

## Additions to dragonfly (Odonata) fauna of the Republic of Adygea (North-Western Caucasus)

### Дополнение к фауне стрекоз (Odonata) Республики Адыгея (Северо-Западный Кавказ)

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КЛЮЧЕВЫЕ СЛОВА: стрекозы, новые находки, Республика Адыгея, Odonata, *Anax ephippiger*, *Pantala flavescens*, *Selysiothemis nigra*.

ABSTRACT. The article provides data on new findings of 10 species of dragonflies on the territory of the Republic of Adygea. *Anax ephippiger* (Burmeister, 1839), *Pantala flavescens* (Fabricius, 1798) and *Selysiothemis nigra* (Vander Linden, 1825) were recorded as new to the fauna of this region. For *Coenagrion ornatum* (Selys, 1850), *Ischnura pumilio* (Charpentier, 1825), *Pyrrhosoma nymphula* (Sulzer, 1776), *Anaciaeschna isoceles* (Müller, 1767), *Gomphus schneiderii* Selys, 1850, *Libellula fulva* Müller, 1764, and *Orthetrum cancellatum* (Linnaeus, 1758) that were previously known from single findings, we identified new collection points. The findings of exuviae of larvae of *Selysiothemis nigra* (Vander Linden, 1825) in the coastal parts of the water bodies of the city of Maykop indicate the reproduction of this species in the region.

РЕЗЮМЕ. Приводятся данные о новых находках для 10 видов стрекоз, на территории Адыгеи. *Anax ephippiger* (Burmeister, 1839), *Pantala flavescens* (Fabricius, 1798) и *Selysiothemis nigra* (Vander Linden, 1825) впервые указываются для фауны данного региона. Для *Coenagrion ornatum* (Selys, 1850), *Ischnura pumilio* (Charpentier, 1825), *Pyrrhosoma nymphula* (Sulzer, 1776), *Anaciaeschna isoceles* (Müller, 1767), *Gomphus schneiderii* Selys, 1850, *Libellula fulva* Müller, 1764, *Orthetrum cancellatum* (Linnaeus, 1758), ранее известных по единичным указаниям, отмечены новые пункты сборов. Находка экзувиев личинок *Selysiothemis nigra* (Vander Linden, 1825) в прибрежной части

водоёмов города Майкопа, свидетельствует о размножении данного вида в регионе.

### Introduction

The taxonomic diversity of the order Odonata in Russia comprises 160 species [Malikova, Kosterin, 2019]. Eighty five species and subspecies of dragonflies were described from the Caucasus fauna [Haritonov et al., 2007; Malikova, Kosterin, 2019]. According to the generalized data 71 dragonfly species from 29 genera and 9 families have been registered in the North-Western Caucasus. The taxonomic spectrum of the fauna is determined by the families Libellulidae (34%), Coenagrinoidea (20%), Aeshnidae (14%) and Lestidae (12%) [Stain, Shapovalov, 2016; Shapovalov, Korotkov, 2019].

Previously, we have published an annotated checklist of dragonflies (Odonata) of the fauna of the Republic of Adygea (North-Western Caucasus) based on our own and published data; it includes 43 species from 21 genera belonging to 8 families [Shapovalov, Korotkov, 2019].

The entire territory of the Republic of Adygea is located in the basin of the Kuban River (which belongs to the basin of the Sea of Azov); its length from North to South is 208 km (from 45°13'N to 43°46'N), from West to East 165 km (from 38°41'E to 40°30'E); the area of the region is 7,790 km<sup>2</sup>. The region is characterized by pronounced altitudinal zonality with three orographic zones: flatland, foothill, and mountainous [Kanonnikov, 1977]. Adygea has more than 5 thousand rivers and

streams, about 95% of which are small watercourses that belong mainly to the slopes of the Greater Caucasus. The density of the river network within Adygea varies from 0.3 km/km<sup>2</sup> in the flatland zone, 0.7 km/km<sup>2</sup> in the foothill zone, and 1.5–1.9 km/km<sup>2</sup> in the upper reaches of the Belaya and Laba Rivers [Melnikova, 2019]. The climate in the region is temperate continental in the northern flatland part, moderately warm and humid in the foothills, and alpine in the mountainous regions [Varshanina, Mitusov, 2005].

This paper presents data on findings of dragonfly species that are new to the region, as well as on new collection points for species previously known from single findings.

## Material and methods

The material for this paper was collected by the authors in 2017 and 2019–2021 years on the territory of the Republic of Adygea. When collecting dragonfly imagoes, we used an air entomological net with the hoop diameter of 50 cm and the handle length of 110 cm [Golub et al., 2012]. Most of the material was mounted on entomological pins, some part was stored on cotton entomological mattresses. All materials are stored in the collection fund of the Laboratory for Bioecological Monitoring of the Invertebrate Animals of Adygea of the Research Institute of Complex Problems, Adyge State University (Maykop).

The photographs were taken by M.I. Shapovalov and M.A. Saprykin (Figs 1–11) using a Canon Power Shot A580 camera, a Micromed MC-3-Zoom LED microscope and a WINGRIDY W50 lighting system.

## Results

### Zygoptera

#### Family Coenagrionidae

##### *Coenagrion ornatum* (Selys, 1850)

**MATERIAL.** **Maykopsky District:** environs of the Krasny Most, Botanical Garden at Adyge State University, 44.535249N, 40.102628E, 238 m a.s.l., 3.06.2021 — 1♀. **Koshekhabsky District:** environs of the Khodz, Khodz River, 44.528489N, 40.719931E, 307 m a.s.l., 24.05.2019, 6.06.2019 — 6♂♂, 5♀♀; ibidem 44.525860N, 40.719742E, a meadow, 6.06.2019, 9.06.2019 — 5♂♂, 4♀♀; ibidem 44.526197N, 40.720635E, tributary of the Khodz River, 1.06.2021 — 5♂♂, 2♀♀.

##### *Ischnura pumilio* (Charpentier, 1825)

**MATERIAL.** **Maykopsky District:** Podgorny, 44.457562N, 40.171005E, 188 m a.s.l., 3.07.2020 — 1♀.

**REMARKS.** Findings of the species were reported on the Black Sea coast of the Krasnodar Krai: Sukko [Onishko, 2016]; Abrau Peninsula, Dyurso, Novorossiysk [Kosterin, Solovyev, 2017]; Malyy Utrish, Dyurso, Novorossiysk [Kosterin, 2017]. Previously known records of the species in Adygea were in Maykop, Kurdzhips River [Bartenev, 1930].

We recorded new findings of this species in the Krasnodar Krai: Krymsk, Adagum River, 44.929934N, 37.992022 E, 26 m a.s.l., 25.07.2020 — 3♀♀.

##### *Pyrhosoma nymphula* (Sulzer, 1776)

**MATERIAL.** **Maykopsky District:** environs of the Shuntuk, water reservoir, 44.459857N, 40.188591E, 28.05.2021 — 1♂.

### Anisoptera

#### Family Aeshnidae

##### *Anaciaeschna isoceles* (Müller, 1767)

**MATERIAL.** **Maykop:** Zelenstroy City District, 44.595043N, 40.070025E, 9.06.2019 — 2♂♂; Voskhod City District, 44.595043N, 40.070025E, 10.06.2019 — 2♂♂. **Maykopsky District:** environs of the Krasny Most, Botanical Garden at Adyge State University, 44.535249N, 40.102628E, 13.06.2017 — 3♀♀; Gaverdovsky, 44.627052N, 40.019762E, pond, 2.06.2019 — 2♂♂; Podgorny, 44.457562N, 40.171005E, 188 m a.s.l., 26.07.2021 — 1♂.

##### *Anax ephippiger* (Burmeister, 1839)

**MATERIAL.** **Giaginsky District:** Novy, 44.937096N, 40.173856E, at light, 4.07.2021 — 1♂.

**REMARKS.** We reported this species for the territory of Adygea for the first time. The species was previously registered on the Black Sea coast: Matsesta, Khosta [Skvortsov, 2010]; Anapa, Novorossiysk, on the Abrau Peninsula, in the vicinity of the Dyurso village, the settlement of Maly Utrish, Dzhubga [Kosterin, 2017; Kosterin, Borisov, 2018]; the Bolshoy Utrish Cape, Tuapse [Onishko, 2016, 2019], as well as from Krasnodar and Ust-Labinsk [Kosterin, Borisov, 2018].

We recorded new findings of this species in the Krasnodar Krai: Abinsk, rice paddy fields, 8.08.2015 — 1♀; Ust-Labinsky District: 2.5 km from the Tenginskaya station, Maly Zelenchuk River, 45.124444N, 39.995639E, 103 m a.s.l., 21.08.2019 — 1♀.

#### Family Gomphidae

##### *Gomphus schneiderii* Selys, 1850

**MATERIAL.** **Giaginsky District:** Nizhniy Ayryum, Ayryum River, 44.897991N, 40.186783E, 26.05.2019 — 1♂, 1♀.

**REMARKS.** For the territory of Adygea, the species was previously registered in two localities – Krasny Most, Botanical Garden at Adyge State University and Maykop [Shapovalov, Korotkov, 2018, 2019]. The new collection point was located in the northernmost part of the territory of Adyge Republic.

#### Family Libellulidae

##### *Libellula fulva* Müller, 1764

**MATERIAL.** **Giaginsky District:** Nizhniy Ayryum, Ayryum River 44.897991N, 40.186783E, 26.05.2019 — 3♂.

##### *Orthetrum cancellatum* (Linnaeus, 1758)

**MATERIAL.** **Maykop:** Zelenstroy City District, 44.595043N, 40.070025E, pond, 28.06.2019, 3.07.2019 — 1♂, 2♀♀; Voskhod City District, 44.595043N, 40.070025E, pond, 236 m a.s.l., 16.07.2020 — 1♂; **Takhtamukaysky District:** vicinity of the Novobzhegokay, a temporary reservoir near the Afips River, 44.94059N, 38.832852E, 5.09.2021 — 1♀.

##### *Pantala flavescens* (Fabricius, 1798)

###### Figs 1–6.

**MATERIAL.** **Maykopsky District:** environs of the Dakhovskaya, camp site «Gornaya Legenda», 44.255171N, 40.197733E, 447 m a.s.l., 6.08.2019 — 1♂, 1♀; Podgorny, 44.457562N, 40.171005E, 188 m a.s.l., 9.08.2020 — 1♂.

**REMARKS.** The species is specified for the territory of Adygea for the first time. Previously known records of the species in the Krasnodar Krai were in the following localities: Khosta [Skvortsov, 2010]; 2.3 km W of Dyurso village, Novorossiysk [Kosterin, 2017; Kosterin, Borisov, 2018]; Natukhaevskaya, Kabardinka [Kosterin, Solovyev, 2017]; Fanagoriyskoye, the Goryachy Klyuch District [Onishko, 2019].

New findings of this species in the Krasnodar Krai were in the Krymsky District, Novokrymsky village, Novokrym-



Figs 1–6. *Pantala flavescens*: 1 — imago ♂; 2 — head coloration, lateral view; 3 — thorax, lateral view; 4 — anal appendages, dorsal view; 5 — anal appendages, lateral view; 6 — anal appendages, ventral view (collected in the settlement of Podgorny).

Рис. 1–6. *Pantala flavescens*: 1 — имаго ♂; 2 — окраска головы, сбоку; 3 — грудь, сбоку; 4 — анальные придатки, сверху; 5 — анальные придатки, сбоку; 6 — анальные придатки, снизу (экземпляр собран в пос. Подгорный).

skoye reservoir (“Grecheskoye Lake”), 44.944424N, 37.802287E, 26.07.2020 — 5♂♂, 5♀♀.

*Selysiothemis nigra* (Vander Linden, 1825)  
Figs 7–9.

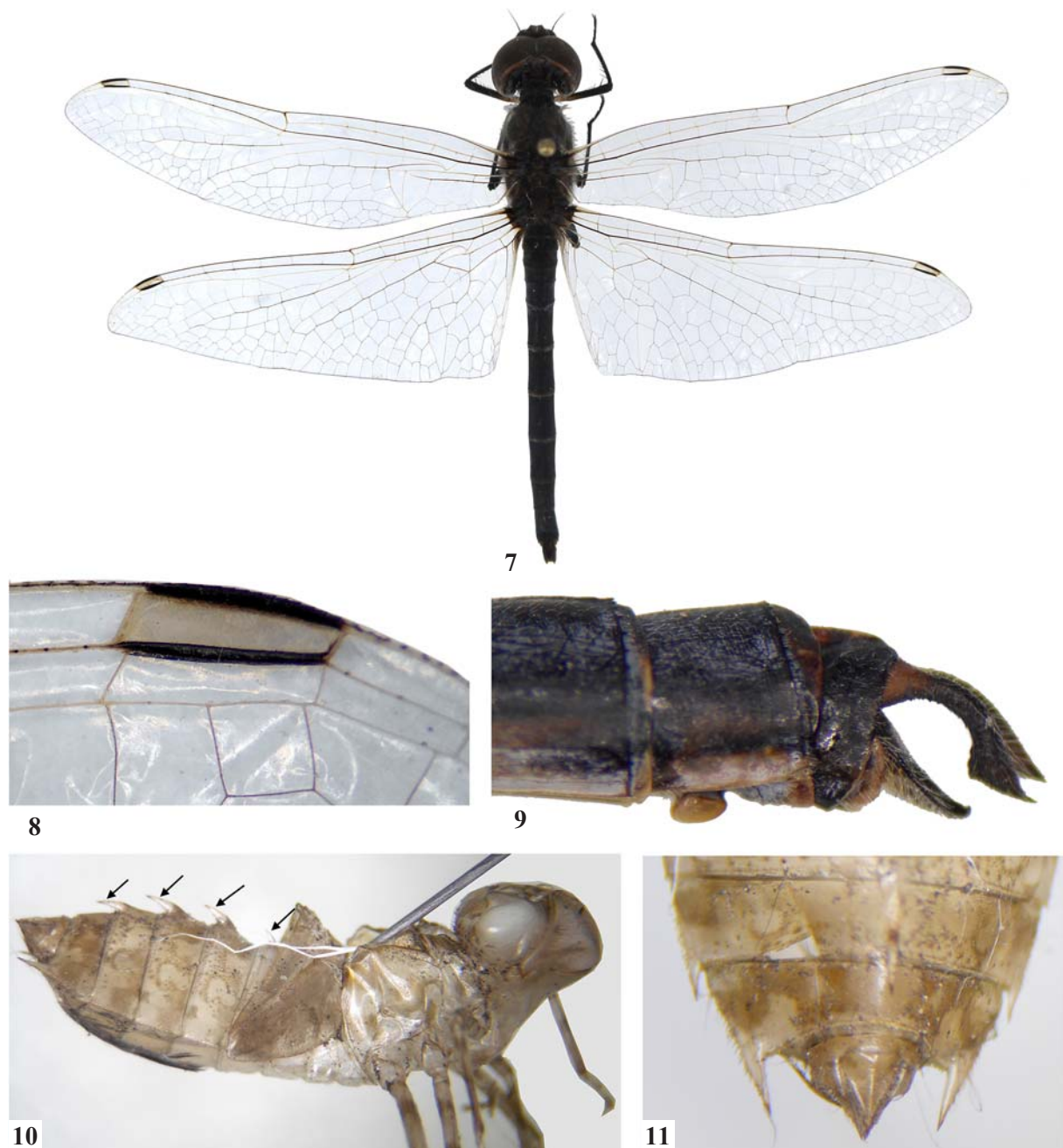
**MATERIAL.** **Maykop:** Zelenstroy City District, 44.595043N, 40.070025E, 7.06.2019, 28.06.2019, 3.07.2019, 14.07.2019, 20.07.2020 — 12♂♂, 5♀♀; **Maykop,** Belaya River, 44.589418N, 40.073485E, 23.07.2020 — 1♀.

**REMARKS.** For the Republic of Adygea, it was recorded for the first time. Species is currently characterized by an expansion of its range. In 2002, one specimen was caught in Ukraine, near the shore of the Chirnine Lake, in the vicinity of Pokrovka village in the Nikolaiv Oblast [Titov, 2007]. In 2006, the species was first discovered in the Crimea, in the vicinity of the Karadag Nature Reserve [Matushkina, 2007]. In 2007, this species was registered as new for the European part of Russia, based on materials from the Chornye Zemli Nature Reserve located on the territory of the Yashkul and Chernozemelsky Districts of the Republic of Kalmykia [Skvortsov, Kuvaev, 2007]. In August 2015, the species was registered in the Krasnodar Krai, on the banks of the Temryuk Estuary (in the vicinity of Temryuk), as well as on the banks

of the Beisug Estuary (Kanevskoy District, in the vicinity of Trud village) [Martynov et al., 2015]. Findings of the species were registered in the Yeysky District of the Krasnodar Krai in 2014 and in the town of Goryachy Klyuch in 2018 [Onishko, 2019]. Findings of the *Selysiothemis nigra* were registered on the Black Sea Coast: in 2015, on the Abrau Peninsula, in the vicinity of Novorossiysk and Kabardinka [Kosterin, Solovyev, 2017]; in 2017, on the Abrau Peninsula, 2.4 km WNW of Dyurso village [Kosterin, 2017].

**INFORMATION ON THE BIOLOGY OF THE SPECIES.** No imagoes of this species were registered directly near the pond. Dragonflies were flying at a distance of 200–250 m from the reservoir, in an open area practically devoid of vegetation and shelters from sun exposure. During the period of imago activity (on the territory of Maykop), the air temperature was 26–32°C. According to Borisov [2005], imago activity in the desert zone was observed even at 42°C.

On the territory of the city of Maykop, when studying the fauna of ponds in the Zelenstroy District, we collected exuviae (4 specimens) of larvae of this species from 5–15 July 2019 (Fig. 10–11). Exuviae were located on near-water vegetation at a height of 30–50 cm, at a distance of 0.5 m from the



Figs 7–11. *Selysiothemis nigra*: 7 — imago ♂; 8 — pterostigma; 9 — anal appendages ♂, lateral view; 10–11 — exuvia (arrows indicate dorsal spikes) (collected in the Maykop).

Рис. 7–11. *Selysiothemis nigra*: 7 — имаго ♂; 8 — птеростигма; 9 — конец брюшка ♂ (анальные придатки), сбоку; 10–11 — экзувий (стрелками указаны дорсальные шипы) (экземпляр собран в Майкопе).

shore of the reservoir. The finding of exuviae of *S. nigra* larvae indicates the reproduction of this species in the water bodies of the region.

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**Competing interests.** The authors declare no competing interests.

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