

Original Article

Effect of fertilizer with different fish stocking on the yield of an integrated rice-fish polyculture farming system

Md. Shamim Parvez^{1*}, Ashim Gosh², Md. Jahidul Hasan³, Farhana Ahmed², Md. Forhadur Reza², Lipton Sardar³, M. Aminur Rahman⁴, Md. Masum Billah⁵

¹Laboratory of Marine Biotechnology, Institute of Bioscience, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia, ²Department of Fisheries, Matshya Bhaban, Ramna, Dhaka, Bangladesh, ³Department of Fisheries, Fish Inspection and Quality Control laboratory, Khulna, Ministry of Fisheries and Livestock, Bangladesh, ⁴Fisheries and Marine Bioscience, Jashore University of Science and Technology, Bangladesh, ⁵Department of Land Management, Faculty of Agriculture, Universiti Putra Malaysia, 43400 UPM, Serdang, Selangor Darul Ehsan, Malaysia

ABSTRACT

An experiment was conducted in the rice field plots with developing the infrastructure 30 m² to determine the appropriate fertilization effects for the freshwater fish Tilapia and Carp Fish species cultured along with the rice-fish farming system in the plots. There were setting up three systems to assess the effect of fish species on tiller yield, regarding for fish species, i.e., no fish stocking with rice (C), tilapia with rice (F_T), and carp fish with rice (F_C). Each treatment of fish species cultured with different doses of fertilizer such as (T₀) control: Without any fertilization; (T₁) with 100% recommended fertilizer (RF); (T₂) with 75% RF; (T₃) with 10t compost fertilizer; (T₄) with 5t compost fertilizer + 75% RF, and rice culture with 5t compost fertilizer + 50% RF. The maximum number of the plant in the tiller was found in carpio fish (F_C) species (7.02 no/tiller and 82.95 cm/tiller) whereas lowest in F_T (6.40 no/tiller and 81.65 cm/tiller) during 75 day after transplanted. In regard of fertilizer application, the highest height was observed in F_C on an average 31.71, 53.28, and 73.06 cm/tiller during 30, 40, and 60 DAT, respectively, whereas followed by F₀ (31.92, 52.43, and 72.31 cm/tiller at 30, 45, and 60 DAT) and F_T (30.28, 49.76, and 67.25 cm/tiller at 30, 45, and 60 DAT), respectively, in which there was found no significant differences ($P > 0.05$) among different treatments. The rice yield in carpio fish, the fertilizer treatment T₄ (7.30 ± 1.86 kg/m²) was significantly higher than those of other treatments (7.16 ± 2.78, 6.83 ± 2.88, 6.67 ± 1.44, 6.17 ± 1.84, and 4.06 ± 1.76 kg/m² in treatments T₅, T₃, T₂, T₁, and T₀, respectively). The yields of fish were significantly faster ($P < 0.05$) in treatments T₄, (11.70 ± 3.86 kg/m²) than other fertilizer treatments T₅ (11.25 ± 3.56 kg/m²), T₃ (10.85 ± 5.76 kg/m²), T₂ (10.80 ± 5.55 kg/m²), T₁ (9.90 ± 4.66 kg/m²), T₀ (4.78 ± 3.48 kg/m²) and in F_C and also compared to all other fertilizer treatments in F_T. In regard of straw, the yields were significantly faster ($P < 0.05$) in treatments T₄, (13.76 ± 6.24 kg/m²) and followed by T₅ (13.55 ± 4.42 kg/m²), T₃ (12.88 ± 6.24 kg/m²), T₂ (10.75 ± 4.65 kg/m²), T₁ (10.65 ± 3.36 kg/m²), T₀ (4.28 ± 3.86 kg/m²) and in F_C and also compared to all other fertilizer treatments in F_T. The outcome in T₄ gave the highest returns among all treatments, followed by treatments T₅, T₃, T₂, T₁, and T₀ indicating that the combination of basal fertilization and compost fertilizer is the most appropriate nutrients input regime for the rice-carp fish integrated culture system.

Keywords: Effect, fertilization, integrated polyculture, rice-fish farming, yields

Submitted: 21-11-2019, **Accepted:** 28-11-2019, **Published:** 29-12-2019

INTRODUCTION

Rice is an essential food crop in all around the world, with differentiated varieties full-grown on 157 million ha worldwide in an extensive variety of natural conditions and water management. It is the main food for over 50% population of the world with yearly yields of 652 million in 2007. The

concurrent of rice-fish farming, rice-fish culture is one of the best opportunities to increase food production from restricted ecological agricultural land.^[1,2] It is experienced in various countries of the world, mainly in Asia.^[3] There has been practiced rice-fish culture for at least 1700 years in China.^[4,5] According to Lu and Li,^[6] it is recorded by Food and Agriculture Organization of the United Nations and the United Nations

Address for correspondence: Md. Shamim Parvez, Laboratory of Marine Biotechnology, Institute of Bioscience, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia. E-mail: parvezmdshamim@gmail.com

Educational, Scientific and Cultural Organization as one of the Globally Important Ingenious Agricultural Heritage Systems in 2005, attributable to its long history and expanded examples and strategies.^[6]

Fish farming in rice fields improves the utilization of land and water and yielding more fish and rice, combined with more economic yields than the monoculture of rice.

Within the rice-fish ecosystem, plants and fish complement and interact with each other.^[7,8] Rice fields are exceptionally profitable as far as both quantity and natural variety of food organisms for fish. Most of the Asian countries additionally endorse fish farming in the rice fields through integrated pest management (IPM) and it is the real method to increase the yields in the rice fields by harvesting both of rice and fish.^[5,9]

The acceptance of rice-fish farming decreased due to the use of chemicals and pesticides in rice yields. Now, it is increasing due to reduce the utilization of levels of pesticide and the higher economic returns had received from fish and improved rice yield. In traditional rice-fish farming, there are stocked mainly herbivorous fish species such as grass carp *Ctenopharyngodon idella* (Valenciennes, 1844), silver barb *Barbodes gonionotus* (Bleeker, 1850), and tilapia (*Oreochromis* spp). The profits of rice-fish farming go beyond yielding extra fish in the rice field. In the rice fields, the fish can control the pests and weeds, acknowledging IPM. Regarding the fish manure like as a fertilizer, which increases the availability of nutrient to the rice crop.^[2,10-12] Rice-fish farming conserves the ecological-stability in rice field that may not only be a higher yielding but also a more sustainable farming system.^[13,14] In China and Indonesia, the rice-fish farming system is known to increase yields of rice from 5% to 35% and yield about 150 kg/ha/crop of fish in extensive systems, and up to 800 kg/ha/crop afterward agricultural by-products are given as fish feed and fertilizer.^[5,9]

Fertilization in the rice-fish farming is a crucial management exercise for enhancing rice and fish production; the farmers are utilizing fertilizer in a variety of doses which may sometimes be 3 or 4 times higher than that of the standard dose, hopeful more benefit. However, presently crisis of the inorganic fertilizer in the country is an acute problem. As well, the agriculturalists are facing financial loss to buy excess fertilizer. However, there is done a little work to determine the standard dose of fertilizer need for the maximum yields from rice-fish farming. Therefore, it is important to undertake investigations to find out the standard dose of fertilizer for higher fish and rice production. Considering the above scenario, the present study was carried out to determine the optimal dose of fertilizer used in rice-fish farming.

MATERIALS AND METHODS

The experiment was conducted using a completely randomized block design in 54 ($3 \times 6 \times 3$) plots of 15 (5×3) m² rice fields, each with a transversal trench of $1.2 \times 5 \times 0.7$ m (width \times length \times depth), at the Bangladesh Agricultural University (BAU), Mymensingh, Bangladesh, during Boro season, i.e., 2nd August 2017 to 2nd December 2017, a period for 112 days. The experiment was set with the variety of BRRI Dhan -29 with two factors, i.e., fish species and fertilizer rate. The experimental design is shown in Table 1. To assess the effect of fish species on tiller yield, no fish stocking with rice considered as the control (C), the treatment was rice + Tilapia fish (F_T) and rice + Carpio fish (F_C).

To assess the effect of fertilizer on tiller yield in the rice field, six treatments were designed, as shown in Table 2.

There were six treatments in triplicate: (T_0) Control: Rice culture without any fertilization; (T_1) rice culture with 100% recommended fertilizer (RF); (T_2) rice culture with 75% RF; (T_3) rice culture with 10t compost fertilizer; and (T_4) rice culture with 5t compost fertilizer + 75% RF, and rice culture with 5t compost fertilizer + 50% RF. The fertilization rate was calculated based on the rice platform area. The application of RF is given by the following Table 3.

Table 1: Trials using different fish species

Treatment	Stocking fish species
C	No fish stocking
F_T	Stocking tilapia fish
F_C	Stocking carpio fish

Table 2: Trials using different fertilizer as a nutrient

Treatment	Fertilizer dosages
T_0	No fertilizer
T_1	100% recommended fertilizer
T_2	75% recommended fertilizer
T_3	10 t compost fertilizer
T_4	5 t compost fertilizer+75% recommended fertilizer

Table 3: Recommended fertilizer dose (g/plot)

Name of fertilizer	Fertilizer dose (g/plot)		
	100%	75%	50%
Urea	375	281.25	187.50
TSP	180	135.00	90
MOP	150	112.50	75
Gypsum	90	67.50	45
$ZnSo_4$	15	11.25	7.50

TSP: Triple superphosphate, MOP: Muriate of potash

The rice fields were flooded with canal water to soak the soil for a week and then tilled repeatedly until the soil became puddled. L-shaped canal was constructed at the periphery of chatal (field) of each plot with the same area. Before 2 days transplanting, liming was applied at a rate of 6 kg CaCO₃ per plot. Plastic sheets were set up around every plot (50 cm above and 30 cm below the platform level) to prevent seepage and predator invasion. The mesh size (2 m × 1 m) nets were fencing surrounding the fields from escaping and also protecting the fish from the predators.

Rice seedlings (BRRI dhan – 29) were transplanted at 25 cm × 25 cm spacing at a rate of four seedlings per hill (a small bunch of rice seedling thrust into the mud is called a “hill”). Water depth in rice fields and trenches was maintained at 5–10 cm and 75–80 cm during the 1st month, and 10–15 cm and 80–85 cm during the rest of the culture period, respectively. Manual weeding was carried out at the 20th and 40th DAT.

Fingerling of fish on a normal size 1.5 g was stocked in the rice fields with a density of 6 fingerlings/m² of an aggregate zone (10 prawns/m² of trench region) on the third DAT. Rice development execution was controlled by checking the number and stature of tillers per slope in arbitrarily chose ten slopes for every plot at 30, 45, 60, and 75 DAT. Rice collected from each plot was cleaned, dried, and weighed after drying. The grain weight was balanced to 14% dampness content.^[15]

Water quality in ditches was resolved for DO and temperature at 06:00–07:00 h, at 10 cm beneath the water surface with a YSI oxygen meter (show 58 Yellow Springs Instruments, Yellow Springs, OH, USA). Coordinated water tests of the whole water segment were taken fortnightly close to the focal point of each trench at 08:00 h for examinations of pH, add up to solids, add up to unpredictable solids total volatile solids, add up to alkalinity, add up to hardness, add up to smelling salts nitrogen total ammonia nitrogen nitrite-N (NO₂-N), nitrate-N (NO₃-N), add up to phosphorus total phosphorus, disintegrated orthophosphate (PO₄-P), and chlorophyll-a.^[16]

Unionized smelling salts nitrogen was figured utilizing a transformation table for separate pH and temperature.^[17] Secchi circle perceivability was estimated utilizing a Secchi plate at the season of water inspecting.

Water was provided to the rice-fish plots by shallow pump when the water level was dropped and constantly kept up at 40 cm–50 cm of the chatal’s (field) tallness amid the exploratory period. DO was estimated each fortnight at 7 am and again at 4 pm. pH esteem was likewise recorded at similar occasions individually. Temperatures were additionally recorded fortnightly with a thermometer in the meantime. Alkali was recorded at 8 am fortnightly. All parameters for observing the water quality were estimated utilizing the

HACH test Kit (show FF1A). The information was computing and investigating.

The growth performance of fish and rice and water quality parameter was analyzed for significant differences among treatments using ANOVA.^[18] Differences were considered to be significant at the level of 0.05. All means were given with standard error.

RESULTS

In regard of fish species, the effects of fish species on tillers number of rice in each hill increased quickly in the vegetative phase and attained in maximum number during the reproductive phase and then reduced in the ripening phase. In regard of tiller number in each hill, no significant differences ($P > 0.05$) were found among different treatments. The maximum number of plants in the tiller was found in (F_C) carpio fish species (7.02 no/tiller) whereas followed by F₀ (6.07 no/tiller) and F_T (6.40 no/tiller) during 75 DAT [Figure 1].

The highest number was observed in F_C on an average 4.05, 5.86, and 6.61 no/tiller during 30, 40, and 60 DAT, respectively, whereas followed by F₀ (4.05, 5.85, 6.34, and 6.76 no/tiller at 30, 45, 60, and 75 DAT) and F_T (3.84, 5.62, 6.01, and 6.4 no/tiller at 30, 45, 60, and 75 DAT), respectively.

On the other hand, the effects of fish species on tillers height of rice in each hill were also rapidly increased in the vegetative phase and attained in maximum height during the reproductive phase and then also reduced in the ripening phase. In regard to tiller height in each hill, no significant differences ($P > 0.05$) were found among different treatments. The maximum height of the plants in the tiller was found in (F_C) carpio fish species (82.95 cm/tiller) whereas followed by F₀ (81.65 cm/tiller) and F_T (78.04 cm/tiller) during 75 DAT [Figure 2].

The highest height was observed in FC on an average 31.71, 53.28, and 73.06 cm/tiller during 30, 40, and 60 DAT,

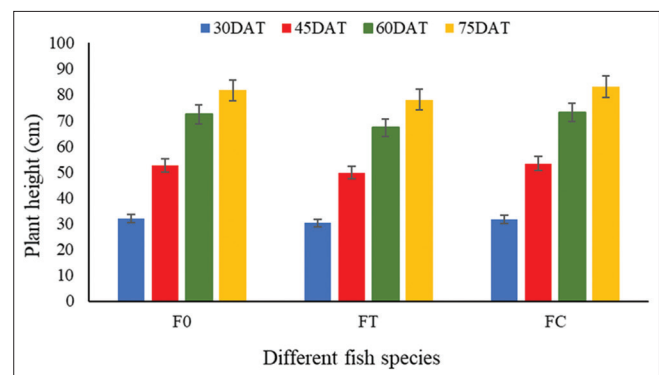


Figure 1: Effects of fish on plant height in each tiller of the rice-fish field

respectively, whereas followed by F_0 (31.92, 52.43, and 72.31 cm/tiller at 30, 45, and 60 DAT) and F_T (30.28, 49.76, and 67.25 cm/tiller at 30, 45, and 60 DAT), respectively [Figure 2]. In regard to fertilizer application, the effects of fertilizer on the tillers number of rice plants in each hill were found the same growth condition in the vegetative phase and reached in maximum number during the reproductive phase while gradually reduced in ripening phase. In regard to tiller number per hill, no significant differences ($P > 0.05$) were found among different treatments. The maximum number of plants in the tiller was found in T_4 (6.06, 7.06, 7.86, and 9.53 no/tiller in different 30, 45, 60, and 75 DAT, respectively) whereas lowest values were found in T_0 (4.46, 5.26, 6.66, and 7.53 no/tiller in different 30, 45, 60, and 75 DAT, respectively) [Figure 3]. According the highest number was found in T_5 (5.20, 6.80, 7.13, and 8.06 cm/tiller), T_3 (4.80, 6.20, 6.86, and 7.86 cm/tiller), T_2 (4.73, 5.86, 6.73, and 7.73 DAT), and T_1 (4.6, 5.46, 6.80, and 7.66 DAT) during 30, 40, 60, and 75 DAT, respectively [Figure 3]. On the other hand, the effects of fertilizer on tillers height of rice per hill were also growing fast and the maximum was found in the vegetative and reproductive phase and then also reduced in the ripening phase. In regard to tiller height in each hill, no significant differences ($P > 0.05$) were found among different treatments.

According the highest height was found in T_4 (33.06, 54.93, 74.26, and 85.46 cm/tiller) whereas, followed by T_5 (32.33, 51.33, 70.60, and 80.86 cm/tiller), T_3 (32.00, 50.93, 68.93, and 78.40 cm/tiller), T_2 (31.06, 49.66, 67.26, and 75.66 cm/tiller), T_1 (30.73, 47.33, 65.86, and 74.33 cm/tiller), and T_0 (30.53, 46.46, 56.33, and 72.53 cm/tiller) during 30, 40, 60, and 75 DAT, respectively [Figure 4]. The highest growth plant in height was observed in T_1 than the other treatments but there was no significant difference ($P > 0.05$) [Figure 4].

Table 4 shows that the mean higher yield of fish was obtained from fertilizer treatment (T_4) in stocking carp fish species (F_C) 7.30 ± 1.86 kg/m² compared to all other fertilizer treatments in stocking carp and tilapia fish species. The yield of fish in F_C with T_4 was significantly differed ($P < 0.05$) among all other fertilizer treatments in F_C and F_T fish species. The mean gross yield of rice was recorded significantly higher ($P < 0.05$) in treatment T_4 , (11.70 ± 3.86 kg/m²) than other fertilizer treatments T_5 (11.25 ± 3.56 kg/m²), T_3 (10.85 ± 5.76 kg/m²), T_2 (10.80 ± 5.55 kg/m²), T_1 (9.90 ± 4.66 kg/m²), T_0 (4.78 ± 3.48 kg/m²) and in F_C and also compared to all other fertilizer treatments in F_T .

Tables 5 and 6 show that the mean DO was recorded a little higher in T_4 followed by T_5 , T_3 , T_2 , T_1 , and T_0 , both in morning and afternoon. On the other hand, the pH value of the treatments was also found to be a little higher in T_4 , followed by T_5 , T_3 , T_2 , T_1 , and T_0 (both in morning and afternoon). Temperature was recorded at about 28°C in the morning and about 30.5°C in the afternoon [Tables 5 and 6].

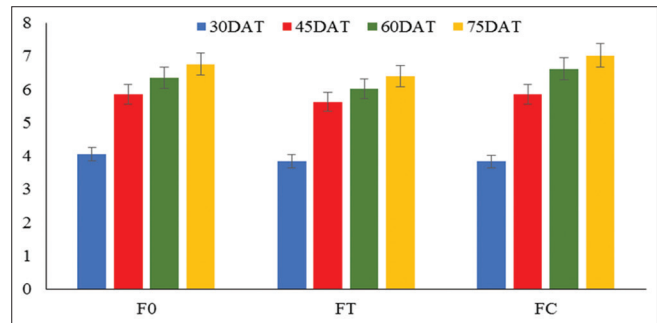


Figure 2: Effects of fish on plant number in each tiller of the rice-fish field

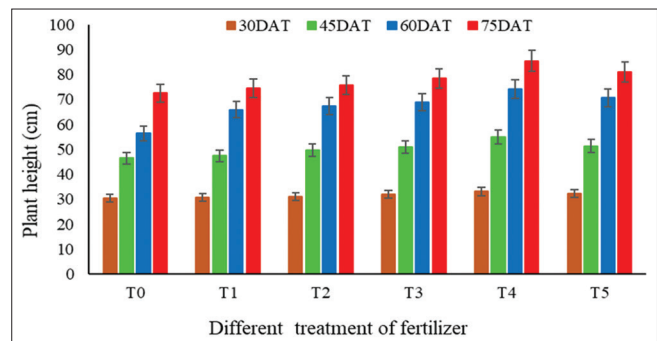


Figure 3: Effects of fertilizer on plant height in each tiller of the rice-fish field

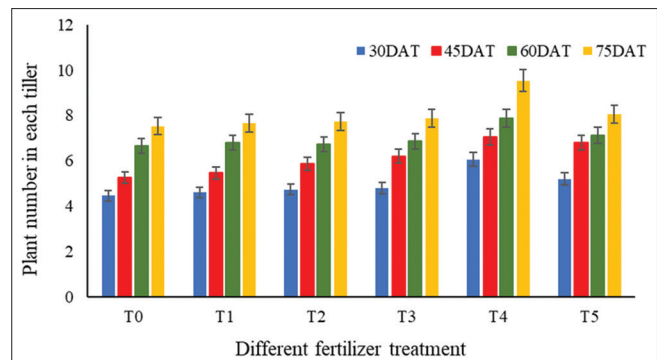


Figure 4: Effects of fertilizer on plant number in each tiller of the rice-fish field

The mean ammonia content was found to range between 0.0016 mg/l and 0.0026 mg/l during the course of the experiment [Tables 4 and 5].

DISCUSSION

Fish yield can be expanded with exact utilization of composts and supplementary feeds in carp polyculture approaches. The principle motivation behind lake preparation is to enlarge the yields of tiny fish which fills in as normal nourishment of the fishes; since treatment empowers both the autotrophic and heterotrophic levels which increment angle creation.^[19] Fish

Table 4: Details productivity of rice-fish farming with different fish species

Details productivity of rice-fish farming (no fish stocking) in F ₀						
Parameter	T ₀	T ₁	T ₂	T ₃	T ₄	T ₅
Average weight of fish (g/fish)	-	-	-	-	-	-
Gross production (Kg/m ²)	-	-	-	-	-	-
Rice (kg/m ²)	4.00±4.56	8.08±3.86	9.45±6.32	9.63±6.66	9.72±4.86	9.72±5.35
Straw (kg/m ²)	4.60±3.24	8.70±1.45	13.50±2.85	12.60±3.54	14.40±4.68	13.50±4.32
Details productivity of rice-fish farming (tilapia fish stocking) in F _T						
Average initial weight of fish (g/fish)	12.48±1.32	12.40±1.52	12.24±0.97	12.57±1.22	12.24±1.07	12.35±1.13
Average final weight of fish (g/fish)	52.07±6.74	56.46±13.88	51.53±7.50	52.61±7.26	66.94±11.69	51.64±4.56
Gross fish production (Kg/m ²)	4.64±2.64	4.65±2.22	4.68±2.25	4.73±1.88	6.02±1.45	5.08±2.28
Gross production of rice (kg/m ²)	4.82±5.54	8.55±3.48	9.00±3.65	9.18±3.38	9.90±4.45	9.18±4.48
Gross production of straw (kg/m ²)	4.70±5.32	8.6±5.86	10.5±4.55	13.5±2.66	14.4±3.86	14.4±5.65
Details productivity of rice-fish farming (carp fish stocking) in F _C						
Average initial weight of fish (g/fish)	25.15±1.54	25.37±1.76	25.33±1.81	25.19±1.35	24.87±1.78	25.45±1.74
Average final weight of fish (g/fish)	67.36±10.32	68.56±6.65	74.12±3.81	75.92±7.59	81.17±12.39	80.68±5.86
Gross fish production (Kg/m ²)	4.06±1.76	6.17±1.84	6.67±1.44	6.83±2.88	7.30±1.86	7.16±2.78
Gross production of rice (kg/m ²)	4.78±3.48	9.90±4.66	10.80±5.55	10.85±5.76	11.70±3.86	11.25±3.56
Gross production of straw (kg/m ²)	4.28±3.86	10.65±3.36	10.75±4.65	12.88±6.24	13.76±3.95	13.55±4.42

Table 5: The water quality parameter (mean±standard error) of rice-fish field during the culture period

Parameter	T ₀	T ₁	T ₂	T ₃	T ₄	T ₅
Oxygen (mg/l)						
at 7 am	4.00±0.29	4.10±0.21	3.90±0.16	3.80±0.19	4.50±0.19	4.45±0.13
at 4 pm	6.68±0.14	6.68±0.15	7.20±0.10	7.50±0.35	7.56±0.17	7.10±0.22
pH						
at 7 am	7.40±0.90	7.72±0.40	7.10±0.45	7.30±0.52	7.80±0.22	7.50±0.72
at 4 pm	7.80±0.65	7.85±0.40	7.35±0.45	7.40±0.40	8.12±0.35	7.65±0.40
Temperature (°C)						
at 7 am	28.10±0.50	28.0±0.75	27.70±0.75	27.80±0.90	27.80±0.90	28.00±0.80
at 4 pm	31.00±1.20	31.10±1.00	30.50±1.20	30.60±1.10	30.40±1.30	30.60±1.40
Ammonia (mg/l)	0.0018±0.0004	0.0016±0.0009	0.0026±0.0011	0.0026±0.0015	0.0021±0.0005	0.0024±0.0018

Table 6: The water quality parameter (mean±standard error) of rice-field after application of fertilizer

Parameter	T ₀	T ₁	T ₂	T ₃	T ₄	T ₅
Oxygen (mg/l)						
at 7 am	4.42±0.15	4.55±0.20	3.95±0.20	3.85±0.20	4.15±0.25	4.05±0.30
at 4 pm	7.55±0.40	7.60±0.20	6.70±0.20	6.70±0.15	7.15±0.25	7.25±0.15
pH						
at 7am	7.85±0.25	7.75±0.45	7.15±0.50	7.35±0.60	7.55±0.75	7.45±0.95
at 4 pm	8.15±0.40	7.90±0.45	7.40±0.50	7.45±0.45	7.85±0.70	7.70±0.45
Temperature (°C)						
at 7am	28.15±0.55	28.05±0.80	27.75±0.80	27.85±0.95	27.85±0.95	28.05±0.85
at 4pm	31.15±1.25	31.15±1.15	30.55±1.25	30.68±1.18	30.45±1.35	30.65±1.45
Ammonia (mg/l)	0.0018±0.0004	0.0016±0.0009	0.0026±0.0011	0.0026±0.0015	0.0021±0.0005	0.0024±0.0018

yield can be expanded up to 5000 kg/ha by nourishing and preparation.^[20] In addition, prawn culture to rice cultivating has been observed to be environmentally stable and is a decent technique for expansion. Prawns originate before on creepy crawlies, enhance soil fertility and constitute a high-valued money trim.^[21] That regularly enhances the rice yield. In the present investigation, a relatively comparative rice yield was acquired from the rice-fish incorporated culture with consistent treatment contrasted and rice monoculture, notwithstanding the way that the planted zone in rice-angle culture was less by 20% in view of the region used for trenches. Comparative outcomes in rice-fish culture were accounted for by Costa-Pierce^[9] and Cai *et al.*^[5] As to rice culture lonely is taken into thought, the rice production from rice-fish culture with the usual application of fertilizer was altogether higher than those of rice monoculture. The wellsprings of supplements going into the rice-fish fields were from fertilizers and feed,^[22,23] yet these supplements were gathered into the water segment of the ditch. From the present investigation, the result displayed that an immediate connection between supplement supply and yielding of rice could be found; expanding supplement supply featuring an expansion of yielding rice and fish. This is shown by the altogether higher fish yield in treatment T_4 taken after by treatment T_5 , T_3 , T_2 , T_1 , and T_0 in carp angle with rice culture. As to tilapia fish with rice culture, a similar event was watched. The rice yields in rice monoculture (9.72 ± 5.35 , 9.72 ± 5.35 , 9.63 ± 6.66 , 9.45 ± 6.32 , 8.08 ± 3.86 , and 4.00 ± 4.56 kg/m²) and rice-fish culture with standard treatment and sustaining acquired in the present investigation (11.70 ± 3.86 , 11.25 ± 3.56 , 10.85 ± 5.76 , 10.80 ± 5.55 , 9.90 ± 4.66 , and 4.78 ± 3.48 kg/m²) are like the yield from the rice-prawn framework (around 4.3 ton/ha/trim) gotten by Nguyen *et al.*^[24] With respect to the preparation impacts, in the inorganic and natural compost fertilizer dosage was higher in net gross yield than those of other manure trials. Thus, inorganic and natural compost dosage 100 kg/ha/month is superior to those of others and can be prescribed in carp polyculture. Shang^[25] got 3,434.07 kg/ha angle in 10 months by applying cow compost, supplementary feed and 50 kg/ha inorganic manure in carp polyculture framework. Dissolved oxygen focuses in all trials were lower than the ideal level of 4 ppm for carp growth after the 5th week.

This result of this study is overall similar to rice-prawn culture with general preparation just and that with both consistent treatment and sustaining, dissolved oxygen fixation was regularly beneath the basic level of 2 ppm^[26] after the 7th week. Low dissolved oxygen fixations in those trials may be a direct result of the blossoming of duckweed and green growth that shaded the trench and water surface of the rice field, bringing about the lessening of phytoplankton in the water segment, and keeping oxygen dissemination from the environment. In spite of the fact that rice generation was most reduced in the rice-prawn culture with basal treatment and nourishing, prawn

yield was most elevated in this framework. These outcomes demonstrate that the prawn effectively expended the feed, yet the supplements accessible for rice plants were not sufficient for ideal rice yield. Lee and Wickins^[27] revealed that the net yield in broad prawn culture was around 200–300 kg/ha/year, which is impressively not as much as the present yield of 816–1268 kg/ha/year. This shows prawn culture in rice fields is more profitable and is a superior approach than the monoculture. In spite of the fact that the day by day weight pick up of prawns in this rice-prawn culture is low contrasted and the information from lake culture, which is around 0.4 g/prawn/day, survival rates are pretty much like that in escalated prawn culture in lakes, which is 60%.^[28] The size circulation of the freshwater prawns was observed to be skewed, and guys became speedier than females. Comparative outcomes were seen by Sampaio and Valenti.^[29]

CONCLUSION

We can conclude from the study that the effects of fertilization with different treatments (dosages) on the productivity of rice-fish farming in regards of Tilapia fish stocking were best than those of carp fish stocking and even only in rice culture. We can consider for the application of fertilizer (5 t compost fertilizer + 75% RF, i.e., urea 281.25 g/15 m², triple superphosphate 135.00 g/15 m², Muriate of Potash 112.50 g/15 m² gypsum 67.50 g/15 m² and ZnSo₄ 11.25 g/15 m²) in tilapia fish culture as the standard dosage for more production that will more effective in rice-fish farming aquaculture in our country.

ACKNOWLEDGMENTS

The authors wish to thank Md. Parvez Anwar of the BAU, for their field and laboratory assistance and KASS trade, Dhaka for providing financial supports for this research' will be changed as "The authors wish to thank Md. Parvez Anwar from Bangladesh Agricultural University (BAU), Mymensingh, Bangladesh for using their field and laboratory assistance and also KASS trade, Banglamotor, Dhaka for providing us the financial supports to do this research work".

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