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Avifaunal diversity of Anekere wetland, Karkala, Udupi district, Karnataka, India

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Abstract: *The avifaunal diversity and density in Anekere wetland, Karkala, Udupi district, Karnataka, India, was studied for a period of three years. Anekere pond inhabits several local and migratory bird species. Reduction in water retention in this pond in summer, weed infestation, variations in food availability in different seasons and threat of predation on the breeding activity of birds affected the avifauna diversity in the study area. This habitat attracted 44 bird species, which are local and migratory including aquatic birds, waders and others. Highest population of tree ducks (lesser whistling teal) was recorded in all the three years of study. Other prominent residents were Moorhens, Jacanas, Herons and Cormorants. The visitors include ringed plovers, wagtails and storks. It was evident that purple moorhen and tree ducks have developed high tolerance to this highly fluctuating habitat and human activity.*

Key words: *Wetland birds, Avifauna, Anekere, Open bill stork, Mmoorhen, Tree duck*
PDF of full length paper is available online

Introduction

Wetlands constitute a treasury of biodiversity. The social demand and dependence on the wetlands provide an unaccountable economic value to such habitats. They are complex water and land interactive systems and are supposed to be the most fertile and productive sites in the world. The study of avifauna of different wetlands gained momentum only after Ramsar convention in 1971.

Saxena (1975) has studied the flora and fauna of Bharatpur Bird Sanctuary which support the bird life. Hussain *et al.* (1984) has studied the profile of Chilka lake in Orissa. Singh and Roy (1990) studied the ecology of birds of Kawar lake in Bihar. Sanjay (1993) studied the ecology of birds at Kokkare-Bellur. Hosetti *et al.* (2001) studied the ornitho-ecological aspects on Gudavi bird Sanctuary, Shimoga. Uttangi (2001) has studied the conservation and management for the waterfowls of minor irrigation tanks and their importance as stopover sites in Dharwad district. Shanbhag *et al.* (2001) reported the impact of Konkan Railway Project on the avifauna of Carambolim lake in Goa. Inac *et al.* (2008) studied the bird species of Kumasir lake, Turkey and the role of environmental ethics on sustainable wet land management.

The above avifaunal studies impress upon the need for the inventory of avifaunal diversity of other such habitats. The study area is the Anekere pond, a man-made wetland, located in Karkala taluk of Udupi district, Karnataka state at the foot hills of Western Ghats (Fig. 1). It is about 35 km from Udupi located at 13° North latitude and 75° East longitude. The altitude is about 300 meters. The average rainfall is about 4500 mm per annum and the temperature ranges from 19° to 38°C (Achar, 1996).

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Anekere wetland extends over 25 acres area with a Jain Temple (Basadi) in the centre. Anekere pond is a scenic beauty and most productive ecosystem in the past. It was built by Pandyadeva of Bhyravarasu Dynasty in 1262 A.D. The pond has been a main source of water for recharging the surrounding wells and bore wells in the town. It is a vulnerable pond harboring plenty of resident and migratory birds.

The pond is infested by the weed *Salvinia molesta*. It has affected the light penetration in the pond (Hosetti *et al.,* 1985). The present investigation deals with the studies on the ornitho-ecological aspects of Anekere wetland, with special citation to resident and migratory birds. Seasonal changes in the density and diversity of avifauna of Anekere pond was recorded for a period of 3 years from April 2004 to March 2007.

Materials and Methods

Inventorying water fowl diversity and density was made. The pond was demarcated into 2 sites *i.e.*, Site I (West) and Site II (East), for the study purpose. Weekly visit to the pond was made for three years and an average of 4 weeks was accounted for a month. Water fowl population was enumerated by point count and direct counting methods (Colin *et al*., 1992). Binoculars were used for bird watching. Water fowls were identified by referring the key provided (Bhushan *et al*., 1993; Ali, 1996; Bikram, 2000).

Water fowl population was observed and documented every week end in the morning hours. The relative abundance of birds was estimated and their monthly fluctuations over the years were recorded. The present study was focused on the ecological status

of avifaunal diversity and density in the study area. The birds are classified on the basis of "The Book of Indian birds" (Ali, 1996).

Results and Discussion

Monthly variation in the avifauna and the relative abundance of these species in the study area was recorded. A check list of 44 bird species cited in the present study is presented in Table 1.

Little grebes (*Tachybaptus ruficollis*) occupied the pond invariably in winter. They are locally displaced in different seasons. Little cormorants (*Phalacrocorax niger*) were found in the study area in all seasons. However they were found moving to large trees in neighboring woodlands for breeding activity with other birds like herons. Similar observation of mixed nesting of cormorants with herons was reported by Thompson (1981). Herons and egrets were found in remarkable number in the pond during the winter months of the study period as there was abundant food source and safe habitat. They were locally displaced when the pond dried up in summer.

Surprisingly open bill storks (*Anastomus oscitans*) which was never cited in the study area earlier was noticed in November 2004. They were only 6 in number. They stayed there up to May 2005 and then disappeared and never returned again. Their arrival to the pond may be accidental.

The highest population of the lesser whistling teal or tree duck (*Dendrocygna javanica*) was found in the study area with a composition of 52.13% of total avifauna. The tree duck population was found to be maximum in winter months, less in summer and minimum in the monsoon season. All the tree ducks left the pond completely in April and May 2006, may be due to non availability of food.

Common teal (*Anas crecca*) and Cotton teal (*Nettapus coromandelianus*) were local migratory birds found foraging in the pond mostly from December to April in all the 3 years of study. Probably they occupy the pond only when the food is available and then move to some other suitable areas.

White breasted waterhen (*Amaurornis phoenicurus*) was a resident bird, found throughout the year. They are more heard than seen, because they disappear quickly on sighting the danger. Similar openion was expressed by Fredrickson and Reid (1986), about Indian moorhen.

The purple moorhen (*Porphyrio porphyrio*) which was altogether absent in the study area previously (Achar, 1996), was a common resident species in all the 3 years of the present study. These species were adopted to live in weed infested marshy area and are able to tolerate regular disturbances. The breeding activity of purple moorhens was also observed on the weed beds in the pond. Presence of these birds in the pond may be an indicator of enhanced weed infestation and increased vegetation in the wetland.

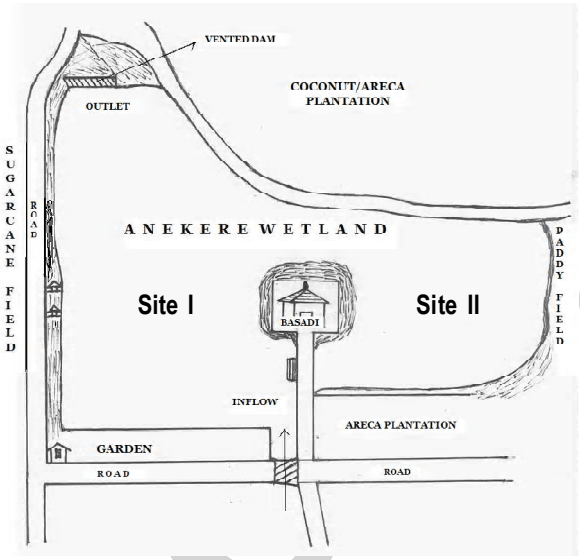

Fig. 1: Anekere pond showing Site I and Site II

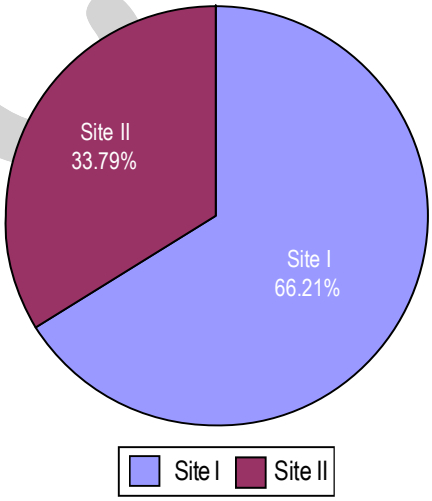

Fig. 2: Percentage composition of avifauna in Site I and Site II

Bronze winged jacana (*Metopidius indicus)* was also found as resident species in the study area. Both feeding and breeding activities of jacanas were observed in the pond. However their number was more in late winter, as it was their post breeding season and due to abundance of food. They are less in pre monsoon period due to local displacement.

Birds like red wattled lapwing (*Vanellus indicus*), common sand piper (*Tringa hypleucos*) and little ringed plover (*Charadrius dubius*) occupied the pond only on and after winter months. Their arrival coincides with the reduction in water level, where they can avail the food easily by probing in to the mud. Similar observation was made earlier on water birds of Sunderban (Mukherjee, 1972).

The different species of kingfishers recorded in the study area include small blue kingfisher (*Alcedo atthis*), white breasted kingfisher (*Halcyon smyrnensis*), pied kingfisher (*Ceryle rudis*) and

Table - 1: Checklist of birds cited in the study area

Common name	Scientific name	Habitat
Order: Podicipediformes		
Family: Podicipitidae		
Little grebe	*Tachybaptus ruficollis*	+
Order: Pelecaniformes		
Family: Phalacrocoracidae		
Little cormorant	*Phalacrocorax niger*	+
Order:Ciconiiformes		
Family: Ardeidae		
Purple heron	*Ardea purpurea*	+
Grey heron	*Ardea cinerea*	+
Little green heron	*Ardeola striatus*	+
Pond heron	*Ardeola grayii*	+
Cattle egret	*Bubulcus ibis*	+
Median egret	*Egretta intermedia*	
Little egret	*Egretta garzetta*	+
Family: Ciconiidae		
Open bill stork	*Anastomus oscitans*	+
Order: Anseriformes		
Family: Anatidae		
Tree duck (lesser whistling teal)	*Dendrocygna javanica*	+
Common teal	*Anas crecca*	+
Cotton teal	*Nettapus coromandelianus*	+
Order: Gruiformes		
Family: Rallidae		
White breasted waterhen	*Amauromis phoenicurus*	+
Purple moorhen	*Porphyrio porphyrio*	+
Order: Charadriiformes		
Family: Jacanidae		
Bronze winged jacana	*Metopidus indicus*	+
Family: Charadridae		
Red wattled lapwing	*Vanellus indicus*	-
Common sandpiper	*Tringa hypoleucos*	-
Little ringed plover	*Charadrius dubius*	-
Order: Coraciiformes		
Family: Alcedinidae		
Small blue kingfisher	*Alcedo atthis*	-
Whitebreasted kingfisher	*Halcyon smyrnensis*	-
Pied kingfisher	*Ceryle rudis*	-
Brownheaded storkbilled kingfisher	*Pelargopsis capensis*	-
Family: Meropidae		
Small green bee-eater	*Merops orientalis*	-
Order: Passeriformes		
Family: Motacillidae		
Large pied wagtail	*Motacilla madaraspatensis*	-
F: Hirundnidae		
Swallow	*Hirundo rustica*	-
Family: Dicruridae		
Black drongo (king crow)	*Dicrurus adsimilis*	-
Racket-tailed drongo	*Dicrurus paradiseus*	-
Family: Sturnidae		
Indian myna	*Acridotheres tristis*	-
Jungle crow	*Corvus macrorhynchos*	-
Tree pie	*Dedrocitta vagabunda*	-
Family: Pycnonotidae		
Red whiskered Bulbul	*Pycnonotus jocosus*	-
Family: Muscicapidae		
Magpie-robin	*Copsychus saularis*	-
Order: Falconiformes		
Family: Accipitridae		
Pariah kite	*Milvus migrans*	-
Brahminy kite	*Haliastur Indus*	-
Sparrow-hawk	*Accipiter nisus*	-
Order: Columbiformes		
Family: Columbidae		
Blue rock pigeon	*Columba livia*	-
Spotted dove	*Streptopelia chinensis*	-
Order: Psittaciformes		
Family: psittacidae.		
Roseringed parakeet	*Psittacula krameri*	-
Bluewinged parakeet	*Psittacula columboides*	-
Order: Cuculiformes		
Family: Cuculidae		
Koel	*Eudynamys scolopacea*	-
Crow-pheasant (Coucal)	*Centropus sinensis*	-
Order: Apodiformes		
Family: Apodidae		
House Swift	*Apus affinis*	-
Order: Piciformes		
Family: Capitonidae		
Large green barbet	*Megalaima zeylanica*	-

Table - 2: Monthly fluctuation in the diversity of avifauna

Month	2004-05		2005-06		2006-07	
	Site I	Site II	Site I	Site II	Site I	Site II
Apr.	21	16	22	16	18	17
May	17	12	16	14	15	14
Jun.	16	11	16	13	16	15
Jul.	16	9	18	8	17	11
Aug.	15	13	18	14	17	12
Sep.	16	15	19	17	19	16
Oct.	17	16	19	16	20	17
Nov.	20	17	21	17	21	22
Dec.	22	22	23	20	23	23
Jan.	23	23	23	19	22	19
Feb.	24	24	23	21	23	19
Mar.	24	24	23	21	23	20

Table - 3: Monthly fluctuations in the density of avifauna

Month	2004-05		2005-06		2006-07	
	Site I	Site II	Site I	Site II	Site I	Site II
Apr.	339	251	400	148	110	98
May	315	227	179	81	86	68
Jun.	225	134	168	72	63	63
Jul.	199	74	74	30	61	29
Aug.	216	93	86	41	60	26
Sep.	307	145	102	53	69	42
Oct.	378	155	231	92	151	89
Nov.	454	216	293	93	236	180
Dec.	514	232	416	196	254	208
Jan.	568	215	450	197	320	231
Feb.	533	231	429	172	340	210
Mar.	484	192	180	112	283	190

brown headed stork billed kingfisher (*Pelargopsis capensis*). Small green bee eaters (*Merops orientalis*), large pied wagtail (*Motacilla madaraspatensis*) and common swallow (*Hirundo rustica*) were the resident species, recorded throughout the study period.

Monthly variation in the diversity of aquatic and water birds during the study period is presented in Table 2. It was observed that the avifaunal diversity was more in January, February and March as there was optimum water storage, availability of abundant food, increased vegetation and the arrival of migratory birds. The minimum diversity was recorded in July due to heavy rain, increased flow of water, non availability of food and return of migratory birds.

Many of the birds were displaced during this season and spread in the neighboring areas of agricultural activities, which form their feeding ground. Some birds find their breeding grounds elsewhere in this season. They start returning to the pond by September.

Monthly variation in the density of avifauna (number of individuals) in the study period was presented in Table 3. The bird density or the number of individuals were more in December, January and February and less in May, June and July. Similar observations were made by Saxena (1975) on avifauna of Keoladeo National Park, Bharatpur. Since January month is the post breeding season of many of the birds, chicks of birds like jacanas and moorhens were noticed in the pond; where the parents' exhibit marked parental care. Abundant food supply was also the cause of increased density of avifauna in January every year.

Percentage composition of birds inhabiting in Site I and Site II in the study area during the study period was presented in Fig. 3. Interestingly it was observed that the Site I was occupied by 66.21% of birds and Site II was occupied by only 33.79%. It clearly indicates that the birds preferred Site I in the study area. This may be due to less disturbance, higher water retention for a longer period, availability of abundant food and more vegetation.

The Site I in the study area was preferred by all bird species. Highest population of tree duck (lesser whistling teal) was found in the pond followed by purple moorhen and then Bronze winged Jacana. Rarely recorded bird was the open bill stork and the lowest population was of white breasted king fisher. More number of species occurred mostly during January, February and March months and less in May, June and July months in the study area. Maximum number of individuals was recorded mostly in the month of January and minimum was in July in all the 3 years of study.

The study proved that the present ecological characteristics of the pond made the birds unable to inhabit the pond throughout the year. Siltation, pollution and weed infestation are the major threats to the avifauna of Anekere pond. Hence, it is required to restore the original ecological features of Anekere wetland by the Government, NGOs and the general public at large to make the pond an abode of water fowl.

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