

Effects of Seasonal Variation on Fish Catching in Jebel Aulia Reservoir on the White Nile, Sudan

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Abstract

This study was conducted to see the effects of seasons on fish production, in Jebel aulia dam south of Khartoum 45 km during the period January to December 2014, (containing 12 months) includes three seasons, summer, autumn and winter. 23 species belonging to 14 families were recorded during the period of investigation. Distribution production of fish in seasons as follow: in summer the high production is *Tilapia* in March 61.2%, April 53.3%, May 40%, finally June 32%. *Bagrus bayad* in March 9.9%, April 5.6%, May 12.6%, finally 4.9% in June. The fish which is rare is *Disticodus niloticus* and *Citharinus citharus*. High production months in the summer are June 36%, April 23%, March 21% and May 21%. In autumn the fish species which very high production is *tilapia* in July 25.9%, August 31.6%, September 33.5% and October 9.9% followed by *Schall fish* and *Labeo niloticus*. In winter the study found the high production of species is *Tilapia*, *labeo niloticus* and *Hydrocon Forskali*. The months which is high production in winter containing November, December, February and January. The study showed that the fish production seasons are summer 37.15%, autumn 35.95% and finally winter 26.90%.

Keywords: Jebel Aulia Dam; Reservoir; Seasons; Fish species; Investigation production; Variation

Introduction

Jebel Aulia Dam was constructed in 1937 across the White Nile some 45 kilometres south of Khartoum. It resulted in the formation of larger shallow lake and covered estimated area of about 12,000 hectares. The Dam stores about 3.5 Millard cubic meters of water. Maximum depth of the reservoir is about 15 meters during the time of high flood (late August to mid-September) while a minimum depth of 5 meters is attained in May, when the reservoir is nearly emptied to a normal river level. Fish and fisheries of White Nile have been investigated by several workers. The taxonomy and characteristic of fish were compiled by Boulenger [1] in his treaties or fish fauna of the Nile. Girgis [2] recorded 18 families and 62 species from the swamps and the southern tributaries of the White Nile. The feeding and breeding habits of some common Nile fish were studied by Pekkola [3] and his investigations were further extended by Sandon [4]. Sandon [5] investigated the fishes of northern Bahr Elgazel and stated that fishing follows the seasonal regime of flooding and fallowing water. One hundred and eight species were recorded by Sandon [6] from the Sudan waters of the White Nile system. They belonged to 51 genera and 23 families. More recently [7] reported that the fish fauna of the Nile basin is rich and diversified and includes at least 54 genera and well over 300 species. Gidiri [8] carried out a detailed study on the biology of genus *Synodontis* at Khartoum which its establishment of *Synodontis khartoumensis* as a new species. The present paper however is an attempt to consider the distribution and abundance of fish of the White Nile in the area affected by Jebel Aulia Dam.

Materials and Methods

The area investigated was Jebel Aulia Dam two sets of gill nets were used to catch the fish the first set with mesh size ranging between 40 mm-120 mm and 1.5 meters-2 meters in depth. The second set of gill nets had a mesh size ranging from 70 mm-90 mm and 1.55 meters-1.80 meters in depth. Gill nets were set overnight. The catch was sorted out immediately after collection and fish identified down to species level. Total weight of fish was recorded in kilogram (kg). The period of study was (January-December 2014).

Results

Fish population in the study area obtained 23 species belonging to 14 families were recorded during the period of investigation. These are listed as follows in Table 1. In summer *Tilapia fish*, and *Bagrus bayad* is high production in month March, April, May and June. The rare fish were *Disticodus niloticus* and *Citharinus citharus* in Table 2. High production of months in summer is June 36% (Table 3).

Family (14)	Species (23)
(1) Mormyridae	1-Mormyrus caschive
	2-Mormyrus bebe
	3-Mormyrus cyprinoids
(2) Mochokidae	1-Synodontis schall
(3) Bagridae	1-Bagrus bayad
	2-Bagrus domac
	3-Chrysichthys auratus
	4-Auchenoglanis occidentals

(4) characidae	1- <i>Alestes dentex</i>	(9) Clariidae	1- <i>Clarias lazera</i>
	2- <i>Hydrocynus forskalli</i>	(10) Protopteridae	1- <i>Protopterus aethiopicus</i>
	3- <i>Alestes nurse</i>	(11) Centropomidae	1- <i>Lates niloticus</i>
(5) Citharinidae	1- <i>Distichodus niloticus</i>	(12) Tetraodontidae	1- <i>Tetraodon lineatus</i>
(6) Schilbeidae	1- <i>Schilbe mystus</i>	(13)Malapteroidea Malapteroidea	1- <i>Malapterurus electricus</i>
(7) Cyprinidae	1- <i>Labeo niloticus</i>	(14) Osteoglossidae	1- <i>Heterotis niloticus</i>
	2- <i>Labeo horii</i>		
	3- <i>Barbus bynni</i>		
(8) Cichlidae	1- <i>Oreochromis niloticus</i>		

Table 1: Showed the families and species of the study.

Species	March		April		May		June	
	%	Wt.(kg)	%	Wt.(kg)	%	Wt.(kg)	%	Wt.(kg)
<i>Lates niloticus</i>	0.7	385.28	1.2	677.57	1.6	868	1.1	961
<i>Bagrus domac</i>	0.2	93	0.3	150.57	0.1	48.71	0.3	318.86
<i>Bagrus bayad</i>	9.9	5194.71	5.6	3255	12.6	6642.86	4.9	4455.14
<i>Tilapia niloticus</i>	61.2	32200.14	53.3	31093	40	21040.1	32	29255.1
<i>Labeo niloticas</i>	7.6	4003.43	18.8	10978.4	17.1	9007.71	18	16443.3
<i>Barbus bynni</i>	0.1	75.26	0.4	252.43	0.5	279	0.9	828.4
<i>Labeo horii</i>	0	0	0	0	0	0	0	0
<i>Kanumm sp</i>	0.2	93	0.4	212.57	1.5	788.29	0.4	366.57
<i>Distichodus niloticus</i>	0	0	0	0	0.1	75.29	0.1	53.14
<i>Cithrius cithrius</i>	0	0	0	0	0	0	0	0
<i>Synodontis schall</i>	2.1	1098.29	2.2	1266.57	2.9	1501.29	23.1	21124.3
<i>Alestes dentex</i>	2.4	1240	2.2	1266.57	2.5	1302	1.5	1377.29
<i>Clarias lazera</i>	5.5	2896.28	7.6	4424.14	8.7	4561.43	5.3	4867
<i>Hydrocon Forskalli</i>	2.3	1217.85	1.8	1049.57	4.4	2338.29	1.8	1603.14
<i>Shelbe mystes</i>	0.5	261.28	0.5	314.43	1.5	766.14	0.8	744
Other	7.3	3835.14	5.7	3343.57	6.5	3432.14	10	9114
Total	100	52593.66	100	58284.39	100	52651.25	100	91511.24

Table 2: Showed fish production in months of summer 2014.

Months of summer	Production(kg)	%Percentage
March	52594	21%
April	58284	23%
May	52651	21%
June	91511	36%

Total	254740	100%
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Table 3: Showed months of summer and production (kg).

In autumn also *tilapia* and *Labeo niloticus* is high production (Table 4). Months of autumn which is high are July, October, August and September, in Winter also *Tilapia*, *Labeo niloticus* and *Hydrocon Forskalli* is high production but the fish was very rarely is *Bynni*, *Citharus*, *Distichodus* and *Labeo horii* (Tables 5 and 6).

Species	July		August		September		October	
	%	Wt.(kg)	%	Wt.(kg)	%	Wt.(kg)	%	Wt.(kg)
<i>Lates niloticus</i>	1.6	1169.11	1.1	635.71	1.5	827.14	0.1	681.43
<i>Bagrus domac</i>	0.2	172.71	0.5	270	0.4	205	0.1	381.43
<i>Bagrus bayad</i>	5.6	4034.72	3.5	2044.29	5.9	3325.71	1.2	6930
<i>Tilapia niloticus</i>	25.9	18639.9	31.6	18475.71	33.5	18831.43	9.9	59258.57
<i>Labeo niloticas</i>	19	13666.6	15.3	8961.43	13.9	7787.14	2.9	17288.57
<i>Barbus bynii</i>	0.1	66.43	0	7.57	0	0	0	0
<i>Labeo horii</i>	0	0	0	12.86	0	0	0.1	488.57
<i>Kannume sp</i>	0.8	571.29	0.4	244.29	0.3	180	0	0
<i>Distichodus niloticus</i>	0.1	97.43	0	0	0.1	30	0	0
<i>Cithrius cithrius</i>	0	0	0	0	0	0	1.9	11472.86
<i>Synodontis schal</i>	25.3	18205.9	22.1	12882.86	15	8400	0.2	1015.71
<i>Alestes dentex</i>	1.1	819.29	15.6	9092.8	1.2	668.57	1.3	7920
<i>Clarias lazera</i>	6.2	4464	4.3	2502.86	7.6	4285.71	0.2	1345.71
<i>Hydrocon Forskali</i>	1.6	1169.14	1.7	1002.86	1.4	801.43	0.1	660
<i>Shelbe mystes</i>	0.9	624.43	1.5	890.71	1.4	775.71	9.3	55774.29
Other	11.6	8356.71	2.4	1398	17.9	10050	72.7	435623
Total	100	72057.66	100	58421.95	100	56167.84	100	59884.14

Table 4: Showed the fish production in months of autumn 2014.

Months of autumn	Production (kg)	%Percentage
June	72058	29.20%
August	58422	23.70%
September	56188	22.80%

October	59884	24.30%
Total	246532	100%

Table 5: Showed months of autumn and production kg.

Species	November		December		January		February	
	%	Wt.(kg)	%	Wt.(kg)	%	Wt.(kg)	%	Wt.(kg)
<i>Lates niloticus</i>	1	801.43	0.2	681.43	2.2	540.14	2.9	1085
<i>Bagrus domac</i>	1	827.14	9.9	38143	2.1	513.71	1.3	496.71
<i>Bagrus bayad</i>	5	4165.71	1.8	6930	6	1483.57	8.1	3038
<i>Tilapia niloticus</i>	39.9	33407.14	15.4	59258.57	61.3	15256.43	58.5	21908.14
<i>Labeo niloticas</i>	18.9	15810	4.5	17288.57	5.5	1377.29	6.2	2329.43
<i>Barbus bynii</i>	0	0	0	0	1.4	354.29	1.1	403
<i>Labeo horii</i>	0	0	0	0	0	0	0	0
<i>Kanumm sp</i>	0.5	420	12.7	48857	0.3	84.14	0.6	234.71
<i>Distichodus niloticus</i>	0	0	0	0	0	0	0	0

<i>Cithrius cithrius</i>	0	0	0	0	0	0	0	0
<i>Synodontis schall</i>	3.3	2790	3	11472.8	4	987.57	1.8	669.43
<i>Alestes dentex</i>	1.6	1307.14	0.3	1015.71	3	752.86	3.2	1204.5
<i>Clarias lazera</i>	5.1	4264.29	2.5	9720	2.2	552.71	5.3	1970.71
<i>Hydrocon Forskalli</i>	11.1	9272.86	35	134571	4.6	1155.86	3.1	1160.29
<i>Shelbe mystes</i>	0.7	604.29	0.2	660	2.1	513.17	1.1	394.14
Other	11.9	9972.86	14.5	55774.29	5.3	1324.14	6.9	2568.57
Total	100	83642.9	100	38437.24	100	24895.9	100	37462.6

Table 6: Showed fish production in months of winter 2014.

High months in production in winter is November, December and February the study show the high season in production is summer 37.15%, autumn 35.95% and winter 26.90% (Tables 7 and 8). The boats were made of woods, metal, and fiberglass. Gill net and cast net are very famous nets in the Reservoirs. The boats made of locally woods (Table 9).

Months of winter	Production (kg)	%Percentage
November	83643	45.40%
December	38437	20.80%
January	24896	13.50%
February	37463	20.30%
Total	184439	100%

Table 7: Showed months of winter and production kg.

Seasons	Fish production	%Percentage
Summer	254.741	37.15%
Autumn	246.532	35.95%
Winter	184.439	26.90%
total	685.712	100%

Table 8: Show seasons variation and fish production 2014.

Boat kinds	Nets kinds	Woods kinds
Wood boat	Gill net	haraz
Metal boat	Cast net	sonut
sharoug	crabs	neem
flouka		mahogani
Fiber glass		sayal

Table 9: Show the boat, net and kind of wood in fish catching.

Discussion

The study showed that high production was recorded in summer season 37.145%, autumn 35.95% and finally winter 26.95%. 23 species and 14 families were found in the study. The important species in this study were *Oreochromis niloticus*, *Labeo niloticus* and *Synodontis schall*. The rare fish in the dam were *Disticodus niloticus*, *Labeo niloticus* and *Citharinus citharus*. The present study agrees [9] had found 14 families and 21 species. The study agrees [10] that the boats in Jebel aulia were made from woods, metal, shroug and fiberglass. Otherwise the local names of the nets were gill nets and caste net. The kinds of wood by local name are Haraz, Sonut, Neem and Sayal.

Girgis [2] recorded 18 families and 62 species from the swamps and the southern tributaries of the White Nile but in this study found 14 families only. 108 species were recorded by Sandon [6] from the Sudan waters of the White Nile system. They belonged to 51 genera and 23 families but in this study 14 families may be return to periods between the two studies. More recently [7] reported that the fish fauna of the Nile basin is rich and diversified and includes at least 54 genera and well over 300 species [8].

1967 studied all fishes in Sudan but this study is included only Jebel aulia dam (Figure 1).

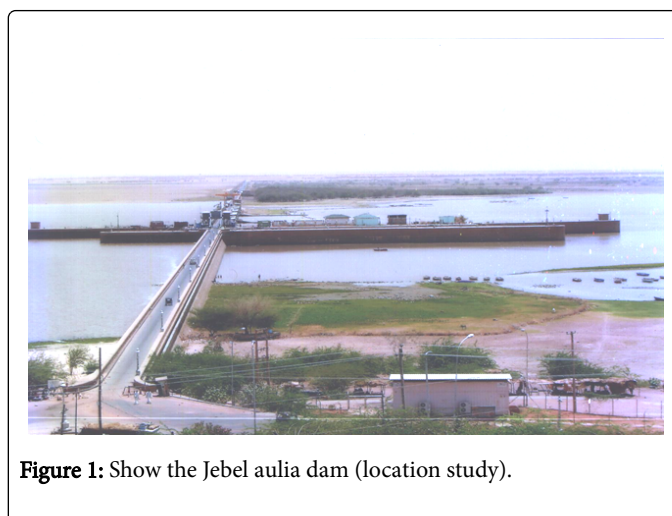


Figure 1: Show the Jebel aulia dam (location study).

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