

Impact Factor:

ISRA (India) = 6.317
ISI (Dubai, UAE) = 1.582
GIF (Australia) = 0.564
JIF = 1.500

SIS (USA) = 0.912
ПИИИ (Russia) = 3.939
ESJI (KZ) = 8.771
SJIF (Morocco) = 7.184

ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

SOI: [1.1/TAS](#) DOI: [10.15863/TAS](#)

International Scientific Journal Theoretical & Applied Science

p-ISSN: 2308-4944 (print) e-ISSN: 2409-0085 (online)

Year: 2024 Issue: 04 Volume: 132

Published: 30.04.2024 <http://T-Science.org>

Issue

Article



Alijon Karimovich Khusanov

Andijan state university

Professor, Doctor of biological sciences, head of the department of Zoology and biochemistry

a_xusanov75@adu.uz

Diyorbek Murodiljon o'g'li G'anijonov

Andijan state university

Student at the department of Zoology and biochemistry

diyorbekganijonov03@gmail.com

Saidakhon Toxirjon qizi Tillaeva

Andijan state university

PhD student at the department of Zoology and biochemistry

saidatillayeva37@gmail.com

FAUNISTIC ANALYSIS OF DRAGONFLY (INSECTA, ODONATA) DISTRIBUTED IN THE EASTERN PART OF ANDIJAN

Abstract: In this article, some representatives of the genus of dragonflies, which are widespread in the south-eastern regions of Andijan, were studied and faunistically analyzed. According to the results of the research, it was found that there are 6 families, 8 genera and 11 species belonging to 2 suborders of dragonflies in the south-eastern regions of Andijan. The morpho-ecological features of the identified species were studied and taxonomic analysis was carried out.

Key words: Odonotafauna, odonotology, zoogeographic, collection, Anisoptera, Zygoptera.

Language: English

Citation: Khusanov, A. K., G'anijonov, D. M., & Tillaeva, S. T. (2024). Faunistic analysis of dragonfly (insecta, odonata) distributed in the eastern part of Andijan. *ISJ Theoretical & Applied Science*, 04 (132), 276-283.

Soi: <http://s-o-i.org/1.1/TAS-04-132-32> **Doi:**  <https://dx.doi.org/10.15863/TAS.2024.04.132.32>

Scopus ASCC: 1103.

Introduction

With the development of dragonflies in two different environmental conditions, it has its place in the exchange of substances in the biocenosis. Even in small water bodies, they participate in the formation of several tons of biogenic substances over the years [1].

6650 species of dragonflies grouped into 40 families are known in the fauna of the world, of which 1665 species, i.e. the largest part, belong to the Indomalayan zoogeographic region [2].

Odonatology is a science that studies dragonflies. So far, the authors have done a lot of research on dragonflies. The Worldwide Dragonfly Association was also established in September 1997. In order to support dragonfly research projects, the

International Dragonfly Fund was established by this association. The main goal of this foundation is to promote projects for the study and protection of dragonflies and their habitats [3].

In Central Asia, the study of dragonflies was somewhat developed at the beginning of the 20th century. G. G. Yakobson, V. L. Bianchi describe some dragonflies distributed in Central Asia [4]. In addition, information about Central Asian dragonflies can be found in the data of Bartenov (1933) and Sokolov (1933). Belyshev and Shevchenko (1958) present a systematic list of dragonflies distributed in the water bodies of Tashkent, Western Tien-Shan and Kazakhstan [5,6,7].

Preliminary information on the study of dragonflies in Uzbekistan is reflected in Belyshev's

Impact Factor:

ISRA (India) = 6.317
ISI (Dubai, UAE) = 1.582
GIF (Australia) = 0.564
JIF = 1.500

SIS (USA) = 0.912
ПИИЦ (Russia) = 3.939
ESJI (KZ) = 8.771
SJIF (Morocco) = 7.184

ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

monograph (“Фауна и экология стрекоз”). This monograph is based on analytical data aimed at the study of representatives of the dragonfly family of Uzbekistan, including neighboring countries [8]. Along these lines, information about the bioecology and morphology of dragonfly species found in Uzbekistan is given in the data of A. Kulmamatov [9]. S.N. Borisov's (2007) article entitled "Middle Asian dragonflies" contains information on the species composition of 56 species of dragonflies found in Uzbekistan and Tajikistan [10].

Almost no odontological studies have been conducted in the south-eastern part of Andijan. Some information about Sohaga cannot provide full information about the biological and ecological characteristics and life cycle of insects belonging to the family of dragonflies in Uzbekistan [11].

MATERIALS AND METHODS

Research area: The research was conducted in the 2022-2023 (spring-summer-autumn) season in the plains, hills, and mountain regions of Khojaabad, Marhamat districts in the southeastern regions of Andijan, and bordering regions. The climate of the researched areas is sharply continental. The average annual temperature is 13.10C, the average in July is 26.70C, the highest temperature reaches 45.0C. The average temperature in January is -3.50C, and the minimum temperature is around -26.0C. Annual rainfall is 218-330 mm [12].

Materials. White stork fishery of Khojaabad district, sports rehabilitation camp located in the village of Karnaychi, reservoirs around the shrine of Imam ota, lakes between Imam ota mountain, Bobakhuroson, Ulyuz, Tosh yoli Marhamat district. It was collected from ditches near the village of Bakhoristan, near the shrine of Aq Tonlik ota, near the farm. The collection of materials was carried out in the summer-autumn seasons of 2022-2023 (from the second half of June).

In order to study the fauna and distribution of dragonfly species distributed in Khojaabad and Marhamat districts, an expedition route (Dedyukhin method) was used to collect biomaterials [13]. A field diary was used to record the process, and a GPS navigator was used to obtain information about the place of research. In the research, samples were collected (using an entomological trap) along water bodies, ditches, lakes, ditches and cultivated fields.

When analyzing the taxonomic composition of dragonfly species, Kharitonov (1977) identifiers were used, including the scientific literature of the field, and when analyzing them from a systematic point of view, the dissertation of S.N. Borisov (Стрекозы (Insecta, Odonata) Средней Азии и их адаптивные стратегии) and the site <https://www.gbif.org/> were consulted [13,14,15]. The location coordinates of the materials collected for research were determined using the cartographic service of the Google map program.

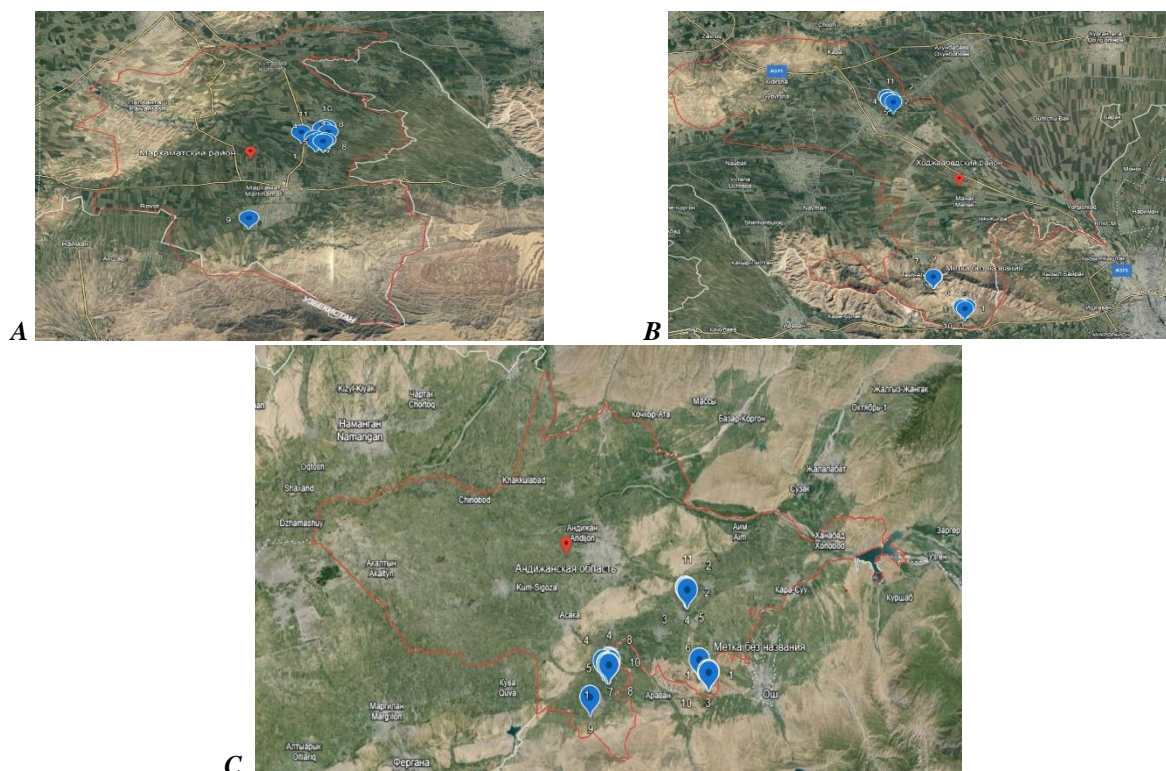


Figure-1. Map of Andijan sample collection sites. (A - places where the material was collected in Marhamat district, B - places where the material was collected in Khojaabad district, C - a general view of the south-eastern zones of Andijan where the material was collected).

Impact Factor:	ISRA (India) = 6.317	SIS (USA) = 0.912	ICV (Poland) = 6.630
	ISI (Dubai, UAE) = 1.582	PIIHU (Russia) = 3.939	PIF (India) = 1.940
	GIF (Australia) = 0.564	ESJI (KZ) = 8.771	IBI (India) = 4.260
	JIF = 1.500	SJIF (Morocco) = 7.184	OAJI (USA) = 0.350

South-eastern regions of Andijan. 1.(40°31'01"N 72°38'34"E., 40°30'59"N 72°38'27"E., 40°31'55"N 72°21'13"E.) 2.(40°40'09"N 72°35'00"E., 40°40'16"N 72°34'45"E.) 3.(40°40'23"N 72°34'40"E.) 4.(40°40'17"N 72°34'56"E., 40°31'45"N 72°21'16"E, 40°31'44"N 72°21'35"E.) 5.(40°40'34"N 72°34'36"E., 40°31'48"N 72°21'43"E.) 6.(40°30'55"N 72°38'37"E.) 7.(40°32'20"N 72°37'03"E., 40°32'10"N 72°21'48"E.) 8.(40°31'01"N 72°38'30"E., 40°31'50"N 72°21'27"E, 40°32'21"N 72°21'34"E.) 9.(40°32'20"N 72°37'01"E., 40°28'08"N 72°18'24"E.) 10.(40°31'01"N 72°38'43"E., 40°32'25"N 72°21'43"E.) 11.(40°40'15"N 72°34'47"E., 40°32'10"N 72°20'40"E.)

Table-1. List of specimens of species distributed in the south-eastern zone of Andijan, including: date of collection, location and sex of captured individuals.

No	date	District	Individ	Length (N)	Area (E)	the person who collected the sample
<i>Gomphus flavipes</i> Charpentier, 1825						
1	19.06.2023	Khujaabad	1♀2♂	40°31'01"N	72°38'34"E	Ganijonov D
2	06.07.2023	Marhamat	2♀3♂	40°30'59"N	72°38'27"E	Ganijonov D
3	11.07.2023	Marhamat	1♀3♂	40°31'55"N	72°21'13"E	Ganijonov D
<i>Anax imperator</i> (Leach, 1815)						
1	21.06.2023	Khujaabad	1♀0♂	40°40'09"N	72°35'00"E	Ganijonov D
2	22.06.2023	Khujaabad	1♀1♂	40°40'16"N	72°34'45"E.	Ganijonov D
<i>Anax parthenope</i> (Selys, 1839)						
1	23.06.2023	Khujaabad	0♀1♂	40°40'23"N	72°34'40"E	Ganijonov D
<i>Sumpetrum vulgatum</i> (Linnaeus, 1758)						
1	24.06.2023	Khujaabad	3♀2♂	40°40'17"N	72°34'56"E	Ganijonov D
3	14.07.2023	Marhamat	4♀1♂	40°31'55"N	72°21'13"E	Ganijonov D
<i>Sympetrum fonscolombii</i> (Selys, 1840)						
1	25.06.2023	Khujaabad	3♀2♂	40°40'34"N	72°34'36"E	Ganijonov D
2	16.07.2023	Marhamat	1♀2♂	40°31'48"N	72°21'43"E	Ganijonov D
<i>Libellula quadrimaculata</i> (Linnaeus, 1758)						
1	27.06.2023	Khujaabad	1♀0♂	40°30'55"N	72°38'37"E	Ganijonov D
<i>Orthetrum brunneum</i> (Fonscolombe, 1837)						
1	27.06.2023	Khujaabad	3♀1♂	40°32'20"N	72°37'03"E	Ganijonov D
2	18.07.2023	Marhamat	1♀1♂	40°32'10"N	72°21'48"E	Ganijonov D
<i>Calopteryx splendens</i> (Harris, 1780)						
1	28.06.2023	Khujaabad	6♀3♂	40°31'01"N	72°38'30"E	Ganijonov D
2	20.06.2023	Marhamat	5♀2♂	40°31'50"N	72°21'27"E	Ganijonov D
<i>Calopteryx virgo</i> (Linnaeus,1758)						
1	28.06.2023	Khujaabad	5♀3♂	40°32'20"N	72°37'01"E	Ganijonov D
2	21.07.2023	Marhamat	4♀2♂	40°28'08"N	72°18'24"E	Ganijonov D

Impact Factor:	ISRA (India) = 6.317	SIS (USA) = 0.912	ICV (Poland) = 6.630
	ISI (Dubai, UAE) = 1.582	PIHII (Russia) = 3.939	PIF (India) = 1.940
	GIF (Australia) = 0.564	ESJI (KZ) = 8.771	IBI (India) = 4.260
	JIF = 1.500	SJIF (Morocco) = 7.184	OAJI (USA) = 0.350

<i>Lestes nympha</i> (Selys, 1840)						
1	29.06.2023	Khujaabad	3♀2♂	40°31'01"N	72°38'43"E	Ganijonov D
2	23.07.2023	Marhamat	4♀1♂	40°28'08"N	72°18'24"E	Ganijonov D
<i>Ischnura elegans</i> (Vander Linden, 1820)						
1	30.06.2023	Khujaabad	6♀2♂	40°40'15"N	72°34'47"E	Ganijonov D
2	25.07.2023	Marhamat	5♀2♂	40°32'10"N	72°20'40"E	Ganijonov D

RESULT AND DISCUSSION

As a result of the taxonomic analysis of the odonata fauna of Khojaabad and Marhamat districts,

which are the southeastern part of Andijan, it was found that they consist of 2 suborders, 6 families, 8 genera, and 11 species (Table 2).

Table-2. Taxonomic description of species identified in Marhamat and Khojaabad districts.

T/r	Odonata -dragonflies
	Suborder -Anisoptera- all kinds of winged
	Family -Gomphidae (Rambur, 1842)
	Genera-- Gomphus (Leach, 1815)
1.	<i>Gomphus flavipes</i> (Charpentier, 1825)
	Family - Aeschnidae (Rambur, 1842)
	Genera-Anax (Leach,1815)
2.	<i>Anax imperator</i> (Leach, 1815)
3.	<i>Anax parthenope</i> (Selys, 1839)
	Family - Libellulidae Rambur, 1842
	Genera-Sumpetrum (Newman, 1833)
4.	<i>Sumpetrum vulgatum</i> (Linnaeus, 1758)
5.	<i>Sympetrum fonscolombii</i> (Selys, 1840)
	Genera -Libellula (Linnaeus,1758)
6.	<i>Libellula quadrimaculata</i> (Linnaeus, 1758)
	Genera – Orthetrum, (Newman, 1833)
7.	<i>Orthetrum brunneum</i> (Fonscolombe, 1837)
	Suborder – Zygoptera- Straight winged
	Family - Calopterygidae (Selys, 1850)
	Genera - Calopteryx (Leach, 1815)
8.	<i>Calopteryx splendens</i> (Harris, 1780)
9.	<i>Calopteryx virgo</i> (Linnaeus,1758)
	Family - Lestidae (Calvert, 1901)
	Genera -Lestes (Leach, 1815)
10.	<i>Lestes nympha</i> (Selys, 1840)
	Family -Coenagrionidae (Kirby, 1890)
	Genera - Ischnura (Charpentier, 1840)
11.	<i>Ischnura elegans</i> (Vander Linden, 1820)

Impact Factor:

ISRA (India) = 6.317	SIS (USA) = 0.912	ICV (Poland) = 6.630
ISI (Dubai, UAE) = 1.582	ПИИЦ (Russia) = 3.939	PIF (India) = 1.940
GIF (Australia) = 0.564	ESJI (KZ) = 8.771	IBI (India) = 4.260
JIF = 1.500	SJIF (Morocco) = 7.184	OAJI (USA) = 0.350

According to the table, it was found that the odonata fauna of Khojaabad and Marhamat districts consisted of 11 species when taxonomically analyzed.

In the diagram below, representatives of the dominant species of dragonflies Anax (Leach, 1815) 18.30%, Sumpetrum (Newman, 1833) 18.30% and Calopteryx (Leach, 1815) 18.30% make up 55% of the

total identified species. Also, Ischnura (Charpentier, 1840) 9%, Lestes (Leach, 1815) 9%, Orthetrum, (Newman, 1833) 9%, Libellula (Linnaeus, 1758) 9% and Gomphus (Leach, 1815) 9% each. type was noted, that is, it is 45%. In the diagram below, you can see their percentage in relation to the total fauna.

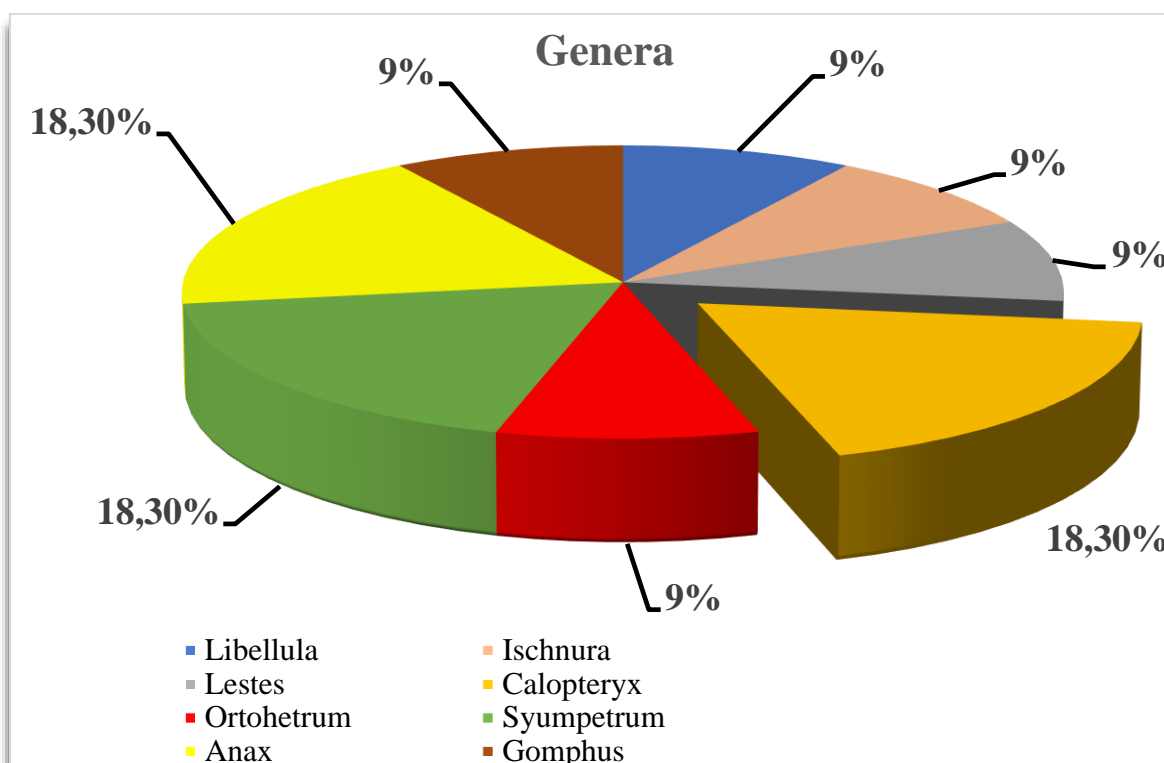


Figure 2. The percentage (%) of dragonflies found in the south-eastern regions of Andijan.

Morphoecological characteristics of dragonflies of Khojaabad and Marhamat districts

Suborder: Anisoptera - All kinds of wings

Family - Gomphidae Rambur, 1842

A family of medium-sized dragonflies with enlarged segments at the end of the abdomen. But not all species have such extended segments. That's why their widespread compound large eyes are a good sign to recognize. The tail and body color of most species are usually marked with brown or dark yellow or green. These dragonflies actively move on the water, but usually rest horizontally on the ground, sitting on rocks [18].

Genera - Gomphus Leach, 1815

Species: Gomphus flavipes Charpentier, 1825

Place of origin: Andijan region, Khojaabad district, lake between Imam-ota mountain. 19.06.2023 Regional turning degree: 40°31'01"N 72°38'34"E. 07.06.2023, 40°30'59"N 72°38'27"E Marhamat district, Tosh yoli water dam banks, 07.11.2023, 40°31'55"N 72°21'13"E.

Morpho-ecological characteristics: Gomphus flavipes inhabits the middle and lower reaches of slow-flowing medium and large rivers. Males are blue and females are green. The legs of both sexes are mainly yellow in color [19].

Family: Aeschnidae Rambur, 1842

Very large family of dragonflies, body length 70 mm, wingspan 95-115 mm. The eyes have a small socket on the top of the head. The color of the body is variegated, black and blue colors predominate in male individuals, and yellow, fawn, and brown colors predominate in female individuals [20].

Genera: Anax Leach, 1815

Species: Anax imperator Leach, 1815

Place And Time Of Sample Collection: Aqqush reservoir, Khojaabad district, Andijan region. 21.06.2023., Regional turning degree: 40°40'09"N 72°35'00"E, 40°40'16"N 72°34'45"E.

Morpho-ecological characteristics: Body length 65-82 mm, ventral length 49-61 mm, hind wing 45-52 mm. The head is large, the forehead is green

Impact Factor:

ISRA (India) = 6.317
ISI (Dubai, UAE) = 1.582
GIF (Australia) = 0.564
JIF = 1.500

SIS (USA) = 0.912
PIIHQ (Russia) = 3.939
ESJI (KZ) = 8.771
SJIF (Morocco) = 7.184

ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

with a thin black line, and the lower part has a black spot. His eyes are green-blue above, yellow-green below. the chest of the male is greenish-blue, the belly is blue, the upper part is broad black, and the sides are painted in a concave band. The wings are colorless. The breast of the female is green, the abdomen is also green and has a brown stripe [20].

Species: *Anax parthenope* (Selys, 1839)

Place And Time Of Sample Collection:

Aqqush reservoir, Khojaabad district, Andijan region. 23.06.2023, Regional turning degree: 40°40'23"N 72°34'40"E.

Family: Libellulidae Rambur, 1842

This family includes dragonflies of medium size (body length 30-50 mm, wingspan up to 80 mm). Their coloring is mainly yellow, brown, black, and red. A number of representatives of some genera, male individuals, have a bluish color on the abdomen. The colors are not shiny. The eyes are connected to the back of the head. The wings are transparent, there is a dark spot at the base of the hind wings. Female dragonflies drop their eggs into the water while flying [16].

Genera: Sumpetrum (Newman, 1833)

Species: *Sumpetrum vulgatum* (Linnaeus, 1758)

Place And Time Of Sample Collection: : White stork fishery, Khojaabad district, Andijan region. 24.06.2022, 40°40'17"N 72°34'56"E., Marhamat District, Kurgancha Mfy ditches 14.07.2022, Region turning degree: 40°31'45"N 72°21'16"E.

Species: *Sympetrum fonscolombii* (Selys, 1840)

Place And Time Of Sample Collection: White stork fishery, Khojaabad district, Andijan region. 25.06.2022, 40°40'34"N 72°34'36"E., Marhamat district, Kurgancha mfy ditches 16.07.2022, Region turning degree: 40°31'48"N 72°21'43"E.

Genera: Libellula (Linnaeus, 1758)

Species: *Libellula quadrimaculata* Linnaeus, 1758

Place And Time Of Sample Collection: : Andijan province, Khojaabad district, a lake between Imam Ota Mountain. 27.06.2022 Regional turning degree: 40°30'55"N 72°38'37"E.

Morpho-ecological characteristics: Four-spotted dragonfly Four-spotted chaser. Differences between male and female: The difference between male and female is the spot on the abdomen [21].

Genera: - Orthetrum, (Newman, 1833)

Species: *Orthetrum brunneum* (Fonscolombe, 1837)

Place And Time Of Sample Collection: Khojaabad district, Andijan region, Imam ota bulak 27.06.2022, 40°32'20"N 72°37'03"E., Marhamat district, Bobakhuroson mfy ditches 18.07.2022, Region turning degree: 40°32'10"N 72°21'48"E.

Suborde: Zygoptera.

2 pairs of well-developed wings. Upper and lower jaws are well-developed chewing type. The

morpho-anatomical structure of the 1st and 2nd pair of wings is the same. When the dragonfly rests, the wings are folded on both sides of the body. These dragonflies fly relatively slowly and low. The eyes are located on both sides of the head in a small faceted structure. Representatives of this subspecies are mostly found near water bodies [9].

Family: Calopterygidae-Calopterygidae.

Except for the base and tip of the wings, everything else is dark blue. Pterostigma is conspicuously white on the edge of the upper part of the wings. The length of males is 38-45 mm, the length of females is 30-38 mm. There are 3 species belonging to this family in Uzbekistan. Basically, representatives of this family are found in swamps and wetlands with high humidity [16].

Genera: Calopteryx

Species: *Calopteryx splendens*- Linnaeus, 1758.

Place of origin: White stork fishery, Khojaabad district, Andijan region. 28.06.2022, 40°31'01"N 72°38'30"E., Marhamat District Bobokhuroson Mfy ditches 20.06.2022, Region turning degree: 40°31'50"N 72°21'27"E , 40°32'21"N 72°21'34"E.

Morpho-ecological characteristics: The body is green-bronze in color. The wings of males are solid blue, and those of females are colorless and light. When the wings are folded, the width is 58-75 mm. The length of the abdomen is 33-40 mm. It is found around water bodies [16].

Species: *Calopteryx virgo* (Linnaeus, 1758)

Place And Time Of Sample Collection:

Khojaabad District, Andijan Region, Imam Ota Bulak. 28.06.2022, 40°32'20"N 72°37'01"E, Merhamat District, Bakhoristan mfy ditch banks 21.07.2022, Region turning degree: 40°28'08"N 72°18'24"E.

Family: Lestidae Calvert, 1901 - Dwarf dragonflies

The length of the wings is 20-30 mm, the color of the body is shiny, the wings are transparent, the pterostigma occupies at least 2 cells that are clearly visible on both wings. 9 species of this family are distributed in Uzbekistan (Nasekomye Uzbekistana, 1993) [16].

Genera: Lestes Leach, 1815

Species: *Lestes nympha* Selys, 1840

Place And Time Of Sample Collection:

Khojaabad District, Andijan Region, Lake between Imam Ota Mountain. 29.06.2022 Regional turning degree: 40°31'01"N 72°38'43"E. Ulyuz ditch, Marhamat district. 23.07.2023. Regional turning degree: 40°32'25"N 72°21'43"E.

Morpho-ecological characteristics: distributed near streams and rivers, male and female have the same brown body. The length of the body is 34–39 mm, the length of the abdomen is 27–30 mm, the length of the wings is 20–22 mm, the larvae develop up to 3 months. It feeds on small insects[17].

Family: Coenagrionidae Kirby, 1890

Impact Factor:

ISRA (India) = 6.317
ISI (Dubai, UAE) = 1.582
GIF (Australia) = 0.564
JIF = 1.500

SIS (USA) = 0.912
PIHII (Russia) = 3.939
ESJI (KZ) = 8.771
SJIF (Morocco) = 7.184

ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

Spear-shaped dragonflies Small-bodied, delicately structured dragonflies. In most species, the abdomen of the female is light green or brown, and the male is bright blue with black spots. Pterostigmas are small 1 cell size. (Nasekomye Uzbekistana, 1993) [16].

Genera: - Ischnura Charpentier, 1840

Species: *Ischnura elegans* Vander Linden, 1820

Place of receipt: White stork fishing farm, Khojaabad district, Andijan region, 30.06.2022. Regional turning degree: 40°40'15"N 72°34'47"E. Marhamat district, a farm near the shrine "Aq Tonlik Ota". 25.07.2023, 40°32'10"N 72°20'40"E.

Morpho-ecological characteristics: this species is distinguished from other representatives of dragonflies by its elegant appearance. It is a small, delicate dragonfly common in Central Asia, the length of the abdomen is 18-28mm, the length of the wings is 18-21mm. Males have blue bellies with black patterns, females are light brown in color. Lays eggs

in algae tissues. The larvae feed on the larvae of mosquitoes, wasps, etc., like those of other species. In turn, they are food for fish. It is found in coastal plants. Widespread in Central Asia [17].

SUMMARY.

According to the conducted faunistic studies, it was found that 6 families, 9 genera, and 11 species belonging to 2 subgroups of dragonflies can be found in the south-eastern regions of Andijan. The morphometric indicators of these species were compared across regions and their bioecology was studied. Specimens for collection materials were taken from identified species.

As a result of our observations, it became known that the species composition of dragonflies distributed in the southeastern regions of Andijan is almost similar.

The obtained results will undoubtedly serve as material for students studying biology and ecology and environmental protection.

References:

1. Haritonov, A.Jy. (1991). Boreal`naja odonatofauna i jekologicheskie faktory geograficheskogo rasprostraneniya strekoz. Avtoreferat disser. dokt. nauk. 1991g.
2. (n.d.). The classification and diversity of dragonflies and damselflies (Odonata)* b. Dijkstra, Günter Bechly. August 2013 Zootaxa 3703(1): p-36-45 DOI:10.11646/zootaxa.3703.1.9.
3. (1997). CONSTITUTION of the Worldwide Dragonfly Association (WDA) adopted, September, 1997.
4. Jakobson, G.G., et al. (n.d.). "Prjamokrylye i lozhnosetchatokrylye Rossijskoj imperii" Izdatel'stvo: SPb: A.F. Devrien.
5. Bartenov, A.N. (1933). Zametka o predstaviteljah podsemejstva Lestinae i Ayrioninae (Odonata) Kavkaza i Turkestana L.Bull. Gos. muzeja Gruzii T.8. 1933.
6. Sokolov, I.I. (1933). K poznaniu fauny vodojomov Staroj Buhary i ejo okrestnostej. Trud Uzbekskogo in-ta tropicheskoy mediciny. T. 1 vip 4. 1933g.
7. Belyshev, B.F., & Shevchenko, V.V. (1958). K faune strekoz (Ojooopaga) Talasskogo Alatau i Karatau / B.F. Belyshev, V.V. Shevchenko. Tr. Zool. in-ta AN KazSSR, 1958, T.
8. Belyshev, B.F., Haritonov, A.Jy., & Borisov, S.N. (1989). Aziatskaja chast` SSSR. Fauna i jekologija strekoz. Novosibirsk: Nauka 1989g.
9. Kulmamatov A. (2004). Umurtkasizlar zoologijasidan ykuv-dala amalijoti. Toshkent "Ykuvchi" 2004.g.
10. Borisov S.N., Haritonov A.Jy. (2007). Strekozy (Odonata) Srednej Azii. Chast` 1. Caloptera, Zygotera. Evraziatskij jentomol. zhurn. T. 6. Vyp. 4. S. 343-360.
11. Zokirova M.S. (n.d.). Farg`ona vodiysi ninachilari (insecta: odonata) faunasi, morfo-ekologik xususiyatlari. diss. Avtoreferati.
12. (n.d.). Retrieved from www.andijan.uz.
13. Deduhin S.V. (2011). Principy i metody jekologo-faunisticheskix issledovaniy nazemnyh nasekomyh: Uchebno-metodicheskoe posobie. Izhevsk: Izdatel'stvo «Udmurtskij universitet», 2011. 87-88 s.
14. BORISOV S.N. (2007). Strekozy (Insecta, Odonata) Srednej Azii I Ih Adaptivnyye Strategii Avtoreferat diss na soiskanie uchenoj stepeni dr, biologicheskix nauk Novosibirsk 2007.
15. (n.d.). Retrieved from https://www.gbif.org.
16. (1993). "Nasekomye Uzbekistana" monografija, Tashkent, 1993, 19-380.
17. Haritonov, A.Jy. (1988). Strekozy roda Ischnura Charp. (Insecta, Odonata) fauny SSSR. Taksonomija zhivotnyh Sibiri: Novye i

Impact Factor:	ISRA (India) = 6.317	SIS (USA) = 0.912	ICV (Poland) = 6.630
	ISI (Dubai, UAE) = 1.582	ПИИИ (Russia) = 3.939	PIF (India) = 1.940
	GIF (Australia) = 0.564	ESJI (KZ) = 8.771	IBI (India) = 4.260
	JIF = 1.500	SJIF (Morocco) = 7.184	OAJI (USA) = 0.350

- maloizvestnye vidy fauny Sibiri. Novosibirsk, 1988. Vyp. 20. S. 32-46.
18. Janybaeva V.A. (2002). Fauna i jekologija strekoz Jyzhnogo Urala: Dis. kand. biol. nauk. Novosibirsk, 2002.
 19. Phillips, E.C. (2001). Life history, food habits and production of *Progomphus obscurus* Rambur (Odonata: Gomphidae) in Harmon Creek of east Texas February 2001 Texas Journal of Science 53(1):19-28.
 20. Belevich, O.Je. (2005). Strekozy roda Aeshna (Odonata, Anisoptera) Palearktiki: Dis. kand. biol. nauk. Novosibirsk, 2005. 385 s.
 21. (n.d.). "Andijon viloyatining sharqiy qismida olib borilgan odonatologik (Insecta: Odonata) tadqiqotlarga oid" Xusanov A.K., Ganijonov D.M.