Food and Feeding Habit of *Heterotis Niloticus* in Oguta Lake, IMO State, Nigeria

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Abstract— *A study on the food and feeding habits of Heterotis niloticus (Cuvier, 1829) was carried for a period of six months in Oguta lake of Imo state between January to June 2018. The aim of the study was to investigate the food and feeding habits of Heterotis niloticus within the lake. A total of 180 specimens of Heterotis niloticus were sampled and examined. The result of the stomach content analysis showed that Heterotis niloticus consumed food of animal origin more than those from plant origin with respect to the size of the fish. There is a shift in the food and feeding habit of this fish from carnivorous to omnivorous feeding habit before maturity. The most dominant diet from the juvenile to Adult sizes of the fish were Copepods 61.0%, Cladeceran 58.0%, Ostracoda 48.0%, and Diatoms 46.7%, Frequency of Occurrence (FO) repectively. These finding showed that Heterotis niloticus consumed more zooplanktons and other animals based diets than phytoplankton's and other plant based diets.*

Keywords— Feeding, Habit lake, Oguta.

I. INTRODUCTION

The importance of fish in the economy and ecology of inland water has generated a lot of interest. Over the years aquaculture has gained a rapid interest due to importance of fish as a cheap source of animal protein, since beef is beyond the reach of an average Nigerian citizen these days (Akegbejo, 1995).

Fish like other animals required adequate nutrition to grow and survive in the wild, nature offers a great diversity of foods; these include: nutrients in solution and a host of different plants and animals. However in ponds, natural food is not sufficient to sustain the fish culture, especially in ponds with high density of fish.

For efficient and effective management in fish farming and in order to avoid high cost of producing fish, there is need for proper and adequate nutrition strategies, which can only be achieved via proper understanding of the food and feeding habit of the fish to be cultured. *Heterotis niloticus* (Cuvier, 1829) of the family Arapaimidae, is widely distributed in Nigeria, most especially in the fresh waters of Nigeria rivers. There is only one species of this genus *Heterotis,* hence species *niloticus* (Akegbejo-Samason, 1995). It constitutes an important food source within the region and comprises a portion of the inland fishes in Nigerian due to its delicacy, as it is widely known, but not popularly used in research and production probably due to its inability to easily adapt to environment changes. *Heterotis niloticus* grow reasonable fast from one to eleven months during culture.

Most Rivers and lakes in Nigeria, contain commercially culturable species of fish but very little information is valuable on food and feeding habits *Heterotis niloticus*, in Oguta lake. It is in this view that a study on the food and feeding habits of *Heterotis niloticus* was carried out in Oguta lake of Imo State.

Heterotis niloticus is a pelagic species, it occurs in shallow waters where it feeds on invertebrates, copepods and chironomids (Hickley and Bailey, 1987). Young ones are found in swampy places among aquatic vegetation (Moreau 1982, Dankwa *et al.,1999),* adults live in the open water of rivers and lakes, where they can be found in the pelagic zone as well as the littoral zone (Moreau 1982). Its auxiliary branchial air breathing organs enable it to survive in deoxygenated water; the hardiness of this fish, together with its great growth rate, make it a candidate for aquaculture in Africa and it has been transported to a

number of countires for this purpose (Bake and Sadiku, 2005). Escapees from ponds into the wilds resulted in established populations which form the basis for Fisheries and Aquaculture. (Akintunde, 1977).

This species is considered as a mud feeder (Hickley and Bailey 1987), but in West Africa it is also seen as a phytoplankton feeder. It feeds mostly on plankton, being the only plankton feeder of the Osteoguosssidae (Dankwe *et al*., 1999). It has a superabranarial organ which has a sensory function. During breeding, it creates a circular nest in swamps.

The young's leave the nest after a few days and are guarded by the male (Balon, 1975). *Heterotis niloticus* breeds in the wet season in swamps and flood plains. It builds a circular nest about one millimeter (1mm), in diameter and 20 to 60m deep (Bailey).

The rim of the nest in a high wall is formed out of plank winks, about 15-20cm thick and projecting. Above the water surface, the bottom is a clean platform of clay or mud (Balon, 1975). After the spawning act, the fish leave the way of a hole in wall, through which 5 days later, the young leave the nest and are guarded by the male. The youngs posses external gills for breathing.

Heterotis niloticus is a long-bodied fish with large scales, long dorsal and anal fins set far back on the body and a rounded caudal fin it height is 3.5 to 5 times standard length (SL). It has been reported to reach up to 1m (3.3ft) SL and weight up to 10.2kg (22Ib).

This fish is gray, brown or bronze in colour. Colouration is uniform in adults, but juveniles often have air-breathing organs or less-bronchia, enabling them to survive in oxygen depleted water. A suprachiiae organ allows it to concentrate on small planktonic and food particles and also has a sensory function.

II. MATERIALS AND METHOD

The city of Oguta is divided into two: Oguta 1 and Oguta 2, separated by its popular lake, with the Local Government Headquarters located at Oguta 1. Today, Oguta is better known for its Resort hotel, challenging Scottish-designed golf course. Oguta has attracted lots of visitors because of its popular lake. It is also a home to some fresh water fishes. It has a huge oil and gas exploration going on its cultural diversity. Oguta has history that traces their forefathers to the Oba. Their traditional attires tell a lot about our rich culture. Fish , yam and cassava are some staples food in an average Oguta person's diet.

Neighbouring towns include: Ezi orsu, Izombe (an oil and gas producing community) Akri, Mgbefe, Nkwesi, Nnebukwu, Orsu-Obodo, Egwe and Egbuoma, border town with Anambra State.

2.1 Sampling (Consider Exponge)

Fish samples were obtained between January-June 2018. The samples were collected on weekly bases. A total of 180 fish specimen were sampled during this period. Three categories of fishing gears were used which include: cast nets, surface set gill net and bottom-set gill net.

After capture, the fishes were immediately identified with the aid of (an identification Key) (kef). Thereafter, the specimens were preserved with 10% formalin and it was transported to the Fisheries laboratory of the Imo State Polytechnic Umuagwo in 10% formalin for analyses. Excess water was drained from the fish with filter paper before preservation.

2.2 Preparation of Fish Sample

Dissection of the fish species with the aid of dissection kits.

Weight of stomach content were taken and graded as;

0/4 - empty

¼ - Semi empty

2/4 - half full

¾ - quarter full

Total length, Standard length and Body weight of fish were also measured.

2.3 Examination of Stomach Contents:

Stomach contents of the fish samples were emptied into a Petri dish and diluted with small amount of distilled water, after which a pipette was then used in dropping the mixture to a slide and then the slide is examined with the aid of a microscope.

2.4 Stomach Contents Analyses:

Standard methods described by Sarke (1980), were adopted for stomach contents analyses. Immediately after capture the fishes were kept in ice to prevent regurgitation. They were then measured for total length (T.L), weighed and dissected to extract the stomach which was stored in 4% formalin, or the whole fish was orally administered with 10% formalin to prevent post mortem digestion and then taken to the laboratory for examination. Their foods were evaluated both quantitatively (number of organism) and qualitatively (types of organisms). A combination of frequency of occurrence method and numerical method were adopted in the analysis of the stomach contents. This is to eliminate the inherent bias in the use of one method were separated by taxa and identified to species level and in some cases to higher taxonomic levels. After dissection, the contents of the stomach were placed in separately labeled Petri dishes and the food items examined under a name type of microscope and classified. Counts were made of the number of different food categories was used for the identification of the food items encountered in the stomach was then prepared

2.5 Analysis of Food and Stomach Content:

The stomach contents were analyzed using a binocular microscope to identify the stomach contents. Their foods were evaluated both quantitatively (number of organisms) and qualitatively (types of organisms). The combination of frequency of occurrence method and numerical method (Bake and Sadiku, 2005), were adopted in the analyses of the stomach content. These methods were appropriate because they bring about individual assessment and estimation of majority of food items and feeding intensity were made in line with the size of each specimen and there was no problem of system of standards and adjustment for size of individual. The results were recorded on a raw data sheet. For the fact that very tiny grained particles were found in the gut content, the "occurrence" and point method were used for the estimation of food items.

In frequency of occurrence method, observations were made on each gut and items found were identified and recorded. The total number of gut in which each food item occurred was recorded and taken as a percentage of the result.

TABLE 1
ANALYSIS OF FOOD ITEMS OF *HETEROTIS NILOTICUS* FORM OGUTA LAKE

No. of fish examined	Juvenile 72		Adult 108	
No. of fish empty stomach	21		23	
Food item	% FO	% Nm	% FO	% Nm
Copepods	61.0	33.2	61.3	21.3
Cladeceran	53.0	21.7	58.2	19.3
Ostracode	48.3	18.7	49.4	16.3
Diatoms	46.7	15.8	51.5	15.3
Insect part	30.9	10.8	36.9	3.6
Bivalves	20.3	3.1	18.5	2.3
Plants remains	18.4	10.04	17.9	8.73
Plant detritus	20.7	3.29	21.4	4.83
Sand	25.8	14.1	22.6	9.78
Univellular algae	21.3	6.37	23.4	6.68

The result revealed that the juvenile of *Heterotis niloticus* ingested more of Copepods (61.0%), followed by Cladeceran, (33.0%), Ostracode, (48.3%), with plant remains been the least (15.4%). Adult *Heterotis niloticus* equally ingested more of Copepods just like their juvenile counterparts, followed by Cladeceran (53%) and Ostracode (48.3%)

III. DISCUSSION

The food and feeding habits of *Heterotis niloticus* were examined, 180 stomach contents were then analyzed. Among all the food items, the food items of animal origins were most important in the juveniles diet than those of plant origin.

The most dominant diet of juvenile and adult of *Heterotis niloticus* were:

Crustacean; Cladecerans, (53.0%) for juvenile, 58% for adult, Copepods, 61% for juvenile and 61.3% for adult and Ostracoda, 48.3% for juvenile and 49.4% for adult and diatoms.

The abundance of *Heterotis niloticus* in Oguta lake is overwhelming especially at the period of this, that is (Wet season) due to food availability and environment condition that permits rapids growth.

Fish growth is determined by the combined effect of food quality and quantity. Analysis of composition in stomach of *Heterotis niloticus* from Oguta lake show a predominant microphagous diet plus insect *larvae.*

The inclusion of sand grains were possibly an incidental ingestion along with insect larvae, annelids, prawn and bivalves, while the high occurrence and preeminence of detritus, suggest frequent bottom feeding on benthic invertebrate, which dominated the diet in the river (Akegbejo-Samsons, 1995).

It was evident that *Heterotis niloticus* was strictly a planktonic microphage in the lentic habitats while it adopted a mud-eating microphagous habit in the river.

Ecologically, these habits seem to be common and characteristic of Osteoglosid fish species (Akintunde, 1977), this adaptiveness to the natural diet is responsible for the success of *Heterotis niloticus* in their feeding; primarily consuming a combination of two or more of crustaceans, insects, plankton and plant detritus, depending on availability and abundance of these foods.

IV. CONCLUSION

From the result of this study *Heterotis niloticus* can be domesticated like other culturable fishes like *Clarias garipinus, Hetrobranchus nilotices* as well as *Tilapia do* in the ponds and other artificial settings

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