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Rearing of all Male Tilapia (Oreochromis Niloticus) Fingerlings with Chicken Manure and Mixture of Chicken Manure and Commercial Diet in Fibre Glass Tank

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Abstracts— *Mono-sex population of Oreochromis niloticus fingerlings were collected from Nigerian Institute for oceanography and Marine Research Sapele station Hatchery and acclimatized for a week and randomly stocked at density of 300 fish/tank in nine fibre glass tank. The fingerling were fed daily 800h and 1600h with three different types of feed (Dry chicken manure, mixture of chicken manure and commercial diet, and commercial (coppens) only.*

Each treatment was replicated three times. The water quality parameters are within tolerant limit. The growth response in all the treatment wee generally satisfactory. Though treatment T3 Tanks fed with commercial diet only (coppens) had better growth performance compared with treatment T2 and T1, chicken manure and mixture of chicken manure and commercial diet respectively.

The results demonstrate the feasibility of rearing all male tilapia (O. niloticus) fingerlings in fiber glass tanks.

Keywords— Fibre Glass, Chicken Manure, Fish farmers.

I. INTRODUCTION

Fish farmers in Nigeria use a variety of production systems with different level investment, different management requirements and production potentials. Thus farmers have several option for entering fish farming depending on their physical and financial resources.

As input cost rises (feed, energy, transportation) and yet the selling price of fish remains the same. Fish farmers are forced to find ways to reduce costs. Many farmers are forced to find ways to reduce costs. Many farmers try to find cheaper feed as this represent up to the 60 – 70% of operating cost. This has led to the alternative use of poultry manure (chicken waste) in place of compounded diets. Chicken manure contain considerable quantities of nutrients for fish production with ranges of between 10 and 30% for protein 0.45 – 5.86mg/kg for energy as well as high level of soluble vitamins. It also contains non-digested feed metabolic excretory products and residues resulting from microbial systems which can be utilized to replace reasonable quantities of feedstuffs used in conventional fish feed thereby reducing production cost (Falayi 1998), Fashakin et al 2000). Findings related to feed poultry waste at higher levels has been reported by several workers (, Harmon et al 1975b, Kamal et al2008. Boyd 1976,The aim of this study was to cut natural food chain and make chicken manure the only source of food for fish in order to determine the differences in fish growth, under these two different situations; and compare the effect of rearing tilapia (*O. niloticus*) with dried chicken manure and mixture of dried chicken manure and commercial diet.

Key Word: Tilapia. *Oreochromisniloticus* , Dry chicken manure, Commercial diet. (Coppens).

II. MATERIALS AND METHODS

Study Area: The study was carried out at Nigerian Institute for Oceanography and Marine Research Sapele out station Delta State Nigeria. ($N05^0$ $54^{'}03$"E 005^0 39' 56.4"). The experiment was conducted for 3 month using 9 circular fiberglass tanks each with a capacity of $3.08m^3$ of water (figure 1) between September 2017 and November 2017. The tanks were mounted out door in a row.

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Fig.1

Experimental tanks and stocking rate

Nine (9) circular fibre glass tanks used in this experiment were identical in shape and size, tanks capacities were 3.08m^3 and the flow of each tank drained to the centre drainage of the tank was on the outside via 100mm PVC pipes and gate valves. Each tank received water from a borehole passing through a water treatment plant to correct the pH.

Fingerlings of All male tilapia (*O. niloticus*) were used as specimen for this study. The fish were provided by the Nigerian Institute for Oceanography and Marine Research Sapele out Station hatchery. Each tank was watched, cleaned and disinfected with sodium chloride Nacl after which the tanks were filled with water to a depth of 60.5m and allowed to settled for a day before introducing the fish. Each tank was stocked with All male tilapia fingerlings of average weight of 0.90 – 0.97g and cultured for a period of 12 weeks at a stocking density of 300 fish per tank which translate to 158 fish per m^3. Three types of feed were used to feed the fish, these were dried chicken manure,dried chicken manure with commercial diet (coppens) and commercial diet (coppens) as control. The daily feeding rate was 5% of the total stocked biomass, thereafter the fish were sampled every two weeks to obtain information for adjustment of the feeding rates. Uneaten feed and feaces of the fish were siphoned off and $^1/_3$of the water was replaced every day there was no feed during the night time. Analysis of crude protein fibre ether extracts, ash and moisture content were done in triplicate generally following AOAC(1990) procedures for dried chicken manure and for the commercial diet (coppens).

III. RESULTS AND DISCUSSION

During the experimental period (September 2017 – November 2017) temperature in the fibre tanks ranged between (26 - 28^{0}C averaging 28.7^{0}C.Gui et al (1989)found that an average temperature of 28oc was optimal for growth of Nile tilapia fingerlings Dissolved Oxygenranged between 3.95 and 13.85ml/l DO normally remain above3ml/l with the low value at 3ml/l (before water exchange)Denser (1968), AIT(1968)and Hassan et al(1997) reported that 2.3mg/l is above the normal tolerance level of tilapia. The pH ranged between (6.77-9.41) Boyd (1998) reported that water with a pH range of 6.5 -9 are the most suitable for fish production. The average concentration of unionized ammonia (NH3) was 0.50, 0.60, 0.50mg/l for treatment T1, T2 and T3 respectively.Some studies showed the same trend for lower ammonia concentration; Diana and Lin (1998) reported ammonia concentration 0.374 - 0.410mg/l in pond fertilized with chicken manure. this low

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concentration of ammonia may be attributed to ammonia utilization by phytoplankton Boyd (1998), the average value of secchi disk reading were19.37 ± 2.96,27.57 ± 2.35,32.56 ± 1.19 (cm) for T1, T2, and T3 respectively. The significant decrease in secchi disk reading less than 20cm for T1 (fed chicken manure only) indicates that fiber glass tank is too turbid , which may due to either phytoplankton of suspended solid particle (Boyd (1998).Total Dissolved solid ranged between (102.58 – 182.550) averaging (107.21). The value of Electric conductivity ranged between 208.10 +23.87 – 273.3 + 20.74 µmhos/cm .the above results shows that all parameters of water quality were in a suitable range (Boyd, 1979)

Table.1: showed change in body weight after rearing for 12 weeks with chicken manure and commercial diet (coppens)

Feeds		**Initial fish weight (10g)**	
	Month	**Final fish weight**	**Average weight (gm)**
Dried chicken manure		**TA1 TA2 TA3**	
	1	40.04 42.06 48.10	
	2	80.36 84.38 88.56	84.46
	3	122.64 128.16 126.46	
		81.0184.8187.55	
Dried chicken manure plus commercial diet		**TB1 TB2 TB3**	
	1	62.26 64.40 65.52	
	2	121.32 128.92 126.54	111.11
	3	140.28 141.42 149.38	
		107.95111.58 113.81	
Commercial diet only (coppens)		**TC1 TC2 TC3**	
	1	73.82 72.72 78.40	
	2	148.00 145.58 148.04	147.92
	3	220.06 217.94 226.78	
		147.29145.41151.07	

Table.2: Showing average water quality parameter during the experimental period (12 weeks) in fibre glass tank stocked with all male tilapia fingerlings.

	TREATMENTS		
PARAMETERS	**T1**	**T2**	**T3**
Temperature ^{0}C	26 ± 0.77	25.77 ± 0.75	28.414 ± 0.75
Dissolved oxygen mg/l	3.95 ± 0.88	10.46 ± 0.62	13.850 ± 0.72
pH	6.77 ± 0.13	9.024 ± 0.13	9.101 ± 0.13
NH_3	0.50 ± 0.09	0.60 ± 0.09	0.50 ± 0.04
Secchi disc cm	19.37 ±2.96	27.57 ± 2.35	32.56 ± 1.19
TDS (ppm)	136 ± 16.11	128 ± 20.08	104 ± 11.61
EC µmhos/cm	273 ± 20.74	258 0 ± 17.99	208.10 ± 23.87

T1 = Chicken manure, T2 = Mixture of chicken manure and coppens, T3 = Coppens only

Growth performance

The growth response of fish in all the treatments were generally satisfactory as shown in table (1), the average body weight of all male tilapia (O. niloticus) fingerlings increased from10g to 84.46g, 111.11g and 147.92g for T1, T2 and T3 respectively. It is obvious that T3 (fed commercial diet coppens) recorded higher P>0.05 final body weight than the manure mixed with coppens and manure only T2 and T1 respectively. The same trend was obtained with regard to weight gain. The observation in the low weight gain in manure tans compared with control fed diet reported in similar studies (Daiana et al 1994, 1996, Brown et al 2000) indicates that either phytoplankton may not be enough to meet protein requirement of fish or that fish could not efficiently assimilate the produced phytoplankton in these tanks. Similar findings were

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reported (Colman et al 1990) they recorded poor fish growth in fertilized concrete tank and attributed it to the predomination of the green algae.

In conclusion, based on obtained results and the high cost of fish diet, it can be concluded that the use of chicken manure in fibre glass tanks could be recommended for producing all male tilapia.

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