FOOD AND FEEDING HABITS OF *HETEROTIS NILOTICUS* FROM RIVER KADUNA FLOOD PLAIN.

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ABSTRACT.

A total of 61 Heterotis niloticus specimen were examined and evaluated to determine the food and feeding habits using the frequency of occurrence, point and dominance methods. The specimens had mean standard length of 27.09 ± 4.73cm, total length of 33-40 cm body weight of 90-900g. The gut length ranged from 34-104 cm while the gut weight range from 2.79-130g. It was observed that the fish fed mostly on plankton with rotifers and polycysits having the highest number of frequency and dominant value with mean value of 43.03± 4.12 and 11.73± 1.15, 37.45± 3.27 and 8.32± 0.38 respectively while Arcella had the least mean frequency of occurrence of 3.27± 17, Amoeba sp had the least mean dominance value of 7.06± 50 and Aphnocapsa sp had the least mean frequency of occurrence of 1.10± 0.29 and Navicula sp had the least mean dominance value of 4.31± 1.11. Heterotis niloticus of River Kaduna flood plain is therefore considered to be predominantly planktivorous.

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 the importance of fish as a cheap source of animal protein, since beef is beyond the reach of the average Nigeria citizen.

Fish like other animals require adequate nutrition to grow and survive. In the wild, nature offers a great diversity of food; these include nutrient in solution and a host of different plants and animals. How ever in ponds natural food is not sufficient to sustain the fish culture especially in ponds, with high density of stock fish. Therefore in fish farming, for efficient and effective management to avoid high cost of production to produce fish at a cheaper price there is need for proper and effective nutritional 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 osteoglossidae is widely distributed in Nigeria most especially in the fresh waters of Nigeria rivers. There is only one specie of this genus *Heterotis* hence species *niloticus* (Bard et al; 1976). It constitutes an important food source within the region and comprises a portion of the inland fish in Nigeria due to its delicacy. It is widely know in Nigeria but not widely use in research and production probably due to its in ability to easily adapt to environmental changes. Although under suitable condition and proper feeding, *Heterotis niloticus* grow reasonably fast to 1m in 11 month's culture.

River Kaduna is blessed with a lot of commercially culturable species but very little or no studies have been done on their food and feeding habits especially *Heterotis niloticus*. It is in this view that a study on the food and feeding habits of *Heterotis niloticus* in River Kaduna flood plain in Niger states.

MATERIALS AND METHODS

Fishing was done between June- October 2001 a period of 20 weeks using gill nets A total of 61 specimens' of *Heterotis niloticus* were caught from three sampling stations on the flood plain of river Kaduna that is Nku, Nupeko and Fokpo. Sampling was done once a month, special considerations were required to minimize effect of the following.

(a) Regurgitation of food materials.
(b) Feeding under abnormal conditions
(c) Digestion after captures

A number of good catches were made. The specimens were first killed by breaking the spinal cord and transported from the site of capture to the laboratory in ice crest to minimize any post-mortal changes In the fisheries laboratory of federal university of technology minna, each specimen was measured in term of length (cm) and weight (g) with date, time, and location of capture according to John and Steven (1978),Sagua 1979 and 1982 The gut specimen weighing from 90-900(g) were later preserved in 4% formaline. After degutting of the fish the length and the weight of the guts were also taken using a measuring ruler and electrical sensitive balance.

The stomach contents were analyzed using the three (3) conventional methods of gut content, analyzing via dominance, point and frequency of occurrence methods (John and Stephen 1978, Windell, 1968; Davis and Warren, 1971) with the aid of microscope the morphology in the gut content were investigated

RESULT

The result of basic biometric measument of Heterotis niloticus sampled provides the following information, the gut of the specimen weighed from ? 79-13.06g and the length ranges from34-104cm. The standard lengths of the specimens' ranges from 21-45 cm with a corresponding body weight ranging from 90-900g

Morphology and anatomy of *Heterotis niloticus* in relation to its food and feeding habits:

Heterotis niloticus has a terminal month as described by Reed (1967) He reported that fishes with terminal mouth either prey upon other fishes or filter plankton from water

Gills

There were (4) four gills each side of the body beneath the operculum (welcomme 1967) reported that gills enable such species with this type of gills to feed on planktons Reeds (1967) also said that gill rakers serve as food to some of these species It is believed that fishes with numerous and fine rakers are either microphages or plankton feeders

Gut

Heterotis niloticus of River Kaduna flood plain posse's very long intestine ranging from 34-104 cm with an average length of 86 cm. The gut is differentiated into fore gut, the mid gut (bulging stomach) and the long intestine (hind gut). The rectum open into the anus from the fore gut to the end of the stomach is a very hick walled tube, which act as a gizzard. The stomach is in sac shape hence modified into grinding organ. This organ is more or less similar to the gizzard of a chicken and other poultry.

FOOD ANALYSIS

Three conventional methods were used to evaluate the food content in the gut of the specimens. Table 2 and 3 give a summary of dominance and frequency of occurrence.

FREQUENCY OF OCCURRENCE

From the table 2 and 3 the stomach content analyzed showed wide variety of items. *Polycytis* had the highest value of frequency of occurrence followed by chlorella and *trochiscia* while the least frequency plytoplankton are *Gloecaystis*, *ophiocytium*. Rotifers had the highest value of frequency of occurrence with Amoeba *frontina*, *diaptomus* having the least occurrence among the zooplankton that was found in their stomach.

DOMINANCE METHOD

Table 2 and 3 shows that the first stomachs were mostly dominated by phytoplankous by polycystis, *oocystyis trochicia* and *chorella* while Rhozosolenia and *cyelsppcrium* were the least dominant. The Zooplankton analysis observed shows that Rotifer and volvox dominated the stomach of *heterotis niloticus* while *frontinia* Amoeba and *Arcella* least dominate.

Point method

It was noted or observed that no fish stomach was completely empty; 34% were half full stomach and 66% gain point to be full.

Table 2 summary of food evaluation in *Heterotis niloticus* phytoplankton

Food items	Frequency of occurrence	Percentage dominance
Gloecocystic	2.52 ± 1.45^{a}	5.97 ± 1.35^{b}
Ophiocytium	2.0 ± 0.49^{a}	6.38 ± 0.62^{b}
Chlorella	16.84 ± 3.09^{c}	8.32 ± 0.38^{c}
Trochiscia	18.27 ± 2.70^{c}	8.32 ± 0.38^{c}
Sceneolesmus	1.25 ± 0.32^{a}	4.52 ± 0.95^{ab}
Oocystis	8.30 ± 4.01^{b}	8.32 ± 0.38^{abc}
Surivella	1.38 ± 0.36^{a}	4.98 ± 1.32^{ab}
Gomphonema	1.24 ± 0.42^{a}	4.89 ± 1.63^{ab}
Stephonodiscus	1.36 ± 0.19^{a}	5.69 ± 1.62^{ab}
Cicconesis	1.17 ± 0.41^{a}	4.95 ± 1.20^{ab}
Rhizosolenia	1.21 ± 0.37^{a}	4.31 ± 1.11^{a}
Navicula	1.53 ± 0.67^{a}	5.16 ± 0.89^{ab}
Cyclotella	1.48 ± 0.71^{a}	4.49 ± 0.55^{a}
Coelophaerium	1.10 ± 0.27^{a}	4.46 ± 0.82^{a}
Aphnocapsa	1.37 ± 0.50^{a}	5.58 ± 1.14^{ab}
Polycytis	37.45 ± 3.27^{d}	8.32 ± 0.38^{ac}
Phormidum	1.67 ± 0.54^{a}	5.58 ± 0.34^{ab}

Data on the same column carrying super script differs significantly from each other ($P<0.05$)

Table 3. Summary of food evaluation in *H. niloticus* Zooplankton

Food items	Frequency of occurrence	Percentage dominance
Cypriclopsis	4.88 ± 1.05^{a}	8.74 ± 0.81^{a}
Eubranhipus	4.27 ± 1.83^{a}	3.88 ± 1.98^{a}
Dipatomus	3.84 ± 0.37^{a}	8.39 ± 0.63^{a}
Frontinia	4.40 ± 1.21^{a}	8.92 ± 0.66^{a}
Amoeba	3.37 ± 0.82^{a}	7.06 ± 0.50^{a}
Chilodon	5.16 ± 1.30^{a}	8.61 ± 1.15^{a}
Holophaya	4.14 ± 0.56^{a}	8.91 ± 0.88^{a}

Colpodium	3.34 ± 0.65^a	8.89 ± 2.07^a
Arcella	3.27 ± 1.70^a	8.60 ± 0.90^a
Volvox	20.16 ± 4.38^a	11.76 ± 1.15^a
Rotifer	43.03 ± 4.12^a	11.76 ± 1.15^a

Data on the same column carry super script differ significantly from each other ($P < 0.05$)

Discussion

From the shape of the mouth and the gills arrangement *Heterotis niloticus* exhibited filter feeding with the aid of its fine gill rakers. Hence capable of filtering phytoplanktons and zooplanktons. Therefore, this species is more of plankton feeder as earlier suggested or describe by reed et al (1967). The gut type is that of the omniover, larger (1977).

Describe the stomach of an ominivore as a food grinder. The gut length and weight shows that the gut is very long with range from 34-104cm. This suggests a long gut transit time from the food of this fish. 45% of the specimens were observed to have more food in the stomach (mid gut) than the hindgut. It was observed that smaller specimen had short but in relation to the body. This could be done to the advanced omnivore in the halter than the former with less developed gut.

In terms of individual food items, the fish prefers plants materials (phytoplankton's) favored by plant grains as earlier reported by reed et al (1967) through *Heterotis niloticus* of River Kaduna flood plains do not feed on detritus they feed on polycrystis. Mid – water-feeding habit than bottom were they dwell. This may also be associated with the habitat of *Heterotis niloticus* where they mostly live in glassy areas where there is a lot of grass, particularly during the breeding season as they make their nest on grasses Bard et al (1976).

Frequency of occurrence of food analysis showed that polycystics were the predominant food items in period of phytoplankton boom during which there was a poor zooplankton community. During this period *polyscytis oocystis_trochiscia* and *chlorella* were dominant food items in the guts beings the dominant phytoplankton in the river and the filter feeding mechanism of the fish is non selective. At certain time of the year when zooplankton community increased with more of rotifer, the fish then had preferences for the rotifers and volvox as revealed by dominance method as earlier reported. Although throughout the experiments there was no more decline in phytoplankton consumption but the intake of zooplankton increase tremendously after the algac boom raining season and towards the end of the raining season.

Conclusion

In conclusion food and feeding habit study of the fish shows that the fish prefers food items that varies with time during the four months period of this study there was preference of polyssytis sp before rotifers succeeded later.