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Diversity and Seasonal activities of Munias with preferent wild grasses in Rajarhat marshy grassland, West Bengal, India

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ABSTRACT

The Scaly-breasted Munia *Lonchura punctulata*, Tricolored Munia *Lonchura malacca*, White-rumped Munia *Lonchura striata*, and Indian Silverbill *Euodice malabarica* are members of the Estrildidae family and are native to both India and Sri Lanka, however the Chestnut Munia *Lonchura atricapilla* and Red Avadavat *Amandava amandava* are only found in India. They typically congregate in groups of several birds and occasionally sit alongside other munia species in plains near water sources, marshy grasslands, or even high altitude grasslands. By using the point-count approach, the diversity and seasonal activities of Munias with preferent wild grasses were identified from August 2021 to July 2022 in Rajarhat, West Bengal, a marshy grassland area. The findings showed that the Scaly-breasted Munia (3164), Tricolored Munia (773), Red Avadavat (548), Chestnut Munia (107), and Indian Silverbill (100) were the most prevalent species. Only two White-rumped Munia were found at the site during the study period. In the research location, munias were seen gathering for nesting and foraging from 13 different types of grasses and most usable grasses were *Saccharum spontaneum* and *Echinochloa colona*. January had the most Munias (3540), followed by December (624), while April had the fewest (23). For bird watching, Rajarhat's grasslands, especially Munia, are well-known. But in the past ten years, Rajarhat's land-use pattern has altered significantly, and the amount of grassland is disappearing at a startling rate.

Keywords: Estrildidae, *Lonchura*, Pakhibitan, Munia, Rajarhat

1. INTRODUCTION

Birds in the genus of *Lonchura*, *Euodice* and *Amandava* that are part of the Estrildidae family are referred to as "munias". They are small, gregarious birds that primarily eat grass seeds or ground seeds, nutlets, crops, filamentous algae, and small insects. Stubby bills and stocky bodies almost have the same size and structure of them [1]. They are mostly found in marshy grasslands, plains near water sources, and even high altitude grasslands (2500 m). They frequently congregate in flocks of several birds and sometimes perch with other species of Munias [2].

Though all these Munias consume the seeds of wild grasses, mostly, but in southern Indian states they are regarded as agricultural pests because they eat a lot of planted cereals like Finger Millet (*Eleusine coracana*), Jowar (*Sorghum bicolor*), Little Millet (*Panicum sumatrense*) Pearl Millet (*Pennisetum glaucum*) and Rice (*Oryza sativa*).

These Munias took roost in dense shrubs such as *Cotoneaster buccifolius*, *Flueggea leucopyrus*, *Lantana camara*, *Carissa spinarum* as well as a number of wild trees, ornamental plants like *Cycas revoluta*, *Dyopsis Ficus benjamina* and avenue trees. They also construct nests in the marshy grasslands and a few in the palm trees where they can gather some particular wild grasses for use as nesting materials during the breeding season [3]. These Munias are Scaly-breasted Munia (*Lonchura punctulata*), Tricolored Munia (*Lonchura malacca*), Chestnut Munia (*Lonchura atricapilla*), White-rumped Munia (*Lonchura striata*), Indian Silverbill (*Euodice malabarica*) and Red Avadavat (*Amandava amandava*) which are found in Rajarhat Grassland.

Scaly-breasted Munia (*Lonchura punctulata*) was described in the year of 1758 by Carl Linnaeus. Adults are typically dark chestnut-brown on top and white underneath, with a fine dark scaly pattern on the belly. Juveniles plain brown all over with slightly paler underparts. They are indigenous to southern Asia and highly adaptable, found in a variety of human-modified environments [4]. They build dome like nests where they use dry grasses, plant fibers, feathers, and tinder as nesting materials [5].

Tricolored Munia (*Lonchura malacca*) is a small, finch-like, granivorous bird. It is native to India and Sri Lanka [6]. The adult has rufous brown upper parts and black head. A broad white band running from the flanks across the lower breast. Black belly in the centre and under tail-coverts. Thick grey bill. The juvenile has uniform brown upperparts and buff to whitish underparts.

Chestnut Munia (*Lonchura atricapilla*) was previously considered as Tricolored Munia (*Lonchura malacca*). Now recognized as a separate species [3]. Head is black and chestnut lower breast and flank, thick silvery-blue bill in adult. While young have a plain sandy brown colour body with slightly darker wings.

White-rumped Munia (*Lonchura striata*) is about 10-12 cm long. Dark breast and wings, streaked upper parts. The rump is typically white, and a pointed tail that is black in color. Throat is dark brown color However, in juvenile has barred brown buff on throat and breast [7].

Indian Silverbill (*Euodice malabarica*) also called as White-throated Munia. Small, long-tailed finch with a chunky body and short, stout bill. Gray-brown above and pale below with a whitish rump and black-pointed tail. But Juvenile lacks barrings on flanks, has dark mottling on rump, tail is shorter and more rounded.

Red Avadavat (*Amandava amandava*) is a native of South and South-east Asia. They are extensively found in India except in parts of arid and semi-arid landscapes in the north-west

and the Deccan Plateau [8]. It typically gathers in small flocks on flat plains with thick grasses close to water sources [9]. Males are largely red and covered in white spots with dark wings and tail. Females are gray with a rufous rump. Both sexes have a red beak.

So, the purpose of this study was to evaluate the seasonal diversity of these Munias, their interactions with various plants species, and to emphasize Rajarhat's importance in terms of Munia diversity.

2. RESULT (MATERIALS AND METHODS)

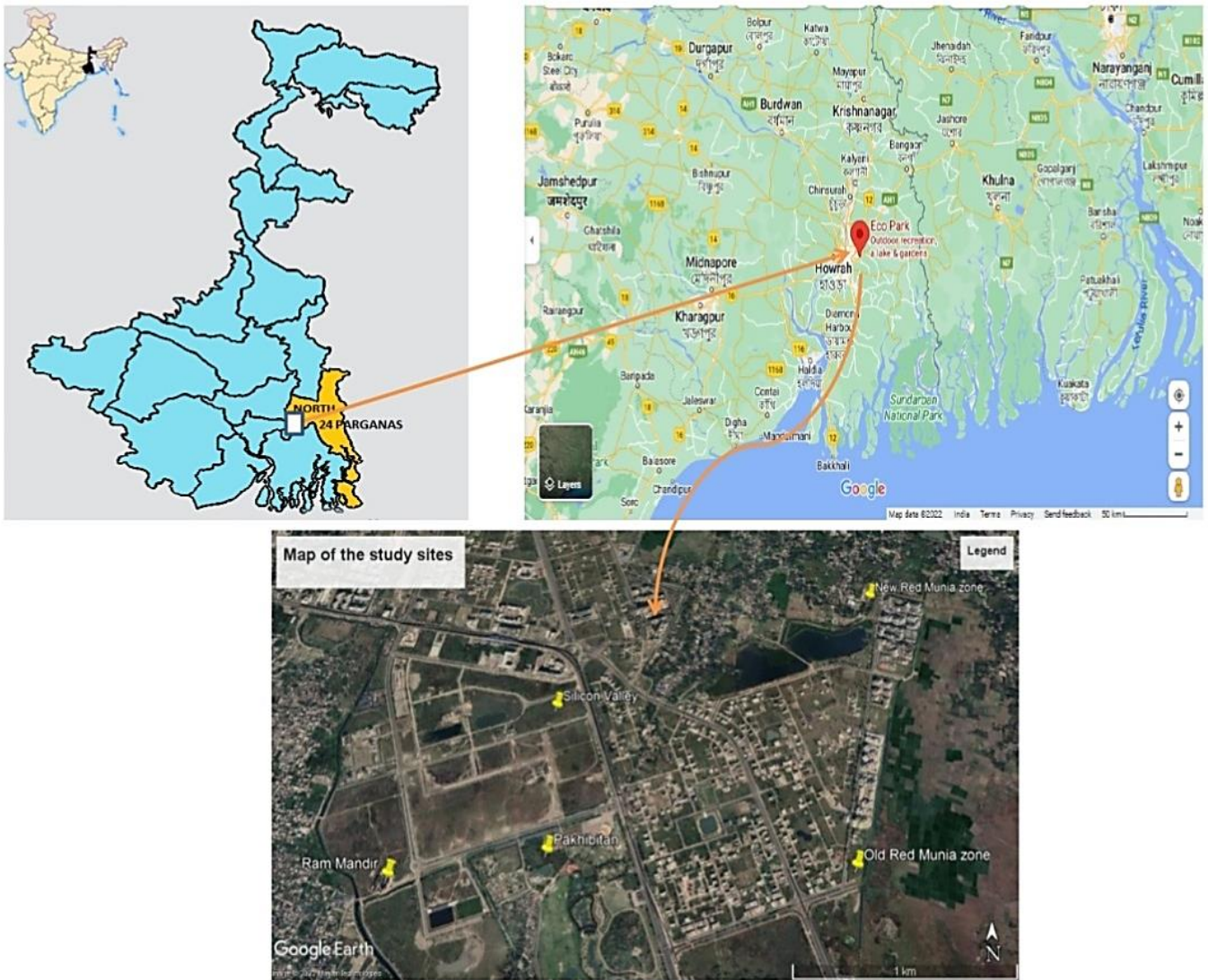


Figure 1. Map of the study areas

The study was conducted in marsh areas in Rajarhat, West Bengal, from August 2021 to July 2022. The Rajarhat area was essentially a wetland, but due to its proximity to the Netaji

Subhash Chandra Bose International Airport (22°39'11.34"N 88°26'41.54"E), it is now being negatively altered to make way for rapid development. In this urban environment, the Rajarhat wetland has long been popular for munias, especially Red Avadavat (*Amandava amandava*). Five grassland sites from this wetland were chosen for this study are given below (Table 1 and Figure 1).

Table 1. Study areas with GPS

Spot-1	Ram Mandir	22°36'29.09"N 88°27'23.05"E
Spot-2	Silicon Valley	22°36'57.19"N 88°27'49.17"E
Spot-3	Old Red Munia Zone	22°36'30.40"N 88°28'40.78"E
Spot-4	New Red Munia Zone	22°37'19.60"N 88°28'51.14"E
Spot-5	Ecopark Pakhibitan	22°36'32.71"N 88°27'49.08"E

Two days a week, continuous spot visits were made in the morning and afternoon. Morning and afternoon are chosen because munias are most active at those times as they show high foraging behavior in the morning and moving behavior in the afternoon [10]. During these times, munias' activities for foraging throughout the year were most evident. Birds were counted using 100-m fixed-radius point counts [11] of 10 minutes duration without a waiting time [12]. The number of times the same bird may be counted twice was limited by leaving a 50 m buffer between one point's bird count and the next. All pictures were taken with a Nikon Coolpix 60x camera (Photoplate 1 and Photoplate 2). Notes were taken for documenting the species-specific plant dependence of munias, which plants and what plant parts they are collecting as nesting materials and what are they feeding on from which species of grass [13-16]

3. DISCUSSION

Six different species of munias, which are members of the Estrididae family and include the Scaly-breasted Munia (*Lonchura punctulata*), Tricolored Munia (*Lonchura malacca*), White-rumped Munia (*Lonchura striata*), Chestnut Munia (*Lonchura atricapilla*), Indian Silverbill (*Euodice malabarica*) and Red Avadavat (*Amandava amandava*), were spotted during this survey. The results showed that *Lonchura punctulata* L. 3164 (67% of the species) was the most prevalent, followed by *Lonchura malacca* 773 (17%), *Amandava amandava* 548 (12%), *Lonchura atricapilla* 107 (2%), and *Euodice malabarica* 100 (2%). Only twice during the study period did two *Lonchura striata* appear throughout study period from this areas.

Scaly-breasted Munias *Lonchura punctulata* are the most common of all the munia species found almost throughout the year in all parts of the study area (Table 2). They were observed in groups of 5 to 12, although during their breeding season, they were more frequently observed in pairs. They has been observed gathering part of wild grasses for nesting in the beginning of the month of May and lasting through October, they have been observed. During the months of September and October, their nests were primarily visible at spot-5 in the palm

tree and a few shrubs. They were typically spotted with young in small groups from November to January. The most frequently observed *Munia* in the study area peaked in January and then gradually declined after that.

Table 2. Seasonal activities of *Lonchura punctulata* in study areas

<i>Lonchura punctulata</i>					
	Spot-1 Ram Mandir	Spot-2 Silicon valley	Spot-3 old Red Munia zone	Spot-4 New Red Munia zone	Spot-5 Ecopark Pakhbitan
Aug-21	Nesting Material collection	Foraging	Foraging	Foraging	Nesting Material collection
Sep-21	Nesting Material collection, Nest	Foraging	Foraging	Foraging	Nest
Oct-21	Nesting Material collection	Foraging	Foraging	Foraging	Nest
Nov-21	Foraging	Foraging	Foraging	Foraging	With Sub-adult
Dec-21	With Sub-adult, Foraging	With Sub-adult, Foraging	With Sub-adult, Foraging	With Sub-adult, Foraging	With Sub-adult
Jan-22	With Sub-adult, Foraging	With Sub-adult, Foraging	With Sub-adult, Foraging	With Sub-adult, Foraging	With Sub-adult
Feb-22	Foraging	Foraging	Foraging	Foraging	Foraging
Mar-22	Foraging	Foraging	Foraging	Foraging	Foraging
Apr-22	Foraging	Foraging	Foraging	Foraging	Foraging
May-22	Foraging	Foraging	Foraging	Foraging	Nesting Material collection
Jun-22	Foraging	Foraging	Foraging	Foraging	Nesting Material collection
Jul-22	Nesting Material collection	Foraging	Foraging	Foraging	Nesting Material collection

The Tricolored Munias *Lonchura malacca* are the second-most common species of munia in this area, according to the research (Table 3). The summer months of March, April, and May observed very few sightings. They were eventually spotted once more in September, at the start of their nesting season in July. They were observed in pairs during the breeding season gathering grass for their nests. Otherwise they were usually seen in small groups of 5 to 7. Tricolored Munia *Lonchura atricapilla* were spotted with their young from November to January in all of the study areas. Nesting evidence for them was found in the bushy trees in spot-1 in September. One or two hybrid Munias, thought to be a cross between the Tricolored Munia *Lonchura malacca* and the Chestnut Munia *Lonchura atricapilla*, were observed in their group throughout the study period.

Table 3. Seasonal activities of *Lonchura malacca* in study areas

<i>Lonchura malacca</i>					
	Spot-1 Ram Mandir	Spot-2 Silicon valley	Spot-3 old Red Munia zone	Spot-4 New Red Munia zone	Spot-5 Ecopark Pakhbitan
Aug-21	Foraging	Foraging	Foraging	Foraging	Nesting Material collection
Sep-21	Nesting Material collection, Nest	Foraging	Foraging	Foraging	Foraging
Oct-21	Foraging	Foraging	Foraging	Foraging	Foraging
Nov-21	With Sub-adult, Foraging	With Sub-adult, Foraging	Foraging	Foraging	Foraging
Dec-21	With Sub-adult, Foraging	Foraging	Foraging	Foraging	Foraging
Jan-22	Foraging	Foraging	Foraging	Foraging	With Sub-adult, Foraging
Feb-22	Foraging	Foraging	Foraging	Foraging	Foraging
Mar-22		Foraging	Foraging		
Apr-22		Foraging	Foraging		
May-22	Foraging	Foraging	Foraging	Foraging	
Jun-22	Foraging	Foraging	Foraging	Foraging	
Jul-22	Nesting Material collection	Nesting Material collection	Nesting Material collection	Nesting Material collection	Nesting Material collection

Red Avadavat *Amandava amandava* was found to be a local migrant, primarily seen in the Rajarhat region between October and January (Table 4). According to the results, they outnumbered *Lonchura punctulata* and *Lonchura malacca*. Since late July, two groups of around 10 to 13 primarily female birds have been observed moving into the research sites. They were initially discovered together, but as nesting season gets closer, they are seen splitting up into male and female pairs and choosing nesting places. They have mostly been seen gathering nesting materials from Spot-1, Spot-3, and Spot-4 between the months of August and September. Between September and October, they have been spotted constructing their nests in locations 3 and 4. They often made their nests in grassland during the breeding season, and they could be observed gathering feathers and delicate cottony grass blossoms for the nest. From December to January, after nesting, they were seen all over the study area with their youngs, but from February to June, they were nowhere to be seen (Table 4).

Table 4. Seasonal activities of *Amandava amandava* in study areas

<i>Amandava amandava</i>					
	Spot-1 Ram Mandir	Spot-2 Silicon valley	Spot-3 old Red Munia zone	Spot-4 New Red Munia zone	Spot-5 Ecopark Pakhbitan
Aug-21	Nesting Material collection		Nesting Material collection	Nesting Material collection	
Sep-21	Nesting Material collection		Nesting Material collection	Nest	
Oct-21	Foraging	Foraging	Nest, Foraging	Nest, Foraging	
Nov-21	Foraging	Foraging	Foraging	Foraging	Foraging
Dec-21	With Sub-adult, Foraging	With Sub-adult, Foraging	With Sub-adult, Foraging	With Sub-adult, Foraging	With Sub-adult, Foraging
Jan-22	With Sub-adult, Foraging	With Sub-adult, Foraging	With Sub-adult, Foraging	With Sub-adult, Foraging	With Sub-adult, Foraging
Feb-Jun 22	For Local Migration period, they shift into another place.				
Jul-22		Foraging			Foraging

The richness of Munias were seen in January (1540 individuals), then again in December (624 individuals), when this time they are mostly seen with their youngs. Very few number of Munias were recorded in April (23 individuals) when the temperature begins to rise gradually in Kolkata (Figure 2).

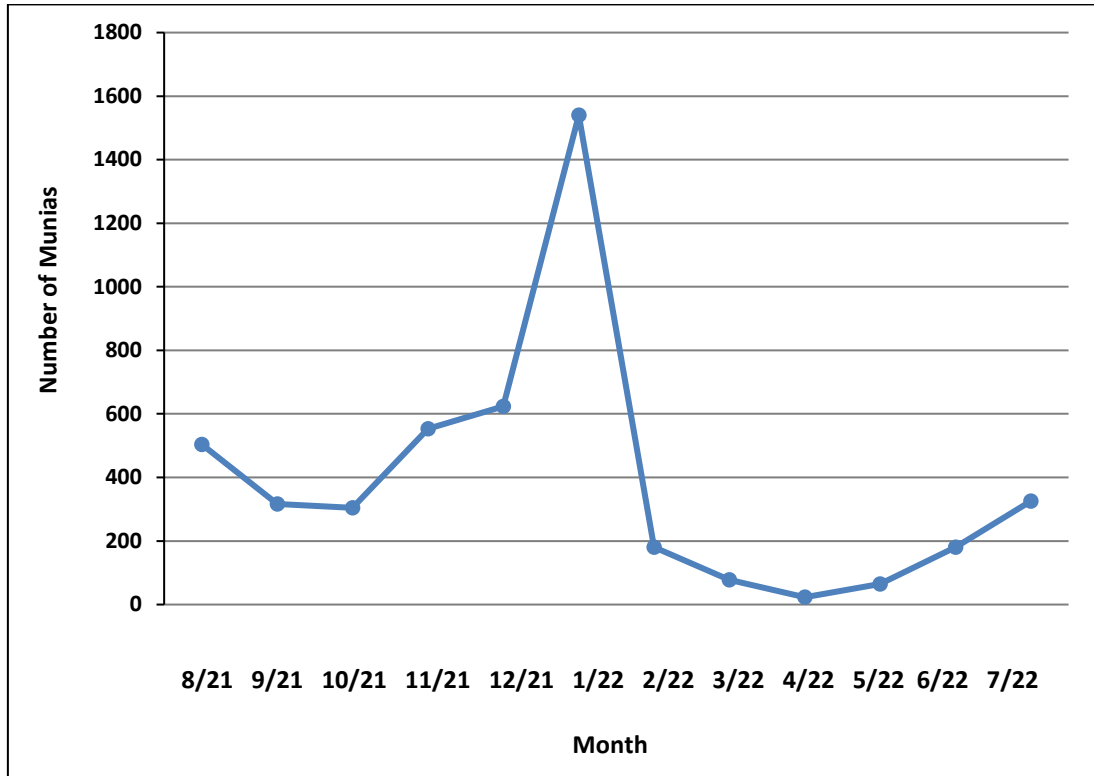


Figure 2. Month-wise abundance of all Munias throughout the study area

In the study area, munias were seen gathering materials for nesting and foraging from 13 different types of grasses (Table 5). It was found that the most suitable grasses for foraging were *Brachiaria* sp, *Cyperus* sp, *Dactyloctenium aegyptium*, *Digitaria* sp, *Echinochloa colona*, *Eriochloa* sp, *Paspalum distichum*, *Setaria pumila*, while the preferred grasses for nesting were *Arundo donax*, *Chrysopogon* sp, *Imperata cylindrica*. Inside the nest, they preferred the delicate cotton-like flowers of *Typha* sp. grasses and *Saccharum spontaneum*, especially the Red Munia. *Typha* sp also helps the munias for hiding, roosting etc.

Table 5. The relation of wild grasses with different Munias from the study area.

Sl No.	Grass Name	Usage	Scientific Name of munias					
			<i>Lonchura punctulata</i>	<i>Lonchura malacca</i>	<i>Lonchura atricapilla</i>	<i>Amandava amandava</i>	<i>Lonchura striata</i>	<i>Euodice malabarica</i>
1	<i>Arundo donax</i>	Nesting	<input type="checkbox"/>					
2	<i>Brachiaria</i> sp.	Foraging	<input type="checkbox"/>					<input type="checkbox"/>

3	<i>Chrysopogon</i> sp.	Nesting	<input type="checkbox"/>					
4	<i>Cyperus</i> sp.	Foraging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
5	<i>Dactyloctenium aegyptium</i>	Foraging	<input type="checkbox"/>					
6	<i>Digitaria</i> sp.	Foraging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
7	<i>Echinochloa colona</i>	Foraging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
8	<i>Eriochloa</i> sp.	Foraging	<input type="checkbox"/>					
9	<i>Imperata cylindrica</i>	Nesting	<input type="checkbox"/>	<input type="checkbox"/>				
10	<i>Paspalum distichum</i>	Foraging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
11	<i>Saccharum spontaneum</i>	Nesting, Foraging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
12	<i>Setaria pumila</i>	Foraging	<input type="checkbox"/>					
13	<i>Typha</i> sp.	Nesting	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

Note: This Mark () is used for wild grasses uses by munias species.

All Munias were observed during this survey engaging in seasonal activity, such as nesting and foraging, in the five locations. This allowed researchers to learn more about the species' availability in the area, breeding season, and dependence on different wild grasses.

Every grass listed in (Table 5) was used by *Lonchura punctulata*. The majority of Munias were seen foraging on *Echinochloa colona*. The munias breeding season began in October and is timed to coincide with *Saccharum spontaneum*'s flowering season. All munias have been observed using these flowers to construct their nests, but more activity and uses were seen by Red Avadavat (*Amandava amandava*).

Seasonal activities of Chestnut Munia (*Lonchura atricapilla*) in study areas

No such information was discovered about them; they were usually seen in groups of one or two Tricolored Munias. They used to forage alongside them. They were not seen gathering nesting materials or mating.

Seasonal activities of Indian Silverbill (*Euodice malabarica*) in study areas

Although this species is resident, it was not found in large numbers during this study, unlike the *Lonchura punctulata*, *Lonchura malacca*, and *Amandava amandava*. Only in spots 1 and 5, they were found foraging in small groups of 5 to 7 from October to January. During this survey, no nesting activities were discovered, but some evidence of a useless nest was discovered in spot-1.

Seasonal activities of White-rumped Munia (*Lonchura striata*) in study areas

During the survey, *Lonchura striata* found the lowest in Rajarhat. In July, only two of them were spotted at spot-5. They are of local status and have been seen in large numbers in the Rajarhat vicinity.

4. CONCLUSIONS

Bird watching is popular in Rajarhat's grasslands, particularly watching the munias. Rajarhat's natural environment is gradually fading due to the city's rapid expansion. Wetlands, grasslands, and other natural areas are being converted into human habitats and case of burning down the still existing grassland in the name of cleaning and clearing during winter is a regular happening. Along with it, the grassland's wild grasses that the munias depend on for nesting and foraging have disappeared if local authorities didn't take any action to protect this grassland. Due to the lack of adequate habitat, the diversity of the munias would gradually decline. This survey has brought attention to how the munia species are doing right now in this area. Public awareness is needed to prevent actions like tree-cutting and grass-land burning during the munias' breeding season, which is from October to January.

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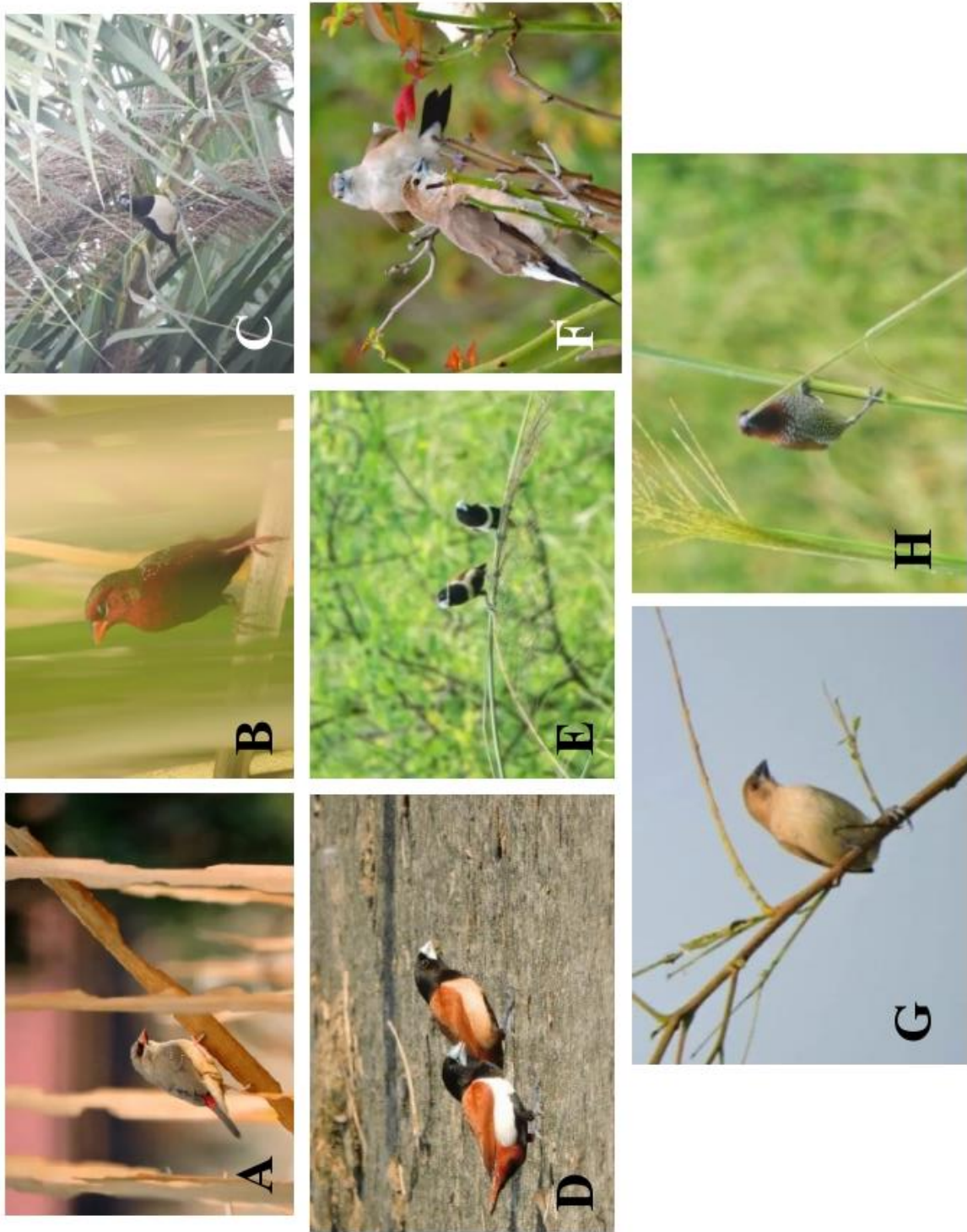
Biography

Lina Chatterjee is a research associate of the Nature Mates-Nature Club. Her aim is to preserve wildlife, bring awareness to the common people through her own mother tongue, document it with scientific information in literature for easily accessible to everyone, and grow interest in wildlife among the students through wildlife art creativity. She has published so many books related to wildlife, conservation, and awareness. Tarak Samanta is a Field Biologist at Nature Mates-Nature Club. His study is based on monitoring avifaunal diversity, EIA Biodiversity survey and documentation of wildlife. Nandana Chaudhuri and Sumana Besra is a research intern of Nature Mates-Nature Club. Arjan Basu Roy is the Secretary of Nature Mates-Nature Club, India. His major focus is on working in the field of wildlife conservation in West Bengal and also pan India basis. He is interested in the process of inclusive development, bottom-up conservation approach and habitat creation, and restoration in the urban landscape. He has published several books and research articles.

References

- [1] Avery, Michael L. Diet and Breeding Seasonality among a Population of Sharp-Tailed Munias, *Lonchura striata*, in Malaysia. *The Auk* 97.1 (1980) 160-166
- [2] Arigela, R. K., Siddabathula, N., Prasad, K. and Singh, R.K. Preferent wild grasses of Scaly-breasted Munia (*Lonchura punctulata*) in Andhra Pradesh, Tamil Nadu and Telangana. *NeBIO* 11 (1) (2020) 13-17

- [3] Bhatt, Yagnesh, Bimal Patel, and B. M. Parasharya. Range extension of Chestnut Munia *Lonchura atricapilla* to Gujarat, western India. *Indian BIRDS* 14 (6) (2018) 166-168
- [4] Conn, Alyssa R., Lynn Chamberlain, and Daniel M. Brooks. Ecology, behavior and reproduction of an introduced population of Scaly-breasted Munias (*Lonchura punctulata*) in Houston, Texas. *Half a Century of Ornithology in Texas: The Legacy of Dr. Keith Arnold* (2017) 42-55
- [5] Chatterjee Lina, Samanta T, Sinha S, Besra S, Roy A. B. Nesting Pattern and Nest Predators of Some Resident birds of Ecopark, an Urban Park in Kolkata, West Bengal. *International Journal of Advanced Research* 10(8) (2022) 110-119
- [6] Pandian, M. Observations on the foraging behavior of Tricoloured Munia *Lonchura malacca* (Linnaeus, 1766) and its interaction with pearl millet fields in Villupuram District, Tamil Nadu, India. *Journal of Threatened Taxa* 13.14 (2021) 20201-20208
- [7] Joshi, Kamal Kant. Distribution of White Rumped Munia (*Lonchura striata acuticauda* Hodgson, 1836) at Doon Valley (Lower Garhwal Himalaya) of Uttarakhand, India. *International Journal of Ecology and Environmental Sciences* 44.1 (2018) 11-15
- [8] Pandian, M. Nesting habits of the Red Avadavat *Amandava amandava* in Viluppuram District, Tamil Nadu, India. (2022).
- [9] Roy, Surajit Bhadra. Red Wonder! *Science Reporter* 54 (7) (2017) 36-37
- [10] Dwijayanti, E., U. Nurlaily, and T. H. Widarto. Study on the daily activity of scaly-breasted Munia (*Lonchura punctulata*) in the Indonesian rice field. *IOP Conference Series: Earth and Environmental Science* 948 (1) (2021)
- [11] Hutto, Richard L. The composition and social organization of mixed-species flocks in a tropical deciduous forest in western Mexico. *The Condor* 96.1 (1994) 105-118
- [12] Savard, Jean-Pierre L., and Tracey D. Hooper. Influence of survey length and radius size on grassland bird surveys by point counts at Williams Lake, British Columbia. *Monitoring bird populations by point counts. USDA Forest Service General Technical Report PSW 149* (1995) 49-62
- [13] Fabio Rossano Dario. Xingu River's Big Bend: great diversity of birds in the Brazilian Amazon rainforest. *The Institute of Biopaleogeography named under Charles R. Darwin* 4 (2021) 1-56
- [14] Fabio Rossano Dario. Landscape and birds diversity in the Kayabi and Apiaká indigenous territories in the Amazon rainforest. *The Institute of Biopaleogeography named under Charles R. Darwin* 7 (2021) 1-57
- [15] Fabio Rossano Dario. Scientific expedition in Bororo indigenous territory in the Brazilian Savanna. *The Institute of Biopaleogeography named under Charles R. Darwin* 9 (2021) 1-60
- [16] Fabio Rossano Dario. The Brazilian Caatinga biome where the Pankararu indigenous live. *The Institute of Biopaleogeography named under Charles R. Darwin* 10 (2021) 1-69



Photoplate 1: Munias of the study area- A) *Amandava amandava* (Female), B) *Amandava amandava* (Male), C) *Lonchura striata*, D) *Lonchura malacca*, E) *Lonchura malacca* foraging, F) *Euodice malabarica*, G) Juvenile of *Lonchura punctulata*, H) Adult *Lonchura punctulata* collecting nesting material



Photoplate 2: Some of the pictures of preferable wild grasses of the munias -A) *Imperata cylindrica*, B) *Cyperus* sp. C) *Arundo donax*, D) *Typha* sp. E) *Saccharum spontaneum*.