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SHORT COMMUNICATION

AVIFAUNAL DIVERSITY OF TILYAR LAKE, ROHTAK, HARYANA, INDIA

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Avifaunal diversity of Tilyar Lake, Rohtak, Haryana, India

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Abstract: Avian diversity of Tilyar Lake (28.883–28.879 °N & 76.637–76.634 °E) located on the eastern outskirts of Rohtak, Haryana was conducted from May 2017 to April 2018. A total of 73 avian species belonging to 62 genera and 31 families under 15 orders was observed. Order Passeriformes with 21 species in 12 families dominated the avifauna whereas orders Bucerotiformes, Podicipediformes, and Psittaciformes were poorly represented with a single species each. Family Anatidae was the most dominant representing 13.89% (n=10) of the total species recorded. Among the reported species 75% (n=54) were resident while 25% (n=18) were migrant. Common Pochard *Aythya ferina* assessed globally as Vulnerable, while Painted Stork *Mycteria leucocephala*, Oriental Darter *Anhinga melanogaster* and Black-headed Ibis *Threskiornis melanoleuca* are assessed as Near Threatened, whereas the rest of the species were in the Least Concern category of the IUCN Red List 2019. The omnivorous feeding habit was shown by the maximum number of species while frugivorous and granivorous bird species were in the least numbers. The rich avifaunal diversity of the Tilyar Lake confirms it as a suitable habitat for both resident and migrant bird species. Therefore, the present study suggests the need for incorporation of appropriate protective measures for conservation of the avian heritage of Tilyar Lake, Rohtak.

Keywords: Anthropogenic activities avian heritage, frugivorous, granivorous, migrant birds.

The Indian subcontinent harbours nearly 1,340 bird species accounting for more than 13% of the world's avian diversity (Chakdar et al. 2016). In Haryana, about 450 species of birds have been reported at times (Goyal et al. 2014). The water bodies, whether flowing or static, form an essential constituent of different ecosystems and attract a large number of birds by fulfilling their feeding and other needs. Haryana with 42,480ha area of wetlands

(National Wetland Atlas 2010) provides a home to a huge diversity of wildlife including birds. Many avifaunal studies have been done on the wetland birds of Haryana (Kumar & Gupta 2009; Gupta et al. 2010, 2012; Tak et al. 2010; Gupta & Kaushik 2012, 2013; Goyal et al. 2014; Kaushik & Gupta 2014; Kumar & Dhankhar 2015; Kumar et al. 2016; Kumar & Sharma 2018). Among the wetlands of Haryana, Tilyar Lake in Rohtak occupies a prominent position. It has four islands with thick vegetation cover, green lawns and waterlogged land along the Jawahar Lal Nehru canal on its western margin; all this attracts a variety of resident and migratory birds.

The presence of water birds, a mini zoo, boating facility, and amusement zone attracts urban people to picnic at Tilyar Lake making it a popular tourist destination. Despite its economic importance, little scientific work has been done towards the assessment of its avian diversity.

Study Area

Tilyar Lake is located between 28.883–28.879 °N & 76.637–76.634 °E (Figure 1). The lake extends over 132 acres, and is situated adjacent to the Jawahar Lal Nehru canal, beside the national highway of Rohtak-Delhi on the eastern outskirts of Rohtak city in Haryana. It is only 66.1km away from the national capital of India, New Delhi. Tilyar Lake is a perennial stagnant water body with no outflow, having an average depth of 3m. It has four

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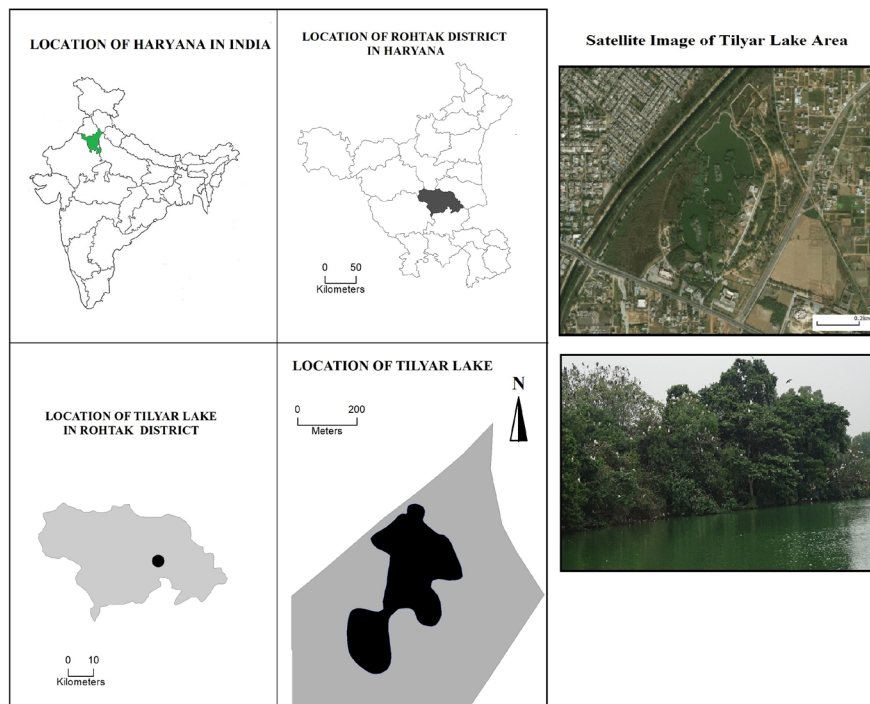


Figure 1. Tilyar Lake, Rohtak with adjacent area.

small islands with high tree density out of which three are least affected by human activities. The lake harbours aquatic weeds supporting a large number of aquatic zooplankton. The periphery is also covered with trees and bushes providing suitable habitat for a variety of birds.

MATERIAL AND METHODS

The diversity and seasonal migration of avian fauna was studied for a period of one year at Tilyar Lake from May 2017 to April 2018. Regular weekly surveys were conducted in the morning (from 07.00–09.00 h in winter; 05.00–07.00 h in summer) and before sunset in the evening. The line transect method was used to observe the birds in this open habitat with the aid of Olympus binoculars (8X40) and birds were photographed using a Nikon D5300 DSLR camera. Birds were identified as per field guides of Grimmett et al. (2013). A checklist was prepared following the nomenclature used in the IUCN Red Data List 2019.

The identified birds were then categorized according to their residence status as Resident (R), Winter migrant (WM), Summer migrant (SM) following Grimmett et al. (2013). The composition of bird community, species abundance and richness, feeding habits and relative diversity were observed and calculated.

Feeding habits were assigned according to observations during the study. Birds feeding on larvae,

eggs, small amphibians, fishes, crustaceans, and small birds were placed under carnivorous feeding habit whereas, the birds feeding on algae, tender foliage, aquatic weeds, and vegetation were categorized as herbivorous; birds feeding on insects and moths were listed as insectivorous, while the omnivorous habit include both carnivory and herbivory. The frugivorous and granivorous habits refer to fruit-eaters and grain-eaters, respectively.

Relative Diversity (RD_i) denotes percentage occurrence of various families concerning the whole bird community and is a powerful tool for the population study related to family diversity and dominance. It was calculated following Koli (2014).

$$RD_i = \frac{\text{Number of species in a family}}{\text{Total number of species}} \times 100$$

RESULTS

The present study revealed a total of 73 avian species of 62 genera belonging to 31 families and 15 orders in the studied area of Tilyar Lake, Rohtak (Table 1; Images 1–20).

In Tilyar Lake Passeriformes (21 species in 12 families) was the most dominant order followed by Anseriformes (10 species in one family), Charadriiformes (10 species in three families); Pelecaniformes (eight species in two families); Gruiformes (four species in one

Table1. Checklist of birds recorded in Tilyar Lake, Rohtak.

	Common name	Scientific name	Resident status	IUCN Red List status	Feeding habit
Order: Accipitriformes					
Family: Accipitridae					
1	Shikra	<i>Accipiter badius</i> (Gmelin, 1788)	R	LC	CV
2	Black-shouldered Kite	<i>Elanus caeruleus</i> (Desfontaines, 1789)	R	LC	CV
3	Black Kite	<i>Milvus migrans</i> (Boddaert, 1783)	R	LC	OV
Order: Anseriformes					
Family: Anatidae					
4	Bar-headed Goose	<i>Anser indicus</i> (Latham, 1790)	WM	LC	HV
5	Northern Shoveler	<i>Spatula clypeata</i> (Linnaeus, 1758)	WM	LC	HV
6	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i> Forester, 1781	R	LC	OV
7	Lesser Whistling-duck	<i>Dendrocygna javanica</i> (Horsfield, 1821)	R	LC	OV
8	Comb Duck	<i>Sarkidiornis melanotos</i> (Pennant, 1769)	R	LC	OV
9	Gadwall	<i>Mareca strepera</i> Linnaeus, 1758	WM	LC	OV
10	Common Teal	<i>Anas crecca</i> Linnaeus, 1758	WM	LC	OV
11	Northern Pintail	<i>Anas acuta</i> Linnaeus, 1758	WM	LC	OV
12	Common Pochard	<i>Aythya ferina</i> (Linnaeus, 1758)	WM	VU	OV
13	Ruddy Shelduck	<i>Tadorna ferruginea</i> (Pallas, 1764)	WM	LC	OV
Order: Charadriiformes					
Family: Scolopacidae					
14	Common Sandpiper	<i>Actitis hypoleucos</i> Linnaeus, 1758	WM	LC	OV
15	Common Snipe	<i>Gallinago gallinago</i> (Linnaeus, 1758)	WM	LC	OV
16	Common Redshank	<i>Tringa totanus</i> (Linnaeus, 1758)	WM	LC	CV
17	Common Greenshank	<i>Tringa nebularia</i> (Gunner, 1767)	WM	LC	CV
18	Green Sandpiper	<i>Tringa ochropus</i> Linnaeus, 1758	WM	LC	CV
19	Ruff	<i>Calidris pugnax</i> (Linnaeus, 1758)	WM	LC	OV
Family: Burhinidae					
20	Eurasian Thick-knee	<i>Burhinus oedicnemus</i> (Linnaeus, 1758)	R	LC	CV
Family: Charadriidae					
21	White-tailed Lapwing	<i>Vanellus leucurus</i> (Lichtenstein, 1823)	WM	LC	CV
22	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i> (Boddaert, 1783)	R	LC	CV
23	Red-wattled Lapwing	<i>Vanellus indicus</i> (Boddaert, 1783)	R	LC	CV
Order: Ciconiiformes					
Family: Ciconiidae					
24	Asian Openbill	<i>Anastomus oscitans</i> (Boddaert, 1783)	R	LC	CV
25	Painted Stork	<i>Mycteria leucocephala</i> (Pennant, 1769)	R	NT	CV
Order: Columbiformes					
Family: Columbidae					
26	Rock Dove	<i>Columba livia</i> Gmelin, 1789	R	LC	OV
27	Eurasian Collared Dove	<i>Streptopelia decaocto</i> (Frisvaldszky, 1838)	R	LC	OV
28	Laughing dove	<i>Spilopelia senegalensis</i> (Linnaeus, 1766)	R	LC	OV
Order: Coraciiformes					
Family: Alcedinidae					
29	White-breasted kingfisher	<i>Halcyon smyrnensis</i> (Linnaeus, 1758)	R	LC	OV
30	Pied kingfisher	<i>Ceryle rudis</i> (Linnaeus, 1758)	R	LC	OV
Family: Meropidae					
31	Green bee-eater	<i>Merops orientalis</i> Latham, 1801	R	LC	IV
Order: Bucerotiformes					
Family: Upupidae					
32	Common Hoopoe	<i>Upupa epops</i> Linnaeus, 1758	R	LC	OV

	Common name	Scientific name	Resident status	IUCN Red List status	Feeding habit
Order: Cuculiformes					
Family: Cuculidae					
33	Greater Coucal	<i>Centropus sinensis</i> (Stephens, 1815)	R	LC	OV
34	Asian Koel	<i>Eudynamys scolopacea</i> (Linnaeus, 1758)	R	LC	OV
Order: Galliformes					
Family: Phasianidae					
35	Indian Peafowl	<i>Pavo cristatus</i> Linnaeus, 1758	R	LC	OV
36	Grey Francolin	<i>Francolinus pondicerianus</i> (Gmelin, 1789)	R	LC	OV
Order: Gruiformes					
Family: Rallidae					
37	Common Coot	<i>Fulica atra</i> Linnaeus, 1758	WM	LC	OV
38	Common Moorhen	<i>Gallinula chloropus</i> (Linnaeus, 1758)	R	LC	OV
39	Purple Swampphen	<i>Porphyrio porphyrio</i> (Linnaeus, 1758)	R	LC	OV
40	White-breasted Waterhen	<i>Amaurornis phoenicurus</i> (Pennant, 1769)	R	LC	OV
Order: Passeriformes					
Family: Cisticolidae					
41	Ashy Prinia	<i>Prinia socialis</i>	R	LC	IV
42	Plain Prinia	<i>Prinia inornata</i> Sykes, 1832	R	LC	IV
43	Common Tailorbird	<i>Orthotomus sutorius</i> (Pennant, 1769)	R	LC	OV
Family: Corvidae					
44	House Crow	<i>Corvus splendens</i> Vieillot, 1817	R	LC	OV
45	Large-billed Crow	<i>Corvus macrorhynchos</i> Wagler, 1827	R	LC	OV
Family: Estrildidae					
46	Red Avadavat	<i>Amandava amandava</i> (Linnaeus, 1758)	R	LC	OV
47	Indian Silverbill	<i>Lonchura malabarica</i> (Linnaeus, 1758)	R	LC	OV
Family: Motacillidae					
48	White Wagtail	<i>Motacilla alba</i> Linnaeus, 1758	WM	LC	OV
49	Western Yellow Wagtail	<i>Motacilla flava</i> Linnaeus, 1758	WM	LC	OV
Family: Nectariniidae					
50	Purple Sunbird	<i>Nectarinia asiatica</i> (Latham, 1790)	R	LC	OV
Family: Passeridae					
51	House Sparrow	<i>Passer domesticus</i> (Linnaeus, 1758)	R	LC	GV
Family: Ploceidae					
52	Baya Weaver	<i>Ploceus philippinus</i> (Linnaeus, 1766)	R	LC	OV
53	Black-breasted Weaver	<i>Ploceus benghalensis</i> (Linnaeus, 1758)	R	LC	OV
Family: Pycnonotidae					
54	Red-vented Bulbul	<i>Pycnonotus cafer</i> (Linnaeus, 1766)	R	LC	OV
Family: Sturnidae					
55	Common Myna	<i>Acridotheres tristis</i> (Linnaeus, 1766)	R	LC	OV
56	Bank Myna	<i>Acridotheres ginginianus</i> (Latham, 1790)	R	LC	OV
Family: Leiothrichidae					
57	Common Babbler	<i>Turdoides caudatus</i> (Dumont, 1823)	R	LC	OV
58	Jungle Babbler	<i>Turdoides striatus</i> (Dumont, 1823)	R	LC	OV
Family: Hirundinidae					
59	Wire-tailed Swallow	<i>Hirundo smithii</i> Leach, 1818	SM	LC	IV
Family: Muscicapidae					
60	Bluethroat	<i>Luscinia svecica</i> (Linnaeus, 1758)	WM	LC	OV
61	Oriental Magpie Robin	<i>Copsychus saulari</i> (Linnaeus, 1758)	R	LC	OV
Order: Pelecaniformes					
Family: Ardeidae					
62	Black-crowned Night-heron	<i>Nycticorax nycticorax</i> (Linnaeus, 1758)	R	LC	OV

	Common name	Scientific name	Resident status	IUCN Red List status	Feeding habit
63	Cattle Egret	<i>Bubulcus ibis</i> (Linnaeus, 1758)	R	LC	CV
64	Great White Egret	<i>Casmerodius albus</i> (Linnaeus, 1758)	R	LC	CV
65	Little Heron	<i>Butorides striatus</i> (Linnaeus, 1758)	R	LC	CV
66	Indian Pond-heron	<i>Ardeola grayii</i> (Sykes, 1832)	R	LC	OV
67	Little Egret	<i>Egretta garzetta</i> (Linnaeus, 1766)	R	LC	CV
Family: Threskiornithidae					
68	Black-headed Ibis	<i>Threskiornis melanocephalus</i> (Latham, 1790)	R	NT	CV
69	Red-naped Ibis	<i>Pseudibis papillosa</i> (Temminck, 1824)	R	LC	CV
Order: Podicipediformes					
Family: Podicipedidae					
70	Little Grebe	<i>Tachybaptus ruficollis</i> (Pallas, 1764)	R	LC	CV
Order: Psittaciformes					
Family: Psittacidae					
71	Rose-ringed Parakeet	<i>Psittacula kramera</i> (Scopoli, 1769)	R	LC	FV
Order: Sulliformes					
Family: Phalacrocoracidae					
72	Indian Cormorant	<i>Phalacrocorax fuscicollis</i> Stephens, 1826	R	LC	CV
Family: Anhingidae					
73	Oriental Darter	<i>Anhinga melanogaster</i> Pennant, 1769	R	NT	CV

R—Resident | SM—Summer migrant | WM—Winter migrant | LC—Least concerned | NT—Near threatened | VU—Vulnerable | CV—Carnivorous | HV—Herbivorous | IV—Insectivorous | OV—Omnivorous.

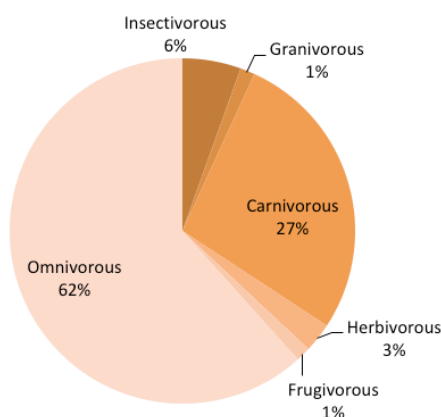


Figure 2. Distribution of bird species according to their feeding habits.

family); Coraciiformes (three species in two families); Accipitriformes, Columbiformes (three species each in single family each); Sulliformes (two species in two families); Ciconiiformes, Cuculiformes, Galliformes (two species each in single family each). While Bucerotiformes, Psittaciformes, and Podicipediformes were the least represented orders with a single species each (Table 1).

Anatidae with relative diversity of 13.70% (n=10 species) was the most dominant family; followed by Ardeidae and Scolopacidae 8.22% (n=6 species each), family Rallidae 5.48% (n=4 species) while families

Accipitridae, Columbidae, Charadriidae, and Cisticollidae represented 4.11% (n=3 species each) whereas families Ciconiidae, Alcedinidae, Cuculidae, Phasianidae, Corvidae, Estrildidae, Motacillidae, Ploceidae, Sturnidae, Leiostichidae, Muscicapidae, and Threskiornithidae reported 2.74% each (n= 2 species each). Burhinidae, Meropidae, Upupidae, Nectariniidae, Passeridae, Pycnonotidae, Hirundinidae, Podicipedidae, Psittacidae, Phalacrocoracidae, and Anhingidae were the least represented families showing 1.37% each (n= 1 species each) (Table 2).

Non-passerine birds dominated the diversity with percentage occurrence of 71.23% (n=52) as compared to passerine birds with 28.77% (n=21). The data on residential status revealed that out of 73 species 73.98% (n=54) were the resident species recorded at Tilyar Lake whereas the remaining 26.03% (n=19) showed seasonal migration; in which 24.65% (n=18) were winter migrant while only 1.37% (n=1) was summer migrant. *Anser indicus*, *Spatula clypeata*, *Mareca strepera*, *Anas crecca*, *Anas acuta*, *Aythya farina*, *Tadorna ferruginea*, *Actitis hypoleucos*, *Gallinago gallinago*, *Tringa totanus*, *Tringa nebularia*, *Tringa ochropus*, *Vanellus leucurus*, *Fulica atra*, *Motacilla alba*, *Motacilla flava*, *Luscinia svecica*, and *Calidris pugnax* were spotted during the winter season from December to March, while *Hirundo smithii*, the sole

Table 2. Family-wise distribution of genera and species of birds.

	Family	No. of Genera	No. of Species	Relative Diversity (RDi)
1	Accipitridae	3	3	4.11
2	Anatidae	8	10	13.70
3	Scolopacidae	4	6	8.22
4	Burhinidae	1	1	1.37
5	Charadriidae	1	3	4.11
6	Ciconiidae	2	2	2.74
7	Columbidae	3	3	4.11
8	Alcedinidae	2	2	2.74
9	Meropidae	1	1	1.37
10	Upupidae	1	1	1.37
11	Cuculidae	2	2	2.74
12	Phasianidae	2	2	2.74
13	Rallidae	4	4	5.48
14	Cisticolidae	2	3	4.11
15	Corvidae	1	2	2.74
16	Estrildidae	2	2	2.74
17	Motacillidae	1	2	2.74
18	Nectariniidae	1	1	1.37
19	Passeridae	1	1	1.37
20	Ploceidae	1	2	2.74
21	Pycnonotidae	1	1	1.37
22	Sturnidae	1	2	2.74
23	Leiothrichidae	2	2	2.74
24	Hirundinidae	1	1	1.37
25	Muscicapidae	2	2	2.74
26	Ardeidae	6	6	8.22
27	Threskiornithidae	2	2	2.74
28	Podicipedidae	1	1	1.37
29	Psittacidae	1	1	1.37
30	Phalacrocoracidae	1	1	1.37
31	Anhingidae	1	1	1.37
	Total	62	73	100

summer migrant was observed from April to August.

It was found that 69 species are Least Concern category of the IUCN Red List 2019—three species (*Mycteria leucocephala*, *Anhinga melanogaster*, and *Threskiornis melanocephalus*) are Near Threatened and one species *Aythya ferina* Vulnerable. Besides these, Painted Stork *Mycteria leucocephala* is protected under Schedule IV of the Indian Wildlife Protection Act, 1972.

The feeding habits of the recorded birds showed that the maximum number of species (45 species) were omnivorous followed by carnivorous (20 species),

insectivorous (four species), herbivorous (two species), frugivorous (one species) and granivorous (one species). A significant number of the omnivorous species suggested the presence of a very heterogeneous habitat in terms of availability of food (Figure 2).

DISCUSSION

The presence of a variety of birds in the diverse habitats of the Tilyar Lake suggests it an important bird habitat. The lake islands, green lawns, and the peripheral waterlogged area provide a heterogeneous habitat which supports a rich diversity of birds. We report an updated and extended checklist of Tilyar Lake, Rohtak. The sighting of the additional bird species suggests the need for further scientific studies and more field works on the lake and adjacent area. The lake, therefore, serves as an excellent stopover site for many migrant species as well as a favourable roosting and nesting site for a large number of resident species. The variety of habitats and heterogeneous environments of Tilyar Lake attracts and supports a good number of bird species. It is, therefore, proposed that developmental and other anthropogenic activities should be avoided or minimized in and around the lake area. Adequate measures should, therefore, be adopted for the protection and conservation of the lake's avian heritage.

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Image 1–20. Some important birds of Tilyar Lake, Rohtak: 1—Indian Spot-billed Duck | 2—Pied Kingfisher | 3—Red Avadavat | 4—Ruff | 5—Bar-headed Goose | 6—Green Sandpiper | 7—Northern Pintail | 8—Common Pochard | 9—Eurasian Thick knee | 10—Red-naped Ibis | 11—Northern Shoveler | 12—Lesser Whistling-duck | 13—Grey Francolin | 14—Painted Stork | 15—Comb Duck | 16—Bank Myna | 17—Oriental Darter | 18—Black-headed Ibis | 19—Yellow-wattled Lapwing | 20—Black-crowned Night Heron. © Vinay Malik.

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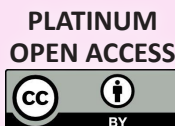
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Communications

Mammalian fauna in an urban influenced zone of Chandaka-Dampara Wildlife Sanctuary in Odisha, India

– Subrat Debata & Kedar Kumar Swain, Pp. 15767–15775

Species in peril: assessing the status of the trade in pangolins in Nepal

– Prayash Ghimire, Nirjala Raut, Pragya Khanal, Suman Acharya & Suraj Upadhyaya, Pp. 15776–15783

Diversity and synanthropy of flies (Diptera: Calypttratae) from Ecuador, with new records for the country

– Karen Blacio, Jonathan Liria & Ana Soto-Vivas, Pp. 15784–15793

Butterfly diversity in Gidakom Forest Management Unit, Thimphu, Bhutan

– Thal Prasad Koirala, Bal Krishna Koirala & Jaganath Koirala, Pp. 15794–15803

Butterfly diversity in heterogeneous habitat of Bankura, West Bengal, India

– Kalyan Mukherjee & Ayan Mondal, Pp. 15804–15816

A second report on butterflies (Lepidoptera) from Ladakh Union Territory and Lahaul, Himachal Pradesh, India

– Sanjay Sondhi, Balakrishnan Valappil & Vidya Venkatesh, Pp. 15817–15827

Collecting parasitic Aculeata (Hymenoptera) from rice ecosystems of Tamil Nadu, India

– J. Alfred Daniel & K. Ramaraju, Pp. 15828–15834

An annotated checklist of sea slug fauna of Gujarat coast, India

– Piyush Vadher, Hitesh Kardani & Imtiyaz Belem, Pp. 15835–15851

Additional description of the Algae Hydroid *Thyroscyphus ramosus* (Hydrozoa: Leptothecata: Thyroscyphidae) from Palk Bay, India with insights into its ecology and genetic structure

– G. Arun, R. Rajaram & K. Kaleshkumar, Pp. 15852–15863

Floristic composition and distribution pattern of herbaceous plant diversity in fallow lands of the central districts of Punjab, India

– Jashanpreet Kaur, Rajni Sharma & Pushp Sharma, Pp. 15864–15880

Morphological and molecular phylogenetic studies on *Battarrea phalloides* (Agaricales): a new report to Indian mycobiota

– R. Kantharaja & M. Krishnappa, Pp. 15881–15888

Diversity of polypores in Kerala Agricultural University main campus, Vellanikkara, Kerala, India

– M. Kiran, C.K. Adarsh, K. Vidyasagran & P.N. Ganesh, Pp. 15889–15904

Short Communications

On the evidence of the Irrawaddy Dolphin *Orcaella brevirostris* (Owen, 1866) (Mammalia: Cetartiodactyla: Delphinidae) in the Hooghly River, West Bengal, India

– Gargi Roy Chowdhury, Kanad Roy, Naman Goyal, Ashwin Warudkar, Rashid Hasnain Raza & Qamar Qureshi, Pp. 15905–15908

Avifaunal diversity of Tilyar Lake, Rohtak, Haryana, India

– Jagjeet Singh, Sandeep Antil, Vivek Goyal & Vinay Malik, Pp. 15909–15915

Life-history traits and courtship behaviour of four poorly known endemic bush frogs (Amphibia: Anura: Rhacophoridae) from the Western Ghats of India

– A.V. Abhijith & Shomen Mukherjee, Pp. 15916–15921

A first record of *Camacinia harterti* Karsch, 1890 (Odonata: Libellulidae) from Arunachal Pradesh, India

– Arajush Payra, K.A. Subramanian, Kailash Chandra & Basudev Tripathy, Pp. 15922–15926

Occurrence of *Fulgoraacia* (= *Epiricania*) *melanoleuca* (Lepidoptera: Epipyropidae) as a parasitoid of sugarcane loophopid planthopper

Pyrilla perpusilla in Tamil Nadu (India) with brief notes on its life stages

– H. Sankararaman, G. Naveenadevi & S. Manickavasagam, Pp. 15927–15931

A preliminary survey of soil nemafuna of Bhagwan Mahaveer Wildlife Sanctuary, Goa, India

– Kiran Gaude & I.K. Pai, Pp. 15932–15935

Thirty-nine newly documented plant species of Great Nicobar, India

– Kanakasabapathi Pradheep, Kattukkunnel Joseph John, Iyyappan Jaisankar & Sudhir Pal Ahlawat, Pp. 15936–15944

Notes

An observation of homosexual fellatio in the Indian Flying Fox

Pteropus medius (Temminck, 1825) (Mammalia: Chiroptera: Pteropodidae)

– K.S. Gopi Sundar & Swati Kittur, Pp. 15945–15946

Diurnal observation of a Malayan Krait *Bungarus candidus* (Reptilia: Elapidae) feeding inside a building in Thailand

– Cameron Wesley Hodges, Anji D'souza & Sira Jintapirom, Pp. 15947–15950

An additional record of the Tamdil Leaf-litter Frog *Leptobrachella tamdil* (Sengupta et al., 2010) (Amphibia: Megophryidae) from Dampa Tiger Reserve, Mizoram, India

– Vanlalsiammawii, Remruatpuii, V.L. Malsawmhriatuali, Lalmuansanga, Gospel Zothanmawia Hmar, Saisangpuia Sailo, Ht. Decemson, Lal Biakzuala & H.T. Lalremsanga, Pp. 15951–15954

Records of dragonflies and damselflies (Insecta: Odonata) of Dipang Lake, with two new records to Nepal

– K.C. Sajjan & Juddha Bahadur Gurung, Pp. 15955–15961

Henry's Rattan *Calamus henryanus* Becc. (Arecaceae), a new record to India

– Selim Mehmud & Himu Roy, Pp. 15962–15966

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