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FAUNA IN DEVELOPED BIOTOPES WAYS OF FORMATION

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ABSTRACT

The article provides information on the diversity of vertebrates in different biotopes of the South-Western Kyzylkum Desert formed under the influence of anthropogenic activities, meeting features, distribution ecology, adaptation of species to environmental factors and the organization of their protection.

KEYWORDS: *Desert Zone, Biotope, Ecotone, Colony, Environmental Factors, Adaptation, Ethology.*

INTRODUCTION

Every change that occurs in natural habitats due to human economic activities, first of all, leads to the emergence of unique ecological opportunities for the life of flora and fauna in the region (Turaev, 2006) **[1]** .The rapid change of the natural environment in the world and the formation of anthropogenic biocenoses have a direct impact on the fauna of vertebrates, which today are the basis of the constituent components of natural biogeocenoses. As a result, some peculiar adaptive reactions are forming in the behavior of the representatives of the fauna of the region. At the same time, the formation of anthropogenic biocenoses is leading to the adaptation of animals to man-made structures and their economic activities. This can lead to a number of problems in some industries (fishing, aviation, medicine, agriculture). Sometimes, the measures taken by human activities (natural biotopes, the construction of highways, the construction of railways, the construction of high-voltage power lines, the expansion of arable lands) can negatively affect the state of the fauna of the region. Therefore, today in anthropogenic biocenoses it is important to determine the distribution, number, bioecological and ethological characteristics of animals, to reveal the changes that occur in their behavior. It is also of great scientific and practical importance to determine the role of species in natural and artificial

biocenoses, as well as their role in bio-damage, protection of beneficial species, management of pest species, development of measures to reduce and prevent their damage.

MATERIALS AND METHODS

These data show that in all seasons of 2002-2017 and 2019-2021 in different biotopes of Bukhara and Navoi regions along the power grid (35 km along the Amu-Bukhara canal, 7 km along the northern bank of the Tudakul reservoir) a total of 42 km, highway (17 km along the Bukhara-Karshi highway, 23 km of the Bukhara-Gazli highway) for a total of 40 km, along the railway line (along the western border of the Jayron eco-center) at a distance of 2 km, wooded groves (Jayron eco-center and Observations were made in lakes and ponds in the border area, along the Amu-Bukhara canal (57 km) and in the open section of the Jayron Eco-Center and in the developed agrocenoses in the eastern part of the Tudakul Reservoir. The geographical relief of the study area is defined by plains, saline soils, small sand dunes, groves, water basins and agrocenoses and settlements under the influence of human activities. At the same time, ecological analysis of species was carried out on the basis of Novikov's (1949) method, distribution of birds in biotopes on the basis of Kashkarov's method (1927) **[2],** collective analysis of species on the basis of Lanovenko, Felatov, Felatova's (2017) **[3**] method.

Outcome analysis. In the study area, 24 species of vertebrates, 2 species of aquatic and terrestrial species, 21 species of reptiles, 131 species of birds and 26 species of mammals belonging to different biotape of the fauna were recorded and distributed in the following biota of the region (Table 1).

List of vertebrates recorded in different biotopes(Table 1).

T/p	Classes of vertebrates	Number of types	Registered biotope			
			Water biotopes	Agrocenoses	Desertsand steppesbiotope	Reeds
1	*Pisces*	24	24			
2	*Amphibia*	2	1	1		1
3	*Reptilia*	21	2	11	19	5
4	*Aves*	131	116	68	39	78
5	*Mammalia*	26	2	23	24	19

Diversity in natural and artificial biotopes was observed, including species distribution, encounter characteristics, number, density, and degree of adaptation to environmental factors. In particular, in desert-based settlements and agrocenoses, species diversity is formed over the years at the expense of natural biotopes, and this composition is characterized not only in terms of diversity, but also in the behavior (ethology) of the species. Although each change in the natural habitat caused by anthropogenic influences is assimilated by the fauna over a period of time, the formation of a stable fauna of the region takes different time, although it is a movement to adapt or move away from it. This process depends on several factors, including: the area developed, the degree of impact of anthropogenic activity in the region, the type of anthropogenic activity

For example, the diversity of species in the fauna of the city of Gazli, formed in the desert, has been stable for 25-30 years (Ten, 2012) **[4]**, while in the ecological center of Jayran it has been observed for 5-10 years.

To say stability of the composition of the biocenosis in the second case is difficult, in which the composition of the species' fauna in the adjacent biotopes was somewhat mixed. This is usually explained by the proximity of the biotopes to each other and the extreme similarity of the differences between environmental factors. In these "ecotones" at the border of biotopes, it is usually observed that the representatives of both biotope species (synanthropic species and natural biotope species) have expanded opportunities for life (feeding, reproduction, overnight, rest and sometimes protection from the enemy). However, it is noticeable that some changes in the behavior of representatives of the animal kingdom are intensifying. Including thin-fingered and yellow-tailed deer- Citellus fulvis ,*Rhombomys optimus* ,*Mustella wersmanni* ,*Lepus* tolay coming to feed on discarded food scraps;Bird of sea- *Larus cachinnans* ,*Larus ridibundus*as birds search for food in garbage dumps:*Pterocles orientalus*,*Pterocles alhata, Columba livia, Corvusfrugilegus, Corvusmonedula form a mixed gala and cultivate grain crops planted in agrocenosis fields;From the shores of water bodies, lizards are observed to adapt to fishingHimantopushimantopis, Sterna hurundo.*Similarly, in the Jayron eco-center, the pica pica hunts for sand, the mouse feeds on house mice, Circus arendinosus, Corvusfrugilegus, and Coracias garrogand. it is possible to observe the railway tracks and observe the feeding of animal carcasses that perished at night on the road.We also noted during our observations that due to the duration of such changes, species that sometimes live in natural biotopes later entered zones with strong human activity in urban landscapes and formed adaptations specific to synanthropic species.Nuctocorax, a swan living in the forest and aquatic biota, small blackbird Phalacrocoraxrygmaeus, small white rhinoceros Egrettagarzetta and Egyptian black Bubulcus ibis Karakul of Bukhara regionIn the alleys of Alat, Jondor, Romitan, Kagan districts and in the center of Bukhara city, it is observed that manure is adapted to build nests in the colony Corvusfrugilegus (Turaev, 2019) **[5,6].**This ensures that the species proliferates in the region.

However, in the lives of some species, such changes have a negative impact, including; Gazelle subqutturosa, Otis tarda, Tetraxtetrax, Pteroclesalchata, Syrrhaptes paradoxus, Podocespanderi, leading to a slight reduction in its range, and over the years such species have become one of the few or most declining species in the region. Until the middle of the last century, the Podocespanderi was a typical representative of the region, but today the area of this endemic species has been reduced to the northern city of Gazli. In order to meet the water needs of the desert zone (as well as for water and submarine birds whose lives are associated with the aquatic biotope), the Amu-Bukhara canal in the area and a number of lakes and ponds formed around it should be shown to have a herring. It is observed that 32 species of birds are involved in nesting in reeds and shrubs around the reservoirs (Table 1). The high diversity of species in this biotope is due, firstly, to the lack of water in the desert zone, secondly, the main mass of vegetation cover for animals also grows around the aquifers, and thirdly, the main mass of species that can be found in different biotopes of the Southern Kyzylkumdvrida is recorded in the region. It should be noted that among them there are a number of rare, rare species of our fauna. Since the last years of the last century, in the area of Tudakul, Karakir, Zikri and Kogan fisheries in the area we have observed, there has been an increase in the number of such species as swan, swan, blackbird, and small white carp. (Turaev, 2021) **[7].**

It is also found in the groves of the region, consisting of birch, willow, willow and reeds: Phazanuscolchicus ssp. zerafschanicus, Lusciniamegarhynchos, Turdusmerula, Streptopelaturtur, Laniusexcubitor, Lanius minor, Laniusschach, Athene noctua, Asiootus, Falco tinnunculus, Cuculuscanorus, Parusbokharensis, Remizpendulinus, Columba livia, Streptopela senegalensis, Streptopeladicaocta, Passer montanus, Pasterdomesticus, Acridotherestristis, Oriolusoriolus, form an integrated community and form the forest biocenosisornithofauna.

This habitat is also the main habitat of mammals. From the class in the reeds of trees and puddles formed along the canal, 57 km from the Amu-Bukhara canal: Lepus tolay, Wulpeswulpes, Canisavreus, Ondatra zibethicus, Citellusfulvis, Sus serafa, LutraLutra, Felis uncia, Vormelaperegusna, Mustellawersmanni, such species are recorded. Eight species of amphibians and reptiles have been recorded. Colomberladacensis, Nadrixtessellata, and Pasammophislineolatum dominated the rest of the class.

In the lowland, sandy, and saline biotopes of the region, although the diversity is small, in the low-lying parts of these biotopes, birds blue Coracias garrulus, Meropspersicus, Meropsapiaster, galistacristata, Amomanes dessert, Calandrellabrachydactyla and Calandrellacheleensis species, Pteroclesorientalis, Pteroclesalchata, Oenanthe oenanthe, playful tortoise, Saxicola caprata, bubo bubo were observed to enter agrocenoses.

Bird species recorded in nesting in different biotopes

TABLE 2

T\n	Categories	Number of tours	Biotopes			
			Submerged biotopes	Agrocenoses	Desert and steppe biotope	Bush and reeds
1	Podicipediformes	2	+			
2	Pelecaniformes	2	+			+
3	Ciconiiformes	8	+			+
4	Anseriformes	6	+			
5	Falconiformes	1	+			+
6	Galliformes	1		+		
7	Gruiformes	3	+			+
8	Charadriiformes	13	+	+		
9	Columbiformes	7		+	+	+
10	Cuculiformes	1			+	
11	Strigiformes	4			+	
12	Caprimulgiformes	1			+	

13	Apodiformes	1		+	+	+
14	Coraciiformes	4	+	+	+	
15	Upupiformes	1		+	+	+
16	Piciformes	1				+
17	Passeriformes	38	+	+	+	+
		94				

The activity and species composition of birds in this biotope changed during the season, depending on the type of crop, ie when the seeds of cereals such as wheat, barley, rice, millet were planted (September, October, November): Columba livia, Streptopela senegalensis, Streptopeladicaocta, Passer montanus, Pasterdomesticus, Pteroclesorientalis, white-tailed deer Pteroclesalchata, llowing months by representatives of this genus of geese when the grasses have grown. Occasionally, Anseranser, Tadornaferruginea, Anas platyrhynchos are collected in the range of 25-40 to 60-75 forage per hectare. In early spring, this composition is first replaced by entomophagous species, then by sparrows during the milking process, especially by the field sparrow Passer montanus and the house sparrow Pasterdomesticus. Based on the results of our many years of observations, it should be noted that the duration of anthropogenic activity leads to the reorganization of the biotopes in the region, phytocenoses and zoocenoses.

It also depends on the duration of anthropogenic economic activity and the vital needs of the fauna. As evidence for our view, we noted during our observations that due to the duration of changes in the region, species that sometimes live in natural biotopes later entered zones with strong human activity in urban landscapes and formed adaptations specific to synanthropic species in a short time.These include birds of prey and aquatic biota - Nuctocoraxnuktocorax, Phalacrocoraxrygmaeus, Egrettagarzetta and Bubulcus ibis are found in the alleys of Karakul, Alat, Jondor, Romitan, Kagan districts of Bukhara region and in the center of Bukhara city: We can show that manure is suitable for building nests in a colony mixed with crows (Turaev, 2021) **[8].**

Or the fact that the ornithofauna around Lake Karakir, formed in the foothills of the Kyzylkum desert in the northern part of the region, can be assimilated by aquatic and underwater species in a very short time and take 10-15 years to form a stable biocenosis(the formation of stable fauna is observed in Russia in 30-35 years (Sagitov, Pukinsiy, Pukinskaya 1989**) [9].**

Sometimes the negative effects of anthropogenic activity in the region are obvious. Including; The construction of a high-voltage power line (LEP) across the area where our observations were made could serve as a major holiday for migratory and desert birds, nesting for some species, and food sources for some species. We have witnessed the network claiming the lives of many birds. During our observations, the bodies of a total of 28 birds were found at a distance of 24 km, of which 23.5% are the species listed in the Uzbek and International Red Books. Similar incidents occurred in 2002-2004 and 2013-2019, when 3 km of power lines were laid between the Todakol and Kuyimazor reservoirs. (28.02.2020; 26.03.2006) A total of 14 pink and curly lizards were killed by an electric wire. Collisions of birds with the power grid are mainly observed during the spring and late autumn migrations of birds, especially on rainy and foggy days when birds form a gala and fly to the network (Turaev 2006, 2021) **[10,11].**

There are some negative effects on the fauna of the area, as well as on the roads and railways that cross the area. The highway connecting Bukhara and Karshi is a first-class road, with an average

of 2,500 to 4,000 vehicles a day. Due to the small size of the vehicles, the uninterrupted flow of traffic in the area has led to the loss of wildlife and the loss of lives. (Table 3).

TABLE 3 LIST OF BIRDS KILLED IN COLLISIONS WITH POWER TRANSMISSION LINES

т\р	Bird species	Recorded time	Noted location	Number	Recorded material
1	Galeridacristata	29.11.09.	Powersupply	1	Birdbody
2	Piteroclesorientalis	17.01.10.	Powersupply	1	Birdbody
3	*Pelecanus crispus*	26.03.2002, 22.03.2017	Powersupply	1 1	Birdbody
4	*Pelecanus onocrotalus*	28.02.2004, 02.03.2006	Powersupply	1 2	Birdbody
5	*Sturnus vulgaris*	14.11.2010	Powersupply	1	Birdbody
6	*Pica pica*	19.02.13.	Powersupply	1	Birdbody
7	Corvusfrugilegus	7.03.10.	Powersupply	2	Birdfeathers
8	Anas crecca	8.03.10.	Powersupply	1	Birdfeathers
9	Falco tinnuculus	17.02.10.	Powersupply	3	Birdfeathers
10	Bubo bubo	14.03.10.	Powersupply	2	Birdfeathers
11	Aegypiusmonachus	27.02.17.	Powersupply	2	Birdfeathers
12	Buteo lagopus	7.02.10.	Powersupply	1	Birdfeathers

- With the increase in activity and the need for nutrition during the mating season in early spring, it is observed that representatives of vertebrates and invertebrates in the region, especially in the evening, sometimes die on the roadsides while crossing the road. It is during this process that vertebrates often collide with vehicles. Direct collisions of animals with vehicles are often observed in "young" or "insufficiently qualified" representatives**. [12]**

Occasionally, collisions occur when grain is being transported to highways: spilled grain products, food debris dumped by passengers, animal carcasses killed in a car crash are the main factors that attract animals to the tracks. In April, May and June 2010, 59 animal and bird carcasses were recorded at a distance of 14 km from this highway. **[13]**

Animal species killed by vehicles on the Bukhara-Karavulbozor-Karshihighway (March-June). Table – 4

т\р	Animal species	Number	Place of registration	Time of registration (from 24.04.10 to 02.06.10)
1	*Eryx miliaris*	1	*Bukhara – Korovulbozor, (highway)*	24.04.10
2	*Trapelus sanguinolentus*	29	*Bukhara – Korovulbozor, (highway)*	24.04.10 02.06.10

3	*Columber ladacensis*	6	*Bukhara – Korovulbozor, (highway)*	2.05.10
4	*Pasammophis lineolatum*	2	*Bukhara – Korovulbozor, (highway)*	7.05.10
5	*Erinaceidae*	2	*Bukhara – Korovulbozor, (highway)*	12.05.10
6	*Eremias velox*	12	*Bukhara – Korovulbozor, (highway)*	15.05.10
7	*Trapelus sanguinolentus*	4	*Bukhara – Korovulbozor, (highway)*	18.05.10
8	*Rhombomys optimus*	2	*Bukhara – Korovulbozor, (highway)*	8.05.10
9	*Wulpes wulpes*	1	*Bukhara – Korovulbozor, (highway)*	9.05.10
10	*Varanus griseus*	1	*Bukhara – Korovulbozor, (highway)*	19.05.10
11	*Lepus tolay*	1	*Bukhara – Korovulbozor, (highway)*	12.05.10
12	*Sylviacurruca*	1	*Bukhara – Korovulbozor, (highway)*	15.05.10

Similar observations were made in 2004-2007 at the Sarmushsoy settlement in Navoi region, and in 2012-2019 on the Bukhara-Gazli highway. **[14]**

CONCLUSION

Thus, at the end of our observations, we can say that, given the fact that every activity of mankind in nature has its pros and cons, it is necessary to conduct regular monitoring on the ground. Also, to reduce collisions between animals and birds in vehicles and high-voltage power lines (LEPs): **[15-18]**

- Pay attention to the installation of concrete barriers along highways and railways;

- Introduce the installation of special "passage corridors" tunnels for the passage of animals under the highways and railways that cross the area;

- Strengthen control over the speed of vehicles in areas where the wildlife of the desert zone is crowded;

-Increase attention to warning and prohibitory road signs;

-Introduction of installation of various reflectors in high-voltage power lines (LEP); would be appropriate.

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