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Fauna and Ecology of the Nukus City Birds

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1. Introduction.

Today, almost all landscapes on planet Earth are directly or indirectly affected by human activities. Therefore, at present, much attention is paid to the study of the fauna and population of animals, especially birds, which play a leading bioindicator role in cultural landscapes [11, 6, 7]. Among cultural landscapes, the urban landscape is one of the most widespread. But so far, the avifauna of the urban landscape of Karakalpakstan has not been fully studied. For this reason, a comprehensive study of the species composition, spreading, number, ecology and ways of adaptation of birds in the city of Nukus is of great scientific-practical importance.

2. Materials and methods of research.

The research work was carried out in 2019-2023 in the lower reaches of the Amu Darya River, in all seasons of the year, in the city of Nukus of Republic of Karakalpakstan and its environs.

When studying the avifauna, generally accepted methods were used [17, 20]: the route method of observation and accounting (on foot, by car); methods for determining the species of birds by voice, and night migrants - by the light of the moon; for subsequent determination and analysis - photo and video filming of species; registration of the main biotopic features at the observation sites, etc.

Observation and registration of birds in their habitats was carried out by 10x binoculars and a 60x Viking tube. The duration of observations at the counting points ranged from 5 to 20 minutes.

Most of the scientists who conducted ornithological observations in Karakalpakstan

were interested in the cultural landscape, including urban birds. But the fauna and ecology of urban birds have not been studied separately. Only in the works of some researchers this question is given in the form of fragmentary data [1, 2, 3, 4, 5, 6, 7, 8, 9, 10].

3. Results and discussion.

According to the available literary sources [1, 2, 5, 6, 7, 8, 12, 13, 14, 15, 16, 18] and our own observations, it was determined that 198 species of birds belonging to 18 orders and 46 families are spread in the city of Nukus (Table 1).

Table 1- The systematic composition of the birds of Nukus city and its environs and arrival status

order	number of species		settled		nesting		migratory		wintering	
	абс.	%	абс	%	абс	%	абс.	%	абс.	%
Podicipediformes	5	2,52	-	-	4	4,35	5	3,40	-	-
Pelecaniformes	4	2,02	-	-	4	4,35	3	2,04	-	-
Ciconiiformes	7	3,53	-	-	7	7,61	2	1,36	2	4,25
Phoenicopteriformes	1	0,51	-	-	1	1,09	1	0,68	-	
Anseriformes	19	9,6	-	-	11	11,95	19	12,92	5	10,64
Falconiformes	14	7,07	2	8,7	6	6,52	10	6,80	7	14,89
Galliformes	2	1,01	1	4,35	1	1,09	1	0,68	1	2,13
Gruiformes	7	3,53	-		3	3,26	7	4,76	1	2,13
Charadriiformes	39	19,7	-		16	17,39	36	24,49	3	6,38
Columbiformes	5	2,52	3	13,04	2	2,17	2	1,36	1	2,13
Cuculiformes	1	0,51	-		1	1,09	1	0,68	-	
Strigiformes	4	2,02	2	8,7	1	1,09	-	-	1	2,13
Caprimulgiformes	1	0,51	-		1	1,09	1	0,68	-	
Apodiformes	1	0,51	-		1	1,09	1	0,68	-	
Coraciiformes	3	1,51	-		3	3,26	2	1,36	-	
Upupiformes	1	0,51	-		1	1,09	1	0,68	-	
Piciformes	2	1,01	1	4,35	-		1	0,68	-	
Passeriformes	82	41,41	14	60,86	29	31,52	54	36,73	26	55,32
Total	**198**	**100**	**23**	**11,61**	**92**	**46,46**	**147**	**74,24**	**47**	**23,74**

Note: The total number of species grouped by arrival status exceeds the number of species in the avifauna of Nukus. This is because the northern geographic populations of most nesting species are also migratory.

Table 1 provides information on the systematic composition and nature of the stay of birds common in the city of Nukus. It is characterized by the predominance of migratory bird species (74.24 %) over nesting (46.46 %), wintering (23.74 %) and settled (11.61 %).

Among the named orders, the most widespread are Passeriformes - 82 species or 41.41%, Charadriiformes - 39 species (19.7 %), Anseriformes - 19 species (9.6 %), Falconiformes - 14 (7.07 %), Ciconiiformes and Gruiformes - from 7 species (3.53 % each), Podicipediformes and Columbiformes - 5 species (2.52 % each), Pelecaniformes and Strigiformes - 4 species (2.02 % each), and 3 species (1.51 %) belong to the Coraciiformes, etc. (Fig. 1).

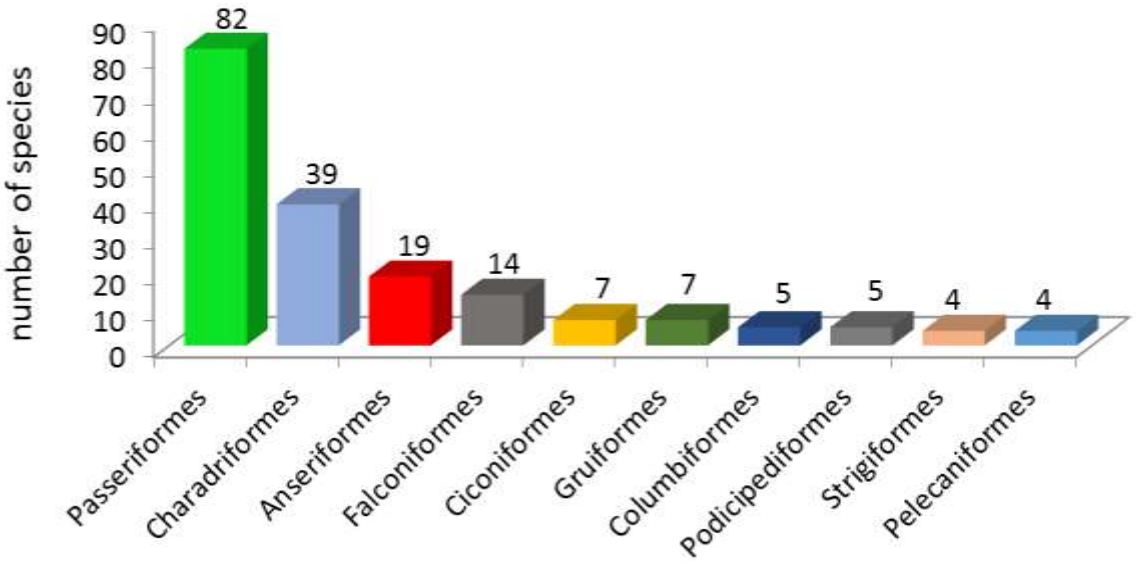

Figure 1. The number of birds in the city of Nukus by species

If we analyze the composition of birds seasonally, then among the representatives of the nesting avifauna the following orders prevail: Passeriformes (31.52 %), Charadriiformes (17.39 %), Anseriformes (11.95 %), Ciconiiformes (7.61 %), Falconiformes (6.52 %), Podicipediformes and Pelecaniformes (4.35 % each), Gruiformes and Coraciiformes (3.26 % each), Columbiformes (2.17 %). The indicator of other types corresponds to 1.09 %. The share of migratory bird species remains at the same level, i.e. Passeriformes (36.73 %), Charadriiformes (24.49 %), Anseriformes (12.92 %), Falconiformes (6.80 %), Gruiformes (4.76 %), Podicipediformes (3.40 %), Pelecaniformes (2.04 %), Ciconiiformes, Columbiformes and Coraciiformes (1.36 % each). The indicator of other categories corresponds to 0.68 %. Passeriformes predominate among wintering species - 26 species (55.32 %), followed by Falconiformes - 7 species (14.89 %), Anseriformes - 5 species (10.64 %), Charadriiformes - 3 species (6.38 %), Ciconiiformes - 2 species (4.25 %). Each of the remaining categories is 2.13% (1 type). Sedentary birds make up 23 species and are grouped into the following orders: Passeriformes - 14 species (60.86 %), Columbiformes - 3 species (13.04%), Falconiformes and Strigiformes - 2 species each (out of 8.7 %), Galliformes and Piciformes - 1 species (4.35 % each).

The avifauna of the city of Nukus is formed by representatives of desert, waterfowl and tugai birds. Today, birds are spread over 7 main habitat (biotopes) in the city of Nukus. These are:

1. microdistricts and many-storied buildings;
2. settlements consisting of one-story houses;
3. gardens, alleys, tugai on the outskirts of the city;
4. industrial centers (plants, factories, stations, offices, etc.);
5. ruderal areas (garbage dumps, roads);
6. reservoirs and their banks (rivers, canals, lakes, ponds);
7. cemeteries and nearby open areas.

All these stations differ from each other in terms of bird habitats, and they have their own indicator birds. Currently, the composition of the avifauna is gradually replenished with birds of the cultural landscape. At the same time, the increase in settlements and cultural sites is crowding out bird species that previously lived there.

The development of the city as a habitat for birds is accompanied by a change in their

ecology. Therefore, not all birds can co-adapt in urban environments.

The rarity of prey birds, the absence of disturbance for the night and the abundance of food create opportunities for migratory and wintering birds to enter the city. According to our observations, in winter, most crows spend the night on tall trees in the city. In the autumn-winter period, the number of birds that feed on grain and birds that feed on food residues (*Columbidae, Corvidae, Sturnidae, Passeridae*) increases significantly.

There are also ample opportunities for nesting in urban areas. To build a nest, birds choose different places, sometimes places that were not familiar to them before. For example, rock dove *Columba livia G.*, myna *Acridotheres tristis*, collared turtledove *Streptopelis decaocto F.*, tree sparrow *Passer montanus*, barn swallow *Hirundo rustica L.*, black swift *Apus apus* can nest in buildings of historical or modern architecture, high lampposts. Myna *Acridotheres tristis*, collared turtledove *Streptopelia decaocto F.*, tree sparrow *Passer montanus L.*, rock dove *Columba livia G.*, starlings *Sturnus vulgaris* often feed in garbage dumps, find food in markets, in transport stops and around warehouses. These birds are not so afraid of people.

The intensive development of industrial production and social facilities has a significant impact on the biological diversity of birds and their ecology in the urban landscape. Also, the expansion of the park with various trees and shrubs attracts many birds.

Some birds build nests here, hibernate, and in the cold winter they find food for themselves. Some of them temporarily stop in water areas located inside or on the outskirts of the city during their seasonal migration. At this time, we even met rare birds listed in the Red Book of the Republic of Uzbekistan [19] on Ashshi Kol Lake in the outskirts of Nukus. For example, every year during the spring and autumn migration on this lake we observe about 100 individuals of the white-headed duck *Oxyura leucocephala S.* (Fig. 2). On May 2, 2021, we encountered 17 pink flamingos *Phoenicopterus roseus L.* on this lake. We would like to emphasize that these rare birds always avoid anthropogenic habitats, but they were noted in the outskirts of the city of Nukus for the first time.

Figure 2. white-headed duck *Oxyura leucocephala*

The increase in the number of cars on city streets and the asphalting of many roads have driven out striated scops-owl *Otus brucei Hume*, eurasian roller *Coracias garrulous L.*, hoopoe *Upupa epops* L. and barn swallow *Hirundo rustica L.* from the city.

Most Columbiformes and Passeriformes forage and nest in crowded areas such as busy markets and car depots.

Rooks *Corvus frugilegus L.* and jackdaws *Coloeus monedula L.* nest and spend the night in cities, gathering in colonies in trees. They disturb people with their loud noise and pollute tree trunks and streets with their excrement. That’s why most people try to drive them

out by destroying their nests.

4. Conclusions.

Today, 198 species of birds belonging to 18 orders and 46 families are distributed in the city of Nukus. The avifauna of the city of Nukus is formed by representatives of desert, water and tugai birds. As a habitat for birds, the city of Nukus has many habitats and biotopes, and birds adapt to it in different ways.

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Summary

The article presents materials collected during 2019-2023 on birds spread in the city of Nukus and its surroundings. Also, the authors have studied the modern composition of the avifauna of the city of Nukus, its spreading and character of residence, as well as the ecology of birds, including their adaptation to the city and food.

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