

DIFFERENT TYPES OF NEST BOXES USED BY LESSER KESTREL (*FALCO NAUMANNI*) AFTER BEING RECOVERED AS A BREEDER IN BULGARIA

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Abstract

Lesser Kestrel often nests in urban areas surrounded by agricultural areas. This makes the species largely dependent on human activity to availability of nesting places. The loss of natural nesting sites was one of the main reasons the species to become extinct in the late 20th century in Bulgaria. After it was recovered as a breeding species in country, one of the main goals of the expert is to make the colony stable. For implementation of these goals, it is necessary to provide a suitable nesting place for the species. Field studies show that the provision of artificial nest boxes for Lesser Kestrel resulted in increasing of numbers and strengthening existing colonies. There are different types of artificial nest boxes like: Classic wall, cavity wall, under-roof and etc. Conducting daily observations of the birds, the colony's nesting territory was determined - concentrated around the Lesser Kestrel Release and Adaptation Module. In the past years large proportion of the Lesser Kestrel population in Bulgaria nested in artificial nest boxes thus proving that species easily occupies artificial nests designed for it.

Key words: endangered species, Falcon, raptors, Sakar SPA.

INTRODUCTION

Lesser Kestrel (*Falco naumanni*, Fleischer, 1818) is a small species of falcon, one of the smallest falcons found in Europe. The species nests in Southern Europe, North Africa, Asia Minor and the Middle East, Southern Russia, the Caucasus, Central Asia east to China. Most birds breeding in western Europe winter in Africa south of the Sahara, although some individuals remain in Spain (Negro, 1991), southern Turkey (Cade, 1982). Some of these birds may be early migrants, depending on climatic conditions and food availability (Global Raptor Information Network, 2022). Lesser Kestrel often nests in urban areas, as they provide nesting sites and the level of threat of predation in the nest is lowland are usually surrounded by agricultural areas or open uncultivated areas providing food resources. That is why the species largely depends on human activity not only in terms of feeding places, but also because of the presence of nesting places. Despite being widespread in Bulgaria in the mid-XIX (Radakoff, 1879), but has suffered dramatic declines in many parts of its breeding area, as well as its disappearance from some countries where it had previously

multiplied. In Europe, declines equivalent to 46% in each decade since 1950 have occurred and on the wintering grounds in South Africa, there have been declines equivalent to 25% in each decade since 1971 (BirdLife International, 2004).

In the breeding range, problems include demolition of older buildings where the birds nested, loss of habitat through afforestation, intensification of agriculture, and urbanization, pesticide poisoning, human persecution, and interspecific competition (Biber, 1996). The principal threats in South Africa are the loss of grassland habitat to overgrazing and pesticide effects, particularly when the birds are attracted to outbreaks of locusts or crickets, which are sprayed by farmers (Pepler, 2000).

The reduction of the nutritional base of the Lesser Kestrel as a result of the intensive use of pesticides and poisons, together with the overgrowth and abandonment of pastures and agriculture lands, are considered to be one of the main reasons for the extinction of the species in Bulgaria.

In Bulgaria, at the close of the 19th century the Lesser Kestrel was reported as "nesting everywhere" (Radakoff, 1879), and in the mid-

20th century as “fairly common” and widely distributed (Patev, 1950; Arabadzhiev, 1962). In 2000-2010, there were no breeding birds reported (Barov, 2002) i.e., no confirmed breeding of the species (Iñigo & Barov, 2010). In according to the updated edition of the Red Data Book of Bulgaria, the species was announced critically endangered (CR) without being reported for nesting population (Barov et al., 2015). The species has been reported with negative trends for all population parameters (Marin et al., 2020). The most serious problem today is the critically low number of populations and isolation, which do not allow the species to recover naturally. With the help of a specialized project “Lesser Kestrel Recovery” LIFE11 NAT/BG/360 implemented by “Green Balkans – Stara Zagora” NGO the Lesser Kestrel has been successfully recovered as a breeder in Bulgaria. To preserve and ensure the sustainable existence of the recovered colony are necessary additional conservation efforts. Due to the drastic reduction of natural habitats, the placement of artificial nest boxes provides reliable nesting sites with a low risk of predation.

MATERIALS AND METHODS

After being recovered as a breeding species in Bulgaria, one of the main objects of conservationists is to make the colony stable. To achieve these objectives, it is necessary to provide suitable nesting places for the species. Field studies indicate that the provision of artificial nesting structures for Lesser Kestrel is an old and traditional practice in the Sakar region, and probably other parts of the country (Marin et al., 2020). The field research was implemented on the territory of Lesser Kestrel Release and Adaptation Module in village Levka SPA “Sakar” (BG0002021) part of European Ecological Network NATURA 2000, where for the species are laid targeted conservation activities by a team of “Green Balkans – Stara Zagora” NGO within a project “Better Life for Lesser Kestrel in South-East Balkans” LIFE19 NAT/BG/001017.

SPA “Sakar” (BG0002021) classified as SPA by Council of Ministers Decision No. 802/04.12.2007 (promulgated SG 107/2007). Issued designation order by the Minister of Environment and Water of Bulgaria with

prohibitions and restrictions on activities contradicting the conservation objectives of the site – Order No. RD – 758/19.08.2010 (promulgated SG 72/2010), amended by Order No. RD – 70/28.01.2013 (promulgated SG 10/2013).

A low-mountain region with rounded hilltops and comparatively open river valleys of the Maritsa and Tundzha tributaries, close to the state border with Turkey. The terrain altitude is between 50 and 856 m. On its territory there about 30 small settlements, the town of Topolovgrad and a poorly developed road network. Lower parts of the Sakar territory is occupied by farmland, which has replaced forests of *Quercus pubescens* and *Quercus virgiliana*. On about 15% of the area there are dispersed xerothermal grass associations, dominated by *Dichantium ischaemum*, *Poa bulbosa*, *Chrisopogon grillus*, etc., and, more rarely, meso-xerothermal vegetation. The shrubs of *Paliurus spina-christi*, mixed with *Jasminum fruticans* in combination and the xerothermal grass formations determine the comparatively high numbers of the Hare (*Lepus europeus*) and the Souslik (*Spermophilus citellus*) respectively. The area of Sakar currently supports 220 bird species, 59 of which are listed in the Red Data Book for Bulgaria. From the birds occurring there 96 species are of European conservation concern (SPEC), 11 of them being listed in category SPEC 1 as globally threatened, 23 in SPEC 2 and 62 in SPEC 3 as species threatened in Europe. The area provides suitable habitats for 76 species, included in Annex 2 of the Biodiversity Act, which need special conservation measures. Sixty-eight of them are listed also in Annex I of the Birds Directive and more than half of them breed in the region in significant populations. Sakar holds the biggest populations in the country of Imperial Eagle (*Aquila heliaca*), Lesser Spotted Eagle (*Aquila pomarine*), Booted Eagle (*Hieraetus pennatus*), Black Kite (*Milvus migrans*) and Long-legged Buzzard (*Buteo rufinus*). It is one of the most important areas in the country on European Union scale for the species mentioned above, as well as for the Levant Sparrowhawk (*Accipiter brevipes*), the Tawny Pipit (*Anthus campestris*), Calandra Lark (*Melanocorypha calandra*), Greater Short-toed Lark (*Calandrella brachydactyla*), Masked Shrike (*Lanius nubicus*), Stone Curlew (*Burchinus*

oediacnemus), Montagu's Harrier (*Circus pygargus*), Syrian Woodpecker (*Dendrocopos syriacus*) and the Olive-tree Warbler (*Hippolais olivetorum*) (Natura 2000, standard data form, 2015).

During the communist regime in Bulgaria, for several decades, the border areas with Greece and Turkey remained closed and inaccessible to tourists, visitors and guests of the region.

The strict control and restricted access to the border areas was part of the division of Eastern and Western Europe into two warring camps during the Cold War. Sakar mountain fell into the trap of the so-called "Iron Curtain" and were unfamiliar to the public.

Due to the limited access to these areas, the strict controls and not infrequently the geographical isolation of the border areas, they have preserved key habitats, rare and protected species and unique landscapes.

These areas are united together in the European Green Belt initiative. At present, when we have United Europe, these regions, which were unknown until recently, are gradually opening up and showing their treasures.

For nature and history lovers, the heritage reveals emblematic etalons of conserve nature, preserved historical sites and distinctive culture and traditions. Gradually, not only for the general public, but also for the scientific community, monuments and landmarks of Sakar mountain region are getting popular and accessible used to be unfamiliar until recently.

The region also reveals its unique nature at the gorge of the Tundzha River, the floodplain forests along the islands of the Maritza River, the habitats of the Eastern Imperial Eagle and Lesser Kestrel, for which Sakar Mountain is one of the most important nesting areas in the whole country.

In the Transboundary region of Bulgaria, Greece and Turkey there are some emblematic species that have been known to people on both sides of the border for centuries and are now conserved by NATURA 2000.

Particularly popular in this respect are various rare and protected birds. They fly over large areas, with state borders and natural barriers being no obstacle for them. Many of these feathered creatures live close to people and can

be identified by them. At the same time, these emblematic species are quite sensitive to the environmental changes, direct violations on them or large-scale investment actions (Gradev, 2021).

For these purposes was chosen the area of the village Levka SPA "Sakar" (BG0002021) for recovered Lesser Kestrel as a breeding.

That the Sakar Mountain are part of European ecological network Natura 2000 and European Green Belt, which areas are with preserved nature and biodiversity (Yaneva et al., 2021).

The monitoring of the occupied nesting places was carried out in the period March-September 2021, when is the breeding season of Lesser Kestrel. For its implementation standard internationally established methods are used, including observation and follow-up with:

- Binoculars; (Figure 1)
- Field scope tube; (Figure 2)
- Camera;
- Video surveillance. (Figure 3)



Figure 1 Observation of Lesser Kestrel with binoculars / Photo credit: "Green Balkans – Stara Zagora" NGO/



Figure 2. Observation of Lesser Kestrel with field scope tube / Photo credit: "Green Balkans – Stara Zagora" NGO/

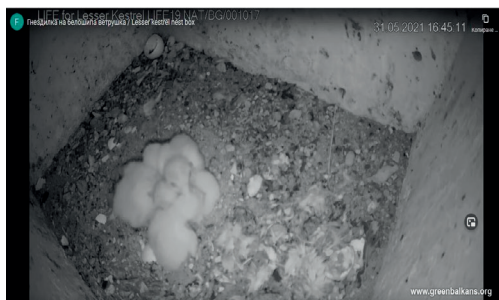


Figure 3. Observation of Lesser Kestrel with video surveillance /Photo credit: “Green Balkans – Stara Zagora” NGO/

In addition to following the nesting sites occupied and breeding success, except daily monitoring through field observation methods direct inspections of artificial nest boxes have been carried out, which are performed during a certain period in order to determine the exact number of hatched chicks (Figure 4).

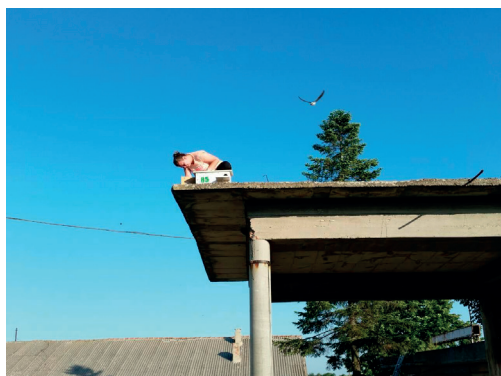


Figure 4. Check the artificial nest box /Photo credit: “Green Balkans – Stara Zagora” NGO/

All methods of observation Lesser Kestrel during the breeding period are selected for the purpose birds should be monitored without direct disturbance. Direct inspections of nesting sites are carried out in a period in which the probability of abandoning eggs or small hatched chicks is minimal.

RESULTS AND DISCUSSIONS

From the surveys conducted in 2021 three types of artificial nest boxes have been identified:

1. Classical wall nest box; (Figure 5)
2. Cavity wall nest box; (Figure 6)
3. Under-roof nest box. (Figure 7)



Figure 5. Classical wall nest box /Photo credit: “Green Balkans – Stara Zagora” NGO/



Figure 6. Cavity wall nest box /Photo credit: “Green Balkans – Stara Zagora” NGO/



Figure 7. Under-roof nest box /Photo credit: “Green Balkans – Stara Zagora” NGO/

All artificial nest boxes are specially designed for the Lesser Kestrel in accordance with the methodology of the Spanish organization DEMA.

The nest boxes are made from materials to be strong, reliable and to protect birds, eggs and young chicks. The material and the structure have to be impermeable to water to avoid flooding of the nest box, which would lead to drowning of eggs or chicks. Several small holes

should be opened in the floor of the nest box to allow drainage of water when necessary. Such openings should be provided in the higher parts of all walls to allow ventilation inside the nest. It is recommended to cover the floor of the nest box with fine sand, to enable the birds form egg-laying cavities and secure mechanical protection of the eggs, since Lesser Kestrels do not build typical nests and there is a risk for the eggs to roll over the smooth flat surface of the nest bottom. The measurements of the entrance hole should be about 6-6.5 cm, to avoid penetration of other bird species, competing with Lesser Kestrels for breeding sites. It is good to put a door on one of the walls, in order to allow the implementation of manipulations or examinations when needed. In the bottom of the nest box have to be with an extra hole and a shutter, allowing easy cleaning of the nest box after the end of every breeding season. The door for inspection and the shutter of the opening for cleaning the nest box was securely fixed and tightened, so that they cannot be opened by martens, domestic cats, rats or other predators.

During the breeding season 2021 in the colony of Lesser Kestrel in the village Levka, part of SPA “Sakar” (BG0002021) is established 25 formed pairs in artificial nest boxes and 11 between 3-4 pairs in natural nesting sites. After the end of the breeding season and data processing it was found that 85% of breeding pairs of Lesser Kestrel prefer to nest in artificial nest boxes. Artificial nest boxes are of great importance in providing safe nesting sites, more than 60 % of the population in Bulgaria use those (Gradev et al., 2021).

In 2020 Society “Nature Park Sakar” and “Green Balkans – Stara Zagora” NGO made and installed 40 artificial nest boxes for Lesser Kestrel near to breeding colony, according to an innovative methodology for the country. The model is borrowed from the Spanish organization DEMA, part of specialized project under the Program LIFE of EU - LIFE-ZEPAURBAN, which is aimed at improving the nesting areas for Lesser Kestrel in some villages in Spain. The artificial nest boxes are not made of ordinary wood and are made of modern building materials with very good insulating properties. This provides additional comfort for

the Lesser Kestrel, protecting them from rain and high temperatures in the summer in the Sakar Mountains.

In 2021 the first successful occupied of the new artificial nests by a pair of Lesser Kestrel was proven (Figure 8).

In 2021, a new method for releasing Lesser Kestrel in Bulgaria was experimented for the first time. To this moment in the framework of the recovery activities of the Lesser Kestrel, the Green Balkans team released only zero-year-old chickens - birds aged between 25 and 30 days, in down plumage.



Figure 8. First occupied artificial nest box from the new methodology /Photo credit: “Green Balkans – Stara Zagora” NGO/

New in the approach was the adaptive aviary - a cage on wheels, which is used as a temporary home for the birds, from where they were later released. This time the released birds were hatched in 2020, i.e., at the age of almost one year. After the aviary was opened, more than half of the released birds were noticed around the release site – Lesser Kestrel Release and Adaptation Module in village Levka, not just in flight, but also actively eating at the feeding place. At least three of the birds have formed pairs in artificial nest boxes placed specifically for the species.

All of these cases confirmation that the artificial nest boxes, constructions especially for the Lesser Kestrel, are recognizable for the species and them easily occupied it. It is an interesting fact that in addition to Lesser Kestrel, artificial nest boxes are also occupied by other birds in the area such as Little owl, Eurasian scops owl, Common starling and sparrow.

CONCLUSIONS

From the surveys have been identified three different types of artificial nest boxes: Classical wall nest box, cavity wall nest box, under-roof nest box.

All studies conducted in 2021 show that Lesser Kestrel adapt extremely successfully to artificial nest boxes and this is a major way to conserve the species as well as increase its numbers. In recent years, a large part of the population of the Lesser Kestrel in Bulgaria nests in artificial nest boxes, which proves that the species easily occupied it.

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