

Diversity of Avifauna in Urban areas of Chikmagalur and Shimoga Districts

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Abstract : The present investigation was conducted to examine the avifaunal diversity in the human settlement and urbanized areas of the two cities, Shimoga and Chikmagalur, which have considerable extent of areas under forest lying in the Western Ghats of India. The data gathered from the study provides comprehensive information of the urban avifaunal diversity using point count and line transects methods. A total of 150 bird species belonging to 16 orders and 55 families were recorded during the study period. Among these 83.6% are resident birds and 13.33% are migratory birds. Passerine Carnivorous birds were found to be dominating in the area and the highest number of individuals was documented in the month of April followed by March owing to varied seasonal agricultural practices and other favourable conditions for breeding, nesting and foraging. The present study has produced a reliable bird inventory regarding the abundance, status, feeding preference, trend of population and vernacular name.

IndexTerms - Avifauna; Diversity; Urban bio-diversity; Western Ghats; Point Count Method; Transect Method.

I. INTRODUCTION

Urban areas cover about 2.7% of the world surface (Center for International Earth Science Information Network 2004) and are inhabited by human population by the process of Urbanization which has lead to favourable conditions for only humans. However, it can simultaneously lead to a host of environmental problems, including the loss of biodiversity (Grimm et al. 2008). Avifaunal studies are significant for monitoring of an ecosystem health. Assessing the avifaunal diversity for longer terms provide a baseline data for further assessment of the factors resulting in the fluctuations of avifaunal population and their decline due to habitat loss or degradation (Muhammad and Mohamed 2011). Aves are considered as an integral part of biotic community of an ecosystem. Birds respond quickly to the changes of its habitat. Thus birds are excellent indicators of health of an ecosystem. Birds and their diversity constitute a major part of the natural environment and is a good environmental indicator revealing the state of an ecosystem. Birds also act as dispersal agents in transferring nutrients and spores from place to place during their migration. As far as avian diversity of Karnataka is concerned, many work have been done on this regard. While many common species are spread over large areas of the Karnataka, others may be limited to a region. Since the Indian subcontinent has a dense population, the birds which adapt themselves to human habitat flourish well (Manjunath and Joshi, 2012). The avian habitat is roughly divided into forest, scrub and wetlands, although many species require a mixed type of habitat (Mohan Ramachandra 2013). In Karnataka most of the work is being concentrated on survey, distribution, diversity and status of avifauna in different bio regions of the selected districts. However, no significant work has been made in the urban bio-diversity regarding the diversity, distribution pattern, abundance, population trends, feeding behavior and present status of avifauna. In view of this, the present investigating was made to evaluate the species composition of birds in the said districts.

II. RESEARCH METHODOLOGY

2.1 STUDY AREA

Shimoga is located at almost central part of Karnataka and it lies between 13°21' to 14° 8'N and 75 °5' to 75° 45' E. Shimoga borders Davangere district in the north, Chikmagalur district in the south and south west, Dakshina Kannada and Udupi districts in the west. The district has a population of 17.53 Lakhs (2011 Census) and is divided into two divisions and 7 taluks. The Sagar Sub-Division covers the Sagar, Soraba, Shikaripur and Hosanagar Taluks, whereas the Shimoga Sub-Division covers the Shimoga, Bhadravathi and Thirthahalli Taluks. The district is spread over an area of 8477 Sq.Kms with a forest area of 2.27 lakhs hectares. The total forest area coming under the Shimoga as per working plan 2001 is 67551.44 hectares of which 26388.52 hectares are State forests and 35843.36 hectares are minor forests. The forest consists of about 13,000 hectares of evergreen and semi-evergreen forests about 23,000 hectares of closed deciduous forests about 12,500 hectares of plantations and about 19,000 hectares of degraded and open forest lands in the division. Of the total area of the district, 214.23 hectares is the net sown area (Sahyadri conservation series 2013).

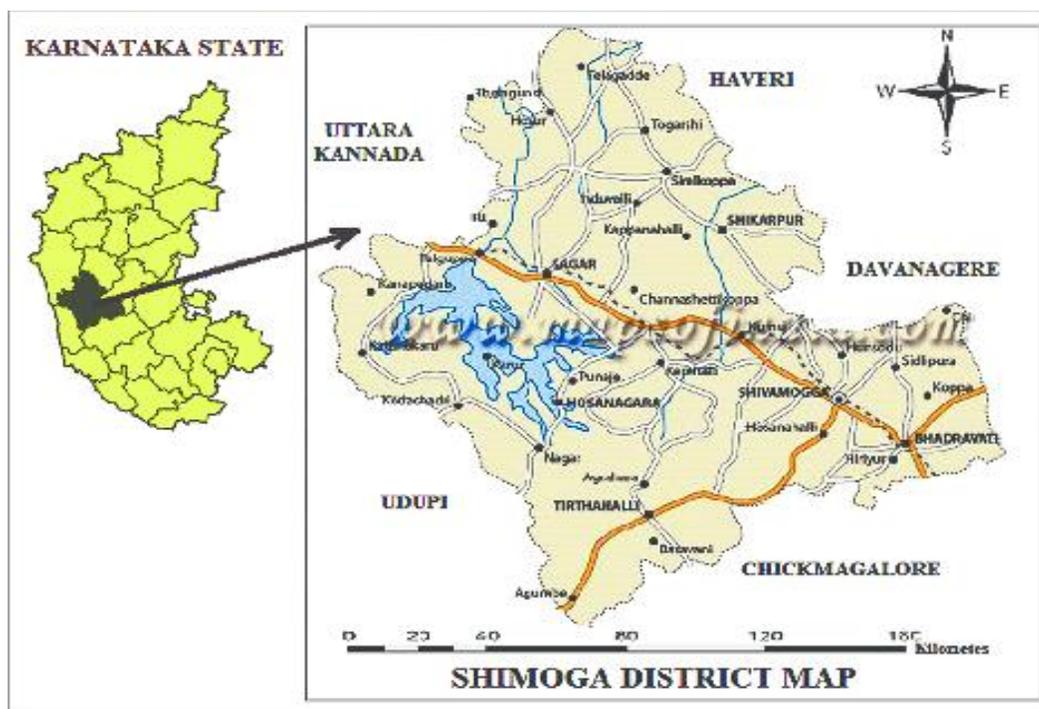


Fig 1: MAP SHOWING MAJOR CITIES AND TOWNS OF SHIMOGA

Chikmagalur is a city municipal council in the district of Chikmagalur. The district is divided into seven taluks (Fig-2). The area of Chickmagalur district falls in Krishna riparian basin. Chikmagalur District occupies an area of approximately 7201 square kilometres and is surrounded by the Chandra Dronha hills and dense forests. The district is between $12^{\circ} 54' 42''$ and $13^{\circ} 53' 53''$ north latitude and between $75^{\circ} 04' 46''$ and $76^{\circ} 21' 50''$ east longitude. 30% of the district (2108.62 km²) is covered with forests. Chikmagalur borders Shimoga district to the North, Davanagere district to the north-east, Chitradurga and Tumkur to the East, Hassan district to the south, Dakshina-Kannada to the southwest and Udupi district to the south-west. Chikmagalur has forest area of 3.49 lakhs Ha.



Fig 2: MAP SHOWING MAJOR CITIES AND TOWNS OF CHIKMAGALUR

In the present study, different landscapes with considerable bird activities were selected after surveying and random sampling of the urban area. The selected places were monitored throughout the year for locating the avifauna. The bird population was recorded using the belt transect method (Cunningham et al. 2006). Transect walks involved an observer recording the data on the sightings of bird species, with respect to perpendicular distance from the line and total number of species. Observations which are lying within a maximum of 50m of either side of the transect line were checklisted. The study was carried out at periodically during 2015-2016 and the checklist was regularly updated. About 4-5 transect line each measuring approximately a length of 300m were plotted in each site. The transect lines were walked at a slow pace and observations were

made at each transect line for about 45-60 minutes. Birding was done in the early hour's (morning 6.30 to 10.00AM) and in the evening (From 16.00 to 18.30PM) when there is maximum bird activity (Cunningham et al. 2006; Simons et al. 2006). Point count method was adopted for the places where transect walk was not possible. The point count method which was employed had a fixed radius of 30m. About 45-60 minutes was spent at each point in the count site. A questionnaire was prepared to gather information from the local inhabitants. All the observed birds in the site were recorded in a standard field data sheet.

Birds were sighted using a 10X50 wide angle Celestron binocular and the birds were photographed using Canon 60d and 600d cameras using different lens ((i) 18-135mm (ii) 55-250mm & (iii) Tamron 150-600mm telescopic lens). The identification of the birds was confirmed by scientific literature on birds. Names of known birds whose calls were clearly audible were also listed. Calls of unknown and non-sighted birds were recorded using Sony recorder and identified later by consulting of bird experts and by making the use of internet and android applications called 'Bird Sounds'. Birds which couldn't be identified on spot were either photographed and later identified using field guides, namely (i) Common birds of Indian sub-continent by Ananda Banerjee and (ii) The book of Indian sub-continent by Dr. Salim Ali.

The birds were categorized according to their respective status as Residents (Re), Migratory (M), Resident migratory or Local Migratory (ReM), Winter Migratory (WM), and according to its abundance as Very Common (VC), Common (C), Rare (R), Very Rare (VR) and the trends of population was determined by analyzing the regularly updated checklist of two years. The bird species were further catalogued (Table 1).



Table 1: In this study, the following check list of the birds has been made which includes trends of population of every species as per the observations and discussions made with the experts, villagers, forest officials and tribes of the respected regions.

SL NO	ORDER	FAMILY	COMMON NAME	SCIENTIFIC NAME	REGIONAL NAME	OCCURRENCE	MIGRATORY STATUS	FOOD	STATUS	TREND OF POPULATION
1	Anseriformes	Anatidae	Fulvous whistling Duck	<i>Dendrocygn abiclor</i>	Kandhu shillebaathu koli	C	ReM	O	LC	Decreasing
			Lesser whistling Duck	<i>Dendrocygna javanica</i>	Shillebaathu koli	C	Re	O	LC	Decreasing
			Spot-billed Duck	<i>Anas poecilorhyncha</i>	Charle baathukoli	VC	Re	H	LC	Decreasing
2	Columbiformes	Columbidae	Laughing Dove	<i>Spilopelia senegalensis</i>	Kandu beleva	C	Re	H	LC	Stable
			Spotted Dove	<i>Spilopelia chinensis</i>	Horasalu Hakki	C	Re	H	LC	Increasing
			Rock Dove	<i>Columba livia</i>	Paarivaala	VC	Re	H	LC	Decreasing
3	Gallariformes	Phasianidae	Indian Peafowl	<i>Pavo cristatus</i>	Navilu	UC	Re	O	LC	Stable
			Common Quail	<i>Coturnix coturnix</i>	Batera	UC	Re	O	LC	Stable
			Red Spurfowl	<i>Galloperdix spadicea*</i>	Chittukoli	UC	Re	O	LC	Stable
			Grey Partridge	<i>Francolinus pondicerianus</i>	Boodu Koujuga	UC	Re	O	LC	Stable
			Black breasted Quail	<i>Coturnix coromandelica</i>	Kappu batera	C	Re	O	LC	Stable
			Rock bush Quail	<i>Perdicula argoondah*</i>	Podheburli	UC	Re	H	LC	Decreasing
			Painted bush Quail	<i>Perdicula erythrorhyncha*</i>	Bannada podheburli	UC	Re	H	LC	Decreasing
			Grey jungle Fowl	<i>Gallus sonneratti</i>	Boodhi kaadukoli	UC	Re	O	LC	Decreasing
			Red jungle Fowl	<i>Gallus gallus</i>	Kaadukoli	C	Re	O	LC	Decreasing
4	Cuculiformes	Cuculidae	Greater Coucal	<i>Centropus sinensis</i>	Kembootha	VC	Re	Cr	LC	Stable
			Lesser Coucal	<i>Centropus bengalensis</i>	Kembootha	C	Re	Cr	LC	Stable
			Pied Cuckoo	<i>Clamator jacobinus</i>	Jaathaka pakshi	C	M	O	LC	Stable
			Indian Cuckoo	<i>Cuculus micropterus</i>	-	R	M	Cr	LC	Stable

	rnes		Asian Koel	<i>Eudynamys scolopaceus</i>	Kogile	C	Re	O	LC	Stable
			Fork tailed drongo	<i>Surniculus lugubris</i>	Inchara	C	Re	O	LC	Stable
5	Gruiformes	Rallidae	Ruddy-breasted Crake	<i>Zapornia fusca</i>	Kemneergoli	UC	Re	O	LC	Unknown
			Brown Crake	<i>Zapornia akool</i>	-	UC	Re	O	LC	Unknown
			White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Hundukoli	UC	Re	O	LC	Stable
			Purple Moorhen	<i>Porphyrio porphyria</i>	Neeli naamagoli	UC	Re	O	LC	Stable
			Indian Moorhen	<i>Gallinula chloropus</i>	Kappu naamagoli	C	Re	O	LC	Stable
			Common coot	<i>Fulica atra</i>	Naamada koli	C	M	H	LC	Decreasing
6	Pelecaniformes	Ciconiidae	Painted Stork	<i>Mycteria leucocephala</i>	Daasa kokkare	C	M	P	NT	Decreasing
			Openbill Stork	<i>Anastomus soscitans</i>	Baaykalaka kokkare	C	Re	P	LC	Unknown
			White-necked Stork	<i>Ciconia episcopus</i>	Bili kutthige kokkare	C	Re	P	LC	Decreasing
		Pelicanidae	Spot-billed Pelican	<i>Pelecanus philippensis</i>	JoligeKokka/Heccharle	C	Re	P	NT	Decreasing
		Ardeidae	Eurasian Bittern	<i>Botaurus stellaris</i>	Guppi	UC	Re	Cr	LC	Decreasing
			Yellow Bittern	<i>Ixobrychus sinensis</i>	Haladibaka	UC	Re	Cr	LC	Decreasing
			Little Green Bittern	<i>Ixobrychus minutus</i>	Hasiru guppi	UC	Re	Cr	LC	Decreasing
			Black Bittern	<i>Ixobrychus flavicollis</i>	Kari guppi	UC	Re	Cr	LC	Decreasing
			Indian Pond Heron	<i>Ardeolagravii</i>	Kolada baka	C	Re	Cr	LC	Stable
			Striated Heron	<i>Butorides striata</i>	Patti Kolada baka	C	Re	Cr	LC	Decreasing
			Cattle Egret	<i>Bubulcus ibis</i>	Govalli	C	Re	Cr	LC	Increasing
			Great Egret	<i>Ardea alba</i>	Doddabellakki	C	Re	Cr	LC	Stable
			Intermediate Egret	<i>Ardeaintermedia</i>	Bellakki	C	Re	Cr	LC	Stable
Little egret	<i>Egretta garzetta</i>		Sannabellakki	C	Re	Cr	LC	Increasing		
Grey Heron	<i>Ardeacinerea</i>	Boodhu kokkare	C	Re	Cr	LC	Decreasing			

			Purple Heron	<i>Ardeapurpurea</i>	Kanneeli baka	C	Re	Cr	LC	Decreasing
		Phalacrocoracidae	Little darterant	<i>Microcarboniger</i>	Putta neerkaage	C	Re	P	LC	Stable
			Great Cormorant	<i>Phalacrocoraxfuscicicillis</i>	Bili kutthige neerkaage	UC	M	P	LC	Stable
		Anhingidae	Oriental Darter	<i>Anhinga melanogaster</i>	Haavakki	UC	Re	P	NT	Decreasing
		Threskiornithidae	Oriental white Ibis	<i>Threskiornismelan ocephalus</i>	Bilikembaralu	UC	Re	Cr	NT	Decreasing
			Black Ibis	<i>Psuedibis pappilosa</i>	Kari kembaralu	UC	Re	Cr	NT	Decreasing
7	Charadriiformes	Burhinidae	Eurasian Thick-knee	<i>Burhinus oediconemus</i>	Gorava	UC	Re	Cr	LC	Decreasing
		Charadriidae	Yellow-wattled Lapwing	<i>Vanellusmalabari cus</i>	Halladhi tittibha	C	Re	Cr	LC	Stable
			Red-wattled Lapwing	<i>Vanellus indicus</i>	Kemputittibha	C	Re	Cr	LC	Unknown
8	Accipitiformes	Accipitridae	Indian Spotted Eagle	<i>Clanga hastate</i>	Dodda garuda	VC	M	Cr	VU	Decreasing
			Black Eagle	<i>Ictinaetus malaiensis</i>	Kappu garuda	UC	Re	Cr	LC	Decreasing
			Booted Hawk Eagle	<i>Hieraaetus pennatus</i>	-	C	WM	Cr	LC	Decreasing
			Black Kite	<i>Milvus migrans</i>	Haddu	VC	Re	Cr	LC	Decreasing
			Brahminy Kite	<i>Haliastur indus</i>	Bili Garuda	C	Re	Cr	LC	Decreasing
			Oriental Honey Buzzard	<i>Pernis ptilorhynchus</i>	Jenu Giduga	UC	Re	O	LC	Stable
			Shikra	<i>Accipiter badius</i>	-	C	Re	Cr	LC	Stable
9	Falconiformes	Falconidae	Common Kestrel	<i>Falco tinnunculus</i>	-	UC	M	Cr	LC	Stable
10	Strigiformes	Strigidae	Brown Hawk Owl	<i>Ninoxscutulata</i>	Meenu gumma	UC	Re	Cr	NT	Decreasing
			Brown Fish Owl	<i>Ketupa zeylonensis</i>	Goobe	UC	Re	I/F	LC	Decreasing
			Spotted owlet	<i>Athene brama</i>	Haalakki	C	Re	Cr	LC	Stable
11	Bucerotiformes	Bucerotidae	Great Hornbill	<i>Buceros bicornis</i>	Dodda mangatte	UC	Re	O	NT	Decreasing
			Indian Grey Hornbill	<i>Acycero sbirostris</i>	Boodhu mangatte	C	Re	O	LC	Stable
		Upupidae	Common hoopoe	<i>Upupa epops</i>	Chandra mukuta	C	Re	I	LC	Decreasing
12		Picidae	Common Flame-	<i>Dinopium</i>	Suvarna bennina	C	Re	I	LC	Stable

	Piciformes		backed Woodpecker	<i>javanense</i>	marakutuka					
			Rufous Woodpecker	<i>Micropternus brachyurus</i>	Kandu marakutuka	UC	Re	I	LC	Decreasing
			Speckled Piculet	<i>Picumus innominatus</i>	-	R	Re	I	LC	Decreasing
		Megalaimeidae	Coppersmith Barbet	<i>Megalaima cephala</i>	Kal gojualhakki	C	Re	O	LC	Stable
			Large Green Barbet	<i>Psilopogon zeylanicus</i>	Dodda Kutra	C	Re	O	LC	Stable
13	Coraciiformes	Meropidae	Green Bee-eater	<i>Merops orientalis</i>	Sanna kallipeera	C	Re	I	LC	Increasing
			Blue-tailed Bee-eater	<i>Merops philippinus</i>	Neelibaalada kallipeera	C	M	I	LC	Stable
		Alcedinidae	Oriental dwarf Kingfisher	<i>Ceyx erithaca</i>	Sanna kappu minchulli	UC	Re	Cr	LC	Decreasing
			Black-capped Kingfisher	<i>Halcyon pileata</i>	Kari mande minchulli	C	Re	Cr	LC	Decreasing
			White- Throated Kingfisher	<i>Halcyon smyrnensis</i>	Gaddhe minchulli	C	Re	Cr	LC	Increasing
			Stork-billed Kingfisher	<i>Pelargopsis capensis</i>	Hemminchulli	C	Re	Cr	LC	Decreasing
			Common Kingfisher	<i>Alcedo rudis</i>	Kiru Neelminchulli	C	Re	Cr	LC	Stable
			Pied Kingfisher	<i>Ceryle rudis</i>	Kappu minchulli	C	Re	Cr	LC	Unknown
		Coraciidae	Indian Roller	<i>Coracias benghalensis</i>	Neela kanta	C	Re	Cr	LC	Increasing
14	Psittaciformes	Psittaculidae	Rose-ringed Parakeet	<i>Psittacula krameri</i>	Gulabikoralinagili	VC	Re	Fr	LC	Increasing
			Alexandrine Parakeet	<i>Psittacula eupatria</i>	Raamagili	UC	Re	Fr	LC	Decreasing
			Vernal hanging Parrot	<i>Loriculus vernalis</i>	Chittugili	UC	Re	Fr	LC	Decreasing
15	Caprimulgiformes	Apodidae	House swift	<i>Apus nipalensis</i>	Sooru aakashagubbi	C	Re	I	LC	Increasing
16		Campephagidae	Scarlet Minivet	<i>Pericrocotus speciosus</i>	Gulaganji/chitrapakshi	C	Re	I	LC	Stable
			Ashy Minivet	<i>Pericrocotus divaricatus</i>	Boodhi chitrapakshi	C	Re	I	LC	Stable
		Oriolidae	Black-hooded Oriole	<i>Oriolus xanthornus</i>	Karimande	C	Re	O	LC	Decreasing

Passeriformes		Black-naped Oriole	<i>Oriolus chinensis</i>	-	C	Re	I/N /F	LC	Unknown
	Vangidae	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	Kaadukalinga	UC	Re	I	LC	Decreasing
		Indian Pitta	<i>Pitta brachyuran</i>	Navaranga	UC	Re	I	LC	Decreasing
	Alaudidae	Small Skylark	<i>Alauda gulgula</i>	-	UC	Re	O	LC	Decreasing
	Motacillidae	Pied Wagtail	<i>Motacilla alba</i>	Bili Sipale	C	M	I	LC	Stable
		Large Pied Wagtail	<i>Motacilla maderaspatensis</i>	Dodda Sipale	C	Re	I	LC	Stable
		Grey Wagtail	<i>Motacilla cinerea</i>	Boodhu sipale	C	M	I	LC	Stable
		Tree Pipit	<i>Anthus trivialis</i>	-	UC	M	O	LC	Decreasing
		Indian Pipit	<i>Anthus hodgsoni</i>	-	C	M	I	LC	Stable
	Pycnonotidae	Grey-headed Bulbul	<i>Pycnonotus priocephalus</i>	Boodu mande peekalaara	C	Re	I/F	LC	Decreasing
		Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	Kemmese Peekalaara	C	Re	I/F	LC	Decreasing
		Red-vented Bulbul	<i>Pycnonotus cafer</i>	Kempubaalada Peekalaara	C	Re	I/F	LC	Increasing
	Chloropseidae	Golden-fronted Leafbird	<i>Chloropsis aurifrons</i>	Yele hakki	C	Re	F/I/N	LC	Stable
		Blue-winged Leafbird	<i>Chloropsis cochinchinensis</i>	Yele Hakki	VR	Re	I	NT	Decreasing
	Laniidae	Brown Shrike	<i>Lanius cristatus</i>	Kandu Kalinga	C	M	I	LC	Decreasing
		Long-tailed Shrike	<i>Lanius schach</i>	Kandu bennina Kalinga	C	Re	Cr	LC	DD
	Muscicapidae	Blue-headed Rock Thrush	<i>Monticola cinclorhyncha</i>	Neelithaleya bande sillara	UC	Re	I	LC	Stable
		Indian Blue Robin/Chat	<i>Larvivora brunea</i>	Chittu madivaala	UC	Re	I/N	LC	Decreasing
		Indian Robin	<i>Saxicoloides fulicatus</i>	Madivaala	C	Re	I	LC	Decreasing
		Oriental Magpie Robin	<i>Copsychus saularis</i>	Madivaala	C	Re	I/N	LC	Stable
		Pied Bushchat	<i>Saxicola caprata</i>	Neelimande peepi	C	Re	I	LC	Stable
Monarchidae	Asian Brown Flycatcher	<i>Muscicapa dauurica</i>	Korala	UC	M	I	LC	Stable	
	White-bellied Blue	<i>Cyornis pallidipes</i>	-	UC	Re	I	LC	Decreasing	

		Flycatcher							
		Asian Paradise Flycatcher	<i>Terpsiphone paradise</i>	Baaladande Hakki	UC	Re	I	LC	Stable
	Rhipiduri dae	White-browed fantail	<i>Rhipidura aureola</i>	-	UC	Re	I	LC	Decreasing
	Pellorneid ae	Spotted Babbler	<i>Pellornem ruficeps</i>	Chukke chikka	C	Re	I	LC	Stable
	Timaliida e	Dark-Fronted Babbler	<i>Rhopocochla atriceps</i>	Chikka	UC	Re	I	LC	Decreasing
		Rufous Bellied Babbler	<i>Turdoides subrufus</i>	Kempu geejagarlu	UC	Re	I	LC	Decreasing
	Leitrichid ae	Jungle Babbler	<i>Turdoides striata</i>	Kaadu geejagarlu	C	Re	O	LC	Stable
		Common Babbler	<i>Argya caudate</i>	Geejagarlu	C	Re	O	LC	Stable
	Sittidae	Velvet-fronted Nuthatch	<i>Sitta frontalis</i>	Makmal Netthi	C	Re	I	LC	Decreasing
	Turdidae	Indian Blackbird	<i>Turdus simillimus</i>	Kari goravanka	C	Re	I/F	LC	Stable
	Hirundididae	Common Swallow	<i>Hirundo rustica</i>	Ambara gubbi	C	Re	I	LC	Decreasing
	Cisticolid ae	Ashy Prinia	<i>Prinia socialis</i>	Tuvvi Hakki	C	Re	I	LC	Stable
		Common Tailorbird	<i>Orthotomus sutorius</i>	Simpiga/Hasuru Tuvvi	C	Re	I/N	LC	Stable
	Aegithini dae	Common Iora	<i>Aegithina tiphia</i>	Madhurakanta	C	Re	I	LC	Unknown
	Dicrurida e	Greater Racket-tailed Drongo	<i>Dicrurus paradiseus</i>	Brunga raja	UC	Re	O	LC	Decreasing
		White-bellied Drongo	<i>Dicrurus caerulescens</i>	Bili hotteya kaajana	UC	Re	O	LC	Decreasing
		Ashy Drongo	<i>Dicrurus leucophaeus</i>	Bhoodhi bhujanga	C	Re	O	LC	Unknown
		Black Drongo	<i>Dicrurus macrocercus</i>	Kari bhujanga	VC	Re	O	LC	Stable
	Corvidae	Rufous Treepie	<i>Dendrocitta vagabunda</i>	Nookarebaala	C	Re	O	LC	Stable
		House crow	<i>Corvus splendens</i>	Oorukaage	VC	Re	O	LC	Stable
		Jungle Crow	<i>Corvus macrorhynchos</i>	Kaadukaage	VC	Re	O	LC	Stable
	Ploceidae	Baya Weaver	<i>Ploceus philippinus</i>	Neygaara pakshi	C	Re	H/I	LC	Stable
	Dicaeidae	Flowerpecker	<i>Dicaeum concolor</i>	Badanike pakshi	C	Re	H	LC	Decreasing

		Thick-billed Flowerpecker	<i>Dicaeum agile</i>	Dappa kokkina Badanike	C	Re	O	LC	Stable
	Nectarinii dae	Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	Soorakki	C	Re	I/N	LC	Stable
		Purple Sunbird	<i>Cinnyris asiaticus</i>	Nerale soorakki	C	Re	I/N	LC	Stable
		Crimson-backed Sunbird	<i>Leptocoma minima</i>	Sanna Soorakki	C	Re*	I/N	LC	Unknown
		Loten's Sunbird	<i>Cinnyris lotenius</i>	Soorakki	C	Re	I/N	LC	Unknown
		Little Spiderhunter	<i>Araethya longirostris</i>	Baale gubbi	C	Re	I/N	LC	Stable
		Estrilididae	Scaly-breasted Munia	<i>Lonchura punctulata</i>	Chukke muniya	C	Re	O	LC
	Black-throated Munia		<i>Lonchura kelaarti</i>	Kari muniya	C	Re	O	LC	Alike
	Black-headed Munia		<i>Lonchura Malacca</i>	Kappu thaleyamuniya	C	Re	H	LC	Alike
	White-rumped Munia		<i>Lonchura striata</i>	Biliprushtada raatavala	C	Re	H	LC	Alike
	Zosteropidae	Oriental White Eye	<i>Zosterops palpebrosus</i>	Biligannina chitagubbi	C	Re	I/N /F	LC	Decreasing
	Sturnidae	Indian Myna	<i>Acridotheres tristis</i>	Goravanka	C	Re	I/F	LC	Increasing
		Jungle Myna	<i>Acridotheres fuscus</i>	Kaadu goravaka	C	Re	I/F	LC	Decreasing
	Acrocephalidae	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	-	UC	M	I	LC	Increasing
		Clamorous Warbler	<i>Acrocephalus stentoreus</i>	Tuvvi	C	WM	I	LC	Stable
		Greenish Leaf Warbler	<i>Phylloscopus trochiloides</i>	Kiru tuvvi	UC	M	I	LC	Increasing
		Large-billed Reed Warbler	<i>Acrocephalus orinus</i>	-	R	M	I	DD	Decreasing
	Passeridae	House sparrow	<i>Passer domesticus</i>	Gubbacchi	C	Re	O	LC	Decreasing
		Chestnut-shouldered Petronia	<i>Gymnoris xanthocollis</i>	Arashina kutthige Gubbacchi	C	Re	O	LC	Stable
	Artamidae	Ashy Woodswallow	<i>Artamus fuscus</i>	-	UC	Re	I	LC	Stable

ReM-Resident Migratory, Re-Resident, M-Migratory, WM=Winter Migratory O-Omnivores, H-Herbivores, I-Insectivores, Cr-Carnivores, Fr-Frugivores, P-Piscivores, N-Nectar, LC-Least Concerned, NT-Near Threatened, VU-Vulnerable, DD-Data Deficient*-Endemic to Region Abundance: VC-Very Common(>10 Sightings), C-Common(5-10 Sightings), UC-Uncommon(3-5 Sightings), R-Rare(<3 Sightings)

III. RESULTS AND DISCUSSION

Birds composite a crucial part in food chain thus it is necessary to have information about their diversity, distribution pattern, abundance, population trend, migratory status and conservation status. During the study period, a total of 150 birds belonging to 16 Orders and 55 Families have been identified. The present study reveals that the avifaunal diversity of the study area includes 130 resident birds (83.6%), 1 resident migratory, 2 winter migratory birds and 20 migratory birds (13.33%) (Fig 4). In the current study, the highest numbers of individuals of birds were documented in the month of April, followed by March, February, January, December and November respectively (Fig-3). The resident birds were observed throughout the year during the investigation while the migratory birds were observed in different seasons. The migratory birds showed specific requirement for their seasonal occurrence owing to their nutritional and breeding behavior. The fluctuation in the number of birds during the study period could be due to the varied agricultural practices which the farmers practice in different seasons and the bird also outnumbers due to the influence of unfavourable seasons. It is well established fact that, seasonal variations, local migration pattern, reproductive behavior, regional and global microclimatic events and erratic climatic might also influence the birds number in any habitat (Pittock, 2003 and Romano *et al.*, 2005) and species composition of an area or a community is interlinked to the available resources of the area, which includes physical structure of the habitat, food availability and biotic interactions (Terdalkar *et al.*, 2005). Thus the results of the present study reveals that the urban areas of Shimoga and Chikmagalur districts provides all the requirements for the survival of avifauna in different seasons and a detailed prolonged investigation is required in order to assess the factors influencing the fluctuation of avifauna in the study area.



Figure-3: Number of individuals documented in different months

Migratory Status of Birds

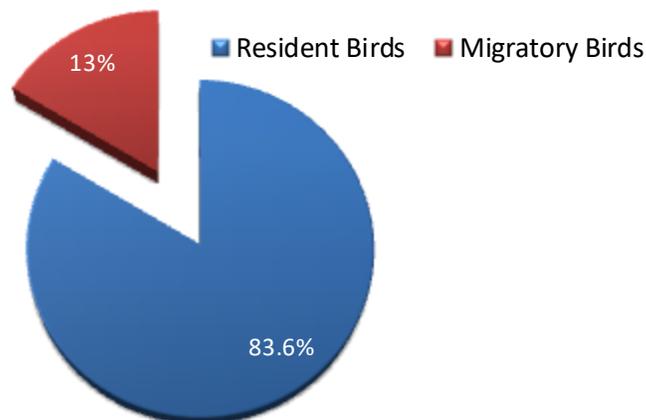


Figure-4: Graphical representation of migratory status of recorded birds

Of the 150 species of birds belonging to 16 orders and 55 families, order Passeriformes is found to be dominant with 30 families and 68 species (45.33%), followed by Pelicaniformes with 6 families and 21 species (14%), Coraciiformes with 3 families and 9 species (6%), Galliformes with 1 family and 9 species (6%), Acciptriformes with 1 family and 7 species (4.66%), Gruiformes with 1 family and 6 species (4%), Piciformes with 2 families and 5 species (3.3%), Cuculiformes with 1 family and 5 species (3.3%), Bucerotiformes with 2 families and 3 species (2%), Charadriiformes with 2 families and 3 species (2%), Psittaciformes with 1 family and 3 species (2%), Strigiformes with 1 family and 3 species (2%), Columbiformes with 1 family and 3 species (2%),

Anseriformes with 1 family and 3 species (2%), Falconiformes with 1 family and 1 species (0.6%) and Caprimulgiformes ranked last with a single species (0.6%) (Fig 3). Among the above mentioned species 91 were commonly found (60.6%), 46 were uncommon (30.6%), 9 were found very commonly (6%), 3 were rarely seen (2%) and 1 species was found very rarely (0.6%) (Fig 4).

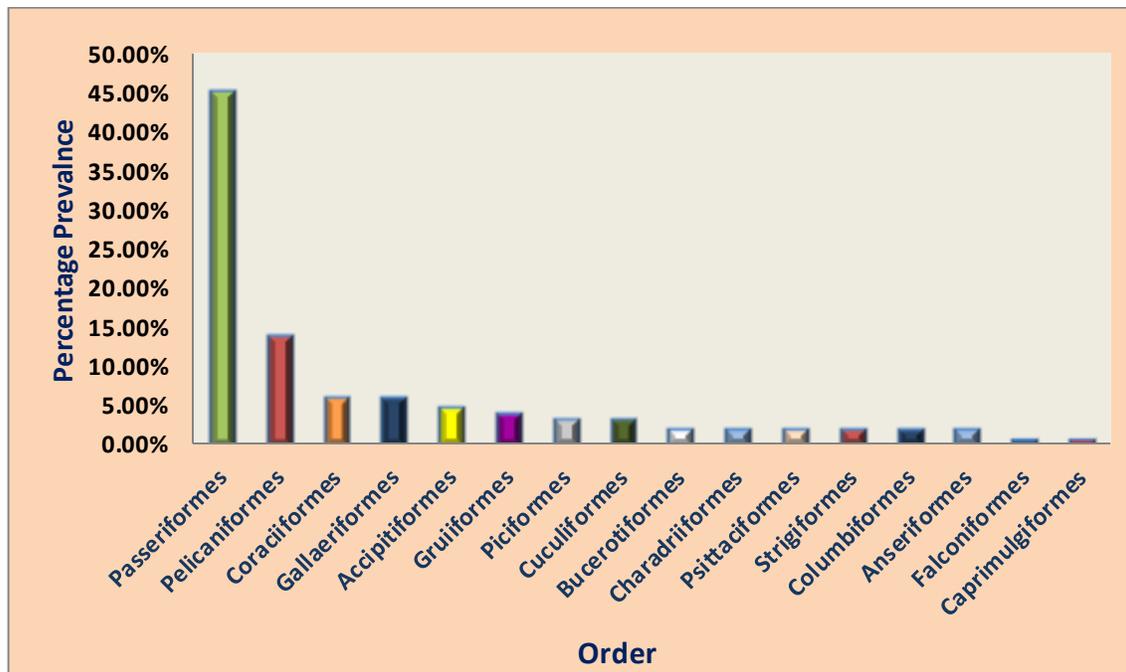


Figure-5: Percentage prevalence of respective orders

The pattern of nutritional behavior of the recorded birds have shown that, about 53.33% are carnivorous that feed on insects, reptiles, fishes, cocoons, small birds etc., 38% are Omnivorous feeding grains, seeds, weeds, Insects, Nectar, Amphibians etc., and only about 8.6% are Herbivorous that feeds on grains, nectar, plants, fruits, seeds etc.) respectively (Fig 4). Thus with respect to dietary pattern carnivorous species are dominating the study area since the rich feeding sites attract large number of avian community.

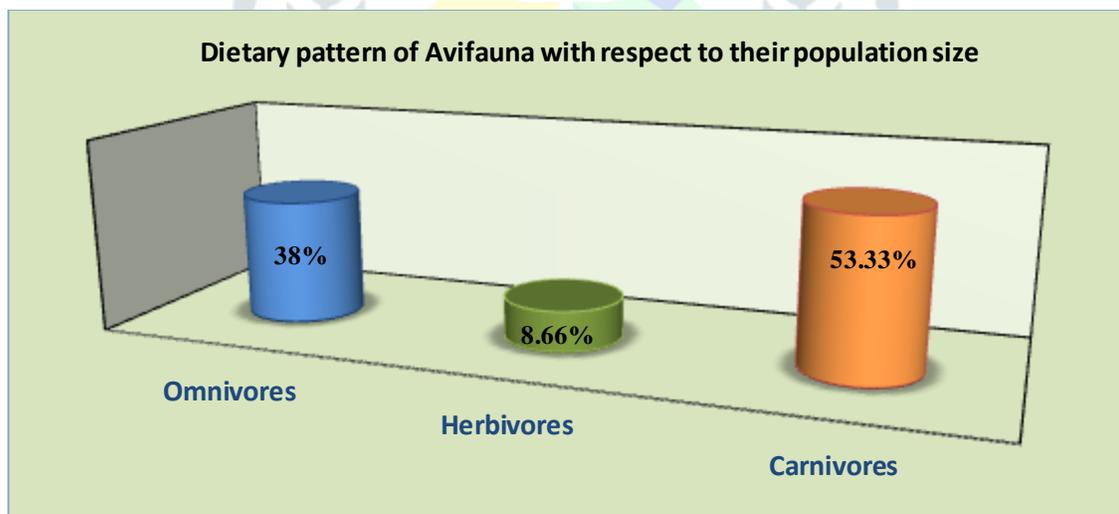


Figure-6: Graphical representation of nutritional pattern of documented birds

The present study produced a reliable estimate of birds through direct observations on line transects that were repeatedly walked for over a considerable period of time. The coverage region for the present study is almost uniform. The region is characterized by high habitat structural complexity and heterogeneity. It is a well established fact that anthropogenic activities are disturbing the distribution and diversity of bird species.

In the present study it is shown that seasonal change along with habitat alteration and ecologically suitable habitat for breeding, nesting and rhythmically availability of food may have enforced the assemblage of birds over time from natural habitats to urban areas. The abundant populations of the Common and Jungle Myna, Black and Fork Tailed Drongo, Jungle Babbler, Red-vented and Red Whisked Bulbul, Indian Grey Hornbills etc., shows an extensive urbanization and encroachment in the vicinity of the forest area.

The study furnishes the information related to the status of the avifauna of the region which can be used as a reference by the city/town municipalities and urban decision makers in development of botanical gardens and bird parks. Baseline data will come to be greatly valued when the survey of the birds is repeated in the future. Since an increase in human settlements will cause more

danger to avian species the status of avifauna is helpful in proper management that in turn prevents avifaunal species from becoming threatened or extinct. Thus, it is recommended that a more eco-friendly urbanization coupled with sustainable development is essential to curb any negative human interference in the areas that are having rich avian populations. Further research and appropriate conservation mechanisms and management with the ultimate conservation goal of changing urban environments into species rich and self sustainable ecosystem are essential in the study area.

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Urban Avifauna of Shimoga and Chikmagalur Districts



Gallus sonneratii (Grey Jungle Fowl)



Porphyrio porphyria (Purple Moorhen)



Columba livia (Rock Pigeon)



Centropus sinensis (Greater Coucal)



Argya affinis (Yellow-billed Babbler)



Vanellus indicus (Red-wattled Lapwing)

Urban Avifauna of Shimoga and Chikmagalur Districts



Cyornis pallidipes (White-bellied Blue Flycatcher)



Pycnonotus cafer (Red-vented Bulbul)



Cinnyris asiaticus (Purple Sunbird)



Saxicola caprata (Pied Bushchat)



Lanius schach (Long-tailed Shrike)



Halcyon smyrnensis (White-breasted Kingfisher)

Urban Avifauna of Shimoga and Chikmagalur Districts



Spilopelia senegalensis (Laughing Dove)



Saxicola caprata (Pied Bushchat (Female))



Accipiter badius (Shikra)



Ketupa zeylonensis (Brown Fish Owl)



Saxicola caprata (Pied bush chat (Male))



Lonchura punctulata (Scaly-breasted Munia)

Urban Avifauna of Shimoga and Chikmagalur Districts



Oriolus oriolus (Golden Oriole)



Columba livia (Rock Dove)



Spilopelia chinensis (Spotted Dove)



Pycnonotus jocosus (Red-whiskered Bulbul)



Apus nipalensis (House swift)



Merops orientalis (Green Bee-eater)

Urban Avifauna of Shimoga and Chikmagalur Districts



Ardeola grayii (Indian Pond Heron)



Dicrurus macrocercus (Cattle Egret)



Corvus macrorhynchos (Jungle Crow)



Upupa epops (Common hoopoe)



Anhinga melanogaster (Oriental Darter)



Argya striata (Jungle Babbler)