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THEME
SECURING ANIMAL AGRICULTURE AMIDST GLOBAL CHALLENGES

FOOD AND FEEDING HABITS OF *Bagrus bayad*, NAKED CATFISH, IN GAFARA RIVER, NGASKI LOCAL GOVERNMENT AREA, KEBBI STATE

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ABSTRACT

The present study was conducted on Bagrus bayadin Gafara River to ascertain the food and feeding habits of the species. Specimens were obtained on monthly basis from the artisanal fishermen catches at their landing sites at the river for a period of twelve months (February 2020 to January 2021). Data on stomach contents was subjected to Frequency of Occurrence, Index of Relative Importance and Gastro somatic Index analysis. The results showed that fish larva, small fish and insect parts had the highest occurrence, 29.70, 19.23 and 16.14%, respectively. Gastrosomatic index revealed that B. bayad feed intensively during rainy season period. The occurrence of these food items is an indication that B. bayad exhibited carnivorous feeding habits in Gafara River which will assist fish farmers in the culture of the fish.

Key words: Feeding habits, *Bagrus bayad*, Gut content, Index of relative importance, Gastrosomatic index

Introduction

The term "fish" refers to diverse aquatic organisms including lampreys, sharks, and crustacean. Among many animals in aquatic ecosystem, fish occupy a biological status in the trophic cascade of the aquatic ecosystem. Several species of fishes also play an important role in economies in many countries around the world. However, what determines the success in commercialization of fish is the food it receives for growth and nutrition. Thus, the study of the food and feeding habits of fish species is a subject of continuous research because it constitutes the basis for the development of a successful fisheries management programme on fish capture and culture and because the aquatic ecosystem is dynamic. The dietary analysis of fish in their natural habitats enhances the understanding of the growth, abundance, productivity and distribution of organisms (Fagade *et al.*, 1972). Additionally, fish contains high quality protein and is often recommended in the treatment of various diseases such as cardio-vascular disease, Cancer and Asthma among others. Fishes were able to achieve that because of their wider feeding habits on variety of items of both animals and plants origin like insects, insect larvae, worms, fishes, planktons, leaves, roots of plants *e.t.c.*

A lot of research has been conducted on the food and feeding habits of various fishes. (Yazicioglu *et al* 2018; Manorama *et al* 2017). However, there is scarcity of information on food and feeding habits of *B. bayad* in the Gafara river at Ngaski Local Government, Kebbi State, Nigeria.

Materials and Methods

Study area

The study area is located in Gafara village Ngaski Local Government of Kebbi State, Nigeria. Its geographical location is Latitude 10° 35' 0" North and Longitude 4° 58' 0" East.

Samples collection

The samples of *Bagrus bayad* were purchased from the fishermen at Gafara River Fish Landing Site at Ngaski Local Government, Kebbi State during the study period from January 2020 to February 2021.

Method of gut content analysis

The body weight of the samples were measured using an electronic weighing balance, the total length, standard length were all measured with plastic ruler. The gut weights were weighed using the sensitive weighing balance and the gut lengths were measured using plastic ruler.



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Frequency of occurrence method

Each food item occurred in number of stomachs were recorded and expressed as a percentage of the total number of fish stomachs examined.

$$\text{Frequency of occurrence, \% } O_i = \frac{n_i}{n} \times 100$$

Where: % *O* is the frequency of occurrence of given food *i*

n_i is the number of stomachs containing prey *i*

n is the total number of stomachs with some food

Points (Volumetric method)

Point's method is a contrast to the eye estimation method. While allotment of points both the length of the fish and the fullness of the stomach are taken into account by certain workers.

Percentage volumes within each subsample were calculated as:

$$\alpha = \frac{\text{Number of points allocated to component } \alpha}{\text{Total points allocated to subsample}} \times 100$$

Where: α is the percentage volume of the prey component.

Index of Relative Importance (IRI)

$$\text{Index of Relative Importance, IRI} = \%O(\%N + \%V) \times 100$$

Where *V* is percentage of the volume of food item

O is the percentage of occurrence of given food item

N=Percentage of the Number of food item

Gastro-Somatic Index (GSI)

Gastro- somatic Index (GSI) was calculated by the following formula:

$$\text{GSI} = \frac{\text{Weight of the gut}}{\text{Total weight of the fish}} \times 100$$

Data analysis

Descriptive statistics using percentages and means were used to analyze the data.

Results

The Frequency of Occurrence of various food items in the stomach of *Bagrus bayad* in the Gafara River ranged from fish larva and detritus to larger plant materials and small fishes (Table 1). Fish larva was found in the stomach of the fish throughout the year and constitute the highest food item consumed (29.70%). The highest consumption of this food item was observed in December (14.21%) while the lowest was recorded in October and November. Plant materials (19.23%) constitute the second most consumed prey by frequency of occurrence, which comprised of different forms of plant materials. Small fish and insect parts were recorded in 17.85% and 16.14% of the guts examined, respectively, which when combined form 33.99% animal food source (Table 1). Detritus was found in 17.05% of the stomachs dissected. Index of Relative Importance shows that larva (35.06%) is more dominant in the diet of *Bagrus bayad* followed by detritus (25.41%) and small fish (18.07). Plant materials constitute 9.54% of the fish diet (Table 2). The average Gastrosomatic index ranges from 4.39 in July to 1.27 in November for females and 3.68 in July to 1.62 in September for male *B. bayad*. The highest GaSi was observed in July in Males while the lowest was 1.27 in November observed in males.

Discussion

Fish food and feeding habits change according to the availability of food (Desai 1992). Stomach content analysis revealed that the food items of *B. bayad* consist of larva, small fish, insect parts and detritus with larva and small fish being the most frequently consumed. This is similar to Hickley and Bailey (1987) who described *B. bajadas* a macro-predator in River Nile (southern Sudan), its diet consisting mainly of fish prey, aquatic insects, organic detritus and aquatic higher plants. In addition, Bishai (1970) in his work on *B. bajad* in Sudan estimated that frequency of occurrence of fish prey was high followed by aquatic insects and crustaceans. The Index of Relative Importance (IRI) revealed that *Bagrus bayad* in Gafara River is



omnivore because it had a lot of animal components including fish larva, small fishes, aquatic insects, and detritus.

Conclusion

The species is an omnivorous animal. In our study, *B. bayad* can be classified as omnivores, feeding on a wide range of food of planktonic and benthic organisms.

Recommendations

To enable the culture of *Bagrus bayad* under captivity, more studies should be conducted in other freshwater bodies to ascertain the food and feeding habits of this fish in its natural environment.

Table 1: Seasonal variation of food items in stomach of *Bagrus bayad* in Gafara River by Frequency of Occurrence method

Date	No. of Fish	Fish larva	Detritus	Small fish	Plant material	Insect parts		
Percentage number of guts food item occurred								
Feb	5	2.86	0	0		4.29	0	
Mar	6	5	2.11	0		2.25	0	
Apr	7	2.78	4.12	2		2.12	2	
May	3	2	2	1.47		1.34	1	
June	8	2	4	2.78		2.64	2.25	
July	5	6	2	3		4	6	
Aug	7	1.1	1.36	6.48		3.71	3.6	
Sept	6	2.34	2.43	4.65		2	2	
Oct	9	0	2.32	2.12		2.22	2.23	
Nov	7	0	1.45	3.4		3.34	4.34	
Dec	6	14.21	1.75	0		0	0	
Jan	6	4.81	1.21	0		0	0	
Percentage occurrence for the year		43.1	24.75	25.9		27.91	23.42	145.08
Yearly average %occurrence		29.70	17.059	17.85		19.23	16.14	100

Table 2: Index of Relative Importance (IRI) of prey items in the diet composition of *Bagrus bayad* in Gafara River, Ngaski, Kebbi State

Prey	%N	%V	%O	(%N+%V) %O	%IRI
Larva	23.12	25.13	29.71		1433.40
Detritus	16.1	44.78	17.06		1038.59
Small Fish	24.22	17.15	17.85		738.55
Plant mat.	16.43	8.9	19.24		487.29
Insect parts	20.13	4.04	16.14		390.17
Total	100	100	100		4087.99

N=Percentage of the Number of food item

V=Percentage of the Volume of food item



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O=Percentage of Occurrence of given food item
IRI=Index of Relative Importance

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