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Nesting of Sooty Falcon *Falco concolor* (Temminck, 1825) in Libya 2020–2024

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Abstract The geographical location of Libya makes it an important stopover area for many bird species during migration. In addition to its vast deserts, the country is characterised by diverse environments – including mountains, plains, desert oases, and unique rock formations – which attract many species adapted to these conditions. Among the most notable are birds of prey. One falcon species that commonly nests in Libya is the globally threatened Sooty Falcon *(Falco concolor)*, whose breeding range extends from eastern Libya and Egypt to the Arabian Peninsula. It winters primarily in southeast Africa and Madagascar. Data collection was carried out through field visits conducted between 2020 and 2024 by professional hunters cooperating with the Al-Hayat Organization for the Protection of Wildlife and Marine Organisms, as well as by members of the organisation. The number of observed nests ranged between 70 and 180, with the highest number recorded in 2024 and the lowest in 2023. Most of the data – whether collected by hunters or by the organisation's team – indicate that brood size typically ranges from two to three chicks. A comprehensive study investigating population trends, nesting success, and the factors influencing breeding performance of the Sooty Falcon is essential to support effective conservation efforts.

Keywords: threatened species, nesting success, Libyan Desert, conservation

Összefoglalás Líbia földrajzi elhelyezkedése miatt a madarak vonulási útvonalán fontos pihenőhelynek számít. A nagy kiterjedésű sivatagok mellett az ország változatos élőhelyekkel rendelkezik – hegyekkel, síkságokkal, sivatagi oázisokkal és egyedülálló kőzetformációkkal –, amelyek számos, ezekhez a körülményekhez alkalmazkodott fajt vonzanak. Ezek közül kiemelkedő jelentőségűek a ragadozómadarak. Líbia gyakori költőfaja a globálisan veszélyeztetett hamvas sólyom *(Falco concolor)*, amelynek költési elterjedése Kelet-Líbiától és Egyiptomtól egészen az Arab-félszigetig húzódik. A téli időszakot elsősorban Délkelet-Afrikában és Madagaszkáron tölti. Az adatgyűjtés 2020 és 2024 között történt, terepi bejárások során, amelyeket a vadon élő állatok és tengeri élőlények védelmével foglalkozó Al-Hayat szervezettel együttműködő hivatásos vadászok, valamint a szervezet munkatársai végeztek. A megfigyelt fészkek száma 70 és 180 között mozgott; a legtöbbet 2024-ben, a legkevesebbet 2023-ban észlelték. A rendelkezésre álló adatok – legyenek azok vadászoktól vagy a szervezet csapatától – azt mutatják, hogy az átlagos fészekaljméret két vagy három fióka. A hamvas sólyom állománytrendjeinek, költési sikerének és a költési teljesítményt befolyásoló tényezőknek az átfogó vizsgálata alapvető fontosságú a hatékony természetvédelmi intézkedések megalapozásához.

Kulcsszavak: veszélyeztetett faj, költési siker, Líbiai sivatag, természetvédelem

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Introduction

The area of Libya is estimated to about 1,665,000 km^2, with approximatively 66% of this area consisting of true desert, and vast arid plain. Only a narrow coastal strip represents the green patch of the country (Bahor 2023). Libya's geographical location in the southern Mediterranean and its position in North Africa has made it a stopover area for many migrating bird species. In addition to its vast deserts, the country is characterised by diverse environments – including mountains, plains, desert oases, and unique rock formations – which attract many species, especially birds of prey, adapted to these conditions.

The Libyan bird list includes approximately 36 species of birds of prey, some of which are common and have recent records, while others are rarely seen or may have been observed only once or twice. Of these, 11 species of falcons are found in Libya, some of which are migratory, others are resident, and nest in Libyan territories (Isenmann *et al*. 2016).

A common falcon species that nests in Libya is the Sooty Falcon *(Falco concolor)*, which has a range extending from eastern Libya and Egypt to the Arabian Peninsula, and Pakistan, and winters primarily in southeast Africa and Madagascar. It is a globally threatened – vulnerable – species. The species has been recorded in Libya since the 1950s as a nesting migrant (Bundy 1976, Isenmann *et al*. 2016), and breeding is known to be restricted to the eastern part of the Libyan Desert near Jaghboub (Booth 1961). However, the western limit of its breeding range is still poorly documented and may extend into Fezzan (Bundy 1976). Generally, the Sooty Falcon breeds in colonies in hot, arid and semi-arid deserts, as well as in non-vegetated coastal habitats. Its breeding period coincides with the migration season of birds, especially small birds, which it feeds on in the autumn (Clark & Davies 2018).

In general, raptors in Libya have not been extensively studied, especially the Sooty Falcon, which nests densely in the south eastern region of the country. The aim of this study was to present the first dataset about the Libyan Sooty Falcon population, based on the surveys done in 2020–2024 in the eastern part of the country, which was compiled through coordinated effort specifically targeting the species.

Methods

The study area is located in eastern Libya, extending from the Jaghboub region (286 km south of Tobruk) to the south of Tazerbu (about 400 km northeast of Kofra), covering an estimated area of approximately 310,000 km^2 *(Figure 1A)*. The study area primarily consists of arid desert land with quicksand dunes and numerous low-altitude rock formations. It is surrounded by mountain ranges to the southeast and west, while to the north, it extends into the Jaghboub Mountains region.

The data collection method was based on visits by professional hunters cooperating with the Al-Hayat Organization for Protection of Wildlife and Marine Organisms (7 people), as well as field surveys conducted by members of the organization (5 people) to the area from 2020 to 2024. Moreover, the visits were to the same nesting area and the same nests,

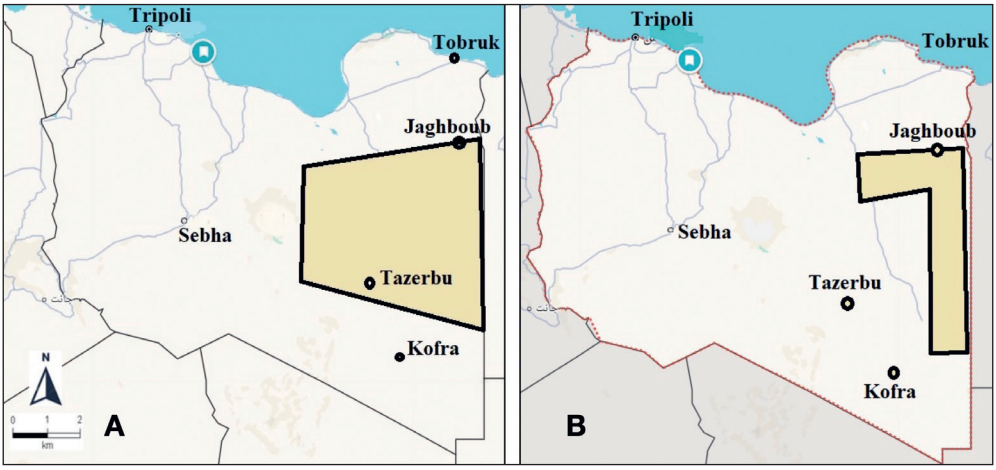

Figure 1. Study areas surveyed for Sooty Falcon nests: 2024 (A) and 2020–2023 (B)
1. ábra A hamvas sólyom fészkek keresése során felmért mintaterületek: 2024 (A) és 2020–2023 (B)

but during 2024 the search area expanded to extend westward by about three times the area in previous years *(Table 1)*. Due to the difficult access to the area and the high costs of entering desert regions, the team was unable to fully monitor nesting parameters. Therefore, the main task was to count the nests closely and record the brood size.

Table 1. Survey years and periods
1. táblázat A felmérés évek és időszakok szerint

Survey	Year of observation	Period of observation
1	2020	15 August to 01 November
2	2021	15 August to 01 November
3	2022	20 August to 01 November
4	2023	15 August to 13 September
5	2024	14 September to 25 October

Results and Discussion

The study area has long been known to specialists and hunters as a nesting area for the Sooty Falcon. Its presence and nesting have been recorded since the 1950s, mostly in August and September. A recent study also confirmed the continued nesting of this species in the Jaghboub and Tazerbu regions, although its findings were based on questionnaires distributed to hunters and falconers (El-Barasi *et al*. 2023).

The results of this study were based on a census of Sooty Falcon nests conducted from 2020 to 2024. The number of nests ranged from 70 to 180 nests, with the highest recorded in 2024 and the lowest during the 2023 season *(Figure 2)*. Unfortunately, nest numbers compared to brood size have not been documented. However, most of the data, whether from hunters or the organization's team, confirms that brood size ranged between 2 and 3, with many chicks recorded in the nests *(Figure 3)*.

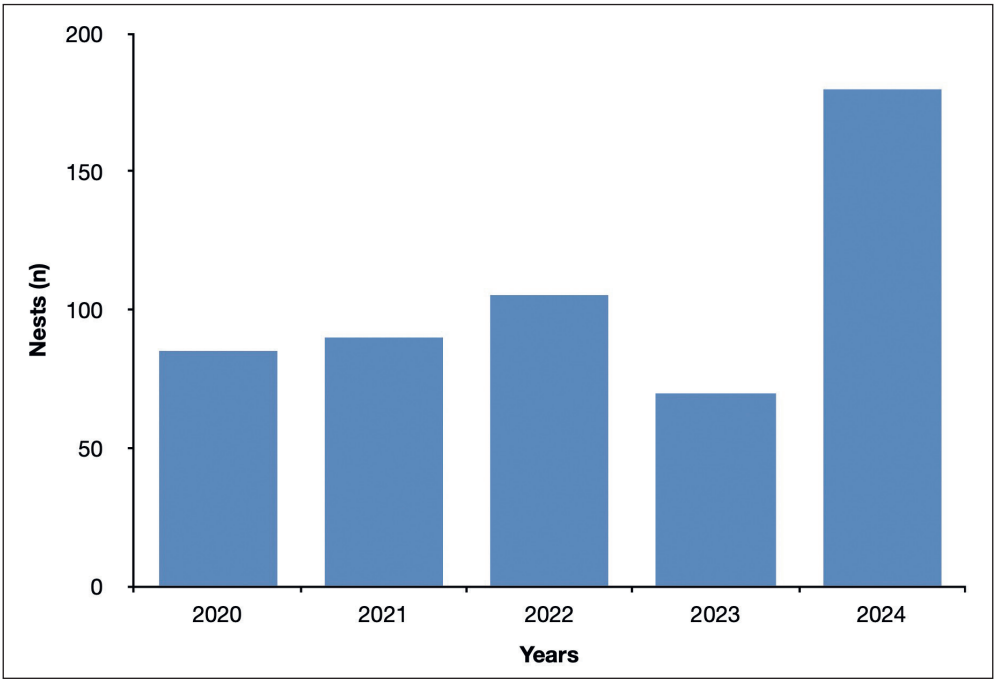

Figure 2. Number of Sooty Falcon nests recorded in the study areas of Libya from 2020 to 2024.
2. táblázat A mintaterületen felmért hamvas sólyom fészkek száma 2020 és 2024 között

Figure 3. Sooty Falcon nestlings found during field surveys (Photo: M. Mashri)
3. táblázat A terepi felmérés során talált hamvas sólyom fiókák (Fotó: M. Mashri)

In 2024, the number of nests was higher compared to other years, reflecting the larger area surveyed. This expansion occurred for the first time after the Daniel flood of 2023, which created many ponds were ranging from 5 to 10 km^2. This water sources allowed cooperating hunters to cover larger areas.

In the other years of the study, the surveyed area extended longitudinally from the city of Jaghboub to the border triangle between Libya, Egypt and Sudan. Horizontally, the hunting path stretched from the Egyptian border westward to Tazerbu, covering a distance of 400 to 500 km *(Figure 1B)*. The results indicate that 2023 had the lowest number of recorded nests. This was due to the limited survey period caused by the Daniel flood disaster, which devastated the city of Derna and several nearby coastal cities. As result, hunting activities in the area ceased, with efforts redirected toward rescue operations. Hunting and nest surveys resumed in the 2024 season.

Based on available information and interviews with hunters, it is clear that the potential and actual threat to this species is due to the actions of irresponsible hunters who collect chicks, juveniles and in some cases adults for use in catching birds of prey. The results clearly indicate that the region is of great importance for the nesting of this globally endangered species. It is to highlight its significance and implement protection measures to ensure the species continues to breed successfully. Conducting a comprehensive study to investigate the population trend, nesting success and the factors influencing nesting success of Sooty Falcon is highly necessary.

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