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HIGH VOLTAGE PYLONS AS ROOST SITES OF THE LESSER KESTREL (*FALCO NAUMANNI*) DURING THE PRE-MIGRATORY PERIOD IN THE SOUTHEASTERN BALKANS

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Abstract

Although the Lesser Kestrel (*Falco naumanni*, Fleischer, 1818) was a widespread species in Bulgaria, there are no detailed surveys on its biology and ecology like the ones implemented in countries still harbouring abundant populations, such as Spain, Italy, Greece, etc. After 2014 when "Green Balkans", as a breeder, launched the reinforcement of the species and its recovery in Bulgaria now it is possible to study the species using modern technologies and methods like radio and satellite transmitters.

The known roost sites (n=12), the subject of our study, are located from 55 to 745 m above the sea level, as the main part of them is situated about 100 - 200 m above the sea level. The most numerous roost site, which is located in the North-eastern Greece, is comprised of about 80 individuals but in the other roost sites the number of the Lesser Kestrel reach 20-40 individuals. During the period 2014 - 2021 the Lesser Kestrels in the largest known colony of the species in Bulgaria, which is located in SPA Sakar, have used different high voltage pylons from the same power lines, alternating pylons depending on the type of agricultural crops in the area. It has been found that the birds express preferences for cereal crops around high voltage pylons, which they use as roost sites.

***Keywords*:** communal roost sites, LIFE for Lesser Kestrel, post-breeding dispersal.

INTRODUCTION

The Lesser Kestrel (*Falco naumanni Fleischer, 1818*) is a small diurnal and colonially breeding, long-distance trans-Saharan migrant raptor (Sarà et al., 2019). The species breeds in South Europe (Iberian, Italian and Balkan peninsulas), North Africa, Turkey, parts of the Middle East, and Central Asia (Kmetova et al., 2020). The species often migrates not directly to the African winter grounds but exhibits a post-breeding/pre-migratory staging behaviour that lasts several weeks (Newton, 2008) forming communal roost sites of up to several thousand individuals. The Lesser Kestrel pre-migratory areas are of great importance and have been highlighted in several studies in Albania, Greece, Spain, Italy and others (Olea et al., 2004, Minias et al. 2009, De Frutos et al., 2010, Sarà et al., 2014, Bounas & Sotiropoulos 2017, Krištín et al., 2020). On the Balkan Peninsula, communal roost sites numbering thousands of individuals during pre-migratory were registered in Albania including the central Albanian Adriatic coast (Minias et al., 2009, Bino et al., 2016, Bounas &

Sotiropoulos 2017, Krištín et al., 2020), and also in North-western Greece (Bounas et al., 2016). In these cases, birds gather in communal roost sites, located mainly in settlements congregating exclusively on full-grown poplars (*Populus canadensis*) and plane trees (*Plantanus orientalis*). A maximum of 200 individuals were registered in pre-migratory communal roost sites in Bosnia and Herzegovina (Topić & Topić, 2022), which used roofs of farm buildings and low and medium voltage power lines as perches. In Bulgaria for the period 1994 - 2014, several observations of the Lesser Kestrel during the period of post-breeding dispersal have been described, and these are sightings of single birds or several hunting and feeding individuals without reports about gathering in communal roost sites (Daskalova et al., 2016).

At the same time in the Action Plan for the Lesser Kestrel in the European Union, the loss of pre-migration roost sites is described as one of the factors increasing adult mortality - decreased fitness in critical periods (Iñigo & Barov, 2010). In the National Action Plan of Bulgaria, the mortality at roost sites during migration and wintering is described as one of the threats with high impact (Marin et al., 2020). In this regard, after the restoration of a breeding population of the species in Bulgaria by "Green Balkans" NGO (Gradev et al., 2016), the monitoring of the communal roost sites during the pre-migratory period of this species in Bulgaria and the neighbouring countries is one of the important conservation activities carried out by "Green Balkans".

MATERIALS AND METHODS

The present study was conducted by our team (joint representatives of "Green Balkans - Stara Zagora" NGO, Agricultural University, Fund for Wild Flora & Fauna and one Independent researcher) in the period 2014 – 2021, through the use of radio (2.38 gr. transmitters - PIP Ag393, produced by Biotrack) (Zhelev et al., 2016), satellite (5g Solar PTT-100 backpack - Platform Terminal Transmitters, Microwave Telemetry) (Gradev et al., 2016a) and GPS/GSM (GPS-GSM Logger MINI - delivered by INTERREX-RINGS) transmitters. All these three types of devices have been attached to the bird according to the standard method described as "backpack" (Garcelón, 1985) (Fig. 1). The weight of the transmitter and teflon ribbons, stitches, and glue, with which the device is attached to the bird's body, does not exceed 2.8-2.4% of the bird's mass. Thus, the rule is that the total weight of the equipment should not exceed 4% of the bird's weight, so that the behaviour of birds of prey is not negatively affected (Sergio, 2015).

Fig. 1. Real size model of male Lesser Kestrel equipped with a satellite transmitter.

A literature review was also carried out by the representative of the Agricultural University, as well as field surveys were carried out by all other team members. Field research and verification of data from transmitters in the field were carried out in some of the most important areas part of the ecological network NATURA 2000 in Southern Bulgaria - Sakar (BG0002021), Kresna (BG0002003), Besaparski ridove (BG0002057), Sveti Iliyski vazvishenia (BG0000401). In a similar approach, by using the data from the transmitters, field studies were also carried out near some NATURA 2000 sites in North-eastern Greece - Oros Pangaio Kai Noties Yporeies Tou (GR1150011) and Delta Evrou (GR1110006).

RESULTS AND DISCUSSION

In the period 2014 - 2021 in total over 10 communal roost sites during pre-migratory period of this species have been found. All of them are located in Southern Bulgaria (n= 9) and North-eastern Greece (n= 3), as different numbers are registered at each of the sites, with counts from 10 up to 80 individuals. So far, no congregations of the Lesser Kestrel have been reported in these areas. In most cases, roost sites are located at high voltage pylons in Bulgaria, while in Greece at high antennas, fences, and light poles of a gas distribution station, and in only one case on plane trees (*Plantanus sp.*) (Fig. 2).

With the exception of plane trees, similar structures used by the Lesser Kestrel for communal roost sites have not been reported so far on the Balkan Peninsula. Some of the roost sites are located nearby (not more than a few kilometres) two of the known colonies of the species in Bulgaria, as there are registered mainly birds from nearby colonies. In the other registered pre-migratory congregations of the Lesser Kestrel, the origin of the birds has not been established. In 2021, a peak in the newly discovered roost sites has been observed and at least four new similar locations in Bulgaria have been discovered, probably due to an increase in the breeding numbers of the species at the national level described by Project LIFE for Lesser Kestrel, LIFE19 NAT/BG/001017. The known roost sites (n=12), the subject of our study, are located from 55 to 745 m above sea level, as the main part of them is situated about 100 - 200 m above sea level (Fig. 3.). The most numerous roost site numbers about 80 individuals and was registered in North-eastern Greece (Fig. 4.), and in the other cases, the number of the Lesser Kestrel counts around 20-40 individuals. In the period 2014 - 2021 within the largest known colony of the species in Bulgaria, which is located in SPA Sakar, the Lesser Kestrels have used different high voltage pylons from the same power lines, alternating pylons depending on the type of agricultural crops in the area. It has been found that the birds express preferences for cereal crops around high voltage pylons, which they use as roost sites.

Fig. 2. High voltage poles and high antennas used by the Lesser Kestrel for communal roosting sites in Southern Bulgaria and North-eastern Greece.

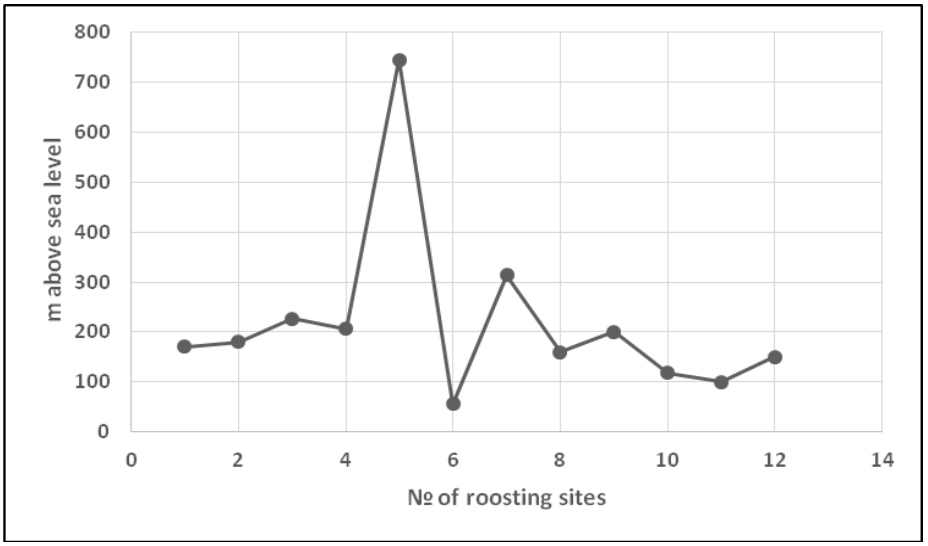

Fig. 3. Altitude of the communal roost sites during pre-migratory period of the Lesser Kestrel in Southern Bulgaria and North-eastern Greece

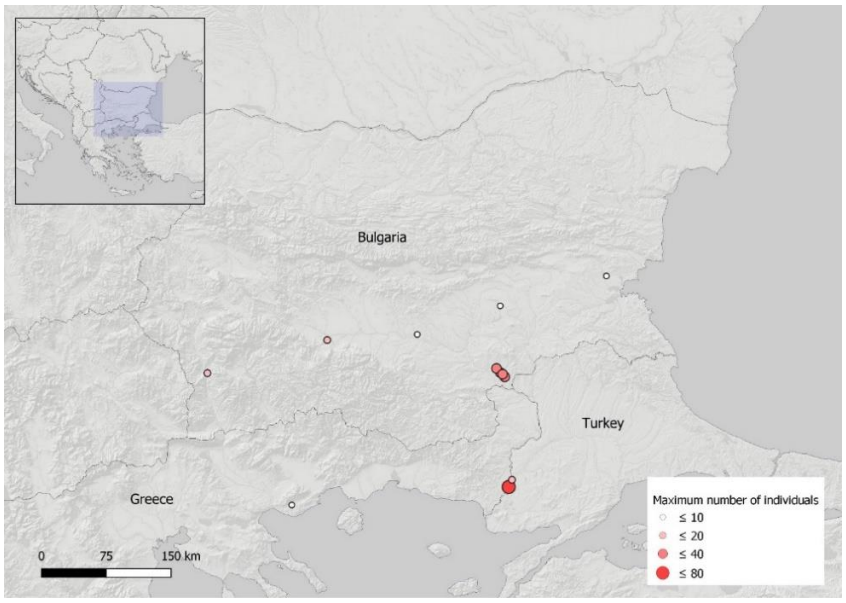

Fig. 4. Distribution of communal roost sites during pre-migratory period of the Lesser Kestrel in Southern Bulgaria and North-eastern Greece.

CONCLUSION

Although the communal pre-migratory roost sites of the Lesser Kestrel located in Southern Bulgaria and North-eastern Greece, the subject of the present study, are not as numerous as those registered in other parts of the Balkan Peninsula (Albania and North-western Greece), they are of considerable importance for the conservation of the species in the region. In addition, the monitoring of these roosts is a prerequisite for collecting up-to-date data on the origin of the birds, the relationships between individual colonies of the species in the Balkans, assessment of threats, and undertaking conservation measures. The use of artificial structures (high voltage pylons, high antennas, fences, light poles) by the Lesser Kestrel as communal roost sites gives variability in the selection of roost sites during the post-breeding/pre-migratory period.

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