



RESEARCH PAPER

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Study of nesting behaviour and parental care of Asian paradise flycatcher *Terpsiphone paradisi* from North 24 parganas, West Bengal, India

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Abstract

The Asian paradise flycatcher *Terpsiphone paradise* is a graceful looking medium sized bird widely found in the forest area of different parts of Asia including India. These birds exhibit distinct sexual dimorphism with males being present in two or more morphs. The present work is aimed to study the detailed nesting behaviour and parental care of Asian paradise flycatcher from north 24 parganas district of West Bengal. Observations were carried out during May to July of 2021 and 2022. A total of 12 nests were observed during our study. Our observation revealed that these birds made small cup shaped nest. The female usually lays 3-4 egg and both male and female alternately incubate the eggs till they hatch. Both the parents take part in feeding and other parental cares. We also observed a specific correlation between the development of chicks and time of bathing of the parents. We report here, an ethogram based on the observed behaviour of these birds. In short our study revealed some insights into the nest building and parental care of paradise flycatcher.

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Introduction

Terpsiphone paradise commonly known as Asian or Indian Paradise flycatcher is a beautiful looking bird found in different parts of Asia. In West Bengal they visit in summer (Grimmett *et al.*, 2011, Rasmussen & Andertor 2012). Reports suggests that there is a non-migratory variety of Asian paradise flycatcher belonging to subspecies *affinis*. The migratory subspecies is *incai* (Das N. & Adhikari S. 2019). The two subspecies differ in their breeding season. The size of the adult bird is between 18 to 22cm. Their heads are glossy black with a black crown and crest, black bill and black eye. They exhibit prominent sexual dimorphism. The females are rufous on the back side with grayish throat and grayish to white on the ventral side. Males occurs mainly in two morphs, one with rufous or glossy chestnut upper plumage and another with white plumage. The young males look almost like the females with rufous colour and short tail but have a black throat and blue ringed eyes.

The Asian paradise flycatcher has 12 tail feathers. Out of the 12 feathers two central feathers of adult males are elongated greatly and form streamers (Mizuta T. and Yamagishi S. 1998). The length of the tail of adult male can be 20-24cm, with the central feathers growing upto 30cm long streamers. The males acquire the long central feather in 2nd or 3rd year. Asian paradise flycatcher is socially monogamous animal and belongs to schedule IV according to wildlife protection act 1972 and is classified as least concerned by IUCN (IUCN 2019)

Studies on the nesting behaviour and parental care of Asian paradise flycatcher are sparsely available (Gokula V & Vijayan L 2003, Das N & Adhikari S 2019). The present work is aimed to study the detailed nest building behaviour and parental care of Asian paradise flycatcher.

Materials and methods

Study site

The study was carried out in a number of sites in north 24 parganas district of West Bengal. The first study site was forest land opposite to Sagar itbhata on

the side of Bongaon-Kulpi road. Site location was 23°03'12" N and 88°48'30" E. The second site was a small woodland area in Bagjola near Bagjola Adhirdhar Milan masjid (22°46'57" N and 88°44'41" E). The third site was at uttarkolsur near bagjola road (22°47'20" N and 88°44'14" E). All the sites were forested area with very less human activities. Teak, Mango jackfruit and Guava trees are most predominant in the study site. In some places Bamboo plant is also reported. One thing common to all the sites was their vicinity to a water body. Vast agricultural lands were present near the study sites.

Methods

Observations were carried out during May to July of 2021-2022. The observation was done during the day time. A total of 12 nests were observed during our study. The observations were made from a considerable distance from a safe hideout. A pair of binoculars (Olympus) was used for observation. Nikon D5600 camera with AF-P DX Nikkor 70-300mm f/ 4.5-3G ED VR lens was used for documentation. The birds were not disturbed during the study and the active nests (the nests in which adults were seen building or repairing nest, incubating, feeding chicks in or around the nest) were never touched. Data was collected for the entire study period and pooled for analysis. There was no significant difference in whether in different study sites and over the years of study. For morphometric analysis of the nests, the nests were measured using scale and vernier calipers.

Results

Sexual dimorphism in Asian Paradise flycatcher

Asian Paradise flycatcher shows distinct sexual dimorphism. Usually the males are characterized by exceptionally long pair of Central tail feather which can extend up to about 25cm past their other tail feather. However in some cases the males do not develop the central tail feather. The males can exhibit two colours, one is rufous colour and called as rufous morph and white coloured known as the white morph. The females are only rufous morph. According to some researchers the male birds are

rufous in colour in Juvenile stage and as they grow they developed this white colour. However there are other concepts also where it predicts that this rufousness is not associated with age. Reproductive rufous male with small tail (that is without the long central feathers) has also been reported (Mizuta T. and Yamagishi S. 1998). However, we did not observe this category in our study.

Interestingly, during our study we have documented two males which had both rufous and white coloured feather. These intermediate morphed male supports the concept that probably the rufous males matures into white morphed male. Though we have found these intermediate morphs, but their nests could not be located and has not been included in our study. In our study we have included long tailed rufous male and long tailed white males (Fig. 1) and both these males were found to reproduce with females and produce viable offsprings.

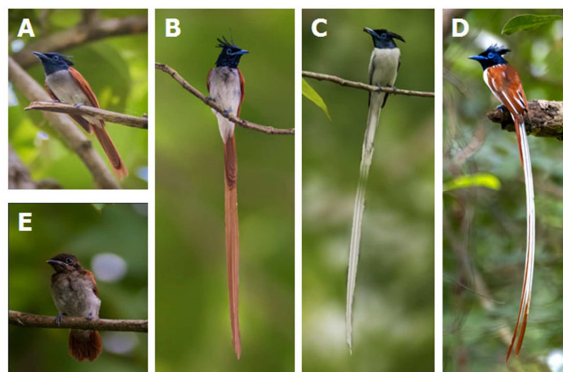


Fig. 1. Morphological differences of Asian paradise flycatcher observed. A: adult female. B: Rufous long tailed male. C: White long tailed male D. Intermediate morph male with long tail. E: chick.

Nest

The nests were mostly build in the branches of Teak, Mango, Jackfruit and bamboo tree. The nests were built in areas with very less or no anthropogenic activities. The nests also had a water body in its vicinity. The birds in most of the cases were seen to build their nest in the upper branch of the tree. The nests were open deep bowl /cup shaped shaped and made chiefly with plant fibers, twigs, cobweb and lichen at the end of short branches (Fig. 2). The nests

were mostly found in shady area. We observed a remarkable feature in all the nests. The nests always had at least one small branch of the tree running through the nests. Probably this provides a better strength to the nest. We have done morphometric analysis of 5 nests of Asian paradise flycatcher. Firstly those which fell down due to rain or storm and secondly , the abandoned nest that were near our reach. The data is represented in Table 1.

Table 1. Morphometry of the nests of Asian Paradise flycatcher.

SL	Measurements incm (mean ± sem)	
1	Inner depth of the nest	4.08 ± 0.1
2	Outer height of the nest	6.06 ± 0.42
3	Thickness of the nest at the bottom	1.98±0.3
4	Inner diameter	6.44 ± 0.34
5	Outer diameter	7.62 ± 0.37
6	Thickness of nest at the upper rim	1.18 ± 0.11



Fig. 2. Nests of Asian Paradise flycatcher.

Both the males and females were observed to take part in nest building. However the males seemed to invest more time and effort than the female in building the nest. In most of the cases the nests of Asian Paradise flycatcher were found near the nests of drongo and/or black hooded oriole. We suspect, probably this is because nesting in close proximity of breeding pair of predatory birds like drongo and treepie results in significantly greater reproductive success as reported (Nolan V. 1963, Ricklefs, R.E. 1969)

Egg laying and incubation

3-4 eggs were laid in each nest by the female birds. Our observation revealed that both the male and female bird engaged themselves in incubating the eggs (Fig. 3). However the females invested relatively more time in incubating the eggs as compared to the male counterparts. The hatching time was found to vary within 15-18 days.

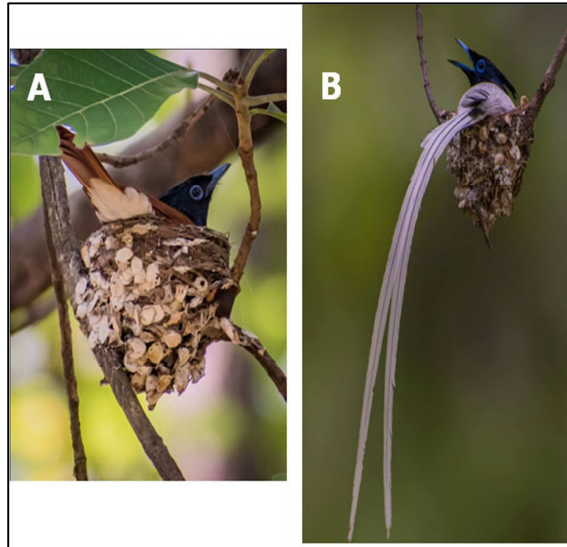


Fig. 3. A. Female bird incubating egg, B. Male birds incubating egg.

Parental care

Both male and female were engaged in brooding and feeding the juveniles. The chicks were fed even after they come out of the nest, till the babies start flying. The babies were mostly feed with pieces insects. As the parents come near the nest, the babies open their mouth seeking food (Fig. 4). The parent birds insert the food deep inside. The parents keep feeding the babies till they grow up and start flying.

We during our study observed that during rain both male and female bird guarded the nests and babies. The parent birds sat on the edge of the nest and spread their wings together over the nest covering the babies and nest from rain. The parent birds were observed to clean the nest regularly. The parent birds used to take the dropping from nest as well as from the anus of the chicks and carry them in their beaks to a distant area for disposal (Fig. 5).

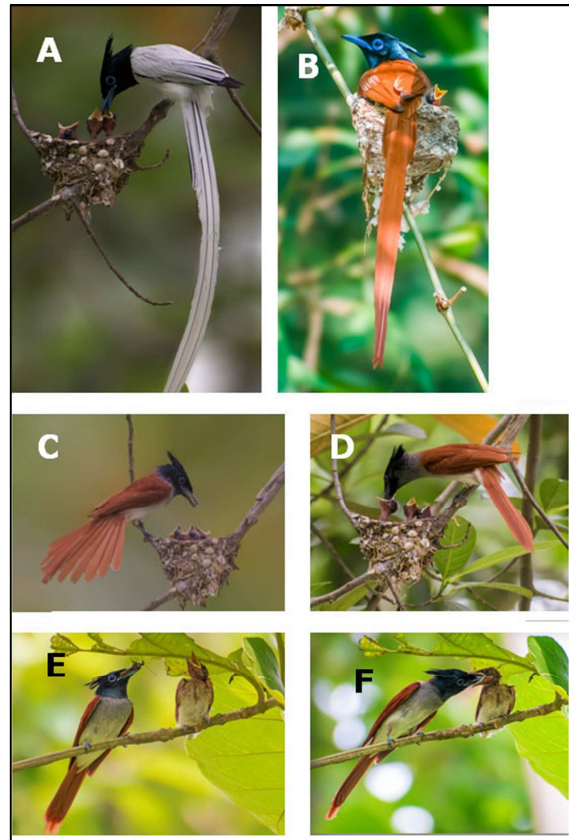


Fig. 4. A: White morph male bird feeding the chicks, B: Rufous morph male bird feeding the chicks, C,D: female birds feeding chicks inside the nest. E,F : Female bird feeding the chicks outside the nest.



Fig. 5. Male bird carring dropping for disposal.

Bathing behaviour of Asian Paradise flycatcher

The adult birds exhibit an interesting bathing behaviour. Both the birds took bath in the nearby water body containing clear water and having minimum anthropogenic activity. The bird seems to follow a fixed action pattern for bathing. The birds go for taking bath one by one. When the male bird goes for bathing the female guards the nest and vice versa. Initially the birds fly to the water body and seats on a tree branch

hanging close to the water. After that the bird exhibits a fixed pattern of action. The bird takes a shallow dive in the water (Fig. 6) and returns back to the branch, seats there for a while, shakes its body to remove all the water and then again takes a second dive.



Fig. 6. Bathing behaviour of A. Male and B. Female bird.

The bird takes three subsequent dives and returns back to the nest. The time of bathing was found to be very specific and it gradually shifts from 12 noon to 4:00 p.m. in the afternoon.

Initially during the egg incubation period and 1-2 days after hatching of the eggs the bathing time was found to be approximately around 12 noon to 1:00 p.m. After 5-6 days of hatching the bathing time shifted to 2 to 3:00 p.m. and after 14 or 15 days of hatching bathing time shifted to 4 to 5:00 p.m. in the afternoon.

Ethogram

Based on our observation the following ethogram was prepared (Table 2). The behaviour of the Asian paradise flycatcher have been grouped into six behavioural classes. Each class was divided into a number of behavioural categories.

Table 2. Ethogram of Asian Paradise flycatcher.

Behavioural class	Behavioural Category	Definition
Locomotive / movement behaviour	Walking/Hopping	Locomotion through movement of legs on the branch of the tree
	Flying	Locomotion with the help of the wing, flying from one place to another
	Preening	Clear and fix feather using the beak
Body care behaviour	Thermoregulation	Beak slightly open to ensure panting and it lasts for more than 1-2 seconds.
	Defecation	Expelling the excreta
	Stretching	One or both the wing stretched
Resting behaviour	Resting	Standing stationary on the nest or branch , with folded wings and open eyes
	Sleeping	Sitting or lying in the nest or branch with eyes closed
Consumption behaviour	Eating	Eating food mostly insects
	Maintenance/Drinking	Drinking Water
	Grooming/ Allopreening	Cleaning the fur /body of other individual of same species
Social behaviour	Observing conspecific	Looking at same species
	Observing other species	Being watched by same species
	Building /repairing nest	Looking at / observing other species
	Incubation	New nest was built / repaired using different nesting material
	Brooding	Lying on the egg, body in horizontal position with belly in direct contact with the egg
	Food begging by chicks	Close contact of the frontal body with the chick to transfer heat
	Provides food	The chicks lies on the belly inside the nest, the head is held high pointing towards the adults with mouth wide open
Nesting and parental care	Receives food	The beak of the adult and the chick are in very close contact and the adult regurgitates food for the chick
	Protecting chicks from rain	The beak of the adult and the chick are in very close contact and the chick ingests the food received from the adult.
	Clearing droppings of the chick	During rain both the parents sits on the edge of the nest and spreads the wing so as to cover the nest, preventing rain water from entering the nest.
	Cleaning the nest	The adult is seen to clear dropping from the anus of the chicks
		Both the sexes were found to clean the nest regularly. the droppings were taken away from the nest for disposal.

Discussion

The present study documents the nesting behaviour and the parental care of Asian paradise flycatcher from North 24 pgs of West Bengal. Our results were based on the observation from 12 nests. We have also constructed an ethogram based on the observed behavior. In Asian paradise flycatcher, males can be of three types, rufous morph with long tail, rufous morph with short tail (without the long tail feather) and white morph with long tail feather. The exact explanations for the coexistence of these 3 morphologically different males are not totally understood.

We also found intermediate morphed male, supporting the hypothesis that the rufous males matures into white morph. However to conclude on such a notion more detailed research over a much longer period with larger number of birds are needed. We in this study have included long tailed males both white and rufous. It is a bit difficult to explain exaggerated ornamentation in monogamous birds (Mizuta T. and Yamagishi S. 1998). Even though Asian paradise flycatcher is a monogamous species, they exhibit exaggerated ornamentation in form of the long tail feather.

There are very few reports regarding the nesting behaviour of Asian paradise flycatcher. However these studies are on single or very few nests. Moreover, whatever reports are there, they do not corroborate well with each other. Mizuta and Yamagishi 1998 reported the incubation period to be 14-16 days and Nilemesh Das & Shuvadip Adhikari (Das, N. & Adhikari S 2019) reported the incubation period to be 23-26 days. We in our study found the incubation period to be 15-18 days. Our observation corroborates well with that study of Gokula and Vijayan (Gokula V. & Vijayan L. 2003) from south India. The males and females take part in nest building, incubation of eggs and parental care. One previous report suggests that only females feed the chicks with occasional intervention by the males. However we found that both the sexes were involved in feeding the chicks. The parent birds continue feeding even after the chicks come out of the nest till they start flying.

The bathing behaviour and time associated with it is a very unique observation reported. We do not exactly know the reason for the time shifting but it would be interesting to understand this behaviour in details. The bathing could be a reason for choosing the nesting site near an undisturbed water body.

The ethogram represents different behavioural activities in connection to nesting and parental care of Asian paradise flycatcher. This ethogram was prepared based on the observation during study period. More detailed study is required to document all the behavioural activity of Asian paradise flycatcher.

In a nutshell, our study provides a detailed description of the nest, nesting behaviour and parental care of Asian paradise flycatcher from North 24 Parganas, West Bengal. This will contribute in better understanding of the behavioural biology of these birds.

Acknowledgement

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