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Original Article

Abundance, Mayas Preference and Distribution of Birds in Dinder National Park, Sudan

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ABSTRACT

This study was conducted in Dinder National Park during the dry season. The main purpose of the present study was to identify distribution and abundance of birds in DNP. The results showed that, the total number of birds is about 13.695 in five Mayas studied comprises 54 different species. The results showed significant different between five Mayas P < 0.01. The distribution of birds in DNP mainly depends in the availability of water and food.

KEY WORDS: DNP (Dinder National Park), Birds, Mayas, Count.

INTRODUCTION

The Dinder National Park (DNP) was established in 1935 following the London convention of 1933, and in 1979 it was designated as biosphere reserve, one of only two in the Sudan. The global significance of the DNP is that it falls between two important ecological zones the (Sudano-Sahelian and the Ethiopian). The DNP was designated as a Ramsar site in 2001. The Mayas are oxbow lakes along the meandering rivers, they are subject to floods and contain green fodder and water up to the end of the dry season. The park supports 27 large mammals, bats and small mammals, more than 160 species of birds, 32 fish species, reptiles and amphibians. In addition there are about 58 species of shrubs and trees (Higher Council for Environment and Natural Resources, 2001). Hashim and Nimir (1979) observed that there were fluctions in the structure and densities of animals in the park during the previous years, and these fluctions were attributed to habitat deterioration, poaching and encroachment of human activities. As human population increases, demand for food also increase and this exerts pressure on the land and its resources. Wildlife ecosystem in Sudan is composed of biosphere reserves, national parks, game reserves and sanctuaries. In 1983 it was reported that there were 52 major wildlife species in northern Sudan while in 1991 a list of 83 was produced, Major species were distributed in 19 protected areas all over the Sudan. In Dinder National Park showed that 27 mammals and also several species of small mammals, and partial summer lists of 115 birds 14 snakes and scorpions, and 108 species of insect and 26 fish species are recorded. About 49 common tree species and shrubs (of which eight endangered) and 195 common herbaceous plants are identified (GOS and HCENR, 2006). Dinder National Park support a large population of animals during the dry season and the lesser number during the wet season (Dasmann, 1972). A systemic animals census had been conducted by Minga (1971) on nine of the principle of Mayas, he counted a total of 5613 large game animals during the period March to April 1971. Dasmann (1972) used aerial counts in August, counted 49 animals outside the park include reedbuck, roan antelope, tiang and ostrich. Although sight of animals was difficult because of the dense wooded vegetation. Dropping counts and road counts of the large herbivores conducted by Wildlife Research Center (WRC) in the most of the principle Mayas during 1971-1994 (Abdel Hameed 1994) showed that generally there was a decline trend in the total number of the animals using the Mayas.

Study Area

Dinder National Park: Dinder National Park in the southern eastern Sudan. The park is located between latitude 12° N and 13°N and longitude 34°E and 35°E. Covering an area of 10.291.88 km². The park area is generally a flat plain with occasional isolated hills occurring at its southern portion. Essentially, the Dinder Rahad and Galagu are principal seasonal rivers that descend from the Ethiopia highlands and drain the park during the rainy season. There are also many intermittent streams that wind through the park to join one or any of the three rivers. The DNP was inhabited

by people until 1880 when disease and famine drastically reduced human population. When the park was established in 1935; the area was very sparsely populated with humans (Holsworth, 1968).

Climate: The climatic conditions of DNP in general, can be summarized as cool and dry in winter and wet and warm in summer. The wet season starts in May and ends in November, during which the area receives an annual rainfall ranging 600-1000 mm. The annual mean relative humidity varies between 35-45% but higher value of 79% was recorded during the peak of the rains in August (Dai, 1982).

Topography and Soil: According to Holsworth (1968) and Dasman (1972) have described two types of soils in DNP: the vertisols and entisols. The former, which are the most extensive in the park, are dark, heavy clays and (selfploughing) soils often known as the black cotton soil. They crack deeply during the early dry season. The entisols dominate the eastern limits of the park towards the foothills of the Ethiopian plateau and along riverbanks. This type of soils occurs in patches of sandy loam and sandy clay. They intersperse with the vertisols.

Vegetation ecosystem: Holsworth (1968) and Hakim et al. (1978) described the vegetation of the DNP to three ecosystem: 1. Wooded grass land: The A. seyal-Balanites ecosystem is a woodland or wood grassland, dominated by species of Acacia seyal, Balanites aegyptica, and Combretum hartmannianum. This ecosystem occurs extensively on deep, cracking clay soils (vertisols). 2. Riverine ecosystem: Riverine ecosystem occurs in the banks of Dinder and Rahad river. The forest is amulti-layered vegetation, dominated by Hypheana thebaica (Dom), Acacia nilotica (sunt), Zizphus spina Christi (Siddir). 3. Maya ecosystem: Mayas are wetland (Meadows) found along the flooded plains of rivers. They have been formed due to the meandering characters of the channel and nature of flows of their waters. They occupy low lying basin, meanders and oxbows. Mayas are the major parts of water courses that have been separated as Oxbow lake and depressions that get filled in the rainy season by rains or by flood.

Fauna: Dinder national park was reported to have a variety of wildlife species in the past. Some of these animals migrate to wet season habitat outside the boundaries of the park. The season for these migrations is not yet known.

Birds: Common birds in the park include the following:

Ostrich Struthio camelus camelus, Egyption goose Alopchen aegyptiacus, Helmeted Guinea fowl Numida meleagris, Sacred ibis Threskiornis aethiopicus, Pink backed pelican Pelecanuse rufescens, Marabu stork Leptoptilos crumeniferus, Namaqua dove Oena capensis, Blue-eared glossy starling Lamprotornis chalybacus, Red-billed quelea Quelea quelea.

MATERIALS AND METHODS

Wildlife species

The field study was conducted in the dry season of 2011 in DNP, the techniques were used for estimating the number of the birds and their distribution (Norton, 1978) direct observation in Mayas and pools

Direct observation

In this study the total number of pools and Mayas were observed, The selection of pools and Mayas depend on the availability of water and forage throughout the study period. Among the pools and Mayas the following were covered; Ras Amir, Beit elwahsh, Abd elghani, Gerirrisa and Berkat eltamaseeh. Counting started early in the morning period and end in the late evening. There assumption were considered: 1-All birds

are inside the park and use the Mayas every day. 2-each Maya has its own birds and the birds will not migrate to the other Maya during the study period. 3-Habitat conditions are the same around water areas. Data collected by direct observation were used to define the distribution of birds species in the park in the dry season.

Manage Mana								
Birds	RasAmir	Beitelwahsh	Abdelghani	Gerirrisa	Berkateltomsah	Total		
No of Spp	54	33	39	16	40	182		
Frequency	0.3	0.2	0.2	0.1	0.2	1		
Percentage	30%	20%	20%	10%	20%	100%		

Table 1	 Frequence 	y of Birds spp). in fiv	'e Maya	s in	DNF
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Bird count

Birds of various species timed species counted and Tengecho 1986, pomeroy (1992) in Ras Amir, Beit elwahsh, Abd elghani, Grireesa and Berkat eltamsah. A pair of binocular super Zenith 10×50 was used. At every 10 minutes, number of birds per species sighted, counted as count of scores (×), be perching on tress, flying overhead for two hours (2). Frequency of sighting of each species added, mean numbers of birds and prominence value (PV) calculated for each bird species seen in Mayas.

Shannon weiner index formula usually written as:

 $H^{I} = \sum$ piLnpi, where H^I being the index; Pi = the proportion of birds in the 1TH species; In = natural logarithms; Σ = the sum of one prominence value (PV) as measurement of abundance and distribution calculated as $PV=N\times\sqrt{f}$; when, N= number of bird calculating seen; F= frequency of seeing that particulate bird (Britton1980, Grateshace and Broak, 1982). Abundance and distribution of birds in Sudan notes (Cave and Macdonald1955, Nikolaus 1987).



Ostrich Struthio camelus camelus



Marabou stork Leptoptilos crumeniferus



Saddle-blilled stork Ephippiorhynchus senegalensis



Pink-backed Pelican

Pelecanuse rufescens



Purple heron Ardea purpurea



Yellow-billed stork Mycteria ibis



Helmeted Guinea fowl Numida meleagris



Arabian bustard Otsarabs sp



Jacana Actophilorns africanus



Red-billed hornbill Tochus erthrorhynehus



Black-winged stilt Himantopus himantopus



Wooly-necked stork Ciconia episcopus

RESULTS AND DISCUSSION

Species of birds distribution and abundance in Dinder National Park decreased by more than 50% with increasing level habitat degradation, and this effect was independent of potentially confounding factors such as time of day, weather, soil type, age of tree stands and habitat. ElHassan (2011) reported that there are more than 40 mayas (wetlands) in Dinder National Park occupying low lands. Due to the variety and nature of Dinder's mayas, about 250 species of birds are identified, many of them are migrants. The migrants include yellow-billed Stork (*Mycteria ibis*), woolly-necked stork (*Ciconia episcopus*), yellow and European wagtail (*Motacilla* spp). The Park is also used by intra-Africa migrants e.g. Abdim's stork (*Ciconia abdimii*), spur-wing goose (*Plectropterus gambensis*) Numbers of water birds in DNP is influenced by seasonality and yearly climatic change. Drought that struck the area in 2010 affected the abundance of water birds considerably. Most of the mayas were not filled with water during the rainy season; some of them dried out early in the dry season with a subsequent decrease in the number and diversity of water birds visiting the Park).

Table 2. Number of Birds in Mayas in Dinder National Park

Mayas	RasAmir	Beitelwahsh	Abdelghani	Gerirrisa	Berkateltomsah	Total
Birds		Dertermunder			2001110000000000	
Ostrich	12	270	5	8	0	295
Pink-backed pelican	20	255	637	0	0	912
Grey heron	23	15	16	3	24	81
Black headed heron	14	3	14	13	18	82
Squacco heron	3	0	2	0	5	10
Cattle egret	299	498	199	0	17	1013
Little egret	50	34	28	0	0	112
Purple heron	2	0	2	0	1	5
Open- billed stork	350	56	59	0	25	450
Abdmis stork	50	16	43	0	22	131
Wooly- necked stork	43	17	63	0	32	155
Saddle- billed stork	2	14	6	0	7	29
Marabu- stork	24	850	132	0	17	1023
Yellow- billed stork	8	35	4	0	6	53
Scared ibis	39	13	51	0	0	103
African spoon bill	12	0	0	0	0	12
White whistling duck	33	0	0	0	0	33
Egyptian goose	8	0	14	0	0	22
Mallrad	2	0	0	0	0	2
Spur-winged goose	550	0	0	0	4	554
Hooded vulture	2	0	5	0	82	89
Fish eagle	5	12	2	36	8	63
Black kite	10	31	19	18	36	114
Clappertoni francolin	0	0	0	0	12	12
Helmented Guinea fowl	380	600	707	65	656	2408
Jacana	3	0	0	0	0	3
Spur- winged plover	36	59	20	0	13	128
Common sandpiper	3	0	2	0	7	12
Wood sandpiper	2	0	0	0	0	2
Black winged stilt	2	0	0	0	10	12
Namagua dove	63	36	14	28	63	204
Mourning dove	113	130	79	18	148	488
Laughing dove	152	220	67	43	207	689
Palm swift	110	80	24	25	140	379
Blue napped mouse bird	2	2	0	0	0	4
Pied king fisher	4	1	4	Ő	13	22
Malachite king fisher	2	0	2	Ő	2	6
Littlebee eater	2	1	3	Ő	3	9
Abyssinian roller	$\frac{1}{2}$	3	6	5	4	20
Green wood hoopoe	1	0	1	0	5	7
Grev wood hoopoe	1	Õ	0	Õ	0	1
Drongo	2	13	Õ	Ő	Õ	15
White vented bulbul	13	0	6	Õ	14	33
White wagtail	18	2	14	Ő	8	52
Yellow wagtail	20	96	166	Ő	113	395
Blue eared glossy starling	48	149	38	112	57	404
Rupples long tails starling	27	90	34	96	67	314
Reputiful sunbirds	5	1	2	0	55	63
Cinnamon weaver	1	Ô	õ	õ	0	1
Red-billed quelea	318	0	0	0	232	550
House sparrow	3/	199	61	33	160	487
Grev- headed sparrow	270	432	88	90	630	1510
Way hill	270	-52	0	0	0.50	1
Red-billed firefinch	1	0	2	23	2/	63
Red-Check cordon below	2	0	0	0	12	14
Rea Check column Delow	4	U	0	0	14	14

The total number of birds observed in five mayas in Dinder National Park was found to be 13,651, comprising 24 families, 54 different species most of the families are represented by one genus and the most frequent genera (6) was found in families (Ardeidae, Scopidae and Ploceidae) and four genera are found in the family Anatidae.

It is clear that Dinder National Park still has natural resources in good condition. In these study showed that the distribution of birds in DNP depend in availability of water and food.

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