Recent Research in Science and Technology 2012, 4(7): 27-34
ISSN: 2076-5061
Available Online: http://recent-science.com/

Avifaunal diversity in Gulbarga region, north Karnatak

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Abstract
The study involves of bird fauna in Gulbarga region within radius of about 100km which include, Gulbarga University campus, Gulbarga city, Chandrampalli forest areas and Surpur- Bonal reservoir. The study area (Gulbarga) lies between17 04' -77 42' longitude and 16 12' -17 46' north latitude and is placed 45meters above the mean sea level. Gulbarga has a climate that is almost typical of south Indian pennisula with semi-arid conditions. The temperature between 14ºC, – 45ºC; in winter to in summer and the average rainfall being 702mm. The forest area of the District is 275 sq. miles, occupying about 4% of the geographical area. The forests are primarily deciduous at North Eastern Zone, with reasonably dense tree growth. Chincholi taluk itself represts 50% of the forest and possess teak, rosewood trees. The objective of the study included evaluation of species composition, relative abundance and distribution of avifauna of the chosen region. Line and point transect technique method were used for the survey purpose. A total of 115 species of birds belonging to 16 orders and 41 families were recorded. The Species consisting 85 resident, 27 winter and summer migrants were identified. Among the birds recorded in this study, 47 species were insectivorus, 11 omnivorus, 20 piscivorous, 8 carnivorus, 17 frugivorus, and 13 grainivorus.

Keywords: Avifauna, diversity, Gulbarga region, north Karnataka.

INTRODUCTION

Diversity of avifauna is one of the most important ecological indicators to evaluate the quality of habitats. Avifaunal diversity has been decreasing due to the destruction of natural habitat and human activities. Most of the birds are useful to mankind. Birds play a useful role in the control of insect of pests of agricultural crops, as predators of rodents, as scavengers, as seed dispensers and as pollinating agents, Birds thus form an important component in natural ecosystem. Protection and maintance of avifaunal diversity is important in maintaning species diversity of plants and animals. Therefore birds are reared not only for preserving ecological balance but also for products of economic importance and as down feathers. (Simeone *et al* 2002).

Birds are often common denizens of the ecosystems and they have been considered as an indicator species of inhabited areas (Blair, 1999). Studies have shown that depressed abundance of various bird species in most human inhabited parts of the world today is of concern as cities are growing rapidly both in area and in population (Emlen, 1974; Donaldson et al., 2007). Population of birds is a very sensitive indicator of degree of pollution in both terrestrial and aquatic ecosystem (Gaston, 1975; Hardy et al. 1987). The estimation of local densities of avifauna helps to understand the abundance of various species of other organisms (Turner, 2003). One of the major priorities in conserving animals is monitoring their populations to find methods for their long term survival (Caughley, 1982).

There are approximately 9,990 bird species on our planet, distributed in 29 orders, 195 families, and 2,113 genera. The order *Passeriformes* include 58% of all extant bird species and among the non-passerines, *the Apodiformes* is the most diverse order, totaling roughly 443 species, which is about 4% of the total of world bird species. The most representative passerine family in species numbers is *Tyrannidae*, with around 410 *Psittacidae,* represented by the macaws, parrots, lories, and lorikeets, has the greater species number, with around 374 species. The genus *Nectarinia* (some sunbirds) shows the greater bird species richness in the world with 78 species.

On account of their varied anatomical and ecological adaptations, birds have a worldwide distribution. The most distinctive zoological region for avifauna is the Neotropical region, with around one third of Earth's species, including a great number of endemics species (e.g. toucans, manakins, hummingbirds, rheas, among others). Birds are also diversified and abundant in other tropical areas of Ethopian, Australian and Oriental Zoological regions.

India being a megadiversity centre, harbours 1,200 species of birds which amounts to 13% of the bird species of the world (9,600 species) (Ali & Ripely, 1987). These include (Ali 1941), (Ali 1968-74, 1983), (Alfred *et al*., 2001), (Grewal *et al*., 2002 and Pfister 2004). However, with the new classification coming in to force, the number of species may well be 1300 (Javed and Kaul 2000). Urban biodiversity has received very little attention from conservation biologist as compared to natural and protected ecosystem (Jules 1997, Vandermeer 1997). (Patvarthan *et al.* 2000) have identified educational and defense premises that occupy less than 5% of the total urban area and are the hotspot for the urban biodiversity. Study of the avifauna in the educational premises of the country (Trirumurthi and Balaji, 1997, Palot and Pramod 2000, Ramitha and Vijayalaxmi 2001, Nazneen *et al.* 2001, Nayan *et al*. 2005) have been completed. Recently with the increased consciousness for

Received: May 10, 2012; Revised: June 20, 2012; Accepted: July 25, 2012.

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biodiversity census and monitoring, many new species were added to the list. As far as avian diversity of India is concerned, many workers have done a lot work on this regard. While many common species are spread over large areas of the Indian subcontinent others may be limited to a region. Since the subcontinent has a dense population, the birds which adapt themselves to human habitat flourish well. The present study is focused not only on diversity of birds, but also to find out their occurrence status and to create awareness for their conservation. Avifaunal diversity of the region under study has not been documented. The chosen region of Gulbarga consists of diverse habitats, that include, semi- arid region, reverine region, wet- land like region and an area with natural water reservoir. The aim of the study is to prepare a base- line information on avifaunal diversity of this region, except a preliminary survey done on Gulbarga University bird fauna (blog, ref), there is little information available on the avifaunal composition.

Study area

Source: mapsofindia.com

Fig 1. Map of the study area

The study regions include three sub-regions; Gulbarga, Chincholi and Surpur. Gulbarga district is located on the North-Eastern part of Karnataka. Geographically it lies between 17 04' -77 42' longitude and 16 12' -17 46' latitude and placed 45meters above the mean sea level. Gulbarga possesses a typical climate of South Indian pennisula with semi-arid conditions, with temperature between 14ºC,-45ºC in winter to in summer and the average rainfall being 702mm. This area falls under the 'maiden zone as described by (David et al 1974) and typically has an undulating countour, thus making scope for depression and catcment area. Thereby many natural ponds occur; River Krishna runs on Southern side of the district and becomes natural boundary between Raichur and Gulbarga. River Bhima running on the western boundary in between two Bijapur and Gulbarga becomes natural boundary in between two districts. The river also receives many streams and river viz., Bori, Amerja and Kagna etc.

The forest area of the District is 267.20 sq. miles, occupying the 4% of the geographical area. The forests are mainly deciduous at North Eastern Zone, with fairly dense tree growth. Chincholi taluk (80 km distance from Gulbarga) itself represts 50% (77 25' 48' E and Latitude of 17 28' 12'' N.) of the forest and possess teak, rosewood and nallamadri tress.

Surpur (108 km distance from Gulbarga) with a latitude of 16.52 (16° 31' 0 N) and a longitude of 76.75 (76° 45' 0 E). The Bonal reservoir is the largest bird sanctuary in Karnataka after Rangantittu bird sanctuary near Mysore. The reservoir is situated about 108kms south of Gulbarga and covers area of 40.96 Sq. miles. The reservoir was built in 17th century by surpur King Raja Pam Naik, and later Captain Meadows Taylor a Captain in British rule increased the capacity of tank from 4ft to 12ft depth. The Bonal reservoir is established primarily on Bonal Village. The reservoir was under the control of irrigation department, Government of Karnataka, Gulbarga Division till 1998. It is now an ornithologist's paradise.

MATERIALS AND METHODS

The study area was surveyed for recording of avifauna diversity by applying line transect method, (Sale and Berkmuller 1988), and point transect method (Verner 1985). A preliminary survey was conducted in all three regions from Aug 1. 2007 to Sep 30. 2007. Keeping in view the large size of the study area were adopted for studying the avifauna of in three regions Gulbarga (University campus, jagat tank, public gardens), Chandrampalli (aninoli, Chincholi), and Surpur (Bonal reservoir) were adopted for the survey. Various natural ecosystems/habitats like forests, grasslands, streams, and human settlements etc., spread over different areas of Gulbarga, Chincholi and Surpur regions were selected for the present studies. The physical features of the study area were assessed using ground survey. The study was conducted at monthly intervals from Oct 2007 to May 2010. The other most important aspect kept in consideration was to make the observation during the activity of birds. Since the peak activity in most birds lasts for 1 or 2 hours after sunrise or before sunset, so monitoring of transects was done either in early morning or late evening hours as used by Thakur [Thakur, M.L. 2008). Besides visits were also made during different hours of the day. Photography was done by making use of Sony DH-7 (8.1 mp with x15 optical zoom lenses) camera. For identification and field-diagnosis of birds, colored plates of (Ali and Ripley 1968-74), (Ali 1996), (Grimmett *et al*., 1988) and (Grewal *et al*., 2002) were used.

Feeding guilds were classified as per direct observations and available literatures (Ali and Ripley 1987). Birds were identified using field guide books of (Ali and Ripley 1987) and (Grimett *et al*., 2000). The common and scientific names of the birds given in the checklist followed the Birds of the World, recommended English Names (Gill *et al*., 2006). The Common - Rare, Resident- Migratory Status of the birds are classified as per (Saikia P. K & M. K. Saikia, 2000).C – Common species, r - Rare, R - Residents, species found in the study area throughout the year; WM – Winter Migrants, species found in the study area only during the winter and SM - Summer Migrants, species visiting the area during the summer seasons.

Breeding birds nest were also observed in this study area and subsequently this information was used to assess the status of bird species that are resident to the area. The following formula was used for determining percentage of occurrence of Families (Basavarajappa, 2006).

$$\text{Percentage Occurrence} = \frac{\text{No of Species of each family}}{\text{Total no of Different species seen}} \times 100$$

RESULTS AND DISCUSSION

Contrary to the several belief the diversity of avifauna in Gulbarga and surrounding is good. The study reveals the occurrence of 115 species of birds belonging to 16 orders of 41 families (Table 2). (Table1 a) details the relative percentage of total bird species belonging to different families. Most of the families represented by one or two species (relative percentage of species 0-2, 19 families; 2-4 15 families; 4-6, 5 families), while the maximum relative percentage is from two families, *Corvidae* and *Musciapidae* (14 and 6 respectively). This is perhaps the first documented report on the diversity of the bird species in this region.

In the present study, 84 resident and 22 winter and 9summer migrants were recorded (fig 2 a). Birds sighted more than 73% Common (C); winter and summer migrants were about 19% and 20% respectively (fig 2 b). Based on the food/foraging, from the present data it is apparent that the avifauna of these regions is dominated by insectivorous (47 species), fallowed by piscivorous, carnivorus, grainivorous, frugivorous and omnivorous birds (20, 8, 13, 17 and 11 species with respectively (fig 3)). Most of the family contained 0-2 species. Maximum percent occurrence was found in the Families: *Corvidae* and *Muscicapidae* (8.695), than *Columbidae* (5.217), *Phsianidae* (3.478) and *Anatidae* (1.739), respectively (Table-1 b).

Table1 a. Relative percentage of number of species in various families of birds in the study area

Relative percentage of species			
0-2	**2-4**	**4-6**	**6 and Above**
Podicipitidae	Phsianidae	Rallidae	Ardeidae
Phalacrocoracidae	Scolopacidae	Charadriidae	Accipitridae
Ciconidae	Cuculidae	Columbidae	Corvidae
Threskiornithidae	Alaudidae	Passeridae	Muscicapidae
Anatide	Sturnidae		
Otidae	Ploceidae		
Rostratulidae			
Psittacidae			
Laridae			
Centropodidae			
Strigidae			
Apodidae			
Cerylidae			
Alcendinidae			
Meropidae			
Dacelonidae			
Coraciidae			
Upupidae			
Bucerotidae			
Capitonidae			
Hirundinidae			
Daniidae			
Picidae			
Irenidae			
Pycnonotidae			
Sylviidae			
Paridae Nectarinidae			

Table-1 b. Percentage occurrence in avifauna represented in families

SL.NO.	FAMILIES	PERCENT OCCURRENCE
1	Podicipedidae	0.86
2	Phalacroccoracidae	0.86
3	Ardeidae	6.08
4	Ciconiidae	1.73
5	Threskiomithidae	0.86
6	Anatidae	1.73
7	Accipitridae	6.95
8	Phasianidae	3.47
9	Rallidae	4.34
10	Otidiae	0.86
11	Charadriidae	4.34
12	Rostratulidae	0.86
13	Solopacidae	3.47
14	Laridae	0.86
15	Columbidae	5.21
16	Psittacidae	0.86
17	Cuculidae	2.60
18	Centropodidae	0.86
19	Strigidae	0.86
20	Apodidae	0.86
21	Cerylidae	0.86
22	Alcedinidae	0.86
23	Dacelonidae	0.86

24	Meropidae	1.73
25	Coraciidae	0.86
26	Upupidae	0.86
27	Bucerotidae	0.86
28	Capitonidae	1.73
29	Picidae	0.86
30	Alaudidae	2.60
31	Hirundinidae	0.86
32	Daniidae	1.73
33	Corvidae	8.69
34	Sturnidae	3.47
35	Irenidae	1.73
36	Pycnontidae	0.86
37	Muscicapidae	8.69
38	Sylviidae	1.73
39	Paridae	1.73
40	Passeridae	4.34
41	Nectariniidae	1.73
42	Ploceidae	3.47

Table 2. A systematic list of birds with their status and food habitat in all three regions during the study period.

SCIENTIFIC NAME	COMMON NAME	S	F
Podicipedidae			
Tachybaptus ruficoliis	Little Grebe	R	P
Phalacrocoracidae			
Phalacrocorax niger	Little Cormarant	WM	P
Ardeidae			
Ardea purpurea	Purple Heron	WM	P
Ardea cinerea	Grey Heron	WM	P
Nycticorax nycticorax	Night Heron	R	P
Ardeola grayii	Pond Heron	R	P
Bubulcus ibis	Cattle Egret	WM	P
Egreta intermedia	Median or Small Egret	WM	P
Egretta garzeeta	Little Egret	R	P
Ciconiidae			
Ciconia episcopus	White-necked stork	WM	P
Mycteria leucocephala	Painted stork	WM	P
Threskiomithidae			
Threskiornis aethiopica	White Ibis	R	P
Anatidae			
Anas acuta	Pintail	WM	P
Anas poecilohyncha	Spotbill	WM	P
Accipitridae			
Aviceds jerdoni	Brown Lizard Hawk	R	C
Milvus migrans	Common Pariah Kite	R	C
Haliastur indus	Brahminy Kite	R	C
Accipiter badius	Shikra	R	C
Circaetus gallicus	Short-Toed Eagle	R	C
Circus macrourus	Pale Harrier	SM	C
Cirus melanoleucos	Pied Harrier	SM	C
Auila vindhiana	Tawny Eagle	R	C
Phasianidae			
Francolinus pondicerianusb	Grey Partridge	R	O
Gallus sonnneratii	Grey Junglefowl	R	F, 1
Gallus gallus	Red Junglefowl	R	F, 1
Pavo cristatus	Common peafowl	R	O
Rallidae			
Amaurornis akool	Brown Crake	R	I, G
Amaurornis phoenicurus	Water Hen	R	I, G
Gallicrex cinera	Water Cook	R	I, G
Porphyrio porphyrio	Purple Moorhen	R	O
Fulica atra	Coot	R	O
Otididae			
Choriotis nigriceps	Great Indian Bustard	WM	G,I
Charadriidae			
Himantopus himantopus	Black-winged stilt	R	I
Vanellus indicus	Red-wattled lapwing	R	I
Vanellus malabaricus	Yellow-wattled lapwing	R	I
Pluvialis squatarola	Grey Plover	WM	I
Glareola lactea	Small Pratincole	R	I
Rostratulidae			

Rostratula bengalensis	Painted Snipe	R	G, I
Solopacidae			
Tringa nebularia	Greenshank	WM	I
Tringa glareola	Spotted sandpiper	WM	I
Calidris temminckii	Temmminck's Stint	WM	I
Calidris alba	Sanderling	WM	P
Laridae			
Stema hirundo	Common Tern	WM	P
Columbidae			
Treron phoenicoptera	Common Green Pigeon	R	G, F
Columba livia	Blue Rock Pigeon	R	G, F
Streptopelia decaocto	Ring Dove	R	G, F
Streptopelia orientalis	Rufous Turtle Dove	R	G, F
Streptopelia tranquebarica	Red Turtle Dove	R	G, F
Streptopelia chinensis	Spotted dove	R	G, F
Psittacidae			
Psittacula krameri	Rose Ringed Parakeet	R	F
Cuculidae			
Clamator jacobinums	Pied Crested Cuckoo	SM	F, I
Eudynamys scolopaea	Koel	R	F, I
Rhopodytes viridirostris	Small Greenbilled Malkoha	R	F, 1
Centropodidae			
Centropus sinensis	Greater Coucal	R	I
Strigidae			
Athene brama	Spotted owlet	R	C
Apodidae			
Apus affinis	House swift	R	I
Cerylidae			
Ceryle rudis	Pied kingfisher	R	P
Alcedinidae			
Alcedo atthis	Blue-Eared kingfisher	WM	P
Dacelonidae			
Halcyon smyrnensis	White-Breasted kingfisher	R	P
Meropidae			
Merops superciliosus	Bluecheeked Bee-Eater	R	I
Merops orientalis	Small Green Bee-Eater	R	I
Coraciidae			
Coracias benghalensis	Indian Roller	R	I
Upupidae			
Upupa epops	Hoopoe	R	I
Bucerotidae			
Tockus birostris	Common Grey Hornbill	R	I
Capitonidae			
Megalaima haemacephala	Coppersmith Barbet	R	F
Megalaima zeylanica	Large Green Barbet	R	F
Picidae			
Dinopium benghalense	Lesser Goldenbacked woodpecker	R	F
Alaudidae			
Eremopterix grisea	Blackbelled Finch-Lark	R	I
Ammomanes	Rufstailed Finch-Lark	R	I
Calandrella raytal	Sand Lark	R	I
Hirundinidae			
Hirundo rustica	Swallow	R	I
Daniidae			
Lanius vittatus	Baybacked Shrike	R	I
Lanius cristatus	Brown Shrike	R	I
Corvidae			
Oriolus oriolus	Golden oriole	SM	O
Dicrurus paradiseus	Black Drongo	R	C
Dendrocitta vagabunda	Tree Pie	R	O
Corvus splendens	House Crow	R	O
Corvus macrorhynchos	Jungle crow	R	O
Pericrocotus cinnsmomeus	Small Minivit	R	I
Coracina melanoptera	Blackheaded Cucko-shrike	SM	I
Tephrodorins pondicerianus	Common Wood Shrike	R	I
Aegithina tiphia	Common iora	R	I
Aegithina nigrolutea	Marshall'S Iora	R	I
Sturnidae			
Sturnus pagodarum	Brahminy Myna	R	O
Acridotheres tristis	Indian Myna	R	O
Sturnus roseus	Rosy starling	SM	C

Sturnus contra	Pied myna	R	O
Frenidae			
Chloropis cochinchinesis	Goldmanted Chloropsis	R	I
Irena puella	Fairy bluebird	R	F
Pycnonotidae			
Pycnonotus cafer	Red-vented Bulbul	R	F
Muscicapidae			
Alcippe poioicephala	Quaker Babbler	R	I
Turdoides malcolmi	Large Grey Babbler	R	I
Turdoides striatus	Jungle Babbler	R	I
Muscicapa latirostris	Brown Flycatcher	R	I
Muscicapa parva	Redbreasted Flycatcher	SM	I
Muscicapa thalassina	Verditer Flycatcher	R	I
Copsychus saularis	Oriental Magpie Robin	R	I
Saxicoloides fulicata	Indian Robin	R	I
Phoenicurus ochruros	Black Redstar	SM	I
Zoothera citrina	Orangeheaded Ground Thrush	R	I
Sylviidae			
Orthotomus sutorius	Common Tailorbird	R	I
Acrocephalus dumetorum	Blyth's Reed Warbler	SM	I
Paridae			
Parus major	Grey Tit	R	I
Parus nuchalis	Whitewinged Black Tit	R	I
Passeridae			
Motacilla flava	Yellow Wagtail	WM	I
Motacilla citreola	Yellowheaded Wagtail	WM	I
Motacilla cinerea	Grey Wagtail	WM	I
Motacilla alba	White Wagtail	WM	I
Motacilla maderaspatensis	Large Pied Wagtail	WM	I
Nectariniidae			
Nectarinia zeylonica	PurpleRumped Sunbird	R	F, G, I
Nectarinia asiatica	Purple Sunbird	R	F, G, I
Ploceidae			
Passer domesticus	House Sparrow	R	G, I
Ploceus philippinus	Baya Weaver Bird	R	G
Lonchura punctulata	Spotted Munia	R	G
Lonchura malabarica	Whitethroated Muina	R	G

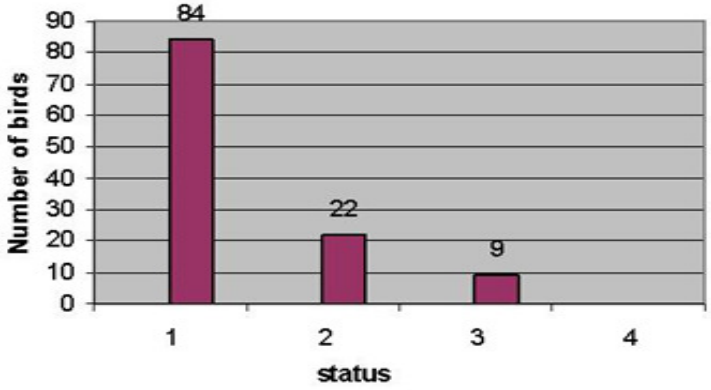

Fig 2 a. Numbers of Resident, winter and summer migrant bird species in the study area.

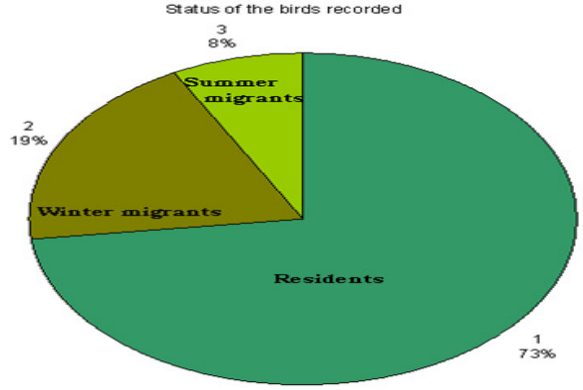

Fig 2 b. Percentage of Resident, winter and summer migrant bird species as in the study area.

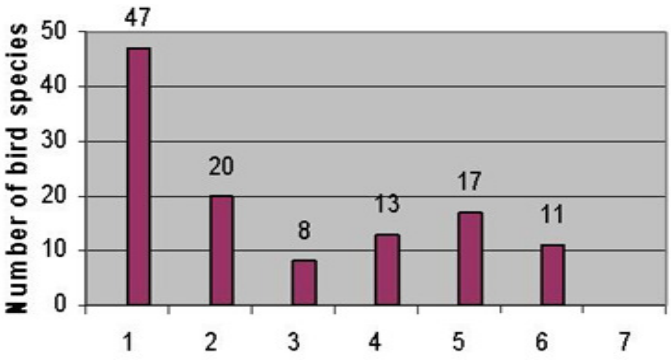

Fig 3. Distribution of birds according to their feeding habits in the study area.

Our study area includes thick forest, public gardens, and reservoirs. Bonal reserviour and Chincholi includes thick forest and has less human interference (the high diversity of frugivorous and insectivorous birds reveals the quality of the forest habitat) than Gulbarga city (University campus, Public gardens). Human activities like, construction and noise due to vehicles and peoples are creating threat to the avifauna (Gulbarga city). Anthropogenic activities may be the reason for depressed species diversity in urban locations. A good number of bird species are still prevailing on these three regions. Of the study unfortunately, these regions are getting invaded by commercial activity due to expanding city limits. Expanding cities lead to the distribution of habitats and nesting locations of these species (Gulbarga University campus). Decades before this area was covered by the forest but most of land has been turned into commercial areas and the people cut down the trees and cleared forest. Thus, many species of birds either migrated to other places or gradually declined their population as nesting sites are destroyed. To save avifauna reforestation restoration of habitats is necessary to create the local avifauna lakes, parks and plantation besides human habitation may be needed to facilitate the foraging, sheltering and breeding for birds. Plantation of fruit trees within residential area can attract many frugivorous and insectivorous birds to live their. It is well known that birds are friends of human as they destroy lot of harmful insects and mosquitoes from the environment (Jaman *et al.* 1999). Therefore, a conservation plan should be under taken by the government to save the urban species of birds and their sustainable population.

Among the avifauna the most common one in Asia are common crow, house sparrow, myna and egrets. These are found to be more commensal as they always try to live near human settlements and keep control of pests. Among them the house sparrows originated in the meditaranian area was introduced to all parts of the globe by the European traders as means to control insects and is now established as cosmopolitan species. But sparrows are declining in Europe and some Asian countries due to habitat destruction. Hence these are placed under red data book in England in 2003. They are also declining and become rare in Indian cities. However found they are still in good numbers in villages. It is interesting to note that the sparrows and starlings, mynas have attained pest status in USA and are not given any legal protection in the USA (Sruti).

Unlike the mega cities, Gulbarga region of north Karnataka is not yet urbanizing with alarming speed. Town/city planner need to pay attentions to preserve the richness of avifauna of this region. Bird species not only add aesthetic value to our life but also help in agriculture and in maintaining a health ecological balance.

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