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The Monthly Variation in the Feeding Habits of *Auchenoglanis occidentalis* from Tagwai Lake, Minna, Nigeria

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Abstract
The food and feeding habits of *Auchenoglanis occidentalis* commonly called the "BuBu" cat fish or the giraffe cat fish from Tagwai Lake, Minna, was analysed from January to June, 2013. A total of 216 fish specimen were used for this study, and these were obtained from the local fishermen operating in Tagwai Lake Minna. These fishermen used various fishing gears, including hand nets, cast nets and gills nets of various sizes. They also used hook and lines. The frequency of occurrence and dominance method were used to analyse the food in the gut. *Auchenoglanis occidentalis* from Tagwai Lake, Minna had a broad spectrum of food items in the gut ranging from insects, fish and plants to protozoan. The percentage of insects was (31.75%), fish (12.70%), Chyme (20.65%), plant materials (20.63%), protozoa (1.59%) and soil (12.70%). The presence of different food items in the gut of the *Auchenoglanis occidentalis* which ranged from animal to plant and soil resulted in it being considered as an omnivore bottom feeder. The broad food spectrum of the fish makes them good aquaculture candidate. It also suggests that the species feed both in surface water and near the substratum (sand). Interestingly, the food habits of the fish species were not removed by difference between the dry season months and the rainy season months. The result also showed that insects had the highest percentage (31:75%) followed by plant materials.

Key words: *Auchenoglanis occidentalis*, feeding habits, Tagwai Lake.

Introduction

The important role of fish in addressing nutritional and livelihood security of people in the developing countries cannot be over emphasised. Fish provide 20% of animal protein intake to about 2.6 billion people globally and at least 50% of animal protein intake for over 400 million Asia and Africa. However, in developed countries, it provides only 13% of animal protein (FAO, 2008). On a global scale, fish and fish products are the most important sources of protein in human diet. This protein is relatively of high digestibility when compared to other protein sources.

Auchenoglanis occidentalis, which is a Bagrid is one of those fishes of great economic importance, whose biological and environmental requirements for cost effective production in captivity could be easily harnessed and domesticated. *Auchenoglanis occidentalis* is commonly called the giraffe cat fish or the Bubu cat fish. It got its name from the giraffe like pattern of spots on its body. A good understanding of the natural history, with particular emphasis on the feeding habits and diets of the fish species is an important prerequisite for planning and designing cost effective strategies for raising fish species being studied in captivity. Nature offers great diversity of organisms used as food by fish and these differ in sizes and taxonomic group (Onimisi *et al.*, 2009). The dietary analysis of an organism in its natural habitat enhances the understanding of the growth, abundance, productivity and distribution of the organism (Fagade and Adebisi, 1979). The diet of cultured species does not provide precise and reliable information on the food, feeding habits and condition factor of such species. Hence, most studies which are aimed at obtaining such information are conducted on fish species from the wild. A good understanding of the food and feeding habits of fish enable scientists to develop a rational method of exploiting a particular population of fishery, and forms the basis for the development of successful capture and culture fisheries (Adebisi, 1981).

The study of the food and feeding habits of fresh water fish species is a subject of continuous research because it constitutes the basis for the development of successful fishery management, progressional fish capture and culture (Oransaye and Nekpodis, 2005). Most study of the biology of Bagrid in Nigeria has been conducted in Kainji Lake in Niger State and Lekki Lagoon in Lagos (Lawson and Olusanya, 2010). Very little is known about the Biology of *Auchenoglanis occidentalis*. published information on the Genus *Auchenoglanis* include those of Abdullahi (2001) and Idodo-Umeh (1987). Ikongbeh *et al.* (2014) also looked at the food and feeding habits of *Auchenoglanis occidentalis* from Lake Akata in Benue State, Nigeria. Information on the present status of *Auchenoglanis occidentalis* in terms of food and feeding from Tagwai Lake, Minna only came into limelight with the work of Chukwuemeka (2011), who looked at the feeding habits of three (3) selected fish species, among which was *Auchenoglanis occidentalis*.

Our dependence on unexplored wild fishery resources and domestication of the very few species such as Tilapia, carp and Clarias cannot meet the ever increasing human demand for animal protein. *Auchenoglanis occidentalis* is known to exhibit good growth rate and size and have tremendous market value (Onimisi *et al.*, 2009). Generating information which will fast track the domestication and eventual mass production of *Auchenoglanis occidentalis* necessitated this study.

Materials and Methods

Description of Study Area:

The state experiences two distinct seasons i.e. the dry season (between November and March) and the rainy season (between April and October). The area has a tropical climate with mean annual temperature of 30°C, relative humidity of 61.00% and mean annual rainfall of 1,334.00mm. The vegetation of the area is typically grass, dominated with scattrred tree species. The occupation of the people of the area is fishing. Tagwai settlement is dominated by Nupe and Gwari people. The lake is about 10km away from the heart of the town. The secondary benefits of the dam includes fisheries, recreation and wild life conservation.

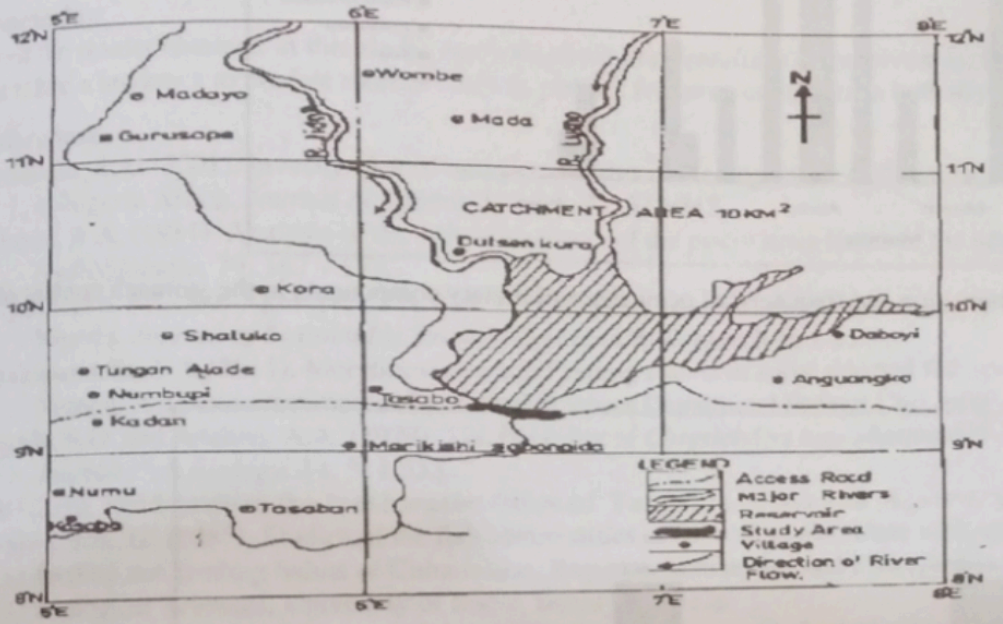

Figure 1: Map of Tagwai Lake

Collection of samples for feeding habits:

Auchenoglanis occidentalis was taken randomly from the total catch landed by the fisher men, and they were transported to the laboratory for further processing in containers with ice blocks (Fagade and Adebisi, 1979). This was done bi – weekly. The stomach content was analysed following the techniques of Fagade and Adebisi (1979), and dietary components were identified taxonomically to class level.

A total of 216 samples of *Auchenoglanis occidentalis* were randomly sampled monthly for 6 months. Fish sampling was usually done in the morning between 7:00am – 9:00am; the period of the study was from January to June, 2013. The fish specimen used for the study was obtained from artisan fishermen operating along Tagwai Lake. These fisher men used different fishing gears, ranging from gill net, cast net, hook and line, and hand net of various standard sizes. The fish specimen were preserved in ice chest (to prevent the gut from degenerating) and taken to the WAFT laboratory of the Federal University of Technology Minna for analysis.

In the laboratory, each specimen was dissected, the gut was removed and the entire stomach of the each fish was also removed. The stomach content was analysed using frequency of occurrence method and dominance method.

The data collected were subjected to statistical packages of social science (SPSS) and the empirical analysis. The relative abundance of dietary components of species was established using simple percentage proportions. All statistical test were carried out at p= 0.1 level of significance.

Results

Figure 1 shows the monthly variations in composition and frequency of occurrence of dietary components in the stomach content of *Auchenoglanis occidentalis* from Tagwai Lake, Minna from January to June, 2013. The dietary components were classified into six groups namely; insects, chyme, fish, plant materials, protozoa and sand. Interestingly, insects featured in all the months, though in varying frequencies. Fish materials were only present in January, April and May. The Chyme which was so high in the first month of study, January, reduced in February and did not occur again in June. Plant materials also occurred in all the months except in March. Sand was seen to present in the food.

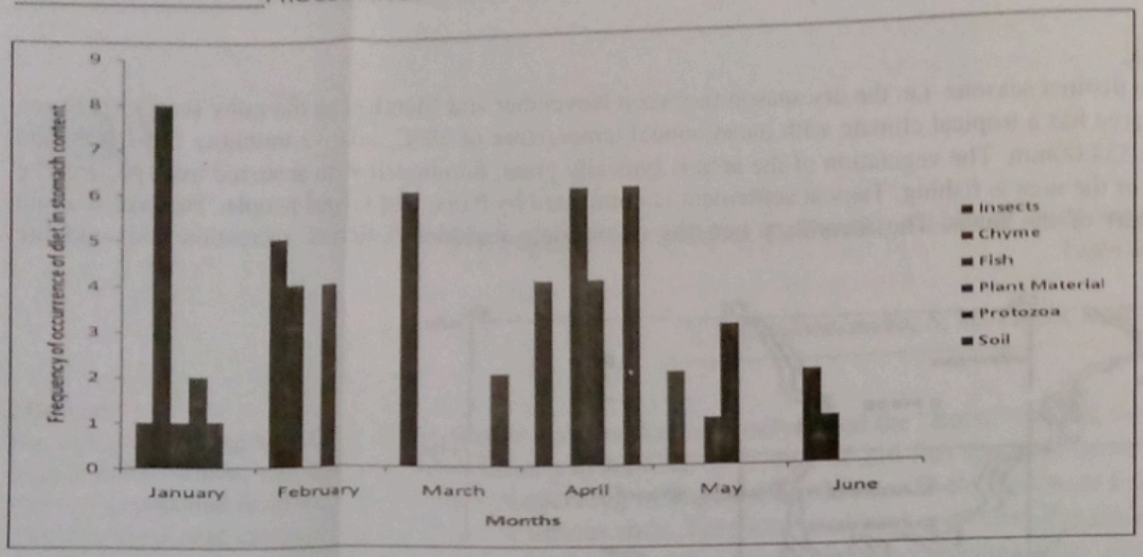

Figure 1: Monthly Variations in composition and frequency of occurrence of dietary components in the stomach content of *Auchenoglanis occidentalis*.

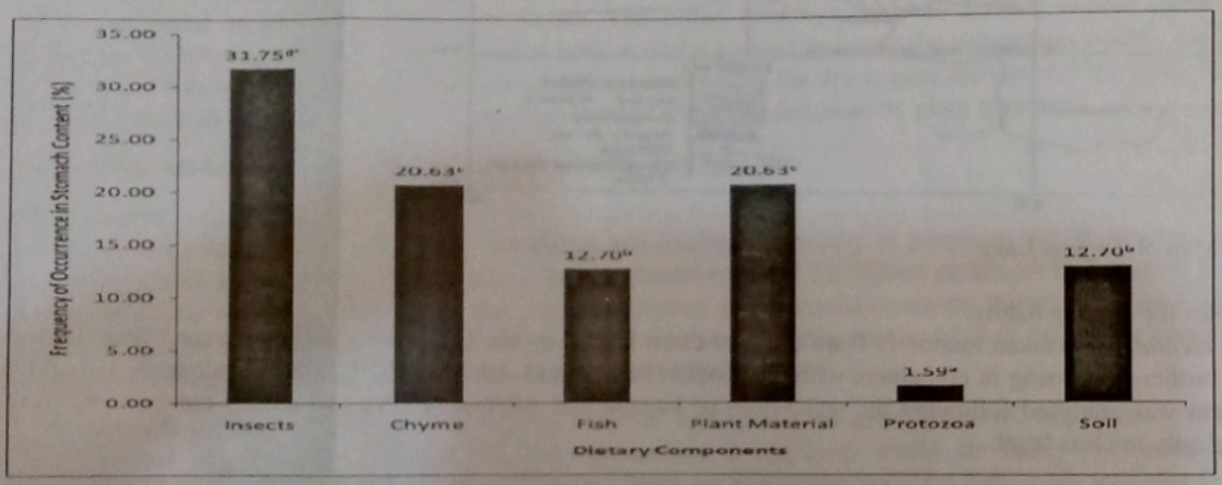

Figure 2: Composition and frequency of occurrence of dietary components in the stomach content of *Auchenoglanis occidentalis*.

In figure 2, the composition and frequency of occurrence of dietary components in the stomach content of *Auchenoglanis* from Tagwai lake Minna is shown. The frequency of occurrence of insects was higher.

Discussion

Figure 1 showed the monthly variation in component and frequency of occurrence of dietary components in the stomach content of *Auchenoglanis occidentalis* from Tagwai lake Minna.

The food and feeding habits of *Auchenoglanis occidentalis* from Tagwai Lake Minna, Nigeria were not remarkably different between the dry season months (January to March) and the rainy season months (April to June) in 2013. The results obtained in this study were in line with the work of Meye and Ikomi (2010), who studied the food and feeding habit of *Auchenoglanis occidentalis* in River Orogodo in Delta State. They reported that there was no significant difference in the feeding habits of the fish in both the dry and the rainy seasons.

Also from Figure 1, *Auchenoglanis occidentalis* shown to be an Omnivore i.e. it feed both on plant and animal materials. This agreed with the work of Onimisi *et al.* (2009) who studied the same fish species in Zaria River, and reported that they fed on both plant and animal materials. Also, Meye and Ikomi (2010) reported about the fish species though in River Orogodo.

From Figure 2, it is also obvious that insects had the highest percentage of 31.75%. This agreed with the work of Chukwuemeka *et al.* (2011) and Ikongbeh *et al.* (2014). Ikongbeh *et al.* (2014) studied the food and feeding habits of *Auchenoglanis occidentalis* in River Akata in Benue State, Nigeria. They reported that 70.10% of the food of this fish species comprised of insects. *Auchenoglanis occidentalis* from this study was seen to have a variety of food materials ranging from

insects, insect larvae, protozoa to plant materials. This no doubt makes it a good aquaculture candidate. Onimisi *et al.* (2009) who worked in Zaria River and Meye and Ikomi (2010) who worked on River Orogodo in Delta State also reported same. From Figure 1 and 2, sand is also seen to be a part of the diet. Although its function is not well known, but the presence of sand in the gut is a pointer that the fish species feed both at the surface water and near the substratum (sand). It is possible that the sand in the gut might have been accidentally ingested with the fish species since both have the same percentage of 12.70 and they were not significantly different. It could also mean that the *Auchenoglanis occidentalis* is a bottom dweller. This agreed with the work of Onimisi *et al.* (2009), Akpaniteku *et al.* (2013) and Idodo-Umeh, (2003). They all reported separately in their works that *Auchenoglanis* species are bottom dwellers as sand was found reasonably in their gut.

Conclusion

From the results obtained in this study, *Auchenoglanis occidentalis* is an omnivore (feed both on plant and animal materials) but it had a tendency to predate more on insects, since it fed more on insects in both dry and rainy season.

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