

Dragonflies and Damselflies (Odonata) of north-eastern Kazakhstan

Стрекозы (Odonata) Северо-Восточного Казахстана

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Keywords: dragonflies, damselflies, Odonata, north-eastern Kazakhstan, *Nehalennia speciosa*, *Macromia amphigena fraenata*, *Stylurus flavipes*, *Stylurus ubadschii*.

Ключевые слова: Стрекозы, Odonata, Северо-Восточный Казахстан, *Nehalennia speciosa*, *Macromia amphigena fraenata*, *Stylurus flavipes*, *Stylurus ubadschii*.

Abstract. Earlier north-eastern Kazakhstan was practically not studied with respect to Odonata. Here we report 39 species found in 14 localities, including such species rare in northern Kazakhstan as *Coenagrion johanssoni*, *Ischnura pumilio*, *Nehalennia speciosa*, *Anax imperator*, *Anax parthenope* and *Macromia amphigena fraenata*. The record of *Sympetrum fusca* appeared the northernmost in Asia and that of *C. johanssoni* the southernmost in Kazakhstan. The known distribution of close species *Stylurus flavipes* and *S. ubadschii* in Kazakhstan and presence of *M. a. fraenata* in the Irtysh River basin are considered. The recorded individuals of *Anax parthenope* and *Sympetrum fonscolombii* probably arrived from the south. *N. speciosa* was found in rather an unusual habitat.

Резюме. Северо-восток Казахстана оставался практически неисследованным в одонатологическом отношении. В данной работе в 14 локалитетах отмечено 39 видов стрекоз. Среди редких видов для северной части Казахстана приводятся *Coenagrion johanssoni*, *Ischnura pumilio*, *Nehalennia speciosa*, *Anax imperator*, *Anax parthenope* и *Macromia amphigena fraenata*. Для *Sympetrum fusca* это самый северный локалитет, известный в Азии, а для *C. johanssoni* — самый южный в Казахстане. Отмеченные особи *Anax parthenope* и *Sympetrum fonscolombii* скорее всего мигрировали с юга. Рассмотрены распространение в Казахстане близких видов *Stylurus flavipes* и *S. ubadschii* и присутствие *M. a. fraenata* в бассейне Иртыша. *N. speciosa* найдена в необычном для этого вида местообитании.

There is quite a number of papers devoted to Odonata of Kazakhstan, including two summarising works. B.F. Belyshev and V.V. Shevchenko [1971] reported for Kazakhstan 73 species and analysed their distribution. More than thirty years later Chaplina et al., 2007 reported 86 species for 83 localities. However, the «data» of Odonata species recorded with respect to localities, dates and collectors provided in the last paper are in

fact misinformation since the numeration of localities is hopelessly confused by shifting in that paper, and the correct one cannot be retrieved. Some of the errors in Chaplina et al. [2007] were mentioned by O.E. Kosterin and P.Y. Gorbunov [2010] but in fact all data by Chaplina et al. [2007] turned to be corrupted. Brief textual outlines of distribution of particular species in Kazakhstan in Chaplina et al. [2007] are, nevertheless, trustful. The disposition of localities provided on the map in that paper is adequate to their legend in the text, so only the data on Odonata at these localities are confused. On that odonatological map of Kazakhstan, one still can see a lot of «white spots» where Odonata were not yet explored. For instance, a vast north-east of Kazakhstan harbours two localities only, No. 5 and No. 9, with only two species reported for No. 9 (Pavlodar city), most probably in error, and none (obviously in error) for No. 5 (Lake Kyzyl-Dzhar).

In 2006 and 2012 the first author studied Odonata in north-eastern Kazakhsan, Pavlodar Province and north-eastern Karaganda Province, namely the Irtysh River middle flow with adjacent steppen areas, the Nura River middle flow and Bayanaul State National Nature Park (further in the text mentioned as «Bayanaul»). The Bayanaul hilly massif is a kind of oasis, with rivulets, brooks and lakes, surrounded by nearly waterless semidesert steppe. The results of that study are presented below, as well as some occasional data offered by S. Titov.

List of localities

The localities examined are encoded by their numerals below and so will be mentioned in *Material* section in the text below; their disposition is shown on the schematic map (Fig. 1).

1. Mynkol' village, a pond formed by hot (38 °C) radon containing water from a well, 53°45'20" N, 76°47'11" E, 103 m a.s.l., 06.VII.2013.

2. Baykonys village, and Irtysh River oxbow and floodplain pools, 52°56'38" N, 76°24'05" E, 97 m a.s.l., 24.VI. 2013.

3. Pavlodar city, an Irtysh River arm and floodplain pools, 52°22'14" N, 76°52'20" E, 125 m a.s.l., 2.VII.2013.

4. Zhebulak village, a brackish brook at Lake Maraldy, 52°20'29" N, 77°48'41" E, 80 m a.s.l., 21.VI.2013.

5. A spring, pond and bogs at Borly salt lake, 51°49'27" N, 77°56'46" E, 124 m a.s.l., 22.VI.2013.

6. Bayanaul National Park, Lake Birzhankol', 24 km NW of Bayanaul Town, 50°49'18" N, 75°20'19" E, 445 m a.s.l., 11.VI.2008 (collected by S. Titov).

7. Bayanaul National Park, a small lake in a granite rock «cap» on a ridge crest, 50°50'07" N, 75°46'37.7" E, 607 m a.s.l., 27.VI.2013 (Fig. 2).

8. Bayanaul National Park, Lake Kamyshovoe and a pond at the park headquarters, 50°48'32" N, 75°46'32" E, 440 m a.s.l., 26, 27, 30.VI.2013.

9. Bayanaul Natural Park, Lake Sabindykol' and the adjacent steppe, 50°46'54" N, 75°44'01" E, 453 m a.s.l., 28.VI.2013.

10. Bayanaul Natural Park, Lake Kempirtas among granite plates, 50°51'25" N, 75°34'10" E, 415 m a.s.l., 29.VI.2013 (Fig. 3).

11. Bayanaul Natural Park, Lake Dzhasybay, 50°49'39" N, 75°34'01" E, 395 m E, 29.VI.2013.

12. Bayanaul Natural Park, Lake Shelandykol' (Zmeinoe), 50°44'47" N, 75°37'09" E, 558 m a.s.l., 15–16.VI.2006.

13. Temirtau Town, the Nura River, 50°05'40" N, 73°12'19" E, 496 m a.s.l., 16–17.VI.2006.

14. The bridge across the Taldy (Sherubay-Nura) River Karaganda-Balkhash, 49°13'13" N, 73° 25'52" E, 624 m a.s.l., 17.VI.2006.

Annotated list of species

The specimens are kept in the collection of the Institute of Systematics and Ecology of Animals of Siberian Branch of Russian Academy of Sciences (further in the text ISEA).

Lestes barbarus (Fabricius, 1798)

Material. 8 (15♂♂, 9♀♀), 9 (2♂♂, 1♀), 10 (1♀).

Remarks. Common throughout Kazakhstan [Borisov, Haritonov, 2007; Chaplina et al., 2007].

Lestes dryas Kirby, 1890

Material. 2 (2♂♂, 1 ♀), 5 (2♀♀), 8 (5♂♂, 4♀♀), 9 (1♂), 13 (2♂♂).

Remarks. Common throughout Kazakhstan [Borisov, Haritonov, 2007; Chaplina et al., 2007].

Lestes sponsa (Hansemann, 1823)

Material. 3 (3♂♂, 1♀), 8 (3♂♂, 3♀♀), 9 (2♂♂, 1♀).

Remarks. Common in the north of Kazakhstan [Chaplina et al., 2007] while south of 44° E inhabits only mountains [Borisov, Haritonov, 2007].



Fig. 1. Disposition of the studied localities in north-eastern Kazakhstan.

Рис. 1. Места находок стрекоз на северо-востоке Казахстана.



Fig. 2. Locality 2: a small lake in a granite 'cup' on a ridge in the Bayanaul National Park.

Рис. 2. Локалитет 2. Озеро в каменной чаше на гребне хребта в Баянаульском природном парке.



Fig. 3. Locality № 10: Lake Kempirtas (Babay-Yaga) among granite plates in the Bayanaul National Park.

Рис. 3. Локалитет № 10. Озеро Кемпиртас (Баба-Яга) среди гранитных пластов в Баянаульском природном парке.

Lestes virens (Charpentier, 1825)

Material. 6 (1♂).

Remarks. Distribution in Kazakhstan is unclear: the species is known by solitary findings in north-east (Bayanaul, this paper), east [Chaplina et al., 2007] and south-east [Borisov, Haritonov, 2007]. The subspecies *L. virens marikovskii* Belyshev, 1961 has been reported for Kazakhstan [Chaplina et al., 2007] but the intraspecific variation of *L. virens* remains rather unclear [Jödicke, 1997; Samraoui et al., 2003; Schröter, 2010].

Sympetma fusca (Vander Linden, 1820)

Material. 5 (2♂♂, 1♀), 8 (1♂, 1♀).

Remarks. At present this is the northernmost Kazakhstan record of this species, which is common in south and south-east of this country [Borisov, Haritonov, 2007]. Earlier it was not reliably known northerly of Lake Balkhash, while a report of a female for Ust'-Kamenogorsk [Chaplina, 2004] appeared to be erroneous: examination of this specimen in ISEA collection proved its being *S. paedisca* [Borisov, Haritonov, 2007]. A report for Bashkiria in South Ural without locality [Boev et al. 1989; Haritonov, Eremina, 2010] also requires confirmation.

Sympetma paedisca (Brauer, 1877)

Material. 3 (3♂♂, 2♀♀), 4 (6♂♂, 3♀♀), 6 (1♂), 13 (2♂♂, 4♀♀), 14 (1♀).

Remarks. Common throughout Kazakhstan [Borisov, Haritonov, 2007; Chaplina et al., 2007].

Calopteryx splendens (Harris, 1782)

Material. 3 (6♂♂, 2♀♀), 13 (4♂♂, 1♀), 14 (2♂♂, 2♀♀).

Remarks. In Kazakhstan this species is common in permanent (not drought in summer) rivers and rivulets in flatland [Borisov, Haritonov, 2007; Chaplina et al., 2007].

Platycnemis pennipes (Pallas, 1771)

Material. 3 (9♂♂, 4♀♀), 13 (2♂♂, 3♂♂), 14 (4♂♂, 3♀♀).

Remarks. In Kazakhstan this species, as the above one, is common in permanent (not drought in summer) rivers and rivulets in flatland [Borisov, Haritonov, 2007; Chaplina et al., 2007].

Coenagrion armatum (Charpentier, 1840)

Material. 5 (4♂♂, 3♀♀), 13 (1♂). (Lake Alakol', Chernaya Kosa spit, 45°59' N, 81°30' E, 347 m a.s.l., 16.VI.2008, S. Borisov leg).

Remarks. Common in northern Kazakhstan [Chaplina et al., 2007]; in the south known by a single male from Alakol' Depression. There is a still more southerly record from Suusamyr Valley in Kyrgyzstan [Schröter, 2010].

Coenagrion hastulatum (Charpentier, 1825)

Material. 3 (2♂♂, 3♀♀), 12 (1♀).

Remarks. Distribution of this species in Kazakhstan is unclear; it is thought to be common in North Kazakhstan [Chaplina et al., 2007], A.N. Popova [1951] reported it for South Kazakhstan without details, besides, one male was collected at Lepsinsk in the Dzhungarian Alatau Mts. [Kosterin, Borisov, 2010].

Coenagrion johanssoni (Wallengren, 1894)

= *C. concinnum* (Johannson, 1859).

Material. 2 (1♂), 8 (1♂).

Remarks. Known in Kazakhstan by solitary findings in the north [Chaplina, 2004; Chaplina et al., 2007]; the here-with reported record in Bayanaul is the southernmost in the country.

Coenagrion lunulatum (Charpentier, 1840)

= *C. vernale* (Hagen, 1839).

Material. 1 (1♂, 2♀♀), 2 (3♂♂), 4 (2♂♂), 5 (12♂♂, 3♀♀), 8 (18♂♂, 6♀♀), 9 (1♂), 10 (4♂♂), 12 (15♂♂, 7♀♀), 13 (3♂♂, 1♀).

Remarks. The species is known in the north and east [Chaplina et al., 2007]; reported for South Kazakhstan without details by A.N. Popova [1951], found in two localities in the Dzhungarian Alatau Mts. in South-East Kazakhstan [Kosterin, Borisov, 2010]. The southernmost Kazakhstan record beyond mountains at 48° E is at the Ashchysu River north of Ayaguz Town [Borisov, Haritonov, 2007].

Coenagrion puella (Linnaeus, 1758)

Material. 1 (1♂), 5 (4♂♂, 3♀♀), 14 (3♂♂).

Remarks. Common in Kazakhstan [Borisov, Haritonov, 2007; Chaplina et al., 2007].

Coenagrion pulchellum (Vander Linden, 1823)

Material. 1 (2♂♂), 2 (6♂♂, 4♀♀), 3 (2♂♂), 5 (6♂♂, 5♀♀), 8 (22♂♂, 9♀♀), 10 (1♂), 11 (3♂♂), 12 (12♂♂, 10♀♀), 13 (4♂♂, 2♀♀), 14 (2♂♂).

Remarks. Common in Kazakhstan [Borisov, Haritonov, 2007; Chaplina et al., 2007].

Enallagma cyathigerum risi Schmidt, 1961

Material. 1 (6♂♂, 3♀♀), 2 (2♂♂), 3 (7♂♂, 2♀♀), 4 (2♂♂), 5 (5♂♂, 4♀♀), 7 (2♂♂), 8 (15♂♂, 10♀♀), 9 (14♂♂, 6♀♀), 10 (1♂, 2♀♀), 11 (1♂), 12 (13♂♂, 5♀♀), 13 (3♂♂, 5♀♀).

Remarks. All males of the collected series have the cercus structure typical for the subspecies *E. cyathigerum risi* ranging in semiarid and arid zones of Eurasia from Volga to the Great Hinggan Mts. [Kosterin, Zaika, 2010]; it is common throughout Kazakhstan [Borisov, Haritonov, 2007; Chaplina et al., 2007].

An alkaline Lake Sabindykol' (locality 9; potassium-hydrocarbonate mineralisation) is a peculiar habitat since it missed any Odonata other than *E. c. risi*, which was a mass species there. An ability of this taxon to flourish in brackish water bodies is now well known, as reported e.g. for West Siberia and Tuva [Kosterin, Zaika, 2010].

Erythromma najas najas (Hansemann, 1823)

Material. 2 (1♂), 3 (2♂♂, 1♀), 4 (1♂), 5 (3♂♂, 3♀♀), 7 (1♀), 8 (8♂♂, 2♀♀), 9 (1♂, 2♀♀), 13 (4♂♂, 3♀♀).

Remarks. In Kazakhstan, the species seems to be absent southerly of 44° N, that is in considerable part of the country [Chaplina et al., 2007; Borisov, Haritonov, 2007].

Ischnura aralensis Haritonov, 1979

Material. 9 (2♂♂, 1♀).

Remarks. *I. aralensis* has a peculiar range without analogs among Odonata; it occupies South Ural and Kazakhstan except for its mountainous southern and south-eastern parts [Yanybaeva et al., 2006; Borisov, Haritonov, 2007].

Ischnura elegans (van der Linden, 1820)

Material. 1 (4♂♂, 1♀), 3 (2♂♂, 1♀), 9 (3♂♂, 2♀♀), 11 (2♂♂), 13 (4♂♂, 4♀♀), 14 (1♂).

Remarks. Common in Kazakhstan, a mass species in the south of the country [Borisov, Haritonov, 2007].

Ischnura pumilio (Charpentier, 1825)

Material. 5 (3♂♂, 2♀♀).

Remarks. A species common in the south [Borisov, Haritonov, 2007] but local in the north of Kazakhstan; found at the

Utva River at Aksai Town in north-western Kazakhstan [Volkman, 1991]. It should be noted that Volkman, 1992 communicated wrong coordinates of Aksai Town (53°10' N, 52°58' E); in fact they are 51°10' N, 52°58' E, that is the error comprised 2 degrees of latitude. To the northerly of Kazakhstan the species was recorded in South Ural [Haritonov, Eremina, 2010], Novosibirsk [Kosterin, 2013], Lake Manzherok in North Altai [Kosterin, 1987] and in Tuva [Kosterin, Zaika, 2010].

Nehalennia speciosa (Charpentier, 1840)

Material. 9 (1♀).

Remarks. The only female was found in a steppe between the alkaline Lake Sabindykol' and a swamp about 700 m in diameter, with reed thickets, some tussocks and a birch grove in the centre which hid a spring. Three still wet valleys of temporary brooks entered the depression. It is this swamp which most probably was the local *N. speciosa* habitat (curiously, no Odonata were recorded immediately at that swamp).

At least at in Europe, *Nehalennia speciosa* is a stenotopic species confined to stands of certain density of stems of sedge species (mostly *Carex limosa* L., less frequently *C. lasiocarpa* Ehrh., *C. rostrata* Stokes, *C. elata* All. and rarely other *Carex* species) emerging from shallow water in two types of habitats: (1) peat-moss habitats, mostly quaking bogs at lake banks or sinking margins of water openings in peat-moss mires (the preferred habitat type) or (2) swamped meadows, shallow ponds or artificial pits or similar water bodies (mostly at margins of the species range) [Bernard, Wildermuth, 2005]. The habitats of *N. speciosa* in the boggy part of the West Siberian Lowland belong exactly to the type 1 [Bernard, Kosterin, 2010]. They disprove associations of the species range with the areas once covered by glaciers which was observed in Europe [Bernard, Wildermuth, 2005] since southern West Siberian Lowland has never been glaciated; most probably this European association resulted from the glaciation in the past having provided a relief favouring lakes and mires. The here reported presumed habitat at Lake Sabindykol' seems to offer a habitat of the type 2. Note it nearly contradicts the association of *N. speciosa* habitats with woody vegetation which was also observed in Europe [Bernard, Wildermuth, 2005], a small birch grove being the only trees in this swamp.

An explosive appearance of *N. speciosa* in a similar habitat, unusual for this species in the forest-steppe zone of West Siberia, was described by A.Y. Haritonov and O.N. Popova [2011]. In 2006, the species appeared in abundance at Lake Malye Chany (a large shallow lake with vast reed thickets, no arboreal vegetation, 54°37' N, 78°13' E, Zdvinsk District of Novosibirsk Province). Together with *N. speciosa*, another damselfly species with similar ecological preference elsewhere favouring peat-moss habitats, *C. johanssoni*, appeared as common at the same locality. This locality had been permanently being monitored by these authors on a basis of the field station of the Institute of Systematics and Ecology of Animals situated at that lake, but for the 30 preceding years both species had been registered before only two times and by single specimens. Unfortunately, the cited paper provides no further details concerning that outburst of *N. speciosa*. A. Y. Haritonov once informed us personally that both damselfly species occurred at a clayey 'littoral' overgrown with sedge (and partly by reed), which appeared in place of the lake bottom because of a drop of its level in 2006. Next year, when the level rose again, *N. speciosa* has not been registered at all. Unfortunately, this fact was not mentioned in the cited paper, although it claimed to consider trends of abundance and migrations of Odonata at that place for the period 1972–2008.

N. speciosa is an amphipalaearctic (most probably) or transpalaearctic [Kosterin, 2005] mostly boreal species with local distribution. Chaplina et al. [2007] was reported it for Kazakhstan by one female from «collection of ZI RAS» dated 15.VI.1978 from their loc. 78 which according to the legend was Bishkek, hence not at all in Kazakhstan! Obviously here we again face data corruption because of some numeration shift. A correct locality may be found in the Ph.D. Thesis by I.A. Chaplina [2004] as follows: «South Kazakhstan, the Chu River, 1♀ (Kerzhner)». Note that the boreal *N. speciosa* was far from being expected for such a southern and arid locality.

Aeshna affinis Vander Linden, 1820

Material. 3 (1♀), 8 (3♂♂).

Remarks. In Kazakhstan it is common in the north and rarer in the southern half of the country [Chaplina et al., 2007; Borisov, Haritonov, 2008].

Aeshna crenata Hagen, 1856

Material. 7 (1♀, 2♀♀, 4 exuviae with dead imagines).

Remarks. Breeding was registered at a small cup-like lake on a granite ridge crest which seems to feed exclusively by precipitation (Fig. 2). The last instar larvae, exuviae, and some imagines which died at eclosion were collected.

Earlier the species was known for Kazakhstan by two findings in north and east [Chaplina et al., 2007].

Aeshna grandis (Linnaeus, 1758)

Material. 2 (3♂♂, 2♀♀), 3 (1♀), 8 (1♂).

Remarks. The species has been seemingly reported for Pavlodar by Chaplina et al. [2007] but since the numeration of localities in that paper was shifted, that record in fact referred to some other locality. In Kazakhstan, this species occurs in the north and east of the country [Chaplina et al., 2007] and is also known by solitary findings at Almaty City [Borisov, Haritonov, 2008].

Aeshna serrata Hagen, 1856

Material. 3 (1♀), 7 (4♂♂, 1♀), 8 (4♂♂).

Remarks. In Kazakhstan, this species is common in the north and east of the country [Chaplina et al., 2007], besides, a single female was reported from the Alakol' Depression in south-east [Borisov, Haritonov, 2008]. It was also registered in northern Kyrgyzstan near its border with Kazakhstan [Schröter, 2010].

Anax imperator Leach, 1815

Material. 2 (1♂ teneral).

Remarks. In Kazakhstan, the species was known only from the east [Chaplina et al., 2007] and south-east [Borisov, Haritonov, 2008]. This finding is the northernmost for the country. In South Ural this species is known even more northerly [Haritonov, Eremina, 2010].

Anax parthenope (Selys, 1839)

Material. 3 (1♂), 8 (1♂, 1♀ in copula).

Remarks. The range of *A. parthenope* embraces North Africa and the southern half of Eurasia. In Kazakhstan, this is a mass species in the south but hitherto was not known from the north [Chaplina et al., 2007]. At the same time it was recorded from South Ural [Yanybaeva et al., 2006; Haritonov, Eremina, 2010], southern West Siberia [Belyshev, Belyshev, 1976; Kosterin, 2007; Dronzikova, 2011] and southern Central Siberia [Kosterin, Zaika, 2010] where reaches as northerly as Krasnoyarsk [Borisov, 2012a]. This



Рис. 4. Teneral ♂ of *Anax parthenope* arrived to an ultraviolet lamp at night in Pavlodar, 29.VII.2009 (photo by S. Titov).

Рис. 4. Молодой ♂ *Anax parthenope*, прилетевший ночью на свет УФ-лампы, Павлодар, 29.VII.2009 (фото С. Титова).

species is migratory but its migration strategy is still unclear. The only reliably known fact is that in southern Kazakhstan these dragonflies show regular migrations in the southern direction in autumn [Borisov, 2012a, b]. All three our specimens were mature and had strongly worn out wings. At the same time, S. Titov offered us a photo of a teneral male *A. parthenope*, with characteristic glittering wings, (Fig. 4) which arrived at night 29.VII.2009 to an ultra-violet lamp in Pavlodar (loc. 3). (Note that a teneral male was also collected in Omsk on 8.VI.2007 [Kosterin, 2007]). We suppose that our old specimens migrated from the south while the teneral male was of a local origin. The supposed spring northward migrations of this species would be difficult to observe since they most probably take place diffusely so that the migrated individuals are registered already at breeding habitats [Holland et al., 2006; May, Matthews, 2008; May, 2013]. Note that the first author observed mass congregations of *A. parthenope* in Altyn-Emel Nature Park at Kapchagai Water Reserve in south-eastern Kazakhstan in mid-May 2009 and late April 2012 (unpublished). This place is about 800 km southerly of Bayanaul. Great abundance of these dragonflies was also noted in late May–early June 1992 for the Ili River lower reaches [Reinhardt, Seidenbusch, 1999], which is about 600–700 km southerly of Bayanaul.

Onychogomphus forcipatus (Linnaeus, 1758)

Material. 14 (2♂♂).

Remarks. This species has been reported for Kazakhstan by B.F. Belyshev and V.V. Shevchenko [1971]. One of us, O. Kosterin, collected this species near Nezhinka village at the Ishim River in the former Kokchetav Province in central Northern Kazakhstan on 3, 9, 10 and 23.VII.1983 (unpublished). I.A. Chaplina mentioned this record, as well as record from western Kazakhstan, in her unpublished manuscript Ph.D. Thesis [Chaplina, 2004]. Unfortunately, in their summarising

paper, Chaplina et al. [2007] again mentioned occurrence in North and West Kazakhstan but at the same time reported only locality 10, which was indicated in the legend to be in West Kazakhstan (Tersakkan River), to which specimens collected by O. Kosterin at Nezhinka (listed in the cited paper as locality 4, «Ishim River») were erroneously ascribed.

Ophiogomphus cecilia (Geoffroy in Fourcroy, 1785)

Material. 3 (2♂♂, 2♂♂), 13 (3♂♂).

Remarks. Although the species has been seemingly reported for Pavlodar by Chaplina et al. [2007], this datum most probably referred to some other locality (see above). There is an erroneous opinion that *O. cecilia* occurs throughout Kazakhstan [Chaplina, 2004; Chaplina et al., 2007]. For instance, it was reported for Alakol Depression and Almaty [Chaplina, 2004; Chaplina et al., 2007]. In fact, southern and south-eastern Kazakhstan (as northerly as Lake Zaisan) is inhabited by another species, *O. reductus* Calvert, 1989, while *O. cecilia* occupies north-western, north and eastern parts of the country [Borisov, 2005; Borisov, Haritonov, 2008].

Stylurus flavipes (Charpentier, 1825)

Material. 3 (4♂♂, 2♀♀, 12 exuviae), 13 (2♂♂, 8 exuviae).

Remarks. This species was reported for Kazakhstan as *Gomphus (Stylurus) flavipes* [Chaplina et al., 2007]. I.A. Chaplina [2004] specified that all specimens of this species from Kazakhstan examined by her belonged to the nominotypical *S. f. flavipes*, which was claimed to occur in western, northern, eastern and southern Kazakhstan [Chaplina, 2004; Chaplina et al., 2007]. In fact, there are two close species in Kazakhstan: *Stylurus flavipes* (Charpentier, 1825) and *Stylurus ubadschii* Schmidt, 1953 (= *Gomphus flavipes lineatus* Bartenev, 1929). The here reported localities of *S. flavipes* are the only existing for Kazakhstan up to date. In Kazakhstan, this species is most probably confined to the Irtysh River basin (as our locality 3 at the Irtysh itself) and the inner basins of minor lakes of the Kazakh hilly land (as our locality 13, the Nura River). All other Kazakhstanean adult specimens which we were able to examine were from southern Kazakhstan as referring to the basins of the major lakes Alakol', Balkhash, Isykkul' and Aral, and appeared to represent *S. ubadschii*. They were as follows:

— the Lake Alakol' basin: 2♂♂, the Tentek River, 20–21.VIII.2008, B. Zlatanov leg., coll. Institute of Zoology Almaty; the Lake Balkhash basin, the Ili River: 1♀, Iliysk station (presently Kapchagai Town), the Saskelie River, 09.VI.1952, P.A. Ler leg. (ISEA) (Published in [Belyshev, Shevchenko, 1961] as *Gomphus flavipes liniatus*); 1♂, 40 km downstream of Kapchagai Town, 44°12' N, 76°54' E, 426 m a.s.l., 24–25.VI.2006, S. Borisov leg. (ISEA); 1♂ (a photo), Tamgaly-Tas terrain, 6.VII.2009, O. Kosterin;

— the Lake Balkhash basin, the Karatal River: 2 teneral ♂♂, 1 teneral ♀, a series of larvae, Ushtobe, 45°20' N, 77°59' E, 410 m a.s.l., 26–28.V.2008, S. Borisov leg.;

— the Lake Issykkul' basin, the Chu River: 2♂♂, 1♀, Belbasar and Aydarly villages, 10.VII.2008, collectors unknown, coll. Institute of Zoology Almaty;

— the Lake Aral basin: 2♂♂, 1♀, the Chirkili River, Terenozek District, 8–15.VIII.1976, A.Y. Haritonov (ISEA).

In earlier works co-authored by the second author, *S. ubadschii* used to be referred to as a subspecies *Gomphus flavipes liniatus* or *Stylurus flavipes liniatus* (sic, with a spelling error inherited from the works by B.F. Belyshev) and its transition to *S. flavipes flavipes* was supposed to take place in the Turanian Plain, that is in Kazakhstan [Borisov, Haritonov, 2008]. However, reconsideration of the specimens available did not provide ground to doubt in *S. ubadschii* being a species

distinct from *S. flavipes*. More specimens from more localities are still necessary for a final decision.

Macromia amphigena fraenata Martin, 1906

Material. 3 (3♂♂, 1♀).

Remarks. The collected specimens.

Earlier this taxon was reported for more upstream parts of the Irtysh River basin:

— the Bulgan-Gol River descending from the Mongolian Altai Mts to the Dzhungarian Depression at the westernmost territory of Mongolia [Peters, 1985];

— at the Bukhtarminskoe Water Reserve near Ust'-Bukhtarminsk, East Kazakhstan Province [Reinhardt, Samietz, 2003];

— at Sibinskiy Lakes in the westernmost Kalbinskiy Range, East Kazakhstan Province [Chaplina, 2003; 2004].

Therefore, is its presence at an Irtysh River arm at Pavlodar was not too surprising. More surprising its absence downstream the Irtysh River or at its downstream tributaries at Omsk, the surroundings of which the second author used to examine for decades [Kosterin, 1996; 2007]. Omsk is at the same latitude of 55° E as (but enjoys even somewhat milder climate than) Novosibirsk where *M. amphigena fraenata* is abundant at medium-sized Inya and Berd' Rivers [Kosterin et al., 2001; Kosterin, 2005]. Its absence at Omsk could be explained by too turbid waters of the Irtysh itself and too polluted waters of its medium-sized tributary Om'.

Recently enigmatic *Macromia* sp. (maybe *M. amphigena fraenata* as well) has been surprisingly reported by larvae from as westerly as South Ural (Lake Bol'shoe Miassovo in the Il'menskiy Nature Reserve) [Haritonov, Eremina, 2010]. An imaginal records allowing species identification is utmostly needed from there.

Epitheca bimaculata (Charpentier, 1825)

Material. 5 (1♂).

Remarks. The only male was captured in a birch grove at salt lake Borly. Earlier the species was known for Kazakhstan by two records in the east [Chaplina et al., 2007].

Somatochlora flavomaculata (Vander Linden, 1825)

Material. 5 (2♂♂).

Remarks. The species was earlier reported for Kazakhstan by one male from Ural'sk Town in the west [Chaplina et al., 2007].

Somatochlora metallica (Vander Linden, 1825)

Material. 2 (3♂♂, 1♀), 14 (2♂♂).

Remarks. Common in northern Kazakhstan [Chaplina et al., 2007].

Leucorrhinia pectoralis (Charpentier, 1825)

Material. 7 (1♀), 12 (3♂♂).

Remarks. Common in northern Kazakhstan [Chaplina et al., 2007], locally known from the Alakol' Depression and Dzhungarian Alatau Mts. in south east [Borisov, Haritonov, 2008; Kosterin, Borisov, 2010].

Leucorrhinia rubicunda (Linnaeus, 1758)

Material. 2 (1♂, 2♀♀), 7 (1♂), 10 (2♂♂), 12 (1♂).

Remarks. Known from northern Kazakhstan, not recorded southerly of 48° N [Chaplina et al., 2007].

Libellula quadrimaculata Linnaeus, 1758

Material. 2 (3♂♂, 1♀), 3 (2♀♀), 5 (2♂♂, 2♀♀), 7 (1♂), 10 (2♂♂, 1♀), 12 (1♂), 14 (3♂♂, 1♀).

Remarks. Common throughout Kazakhstan [Chaplina et al., 2007; Borisov, Haritonov, 2008].

Orthetrum cancellatum (Linnaeus, 1758)

Material. 1 (1♂), 3 (1♂, 3♀♀)

Remarks. In Kazakhstan the species is common in southern and south-eastern plains [Borisov, Haritonov, 2008], locally occurs in the north [Chaplina et al., 2007].

Sympetrum flaveolum (Linnaeus, 1758)

Material. 1 (3♂♂, 2♀♀), 2 (1♂), 3 (6♂♂, 2♀♀), 5 (2♂♂, 1♀), 8 (9♂♂, 11♀♀), 9 (1♂), 10 (1♂, 2♀♀), 11 (2♂♂, 3♀♀), 13 (2♂♂, 1♀).

Remarks. Mass species in northern Kazakhstan but associated with mountains in the south [Borisov, Haritonov, 2008].

Sympetrum fonscolombii (Selys, 1840)

Material. 8 (3♂♂, 2♀♀).

Remarks. The species was found only at a pond in the Bayanaul National Park headquarters. Noteworthy these dragonflies were absent on June 26 and 27 but quite abundant on June 30. They all were mature, with a saturated red coloration in males and brownish-olive in females; mating and oviposition was observed. Alike *A. parthenope*, dragonflies of this species demonstrate regular latitudinal migrations in the temperate zone, but differ from the mentioned species in being represented in the former Soviet Central Asian Republics and Kazakhstan by ephemeral populations only. Mature individuals arrive from the south in spring and early summer and lay eggs from which a local brood develops to migrate backward to the south in autumn [Borisov, 2010, 2011, 2012b].

The northernmost records of the species in the Asian part of the range were as follows: Lake Uvil'dy in South Ural, 55°34' N, 60° 34' E [Haritonov, Eremina, 2010], Aksai in north-western Kazakhstan, 51°10' N, 52°58' E (corrected, see above in remarks to *I. pumilio*) [Volkman, 1991] and Ust'-Kamenogorsk City in East Kazakhstan, 49° 57' N, 82° 43' E [Chaplina et al., 2007].

Discussion

Along with first reliable faunistic data on Odonata of north-eastern Kazakhstan, mostly including highly expected species, we made two northernmost records in this country, of *S. fusca* and *A. imperator* (that for the former is also the northernmost in Asia), and one southernmost one, of *C. johansoni*. We also for the first time reported true *S. flavipes* for Kazakhstan.

Too few (just two) species of *Sympetrum* recorded is explained by relatively early dates of the study, no doubt more would be found in the same localities in August/September.

The here reported findings of *N. speciosa* and *M. amphigena fraenata* shed some more light of their still poorly understood distribution and habitat preference, as discussed in remarks.

Acknowledgements

The work of O. Kosterin was supported by Russian State Project VI.53.1.3, the work by S.N. Borisov — by the grant 12-04-00824a of Russian Fund of Fundamental Research.

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