

Seasonal Variation of Birds Species Diversity at Vindhyaachal Forest Reserve Khargone, District (M.P.)

Praveer Pandey¹, C.S. Shrivastava², S. Gaherwal^{3*}

¹Department of Zoology, Government College, Mandleshwar (M.P.), India

²Department of Zoology, Government College Mundi, Khandawa (M.P.), India

³Department of Zoology, Government Holkar Science College, Indore (M.P.), India

*Corresponding Authors: psgaherwal@yahoo.com

Available online at: www.isroset.org

Received: 07/Oct/2020, Accepted: 13/Oct/2020, Online: 31/Oct/2020

Abstract-The main aim of the present investigation was to study the seasonal variation of birds species diversity at vindhyachal forest reserve at khargone district (M.P.). Seasonal variation of birds species were observed from all the four sites (Wachoo point at Mandleshwar, Jamghat Temple at main Vindhyaachal, Double golai Balwada and Gavalan Pati Charbhuj temple Katkut). Several species were observed in different season in the present study. Total forty eight species at Wachoo point, fifty three species at Jamghat Temple, forty four species at Double Golai Balwada and sixty species at Gavalan Pati Charbhuj temple Katkut were recorded during the different season.

Keyword:- Bird, Jamghat Temple, Wachoo point, Gavalan Pati, Double golai and Avian diversity.

I. INTRODUCTION

Thus biodiversity is real, but unrecognized wealth of the country. Many people in India are directly depends on this biological wealth found in their immediate environment for food, fiber, fodder and fuel [1]. The Basic characteristic of life is it unlimited diversity. No two individuals in sexually reproducing population are like. Diversity, whether it is genetically, taxonomical or ecological is an important component of biodiversity. Biodiversity is variety of life.

India is a mega diversity country, is among the top ten nations endowed with the world's richest biodiversity. Its immense biological diversity represents about 7% of the world's flora and 6.5 % of the fauna. Madhya Pradesh is one of the biodiversity states in India. The species richness in the forest and water bodies of M.P. is significantly higher in comparison to other state [2].

Birds play an important role in any ecosystem as they are potential bio-indicators, pollinators, seed-dispersers and scavengers and are also beneficial to human in agriculture by checking the population of harmful pests which adversely affect productivity (Dhindsa and Saini, 1994). The Number of migratory birds visiting ant area also indicates the health of that particular environment [3].

Sharma and Shukla [4] reported avian diversity is in danger due to increase in population, the interaction between human and ecosystem is expanding. Due to alarming interference, because of few more reasons for example development of the residential area and urbanized

colonies. Thus, the present study “seasonal variation of birds species diversity at vindhyachal forest reserve khargone, district (M.P.)” was undertaken.

II. MATERIAL AND METHODS

STUDY AREA:

The Vindhyaachal Forest Reserve area (Khargone District (M.P.), India) was selected for present study. It is a complex, discontinuous chain of mountain ridges, hill ranges, highlands and Forest in west-central India. The Vindhya Range is also known as Vindhyaachal.

SAMPLING SITES:

The Four sampling sites were selected in Vindhyaachal Forest Reserve for present study. They were following.

1. Wachoo point at Mandleshwar:-
2. Jamghat Temple at main Vindhyaachal:-
3. Double golai Balwada:-
4. Gavalan Pati Charbhuj temple Katkut:-

Methods:

The data of bird counting from intensive studies and surveys have been used to present study and estimate their densities [5]. Diversity and density are very useful indicators for quality [6]. Birds are may be identify by their calls or songs. Many persons are expertise to identify to birds in the field [7]. For birds counting various methods are available [8]. Effort for counting is usually limited and accurate census is very difficult to obtain in various available methods. Good study is depending on what type of data is required in the possible counting methods. A definite bird count method does not exist. In

various birds counting methods, we used following three methods for present study, which are suitable for present study

1. Point count
2. Direct count (Individual species) method
3. Look and see method

III. RESULTS

The study results show that total forty eight species were recorded at Wachoo point at Mandleshwar. There was seasonal variation in the species recorded as around thirty species were recorded in the winter season at Wachoo point at Mandleshwar. Then in summer season twenty eight species were recorded and during the monsoon period around thirty five species were recorded. Total thirty two species were recorded in the post monsoon season at Wachoo point at Mandleshwar. Highest bird diversity is reported at monsoon season and lowest bird diversity was seen in summer season.

At Jamghat Temple at main Vindhyaal, the birds recorded were fifty three in number during the study duration. The bird species were thirty two in number in the winter season. Total thirty two species were recorded in the summer season and thirty seven species were found were recorded in the monsoon season; only thirty seven species were recorded at Jamghat Temple at main

Vindhyaal in post monsoon season. The highest numbers of bird species were recorded in monsoon and post monsoon both and least were found in winter and summer season both at Jamghat Temple at main Vindhyaal.

The study results show that total forty four species were recorded at Double Golai Balwada. There was seasonal variation in the species recorded as around thirty two species were recorded in the winter season at Double Golai Balwada. Then in summer season twenty eight species were recorded and during the monsoon period around thirty five species were recorded. Total thirty five species were recorded in the post monsoon season at Double Golai Balwada. Highest bird diversity is reported at monsoon season and post monsoon season; lowest bird diversity was seen in summer season.

At Gavalan Pati Charbhuj temple Katkut, the birds recorded were sixty in number during the study duration. The bird species were thirty seven in number in the winter season. Total thirty six species were recorded in the summer season and forty one species were found were recorded in the monsoon season; only forty species were recorded at Gavalan Pati Charbhuj temple Katkut in post monsoon season. The highest numbers of bird species were recorded in monsoon season and least were found in summer season at Gavalan Pati Charbhuj temple Katkut.

Table 1: Seasonal changes of bird species at Wachoo point at Mandleshwar

Site 1	Winter	Summer	Monsoon	Post-monsoon	English Name	Scientific Name
Yes	Yes			Yes	Indian Spot-billed Duck	Anas poecilorhyncha
Yes			Yes		Indian Peafowl	Pavo cristatus
Yes	Yes	Yes	Yes	Yes	Rock Pigeon	Columba livia
Yes	Yes	Yes	Yes	Yes	Laughing Dove	Streptopelia senegalensis
Yes	Yes	Yes	Yes		Jungle Nightjar	Caprimulgus indicus
Yes	Yes	Yes	Yes	Yes	Indian House Swift	Apus affinis
Yes		Yes			Common Swift	Apus apus
Yes				Yes	Asian Koel	Eudynamys scolopaceus
Yes		Yes	Yes	Yes	Indian Cuckoo	Cuculus micropterus
Yes	Yes	Yes	Yes	Yes	Greater Adjutant	Leptoptilos dubius
Yes	Yes	Yes	Yes	Yes	Indian Pond Heron	Ardeola grayii
Yes	Yes	Yes	Yes	Yes	Cattle Egret	Bubulcus ibis
Yes	Yes		Yes	Yes	Little Egret	Egretta garzetta
Yes	Yes	Yes	Yes	Yes	River Lapwing	Vanellus duvaucelii
Yes	Yes	Yes	Yes	Yes	Red-wattled Lapwing	Vanellus indicus
Yes	Yes	Yes	Yes	Yes	Black Kite	Milvus migrans
Yes	Yes	Yes	Yes	Yes	Jungle Owlet	Glaucidium radiatum
Yes	Yes	Yes	Yes	Yes	Common Kingfisher	Alcedo atthis
Yes	Yes	Yes	Yes	Yes	Rose-ringed Parakeet	Psittacula krameri
Yes	Yes	Yes	Yes	Yes	Black Drongo	Dicrurus macrocerus
Yes			Yes		White-spotted Fantail	Rhipidura albogularis
Yes	Yes	Yes		Yes	House Crow	Corvus splendens
Yes	Yes	Yes	Yes	Yes	Large-billed Crow	Corvus macrorhynchos
Yes	Yes		Yes	Yes	Indian Paradise-flycatcher	Terpsiphone paradisi
Yes	Yes	Yes	Yes	Yes	Purple Sunbird	Cinnyris asiaticus

Yes	Yes	Yes	Yes	Yes	Black-throated Sunbird	<i>Aethopyga saturata</i>
Yes	Yes		Yes	Yes	Red Munia	<i>Amandava amandava</i>
Yes	Yes	Yes	Yes	Yes	House Sparrow	<i>Passer domesticus</i>
Yes			Yes		White Wagtail	<i>Motacilla alba</i>
Yes			Yes		Common Rosefinch	<i>Carpodacus erythrinus</i>
Yes				Yes	Jungle Prinia	<i>Prinia sylvatica</i>
Yes	Yes	Yes	Yes	Yes	Common Tailorbird	<i>Orthotomus sutorius</i>
Yes				Yes	Barn Swallow	<i>Hirundo rustica</i>
Yes		Yes		Yes	Dusky Crag Martin	<i>Ptyonoprogne concolor</i>
Yes		Yes			Tickell's Leaf Warbler	<i>Phylloscopus affinis</i>
Yes			Yes		Common Babbler	<i>Argya caudata</i>
Yes	Yes		Yes		Jungle Babbler	<i>Turdoides striata</i>
Yes		Yes	Yes		Common Starling	<i>Sturnus vulgaris</i>
Yes		Yes			Jungle Myna	<i>Acridotheres fuscus</i>
Yes	Yes		Yes		Spot-winged Starling	<i>Saroglossa spilopterus</i>
Yes		Yes	Yes	Yes	Indian Robin	<i>Saxicoloides fulicatus</i>
Yes	Yes	Yes	Yes	Yes	Oriental Magpie Robin	<i>Copsychus saularis</i>
Yes	Yes				Blue-throated Flycatcher	<i>Cyornis rubeculoides</i>
Yes	Yes				Taiga Flycatcher	<i>Ficedula albicilla</i>
Yes	Yes			Yes	Black Redstart	<i>Phoenicurus ochruros</i>
Yes			Yes		White-tailed Stonechat	<i>Saxicola leucurus</i>
Yes			Yes		Pied Wheatear	<i>Oenanthe pleschanka</i>
Yes				Yes	Black-throated Thrush	<i>Turdus atrogularis</i>

Table 2: Seasonal changes of bird species at Jamghat Temple at main Vindhyachal

Site 2	Winter	Summer	Monsoon	Post-monsoon	English Name	Scientific Name
Yes			Yes		Indian Peafowl	<i>Pavo cristatus</i>
Yes	Yes	Yes	Yes	Yes	Rock Pigeon	<i>Columba livia</i>
Yes	Yes	Yes	Yes	Yes	Laughing Dove	<i>Streptopelia senegalensis</i>
Yes	Yes	Yes	Yes	Yes	Indian House Swift	<i>Apus affinis</i>
Yes		Yes		Yes	Greater Coucal	<i>Centropus sinensis</i>
Yes				Yes	Asian Koel	<i>Eudynamis scolopaceus</i>
Yes		Yes	Yes	Yes	Indian Cuckoo	<i>Cuculus micropterus</i>
Yes			Yes		Common Coot	<i>Fulica atra</i>
Yes	Yes			Yes	Common Crane	<i>Grus grus</i>
Yes	Yes	Yes	Yes	Yes	Greater Adjutant	<i>Leptoptilos dubius</i>
Yes	Yes		Yes	Yes	Woolly-necked Stork	<i>Ciconia episcopus</i>
Yes	Yes	Yes		Yes	Black Bittern	<i>Ixobrychus flavicollis</i>
Yes	Yes	Yes	Yes	Yes	Indian Pond Heron	<i>Ardeola grayii</i>
Yes	Yes	Yes	Yes	Yes	Cattle Egret	<i>Bubulcus ibis</i>
Yes		Yes		Yes	Great Egret	<i>Ardea alba</i>
Yes	Yes		Yes	Yes	Little Egret	<i>Egretta garzetta</i>
Yes				Yes	Little Cormorant	<i>Microcarbo niger</i>
Yes		Yes	Yes	Yes	Grey Plover	<i>Pluvialis squatarola</i>

Yes	Yes	Yes	Yes	Yes	River Lapwing	Vanellus duvaucelii
Yes	Yes	Yes	Yes	Yes	Red-wattled Lapwing	Vanellus indicus
Yes			Yes		Oriental Honey Buzzard	Pernis ptilorhynchus
Yes		Yes			Bonelli's Eagle	Aquila fasciata
Yes	Yes	Yes	Yes	Yes	Black Kite	Milvus migrans
Yes	Yes	Yes	Yes	Yes	Jungle Owlet	Glaucidium radiatum
Yes	Yes	Yes	Yes		Indian Scops Owl	Otus bakkamoena
Yes	Yes	Yes	Yes	Yes	Common Kingfisher	Alcedo atthis
Yes			Yes		Alexandrine Parakeet	Psittacula eupatria
Yes	Yes	Yes	Yes	Yes	Rose-ringed Parakeet	Psittacula krameri
Yes	Yes	Yes	Yes	Yes	Black Drongo	Dicurus macrocercus
Yes	Yes	Yes		Yes	House Crow	Corvus splendens
Yes	Yes	Yes	Yes	Yes	Large-billed Crow	Corvus macrorhynchos
Yes	Yes		Yes	Yes	Indian Paradise-flycatcher	Terpsiphone paradisi
Yes	Yes	Yes	Yes	Yes	Purple Sunbird	Cinnyris asiaticus
Yes	Yes	Yes	Yes	Yes	Black-throated Sunbird	Aethopyga saturata
Yes	Yes		Yes	Yes	Red Munia	Amandava amandava
Yes	Yes	Yes	Yes	Yes	House Sparrow	Passer domesticus
Yes			Yes		White Wagtail	Motacilla alba
Yes			Yes		Common Rosefinch	Carpodacus erythrinus
Yes				Yes	Jungle Prinia	Prinia sylvatica
Yes	Yes	Yes	Yes	Yes	Common Tailorbird	Orthotomus sutorius
Yes				Yes	Barn Swallow	Hirundo rustica
Yes		Yes		Yes	Dusky Crag Martin	Ptyonoprogne concolor
Yes		Yes			Tickell's Leaf Warbler	Phylloscopus affinis
Yes			Yes		Common Babbler	Argya caudata
Yes	Yes		Yes		Jungle Babbler	Turdoides striata
Yes		Yes	Yes		Common Starling	Sturnus vulgaris
Yes		Yes			Jungle Myna	Acridotheres fuscus
Yes	Yes		Yes		Spot-winged Starling	Saroglossa spilopterus
Yes		Yes	Yes	Yes	Indian Robin	Saxicoloides fulvicatus
Yes	Yes	Yes	Yes	Yes	Oriental Magpie Robin	Copsychus saularis
Yes	Yes				Blue-throated Flycatcher	Cyornis rubeculoides
Yes	Yes				Taiga Flycatcher	Ficedula albicilla
Yes	Yes			Yes	Black Redstart	Phoenicurus ochruros

Table 3: Seasonal changes of bird species at Double Golai Balwada

Site 3	Winter	Summer	Monsoon	Post-monsoon	English Name	Scientific Name
Yes	Yes			Yes	Indian Spot-billed Duck	Anas poecilorhyncha
Yes			Yes		Indian Peafowl	Pavo cristatus
Yes	Yes	Yes	Yes	Yes	Rock Pigeon	Columba livia
Yes	Yes	Yes	Yes	Yes	Laughing Dove	Streptopelia senegalensis
Yes	Yes	Yes	Yes	Yes	Indian House Swift	Apus affinis
Yes				Yes	Asian Koel	Eudynamys scolopaceus

Yes	Yes			Yes	Common Crane	Grus grus
Yes	Yes	Yes	Yes	Yes	Greater Adjutant	Leptoptilos dubius
Yes	Yes		Yes	Yes	Woolly-necked Stork	Ciconia episcopus
Yes	Yes	Yes		Yes	Black Bittern	Ixobrychus flavicollis
Yes	Yes	Yes	Yes	Yes	Indian Pond Heron	Ardeola grayii
Yes	Yes	Yes	Yes	Yes	Cattle Egret	Bubulcus ibis
Yes		Yes		Yes	Great Egret	Ardea alba
Yes	Yes		Yes	Yes	Little Egret	Egretta garzetta
Yes		Yes	Yes	Yes	Grey Plover	Pluvialis squatarola
Yes	Yes	Yes	Yes	Yes	River Lapwing	Vanellus duvaucelii
Yes	Yes	Yes	Yes	Yes	Red-wattled Lapwing	Vanellus indicus
Yes			Yes		Oriental Honey Buzzard	Pernis ptilorhynchus
Yes		Yes			Bonelli's Eagle	Aquila fasciata
Yes	Yes	Yes	Yes	Yes	Black Kite	Milvus migrans
Yes	Yes	Yes	Yes	Yes	Jungle Owlet	Glaucidium radiatum
Yes	Yes	Yes	Yes		Indian Scops Owl	Otus bakkamoena
Yes	Yes	Yes	Yes	Yes	Common Kingfisher	Alcedo atthis
Yes	Yes		Yes		White-throated Kingfisher	Halcyon smyrnensis
Yes			Yes		Alexandrine Parakeet	Psittacula eupatria
Yes	Yes	Yes	Yes	Yes	Rose-ringed Parakeet	Psittacula krameri
Yes	Yes	Yes	Yes	Yes	Ashy Minivet	Pericrocotus divaricatus
Yes	Yes	Yes	Yes	Yes	Black Drongo	Dicrurus macrocercus
Yes	Yes	Yes		Yes	Ashy Drongo	Dicrurus leucophaeus
Yes			Yes		White-spotted Fantail	Rhipidura albogularis
Yes	Yes	Yes		Yes	House Crow	Corvus splendens
Yes	Yes	Yes	Yes	Yes	Large-billed Crow	Corvus macrorhynchos
Yes	Yes		Yes	Yes	Indian Paradise-flycatcher	Terpsiphone paradisi
Yes	Yes	Yes	Yes	Yes	Purple Sunbird	Cinnyris asiaticus
Yes	Yes	Yes	Yes	Yes	Black-throated Sunbird	Aethopyga saturata
Yes	Yes		Yes	Yes	Red Munia	Amandava amandava
Yes	Yes	Yes	Yes	Yes	House Sparrow	Passer domesticus
Yes	Yes	Yes	Yes	Yes	Common Tailorbird	Orthotomus sutorius
Yes	Yes		Yes		Jungle Babbler	Turdoides striata
Yes		Yes	Yes	Yes	Indian Robin	Saxicoloides fulicatus
Yes	Yes	Yes	Yes	Yes	Oriental Magpie Robin	Copsychus saularis
Yes			Yes		White-tailed Stonechat	Saxicola leucurus
Yes			Yes		Pied Wheatear	Oenanthe pleschanka
Yes				Yes	Black-throated Thrush	Turdus atrogularis

Table 4: Seasonal changes of bird species at Gavalan Pati Charbhujia temple Katkut

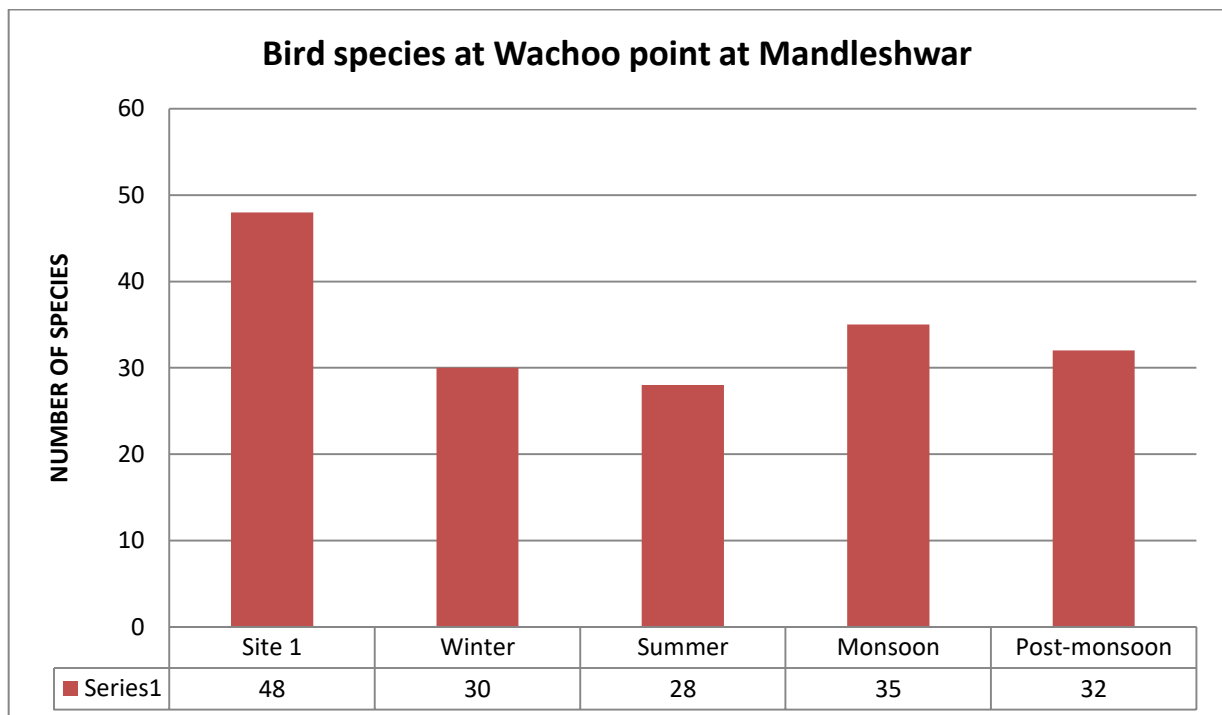
Site 4	Winter	Summer	Monsoon	Post-monsoon	English Name	Scientific Name
Yes	Yes			Yes	Indian Spot-billed Duck	Anas poecilorhyncha
Yes			Yes		Indian Peafowl	Pavo cristatus
Yes	Yes	Yes	Yes	Yes	Rock Pigeon	Columba livia

Yes	Yes	Yes	Yes	Yes	Laughing Dove	<i>Streptopelia senegalensis</i>
Yes	Yes	Yes	Yes		Jungle Nightjar	<i>Caprimulgus indicus</i>
Yes	Yes	Yes	Yes	Yes	Indian House Swift	<i>Apus affinis</i>
Yes		Yes			Common Swift	<i>Apus apus</i>
Yes		Yes		Yes	Greater Coucal	<i>Centropus sinensis</i>
Yes				Yes	Asian Koel	<i>Eudynamys scolopaceus</i>
Yes		Yes	Yes	Yes	Indian Cuckoo	<i>Cuculus micropterus</i>
Yes			Yes		Common Coot	<i>Fulica atra</i>
Yes	Yes			Yes	Common Crane	<i>Grus grus</i>
Yes	Yes	Yes	Yes	Yes	Greater Adjutant	<i>Leptoptilos dubius</i>
Yes	Yes		Yes	Yes	Woolly-necked Stork	<i>Ciconia episcopus</i>
Yes	Yes	Yes		Yes	Black Bittern	<i>Ixobrychus flavicollis</i>
Yes	Yes	Yes	Yes	Yes	Indian Pond Heron	<i>Ardeola grayii</i>
Yes	Yes	Yes	Yes	Yes	Cattle Egret	<i>Bubulcus ibis</i>
Yes		Yes		Yes	Great Egret	<i>Ardea alba</i>
Yes	Yes		Yes	Yes	Little Egret	<i>Egretta garzetta</i>
Yes				Yes	Little Cormorant	<i>Microcarbo niger</i>
Yes		Yes	Yes	Yes	Grey Plover	<i>Pluvialis squatarola</i>
Yes	Yes	Yes	Yes	Yes	River Lapwing	<i>Vanellus duvaucelii</i>
Yes	Yes	Yes	Yes	Yes	Red-wattled Lapwing	<i>Vanellus indicus</i>
Yes			Yes		Oriental Honey Buzzard	<i>Pernis ptilorhynchus</i>
Yes		Yes			Bonelli's Eagle	<i>Aquila fasciata</i>
Yes	Yes	Yes	Yes	Yes	Black Kite	<i>Milvus migrans</i>
Yes	Yes	Yes	Yes	Yes	Jungle Owlet	<i>Glaucidium radiatum</i>
Yes	Yes	Yes	Yes		Indian Scops Owl	<i>Otus bakkamoena</i>
Yes	Yes	Yes	Yes	Yes	Common Kingfisher	<i>Alcedo atthis</i>
Yes	Yes		Yes		White-throated Kingfisher	<i>Halcyon smyrnensis</i>
Yes			Yes		Alexandrine Parakeet	<i>Psittacula eupatria</i>
Yes	Yes	Yes	Yes	Yes	Rose-ringed Parakeet	<i>Psittacula krameri</i>
Yes	Yes	Yes	Yes	Yes	Ashy Minivet	<i>Pericrocotus divaricatus</i>
Yes	Yes	Yes	Yes	Yes	Black Drongo	<i>Dicrurus macrocercus</i>
Yes	Yes	Yes		Yes	Ashy Drongo	<i>Dicrurus leucophaeus</i>
Yes			Yes		White-spotted Fantail	<i>Rhipidura albogularis</i>
Yes	Yes	Yes		Yes	House Crow	<i>Corvus splendens</i>
Yes	Yes	Yes	Yes	Yes	Large-billed Crow	<i>Corvus macrorhynchos</i>
Yes	Yes		Yes	Yes	Indian Paradise-flycatcher	<i>Terpsiphone paradisi</i>
Yes	Yes	Yes	Yes	Yes	Purple Sunbird	<i>Cinnyris asiaticus</i>
Yes	Yes	Yes	Yes	Yes	Black-throated Sunbird	<i>Aethopyga saturata</i>
Yes	Yes		Yes	Yes	Red Munia	<i>Amandava amandava</i>
Yes	Yes	Yes	Yes	Yes	House Sparrow	<i>Passer domesticus</i>
Yes			Yes		White Wagtail	<i>Motacilla alba</i>
Yes			Yes		Common Rosefinch	<i>Carpodacus erythrinus</i>
Yes				Yes	Jungle Prinia	<i>Prinia sylvatica</i>
Yes	Yes	Yes	Yes	Yes	Common Tailorbird	<i>Orthotomus sutorius</i>

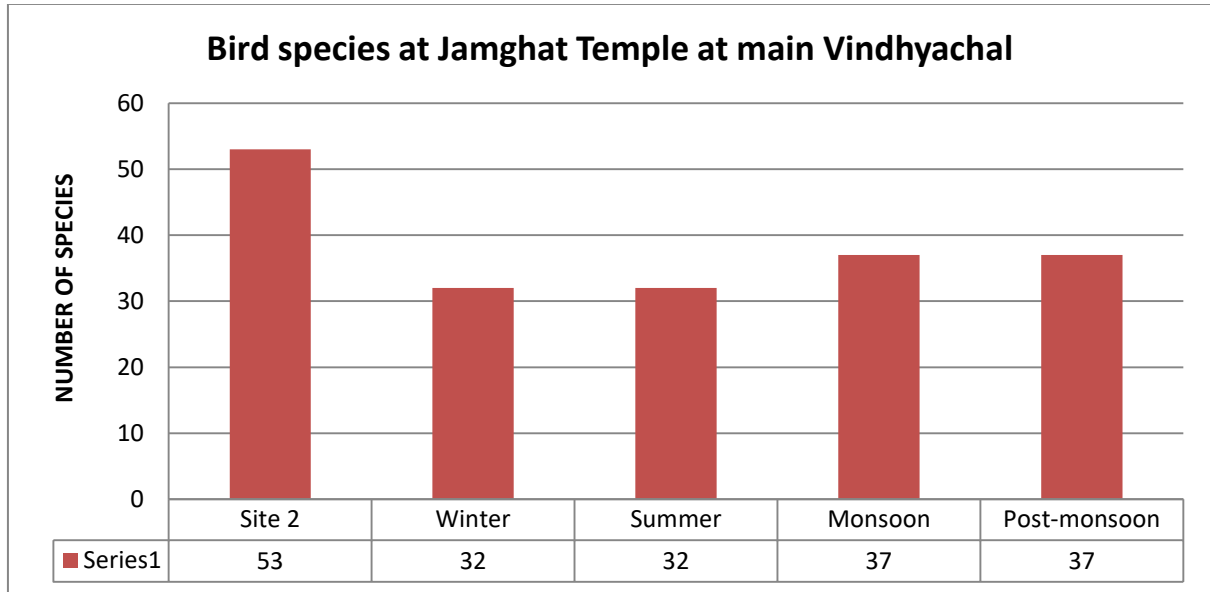
Yes				Yes	Barn Swallow	Hirundo rustica
Yes		Yes		Yes	Dusky Crag Martin	Ptyonoprogne concolor
Yes		Yes			Tickell's Leaf Warbler	Phylloscopus affinis
Yes			Yes		Common Babbler	Argya caudata
Yes	Yes		Yes		Jungle Babbler	Turdoides striata
Yes		Yes	Yes		Common Starling	Sturnus vulgaris
Yes		Yes			Jungle Myna	Acridotheres fuscus
Yes	Yes		Yes		Spot-winged Starling	Saroglossa spilopterus
Yes		Yes	Yes	Yes	Indian Robin	Saxicoloides fulvicatus
Yes	Yes	Yes	Yes	Yes	Oriental Magpie Robin	Copsychus saularis
Yes	Yes				Blue-throated Flycatcher	Cyornis rubeculoides
Yes	Yes				Taiga Flycatcher	Ficedula albicilla
Yes	Yes			Yes	Black Redstart	Phoenicurus ochruros

Table 5: Seasonal changes of bird species at season wise.

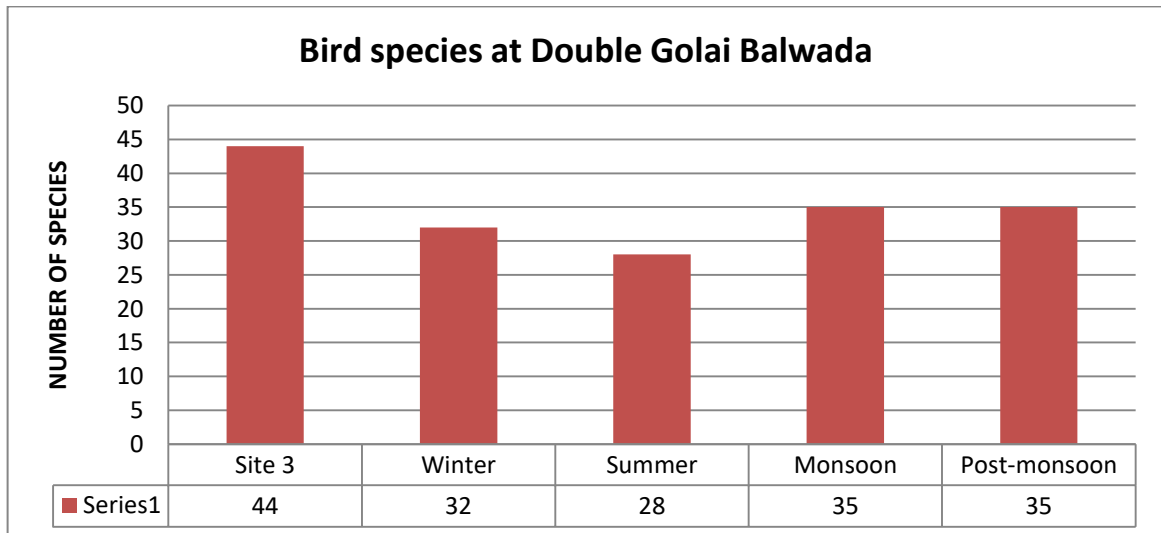
Site 1	Winter	Summer	Monsoon	Post-monsoon
48	30	28	35	32
Site 2	Winter	Summer	Monsoon	Post-monsoon
53	32	32	37	37
Site 3	Winter	Summer	Monsoon	Post-monsoon
44	32	28	35	35
Site 4	Winter	Summer	Monsoon	Post-monsoon
60	37	36	41	40



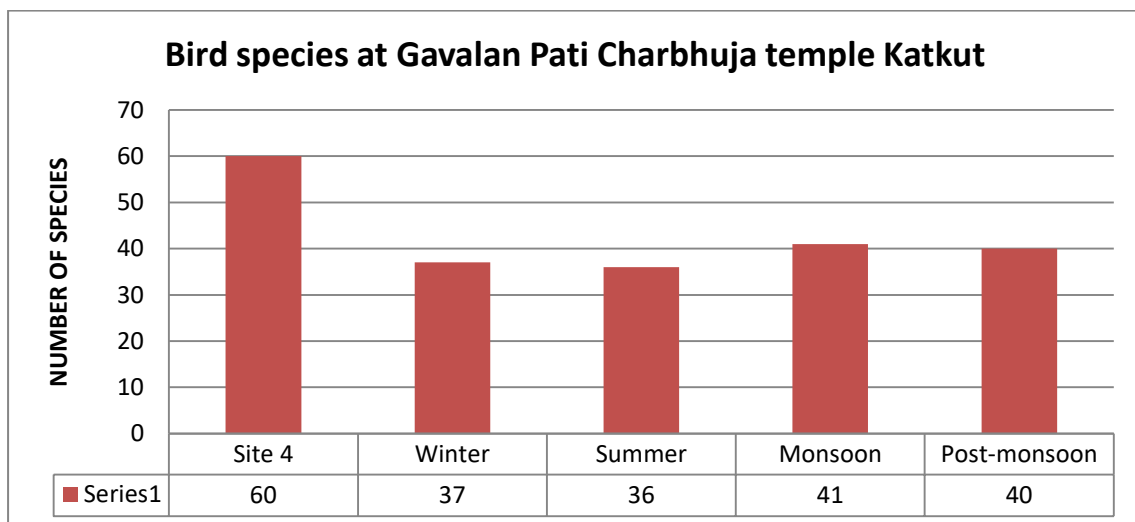
Graph 1: Seasonal changes of bird species at Wachoo point at Mandleshwar season wise.



Graph 2: Seasonal changes of bird species at Jamghat Temple at main Vindhychal



Graph 3: Seasonal changes of bird species at Double Golai Balwada



Graph 4: Seasonal changes of bird species at Gavalan Pati Charbhuj temple Katkut

IV. DISCUSSION

Wachoo point at Mandleshwar has thirty species in winter season; in summer season twenty eight species were recorded and during the monsoon period around thirty five species were recorded. Total 32 species were recorded in the post monsoon season; highest bird diversity is reported at monsoon season and lowest bird diversity was seen in summer season. Maximum bird species were recorded during spring, early monsoon and late winter while comparatively less number of species was observed during late summer, late rainy season and early winter. 38 species of birds belonging to 12 orders recorded from three water bodies in Chandrapur district of Maharashtra [9].

Jamghat Temple at main Vindhyachal, the birds recorded were fifty three in number during the study duration. The bird species were thirty two in number in the winter season. Total thirty two species were recorded in the summer season and thirty seven species were found were recorded in the monsoon season; only thirty seven species were recorded in post monsoon season. Valcu [10] observed response to habitat edges was influenced by the season and habitat qualities, but it is still merely studied how communities respond to structural complex edges.

Total forty four species were recorded at Double Golai Balwada around thirty two species were recorded in the winter season; in summer season twenty eight species were recorded and during the monsoon period around thirty five species were recorded and thirty five species were recorded in the post monsoon season. The birds recorded were sixty in number during the study duration. The bird species were thirty seven in number in the winter season. Wetland is important for birds due to its habitat diversity, food resources, ecofriendly farming practices, lesser disturbances etc; because the availability of food resources is different in diff seasons [11].

Gupta and Kaushik [12] studied the avian fauna of a rural pond in village "Raipur Rodan" in Karnal district in Haryana and reported 64 species of wetland birds belonging to 10 orders and 17 families. Shiu and lee [13] reported similar results in their study; the bird species richness declined with elevation above about 1500 m (with decrease in temperature). At normal level and topography species richness remained constant. The breeding season, the richness reached a maximum number.

Total thirty six species were recorded in the summer season and forty one species were found were recorded in the monsoon season; only forty species were recorded at Gavalan Pati Charbhuj temple Katkut in post monsoon season. Our study results show a similarity to other authors study.

REFERENCES

- [1]. Roy, S. P., "Eco- Restoration of wetland of Bihar with reference to the status and con. of aqu. Biodiv," *Abstract booklet. of Nat. sem. On . rec. adv. In aqu. Bio.*, Jiwaji University, Gwalior (March 15-16, 2005) **P, 11, 2005.**
- [2]. Rao, R. J. and Bhatnagar, A., "Biodiversity conservation in protected areas in Madhya Pradesh (India)," *Abstract in Nat. sem. On .Biodiversity* Jiwaji University, Gwalior (Nov.26-28, 2001) **P, 33, 2001.**
- [3]. Pawar, S.K. and P. S. Salunkhe, "The migratory birds in and around Pandharpur city with special reference to Takali (Padmavati) Lake, Pandharpur, Dist. Solapur (M.S.)," *Avishkar-Solapur University journal*, Vol. 3. PP- **38-44, 2014.**
- [4]. Sharma, S. and Shukla, A., "Preliminary study on Avian Faunal Diversity of Polipathar area in Jabalpur (M.P.)," *International Journal of Current Advanced Research*, 4(9): **364-367, 2005.**
- [5]. Javed, S. and Rahmani, A. R., "Conservation of the avifauna of Dudhwa national park, India, *Forktail*. 14:57-**66, 1993.**
- [6]. Gibbons Coller, N.J. and Andrew, P., "Birds to Watch," *IBH Publishing Company, New Delhi, 1993.*
- [7]. Bibby, C.J., Jones, M. and Marsden, S., " Expedition Field Techniques," *Bird Surveys. Royal Geographical Society, London, 1998.*
- [8]. Colin, J. Bibby, Neil, D. Burgess and David, A., "Text Book of Birds Census Techniques," *Academic Press Ltd., London, 24-28, 1993.*
- [9]. Harney, N.V., "Avifaunal diversity of Ghotimbala lake near Bhadrawati, Chandrapur, Maharashtra,India," *International Journal of Life Sciences*, 2 (1): **79-83, 2014.**
- [10]. Valcu, M., "Seasonal changes in bird species diversity at the interface between forest and reed-bed," *Biodiversity and Conservation* ,15(11):91-99, **2007.**
- [11]. Tomy, P.J., George, T.U. and Suseela, Jose, "Pokkali Cultivation in Kerala," *Technical bulletin -10, K.A.U. Trichur, Kerala, 1-20, 1984.*
- [12]. Gupta, R., Kaushik, T. K. and Kumar, S., "Analysis of winter migratory Wetland Birds in Karnal district in Haryana," *J. Adv. Zool*, 30 (2):**104-117, 2009.**
- [13]. Shiu, H.A. and Lee, P.F., "Seasonal Variation in Bird Species Richness along Elevational Gradients in Taiwan," *Acta ZoologicaTaiwanica*, 14(1): **1-21, 2003.**