



# DIVERSITY OF AVIFAUNA IN LOCAL AND PERIPHERAL ECOSYSTEMS OF TASGAON TAHSIL OF SANGLI DISTRICT, MAHARASHTRA, INDIA.

S.A. Khabade, P.S. Bhandare and S. S. Jadhav

Department of Zoology, Padamabhushan Dr. Vasantodada Patil Mahavidyalaya Tasgaon, Dist- Sangli.

**Abstract:** There are about 30 different families. 12 orders and 63 species of the terrestrial birds were reported in local and peripheral ecosystems of Tasgaon tahsil.

Similarly, there are about 10 different families, 7 orders and about 17 species of the aquatic birds were reported in present study.

**Keywords** - Avifauna diversity , Tasgaon, Sangli, district , Maharashtra India.

## INTRODUCTION

Sangli is one of the southernmost districts of Maharashtra in peninsular India. Though botanists and birdwatchers have documented the flora and salient features of the birdlife of the district, much of this data remains unpublished or has not been summarized, so that birds diversity of Sangli district was studied by Tuljapurkar *et.,al.*(2013). He enlisted the land birds and aquatic birds from this district. The records of species obtained are compared with old. Butler (1881) and recent records of birders from the area.

Tasgaon Tahsil of Sangli district is one of the agriculturally well developed area having grape fields. The eastern part of the tahsil is a drought prone area having minor and major irrigation tanks while western part of tahsil is situated near the bank of the Krishna and Yerala rivers. In this tahsil the land birds and aquatic birds occurs in vegetation and wetlands. Due to agricultural development in the tahsil the farmers used fertilizers, herbicides, pesticides and fungicides continuously. Avian biodiversity is affected by local factors more than by regional ones, with species richness and densities declining as the number of buildings increases urbanization will be detrimental for many bird species. Study of avifaunal diversity is an essential ecological tool which acts as an important indicator to evaluate different habitats both qualitatively and quantitatively (Bilgrami 1995). Unfortunately Global diversity of birds is decreasing due to anthropogenic disturbances, (Rapoport 1993) and climate change (Chen *et al.*, 2011; Sekercioglu *et al.*,2012). Blackburn (2003) estimated that since pre- agricultural levels overall global bird population has declined by a fifth to a quarter due to change in land- use pattern alone.

Other reports related to survey of birds was also carried out and no serious studies exclusively on bird diversity across different land scape are made in the western ghat regions. From the review of literature it was inferred that not much studies are made in Tasgaon tehsil, so that studies on censuses diversity and relationship with vegetation is needed. Hence the present study was attempted on the birds of local and peripheral ecosystem of Tasgaon tehsil of Sangli District.

The Indian subcontinent, a part of the vast oriental biogeography regions, is very rich in biodiversity. Out of the more than 9000 birds, the Indian subcontinent contains about 1300 species, or over 13 percent of the world's birds. Ali and Ripley (1983) reported the avifauna of Indian subcontinent being represented by 2094 forms belonging to 1200 species out of which 19.9 percent (417) forms are wetland birds. (Bhagwat 2003) examined the effects of landscape modification on bird diversity in Kodagu district.

In recent past years, importance of bird diversity and its conservation has been emphasized and such studies are encouraged much work related to the avifaunal diversity has been done in temperate forest, while a very limited data is available in tropics in general and mangroove forest in particular. In Tasgaon tehsil during 1972's famine a government of Maharashtra has been constructed about 7 minor and major irrigation tanks under Employment Guarranty Scheme (EGS). These minor and major irrigation tanks and running water bodies are nothing but the wetlands of this tehsil, which are found to be the richest sites by holding major share of existing avifauna. Wetlands are among the world's most productive environment, rich in biodiversity that provides the water and the productivity upon which countless species of plants and animals depending upon their survival (Kumar *et al.*, 2005).

The present study assesses freshwater diversity as the most threatened of all types of diversity. It is estimated that freshwater wetland alone support 20 percent of the known range of biodiversity in India. It has been suggested that the avifauna is important for the ecosystem because of its various roles such as scavenger, pollinators and predators of pest. The different kinds of environments like urbanization and industrialization disturb the avian habitats. By considering so many things as mentioned above, the present study has been carried out.

### STUDY AREA

The bird diversity study was conducted from Tasgaon Tehsil (16.46 to 17.1 ° N and 73.42 to 72.4°E). The tehsil shows hilly area with drought condition due to geographical distribution as well as low rainfall.

### MATERIALS AND METHODS

In present study total six study stations were selected and fixed at different locales, namely P.D.V.P. Mahavidyalaya campus, Pundi, Siddhewadi, Lode, Balgavade, Bastavde. The study was carried out for the period of six month from 23 March 2021 to 23 September 2021.

Census began at 6 am and continued up to 9 am. In the evening bird census was done from 4 pm to 6 pm. In terrestrial as well as aquatic habitat minimum six to eight censuses were conducted. About four to eight censuses carried out in each study sites. At each study site, all the birds that are seen were recorded by using field binoculars. The census was not conducted during heavy rain and misty morning. The photographs of birds were taken by using Nikon camera.

The birds observed were identified by using standard field guides (Wood Cock, 1980., Ali and Ripley 1983., Sonobe and Usui, 1993., Grewal, 1995., Ali 1896., Grimett *et al.*, 1998).

### RESULTS AND DISCUSSION

In present investigation about 63 species of the terrestrial birds were reported in local and peripheral ecosystems of Tasgaon Tehsil. There are about 30 different families and 12 orders were recorded during this study. About 29 species of birds were recorded from order *Passeriformes* followed by 6 species of *Columbiformes*, 6 species of *Coraciiformes*, 6 species of *Ciconiformes*, 3 species in *Cuculiformes*, 2 species of *Falconiformes* and 1 species in *Accipitriformis*, *Piciformes*, *Psittaciformes*, *Charadriiformes*, *Gruiformes* and *Pelecaniformes* in each.

There are about 17 species of the aquatic birds were reported in local and peripheral ecosystems of Tasgaon tahsil. There are about 10 different families and 07 orders of an aquatic birds were recorded during this study.

Table 1. showing different orders, families, scientific names, common names, and local status of the terrestrial birds. Similarly table 2. showing different orders, families, scientific names, common names, and local status of the aquatic birds.

Sr. No.	Order	Family	Common Name		Zoological Name	Local status
1	Muscicapidae		Black Scrub Robin	kaL Taop ksturl	<i>Cercotrichas podobe</i>	RC
2			Oriental Magpie-Robin	dyaaL	<i>Copsychus saularis</i>	RC
3			Indian Robin	icark	<i>Copsychus fulicatus</i>	RC
4	Pycnonotidae	Passeriformes	Red-vented Bulbul	laala bauDyaacaa baulabaula	<i>Pycnonotus cafer</i>	RC
5	Dicruridae		Black - Drongo	kaotvaala	<i>Dicrurus Macrocerus</i>	RC
6	Sturnidae		Brahminy Starling	b` aahmNal maOOnaa	<i>Stuinaepagodarum</i>	RC
7			Rosy Starling	gaulaabal maOnaa	<i>Pastor roseus</i>	RC
8			Bank Myna	saaLUMKI	<i>Acridotheres ginginianus</i>	RC
9	Zosteropidae		Indian White-eye	caYmaovaala a	<i>Zosterops palpebrosus</i>	RC
10			Indian White-eye	caYmaovaala a	<i>Zosterops palpebrosus</i>	RC
11			Indian White-eye	caYmaovaala a	<i>Zosterops palpebrosus</i>	RC

12	Motacillidae		Sprague's pipit	vaRxa itricamaNal	<i>Anthus spragueii</i>	RC
13	Pycnonotidae		Red - Whiskered Bulbul	iSapaš baulabaula	<i>Pycnonotus jocosus</i>	RC
14			White - browed Bulbul	Kr baulabaula	<i>Pycnonotus luteolus</i>	RC
15	Aegithinidae		Common iora	sauBaMga	<i>Aegithina tiphia</i>	RC
16	Laniidae		Bay-backed shrike	KaTik	<i>Lanius vittatus</i>	RC
17	Alaudidae		Red Winged Bush Lark	laalapMKI BaTcaMDaol a	<i>Mirafra erythroptera</i>	RC
18	Dicuridae	Passeriformis	White – bellied Drongo	paMZáya paoTaca kaotvaala	<i>Dicurus caerulescens</i>	RC
19	Dicaeidae		Thick – billed Flowerpecker	jaad caaocalcaa fulaTaocaa	<i>Dicaeum agile</i>	RC
20	Cisticolidae		Tailor Bird	iSaMpl	<i>Orthotomus satorius</i>	RC
21	Nectariniidae		Purple Sunbird	iSaMjlr	<i>Cinnyris asiaticus</i>	RC
22	Acrocephalidae		Blyth's Reed Warbler	baayaqaa	<i>Acrocephalus dumetorum</i>	RC
23	Rhipiduridae		White – Throated fantail Flycatcher	naacara	<i>Rhipidura albicollis</i>	RC

24			Tawny – bellied Babbler	ipMgaT paoTaca saatBaaš	<i>Dumetia Hyperythra</i>	RC
25	Timaliidae		Large Grey Babbler	maoza raKI saatBaašc	<i>Turdoides malcolmi</i>	RC
26			Jungle Babbler	saatBaaš	<i>Turdoides Striatus</i>	RC
27		Corvidae	House Crow	kavaLa	<i>Corvus splendens</i>	RC
28	Passeridae		House sparrow	icamaNal	<i>Passer domesticus</i>	RC
29	Estrildidae		Scaly Breasted Spotted Munia	□□□□□□□□ □□□□□□	<i>Lonchura punctulata</i>	RC
30	Ploceidae		Baya weaver	saugarna	<i>Ploceus philippinus</i>	RC
31	Picidae	Piciformes	Yellow – Fronted Pied Woodpecker	kvaDyaa sautar	<i>Leopicus mahrattensis</i>	RC
31	Meropidae	Coraciiformes	Green bee-eater	vaoDa raGaU	<i>Merops orientalis</i>	RC
32			Rainbow bee-eater	ihrvaa vaoDa raGaU	<i>Merops ornatus</i>	RC
33			Little Green bee eater	baihraraGau	<i>Merops orientalis</i>	RC
34	Alcedinidae		White-throated kingfisher	CaoTa KMDyaa	<i>Halcyon smyrnensis</i>	RC
35			Black-capped Kingfisher	raKal KMDyaa	<i>Halcyon pileata</i>	RC
36			Lesser Pied	kvaDyaa	<i>Ceryle rudis</i>	Rr

			Kingfisher	KDyaa		
37			Common Kingfisher	CaoTa Kdyaa	<i>Alcedo atthis</i>	RC
38	Columbidae	Columbiformes	Eurasian Collared Dove	kmzorl haolaa	<i>Streptopelai decaocto</i>	RC
39			Feral Pigeon	parvaa	<i>Columbalivia</i>	RC
40			Blue Rock pigeon	Paarvaa	<i>Columba livia</i>	RC
41			Laughing Dove	haolaa	<i>Streptopellia senegalensis</i>	RC
42			Indian pea fowl	maoor	<i>Paro cristatus</i>	Rr
43	Cuculidae	Cuculiformes	Asian koel	kaokIL	<i>Eudynamys scolopaceus</i>	RC
44			Common Hawk Cuckoo	pavaSyaa	<i>Hierococyx barius</i>	RC
45			Greater Coucal	BaarWaja	<i>Centropus sinensis</i>	RC
46	Ardeidae	Ciconiformes	Indian Pond Heron	vaMcak	<i>Ardeola Grayii</i>	RC
47			Grey Heron	raKI bagaLa	<i>Ardea cinerea</i>	WMC
48			Cattle Egret	gaayabagaLa	<i>Bubulcus ibis</i>	RMC
49			Indian pond Heron	BaUra bagaLa	<i>Ardeola grayii</i>	RC
50			Little Egret	lahanabagaLa	<i>Egretta garzetta</i>	RMC
51	Ciconidae		Painted Strok	rgalt krkaocaa	<i>Mycteria leucocephala</i>	WMU
52	Threskiornithidae	Ciconiformes	Indian Black Ibis	Kalaa baajaa	<i>Pseudibis papillosa</i>	WMU
53	Falconidae		Common Kestrel	dovasasaaNa	<i>Falco tinnununculus</i>	RC

				a		
54	Accipitridae	Falconiformes	Red – headed Falcon	turmatl	<i>Falco chicquera</i>	RC
55			Black shouldered kite	kapSal	<i>Elanus caeruleus</i>	Rr
56		Accipitriformis	Shikra	iSaĒa	<i>Accipiterbadius</i>	RC
57			Brahminy Kite	saagarl Gaar	<i>Helaistur 420ndus</i>	RC
58	Charadriidae	Charadriiformes	Red Wattled Lapwing	□□□□□□□□ □□□□□	<i>Venellus indicus</i>	RC
59			Yellow Wattled Lapwing	maaLiTTval	<i>Venellus mulbaricus</i>	Rr
60	Psittacidae	Psittaciformes	Rose Ringed parakeet	paopT	<i>Psittacula krameri</i>	RC
61	Rallidae	Gruiformes	Common Coot		<i>Fulica atra</i>	RM
62	Phalacrocoracidae	Pelecaniformes	Yellow bittern	ipvaLa tapsa	<i>Ixobrychus sinensis</i>	RMC

table 1 : checklist of terrestrial avifauna in local and peripheral ecosystems of tasgaon tahsil of sangli district, maharashtra, india

1	Charadriiformes	Recurvirostridae	Black winged stilt	SaokaTyaa	<i>Himantopus himantopus</i>	RC
2	Suliformes	Anhingidae	Oriental Darter (Snake Bird)	saapmaanyaa	<i>Anhinga melanogaster</i>	RU
3		Phalacrocoracidae	Indian cormorant	panakavaLa	<i>Phalacrocorax Fuscicollis</i>	RC
4			Little cormorant	lahana panakavaLa	<i>Microcarbo niger</i>	RC
5	Podicipediformes	Podicipedidae	Little grebe	panaDubal	<i>Tachybaptus ruficollis</i>	RC
6		Threskiornithidae	Glossy Ibis	kudLyaa	<i>Plegadis falcinellus</i>	RC

7			Eurasian spoonbill	Camacyaa	<i>Platalea leucorodia</i>	MV
8	Pelecaniformes	Ardeidae	Grey heron	saarga	<i>Ardea cinerea</i>	RC
9			Purple heron	jaaMBaLa bagaLa	<i>Ardea purpurea</i>	RC
10			Pond Heron	kaok	<i>Ardeola grayii</i>	RC
11			Cattle egret	gaaya bagaLa	<i>Bulbus ibis</i>	RC
12			Little egret	CaoTa bagaLa	<i>Aedea alba</i>	RC
13			Ciconiformes	Ciconiidae	Painted strok	krkaocaa
14	Wooly necked stork	kaDo sar			<i>Ciconia episcopus</i>	RC
15	Anseriformes	Anatidae	Rudy Shelduck	cakRvaak	<i>Tadorna ferruginea</i>	MC
16			Spot billed duck	hLdlkUkUUUUU badk	<i>Anas poecilorhyncha</i>	RC
17	Gruiformes	Rallidae	Purple Moorehen	jaaMBaLI PaanakaobaDI	<i>Porphyrio porphyrio</i>	RC

**Table 2 : Checklist of aquatic avifauna in local and peripheral Ecosystems of Tasgaon Tahsil of Sangli District, Maharashtra, India**

(RM- Resident Migrant, RMC- Resident Migrant Common, Rr- Resident Rare, RC- Resident Common, RU- Resident Uncommon WMC- Winter Migrant Common, WMU- Winter Migrant Uncommon, MV- Migrant Uncommon)

Wadatkar and Kasambe (2002) reported 171 species of bird at Pohara- Malkhed forest reservoir of Amaravati district (M.S.). Yardi *et al.*, (2004) reported 64 species of bird in Salim Ali lake, Aurangabad (M.S.). Kedar and Patil (2005) recorded 60 bird species from Rishi lake Karanja (Lad) of Washim district (M.S.), Pawar *et al.*, (2005) reported 74 species of bird in and around Yedshi lake, Mangrulpir, Washim district (M.S.). Kulkarni *et al.*, (2006) reported 93 species of bird from Shikhachwadi reservoir of Nanded district (M.S.). Kedar *et al.*, (2008) recorded 74 species of birds in Rishi and Zedshi lake of Washim District (M.S.). Assessing the bird diversity of a habitat, overtime and space is one of the key issues for avian community ecologist. Richness, abundance and community composition often used by ecologist to understand the diversity of species in their natural occurrence, Olechnowski B. F. (2009). Kurhade (2010) reported 208 species of birds in Jaikwadi reservoir near Ahmadnagar (M.S.). Narwade and Fartade (2011) recorded 165 species of birds of Osmanabad district (M.S.). Pande *et al.*, (2011) studied bird diversity of Maharashtra state. Wanjari P.D. (2012) reported 72 bird species from Nagpur city, Chinchkhede, K and G.T. Harney *et al.*, (2012) recorded 37 species of birds from Kanhala pond of Bhadravati district

Chandrapur (M.S.). Natrajan Mariappan *et al.*, (2013) recorded 92 species of birds from different habitats of agricultural ecosystem of Pollachi (T.N.).

India harbors about 1237 species of birds, out of which 580 species are found in Western Ghat. Joshi *et al.*, (2013) reported 568 species of 83 families from Karnala Bird Sanctuary, Maharashtra State. The study of birds species diversity and richness in newly formed habitats of Chandoli National Park in Western Ghats (now declared as international heritage), Maharashtra state, India was carried out in early wet and dry seasons by Abdar M.R. (2013). Kedar (2013) recorded 126 species from Navgaon National Park from Gondia District. About 93 bird species were recorded from Gogate Salt Plant which is suburban part of Mumbai (Varkey *et al.*, 2015). According to Tesfahuny *et al.*, (2016) avifauna is continuously threatened by drivers such as an habitat loss and degradation, hunting, pollution, invasive species and disease. Arun M. Chhilke (2018), reported about 58 bird species in and around Bamanvada Lake of Rajura, District Chandrapur (Maharashtra). About 73 bird species were reported by Shelake A. D. (2019) in local peripheral ecosystems of Chalisgaon in Jalgaon, North Maharashtra, India. Pimpalshende A. K. and Sitre S. R. (2020), studied bird diversity of Satara Bhosale and Satara Tukum lakes of Pombhurna tehsil and reported about 40 different kinds of birds in Satara Tukum lake and 33 bird species were recorded in Satara Bhosale lake.

It is expected that this study would provide a data base for the avifauna of Tasgaon tehsil area for the further research.

### CONCLUSION

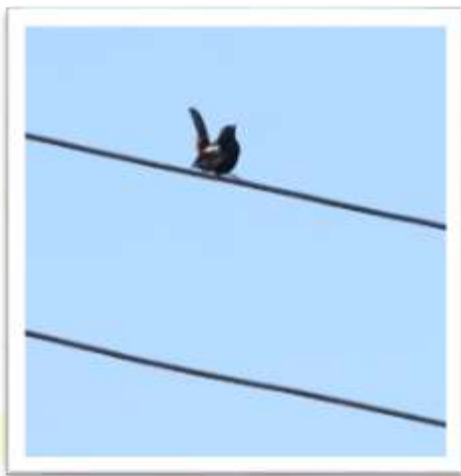
Tasgaon tehsil of Sangli district is one of the drought prone area having minor and major irrigation tanks which forms the wetlands towards the eastern part of tehsil. The western part of tehsil is situated at the bank region of Yerala and Krishna rivers. Due to less rainfall the eastern part of tehsil shows the different types of bird species than the western part. Mostly grassland bird species occur towards the eastern part. Most of the aquatic birds shows their presence in the wetlands of eastern part as well as in the Yerala and Krishna river basins. Thus all wetlands are very important in conservation of diversity of birds. The aquatic birds and terrestrial birds are strongly associated with the food, prey distribution and its abundance. The study of diversity of avifauna in local and peripheral ecosystems of Tasgaon Tahsil, will help in conservation strategies and management plans, which is the key component of the ecosystems.

### ACKNOWLEDGMENT

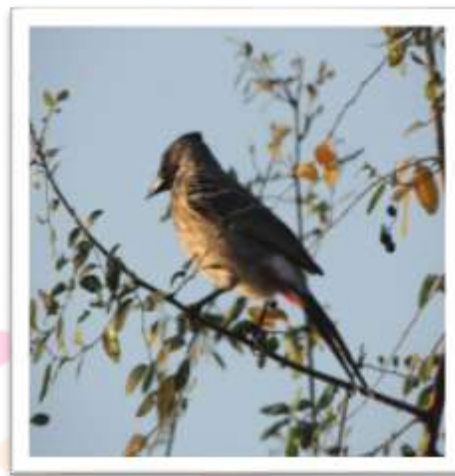
The authors are thankful to Dr. Milind S. Hujare, the Principal of Padmabhushan Dr. Vasantodada Patil Mahavidhyalaya Tasagaon and Prof. (Dr.) Suresh A. Khabade. Head of the Department of Zoology for providing necessary facilities to carry out the present work in research laboratory. The thanks are also due to the colleagues Dr. P.B. Teli., Mr. V. M. Jadhav., Miss P.P. Patil., Miss C. S. Gavali., Miss S. P. Kusarkar who encourage us for doing this study, We are also Thankful to the nonteaching staff



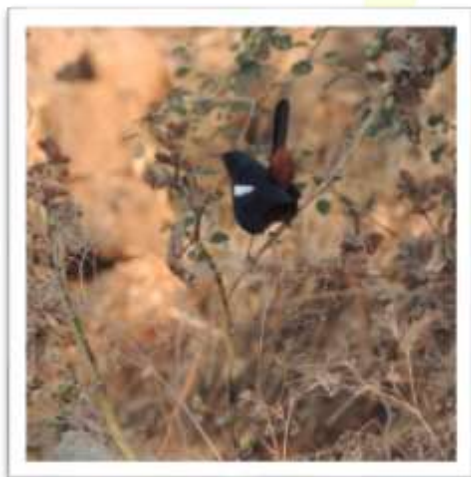
***Black Scrub Robin***  
**kaLTaop ksturl**



***Oriental Magpie-Robin***  
**dyaal**



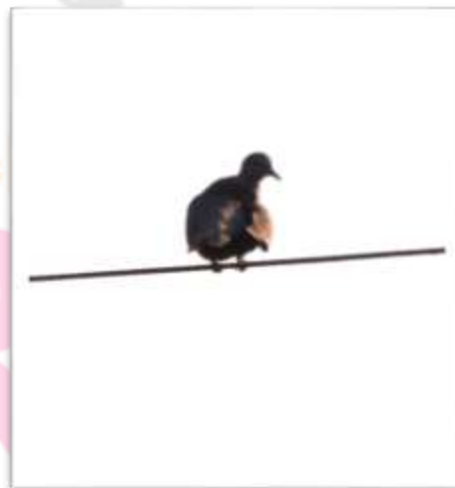
***Red-vented Bulbul***  
**laala bauDyaacaa baulabaula**



***Rosy Starling***  
**gaulaabal maOnaa**



***Indian Robin***  
**icark**



***Eurasian Collared Dove***  
**kMzorl haolaa**

Research Through Innovation



*Indian White-eye*  
caYmaovaalaa



*Brahminy Starling*  
b`aahmNal maOOnaa



*Black - Drongo*  
kaotvaala



*Bank Myna*  
saaLUMKI

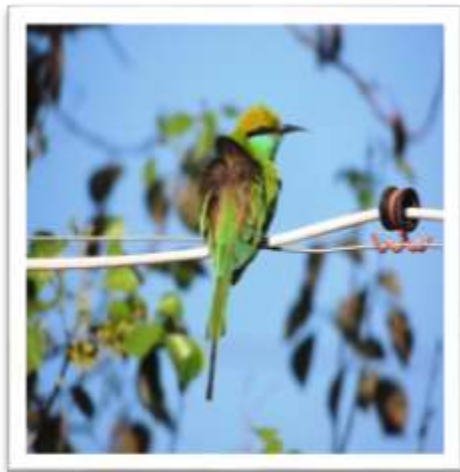


*Green bee-eater*  
vaoDa raGaU



*Sprague's pipit*  
vaRxa itricamaNal

Research Through Innovation



*Rainbow bee-eater*  
ihrvaa vaoDa raGaU



*Red - Whiskered Bulbul*  
iSapaš baulabaula



*Red-vented Bulbul*  
laala bauDyaacaa  
baulabaula



*White - browed Bulbul*  
Kr baulabaula



*White-throated kingfisher*  
CaoTa KMDyaa



*Common iora*  
sauBaMga

IJNRD  
Research Through Innovation



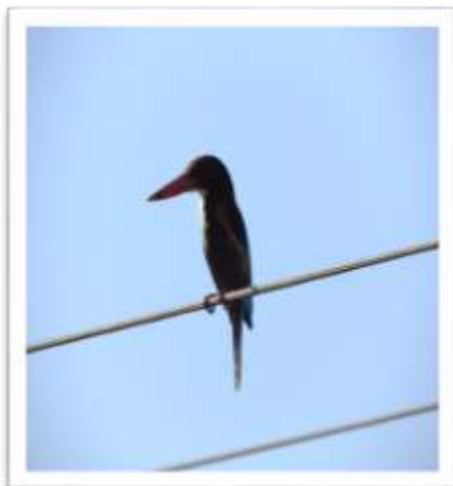
**Red-backed shrike  
KaTIk**



**Feral Pigeon  
parvaa**



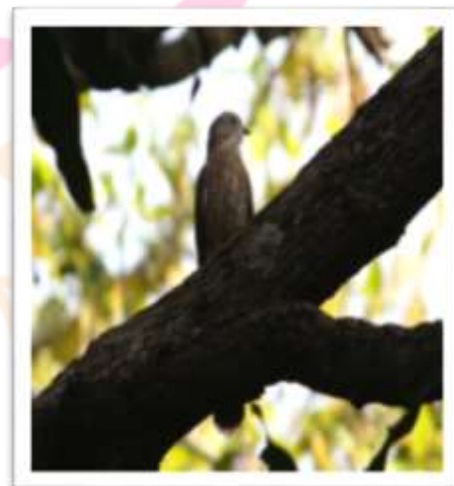
**Asian koel  
kaokIL**



**Black-capped Kingfisher  
raKal KMDyaa**



**Indian Pond Heron  
vaMcak**



**Hawk Cuckoo  
pavaSyaa**

International Research Journal  
**IJNRD**  
Research Through Innovation



**Greater Coucal**  
**BaarWaja**



**Common Kestrel**  
**dovasasaaNaa**



**Red Winged Bush Lark**  
**laalapMKIBaTcaMDaola**



**Red - headed Falcon**  
**turmatI**



**Shikra**  
**iSaĒa**

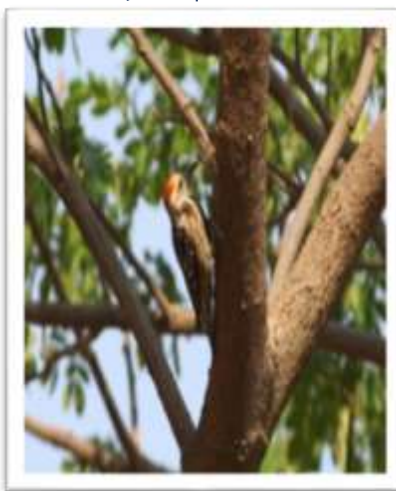


**White - bellied Drongo**  
**paMZāyaapaoTacaakaotvaala**

International Research Journal  
**IJNRD**  
Research Through Innovation



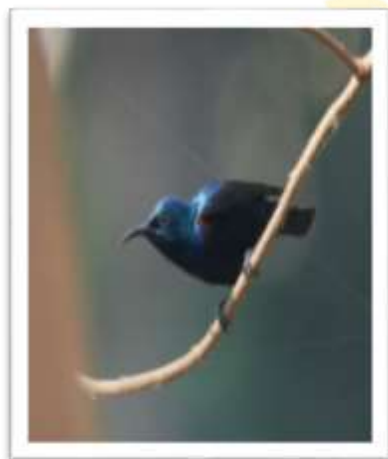
**Thick - billed Flowerpecker**  
**jaaDcaaocaIcaafulaTaocaa**



**Yellow - Fronted Pied Woodpecker**  
**kvaDyaasautar**



**Tailor Bird**  
**iSaMpi**



**Purple Sunbird**  
**iSaMjaIr**



**Biyth's Reed Warbler**  
**baayaqaa**



**White - browed fantail Flycatcher**  
**naacara**

International Research Journal

**IJNRD**

Research Through Innovation



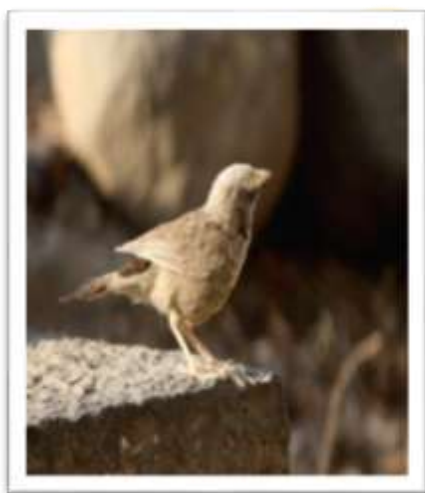
*Tawny - bellied Babbler*  
ipMgaTpaoTacaasaatBaaš



*Large Grey Babbler*  
maozaraKIsaatBaašc



*Small Babbler*  
saatBaaš



*Small Minivet*  
lahanagaomaot



Common sand piper



Purpal Moorhen  
jaaMBaLI PaanakaobaDI

International Research Journal  
**IJNRD**  
Research Through Innovation



Black Headed Ibis  
kudLyaa



Pond Heron  
kaok



Grey Heron  
raKI bagaLa



White necked black stork  
kaOOOrva



Greater Egret  
bagaLa



Shrik  
BaUra KTIk

International Research Journal  
**IJNRD**  
Research Through Innovation

**BIBLIOGRAPHY**

1. Abdar M.R. (2013) : Diversity and richness of bird species in newly formed habitats of Chandoli National Park in Western Ghats, Maharashtra State, India. *Biodiversity Journal*, 4(1): 235-242.
2. Ali S. (2002). The Book of Indian Birds, 13<sup>th</sup> revised Ed. Mumbai : Bombay Natural History Society, pp: 326.
3. Ali S. Ripley, SD. (1995): A Pictorial Guide to the Birds of the Indian Subcontinent, Bombay Natural History Society, Mumbai.
4. Ali S., Ripley, S. D. (1983): A Pictorial Guide to the Birds of the Indian Subcontinent, Bombay Natural History Society, Mumbai.
5. Bhagwat V. R. (2002): Status of avifauna around Miraj in Sangli District of Maharashtra. Oral paper presented in 3rd National symposium on “Avian Biodiversity – Issues and Conservation Strategies” at ANGR Agriculture University, Hyderabad, 7–8 February, 2002.
6. Bilgrami K. S. (1995): Concept and Conservation of Biodiversity. CBS Publishers and Distributors, Delhi
7. BUTLER E. A. (1881): A Tentative Catalogue of the Birds of the Deccan and South Mahratta Country. *Stray Feathers* 9: 367–442.
8. Chen Yuan. (2010) : Study on the relationship between urban birds and garden plants. M. S. Thesis, Chongqing: Southwestern University.
9. Chinchkhede K. and Kedar G.T. (2013) : Habitat Niche and status of the Birds of Navegaon National Park, Maharashtra. *Int.J.of Scientific Research*, 2(9): 430-436.
10. Grewal B. (1995) : Birds of the Indian Subcontinent. Guide Book Company Ltd. Hong Kong.
11. Grimmett R, Inskipp C, Inskipp T. Christopher Helm (1998), London.
12. Harney N.V., A. A Dhamani. and R.J. Andrew (2012): Avifaunal diversity in and around Kanhala lake near Bhadrawati, Dist-Chandrapur (MS), India. *Bionano Frontier* Vol.5(2-I):30-33.
13. Harney N.V., A. A. Dhamani and R.J. Andrew (2011): Studies on avifaunal diversity of three water bodies near Bhadrawati, Distt. Chandrapur (MS) *ISRJ*, Vol.1(6):216- 218.
14. Joshi P.J., Raut N.B., Khanolkar C. and Kumar P. (2013) : Avifaunal Distribution within Different Habitats of Karnala Bird Sanctuary, Maharashtra. ISBN: 978-81-923628-16. 6. *Journal of Emerging Technologies and Innovative Research*, ( J E T I R), March 2019, Volume 6, Issue 3, pp 92-100.
15. Kedar G.T. and Patil, G.P. (2005): Avifaunal diversity of Rishi lake, Karanja (Lad), Maharashtra with reference to food preference and feeding habits. *J. Aqua. Biol.* Vol.20 (1): 35-38.
16. Kedar G.T., Patil, G.P. and Yeole, S.M. (2008): Comparative study of avifaunal status of two freshwater lakes of Washim district, Maharashtra. *J. Aqua. Biol.* Vol.23(1): 29-33.
17. Kulkarni A. K., Kanwate, V. S. and Deshpande, V. D. (2006): Check list of birds of Shikhachi wadi, Reserovir, Dist. Nanded, Maharashtra. *J. Aqua. Biol.* Vol.21(1): 80 - 85.
18. Kurhade Sudhakar (2010): Status and Diversity of avifauna in Jaikwadi reservoirs, Maharashtra. *J. Aqua. Biol.* Vol.25(1): 32-40.

19. N. S., Sekercioglu J., Barlow and Robinson S. K. (2011) : Conservation of Tropical Birds. Wiley-Blackwell, UK, pp. 1-300. 11 12.
20. Narwade Sujit and Fartade M.M. (2011): Birds of Osmanabad district of Maharashtra, India. Journal of Threatened Taxa. Vol.3(2):1567-1576.
21. Natarajan Mariappan, B.K. Ahamed Kalfan, Srinivasagam Krishnakumar (2013): Assessment of Bird Population in Different Habitats of Agricultural Ecosystem. JSRES, Vol. 1(11): 306-316.
22. Olechnowski B. F. (2009): An examination of songbird avian diversity, abundance trends, and community composition in two endangered temperate ecosystems: Neal Smith National Wildlife Refuge Iowa State University.
23. Pande S., P. Deshpande and N. Sant (2011): Birds of Maharashtra. Pub. Ela Foundation, Pune, India, 330.
24. Pawar R.H., G.P Patil., G.T. Kedar and S.M. Yeole (2005): Diversity of avifauna in and around Yedshi lake, Mangrulpir taluka, washim District, Maharashtra, India. Biodiversity of Lonar creator, Anamaya Publishers, New Delhi, India. PP.106-113.
25. Pimpalshende A.K. and S.R. Sitre (2020): Bird Diversity of Satara Bhosale and Satara Tukum Lakes of Pombhurna Tehsil. *Int. Res.J.of Science and Engineering, Special Issue*
26. Rapoport E. H. (1993) : The process of plant colonization in small settlements and large cities. In: Mac Donnell, M.J. and Pickett, S. (Eds), Humans as components of ecosystems. *Springer-Verlag, New York*, 190-207,
27. Sekercioglu C.H, Primack R.B. and J Wormworth (2012) : The effects of climate change on tropical birds. *Biological Conservation*, 148: 1-18.
28. Shelke A. D. (2019) : Bird Diversity in and around the Hatale Dam, Taluka Chalisgaon, District of Jalgaon, Maharashtra.
29. Sonobe K. and S.Usui(eds.), (1993) : A field guide to the Waterbirds of Asia. Wildbird Society of Japan, Tokyo.
30. Tesfahunegn W., T. Fekensa. and G. Mulualem (2016): Avifauna Diversity in Kafa Biosphere Reserve: Knowledge and Perception of Villagers in Southwest Ethiopia. *Ecology and Evolutionary Biology*, 1(2):7 – 13.
31. Tuljapurkar V.B., V.R. Bhagwat And G.A. Jathar (2013): The Birds of Sangli District, Maharashtra, India. *J. of the Bombay Natural History Society* 110(3) pp-172-186.
32. Varkey J., A. Pandirkar ., B., Fernandes., K. Pathak., P. Khadye and P. Ghadigaonkar (2015): Threats to the existing diversity of avifauna of Gogte salt plant, Mumbai. Proceedings of the UGC Sponsored National seminar on Wetlands: Present Status ,Ecology and Conservation, India 12th August 2015, 1-8.
33. Wadatkar J.S. and R. Kasambe (2002): Checklist of Birds from Pohara-Malkhed reserve forest, Dist. Amravati, Maharashtra. *Zoos. Print Journal*. Vol.17(66): 807-811.
34. Wanjari P.D. (2012): Avifaunal diversity of Nagpur City, MS, India. *Bionano Frontier*, 5(2-I): 124-126.
35. Woodcock M. (1980) : Collins Handguide to the Birds of Indian subcontinent. 2nd Edn. Collins, London.
36. Yardi, D., S.S. Patil, and R.G Auti., (2004): Diversity of Avian Fauna from Salim Ali Lake of Aurangabad. Paper presented in 21st meet of birds lovers of Maharashtra held at Nanded on 3rd, 4th April – 2004