

Updates to the fauna of dragonflies (Odonata) of Novosibirskaya Oblast of Russia and Novosibirsk City, with the first record of *Pantala flavescens* (Fabricius, 1798) (Libellulidae) in West Siberia

Добавления к фауне стрекоз (Odonata) Новосибирской области России и города Новосибирска, в том числе первая находка *Pantala flavescens* (Fabricius, 1798) (Libellulidae) в Западной Сибири

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Ключевые слова: Odonata, стрекозы, *Coenagrion glaciale*, *Ophiogomphus obscurus*, *Pantala flavescens*, *Sympetrum fonscolombii*, Западная Сибирь, Новосибирская область, первая находка.

Abstract. In early June 2023, *Coenagrion glaciale* (Hagen in Selys, McLachlan, 1872) has been for the first time recorded in Novosibirskaya Oblast and District 3 km W of Koltsovo Town. On 13.VI.2024, a male of *Ophiogomphus obscurus* Bartenev, 1909 has been photographically registered in Iskitim District, for the first time in Novosibirskaya Oblast as well. The findings of these two species were quite expectable in Novosibirskaya Oblast. Many new findings of *C. glaciale* (Hag.) in Ural and Siberia have been submitted in recent years to iNaturalist.org. On 12–13.VIII.2024, single young individuals of two migrant species, a male of *Pantala flavescens* (Fabricius, 1798) and a female of *Sympetrum fonscolombii* (Selys, 1840), have been found at Baltiyskaya Street at the margin of Sovetskiy District of Novosibirsk City: the former species for the first time in West Siberia and the latter one for the second time in Novosibirskaya Oblast. These two dragonflies most probably represented local progenis of migrant individuals which had arrived to Novosibirsk from the south early in summer.

Резюме. В начале июня 2023 г. в Новосибирской области (и районе) был впервые найден *Coenagrion glaciale* (Hagen in Selys, McLachlan, 1872), 3 км 3 г. Кольцово. 13 июня 2024 г., самец *Ophiogomphus obscurus* Bartenev, 1909 был фотографически зарегистрирован в Искитимском районе, также впервые для Новосибирской области. Находки этих двух видов в Новосибирской области были вполне ожидаемы. В последние годы многие новые находки *C. glaciale* на Урале и в Сибири были добавлены на интернет-платформу iNaturalist.org. 12 и 13 августа 2024 г. молодые особи двух видов-мигрантов, самец *Pantala flavescens* (Fabricius, 1798) и самка *Sympetrum fonscolombii* (Selys, 1840) были обнаружены по ул. Балтийская на окраине

Советского р-на г. Новосибирска; первый вид — впервые в Западной Сибири, второй — во второй раз в Новосибирской области. Эти две стрекозы скорее всего представляли собой местное потомство особей, мигрировавших в Новосибирск с юга в начале лета.

Introduction

Novosibirskaya Oblast is among the regions of Russia best studied with respect to the fauna of Odonata, because since 1950s, Novosibirsk was and still is a home of the team of odonatologists founded by B.F. Belyshev [Haritonov et al., 2007; Haritonov, 2010; Kosterin, Onishko, 2021]. The most recent summary of this fauna made by Kosterin and Onishko [2021] contained 57 species, 55 of which were also reported for the city limits of Novosibirsk. This paper reports three more dragonflies species discovered in or near Novosibirsk in 2023–2024 for the first time in Novosibirskaya Oblast, and the second finding of one more species.

Materials and Methods

All the species reported were collected and/or photographed by the first author (further O.K.) on his bicycle trips in and around Novosibirsk Academy Town. Three of the four species for the first time reported for Novosibirskaya Oblast were found occasionally. One more species, *Coenagrion glaciale* (Hagen in Selys, McLachlan, 1872), was first discovered by the second

author (further V.O.) among photographic observations by Konstantin Romanov made between Academy Town and Koltsovo Settlement and submitted to the internet platform iNaturalist [2024], and then confirmed in that locality by O.K. All photographs were made by O.K., in 2023 with a Canon EOS 7D camera equipped with a Sigma F2.8 EX DG 38-70 Macro Lens, and in 2024 with a Sony Cyber-shot DSC-RX10 camera. They were geotagged by synchronisation using Adobe Photoshop Lightroom Classic 11.2 program with trip tracks made with a Garmin GPSmap 78 navigator, with visual checking of geolocation correctness. The dragonfly photographs made were submitted as photographic observations to iNaturalist [2024] (see also the research grade observations from there adopted by Global Biodiversity Informational Facility (GBIF) [iNaturalist, 2024]) and may serve as numerous external geotagged illustrations for this paper. They can be retrieved by substitution a specific observation number x (an integer value currently of 9 digits) into the following internet link template: <https://inaturalist.org/observation/x>. These iNaturalist observation numbers are provided below in parentheses, after the number of collected specimens, if any, or under subheading «Photographic record» if none were collected.

To preserve colours and harden, fresh collected specimens were put into acetone overnight and then dried. They are currently kept in the first author's collection.

The present work is registered in ZooBank (www.zoobank.org) under urn:lsid:zoobank.org:pub:F27B6F05-96BF-48F3-8243-01C40ADD0170

Results

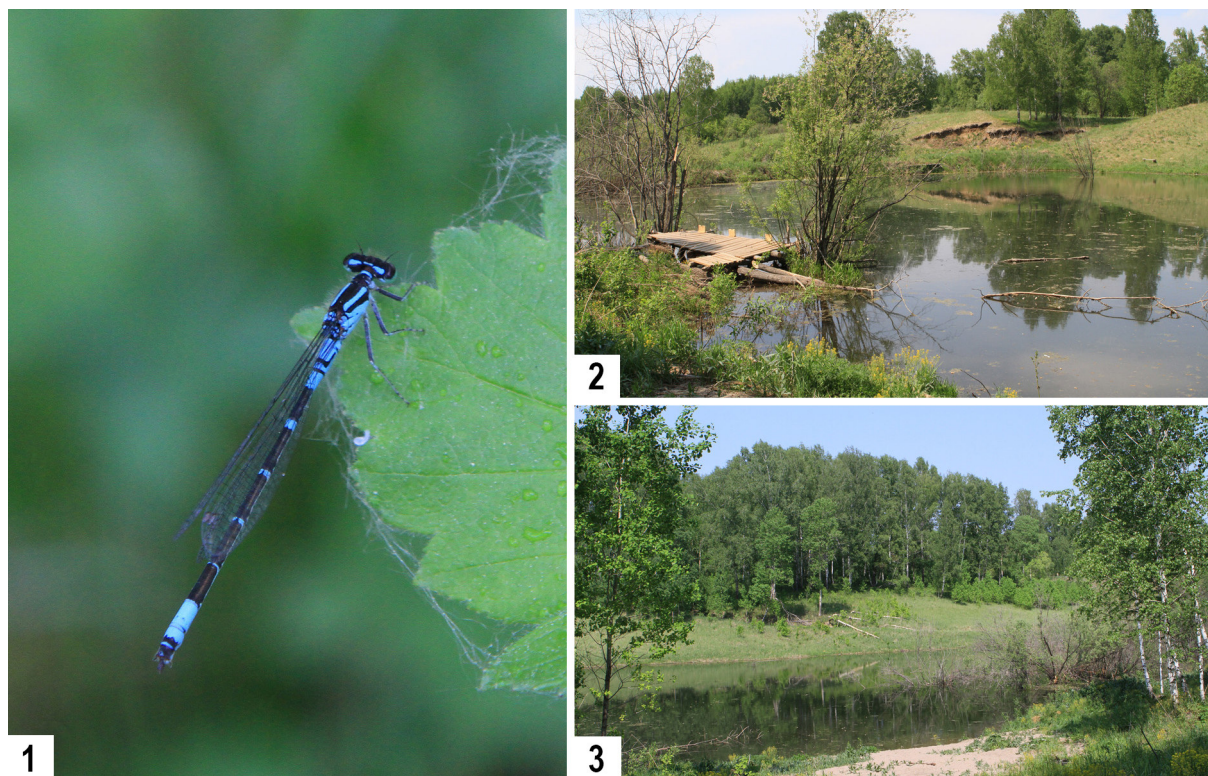
Coenagrion glaciale (Hagen in Selys, McLachlan, 1872)

Fig. 1.

Material. Novosibirskaya Oblast, Novosibirsk District: 3 km W of Koltsovo Town, the pond on the Dol Rivulet at the Klon Garden Fellowship, 54.8956° N, 83.1984° E, h~178 m a.s.l., 7.VI.2023, O.K. — 2♂♂ (193960355) (Fig. 1).

Photographic record. The same place as above, 4.VI.2023, K. Romanov — 1♀ (51565830).

Observations. The pond where this species occurred (Figs 2–3) was small (150 × 65 m), as formed by a dam across the Dol Rivulet flowing in a moderately deep valley with meadows and birch and aspen groves, where many aspen trees and saplings were felled by beavers. The pond was chest-deep, with the water warm at the surface but cold beneath. It had some willow bushes at banks but lacked emerging vegetation except for scarce *Hydrocharis morsus-ranae* L. It appeared to be remarkably rich in early summer Odonata, 10 species of which were found there at once on 7.VI.2023: many *C. hastulatum* (Charpentier, 1825) (most numerous, 193987945, 193988404), *C. puella* (Linnaeus, 1758) (193954472, 193954745, 193957898, 193990651, 193991856, 193992220), *C. johannsoni* (Wallengren, 1894) (193953753, 193954107, 193987873, 193989189, 193989711) and few *Sympecma paedisca* (Brauer, 1877) (193992156), *Coenagrion armatum* (Charpentier, 1840) (193990164, 193990861), *C. glaciale*, *Erythromma najas najas* (Hansemann, 1823) (193987644), *Libellula quadrimaculata* Linnaeus, 1758, *L. rubicunda* (Linnaeus, 1758) and *Cordulia aenea aenea* (Linnaeus, 1758). Along with few males of *C. glaciale*, there were quite many individuals of both sexes, including ovipositing tandems (193989711), of one more species of the same genus which is rare in the area, *C. johannsoni* [Kosterin,



Figs 1–3. Habitus and habitat of a *Coenagrion glaciale* (Hagen in Selys, McLachlan, 1872). 1 — male; 2–3 — two different views on a habitat site.

Рис. 1–3. Внешний вид и местообитание *Coenagrion glaciale* (Hagen in Selys, McLachlan, 1872). 1 — самец; 2–3 — два фото местообитания с разного ракурса.

2013]. The reason why that pond was so favourable for diverse Odonata remained unclear. A search of both *C. glaciale* and *C. johannsoni* at similar ponds in the environs of Novosibirsk Academy Town situating 7–10 km to the south-east was not successful.

Two males of *C. glaciale* were observed; they fast and restlessly flew above the water surface along the bank, examining sparse twigs, leaves and stems protruding from water and making short attacks toward other damselflies. They were impossible to photograph, but when a shower approached a male was noticed which fast flew off of water, examining herbage and small bushes as if intending to land, at last landed on a bush branch ca 1 m above the ground, but twice changed the position (Fig. 1). Such a high flying activity of *C. glaciale* males, as compared to its congeners, which is retained during rains, and their inclination towards open water surface was reported for this species in general [Onishko, Kosterin, 2021].

Ophiogomphus obscurus Bartenev, 1909

Fig. 4.

Photographic record. Novosibirskaya Oblast, *Iskitim District*: 3.8 km SW of Nizhniy Koyon village, the Opalikha Rivulet 120 m upstream of its mouth in the Koyon River floodplain left side, 54.7984° N, 83.3403° E, h~131 m a.s.l., 13.VII.2024, O. Kosterin — 1♂ (229237707).

Remarks. Identification of this species by photo is unmistakable because of the saturated green ground colour, including on the abdomen, the cerci nearly straight and not longer than the paraproct, the vertex missing the pale spot (Fig. 3).

Observations. A male of this species was noticed occupying a small shale stone amidst quite a fast and shallow stream of Opalikha and photographed (Fig. 3), but immediately after this it flew away and was not collected.

The Opalikha Rivulet was too small for breeding of gomphids and there is no doubt that this species breeds in the moderate-sized, knee- to neck-deep and remarkably cold (in a very hot midsummer) Koyon River, which was just 120 m apart. In that Koyon River valley, the closely related species *Ophiogomphus cecilia* (Geoffroy in Fourcroy, 1785) is common, 2♀♀ and 1♂ of which were registered photographically some two hours later and 2 km apart to the north-east (229233206, 229235485, 229236450).

Pantala flavescens (Fabricius, 1798)

Figs 5, 7–8.

Photographic record. Novosibirsk, *Sovetskiy District*: Baltiyskaya Street, a broad cutting through pine forest, 54.8581° N, 83.0634° E, h~121 m a.s.l., 12.VIII.2024, O. Kosterin — 1♂ (235945384).



Fig. 4. External appearance of an *Ophiogomphus obscurus* Bartenev, 1909 at the Opalikha Rivulet.

Рис. 4. Внешний вид стрекозы *Ophiogomphus obscurus* Bartenev, 1909 на р. Опа́лиха.

Remarks. Judging by the coloration and state of the wings, this male specimen was very fresh, emerged not more than few days before.

Observations. At 3:25 p.m., O.K. noticed an individual of *P. flavescens* while flying above a small open place about 15–20 m in diameter near a small elevation with a big power line pole (Fig. 6) amidst a 45 m broad cutting in pine forest along which the continuation of Baltiyskaya Street was going, being there a busy road without buildings. The dragonfly was flying in a manner so characteristic for this species, making almost regular rounds at the variable height of 2–5 m. O.K. had no net and tried to photographically register it while flying (Fig. 5) but had an unfit camera. The sun shone though some Cirrostratus clouds which at one moment became thicker and the sunlight faded. The dragonfly gradually lowered the height of its rounds and at 3:34 p.m. at last landed on ruderal herbs low above the ground. O.K. managed to come close and photograph it (Fig. 7). It was startled but flew only for about one meter and landed again (Fig. 8). O.K. tried to catch it by hand, approached it for some 5 cm but the strike appeared too slow and he missed. After few minutes the dragonfly re-appeared in the air above the same place once again and flew for several more rounds for next few minutes but then it rose high above pine crowns and disappeared. That behaviour was typical for this species, but in the main range, these dragonflies usually fly in swarms of few to hundreds individuals [Onishko, Kosterin, 2021]. Next two days that place was examined but *P. flavescens* was no longer found.

Sympetrum fonscolombii (Selys, 1840)

Figs 9–10.

Material. Novosibirsk, *Sovetskiy District*: a wasting land patch 90×80 m with ruderal vegetation at Baltiyskaya Street 31, 54.8551° N, 83.0533° E, h~109 m a.s.l., 13.VIII.2024, O. Kosterin — 1♀ (235959137).

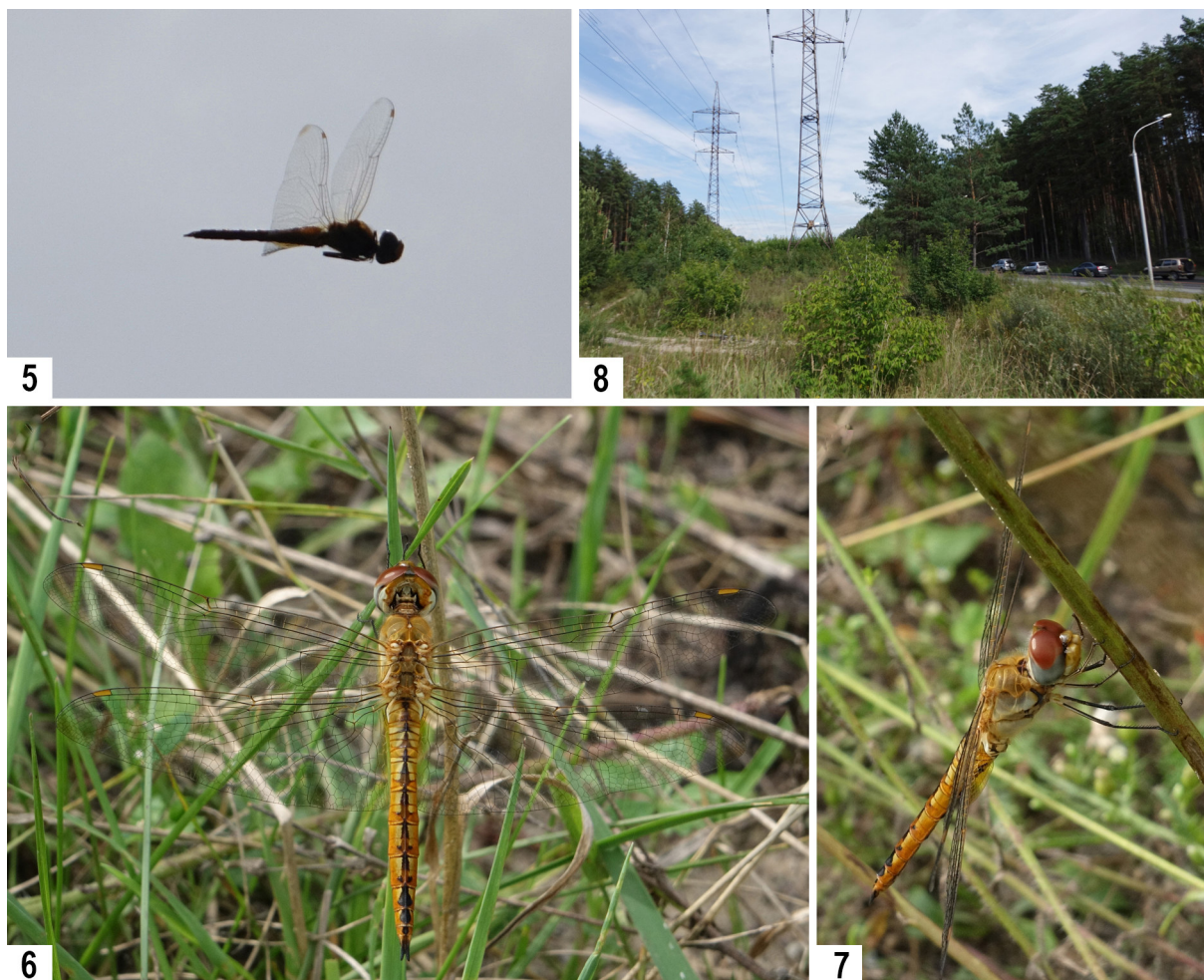
Remarks. Again, judging by its coloration, the individual collected was very fresh.

Observations. Curiously, this finding of one more migrant species was made next day after the above considered finding of *P. flavescens* and just 720 m apart — actually it was made on a vain attempt to once more find that species. The female of *Sympetrum fonscolombii* perched on the top of an inflorescence of *Chenopodium album* L. (Fig. 8) in a 90×80 m wasting land patch with ruderal vegetation (Fig. 10). Of other Odonata, there were many *Sympetrum flaveolum* (Linnaeus, 1758), *S. sanguineum* (Müller, 1764), *S. vulgatum vulgatum* (Linnaeus, 1758), few *S. pedemontanum pedemontanum* (Müller in Allioni, 1766), *Aeshna grandis* (Linnaeus, 1758), and a single male of *Aeshna crenata* Hagen, 1856.

Discussion

Findings of *C. glaciale* and *O. obscurus* in Novosibirskaya Oblast were predicted by Kosterin and Onishko [2021].

C. glaciale is known to range in Russia from Arkhangelskaya Oblast and South Ural in the west to the Pacific coast in the east, but so far was not recorded in Novosibirskaya Oblast [Onishko, Kosterin, 2021]. Its closest, although still quite remote, published records were as follows: Tomskaya Oblast, near Volodino and Sugot villages [Popova, Haritonov, 2013] (240 km to NNE from the here published locality), Lake Ishkol in the eastern foothills of the Kuznetskoe Alatau Mts (360 km to ENE) [Kosterin et al., 2011] and Kyshtym District of Chelyabinskaya Oblast (1,430 km to W) [Haritonov,



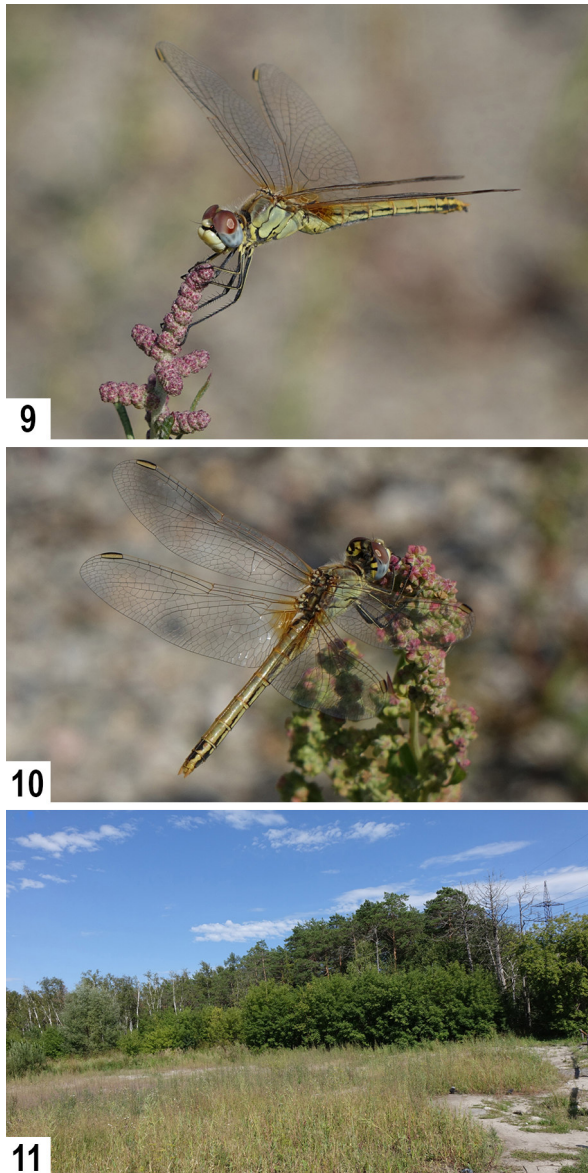
Figs 5–8. A young male of *Pantala flavescens* (Fabricius, 1798) found in Novosibirsk. 5 — dragonfly in flight; 6 — dragonfly, dorsal view; 7 — dragonfly, lateral view; 8 — habitat.

Рис. 5–8. Молодой самец *Pantala flavescens* (Fabricius, 1798), обнаруженный в Новосибирске. 5 — стрекоза в полёте; 6 — стрекоза сверху; 7 — стрекоза сбоку; 8 — местообитание.

Eremina, 2010]. The former of these records was close enough to expect this species in Novosibirskaya Oblast too. In recent years, quite a number of photographic records of *C. glaciale* appeared at iNaturalist [2024] which substantially updated our knowledge of the distribution of this species in the Urals and West Siberia: *Chelyabinskaya Oblast*, Kaslino District, Bogoryak village environs, 56.21227N, 61.47889E, 30.V.2024, 1♀, by Sergey Sanatin (221823463); *Sverdlovskaya Oblast*, Sysert District, Bolshoy Istok village environs, 56.73466, 60.76133, 5.VI.2023, tandem, by Igor Fadeev (221010792), Ekaterinbug, 56.91354, 60.5604, 31.V.2024, 1♀, by Mikhail Belykh (220690916); *Tomskaya Oblast*, Filimonovka village environs, 57.19237, 85.81926, 5.VI.2021, tandem, by Konstantin Samodurov (83356664), Tomskiy District including Tomsk and Seversk Cities, 13 observations by Leonid Grishaev, Alexander Popov and Natalya Gabrusenko (118158754, 164957971, 164957972, 164957973, 164957974, 164957977, 164957982, 165303057, 165303061, 166618840, 166618843, 166867231, 166867310). All these records, as well as the here published ones, were

made in late May/early June, in line of the early flight period of this species [Onishko, Kosterin, 2021].

O. obscurus Bart. was described, as «*Ophiogomphus cecilia* var. *obscura* var. n.» by a series of male syntypes the number of which was not reported [Bartenev, 1909]. Most of them were collected by A.N. Bartenev on 17–21.VII.1908 (according to the Julian Calendar, that is 30.VII–3.VIII.1908 according to the present Grigorian Calendar) at Zavarzino village (56.47° N, 85.08° E) in the eastern suburbs of Tomsk, in the Siberian Stone Pine (*Pinus sibirica* Du Tour) forest and above the Ushayka River. Besides, in the same paper, one more male specimen was implicitly added to the syntype series by identification as «*Ophiogomphus cecilia* var. *obscura* Bartenev», which was collected by M. Mordokhovich in the summer of 1908 in 450 km to the NNE, in Belskoe village (57.82° N, 92.17° E) of Balagansk District of Irkutsk Governorate (currently in Pirovskii District of Krasnoyarskii Krai). The shortened English translation of the same paper, again mentioning «var. n.», was published a year later [Bartenev, 1910: 277]. Hence, the environs of both Zavarzino and Belskoe villages,



Figs 9–11. Habitus and the place of occurrence of a young female of *Sympetrum fonscolombii* (Selys, 1840). 9 — dragonfly, lateral view; 10 — dragonfly, dorsal view; 11 — habitat.

Рис. 9–11. Внешний вид и место обнаружения молодой самки *Sympetrum fonscolombii* (Selys, 1840). 9 — стрекоза сбоку; 10 — стрекоза сверху; 11 — местообитание.

so distant from each other, comprise the type locality of *O. obscurus*. Most probably all syntypes no longer exist [Medvedev et al., 2013].

Zavarzino near Tomsk is situated ~216 km NNE from the here reported locality. The closest observations of this species in iNaturalist [2024] are clustered around Tomsk as well. Interestingly, Wnukowsky [1928] and Belyshev [1964] each reported for Tomsk single males of the very close species *O. cecilia* stressing that they were not *O. obscurus* (which they considered as only a variety or subspecies of the former). No recent observation of *O. cecilia* near Tomsk has been so far uploaded to iNaturalist [2024]. Anyway, now we observed co-occurrence of both species in the Koyon River valley.

The same was earlier reported for the Isha River in Altai Republic and the Mana River in Krasnoyarskii Krai [Kosterin, Zaika, 2010; Kosterin, 2020a]. *O. obscurus* is more or less confined to the taiga zone, slightly extending to broad-leaved forests in Korea [Kosterin, 2020a; Onishko, Kosterin, 2024], hence it was expected in Novosibirskaya Oblast either more northerly, in Bolotnoe District, or more easterly, on the low, taigous Salairskii Kryazh Range [Kosterin, Onishko, 2021], rather than in the forest-steppe surroundings of Novosibirsk, where it was actually found. No doubt, it will be sooner or later found in those regions as well.

The here reported finding of *P. flavescens* is the first in West Siberia; its previous findings in Siberia were confined to SE Transbaikalia [Kosterin, 2004], that is East Siberia, ~2 200 km ESE from Novosibirsk. The here reported record was made half a degree southerly from the current world northern record of this species being Moscow (67407112) (~2 800 km W from Novosibirsk) [Onishko, Kosterin, 2021]. The fact that it was noticed in Moscow and Novosibirsk, where few people live which are able to recognise this species while flying, probably suggests that it rarely occurs throughout the temperate zone of Russia but remain unnoticed. Indeed, a photographic record of this species from Bashkortostan (Oktyabrskiy Settlement, Kazan, 54.490 53.498 E, 23.VIII.2024, 1♂, by Denis Volodin), ~1900 km W from Novosibirsk was recently uploaded to iNaturalist [2024] (237424588).

S. fonscolombii has once been recorded in the western part of Novosibirskaya Oblast: Zdvinsk District, Lake Shirokaya Kurya [Popova, Eremina, 2016], so the above female comprises the second record in the Oblast and the first one in its eastern part and in Novosibirsk in particular.

Curiously, *P. flavescens* and *S. fonscolombii* were found in two adjacent days 720 m apart from each other at pine forest margin in a broad cutting of a street, and on 12.VII.2020 nearly at the same place, the third known specimen (female) of the locally extremely rare (and non-migrating) species *Somatoclora exuberata* Bartenev, 1910 was collected (52964113) [Kosterin, 2020b].

P. flavescens [Borisov, 2012; Kalkman, Monnerat, 2015; Borisov, Malikova, 2019; Borisov et al., 2020a; Borisov, Borisov, 2024] and *S. fonscolombii* [Borisov et al., 2020 b,c] are well known migrating species which cannot over-winter in the temperate zone but are able to migrate there and even produce their progeny during the warm season. Judging by their clear coloration and perfect state, both individuals, of *P. flavescens* and *S. fonscolombii*, were very fresh, perhaps not more than a week old, but hardly as young as 1–2 days since their wings were already not glittering. This indicates that they were of a local origin, that is they had emerged from some nearby stagnant water bodies. A focused examination of such ones for those species in few following days did not reveal them. Then they must represent the progenies of some individuals which migrated to Novosibirsk from the south early in the season (May–June). They should have originated from the regions where these species are able of

persisting during winter. Taking into account the situation of Novosibirskaya Oblast and the mountain relief to the south of it, the parents of our individuals have arrived from somewhere in South-West Asia: *P. flavescens* in its regions southerly of 30° N [Borisov, 2012; Borisov et al., 2020a] and *S. fonscolombii* from those southerly of 36–37° N [Borisov, 2011; Borisov et al., 2020 b, c].

It could be added that of the three species of Odonata now added to the known fauna of Novosibirskaya Oblast two (*C. glaciale* and *O. obscurus*) were known to range more northerly and one (*P. flavescens*) — more southerly, and *S. fonscolombii* recorded in the Oblast for the second time, is also a southern species. Hence the new faunal updates are well balanced with respect to northern and southern species.

Based on the count by Kosterin and Onishko [2021] updated with the three species hereby reported for the first time, the revealed fauna of Odonata of Novosibirskaya Oblast currently includes 60 species. Of these, only *C. glaciale*, *A. caerulea* (Ström, 1783) and *O. obscurus* Bart. have not yet been recorded in the Novosibirsk City limits, although the former species was found very close to them, and only *A. caerulea* was not yet recorded in the part of the Oblast easterly of the Ob River.

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References

- Bartenev A.N. 1909. [List XII]. [Materials on the fauna of dragonflies of Siberia (1–5) // N.F. Kashchenko (Ed.): Spiski Kollektitsiy Bespozvonochnykh Zoologicheskogo Muzeya Imperatorskago Tomskogo Universiteta pod obshchey redaktsiyey Professora N.F. Kashchenko. Spiski XI–XII (s tablitsami I i II). Tomsk: Tipo Litografiya Sibirskago T-va Pechatnogo Dela. P.3–56. [In Russian].
- Bartenev A.N. 1910. Data related to Siberian dragonflies // Zoologischer Anzeiger. Bd.35. P.270–278.
- Borisov S.N. 2011. [Migrant dragonflies in Middle Asia. 2. *Sympetrum fonscolombii* (Selys 1840) (Odonata, Libellulidae)] // Euroasian Entomological Journal. Vol.10. No.4. P.415–421. [In Russian].
- Borisov S.N. 2012. [Migrant dragonflies in Middle Asia. 3. *Pantala flavescens* (Fabricius, 1798) (Odonata, Libellulidae)] // Euroasian Entomological Journal. Vol.11. No.1. P.37–41. [In Russian].
- Borisov S.N., Borisov A.S. 2024. Migrant dragonfly *Pantala flavescens* (Fabricius, 1798) (Odonata, Libellulidae) in western Russia and different migration cycles in the western Palearctic // Euroasian Entomological Journal. Vol.23. No.6. P.360–368. <https://doi.org/10.15298/euroasentj.23.06.13>
- Borisov S.N., Iakovlev I.K., Borisov A.S., Ganin M.Y., Tiunov A.V. 2020a. Seasonal migrations of *Pantala flavescens* (Odonata: Libellulidae) in Middle Asia and understanding of the migration model in the Afro-Asian region using stable isotopes of hydrogen // Insects. Vol.11. No.12. Art.890. <https://doi.org/10.3390/insects11120890>
- Borisov S.N., Iakovlev I.K., Borisov A.S., Zuev A.G., Tiunov A.V. 2020b. Isotope evidence for latitudinal migrations of the dragonfly *Sympetrum fonscolombii* (Odonata: Libellulidae) in Middle Asia // Ecological Entomology. Vol.45. No.6. P.1445–1456. <https://doi.org/10.1111/een.12930>
- Borisov S.N., Malikova E.I. 2019. Distribution and migration strategy of *Pantala flavescens* (Fabricius, 1798) (Odonata, Libellulidae) near the northern limit of the range in Transbaikalia and in the Far East of Russia // Euroasian Entomological Journal. Vol.18. No.3. P.155–152. <https://doi.org/10.15298/euroasentj.18.3.01>
- Borisov S.N., Onishko V.V., Borisova N.V., Popova O.N., Borisov A.S., Iakovlev I.K. 2020. Northern limits of distribution and migration strategy of the dragonfly *Sympetrum fonscolombii* (Selys, 1840) (Odonata, Libellulidae) in Russia // Euroasian Entomological Journal. Vol.19. No.6. P.322–328. <https://doi.org/10.15298/euroasentj.19.6.05>
- Haritonov A.Yu. 2010. A dedication to Boris Fedorovich Belyshev on his 100th birthday: retrospective and perspectives of odonatology in Siberia // Euroasian Entomological Journal. Vol.9. No.2. P.223–230. [In Russian].
- Haritonov A.Yu., Borisov S.N., Popova O.N. 2007. Odonatological researches in Russia // Euroasian Entomological Journal. Vol.6. No.2. P.143–156. [In Russian].
- Haritonov A.Yu., Eremina E.E. 2010. [The dragonflies (Odonata) of South Ural: the value of regional faunistic research] // Euroasian Entomological Journal. Vol.9. No.2. P.263–273 [In Russian].
- iNaturalist. 2021. Internet resource: <https://www.inaturalist.org>. Accessed 1.X.2024.
- iNaturalist. 2024. iNaturalist Research-grade Observations. iNaturalist. Occurrence dataset: <https://doi.org/10.15468/ab3s5x> Accessed via GBIF.org 1.X.2024.
- Kalkman V.J., Monnerat C. 2015. *Pantala flavescens* (Fabricius, 1798) // Boudot J.-P., Kalkman V.J. (eds): Atlas of the European dragonflies and damselflies. Zeist: KNNNV Publishing. P.289–291.
- Kosterin O.E. 2004. Odonata of the Dauriskii State Nature Reserve area, Transbaikalia, Russia // Odonatologica. Vol.33. No.1. P.41–71.
- Kosterin O.E. 2013. [New data on dragonflies and damselflies (Odonata) of Akademgorodok and its surroundings] // Zhimulev I.F. (Ed.): [Dynamics of Ecosystems of Novosibirsk Academy Town]. Novosibirsk: SO RAN. P.204–209. [In Russian].
- Kosterin O.E. 2020a. *Ophiogomphus obscurus*. The IUCN Red List of Threatened Species 2020: e.T138183235A141941825. Internet resource: <https://dx.doi.org/10.2305/IUCN.UK.2020-1.RLTS.T138183235A141941825.en>. Accessed 15.X.2024.
- Kosterin O.E. 2020b. *Somatochlora exuberata*. The IUCN Red List of Threatened Species 2020: e.T50980636A142917078. Internet resource: <https://dx.doi.org/10.2305/IUCN.UK.2020-1.RLTS.T50980636A142917078.en>. Accessed 15.X.2024.
- Kosterin O.E., Onishko V.V. 2021. Two newly recorded dragonfly species (Odonata: Libellulidae) for the Novosibirskaya Oblast of Russia // Euroasian Entomological Journal. Vol.20. No.4. P.221–228. <http://dx.doi.org/10.15298/euroasentj.20.4.10>
- Kosterin O.E., Skalon N.V., Skalon T.N. 2011. [Interesting findings of Odonata in the Kuzhentskiy Alatau Mts. north-eastern foothills] // Amurian Zoological Journal. Vol.3. No.2. P.124–127. [In Russian].
- Medvedev A.F., Kosterin O.E., Malikova E.I., Schneider W. 2013. Description date of *Somatochlora exuberata* Bartenev, *Leucorrhinia intermedia* Bartenev and *Sympetrum vulgatum grandis* Bartenev, the fate of A.N. Bartenev's type specimens and designation of the lectotype of *L. intermedia* (Anisoptera: Corduliidae, Libellulidae) // Odonatologica. Vol.42. No.3. P.211–228.
- Onishko, V., Kosterin, O. 2021. [Dragonflies of Russia. Illustrated Photo Guide]. Moscow: Phytos XXI. 480 p. [In Russian].
- Popova O.N., Eremina E.E. 2016. *Sympetrum fonscolombii* (Selys, 1840) (Odonata: Libellulidae) in northernmost areal localities in Chelyabinskaya and Novosibirskaya Oblasts of Russia // Euroasian Entomological Journal. Vol.15. No.1. P.45–59. [In Russian].
- Popova O.N., Haritonov A.Yu. 2013. [Odonata of the East Vasyugan, West Siberia, Russia] // Euroasian Entomological Journal. Vol.12. No.3. P.217–223. [In Russian].
- Wnukowsky W.W. 1928. [Contribution à la faune des Odonates de la Sibirie occidentale] // [Les travaux de l'institut agronomique et forestier]. Vol.10. P.195202. [In Russian, with French resume].