

## AVIFAUNAL DIVERSITY AND COMPOSITION OF VELLAKATTUKULAM, BATTICALOA DISTRICT, SRI LANKA

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### ABSTRACT

The present study was carried out at freshwater wetland Vellakattukulam in Batticaloa district, East coast of Sri Lanka. The prime objective is to determine the existing avian species diversity of Vellakattukulam, Batticaloa. The observations were recorded in between August 2016 to July 2017, to covering the migratory period. Monthly basis bird census was done by point transect and opportunistic observation methods within the time period of 06.00 – 09.00 h and 16.00 - 18.00 h. The whole study area was scanned systematically using 8 × 40 binoculars to count birds. The findings revealed that, 15,291 individuals representing 61 species and 34 families inclusive of 6 migratory bird species such as Glossy ibis (*Plegadis falcinellus*), Wood sandpiper (*Tringa glareola*), Common sandpiper (*Actitis hypoleucos*), Gull billed tern (*Sterna nilotica*), Whiskered Tern (*Chlidonias hybrida*), and Blue-tailed bee-eater (*Merops philippinus*). Black-headed ibis (*Threskiornis melanocephalus*) and Glossy ibis (*Plegadis falcinellus*) were higher abundance species with its own nesting sites in this region. Shannon index (2.75) and Simpson's diversity index (0.89) shows the typical diversity of avifauna. Further studies must be directed along with long-term observations for policy making to declare as Important Bird and Biodiversity Area. It contributes noticeably to the local avian biodiversity and ecotourism.

**KEYWORDS:** Abundance, Avifauna, Diversity Index, Nesting Sites & Wet Land

### INTRODUCTION

Wetlands are the most productive ecosystem that having high biodiversity in nature, and many flora and fauna depending on these places for their survival (Green, 1996). Freshwater wetlands are worldwide held more than 40% of bird species and about 12% of other faunal species (Rajpar and Zakaria, 2010). Wetland ecosystem is the best and important place for breeding and foraging site as well as shelters of avifaunal species (Shapoor *et al.*, 2013), these favorable conditions allow to act as birding sites. But in recent days wetlands are one of the most threatened habitats because of their vulnerability and attractiveness by anthropogenic activities (Giri and Chalise, 2008). Avifaunal diversity is an excellent indicator of particular ecosystem stability because birds respond quickly to changes in their environments (Miller and Spoolman, 2009). Bird populations and associated habitats appeared to be particularly useful tools in environmental monitoring and, the individual species abundance was positively correlated with assemblage species richness (Chaminda and Manjula, 2014). Species richness and the presence of rare species are the most frequently used tool for the selection of conservation areas (RodriguezFerraro and Blake, 2008; Chaminda and Manjula, 2014). Bird watching is a scientific hobby that can improve one's knowledge of the environment, animal behavior and biological relationships (Kotagama and Ratnavira, 2010). The study of avian species also helps to understand the complexity of ecosystem structure and providing

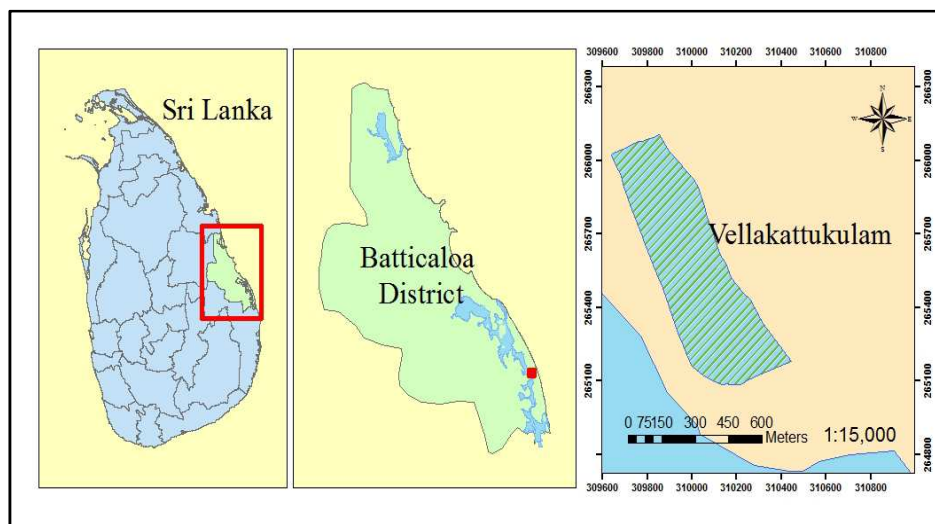
updated information on each consideration about this particular ecosystem.

Sri Lanka is an excellent birding destination for viewing a great number of species within a relatively short period due to its small size (De Silva Wijeyeratne, 2008). The geographic position and topography of Sri Lanka have given a wide variety of habitats, which support an avifauna of high biodiversity with 236 breeding and 203 purely migrant species (Warakagoda and Sirivardana, 2009). Among the former 33 species and 68 subspecies are recognized as endemic to Sri Lanka (Rasmussen and Anderton, 2005; Warakagoda and Sirivardana, 2009). In Sri Lanka with nearly 25% of the resident birds and more than 75% of the migrants depend on wetland habitats (Weerakoon and Gunawardena, 2012). In Batticaloa district, Sathurukondan identified as birding site (Harris *et al.*, 2017) and Urugamam as Important Bird and Biodiversity Area (Kotagama and Ratnavira, 2010), both coming under migratory disperse way from the Eastern route and Andaman route entries. Still, there are some wetlands with considerable avifaunal diversity in Batticaloa district without systemic identification. That why we initiate the systematic scientific study from August 2016 to July 2017 in order to ensure the avian diversity at Vellakattukulam. The scope of the present study is to assess the avian diversity at Vellakattukulam wet-land.

## MATERIALS AND METHODS

### Study Area

The study site located between the geographical coordinates  $7^{\circ} 35' 29''$  N and  $81^{\circ} 46' 18''$  E in Batticaloa district, East coast of Sri Lanka (Figure 1). The study site far away from the urban area, near to the Kirankulam and in between the A4 highway and Batticaloa lagoon. Total area extends about 33.4 hectares. This region coming under the migrant disperse way from the Eastern route and Andaman route entries. Inside the study area there is a freshwater pond at the center and adjacent to the wetland, people engaged household agronomical practices.



**Figure 1: Study Area**

### Methods

The study was carried out from August 2016 to July 2017. The bird count was recorded on a monthly basis. The census was limited to daytime in between 06.00 – 09.00 h and again 16.00 - 18.00 h using the point transect method. Days with unfavorable weather such as heavy rainy days were avoided. Nine sampling points were selected using simple

random sampling because this area having a pond inside and surrounded by dense vegetation. The opportunistic observation method was used since some bird species could not be identified inside point transect. A minimum distance of approximately 100m was kept between points to avoid pseudoreplication. Birds were counted for the standard period of time (15 minutes) at each point with the help of 8 × 40 binoculars (Nikon, USA). Observers may count birds within a circle of fixed radius, or they may count all birds out to the limit of detection for each species as prescribed by Somenzari *et al.*, 2011. Digital camera (Canon EOS 1100 D, Japan) was used to take clear photographs for further confirmation. The observed birds were identified using bird guidebooks (Kotagama and Ratnavira, 2010; Grewal *et al.*, 2002) and Ceylon Bird Club Sri Lanka List (Country List) of bird species, 2011. The species diversity was measured by using the Shannon diversity index and Simpson's diversity index (Usher, 1983) as follows.

$$\text{Shannon-wiener diversity index, } H = \sum |p_i \times \ln p_i|$$

Where  $p_i$  is the proportion of the total number of individuals in the population of  $i^{\text{th}}$  species.

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

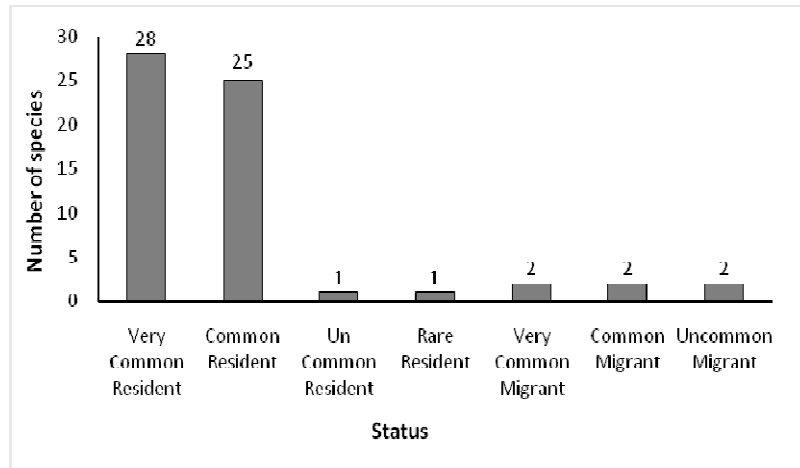
Where  $n$  is a total number of individuals of particular species,  $N$  is the total number of organisms of all species.

## RESULTS AND DISCUSSIONS

Totally 15,291 individuals of 61 species were recorded representing 34 families throughout the study period. Six species were recorded as migratory birds while other species (about 90%) belongs to the breeding resident. Shannon index (H) and Simpson's diversity index (D') of the study site were 2.75 and 0.89 respectively. These findings clearly figure out the wetland having typical avifaunal diversity.

In this region Black-headed ibis (*Threskiornis melanocephalus*) having a large patch of nesting sites along with migratory bird Glossy ibis (*Plegadis falcinellus*). The family Threskiornithidae which include these two species was the most abundance (about 41 % of total bird population) in this region during the study period. Moreover, there was no record for any migratory nesting site in Batticaloa district.

This reveals that the region acts as a nesting and roosting site for migrant birds. Totally 11 species representing family Ardeidae, which was the most diverse family in this region and second most abundance about 15%. Black-headed ibis (*Threskiornis melanocephalus*) and Stork-Billed Kingfisher (*Pelargopsis capensis*) were the most abundant and least abundant species respectively in this site during the study period. Glossy Ibis (*Plegadis falcinellus*), Wood Sandpiper (*Tringa glareola*), Common Sandpiper (*Actitis hypoleucos*), Gull-billed Tern (*Sterna nilotica*), Whiskered Tern (*Chlidonias hybrida*), and Blue-tailed Bee-eater (*Merops philippinus*) were identified as migrant species present in the study area. The site included species which were habitat in an aquatic and terrestrial environment that, characteristic reflected in their diversity. It contributes noticeably to the local avian biodiversity.



**Figure 2: Status of Bird Species**

Figure 2 shows the status of avian species present in the region in the study period. According to this chart, very common and common resident bird species were more abundant than others. And there were no any endemic species recorded in this region.

**Table 1: Recorded Birds in the Study Site**

Family	Common Name	Status		Total Count
		Residential	Abundance	
Accipitridae	Brahminy Kite	BrR	C	128
Aegithinidae	Common Iora	BrR	VC	5
Alcedinidae	White-Throated Kingfisher	BrR	VC	52
	Common Kingfisher	BrR	C	5
	Pied Kingfisher	BrR	C	13
	Stork-Billed Kingfisher	BrR	C	4
Anatidae	Lesser Whistling Duck	BrR	VC	1864
Anhingidae	Oriental Darter	BrR	C	14
Apodidae	Asian Palm Swift	BrR	C	127
Ardeidae	Black-Crowned Night Heron	BrR	C	48
	Little Egret	BrR	VC	374
	Intermediate Egret	BrR	C	685
	Great Egret	BrR	C	68
	Cattle Egret	BrR	VC	312
	Indian Pond-Heron	BrR	VC	734
	Purple Heron	BrR	C	41
	Grey Heron	BrR	C	32
	Striated Heron	BrR	C	16
	Black Bittern	BrR	C	12
	Yellow Bittern	BrR	C	11
Ramphastidae	Brown-Headed Barbet	BrR	VC	64
Charadriidae	Red Wattled Lapwing	BrR	VC	75
Ciconiidae	Asian Openbill	BrR	C	58
	Painted Stork	BrR	C	186
Columbidae	Spotted Dove	BrR	VC	89
	Rock Pigeon	BrR	VC	53
Corvidae	Jungle Crow	BrR	VC	45
	House Crow	BrR	VC	762
Cuculidae	Asian Koel	BrR	C	22
	Greater Coucal	BrR	VC	18

Family	Species	Residential Status	Abundance Status	Count
Dicruridae	Black Drongo	BrR	C	14
Estrildidae	Scaly-Breasted Munia	BrR	VC	73
Jacaniidae	Pheasant-Tailed Jacana	BrR	C	76
Laridae	Gull Billed Tern	M	C	47
	Whiskered Tern	M	VC	35
Meropidae	Little Green Bee-Eater	BrR	VC	117
	Blue-Tailed Bee-Eater	M	VC	54
Monarchidae	Asian Paradise-Flycatcher	BrR	C	7
Motacillidae	Paddy Field Pipet	BrR	C	39
Muscicapidae	Oriental Magpie Robin	BrR	VC	94
Nectariniidae	Purple-Rumped Sunbird	BrR	VC	43
	Purple Sunbird	BrR	VC	21
Oriolidae	Black-Hooded Oriole	BrR	VC	16
Pelecanidae	Spot-Billed Pelican	BrR	VC	18
Phalacrocoracidae	Little Cormorant	BrR	VC	975
	Great Cormorant	BrR	UC	12
	Indian Cormorant	BrR	C	32
Picidae	Black-Rumped Flameback	BrR	VC	8
Psittacidae	Rose-Ringed Parakeet	BrR	VC	76
Pycnonotidae	Red-Vented Bulbul	BrR	VC	39
Rallidae	White-Breasted Water Hen	BrR	VC	106
	Purple Swamphen	BrR	VC	658
	Common Coot	BrR	R	36
	Common Moorhen	BrR	C	22
Recurvirostridae	Black-Winged Stilt	BrR	C	62
Scolopacidae	Wood Sandpiper	M	UC	12
	Common Sandpiper	M	C	34
Sturnidae	Common Myna	BrR	VC	356
Threskiornithidae	Black-Headed Ibis	BrR	C	3241
	Glossy Ibis	M	UC	2984
Timaliidae	Yellow-Billed Babbler	BrR	VC	67
<b>Total Individuals</b>				<b>15291</b>

Table 1 shows the bird species with respective families observed at the study site during the study period, their residential and general abundance status of them. Where BrR is Breeding Resident, M is Migrant, VC is Very Common, C is Common, UC is UnCommon and R is Rare.

## CONCLUSIONS AND RECOMMENDATIONS

Our findings concluded Vellakattukulam having typical avian diversity, and act as a migratory bird nesting site. Presently, improper development activities in close vicinity to the above-mentioned birding site leading to disturbance and destruction of nesting and roosting site. Extensive usage of agrochemicals in nearby croplands paves the path to minimize the availability of food for water wading birds due to the hazardous impact of agrochemicals. Immediate attention to be taken by relevant authorities to minimize the habitat destruction to conserve the significant avian diversity of Vellakattukulam. Moreover, proper monitoring activities and long-term studies are necessary to ensure the future existence of avifauna.

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