



AVIFAUNA OF MANDHALA WATERSHED, SOLAN (HIMACHAL PRADESH), INDIA

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ABSTRACT

Studies on diversity and status of avifauna, carried out in Mandhala watershed area, during different seasons of the years 2004-2007 revealed the presence of 117 species spread over 92 genera, 43 families and 14 orders. Data on residential status revealed that Mandhala watershed supported 23 such species of birds which were purely resident and rest 94 were seasonal-local and long range migrants. Of these 94 migrants, 58 were seasonal-local migrants, 16 were winter visitors, 11 were summer visitors, 8 showed winter influx and 1 showed summer influx. Therefore, there were 90 such species of birds which stayed year round in the present study area. Analyses of data on relative abundance showed that 75 species of birds were very common, 33 were common, 6 were uncommon and rest 3 species were rare to the area. Elucidation of feeding habits of birds revealed that maximum number of species (48) were insectivorous and important agents of bio-control of insect pests of agriculture, horticulture and forests. It was further reported that Mandhala watershed supported 3 threatened species of birds viz., Egyptian Vulture, Indian White-backed Vulture and Red-headed Vulture.

KEY WORDS: Avifauna, Mandhala watershed, residential status, relative abundance, feeding habits.

INTRODUCTION

The Himalayan ecosystem is unique, very rich in natural resources and biological wealth mainly due to large differences in altitude and precipitation. Moreover, historical influx of fauna from adjacent biogeographical regions and subsequent speciation in relation to local environment has greatly enriched the animal resources of the Himalayan region therefore bird diversity in Himachal Pradesh is very rich and diversified. But, in recent years, the state has come under a strong threshold of development. Natural ecosystems have been over-exploited and even destroyed by the rapidly increasing human population, industries and a number of river valley projects. A number of endemic and restricted range species found in the region are facing threat to their existence (Mehta and Julka 2002; Thakur 2008).

Avifaunal studies were conducted in Mandhala watershed situated at 31° 03' N and 76° 40' E in Solan district of Himachal Pradesh. The watershed has an area of about 23.60 sq km. and altitude varies from 500 to 900 m a.s.l. The present study area flanks the industrial belt of Baddi-Barotiwala (main industrial areas of the State) and the mandhala stream flows through these industrial areas. The climate of area is sub-tropical, and the flora is dominated by *Acacia* spp., *Lantana camara*, *Eucalyptus* sp., *Butea* sp., *Lanaea coromandelica*, *Mangifera indica*, *Morus alba*, *Delbergia sissoo*, *Psidium gujawa*, *Carica papaya*, *Ipomea carnea* and *Parthenium* sp.

Avifaunal studies have been conducted in different parts of Himachal Pradesh by several people (Jones 1947 a & b, 1948; Whistler 1925, 1926 a, b & c; Wynter-Blyth 1951, 1952, 1953; Pandey 1989; Mahabal and Sharma 1992, 1993; Gaston *et al.* 1993; Narang and Singh 1995;

Mahabal 1996, 2000 a & b, 2005; Thakur *et al.* 2002, 2003, 2006, 2010 a; Santharam 2005; Sangha 2005; Mattu and Thakur 2006; Thakur 2008; Thakur and Mattu 2011), and a few studies have been conducted in different parts of Solan district (Tilak and Tyagi 1977; Mukherjee and Chandra 1984; Narang and Singh 1995; Sharma and Mahabal 1997; Thirumurthi and Banumathi 1998; Narang and Rana 1999; Thakur *et al.* 2010 b), whereas, the present study area of Mandhala watershed has not received the attention of the field workers. Therefore, studies were conducted on different aspects of avifauna like diversity, residential status, relative abundance and feeding habits in this important watershed area which would serve as a baseline data for the impact assessment of one of the main industrial centers of the State.

METHODOLOGY

Specific sampling strategies, based upon the principle of exploration of a portion of the individuals in the whole population were employed to study the avifauna of Mandhala watershed area. Thus, stratified random sampling technique (Snedecore and Cochran 1993) was followed for studying the birds of the area, which involved the division of the present study area of Mandhala watershed into different strata, based upon vegetation type and habitat. This technique not only allowed collection of the right type of scientific information but also saved time and yielded the avian data which was very much amenable for analysis for the better presentation of results (Daniels 1989; Javed 1996).

These studies were conducted during the different seasons of 2004-2007 in various habitat types like agriculture fields, forests, grasslands, streams, human habitations etc. The other most important aspect kept in consideration was

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 (2008). Birds were observed with aid of 10 x 50 super Zenith field binocular. Field identifications were carried out with the help of various field guides (Ali and Ripley 1983; Grimmett *et al.* 1999; Kazmierczak 2000). The nomenclature followed here is after Manakadan and Pittie (2001).

The data recorded in each survey from different habitat types of Mandhala watershed was kept separate and analysed for relative abundance on the basis of frequency of sightings (McKinnon and Philips 1993). Based upon these, different categories assigned were: Very Common (recorded in more than 45 % of data sheets), Common (between 25-45 % of data sheets), Uncommon (between 10-24 % of data sheets) and Rare (recorded once or twice). The relative frequency scale was fixed in such a way so as to include the migrant species sighted seasonally in good numbers (which visited the area for a brief period of time) to their respective category (Mattu and Thakur 2006; Thakur 2008).

Residential status of the birds has been worked out and different categories like resident, winter visitor, summer visitor etc., have been assigned strictly with reference to the study area on the basis of presence or absence method (Thakur *et al.* 2003, 2006; Thakur 2008). The birds that showed irregular trend of sighting and population fluctuations (nonseasonal) have been placed under resident with local movements (R/LM) category (Thakur 2008). Moreover, the feeding habits of the birds like insectivorous, graminivorous, frugivorous, etc., as shown in Ali and Ripley (1983) have been assigned to each species.

RESULTS AND DISCUSSION

Avifaunal studies revealed the presence of a total of 117 species of birds spread over 92 genera, 43 families and 14 orders from Mandhala watershed of Solan district. Passerine birds dominated the diversity with 62 species as compared to non-passerines (55 species) (Table 1).

Muscicapidae is the largest family of birds in India with 370 species (Manakadan and Pittie 2001). Present investigations also revealed that family Muscicapidae (22 spp.) dominated the avifauna, followed by Accipitridae (10 species), Cuculidae (6), Phasianidae, Columbidae and Sturnidae (5 each), and Psittacidae and Corvidae (4 each), whereas, Podicipedidae, Phalacrocoracidae, Falconidae, Rallidae, Scolopacidae, Recurvirostridae, Laridae, Strigidae, Meropidae, Coraciidae, Upupidae, Bucerotidae, Irenidae etc. (1 species each) were poorly represented in the area (Table 1). Recently, Mahabal (2005) also recorded Muscicapidae as the largest family of birds, comprising 105 species, from Himachal Pradesh. Similarly, many other investigators like Narang and Singh (1995), Mattu and Thakur (2006), Thakur *et al.* (2002, 2003, 2006, 2010 a & b) and Thakur and Mattu (2011) have also found Muscicapidae to be the largest family in different parts of Himachal Pradesh.

Analysis of data on residential status revealed that out of 117 species, 23 were resident while the remaining 94

showed seasonal-local or long-range migrations. Analysis based on presence/absence method and population fluctuations revealed that of the 94 seasonal-local and long-range migrants, 58 species, showed seasonal-local movements, 16 were winter visitors, 11 summer visitors, 8 showed winter influx, and 1 showed summer influx. Further analysis of residential status and relative abundance indicated that of 23 resident species, 11 were very common, 8 were common, and 2 each were uncommon and rare. Of the local migrants, 44 were very common, 12 were common and 1 each was uncommon and rare. Categorization of long-range migrants revealed that out of 16 winter visitors, 7 each were very common and common, and 2 were uncommon. Of the 11 summer visitors, 6 were very common and 5 were common. Moreover, of the 8 species, which showed winter influx, 7 were very common, and 1 was common. A single species which showed summer influx was uncommon. Therefore, the study revealed the presence of 75 very common, 33 common, 6 uncommon and 3 rare species of birds (Table 1; Fig. 1).

These studies are in compliance with the earlier works of Thakur *et al.* (2002, 2003, 2006, 2010 a), Mattu and Thakur (2006) and Thakur and Mattu (2011) who also reported the presence of different categories of birds like resident, summer visitors, winter visitors, very common, common, etc., from different biogeographical regions of Himachal Pradesh. Recently, Mahabal (2005) reported 447 species of birds comprising 35.5% residents, 15.7% winter visitors, 11.6% summer visitors, 10.4% altitudinal migrants and 26.8% birds of Himalayan ecosystem from Himachal Pradesh. Similarly, Thakur (2008) recorded 123 species of altitudinal migrant birds, 72 seasonal-local migrants, 61 winter visitors, 33 residents, 28 summer visitors, four winter influx and one summer influx from different biogeographical zones of Himachal Pradesh. In addition, Thakur *et al.* (2010 b) recorded the presence of 167 species spread over 121 genera, 51 families and 17 orders from adjacent Nalagarh valley of Himachal Pradesh. Further, 28 species of residents, 74 seasonal-local migrants, 39 winter visitors, 14 summer visitors, 12 species with winter influx and 1 species with summer influx were reported.

Therefore, the present explorations revealed that there were 90 such species of birds which stayed year round in the present study area of Mandhala watershed. The diversity increased to 106 species during winter months with the addition of 16 winter visitors. Moreover, number of bird species became 101 during summer season with the addition of 11 summer visitors (Table 1). This high number of migrants (94 seasonal-local and long range migrants) can be correlated with the spatial position of Mandhala watershed, which due to its location in the foothills, in addition to the long range migrants from North and Central Asia, attracts a large number of winter migrants from the Himalayas and summer (breeding) visitors from adjacent plains (Hunter 1989 and Gaston 1995). Moreover, the predominance of local migrants (58 species), residents (23 species), winter visitors (16 species) and summer visitors (11 species) in Mandhala watershed, situated in the Shiwalik zone of Himachal Pradesh can be explained with the earlier work of Mahabal (2005) who

elucidated that these categories of birds are predominantly observed in the lower zone of Himalaya and with increase in altitude there is a decrease in the number of resident and winter migrant birds.

Analysis of feeding habits showed that maximum number of species (48) were insectivorous, followed by graminivorous (16 species), frugivorous (15), omnivorous and aquatic animal eaters (12 each), carnivorous (8), scavengers (4) vegetable matter eaters and nectar eater (1 each) (Table 1; Fig. 2). Recently, Thakur *et al.* (2010 a) have reported the presence of about 49 % insectivorous species of birds from Arki hills of Solan district. Similarly, about 47 % (210 species) of birds in Himachal Pradesh

were recorded as insectivorous and important agents of bio-control of insect pests of agriculture, horticulture and forests (Mahabal 2005).

It has been found that there are 3 such species of birds in Mandhala watershed area, which have been placed under different threat categories. Of these, Indian White-backed Vulture and Redheaded Vulture have been placed under Critically Endangered category and Egyptian Vulture has been categorized as Endangered (IUCN 2007). It was further reported that Indian White-backed Vulture and Red-headed Vulture were rare in abundance and Egyptian Vulture was very common in the Mandhala area.

TABLE 1: Systematic list of avifauna recorded in Mandhala Watershed (Himachal Pradesh)

S.No.	Taxon	Res. Status	Rel. Abd.	Feeding Hb
Order: Podicipediformes				
Family: Podicipedidae				
1.	Little Grebe <i>Tachybaptus ruficollis</i> (Pallas)	R/LM	VC	AqA
Order: Pelecaniformes				
Family: Phalacrocoracidae				
2.	Little Cormorant <i>Phalacrocorax niger</i> (Vieillot)	R/LM	C	AqA
Order: Ciconiiformes				
Family: Ardiidae				
3.	Little Egret <i>Egretta garzetta</i> (Linnaeus)	R/LM	VC	AqA & I
4.	Cattle Egret <i>Bubulcus ibis</i> (Linnaeus)	R	C	AqA
5.	Indian Pond-Heron <i>Ardeola grayii</i> (Sykes)	R/LM	VC	AqA & I
Order: Falconiformes				
Family: Accipitridae				
6.	Black-shouldered Kite <i>Elanus caeruleus</i> (Desfontaines)	R/LM	VC	CR
7.	Black Kite <i>Milvus migrans</i> (Boddaert)	R	VC	OM
8.	Egyptian Vulture <i>Neophron percnopterus</i> (Linnaeus) * EN	R/LM	VC	SC
9.	Indian White-backed Vulture <i>Gyps bengalensis</i> (Gmelin) * CR	R	Ra	SC
10.	Himalayan Griffon <i>Gyps himalayensis</i> Hume	WV	UC	SC
11.	Red-headed Vulture <i>Sarcogyps calvus</i> (Scopoli) * CR	R	C	SC
12.	Short-toed Snake-Eagle <i>Circaetus gallicus</i> (Gmelin)	R	Ra	CR
13.	Crested Serpent-Eagle <i>Spilornis cheela</i> (Latham)	R/LM	C	CR
14.	Shikra <i>Accipiter badius</i> (Gmelin)	R/LM	VC	CR
15.	Eurasian Sparrowhawk <i>Accipiter nisus</i> (Linnaeus)	R	UC	CR
Family: Falconidae				
16.	Common Kestrel <i>Falco tinnunculus</i> Linnaeus	R/WV	VC	I
Order: Galliformes				
Family: Phasianidae				
17.	Black Francolin <i>Francolinus francolinus</i> (Linnaeus)	R	VC	VgM & I
18.	Grey Francolin	R	VC	GR

19.	<i>Francolinus pondicerianus</i> (Gmelin) Jungle Bush-Quail	R	C	GR
20.	<i>Perdicula asiatica</i> (Latham) Red Junglefowl	R	VC	GR
21.	<i>Gallus gallus</i> (Linnaeus) Indian Peafowl <i>Pavo cristatus</i> Linnaeus	R	VC	OM
	Order: Gruiformes Family: Rallidae			
22.	White-breasted Waterhen <i>Amaurornis phoenicurus</i> (Pennant)	R/LM	VC	OM
	Order: Charadriiformes Family: Charadriidae			
23.	Little Ringed Plover <i>Charadrius dubius</i> Scopoli	R/WV	VC	I
24.	Red-wattled Lapwing <i>Vanellus indicus</i> (Boddaert)	R/LM	VC	I
	Family: Scolopacidae			
25.	Common Sandpiper <i>Actitis hypoleucos</i> Linnaeus	WV	C	AqA
	Family: Recurvirostridae			
26.	Black-winged Stilt <i>Himantopus himantopus</i> (Linnaeus)	R/LM	VC	AqA
	Family: Laridae			
27.	River Tern <i>Sterna aurantia</i> J.E. Gray	R/LM	VC	AqA
	Order: Columbiformes Family: Columbidae			
28.	Blue Rock Pigeon <i>Columba livia</i> Gmelin	R/LM	VC	GR
29.	Little Brown Dove <i>Streptopelia senegalensis</i> (Linnaeus)	R/LM	VC	GR
30.	Spotted Dove <i>Streptopelia chinensis</i> (Scopoli)	R/LM	VC	GR
31.	Red Collared-Dove <i>Streptopelia tranquebarica</i> (Hermann)	SV	C	GR
32.	Yellow-legged Green-Pigeon <i>Treron phoenicoptera</i> (Latham)	R/LM	C	FR
	Order: Psittaciformes Family: Psittacidae			
33.	Alexandrine Parakeet <i>Psittacula eupatria</i> (Linnaeus)	R/LM	VC	FR
34.	Rose-ringed Parakeet <i>Psittacula krameri</i> (Scopoli)	R/LM	VC	FR
35.	Slaty-headed Parakeet <i>Psittacula himalayana</i> (Lesson)	R/LM	VC	FR
36.	Plum-headed Parakeet <i>Psittacula cyanocephala</i> (Linnaeus)	R/LM	VC	FR
	Order: Cuculiformes Family : Cuculidae			
37.	Pied Crested Cuckoo <i>Clamator jacobinus</i> (Boddaert)	SV	C	I
38.	Brainfever Bird <i>Hierococcyx varius</i> (Vahl)	R/LM	VC	I
39.	Indian Cuckoo <i>Cuculus micropterus</i> Gould	R/LM	VC	I
40.	Common Cuckoo <i>Cuculus canorus</i> Linnaeus	SV	VC	I
41.	Asian Koel <i>Eudynamys scolopacea</i> (Linnaeus)	R/LM	VC	FR

42.	Greater Coucal <i>Centropus sinensis</i> (Stephens)	R	C	CR
	Order: Strigiformes			
	Family: Strigidae			
43.	Spotted Owlet <i>Athene brama</i> (Temminck)	R	C	I, CR
	Order: Coraciiformes			
	Family: Alcedinidae			
44.	Small Blue Kingfisher <i>Alcedo atthis</i> (Linnaeus)	R/LM	C	AqA
45.	White-breasted Kingfisher <i>Halcyon smyrnensis</i> (Linnaeus)	R/LM	VC	AqA
46.	Lesser Pied Kingfisher <i>Ceryle rudis</i> (Linnaeus)	R	VC	AqA
	Family: Meropidae			
47.	Small Bee-eater <i>Merops orientalis</i> Latham	SV	VC	I
	Family: Coraciidae			
48.	Indian Roller <i>Coracias benghalensis</i> (Linnaeus)	R/LM	VC	I
	Family: Upupidae			
49.	Common Hoopoe <i>Upupa epops</i> Linnaeus	R/WV	VC	I
	Family: Bucerotidae			
50.	Indian Grey Hornbill <i>Ocyrceros birostris</i> (Scopoli)	R/SV	UC	FR
	Order: Piciformes			
	Family: Capitonidae			
51.	Brown-headed Barbet <i>Megalaima zeylanica</i> (Gmelin)	R/LM	C	FR
52.	Coppersmith Barbet <i>Megalaima haemacephala</i> (P.L.S. Müller)	R/LM	C	FR
	Family: Picidae			
53.	Eurasian Wryneck <i>Jynx torquilla</i> Linnaeus	WV	C	I
54.	Fulvous-breasted Pied Woodpecker <i>Dendrocopos macei</i> (Vieillot)	R	C	I
55.	Lesser Golden-backed Woodpecker <i>Dinopium benghalense</i> (Linnaeus)	R	VC	I
	Order: Passeriformes			
	Family: Hirundinidae			
56.	Common Swallow <i>Hirundo rustica</i> Linnaeus	SV	VC	I
57.	Wire-tailed Swallow <i>Hirundo smithii</i> Leach	SV	VC	I
58.	Red-rumped Swallow <i>Hirundo daurica</i> Linnaeus	R/WV	VC	I
	Family: Motacillidae			
59.	Yellow Wagtail <i>Motacilla flava</i> Linnaeus	WV	C	I
60.	Grey Wagtail <i>Motacilla cinerea</i> Tunstall	R/WV	VC	I
61.	Paddyfield Pipit <i>Anthus rufulus</i> Vieillot	R/WV	VC	I
	Family: Campephagidae			
62.	Black-winged Cuckoo-Shrike <i>Coracina melaschistos</i> (Hodgson)	R/LM	C	FR, I

63.	Small Minivet <i>Pericrocotus cinnamomeus</i> (Linnaeus)	R/LM	VC	I
64.	Common Woodshrike <i>Tephrodornis pondicerianus</i> (Gmelin)	R	UC	I
Family: Pycnonotidae				
65.	Himalayan Bulbul <i>Pycnonotus leucogenys</i> (Gray)	R/LM	VC	FR
66.	Red-vented Bulbul <i>Pycnonotus cafer</i> (Linnaeus)	R	VC	FR
Family: Irenidae				
67.	Common Iora <i>Aegithina tiphia</i> (Linnaeus)	R/LM	VC	I
Family: Laniidae				
68.	Bay-backed Shrike <i>Lanius vittatus</i> Valenciennes	SV	C	CR
69.	Rufous-backed Shrike <i>Lanius schach</i> Linnaeus	R/LM	VC	CR
Family: Muscicapidae				
Subfamily: Turdinae				
70.	Blue Rock-Thrush <i>Monticola solitarius</i> (Linnaeus)	WV	VC	I
71.	Blue Whistling-Thrush <i>Myiophonus caeruleus</i> (Scopoli)	WV	UC	AqA
72.	Dark-throated Thrush <i>Turdus ruficollis</i> Pallas	WV	VC	I
73.	Bluethroat <i>Luscinia svecica</i> (Linnaeus)	WV	C	I
74.	Oriental Magpie-Robin <i>Copsychus saularis</i> (Linnaeus)	R/LM	VC	I
75.	Indian Robin <i>Saxicoloides fulicata</i> (Linnaeus)	R/LM	VC	I
76.	Black Redstart <i>Phoenicurus ochruros</i> (Gmelin)	WV	VC	I
77.	White-capped Redstart <i>Chaimarrornis leucocephalus</i> (Vigors)	WV	C	I
78.	Common Stonechat <i>Saxicola torquata</i> (Linnaeus)	R/LM	VC	I
79.	Pied Bushchat <i>Saxicola caprata</i> (Linnaeus)	R/LM	VC	I
80.	Grey Bushchat <i>Saxicola ferrea</i> Gray	WV	VC	I
Subfamily: Timaliinae				
81.	Rusty-cheeked Scimitar-Babbler <i>Pomatorhinus erythrogegens</i> Vigors	R	C	I, FR
82.	Yellow-eyed Babbler <i>Chrysomma sinense</i> (Gmelin)	R	VC	I
83.	Common Babbler <i>Turdoides caudatus</i> (Dumont)	R/LM	C	I
84.	Jungle Babbler <i>Turdoides striatus</i> (Dumont)	R	VC	I
85.	Red-billed Leiothrix <i>Leiothrix lutea</i> (Scopoli)	R/LM	C	I
Subfamily: Sylviinae				
86.	Ashy Prinia <i>Prinia socialis</i> Sykes	R	VC	I
87.	Common Tailorbird <i>Orthotomus sutorius</i> (Pennant)	R/LM	VC	I
Subfamily: Muscicapinae				
88.	Grey-headed Flycatcher <i>Culicicapa ceylonensis</i> (Swainson)	R/WV	VC	I

	Subfamily: Monarchinae			
89.	Asian Paradise-Flycatcher <i>Terpsiphone paradisi</i> (Linnaeus)	SV	C	I
	Subfamily: Rhipidurinae			
90.	Yellow-bellied Fantail-Flycatcher <i>Rhipidura hypoxantha</i> Blyth	WV	VC	I
91.	White-throated Fantail-Flycatcher <i>Rhipidura albicollis</i> (Vieillot)	R/LM	VC	I
	Family: Paridae			
92.	Great Tit <i>Parus major</i> Linnaeus	R/LM	VC	I
	Family: Sittidae			
93.	Wallcreeper <i>Tichodroma muraria</i> (Linnaeus)	WV	C	I
	Family: Certhiidae			
94.	Bar-tailed Tree-Creeper <i>Certhia himalayana</i> Vigors	WV	C	I
	Family: Dicaeidae			
95.	Thick-billed Flowerpecker <i>Dicaeum agile</i> (Tickell)	R/LM	UC	FR
	Family: Nectariniidae			
96.	Purple Sunbird <i>Nectarinia asiatica</i> (Latham)	SV	VC	N
	Family: Zosteropidae			
97.	Oriental White-eye <i>Zosterops palpebrosus</i> (Temminck)	R/LM	VC	OM
	Family: Emberizidae			
	Subfamily: Emberizinae			
98.	Crested Bunting <i>Melophus lathami</i> (Gray)	R/LM	VC	GR
99.	Rock Bunting <i>Emberiza cia</i> Linnaeus	WV	VC	GR
100.	Striolated Bunting <i>Emberiza striolata</i> (Lichtenstein)	R/LM	Ra	GR
	Family: Fringillidae			
101.	Common Rosefinch <i>Carpodacus erythrinus</i> (Pallas)	WV	VC	GR
	Family: Estrildidae			
102.	Red Munia <i>Amandava amandava</i> (Linnaeus)	R	C	GR
	Family: Passeridae			
	Subfamily: Passerinae			
103.	House Sparrow <i>Passer domesticus</i> (Linnaeus)	R/LM	VC	GR
104.	Cinnamon Tree Sparrow <i>Passer rutilans</i> Temminck	R/LM	C	GR
105.	Yellow-throated Sparrow <i>Petronia xanthocollis</i> (Burton)	SV	C	GR
	Subfamily: Ploceinae			
106.	Baya Weaver <i>Ploceus philippinus</i> (Linnaeus)	R/LM	VC	GR
	Family: Sturnidae			
107.	Brahminy Starling <i>Sturnus pagodarum</i> (Gmelin)	R/LM	C	FR
108.	Asian Pied Starling <i>Sturnus contra</i> Linnaeus	R/LM	C	OM
109.	Common Myna	R/LM	VC	OM

	<i>Acridotheres tristis</i> (Linnaeus)			
110.	Bank Myna	R/LM	VC	OM
	<i>Acridotheres ginginianus</i> (Latham)			
111.	Jungle Myna	R/LM	VC	OM
	<i>Acridotheres fuscus</i> (Wagler)			
	Family: Oriolidae			
112.	Eurasian Golden Oriole	SV	VC	FR
	<i>Oriolus oriolus</i> (Linnaeus)			
	Family: Dicruridae			
113.	Black Drongo	R/LM	VC	I
	<i>Dicrurus macrocercus</i> Vieillot			
	Family: Corvidae			
114.	Red-billed Blue Magpie	R/WV	C	OM
	<i>Urocissa erythrorhyncha</i> (Boddaert)			
115.	Indian Treepie	R/LM	VC	OM
	<i>Dendrocitta vagabunda</i> (Latham)			
116.	House Crow	R/LM	VC	OM
	<i>Corvus splendens</i> Vieillot			
117.	Jungle Crow	R/LM	VC	OM
	<i>Corvus macrorhynchos</i> Wagler			

Res. Status= Residential status, R: Resident, R/LM: Resident with local movements, R/WV: Resident with winter influx, R/SV: Resident with summer influx, WV: Winter visitor, SV: Summer visitor

Rel. Abd.= Relative abundance, VC: Very common, C: Common, UC: Uncommon, Ra: Rare

Feeding Hb.= Feeding habits, I: Insectivorous, GR: Graminivorous, CR: Carnivorous, AqA: Aquatic animal eater, OM: Omnivorous, VgM: Vegetable matter eater, FR: Frugivorous, SC: Scavenger, N: Nectar eater.

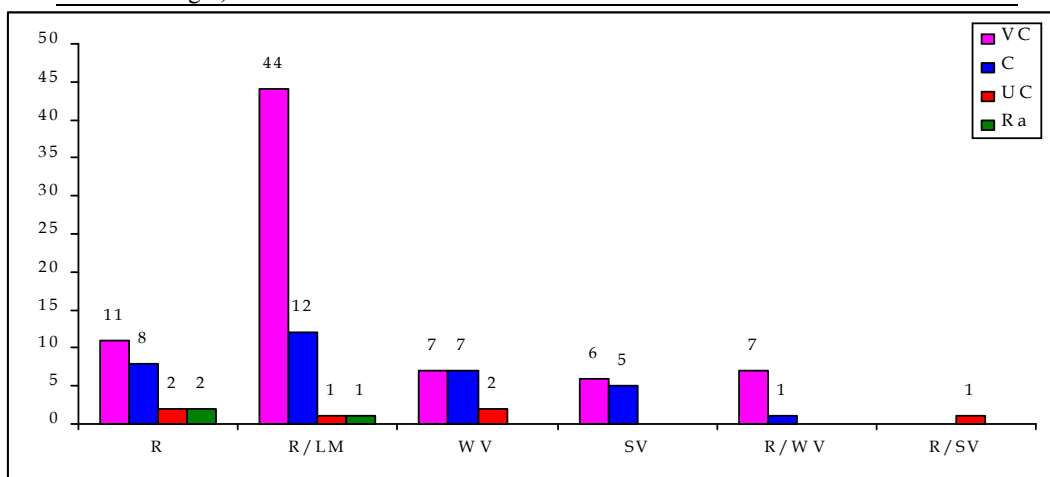


FIGURE 1: Residential status and relative abundance of avifauna of Mandhala watershed

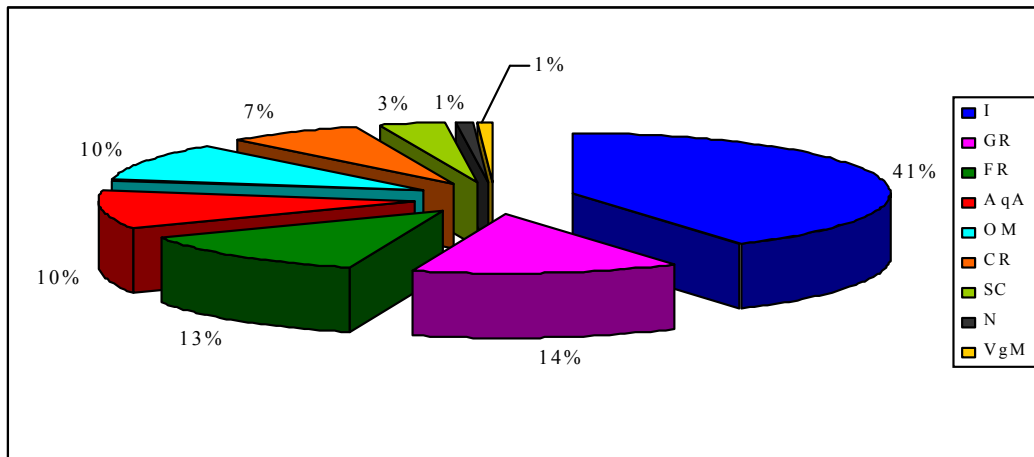


FIGURE 2: Feeding habits of birds of Mandhala watershed, Solan (Himachal Pradesh)

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