Türkiye's Little Bustards *Tetrax tetrax* in decline: assessing distribution, population trends and threats

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Summary: The Little Bustard *Tetrax tetrax*, a key indicator of grassland health, has experienced significant population declines across its range. In Türkiye, the species was classified as Critically Endangered (CR) in 2004, and recent estimates suggest that the breeding population has nearly disappeared, with an estimated 5–30 'pairs' remaining. Despite its precarious status as a breeding species and its presence during migration and winter, no systematic surveys have been conducted for Little Bustards in Türkiye for almost two decades. This study integrates published and grey literature, citizen science data and expert interviews to assess the status, distribution and movements of Little Bustards in Türkiye. We estimate a breeding population of 10–20 individuals, restricted to a few localities in eastern Türkiye, a migratory population of 250–400 individuals and a wintering population of 100–200 birds, which primarily use sites in coastal regions. The threats to these populations in Türkiye are known or inferred to include agricultural intensification and expansion, overgrazing and hunting. An exceptional influx of Little Bustards in 2024/2025 is unexplained. Urgent conservation actions and targeted surveys are needed to protect the remaining breeding and non-breeding populations, identify ongoing threats and ensure the species' survival in Türkiye.

INTRODUCTION

The Little Bustard *Tetrax tetrax* is a rare breeding species in Türkiye, with sporadic records of migrating and wintering individuals along the Mediterranean, Aegean and Black Sea coasts (Kılıç & Eken 2004, Eken *et al* 2006, Kirwan *et al* 2008). Historically, and into the 21st century, central, eastern and north-western Türkiye hosted small breeding populations of the species (Kasparek 1989, Kirwan *et al* 2008). However, over recent decades its populations have declined markedly, and the latest national-level Red List assessment in 2004 classified the Little Bustard as Critically Endangered (CR), citing an estimated decline of more than 80% in the breeding population, which was believed to number some 30–60 individuals (Kılıç & Eken 2004).

The most recent national-level assessment of Little Bustards in Türkiye was carried out in 2006, and it reported little evidence of the species' persistence, suggesting that it might be considered extinct as a breeding species in the country (Özbağdatlı & Tavares 2006). Since then, no systematic assessments or surveys have been conducted to determine the status of breeding or non-breeding populations and threats facing them. Furthermore, although sporadic non-breeding records have been reported through citizen science observations and social media, there is no comprehensive understanding of the species' non-breeding populations and movements within Türkiye or between Türkiye and neighbouring regions. Given the ongoing threats, including extensive habitat loss to agricultural intensification and illegal hunting (Kirwan *et al* 2008, Yılmaz *et al* 2021), identifying key areas where populations may still persist, especially in the rarely surveyed part of the species' range in eastern Türkiye, is essential.

We compile data on Little Bustard sightings in Türkiye with the aim of estimating breeding and non-breeding population sizes, distribution and routes followed by Little Bustards during autumn migration and winter and identifying threats facing the species in the country.

METHODS

To obtain a comprehensive understanding of the past and present status of Little Bustards in Türkiye, we followed a multi-step approach. First, we reviewed all available published and grey literature on the species. Second, we downloaded all Little Bustard observation records from eBird and used only those that had been reviewed and confirmed (Cornell Lab of Ornithology 2025). Third, we examined all observation and photographic records of Little Bustards on the national bird photography and observation database TRAKUŞ (TRAKUŞ 2025) and contacted the observers for additional details, such as the number of individuals observed and exact location. Fourth, we reviewed relevant social media platforms (Instagram, Facebook) to collect recent sighting records. Lastly, we interviewed several researchers, photographers and birdwatchers who regularly observe the species or have studied it in the past to collect their personal unpublished records. We also included our own observations, collected opportunistically across Türkiye during fieldwork focused on other species over the last two decades.

We used the data to present an overview of the historical (up to 2015) and current (post-2015) distributional ranges of the species' breeding populations, as well as its autumn and winter movements within and through Türkiye. We defined the breeding season as May to August (Cramp 1980, Kirwan *et al* 2008). We opted to present only the current non-breeding range of the species owing to data limitations. To account for uncertainties associated with some records (Aceves-Bueno *et al* 2017) and ensure compatibility with national and continental bird atlas data (*eg* Boyla *et al* 2019, Keller *et al* 2020), we mapped the species' distribution at a coarse resolution of 50×50 km. We then focused further on the autumn and winter records and flight direction notes recorded alongside some observations to broadly assess potential movement routes of Little Bustards in and around Türkiye, as well as population sizes across the species' non-breeding range. For current distributional ranges and population sizes, we used records from the past 10 years (from 2015 onwards), and integrated information from the literature and all available sightings.

RESULTS

After removing duplicate sightings, we compiled a total of 187 records, including 63 from eBird, 50 from TRAKUŞ, seven from our own unpublished data, and 67 from published and grey literature.

We estimate the Little Bustard breeding population in Türkiye at 10–20 individuals, the migrating population at 250–400 individuals, and the wintering population at 100–200 individuals (Table 1). The following sub-sections provide detailed descriptions of historical and recent records for each population, along with their distribution maps. Population size and trend estimates for these populations are summarised in Table 1. The threats to the species are then itemised.

Table 1. Population size and trend estimates for the Little Bustard in Türkiye. 'Migration' covers pre-migratory gatherings and stopover flocks. Quality of estimate: 1 = low, 5 = high.

Season	Number of birds	Important sites	Quality of estimate	Population trend			
				1950–1990	1990–2020	2020–2023	1950–2023
Breeding	10–20	2	3	↘	↘	↘	↘
Migration	250–400	3	2	↘	↘	?	↘
Wintering	100–200	3	3	↘	↘	↘	↘

Status and distribution of the breeding population

Only 34 of the records we compiled (*c*18%) pertained to the breeding season; they separate into three general regions.

North-west. Records of breeding Little Bustards in north-western Türkiye date back to the 1930s, when the species was apparently widespread and numerous in Bursa, south of the Sea of Marmara, and where it was extensively hunted (Kasparek 1989). The most recent breeding season sightings from this region are from the 1980s, and the breeding population in this area is certainly extinct (Goriup & Parr 1985, Kasparek 1989, Kirwan *et al* 2008).

Central. Breeding records of Little Bustards in central Türkiye date back to the 1940s, with regular observations around Lake Tuz Important Bird Area (IBA) until the decade 2000–2010 (Figure 1; OST 1975, Kasparek 1989, Balmer & Betton 2004, Kirwan *et al* 2008). During a regional breeding bird atlas survey conducted in the Konya Closed Basin, a population of 40 individuals was recorded in 1998 and 1999, dispersed across several localities around Lake Tuz (Eken & Magnin 2000). This was the highest number of breeding Little Bustards ever reported from central Türkiye. Additional records of adults from the summers of 1998 and 1999 suggest that small breeding populations persisted in at least 3–4 localities west and south of Lake Tuz IBA, including Lake Tersakan and Lake Kulu IBAs (Figure 1), as well as the Sultanhanı Plain (Cornell Lab of Ornithology 2025).

Further breeding season records from central Türkiye include two females observed in May 1992 in Sivrihisar, Eskişehir, and one female in Kütahya (OST 1975, Kirwan & Martins 2000). These areas, which support Türkiye's largest Great Bustard *Otis tarda* populations (Eken *et al* 2006, Özgencil *et al* 2021), contain protected habitats that seem highly suitable for Little Bustards, suggesting that a small breeding population is likely to have existed in the past. There are also records of breeding Little Bustards from the Karamık marshes (Figure 1), north of lake Eğirdir, from the 1980s and 2000s (Kasparek 1989, authors' unpublished observations). The small breeding population in this area is believed to have been extirpated before 2010. The most recent records from central Türkiye are from two localities, Lake Kulu IBA (Figure 1; north of Lake Tuz) and Tavşançalı (west of Lake Tuz), where a total of eight individuals was detected in the spring and summer of 2004 (Cornell Lab of Ornithology 2025). However, the species has not been observed in central Türkiye during the breeding season since then. Even extensive fieldwork that has been carried out every spring since 2018 around Lake Tuz Special Environmental Protection Area (Özgencil & Özcan 2018, Özgencil 2019) failed to detect any Little Bustards. Nevertheless, the Turkish Breeding Bird Atlas, which was a part of the greater European Breeding Bird Atlas 2 (Keller *et al* 2020), reported a breeding population of 1–9 'pairs' from the area (Boyla *et al* 2019). As some of these former breeding sites, such as Lake Kulu IBA, are regularly visited by birdwatchers and no individuals have been observed despite extensive, high-effort surveys, it is likely that the breeding population in all of central Türkiye was extirpated sometime before 2010.

East. Breeding records of Little Bustards in eastern Türkiye are primarily from the Muş, Bulanık and Malazgirt plains (Figure 1). Although the species' presence in Muş, west of Lake Van, was known as early as the 1960s (Goriup & Parr 1985), the earliest detailed record from this region dates to the summer of 1987, when an adult male was observed along the Murat river (Cornell Lab of Ornithology 2025). A later sighting occurred in 2003, when a single individual was recorded in the Bulanık–Malazgirt Plains IBA (Balmer & Betton 2004). In 2006, the total breeding population across the Bulanık, Malazgirt and Muş plains was estimated at 3–5 'pairs' (Eken *et al* 2006). Later on, up to five individuals were observed in the Muş Plain IBA during the summers of 2008 and 2009 (Kirwan *et al* 2014, Cornell Lab of Ornithology 2025, TRAKUŞ 2025). The most recent records from

eastern Türkiye come from the Muş plain, where two individuals were seen in summer 2016 (Cornell Lab of Ornithology 2025, TRAKUŞ 2025). According to the Turkish Breeding Atlas, Muş plain, the area west of Lake Van, and the Bulanık–Malazgirt plains each had an estimated breeding population of 1–9 'pairs' (Boyla *et al* 2019). Additionally, species distribution models developed for EBBA2, which consider climatic and land-cover variables among others, suggest that these sites remain marginally suitable for Little Bustards (Keller *et al* 2020). Given this, and the fact that this part of the country received little attention from researchers, birdwatchers and photographers over the past two decades, it is entirely possible that a small breeding population persists in the region.

The only other notable records from the eastern half of Türkiye include a pair observed near Sulakyurt, Ardahan, in north-eastern Türkiye in late May 2022 (authors' unpublished observations) and two males seen in Ceylanpınar, Şanlıurfa, in the south-east in April 1981 (Goriup & Parr 1985). The Sulakyurt area contains extensive stretches of seemingly suitable habitat for the species and may still harbour a small breeding population. The Ceylanpınar area, before the shift to intensive irrigated agriculture, contained large areas that were likely suitable for Little Bustards (Magnin & Yarar 1997, Kılıç & Eken 2004, Eken *et al* 2006). This, and the presence of displaying males in the early 1980s, suggest that the area supported a small breeding population that has since been extirpated (Cramp 1980, Kirwan *et al* 2008).

Current total. The most recent population size estimate for Little Bustards in Türkiye, covering 2013–2018, was 5–30 'pairs' (Burfield *et al* 2023). We revise this estimate to 10–20 individuals, which we believe are distributed between three localities in eastern and north-eastern Türkiye, each supporting only several individuals (Figure 1).

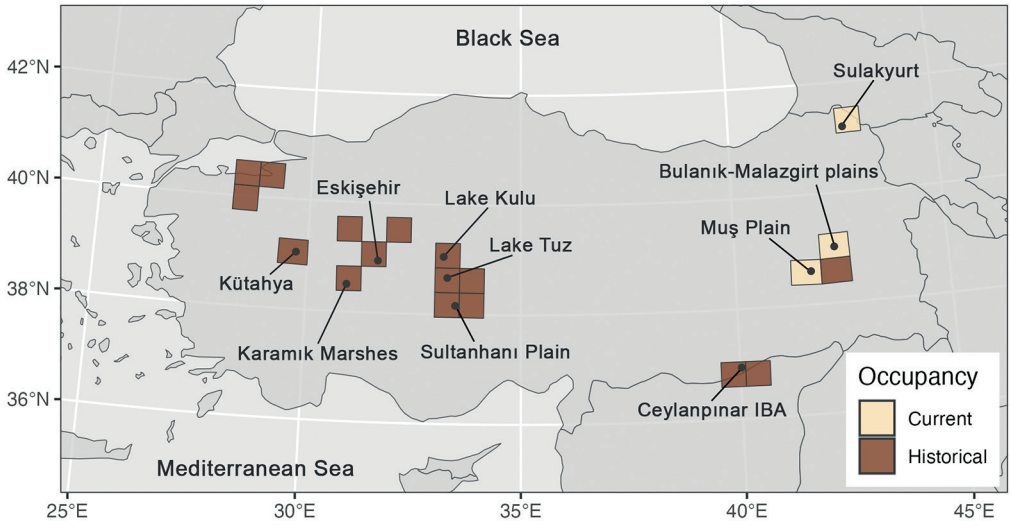

Figure 1. Estimated historical (before 2015) and current (after 2015) breeding distribution of the Little Bustard *Tetrax tetrax* in Türkiye. Squares, 50×50 km, indicate breeding areas (dark = historical, pale = current), and correspond with the grid of the Turkish Breeding Bird Atlas (Boyla *et al* 2019). Key sites mentioned in the text are labelled.

Status and distribution of the non-breeding population

Owing to the facultative and sporadic nature of the autumn and winter movements of the species (Cramp 1980, Bretagnolle *et al* 2022), we opted to present a single distribution map

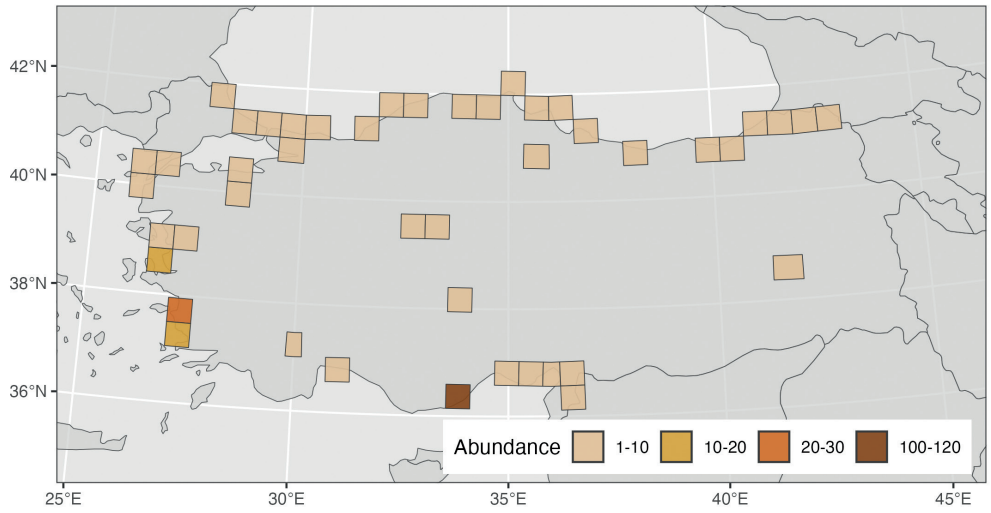

Figure 2. Non-breeding distribution and local abundance estimates for the Little Bustard *Tetrax tetrax* in Türkiye in 2015–2025. Number of individuals in a 50×50 km grid square is represented by the colour. The grid corresponds to that used in the European and Turkish Breeding Bird Atlases.

for migrating and wintering Little Bustard populations (Figure 2), although we present separate population size estimates for each of these populations in Table 1.

Relatively small numbers of Little Bustards migrate through or winter in Türkiye (Kirwan *et al* 2008). Individuals observed during autumn migration or winter are likely to originate from breeding populations in Ukraine or southern Russia, which are the closest breeding areas north of Türkiye (Keller *et al* 2020). However, it is highly probable that at least some of the individuals wintering along the Mediterranean coast are those that breed in central and eastern Türkiye, as discussed above (Kasparek 1989, Kirwan *et al* 2008).

Autumn and winter records of Little Bustards in Türkiye are mostly restricted to the coastal regions, with the majority of observations concentrated in the Black Sea region (Figure 2). This predominantly coastal distribution of non-breeding Little Bustards may be attributed to the mountain ranges running parallel to the Black Sea coastline acting as a potential barrier to movement inland (Kirwan *et al* 2008). The earliest records of non-breeding individuals in north-western and western Türkiye date from the mid-19th century (Kasparek 1989, Kirwan *et al* 2008). Most non-breeding observations involve small groups of 1–3 individuals, with a few notable exceptions: two deltas on the west coast, Gediz Delta and Büyük Menderes Delta IBAs, have hosted larger groups of 10–30 individuals, while a site on the south coast, Göksu Delta IBA, recorded an exceptional 100–120 individuals in the winter of 2025 (Plate 1, Figure 2; Cornell Lab of Ornithology 2025).

In some years, Türkiye receives larger numbers of migrating and wintering Little Bustards than usual, possibly owing to unfavourable conditions to the north. Early 2025 was particularly notable in this regard, with record numbers of non-breeding Little Bustard sightings at multiple sites. The more than 100 birds in the Göksu Delta IBA represented the joint-largest congregation ever documented in Türkiye, matched only by the 119 birds recorded in Ceylanpınar IBA near the Syrian border in March 1969 (Figure 1; OST 1972). Additionally, the first ever wintering records from Ankara in central Türkiye (both involving single birds) were documented in December 2024 (Plate 2) and March 2025 (Cornell Lab of Ornithology 2025). The only other non-breeding record in central

Plate 1. Part of a flock of over 100 Little Bustards *Tetrax tetrax* observed at the Göksu Delta in January 2025. © *Ahmet Karataş*

Plate 2. The first Little Bustard *Tetrax tetrax* ever seen in Ankara in central Türkiye, December 2024. © *Kubilay Yakup Kaplan*

Türkiye over the past decade is of a hunted individual south of Lake Tuz in November 2017 (authors' unpublished observations).

The only non-breeding records of the species in eastern Türkiye over the past decade come from Muş Plain IBA, where 1–2 individuals were observed in early and mid-March 2021 (Cornell Lab of Ornithology 2025). Given the harsh winter conditions in the region (Eken *et al* 2006, Tanrıverdi 2015), we classify this as a non-breeding record while acknowledging that these individuals may have been early arrivals for breeding. Meanwhile, the once

important sites near the Syrian border in Ceylanpınar IBA, Şanlıurfa, no longer appear to host wintering Little Bustards (Kasparek 1989, Kirwan *et al* 2008).

To our knowledge, no population estimates have previously been reported for migrating or wintering Little Bustards in Türkiye. The facultative nature of the species' autumn and winter migration complicates distinctions between migrating and wintering individuals. However, we opt to provide separate estimates for these two groups: 250–400 individuals on passage, and 100–200 individuals overwintering (Table 1). Comparing these numbers with historical records (Kasparek 1989, Kirwan *et al* 2008) and accounts from elderly locals in north-eastern Türkiye mentioning hundreds of Little Bustards migrating through or wintering in the valleys of the north-east (authors' unpublished observations), it appears that both migrating and wintering populations have declined over the past century.

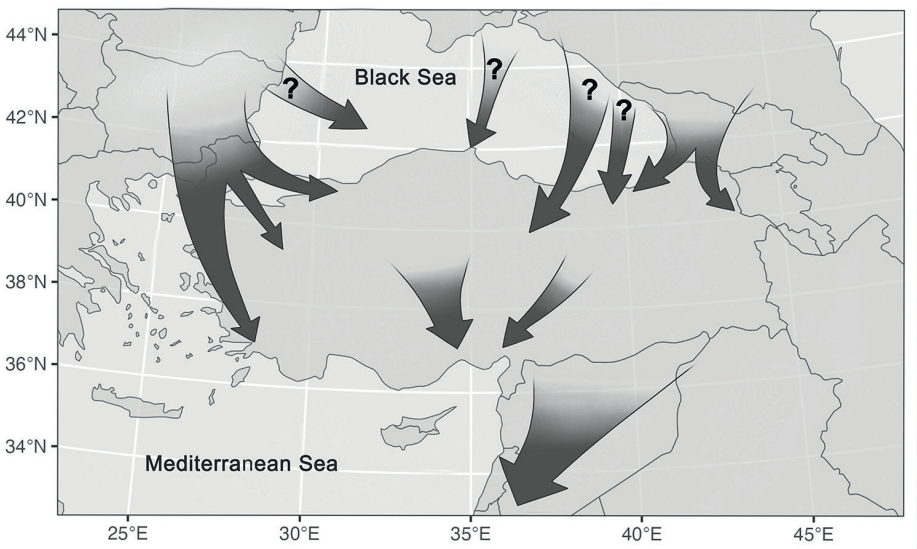

Figure 3. Hypothesised migratory routes of Little Bustards *Tetrax tetrax* in Türkiye during the autumn and winter.

Movements of Little Bustards within or through Türkiye

Regular records of individuals in north-western Türkiye suggest a migratory route via Thracian Türkiye. These individuals may arrive overland or, alternatively, may cross the Black Sea to reach north-western Türkiye. Once there, they may continue southwards to staging or wintering grounds along the western coast or take an easterly route to reach the western Black Sea coast of Türkiye (Figure 3). Some may even travel inland to central Türkiye or as far as the southern Mediterranean coast. Observations of individuals crossing the Taurus range in Karaman province (Kasparek 1989) support this hypothesis. Additionally, a sighting in winter 2016 of Little Bustards arriving on Türkiye's north coasts over the Black Sea in Ordu province (Plate 3; authors' unpublished observations), combined with their known ability to perform long-distance migratory flights (Bretagnolle *et al* 2022), supports the likelihood that some individuals breeding across the Kerch strait and in eastern Crimea (Collar *et al* 2020, Keller *et al* 2020) may fly directly over the Black Sea to reach their wintering grounds in northern Türkiye. Figure 3 presents these hypothesised autumn and winter movement pathways of Little Bustards in Türkiye.

A larger number of individuals are likely to enter Türkiye at its north-eastern corner (Figure 3). These birds probably originate from breeding populations in south-western

Plate 3. A male Little Bustard *Tetrax tetrax* observed flying over the Black Sea and arriving at a bay in Ordu, Türkiye, in the winter of 2016. © *Ahmet Karataş*

Russia (Collar *et al* 2020, Keller *et al* 2020). Some of them may cross the Black Sea from points near the western Caucasus, around or north of Sochi, while others may follow the coastline before further dispersing into Türkiye. These birds may either remain along the north coasts, move inland toward central Türkiye or the Mediterranean coast, or continue onward to wintering grounds beyond the borders of Türkiye (BirdLife International 2018, Collar *et al* 2020).

Threats

Agricultural intensification and associated habitat changes are the primary drivers of Little Bustard declines globally (BirdLife International 2018, Keller *et al* 2020, Bretagnolle *et al* 2022), and Türkiye is no exception (Eken *et al* 2006, Kirwan *et al* 2008). Over the past two decades, agricultural intensification has accelerated across the country, with some of the former and current Little Bustard breeding sites among the most affected areas (Kirwan *et al* 2008, Özgencil *et al* 2021, Yılmaz *et al* 2021). In central Türkiye, intensification often involves the conversion of dry grasslands and low-intensity farmlands into heavily irrigated agricultural landscapes (Yılmaz *et al* 2021, Çolak *et al* 2022). This conversion eliminates diverse land-use mosaics, reducing the quantity of both breeding and non-breeding habitats (Cramp 1980, Morales *et al* 2005, Collar *et al* 2020, Bretagnolle *et al* 2022). Other agriculture-related threats, including desertification, salinisation, increased human disturbance, the crushing of females, eggs and young by agricultural machinery, and heavy pesticide and herbicide use (Bretagnolle *et al* 2011, 2022), must also have contributed to the decline of the Little Bustard in Türkiye. As a farmland bird, it may have also suffered from the widespread use of DDT across the country in the 1950s, which is considered to be the primary cause of the extinction of Northern Bald Ibis *Geronticus eremita* in Türkiye (Kirwan *et al* 2008, Böhm *et al* 2021). Furthermore, widespread wetland drainage and uncontrolled surface and groundwater use, largely driven by agricultural demands, have likely further degraded the quality and suitability of both breeding and non-breeding habitats (Eken *et al* 2006, Yılmaz *et al* 2021, Çolak *et al* 2022).

Overgrazing, which is a widespread problem in Türkiye (Eken *et al* 2006, Ambarlı *et al* 2016), may have contributed to the decline of Little Bustards in the country. It reduces arthropod populations and edible plant biomass during the breeding and winter seasons (Bretagnolle *et al* 2011), and is a particular problem for steppe wildlife around lake Tuz, a former breeding site for Little Bustards (Özgencil *et al* 2021, 2022).

Historically, hunting of Little Bustards was a tradition in north-eastern Türkiye, where locals relied on its meat for winter consumption before economic growth from tea cultivation transformed the region (authors' unpublished observations). The Turkish literature contains numerous records of Little Bustard hunting, with the earliest dating back to the 19th century (Kasparek 1989). Hunting of Little Bustard has long been banned in Türkiye (Goriup & Parr 1985, DKMP 2024), but enforcement is weak. Moreover, although the majority of breeding, migrating and wintering Little Bustard populations in Türkiye are located within IBAs (Kılıç & Eken 2004, Eken *et al* 2006), these areas lack effective protection. We therefore presume that hunting likely remains a major threat to the species throughout its annual cycle, as it does for Türkiye's legally protected Great Bustards (Özgencil *et al* 2021). Stories we heard from hunters, who openly admit to shooting Little Bustards across different regions of Türkiye over the past two decades, support this view.

To our knowledge, there are no documented cases of powerline collisions involving the Little Bustard in Türkiye. However, since powerline collisions have been reported as a cause of mortality for the species elsewhere in the world (Bretagnolle *et al* 2022, Silva *et al* 2023), the problem is clearly likely to affect the species in Türkiye as well.

CONCLUSIONS

The Little Bustard is a critically endangered and rare breeding species in Türkiye (Kılıç & Eken 2004, Kirwan *et al* 2008), with an estimated 10–20 breeding individuals remaining in the entire country. Although the migrating and wintering population is larger, historical records suggest that this population has also declined, probably due to a combination of breeding population declines both within and outside Türkiye (BirdLife International 2018, Collar *et al* 2020). Despite the recent growth in the amount of data collected via citizen science, the species remains understudied in Türkiye, with the most recent national-level assessment dating back to 2006 (Özbağdatlı & Tavares 2006). Consequently, the greatest threat to Little Bustards in the country may be the lack of scientific, species-specific surveys and updated assessments, which are crucial for obtaining a more accurate understanding of distribution, population sizes and, crucially, key threats to the species and the solutions to them. Targeted surveys in eastern and north-eastern Türkiye are urgently needed to assess the status of the remaining breeding populations before they disappear. Moreover, intensive surveys are needed in and around lake Tuz to identify the causes and remedies of the adverse situation of the species in a former breeding stronghold.

Addressing the threats posed by agricultural intensification and hunting remains a conservation challenge for steppe avifauna in Türkiye (Özgencil *et al* 2021, Yılmaz *et al* 2021). Currently, the most feasible conservation actions for preserving the remaining breeding populations of Little Bustards involve identifying their exact breeding locations and implementing targeted conservation measures. These should include modifications to agricultural practices and protection against illegal hunting, leveraging both domestic and international funding sources.

Illegal hunting likely remains a threat for migrating and wintering Little Bustards in Türkiye, with no solution in sight. The species' wide non-breeding distribution presents a challenge for conservation efforts, although it is possible to identify a few key congregation sites, such as the Göksu Delta IBA, which has regularly harboured migrating and wintering Little Bustards for decades (Kirwan *et al* 2008, Cornell Lab of Ornithology

2025, TRAKUŞ 2025). Nevertheless, it is highly likely that some other wintering locations of the species remain undiscovered. If further studies can identify additional regular wintering areas, it will not only facilitate the distinction between true wintering and stopover, but also help determine which areas need to be protected and in what manner.

Owing to the sparsity of studies of this species in Türkiye, the population size and migratory pathways presented in this study are of no more than medium quality. Moreover, the origins of Little Bustards observed in Türkiye during autumn and winter remain unknown. Stable isotope analyses of shed feathers (Hobson 1999) collected from wintering grounds could provide an insight into the sources of these individuals with minimal or no disturbance to the birds.

The year 2025 was a year of exceptional influx of Little Bustards in Türkiye, with nearly 40% of all TRAKUŞ records and 50% of eBird records occurring in the autumn of 2024 and winter of 2024–2025. Several locations reported record-breaking counts of individuals, most notably the observation of 100–120 birds at the Göksu Delta IBA in January (see above). Researchers initially suspected that adverse climatic conditions to the north may have driven this influx. However, climate summaries for the winter of 2025 (Hersbach *et al* 2025) indicate that both Ukraine and southern Russia, the most likely origins of migrating and wintering Little Bustards in Türkiye, experienced relatively warm conditions during winter. On the other hand, ongoing war has led to the abandonment of vast agricultural areas in eastern Ukraine (FAO 2023). As Little Bustards can significantly benefit from land abandonment (Bretagnolle *et al* 2022), we hypothesise that the increased number of Little Bustards recently observed in Türkiye may be attributed to improved breeding conditions in eastern Ukraine. However, colleagues in Ukraine and Russia—Y Andryushchenko, ML Oparin and OS Oparina—indicate that there is no evidence of an increase in the number of Little Bustards breeding in Crimea or around the Kerch strait, nor of a particular event or circumstance that could have caused Türkiye's influx of 2025. Currently, the reasons behind this unprecedented movement of Little Bustards remain unknown. Further research considering all potential contributing factors, including habitat changes, population trends and climatic conditions in the species' breeding grounds in Ukraine and Russia, may provide better insight into this unusual event.

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