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Diversity of Avifauna of Trimmu Barrage, District Jhang, Punjab, Pakistan

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Abstract.- Trimmu Barrage is situated at a distance of 21 km in southwest of Jhang city on Jhang-Bhakkar road. It is a complex of aquatic and terrestrial ecosystem. Study was conducted with special reference to diversity of birds on monthly basis for a period of nine months. A total of 9699 birds 89 species belonging to 68 genera, 39 families and 15 orders were recorded. Among these 89 avian species were migratory and winter visitors, 4 migratory but summer breeder, 4 ordinary migrants and 52 were residents. Maximum population of birds was recorded during December, 2004 and January, 2005 due to increase in population of migratory and winter visitor birds *i.e.* waterfowl species. Illegal hunting, land leasing to the farmers for cultivation, eutrophication of reservoir, livestock grazing and vegetation exploitation were recorded as the major threats to wild fauna of the study area. It was concluded that there is an urgent need to safeguard the very fragile ecosystem and the overall biodiversity of Trimmu Barrage through management planning of the area.

Key words: Avifauna, Trimmu Barrage, waterfowl, migratory birds, winter visitor, resistant birds.

INTRODUCTION

The avifauna of Pakistan has an interesting and varied composition, which is mainly due to its location in a transitional zone between two of the world's six major biological realms: the Palearctic and Indomalayan (Oriental) realms, and its considerable diversity of habitats. Although Pakistan is predominantly arid and semi-arid, it possesses a great variety of wetlands distributed almost throughout the country from the coastal mangroves and mudflats on the Indus delta to the glacial lakes of the high Himalayas.

Trimmu barrage is an important staging and wintering place for a variety of migratory waterfowls notably Anatidae and staging refuge for waders. The area has a very good potential for scientific research, conservation, education and sport hunting. For the effective management of a species or population, Rubin *et al*. (1998) stressed on the need of accurate knowledge of its spatial distribution. With this aim, the present study was conducted to identify and enlist various species of birds visiting and residing in the area which may provide a baseline for the future management of avian fauna in the area.

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MATERIALS AND METHODS

Study area

Trimmu Barrage (= three mouths) receives two rivers Jhelum and Chenab and one drain named Bhud. It is situated at a distance of about 96Km from Faisalabad and 21Km from district Jhang. Head-Pond area of Trimmu Barrage consists of 3,680.43 acres. Three main canals, two from the left bank (Trimmu–Sadhnai link canal and Haveli Project canal) and one from the right bank (Rangpur canal) emerged from the pond area of the barrage. Pond area of the barrage is contained by the left and right marginal embankment and head works. The main function of barrage is to regulate supply of river water to head Sadhnai, irrigation and control of flood. Trimmu Barrage is a complex of fresh water and terrestrial ecosystems because it has characteristics of both these types. The area has well diversified flora and fauna of aquatic and terrestrial ecosystems.

Procedure adopted

Different types of plants found in the area were collected and their species were identified. Survey was carried out during November, 2004 – July 2005 on monthly site visit basis to study the population of different migratory waterfowl and local bird species of the area. Visits were conducted in the morning and evening. Marginal bunds of the barrage were surveyed by walking on the bunds, whereas pond area was surveyed by using wooden boat. Study was conducted with special reference to diversity of birds. The survey method included on site direct observations with naked eye, Binocular Standard-EZ (10x50) Minolta and Swift Telemaster Model-841 Zoomscope (15x-60x60mm) were used to spot and identify the birds species following Roberts (1991, 1992) and Ali and Ripley (1995, 2001). Birds observed in Trimmu Barrage area were identified upto species level. Informal discussions and dialogues with the local people were also carried out to gather the information about the natural resources of the wetland. Information from the local community and on site observations were recorded on every visit and accumulated at the end of the study.

RESULTS AND DISCUSSION

Avifauna

Habitat of the area has two types of plants, terrestrial plants found on marginal bunds and aquatic plants found n and around water. Main species of trees found on marginal bunds were Siris (*Albizia lebbeck*), Egyptian mimosa (*Acacia nilotica*), Bo tree (*Ficus religiosa*), and River red-gum (*Eucalyptis camaldulensis*), Date palm (*Phoenix dactylifera*), Rosewood (*Dalbergia sissoo*), Indian jujube (*Ziziphus mauritiana*) and Wild jujube (*Z. nummularia*). Ground flora found in the area consisted mainly on Lamb's-quarters (*Chenopodium album*), Cheeseweed mallow (*Malva parviflora*), Camel thorn (*Alhagi maurorum*), Toothed medick (*Medicago polymorpha*), Sweet clover (*Melilotus indica*), Bermuda grass (*Cynodon dactylon*), Syrian rue (*Peganum harmala*) and Puncture vine (*Tribulus terristris*). The main aquatic plant species found in the area were Wter-thyme (*Hydrilla verticillata*), Striate vallis (*Vallisneria spiralis*), Sacred lotus (*Nelumbo nucifera*), Egyptian lotus (*Nymphea lotus*), Bengal cane (*Saccharum bengalense*), Wild cane (*S. spontaneum*), Tamarisk (*Tamarix dioica*) and Southern cat-tail (*Typha domingensis*).

The area accommodates a large variety of birds. During study 89 bird species belonging to 68 genera 39 families and 15 orders were recorded from the area (Table I). The avifauna was observed to be a combination of avian species found in freshwater and terrestrial habitat. Passeriformes is the most dominant order represented by 36 species belonging to 18 families, followed by Charadriiformes, which was represented by 11 species belonging to 5 families. Coraciiformes is represented by 6 species belonging to 4 families. Order Ciconiiformes, Anseriformes, Accipitriformes, Gruiformes and Columbiformes were represented by 6, 7, 5, 4 and 4 species, respectively belonging to single family each. Order Galliformes, Cuculiformes and Piciformes were represented by 2 species each belonging to single family. Order Podicipediformes, Pelecaniformes, Psittaciformes and Strigiformes were represented by a single species each.

Among 89 bird species recorded in the area, 29 species were migratory and winter visitors, 4 were migratory but summer breeders, 4 ordinary migrant and 52 were resident, and found throughout the year and also breed in the area.

During study a total of 9699 birds were observed. Maximum population of birds was recorded during the month of December, 2004 and January 2005 when 1871 and 1843 birds, respectively, were observed and recorded, whereas minimum population of birds was recorded during May–July (Table I). The population of birds increased upto mid-winter due to increase in population of migratory and winter visitor birds especially waterfowl species. Then after mid-winter population, birds decreased gradually due to back migration of waterfowls.

Maximum number of bird species was found during mid-winter and minimum during summer. Seventy six bird species were recorded in January whereas 47 were recorded in July. The increase in number of species during winter is again due to winter visitor waterfowl species.

Different types of waterfowl visit this wetland during winter. The most abundant are

Fulica atra, Anas crecca, A. acuta, A. platyrhynchos, A. Penelope and *Aythya ferina*. Other species found in the area are *Tachybaptus*

ruficollis, Phalacrocorax niger, Ardea cinerea, Bubulcus ibis, Egretta garzetta, Ardeola grayi, Amaurornis phoenicurus, Gallinula chloropus, Porphyrio porphyrio and *Hoplopterus indicus*. Waterfowls are important as game species. It is a great source of food for sport hunters.

During study period Little ringed plover, Little cormorant, Common teal, Little egret, Common coot and Mallard had maximum population which was recorded as 675,604, 592, 562, 519 and 511 birds, respectively (Table I).

Hussain *et al*. (2002) reported 15 migratory and only 6 resident bird species at Rawal Lake, Islamabad. Among these 21 species, the most important was long tailed duck, which is very rare and according to Roberts (1991) there have been no records within the past 50 years. They also recorded red-crested poachard at Rawal Lake. Both these bird species were not found at Trimmu Barrage.

The major threats to avifauna in the area are (i) illegal hunting (ii) leasing to farmers for cultivation of crops by the Punjab and Power Department, which seriously degraded the natural habitat of wild birds (iii) eutrophication due to high nutrient levels which led to increased biomass of aquatic vegetation (chiefly macrophytes) and reduced area of open water for migratory waterfowls. Eutrophication also led to increased sediment deposition from decomposition of emergent and floating plants, and to oxygen deficiency, which further reduced reversion for birds (iv) livestock grazing which continuously disturbed the wild birds who avoid their presence. The domestic dogs accompanying the grazing herds destroy the eggs and chicks of the resident birds, and disturb the waterfowl population in the pond area of the barrage (v) *Saccharum spontaneum* and *Typha domingensis* are cut for commercial purpose, as the logs are used for construction of houses and other material of daily use (vi) unexpected and unpredictable rise and fall in water level due to flood also adversely affects bird population.

Recommendations for management

In order to protect the ecosystem and avifauna of the area all above mentioned threats must be removed. Moreover Government of Punjabs Notification of (S.O. (Rev.) I&P/12-54/2002/Pond area) of November 6, 2002 declaring Trimmu Barrage area as Wildlife Sanctuary should be revised with the information about the extent and boundaries of the Wildlife Sanctuary to enable the Punjab Wildlife & Parks Department to protect avifauna of the area. Creation of public awareness about the local environmental problems through publicity campaigns and media, and involvement of local community in management of the area will help improve the status of Wildlife in Pakistan.

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Table I.- Month wise population of Avifauna of Trimmu Barrage during 2004-2005.

Family	Order	Common Name	Scientific Name	Months									Total
				Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	
Podicipedidae	Podicipediformes	Little grebe	*Tachybaptus ruficollis* (Pallas, 1764)	7	10	20	18	14	6	5	6	-	86
Phalacrocoracidae	Pelecaniformes	Little cormorant	*Phalacrocorax niger* (Vieillot, 1817)	82	18	-	212	285	-	-	-	7	604
Ardeidae	Ciconiiformes	Grey heron	*Ardea cinerea* (Linnaeus, 1758)	-	13	-	5	15	-	-	-	-	33
		Cattle egret	*Bubulcus ibis* (Linnaeus, 1758)	36	57	-	25	25	16	14	14	51	238
		Intermediate egret	*Egretta intermedia* (Wagler, 1829)	-	3	20	30	21	11	9	12	-	106
		Little egret	*E. garzetta* (Linnaeus, 1766)	63	89	25	47	131	50	35	35	87	562
		Indian pond heron	*Ardeola grayii* (Sykes, 1832)	15	62	29	36	22	9	7	29	15	224
		Purple heron	*Ardea purpurea* (Linnaeus, 1766)	4	-	2	-	6	4	-	-	7	23
Anatidae	Anseriformes	Ruddy shelduck	*Tadorna ferruginea* (Pallas, 1764)	-	3	9	-	-	-	-	-	-	12
		Pintail	*Anas acuta* (Linnaeus, 1758)	38	94	115	9	25	-	-	-	-	281
		Common teal	*A. crecca* (Linnaeus, 1758)	146	159	170	90	27	-	-	-	-	592
		Mallard	*A. platyrhynchos* (Linnaeus, 1758)	121	67	182	121	20	-	-	-	-	511
		Eurasian wigeon	*A. penelope* (Linnaeus, 1758)	48	58	59	40	45	-	-	-	-	250
		Common pochard	*Aythya ferina* (Linnaeus, 1758)	24	75	-	13	35	-	-	-	-	147
		Tufted duck	*A. fuligula* (Linnaeus, 1758)	-	15	20	-	-	-	-	-	-	35
Accipitridae	Accipitriformes	Black winged kite	*Elanus caeruleus* (Latham, 1790)	2	-	2	-	-	2	3	2	-	11
		Pariah kite	*Milvus migrans* (Sykes,1832)	9	18	14	-	4	2	3	2	-	52
		Marsh harrier	*Circus aeruginosus* (Linnaeus, 1758)	2	3	5	3	-	-	-	-	-	13
		Indian sparrow hawk	*Accipiter badius* (Temminck, 1824)	3	-	1	1	2	1	-	3	-	11
		White-backed vulture	*Gyps bengalensis* (Gmelin, 1788)	4	-	-	8	12	-	-	-	6	30
Phasianidae	Galliformes	Grey partridge	*Francolinus pondicerianus* (Gmelin, 1789)	2	1	3	4	-	6	4	6	3	29
		Black partridge	*F. francolinus* (Bonaparte, 1856)	2	3	3	4	2	3	2	3	2	24
Rallidae	Gruiformes	White-breasted water hen	*Amaurornis phoenicurus* (Pennant, 1769)	31	39	25	-	6	4	3	6	3	117
		Coot	*Fulica atra* (Linnaeus, 1758)	128	73	180	128	10	-	-	-	-	519
		Indian moorhen	*Gallinula chloropus* (Linnaeus, 1758)	18	27	17	10	12	7	-	3	10	104
		Purple swamphen	*Porphyrio porphyrio* (Linnaeus, 1758)	12	19	8	12	7	-	6	5	9	78

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Family	Order	Common Name	Scientific Name	Months									Total
				Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	
Recurvirostridae	Charadriiformes	Black-winged stilt	*Himantopus himantopus* (Linnaeus, 1758)	43	36	45	12	45	5	-	-	-	186
Charadriidae		Red-wattled lapwing	*Hoplopterus indicus* (Boddaert, 1783)	59	47	14	16	12	25	19	20	10	222
		Northern lapwing	*Vanellus vanellus* (Linnaeus, 1758)	19	9	6	-	-	-	-	-	-	34
		White-tailed plover	*V. leucurus* (Lichtenstein, 1823)	-	5	6	10	4	-	-	-	-	25
		Little ringed plover	*Charadrius dubius* (Scopoli, 1786)	173	182	216	59	30	15	-	-	-	675
Scolopacidae		Green shank	*Tringa nebularia* (Gunnerus, 1767)	17	14	23	-	17	-	-	-	-	71
		Red shank	*T. tetanus* (Linnaeus, 1758)	-	25	17	4	10	-	-	-	-	56
		Common sandpiper	*Actitis hypoleucos* (Linnaeus, 1758)	46	36	18	19	21	12	-	-	-	152
Laridae		Common black-headed gull	*Larus ridibundus* (Linnaeus, 1766)	10	42	45	32	15	-	-	-	-	144
Sternidae		Indian river tern	*Sterna aurantia* (Gray, 1831)	18	25	28	12	12	8	6	-	-	109
		Black-bellied tern	*S. acuticada* (Gray, 1831)	2	3	4	2	2	-	-	-	-	13
Columbidae	Columbiformes	Blue rock pigeon	*Columba livia* (Stickland, 1844)	3	10	9	8	7	4	5	3	2	51
		Indian ring dove	*Streptopelia decaocto* (Frivaldszky, 1838)	17	29	21	17	17	13	-	15	12	141
		Red turtle dove	*S. tranquebarica* (Hermann, 1804)	-	-	-	-	4	3	7	8	4	26
		Little brown dove	*S. senegalensis* (Gmelin, 1789)	7	12	11	-	9	7	6	9	6	67
Psittacidae	Psittaciformes	Rose-ringed parakeet	*Psittacula krameri* (Neumann, 1915)	19	41	27	14	24	19	25	23	12	204
Cuculidae	Cuculiformes	Crow pheasant	*Centropus sinensis* (Stresemann, 1913)	5	-	3	4	5	4	3	4	2	30
		Koel	*Eudynamys scolopacea* (Linnaeus, 1758)	-	-	-	-	-	2	3	5	3	13
Strigidae	Strigiformes	Little owlet	*Athene noctua* (Blyth, 1848)	6	-	4	2	-	4	-	3	2	21
Alcedinidae	Coraciiformes	Common kingfisher	*Alcedo atthis* (Reichenbach, 1851)	2	-	3	2	4	3	2	4	4	24
		White-throated kingfisher	*Halcyon smyrnensis* (Linnaeus, 1758)	6	7	14	5	3	4	3	7	4	53
		Pied kingfisher	*Ceryle rudis* (Reichenbach, 1851)	2	4	5	2	2	2	3	2	3	25
Meropidae		Little green bee-eater	*Merops orientalis* (Neumann, 1910)	8	6	10	16	28	24	20	25	16	153
Coraciidae		Indian roller	*Coracias benghalensis* (Linnaeus, 1758)	3	2	1	1	4	3	2	4	3	23

Continued….

Family	Order	Common Name	Scientific Name	Months									Total
				Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	
Upupidae		Hoopoe	*Upupa epops* (Linnaeus, 1758)	2	15	5	3	3	1	3	6	2	40
Picidae	Piciformes	Golden-backed woodpacker	*Dinopium benghalense* (Blyth, 1849)	2	2	4	2	3	2	2	3	-	20
		Mahratta pied woodpacker	*Dandrocopos mahrattensis* (Biswas, 1951)	-	2	2	5	-	3	2	3	4	21
Alaudidae	Passeriformes	Red winged bush lark	*Mirafra erythroptera* (Blyth, 1845)	-	3	5	-	-	-	-	-	-	8
		Crested lark	*Galerida cristata* (Franklin, 1831)	1	4	5	4	6	5	3	4	5	37
Hirundinidae		Common swallow	*Hirundo rustica* (Linnaeus, 1758)	15	18	20	28	16	14	-	-	-	111
		Wire-tailed swallow	*H. smithii* (Stephens, 1825)	-	-	-	-	-	-	15	7	8	30
		Indian cliff swallow	*H. fluvicola* (Blyth, 1855)	-	27	24	18	8	10	16	15	7	125
		Sand martin	*Riparia riparia* (Lonnberg, 1908)	-	19	23	-	-	-	-	-	-	42
Motacillidae		Yellow wagtail	*Motacilla flava* (Sykes,1832)	3	27	7	9	-	-	-	-	-	46
		White wagtail	*M. alba* (Sykes, 1832)	11	18	12	25	11	8	6	5	-	96
		Large pied wagtail	*M. maderaspdtensis* (Gmelin, 1789)	2	-	8	18	5	4	2	3	-	42
		Grey wagtail	*M. cinerea* (Tunstall, 1771)	-	4	6	5	2	-	-	-	-	17
Pycnonotidae		Red-vented bulbul	*Pycnonotus cafer* (Linnaeus, 1766)	5	5	18	-	14	9	10	12	8	81
Turdidae		Black red start	*Phoenicurus ochruros* (Moore, 1854)	1	1	2	3	2	-	-	-	-	9
		Magpie robin	*Copsychus saularis* (Linnaeus, 1758)	-	5	13	-	-	4	3	4	-	29
		Indian robin	*Saxicoloides fulicata* (Latham, 1790)	-	12	5	4	6	5	3	5	-	40
		Pied bush-chat	*Saxicola caprata* (Sykes, 1832)	9	12	4	6	7	5	4	2	6	65
Sylviidae		Streaked fantail warbler	*Cisticola juncidis* (Franklin, 1831)	3	4	6	3	5	-	3	-	4	28
		Plain coloured prinia	*Prinia subflava* (Hume, 1874)	4	2	2	6	4	2	2	2	-	24
Muscicapidae		Spotted flycatcher	*Muscicapa striata* (Snigirewaki, 1928)	-	3	3	4	-	-	-	-	-	10
Rhipiduridae		White-browed fantail	*Rhipidura aureola* (Lesson, 1830)	-	3	2	4	-	6	-	4	-	19
Monarchidae		Indian paradise flycatcher	*Terpsiphone paradise* (Swainson, 1838)	-	-	-	-	-	4	3	3	-	10
Timaliidae		Jungle babbler	*Turdoides striatus* (Tigehurst, 1920)	28	31	31	16	22	18	16	21	16	199
		Common babbler	*T. caudatus* (Dumont, 1823)	21	47	36	23	36	29	25	30	26	273

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Family	Order	Common Name	Scientific Name	Months									Total
				Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	
Nectariniidae		Purple-sunbid	*Nectarinia asiatica* (Latham, 1790)	-	-	-	-	-	-	4	4	2	10
Oriolidae		Golden oriole	*Oriolus oriolus* (Sykes, 1832)	-	-	-	-	-	3	2	3	2	10
Lanidae		Great grey shrike	*Lanius excubitor* (Sykes, 1832)	4	5	3	5	2	4	7	2	4	36
		Bay backed shrike	*L. vittatus* (Vaurie, 1955)	5	6	-	2	1	3	-	4	2	23
		Rufous backed shrike	*L. schach* (VIGORS,1831)	2	-	-	2	8	6	4	-	4	26
Dicruridae		Black drongo	*Dicrurus macrocercus* (Koelz, 1954)	9	14	17	4	6	4	2	3	4	63
Corvidae		Indian tree pie	*Dendrocitta vagabunda* (Latham, 1790)	4	2	6	5	3	4	2	3	3	32
		House crow	*Corvus splendens* (Viellot, 1817)	15	13	32	10	33	15	25	20	18	181
Sturnidae		Common starling	*Sturnus vulgaris* (Viellot, 1878)	13	17	16	-	-	-	-	-	-	46
		Pied myna	*S. contra* (Linnaeus, 1758)	-	5	4	2	-	2	-	-	-	13
		Common myna	*Acridotheres tristis* (Linnaeus, 1766)	27	63	29	42	13	10	15	18	19	236
		Bank myna	*A. ginginianus* (Latham, 1790)	-	24	14	35	45	30	24	19	12	203
Passeridae		House sparrow	*Passer domesticus* (Jardine and Selby, 1835)	25	12	24	18	16	15	14	21	9	154
Estrildidae		White-throated munia	*Euodice malabarica* (Linnaeus, 1758)	2	5	6	8	-	4	-	3	6	34
	Total Birds Observed			1475	1871	1843	1372	1278	507	412	487	454	9699
	Total Species	74		66	74	46	69	67	60	51	55	47	