DOI: https://doi.org/10.36094/sc.v89.2024.A_Study_on_Certain_Behavioural_Aspects.Saha_Mukherjee Saha.114

Research Communication

Sci. and Cult. 90 (3–4) : 114-121 (2024)

A Study on Certain Behavioural Aspects of Blue Throated Barbet (*Psilopogon asiaticus*) During Covid-19 Lockdown in Selected Habitat of Coochbehar, West Bengal

***Abstract*: In India lockdown started on 23rd March, 2020 due to pandemic situation of COVID-19 for the outbreak of SARS-CoV-2 at first for 18 days and then extended in phases with the imposition of strong restrictions for movement. By then lockdown was already there in several countries of the World. In all over the world peoples encountered with the situation like a house arrest. All the social, official, commercial and institutional activities were restricted and regimented for the people. During our walk at the Bungalow premises we have observed 35 species of birds. We have attracted toward Blue-throated Barbets (*Psilopogon asiaticus*) during our walk and documented the roosting, nesting, foraging behaviour of the Blue-throated Barbets. We have found great camouflage adaptation of Blue-throated Barbets and several times only bird call/song helped us to sight the bird. We have recorded bird calls/songs and all the data related to sighting and audio were submitted to eBird platform. Spectrograms of audios were analyzed to decipher the bird call/song. Lockdown helped us to learn fundamental lessons of ornithology.**

Keywords: COVID-19, Lockdown, Blue-throated Barbet, Call/Song, Ornithology

As per the IUCN, Blue-throated Barbet (*Psilopogon asiaticus*) is having the conservation status as 'Least Concern' and due to that CITES (Convention on International Trade in Endangered Species) of wild fauna and flora did not evaluated the species till date. Probably this may be reason that though some sporadic and discrete information, photographs about Blue-throated Barbet (*Psilopogon asiaticus*) is available on internet, but hardly any detail and specific scientific study available on ecology, behaviour, preferred food and habitats, among other specializations of Blue-throated Barbet. Even the generation of data through citizen science approach is very scanty with respect to the conservation of Blue-throated Barbet. Analysis of spectrograms of bird calls from the ornithological perspective is totally an advance approach of bird watching, which has been studied in this paper. So, the scope of this paper actually addressing the data deficiency of blue throated barbet in the field of basic as well as advance lessons of ornithology with the objective of its conservation, beyond mere bird watching.

During the first phase of Covid-19 Lockdown, we have started to watch and photo-document birds. As part of that we began studying ornithology of a bird, Blue-throated Barbet (*Psilopogon asiaticus*). This bird is also famous as "***Nilkantha Basantbauri***" (***Nilkantha*** = Blue-throat + Harbinger of spring season = ***Basantbauri)*** [1]**.** The beautiful plumage colour, songs of the bird inspired us to revisit the fundamentals of the Blue-throated Barbet from our backyard.

Study Area: The study was conducted at the premises of the 'Motabash Bungalow' of Jaldapara Wild Life Division, Nilkuthi and also in the adjacent Bungalow premises of Divisional Forest Officer (DFO), Coochbehar Division in West Bengal of India and the GPS coordinates of the site was as N 26°19'30.47", E 089°27'59.56" (Fig 1).

Materials and Methods: In our backyard certain behavioural aspects including Foraging, Roosting, Singing

Fig. 1 Google Map of the Study Area

Fig. 2 Blue-throated Barbet Roosting on Semal Tree (*Bombax ceiba***)**

Fig. 3 Blue-throated Barbet Roosting on Jamun Tree (*Syzygium cumini*)

Fig. 4 Blue-throated Barbet (*Psilopogonasiaticus*) with great camouflage adaptation on Semal (*Bombax ceiba*) tree

Fig. 5 Blue-throated Barbet showing great camouflage at the time of eating Guava

Fig. 6 Blue-throated Barbet showing great camouflage by roosting at Guava (*Psidium guajava*) tree

and Breeding behaviours of Blue throated Barbet were observed during Covid-19 Lockdown, then documented and submitted to the Cornell Lab of Ornithology and Bird Count India through the eBird mobile app for further research and analysis. The eBird app helped us to get the auto generated checklist of the birds in a user friendly manner with the details of the sightings of the birds. We have observed the behaviours of bird thorough naked eye, binocular, camera and recorded them in the mode of photographs and video. Bird call was recorded through mobile phone and then uploaded in the eBird platform of the Cornell lab of Ornithology. Cornell Lab of Ornithology processed the bird call and archived as spectrograms with specific ids. We have further analyzed the spectrograms to reach specific conclusions. The study was conducted in between 03-May-2020 to 22-June-2020, during Covid-19 Lockdown in selected habitat of Coochbehar, West Bengal. We have gone through lots of observations, but able to scientifically record 42 observations and submitted in the eBird platform of the Cornell Lab of Ornithology as scientific documentation.

Results and Discussion: **Elaboration of Bhavioural Aspects:** Among the behavioural aspects of Blue throated barbets (*Psilopogon asiaticus*) studied during Covid-19 Lockdown, the birds were found busy mostly in roosting, foraging, singing/calling and breeding activities during different parts of the day (Table 1). Foraging and carrying of food were observed mostly in morning and in afternoon. Roosting time was observed mainly in the late afternoon and evening. Singing/repetitive calling of the birds were observed mostly in the early and later part of morning. Though direct copulation of the birds were not observed, but breeding code like pair formation after the singing/ calling of another birds were observed. But Blue throated barbets were found pecking of snag trees/woods in the early morning and evening, this may be in searching for insects or nest formation like woodpecker birds of the same *Piciformes* order. As foraging time is in morning and afternoon, it may be considered that pecking of wood in the morning may be for searching of insects and pecking of woods in the evening may be for the making of nest hole, as part of the behaviour of breeding. Here it has to mention that actual excavation for the making of nest hole on tree trunk varies in between March to July, as part of the breeding behaviour of Blue throated barbet (*Psilopogon asiaticus*)[2]. Our seasonal period of observations on certain behavioural aspects, including breeding behaviour of Blue throated barbet in between 3rd May, 2020 to 22nd June, 2020 are at par with the Chanda and Bhattacharya, 2022.

Habit and Habitat: This bird was active between dawn and dusk and also sighted in pairs. For foraging, roosting, courtship this bird prefers the trees of *Bombax ceiba* (Semal) (Fig. 2), *Syzygium cumini* (Jamun) (Fig. 3), *Terminalia bellirica* (Bahera), *Terminalia chebula*, *Elaeocarpus ganitrus* (Rudraksh), *Anthocephalus cadamba* (Kadam), *Emblica officinalis* (Amla) and snag trees i.e. dead, decaying trees important for wildlife habitat[1] (Fig. 4). So, these trees should be maintained in the available land of backyard to conserve this bird [1].

As per the previous study Blue-throated Barbet prefers the fruits of *Ficus benghalensis* (Banyan tree) and *Ficus religiosa* (Peepal tree) [1]. We have also observed that in our backyard they are eating the ripened Guava (*Psidium guajava*) fruits in the morning (Fig. 5). During the study we have planted saplings of Guava (*Psidium guajava*) trees to enrich the habitat further for the Blue-throated Barbets and other backyard birds.

Camouflage through Plumage: Deep green plumage colour of Blue-throated Barbet shows great camouflage adaptation in the green foliage of all the above mentioned trees of the backyard of the Bungalow of Divisional Forest Officer, Coochbehar in West Bengal. During study we have found that blue throat, cheeks and red on crown separate these birds from the deep green foliages of the Semal (*Bombax ceiba*) (Fig. 4) and Guava (*Psidium guajava*) trees at the time of roosting and foraging (Fig. 5, Fig. 6). Also blue throat and cheeks differentiate the Blue throated barbet from all but the allopatric Yellow-fronted Barbet and Blue-eared Barbet which lacks red on crown [3] and it is a relevant identifying character to distinguish the different species of the genus *Psilopogon*.

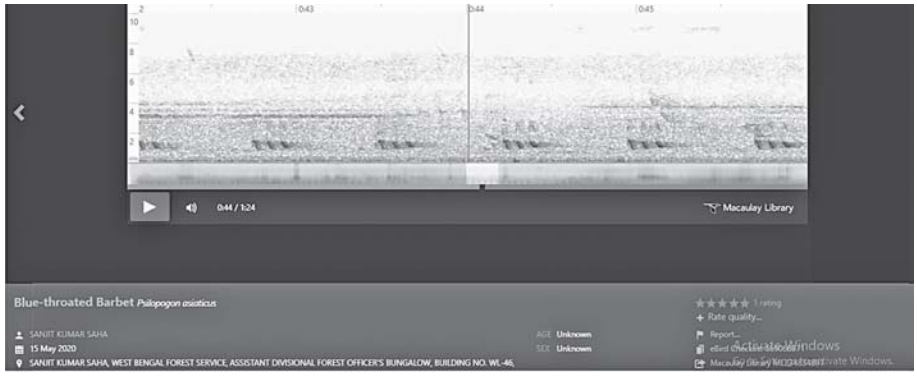

Fig. 7 Graphical representation (kHz Vs Time) of the bird calls of the Blue-throated Barbet

Table 1 Behavioural Aspects of Blue Throated Barbet (*Psilopogon asiaticus*) Observed during Covid-19 Lockdown

Date	Bird Count	Time	Behaviour Code Observed	Details	Parts of the Day
22-Jun-20	1	6:43 PM	Roosting	-	Late Evening
20-Jun-20	2	2:33 PM	Foraging	Carrying Food	Early afternoon
19-Jun-20	1	6:18 PM	Roosting	-	Evening time
18-Jun-20	1	5:58 PM	Roosting	-	Evening time
16-Jun-20	1	6:04 PM	Roosting	-	Evening time
15-Jun-20	1	6:43 PM	Roosting	-	Evening time
14-Jun-20	1	3:05 PM	Roosting		After Noon
13-Jun-20	1	12:12 PM	Singing	Found with the repetitive bird calls/song	Noon
12-Jun-20	1	9:33 AM	Singing	Found with the repetitive bird calls/song	Morning
11-Jun-20	1	9:07 AM	Singing	Found with the repetitive bird calls/song	Morning
10-Jun-20	1	7:45 AM	Singing	Found with the repetitive bird calls/song	Morning
09-Jun-20	1	6:47 AM	Singing	Found with the repetitive bird calls/song	Early Morning
06-Jun-20	2	5:20 PM	Foraging/ Breeding	Braced the stem of snag tree by tail feathers, at the time of pecking the woods, like Woodpecker bird of the *Piciformes* order, either may be for eating insects or nest building.	Early evening
05-Jun-20	1	4:27 AM	Singing	Repetitive bird call/song was acted as morning 'Alarm Call' for human being to wake up	Very Early Morning
04-Jun-20	1	9:02 AM	Singing	Found with repetitive bird calls/songs	Morning
03-Jun-20	1	5:42 AM	Roosting	Perched on a snag tree	Evening time
01-Jun-20	1+1=2	7:23 AM	Singing/ Breeding	One bird was singing/calling on a Teak (*Tectona grandis*) tree. After 10 minutes this singing bird and another one bird paired up on a snag tree of the campus. It was raining outside. First bird was spotted through ear-birding due to bird call/song	Early Morning
31-May-20 ear- birding	1	5:30 PM	Singing/Calling	-	Spotted through ear-birding
29-May-20	1	11:10 AM	Singing/Calling	-	Forenoon
23-May-20	2	6:07 AM	Roosting	-	Early Morning
21-May-20	1	10:39 AM	Bathing in the rain	-	Morning
20-May-20	1	3:46 PM	Roosting	-	Afternoon
20-May-20	2	9:01 AM	Singing/Calling	-	Morning
19-May-20	1	1:25 PM	Roosting	-	Afternoon
19-May-20	1+1=2	7:51 AM	One is singing and another one is moving	One bird was singing perched on a snag tree with rhythmic voice "***Tu-Ka-Tuk***" and another bird was doing canopy movement.	Morning
18-May-20	1	5:16 AM	Singing/Calling	Sighted with the repetitive bird call/song. Singing Bird.	Very Early Morning
17-May-20	1	3:19 PM	Singing/Calling	Sighted with the repetitive bird call/song. Singing Bird.	Afternoon
16-May-20	1	3:03 PM	Foraging/ Breeding	Pecking the wood of snag tree either may be for eating insects or nest building. Showed similar behaviour of the *Piciformes* order of Woodpecker birds.	Afternoon

Date	Bird Count	Time	Behaviour Code Observed	Details	Parts of the Day
16-May-20	1	1:29 PM	Roosting	-	Afternoon
15-May-20	2	3:46 PM	Carrying Food	Carrying the black ripen pod of Eastern Black Nightshade (*Solanum ptycanthum*) plant.	Afternoon
15-May-20	1	9:39 AM	Singing/ Calling	Sighted on a snag tree with repetitive bird call/song. Singing Bird.	Morning
14-May-20	1	12:16 PM	Flying/ Foraging	Flying from one canopy to another	Noon
14-May-20	1	9:22 AM	Foraging/ Breeding	Pecking the wood of a snag tree either may be for eating insects or nest building.	Morning
11-May-20	2	4:34 PM	Roosting/ Breeding	Mating pair on wild *Jamun* tree	Late afternoon
10-May-20	1	3:17 PM	Flying/ Foraging	Flown away from one tree to another	Afternoon
09-May-20	1	1:57 PM	Foraging	Flown away from West to East	Afternoon
09-May-20	2	6:55 AM	Breeding	Landed on 2 different *Elaeocarpus ganitrus* (Rudraksha) tree side by side. Then goes elsewhere. After few times that same pair came again and landed on a *Terminalia bellirica* (Baheda/Bahera) tree.	Morning
07-May-20	1	3:11 PM	Foraging (Eating)	Taking the fruit/berry of the wild tomato plant.	Afternoon
06-May-20	1	7:48 AM	Foraging/ Breeding	Pecking the wood of snag tree either may be for eating insects or nest building. Showed similar behaviour of the *Piciformes order* of Woodpecker birds.	Morning
04-May-20	1	3:24 PM	Foraging	Taking insects from the inflorescence of wild *Jamun* Tree	Afternoon
04-May-20	1	1:49 PM	Roosting	Single bird	Early afternoon
03-May-20	2 (as one Pair) + 1=3	4:43 PM	Breeding/ Roosting	One Pair found in suitable habitat and another one single bird was in roosting.	Late afternoon

Identification, positioning from Vocalization: **Spotting and Identification of Birds through Bird Call:** Birds can be spotted as well as identified through their characteristic sound or call. The most characteristic calls and songs have been included wherever they were considered useful for identification purposes[3]. Actually position of the birds can be confirmed by their sounds only. These vocalizations are usually fairly specific to a given species so that with practice it is possible to identify most birds simply by their calls[3]. Blue-throated Barbet is having characteristic sound or call. Nearly all bird species use vocalizations in order to communicate in certain basic situations[3]. During our study we have recorded the bird calls of Blue-throated Barbet (*Psilopogon asiaticus*) by the Voice Recorder software of mobile phone Samsung 4G Duos. Then we have converted the recorded bird calls into WAV (preferred) audio file by online conversion mode. Then submitted all the recorded bird calls in the Mcaulay Library through the add media option of the e-bird checklists of the Cornell Lab of Ornithology. Macaulay Library kept our effort of recorded bird calls of Blue-throated Barbet in their archive by graphical representation in terms of kHz Vs. Time (Fig. 7). The significance of the e-bird app of the Cornell Lab of Ornithology is that, all this data can be used further for the protection and conservation of the birds like Blue-throated Barbets and others.

Bird Call Analysis: No significant fundamental works are there regarding bird call analysis of Blue-throated Barbets. So, with the purpose of deciphering the bird call, vocalizations were recorded at the different date and time of the days. The repeated notes of the bird calls were counted and recorded with the simple mobile voice recorder for specific time duration. Frequency (in kHz) of individual bird calls were calculated by dividing the total number of bird calls (All the counted notes) with the

Table 2 Results of Analysis of Spectrogram of Bird Voice/ Call

Date	Repeated voice/bird call (x in No.)	Recorded Time (t in Sec)	Frequency (f = x/t in kHz)	Missed Note
14/5/2020	31	29	1.06	2
17/5/2020	34	29	1.17	5
1/6/2020	30	26	1.15	4
9/06/2020	20	16	1.25	4
Total	115	100	4.63	15
Average	28.75	25	1.15	3.75

recorded time duration (in Sec) (Table 2). Missed note counted was varies in between 2 – 4 of an individual continuous repetitive bird call (Table 2).

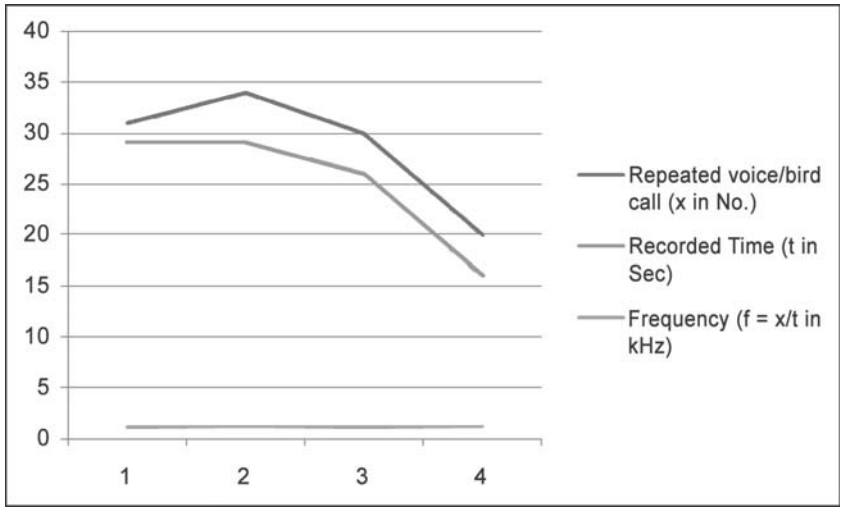

Fig. 8 Analysis of Cumulated Spectrograms of Bird Audio

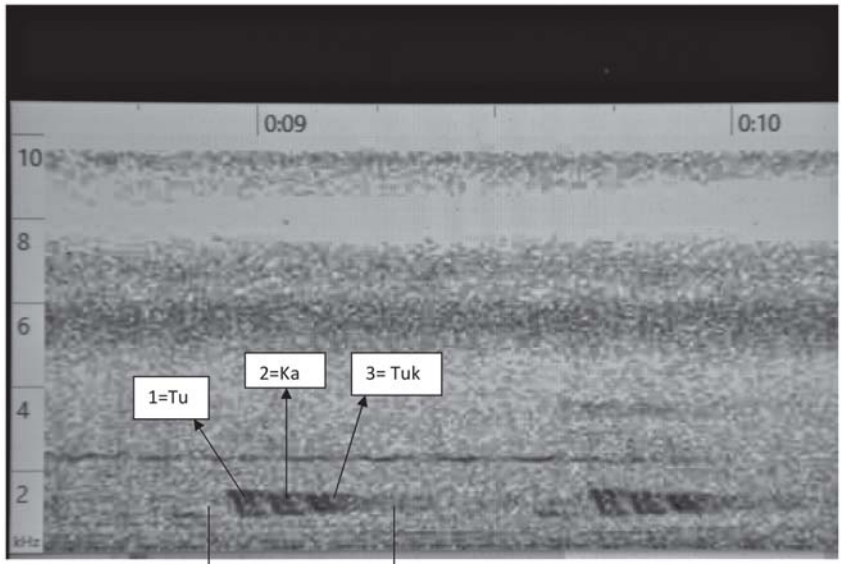

Fig. 9 Sound birding through Spectrogram analysis

Analysis of Individual Notes and Sequences: After the analysis of above mentioned spectrograms (Fig.9, Fig.10) we have found that Blue-throated Barbet combines sounds to create a sequence. Most songs are sequences, while calls are often isolated sounds. So here the recorded piece of combined sound sequence of Blue-throated barbet is most probably a song.

Spectrograms from Sound: **Analysis of Spectrograms:** A song is often defined as a relatively structured vocalization used for reproduction purposes[4]. Calls tend to be shorter, less built sounds used to communicate an anxiety or an individual's location[4]. From the spectrogram analysis we have found that, here the recorded vocalization of Blue-throated Barbet is structured one and having the transcription as *'Tu-Ka-Tuk'* in repetitive manner (Fig. 9 and Fig. 10). The Blue-throated Barbets are forming nest in between March to July[2,5]. During the study, vocalizations were recorded in the month of May, 2020 and Jun, 2020 i.e. in between March to July (Table 1). During the same period, the birds were also identified with nest hole formation/nest building (6th May, 14th May, 16th May, 6th June), pairing up in snag trees or in suitable habitat in response to the repetitive bird calls/songs of other birds (1st June, 19th May), moving together (9th May) and mating pairs (3rd May, 11th May) (Table 1). So, it can be concluded that the recorded structured vocalizations were used may be for the reproduction purposes of Blue throated barbets during that period. Ultimately the sound birding through the spectrogram analysis helped us to decipher the bird song and identify. Here remain the importance of sound birding and analysis of the spectrogram of the vocalization of bird songs/ repetitive calling.

In detail, as per the observed data of 19th May (7:51 AM), one bird was singing perched on a snag tree with rhythmic voice "*Tu-Ka-Tuk*" and another bird was doing canopy movement (Table 1). As per the data of 1st June (7:23 AM), one bird was singing/calling on a Teak (*Tectona grandis*) tree and after 10 minutes another one bird paired up with the singing bird on a snag tree of the campus. It was raining outside (Table 1).

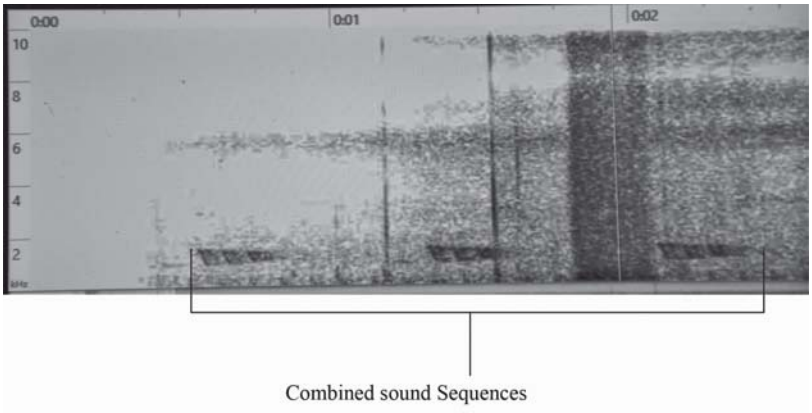

Fig. 10 Combined Sound sequences

In case of our sets of observation mentioned here, one bird paired up with another after hearing the bird song/ repetitive calling by the other bird. Darwin's theory and other bird song research suggest that song is used by male birds to attract females and compete with rivals as part of the procedure of sexual selection[6, 7, 8]. So, apparently the bird sang here may be a male bird. But in tropics both males and females of many species sing [9, 10, 11]. Female song is widespread in Australia also[12]. As per the recent survey female song is present in sampled population of 229 species out of 323 species i.e. in 71% of the surveyed species including 32 of 34 oscine families[13]. Female song is also found in 43% European passerine species in recent past[14]. In case Blue-throated Barbets also both the female and male birds can sing loudly[5]. So, only sound birding/ ear-birding will not specify either the female or male identity of the birds. But future study is required to ascertain either any specific sex or both the sexes are calling/singing prior pairing during breeding season of birds in specific to blue throated barbet or for other species of birds in general.

Visualization of Bird Call Through Spectrograms: Humans are visual creature and for most of us, our visual memory is much better than our auditory memory[4]. Therefore, the idea to analyze unfamiliar sounds is to convert them into spectrogram for visualization of a sound[4]. Higher pitched sound was determined by the higher point on the spectrogram. Here during the analysis of 'bird audio spectrogram' of Blue-throated Barbet, we have found that the pitch or frequency of the song of Blue-throated Barbet is 1.15 kHz and the result is at per as per the calculation of frequency by the fundamental method (Table 2). The frequencies of song of Blue-throated Barbets are same for all the individuals and it is independent of recording duration, day or evening time or season of the year (Fig. 8).

Conclusion

This work was done totally to inculcate scientific temper through a citizen science approach among the masses. Bird watching with the application of this advance, integrated and successfully tested model of ornithology will help other citizens of the global village to discover the new and detailed knowledge of a bird in terms of the behaviour, habitat, their interaction with the habitat and ecological significance in a holistic manner. Local level field based studies on the ethology i.e. science of animal behaviour from the biological perspective of a data deficient species like Blue throated barbet (*Psilopogon asiaticus*) definitely contribute something new to the science. Finally our study of behavioural aspect of a bird during Global exigencies like Covid-19 in a selected habitat is the execution of the plan of action to "protect, restore and promote sustainable use of terrestrial ecosystems and halt biodiversity loss", in principle with the Sustainable Development Goal-15 of the United Nations.

Acknowledgements

The authors are acknowledging all the assistance of the Bungalow staff of Coochbehar and Jaldapara Wildlife Division and also the facilitation of the Chief Conservator of Forests, Northern Circle and the Principal Chief Conservator of Forests (Head of Forest Force), West Bengal to complete the study. ❐

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Received: 13 April, 2023
Revised: 13 July, 2023

1. S.K. Saha and R.M. Saha, *Indian Forester*, 147 (12): 1244-1246 (2021), DOI:10.36808/if/2021/v147i12/153389
2. A. Chanda and T. Bhattacharya, *International Research Journal of Basic and Applied Sciences*. 7: 83-88 (2022).
3. K. Kazmierczak and B.V. Perlo, OM FIELD GUIDES-Birds of India, (Christopher Helm., London, 2000) p.44.

4. http://soundbirding.org/index.php/sound-and-spectrogram/ (2020, June 22).

5. T. Das and U. Ghosh, Amader Pakhi-Paschim Banglar Pakhi, (Rong Route, Kolkata 2015) pp.285, 288.

6. C. Darwin. The Origin of Species (Murray, 1859).

7. M.D. Beecher and E.A. Brenowitz, *Trends Ecol. Evol.* 20: 143–149 (2005).

8. B.E. Byers and D.E. Kroodsma, *Anim. Behav.* 77: 13–22 (2009).

9. D.E. Kroodsma, J.M.E. Vielliard and F.G. Stiles, in Ecology and Evolution of Acoustic Communication in Birds (Cornell University Press, 1996) *eds Kroodsma, D. E. & Miller, E. H.*, 269–281.

10. E.S. Morton, in Ecology and Evolution of Acoustic Communication in Birds. (Cornell University Press, 1996), *eds Kroodsma, D. E. & Miller, E. H.*, 258–268.

11. P.J.B. Slater and N.I. Mann, *J. Avian Biol.*, 35: 289–294 (2004).

12. A, Robinson, *Emu*, 48: 291–231 (1949).

13. K.J. Odom, M.L. Hall, K. Riebel, K.E. Omland and N.E. Langmore, *Nature Communications*.5.3379 doi: 10.1038/ncomms4379 (2014).

14. L.Z. Garamszegi, D.Z. Pavlova, M. Eens and A.P. Moller, *Behav. Ecol.*, 18: 86–96 (2007).