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Email: editor@indianbirds.in

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Aims & Objectives

- To publish a newsletter that will provide a platform to birdwatchers for publishing notes and observations primarily on birds of South Asia.
- To promote awareness of birdwatching amongst the general public.
- To establish and maintain links/liaison with other associations or organized bodies in India or abroad whose objectives are in keeping with the objectives of the Trust (i.e. to support amateur birdwatchers with cash / kind for projects in ornithology).



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Front cover: White-bellied Sea-Eagle *Haliaeetus leucogaster*
Photographer: Niranjana Sant

The birds of Sambhar Lake and its environs

Harkirat Singh Sangha

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Harkirat Singh Sangha, B-27, Gautam Marg, Hanuman Nagar, Jaipur 302021, Rajasthan, India. Email: harkirat.sangha@gmail.com
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Sambhar Lake, situated in the Nagaur, Jaipur and Ajmer districts of Rajasthan and spread over 190 km², is India's largest inland saline wetland. It has been recognised by Government of India as a wetland of international importance and has been accordingly designated a Ramsar Site. However, little information is available on the avifauna of the lake, as most published studies relate to impacts of algal growth on salt quality. This paper aims to present an updated, annotated checklist of the birds of the lake and its environs and to document changes in birdlife of the area since R. M. Adam's observations from the latter part of the nineteenth century.

Geography & climate

Sambhar Lake (26°52'–27°02'N 74°54'–75°14'E) has a catchment area spread over 5,700 km² (Fig. 2). Its drainage pattern indicates that the western and southern parts of the catchment have a good concentration of streams whereas the northern and eastern parts are represented by poor drainage (Fig. 2). The streams originating from the western and southern catchments have a dendritic drainage system, cutting through hilly terrain (Jain 2006). Sambhar is essentially an ephemeral lake that remains dry during a greater part of the year, filling with water only during monsoons. Interestingly, Sambhar used to be a perennial lake till about 1000 BC after which it gradually became seasonal (Lahiri 2000). The periods of dryness and being full of water are quite irregular and the intervals between the two might be so short that one period of full water level merges almost into the other. Sometimes the periods of dryness (Fig. 1) or full water level are also extraordinarily prolonged.

The playa has a maximum depth of 3 m with average depth not exceeding 0.16 m. The lake basin is 22.5 km long while its

width ranges from 3.2 to 11.2 km. The lakebed (360 m alt.) is almost flat with a slope of 10 cm per km. The lake was divided into two unequal parts by a 5.16 km long embankment erected in 1924 between the settlements of Jhapok in the south and Gudha in the north. The western part of the lake covering about 113 km² has almost no disturbance and is a natural continuous sheet of water. On the other hand, the eastern part of the lake, covering 77 km², is heavily used for salt extraction and comprises a mosaic of canals and saltpans (*kyars*). Four seasonal streams—Mendha, Rupangarh, Kharian and Khandel—besides numerous rivulets and surface runoff, feed the lake. With the onset of rains, the lake starts filling gradually and the water is almost fresh, with salinity less than 2 ppt. The salinity of the lake, however, increases through the winter due to evaporation and salt-encrustation of the lakebed. Salinity rises sharply during spring or early summer when salt crystallisation starts.

The climate of the lake is subtropical monsoonic (Gopal & Sharma 1994). The year is marked with distinct summer, rains and winter seasons. The mean monthly temperature during summer crosses 40°C whereas the mean minimum temperature remains about 11°C. The annual rainfall averages 54 cm, occurring almost entirely during the south-western monsoon between July and September. However, the precipitation record for a hundred years shows that both, the total and annual rainfall, and its period of occurrence and intensity during the season, exhibit wide variations, resulting in frequent spells of droughts and floods (Gopal & Sharma 1994).

Conservation value, threats and outlook

Sambhar, being an inland salt lake, is a unique ecosystem that supports a highly specialised group of organisms, including the algae *Dunaliella salina* and the bacterium *Serratia sambhariana* (Gopal & Sharma 1994). In particular, flamingos (Phoenicopteridae) are the avian flagships of the lake. Both Greater *Phoenicopterus ruber* and Lesser *P. minor* Flamingo regularly visit the lake and this site is probably the most important area for flamingos on the Indian Subcontinent, outside the Rann of Kachchh (Sangha 1998). The Lesser Flamingo is a Near-threatened species (BirdLife International 2008) and Sambhar Lake supports one of its largest populations in the Subcontinent, estimated to number around 18,500 birds (Sangha 1998). Large numbers of waterfowl also occur on passage and in winter.

A growing need for water in the catchment of the lake has led to the construction of numerous check dams on the ephemeral rivers that flow into the lake. This has drastically reduced the natural inflow of water, accompanying nutrients and organic matter into the lake. According to data available with the irrigation department there are 675 check dams on



Fig. 1. The lakebed in summer (2000) covered with dry algae that turn black on drying. Palls of dust are caused by strong westerlies.

the inflowing rivers. Ensuring the free flow of water, as per the V. T. Krishnachari Award of 1961, has been neglected by government agencies including the forest department.

Precipitating matters is unchecked growth of private salt manufacturers, permitted by the state government to set up shop in the catchment area in the mid 1980s (Parihar 1999). These unauthorised salt manufacturers have encroached mainly on the northern periphery of the lake, towards Nawa in Nagaur district (Fig. 2). By pumping out the subsoil brine for salt production they have depleted the subsoil brine from the main lake area. They also excavate clay from the lakebed to spread it on their salt pans.

Whilst the manufacture of salt by Hindustan Salts Limited (a.k.a. Sambhar Salts), a public sector undertaking that has the sole rights to produce salt in Sambhar Lake, has had no adverse impact on the main lake, its decision to dig 25 bore wells and 50 surface wells is far more ominous than digging channels on the lakebed. Digging channels by Hindustan Salts Limited to facilitate the flow of water from the main lakebed to the eastern part (reservoir) even after it stops flowing naturally through sluice gates is detrimental to the waterfowl.

A recent study to put in place a conservation plan for the lake, using satellite remote sensing data from 2003, along with inputs from field observations, information collected from

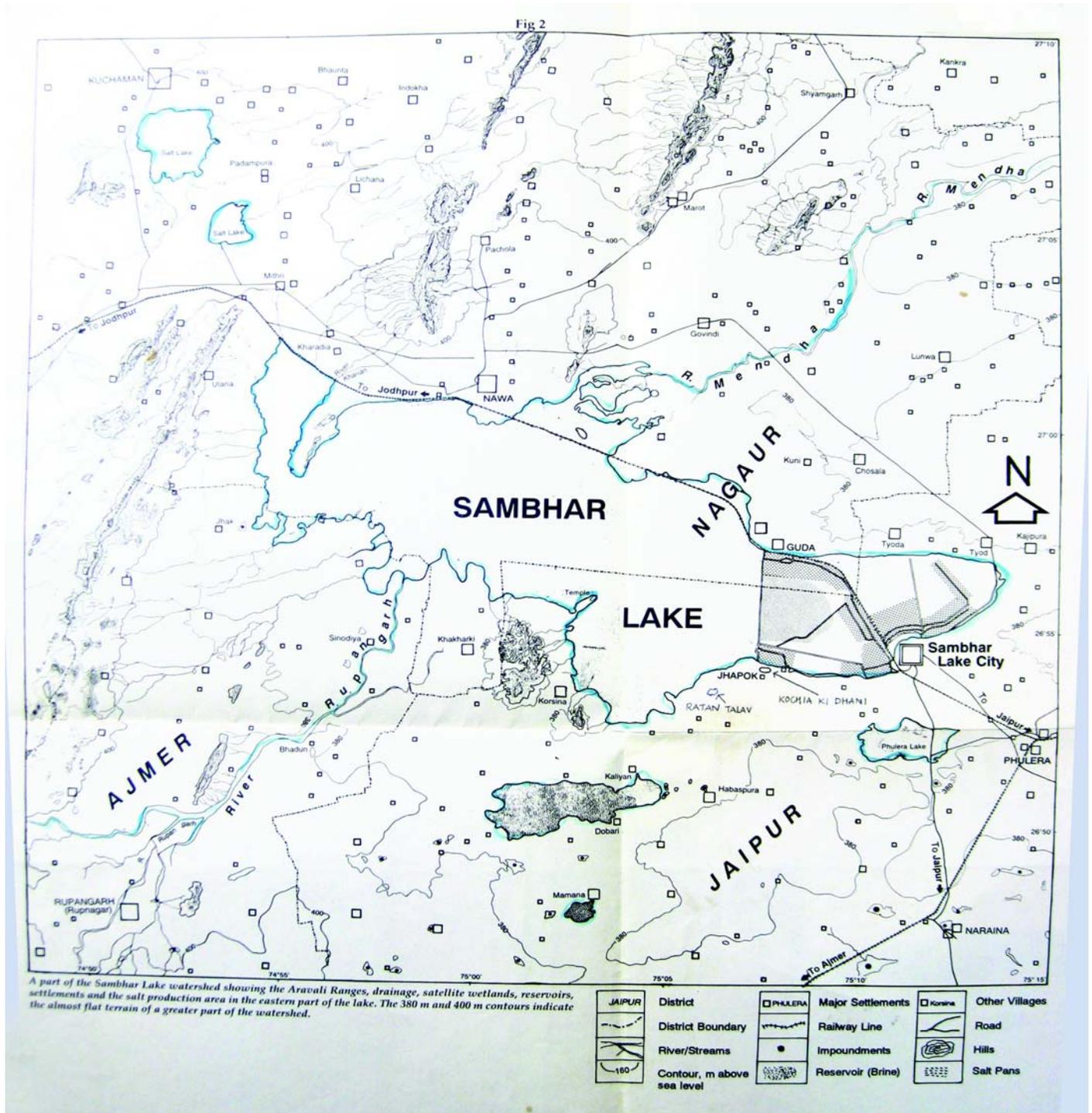


Fig. 2. Sambhar Lake (Source: Gopal & Sharma 1994)

various concerned department and local people, reveals that Sambhar Lake and its surrounding areas have been degrading for quite some time. The lake is under tremendous anthropogenic pressure due to wrong utilisation of its resources (Jain 2006).

Current conservation measures are quite inadequate in dealing with various threats to the lake, and there is every need to increase protection efforts, if the unique habitat is to be saved. Designating it a Ramsar Site in 1990 has not been followed up by any concrete measures towards conservation of the ecosystem. The proposal of the Rajasthan State Forest Department to create a two kilometre wide eco-sensitive buffer zone around the main lake, banning all activity within two kilometres of the lake's periphery remains a non-starter. More important than establishing a buffer zone would be to curb the growth of check dams on rivers throughout the catchment. Already about 250 check dams have been constructed on rivers, substantially reducing the inflow of water.

According to a recent study for conservation planning of the Sambhar Lake using the satellite remote sensing data of the year 2003 the future of the lake looks bleak. The data reveal that already water spread has reduced considerably. The study suggests dividing the entire eco-sensitive area into three important priority zones for carrying out conservation planning. The areas, which require immediate attention for conservation fall into first category. The second category, which is otherwise, an intermediate area between the first and third may be considered for prioritisation after the first prioritisation work is over. The land use / land cover classes falling in the third and the outermost zone are recommended for eco-restoration in the final stage. The suggested three-kilometre buffer zone covers an area of 550 km² out of which the lake itself covers c. 230 km² (Jain 2006).

History

The lake has been worked for salt for at least a thousand years. It was however not till the rule of the Mughal Emperor Akbar (1542–1605¹) that a settled system of working the lake was introduced. In his days the income from the lake was about Rs 250,000 per annum. The income had gradually increased to Rs 1.5 million when Aurangzeb ascended the throne (1658²). With the decline of the Mughals the revenues declined and about 1770, confederates of Jaipur and Jodhpur appropriated the lake without a struggle. During the next epoch the management of the lake passed backwards and forward between the Rajputs and Mahrattas. History is silent as to what revenue was realised in those days (1770–1834) till the British assumed charge of the lake in 1835. The *Shamlat*, the joint government of Jaipur and Jodhpur, worked the lake from 1844 onwards (Gopal & Sharma 1994). At that time Nawa and Gudha were insignificant hamlets, but gradually developed into salt markets. When Jodhpur began to develop salt works at Nawa and Gudha, Jaipur become envious. This led to constant friction and discord between the two states. The Holkar and Scindia families too got mixed up with these events (Aggarwal 1951). This went on till the lake, including Nawa and Gudha, were taken over by the British in 1870—on lease from Jodhpur and Jaipur and worked till 1947 (Sarkar 1984). The ownership of the lake passed onto the Rajasthan state government in 1950 on the integration of the Indian states after independence. Today its land tenure has been leased to Sambhar Salts, a joint venture of Hindustan Salts with Rajasthan government.

Early avian studies

Surprisingly, the lake has received very little attention from

ornithologists. R. M. Adam, who was Assistant Commissioner at Sambhar, was the first to publish ornithological records of the lake and its surrounding areas including Kuchaman and Nawa (Adam 1873, 1874a–b). His detailed notes on the birdlife of the lake still remain the only authentic source of information and provide an invaluable benchmark against which changes in population size and bird diversity can be compared today. World Wide Fund for Nature-India's booklet on the lake, authored by Gopal & Sharma (1994), contains a brief account of its avifauna. Save for a checklist of waterfowl prepared mainly for foreign birdwatchers (Sangha 1998b), other published accounts relate only to the two species of flamingos (Alam 1981; Sangha 1998a).

Bhatnagar & Shukla (2005) is rife with erroneous and doubtful records such as describing the Great White Pelican *Pelecanus onocrotalus* and Black-bellied Tern *Sterna acuticauda*, which are both locally rare, as common, and the Black Stork *Ciconia nigra*, a winter migrant, as resident and common. Similarly, another recent publication on birdlife of Sambhar Lake by Zoological Survey of India (Anonymous 2005) contains several dubious records like stating that the Ibisbill *Ibidorhyncha struthersii* winters in Sambhar Lake.

Historical changes in Sambhar landscape

During Adam's stay in Sambhar, cultivation was sparse. Although some of the low hills were all but destitute of vegetation some patches of dense scrub jungle did exist. While wild boar *Sus scrofa* was very common, small herds of sambar *Cervus unicolor* and nilgai *Boselaphus tragocamelus* were sparingly met with. Though he has not mentioned the presence of antelopes in the area, blackbuck *Antelope cervicapra* and Indian gazelle *Gazella gazella* were reported around the lake well up to the mid 1970s (Digvijay Singh Dhamotar, *verbally*). While blackbuck and Indian gazelle have since become extinct in the study area a small population of nilgai has colonised the area in recent years.

Nawa *beed* (forest), which belongs to Sambhar Salts, on the periphery of the lake from where Pied Tit *Parus nuchalis* was reported (Tiwari 2001), has vanished in the absence of effective control. There was long grass or scrub jungle in the area and Adam often flushed Short-eared Owls *Asio flammeus* when beating for game. I have only one record of the species. A dead bird was found near Sambhar town in 1990 (Dhirendra Devarshi, *verbally*). Over the last six–seven years, the exotic *Prosopis chilensis* has spread in the vicinity of the lake. Up to the 1990s there were no roads around the lake. Now a road connects Sambhar town with Shakambri Mata Temple *via* Korsina village. The open wells used for irrigation, about Sambhar and frequently mentioned by Adam, are no longer found. These were excavations in the fields, about 10–12 m in diameter and six meters deep. The sides of these wells were densely clothed with grass and were favourite haunts of numerous birds like Brown Crake *Amaurornis akool*.

Methods

After an initial reconnaissance in 1990 the main areas of the lake were identified and surveyed over the years. The records span a period of over 18 years (1990–2009). Bird observations were carried out at Sambhar Lake and satellite wetlands covering all seasons. During field visits, the focus was mainly

¹ Source: http://en.wikipedia.org/wiki/Akbar_the_Great.

² <http://en.wikipedia.org/wiki/Aurangzeb>.

on waterfowl. Nevertheless, land birds were also recorded and these are listed in the Appendix. The habitats covered during visits include the main lake, reservoir and satellite wetlands including Ratan Talav, Kochia ki Dhani and Phulera Lake.

Results & discussion

A total of 83 species of waterfowl were recorded. The highest number of species was recorded from September to December. Many of the species frequent the lake soon after rains when its salinity is low. They leave as soon as the specific gravity of the lake brine increases after November. However, both the species of flamingos stay through winter when the lake contains only a concentrated solution of brine.

During years of normal monsoon, water is present from August to March. On the contrary, the records of Adam seem to indicate that during his stay at Sambhar the lake was drying by summer as he shot many birds as late as May. Probably the rivers flowed regularly and supplied more water to the lake to last up to summer. The lake in the recent years has dried up suddenly on many occasions when sluice gates were opened to drain the water to salt pans. In such situations the birds have had to abandon the lake en masse. More than 20,000 birds including *c.* 10,000 Lesser and *c.* 5,000 Greater Flamingos were present on 19th September 2001 and after the release of water by Sambhar Salts I found only 200 Greater Flamingos!

The chemistry of the lake is strange and needs to be studied. On 4th December 1994, 8,500 Lesser Flamingos were seen on the lake, but no Greater Flamingos. Similarly, on 31st January 1995 there were *c.* 5,000 Lesser Flamingos but Greater Flamingos and other species were missing, probably due to high level of salinity.

Despite the claims of Kumar (1996) and Kumar & Bhargava (1996, 1998), there is no evidence that substantiates the nesting of Greater or Lesser Flamingos, or both, at Sambhar Lake. Any claims of breeding based on nests, eggs and young of the two species, must be ratified by rigorous morphometric data like measurements of the nest mounds, eggs or detailed notes of plumage and bill/leg colouration of the chicks and juveniles, as these parameters are superficially similar for both species. In the Zoological Survey of India's publication (Anonymous 2005), the population estimate of 100,000 Lesser Flamingos in the years 1995 and 1996 is obvious hyperbole. Moreover, concluding on the basis of eggshells, "the bird has certainly bred," raises doubts about the veracity of the record.

The fact remains that neither species has ever bred successfully in Sambhar Lake. Downy young or non-flying juveniles of either species have never been recorded. However, in December 1993 V. D. Sharma, Chief Wildlife Warden, Rajasthan and this author found eight or nine damaged or incomplete nest mounds on the dry lakebed but mating and initial nest-building activities can occur at lakes other than on which the birds subsequently breed. Birds may change grounds overnight and begin their breeding efforts elsewhere (Mari & Collar 2000). On 2nd November 2001 when B. C. Choudhury of Wildlife Institute of India, K. K. Sharma of Rajasthan Forest Department and this author visited the lake, an egg (84 x 53 mm) was found on the dry lakebed near the embankment but there was no nest mound. The dimensions of the egg would indicate it belonged to a Greater Flamingo. We do know that occasionally birds drop their eggs without having made a nest, which go to waste on the dry surface of the lakebed (Mari & Collar 2000). Therefore, in the absence of a nest it is difficult to confirm breeding.

A note on systematic waterfowl list

A compilation of bird records gathered from 1990 to 2009 is given, together with information on status and abundance. All observations and records are the author's, unless otherwise mentioned. The following checklist includes species of waterfowl recorded at the lake, reservoir and the satellite wetlands up to January 2009. Taxonomy and nomenclature follow Manakadan & Pittie (2001).

Each species' abundance may vary according to season, salinity, and level of water in the lake. Thus the details given here are to an extent subjective and only an approximate guide to the likelihood of seeing the species in an appropriate location and season.

Some of the species mentioned in the list as 'uncommon' or 'rare' for the main lake are very common in the satellite wetlands. The Brahminy Shelduck *Tadorna ferruginea*, for example, is quite common on most freshwater wetlands in the area, but it is rare in Sambhar Lake. On the other hand, Lesser Flamingo, which is usually uncommon to rare everywhere is not only common at Sambhar Lake but is also the most abundant species on the lake.

Waterfowl records are listed below with comparisons to Adam's (1873, 1874a–b) records where necessary. Species status follows the scientific name and is indicated by the following abbreviations:

- * = New record
- ? = Status uncertain
- M = Monsoon visitor (July–September)
- PM = Passage migrant
- R = Resident
- V = Vagrant
- W = Winter visitor (October–March)

Little Grebe *Tachybaptus ruficollis* R: Absent from the main lake but regular on Ratan Talav, Kochia ki Dhani and wetlands in its vicinity.

Great Crested Grebe *Podiceps cristatus* W: Rare. A single bird sighted on Ratan Talav on 11th January 1996.

Great White Pelican *Pelecanus onocrotalus* PM, W: Only four sightings from the lake—one bird on 4th December 1994; one on 10th March 1996; three on 6th April 1996 and two on 25th April 1997. All these birds were resting on the edge of the lake. Adam only saw "flocks flying overhead" except "one specimen" which had "met with an accident of some sort and could not fly." 40 birds were seen at Phulera on 1st April 1996.

Little Cormorant *Phalacrocorax niger* W: Rare on the main lake. A flock of ten was seen on 13th September 1996. Adam did not record the species on the main lake, for he writes, "small parties are now and then seen about the ponds." Fairly common on satellite wetlands.

Great Cormorant *P. carbo* W: Rare on the main lake. I saw it there only twice—five on 11th January 1996 and more than 20 on 13th November 1996. Adam also described it as rare, having seen one party of about ten on 30th March 1871.

Darter *Anhinga melanogaster* W: Never recorded on the main lake but occasionally seen at Ratan Talav.

Little Egret *Egretta garzetta* R: Common. Breeds in the area.

Grey Heron *Ardea cinerea* W: Occasionally one or two birds were seen on the lake during winter months. One straggler was seen as late as 3rd May 1997. Four were observed on 5th

September 1997. Adam recorded it as very rare and had only three undated sight records.

Large Egret *Casmerodius albus* W: Recorded on the main lake—two on 16th October 1991; one on 2nd January 1996 and eight on 13th November 1996 towards the deepest area of the lake near the Gudha-Jhapog embankment.

Cattle Egret *Bubulcus ibis* R: Resident. Usually found in attendance on grazing sheep and cattle in the fields surrounding the lake. For past fifteen years the species has been breeding on the grand banyan tree at Ratan Talav. Adam found it “very common” and breeding in a village (?) during June and July.

Indian Pond-Heron *Ardea grayii* R: Although never seen on the lake, the species is fairly common on salt pans of Sambhar, Ratan Talav, Kochia ki Dhani, Phulera lake and small ponds in the area. Adam found it “very common” and breeding in a village (not mentioned) “closer to Sambhar during June and July.”

Little Green Heron *Butorides striatus* V: One sighting from Ratan Talav on 24th November 1993. Adam obtained one specimen during the rains of 1871.

Black Stork *Ciconia nigra* W: Uncommon winter visitor. Four sightings—two on 5th February 1994, eight on 24th December 1994 and one on 2nd January 1996. During all sightings the birds were resting in the middle of the lake. Adam (1873) saw “pair of young birds” and shot the female on 26th March 1873”.

Eurasian Spoonbill *Platalea leucorodia* W: Although Adam met with small flocks during rains (1873). On the lake I observed 25 on 10th August 1996, 30 birds on 13th November 1996, and 20 on 3rd April 1997.

Greater Flamingo *Phoenicopterus ruber* W: Regular and common winter visitor. They usually arrive by the second week of August and their stay at the lake is largely dependent on the water availability. In normal rainfall years they abandon the lake by February, when the lake starts drying up due to high level of evaporation and diversion of water for salt production.

However, during ‘flood’ years (e.g., July 1977–June 1978), when the lake remains wet even in summer, both Greater and Lesser Flamingos were recorded throughout the year (Sangha 1998). The extreme dates of arrival and departure are 10th August 1996 and 6th April 1996 respectively. During several visits to the wetland between 1991 and 2009 complete flamingo censuses were carried out and distribution of the two species plotted. Greater Flamingos were always less numerous than Lesser Flamingos, contrary to recent published literature (Gopal & Sharma 1994). More than 10,000 were counted on 25th January 1998. Although an egg was found near the embankment on the lakebed on 2nd November 2001, the species has never bred successfully at Sambhar, as ideal water conditions are not available to them.

Lesser Flamingo *P. minor* W: Globally classified as Near-threatened (BirdLife International 2008), it is very common and the most abundant species on the lake (Sangha 1998). Strangely, Adam did not observe it “during the first two years” of his residence at Sambhar. He adds that the “oldest inhabitant informed me that they have noticed more or less of the small flamingos, which they state visit the lake after six or seven years.” Since 1990 I have regularly observed the Lesser Flamingos. Flocks appear after the first heavy showers of rain, and the duration of their stay depends upon the amount of water in the lake. The earliest arrival date recorded was 7th August 1998 when 7,000+ were observed. They usually leave by the end of March, but the extreme date recorded is 6th April 1996. Record numbers were observed on 23rd September 1995 when more than 20,000 were estimated. From early January to end March 1996 about 18,000 were present. On 4th January 2009 c. 15,000 were there.

Greylag Goose *Anser anser* * W: Not recorded by Adam. I have seen the species twice on the lake—about 50 on 11th January 1996 and four on 29th November 1997. However, on the fresh water bodies in the vicinity of the main lake, they are occasionally seen.



Lesser Flamingo *Phoenicopterus minor*

Clement Francis

Bar-headed Goose *A. indicus* W: One record from the lake—five birds on 29th February 1997. Fairly common at Kochia ki Dhani and Ratan Talav and Phulera. The species was perceptibly uncommon during Adam's period, as it was "only met with in small flocks".

Brahminy Shelduck *Tadorna ferruginea* W: Rare winter visitor to the lake. There are only three records—12 on 14th February 1993; five on 10th March 1996 and three on 13th September 1996. However, the species is quite common at Kochia ki Dhani, Ratan Talav and Phulera. On the contrary, Adam found it "very rare about Sambhar" and never saw the species "except on the Kuchaman jheel."

Common Shelduck *T. tadorna* * W: Rare. A new record for the site. Adam did not mention the species from Sambhar. On 24th December 1994 I scoped a maximum of 25 and again saw three on 5th February 1999.

Comb Duck *Sarkidiornis melanotos* M?: Recorded only once—two at Ratan Talav on 20th September 2003. Adam saw a bird during the rains of 1871 and a fine male was shot for him in September.

Gadwall *Anas strepera* W: Not observed on the lake but not uncommon on the fresh water ponds in the area.

Eurasian Wigeon *A. penelope* W: Quite uncommon on the lake. Eight birds were observed on 21st November 1992 and seven on 24th March 1993. Not uncommon on the fresh water ponds in the area.

Spot-billed Duck *A. poecilorhyncha* V: Only one record from Ratan Talav. One bird was seen on 20th September 2003. Adam "met with it throughout the year but in greater numbers during rains." The species has obviously declined like other resident ducks.

Northern Shoveller *A. clypeata* W: Common. Appears in immense flocks in some years on the lake. Up to 8,500 were recorded on 29th February 1997, more than 6,000 on 14th October 1995 and about 5,500 on 2nd January 1996. Extreme arrival and departure dates being 19th August 2001 and 9th April 1996. Unlike other ducks they do not shift to fresh waterbodies when the lake turns brackish. Adam also found the species "very common during the winter on the lake and about all patches of fresh water in the neighbourhood." The species is also common on Phulera Lake—c. 5,000 were observed on 18th September 2001 and c. 1,500 on 4th January 2009.

Northern Pintail *A. acuta* W: Uncommon on the lake but common on surrounding waterbodies including Kochia ki Dhani and Ratan Talav. A straggler female was observed at Ratan Talav on 6th April 1993. Surprisingly Adam did not record it in 1873. He shot one on 18th January 1874.

Garganey *A. querquedula* W: Not uncommon in small numbers on the lake during autumn passage. 150 were observed on 15th September 1995. Three on Phulera Lake on 3rd May 1998. Adam saw only a few small flocks on the lake during the cold weather.

Common Teal *A. crecca* W: Commonly seen on the lake during September–February, after which it shifts to surrounding waterbodies as the lake becomes brackish. Extreme dates from the lake being 17th September 1995 and 14th February 1996 (1st April 1996 on Phulera Lake, where water was less brackish). 1,000+ were recorded on 14th October 1995. Adam noted it as "Very plentiful in the cold weather, and is to be found in the lake until the water becomes very salt," (*sic*).



Mohan Kemparaju

Common Pochard *Aythya ferina*

Red-crested Pochard *Rhodonessa rufina* W: Rather uncommon. Recorded irregularly at Ratan Talav.

Common Pochard *Aythya ferina* W: Adam "observed a few small parties of this species during the cold weather." They were 'on a jheel' near Sambhar. As it prefers deep water, it is rare on the lake, which is quite shallow. Five birds were observed on the lake on 21st November 1995.

Ferruginous Pochard *A. nyroca* W: Only one record from Ratan Talav of a single bird seen on 24th March 1993. Adam described it as "not common."

Tufted Pochard *A. fuligula* * W: Uncommon on the lake but common on the deep and freshwater ponds. Surprisingly, Adam does not mention the species.

Demoiselle Crane *Grus virgo* W: A flock of 30 birds was seen near the lake on 10th March 1996. Adam saw large flocks in cold weather in "the neighbourhood" and on 13th March 1873 observed a flock in a field near Nawa.

Common Crane *G. grus* W: Occasionally small parties are seen about the lake from October to March. They come to roost on the dry lakebed. one bird was seen on 16th October 1991, six on 19th December 1993, eight on 24th December 1994, 40 birds including three juveniles on 29th January 1996, 15 on 29th February 1997, 26 on 25th January 1998. Extreme dates were 14th October 1995 and 24th March 1996.

White-breasted Waterhen *Amaurornis phoenicurus* R: Common at Ratan Talav.

Purple Moorhen *Porphyrio porphyrio*?: Rare. Two birds were observed on 25th January 1998 at Ratan Talav. Also observed at Puna Talab adjoining Phulera Lake.

Common Moorhen *Gallinula chloropus* R?: Small numbers are seen at Ratan Talav. Adam observed a number of these birds around open wells.

Common Coot *Fulica atra* W: Quite common on the satellite wetlands and occasionally on the lake. Observed in good numbers—200+ on 25th October 1991 and 300+ on 20th January 1993. Adam did not observe the species on the lake and called it somewhat rare except on the ponds.

Pheasant-tailed Jacana *Hydrophasianus chirurgus*?: One bird was seen on 3rd May 1998 at Ratan Talav. Adam shot a bird in full breeding plumage on 5th June 1873.

Greater Painted-Snipe *Rostratula benghalensis* M?: Uncommon during monsoon on small water bodies but never on the lake. Three birds were observed on 3rd May 1998 at Ratan Talav.

Pacific Golden-Plover *Pluvialis fulva* * PM: Rare. One bird in breeding plumage was observed on 3rd April 1997. Not recorded by Adam.

Grey Plover *P. squatarola* PM: Rare. Recorded twice during autumn and late summer. Two adults were recorded on 29th February 1997 and two in breeding plumage on 3rd May 1998. Adam reports of a specimen in breeding plumage, "shot on the 25th September."

Little Ringed Plover *Charadrius dubius* R W: Small numbers were irregularly sighted on the lake—45 on 19th December 1993. Not uncommon on the satellite wetlands.

Kentish Plover *C. alexandrinus* W: Common. Usually 300–500 birds are recorded. In January 1996 more than 2,000 were observed and about 700 remained up to the end of March 1996. On 10th February 2000 there was no water in the main lake but the moist lakebed was full of flies / insects and c. 100 birds were feeding there. On 14th November 2003, c. 5,000 were seen. On 15th August 2007 the dry lakebed did not have any species except nine Kentish Plovers. About 3,000 were observed feeding on the recently dried margins of the lake on 4th January 2009.

Lesser Sand Plover *C. mongolus* PM: Uncommon. Seen in small numbers during August / September. One bird was recorded on 13th August 1994, six on 3rd May 1998 and five on 10th September 1998.

Greater Sand Plover *C. leschenaultii* PM: Although Adam shot "several specimens" about the middle of August and first week of September, I have observed the species only once—five birds in partial breeding plumage on 10th September 1998.

Yellow-wattled Lapwing *Vanellus malabaricus* R: Two birds observed near Ratan Talav on 3rd May 1998. Used to be regularly seen near a railway crossing on Sambhar-Narayana road.

Red-wattled Lapwing *V. indicus* R: Common about the lake especially around Ratan Talav.

White-tailed Lapwing *V. leucurus* W: Not uncommon on Ratan Talav and Kochia ki Dhani.

Common Snipe *Gallinago gallinago* W: Uncommon on Ratan Talav and Kochia ki Dhani but never on the lake. Adam rarely met with it but "shot one or two about the banks of the open wells."

Black-tailed Godwit *Limosa limosa* W: Although Adam observed the species in large numbers, only small flocks of 15–30 birds have been seen during the study period except once—on 14th October 1994 more than 500 birds were observed on the southern edge of the lake.

Eurasian Curlew *Numenius arquata* PM, W: Common. Usually two–three birds are encountered. However, 27 birds were observed feeding on the main lake on 14th October 1995. Usually arrives by the first week of August and leaves by April. Stragglers have been observed up to May. Two birds were observed feeding on the grassy edge of the lake on 3rd May 1998.

Spotted Redshank *Tringa erythropus* W: Not very common on the lake. More than 100 in breeding plumage were observed at

Phulera on 8th April 1996 and two in full breeding plumage on 3rd May 1998.

Common Redshank *T. totanus* W: Small numbers are commonly seen on the lake, the highest numbers recorded being c. 200 birds on 13th November 1996. Adam wrote that the species is sparingly met with during the cold weather.

Marsh Sandpiper *T. stagnatilis* W: Not very common on the lake but common on the satellite wetlands.

Common Greenshank *T. nebularia* W: Uncommon on the lake—the maximum being c. 50 on 16th November 1996. Adam found it very rare and shot a female on 4th May 1873.

Green Sandpiper *T. ochropus* W: Not recorded on the lake but common on the satellite wetlands.

Wood Sandpiper *T. glareola* W: Not very common on the lake but common on the satellite wetlands.

Terek Sandpiper *Xenus cinereus* PM: Rare. An individual was observed on 10th September 1998 at Kochia ki Dhani.

Common Sandpiper *Actitis hypoleucos* W: Adam found it very rare and obtained only one specimen. Not so rare now, and I once observed more than 100 birds on 4th December 1994.

Ruddy Turnstone *Arenaria interpres* PM: Rare. A male in breeding plumage was observed on 5th September 1995 at Phulera (Sangha & Vardhan 2002). During September Adam obtained three specimens on the lake.

Little Stint *Calidris minuta* W: Common; extreme dates of arrival and departure being 10th August 2003 and 3rd May 1998 respectively. In some years 500–1,000 birds are not uncommon. Adam collected the species up to 25th May.



Black-tailed Godwit *Limosa limosa*

Moham Kemparaju

Temminck's Stint *C. temminckii* W: Common, but in smaller numbers than the previous. About 440 birds were observed on 23rd September 1996.

Dunlin *C. alpina*?: Although Adam reported "large flocks" in winter, I have observed only occasional small flocks. The biggest flock of 25 birds in breeding plumage was observed on 10th September 1998. Eleven in breeding plumage were observed on 5th September 1999 and three on 19th September 2001 at Kochia ki Dhani. A flock of 87 birds was observed at Deedwana on 1st February 1998.

Curlew Sandpiper *C. ferruginea*?: Contrary to Adam's observation that the species "visits the lake in only small numbers during the cold weather," all my records are during autumn passage. Adam shot a female on 21st May in full breeding plumage.

Broad-billed Sandpiper *Limicola falcinellus* * PM: Rare. Two birds were observed at Kochia ki Dhani on 7th March 1999; three at Phulera and one at Kochia ki Dhani on 19th September 2001 (Sangha & Kulshreshtha 2004)—a new record for the area and Rajasthan. Not recorded by Adam.

Ruff *Philomachus pugnax* PM, W: Maximum numbers were seen during autumn passage, September–November—more than 5,000 on 17th September 1995; c. 2,500 on 19th September 2001. The extreme arrival and departure dates were 10th August 2001 and 3rd May 1998.

Black-winged Stilt *Himantopus himantopus* R, W: Common. The influx in winter months indicates that the migrants augment the resident population. A maximum of 3,000+ birds was recorded on 17th September 1995. The species bred on the lake in August 1994 and at Phulera 23 birds were observed incubating on 9th April 1996. On the main lake the species has been observed from August to May but in the neighbouring waterbodies, which retain water, it is present throughout the year. Although Adam observed that "immense flocks" frequent the lake from the commencement of rains till the beginning of summer, the usual numbers in winter have varied between 100–500 during 1990–2008.

Pied Avocet *Recurvirostra avosetta* W: Common and regular on the lake and Phulera Lake in variable numbers. In some years birds arrive by mid July–early August and stay as long as water is available. Extreme dates of arrival and departure are 11th July 1997 and 1st April 1996 respectively. Unusually large flocks were sometimes observed: c. 450 on 14th October 1994, 150 on 1st April 1996, 600+ on 23rd September 1996, and c. 1,100 on 13th December 1996. Adam found it "rare about the lake," but in additional notes he has written that "during the last cold season this appeared in large flock about the lake."

Red-necked Phalarope *Phalaropus lobatus* PM: Uncommon. 27 were observed at Kochia ki Dhani foraging with Little Grebe on 9th September 1998 and four on 5th September 1999. 17 were observed on 5th February 1999, sticking in two–three groups around Northern Shoveller and picking off flies disturbed by the swimming ducks (Sangha 2002), and five birds including one juvenile were observed on 2nd November 2001. 13 were observed foraging on 21st September 2008 on the lake. Adam obtained specimens on 22nd and 25th September.

Stone-Curlew *Burhinus oedipnemus* R: Adam met with the species only near Nawa. During 1990s the species was sighted only near Kochia ki Dhani. However, since 1996 I have observed the species quite regularly at Ratan Talav. The recent growth



Indian Courser *Cursorius coromandelicus*

Clement Francis

exotic of *Prosopis chilensis* seems to have provided safe shelter to the species. Three–four young birds were also seen 5. ix. 1999.

Great Stone-Plover *Esacus recurvirostris* R?: Nine birds were observed on 29th January 1996 resting under a *Prosopis chilensis*. Irregularly sighted on Phulera lake.

Oriental Pratincole *Glareola maldivarum*?: Three–four sightings on Kochia ki Dhani and Phulera.

Small Pratincole *G. lactea*?: Uncommon. One on 16th October 1991, five on 21st November 1992 near the lake, 15 at Phulera on 17th September 1995 and nine on 15th August 2007 at Kochia ki Dhani.

Indian Courser *Cursorius coromandelicus* R: Adam found the species abundant about the lake frequently in company with *C. cursor* during the entire cold season, but did not record it breeding. I observed the species only occasionally in small numbers varying from four to nine. However, more than 40 birds were observed in a harvested field near the lake on 20th September 2003. The species seems to have declined. It breeds in small numbers in the Sambhar area. At Julga, on the dry lakebed, six breeding pairs were observed on 5th June 2004 and nine breeding pairs were seen at Vala on 10th June 2004.

Pallas's Gull *Larus ichthyaetus* W: Rather uncommon although c. 350 birds were recorded on 20th February 1993

Brown-headed Gull *L. brunnicapillus* W: Common in small numbers on the lake, although Adam found it "very plentiful" during the whole cold weather and till the beginning of hot weather.

Black-headed Gull *L. ridibundus* W: Almost rare on the lake. Six were observed on 21st November 1992, 25 on 25th January 1993 and seven on 14th October 1995. On the contrary Adam found it plentiful during the cold weather.

Gull-billed Tern *Gelochelidon nilotica* W: Common in small numbers. Up to 100 were observed on 23rd September 1996, its extreme arrival and departure dates being 30th September 1992 and 3rd May 1998 respectively. On 16th January 1996 13 birds were hawking insects over a gram field, flying about 3m above the un-ripened crop. More than 100 were observed on 19th September 2001 at Phulera.

River Tern *Sterna aurantia* M: Uncommon. All three records are from the monsoon period—three on 30th August 1999, five on 17th September 1995 and three on 23rd September 1996.

Little Tern *S. albifrons* *?: Two at Kochia ki Dhani on 19th September 2001, a new record for the area. Not recorded by Adam.

Whiskered Tern *Chlidonias hybridus* W: Not uncommon on the lake. However, when salinity increases, moves to the satellite wetlands. Up to 250 birds were observed on 23rd September 1996 on the lake and 150 on 24th March 1993 at Kochia ki Dhani. Adam found it very common.

White-winged Black Tern *C. leucopterus* * PM: Only one record. Four birds in breeding plumage were observed on 9th April 1996 at Phulera (Sangha & Vardhan 1998), which is a new record for the area and Rajasthan. Not recorded by Adam.

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References

- Adam, R. M. 1873. Notes on the birds of Sambhar Lake and its vicinity. *Stray Feathers* 1 (5): 361–404.
- Adam, R. M. 1874a. Additional notes on the birds of Sambhar Lake and its vicinity. *Stray Feathers* 2 (4&5): 337–341.
- Adam, R. M. 1874b. Letters to the Editor. [“Since writing my additional note I find that the under mentioned bird has been shot at Sambhar: ...”]. *Stray Feathers* 2 (4&5): 465–466.
- Aggarwal, S. C. 1951. *Sambhar Lake salt source*. New Delhi: Government of India Publication.
- Alam, M. 1981. The flamingoes of Sambhar Lake. *J. Bombay Nat. Hist. Soc.* 79 (1): 194–195.
- Ali, S. & Ripley, S. D. 1978. *Handbook of the birds of India and Pakistan together with those of Bangladesh, Nepal, Bhutan and Sri Lanka. Divers to hawks*. Vol 1. 2nd (Hardback) ed. Delhi (Sponsored by Bombay Natural History Society.) Oxford University Press.
- Anonymous. 2005. *Fauna of Sambhar Lake (Rajasthan)*. Wetland Ecosystem Series, 6. Kolkata: Zoological Survey of India.
- Bhatnagar, S. P. & Shukla, S. K. 2005. Checklist of Sambhar Lake waterfowl in inland saline water ecosystem, Rajasthan, India. *Newsletter for Birdwatchers* 45 (3): 40–41.
- BirdLife International. 2001. *Threatened birds of Asia: The BirdLife International Red Data Book*. 2 vols. Collar, N. J., Andreev, A. V., Chan, S., Crosby, M. J., Subramanya, S. & Tobias, J. A. (eds.). Cambridge, UK: BirdLife International.
- BirdLife International 2008. *Phoeniconaias minor*. In: IUCN 2008. 2008 IUCN Red List of Threatened Species. <. Downloaded on 28 May 2008.
- Collar, N. J., Crosby, M. J. & Stattersfield, A. J. 1994. *Birds to watch 2, the world list of threatened birds*. Cambridge: BirdLife International.
- Devarshi, D. 2004. *A study of avifauna of Rajasthan (India)*. Ph.D. Thesis. Jaipur: University of Rajasthan.
- Gopal, B. & Sharma, K. P. 1994. *Sambhar Lake, Rajasthan*. New Delhi: WWF-India.
- Grimmett, R. & Inskipp, T. 2003. *Birds of northern India*. New Delhi: Oxford University Press.
- Hancock, J. A., Kushlan, J. A. & Kahl, M. P. 1992. *Storks, Ibises and Spoonbills of the World*. London: Academic Press.
- Hindustan Salts Limited:
- Jain, A. K. 2006. *Conservation Planning of Sambhar Lake, Rajasthan Using Satellite Remote Sensing and GIS*. Thesis submitted to the Andhra University in partial fulfilment of the requirements for the award of Master of Technology in Remote Sensing and Geographic Information System.
- Kumar, S. & Bhargava, R. N. 1996. Sambhar Lake: a new breeding ground of flamingos in India. *Sanctuary Asia* 16 (2): 59.
- Kumar, S. & Bhargava, R. N. 1998. Sambhar Lake: A new breeding ground of flamingoes. *Flamingo Specialist Group Newsletter*. 8

- (Wetlands International IUCN-Species Survival Commission., Ed: Johnson, AR). Pp. 24–25.
- Lahiri, N. (Ed.) 2000. *The decline and fall of the Indus Civilisation*. Delhi: Permanent Black.
- Manakadan, R. & Pittie, A. 2001. Standardised common and scientific names of the birds of the Indian Subcontinent. *Buceros* 6 (1): i–ix, 1–37.
- Mari, C. & Collar, N. 2000. *Pink Africa*. London: The Harvill Press.
- Parihar, R. 1999. Dry horizons—Sambhar Lake. *India Today* (8th March 1999): 57.
- Rasmussen, P. C. & Anderton, J. C. 2005. *Birds of South Asia. The Ripley guide. Field guide*. 2 vols. Washington, D.C. and Barcelona: Smithsonian Institution and Lynx Edicions.
- Sangha, H. S. 1998a. Flamingo surveys at Sambhar Lake (Rajasthan), India. *Flamingo Specialist Group Newsletter*. 8 (March 1998, Wetlands International IUCN-Species Survival Commission., Ed: Johnson, AR), 24–25.
- Sangha, H. S. 1998b. *Waterbirds of Sambhar Lake: checklist up to May 1998*. Unpublished. Pp. 3.
- Sangha, H. S. 2002. Occurrence and association of Red-necked Phalarope *Phalaropus lobatus* with other species at Sambhar, Rajasthan. *J. Bombay Nat. Hist. Soc.* 99 (2): 301.
- Sangha, H. S. 2005. Sightings of Sociable Lapwing *Vanellus gregarious* in Rajasthan, excluding Bharatpur records. *Indian Birds* 1 (4): 84.
- Sangha, H. S. & Kulshreshtha, M. 2004. Broad-billed Sandpiper *Limicola falcinellus*: an addition to the avifauna of Rajasthan. *J. Bombay Nat. Hist. Soc.* 101 (2): 318.
- Sangha, H. S. & Naoroji, R. 2003. Oriental Turtle-dove *Streptopelia orientalis*: a new species for the Thar Desert. *J. Bombay Nat. Hist. Soc.* 99 (3): 528 (2002).
- Sangha, H. S. & Naoroji, R. 2004. Nidification of the Common Raven *Corvus corax* in the Thar Desert. *J. Bombay Nat. Hist. Soc.* 101 (2): 321–323.
- Sangha, H. S. & Vardhan, H. 1998. Occurrence of the Whitewinged Black Tern *Chlidonias leucopterus* in Rajasthan. *J. Bombay Nat. Hist. Soc.* 95 (1): 113–114.
- Sangha, H. S. & Vardhan, H. 2002. Ruddy Turnstone *Arenaria interpres* Linn. at Phulera lake, Rajasthan. *J. Bombay Nat. Hist. Soc.* 99 (3): 525.
- Sarkar, J. 1984. *A history of Jaipur*. New Delhi: Orient Longman.
- Sharma, S. K. 2004. Present distribution of Asian Pied Starling *Sturnus contra* in Rajasthan. *Zoo's Print Journal* 19 (12): 1716–1718.
- Singh, G. & Singh, C. 1960. The Adjutant Stork *Leptoptilos dubius* (Gmelin), a destroyer of locusts in Rajasthan. *J. Bombay Nat. Hist. Soc.* 57 (1): 221–222.
- Tiwari, J. K. 2001. Status and distribution of the White-naped Tit *Parus nuchalis* in Gujarat and Rajasthan. *J. Bombay Nat. Hist. Soc.* 98 (1): 26–30.
- Whistler, H. 1938. Ornithological survey of Jodhpur State. *J. Bombay Nat. Hist. Soc.* 40 (2): 213–235.

Appendix

The following list includes all records, including historical, of the birds of Sambhar Lake, its vicinity and satellite wetlands, with brief notes. Where necessary, I have included notes on the general present day status of a species in Rajasthan. Species' English and scientific names are followed by their abbreviated species status. On the next line I have summarised Adam's (1873, 1874a–b) notes, followed by my comments within square brackets. The species mentioned under 'systematic waterfowl list' (above) are merely listed to avoid repetition. The taxonomy and scientific nomenclature follow Manakadan & Pittie (2001).

Abbreviations

- * = New record. Species not previously reported from Sambhar Lake and its vicinity by Adam, or inadvertently omitted.
- ? = Status uncertain.
- AL = Already listed in the 'systematic waterfowl list' section of this paper.

M = Monsoon visitor (July–September).
 PM = Passage migrant.
 R = Resident.
 S = Summer visitor (April–July).
 V = Vagrant.
 W = Winter visitor (October–March).

Checklist

Little Grebe *Tachybaptus ruficollis* AL

Great Crested Grebe *Podiceps cristatus* AL

Black-necked Grebe* *P. nigricollis* V
 Not recorded by Adam. [Rare. Only one record from Sursura village water body near Rupangarh. A bird was seen with Little Grebe on 30th January 1996.]

Great White Pelican *Pelecanus onocrotalus* AL

Little Cormorant *Phalacrocorax niger* AL

Great Cormorant *P. carbo* AL

Darter *Anhinga melanogaster* AL

Little Egret *Egretta garzetta* AL

Grey Heron *Ardea cinerea* AL

Large Egret *Casmerodius albus* AL

Cattle Egret *Bubulcus ibis* AL

Indian Pond-Heron *Ardeola grayii* AL

Little Green Heron *Butorides striatus* AL

Painted Stork *Mycteria leucocephala* AL

Black Stork *Ciconia nigra* AL

White-necked Stork *C. episcopus* AL

Greater Adjutant-Stork *Leptoptilos dubius*
 Adam observed only two pairs during the rains. [Ali & Ripley's (1978) claim that it was not uncommon in northern India, chiefly during rains, seems to have been based on very old records. Although Hume (in Whistler 1938) found it scarce in Jodhpur except during rains, Whistler (1938) did not record it. In the years when desert locust swarms were heavy the species arrived in good numbers. About 2,000 were observed feeding on locusts and grasshoppers from c. 14–21 August 1956 in Rayanwali, Thukrana, Freedisar and Kardoo villages in Suratgarh, north Rajasthan (Singh & Singh 1960). In the last few years the species has been more or less restricted to Assam (Hancock *et al.* 1992). All the recent records in Rajasthan are from Bharatpur and none after 1990 (Devarshi 2004).]

Eurasian Spoonbill *Platalea leucorodia* AL

Greater Flamingo *Phoenicopterus ruber* AL

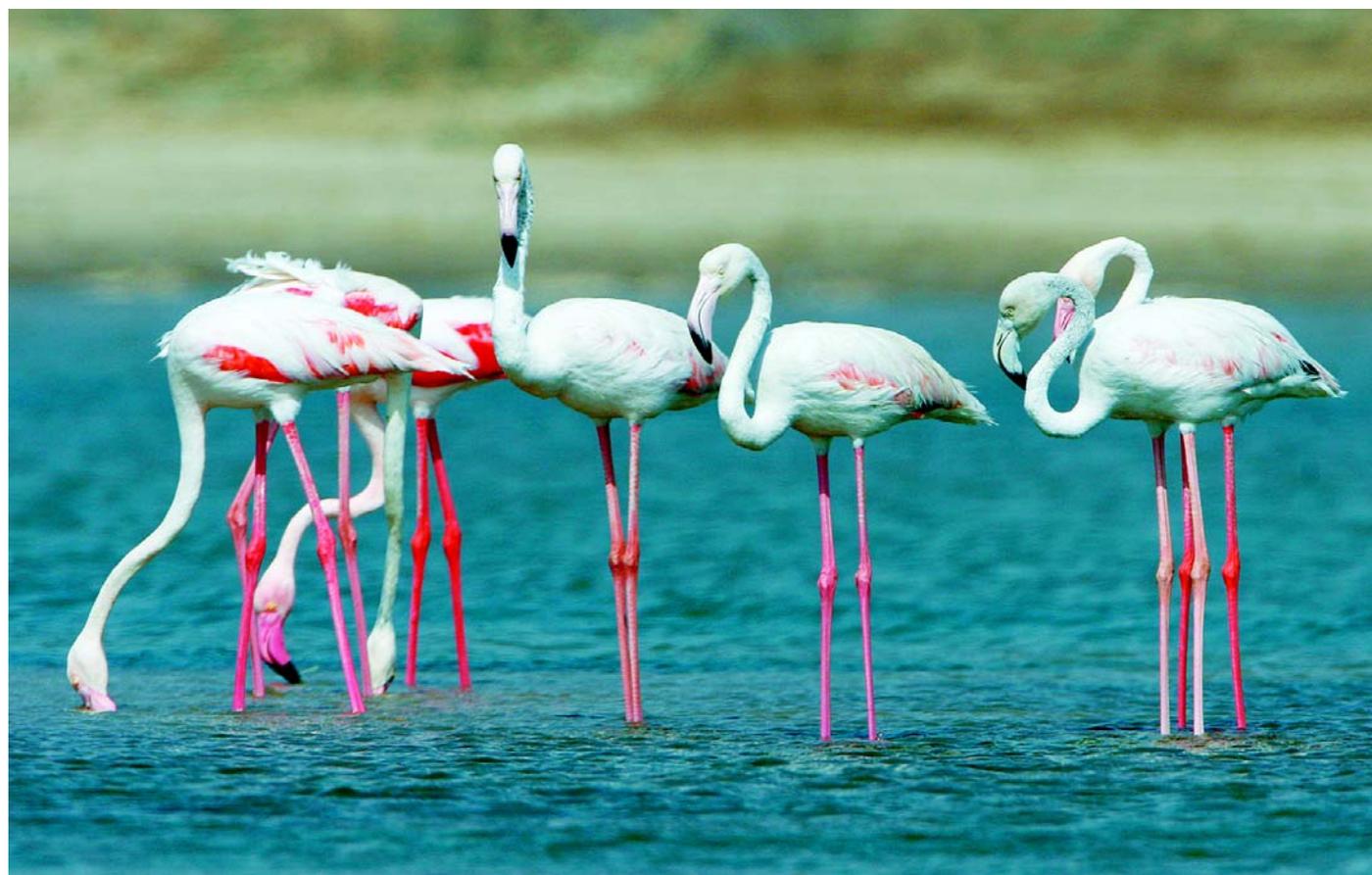
Lesser Flamingo *P. minor* AL

Greylag Goose *Anser anser* AL

Bar-headed Goose *A. indicus* AL

Brahminy Shelduck *Tadorna ferruginea* AL

Common Shelduck *T. tadorna* AL



Greater Flamingo *Phoenicopterus ruber*

- Comb Duck *Sarkidiornis melanotos* AL
 Gadwall *Anas strepera* AL
 Eurasian Wigeon *A. penelope* AL
 Spotbilled Duck *A. poecilorhyncha* AL
 Northern Shoveller *A. clypeata* AL
 Northern Pintail *A. acuta* AL
 Garganey *A. querquedula* AL
 Common Teal *A. crecca* AL
 Red-crested Pochard *Rhodonessa rufina* AL
 Common Pochard *Aythya ferina* AL
 Ferruginous Pochard *A. nyroca* AL
 Tufted Pochard *A. fuligula* AL
 Oriental Honey-Buzzard *Pernis ptilorhynchus* ?
 Very rare; noticed only twice. [Only one sighting.]
 Black-shouldered Kite *Elanus caeruleus* R
 Not common. [Not uncommon.]
 Black Kite *Milvus govinda* R
 Very common. [Not uncommon.]
 Pallas's Fish-Eagle *Haliaeetus leucoryphus* ?
 Occasional. Saw it perching on stakes in the lakebed. [No recent sighting except at Bharatpur.]
 Egyptian Vulture *Neophron percnopterus* R
 Very common all around the lake; took nests from walls of the Sambhar Fort, from the top of the temples and peepul trees. [Occasional.]
 Indian White-backed Vulture *Gyps bengalensis* R
 Very common...Dying camels and bullocks attracted these birds in great numbers. [Common in 1990s, now occasional. Three-four bred at Ratan Talav and Ranian in 2004. Their absence is noteworthy, presumably related to the catastrophic declines of *Gyps* vultures in the Indian Subcontinent owing to diclofenac poisoning (BirdLife International 2004).]
 Long-billed Vulture *G. indicus* R
 Common. [Quite rare after the recent plummeting of population.]
 Eurasian Griffon *G. fulvus* W
 The migrant vulture is not uncommon, in winters. [Not uncommon.]
 Cinereous Vulture *Aegypius monachus* W
 Met with in the cold weather. [Occasional.]
 Red-headed Vulture *Sarcogyps calvus* R
 Common; saw a nest in the face of a rock in the hills near Nawa. [Occasional. Surrounding area much disturbed, for it to breed, due to lopping of trees.]
 Short-toed Snake-Eagle *Circaetus gallicus** W
 Not recorded by Adam. [Occasional in winter.]
 Western Marsh-Harrier *Circus aeruginosus* W
 Young birds of this species are very common during the cold season. [Quite common; rare on the lake.]
 Pallid Harrier *C. macrourus* W
 Very common. [Not uncommon.]
 Montagu's Harrier *C. pygargus** W
 Not recorded by Adam. [Occasional.]
 Shikra *Accipiter badius* R
 Not common. [Not uncommon.]
 Besra Sparrowhawk *A. virgatus* ?
 Very rare, but collected two specimens. [No recent record.]
 Eurasian Sparrowhawk *A. nisus* ?
 Rare; saw it once or twice at the lake. [No sighting in the study area. Otherwise most sightings of the species are during spring passage in Rajasthan.]
 White-eyed Buzzard *Butastur teesa* R
 Pretty common. Collected a nest and saw a pair in coitus on the top of one of the salt heaps on 26th April 1870. [Rare. Only two or three sightings.]
 Long-legged Buzzard *Buteo rufinus** W
 [Fairly common.]
 Tawny Eagle *Aquila rapax* ?
 Very common; found nests. [No sighting.]
 Steppe Eagle *A. nipalensis** W
 [Fairly common. Treated as race of the earlier species in older works but Adam has not mentioned it.]
 Bonelli's Eagle *Hieraetus fasciatus* ?
 Obtained one specimen at Sambhar. [Rather uncommon, three sightings.]
 Booted Eagle *H. pennatus** W
 Not recorded by Adam. [Uncommon. A bird was observed attacking Pied Avocets at Phulera on 14th October 1995.]
 Common Kestrel *Falco tinnunculus* W
 Very common. [Common.]
 Red-headed Falcon *F. chicquera* R
 Not common; saw a few pairs about the lake. [Four sightings. On 1st February 1998 a pair was observed hunting Kentish Plovers on the dry lakebed after sunset.]
 Laggar *F. jugger* ?
 Very common about the lake; found it breeding. [No sighting. Seems to have drastically declined all over Rajasthan except western districts of the state.]
 Peregrine Falcon *F. peregrinus* W
 Found frequenting the lake; pouncing on waders. [Rare. Recorded once on 4th January 2009, hunting Kentish Plovers on the dry lakebed at dawn.]
 Grey Francolin *Francolinus pondicerianus* R
 Very common. [Very common.]
 Common Quail *Coturnix coturnix* W
 Often met with in grasslands or near cultivation. [Rather uncommon.]
 Rain Quail *C. coromandelica* M
 Nowhere common. [Rather uncommon.]
 Jungle Bush-Quail *Perdicula asiatica* R
 Not common. [Uncommon.]
 Indian Peafowl *Pavo cristatus* R
 Very common. [Common.]
 Yellow-legged Buttonquail *Turnix tanki* ?
 Obtained a number of specimens about the setting in of the rains. [Not uncommon.]

Sarus Crane *Grus antigone* ?

Adam found it very common and saw as many as thirty young and adult birds feeding together. He collected eggs on 23rd August from a nest, which was in a patch of grassland flooded by the rains. [Rare. A pair was seen at Chhomora Nala near Dudu in December 1988.]

Demoiselle Crane *G. virgo* ALCommon Crane *G. grus* ALBrown Crake *Amaurornis akool* ?

Not common. It frequented the long grass on the banks of open wells. [No record.]

White-breasted Waterhen *A. phoenicurus* ALPurple Moorhen *Porphyrio porphyrio* ALCommon Moorhen *Gallinula chloropus* ALCommon Coot *Fulica atra* ALGreat Indian Bustard *Ardeotis nigriceps* ?

Although Adam never saw this species during his stay in Sambhar, he mentions that some Railway Engineers had shot it. [No recent sighting. The species has declined drastically all over its range in Rajasthan.]

Houbara *Chlamydotis undulata* ?

Adam saw the species on 'three occasions during winter. On one occasion shot two birds from a party of six. [No recent record.]

Lesser Florican *Sypheotides indica* ?

Shot one male at Sambhar on 19th July and later a female at the beginning of rains. [No recent record from Sambhar]

Pheasant-tailed Jacana *Hydrophasianus chirurgus* ALGreater Painted-Snipe *Rostratula benghalensis* ALPacific Golden-Plover *Pluvialis (dominica) fulva* ALGrey Plover *P. squatarola* ALLittle Ringed Plover *Charadrius dubius* ALKentish Plover *C. alexandrinus* ALLesser Sand Plover *C. mongolus* ALGreater Sand Plover *C. leschenaultii* ALNorthern Lapwing *Vanellus vanellus* ?

Very rare. Saw it twice near Kuchaman and obtained one specimen. [No record from Sambhar. However, a small flock was observed regularly at Ramchandrapura near Jaipur in the 1980s.]

Yellow-wattled Lapwing *V. malabaricus* ALRed-wattled Lapwing *V. indicus* ALSociable Lapwing *V. gregarius* ?

Although Adam collected four specimens, he found it was not very common and met with it sparingly about the plains. [No record from Sambhar. All recent records are from Bharatpur, Churu, Hanumangarh, Jaisalmer and Sikar districts (Sangha 2005). There is a very recent record from Nimaj, Pali of a single bird on 3rd March 2008 (Sumendra Singh, verbally).]

White-tailed Lapwing *V. leucurus* ALCommon Snipe *Gallinago gallinago* ALJack Snipe *Lymnocyptes minimus* W

Very rare; procured only one specimen. [Only one sight record from Kuchaman. Per Undeland and I scoped a bird on 1st February 1998.]

Black-tailed Godwit *Limosa limosa* ALEurasian Curlew *Numenius arquata* ALSpotted Redshank *Tringa erythropus* ALCommon Redshank *T. totanus* ALMarsh Sandpiper *T. stagnatilis* ALCommon Greenshank *T. nebularia* ALGreen Sandpiper *T. ochropus* ALWood Sandpiper *T. glareola* ALTerek Sandpiper *Xenus cinereus* ALCommon Sandpiper *Actitis hypoleucos* ALRuddy Turnstone *Arenaria interpres* ALSanderling *Calidris alba* ALLittle Stint *C. minuta* ALTemminck's Stint *C. temminckii* ALDunlin *C. alpina* ALCurlew Sandpiper *C. ferruginea* AL

Cream-coloured Courser *Cursorius cursor*.

Clement Francis.

- Broad-billed Sandpiper *Limicola falcinellus* AL
 Ruff *Philomachus pugnax* AL
 Black-winged Stilt *Himantopus himantopus* AL
 Pied Avocet *Recurvirostra avosetta* AL
 Red-necked Phalarope *Phalaropus lobatus* AL
 Stone-Curlew *Burhinus oedicephalus* AL
 Great Stone-Plover *Esacus recurvirostris* AL
 Cream-coloured Courser *Cursorius cursor* ?
 Abundant all over the sandy plains during the cold weather. Adam sent three parties in three different years to obtain the eggs. [No recent sighting. All winter records are from western Rajasthan. On what basis Adam postulated that the species bred it is difficult to say.]
 Indian Courser *C. coromandelicus* AL
 Oriental Pratincole *Glareola maldivarum* AL
 Small Pratincole *G. lactea* AL
 Pallas's Gull *Larus ichthyaetus* AL
 Brown-headed Gull *L. brunnicephalus* AL
 Black-headed Gull *L. ridibundus* AL
 Gull-billed Tern *Gelochelidon nilotica* AL
 River Tern *Sterna aurantia* AL
 Little Tern *S. albifrons* AL
 Whiskered Tern *Chlidonias hybridus* AL
 White-winged Black Tern *C. leucopterus* AL
 Chestnut-bellied Sandgrouse *Pterocles exustus* R
 Great numbers. Collected nests in April–May. [Commonly seen in small flocks.]
 Black-bellied Sandgrouse *P. orientalis* ?
 Very large numbers during the cold weather. The bird catchers were netting these birds. [The species has greatly declined in numbers. Now known to occur no further east than Jodhpur. Former ruler of Kishengarh shot it at Rupangarh up to late 1950s (Shantanu Kumar, *verbally*).]
 Painted Sandgrouse *P. indicus* R
 Common all about the low ranges of hills. [Not uncommon.]
 Blue Rock Pigeon *Columba livia* R
 Abundant. [Very common.]
 Oriental Turtle-Dove *Streptopelia orientalis* W
 Very rare; collected a specimen on 10th May 1873. [Not recorded in Sambhar but there is a recent record further west from Bikaner (Sangha & Naoroji 2002).]
 Little Brown Dove *S. senegalensis* R
 Very common. [Very common.]
 Spotted Dove *S. chinensis* ?
 Uncommon. Obtained specimens (?) only during the rains. [No sighting.]
 Red Collared Dove *S. tranquebarica* R
 Very common. [Less common than *S. senegalensis* and *S. decaocto*.]
 Eurasian Collared-Dove *S. decaocto* R
 Very common. [Very common.]
 Yellow-legged Green-Pigeon *Treron phoenicoptera* R
 On his arrival at Sambhar Adam shot these birds (*chorigaster*) for the table but also noted that lately the bird has almost disappeared. Also observed it in Nawa. Found the nominate race very rare, obtaining a single specimen. [*T. p. chorigaster* is not uncommon. The status of the nominate race is unclear. However, there is a confirmed recent record, as a bird was shot on 11th December 2004 at Nimaj, Pali district (Nandi Vardhan Rathore, *verbally*).]
 Rose-ringed Parakeet *Psittacula krameri* R
 Very common. [Very common.]
 Blossom-headed Parakeet *P. cyanocephala* R
 Common. [Common.]
 Pied Crested Cuckoo *Clamator jacobinus* M
 Very rare. [Occasional in monsoon.]
 Brainfever Bird *Hierococcyx varius* M
 Very rare. [Occasional.]
 Common Cuckoo *Cuculus canorus* ?
 Observed only twice. [No sighting.]
 Asian Koel *Eudynamis scolopacea* R
 Rare. [Not uncommon.]
 Sirkeer Malkoha *Phaenicophaeus leschenaultii* R
 Very rare. Adam shot a pair near Marot. [No sighting but not unlikely as the suitable habitat is present.]
 Greater Coucal *Centropus sinensis* R
 Adam found the species very rare but shot one in his garden. [Common.]
 Barn Owl *Tyto alba* R
 Very rare. [Not sighted but likely to occur.]
 Dusky Eagle-Owl *Bubo coromandus* ?
 Not common, but noted that a pair were generally to be found in some of the topes of trees. [No sighting. Suitable trees for roosting hardly exist.]
 Mottled Wood-Owl *Strix ocellata* ?
 Very rare; seen twice. [No sighting. Densely canopied trees are few and far between in the area. People lop every tree to feed their goats.]
 Spotted Owlet *Athene brama* R
 Very common. [Very common.]
 Short-eared Owl *Asio flammeus* W
 Not very common but occasional. [Rather uncommon. A dead bird was found near Sambhar in December 1990 (Dhirendra Devarshi, *verbally*).]
 Common Indian Nightjar *Caprimulgus asiaticus* ?
 Not common. [Very uncommon.]
 Franklin's Nightjar *C. affinis* ?
 Not common. Generally found it in the low-lying hills towards Nawa. [Uncommon.]
 House Swift *Apus affinis* R
 Very common. [Very common.]
 Small Blue Kingfisher *Alcedo atthis* R
 Very rare. [Occasional at Ratan Talav and Kochia ki Dhani.]
 White-breasted Kingfisher *Halcyon smyrnensis* R

- Very common; found it breeding on the banks of open wells. [Very common.]
- Lesser Pied Kingfisher *Ceryle rudis* R
Very rare. [Uncommon.]
- Small Bee-eater *Merops orientalis* R
Very common. [Very common.]
- Blue-cheeked Bee-eater *M. persicus* S
Very common near Mata Pahar and Marot hills. [Common summer migrant. Breeds in the area.]
- European Roller *Coracias garrulus** PM
Not recorded by Adam. [A few birds are regularly seen during autumn passage.]
- Indian Roller *C. benghalensis* R
Very common. [Not uncommon.]
- Common Hoopoe *Upupa epops* R
Uncommon. [Not uncommon.]
- Indian Grey Hornbill *Ocyrceros birostris* ?
Not recorded by Adam. [Very uncommon.]
- Coppersmith Barbet *Megalaima haemacephala* R
Very common. [Common.]
- Eurasian Wryneck *Jynx torquilla* W
Very rare; shot it on two occasions. [Uncommon.]
- Yellow-fronted Pied Woodpecker *Dendrocopos mahrattensis* R
Not common but occasional. [Uncommon.]
- Lesser Golden-backed Woodpecker *Dinopium javanense* R
Saw only at Kuchaman. [Uncommon.]
- Black-shouldered Woodpecker *Chrysocolaptes festivus* ?
Adam collected a single specimen from Kuchaman. [No record. Suitable trees are not present in the area.]
- Singing Bush-Lark *Mirafra cantillans* ?
Not very common. [No sighting.]
- Red-winged Bush-Lark *M. erythroptera* R
Common about the scrub jungle. [Common.]
- Ashy-crowned Sparrow-Lark *Eremopterix grisea* R
Plentiful. [In small numbers.]
- Rufous-tailed Finch-Lark *Ammomanes phoenicurus* M
Very common about the fields after rains. [Present in small numbers.]
- Eastern Calandra-Lark *Melanocorypha bimaculata* W
Not very common. [Occasional.]
- Greater Short-toed Lark *Calandrella brachydactyla* W
Abundant. [Very common. Flocks of 300–400 birds not uncommon.]
- Common Crested Lark *Galerida cristata* R
Very common. [Quite common.]
- Eastern Skylark *Alauda gulgula* ?
Abundant; flocks all over the plains in winter. [Uncommon.]
- Plain Martin *Riparia paludicola*
Very common [Very common.]
- Dusky Crag-Martin *Hirundo concolor* R
Not common. [Not uncommon.]
- Common Swallow *H. rustica* W
Plentiful. [Common in winter.]
- Red-rumped Swallow *H. daurica* ?
Not very common. [Not uncommon.]
- Streak-throated Swallow *H. fluvicola* ?
Very common. [Not uncommon.]
- White Wagtail *Motacilla alba* W
Common. [Common.]
- Large Pied Wagtail *M. maderaspatensis* R
Very common. [Common.]
- Citrine Wagtail *M. citreola* W
Common. [Not uncommon.]
- Yellow Wagtail *M. flava* W
Very common. [Common.]
- Grey Wagtail *M. cinerea* W
Common. [Common.]
- Paddyfield Pipit *Anthus rufulus*
Common. [Common.]
- Tawny Pipit *A. campestris* W
Not very common. [Not uncommon.]
- Oriental Tree Pipit *A. hodgsoni* ?
Not very common. [No record.]
- Black-headed Cuckoo-Shrike *Coracina melanoptera* M ?
Obtained two specimens in June 1871. [No record from Sambhar but I have observed it breeding in Jaipur.]
- Small Minivet *Pericrocotus cinnamomeus* R
Common. [Not uncommon.]
- White-bellied Minivet *P. erythropygus* ?
Shot the species near Marot and Kuchaman. [Only one sighting near Phulera.]
- Short-billed Minivet *P. brevirostris* R
Small parties in winter. [No sighting. Small parties of the species seen in winters by Adam were actually *P. ethologus* (Rasmussen & Anderton 2005), which is not unlikely to occur in this part of India during winter.]
- Common Woodshrike *Tephrodornis pondicerianus* R
Not very common. [Uncommon.]
- White-eared Bulbul *Pycnonotus leucotis* R
Abundant towards Marot and Nawa. [Not uncommon.]
- Red-vented Bulbul *P. cafer* R
Very common. [Very common.]
- Common Iora *Aegithina tiphia* R
Very rare. [One or two sightings in Sambhar town. Probably not rare.]
- Marshall's Iora *A. nigrolutea** R ?
Not recorded by Adam. [Rare. One sight record. A pair was seen at Sursura near Rupangarh on 30th January 1996.]
- Rufous-tailed Shrike *Lanius isabellinus* PM, W
Frequently seen. [Occasional in winter.]
- Bay-backed Shrike *L. vittatus* R
Very common. [Not uncommon.]
- Rufous-backed Shrike *L. schach* R
Not very plentiful. [Occasional.]
- Southern Grey Shrike *L. meridionalis* R
Very common. [Quite common.]

- Blue-headed Rock-Thrush *Monticola cinclorhynchus* W
Adam shot one on 18th September. [No record from Sambhar.]
- Blue Rock-Thrush *M. solitarius* W
Met with it only on two occasions. [No record from Sambhar.]
- Orange-headed Thrush *Zosterops citrina* V
Shot a female on 10th March. [No recent records except from Bharatpur.]
- Tickell's Thrush *Turdus unicolor* V
Very rare. [Not recorded in the study area. Two or three birds are quite regularly seen in Bharatpur.]
- Bluethroat *Luscinia svecica* W
Common. Frequenting the long grass about the open wells and the fields adjoining the wells. [Uncommon. For a species, which only winters, in plains of the subcontinent, Adam mistakenly felt that it breeds in Sambhar although he had never obtained a nest!]
- Oriental Magpie-Robin *Copsychus saularis* R
Not common. [Uncommon.]
- Indian Robin *Saxicoloides fulicata* R
Plentiful. [Common.]
- Black Redstart *Phoenicurus ochruros* W
Not very common. [Fairly common.]
- Common Stonechat *Saxicola torquata* W
Not very common. [Fairly common.]
- Pied Bushchat *S. caprata* R ?
Not very plentiful. [Quite common.]
- Variable Wheatear *Oenanthe picata* W
Not common—*O. p. opistholeuca*; common—*O. p. picata*. [Very common. The three regional forms—variously considered morphs, races or distinct species—occur in Rajasthan, *capistrata* being the most uncommon. In Sambhar *picata* is the most common like elsewhere in Rajasthan.]
- Desert Wheatear *O. deserti* W
More plentiful. [Very common.]
- Isabelline Wheatear *O. isabellina* W
Very common. [Not uncommon.]
- Indian Chat *Cercomela fusca* R
Very common. [Very common.]
- Yellow-eyed Babbler *Chrysomma sinense* R
One specimen was obtained. [Only two–three sight records.]
- Common Babbler *Turdoides caudatus* R
Very common. [Very common.]
- Large Grey Babbler *T. malcolmi* R
Very common. [Very common.]
- Jungle Babbler *T. striatus* R
[A very common and distinctive bird possibly overlooked by Adam.]
- Streaked Fantail-Warbler *Cisticola juncidis* ?
Not common. [No recent record from Sambhar.]
- Rufous-fronted Prinia *Prinia buchanani* R
Very common. [Common.]
- Franklin's Prinia *P. hodgsonii* R
Pretty common in the hills towards Kuchaman. [Common.]
- Graceful Prinia *P. gracilis* R
Very common about the grassland and low scrub jungle. [Common.]
- Ashy Prinia *P. socialis* R
[Uncommon.]
- Plain Prinia *P. inornata* R
Not very common. [Fairly common.]
- Blyth's Reed-Warbler *Acrocephalus dumetorum* PM
Not often met with. [Not uncommon during spring/summer passage.]
- Indian Great Reed-Warbler *A. stentoreus* ?
Collected three specimens in April–May 1873. [No record.]
- Booted Warbler *Hippolais caligata* ?
Not very common. [Rather uncommon.]
- Common Tailorbird *Orthotomus sutorius* R
Very common. [Very common.]
- Common Chiffchaff *Phylloscopus collybita* W
Very rare. [Fairly common.]
- Olivaceous Leaf-Warbler *P. griseolus* ?
Very rare. [No record.]
- Greenish Leaf-Warbler *P. trochiloides* PM
Very rare. [Not uncommon during autumn passage.]
- Common Lesser Whitethroat *Sylvia curruca* W
Very common. [Very common.]
- Hume's Lesser Whitethroat *S. althaea** W
[Common. Now considered a distinct species from *S. curruca*.]
- Orphean Warbler *S. hortensis* PM ?
Adam met with the species once. [One or two sightings in September.]
- Spotted Flycatcher *Muscicapa striata* PM
Only one specimen was obtained. [Uncommon autumn migrant mostly seen in western Rajasthan.]
- Red-throated Flycatcher *Ficedula parva* W
Somewhat rare. [Uncommon.]
- Verditer Flycatcher *Eumyias thalassina* V
A male was collected in November 1873. [No record.]
- Grey-headed Flycatcher *Culicicapa ceylonensis* W
Very rare, obtained one specimen on December 1870. [Rare in the area.]
- Asian Paradise-Flycatcher *Terpsiphone paradisi* ?
Not very common. [Uncommon.]
- White-browed Fantail-Flycatcher *Rhipidura aureola* R
Very rare but saw few pairs at Nawa and Marot. [Rare.]
- Great Tit *Parus major* R
Very rare. [Rare.]
- Pied Tit *P. nuchalis* R
Common about Marot jungle; Adam collected 12 specimen. [Six birds were seen in 1996 at three different sites—two each at Maroth, Panchothia near Nawa and Sambhar Salts *beed* (forest) near Nawa (Tiwari 2001).]
- Spotted Creeper *Salpornis spilonotus* R
Adam had two specimens shot for him near Kuchaman. [Rare. A pair was seen at village Sursura near Rupangarh on 30th January 1996.]

Purple Sunbird *Nectarinia asiatica* R
Very common. [Very common.]

Oriental White-eye *Zosterops palpebrosus* R
Adam saw a small party once in his garden. [Presumably this fairly common species seems to have been overlooked.]

Crested Bunting *Melophus lathamii* ?
Very rare; collected only two from Sambhar but number of males from Kuchaman. [No recent records.]

Grey-necked Bunting *Emberiza buchanani* W
Obtained the specimens on two–three occasions close to Nawa and Kuchaman. [No record from Sambhar. However, there is a very recent record from Nahargarh, Jaipur. A single bird was recorded on 24th April 2008. Used to be found 'in huge flocks' at Pali (Whistler 1938).]

Striolated Bunting *E. striolata* R ?
Scrub jungles about the hills of Nawa and Marot; was certain that it bred about the hills near the lake. [Uncommon. Recorded from Nahargarh near Jaipur.]

Red-headed Bunting *E. bruniceps* ?
At times saw the species in large numbers; on 15th April 1873 saw males in breeding plumage. [No sighting.]

Common Rosefinch *Carpodacus erythrinus* W
Very rare and observed it on one or two occasions. [No recent records.]

White-throated Munia *Lonchura malabarica* R
Very common. [Very common.]

Spotted Munia *L. punctulata* ?
One sighting during rains. [No record.]

House Sparrow *Passer domesticus* R
Very common. [Common.]

Spanish Sparrow *P. hispaniolensis* W
Plentiful in *Prosopis cineraria* jungle near Kuchaman. [Rather occasional in winter.]

Yellow-throated Sparrow *Petronia xanthocollis* ?
Very common. [Rather uncommon. About 80 were observed feeding near Bichoon on 10th February 1999.]

Baya Weaver *Ploceus philippinus* R
Very common. [Rather uncommon. Depletion of suitable grasses for nest building could be the reason.]

Brahminy Starling *Sturnus pagodarum* R
Not very common. [Fairly common.]

Rosy Starling *S. roseus* PM, W
Large flocks during cold weather. [Occasional in winter. Common during passage in April.]

Common Starling *S. vulgaris* W
Often met with in pairs. [Rather uncommon. However, more than 100 were sighted near the lake on 8th February 1995.]

Asian Pied Starling *S. contra** R
Not recorded by Adam. [Common. The species was almost absent west of Jaipur up to the 1980s. Although its distribution is given east of 76°E by Ali & Ripley (1978) the species has crossed 74°E longitude in Rajasthan and likely to advance further west (Sharma 2004).]

Common Myna *Acridotheres tristis* R
Very common. [Very common.]

Bank Myna *A. ginginianus* R
Very common. [Very common.]

Eurasian Golden Oriole *Oriolus oriolus* S
Common. [Occasional.]

Black Drongo *Dicrurus macrocercus* R
Very common. [Very common.]

Indian Treepie *Dendrocitta vagabunda* R
Very rare. [Occasional.]

House Crow *Corvus splendens* R
Abundant. [Common.]

Common Raven *C. corax subcorax* W
Pretty common during cold weather, but pairs are seen throughout the year. Collected a nest with three eggs. [Occasionally in small flocks near Shakambri Mata Temple during winters. Two birds were observed feeding on a dead dog near Bichoon on 8th February 1995. The species is now confined to extreme western Rajasthan and seems to have declined. It used to be very common and LaPersonne (in Whistler 1938) has remarked on the tameness of the bird in desert towns. In Phalodi they actually entered bungalow verandas (Whistler 1938)! All recent breeding records are from Bikaner and Jaisalmer (Sangha & Naoroji 2004).]



Lesser Flamingo *Phoenicopterus minor*

Breeding biology of Oriental Dwarf Kingfisher *Ceyx erythaca*

Sachin Balkrishna Palkar, Vishwas Dattatrya Katdare, Rohan Janardhan Lovalekar,
Ram Vasudev Mone & Vishwas Vishnu Joshi

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Sachin Balkrishna Palkar, Vishwas Dattatrya Katdare, Rohan Janardhan Lovalekar, Ram Vasudev Mone & Vishwas Vishnu Joshi: Sahyadri Nisarga Mitra, Near Laxminarayan temple, Chiplun 415605, Ratnagiri district, Maharashtra, India. Email: sahyadricpn@rediffmail.com

Ms received on: 16th September 2007.

Introduction

The Oriental Dwarf Kingfisher *Ceyx erythaca* is a resident bird that disperses widely with the onset of the south-west monsoon. It is mostly found in Nepal, northern West Bengal, Sikkim, Bhutan, Assam, Nagaland, Manipur, Mizo Hills, Bangladesh and the Western Ghats. Shady jungle, streamlets, moist deciduous and evergreen forests are its most favored haunts (Ali & Ripley 2001). It is one of six species of kingfishers (Alcedinidae) found in and around Chiplun city (17°31'N 73°31'E) in Ratnagiri district (Maharashtra, India). It is a breeding visitor to the area in June–September, thereafter not being present during October–May. Here we present observations on the breeding biology of the Oriental Dwarf Kingfisher.

Study area

Chiplun town is surrounded by the foothills of the Western Ghats and is 50 km away from Arabian Sea. Here, in 2003, we studied the breeding biology of the Oriental Dwarf Kingfisher, close to the house of one of the authors (SBP), which is located in an urban area, along the Mumbai–Goa highway. This nest was behind a cowshed, and was situated in a 2.4 m vertical land cutting. The nest was at a height of 2 m from the ground and 5 m away from the cowshed.

Between 2005 and 2007 we closely observed another nest of this species, in a small nullah, near the Vindhyawasini temple—a well-known locality of Chiplun. This area has semi-evergreen vegetation and a plantation of mango *Mangifera indica* and teak *Tectona grandis* trees. The Oriental Dwarf Kingfisher has been known to breed here since 1999.

We observed a third nest of this kingfisher at Matewadi, a small area situated between SBP's house and Vindhyawasini temple.

Methodology

We studied the breeding biology of Oriental Dwarf Kingfisher by using a closed-circuit television (CCTV) camera and a camera stick. We measured the internal and external temperature of the nest with a digital thermometer, which had a 2 m sensor. We also made video recordings with the CCTV camera.

Every day we switched on the camera and the fluorescent tube for a brief period of 10–15 min. Then we switched off the equipment for 45–55 min. This procedure was followed till the evening. The birds were not disturbed when we operated the fluorescent tube and the camera.

Nest 1: To observe the action inside the nest located behind SBP's house, we fixed a 12-volt CCTV camera and a 6-volt fluorescent tube on the upper side of the nest chamber (Fig. 1). The camera was fixed inside a 23 cm long waterproof PVC pipe of 10 cm diameter. The fluorescent tube was fixed in a 23 cm long waterproof PVC pipe having a 5 cm diameter. This was done late in the evening when the chamber was about 90% complete. We dug approximately for one meter parallel to the nest to the left and 1.5 meters away from the nest entrance. Then we started digging from the upper side towards the chamber.

When the chamber was visible we fixed the pipes containing camera and the tube, at the upper side of the chamber. Then we filled it up using wet mud and leveled it. A small piece of plastic was spread over the pipes to prevent leakage of water through the pipes. Dry leaves and soil were spread over that plastic. This effectively camouflaged all the damage done while digging. We connected the wires. Now everything inside the chamber was clearly visible on the TV monitor. We completed this work in two hours.

Next day was very important, as we were not sure whether the birds would accept our arrangement. We were relieved to observe the birds enter the nest as usual. They were not disturbed or confused, and it seemed that they didn't notice the changes in the chamber.

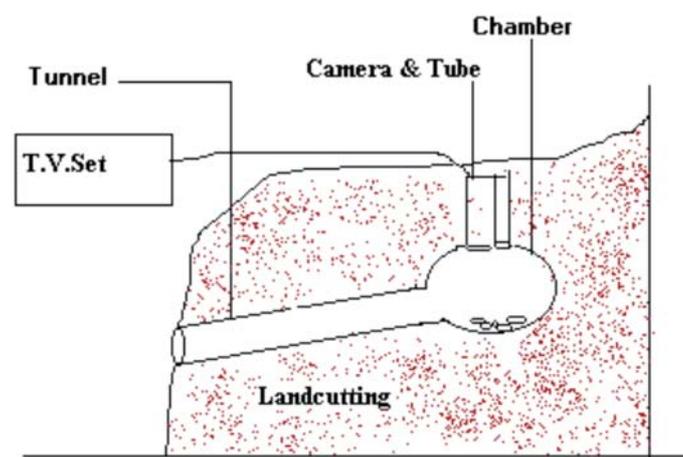


Fig. 1. The nest behind Sachin Palkar's house.

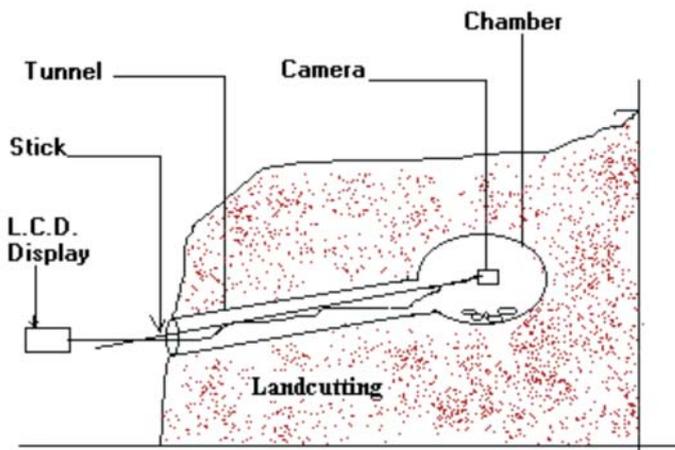


Fig. 2. Nest at Vindhyawasini temple.

Nest 2: At the Vindhyawasini temple we used a 2 cm diameter CCTV camera. It was fixed to one end of a metal rod. A 3-volt bulb was fixed to one side of this camera and attached to a battery, through which it operated a 6-volt LCD display.

We inserted the camera stick into the nest, when bird left, and made all necessary connections. Everything inside the nest was clearly visible on the LCD display.

Temperature

We checked the change in temperature inside the chamber, when the light was turned on. When the incubent departed we inserted the sensor of the thermometer into the chamber so that it was easily visible on the monitor—and read the temperature. After that we turned on the light and the camera for up to 30 min and took a reading again. There was no change in the temperature. During the study, temperatures outside the nest ranged from 23.6°C to 31.1°C while inside it ranged from 27.5°C to 29.1°C.

Rainfall

In 2003 the rains started on 11th June 2003 and up to 30th September 2003, 3,154 mm had fallen. While in 2005 rainfall commenced on 1st June 2005 and up to 30th September 2005, 4,780 mm had fallen.

Notes on breeding biology

In the Chiplun area, breeding activities of the Oriental Dwarf Kingfisher start with the onset of the south-west monsoon, i.e., in June and ended in September.

Nest & nest construction

The nest is a horizontal tunnel up to a meter in length and 4 cm



Oriental Dwarf Kingfisher: Male



Niranjan Sant

Oriental Dwarf Kingfisher: Female

in diameter, which ends in a wider egg chamber—in a vertical earthen bank, or in a land cutting near a small nullah (Ali & Ripley 2001). The tunnel and egg chamber are inclined upwards. This perhaps prevents entry of water inside the chamber. It also helps the flow of waste material outside the nest. The egg chamber is unlined.

From 2004 to 2007 a pair of kingfishers was observed with the onset of monsoon. Twice they were seen entering the same nest (in site No. 1). They were busy in nest-site selection, but nest excavation process was incomplete and they left the place.

In 2005 we ringed the pair at Vindhya wasini. Next year, in 2006, the same pair used the same nest for their nesting, but the birds removed the eggs after completion of the clutch, perhaps because of the low rainfall. The same pair was again observed in 2007, when they started building a new nest on 30th August, but later abandoned it, presumably because of poor rainfall.

Nest 1—SBP's house:

From 21st June 2003 a pair was observed calling and chasing each other in this area. Nest excavation started on 26th June 2003.

The process of nest excavation: Both the birds sat on a dead *Artocarpus heterophyllus* tree in front of their chosen nest site, under a horizontal root of a teak *Tectona grandis*. One of the birds flew like a projectile at the land cutting and hit the

nest spot with its bill. It immediately flew back towards the perch, which was 2.5 m away from the bank. The other bird repeated the same process. Both excavated alternatively. They made a 4.5 cm hole and prepared a tunnel entrance. Then sitting on the edge of the nest entrance, and pecking with the tips of their beaks they excavated a 4 cm wide (diameter) and 15 cm long tunnel. Excavation activity slowed down in the evening.

When we fixed the camera on 29th June 2003, about 90% of the egg-chamber had been completed. Then both the birds finished the wall of the chamber. No more changes inside the chamber were observed after the camera had been fixed.

During this period courtship feeding was observed. Once the male was seen presenting a centipede to the female. The nest was completed in ten days, on 5th July 2003.

Nest 2—Vindhya wasini

In 2005 rains commenced on 10th June. During 14th–26th June 2005 the pair changed the sites of nest excavation six times, due to unsuitability of the selected sites. They finally selected a new site on 26th June 2005. As usual, both the birds started excavating a nest. Its location was under a horizontal root of a mango *Mangifera indica* tree in a 1 m earth bank, and the nest was completed on 4th July 2005. Egg laying commenced on 4th July 2005, and incubation started after the last egg was laid. From 25th to 27th July there was a heavy downpour (856 mm).

Table 1. Dimensions of nests (in cm)

Location	Dia. of entrance	Tunnel	Chamber
SBP's house	5	61	10
Vindhyawasini	5	56	11.5
Matewadi	7.5	64	20.5

Table 2. Morphometric details

	Male	Female
Weight	14.83gm	18.03gm
Beak	31mm	32mm
Tarsus	8mm	9mm
Tail	24mm	27mm
Wing	53mm	57mm

There was no incubation during this period (due to heavy rain?). On the morning of 27th July 2005 the birds removed all the eggs. This might be the first record of a pair removing all infertile eggs from their nest.

Nest 3—Matewadi

In 2005 we observed an unusual nesting situation of this species in Matewadi. A pair used an existing nest-hole of a White-breasted Kingfisher *Halcyon smyrnensis*, which had been excavated in 2004. It was at a height of 1.5 m from the ground in an 11.5 m vertical land cutting.

A pair of Oriental Dwarf Kingfishers was seen from 26th June 2005 trying to excavate a nest in the same land cutting but soon abandoned it because of hardness of the earth. On 30th June 2005 we saw the male Oriental Dwarf Kingfisher entering the White-breasted Kingfisher's unused nest. Subsequently we observed five eggs inside this nest by using camera stick.

All five eggs hatched on the morning of 17th July 2005. There was heavy rainfall (700 mm) during 26th–28th July 2005, which caused a landslide and all the five chicks perished. The adults were seen in the vicinity for the next two days after which they disappeared.

This might be the first record of an Oriental Dwarf Kingfisher using another kingfisher's nest for nesting.

First brood

A clutch of glossy white eggs varies between 4–5 and sometimes 6–7. Ali & Ripley (2001), quoting Baker, give the average size of 30 eggs as 18.9 x 15.6 mm.

We observed that one egg was laid per day in the morning—immediately after which the hen left the nest. Incubation started only after the last egg was laid. Only the hen incubated at night while the cock shared incubation duties during the day.

Incubation period is considered to be the period from the laying of the last egg of a clutch to the hatching of the last nestling (Skutch 1945).

Nest 1: Incubation period lasted for 17 days. During incubation, both birds would cover all eggs with their belly feathers. Not an egg remained outside. Sometimes they hammered on the walls of the nest chamber with their beaks during incubation. Houseflies, centipedes, millipedes, spiders, mosquitoes, red- and black-coloured ants, snails and other invertebrates were regularly observed in the nest during the incubation period. The walls of the nest were wet.

The birds regurgitated undigested food in the form of a pellet during incubation—which they later removed. While changing incubation duties, the relieving bird would arrive and sit on a regular perch near the nest, and utter a shrill call. Before leaving, the incubating bird stands over the clutch, flutters its wings for a second and then leaves the nest, flying out quickly and silently.

When the relieving bird enters the tunnel it utters an unfamiliar note, 'tronk-tronk', which has not been described earlier. Before settling down for incubation, it touches every egg with the tip of its bill and then begins incubation. After about 20–30 minutes the bird changes its position, and rotates the eggs.

On 12th July 2003 female started incubation at 1850 hrs and left the nest on 13th July 2003 at 0610 hrs.

On 20th July 2003 we recorded incubation details over a period of 12 hours during the day (Table 4).

Once, the male incubated continuously for a period of 184 min. The eggs were left unattended for a maximum period of 17 min.

Hatching

Nest 1: On 27th July 2003 the first egg hatched at 0606 hrs, the last at 1052 hrs. The attending bird removed the eggshells. Chicks were naked and pink and called continuous—'chick-chick'. On entering the nest chamber, an adult touched each nestling with the tip of its bill, after which it gathered all the chicks under its abdomen and commenced brooding.

Feeding

Nest 1: Feeding commenced at 0729 hrs, even before the entire clutch of eggs had hatched. Both the birds fed the chicks. When both parents brought food simultaneously only one of them entered the nest while the other waited outside. Also they uttered a particular call to each other. Feeding activity was carried on throughout the day. While feeding a chick, the food—lizard, fish, gecko, etc—was presented head first into its gape. Frequently the items being fed were half alive. At this time too they gave the 'tronk-tronk' calls. Food was at times much larger than their body length. Sometimes the tail of a food item

Table 3. Nesting record

Nest	Y	P	B	Laying dates					Hatching dates					F
				1	2	3	4	5	1	2	3	4	5	
1	2003	S	1st	6/7	7/7	8/7	9/7	10/7	27/7	27/7	27/7	27/7	27/7	16/8
	2003	S	2nd	4/9	5/9	6/9	7/9	—	25/9	25/9	25/9	25/9	—	D
2	2005	V	1st	5/7	6/7	7/7	8/7	9/7	I	I	I	I	I	—
	2005	V	2nd	2/8	3/8	4/8	5/8	6/8	24/8	24/8	24/8	24/8	24/8	12/9

Abbreviations: B=Brood; D=Dead chick; F=Fledging dates; I=Infertile egg; P=Place; S=SBP's house; V=Vindhyawasini temple; Y=Year.

Table 4. Incubation details over 12 hrs

	Minutes	% share
Female	232	32.22%
Male	437	60.70%
Unattended	051	07.08%
Total	720	—

protruded outside its bill—one chick took 17 min to swallow a full-grown common skink *Mabuya carinata*.

We observed the birds feeding chicks 19 times on the first day. The male fed them 13 times and the female six times. Fish was the commonest item that day, being brought 14 times; frogs were brought four times and a snail once.

From the fourth day onwards parents brought geckos, frogs, mantids and water striders to the nest; from the sixth—lizards.

Once the female brought a frog in its beak. The male was busy brooding. She extended it towards the chicks but they didn't accept it. This went on for five minutes. Then she offered it to the male. During this time they uttered the 'tronk-tronk' call. Finally she dropped the frog in front of the chicks and went out. The male followed her immediately. After about 20 min, the male brought a snail and fed it to the chicks and started brooding. Then after 25 min the male picked up the frog and went outside the nest.

The adults did not remove undigested food material but on three instances we observed that food that had been dropped while being brought to the chicks, was removed by the incubating bird.

Due to the high humidity inside the chamber, its floor becomes dirty with droppings, undigested food and waste material, and after a while a number of white maggots were visible. Mosquitoes, millipedes and centipedes were also observed moving freely in the nest chamber. One day we observed two mosquitoes biting chicks.

After 6–7 days parents fed the chicks from the entrance of the chamber, as they couldn't enter it. The chicks jostled each other to get the food they brought, which included geckos, crabs, spiders, field crickets, dragonflies, lizards, grasshoppers (mantis), snails, mole crickets, frogs, common skinks, etc.

For about six to seven days, most of the parents' time was spent in brooding the chicks and after that, in standing guard. Thereafter only chicks were observed in the chamber. The female guarded and brooded the chicks up to the night of 2nd August 2003.

On 15th August 2003 we observed only four chicks inside the nest. One lay dead outside.

Fledging

All the chicks fledged out in the morning. Fledging period is considered, as defined by Skutch (1945), to be the period from the hatching of the last egg of a clutch to the fledging of the last chick.

Nest 1: All the four chicks fledged out one by one after 20 days, on 16th August 2003 from 0800–0830 hrs. Feeding was observed throughout the day in this area. The nest chamber was full of maggots.

Second brood

Both pairs raised a second brood, each commencing 19 and 23 days after the fledging / failure of the first brood.

Nest 1: Though the chicks fledged on 16th August 2003, we continued our daily observations, despite the heavy rain. Roots had begun to grow inside the nest chamber. Houseflies, mosquitoes and black coloured beetles were regularly observed in the chamber. From 18th August 2003 onwards, fewer white maggots were not observed but base of the chamber was muddy. Small bones remained in the chamber.

From 27th August 2003 a pair of Oriental Dwarf kingfishers was seen chasing each other in the vicinity and then entering this nest.

Both the birds entered the nest and made some alterations. They widened the egg chamber as well as dug up the floor of the chamber and removed all the roots growing inside the chamber.

Nest 2: Birds were regularly observed in the area, as well as entering in the nest.

Egg laying

Nest 1: Egg laying started on 4th September 2003. Four eggs were laid, one per day, between 0630 and 0729 hrs. Incubation, as in the first brood, started from the last egg. In this brood, houseflies, beetles, millipedes, centipedes, etc., were fewer than in the first brood.

Nest 2: Egg laying commenced on 2nd August 2005. Five eggs were laid between 0632 and 0711 hrs. The clutch was completed on 6th August 2005.

Table 5. Nestling development in Nest 1

Age in days	Remarks
0–2	All the chicks were naked, pink in colour, with black colour eyeball prominent and eyes closed. The newly hatched chicks were able to raise their necks but were unable to stand and called continuously 'cheek-cheek'.
2–4	Primaries and secondaries appeared on the third day. Chicks had rough body surface appearance. At the base of the upper beak near nostril, black colour developed.
4–8	Black colour primaries and secondaries.
8–12	On 9th day eyes of the chicks opened. On 11th day chick had colour feathers and feathers on the back, rump and tail.
12–16	On 14th day chicks had blue colour on the back and rump feathers. Colour of the bill tip was orange-yellow. Colour of the chicks looked much brighter. Also had white colour patch and beside that deep blue colour feathered patch developed on each side of the head. They fluttered their wings. From 15th day primaries and secondaries developed fan shaped (webs) and blackish in colour. Tail feathers developed pinkish colour.
16–20	From 16th day chicks had fully colour feathers. They push each other to get food from the parents. They were getting ready for fledging.

Table 6. Total rainfall (mm) in the study period

Brood		2003		2005	
First	Construction		701		920
	Incubation		959		1520
	Brooding		649		—
	Total rainfall		2309		2440
Second	Up to the 1st egg		261		475
	Incubation		175		726
	Brooding		18		408
	Total rainfall		454		1609

Hatching

Nest 1: All the eggs hatched on the morning of 25th September 2003 and eggshell removal started at 0543 hrs by the attending bird. From this day the male was not observed in this area.

On 24th September 2003 one adult kingfisher was observed dead on the road. It was 18–20 m away from the nesting site. The bird had succumbed after being hit by a fast-moving vehicle.

Nest 2: All the eggs hatched on the morning of 24th August 2005—the eggshells being removed immediately by the attending bird. Incubation period lasted for 18 days.

Feeding

Nest 1: First feeding was observed at 1009 hrs. Up to 4th October 2003 the female guarded the chicks at night. As the female had to feed the entire brood alone, gradually the feeding frequency decreased. All chicks looked hungry and eventually died due to starvation. On 12th October 2003, one chick died inside the nest chamber. The female did not remove it and soon maggots were observed in the dead chick. Next day another chick was found dead at 0645 hrs. Then one by one the remaining chicks died. The female was last observed in the area at 1930 hrs after which she was not seen.

Fledging

Nest 2: All five chicks fledged successfully on 12th September 2005 in between 0700 to 0730 hrs. Fledging period was 18 days.

Sexual dimorphism

Ali & Ripley (2001) note that the sexes of this species are alike while Rasmussen & Anderton (2005) say that the 'female typically has rufous crown, lacking strong lilac sheen; mantle mostly black with dark glossy blue spotting (less blue than on male).'

Over the last five years we observed that the sexes differed in colouration, at all nesting sites. To determine their sex, we watched the pairs during the egg laying process and subsequently by ringing them.

We found that the female was duller and the male was brighter in colour—a fact that is visible in the photographs. Both male and female have white coloured and deep bright blue coloured patch on the nape. Male has deep bright blue coloured lesser and median coverts. Female has brownish coloured lesser and median coverts. Male has lilac coloured forehead and crown. Female has faint rufous-coloured forehead and crown.

The female was also larger than the male.

On 13th September 2005 we mist-netted and measured the pair at Nest 2.

Conclusions

Difficulties that the species faces during breeding in the study area include:

1. Birds excavated the nest in loose land cutting—the earth caved in easily during the onset of heavy rainfall.
2. Nesting near a busy road may result in birds being hit by speeding vehicles.
3. Unhealthy chicks cannot fly easily. Sometimes they fall into the water and die.
4. As chicks grew and their hunger increased, they moved towards the entrance in anticipation of returning parents and in their enthusiasm to get at the food, sometimes fell out of the nest and perished.
5. Starvation is one of the main causes affecting breeding success.
6. The amount of rainfall is an important factor on which successful breeding depends.

Incubation period of the Oriental Dwarf Kingfisher is presented for the first time in this paper. Both the birds share all nesting duties. The female is larger in size and has duller coloured plumage than a male. Eggs are laid at an interval of 24 hours, in the morning. Normal clutch size is five eggs. Incubation begins after the last egg is laid. Female takes a larger part in incubation being the one to incubate at night. Incubation period is 17–18 days and fledging period is 18–20 days. In two of the three observed nests two broods were raised but only one was successful. Out of the total 24 eggs that were laid, five were infertile, nine chicks fledged and the remaining ten died—four out of starvation, one by falling out of the nest, and five due to collapse of the nest chamber. Nest re-use is recorded for the first time.

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References

- Ali, S. & Ripley, S. D. 2001. *Handbook of the birds of India and Pakistan together with those of Bangladesh, Nepal, Bhutan and Sri Lanka*. Vol 4. 2nd ed. Delhi: (Sponsored by Bombay Natural History Society.) Oxford University Press [Oxford India Paperbacks].
- Rasmussen, P. C. & Anderton, J. C. 2005. *Birds of South Asia. The Ripley guide. Attributes and status*. Vol 2. Washington, D.C. & Barcelona: Smithsonian Institution & Lynx Edicions.
- Skutch, A. F. 1945. Incubation and nestling periods of Central American birds. *Auk* 62 (1): 8–37.

Breeding biology of White-breasted Kingfisher *Halcyon smyrnensis*

Sachin Balkrishna Palkar, Rohan Janardhan Lovalekar & Vishwas Vishnu Joshi

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Sachin Balkrishna Palkar, Rohan Janardhan Lovalekar, Vishwas Vishnu Joshi: Sahyadri Nisarga Mitra, Near Laxminarayan Temple, Chiplun 415605, Ratnagiri district, Maharashtra, India. Email: sahyadricpn@rediffmail.com

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Introduction

White-breasted Kingfisher *Halcyon smyrnensis* is a familiar and common resident, breeding bird of India, Bangladesh, Pakistan, Sri Lanka and Myanmar (Ali & Ripley 2001). Its Marathi names are 'Khandya, Dheesa and Dheewar.' This bird is less dependent on water than other members of the Alcedinidae.

According to Ali & Ripley (2001) the breeding season of the White-breasted Kingfisher is March–July.

In this note we present its nesting activity in Chiplun city, Ratnagiri dist. (Maharashtra, India) and introduce a simple method that allows a birdwatcher to look into a hole / tunnel nest.

Study site & methodology

Chiplun (17°31'N 73°31'E) is a small city that is surrounded by foothills of the Western Ghats. It is 50 km away from the Arabian Sea.

Vindhyawasini is a locality of Chiplun city. The area has semi-evergreen vegetation that includes teak *Tectona grandis* and mango *Mangifera indica* trees. There is a small nullah here that flows only during the rainy season. Average rainfall is 3,500 mm. Temperatures in this area ranges from 23°C to 40°C.

In this area we studied five different nests of the White-breasted Kingfisher during 2004–2006, using a convex mirror

with a 5 cm diameter and a 20 cm focal length, mounted on a 1 m long metal rod that was bent at a 60 degrees angle, and 10x50 power binoculars to view activities within the nests. We used convex mirror as it allowed a full view of the interior of the chamber. After inserting the mirror stick into the chamber of the nest, we focused a torch on the mirror, which reflected the light on the base of the chamber. This enabled us to get a good view.

We made observations at the nests at least twice a day, i.e., once in the morning and once in the evening, during their breeding period. Care was taken to insert the mirror only after the bird had left the nest.

We also made readings of temperatures inside (26.9°C–32.7°C) and outside (25.7°C–40°C) the nest with a digital thermometer that had a 2 m long sensor.

Observations & results

Courtship

Courtship starts from March. Birds are very vocal during this period and utter their cackling call 'kili-kili' repeatedly from a treetop for extended periods of time (Ali & Ripley 2001). Birds sit close to each other and repeatedly call. We also observed courtship feeding during the nest excavation.

The nest & its construction

The nest is a horizontal tunnel, up to a meter long, which ends in a widened egg chamber and has a 7 cm wide entrance (Table 1). It is excavated in a vertical cutting of earth on the bank of a river, stream, nullah or a roadside land cutting (Ali & Ripley 2001).

The egg chamber is slightly inclined, perhaps to prevent the flow of water into the chamber. Also, it makes disposal of waste material from within easy, as the chicks grow. In some nests the egg chamber is curved to the left or right. Lining of the egg chamber was not observed.

Both the birds participate in nest excavation. One of the birds flew full tilt at the prospective spot and hit it with the tip of its bill. It immediately returned to the perching site while its partner repeated same process. This went on until a nest entrance had formed. After the entrance was at least 5 cm long, both birds took turns to sit at its edge and excavate the tunnel further. Excavation ceased if the pair encountered problems such as rocky or hard soil, and a new site was selected. We have observed pairs occupying the same area for 3–4 years. However only ringing will confirm the reuse of a nest or site by the same pair.

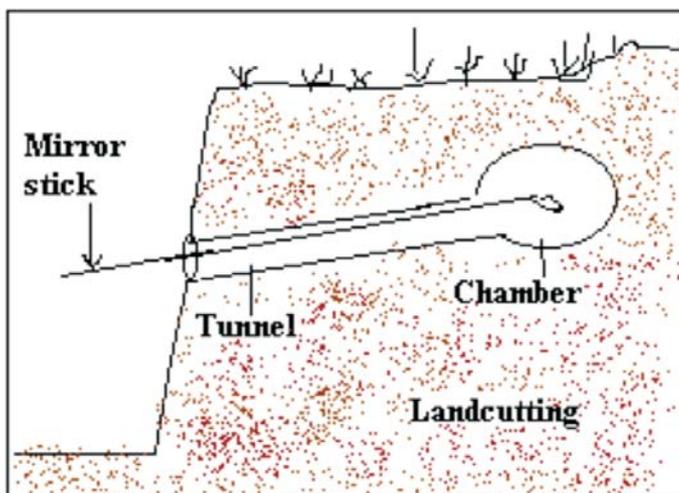


Fig. 1. Diagrammatic representation of the method used in nests of White-breasted Kingfisher *Halcyon smyrnensis*.

Table 1. Dimensions of nests

No.	Location (Year)	Entrance diameter (cm)	Tunnel length (cm)	Chamber diameter
1.	Vindhyawasini (2004)	10	33	12.5
2.	Vindhyawasini (2005)	7.5	68.5	12.5
3.	Matewadi (2005)	7.5	56	18
4.	Vindhyawasini (2006)	8	34	15
5.	Matewadi (2006)	8.5	6	14

However, the White-breasted Kingfisher is known to use various locational situations for constructing its nest. Balasubramanian (1992) reported its nesting inside paddy haystacks for about two years at Mayiladuthurai, Thanjavur district (Tamil Nadu). Rohan J. Lovalekar (*verbal comm.*) observed a successful nest in Chiplun, which was excavated in the earthen wall of an old house in 1995 and 1996. In 2000, 2006 and 2007 we found nests of this bird, which had been excavated in a cement pipe (10 cm diameter) in a compound wall. The chamber was excavated at the end of the pipe. In Lanja, Ratnagiri district, Rajendra Kokate (*verbal comm.*) observed a nest inside a well in 2003, but due to heavy rainfall the water level rose and all the chicks died. Hussain (2000) too reported nests of these birds in a well in Karnataka.

We observed the nesting activity of this kingfisher at Matewadi an area in Chiplun, where, in 2004, the birds excavated a nest in a vertical bank at a height of 1.5 m from the ground. In 2005 they (or another pair) excavated a new nest, which was about 1 m away from the 2004 nest. Interestingly, between these two nests a pair of Small Bee-eater *Merops orientalis* had excavated their nest. Both, the kingfisher and the bee-eater excavated their nest simultaneously.

Eggs & egg laying

A clutch may comprise 4–7 eggs, but usually contains 5–6. Eggs are white and spherical-oval in shape. The average size of 30 eggs is 29.4 × 26.2 mm (Ali & Ripley 2001, quoting Baker).

Out of the five nests observed, only in one nest, were the eggs laid at regular intervals of 24 hrs. In the other four nests there was at least one gap of 48 hrs in the egg laying process (Table 2). All the eggs were laid after mid-day.

Incubation & hatching

There was negligible incubation up to the laying of last egg—after which, it commenced at night. Both birds participate in incubation. The birds destroyed undigested food pellets that collected in the nest during incubation. During changing over of duties, the relieving bird uttered a call to the incubating bird, at which the latter left the nest. After the eggs hatched, the attending bird removed the shells. In one of the nests the adults also removed an infertile egg.

Skutch (1945) defines incubation period to be the extent of time from the laying of the last egg of a clutch to the hatching

of the last nestling. For the White-breasted Kingfisher it was 21–22 days. Oommen & Andrews (1993) give it as 18–21 days.

Nestling & feeding

Chicks were naked and pink in coloured. Feeding, by both birds, commenced 2 hrs after the first chick hatched. When both the parents brought food simultaneously only one of them entered the nest while the other waited outside. The parents were never observed cleaning the nest and during the rains it became wet, muddy, dirty and foul smelling. One of the adults guards the chicks for the first 8–9 nights. The following food items were fed to the young: common garden lizards *Calotes versicolor*, geckos, centipedes, fishes, frogs, common skinks *Mabuya carinata*, crabs and cockroaches.

Fledging period

Skutch (1945) defines the fledging period as the span of time from the hatching of the last egg of a clutch to the fledging of the last chick. In the White-breasted Kingfisher this was found to be 19 days. All chicks were fledged in the morning.

Mortality

During our study we recorded one infertile egg. In one nest, during the hatching period, black ants attacked the chicks and eggs. At another nest, weaver ants attacked a chick. Other common causes of chick mortality include accidental drowning, caving in of the nest chamber and, falling out of nest hole. Speeding vehicles occasionally knock down adult birds.

Conclusions

Incubation period is 21–22 days and fledging period 20–21 days. In the five nests that were observed, 22 eggs were laid, of which one egg was infertile and black ants attacked one chick and 3 eggs. The remaining 17 eggs hatched successfully (Table 2).

References

- Ali, S. & Ripley, S. D. 2001. *Handbook of the birds of India and Pakistan together with those of Bangladesh, Nepal, Bhutan and Sri Lanka*. Vol 4. 2nd ed. Delhi: (Sponsored by Bombay Natural History Society.) Oxford University Press [Oxford India Paperbacks].
- Balasubramanian, P. 1992. New nesting site of the Indian Whitebreasted Kingfisher *Halcyon smyrnensis fusca* (Boddaert). *J. Bombay Nat. Hist. Soc.* 89 (1): 124.
- Hussain, S. A. 2000. Of kingfishers and wells. *Newsletter for Birdwatchers* 40 (1): 4–5.
- Oommen, M. & Andrews, M. I. 1993. Breeding biology of the Whitebreasted Kingfisher, *Halcyon smyrnensis*. In: *Bird Conservation: Strategies for the Nineties and Beyond*. 177–180. Verghese, A., Sridhar, S. & Chakravarthy, A. K. (eds.). Bangalore: Ornithological Society of India.
- Skutch, A. F. 1945. Incubation and nestling periods of Central American birds. *Auk* 62 (1): 8–37.

Table 2. Nesting details

Nest date	Place	Year	Egg laying dates					Egg hatching dates					Fledging
			1	2	3	4	5	1	2	3	4	5	
1	V	2004	3/5	4/5	5/5	6/5	7/5	27/5	28/5	28/5	28/5	29/5	17/6
2	V	2005	30/4	1/5	2/5	4/5	—	23/5	23/5	25/5	I	—	15/6
3	M	2005	14/5	15/5	17/5	18/5	—	7/6	8/6	8/6	8/6	—	?
4	V	2006	2/5	3/5	4/5	6/4	—	D	D	D	D	—	—
5	M	2006	6/4	7/5	8/5	10/5	11/5	30/05	30/05	31/05	1/06	2/06	23/06

Abbreviations: D=Destroyed by ants; I=Infertile egg; M=Matewadi; V=Vindhywasini; ?=Date not available

Egg laying, egg parameters and clutch size in Mallard *Anas platyrhynchos*

G. Mustafa Shah, Ulfat Jan, Fayaz Ahmad Ahanger, Bilal A. Bhat & M. F. Fazili

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G. Mustafa Shah, Ulfat Jan, Fayaz Ahmad Ahanger, Bilal A. Bhat & M. F. Fazili: Post Graduate Department of Zoology, University of Kashmir, Srinagar 190006, Jammu & Kashmir, India. Email: fayaz_sultan@yahoo.co.in

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Abstract

This paper discusses observations made on egg laying, egg parameters and clutch size in Mallard *Anas platyrhynchos*. Egg laying season extended from early March to early June. April was the peak-laying month. Mean egg weight was 50.21 gm (± 2.74) while as the average egg size was 56.42 x 40.55 mm (± 2.34 x ± 1.19). Average clutch size was found to be 8.27 (± 2.23).

Introduction

Within Indian limits, Kashmir is the only state where the Mallard *Anas platyrhynchos* breeds (Bates & Lowther 1952).

Due to the destruction of wetland habitat in general and nesting sites of the bird in particular, unrestricted poaching, illegal egg collection and other human threats, the Mallard gradually stopped breeding in Kashmir. Bates & Lowther (1952), even after extensive surveys, could locate only a few nests in Kashmir. Shah (1984) could not find any evidence of breeding Mallards in the wetlands of Kashmir.

However, since a few years there is a marked change in the attitude of people towards wetlands. More protection is being provided to the wetlands, there is a great reduction in macrophyte harvesting, and a complete ban on duck shooting licenses have all contributed to the Mallard breeding in small numbers, once again, on the wetlands of Kashmir.

Studies on various aspects of the breeding biology of the Mallard were carried out during January 2004–December 2005, at Hokarsar Lake, Jammu & Kashmir. The present paper discusses observations on egg laying, various egg parameters and clutch size of Mallard.

Study area

Hokarsar Lake (34°06'N 74°05'E; 1,584 m a.s.l.) is an Important Bird Area (Islam & Rahmani 2004) in Budgam and Srinagar districts of Jammu & Kashmir. It lies c. 10 kms west of Srinagar on Srinagar–Baramullah highway. The lake is more or less semicircular in outline, extending in an east–west direction with an area of about 13.75 km². It is fed by the Doodhganga, a perennial stream that originates from Doodhganga watershed in Pir Panjal range of Himalayas and Sukhang, a stream on its west. Hokarsar drains into River Jhelum on the north-west through a small stream near Sozayet. The wetland provides an excellent habitat to a variety of resident and non-resident birds and is renowned for its wintering waterfowl (Islam & Rahmani 2004).

Methodology

Mallards nest in tall, dense macrophytic vegetation, willow *Salix*

spp. bushes and hollows of old willows. During the breeding season, such vegetation was thoroughly searched to detect nests. We flushed ducks by gently disturbing the macrophytic vegetation and willow bushes (Klett *et al.* 1988). Care was taken to avoid excessive disturbance, which might have attracted predators. Care was also taken to avoid stepping upon the well-concealed nests. Slender willow stakes flagged with strips of cloth were planted at a distance of at least 4 m from each nest to mark its position for easy location (Klett *et al.* 1988). During egg laying season, each nest was visited daily to determine egg laying intervals. Each newly laid egg was measured with Vernier calipers and weighed to nearest gram.

Results

We located 41 nests during our study and made the following observations.

Egg laying

The Mallard was found to be an early breeder. Egg laying started in early March and was complete by early June.

In 2004, 19 nests were studied, and initiation dates (date on which first egg was laid) determined for 12. Egg laying started in early March, with the first egg being laid on 4th March 2004.

In 2005, 22 nests were studied and initiation dates were determined for 19. The latter half of February saw heavy snowfall in the valley, resulted in a considerable drop in

Month	Year	No. of nests initiated	Total
March	2004	04	07
	2005	03	
April	2004	03	11
	2005	08	
May	2004	04	11
	2005	07	
June	2004	01	02
	2005	01	
Total	2004	12	31
	2005	19	

Month	Year	No. of eggs laid	Total
March	2004	24	48
	2005	24	
April	2004	41	116
	2005	75	
May	2004	34	81
	2005	47	
June	2004	04	11
	2005	07	
Total	2004	103	256
	2005	153	

Egg parameter	Minimum value	Maximum value	Mean value	Number measured (n)
Weight (Un-incubated) (gm)	41.0	55.5	50.21 (± 2.74)	40
Length (mm)	52.0	60.0	56.42 (± 2.34)	40
Breadth (mm)	37.4	42.2	40.55 (± 1.19)	40

temperature, which delayed the laying till late March. In the earliest nest found during the season egg laying was initiated on 20th March.

The month-wise data on nest initiation are shown in the Table 1.

Egg laying dates were determined for a total of 256 eggs (103 in 2004 and 153 in 2005). The month wise data on egg laying for these 256 eggs are shown in the Table 2.

It is evident from the table that April was the peak egg-laying month. Egg laying was completed in early June.

One egg was laid every morning between 0500 and 1100 hrs, till the completion of a full clutch. The duck spent 17–63 min on the nest at the time of egg laying.

Egg parameters

Eggs were elliptical ovate in shape with one end relatively broad and the other more or less pointed. Their colour varied from creamy to greyish or greenish buff without any markings. The sizes and weights of the eggs are given in Table 3.

Clutch size

Of the 41 nests studied, 37 contained full clutches. Clutch sizes varied from four to 13, with an average of 8.27 (± 2.23 ; $n=37$). The smallest clutch, comprising four eggs, was found in two nests while one nest held a clutch of 13 eggs. A clutch of nine eggs was most common, present in eight nests (Table 4).

Laying dates were determined for 30 full clutches. The average clutch size varied at various periods of the laying season. Early clutches were larger than those deposited late in the season (Table 5).

Discussion

During our study Mallards began laying eggs in the first half of March in 2004 and in the second half of March in 2005—the

Laying period	Average clutch size (SD)	No. of nests
4th March–20th April	9.19 (± 1.64)	16
20th April–22nd May	6.83 (± 1.99)	12
22nd May–10th June	5.5 (± 2.12)	2

delay in the second season presumably caused by a fall in temperature. Hill (1984) also found (in the UK) that Mallards nested earlier in years with high mean February temperatures. Egg laying lasted from early March to early June with April being the peak laying month. Bates & Lowther (1952) presumed late April, May and possibly early June as the laying months in Kashmir while Ali (2002) reported May–June to be the laying months in Kashmir.

The duck laid one egg daily, between 0500 and 1100 hrs, until the completion of a clutch. These observations are in confirmation with Drilling *et al.* (2002).

Several studies (Kluijver 1951; Willson 1966; Crawford 1980) have correlated variations in clutch size with several environmental and physiological factors. During the present study an average clutch size was 8.27 (± 2.23). We found that early clutches, laid at the beginning of a nesting season, were larger; as the season progressed, smaller clutches were found in nests. Hill (1984) also found that late breeding Mallards and Tufted Ducks *Aythya fuligula* laid smaller clutches than those breeding early in a season. Gec (1983) reported Mallards laying four–ten eggs with a maximum of 13 and a mean clutch size of 7.34 (± 2.48).

A clutch of more than 13 eggs is assumed the result of egg dumping (Pehrsson 1991). However in the present study no nest was found to contain more than 13 eggs. Clutch size is influenced by nest initiation date, quality of available diet and the duck's condition (Batt & Prince 1979; Eldridge & Krapu 1988).

Diet too has an impact on clutch size. In captive wild type sibling pairs, siblings fed enriched diet had higher clutch size, larger eggs, faster laying rate and more nesting attempts (Eldridge & Krapu 1988).

Egg size is an important parameter. Chicks from large eggs usually survive better than those from small eggs (Parson 1975; Batt & Prince 1979; Krapu 1979). The average egg size during the present study was 56.42 x 40.55 mm (± 2.34 x ± 1.19). Bent (1923) reported egg dimensions from North America as 57.8 x 41.6 mm. Egg size is strongly influenced by habitat condition, food quality, condition of duck, and population density (Eldridge & Krapu 1988; Pehrsson 1991).

The average weight of an egg, during the present study, was 50.21 gm (± 2.74). The weights reported by various workers are more or less the same—52.2 gm (± 0.5) (Hill 1984), 52.2 (± 4.2) (Rhymer 1988), 52.2 gm, with a range of 32.2–66.7 gm (Eldridge & Krapu 1988), 52.5 gm (Pehrsson 1991) and, 49.3 gm (± 3.5) (Lokemoen *et al.* 1990). Birkhead (1985) and Rhymer (1988) observed that variation in egg weight is higher among clutches than within clutches.

Number of Nests	Year	Clutch size										Average clutch	Total no. of nests
		4	5	6	7	8	9	10	11	12	13		
Total	2004	1	2	1	-	2	4	2	3	-	1	8.625 (± 2.23)	16
	2005	1	1	2	5	4	4	1	2	1	-	8.00 (± 2.0)	21
		2	3	3	5	6	8	3	5	1	1	8.27 (± 2.23)	37

References

- Ali, S. 2002. *The book of Indian birds*. 13th (Revised) ed. Daniel, J. C. (ed.) Mumbai: Bombay Natural History Society & Oxford University Press.
- Bates, R. S. P. & Lowther, E. H. N. 1952. *Breeding birds of Kashmir*. London: Oxford University Press.
- Batt, B. D. J. & Prince, H. H. 1979. Laying dates, clutch size and egg weights of captive mallards. *Condor* 81: 35-41.
- Bent, A. C. 1926. Life history of North American marsh birds. *Bull. U. S. Nat. Mus.* (121) pp. 343.
- Birkhead, M. 1985. Variation in egg quality and composition in the Mallard *Anas platyrhynchos*. *Ibis* 127: 467-475.
- Crawford R. D. 1980. Effects of age on reproduction in American coots. *Journal of Wildlife Management* 44: 183-189.
- Drilling, N., Titman, R. & McKinney, F. 2002. Mallard (*Anas platyrhynchos*). In: *The birds of North America*, No. 658. (Eds. Poole, A. & Gill, F.). Philadelphia, P.A.: The birds of North America, Inc.
- Eldridge, J. L. & Krapu, G. L. 1988. The influence of diet quality on the clutch size and laying pattern in Mallards. *Auk*. 105: 102-110.
- Gec, D. 1983. Results of a study of the nesting of Mallard (*Anas platyrhynchos* L.) on the territory of Kopa?evski Rit (Marsh) in Baranja. *Larus* 33-35 (1981-1983), 55-68.
- Hill, D. A. 1984. Laying date, clutch size and egg size of the Mallard *Anas Platyrhynchos* and Tufted Duck *Aythya fuligula*. *Ibis* 126 (4): 484-495.
- Islam, Z.-u. & Rahmani, A. R. 2004. *Important Bird Areas in India. Priority sites for conservation*. Mumbai: Indian Bird Conservation Network:



Fig. 1. Mallard nest with eggs



Fig. 2. Mallard duck on its nest

- Bombay Natural History Society and BirdLife International (UK).
- Klett, A., Terry, T., Shaffer, L. & Douglas, H. J. 1988. Duck nest success in the Prairie Pathole region. *Journal of Wildlife Management* 52 (3): 431-440.
- Kluijver, H. N. 1951. The population ecology of the Great Tit. *Parus Major L. Ardea* 39: 1-135.
- Krapu, G. L. 1979. Nutrition of female dabbling ducks during reproduction. In: Bookhout, T. A. (Ed): *Waterfowl and wetlands— an integrated review*. Proc. 1977. Symp. The Wildlife Society Madison.
- Lokemoen, J. T., Johnson, D. H. & Sharp, D. E. 1990. Weight of wild Mallard *Anas platyrhynchos*, Gadwall *A. strepera* and Blue-winged Teal *A. discors* during the breeding season. *Wildfowl* 41: 122-130.
- Parsons, J. 1975. Asynchronous hatching and chick mortality in Herring Gull *Larus argentatus*. *Ibis* 117 (4): 517-520.
- Pehrsson, O. 1991. Egg and clutch size in Mallard as related to food quality. *Canadian J. Zool.* 69: 156-162.
- Rhymer, J. M. 1988. The effect of egg size variability on thermoregulation of Mallard (*Anas Platyrhynchos*) offspring and its implications for survival. *Oecologia* 75: 20-24.
- Shah, G. M. 1984. *Birds of Hokarsar: food, feeding and breeding biology of resident and non-resident birds*. PhD thesis: University of Kashmir.
- Willson, M. F. 1966. Breeding ecology of the Yellow-headed Blackbird. *Ecological Monographs* 36 (1): 51-77.

In memoriam

Dr Ravi Sankaran

1963 – 2009

Director, Salim Ali Center for Ornithology and Natural History
(SACON)

— Short notes —

A record of the Brown Skua *Catharacta antarctica* from Thiruvananthapuram coast, Kerala

Suresh Elamon & E. Kunhikrishnan

Elamon, S. & Kunhikrishnan, E. 2009. A record of the Brown Skua *Catharacta antarctica* from Thiruvananthapuram coast, Kerala. *Indian Birds* 4 (3): 109 (2008).

Suresh Elamon, Birdwing, CIT Road, Karamana P.O., Thiruvananthapuram 695002, Kerala, India. Email: yeselamon@gmail.com
E. Kunhikrishnan, Lecturer, Department of Zoology, University College, Thiruvananthapuram, Kerala, India. Email: ekunhi@gmail.com
Mss received on 16th September 2007.

Brown Skua *Catharacta antarctica* is a rarely reported pelagic bird from India's coasts. There have been only two previous recoveries of this species from the western coast of India, namely, a single specimen recovered from Thiruvananthapuram in 1933 and another recovered off the Ratnagiri coast in 1957 (Ali & Ripley 1984). C. Sashikumar and Dinesan Cheruvat are reported to have seen one adult one kilometre off the coast of Kannur, Kerala (Sashikumar *verbally*).

Television film producer Purushothaman saw a weak individual of a skua species on the morning of 2nd July 2007, at Shangumugam beach, Thiruvananthapuram (8°28'N 76°54'E). He thought it was an unusual bird and immediately informed Leela Latheef of People For Animals, Thiruvananthapuram. She sent the PFA ambulance and collected the bird. Though no measurements were taken, the bird was photographed on 3rd July 2007 by one of the authors (SE) and later on 6th July 2007 by EK. The bird survived well and the following quote from Mrs Leela Latheef on this individual.

'The most remarkable thing about the bird was that it had no fear either of humans or dogs. I did not want to confine the bird inside a cage and seeing that the bird was quite fearless, I let it loose in the compound along with almost a dozen dogs ranging [in size] from Pomeranians to Great Danes. It was perfectly at home with the dogs. It used to drink water from a basin and feed on raw fish. At times it used to stretch and exercise its wings but not even once did it attempt to take off. On 11th morning it got a little disturbed by one of the dogs and suddenly flapped her wings and jumped on to the compound wall. From there it jumped down to a narrow lane behind my house. My keeper, seeing all this, got out and ran towards it to get hold of it [and] then it suddenly started running with wings flapping and just took off towards the east.'

The species was tentatively identified as a Brown Skua.

Considering the complexity of skua identification, its photographs were circulated and we received expert help through OrientalBirding. Chris Kehoe and Dr Robert Furness opined that the bird looked like a Brown Skua. Dr Stephen Votier, researching skua taxonomy at Plymouth University, UK, remarked thus, after considering South Polar Skua *Stercorarius maccormicki* and Great Skua *S. skua*:

'The bill is too massive for a South Polar Skua, with a very well pronounced gonydeal angle. In addition the primary projection looks wrong for South Polar Skua—only 4 primary tips beyond the tertials and 2 primary tips beyond the tail (5 tips beyond the tertials and 3 beyond the tail in most South Polar Skua) [if this feature holds up to scrutiny]. Also I think the extensive streaking looks all wrong for South Polar Skua. The other possibility is a Great, but I think the bill is too massive for that too.'

This is the third reported recovery of Brown Skua from the western coast of India. Perhaps the bird is not uncommon in deep sea and reaches the coasts only during strong monsoon winds.

Acknowledgements

We would like to thank Chris Kehoe of the British Ornithologists' Union Records Committee (BOURC), Dr Robert Furness, University of Glasgow, UK, and Praveen J. of KeralaBirder for taking earnest efforts to reach the best hands to identify the skua from its photographs.

References

- Ali, S. & Ripley, S. D. 1987. *Compact handbook of the birds of India and Pakistan together with those of Bangladesh, Nepal, Bhutan and Sri Lanka*. 2nd ed. Delhi: Oxford University Press.
Sashikumar, C., Praveen J., Palot, M. Jafer & Nameer, P. O. (in prep). *Birds of Kerala—a recent update on status and distribution*.



Some behavioural observations of wintering Lesser *Charadrius mongolus* and Greater *C. leschenaultii* Sand Plovers in Goa, India

Rainer Mönke & Klaus-Jürgen Seelig

Mönke, R. & Seelig, K.-J. 2009. Some behavioural observations of wintering Lesser *Charadrius mongolus* and Greater *C. leschenaultii* Sand Plovers in Goa, India. *Indian Birds* 4 (3): 110–111 (2008).

Rainer Mönke, Ansgarweg 21, D-23879 Mölln, Germany. E-mail: Rmoenke@arcor.de

Klaus-Jürgen Seelig, Ringfurter Weg 1, D-39128 Magdeburg, Germany.

Mss received on 30th March 2008.

We visited Goa (India) from 1st to 15th November 2006 on an ornithological excursion and stayed at a small hotel, “Horizon Beach Resort”, on Velsao beach, South Goa. From here we made many birding trips to different protected areas of Goa.

Velsao beach is well known for its regular and large aggregations of Brown-headed Gulls *Larus brunnicephalus* during winter. Lainer (2004) counted up to 5,000 birds and we confirmed that number nearly every day. Lesser *Charadrius mongolus* and Greater *C. leschenaultii* Sand Plovers are also common in that area. According to Lainer (2004) flocks of 500 are not rare but the ratio of the two species, within flocks, can vary considerable. The race, *C. m. atrifrons* is presumed to be the commonest over wintering plover on the coast of India and Sri Lanka (Henry 1955, 1998; Ali & Ripley 1980; Cramp & Simmons 1983; Ali 1996; del Hoyo *et al.* 1996; Glutz von Blotzheim *et al.* 1999).

Almost daily we counted 400–600 of these plovers between Velsao and Cansaulim beaches, most of them being Lesser Sand Plovers. But sometimes it is difficult to assign these birds to a species, especially when they are in their winter or first year plumage (Makatsch 1981; Hayman *et al.* 1986; Nadler & Königstedt 1986; Colston & Burton 1988; Glutz von Blotzheim *et al.* 1999).

We observed that both species spent the night on the sandy beach, above the high-tide line, looking like scattered pebbles at twilight (see also Ali & Ripley 1980). During the day too they mostly rested there. While relaxed, the plovers sat or stood on a beach that had no shade, some in little sand cavities, behind washed- or blown-up plastic waste, shells of coconuts and also on stretches of sand covered with beach morning glory *Ipomoea pes-caprae*. Often the plovers rested together with hundreds of Small Pratincoles *Glareola lactea*. Generally they tolerated an



Fig. 1. Birds among beach morning glory.

Rainer Mönke

approach up to 6–8 m without any reaction. In the inner Asiatic highlands, during their breeding season, Lesser Sand Plovers have a flushing distance of 50–150 m and are considered amongst the shyest of plovers (Schäfer 1938; Gebauer & Nadler 1992).

When flushed by roaming dogs, human beings or low-flying helicopters, the flocks flew low and fast, across beach and sea, invariably returning quickly to the same resting places. In flight they called intensively, “Prrritt, prrritt, trruitt” or “Drrrüüitt, drüüitt”. Gebauer & Nadler (1992), who studied the breeding behaviour of Lesser Sand Plovers in the Chinese province of Quinghai, described these calls as “*Erregungsruf*” – uttered by the birds during contact with either conspecifics or enemies. Regarding wintering Lesser Sand Plovers in Sri Lanka, Henry (1955, 1998) wrote, “As they fly, a flock keeps up a continuous musical piping”.

Surprisingly, though numerous raptors like Black *Milvus migrans* and Brahminy *Haliastur indus* Kites, flew over the beach and sea, the plovers did not seem threatened by them nor show any escape reaction.

During low tide, large areas of tidal mud flats emerged and the Lesser and Greater Sand Plovers foraged there together with Dunlins *Calidris alpina*, Sanderlings *C. alba*, Great Knots *C. tenuirostris*, Greenshanks *Tringa nebularia* and some Whimbrels *Numenius phaeopus*.

In the late forenoon of 8th November we observed, for the first time, as the water decreased, at the beginning of low tide, some Lesser Sand Plovers running briskly to the just-wet areas and lying down there with outstretched wings and legs. They stayed in that position for a few seconds, even up to one minute. No sooner was the wet mudflat dried by the hot sun, they stood up and ran to another wet area and repeated the process. While lying prone on the wet mudflat they appeared cautious and shy and we could not approach closer than about 30–50 m. For some time we were astonished by this behaviour but soon realised and were quite convinced that this peculiar behaviour served the purpose of thermoregulation. The prone bird's body was cooled by the evaporation of water from the wet mud flat. The Lesser Sand Plovers gave out their excessive heat by pressing their bodies to the wet ground. Another cooling down method was the use of aerial convection currents for evaporation brought about by, running or flying with wet feathers. We measured (with a 0.2°C scale thermometer) the air temperature on a shaded part of the beach, at a height of 1 m above the ground, as 32°C–34°C; the bare sand surface of the beach was up to 60°C; the seawater was 28°C and the just-wet mudflat was about 33°C. For Greater Sand Plovers we cannot confirm such activities with certainty.

The use of water for foot-wetting and belly-soaking in the Charadriiformes is often mentioned in literature (Thompkins

1942; Gatter 1971; Wassenich 1974; Maclean 1975; Beck & Maclean 1976; Ginn 1977; Steinbach 1977; Schardien & Jackson 1979; Nisbeth 1983; Collias & Collias 1984; Goutner 1984; Grant 1987; Mathiasson 1988) but we could not any instance of the behaviour of Lesser Sand Plovers that we observed at Velsao beach.

References

- Ali, S. 1996. *The book of Indian birds*. 12th Revised and enlarged, Reprint ed. Daniel, J. C. (ed.) Mumbai: Bombay Natural History Society & Oxford University Press.
- Ali, S. & Ripley, S. D. 1980. *Handbook of the birds of India and Pakistan together with those of Bangladesh, Nepal, Bhutan and Sri Lanka. Megapodes to Crab Plovers*. Vol 2. 2nd (Hardback) ed. Delhi: (Sponsored by Bombay Natural History Society.) Oxford University Press.
- Beck, G. W. & Maclean, G. L. 1976. Belly-soaking in the White-crowned Plover. *Ostrich* 47: 65.
- Collias, N. E. & Collias, E. C. 1984. *Nest building and bird behavior*. Princeton University Press, Princeton, N. J.
- Colston, P. & Burton, P. 1988. *A field guide to the waders of Britain and Europe with North Africa and Middle East*. Sydney, London, Auckland, Toronto: Hodder & Stoughton.
- Cramp, S. & Simmons, K. E. L. 1983. *Handbook of the birds of Europe the Middle East and North Africa*. Vol. 3. Oxford, London, New York: Oxford University Press.
- del Hoyo, J., Elliott, A. & Sargatal, J. (eds.). 1996. *Handbook of the birds of the world. Volume 3. Hoatzin to Auks*. Barcelona: Lynx Edicions.
- Gatter, W. 1971. Wassertransport beim Flussregenpfeifer (*Charadrius dubius*). *Vogelwelt* 92: 100-103.
- Gebauer, A. & Nadler, T. 1992. Verhalten und Stimme des Mongolenregenpfeifers *Charadrius mongolus*. *Limicola* 6: 105-125.
- Ginn, P. J. 1977. Sandgrouse drinking behaviour in Botswana. *Honeyguide* 90: 23-27.
- Glutz von Blotzheim, U. N., Bauer, K. M. & Bezzel, E. 1999. *Handbuch der Vögel Mitteleuropas*. Bd. 6., 3. durchges. Aufl. - Aula-Verlag, Wiesbaden/Wiebelsheim.
- Grant, G. S. 1978. Foot-wetting and belly-soaking by incubating Gull-billed Terns and Black Skimmers. *J. Bombay Nat. Hist. Soc.* 75 (1): 148-152.
- Goutner, V. 1984. Belly-soaking in the Avocet. *Ostrich* 55: 167-168.
- Hayman, P., Marchant, J. & Prater, T. 1986. *Shorebirds. An identification guide to the waders of the world*. London; Sydney: Croom Helm Ltd; Croom Helm Australia Pty. Ltd.
- Henry, G. M. 1955. *A guide to the birds of Ceylon*. 1st ed. London: Geoffrey Cumberlege, Oxford University Press.
- Henry, G. M. 1998. *A guide to the birds of Ceylon*. 3rd revised and enlarged ed. Hoffman, T. W., Warakagoda, D. & Ekanayake, U. (eds.). Delhi: Oxford University Press.
- Lainer, H. 2004. *Birds of Goa. A reference book*. 1st ed. Mapusa, Goa: The Goa Foundation.
- Maclean, G. L. (1975). Belly-soaking in the Charadriiformes. *J. Bombay Nat. Hist. Soc.* 72: 74-82.
- Makatsch, W. 1981. *Die Limikolen Europas*. Berlin: VEB Deutscher Landwirtschaftsverlag.
- Mathiasson, S. 1988. Food and water intake in relation to deep body temperature and habitat preference of doves living in deserts and subdeserts of northern Sudan. *Vogelk. Tageb. Schleswig-Holst.* 16: 179-193.
- Mönke, R. & K.-J. Seelig 2008. Einige Beobachtungen zum Verhalten von Mongolen- *Charadrius mongolus* und Wüstenregenpfeifern *Charadrius leschenaultii* im indischen Winterquartier. *Ornithol. Mitt.* 60: 51-57.
- Nadler, T. & D. Königstedt. 1986. Zur Unterscheidung von Mongolenregenpfeifer (*Charadrius mongolus*) und Wüstenregenpfeifer (*Charadrius leschenaultii*) und zu ihrem Vorkommen in der Mongolei (MVR) (*Aves, Charadriiformes, Charadriidae*). - *Zool. Abh. Staatl. Mus. Tierkd. Dresd.* 42: 79-106.
- Nisbet, I. C. T. 1983. Belly-soaking by incubating and brooding Common Terns. *J. Field Ornithol.* 54: 190-192.
- Schardien, B. J. & J. A. Jackson 1979. Belly-soaking as a Thermoregulatory Mechanism in Nesting Killdeers. *Auk* 96: 604-606.
- Schäfer, E. 1938. Ornithologische Ergebnisse zweier Forschungsreisen nach Tibet. *J. Ornithol.* 86, Sonderheft: 1-349.
- Steinbach, R. 1977. Noch einmal zum Thema “Belly-soaking” bei den Charadriiformes. *Abh. Ber. Naturk. Mus. Mauritianum Altenburg* 9: 309-311.
- Thompkins, R. L. 1942. Least Tern watering eggs: Gideon Mabbett's query. *Auk* 59: 308.
- Wassenich, V. 1974. Wassertransport beim Flußregenpfeifer. *Regulus* 11: 131-142.



Fig. 2. Lesser Sand Plover.

First record of Masked Booby *Sula dactylatra* from Kachchh, India

Sandeep Munjpara, Arjun Potter, Parimal Solanki & Jyoti Tak

Munjpara, S., Potter, A., Solanki, P. & Tak, J. 2009. First record of Masked Booby *Sula dactylatra* from Kachchh, India. *Indian Birds* 4 (3): 112 (2008).

Sandeep Munjpara, Arjun Potter, Parimal Solanki, Jyoti Tak: GEER Foundation, Gandhinagar, Gujarat, India.
Email: sandeepmunjpara@gmail.com

Mss received on 24th June 2008.

The pelagic Masked Booby *Sula dactylatra* has widespread distribution throughout the tropical and sub-tropical oceans. It is 80 cm in length, making it the largest of the boobies. The adult bird is white with light brown patches and a black mask. The flight and tail feathers are also black. It breeds throughout its range on islands in the Atlantic, Indian, and Pacific Oceans. It has four sub-species of which *S. d. melanops* breeds on Socotra, Mait, and other islands off the Somali coast. It probably breeds in the Arabian Sea on the Kuria Muria Islands as well. On the Indian Subcontinent, Masked Booby has been recorded as a pelagic passage migrant off Sind and Makran along the coast of Pakistan, at Ormara Head, Sri Lanka, and Cannanore, India (Ali & Ripley 1987). However, it is quite uncommon on the Indian coastline. Monsoon gales occasionally blow birds to the western coast of India. This species has been recorded near Bombay and Nasik (Ali & Ripley 1987), Lakshadweep and west coastal area of south India, as well as the Maldives (Grimmett *et al.* 2000).

The species was recently recorded in Gujarat coast near Mithapur in Jamnagar district (Trivedi 2003). It has also been recorded in some parts of south Gujarat (Grimmett *et al.* 2000). However, there has been no record of this species on the coast of Kachchh.

Our team from GEER Foundation found a dead Masked Booby on Pingleshwar beach (23°01'N 68°53'E), in Abdasa taluka of Kachchh district (Gujarat, India) on 13th July 2007. This area lies on the northern coast of the Gulf of Kachchh. This is the first record of the species for Kachchh, and the northernmost record from India.

Unfortunately the bird was found dead, washed up at the high tide line of the beach. The body and feathers of the bird were intact, hence it was easy to identify. The bird was found without any external injury. The carcass was quite fresh, in the pre-rigor mortis stage. Its skin was visible. Though the cause of death is not known, it is likely that it drowned at sea. It is interesting to note that all other records of boobies from the Gujarat coast have been either of dead birds or those that died soon after being spotted (Dave *et al.* 2003).

References

- Ali, S. & Ripley, S. D. 1987. *Compact handbook of the birds of India and Pakistan together with those of Bangladesh, Nepal, Bhutan and Sri Lanka*. 2nd ed. Delhi: Oxford University Press.
- Grimmett, R., Inskipp, C. & Inskipp, T. 1998. *Birds of the Indian Subcontinent*. 1st ed. London: Christopher Helm, A & C Black.
- Trivedi, S. H. 2003. Sightings of Masked Booby *Sula dactylatra* at Mithapur - first record for Gujarat. *Flamingo* 1 (3&4): 3-4.
- Dave, R., Dodiya, P. & Dhadhal, J. 2003. Bluefooted Booby on Mahuva coast: A first record for the Indian subcontinent. *Flamingo* 1 (3&4): 4-5.



A vulture population survey in Ranthambore Tiger Reserve, India

Raju Lal Gurjar

Gurjar, R. L. 2009. A vulture population survey in Ranthambore Tiger Reserve, India. *Indian Birds* 4 (3): 113–114 (2008).
Raju Lal Gurjar, Wildlife Institute of India, Dehradun 248001, India. Email: gurjarraju2005@yahoo.com
Mss received on 1st May 2008

Ranthambore Tiger Reserve (26°2'N 76°45'E) covers an area of 1,334 km² (core area = 392 km²). It is in the Sawai Madhopur district of south-eastern Rajasthan (India), where the Vindhya and Aravalli Hills converge. Its terrain consists of hills with cliff faces, valleys and riverine forests. The dominant tree species is dhok *Anogeissus pendula* while khair *Acacia catechu* is found in the valleys. I present below details of vulture surveys I conducted here from 15th September 2006 to 31st January 2007 (Table 1).

I collected information, on vultures, provided by the forest department, and used a landowner questionnaire (Murn 2001) for gathering information from a wider area. I also searched for vultures by driving around the park as well as walking. The ground surveys aimed to confirm the location of breeding colonies known from previous investigations (Anderson & Maritz 1997), and to reveal any new colonies in the area. Vultures were counted at roosts in the morning and in the evening. A 40x optical zoom video camera and, a digital camera, were used for photographic records. All identifications of vultures were based on Ali & Ripley (1987) and Kazmierczak (2000).

A total of 199 vultures—171 Long-billed *Gyps indicus*, 18 Red-headed *Sarcogyps calvus*, five Egyptian *Neophron percnopterus*, and five Himalayan Griffon *G. himalayensis* were counted in Ranthambore Tiger Reserve. I found 62 nests of Long-billed Vulture (Table 1). I also found one dead Long-billed Vulture near Lahpur choki water dam on 18th October 2006. Out of the four resident vulture spp., only Long-billed Vultures were observed nesting—on the cliffs in and around this tiger reserve. The breeding and roosting sites of Long-billed Vultures, on the cliffs, were quite inaccessible to humans and wild animals from both the ground and from above.

Ranthambore Tiger Reserve has a population of 30–35 tigers *Panthera tigris* (Jhala *et al.* 2007, 2008). Tigers and other carnivores kill herbivores daily in Ranthambore, so food is available in plenty for vultures. The Delhi–Bombay railway line passes near the Balash camp of Sawai Mansingh Sanctuary, a part of the Reserve, and mortality of cattle due to collisions with passing trains is high, providing food for the Long-billed Vultures that roost and breed here. With water and food plentifully available in Ranthambore, the vulture population seems to be safe for the time being.

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References

- Ali, S. and S. D. Ripley. 1987. *Compact handbook of the Birds of India, Pakistan, together with those of Bangladesh, Nepal, Bhutan and Srilanka*. New Delhi: Oxford University Press.
Anderson, M. D. & Maritz, A. W. A. 1997. The status and distribution of vultures in the Northern Cape Province, South Africa. In: Boshoff, A. F., Anderson, M. D. & Borello, W. D. (Eds.). *Vultures*

Table 1: Vulture populations found in and around Ranthambore Tiger Reserve, India

Dates of observations	Species	Place	Population	Activity	Nest Nos.
15th September 2006	Red-headed Vulture	Jogi Mahal	2	Roosting	
20th September 2006	Long-billed Vulture	Chiroli	14	Flying	
18th October 2006	Red-headed Vulture	Lakardha	6	Feeding	
24th October 2006	Red-headed Vulture	Kukraj	3	Roosting	
30th October 2006	Long-billed Vulture	Khandar	5	Flying	
11th November 2006	Egyptian Vulture	Bodal	2	Flying	
28th December 2006	Long-billed Vulture	Khatola	10	Nesting, flying	4
2nd January 2007	Red-headed Vulture	Balash	4	Roosting	
5th January 2007	Red-headed Vulture	Anantpura	3	Feeding	
5th January 2007	Egyptian Vulture	Anantpura	3	Resting	
5th January 2007	Long-billed Vulture	Anantpura	6	Nesting, flying	3
6th January 2007	Long-billed Vulture	Balash	38	Nesting, flying	16
11th January 2007	Long-billed Vulture	Sherpur	16	Nesting, roosting, flying	5
15th January 2007	Long-billed Vulture	Soleshar	17	Nesting, flying	7
18th January 2007	Himalayan Griffon	Gudha	5	Feeding	
22nd January 2007	Long-billed Vulture	Gudha	40	Nesting, flying, feeding	18
22nd January 2007	Long-billed Vulture	Bodal	25	Nesting, flying	9
	Total		199		62

in the 21st Century: proceedings of a workshop on vulture research and conservation in southern Africa. Johannesburg: Vulture Study Group.

Jhala, Y. V., Gopal, R. & Qureshi, Q. (Eds.). 2007. *Status of the tigers and co-predators in central Indian landscape: a preliminary report*. New Delhi & Dehradun: National Tiger Conservation Authority, Govt. of India & Wildlife Institute of India.

Jhala, Y. V., Gopal, R. & Qureshi, Q. (Eds.). 2008. *Status of the tigers, co-predators, and prey in India*. New Delhi & Dehradun: National Tiger

Conservation Authority, Govt. of India & Wildlife Institute of India.

Kazmierczak, K. 2000. *A field guide to the birds of India, Sri Lanka, Pakistan, Nepal, Bhutan, Bangladesh and the Maldives*. London: Pica Press / Christopher Helm.

Murn, C. P. 2001. The breeding and foraging distribution of African White-backed Vultures *Gyps africanus* in the Kimberley area, South Africa, in relation to different land use practices. M.Sc. thesis. University of Reading, Berkshire, U. K.

A large congregation of Northern House-Martins *Delichon urbica* near Pune, India

V. Santharam

Santharam, V. 2009. A large congregation of Northern House-Martins near Pune, India. *Indian Birds* 4 (3): 114 (2008).
V. Santharam, Institute of Bird Studies Natural History, Rishi Valley 517 352, Chittoor District, Andhra Pradesh, India.
Email: santharam@gmail.com
Mss received on: 23rd May 2008.

I was at the Sahyadri School (Krishnamurti Foundation India) near Rajgurunagar, Pune (Maharashtra, India) from 12th to 16th January 2008 to conduct a birdwatching workshop for the students. This was my fourth visit to the school and I have now recorded over 135 bird species from the campus and immediate neighbourhood.

An interesting observation during this visit was the sighting of a large congregation of swallows (Hirundinidae) seen in the campus on the morning of 15th January 2008. I estimated their numbers at 3,500 and a closer study revealed two species: Redrumped Swallow *Hirundo daurica*—approximately 1,500 birds and Northern House-Martin *Delichon urbica*—approximately 2,000 birds. They were perched on telegraph wires and posts that spanned at least 250 m in three or four rows. Besides, a number of them were hawking flying insects. I watched them for over 30

minutes until they were chased by a Eurasian Sparrow-hawk *Accipiter nisus*. The next morning I again tried to locate the birds. They were flying over the reservoir below the hill and since I was leaving early that morning, I could not spend much time.

Prasad (2004) mentions that this species is a rare winter visitor to this region but may possibly be more common than supposed. The largest number on record is 100+ seen in November 1880 at Prakasha on the Tapti River, Dhule district by Davidson (1882).

References

Davidson, J. 1882. Rough list of the birds of western Khandesh. *Stray Feathers* 10 (4): 279–327.

Prasad, A. 2004. Annotated checklist of the birds of Western Maharashtra. *Buceros* 8 (2&3): i-ii, 1–174 (2003).

Breeding notes on the Rufous-bellied Babbler *Dumetia hyperythra*

Raju Vyas

Vyas, R. 2009. Breeding notes on the Rufous-bellied Babbler *Dumetia hyperythra*. *Indian Birds* 4 (3): 114–115 (2008).
Raju Vyas, 505 Krishnadeep Tower, Vadodara 390002, Gujarat, India. Email: razoovyas@hotmail.com
Mss received on 23rd March 2007.

The Rufous-bellied Babbler *Dumetia hyperythra* is represented by four subspecies on the Indian Subcontinent—*hyperythra*, *albogularis*, *abuensis* and *phillipsi*. The first three inhabit mainland India whereas the last is endemic to Sri Lanka. The nominate race and *D. h. albogularis* are found in eastern and southern India respectively. *D. h. abuensis* is found from southern Rajasthan, through Gujarat (excluding Kachchh), eastwards onto the Satpuras and southwards to the northern parts of the Western Ghats (Ali & Ripley 1983).

During the last decade I have been regularly observing a few pairs of Rufous-bellied Babblers along the Vishawamitri River at Sayaji Baug Garden, Vadodara, Gujarat from June till withdrawal of the monsoon by mid-October. They frequent undisturbed areas of the garden with low bushes on either side of the river. Every year I found a nest in a corner of the zoo office garden. I surmise it is the same pair using the same location year after year.

In the second week of June 2003, I first observed this pair in the zoo office garden. Both birds were very active and vocal.

On 16th June 2003, the pair was seen among potted plants overhung by climbers and vines. Next day both the birds were observed carrying long grass blades and other nesting materials. The nest building activity was observed between 10:00 hrs and 15:00 hrs. Within a week a globular nest was found in the corner. This nest was constructed about 85 cm above the ground. It was a little higher than nests constructed at the same location in previous years. Later, when either bird did not visit the nest site, I feared they had been disturbed and abandoned the nest. On 24th June 2003, I took a closer look at the nest thinking it had been abandoned, but to my surprise, I found it contained two eggs. On 26th June, at noon, I carefully checked the nest and found four eggs.

On the morning of 27th June, both birds were sighted around the nest till 13:00 hrs., when one entered the nest while the other flew away. When one of the pair came near the nest it gave a distinctive call that was immediately answered by the incubating bird, which would come out to be replaced by its mate. Both birds participated in incubation. Once incubation had started, the nest was never left unattended.

On the evening of 9th July, I hear the call of chicks and see the parents changing duties. The same evening I inspected the nest when both parents were away and found three pink-coloured nestlings and one un-hatched egg. Both parents fed the chicks during the day, with one of them settling in to brood

them at night. On 12th July only two nestlings and an egg were noted in the nest (loss of one chick from the nest is a mystery because if it had been predated, then the nest would have been damaged and its contents devoured). On 18th July 2003, the two chicks left the nest. For the next ten days both chicks grew fast and almost looked like the parents except for a darker body colour and their yellow gape.

On 20th July 2003, I took down the nest for inspection. The un-hatched egg was pale grey with reddish brown spots and blotches. It measured 15.60 x 12.92 mm and weighed 1.5 gm. It was infertile.

The globular nest measured 16 x 15 cm with a 4 cm entrance hole. The material used was 20–25 cm long grass, and palm leaf blades, with its outer layers comprising bamboo leaves. The innermost lining was of finer grass and palm leaf strips intermingled with very fine fibres and similar soft material.

Ali & Ripley (1983) have very little on the nesting biology of this species. The Vadodara egg is smaller than their published average of 17.4 x 14.1 cm. The incubation period lasted twelve days.

References

- Ali, S. & Ripley, S. D. 1983. *Handbook of the birds of India and Pakistan together with those of Bangladesh, Nepal, Bhutan and Sri Lanka*. Compact ed. Delhi: Oxford University Press.

Jungle Myna *Acridotheres fuscus* usurping the nest hole of Grey-headed Starling *Sturnus malabaricus*

Naba Krishna Nath

Nath, N. K. 2009. Jungle Myna *Acridotheres fuscus* usurping the nest hole of Grey-headed Starling *Sturnus malabaricus*. *Indian Birds* 4 (3): 115 (2008).

Naba Krishna Nath, Aaranyak, "Ever Green", Samanwoy Path, Survey, Guwahati-28, Assam, India. Email: naba@aaranyak.org
Mss received on 6th July 2007.

Grey-headed Starling *Sturnus malabaricus* and Jungle Myna *Acridotheres fuscus* are both common and familiar birds in India. Their breeding seasons coincide in April–July (Ali & Ripley 1987).

While observing a breeding pair of Grey-headed Starlings in the Bansbari range office campus in Manas National Park (Assam, India), I witnessed an instance of usurpation of its nest by a pair of Jungle Mynas. Here is the sequence of events.

8th April 2007: I discover a nest hole occupied by a pair of Grey-headed Starlings at a height c. 7 m from the ground, in a dead Persian lilac tree *Melia azedarach*. Both birds of the pair were observed bringing nest material to the hole.

18th April 2007: In the morning, a commotion attracted my attention towards the nesting tree. I saw a pair of Jungle Mynas fighting with the Grey-headed Starlings.

22 April 2007: In the morning, a pair (the same?) of Jungle Mynas reappeared near the nest hole and engaged the Grey-headed Starlings in a fight—finally evicting the latter and forcibly occupying their nest. In the afternoon, the usurpers were seen throwing the nesting material collected by Grey-

headed Starlings, out of the nest hole—even as the hapless erstwhile owners watched helplessly from the top canopy of the same tree!

24th April 2007: The Jungle Myna pair was seen carrying nesting material in to the nest hole.

10th May 2007: Brooding feathers were noticed on one of the Jungle Mynas—incubation might have begun.

9th June 2007: Calls of chicks were heard when parents approached the nest hole with food—indicating successful fledging.

Though the usurpation of a nest hole is a common phenomenon among hole-nesting birds, competition for nest sites being higher than that for non-hole-nesters, this episode was interesting as its perpetrators were different species of the same family—Sturnidae.

Reference

- Ali, S. & Ripley, S. D. 1987. *Compact handbook of the birds of India and Pakistan together with those of Bangladesh, Nepal, Bhutan and Sri Lanka*. 2nd ed. Delhi: Oxford University Press.

Olive-backed Sunbird *Cinnyris jugularis* nesting from electric wires in Great Nicobar Island

Satish Pande & Niranjana Sant

Pande, S. & Sant, N. 2009. Olive-backed Sunbird *Cinnyris jugularis* nesting from electric wires in Great Nicobar Island. *Indian Birds* 4 (3): 116–117 (2008).

Satish Pande And Niranjana Sant: ELA Foundation, C-9, Bhosale Park, SahakarNagar-2, Pune 411009, Maharashtra, India. Email: pande.satish@gmail.com

Mss received on 23rd January 2008.

Introduction

Three races of Olive-backed Sunbird *Cinnyris jugularis* occur in India. *C. j. andamanica* is restricted to the Andaman Islands, *C. j. proselia* is a resident of Car Nicobar Island and *C. j. klossi* occurs on Great Nicobar and Little Nicobar Islands and the Nancowry archipelago (Ali & Ripley 1974; Chandra & Kumar 1994; Chandra & Rajan 2004; Rasmussen & Anderton 2005; Rao & Sastry 2007). During our January 2007 avifaunal survey of the Andaman and Nicobar Islands, we recorded all these three races of the Olive-backed Sunbird (Pande *et al.* 2007). Here we present an unusual nesting behaviour of *C. j. klossi* from Great Nicobar Island.

The Olive-backed Sunbird is known to occur in forest, scrub and, coastal mangroves (Baker 1923; Ali & Ripley 1974). Its breeding season is January–February and May–July. Its nest is an oval, pear-shaped purse with a lateral entrance hole and an overhanging porch made of grass, leaves, moss, bark, lichen, fibres, cocoons, cobwebs, etc., and internally lined with soft grass and down. It is usually suspended over water, from a twig or branch, in mangroves (Ali & Ripley 1974). Its clutch comprises two eggs that range in colour from pale greyish-white to pale-brown.

Observations

During our survey we counted 100 individuals of *C. j. klossi*, of which about 40 were recorded at Camorta in the Nancowry archipelago and about 60 were recorded on Great Nicobar Island (Pande *et al.* 2007). We did not find any nests of *klossi* in Camorta. At Great Nicobar we spotted 23 nests of *klossi* in various habitats, particularly in forest, open land, gardens and near human dwellings, in hilly as well as in plains country, during a roadside survey from Campbell Bay along the East-West highway, over a distance of about 24 km in a non-intersecting line transect. All the nests were typically as described above, but with some extra rubbish attached to the neat pouch on the lower side. All nests were also active and were either occupied by a sunbird, or a sunbird was seen adjacent to the nest or was seen feeding the chicks.

We recorded two types of locations from where nests were suspended. In the first type, 20 nests were suspended from live overhead electric wires, being located between the two poles at a height of about 5 m from the ground. The nearest distance of a nest from a pole was about 6 m, while most of the nests were suspended equidistant from the adjacent poles. In the second type, three nests were seen suspended from the metallic guy-wires used to steady electric poles and tied to the pole at an angle of about 30–40 degrees. The lowest nest was 1 m from the ground while the highest was 2.5 m from the ground. The lowest nest was within 1 m of a footpath used by villagers. Two chicks were present in each nest (n=3). Brief observations

revealed that both male and female *klossi* fed the chicks in the nest but the female did so more frequently than her mate (3:1). Spiders, insects and small butterflies were amongst food items brought for the young.

We witnessed a fight between two male *klossi* wherein both birds fell to the ground while energetically pecking at one another. Though the victorious sunbird flew to an adjacent branch, the ‘vanquished’ male lay on the ground on its back, seemingly unable to fly. Dharmakumarsinhji [1955] reports such pugnacious behaviour amongst sunbirds. We promptly rescued the latter male, releasing it subsequently after confirming that there was no injury.

Discussion

Suspending nests from metal wires, whether live or not cannot be considered an exception since 23 such nests of *klossi* sunbirds were recorded during a brief survey. The use of live electric wires and guy wires as anchors for suspended nests, in open habitats, has not been reported previously for sunbirds. Sunbirds of various species appear to be adaptive in nest site selection, as evident by various nest sites like twigs, branches, thorny shrubs, overhangs, doors frames, trellis work in verandas, dangling wires and bulb sockets in houses, hedges near footpaths and sidewalks, gardens and various other places near human habitation (Ali & Ripley 1974; Pande 1999; Pande *et al.* 2003). However, Baya Weavers *Ploceus philippinus* are known to suspend their nests from overhead electric wires in open habitats—a possible adaptation to a reduction in their traditional nest sites due to habitat destruction.

Though *klossi* has been recorded in Great Nicobar as a common bird by previous observers, there is no mention of nesting on overhead wires (Chandra & Kumar 1994). It is likely that during our survey we noticed nests of *klossi* suspended from wires because of their conspicuous location, so uncharacteristic among sunbirds. It is also likely that the usual nest sites, like branches and twigs near human habitations, were also being used simultaneously by these sunbirds in Great Nicobar, but we failed to spot them. Enquiry with local people revealed that the trend of nesting on wires was recent, apparently having developed in the past two-odd years. On the other hand, some local people were not even aware of the nests, thereby strengthening the possibility that the nest site was recent. All the nests that were suspended from wires were at least a few kilometres away from the seacoast. The known nesting site of *klossi* is in mangroves, suspended over water (Ali & Ripley 1974). The trend of *klossi* using wires as anchors for their suspended nests is likely to be new, as it was not reported earlier, although electricity has been available on Great Nicobar from June 1967 and was operational from July 1970 when the work of overhead wires

was completed (Kailash Chandra, *verbally*). It is hypothesized that the tsunami that struck the Great Nicobar coastline in late December 2004 devastated the coastal habitat, including the mangroves, the traditional nesting grounds of *klossi* sunbirds. This may have prompted the sunbirds to look for alternate nest sites and the use of wires is their immediate response to a situation. However, only further study can confirm whether this nesting strategy holds in the future or whether the birds revert to using coastal mangroves to locate their nests. The conspicuousness of the nests on open wires appears to be a disadvantage as they can attract the attention of predators. Interestingly one of the commonest predators of small birds' nests, crows, are absent from Great Nicobar Island (Pande *et al.* 2007). The only predatory threat to nesting sunbirds on this island is the presence of large troops of marauding crab-eating macaques *Macaca fascicularis* that, report villagers, predate on nestlings, crabs, snails, insects, fruits, *etc.* These macaques do not venture to on open and live electric wires—therefore a potentially safe place for sunbirds to locate their nests. It shall be interesting to observe the fate of this recent unusual nesting trend of *klossi* in the future.

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References

- Ali, S. & Ripley, S. D. 1974. *Handbook of the birds of India and Pakistan together with those of Bangladesh, Nepal, Sikkim, Bhutan and Sri Lanka. Flowerpeckers to Buntings*. Vol 10. Bombay: (Sponsored by the Bombay Natural History Society) Oxford University Press.
- Chandra, K. & Sanjeev, K. 1994. Observation on avifauna of Great Nicobar Island, India. *Indian Forester* 120 (10): 953–955.
- Chandra, K. & Rajan, P. T. 2004. Faunal Diversity of Mount Harriett National Park (South Andaman). *Conservation Area Series* 17: 1–142 (Published by Director, Zool. Surv. India, Kolkata).
- Dharmakumarsinhji, R. S. Undated [=1955]. *Birds of Saurashtra, India: With additional notes on the birds of Kutch and Gujerat*. Bhavnagar, Saurashtra: Published by the author.



Niranjan Sant

- Pande, S. A. 1999. Nest making and breeding of the Purplerumped Sunbirds (Abstract). *Newsletter for Birdwatchers* 38 (6): 102–103.
- Pande, S., Tambe, S., Francis M, C. & Sant, N. 2003. *Birds of Western Ghats, Kokan and Malabar (Including birds of Goa)*. Mumbai: Bombay Natural History Society, Oxford University Press.
- Pande, S., Sant, N., Ranade, S., Pednekar, S., Mestry, P., Deshpande, P., Kharat, S. & Deshmukh, V. 2007. Avifaunal survey of Andaman and Nicobar Islands, January 2007. *Indian Birds* 3 (5): 162–180.
- Rao, D. V. and D. R. K. Sastry (2007) Fauna of Buttan Island National Park, South Andaman, Bay of Bengal. *Rec. Zool. Surv. India. Occ. Paper No. 270*: 1–54. (Published by Director, Zool. Surv. India, Kolkata).
- Rasmussen, P. C. & Anderton, J. C. 2005. *Birds of South Asia. The Ripley guide. Field guide*. 2 vols. Washington, D.C. and Barcelona: Smithsonian Institution and Lynx Edicions.

Recoveries from the *Newsletter for Birdwatchers (1970)—21*

Zafar Futehally

Futehally, Z. 2009. Recoveries from the *Newsletter for Birdwatchers (1970)-21*. *Indian Birds* 4 (3): 118 (2008).
Zafar Futehally, #2205 Oakwood Apartments, Jakkasandra Layout, Koramangala 3rd Block, 8th Main, Bangalore 560034, Karnataka,
India. Email: zafar123@vsnl.net

The Pied-crested Cuckoo *Clamator jacobinus* is a bird that attracts us for its handsome appearance, its loud distinctive “tinkling” call, and for being the harbinger of the monsoon. I have personal experience of the bird arriving in Bombay from its southern quarters a couple of days prior to the advent of the rains in June. Stuart Baker, in his *Cuckoo Problems*, gives a list of fosterers parasitized by this bird. It seems that in the south its favourite dupes are babblers, while in the north, Laughingthrushes are its main hosts. In the March 1970 issue of the NLBW, Jamal Ara wrote an article based on the notes of her observations over several years, and I think you will find her remarks useful.

“Just as the dawn of spring is heralded in northern lands by the call of the cuckoo, the onset of the monsoons in India, both Southwest and Northwest is announced by the Pied Crested Cuckoo. No sooner the rains break than groves, gardens, and open woodlands echo to its metallic *piu...piu...pee-pee-piu*, repeated twice. Often, only the monosyllable *piu* is heard. If the clouds part and the moon shines down on a rain-soaked earth, this bird will immediately greet the effulgent moonlight.

“The Pied Crested Cuckoo is the most handsome of all the cuckoos, and is easily recognised. The upperparts of its plumage are black, while the lowerparts and the tips of its tail feathers are white, and prominent in flight. There is in each wing a conspicuous white roundish patch, and a black crest that does not lie down, but projects prettily from the back of the head. In flight, which is direct and laboured, the tail is kept pointing slightly upwards. But it is not necessary to set eyes on it to recognise it, only to hear it, is sufficient.

“Like all cuckoos it is mostly arboreal, but unlike the other members of its family, it perches on the tops of low bushes—scrutinising their foliage carefully for the insects on which it feeds. Beetles, tree-crickets, and hairy caterpillars from its diet. Often food is taken from the ground, where the bird hops about in search of insects.

“The Pied Crested Cuckoo does not indulge in elaborate courtship—it is carried out on the wing with the tail partly spread out, the wings are beaten slowly and deliberately, as if practising some sort of delayed action flight. Of course, the courtship of no cuckoo is silently and the Pied Crested Cuckoo is no exception—it makes a noise all the time while courting. The bird is neither shy nor retiring, and one bird chasing another is a common sight. It is a parasitic bird, and wherever it is found, it lays according to the breeding season of the various babblers, in whose nests it deposits its eggs, from January to July. The eggs are a perfect imitation of those of the babblers—spotless sky blue, highly glossy, varying in length. In the Eastern Himalayas it has been found placing eggs in the nest of the Necklaced and Blackgorgeted Laughing thrushes, while in the

Western Himalayas it is the Striated Laughing Thrush. The eggs of this cuckoo (northern) referred to in Hume's *Nests and Eggs of Indian Birds* (Vol. 3, pp. 388–391) were found in the plains of India or in the lower ranges of the Nilgiris or sub-Himalayas.

“September is the month in which to look out for young Pied Crested Cuckoos. Those that I have seen in Daltongunj (Palamau) and Saitba (Singhbhum) differ considerably from the adult in appearance—being slaty grey above, the wing patch, and the tips of the outer tail feathers and lower portions, pale yellowish white. They were accompanied by young Jungle Babblers clamouring for food and flapping wings, just like the young babblers. But in Monghyr the young cuckoos were always seen unaccompanied by foster-brothers or sisters.

“The Pied Crested Cuckoo is a restless bird, moving about a good deal, seldom staying more than a couple of days in one spot. The typical race is resident in Ceylon, South India north of the Coromandel Coast, and the southern Bombay Presidency, as far north as Karwar on the west and Madras on the east (Stuart Baker). The rest of India and Burma is inhabited by the larger form (*serratus*) which is migratory, being a rains visitor (breeding), appears to come from Africa. In India it spreads throughout the plains and hills alike, up to about 8,000 feet in the Himalayas. The movements of *serratus* have not been fully worked out, but there is reason to believe that it winters in Africa. But much remains to be discovered regarding the distribution of this cuckoo. It appears to undergo considerable local migration. The SW monsoon begins to set in over northern India around June, and that is when this bird arrives. Again the NE monsoon breaks over the Nilgiris in January, and the Pied Crested Cuckoo reaches that area in the cold weather. Several observers, particularly in northern India have communicated to the papers the dates on which they first saw or heard the bird. Dewar saw it in Madras in July, at that time it is supposed to migrate northwards.

“Sustained observation on the arrival of this bird was maintained by one observer for ten years in Chota Nagpur, and he recorded arrival dates between April 21 and May 28. The last date on which he observed the bird was 21 October. In Monghyr and Madhubani it is very common from May to October. At different places ranging from Jhansi and Almora in the west and Chittagong in the east, the dates vary between 20 May and the first week of July. The majority of dates being in June, almost coinciding with the break of the monsoon. In Burma it has been observed between late May and early November...”

Sinning by a bird book

Lt. General (Retd) Baljit Singh

Singh, B. 2009. Sinning by a bird book. *Indian Birds* 4 (3): 119–120 (2008).
Lt. General (Retd.) Baljit Singh, House 219 Sector 16-A, Chandigarh 160015, India.

I recently chanced upon a book in the headquarters Western Command library at Chandimandir—'A company of birds', by Loke Van Tho, published in January 1958. It was the type of find you quickly want to take home, drop down on your favourite reading chair and then open one page at a time, deliberately.

But in the instant case I remained glued to the title page itself, which carried a citation, "Col Baljit Singh, with kind regards", in the hand of and signed by the world-renowned "Sálim Ali. 12.xi.63."

Sálim Ali was known to be most frugal with money and gifts. So obviously his inscription would only be in the nature of a very special autograph. And the recipient of that generosity had to be at the least, a congenial bird-watcher to have so won Sálim Ali's esteem.

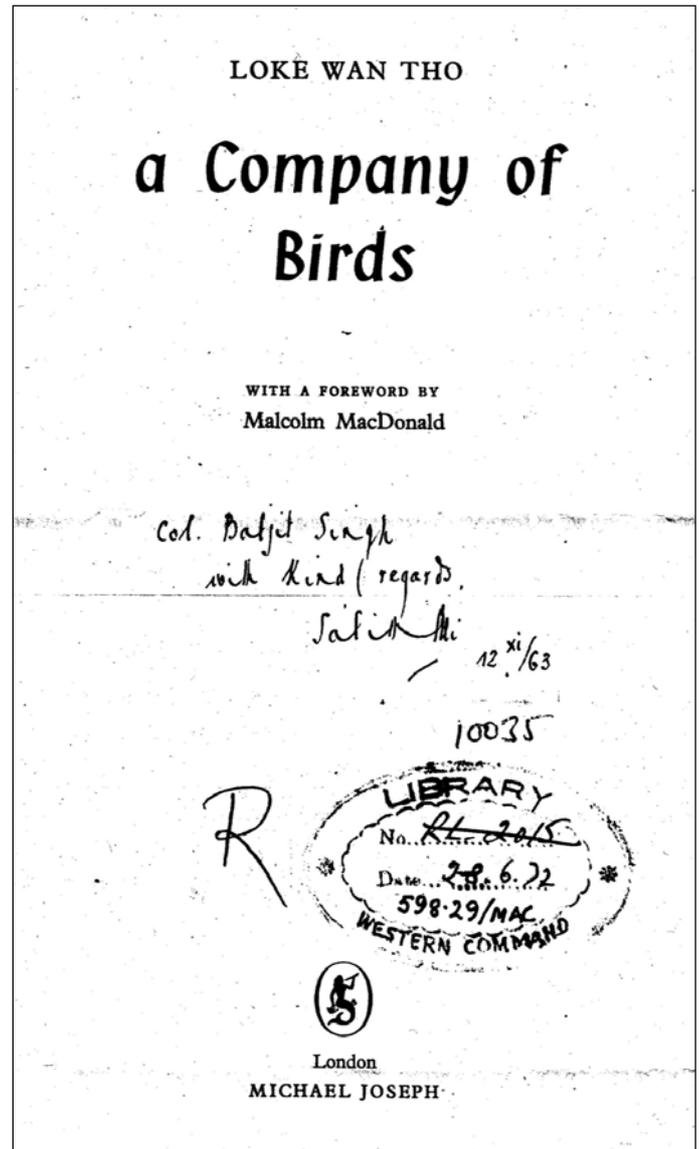
So far so good, but then who was this colonel? The thought nagged me for days. And then an evil thought crossed my mind: "why not claim the book ostensibly lost in 1972?"

It was a sinful thought, no doubt, but the very next moment, I did summon courage and command, "Get thee behind me, Satan."

The book has since been shifted to the reference section, never again to leave the sanctuary of the library!

The title, 'A company of birds', leaves nothing in suspense about the subject matter; except whether the presentation be in the narrative or visual format? Happily for the reader, it presents a perfect blend of the two crafts. The upper half page is given to a photograph followed by description and at times an anecdote relating to the bird or to the travails of bird photography. For instance the temperature inside a 'hide' could be touching 45°C and humidity at 90 per cent; or driven to play mind games with an inquisitive cobra that chooses to climb up the camera tripod just when it was time to capture the bird on the film! And on offer is some of Loke's best output from regions as far apart as Kashmir, Singapore and New Guinea.

Bird photography by Loke and, later, his wife Christina, was to place them among the world's outstanding photographers. Loke's black and white images of the nesting White-bellied Sea Eagles in the *Journal of the Bombay Natural History Society* will remain the finest ever. And Christina's coloured, full page images to support the text of 'Birds in my garden' by Sir Malcolm Macdonald (the British High Commissioner) in his residence at New Delhi was an instant best-seller in the 1960s.



This passion for and perfection of photography would be understandable from a person whose life's calling it was. But it would place a practitioner of this art form in the class of 'Great Masters' particularly when the product was "the result of the holidays and leisure hours of a businessman"(!), as stated by Loke in the introduction.

Loke was the scion of the family that owned large rubber plantations and tin-mines in Malaya. He was schooled in Switzerland from where he moved to the Cambridge

University. He fled Singapore barely hours before the Japanese occupation in 1942. Unfortunately, a day later, the Japanese targeted the ship and Loke suffered sixty percent body burns. A doctor told him, "I want to put Atropin in your eyes; you will certainly go blind if I do not but there is still a chance if I do" Loke could muster just enough strength to say, "Go ahead and put the stuff in." And in the spirit of the Biblical injunction "Let there be light," a week later, his vision began mending as also the body skin!

By now he was a refugee in India. As luck would have it, his school teacher from Switzerland, Jack Gibson, was also teaching in India. One evening Gibson invited Loke to a dinner where Sálim Ali was the other guest. They took to each other at first sight and as they say, "the rest is history"!

When the war ended Loke Van Tho returned to

Singapore, resurrected the family business and on the sidelines also created some of the finest avian photo-art, and also moved into the exclusive club of the world's billionaires—all in his own lifetime.

I have at last succeeded in tracking the enigmatic 'Col Baljit Singh' to the 8th Light Cavalry Regiment. He was an instructor at the National Defence Academy, Khadakvasla, when in 1963 he befriended Sálim Ali to help inculcate among the cadets the love of the outdoors. The colonel's daughter (the wife of a fellow General Officer) has vividly recollected Sálim Ali's visits to their bungalow on the NDA campus. And the Colonel's widow gifted some of his books to the HQ Western Command library.

Hopefully, the Colonel, the Van Thos and Sálim Ali have formed a bird-watchers club in Valhalla.

— Correspondence —

Sighting of a partially albino Red-wattled Lapwing Vanellus indicus in Udaipur, Rajasthan

We would like to report the sighting of a partial albino Red-wattled Lapwing *Vanellus indicus* from Udaipur, Rajasthan. On the 27th of July 2007 we saw a strange white-coloured plover on the edge of a flooded field on the outskirts of Udaipur,

Rajasthan. On closer observation we realised that it was a partially albino Red-wattled Lapwing (Fig. 1), which had white on its upper parts and breast, instead of bronze-brown and black, respectively.

We believe that albinism or partial albinism has not been reported for this species from India earlier.



Lalit Sharma

Fig. 1. Partially albino Red-wattled Lapwing.

Satya P. Mehra
WWF-India Bharatpur Field Office
Keoladeo National Park,
Bharatpur 321001
Rajasthan, India.
Email: spmehra@yahoo.com

Narayan Singh & Sarita Mehra
Rajputana Society of Natural History
Kesar Bhawan,
16/747, P. No. 90, Ganeshnagar
Pahada, Udaipur 321001,
Rajasthan, India.
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Errata

Indian Birds Volume 4 No 2 (March–April) 2008.

Please read Indian Bushlark *Mirafra erythroptera* instead of Jerdon's Bushlark *Mirafra affinis*, on p. 68, column one, line 3.