DIVERSITY OF AVIFAUNA OF KUKKARAHALLI LAKE AND MANASA GANGOTHRI UNIVERSITY CAMPUS: MYSORE CITY, KARNATAKA, INDIA

Suchitra G*
Department of Zoology, Maharani's Science College for Women, Mysore- 570 005

ABSTRACT
Avifauna encompasses a wide range of bird species, each with its unique characteristics, behaviors, and adaptions. The field study was conducted to examine the diversity of birds, status, occurrence and abundance of avifauna in Mysore city, Karnataka during March 2015 to July 2016. Sampling was done byline transect method and local visual count method, collected data from 2 study area were subjected to estimate diversity of species. A total 73 species under orders were recorded. Order Passeriformes was found to be most dominant withspecies followed by Apodiformes, Galliformes, Podicipediformes, Psittaciformes, Strigiformes, with 1 species respectively.

Keywords:
Avifaunal Diversity, Line transact method, Residential status,Mysore city.

INTRODUCTION

Birds are bipedal, warm-blooded feathered creatures (Ayyar, 1964). Known fortheir ecological economical, ethical, medicinal and scientific values (Ali S and Ripley 1996). They have a worldwide distribution, living in and around oceans,rivers, forest and mountains. They are the most noticeable group in the animal kingdom (Lameed ,2011). They inhabit all the ecosystem across the globe.There has been a wide range in size of birds that is from Bee humming 5cm to Ostrich 2.5m. Birds are some of the most prominent species of the Earth's biodiversity and being sensitive to environmental changes (main streaming).Birds are social animals that communicate with visual signs, calls and songs. They display social behaviors such as cooperative breeding and hunting, flocking and mobbing of predators (Lameed, 2011). Their behaviour patterns and reproductive ability have most often been used to examine the long term affects of habitat fragmentation. Hence, they are the good indicators of ecological status of any given ecosystem (Bilgrami, 1995). The ornithological information is utilized to show the impacts of natural changes on biodiversity, currently plentiful endeavors are being made in a few far-off regions (Hussainet al., 2011).They have been used to evaluate the environment throughout the history as 'bio monitors' and; the changes in their population (Biligrami, 1995). Birds detects changes in the environment which cannot be detected or observed by physical parameters. Birds are also good biological control. They consume insect such asmosquitoes, beetles and stem borers which are pests (Ezealor, 2001). Birds havebeneficial interactions with forest plants. The beneficial interactions include pollination and seed dispersal. Flowers of some plant species have been discovered to be visited by birds (Anderson *et al.,* 2006). Birds play a noteworthyfunction in ecosystem. Birds are an imperative component of biodiversity and their occurrence and distribution are an important phenomenon to understand theoverall picture of habitat (Chauhan *et al.,* 2008). Birds have a good system for spreading plant seeds that makes them agents of dispersal. They eat fruits and swallow the seeds of plants. When they dispose of their waste, the seeds are disposed along with it. Birds droppings (faeces) provide good fertility to the soilupon which they are dropped, giving the seeds very good conditions with whichto grow (Anderson *et al.,* 2006). Scavenger birds, such as the pied crow (Corus albus), contribute to biomass recycling and to some degree reduce levels of disposal wastes. Frugivorous birds play an important role in seed dispersal of fleshy fruit producing plants (Stevenson and Fanshawe, 2002). Birds are also important in plant pollination as demonstrated by sun-birds, which participate incrossbreeding of flowering plants, especially those with bird-pollination syndrome (Judd *et al.,* 2008). The ecosystem services are important for many communities, and to ensure that birds can fulfil these biological roles at an appropriate level for current and future generations, there is a pressing need to study the dynamics and socioeconomics of bird diversity outside protected areas,especially in urban areas (Gatesire *et al.,* 2014). Portraying and clarifying spatialexamples in species variety are essential

strides in moderating worldwide biodiversity (Lee *et al.*, 2004). As the quantity of bird species possessing different altitudinal belts or, life zones' (Ali S ,2002). Rely upon climatic changes joined by comparing changes in vegetation (Sekercioglu and Cagan Hakki 2006).

The present study was under taken to assess the species diversity, abundance, status and distribution of avifauna in different habitats within Mysore city, Karnataka, India.

MATERIALS AND METHDOLOGY

Study area

For the research study two places were selected in the Mysore city

I. Site- 1 (Kukkarahalli lake)

Coordinates: 12.3098° N ,76.6326° E

Kukkarahalli lake was built in 1864, to provide drinking water to Mysore city, and came under the custody of the university of Mysore city in 1960. The original catchment area of the lake was~4.5 sq km. And the lake is situated 3km from Mysore city. It is adjacent touniversity of Mysore and Kalamandir. The lake is large with an area of150 acers, receives both south-western and the north-east monsoons with an average rainfall 782mm. This lake drains a catchment area of more than 414 square kilometres (160 sq. mi) and the water body spreadover 62 hectares with the maximum depth 5m(16ft).

II. Site-2 (Manasa Gangotri campus)

Coordinates: 12.30210° N, 76.6500° E

The University of Mysore is a public state university in Mysore,Karnataka, India. The university was founded during the region of Krishnaraja Wodeyar IV, the Maharaja of Mysore. It opened on 27 July1916. The Manasa Gangotri campus is confined within the area of 739acres of picturesque land containing a sprawling Kukkarahalli lake surrounded by verdurous tress extending to an area of 261 acres, The campus has rich presence of flora which provide wide range of habitatsfor the birds. Also, some of areas within in the university is quite silentwhich indirectly promote the avian diversity.

Methods

The field study observations were conducted twice a month from March 2015 toJuly 2016 for a period of 5 months to record the avifauna diversity. Birds are sighted during their peak activity from 6:30 am to 8:30 am in the morning and 5:00 pm to 6:30 pm in the evening. For the interpretation of collected data the year was divided into three seasons (i) Spring- March, (ii) Summer- April and May, (iii) Early monsoon-June and July.

The study area was surveyed for recording avifauna diversity by applying line transect method, Local visual method.

The birds were identified using 10×50 DPS I Field 6.5° Olympus binoculars, Photography was done by making use of Cannon HD 30X Optimal Zoom Camera. The recorded birds were identified based on their morphological featuressuch as beak shape, colour, type of foot (e.g., webbed or non-webbed), colour ofshank, foot and feather colour with the help of field guide and various key books(Salim Ali,2002, Grimmet and Inskipp, 2007)

The check list of species was prepared following Salim Ali (2002) and (Grimmetand Inskipp, 2007)

Order	Family	Common names	Scientific names	Residential status	Abundance	Feeding Guild
Passeriformes	Oriolidae	Eurasion golden oriole	Oriolus oriolus	RM	C	OV
	Dicruidae	Black drango	Dicrurus macrocercus	R	VC	IV
	Pycnonotidae	Red-whiskeredbulbul	Pycnonotidae	R	VC	FV
		Red vented bulbul	Pycnonotuscafer	R	C	GV
		White-eared bulbul	Pycnonotidae leucotis	R	VC	GV
	Nectariniidae	Purple rumpedsunbird	Nectarinia zeylonica	R	VC	IV
		Loten's sunbird	Nectarinia lotenia	R	VC	IV
		Purple sunbird	Nectarinia astiatica	R	C	NV
		Small sunbird	Nectarinia minima	R	VC	NV
	Muscicapidae	Oriental magpie robin	Copsychus saularis	R	C	IV
		Pied bush chat	Saxicola caprata	R	C	IV
	Cisticolidae	Ashy prinia	Prinia socialis	R	C	IV
		Common tailor bird	Orthotomus sutorius	R	C	IV
	Tilmaliidae	Red capped babbler	Timalia pileate	R	C	IV
		Yellow-breastedbabbler	Macronous gularis	R	C	IV

	Motacillidae	Large pied wagtail	Motacilla maderaspatensis	R	VC	IV
	Corvidae	House crow	Corvus splendens	R	VC	OV
		Jungle crow	Corvus macrorhynchos	R	VC	OV
	Paridae	Great tit	Parus major	R	C	IV
		Pied tit	Parus nuchalis	R	C	IV
	Sturnidae	Commonmyna	Acridotherestristis	R	C	OV
		Jungle myna	Acridotheresfuscus	R	UC	OV
	Aegithinidae	Common Iora	Aegithinatiphia	R	UC	IV
	Leiothrichidae	Large greybabbler	Turdoides malcolmi	R	UC	GV
		Jungle babbler	Turdoidesstriatus	R	C	GV
	Passeridae	House sparrow	Passer domesticus	R	O	CV
Pelecaniformes	Ardeidae	Grey heron	Ardea cinerea	RM	O	CV
		Black- crowned night- heron	Nycticorax nycticorax	R	O	CV
		Large egret	Casmerodiusalbus	RM	UC	CV
		Indian pond-heron	Argeolagrayii	R	VC	CV
		Little egret	Egretta garzetta	R	C	CV
		Cattle egret	Bubulcusibis	RM	C	CV

		Median egret	Ardea intermedia	RM	O	CV
	Pelecanidae	Spot-billedpelican	Pelecanus philippensis	RM	UC	
	Threskiornithidae	Oriental whiteibis	Threskiornis melanocephalus	R	UC	OV
		Glossy ibis	Plegadis falcinellus	RM	O	PV
		Black ibis	Pseudibis papillosa	R	R	IV
Coraciformes	Meropidae	Blue-cheekedbee-eater	Merops persicus	RM	R	IV
		Blue-tailedbee-eater	Merops philippinus	RM	R	IV
	Alcedinidae	White- breasted kingfisher	Halcyon smyrnensis	R	VC	PV
		Small bluekingfisher	Alcedoatthis	RM	VC	IV
Colmbiformes	Columbidae	Spotted dove	Spilopelia chinensis	R	C	GV
		Blue rockpigeon	Columbalivia	R	C	GV
		Little browndove	Streptopelia senegalensis	R	C	OV
Galliformes	Phasianidae	Indian peafowl	Pavo cristatus	R	VC	OV
Cuculiformes	Cuculidae	Asiankoel (Female and Male)	Eudynamys scolopaceus	R	C	FV
		Greatercoucal	Centropus sinensis	R	C	IV
		Lesser coucal	Centropus bengalensis	R	C	IV

Charadriformes	Jacanidae	Bronze winged jacana	Metopidiusindicus	R	C	IV
	Charadridae	Red-wattledlapwing	Vanellus indicus	R	VC	IV
Accipitriformes	Accipitridae	Brahminy kite	Haliasturindus	R	C	CV
		Black kite	Milvus migrans	R	C	CV
		Shikra	Accipiterbadius	R	C	CV
		Long-leggedbuzard	Buteno rufinus	R	C	CV
Gruiformes	Rallidae	Commomcoot	Fulica atra	RM	C	IV
		Purple moorhen	Porphyrio porphrio	R	C	IV
		Commommoorhen	Gallinula chloropus	RM	O	IV
		White- breasted waterhen	Amaurornis phoenicurus	R	O	IV
Piciformes	Megalaimidae	Coppersmithbarbet	Megalaima haemacephala	R	UC	FV
	Picidae	Lesser golden-backed woodpecker	Dinopium benghalense	R	R	IV
		Commongolden-backed woodpecker	Dinopium javanense	R	R	IV
Suliformes	Phalacrocoracidae	Great cormorant	Phalacrocorax carbo	RM	O	PV
		Little cormorant	Microcarboniger	RM	O	PV

		Darter	Anhingidae	RM	O	PV
Psittaciformes	Psittaculidae	Rose-ringedparakeet	Psittacula krameri	R	VC	FV
Apodiformres	Apodidae	Asian palm-swift	Cypsiurus balasiensis	R	C	IV
Strigiformes	Strigidae	Spotted owlet	Athene brama	R	VC	CV
		Asian openbill stork	Anastomus oscitans	R	O	CV
Podicipediformes	Podicipedidae	Little grebe	Tachybaptus ruficollis	R	VC	

R- rare, C- common, VC- very common, O- omnivores, IV- Insectivores,PV piscivores,

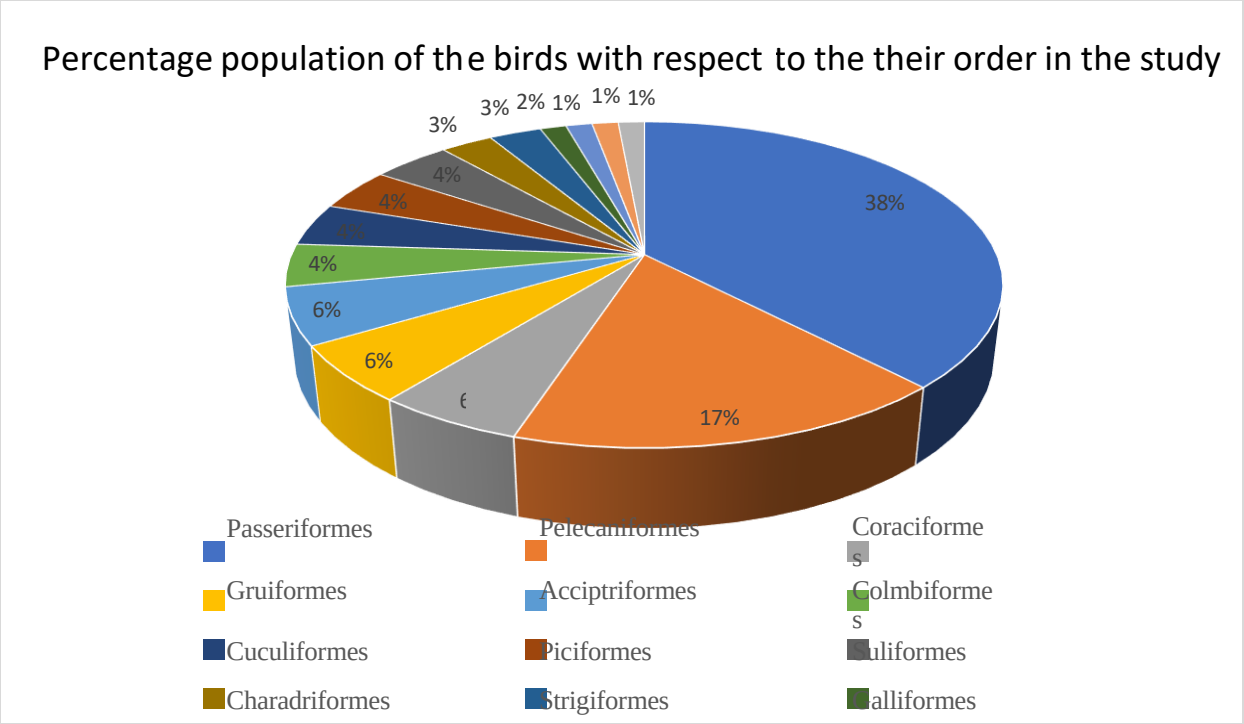

Figure 1: Representing occurrence of order with respect to belonging species ofbirds.

Result and Discussions

A total of 73 species of birds belonging to families were recorded from the two study areas of Mysore city. On the basis of the order wise species occurrence the order Passeriformes dominated with n=27 followed by the Pelecaniformes, Apodiformes, Galliformes, podicipediformes, Psittaciformes, Strigiformes with n=1 were represented from total collected species (Fig:1). In the present study itis noticed that order Passeriformes was found to be predominated from other 7 orders. Similar results of abundance were also reported by several ornithological studies from India.

Among the 2 study areas. Kukkarahalli lake is observed with more bird species,while Manasagangotri was found to be least. The abundance calculated variedamong the species recorded. Based on the percentage of relative abundance it was revealed that 4 species of birds were very common.

The seasonal distribution pattern showed two peaks of species richness, Shannon diversity, equitability, and evenness index, one in early winter and theother in summer. Depending on seasonality, many species breed in late winter,which contributes to more of nesting and less of roaming in late winter and hence low sighting was revealed. On the contrary, in the spring probably eggs hatch and birds can be seen roaming as they gather food for the new born. Newindividuals can also contribute to high richness and diversity of spring.

Flowering in the early winter assures food availability and it could also be an important cause for high species richness, while comparatively low vegetation thickness in spring and summer can also contribute to high species richness anddiversity mainly due to the fact that as there is more exposure, birds can be easily sighted. Low sighting of the birds in monsoon could be due to the less activity (Anand *et al*. 2007 The daylight is very poor; sometimes the entire areamay be occupied by clouds resulting into poor visibility in monsoon. Chilling winds worsen the wet conditions. These results into low species distribution andlow sightings in the study area (Anand *et al*. 2007). The species still remain in the study area are habitat specific ones, which can tolerate the hostile conditionsand some species become secretive to reside in the dense canopy and thus can not be sited in the transects. Most of the species encountered in transacts duringmonsoon breed in this season. These conditions also result into meager food availability. It is evident from the study, that fruigivorous and insectivorous birds (52%) constitute majority of the bird community in the study area.

Therefore, the food availability for these birds is extremely scanty during the monsoon season. This is another reason for their less sighting and low species richness and diversity. Subsequent seasons show better food availability due toincreased sunlight and temperature as well as reduction in rainfall. Insect population rises from October onwards and hence the birds start coming back. The species overlapping pattern starts getting restored. High α- and β-diversityduring spring and summer is attributed to the availability of diverse food.

Majority of the flora of study area shows flowering and fruiting during this period. The study revealed the presence of large number of nectarivorous birds (sun birds), though their number was large but the species are few in number. Asper the present study, mixed moist deciduous, and dry deciduous forests in the study area are best habitats for the birds as far as the number and diversity is concerned. As the most serious loss of the biodiversity value occurs in the transformation of original landscapes to croplands due to human interference (Pramod et al. 1997), evaluation of bird communities from various study sites from the Western Ghats is essential for planning “biodiversity-friendly” developmental activities.

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