

VERTEBRATE WILDLIFE DIVERSITY OF SREEPUR UPAZILA, MAGURA BANGLADESH

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Abstract

The species diversity and abundance of wildlife are the important indicators of a healthy ecosystem. A survey-based scientific study on species diversity, abundance and status of vertebrate wildlife was conducted from May 2015 to April 2016 at Sreepur upazila, Magura, Bangladesh. A total of 123 species of vertebrate wildlife was recorded during the 12 months of study period. Among them, eight species (6.5%) were amphibians, 13 (10.57%) reptiles, 84 (68.29%) birds and 18 species (14.64%) were mammals. Out of 84 species of birds, 45 (53.57%) were passerines and 39 (46.43%) non-passerines. Most of the observed birds (72 species, 85.72%) were resident and the rest 12 species (14.28%) were migratory. The highest number of wildlife species was observed in winter (108 species, 87.80%), particularly in December (62 species, 50.40%). The lowest number of species was recorded in June (33 species, 26.83%). Out of 123 species of vertebrate wildlife, three (2.44%) were very common, nine (7.32%) common, 26 (21.14%) fairly common and 85 (69.1%) were common. Of the total species, 117 (95.12%) species were least concern, five (4.06%) near threatened and one (0.81%) was endangered according to IUCN Bangladesh 2015. Implementation of conservation and management plan is required to save the wildlife in the study area.

Key words: Richness; Abundance; Habitat; Threats; Conservation.

INTRODUCTION

Bangladesh acts as an intermediate area for the flora and fauna of the subcontinent due to its location (Khan 2018). The variation in climate (e.g. temperature, rainfall) and abiotic factors (e.g. soil and hydrology) has graded the whole country into 25 bio-ecological zones with diverse ecosystems (Nishat *et al.* 2002). These diverse ecosystems support more than thousands of wild fauna (Amphibia-Mammalia) and some new species has been described recently (IUCN BD 2015, Shome *et al.* 2020b, Khan 2018, Al-Razi *et al.* 2020a and b, Hakim *et al.* 2020). At present, the country has a total of 127 mammals, 680 birds, 167 reptiles and 57 amphibian species (IUCN BD 2015).

The rich and diverse wildlife in Bangladesh have been playing important roles in ecological, cultural, economic, social sector. In agricultural sector, wildlife plays an important role in pest control (both vertebrate and invertebrate pest). Besides, diseases control, scavenging, pollinating, seed dispersal, mosquito controls and providing food to human were also done by them (Islam *et al.* 2018, Jaman *et al.* 1999, Mukul 2008). But, anthropogenic activities, habitat loss and indiscriminate killing are becoming the major causes of rapid population declining in this country (Khan 2018). The wildlife population decline and species extinction are related and can occur both in protected and non-protected areas.

Non-protected areas such as rural areas of Bangladesh hold a good number of habitats (e.g. *haor*, *baor*, canal, *beel*, pond, riverine islands, agricultural lands, fallow lands, homestead forest(s) gardens, roadside trees etc.) provide support for wildlife (IUCN BD 2015, Shome *et al.* 2020b, Khan 2018, Mukul 2008). Some researches on wildlife were conducted in different regions of Bangladesh (Jaman *et al.* 2021, Shome *et al.* 2020b, Islam *et al.* 2018, Hussain and Sarker 1997, Sarker *et al.* 2001, Hossain *et al.* 2004, Jaman *et al.* 2011, Rahman *et al.* 2011, Rabbi *et al.* 2011, Jaman *et al.* 2014, Jaman *et al.* 2015). But, these are not sufficient to visualize the overall status and condition of wildlife of non-protected areas. The previous studies suggested that wildlife outside protected areas is facing numerous threats for human activities (e.g. illegal hunting, poaching, human wildlife conflict, etc.) (Jaman *et*

al.2021, Islam *et al.* 2018, Khan 2015). Besides, many wild species are killed by human due to misconception and preconception in rural areas (Jaman *et al.* 2020). A baseline survey is essential for getting proper ideas about vertebrate wildlife in an area and implementing proper management plan for conserving them. The recent record of new species along with new geographical records indicates the importance of proper management system in non-protected areas (Hakim *et al.* 2020, Shome *et al.* 2020a, Kajol *et al.* 2020).

To get an overview of the wildlife diversity, we conducted a vertebrate wildlife survey in Sreepur upazila, Magura. No previous research study has been done on wildlife in this area. This study will provide a baseline information on wildlife status, abundance, seasonal occurrence, habitat usage and threats to vertebrate wildlife in Sreepur upazila, Magura, Bangladesh.

MATERIAL AND METHODS

Study area

The study area is 179.18 Km² under the Magura district of Khulna division (Fig. 1). It is located about 176 km south-west from Dhaka city. It is located in between 23°32' and 23°41' north latitudes and in between 89°21' and 89°32' east longitudes. The study area is mainly occupied by the homestead forests and crops lands.

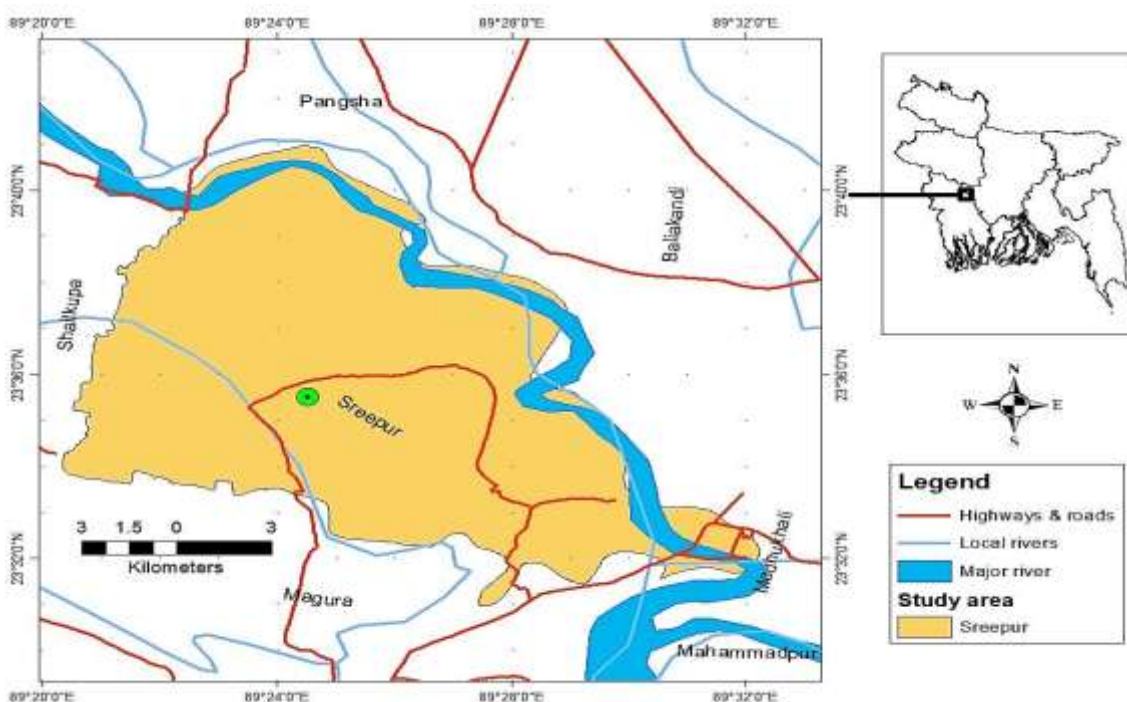


Fig. 1. Map of Sreepur upazila, Magura district –showing the study area.

Observation techniques

The study was based on direct field observation. Data collection was started in May 2015 and continued to April 2016. The study period was divided into three seasons, such as summer (March-June), rainy (July-October) and winter (November-February). The observation was made for four days in a month and each observation day was divided into three quarters. Sometimes night survey was conducted to observe nocturnal species. The observation usually started early in the morning and followed by afternoon, spent about 8 hours in a day.

Transect line method

The study area was visited in north-south direction and in total 70 transect lines were made to observe the wildlife and their habitat utilizations. The size of each transect was one km in length and 200 m wide at both sides. The same speed and direction were repeated every time.

Plot counting method

For observing the amphibian and reptilian fauna, plot counting method was used. The counting of these animals was managed in various ways, depending on the species and habitat types in the plots. A total of 50 random plots was selected in the study area. Each plot size was 200 m × 200 m.

Interview of local people

All animals are not visible in all the year round, especially nocturnal animals are not easy to observe. So, interview of the local people was taken during the study period to know about those species that are present in the study area, but not easy to observe. Sometimes the calls and songs were recorded and identified by the respective experts. The activities of different species were observed directly or with the help of a pair of binoculars. Camera with different lens was used to photograph the habitats utilized by different vertebrate wildlife. Different field guides were used to identify wildlife in the fields (Khan 2018, Halder 2010, Khan 2015).

The relative abundance of a particular species was calculated by dividing the number of individuals of that species by total number of individuals of all species multiplied by 100. To find out density of a species Khan (2015) was followed. We plotted rank-abundance curves for each group of wildlife by plotting the overall abundance against their rank following Whittaker (1965).

RESULTS AND DISCUSSION

Species richness, abundance and density

A total of 123 species of vertebrate wildlife was recorded from the study area during the study period. Among the total observed wildlife, amphibians were 6.50% (8 species), reptilians 10.57% (13 species), birds 68.29% (84 species) and mammals were 14.64% (18 species) (Table 1). Sarker *et al.* (2009) recorded 27 species of birds from two urban sites of Uttara, Dhaka. Rahman *et al.* (2013) reported 89 species of wild animals of which, six (6.74%) species were amphibians, 11 (12.36%) reptiles, 56 (62.93%) birds and 16 (17.94%) mammals from Sirajgonj, Bangladesh. Shome *et al.* (2020a) reported in total 140 species of birds belonging to 18 orders and 48 families were observed from Magura Sadar upazila. Another study recorded 209 species belonging to 79 families of wildlife from Dhaka urban areas, of them 12 species were amphibians, 19 reptiles, 162 birds and 16 mammals (Jaman *et al.* 2021). In total 4352 individuals of wildlife were counted from the study area. Among them, 1.79% (n=78) were amphibians, 1.90% (n=83) reptilians, 89.65% (n=3902) birds and 6.64% (n=289) mammals.

Amphibians

All recorded amphibian species were frogs and toad belonging to five families (Table 1). The highest abundance (n=20) and density (10/km²) was recorded for Indian bull frog (*Hoplobatrachus tigerinus*). The least abundance (n=5) and density (2.5/km²) was recorded for maculated tree frog (*Polypedates maculates*) and (*Microhyla* sp.). Indian bull frog is distributed widely in Bangladesh and can occur in every type of habitats including urban landscapes (Hasan *et al.* 2014). Thus, we also observed high number of individual of this species during the study.

Reptiles

Among the observed reptilian species, six (46.15%) species were snakes and seven (53.85%) were lizards (Table 1). No turtle species was observed or recorded through the questionnaire survey. The top most abundance (n=26) and density (13/km²) was calculated for house lizard (*Hemidactylus flaviviridis*) whereas the lowest abundance (n=1) and density (0.5/km²) was found for Indian rat snake (*Ptyas mucosa*). House lizard is an adaptive gecko species that can occur in and around human habitations as well as in forest habitats (Jaman *et al.* 2021). This kind of adaptation caused this reptile species to be the most abundant species in the area.

Birds

Diverse group of birds in term of feeding behaviour was observed. The number of the Passerine bird species was 45 (53.57%) and of the non-passerines 39 (46.43%). Among the recorded bird species, 72 (85.72%) species were resident and 12 (14.28%) were migratory. The maximum abundance (n=752) and density (26.85/km²) was recorded for common myna (*Acridotheres tristis*) and the minimum abundance (n=1) and density (0.036/km²) was for orange-headed thrush (*Zoothera citrina*) (Table 1). Common myna is an omnivorous, highly adaptive and scavenger bird. This species can tolerate habitat alteration and found throughout the year (Khan 2015). During sampling this species was found in the study area frequently in different microhabitats. Shome *et al.* (2020) recorded 140 species of birds from Magura Sadar upazila, a small site where bird diversity was higher than the birds recorded in this study.

Mammals

Among the mammals, the highest observed population (n=91) was for large bandicoot rat (*Bandicota indica*) and the density was 3.25/km². The lower most abundance (n=2) and density (0.07/km²) was for fishing cat (*Prionailurus viverrinus*). Most of the observed mammals were rodents and their total individuals were also higher compared to the carnivorous and flying mammals (Table 1). This indicates that the study area is a suitable ground for the vertebrate pest animals like rats and mice.

Table 1. Recorded vertebrate wildlife in Sreepur upazila, Magura with the status of each species.

Scientific name	Common name	N	RA	D	S	Scientific name	Common name	N	RA	D	OS
Amphibia (8 species)											
<i>Hoplobatrachus tigerinus</i>	Indian bull frog	20	25.64	10	C	<i>Microhyla ornata</i>	Ornate narrow-mouthed frog	8	10.26	4	F
<i>Euphlyctis cyanophlyctis</i>	Skipper frog	14	17.95	7	C	<i>Polypedates leucomystax</i>	Common tree frog	7	8.97	3.5	F
<i>Duttaphrynus melanostictus</i>	Asian common toad	10	12.82	5	FC	<i>Microhyla</i> sp.	Narrow-mouthed frog	5	6.41	2.5	F
<i>Fejervarya asmata</i>	Asmat's cricket frog	9	11.54	4.5	FC	<i>Polypedates maculatus</i>	Maculated tree frog	5	6.41	2.5	F
Reptilia (13 species)											
<i>Hemidactylus flaviviridis</i>	House lizard	26	31.33	13	C	* <i>Amphisma stotatum</i>	Striped keelback	3	3.61	1.5	F
<i>Xenochrophis piscator</i>	Checked keelback	13	15.66	6.5	FC	* <i>Gekko gekko</i>	Tokay gecko	3	3.61	1.5	F
<i>Calotes versicolor</i>	Common garden lizard	12	14.46	6	FC	* <i>Naja naja</i>	Binocellate cobra	2	2.41	1	F
<i>Eutropis carinata</i>	Common skink	6	7.23	3	F	* <i>Ahaetulla nasuta</i>	Vine snake	2	2.41	1	F
<i>Varanus</i>	Yellow	5	6.02	2.5	F	* <i>Typhlops</i>	Diard's	2	2.41	1	F

<i>flavescens</i>	monitor					<i>diardii</i>	Blind snake				
<i>Hemidactylus brookii</i>	Brook's house gecko	5	6.02	2.5	F	* <i>Ptyas mucosa</i>	Indian rat snake	1	1.2	0.5	F
* <i>Varanus bengalensis</i>	Bengal monitor	3	3.61	1.5	F						
Aves (84 species)											
<i>Acridotheres tristis</i>	Common myna	752	19.27	26.85	VC	<i>Lonchura striata</i>	White-rumped munia	10	0.26	0.36	F
<i>Pycnonotus cafer</i>	Red-vented bulbul	628	16.09	22.43	VC	<i>Coracias benghalensis</i>	Indian roller	9	0.23	0.32	F
<i>Dicrurus macrocercus</i>	Black drongo	326	8.35	11.64	C	<i>Lonchura malabarica</i>	Indian silverbill	9	0.23	0.32	F
<i>Acridotheres fuscus</i>	Jungle myna	281	7.2	10.03	C	<i>Milvus migrans</i>	Black kite	9	0.23	0.32	F
<i>Apus affinis</i>	House swift	205	5.25	7.32	C	<i>Ardea alba</i>	Great white egret	9	0.23	0.32	F
<i>Sturnus contra</i>	Pied myna	173	4.43	6.18	C	<i>Hierococcyx varius</i>	Common hawk-cuckoo	8	0.21	0.28	F
<i>Passer domesticus</i>	House sparrow	141	3.61	5.03	FC	<i>Cacomantis merulinus</i>	Plaintive cuckoo	8	0.21	0.28	F
<i>Coracina macei</i>	Large cuckoo shrike	97	2.49	3.46	FC	<i>Cypsiurus balasiensis</i>	Asian palm swift	7	0.18	0.25	F
<i>Centropus sinensis</i>	Greater coucal	93	2.38	3.32	FC	<i>Nectarinia asiaticus</i>	Purple sunbird	7	0.18	0.25	F
<i>Cyornis rubeculoides</i>	Blue-throated blue flycatcher	88	2.26	3.14	FC	<i>Cyanecula vecica</i>	Blue throat	7	0.18	0.25	F
<i>Copsychus saularis</i>	Oriental magpie-robin	86	2.2	3.07	FC	<i>Athene brama</i>	Spotted owlet	7	0.18	0.25	F
<i>Dinopium benghalense</i>	Black-rumped Flameback	65	1.67	2.32	FC	<i>Anastomus oscitans</i>	Asian Openbill	7	0.18	0.25	F
<i>Coracina melanoptera</i>	Black-headed cuckooshrike	64	1.64	2.28	F	<i>Copsychus malabaricus</i>	White-rumped shama	6	0.15	0.21	F
<i>Spilopelia chinensis</i>	Eastern spotted dove	55	1.41	1.96	F	<i>Dendrocopos macei</i>	Fulvous-breasted woodpecker	6	0.15	0.21	F
<i>Ardeola grayii</i>	Pond heron	48	1.23	1.71	FC	<i>Haliastur indus</i>	Brahmany kite	6	0.15	0.21	F
<i>Halcyon smyrnensis</i>	White-breasted kingfisher	44	1.13	1.57	F	<i>Motacilla madaraspatensis</i>	White-browed wagtail	6	0.15	0.21	F
<i>Alcedo atthis</i>	Common kingfisher	42	1.08	1.5	FC	<i>Parus major</i>	Great tit	6	0.15	0.21	F
<i>Aegithina tiphia</i>	Common iora	33	0.85	1.17	FC	<i>Megalaima haemacephala</i>	Coppersmith barbet	5	0.13	0.18	F
<i>Dicaeum erythrorhynchos</i>	Pale-bellied flowerpecker	33	0.85	1.17	FC	<i>Prinia inornata</i>	Plain prinia	5	0.13	0.18	F
<i>Micropternus brachyurus</i>	Rufous woodpecker	32	0.82	1.14	FC	<i>Nectarinia zeylonica</i>	Purple-rumped sunbird	5	0.13	0.18	F
<i>Bubulcus ibis</i>	Cattle egret	32	0.82	1.14	F	<i>Streptopelia tranquebarica</i>	Red turtle dove	5	0.13	0.18	F
<i>Phylloscopus affinis</i>	Tickell's leaf-warbler	30	0.77	1.07	FC	<i>Tyto alba</i>	Barn owl	5	0.13	0.17	F
<i>Turdoides striata</i>	Jungle babbler	28	0.72	1	FC	<i>Acrocephalus dumetorum</i>	Blyth's reed-warbler	5	0.13	0.17	F
<i>Oriolus xanthornus</i>	Black-hooded oriole	28	0.72	1	F	<i>Corvus splendens</i>	House crow	4	0.1	0.14	F
<i>Sturnus malabaricus</i>	Chestnut-tailed starling	27	0.69	0.96	F	<i>Pericrocotus cinnamomeus</i>	Small minivet	4	0.1	0.14	F

<i>Megalaima asiatica</i>	Blue-throated barbet	26	0.67	0.93	F	<i>Psittacula cyanocephala</i>	Plum-headed parakeet	4	0.1	0.14	F
<i>Dendrocitta vagabunda</i>	Rufous treepie	22	0.56	0.78	F	<i>Motacilla alba</i>	White wagtail	4	0.1	0.14	F
<i>Psilopogon lineata</i>	Lineated barbet	20	0.51	0.71	F	<i>Picus xanthopygaeus</i>	Streak-throated woodpecker	4	0.1	0.14	F
<i>Ardea intermedia</i>	Intermediate egret	19	0.49	0.68	F	<i>Ploceus phillippinus</i>	Baya weaver	4	0.1	0.14	F
<i>Pellorneum ruficeps</i>	Puff-throated babbler	19	0.49	0.68	F	<i>Corvus leuallantii</i>	Jungle crow	3	0.08	0.11	F
<i>Orthotomus sutorius</i>	Common tailorbird	17	0.44	0.61	F	* <i>Dicrurus aeneus</i>	Bronzed drongo	3	0.08	0.11	F
<i>Otus lettia</i>	Collared scops owl	17	0.44	0.61	F	* <i>Psittacula krameri</i>	Rose-ringed parakeet	3	0.08	0.11	F
<i>Lonchura punctulata</i>	Scaly-breasted munia	15	0.38	0.53	F	* <i>Saxicola caprata</i>	Pied bushchat	3	0.08	0.11	F
<i>Merops orientalis</i>	Asian Green bee-eater	13	0.33	0.46	F	* <i>Oriolus oriolus</i>	Eurasian golden oriole	3	0.08	0.11	F
<i>Egretta garzetta</i>	Little egret	12	0.31	0.43	F	* <i>Jynx torquilla</i>	Eurasian wryneck	3	0.08	0.11	F
<i>Eudynamis scolopaceus</i>	Western koel	12	0.31	0.43	F	* <i>Phalacrocorax niger</i>	Little cormorant	3	0.08	0.11	F
<i>Clamator jacobinus</i>	Jacobin cuckoo	12	0.31	0.43	F	* <i>Centropus bengalensis</i>	Lesser coucal	3	0.08	0.11	F
<i>Picoides canicapillus</i>	Grey-capped woodpecker	11	0.28	0.39	F	* <i>Tephrodornis pondicerianus</i>	Common woodshrike	2	0.05	0.07	F
<i>Gecinulus grantia</i>	Pale-headed woodpecker	11	0.28	0.39	F	* <i>Zosterops palpebrosus</i>	Oriental white-eye	2	0.05	0.07	F
<i>Picus guerini</i>	Black-naped woodpecker	11	0.28	0.39	F	* <i>Acrocephalus agricola</i>	Paddyfield warbler	2	0.05	0.07	F
<i>Ficedula albicilla</i>	Taiga flycatcher	10	0.26	0.36	F	* <i>Merops philippinus</i>	Blue-tailed bee-eater	2	0.05	0.07	F
<i>Lanius cristatus</i>	Brown shrike	10	0.26	0.36	F	* <i>Zoothera citrina</i>	Orange-headed thrush	1	0.03	0.03	F
Mammalia (18 species)											
<i>Bandicota indica</i>	Large bandicoot rat	91	31.49	3.25	VC	<i>Mus booduga</i>	Little Indian field mouse	7	2.42	0.25	FC
<i>Funambulus pennantii</i>	Northern palm squirrel	72	24.91	2.57	C	<i>Pipistrellus coromandra</i>	Indian pipistrelle	6	2.08	0.21	FC
<i>Bandicota bengalensis</i>	Lesser bandicoot rat	16	5.54	0.57	FC	<i>Rattus norvegicus</i>	Brown rat	5	1.73	0.18	FC
<i>Herpestes edwardsii</i>	Common mongoose	16	5.54	FC	FC	<i>Pteropus giganteus</i>	Indian flying fox	4	1.38	0.14	F
<i>Suncus murinus</i>	Asian house shrew	14	4.84	0.5	C	<i>Pipistrellus tenuis</i>	Least pipistrelle	4	1.38	0.14	F
<i>Rattus rattus</i>	Common house rat	13	4.5	0.46	FC	* <i>Felis chaus</i>	Jungle cat	4	1.38	0.14	F
<i>Mus musculus</i>	House mouse	10	3.46	0.36	FC	* <i>Vulpes bengalensis</i>	Bengal fox	4	1.38	0.14	F
<i>Herpestes auropunctatus</i>	Small Indian mongoose	10	3.46	0.57	FC	* <i>Canis aureus</i>	Asiatic jackel	3	1.04	0.11	F
<i>Megaderma lyra</i>	Greater false vampire	8	2.77	0.28	FC	* <i>Prionailurus viverrinus</i>	Fishing cat	2	0.69	0.07	F

[Note: N - Number of individual; RA - Relative Abundance; D - Density/ km²; S - Status, VC - Very Common, C- Common, FC - Fairly Common; Few - F, LC- Least Concerned, NT- Near Threatened and EN- Endangered. Rare species observed in the study area is marked (*) in the table.]

Diverse species composition under various vertebrate wildlife groups indicates that this area consists by ideal habitats for wildlife. Some natural patchy habitats in the study area are suitable for providing food, shelter and breeding facilities of some particular type of wildlife. There is no previous research about wildlife of this study area. Some of the rare bird species is presented in Fig. 2.



Fig. 2. Some rare bird species observed in the site: **a.** Little Grebe (*Tachybaptus ruficollis*); **b.** Blue throat (*Luscinia servica*); and **c.** Blue-tailed bee-eater (*Merops philippinus*).

Species richness in months and seasons

The maximum species richness was recorded in December (62 species). The lowest species richness was recorded in June (33 species) (Fig. 3a). We found that there was a remarkable variation in the richness of species in seasons. Winter season (108 species) was the pick for species diversity of vertebrate wildlife in terms of richness followed by rainy (94 species) and summer (70 species) (Fig. 3b). In winter, 10 species of migratory birds were observed in the study area. Migratory birds in winter may influence the richness and diversity of wildlife including birds in a region (Shome et al. 2020b). Additionally, food availability increased in agricultural lands, farmlands and water body during winter those attract wildlife to forage on them.

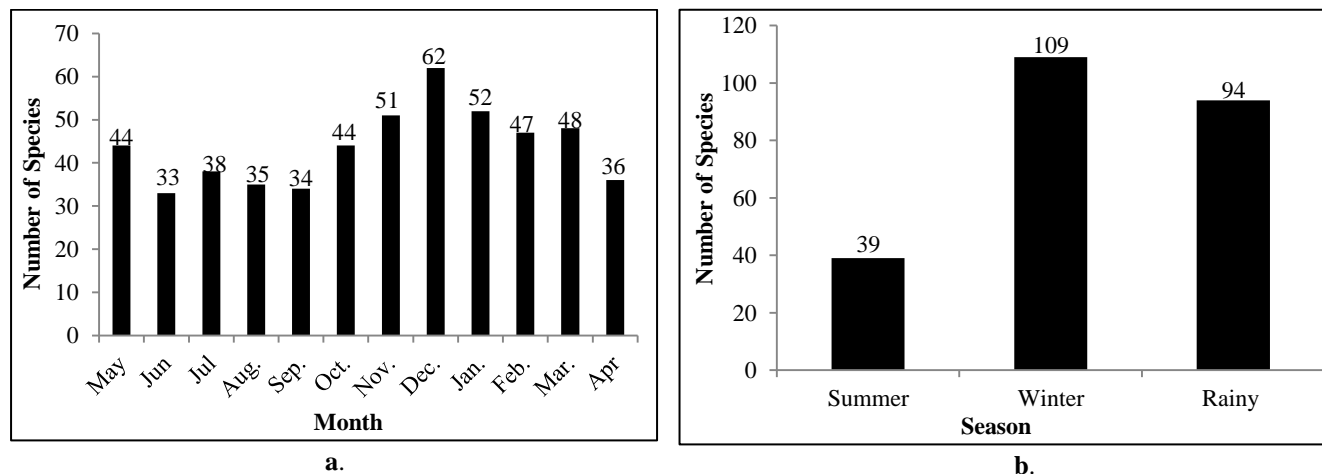


Fig. 3. Showing species richness in study area: **a.** Species in months; and **b.** Species richness in seasons.

Species richness across habitats

Considering macro-habitats, we found that 76 species (61.78%) preferred arboreal habitat such as trees followed by 31 species (25.21%) in terrestrial habitat and 16 species (13.01%) in aquatic habitat. Among 12 types of micro-habitats, tree was the most used microhabitat (68 species, 55%) (Fig. 4). The study area was mostly occupied by various types of native plant species which might provide good

shelter, food, roosting and nesting facilities for the wildlife. Besides, the species composition includes 84 bird species which is more than two-third of the total wildlife. Birds use tree for versatile purposes, thus can manipulate the result of microhabitat usage in this study.

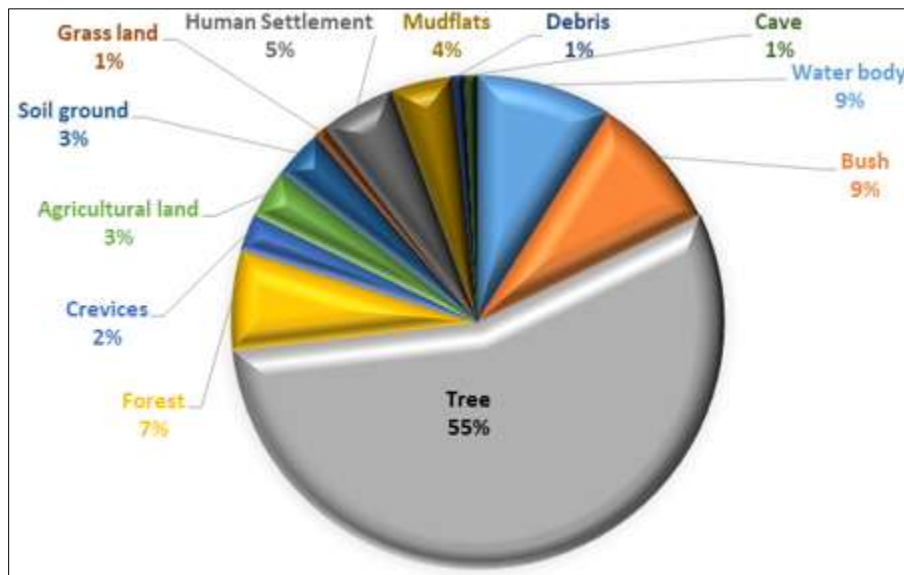


Fig. 4. Species richness in the different microhabitats.

Observation status, relative abundance, rank-abundance curve, and threatened status

Among the recorded wildlife, the observation status showed that three species (2.44%) were very common, nine (7.32%) were common, 26 (21.14%) were fairly common and 85 (69.1%) were few (Table 1).

Amphibians

Among all amphibians, the relative abundance of *Hoplobatrachus tigerinus* was the highest (25.64%) and it also ranked topmost amphibians in the curve (Table 1 and Fig. 5a). The study area holds many water resources that act as foraging and breeding ground like other areas for this species (Hasan *et al.* 2014).

Reptiles

The relative abundance was the highest for common house gecko *Hemidactylus flaviviridis* (31.33%) and it is also placed at the apex position in the curve followed by checkered keelback *Xenochrophis piscator* (15.66%) (Table 1 and Fig. 5b). It was observed that this study site is suitable for *Hemidactylus flaviviridis* as there are many old buildings, household and forested habitats. Alongside, water bodies like lakes, ponds, *beel*, canals, ditches provide a good support for *Xenochrophis piscator*.

Birds

The relative abundance of *Acridotheres tristis* was the highest (19.27%) followed by *Pycnonotus cafer* (16.09%) as they are supported by suitable native and planted tree species, homestead gardens, agricultural lands and soil ground providing enough food, shelter and nesting facilities for them. *Acridotheres tristis* also ranked as the most dominant bird species in rank-abundance curve (Fig. 5c).

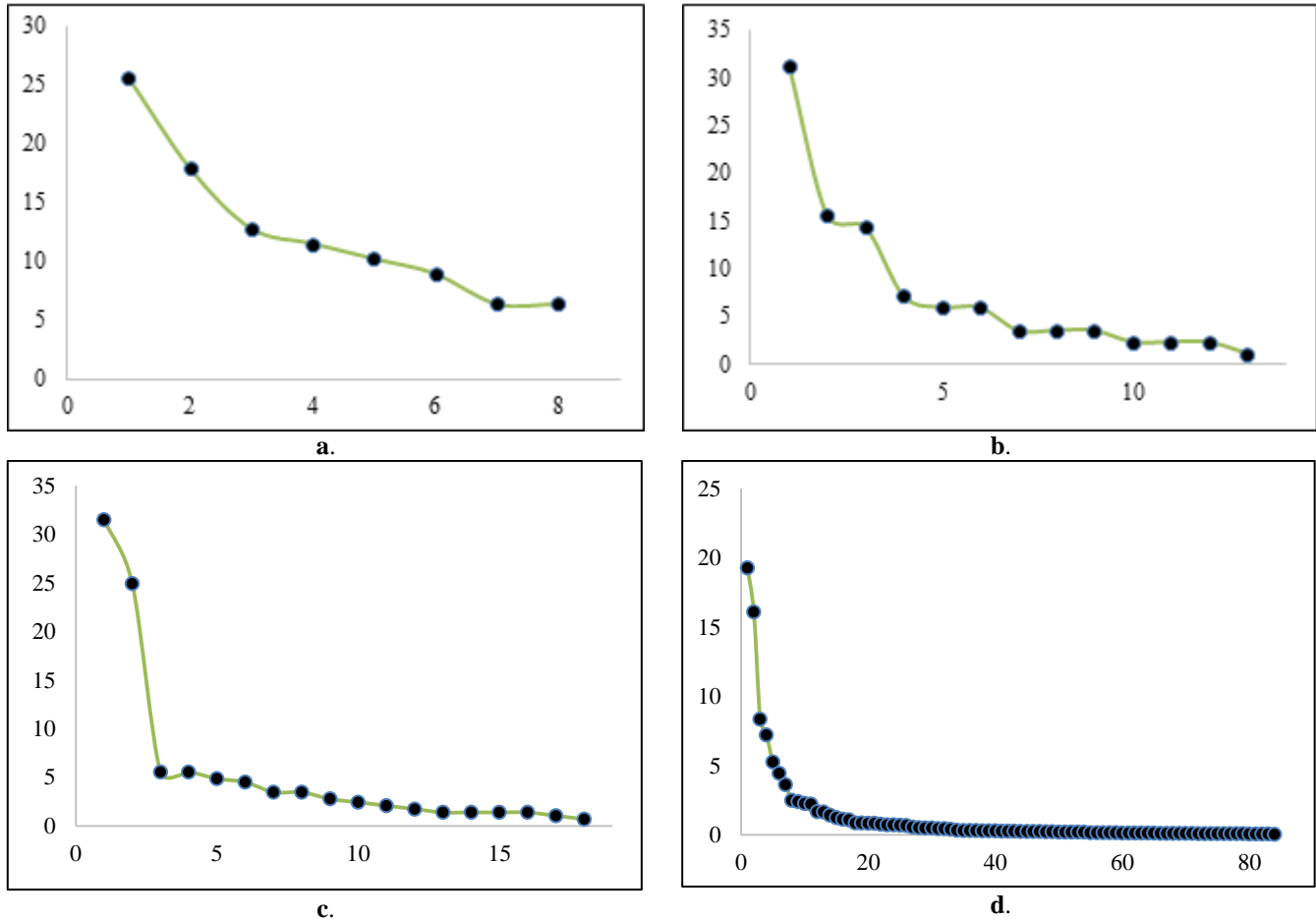


Fig. 5. Rank-abundance curve of the four groups of wildlife where proportion of rank represented vertically and rank of species represented horizontally: a. Amphibia; b. Reptilia; c. Aves; and d. Mammalia.

Mammals

Among mammals, the relative abundance of lesser bandicoot rat *Bandicota indica* (31.49%) was the highest, placing it on the cap of the curve and this is followed by common house rat *Funambulus pennantii* (24.91%) (Table 1 and Fig. 5d). Rural habitat provides suitable facilities, such as food sources (e.g. grains, vegetables, fruits, seeds, barks) and make an ideal habitat for living and reproduction thus rising their population in the study area. The conservation and threatened status showed that 117 (95.12%) species were least concern, five (4.06%) were near threatened and one (0.81%) were endangered. Sarker and Sarker (1983) and IUCN (2015) reported that fifteen species of mammals are threatened nationally.

In total 23 species of vertebrate wildlife were rarely seen in the study area (Table 2). Among them seven reptiles, 12 species were birds and four mammals.

Some factors are affecting the wildlife of Sreepur, such as (1) habitat degradation due to the increases of human population, (2) extension of agricultural land and increase of land use in the above mentioned habitats, (3) wide scale destruction of the natural habitats where wild animals are inhabiting, (4) illegal hunting, trapping and collecting of young birds and mammals from their nests causing depletion of wildlife population from the study area, (5) agro-chemicals are being randomly used by the farmers without having proper knowledge, thus adding pollutants to the environment of wildlife and (6) ignorance of local people about the importance of biodiversity and conservation of wildlife species.

Table 2. Recorded rare vertebrate wildlife in Sreepur upazila, Magura.

Scientific name	English name	Recorded individuals	Relative Abundance	Density/ km ²
Aves (12 species)				
<i>Dicrurus aeneus</i>	Bronzed drongo	3	0.08	0.11
<i>Psittacula krameri</i>	Rose-ringed parakeet	3	0.08	0.11
<i>Saxicola caprata</i>	Pied bushchat	3	0.08	0.11
<i>Oriolus oriolus</i>	Eurasian golden oriole	3	0.08	0.11
<i>Jynx torquilla</i>	Eurasian wryneck	3	0.08	0.11
<i>Phalacrocorax niger</i>	Little cormorant	3	0.08	0.11
<i>Centropus bengalensis</i>	Lesser coucal	3	0.08	0.11
<i>Tephrodornis pondicerianus</i>	Common woodshrike	2	0.05	0.07
<i>Zosterops palpebrosus</i>	Oriental white-eye	2	0.05	0.07
<i>Acrocephalus agricola</i>	Paddyfield warbler	2	0.05	0.07
<i>Merops philippinus</i>	Blue-tailed bee-eater	2	0.05	0.07
<i>Zoothera citrina</i>	Orange-headed thrush	1	0.03	0.03
Mammalia (4 species)				
<i>Felis chaus</i>	Jungle cat	4	1.38	0.14
<i>Vulpes bengalensis</i>	Bengal fox	4	1.38	0.14
<i>Canis aureus</i>	Asiatic jackal	3	1.04	0.11
<i>Prionailurus viverrinus</i>	Fishing cat	2	0.69	0.07
Reptilia (7 species)				
<i>Amphiesma stolatum</i>	Striped keelback	3	3.61	1.5
<i>Gekko gekko</i>	Tokay gecko	3	3.61	1.5
<i>Naja naja</i>	Binocellate cobra	2	2.41	1.0
<i>Ahaetulla nasuta</i>	Vine snake	2	2.41	1.0
<i>Typhlops diardii</i>	Diard's blind snake	2	2.41	1.0
<i>Ptyas mucosa</i>	Indian rat snake	1	1.20	0.5
<i>Varanus bengalensis</i>	Bengal monitor	3	3.61	1.5

To protect wildlife diversity, habitat degradation should be prevented. The habitats occupied by the wildlife cannot be hampered by the people. Killing, hunting or trapping of wildlife must be stopped for the survival of threatened (critically endangered, endangered and vulnerable) wildlife. Creation of public awareness through organizing public programs, like discussion in the educational institutions and stakeholders and distribution of leaflets and hand notes may help to increase consciousness about the importance of the wildlife diversity. Besides, preparing and implementing wildlife management plan is important in order to protect the biodiversity in this area.

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