

Notes on breeding and management of Black-headed Ibis *Threskiornis melanocephalus* (Aves: Pelecaniformes: Threskiornithidae) at Thiruvananthapuram Zoo, Kerala, India



Black-headed Ibis during the incubation stage in Trivandrum Zoo.

Black-headed Ibis *Threskiornis melanocephalus* (hereafter Ibis) is a resident wading waterbird which breeds in southern and southeastern Asia. Though a fairly common wetland bird in Kerala, its nesting was recorded only in Panamaram in Wayanad District (Balakrishnan & Thomas 2004), Kumarakom in Kottayam District (Narayanan et al. 2006), and Manthakad in Palakkad District (Roshnath et al. 2017).

The study was carried out in January–March 2018 at Thiruvananthapuram Zoo in the heart of Thiruvananthapuram City (8.5102°N & 76.9550°E), towards the southern limits of mainland India. Of the 12 Ibises maintained in the newly designed aviary of the zoo, three pairs were found displaying nesting behaviour from mid-January.

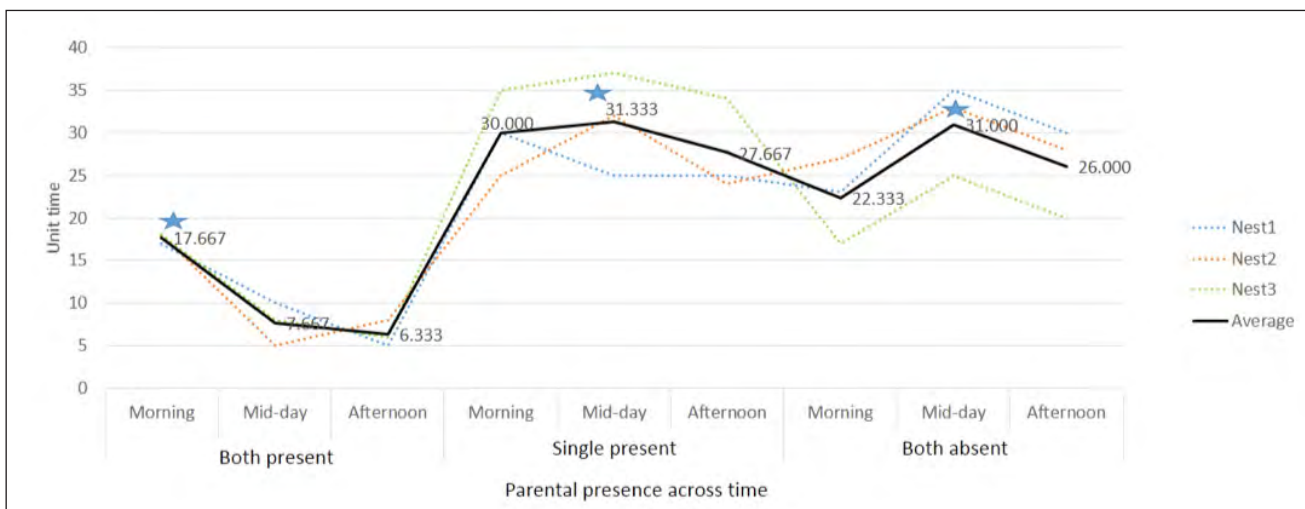
Nests were closely monitored from 9.00h to 14.00h using focal animal sampling method (Altmann 1974) from 7 February to 19 March. The nests were numbered according to the sequence in which they were built (i.e., the first nest was numbered 1). Each nest was observed for 10min followed by an interval of 5min. For ease of interpretation, time was clubbed as morning (9.00–10.40 h), mid-day (10.45–12.25 h), and afternoon (12.30–13.55 h). The activities of the parent birds (present or absent, incubation, feeding, and nest arrangement) were recorded during different nesting stages (incubation, nestling, and fledgeling) in each 10min observation unit. A total of 2000min observation over a period of 10 days (daily 200min of observation; i.e., 20 units of 10min each) was recorded during the study. Also, a ladder placed parallel to the aviary

Table 1. Nesting success of Black-headed Ibis in Trivandrum Zoo.

Condition	Nest 1	Nest 2	Nest 3
No. of eggs	3	3	3
No. of eggs hatched	3	3	3
No. of nestling	3	3	2
No. of fledgling	3	2	2
Nesting success	100	66.7	66.7

helped the observer record the number of eggs and hatchlings to determine nesting success.

In southern India, November–March is the general breeding season for Ibises (Ali & Ripley 1983; Ali 1996); in Kerala (Kumarakom Heronry), however, they were found nesting in July–September (Narayanan et al. 2006). In general, Ibises are known to breed during the heronry season which coincides with



Frequency of parental presence of Black-headed Ibis across the observation period in Trivandrum Zoo.

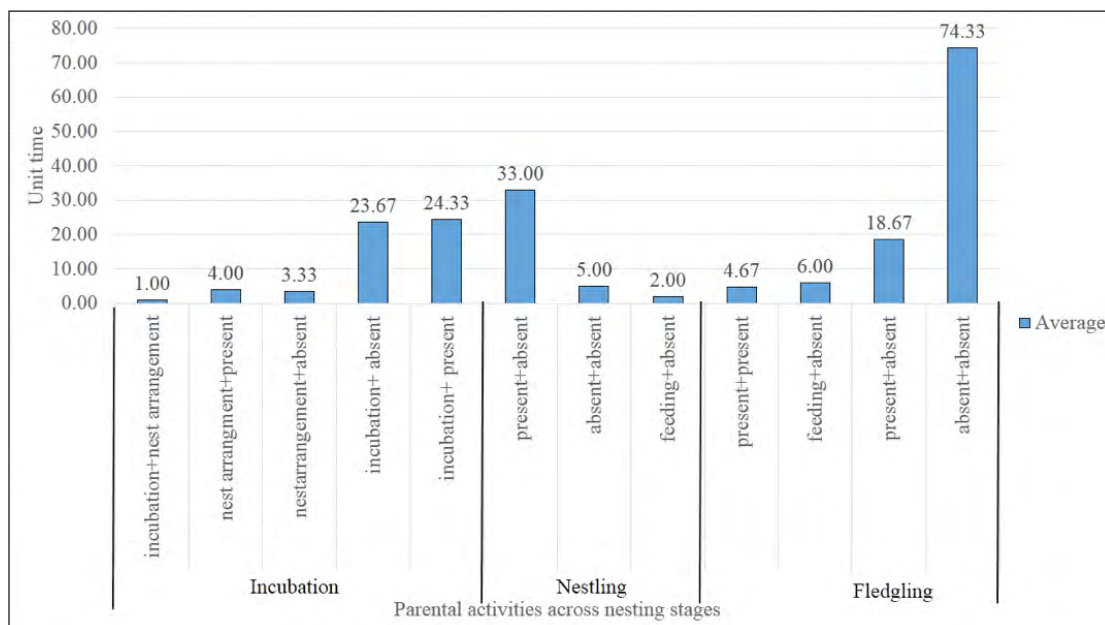
the southwestern monsoon in Kerala. At the Trivandrum Zoo, adequate food and protection provided under captive conditions might have been the reason for breeding during the summer season. The Ibises in the aviary showed courtship displays and mating behaviours in mid-January. Collection of twigs was observed and a platform nest was constructed on a dead tree (*Copperpod Peltophorum pterocarpum*) at a height of 6m in late January.

During the present study, nesting success was 100% in nest 1, while nests 2 and 3 lost one chick each (Table 1). The first egg of nest 1, 2, and 3 hatched on 6, 8, and 19 February, respectively. The chicks from nests 1 and 2 fledged by 12 March and

those from nest 3 by 21 March. The average fledging period was found to be 32 days.

Parent birds were mostly found to be present at the nest during morning hours, where either both (n=17.66) or one of the parents (n=30) was found guarding the nest. Parental presence in the nests was least recorded (i.e., both absent) during mid-day hours (n=31). When present, the birds showed activities such as incubation, nest rearrangement, feeding, or merely standing on or near the nests. When absent, the birds were away from the nests engaged in activities like foraging, flocking, or perching.

Different combinations of parental actions were observed during different nesting stages. During the incubation stage, either



Parental activities shown by Black-headed Ibis during different nesting stages in Trivandrum Zoo.

with the presence of both (n=24.33) or one (n=23.67) of the parents, incubation was the major activity shown by the parental birds. Along with incubation, parents were found to engage in nest building and rearrangement activities (n=8.33). Unguarded nest condition, i.e., absence of both parents at a time, was not recorded during this stage. Parental guarding behaviour (n= 33) was prominent during the nestling stage.

The complete absence of both parents (n=5) was also recorded during this stage, which may have been due to the assured security and absence of predators in the aviary.

The fledgeling stage was found to involve less parental interventions and nests were found unguarded most of the time during this stage (n=74.33).

Parental feeding behaviour was generally recorded less, but with increased frequency, during the fledgeling stage compared to the nestling stage. Low record of feeding behaviour may have been because feeding as a fast process may have happened during non-observatory periods (5min interval) and hence not documented in the data sheet.

Both parents contributed equally to nest arrangements, incubation, and feeding. Stealing of nesting material from

neighbouring nests was observed quite regularly. Frequent fighting was observed between neighbouring pairs. Many sub-adult Ibises were found perching near the nests and some were found disturbing the nesting pairs occasionally. Although courtship behaviours were noted among these birds, none was found nesting during the study period.

Devkar et al. (2006) observed increased reproductive success of Ibises under captive conditions due to favourable conditions and remarkable management in the zoo. At Thiruvananthapuram Zoo, the aviary was designed to cover a large area (1,823.89m²) with a pond at the centre, ensuring free movement and exhibition of normal behaviours. Raised platforms were provided for roosting and nesting. Adequate amount of sticks and twigs were provided in the aviary during the nesting phase. More feed (selectively, freshwater fishes) were provided inside the aviary owing to the high energy needs during the nesting season and to ensure the survival of hatchlings. Movement of zookeepers inside the aviary was also restricted and keepers were specially appointed to watch the birds and provide adequate care.

The incident of breeding of Ibises at the Thiruvananthapuram Zoo indicates that the species can be bred successfully in captive conditions. Being a conservation-

priority species, along with the proper documentation of captive ecological studies, studies from natural habitats can help in planning scientific reintroduction programmes.

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