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Effect of feeding frequency on the growth of GIFT (*Oreochromis niloticus*)

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Abstract

The experiment was conducted at Sharnalata Agro Fisheries Limited, Radhakanai, Fulbaria, Mymensingh by using three treatments (T₁, T₂, T₃) and each having 2 replications for a period of 35 days in hapa system to see the growth performance of tilapia. In T₁ - fish fed four times daily, T₂ - fed three times daily and T₃ - fed two times daily. GIFT fingerlings weighing 30 ± 3.80 g were reared by feeding a formulated diet containing 32% protein (Mega 301p) feeding at the rate of 10% of the body weight of fish for the first 3 weeks and then it was adjusted to 8% of the body weight for the next 2 weeks. It was found that mean weight gain were 105.12 ± 4.60, 105.8 ± 5.23 and 108.2 ± 4.86 g respectively. The mean weight gain was not significantly different (p>0.05) among three treatments but a bit higher growth was found in T₃ compared to T₁ and T₂. The SGR values of the experimental fish in T₁, T₂ and T₃ were 4.32 ± 0.32, 4.34 ± 0.30 and 4.38 ± 0.28 respectively. SGR (%/day) was highest in T₃ and FCR was lowest as expected. GIFT reared in hapa showed better growth performance by feeding two times daily. Many previous researches showed that maximum growth rate was obtained by feeding fish three times a day. Therefore, it can be concluded that the ambiguity of the present results with the previous works (feeding three times provided better growth) can be resolved by conducting experiments under control temperature conditions and by subsequently extrapolating that results in farm conditions especially during best growing season of the fish (June-July).

Keywords: tilapia, growth performance, FCR, aquaculture, feeding frequency

1. Introduction

Bangladesh is a riverine state having high feasible in both capture fishery and aquaculture and each provides plenty of resources to boost fisheries potential. Bangladesh has abundant fisheries resources with a large number of aquatic species. Fish is a famous supplement to rice in the countrywide diet, giving rise to the adage Maache-Bhate Bangali ("Bengali food is made of fish and rice") (Ghose, 2014) ^[1]. Aquaculture is the fastest-growing food production sector in the world. It provides half of the global fish supply. Tilapia, now the second maximum farmed fish inside the world, has performed a vital function within the growth of aquaculture and could keep to within the density. Tilapia is the popular fish which is extensively dispensed in many nations of the arena. However, there are 3 categories of tilapia species mainly on Nile tilapia (*Oreochromis niloticus*), Mozambique tilapia (*Oreochromis mossambicus*) and blue tilapia (*Oreochromis aureus*). Of these 3 species, *O. niloticus*, has for many decades, been responsible for the significant increase in global tilapia production from freshwater aquaculture and accounted for about 83% of total tilapias produced worldwide.

GIFT(Genetically Improved Farm Tilapia) is one of the most-farmed aquaculture fish in Bangladesh and performs 60% better growth and showed better survival than the commercially available strains of tilapia (McAndrew and Majumdar, 1989) ^[2]. It has emerged as a fish of dense because it's far fast developing and a less expensive supply of animal protein. Quicker-developing, harder and extra disease-resistant fish have many benefits for small-scale farmers and resource-bad clients. They allow farmers a more return on their funding, and in a few countries genetically improved tilapia has accelerated the countrywide production fee of tilapia and caused decrease prices for purchasers.

Feeding strategies in an aquaculture system involves selection of appropriate ration sizes, (the amount of feed supply), determining the feeding frequency (how many times the organism should be fed in a day), and timing of meal and efficient broadcasting of the predetermined ration to the culture system (Murai and Andrews, 1976) [3]. The number of feeding per day and the time of feeding vary with species, size of fish and environmental conditions (Chiu *et al.*, 1987) [4]. It is essential to advocate the most desirable feeding rate for economic production of fish. In widespread the feeding regime and growth of fish are very plenty associated. Thus the feeding strategy may provide clue for maximum growth because the feeding frequency contribute to feed efficiency and growth response (Jarboe and Grant, 1997) [5]. With the expansion of aquaculture in Bangladesh, there has been an increasing trend in using chemicals in aquatic animal health management (Uddin *et al.*, 2020) [6]. The aim of this study was to investigate the effects of different feeding frequencies on the growth performance of the fish. The feeding frequencies used were based on practical management of feeding frequencies by fish farmers in the Mymensingh areas with modification providing lower and higher frequency. The expected findings from the experiment could be applied to maximize growth using a minimal feed ration expected this spending less for the production of the fish.

2. Materials and Methods

2.1 Study site

The on farm experiment was conducted to know the “effect of feeding frequency on the growth of genetically improved farmed tilapia (GIFT) for a period of 35 days from August 21, 2019 to September 24, 2019 in ‘Sharnalata Agro Fisheries Limited’, Radhakanaai under Fulbaria Upazila of Mymensingh district.

2.2 Pond preparation

Before stocking of the fish, Preparation of the ponds was done in the following manner:

2.2.1 Draining, drying and leveling

The water of the ponds were drained and kept for sundry about a week, until the bottom cracks or hardened sufficiently to support a man on his feet without sinking more than 1 cm. Draining and drying eradicate competitor fishes and predators, and kill disease-causing organisms. The pond’s bottom was leveled. Leveling makes the pond bottom slope gradually from its farthest end down towards the drainage structures – the deepest portion of the pond.

2.2.2 Repairing gates, dikes and screens

All gates and pipes were checked for broken slabs and other parts. Clean to remove debris which may cause clogging. Screens are repaired to prevent predators and pests from entering the pond system.

2.2.3 Liming

Agricultural lime (CaCO_3) is the most commonplace time used in fish ponds. The lime changed into broadcasted or unfolds over the tired but wet pond backside. The lime was mixed, very well with the soil to attain maximum effectiveness and allowed one week to lapse before applying phosphate fertilizer.

2.2.4 Fertilizer application and pond filling

Organic and inorganic fertilizer were applied to growth the water conserving capability of the soil, lower the price of evaporation and increase enzymatic activity, all of which growth fertility and yield. After pond clearing, organic fertilizer became implemented as early and appropriately as viable so that sufficient natural food is available in the course of the early stages of cultivation. Manure changed into unfold calmly at the pond backside or beside the last water and uncovered to the solar for several days. After the software of the fertilizer, the pond becomes packed with sparkling water. The initial addition has to deliver the water degree to about 1 m.

2.2.5 Weeds, pests and predator control

Fish manufacturing in ponds is normally tormented by some pests and predators. Predators are organisms which prey on the classy fish. Animals that compete for food or space are known as competition. Aquatic weeds had been removed manually from the ponds. The grasses on the pond dyke were additionally pruned manually to very small size. Complete eradication of all undesirable fish, bugs and different aquatic life forms had been completed by using the usage of phostoxin tablet (3 g consistent with pill, natural prescribed drugs restricted) on the charge of six capsules per decimal. After a few hours of phostoxin pill administration the dead organisms had been collected from the ponds by means of repeated netting and buried into the soil on the way to prevent undesirable infection and pollutants.

2.3 Hapa design

2.3.1 Construction of hapa

For of this study (fingerlings to juvenile stage) same size 6 hapas were used those were rectangular in shaped, made up of high density polyethylene net of 1 mm mesh size. The size of each hapa was 2.75 m × 1.82 m × 0.76 m.

2.3.2 Installation of hapa

Prior to stocking of brood fish, each of the hapa became installed (Figure 1) with all the facilities necessary to run the test correctly. The hapa have been hooked up with several bamboo poles. Those were fixed with bamboo poles inserted into the pond bottom. Those have been tied fixed with the bamboo pole by nylon ropes at the time of suspension; about 30 cm of the upper portion of the hapa have been continually kept above the water level. The physicochemical parameters which include temperature, dissolved oxygen and pH of the pond water were monitored on ordinary basis to ensure that the water pleasant remained suitable for the fish.



Fig 1: Installation of hapa

2.4 Experimental design

The research was conducted by three treatments (each having 2 replications) into 6 hapa at a stocking density of 500 g fish /hapa (17 fishes weigh= 500 g), after acclimatization. Fish in Treatment one (T₁) was fed four times daily, Treatment two (T₂) - feeding thrice daily, Treatment three (control T₃) – feeding twice daily, (Table 1). Farm practice of feeding twice

was considered control. Fish were fed at 10% of their body weight per day initially then reduced to 8% after 3 weeks. Equal portion of daily feed were fed in each time of the feed delivery. Furthermore, at the start of the experiment water temperature was found to be 37 to 39 °C, pH 8 to 8.88, DO 4 to 4.5 mg/l and there was no ammonia nitrogen found in the water. Water quality data was collected weekly.

Table 1: Experimental layout of feeding frequency of tilapia

Feeding strategy/Day	T ₁ (hapa 1, 4) Feeding four times daily				T ₂ (hapa 3, 5) Feeding thrice daily			T ₃ (hapa 2, 6) Feeding twice daily	
	8 a.m	11 a.m	2 p.m	5 p.m	8 a.m	11 a.m	5 p.m	8 a.m	5 p.m
Saturday	+	+	+	+	+	+	+	+	+
Sunday	+	+	+	+	+	+	+	+	+
Monday	+	+	+	+	+	+	+	+	+
Tuesday	+	+	+	+	+	+	+	+	+
Wednesday	+	+	+	+	+	+	+	+	+
Thursday	+	+	+	+	+	+	+	+	+
Friday	+	+	+	+	+	+	+	+	+

2.5 Collection and stocking of fish

The fingerlings of GIFT from the equal farm were used for the experiment (Figure 2). After acclimatization for the 3-4 hrs in the cistern tank, fingerlings have been transferred to the experimental hapa. The average weight of each fingerling was 30 g. The stocking density of fingerlings changed into 17 per hapa. Equal stocking density becomes maintained in 6 experimental hapa. Proper methods and hygienic conditions have been maintained all through release of the fingerlings into the hapa.

2.6 Selection of feed and feeding strategy

Commercial floating feed named Mega 301p (Figure 3) (proximate composition is shown in table 2) was selected for the experiment. At the beginning of the experiment feed was supplied at the rate of 10% of their body weight per day for 3 weeks and after that it was adjusted to 8% of their body weight per day for the next 2 weeks.



Fig 2: Collection and stocking of fish



Fig 3: Mega 301p fish feed

Table 2: Proximate composition of “Mega 301p fish feed”

Ingredients		Inclusion level (%) in treatments		
		T ₁	T ₂	T ₃
Mega 301p Fish Feed	Protein (%)	32.07	32.07	32.07
	Carbohydrate (%)	31.00	31.00	31.00
	Lipid (%)	6.20	6.20	6.20
	Fibre (%)	5.40	5.40	5.40
	Ash (%)	10.43	10.43	10.43
	Moisture (%)	12.00	12.00	12.00
Vitamins & minerals premix (%)		2.9	2.9	2.9

2.7 Sampling and monitoring

2.7.1 Sampling procedure

Sampling of the experimental fish were achieved randomly after 3 weeks by way of elevating in order to check the increase performance of fish and also alter the feeding rate.

2.7.2 Monitoring

Hapa circumstance will be checked and wiped clean after every 7 days to look at common circumstance whether or not getting harm or now not. Eventually length and weight

of individuals might be measured and recorded from every of the hapa for analyses.

2.8 Analyses of growth performance

The following parameters were used to evaluate the growth of the fishes

2.8.1. Weight gain = Mean final fish wt (g) -Mean initial fish wt (g)

$$\text{Percent weight gain (\%)} = \frac{\text{Mean final fish wt (g)} - \text{Mean initial fish wt (g)}}{\text{Mean initial fish wt (g)}} \times 100$$

2.8.2 Specific growth rate (SGR%/ day)

Specific growth charge (SGR) is the on the spot change in weight of fish calculated as the percent of increase body weight consistent with day over the experimental length. SGR become calculated by using following components:

$$\text{SGR\%/day} = \frac{\ln W_2 - \ln W_1}{T_2 - T_1} \times 100$$

Where,

W1 = the initial live body weight (g) at time T1 (day)

W2 = the final live body weight (g) at time T2 (day) 22

T2 -T1 = Duration of the experiment (day)

2.8.3 Food conversion ratio (FCR)

Food conversion ratio is the amount of dry feed fed per unit of live weight gain. FCR was calculated by using the following formula

$$\text{FCR} = \frac{\text{Amount of feed (g)}}{\text{Live weight gain (g)}}$$

2.8.4 Survival rate (%)

On the give up of the experiment all of the fishes were caught by using raising hapa. So, the survival charge needs to be

calculated by using the following system:

$$\text{Survival rate (\%)} = \frac{\text{No.of fish harvested}}{\text{No.of fish stocked}} \times 100$$

3. Results

The results of the experiment on effect of feeding frequency on the growth of genetically improved farmed tilapia (*Oreochromis niloticus*) at Sharnalata Agro Fisheries Farm, Radhakanai, Fulbaria, Mymensingh are presented below under the following headings:

3.1 Physico-chemical parameter of the pond

The value of the water quality parameters such as temperature, pH and dissolved oxygen were monitored during the experimental period is showed in fig 4, 5, 6.

3.1.1 Water temperature (°C)

During the study period average water temperature in treatment T₁ was 38.25±0.72 (°C), in treatment T₂ was 38.25±0.78 (°C), in treatment T₃ was 38.22 ± 0.78 (°C). The maximum temperature (39.22 °C) was recorded in treatment T₂ on 29th August whereas; the minimum (37.05 °C) was recorded in treatment T₁ on 6th September (Figure 4).

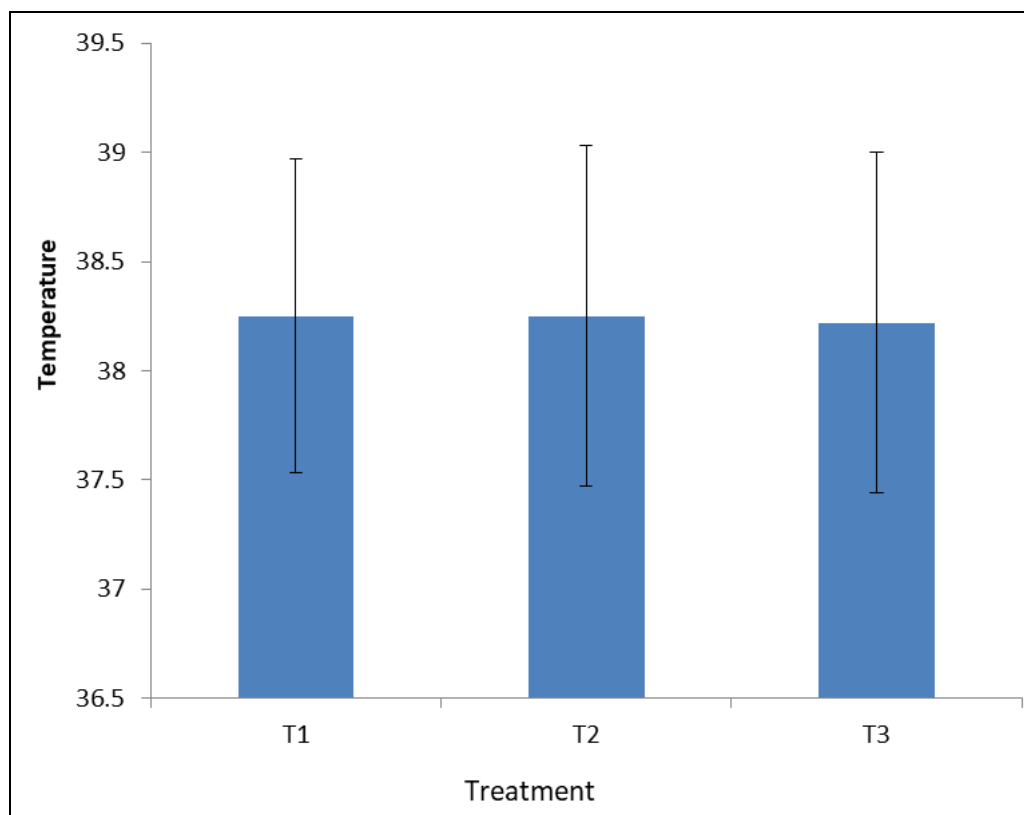


Fig 4: Average values of water temperature (°C) under different treatments throughout the study period

3.1.2 Dissolved Oxygen (mg/l)

During the experimental period, dissolved oxygen content of water was found to be in between (4 to 4.5) mg/l of the three treatments. The highest value of dissolved oxygen was found

on 21th August and the value was 4.49 mg/l in treatment T₂. The lowest value of dissolved oxygen was found on 23th September in treatment T₁ (Figure 5).

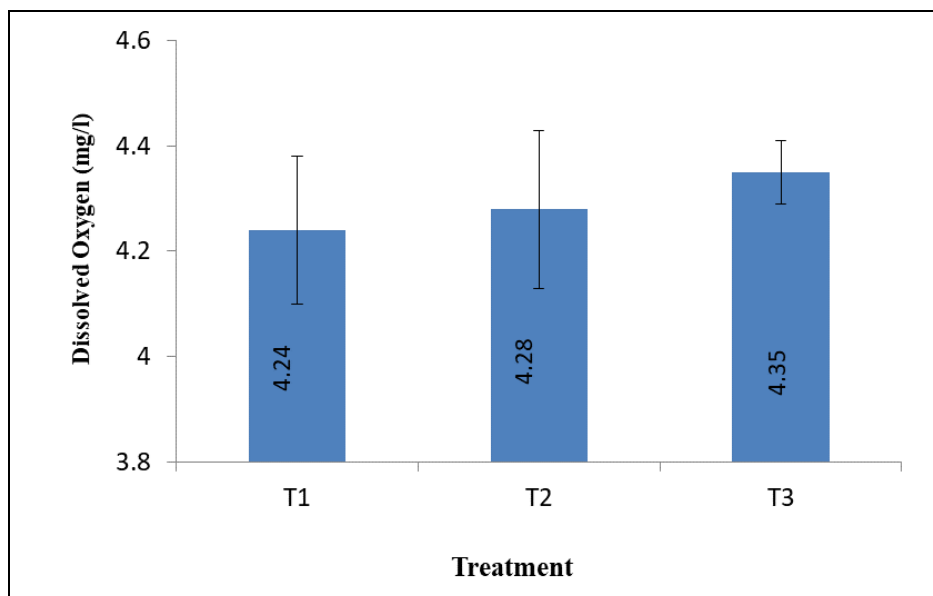


Fig 5: Average value of dissolved oxygen (mg/l) under different treatments throughout the study period

3.1.3 pH

Variation of pH becomes found in one of a kind treatment during the experimental duration. The mean values of pH content of the water in remedy T₁, T₂ and T₃ become 8.46; 8.42; 8.43, respectively. The highest pH fee became

discovered in treatment (T₂) on September 14 while the bottom pH value turned into located in treatment (T₃) on August 21. No massive variation of pH becomes determined among 3 treatments at some point of the look at duration (Figure 6).

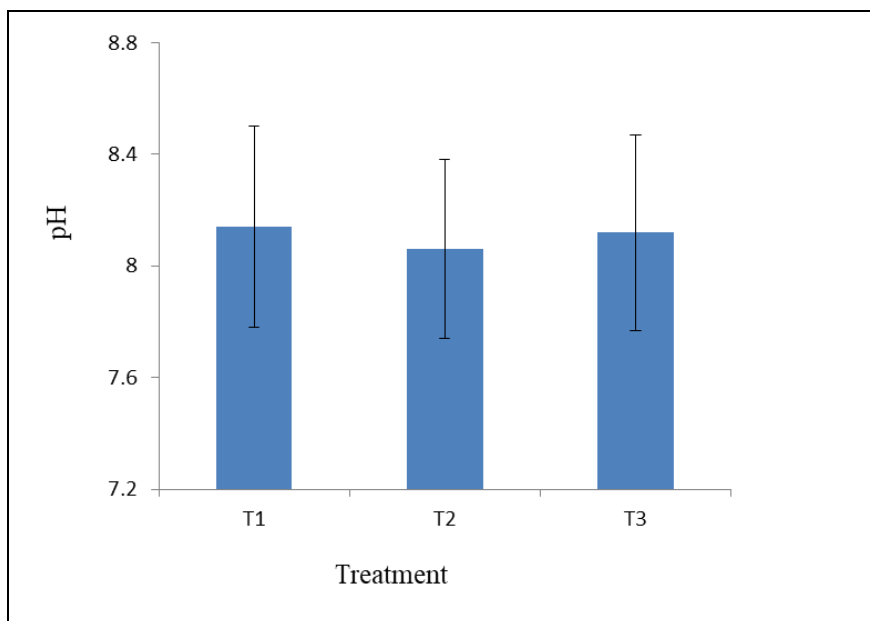


Fig 6: Average values of water pH under different treatments throughout the study period

Table 3: Changes in weight (g) of GIFT during the experimental period (values are mean± SD)

Treatment	Days of observation		
	21 August 2019	11 September 2019	24 September 2019
T ₁	30±4.12	96.67±2.71	135.11±5.12
T ₂	30±3.61	96.91±4.44	136.94±5.07
T ₃	30±3.68	99.20±5.45	138.76±4.04

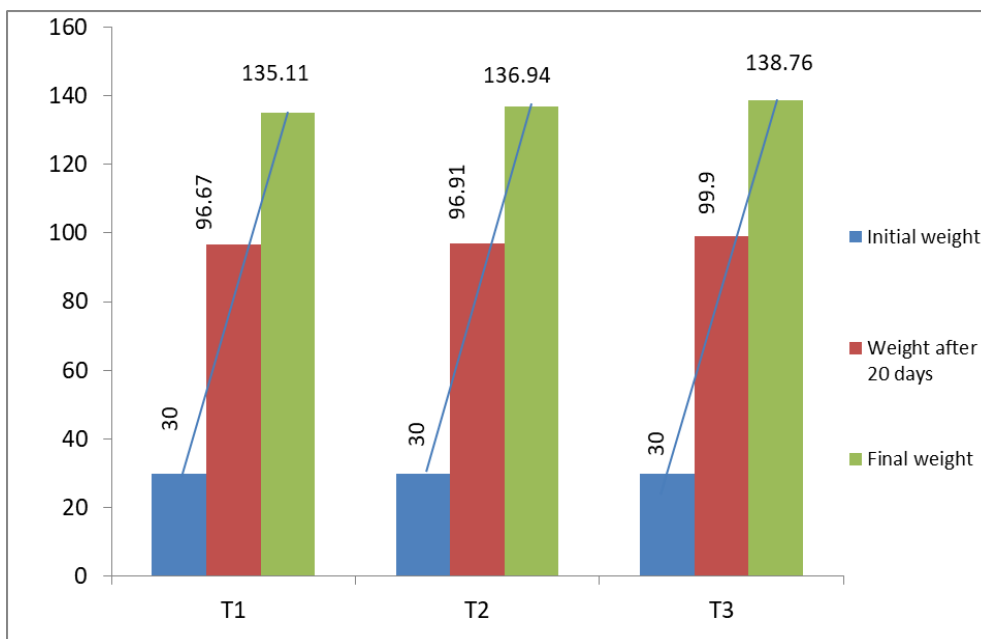


Fig 7: Growth pattern of GIFT in terms of increase in weight (g) in different treatments during the experimental period

3.2 Growth performance of fish

Growth performances of GIFT in terms of weight gain (Figure 7) under different feeding frequency for a period of 35 days (21 August -24 September) are studying. Initial weight of fry, final weight of fry, % weight gain, SGR (% day), FCR and survival rate (%) were calculated and shown in Table- 4.

Table 4: Growth parameters of GIFT observed in different treatments during the experimental period.

Growth parameter	Treatment		
	T ₁	T ₂	T ₃
Initial weight(g)	30±4.12	30±3.61	30±3.68
Final weight(g)	135.12±5.12	136.94±5.06	138.76±4.04
Weight Gain(g)	105.12±4.60	105.8±5.23	108.2±4.86
% weight gain(g)	356.73±58.18	355.48±49.60	365.37±49.38
SGR(%/day)	4.32±0.32	4.34±0.30	4.38±0.28
FCR	1.74±0.056	1.65±0.056	1.60±0.16

3.2.1 Mean total weight gain

The mean weight gain of the experimental fish in unique remedies increased definitely in T₃ due to using twice feeding each day. On the other hand, the suggest weight benefit in T₁ and T₂ became pretty decrease than T₃ due to the use of thrice and four times feeding each day. In remedy T₁ where fish fed four times day by day, the mean weight benefit turned into 105.12 ± 4.60 g. In T₂ wherein fish fed thrice daily, the imply weight gain become 105.8 ± 5.23 g. In T₃ in which fish fed two times daily, the suggest weight benefit turned into 108.2 ± 4.86 g. The prevailing study resulted that higher imply weight gain in T₃ than all different remedies and ranked (T₃>T₂>T₁). The best mean weight became located in T₃ and the lowest one became T₁ (Figure-8). There has been no full-size distinction (p>0.05) in imply weight benefit among the different remedies.

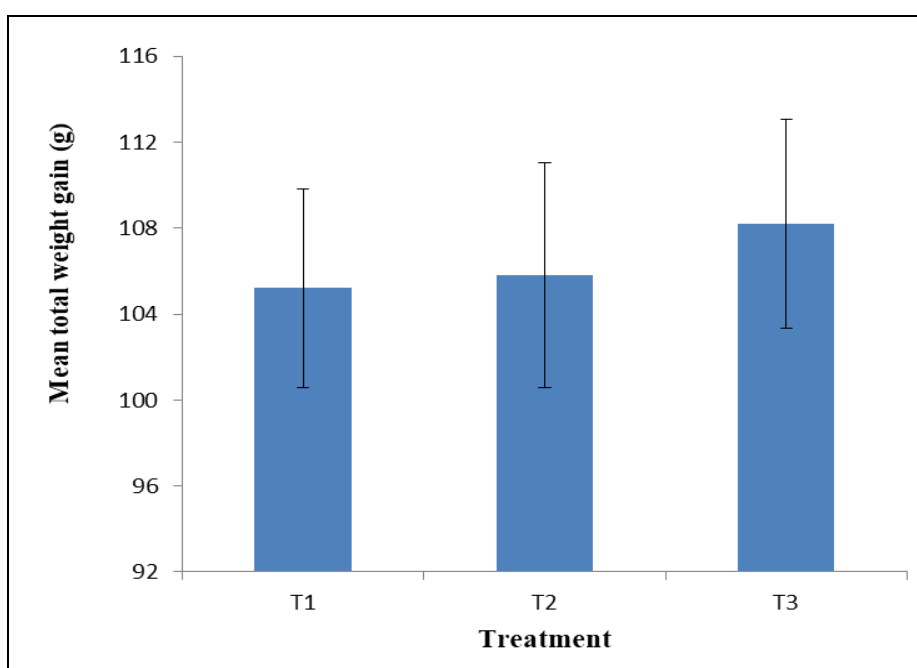


Fig 8: Effects of different feeding frequency on mean total weight gain of GIFT fingerlings

3.2.2 Percent weight gain (%)

The percent weight gain of experimental fish in different treatments increased positively in T₃ by feeding two days daily. On the other hand, the percent weight gain in T₁ and T₂ was quite low than T₃ due to using thrice and four times feeding daily. In T₁ where fish fed four times daily, the percent weight gain was 356.73 ± 58.18 . In T₂ where fish fed thrice daily, the percent weight gain was 355.48 ± 49.60 . In

T₃ where fish fed twice daily, the percent weight gain was 365.37 ± 49.38 . The present study resulted that better percent weight gain in T₃ than all other treatments and ranked (T₃>T₁>T₂). The highest percent weight gain was observed in T₃ and the lowest one was T₂. There was no significant difference ($p>0.05$) in percent weight gain among the different treatments (Figure 9).

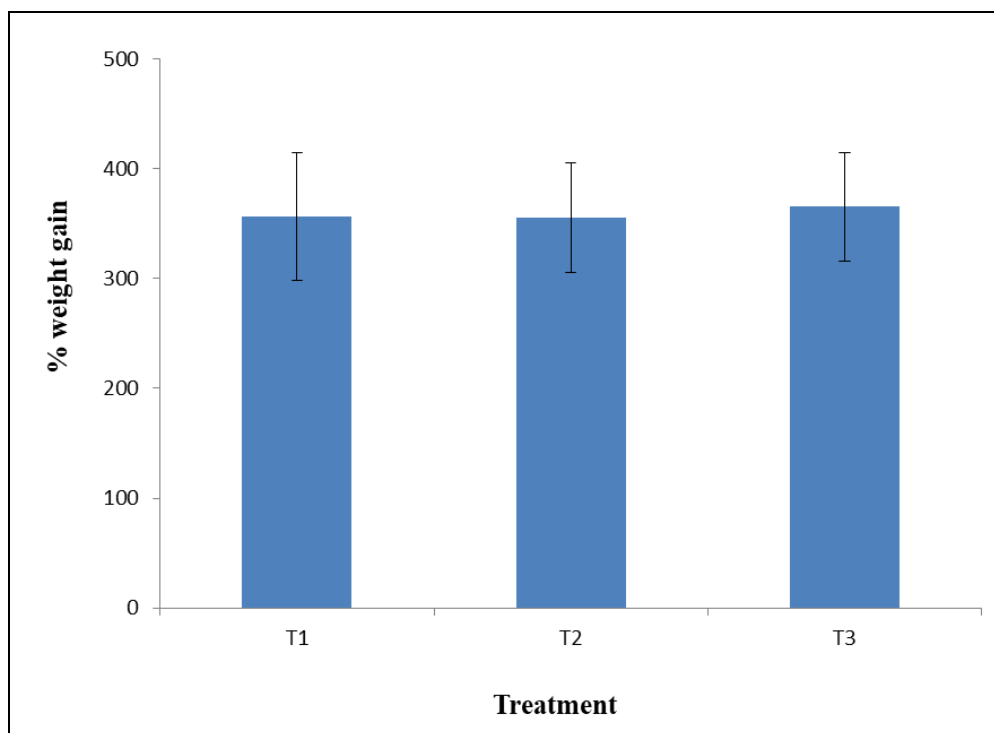


Fig 9: Effects of different feeding frequency on percent weight gain of GIFT fingerlings

3.2.3 SGR (%/day)

The SGR values of experimental fish in treatment T₁, T₂, T₃ were 4.32 ± 0.32 , 4.34 ± 0.30 , 4.38 ± 0.28 respectively. Although the SGR in T₁ was lower but no significant difference was found among the three treatments due to high

temperature. The present study resulted that better SGR gain in T₃ than all other treatments and ranked (T₃>T₂>T₁). The highest SGR value was observed in T₃ and the lowest one was T₁. There was no significant difference ($p>0.05$) of SGR among the different treatments (Figure 10).

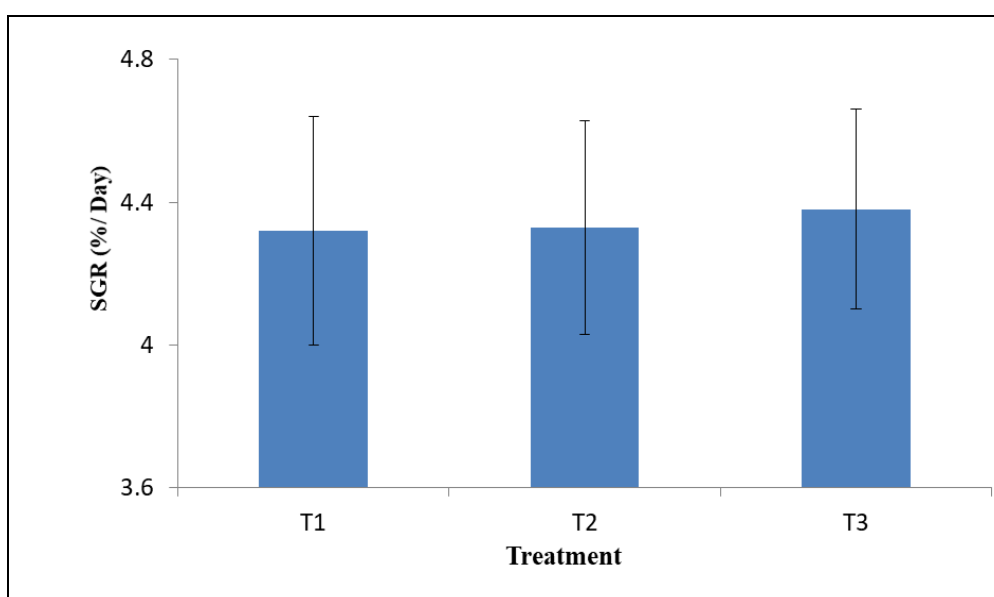


Fig 10: Effects of different feeding frequency on SGR (% per day) of GIFT fingerlings under field trial.

3.2.4 FCR (%/day)

After the ending of 35 days experiment, the food conversion ratio was estimated and that was notably very near to each other in all treatments. In Treatment T₁ where fish fed four times daily, the FCR value was 1.74. In T₂ where fish fed thrice daily, the FCR value was 1.65. In T₃ (Control) where

fish fed twice daily, the FCR value was 1.60. The present study resulted that better FCR value gain in T₃ than all other treatments and ranked (T₃>T₂>T₁). The highest FCR value was observed in T₁ (1.74) and the lowest one was T₃ (1.60). There was no good sized difference ($p>0.05$) in FCR value was discovered among treatment T₁, T₂, T₃ (Figure 11).

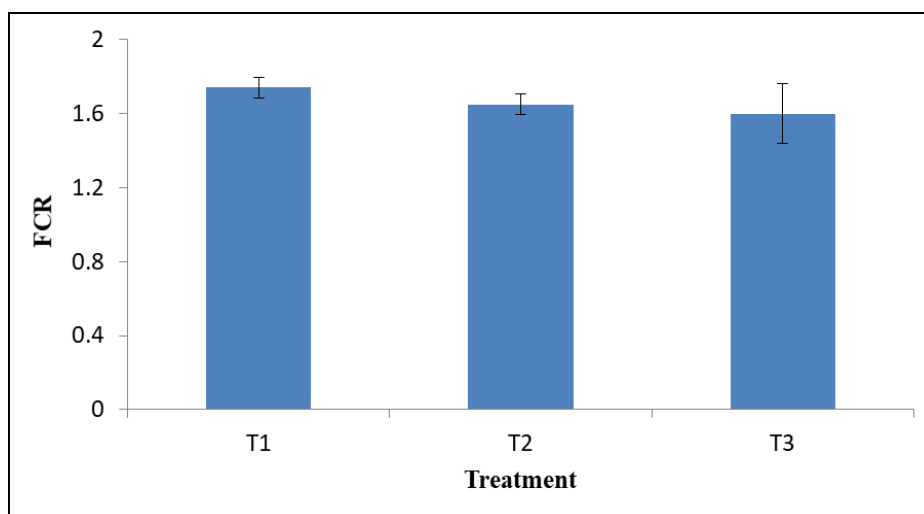


Fig 11: Effects of different feeding frequency on FCR of GIFT fingerlings under field trial

4. Discussion

4.1 Water quality parameters

Water nice parameters are the maximum crucial elements affecting fish fitness and overall performance in aquaculture manufacturing structures. Maximum essential environmental parameters are water temperature, dissolved oxygen and pH. There exists dating among feeding strategies and water quality parameters. Feeding to be decreased or stopped if water best falls beneath positive degree. Commonly after feeding, dissolved oxygen tiers decline hastily due to decomposition of uneaten feed. Dissolved oxygen ranges should be maintained above 5.0 ppm for exceptional increase of fish. As a hard fish tilapia can endure lower oxygen ranges underneath 3.0 ppm. Water temperature is an important water quality parameter for proper growth of fish. Water temperature of the hapas set in pond water turned into recorded in each 7 days interval all through the experimental period and recorded water temperature changed into greater or less similar in different treatments that ranged from 37.05 °C to 39.22 °C. The temperature of all the hapas had been no longer on the finest degree for fish subculture but a chunk better for the right growth of fish. Different water exceptional parameters such as DO, pH changed into inside the right limits for aquaculture.

4.2 Growth performance of fish

4.2.1 Weight gain (g)

There has been no widespread difference ($p>0.05$) in imply weight benefit the various specific remedies. The imply weight advantage turned into determined almost similar amongst three treatments (T₁, T₂, T₃). Previous study indicated that the highest weight gain obtained by feeding 3 times per day (Tung and Shiau, 1990; Kubaryk, 1980; Siraj *et al.* 1988; and Lovell, 1998) [7-10]. It's changed into also indicated that stay weight advantage become undoubtedly tormented by increase feeding frequency, whereas the hybrid red tilapia (*O. mossambicus* x *O. niloticus*), increase did not longer substantially differ with frequency beyond twice an

afternoon (Siraj *et al.*, 1988) [9]. Growth in the cutting-edge study did not statistically range among corporations fed instances, 3 instances and 4 times a day, similar consequences were observed in a diffusion of different species (Tyler and Dunn, 1976; Grayton and beamish, 1977; Tsevis *et al.* 1992; Wang and Shiau S, 1998) [11-14] too. For *O. niloticus* (5 g) fed one, two, four, or eight instances day by day, differences in boom have been discovered till the frequency passes four times daily (Kubaryk, 1980) [8]. Fish fed once an afternoon ate up greater feed all through the morning feeding than fish fed greater regularly, as found in other species (Andrews and page, 1975) [15].

The results of the present study indicate that highest mean weight gain was found by feeding twice daily. Nowadays farmers are also using two times feeding daily as a common practice. Although it was expected greater feeding frequency supposed to increase growth but the results of the study indicate rather better growth performance by the fish feeding twice. On that context it can be said that the culture temperature of the water might have contributed to lesser feed consumption especially feeding during middle period of the day for the feeding frequencies three times and four times per day.

4.2.2 Percent weight gain (g)

There was no significant difference ($p>0.05$) in percent weight gain among the different treatments. The average percent weight gain among of treatments was 356.73 ± 58.18 , 355.48 ± 49.60 , and 365.37 ± 49.38 . Various research workers concluded that the percent weight gain was highest by three times feeding (Ball, 2018) [16]. The percent weight gain of the present study was almost same in treatment T₁, T₂, T₃ and this might be due to the uneaten feed loss at high temperature. In the present study resulted better percent weight gain in T₃ (two times feeding) than all other treatments and ranked (T₃>T₂>T₁).

4.2.3 Specific growth rate (SGR % day)

The values of specific growth rate of the fish in T₁ (feeding four times daily), T₂ (feeding thrice daily), T₃ (feeding twice daily) were not different from each other. The range of the SGR value in the present study was 4.32 to 4.38. There was no significant difference ($p > 0.05$) among the different treatments. The present study was supported by Azad *et al.* (2004)^[17] where they found that this value is more or less similar SGR where fish was fed once, twice and three times daily but slightly lower whereas SGR values were obtained by Huang and Qing (2015)^[18] and Azimuddin *et al.* (1999)^[19]. Hossain and Jauncey (1989)^[20] achieved the specific growth rate ranged between 3.14 and 3.32. The similarity of SGR values of tilapia in different treatments of the present study might be due to the high temperature in the water. It was observed that fish reared in treatments feeding three times and four times a day were found unwilling to eat at high temperature and especially on the feed served at the middle periods of the day.

4.2.4 Feed conversion ratio (FCR)

Siraj *et al.* (1988)^[9] found that the best FCR results were achieved when they were fed 3 times per day. In the present study, the FCR was not significantly affected by the different feeding frequencies due to high temperature. The food conversion ratio in treatment T₁ was 1.74, treatment T₂ was 1.65 and treatment T₃ was 1.60. It was expected that greater feeding frequency supported to increase FCR but the results of the present study indicated rather greater growth was performed by the fish feeding twice. So it can be said that the culture temperature of the water might have contributed to lesser feed consumed and more feed wastage especially feeding during middle period of the day.

4.2.5 Survival rate (%)

The survivability of tilapia in the present study was 98%. Islam *et al.* (2020)^[21] found that the survival rate of rohu was 97.78% ± 22 that supported the present study. The ambiguity of the present results with the previous workers can be resolved by conducting experiments under control temperature conditions and by extrapolating that result in farm conditions especially during best growing season of the fish during June-July.

5. Conclusion

Tilapia grows rapidly and is pretty proof against strain and disease. To maximize manufacturing performance and minimize prices, tilapia must be fed nutritionally whole diets to fulfill their nutritional necessities. Most beneficial feeding charge (% of fish frame weight), feeding frequency and interval of feeding based totally on the scale of the fish and the tradition conditions are critical. The result of the prevailing have a look at showed a higher result at the increase performance of tilapia through feeding times at afternoon, instead of feeding three times and four instances in line with day. There has been no sizable difference ($p > 0.05$) in imply weight benefit among the specific remedies had been located. In the end, it could be concluded that feeding frequency played a vital position at the growth overall performance of present way of life by means of providing feeding frequency of instances day by day. It is advocated two instances feeding in step with day need to succeed for tilapia farming. the paradox of the existing results with the previous people can be resolved by engaging in experiments

underneath manipulate temperature situations and by way of extrapolating that result in farm conditions specifically for the duration of first-class growing season of the fish in the course of June-July.

6. References

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