

AVIAN SPECIES DIVERSITY AND ITS DISTRIBUTION IN EASTERN UNIVERSITY, SRI LANKA

Mr Santhalingam Thanusanth
Department of Zoology
Eastern University Sri Lanka, Chenkallady, 30350, Sri Lanka.
Email: saanthanueusl@gmail.com, Tel: 0094752822991

Mr A.M. Riyas Ahamed
Department of Biological Sciences
Faculty of Applied Sciences
South Eastern University of Sri Lanka, Sammanthurai, 32200, Sri Lanka
Email: riyasahame@yahoo.co.uk, Tel: 0094776009200

ABSTRACT

Avian species are important for the ecosystem as they play roles as scavenger, pollinators, seed dispersal agent and predators of insect pest and these are the important indicator to evaluate different habitats. The present investigation carried out in March of 2017, to assess the avian species diversity in Eastern University of Sri Lanka, situated in the East coast of Sri Lanka, Batticaloa district. The prime objective of this study is to assess the existing avian diversity and analyze its distribution in different niches in Eastern University, Sri Lanka. The Senate site and Ground site were selected as habitat 1 and habitat 2 respectively. The bird counting was done by point count method in weekly basis throughout the one month study period. Totally 2004 individuals of 31 species were recorded representing 24 families inclusive one migratory species in total study area throughout the study period. Blue-tailed bee-eater (*Merops philippinus*) is the migratory bird present here. More abundance species of this region is rock pigeon (*Columba livia domestica*). Simpson's diversity index (0.78) of total study site indicate that, the study area (Eastern University of Sri Lanka) having notable avian species diversity. The comparison between habitat 1 and habitat 2 shows that, most of the species are abundance in Habitat 2 than habitat 1. Simpson's diversity index (D') of habitat 1 and habitat 2 were 0.72 and 0.82 respectively. This finding clearly figure out the habitat 2 having slightly rich avifaunal diversity than habitat 1. Compare to the habitat 1, habitat 2 having less human intervention and having more suitable habitat and nesting environment for birds. That's why the habitat 2 having slightly rich avian diversity than habitat 2. Further long term studies are helpful to confirm their existence of avian fauna in Eastern University, Sri Lanka.

Keywords: Birds, biodiversity, species diversity, Sri Lanka

INTRODUCTION

Avian species are indispensable for the bionetwork, they play roles as scavenger, pollinators, seed dispersal agent and predators of insect pest and be a part of indicator to appraise different habitats (Mistry, 2015). Species richness and diversity of birds in terrestrial landscapes closely correlated with habitat structure and floristic characteristics (Lawes *et al.*, 2015). The habitat preference by tropical birds often interrelated with food resources and microhabitat characters of nesting sites (Thilina *et al.*, 2013). Species composition also often reflect as tool for the selection of conservation areas (RodriguezFerraro and Blake, 2008; Chaminda and Manjula, 2014). Ornithology can improve one's knowledge on animal behavior and biological relationships (Kotagama and Ratnavira, 2010). In present situation, anthropogenic interventions and destruction of natural habitats often interrupt the global avian species diversity (Vaghela and Dal, 2015). Therefore, scientific systematic studies on avian species is crucial to maintain the ecosystem and protect the avian diversity (Vaghela and Dal, 2015).

Sri Lanka is an island situated in Indian Ocean, which having rich avifauna diversity, about 439 species were recorded so far including 236 breeding resident and 203 purely migrant species (Harris *et al.*, 2017). Among existing former, 33 species recognized as endemic to Sri Lanka (Warakagoda and Sirivardana, 2009). According to high avian diversity and endemism, Sri Lanka has been renowned as a country with "Important Bird Areas" (IBA), "key Asian region for threatened birds" and "Endemic Bird Area" (Surasinghe and Alwis, 2010). Batticaloa District having area like Sathurukondan, which coming under the migratory dispersal ways from Eastern route and Andaman route entries, and having the IBA points (Kotagama and Ratnavira, 2010). Scientific studies about birds also so far been conducted in these places. The study site, Eastern University of Sri Lanka situated in Batticaloa district. However in this area the bird related study is rather scarce (Dharmaretnam, *et al.*, 2001). Therefore the systematic scientific study was initiated to ensure the avian diversity. The prime objective of the present study is to assess the avian species diversity and analyze its distribution in different niches in Eastern University, Sri Lanka.

MATERIALS AND METHODS

STUDY AREA

The study site located between the geographical coordinates 7° 47' 46" N and 81° 34' 49" E in Batticaloa District, East coast of Sri Lanka. The study site is little faraway (about 16 km) from urban area and in Eravur Pattu DS division, near to the Chenkalady and both site of A15 Highway. Floristically, the region having dry zone adapted tree, shrubs and grass like vegetation pattern. Inside the study site having dense vegetative areas, agricultural farm, animal husbandry farm, open lands and buildings. The University premises are relatively flat land and also having seasonal water stagnant areas, which stagnated with water during rainy season. Most of the part from total area in study site is related with human intervention. The whole study site separated by A15 Highway in to two distinguishable regions. So the study area divided in to two niches respect to this separation. Habitat 1 denotes, the Ground site with academic buildings, hostels and open ground areas. Habitat 2 denotes, the Senate building site which include the agricultural and animal husbandry farms with vegetated areas.

Figure 1: Study area



METHODOLOGY

The study was carried out March of 2017 within one month period. The bird survey was carried out weekly basis limited period of day time between 06.00 - 8.30 h and again 16.00 - 18.00 h using the point transect technique. Six sampling points were selected in each habitat using simple random sampling because this area having buildings and stagnated pond in side. The opportunistic observation method also used since some bird species could not lied inside point transect. At least 100m distance was kept between points to avoid repetition in counting. Within a standard period of time (15 minutes), bird records consisted of individuals seen with the help of 8×40 binoculars (Nikon, USA) from a fixed point. A survey consists of a series of such counts done at various points within a circle of fixed radius or may count all birds out to the limit of detection for each species representing whole study area (Somenzari *et al.*, 2011). The observed birds were identified up to least taxonomic level using bird guide books (Kotagama and Ratnavira, 2010; Grewal *et al.*, 2002). Digital camera (Canon EOS 1100 D, Japan) was used to take clear photographs for further confirmation of identification. The overall species diversity of study site was measured by Simpson’s diversity index (Usher, 1983) as follow.

$$\text{Simpson's diversity index, } D' = 1 - \frac{\sum n \times (n - 1)}{N \times (N - 1)}$$

Where *n* is total number of individuals of particular species, *N* is total number of organisms of all species.

Avian species distribution between different niches in study area (Habitat 1- Ground site and Habitat 2- Senate site) within the University premises were statistically analyzed using Minitab 17 software. T-test was used to analyze the significance of avian distribution between two different niches which obtain at 95% confident level.

RESULTS AND DISCUSSION

RESULT

Totally 2004 individuals of 31 species were recorded representing 24 families in total study area throughout the study period. 1 species was recorded as migratory bird while other 30 species belongs to breeding resident. Blue-tailed bee-eater (*Merops philippinus*) is the migratory bird present here, but still the debates going on the migratory pathway of this species by experts. Rock pigeon (*Columba livia domestica*) and Black-rumped Flameback (*Dinopium benghalense*) were recorded as most abundance and least abundance species respectively in this region. Simpson’s diversity index (D’) of total study site is calculated as 0.78. The presence of terrestrial as well as aquatic habitat species and value of diversity indices revealed in their notable diversity.

Figure 2: Status of bird species

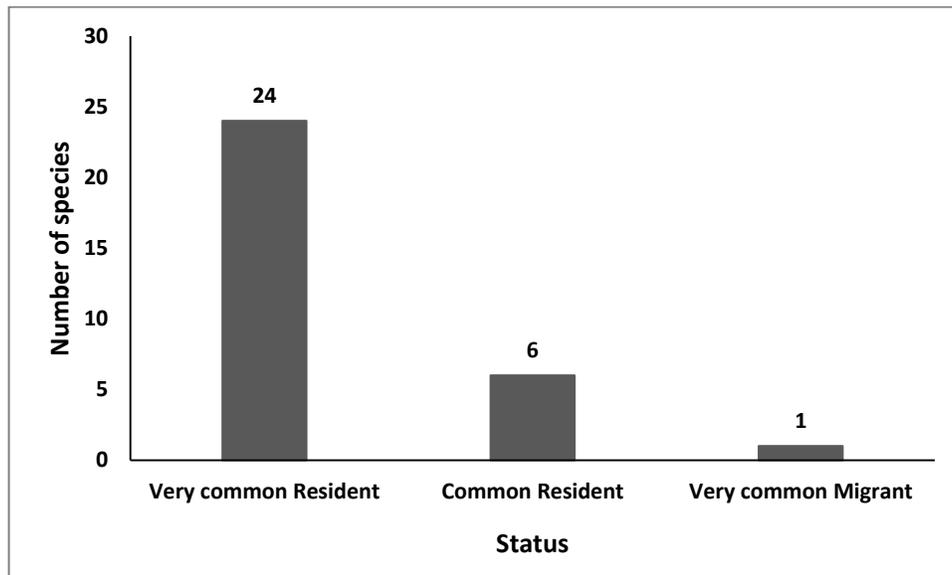


Figure 1 shows the general abundance status of avian species present in this region throughout study period. This revealed that very common resident bird species were more abundant (about 77%) than others. There were no any endemic species recorded in this region.

If we take the comparison between habitat 1 and habitat 2, out of 31 species habitat 1 having 27 species, In Habitat 2 all of 31 species were recorded. Greater coucal (*Centropus sinensis*), Rose-ringed parakeet (*Psittacula calthropae*), Black-hooded oriole (*Oriolus xanthornus*) and White-breasted water hen (*Amaurornis phoenicurus*) are species, which not recorded in habitat 1. Most of the species are abundance in Habitat 2 than habitat 1. Simpson’s diversity index (D’) of habitat 1 and habitat 2 were 0.72 and 0.82 respectively. This finding revealed that, the habitat 2 having slightly rich avifaunal diversity than habitat 1.

Table 1: Recorded Bird species in study site
Where, BrR is Breeding Resident, M is Migrant, VC is Very Common and C is Common.

Family Name	Scientific name	Common Name	Residential status	Abundance Status	Habitat 1	Habitat 2
Accipitridae	<i>Haliastur indus</i>	Brahminy kite	BrR	C	12	14
Alaudidae	<i>Mirafra affinis</i>	Jerdon's bushlark	BrR	VC	12	24

Alcedinidae	<i>Halcyon smyrnensis</i>	White-throated kingfisher	BrR	VC	5	1
Ardeidae	<i>Mesophoyx intermedia</i>	Intermediate egret	BrR	C	12	14
Ardeidae	<i>Ardeola grayii</i>	Indian pond heron	BrR	VC	2	3
Ardeidae	<i>Bubulcus ibis</i>	Cattle egret	BrR	VC	26	29
Cisticolidae	<i>Prinia socialis</i>	Ashy prinia	BrR	C	1	3
Cisticolidae	<i>Prinia inornata</i>	Plain prinia	BrR	VC	2	3
Columbidae	<i>Stigmatopelia chinensis</i>	Spotted dove	BrR	VC	22	62
Columbidae	<i>Columba livia domestica</i>	Rock Pigeon	BrR	VC	486	385
Coraciidae	<i>Coracias benghalensis</i>	Indian roller	BrR	C	5	8
Corvidae	<i>Corvus levaillantii</i>	Jungle crow	BrR	VC	85	77
Corvidae	<i>Corvus splendens</i>	House crow	BrR	VC	120	85
Cuculidae	<i>Eudynamys scolopaceus</i>	Asian koel	BrR	C	5	12
Cuculidae	<i>Centropus sinensis</i>	Greater coucal	BrR	VC	0	7
Hirundinidae	<i>Hirundo rustica</i>	Barn Swallow	BrR	VC	18	8
Meropidae	<i>Merops orientalis</i>	Little green bee-eater	BrR	VC	9	27
Meropidae	<i>Merops philippinus</i>	Blue-tailed bee-eater	M	VC	1	4
Motacillidae	<i>Anthus rufulus</i>	Paddyfield pipit	BrR	VC	36	12
Muscicapidae	<i>Copsychus saularis</i>	Oriental magpie robin	BrR	VC	2	6
Nectariniidae	<i>Nectarinia zeylonica</i>	Purple-rumped sunbird	BrR	VC	1	4
Oriolidae	<i>Oriolus xanthornus</i>	Black-hooded oriole	BrR	VC	0	4
Passeridae	<i>Passer domesticus</i>	House sparrow	BrR	C	6	11
Picidae	<i>Dinopium benghalense</i>	Black-rumped Flameback	BrR	VC	1	2
Psittacidae	<i>Psittacula krameri</i>	Rose-ringed parakeet	BrR	VC	0	14
Pycnonotidae	<i>Pycnonotus cafer</i>	Red-vented Bulbul	BrR	VC	2	11
Rallidae	<i>Amaurornis phoenicurus</i>	White-breasted water hen	BrR	VC	0	12
Ramphastidae	<i>Megalaima zeylanica</i>	Brown-headed barbet	BrR	VC	3	6
Sturnidae	<i>Acridotheres tristis</i>	Common myna	BrR	VC	72	88
Sylviidae	<i>Orthotomus sutorius</i>	Common tailorbird	BrR	VC	1	3
Timaliidae	<i>Turdoides affinis</i>	Yellow-billed babbler	BrR	VC	32	86
Total number of individuals					979	1025

Table 1 shows the bird species with respective orders observed in the study site throughout study period, their residential and general abundance status of them. Total number of individuals of each species respect to its habitat also mentioned in the table.

The statistical significance in bird species distribution between Habitat 1 and Habitat 2 was analyzed by using two sample T-Test at 95% confident level. The result revealed that, the P-value = 0.942. In 95% confident level, table value = 0.07. Where, P-value (0.942) > Table value (0.07). In this statistical analyzes P-value greater than table-value. So statistically there is no any significant difference in avian species distribution between Habitat 1 and Habitat 2.

DISCUSSION

The diversity of avian species and their distribution in Eastern University of Sri Lanka, with respect to two different habitat sites show the importance of the university premises as a notable avian habitat. The preference of birds to this site can be attributed to many factors. Such as its having mosaic habitat type like open grounds, grass lands, dense vegetated areas, agricultural farms, and

animal husbandry farms. The university area is significantly high in resource obtainability for the birds. For instance, several species of nectarine and fruit-bearing plant species are grown within the study site, especially in the farm areas. The study site remote from the urban area, also one of the factor influencing avifaunal diversity due to the low level of disturbance.

Comparison of two different habitats in the study area, habitat 1 having more human intervention than habitat 2. Because most of the academic buildings and hostels are positioned in habitat 1 site. Compare to the habitat 1, habitat 2 with less human intervention and endowing more suitable habitat and nesting environment for birds like vegetated areas and farms. This circumstances pave the path to habitat 2 having slightly rich avian diversity than habitat 1. Nevertheless, statistically there was no any significant different among these two habitat sites, because there was no any large difference in total number of individual birds recorded in both habitat.

CONCLUSION AND RECOMMENDATIONS

The results and findings evidently indicate that, the study area (Eastern University of Sri Lanka) having notable avian species diversity including one migratory species due to the favorable conditions for survival of birds. However, this area having considerable human interventions which impact on the abundance of avian species. In order to enhance the existing avifaunal diversity and attract more avifauna in this region, habitats be ensured by conserving of existing floristic features and introduction of native nectarine and fruit-bearing plants by plantation. Minimalizing of anthropogenic disturbance against avian habitats also essential to retain the diversity. Further extended studies support to confirm the existence of avian fauna.

ACKNOWLEDGEMENT

Authors wish to extend sincere thanks to Eastern University of Sri Lanka for providing opportunity to work on the field and thanks to the Department of Zoology, Faculty of Science Eastern University of Sri Lanka for providing facilities for field visits. Further extend to their heartfelt thanks to those who are encouraging and involving in the field work.

REFERENCES

- Chaminda, W. & Manjula, W. (2014). Bird Diversity of Dekinda Forest Reserve, Balana, Sri Lanka: Implications for Conservation. *Ceylon Journal of Science*, 43 (1), 137-146.
- Dharmaretnam, M., Ahamed, R., Devika, F. & Niomi, T.A. (2001). The Seven Sisters and the Four Eggs. *Loris*, 22, 5.
- Grewal, B., Harvey, B., & Pfister, O. (2002). *A Photographic Guide to the Birds of Sri Lanka & India*. Periplus Editions (Hong Kong) Ltd.
- Harris, J. M., Kishoran, S., Vinobaba, P., & Vinobaba, M. (2017). Bird Diversity and Threaten to their Habitat in Sathurukondan Birding Site in Batticaloa, Sri Lanka. *Journal of Agricultural Science and Technology*, A 7, 123-128.
- Kotagama, S. W. & Ratnavira, G. (2010). *An Illustrated Guide to the Birds of Sri Lanka*. Colombo, Sri Lanka: Field Ornithology Group of Sri Lanka.
- Lawes, M. J., Richard, A. N. & Jayasilan, M. A. (2015). The role of habitat heterogeneity in structuring mangrove bird assemblages. *Diversity*, 7, 118-136.
- Mistry, J. (2015). Avifaunal diversity in and around Berhampore, Murshidabad District, West Bengal, India. *International Journal of fauna and Biological studies*, 2 (4), 06-10.
- Rodriguez-Ferraro, A., & Blake, J. G. (2008). Diversity patterns of bird assemblages in arid zones of northern Venezuela. *The Condor*, 110, 405-420.
- Somenzari, M., Silveira, L.F., Piacentini, V.Q., Rego, M.A.; Schunck, F. & Cavarzere, V. (2011). Birds of an Amazonia-Cerrado ecotone in southern Pará, Brazil, and the efficiency of associating multiple methods in avifaunal inventories. *Revista Brasileira de Ornitologia*, 19, 260-275.
- Surasinghe, T.D. & C. De Alwis (2010). Birds of Sabaragamuwa University campus, Buttala, Sri Lanka. *Journal of Threatened Taxa*, 2(5), 876-888.
- Thilina de Silva, Ranawana, K. B., Fernando, S., and Ellepola, G. (2013). Comparison of Avifaunal Composition in a Natural and a Regenerating Forest: towards using Birds as Ecological Indicators. *Ceylon Journal of Science*, 42 (2), 71-78.
- Usher, M. B. (1983). Species Diversity: A Comment on a Paper by W. P Yapp. *Field Studies*, 5, 825-832.
- Vaghela, A. & Dal, P. (2015). Preliminary survey of avifaunal diversity around Shetrunji River, Dhari, India. *Journal of Biology and Earth sciences*, 5 (1), 19-24.
- Warakagoda, D., and Sirivardana, U. (2009). "The Avifauna of Sri Lanka: An Overview of the Current Status." *Taprobanica*, 1 (1), 28-35.