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## RESEARCH ARTICLE

### STATUS AND DIVERSITY OF BIRDS IN THE DODDABETTA AREA, THE UPPER NILGIRIS, WESTERN GHATS

<sup>1</sup>Kalaiyarasi, G., <sup>2</sup>Jeyabalan, D., <sup>3</sup>Rameshkumar, C. and <sup>\*</sup>Subramanian, C.

<sup>1</sup>Department of Zoology and Wildlife Biology, Government Arts College, Udthagamandalam-643 002, The Nilgiris, Tamilnadu, India

<sup>2</sup>PG & Research Department of Zoology, Government Arts College (Autonomous), Kumbakonam-2, Tamilnadu, India

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#### ABSTRACT

The Doodabedda is one of the highest peaks in the Nilgiris. A total of 37 bird species were had from twelve transects in the Doddabedda study area during the study period from November 2017 to October 2018. The highest Encounter Rate was recorded in the house sparrow (*Passer domesticus*) ER= 23.41 (LER 17.8 & UER 26.31). The lowest Encounter Rate was observed in the Eurasian black bird (*Turdus merula*) ER=0.13 (LER 0.03 & UER 0.18). The other species were noticed the moderate encounter rate of population. A total of 37 species it consisting of 11 orders and 27 families, were recorded. Out of 37 species, the highest Encounter Rate (ER) was for House Sparrow (*Passer domesticus*) The Shannon index of alpha diversity of avifaunal group in the Study Area was - 1.641.

## INTRODUCTION

Birds are widely recognized as good bioindicators of the quality of the ecosystems and the health of environment (Gill 1994; Jayson and Mathew 2002). The Birds are an important component of the forest ecosystem play a major role as consumer and disperser of plants, seeds and controllers of insect population. The scavenging bird species assist in cleaning environment, while others control crop and animal pests, and some serve as indicators, of changes in environmental quality. The changes in the status of birds may warn of habitat loss and modifications and can indicate the likely impact of these threats on other animals and plants (Kershaw and Looney 1973). The habitat structure, diversity and their relationship with the fauna provides information about the habitat utilization which ultimately leads to the management and monitoring species, habitats and the ecosystem (Hoyo et al 1992 and Grimmett et al 1998). Information on status and distribution of species especially threatened and endemic birds, in prediction of distribution level and conservation efforts at all potential sites of their occurrence (Satterfield et al 1998; Robin and Sukumar 2002). Western Ghats a is one of the world's hot Spot and has over 5000 species of flowering plants, 139 mammal species, 508 bird species and 179 amphibian species.

\*Corresponding author: Subramanian, C.

2PG & Research Department of Zoology, Government Arts College (Autonomous), Kumbakonam-2 Tamilnadu, India

At least 325 globally threatened species occur in the Western Ghats. The Western Ghats have one of the most complex and patchy, landscape in India. All these have streams and marshes forming a natural mosaic of patches which is the habitat specialist and endemics (Vijayan and Gokula 2000). The Western Ghats have divers avifauna there are 507 species from Western Ghats and adjacent narrow coastline (Kershaw and Looney 1973) of these 369 birds species at residents with 16 being endemic (Satterfield et al 1998). The Nilgiri Hills in the Western Ghats is known for its high endemism. The species which have restricted range of distribution have more changes of getting endangered or extinct (Lim and Sodhi 2004) and have hence require high priority for conservation. The number of resident species of the Western Ghats is however lower when compared with other parts of the tropics (Gokula and Vijayan 1997; Terborgh et al 1990). The Western Ghats has to be made an ecologically sensitive zone. The important bird areas IBAs, namely Mukurthi National Park, Avalanche Reserved Forest, Taishola, Long wood shola, Coonoor, Bison Swamp and Governor shola have been identified from the Upper Nilgiris, Islam and Rahmani (2004). There is at least 508 bird species, there are at least 16 species of birds endemic to the Western Ghats. Avifauna are important for the ecosystems as they play various roles as scavenger, pollinators and predators of insect pest. There are few old records of the birds in the Nilgiris by British and later compiled by Ali and Ripley (1998) and Islam and Rahmani (2004). The Nilgiris

district form an integral part of the Western Ghats and covers an area 2,549 sq.km the typical evergreen temperate forests, endemic to the Nilgiris called sholas, grasslands endow this district with a unique and rich bio-diversity and unique geographical condition. The Nilgiris is the natural habitat of a variety of fauna like elephants, spotted deer, panthers, tigers, bison, wild buffaloes and variety of birds etc. The Mudumalai sanctuary and Mukurthi National Parks are the other important parts of the Nilgiris. Some preliminary surveys were done by various workers in very few areas, in Nilgiris on the avian population. However, still there was a gap to fulfill the documentation of avian study such population and diversity in the Doddabedda in the upper Nilgiris. Due to the lack of scientific information on the abundance, population and diversity of different species of birds in the Nilgiris, the present study was designed and carried out in the Doddabedda areas in the upper Nilgiris. The Doddabedda roadside (DR), Agricultural field (AF), Tea Plantation (TP) and natural forest areas (NR) are the selected study spots which were studied intensively for thorough investigation on the avian population and diversity.

## MATERIALS AND METHODS

The study of bird population and its diversity was studied by the standard methods. The Line transect method as described by Burnham *et al* (1980) and Lack (1993) was adopted for estimating the abundance and population of avifauna in all the study areas. The line transects (12 transects) that were laid in different direction in the study areas. In which, the data on species, and individuals for avian fauna were collected while sighting on the transects. The line transects were also laid in the different altitudinal gradient and available habitats.

The data were collected monthly once in all the transects. Each transect was measured and sampled for 1kms length. The intensive study was conducted in 12 locations from the month of November 2017 to October 2018. During the walk of a transect the data were collected based on the visual Encounter Rate on a bird the details such as species, number of individuals and distance from the observer when first sighted were noted. To estimate the population of bird species in the study areas, the encounter rate and alpha diversity of birds were calculated.

## Statistical analysis

To estimate the population of bird species in the study areas, the encounter rate was calculated by using the DISTANCE software. The alpha diversity (Shannon index) was applied for the alpha diversity birds abundance in the Doddabedda area.

## RESULTS

The Doodabedda is one of the highest peaks in the Nilgiris. A total of 37 bird species were had from twelve transects in the Doddabedda study area during the study period from November 2017 to October 2018 (Tables 1 & 2). The highest Encounter Rate was recorded in the house sparrow (*Passer domesticus*) ER= 23.41 (LER 17.8 & UER 26.31). The lowest Encounter Rate was observed in the Eurasian black bird (*Turdus merula*) ER=0.13 (LER 0.03 & UER 0.18). The other species were noticed the moderate encounter rate of population (Tables 1 & 2). A total of 37 species it consisting of 11 orders and 27 families, were recorded. Out of 37 species, the highest Encounter Rate (ER) was for House Sparrow (*Passer domesticus*) (Figs 1 & 2).

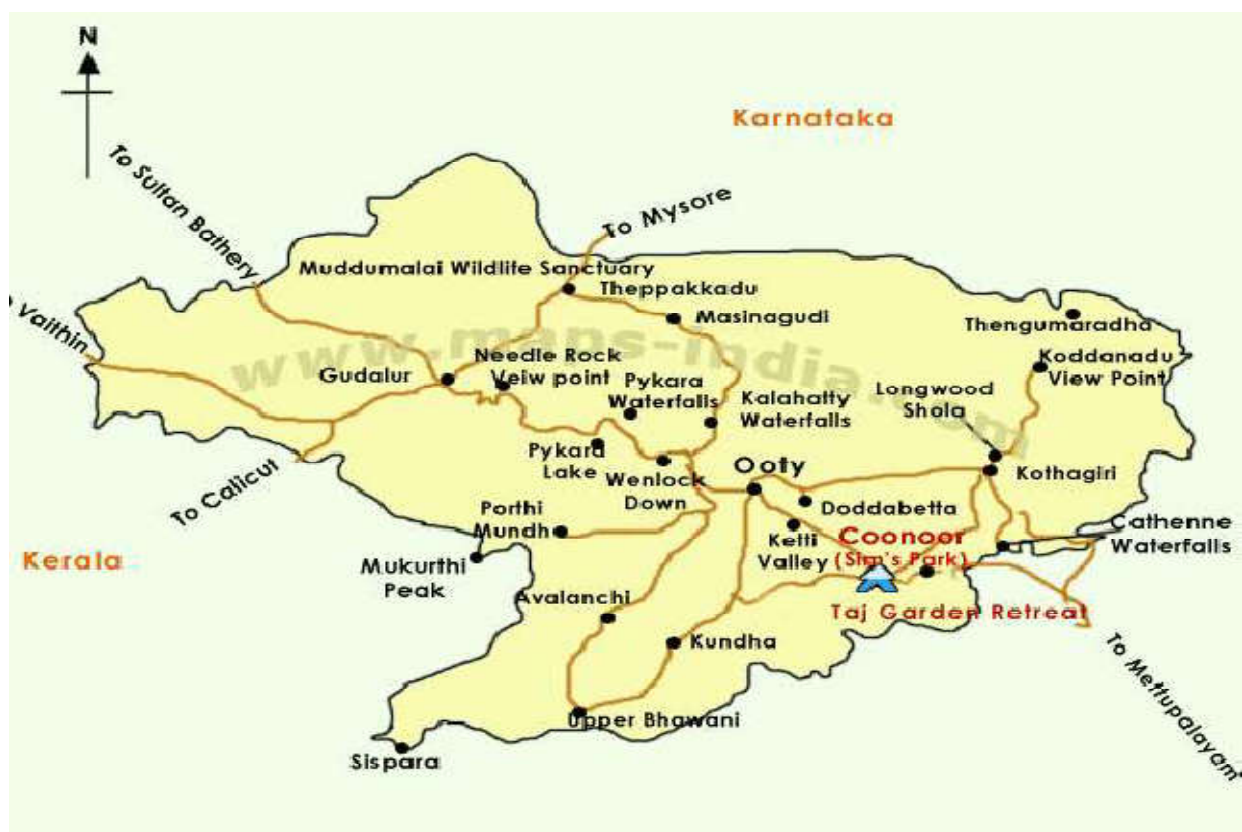


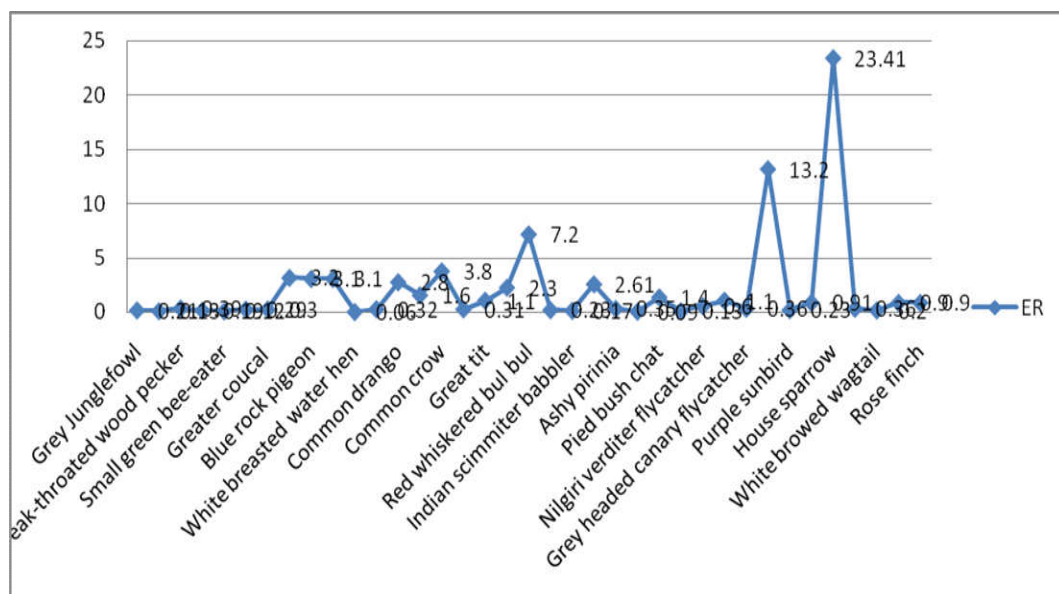
Figure 1. The Nilgiris Map

The Shannon index of alpha diversity of avifaunal group in the Study Area was - 1.641. The overall bird species was 37 (consisting of 11 orders and 27 families) were recorded along with some endemic species. The avian fauna includes various kinds of orders and families. All the study spots were slightly differed in the avian abundance and diversity including orders and families.

Remarkably, particular type of species (House sparrow *Passer domesticus*) is rich in diversity and abundance in several study areas, habitats and seasons. The Shannon index of alpha diversity of avifaunal group in the Study Area was analysed for avian different in the study area - 1.641.

**Table 1. Encounter Rate of Birds in Doddabedda Area during the study period 2017-2018**

Sl.No	Common Name	Scientific Name	ER/km walked	Lower Limit	Upper Limit
1	Grey Junglefowl	<i>Gallus sonneratii</i>	0.21	0.13	0.34
2	Eurasian black bird	<i>Turdus merula</i>	0.13	0.03	0.18
3	Streak-throated wood pecker	<i>Picus xanthopygacus</i>	0.39	0.1	0.45
4	Common hoopoe	<i>Upupa epops</i>	0.19	0.1	0.26
5	Small green bee-eater	<i>Merops orientalis</i>	0.12	0.1	0.2
6	House swift	<i>Apus affinis</i>	0.29	0.2	0.38
7	Greater coucal	<i>Centrops sinensis</i>	0.3	0.2	0.5
8	Spotted dove	<i>Streptopelia chinensis</i>	3.2	2.1	4
9	Blue rock pigeon	<i>Columba livia</i>	3.1	1.51	4.4
10	Common coot	<i>Fulica atra</i>	3.1	1.5	4.1
11	White breasted water hen	<i>Amaurornis phoenicurus</i>	0.06	0.02	0.09
12	Brahminy kite	<i>Haliastur Indus</i>	0.32	0.15	0.52
13	Common drango	<i>Dicrurus macrocercus</i>	2.8	1.51	3.2
14	Jungle crow	<i>Corvas marorrhynchis</i>	1.6	0.9	2.1
15	Common crow	<i>Corval splendens</i>	3.8	1	4.3
16	Long tailed shrike	<i>Lanius schach</i>	0.31	0.14	0.52
17	Great tit	<i>Parus major</i>	1.1	0.6	1.8
18	Red-rumped Swallow	<i>Hirundo daurica</i>	2.3	1.4	3.1
19	Red whiskered bul bul	<i>Pyconotus jocosus</i>	7.2	5.8	9.2
20	Red vented bulbul	<i>Pyconptus cafer</i>	0.23	0.12	0.51
21	Indian scimmiter babbler	<i>Pomatorhinus horsfieldii</i>	0.17	0.1	0.2
22	Oriental white eye	<i>Zosterops palpehrosus</i>	2.61	1.4	3.5
23	Ashy pirinia	<i>Prinia socialis</i>	0.35	0.21	0.53
24	Nilgiri laughing thrush	<i>Garrulax cachinnans</i>	0.09	0.03	1.2
25	Pied bush chat	<i>Saxicola capratos</i>	1.4	0.5	2.1
26	Magpie robin	<i>Copsychus saularis</i>	0.13	0.1	0.2
27	Nilgiri verditer flycatcher	<i>Muscicapa albicaudata</i>	0.6	0.4	0.9
28	White browed fantail flycatcher	<i>Rhipidura aureola</i>	1.1	0.6	1.6
29	Grey headed canary flycatcher	<i>Culicicapa ceylonensis</i>	0.36	0.2	0.62
30	Jungle myna	<i>Acridotheres juscus</i>	13.2	11.13	15.14
31	Purple sunbird	<i>Nectarinia asiatica</i>	0.23	0.15	0.33
32	Spotted munia	<i>Lonchura punctulata</i>	0.91	0.5	1.5
33	House sparrow	<i>Passer domesticus</i>	23.41	17.8	26.31
34	Grey wagtail	<i>Motacilla cinerea</i>	0.36	0.15	0.57
35	White browed wagtail	<i>Motacilla maderespatensis</i>	0.2	0.8	0.31
36	Nilgiri pipit	<i>Anthus nilghiriensis</i>	0.9	0.7	0.13
37	Rose finch	<i>Carpodacus erythrinus</i>	0.9	0.7	1.6



**Fig. 1. Encounter Rate of Birds in Doddabedda area in Nilgiris during the Study Period 2017-2018 (ER=n/km walked)**

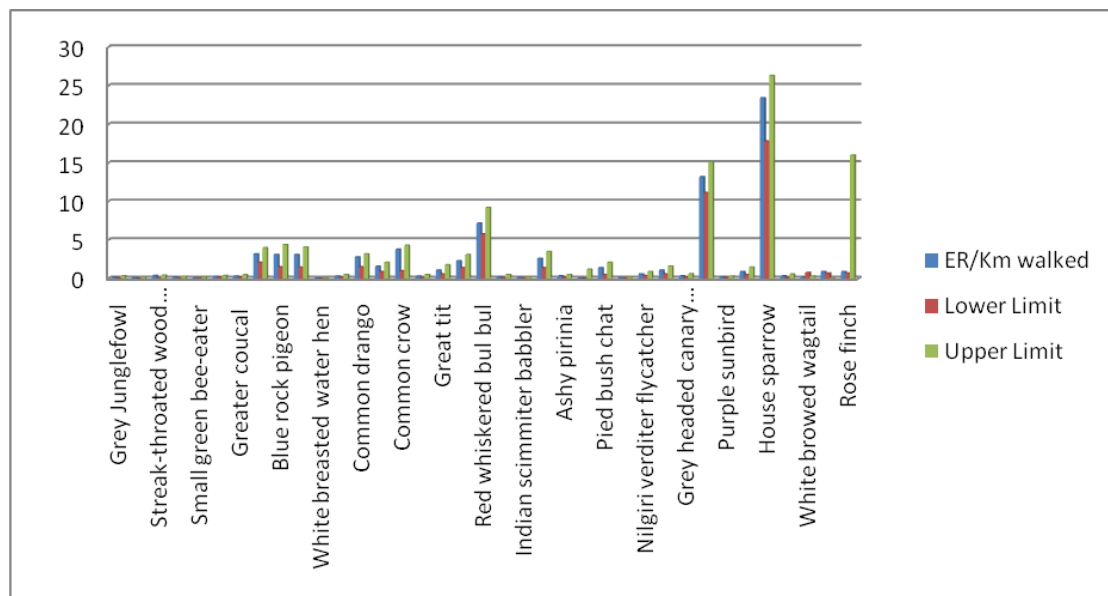


Fig. 2. Encounter Rate of Birds in Doddabedda Area during the Study Period 2017-2018 (ER=n/km walked)

## DISCUSSION

The Western Ghats have diverse avifauna there are 507 species from Western Ghats and adjacent narrow coastline (Kershaw and Looney 1973) of these 369 birds species at residents with 16 being endemic (Stattersfield *et al.*, 1998). The Nilgiri Hills in the Western Ghats is known for its high endemism. The species which have restricted range of distribution have more changes of getting endangered or extinct (Lim and Sodhi 2004). According to Gaston (1996) the Biodiversity is the variety of life the different plants, animals and microorganism, their genes and the ecosystems of which they are a part. Vijayan and Gokula (2000) conducted a preliminary status of the Nilgiri laughing thrush. Zarri *et al* (2005) conducted the first intensive ecological investigation on the avifauna of the Nilgiri and reported the patterns of bird community, guild The Doddabedda harbors about 37 species of birds. The Nilgiris have diverse avian fauna there are 50% species at birds known from Western Ghats and adjacent areas. Of these, 360 birds species are residents with 16 being endemic (Stattersfield *et al* 1999). The Nilgiris hill in the western Ghats are known for its high endemism. The species which have restricted range of distribution have more changes of getting endangered or extinct (Lee *et al* 2005). According to Gokula and Vijayan (1997) the number of resident species of the Western Ghats is however lower when compared with other parts of tropics. However in addition to the diversity the endemic species namely Nilgiri Laughing Thrush and Nilgiri Flycatcher was predominantly observed in many spots of upper Nilgiris. However the result of the present study showed that these are decline trend in the population of endemic birds. Among the birds observed in this area most of them are resident species and lesser number of migration birds found here. According to Renuka (2012) reported 32 species were also obtained in the Botanical garden of Udthagamandalam and many birds are higher in number in the abundance except some migratory birds. Similar observations were also made in the boat house area in Ooty (Jackur nisha 2012). According to Rameshkumar *et al* (2017) Indian Peafowl densities in the Theni forest area in Tamilnadu, were high in the Deciduous habitats when compared to higher altitudinal habitats such hill forest.

It seems to be an ideal microhabitat variables as well as clearings in the summer and it may be the preference of open areas. Karthick (2013) studied in the selected sites in the Ketti area which was the house sparrow (*Passer domesticus*) was higher encounter rate and the Grey wagtail (*Motacilla cinere*) was lower encounter rate. The similarly Selvaraj (2013) observed in Love Dale villages, in Nilgiris. Sudha (2013) recorded the maximum individual for House sparrow (*Passer domesticus*) and minimum for Bramini kite (*Haliastur sindus*) in the Government Rose Garden, Udthagamandalam in Nilgiris. Similar observation obtained by Sivakumar (2015) surveyed the avian diversity in the Emerald area, in the Nilgiris. The highest Encounter Rate (ER) was in the House Sparrow *Passer domesticus* and the lowest ER in the Greater coucal *Centropus sinensis* were observed in Kethi valley area, in Nilgiris by Kalaiyarasi *et al* (2017). The present study is also supporting to the previous observations in the upper Nilgiris.

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