



Biodiversity of Avifauna in Chilkigarh, Jhargram, West Bengal (India)

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ABSTRACT

Chilkigarh is a rural and tribal area in the jangal-mahal belt of West Bengal situated at the bank of Dulung river in Jamboni block, district Jhargram, 14 km away from the main town of Jhargram. The present study deals with the documentation of avifaunal diversity in this region. The study was carried out from December 2021 to July 2022. The study area includes Chilkigarh Raj Palace, Dulung river bank, Chilkigarh Kanak Durga Sacred Grove, Chilkigarh hospital area, Sonajhuri garden, Sal Forest, Open grasslands, Agricultural lands, etc. A total of 37 birds belonging to 24 families under 10 orders were photographed and identified at the species level. 19 out of these 37 species are legally protected under Wildlife (Protection) Act, 1972. The most dominant species-rich order was Passeriformes (54%). Based on feeding habits they have been grouped and Omnivore becomes the dominant (37.8%) one. This study provides important data-based documentation for future investigation and conservation strategy planning in this particular area.

Keywords: Avifaunal diversity, Feeding habits, GPT, Chilkigarh birds, Jhargram, West bengal

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INTRODUCTION

An ecosystem is a structural and functional unit of ecology, consisting of both organisms and the physical environment with which they interact (Chapin *et al.*, 2011). Faunal components of the ecosystem play a crucial role in the maintenance and sustainability of the ecosystem; Feathered bipeds are paying to the ecosystem through various services like pest control, scavenging, pollination, seed dispersal, etc. (Priya *et al.*, 2022). Chilkigarh is a rural and tribal area on the bank of the Dulung river. Chilkigarh Kanak Durga Sacred Grove is one of the famous tourist destinations for its distinct habitat patches and floral and faunal components. 388 species of higher plants and 26 species of megafauna including 13 species of birds have been previously reported (Bhakat, 2015; Gaurav *et al.*, 2021). In 2018 the site has been declared as Chilkigarh Kanak Durga Biodiversity Heritage Site by Environment Department, Govt. of West Bengal, India. Chilkigrah Raj Palace, Sonajhuri garden, and Sal Forest areas are other important places to visit. As the avifaunal diversity of the entire chilkigarh area has not been worked out previously, this study is an effort to document avian diversity

along with their feeding habits, enumeration of their local status, and its comparison with global population trend (GPT) which will provide a guideline for future large-scale study and planning of conservation strategies.

MATERIALS AND METHODS

Study area

Chilkigarh (**Figure 1**) is located between latitudes 22° 27' 20" N to 22° 56' 50" N and longitude 86° 52' 20" E to 86° 53' 10" E; the average elevation is 60–85 m of the mean sea level (Saadi *et al.*, 2020). It is situated around 14 km away from Jhargram town, West Bengal. This area is located at the bank of the Dulung river and consists of mixed vegetation of deciduous, semi-deciduous, and evergreen trees (Bhakat, 2015; Soboleva *et al.*, 2022). Due to various kinds of habitats, this area contains huge vegetation of Sal Forest which is commonly under the 'Tropical Moist Deciduous Forest' type, and various kinds of shrubs, herbs, climbers, and grasses which provides a good source of food and habitat for several animals. Several different areas like Dulung river bank, Chilkigarh Kanak Durga Sacred Grove, Open grassland, Chilkigarh hospital area, Chilkigarh Raj Palace, Sonajhuri garden, Sal forests, and Agricultural lands were the primary sites of this study.

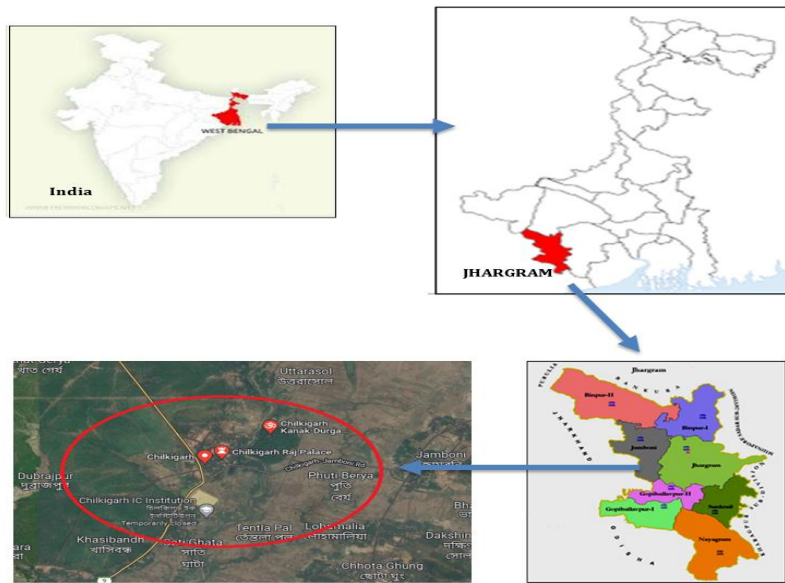


Figure 1. Location map of Chilkigarh in West Bengal, India.

(Source: <https://www.freeworldmaps.net/>, https://en.m.wikipedia.org/wiki/File:Jhargram_district.svg, <https://www.google.com/maps/place/Chilkigarh>)

Data collection & identification

During the study, photographic documentation was done by visiting different study sites from 7:00 am to 10:00 am and 3:00 pm to 6:00 pm adopting the line transect method (Bibby *et al.*, 1992; Buckland *et al.*, 1993; Nadershah, 2022). No study was done after sunset. The survey was conducted once or twice a week during the winter, summer, and monsoon seasons by taking photographs of birds from all possible angles using a Canon IXUS 190 Digital Camera. Identification of birds was done following Grimmett *et al.* (2011) and Ali (1990). Taxonomic information of each bird species (scientific name, order, and family names) has been compiled by accessing Clements Checklists of Birds of the World v2021 (Clements *et al.*, 2021). Observed birds were classified into different foraging groups as carnivorous (CV), frugivorous (F), granivorous (G), insectivorous (I), nectarivorous (N), omnivorous (O) types based on their feeding and foraging habits as described by Ali *et al.* (1987); Mukhopadhyay and Mazumdar (2017a); Kumber and Ghadage (2014); Das and Bandyopadhyay (2016).

The status of the observed birds was determined using standard methods outlined by Khan (1980); Khan and Naher (2009). During field visits, 80-100% of occurrence was categorized as very common (VC), 50-79% common (C), 20-49% fairly common (FC), and below 19% rare (R).

IUCN conservation status and Global Population Trend (GPT - I-increasing, D-decreasing, S-stable, U-unknown) of the documented birds were collected from the Red list of IUCN (2021 www.iucnredlist.org).

The Relative Diversity (RDi) of listed bird families was calculated using the following formula (Torre-Cuadros *et al.*, 2007).

$$RDi = \frac{\text{Number of bird species in family 'I'}}{\text{Total number of bird species}} \times 100 \quad (1)$$

RESULTS AND DISCUSSION

A total of 37 bird species belonging to 24 families under 10 orders have been recorded from Chilkigarh (**Table 1 and Figure 4**). The highest number of species encountered during the study period belongs to the order Passeriformes (54%) followed by Coraciiformes (11%) and Columbiformes (8%). Three orders Piciformes, Accipitriformes, and Cuculiformes each contribute 5% of the total listed species. The remaining 4 orders -Bucerotiformes, Pelecaniformes, Psittaciformes, and Suliformes, were each contributed 3% of the total count (**Figure 2**).

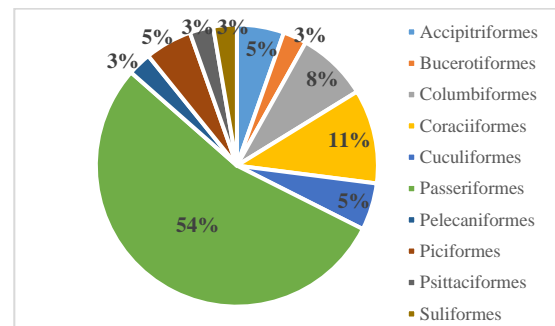


Figure 2. Percentage composition of Bird species under different orders

According to IUCN (Ver 3.1), all 37 bird species recorded from Chilkigarh were found to be Least Concern (LC) in conservation status (**Table 1**). Order Passeriformes is represented by 20 species belonging to 17 genera under 12 families viz Alaudidae, Artamidae, Dicruridae, Laniidae, Leitrichidae, Passeridae, Oriolidae, Pycnonotidae, Corvidae, Muscicapidae, Nectariniidae, Sturnidae respectively. Order Coraciiformes is represented by 4

species belonging to 4 different genera under 3 families viz, Alcedinidae, Coraciidae, and Meropidae. Order Columbiformes is represented by 3 species belonging to 2 genera under the single-family Columbidae. Order Piciformes is represented by 2 species belonging to 2 genera under 2 families Megalimidae and Picidae. Order Accipitriformes and Cuculiformes are each represented by 2 species belonging to 2 genera under single-family Accipitridae and Cuculidae respectively. Order Bucerotiformes, Pelecaniformes, Psittaciformes and Suliformes are each represented by single species under four families viz. Upapidae, Ardeidae, Psittacidae, and Phalacrocoracidae respectively. 19 out of 37 birds are found to be legally protected under Wildlife (Protection) Act, 1972 (Table 1). All 37 birds were grouped based on their feeding habit. 37.83% of the total count shows Omnivory. Followed by Insectivory (24.32%), Carnivory (18.91%) and Granivory (8.1%). Frugivory and Nectarivory both are represented by 5.4% (Table 1 and Figure 3). Sturnidae followed by Columbidae have shown the highest genus-to-species proportion (Table 1).

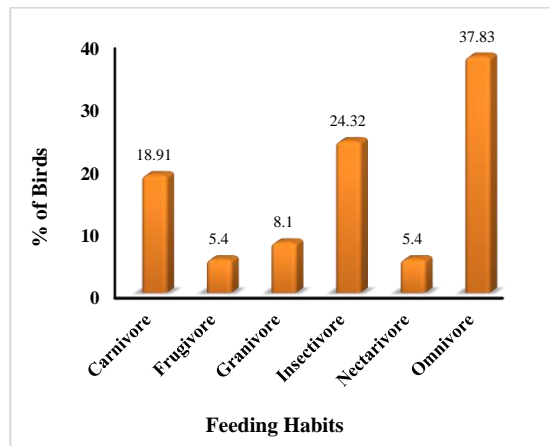


Figure 3. Percent distribution of birds in Chilkigarh based on feeding habits

Relative Diversity (RDi) (1) analysis shows the same trend i.e, Sturnidae is the most diverse family (4 species, RDi=10.81) in the study area, followed by Columbidae (3 species, RDi=8.1) and others. Only one species of bird has been recorded from each of the following 14 families - Ardeidae, Artamidae, Alaudidae, Coraciidae, Megalimidae, Meropidae, Dicruridae, Laniidae, Leiotrichidae, Passeridae, Picidae, Psittacidae, Phalacrocoracidae, Upupidae (Table 2). Unfolding the story of Local status reveals that six bird species are rare (R), eight are fairly common (FC), fourteen are very common (VC), and the rest nine are common (C). Global Population Trend (GPT) analysis uncovers that six bird species are decreasing globally, fifteen are stable, nine are increasing and seven belong to the unknown category (Table 1 and Figure 5). The most species-rich order was Passeriformes (54%), consistent with the Indian trend (Praveen et al., 2016). Sturnidae is the most diverse family with RDi=10.81. The highest genus-to-species proportion has also been shown by the same family (Table 1). Among documented species, 19 are found to be legally protected under Wildlife (Protection) Act, 1972. The Chilkigarh area is a habitat of diversified bird species. The majority of the birds in the study area have shown omnivory (37.8%) suggesting the availability of diverse categories of food resources including a variety of plantations. On comparing the Local status of birds with Global Population Trend (GPT), it has been noticed that three species are globally declining viz. Common Pigeon (*Columba livia*), Rufous Treepie (*Dendrocitta vagabunda*), and House-Sparrow (*Passer domesticus*) are very common in this area. Also, two birds viz. Common Hoopoe (*Upupa epops*) and Brown Shrike (*Lanius cristatus*) are found to be fairly common though they are decreasing globally. This may be due to the presence of suitable habitats and plenty of foods (Mukhopadhyay & Mazumdar, 2017b). Only one bird Red-whiskered Bulbul (*Pycnonotus jocosus*), rare in the study area is also showing decreasing trend globally. Two globally stable species are rare in Chilkigarh, Laughing Dove and Plaintive Cuckoo, suggesting their conservation policy is needed.

Table 1. Order-wise checklist with scientific & common names along with WPA, IUCN status, feeding habits, GPT & Local Status of each bird species encountered at Chilkigarh.

| Sl.No. | Family | Scientific Name | Common Name | WPA status | IUCN Status (ver 3.1) | Feeding habit* | GPT | Local Status |
|--------------------------------|--------------|--------------------------------|---------------------------|------------|-----------------------|----------------|------------|--------------|
| Order : Accipitriformes | | | | | | | | |
| 1 | Accipitridae | <i>Elanus caeruleus</i> | Black-winged Kite | | LC | C | stable | FC |
| 2 | Accipitridae | <i>Accipiter badius</i> | Shikra | Sch. I | LC | C | stable | FC |
| Order : Bucerotiformes | | | | | | | | |
| 3 | Upupidae | <i>Upupa epops</i> | Common Hoopoe | Sch. IV | LC | O | decreasing | FC |
| Order : Columbiformes | | | | | | | | |
| 4 | Columbidae | <i>Spilopelia chinensis</i> | Spotted Dove | | LC | G | increasing | VC |
| 5 | Columbidae | <i>Spilopelia senegalensis</i> | Laughing Dove | | LC | G | stable | R |
| 6 | Columbidae | <i>Columba livia</i> | Common Pigeon | | LC | G | decreasing | VC |
| Order : Coraciiformes | | | | | | | | |
| 7 | Alcedinidae | <i>Alcedo atthis</i> | Common Kingfisher | Sch. IV | LC | C | unknown | C |
| 8 | Alcedinidae | <i>Halcyon smyrnensis</i> | White-breasted Kingfisher | Sch. IV | LC | C | increasing | C |
| 9 | Coraciidae | <i>Coracias benghalensis</i> | Indian Roller | Sch. IV | LC | I | increasing | C |
| 10 | Meropidae | <i>Merops orientalis</i> | Asian Green Bee-eater | Sch. IV | LC | I | increasing | C |

| Order : Cuculiformes | | | | | | | | |
|------------------------|-------------------|----------------------------------|--------------------------|---------|----|---|------------|----|
| 11 | Cuculidae | <i>Cacomantis merulinus</i> | Plaintive Cuckoo | | LC | I | stable | R |
| 12 | Cuculidae | <i>Centropus sinensis</i> | Greater Coucal | Sch. IV | LC | O | stable | VC |
| Order : Passeriformes | | | | | | | | |
| 13 | Alaudidae | <i>Mirafra assamica</i> | Bengal Bushlark | | LC | O | stable | FC |
| 14 | Artamidae | <i>Artamus fuscus</i> | Ashy Woodswallow | | LC | C | stable | FC |
| 15 | Corvidae | <i>Corvus splendens</i> | House Crow | | LC | O | stable | VC |
| 16 | Corvidae | <i>Dendrocitta vagabunda</i> | Rufous Treepie | Sch. IV | LC | O | decreasing | VC |
| 17 | Dicruridae | <i>Dicrurus macrocercus</i> | Black Drongo | Sch. IV | LC | I | unknown | VC |
| 18 | Laniidae | <i>Lanius cristatus</i> | Brown Shrike | Sch. IV | LC | I | decreasing | FC |
| 19 | Leiotrichidae | <i>Argya striata</i> | Jungle Babbler | | LC | O | stable | C |
| 20 | Muscicapidae | <i>Copsychus saularis</i> | Oriental Magpie-robin | | LC | I | stable | C |
| 21 | Muscicapidae | <i>Phoenicurus ochruros</i> | Black Redstart | | LC | I | increasing | R |
| 22 | Nectariniidae | <i>Cinnyris asiaticus</i> | Purple Sunbird | | LC | N | stable | VC |
| 23 | Nectariniidae | <i>Leptocoma zeylonica</i> | Purple-rumped Sunbird | | LC | N | stable | VC |
| 24 | Oriolidae | <i>Oriolus xanthornus</i> | Black-hooded Oriole | | LC | O | stable | C |
| 25 | Oriolidae | <i>Oriolus kundoo</i> | Indian Golden Oriole | | LC | O | unknown | R |
| 26 | Passeridae | <i>Passer domesticus</i> | House Sparrow | | LC | O | decreasing | VC |
| 27 | Pycnonotidae | <i>Pycnonotus cafer</i> | Red-vented Bulbul | Sch. IV | LC | O | increasing | C |
| 28 | Pycnonotidae | <i>Pycnonotus jocosus</i> | Red-whiskered Bulbul | Sch. IV | LC | O | decreasing | R |
| 29 | Sturnidae | <i>Sturnia malabarica</i> | Chestnut-tailed Starling | Sch. IV | LC | I | unknown | C |
| 30 | Sturnidae | <i>Sturnia pagodarum</i> | Brahminy Starling | | LC | O | unknown | R |
| 31 | Sturnidae | <i>Gracupica contra</i> | Asian Pied Starling | Sch. IV | LC | O | increasing | VC |
| 32 | Sturnidae | <i>Acridotheres tristis</i> | Common Myna | Sch. IV | LC | O | increasing | VC |
| Order : Pelecaniformes | | | | | | | | |
| 33 | Ardeidae | <i>Ardeola grayii</i> | Indian Pond Heron | Sch. IV | LC | C | unknown | VC |
| Order: Piciformes | | | | | | | | |
| 34 | Megalimidae | <i>Psilopogon asiatica</i> | Blue-throated Barbet | Sch. IV | LC | F | stable | FC |
| 35 | Picidae | <i>Dinopium benghalense</i> | Black-rumped Flameback | | LC | I | stable | FC |
| Order : Psittaciformes | | | | | | | | |
| 36 | Psittacidae | <i>Alexandrinus krameri</i> | Rose-ringed Parakeet | Sch. IV | LC | F | increasing | VC |
| Order: Suliformes | | | | | | | | |
| 37 | Phalacrocoracidae | <i>Phalacrocorax fuscicollis</i> | Indian Cormorant | Sch. IV | LC | C | unknown | VC |

Note. *Feeding Habit: CV=Carnivore, F=Frugivore, G= Granivore, I=Insectivore, N= Nectarivore, O=Omnivore.

** Local Status: VC=Very Common, C=Common, FC=Fairly Common, U=Unknown.

Table 2. Relative diversity (RDi) values of different bird families were recorded from the study area.

| Avian Families | Number of Species | RDi value |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------|
| Sturnidae | 4 | 10.81 |
| Columbidae | 3 | 8.1 |
| Accipitridae, Alcedinidae, Corvidae, Cuculidae, Muscicapidae, Nectariniidae, Oriolidae, Pycnonotidae | 2 | 5.4 |
| Ardeidae, Artamidae, Alaudidae, Coraciidae, Megalimidae, Meropidae, Dicruridae, Laniidae, Leiotrichidae, Passeridae, Picidae, Psittacidae, Phalacrocoracidae, Upupidae | 1 | 2.7 |

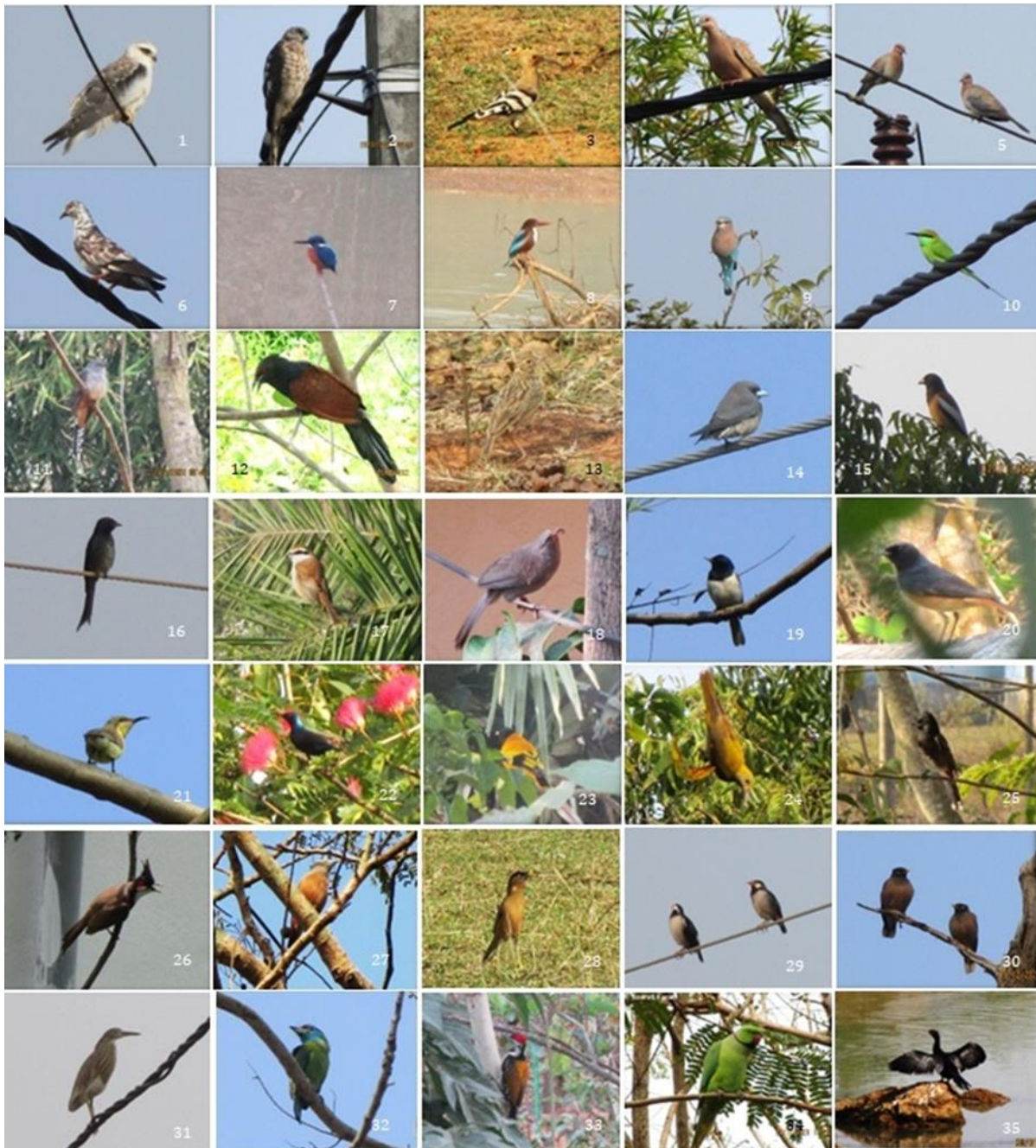


Figure 4. 1. Black Winged Kite 2. Shikra 3. Common Hoopoe 4. Spotted Dove 5. Laughing Dove 6. Common Pigeon 7. Common Kingfisher 8. White-breasted Kingfisher 9. Indian Roller 10. Asian Green Bee-eater 11. Plaintive Cuckoo 12. Greater Coucal 13. Bengal Bushlark 14. Ashy Wood swallow 15. Rufous Treepie 16. Black Drongo 17. Brown Shrike 18. Jungle Babbler 19. Oriental Magpie-robin 20. Black Redstart 21. Purple Sunbird (female) 22. Purple Sunbird (male) 23. Black-hooded Oriole 24. Indian Golden Oriole 25. Red-vented Bulbul 26. Red-whiskered Bulbul 27. Chestnut-tailed Starling 28. Brahminy Starling 29. Asian Pied Starling 30. Common Myna 31. Indian Pond Heron 32. Blue-throated Barbet 33. Black-rumped Flameback 34. Rose-ringed Parakeet 35. Indian Cormorant.

CONCLUSION

It can be concluded from the above study that the Chilkiarh area is maintaining a good composition of bird species. The study was done during day time only, so a more intensive study (documentation of nocturnal bird species and seasonal

variation) would surely result in the identification of many more birds in this region. This preliminary study will provide a baseline for future investigation of the avian composition of this particular area. The impact of tourism and anthropogenic alteration of habitats on the bird's composition in Chilkiarh is also needed to be detailed out through the intensive study.

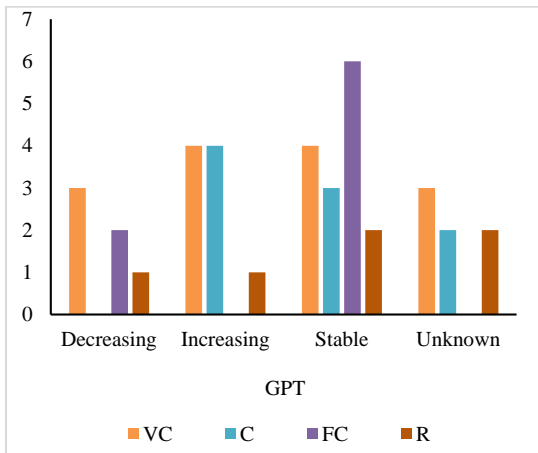


Figure 5. Comparative graphical representation between Local Status (VC, C, FC, R) and Global Population Trend (GPT) of birds documented from Chilkigarh

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ETHICS STATEMENT: In this study none of the bird species were captured or harmed by any means. Images in the figure are the result of live photography.

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