

Updates to the fauna of dragonflies (Odonata) of the Altaiskii Krai with new records of species for Siberia

К фауне стрекоз (Odonata) Алтайского края с указанием новых видов для Сибири

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Ключевые слова: Odonata, *Sympsecta fusca*, *Anax imperator*, *Orthetrum albistylum*, *Orthetrum brunneum*, Алтайский Край, Сибирь.

Abstract. 35 dragonfly species were recorded during an expedition to the Altaiskii Krai, three of which, *Sympsecta fusca* (Vander Linden, 1820), *Anax imperator* Leach, 1815 and *Orthetrum brunneum* (Fonscolombe, 1837), are recorded for Siberia for the first time. New data on the occurrence of the rare and little-known species *Ischnura pumilio* Charpentier, 1825, *Anax parthenope* (Selys, 1839) and *Orthetrum albistylum* (Selys, 1839), are provided. A new record of the migrant species *Sympetrum fonscolombii* (Selys, 1840) in Siberia is also presented.

Резюме. Во время экспедиции в Алтайский край отмечено 35 видов стрекоз. Для Сибири впервые приводятся три новых вида — *Sympsecta fusca* (Vander Linden, 1820), *Anax imperator* Leach, 1815 и *Orthetrum brunneum* (Fonscolombe, 1837), также данные о встречах редких и малоизвестных видов *Ischnura pumilio* Charpentier, 1825, *Anax parthenope* (Selys, 1839), *Orthetrum albistylum* (Selys, 1839). Сообщается также о новой находке в Сибири вида-мигранта *Sympetrum fonscolombii* (Selys, 1840).

Introduction

The fauna of dragonflies in the Altaiskii Krai, as well as in most part of Siberia as a whole, has been studied quite well by now [Belyshev, 1958, 1968, 1973; Kosterin 1987; Haritonov et al., 2007; Malikova, Kosterin 2019]. Nevertheless, an expedition to the Altai steppes made it possible to replenish information about dragonflies in this region and find there a number of little-known and new species not only for the Altaiskii Krai, but also for Siberia in general.

The expedition was completed in the period from June 28 to July 7, 2020. Research was carried out in the Rubtsovsky and Loktevsky Districts in the South-West and in the Biysk District in the east of the Altaiskii Krai. The work also includes A. Noskova's data on the finding of the migrant species *Sympetrum fonscolombii* (Selys, 1840) in the city of Biysk.

A total of 35 species of dragonflies were recorded. The places of their collection are shown on the map.

Locality designations correspond to those in the locations list (Fig. 1).

List of localities

Loc. 1. 2 km south-west of the village of Zakharovo, the Aley River and the pond, 51°38'16" N, 81°19'08" E, 205 m a.s.l., 28–29.VI.2020.

Loc. 1a. Ibid, 4.VII.2020.

Loc. 2. 3 km west of the city of Rubtsovsk, a field with shrubby vegetation, 51°31'58" N, 81°09'37" E, 215 m a.s.l. 29.VI.2020.

Loc. 3. The main channel, 10 km west of the village of Veseloyarsk, 51°17'35" N, 80°57'47" E, 223 m a.s.l., 4.VII.2020.

Loc. 4. Aley River (near the bridge), 6 km south of the village of Lokot', 51°08'38" N, 81°14'23" E, 240 m a.s.l., 29.VI.2020.

Loc. 5. Reservoir (0.6 km x 0.3 km) on the Pilnichikha River and a stream with seeping ground water, 8 km north of the village of Pokrovka, 51°15'23" N, 81°26'42" E, 285 m a.s.l., 30.VI.2020.

Loc. 6. Reservoir (1.2 km x 0.8 km) on the Eldarka River and semi-flowing reservoirs with seeping ground water, 2 km east of the village of Bugry, 51°16'59" N, 81°29'19" E, 290 m a.s.l., 3.VII.2020.

Loc. 7. Middle course of the Ust'yanka River, 4 km north of the village of Pokrovka, 51°13'27" N, 81°28'23" E, 264 m a.s.l., 29.VI.2020.

Loc. 8. The Aley River and the oxbow river, 2 km southeast of the village of Pokrovka, 51°09'53" N, 81°28'23" E, 257 m a.s.l., 1.VII.2020.

Loc. 9. The lower reaches of the Sukhaya River, 6 km east of the village of Pokrovka, 51°10'25" N, 81°32'07" E, 275 m a.s.l., 2.VII.2020.

Loc. 10. Biysk, Lake Kovalevskoe (within the city), 52°32'10" N, 85°09'43" E, 180 m a.s.l., 12.VI.2019.

Loc. 11. The Nenyka River and its oxbow. Neninka village, 52°39'59" N, 86°12'06" E, 215 m a.s.l., 6–7.VII.2020.



Fig. 1. Map of the Altaiskii Krai with designations of places of dragonfly collected. The locality numbers correspond to those in the locality list.

Рис. 1. Карта Алтайского края с обозначениями мест сбора стрекоз. Номера локалитетов соответствуют таковым в списке местонахождений.

Loc. 12. Biya River and oxbow rivers, 1 km north of the village of Novaya Anzhinka, 52°33'37" N, 86°20'03" E, 209 m a.s.l., 6.VII.2020.

List of species and specimens

Lestes barbarus (Fabricius, 1798)

Material. Loc.: 6 (1♀), 8 (4♂♂), 11 (1♂).

Lestes dryas Kirby, 1890

Material. Loc.: 8 (1♂, 1♀).

Lestes macrostigma (Eversmann, 1836)

Material. Loc.: 3 (2♂♂, 1♀), 5 (4♂♂, 2♀♀).

Lestes sponsa (Hansemann, 1823)

Material. Loc.: 1 (1♀), 1a (3♂♂), 2 (1♂), 5 (5♂♂, 1♀), 7 (1♂), 11 (2♂♂, 2♀♀).

Lestes virens vestalis Rambur, 1842

Material. Loc.: 1a (1♀), 2 (1♀), 5 (1♂), 11 (1♀).

Notes. For taxonomic status of the eastern representatives of *L. virens* see Schröter et al. [2015].

Sympecma fusca (Vander Linden, 1820)

Material. Loc.: 5 (1♂), 11 (1♂).

Sympecma paedisca (Brauer, 1877)

Material. Loc.: 1a (1♀), 2 (1♂), 3 (2♂♂), 11 (1♀).

Calopteryx splendens splendens (Harris, 1782)

Material. Loc.: 1a (1♂), 3 (1♂), 4 (3♂♂), 5 (1♂), 7 (6♂♂, 3♀♀), 8 (1♂, 2♀♀), 9 (1♂, 2♀♀), 11 (1♂, 2♀♀).

Notes. For the subspecific status of *C. s. splendens* see Malikova, Kosterin [2019].

Platycnemis pennipes (Pallas, 1771)

Material. Loc.: 1a (1♂), 4 (2♂♂), 5 (3♂♂), 6 (2♂♂), 7 (10♂♂, 6♀♀), 8 (2♂♂), 9 (2♂♂), 11 (7♂♂).

Coenagrion hastulatum (Charpentier, 1825)

Material. Loc.: 11 (6♂♂), 12 (2♂♂).

Coenagrion puella (Linnaeus, 1758)

Material. Loc.: 5 (10♂♂), 11 (7♂♂, 2♂♂), 12 (2♂♂).

Coenagrion pulchellum sibiricum Belyshev, 1964

Material. Loc.: 5 (3♂♂), 11 (2♂♂).

Notes. For the subspecific status of *C. p. sibiricum* in Siberia see Malikova, Kosterin [2019].

Enallagma cyathigerum risi Schmidt, 1961

Material. Loc.: 1 (1♀), 3 (1♂, 1♀), 5 (3♂♂, 7♀♀), 6 (12♂♂, 4♀♀), 7 (2♂♂, 2♀♀).

Notes. For the subspecific status of *E. c. risi* see Kosterin [2004] and Kosterin, Zaika [2010].

Erythromma najas najas (Hansemann, 1823)

Material. Loc.: 3 (3♂♂), 7 (1♂, 2♀♀), 6 (2♂♂, 1♂), 8 (1♂, 1♀), 11 (5♂♂, 1♀).

Ischnura elegans (Vander Linden, 1820)

Material. Loc.: 3 (4♂♂, 1♀), 5 (5♂♂, 1♀), 6 (1♂), 7 (5♂♂, 2♀♀), 11 (10♂♂, 5♀♀).

Notes. The current consensus is absence of clear subspecies in *I. elegans* [Schröter et al., 2015; Kosterin, Ahmadi, 2018; Schneider et al., 2018; Malikova, Kosterin, 2019].

Ischnura pumilio (Charpentier, 1825)

Material. Loc.: 3 (2♂♂, 1♀), 5 (14♂♂, 1♀), 6 (1♂), 7 (2♂♂), 11 (2♂♂), 12 (1♂).

Aeshna affinis Vander Linden, 1820

Material. Loc.: 1 (2♂♂, 2♀♀), 1a (2♂♂), 4 (2♂♂), 6 (1♂), 7 (1♀), 8 (1♂).

Aeshna crenata Hagen, 1856

Material. Loc.: 11 (3♂♂).

Aeshna grandis (Linnaeus, 1758)

Material. Loc.: 1 (1♀), 11 (2♀♀).

Anax imperator Leach, 1915

Material. Loc.: 5 (2♂♂ visual), 6 (1♂, 1♀).

Anax parthenope (Selys, 1839)

Material. Loc.: 5 (1♂, visually more than 10 ♂♂ patrolling along the coast), 6 (2 ♂♂), 7 (visually pair during egg-laying).

Notes. At present, the species is considered to be monotypic. The closely related *A. julius* Brauer, 1865 replaces *A. parthenope* in the Eastern Palearctic [Kalkman, Proess, 2015a].

Gomphus vulgatissimus (Linnaeus, 1758)

Material. Loc.: 11 (2♂♂, 2♀♀).

Ophiogomphus cecilia (Geoffroy in Fourcroy, 1785)

Material. Loc.: 1 (3♂♂, 3♀♀), 1a (1♂), 4 (3♂♂), 8 (2♂♂, 2♀♀).

Shaogomphus postocularis epophthalmus
(Selys, 1872)

Material. Loc.: 12 (1♂).

Stylurus flavipes (Charpentier, 1825)

Material. Loc.: 1 (2♀♀).

Macromia amphigena fraenata Martin, 1906

Material. Loc.: 11 (1♂, visually more than 10 males).

Somatochlora metallica (Vander Linden, 1825)

Material. Loc.: 11 (2♂♂).

Libellula quadrimaculata Linnaeus, 1758

Material. Loc.: 5 (1♂), 8 (1♀), 9 (1♂), 10 (1♂).

Orthetrum albistylum (Selys, 1848)

Material. Loc.: 3 (1♂, visually more than 10 males), 5 (2♂♂, 1♀, visually more than 10 males), 6 (1♂, visually more than 10 males), 7 (1♂).

Notes. The eastern subspecies *O. a. speciosum* (Uhler, 1858) was shown to have no reliable diagnostic differences and cannot be supported [Seehausen, Fiebig 2016; Malikova, Kosterin, 2019]. See also Borisov [2016], Borisov, Borisov [2017].

Orthetrum brunneum (Fonscolombe, 1837)

Material. Loc.: 3 (3 ♂♂ visual), 5 (1♂, 2♀♀), 6 (1♂), 7 (4♂♂, 1♀).

Orthetrum cancellatum (Linnaeus, 1758)

Material. Loc.: 5 (1♂), 6 (2♂♂, 1♀).

Sympetrum flaveolum (Linnaeus, 1758)

Material. Loc.: 1 (1♀), 2 (1♀), 4 (1♀), 8 (1♂), 9 (1♂, 1♀), 11 (3♀♀).

Sympetrum fonscolombii (Selys, 1840)

Material. Loc.: 10 (photo by male, A. Noskova).

Sympetrum sanguineum (Müller, 1764)

Material. Loc.: 1 (1♀), 7 (1♀), 8 (1♀), 9 (1♂), 11 (1♂, 3♀♀), 12 (1♂).

Sympetrum vulgatum vulgatum (Linnaeus, 1758)

Material. Loc.: 1 (1♂), 1a (1♀), 2 (1♀), 4 (1♀), 5 (1♀), 8 (1♀), 9 (1♀).

New for Siberia and little-known species

***Sympetma fusca*.** One male was found in the southwest (loc. 5) and one male in the east (loc. 11) of the Altaiskii Krai. Both individuals were of the last year's brood, which overwintered in adults.

A West-Palaearctic species, previously known in the eastern part of the range only from Middle Asia and Kazakhstan [Borisov, Haritonov, 2007; Kalkman, Willigalla, 2015]. For Siberia, these are the first reliable findings of the species and the most northern and eastern ones in the Asian part of the range. The closest location lies in the north-east of Kazakhstan (Borly Lake, 51°49'27" N, 77°56'46" E) [Borisov, Kosterin, 2014].

***Ischnura pumilio*.** Dragonflies of this species are found in 6 localities. In the southwestern part of the Altaiskii Krai, *I. pumilio* was common in small reservoirs (loc. 5, 6) and on the warm Ust'yanka River with a predominantly soil type of feeding (loc. 7).

A West-Palaearctic species penetrating eastward to Mongolia and Inner Mongolia in northeastern China [Dumont, 2003; Boudot, Šalamun, 2015]. In the south of Western Siberia, it is distributed locally. It was previously known there from the village of Tochilino (the correct name is Tochilnoye) in the Altaiskii Krai [Belyshev, 1958], Lake Manzherok in the Altai Republic [Kosterin, 1987], in the Khemchik depression and Central Tuvianian depression in Tuva [Kosterin, Zaika, 2010] and in Novosibirsk (Akademgorodok) [Kosterin, 2013]. In Eastern Siberia, the species is known only from an old report from Irkutsk [Selys-Longchamps, McLachlan, 1872].

***Anax imperator*.** The species is recorded for the first time in Siberia. It was recorded in two reservoirs in the western spurs of the Kolyvan Range in the southwest of Altaiskii Krai (loc. 5, 6).

A. imperator is distributed in Africa, Europe and western Asia [Borisov, Haritonov, 2008; Kalkman, Proess, 2015b]. Earlier in Russia, this species was not known east of the Urals [Haritonov, Eremina, 2010]. The easternmost point of the range was located in East Kazakhstan (Dubygalskoe Lake, 50° 10' N, 81° 30' E) [Chaplina et al., 2007]. In Northeastern Kazakhstan, this species is known somewhat northerly of the here reported Siberian finds (Baykonys village, 52° 56' 38" N, 76° 24' 05" E) [Borisov, Kosterin, 2014].

***Anax parthenope*.** Dragonflies of this species were quite common in reservoirs (loc. 5, 6), one copulating pair was observed on the Ust'yanka River (loc. 7).

A. parthenope is distributed in Europe, North Africa, and western Asia [Kalkman, Proess, 2015a]. It is common in the Southern Urals [Haritonov, Eremina, 2010]. In the south of Western Siberia, this species is found locally, eastward to Krasnoyarsk and Tuva [Kosterin, Zaika, 2010; Borisov, 2012].

***Orthetrum albistylum*.** This species turned out to be quite common in three localities in the south-west of the Altaiskii Krai, the most northern of which is the main channel in the Rubtsovskiy district (51° 17' 35" N) (loc. 3). The nearest locality of *O. albistylum* lies somewhat to the south — in Ust-Kamenogorsk in Eastern Kazakhstan (ca. 50° N) [Borisov, 2014; Kosterin, pers. comm.]. Earlier in Siberia at such northern latitudes, *O. albistylum* was known only from the thermal springs of the Baikal region and the Chara depression [Borisov, 2016; Borisov, Borisov, 2017].

In the European part of the range, *O. albistylum* has spread to the north since the 90s of the last century [Kalkman, Ambrus, 2015a]. In Russia, this species was recently found in the Prisurskiy Nature Reserve in Chuvashia (55° 01' 50" N, 47° 55' 10" E) [Borisova, Karolinsky, 2018]. Probably, just like in Europe, we should expect the spread of this dragonfly in the northern direction also in Siberia.

***Orthetrum brunneum*.** This species was found in 4 localities in the south-west of the Altaiskii Krai: at a large main canal (loc. 3), at reservoirs (loc. 5, 6) and at the warm Ust'yanka River with a predominantly subsoil type of feeding (loc. 7).

In Siberia, until recently, *O. brunneum* was known only from an old record in the vicinity of Irkutsk [Hagen, 1856]. In the summer of 2020, this species was discovered in the city of Novosibirsk (55° 03' N) [Kosterin, pers. comm.]. Our findings were made almost simultaneously in Altaiskii Krai, the northernmost of which at 51° 17' 35" N. The nearest location is in Eastern Kazakhstan (Ust-Kamenogorsk, 50° N) [Chaplina, 2004].

In Europe, *O. brunneum* has been registered to actively spread northward since the 90s of the last century, which is associated with climate warming [Kalkman, Ambrus, 2015b]. At present, the northernmost point of the range is known in Latvia (near Lake Klāņi, 57° 28' N, 21° 48' E) [Kalniņš, 2007]. In the European part of Russia, this species was recently found in Chuvashia (the village of Emishkeevo, 55° 02' N, 47° 55' E) [Borisova et



Fig. 2. *Sympetrum fonscolombii* (loc. 10), male, from Lake Kovalevskoe in Biysk, 12.VI.2019 (photo by A. Noskova).

Рис. 2. *Sympetrum fonscolombii* (loc. 10), самец, с оз. Ковалевское в Бийске, 12.VI.2019 (фото А. Носковой).

al., 2019], at approximately the same latitude as in Novosibirsk. Thus, the movement of *O. brunneum* to the north is traced both in the European and Asian parts of the range.

***Sympetrum fonscolombii*.** This report is based on a photograph of a male taken by A. Noskova on Lake Kovalevskoye within the city of Biysk (loc. 10) (Fig. 2).

The range of *S. fonscolombii* covers the Afro-Eurasian region. This species belongs to the obligate migrants, which are characterized by regular seasonal translatitudinal migrations. In spring and early summer, dragonflies migrate to temperate latitudes from southern tropical and subtropical areas of their habitat. During the warm season, the summer temperate generation has time to develop there. In autumn, individuals of this generation make reverse migrations to the south [Borisov, 2011, 2015; Borisov et al., 2020]. In Siberia, the species is at the northern limits of the range and its findings are rare. It was previously recorded in Omsk [Lavrov, 1927], in the vicinity of Lake Chany [Popova, Eremina, 2016], and in the Ubsunur depression in Tuva [Kosterin, Zaika, 2018]. Recently, this species was also found in the Russian Far East in Primorye [Onishko, 2019].

In Biysk, *S. fonscolombii* was photographed on 12 June. Its coloration (Fig. 2) corresponded to a sexually mature male, that means this was an immigrant from the south. In Siberia, due to temperature conditions, the winter development of the larvae of this species with emerging of dragonflies in the first half of summer is excluded [Borisov et al., 2020].

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