

# Daily behaviours of Great Bustard (*Otis tarda*) during the breeding period in the Sootave, Mokryan Region, NorthWestern Iran

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## Abstract

The daily behaviours of the Great Bustard (*Otis tarda*) during the breeding period were examined in the Sootave region of NW Iran. While previous studies by Carmen Martinez (2000) in Spain have provided insights into the seasonal variation, times of day, and land use patterns of Great Bustard activities, this study focuses on understanding the month-to-month variations in behaviour during the breeding period. Data on time budgets were collected, distinguishing between sexes and months. The study revealed variations in behaviours such as courtship, feeding, resting, scanning, moving, flying, and incubation, shedding light on how these behaviours change throughout the breeding season. Males were found to spend more time on courtship displays in March and April, while females allocated more time to feeding during those months. In May and June, these patterns reversed. The study provides important insights into the daily behaviours of Great Bustards during their breeding season, contributing to our understanding of this globally threatened species in Iran.

**Keywords:** Daily behavior, Great Bustard (*Otis tarda*), Sootave habitat, NW Iran

## Introduction

The Great Bustard (*Otis tarda*) is a globally threatened species with a distribution range extending from the Iberian Peninsula to eastern Asia. Its populations have significantly declined over the past century, leading to its classification as a vulnerable species by the IUCN. In Iran, the Great Bustard, although protected by the Department of the Environment (DoE) since 1967, faces critical

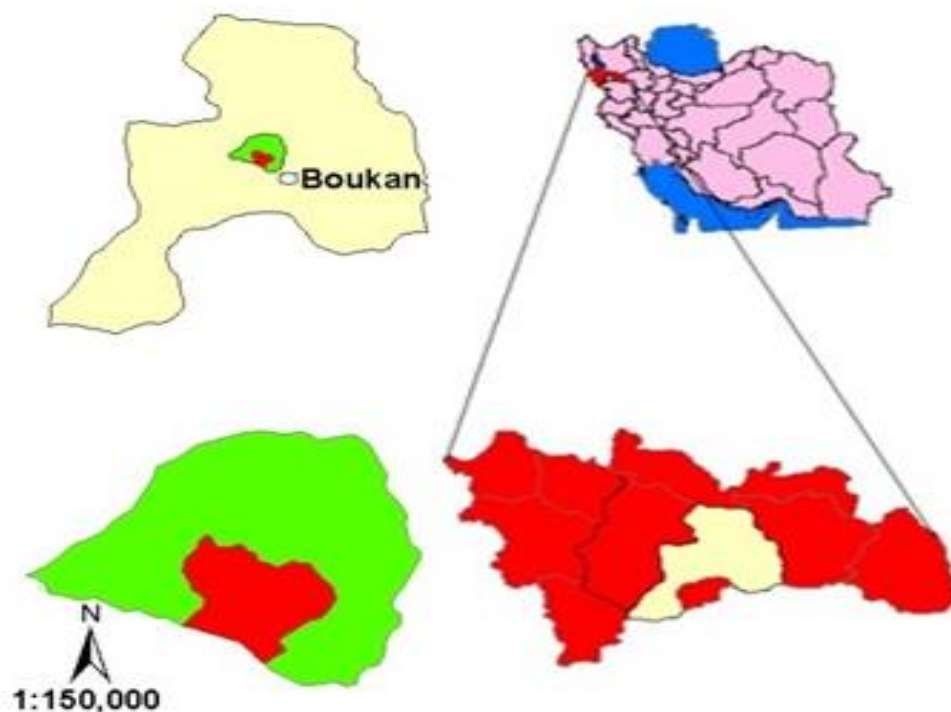
endangerment, with populations dwindling to an estimated 35-50 individuals nationwide. The Mokryan region in NW Iran, particularly the Sootave plain, serves as a key breeding area for this species. However, breeding success in this region is threatened by various factors, including habitat destruction, human activities, and predation.

To address these challenges, the DoE is implementing an action plan to protect and conserve the Great Bustard in the region. Understanding the behaviour patterns of this species during sensitive periods, such as the breeding season, is crucial for effective conservation efforts. This study focuses on the Sootave region, where the Great Bustard predominantly breeds, to examine the activities of Great Bustards during the breeding season (March to June).

## Material and methods

### Study Area

The study was conducted in the Sootave plain, the primary breeding ground for the Great Bustard in Iran. Sootave is located approximately four kilometres northwest of Boukan city in the Mokryan region, South West Azerbaijan Province. This region covers approximately 44-50 square kilometres and is characterized by drylands, including wheat and chickpea cultivation, as well as pasture-covered hills. In 2011, Sootave was designated as a wildlife refuge by the DoE.



**Figure 1.** Location of Study Area (Sensitive Region) in Sootave Habitat, Boukan City, Mokryan region, NW Iran

## Data Collection

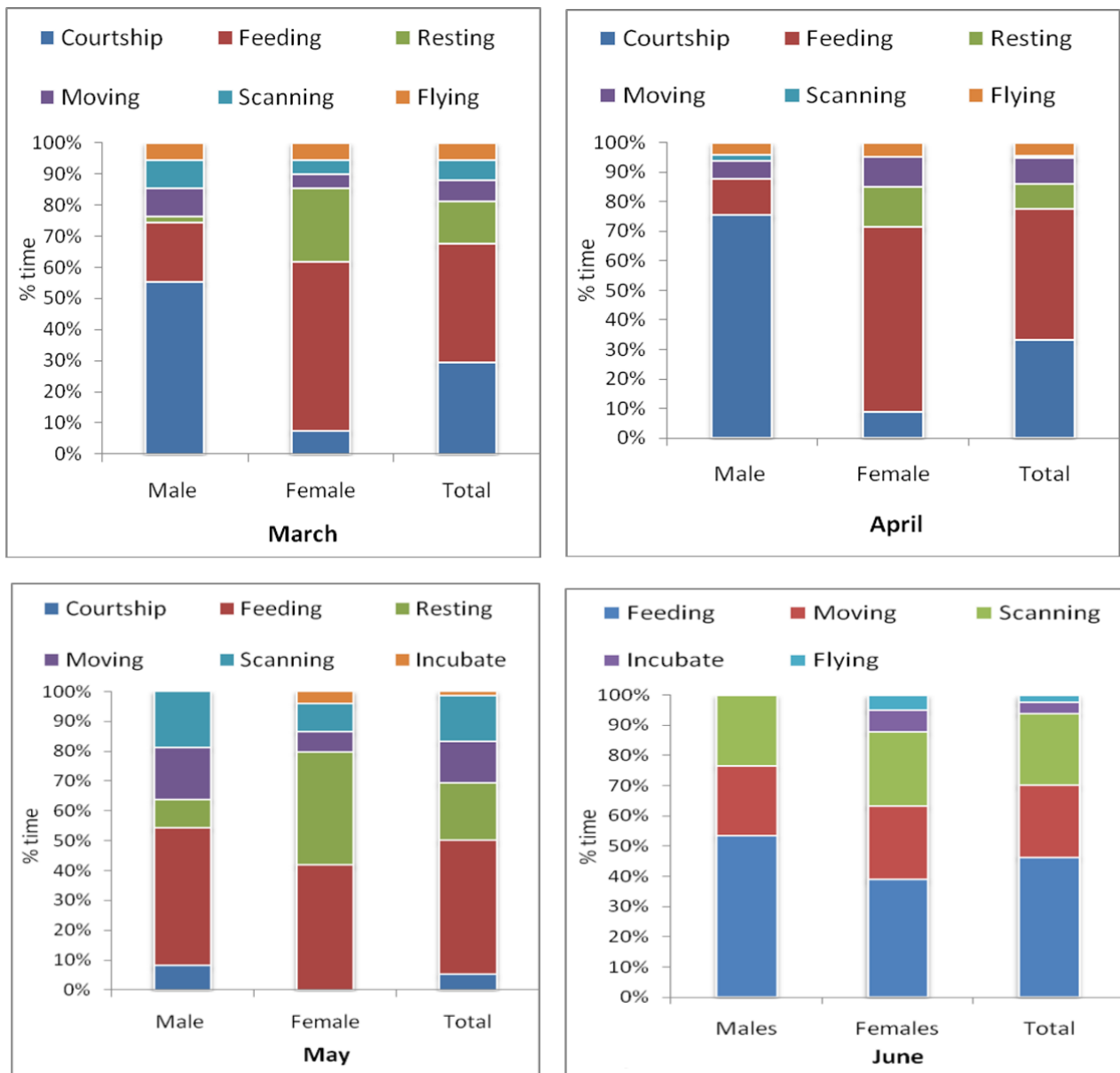
Fieldwork was conducted from March to June 2022 in the sensitive region of Sootave, where lekking sites were observed. Daily visits were made, and the area was surveyed from dawn to dusk. Observations were conducted using binoculars and telescopes. All accessible tracks were covered, and observations were also made from adjacent hills. Surveys were conducted three times each day: morning (7:00-9:00), midday (12:00-2:00), and afternoon (5:00-7:00). Data on behaviour were recorded for each observed Great Bustard individual, including feeding, scanning, moving, resting, courtship behaviour, flying, and incubation. Behaviour recordings were made in 5-minute intervals. The proportion of time allocated to each behaviour was calculated for each sex (male, female, and mixed-sex groups) and month. Additionally, breeding activities, crop growth stages, and habitat changes were documented.

## Results

This study investigates the daily behaviours of the Great Bustard during the breeding season in Iran, with a focus on month-to-month variations. Our study complements this by examining how these behaviours change during the breeding period in Iran.

Courtship display emerged as a significant behaviour, with males dedicating 56% of their time to this activity in March, followed by 76% in April, and 8% in May. In contrast, females spent only 8% and 9% of their time on courtship behaviour in March and April, respectively. Most courtship behaviors occurred in April (33%). Courtship activities commenced in late March and peaked in mid-April. During this period, males congregated at traditional arenas, engaged in rank-establishing fights, and displayed in a lek mating system. This male-male competition was followed by the selection of 2-5 females by a preferred male, based on body condition.

Feeding was the most common activity for both sexes throughout the year. Males allocated less time to feeding in March (19%) and April (12%) but increased in May (47%) and June (54%). In contrast, females spent more time feeding in March (53%) and April (62%), with decreased feeding time in May (42%) and June (40%). Feeding patterns were influenced by courtship behaviours in males and the incubation cycle in females. The resting activity was generally low, especially in males, due to mating activities in March (2%) and April (0.0) (Fig. 2). In contrast, resting was common among females throughout the survey period. Resting time peaked in May when females were incubating eggs or camouflaging themselves and their young.



**Figure 2.** Activity pattern of Great Bustard during the breeding period

Moving was observed throughout the survey period and increased linearly from March to June. Food resource availability influenced the movements of Great Bustards. Scanning, which involves monitoring the surroundings, had lower time allocations in March and April but increased in June. This behaviour was influenced by the onset of courtship and the need for vigilance against threats. Flying, typically less frequent for Great Bustards due to their large size and weight, was observed

### Discussion

Previous research by Martinez (2000) in Spain provided valuable insights into seasonal variations of Great Bustard behavior. Our study extends this knowledge by focusing on the month-to-month variations in behavior during the breeding period in the Sootave region of Northwestern Iran. The

results of our study indicate several interesting patterns in Great Bustard behavior, which have implications for the conservation of this globally threatened species.

Courtship display, a key behavior in Great Bustards, was found to be more prominent in males, peaking in April. This aligns with findings in Spain, where courtship behaviors were observed primarily in the breeding season (Martinez, 2000). The peak in courtship activities in mid-April coincides with the selection of females by preferred males, based on body condition. These findings suggest that the breeding season in Iran follows a pattern similar to that observed in Spain, emphasizing the importance of protecting lekking areas and traditional arenas where courtship displays occur.

Feeding was identified as the most common behavior for both sexes throughout the year. However, there were notable differences between males and females. Males allocated less time to feeding in March and April, possibly due to their focus on courtship activities during these months. In contrast, females spent more time feeding in March and April, reflecting their need to maintain body condition for egg production. These feeding patterns were influenced by the reproductive cycle, and this understanding is vital for conservation efforts, as it highlights the significance of food resource availability in the breeding season.

Resting activities were found to be generally low, especially among males, during the breeding season. This can be attributed to their engagement in courtship activities and rank-establishing fights in March and April. On the other hand, females engaged in more resting, especially during May, when they were incubating eggs or camouflaging themselves and their young. This behavior is consistent with the need for females to conserve energy during this critical phase of reproduction. The study also noted increased movements and scanning behaviors as the breeding season progressed. This is likely linked to food resource availability and the need for vigilance against threats, especially during the incubation period. It is important to note that movements and scanning are integral to the overall success of the breeding season and the survival of both adults and chicks.

Flying, a behavior less frequently observed in Great Bustards due to their large size and weight, was noted in the study. Understanding the circumstances under which Great Bustards take flight can provide valuable insights into their behavior and interactions with the environment. These findings are crucial for conservation efforts, as they shed light on the adaptability of Great Bustards in response to changing environmental conditions.

In conclusion, our study of the daily behaviors of Great Bustards during the breeding season in the Sootave region of Northwestern Iran provides important insights into the behavior of this globally threatened species. These findings offer a foundation for more targeted and effective conservation strategies, emphasizing the importance of protecting courtship arenas and food resources during the

breeding season. Additionally, our results contribute to the broader understanding of Great Bustard behavior and can be used to inform similar studies in other regions, ultimately aiding in the conservation of this vulnerable species.

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