

Status and conservation of avian fauna of Sultanpur National Park Gurgaon, Haryana (India)

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Abstract: The present study was conducted in Sultanpur National Park Gurgaon, Haryana (India) from February, 2011 to January, 2012 to analyze the avian diversity along with its status and abundance. During the study period, a total of 113 species of birds belonging to 14 orders, 35 families and 80 genera were identified. Maximum 41 species belonging to 12 families of order Passeriformes represented 36.28% of the total identified avian fauna while Podicipediformes and Strigiformes were the least represented avian orders (0.88%) with one species each, namely, Little Grebe, *Tachybaptus ruficollis* and Spotted Owlet, *Athene brama* respectively. Out of total reported 113 species, 64 were 'resident' species and 49 were 'migrant' species. Most of the migratory species were winter visitors except Red throated flycatcher, *Ficedula parva*; Orange Headed Thrush, *Zoothera citrine* and Eurasian Golden Oriole, *Oriolus oriolus* which were summer visitors. In all, 42 species were 'common', 33 species were 'uncommon' and 38 species were 'occasional' bird species. Based on sighting, White Breasted Kingfisher, *Halcyon smyrnensis*; White Breasted Water Hen, *Amaurornis phoenicurus*; Common Moorhen, *Gallinule chloropus*; Black Wing Stilt, *Himantopus himantopus*; Red Wattled lapwing, *Vanellus indicus*; Cattle Egret, *Bubulcus ibis* and Indian Pond Heron, *Ardeola grayii* were common wetland bird species of Sultanpur National Park while Pied king fisher, *Ceryle rudis* and Coppersmith Barbet, *Megalaima haemacephala* were 'rarely sighted' bird species. During the study period, 7 'globally threatened' species, namely, Painted Stork, *Mycteria leucocephala*; Black neck Stork, *Ephippiorhynchus asiaticus*; Black headed Ibis, *Threskiornis melanocephalus*; Darter, *Anhinga melanogaster*; Pacific Reef Egret, *Egretta sacra*; Sarus Crane, *Grus antigone* alongwith Hogson bushchat, *Saxicola insignis* were also recorded from the study area.

Keywords: Abundance, Avian fauna, Muscicapidae, Podicipedidae, Sultanpur National Park

INTRODUCTION

India is unique in having approximately 1300 species of birds constituting 13% of the world bird assembly and, thus, is a region of high avian diversity (Grimmett *et al.*, 1998). Information about avian distribution across different habitats including protected areas (wildlife sanctuaries and national parks) in India is documented very well (Ali and Ripley, 1983; Gole, 1987; Ripley, 1988; Lainer, 1990; Naoroji, 1990; Pittie, 1990; Sinha and Mukherjee 1995; Javed and Rahmani, 1998; Kalsi 1998; Inskipp *et al.*, 1999; Bhatt and Sharma, 2002; Choudhary, 2003; Srinivasan and Prashanth, 2005; Sundar, 2005; Urfi *et al.*, 2005; Shahabuddin *et al.*, 2006; Sultana *et al.*, 2007; Pande *et al.*, 2007).

Avifauna is important part of ecosystem as birds act as scavengers, pollinators, and predators of insect pests. They are also the good indicators of water ecosystem (Sinha and Mukherjee, 1995). Pioneer work on avian diversity has also been conducted by many researchers in the state of Haryana (Whistler, 1915 and 1918; Yadav and Maleyver, 1978 and 1981; Gupta and Ahmed, 1993; Gupta and Bajaj, 1997 and 1999; Kalsi, 1998; Harris, 2001;

Harvey, 2003). However, protected areas of Haryana have not been thoroughly explored from biodiversity point of view. Therefore, the present study was planned in Sultanpur National Park, Haryana to study avian diversity along with seasonal variations in their status and conservation strategies.

MATERIALS AND METHODS

Sultanpur National Park (28° 28' N latitude and 76° 53' E longitude) is located in a predominantly agricultural landscape crisscrossed by irrigation canals (Fig. 1). The national park covers an area of 13,727 ha (Islam and Rahmani, 2004) and includes its core area of 143 ha of low-lying marshes, notified as a bird sanctuary by the Haryana state government in 1971 (Kalpavriksh, 1994). Periodic fortnightly visits were conducted from February, 2011 to January, 2012 in terrestrial and aquatic habitat in the area in the morning phase (06:00 AM to 10:00 AM) and later in the evening phase (15:00 PM to 18:00 PM) to record avian species, their status and conservation strategies. The birds were photographed using Sony Handycam model DCR-HC-42E and digital camera Nikon L-120 and were later identified following field guides (Ali

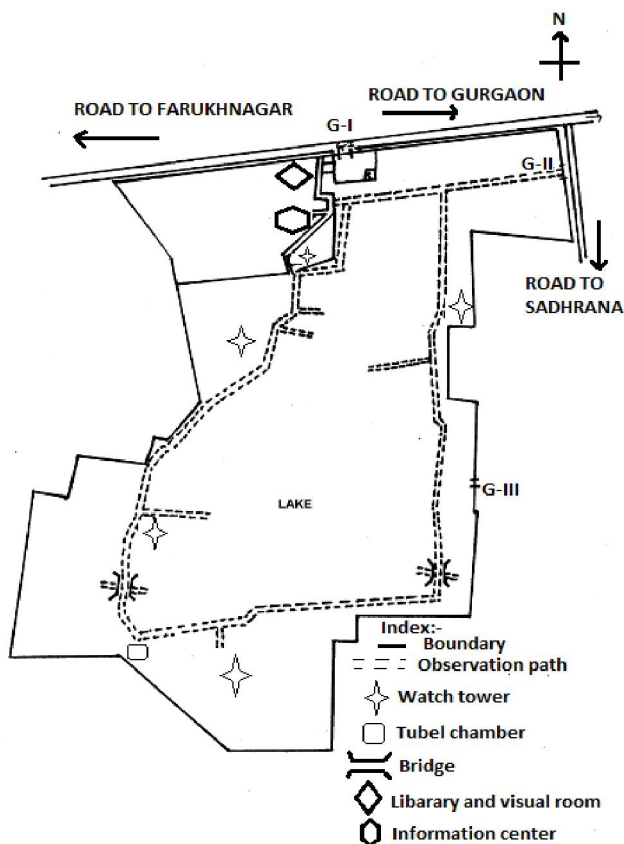


Fig. 1. Map showing the area and location of Sultanpur National Park, Gurgaon, Haryana.

and Ripley, 1987; Grimmett et al., 1998; Inskipp et al., 1999). Line transects method (Sale and Berkmueller, 1988) and point count method (Blondel et al., 1981) were used to study the avifauna.

Seasonal variations in avian diversity were recorded by collecting the data during winter, summer, monsoon and autumn seasons. The observed birds were categorized as A- abundant; C- common; O- occasional; U- uncommon and Rr- rare. Status of the birds were classified as: R- resident species, found in the study area throughout the year; WM- winter migrant species, found in the study area only in winter season; LM- local migrant species, found irregularly in study site but resident of India; BM- breeding migrant species, visiting the area for breeding or during the breeding seasons; SS- straggler bird species, observed at irregular gaps of the year in the study area; SU- status unknown species, not observed in above mentioned categories included in this category.

RESULTS AND DISCUSSION

Sultanpur National Park, known for low lying marshes and forest patches, harbours rich avian diversity (Gaston, 1994; Islam and Rahmani, 2004; Urfi et al., 2005). The region is known as suitable nesting site especially for Painted Stork, *Mycteria leucocephala* (Urfi et al., 2007). In the one year study from February, 2011 to January,

2012, a total of 113 species of birds belonging to 14 orders, 35 families and 80 genera were identified in the Sultanpur National Park. Avian diversity along with abundance, status and percentage composition is presented in Tables 1 and 2.

Maximum of 41 species belonging to 12 families of order Passeriformes represented 36.28 % of the total identified avian fauna in the present study. Podicipediformes and Strigiformes were the least represented avian orders (0.88%) with one species each, namely, Little Grebe, *Tachybaptus ruficollis* and Spotted Owllet, *Athene brama* respectively. Most of the birds were observed near the wetland area and between the water islands. During the study period, 7 globally threatened species were also recorded. Among these, Painted Stork, *Mycteria leucocephala*; Black neck Stork, *Ephippiorhynchus asiaticus*; Black headed Ibis, *Threskiornis melanocephalus*; Darter, *Anhinga melanogaster*; Pacific Reef Egret, *Egretta sacra* are listed in 'near threatened' category and Sarus Crane, *Grus antigone* along with Hogson bushchat, *Saxicola insignis* are listed in 'vulnerable' category (IUCN, 2010). However, Gupta and Bajaj (1997) reported 8 globally threatened species including woolly-necked stork, *Ciconia episcopus*.

The family Muscicapidae of order Passeriformes dominated the list with 16 species and represented 14.15% of the total reported bird species. Out of total reported 113 species, 64 were 'resident' species and 49 were 'migrant' species. Most of the migratory species were 'winter visitors' except Red throated flycatcher, *Ficedula parva*; Orange Headed Thrush, *Zoothera citrine* and Eurasian Golden Oriole, *Oriolus oriolus* which were 'summer visitors'. The past studies also revealed 44 winter migrant species (Gaston, 1994; Gupta and Bajaj, 1997).

The study revealed that out of total 113 birds' species, 33 species were 'uncommon', 42 species were 'common' and remaining 38 were 'occasional' species. Based on frequency of sightings, 7 species, namely, white breasted kingfisher, *Halcyon smyrnensis*; White Breasted Water Hen, *Amaurornis phoenicurus*; Common Moorhen, *Gallinula chloropus*; Black Wing Stilt, *Himantopus himantopus*; Red Wattled lapwing, *Vanellus indicus*; Cattle Egret, *Bubulcus ibis* and Indian Pond Heron, *Ardeola grayii* were 'common wetland' bird species of Sultanpur National Park. Black neck Stork, *Ephippiorhynchus asiaticus*; Black Headed Ibis, *Threskiornis melanocephalus*; Cotton Pygmy Goose, *Nettapus coromandelianus*; Sarus Crane, *Grus antigone*; Common Red Shank, *Tringa tetanus* and Yellow Crowned Woodpecker, *Dendrocopos mahrattensis* were among the most 'uncommon' species and Pied king fisher, *Ceryle rudis* and Coppersmith Barbet, *Megalaima haemacephala* were 'rarely sighted' bird species. These

Table 1. Diversity of Avian fauna in Sultanpur National Park Gurgaon, Haryana (India).

Order	Family	Common name	Zoological name	Status	Abundance		
1. Podicipediformes	Podicipedidae- Grebes	1. Little Grebe	<i>Tachybaptus ruficollis</i>	R	O		
		2. Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	LM	C		
2. Pelecaniformes	Phalacrocoracidae- Cormorants, Darter	3. Great Cormorant	<i>Phalacrocorax carbo</i>	LM	UC		
		4. Little Cormorant	<i>Phalacrocorax niger</i>	L	UC		
		5. Darter	<i>Anhinga melanogaster</i>	R	O		
		6. Grey Heron	<i>Ardea cinera</i>	LM	O		
		7. Purple Heron	<i>Ardea purpurea</i>	LM	O		
3. Ciconiiformes	Ardeidae- Herons, Egret, Bittern	8. Indian Pod-Heron	<i>Ardeola gravi</i>	R	C		
		9. Cattle Egret	<i>Bulbulcus ibis</i>	R	C		
		10. Great Egret	<i>Casmerodius albus</i>	LM	O		
		11. Pacific Reef Egret	<i>Egretta sacra</i>	LM	O		
		12. Intermediate Egret	<i>Mesophoyx intermedia</i>	LM	O		
		13. Little Egret	<i>Egretta garzetta</i>	LM	O		
		14. Open Bill Stork	<i>Anastomus oscitans</i>	LM	O		
		15. Painted Stork	<i>Mycteria leucocephala</i>	R	O		
		16. Black Neck Stork	<i>Ephippiorhynchus asiaticus</i>	WM	UC		
		17. Black Headed Ibis	<i>Threskiornis melanocephalus</i>	LM	UC		
		4. Anseriformes	Threskiornithidae – Ibises, Spoonbill Anatidae – Ducks, Geese	18. Bar-headed Goose	<i>Anser indicus</i>	WM	C
				19. Grey Leg Goose	<i>Anser anser</i>	WM	O
				20. Lesser Whistling Duck	<i>Demrocygna javanica</i>	WM	O
21. Northern Pintail	<i>Anas acuta</i>			WM	O		
22. Cotton Pygmy Goose	<i>Nettapus coromandelianus</i>			WM	UC		
23. Common Teal	<i>Anas crecca</i>			WM	O		
24. Spot Billed Duck	<i>Anas poecilorhynchus</i>			WM	C		
25. Gadwall	<i>Anas strepera</i>			WM	C		
26. Eurasian Wigeon	<i>Anas penelope</i>			WM	O		
27. Mallard	<i>Anas platyrhynchos</i>			WM	UC		
28. Common Pochard	<i>Aythya ferina</i>			WM	O		
29. Comb Duck	<i>Sarkidiornis melanotos</i>			WM	UC		
5. Falconiformes	Accipitridae – Hawks, Vultures			30. Brahminy Kite	<i>Haliastur indus</i>	R	UC
				31. Black Kite	<i>Mitrus migrans</i>	R	C
				32. Black Shoulder Kite	<i>Elanus caeruleus</i>	R	C
				33. Shikra	<i>Accipiter badius</i>	R	O
				34. Tawny Eagle	<i>Aquila rapax</i>	LM	O
		35. Eurasian sparrow Hawk	<i>Accipiter nisus</i>	SM	O		

Contd.

6. Galliformes	Phasiidae – Pheasants, Partridges, Quails	36. Grey Francolin	<i>Francolinus pondicerianus</i>	R	O
		37. Indian Peafowl	<i>Pavo cristatus</i>	R	O
7. Gruiformes	Gruidae- Crane	38. Sarus Crane	<i>Grus antigone</i>	R	UC
	Rallidae-Rails, Coots	39. White Breasted Waterhen	<i>Amaurornis phoenicurus</i>	R	O
		40. Common Moorhen	<i>Gallinule chloropus</i>	WM	C
		41. Purple Swamphen	<i>Porphyrio porphyria</i>	R	C
		42. Common coot	<i>Fulica atra</i>	WM	C
	Charadriidae –Plovers, Curlew	43. Red Wattled Lapwing	<i>Vanellus indicus</i>	R	C
		44. Common Sandpiper	<i>Actitis hypoleucos</i>	WM	O
		45. Spotted Sandpiper	<i>Tringa erythropus</i>	WM	C
		46. Common Red Shank	<i>Tringa tetanus</i>	WM	UC
		47. Ruff	<i>Philomachus pugnax</i>	WM	UC
8. Columbiformes	Recurvirostridae –Stilts, Avocets	48. Black Winged Stilt	<i>Himantopus himantopus</i>	R	C
	Columbidae- Pigeons, Doves	49. Yellow Footed Green Pigeon	<i>Treeron phoeniptera</i>	R	UC
		50. Rock Pigeon	<i>Columbia livia</i>	R	C
		51. Red Collared Dove	<i>Streptopelia tranquebarica</i>	R	O
		52. Spotted Dove	<i>Streptopelia chinensis</i>	R	UC
		53. Eurasian Collared Dove	<i>Streptopelia decaocta</i>	R	C
		54. Laughing Dove	<i>Streptopelia senegalensis</i>	R	C
9. Psittaciformes	Psittacidae-Parrots	55. Rose Ringed Parakeet	<i>Psittacula krameri</i>	R	C
10. Cuculiformes	Cuculidae- Cucukoos	56. Pied Cuckoo	<i>Clamatro jacobinus</i>	SM	UC
		57. Greater Coucal	<i>Centropus sinensis</i>	R	O
		58. Common Hawk Cuckoo	<i>Hierococcyx varius</i>	SM	UC
		59. Asian Koel	<i>Eudynamis scolopacea</i>	R	C
11. Strigiformes	Strigidae –Owls	60. Spotted Owllet	<i>Athene brama</i>	R	C
12. Coraciiformes	Alcedinidae-Kingfishers	61. Pied Kingfisher	<i>Ceryle rudis</i>	WM	UC
		62. White Throated King Fisher	<i>Halcyon smyrenensis</i>	R	C
		63. Chestnut Headed Bee-Eater	<i>Merops leschenaulti</i>	R	C
		64. Blue Cheeked Bee-Eater	<i>Merops persicus</i>	WM	O
	Meropidae –Bee-eater	65. Green Bee-eater	<i>Merops orientalis</i>	R	C
		66. Indian Roller	<i>Coracias benghalensis</i>	SM	C
	Coraciidae-Rollers	67. Common Hoppoe	<i>Upupa epops</i>	R	C
	Upupidae-Hoppoes	68. Indian Grey Hornbill	<i>Ocyrocops birostris</i>	R	UC
	Bucerotidae- Hornbill	69. Brown Headed Barbet	<i>Megalaima zeylanica</i>	R	O
13. Piciformes	Capitonidae – Barbets	70. Coppersmith Barbet	<i>Megalaima haemacephala</i>	SM	UC
		71. Yellow Crowned Woodpecker	<i>Dendrocopos mahrattensis</i>	R	UC
	Picidae –Woodpecker	72. Black Rumped Flameback	<i>Dinopium benghalense</i>	R	O

Contd.

14. Passeriformes	Alaudidae – Lark	73. Crested lark	<i>Galerida cristata</i>	R	O
		74. Rufous Tailed Lark	<i>Ammodramus phoenicurus</i>	R	O
		75. Indian Bush Lark	<i>Mirafra erythroptera</i>	R	C
	Laniidae- Shrike	76. Graet Grey Shrike	<i>Lanius excubitor</i>	R	O
		77. Long-Tailed Shrike	<i>Lanius schach</i>	R	UC
		78. Brown Shrike	<i>Lanius cristatus</i>	WM	UC
		79. Bay Backed Shrike	<i>Lanius vittatus</i>	R	UC
	Oriolidae-orioles	80. Eurasian Golden Oriole	<i>Oriolus oriolus</i>	SM	C
	Dicruridae-Drongos	81. Black Drongo	<i>Dicrurus macrocercus</i>	R	C
	Sturnidae-Starlings, Mynas	82. Asian Pied Starling	<i>Sturnus contra</i>	R	C
		83. Common Myna	<i>Acridotheres tristis</i>	R	C
		84. Bank Myna	<i>Acridotheres ginginianus</i>	R	C
	Campephagidae-Cuckoo Shrike, Minivet	85. Long Tailed Minivet	<i>Pericrocotus ethologus</i>	WM	O
	Corvidae- Crows, Tree Pies	86. Rufous Treepie	<i>Dendrocitta vagabunda</i>	R	C
		87. House Crow	<i>Corvus splendens</i>	R	C
		88. Large Billed Crow	<i>Corvus macrorhynchos</i>	R	UC
	Pycnonotidae-Bulbuls	89. Red Vented Bulbul	<i>Pycnonotus cafer</i>	R	C
	Muscicapidae-Babblers,	90. Common Babbler	<i>Turdoides caudatus</i>	R	C
	Flycatchers, Warblers, Thruses, Chats	91. Large Grey Babbler	<i>Turdoides malcoimi</i>	R	C
		92. Jungle Babbler	<i>Turdoides striatus</i>	R	C
		93. Oriental Magpie Robin	<i>Copsychus saularis</i>	R	UC
		94. Common Stone Chat	<i>Saxicola torquata</i>	R	UC
		95. Brown Rock Chat	<i>Cercomela fusca</i>	R	C
		96. Pied Bush Chat	<i>Saxicola caprata</i>	WM	O
		97. Ashy Prinia	<i>Prinia socialis</i>	R	UC
		98. Jungle Prinia	<i>Prinia sylvatica</i>	R	UC
		99. Orange Headed Thrush	<i>Zoothera citrina</i>	R	UC
		100. Hogson Bush Chat	<i>Saxicola insignis</i>	SM	UC
		101. Grey bush chat	<i>Saxicola ferreus</i>	SM	O
		102. Rusty tailed flycatcher	<i>Muscicapa ruficauda</i>	R	O
		103. Red throated flycatcher	<i>Ficedula parva</i>	WM	UC
		104. Rufous Fronted Prinia	<i>Prinia buchanani</i>	SM	UC
		105. Indian Robin	<i>Saxicoloides fulicuta</i>	R	O
		106. Paddy Field Pipit	<i>Amsthus rufulus</i>	R	C
		107. Grey Wagtail	<i>Motacilla cinerea</i>	R	UC
	Motacillidae-Pipts, Wagtails	108. Clamorous Reed Warbler	<i>Motacilla cinerea</i>	WM	C
		109. White Browed Wagtail	<i>Acrocephalus stentoreus</i>	WM	O
		110. Purple Sunbird	<i>Motacilla maderaspatensis</i>	WM	UC
	Nectariniidae-Sunbird	111. House Sparrow	<i>Nectarinia asiatica</i>	R	O
	Ploceidae-House Sparrows Weaver Bird	112. Baya Weaver Bird	<i>Passer domesticus</i>	R	C
		113. White Thoated munia	<i>Ploceus philippinus</i>	R	C
			<i>Euodice malabarica</i>	WM	UC

Table 2. Showing number (per cent) of avian species belonging to different orders and families.

Sr. No.	Order	No. of species (%)	Family	No. of species (%)
1	Anseriformes	12 (10.61)	Anatidae	12 (10.61)
2	Ciconiformes	12 (10.61)	Ardedidae	8 (7.07)
			Ciconiidea	3 (2.65)
			Thireskiornithidae	1 (0.88)
3	Columbiformes	6 (5.30)	Columbidae	6 (5.30)
4	Coraciformes	8 (7.07)	Alcedindae	2 (1.76)
			Meropidae	3 (2.65)
			Coraciidae	1 (0.88)
			Upupidae	1 (0.88)
			Bucerotidae	1 (0.88)
5	Cuculiformes	4 (3.53)	Cuclidae	4 (3.53)
6	Falconiformes	6 (5.30)	Accipitridae	6 (5.30)
7	Galliformes	2 (1.76)	Phasiandae	2 (1.76)
8	Gruiformes	11 (9.73)	Gruidae	1 (0.88)
			Rallidae	4 (3.53)
			Charadriidae	5 (4.42)
			Recurvirostridae	1 (0.88)
9	Passeriformes	41 (36.28)	Alaudidae	3 (2.65)
			Landidae	4 (3.53)
			Oriolidae	1 (0.88)
			Dicruridae	1 (0.88)
			Sturnidae	3 (2.65)
			Camephagidae	4 (3.53)
			Pycnonotidae	1 (0.88)
			Mucicapidae	16 (14.15)
			Motacillidae	4 (3.53)
			Nectariniidae	1 (0.88)
			Corvidae	3 (2.65)
			Ploceidae	3 (2.65)
10	Pelecaniformes	4 (3.53)	Phalacrocoracidae	4 (3.53)
11	Piciformes	4 (3.53)	Capitonidae	2 (1.76)
			Picidae	2 (1.76)
12	Podicipediformes	1 (0.88)	Podicipedidae	1 (0.88)
13	Psittaciformes	1 (0.88)	Psittacidae	1 (0.88)
14	Strigiformes	1 (0.88)	Strigidae	1 (0.88)

two rare bird species are highly susceptible to habitat disturbances and, therefore, are good indicators of aquatic habitats (Kushlan, 1992; Jayson and Mathew, 2002; Kler, 2002). However, previous studies revealed 58 occasional species and 44 uncommon species (Gupta and Bajaj, 1999; Harvey, 2003; Islam and Rahmani, 2004). The rich diversity of the birds, documented during the present study, may be because of availability of the varied habitats including forest patch, low laying marshy areas as well as availability of different sources of food. The landscape has a large variety of flora including prominent trees (e.g., *Prosopis juliflora*, *Acacia nilotica*, *Tamarindus indica* and *Azadirachta indica*) and grasses (e.g., *Vetiveria zizanioides* and *Erianthus ravennae*). In addition, 'submerged vegetation' such as *Vallisneria natans* and *Ceratophyllum demersum*,

'emergents' such as *Typha angustata*, *Saccharum munja* and *Cyperus rotundus*, and 'surface vegetation' such as *Nymphaea stellata*, *N. nouchali* and *Ipomoea reptans* in the littoral zone of low laying water bodies provided feeding and/or roosting sites for small bird species (Urfi et al., 2005).

Increased anthropogenic factors such as habitat fragmentation and destruction, tourism pressure and scarcity of water in low lying water bodies during the summer season were some of the major stress factors posing threats to avian fauna in Sultanpur National Park. The herds of Nilgai, dog and wild cattle also occasionally trampled the chicks and eggs of water birds. It is, therefore, suggested that the water body needs to be patrolled regularly to minimize the disturbance, particularly during the breeding season.

REFERENCES

- Ali, S. and Ripley, S.D. (1983). Pictorial guide to the birds of Indian subcontinent. Delhi: Oxford University Press.
- Ali, S. and Ripley, S.D. (1987). Compact handbook of the birds of India and Pakistan. Delhi: Oxford University Press.
- Bhatt, D. and Sharma, R. (2002). Diversity, status and feeding Ecology of avian fauna in area of Rajaji National Park, India. *Annals of Forestry*, 2: 141-179.
- Blondel, J., Ferry, C. and Frochot, B. (1981). Point counts with unlimited distance. *Stud. Avian Biol.*, 6: 414-420.
- Chaudhary, A. (2003). Birds of Eagle nest wildlife sanctuary and Sessa Orchid Sanctuary, Arunachal Pradesh, India. *Forktail*, 19: 1-13.
- Gaston, A. J. (1994). Some comments on the revival of Sultanpur lake. *Oriental Bird Club Bull.*, 20: 49-50.
- Gole, P. (1987). Birds of the Kedarnath Muskdeer Sanctuary, Chamoli district, Uttanchal: status and distribution. *J. Bombay Nat. Soc.*, 83: 603-617.
- Grimmet, R., Inskipp, T. and Inskipp, C. (1998). Birds of the India subcontinent. Oxford University Press, Delhi.
- Gupta, R.C. and Ahmed, I. (1993). On the clutch size, egg laying schedule, hatching patterns and stay of nestlings of Indian Hoopoe, (*Upupa epops*). *Geobios*, 20: 148-150.
- Gupta, R.C. and Bajaj, M. (1997). Preliminary investigations into migratory wetland birds of Brahma Sarovar at Kurukshetra. *Jeevanti*, 15: 29-41.
- Gupta, R.C. and Bajaj, M. (1999). An analysis of Ecological and behavioral patterns of migratory Shoveller (*Anas clypeata*, Linnaeus) in certain wetlands of Haryana. *Jeevanti*, 17: 27-35.
- Harris, C. (2001). Checklist of the birds of Yamuna River (Okhla to Jaitpur village). Unpublished checklist downloaded January 2002 from <http://www.delhibird.org/checklist/checklists-yumna.htm>.
- Harvey, B. (2003). Checklist of the birds of Sultanpur. Retrieved August, 18, 2010 from <http://www.delhibird.net/content/view/73/89>.
- Inskipp, C., Inskipp, T. and Grimmet, R., (1999). A Pocket Guide to the Birds of the Indian Subcontinent.
- Islam, M.Z. and Rahmani, A.R. (2004). Important Bird Areas in India: Priority sites for conservation. Mumbai and Cambridge, U.K.: Bombay Natural History Society and Bird Life International.
- IUCN. (2010). IUCN Red List of threatened species. Version 2010. <www.iucnredlist.org>
- Javed, S. and Rahmani, A.R. (1998). Conservation of the avifauna of Dudhwa National Park, India *Forktail*, 14: 57-66.
- Jayson, E.A. and Mathew, D.N. (2002). Structure and composition of two bird communities in the southern Western Ghats. *J. Bombay Nat. Hist. Soc.*, 99(1): 8-25.
- Kalpavriksh, (1994). Small and beautiful Sultanpur National Park. New Delhi.
- Kalsi, R.S. (1998). Birds of Kalesar Wild Life Sanctuary, Haryana, India. *Forktail*, 13: 29-32.
- Kler, T.K. (2002). Bird species in Kanjali wetland. *Tiger Paper*, 39(1): 29-32.
- Kumar, A., Sati, J.P., Tak, P.C. and Alfred, J.R.B. (2005). Handbook on Indian wetland birds and their conservation. Zoological Survey of India, Dehradun.
- Kushlan, J.A. (1992). Population biology and conservation of colonial water birds. *Colonial Water Birds*, 15: 1-7.
- Lainer, H. (1990). The birds of Goa. *J. Bombay Nat. Hist. Soc.*, 96(3): 405-423.
- Naoroji, R. (1990). Predation by Aquila eagles on nestling storks and herons in Keoladeo National Park, Bharatpur. *J. Bombay Nat. Hist. Soc.*, 87: 37-46.
- Pande, S., Sant, N., Ranande, S., Pednekar, S., Mestry, P., Kharat, S. and Deshmukh, V. (2007). Avifaunal survey of Andamaan and Nicobar Islands. *Indian Birds*, 3(5): 162-180.
- Pittie, A. (1990). Checklist of birds of Calicut University campus Kerala. *Indian Birds*, 3(6): 210-217.
- Ripley, S.D. (1988). A synopsis of Birds of India and Pakistan. Bombay Nat. Hist. Society.
- Sale, J.B. and Berkemuller, K. (1988). Manual of wildlife techniques for Indian field documents no. 11. Wildlife Institute of India, Dehradun.
- Shahabuddin, G., Kumar, R. and Verma, A. (2006). Annotated checklist of the birds of Sariska Tiger Reserve, Rajasthan, India. *Indian Birds*, 2(3): 71-76.
- Sinha, S.P. and Mukherjee, S.K.. (1995). The management of Palamau Tiger Reserve: A report- Wildlife Institute of India, Dehradun.
- Srinivason, U. and Prashanth, N.S. (2005). Additions to the avifauna of the Biligirirangan Hills, Karnataka. *Indian Birds*, 1(5): 103-104.
- Sultana, A., Hussan, M.S. and Khan, J.A. (2007). Proposed Naina and Pindari wildlife sanctuaries in the Kumaon. Himalaya, Uttrakhand, India. *J. Bombay Nat. Hist. Soc.*, 104 (10): 19-29.
- Sundar, K.S.G. (2005). Predation of fledgling Painted Stork *Mycteria leucocephala* by a Spotted Eagle *Aquila* species in Sultanpur National Park, Haryana. *Indian Birds*, 1: 144-145.
- Urfi, A.J., Meganathan, T., Kalam, A. and Mahendiran, M. (2005). Nesting of Asian Openbill and other heronry birds at Sultanpur National Park. *Indian Birds*, 6: 10-11
- Urfi, A.J., Meganathan, T. and Kalam, A. (2007). Nesting ecology of the Painted Stork, *Mycteria leucocephala* at Sultanpur National Park, Haryana, India. *Forktail*, 23: 150-153.
- Whistler, H. (1915). Notes on the birds of Ambala District, Punjab. Part-2. *J. Bombay Nat. Soc.*, 24(1): 172-191.
- Whistler, H. (1918). Notes on the birds of Ambala District, Punjab. *J. Bombay Nat. Soc.*, 25(4): 665-681.
- Yadav, J.S. and Maleyvar, R.P. (1978). The birds of Haryana. A classified List. *Journal of Haryana studies*, 10(1): 37-51.
- Yadav, J.S. and Maleyvar, R.P. (1981). The birds of Haryana: a few more spotting. *Pavo*, 19: 51-55.