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ECOLOGICAL GROUPS OF MAMMALS IN BUKHARA REGION AND ADJACENT TERRITORIES

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Introduction. Bukhara region is located in the south-west of Uzbekistan. Global environmental problems observed around the world, in particular anthropogenic factors affect nature, including the distribution and bioecological characteristics of mammals. This leads to a shrinkage of the distribution area of mammals, a reduction in their numbers. Through comprehensive study special attention is being paid to the control of the population of mammals all around the world, occurring in large numbers, important in nature and the national economy, as well as their use regarding to the needs of man. Especially today, the expansion of the type and scale of human economic activity, as well as a rise in the level of environmental impact dictate the need to preserve environmental sustainability and diversity of mammals in the Bukhara region and adjacent areas.

Keywords: Mammalia, Chiroptera, Vulpes vulpes, Lepus tolai, agrocenosis, Rodentia, Sus scrofa, Gazella subgutturosa

Material methodology. These data, concerning bioecological features, distribution, existing biotopes, the number and protection of mammals found in the territory of Bukhara region and surrounding regions such as Navoi, Kashkadarya and Khorezm, is the result of our observations conducted in different seasons of 2000-2022. Ecological analysis of the data presented in the work is done according to methods of G.A.Novikov (1947) and G.Koli (1979). 94 counts were carried out in various natural biotopes - deserts, semi-deserts, natural reservoirs, gallery forests, as well as partially developed territories, agricultural landscapes and developed urban zones by stationary and route methods, as well as by counting, observation, sampling at different times of the year (spring, summer, autumn and winter)[2;3;4; 6].The article also uses admirable materials collected for a long time in the Zoological Museum of Bukhara State University.

Description of the topic. In the biotopes of Bukhara region and adjacent territories, mainly steppe and partly steppe, the species composition of mammals has been studied by many experts for many years (Zarudny1916, Bogdanov1932, Kashkarov 1967, Salikhbayev, Petrov,1967, Ishunin1987, Bogdanov 1960, 1980, Bykova, Esipov 2006,2009,2015). But the negative impact of anthropogenic activity observed in all regions of our republic is also felt in the studied territory, due to the fact that most of the natural gas and fuel factories are located in Karshi and Southwestern Kyzylkum deserts, or due to the increasing number of

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automobile and railway lines from the territory of Bukhara to Kashkadarya, Navoi regions, especially in the desert areas of irrigated fields. Such measures as expansion at the expense of the territory, the release of new irrigation networks lead to drastic changes in the lives of all animal species found in the natural biotopes of the territory. Based on our observations, 39 species of representatives of mammals have been registered in the territory, and divided into 4 ecological groups depending on their habitat conditions; mammals found in the terrestrial biotope, mammals nesting underground and finding food on the ground, mammals living in the aquatic biotope, flying mammals. (Table 1).

(Table 1).

Ecological groups of mammals living in Bukhara region and adjacent areas, depending on the biotope

S/n	Species	Terrestrial biotope	Mammals nesting underground and finding food on the ground	Mammals living in the aquatic biotope	Flying mammals
	Class. Mammalia				
	Order. Insectivora				
	Family. Erinaceidae				
1	Hemiechinus auritus	+			
2	Hemiechinus hypomelas	+			
	Order. Chiroptera				
	Family . Rhynalophidae				
3	Rhynolophus bocharicus				+
	Family. Vespertilionidae				
4	Barbastella leucomelas				+
5	Nyctalus noctula				+
6	Taradrida teniotis				+
	Order .Lagomorpha				
	Family Leporidae				
7	Lepus tolai	+			
	Order.Rodentia				

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	Family. Hystricidae				
8	Hystrix Leucura syk	+			
	Family. Citellus				
9	Citellus fulvus		+		
10	Spermophilopsis leptodactyus		+		
11	Spermophilus pygmaeus		+		
	Family. Dipodidae				
12	Allactaga elater		+		
13	Paradipus ctenodactylus		+		
14	*Salpingotus heptneri*		+		
	Family. Muridae				
15	Mus musculus		+		
16	Rattus norvegicus		+		
17	Apodemus agrarius		+		
	Family. Cricetidae				
18	Ondatra zibethica			+	
	Family. Myocastoridae				
19	Myocastor coypus			+	
	Order.Carnivora				
	Family. Canidae				
20	Vulpes vulpes		+		
21	Canis lupus		+		
22	Canis aureus		+		
23	Vulpes corsak		+		
	Family. Felidae				
24	Lynx caracal	+			
25	Felis chaus	+			
26	Felis libyca	+			
27	Felis margarita	+			
28	Felis manul	+			
	Family. Mustelidae				
29	Mustela eversmanni	+			
30	Lutra lutra			+	
31	Vormella peregusna	+			
32	Meles meles		+		
	Order . Artiodactyla				
	Family. Suidae				
33	Sus scrofa	+			

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	Family. Bovidae				
34	Gazella subgutturosa	+			
35	ssp.bochariensis	+			
36	Capra falconeri	+			
	Family. Cervidae				
37	Cervus elaphus bactrianus	+			
	Order. Perissodactyla				
	Family. Equidae				
38	Equus hemionus	+			
39	Equus Przevalskii	+			
	Total	**18**	**14**	**3**	**4**

Among the animals registered on the territory, there are 18 species of mammals that are found in the terrestrial biotope, 14 species of mammals in the ecological group of mammals which nest underground but find food on the ground, 3 species in the ecological group of mammals which live in the aquatic biotope, 4 species in the ecological group of flying mammals. It can be seen from the analysis of tabel that the species diversity of terrestrial mammals living in the territory is somewhat higher, and they can be found in various biotopes of the territory, in sparse grassy sandy deserts (Felis margarita, felis libyca, vormella peregusna, Lepus tolai, hemiechinus auritus, hemiechinushypomelas), in shrubby deserts (gazella subgutturosa, sus scrofa, Felis chaus, Mustela eversmanni, vormella peregusna), in the mountains and on the hills (Hystrix leucura SYK, Vulpes vulpes), in the vicinity of reservoirs and meadows (Lepus tolai, sus scrofa, meles meles,) and even near fields and settlements of developed agrocenoses (Vulpes vulpes, Lepus tolai, hemiechinus auritus, Mustela eversmanni, Vormella peregusna,). According to the results of our observations, we saw that the distribution area of terrestrial mammals in the region is much wider than the other groups. (Table 2).

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Table -2

Mammals found in the terrestrial biotope of Bukhara region and adjacent territories

	Species	Sparse grassy sandy deserts	Shrubby deserts	Mountains and the hills	Water and nearby gallery forests
	Class. Mammalia				
	Order. Insectivora				
	Family. Erinaceidae				
1	Hemiechinus auritus	+	+	+	
2	Hemiechinus hypomelas	+		+	
	Order . Lagomorpha				
	Family. Leporidae				
3	Lepus tolai	+	+	+	
	Order . Rodentia				
	Family. Hystricidae				
4	Hystrix Leucura syk			+	
	Family. Felidae				
5	Lynx caracal	+			
6	Felis chaus	+	+		
7	Felis libyca	+	+		
8	Felis margarita	+	+		
9	Felis manul	+	+		
	Family. Mustelidae				
10	Mustela eversmanni	+		+	
11	Vormella peregusna	+		+	
	Order . Artiodactyla				
	Family. Suidae				
12	Sus scrofa			+	+
	Family . Bovidae				
13	Gazella subgutturosa	+	+	+	

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14	ssp.bochariensis	+			
15	Capra falconeri	+			
	Family. Cervidae				
16	Cervus elaphus bactrianus	+		+	
	Order. Perissodactyla				
	Family. Equidae				
17	Equus hemionus	+			
18	Equus Przevalskii	+			
	Total	**16**	**7**	**9**	**1**

Although the expansion of the distribution area of this group is observed, the number of them has been declining in recent years. Today, only several species can be found on the territory of the region sometimes even in captivity, and in specially "protected" territories (Table 3).

Table3

Small animals found and located on the territory of the wild life preserve called "Jeyran" in Bukhara

	Species	Spread in natural biotopes	Spread in special es
	Class. Mammalia		
	Order. Insectivora		
	Family. Erinaceidae		
1	Hemiechinus hypomelas	-	
	Order. Chiroptera		
	Family. Rhynalophidae		
2	Taradrida teniotis	-	
	Order . Rodentia		
	Family. Dipodidae		
3	*Salpingotus heptneri*	-	
	Order.Carnivora		
	Family. Canidae		

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4	Vulpes corsak	-	
	Family. Felidae		
5	Lynx caracal	-	
6	Felis margarita	-	
	Family. Mustelidae		
7	Mustela eversmanni	-	
8	Lutra lutra	-	
9	Vormella peregusna	-	
	Order . Artiodactyla		
	Family. Bovidae		
10	Gazella subgutturosa		+
11	ssp.bochariensis		+
12	Capra falconeri		+
	Family. Cervidae		
13	Cervus elaphus bactrianus		+
	Order. Perissodactyla		
	Family. Equidae		
14	Equus hemionus		+
15	Equus przevalskii		+
	Total	**9**	**6**

Also, animals such as Hemiechinus auritus, Lepus tolai, sus scrofa, representatives of widely distributed groups in the territory suffer from various manifestations of anthropogenic activity. Statistics show that hemiechinus auritus is considered one of the species which is mostly dying on highways. During our observations for April-June in 2021, at the site of the 'Jeyran' eco-center of the Bukhara-Karshi highway at a distance of 14 km by 17 km, we witnessed 59 vertebrate corpses, including 2 eared hedgehogs, 1 fox, 2 large sand mice, 1 rabbit (Turaev, 2021).

Table-4

Animal species, killed in a collision of vehicles on the highway Bukhara – Karaulbazar – Karshi (2021, April-June).

	Species	Number	Recorded place	Recorded time (from 24.04.21. to 02.06.21.)
1	Hemiechinus auritus	2	'Jeyran' eco-center	2.05.21
2	Apodemus agrarius	2	'Jeyran' eco-center	8.05.21
3	Vulpes vulpes	1	'Jeyran' eco-center	9.05.21

4	Lepus tolai	1	'Jeyran' eco-center	12.05.21

We have recorded similar cases in our observations conducted in 2004-2007 on the Sarmushsai highway, Navoi region (Turaev 2007), or, in 2012-2019, on the Bukhara-Gazli highway. The sand hare and wild boars are the main hunting species hunted by poachers and hunters. Hense, the number of mammals found in the terrestrial biotope requires regular observation and monitoring.

14 species of mammals were recorded, representatives of another group of which nest underground and find food above ground, and it was noted that they make up 37.8% of the species of territorial mammals (Table 1). Representatives of this group demonstrate a high number due to their prevalence in almost all biotopes of the region and high capabilities of protection from the enemy. We can indicate such influences as human development at natural zones (expansion of agrocenoses, expansion of urban zones), as a controlling factor of the number of representatives of this group. 3 species among the registered mammals in the aquatic biotope and 4 species of flying mammals (chiroptera). Of the representatives of these groups, such species as Lutra Lutra, Tadarida Teniotis are listed in the "Red Book"Of Uzbekistan, are numerically rare. Muskrat and nutrias, on the other hand, are considered to be one of the species acclimatized by humans, and today they are considered the main objects of hunting in the wild as fur-producing species in the area, sometimes specially bred in pools.

Conclusion. Thus, considering that the diversity of mammals of the Bukhara region and their biotopic distribution in most cases is formed under the influence of anthropogenic activity and that every activity that humanity shows to nature has its pros and cons, it is necessary to establish regular monitoring work on the ground.

We also consider it appropriate to pay attention to the following recommendations, which are applied in a number of protected areas of our republic in order to prevent collisions of animals with vehicles:

- Paying attention to the installation of concrete fences (barriers) along road and railway networks in animal protection zones;
- The introduction of special "transition corridors" tunnels for the passage of animals under highways and railways crossing the protected area;
- Establishment of speed limits for vehicles in places where animals of natural biotopes congregate;

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