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### Caddisflies (Trichoptera) of south-western Siberia: new zoogeographical records, aquatic habitat preferences and flight periods

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**Abstract.** 20 caddisfly species are newly recorded for Novosibirsk Province, south-eastern corner of the Great Siberian Plain (54°-56° N and 81°-84° E). The new localities for *Stenopsyche marmorata*, *Rhyacophila sibirica*, *Cheumatopsyche infascia*, *Setodes pulcher* are the most western. An updated species list (57 species: 5 Holarctic, 26 Palaearctic, 9 West Palaearctic, 17 East Palaearctic, and 1 with unclear distribution) is provided with information on geographical distribution, aquatic habitat preferences, and flight periods. The role of the West Siberian Lowland as a barrier between the European and Siberian faunas of aquatic insects is discussed.

### Introduction

The trichopteran fauna of the large territory of Western Siberia is very poorly investigated. Recently BEKETOV & IVANOV (2004) presented the first species list for Novosibirsk Province and summarized the literature on the caddisflies of Western Siberia. The list contained 38 species, but that is evidently far from a complete list for this territory. Nevertheless, it was shown that the territory is a borderland for both the East- and West-Palaearctic caddisfly species. The same feature was also demonstrated by the mayfly fauna of the region (BEKETOV & KLUGE, 2003; BEKETOV, 2004a). The present paper is a continuation of the study by BEKETOV & IVANOV (2004); it provides a more complete species list, information on the larval habitat preferences, and flight periods of caddisflies of Novosibirsk Province (54°-56° N and 81°-84° E). The new findings given here were made during the years 2004 and 2005. Information on the habitat preferences and flight periods was derived from samples collected from 2002 to 2005. Aquatic habitats were roughly divided into four categories (see Table 1): LR – large rivers (width more than 50 m, in the region considered there is only the Ob' River), SR – small rivers (width from 50 to 5 m), Rlt – rivulets (width less than 5 m), and SW – stagnant water bodies. This system is very rough, but allows a general classification, and was used previously for the mayflies of the region (BEKETOV, 2004a). Information on the geographical distributions is mainly derived from recent keys by IVANOV et al. (1997; 2001).

### New species records

#### Rhyacophilidae

*Rhyacophila sibirica* MACLACHLAN, 1879. One larva, Bolshaya Pustynka rivulet, left tributary of Inya River, 2 km east of Krinita Railway Station, Toguchinskii District, Alt. 135 m a.s.l., 55°04'45.7" N and 083°31'37.9" E, 30-V-2004, M.A. Beketov. Previously known from the Altai and Sayan Mountains. LEPNEVA (1930) has reported this species for the Upper Ob' basin

but the exact collecting site was not stated. First record from West Siberian plains.

#### Stenopsychidae

*Stenopsyche marmorata* NAVÁS, 1920. Six larvae, Berd' River, 4 km east of Suenga Village, Maslyaninskii District, Alt. 196 m a.s.l., 54°23'55.7" N and 084°35'36.5" E, 17-VII-2005, M.A. Beketov. Previously known from south Siberia, south of the Russian Far East, Mongolia, Korea, and Japan. First record from the West Siberian plains.

#### Hydropsychidae

*Hydropsyche newae* (KOLENATI, 1858). Two males, Rep'ev Village, Toguchinskii District, 12-VII-2004, M.A. Beketov (light trap). Palaearctic species.

*Cheumatopsyche infascia* MARTYNOV, 1934. Six males, Bugotak River, left tributary of Inya River, Bugotak Village, Toguchinskii District, 12-V-2004, M.A. Beketov. Previously known from the Russian Far East, China, Korea, and Japan. First record for western Siberia.

#### Phryganeidae

*Agrypnia pagetana* CURTIS, 1835. One male, Rep'ev Village, Toguchinskii District, 12-VII-2004, M.A. Beketov (light trap). Holarctic species.

#### Limnephilidae

*Limnephilus decipiens* KOLENATI, 1848. Seven males, pond on nameless rivulet, left tributary of Inya river, 2 km east of Rep'ev Village, Toguchinskii District, 3-X-2004, M.A. Beketov. Previously known from Europe and Siberia.

*Limnephilus elegans* CURTIS, 1834. One male, near Kinterep River, 2 km north of Suenga Village, Maslyaninskii District, Alt. 204 m a.s.l., 54°25'55.5" N and 084°31'48.4" E, 16-VII-2005. Palaearctic.

*Limnephilus fuscicornis* (RAMBUR, 1842). One male, Mosikha rivulet, left tributary of Inya river near 38 Kilometr Railway Station, Novosibirsk District, 31-V-2003, M.A. Beketov, identified by V.D. Ivanov. Previously known from Europe and Siberia.

*Limnephilus nigriceps* ZETTERSTEDT, 1840. Two males, 4 km north of Otgonka Railway Station, Toguchinskii District, Alt. 121 m a.s.l., 55°13'52.2" N and 083°56'46.6" E, 9-VII-2005, M.A. Beketov. Palaearctic.

*Limnephilus politus* MACLACHLAN, 1865. Four males and five females, near nameless pond, Novosibirsk City, 16-VIII-2005, M.A. Beketov. Palaearctic.

*Limnephilus stigma* CURTIS, 1834. One male, 4 km north of Otgonka Railway Station, Toguchinskii District, Alt. 121 m a.s.l., 55°13'52.2" N and 083°56'46.6" E, 9-VII-2005, M.A. Beketov. Palaearctic.

*Limnephilus vittatus* (FABRICIUS 1798). Three males and five females near Kinterep River, 2 km north of Suenga Village, Maslyaninskii District, Alt. 204 m a.s.l., 54°25'55.5" N and 084°31'48.4" E, 16-VII-2005. Palaearctic species.

*Stenophylax lateralis* (STEPHENS, 1837). One male, Rep'ev Village, Toguchinskii District, 12-VII-2004, M.A. Beketov (light trap). West Palaearctic species distributed eastward as far as the Baikal Region.

*Potamophylax rotundipennis* (BRAUER, 1857). Ten larvae, Bugotak River, left tributary of Inya River, Bugotak Village, Toguchinskii District, 12-V-2004, M.A. Beketov. Known from Europe and south of West Siberia.

*Dicosmoecus palatus* MACLACHLAN, 1872. One larva, Bolshaya Pustynka rivulet, left tributary of Inya River, 2 km east of Krinita Railway Station, Toguchinskii District, Alt. 135 m a.s.l., 55°04'45.7" N and 083°31'37.9" E, 11-VII-2004, M.A. Beketov. North Palaearctic species.

#### Molannidae

*Molanna albicans* (ZETTERSTEDT, 1840). Seven males, near Burmistrovo Village, Iskitimskii District, 23-VI-2004, V.Yu. Kryukov (light trap). North Palaearctic species.

#### Leptoceridae

*Oecetis ochracea* (CURTIS, 1825). Seven males and one female, near Burmistrovo Village, Iskitimskii District, 23-VI-2004, V.Yu. Kryukov (light trap). Palaearctic species.

*Oecetis tripunctata* FABRICIUS, 1793. One male, Rep'ev Village, Toguchinskii District, 12-VII-2004, M.A. Beketov (light trap). Palaearctic species.

*Setodes pulcher* MARTYNOV, 1910. Numerous adults, Rep'ev Village, Toguchinskii District, 12-VII-2004, M.A. Beketov (light trap). East Palaearctic species previously known from Baikal Region, Russian Far East, China, and Korea.

#### Hydroptilidae

*Ithytrichia lamellaris* EATON, 1873. A larva, Berd' River, 4 km east of Suenga Village, Maslyaninskii District, Alt. 196 m a.s.l., 54°23'55.7" N and 084°35'36.5" E, 17-VII-2005, M.A. Beketov. Known from Europe and Siberia.

#### Discussion

During the period 2004 – 2005, twenty caddisfly species were recorded for the first time in Novosibirsk Province. Four of these appear to be westernmost: *Stenopsyche marmorata*, *Rhyacophila sibirica*, *Cheumatopsyche infascia*, *Setodes pulcher*. The discovery of *S. marmorata* and *Rh. sibirica* was expected, as these two species had been recorded previously from neighbouring areas of the Altai Mountains. In contrast, the present finding of *Ch. infascia* and *S. pulcher* was not as predictable because *Ch. infascia* was known previously from the Russian Far East, China, Korea, and Japan; *S. pulcher* was also recorded from these regions, and also from the Baikal Region.

The flight periods given here (Table 1) are quite comparable with the periods reported previously (IVANOV et al. (1997) and LIESS et al. (online database) were used as references for East Palaearctic region and Europe respectively) with one interesting exception. The longest flight period from 26 May to 29 August was recorded for *Mystacides dentatus*. However, no adults of this species were recorded in mid-July, and it remains unclear whether *M. dentatus* has two subsequent generations in a year or one generation but two temporally shifted forms. In contrast, for the Russian Far East, Siberia, China, and Korea the adults

of this species occurred in July (IVANOV et al., 1997). Habitat preferences reported in Table 1 are also quite comparable with the literature data (LEPNEVA, 1964; 1966).

The present species list (Table 1) includes 58 species: 5 Holarctic, 26 Palaearctic, 9 West Palaearctic, and 17 East Palaearctic (larva of *Trienodes* sp. cannot be attributed zoogeographically). Evidently this is not a complete list for the region considered. Nevertheless, the list obviously contains the main part of the trichopteran fauna of the Novosibirsk Province. Hence some characteristic features can be described. In general, the fauna comprises a mixture of East Palaearctic rhithral fauna and Palaearctic and West Palaearctic faunas of potamal and stagnant water bodies. As discussed previously, the West Siberian Lowland is a barrier between the European and Siberian faunas of aquatic insects inhabiting relatively fast-flowing and low-temperature streams (for Trichoptera see BEKETOV & IVANOV (2004), BEKETOV & KRYUKOV (2004); for Ephemeroptera BEKETOV & KLUGE (2003), BEKETOV (2004a), for Plecoptera BEKETOV (2004b)). In contrast, many species inhabiting slow-flowing plain rivers and standing waters have wide trans-palaearctic distributions. The West Siberian Lowland, characterized by high water temperatures and low oxygen levels, cannot be such an important barrier for limnophilic species as for rheophilic. Hence, the trans-palaearctic type of geographical distribution is highly possible for many limnophylic caddisflies, which at present are considered as West Palaearctic. To prove this prediction further studies of slow-flowing and stagnant waters in Middle and East Siberia and north-eastern Asia in general are necessary.

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**Table 1.** Caddisflies of Novosibirsk Province, south-western Siberia: geographical distribution, findings in different water bodies (LR – large river (Ob' River), SR – small rivers, Rlt – rivulets, and SW – stagnant water bodies, explanations in the text), and flight periods (species recorded in the region for the first time are asterisked).

Taxa	Geographical distribution	Water bodies				Flight period
		LR	SR	Rlt	SW	
<b>Rhyacophilidae</b>						
<i>Rhyacophila angulata</i> MARTYNOV, 1910	EP		+	+		12.VI-6.VIII
<i>Rhyacophila sibirica</i> MACLACHLAN, 1879 *	EP			+		-
<b>Psychomyiidae</b>						
<i>Psychomyia minima</i> (MARTYNOV, 1910)	EP	+				15.VIII
<b>Polycentropodidae</b>						
<i>Polycentropus flavomaculatus</i> PICTET, 1834	P		+	+		31.V-12.VI
<i>Cyrnus flavidus</i> MACLACHLAN, 1864	P possibly		+	+		-
<i>Neureclipsis bimaculata</i> (LINNAEUS, 1758)	H	+	+			7-24.VIII
<b>Stenopsychidae</b>						
<i>Stenopsyche marmorata</i> NAVÁS, 1920 *	EP			+		-
<b>Hydropsychidae</b>						
<i>Aethaloptera evanescens</i> (MACLACHLAN, 1880)	EP	+				24.VI-14.VII
<i>Macrostemum radiatum</i> (MACLACHLAN, 1872)	EP	+	+			4.VI-18.VII
<i>Hydropsyche kozhantshikovi</i> MARTYNOV, 1924	EP		+	+		25.V-15.VIII
<i>Hydropsyche nevae</i> (KOLENATI, 1858) *	P					12.VII
<i>Hydropsyche valvata</i> MARTYNOV, 1927	EP	+	+	+		4.VII-17.VIII
<i>Hydropsyche angustipennis</i> CURTIS, 1834	P		+	+		25.VI
<i>Hydropsyche bulgoromanorum</i> MALICKY, 1977	P	+	+			26.VI-10.VIII
<i>Hydropsyche contubernalis</i> MACLACHLAN, 1865	P	+	+			31.V-24.VIII
<i>Hydropsyche pellucidula</i> CURTIS, 1834	WP unclear		+	+		-
<i>Potamyia czekanowskii</i> (MARTYNOV, 1910)	EP	+	+	+		8.VII-10.VIII
<i>Cheumatopsyche infascia</i> MARTYNOV, 1934 *	EP		+			12.V
<b>Phryganeidae</b>						
<i>Agrypnia crassicornis</i> (MACLACHLAN, 1876)	P possibly				+	29.VII
<i>Agrypnia pagetana</i> CURTIS, 1835 *	H				+	22.VIII
<i>Oligotricha lapponica</i> (HAGEN, 1864)	H		+		+	9.VI
<i>Phryganea bipunctata</i> RETZIUS, 1783	P				+	18.VI
<i>Phryganea grandis</i> LINNAEUS, 1758	P		+		+	16.VIII-12.IX
<i>Semblis atrata</i> (GMELIN, 1790)	P			+		22.VII
<i>Semblis phalaenoides</i> (LINNAEUS, 1758)	P		+		+	12.VI
<b>Brachycentridae</b>						
<i>Brachycentrus subnubilus</i> CURTIS, 1834	P	+	+			26.V-5.VI
<b>Limnephilidae</b>						
<i>Anabolia furcata</i> BRAUER, 1857	WP		+	+		15.VIII
<i>Limnephilus decipiens</i> KOLENATI, 1848 *	WP				+	3.X
<i>Limnephilus elegans</i> CURTIS 1834 *	P				+	16.VII
<i>Limnephilus flavicornis</i> FABRICIUS, 1783	WP		+			10.VIII
<i>Limnephilus fuscicornis</i> (RAMBUR, 1842) *	WP				+	31.V
<i>Limnephilus major</i> (MARTYNOV, 199)	P				+	3.VII
<i>Limnephilus nigriceps</i> ZETTERSTEDT, 1840 *	P					9.VII
<i>Limnephilus politus</i> MACLACHLAN, 1865 *	P				+	16.VIII
<i>Limnephilus stigma</i> CURTIS, 1834 *	P					9.VII
<i>Limnephilus rhombicus</i> (LINNAEUS, 1758)	H		+			22.VI-6.VIII
<i>Limnephilus vittatus</i> (FABRICIUS 1798) *	P					16.VII
<i>Micropterna lateralis</i> (STEPHENS, 1837) *	WP					12.VII
<i>Potamophylax rotundipennis</i> (BRAUER, 1857) *	WP		+			-
<i>Dicosmoecus palatus</i> MACLACHLAN, 1872 *	P			+		-
<i>Halesus</i> sp. <i>tesselatus</i> (RAMBUR, 1842) ?	P		+	+		-
<i>Hydatophylax grammicus</i> (MACLACHLAN, 1880)	EP			+		31.V
<b>Sericostomatidae</b>						
<i>Gumaga orientalis</i> (MARTYNOV, 1935)	EP		+			4.VI
<i>Sericostoma</i> sp. <i>personatum</i> (KIRBY & SPENCE, 1826) ?	WP		+			-
<b>Molannidae</b>						
<i>Molanna albicans</i> (ZETTERSTEDT, 1840) *	P					23.VI
<i>Molanna moesta</i> BANKS, 1906	EP		+	+		7-23.VIII

<b>Leptoceridae</b>						
<i>Ceraclea albimacula</i> (HAGEN, 1860)	P	+				6-12.VII
<i>Ceraclea excisa</i> (MORTON, 1904)	H		+			25.VI
<i>Ceraclea lobulata</i> (MARTYNOV, 1935)	EP	+				12.VII-24.VIII
<i>Oecetis brachyura</i> YANG & MORSE, 1997	EP			+		6.VIII
<i>Oecetis intima</i> MACLACHLAN, 1877	P				+	29.VII
<i>Oecetis ochracea</i> (CURTIS, 1825) *	P					23.VI
<i>Oecetis tripunctata</i> FABRICIUS, 1793 *	P					12.VII
<i>Setodes pulcher</i> MARTYNOV, 1910 *	EP					12.VII
<i>Setodes viridis</i> (FOURCROY, 1785)	WP					12.VII-14.VIII
<i>Mystacides dentatus</i> MARTYNOV, 1924	EP	+	+	+		26.V-29.VIII
<i>Triaenodes</i> sp.	-		+			-
<b>Hydroptilidae</b>						
<i>Ithytrichia lamellaris</i> EATON, 1873 *	P possibly		+			-

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Karl Müller

Christian Otto tells me that his predecessor as Professor at the University of Umeå passed away in September 2005 at the age of 85. He had a stroke in 1982, and since then he paid several visits to the hospital. However, he had a remarkable capacity to recover, and he perused *Der Spiegel* every week to the bitter end.

Prof. Müller made important contributions to the ecology of caddisflies including periodicity, circadian rhythms and life cycles in northern Sweden.

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