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ASPECTS OF THE BIOLOGY OF *Sarotherodon melanotheron* And *Tilapia guineensis* (PERCIFORMES: CICHLIDAE) IN BUGUMA CREEK, RIVERS STATE, NIGERIA.

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ABSTRACT

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Assessment of stomach contents for food and gastrointestinal helminths, determination of sex ratio and morphometric features of fecund females of Sarotherodon melanotheron and Tilapia guineeensis was conducted between August and December, 2005 for Buguma Creek, Rivers State, Nigeria. Four hundred and forty-three fish samples comprising three hundred and six for S. melanotherodon and one hundred and thirty-seven for T. guineensis were analyzed. The food items of the two species were dominated by mud, with S. melanotheron having more diversity of food items than T. guineensis. There was absence of gastrointestinal helminthes in the fish samples observed. The two species had overall sex ratio of 1:1. The weight range of fecund females (g) were 8.5 – 48.2 and 31 – 117.9 for S. melanotheron and T. guineensis respectively.

Keywords: *Biology, Sarotherodon melanotheron, Tilapia guineensis, Buguma Creek, Nigeria.*

INTRODUCTION

The Clariidae (Siluroidei) and the various tilapine species constitute the most important aquaculture species in Africa (Teugels *et al*., 1992; Anibeze and Inyang, 2000). *Sarotherodon melanotheron* and *Tilapia guineensis* are the dominant brackishwater tilapine species commonly cultured in the Niger Delta. Although the culture of these species have been investigated in Nigeria, further investigation, particularly of the biology are treated cursorily. For proper management and sustainable yield of brackishwater tilapia in Nigeria brackishwater aquaculture, it is expedient to understand various aspects of their biology. Tilapia species have been reported to be omnivorous subsisting on readily available food of plant and animal origin (Fagade, 1978, Arrignon, 1998; Anibeze, 2001). *S. melanotheron* feed primarily on filamentous algae, microorganisms, and organic materials from dead and decomposing plants and animals. The stomach contents of these fish also include granules of mud and sand (Pauly, 1976). Ugwumba and Adebisi (1992) reported blue-green algae, plankton, insect larvae, plant matter and sand grains as the food of *S. melanotheron* in a small freshwater reservoir. Cisse (1985) considered *T. guineensis* a benthic grazer. Payne (1978) found adults feeding on decaying leaves in the estuaries in Sierra Leone. Fagade (1971) found them feeding on algae, detritus, sand and invertebrates in the Lagos lagoon. Morenikeji and Adepeju (2000) have reported trematode and acanthocephala as helminth parasites for *S. melanotheron* of Eleiyele Lake. The majority of nematodes occur in the alimentary system and only a few enter tissues or inner cavities (Khalil, 1971; Paperna, 1996). Information on reproduction can be used in the design of fisheries management measures (Njiru *et al.*, 2006). Sex ratio determination of *Oreochromis niloticus* indicated that males predominated over females (Njiru *et al.*, 2006). Morphometric relationships and spawning pattern are two important data inputs in fishery management (Udo, 2002). Fecundity increases with age and size of the fish (Bone *et al.*,1995). This study which is part of a series intended to supply information on the biology of Cichlidae in Buguma Creek is focused on the feeding habits, gastrointestinal helminth status, sex ratio and morphometric characteristics of fecund females of *S. melanotheron* and *T. guineensis*.

MATERIALS AND METHODS

Study Area

The Buguma Creek is located Southeast of the Niger Delta between longitude 6° 47'E and 6° 59'E, and latitude 4° 31'N and 4° 59'N (Fig. 1) in Asari-Toru Local Government Area of Rivers State. The Buguma Creek system consists of the main creek channel and associated interconnecting creeks, which interconnect and surround Buguma and Ido communities. The Buguma Creek serves as a source of tidal water for Nigerian Institute for Oceanography and Marine Research/Buguma Brackish Water Experimental Fish Farm, which was constructed between 1963 and 1966 under the auspices of the FAO. The New Calabar River brings the salty ocean water as

tidal flows diurnally to the fish ponds (Dublin-Green and Ojanuga, 1988). A more detailed description of the study area and water quality have been given by Ogbeibu and Oribhabor (2008); Oribhabor and Ogbeibu (2009a and 2009b).

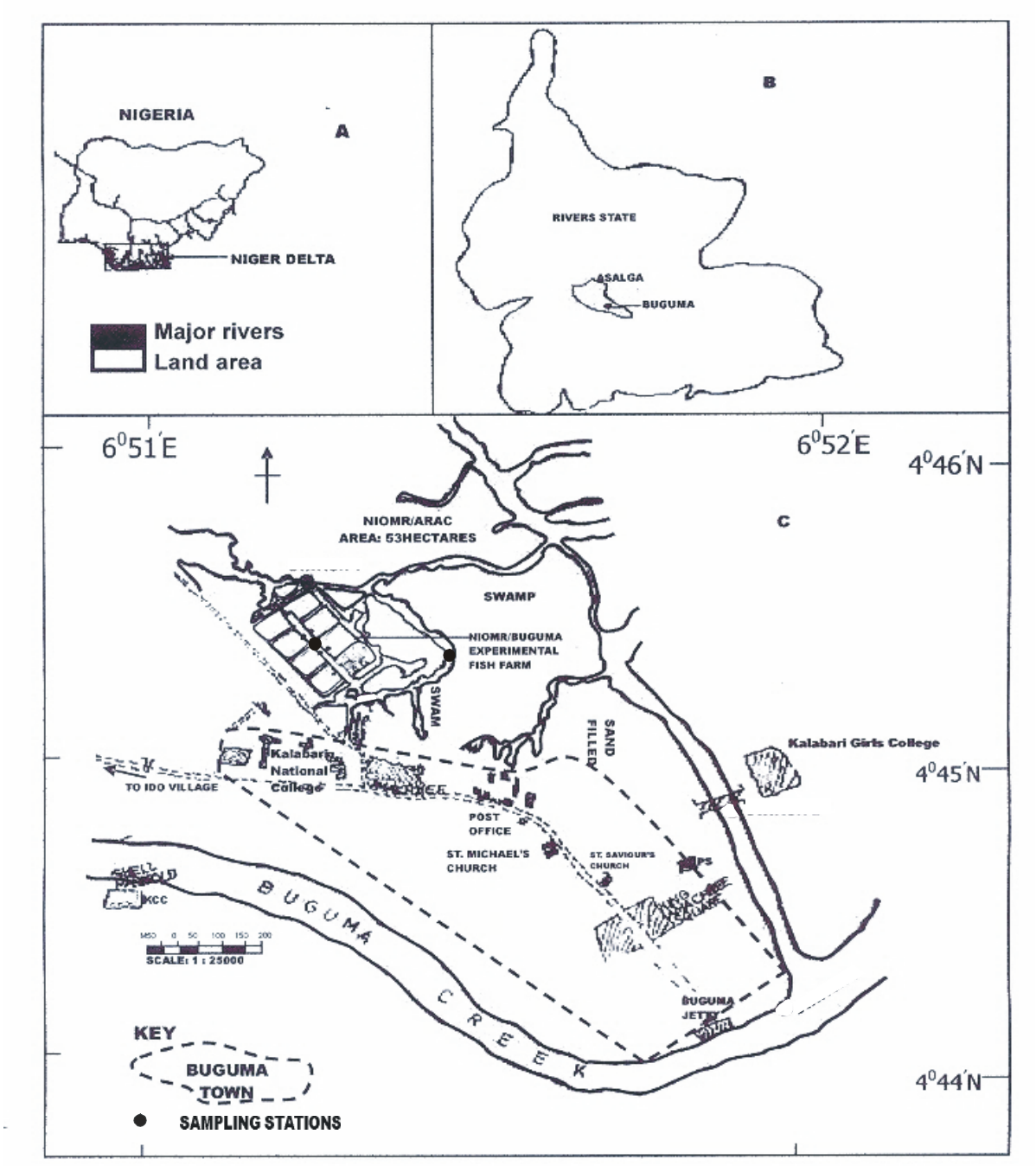

Figure 1: Map of the Study Area: A – Nigeria showing Niger Delta, B – Rivers State showing Buguma, C. The study creek showing sampling stations.

Sampling and laboratory procedures

Fish samples were obtained by sampling during flood tides at fortnightly intervals between August and December, 2005. Baited funnel entrance traps were used in sampling. Fish samples were pooled after capture, and immediately transported to the laboratory for analysis.

In the laboratory, fish specimens were sorted and identified to the species level using the keys and descriptions of Teugels *et al.* (1992), Olaosebikan and Raji (2004). The body weights of fecund females were measured to the nearest 0.1g using a Scout Pro SPU 401 Ohius Top loading balance, while the standard lengths and total lengths were measured to the accuracy of 0.1cm using a measuring board. Fishes were dissected, gut of each specimen

was removed and preserved in a specimen bottle containing 4% formaldehyde. Each stomach was cut open and the contents washed into a Petri dish using 4% formaldehyde for examination of food contents and helminth parasites. Detailed examination was done under the dissecting microscope. The gonads were inspected to determine the sex of each fish and fecund females were observed.

RESULTS AND DISCUSSION

A total of four hundred and fourty-three fish specimens comprising of three hundred and six for *S. melanotheron* and one hundred and thirty-seven for *T. guineensis* were analyzed. The results of analysis of stomach contents using the fullness method are shown in Table 1. Although mud dominated the food items of the two species, *S. melanotheron* had more diversity of food items than *T. guineensis* (Table 2).

Table 1: Filled portion of stomach of *S. melanotheron* and *T. guineensis* in Buguma Creek, August to December, 2005

Fish species	No. of specimens	4/4	¾	½	¼	0
S. melanotheron	306	63	148	70	16	9
T. guineensis	137	49	62	9	5	12
Total	443	112	210	79	21	21
Percentage		25.3	47.4	178	4.7	4.7

Table 2: Analysis of food items found in the stomach of the fish species

Food items	*S. melanotheron*				*T. guineensis*			
	Frequency of occurrence method		Numerical method		Frequency of occurrence method		Numerical method	
	Frequency	%0	Number	%N	Frequency	%0	Number	%N
Mud	297	100			58	46.4		
Bait (mash of oil and garri)	48	16.1			43	34.4		
Unidentified plant parts	5	1.7	279	86.6				
Unidentified fruit seed	3	1.0	28	8.2				
Unidentified animal parts	6	2.0	12	3.5				
Oxyethira sp (Trichopteran larva)	3	1.0	3	0.9				
Hymenopteran nymph	2	0.7	2	0.6				
Parapeneus longirostris	7	2.4	10	0.03				
Sicyonia sp.	1		1	0.03				
Partially digested shrimps	3	1.0	8	2.3				
Crab parts					5	4	14	100
Number of empty stomachs		9				12		
Number of non-empty stomachs		297				125		
Total number examined		306				137		

% 0 = Percentage of occurrence
%N = Percentage of number

The lower number of empty stomach for *S. melanotheron* than *T. guineensis* suggests a more continuous feeding for *S. melanotheron* (Anibeze, 2001). The feeding of the fish species on the bait is an indication of unspecialized flexible dietary habits which are optimal strategy for survival (Welcome, 1979; Olojo *et al.*, 2003). The difference in food items of *S. melanotheron* of this study from those recorded for other waters is due to environmental differences (Tidiani and Teugels, 2004). There was absence of gastrointestinal helminthes in all the fish samples observed. The morphometric characteristics of the fish species and the fecund females are presented in Table 3, while the sex ratio and ratio of fecund females are presented in Table 4. The overall sex ratio of 1:1 for both species conforms with the record of *S. melanotheron* for East-Central Florida (Faunce, 2000).

Table 3: Morphometric characteristics of fecund females

Morphometric parameters	*S. melanotheron*	*T. guineensis*
Total length range of fecund females (cm)	7.9 – 14.2	12.1 – 19.6
Standard length range of fecund females (cm)	6 – 10.5	9.1 – 14.5
Weight range of fecund females (g)	8.5 – 48.2	31 – 117.9

Table 4: Sex ratio and ratio of fecund females to non-fecund females

Ratio	*S. melanotheron*	*T. guineensis*
Sex ratio (male: female)	1:1	1:1
Fecund females: Non fecund females	2:26	1: 60

CONCLUSION AND RECOMMENDATIONS

Good understanding of the biology of fish species enhances their management and yield in culture. The findings of this study apart from contributing to the knowledge of biology of *S. melanotheron* and *T. guineensis* will stimulate further research on the biology and culture of these species.

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