GROWTH AND PRODUCTION OF FRY/FINGERLINGS OF DUTCH CLARIAS GARIEPINUS IN INDOOR TANKS IN ARID ZONE, NIGERIA

A.N. Olanrewaju, O.O. Agbelege & A.K. Saidu
Federal College of Freshwater Fisheries Technology, Baga, PMB 1060, Maiduguri

ABSTRACT

Study on the growth and percentage survival of seasonal induced breeding was carried out at the Federal College of Freshwater Fisheries Technology Baga. About 40,414 fingerlings were produced with percentage survival of 81.1% at water temperature of 28° C between April and May, 2009. The average weight of fingerlings produced was 1.54 g with average standard and total length of 3.0 cm and 3.5 cm respectively. However, environmental factors that could hinder mass production of Dutch *Clarias* fry/fingerlings stocked at low and high stocking densities were monitored for eight weeks at 3.6 m^2 indoor concrete tanks with water aeration using flow-through system. The percentage survival of 83.5% and 92.5% were obtained after the period of 8 weeks. The fry/fingerlings were fed with artemia mixed with powdered feed of 35 % crude protein. The study shows that for Dutch *Clarias* fry/fingerlings production and management, smaller concrete tanks with flow-through mechanism are required and 3.6 m^2 should not be stocked with more than 3,500 fingerlings per tank in the first 8 weeks before transferring them to production ponds. It was observed that apart from efficient water aeration, constant feeding and sampling of fingerlings will increase growth rate, increase resistance to disease and uniformity in size of the Dutch *Clarias*. The mean water temperature measured in this study ranged from 27.5° C in April and 28.5° C in May while pH ranged between 7.5 and 7.3 in April and May, respectively.

INTRODUCTION

Fish is still the cheapest and most available source of animal protein in Nigeria. Though the high cost of fish today is attributable to low supply caused by low productivity from the water bodies that are already over-exploited due to reckless fishing methods (Adesulu, 2001). Therefore, research cannot but continues on how to salvage Lake Chad fisheries from heavy fishing pressure. A better alternative is to ensure availability of fast grow fish seeds for people in the area for aquaculture. Fish like any other valuable natural resources require good management. The growing interest in fish culture has increased the awareness of the importance of improved variety of fish seeds as one of the major challenges in fish culture. It is noted that the growth of aquaculture in the arid zone especially in Borno State, Nigeria has been poor due to some factors which include non-availability of fish seeds. Consequently, the production of improved catfish variety in the zone has become essential in order to satisfy the quest of people that have embraced aquaculture. The study was designed to evaluate the growth and percentage survival of Dutch *Clarias* in the arid zone.

MATERIALS AND METHODS

Experimental induced breeding of Dutch *Clarias gariepinus* using ovaprim was carried out at the fish hatchery complex of Federal College of Freshwater Fisheries Technology, Baga, Bornu state, Nigeria in April 2009. Eight Dutch Clarias broodstocks were obtained from Ijebu Ode; Ogun.The broodstocks were kept in two separate tanks for male and female and fed into satiation. Stripping and artificial fertilization techniques were used and breeding was carried out in April after the first rainfall of the year when water temperature was about 25° C. Gravid female broodstocks (1.2kg) were selected and injected with 0.5ml/kg body weight ovaprim while male broodstocks were given half the dose. Most of the eggs matured and ovulated within 11 hours after injection and eggs were stripped out of the females into a dry receptacle. Males were conditioned inside anaesthesia for easy dissection and suction before stripping. Males were dissected and the milt was sucked using 0.5 ml needle and syringe and stitched back to position. The milt was mixed with the eggs by shaking the bowl gently. Mixing was facilitated by adding small amount of salt solution. The eggs were fertilized by adding approximately the same volume of clean water, with gentle shake. Fertilized eggs were spread on kakaban inside the breeding tanks already prepared with water level of 0.2 m.The eggs hatched after 29 hours at 25° C water temperature. Fry were fed 6 times a day between 6.00 am and 8.00 pm. with decapsulated artemia. Aeration through power aerator and flow-through was ensured for 6 hours daily. Feeding with artemia lasted for 2 weeks as described by Sorgeloos (1980). Fry were counted and restocked in indoor tanks with turn-down pipes and flow-through adjusted to 0.4 m. Two stocking densities (low and high) were adopted as described by Okoye *et al.* (1989). Tanks with low densities had between 1,000 and 2,500 fry while the high stocking densities contained between 3,000 and 4,000

fry. Advanced fry were fed 3 times daily with 40% crude protein diet. The tanks were continuously aerated using flow-through system. Fry were sampled forthnightly to determine the weight and length using hatchery ruler and electric digital weighing balance. Jumpers were removed at every sampling period so as to avoid or reduce cannibalism which was identified as a major problem in the management of mudfish fry by Kelleher and Vincke (1976). The experiment lasted for 8 weeks.

RESULTS AND DISCUSSION

Table 1 shows the number of induced breeding exercises that were carried out in the study. The hormone, the number of male and female brooders used, estimated number of eggs, the percentage hatching success, the mean water temperature and pH. A total number of 3 induced breeding exercises were carried out between April and May 2009 with 3 males and 3 female brooders. These produced about 70,000 eggs and 62.5% hatching success. Table 2 shows the estimated number of fry produced, the percentage survival of the fry and fingerlings in the indoor concrete tanks. About 50,350 fry were produced with percentage survival of 81.1% in the indoor concrete tanks.

Table 1: Hormone induced breeding success rate

Month	No. of breeding	Hormone	No. of tanks	No. of females	No. of males	No. of Eggs	% success	Mean temp. °C	Mean pH
April	2	OVP	2	2	2	50,000	75	27.5	7.5
May	1	OVP	1	1	1	20,000	50	28.5	7.3

OVP = Ovaprim

Table 2: Survival rate for fry and fingerlings

Month	No of fish stocked	No of survival (indoor)	% survival
April	37,500	29,775	79.4
May	12,850	10,639	82.8
Total	50,350	40,414	81.1

Table 3 shows the average weight and size at periodic sampling of 4th, 6th and 8th week and, the number of jumpers and their average weight and size at sampling. Average weight ranged from 0.66 g after 4 weeks, 0.92 g after 6 weeks and 1.54 g after 8 weeks while the total length ranged from 1.6 cm to 3.5 cm. 48, 27 and 19 jumpers were recorded after 4 weeks, 6 weeks and 8 weeks respectively with the standard and total length ranged from 3.4 to 4.9 cm and 3.8 to 5.4 cm, respectively. Table 4 shows the relative comparison of the percentage survival of fry stocked at low and high densities in 3.6 m^2 indoor concrete tanks. The percentage survival in the tanks with high stocking densities ranged from 90.5 % to 95 % after 4 weeks, 82.7% to 92% after 6 weeks while the overall percentage survival after 8 weeks ranged from 77.2% to 83.5%. At low stocking densities, after 4 weeks, the percentage survival ranged from 91.0 % to 98.5 %, 88.9 % to 96.4 % after 6 weeks while the overall percentage survival after 8 weeks ranged from 85 % to 92.5 %.

Table 3: Growth rate of fry and fingerlings

Sampling period (week)	Weight (g)	Standard length (cm)	Total length (cm)	No. of shooters	Weight of shooters (g)	Standard length (cm)	Total length (cm)
4th	0.66	1.60	1.80	48	0.96	3.40	3.80
6th	0.92	2.30	2.70	27	1.42	4.0	4.50
8th	1.54	3.00	3.50	19	2.11	4.90	5.40

Flow-through techniques should be adopted for propagation of dutch *Clarias gariepinus* in Arid zone, Nigeria to ensure its fast growth and propagation should be encouraged as this will supplement the current over-exploitation of fish on the Lakes by capture fisheries. Also, dutch *Clarias gariepinus* could be introduced through artificial mass production at commercial level to interested fish farmers in the zone. This study served as a baseline data for more advance research of this nature to enhance fish production through aquaculture development in the arid zone.

Table 4: Survival rate at indoor concrete tank at low and high density

Tank No	No of fry stocked after 2 wks	Harvest after 4 wks	% survival	Harvest after 6 wks	% survival	Harvest after 8 wks	Overall % survival
			Low Stocking Density				
1	1,000	985	98.5	964	96.4	925	92.5
2	1,500	1,55	97.0	1,395	93.0	1,350	90.0
3	2,000	1,880	94.0	1,810	90.5	1,772	88.6
4	2,500	2,275	91.0	2,222	88.9	2,125	85.0
			High Stocking Density				
1	3,000	2,850	95	2,760	92	2,505	83.5
2	3,500	3,255	93	3, 1178	90.8	2,819	80.5
3	3,800	3,534	93	3,354	88.2	2,945	77.5
4	4,000	3,620	90.5	3,310	82.7	3,089	77.2

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