

FECUNDITY AND FOOD HABITS OF THE SLENDER STONEBASHER (*Hippopotamyrus ansorgii* Boulenger, 1905) (Mormyridae) IN OGBESE RIVER

D. O. ODEDEYI¹ AND I. M. ODEDIRE²

¹Department of Fisheries and Aquaculture, Adekunle Ajasin University Akungba Akoko, Ondo State.

²Department of Animal and Environmental Biology, Adekunle Ajasin University Akungba Akoko, Ondo State.

ABSTRACT

Fecundity and food habits of *Hippopotamyrus ansorgii* from Ogbese River were investigated. The major fishing method employed for collecting the specimens were cast and gill netting. The total lengths ranged from 14.6 cm to 22.1 cm while the body weights ranged from 30.0 to 91.0 g. The food items found in the examined stomachs were rotifer, algae, insects, crustacean, detritus and plant parts but the major food items based on the ranking index were insects and crustaceans. The sex ratio of *H. ansorgii* was 1.13: 1 for males: females. The gonadosomatic index showed that *H. ansorgii* in Ogbese River uses an average of 11.69% of its body weight in egg production. Fecundity ranged from 600 to 7200 eggs with an average of 3231 eggs per female. In conclusion, *H. ansorgii* in Ogbese River was an omnivore and highly fecund fish.

Keywords: Fecundity, food habits, Sex ratio, *Hippopotamyrus ansorgii*.

INTRODUCTION

The ability to meet world demand for fish from natural fish stock requires natural fisheries and genetically improved fast-growing fish species (Adeyemi *et al.*, 2011). Several studies has been carried out on the biology of some freshwater fish species across Nigeria (Malami *et al.*, 2007; Adeyemi *et al.*, 2009; Adeyemi, 2010). Fecundity study is important in order to evaluate the reproductive potentials of fish species (Duarte and Araujo, 2002). Family Mormyridae is one of the largest families of fishes endemic to Africa with an estimated 200 species belonging to 17 genera (Gosse, 1984; Moller, 1995).

The Slender stonebasher (*Hippopotamyrus ansorgii*) is a freshwater fish, belonging to the family Mormyridae. Literatures on the biology of mormyrids are many (Nwani *et al.*, 2004; 2006 a, b; Malami *et al.*, 2007) but there is paucity of information on the biology of *Hippopotamyrus ansorgii*. This research was conducted to study the fecundity and food habits of *Hippopotamyrus ansorgii* in Ogbese River.

MATERIALS AND METHODS

Ogbese River is located within latitudes 7°25' and 7°52'N; and longitudes 4°48' and 5°30'E. Major fishes found in this river include *Oreochromis niloticus*, *Mormyrus macrophthalmus*, *Mormyrus rume*,

Parauchenoglanis ansorgii, *Tilapia zilli*, *Hippopotamyrus ansorgii*, *Clarias gariepinus*.

Artisanal fishermen operating on Ogbese River were employed to catch the fish using their cast nets and gill nets. The fish specimens were transported in plastic buckets containing ice flakes to the Department of Environmental Biology and Fisheries of Adekunle Ajasin University, Akungba-Akoko for laboratory investigations.

Records of length and body weight measurements of each fish sample were made using standard measuring board for length to the nearest 0.1 cm and a digital weighing balance for weight to the nearest 0.1 g. The specimens were dissected on the ventral side from the anal opening to the pectoral fin region and sexes were noted using both external features (shape of belly) and internal features (female carry ovary). Specimens were preserved in 10% formalin for further analysis.

For the estimation of fecundity, each preserved ovary was weighed and the number of eggs from three 1 g sub-samples was counted. The means of the total number of eggs in the sub-samples were determined while the total number of eggs per ovary was estimated by multiplying the weight of the ovary by the mean of the total number of eggs in the sub-samples. Gonadosomatic indices (GSI) were calculated using the formula: $100 \text{ Gw/Fw} - \text{Gw}$. Linear regression analysis was

done to find the relationship of fecundity to the length and weight.

For the food habit, the gut of the specimens were removed and the degree of fullness was assessed visually and recorded as: 0 empty, ¼ full, ½ full, ¾ full, and full. The volume of each gut was estimated by dropping the gut into a measuring cylinder containing known volume of water to determine the volume. The stomach of each specimen was opened and the contents emptied into a Petri dish containing known volume of water for identification of food items under a binocular microscope. The various food items were analyzed by occurrence and volumetric methods (Arawomo, 1976). The prominence of individual food items was determined by the ranking index I (Oda & Parrish 1981): $I = (\% \text{ occurrence} \times \% \text{ volume}) \times 10^{-2}$. Data obtained were processed using Microsoft excel 2007 and result presented as Mean, Standard deviation, linear regression chart and bar chart

RESULTS AND DISCUSSION

Of the 32 specimens examined 15 (46.88%) were females and 17 (53.13%) were males giving an overall proportion of 1.13:1 sex ratio. Male specimens appeared to be more populated than the female. Similar result was also reported by Olele (2011) in *Hyperopisus bebe occidentalis* (Lacepede 1803). This situation may have resulted from the fact that the females migrated to deeper waters for spawning purposes during certain months of the year as confirmed by Nwani (2004). The mean GSI value obtained showed that the fish species uses 11.69% of its body weight for egg production. Knowledge of fecundity of a fish is needed in establishing its production potential and consequently its exploitation and management rationale (Oben *et al.*, 2000). The species was found to be highly fecund with an average of 3,230 eggs per mature female, which accounts for the losses to predators and adverse external factors. The high fecundity observed in this species further stresses their suitability for aquaculture, because the fingerlings will be more available to fish farmers under good hatchery management. The squared correlation (r^2), between fecundity and weight (0.67) was higher than that between fecundity and length (0.54). Thus there is a closer relationship between fecundity and weight than what obtains between fecundity and length. In

this study, there were wide variations in fecundity of the *H. ansorgii*. This variation was also reported by Odedeyi *et al.* (2010) in *Mormyrus rume* in River Ose and Fawole (2002) for *Mormyrus rume* in Lekki Lagoon. These wide fluctuations were attributed to differential feeding success within members of the fish population. It could also be due to the coexistence of a varied mixture of age classes since they reproduce year round (Fawole and Adewoye, 1999). The low incidence of full stomachs, coupled with the high incidence of ¼ full stomachs, suggests poor feeding activity in River Ogbese but may also be attributed to the method of catching, as many of the specimens were caught using gill nets. Odedeyi *et al.* (2010) reported high incidence of ¼ full stomachs (62.4%) and low incidence of full stomach (3.2%) of *Mormyrus rume* caught in River Ose using gill net. Arawomo (1976) reported that there are 67% empty stomachs for *Citharinus cuvier* caught with gill nets in Lake Kainji. Ipinjolu *et al.* (2005) reported that 48.1% of *Mormyrus rume* specimens caught in River Rima and Goronyo Dam had empty stomachs and no sample had 100% fullness. This may have been due to the food items having been regurgitated or digested as the fish struggled during the gill net catches. This study show that *Hippopotamyrus ansorgii* in River Ogbese fed mainly on insects and crustaceans, which were found in all the stomachs containing food. This observation agrees with Ugwumba *et al.* (1990) that the mormyrids of Lekki Lagoon fed mainly on insects and crustaceans. It also agrees with Kouamelan *et al.* (1999) who reported that Mormyrids in River Bia consumed invertebrates. There were also plant parts, sand grains and detritus in all stomachs containing food. Sand grains and detritus were probably ingested along with food items during feeding at the river bottom. This observation revealed that *Hippopotamyrus ansorgii* is a bottom dweller, feeding on benthic organisms. Paugy (2002) also reported that Mormyrids in Baoule River was insectivorous and that it was a benthic dweller. However, Omotosho (1993) reported that Mormyrids fed on detritus, algae and macrophytes in Oyun mini-dam, Ilorin, which agrees with Fawole (2002) who reported that the major food items of Mormyrids in Lekki Lagoon were detritus and plant parts. According to

Ugwumba and Ugwumba (2007), these differences can be attributed to differences in food availability between the different habitats. All the food items were encountered in the stomachs of specimens irrespective of size and season. This agrees with Kouamelan *et al.* (1999) who reported that there were no significant variations in the food composition of Mormyrids from River Bia (Cameroon). The high percentage occurrence of detritus suggests that *P. ansorgii* is a bottom dweller and a detritivore.

CONCLUSION

This study has provided important baseline information on the fecundity and food habits of *Hippopotamyrus ansorgii* in Ogbese River. The result of which would be a useful tool for its management and aquaculture.

REFERENCES

- Adeyemi, S. O. (2010). Food and feeding habits of *Synodontis resupinatus* (Boulenger, 1904) at Idah area of River Niger, Kogi State, Nigeria. *Animal Research International*, 7(3):1281 – 1286.
- Adeyemi, S. O., Adeyemi, J. O. and Ekele, J. (2011). Studies on some aspects of the socio-economic factors influencing fish farming in Lokoja, Kogi State, Nigerian. *Proceedings of Sixth International Conference on Scientific and Industrial Studies*, 6(2): 106 – 108.
- Adeyemi, S. O., Bankole, N. O. and Adikwu, A. I. (2009). Food and feeding habits of some commercially important fish species in Gbedikere Lake, Bassa, Kogi State, Nigeria. *International Journal of Lakes and Rivers*, 4(1): 26 – 35.
- Arawomo G.A.O. (1976). Food and feeding of three *Citharinus* species in Lake Kainji, Nigeria. *Journal of Fish Biology* 9: 3-10.
- Duarte, F. and Araujo, F. G. (2002). Fecundity of the *Hoplostomus affinis* (Siluriformes, Loricariidae) in the Lajes Reservoir, Rio de Janeiro, Brazil. *Revised Biology*, 50(1): 197 – 200.
- Fawole O.O. (2002). Morphometry and diet of *Mormyrus rume* in the Lekki Lagoon, Nigeria. *Reviews in Tropical Biology* 50 (2): 689-694.
- Fawole, O.O. and S.O. Adewoye. (1999). The length-weight relationship, condition factor and fecundity of *Sarotherodon galilaeus* (Artedi) in Oba reservoir Ogbomoso, Nigeria. *Bioscience Res. Comm.* 11(2): 113-119.
- Gosse, J.P. (1984). Mormyridae, Gymnarchidae. *Checklist of the Freshwater Fishes of Africa (CLOFFA)* 1: 63 - 124.
- Ipinjolu, J.K, Malami, Z.G., Hassan, W.A and Abubakar, U. (2005). Food habits of elephant snout (*Mormyrus rume* Cuvier & Valenciennes) in River Rima and Goronyo Dam in northwestern Nigeria. *Bulletin of the Science Association of Nigeria* 26: 173-185.
- Kouamelan P.E., Teugels G.G., Gourene G., Ollevier F. and ThysVanden D.F.E. (1999). The effect of a man-made lake on the diet of the African electric fish *Mormyrus rume* Valenciennes, 1846 (Osteoglossiformes; Mormyridae). *Hydrobiologia* 380: 141-151.
- Malami, G. Z., Ipinjolu, J. K. Hassan, W. A. and Magawata, I. (2007). Food and Feeding Habit of Fresh water Mormyrid *Hyperopisus bebe* occidentalis in River Rima and Goronyo Dam, Nigeria. *Proceeding of the Fisheries Society of Nigeria* held at Kebbi State 12 – 16th November 2007.
- Moller, P. (1995). Electric Fishes: history and behaviour. New York: Chapman & Hall.
- Nwani, C. D., Eyo, J. E. and Udeh, E. F. (2006). Food and feeding habits of *Campylomormyrus tamandua* in Anambra River, Nigeria. *Animal Research International*, 3(1): 410 – 414.
- Nwani, C. D., Ezenwaji, H. M. G., Eyo, J. E. and Udeh, E. F. (2006). Length-weight relationship and condition factor of four Mormyrid species of Anambra River. *Animal Research International*, 3(1): 426 – 430.
- Nwani, C. D., Inyang, N. M. and Eyo, J. E. (2004). Sex discrimination among four mormyrid species of Anambra River system, Nigeria. *Animal Research International*, 1(3): 169 – 172.
- Oben, P.M., Ugwumba. O.A. and Oben, B.O. (2000). Aspects of the reproductive biology of the Mormyrid, *Hyperopisus bebe* (Lacepede) in the Lekki Lagoon, Nigeria. *Nigerian Journal of Science*. 34(4): 305 – 316.
- Odedeyi, D.O. and Fagbenro, O.A. (2010). Feeding habits and digestive enzymes in the gut of *Mormyrus rume* (Valenciennes 1846)

- in River Ose, Southwestern, Nigeria. *Tropical Zoology* 23: 75-89.
- Omotosho, J.S. (1993). Analysis of fish species composition of Oyun mini dam, University of Ilorin, Nigeria. *Journal West Africa Science Association*, 36: 37-48.
- Paugy, D. (2002). Reproductive strategies of fishes in a tropical temporary stream of the upper Senegal basin: Baoule River in Mali. *Aquatic Living Resources* 15: 25-35.
- Ugwumba, A. and Ugwumba, A.A.A. (2007). Food and feeding ecology of fishes in Nigeria. Ajah, Lagos: *Crystal Publishers*, 91 pp.
- Ugwumba A., Ugwumba A.A.A. and Mbu-Oben P. (1990). Food, feeding ecology of the mormyrids of Lekki Lagoon, Nigeria. *Nigerian Journal of Natural Sciences* 5 (1-2): 38-46.

Table 1: Gonadosomatic indices of *H. ansorgii* from River Ogbese

Standard length (cm)	Body weight (g)	Ovary weight (g)	Fecundity	GSI
12.1	31	3	1,800	10.71%
12.5	33	3	1,800	10.00%
12.6	33	3	1,800	10.00%
12.7	38	4	2,400	11.77%
13.1	35	4	2,400	12.9%
13.3	34	1	600	3.03%
13.8	45	7	4,200	18.42%
14.0	52	5	3,000	10.64%
14.2	46	6	3,600	15.00%
14.8	60	8	4,800	15.39%
16.4	77	9	5,400	12.5%
16.4	82	12	7,200	14.63%
17.0	77	5	3,000	6.94%

Table 2. Summary of stomach contents of *Hippopotamyrus ansorgii* in River Ogbese

	VOLUMETRIC METHOD	FREQUENCY METHOD		RANKING INDEX
Food Items	% Volume	Number	% Occurrence	
Crustacea	24.0	32	100	24.0
Insecta	21.0	32	100	21.0
Algae	2.7	21	66	1.78
Rotifera	5.0	25	78	3.9
Detritus	22.0	32	100	22.0
Plants Parts	17.0	26	81	13.77
Unidentified Mass	6.3	32	100	6.3
Sand grains	2.0	32	100	2.0
Total	100			

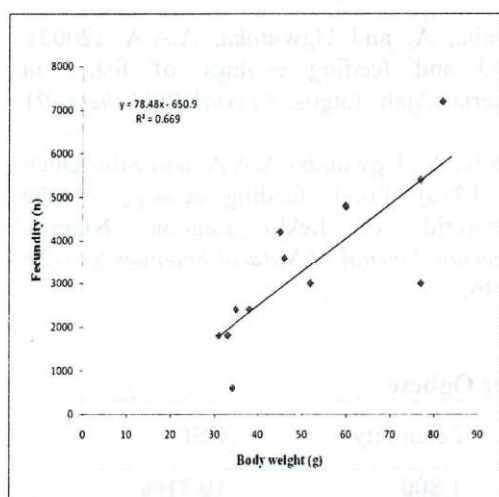


Figure 1. Relationships between fecundity and body weight of *H. ansorgii* from River Ogbese

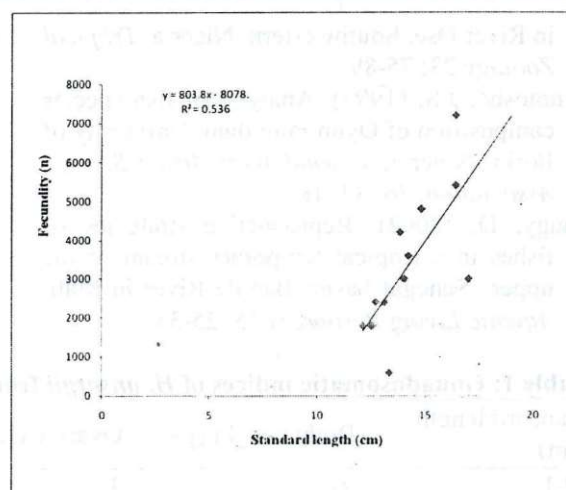


Figure 2. Relationships between fecundity and standard length of *H. ansorgii* from River Ogbese

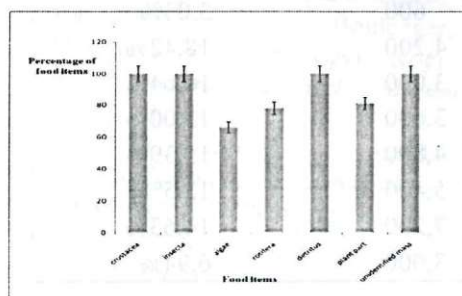


Figure 3. Percentage of food items that constituted the diet of *H. ansorgii* specimens from River Ogbese