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REPRODUCTION ECOLOGY OF THE GENUS MEROPS IN UZBEKISTAN

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ABSTRACT

The aim of the research is to study the reproductive ecology of golden european bee-eater-Merops apiaster and blue-cheeked bee-eater -Merops persicus from birds of the genus Merops in Uzbekistan on the example of their nesting sites, nest structure, reproductive efficiency and factors influencing it. As a result of the study, the ecological characteristics of bee-eater-Merops nesting sites in Uzbekistan were described, the structure and characteristics of nests were determined, the number and size of eggs, reproductive efficiency were studied and factors negatively affecting reproductive efficiency were assessed. The study of the ecological features inherent in the reproductive cycle of the Merops generation will allow them to reduce the damage they cause to conservation and beekeeping.

KEYWORDS: *Reproductive, Beekeeping, Species*

INTRODUCTION

The protection of wildlife, including birds, is a topical issue that can be addressed through an in-depth study of the ecology of the species, a proper assessment of its importance. It is known that in different parts of the range of the species there are some differences in the course of its life cycles, in nature and in economic importance. On this basis, it is necessary to study the ecology of migratory species, especially *M. apiaster* and *M. persicus*, within their range.

In Uzbekistan, the reproductive cycle of *M. apiaster* and *M. persicus* is unique. In the literature, there are many materials related to the proliferation of *M. apiaster*. However, in Uzbekistan, nesting stations of *M. apiaster* and *M. persicus*, nest structure, reproductive efficiency and factors influencing it, etc. are not sufficiently studied, and the available materials are not focused on the protection of these species [2,6,7,8,9] .

Materials and methods. Research materials were collected from Bukhara, Samarkand, Surkhandarya, Fergana, Tashkent regions and the Republic of Karakalpakstan. Commonly used zoological, ecological, questionnaire, visual and methodological methods were used in the research [5]. 248 nests of *M. apiaster* and 84 nests of *M. persicus* were studied. Materials on the reproduction of birds were collected based on the study of 20 of their nests.

Results and its discussion. When the course of the reproductive cycle in *M. apiaster* and *M. persicus* was studied ecologically comparatively, it was observed that they had similarities and differences. In particular, it was found that *M. apiaster*'s colonial nests were often colonized in various gullys and steep gullys in the mountains and foothills, and in the plain zone on the steep banks of water bodies and on the walls of various quarries. *M. persicus* nests, on the other hand, are often found in the side walls of quarries, in the inner walls of canals, ditches-collectors, and on the sides of soil piles removed from them, at the edges of fields, and on flat surfaces.

Not all nests built in the form of a colony are used for reproduction. Usually the number of unused nests in older colonies is greater than the number of used nests.

Unlike other bird species, bee-eaters build new nests every year. This situation can be explained by the following: as a result of the decay of the remains in the chamber of the old nests, an uncomfortable environment is created in the nest; the nest will be occupied by other bird species or other animals; as a result of various abiotic and biotic effects, the entrance holes of the nests, the access roads, and the nest chambers become unusable as a result of erosion.

According to VT Butev, the number of nests in the nesting colonies of *M. persicus* varies in different parts of the nesting area, up to 100 m. sq. Oscillates from 0.8 to 25 [1]. The distance between nests in the nest colonies we studied was 20 cm. and 300-400 cm. occupied a distance of up to. These differences in nest densities are inextricably linked to the species's demand for trophic and topical factors, the degree of protection of the nests, and the amount of space available for nest construction.

The height and depth of the nests above ground level vary according to the characteristics of their location. In both species, the height of the entrance to the nest above ground or water level, as well as the location (low) of the entrance to the nest relative to the ground surface, are variable and can be assessed as an adaptation to maintain the appropriate temperature and humidity in the nest. A similar pattern applies to the studied nests of *M. persicus* (Fig. 1, Table 1).

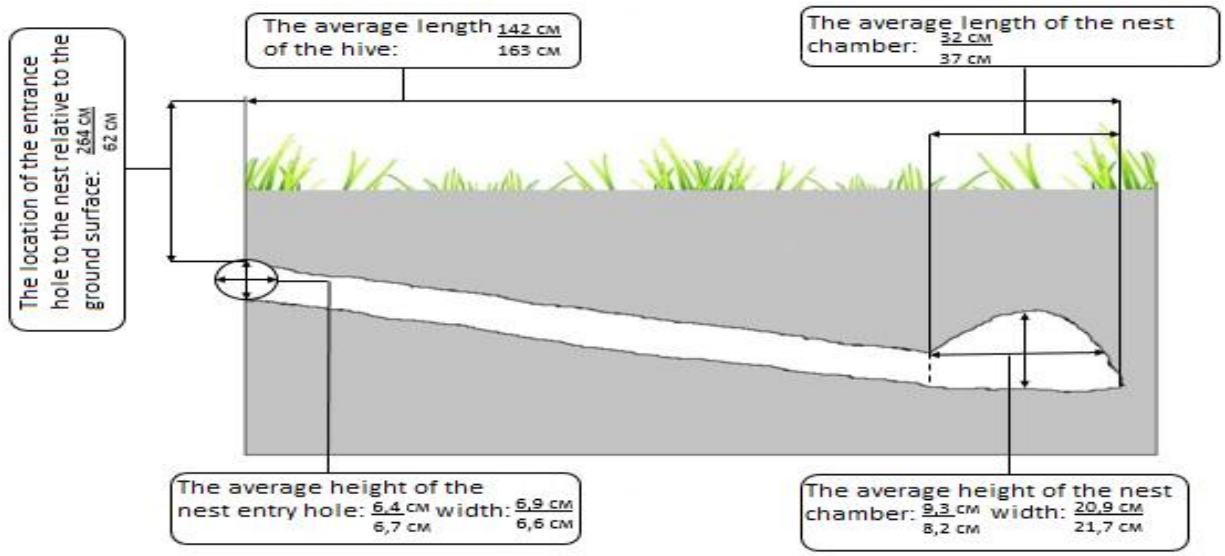

Figure 1. Average size of nests: *M. apiaster* nest in the numerator and size of *M. persicus* nest in the denominator

TABLE 1. COMPARATIVE DESCRIPTION OF THE STRUCTURE OF M. APIASTER AND M. PERSICUS NESTS (N=20)

Average number of nests (in cm)	***M. apiaster***	***M. persicus***
The length of the access path to the nest	142 (68-170)	163 (120-198)
The height of the entrance hole to the nest	6,4 (6-7,5)	6,7 (6-8)
The width of the entrance hole to the nest	6,9 (6-8)	6,6 (6-7,5)
The length of the nest chamber	32 (22-38)	37 (26-45)
The height of the nest chamber	9,3 (8-11)	8,2 (6-10)
The width of the nest chamber	20,9 (17-24)	21,7 (16-25)
The location of the entrance to the nest relative to the ground (low)	264 (35-440)	62 (20-110)
Slope (the slope of the location of the nest chamber relative to the entrance hole of the nest	15,4 (9-25)	28,6 (20-36)

The nests are located horizontally on the ground, deepening to an average of 15.4-28.6 cm at a distance from the entrance hole to the nest chamber. This figure is particularly pronounced in *M. persicus* nests (28.6). The relatively long access path to the nest in *M. persicus* nests (average-163 cm) is based on the fact that the nests are built in arid areas and the need for nest protection is relatively high.

The shape of the nest chamber resembles an overturned bowl. Humidity in the nesting chambers of both species was found to be consistently high. This indicates that the embryo and chick are developing under conditions of high humidity. In particular, the construction of *M. persicus* nests in areas with high soil moisture and the deepening of the access path to the nest can be taken as evidence of this. However, due to the very high humidity in the nest chamber, it was found that the feed wastes in the chamber and the excrement itself emitted an ammonia odor.

In the literature, it is sometimes noted that the entrance to the nest has one or two turns of no more than 450, there are additional nests with a depth of 3-45 cm around the main nest used, and these nests are described as "fake" nests [6,7,8]. There were no significant deviations in the access pathways of the nests we studied. Occasionally, similar pits were observed around the main nests. Such pits are abandoned nests due to exposure to a hard (gully, plant root, etc.) or very soft (brittle sand) layer during nesting, and it is less accurate to describe nests as “fake” nests.

The chicks of both species are similar in appearance to the chicks of other species, but differ from other species in that the lower part of the marrow and shin joints expands and takes the form of a “compensation” -like package (Fig. 2). It allows the chicks to move back and forth without turning in a narrow passage from the nest chamber resting on this heel to the nest entry hole. The joints of adult birds do not have such a "heel". Such a morphological trait can only be assessed as an instinctive adaptation specific to chicks [3,4].

Figure 2. "heel" in the marrow and calf joints of bee-eaters

During the study, the reproductive efficiency of the birds in the observed nests (n = 28) was determined. According to observations, the reproductive efficiency of *M. apiaster* is 63.5%, with egg mortality 7.3%, chick death 29.2%, and *M. persicus* reproduction efficiency 45.4%, egg death 20%. , the mortality of chickens was 35.3% (Table 2-3).

TABLE 2.INFORMATION ON THE OBSERVED NESTS OF *M. APIASTER* (N = 14) AND REPRODUCTIVE EFFICIENCY

The sequene number of the nest	The location and date of nesting	The condition of the nest, the total number of eggs and chicks	Reproductive efficiency (in %)
1	Samarkand region, Ishtikhon district., 18.07.2021	The existing 7 chicks in the nest have successfully left the nest.	100
2	Samarkand region, Ishtikhon district., 26.06.2021	All 6 chicks in the nest were killed and one more egg was found.	0
3	Samarkand region, Koshrabad district, 09.07.2021	It was found that 5 chicks flew successfully from the nest.	100
4	Samarkand region, Koshrabad district, 15.07.2021	Six chicks in the nest were found to have flown successfully.	100
5	Samarkand region, Ishtikhon district, 13.07.2021	5 chicks successfully left the nest and 1 more chick was found dead.	83,3

6	Tashkent region, Zangiota district, 20.06.2021	All 6 chicks in the nest were killed by beekeepers.	0
7	Tashkent region, Zangiota district, 10.07.2021	7 chicks successfully left the nests	100
8	Samarkand region, Koshrabad district, 10.07.2021	4 chicks successfully left the nest. Another chick was found dead and one egg in the nest	66,6
9	Samarkand region, Koshrabad district, 30.06.2021	All 4 chicks in the nest were killed.	0
10	Samarkand region, Koshrabad district, 14.07.2021	4 chicks successfully left the nest. It was discovered that there was an egg in the nest.	80
11	Samarkand region, Koshrabad district, 17.07.2021	A total of 3 chicks successfully left the nest. An egg and 1 dead chicken were found in the nest.	60
12	Tashkent region, Parkent district, 18.07.2021	A total of 6 chicks successfully left the nest.	100
13	Tashkent region, Parkent district, 10.07.2021	The hole in the nest is closed. When the nest was excavated, 5 chickens were found dead and 2 eggs were found in it.	0
14	Tashkent region, Parkent district, 20.07.2021	A total of 5 chicks successfully left the nest.	100
	Average	**5,85 та**	**63,5**

TABLE 3. INFORMATION ON THE OBSERVED NESTS AND REPRODUCTIVE EFFICIENCY OF M. PERSICUS

The sequence number of the nest	**The location and date of nesting**	**The condition of the nest, the total number of eggs and chicks**	**Reproductive efficiency (in %)**
1	Bukhara region, Karakul district, 8.06.2021	an egg, 4 chickens killed	0
2	Bukhara region, Karakul district, 14.07.2021	6 chicks successfully left the nest.	100
3	Bukhara region, Karakul district, 05.07.2021	7 chicks of different development in the nest were killed	0
4	Bukhara region, Karakul	6 different developing chicks	0

	district, 05.07.2021	in the nest were killed	
5	Bukhara region, Karakul district, 20.05.2021	6 eggs in the nest were killed.	0
6	Bukhara region, Karakul district, 18.07.2021	6 chicks successfully left the nest and 1 dead chick was found there.	85,7
7	Bukhara region, Shafirkan district, 20.05.2021	The nest was destroyed and it was found that there were 6 eggs in the nest..	0
8	Bukhara region, Shafirkan district, 15.07.2021	The 5 chicks in the nest successfully left it.	100
9	Bukhara region, Karakul district, 14.07.2021	5 chicks successfully left the nest and 1 dead chick was found there.	83,3
10	Bukhara region, Karakul district, 04. 07.2021	A total of 7 chicks in the nest were killed by the shepherds	0
11	Bukhara region, Shafirkan district, 10.07.2021	The 5 chicks in the nest successfully left the nest	100
12	Bukhara region, Shafirkan district, 08.06.2021	3 chicks and 3 eggs in the nest were killed by beekeepers	0
13	Bukhara region, Shafirkan district, 17.07.2021	The 7 chicks in the nest successfully left the nest	100
14	Bukhara region, Shafirkan district, 15.07.2021	4 chicks successfully left the nest. 1 dead chicken and an egg were found in the nest.	66,6
	Average	**6,07**	**45,4**

The reproductive efficiency of the studied species is negatively affected by the destruction of bird nests and their eggs and chicks by beekeepers and shepherds. Occasionally, snakes belonging to the family Vulpes vulpes, Canis aureus, Varanus griseus, and Colubridae also destroy bee-eaters'nests, killing eggs and chicks. Usually the chicks that eventually hatch from the eggs lag behind the others in growth and development, and it has been found that the last chick in particular dies. For this reason, nests with 7 eggs usually have 6 chicks.

CONCLUSIONS

Significant damage to the reproductive efficiency of these species is explained by the incorrect assessment of their importance in nature and in the economy, the diversity of approaches to the protection of the species.

The structure of the nests of the studied species and the slope of the entrance passages to the nests are adaptations aimed at maintaining constant humidity and temperature in the nest chambers.

The relatively well-protected nature of *M. apiaster* nests, i.e., the fact that nest colonies are located in high and steep gullys with little exposure to various predators and anthropogenic

factors, leads to their high reproductive efficiency. The construction of *M. persicus* nests, often in flat, easy-to-light soft soils, increases their likelihood of damage under the influence of various factors.

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