

Effects of Climate Change on the Fauna of Sparrowhawks (Passeriformes) in Urbanized Ecosystems of Southern Kyrgyzstan

Kutmanaly Stamaliev^{1*}, Abdimannap Abdykaarov¹, Abdusattar Kulbaev², Kambarali Abdisarov³ and Abiba Samatova⁴

¹State University, Kyrgyzstan

²Kyrgyz-Uzbek University Batyraly Sydykov, Kyrgyzstan

³State Nature Reserve "Kulun-Ata", Kyrgyzstan

⁴Batken State University, Kyrgyzstan

*Corresponding Author

Kutmanaly Stamaliev, State University, Kyrgyzstan.

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Abstract

The paper reviews the impact of climate change on the fauna of sparrow-like (Passeriformes) birds in the urbanized ecosystems of southern Kyrgyzstan. The study was carried out by the method of linear transects (route counts). In the urbanized ecosystems of southern Kyrgyzstan, 84 species of sparrow-like birds belonging to 19 families and 34 genera are established. According to the nature of stay to the category of nesting belong-29, wintering-9, flying-9, flying-1 and sedentary-36 species. The transition of bird species into the category of "resident" previously considered a migrant species - yellow thrush (*Motacilla flava*) and nesting - common starling (*Sturnus vulgaris*), yellow-headed (*Motacilla citreola*) and masked thrush (*Motacilla personata*) is established. An analysis of the distribution of birds by biotope, their population density, quantitative indicators by seasons and the nature of their stay was conducted. The avifaunal shaping of the urban ecosystem mainly occurs at the expense of birds inhabiting natural and transformed biotopes of the urban environment. It has been proved that the formation of the ornithofauna depends on the nature of bird stay, seasonal migrations, abundance and nature of food, availability of nesting sites, 'disturbance factors. Their adaptation is directly related to the species of birds arriving from agricultural territories, hilly, steppe biotopes, sylvian, petrical landscapes. According to ecological groups, 16 species of birds belong to urbophiles, and 21 species - to urbophobes.

1. Introduction

In recent years, there has been a high population concentration in the biosphere in urban ecosystems, which are tremendously growing in population and also in area. Consequently, the urban ecosystem is quite special, evolutionarily new to any species of zoocenoses, as they all arose long before the appearance of various urbanized complexes on the planet. A feature of the urban ecosystem is also its biotopic structure from ecotones - transitional, intermediate zones between natural landscapes belonging to ecotonal ecology, the concept of which is still being formed [1,2].

The construction of cities occupies and urbanizes marginal forest, field, and steppe biotopes, and thus, disrupts animal communities. Zoocenoses that enter the new environment of urbanized complexes reacts to environmental intervention in two ways. Some species move into adequate biotopes past urbanized complexes directly during the construction of cities or sometime after its completion. Others - adapt to the urban environment: they choose for themselves such an urban biotope, which most meets their topical requirements.

The intended changes in zoocenoses, the way and degree of adaptation of individual animal species to the new environment and to man, the bio indicative, economic, economic, health value of animals, all this represents the basis for zoological studies in urbanized complexes. Likewise, the revitalization of cities by animals attractive to the urban population is studied, and, on the other hand, the importance of the urban environment for the preservation of certain species of animals, like for example sylvian and petrical.

Birds are the most abundant in terms of species diversity among other terrestrial vertebrates. Because of this, they occupy a large place in urbanized ecosystems. They, feeding on insects, rodents, causing damage to agriculture and forestry, adjust their numbers. Along with this, participating in the biological cycle of substances, energy transformations, maintaining ecological balance, perform the functions of edificers shaping the environment of urbanized ecosystems.

The bioecological features, species composition, and distribution across urbanized landscapes of sparrow hawks have been studied by many researchers [3-6]. According to Yu. -H. Chon et al. sparrow population density is a crucial factor in habitat use [7]. In the conditions of Belarus, on the example of the city of Grodno, species diversity of the order of sparrow hawks (Passeriformes) of urbanized territories in different seasons of the year was revealed [8].

In connection with the fact that zoological research of urbanized complexes takes the first place worldwide. The study of sparrow hawks on species composition, distribution across biotopes, numbers, nature of their stay and avifaunal formation in urbanized ecosystems of southern Kyrgyzstan determines the relevance of the conducted research.

2. Research Materials and Methods

The urbanized ecosystems of southern Kyrgyzstan - the cities of Osh, Jalal-Abad, Kyzyl-Kiya, Tash-Kumir, etc., are spread out in the Fergana Valley in the foothills of the mountain ranges of

Chatkala, Fergana, Alaya, Turkestan, which are part of the Turan Province, and are located on the 58 -1 110 m above sea level. The landscape type is semi-desert, dry subtropical. Climatic features: the average temperature in January -3-8 ° C, in July +24-30.5 ° C, the level of annual precipitation is - 30-468 mm. The cities are surrounded by hills, steppes and farmland.

The internal structure of urban ecosystems - soil, climate, anthropogenic noxes, plants and other biotopes consists of zoocenoses matched by their biotopic characteristics. Their internal structure consists of the central part (multi-storey houses, one- and two-storey houses, parks, squares, green fences along the road, riparian ecotones of rivers, canals); landfill sites; agricultural areas; hilly-steppe part and mosaic habitat.

The research was conducted in the cities of Osh, Jalal-Abad, Tash-Kumyr and Kyzyl-Kiya. The study sites were selected based on their similar physico-geographical features and biotopic structures. By classifying similar systems according to the internal structure, in the features of these cities we identified 7 biotopes (Table 1).

Explored cities	No	Biotopes	Characteristic
Osh Jalal-Abad Tash-Kumyr Kyzyl-Kiya	1.	Multi-Storey Buildings (M.E.D.)	Multi-storey buildings. Artificial ground cover (asphalt, concrete) - 60-80%.
	2.	One-two-Storey Houses (O.D.E.D.)	One- and two-story houses built on the outskirts of the city and their rural and livestock complexes. Artificial ground cover (asphalt, concrete) - 40-60%.
	3.	Green Zones (GZ)	Parks, squares, alleys and perennial trees. Artificial ground cover (asphalt, concrete) is 5-10%.
	4.	Recreational Areas (RA)	City water basins, recreation areas and resort areas. Coastal ecosystems: Ak-Buura, Kok-Art, Naryn, Isfayram-Sai rivers.
	5.	Landfill Sites (LWS)	City garbage dumps and garbage sites inside the city. In this biotope there is little "disturbance factor" for zoocenoses.
	6.	Agricultural Lands (A.H.T.)	Crop fields for growing crops around the city.
	7.	Hills, Steppes (H.S.)	Hills, wastelands, altered steppes, areas for grazing cattle and hayfields, cemeteries and various quarries, etc., surrounding the city.

Table 1: Biotope Structure of Urbanized Ecosystems

The study of sparrowhawks was carried out comprehensively (species composition, biotope distribution, abundance, seasonal distribution, stay pattern, faunal formation features) using the method of linear transects where route records were deposited to determine quantitative indicators on 7 biostatic sites. The distance between transects was 4-9 km, and the width of the route - 100 m (50 m left and right). Determination methods were used to determine the species composition. Number counting was performed visually and audibly. Statistical calculations were carried out with the help of the programs "Statist", "Stat processing" [9-11].

The research materials were collected by the authors from 2019 to 2023 during 22 expeditions and 510 walking routes with a total length of 1,806 km. During the census period, 158,953 individual birds belonging to 84 sparrow species were counted. Laboratory-

chamber treatments of the collected material were performed at the Department of Zoology, Ecology and Bioengineering of Osh State University.

3. Results and Discussions

The process of urbanization invariably leads to a drastic change in the former natural ecosystems. In order to address these concerns, we selected the widespread sparrow-like (Passeriformes) birds, considered to be the most biologically diverse, as the object of study. Of all the known species of birds in the biosphere (about 9 thousand), sparrows account for 63% (5,120 species). There are 391 species of birds in Kyrgyzstan, of which sparrows account for 183 species (46.9%), and 84 (45.9%) species of these birds occur in the urbanized ecosystems of the south of Kyrgyzstan. According to our data, in 7 biotopes, the dominant position is

occupied by the field sparrow (*Passer montanus* (Linnaeus, 1758)) -(28.26%), and the subdominant is the maina (*Acridotheres tristis* (Linnaeus, 1766)) -(18.47%). Background species recorded: common starling (*Sturnus vulgaris* Linnaeus, 1758)-(7.07%), tick (*Pyrrhocorax graculus* (Linnaeus, 1766))-(4.44%), grasshopper (*Corvus frugilegus* Linnaeus, 1758)-(4.03%), magpie (*Pica pica* (Linnaeus, 1758))-(2.52%), house sparrow (*Passer domesticus* (Linnaeus, 1758))-(2.32%), Spanish sparrow (*Passer hispaniolensis* (Temminck, 1220))-(2.01%) and black thrush (*Turdus merula* Linnaeus, 1758)-(1.71%).

3.1 Distribution of Sparrow Hawks Across Biotores

• Biotope of High-Rise Buildings

This area is called the central part of the city or "asphalt". As a result of the surveys, 61 sparrow species were recorded, of which, field sparrow is dominant (46.64%), maina is subdominant (16.34%). Sparrow-like birds of this biotope make up 33.3% of all sparrow-like birds in Kyrgyzstan, and their share in the urbanized areas we studied was 72.6%.

• Biotope of One- to Two-Story Houses

There are 77 species (91.7%) of sparrows. Field sparrow is dominant (35.88%), mine (17.79%) is subdominant.

• Biotope of Green Zones

In this biotope, 69 species (82.14%) were recorded, where the dominant position was occupied by the Field Sparrow (24.04%) and the subdominant by the Mayna (17.6%).

• Biotope of Recreational Areas

Due to the fact that this biotope is a natural, or semi-anthropogenic biocenosis, sparrowhawks have the richest species diversity here - 79 species, where the field sparrow is dominant (19.57%) and the maina is subdominant (16.75%).

• Biotope Garbage Dumps

There are 37 species identified here. Dominant mine (24.94%), subdominant field sparrow (18.73%) and common starling (18.42%).

• Biotope of Agricultural Territory

There were 71 species recorded here, of which Field Sparrow was dominant (35.67%) and Mayna (13.68%) was subdominant.

Biotope of hilly, steppe areas. species were established, where the dominant is - mine (13.47%), subdominants: snow wren (7.43%),

gray crow (6.79%), tick (6.65%) and crow (5.99%) %).

3.2 Feature of Population Density by Biotope (Individual/km²)

This section reports sparrow population density data by biotope. So, 26 species out of 84 are found in all biotopes of the urban ecosystem, indicating the complete adaptation of these species to the environment and conditions of the urban ecosystem. However, according to the nature of the stay they belong to different categories.

Field sparrows and minnows have the highest population densities in all biotopes. Correspondingly, their density ranges from 12.41±1.27 to 279.88±1.72 and from 16.34±0.24 to 144.9±1.79 individuals per km². The dominant two species by population density show the suitability of the ecological niche of the urban ecosystem for nesting and breeding. The most convenient biotopes for sparrowhawks are recreation areas and territories of one- and two-story houses.

3.3 Seasonal Distribution and Population Density (Person/km²)

As the seasons change, sparrowhawks migrate from one territory to others. Some arrive in winter (overwintering), others for nesting arrive in spring and summer (nesting), and a third species lives year-round (sedentary). This section provides the seasonal species composition and population density of sparrowhawks in different biotopes of urbanized ecosystems.

• Biotope of High-Rise Buildings

Of the 61 species established, 32 (38.1%) species occur here in winter, 49 (58.3%) in spring, 45 (53.6%) in summer and 44 (52.4%) species in autumn (Fig. 1). In winter, the dominant position is occupied by field sparrows 106.33±2.18 individuals; subdominant - mine 92.0±1.46 individuals. Along with this of the number of sparrow-like in winter the population density was the common starling - (7.42%) - 45.00±1.06, house sparrow - (5.3%) - 32.17±0.91, gracha (4.01%) - 24.33±0.80 individuals. The spring density of the dominant species - Field Sparrow is 146.8±1.58 individuals, the subdominant - Maina 133.0±1.5 individuals. In summer, the density of the dominant field sparrow species is 157.63±2.38 individuals and that of the subdominant maina species is 71.13±1.85 individuals. In autumn, the dominant field sparrow is 137.8±2.6 individuals, the subdominant maina is 65.0±2.10 individuals.

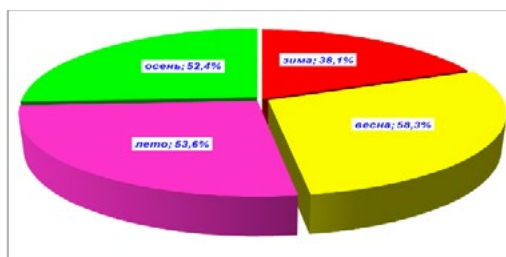


Figure 1: Seasonal Distribution of Bird Species in the High-Rise Building Biotope

• Biotope of One- to Two-Story Houses

There are 77 species, including 32 (38.1%) in winter, 53 (63.1%) in spring, 54 (64.3%) in summer and 44 (52.4%) in autumn. Sedentary species occur -17. Winter dominant is field sparrow - 262.6±2.19 individuals, subdominant may - 78.9±1.57 individuals. In spring, the dominant field sparrow had 386.8±1.78 individuals and the subdominant maina had 157.5±1.42 individuals. In summer, the dominant field sparrow - 224.9±1.57 individuals, the subdominant myna - 132.8±1.29 individuals. In autumn, dominant field sparrow - 147.7±2.54 individuals, subdominant maina 69.6±2.03 individuals.

• Biotope of Green Zones

Of the 69 species, 41 (48.8%) species occurred in winter, 51 (60.7%) in spring, 36 (42.9%) in summer, and 44 (52.4%) in autumn (Fig. 3.3). In winter, the dominant species are field sparrows - 29.55±1.88 individuals, the subdominant birds - 24.7±1.74

individuals. In spring, dominant field sparrows are 189.5±2.09 individuals, subdominant in May 85.5±1.61 individuals. In summer, dominant field sparrows - 85.13±2.4, subdominant mine 76.5±2.4 especially. In autumn, dominant minnows 37.67±3.02, subdominant field sparrows 28.50±2.71 individuals.

• Biotope of Recreational Areas

There are only 79 species recorded here. Of these, 32 (38.1%) species occurred in winter, 66 (78.6%) in spring and summer, and 62 (73.8%) in autumn (Fig. 2). 21 species is sedentary. Dominant in winter is field sparrow 133.53±3.07, subdominant mayna - 40.1±2.20 individuals. In spring, dominant field sparrows are 81.08±2.56, subdominant in May 52.2±1.2 individuals. In summer, dominant are field sparrow - 69.25±2.23, subdominant mine - 54.6±2.03 respectively. In autumn, dominant - field sparrows 50.86±2.76, sub-dominant - mine 36.81±2.44 respectively.

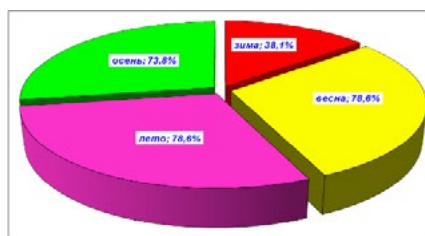


Figure 2: Seasonal Distribution of Bird Species in the Biotope of Recreational Areas

• Biotope Garbage Dumps

8 species out of 37 are found in all seasons. Although the species composition is lower than in other biotopes, the number is much higher as the food base is richer here. The numerical distribution of species was as follows: winter - 15 (17.9%), spring - 30 (35.7%), summer - 22 (26.2%) and autumn - 16 (19.1%) species. In winter, the dominant species is maina 326.08±1.23, subdominants are common starling 267.1±1.15, field sparrow 267.3±1.15 individuals. In spring, the dominant species - Mayna - 115.13±2.20, subdominant - Field Sparrow - 85.13±1.99 individuals. In summer - dominant species - mine 26.63±3.50, subdominant - field sparrows 22.44±3.28 and house sparrows 21.69±3.23 respectively. In autumn, Black-breasted Sparrow is dominant with 169.50±1.17, Mayna with 137.67±1.65 and Starling with 126.67±1.60 individuals are subdominant.

In spring, dominant - field sparrows 93.3±2.53, sub-dominant - starlings 42.25±0.89 and mayna 39.50±1.83 individuals. In summer, dominant field sparrows 160.13±2.23, subdominant maina 56.0±1.53 individuals. In autumn, dominant - field sparrows 94.83±3.02, subdominant - mine 61.17±2.67 individuals.

• Biotope of Hilly, Steppe Areas

Fifty species were recorded, of which 30 (35.7%) species occurred in winter, 32 (38.1%) in spring and autumn, and 27 (32.1%) species in summer (Fig. 3). Winter dominants are snowy owl 63.85±2.34, subdominant gray crow 43.08±2.01 respectively. Spring dominant - mine 52.06±2.24, subdominant crows 24.7±1.63 and tick 21.76±1.54 individuals. In summer, dominant - mine 42.63±2.37, subdominant - house sparrow 31.4±2.09 individuals. In autumn, the dominant are: the tick 29.46±2.0, the mine 29.46±2.0, the grasshopper 27.14±1.93 and the lark 23.39±1.81, the subdominants are the common starling 17.50±1.59, field sparrow 16.25±1.53 and gray crow 14.46±1.45 individuals.

• Biotope Agricultural Territory-Counts 71 Species

In winter, 31 species, dominant - field sparrow 117.65±2.54, subdominant - tick 43.8±1.8 and mayna 38.68±1.69 individuals.

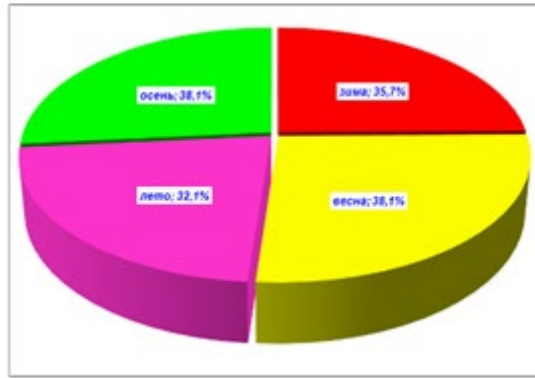


Figure 3: Seasonal Distribution of Bird Species in the Biotope of Hilly, Steppe Areas

• The Nature of the Sparrow's Stay

In science, there are the following categories of bird stay: nesting (B); wintering (W); flyers, or migrants (M); flying, or visitors (V) and settlers (BW). Nesters are species that fly into specific biotopes in the spring and summer, nest, fledge, breed, and fly again in the fall; wintering - species found only in winter; flyers - birds flying through certain biotopes; fliers, or visitors - species accidentally arriving in biotopes and flying away quickly; sedentary are species inhabiting specific biotopes throughout the year [12,13]. Based on the collected materials, questions are addressed through which stay categories the formation of sparrowhawk avifauna occurs (Table 2).

In the course of the research, it has been established that those bird species belonging to the 'nesting' category ('B') occur in winter and complement the 'sedentary' ('BW') category. These include: masked woodpecker (*Motacilla personata* Gould, 1885) in 2020,

2021, 2022, 2023, in all biotopes; yellow woodpecker (*Motacilla flava* Linnaeus, 1758) in 2019, 2021, 2023, in biotopes of one- and two-story houses, green and recreational areas, agricultural and hilly, steppe areas; yellow-headed woodpecker (*Motacilla citreola* Pallas, 1776) in 2019, 2020, 2022, in high-rise building biotopes and recreational areas; common starling (*Sturnus vulgaris* Linnaeus, 1758) in all biotopes. Together with this, it is proven that the grasshopper (*Corvus frugilegus* Linnaeus, 1758) as a "sedentary" ("BW") species occurs in the urban ecosystem only in winter and early spring, indicating its transition to the "wintering" ("W") category.

Summarizing the obtained data, it should be noted that out of 84 species of sparrows found in different biotopes of the urban ecosystem, 29 species constitute the category of "nesting", 9- "wintering", 9- "spanning", 1- "flying" and 36- "eating" (Fig. 4).

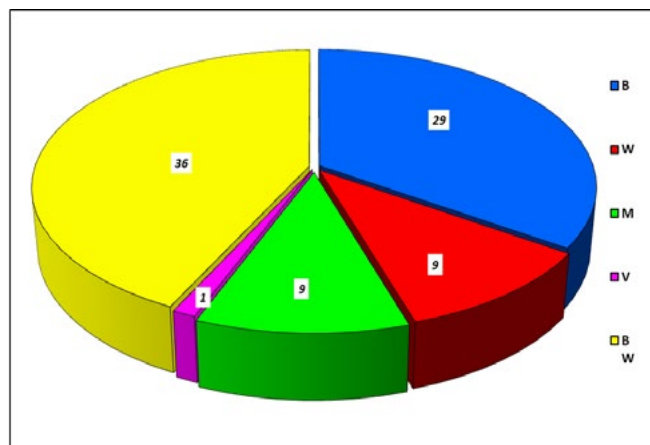


Figure 4: Nature of stay and number of sparrow species in urbanized ecosystems: "B"-Nesting; "W"-Wintering; "M"-Spans; "V"-Inlets; "BW"-Settled

No	Family	Number of Species	Of these, the Number of Species				
			"B" (Nesting)	"W" (Wintering)	"M" (spans)	"V" (Flights)	"BW" (Seated-lye)
1.	Swallows (Hirundinidae)	4	4	-	-	-	-
2.	Jaws (Alaudidae)	3	1	-	1	-	1
3.	Motacillidae (Motacillidae)	5	2	-	1	-	2
4.	Magpies (Laniidae)	4	3	-	1	-	-
5.	Willows (Oriolidae)	1	1	-	-	-	-
6.	Starlings (Sturnidae)	3	1	-	-	-	2
7.	Crows (Corvidae)	7	-	2	1	-	4
8.	Cinclidae	2	-	-	-	-	2
9.	Nettleworms (Troglodytidae)	1	-	-	-	-	1
10.	Prunellidae	2	-	-	-	-	2
11.	Slaviidae (Sylviidae)	6	-	-	3	-	3
12.	Thrushes (Turdidae)	13	7	2	1	-	3
13.	Remizidae (Remizidae)	1	1	-	-	-	-
14.	Ticks (Paridae)	5	-	-	-	-	5
15.	Crawlers (Sittidae)	1	-	-	-	-	1
16.	Certhiidae (Certhiidae)	2	2	-	-	-	-
17.	Sparrowhawks (Passeridae)	6	2	-	-	-	4
18.	Sparrowhawks (Fringillidae)	12	3	4	-	-	5
19.	Oats (Emberizidae)	6	2	1	1	1	1
Bcero:		84	29	9	9	1	36

Table 2: Sparrowhawk Occupancy Categories in Urbanized Ecosystems

• Nesting

It was determined that in the biotopes of the urban ecosystem, 29 (34.5%) species belong to the category of ‘nesting’. As shown in Table 2, the bird species of this category have relatively high abundance than the other categories. Basically, this category is formed by representatives of nesting and sedentary.

• Wintering

In the biotopes of the urban ecosystem, “overwintering” sparrows account for 9 species (10.7%) and are replenished by birds arriving in late autumn as well. These include: crow (*Corvus frugilegus*), gray crow (*Corvus cornix*), heron (*Erythacus rubecula*), black-eared thrush (*Turdus atrogularis*), woodpecker (*Fringilla coelebs*), woodpecker (*Fringilla montifringilla*), spinus (*Spinus*), common spinus (*Carduelis carduelis*) and common oat (*Emberiza citrinella*). “Overwintering” arrive in urban ecosystems for hibernation in the month of October and fly away in March. In this study, the species composition and population density of sparrowhawks in spring and autumn were analyzed.

• Spans

In different biotopes, 9 species (10.7%) of sparrowhawks were recorded as migrants. This category includes: steppe lark (*Melanocorypha calandra*), yellow woodpecker (*Motacilla flava*), common woodpecker (*Lanius collurio*), alpine tick (*Pyrrhocorax graculus*), freckle (*Phylloscopus trochilus*), shadow lark (*Phylloscopus-bill*). (*Phylloscopus inornatus*), common bittertail

(*Phoenicurus phoenicurus*), and garden oat (*Emberiza hortulana*).

• Flying

In the biotopes of the urban ecosystem, only one species of this category occurs - oat-remez (*Emberiza rustica*), which was recorded during the census in 2019, 2020, 2022, 2023. If we consider the biotopes, this species is observed in the area of apartment buildings and green areas - in spring, in the biotope of recreational areas - in winter, spring and summer, and in hilly, steppe territories - in winter.

• Sedentary

This category contains 36 species of 14 families. Formation of the sparrow fauna. Earlier, the territories of cities were natural landscapes. As a result of urbanization processes, urban ecosystems and different biotopes have been formed [14,15].

The formation of the sparrowhawk fauna in the urban ecosystem occurs also as in natural ecosystems and is directly related to different stay categories and ecological groups of birds: urbophiles, dendrophiles, sclerophiles, limnophiles, campophiles. In other words, the ornithofauna is created at the expense of representatives of these groups.

In the studied biotopes, the species composition and abundance of urbanized ecosystems have the following indicators: multi-storey houses - 61 species, the total number of recorded individuals -

24,374, one-two-storey houses - 77 species, individuals - 32,890, green zones - 69 species, individuals - 12 764, recreational zones - 79 species, individuals - 21 137, garbage dumps - 37 species,

individuals - 41 528, agricultural territories - 71 species, individuals - 15 367 and steppe territories - 500 species, individuals - 10,893 (Figures 5 and 6).

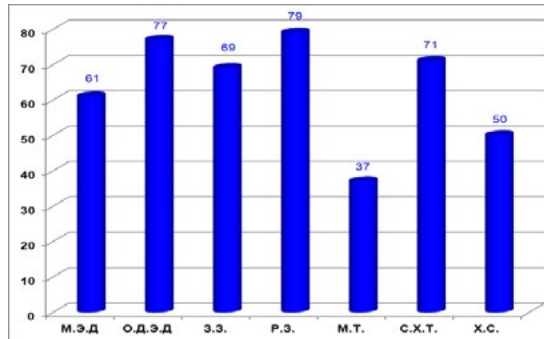


Figure 5: Number of Sparrowhawk (Passeriformes) Species by Biotope

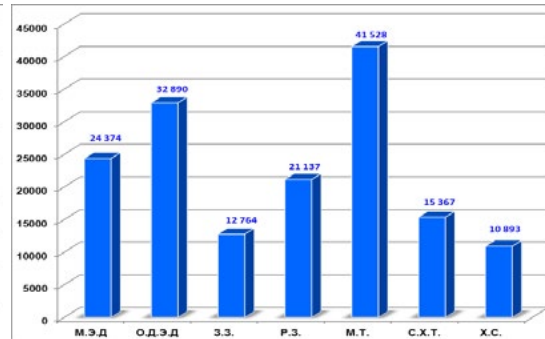


Figure 6: Absolute Number of Sparrowhawk (Passeriformes) Individuals by Biotope

In 5 biotopes out of 7, Field Sparrow (*Passer montanus*) is dominant (multi-storey houses, one- and two-storey houses, green areas, recreational areas, and agricultural land), and in one biotope (garbage dumps) is subdominant. Mine (*Acridotheres tristis*) is dominant in 2 biotopes - garbage dumps and hilly, steppe areas. In 4 biotopes (one- and two-storey houses, green areas, recreational areas and agricultural territory) occupies a subdominant position. The common starling (*Sturnus vulgaris*) in biotopes of high-rise buildings and garbage dumps, and the snowy owl (*Montifringilla nivalis*) in hilly, steppe areas are subdominant. Background species

on biotopes have the following indicators: multi-storey houses - 10 species, one-two-storey houses - 16, territories of green and recreational zones - 20, areas of garbage dumps - 9, agricultural territories - 16 and hilly, steppe territories - 18.

When distributing the birds found in the urban ecosystem into ecological groups, it was found that out of the 84 species inhabiting urbanized ecosystems, 16-urbophiles and 21-urbophobes. The remaining 47 sparrowhawk species belong to different ecological groups (Table 3).

No	Urbophiles	No	Urbophobes
1.	Rustic Swallowtail (<i>Hirundo Rustica</i>)	1.	Hooded Lark (<i>Galerida Cristata</i>)
2.	Red-backed Swallowtail (<i>Hirundo Daurica</i>)	2.	Turkestan Woodpecker (<i>Lanius Phoenicuroides</i>)
3.	Urban Swallowtail (<i>Delichon Urbica</i>)	3.	Long-tailed Magpie (<i>Lanius Schach</i>)
4.	Yellow thrush (<i>Motacilla Flava</i>)	4.	The Black Magpie (<i>Lanius Minor</i>)
5.	Yellow-Headed Woodpecker (<i>Motacilla Citreola</i>)	5.	Common Willow (<i>Oriolus Oriolus</i>)
6.	The Masked Woodpecker (<i>Motacilla Personata</i>)	6.	Magpie (<i>Pica Pica</i>)
7.	Common starling (<i>Sturnus Vulgaris</i>)	7.	Crow (<i>Corvus Corax</i>)
8.	Pink Starling (<i>Sturnus Roseus</i>)	8.	Nettles (<i>Troglodytes Troglodytes</i>)
9.	Mine (<i>Acridotheres Tristis</i>)	9.	Southern Nightingale (<i>Luscinia Megarhynchos</i>)
10.	Corvus Monedula	10.	Red-Necked tit (<i>Parus Rufonuchalis</i>)
11.	Grach (<i>Corvus Frugilegus</i>)	11.	The Prince (<i>Parus Cyanus</i>)
12.	Gray Crow (<i>Corvus Cornix</i>)	12.	Yellow-breasted Princess (<i>Parus flavipectus</i>)
13.	Black Thrush (<i>Turdus Merula</i>)	13.	The Bukhara tit (<i>Parus Bokharensis</i>)
14.	The House Sparrow (<i>Passer Domesticus</i>)	14.	Stenolase (<i>Tichodroma Muraria</i>)
15.	Field Sparrow (<i>Passer Montanus</i>)	15.	Indian Sparrow (<i>Passer Indicus</i>)
16.	Zyablik (<i>Fringilla Coelebs</i>)	16.	Spanish Sparrow (<i>Passer Hispaniolensis</i>)
Total: 16 Species		17.	Stone Sparrow (<i>Petronia Petronia</i>)
		18.	Fringilla Montifringilla
		19.	Spinus Spinus
		20.	Gray-Headed Woodpecker (<i>Carduelis Caniceps</i>)
		21.	Prosyanka (<i>Emberiza Calandra</i>)
		Total: 21 Species	

Table 3: Ecological Groups of Sparrows

Of the sparrowhawks found in urbanized ecosystems, 19.04% were urbophiles and 25.0% were urbophobes. The remaining species are included in the ecological groups: Dendrophylla, Sclerophylla, Limnophylla, Campophila.

4. Conclusion

In the urbanized ecosystems of southern Kyrgyzstan, 84 species of sparrow-like birds belonging to 19 families and 34 genera are established. According to the nature of stay to the category of nesting belong-29, wintering-9, flying-9, flying-1 and sedentary-36 species.

According to population density, the dominant species in the biotopes of multi-storey houses, one- and two-storey houses, green areas, recreational and agricultural areas is the field sparrow (*Passer montanus*) and the subdominant maina (*Acridotheres tristis*). In the biotopes of garbage and hilly, steppe territories, the dominant is the minnow (*Acridotheres tristis*), the subdominants are the common starling (*Sturnus vulgaris*), the field sparrow (*Passer montanus*), the hoary sparrow (*Galerida cristata*), the woodpecker (*Corvus monedula*) and the snowdrop (*Monedula*).

In terms of number of individuals, the highest values (303.4±1.19; 1,267.5±1.74 individuals/km²) were established in biotopes of garbage dumps and hilly, steppe areas. Note that the highest species counts by season were observed in recreational areas: winter-32, spring and summer-66, autumn-62 species.

Field sparrows (*Passer montanus*) and maina (*Acridotheres tristis*) were found to have the highest population density (279.88±1.72 and 144.9±1.79 individuals/km², respectively) in all studied biotopes.

It has been proved that the formation of the ornithofauna depends on the nature of bird stay, seasonal migrations, abundance and nature of food, availability of nesting sites, 'disturbance factors. Their adaptation is directly related to the species of birds arriving from agricultural territories, hilly, steppe biotopes, sylvian, petrical landscapes. According to ecological groups, 16 species of birds belong to urbophiles, and 21 species - to urbophobes.

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