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Length Weight Relationship of Clarias batrachus (Linn.) Fed With Local Feeds

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Abstract:
Length weight relationship and the diet of *Clarias batrachus* were investigated and 30 *Clarias batrachus* (fingerlings) of sizes 0-20g of weight and 0-10cm of length were grouped into 3 tanks with replicates, they were fed for twelve weeks with local formulated feeds (guinea corn, maize, bone meal and groundnut) and Coppen. Tank A was fed with Coppen which served as control with a proximate analysis of 42% crude protein, 13% crude fat, 1.9% crude fibre and 8.9% ash while tank B has 22.0% crude protein, 10.09% fat, 3.51% crude fibre, 25.38% carbohydrate and 11.60% ash, and tank C with a proximate analysis of 25.2% crude protein, 8.9% fat, 6.9% moisture, 26.10% carbohydrate and 14.0% ash. They were fed at 4% body weight twice daily 6:00am-8:00am and 6:00pm-9:00pm, the growth performance and physiochemical parameters were measured weekly. The total weight and length were converted into log to find the relationship between the length and weight, length weight regression analysis gave an a,b and r value of 1.791,0.998 and -0.203 for tank A 1.778,0.999 and -0.197 for tank B while tank C had 25.59, 0.991 and -0.997. Results shows that the treatment fed with Coppen in tank A had the best growth performance while the treatment fed with substitute feeds in tank B and C show appreciable growth performance. The final mean weight gain were (0.535) for treatment A, (0.485) for B, while (0.475) was for C.

Keywords: *Clarias batrachus* proximate analysis and a,b and r value.

Introduction

Clarias batrachus(catfish) is a group of domesticated catfishes of the family Clariidae, the air breathing catfishes. It belongs to the Kingdom: Animalia Phylum: Chordata Class: Actinopterygii Order: Siluriformes Family: Clariidae (Burchell, 1822). In India, fishing is decreasing in importance and the trend is towards intensive fish culture.

This has its advantages in that useful man hours are not spent searching for fish culture demand extra feeding in other for the fish to attain table size within a short period of time. With the constraints on importation currently being experienced all over the federation, the fish farmer is facing a major setback in his business. This emanated from the demand of local fish farmers. Fish farmers who are now facing problem with restriction on importation of fish feed to highlight those raw materials locally available that can be used in making pellets as fish feed.

Like other animals, fish need protein, carbohydrates, lipids, minerals and vitamins for growing and maintenance of physiological activities. Some of the locally available raw materials in India include maize, guinea corn and groundnut. The most expensive part of feed is the protein and this is more important because it is used for body building. The combination of various sources such as animal and plant sources is best (Bryant *et al*., 1980).

Fish is an important source of both food and income to many people in developing countries. In India, most people depend wholly or partly fisheries sector for their livelihood (FAO, 1996). The consumption and demand for fish as a cheap source of protein is on the increase in India. While capture fisheries based on species that are presently exploited seems to have reached their natural limits (FAO, 1996). Fish requires high quality nutritionally balanced diets for growth and attainment of market size within the shortest possible time.

As aquaculture production becomes more and more intense in India, fish feed will be a significant factor in decreasing the production and profitability of aquaculture (Akinrotimi *et al.*, 2007). Feed management determines the viability of the cost of fish production. The need to intensify the culture of the fish, so as to meet the ever increasing demand for fish has made it supplementary forms for ponds or as complete feed in tanks (Olukunle, 2006) for the purpose of nutritional and economic benefits, previous research have made attempt at increasing the use of non-conventional plant and animal materials to replace conventional feed ingredient like maize and fish meal in fish feed in ratio (Baniah *et al.*, 2003).

According to Olurin *et al.*, (2006), maize is the major source of metabolisable energy in most compounded diet for cat fish species. This is because it is reading available and digestible. However, the increasing prohibition cost of this commodity has necessitated the need for search for alternative source of energy. Recently, FAO (2006), reported shortages in the production of cereal products, especially maize in fish feeds is becoming increasingly unjustified in economic terms (Terve, 2004), because of the ever increasing cost. There is therefore, the need to exploit cheaper energy sources to replace expensive cereal in fish feed formulation to receive the food feed competition between man and animals and for profit maximization, maize and guinea corn.

Literature Review.

Feed and feeding of catfishes in grow out ponds are perhaps the most documented in literature (Ayinla, 1988). Various efforts have been made to establish the crude protein and amino acid requirement of *Clarias batrachus.* Ayinla (1988), recommended 35 and 40% crude protein (CP) for raising table size and brood stock respectively. (Ayinla, 1997) stated that the protein consumed in India comes from the wild. According to Lim and Dominy (1993), Rumsey (1993), fish meal supply was likely to decline between 1900MT AND 2000MT and this could no longer meet the demand of the expanding fish feed industry. Therefore, the need to find suitable replacement to fish meal in fish feeds is of great importance.

Aquaculture is one of the fastest growing food production systems in the world, with huge output currently being produced within developing and developed countries of the world and especially with expectations for aquaculture to continue its contributions to food security and poverty alleviation (Tobor, 1996). The vast majority of aquaculture practices around the world have produced significant nutritional and social benefits and generally with little or no environmental costs over the last two decades. In aquaculture, fish require adequate food supply in the right proportions and with proper nutritional contents needed for growth, energy, reproduction, movement, and other activities which they carry out.

Therefore aquaculture remains the only viable alternative for increasing fish production in order to meet the protein need of the people (Ayinla, 1997). In the review of Oresegun *et al*., (2007), it was stated that early fish farmers in India raised their fish in burrow pits, abandoned minefields and in earthen ponds on extensive production system. The introduction of concrete tanks allows for manageable pond size and modification of the environment through a water flowthrough system and supplementary feeding thus allowing for higher fish yield. The advent of the indoor water re-circulatory system (WRS) has ushered in a new prospect for aquaculture.

The introduction of WRS has created a turning point in the production of catfish in India. It was observed that of the over 30,000MT of various freshwater and brackish water fish species caught in the year 2000, catfishes were more abundant next to Tilapias. FAO (1993), reported that 27,488MT of catfishes produced in 1990 were consumed locally. This implies that there is still great need for higher production for both local and international markets.

In order to formulate and compound aqua feeds that will meet the nutrient requirements of the catfish at affordable cost, several conventional and nonconventional animal by-products and plant residues have been tested to substitute or replace fishmeal. Feeding development has moved from the use of single ingredient, broadcasting un-pelleted meal to use of pelleted feeds. However, the use of pelleted feed has made a big difference to aquaculture development in India as *C.batrachus* is being raised to maturity within some months.

The Culture Of Catfish (*Clarias Batrachus*)

Catfish appears as the major specie cultured in the tropics followed by tilapias (Tobor, 1996). According to Hepher (1990), fish yield and profitability per pond area of a culture unit depends, to a large extent, on the amount of the supplementary feed used. The reasons for their culture are based on their fast growth rate, disease resistance, high stocking growth, high stocking density, aerial respiration and high speed conversion among others. Weatherly and Gill, (1977) stated that fish meal is commonly used in feed formulation to supplement the high cost of protein in culture diets due to its nutritive value.

This is obviously related to continual improvement in mass propagation techniques and the development of water re-circulatory systems, along with quality feed development. Indian catfish are produced almost exclusively on private land and in systems that take environmental balance into consideration. The most common habitats of catfish are flood plains, swamps and pools. The catfish can survive during the dry season due to the accessory air breathing organ (Bruton, 1979, Clay, 1979).

It has been cultured both at small-scale (for household consumption) and at commercial scale for the generation of income by the practitioners in fish holding devices such as earthen ponds, concrete tanks, fibre tanks and other fish holding devices (Otubusin, 1996) which are usually determined by the financial standing of the investor and the managing capability of the farmer.

Over the last decade, non-farmers have been found to be investing in aquaculture than most other agriculture sectors and more research to improve the profitability of Indian catfish culture in aquaculture so as to justify the effort of the investors is being carried out (Nath, 1995).

Materials And Methods.

Feed Formulation.

Maize and guinea corn were bought from market. They were washed and grinded, thereafter the blended maize and guinea corn were boiled in boiling water adding pap to it to make it solid. Multivite (abidec) was added for healthy purpose, and then the formulated feed was sun dried to make it pellets.

Experimental Fingerlings.

The experimental fish (fingerlings) *Clarias batrachus* of about 0-10cm and 0-20g were collected from lake in a plastic bowls with well oxygenated water at the early hour in d morning to avoid mortality due to high temperature. A total number of 30 fingerlings catfish were randomly distributed into 3 circular tanks (10 fishes per circular tank).

The fingerlings nearly of the same size were acclimatized for seven days and fed with Coppens at 2% body weight. At the end of acclimatization period, the fishes were starved for 24 hours to empty their content and prepare them for experimental feed. This also makes the fish hungry and making them adapt to the new diet before stocking the fish randomly. The initial total length (cm) of individual fish and mean weight of the fish were recorded before placing them in the rearing containers. The fingerlings were fed 4% body weight twice daily (8.00am) and (6.00pm) respectively.

Proximate Analysis Of Formulated Fish Meal.

Proximate analysis also known as nutritive value is applied to know if the sample could be formulated into a diet as a source of protein or energy.

Crude Lipids: This method involves the extraction of fats and oil from the sample using the appropriate organic solvent.

Moisture: It is essential in monitoring the moisture % in powdered food sample to avoid contamination risk by bacteria and fungi during storage. **Ash:** These consist of oxidizing organic matter in the sample of the ash remaining.

Crude proteins: For the amount of protein present in the food.

Feeding And Measurement.

Tank A: Coppen feeds for aquaculture (floating diet) containing 42% crude protein, 13% crude fat, 1.9% crude fibre and 8.9% ash was used as control feed for the first treatment which serves as control Treatment. **Tank B:** Boiled maize and guinea corn at a 50:50 ratio containing 22.0% crude protein, 10.09% fat, 3.51% crude fibre, 25.38% carbohydrate and 11.60% ash for second treatment.

Tank C: Boiled maize and guinea corn at a 30:70 ratio containing 25.2% crude protein, 8.9% fat, 6.9% moisture, 26.10% carbohydrate and 14.0% ash for third treatment.

The fingerlings were fed 4% of their body weight twice daily, morning (8am-9am) and evening (6pm9pm). Samplings of fish for weight and length measurement were initially done with a scoop net **Circular Tank Management.**

The circular tank were bought from market, the tanks are of the same size with 40 litres per each capacity. The tanks were washed thoroughly with salt to kill pathogen then filled later with tap water to (30) litres capacity. 10 fingerlings (*Clarias batrachus*) were introduced into each of the three tanks. The tanks were covered with mosquito net to prevent fingerlings from jumping out, intrusion of insects and other foreign bodies (Lizards, geckos, etc). The water in the tanks was changed after every forty eight (48) hours interval to avoid accumulation of toxic waste which will be harmful to the fishes. Fish weight (g) was taken using a top loading balance (model: Ohause precision plus). The fingerlings were weighed in groups once a week. The standard length of the fish was taken to the nearest cm with the aid of a measuring board. This was done once a week.

Length Weight Relationship.

The conventional formula described by Le Cren (1951), was used for calculating the length weight relationship.

$$W = aL \ldots (1)$$

The above equation (1) and the data were transformed into logarithms before the calculations

were made. Therefore equation (1) becomes;

$$\text{Log } W = \log a + b \text{ Log } L \ldots (2)$$

Where W = Weight of the fish (g)

L Length of the fish (cm) a = Constant

and b = an exponent.

The results of the length weight correlation analysis are calculated, this shows that the fish exhibit allometric growth. The correlation coefficients were high and significant at 0.001 level. The log-log graphs of length weight relationship were also drawn, the graph shows increase in weights with increase in length. The condition factors <k> were also calculated using the conventional formulae by Worthington and Richard (1930).

$$K = \frac{W \times 100}{L^3} \quad (3)$$

Physiochemical Parameters.

Both surface water temperature and atmospheric temperature were read daily to the nearest ^{0}C with the aid of mercury in glass thermometer. Dissolved oxygen was determined once a week by titration with 0.1 NAOH and the azide modification of the Winkler method (American Public Health Association 1976). pH, ammonia (NH_3) nitrite was determined using the urinalysis strip.

Nutrients Utilization Parameters.

Growth and nutrient utilization parameters were calculated as measures of the effectiveness of utilization of maize and guinea corn as a replacements for Coppens in the diets of catfish. This was done with the method of Brown (1975)

i. Mean Weight Gain (%). This was calculated as

$$MWG\% = \frac{\text{Final Mean Weight}}{\text{Initial Mean Length}} \times 100$$

ii. Mean Length Gain (%)

$$MLG\% = \frac{\text{Final Mean Length}}{\text{Initial Length}} \times 100$$

iii. Specific Growth Rate (SGR)

$$SGR = \frac{LnWT - LnWt}{T - t} \times 100$$

Where: WT =Final Weight

Wt=Initial Weight T = Final Time t = Initial time

Result And Analysis.

Ln =natural logarithm (Solomon, 2006)

iv. Food Conversion Efficiency (FCE)

$$FCE = \frac{\text{WeightGain}}{\text{Foodintake}} \times 100$$

v. Mean Growth Rate (MGR)

$$MGR = \frac{W_2 - W_1}{0.5(W_1 \times W_2)} \times \frac{100}{t}$$

Where W1 = initial weight

W2 =final weight t=period of experiment in days

0.5 =constant

vi. Survival Rate (SR)

$$SR = \frac{\text{Total Fish number harvested}}{\text{Total fish number stocked}} \times 100$$

(Akinwole *et al.*, 2006)

3.9 Statistical Analysis

Data generated from the experiment were subjected to analysis of variance (ANOVA) and was carried out to test the effects of the treatments on the fish growth rate separated using the Duncan multiple range Test.

Table 1: Production Parameters for Treatment A

Parameters	initial week	week one	week two	week three	week four	week five	week six	week seven	week eight	week nine	week ten	week eleven	week twelve	total	mean
total weight (g)	14.6	18.2	25.31	32.1	39.12	45.5	51.4	58.61	65.7	70.5	74.6	79.6	83.6	658.97	50.69
mean total weight (g)	1.46	1.82	2.53	3.21	3.91	4.55	5.14	5.86	6.57	7.05	7.45	7.96	8.36	35.05	3.894444
total length (cm)	26.5	33.7	36.4	46.1	65.3	55.4	67.8	72.26	79.5	84.6	89.6	94.5	99.6	851.33	65.48692
mean total length (cm)	2.65	3.37	3.64	4.61	6.53	5.54	6.78	7.23	7.95	8.45	8.96	9.45	9.95	85.11	6.546923
weight gain (g)	0	0.36	0.71	0.68	0.7	0.64	0.59	0.72	0.71	0.48	0.41	0.52	0.43	6.95	0.534615
length gain (cm)	0	0.72	0.28	0.97	1.92	0.99	1.24	0.45	0.72	0.5	0.51	0.49	0.5	9.29	0.714615
gross specific growth rate (g)	0	1.37	1.62	0.49	0.31	0.17	0.12	0.11	0.08	0.42	0.36	0.3	0.26	5.61	0.431538
food conversion eff. %	0	9.35	17.75	17	17.5	16	14.8	18	17.5	12	10.3	13	10.8	173.8	13.36923
mean growth rate	0	0.04	0.022	0.08	0.039	0.07	0.01	0.009	0.01	0	0	0	0	1826.1	141.6683
survival rate	100	100	100	100	100	100	100	100	100	100	90	90	90	1270	97.69231
Total														4922.2	381.0289

Table 2: Physiochemical Parameters (Treatment A)

PARAMETERS	INITIAL WK	WK 1	WK 2	WK 3	WK 4	WK 5	WK 6	WK 7	WK 8	WK9	WK10	WK11	WK12
WATER TEMP	27	27	26	27	27	27	26	26	26	26	27	26	26
ABSORBED O2	5.4	5.7	6	5.9	6	5.4	6.1	6.1	6.1	6	6	6	5.9
PH	8	7.5	7.9	8.1	8.1	7.9	8.3	8.2	8.1	8	8.2	8.2	8.3
AMMONIA mg(l)	0.01	0.35	0.37	0.43	0.56	0.6	0.74	0.85	0.8	0.9	0.9	0.81	0.8
NITRITE mg(l)	0.01	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04

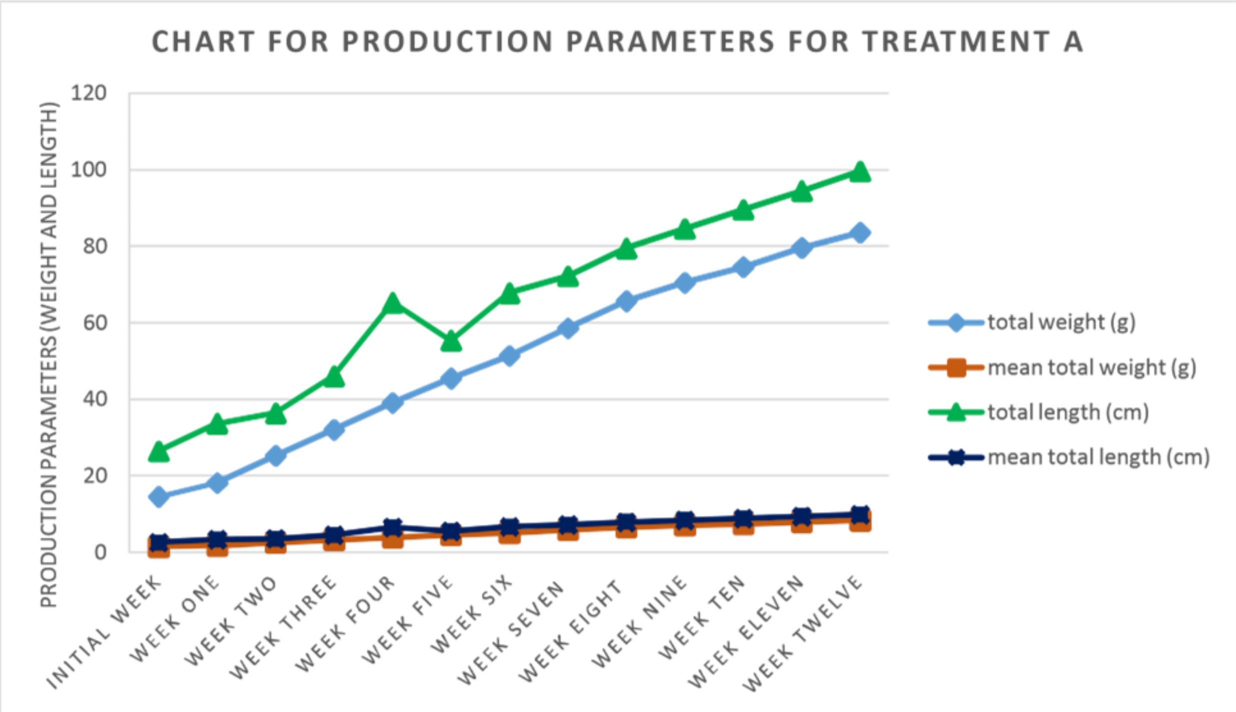

Figure 1: Production Parameters for Treatment A

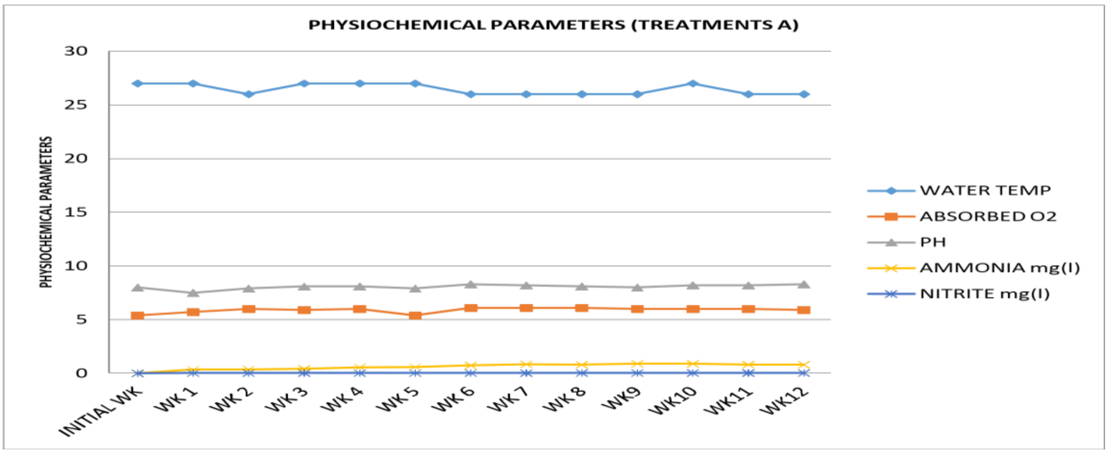

Figure 2: Physiochemical Parameters for Treatment A.

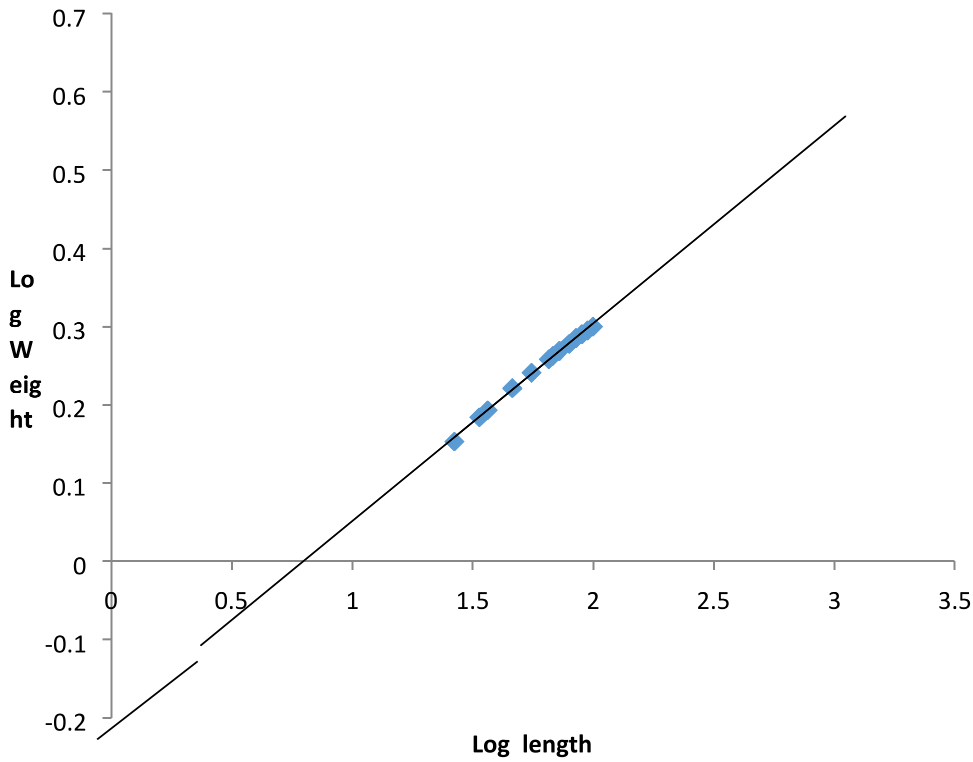

Figure 3: Length Weight Relationship for Treatment A

Parameters	initial week	week one	week two	week three	week four	week five	week six	week seven	week eight	week nine	week ten	week eleven	week twelve	total	mean
total weight (g)	14.62	14.93	19.65	23.61	27.4	32.6	38.14	45.41	51.22	58.28	64.32	69.38	74.45	534.01	41.07769
mean total weight (g)	1.46	1.49	1.96	2.36	2.76	3.26	3.82	4.54	5.12	5.82	6.43	6.93	7.4	53.35	4.103846
total length (cm)	28.7	35.8	39.07	44.88	52.5	59.21	65.71	71.41	78.51	83.57	89.62	94.51	98.56	842.05	64.77308
mean total length (cm)	2.87	3.58	3.91	4.49	5.25	5.92	6.57	7.14	7.85	8.35	8.96	9.45	9.85	84.19	6.476154
weight gain (g)	0	0.03	0.47	0.4	0.4	0.56	0.72	0.72	0.58	0.71	0.64	0.51	0.57	6.31	0.485385
length gain (cm)	0	0.71	0.33	0.58	0.66	0.67	0.65	0.57	0.71	0.5	0.61	0.49	0.4	6.88	0.529231
gross specific growth rate (g)	0	0.13	0.85	0.38	0.24	0.21	0.16	0.15	0.09	0.09	0.61	0.81	0.36	4.08	0.313846
food conversion eff. %	0	0.75	11.75	10	10	14	18	18	14.5	17.75	16	12.75	14.25	157.75	12.13462
mean growth rate	0	0.04	0.022	0.081	0.041	0.033	0.021	0.017	0.004	0.007	0.004	0.002	0.001	0.273	0.021
survival rate	100	100	100	100	100	100	100	100	100	100	100	90	90	1280	98.46154
Total														2968.893	228.3764

Table 3: Production Parameters for Treatment B

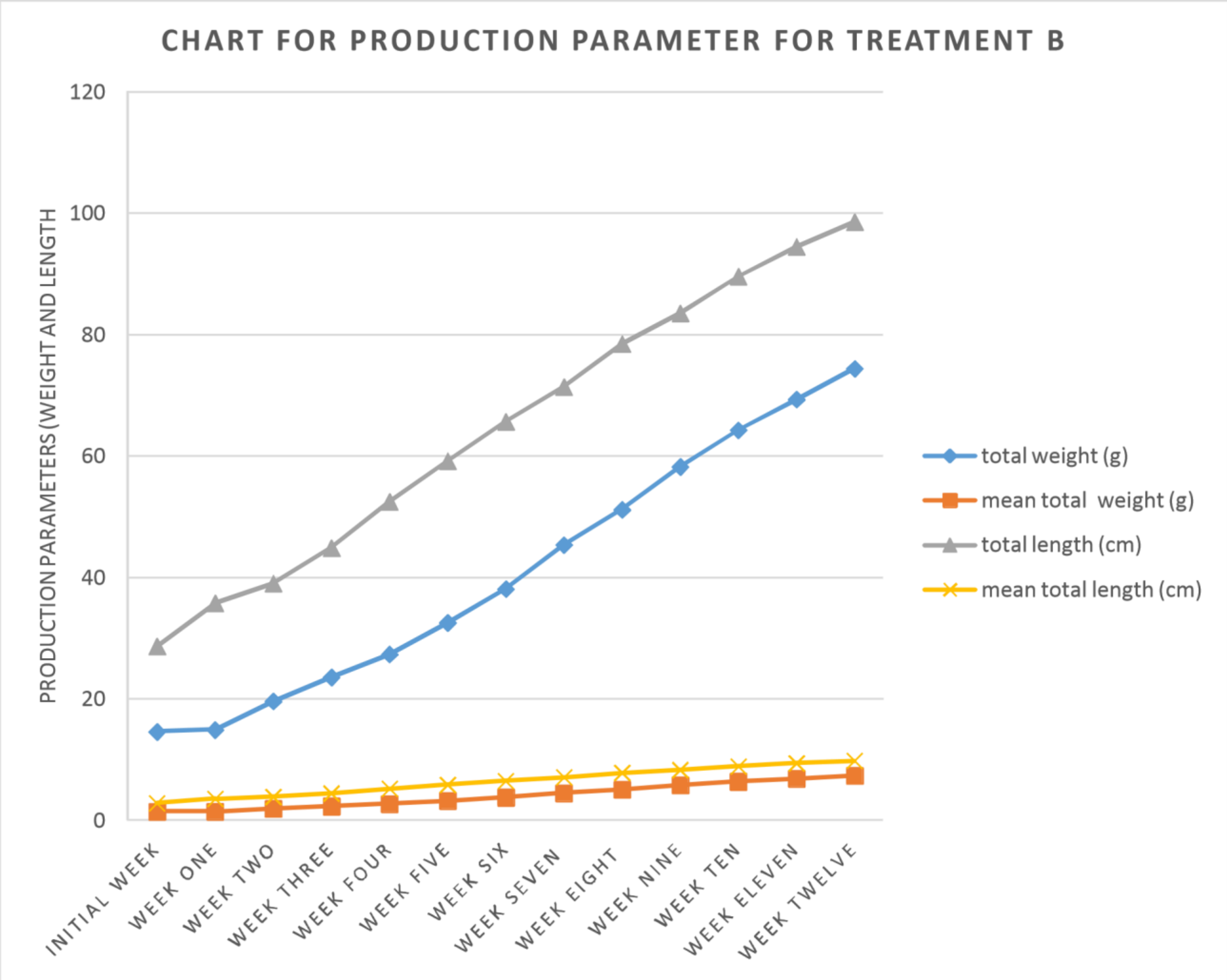

Figure 4: Production Parameters for Treatment B

Table 4: Physiochemical Parameters (Treatment B)

PARAMETERS	WK 0	WK 1	WK 2	WK 3	WK 4	WK 5	WK 6	WK 7	WK 8	WK9	WK10	WK11	WK12
WATER TEMP	27	27	27	26	26	26	27	27	27	26	27	26	27
ASORBED O2	6.32	6.35	6.72	6.25	6.29	6.78	5.9	5.9	5.8	6	6.61	6.02	6.23
PH	8	7.2	7.9	8.1	8.3	8.5	8	7.6	7.6	7.6	8.2	8.34	7.89
AMMONIA mg(l)	0.01	0.27	0.37	0.42	0.59	0.42	0.56	0.57	0.55	0.57	0.56	0.58	1
NITRITE mg(l)	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03

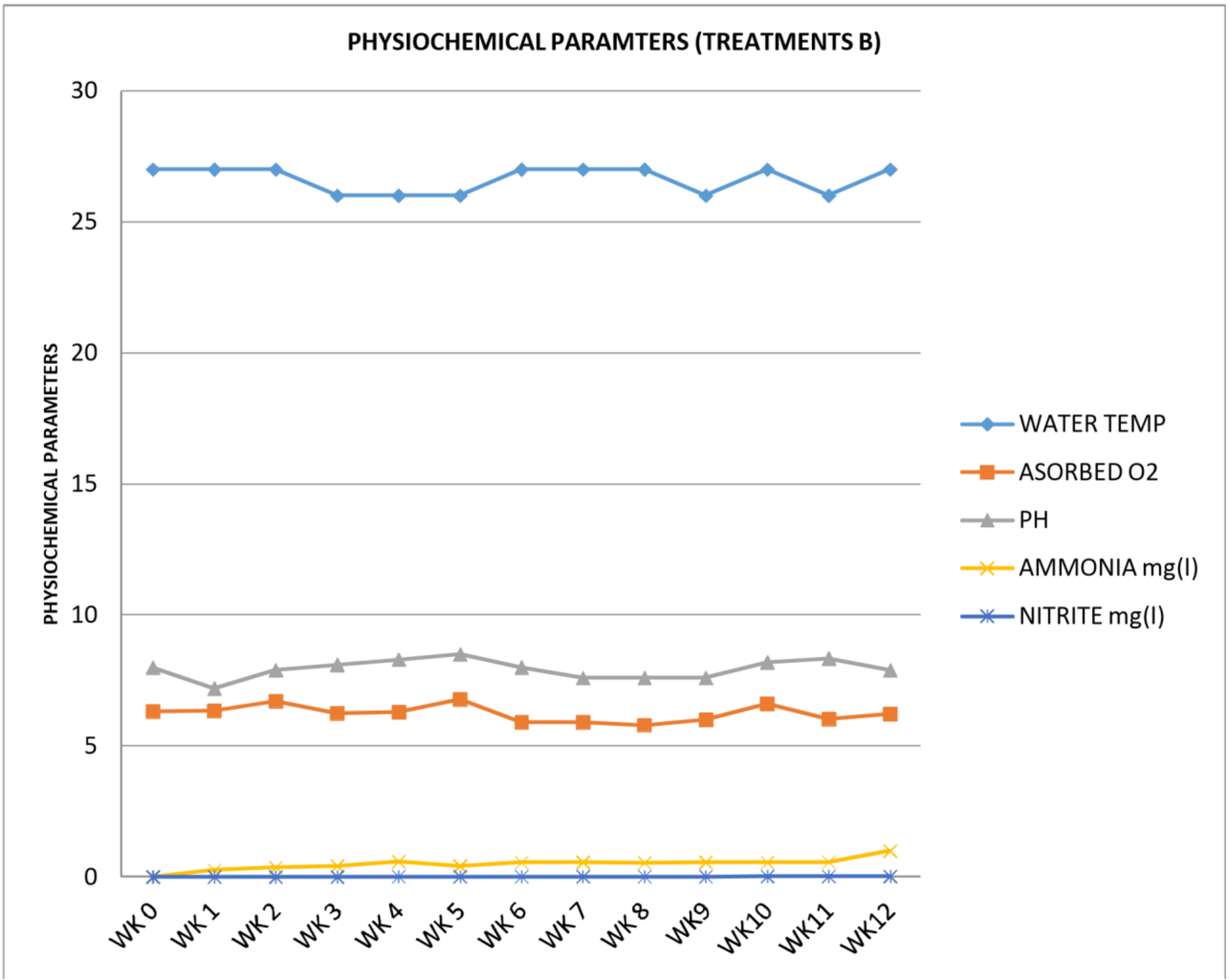

Figure 5: Physiochemical Parameters for Treatment B

Table 5: Production Parameters for Treatment C

Parameters	initial week	week one	week two	week three	week four	week five	week six	week seven	week eight	week nine	week ten	week eleven	week twelve	total	Mean
total weight (g)	13.51	15.21	19.31	23.41	29.5	35.31	39.41	46.28	51.36	57.49	63.47	69.51	74.59	538.36	41.4119
mean total weight (g)	1.35	1.52	1.93	2.34	2.95	3.53	3.94	4.63	5.14	5.74	6.34	6.95	7.49	53.85	4.14231
total length (cm)	29.21	34.84	45.82	51.68	59.71	62.42	71.31	78.41	85.27	91.32	94.39	98.42	105.49	908.29	69.8685
mean total length (cm)	2.92	3.48	4.58	5.17	5.97	6.24	7.13	7.84	8.53	9.13	9.43	9.84	10.54	90.8	6.98462
weight gain (g)	0	0.17	0.41	0.41	0.61	0.57	0.42	0.69	0.51	0.61	0.59	0.61	0.58	6.18	0.47538
length gain (cm)	0	0.56	0.11	0.59	0.8	0.27	0.89	0.71	0.69	0.6	0.3	0.35	0.7	6.57	0.50538
gross specific growth rate (g)	0	0.73	0.74	0.39	0.29	0.23	0.12	0.14	0.81	0.76	0.79	0.51	0.36	5.87	0.45154

food conversion eff. %	0	4.25	10.25	10.25	15.25	14.25	10.5	17.25	12.75	15.25	14.75	15.25	14.5	154.5	11.8846
mean growth rate	0	0.023	0.019	0.086	0.062	0.031	0.014	0.015	0.007	0.006	0.004	0.003	0.002	0.272	0.02092
survival rate	100	100	100	100	100	100	100	100	100	100	80	80	80	1240	95.3846
Total														3004.7	231.13

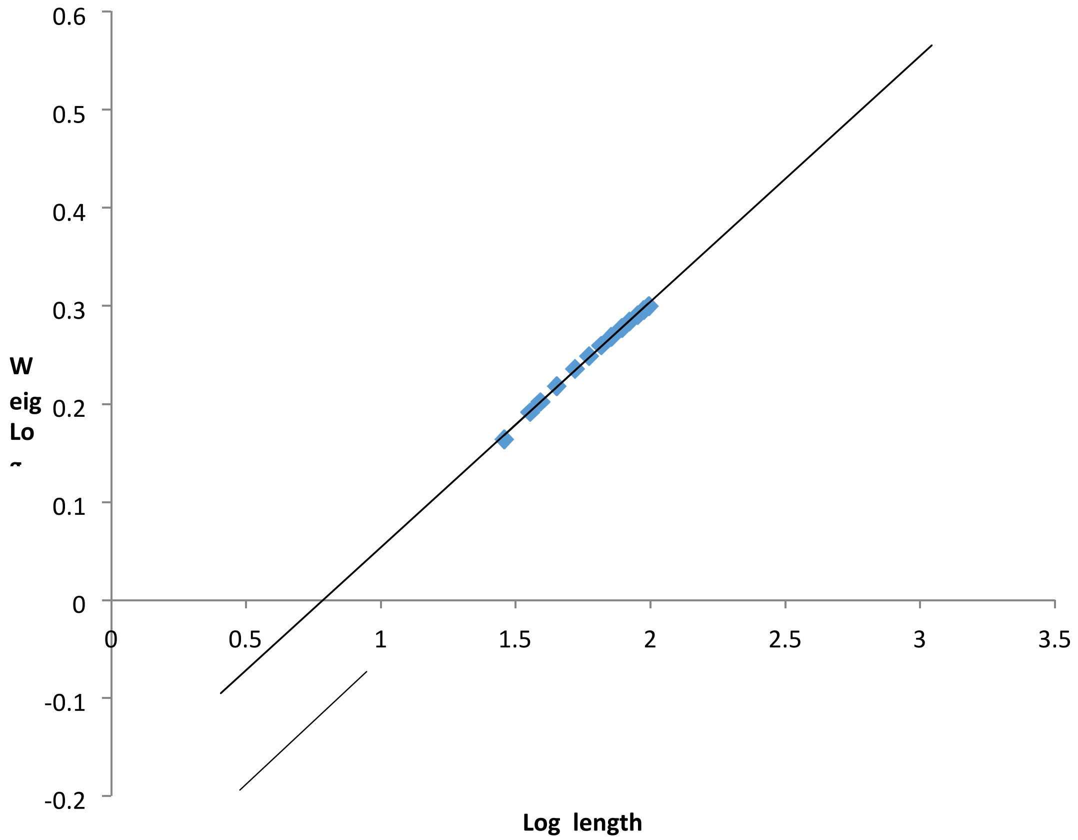

Figure 6: Length Weight Relationship for Treatment B

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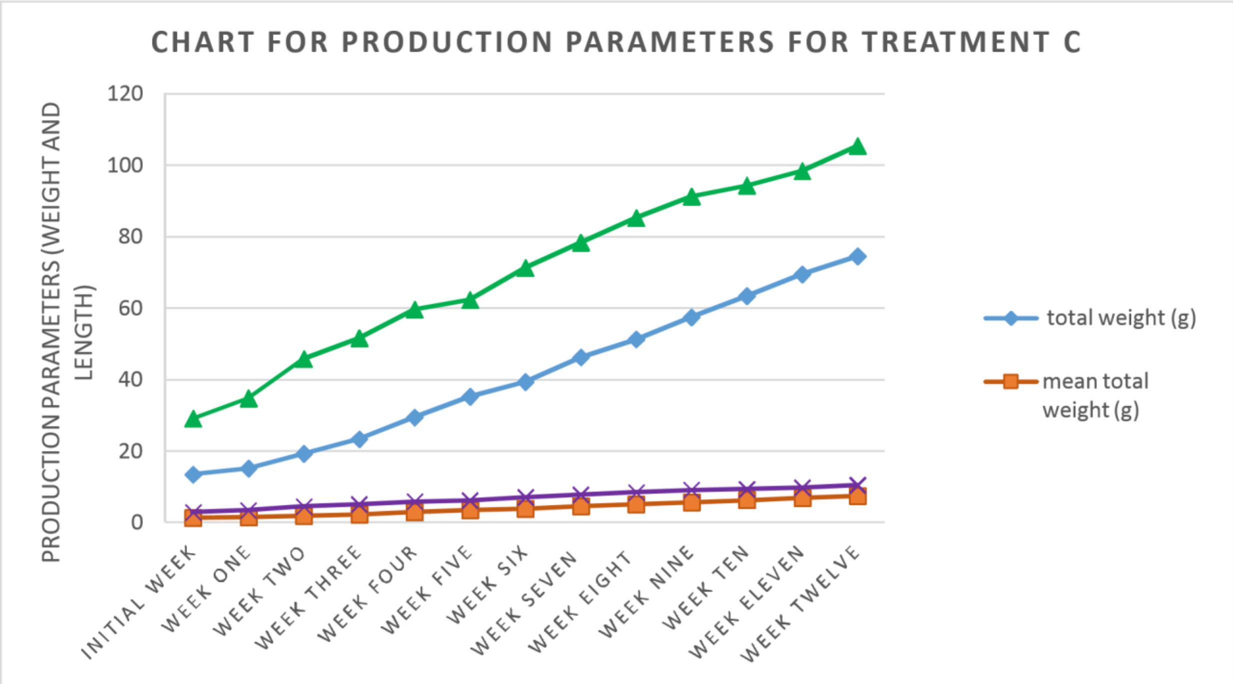

Figure 7: Production Parameters for Treatment C

Table 6: Physiochemical Parameters (Treatment C)

PARAMETERS	INITIAL WK	WK 1	WK 2	WK 3	WK 4	WK 5	WK 6	WK 7	WK 8	WK9	WK10	WK11	WK12
WATER TEMP	27	26	26	26	26	27	27	27	26	26	27	27	26
ABSORBED O2	5.4	5.6	6.01	6.41	5.04	6	5.8	5.9	5.9	5.8	5.8	6	6
PH	8.2	7.6	7.5	8.4	8.3	8.1	7.8	7.1	8	8.4	8	7.9	8.01
AMMONIA mg(l)	0.01	0.25	0.34	0.41	0.54	0.62	0.74	0.8	0.8	0.9	0.94	8	8
NITRITE	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04

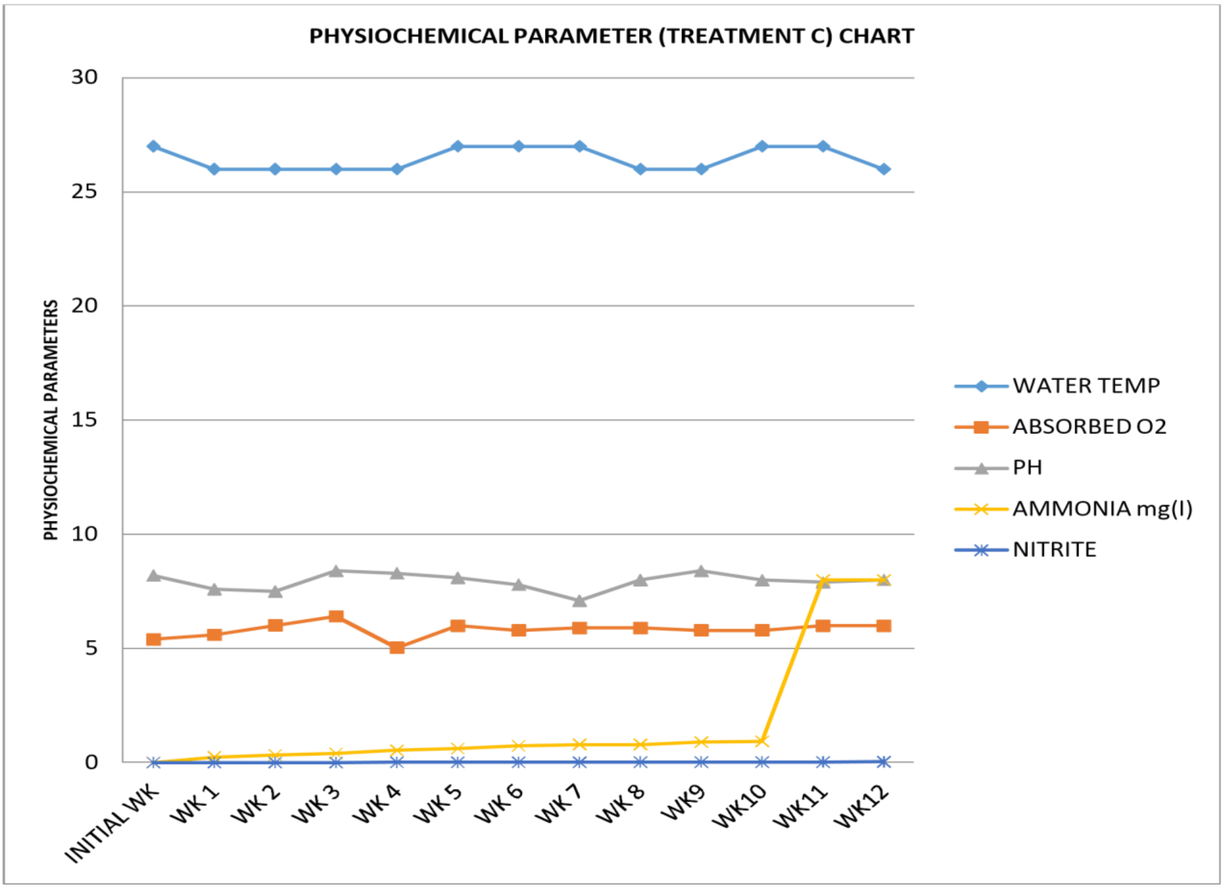

Figure 8: Physiochemical Parameters for Treatment C

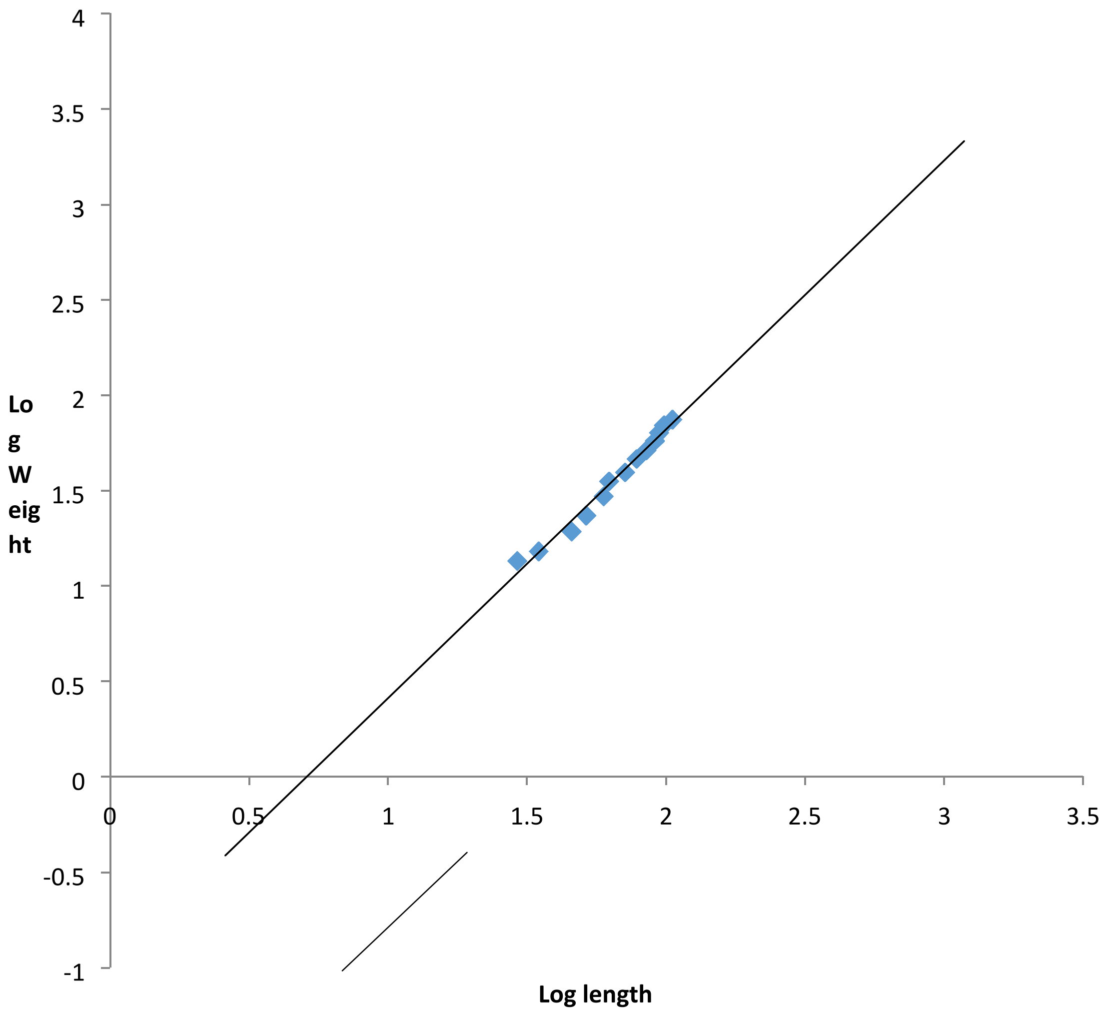

Figure 9: Length Weight Relationship for Treatment C

Table 7: Length Weight Regression Analysis for Treatment A, B, and C

Tanks	No. of Weeks	a	b	r	Significance of r	Standard Deviation
A	13	-0.203	1.791	0.998	≥ *0.001*	0.793
B	13	-0.197	1.778	0.999	≥ *0.001*	0.791
C	13	-0.997	25.59	0.991	≥ *0.001*	0.250

Discussion, Conclusion And Recommendation Discussion.

The analysis of length-weight relationship showed that the growth of the fish is allometric. This means that the fish does not grow symmetrically (Tesch, 1968). Although, in most cases, samples are often pooled together for calculation, Vasnetsov (1953), had shown that fish during their development pass through several stages or stanzas each of which may have its own length-weight relationship, the condition factor K was calculated to be 60.68.

Unfavourable concentration of water quality parameters especially oxygen and unionizing ammonia were noticeable through the rearing period, apart from saving as likely stressors some of the stressors could have been direct cause 0f death. In addition, nutrition and density stress may have also been in play throughout the part of the rearing cycle.

The physiochemical parameters such as atmospheric temperature, water temperature, pH dissolved oxygen and biological oxygen (mg/l) were Determined for abnormal concentration of any of these physiochemical parameters may have been the cause of the fish death. However, numeration and density stress are additional parameter for fish death thus high survival rate and cannibalism were observed in treatments with higher stocking densities. The atmospheric and water temperature recorded during the study period ranged between 26% to 32%, 25% to 28 % respectively, water and atmospheric temperature reading in all the treatment (A, B and C) was within a permissible between range thus show that the reading lose within a required or tolerable ranged for the culture of fish.

Swann *et al*., 1990 recorded the normal range of temperature for culture of catfish (*Clarias batrachus)*, culture were between $23^oC - 32^oC$., the pH hydrogen ion concentration record for the treatment range between 69 and 76.

This may have resulted to the different stocking densities the results demonstrated that concentration of dissolved oxygen in all the three treatment were alkaline and within the permissible between ranges (6.0-9.0)for culture of some of the water qualities parameter (Akinwole and Faturoti 2006). At the early weeks at the present studies, concentration of oxygen were highly but gradually lowed as the growth of fishes (Fingerlings) were achieved in treatment A and dissolved oxygen decreased, this could be considered frequently below the permissible level for good growth of catfish (Oyewole and Faturoti,2006, young;2006).

The low level resulted due to metabolic activities of the fishes and of bacterial decaying organic material such as under-utilized were the major concentration to this demand. However, the survived *clarias* batrachus depend on oxygen in the water since it is equipped to obtain energy by gulping air and inadequate dissolved oxygen is not lethal to catfish growth (Brown,1957). At the end of the Twelve –weeks of study values of the measurement of various production parameters in all the three different stocking ratio were taken.

Clarias batrachus showed that final mean length (cm) and weight-gain (g) for treatment C exceeded that of treatment A with the value of 10.54 cm and treatment A exceeded that of treatment B with the value of 99.6cm, while treatment B has the lowest with the value of 9.85 cm. Treatment A has the mean weight gain of 0.53g, treatment B has 0.48g and that of treatment C is 0.47g.

The single fact in both the final length (cm) and weight gain for the three treatments may be related to the availability of food and space, as such decreased in completion among the fishes in the aquarium. The increase in stocking density will increase inter-specific and intra-specific competition and the fish production will slow down the body weight.

The specific growth rate of treatment A is 5.61, treatment B 4.08 while treatment C 5.87. Also the survival rate varies between treatments, with treatment A90%, B exceeded to treatment C 75%. Treatment C has the highest mortality rate which may be due to the handling of stress and probably overcrowding during the weekly samplings.

The survival rate on the productivity of catfish *Clarias batrachus* was statistically analysed using a one way ANOVA.

One way ANOVA of treatment A showed a significant at different P=0.193; P-value 0.998; df =129 f crit 0.194 Appendix I Treatment B df=129; f=0.209; P-value o.998 crit 1.94 P=>0.5% Appendix II Treatment C df=129; f

=0.186 P=value 0.999 f crit =1.94 = 0.05 Appendix III.

Conclusion And Recommendation.

The present study proved that hybrids cat fish stress and survive at high stocking density it should be encouraged because it perform better and indigenous zooplankton which should be promoted because it will return the cost at production (Osutiku, 2008), the pond culture of catfish in India has potential profit to boost economic success. These fish are there by advice to improve productivity, hence fish farmers can include maize and guinea corn in replacement of coppen when formulating feed for fish in aquaculture.

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Appendix I: One way ANOVA of production parameters for table 1 to determine the length weight relationship of *Clarias batrachus* in treatment A

One-way ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	3102.457	12	258.538	.198	.998
Within Groups	152543.574	117	1303.791		
Total	155646.032	129			

F0.05, 12, 112 = 1.94

Since F = 0.198 is not at least $F_{0.05,12,117}$=1.94 at 0.05 level of significance. H_0 is not rejected; hence we accept H_0 and assert that there is a mean relationship among the observed parameters at □ is 5% level of significance.

APPENDIX II: One way ANOVA of production parameters for table 3 to determine the length weight relationship of *Clarias batrachus* in treatment B

One-way ANOVA

VAR00002

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3150.724	12	262.560	.209	.998
Within Groups	146843.970	117	1255.077		
Total	149994.694	129			

F0.05, 12, 112= 1.94

Since F = 0.209 is not at least $F_{0.05,12,117}$=1.94 at 0.05 level of significance. H_0 is not rejected; hence we accept H_0 and assert that there is mean relationship among the observed parameters at is 5% level of significance.

Appendix III: One way ANOVA of production parameters for table 5 to determine the length weight relationship of *Clarias batrachus* in treatment C

One-way ANOVA

VAR00004

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2829.137	12	235.761	.186	.999
Within Groups	148425.040	117	1268.590		
Total	151254.177	129			

F0.05, 12, 112 = 1.94

Since F = 0.186 is not at least $F_{0.05,12,117}$=1.94 at 0.05 level of significance. H_0 is not rejected; hence we accept H_0 and assert that there is mean relationship among the observed parameters at is 5% level of significance.