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Check-list of Odonata of the Russian Federation

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Abstract. A check-list of 152 species and 168 subspecies of Odonata known from the territory of Russian Federation and their occurrence in its seven main eco-geographical regions (European part, Caucasus, Ural, West Siberian Lowland, South Siberia, North-East Asia and southern Far East) is presented in tabular form. First reliable reports of particular species for particular regions made after latest summarising monographic publications referring to those regions are referenced. Dubious reports are not mentioned. Taxonomically and otherwise complicated cases are commented. The highest diversity of 91 species (59.9 % of the fauna) is found in southern Far East of Russia; Caucasus, European part, South Siberia and Ural show moderately rich faunas of 81, 80, 75 and 74 species, respectively; the fauna of West Siberian Plain is poor (56 species) and that of North-East Asia very poor (39 species).

Further key words. Dragonfly, damselfly, Europe, Asia, Caucasus, Siberia, Ural

Introduction

Although the Russian Federation has existed as an independent state for 27 years no check-list of its Odonata fauna has been compiled until now. This is because for the previous four hundred years its present territory was a constituent of a larger state also associated with the name 'Russia', at least unofficially: the Russian Empire up to 1917 and the Union of Soviet Socialist Republics, USSR, from 1922–1991. Although effectively a single state, the USSR was officially a confederation of fifteen Soviet Socialist Republics. One of them was the Russian Soviet Federative Socialist Republic (Russian SFSR) – which, in turn, included several Autonomous Soviet Socialist Republics among its constituents of the province rank. The territory of the Russian SFSR was inherited by the present Russian Federation. This has been over-

looked by some foreign authors, leading to confusion. For instance, Tsuda (2000) adopted a species checklist of the USSR and claimed it was that of Russian Federation. Indeed, at least two national checklists were published during Soviet times (Spuris 1988; Belyshev et al. 1989); covering the entire territory of the USSR. This was at the time of the 'iron curtain' global political divide that afforded Russian odonatologists opportunities to investigate in detail the entire territory of the USSR but they had little experience of the world beyond. It is noteworthy that even after the breakup of the USSR, another checklist was published again concerning the same ex-USSR territory, under the misleading title, »Odonatological researches in Russia« (Haritonov et al. 2007).

Times have changed, and independent states formed after the USSR broke apart. We thus consider it important to produce a species checklist for the largest of these states, the Russian Federation, which extends across the northern parts of Eurasia from Norway in the west to China and Korea in the east, while in the Far East it has narrow maritime borders with the USA and Japan.

Methods

Our work is based chiefly on published information, and, in addition, on EIM's examination of main museum collections in Moscow and St Petersburg. Unreliable records and dubious taxa were excluded.

We registered presence of species and subspecies in the following very rough conventional biogeographical units:

European part – Russia within Europe, excluding the Caucasus and Ural Mountains.

Caucasus – the mountains and foothills of the Caucasus within the Russian Federation.

Ural – the Ural Mts and their western and eastern foothills.

West Siberian Lowland – The lowland bordered by the Ural Mts in the West, the Yeniseyskiy Kryazh Mts outlined by the Yenisey River in the East, the state border of Russia in the South and the Altai and Kiznetskiy Alatau Mts in the South-east.

South Siberia – a largely mountainous region east of the Ob' River and (inclusively) the Altai Mts, north to include Tomsk environs, the Kuznetskiy Alatau, the Sayans, the mountains of Baikal area, Transbaikalia, the Stanovoe Upland and Stanovoy Range. Roughly demarked by the Ob' in the west, by 55–57° parallel in the north, and by the state border in the South and East.

North-East Asia – the territory demarked by the Yenisey River in the west, by 55–58°N in the South and by seas in North and East. Includes Taimyr, Evenkia, Yakutia, Magadan Province, Chukotka, Kamchatka, the North Kuriles and northern Khabarovskiy Krai Province.

Southern Far East – Amur Province, Primorye, southern Khabarovskiy Krai Province, Sakhalin, the South Kuriles. Outlined roughly by 55°N in the North, by seas in the East and by the Amur Province and state borders in the South-west and South.

Results

The resulting check-list of Odonata species and subspecies for the Russian Federation is given in Table 1. In the main body of Table 1, references are given for the first records in respective regions of the European part, the Caucasus and Ural if taken after publication of the 'Dragonflies of Eastern Europe and Caucasus' by Skvortsov (2010) and the 'Atlas of the European Dragonflies and Damselflies' by Boudot & Kalkman (2015). The former source was critically reviewed by Schröter (2011) and the latter source adopted most information from the former after critical evaluation. References for the records in the Asian part of Russia are given if made after publication of 'The Dragonflies (Odonata) of Siberia' by Belyshev (1973). The three above referenced major works have distribution maps that allow inferring the presence of certain species in certain regions. In cases when two publications were based on the same material and the first published was less detailed, less formal, a manuscript, or in Russian, both were referenced as the first record; these are Malikova (1995) and Malikova (2009 – a large manuscript dissertation in Russian *vs* its synopsis in English), Kosterin (1999) and Kosterin (2004 – in Russian *vs* in English), Bernard & Kosterin (2008) and Bernard & Kosterin (2010 – a field report *vs* regular paper). It should be mentioned that the paper 'Odonata of the Russian Far East: a summary' by Haritonov & Malikova (1998) contained errors in the table and did not cover some findings made at the time of its publication (Malikova 2009).

There are species occurring in Georgia and/or Azerbaijan that could extend to the Russian territory but never were actually reported from there (Skvortsov 2010; Boudot & Kalkman 2015; Schröter et al. 2015). These are *Onychogomphus forcipatus albotibialis* Schmidt, 1954; *Stylurus ubadschii* Schmidt, 1953; *Orthetrum sabina* (Drury, 1770); and *Sympetrum arenicolor*

Jödicke, 1994. Of these, *O. sabina* and *S. arenicolor* (as *S. decoloratum*) were mentioned as ubiquitous in the Caucasus by Ketenchiev & Haritonov (1996), although no reliable record from Russia is known. While *O. sabina* is unmistakable, old records of '*S. decoloratum*' could well be misidentified (Seehausen et al. 2016). We also omitted *Onychogomphus lefebvrii* (Rambur, 1842), for which »solitary findings in the eastern part of North Caucasus« were mentioned (Ketenchiev & Haritonov 1996: 39) but no actual data from Russian territory are available.

Taxonomic and other comments are given as notes below Table 1. We ignore formerly proposed weak subspecies avoiding detailed discussion of their synonymy, which has been published or should be published for each case elsewhere. Junior synonyms described from the territory of the Russian Federation in the rank of species during the 20th century are given in Table 2 – in the 19th century too many species were proposed, with most junior synonyms recognised and no longer used in the 20th century.

Species obviously or supposedly misidentified from the territory of Russian Federation are not included and not mentioned. Such reports have mostly been published in local Russian journals without proof and without review by odonatologists. However, some reports excluded, especially those published in other European languages, are well-known worldwide and should be remarked on.

Three well-known Nearctic species were described by H.A. Hagen with improbable reference to Russian type localities: *Aeshna palmata* Hagen, 1856, based on a male from Kamchatka (Hagen 1856); *Gomphus kurilis* Hagen in Selys, 1858, based on a male from »les Kuriles« (Selys 1858); and *Argia kurilis* Hagen in Selys, 1865, based on a female from the same islands (Selys 1865). All these names have subjective synonyms described from America but *A. palmata* and *G. kurilis* are the senior synonyms and hence valid names, while the synonymous *Argia vivida* Hagen in Selys, 1865, and *A. kurilis* were described in the same paper and Gloyd (1941), acting as the First Reviser, chose *A. vivida* as valid. It was also Hagen (1856) who reported from Kamchatka the pantropical species *Pantala flavescens* and the American species *Anax junius*. Following Belyshev (1973) and Belyshev & Haritonov (1981), we accept reports of the two latter species since their propensity for transoceanic migration is well documented (Kalkman

& Monnerat 2015; Kalkman & Prentice 2015). In principle, a vagrant *A. palmata* flying from Alaska to Kamchatka (1 500–2 500 km across the Bering Sea) might occur but we omit it from the list because of the absence of further reports. We also reject the dispersal by natural means of a sedentary, stenotopic gomphid and a coenagrionid from Oregon [the northernmost occurrence of these species on the American Pacific coast; (Paulson 2009)], to the Kurile Islands over almost 7 000 km of the open Pacific. Label confusion among the specimens examined by Hagen in the Imperial Museum in Saint-Petersburg (then in coll. H.A. Hagen, Museum of Comparative Zoology, Cambridge, Massachusetts) is a much more likely explanation for these improbable records of *A. kurilis* and *G. kurilis* (Gloyd 1941: 131): »The single male of *kurilis* was originally a part of the collection of the early Russian explorers and could possibly have been given to them by friends interested in natural history when in port at San Francisco«. It is noteworthy that Alaska was then part of the Russian Empire. All communications with Alaska were operated by the Russian-American Company via Kamchatka. This company also made attempts to explore the western coast of North America further south. Some specimens of American origin could have reached the Russian capital via Kamchatka as well and could have resulted in mislabelling.

We also omit »*Neurothemis palliata palliata* Ris«, reported from a single male from Vladivostok (without date) by Bartenev (1912), who provided quite a detailed description of the specimen. Although currently that name is a synonym of *N. fluctuans* (Fabricius, 1793) (Seehausen & Dow 2016), the large size (hind wing 32 mm) together with the hind wing coloration suggests *N. ramburii* (Kaup in Brauer, 1866), rather than *N. fluctuans*. Both these as well as other related species are tropical and not strong fliers, so most probably that specimen arrived by ship.

The report of *Pseudothemis zonata* (Burmeister, 1839), from Kunashir (Paulson et al. 1998) was based on a misidentified female of *Orthetrum melania* (Selys, 1883), as later stated by the first author (D. Paulson pers. comm.) and recently published by Sasamoto et al. (2017).

The report of *Onychogomphus assimilis* for Sochi by Skvortsov (2010) is excluded as it is based on visual observation not confirmed by specimens and biogeographically unnatural (Schröter 2011).

Table 1. Check-list of Odonata of the Russian Federation with their presence in its main biogeographic regions. Taxa with their type localities in Russian Federation are marked by an asterisk. References refer to the first or otherwise important reports of species for the main regions published after relevant compendiums of Odonata covering these regions (Belyshev 1973; Boudot & Kalkman 2015); for a detailed explanation see text. Europ - European part, Cauc - Caucasus, WSL - West Siberian Lowland, SSib - South Siberia, NEA - North East Asia, SFE - Southern Far East. **Ref. 1** – Bernard & Kosterin (2008); **Ref. 2** – Bernard & Kosterin (2010); **Ref. 3** – Buczyński et al. (2014); **Ref. 4** – Dronzikova (2000); **Ref. 5** – Dumont et al. (2005); **Ref. 6** – Dumont et al. (2018); **Ref. 7** – Fukui (1992); **Ref. 8** – Ilyina & Aliev (2017); **Ref. 9** – Kosterin (1987); **Ref. 10** – Kosterin (1999); **Ref. 11** – Kosterin (2004); **Ref. 12** – Kosterin (2007); **Ref. 13** – Kosterin & Gribkov (2019); **Ref. 14** – Kosterin & Sivtseva (2009); **Ref. 15** – Kosterin & Solovyev (2017); **Ref. 16** – Kosterin & Zaika (2010); **Ref. 17** – Kosterin & Zaika (2018); **Ref. 18** – Kosterin et al. (2001); **Ref. 19** – Malikova (1995); **Ref. 20** – Malikova (2009); **Ref. 21** – Malikova (2010); **Ref. 22** – Malikova & Ivanov (2001); **Ref. 23** – Malikova & Seidenbusch (2001); **Ref. 24** – Malikova et al. (2007); **Ref. 25** – Nagahata et al. (2017); **Ref. 26** – Onishko (2019); **Ref. 27** – Onishko & Dunaev (2017); **Ref. 28** – Popova & Eremina (2016); **Ref. 29** – Popova & Haritonov (2013); **Ref. 30** – Shapoval & Shapoval (2017).

No.	Species/subspecies	Europ	Cauc	Ural	WSL	SSib	NEA	SFE
Lestidae								
1	***Chalcolestes*** *parvidens* Artobolevskij, 1929 (*)	-	+	-	-	-	-	-
2	*Chalcolestes viridis* (Vander Linden, 1820)	+ Ref. 30; Note 2	- Note 1	-	-	-	-	-
3	***Lestes*** *barbarus* (Fabricius, 1798)	+	+	+	+	+	-	-
4	*Lestes dryas* Kirby, 1890	+	+	+	+	+	+	+
5	*Lestes japonicus* Selys, 1883	-	-	-	-	-	-	+ Refs 19, 20, 22
6	*Lestes macrostigma* (Eversmann, 1836)*	+	+	+	+	+	-	-
7	*Lestes sponsa* (Hansemann, 1823)	+	+	+	+	+	+	+
8	*Lestes temporalis* Selys, 1883	-	-	-	-	-	-	+
9	*Lestes virens vestalis* Rambur, 1842 Note 3	+	+	+	+	+	-	-
10	***Sympecma*** *fusca* (Vander Linden, 1820)	+	+	+	-	-	-	-

No.	Species/subspecies	Europ	Cauc	Ural	WSL	SSib	NEA	SFE
11	*Sympecma gobica* Förster, 1900	-	+ Refs 26, 27; Note 4	-	-	-	-	-
12	*Sympecma paedisca* (Brauer, 1877)	+	+	+	+	+	+	+
Calopterygidae								
13	***Atrocalopteryx*** *atrata* (Selys, 1853)	-	-	-	-	-	-	+
14a	***Calopteryx*** *japonica altaica* Belyshev, 1955*	-	-	-	-	+ Notes 5, 6	-	-
14b	*Calopteryx japonica japonica* Selys, 1869; Note 5	-	-	-	-	-	+ Ref. 14	+
15a	*Calopteryx splendens intermedia* Selys, 1887	-	+ E. Ilyina un-publ.	-	-	-	-	-
15b	*Calopteryx splendens mingrelica* Selys, 1869	-	+	-	-	-	-	-
15c	*Calopteryx splendens njuja* Kosterin et Sivtseva, 2009*	-	-	-	-	-	+ Ref. 14	-
15d	*Calopteryx splendens splendens* (Harris, 1780); Note 7	+	+	+	+	+	-	-
16a	*Calopteryx virgo feminalis* Kosterin, 2017*	-	+ Note 8	-	-	-	-	-
16b	*Calopteryx virgo festiva* Brullé, 1832	-	+ Note 9	-	-	-	-	-
16c	*Calopteryx virgo virgo* (Linnaeus, 1758)	+	-	+	-	- Note 10	-	-
17	***Mnais*** *pruinosa costalis* Selys, 1869	-	-	-	-	-	-	+ Refs 19, 20; Note 11
Euphaeidae/Epallagidae								
18	***Epallage*** *fatime* (Charpentier, 1840)	-	+ Ref. 8	-	-	-	-	-

No.	Species/subspecies	Europ	Cauc	Ural	WSL	SSib	NEA	SFE
Coenagrionidae								
19	***Coenagrion*** *armatum* (Charpentier, 1840)	+	+	+	+	+	+	+
20	*Coenagrion ecornutum* (Selys, 1872)*	-	-	+	+	+	+ Ref. 7	+
21	*Coenagrion glaciale* (Selys, 1872)*	+	-	+	+ Ref. 29	+	+	+
22	*Coenagrion hastulatum* (Charpentier, 1825)	+	+	+	+	+	+	+ Refs 19, 20, 22
23	*Coenagrion hylas* (Trybom, 1889)*	+	-	+	-	+	+	+
24	*Coenagrion johanssoni* (Wallengren, 1894)	+	-	+	+	+	+	+
25	*Coenagrion lanceolatum* (Selys, 1872)*	-	-	-	-	+	+	+
26	*Coenagrion lunulatum* (Charpentier, 1840)	+	+	+	+	+	+	+
27	*Coenagrion ornatum* (Selys, 1850)	+	+	-	-	-	-	-
28	*Coenagrion ponticum* (Bartenev, 1929)*	-	+	-	-	-	-	-
29	*Coenagrion puella* (Linnaeus, 1758)	+	+	+	+	+	-	-
30 a	*Coenagrion pulchellum pulchellum* (Vander Linden, 1825)	+	+	+	-	-	-	-
30 b	*Coenagrion pulchellum sibiricum* Belyshev, 1964* Note 12	-	-	-	+	+	-	-
31	*Coenagrion scitulum* (Rambur, 1842)	+	+	-	-	-	-	-
32	***Enallagma*** *circulatum* Selys, 1883	-	-	-	-	-	-	+ Note 13
33a	*Enallagma cyathigerum cyathigerum* (Charpentier, 1840)	+	+	+	+	+	+	+
33b	*Enallagma cyathigerum risi* Schmidt, 1961 Note 14	+ Refs 10, 11; Note 15	+ Note 16	+	+	+	-	-
34	***Erythromma*** *lindenii* (Selys, 1840)	-	+	-	-	-	-	-

No.	Species/subspecies	Europ	Cauc	Ural	WSL	SSib	NEA	SFE
35a	*Erythromma najas humerale* Selys, 1887*; Note 17	-	-	-	-	+	+	+
35b	*Erythromma najas najas* (Hansemann, 1823)	+	+	+	+	+	-	-
36	*Erythromma viridulum* (Charpentier, 1840)	+	+	+	-	-	-	-
37	***Ischnura** aralensis* Haritonov, 1979	-	-	+	-	-	-	-
38	*Ischnura asiatica* (Brauer, 1865)	-	-	-	-	-	-	+
39	*Ischnura elegans* (Vander Linden, 1820) Note 18	+	+	+	+	+	-	+ Refs 19, 20
40	*Ischnura fountaineae* Morton, 1905	-	+	-	-	-	-	-
41	*Ischnura pumilio* (Charpentier, 1825)	+	+	+	+	+	-	-
42	***Mortonagrion** selenion* (Ris, 1916)	-	-	-	-	-	-	+
43	***Nehalennia** speciosa* (Charpentier, 1840)	+	+	+	+	+	-	+
44	***Paracercion** calamorum* (Ris, 1916)	-	-	-	-	-	-	+ Refs 19, 20, 22
45	*Paracercion hieroglyphicum* (Brauer, 1865)	-	-	-	-	-	-	+ Refs 19, 20, 22
46	*Paracercion plagiosum* (Needham, 1930)	-	-	-	-	-	-	+ Refs 19, 20, 22
47	*Paracercion v-nigrum* (Needham, 1930)	-	-	-	-	+ Refs 10, 11	-	+
48	***Pyrrhosoma** nymphula* (Sulzer, 1776)	+	+	+	-	-	-	-
Platycnemididae								
49	***Platycnemis** dealbata* Selys, 1850	-	+	-	-	-	-	-
50	*Platycnemis pennipes* (Pallas, 1771)	+	+	+	+	+	-	-
51	*Platycnemis phyllopoda* Djakonov, 1926*	-	-	-	-	-	-	+
52	***Pseudocopera** tokyoensis* (Asahina, 1948)	-	-	-	-	-	-	+

No.	Species/subspecies	Europ	Cauc	Ural	WSL	SSib	NEA	SFE
Aeshnidae								
53	***Aeschnophlebia*** *longistigma* Selys, 1883	-	-	-	-	-	-	+
54	***Aeshna*** *affinis* Vander Linden, 1820	+	+	+	+	+	-	-
55	*Aeshna caerulea* (Ström, 1783)	+	+	+	+	+	+	+
56	*Aeschna crenata* Hagen, 1856*	+	-	+	+	+	+	+ Note 19
57	*Aeshna cyanea* (Müller, 1764)	+	+	+	-	-	-	-
58	*Aeshna grandis* (Linnaeus, 1758)	+	+	+	+	+	+ Ref. 14	-
59	*Aeshna isoceles* (Müller, 1767)	+	+	+	-	-	-	-
60	*Aeshna juncea* (Linnaeus, 1758) Note 20	+	+	+	+	+	+	+
61	*Aeshna mixta* Latreille, 1805	+	+	+	+	+	-	+
62	*Aeshna serrata* Hagen, 1856	+	+	+	+	+	+ Refs 5, 7	-
63	*Aeshna subarctica* Walker, 1908 Note 21	+	-	+	+	+	+	+
64	*Aeshna viridis* Eversmann, 1836*	+	+	+	+	+	-	- Note 22
65	***Anax*** *ephippiger* (Burmeister, 1839)	-	+	-	-	-	-	-
66	*Anax imperator* Leach, 1815	+	+	+	-	-	-	-
67	*Anax junius* (Drury, 1773)	-	-	-	-	-	+ two strays to Kam-chatka	-
68a	*Anax parthenope parthenope* (Selys, 1839)	+	+	+	+ Ref. 12	+ Refs 4, 16; Note 23	-	-
68b	*A. parthenope julius* Brauer, 1865	-	-	-	-	+ Refs 10, 11; Note 23	-	+

No.	Species/subspecies	Europ	Cauc	Ural	WSL	SSib	NEA	SFE
69	***Brachytron*** *pratense* (Müller, 1764)	+	+	+	-	-	-	-
70	***Caliaeschna*** *microstigma* (Schneider, 1845)	-	+	-	-	-	-	-
Gomphidae								
71	***Anisogomphus*** *maacki* (Selys, 1872)*	-	-	-	-	+ Refs 10, 11	-	+
72	***Asiagomphus*** *melanopsoides* (Doi, 1943)	-	-	-	-	-	-	+ Refs 19, 20
73	***Davidius*** *lunatus* (Bartenev, 1914)	-	-	-	-	-	-	+
74	***Gomphidia*** *confluens* Selys, 1878	-	-	-	-	-	-	+ Refs 19, 20
75	***Gomphus*** *schneiderii* (Selys, 1850)	-	+ Refs 26, 27	-	-	-	-	-
76	*Gomphus vulgatissimus* (Linnaeus, 1758)	+	+	+	+ Note 24	+ Ref. 18	-	-
77	***Lindenia*** *tetraphylla* (Vander Linden, 1825)	+	+	-	-	-	-	-
78	***Nihonogomphus*** *ruptus* (Selys & Hagen, 1858)	-	-	-	-	+	+	+
79	***Onychogomphus*** *flexuosus* (Schneider, 1845)	-	+	-	-	-	-	-
80	*Onychogomphus forcipatus forcipatus* (Linnaeus, 1758)	+	+ Note 25	+	-	-	-	-
81	***Ophiogomphus*** *cecilia* (Geoffroy in Fourcroy, 1785)	+	- Note 26	+	+	+	-	-
82	*Ophiogomphus obscurus* Bartenev, 1909*	-	-	-	+	+	+ Ref. 14	+
83	*Ophiogomphus spinicornis* Selys, 1878	-	-	-	-	+ Refs 10, 11	-	-
84	***Shaogomphus*** *postocularis epophthalmus* (Selys, 1872)*	-	-	-	+ Refs 1, 2	+	-	+
85	*Shaogomphus schmidti* (Asahina, 1956)	-	-	-	-	-	-	+

No.	Species/subspecies	Europ	Cauc	Ural	WSL	SSib	NEA	SFE
86	***Sieboldius*** *albardae* Selys, 1886	-	-	-	-	-	-	+
87	***Sinictinogomphus*** *clavatus* (Fabricius, 1775)	-	-	-	-	-	-	+
88	***Stylurus*** *annulatus* (Djakonov, 1926)*	-	-	-	-	-	-	+
89	*Stylurus flavipes* (Charpentier, 1825)	+	+	+	+	+	-	+
90	*Stylurus occultus* (Selys, 1878)	-	-	-	-	-	-	+ Ref. 24
91	***Trigomphus*** *anormolobatus* Bartenev, 1912* Notes 27, 28	-	-	-	-	-	-	+?
92	*Trigomphus citimus* (Needham, 1931)	-	-	-	-	-	-	+ Refs 19, 20, 22
93	*Trigomphus nigripes* (Selys, 1887)*	-	-	-	-	-	-	+
Cordulegastridae								
94	***Anotogaster*** *sieboldii* (Selys, 1854)	-	-	-	-	-	-	+ Note 11
95	***Cordulegaster*** *boltonii boltonii* (Donovan, 1807)	+	-	+	-	-	-	-
96	*Cordulegaster mzymtae* Bartenev, 1929*	-	+	-	-	-	-	-
97	*Cordulegaster picta* Selys, 1854	-	+ Ref. 15	-	-	-	-	-
Corduliidae								
98a	***Cordulia*** *aenea aenea* (Linnaeus, 1758) Note 29	+	+	+	+	+?	-	-
98b	*Cordulia aenea amurensis* Selys, 1887* Note 29	-	-	-	-	+	+	+
99	***Epitheca*** *bimaculata* (Charpentier, 1825)	+	+	+	+	+	+	+
100	***Somatochlora*** *alpestris* (Selys, 1840)	+	-	+	-	+	+	+
101	*Somatochlora arctica* (Zetterstedt, 1840)	+	-	+	+	+	+	+
102	*Somatochlora exuberata* Bartenev, 1910*	-	-	-	-	+	+	+

No.	Species/subspecies	Europ	Cauc	Ural	WSL	SSib	NEA	SFE
103	*Somatochlora flavomaculata* (Vander Linden, 1825)	+	+	+	+	+	-	-
104	*Somatochlora graeseri graeseri* Selys, 1887*	+	-	+	-	+	+	+
105	*Somatochlora metallica* (Vander Linden, 1825)	+	+	+	+	+	-	-
106	*Somatochlora sahlbergi* Trybom, 1889*	+	-	+	-	+	+	-
107	*Somatochlora uchidai* Förster, 1909	-	-	-	-	-	-	+ Note 11
108	*Somatochlora viridiaenea* (Uhler, 1858)	-	-	-	-	-	-	+
Macromiidae								
109	***Epophthalmia*** *elegans* (Brauer, 1865)	-	-	-	-	-	-	+
110	***Macromia*** *amphigena fraenata* Martin, 1906	-	-	+ Note 30	-	+	-	+
111	*Macromia daimoji* Okumura, 1949	-	-	-	-	-	-	+ Ref. 24
112	*Macromia manchurica* Asahina, 1964	-	-	-	-	-	-	+ Ref. 23
Libellulidae								
113	***Crocothemis*** *erythraea* (Brullé, 1832)	+	+	-	-	-	-	-
114	***Deielia*** *phaon* (Selys, 1883)	-	-	-	-	-	-	+
115	***Leucorrhinia*** *albifrons* (Burmeister, 1839)	+	-	+	+	+	-	-
116	*Leucorrhinia caudalis* (Charpentier, 1840)	+	+	+	+	+	-	-
117	*Leucorrhinia dubia* (Vander Linden, 1825)	+	+	+	+	+	-	-
118	*Leucorrhinia intermedia* Bartenev, 1910*	-	-	-	-	+	+	+
119	*Leucorrhinia orientalis* Selys, 1887* Note 31	-	-	+	-	+	+	+
120	*Leucorrhinia pectoralis* (Charpentier, 1825)	+	+	+	+	+	-	-
121	*Leucorrhinia rubicunda* (Linnaeus, 1758)	+	+	+	+	+	-	-

No.	Species/subspecies	Europ	Cauc	Ural	WSL	SSib	NEA	SFE
122	***Libellula*** *depressa* Linnaeus, 1758	+	+	+	-	+ Ref. 13	-	-
123	*Libellula fulva* Müller, 1764	+	+	+	-	-	-	-
124	*Libellula quadrimaculata* Linnaeus, 1758	+	+	+	+	+	+	+
125	***Lyriothemis*** *pachygastra* (Selys, 1878)	-	-	-	-	-	-	+
126	***Orthetrum*** *albistylum* (Selys, 1848)	+	+	-	-	+ Note 32	-	+ Note 33
127	*Orthetrum brunneum* (Fonscolombe, 1837)	+	+	-	-	+ Note 32	-	-
128	*Orthetrum cancellatum* (Linnaeus, 1758)	+	+	+	+	+	-	+ single stray; Ref. 21
129a	*Orthetrum coerulescens coerulescens* (Fabricius, 1798)	+ Ref. 30; Note 2	-	-	-	-	-	-
129b	*Orthetrum coerulescens anceps* (Schneider, 1845)	+	+	-	-	-	-	-
130	*Orthetrum melania* (Selys, 1883)	-	-	-	-	-	-	+ Note 11
131	***Pantala*** *flavescens* (Fabricius, 1798)	+ single stray; Ref. 3; Note 2	+ strays	-	-	+ strays	+ single stray	+
132	***Selysiothemis*** *nigra* (Vander Linden, 1825)	+	+	+	-	-	-	-
133	***Sympetrum*** *baccha matutinum* Ris, 1911	-	-	-	-	-	-	+
134	*Sympetrum cordulegaster* (Selys, 1883)	-	-	-	-	-	-	+
135	*Sympetrum croceolum* (Selys, 1883)	-	-	-	+ Ref. 18	+ Ref. 9	-	+
136	*Sympetrum danae* (Sulzer, 1776)	+	+	+	+	+	+	+
137	*Sympetrum darwinianum* Selys, 1883	-	-	-	-	-	-	+ Ref. 25

No.	Species/subspecies	Europ	Cauc	Ural	WSL	SSib	NEA	SFE
138a	*Sympetrum depressiusculum depressiusculum* (Selys, 1841)	+	+	-	-	+	-	+
138b	*Sympetrum depressiusculum frequens* (Selys, 1883)	-	-	-	-	-	+ single stray	+ Note 11
139	*Sympetrum eroticum eroticum* (Selys, 1883)	-	-	-	-	-	-	+
140	*Sympetrum flaveolum* (Linnaeus, 1758)	+	+	+	+	+	+	+
141	*Sympetrum fonscolombii* (Selys, 1840)	+	+	+	+ Ref. 28	+ Ref. 17	-	+ Ref. 26
142	*Sympetrum infuscatum* (Selys, 1883)	-	-	-	-	-	-	+
143	*Sympetrum kunckeli* (Selys, 1884)	-	-	-	-	-	-	+
144	*Sympetrum meridionale* (Selys, 1841)	+	+	+	+	-	-	-
145	*Sympetrum parvulum* (Bartenev, 1912)*	-	-	-	-	-	-	+
146a	*Sympetrum pedemontanum pedemontanum* (Müller in Allioni, 1766)	+	+	+	+	+	-	+
146b	*Sympetrum pedemontanum elatum* (Selys, 1872)	-	-	-	-	-	-	+ Note 11
147	*Sympetrum risi* Bartenev, 1914	-	-	-	-	-	-	+
148	*Sympetrum sanguineum* (Müller, 1764)	+	+	+	+	+	-	-
149a	*Sympetrum striolatum striolatum* (Charpentier, 1840)	+	+	+	-	-	-	-
149b	*Sympetrum striolatum imitoides* Bartenev, 1919*	-	-	-	-	-	-	+
150	*Sympetrum tibiale* (Ris, 1897)	-	+ Ref. 6	-	-	+ Ref. 16	-	-
151	*Sympetrum uniforme* (Selys, 1883)	-	-	-	-	-	-	+
152a	*Sympetrum vulgatum vulgatum* (Linnaeus, 1758)	+	+	+	+	+	+	-
152b	*Sympetrum vulgatum imitans* (Selys, 1886)	-	-	-	-	+	-	+
	Total species: 152	80	81	74	56	75	39	91
	Total with subspecies: 168	82	85	75	57	80	39	93

Note 1. The dot in the Caucasus in the map of Boudot & Willigalla (2015) is an error resulting from a duplication of the report of *Lestes parvidens* under the name of its original publication; see Kosterin & Solovyev (2017).

Note 2. Recorded only in Kaliningrad Province (Shapoval & Shapoval 2017).

Note 3. For taxonomic status of the eastern representatives of *Lestes virens* see Schröter et al. (2015).

Note 4. *Sympecma gobica* Förster, 1900, was indicated for Daghestan on the map by Skvortsov (2010) with reference to a comment on page 595, where it was mentioned (by a very dubious record) only for Armenia, not indicated on the map; we assume this record therefore as an error. However, this species was later collected in Daghestan, Sarykumskie Peski Nature Reserve (Onishko & Dunaev 2017; Onishko 2019).

Note 5. Prior to the work by Malikova (1995), *Calopteryx japonica* was misidentified in Russia as *C. virgo.*

Note 6. The subspecific status of *C. japonica altaica* needs confirmation, since the subspecies description (Belyshev 1955) was based on the comparison with *C. virgo* rather than *C. japonica*.

Note 7. *Calopteryx splendens* is an enormously variable species throughout its range, so its unequivocal delimitation into subspecies is impossible. However, the current subspecies concept implies that a certain phenotype strongly predominates on certain territory, allows occurrence of other phenotypes on the same territory and broad transition zones between subspecies but does not allow subspecies identification by a single specimen. Hence we find it possible to retain subspecies of *C. splendens* as a certain level of generalisation of its geographical variation. If *C. splendens ancilla* Selys in Hagen, 1853, is accepted as a valid eastern subspecies, characterised by some extension of the wing coloration in 'normal' males and presence at variable frequencies of male morphs with the coloration extended to tips and female androchromic morphs (see Kosterin & Zaika 2010), then populations from the European part of Russia, Ural and Siberia, except those in Yakutia, should be attributed to this subspecies. *Calopteryx splendens johanseni* Belyshev, 1955, later considered a full species (Haritonov 1978), is a junior synonym of the same subspecies, *splendens* or *ancilla* (Kosterin & Bernard 2010). In the Russian part of the Caucasus, the characters vary from those of the typical West European *C. splendens splendens* (*e.g.*, at Dyurso village at the Abrau Peninsula; Kosterin 2017b), those of *C. splendens mingrelica*, Selys, 1868 (occurring already in 30 km east of the latter, at Kabardinka village; Kosterin & Solovyev 2017: fig. 9) to *C. splendens intermedia* Selys, 1887 (in Daghestan Nature Reserve; E. Ilyina pers. comm.)

Note 8. *Calopteryx virgo feminalis* is a subspecies ranging along the Black Sea coast of the Caucasus, characterised by a dark apical part of the female hind wing and male S9–S10 whitish beneath, perhaps with a transition zone to *C. v. festiva*. It was described by Bartenev (1910a), however under an unavailable name, and formally re-described by Kosterin (2017a).

Note 9. Specimens from the Northern Caucasus apart from the Black Sea coastal areas are provisionally regarded as *Calopteryx virgo festiva*.

Note 10. The collection of the Zoological Institute, Saint-Petersburg (ZISP) includes – together with specimens of *C. japonica* and *C. splendens* – two male specimens of *C. virgo* from »Bunbuy, Kanskiy Uezd, Eniseyskaya Gub.« [Bunbuy village, Kansk District, the present Krasnoyarskiy Kray, Central Siberia], 03–06-vi-1915, coll. Valdaev, information published by Malikova (1995, 2009). However, there are also many specimens from the same locality collected by Valdaev and Varaksina in 1910–1915, which include other species unexpected from there such as *Anax imperator* and *Orthetrum brunneum* (A. Medvedev pers. comm.). A special trip to Bunbuy by Andrey Medvedev (Moscow State University) revealed only a typical Siberian fauna of Odonata without *Calopteryx* spp. Most probably, those specimens were mislabelled.

Note 11. In Russia, confined to the South Kurile islands of Iturup and Kunashir.

Note 12. *Coenagrion pulchellum* is a highly variable species and therefore quite a number of dubious subspecies have been described. Nevertheless, in West Siberia and North Kazakhstan, the males are strikingly homogeneous, representing the most melanised version of the species' coloration; an even more melanistic androchromatic morph predominates overwhelmingly among females (Belyshev 1973; Kosterin 2015; Kosterin & Ahmadi 2018). To acknowledge and stress this fact we regard it necessary and compatible with the subspecies concept to rank them as subspecies. Two negligibly differing subspecies were erected in the same paper by Belyshev (1964) for such specimens, with the type localities 500 km from each other in the western foothills of the Altai Mts: *C. pulchellum sibiricum* Belyshev, 1964 (type locality: Russia, Altaiskiy Kray, Bystryy Istok District, Novopokrovskoe; 52°14'N, 84°26"E), and *C. pulchellum saisanicum* Belyshev, 1964 (type locality: Kazakhstan, East Kazakhstan Province, Lake Zaisan at Topolevy Mys; 47°50'N, 84°04"E). Acting as the First Reviser according to ICZN Art. 24.2, we select the name *C. pulchellum sibiricum* Belyshev, 1964, as valid for the West Siberian/North Kazakhstanean subspecies, if recognised. The European specimens are regarded here as nominotypical. The whereabouts of the transition zone, most probably in Ural or westernmost Siberia, are insufficiently known.

Note 13. Reported from the Kurile Islands, north to Shiashkotan, as *Enallagma* sp. (Okumura 1941) and from southern Sakhalin as *E. deserti yezoensis* Asahina (Asahina 1949). The report of *E. cyathigerum* for southern Sakhalin by Matsumura (1911) refers to this taxon as well (Asahina 1949).

Note 14. For the subspecific status of *Enallagma cyathigerum risi* see Kosterin (2004) and Kosterin & Zaika (2010); it is noteworthy that *Enallagma cyathigerum* sensu Belyshev (1973) was this taxon.

Note 15. Reported only from Astrakhan (Kosterin 1999; 2004). The two references referred to here and further on have chiefly the same content, with the earlier paper in Russian.

Note 16. *Enallagma rotundatum* Bartenev, 1930, described from the western Caucasus (Bartenev 1930), looks like the senior synonym of *Enallagma risi* Schmidt, 1961. This case is to be clarified elsewhere.

Note 17. For the subspecific status of *Erythromma najas humerale* see Kosterin & Zaika (2010).

Note 18. The current consensus is an absence of clear subspecies in *Ischnura elegans* (Schröter et al. 2015; Schneider et al. 2018; Kosterin & Ahmadi 2018).

Note 19. The Japanese taxon *nigroflava* Martin, 1908, was downgraded to a Far Eastern subspecies of *Aeshna crenata* by Belevich (2005). Unfortunately, the cited work exists so far only as a large manuscript thesis in Russian. Later, Karube et al. (2012), based on both morphological and molecular analyses, downgraded *nigroflava* further to a synonym of *crenata*.

Note 20. Belevich (2005) synonymised all known subspecies of *Aeshna juncea* with the nominotypical ssp.

Note 21. Eurasian representatives of *Aeshna subarctica* are traditionally attributed to the subspecies *A. s. elisabethae* Djakonov, 1922. However, existence of this subspecies remains doubtful and an extensive revision of Eurasian *vs* American material is needed.

Note 22. There is an old record by Bartenev (1912); a more recent record by Malikova (1995) was based on two smaller larval instars and is unreliable.

Note 23. In southern Siberia, *Anax parthenope parthenope* extends east to the Tuva Republic while *A. parthenope julius* occurs in Transbaikalia (Kosterin 2004; Kosterin & Zaika 2010).

Note 24. Belyshev (1973) refuted the report of *G. vulgatissimus* for Omsk by Lavroff (1929) as he did not accept the presence of this species in Siberia. However, this species was found later on the West Siberian Plain in Tomsk Province (Bernard & Kosterin 2008, 2010).

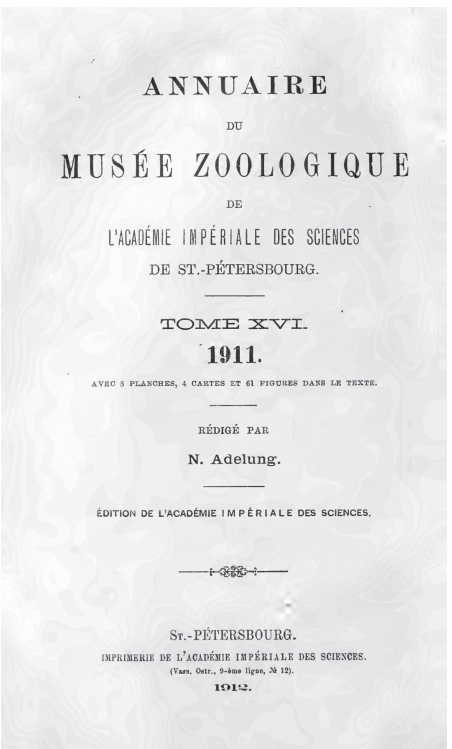
Note 25. Available and studied specimens from the Russian part of the Caucasus belong to the nominotypical subspecies (*e.g.*, Kosterin & Solovyev 2017); however, one cannot exclude that *Onychogomphus forcipatus albotibialis* Schmidt, 1964, ranging in Transcaucasia (*e.g.*, Schröter et al. 2015) might extend into Russian territory as well.

Note 26. The report of *Ophiogomphus cecilia* for the Caucasus (Zamotailov et al. 2018) is erroneous, see Kosterin (2018).

Note 27. Two communications of »Contributions à la connaissance des Odonates de l'Asie paléarctique du Musée Zoologique de l'Académie Impériale des Sciences de St. Pétersbourg« by A.N. Bartenev (1912, 1913) hitherto were usually dated with 1911 and 1912. However, they were actually published in the series, *Annuaire du Musée zoologique de l'Académie impériale des Sciences de St.-Pétersbourg* in 1912 and 1913. The confusion resulted from the fact that the *Annuarie* of 1911 was published in 1912 and *Annuaire* of 1912 in 1913 with both dates, that of the *Annuaire* itself and that of the printing, both printed on the front covers of these

journal volumes (Fig. 1). Bartenev himself made reference to the first communication as »Ежегодникъ З. М. XVI, 1911 (1912)« (Bartenev 1913: 289) and to the second one as »Ежегодн. Зоол. Муз. Ак. Н., XVII, 1913« (Bartenev 1914: 10). Hence the correct year of description of the genus *Trigomphus* and the species *T. anormolobatus* is 1912, and that of *Sympetrum parvulum* is 1913.

Note 28. The record refers to the holotype (female) *Trigomphus anormolobatus* Bartenev, 1911, originating from Vladivostok (Bartenev 1912), which is the only specimen known under that name. It was repeatedly considered a synonym (or maybe an aberration) of other congeners, such as *T. nigripes* (Selys, 1887) (Belyshev 1973), *T. melampus* (Selys, 1869) (Malikova 1995; Malikova, Ivanov 2001), or *T. ogumai* Asahina, 1949 (Kosterin et al. 2004); the latter two species inhabit Japan and are not known from continental Asia. Yet the characters of the holotype are rather unique and those synonymies were hardly justified. Both Bartenev (1956) and Belyshev (1956) independently reported in the same year on male specimens presumably associated with '*Gomphus anormolobatus*', which actually referred to *T. nigripes* (Malikova 1995). Hence, *T. anormolobatus* still remains to be re-discovered.


ANNUAIRE

DU

MUSÉE ZOOLOGIQUE

DE

L'ACADÉMIE IMPÉRIALE DES SCIENCES

DE ST.-PÉTERSBOURG.

TOME XVI.

1911.

AVEC 3 PLANCHES, 4 CARTES ET 61 FIGURES DANS LE TEXTE.

RÉDIGÉ PAR

N. Adelung.

ÉDITION DE L'ACADÉMIE IMPÉRIALE DES SCIENCES.

ST.-PÉTERSBOURG.

IMPRIMERIE DE L'ACADÉMIE IMPÉRIALE DES SCIENCES.

(Vass. Ostr., 9-ème ligne, № 12).

1912.

Figure 1. The cover of Volume 16 of *Annuaire du Musée zoologique de l'Académie impériale des Sciences de St.-Pétersbourg*. Note that 1911 refers to the year of this volume of the *Annuaire* and the year 1912 when it was printed. Even the month of printing is present on the back cover of the volumes, *e.g.*, in Volume 16, as follows: »Напечатано по распоряженію Императорской Академіи Наукъ. / Мартъ, 1912 г.« [Printed by the order of the Imperial Academy of Sciences / March, 1912] (https://www.biodiversitylibrary.org/item/34698#page/8/mode/1up). March, 1913 is similarly printed on the back cover of Volume 17, assigned to 1912.

The origin of the holotype is also somewhat doubtful. It was stated as follows: »Владивостокъ, из. колл. Таренецкаго (Wladiwostok) [Vladivostok, from coll. Tarenetskiy (Wladiwostok)]«, without date (Bartenev 1912: 435). It is noteworthy that in the next paper of the same series Bartenev (1913) reported a specimen of »*Neurothemis palliata palliata* Ris« with exactly the same data. That finding of a (sub-)tropical dragonfly was traditionally interpreted as a result of occasional transport by ship. Alternatively, it could be supposed that Vladivostok was only the city where Tarenetskiy lived, as indicated by the city name in parentheses after his surname, rather than the specimen's provenance. Therefore, the whole collection by Tarenetskiy – beyond the two mentioned species also including *Sympetrum flaveolum* (Linnaeus, 1758) and *Aeshna mixta* Latreille, 1805 (Bartenev 1912) – may have originated from elsewhere rather than Vladivostok. If this was the case, *T. anormolobatus* should be searched for somewhere in (sub-)tropical Asia or Sundaland rather than in the Far East of Russia, but so far no matching species has been recognised anywhere. Therefore, for the time being we retain *T. anormolobatus* in the checklist.

Note 29. The taxon *amurensis* Selys, 1887 was elevated to species rank based on molecular data by Jödicke et al. (2004). For the time being, OEK sees no reason to consider the latter even a subspecies, as there is a smooth cline of slightly decreasing size from west to east (Dumont et al. 2005). On the other hand, EIM upholds at least its subspecific status. *Cordulia* has a continuous range in Siberia, while Jödicke et al. (2004) had no data from vast areas from Central Siberia where the proposed taxa *aenea* s. str. and *amurensis* should either overlap or intergrade (Kosterin & Zaika 2010).

Note 30. Reported by Haritonov & Eremina (2010) from larvae. While the species identification could be disputed, the genus is unmistakable.

Note 31. The specific *vs* subspecific status of the taxon *orientalis* Selys, 1887 is equivocal, even between the authors of this paper. Arguments for the subspecific status, which are populations with characters transitory to *L. dubia* in the Kuznetskiy Alatau Mts (Kosterin & Zaika 2011), the West Sayan Mts (Kosterin & Zaika 2018) and Tuva (Kosterin & Zaika 2010, 2011) are published. The counter-arguments consisting in sympatric occurrence of both taxa but in different habitats in Central Siberia are not yet published (data by EIM and Andrey Medvedev pers. comm.). It is not excluded that in different cases these taxa may respond to secondary contact in different ways, as co-occurring species or intergrading subspecies, maybe undergoing the process of parapatric speciation.

Note 32. Geothermal springs only.

Note 33. The eastern subspecies *Orthetrum albistylum speciosum* (Uhler, 1858) was shown to have no reliable diagnostic differences and cannot be supported (Seehausen & Fiebig 2016).

Table 2. Invalid but available names (junior synonyms) proposed at species rank in the 20th century, based on specimens from the territory of Russian Federation, and their valid synonyms. Taxa described as species and further downgraded to valid subspecies, mentioned in Table 1, are not included. The order follows that of the valid species in Table 1.

Junior synonym	Valid name	Reference to synonymisation
Enallagma belyshevi Haritonov in Belyshev et Haritonov, 1975	*Enallagma circulatum* Selys, 1883	Seidenbusch (1997); Paulson et al. (1998)
Ischnura karafutonis Matsumura, 1931	*Enallagma circulatum* Selys, 1883	Asahina (1989a) (*Enallagma boreale circulatum*)
Agrion antiquum Bartenev, 1956	*Enallagma cyathigerum cyathigerum* (Charpentier, 1840)	Kosterin (1999, 2004) (*Enallagma cyathigerum* ?ssp. *antiquum*)
Enallagma nigrolineatum Belyshev et Haritonov, 1975	*Enallagma cyathigerum cyathigerum* (Charpentier, 1840)	Malikova (1995) (*Enallagma antiquum*); Kosterin (1999, 2004)
Enallagma rotundatum Bartenev, 1930	*Enallagma cyathigerum* ssp.	Kosterin (1999, 2004); Note 34
Agrion tugur Bartenev, 1956	*Coenagrion glaciale* (Selys, 1872)	Belyshev & Stepanchuk (1965) (*Agrion*)
Agrion amurensis Bartenev, 1956	*Coenagrion johanssoni* (Wallengren, 1894)	Belyshev & Stepanchuk (1965) (*Agrion concinnum*)
Agrion striatum Bartenev, 1956	*Paracercion plagiosum* (Needham, 1930)	Malikova (1995, 2009); Malikova & Ivanov (2001) (*Cercion*); Note 35
Agrion brevicauda Bartenev, 1956	*Paracercion v-nigrum* (Needham, 1930)	Belyshev & Stepanchuk (1965) (*Agrion V-nigrum?*); Malikova (1995, 2009); Malikova & Ivanov (2001) (*Cercion*)
Denticnemis bicolor Bartenev, 1956	*Pseudocopera tokoyensis* (Asahina, 1948)	Malikova (1995, 2009); Malikova & Ivanov (2001) (*Copera*)
Aeschnophlebia zygoptera Belyshev, 1956	*Aeschnophlebia longistigma* Selys, 1883	Malikova (1995, 2009); Malikova & Ivanov (2001)
Aeschna gigas Bartenev, 1908	*Aeshna crenata* Hagen, 1856	Bartenev (1910b)

Junior synonym	Valid name	Reference to synonymisation
Aeschna undulata Bartenev, 1930	*Aeshna juncea* (Linnaeus, 1758)	Belevich (2005)
Aeschna baicalensis Belyshev, 1964	*Aeshna juncea* (Linnaeus, 1758)	Belevich (2005)
Temnogomphus amurensis Bartenev, 1930	*Anisogomphus maacki* (Selys, 1872)	Asahina (1942)
Altaigomphus heterostylus Bartenev, 1930	*Nihonogomphus ruptus* (Selys, 1858)	Lieftinck 1964
Ophiogomphus bellicosus Vorontsovskiy, 1909	*Ophiogomphus cecilia* (Geoffroy in Fourcroy, 1785)	Bartenev (1911); Vorontsovskiy (1912)
Gomphus chancae Bartenev, 1956	*Shaogomphus schmidti* (Asahina, 1956)	Asahina (1989b) (*Gomphus*)
Somatochlora gratiosa Bartenev, 1910	*Somatochlora arctica* (Zetterstedt, 1840)	Belyshev (1952)
Somatochlora japonica Matsumura, 1911	*Somatochlora exuberata* Bartenev, 1910	Malikova (1995, 2009); Karube et al. (2012)
Somatochlora vera Bartenev, 1914	*Somatochlora exuberata* Bartenev, 1910	Belyshev & Kurentsov (1964) (*Somatochlora metallica exuberata*)
Somatochlora borealis Bartenev, 1910	*Somatochlora graeseri graeseri* Selys, 1887	Belyshev (1953)
Macromia sibirica Djakonov, 1926	*Macromia amphigena fraenata* Martin, 1906	Asahina (1964)
Macromia bartenevi Belyshev, 1973	*Macromia amphigena fraenata* Martin, 1906	Malikova (1995, 2009); Note 36
Leucorrhinia circassica Bartenev, 1929	*Leucorrhinia dubia* ssp.	Note 37
Leucorrhinia ussuriensis Bartenev, 1914	*Leucorrhinia orientalis* Selys, 1887	Malikova (1995, 2009); Malikova & Ivanov (2001)
Libellula relicta Belyshev et Kiauta, 1968	*Libellula quadrimaculata* Linnaeus, 1758	Beutler (1986)
Sympetrum arcticum Matsumura, 1911	*Sympetrum danae* (Sulzer, 1776)	Asahina (1949)

Note 34. Most probably *Enallagma cyathigerum rotundatum* will become the senior and valid synonym for *E. cyathigerum risi* Schmidt, 1961, to be clarified elsewhere.

Note 35. In this case and below, the synonymies were first proposed in a manuscript thesis (Malikova 1995), the English synopsis of which was published later (Malikova 2009); however, the first formal publication of these synonymies was by Malikova & Ivanov (2001).

Note 36. Belyshev (1973) erected *Macromia bartenevi* Belyshev, 1973, with reference to the detailed description of two males of »*Macromia amphigena* Selys (?)« from the environs of »Imyan'po Station« in Manchuria (presently China, Heilongjiang, Yimianpo, 45°03'N, 128°03'E) by Bartenev (1914: 21) and a male from the Birushka River mouth, Pereyaslavskiy District of Khabarovskiy Kray, which was at his disposal. He explicitly wrote: »…the species is known from three specimens only: two from Harbin City environs and one from Middle Amurland (the Birushka River)« (Belyshev 1973: 389). Lieftinck (1955) claimed that Bartenev's males were not conspecific to *M. amphigena* but were an undescribed species. Malikova (1995) examined Belyshev's male and found it to be a teneral specimen of *M. amphigena fraenata* with deformed appendages. Based on that specimen, Malikova (1995; 2009) considered *M. bartenevi* a junior synonym of *M. amphigena fraenata*. However, as follows from the above, the type series of *M. bartenevi* was heterogeneous as based on three male syntypes belonging to two different species, so a lectotype should have been designated to define the species before making conjectures of its synonymy. Most specimens from Bartenev's collection have been lost (Medvedev et al. 2012), why Belyshev's specimen is most probably the only presently existing syntype of *M. bartenevi*. This circumstance, as well as lack of information allowing us to individually associate the drawings by Bartenev (1914) with one of his two specimens, restricts the specimen choice for possible lectotype designation to Belyshev's specimen only. So, although the lectotype has not been yet designated, we may adopt the synonymy by Malikova (1995) for the time being.

Note 37. The reconsideration of *L. circassica* will be published by OEK elsewhere.

Discussion

The Odonata fauna of Russia contains 152 reliably reported species and 168 subspecies recognised by us. In spite of the huge area of the country, there is not one endemic species. This is explained by the fact that Russia is mostly situated at high latitudes, with a harsh climate that is hostile to dragonflies and damselflies. Moreover, the high latitudes were most affected by the climatic cooling events of the Pleistocene. In Russia they are especially impoverished since the predominantly east-west orientation of the mountains prevented displacement of thermophilic biota to the south during cold periods, so that only the Pacific coastal areas free of mountain barriers retained

their diversity (Kosterin 2005). Therefore the Russian territory is mostly inhabited by allochthonous species of Odonata. Among the subspecies recognised above, only *Calopteryx japonica altaica* and *C. splendens njuja* are seemingly endemic for Russia, but their validity remains questionable.

The highest Odonata diversity of 91 species (59.9 % of the total fauna) is found in southern Far East of Russia, embracing the northern margin of the range of the rich East Asian (Manchurian) fauna. As many as 40 species (26.3 % of the fauna) on the national checklist occur only there, within Russia. The Caucasus, the European part of Russia, South Siberia and Ural show similar, moderately rich faunas of 81, 80, 75 and 74 species, respectively. Those of the European part of Russia and of the Caucasus consist of European species, while that of Siberia looks rather like an impoverished European enriched with some eastern species (Kosterin 2005). The evenly lowland of the West Siberian Plain is poor (56 species), and the mountainous but severe North East Asia is expectedly very poor (39).

Of the main geographical regions considered, the most underexplored is the Caucasus, especially beyond the Black Sea coast, where a number of more species known from Georgia and Azerbaijan may yet be found. Other regions are well studied, although the current climate warming may cause more Manchurian species to appear in the southern Far East near the Chinese and Korean borders.

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