

Taxonomic Analysis of Game Birds Fauna in Bukhara Region

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Abstract The article analyzes the species composition, leading order, spectrum of families and taxonomic composition of game birds of Bukhara region and adjacent territories. It has been established that in the territory of the Bukhara region and adjacent territories there are 7 orders, 9 families and 27 species of game birds. Due to the increased interest in bird hunting, in particular hunting tourism, much attention is being paid to improving the system of hunting management, special breeding and protection of game bird species, and the introduction of advanced working methods in this area. In this regard, improvements were made, including in the management of hunting farms, the organization of hunting, maintaining their sustainability through the special breeding of game birds, as well as increasing the economic efficiency of farms through the introduction of hunting tourism.

Keywords *Streptopelia senegalensis*, *Columba livia*, *Corvus frugilegus*, Desert zone, Biotope, Agrocenosis, Biocenosis, Environmental factor

1. Introduction

The use of modern methods and technologies in the activities of hunting farms has resulted in the preservation of the number of bird species and the stability of their habitats [4]. It should be noted that, depending on the zoogeographical characteristics of each region and the specifics of the hunting industry there, the type of hunting objects and the volume of hunting differ from each other [5]. Accordingly, a scientific approach to compiling a list of huntable bird species for a particular region, acclimatizing promising bird species, and issuing appropriate permits for hunting is of significant scientific and practical importance in preventing the decline in the number of huntable bird species, developing measures for the implementation of biotechnical measures, and putting them into practice.

2. Materials and Methods

In order to determine the species composition of the bird fauna of the Bukhara region and adjacent areas, our observations were carried out in different seasons in 2010-2025. In various natural biotopes - deserts, semi-deserts, foothills, natural reservoirs, groves, as well as partially developed areas, stationary and routed, a total of 140 land censuses were conducted in different seasons of the year (spring, summer, autumn and winter) [18,5]. The results of the census of the number of birds of prey in the Bukhara region and adjacent areas were extrapolated to an area of 10 hectares, and the density of the bird community was determined according to the following formula: [16,17]

$$D = \frac{n}{2LW}$$

where D is the density; n is the number of birds encountered; L is the length of the route; W is the width of the route, or the distance from the route axis to the border of the calculated corridor. To take into account the species composition of the prey bird fauna on the left and right sides of the route axis, a multiplier of 2 was used in the formula, but the results of our calculations were taken from one side of the route axis, due to the specifics of the deserts [6].

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In addition to visual observations, photographs and video images were used to determine the species and count the number of hunted bird fauna, using a Cinema Res 1200x video camera and Viking 10x50 binoculars. The following methods were used to identify animals and record populations:

1. Visual observation: Identification of animals by direct observation in their natural habitat.
2. Identification by tracks and remains: Species identification using paw prints, fur, bird remains, and negative tracks.
3. Traps and camera traps: Animal activity and species were recorded using special sensor cameras.
4. Acoustic monitoring: identification using the vocalizations of birds and some mammals.
5. Biological samples: laboratory analysis of soil, bird eggshells, fur, and food samples.

Each method was applied in a manner that caused minimal environmental harm to the animals [1,2,4].

The percentage of a particular species in the prey population (%) was determined using the following formula:

$$X = \frac{a \cdot 100}{b};$$

Here a is the number of representatives of a specific species; b is the number of representatives of all species counted at the census location [5,15].

3. Literature Review

Studies on migration, distribution in biotopes, population size, biology, and ecology of passerine birds have been conducted by foreign researchers such as M. Umar *et al.* [13], S. Laxminarayan *et al.* [11], Pande Satish *et al.* [8], Laszlo Bozo and Tibor Csorgo [7], Rahmat Ullah Khan *et al.* [10], Wafae Squalli *et al.* [14], Muhammad Zeshan Haider *et al.* [9], W. Tesfahunegn and A. Assefa [12], and others.

Research on bird fauna and their ecological characteristics has also been reported in the works of T. Zohidov, R.N.

Meklenburuev, A.K. Sagitov, O.V. Mitropolsky, D.Yu. Kashkarov, E. Shernazarov, A. Mambetjumaev, S. Bakaev, F. Kholboev, M. Jumanov, A. Jabborov, M. To'raev, R.R. Rakhmonov, A.R. Rayimov, and others [3].

4. Topic Description

It was determined that 27 species of birds belonging to 1 subclass (Neornithes), 7 orders (Pelecaniformes, Ciconiiformes, Anseriformes, Galliforme, Gruiformes, Columbiformes, Passeriformes), 9 families (Phalacrocoracidae, Ardeidae, Anatidae, Phasianidae, Rallidae, Pteroclididae, Columbidae, Sturnidae, Corvidae) were found in the Bukhara region and adjacent areas. Birds are hunted for sports and amateur purposes, as well as for scientific, medical and other purposes, and almost all of these hunts are carried out by removing birds from their habitat. (Table 1).

The importance of a species in human life and in the biogeocenosis as a whole is inextricably linked to its number. The number (density) of each species per unit area was determined in the Bukhara region and its adjacent natural desert biocenoses, water bodies, agrocenoses and cities [6]. For this, several continuous observations were conducted using specific methods on the relevant routes, and according to their results, the number (density) of species per unit area was determined based on an area of 10 ha [1]. Species were divided into the following groups according to their number (density) per unit area: Very abundant species - (JK) more than 100 per 10 ha; Abundant species - (K) from 10 to 100 per 10 ha; A small number of species - (O) from 1 to 10 per 10 ha (Table 1).

Birds hunted in the Bukhara region and adjacent areas can be divided into 2 ecological groups depending on the seasonal nature of their habitat:

Sedentary species - species that constantly nest in the Bukhara region and adjacent areas throughout the year;

Migratory species - species that nest in the Bukhara region and adjacent areas during the nesting period and species that fly in for wintering and fly out in the spring.

Table 1. Ecological groups of game birds in the Bukhara region according to seasonal changes in their fauna and habitat

No	Name of order, family and species	Species abundance and status per unit area	Sedentary species	Migratory species.
	Phylum. Chordata.			
	Subphylum. Craniata.			
	Superclass. Tetrapoda.			
	Class. Aves.			
	Subclass. Neornithes.			
	Super order. Carinatae.			
	Order. Pelecaniformes.			
	Family. Phalacrocoracidae.			
1	Phalacrocorax carbo	J.K	+	
	Order. Ciconiiformes			
	Family. Ardeidae			
2	Botaurus stellaris	O		+

№	Name of order, family and species	Species abundance and status per unit area	Sedentary species	Migratory species.
	Order. Anseriformes.			
	Family. Anatidae.			
3	<i>Anser anser</i>	K		+
4	<i>Anas platyrhynchos</i>	J.K	+	
5	<i>Anas crecca</i>	J.K		+
6	<i>Anas strepera</i>	K		+
7	<i>Anas penelope</i>	K		+
8	<i>Anas acuta</i>	J.K		+
9	<i>Netta rufina</i>	J.K	+	
10	<i>Aythya ferina</i>	J.K		+
	Order. Galliforme .			
	Family. Phasianidae			
11	<i>Alectoris chukar</i>	O		+
12	<i>Ammoperdix griseogularis</i>	O		+
13	<i>Coturnix coturnix</i>	K	+	
14	<i>Phasianus colchicus</i>	O	+	
	Order. Gruiformes .			
	Family. Rallidae.			
15	<i>Fulicaatra</i>	J.K	+	
16	<i>Rallus aquaticus</i>	K	+	
	Order. Columbiformes.			
	Family. Pteroclididae.			
17	<i>Pterocles orientalis</i>	O		+
	Family. Columbidae			
18	<i>Columba livia</i>	J.K	+	
19	<i>Streptopelia decaocto</i>	J.K	+	
20	<i>Streptopelia senegalensis</i>	J.K	+	
	Order. Passeriformes			
	Family. Sturnidae			
21	<i>Sturnus vulgaris</i>	K	+	
22	<i>Acridotheres tristis</i>	K	+	
	Family. Corvidae			
23	<i>Pica pica</i>	K	+	
24	<i>Corvus monedula</i>	K	+	
25	<i>Corvus frugilegus</i>	J.K	+	
26	<i>Corvus corone</i>	K		+
27	<i>Corvus cornix</i>	K		+

Table 2. The spectrum of the leading orders and families of birds hunted in the Bukhara region and adjacent areas

Name of order	Number of families	(%)	Number of species	(%)
Pelecaniformes	1	11,11	1	3,7
Ciconiiformes	1	11,11	1	3,7
Anseriformes	1	11,11	8	29,6
Galliforme	1	11,11	4	14,81
Gruiformes	1	11,11	2	7,43
Columbiformes	2	22,22	4	14,81
Passeriformes	2	22,22	7	25,92
Total	9	100	27	100

Table 3. Taxonomic composition of game birds in the Bukhara region and adjacent areas

Phylum	Class	Order	Family	Species
Chordata	Aves	Pelecaniformes	Phalacrocoracidae	Phalacrocorax carbo
		Ciconiiformes	Ardeidae	Botaurus stellaris
		Anseriformes	Anatidae	Anser anser
				Anas platyrhynchos
				Anas crecca
				<i>Anas strepera</i>
				<i>Anas penelope</i>
				<i>Anas acuta</i>
				Netta rufina
				Aythya ferina
		Galliformes	Phasianidae	Alectoris chukar
				Ammoperdix griseogularis
				Coturnix coturnix
				Phasianus colchicus zarudnyi
		Gruiformes	Rallidae	Fulicaatra
				Rallus aquaticus
		Columbiformes	Pteroclididae	Pteroclididae
			Columbidae	Columba livia
				Streptopelia decaocto
				Streptopelia senegalensis
		Passeriformes	Sturnidae	Sturnus vulgaris
				Acridotheres tristis
			Corvidae	Pica pica
				Corvus monedula
				Corvus frugilegus
				Corvus corone
		Corvus cornix		

According to the results obtained, out of 27 species of game birds identified in the Bukhara region and adjacent areas, the most common species in terms of species composition are the Anseriformes order with 8 species (29.6%), the Passeriformes order with 7 species (25.92%), the Columbiformes order with 4 species (14.81%), the Galliformes order with 4 species (14.81%), the Pelecaniformes order with 1 species (3.7%), the Ciconiiformes order with 1 species (3.7%), and the Gruiformes order with 2 species (7.43%). (Table 2).

The birds hunted in the Bukhara region and adjacent areas include 8 species belonging to 1 family (Anatidae) of the Anseriformes order, 7 species belonging to 2 families (Passeriformes, Corvidae) of the Passeriformes order, 4 species belonging to 2 families (Pteroclididae, Columbidae) of the Columbiformes order, 4 species belonging to 1 family (Galliformes) of the Galliformes order, 1 species belonging to 1 family (Phalacrocoracidae) of the Pelecaniformes order, and 1 species belonging to 1 family (Ardeidae) of the Ciconiiformes order. (Table 3).

Breeding of the species *Coturnix coturnix*, *Alectoris chukar*, *Ammoperdix griseogularis*, *Phasianus colchicus* has been established in the hunting farms of the Bukhara region

using the nursery method. In these studies, adaptations were observed in the large number of migrations of game birds during the seasons, wintering and nesting, and care for offspring. These adaptations are associated with the victory of game birds in the struggle for survival, their viability, and competitiveness.

The need to determine the species composition, number of birds being hunted, their migration routes, and the main habitats during the seasons, and to establish hunting ecotourism in the region, will create opportunities for the organization of new tourism destinations around the Zamobobo, Oyok-og'itma, Karakir, Shor'kul, and Tudakol reservoirs of our republic.

5. Conclusions

It is necessary to restore the number of rare species of game birds (*Pterocles orientalis*, *Phasianus colchicus zarudnyi*, *Ammoperdix griseogularis*, *Alectoris chukar*, *Botaurus stellaris*) in the Bukhara region and adjacent areas, acclimatize promising species, breed them in captivity, implement biotechnical measures, and establish industrial hunting to

increase the diversity of hunting objects and the economic efficiency of hunting farms.

It is equally vital to preserve the fauna and biodiversity of game birds in the Bukhara region and adjacent areas, to improve their distribution, number, bioecological characteristics, to reduce the impact of anthropogenic factors, to improve measures for the protection and sustainable use of species. Monitoring the state of the game bird population in the Bukhara region and adjacent areas, and to create a cadastral information base should also be considered.

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