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Growth and Survival of *Clarias gariepinus* Fry Raised on Plankton from Cow Dung and Poultry Manure

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Abstract: The effect of zooplankton raised from cow dung and poultry dropping on the growth and survival of *Clarias gariepinus* fry was investigated weighing 0.01 g ± and length ± 7.00 mm. Among the treatments, poultry manure source of zooplankton used for feeding fry six times daily had the highest specific growth rate 7.45, mean percentage body weight gain 45% and survival rate 53.33%. In terms of mean length gain, treatment fed nine times daily had the highest 2.88 mm. The specific growth rate and mean length gained were significant ($p < 0.05$) where as the values for mean weight gained and mean length increase were insignificant ($p > 0.05$). The survival rate for the period were found to be the same for treatments where fry were fed nine times daily with different food sources, also applicable to treatment fed thrice daily with poultry manure as the source.

Key words: Zooplankton, fry, survival, manure

INTRODUCTION

The importance of aquaculture in improving the diet of the people, generating employment in rural areas and saving foreign exchange through import substitution has generally been considered in most countries of Africa in recent years. The transition from endogenous to exogenous feeding is a critical event in the life of a fish and it is generally acknowledged that live food during the first few days of hatching is necessary to ensure adequate larval survival. It has been considered that dry diets are inadequate to nourish small larvae during the first stages of feeding and that such diets could be used successfully after the larvae had been fed on live food for some time (Adeyemo, 1991). Ovie (1986) and Ojutiku (2008) named common cultured zooplankton species as *Brachionus sp.*, *Daphnia sp.*, *Monia sp.*, *Cyclops sp.*, *Copepodita sp.*, *Calanoid sp.* Adeniyi.

The use of live organisms in aquaculture has for the past decades received tremendous attention in countries where aquaculture is well developed. Faturoti (2000) noted that for Aquaculture industry to thrive apart from development of adequate manpower there is also need to research and develop various inputs of production such as feed. The cost of feeding fish fry on artificial is very high only very few farmers can afford it, also artificial feed tends to pollute water as a result there is the need to find alternative feed for fish fry.

This study was undertaken to provide baseline information that may be employed to develop a simplified hatchery technique for post larval feeding of *Clarias gariepinus* on zooplankton cultured from poultry manure and cow dung. The study therefore aimed at investigating the growth and survival rate of *Clarias gariepinus* fry fed on different natural diet sources with

the view to determine the best source of production of live food for fish seed culture.

MATERIALS AND METHODS

Two major steps were involved in this experiment. They include:

- Raising of zooplankton from cow dung and poultry manure which was raised outside the Laboratory for illumination.
- Feeding trials which were carried out inside the Laboratory.

Two plastic bowls of the same size were used for raising zooplankton. Total 300 g each of cow dung and poultry manure were collected and kept, respectively. 30 liters of spring water was added to each of the bowl and kept outside for illumination. Each medium was constantly aerated by stirring. On the fourth day, water sample were collected from each bowl and examined under the microscope for identification and counting. It was repeated for 7 days. Six glass tanks (1×0.5 m) each were used for fry rearing. Fish larvae were collected, after yolk absorption (4th day) 60 fry were randomly selected, weighed and stocked at 1 fry/130 mL of clean spring water in each of the tanks. Aeration of each unit was done mechanically using aerator. Tanks A-C were fed with live food raised from cow dung source harvested using a sieve into a bottle of about 80 mL of the medium. The same was repeated for tanks D-F which were fed live food from poultry manure as source, the experiment was repeated 3 times. Growth parameters monitored include daily increase in length (mm) of swim-up fry right from 4 days old to the end of

Table 1: Growth performance and survival of *Clarias gariepinus* fry

	A	B	C	D	E	F	Sign
Specific growth rate	12.90	6.81	5.25	6.81	17.45	7.35	S
Initial weight (mg)	0.01	0.02	0.03	0.02	0.03	0.22	
Final weight (mg)	0.08	0.06	0.07	0.06	0.05	0.07	
Mean weight gained	0.07	0.04	0.04	0.04	0.47	0.05	NS
%Body weight gained	7.00	4.00	4.00	4.00	47.00	50.00	
Initial length (mm)	7.00	6.63	6.50	6.75	7.13	6.88	
Final length (mm)	9.13	9.00	8.88	9.13	9.38	9.95	
Mean length gained (mm)	2.13	2.38	2.38	2.38	2.50	2.88	
Mean Length increase (mm)	8.34	8.36	8.33	8.43	8.65	8.75	NS
Stocking ratio	60.00	60.00	60.00	60.00	60.00	60.00	
Mean survival rate (%)	49.17	50.00	51.67	51.67	53.33	51.67	

S = Significant at (p<0.05) NS = Not significant at (p>0.05)

Table 2: Final average weight (mg) and length (mm) of fry *Clarias gariepinus*

Treatments	Daily frequency of feeding	Average weight (mg)	Average length (mm)
A	3	0.07	9.13
B	6	0.04	9.00
C	9	0.04	8.88
D	3	0.04	9.13
E	6	0.47	9.38
F	9	0.50	9.75

Table 3: Average daily increase in length (mm)

Day	Treatments					
	A	B	C	D	E	F
1	7.00	6.63	6.50	6.75	7.13	6.88
2	7.25	7.75	7.88	7.88	7.88	7.88
3	8.25	8.75	8.63	8.63	8.63	8.88
4	8.75	8.75	8.63	8.75	9.00	9.00
5	9.00	8.75	8.88	8.88	9.13	9.25
6	9.00	8.88	8.88	9.00	9.38	9.50
7	9.13	9.00	8.36	9.13	9.38	9.75
Total average	8.34	8.36	8.33	8.43	8.65	8.75

the experiment. Specific Growth Rate (SRG) was obtained by using the formula below.

$$S.G.R = \frac{\text{Log}W_2 - \text{Log}W_1}{T_2 - T_1} \times 100$$

Where,

W1 : Final weight of fry.

W2 : Initial weight of fry.

T2 : Final time (days).

T1 : Initial time (days).

$$\% \text{ Weight gain} = W_2 - W_1 \times 100$$

$$\% \text{ Survival} = \frac{\text{Number of fry survived}}{\text{Number of fry survived}}$$

The experimental design was Complete Randomized Design (CRD). The Analysis of Variance (ANOVA) was used to test for significance as well as the correlation.

RESULTS

The weight gained and other growth performance is presented on Table 1 and 2. Slight differences in growth and survival occurred between fry fed with zooplankton

raised from cow dung and poultry dropping. The mean weight of 0.5 mg by fry fed with zooplankton raised from poultry manure was the highest, as well as the survival rate of 53.33%.

The relationship between daily increase in length (mm) of fry from day 1 after yolk absorption to day 7 (Table 3) shows that Treatment F has the highest mean daily increase 8.75 mm followed by Treatment E 8.65.

DISCUSSION

Fry fed with zooplankton from poultry manure source in treatment F had maximum gain in length throughout the experiment 2.88 mm. Increase in length of fry from different treatment does not follow a specific pattern. Treatment E had the highest Specific Growth Rate of 17.45 and highest survival rate of 53.33%, survival of 51.67% was common to Treatments C,D and F which agrees with the findings of Ovie and Adepoju (1995), Lamai (1999) and Ojutiku (2008). The magnitude of Specific Growth Rate, mean percentage body weight gained and mean length gained does not correspond with the survival rate in all the experiments except in treatment E. There was significant difference in length increase p<0.05 as also reported by Faturoti (1992).

There was also a significant difference between the length and weight $p < 0.05$.

Conclusion: The successful feeding with small live zooplankton indicates that this could be a solution for the rearing of *Clarias gariepinus* fry when zooplankton can easily be obtained or cultured in circumstances where Artemia cysts are not readily available as in the case in Nigeria where the price is limiting due to high foreign exchange rate.

From all the data collected, poultry dropping is much preferable as source of raising zooplankton. It thus appeared that *Clarias gariepinus* is one of those species for which fry rearing requires a phase of feeding with natural, preferably live food.

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