DIVERSITY STUDIES OF BIRDS IN AND AROUND HARANGI RESERVOIR, KODAGU DISTRICT, CENTRAL WESTERN GHATS

M.P. Krishna*

* Department of Zoology Field Marshal K. M. Cariappa Mangalore University College, Madikeri 571201, Karnataka, India.

ABSTRACT

Kodagu district is one of the important regions in the Central Western Ghats experiencing extreme climatic conditions and harbor diverse flora and fauna. The river Harangi is the first major tributary that joins the Cauvery River. It originates at the contemporary area of Western Ghats in the Kodagu district a reservoir has been built across the river Harangi before confluence with Cauvery. Wetlands are rich in flora and fauna and birds are one of the important biotic factors which prefer to live near these wetlands. The study was undertaken to enumerate the bird diversity in the region from June 2016 to May 2017. In the present study, 44 bird species have recorded belonging to 11 orders, 28 families, which consists of 25 resident birds 15 resident migratory birds and 4 migratory birds. Maximum numbers of birds 23 were found in deciduous forest. Passiriformes is the most dominant order comprising 17 species. Of the total bird species recorded 1 species belong to Near Threatened category, 3 were belong to Vulnerable, 3 species were belong to Endemic to Western Ghats, and Nilgiri Wood Pigeon (*Columba elphinstonii*) were Endangered species recorded in Deciduous forest indicating their conservation significance.

KEYWORDS: Diversity, Wetland, reservoir, Avifauna, Endangered

INTRODUCTION:

Biodiversity is defined as the variety and differences among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part. Water is a basic and primary need of all vital processes and it is now well established that the life first arose in aquatic environment. Wetlands are traditional zones that occupy intermediate position between dry land and open water. These wetlands are rich in flora and fauna and birds are one of the important biotic factors which prefer to live near these wetlands. Avian fauna occupies a special position in an aquatic ecosystem. They not only have an aesthetic role but also occupy a very important position in food chain. Birds

are the best known and the most easily recognizable of all animals and are ideal bioindicators and useful models for study in a variety of environmental problems.

There are around 9000 species of birds living in the world with a tremendous diversity of lifestyle. The Western Ghats has nearly 580 bird species of which 3.5% are endemic out of more than 1250 species in India. Karnataka harboring 515 species (Vidya 2010). And Kodagu district harbors about more than 310 species belong to 61 families and sub families (Narasimhan, 2008). About 13 species endemic to Western Ghats occur in Kodagu district. Apparently the Indian bird population has been dwindling due to direct/ indirect impact from increasing human population, habitat loss, fragmentation and severe biotic pressure. Bird community evaluation has become an important tool in biodiversity conservation and for identifying conservation actions in areas of high human pressure. Thus bird life in most areas of the Western Ghats is well documented (Hosetti *et al.*, 2001., Uttangi 2001., Shanbhag *et al.*, 2001., Praveen and Nameer 2008., Ishwar Bhat *et al.*, 2009., Sahas Barve and Rekha Warrier, 2013., Pulugandi, C and Rajan, M.K 2014 and Jhenkhar *et al.*, 20016). However, it is evident from literature that there are only few reports about diversity of birds in Kodagu district (Narasimhan, 2008; Vidya, 2010 and Jhenkhar *et al.*, 20016). Therefore present investigation of bird species in this region with special reference to diversity, abundance, status, species richness, dominance, and habitat preference was conducted.

Study Area:

The Western Ghats of India is one of the 34 biodiversity hotspots in the world characterized by high diversity and endemicity (Myers *et al.*, 2000). Kodagu district is one of the important regions in the Central Western Ghats experiencing extreme climatic conditions and harbor diverse flora and fauna. The District encompasses an area of 2,552 km² at 1,523.6 m asl of the Western Ghats. Kodagu region experiences an average rain fall of 268.25 cm/annum and average temperature of 15°C ranging from 11 to 28°C. The physical area of Kodagu on the basis of amount of rain fall received is categorized in to Wet zone, Intermediate zone, and Dry zone. Which have given raise many forest types like the thick evergreen forests, semi evergreen forests, moist and dry deciduous forests, shola forests and grasslands in the mountain valleys (Vidya, 2010). Nearly 867 km² are declared as reserved forest. River Cauvery which is the longest perennial river. It originates from the Brahmagiri hills of Western Ghats in the Kodagu district of Karnataka. The river Harangi is

the first major tributary that joins the Cauvery River. It originates at the contemporary area of Western Ghats in the Kodagu district a reservoir has been built across the river Harangi before confluence with Cauvery. Reservoirs are biologically very potential and rich in flora and fauna. The marshy places forms natural habitat for feeding, breeding and nesting grounds for birds (Pawar *et al.*, 2010)

MATERIALS AND METHODS:

The study was carried out for one year from June 2016 to May 2017. Monsoon (June to September), post-monsoon (October-January) and summer seasons (February-May). The study was undertaken to enumerate the bird diversity in the region. In each of the selected site, line transects of 3 km length were marked and survey was conducted by walking on the existing trails and track using the knowledge of standard field guides and observation on birds were recorded. Weekly visits to the sites were made for one year with a maximum of 4 visits per month. The study of birds of the reservoir area and their surrounding natural forest habitat were observed during morning 6.30am to 9.00am and evening 4.00pm to 6.30pm respectively by using binoculars (Nikon 10×50 Action Binoculars, Japan, Model # 018208072187). Photographs and video graphs taken using digital video camera recorder (Sony handy cam, 40 x Zoom). The identification of birds was done by using standard field guides (Grimmettet, R. *et al.*, 1998; Salim Ali 2003).

Table 1: Diversity of birds recorded at Harangi water Reservoir, Western Ghats

| S.No. | Family | Common Name | Scientific Name | IUCN | |
|-------|---------------|---------------------|-------------------------|-------------|--|
| | 100 | | | Status | |
| 1 | Campephagidae | Scarlet minivet | Pecrocotus flammeus | LC | |
| 2 | Cisticolidae | Paddy field Warbler | Acrocephalus agricola L | | |
| 3 | Corvidae | Common Raven | Corvus corax | LC | |
| | | River Tern | Sterna aurantia | NT | |
| 4 | Dicrusidae | Drongo | Dicrurus adsimilis | LC | |
| 5 | Motacillidae | Forest Wagtail | Motacilla indica L | | |
| 6 | Muscicapidae | Magpie Robin | Copsuchus saularis | saularis LC | |
| 7 | Nectarinidae | Purple Sunbird | Cinnyris asiaticus | LC | |
| | | Crimson Sunbird | Aethopyga siparaja | En | |
| 8 | Paridae | Yellow cheeked Tit | Parus xanthogenys | LC | |

| 9 | Pittidae | Indian Pitta | Pitta brachyura | LC |
|----------|--|---------------------------|---------------------------------|----|
| 10 | Pycnonotidae | Red whiskered Bulbul | Pycnonotus jocosus | LC |
| | | Yellow browed Bulbul | Acritillas indica | LC |
| | | Red vented Bulbul | Pycnonotus cafer | En |
| 11 | Sturnidae | Jungle Myna | Acridotherus fuscus LC | |
| 12 | Tephrodornithidae | Bar winged Flycatcher | Hemipus picatus | LC |
| 13 | Zosteropidae | White ring Round eye | Zosterops palpebrosus | LC |
| 14 | Accipitridae | Sparrow Hawk | Accipites nisus | LC |
| | | Bonnelis Eagle | Hieraetus fasciatus | LC |
| | - 20 | Pariah Kite | Milvus migrans | LC |
| 15 | Ardeidae | Night Heron | Nycticorax nycticorax | LC |
| | e de la companya del companya de la companya del companya de la co | Indian reef Heron | Egretta gularis | LC |
| miles of | | Large egret | Cosmerodius albus | LC |
| | | Cattle egret | Bubulcus ibis | LC |
| | - 4 | Large egret | Ardea alba | LC |
| 16 | Charadridae | Red Wattle Lapwing | Vanellus indicus | LC |
| 17 | Ciconidae | White necked Stork | Ciconia ep <mark>iscopus</mark> | VU |
| 18 | Glareolidae | Ruff and Reve | Philomachus pugnax | VU |
| 19 | Phalacrocoracidae | Little Cormorant | Phalacrocorax niger | LC |
| 20 | Threskiornithidae | White Ibis | Threskiornis | LC |
| 1 | | | aethiopica | |
| 21 | Cuculidae | Greater Coucal | Centropus sinensis | LC |
| 22 | Columbidae | Spotted Dove | Streptopelia chinensis | LC |
| | | Nilgiri Wood Pigeon | Columba elphinstonii | EN |
| 23 | Bucerotidae | Malabar Grey Hornbill | Tockus griseus | LC |
| | | Rufous necked Hornbill | Aceros nipalensis | VU |
| 24 | Psittacidae | Hanging Parrot | Loriculus vernalis | LC |
| | | Blue winged parakeet | Psittacula | En |
| | | | columboides | |
| 25 | Meropidae | Small Bee eater | Merops orientalis | LC |
| | | Blue Bee eater | Nyctyornis athertonis | LC |
| 26 | Alcedinidae | White breasted Kingfisher | Halcyon smyrnensis | LC |

| | | Small blue Kingfisher | Alcedo atthis | LC |
|----|------------|-----------------------|---------------------|----|
| 27 | Picidae | Black Woodpecker | Drycopus martius | LC |
| | | Golden Woodpecker | Dinopium | LC |
| | | | benghalense | |
| 28 | Trygonidae | Malabar Trogon | Harpectes fasciatus | LC |

IUCN status: **LC**= Least concerned, **NT**= Near Threatened, **En**= Endemic to

Western Ghats, **EN**= Endangered

RESULTS:

In the present study, 44 bird species have recorded (Table.1) belonging to 11 orders, 28 families, which consists of 25 resident birds 15 resident migratory birds and 4 migratory birds. As for the food preferences of the birds, 13 were piscivores, 11 insectivorous, 9 granivores, 8 carnivores, 3 were omnivores (Himanshu, S. Palei *et al.*, 2012) Among different vegetation type maximum number of birds 23 were found in Deciduous forest, 10 species were found in Semievergreen forest, 7 species were found in evergreen forest and 4 species were found in Scrub forest. Passiriformes is the most dominant order comprising 17 species, 13 families. Order Ciconiformes comprising 11 species, 7 families, order Coraciiformes comprising 4 species, 2 families, order Pisciformes comprising 3 species, 2 families. order such as Psittaciformmes comprising 3 species, 1 family, Order Columbiformes comprising 2 species, 1 family, order Bucerotiformes comprising 2 species, 1 family and avian order Cuculiformes, and Charadriformes comprising 1 each species, in 1 each family.

Of the total 44 bird species recorded 1 species belong to Near Threatened category they are River Tern (Sterna aurantia), 3 were belong to Vulnerable category they are White necked Stork (Ciconia episcopus), Ruff and Reve (Philomachus pugnax) and Rufous necked Hornbill (Aceros nipalensis) 3 species were belong to Endemic to Western Ghats they are Crimson Sunbird (Aethopyga siparaja), Blue winged parakeet (Psittacula columboides), Red vented Bulbul (Pycnonotus cafer) and Nilgiri Wood Pigeon (Columba elphinstonii) were Endangered species recorded in Deciduous forest indicating their conservation significance.

Table 2: Seasonal variation, distribution, diversity and abundance of avifauna at Harangi water Reservoir, Western Ghats

| S.No. | Scientific Name | Monsoon | Postmonsoon | Summer |
|-------|----------------------------------|---------------------|--------------------|----------------|
| | | (June to September) | (October-January) | (February-May) |
| 1 | Pecrocotus flammeus | + | +++ | + |
| 2 | Acrocephalus agricola | + | +++ | ++ |
| 3 | Corvus corax | + | ++ | + |
| 4 | Sterna aurantia | + | +++ | _ |
| 5 | Dicrurus adsimilis | + | ++++ | ++ |
| 6 | Motacilla indica | _ | ++++ | ++ |
| 7 | Copsuchus saular <mark>is</mark> | + | ++ | _ |
| 8 | Cinnyris asiaticus | + /** | ++ | _ |
| 9 | Aethopyga sipara <mark>ja</mark> | | +++ | + |
| 10 | Parus xanthogeny <mark>s</mark> | _ | +++ | + |
| 11 | Pitta brachyura | + | ++ | ++ |
| 12 | Pycnonotus jocos <mark>us</mark> | + | ++++ | +++ |
| 13 | Acritillas indica | + 1935 | +++ | ++4 |
| 14 | Pycnonotus cafer | + | + | ++ |
| 15 | Acridotherus fuscus | -11 | ++1 | 9+ |
| 16 | Hemipus picatus | | PF (| + |
| 17 | Zosterops palpebrosus | - V | 10 | + |
| 18 | Accipites nisus | + | 30. 1.1 | _ |
| 19 | Hieraetus fasciatus | + | | ++ |
| 20 | Milvus migrans | _ | + | + |
| 21 | Nycticorax nycticorax | ++ | + | ++ |
| 22 | Egretta gularis | ++ | ++++ | ++ |
| 23 | Cosmerodius albus | ++ | ++++ | ++ |
| 24 | Bubulcus ibis | ++ | ++++ | ++ |
| 25 | Ardea alba | ++ | ++++ | ++ |
| 26 | Vanellus indicus | + | + | + |
| 27 | Ciconia episcopus | _ | +++ | + |
| 28 | Philomachus pugnax | _ | +++ | ++ |

| 29 | Phalacrocorax niger | _ | +++ | ++ |
|----|-------------------------------------|--------|------|------|
| 30 | Threskiornis aethiopica | _ | +++ | ++ |
| 31 | Centropus sinensis | + | ++ | ++ |
| 32 | Streptopelia chinensis | _ | ++ | + |
| 33 | Columba elphinstonii | _ | + | + |
| 34 | Tockus griseus | + | ++ | _ |
| 35 | Aceros nipalensis | _ | + | ++ |
| 36 | Loriculus vernalis | _ | ++ | + |
| 37 | Psittacula columboides | _ | ++ | _ |
| 38 | Merops orientalis | + | ++++ | _ |
| 39 | Nyctyornis athert <mark>onis</mark> | + | ++++ | ++ |
| 40 | Halcyon smyrnen <mark>sis</mark> | + 1000 | ++++ | ++ |
| 41 | Alcedo atthis | + | ++ | _ |
| 42 | Drycopus martius |) - I | +++ | ++ |
| 43 | Dinopium bengha <mark>lense</mark> | | +++ | ++ |
| 44 | Harpectes fasciat <mark>us</mark> | + _ % | ++ |) -) |

Absent -; Rare +; Occasional ++; Common +++; Abundance ++++

DISCUSSION:

The Harangi reservoir and surrounding natural forest area is highly rich in avifauna. This high diversity may be attributed to the fact that this area supports good vegetation and very low human interferences. Reservoirs are biologically very potential and rich in flora and fauna. The marshy places forms natural habitat for feeding, breeding and nesting grounds for birds (Pawar *et al.*, 2010). In this study family Ardeidae to be the most dominant family with 5 species. Similar kind of observations and results were made by (Kumar, 2006) in Bharathpuzha river basin Kerala, (Murugesan *et al.*, 2013) reported 166 bird species belonging to 56 families from the wetland area of Oussudu Lake in Puduchery. (Ishwara Bhat *et al.*, 2009) reported 44 bird species in Anekere wetland area of Karkala, Udupi district of Karnataka. Seasonal variation in the diversity and abundance of avifauna in the study period was presented in (Table. 2). Present study reveals avifaunal diversity

and abundance is more in post monsoon (October-January) as there was ideal climatic condition, optimum water storage, and availability of abundant food, increased vegetation and arrival of migratory birds. The minimum diversity was recorded in Monsoon (June to September), because of bad weather, heavy rain, increased flow of water, non-availability of food and return of migratory birds.

CONCLUSION:

Present study indicates that there is a greater bird diversity seen in the natural deciduous forest. The conservation of birds has direct impact from two major factors. The impact of habitat loss will directly lead to loss in species density and diversity. On the other hand effect of climate change may have implication on distribution, habitat change of birds. Of the total bird species recorded 1 species belong to Near Threatened category, 3 were belong to Vulnerable, 3 species were belong to Endemic to Western Ghats, and Nilgiri Wood Pigeon (*Columba elphinstonii*) were Endangered species recorded in Deciduous forest indicating their conservation significance. This shows that there is a need to protect these, each and every habitat to conserve reservoir, wetland and their surrounding natural forest. It is necessary to document the current status of bird species for future monitoring and conservation.

ACKNOWLEDGEMENT:

I express my sincere thanks to the Principal, Field Marshal K.M. Cariappa Mangalore University College, Madikeri, Karnataka, for the facilities.

REFERENCES:

- 1. Barve, S., and Warrier, R., 2013. Bird diversity of the Sharavathy landscape, Karnataka,. Indian Birds 8 (3): 57-61.
- 2. Grimmett, R., Inskipp, C. and Inskipp, T. 1998. Birds of the Indian subcontinent. 1st ed. London: Christopher Helm, A & C Black.
- 3. Himanshu, S. Palei, Pratyush, P, Mohapatra and Hemanth K Sahu, 2012. Birds of Hadagarh Wildlife Sanctuary, Odisha, India. World Journal of Zoology 7 (3): 221-225.
- 4. Hosetti, B.B., B.C. Somanath and K.L. Naik: 2001 Eco-ornithological studies on Gudavi Bird Sanctuary, Shimoga, Karnataka, India, cited. In: Trends in wild life biodiversity conservation and management (Eds.: B.B. Hosetti and M. Venkateshwarulu). Vol. 1, Daya Publishing House, Delhi. pp. 269-289.

- 5. Ishwara Bhat, P. S., Cristopher and Hosetti, B.B. 2009. Avifaunal diversity of Anekere wetland, Karkala, Udupi district, Karnataka, India. Journal of Environment Biology. 30 (6): 1059-1062.
- 6. Jhenkhar, M., Jadeyegowda, M., Kushalappa, C.G., Ramesh, M.N., and Sathish, B.N. 2016. Bird diversity across different vegetation types in Kodagu, Central Western Ghats, India. International Journal of Zoology and Research. Vol.6 (3): 25-36.
- 7. Kumar, A.B. 2006. A checklist of avifauna of the Bharathpuzha river basin, Kerala. Zoos Print 21 (8): 2300-2355.
- 8. Murugesan, M., Rachna Chandra, B., Anjan Kumar Prusty and Arun, P.R. 2013. Avifauna of the Oussudulake and its environs, Puduchery, India and Conservation concerns. 19-29.
- 9. Myers, N., Mittermeier, R., Mittermeier, C., Foneseka, G and Kent, J. 2000. Biodiversity hotspots for conservation priorities, Nature 403: 853-858.
- 10. Narasimhan, 2008. Feathered Jewels of Coorg, Karnataka, India. Coorg wildlife society, Karnataka, India.
- 11. Pawar, S.M., Ganeshwade, R.M and Sonawane, 2010. Avifaunal along three water reservoir from Satara district, Maharashtra. The Biocan, 5 (4): 609-612.
- 12. Praveen, J and Nameer, P.O. 2008. Bird diversity of Siruvani and Muthukulam Hills, Western Ghats, Kerala Indian Birds, 3. (6), 210-217.
- 13. Pulugandi, C and Rajan, M.K. 2014. Biodiversity of Birds in Vambakottai water Reservoir, Virudhunagar District, Tamilnadu.. Journal of Pharmaceutical and Bilogical Research Vol. 2 (2): 178-183.
- 14. Salim Ali, 2003. The book of Indian Birds. (13th Edition) published by Bombay Natural History Society, Oxford university press. 1-326.
- 15. Shanbhag, A.B., R. Walia and S.D. Borges 2001: The impact of Konkan railway project on the avifauna of Carambolim lake in Goa. Zoos' Print J., 16, 503-508.
- 16. Uttangi, J.C. 2001: Conservation and management for the waterfowls of minor irrigation tanks and their importance as stopover sites in Dharwad Dist., cited. In: Trends in wild life biodiversity conservation and management (Eds.: B.B. Hosetti and M. Venkateshwarulu). Vol. 1, Daya Publishing House, Delhi.1062.
- 17. Vidya Srinivasarao, 2010.Impact of Grevillea robusta composition on bird diversity in coffee plantations in Cauvery Watershed area of Coorg district. Report commissioned by Cafnet (2010).