

materials on the ecology of european bee-eater *MEROPS APIASTER* IN THE LOWER STRETCHES OF THE AMUDARYA

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ABSTRACT: The article provides materials on the ecology of European bee-eater collected in the lower stretches of the Amudarya in 2005-2007, 2014-2016. The research includes data on the distribution, numbers, nesting biology and diet of European bee-eater. The work also estimates the importance of this bird for the human economy.

Keywords: European bee-eater, lower stretches of the Amudarya, prolific bird, anthropogenic landscape, burrow digging, nest chamber, egg laying, incubation, wing, fledging.

INTRODUCTION

European bee-eater *Merops apiaster* is a common migrating bird nesting throughout Uzbekistan, including the territory of Karkalpakstan. A number of ornithologists have studied the biology and ecology of European bee-eater in Uzbekistan [3, 7, 10, 11, 13, 14]. However, no one has yet studied this bird's ecology in the territory of Karakalpakstan.

Material and methods:

We collected the material on the ecology of European bee-eater in the Republic of Karakalpakstan in 2005-2007 and 2014-2016. The research was carried out using standard methods, with the help of stationary and transect surveys [8, 15].

Results and discussion:

European bee-eaters tend to arrive in Uzbekistan in spring, when warm weather settles in the region. We discovered the first individuals who had just arrived in late April-early May (27 April 2005, 6 May 2006, 3 May 2007, 5 May 2014, 28 April 2015 and 25 April 2016). The autumn migration starts in Uzbekistan in late September and lasts until the end of the 1st decade of October [10].

In the lower stretches of the Amudarya European bee-eaters occur primarily in anthropogenic environment. We discovered them in agricultural landscapes and within settlements. However, in the lower stretches of the Amudarya European bee-eaters are not so numerous as blue-cheeked bee-eaters and are even quite rare in some areas. So, during the nesting period of 2005 we came across 4 nests within a 6-kilometre distance in the Ornek shirkat area, while in 2015 we counted 3 nests within a section of 4 km near the bank of a canal in the outskirts of Nukus.

According to our observations, after arrival bee-eaters form pairs. According to G.S. Belskaya (1976), in Turkmenistan the birds form pairs on the 3rd-4th day after the arrival. As it finds a proper place in a vertical clay slope, on the steep bank of a roadside canal or on the gently sloping side of a hill, the pair starts digging a burrow. Both birds in the pair take part in the digging. They work primarily in the morning and evening hours. The entire digging process takes between 10 and 15 days. So, in 2006 a pair started digging a hole on 8 May, and on 18 May the female laid the first egg. Another pair in the same place began digging on 11 May and finished the work on 24 May, while in the morning of 25 May they laid the first egg.

According to our observation, the nest of European bee-eater has the following parameters (n=9): the entrance aperture is situated at a height of 4.8-187 cm (76.8 on average) from the ground; the aperture's diameter is 5-8.5 cm (6.4); the length of the burrow is 114-172 cm (138.6). The nest chamber is organised at a depth of 53-68 cm (59.8). Its length is 13-28 cm (20), width 15-25 cm (19.6), height 8-12 cm (10). New nests do not have any bedding, but later it forms through accumulation of the chitin of insects the bird feeds on.

Near the nest bee-eaters organise a few more holes. The purpose of these holes is unknown [9]. M.N. Korelov (1948) calls these burrows 'false' A.K. Sagitov (1990) believes that birds copulate after the nest is ready.

According to our observations, bee-eaters nest in pairs, small groups and even colonies when environment permits. They lay eggs once a year. According to G.P. Demytyev (1952), the egg laying period in Turkmenistan starts on the first days of the second decade and in the middle of May, while according to G.S. Belskaya in 1963 the first eggs were laid on 1 May, most of them were laid between 10 and 15 May, and the latest of them were laid on 19 May. The interval between the beginning and end the egg laying in different pairs is 20 days.

According to our research, in the lower stretches of the Amudarya the birds begin to lay eggs in the middle of May, while the peak of the egg laying activity falls on the late May-early June. The birds lay one egg every two days. According to O.P. Bogdanov (1956), one egg daily.

According to A.K. Sagitov (1990), a full clutch contains 4-7 eggs, most often 5. A.M. Sudilovskaya (1951) reports that their number may reach 10. According to our observations, there are 5-6 eggs in each clutch.

The eggs (n=90) in various regions of Uzbekistan have the following parameters: according to S. E. Fundukchiyev (2017), in Samarkand province they are 24.0x27.3 mm (25.9 on average); their width is 20.4-23.0 mm (21.6), weight 5.05-7.5 (6.39) g; in the Hissar Range (n=6) – 25.0-26.1x20.6-22.0 mm [1]; in Turkmenistan (n=25) 22.8-28.9x20.2-22.8 mm, weight 6.2-7.9 g (6.9) (25.7x21.6 on average) [2].

According to our research, the eggs found in the lower stretches of the Amudarya had the following parameters (table 1): length 24.2-28.6 mm, width – 20.5-22.7 mm (26.3x21.7 on average), the weight of newly laid eggs was 6.2-7.6 g (6.8). The eggs are white and almost spherical in form.

Table 1. Parameters of European bee-eater's eggs in Karakalpakstan

Parameters	Min-max	Average	n
Length, mm	24.2-28.6	26.3	37
Width, mm	20.5-22.7	21.7	37
Weight, g	6.2-7.6	6.8	37

The incubation starts since the laying of the first egg and lasts 18 days in Turkmenistan [2, 9], 20 days [10] or 23-25 days [14] in Uzbekistan, while according to our data, the incubation in the lower stretches of the Amudarya lasts 19-20 days.

Mostly the female incubates the eggs, while the male feeds the female and substitutes it, when the female needs to leave the nest for food [9]. During the incubation each egg loses from 10% to 12% of its weight; according to our observations, in the lower stretches of the Amudarya the weight loss is equal to 12.8% (table 2).

Table 2. European bee-eater's egg weight (g) dynamics in the incubation period (n=4)

Egg weighing days	Average egg weight, mg	Weight loss	
		mg	%
1	7200±4.08	-	-
3	7120±3.87	80±0.4	1.11
5	7000±3.55	120±0.52	1.67
7	6930±3.87	70±0.48	0.97
9	6830±2.01	100±0.91	1.39
11	6710±2.08	120±0.98	1.67
13	6620±1.12	90±0.54	1.25
15	6510±0.57	110±0.95	1.52
17	6430±0.62	80±0.53	1.11
19	6330±0.77	100±0.93	1.39
During the entire incubation period		870	12.08

According to our observation, the hatching lasts 4-8 days. When emerging from their eggs the chicks are naked and blind, but their acoustic meatuses are open. The weight of a one-day-old chick is 4.6-6.1 g (5.1). The body's colour is light pink. The chicks grow slowly. On the third day their eyes begin opening. On the 4th-5th day they are already fully open, and at that very time the shafts of the first flight feathers appear. The shafts of the tail feathers develop on the 6th-7th day (1-picture).

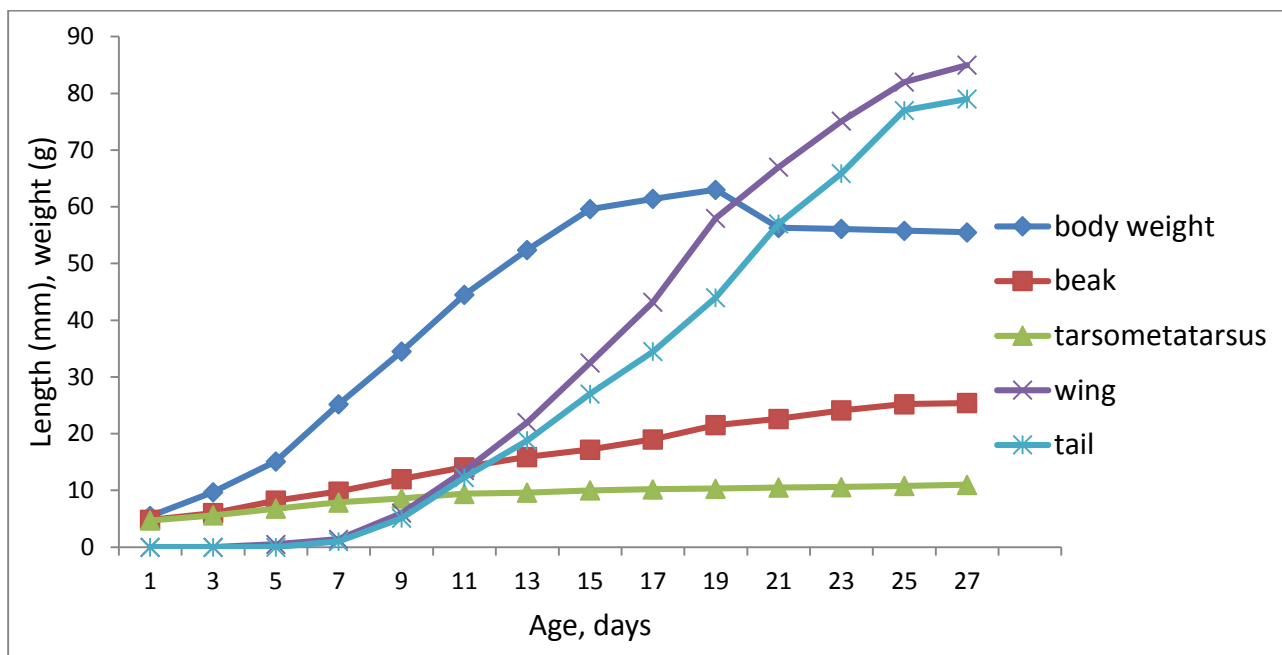


Figure 1. Development of certain organs in the chicks (n=6) of European bee-eater

At the age of 8-9 days the pin feathers cover the entire body of the chick. On the 14th day the feathers unfurl, and on the 21st-22nd day they cover evenly the entire body. Starting from day 8 the weight growth rate drops. The weight of the chicks is at its peak on day 19. After that the chicks begin to lose weight.

On day 27 the chicks leave their nest. Shortly before that they weigh 55-57 g. This means that while staying in the nest the chicks grow 10 times as heavy, that is, their weight increases from 5.5 g to 55.5 g. After leaving the nest the chicks stay with their parents for 2-3 weeks, and the latter continue to feed them.

The chicks leave their nests starting from the middle of July [12] and until early August [1]. In the Kashkadarya River valley European bee-eater's fledglings were reported to leave their nests in large numbers between 19 and 27 July [7], in Surkhandarya the same was recorded in early July [11]. According to our research, in the lower stretches of the Amudarya fledglings leave their nests on 15-20 July.

European bee-eater's diet has been studied quite properly. M.A. Butlerov (1879) specifies that in the lower stretches of the Amudarya European bee-eater feeds on locust. According to M.N. Korelov (1948), in spring European bee-eater's diet consisted primarily of wasps, wild bees, ground beetles, darkling beetles and dragonflies. In the nesting period the bird feeds on wasps, beetles, locusts, hornets, flies, wild bees, dragonflies, bugs, cicadas and various Hymenoptera. It feeds its chicks the same insects.

European bee-eater feeds on bees near apiaries on cold cloudy days. The following portions of various insects were recorded in the stomachs of adult birds between their copulation and the time their fledglings left the nest: pests - 51.84%, of which locusts comprised 10.8%, wasps - 19.4%; neutral insects - 9.16%; useful insects: wild bees - 28.32%, dung beetles - 7.2%, dragonflies - 2.88%. The chick's diet consists primarily of locusts. In the migration period the following types of insects comprised the diet of adult birds: useful insects - 65.59%, harmful insects - 30.52%; domesticated bees comprised 46.87% of all insects [6].

According to our research, in the nesting period European bee-eaters primarily feed on and provide their chicks with locusts, wasps, dragonflies, dung beetles, flies and bugs.

Conclusion:

In the nesting period in spring European bee-eater does much good to humans, as it destroys large numbers of insect pests, most of which are locusts. After the nesting period, during migrations and in autumn, the bird feeds on bees from apiaries and thus does much harm to human activity.

Thus, as the role of European bee-eater is highly controversial, no population control measures must be taken. Moreover, the current level of practical ornithology allows for regulating the harmful effect of European bee-eater's activity.

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