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Growth and survival of *Clarias gariepinus* Frys fed dried decapsulated artemia cyts DDAC and whole egg micro-encapsulated diet WEMD

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Abstract
The study was conducted in Enugu, Nigeria (latitude 074º North and 082º South and longitude 068º East and 076º West with annual mean temperature of 30ºC) to evaluate the growth performance of *Clarias gariepinus* frys fed dried decapsulated *Artemia* cysts DDAC and whole egg micro-encapsulated diet WEMD. Experimental duration was 21 days which started when the catfish was four days old. Triplicate groups of fish were subjected to two treatments of whole egg micro-encapsulated diet and decapsulated *Artemia* feed. The trial was conducted in 80 litres capacity plastic bowls and the frys were stocked at 100 frys per replicate, feeding was done at 5% of their body weight per day through 3 weeks of study. They were fed three times daily at 8.00 hours, 12.00 hours and 16.00 hours. Evaluation of growth parameters and nutrient utilization of fish fed with the experimental diets was based on the mean weight gain, protein efficiency ratio, food conversion ratio and survival rate. The growth parameters monitored showed that there were no significant differences ($P > 0.05$) in growth performance of the frys fed on the two treatment diets. Therefore both the decapsulated *Artemia* cysts and whole egg micro-encapsulated diets are good growth promoters to catfish frys. However to achieve better results, digestibility and nutritional quality of whole egg micro-encapsulated diets should be furthered in future studies. Low income farmers in the tropics can sufficiently alternate imported and often more expensive decapsulated *Artemia* cysts (DDAC) with whole egg micro-encapsulated diets (50% WEMD and 25% yeast).

Keywords: decapsulated *Artemia* cysts and micro-encapsulated diet

1. Introduction
For many fish species, the early phase is considered critical in life. Success of fry rearing depends mainly on the availability of suitable diets that are readily consumed efficiently digested and provide the required nutrients to support good growth and health [3] Diet particles must be chosen with consideration to the small mouth size of fish. The selection of a very small feed particle can lead to nutrient leaching problems with water soluble vitamins being the most susceptible [5]. However, micro-encapsulated diet can help to overcome leaching. Different proteins have been used as protein sources and as material for microencapsulation. Proteins of animal origin, Plasma proteins, meat, pig liver, albumin, and bird protein) have commonly been used for such purpose, but the diet should still be analyzed to determine the extent of the problem in a comprehensive examination scheme [2]. Growth and survival data are powerful tools for understanding the effects of both live and manufactured diet of first feeding fish fry [4, 10]. In the present study, growth and survival data were evaluated to show the effects of *Artemia* and microencapsulated diet on fry of *Clarias gariepinus*.

2. Materials and Methods
2.1 Experimental Site
The experiment was carried out in the fisheries unit of the Department of Animal/Fisheries Science and Management of Enugu State University of Science and Technology, Teaching and Research Farm, and was carried out for 3 weeks. Enugu (latitude 074º North and 082º South and longitude 068º East and 076º West) has an annual mean temperature of 30ºC

2.2 Spawning
The female brood stocks were carefully caught with wet towels covering the head and were injected with ovaprim (0.5ml/kg) intramuscularly at angle 45º using 2ml hypodermal syringe.

The injected areas were finger-robbed and returned back to the holding tank to undergo a latency period of 10 hours. Artificial fertilization of the eggs occurred by stripping the eggs out of the female into a bowl using gentle pressure and fertilizing with milt extracted from males. The male brood was dissected at the abdominal region using a surgical blade to extract milt sack holding the milt. Milt was rinsed with 0.9% saline solution to remove blood stains and was poured over the eggs and stirred with plastic spoon after which saline solution was added to the mixture. It was mixed gently and some part of the saline solution was decanted. The incubation tray was prepared with a mosquito net in clean oxygenated water. The fertilized eggs were poured in a single layer onto the incubation bags. At a temperature range of 26-27°C, hatching of fertilized eggs occurred after 25 hours and 5 additional hours before siphoning commenced, un hatched eggs were removed from the incubator by siphoning. Feeding commenced on day 4 day after hatching took place. Feeding was done three times per day at 8:00 am, 12:00 noon and 4:00 pm at 5% of their body weight in 3 weeks.

The egg was cracked into a resistant container and beaten vigorously with fork into homogenate with constant stirring until it formed particle and brought down and the desired volume was taken in cold water and fed with a spoonful or scoopful directly to the fish. The remaining feeds were stored in a refrigerator.

2.3 Water Quality Assessment

Water quality was collected and temperature, pH was monitored daily, the volume of water was maintained at 30 liters, and the water was changed as the need arose.

2.4 Statistical analysis and design

The experiment was completely randomized, and the frys were randomly separated into two treatments (T_1 and T_2) and replicated 3 times per treatment and each replicate contained one hundred (100) frys. The first treatment was fed with dried decapsulated *Artemia* cysts Artemia, the second treatment was fed with whole egg micro-encapsulated diets (50% WEMD and 25% yeast). All data were collected and analyzed using student T test using SPSS versions 20.

Table 1: Proximate Analysis and Amino Acid Profiles

Nutrient	WEMD	DDAC
Protein, %	48.8	76.9
Fat, %	43.2	-
Gross energy, Kcal/Kg	5 830	3 070
Metabolicatable energy (ME),	Kcal/kg 4 810	2533
ME: protein ratio	9.8	3.3
Calcium,%	0.2063	0.427
Phosphorus, %	0.873	0.282
Amino Acids, %	2.968	4.179
Arginine	0.837	1.282
Cystine	2.734	4.307
Isoleucine	4.063	6.273
Leucine	3.047	6.427
Lysine	3.047	4.427
Methionine henyalanine	1.563 2.500	2.700 4.427
Threonine	2.500	3.692
Tryptophan	0.837	1.350
Tryrosine	1.952	3.076
Valine	3.674	6.025

3. Results

The feeding and the utilization of the data obtained from the 21 days experimental period with the fry of *Clarias gariepinus* fed with *Artemia* and micro-encapsulated diet is shown in the Table 2.

Table 2: Mean Growth of *Clarias gariepinus* Fry fed WEMD and DDAC diets

Parameters	T_1 WEMD		T_2 DDAC
FCR	0.16 ± 0.01^a	$\pm 0.014^a$	0.14 ± 0.12^a
PER	13.40 ± 1.53^b	$\pm 1.53^b$	12.12 ± 0.93^a
MLG (cm)	0.13 ± 0.06^a	$\pm0.06^a$	0.38 ± 0.24^a
MWG (g)	0.113 ± 0.02^a	$\pm0.02^a$	0.12 ± 0.29^a
Survival (%)	65	80	

The food conversion ratio (FCR) shows that T_1 WEMD had a mean of (0.16) while T_2 DDAC had a mean value of (0.14) since no significant difference existed between the two diets, therefore both diets are good for rearing of African catfish fry. Similarly since the significant difference did not exist in PER, MLG and WWG of the two types of diets, it shows that both the micro encapsulated diet and the *Artemia* are good for growth of African catfish frys (Table 2).

Table 3: Survival Rate of frys

Treatment (R_1 – R_2)	Fish Stock	Death Rate%	Survival Rate%
T_1	100	35	65
T_2	100	20	80
$\sum x$	200	55	145

The table shows the death rate and the survival rate of the fish. At the end of the experiment period T_1 (Micro-encapsulated diet) have the survival rate (65) while the T_2 (Artemia) have the survival rate (80) that is T_1 had the highest death rate. The use of *Artemia* as a first food to catfish frys gave a better survival rate than microencapsulated diet

Table 4: Pysico-chemical Parameter of water

Week	Ph DO (mg/L)		0C	
	T1 T2	T1 T2	T1 T2	
1	6.5 6.7	5.8 5.7	26.4 25.8	
2	6.5 6.5	5.8 6.0	27.0 27.5	
3	6.5 6.8	6.1 6.2	26.8 27.0	

The table above represents the result of the weekly level of water quality parameters. The mean temperature ranges from 26 °C as the lowest to 27 °C the highest, the pH was found to vary between 6.5 – 6.9 however, the water quality parameter was found to be within the range of tolerable by the fishes (Viveen *et al.*, 1987) [9].

4. Discussion

Our results indicated that both decapsulated artemia cysts (DDAC) and whole egg micro-encapsulated diets (WEMD) could be suitable first food for the growth of *Clarias gariepinus* frys. Although no significant differences existed in mean weight and lengths of the frys, numerical growth of frys fed DDAC gave slightly better growth, probably due to its smaller particle size (200-250µm) compared to (300-350µm) for WEMD as well as reported high elasticity, floating capacity and slow sinking capacity (Alam and Mollah, 1989) [1]. Higher protein availability of WEMD (13.40) than DDAC value of 12.12 may be due to its higher protein content which

however did not translate into better acceptability probably owing to better digestibility of DDAC (Vereeth and Den 1987) [8]. Although differences existed in survival values of the two treatment diets, appreciable rates were obtained for the WEMD fed frys which was better than reported value by Alam and Mollah (1989) [1] but lower than survival value of Saha *et al*. (1989) [6]. Differences in survival rates may be due to differences in method of formulation as well as size and species variations. Lower mortality in DDAC fed frys may be due to its record of staying longer in fresh water and yet does not cause deterioration of the same (Saha, 1998) [6].

Several authors have reported better performance of DDAC than WEMD (Vereeth and Den 1987) [8], yet a few others reported better performance for WEMD fed frys (Uys and Hecht, 1985) [7]. This finding did not indicate significant differences in growth performance of the two diets which gave an indication that low income farmers in the tropics can sufficiently alternate or supplement decapsulated artemia cysts (DDAC) with whole egg micro-encapsulated diets (WEMD) but researches and improvements of its digestibility and nutritional quality should be furthered.

5. Conclusion

Decapsulated artemia cysts (DDAC) and whole egg micro-encapsulated diets (WEMD) could serve as first food for the growth of *Clarias gariepinus* frys. Therefore low income farmers in the tropics can sufficiently alternate imported and often more expensive decapsulated artemia cysts (DDAC) with whole egg micro-encapsulated diets (50% WEMD and 25% yeast). Furthered researches and improvements in digestibility and nutritional quality of whole egg micro-encapsulated diets are required.

6. References

1. Alam MS, Mollah, MFA. Use of moist diets in rearing catfish Clarias batrachus L. lavae under laboratory conditions. Bangladish Journal of Fisheries. 1989; 12:2-41.
2. Chow KW. Food and Agriculture Organization, 2007. Rome, Italy. ADCP/RED/80/11.PP301-355.
3. Girri SS, Sahoo SK, Shu BB, Sahu AK, Mohanty SN, Mohanty PK *et al*. Larval survival and growth in wallagoattu (Bloch and Schneider); Effect of Light, Photoperiod and feeding regines, Aquaculture. 2002; 213:157-161.
4. Hecht T, Appelbaum S. Notes on the growth of Israeli sharp tooth Catfish (*Clarias gariepinus*) during the primary nursing phase. Aquaculture. 1987; 63:195-204.
5. Meyer BJ, Milligan GC. Dietary intake and food sources of Omega-6 and Omega-3 polyunsaturated fatty acids. Journal of Zoology. 2003; 38:391-398.
6. Saha MR, Mollah MFA, Roy PK. Effect of formulated diets on growth and survival of *Clarias batrachus* larvae. Bangladish Journal of Fisheries Resource. 1998; 25:23-30.
7. Uys W, Hecht T. Evaluation and preparation of an optimal dry food for the primary nursing of Clarias gariepinus larvae pisces Clariidae. Aquaculture. 1985; 47:173-184.
8. Vereeth J, Den Bieman J. quantitative feed requirements of African catfish Clarias gariepinus Burchell larvae fed decapsulated cysts of Artemia I. The effect of temperature and feeding level. Aquaculture. 1987; 63:251-267.
9. Viveen WJ, Richter CJJ, Van Oordt PG, Janssen JAL, Huisman EA. Practical manual for the culture of the African catfish (*Clarias gariepinus*) The Hague. 1987, 93.
10. Wang YB. Effect of probiotics on growth performance and digestive enzyme activity of the shrimp Penaeusvannamei Aquaculture. 2007; 269:259-264.