

# REAPPEARANCE OF THE LITTLE BUSTARD *TETRAX TETRAX* IN ALGERIA AFTER MORE THAN 30 YEARS OF EXTINCTION

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**Abstract.** The Little Bustard *Tetrax tetrax* has been considered extinct in Algeria and Africa since the 1980s, except in Morocco, where its presence is restricted to limited areas and small numbers. We used the Progressive Frequency Sampling method to record the sightings of this species from August 2023 to January 2024 in its known Algerian range, which is at the Macta Marsh and Lake Telamine in the northwest of the country. We also gathered data from surveys with local residents, farmers, and even expert hunters to get as much information as we could. We have observed the species at Macta on multiple occasions, noticing its fluctuating numbers from year to year and from season to season. In November 2016, the largest group was recorded, consisting of over 100 individuals, and in June 2013, 15 juveniles were observed in the same area, especially in lucerne orchard, confirming its breeding. After more than 30 years of extinction, it is evident that this species has returned, with a mix of resident breeding individuals and overwintering migratory ones.

## INTRODUCTION

The Otididae family comprises 26 species across 12 genera (Gill et al. 2024; HBW and BirdLife International 2024). Globally, many bustard species are currently under the threat of extinction. The Little Bustard *Tetrax tetrax* is a medium-sized lekking steppe bird found in arid, cereal farmlands, natural and semi-natural meadows. Its distribution area is large, occupying north-west Africa and the Iberian Peninsula up to Siberia and the foot of the Altai (Morales and Bretagnolle 2022; BirdLife International 2024). After significant declines in its population around the world at the end of the 19th and 20th centuries, the only breeding population remaining on the African continent is in Morocco, where it is highly threatened (El Agbani and Qninba 2011). It became extinct both as a breeder and winter visitor in Algeria during the 1990s (Isenmann and Moali 2000), and nowadays it is also considered extinct in Tunisia (Isenmann et al. 2005).

Algeria was formerly home to four species of bustards. Two of them, the Arab Bustard *Ardeotis arabs* and the Great Bustard *Otis tarda*, have no recent sightings and are considered extinct. The Houbara Bustard *Chlamydotis undulata* is also rare and protected. Once common in Hammada du Guir and “fairly well represented” around El Golea in the 1970s, it was already considered “very rare” in the Dayas during the same period. Finally, the

Little Bustard, which used to nest and spend the winter in the Macta and Telamine in Oran (northwest Algeria), has also been declared extinct (Ledant et al. 1981; Isenmann and Moali 2000; BirdLife International 2024).

Algeria has not produced any research on the Little Bustard in recent years, and no new observations have been documented. Moreover, on 15 July 2006, Algerian legislators enacted Ordinance No. 06–05, officially classifying this species as endangered. As a result of this information, we decided to conduct fieldwork for this species. This involved visiting Lake Telamine and Macta Marsh, which were formerly the only distribution areas in Algeria, and conducting surveys with local residents and farmers.

## MATERIALS AND METHODS

### Study area

The study was conducted in the north-western part of Algeria at two Ramsar sites: Lake Telamine and Macta Marsh (Figure 1). The climate is semi-arid, with annual average rainfall oscillating between 380 and 450 mm and a mean thermal regime varying from 17 to 19 °C (Sitayeb and Benabdeli 2008). Lake Telamine, designated as a Ramsar site in 2004, covers 2,399 ha and presents various habitats typical of saline environments. Its vegetation includes plants that are well-adapted to

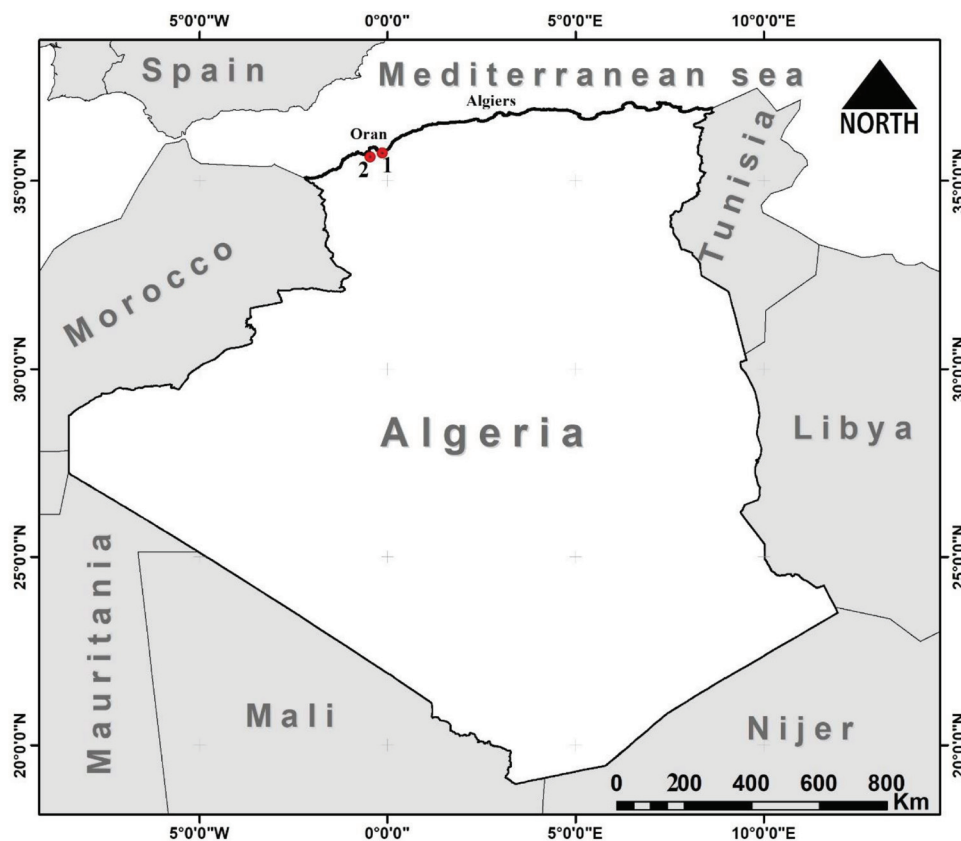


Figure 1. Location of the study area in the north-western part of Algeria: (1) Macta Marsh, (2) Lake Telamine.

salinity, such as *Salicornia* spp. The surrounding olive trees and cereal crops dominate the perimeter, while the mudflats shelter herbaceous vegetation such as tamarisk plants (*Tamarix* spp.). Macta Marsh, a Ramsar site since 2001, extends over 44,500 ha through Oran, Mascara, and Mostaganem. Fed by permanent wadis, it presents open waters, marshes, and a humid steppe rich in aquatic plants, such as *Phragmites australis* and *Typha* spp. The surrounding olive trees, vineyards, wild meadows, and arable land complete its biodiversity (DGF 2020). The climate of both sites is Mediterranean, characterized by four distinct seasons: winter, spring, summer, and autumn.

#### Data collection

To verify the existence of the Little Bustard at the two sites, occurrence data were collected from August 2023 to January 2024 using the Progressive Frequency Sampling (*Echantillonnage Fréquentielle Progressif*, EFP) method (see details in Blondel 1975; Bendjoudi et al. 2013; Chedad et al. 2021). It is based on the point index of abundance method (*Indice ponctuel d'abondance*, IPA). In our case, we conducted monthly surveys, in which the observer remains motionless and records the presence or absence of the species visually or acoustically within an imaginary circle with a diameter of 100 m. We carried out 60 partial points, or approxi-

mately 10 E.F.P. monthly units for Macta Marsh and Lake Telamine.

We used species-occurrence data from the current study, supplemented with our old data and additional occurrence data from surveys with local residents, farmers, and expert hunters, to collect as much information as possible on the distribution, number of individuals, reproduction, wintering site, resting site, and threats. Counts were undertaken by direct observation using a camera (Sony Alpha 7 IV, A7 IV, 200–600 mm) regularly, with monthly surveys in various biotopes (agricultural, wetland, forest, etc.) in Macta and Telamine.

## RESULTS

From August 2023 to January 2024, we did not record any presence of the Little Bustard at Lake Telamine. In contrast, the species was sighted several times in the Macta Marsh at an altitude that did not exceed 70 meters above sea level.

We have observed the species at Macta on multiple occasions, noticing its fluctuating numbers from year to year and from season to season. During our six-month investigation, we found two groups that lived close to each other and sometimes came together to form a single group of 27 individuals (Figure 2A, B). They

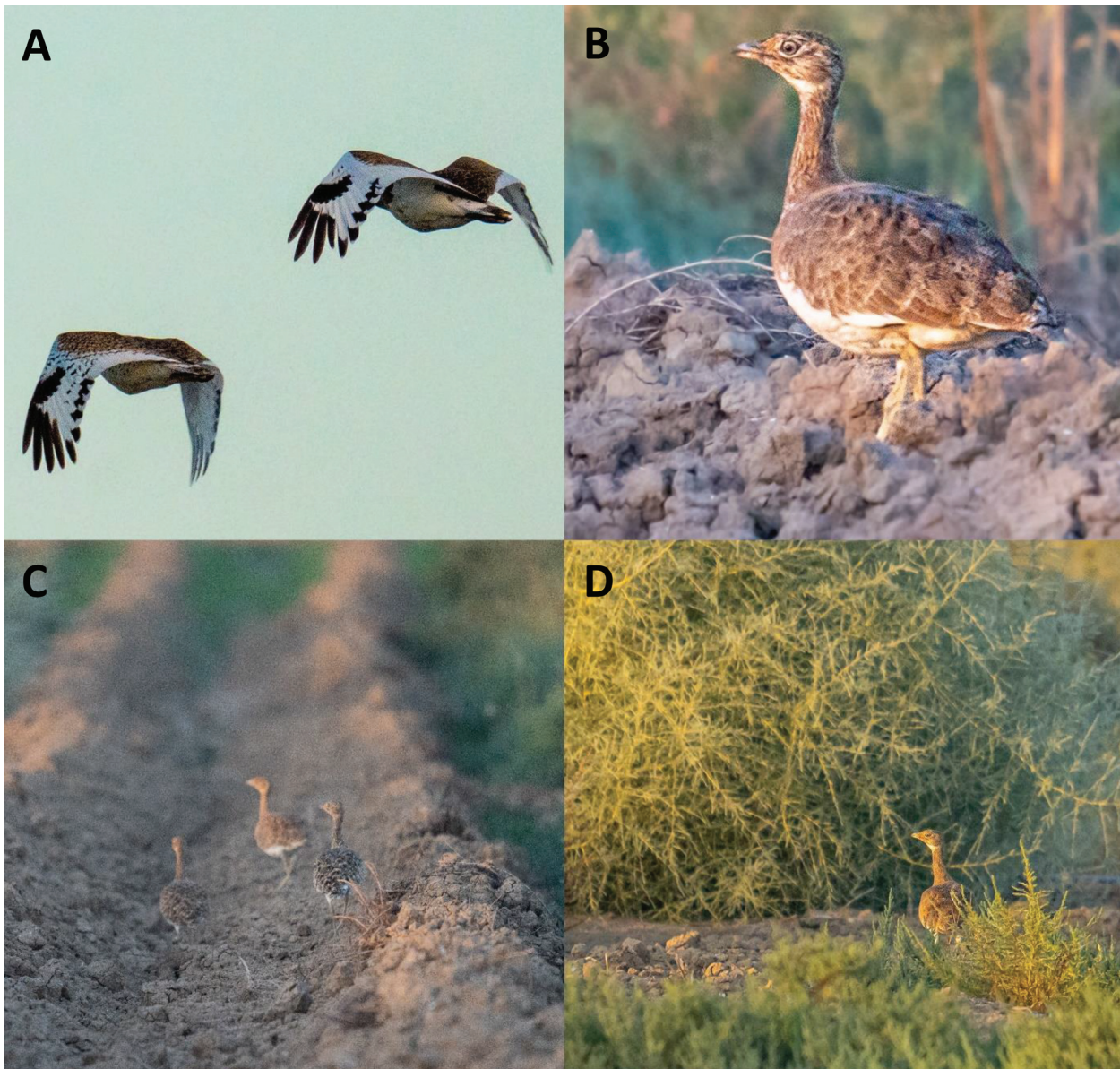


Figure 2. Little Bustard *Tetrax tetrax* in the natural area at Macta Marsh, in the north-western part of Algeria (Ibrahim Cheikh, September 2024): (A) in flight, (B) perched; (C) in a group while foraging, (D) in a hiding position.

moved between the fields of several crops, such as alfalfa, leguminous crops, and steppes, where they could generally find many *Salicornia* plants and others such as *Sarcocornia fruticosa*, *Salsola kali*, *Suaeda maritima*, and *Suaeda vera* (Figure 2C, D). This biotope can serve as a shelter from predators and adverse weather, as well as provide important food sources and nesting sites.

Additionally, we gathered supplementary data from farmers and hunters regarding the species' previous existence at Macta. They confirmed that after the 1980s, the species was considered extinct. Following this, in June 2013, an observation was made of a group consisting of 70 individuals sheltering in an alfalfa orchard with 15 juveniles. It was also preceded by a dubious observation of a single individual in October 2008. Its presence continued in the region, but intermittently until

November 2016, when a large group of more than 100 individuals was counted, which is the largest number recorded to date.

All past and recent observations have been documented at the Ramsar site of Macta Marsh, which faces a growing number of anthropogenic and natural hazards that worsen year after year. Notable threats include anarchic exploitation of the waters of the wetland, draining of the marshes, expansion and diversion of agricultural land, poaching of all kinds, overgrazing, fires, various types of pollution, and precipitation scarcity. Furthermore, the cessation of nomadism and the enclosure of private land have resulted in restricted access to specific regions that were once within the species' range.

Macta Marsh is an ecologically diverse marshland where numerous species of Anatidae, Ciconiidae, Ardeidae,

and Gruids have been recorded. Several farmland birds, including the Crested Lark *Galerida cristata*, Eurasian Skylark *Alauda arvensis*, Northern Wheatear *Oenanthe oenanthe*, Barbary Partridge *Alectoris barbara*, and Black-bellied Sandgrouse *Pterocles orientalis* have also been observed. Additionally, both nocturnal and diurnal raptors, such as the Long-legged Buzzard *Buteo rufinus cirtensis*, Western Marsh Harrier *Circus aeruginosus*, Pharaoh Eagle-Owl *Bubo ascalaphus*, Little Owl *Athene noctua*, and Common Kestrel *Falco tinnunculus*, inhabit the area, with some posing a threat to Little Bustards and their chicks. Other potential predators, such as stray dogs, African wolves, and donkeys, have been documented.

## DISCUSSION

The Little Bustard has been considered completely extinct in Algeria since the 1990s, where the former range was located only in the Macta and the Telamine in Oran (north-west of Algeria) (Isenmann and Moali 2000; BirdLife International 2024). Currently, the only breeding population on the African continent is in Morocco in very small numbers between Asilah and Tangier and in Adarouch plateau (Palacin and Alonso 2009; El Agbani and Qninba 2011; Cherkaoui et al. 2020). But our results show that the species has returned to Macta after the absence of several years, with a variable number from year to year, and that the phenological status locally is occasional breeder.

In general, the winter season exhibits the highest recorded population of the Little Bustard, indicating the potential presence of resident individuals alongside other migrants. In addition, their number declines throughout the reproductive season due to dispersion and partial migrations. Little Bustards display gregarious behaviour beyond the reproductive season, congregating in flocks comprising juvenile and adult males and females of diverse sizes.

During this period, both males and females engage in short-distance movements between France and Spain, with some extending as far south as northern Morocco; alternatively, Russian and Central Asian populations can migrate to wintering grounds via Turkey, the Caucasus, and Iran (del Hoyo et al. 1996; Tarjuelo et al. 2013), which may explain the variation in the number of individuals at a time. Moreover, the species engages in substantial seasonal migrations, which encompass both long-distance voyaging and vagrancy for the purpose of monitoring resources at the local scale (Villers et al. 2010; García de la Morena et al. 2015; Cuscó et al. 2018).

Globally, steppe and farmland bird populations are

experiencing precipitous declines, primarily as a result of intensified agriculture and land-use modification (Onrubia and Andrés 2005; Donald et al. 2006; Vorisek et al. 2010; Dahmani et al. 2023a, b; Douglas et al. 2023). Habitat selection occurs at various spatial and temporal dimensions in a hierarchical fashion (Jones 2001). Consequently, habitat selection is affected by a variety of factors, including the structure and heterogeneity of the landscape, the distribution and abundance of resources, social behaviour, and sex (Jones 2001; Tarjuelo et al. 2013). Generally speaking, a habitat that is conducive to survival and reproduction must satisfy two fundamental criteria: (i) maintain a diverse array of food sources to counteract the adverse effects of drought, particularly in the summer, and (ii) protect against predators and other disruptive agents. This is achieved through the presence of both spontaneous and cultivated plantspecies (which harbour many invertebrates); this is what we found in the study area at Macta, with the registration of several threats.

Silva et al. (2014) in Alentejo, Portugal, demonstrated that the topographic characteristics of certain wintering areas for bustards can provide protection against human disturbance and predators. In addition, they can benefit from moderate hilltops with suitable vegetation, which offer good vantage points for surveillance. According to selection patterns, male Little Bustards showed a higher than anticipated preference for fallows and elderly fallows in their display sites (Delgado et al. 2010). For safety reasons, researchers have found a big difference between males and females. Females prefer to lay and incubate their eggs in places with lots of tall plants, like fallows and leguminous crops, as well as pastures offering high floristic and arthropod diversity (Morales et al. 2008, 2013; Delgado et al. 2010; Silva et al. 2014).

Using umbrella species helps protect larger groups of species or ecosystem components (Roberge and Angelstam 2004). The Little Bustard is thought to be one of the best umbrella species because it can live with and share the same biotope with other steppe birds like *Galerida cristata*, *Alauda arvensis*, *Pterocles orientalis*, etc.

This study identified several threats affecting the Little Bustard and its habitats in the Macta Marsh, and these threats are common in many countries. In France, habitat loss and/or degradation brought on by agricultural intensification are the main causes of declines and range reductions (Lecomte and Voisin 1991; Goriup 1994). Also, overall pesticide use is a major cause of farmland bird declines, either through indirect effects on food supply or through direct toxic effects on the survival, health, and/or reproduction of birds (Geiger et al. 2010; Mineau and Whiteside 2013; Hallmann et al. 2014).

As per international treaties, the Little Bustard is classified in CITES Appendix II, which comprises species

that may become endangered unless commerce is strictly regulated but are not currently threatened with extinction. At present, the species is included in Appendices I and II of the Convention on the Conservation of Migratory Species of Wild Animals (CMS). Moreover, the species is included in Annex II of the Bern Convention on the Conservation of European Wildlife and Natural Habitats. It is listed as near-threatened (NT) under the Global IUCN Red Lists. At the national level, in Algeria, according to Ordinance n° 06–05, this species is classified as in danger of extinction. The fact that this species is protected by national and international laws demonstrates its critical condition; further vigilance is required to prevent its extinction.

In summary, it is universally acknowledged that this particular species is facing an extremely precarious state and that its habitat is targeted for numerous encroachments, including in Algeria. Consequently, heightened vigilance is required to prevent its extinction through a variety of practical measures, including, but not limited to, mitigating all potential hazards, including overgrazing, anarchic resource exploitation, and pollution; enforcing the existing legislation about protected and endangered fauna and flora; increasing inspection and awareness-raising patrols; engaging civil society, particularly local residents, farmers, and hunters; and collaborating with international organisations. Additionally, rehabilitating these habitats and establishing breeding facilities in the available hunting centres should be considered.

Global and national strategies for the conservation of this species must be reconsidered, and future research should begin by intensifying investigations to determine the true population size in Algeria and the limits of the species' distribution range. Subsequently, its reproduction, behaviour, and diet should be studied along with an analysis of the threats and the impact of each one.

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## Conflict of interests

The co-authors report no conflicts of interest.

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## Data availability

The data used to support the findings of this study are included within the article.

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