

# Faunistic Analysis of Dragonfly (Insecta: Odonata) Distributed in Tashkent Region

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**Abstract** This article describes the collection of samples from different regions of the Tashkent region and their species composition analysis. The research was carried out in the Tashkent region of the Republic of Uzbekistan in 2024 (spring, summer, autumn) and 2025 (April, May). The expedition route method was used to collect dragonfly imagoes for collection material. The collected dragonflies were mainly immobilized in morillas with a piece of cotton soaked in chloroform. A filter paper 1 cm wide and 6 cm long is also placed in the morilla. The filter paper absorbs moisture secreted by insects and protects their body growths, legs, and wings from mechanical damage. Detectors and Internet sites were used to identify dragonfly species. Accordingly, 6 families, 11 genera, and 18 species belonging to the suborders Zygoptera and Anisoptera were identified.

**Keywords** Odonata, Fauna, Family, Generation, Biocenosis, Tashkent, Expedition route, Insect

## 1. Introduction

Dragonflies are ancient and widespread representatives of a well-known group that hold a distinct position within the class Insecta [11, p. 280]. They play an important role in both aquatic and terrestrial biocenoses. As dominant organisms in these ecosystems, dragonflies have both direct and indirect significance for humans. They contribute to the mass elimination of blood-sucking insects as well as agricultural and forest pests. Some dragonfly species are considered harmful because they serve as intermediate hosts for parasites that cause diseases in domestic birds, while others are beneficial as food for fish. However, in certain cases, they can harm fisheries by preying on young fish, making their impact both positive and negative [12, p. 116]. In both larval and adult (imago) stages, dragonflies destroy large numbers of blood-sucking insects such as mayflies and mosquitoes [13, p. 133]. Dragonflies are beneficial to mammals but may be harmful in poultry farming, as they play a significant role in the development of trematodes and can, in some cases, cause serious diseases in birds [14, p. 85].

## 2. Materials and Methods

The study was conducted in Tashkent Region of the Republic of Uzbekistan during spring, summer, and autumn

of 2024, as well as in April and May of 2025. Tashkent Region is a distinct biogeographic area, with its northern and northeastern parts occupied by the western Tien Shan mountain system and its branches (the Qurama, Piskom, and Ugam ranges). The highest point is Mount Manas (4,484 m) in the Piskom range. The Ohangaron River runs between the Chatkal and Qurama mountains, forming the Ohangaron Plateau. A significant portion of the region consists of piedmont plains sloping toward the Syrdarya River (the Chirchiq–Ohangaron valley). The climate is sharply continental, with wet and relatively mild winters and hot, dry summers. The average January temperature ranges from  $-1.3^{\circ}$  to  $-1.8^{\circ}\text{C}$ , with minimum temperatures reaching  $-34^{\circ}\text{C}$  in the plains and  $-38^{\circ}\text{C}$  in the foothills. The average July temperature is  $26.8^{\circ}\text{C}$ , with maximum temperatures ranging from  $43^{\circ}\text{C}$  to  $47^{\circ}\text{C}$ . The rivers belong to the Syrdarya basin (the middle course of the Syrdarya River, 125 km in length, and its tributaries: Chirchiq, Piskom, and Ohangaron). These rivers originate in the Tien Shan mountains and are used for hydroelectric power generation and irrigation. Irrigation canals include Bozsuv, Qorasuv, Dalvarzin, Tashkent, among others, along with major reservoirs such as Tuyabogiz (“Tashkent Sea”), Charvak, and Ohangaron [7, pp. 190–194]. To collect adult dragonflies (imago), the expedition route method was used. In this method, mature imagoes were recorded by walking every 500–1000 meters and stopping to survey a 6-meter-wide area along the route. Observations were conducted during daylight hours from 9:00 AM to 5:00 PM. The collected dragonflies were euthanized in insect-killing jars (morilka) containing cotton soaked in chloroform

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Received: Jun. 4, 2025; Accepted: Jul. 2, 2025; Published: Jul. 25, 2025

Published online at <http://journal.sapub.org/ijvmb>

[1, p. 531]. These jars were refreshed prior to each field excursion. A strip of filter paper measuring 1 cm in width and 6 cm in length was also placed in the jar. The filter paper absorbs moisture secreted by the insects and protects their body appendages, legs, and wings from mechanical damage. After several hours, the collected insects were spread and thoroughly dried. The dried dragonflies were then stored in paper envelopes for long-term preservation [5, p. 256]. Species identification was carried out using identification keys and online resources. The relative abundance and dominance indices of the species were calculated using the formula proposed by Fasulat (1971):

$$D = (R \times 100) / K$$

Where:

- **D** = Dominance index
- **R** = Number of individuals of a given species
- **K** = Total number of collected dragonflies

### 3. Results and Discussion

As a result of research conducted in Tashkent Region of Uzbekistan, 14 species of dragonflies belonging to 8 genera, 4 families, and 2 suborders were identified. The locations and geographic coordinates of the study sites were precisely determined. Samples were collected from various areas within Tashkent Region. Specifically:

- F.N. Rusanov Tashkent Botanical Garden (41°20'51.0" N 69°18'45.1"E) – 10.V.2024 (4♀, 5♂)
- Areas near the Syrdarya and Chirchiq rivers in Chinoz District (40°54'17.9"N 68°41'56.1"E; 40°54'17.6"N 68°42'43.2"E) – 5.V.2024 (3♀)
- Bektemir District (41°12'15.3"N 69°17'45.4"E) – 18.VIII.2024 (6♀, 10♂)
- Bostanliq District (41°32'31.2"N 69°38'08.5"E) – 15.V.2024 (4♀), 15.VIII.2024 (4♀, 6♂)
- Besh Tut neighborhood, Ugam-Chatkal mountain ranges, Bostanliq District (41°37'50.7"N 69°56'51.3"E) – 20.VII.2024 (5♀), 4.VIII.2024 (1♀)
- Yukori Chirchiq District (41°11'21.3"N 69°25'09.3"E) – 14.VI.2024 (1♀)
- Tuyabogiz Reservoir and surrounding canals and lakes, Piskent District (40°56'35.5"N 69°22'02.2"E) – 22.V.2024 (2♀), 2.IX.2024 (4♀, 3♂)

**Suborder:** *Zygoptera* Selys, 1854

**Family:** *Calopterygidae* Selys, 1850

**Genus:** *Calopteryx* Leach, 1815

**Species:** *Calopteryx splendens* Harris, 1780

Specimens and coordinates: Yukori Chirchiq District (41°11'21.3"N 69°25'09.3"E) – 14.VI.2024 (1♀)

**Distribution:** Widespread across Eurasia, from the Atlantic coast eastward to Lake Baikal and northwestern China.

**Species:** *Calopteryx virgo* Linnaeus, 1758

Specimens and coordinates: Bostanliq District (41°32'31.2"N 69°38'08.5"E) – 24.V.2025 (1♀, 2♂)

**Distribution:** Within the territory of the Commonwealth of Independent States (CIS), *Calopteryx virgo* is a dragonfly species characteristic of the Euro-Siberian and Central Asian regions, extending eastward to Krasnoyarsk and western Mongolia.

**Table 1.** Taxonomic description of dragonfly species identified in Tashkent region

Suborder	Family	Genus	Species
Zygoptera	Calopterygidae Selys, 1850	<i>Calopteryx</i> Leach, 1815	<i>Calopteryx splendens</i> Harris, 1780
			<i>Calopteryx virgo</i> Linnaeus, 1758
	Platycnemididae	<i>Platycnemis</i> Burmeiste, 1839	<i>Platycnemis pennipes</i> (Pallas, 1771)
	Lestidae Calvert, 1901	<i>Lestes</i> Leach, 1815	<i>Lestes dryas</i> Kirby 1890
		<i>Sympetma</i> Burmeister, 1839	<i>Sympetma fusca</i> Vander Linden, 1820
	Coenagrionidae Kirby, 1890	<i>Coenagrion</i> Kirby, 1890	<i>Coenagrion pulchellum</i> Vander Linden, 1825
			<i>Enallagma</i> Charpentier, 1840
		<i>Ischnura</i> Charpentier, 1840	<i>Ischnura elegans</i> Vander Linden, 1820
			<i>Ischnura pumilio</i> Charpentier, 1825
			<i>Ischnura Forcipata</i> Morton 1907
Aeschnidae Rambur, 1842	<i>Anax</i> Leach, 1815	<i>Anax parthenope</i> Selys, 1839	
Libellulidae Rambur, 1842	<i>Libellula</i> Linnaeus, 1758	<i>Libellula quadrimaculata</i> Linnaeus, 1758	
		<i>Sympetrum vulgatum</i> Linnaeus, 1758	
	<i>Sympetrum</i> Newman, 1833	<i>Sympetrum flaveolum</i> Linnaeus, 1758	
		<i>Sympetrum meridionale</i> Selys, 1841	
	<i>Orthetrum</i> Newman, 1833	<i>Orthetrum brunneum</i> Fonscolombe, 1837	
		<i>Orthetrum cancelatum</i> Linnaeus, 1758	
<i>Orthetrum sabina</i> Drury 1770			

**Family: Platycnemididae****Genus: *Platycnemis* Burmeister, 1839****Species: *Platycnemis pennipes* (Pallas, 1771)****Examined specimens and coordinates:** Tashkent Region, Bostanliq District (41°32'31.2"N 69°38'08.5"E) – 24.V.2025 (2♀)**Distribution:** Widely distributed in parts of Europe and Asia, with its range extending from the Atlantic to Siberia.**Family: Lestidae Calvert, 1901****Genus: *Sympecma* Burmeister, 1839****Species: *Sympecma fusca* (Vander Linden, 1820)****Examined specimens and coordinates:** Tashkent Botanical Garden (41°20'51.0"N 69°18'45.1"E) – 10.V.2024 (2♀, 3♂)**Distribution:** Found in Asia, southern and central Europe, the Mediterranean region, North Africa, and various Mediterranean islands.**Family: Lestidae Calvert, 1901****Genus: *Lestes* Leach, 1815****Species: *Lestes dryas* Kirby, 1890****Examined specimens and coordinates:** Areas near the Syrdarya and Chirchiq rivers (40°54'17.9"N 68°41'56.1"E, 40°54'17.6"N 68°42'43.2"E) – 5.V.2024 (3♀)**Distribution:** Found in Western Europe, the Caucasus, Siberia, Central Asia, Northern China, and Northern Africa.**Family: Coenagrionidae Kirby, 1890****Genus: *Coenagrion* Kirby, 1890****Species: *Coenagrion pulchellum* (Vander Linden, 1825)****Examined specimens and coordinates:** Tuyabog'iz Reservoir and surrounding canals and lakes (40°56'35.5"N 69°22'02.2"E) – 22.V.2024 (2♀)**Distribution:** Temperate regions of Europe, the Caucasus, Central Asia, southern Western Siberia, and the Altai region.**Family: Coenagrionidae Kirby, 1890****Genus: *Enallagma* Charpentier, 1840****Species: *Enallagma cyathigerum* Charpentier, 1840****Examined specimens and coordinates:** Bostanliq District (41°32'31.2"N 69°38'08.5"E) – 15.V.2024 (4♀)**Distribution:** Europe, Siberia, the Far East, North Africa, and western and Central Asia.**Family: Coenagrionidae Kirby, 1890****Genus: *Ischnura* Charpentier, 1840****Species: *Ischnura elegans* (Vander Linden, 1820)****Examined specimens and coordinates:** Ugam-Chatkal Mountain Range (41°37'50.7"N 69°56'51.3"E) – 20.VII.2024 (5♀)**Distribution:** Distributed across the Palearctic, from western to eastern Europe, and found in western and Central Asia.**Species: *Ischnura pumilio* (Charpentier, 1825)****Examined specimens and coordinates:** Tashkent Botanical Garden (41°20'51.0"N 69°18'45.1"E) – 10.V.2024 (2♀, 2♂)**Distribution:** Europe, Western and Central Siberia, North Africa, and parts of Central Asia.**Species: *Ischnura forcipata* Morton, 1907****Examined specimens and coordinates:** Bektemir District (41°12'15.3"N 69°17'45.4"E) – 18.VIII.2024 (2♀, 1♂)**Distribution:** Central Asia, North Africa, and parts of Europe.**Suborder: Anisoptera Selys, 1854****Family: Aeshnidae Rambur, 1842****Genus: *Anax* Leach, 1815****Species: *Anax parthenope* Selys, 1839****Examined specimens and coordinates:** Bostanliq District (41°32'31.2"N 69°38'08.5"E) – 24.V.2025 (1♀)**Distribution:** Found in southern and central Europe, Asia, Japan, the Korean Peninsula, China, and North Africa.**Family: Libellulidae Rambur, 1842****Genus: *Libellula* Linnaeus, 1758****Species: *Libellula quadrimaculata* Linnaeus, 1758****Examined specimens and coordinates:** Tashkent Botanical Garden (41°20'51.0"N 69°18'45.1"E) – 10.V.2024 (1♀)**Distribution:** A widely distributed Holarctic species occurring across Europe, Central Asia, India, China, Japan, and North America.**Genus: *Sympetrum* Newman, 1833****Species: *Sympetrum vulgatum* (Linnaeus, 1758)****Examined specimens and coordinates:** Bektemir District (41°12'15.3"N 69°17'45.4"E) – 18.VIII.2024 (5♀, 6♂)**Distribution:** Widespread in the Palearctic region; found in Europe, southern Siberia, the Far East, Central and Eastern Asia, and North Africa.**Species: *Sympetrum flaveolum* (Linnaeus, 1758)****Examined specimens and coordinates:** Bostanliq District (41°32'31.2"N 69°38'08.5"E) – 15.VIII.2024 (4♀, 4♂)**Distribution:** Found in Europe, Siberia, the Russian Far East, Kamchatka, Sakhalin, and across Central Asia.**Species: *Sympetrum meridionale* (Selys, 1841)****Examined specimens and coordinates:** Bektemir District (41°12'15.3"N 69°17'45.4"E) – 18.VIII.2024 (3♂)**Distribution:** Present in Europe, the Caucasus, Central and Western Asia, and North Africa.**Genus: *Orthetrum* Newman, 1833****Species: *Orthetrum brunneum* (Fonscolombe, 1837)****Examined specimens and coordinates:** Bostanliq District (41°32'31.2"N 69°38'08.5"E) – 15.V.2024 (2♂)**Distribution:** Occurs in Central and Southern Europe, the Caucasus, southern Siberia, Central and Western Asia, and North Africa.**Species: *Orthetrum cancellatum* (Linnaeus, 1758)****Examined specimens and coordinates:** Ugam-Chatkal Mountain Range (41°37'50.7"N 69°56'51.3"E) – 4.VIII.2024 (1♀)**Distribution:** Found in Central Europe, the European part of Russia, the Caucasus, and Central and South Asia.**Species: *Orthetrum sabina* (Drury, 1773)****Examined specimens and coordinates:** Tuyabog'iz Reservoir and surrounding canals and lakes (40°56'35.5"N 69°22'02.2"E) – 2.IX.2024 (4♀, 3♂)**Distribution:** Found from southeastern Europe and North Africa to Japan and Australia.

## 4. Conclusions

A review of the literature indicates that researchers such as A.N. Kirichenko, S.N. Borisov, V.A. Musayev, A.G. Davletshina, and A. Qulmamatov have studied the distribution of dragonfly species in Uzbekistan. However, odonatological studies have been largely lacking in various regions of the Republic, including the city of Tashkent. Given the importance of preserving biodiversity within the country's fauna, conducting a scientific analysis of the current state of Odonata fauna is a timely and essential task.

The aim of this article is to study the dragonfly fauna of Tashkent Region. During our research, samples were collected from various districts of the region, and species composition was analyzed. In total, 14 species belonging to 8 genera, 4 families, and 2 suborders—*Zygoptera* and *Anisoptera*—were identified.

Samples were collected from various districts of Tashkent region. As a result of the research, 14 species belonging to 8 genera and 4 families from the suborders *Zygoptera* and *Anisoptera* were identified.

During the study, the following species were recorded: *Calopteryx splendens* Harris, 1780; *Calopteryx virgo* Linnaeus, 1758; *Platycnemis pennipes* (Pallas, 1771); *Sympecma fusca* (Vander Linden, 1820); *Lestes dryas* Kirby, 1890; *Coenagrion pulchellum* Vander Linden, 1825; *Enallagma cyathigerum* Charpentier, 1840; *Ischnura elegans* Vander Linden, 1820; *Ischnura pumilio* Charpentier, 1825; *Ischnura forcipata* Morton, 1907; *Anax parthenope* Selys, 1839; *Libellula quadrimaculata* Linnaeus, 1758; *Sympetrum vulgatum* (Linnaeus, 1758); *Sympetrum flaveolum* (Linnaeus, 1758); *Sympetrum meridionale* (Selys, 1841); *Orthetrum brunneum* (Fonscolombe, 1837); *Orthetrum cancellatum* (Linnaeus, 1758); and *Orthetrum sabina* (Drury, 1773).

Among the species identified, *Sympetrum vulgatum* (Linnaeus, 1758) and *Sympetrum flaveolum* (Linnaeus, 1758) were found to be relatively more abundant.

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