Фауна і населення	Беркут	21	Вип. 1-2	2012	44 - 49

STUDY ON SOME WATERFOWLS OF MANGLA DAM, AZAD JAMMU AND KASHMIR

Noman Khalique, Muhammad Rais, Tariq Mehmood, Maqsood Anwar, Sakhawat Ali, Sadia Bilal, Bilal Kabeer

PMAS Arid Agriculture University, Dep. of Wildlife Management; Rawalpindi, Pakistan
✉ Muhammad Rais, e-mail: sahil@uaar.edu.pk

Abstract. The present study documented diversity of waterfowls belonging to orders Anseriformes, Gruiformes and Charadriformes at Mangla Dam Reservoir in Azad Jammu and Kashmir, Pakistan from November, 2009 to July, 2010. We recorded 31 species of waterfowls from four sampling sites of the dam. The notable categories included nine duck species (29%), nine shorebird species (29%), four gull species (13%), five tern species (16%) and four species of rallids (13%). Wintering species dominated in the fauna (N = 23; 74%) followed by resident species (N = 5; 16%). We recorded 4774 individuals with a population density of 6.0 ind./ha. Common Gull (10.9%) and Common Pochard (9.8%) were the most abundant species. The abundance of waterfowls varied among the sampling sites as the medians of number of individuals differed significantly ($P < 0.05$). Illegal hunting of waterfowls was recorded as the main threat at the dam. We believe that there is sufficient justification for inclusion of the dam in the list of wetlands of international importance of the country. It is suggested that data on waterfowl population, species richness and conservation status should be collected on regular basis in future.

Key words: number, species diversity, relative abundance, population density, Important Bird Area.

Исследования некоторых гидрофильных птиц водохранилища Мангла, Джамму и Кашмир. - М.Н. Халик, М. Раис, Т. Мехмуд, М. Анвар, С. Али, С. Билал, Б. Кабир. - Беркут. 21 (1-2). 2012. - Водохранилище Мангла построено в 1967 г. на р. Джелум (33° 12´ N, 73° 39´ E). Исследования проводились на 4 пробных участках с ноября 2009 г. до июля 2010 г. Учеты гидрофильных птиц проводились два раза в месяц. Всего отмечен 31 вид: 9 видов уток (29%), 9 – куликов (29%), 4 – чаек (13%), 5 – крачек (16%) и 4 – пастушковых (13%). Преобладали зимующие виды (74%). В общей сложности учтено 4774 особи, плотность населения составила 6,0 ос./га. Наиболее многочисленными видами были сизая чайка (10,9%) и красноголовая чернеть (9,8%). Наибольшее видовое разнообразие отмечено на участках с большим многообразием биотопов. Главная угроза для птиц на водохранилище – нелегальная охота.

Introduction

Ducks, geese, swans and other such birds which depend ecologically on wetlands are recognized as waterfowls (APMWC, 2001). Pakistan has a considerable number of resident and migratory waterfowl species. Every year, tens of hundreds of waterfowls come to Pakistan through Indus Flyway (International Migratory Birds Route Number 4). Significant migratory waterfowls include species of ducks, flamingoes, pelicans, cranes and shorebirds (Rais et al., 2009).

Wetlands cover more than 1,280 million hectares of earth surface. Total area covered by lakes in Asia is around 204 million hectares (MEA, 2005). The high population density of Asian region, around half of the world's human population, has led to a long historical dependence of the people on wetland resources. An estimated area of inland waters in Pakistan is 7,603,590 ha. of which dams and water storage reservoir comprise of around 195, 670 ha (MINFAL, 2003).

Midwinter waterfowl studies are undertaken globally since 1970's and results have been published since 1987 to 1996 by International Waterfowl Research Bureau and Asian Wetlands Bureau (Wetlands International). Zoological Survey Department of Pakistan has been regularly undertaking midwinter waterfowl studies in the country regularly since 1972 (Azam et al., 2008). Ali and Akhtar (2005, 2006), Sheikh and Kashif (2006) and Rais et al. (2011) have documented water birds of the wetlands of northern part of the country. Ali et al. (2011) documented peculiarities of Mangla Dam with special

© M.N. Khalique, M. Rais, T. Mehmood, M. Anwar, S. Ali, S. Bilal, B. Kabeer, 2012

reference to its biodiversity. However, waterfowls of Mangla Dam have not been studied in detail. The present study was conducted to document richness and abundance of some waterfowls (Orders Anseriformes, Gruiformes and Charadriiformes) of Mangla Dam, Azad Jammu and Kashmir, Pakistan.

Materials and Methods

Mangla Dam (33° 12′ N, 73° 39′ E) is a large water storage reservoir built in 1967 on the Jhelum River, covering an area of 26,500 ha. It is located at 30 km North West of Jhelum city, Punjab Province, on the border with Azad Jammu and Kashmir at an elevation of 630 m. The reservoir has long stretches of shallow water along the shoreline. The water level reaches its highest during the monsoon season. The area features subtropical monsoonal climate with hot summers and cool winters (Scott, 1989). The site is an important staging and wintering area for migratory waterfowls (Ali et al., 2011).

Four sampling sites were selected for data collection which differed in habitat characteristics and level of human inference. **Site I** (26° 83′ 93′′ E; 16° 78′ 08′′ N) was located at a distance of 5 km from dam's spillways. It had long stretches of shallow water along the shoreline with patches of terrestrial vegetation. The area also provides boating and recreational facilities. **Site II** (26° 84′ 09′′ E; 16° 78′ 30′′ N) had shallow to less deep water area with no human interference However, at low water level, the exposed land was occasionally used for agriculture. **Site III** (26° 91′ 32′′ E; 16° 84′ 37′′ N) had deep water area having some marshy areas and permanently cultivated lands in the surroundings. Fishing and hunting was common in winter season at this site. **Site IV** (26° 91′ 18′′ E; 16° 84′ 96′′ N) had deep water with adjacent marshy lands.

The sampling sites were visited twice a month from November, 2009 to July, 2010. A vantage point within each sampling site was selected and with the help of a spotting scope (15 × 60) direct counting of all the birds visible in the field of view was undertaken (Bibby et al., 1998). The waterfowls were identified using a field guide (Mirza, 2007). Secondary information was collected from locals and published literature. For each sampling site we calculated population density, Shannon-Wiener diversity index and relative abundance of species.

Results and Discussion

The Mangla Dam was found to support a significant number of waterfowls. A total of 31 species belonging to three orders and seven families were recorded (Table 1). The notable categories included nine duck species (29%), nine shorebird species (29%), four gull species (13%), five tern species (16%) and four species of rallids (13%). Wintering species dominated in the fauna (N = 23; 74%) followed by resident species (N = 5; 16%).

4774 individuals of 31 waterfowl species with a population density of 23.87 ind./ha were recorded from the dam during the study period (Table 2). Common Gull (*Larus canus*) (10.91%) were the most abundant species followed by Common Pochard (*Aythya ferina*) (9.76%) while Gadwall (*Anas strepera*) (0.50%) was the least abundant species (Table 2).

917 individuals of 19 species with a population density of 4.59 ind./ha were recorded from sampling site I. Common Gull (17.99%) was the most dominant waterfowl species (Table 2; Fig.1). A total of 1159 individuals belonging to 25 species with a population density of 5.84 ind./ha were recorded from sampling site II. Common Pochard (15.18%) was the most dominant species. 1410 individuals of 30 species with a population density of 7.09 were recorded from sampling site III. Common Tern (*Sterna hirundo*) (8.65%) was the most dominant species. 1218 individuals of 30 species with a population density of 6.51 ind./ha were recorded from sampling site IV. The most dominant species was Black-bellied Tern (*Sterna acuticauda*) – 8.39%.

The abundance of waterfowls varied among the sampling sites. The Kruskil-Wallis

Table 1

Checklist of waterfowls recorded at Mangla Dam reservoir during 2009–2010
Список околоводных птиц, зарегистрированных на водохранилище Мангла в 2009–2010 гг.

Species	Status
ANSERIFORMES	
Anatidae	
Tadorna ferruginea	WV
T. tadorna	WV
Anas strepera	WV
A. crecca	WV
A. platyrhynchos	WV
A. acuta	WV
A. clypeata	WV
Netta rufina	WV
Aythya ferina	WV
A. fuligula	WV
GRUIFORMES	
Rallidae	
Amaurornis phoenicurus	R
Gallinula chloropus	R
Porphyrio porphyrio	R
Fulica atra	WV
CHARADRIIFORMES	
I. Recurvirostridae	
Himantopus himantopus	SV
II. Charadriidae	
Charadrius dubius jerolii	R
Ch. alexandrinus	WV
Hoplopterus malabaricus	SV
Vanellus indicus	R
III. Scolopacidae	
Philomachus pugnax	PM
Tringa stagnatilis	WV
T. ochropus	WV
Actitis hypoleucos	WV
IV. Laridae	
Larus ichthyaetus	WV
L. genei	WV
L. canus	WV
L. argentatus	WV
V. Sternidae	
Sterna nilotica	WV
S. aurantia	WV
S. hirundo	WV
S. acuticauda	WV
S. albifrons	WV

Status of species: WV – Winter Visitor, SV – Summer Visitor, PM – Passage Migrant, R – Resident.

test showed that the medians of the number of individuals recorded from four sampling sites differed significantly ($P < 0.05$). High values of Shanon-Wiener diversity index revealed that sampling sites III and IV had the highest waterfowl species diversity while sampling site I had the lowest diversity. The evenness was similar at all sampling sites. High diversity at sampling site III was attributed to diverse habitat features. It had deep water area suitable for ducks, coots, terns and gulls; marshy areas suitable for moorhens and other shorebirds. In addition, permanently cultivated lands in the surroundings of these sampling sites provided foraging grounds to variety of waterfowls such as moorhens and coots.

Different researchers (Ali, Akhtar, 2005, 2006; Ali, 2007; Azam et al., 2008, 2009) have documented avifauna of the wetlands situated in the northern part of Pakistan. Study by Scott (1989) provided average waterfowls counts of some waterfowl species at Mangla Dam recorded during 1986–1988 which included 7,740 individuals of Common Teal (*Anas crecca*), 4,820 – Mallard (*A. platyrhynchos*), 4,590 – Northern Pintail (*A. acuta*); 930 – Shoveler (*A. clypeata*); 45 – Red-crested Pochard (*Netta rufina*); 8,570 – Common Pochard, 12,435 – Tufted Duck (*Aythya fuligula*), 160 – Common Coot (*Fulica atra*), 200 – Black-headed Gull (*Larus ridibundus*) and 1,100 – shorebirds.

Mehmood (2007) recorded 14 individuals of Common Coot, 4 – Common Pochard, 8 – Mallard, 7 – Common Teal, 6 – Nothern Pintail, 12 – Common Shelduck (*Tadorna*

Table 2

Number of individuals (N), relative abundance (RA) and population density (PD) of waterfowls recorded at Mangla Dam reservoir during 2009–2010

Число особей (N), относительное обилие (RA) и плотность населения (PD) околоводных птиц, зарегистрированных на водохранилище Мангла в 2009–2010 гг.

Species	Sampling site I			Sampling site II			Sampling site III			Sampling site IV			Total		
	N	RA	PD	N	RA	PD	N	RA	PD	N	RA	PD	N	RA	PD
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Tadorna ferruginea	–	–	–	–	–	–	16	1.13	0.08	32	2.48	0.16	48	1.01	0.24
T. tadorna	37	4.03	0.19	43	3.71	0.22	13	0.92	0.06	24	1.86	0.12	117	2.45	0.59
Anas strepera	–	–	–	–	–	–	8	0.56	0.04	16	1.24	0.08	24	0.50	0.12
A. crecca	51	5.56	0.26	13	1.12	0.07	7	0.49	0.04	70	5.43	0.35	141	2.95	0.71
A. platyrhynchos	–	–	–	151	13.02	0.76	44	3.12	0.22	105	8.15	0.53	300	6.28	1.50
A. acuta	14	1.52	0.07	32	2.76	0.16	23	1.63	0.12	22	1.7	0.11	91	1.91	0.46
A. clypeata	30	3.27	0.15	8	0.69	0.04	9	0.63	0.05	33	2.56	0.17	80	1.68	0.40
Netta rufina	–	–	–	89	7.68	0.45	12	0.85	0.06	42	3.26	0.21	143	3.00	0.72
Aythya ferina	–	–	–	176	15.18	0.88	217	15.39	1.09	73	5.66	0.37	466	9.76	2.33
Amaurornis phoenicurus	–	–	–	14	1.21	0.07	25	1.77	0.13	33	2.56	0.17	72	1.51	0.36
Gallinula chloropus	–	–	–	18	1.56	0.09	59	4.18	0.29	12	0.93	0.06	89	1.86	0.45
Porphyrio porphyrio	–	–	–	5	0.43	0.03	41	2.91	0.21	41	3.18	0.21	87	1.82	0.44
Fulica atra	–	–	–	87	7.50	0.44	56	3.97	0.28	81	6.28	0.41	224	4.69	1.12
Himantopus himantopus	12	1.30	0.06	19	1.63	0.09	28	1.99	0.14	5	0.38	0.03	64	1.34	0.32
Charadrius dubius jerodni	40	0.43	0.02	10	0.86	0.05	25	1.77	0.13	6	0.47	0.03	45	0.94	0.23
Ch. alexandrinus	15	1.64	0.08	11	0.94	0.06	17	1.21	0.09	7	0.54	0.04	50	1.05	0.25
Hoplopterus malabaricus	10	1.09	0.05	47	4.06	0.24	35	2.48	0.18	4	0.31	0.02	96	2.01	0.48
Vanellus indicus	–	–	–	23	1.98	0.112	30	2.13	0.15	27	2.09	0.14	80	1.68	0.40
Philomachus pugnax	11	1.19	0.06	39	3.36	0.19	18	1.27	0.09	13	1.01	0.07	81	1.70	0.41
Tringa stagnatilis	–	–	–	11	0.94	0.06	59	4.18	0.29	32	2.48	0.16	102	2.14	0.51

End of the Table 2

Окончание таблицы 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
T. ochropus	–	–	–	4	0.35	0.02	21	1.48	0.11	18	1.39	0.09	43	0.90	0.22
Actitis hypoleucos	21	2.29	0.11	–	–	–	7	0.49	0.04	21	1.63	0.11	49	1.03	0.25
Larus ichthyaetus	29	3.16	0.15	31	2.67	0.16	29	2.05	0.15	36	2.79	0.18	125	2.62	0.63
L. genei	133	14.5	0.67	62	5.34	0.31	91	6.45	0.46	98	7.6	0.49	384	8.04	1.92
L. canus	165	17.99	0.83	143	12.33	0.72	119	8.44	0.59	94	7.29	0.47	521	10.91	2.61
L. argentatus	108	11.78	0.54	20	1.73	0.10	79	5.61	0.39	53	4.11	0.27	260	5.45	1.30
Sterna nilotica	32	3.48	0.16	–	–	–	79	5.61	0.39	92	7.14	0.46	203	4.25	1.02
S. aurantia	60	6.54	0.30	25	2.20	0.13	–	–	–	45	3.49	0.23	130	2.72	0.65
S. hirundo	56	6.11	0.28	–	–	–	122	8.65	0.61	45	3.49	0.23	223	4.67	1.12
S. acuticauda	32	3.49	0.16	78	6.73	0.39	111	7.87	0.56	108	8.39	0.54	329	6.89	1.65
S. albifrons	97	10.57	0.49	–	–	–	10	0.71	0.05	–	–	–	107	2.24	0.54
Number of Species		**19**			**25**			**30**			**30**			**31**	
Number of Individuals		**917**			**1159**			**1410**			**1288**			**4774**	
Population Density		**4.59**			**5.84**			**7.09**			**6.51**			**6.00**	
Shannon-Wiener Diversity Index (H′)		**2.53**			**2.77**			**3.01**			**3.12**			**3.06**	
Evenness Index (E)		**0.87**			**0.86**			**0.88**			**0.91**			**0.89**	

tadorna) and 8 – Ruddy Shelduck (*T. ferrugenia*). Our waterfowl population counts differed from Scott (1989) and Mehmood (2007) mainly due to our short duration of study and other changes in habitat around the dam area such as water quality, fluctuation of water level and increasing human disturbance over the time.

Presently, the dam faces threats such as sedimentation and fluctuation in water level. However, waterfowls populations are relatively protected as only a few sporadic incidences of illegal hunting were recorded outside the specified hunting season during the present study.

BirdLife International has identified Mangla Dam as an Important Bird Area (IBA Number 19). Further, it is among 18 potential wetlands of international importance as it fulfills the certain used for identifying wetlands of international importance based on threatened species, waterfowls and fish. Based on our findings, it is very difficult to reason any of the criteria set by Ramsar Convention. We believe, however, that there is sufficient justification for inclusion of Mangla Dam reservoir in the list of wetlands of international importance of the country if the data on waterfowl richness, population and conservation status are collected on regular basis.

REFERENCES

Ali Z. (2007): Studies on population status of CMS species of water birds in major wetlands of upper Punjab. - Zoological Survey Department. Ministry of Environment. Government of Pakistan. 1-17.

Ali Z., Akhtar M. (2005): Bird survey at wetlands in Punjab, Pakistan, with special reference to the present status of white-headed duck (*Oxyura leucocephala*). - Forktail. 21: 43-50.

Ali Z., Akhtar M. (2006): Decrease in size of lakes and number of birds in selected wetlands in Pakistan. - Waterbirds around the world. The Sattionary Office, Edinburgh, U.K. 292-293.

Ali Z., Shelly S.,Y., Bibi F., Joshua G., Khan A.M., Khan B.N., Akhtar M. (2011): Peculiarities of Mangla reservoir: biodiversity with sustainable use options. - J. Anim. Plant Sci. 21 (2): 373.

APMWC (2001) Animal and Plant Management through Water and Crop lands. 7: 910.

Azam M.M., Ali M., Ahmed W., Nazr A.Q. (2009): Mid-winter waterfowl census at different wetlands of upper Punjab and NWFP. - Zoological Survey Department. Ministry of Environment. Government of Pakistan. 1-18

Azam M.M., Brohi M.A., Ahmed W. (2008): Studies on the Population Status of Water Birds in Major Wetlands of Upper Punjab. - Rec. Zool. Surv. Pakistan. 18: 4-11.

Bibby C., Jones M., Marsden S. (1998): Bird Surveys. - Expedition Field Techniques. Expedition Advisory Centre of the Royal Geographical Society. 1-134.

Mehmood N. (2007): Avian diversity of Mangla Dam, Azad Jammu and Kashmir. - MSc Thesis. Department of Zoology. University of Azad Jammu and Kashmir, Muzafarabad.

Millennium Ecosystem Assessment (MEA). Ecosystems and Human Well-Being: Wetlands and Water Synthesis. World Resources Institute, Washington, DC, 2005.1-80.

MINFAL. Agricultural Statistics of Pakistan 2001–2002. Govt. of Pakistan, Ministry of Food, Agriculture and Livestock (Economic Wing), Islamabad, 2003.

Mirza Z.B. (2007): A field guide to the birds of Pakistan. Bookland. 1-366.

Rais M., Anwar M., Mehmood T., Hussain I. (2011): Birds diversity and conservation at Kallar Kahar lake with special reference to water birds. - Pak. J. Zool. 43 (4): 673- 681.

Rais M., Kabeer B., Anwar M., Mehmood T. (2009): Effect of habitat degradation on breeding water birds at Kallar Kahar lake District Chakwal. - J. Anim. Plant Sci. 20 (4): 318-320.

Scott D.A. (1989): A Directory of Asian Wetlands. IUCN, Gland, Switzerland and Cambridge, U.K. 1-1181.

Sheikh K.M., Kashif N. (2006): Strategic role of Pakistan wetland resources: prospects for an effective migratory waterbird conservation network. - Waterbirds around the world. The Stationery Office, Edinburgh, UK. 292-293.

Замітки	Беркут	21	Вип. 1-2	2012	49

ВСТРЕЧА СИЗОВОРОНОК (*CORACIAS GARRULUS*) НА ЮГО-ЗАПАДЕ ЧЕРНИГОВСКОЙ ОБЛАСТИ

Record of the Roller (*Coracias garrulus*) in the south-west of Chernigiv region. - V.A. Kostyushin. - Berkut. 21 (1-2). 2012. - Two birds were observed in environs of Desna town [50˚53´ N, 30˚48´ E] on 29.07.2012. [Russian].

В последние десятилетия сизоворонка (*Coracias garrulus*) на территории Украинского Полесья отмечается редко. 29.07.2012 г. в пойме р. Десна южнее пгт Десна (50˚53´ N, 30˚48´ E) нами были встречены две птицы. Они сидели примерно в 150 м одна от другой на старых вербах (*Salix alba*), посаженных вдоль грунтовой дороги.

Поскольку наблюдение было кратковременным, сделать какое-либо заключение о статусе пребывания сизоворонок невозможно, хотя биотоп, в котором они были встречены, является вполне подходящим для гнездования.

В.А. Костюшин

Институт зоологии им. И.И. Шмальгаузена НАН Украины, ул. Б. Хмельницкого, 15, г. Киев, 01601, Украина (Ukraine). E-mail: kost@izan.kiev.ua.