STUDY ON FOOD AND FEEDING HABITS OF SILVER CATFISH Bagrus bayad IN ZOBE RESERVOIR, DUTSINMA LOCAL GOVERNMENT AREA, KATSINA STATE, NIGERIA.

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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, DutseMMA

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 etc. 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 (Ipinlolu 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; Dankishiya 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 DutseMMA 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 DutseMMA 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 Olasebikan and Raji (2004), and Reed et al. (1967).

Keywords: Food and feeding habits, Bagrus bayad, Reservoir, DutseMMA
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Plate 1. 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, ¼ full, ½ full, ¾ full, 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;

That is, \( P = \frac{b}{a} \times 100 \)

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 Table 1, it can be observed that 28.85% had full stomachs. This was followed by those with ¾ full stomachs with percentage fullness of 28.37%. Furthermore, 23.56% and 9.62% was recorded for ½ full and ¼ full 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.

<table>
<thead>
<tr>
<th>Stomach Fullness</th>
<th>Number of Samples</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full</td>
<td>60</td>
<td>28.85</td>
</tr>
<tr>
<td>¾ full</td>
<td>59</td>
<td>28.37</td>
</tr>
<tr>
<td>½ full</td>
<td>49</td>
<td>23.56</td>
</tr>
<tr>
<td>¼ full</td>
<td>20</td>
<td>9.62</td>
</tr>
<tr>
<td>Empty</td>
<td>20</td>
<td>9.62</td>
</tr>
<tr>
<td>Total</td>
<td>208</td>
<td>100</td>
</tr>
</tbody>
</table>

**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.

<table>
<thead>
<tr>
<th>Feed Items</th>
<th>% Frequency of Occurrence (F)</th>
<th>% Volumetric Index (V)</th>
<th>Importance Index (AI)</th>
<th>Ranking</th>
<th>% AI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish and Fish Part</td>
<td>72.34</td>
<td>27.16</td>
<td>1964.64</td>
<td>1</td>
<td>52.93</td>
</tr>
<tr>
<td>Insects and Insect Parts</td>
<td>46.28</td>
<td>12.15</td>
<td>562.14</td>
<td>3</td>
<td>15.15</td>
</tr>
<tr>
<td>Plant Materials</td>
<td>42.55</td>
<td>12.15</td>
<td>517.17</td>
<td>4</td>
<td>13.93</td>
</tr>
<tr>
<td>Unidentified Material</td>
<td>52.13</td>
<td>12.82</td>
<td>667.71</td>
<td>2</td>
<td>17.99</td>
</tr>
</tbody>
</table>

**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**


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