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Status and conservation of water birds in Panamaram heronry, Kerala and implication for management

Anoop N.R[1,*], Mathews T.J[2], Vinayan P.A[2], Jayakumar S[1], Sujin N.S[2], Sabita C[2] and Anoop Raj P.N[1]

[1]*P.G. and Research Department of Zoology & Wildlife Biology, A.V.C. College (Autonomous), Mannampandal, Mayiladuthurai, Tamil Nadu- 609 305, India*

[2]*Ferns Naturalist Society, Wayanad, Mananthavady, Kerala, India*

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ABSTRACT

A study was carried out to assess the status of breeding birds in Panamaram heronry of northern Kerala during June 2010 to November 2010. The study revealed that 9 species belonging to 3 families prefer to breed in the heronry. Family Ardeidae had the highest number of species (n=7) followed by Threskiornithidae and Phalacrocoracidae with one species each. A total of 442 nests were recorded during the course of the study in which *Mesophoyx intermedia* outnumbered all other species followed by Near Threatened *Threskiornis melanocephalus*. The *Bubulcus ibis* was found nesting for the first time from the district. Among the birds, *Casmerodius albus* showed the maximum breeding success (100%) with smaller sample size, followed by *Phalacrocorax niger* (92.9 %) and *Ardeola grayii* (88%). Over the six month period 81 birds were found dead, where *Mesophoyx intermedia* accounted for the highest mortality rate.

Key words: Breeding, conservation, mortality, Panamaram heronry, population, threats

INTRODUCTION

Water birds are considered as one of the important indicators for the ecological conditions, productivity, trophic structure, human disturbance and contamination of wetland ecosystems (Custer and Osborn, 1977; Subramanya, 1996). Different species of water birds vary in their habitat preferences, diet, and behaviour but they have certain common fundamental requirements for nesting (Schoener, 1974; Hafner, 2000). A good nesting site generally provides protection from predators, adverse climatic conditions and offers adequate stability, materials to support and access to adequate foraging areas (Gibbs *et al.,* 1991; Thompson, 1977; Beaver *et al*., 1980; Hafner, 2000). Colonial water birds choose the nesting site after careful valuation of the prevailing safety conditions (Van Eerden *et al.,* 1995; Hafner, 2000). The vegetation structure is also an important criteria for the choice of a specific nesting site among heronry birds (Hafner, 2000; Fellowes *et al*., 2001*)*. The breeding success in water birds changes remarkably depending on the inter and intra species relationships in the colony, food resources and predator pressure (Frederick and Collopy, 1989).

Very little has been published on the nesting ecology of colonially nesting water birds of Kerala (Subramanya, 1996). Panamaram heronry is the largest mixed species heronry in Wayanad district and 9 species recorded to breed here including the Near Threatened Black-headed Ibis. Further, robust estimates of population, number of nests of different species, nest stratification, breeding success and nest-site characteristics which are unavailable. The purpose of this study is to provide baseline information on current breeding status of the heronry birds. This would help to have a better understanding of the conservation perspectives of the heronry.

MATERIALS AND METHODS

Study area

Wayanad sub-plateau is situated at the confluence of three biologically distinct and diverse regions of the Western Ghats, the Niligiri hills and the Deccan plateau. The plateau rises steeply from the coastal plains of Kerala and slopes gently eastwards to merge with the Deccan plateau in the east (Nair, 1986). Almost the entire Wayanad district is drained by the Kabani and its tributaries such as Panamaram, Mananthavady and Kalindi rivers. The Panamaram heronry (11˚45´N, 76˚05´E) is one of the less known heronry in Kerala which located near Panamaram town, about 500 meters downstream of the bridge on the Manathavady – Panamaram road and lies 650 m above the sea level (Figure 1). The heronry is a small natural islet that covers approximately one acre formed by the bifurcating flow of Panamaram river. Vegetation of the heronry is dominated by *Bambusa spp* and rest of the sandy ground is covered with grass, weeds and bushes. The study area usually receives rainfall both from southwest (June to August) and northeast (September to December) monsoons but the bulk

*Corresponding Author's E-mail: anoopnr.99@gmail.com

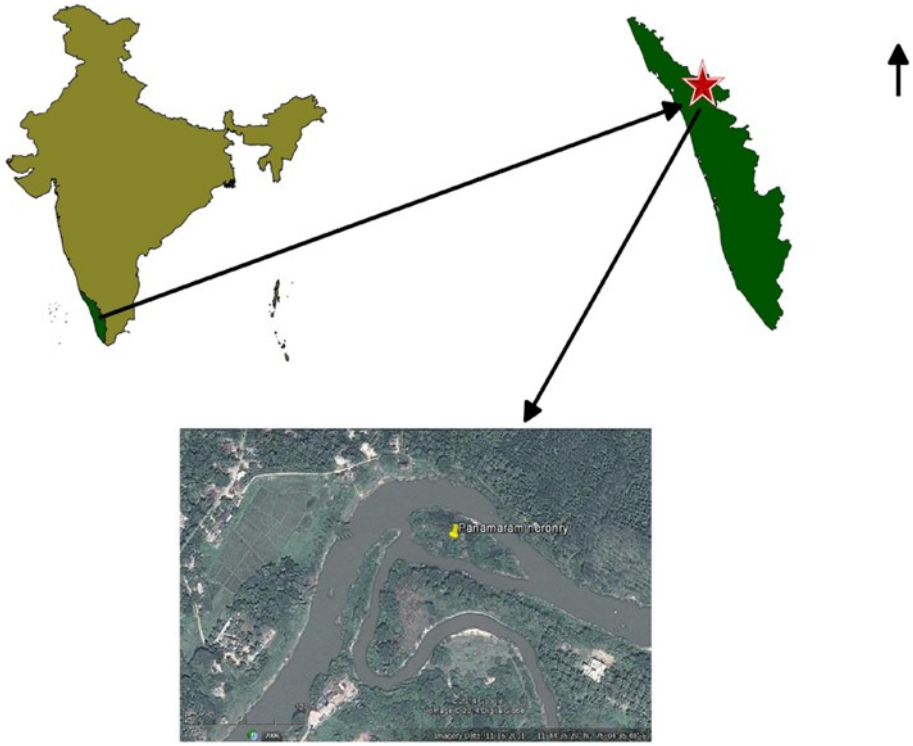

Figure 1. Map showing the geographical location of the study area in Wayanad district of northern Kerala.

precipitation during the southwest monsoon. Heronry birds congregate here to breed during the south west monsoon. The flood plain areas of the Panamaram river is the major foraging area for the heronry birds.

Methodology

The present study was carried out from June-2010 to November-2010. The heronry was surveyed once in a week during the study period by trekking along the river bank and observed by using "7 × 50" Nikon binoculars. Direct total counts and focal animal sampling were employed to study the breeding water birds (Marquiss, 1989). The information's such as abundance, number of nests, nest stand variables, breeding success and number of dead birds of different nesting species were collected. Repeated counts were performed to establish the minimum number of pairs of each species and care was taken to avoid double counting. For assessing the breeding success, the selected number of nests of different species were located by natural markings and monitored until the post nestling stage. The survey was carried out till the last week of November when the breeding activities of all the heronry birds were completed.

RESULTS

A total of 9 species belongs to 3 families are prefer to breed in the heronry *viz.* Little Cormorant *(Phalacrocorax niger*), Little Egret (*Egretta garzetta*), Great Egret (*Casmerodius albus*), Intermediate Egret (*Mesophoyx intermedia*), Cattle Egret (*Bubulcus ibis*), Indian Pond Heron *(Ardeola grayii)*, Black-Crowned Night Heron (*Nycticorax nycticorax*), Purple Heron (*Ardea purpurea*) and Near Threatened Black-headed Ibis (*Threskiornis melanocephalus*). Among the birds, family Ardeidae had the highest number of species (n=7) followed by Threskiornithidae and Phalacrocoracidae with one species each. Among the nine species *Mesophoyx intermedia* had the highest population size (52%) followed by *Threskiornis melanocephalus* (20 %) and *Ardeola grayii* (12 %) (Table 1).

The heronry harboured 442 nests of nine species where, *Mesophoyx intermedia* out numbered all other species (n = 226) followed by *Threskiornis melanocephalus* (n=74), *Ardeola grayii* (n=54), *Nycticorax nycticorax* (n=29), *Egretta garzetta* (n=23), *Phalacrocorax niger* (n=12), *Bubulcus ibis* (n=10), *Casmerodius albus* (n=6) and *Ardea purpurea* (n=3). All recorded species starts breeding in the last week of May except *Threskiornis melanocephalus*. The *Threskiornis melanocephalus* is the last entrant to the heronry and the first nest was recorded on 16^{nth} June. During the count in different weeks, the highest number of *Threskiornis melanocephalus* was 136 and the lowest was 2. The study recorded the nesting of *Bubulcus ibis* for the first time from the district and it is the only breeding site of this species in the state. Some of these heronry birds with breeding activities are shown in the Figure 2.

The study recorded a vertical alignment of nesting by different species in relation with their body size. The *Threskiornis melanocephalus*, *Casmerodius albus* and *Ardea purpurea* build their nests on the bamboo brakes standing in the island but rest of the species using both the heronry and river banks out side the heronry. However, most of the nests are found inside the island. In general *Threskiornis melanocephalus* construct nest higher from the ground (8.5 ± 1.3 m) and it show the strong preference to the top canopy of the bamboo thicket

Figure 2. Clockwise from top left : Black-headed Ibis with chicks, Cattle Egret adult (breeding plumage), Chicks of Purple Heron, Intermediate Egret and chicks, Chicks of Black-crowned Night Heron, Little Cormorant adult with a chick moved away from nest.

Table 1. Month-wise population size (Mean ± SD) of different colonial water birds recorded in Panamaram heronry.

No	Name of the species	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Percentage (%)
1	Cattle Egret	26 ± 2	27 ± 4	27 ± 5	8 ± 4	3 ± 1	-	2
2	Little Egret	56 ± 14	65 ± 6	78 ± 4	47 ± 15	13 ± 9	-	5
3	Intermediate Egret	631 ± 155	878 ± 45	783 ± 136	435 ±98	117 ± 111	2 ± 3	52
4	Great Egret	20 ± 3	20 ± 3	8 ± 1	5 ± 1	2 ± 2	1 ±1	1
5	Indian Pond-Heron	169 ± 43	218 ± 20	134 ± 31	92 ± 17	36 ± 20	3 ± 4	12
6	Black-crowned Night Heron	85 ± 5	75 ± 12	66 ± 7	44 ± 18	6 ± 8	-	5
7	Purple Heron	10 ± 1	11 ± 2	8 ± 1	5 ± 1	0	-	1
8	Black-headed Ibis	49 ± 58	216 ± 44	333 ± 10	340 ± 16	363 ± 88	8 ± 7	20
9	Little Cormorant	39 ± 8	55 ± 6	63 ± 12	19 ± 15	3 ± 2	-	3

and it may help to withstand the heavy nest they construct. The *Ardea purpurea* construct the nest have the mean height of 8 m followed by *Phalacrocorax niger* (7.5 ± 2 m). The *Mesophoyx intermedia* prefer the height of (6.2 ±1.4 m) *Egretta garzetta* (5.5 ± 0.5 m) and *Bubulcus ibis* preferring the height of (5.5 ± 0.5 m). Where *Nycticorax nycticorax* and *Ardeola grayii* were construct their nest close to the ground have the mean height of (3.2 ± 1.3 m) and (4 ± 1 m) respectively.

Altogether 93 nests of eight species were observed to assess the breeding success of heronry birds. The *Casmerodius albus* had the highest breeding success with small sampling size (100 %, n=3) followed by *Phalacrocorax niger* (92.9%, n=9), *Ardeola grayii* (88%, n=11), *Nycticorax nycticorax* (84%, n=10), *Bubulcus ibis* (81.8%, n=10), *Egretta garzetta* (79.4%, n=15), *Threskiornis melanocephalus* (77.5%, n=15) and lowest breeding success was recorded by *Mesophoyx intermedia* (76.6%, n=20). Nests of *Ardea purpurea* were not observed to assess the breeding success due to lack of visibility. There are 81 birds were found dead during this study period including adult and fledglings. The dominant species *Mesophoyx intermedia* accounting the high mortality rate (n=35) followed by *Threskiornis melanocephalus* (n=19), *Egretta garzetta* (n=12), *Ardeola grayii* (n=9), *Casmerodius albus* (n=8), *Bubulcus ibis* (n=3) and

Nycticorax nycticorax (n=1). The presence of house crow *Corvus splendens* and mugger crocodile *Crocodylus paluster* were observed in the heronry but their predation on heronry birds was not observed.

DISCUSSION

There are 15 different species of water birds found breeding in the heronries of Kerala out of which nearly 20 are medium sized heronries with three to five species (Subramanya, 1999). Majority of the heronries in the state are single species nesting sites or with fewer nesting species (Subramanya, 1999; Sashikumar and Jayarajan 2007). According to Sashikumar *et al.* (2012), 12 species of water birds nesting in 102 different heronries in the Malabar region of northern Kerala. Panamaram heronry is the largest traditional mixed-species heronry in Wayanad district and support the breeding of maximum number of species in north Kerala (Sashikumar *et al.,* 2012). The survey data shows an increasing trend in the number of birds nesting in the heronry every year (Vinayan *et al*., 2012). The availability of suitable feeding habitat in the surrounding area and safe nesting site are the factors governing the continued occurrence of this heronry by the water birds. The heronry is entirely surrounded by the deep river water and it will avoid the entry of land predators to the heronry during the breeding season. In Panamaram, the breeding of the birds coincides with the onset of South West monsoon between the end of May to October. Agricultural practices carried out during this period which facilitates the food availability to the nesting birds. The Panamaram river flood plain area as well as the nearby paddy fields is the major foraging areas of the heronry birds.

There are 3 species used to breed in Panamaram heronry during the year of 1990 such as *Clasmerodius albus*, *Egretta garzetta* and *Phalacrocorax niger* (Uthaman 1990). Four species of birds preferred during the years 2000-2001 such as *Mesophoyx intermedia*, *Egretta garzetta*, *Nycticorax nycticorax* and *Ardeola grayii* (Pers Comm. Vinayan). The present study recorded 442 nests of nine species and it indicates shows a steep increase in the number of birds nesting in heronry. Almost all the species colonizing in the heronry are of Least Concern category except *Threskiornis melanocephalus* which have Near Threatened status (BirdLife International, 2001; IUCN, 2011). In 2002 one pair of *Threskiornis melanocephalus* started breeding in the colony and it was the first nesting record of the species from Kerala (Balakrishnan and Thomas, 2004; Vinayan *et al.,* 2012). Now this heronry support the biggest single breeding population of Black-headed Ibis in the state and the present study recorded 74 nests. The study also recorded the breeding of Cattle egret, hence it is the only heronry they breed in the state (Sashikumar *et al.,* 2012). Over the six month period, 81 birds were found dead; with *Mesophoyx intermedia* accounting for the highest mortality rate followed by Near Threatened *Threskiornis melanocephalus*. Here the cause of high mortality is unclear. The wetlands of Wayanad is facing different man induced threats such as degradation, infrastructure development, land conversion, pollution and high level of pesticide usage.

Management suggestions

Panamaram heronry is one of the largest mixed species heronry in Kerala and important site for breeding 9 species of water birds has three species which breed nowhere else in northern Kerala. This heronry supports the largest breeding colony of Near Threatened *Threskiornis melanocephalus* in the state and also the only breeding site of *Bubulcus ibis* in the state. The survey data shows an increase in the number of birds nesting in the heronry every year. Human disturbances from the surrounding areas in the form of poaching of eggs and chicks, sand mining in and around the heronry should be totally banned. The use of chemical pesticide in the foraging areas of the heronry birds should be prevented and encourage organic farming to ensure the existence of healthy population of heronry birds. The heronry is located outside the present existing protected area networks (National park or Wildlife sanctuary) so, special measures should be taken for the protection of heronry through community participation. Conservation programmes of the heronry consist of regular planting of bamboos and other native tree species to enhance the requirement of nesting place and to protect the sandy banks of the heronry from erosion.

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