

Two newly recorded dragonfly species (Odonata: Libellulidae) for the Novosibirskaya Oblast of Russia

Два вида стрекоз (Odonata: Libellulidae) впервые найдены в Новосибирской области России

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Ключевые слова: Odonata, стрекозы, *Orthetrum brunneum*, *Sympetrum depressiusculum*, Западная Сибирь, Новосибирская область, первая находка, загрязнение воды.

Abstract. In 2020, *Orthetrum brunneum* (Fonscolombe, 1837) and *Sympetrum depressiusculum* (Selys, 1841) were first recorded for Novosibirskaya Oblast as photographic observations in the iNaturalist internet platform. Their populations and habitats were examined *in situ*. The habitat of *O. brunneum* at the Eltsovka Vtoraya River in Zaeltsovskiy Park in Novosibirsk lacked other lotic Odonata as a result of pollution. Supposedly the river inside the city limits is warm enough during winter to make possible its colonisation by *O. brunneum* far to the north of its main range. The record of *S. depressiusculum* (Selys, 1841) at the Obskoe Water Reservoir is the northernmost in Siberia. A list of 57 Odonata species currently known from Novosibirskaya Oblast is also provided.

Резюме. В 2020 г. *Orthetrum brunneum* (Fonscolombe, 1837) и *Sympetrum depressiusculum* (Selys, 1841) были впервые отмечены в Новосибирской области в виде фотографических наблюдений на интернет-платформе iNaturalist. Их популяции и местообитания были затем обследованы на месте. Популяция *O. brunneum* обитает в Зельцовском парке Новосибирска на речке Ельцовка 2я, ниже по течению от её участка длиной 9 км, протекающего через город. Её вода загрязнена и потому лишена иных реофильных видов стрекоз и, возможно, подогрета в зимнее время, что по всей видимости и позволило *O. brunneum* колонизировать это местообитание столь далеко к северу от его основного ареала. Находка *S. depressiusculum* (Selys, 1841) на Обском водохранилище — также самая северная в Сибири. Приведён список из 57 видов стрекоз, на данный момент известных из Новосибирской области.

Introduction

The fauna of dragonflies (Odonata) of Novosibirskaya Oblast (Novosibirsk Province) is well studied because the team of odonatologists, founded by

B.F. Belyshev in 1950s and having been working until present, is based in Novosibirsk at the Institute of Systematics and Ecology of Animals of the Siberian Branch of the Russian Academy of Sciences (formerly Biological Institute) [Haritonov et al., 2007; Haritonov, 2010]. Some areas attracted focused attention: the Karasuk Station of the above mentioned institute, situated in the steppe zone at Troitskoe village of Karasuk District [Zaika, 1974; Borisov, 2005; Borisov et al., 2012] and Novosibirsk Academy Town, being an isolated part of Novosibirsk City embracing nearly undisturbed natural habitats of the eastern forest-steppe and pine forests at the Ob' River [Kosterin 2007, 2013, 2020]. Kosterin et al. [2001] first summarised the fauna of the eastern part of the province bordered by the Ob' River to include 48 species. This figure did not contain two species, which to that moment had been found only in the western part of the province: *Lestes macrostigma* (Eversmann, 1836) [Zaika, 1974] and *Aeshna caerulea* (Ström, 1783) [Belyshev, 1973]. The latter report was rather dubious as being two dots immediately to the north and to the south of Lake Chany and the mention of the northern Barabinskaya forest-steppe in the monograph by Belyshev [1973], without published details. No further records of that taigous species in Novosibirskaya Oblast appeared since that. Popova & Haritonov [2012] updated the provincial fauna with *Coenagrion ecornutum* (Selys, 1872) and *Orthetrum cancellatum* (Linnaeus, 1758), Kosterin [2013] with *Ischnura pumilio* (Charpentier, 1825), Popova, Eremina [2016] with *Sympetrum fonscolombii* (Selys, 1840). Kosterin [2015] summarised the Odonata fauna of the territory of Novosibirsk City to include 50 species but *Lestes barbarus* (Fabricius, 1798) was included in error. Kosterin [2020] updated the fauna of the city limits with *C. ecornutum*, *Aesh-*



Fig. 1. *Orthetrum brunneum* at the El'tsovka 2nd Rivulet valley just upstream of the pipeline bridge, Zayel'tsovskiy Park, in Novosibirsk, 7.07.2020: a — immature male; b — female; c — semimature male. Photo by O. Kosterin.

Рис. 1. *Orthetrum brunneum* у р. Ельцовка 2я сразу выше моста трубопровода, Заельцовский парк в Новосибирске, 7.07.2020: а — молодой самец; б — самка; в — полузрелый самец. Фото О. Костерина.

na subarctica Walker, 1908 and *Somatochlora exuberata* Bartenev, 1910, the latter species (hitherto considered not to occur westerly of Central Siberia) being new for the Novosibirskaya Oblast. To the end of 2019 the known fauna of dragonflies and damselflies of Novosibirskaya Oblast counted 55 species and that of the Novosibirsk City territory — 52 species.

Materials and Methods

Since dragonflies are large and colourful creatures, many their species can be reliably identified by photographs. In order to collect 'citizen science' data on dragonfly distribution from numerous amateur naturalists of our country, we utilised the popular internet platform iNaturalist [2021]. In April 2020, the second author launched there the collection project Dragonflies of Russia (2021), later converted to an umbrella project combining data from regional projects launched for all subjects of Russian Federation. 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 Ueda [2021]. In 2020 this way of collecting information yielded two dragonfly species new for Novosibirskaya Oblast. The first author then examined *in situ* the exact habitat of one of them, and found the other species in a habitat close to that recorded in iNaturalist. All photographic records are geo-tagged; the coordinates are provided below in the decimal degree format, with the precision of four digits after decimal point.

Results

Orthetrum brunneum (Fonscolombe, 1837)

Fig. 1.

Material. Novosibirsk, Zayel'tsovskiy Park, the El'tsovka 2nd Rivulet valley just upstream of the pipeline bridge, 55.057° N, 82.871° E, 7.07.2020, O. Kosterin — 2♂♂ (immature), 3♀♀ (in the Institute of Systematics and Ecology of Animals of the Siberian Branch of the Russian Academy of Sciences (ISEA further in the text) and the first author's collection).

Photographic data in iNaturalist (2021) (identification numbers for specific observations are given in parenthesis): Novosibirsk, Zayel'tsovskiy Park, the El'tsovka 2nd Rivulet valley, 55.0594° N, 82.8702° E, 1.07.2020, I. Sukhov — 1♀ (51565830, 51565839); the same place, 55.0628° N, 82.8708° E, 1.07.2020, I. Sukhov — 1♀ (51566851); the same place, 55.0600° N, 82.8714° E, 5.07.2020, D. Zhbir — 1♂ (mature) (51997093); the same place, 55.0571° N, 82.8711° E, 7.07.2020, O. Kosterin — 1♂ (immature), 1♀ (52383679, 52383777); the same place, 55.0575° N, 82.8712° E, 7.07.2020, O. Kosterin — 1♀ (Fig. 1a) (52386428); the same place, 55.0576° N, 82.8713° E, 7.07.2020, O. Kosterin — 1♀ (Fig. 1b) (52387580); the same place, 55.0579° N, 82.8712° E, 7.07.2020, O. Kosterin — 1♂ (semimature) (Fig. 1c) (52427069); the same place, 54.9698° N, 82.8241° E, 8.07.2020, I. Sukhov — 1♂ (mature) (52356477); the same place, 55.0593° N, 82.8704° E, 2.08.2020, I. Sukhov — 1♀ (55127591).



Fig. 2. Habitat of *Orthetrum brunneum* in Novosibirsk: the El'tsovka 2nd Rivulet valley in Zayel'tsovskiy Park, 7.07.2020: a — downstream of the pipeline bridge; b — upstream of the pipeline bridge (not that bridge seen, much bigger). Photo by O. Kosterin.

Рис. 2. Местобитание *Orthetrum brunneum* в Новосибирске: р. Ельцовка 2я в Зайельцовском парке, 7.07.2020: а — ниже моста трубопровода; б — выше моста трубопровода. Фото О. Костерина.

Observations. In 2020, three photographic observations of this species unexpectedly appeared in iNaturalist, made on 1 and 5.07.2020 by two nature photographers, Ilya Sukhov and Denis Zhbir, in the same locality in Novosibirsk: the El'tsovka 2nd [El'tsovka Vtoraya] Rivulet valley in Zayel'tsovskiy Park. The river flows there in a very narrow valley with a steep and high left border, while the surrounding elevated surfaces are overgrown with pine forest belonging to the broad pine stripe along the Ob' River. Observations by I. Sukhov were made in the floodplain of the El'tsovka 2nd at its both banks, while that by D. Zhbir was made in open pine forest at the brink of the valley left side.

On 7.07.2020 this population was examined by the first author who for one and half hours met in total 9 individuals of *O. brunneum* on a 200 m long river stretch: a mature (bue) male, a semimature (scarcely pruinosed) male, two immature (non-pruinosed) males, four females and a teneral (with still glittering wings) female. This result implied that the imagines developed in this river rather than arrived from elsewhere, and their flight period had started not so long ago. The downstream end of the examined river section was marked with a big pipeline crossing the river with a bridge, and a ground road along it. The river was fast and even noisy at numerous big stones downstream of the bridge (maybe not natural there) (Fig. 2a), upstream of which its flow was laminar (Fig. 2b). The water was slightly turbid and rather cool. The floodplain was occupied mostly by *Betula pendula*

Roth, *Acer negundo* L. and *Padus avium* Mill. stands of variable density and grassy glades. The imagines preferred open places by the river and perched on dry branches or stems of *Equisetum hyemale* L. (Fig. 1b). Two females (Fig. 1b) and immature male kept close to a small barren bluff but still perched on stems. A semimature male occupied a small hole in the ground road and sat exclusively to its walls (Fig. 1c). These dragonflies, both immature and mature, were obviously associated with the river. Only one female was found in a small glade by a forest road on the elevated area 90 m to the east of the river valley. It is noteworthy that no other lotic Odonata were observed at the river, including elsewhere common *Calopteryx splendens splendens* (Harris, 1780) or *Platycnemis pennipes* (Pallas, 1771). Only few individuals of *Sympetrum sanguineum* (Müller, 1764), and *S. flaveolum* (Linnaeus, 1758), omnipresent at dispersal, were observed.

In August, I. Sukhov made the last photographic record of *O. brunneum* at that place on 2.08.2020, while the first author already did not find it on 28.08.2020. (The aspect of *Sympetrum* changed: there were *S. vulgatum vulgatum* (Linnaeus, 1758), *S. danae* (Sulzer, 1776) and, again, *S. flaveolum*).

In general, all 2020 records of *O. brunneum* were scattered over a stretch of the El'tsovka 2nd course its crossing by the pipeline bridge to 334 m upstream of it. This does not imply that the population is actually confined to that short river section but just shows our current knowledge.

Sympetrum depressiusculum (Selys, 1841)

Fig. 3.

Material. Novosibirskaya Oblast: *Ordynskoe District*, Obskoe Water Reserve NW bank, 1.1 km NE of the Spirino village outskirts, an inundated stone quarry, 54.148° N, 81.612° E, 5.08.2020, O. Kosterin — 11♂♂, 7♀♀. *Novosibirsk*, Academy Town environs, the Obskoe Water Reserve E bank, the Zyryanka Rivulet estuary, 54.819° N, 83.085° E, 21.08.2020, O. Kosterin — 2♂♂ (in ISEA and the first author's collection).

Photographic data in iNaturalist (2021) (identification numbers for specific observations are given in parenthesis): *Novosibirskaya Oblast: Ordynskoe District*, Karakanskiy Bor pine forest, the Obskoe Water Reserve SE bank at the Glukhaya Rivulet estuary, 54.4374° N, 82.2687° E, 14.08.2020, P. Komkov — 1♂, 1♀ in tandem (Fig. 3) (57228233); almost the same place, 54.4372° N, 82.2694° E, 14.08.2020, P. Komkov — 1♂ (57228253); *Ordynskoe District*, 1.1 km NE of the Spirino village outskirts, an inundated stone quarry, 54.1475° N, 81.6116° E, O. Kosterin — 1♂ (immature) (91592750); the same place and date, 54.1476° N, 81.6117° E, O. Kosterin — 1 copula, 1♀ (immature) (91592546, 91593286); the same place and date, 54.1476° N, 81.6118° E, O. Kosterin — 2♂♂ (immature), 3♀♀ (2 teneral, 1 immature) (91591821, 91592502, 91592749, 91592902, 91593284); the same place and date, 54.1477° N, 81.6117° E, O. Kosterin — 1♀ (immature)



Fig. 3. Tandem of *Sympetrum depressiusculum* at the Obskoe Water Reserve SE bank at the Glukhaya Rivulet estuary, Ordynskoe District, Novosibirskaya Oblast, 14.08.2020; photo by P. Komkov (<https://www.inaturalist.org/observations/57228233>; public domain).

Рис. 3. Тандем *Sympetrum depressiusculum* на Обском водохранилище, д. Глухая, Ордынский р-н, Новосибирская обл., 14.08.2020; фото П. Комкова (<https://www.inaturalist.org/observations/57228233>).

(91592753); the same place and date, 54.1477° N, 81.6118° E, 5.08.2020, O. Kosterin — 1♀ (teneral), 1 tandem (91591820, 91592501); the same place and date, 54.1477° N, 81.6119° E, O. Kosterin — 2♂♂ (1 immature, 1 mature), 1♀ (mature) (91592353, 91592354, 91593285); the same place and date, 54.1479° N, 81.6119° E, O. Kosterin — 1♂ (immature) (91592352); the same place and date, 54.1475° N, 81.6116° E, V. Kosterin — 1♂ (mature); 54.1475° N, 81.6117° E, V. Kosterin — 1♂ (teneral), 2♀♀ (1 teneral, 1 immature) (90038542; 90041164; 90041189); the same place and date, (90038542); the same place and date 54.1475° N, 81.6118° E, V. Kosterin — 1♂ (immature) (90041168); the same place and date, 54.1476° N, 81.6116° E, V. Kosterin — 2♀♀ (teneral) (90038537, 90038539); the same place and date, 54.148° N, 81.612° E (observations by these author were geotagged manually rather than a GPS device), T. Kolesnikova — 5♂♂ (2 teneral, 2 immature, 1 mature), 4♀♀ (2 teneral, 2 immature), 1 tandem (90116267, 90116268, 90116474, 90116562, 90169365, 90170210, 90170212, 90170215, 90170567, 90170863). *Novosibirskaya Oblast, Novosibirsk*, Academy Town environs, the Obskoe Water Reserve E bank, the Zyryanka Rivulet estuary, 54.8194° N, 83.0848° E, 21.08.2020, O. Kosterin — 1♂ (immature) (91961373); the same place and date, 54.8192° N, 83.0854° E, O. Kosterin — 1♂ (immature, 1♀ (mature) (91964968, 91966740); the same place and date, 54.8193° N, 83.0848° E, O. Kosterin — 1♀ (teneral) (91970849); the same place and date, 54.8193° N, 83.0853° E, O. Kosterin — 1♀ (immature) (91968109); the same place and date, 54.8192° N, 83.0855° E, O. Kosterin — 2♀♀ (immature) (91967599, 91968821); 54.8192° N, 83.0854° E, O. Kosterin — 1♂ (mature), 1♀ (teneral) (91969912, 91970561); the same place and date, 54.8191° N, 83.0852° E, O. Kosterin — 1♂ (immature) (91962868); the same place and date, 54.8191° N, 83.0854° E, O. Kosterin — 1♂ (mature) (91967482).

Remarks. Identification of this species is unmistakable even by photos in both sexes due to distinct paired black marks at posteriolateral corners of abdominal segments (which are somewhat expanded), indented from their lateral margins. All females had a slight ochre-yellow tint over their wing membranes. Also a peculiar cue for the species' identification in flight is an impression that the end of the abdomen is slightly bent down.

Observations. According to the first observer of this species in Novosibirskaya Oblast, Pavel Komkov (pers. comm.) and his precise geotagging, the species was first met in mid-August 2020 at a swampy estuary the Glukhaya Rivulet, where it enters the Obskoe Water Reserve after flowing through pine forest at its quite elevated SE bank. The estuary was bordered and nearly isolated from the main reserve with a sandy spit, had a sandy bottom and very shallow water, from which rather sparse reed (*Phragmites australis* (Cav.) Trin. ex Steud.) thickets emerged.

This quite peculiar habitat type is frequent along the reservoir banks. This inspired further search next year, and indeed, on 21.08.2021, a couple of dozens of individuals of *S. depressiusculum*, mostly males, were found by the first author at the same right bank of the Reservoir at a similar estuary of a small rivulet, Zyryanka, already in Novosibirsk City limits near Academy Town, 66 km NE of the previous locality. The estuary had stagnant shallow water tightly filled with rotting pine logs, with the banks overgrown with sedge and some reed patches and partly surrounded by poplar and aspen stand. Most individuals were immature and some teneral, obviously emerged in the morning of that day, but few mature males and females with bright-red abdomen were also present. They were accompanied by more numerous *Sympetrum pedemontanum pedemontanum* (Müller in Allioni, 1766), with similar age spectrum, few mature males of *S. sanguineum*, *S. flaveolum* and one female of *S. vulgatum*



Fig. 4. A pool in the former stone pit on the Obskoe Water Reserve NW bank 1.1 km NE of Spirino village outskirts, where *Sympetrum depressiusculum* breeds in abundance, Ordynskoe District, Novosibirskaya Oblast, 5.08.2021; photo by O. Kosterin.

Рис. 4. Водоем в заброшенном каменном карьере на СЗ берегу Обского водохранилища 1,1 км СВ окраины с. Спирино, на котором в изобилии развивается *Sympetrum depressiusculum*, Ордынский р-н, Новосибирская область, 5.08.2021; фото О. Костерина.

vulgatum; also solitary males of *Aeshna grandis* (Linnaeus, 1758) and *A. mixta* flew above the water. *S. depressiusculum* kept to grassy patches and sedge by the banks and perched on sedge or other grasses, herbs or bushes but never on logs, as males of other species of the same genus frequently did.

In the same year, *S. depressiusculum* was also found *en masse* at the opposite, left bank of the Obskoe Water Reserve 120 km SW of the above considered locality, in quite a peculiar habitat. These were two twin knee-deep pools in an abandoned stone quarry situated at the reservoir bank and bordered by vast pine forest on rocks (Fig. 4). The pools were warm, rimmed with a stand of graceful cattail (*Typha laxmannii* Lepech.) and patches of reed, near which the surface was covered with floating heart (*Nymphoides peltata* (S.G. Gmel) Kuntze); the water was filled with *Chara contraria* A. Braun ex Kützing. They abounded with marsh frogs (*Pelophylax ridibundus* (Pallas, 1771), an invasive species in Siberia) and grass snakes (*Natrix natrix* (Linnaeus, 1758)). Other 11 Odonata species registered at that habitat on the day of its examination were *Calopteryx splendens splendens* (Harris, 1780) (a single male), *Lestes sponsa* (Hansemann, 1823) (abundant), *Sympecma paedisca* (Brauer, 1877) (many young individuals), *C. pulchellum sibiricum* Belyshev, 1964, *Enallagma cyathigerum risi* Schmidt, 1961, *Aeshna affinis* Vander Linden, 1820 (many territorial males, some females), *A. grandis* (several, mostly females), *Libellula quadrimaculata* Linnaeus, 1758 (an old female ovipositing), *Sympetrum danae* (few mature males and an immature female), *S. vulgatum vulgatum* (a teneral female, a mature and an immature male), *S. pedemontanum pedemontanum* (a single mature male). Besides, on 23.07.2021, T. Kolesnikova has registered there a male of *Leucorrhinia albifrons* (Burmeister, 1839) (iNaturalist observation 88403828).

Discussion

Until 2020, no reliable evidence of the presence *O. brunneum* in Siberia were known. The only existing report was by Hagen [1856] for Irkutsk, with no further detail. Its inclusion for South Siberia our Russian Checklist [Malikova, Kosterin, 2019] with a note 'hot springs only' was an unjustified extrapolation from such occurrence of *O. albistylum* (Selys, 1848); actually an error). However, in June 2020 the *O. brunneum* was quite expectedly found by Sergey Borisov [2021] in Lokot' District of Altayskiy Kray, the southernmost point of Siberia at the border with Kazakhstan, from where this species was reported as widespread and common [Chaplina et al., 2007]. That locality was at 51° N, that is 4° or 430 km to the south of Novosibirsk. So, the Novosibirsk population appears to be an intriguing isolate, of an uncertain age. However, the absence of other lotic odonate species at that site may provide a clue for explanation of its existence. Although Zayel'stovskiy Park is actually a very big (10 x 5 km) area of moderately or scarcely disturbed natural habitats (mostly pine forest), the Elts'ovka 2nd Rivulet enters it after having crossed for 9 km a densely populated and industrial area of Novosibirsk downtown, namely Zayeltsovskiy and Kalininskiy Districts. That means that the rivulet is heavily polluted and so cannot be inhabited by most lotic species of Odonata sensitive to water quality, while *O. brunneum* is quite pollution-prone. At the same time, its water most probably somewhat warmer, especially in



Fig. 5. *Sympetrum depressiusculum* at the pool 1.1 km NE of Spirino (Fig. 4), Ordynskoe District, Novosibirskaya Oblast, 5.08.2021; photo by O. Kosterin: a — copula; b — immature male; c — mature male; d — teneral female; photo by O. Kosterin.

Рис. 5. *Sympetrum depressiusculum* на водоёме 1,1 км СВ с. Спирино (Рис. 4), Ордынский район, Новосибирская область, 5.08.2021; а — копула; б — молодой самец; в — зрелый самец; д — свежевypлодившаяся самка; фото О. Костерина.

winter, than natural streams at this latitude. This made possible for some occasional stray of *O. brunneum* to successfully colonise this restricted habitat. «In the north of its range it is often a pioneer species and appears promptly at new, often man-made, warm habitats, declining or even disappearing as the vegetation develops» [Kalkman, Ambrus, 2015: 277].

So far, *S. depressiusculum* was known only from three regions of South Siberia: Central Tuvianian Depression, Minusinsk Depression, and southern Transbaikalia (Dauria; with many records there) [Belyshev, 1973; Kosterin, 2004; Kosterin, Zaika, 2010]]. This is the first record of the species in West Siberia and the northernmost (54.82 N) in Siberia. Curiously, it was hitherto found only at the Obskoe Reservoir banks faced by vast pine forests. This is a fairly late species in the region, starting to emerge not earlier than the last days

of July (since it was not yet found the same locality at Spirino when examined by T. Kolesnikova on 23.07.2021) and still emerging in late August.

These two findings result from one year of existence the project «Dragonflies of Russia» at iNaturalist (2021) and so illustrate the importance and power of citizen science and centralised platforms accumulating geotagged biodiversity data from public, of course only for groups of organisms easily identifiable by appearance, such as dragonflies.

For a state of the art reference, here we provide the list of 57 species currently known from Novosibirskaya Oblast: *Calopteryx splendens splendens* (Harris, 1780), *Lestes barbarus* (Fabricius, 1798), *L. dryas* Kirby, 1890, *L. macrostigma* (Eversmann, 1836), *L. sponsa* (Hansemann, 1823), *L. virens vestalis* Rambur, 1842, *Sympetma paedisca* (Brauer, 1877), *Coenagrion*

armatum (Charpentier, 1840), *C. ecornutum* (Selys, 1872), *C. hastulatum* (Charpentier, 1825), *C. johanssони* (Wallengren, 1894), *C. lunulatum* (Charpentier, 1840), *C. puella* (Linnaeus, 1758), *C. pulchellum sibiricum* Belyshev, 1964, *Erythromma najas najas* (Hansmann, 1823), *Enallagma cyathigerum risi* Schmidt, 1961, *Ischnura elegans* (Vander Linden, 1820), *I. pumilio* (Charpentier, 1825), *Nehalennia speciosa* (Charpentier, 1840), *Platycnemis pennipes* (Pallas, 1771), *Aeshna affinis* Vander Linden, 1820, *A. caerulea* (Ström, 1783), *A. crenata* Hagen, 1856, *A. grandis* (Linnaeus, 1758), *A. juncea* (Linnaeus, 1758), *A. mixta* Latreille, 1805, *A. serrata* Hagen, 1856, *A. subarctica* Walker, 1908, *A. viridis* Eversmann, 1836, *Gomphus vulgatisimus* (Linnaeus, 1758), *Shaogomphus postocularis epophthalmus* (Selys, 1872), *Stylurus flavipes* (Charpentier, 1825), *Nihonogomphus ruptus* (Selys et Hagen, 1858), *Ophiogomphus cecilia* (Geoffroy in Fourcroy, 1785), *Cordulia aenea aenea* (Linnaeus, 1758), *Epitheca bimaculata* (Charpentier, 1825), *Somatochlora arctica* (Zetterstedt, 1840), *S. exuberata* Bartenev, 1910, *S. flavomaculata* (Vander Linden, 1825), *S. metallica* (Vander Linden, 1825), *Macromia amphigena fraenata* Martin, 1907, *Leucorrhinia albifrons* (Burmeister, 1839), *L. caudalis* (Charpentier, 1840), *L. dubia* (Vander Linden, 1825), *L. pectoralis* (Charpentier, 1825), *L. rubicunda* (Linnaeus, 1758), *Libellula quadrimaculata* Linnaeus, 1758, *Orthetrum brunneum* (Fonscolombe, 1837), *O. cancellatum* (Linnaeus, 1758), *Sympetrum croceolum* (Selys, 1883), *S. danae* (Sulzer, 1776), *S. depressiusculum* (Selys, 1841), *S. flaveolum* (Linnaeus, 1758), *S. fonscolombii* (Selys, 1840), *S. pedemontanum pedemontanum* (Müller in Allioni, 1766), *S. sanguineum* (Müller, 1764), *S. vulgatum vulgatum* (Linnaeus, 1758). Of these species, only *A. caerulea* and *S. fonscolombii* have not been recorded in Novosibirsk City limits (*L. barbarus* was at last found there at the Zyryanka Rivulet mouth on 26.08.2021, observation 93025360), and anywhere in the part of the Province easterly of the Ob' River, having a gentle hilly relief in contrast to the larger, perfectly flat western part (impoverished with lotic species), the fauna of which is still insufficiently studied.

The expected taxa to be looked for in Novosibirskaya Oblast as found in neighbouring provinces are *Coenagrion glaciale* (Selys, 1872) (in the Ob' River valley), *Enallagma cyathigerum cyathigerum* (Charpentier, 1840) (in the north), *Anax parthenope* (Selys, 1839) (in the south), *Ophiogomphus obscurus* Bartenev, 1909 (in Salairskiy Kryazh range and Bolotnoe District), *Sympetrum meridionale* (Selys, 1841) (in the south).

According to personal observations by Sergey L. Nikolaev, in late May of some year in the interval 1963–1965 he observed mass invasion of Novosibirsk with numerous individuals of *Libellula depressa* Linnaeus, 1758 which lasted for few days only. The collected species were lost and the species has never been reported for Novosibirskaya Oblast. However, the species is easily recognisable, recently it has been found in Altaiskiy Kray [Kosterin, Gribkov, 2019], another spe-

cies of the same genus, *L. quadrimaculata*, is famous for its far mass migrations [Popova, Haritonov, 2010]. It is not excluded that this event has taken place indeed and similar invasions are not excluded in future.

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