

Short Communication

First report of summer nesting avian species at River Mahanadi (Chhattisgarh segment), Chhattisgarh, India

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ABSTRACT

The state of Chhattisgarh owing to its rich forests and bio-diversity attracts good number and a variety of avian species (both resident and migratory). Though most of the common resident species nest here but some of the important species went unnoticed and has not been yet documented. This study covers two summer nesting species at river Mahanadi. The persistent field visits and study of avifauna have revealed some interesting nesting species in the state. River Mahanadi which has always been a good place for the study and has old historical records was visited almost regularly over the past years. The study in stretch of about 130 km, conducted from October 2017 to June 2019 has revealed the nesting by the Blue-tailed Bee-eater and Small Pratincole during summer, which were hitherto not reported from the state and thus are the first records from Chhattisgarh.

Key words: River Mahanadi, First nesting, Blue-tailed Bee-eater (*Merops philippinus*), Small Pratincole (*Glareola lactea*).

INTRODUCTION

The state of Chhattisgarh (India) with 44% forest cover can be geographically divided into three regions: the Northern region comprising of Surguja division, the Central region which includes the Raipur district, the Southern region of Bastar division. The northern and southern regions are mostly hilly with good forests, whereas the central region is predominantly plains with forests in the eastern and western bordering districts. The above three regions also covers the drainage area of three major river basins of the state. Surguja division has Hasdeo basin, Central region has Mahanadi basin and Bastar division has Godavari Basin. The climate of the central region is tropical, with annual temperature ranging from 5°C to 47°C, rainfall varying between 1200mm to 1400mm annually. The average altitude in the central region is between 300 to 400 m above mean sea level (henceforth *amsl*). The overall biodiversity of the state provides a suitable habitat for avifauna. It is speculated that *ca.* 500 species must exist in the state, so far 429 species have been recorded by the first author (Bharos, 2017).

Chhattisgarh was the part of undivided Madhya Pradesh and the earlier ornithological studies invariably covered both segments of present Madhya Pradesh and Chhattisgarh. Past ornithological studies undertaken by Moss King (1912), Osmaston (1922), Bates (1927), D'Abreu (1931, 1935), Wright (1942), Newton (1996), D'Cunha (2001), Chandra and Singh (2004), Chandra *et al.* (2015), Ghosh *et al.* (2008), Sharma *et al.* (2014), Chandra *et al.* (2015), George *et al.* (2015), Bharos *et al.* (2016a, 2016b) Vishwakarma *et al.* (2018), Bux and Bharos (2018), have mentioned the occurrence of Blue-tailed Bee-eater, Small Pratincole in different geographical areas of the state but none of these studies, however,

have mentioned their breeding in the geographical area of Chhattisgarh. The following species discussed here-under were found nesting since last two-three years, which was not reported earlier.

The Mahanadi river, where the study was undertaken, is the prime river of the state, it originates from *Shringery hills* near Sihawa town of Dhamtari district, Chhattisgarh. Initially, it flows south-wards then turns to the north and en-route to Odisha flows across Dhamtari, Kanker, Gariyaband, Raipur, Mahasamund, Baloda Bazar, Champa-Janjgir, and Raigarh districts of Chhattisgarh. The total length of the major channel of the river from origin to its outfall into the Bay of Bengal is 958 km (Ministry of Water Resources, Govt. of India, Mahanadi Basin, 2014), of which *ca.* 280 Km lies in Chhattisgarh. The width of the river varies from average one Km to three Km in plains. Most of the river bed is used for cultivation of vegetables in summer months. It is mostly a sandy river with several narrow streams and forming islands. The river flows bank to bank in monsoon months.

At this river several threatened species *viz.*: River Lapwing (*Vanellus duvaucelii*), Painted Stork (*Mycteria leucocephala*), Asian Woolly-neck (*Ciconia episcopus*), Indian Spotted Eagle (*Clanga hastate*) Spotted-billed Pelican (*Pelecanus philippensis*), Indian Skimmer (*Rynchops albicollis*), River Tern (*Sterna aurantia*), Eurasian Curlew (*Numenius arquata*), Malabar Pied Hornbill (*Anthracoceros coronatus*) have been documented (Rahmani *et al.*, 2018) and significant species *viz.*: Common Merganser (*Mergus merganser*) (Ali and Ripley, 1987), Grey-headed Lapwing (*Vanellus cinereus*) (Bharos *et al.*, 2019), Demoiselle Crane (*Grus virgo*) (Bharos, 2017) also have been recorded earlier.

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MATERIALS AND METHODS

A segment of river Mahanadi, including Gangrel Dam, and amidst Teela barrage to Samoda barrage and further 40 km downstream at Dhamni village in Balodabazar district, were frequently visited and studied from October 2017 to June 2019. These are mostly open plains, and vegetation comprises small forest patches, plantations, patches of scrub forest, and cultivation. The study sites, Gangrel Dam (N 20.6118916°, E 81.603416°), Futamuda, Gangrel Dam (N 20.606195°, E 81.595965°) Dhamtari District, Teela barrage (N 21.059318°, E 81.965225°), Nisda barrage (N 21.150712°, E 82.002617°), Samoda barrage (N 21.265870°, E 82.0579°), Kutela- Mohmela (N 21.349°, E 82.168°) and Gidhpuri, Dongardevi Temple (N 21.368°, E 82.18°) all in Raipur district, Dhamni-Rohasi (N 21.518°, E 82.292°) Balodabazar district and Bangoli dam (N 21.407°, E 81.866°) a distant site in Raipur district.

General observation of avifauna was made by walking along a pre-determined accessible trail, following *Look and See method* (Bibby *et al.*, 1992). An attempt was made to traverse every habitat in the study patch, focusing keenly over the alluvial river banks, sandy river beds and the adjoining habitat. An isolated site, Bangoli dam, located at a distance *ca.* 50 Km from river Mahanadi, was too visited frequently, avifaunal observations were documented following the above methods and including *block in a flock* method (Urfi, 2003). The prime object of this work was to determine summer nesting species at and around the river beds and banks of river Mahanadi, so the Nest and Roost count (Javed and Kaul, 2002) were advertently undertaken. Our field study was aided by binoculars and DSLR Cameras, also with supportive field guide and standard literature (Ali and Ripley, 1987; Grimmett *et al.* 1998). The study was conducted on different occasions of daylight hours. Our study primarily emphasized on the summer nesting avian along the selected patches of river Mahanadi.

We observed nesting and/or breeding behaviour of the avifauna, compared it with monumental literature (Baker 1929, Ali and Ripley 1987, Rasmussen and Anderton, 2012) to ascertain and suffice our observations of nesting and breeding species.

RESULTS

We encountered resident, migratory, and certain passerby species during our study. Several resident species were observed nesting. Accounts for species of particular interest follows:

Blue-tailed bee-eater (*Merops philippinus*)

The Blue-tailed Bee-eater (*Merops philippinus*) is a breeding-visitor from North Pakistan, Himalayas and Gangetic plains to Assam valley, also Central India (Satpura) and most of the subcontinent. It winters in south peninsula and affects the more wooded, less arid country and the vicinity of water, in flocks. Their food consists of insects like dragonflies, wasps and bees, also occasionally butterflies, moth and beetles. They breed generally from March to June and exclusively nest in a tunnel on a vertical river bank or sandy cliffs usually *ca.* 2 m deep. It nests in a colony of several pairs together (Ali and Ripley, 1987, Grimmett *et al.*, 1998,

Rasmussen and Anderton, 2012). The breeding of the species has been recorded by Neelkanthan (1948) in Rajmundari (East Godavari district) Andhra Pradesh, in western Saurashtra (Gujarat) by Dharam Kumar Singh ji (1947), Near Upper Wardha River, Morshi in Amravati district of Maharashtra, Kasambe (2004), in Central India (Kasambe, 2005) and Melghat Tiger Reserve (MTR), Maharashtra Wadatkar *et al.* (2014). D'Abreu (1935) and Hewetson (1956) mentioned it as a resident and that the species breeds in large colonies on river banks in central province / Central India, from April to May (locations unspecified). However no nesting by this species has been reported from Chhattisgarh.

Nesting site complex

During our earliest visits to Mahanadi river area on 16th and 19th April 2018, to villages Mohmela (N 21.349°, E 82.168°; 300 *amsl*) Kutela area (N 21.368°, E 82.18°; 300 *amsl*), Mahanadi river, Raipur district, over a stretch of 2 km, which forms a 'complex-area' of nesting site. More than 1300 nest-tunnels in western alluvial riverbank were found and also at village Samoda 10 Km further upstream. The sandy bed of the river spans over about a kilometre width, with the flow shredded into 'narrow streams' forming inter-spaced sandy islands. The alluvial western bank of the river reaches about 25-30 m high above the river bed. The nearest 'narrow stream' almost touches the western bank of the river at some places. The plains above the bank have degraded scrub forest where the tree size reaches a maximum height up to 5 m.

Behaviour observed

The different targeted sites of Mahanadi river were intermittently visited. The observations encountered are mentioned in Table-1.

Kutela Nesting Site

Two segments located within a stretch of 2 Km long nesting site at Kutela-Mohmela complex area, the alluvial river banks, were examined for five hours on 31st May 2019. In the first segment, nest-tunnels were counted to be 124 numbers which span over 80 m length and the second segment had 970 nest-tunnels spread over 500 m length, both segments were of about 5 m width, this nest-strip was positioned at about 1 m below the top-ground level and mostly about 3 m above the reference flowing-water level along the banks of the river (Figure 1).

These tunnels were either old, abandoned or freshly dug, of varying depths; nest-mouth diameter ranged from 5 to 20 cm. Depth of the tunnels was randomly selected and measured by inserting long dry straw(s) (soon comparing straw with measuring tape),

The birds did not utilize already dug old nest-tunnels which indicate the deceptive safety factor to evade the predators. Several freshly dug tunnels of varying depths were observed, which were probably still in the process of being dug. The Blue-tailed Bee-eaters were about 250- 280 in numbers, which did not commensurate with the number of existing nest-tunnels,

Table 1. Observations details of Blue-Tailed Bee-Eater in the Complex area of Mahanadi

Date of Observations	Time (AM/PM)	Duration (in Hours)	No. of Birds seen	Observations
11 April 2018	1:11 PM	2:20 Hrs	80-100	Feeding on dragonfly and offering to the mates, perched near the tunnel, a pair was digging tunnel which reached a depth of c. 25 cm, few other fresh tunnels of 5 to 10 cm depth were seen.
16 April 2018	2:53 PM	2:40 Hrs	90-100	Most of the birds indulged in aerial capture of a winged insects, offering and feeding to the mates if mates not interested, the prey was kept in beak up to 20 minutes.
30 April 2018	4:43 PM	1:30 Hrs	More than 100	Birds mostly perched close to the tunnel, few of which were inside, kept coming out and re-entering. Fresh white droppings on the cliff are now visible. Crops of vomited pellets were seen under perches. Birds were observed holding dragonflies, which were also carried inside tunnels and left there.
2 May 2018,	3:50 PM	1:30 Hrs	70-75	Lesser number of birds sighted, presumably due to early return to roost due to overcast weather conditions.
17 May 2018	3:45 PM	2:00 Hrs	More than 100	Birds are seen mostly close to the mouth of tunnels, bringing and carrying food inside.
17 June 2018	2:10 PM	2:00 Hrs	90-100	Chicks were seen which came to mouths, & being fed by parents. Adult birds in prime breeding plumage and observed very alert.
17 April 2019	4:47 PM	1:10 Hrs	more than 100	Alluring and offering food to mates continued. Mating by a pair recorded.
18 April 2019	4:00 PM	1:00 Hr	more than 100	Birds close to the nest, bringing food, fresh tunnels digging observed.
19 April 2019	2:30 PM	1:00 Hr	20-30	Food is offered to mates perched on bushes or ground. At Samoda barrage.
25 May 2019	1:30 PM	2:30 Hrs	150 - 170	Feeding hatchlings and mates inside tunnels,
31 May 2019	8:00 AM	5:00 Hrs	More than 250	Found a dead hatchling, aerial capture of butterflies and dragonflies. Taking food inside the tunnel. Juvenile observed being fed at the mouth of the tunnel.
2 June 2019	6: 00 AM	3:30 Hrs	250-280	Found two dead juveniles. Food supply to mates inside. Chicks peeping from tunnels, mostly single or two in 7 different tunnels. One juvenile seen outside, perched on bank.
4 July 2019	2:47 PM	1:00 Hrs	8-10	Site not approachable due to flood, 7/8 Birds seen in act of aerial foraging over the forest area, Most of the birds have left after nesting.

thus the conception of “safety first” gets confirmed.

Food and pellets

During the period of observation from April 2018 to June 2019 birds were observed capturing and feeding over insects. They mostly indulged in aerial foraging over streams and at & around the river bank hawking winged insects like dragonflies, butterflies and other insect species which forms their main diet (Figure 2). Butterflies seen at the location were Common Mormon (*Palilio polytes*), Lime butterfly (*Papilio demoleus*), Common Emigrant (*Catopsila pomona*), Mottled Emigrant (*Catopsila pyranthe*), Common Grass Yellow (*Eurema hecabe*), Plain tiger (*Danaus chrysippus*), Common Crow (*Eupolea core*), and Tawny Coster (*Acraea violae*) flitting in scrub area and Dragon fly species seen around were Ground Skimmer (*Diplacodes trivialis*), Small Marsh Hawk (*Orthetrum taeniolatum*), T-Marked River Clubtail (*Gomphidia*

t-nigrum), Green Marsh Hawk (*Orthetrum Sabina*), Black Marsh Trotter (*Tramea limbata*), Ruddy Marsh Skimmer (*Crocothemis servilla*), Long-Legged Marsh Glider (*Tithemis pallidinervis*) Common Picture Wing (*Rhyothemis variegata*), Blue-tailed Green Darner



Figure 1: Nesting tunnels



Figure 2. Blue tailed Bee eater feeding



Figure 3. Nest with eggs of Small Pratincole

(*Anax guttatus*), Bumble Bee (*Bombus sp.*), Honey Bee (*Apis cerana*), Wasp (*Ropalidia sp.*), etc.. Photographs obtained showed these insects captured in the beak of Blue-tailed Bee-Eater, which was identified following Raju and Ramchandran (2016).

Birds perched on trees, soil lumps and river bank. Several birds were observed entering the tunnels and coming out also carrying above mentioned food material into the tunnel. Below the perches white fluid dropping marks were noticed at several locations and also ‘crop’ of black coloured pellets were found lying on the ground, underneath several perches, these crops contained about 60 to 120 pellets. A bird was also observed vomiting it. The oblong-shaped pellet’s average

size was about 15 to 18 mm long, and 8 to 10 mm broad (Fig.5). Kasambe (2005) also reported similar observations.

Mating and nest tunnels

The pre-copulatory behaviour observed was close-perching by mates, offering and acceptance of food, pecking of female bird by male with its beak, a little pause of 5 seconds followed by mounting of male over female. During copulation, male held the nape of the female which in turn started moaning. The act lasted for 3-4 seconds. Thereafter, the male flew to a short distance whereas the female remains in the same posture. The act was repeated after 10-15 minutes by them. Then the pair separated. The female started probing for nest-tunnels and after a while went away. Later, it was observed carrying nesting materials like green leaves, grass blades, straw etc. and taking it to the inside of the tunnel. The tunnel selected had a narrow mouth and appeared to be a freshly excavated. Occasionally, the males assisted otherwise, it performed watch and ward duty.

Hatchling and juveniles

A dead, feather-less hatchling was found underneath one of the tunnels, on 31st May 2019, which possibly fell out of the tunnel for unknown reasons. Its body was still soft and without the stink. The age of this hatchling was assessed to be of not more than 2-3 days. The mating by the birds was observed on 17th May 2019 and hatchling was found on 31st May 2019 (not by the same pair) and on 2nd June 2019 two chicks were observed peeping from the mouth of a tunnel (Fig.7), two dead juveniles were also found on ground below the tunnel (Fig.6) on the same day. Presence of a dead hatchling, Juveniles, peeping chicks and carrying food into the tunnel by parents, confirmed breeding by the species in this nesting colony. Few locals were interacted, they revealed that birds arrive here by mid-April and stay till June end to breed since period unknown. Both sexes were observed performing nesting duties. After about a fortnight possibly the eggs seemed hatched, as the carrying of food inside the tunnels suggested. When the chicks grew big enough, they emerged out, perched on tunnel mouth or nearby branches and parents fed them. Presence of one or up to 3 chicks was noticed in a single tunnel.

The threats to these nesting birds assessed were, sand mining operations at close quarters, potential predation by mongoose, snakes, raptors, scavenger birds like Large-billed Crows, Black kites, Monitor lizard which were found present in the locality. Local community though aware of the nesting, have no concern for it.



Figure 4. Small Pratincole



Figure 5. Pellets of Blue-tailed Bee-eater



Figure 6. Dead Juvenile of Blue-tailed Bee-eater



Figure 7. Blue-tailed Bee-eater Chick Peeping

Small pratincole (*Glareola lactea*)

The Small Pratincole (*Glareola lactea*) is a resident bird and local migrant. Distributed all over India, affects large serene streams with sand bars and large wetlands, at times in large flocks. The species breeds from February to April even up till June. Nests in colonies, often several nests close to one another, which are shallow scraps on exposed sandbanks of rivers. Clutch size of normally two eggs and exceptionally three. The nesting birds fly around the nest and agitatedly dive at any intruder. They have a curious habit of walking singly or several at a time, squatting in front of an intruder with open wings and shuffling as if hatching eggs. When approached, by an intruder, they pretend by dragging one wing or beating it on the sand as if broken and making as if to settle on an egg and repeating the act. (Ali and Ripley, 1987).

The past studies mentioned above do not mention breeding by the species in Chhattisgarh. The only documentation available is from Vena Reservoir in Nagpur district (Kasambe *et. al.* 2006). D'Abreu (1935), Hewetson (1956) mention its breeding in larger rivers on sandbanks in central India. (Locations unspecified).

During our visits to River Mahanadi, at village

Dhamni-Rohasi (N 21.518°, E 82.292°) Balodabazar district, situated 40 Km upstream of Kutela from 15th Feb 2018 to 17th June 2018, more than 100 birds were seen on sandy river-bed, which was being prepared for vegetable cultivation by the locals. On 17th June 2018 as we approached closer the birds suddenly took off and started calls, circled around and performed distraction behaviour. Closer investigation revealed a nest with a solitary egg in one of the row bed prepared for cultivation. The nesting bird started distraction with pretention of broken wing display (Fig.4) which continuously called and circled over us. In next visit after about a week, the nest was found missing, as the sandy bed was found levelled by the storm. The summarized observation details are given in Table 2.

During our visit on 24th April 2019, a nesting site was found at Gangrel Dam (N 20.6118916°, E 81.603416°), district Dhamtari, where more than 150 birds were counted, either perched on the ground, on wings, and calling. Due to our presence, the birds started distraction and broken-wing pretention, a characteristic behavior. This behaviour suggested the presence of nests in the locality. On investigation, 12 nests were found with eggs. 10 nests had 2 eggs each (Fig.3) and remaining 2 only one egg each. No hatchlings were seen or found. Broken egg shells were also found elsewhere.

In March-April, 2018 same distraction pretention behaviour was observed at Kutela, where about 20 birds were present, but the nest was not found. On 31st May 2019 at Kutela nesting site of Blue Tailed Bee-eater, on first sandy island. a Small Pratincole was observed taking off on approach of a passerby villager and settled at about 20 m distance and resorted to distraction. repeated twice. The behavior of the Small Pratincole suggested the presence of nest in close proximity. About 60 birds were observed in the locality perched on the sandy bank, circling in the air.

In April – June 2020 another nesting colony has been found at location Futamuda, Gangrel Dam (N 20.606195°, E 81.595965°), river Mahanadi in Dhamtari district. Here *ca.* 100 nest were counted with eggs, chicks and their feeding by adults was observed. In addition, Kentish Plover (*Charadrius alexandrius*) solitary nest, Oriental Pratincole (*Glareola maldivarum*) 20 nests, Black-winged Stilt (*Himantopus himantopus*) 5 nests, Little Ringed Plover (*Charadrius dubius*) 40 nests were found at same site (Amar Mulwani and Gopi Kishen Sahu Pers comm. with photographic evidences).

Finding of nests with eggs and adult bird around, and distraction behaviour confirmed the nesting by the species at Dhamni, Futamuda Gangrel, and Kutela which are the first nesting records of Small Pratincole, being reported from Chhattisgarh.

RESULT AND DISCUSSION

The study was undertaken between October 2017 to June 2019 and covered river Mahanadi between Gangrel Dam, district Dhamtari, to Dhamni in Baloda Bazar District. The riverside sites selected for study were Futamuda Gangrel Dam Dhamtari District, Teela barrage, Nisda barrage Samoda barrage, Mohmela and Gidhpuri, Dongardevi Temple all in Raipur district, Dhamni-Rohasi Balodabazar district and Bangoli a distant site in Raipur district, These sites were repeatedly visited during the summer nesting season during

Table 2. Observations details of Small Pratincole

Date	Location	Time	Duration	No. of Birds	Observations
15 Feb 2018	Dhamni	3:50 PM	3 Hrs	7-8	Normal behaviour
30 March 2018	Dhamni	1:51 PM	3:30 Hrs	10-12	One egg found in sandy bed, mere shallow depression
13 April 2018	Dhamni	2:01 PM	2:40 Hrs	8-9	Nest and egg missing, washed away in a storm
12 April 2019	Dhamni	1:40 PM	3 Hrs	7-8	Perched on ground
31 May 2019	Dhamni	8:00 AM	5 Hrs	60	Pretention, distraction behavior observed at island
2 June 2019	Dhamni	6:00AM	3:30 Hrs	60-80	Broken wing pretention behaviour, perched in depression, but no nest found.
14 June 2018	Mohmela	3:20 PM	3 Hrs	About 100	Juveniles were seen
20 June 2018	Mohmela	2:30 PM	3 Hrs	120	Perched on the ground or in air
28 April 2018	Teela	8:27 AM	3:30 Hrs	7-8	Oriental Pratincole perched on ground
11 June 2019	Teela	8:00AM	3 Hrs	More than 160	Perched or circling, along with Black-winged Stilts
24 April 2019	Gangrel dam, Dhamtari	2:00 PM	4 Hrs	150	12 nest with eggs found. Broken eggshells found elsewhere.

the study. The Mahanadi river proved to be a big potential site for study on summer nesting aquatic species. In the recent past 9 threatened species have been recorded here.

This study was carried out on different dates of the summer season for duration of 1 to 5 hours both in morning and evening hours. The highlight of the study was the discovery of nesting site of Blue-tailed Bee-eaters in 2 km stretch between Chikhli and Kutela wherein two segments the number of tunnels found, in the vertical earthen bank of the river, were about 1300 in number, both old and new. The number of birds seen was about 250-300 in numbers. The lesser number of birds indicates that the species do not use the old nests for safety reasons and bore fresh tunnels for current use. The bird was observed in the activity of alluring mates by offering food, mating, the capture of winged insects and carrying food to the tunnel. The chicks were seen peeping out from eleven tunnels singly or 2 in numbers. A dead hatchling and juveniles were found on ground underneath the tunnels. The birds were found capturing 8 species of butterflies, 9 species of dragon flies, 1 species of the common bumble bee, 1 species of wasp and 1 species of the honey bee. Photographs were obtained of the bird holding these prey in their beak and the insects were identified comparing standard literature (Raju and Ramchandran, 2016). The black shining colour pellets were found dropped underneath several perches, each crop had about 60 to 120 pellets. A bird was recorded vomiting a pellet which confirmed that these pellets belong to this species. Interaction with locals revealed that birds start arriving in April and after nesting leave by the end of June. The nesting colony is active from April to June. No community protection is provided to them.

The Small Pratincole was found nesting at Gangrel Dam and Dhamni, at both locations nests with eggs and chicks were seen. The nesting of Blue-tailed Bee-eater and Small Pratincole and finding of their colonies are the first record from Chhattisgarh. The nearest known nesting sites of Blue-tailed Bee-eater are in Andhra Pradesh and Maharashtra. The Small Pratincole has been reported nesting from adjacent Madhya Pradesh and Vidharbha area of Maharashtra.

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