

Distribution, habitat characteristics and northward expansion of *Orthetrum albistylum* (Selys, 1848) (Odonata, Libellulidae) in the southern part of West Siberia, Russia

Распространение, особенности местообитаний и экспансия на север *Orthetrum albistylum* (Selys, 1848) (Odonata, Libellulidae) на юге Западной Сибири

A.S. Borisov, S.N. Borisov
А.С. Борисов, С.Н. Борисов

Institute of Systematics and Ecology of Animals, Russian Academy of Sciences, Siberian Branch, Frunze Str. 11, Novosibirsk 630091 Russia.
E-mail: baswatch@gmail.com; borisov-s-n@yandex.ru.

Институт систематики и экологии животных СО РАН, ул. Фрунзе 11, Новосибирск 630091 Россия.

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Ключевые слова: *Orthetrum albistylum*, распространение, местообитание, экспансия на север, Западная Сибирь.

Abstract. *Orthetrum albistylum* (Selys, 1848) was first recorded in West Siberia in 2020 in the extreme south of Altai Krai. Further studies in 2021–22 and iNaturalist data from 2025 showed that this species is widespread across Altai Krai. Eleven locations were identified, with the northernmost lying at 53°N. The species is confined to flowing water bodies such as canals and small rivers, as well as semi-flowing water bodies such as ponds on small rivers. It is hypothesised that, over the past two decades, the range of *O. albistylum* in southern part of West Siberia has expanded northwards by three degrees of latitude.

Резюме. В Западной Сибири *Orthetrum albistylum* (Selys, 1848) впервые был зарегистрирован в 2020 году на крайнем юге Алтайского Края. Дополнительные исследования в 2021–22 гг. и данные iNaturalist [2025] показали, что этот вид в Алтайском Крае распространен довольно широко. Приводятся 11 местонахождений, самое северное из которых лежит на 53° N. Вид приурочен к проточным (канал и малые реки) и полупроточным (пруды на малых реках) водоемам. Предполагается, что за два последних десятилетия ареал *O. albistylum* на юге Западной Сибири расширился в северном направлении на три градуса широты.

Introduction

The range of *Orthetrum albistylum* (Selys, 1848) extends from the Atlantic coast of France in the west to Japan and Sakhalin in the east [Kalkman, Ambrus, 2015; Onishko, Kosterin, 2021]. In Europe, since the 1990s, there has been an expansion of this species to the north, where it has reached the Baltic coast [Shapoval, Buczyński, 2012; Gliwa, 2013; Kalkman, Ambrus, 2015; De Knijf, 2019]. The northernmost location here

is in Lithuania 55.5161° N [iNaturalist, 2025 (observations/71200870)].

A similar intensive expansion of the range of *O. albistylum* to the north is also taking place in European Russia. Earlier, on the distribution map of this species, presented in the Atlas of the European dragonflies and damselflies [Kalkman, Ambrus, 2015: 273], the northern boundary of its range passed through the south of European Russia, reaching approximately 51°–52° N. Later, this species was discovered in Chuvashia at 55° N [Borisova, Karolinsky, 2018]. According to iNaturalist [2025, <https://www.inaturalist.org/taxa/107942-Orthetrum-albistylum>], photographic observations of *O. albistylum* were also made in the Smolenskaya, Tul'skaya and Ryazanskaya Oblast again up to 55° N. The northernmost point in the European part of the range is currently located in Tatarstan 55.7815° N [iNaturalist, 2025 (observations/125965787)].

In Russia, the range of *O. albistylum* is disjunctive. Its individual parts are separated by huge intervals. This species is common in the European part, to the east it lives in the south of West Siberia, in the thermal springs of the Baikal rift zone in Eastern Siberia and in the south of the Far East [Borisov, Borisov, 2017; Onishko, Kosterin, 2021].

In West Siberia, *O. albistylum* was first recorded in 2020 in the south of the Altai Krai at the border with Kazakhstan [Borisov, 2021; Onishko, Kosterin, 2021]. Further studies have shown that this species is quite widespread here. The aim of this work is to summarize the available information on the distribution and to clarify the habitat features of *O. albistylum* in the south of West Siberia.

Material and methods

The article is based on the results of studies of the Odonata fauna of the Altaiskii Krai during expeditions in 2021–2022. When summarizing information on the distribution of *O. albistylum*, previously published data [Borisov, 2021] and materials from the iNaturalist Internet platform [2025] were used. The «research grade» (confirmed by other users) iNaturalist observations are adopted by Global Biodiversity Informational Facility (GBIF) and are traditionally referenced in scientific literature as a whole (with a single DOI index) as iNaturalist contributors, iNaturalist [2025]. All photographic observations in iNaturalist [2025] are georeferenced in the form of decimal degree coordinates, which we report in degrees, minutes and seconds. Hyperlinks to specific observations look like <http://inaturalist.org/observations/xxxx>, where xxxx is the unique identification number of the observation, which we indicate in parentheses.

The locations of *O. albistylum* are shown on the map (Fig. 1). The map was prepared using MapCreator 3.

In eight locations (out of 11 listed) dragonflies were collected directly by the authors, which allows us to characterize the habitats and provide a list of dragonfly species collected together with *O. albistylum* (Table 1). The composition of the odonate complex serves as an additional characteristic of a specific habitat.

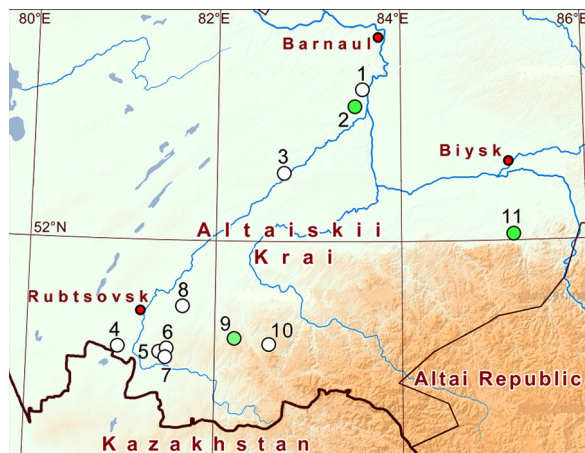


Fig. 1. Distribution of *Orthetrum albistylum* in the southern part of West Siberia. Locality numbers correspond to those in the text. White dots are the authors' dragonfly collection sites, green dots are locations according to iNaturalist [2025].

Рис. 1. Распространение *Orthetrum albistylum* на юге Западной Сибири. Номера локаций соответствуют таковым в списке местонахождений. Белые точки — места сбора стрекоз авторами, зелёные точки — местонахождения по данным iNaturalist [2025].

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Table 1. Species composition of odonatocomplexes in *Orthetrum albistylum* habitats. Locality numbers correspond to those in the list of locations

Таблица 1. Видовой состав одонатокомплексов в местообитаниях *Orthetrum albistylum*. Номера локаций соответствуют таковым в списке местонахождений

Species of dragonflies	Localities							
	1	3	4	5	6	7	8	10
<i>Lestes barbarus</i> (Fabricius, 1798)					+		+	+
<i>Lestes dryas</i> Kirby, 1890		+						
<i>Lestes macrostigma</i> (Eversmann, 1836)	+	+	+	+			+	+
<i>Lestes sponsa</i> (Hansemann, 1823)		+		+		+		
<i>Lestes virens vestalis</i> Rambur, 1842				+				
<i>Sympecma fusca</i> (Vander Linden, 1820)				+				
<i>Sympecma paedisca</i> (Brauer, 1877)		+	+				+	
<i>Calopteryx splendens splendens</i> (Harris, 1782)			+			+		
<i>Platynemesis pennipes</i> (Pallas, 1771)				+	+	+	+	+
<i>Coenagrion lunulatum</i> (Charpentier, 1840)	+						+	
<i>Coenagrion puella</i> (Linnaeus, 1758)				+				+
<i>Coenagrion pulchellum sibiricum</i> Belyshev, 1964	+			+			+	+
<i>Enallagma cyathigerum rotundatum</i> Bartenef, 1929	+	+	+	+	+	+	+	+
<i>Erythromma najas najas</i> (Hansemann, 1823)	+		+		+			+
<i>Ischnura elegans</i> (Vander Linden, 1820)	+	+	+	+	+	+	+	+
<i>Ischnura pumilio</i> (Charpentier, 1825)			+	+	+	+		
<i>Aeshna affinis</i> Vander Linden, 1820	+	+			+	+		
<i>Anax imperator</i> Leach, 1915				+	+			
<i>Anax parthenope</i> (Selys, 1839)				+	+	+		
<i>Libellula quadrimaculata</i> Linnaeus, 1758	+			+				
<i>Orthetrum brunneum</i> (Fonscolombe, 1837)			+	+	+	+	+	
<i>Orthetrum cancellatum</i> (Linnaeus, 1758)				+	+		+	+
<i>Sympetrum sanguineum</i> (Müller, 1764)	+					+		
<i>Sympetrum vulgatum vulgatum</i> (Linnaeus, 1758)	+			+				
Number of species	10	7	8	16	11	10	10	9

Results and discussion

LIST OF *ORTHETRUM ALBISTYLUM* LOCATIONS IN THE ALTAISKII KRAI (SOUTH OF WEST SIBERIA)

Loc. 1. Kalmanskii District, 1.5 km north of the village of Kalistratikha, a pond (Lake Eraska) (1.5 km x 0.2 km) on the Eraska River, 53.0100° N, 83.5772° E, 162 m a.s.l., 11.VII.2021, 1♂ (mature), individual males with territorial behavior were observed, A.S. Borisov, S.N. Borisov.

Loc. 2. [iNaturalist, 2024 (observations/173003190)]: Kalmanskii District, 1.5 km west of the village of Kalmanka, Malaya Kalmanka River, 52.8990° N, 83.4950° E, 15.VII.2023, photo of a male (mature) *O. albistylum*, P. Golyakov.

Loc. 3. Aleyskii District, 3 km southwest of the village of Aleysk, pond (Lake Plotina) (0.25 km x 0.12 km), 52.0092° N, 82.7164° E, 170 m a.s.l., 11.VII.2021, 1♂ (mature), A.S. Borisov, S.N. Borisov.

Loc. 4. [Borisov, 2021]: Rubtsovskii District, 10 km west of the village of Veseloyarsk, the main canal of the Alei irrigation system (Fig. 2), 51.2931° N, 80.9631° E, 223 m a.s.l., 4.VII.2020, 1♂ (mature), visually more than 10 males, S.N. Borisov.

Loc. 5. [Borisov, 2021]: Loktevskii District, 8 km north of Pokrovka settlement, pond (0.6 km x 0.3 km) on the Pilnichikha River (Fig. 3), 51.2564° N, 81.4450° E, 285 m a.s.l., 30.VI.2020, 2♂♂ (mature), 1♀ (mature), visually more than 10 males, S.N. Borisov.

Loc. 6. [Borisov, 2021]: Rubtsovskii District, 2 km east of the village of Bugry, pond (1.2 km x 0.8 km) on the Eldarka River, 51.2831° N, 81.4886° E, 290 m a.s.l., 3.VII.2020, 1♂ (mature), visually more than 10 males, S.N. Borisov.

Loc. 7. [Borisov, 2021]: Loktevskii District, 4 km north of the village of Pokrovka, middle reaches of the Ust'yanka River (Fig. 4), 51.2242° N, 81.4731° E, 264 m a.s.l., 29.VI.2020, 4♂♂ (mature), 1♀ (mature), S.N. Borisov.

Loc. 8. Rubtsovskii District, 30 km east of the city of Rubtsovsk, 6 km north of the village of Troinka, the Kizikha River, 51.5642° N, 81.6489° E, 216 m a.s.l., 15.VI.2022, 1♂ (mature), S.N. Borisov.

Loc. 9. [iNaturalist, 2024 (observations/231986907)]: Zmeinogorskii District, 3 km east of the village of Savvushka, Lake Kolyvanskoye, 51.3574° N, 82.2022° E, 27.VII.2024, photo of a male (mature) *O. albistylum*, A. Ebel.

Loc. 10. Kuryinskii District, Kolyvan' settlement, Zavodskoy pond (1.1 km x 0.1 km) on the Belaya River, 51.3169° N, 82.5717° E, 484 m a.s.l., 9.VII.2021, 1♂ (mature), visually single individuals on the road near the pond, A.S. Borisov, S.N. Borisov.

Loc. 11. [iNaturalist, 2024 (observations/232209876)]: Altaiskii District, 4 km south of the village of Rossosh', 52.0469° N, 85.2090° E, 28.VII.2024, photo of a male (mature) *O. albistylum*, I.N. Kudina.

ORTHETRUM ALBISTYLUM HABITATS

AND ASSOCIATED ODONATOCOMPLEXES

In the Altaiskii Krai, *O. albistylum* was found by the authors in eight habitats. Three of them were flowing water bodies (a canal and small rivers). The hydro regime of the Aleiskii Main Canal (Loc.4, Fig.2) is unique, since water flows into it only during the warm period of the year (May–October). The small rivers Ust'yanka (Loc.7, Fig.4) and Kizikha (Loc.8) have a predominantly groundwater feeding. They are shallow, relatively warm, with slow current and developed aquatic vegetation. The remaining five habitats are semi-flowing ponds on small rivers (Locs 1, 3, 5 (Fig. 3), 6, 10). The water in such ponds can warm up significantly, but at the same time, they are well aerated due to the permanent change of water.

Such a combination of factors is necessary for such southern and generally oxyphilous species *O. albistylum*. For example, on the arid plains of Middle Asia, among natural reservoirs, this species inhabits only spring streams, but at the same time, it is numerous here in irrigation aryk and canals. Such habitats of anthropogenic origin are the main and often the only ones for dragonflies of this species. *O. albistylum* does not inhabit stagnant, poorly aerated reservoirs at all [Borisov, 2008; Borisov, Haritonov, 2008].

Thus, when expanding its range to the north, the originally southern oxyphilous *O. albistylum* prefers relatively “warm”, but at the same time, well-aerated water bodies, which include small rivers and ponds.

An additional characteristic of dragonfly habitats is the composition and structure of the odonatocomplexes, i.e., the set of species that are characteristic of a particular body of water. In eight places, along with *O. albistylum*, dragonflies of 24 species were collected (Table 1). It should be noted that three species among them, *Ischnura elegans* (Vander Linden, 1820), *Ischnura pumilio* (Charpentier, 1825) and *Orthetrum brunneum* (Fonscolombe, 1837), live together with *O. albistylum* in arid conditions on the plains of Middle Asia. These species are part of the odonatocomplexes of oxyphilous species inhabitants of cold springs and artificial watercourses (canals and aryk) [Borisov, 2006].

It is also interesting to note the cohabitation of *O. albistylum* and *O. brunneum*. In the south of West Siberia, both of these species were recorded simultaneously in 2020 [Borisov, 2021; Kosterin, Onishko, 2021; Onishko, Kosterin, 2021]. They were recorded together in 5 locations (Table 1, Locs 4–8). It can be assumed that they began to populate West Siberia simultaneously and relatively recently. In the last century, these species were not indicated for the northern part of Kazakhstan [Belyshev, Shevchenko, 1971]. They were first recorded here only in 2002 in Ust-Kamenogorsk at 50° N [Chaplina, 2004]. Currently, the northernmost location of *O. brunneum* is already in Novosibirsk at 55° N [Kosterin, Onishko, 2021; Onishko, Kosterin, 2021], and of *O. albistylum* slightly south of Barnaul 53° N [this paper]. Thus, in West Siberia, both species demonstrate northward expansion.



Figs 2–4. Habitats of *Orthetrum albistylum* in West Siberia. 2 — Main canal of the Alei irrigation system, Loc.4; 3 — Pond on the Pilnichikha River, Loc.5; 4 — Middle reaches of the Ust'yanka River, Loc.7.

Рис. 2–4. Местообитания *Orthetrum albistylum* в Западной Сибири. 2 — магистральный канал Алейской оросительной системы, Loc.4; 3 — пруд на реке Пильничиха, Loc.5; 4 — среднее течение реки Устьянка, Loc.7.

The range of *O. albistylum* has expanded northward over the last two decades, by approximately three degrees of latitude. The rate of expansion of this species in European Russia and West Siberia is quite comparable.

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