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Full Length Research Paper

The use of traps and the need for conservation of *Synodontis* fisheries in Asa Lake, Ilorin, Nigeria

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The basket conical traps are commonly used to catch *Synodontis* species by the fishermen in Asa Lake, Ilorin, Nigeria because these species are caught alive to attract higher market values. Fleets of these traps randomly set at the bottom shoreline by fishermen at three different locations around the lake from the dam site to the river source were examined for *Synodontis* catch in 12 months. The specimen of *Synodontis schall* and *Synodontis gambiensis* were encountered with the latter occurring in August to October corresponding only with the flood season around the lake. *S. schall* occurred throughout the seasons but more abundantly in the traps during the dry season. All the specimens of *Synodontis* caught were found alive with mean standard length ranging from 7.8 to 16.75 cm for *S. schall* and 16.8 to 22.48 for *S. gambiensis.* Their corresponding weights ranges are 12.50 to 77.45 g and 49.75 to 92.76, for *S. schall* and *S. gambiensis*, respectively. Gravid specimens of both species were caught between the months of June to August in both the fixed and the lost traps. A total of 18 lost traps were recovered during the 12 months of research particularly during the flood seasons. There were no lost traps in November to March. The period of low catch (October and November) also corresponded with the season when the juveniles of *S. schall* became abundant in the lake. The total fish catch in the wet and dry season was significantly different (P<0.05) in both species. 'Ghost fishing' a phenomenon that usually occurred when the set traps were lost due to high floods around the lake and the need for conservation of these valuable water resources are discussed.

Key words: Traps, *Synodontis*, ghost fishing, conservation.

INTRODUCTION

The use of locally made basket traps to catch fish is one of the traditional methods among many others in Nigeria. Through the ages of trial and error, and gradual improvement resulting from long term experience, many of these have become extremely efficient and sophisticated (Reed et al., 1967). Today most of these local fishing traps compare favorably with the most modern types of gear, hence the use of these traps may still continue for a long time. The basket conical traps are considered as passive gear since they are not actively move by man or machine after setting (Bagenal, 1978). In Asa dam, Ilorin, Nigeria, they are usually set at the early morning (06.00 h) and later retrieve in the evening (18.00 h). They can also be re-set in the evening time to be retrieved early morning of the following day. For some fishes particularly the piscivours, efficiency is improved by baiting. Catches are often larger during spawning season (Muncy, 1957) and fish activators such as copper sulphate (Tompkin and Bridges, 1958) and light (Young, 1950) can be used to increase catches. There are studies on the use of traps and other fishing gears that were carried out on different water bodies. Thomas (1990) compared the use of traps, spear, hooks and net for fishing on Lake Chad and reported the use of nets as the best. Bagenal (1978) studied the variability between the catches of wire netting traps set for perch and indicated the number of traps needed to give mean catches of a given accuracy. Ahmed and Ipinjolu (2008) studied the gill net selectivity of *Citharinus citharus, Distichodus rostratus, Hydrocynus forskalii,* and *Synodontis membranaceus* in Kainji Lake Nigeria and reported that the selectivity of the different meshes varied considerably, and the master curves of entangling nets were bell shaped and tended to be skewed to the right for *C. citharus* and *S. membranaceous.*

Synodontis schall is among the common Mochokids found in the Nigerian inland waters (Reed et al., 1967; Willoughby, 1974, Imevbore and Okpo; 1975; Olatunde,

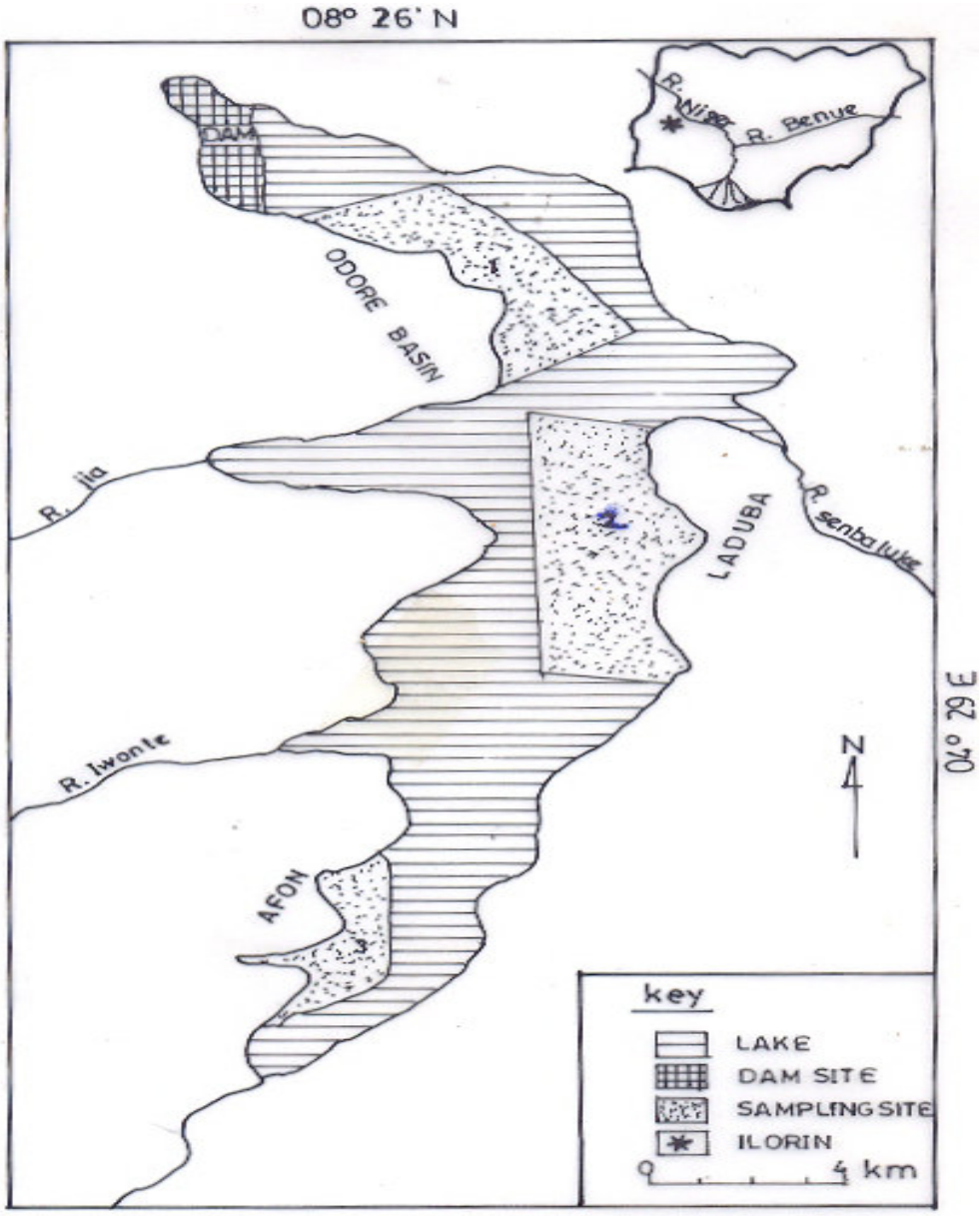

Figure 1. Sketch map of Asa Lake showing the sampling sites.

1989; Araoye, 2001; Araoye and Owolabi, 2005; Adedeji and Araoye, 2006). It is highly relished in Ilorin, Nigeria and environ because of its medium size range which makes its price affordable to the low and middle class income groups (Araoye, 1998). The efficiency of the gill net selectivity for this commercially viable fish species in Asa dam had earlier been carried out (Araoye, 1998). The results from this study that was carried out about 10 years ago compared and explained the effectiveness of the fishing gears but did not address the issue of "ghost fishing' that was prevalent among the traps whenever they were lost due to broken attachment accidents resulting from the high floods. Therefore this report became necessary as a result of many reported cases of lost traps along the lakes that were recovered elsewhere down steam with trapped fish samples. Also in this report the issue of conservation is well addressed because the use of basket trap along the lake is becoming more indiscriminately used due to its ability to trap fish alive in order to attract higher market values.

MATERIALS AND METHODS

The dam is in Ilorin, Kwara State capital, Nigeria on latitude 08°C 26'N and longitude 04°C 29'E (Figure 1). The lake surface area and length is 302 ha and 18 km respectively (Ita et al., 1985). The basket conical trap with a roundish mouth opening and conically woven to the narrow rear end where it is tied with a cane rope

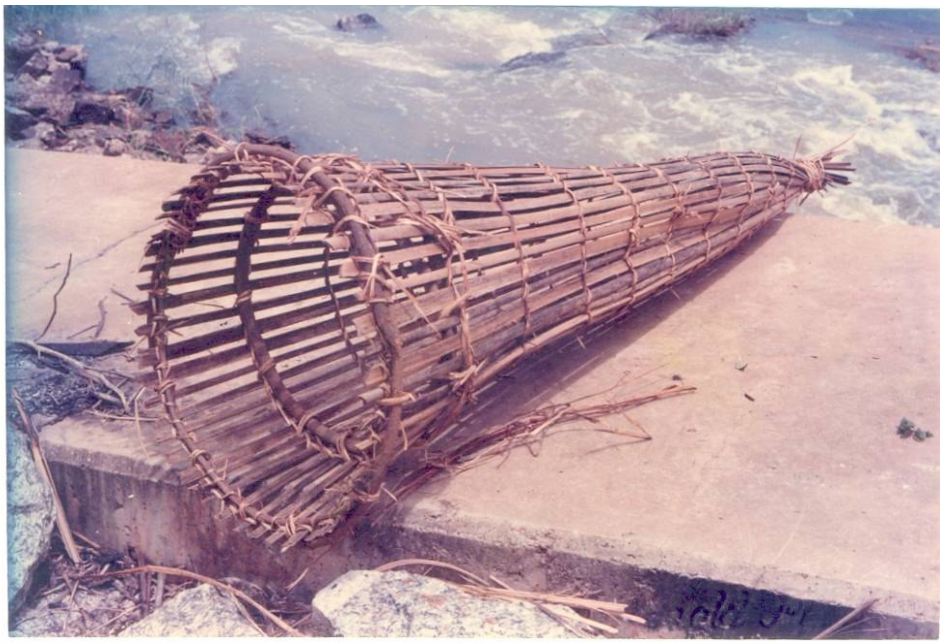

Figure 2. A typical basket conical trap in Asa Lake with the broken branch for attachment found lost around the lake.

Figure 3. A fleet of the set traps along the bottom shoreline. (Note the initial position of some lost traps in arrows).

(Figure 2) is usually made of canes or palm fronds material by the local fishermen. It may range in sizes from small to medium but the medium sizes which are common are usually 3 m in length with a mouth circumference of about 1 m. Internally, is a non–return valve opening that allows in the fish but cannot return through the same opening. The fishes are collected by the fishermen from the rare end that was tied with the cane ropes. A fleet of these conical basket traps contained 10 traps set along the bottom shoreline around the littoral zone of lake from the dam site to the river source at 3 different locations (Figure 3). These were tied to stick pegs with the rope branches at the mouth opening of each trap to prevent dangling inside the water while sticks were pegged down firmly. Each fleet of traps baited with mollusk (*Gambiella* species) was set twice a month in the evening (18.00 h) and checked to retrieve the

Table 1. Monthly catch of *Synodontis schall* in the fixed and lost traps and their gonad stages, mean standard lengths (SL) and weights (wt) in Asa Lake.

Month	Total catch	No. in fix trap	(%)	No. in lost trap	(%)	Mean SL	Mean Wt	Total traps	Lost traps	(%)	Gonad
Apr	10	8	80	2	20	13.50	63.0	30	1	3.3	iv
May	11	11	100	0	0	13.10	64.00	30	2	6.7	iv
Jun	12	8	66.6	4	33.3	16.5	68.70	30	3	10	vi
Jul	12	8	66.6	4	33.3	16.75	70.15	30	3	10	vi
Aug	11	6	54.5	5	45.5	15.0	65.87	30	4	13.3	vi
Sept	8	4	50	4	50	12.80	51.0	30	3	10	vii
Oct	7	3	42.9	4	57.1	12.80	50.57	30	2	6.7	i
Nov	6	3	50	3	50	8.90	12.67	30	0	0	i
Dec	12	12	100	-	-	7.80	12.50	30	0	0	ii
Jan	12	12	100	-	-	15.50	74.86	30	0	0	iii
Feb	13	13	100	-	-	15.70	77.45	30	0	0	iv
Mar	12	12	100	-	-	14.60	64.00	30	0	0	iv
Total	126	100	79.4	26	20.6	-	-	-	-	-	-

caught *Synodontis* species in the morning hours of the following day. Specimens of *Synodontis* species caught from each of the fleet at the 3 sites were brought to the laboratory in a separate ice cooler for identification according to species as described by Reeds et al. (1967), Olaosebikan and Raji (1998). Specimens were allotted serial numbers after which the weight and standard length of each specimen were determined using the top loading Metler balance and measuring board respectively. Gravid male and female specimens trapped were counted and identified by applying slight pressure on their belly to observe the oozing out of oocytes in females and while for the male the genital papilla became reddish and protruded. The total number of *Synodontis* species caught in each month for both the lost and the fixed traps were computed. Also statistical analysis of the dry and wet season catches was determined by T-test.

RESULT

The specimen of *S. schall* and *S. gambiensis* were encountered with the latter occurring in May to October (Tables 1 and 2) corresponding only with the rainy and flood seasons around the lake. *S. schall* occurred throughout the seasons but more abundant in the traps during the dry season (Table 1). The total number of lost traps (Figure 4) during the 12 months of research was 18. The position of some lost traps when they were set initially is shown in Figure 3 (arrowed). Monthly variation of lost traps presented in Figure 2 revealed that lost traps were highest in the months of May to September corresponding with the seasons of rains and floods around the lake. The lost traps were also found with *Synodontis* specimen and in a few, the numbers that were found were more than the numbers in the fixed traps. The snails used as bait in all the traps (both fixed and lost) were no longer found in the traps. The lost traps were usually recovered at another location down stream where they were either hooked among the stones or blocked by the submerged solid obstacles such as wood logs. All the specimen of *Synodontis* caught were found alive with the mean standard length ranging from 7.8 to 16.75 cm for *S. schall* and 16.8 to 22.48 for *S. gambiensis*. Their corresponding weight ranges include 12.50 to 77.45 g and 49.75 to 92.76 g, respectively. Gravid specimens of both species were caught between the months of June to August in both the fixed and the lost traps. There were no lost traps in November to March. The period of low catch (October and November) also corresponded with the season when the juveniles of *S. schall* became abundant in the lake (Table 1). The total fish catch in the wet and dry season was significantly different ($P<0.05$) in both species.

DISCUSSION

The absence of *S. gambiensis* in the catch during the dry season around the lake is an indication that this species only occurred seasonally in the lake particularly at the raining season when the lake became flooded through the river sources. Seasonal abundance of fish species has been reported in similar water bodies due to feeding habits and changes in physico-chemical properties (Fagade and Olaniyan, 1974; Ikusemiju, 1975; Araoye, 1999). *S. gambiensis* of Asa Lake may tend to shift from the riverine to the lacaustrine environment due to the changes in the hydrological conditions of the water body at the flood seasons and also for reproductive activities. Most cat fishes have been reported to spawn during the raining season when there is flood (Araoye, 2001; Dada and Araoye, 2008). Ezenwaji (1992) linked the precise timing of spawning in catfishes with exogenous meteorological and hydrological characteristics of the reservoir coupled with hormonal control and endogenous biological rhythms. Gravid specimen of both species became abundant in the traps during the flood season even when the

Table 2. Monthly catch of *Synodontis gambiensis* in the fixed and lost traps and their and their gonad stages, mean standard lengths and weights in Asa Lake.

Month	Total catch	No. in fix trap	(%)	No. in lost trap	(%)	Mean SL	Mean Wt	Total traps	Lost traps	(%)	Gonad
Apr	0	0	0	0	0	-	-	30	1	3.3	-
May	1	1	100	0	0	18.7	70.40	30	2	6.7	vi
Jun	2	0	0	2	100	19.4	72.10	30	3	10	vi
Jul	4	2	50	2	50	22.48	92.76	30	3	10	vi
Aug	3	2	66.7	1	33.3	20.68	91.50	30	4	13.3	vii
Sept	3	0	0	3	0	18.60	75.90	30	3	10	vii
Oct	3	3	100	0	0	18.90	76.30	30	2	6.7	vii
Nov	0	0	0	0	0	-	-	30	0	0	-
Dec	1	1	100	0	0	16.80	49.75	30	0	0	-
Jan	0	0	0	0	0	-	-	30	0	0	-
Feb	0	0	0	0	0	-	-	30	0	0	-
Mar	0	0	0	0	0	-	-	30	0	0	-
Total	18	10	55.6	8	44.4	-	-	-	-	-	-

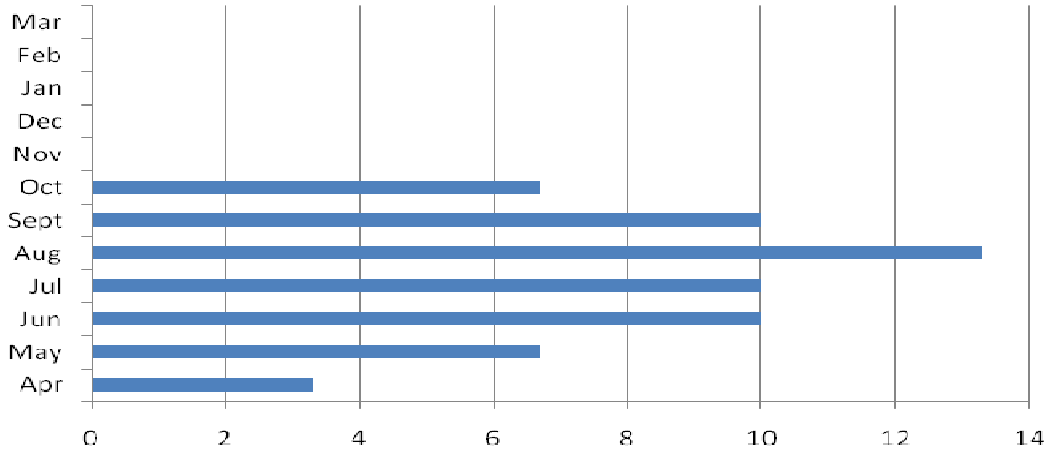

Figure 4. Monthly variation of the percentage lost traps in Asa Lake.

traps were lost. This situation is not environmentally friendly as it affects the recruitment rates of the juveniles that are expected to replenish the stock naturally. The process of reproduction is inevitable as it helps to replenish the fish population density, which could have remained depleted due to natural and fishing mortalities (Araoye, 2001). The higher catches during the dry season for *S. schall* might be attributed to the low water levels at this season resulting in higher fish concentration. An assessment of the effectiveness of a fishing gear is closely related to the availability of fish that constituted the main target in the area of operation (Araoye, 1998). The disappearance of the baits from the set traps is indicative of being fed upon by *Synodontis*. Araoye and Jeje (1999) reported high frequency of occurrence of the Mollusk *Gambiella* species in the diet of *Synodontis* in Asa Lake.

Although some of the advantages of using fishing traps such as the conical basket traps are quite enormous including catching the fishes alive; fishing in water bodies where food are scarce the bait helps to attract fish; trap fishing can be carried out in rough bottom water bodies where other fishing gears may not be able to function and traps can be set in deep waters where some other fishing gears may not reach. However trap fishery is likely to pose some problems with regards to conservation. In Asa Lake the use of basket conical traps is not size selective. Hence uneconomic sizes of below 10.00 cm were also trapped. There is need to regulate the cane mesh of these traps so that it is large enough to allow individual that are too small to escape. Apart from this, the issue of lost traps resulting in 'ghost fishing' during the time of floods when some of the pegs fell off or when the attachments got broken as shown in Figure 3 due to accidents need to be addressed. For this reason, there is need to redesign the traps to allow for escape the trapp-

ed fishes with time. This may be achieved by creating an aperture that can trigger open for escape when the traps are lost and begin to dance around the flooded lake. Also a small part of the traps can be made with the materials that can deteriorate in a short time to provide an escape for the trapped fishes.

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