



THE STUDY OF FOOD AND FEEDING HABITS OF *BAGRUS BAYAD* IN KIRI RESERVOIR SHELLING LOCAL GOVERNMENT AREA, ADAMAWA STATE, NIGERIA.

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ABSTRACT

The study of food and feeding habit of *Bagrus bayad* in Kiri Reservoir the sample collected were 282 individuals of *Bagrus bayad* randomly sampled for period of six (6) months the male and the female were identified through physical observation of the genital organ of the fish. To determine the food and feeding habit of the fish samples were visceraally dissected from mouth to anus to expose the intestinal organs. The guts of each fish were stretched out and the length (GL) measured. The stomach were removed, their contents and conditions were assessed on the five-point scale from 0 (empty) to 100 (full) stomach and the contents emptied into a clean petri-dish. The food substances found in the stomach were analyzed under light microscope, and each food category within the content was identified using a guide provided by Needham and Needham (1962) and Quigley, (1972). The data collected were subjected to one-way analysis of variance (ANOVA). Descriptive statistic, regression analysis, graph (bar chart) mean and standard deviation were used in calculating the data for analysis. Result from the samples collections shows that most of the diet found in the stomach are either plant or animal origin with percentage ranges from 6.67%-50% and 23.33%-36.67% respectively hence *Bagrus bayad* fish is classified as omnivorous fish. It is recommended that aquaculture farmers of *Bagrus bayad* can effectively use plants and animals' materials in the formulation of feeds for feeding *Bagrus bayad* fish.

Keywords: *Bagrus bayad*, Euryphagous, Feeding Habits, Omnivorous,

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INTRODUCTION

Fish exploit food substance in an aquatic ecosystem according to the adaption possessed (Mouth gill rakers, dentation and gut system) which are related to feeding. According to Miller and Harley [1], food and feeding habits of fish could be related to its structural morphology and the way it captures food and how it digests it, studies on fish structural adaptation could provide useful information on their food and feeding habits for management in ponds [2]. The food and feeding habits of *Bagrus* species were reported by [3] also workers many years ago till now, among them [4, 5]. Fish exploit food substances in aquatic ecosystem according to their possessed adaptations (Mouth, Gill-rakers, Dentition and Gut system) which are related to feeding. The feeding intensity was very poor in mature fishes during the spawning period. The juvenile fishes fed actively throughout the year [6]. Shinkafi *et al.* [7] Observed that *Synodontis nigrita* was an omnivore, as it feeding on phytoplankton, zooplankton, crustaceans, insects and insects' parts. Understanding the stomach contents of fish is very useful in guiding towards formulation of artificial diets in fish culture.

MATERIALS AND METHODS

Study area

The study area is Kiri reservoir in Shelleng Local Government Area of Adamawa North East of Nigeria. Kiri reservoir is a man-made lake from river Gongola and lies between 9°40.47" N, 12°00'15" E. The reservoir has a total capacity of 615 million M³. It is

1.2km long and 20m high zoned embankment with an internal day blanket [8]. The reservoir was created from the damming of River Gongola, which was constructed in 1982, aim at providing irrigation for Savannah Sugar Company (Institute of Civil Engineers, ed. 1990; [9]. The host town Kiri is a River side resort with a unique feature and scenic of savannah landscape supplemented by the famous River Gongola with extensive Fadama flood plain. Kiri has a tropical savannah climate with two clear marked seasons of wet from April to October and dry from November to March.

Sample collection

A total of 282 individuals species of *Bagrus bayad* were randomly sampled monthly for the period of 6 months and usually in the morning between 8:00am to 10:00am, and in the evening between 3:00pm and 5:30pm. 47 males and female *Bagrus bayad* samples were collected from the reservoir each month the male and the female were identified through physical observation of the genital organ of the fish. The specimen was preserved with ice block in a cooler and conveyed to laboratory in federal college of education Yola where analysis for stomachs contain was done. The duration for the study was 6 months from November 2016 to April, 2017. The fish used for the study were obtained from fishermen operating along kiri reservoir. The fishermen used various fishing gears ranging from hand nets, cast nets and gill nets of various standard mesh sizes (20.2, 25.4, and 30.5 mm) as well as canoe and calabash were used as fishing craft.

Data analysis

The total and standard lengths were measured with meter rule on measuring board according to Olatunde [10]. The sex of each fish sample was determined by visual observation of genitals. Weights were determined using a top loading meter balance model PM 2000 which measured to the nearest milligram (mg). To determine the food and feeding habit of the fish samples were viscerally dissected from mouth to anus to expose the intestinal organs. The guts of each fish were stretched out and the length (GL) measured. The stomachs removed, their contents and conditions were assessed on the five-point scale from 0 (empty) to 100 (full) stomach and the contents emptied into a clean petri-dish. The food substances found in the stomach were analyzed under light microscope, and each food category within the content was identified using a guide provided by [11, 12], all data that collected were subjected to one-way analysis of variance (ANOVA). Descriptive statistic, regression analysis, graph (bar chart) mean and standard

deviation were used to calculate the established data for analysis.

RESULTS

Six materials were identified in (fish parts, plants parts, mollusks parts, insect parts, detrital materials, and unidentified materials) the gut of *Bagrus bayad* from kiri reservoir. In all the months when the samples were taken, fish taken in the months of January and March were found with five materials (fish parts, insects’ parts, plants parts, mollusks parts, detrital)

November, December and February had four materials (fish parts, insects’ parts, plants parts, mollusks part) while fish parts, plants, and mollusks were recorded in April. The stomach composition is presented, while the F-test calculated is greater than F-test Tabulated at $df = 35$, hence there is significant difference between the stomach compositions (Figure 1). The correlation of the frequency of the feeding materials is presented.

Table 1: Stomach analysis of *Bagrus bayad* showing food compositions

	Fish Parts	Plants part	Mollusc part	Insects part	Detrital materials	Unidentified materials	Empty stomach
November	50	26.67	6.67	16.67	0	0	0
December	40	33.33	16.67	10	0	0	0
January	46.67	23.33	10	6.67	13.33	0	0
February	33.33	40	16.67	10	0	0	0
March	40	33.33	10	13.33	0	3.33	0
April	43.33	36.67	20	0	0	0	0
Mean ±SD	42.22±5.84	32.22±6.21	13.35±5.16	9.45±5.74	2.22±5.44	0.56±1.36	0.0

Table 2: Correlation of the food compositions from the stomach Analysis of *Bagrus bayad*

	Fish Parts	Plants part	Mollusc part	Insects part	Detrital materials	Unidentified materials
Fish Parts						
Plants part	-0.83825					
Mollusc part	-0.59	0.762778				
Insects part	0.110894	-0.27058	-0.74949			
Detrital materials	0.373239	-0.7018	-0.31639	-0.23678		
Unidentified materials	-0.18641	0.087478	-0.31639	0.331496	-0.2	

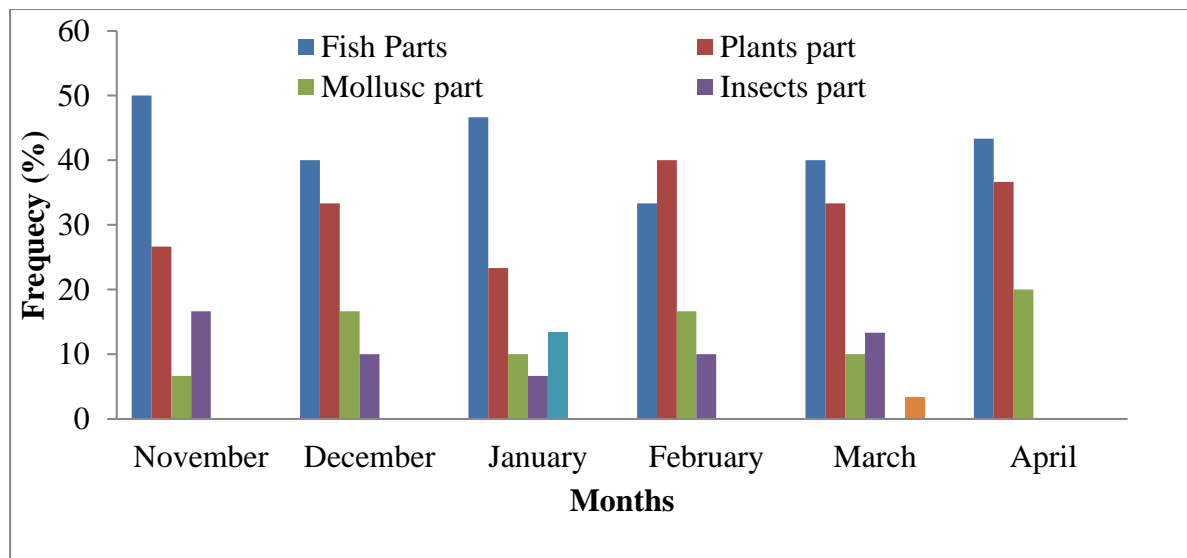


Figure 1: Monthly Variations of Food Materials frequency in the Stomach Analysis of *Bagrus bayad*

DISCUSSION

Study of dietary habits of fish base on stomach contents analysis is widely used in fish's ecology as an important means of investigating trophic relationship in the aquatic communities [13]. In the present study the result of the stomach contents analysis that fish parts recorded the highest percentage that ranges from 40.00% - 50.00% with mollusk parts 6.67% - 20.00% and insects' parts about 10.00% - 13.33% within the month of the study. This shows that *Bagrus bayad* fish exhibited carnivorous feeding habit. This is in agreement with Malami & Magawata [14] who reported that; *Bagrus bayad* is a carnivore mainly feeds on animal material i.e. zooplankton and insects. Latif [15] Who reported that *Bagrus bayad* and *B. doctac* are carnivorous; feed mainly on fish, insect larvae, molluscs and fresh water shrimps. Other food materials found in the stomach contents of the fish are plant parts with about 23.33% - 40.00% occurrences during the months of the study. Detrital materials have about 13.33% occurrences in the month of January and unidentified materials were observed in the month of March with 3.33%. This also indicates that *Bagrus bayad* feed on both animal materials, plants materials and other food substances. Thus, *Bagrus bayad* can be classified as omnivorous feeder. This was in line with Lawal *et al.* [16] who found that the fish fed on variety of food items of which phytoplankton (mainly algae and diatom), crustaceans and molluscs were of primary importance than other food items it has high protein contain that probably served as supplements than plant materials and fish parts. Atobatele & Ugwumba [17] who report insect as the dominant prey item (56.67%) followed by crustacean (41.92%), and also fish consumed more of insects and less of crustacean as it increased in size. Feeding becomes specialized with age and size; larger fish may feed on decapods and fish [18]. Fish species have specific time for feeding in the aquatic

environment. It could be in the morning, afternoon, evening or night because fish species are visual feeders, they can see in night day times. The present work revealed also the presence of detritus in the stomach of *Bagrus bayad* such as sand and stones this agreed with the findings of [19] who proved the presence of detritus in addition on the other food items such as zooplankton, fishes, insects, and phytoplankton as well as insect parts. Present findings are also in accordance with Inyang & Ezenwaji [20] and Araoye & Ada [21] who reported plant materials as a major food, followed by molluscs, worms, insects, ova, protozoans, and fries while the least was sand grains (tiny stones), detritus was not in discrete unit. Detritus, filamentous algae, plant tissues/remains, chironomid larvae and pupae were most preferred by the specie in this study. Yem *et al.* [22] who reported insect, crustacean, arachnida, rotifer and Mollusca, fish scale, unidentified green eggs, detritus, seed, macrophyte parts and sand as food composition of *C. nigrodigitatus*. These variations in feeding habit may be as of the availability of food items in any water body that influences the diet of the fish. Shalloof & Khalifa [23] observed that *Oreochromis niloticus* feeds both types of food, plant material and animal material which is similar to *Bagrus bayad* as shown in the present study. Diatoms, blue green algae and green algae constituted main food of plant origin. Diatoms were found to be the most preferable food of plant origin where it occurred in more than 68.0% of the examined fish. Rotifers, cladocerans, ostracods, copepods, molluscanes and animal derivatives were comprised the food of animal origin. Sand particles, detritus and macrophytes (plant tissues) occurred in about 40.0% 75.4% and 33.3% of the examined guts respectively. It was concluded by [23] that *O. niloticus* in Abu-Zabal lakes is omnivorous. Freshwater catfish, *Eutropi ichthysvacha* was highly predaceous in nature [24]. Begum *et al.* [25] described the food and feeding habits of an estuarine catfish, *Mystusgulio* of the South-West coast of Bangladesh, and revealed that the fish is

euryphagous and omnivorous feeder. The adult fish preferred to feed on insects and crustaceans, whereas, the immature and juvenile fish preferred to consume diatoms, copepods, cladocerans and rotifers.

CONCLUSION

The study shows that *bagrus bayad* fish feed on varieties of food materials including both plants and animals' materials and others, therefore *bagrus bayad* can be described as Omnivorous, or Euryphagous feeder.

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