E.* gr. *gracei**	+	—	—	—	+	—	—
50. *Eukiefferiella* sp.*	+	+	+	—	—	+	—
51. *Euryhapsis subviridis* (Siebert)	+	—	—	—	—	—	—
52. *Heterotrissocladius* gr. *marcidus**	+	+	—	—	—	+	+
53. *H. subpilosus* Kieffer	+	—	—	—	—	—	—
54. *Hydrobaenus fusistylus* (Goetghebuer)	—	—	—	—	—	—	+
55. *H.* gr. *lapponicus**	+	—	—	—	—	—	+
56. *H.* aff. *lugubris* Fries	+	—	+	—	—	—	—
57. *H.* ? *lunzensis* (Gouin)	—	—	—	—	—	+	—
58. *H.* gr. *pilipes**	—	—	—	—	—	—	+
59. *H. spinatis* Sæther	—	—	—	—	—	+	—
60. *Limnophyes brachytomus* (Kieffer)	—	—	—	—	—	—	+
61. *L. aagaardi* Sæther	—	—	—	—	—	—	+
62. *L. natalensis* (Kieffer)	—	—	—	—	—	+	—
63. *L. pumilio* (Holmgren)	—	—	—	—	—	—	+
64. *Limnophyes* sp.	+	+	—	+	—	+	—
65. *L. schnelli* Sæther	+	—	—	—	—	—	—
66. *Metriocnemus albolineatus* Meigen	—	—	—	—	—	+	—
67. *Nanocladius bicolor* (Edwards)*	—	+	+	—	—	—	—
68. *Oliveridia* sp.*	—	—	—	—	—	—	+
69. *Orthocladius rivicola* Kieffer	+	—	—	—	—	—	—
70. *O.* (*Eudactylocladius*) *olivaceus* (Kieffer)	+	—	+	+	—	—	—
71. *O.* (*E.*) sp. 2*	—	—	—	—	—	—	+
72. *O.* (*Euorthocladius*) *rivulorum* Kieffer	—	—	—	+	—	—	—
73. *O.* (*E.*) *saxosus* (Tokunaga)	+	+	—	—	+	+	+
74. *O.* (*E.*) aff. *thienemanni* Kieffer	+	—	—	—	—	—	—
75. *O.* (*E.*) sp. 1*	+	—	—	—	+	—	+
76. *O.* (*E.*) sp. 3*	—	—	—	—	+	—	—
77. *O.* (*E.*) sp. 5*	+	—	—	—	—	—	—
78. *O.* (*E.*) sp. 6*	—	—	—	—	—	—	+
79. *O.* (*Orthocladius*) *obumbratus* Johannsen	+	—	—	—	—	—	+
80. *O.* (*O.*) *frigidus* (Zetterstedt)	+	—	—	—	+	—	—
81. *O.* (*O.*) *saxicola* Kieffer	+	—	+	—	—	+	—
82. *O.* (*O.*) *trigonolabis* Edwards	+	—	—	—	+	—	+
83. *O.* (*O.*) sp. 5*	—	—	—	—	—	—	+
84. *O.* (*O.*) sp. 6*	—	—	—	—	+	—	+
85. *O.* (*O.*) sp. 7*	—	—	—	—	+	—	+
86. *O.* (*O.*) sp. 8*	—	—	—	—	—	—	+
87. *O.* (*O.*) sp. 9*	—	—	—	—	+	—	—
88. *O.* (*Pogonocladius*) *consobrinus* (Holmgren)	—	—	—	—	—	—	+
89. *Paracladius conversus* (Walker)	+	—	—	—	—	—	—
90. ? *Parakiefferiella* sp.*	+	—	—	—	—	—	—
91. *Paraphenocladius* sp.*	+	—	—	—	—	—	—

Table 3. Continued

Taxa	Regions of Kamchatka						
	1	2	3	4	5	6	7
92. *Paratrichocladius skirwithensis* Edwards	+	—	—	—	—	—	—
93. *P. inaequalis* Kieffer	—	—	+	—	—	—	—
94. *Parorthocladius* sp.*	+	—	—	—	—	—	+
95. *Psectrocladius* gr. *dilatatus**	—	—	+	—	—	+	—
96. *P. ischimicus* Tshernovskij*	—	—	+	—	—	—	—
97. *P.* gr. *psilopterus**	+	—	+	+	—	+	—
98. *P. simulans* Johannsen	—	+	—	+	—	—	—
99. *Pseudosmittia* aff. *gracilis* (Goetghebuer)	+	—	—	—	—	—	—
100. *Rheocricotopus* (*R.*) *effusus* (Walker)	+	—	—	—	—	—	+
101. *Rheocricotopus* sp.*	+	—	—	—	+	+	—
102. *Rheosmittia languida* (Brundin)	+	—	—	—	—	—	+
103. *Smittia* gr. *aquatilis**	+	—	—	—	—	—	—
104. *Smittia aterrima* (Meigen)	+	—	—	—	—	—	—
105. *S. hakusansecunda* Sasa et Okazawa	+	—	—	—	—	—	—
106. *Stilocladius* sp.*	+	—	—	—	—	—	—
107. *Symposiocladius lignicola* (Kieffer)*	—	+	—	—	—	—	—
108. *Synorthocladius semivirens* Kieffer*	—	+	—	—	—	+	—
109. *Thienemanniella* sp.*	+	—	—	—	—	—	—
110. *T.* gr. *clavicornis**	—	+	—	—	+	+	+
111. *Tokunagaia obriaini* (Hayes et Murray)	+	—	—	—	—	—	—
112. *Trissocladius* aff. *brevipalpis* Kieffer*	+	—	—	—	—	—	—
113. *Trissocladius* sp.*	+	—	—	—	—	—	—
114. *Tvetenia* gr. *discoloripes**	—	—	—	—	+	—	—
115. *T.* gr. *bavarica**	+	—	—	—	+	—	+
116. *Zalutschia furcarca* Sæther	—	—	—	—	—	—	+
117. *Zalutschia* aff. *mucronata* (Brundin)	+	+	+	—	—	—	—
118. *Zalutschia paratatrica* (Tshernovskij)	—	—	+	—	—	—	—
119. *Z. tatrica* (Pagast)	—	—	+	—	—	—	—
120. *Z. zalutschicola* Lipina	—	+	—	—	—	—	+
Subfamily Chironominae							
Tribe Tanytarsini							
121. *Cladotanytarsus* sp.*	—	—	+	—	—	—	—
122. *Corynocera ambiqua* Zetterstedt	—	—	+	—	—	—	—
123. *Lauterbornia* sp.*	—	+	—	—	—	+	—
124. *Micropsectra* gr. *praecox*	+	+	+	+	—	+	+
125. *Neozavrelia* sp.*	+	—	—	—	—	—	—
126. *Paratanytasus lauterborni* (Kieffer)*	—	—	+	—	—	—	—
127. *P.* ? *baicalensis* (Tshernovskij)*	—	—	+	—	—	—	—
128. *Paratanytarsus* sp.*	—	—	+	—	—	—	+
129. *Rheotanytarsus* sp.*	—	—	—	—	+	—	+
130. *Tanytarsus arduennensis* Goetghebuer	—	—	+	—	—	—	—
131. *T.* gr. *gregarius**	+	—	—	—	—	—	—
132. *T. holochlorus* Edwards	—	—	+	—	—	—	—
133. *T. pallidicornis* (Walker)*	—	—	+	—	—	—	—
134. *T. verralli* Goetghebuer*	—	—	+	—	—	?	—
135. *Tanytarsus* sp.*	+	+	+	—	—	+	+
136. *Zavrelia pentatoma* Kieffer*	—	—	+	—	—	—	—
Tribe Chironomini							
137. *Camptochironomus pallidivittatus* (Malloch)	—	—	—	—	—	+	—
138. *Camptochironomus* sp.	—	—	+	—	—	—	—

Table 3. Continued

Taxa	Regions of Kamchatka						
	1	2	3	4	5	6	7
139. *Chironomus annularius* Meigen*	—	—	+	—	—	—	—
140. *C.* gr. *plumosus**	—	+	—	—	—	+	—
141. *C. solitus* Linevich et Erbaeva	—	—	+	+	—	—	—
142. *Chironomus* sp.	—	—	+	—	—	+	+
143. *Cryptochironomus* gr. *defectus*	—	—	+	—	—	+	—
144. *C. redekei* (Kruseman)	—	—	—	—	—	+	—
145. *Cryptochironomus* sp.*	—	+	+	—	—	—	—
146. *Demicryptochironomus vulneratus* (Zetterstedt)*	—	—	—	—	+	—	—
147. *Dicrotendipes modestus* (Say)*	—	—	+	—	—	—	—
148. *D. nervosus* (Staeger)*	—	—	+	—	—	+	—
149. *D. tritomus* (Kieffer)*	—	—	+	—	—	—	—
150. *Endochironomus albipennis* (Meigen)*	—	—	+	—	—	—	—
151. *E. tendens* (Fabricius)*	—	—	+	—	—	—	—
152. *Kiefferulus tendipediformis* Goetghebuer	—	—	+	—	—	—	—
153. *Parachironomus arcuatus* Goetghebuer	—	—	+	—	—	—	—
154. *Parachironomus* sp.*	—	—	+	—	—	—	—
155. *Paracladopelma camptolabis* (Kieffer)*	—	—	—	—	+	—	—
156. *Polypedilum* gr. *convictum**	+	+	+	—	—	+	—
157. *P. scalaenum* (Schrank)*	—	—	—	—	+	—	—
158. *P. pedestre* (Meigen)*	—	—	+	—	—	+	—
159. *Polypedilum* sp.*	—	+	+	—	—	+	—
160. *Sergentia* gr. *coracina* (Zetterstedt)*	+	—	+	—	—	—	—
161. *Sergentia* gr. *coracina* (Zetterstedt)*	+	—	+	—	—	—	—
162. *S.* gr. *longiventris**	—	+	—	—	—	—	—
163. *Stictochironomus crassiforceps* (Kieffer)	—	—	+	—	—	—	—
164. *Stictochironomus* sp.*	+	—	—	—	+	+	—
Number of species	**66**	**32**	**64**	**14**	**28**	**42**	**58**

Key to Known Species of *Pagastia* Oliver for Males

1. Eyes hairy; aedeagal lobes reduced; basal lobe of gonocoxite very small……*Pagastia* (*Hesperodiamesa*) *sequax* (Garrett, 1925)
(Nearctic)
- Eyes pubescent. One or two aedeagal lobes present ……2
2. Median and lateral aedeagal lobes present. AR 2.5–4.2……3
- Only lateral aedeagal lobe present. AR 1.7–2.1 ……6
3. Median aedeagal lobe digitate and widest in distal part ……4
- Median aedeagal lobe widest in middle and sharp-clawed in apical part……*P.* (*Pagastia*) *partica* (Roback, 1957)
(Nearctic)
4. Gonostylus subapically with "heel"……*P.* (*P.*) *nivis* (Tokunaga, 1936) (=*P. lanceolata sensu* Makarchenko, 1994)
(Palaearctic)
- Gonostylus subapically without "heel"…5
5. Gonostylus subapically angled……*P.* (*P.*) *orientalis* (Tshernovskij, 1949)
(Palaearctic)
- Gonostylus subapically rounded……*P.* (*P.*) *altaica* Makarchenko, Kerkis, and Ivanchenko, 1997
(Palaearctic)
6. Anal point widest in basal part and thin in apical part, pointed and often with peg ……*P.* (*P.*) *lanceolata* (Tokunaga, 1936) (=*P. angarensis* Linevich, 1953)
(Palaearctic)
- Anal point digitateform, in apical part rounded and without peg ……*P.* (*P.*) *orthogonia* Oliver, 1959
(Nearctic)

2. Species from the Kamchatka Peninsula and Bordering Territories

A total of 164 species of adult and larval forms of chironomid, belonging to 65 genera and six subfamilies, are recorded from the Kamchatka Peninsula and bordering territories (Koryak mountain ridge) (Table 3).

Most species (52 spp.) are with wide Palaearctic distribution and 23 species, *Abiskomyia virgo, Brillia flavifrons, Camptochironomus pallidivittatus, Diamesa amplexivirilia, D. davisi, D. gregsoni, D. insignipes, D. leona, Potthastia gaedii, Hydrobaenus fusistylus, H. spinnatis, Limnophyes pumilio, L. brachytomus, Orthocladius (O.) frigidus, O. (O.) trigonolabis, Paratrichocladius skirwithensis, Potthastia longimana, Protanypus caudatus, Pseudodiamesa branickii, Pseudokiefferiella parva, Smittia aterrima, Zalutschia furcarca* and *Z. zalutschicola,* occur in the Holarctic.

Four species, *Hydrobaenus fusistylus, Orthocladius (O.) obumbratus, Tokunagaia obriani* and *Zalutschia furcarca,* were known previously only from North America and are recorded for the Palaearctic region for the first time. The genus *Tokunagaia* and the species *Bryophaenocladius subvernalis, Hydrobaenus fusistylus, H. spinnatis, Limnophyes aagaardi, L. natalensis, L. pumilio, L. schnelli, Metriocnemus albolineatus, Orthocladius (O.) obumbratus, Tokunagaia obriani, Paratrichocladius skirwithensis, Rheosmittia languida, Smittia aterrima, S. hakusansecunda, Zalutschia furcarca* are recorded for Russia for the first time.

Several species appear to have a restricted distribution. *Trichotanypus arctoalpinus* is known from Vrangel Island, Chukotskyi Peninsula, and upper part of Kolyma River, *Diamesa alpina* is known from Japan and the Kuril Islands (Makarchenko, 1985), *Smittia hakusansecunda* is described and known earlier only from Japan (Sasa, Kikuchi, 1995) and *Limnopyes aagaardi* is found in Norway (Sæther, 1990).

Unfortunately, the majority of chironomid taxa recorded from the Kuril Islands, Kamchatka and bordering territories are based solely on larval stages that have yet to be associated with an adult of any known species. The conclusions that can be drawn from distributional patterns based on these records are, therefore, limited and more efforts are needed in order to identify all the life history stages of the species.

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千島列島，カムチャッカ半島，およびその近接地域のユスリカ科の再検討

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千島列島，カムチャッカ半島，およびその近接地域に出現するユスリカについて，簡単な概説を与えた．標本と文献に基づいて，千島列島から102種，カムチャッカ半島とその近接地域から164種を記録し，それぞれの地域についてリストを作成した．エトロフ，ウルップ，シムシル，ケトイ，ラッシュア，オネコタン，シャシコタン，パラムシル，およびシュムシュの島々からは，これまでユスリカの記録はなかった．また，*Pagastia* 属の3種，*P. nivis* (Tokunaga)，*P. orientalis* (Tshernovskij)，および *P. lanceolata* (Tokunaga) の分類学的な混乱を解決し，本属の雄を同定するための検索表を与えた．さらに，千島列島とカムチャッカ半島のユスリカの生物地理学について簡単に論じた．