

DETAILED ANALYSIS OF THE FOOD OF *SAROTHERODON MELANOTHERON* (RUPPELL) FROM AN INLAND TROPICAL LAKE, IBADAN, NIGERIA.

BENEDICTA OSHUWARE OBEN* AND PIUS MBU OBEN**

* Department of Life Sciences, Faculty of science, University of Buea, P.O
Box 63 Buea, Cameroon.

** Department of Geology and Environmental Science, Faculty of Science,
University of Buea, P.O Box 63, Buea, Cameroon.

Target Audience: Fish farmers and nutritionists

ABSTRACT

The analysis of stomach contents of *Sarotherodon melanotheron* Ruppell) was collected between December 19991 and April 1992 from an inland tropical lake. Results of qualitarive and quantitative analysis of food dound in the stomach are provided. *S. melanotheron* consumed a broad range of food materials from plants, phytoplankton and detritus to invertebrates. The proportion of food eaten increases with size. The medium size of *S. melanotherodon* fed more on the cyanophyceae while the large sizes fed more on the chlorophyceae;

Key words: Food, *S. melanontheron* tropical lake Nigeria

DESCRIPTION OF PROBLEM

Sarotheron melanotheron is one of the commonest tilapine fishes in some aquatic system in West African and has received the attention of a number of investigators. (2) emphasised the fact that in order to characterise the diet of a "tilapia species" It is important to know the food components that consistenly occur in the diet over a period of time. Sarotheron species are generally said to be microphagous omnivores (10). Fagade (3, 4) showed that many tilapiine cichlids and the feeding habits of the medium and large sizes of *S. melanotheron* in an inland tropical lake in Ibadan Nigeria.

MATERIALS AND METHODS

Specimen used in the study of the stomach contents in relation to two stages of growth (medium and large sizes) were caught using cast-net, gill net and dragnet in the Abwa lake. The fishes were quickly transfered to the laboratory in the Department of Zoology, University of Ibadan, Nigeria where they were preserved in the deep freezer. Thereafter, each specimen was dissected and its stomach removed and stored in labelled tubes containing 10% formaldehyde prior to examination. The contents from the stomachs of the fish were pooled

together. The pooled sample was shaken to separate the aggregates and mix the contents. Sub samples of the stomach contents were identified and analysed using the numerical and occurrence methods. These methods have been reviewed by (6)

RESULTS AND DISCUSSION

Summary of the major food items.

The summary of the major food items are listed in Table 1. *S. melanotheron* fed on food items made up of Cyanophyceà (blue-green algae), Bacillariophyceae (diatoms), Chylorophyceae (green algae), Euglenophyceae, Crustaceans, Rotifers, Insecta, higher plant materials, fish egg, unidentified materials and organic debris (detritus).

Table 1: Summary of major food items in the stomach of *S. melanotheron*.

Major food item	Numerical method		Occurrence method	
	No	N%	No	0%
Cynaphyceae (blue green algae)	105545	40.07	57	86.36
Bacillariophyceae (diatoms)	6246	2.37	10	15.15
Chlorophyceae (gree algae)	142519	54.11	30	45.45
Euglenophyceae	2834	1.08	7	10.61
Crustaceans	4641	1.76	12	18.18
Rotifers	10.24	0.39	4	21.21
Insecta	110	0.04	2	3.03
Higher plants materials	-	-	19	28.79
Fish eggs	456	0.17	1	1.52
Unidentified materials	-	-	4	6.06
Organic debris (Detritus)	-	-	45	68.18.

The algae, Cyanophyceae constituted 40.07% by number and 86.36% by occurrence and Chlorophyceae (green algae) constituted 54.11% (Numerical) and 45.45 (Occurrence). Higher plants and organic debris constituted 28.79% and 68.18% by number and occurrence respectively.

Among the Cynophyceae (Table 2) Polycystis appear to be the most important in the diet making up 28.92% (Numerical) and 81.82% (Occurrence). This was followed by Coelosphaerium which accounted 10.34% (Numerical) and 53.03% (Occurrence). among the Bacillariophyceae synera constituted 2.13% and 7.59% by number and occurrence respectively.

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53.03% (Occurrence). Among the Bacillariophyceae Synera constituted 2.13% and 7.58% by number and occurrence respectively. Among the Chlorophyceae, Crucigenia constituted 48% (Numerical) and 25.76% (Occurrence). Protococcus constituted 6.78% (Numerical) and 9.09% (Occurrence). The zooplankton were encountered but in small percentages. Detritus and Trichoceca occurred most frequently in the diet of the species.

Major food items in relation to size

A summary of the percentage composition for the size groups of *S. melanotheron* is presented in Figure 1 and 2. Figure 1 represents percentage composition of the major items, while Figure 2 represent the percentage frequency of occurrence of various groups of food items in the stomachs of the fish species. The basic items.

Table 2. Detailed stomach contents of *S. melanotheron*

Food item	Numerical Method		Occurrence Method	
	No	N%	No	O%
PHYTOPLANKTON				
Cyanophyceae (blue green algae)				
Polycystis	76171	28.92	54	81.82
Coelosphaerium	27250	10.34	35	53.03
Nostoc	460	0.17	3	53.03
Anabena	640	0.24	4	53.03
Oscillatoria	114	0.64	1	1.52
Merismopedia	890	0.33	4	6.06
Rivularia	20	0.01	1	1.52
Bacillariophyceae (diatoms)				
Stephanodisms	48	0.02	1	1.52
Synedra	680	2.13	5	7.58
Cyclotella	28	0.01	1	1.52
Flagellaria	90	0.03	3	4.55
Chlorophyceae (green algae)				
Ankistrodesms	1104	0.42	3	4.55
Coelastrum	90	0.03	1	1.52
Aphanizomenon	291	0.11	3	1.52
Crucigenia	121170	48.00	17	25.76
Protococcus	17808	6.78	6	9.09
Botryococcus	310	0.72	3	4.55
Stourastrum	160	0.06	2	3.03
Pediastrum	954	0.36	10	15.15
Rivularia	20	0.01	1	1.52
Cosmarium	612	0.23	4	6.06
Ichyophthirius	880	0.33	1	1.52
Phacus	92	0.33	2	3.03
Trachelomonas	80	0.03	1	1.52
Trinema	870	0.33	3	4.55
Volvox	912	0.35	2	3.03

ZOOPLANKTON

Crustaceans				
Ceridephria	90	0.03	1	1.52
Cyridopsia	90	0.03	1	1.52
Nauphius larvae	4306	1.53	6	9.09
Crustacean part	4	0.01	2	3.03
Daphnia	59	0.02	4	6.06
Cyclops	2	0.03	1	1.52
Camptocercus	50	0.3	1	1.52
Rotifers				
Mytilina	204	0.08	3	4.55
Polyarthra	260	1.00	2	3.03
Peridinium	10	0.004	1	1.52
Synchaetra	20	0.01	1	1.52
Ploesoma	20	0.01	1	1.52
Colurella	396	0.15	1	1.52
Branchionus	54	0.02	3	61.55
Trichoceca	60	0.02	3	61.55
INSECTA				
Insect appendages	80	0.03	1	1.52
Chironomid larvae	30	0.01	1	1.52
HIGHER PLANTS MATERIALS	-	-	-	-
FISH				
Fish eggs	456	0.17	03	4.55
UNIDENTIFIED MATERIAL	-	-	6	9.09
ORGANIC DEBRIS (detritus)	-	-	53	80.30

No.=Number; N% = Numerical Percentage and 0% = Percentage of Occurrence

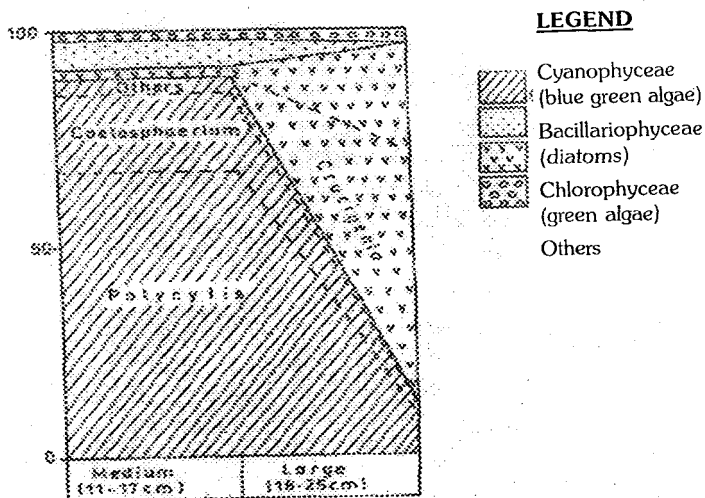


Fig. 1: Numerical percentage composition of the major food items in *Sarotherodon melanotheron*

	Medium (11 - 17cm)	Large (18 - 25cm)
Cyanophyceae (blue green algae)	89.39	100
Bacillariophyceae (diatoms)	100	100
Chlorophyceae (green algae)	100	100
Euglenophyceae	100	100
Crustaceans	100	100
Rotifers	100	100
Insects	100	100
Fish eggs	100	100
Higher plant materials	100	100
Unidentified materials	100	100
Organic debris (detritus)	100	100
	Medium (11 - 17cm)	Large (18 - 25cm)

Fig 2: Percentage frequency of occurrence of various groups of food items in the stomach of the medium and large sizes of *Sarotherodon melanoheron*.

(Table 2) for the medium size (11 -17cm). *S. melanoheron* were algae and detritus. These were followed by plant materials and rotifers. The algae include the Cyanophyceae (blue green algae), Euglenophyceae, Bacillariophyceae. The medium sizes fed more on the Cyanophyceae constituting 89.39 (Numerical) and 100% (Occurrence) while the large fishes also feed more on the Chlorophyceae the medium and large fish sizes feed more on the Euglenophyceae the medium and large fish sizes feed more on the Euglenophyceae (Euglenoids), Bacillariophyceae and the insecta.

On the bases of the food items found in the guts, *Sarotherodon* can be regarded as a less specialized feeder. It consumes a broad range of food materials from plants, phytoplankton, and detritus to invertebrates. It also fed on fish eggs. Such opportunities feeders can seem deceptively narrow in their choice of food, but may be clearly and indication of the ease with which the predominant food items are being obtained. As (1) pointed out that "when a feeding fish is beginning to select one particular type of food, the organism chosen will be one which it sees at least fairly frequently". The main food items of *S. melanoheron* comprise polycystis, *Coelosphaerium*, detritus, *Crucigenia* and plant materials. (5) in the Lagos lagoon also encountered algae, plant materials and detritus, in the stomachs of *S. melanoheron*.

Crustaceans and diatoms were also encountered. (6) reported that it fed on

higher plants. (8) reported that it fed on higher plants. (8) reported mainly plant fragments but also considerable quantities of aquatic insects and Cladoceans.

In the current study the proportion of food eaten by *S. melanotheron* increased with size. (11) found a change in the diet of *S. melanotheron* with increasing size and suggested that such a change in diet is essential if they are to obtain the increase volume of food they need as the change in diet associated with increase in size has been previously reported by (9, 12). In the present work large sizes of *S. melanotheron* consumed more plankton. There was a well-marked change in the diet as they increase in size. The medium size of *S. melanotheron* fed more on the Cyanophyceae while the large sizes fed more on Crucigenia.

CONCLUSIONS AND APPLICATIONS

The prominent food items recorded for *S. melanotheron* comprised Polycystis Coelosphaerium, crucigenia and higher plant materials. The medium size of *S. melanotheron* fed more on the Cyanophyceae while the large size fed more on the chlorophyceae.

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