



## STUDY ON FOOD AND FEEDING HABITS OF SILVER CATFISH *BAGRUS BAYAD* IN ZOBE RESERVOIR, DUTSINMA LOCAL GOVERNMENT AREA, KATSINA STATE, NIGERIA.

\*<sup>1</sup>Nababa, A. S., <sup>2</sup>Dan-kishiya, A. S. and <sup>1</sup>Umaru, J.

<sup>1,2</sup>Department of Fisheries and Aquaculture, Federal University Dutsin-Ma, Nigeria.

<sup>2</sup>Department of Biological Sciences, University of Abuja, P. M. B. 117, Abuja, Nigeria.

Corresponding Author's Email: [naababa77@gmail.com](mailto:naababa77@gmail.com)

### ABSTRACT

*Bagrus bayad* is an important fresh water fish species with high commercial and economic value in Nigeria. The present study was conducted on *Bagrus bayad* in Zobe reservoir to ascertain the food and feeding habits of the species. Specimens were obtained on weekly basis from the artisanal fishermen catches at their landing sites at the Reservoir, for a period of four months (April – July, 2017). Data on stomach contents was subjected to frequency of occurrence and Point method analysis. Categorization of the stomach content of the sampled fishes showed that 90.40% had food items, while 9.62% were empty. The result showed that fish and fish parts had the highest occurrence (72.34%). It composed of the bulk diet (27.16%) by volumetric Index (V), and also formed the most important food item (AI) (52.93%). This is an indication that *B. bayad* exhibited carnivorous feeding habits in the Reservoir.

**Keywords:** Food and feeding habits, *Bagrus bayad*, Reservoir, Dutsinma

### INTRODUCTION

Fish contain 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. The Bagrid fishes are commonly known as naked catfishes. The family Bagridae is represented by thirty (30) genera and two hundred and ten (210) species (Ikongbeh *et al.*, 2012). Bagrids have four pairs of well-developed barbels; these four pairs of barbels are covered by a layer of taste bud-enriched epithelium (Zhang *et al.*, 2006). Bagrid catfish are important economically and ecologically. The food habit of *Bagrus* species were reported by several workers (El-Drawany and Elnagar, 2015; Malami and Magawata, 2010; Abdullahi and Abolude, 2001). Also, a moderate number of biological studies have been undertaken and documented on some economically important tropical fish species in Nigeria freshwater bodies (Ipinjolu *et al.*, 2004; Malami *et al.*, 2004; Malami and Magawat, 2010). The study of dietary habits of fish, based on stomach content analysis, is widely used in fish ecology as an important means of investigating trophic relationships in aquatic communities (Odo *et al.*, 2009), ascertain dietary requirements in their natural habitat and the relationship between the fish and the abiotic environment (Ugwumba, 1988). There are documented work on the fishes from Zobe reservoir (Mzungu *et al.*, 2017; Dan-kishiya *et al.*, 2018). However, information on the food and feeding habits of this commercially important species in Zobe Reservoir is scanty. Hence, the aim is to study the food and

feeding habits of *Bagrus bayad* from Zobe reservoir so as to provide a base line data for effective management of the species in the Reservoir.

### MATERIALS AND METHODS

#### Study Area

Zobe Dam Reservoir is an earth-filled structure with a height of 19m and a total crest length of 2,750m located in Dutsinma Local Government Area of Katsina State (“Zobe Dam, 2010”) as in Dan-kishiya *et al.* (2018). It is coordinated between latitude 12° 23' 17.9” to 7° 28' 28.9N and longitude 7 ° 27 ' 57.12 to 7 ° 34 ' 47.68 E (Plate 1). The reservoir was constructed with the mandates to supply 65,000 cubic meters of portable water to Katsina metropolis daily and harbor irrigation activities of about 8,000 hectares to support farming in the Dutsinma Local Government Area. However, despite the main purpose, there is a lot of fishing activities in the Reservoir.

#### Fish Sampling

Fish were sampled weekly for four months (April – July, 2017), from artisanal fishermen at their landing sites along the reservoir. The fishermen employ different fishing gears ranging from traps, long line, and nets of different mesh sizes for fishing in the reservoir. Fish samples were transported to the laboratory in an ice cube box for further analysis. A total of 208 species of *Bagrus bayad* were examined. Fish samples were identified using identification guide by Olaosebikan and Raji (2004), and Reed *et al.* (1967).



Plate1. Map of the study area (ng.geoview.info>zobe\_reservoir)

#### Stomach content analysis

The fish were dissected in the laboratory, the state of fullness was determined using an index scale of 0-4, corresponding to a quantitative range from empty to full. Alimentary canal of fish was removed and stretched out. The contents were rinsed into a petri dish for examination and identification was done under a binocular microscope (Adeyemi *et al.*, 2009). The remaining contents of the stomach were preserved in 4% formalin for further analysis in the laboratory (Alhassan and Ansu-Darko, 2011).

#### Point method

Physical observation was used to determine the volume of food constituents in the fish stomach. The content of each sample were considered as unity, the various items being expressed in terms of percentage by volume as estimated by inspection. Scale of 0, 1, 2, 3, and 4 was used as empty, ¼full, ½full, ¾full, and full.

#### Frequency of Occurrence

The stomach contents were analyzed by frequency of occurrence method as described by Hynes, (1950). Various food items were identified ranging from plant, fish and fish parts, insects and others. Number of stomach found with food was counted and expressed as a percentage of stomach containing food. The method showed the proportion of individual fish eating a particular food item. The occurrence of each food item

was expressed as a percentage of all stomachs sampled with food (Adeyemi *et al.*, 2009) as follows;

$$\text{That is, } P = (b/a) \times 100$$

where, a = Total number of fish examined with food in the stomach; b = Number of fish containing a particular food item; P = Percentage of occurrence of each food item.

## RESULT AND DISCUSSION

#### Stomach Fullness

Categorization of the stomach of *Bagrus bayad* in the present study showed that 90.40% of the species had food in their stomach, whereas 9.62% had empty stomachs as shown in Table 1. Also from Table1, it can be observed that 28.85% had full stomachs. This was followed by those with ¾full stomachs with percentage fullness of 28.37%. Furthermore, 23.56% and 9.62% was recorded for ½full and ¼full stomachs respectively. This results agree with the reports of Malami and Magawata (2010) as well as Abdullahi and Abolude (2001). The few empty stomachs recorded, could probably be due to post harvest digestion while struggling in fishing gears as reported by Ipinjolu *et al.*, (2004).

**Table 1: Categorization of stomach fullness of *Bagrus bayad* from Zobe Reservoir, Dutsinma Local Government Area, Katsina State.**

Stomach fullness	Number of Samples	Percentage (%)
Full	60	28.85
¾full	59	28.37
½full	49	23.56
¼full	20	9.62
Empty	20	9.62
<b>Total</b>	<b>208</b>	<b>100</b>

**Occurrence of food substances**

The frequencies of occurrence of food substances in the stomach of *Bagrus bayad* are shown in Table 2. The percentage of the different categories of the food items identified in the stomach of the species included fish and fish parts (72.34%), insects and Insects parts (46.28%), plant materials (42.55%) and unidentified materials (52.13%). Analysis of the diet using VI and AI showed that fish and fish parts formed the most important food items representing 27.16% and 52.93% respectively. This was followed by unidentified materials 12.82% (V) and 17.99% (AI). Others are Insects and Insect parts

as well as Plant materials which are ranked as the third and fourth important food items in the stomach of the fish species sampled respectively. The occurrence of food substances of animal origin as the highest ranked among all the categories has also been reported by other researchers (Alhassan and Anso-darko, 2011; Nwazuebe and Garba, 2015). This implies that the species is carnivorous as further reported by other researchers (Nwabueze *et al.*, 2015; Neimat, 2003). However, contrary to the result obtained in this study Alhassan and Anso-darko (2011) reported that *Bagrus bayad* appears to be an omnivorous feeder in Golinga Reservoir in Ghana.

**Table 2: Stomach Content Analysis of *Bagrus bayad* from Zobe Reservoir, Dutsinma Local Government Area, Katsina State.**

Feed Items	% Frequency of Occurrence (F)	% Volumetric Index (V)	Importance Index (AI) [AI = FV]	Ranking	% AI
Fish and Fish Part	72.34	27.16	1964.64	1	52.93
Insects and Insect Parts	46.28	12.15	562.14	3	15.15
Plant Materials	42.55	12.15	517.17	4	13.93
Unidentified Material	52.13	12.82	667.71	2	17.99

**CONCLUSION**

The result of the present study shows that *B. bayad* feeds on fish and fish parts, insect larvae and their remains which are an indication that the fish exhibited carnivorous feeding habits in the Reservoir.

**REFERENCES**

Abdullahi, S. A. and Abolude, D. S. (2001). Some Studies on the Biology of *Bagrus bayad* (Daget) in Tiga Dam, Kano state, Nigeria. *Journal of Arid- zone fisheries*. 1 (1): 1-11.

Adeyemi, S. O., Bankole, N. O. and Adikwu, I. A. (2009). Fish gear survey of Gbedikere Lake, Bassa, Kogi State, Nigeria. *International Journal of Lakes and Rivers*. 2(1):53-56.

Alhassan, E.H. and Ansu-Darko, M. (2011). Food and Feeding Habits of a Potential Aquaculture Candidate, the Black Nile Catfish, *Bagrus Bajad* in the Golinga Reservoir. *Australian Journal of Basic and Applied Sciences*, 5(5): 354-359.

Dan-kishiya, A. S., Bichi, A. H. and Nababa, A. S. (2018). Length-Weight Relationship and Condition Factor of Silver Catfish (*Bagrus bayad* -Forskali, 1775) in Zobe Reservoir,

- Dutsinma Local Government Area, Katsina State, Nigeria. *FUDMA Journal of Sciences (FJS)*. 2(1): 178-182.
- El-Drawany, M.A. and Elnagar, W.G. (2015). Growth, Food and Feeding Habits of *Bagrus bayad* and *Bagrus docmac* Inhibiting Muess Channel, Sharkia Province, Egypt. *J Aquac Res Development* 6:348.
- Hynes, H. B. N. (1950). "The food of freshwater sticklebacks (*Gasterosteus aculeatus* and *pygosteus pungitius*) with a review of methods used in studies of the food of fishes," *Journal of Animal Ecology*. 19: 36-58.
- Ikongbeh, O.A., Ogbe, F.G. and Solomon, S.G. (2012). Length-weight relationship and condition factor of *Bagrus docmac* from Lake Akata, Benue state, Nigeria *Journal of Animal and Plant Sciences*. 15 (3): 2267-2274.
- Ipinjolu, J. K., Garba., S. D. and Bako, G. G. (1988). Length-Weight relationship, Condition factor and stomach of *B. bayad* (*Macropterus*) in River Rima. *Journal of Agriculture and Environment*. 2(1): 113-20.
- Ipinjolu, J. K., Malami, G. Z., Hassan, W. A. and Magawata, I. (2004). Gut systems of some fresh water fish species in River Rima. Northern Nigeria. A paper presented at the 2004 Annual Conference of Zoological society of Nigeria, held at Institute of Development Research, Ahmadu Bello University, and Zaria. 1 – 13.
- Malami, G. Z. and Magawata, I. (2010). Analysis of Food and Feeding Habits of Catfish (*Bagrus bayad*, *Macropterus* (*Daget*) in River Rima and Goronyo Dam, in Sokoto State, Nigeria. *Nigerian Journal of Basic and Applied Science*. 18(2): 277-284.
- Malami, G. Z., Ipinjolu, J. K., Hassan, W. A. and Magawata, I. (2004). Feeding Adaptations of ten fish species in River Rima. North Western Nigeria. A paper presented at the 2004 Annual Conference of Zoological society of Nigeria, held at Institute of Development Research, Ahmadu Bello University, Zaria. 1 – 13.
- Mzungu, I., Orpin, J. B. and Amos, B. (2017). The length-Weight relationship and Condition factor of *Schilbe mystus* and Physico chemistry of water in Zobe Dam, Dutsinma, Katsina State. *FUDMA Journal of Sciences (FJS)*. 1(1): 12-18
- Neimat, M. A. O. (2003). *A studies On Biology of Some Nile Fish Species (Alestes baremose, Bagrus bayad and Mormyrus caschive) During 98 – 1999*. A thesis Submitted in fulfillment for the requirements of the degree of Master of Science.
- Nwabueze, A. A. and Garba, A. A. (2015). Growth pattern and condition factor of *Bagrus bayad* from two rivers in southern Nigeria. *G.J.B.B.*, 4 (4): 330-334.
- Odo, G. Nwamba, E., Helen, O. and Eyo, J. E. (2009). Aspects of the biology of *Heterotis niloticus* (CUVIER 1829) (*Osteoglossiformes: Osteoglossidae*) In the Anambra flood river system, Nigeria. *Animal Research International*. 6(2): 994 – 1002.
- Olaosebikan, B. D. and Raji, A. (2004). *Field guide to Nigerian freshwater fishes*. Federal College of Freshwater fisheries technology. New Bussa, Niger State. Unilorin University press, 2<sup>nd</sup> edition. 1-105.
- Reed, W. J., Buchard, A. J., Hopson, J., and Yaro, I. (1967). *Fish and fisheries of Northern Nigeria*. 1st edition Ministry of Agriculture, Northern Nigeria.
- Ugwumba, O.A. (1988). The food and feeding habits of some juveniles of some cultivable fish species in Nigeria. Institute for Oceanography and Marine Research. Tech paper – 31, 24.
- Zhang, G., Deng, S., Zhang, H., Li, H. and Li Leilei (2006). "Distribution of different taste buds and expression of a – gustducin in the barbells of yellow catfish (*Pelteobagrus fulvidraco*)". *Fish Physiology and Biochemistry*. 32:55-62.