

# Investigation of the Stomach Composition and Feeding Habit of *Bagrus bayad*, (Macropterus) Catfish Specie in Kiri Dam Reservoir, Adamawa State, Nigeria

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**Abstract:-** This study was carried out to investigate the food and feeding habit of *Bagrus bayad specie* in Kiri Reservoir. Sample collected were one hundred and seventy-four species of *Bagrus bayad*, randomly sampled for a period of six months. Male and the female were determined by physical observation of the fish gonad. The determination of the food and feeding habit of the fish were done through visceral dissection of the fish from mouth to anus to reveal the intestinal organ. Stomach were removed and the contents are emptied in to a clean petri-dish. Food materials in the stomachs were analysed under light microscope; and each food item from the content was identified using a provided recommended guide. Data were analysed using percentage, mean and standard deviation. Result of the analysis shows that the food from stomach content are mostly of plant and animal origin. The percentage mean for the food items in the six months shows that plant parts have the highest mean of 17.94% and fish parts have a mean of 16.76%. This is an indication that *Bagrus bayad* fish are omnivorous, based on this outcome it is recommended that aquaculture farmers of *Bagrus bayad* should effectively utilised plants and animals' materials in the formulation of feeds for feeding *Bagrus bayad* fish in culture.

**Keywords:-** Investigation, Feeding Habit, Catfish, Omnivorous, Stomach Composition.

## I. INTRODUCTION

The fish family Bagridae is represented by thirty (30) general and two hundred and ten (210) species, (Zhang et al, 2006). In Nigeria, the *Bagrus bayad* (Daget) were found in most of the Inland waters in the Northern region, more

especially in River Niger, Kaduna, Benue and Lake Chad (Holden and Reed 1972). The species were also available in Dams (Reservoirs) Such as Kiri, Dadin Kowa Kainji, Jebba, Tiga, Goronyo, Asejire, (Ita, et al, 1985). The investigation of the stomach composition and feeding habit of fish species are fundamental for the development and sustainability of a successful fisheries management programme on fish capture and culture (Oronsaye and Nakpodia, 2005). The study of fish stomach composition is very important in guiding fish farmers towards formulation of artificial feeds for fish in culture. The stomach composition and feeding habit of *Bagrus bayad* species and other fish species were reported by several researchers in the passed years and in recent years, among which are Malami, G. Z., Magawata. (2010), Ja'afaru, A. (2001), Lawal, et al. (2010), Abdullahi, S. A., and Abolude, D. S. (2001), Oso et al, (2006). The present study presents the analysis and results of an investigation carried out on the stomach composition and feeding habit of *Bagrus bayad specie* sampled from kiri dam, Adamawa state, Nigeria.

## II. MATERIALS AND METHODS

### ➤ Study Area

Kiri town has a tropical savannah climate with two clear distinct seasons; wet session (from April to October) and dry season (from November to March). Kiri Dam is a man-made lake from river Gongola and lies between 9<sup>o</sup>40.47" N, 12<sup>o</sup>0015" E. The Dam has a total capacity of 615 million m<sup>3</sup>. It is 1.2km long and 20m high zoned embankment with an internal day blanket (Samuel, 1998). The Dam was created from the damming of River Gongola, which was constructed in 1982, aim at providing irrigation for Savannah Sugar Company (Kareem et al., 2018).



Plate 1: Showing the Kiri Dam and the Reservoir  
(Source: www.Google.com, retrieved 2023)

➤ *Description of Fish Species*

The *Bagrus bayad* fish species has the following structural and morphological characteristics features: Dorsal Spines (Total) I: Dorsal soft rays (total): 8 – 12, Anal spine; 0; Anal soft rays: 13 – 15; Vertebrae: 48 – 53. Diagnosis: by rather elongated, 5 – 6 times long than deep. Occipital process 4 – 6 times longer than broad 9 – 11 branched dorsal

– tin rays, the first prolonged into short filaments. Longest filaments comprised 3 – 4 times standard length. Predorsal length 2.4 – 2.6 times the head length. Width of premaxillary toothplate 2.5 – 2.8 times in head length; caudal fin lobes often prolonged into short filaments: Upper caudal fin Lobes comprised 2– 3 time in standard length (Risch, 1992 and Risch, 2003).

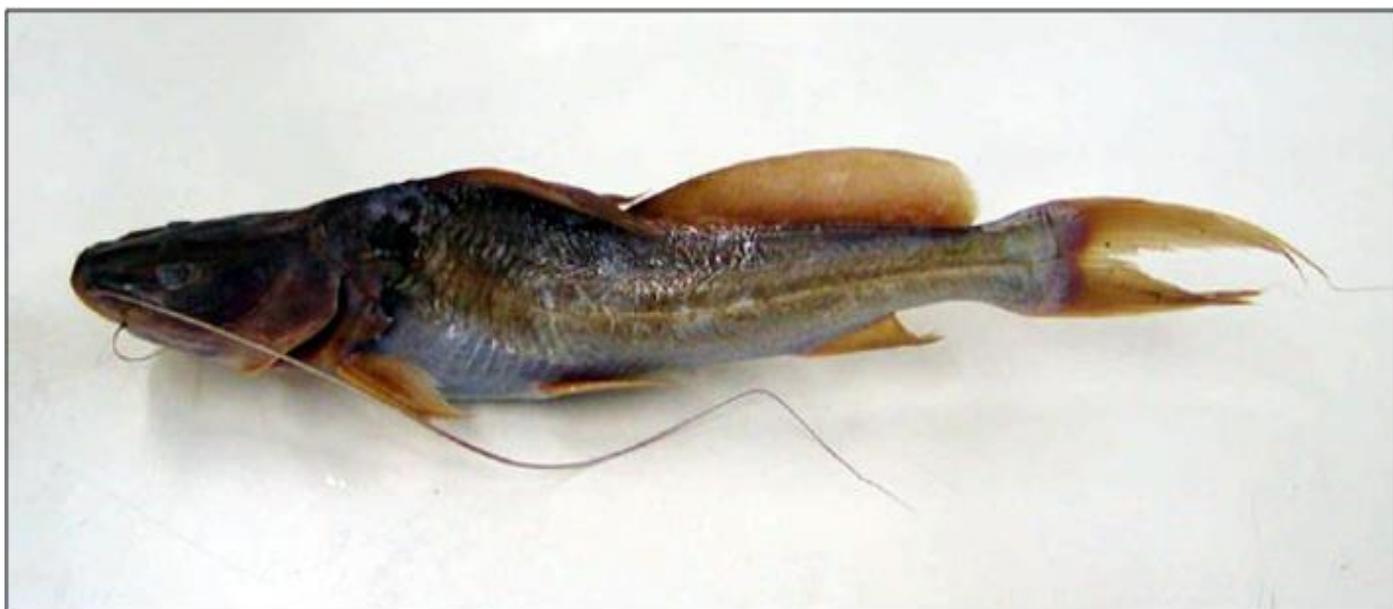


Plate: 2 Bagrus Bayad Specie  
(Source: www.google.com: retrieved (2023)

➤ *Analysis for Stomach Composition and Feeding Habit.*

The analysis of the stomach composition and feeding habit of the fish were done through visceral dissection of the fish from mouth to anus to reveal the intestinal organs. Stomach were removed and the contents are put in to a clean

petri-dish, and the items in the stomach were analysed under light microscope. Each food item from the stomach composition was identified with a guide provided by Needham and Needham (1962) and Quigley (1972)

### III. SAMPLE COLLECTION

A total number of one hundred and seventy-four (174) *Bagrus bayad species* were randomly sampled monthly from September 2023 to February 2024. Sample species used for the investigation were obtained from fishermen operating along the Dam reservoir. The sampled specimen ware kept in ice block in a deep cooler and carried to laboratory where analysis for stomach composition were carried out.

### IV. RESULTS

Frequency occurrences of food items in the stomach composition of *Bagrus bayad* from kiri Dam for the Six months of investigation indicates the following materials: fish particles, plants/microphytes particles, molluscs particles, insect particles, insects’ larva, detritus materials, and green algae were found in the stomach of the fish. The monthly stomach compositions and number of fish examined per month are in Table 1. However, the percentage mean and standard deviation of stomach composition analysis were presented in Table 2 while Table 3 shows the correlation coefficient of the food items from the stomach analysis. Figure 1 presents the monthly variations in food items frequency in the stomach composition.

Table 1 Monthly Stomach Compositions and Number of *Bagrus bayad* Species Examined per Month

Month	Total fish Examined	Detritus	Molluscs Particles	Insect particles	Insect larvae	Green algae	Macrophytes/Plant particles	Fish particles	Total Occurrence
Sept., 2023	29	17	23	21	12	16	25	20	134
Oct., 2023	28	15	25	23	20	15	27	23	148
Nov., 2023	27	10	20	23	18	20	25	24	140
Dec., 2023	32	20	20	15	10	15	24	25	129
Jan., 2024	28	15	23	23	19	15	26	23	144
Feb., 2024	30	10	20	23	20	21	23	25	142

Table 2 Percentage mean and Standard Deviation of Stomach Analysis of *Bagrus bayad*

Month	Detritus	Molluscs Particles	Insect Particles	Insect larvae	Green algae	Macrophytes /Plant Particles	Fish Particles
Sept., 2023	12.69	17.16	15.67	8.96	11.94	18.66	14.93
Oct., 2023	10.14	16.89	15.54	13.51	10.14	18.24	15.54
Nov., 2023	7.14	14.29	16.43	12.86	14.29	17.86	17.14
Dec., 2023	15.50	15.50	11.63	7.75	11.63	18.60	19.38
Jan., 2024	10.42	15.97	15.97	13.19	10.42	18.06	15.97
Feb., 2024	7.04	14.08	16.20	14.08	14.79	16.20	17.61
Mean	10.49	15.65	15.24	11.73	12.20	17.94	16.76
SD	3.26	1.29	1.80	2.67	1.94	0.91	1.62

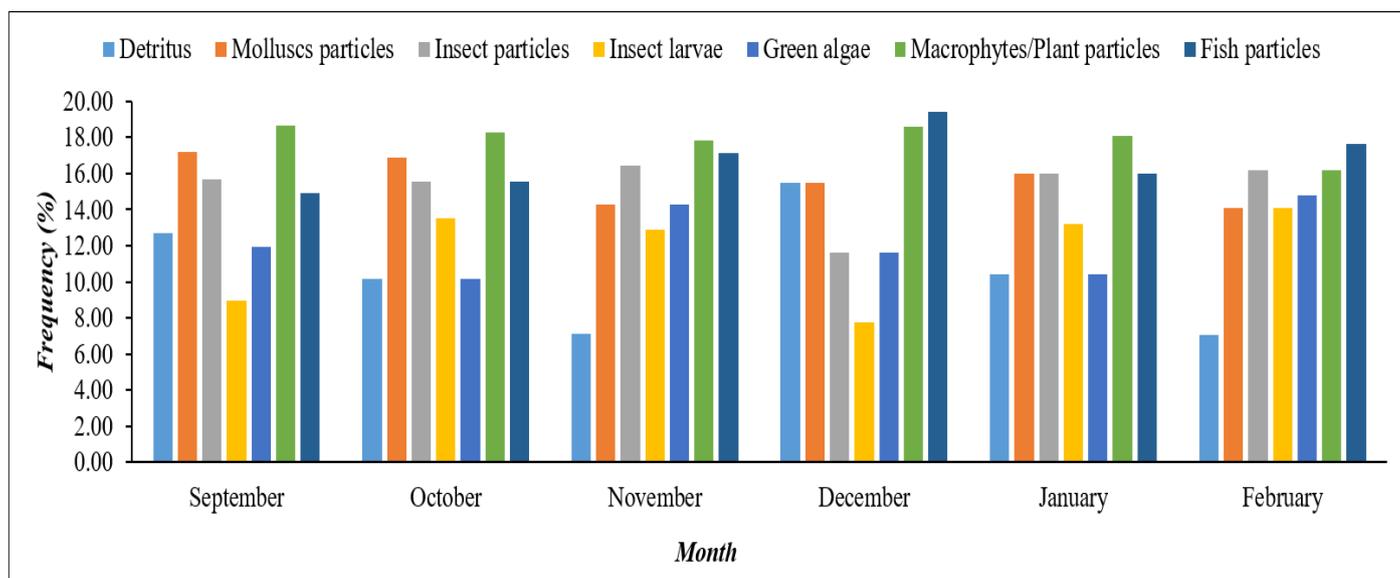


Fig 1 Variation in Monthly Food Items Frequency of the Stomach Analysis of *Bagrus bayad*

Table 3 Correlation Coefficient of the Food Items from the Stomach Analysis of *Bagrus bayad*

Food items	Detritus	Molluscs Particles	Insect Particles	Insect larvae	Green algae	Macrophytes Plant Particles	Fish Particles
Detritus							
Molluscs Particles	0.5765						
Insect particles	-0.8384	-0.1149					
Insect larvae	-0.8879	-0.3585	0.7646				
Green algae	-0.5831	-0.8277	0.2851	0.1983			
Macrophytes /Plant particles	0.7497	0.7282	-0.4517	-0.6711	-0.6908		
Fish particles	0.2038	-0.6484	-0.6796	-0.2875	0.3729	-0.2092	1.000

## V. DISCUSSION AND CONCLUSION

The study of stomach composition of fish is commonly used in fisheries sciences as a vital way of examining the relationship in the aquatic communities (Fagbenro, Adedire, Ayotunde, & Faminu, 2000). The result of the stomach composition analysis from this study shows that plants/macrophytes particles recorded the highest percentage mean of 17.94% during the months of the study. Percentages of other food particles are; fish particles 16.76%, mollusc particles 15.65%, insects' particles about 15.24%, green algae 12.20% and insect's larva 11.73%.. This shows that *Bagrus bayad* has carnivorous feeding habit. This is in agreement with Malami, and Magawata. (2010) who reported that; *Bagrus bayad* is a carnivore and mainly feeds on animal material i.e. zooplankton and insects. Detrital items from the stomach composition have mean percentage occurrence of 10.49%. The results of the analysis also indicate that *Bagrus bayad* feeds on both animal items, plants items and other food substances; thus *Bagrus bayad* is also omnivorous feeder. This was in line with Lawal, Sangoleye, and Seriki (2010) who reported "that the fish fed on variety of food items of which phytoplankton (mainly algae and diatom) and molluscs are the primary food items." Atobatele, and Ugwumba, (2011) reported "insect as the dominant prey item followed by crustacean."

Fish consumed more of insects and less of crustacean as it increased in size. As stated by Akinsanya, Otubanjo, & Ibidapo (2007), "feeding becomes specialized with age and size. The present investigation revealed the presence of detritus in the stomach composition, such as sand and stones. This is in agreement with the findings of Alhassan (2011) who reported the presence of detritus in addition to the other food items such as zooplankton, fishes, insects and phytoplankton, as well as insect parts. The result also in accordance with Inyang and Ezenwaji (2004). Araoye and Ada. (2008) also reported presence plant materials as a major food, followed by molluscs, worms, insects, ova, protozoans, and fries, Detritus, filamentous algae, Chironomus larvae and pupae in the stomach content of the fish. Shalloof and Khalifa (2009) observed that *Oreochromis niloticus* feeds on both plant material and animal material this is similar to the results obtained from the present investigation. Based on this outcome it is advisable that aquaculture farmers of *Bagrus bayad* fish species should

include both plants and animals' materials in the formulation of *Bagrus bayad* feeds.

## ACKNOWLEDGEMENT

The researchers appreciate the efforts of Government of the Federal Republic of Nigeria, through the Tertiary Education Trust Fund (TETFund) programme, who sponsored this research work under the Batch 4 of the Institution Based Research (IBR) Scheme of the Federal College of Education Yola, Adamawa state.

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