

STUDIES ON BIRD AND FISH ASSEMBLAGE IN DAROJI LAKE, BALLARI, KARNATAKA

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Abstract

A study was carried out to record the bird species in Daroji Lake near Sandur, Ballari District, Karnataka. In the present study a total of 34 birds were identified and classified to ten orders and 24 families. Among them Ardeidae and Scolopacidae were found to be the highest composition (11 %) followed by Anatidae, Charadriidae, Jacanidae, Laridae, Ciconidae and Rallidae with 6 % each and others were found to be 3 %. Among fishes population, Catla catla, Mrigal, labeo spp. Tilapia, *Channa punctatus* and low valued fishes like *Glossogobius giuris*, *Mystes*, *Xenentodon cancila*, *Garra* sp., *Paraambassis ranga*, *Hyporhamphus xanthopterus*, *Gambusia*, were recorded during the study. Though the lake does not provide nesting and roosting place directly, it was found that the visitation of these birds is directly correlated with the availability enormous fishes as food items.

Key words: wetlands, charadriiformes, carps, Daroji lake

Introduction

Wetlands are habitats for many number fauna and flora around the world. These are distinct ecosystems with specific functional characteristics and economical values. However, they are also ecologically sensitive and adaptive systems (Turner *et al.*, 2000). In India, wetland ecosystems are distributed in different geographical regions ranging from extreme north to south. According to the Directory of Indian Wetlands 1993 (WWF and AWB, 1993), the areal spread of wetlands was around 58.3 m ha. As mentioned in Space Applications Centre (SAC) National Wetland Atlas (2011), 201,503 wetlands were identified and mapped in India. These wetlands are considered to be a vital part of hydrological cycle and are highly productive systems which supports large biological diversity and provide a wide array of ecosystem goods and services including irrigation, domestic water supply, freshwater fisheries and water for recreation (Wetlands Rules, 2010). Different types of wetlands provide important breeding sites for wildlife and provide a refuge for several migratory birds. According to Agarwal (2011) approximately between 1200 and 1300 number of species of migratory birds recorded from India. In wetlands, aquatic bird communities have been demonstrated to be influenced by their environment factors like water availability and their physical-chemical properties. Assemblage of birds and their composition can also be influenced by local ecological interactions such as food and predation. Wetland

birds perform important functions in the ecosystem as main vectors by maintaining biotic connections between catchments for aquatic plants and invertebrates (Amezaga et al., 2002). Majority of research work on wetland management in India relates to the limnological aspects and ecological/environmental economics of wetland management. However, a few notable field surveys on avian diversity have been conducted in major wetlands of India (Nazneen et al., 2001; Bhat et al., 2009; Saikia and Devi, 2011; Balkhande et al., 2012). Assessing the bird diversity of a habitat over time and space is important to know about the status of avian community as well as lake or status. Hence the present research work was carried out to understand the birds and their food integrity in Daroji Lake Ballari.

Materials and Methods

Study area

Daroji Lake is geographically located at latitude $15^{\circ}15'0''$ and longitude $15^{\circ}15'0''$. It is named after the village Daroji, located in the Sandur taluk of Bellary district in Karnataka (Fig.1). The lake is regarded as the second largest water bodies in Karnataka.

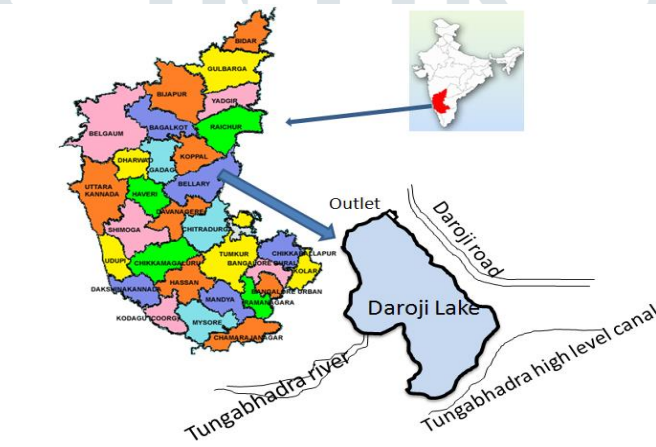


Fig.1. Study area; Local of Daroji Lake

To collect the data on bird diversity, point count survey method (Hamel et al. 1996) was followed. The birds were observed by naked eye and using binoculars and photographs were taken, then bird species were identified and taxonomically classified using bird guide book of by Salim Ali (2002) and Birds of the Indian Subcontinent by Grimmett, Inskipp and Inskipp (2011) and Internet Birds database were used for the identification of birds. Fishes were collected by using fish nets of different mesh size and were identified by using identification keys (Talwar and Jhingran 1991). Prey-predator relationship was evaluated based on the feeding behaviour of birds.

Results and discussion

In the present investigation a total of 34 birds species were identified and they grouped into ten orders and 24 families. Among them charadriformes comprised 12 species of 6 families. The most common bird species are belongs to scolopacidae (4 species). Charadriidae, Jacanidae and Laridae comprised 2 species each. Whereas, Burhinidae and Recurvirostridae comprised one species each. Passeriformes includes Dicruridae, Laniidae,

Pycnonotidae, Motacillidae and Muscicapidae having one representative species in each family. Pelecaniformes comprised Ardeidae, Threskiornithidae and Pelecanidae. The family Ardeidae possesses four species and Threskiornithidae and Pelecanidae comprised one species each. Coraciiformes includes Alcedinidae, Coraciidae and Meropidae with one representative species each. Suliformes includes 2 families (Anhingidae and Phalacrocoracidae) whereas, other orders having one family with one representative bird each (Accipitriformes–Accipitridae; Anseriformes–Anatidae; Ciconiiformes –Ciconiidae; Columbiformes –Columbidae and Gruiformes-Rallidae) Table 1.

Table 1: Check list of Birds visited to Daroji Lake Ballari

Order	Family	Common Name	Scientific Name
Accipitriformes	Accipitridae	Pallied harrier	<i>Circus macrourus</i>
Anseriformes	Anatidae	Pacific black duck	<i>Anas superciliosa</i>
		Ring-necked duck	<i>Aythya collaris</i>
Charadriiformes	Burhinidae	Great thick-knee	<i>Esacus recurvirostris</i>
	Charadriidae	Snowy plover	<i>Charadrius nivosus</i>
		Red-wattled lapwing	<i>Vanellus indicus</i>
	Jacanidae	Northern jacana	<i>Jacana spinosa</i>
		Wattled jacana	<i>Jacana jacana</i>
	Laridae	River Tern	<i>Sterna aurantia</i>
		Whiskered tern	<i>Chlidonias hybrida</i>
	Recurvirostridae	Black-winged stilt	<i>Himantopus himantopus</i>
	Scolopacidae	Common redshank	<i>Tringa totanus</i>
		Stilt sandpiper	<i>Calidris himantopus</i>
		Eurassian Curlew	<i>Numenius arquata</i>
		Black tailed godwit	<i>Limosa limosa</i>
Ciconiiformes	Ciconiidae	Painted stork	<i>Mycteria leucocephala</i>
		Wooly Necked Stork	<i>Ciconia episcopus</i>
Coraciiformes	Alcedinidae	Pied kingfisher	<i>Ceryle rudis</i>
	Coraciidae	The Indian roller	<i>Coracias benghalensis</i>
	Meropidae	Bee-eater	<i>Merops apiaster</i>
Columbiformes	Columbidae	Ring-necked dove	<i>Streptopelia capicola</i>
Gruiformes	Rallidae	Swamphen	<i>Porphyrio porphyrio</i>
		Eurasian coot	<i>Fulica atra</i>
Passeriformes	Dicruridae	Drango	<i>Dicrurus macrocercus</i>
	Laniidae	Red-backed shrike	<i>Lineus collurio</i>
	Pycnonotidae	Red-vented bulbul	<i>Pycnonotus cafer</i>
	Motacillidae	Pied wagtail	<i>Motacilla aguimp</i>
	Muscicapidae	Desert wheatear	<i>Oenanthe deserti</i>
Pelecaniformes	Ardeidae	Grey heron	<i>Ardea cinerea</i>
		Great egret	<i>Ardea alba</i>
		Yellow bittern	<i>Ixobrychus sinensis</i>
		Black headed Ibis	<i>Threskiornis melanocephalus</i>
	Threskiornithidae	Eurasian Spoonbill	<i>Platelea leucorodia</i>
Pelecanidae	Spot Billed Pelican	<i>Pelecanus philippensis</i>	
Suliformes	Anhingidae	Oriental Darter	<i>Anhinga melanogaster</i>
	Phalacrocoracidae	Indian cormorant	<i>Phalacrocorax fuscicollis</i>

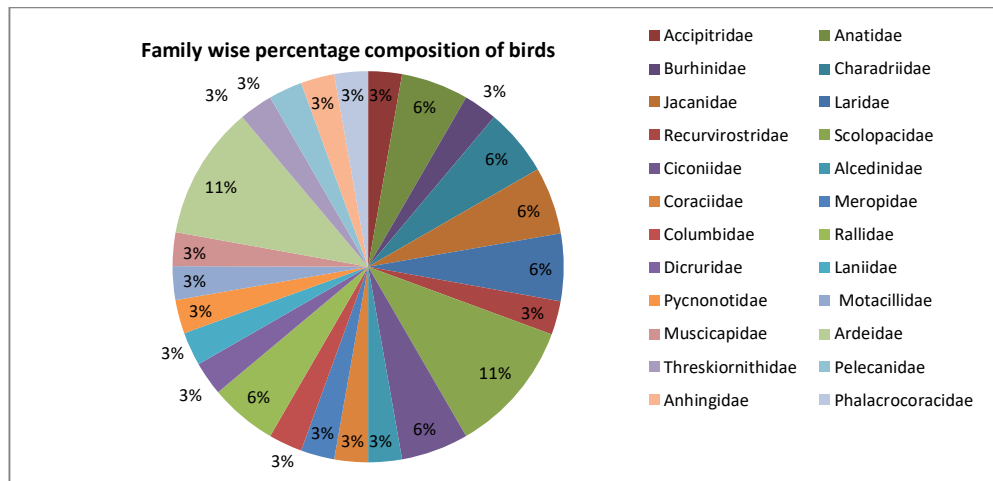


Fig.2 . Family wise percentage composition of birds in Daroji Lake

Among 24 families Ardeidae and Scolopacidae were found to be the highest percentage (11 %) followed by Anatidae, Charadriidae, Jacanidae, Laridae, Ciconidae and Rallidae with 6 % each and others were found to be 3 % (Fig.2). Birds are an integral part of all lake systems and some group like charadriiformes, Passeriformes, pelecorniformes and Coraciiformes were dominated with more number of species in Daroji Lake. This might be due to availability of preferential food organisms especially surface and column feeding fish population in the lake. However, families representing one or two species beside their strong fish feeding habit, they also feed on insect and their larvae in the shallow water areas. Many waterfowl, including the Coots and ring-necked duck use aquatic plants as a food source and thus are generally more abundant in lakes with an abundance of aquatic plants. Other aquatic birds that prefer a habitat with plentiful aquatic plants include curlews. These species are generalized feeders that consume insects, fish, small animals, snails, and other aquatic fauna that are associated with aquatic vegetation (Mark V. Hoyer 2013). The bushy water plants and vegetation along the banks of the lake makes the most suitable place for some of the resident and short migratory birds to take shelter and breed (Scott 1997). Daroji Lake is partially covered with vegetation near the banks and the water spread area is wide and shallow. This makes small waders, aerial foragers and swimming birds to identify their prey easily.

Table 2. Check list of fishes in Daroji Lake Ballari

Order	Family	Common Name	Scientific Name
Anabantiformes	Channidae	Murrels	<i>Channa gachua</i>
		snakehead fish	<i>Channa marulius</i>
		spotted snakehead	<i>Channa punctatus</i>
Cichliformes	Cichlidae	Tilapia	<i>Tilapia mossambica</i>
Cypriniformes	Cyprinidae	Common Carp	<i>Cyprinus carpio var communis</i>
		Grass carp	<i>Ctenopharyngodon idella</i>
		Silver carp	<i>Hypophthalmichthys molitrix</i>
		Catla	<i>Catla catla</i>
		Rohu	<i>Labeo rohita</i>
		Fringed-lipped peninsula carp	<i>Labeo fimbriatus</i>
		Mrigaal	<i>Cirrhinus mrigal</i>
		Flying barb	<i>Esomus daniconius</i>
Cyprinodontiformes	Poeciliidae	Gambusia	<i>Gambusia affinis</i>
Gobiiformes	Gobiidae	Gobi	<i>Glossogobius giuris</i>
Osteoglossiformes	Notopteridae	Asiatic knifefish	<i>Notopterus notopterus</i>
Siluriformes	Clariidae	Cat fish	<i>Clarius batrachus</i>
	Siluridae	wallago catfish	<i>Wallago attu</i>
	Bagridae	Gagari	<i>Mystus seengala</i>
	Heteropneustidae	Asian stinging catfish	<i>Heteropneustes fossilis</i>

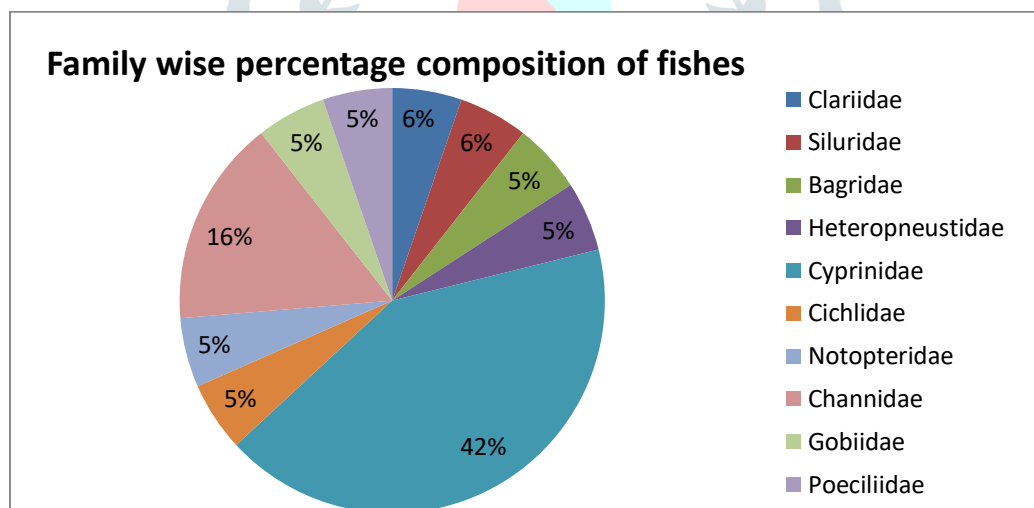


Fig.3 Family wise percentage composition of fishes in Daroji Lake

On the other hand, among fish population Cyprinidae comprised 8 species (Common carp, Grass carp, Silver carp, Catla, Rohu, L. fimbriae, Mrigaal and Flying barb) followed by Channidae (Murrels, Snakehead fish and Spotted snakehead). Whereas, Cichlidae, Poeciliidae, Gobiidae, Notopteridae, Clariidae, Siluridae, Bagridae and Heteropneustidae comprised single representative species each. Among 10 families cyprinidae composed of 42 % followed by channidae (16%), Clariidae and Siluridae 6 % each and Bagridae, Heteropneustidae, cichlidae, Gobidae and Poecilidae comprised 5 % each (Fig.3). Indian major carps are highly commercial and cultured in the lake by local farmer and tilapia is also grown since its adoptability to any kind of condition.

Earlier studies indicated that water quality plays a major role culturing of fishes (Hoyer and Canfield, Jr., 1990; Suresh et al., 2019). In the present study it is clear that availability of food organisms like fishes, and other invertebrates influenced on the visitation of resident as well as short migratory birds (Manohara and Hosetti 2018). Majority of species of Charadriiformes have a habit of feeding on insects and other invertebrates, large amount of Algae and fish are the primary food items. Banda-Villanueva et al. (2013) revealed that the principal food items for charadriiformes are also found in sediments were larvae of Diptera: Chironomidae and Ephydriidae. The Pelecaniform birds feed primarily on fish, mollusks, crustaceans, amphibians, reptiles, and invertebrates. Jinnath Anam *et al.* (2016) observed that certain peccarniforms like *Anastomus oscitans* predominantly feeds on *Puntius* sp, and *Heteropnustes fossilis*. Most of the Passeriformes are native species which were observed throughout the observation period. Mark V. Hoyer and Daniel E. Canfield, Jr (1994) revealed that Bird abundance and species richness remain relatively stable as macrophyte abundance increases, but birds that use open-water habitats (e.g., double-crested cormorant, *Phalacrocorax auritus*) are replaced by species that use macrophyte communities (e.g., ring-necked duck, *Aythya collaris*). The abundance and distribution of birds usually reflects the status of the lower trophic levels and thus giving an indication of the associated biodiversity (Seys et al., 1995). The present study it is therefore can be concluding that the Daroji Lake is a good source of food organisms for much number of native and migratory birds. The current research also infers that the required protection from the unwanted human interference which might disturb the breeding bird population. It is also required to raise awareness about the delicacy this lake with respect to birds.

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