

RECOVERING THE LESSER KESTREL (*FALCO NAUMANNI*) AS A BREEDER IN BULGARIA

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Abstract: The Lesser Kestrel (*Falco naumanni*) is one of the rarest raptors in Bulgaria. Although once a common species, Lesser Kestrel has not been confirmed as a breeder in the country for the past few decades. Having implemented feasibility studies, Green Balkans launched the implementation of direct actions aimed at restoring the species as a breeder in Sakar SPA, a NATURA 2000 site in Bulgaria, through release of juveniles into the wild. With regard to this approach, based on a special methodology designed by DEMA called "Ambiente de Colonia" - a combination of the so called "hacking" and "foster parenting" methods, a Lesser Kestrel Release and Adaptation Module has been established. Lesser Kestrel chicks translocated from Spain are released into the wild. The juveniles are bred in captivity at DEMA's breeding center. A breeding stock has been established at Green Balkans' Wildlife Rehabilitation and Breeding Center (WRBC), consisting of wild birds, which have undergone rehabilitation at rescue centers in Spain and were ceded by the Government of Extremadura (Spain). This breeding stock is also providing offspring to be released.

A total of 286 juvenile Lesser Kestrels were released through the Module as follows – 90 individuals in 2013, 114 individuals in 2014, 82 individuals in 2015. As a result of these actions, the species has been restored as a breeder in Bulgaria. In 2014, there were 8 newly formed pairs, while in 2015 the number of breeding pairs was 9. The number of chicks that fledged in the colony in Levka village, Sakar SPA, was as follows – 15 individuals in 2014 and 17 individuals in 2015.

INTRODUCTION

The Lesser Kestrel (*Falco naumanni*, Fleischer, 1818) is one of the nine representatives of the genus *Falco*, found in the territory of Bulgaria (Simeonov *et al.*, 1990). This small, mainly insectivorous falcon inhabits open steppe

habitats, forming breeding colonies (Cramp & Simmons 1987). The species is distributed across the Palaearctic region, with populations breeding from the Iberian Peninsula to China (Negro 1997), as both European and Asian populations migrate to overwinter in Africa (Negro 1997, Rodríguez *et al.* 2009, Catry *et al.* 2011, Rodríguez *et al.* 2011).

By the mid-20th C, the Lesser Kestrel was considered to be one of the most common birds of prey in Europe (Bijleveld 1974). Like with other species using arable areas, the abundance of the Lesser Kestrel has decreased (Hagemeijer, Iankov, 1997). Probably due to the intensification of agriculture, in the past few decades the European population of the species has marked a severe decline (Tella *et al.*, 1998; Birdlife International, 2004).

In Bulgaria, at the close of the 19th C the Lesser Kestrel was reported as “nesting everywhere” (Radakoff, 1879), and in the mid-20th C as “fairly common” and widely distributed (Patev, 1950, Arabadzhiev, 1962). This was probably followed by a considerable decline in the species’ abundance and Michev (1982) reported a change in the status of the Lesser Kestrel in the period 1950-1982 – from “breeder” to “rare breeder”. In 1985, the species was listed in Bulgaria’s Red Data Book under the “threatened” category (Botev 1985) and later on described as “obscure” (Cramp and Simmons, 1987). In the period 1990-1995, the population was estimated at 10-100 pairs (Biber 1996); Iankov, *et al.* 1994 reported not more than 4 colonies. The abundance of the species was estimated at 0 to 5 breeding pairs in the period 1995-2000 (BirdLife International 2004, Barov 2002). In 2000-2010, there were no breeding birds reported (Iñigo, Barov 2011), i.e. no confirmed breeding of the species (Barov *et al.* 2007). Later, according to the updated edition of the Red Data Book of Bulgaria, the species was announced critically endangered (CR) (Barov *et al.* 2011).

According to the implemented feasibility study and the developed habitat model, although the neighboring countries (Greece and Turkey) still harbor breeding colonies of the species, natural re-colonization of the Lesser Kestrel in Bulgaria is deemed impossible (Kmetova, 2010, and Kmetova *et al.* 2012). Therefore, in 2013 Green Balkans launched the implementation of direct activities to recover the Lesser Kestrel as a breeder in Bulgaria, which, according to IUCN/SSC (2013), are considered reinforcement of the species.

MATERIALS AND METHODS

The recovery of the Lesser Kestrel in Bulgaria was done in line with the reintroduction guidelines of IUCN/SSC (2013).

A habitat model for the restoration of the Lesser Kestrel in Bulgaria (Kmetova, 2010) identified the area of the village of Levka, Sakar SPA (BG0002021), a NATURA 2000 site in Bulgaria, as one of the most suitable regions for the recovery of the species as a breeder.

Also, the Lesser Kestrel was identified as a target species subject to protection in Sakar SPA BG0002021 (MOEW, 2015).

The design of the Lesser Kestrel Release and Adaptation Module (LKRAM) established in Bulgaria was developed by DEMA, following the methodology *Ambiente de colonia* (Colony environment) (Antolín, 2001). This method is based on the combination of the so called “hacking” (Sherrod, 1987) and “foster parenting” (Jones, 1996) methods with some additions and improvements. However, the design was further enhanced when applied in Levka, Sakar SPA.

This method provides for accommodation of juvenile, non-fledged individuals in release boxes equipped with an opening enabling direct access to the outer area. The juveniles are free to leave the facility once they feel confident and ready. Outside the release boxes, the chicks walk along ledges to strengthen their confidence before their first attempts to fly.

Adult individuals, used as foster parents, are placed in a special aviary mounted in front of the release boxes. The chicks in the release boxes are separated from the adults with a mesh net, providing visibility of the landscape in the vicinity of the Module. Urged by their parental instinct, the adults feed the chicks through the mesh, which further strengthens the process of imprinting to the release site.

Artificial nest boxes are placed next to the release boxes and the aviary with the foster parents, which are then occupied by the birds released in previous years after their return from migration. The Module is equipped with windows enabling individual identification of the birds in the colony. In addition, a video monitoring and surveillance system is installed to provide a general picture of the situation in the different sections of the Module.

Four adult birds are placed in a suspended cage, attached by its back side to the wall of the building where the Module is established. The outer walls of this cage are covered with wire-net of 1.5 x 1.5 cm mesh. Thus, the birds in the cage have visibility of the entire vicinity and possibility to communicate with the birds flying in the area. The main purpose of the birds in the cage is to be used as foster parents of the chicks on one hand, and, on the other, to attract and strengthen the attachment of the released juveniles and other wild Lesser Kestrels to the area. However, two nest boxes have also been provided for these pairs used as decoys, to secure suitable nesting conditions, if needed, and shelter in case of bad weather or predator attacks.

The juvenile individuals are transported and placed in the Release and Adaptation Module at the age of about 20 days, each duly marked and banded.

Specialized food (mice, insects, and day old chicken chick) is provided on a daily basis both for the juveniles and the adult Lesser Kestrels. The food is served twice a day (morning and evening) through special pipes so that the birds have no direct visual contact with the keepers.

Once the juvenile Lesser Kestrels leave the release boxes, the food is provided on the roof of the aviary with the adult birds. The feeding time is a

suitable moment to monitor the abundance and presence of individuals, their behavior, relations, etc. Direct observation through a one-way window enables precise identification of individuals through their color rings. Also, through these observations the keepers can easily detect the presence of wild, non-banded birds from other colonies. In parallel, when needed, the team implements monitoring of individuals, pair formation, nest box occupancy, etc. from observation points outside the Module, using suitable equipment such as binoculars and spotting scopes. Such data is also gathered through the video surveillance system comprising 15 cameras and DV-R providing an important advantage, namely storing records that can be checked later.

Juvenile birds from Spain were released at the Module. Using MHC markers, it has been established that there is no genetic differentiation among western European birds (from Spain, France, Italy or Greece). However, these European birds differ genetically from those sampled in Israel and Kazakhstan (Rodriguez *et al.* 2011). Therefore, the launch of the reinforcement of the Lesser Kestrel in the territory of SPA was absolutely possible and scientifically grounded.

The released birds were banded with metal ornithological rings, and the separate batches were backed up with the necessary CITES certificates.

The individual identification of birds was secured through a color-ring scheme (orange ring with a black three alpha code starting with the letter 'B', and orange ring with a black two symbol alpha-numeric code) coordinated with EURING.

Ring recording was done on a daily basis – 2 to 6 hours a day, from March to October, implemented by one or two members of the team, depending on the number of birds. Rings were read as follows: from inside, through the window, from a distance of up to 2 m, and/or from outside, through a 60x spotting scope, from a distance of not more than 50 m.

In accordance with Cheylan's (1981) classification, the definition of the breeding parameters used in this study was: (1) phenology or date of egg laying, which was assimilated with the beginning of incubation; (2) clutch size, the number of eggs in the entire clutch; (3) hatching success, the percentage of eggs that hatched in relation to the total number laid; (4) productive pairs, the number of pairs that laid eggs; (5) productivity, the number of chicks fledged in relation to the number of monitored territories; (6) breeding success, the number of chicks fledged in relation to the number of nests in which eggs were laid; (7) fledging rate, the number of chicks fledged compared to the number of nests with chicks.

RESULTS AND DISCUSSION

Provision of birds for the recovery of the species in Bulgaria:

Lesser Kestrel chicks translocated from Spain were released into the wild in Bulgaria. The juveniles were bred in captivity at DEMA's breeding center.

A breeding stock has been established at Green Balkans' Wildlife Rehabilitation and Breeding Center, consisting of 40 wild birds, which have undergone rehabilitation at rescue centers in Spain and were ceded by the government of Extremadura, Spain.

This breeding stock also provided offspring to be released. When needed, eggs and abandoned chicks from the colony in Levka were also hatched and reared at Green Balkans' Wildlife Rehabilitation and Breeding Center.

A total of 286 juvenile Lesser Kestrels were released through the Module as follows – 90 individuals in 2013, 114 individuals in 2014, 82 individuals in 2015 (see Table 1).

In addition, already in the first year, the Module was visited by two juvenile birds. In the following years, the number of birds (of different sex and age) from wild populations (non-banded) that visited the Module was bigger: 8 individuals in 2014 and 9 individuals in 2015.

Table 1. Origin of the 286 Lesser Kestrels released/fledged at the LKRAM in the village of Levka (2013-2015)

Source of chicks released/fledged at the LKRAM Levka:	2013	2014	2015
DEMA Breeding Center	90	60	45
Green Balkans WRBC	-	29	20
Levka breeding colony	-	16	17
Green Balkans WRBC - resqued eggs/chicks from the breeding colony in Levka	-	9	0
TOTAL	90	114	82

Breeding parameters

Following the release of individuals that took place in the first year (2013), a relatively stable group of 8 juveniles remained in the area of the Module. In the following years, the number of resident birds in the area of the colony continued to increase – 20 Lesser Kestrels in 2014 and 40 in 2015, most of them already mature individuals.

Based on the behavior and plumage (brood patches) of the Lesser Kestrels recorded at the LKRAM in Levka, the number of pairs breeding in the area of Levka was estimated at 8-9 (2014) and 9-13 (2015) respectively. Despite our efforts, we could not identify the location of all breeding pairs.

A particularly interesting observation was the fact that the breeding pairs in the two breeding seasons of the colony established in Levka included birds from the wild population. In 2014 this was an adult, more than 2 years old male, and in 2015 – an adult female individual.

Of all confirmed pairs in 2014, there were 8 newly formed pairs, while in 2015 the number of breeding pairs was 9. The number of chicks that fledged in the colony in Levka village, Sakar SPA, was as follows – 15 individuals in 2014 and 17 individuals in 2015.

Breeding parameters were calculated only for confirmed and controlled breeding pairs. The breeding parameters are presented in Table 2.

Table 2. Breeding parameters of the Lesser Kestrel colony at the LKRAM Levka, Bulgaria

Year	Released juveniles	Registered sexually matured	Resident in the home range	Established pairs	Confirmed pairs and laid eggs	Incubating pairs	Pairs with hatched chicks	Pairs with a reared chick
2013	90	0	8	0	0	0	0	0
2014	114	46	20	8 to 9	8	7	5	5
2015	82	59	40	9 to 13	9	9	5	5
Year	Eggs laid	Chicks hatched	Clutch size	Brood size	Success Rate	Productivity	Breeding Success	Fledging Success
2013	0	0	0	0	0	0	0	0
2014	37	16	4,6 (n=8)	4 (n=5)	0,62 (n=8)	2 (n=8)	2,28 (n=7)	3,2 (n=5)
2015	41	17	4,5 (n=9)	3,4 (n=5)	0,55 (n=9)	1,88 (n=9)	1,88 (n=9)	3,4 (n=5)

An year after the launch of the release of Lesser Kestrels in the village of Levka (2013), on June 23rd, 2014 a male individual in distress was received at Green Balkans' Wildlife Rehabilitation and Breeding Center. The bird was found in the territory of Lukoil Neftochim Burgas AD.

The immediate on-site inspection (Konstantin Popov, pers. comm.) established the presence of at least 2 pairs.

In late May 2015, in cooperation with Lukoil Neftochim Burgas AD, we estimated the population and confirmed at least 3 breeding pairs. The Lesser Kestrels nested on the technological facilities in the area of Lukoil Neftochim Burgas AD, breeding in former nests of Jackdaws (*Corvus monedula*), as the abundance of the latter amounted to more than 30-40 pairs. Some 50 pairs of Common Kestrels (*Falco tinnunculus*) were also breeding in that territory.

The identification of this breeding locality of Lesser Kestrel near the town of Burgas, situated on the Black Sea coast, at a distance of 117 km from Levka, which

coincided with the launch of the species restoration activities implemented there, gives us a reason to believe that there is a connection between these two events. Moreover, already in the year following the establishment of the LKRAM, the team reported a fourfold increase in the number of birds from the wild population recorded in the area of the colony in Levka. The existence of the colony in Levka resulted in an evident flow of wild individuals toward the territory of Bulgaria.

CONCLUSIONS

1. The methodology *Ambiente de colonia* was applied for the first time in Bulgaria, being further enhanced, adjusted, and adapted to the specific environment.
2. The applied methodology proved to be successful and can be used in other regions of Bulgaria.
3. The functioning of the LKRAM established in the village of Levka as a facility for release of juvenile Lesser Kestrels can continue in the future, in order to secure natural re-colonization of habitats suitable for the species.
4. The Lesser Kestrel breeding stock established at Green Balkans' WRBC can be considered a national source of juvenile individuals needed for other projects for the recovery and restoration of the species in Bulgaria.
5. As a result of the actions implemented, the species has been restored as a breeder in Bulgaria.
6. The LKRAM in Levka, Sakar SPA, attracts birds from the wild population to the interior of the country, thus contributing to the re-colonization of the species in Bulgaria.

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