

# Composition and Abundance of Mammal Species of Bukhara Region and Adjacent Territories

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**Annotation:**Global environmental problems that are observed all over the world, in particular, the increasing impact of anthropogenic factors on nature, also affect the distribution and bioecological features of representatives of the fauna in biotopes, including mammals. This leads to a shrinkage of the distribution area of mammals as well as a reduction in their number on the desert territory of Uzbekistan. In our research, the diversity, abundance, distribution by biotope and seasonal changes in the species composition of mammals in the Bukhara region and in the territories bordering the Navoi, Kashkadarya, Khorezm regions were analyzed.

**Key words:**desert zone, biotope, agrocenosis, biocenosis, environmental factor

**Introduction.**Analyzing the number and economic importance of mammals of Bukhara region and adjacent territories in various habitats is one of the important issues of today. Through a comprehensive study of the numerous species of mammals widely spread around the world, which are important in nature and the national economy, special attention is paid to managing their numbers and using them in the necessities of man. Especially nowadays, when humanity is expanding the types and scale of economic activity, as well as the degree of environmental impact, which requires the preservation of ecological sustainability and diversity of mammals in urbanized landscapes. Thus, from the early years of independence, special attention has been paid in our republic to the issues of environmental protection, biodiversity conservation and rational use of biological resources.

**Material and methodology:** Most of the territory investigated is made up of clay soils, rocky deserts, salt marshes and sand dunes. In terms of plants *Climacopteraferganica*, *Chenopodium album*, *Ceratocarpus utriculosus*, *Tamarix*, *Haloxylon persicum*, *Haloxylon aphyllum*, *Descurainia sophia*, *Alhagipseudalhagi*, *Ammodendron conollyi* occur, *Artemisia diffusa*, *Anabasis eriopoda* and such ephemerals grow in the saline desert. In recent years, the construction, transport and railway construction, laying gas pipelines in these regions have had an impact on the biodiversity of the region [7;8;9;13;14;]. In 2015-2021, we carried out observations to determine the species composition of the mammalian fauna of the Bukhara region and adjacent territories. In various natural biotopes: deserts, semi-deserts, mountain ranges, natural reservoirs, partially urbanized territories, agricultural landscapes and deeply developed Urban zones, stationary and route, totally 64 times of calculation were done on land in different seasons of the year (spring, summer, autumn and winter) with methods of counting, observation, collecting samples. [1;2;3;4;6]. The results of counts

were extrapolated to a size area of 10 acres, and the density of the animal community was determined by the formula:

$$D = \frac{n}{2 \cdot L \cdot W} ;$$

D is the density; n is the number of birds encountered; L is the height of the route; W is the width of the route, or the distance from the axis of the route to the border of the corridor along which the calculation is carried out. To account for mammals located to the left and right of the route axis, the formula is multiplied by 2, but the results of our calculations were obtained on one side of the route axis, based on the uniqueness of deserts. [10;11;12;15].

**Result and discussion.**The species composition, abundance, biotopic distribution, reproduction and life expectancy of mammals of the Bukhara region and adjacent territories have not been studied and have become an urgent matter of today. Based on other literature data and field materials we collected, 37 species that belong to 16 families (Erinaceidae, Rhynalophidae, Vespertilionidae, Leporidae, Citellus, Dipodidae, Muridae, Cricetidae, Myocastoridae, Canidae, Felidae, Mustelidae, Suidae, Bovidae, Cervidae, Equidae) and 7 orders of mammals of the Bukhara region (Insectivora, Chiroptera, Lagomorpha, Rodentia, Carnivora, Artiodactyla, Perissodactyla). Table 1

Table 1  
Territorial distribution of mammals of Bukhara region (from 2015 to 2022).

№	Species	Protective status	Randomly listed species	Biotopes		
				Natural biotopes	Partially developed	Urbanized biotopes
	<b>Class. Mammalia</b>					
	<b>Order. Insectivora</b>					
	<b>Family. Erinaceidae</b>					
1	Hemiechinusauritus			+	+	+
2	Hemiechinushypomelas	UzRDB		+	+	-
	<b>Order. Chiroptera</b>					
	<b>Family. Rhynalophidae</b>					
3	Rhynolophus bocharicus			+	+	+
	<b>Family. Vespertilionidae</b>					
4	Barbastellaleucomelas			+	+	+
5	Nyctalus noctula			+	+	+

	<b>Order.Lagomorpha</b>					
	<b>Family.Leporidae</b>					
6	Lepus tolai			+	+	-
	<b>Order. Rodentia</b>					
	<b>Family. Citellus</b>					
7	Hystrix Leucura			+		
8	Citellus fulvus			+	+	+
9	Spermophilopsisleptodactylus			+	+	-
10	Spermophiluspygmaeus			+	+	-
	<b>Family.Dipodidae</b>					
11	Allactaga elater			+	+	-
12	Paradipusctenodactylus			+		
13	<i>Salpingotusheptneri</i>	UzRDBRL		+	+	-
	<b>Family. Muridae</b>					
14	Mus musculus					+
15	Rattus norvegicus			+	+	+
16	Apodemus agrarius			+	+	-
	<b>Family. Cricetidae</b>					
17	Ondatra zibethica			+	+	-
	<b>Family. Myocastoridae</b>					
18	Myocastor coypus			+	+	-
	<b>Order. Carnivora</b>					
	<b>Family. Canidae</b>					
19	Vulpes vulpes			+	+	-
20	Canislupus			+	-	-
21	Canis aureus			+	-	-
22	Vulpes corsak	UzRDB		+	+	-
	<b>Family.Felidae</b>					
23	Lynx caracal	UzRDBCITESI		+	+	-
24	Felis chaus			+	+	-
25	Felis libyca			+	+	-
26	Felis margarita	UzRDB		+	+	-
27	Felis manul	UzRDB RL CITESII		+	-	-
	<b>Family. Mustelidae</b>					
28	Mustela eversmanni	UzRDB		+	+	-
29	Lutra lutra	UzRDB RLCITESI	+	+	+	-
30	Vormella peregusna	UzRDB RL		+	+	-
31	Melesmeles			+	+	-
	<b>Order. Artiodactyla</b>					
	<b>Family. Suidae</b>					
32	Sus scrofa			+	+	-

Family.Bovidae						
33	Gazella subgutturosa	UzRDB		+	+	-
34	ssp.bochariensis	UzRDB RL CITESII	+	-	+	-
Family.Cervidae						
35	Cervus elaphusbactrianus	UzRDBCITESII	+	-	+	-
Order.Perissodactyla						
Family. Equidae						
36	Equus hemionus		+	-	+	-
37	Equus Przewalskii		+	-	+	-
	All	12	<b>5</b>	<b>32</b>	<b>31</b>	<b>7</b>

Note:

UzRDB -species (subspecies) listed in the Red Book of the Republic of Uzbekistan (2019)RL-species (subspecies) listed in the Red Book of the International Union for Conservation of Nature and Natural Resources (IUCN) (2004)CITES I, CITES II-species (subspecies) included in the annexes of the Convention on International Trade in Endangered Species of Wild Fauna and Flora. Due to the ecological features of the territory, mammals were not formed uniformly. The fauna of the steppe zone is rich in comparison with the fauna of partially altered biotopes and fully developed Urban landscapes, more precisely 32 species of mammals are found in natural biotopes, while 31 species in partially developed biotopes, and 17 species in fully developed Urban landscapes (Table 1).

12 species (Hemiechinushypomelas, Salpingotusheptneri, Vulpes corsac, Lynx caracal, Felis margarita, Felismanul, Mustela eversmanni, Vormellaperegusna, Lutralutra, Gazellasubgutturosa, ssp.bocariensis, Cervus elaphusbactrianus ) from the mammalian fauna of the Bukhara region and adjacent territories are listed in the Red Book of the Republic of Uzbekistan, among them Salpingotusheptneri, Vormellaperegusna, Felismanul, Lynx caracal, ssp.bocariensis, Cervus elaphusbactrianus, Lutralutra is listed in the IUCN Red List and CITES I and II. Table 1.[5].

7 orders of mammals have been identified in the Bukhara region and adjacent areas. There are two leading orders: Rodentia along with Carnivora including 12 or more species. (Table 2).

Table 2

The spectrum of the leading orders of mammals of the Bukhara region and adjacent territories.

№	Order	Number of species	%
1	<i>Carnivora</i>	13	35
2	Rodentia	12	33
3	Artiodactyla	4	11
4	Chiroptera	3	8
5	Perissodactyla	2	5
6	Insectivora	2	5
7	Lagomorpha	1	3

	All	37	
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According to the obtained results, of the 37 mammal species identified in the Bukhara region and adjacent areas, 13 species belong to Carnivora order (35%), 12 species to Rodentia (33%), 4 species to Artiodactyla (11%), 3 species to Chiroptera (8%) and 2 species to Perissodactyla (5%) and Insectivora (5%) each, where Lagomorpha includes 1 species (3%). (Figure 1)

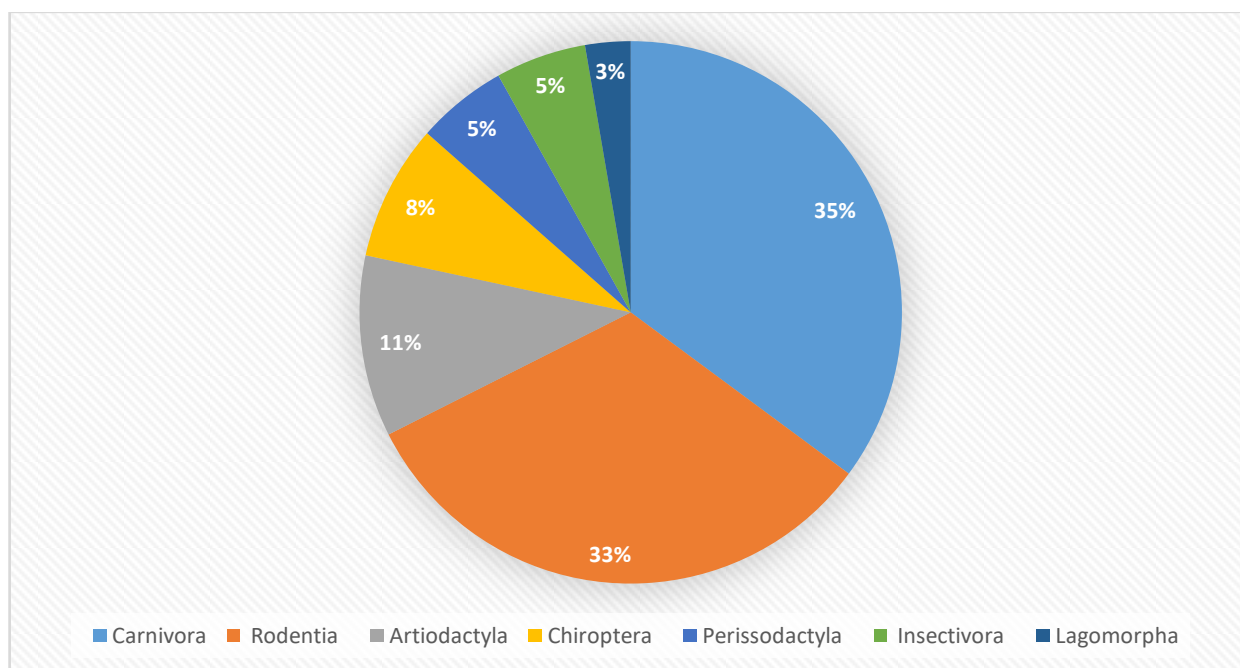


Figure 1. Distribution of mammals by orders in the Bukhara region and adjacent territories.

In the Bukhara region and adjacent territories, there are 4 leading mammalian families with 4 or more species. The leading mammalian families include 17 species (46%), the remaining 12 families comprise 20 species (54%). In the latter families species are distributed as follows: there are 2 families consisting of 3 species (Dipodidae, Muridae), 4 families consisting of 2 species (Bovidae, Vespertilionidae, Equidae, Erinaceidae) 6 families consisting of 1 species (Rhinalophidae, Leporidae, Cricetidae, Myocastoridae, Suidae, Cervidae) Table 3.

Table 3.

Taxonomic composition of mammals of the Bukhara region and adjacent territories

№	Class	Order	Family	Species
		<i>Carnivora</i>	Felidae	Lynx caracal
				Felis chaus
				Felis libyca
				Felis margarita

1	<i>Mammalia</i>			Felis manul
			Canidae	Vulpes vulpes
				Canis lupus
				Canis aureus
				Vulpes corsak
			Mustelidae	Mustela eversmanni
				Lutra lutra
				Vormella peregusna
				Melesmeles
			Rodentia	Citellus
		Citellus fulvus		
		Spermophilopsisleptodactylus		
		Spermophiluspygmaeus		
		Dipodidae		Allactaga elater
				Paradipusctenodactylus
				Salpingotusheptneri
		Muridae		Mus musculus
				Rattus norvegicus
				Apodemus agrarius
		Cricetidae	Ondatra zibethica	
		Mycastoridae	Myocastor coypus	
		Artiodactyla	Bovidae	Gazella subgutturosa
				ssp.bochariensis
			Suidae	Sus scrofa
		Cervidae	Cervus elaphusbactrianus	
		Chiroptera	Vespertilionidae	Barbastellaleucomelas
			Nyctalus noctula	
		Rhynalophidae	Rhynolophus bocharicus	
		Perissodactyla	Equidae	Equus hemionus
				Equus Przevalskii
Insectivora	Erinaceidae	Hemiechinusauritus		
		Hemiechinushypomelas		
Lagomorpha	Leporidae	Lepus tolai		

Hemiechinusauritus, Citellusfulvus, Lepus tolai, Mus musculus, Apodemusagrarius, Rattus norvegicus, Allactaga elater,Ondatra zibethica, Myocastor coypus, Vulpes vulpes, Melesmeles, Sus scrofa are considered as wildy-spread species, while Salpingotusheptneri, Cervus elaphusbactrianus, ssp.bochariensis, Lutralutra are locally-spread.

The state cadastre of wildlife objects is a systematized and qualitative report containing information about the diversity, classification, dynamics, degree of study of animals and other

information necessary for the organization of measures for the protection and sustainable use of wildlife. Nowadays, the data of the state cadastre of wildlife objects do not allow us to obtain accurate information about the total number of animals found in Uzbekistan, including in the Bukhara region. Therefore, practical work in this direction is considered appropriate.

Periodic changes in the number of mammalian populations are associated with the change of seasons; rare changes in the number of mammalian populations are due to natural inconveniences observed in environmental conditions - drought, the usual severe winter frosts and a reduction in food sources due to high temperatures in summer. Unfortunately, in recent decades, related to the economic activity of humans in the territories where our observations were carried out, such adverse phenomena as the formation of settlements, road construction and railways, grazing of livestock in excess of the norm on pastures, complete cutting of reed beds around reservoirs or arson of reed beds were observed in the steppe zone of the region as well as trapping animals by poachers-hunters. There is a decrease in the number of representatives of the animal world in the region. As a result, animals are often forced to change the territory of their habitat. Thus, it can be concluded that the formation of fully adapted stable populations of mammals is still ongoing in the observed steppe biocenoses.

**Conclusion.** It is necessary to establish systematic monitoring on nature, taking into account the positive and negative aspects of each activity that humanity provides to it. And also in order to reduce collisions of animals with vehicles, it is advised to take such decisive measures:

- attention to concrete fences (barriers) along highways and railway networks;
- the introduction of tunnels under highways and railway networks crossing the territory, special "crossings" for the passage of animals;
- limiting the speed of vehicles in places where representatives of the fauna of the steppe zone congregate, especially on highways passing through territories inhabited by rare species;
- to increase attention to the placement of warning and prohibiting road signs on the roadsides;
- any types of anthropogenic activities carried out in natural biotopes (construction of settlements and cities, highway construction, oil and gas pipelines) should be guided by the scientific conclusions of the employees of the regional Department of ecology and Environmental Protection and scientists-specialists;
- reclamation activities by organizing shrub and tree plantations within the developed zones, near highways, along the lines of oil and gas pipelines,
- protect reed beds, where animals gather during breeding and wintering periods.

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