OBSERVATION OF BIRDS DIVERSITY AT VINDHYACHAL FOREST RESERVE KHARGONE DISTRICT (M.P.)

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Abstract

The main aim of the present investigation was to study the Diversity of birds of vindhyachal forest reserve at khargone district (M.P.). Several species were closely observed in present study. The total diversity observed from all the four sites (Wachoo point at Mandleshwar, Jamghat Temple at main Vindhyachal, Double golai Balwada and Gavalan Pati Charbhuja temple Katkut) constitutes 63 bird species from 15 different orders. The highest numbers of birds were recorded at Gavalan Pati Charbhuja temple Katkut and the lowest diversity was seen at Double golai Balwada which is of 44 bird species only.

Introduction:

Birds are one of the most prominent species on the earth. They are the bio-indicators which can be used to access the health of any ecosystem. Because of this reason they are used to monitor the quality of any habitat or niche and hence they are the key elements of any ecosystem (Mariappan et al., 2013). Birds are one of the most adaptive and widely spread organisms on the planet and the adaptation of birds totally depends upon their body mass and feeding habits and because of which they have followed human colonization. Due to a higher degree of adaptability of these few successful species, their density is much higher in the cities as compared to the more natural adjacent habitats (Seress and Liker, 2015).

The loss of biological diversity has been due the effects of such environmental phenomena, deterioration in water quality, increased sedimentation, marked shrinkage, and decrease in the diversity of migratory of fishes, bird populations and other aquatic fauna and the nuisance growth of aquatic weeds. Due to accelerated erosion of soil, decrease in the depth of the water bodies takes place. Soil erosion results in deforestation and other activities on catchments. Thus, present study “Diversity of birds of vindhyachal forest reserve at khargone district (M.P.)” was undertaken.

Material And Methods:

Study area:
The Vindhyachal 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 Vindhyachal.

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**Sampling Sites:**
The Four sampling sites were selected in Vindhyachal Forest Reserve for present study. They were following.
1. Wachoo point at Mandleshwar:-
2. Jamghat Temple at main Vindhyachal:-
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. Javed and Rahamani (1993) Diversity and density are very useful indicators for quality. Gibbons et al. (1993) Birds are may be identify by their calls or songs. Many persons are expertise to identify to birds in the field (Bibby et al., 1998). Colin et al. (1993) for birds counting various methods are available. 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

**Results:**
The Study at Vindhyachal Forest Reserve at Khargone District (M. P.) shows that 48 bird species were observed at Wachoo point at Mandleshwar and they belong to 13 orders (Table- 1): Accipitriformes (1), Anseriformes (1), Caprimulgiformes (3), Charadriiformes (2), Ciconiiformes (1), Columbiformes (2), Coraciiformes (1), Cuculiformes (2), Galliformes (1), Passeriformes (29), Pelecaniformes (3), Psittaciformes (1) and Strigiformes (1).

There were 53 bird species found at the Jamghat Temple at main Vindhyachal, which belonged to 14 Orders (Table-2) which are Accipitriformes (3), Caprimulgiformes (1), Charadriiformes (3), Ciconiiformes (5), Columbiformes (2), Coraciiformes (1), Cuculiformes (3), Galliformes (1), Gruidiformes (2), Passeriformes (25), Pelecaniformes (5), Psittaciformes (2), Strigiformes (2) and Suliformes (1).

A total of 44 bird species were observed at the Double golai Balwada. These species belonged to 14 orders (Table-3) and the composition of each order was Accipitriformes (3), Anseriformes (1), Caprimulgiformes (1), Charadriiformes (3), Ciconiiformes (2), Columbiformes (2), Coraciiformes (2), Cuculiformes (1), Galliformes (1), Gruidiformes (1), Passeriformes (18), Pelecaniformes (5), Psittaciformes (2) and Suliformes (2).

The recorded species number was highest at Gavalan Pati Charbhuj temple Katkut which is of 60 bird species, belonging to 15 different orders (Table- 4). These are as follows Accipitriformes (3), Anseriformes (2), Caprimulgiformes (3), Charadriiformes (3), Ciconiiformes (2), Columbiformes (4), Coraciiformes (2), Cuculiformes (1), Galliformes (1), Gruidiformes (1), Passeriformes (28), Pelecaniformes (5), Psittaciformes (2), Strigiformes (2) and Suliformes (1).

The total diversity observed from all the four sites (Wachoo point at Moundleswar, Jamghat Temple at main Vindhyachal, Double golai Balwada and Gavalan Pati Charbhuj temple Katkut) constitutes 63 bird species from 15 different orders. The highest numbers of birds were recorded at Gavalan Pati Charbhuj temple Katkut and the lowest diversity was seen at Double golai Balwada which is of 44 bird species only.

| Order               | English Name          | Scientific Name       | Family         |
|---------------------|-----------------------|-----------------------|----------------|
| Accipitriformes     | Black Kite            | Milvus migrans        | Accipitridae   |
| Anseriformes        | Indian Spot-billed Duck | Anas poecilorhyncha | Anatidae       |
| Caprimulgiformes    | Jungle Nightjar       | Caprimulgus indicus   | Caprimulgidae  |
| Caprimulgiformes    | Indian House Swift    | Apus affinis          | Apodidae       |
| Caprimulgiformes | Common Swift | Apus apus | Apodidae |
|-----------------|--------------|-----------|----------|
| Charadriiformes | River Lapwing | Vanellus duvaucelii | Charadriidae |
| Charadriiformes | Red-wattled Lapwing | Vanellus indicus | Charadriidae |
| Ciconiiformes   | Greater Adjutant | Leptoptilos dubius | Ciconiidae |
| Columbiformes   | Rock Pigeon | Columba livia | Columbidae |
| Columbiformes   | Laughing Dove | Streptopelia senegalensis | Columbidae |
| Coraciiformes   | Common Kingfisher | Alcedo atthis | Alcedinidae |
| Cuculiformes    | Asian Koel | Eudynamys scolopaceus | Cuculidae |
| Cuculiformes    | Indian Cuckoo | Cuculus micropterus | Cuculidae |
| Galliformes     | Indian Peafowl | Pavo cristatus | Phasianidae |
| Galliformes     | Black Drongo | Dicrurus macrocerus | Dicuridae |
| Passeriformes   | White-spotted Fantail | Rhipidura albogularis | Rhipiduridae |
| Passeriformes   | House Crow | Corvus splendens | Corvidae |
| Passeriformes   | Large-billed Crow | Corvus macrorhynchos | Corvidae |
| Passeriformes   | Indian Paradise-flycatcher | Terpsiphone paradisi | Monarchidae |
| Passeriformes   | Purple Sunbird | Cinnyris asiaticus | Nectarinidae |
| Passeriformes   | Black-throated Sunbird | Aethopyga saturata | Nectarinidae |
| Passeriformes   | Red Munia | Amandava amandava | Estrildidae |
| Passeriformes   | House Sparrow | Passer domesticus | Passeridae |
| Passeriformes   | White Wagtail | Motacilla alba | Motacillidae |
| Passeriformes   | Common Rosefinch | Carpodacus erythrinus | Fringillidae |
| Passeriformes   | Jungle Prinia | Prinia sylvatica | Cisticolidae |
| Passeriformes   | Common Tailorbird | Orthotomus sutorius | Cisticolidae |
| Passeriformes   | Barn Swallow | Hirundo rustica | Hirundinidae |
| Passeriformes   | Dusky Crag Martin | Ptyonoprogne concolor | Hirundinidae |
| Passeriformes   | Tickell's Leaf Warbler | Phylloscopus affinis | Phylloscopidae |
| Passeriformes   | Common Babbler | Argya caudata | Leiothrichidae |
| Passeriformes   | Jungle Babbler | Turdoides striata | Leiothrichidae |
| Passeriformes   | Common Starling | Motacilla alba | Sturnidae |
| Passeriformes   | Jungle Myna | Acriderotheres fuscus | Sturnidae |
| Passeriformes   | Spot-winged Starling | Saroglossa spilopterus | Sturnidae |
| Passeriformes   | Indian Robin | Saxicoloides fulcatus | Muscicapidae |
| Passeriformes   | Oriental Magpie Robin | Copsychus saularis | Muscicapidae |
| Passeriformes   | Blue-throated Flycatcher | Cyornis rubeculoides | Muscicapidae |
| Passeriformes   | Taiga Flycatcher | Ficedula albicilla | Muscicapidae |
| Passeriformes   | Black Redstart | Phoenicurus ochruros | Muscicapidae |
| Passeriformes   | White-tailed Stonechat | Saxicola leucurus | Muscicapidae |
| Passeriformes   | Pied Wheatear | Oenanthe pleschanka | Muscicapidae |
| Passeriformes   | Black-throated Thrush | Turdus atrogularis | Turdidae |
| Pelecaniformes  | Indian Pond Heron | Ardea grayii | Ardeidae |
| Pelecaniformes  | Cattle Egret | Bubulcus ibis | Ardeidae |
| Order                | English Name     | Scientific Name                    | Family   |
|----------------------|------------------|------------------------------------|----------|
| Pelecaniformes       | Little Egret     | *Egretta garzetta*                 | Ardeidae |
| Psittaciformes       | Rose-ringed Parakeet | *Psittacula krameri*              | Psittaculidae |
| Strigiformes         | Jungle Owlet     | *Glaucidium radiatum*              | Strigidae |

Table 2: Showing Diversity of Jamghat Temple at main Vindhyachal.

| Order                | English Name     | Scientific Name                    | Family   |
|----------------------|------------------|------------------------------------|----------|
| Accipitriformes      | Black Kite       | *Milvus migrans*                   | Accipitridae |
| Accipitriformes      | Oriental Honey Buzzard | *Pernis ptilorhynchus*            | Accipitridae |
| Accipitriformes      | Bonelli's Eagle  | *Aquila fasciata*                  | Accipitridae |
| Caprimulgiformes     | Indian House Swift | *Apus affinis*                    | Apodidae |
| Charadriiformes      | River Lapwing    | *Vanellus duvaucelii*              | Charadriidae |
| Charadriiformes      | Red-wattled Lapwing | *Vanellus indicus*                | Charadriidae |
| Charadriiformes      | Grey Plover      | *Pluvialis squatarola*             | Charadriidae |
| Ciconiiformes        | Greater Adjutant | *Leptoptilos dubius*               | Ciconiidae |
| Ciconiiformes        | Woolly-necked Stork | *Ciconia episcopus*               | Ciconiidae |
| Columbiformes        | Rock Pigeon      | *Columbia livia*                   | Columbidae |
| Columbiformes        | Laughing Dove    | *Streptopelia senegalensis*        | Columbidae |
| Coraciiformes        | Common Kingfisher | *Alcedo atthis*                   | Alcedinidae |
| Cuculiformes         | Asian Koel       | *Eudynamys scolopaceus*            | Cuculidae |
| Cuculiformes         | Indian Cuckoo    | *Cuculus micropterus*              | Cuculidae |
| Cuculiformes         | Greater Coucal   | *Centropus sinensis*               | Cuculidae |
| Galliformes          | Indian Peafowl   | *Pavo cristatus*                   | Phasianidae |
| Gruidae              | Common Coot      | *Fulica atra*                      | Galliformes |
| Gruidae              | Common Crane     | *Grus grus*                        | Gruidae |
| Gruidae              | Black Drongo     | *Dicrurus macrocercus*             | Gruidae |
| Passeriformes        | House Crow       | *Corvus splendens*                 | Corvinae |
| Passeriformes        | Large-billed Crow | *Corvus macrorhynchos*            | Passeriformes |
| Passeriformes        | Indian Paradise-flycatcher | *Terpsiphone paradisi*            | Monarchidae |
| Passeriformes        | Purple Sunbird   | *Cinnynis asiaticus*               | Nectarinidae |
| Passeriformes        | Black-throated Sunbird | *Aethopyga saturata*              | Nectarinidae |
| Passeriformes        | Red Munia        | *Amandava amandava*                | Estrildidae |
| Passeriformes        | House Sparrow    | *Passer domesticus*                | Passeridae |
| Passeriformes        | White Wagtail    | *Motacilla alba*                   | Motacillidae |
| Passeriformes        | Common Rosefinch | *Carpodacus erythinus*             | Fringillidae |
| Passeriformes        | Jungle Prinia    | *Prinia sylvetica*                 | Cisticoliidae |
| Passeriformes        | Common Tailorbird | *Orthotomus sutorius*             | Cisticoliidae |
| Passeriformes        | Barn Swallow     | *Hirundo rustica*                  | Hirundinidae |
| Passeriformes        | Dusky Crag Martin | *Pronopropne concolor*            | Hirundinidae |
| Passeriformes        | Tickell's Leaf Warbler | *Streptopelia senegalensis*      | Phylloscopidae |
| Passeriformes        | Common Babbler   | *Argya caudata*                    | Leiothrichidae |
| Passeriformes        | Jungle Babbler   | *Turdoides striata*                | Leiothrichidae |
| Passeriformes        | Common Starling  | *Sturnus vulgaris*                 | Sturnidae |
| Passeriformes        | Jungle Myna      | *Acridotheres fuscus*              | Sturnidae |
| Passeriformes        | Spot-winged Starling | *Saroglossa spilopterus*         | Sturnidae |
| Passeriformes        | Indian Robin     | *Saxicoloides fulicatus*           | Musicapidae |
| Passeriformes        | Oriental Magpie Robin | *Copsychus saularis*             | Musicapidae |
| Passeriformes        | Blue-throated Flycatcher | *Cyornis rubeculoides*       | Musicapidae |
| Passeriformes        | Taiga Flycatcher | *Ficedula albicilla*               | Musicapidae |
| Passeriformes        | Black Redstart  | *Phoenicurus ochruros*             | Musicapidae |
| Pelecaniformes       | Indian Pond Heron | *Ardea cinerea*                   | Ardeidae |
| Pelecaniformes       | Cattle Egret     | *Bubulcus ibis*                    | Ardeidae |
| Pelecaniformes       | Little Egret     | *Egretta garzetta*                 | Ardeidae |
| Pelecaniformes       | Black Bittern    | *Ixobrychus flavicollis*           | Ardeidae |
| Order                | English Name                      | Scientific Name     | Family           |
|----------------------|----------------------------------|---------------------|------------------|
| Accipitriformes      | Black Kite                        | Milvus migrans     | Accipitridae     |
| Accipitriformes      | Oriental Honey Buzzard            | Pernis ptilorhynchus| Accipitridae     |
| Accipitriformes      | Bonelli's Eagle                   | Aquila fasciata     | Accipitridae     |
| Anseriformes         | Indian Spot-billed Duck           | Anas poecilorhyncha | Anatidae         |
| Caprimulgiformes     | Indian House Swift                | Apus affinis       | Apodidae         |
| Charadriiformes      | River Lapwing                     | Vanellus duvaucelii | Charadriidae     |
| Charadriiformes      | Red-wattled Lapwing               | Vanellus indicus    | Charadriidae     |
| Charadriiformes      | Grey Plover                       | Pluvialis squatarola| Charadriidae     |
| Ciconiformes         | Greater Adjutant                  | Leptoptilos dubius  | Ciconidae        |
| Ciconiformes         | Woolly-necked Stork               | Ciconia episcopus   | Ciconidae        |
| Columbiformes        | Rock Pigeon                       | Columba livia       | Columbidae       |
| Columbiformes        | Laughing Dove                     | Streptopelia senegalensis | Columbidae   |
| Coraciiformes        | Common Kingfisher                 | Alcedo atthis      | Alcedinidae      |
| Coraciiformes        | White-throated Kingfisher         | Halcyon smyrnensis | Alcedinidae      |
| Cuculiformes         | Asian Koel                        | Eudynamys scolopaceus | Cuculidae     |
| Galliformes          | Indian Peafowl                    | Pavo cristatus      | Phasianidae      |
| Gruidiformes         | Common Crane                      | Grus grus          | Gruidae          |
| Passeriformes        | Black Drongo                      | Dicrurus macrocerus | Dicuridae       |
| Passeriformes        | House Crow                        | Corvus splendens   | Corvidae         |
| Passeriformes        | Large-billed Crow                 | Corvus macrorhynchos | Corvidae       |
| Passeriformes        | Indian Paradise-flycatcher        | Terpsiphone paradisi | Monarchidae     |
| Passeriformes        | Purple Sunbird                    | Cinnys asiaticus   | Nectarinidae     |
| Passeriformes        | Black-throated Sunbird            | Aethopyga saturata | Nectarinidae     |
| Passeriformes        | Red Munia                         | Amandava amandava  | Estrildidae      |
| Passeriformes        | House Sparrow                     | Passer domesticus  | Passeridae       |
| Passeriformes        | Common Tailorbird                 | Orthotomus sutorius | Cisticolidae     |
| Passeriformes        | Jungle Babbler                    | Turdoides striata  | Leiothrichidae   |
| Passeriformes        | Indian Robin                      | Saxicoloides fulicatus | Muscicapidae |
| Passeriformes        | Oriental Magpie Robin             | Copsychus saularis | Muscicapidae     |
| Passeriformes        | White-spotted Fantail             | Rhipidura albagularis | Rhipiduridae |
| Passeriformes        | White-tailed Stonechat            | Saxicola leucura   | Muscicapidae     |
| Passeriformes        | Pied Wheatear                     | Oenanthe pleschanka | Muscicapidae     |
| Passeriformes        | Black-throated Thrush             | Turdus atrogularis | Turdidae         |
| Passeriformes        | Ashy Minivet                      | Pericrocotus divaricatus | Campephagidae |
| Passeriformes        | Ashy Drongo                       | Dicrurus leucophaeus | Dicuridae       |
| Passeriformes        | Indian Pond Heron                 | Ardea grayii       | Ardeidae         |
| Pelecaniformes       | Cattle Egret                      | Bubulcus ibis      | Ardeidae         |
| Pelecaniformes       | Little Egret                      | Egretta garzetta   | Ardeidae         |
| Pelecaniformes       | Black Bitter                      | Isobrychus flavicollis | Ardeidae |
| Pelecaniformes       | Great Egret                       | Ardea alba         | Ardeidae         |
| Psittaciformes       | Rose-ringed Parakeet              | Psittacula krameri  | Psittaculidae    |
| Psittaciformes       | Alexandrine Parakeet              | Psittacula eupatria | Psittaculidae    |
| Strigiformes         | Jungle Owlet                      | Halcyon smyrnensis | Strigidae        |
| Strigiformes         | Indian Scops Owl                  | Otus bakkamoena    | Strigidae        |

Table 3: Showing Diversity of Double golai Balwada.
### Table 4: Showing Diversity of Gavalan Pati Charbhuja temple Katkut.

| Order                     | English Name                  | Scientific Name             | Family       |
|---------------------------|------------------------------|----------------------------|--------------|
| Accipitriformes           | Black Kite                    | Milvus migrans             | Accipitridae |
| Accipitriformes           | Oriental Honey Buzzard        | Pernis ptilorhynchus       | Accipitridae |
| Accipitriformes           | Bonelli's Eagle               | Aquila fasciata            | Accipitridae |
| Anseriformes              | Indian Spot-billed Duck       | Anas poecilorhyncha        | Anatidae     |
| Caprimulgiformes          | Indian House Swift            | Apus affinis               | Apodidae     |
| Caprimulgiformes          | Jungle Nightjar               | Caprimulgus indicus        | Caprimulgidae|
| Caprimulgiformes          | Common Swift                  | Apus apus                  | Apodidae     |
| Charadriiformes           | River Lapwing                 | Vanellus duvaucelli        | Charadriidae |
| Charadriiformes           | Red-wattled Lapwing           | Vanellus indicus           | Charadriidae |
| Ciconiiformes             | Grey Plover                   | Pluvialis squatarola       | Charadriidae |
| Ciconiiformes             | Woolly-necked Stork           | Ciconia episcopus          | Ciconiidae   |
| Columbiformes             | Rock Pigeon                   | Columba livia              | Columbidae   |
| Columbiformes             | Laughing Dove                 | Streptopelia senegalensis  | Columbidae   |
| Coraciiformes             | Common Kingfisher             | Alcedo atthis              | Alcedinidae  |
| Coraciiformes             | White-throated Kingfisher     | Halcyon smyrnensis         | Alcedinidae  |
| Cuculiformes              | Asian Koel                    | Eudynamys scolopaceus      | Cuculidae    |
| Cuculiformes              | Indian Cuckoo                 | Cuculus micropterus        | Cuculidae    |
| Cuculiformes              | Greater Coucal                | Centropus sinensis         | Cuculidae    |
| Galliformes               | Indian Peafowl                | Pavo cristatus             | Cuculidae    |
| Gruiformes                | Common Crane                  | Grus grus                  | Gruidae      |
| Gruiformes                | Common Coot                   | Fulica atra                | Rallidae     |
| Passeriformes             | Black Drongo                  | Dicrurus macrocerus        | Dicuridae    |
| Passeriformes             | House Crow                    | Corvus splendens           | Corvidae     |
| Passeriformes             | Large-billed Crow             | Corvus macrorhynchos       | Corvidae     |
| Passeriformes             | Indian Paradise-flycatcher    | Tersiphone paradisi        | Monarchidae  |
| Passeriformes             | Purple Sunbird                | Cinnyris asiaticus         | Nectarinidae |
| Passeriformes             | Black-throated Sunbird        | Aethopyga saturata         | Nectarinidae |
| Passeriformes             | Red Munia                     | Amandava amandava          | Estrildidae  |
| Passeriformes             | House Sparrow                 | Passer domesticus          | Passeridae   |
| Passeriformes             | Common Tailorbird             | Orthotomus sutorius        | Cisticolidae |
| Passeriformes             | Jungle Babbler                | Turdoides striata          | Leiothrichida|
| Passeriformes             | Indian Robin                  | Saxicolaoides falcatus     | Musicapidae  |
| Passeriformes             | Oriental Magpie Robin         | Copyschus sularis          | Musicapidae  |
| Passeriformes             | White-spotted Fantail         | Rhipidura alboruginaris    | Rhipiduridae |
| Passeriformes             | Ashy Minivet                  | Pericrocotus divaricatus   | Campephagidae|
| Passeriformes             | Ashy Drongo                   | Dicrurus leucophaeus       | Dicuridae    |
| Passeriformes             | White Wagtail                 | Motacilla alba             | Motacillidae |
| Passeriformes             | Common Rosefinch              | Carpodacus erythrinus      | Fringillidae |
| Passeriformes             | Jungle Prinia                 | Prinia sylvatica           | Cisticolidae |
| Passeriformes             | Barn Swallow                  | Hirundo rustica            | Hirundinidae |
| Passeriformes             | Dusky Crag Martin             | Ptyonoprogne concolor      | Hirundinidae |
| Passeriformes             | Tickell's Leaf Warbler        | Phylloscopus affinis       | Phylloscopidae|
| Passeriformes             | Common Babbler                | Argya caudata              | Leiothrichida|
| Passeriformes             | Common Starling               | Sturnus vulgaris           | Sturnidae    |
| Passeriformes             | Jungle Myna                   | Periotus divaricatus       | Sturnidae    |
| Passeriformes             | Spot-winged Starling          | Saroglossa spilopterus     | Sturnidae    |
| Passeriformes             | Blue-throated Flycatcher      | Cyornis rubeculoides       | Musicapidae  |
| Passeriformes             | Taiga Flycatcher              | Ficedula albicilla         | Musicapidae  |
| Passeriformes             | Black Redstart                | Phoenicurus ochruru         | Musicapidae  |
| Passeriformes             | Indian Pond Heron             | Ardeola grayii             | Ardeidae     |
| Pelecaniformes            | Cattle Egret                  | Bubulcus ibis              | Ardeidae     |
Pelecaniformes  Little Egret  *Egretta garzetta*  Ardeidae
Pelecaniformes  Black Bittern  *Ixobrychus flavicollis*  Ardeidae
Pelecaniformes  Great Egret  *Ardea alba*  Ardeidae
Psittaciformes  Rose-ringed Parakeet  *Psittacula krameri*  Psittaculidae
Psittaciformes  Alexandrine Parakeet  *Psittacula eupatria*  Psittaculidae
Strigiformes  Jungle Owlet  *Glaucidium radiatum*  Strigidae
Strigiformes  Indian Scops Owl  *Otus bakkamoena*  Strigidae
Suliformes  Little Cormorant  *Microcarbo niger*  Phalacrocoracidae

**Graph 1:** Showing Bird Diversity and its Order of Wachoo point at Mandleshwar.

**Graph 2:** Showing Bird Diversity and its Order of Jamghat Temple at main Vindhyachal.
Graph 3: Showing Bird Diversity and its Order of Double Golai Balwada.

Graph 4: Showing Bird Diversity and its Order of Gavalan Pati Charbuja temple Katkut.
Images of various recorded species:

- **Black Kite**
- **Oriental Honey Buzzard**
- **Bonelli’s Eagle**
- **Indian Spot-billed Duck**
- **Indian House Swift**
- **Jungle Nightjar**
- **Red-wattled Lapwing**
- **Grey Plover**
- **Common Swift**
- **Greater Adjutant**
- **River Lapwing**
Discussion:-
The results show that forty eight bird species were recorded at Wachoo point at Mandleshwar which belongs to 13 orders. The order Passeriformes was dominant with highest number of species. Gajera et al. (2013) reported 252
bird species in their study site which belonged to 13 different orders which is a sign that these regions are very rich in bird diversity. Lodhi et al. (2018) also studied few waterfowl with related to bird diversity and conservation in Gwalior region and reported a checklist of Twenty eight bird species belonging to eleven orders. There were 53 bird species which were found at the Jamghat Temple at main Vindhyachal, which belonged to fourteen orders while order Passeriformes was dominant with twenty five species in it.

Forty four bird species were observed at the Double golai Balwada. These species belonged to 14 orders and the order Passeriformes was dominant with eighteen species in its category. Rawal et al. (2016) reported total fifteen bird species of avian fauna at Kunda reservoir and these belonged to six orders and the order Passeriformes was dominant with four species. Bird diversity of fifty eight species was recorded at Indore city and the order Passeriformes was dominant with thirty five bird species (Gaur et al., 2019). The recorded bird species number was sixty bird species, belonging to fifteen different orders. Among them the orders Passeriformes consist of twenty eight species.

In our study at Vindhyachal Forest Reserve at Khargone District (M. P.) order Passeriformes was dominant in the entire four study site with twenty nine (Wachoo point at Mandleshwar), twenty five (Jamghat Temple at main Vindhyachal), eighteen (Double Golai Balwada) and twenty eight (Gavalan Pati Charbhuja temple Katkut).

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