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## Ecological study on the Nubian Nightjar, *Caprimulgus nubicus*, at Fifa Nature Reserve, southern Jordan

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### ABSTRACT

The Nubian Nightjar is extremely rare and endangered species in the Middle East. Minimum population was estimated to be 45 calling males in Fifa area in Jordan. There was a significant positive relationship between the tree cover and the number of calling males with the number of calling males increasing as tree cover increased. This study suggests that there is breeding population of Nubian Nightjar in Fifa Nature Reserve and surrounding areas and the presence of the Nubian Nightjar in Fifa Nature Reserve is of special conservation value, where this little known species is breeding, thus more attention to protect its natural habitats should be addressed.

**Key words:** Nubian Nightjar, Jordan, Fifa, nesting habitat.

### INTRODUCTION

The Nubian Nightjar *Caprimulgus nubicus* Lichtenstein 1823 is the smallest and slightest Nightjar in Western Palaearctic (Snow & Perrins, 1998). The species is relatively widespread in the arid part of eastern Africa, though recorded as uncommon and scarce (Perlman, 2008). In the Middle East, it was reported along the Rift Valley in southern Palestine and the Red Sea coast of southern Arabian Peninsula (BirdLife International, 2012).

The status of the Nubian Nightjar in Jordan is unknown. Only three records of Nubian Nightjar were documented in Azraq during 1963 (Nelson, 1973), in addition, a record of a breeding population was recorded in Wadi Araba in the 1980s (Shirihai, 1996). In Fifa Nature Reserve, south to the Dead Sea, there are unpublished records of Nubian Nightjar calls (RSCN, 2010, 2011). In Palestine, the natural history of the Nubian Nightjar was studied by Perlman (2008), including data on its diet, population estimate and ecological requirements.

Shirihai (1996) indicated that the population of the Nubian Nightjar in the region is declining greatly in recent decades, and is regarded as critically

endangered. The main reason for the population decline is presumably habitat loss due to agricultural development.

The Nubian Nightjar is confined to hot dry low altitudes (Snow & Perrins, 1998). In Palestine, the Nubian Nightjar requires heterogeneous habitats, with dense salt marsh patches of at least 50 ha for breeding and roosting, and adjacent open areas for foraging especially near water sources (Perlman, 2008). In East Africa it is confined in frequent desert thorn scrub in close proximity to water, inhabiting open *Acacia* bush in close proximity to wells that provide a permanent overflow of water (Cramp, 1985). In Jordan, the breeding habitat of Nubian Nightjar was never studied. Eggs were found in nests in mid April in Palestine (Snow & Perrins, 1998).

The present nesting behavior of the Nubian Nightjar in Jordan is unknown (Al-Shamliah *et al.*, 2005). The objectives of this study were to determine the minimum population size of Nubian Nightjar, the relationship between number of calling Nubian Nightjar males and percent tree cover, and the relationship between number of calling Nubian Nightjar and distance to nearest farms in Fifa Nature Reserve, southern Jordan.



**Figure 1:** Nubian Nightjar, *Caprimulgus nubicus* adult, Fifa Nature Reserve, Jordan, April 2014. © Jérôme DUBOS.

## MATERIALS AND METHODS

### Study Site

Fifa Nature Reserve (FNR) is located at the southern end of the Dead Sea along the western border of Jordan (30° 56' N, 35° 24' E) (Figure 2). It is centered between Wadi Um Jufna in the north, Wadi Dahel to the south and west of Fifa village. The reserve area is 26.4 km<sup>2</sup> with elevation -421 m (s.l.). It is listed as an Important Bird Area according to Birdlife International.

Four vegetation communities have been identified at FNR; *Tamarix tetragyna*, *Acacia tortilis*, *Haloxylon salicornicum* and mud flat (RSCN, 2011). *Tamarix tetragyna* is the most widespread tree and is found in all vegetation communities. *Tamarix* dominated vegetation community is the largest habitat in the study area (24.6 km<sup>2</sup>), followed by *Acacia tortilis* (3 km<sup>2</sup>) and *Haloxylon salicornicum* (2.6 km<sup>2</sup>). In addition, farmland surrounds the entire study area. The northern part of the reserve consists of mudflat with no tree and very little shrub covers (Figure 2).

### Field Methods

Surveys were carried out between April 14-16 and May 15-16, 2014, for a total of six days. Thirty-four spot counts were selected randomly covering farm areas, *T. tetragyna* and *A. tortilis* communities. Counts were performed within a period of one hour after dusk until one hour before dawn for 15 minutes each. The detection radius of Nubian Nightjar calls was estimated at 150 m by playing audio calls and walking in a straight distance until the call could no longer be clearly heard. The Nubian Nightjar was identified either by the distinctive male calls during breeding season, or by direct observations.

Tree cover percent was determined in each survey point by two perpendicular line transects (300 m), post-hoc, using satellite imagery in Google Earth to determine if there is a relationship between percent tree cover and number of calling males. In addition, the distance between each point and nearest farm was measured to determine if there is a relationship between number of Nubian Nightjar calls and the distance to nearest farms. ANOVA was used to analyze the data.

## RESULTS

Minimum population size was estimated to be 45 calling males. In addition, eleven males of the 45 calling males were observed. Figure 2 shows sites and the number of calling males. Number of calls varied between sites ranging from 0-5 ( $\bar{x}$  = 1.29, STD =  $\pm$ 0.47). Most birds were recorded from *T. tetragyna* tree cover. Figure 3 shows the relationship between tree cover and the number of calling birds. Calls number significantly increased as tree cover increased ( $F_{1,32}=26.97$ ,  $t=5.19$ ,  $r^2=0.46$ ;  $P<0.0001$ ). There was no significant relationship between the number of calling nightjars and distance of the sampling point to the nearest farm ( $F_{1,32}=0.14$ ,  $t=0.37$ ,  $r^2=0.004$ ;  $P=0.71$ ; Figure 4).

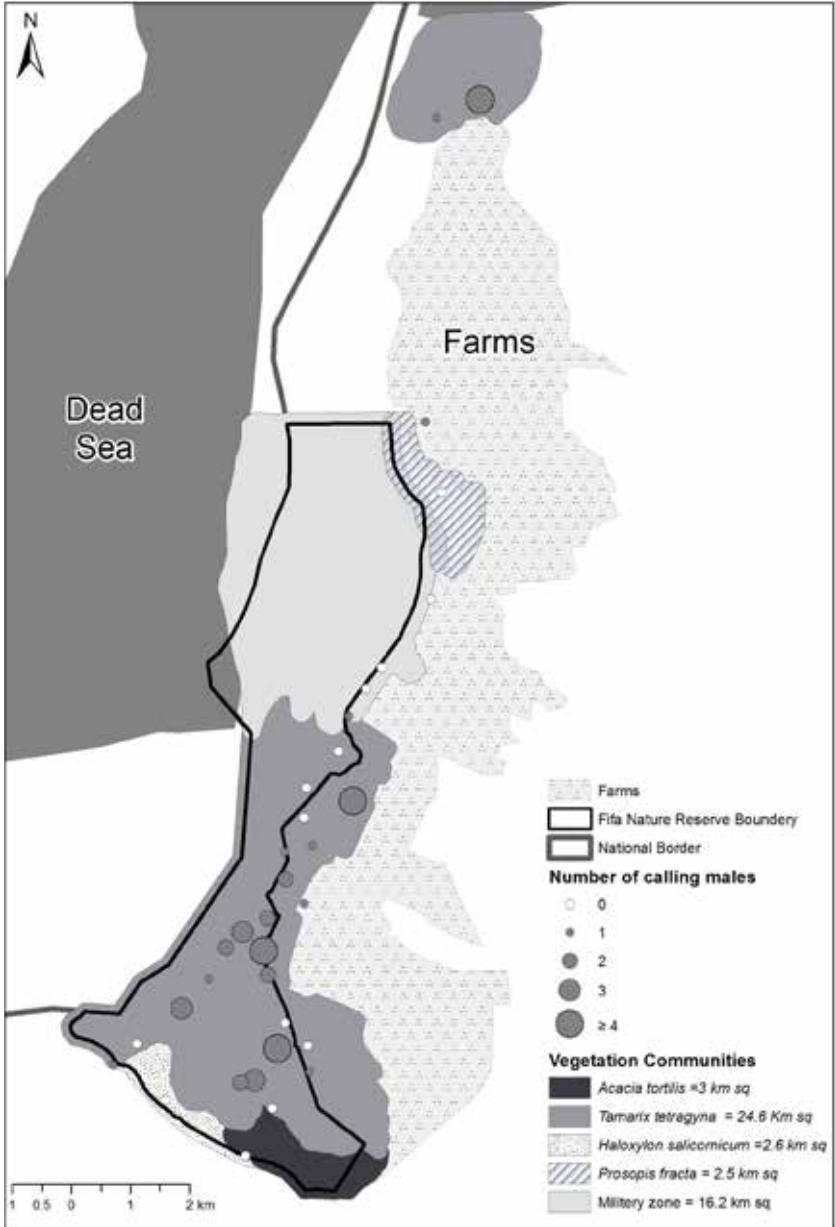


Figure 2: Results of Nubian Nightjar counts in Fifa Nature Reserve.

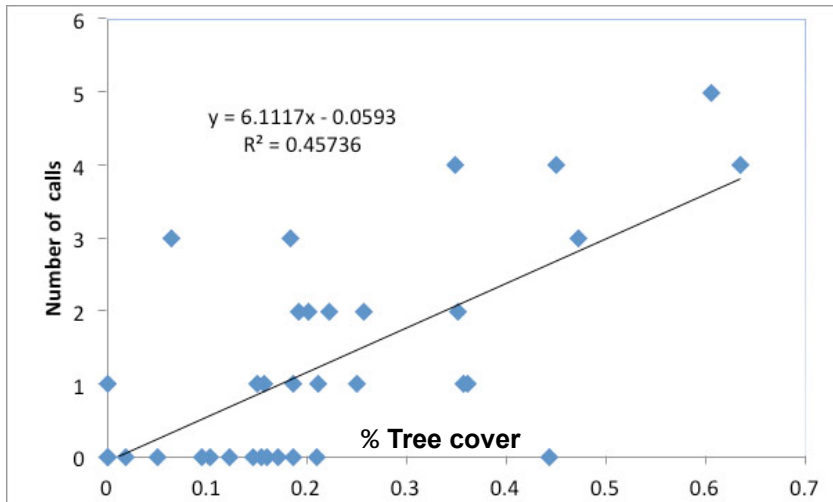


Figure 3: The relationship between percent tree cover and number of calling Nubian nightjar.

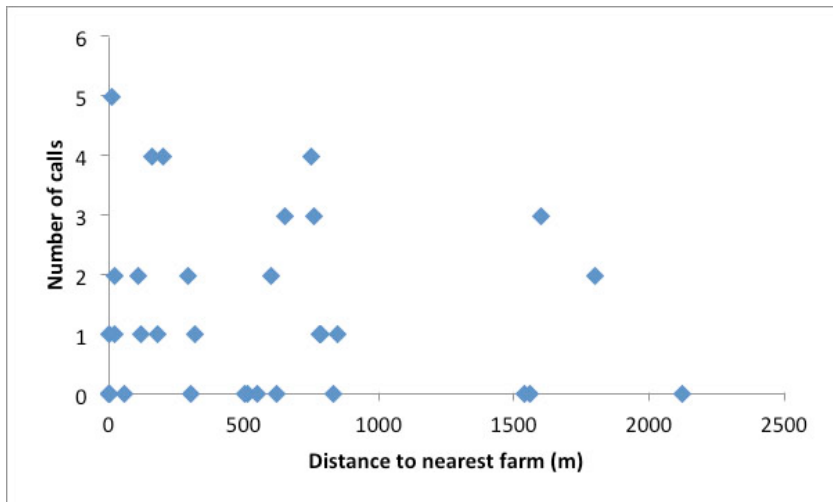


Figure 4: The relationship between distance to nearest farm and number of calling Nubian nightjar.

## DISCUSSION

This study confirmed the presence of the Nubian Nightjar based on both the distinctive male’s calls and actual observations in FNR. Perlman (2008) suggested that FNR population together with the Palestinian one may represent a larger population in the region. In this study 45 callings were

recorded, higher than those recorded in the Palestinian side across the borders (Perlman, 2008). This may be attributed to the rich habitat suitable for nesting and breeding of the Nubian Nightjar in FNR, compared to the smaller and more fragmented habitats in Palestine (Alon & Mayrose, 2003).

Perlman (2008) suggested that the main reasons for the decline of Nubian Nightjar population is the loss of breeding and foraging habitats and the excessive use of the natural water sources for agriculture. This study showed that the highest number of Nubian Nightjar calls were recorded in *Tamarix* dominated habitat with tree cover more than 25% (Figure 3). Higher tree cover has greater potential to host multiple nests and better conceal nests from predators and disturbance.

Holyoak (2001) reported that nightjars preferred foraging in agricultural fields compared to their relative distribution in the total area of their home range. This study found no relationship between the number of calling males and proximity to agricultural areas.

Snow & Perrins (1998) stated that the Nubian Nightjar population in Palestine is an isolated population from the global population in Africa and southern Arabian Peninsula. This study confirms the presence of a breeding population of the Nubian Nightjar in southern Jordan. The presence of the Nubian Nightjar in FNR is of special conservation value, where this little known species is breeding, thus more attention to protect its natural habitats should be addressed.

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