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NATURAL SIGNIFICANCE OF SOME BURROWING BIRD SPECIES IN UZBEKISTAN

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Abstract
This article examines the ecological role of widespread burrowing bird species in Uzbekistan, including the European roller (Coracias garrulus), European bee-eater (Merops apiaster), Blue-cheeked bee-eater (Merops persicus), and Sand martin (Riparia riparia), which construct nests by digging burrows in the soil. Their significance in biocenoses is analyzed through their involvement in bioturbation processes and various forms of biocenotic interactions, including commensalism and predation. Special attention is given to the impact of bioturbation on the physicochemical properties of soil and its fertility, as well as the role of burrows for other species. The need for further research to develop effective conservation measures for these species is emphasized.

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Keywords: biocenosis, commensalism, bioturbation, predation, topical interactions, trophic interactions.

Introduction

In the scientific literature, data on the ecological significance of burrowing birds are extremely limited. In Uzbekistan, this issue has been scarcely studied [3, 5, 6, 9, 10, 11]. Among birds, there are many species that build nests directly on the ground surface or in existing depressions. However, species that independently dig soil to construct nests, known as burrowing birds, are extremely rare. In Uzbekistan, such species include breeding (B-breeding) and widespread species such as the European Roller (Coracias garrulus), European Bee-eater (Merops apiaster), Blue-cheeked Bee-eater (Merops persicus), and Sand martin (Riparia riparia). By digging burrows in the soil, these birds actively contribute to the formation of biocenotic relationships and bioturbation processes. As a result, the physical and chemical properties of the soil are altered, its fertility is enhanced, and the burrows they create are used by other species for shelter and nesting [1, 2, 4]. Based on the above, studying the ecology of birds that dig burrows for nesting (burrowing birds) and assessing their significance in nature is of current importance.

Materials and Methods

Materials related to this study were collected from 2022 to 2025 in various regions of Uzbekistan (Tashkent, Samarkand, Bukhara regions, and others) at the sites of breeding colonies of burrowing birds (n=26) and their feeding areas. The location of breeding colonies, the number of used and unused old nests in the colonies, their placement and morphometric characteristics, as well as the surrounding environment around the nests, were studied using visual, measurement, and calculation methods. To examine the internal structure and condition of the nests, a USB HY001 technical endoscope was used. Commonly accepted ecological methods were applied to study the biocenotic relationships of the species.

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Results and Discussion

Scientific sources contain a significant amount of data on the economic importance of birds; however, their role in natural ecosystems remains insufficiently explored [7, 12]. Typically, the role of birds in nature is reduced to their involvement in regulating the populations of various pests. This, in turn, leads to a diversity of approaches, sometimes contradictory, in assessing the significance of species. For the conservation of species and the management of problematic species' populations, a thorough study of their ecological roles and decision-making based on such studies are essential.

The significance of any species in nature can be determined by studying its population density per unit area, the composition of its food base, and its biocenotic interactions in a specific region. Within the framework of this study, we examined the participation of the specified species in commensal and predatory interactions to elucidate their roles in nature. It is known that Uzbekistan's terrain is predominantly flat, with vast deserts and agroecosystems where there is a shortage of shelter and nesting sites. Burrowing birds create favorable conditions for other species through commensal relationships such as "tenancy" and "freeloading" providing them with nesting sites, shelters, and opportunities for trophic interactions (Fig. 1).

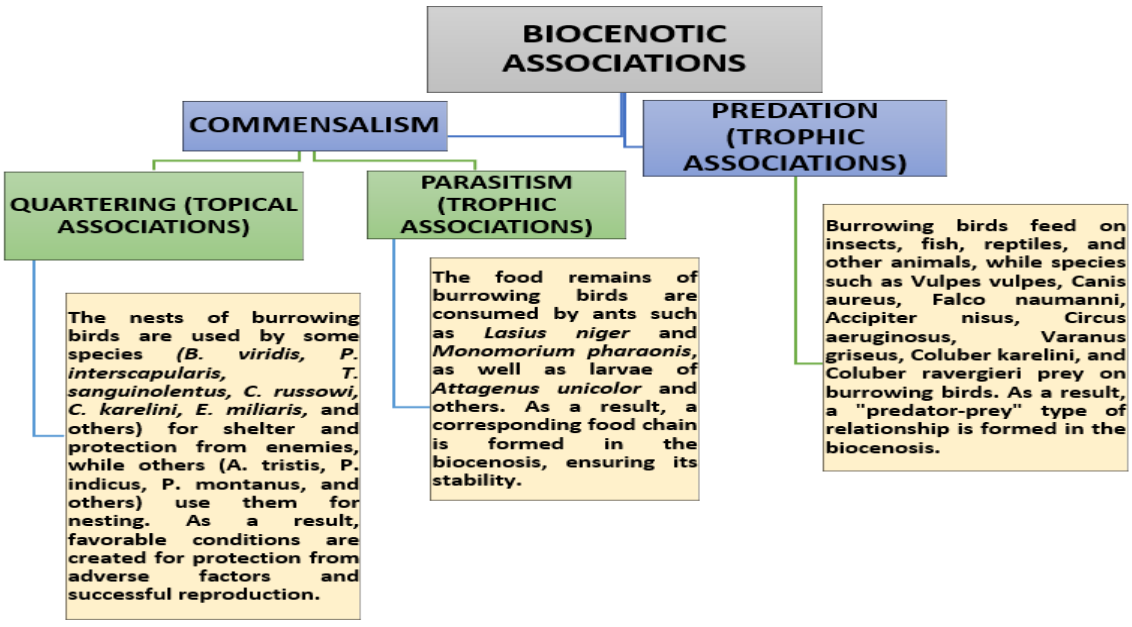

Fig. 1. Participation of burrowing birds in various biocenotic associations

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These processes ultimately contribute to maintaining biodiversity and providing protection from adverse conditions. Observations of such burrows revealed that various bird species nest in them. From 2021 to 2025, in the Tashkent region (Zangiata district, AO DAMACHI), as well as in the Bukhara and Samarkand regions, old burrows of the European Roller (Coracias garrulus), European Bee-eater (Merops apiaster), and Blue-cheeked bee-eater (Merops persicus) were used for nesting by species such as the Rock dove (Columba livia), Little owl (Athene noctua), Common myna (Acridotheres tristis), Indian sparrow (Passer indicus), and Eurasian Tree Sparrow (Passer montanus). The high protection offered by these burrows and the scarcity of nesting sites facilitate their use by other species. Arthropods were noted in almost all old burrows. In some burrows, species such as the Green toad (Bufo viridis), the Lichtenstein's toadhead agama (Phrynocephalus interscapularis), the Steppe Agama (Trapelus sanguinolentus), the Grey gecko (Cyrtopodion russowi), the Karelini racer (Platyceps karelini), and the Sand boa (Eryx miliaris) were encountered (Fig. 2).

Fig. 2. A common myna nesting in a European roller nest and a Karelini racer found in a green bee-eater nest

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In the study area, it was observed that most burrowing birds build new nests annually, resulting in an increase in the number of old nests year by year. Consequently, the number of such burrows as nesting sites and shelters also increases annually, and the function of quartering expands.

Traces of parasitism (trophic associations) were recorded at the entrances to the burrows, in the passages leading to them, and in the nesting chambers. In the burrow chambers, significant amounts of insect body parts (chitinous and membranous wings, head and leg fragments) and bird excrement were found. These remains serve as food for ants (Lasius niger, Monomorium pharaonis), larvae of Attagenus unicolor, and other species. As a result, topical and trophic interactions with positive characteristics based on commensalism are formed.

Among biocenotic associations, trophic relationships in the form of predation are also widespread, with some of these interactions occurring specifically in burrows dug into the soil [1, 2, 4, 12]. Golden and green bee-eaters, feeding on bees, have learned to ambush them near their nests or along their flight paths. Attacks by bee-eaters on bees in the air, attempts to catch multiple bees at once, or the pursuit of grasshoppers and locusts can also be classified as predatory interactions typical of trophic predator associations.

In the burrows of burrowing birds, their eggs and chicks become prey for species such as the fox (Vulpes vulpes), jackal (Canis aureus), Desert Monitor (Varanus griseus), Karelini racer (Platyceps karelini), and the Multicolored racer (Hemorrhois ravergieri). Near the nesting colonies and feeding areas of burrowing birds, attacks by the Eurasian sparrowhawk (Accipiter nisus), Common kestrel (Falco tinnunculus), and Western marsh harrier (Circus aeruginosus) were observed. On May 11, 2021, in a small quarry in the Shafirkan District of Bukhara Region, while studying a green bee-eater colony, traces of Desert monitor, fox, and other predator paws were found at burrow entrances. In one of the burrows, a Desert monitor was discovered that had swallowed a bee-eater. Such predatory relationships, on one hand, contribute to controlling the population of burrowing birds, and on the other, provide sustenance for rare species such as the a Desert monitor and others.

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In the conditions of Uzbekistan, it has been established that burrowing bird species actively participate in bioturbation. During the process of digging burrows, birds displace significant volumes of soil to the surface or to the bases of slopes and cliffs. This improves the physicochemical properties of the soil, increases its fertility, and creates favorable conditions for other species. In areas where soil is displaced, a more developed plant cover with increased plant density and height is observed (Fig. 3).

Fig. 3. Displaced soil at the base of a sand martin colony (Riparia riparia) (Bukhara Region, Karakul District, 2025).

For the desert territory, which occupies a large part of Uzbekistan, low soil fertility and a very sparse plant cover are characteristic. Under such conditions, any factor contributing to improved soil fertility, including the aforementioned process of bioturbation, is of primary importance. Based on the above, it can be concluded that the participation of burrowing birds in bioturbation can be regarded as a role of "engineers of desert ecosystems" [8].

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Currently, in several regions, particularly in countries with developed beekeeping, including Uzbekistan, golden and green bee-eaters are considered pests of beekeeping and are illegally destroyed in large numbers. Under the influence of anthropogenic factors, nesting colonies of rollers and sand martins suffer significantly, leading to a decline in their populations. Considering their importance in nature, it is necessary to reconsider issues of their conservation in the future.

Conclusions

The significance of burrowing bird species in nature is insufficiently studied. The diversity of approaches to assessing their role in nature leads to the formation of certain problems in the conservation of these species. In-depth study of their significance in nature and decision-making based on this are of great importance for their conservation and the control of problematic species populations. In Uzbekistan, burrowing bird species such as the roller, golden bee-eater, green bee-eater, and sand martin actively participate in various biocenotic interactions, contributing to the preservation of biodiversity. Their importance in nature is particularly evident in commensal and predatory interactions. Through commensal relationships such as “quartering” and “parasitism” (topical and trophic associations), burrowing bird species create favorable conditions for the reproduction, shelter, and feeding of other species. Such biocenotic associations play an even more significant role in desert zones, where the food chain is short and biodiversity is poor. Predatory interactions also contribute to the stability of ecosystems. The process of bioturbation involving burrowing bird species is virtually unstudied. This process contributes to the improvement of the physicochemical properties of the soil and increases its fertility. As a result, plant cover develops relatively better in such areas. In the conditions of Uzbekistan, an in-depth study of the ecology and significance of burrowing bird species provides a solid foundation for their conservation.

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