



Short Communication

The First Record of Eurasian Spoonbill (*Platalea leucorodia*) Nesting in the Eastern Province of Saudi Arabia with a Description of Nest Attendance Behavior

Monif AlRashidi^{1*}, Sami Saeed M. Hassan² and Mohammed Shobrak³

¹Department of Biology, Faculty of Science, University of Ha'il, PO Box 2440, Ha'il, Saudi Arabia.

²Department of Zoology, Faculty of Science, University of Khartoum, Khartoum, Sudan.

³Department of Biology, Faculty of Science, Taif University, PO Box 11099, Taif 21944, Saudi Arabia.

ABSTRACT

This study recorded the first nesting attempt of the Eurasian Spoonbill (*Platalea leucorodia*) in Al-Fanateer Island, located about 1.5 km east of Jubail Industrial City, Eastern Province, Saudi Arabia. A trail camera was used to record and describe the nest attendance behavior of this species over 24 h. The results showed that the egg was incubated more than 80% in each two-hour period except for the periods (00:00 - 01:59 h; 02:00 - 03:59 h and 20:00 - 21:59 h) when it was incubated 56.67 %, 29.17 % and 45.00 % respectively. The incubating parent spent more time sitting on the egg rather than standing on the nest in each two-hour period except for the periods (02:00 - 03:59 h and 20:00 - 21:59 h) when the parent never sat on the egg during the period (02:00 - 03:59 h) and sat for only 16.67 % during the period (20:00 - 21:59 h). Moreover, the incubating adult seemed to avoid facing the sun which may be considered a behavioral mechanism to protect the egg from direct sunlight.

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Authors' Contribution

MA performed the fieldwork, analyzed the data, and wrote the article. SSMH and MS helped in paper writing.

Key words

Platalea leucorodia, Nest attendance, Hot environment, Eastern province, Saudi Arabia

The Eurasian Spoonbill (*Platalea leucorodia*) has a wide range covering temperate Europe and west Africa across the Mediterranean region and the Arabian Peninsula to northern India, Pakistan and China (Triplet *et al.*, 2008; Aspinall, 2010; Jennings, 2010; BirdLife International, 2020; Zhang *et al.*, 2020).

According to the IUCN red list of threatened species the species is evaluated globally and regionally as "Least Concern" (BirdLife International, 2020; Symes *et al.*, 2015). However, the overall trend of its population is unknown, and some populations may be subject to heavy illegal hunting pressure, habitat degradation, human disturbance and human exploitation of eggs (Triplet *et al.*, 2008; BirdLife International, 2020; Zhang *et al.*, 2020).

Within the Arabian Peninsula, the Eurasian Spoonbill breeds on the Red Sea islands, but its breeding area in the Arabian Gulf is restricted to the Kuwaiti islands, Warba and Bubiyan (Aspinall, 2010; Jennings, 2010). The breeding

population in the Arabian Peninsula was 275 pairs, out of them 200 pairs breed at the Red Sea coast and islands (Jennings, 2010). In Saudi Arabia, the species was recorded breeding in Red Sea coastal islands, with 103 pairs of 22 colonies estimated from an aerial survey along the Red Sea (Newton and Al Suhaibany, 1996). In 2001 about 28 pairs were observed nesting at a small island near Al Qunfudah (Castell *et al.*, 2002).

The Eurasian Spoonbill breeds colonially, although pairs may nest singly, the nest may be placed on rocks or scree slopes or may be built on bushes or in trees (Jennings, 2010). In Saudi Arabia, the nest is made of sticks with softer stalks and feathers (Jennings, 2010). The clutch size ranges from three to five eggs, but the most common are four (Harrison and Castell, 1998; Jennings, 2010). Egg-laying starts from March until June in Kuwait, while it may start a bit later in April in the Red Sea (Castell *et al.*, 2002; Jennings, 2010). Despite having a vast range, the breeding biology of this species is little known, particularly in the Arabian Peninsula. Therefore, the objectives of this study were to: (1) document the first nesting attempt of the Eurasian Spoonbill in the Eastern

* Corresponding author: m.alrashidi@uoh.edu.sa
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Province of Saudi Arabia; (2) collect some baseline data on some aspects of the nesting site of this species; (3) record the nest attendance behavior and estimate any disturbance or threats that the egg and incubating birds may face.

Materials and methods

Al-Fanateer Island is a human-made island about 1.5 km east of Jubail Industrial City, Eastern Province, Saudi Arabia. Al-Fanateer Island is a bird sanctuary under the authority of the Royal Commission for Jubail and Yanbu. The island is covered by dense vegetation, which is dominated by halophytic shrubs (mainly *Salsola vermiculata* and *Suaeda baryosma*) (Miller *et al.*, 2009) (Supplementary Fig. 1). While we were conducting a survey of breeding seabirds on Al-Fanateer Island on the first of June in 2016, we found a nest of Eurasian Spoonbill; we photographed the nest and recorded its location using a GPS receiver. We used a trail camera (Moultrie M-880i Gen 2, Trail Camera, Mossy Oak Bottomland) to record the nest attendance behavior of this species over 24 h. The camera was placed about 1 m from the nest and was set up to take an image every minute. The camera can record the ambient temperature every minute and stamp that on the image. The camera does not emit any flash and records nocturnal activities with infrared sensors. In total, 1440 images were obtained and analyzed. The temperature under the egg directly was recorded every minute for 24 h using a temperature data logger (Thermochron iButton, Embedded Data Systems, DS1922L-F5).

For data analysis we divided the nest data into 12 two-hour periods. Following AlRashidi *et al.* (2010), the behavioral variable, nest attendance, which could be defined as the percentage of the nest attendance time by incubating adults, was calculated for each period. From the still image, we recorded two types of nest attendance, (1) the percentage when the incubating parents sat on the nest and its belly feathers touched the egg, and (2) the percentage when the incubating parents stood on the nest, and its belly feathers did not touch the egg. Following AlRashidi (2016a), we calculated the percentage of incubating adults' orientation in each direction (North, South, East, and West). Averages of the ambient temperature and the temperature under the egg were taken for each period. Excel 365 was used for statistical analyses and drawing figures. Values are given as mean $\pm$ SE.

Results

The nest of Eurasian Spoonbill was 35 cm in diameter and was built above a halophytic shrub, about 70 cm from the ground. The nest was constructed of halophyte sticks, and its central area was lined with twigs, feathers, and seaweeds (Supplementary Fig. 1). The nest was located

within the northwest side of a colony of Western Reef Heron (*Egretta gularis*) and contained only one egg, unfortunately, the egg did not hatch, and we found it had fallen off the nest on the 14th of July.

Figure 1 shows the diurnal temperature variations. The average of the ambient temperature for the hottest two-hour period of the day (10:00-11:59 h) was 53.23 ± 0.04 °C, whereas its average for the coldest two-hour period of the day (00:00 - 01:59 h) was 26.24 ± 0.04 °C. The average temperature under the egg ranged between 27.70 ± 0.06 °C during the two-hour period (02:00 - 03:59 h) and 35.85 ± 0.11 °C during the two-hour period (12:00 - 13:59 h).

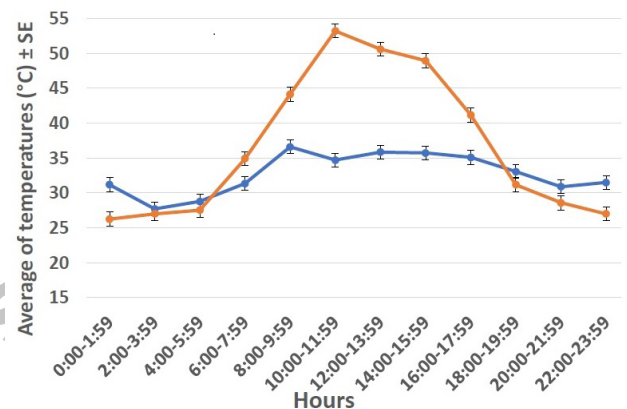


Fig. 1. Ambient temperature about 1 m from the nest (red line), the temperature under the egg directly (blue line), (mean $\pm$ SE for each two-h-time period).

Figure 2 shows the daily routine of nest attendance. The egg was incubated more than 80 % in each two hour period except for the periods (00:00 - 01:59 h; 02:00-03:59 h and 20:00-21:59 h) where it was incubated 56.67 %, 29.17 % and 45.00 %, respectively. The incubating parent spent more time sitting on the egg rather than standing on the nest in each two-hour period except for the periods (02:00-03:59 h and 20:00 - 21:59 h) when the parent never sat on the egg during the period (02:00-03:59 h) and sat for only 16.67 % during the period (20:00- 21:59 h) (Fig. 2). The incubating parent faced the west from midnight until the period (12:00-13:59 h), then it faced the east during the consecutive periods (12:00-13:59 h; 14:00-15:59 h and 16:00-17:59 h) (Fig. 3). The incubating parent seemed to avoid facing the south, particularly during the day's hottest periods (Fig. 3). In contrast, during the two hottest periods of the day (10:00-11:59 h and 12:00-13:59 h), the incubating parent faced the north with minor proportions 16.67 % and 22.50 %, respectively (Fig. 3).

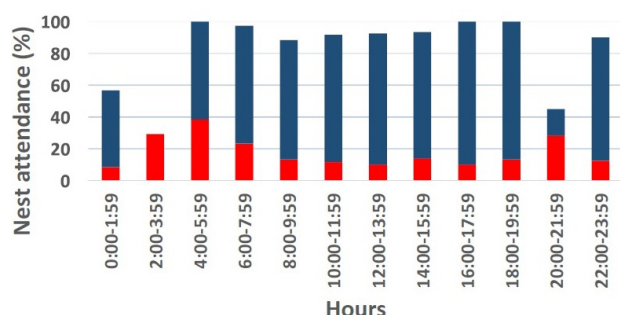


Fig. 2. Nest attendance (%), the percentage when the incubating parent sat on the nest, and its belly feathers touched the egg (blue color), the percentage when the incubating parent stood on the nest, and its belly feathers did not touch the egg (red color).

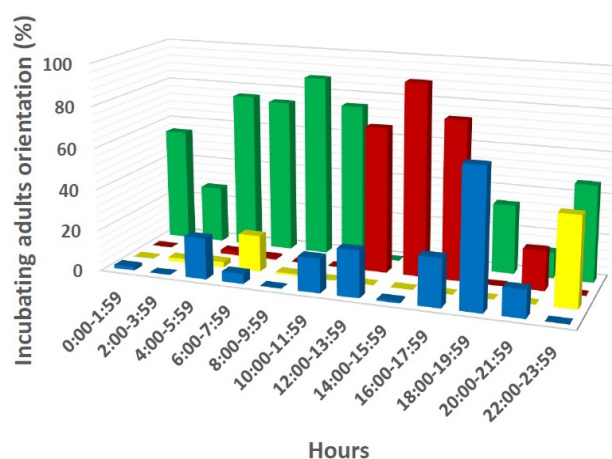


Fig. 3. Incubating adult orientation (%), West (green color), East (red color), North (blue color) and South (yellow color).

Due to the similarity in morphology among incubating adults, we could not distinguish between the male and the female from the still image (Supplementary Fig. 1). Moreover, the camera did not capture any image that showed any change-over behavior, that is, when one parent was relieved by the other parent from incubation duty (AlRashidi et al., 2011; AlRashidi, 2016b). However, the camera recorded that both parents were standing together on the nest, indicating that both parents may participate alternately in incubating the egg (Supplementary Fig. 2). No threat nor disturbance of the incubating bird was recorded.

Discussion

The study found a single nest located within the colony of the Western Reef Herons (*Egretta gularis*).

This result is in line with that reported by Jennings (2010) that a single nest of this species may be found within the colonies of the Cattle Egret (*Bubulcus ibis*), the Western Reef Heron (*Egretta gularis*) and the Grey Heron (*Ardea cinerea*).

In only one two-hour period (02:00-03:59 h), the incubating adult spent all its time standing on the nest and did not incubate the egg, the average temperature under the egg in this period was 27.70 ± 0.06 °C. This behavior may be attributed to the fact that, although the thermal range of avian embryonic development is limited between 30 and 40 °C (Webb, 1987), some avian species that nest in scorching environments have temperature-resistant embryos (Bennett and Dawson, 1979; Bennett et al., 1981; Aguilar et al., 1998).

The Eurasian Spoonbill incubating adult seemed to avoid facing the sun, which may be considered a behavioral mechanism to shade the egg and protect the egg from direct sunlight. AlRashidi (2016a) found that the incubating lesser crested terns, which breed on Jana Island, located approximately 45 km east of Al-Fanateer Island, changed their body orientation with the sun. They generally faced the west in the morning, and they rotated themselves clockwise until they faced east in the evening.

Conclusion

In sum, this study recorded the first nesting attempt of the Eurasian Spoonbill in the Eastern Province of Saudi Arabia. It may also close some knowledge gaps in this species' breeding biology, particularly the nest attendance behavior. Thus, follow-up studies are required to ascertain whether this species nests elsewhere in the Eastern Province of Saudi Arabia and document all aspects of this species' breeding biology, if any.

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Supplementary material

There is supplementary material associated with this article. Access the material online at: <https://dx.doi.org/10.17582/journal.pjz/20201005061049>

Statement of conflict of interest

The authors have declared no conflict of interest.

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Supplementary Material

The First Record of Eurasian Spoonbill (*Platalea leucorodia*) Nesting in the Eastern Province of Saudi Arabia with a Description of Nest Attendance Behavior

Monif AlRashidi^{1*}, Sami Saeed M. Hassan² and Mohammed Shobrak³

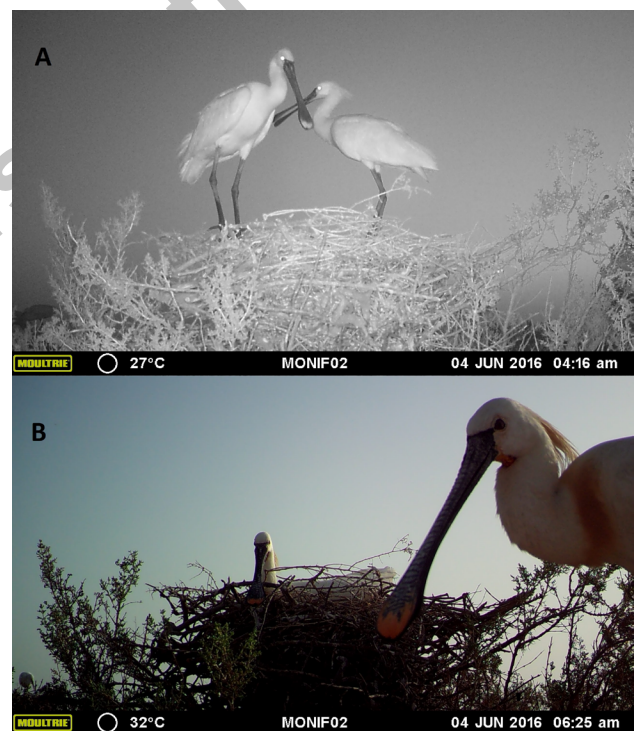
¹Department of Biology, Faculty of Science, University of Ha'il, PO Box 2440, Ha'il, Saudi Arabia.

²Department of Zoology, Faculty of Science, University of Khartoum, Khartoum, Sudan.

³Department of Biology, Faculty of Science, Taif University, PO Box 11099, Taif 21944, Saudi Arabia.



Supplementary Fig. 1. The nest was built above a halophytic shrub, about 70 cm from the ground.



Supplementary Fig. 2. (A) both parents were standing on the nest, the image was captured at 4:16 am; (B) one parent was sitting on the egg while the other was around the nest, the image was captured at 6:25 am.

* Corresponding author: m.alrashidi@uoh.edu.sa
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