

Ecological Factors That Determine the Species, Composition, Distribution and Number of Synanthropic Birds in the Urban Landscapes of South-Western Kyzylgum

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Abstract The ecological factors determining the species composition, distribution and number of synanthropic birds in the urban landscapes of South-Western Kyzylgum, as well as the results of research on the adaptation of synanthropic species to humans, their efforts to reach food resources, and adaptation to breeding and wintering in urban landscapes are presented.

Keywords Synanthropus, Urbolandscape, Urboecotism, Anthropogenic, Abiotic factors, Biocenotic, Urbanization, Solidarity

1. Introduction

It is permanent evolutionary process that birds occupy urban landscapes and adapt to living there. Especially, coming years, the participation of biodamages which are inseparably linked with the behaviour of synanthropic species in urban landscapes is essential with determining species composition, distribution and ecological factors determining the number of these species, serving to optimize relationship between humans and birds.

Data analysis in sources confirms that in any region, synanthropic species have a similar characteristic of factors determining species composition, distribution and number [1,2]. In our researches, in determining species composition, distribution and number of synanthropic fauna, it was identified that abiotic, biotic and anthropogenic factors are involved.

In recent years, global ecological problems that have been generally recognized can be indicated as abiotic factors. The studied ecosystem belongs to the Kyzylgum desert, and factors such as global warming and desertification play an important role in the transformation of living organisms, including bird fauna. These factors cause the extremes of climatic factors in the natural habitats of species and their aspiration to human habitats and, as a result, synanthropization. In the South-western Kyzylgum some biotic factors, for example the complexity of trophic, topical and other biocenotic relationships in the habitats of birds, the intensification of competition arising in these relationships is vital in the entry

of species into urban landscapes.

The anthropogenic factors have direct and indirect impact on the synanthropization of species these factors play a leading role in determining the modern status of synanthropic birds. New residential addresses, including establishment of new cities, expansion of the area occupied by cities, increasing the rate of population in there, expansion of economic activities have made several facilities for synanthropic species. Different conditions which were established by humans, including food resource play a key role in this position. Data on the synanthropization of the field sparrow in eastern Chukotka confirm this [5].

Artificial feeding of birds, creation of various amenities for their reproduction and recreation, the presence of diverse biotopes with mosaic features in residential areas, including cities, etc. serve to attract birds to urban landscapes. In South-western Kyzylgum, during the synanthropization of species like turtle-dove and village swallow, it is important to defend these species by population based on the national facilities too. In Mongolia, it was found that ethnic traditions play an important role in the adaptation of birds to humans. In this place, birds are not hunted or worn, and villagers evaluate the abundance of birds around houses as the wealth and peace [4,6].

2. Materials and Methods

In urban ecosystems, the scale, location and architecture of building structures, green spaces and water bodies play an essential role in species composition and number of synanthropic birds.

Along with ecological factors in determining the species composition, distribution and number of synanthropic birds in certain urban landscapes, the individual characteristics of each species, i.e. the adaptations of birds to breeding, feeding, wintering, roosting and resting in urban landscapes, are important. Each species has its own behavioral reactions to humans and other environmental factors (influencers), and the ecological resilience of this species is determined by the development of a number of adaptive reactions that serve to ensure its survival in urban landscapes.

3. Result and Discussion

In our view, this character in synanthropic species will be better formed than the others, and so they can live with humans. Examples of such adaptive behaviors include:

1. Adaptation of synanthropic birds to humans. In the scientific literature, there are a lot of materials on the specific adaptations of birds in their habitats, including cities [7,8,9,11]. These adaptations appear in adaptations such as avoiding a dangerous object and estimating the escape distance in birds. This kind of adaptations will be formed because of multiple connections of birds with people and other objects. If these connections become positive, the startling of birds decreases, the distance they approach humans and other objects (livestock, poultry, moving and stationary vehicles, etc.) is reduced, and in some species, it may disappear completely. Of course, since this adaptation is different in each species, the distance of the startle is also different.

Panic escape distances are considered as important criteria to determine the level of endurance of birds to disturbing factors which are occurred by humans and other objects.

During the researches, it was found that the distance of escape of the same species in different conditions and at different stages of life is different. For example, in Bukhara city, in winter season, blue pigeons bring a person closer to them up to 3-4 meters. In some places of Tashkent, this distance is 0,5-1 meter. In Tashkent, this situation is related to the fact that the blue dove sometimes specially feeds other birds, especially in the winter season.

During researches, the behaviour of synanthropic birds to livestock, poultry and other domesticated animals was learnt and analysed. Livestock and poultry farming are relatively well-developed industries in the research area and here birds are often associated with livestock and poultry in biocenotic relationships such as "solidarity" and "symbiontism". Especially, in winter season, active participation of species like maynah and field sparrow in this process was recorded. At this time, blue pigeons are more afraid of people than livestock, and their participation in this process is relatively weak. This situation is explained by the fact that they have an increased reaction of "fleeing from a dangerous object" due to the fact that they are caught many times by the population.

All synanthropic species are afraid of dogs especially cats rather than livestock and in this situation, they keep an appropriate distance strictly by "estimating the escape distance" and they warn each other from the danger(maynah

birds). This can be explained by the fact that the listed species pose a greater threat to birds.

Vehicles also play an important role in the synanthropization of birds, as an ecological factor determining their species composition, distribution and number. Starle escape distance from technique means is little rather than distance from a person. In rural areas, it is noted that maynah birds and crows feed very close to tractors working on the land. They are adapted to noise as they feed on insects spooked by tractors and larvae and fungi from overturned soil. This kind of adaptations can be observed around the highways. They are attracted here by insects injured by car collisions and other food items spilled on the road. Adaptations are also observed regarding stationary equipment in grain storage, processing enterprises and mills.

2. Actions for receiving food resources. Its role as an ecological factor determining the formation, type, composition and density of synanthropic fauna in the urban landscape can be assessed by the abundance of food resources in terms of quality and quantity and relative ease of access. In the regions of Kyzylkum, sharply reduction and the difficulty of reaching of food resources are observed in natural ecosystems especially winter and early spring. In this period, in summer and autumn seasons, around residential areas, synanthropic eater species are concentrated in rural and urban areas.

Household waste of the population, various food enterprises, especially in grain production enterprises, their accumulation in large numbers is noted. This process makes it easier not only to find food, but also to reach it. This kind of features are noted in Western Zabaykalskiy and other regions too.

3. Adaptations of the synanthropic species to reproduction in urban landscapes. In studied regions, blue pigeon (*Columba livia*), musica (*Streptopelia decaocto*), turtle-dove (*Streptopelia senegalensis*), black cliff swallow (*Apus apus*), village swallow (*Hirundo rustica*), simple starling (*Sturnus vulgaris*), maynah(*Acridotheres tristis*), magpie (*Pica pica*) and rook (*Corvus frugilegus*) in objects of completely anthropogenic origin adapted to nesting, the field sparrow breeds in nesting places of partially natural origin (holes dug by various birds and other animals), but these are also located close to residential areas. Participation in nesting and reproduction in objects of anthropogenic origin is formed as a result of changes in natural evaluative adaptations of birds.

In such places, choosing a suitable nesting site, building a nest, laying eggs, and raising chicks is accomplished by the development of a series of adaptations in synanthropic birds. Examples of such adaptations include the atypical location of the nests of the studied species, the presence of materials of anthropogenic origin in the nest, the extension of the reproduction period, and the construction of nests in the form of a colony.

Antipic nest location is evident in species such as blue pigeon (*Columba livia*), musica (*Streptopelia decaocto*), turtle-dove (*Streptopelia senegalensis*), black cliff swallow (*Apus apus*), village swallow (*Hirundo rustica*), simple starling (*Sturnus vulgaris*), maynah (*Acridotheres tristis*) and

magpie (*Pica pica*).

In all the studied nests of the, the meeting of materials of simple starling (*Sturnus vulgaris*), maynah (*Acridotheres tristis*), magpie (*Pica pica*) and rook (*Corvus frugilegus*) anthropogenic origin was noted.

It is well known that meeting a large number of birds in a small area leads to a shortage of nesting sites, which leads to increased competition for nesting sites. Synanthropic species are also adapted to such a situation.

Antipic nesting may not be detrimental to synanthropic species. But in recent years, especially new technologies used in the construction of residential buildings, its facade, etc., have led to a sharp decrease in the nesting places of species such as the country swallow and the tern in cities and even in villages. A similar situation was observed in North-West Siberia in the change of nesting sites of the magpie and in other cities.

4. Adaptations of synanthropic species to overwintering in urban landscapes. Synanthropic species are protected against other species in unfavorable conditions, especially severe cold and long-lasting snow cover. Blue doves in different attics of buildings, rook in tall and thick trees, in shelters of various structures and in trees organize night colonies. Such arrangement of nocturnal colonies leads to manifestation of "group effect" in synanthropic species. In 2023, 42 nocturnal colonies were recorded in the parks of the city of Bukhara, Kogon, Jondor and other district centers, in the porches and attics of markets and similar structures. In the largest of such colonies, it was found that the number of blue pigeons is 120, crows are more than 2000, and blackbirds are around 600.

4. Conclusions

By comparing the distribution characteristics and numbers of birds in old and new cities with different levels of urbanization, it is possible to determine their adaptation levels to urban landscapes. For example, among the synanthropic species are the black sparrowhawk (*Apus apus*), the common shrew (*Sturnus vulgaris*), the plover (*Pica pica*) and of the crow (*Corvus cornix*). In the city of Uchkuduq, which is relatively new, black crane (*Apus apus*) and of the stingray (*Pica pica*).

Meeting in Zarafshan city was not recorded. This situation confirms that the level of adaptation of these species is low compared to other studied species (*musica*, *kumri*, field sparrow, etc.).

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