

# Biodiversity of Coleopteran Insects (Insecta, Coleoptera) in the Tugai Forests of the Lower Amudarya State Biosphere Reserve

<sup>1</sup>Bekchanov Xudaybergan Urinovich, <sup>2</sup>Duschanov Umar Egamberdiyevich, <sup>3</sup>Komiljonova Gulrux Kudrat qizi.

<sup>1</sup>Candidate of Zoological Sciences, Urgench State University of Uzbekistan.

<sup>2</sup>Senior Lecturer at the Faculty of Natural Sciences, Urgench State University of Uzbekistan.

<sup>3</sup>Student of the Faculty of natural Sciences, Urgench State University of Uzbekistan.

komiljanova2308@gmail.com

**Abstract.** The paper presents the results of studies on the biodiversity of coleopteran insects (Insecta, Coleoptera) in the tugai forests of the Nizhne-Amudarya State Biosphere Reserve, as well as a review of the literature on this topic. There are 13 species of 4 families: Scarabaeidae, Lymexylidae, Buprestidae, Cerambycidae, which also includes previously published information on finds about the region.

**Keywords:** coleoptera, beetle. Insecta, Scarabaeidae, Lymexylidae, Buprestidae, Cerambycidae.

## 1. INTRODUCTION.

Coleoptera (Insecta: Coleoptera) are one of the most numerous and ecologically diverse orders of insects. Beetles are common in almost all landscape-geographical zones and inhabit most terrestrial ecosystems. The high abundance and confinement to different biotopes, sensitivity to changes in the ecological situation makes it possible to use beetles as a model group for studying the structure of communities in disturbed and reference territories.

## PHYSICAL AND GEOGRAPHICAL CHARACTERISTICS OF THE DISTRICT

### RESEARCH.

The Lower Amudarya State Biosphere Reserve (NABR) was established in 2011 with the support of a joint project of the United Nations Development Program, the Global Environment Facility and the Government of the Republic of Karakalpakstan "Conservation of the tugai forests of Karakalpakstan in the Amudarya river delta" based on the Badai-Tugai nature reserve. In addition to the territory of the former reserve, the tugai forests of the Beruniy and Amudarya regions of Karakalpakstan were transferred to the biosphere reserve. The total area of NABR is 68717.8 hectares. It is located in the lower reaches of the Amu Darya on its right bank. From the south, it is washed by the Amu Darya River and borders on the Tugai forest Tallyk, and from the north and north-west it is surrounded by a tributary of the Amu Darya - Kokdarya. The NABR territory is divided into 3 functional zones; reserved, buffer, and transitional. The reserved zone of the reserve (zone with a strict regime of protection) is 11568.3 hectares. The territory of the protected area is intended for the preservation of old forests, forests of natural regeneration, rare and endangered species, while preserving the biodiversity of the zone. Any economic activity is prohibited in this zone and only scientific research and monitoring is allowed.

The climate in the biosphere reserve is sharply continental. Winter is moderately cold with little snow. Air temperature is very changeable, unstable and subject to significant, often very sharp fluctuations throughout the year. The average annual temperature is 10.0 C, the average temperature of the coldest month (January-February) is 21.30 C, the warmest (July) +36 C - + 49.00 C. At the same time, the absolute minimum reaches -17 C, and the maximum - 48 C. But the heat here is more than 200 days. On average, about 80-150 mm of atmospheric precipitation falls here per year.

The water level begins to rise in April and reaches a maximum in July, overflows the banks, flooding vast areas. Therefore, the water regime of the Amu Darya is one of the most important factors in the development of tugai vegetation in the reserve. Flooding alternates with periods of drought. The winter regime of the Amu Darya is unstable. Frequent changes in freeze-up and ice drifts cause jamming with a rise in water in certain places above the summer peaks of flooding, which is often accompanied by flooding of floodplain banks. In May - June, normal growth and development occurs, as well as the formation of plant communities. The reserve has 167 species belonging to 120 genera and 35 families. However, in recent years, with the beginning of the anthropogenic process of xerohalophytosis of lands, only 61 plant species have been identified. The originality of the vegetation of the former Badai-Tugai reserve, now an expanded territory of the Lower Amu Darya biosphere reserve, is due to the direct location of the proximity of the Amu Darya and the Sultanuizdag mountains. The vegetation cover consists entirely of tugai groupings. Wilhelms and Amu Darya willows are especially abundant in the coastal parts, in the central part. Dens forests of

variegated turanga trees, Aryan and Zhigildik, as well as sparse groups of Zhingil, Shengela. In the northern part of the reserve, there are species typical of rubble - sandy and desert habitats: white saxaul, hodgepodge, ferula, thistle, wormwood.

## 2. MATERIALS AND METHODS OF RESEARCH.

The work is based on the material collected by the authors in 2009-2019. on the territory of the State Nature Reserve "Badai Tugai State Reserve". In addition to their own collections, they used materials collected in field practice by students of Urgan State University, as well as the collection of the Badai Tugai reserve. In total, more than 4000 specimens of coleoptera were processed during the work. The main part of the studied material is stored in the collection of the Badai Tugai reserve. Window traps were used to study the stationary distribution of coleoptera (Samkov, Chernyshev, 1983). They were installed on windblow shafts in 5 model areas. The collection was carried out from April 15 to October 15, 2009-2019, the traps were checked once a decade. The vertical distribution of coleoptera was studied in the indigenous hillmount using standard window and soil traps (Storozhenko et al 2003). A vertical line was set up, consisting of two window traps and soil traps located under them. In Badai Tugai State Reserve 1 - valley, turanga-willows, tugai after thinning, 2 - edge of turanga-willow, 3 - oak forest with lochs, 4-root valley turanga-willow tugai. founded out the features of biology, ecology and nutrition of beetles in 2009-2019. route examination were out both on the territory of the reserve and outside it.

The biology and ecology of the urban barbel (*Aeolesthes sarta* Sols) were studied in laboratory and natural conditions. The period of imaginal activity was recorded, and the imago and larval stage were counted. In natural conditions, we studied the development of the larvae of special model cuts, the territory on the territory of the Badai Tugai State Reserve. the material was determined according to " the determinanted to insects of the Far East" (1989, 1992, 1996), as well as using monographs and revisions of domestic and foreign authors. Taxa names are given according to the catalog of Palaearctic beetles (Catalog, 2003, 2004, 2006, 2007, 2008, 2010, 2011).

Comparison of coleopteran groups was carried out by the method of graph-inclusions (Semkin, Kulikova, 1981), as well as by cluster analysis (Jaccard coefficient). The species richness was measured using the Margalef and Menkhinik indices, and the evenness of species in abundance was measured using the Simpson and Berger-Parker indices (Pesenko, 1982; Magarran, 1992). The calculations were carried out in the Excel program (2003), and the construction of the dendrogram in the program Past .

## 3. RESEARCH RESULT.

Annotated list of coleopterana. This section contains an annotated list of coleopteran imago species collected by us on model plots using window and soil traps. For species, information is provided on the distribution, features of the topical and trophic connections of adults.

**Table 1.**

List of species of dendrophilous insects identified in the forests of the Nizhne-Amudarya State Biosphere Reserve.

№	Insect species	Environmental group	Forage breeds	Occurrence
<b>Family Scarabaeidae</b>				
1	<i>Amphimallon solstitialis</i> L.	Trunk	poplars, willow	Usual
<b>Family Lymexylidae</b>				
2	<i>Elateroides dermestoides</i> L.	Trunk	tree trunk, pine	Usual
3	<i>Melanophila cianea</i> F	Trunk	turanga	Usual
<b>Family Buprestidae</b>				
4	<i>Buprestis novemmaculata</i> L.	Trunk	willow	Usual
5	<i>B. araratica</i> Marseul	Trunk	pine, fir, spruce	Rare
6	<i>Poecilonota variolosa</i> Pk.	Trunk	poplar	Usual
7	<i>Agrilus viridis</i> L.	Trunk	poplar, willow	Usual

Family Cerambycidae				
8	<i>Leptura quadrifasciata caucasica</i> Plav	Trunk	birch, willow, beech, poplar	Usual
9	<i>Arhopalus rusticus</i> L	Trunk	Pine	Usual
10	<i>Nivellia sanquinosus</i> Yyll	Trunk	poplar, alder	Usual
11	<i>Rhagium inquisitor tschukini</i> Sem	Trunk	Poplar	mass
12	<i>Callidium violaceum</i> L	Trunk	oak, willow, alder, elm, chestnut	Usual
13	<i>Necydalis major</i>	Trunk	sicks willows, oaks, poplars, aspens, as well as in alders and willows	Usual

The table systematically lists the main species of dendrophilous insects from the three most common and biocenotically significant species identified in the tugai of the reserve, indicating their ecological group and occurrence.

#### 4. CONCLUSION.

Thus, in the Nizhne-Amudarya State Biosphere Reserve, the identified species are 13 dendrophilic coleoptera belonging to 11 genera and 4 families: they mainly belong to the group of stem pests of wood, a smaller number of species are related to needles and leaf-eating insects, shoot pests, buds and bast on shoots and stems and to root pests. The research shows that the greatest number of species harm willow and on deciduous trees it was found - species of pests, including poplar and a species - the bark beetle *Phloeosinus bicolor* was found on juniper. An implicit relationship was established between the absolute density of the large pine beetle in the stands and the size of the current mortality in the same year, and the complete absence of a relationship between the number of the pine beetle in the stand and the number of populated trees in the next year. This indicates the absence of a direct and significant influence of bark beetles and other stem insects in the modern period on the state of the tugai of the reserve. Such a relatively favorable situation can be violated only by a sharp increase in their food resource, which may be the result of any large-scale adverse effects on the forests of the reserve.

#### 5. REFERENCE.

- [1] Vinokurov N.N., Kanyukova E.V., Golub V.B. Catalog of coleopteran insects (Coleoptera).
- [2] Kirichenko A.N. True coleoptera (Coleoptera)
- [3] Kirichenko A.N. Review of real coleoptera Kozminykh V.O. New data on hemiptera insects (Insecta, Coleoptera).
- [4] Mozolevskaya, E.G. Methods for forest pathological examination of foci of stem pests and forest diseases / E.G. Mozolevskaya, O. A. Kataev, E. S. Sokolov. - M.: Lesnaya prom-st, 1966. -- P. 152. [5] G.K. Shalibashvili et al. // Issues of protection, forest protection and urban greening. - Issue. 224. -M., 1990. - S. 41-46.
- [6] Splavilshchikov, N.N. Woodcutter Beetles / N.N. Smelters // Coleoptera insects. - T. XXII. Part 2. - M.-L.: AN SSSR, 1940. -- 610 p.
- [7] Splavilshchikov, N.N. Woodcutter Beetles / N.N. Smelters // Coleoptera insects. T. XXIII. Part 3. - M.-L.: AN SSSR, 1958. -- 592 p.
- [8] Semenkova, I. G. Phytopathological characteristics of plantations of the Kabardino-Balkarian nature reserve / I.G. Semenkova, Zh.T. Etezhov // Ecology and forest protection. - L., 1987 - S. 102-104.

[9] Eteзов, J.T. Ecological features of pine bark beetles in the pine forests of the Kabardino-Balkarian state reserve / Zh.T. Eteзов // Fauna and ecology of mammals of the Caucasus. - Nalchik, 1987. -S. 222-230. 10.Eteзов, J.T. Species composition of dendrophilous insects of the Kabardino-Balkarian high-mountain state reserve / Zh.T. Eteзов // Questions of mountain ecology. - Nalchik, 1989 .-- S. 187-191.

[11] Eteзов, J.T. Xylophagous Insects of the Sosnovsky Pine in the Forests of the Kabardino-Balkarian High Mountain Reserve / Zh.T. Eteзов: author. diss. - M .: MGUL - 22 p. 12.Eteзов, J.T. Xylophagous insect pines of the Kabardino-Balkarian nature reserve Zh.T. Eteзов, K.A. Kalinina // Rational use, protection and reproduction of forest resources. - Scientific tr. MGUL. - Issue. 18. - M., 1986 - S. 63-66.

[13] Eteзов, J.T. The influence of recreational load on the pathological state of pine forests in the high mountains of the Central part of the North Caucasus / Zh.T. Eteзов // Ecological and floristic studies of the North Caucasus. - Nalchik, 1987 .-- S. 103-105.