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SIS-CARP POLYCULTURE IN HOMESTEAD POND OF RURAL WOMEN FARMER

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ABSTRACT

Khan RH, Monir MS, Sharmin S, Bhadra A, Doulah MAU (2014) SIS-Carp polyculture in homestead pond of rural women farmer. *Int. J. Expt. Agric.* 4(4), 19-23.

The experiment was carried out on Carp polyculture with SIS in three homestead ponds (each size 15 dec.) of rural women farmer from 2 July to 30 December 2012 in three earthen ponds at Ramgopalpur under Gouripur upazila of Mymensingh district. The stocked fishes were silver carp (*Hypophthalmichthys molitrix*), catla (*Catla catla*), rui (*Labeo rohita*), mrigal (*Cirrhinus mrigala*) and, mola (*Amblypharyngodon mola*) and stocking density per decimal was 15, 6, 20, 6 and 150 fish, respectively. Fishes were fed with three diets consisting of rice bran with mustard oil cake, rice bran and wheat bran in T_1, T_2 and T_3, respectively. The physico-chemical parameters were found in suitable range for fish culture during experimental period. Among the treatments, the highest mean final weights were found in silver carp 80.00, catla 42.00, rohu 112.00 and mrigal 31.20 kg/15 dec. in T_1. The mean final weight of mola (SIS) was also highest found in T_1 (4.80 kg/15 dec.) and lowest in T_3 (4.70 kg/15 dec.). Among the treatments, the survival rate of carps species were highest in T_1 ranging from 87.50 to 93.33. However, total production of SIS with carp polyculture was also highest in T_1 (270 kg/15 dec.) and lowest was in T_3 (190.10 kg/15 dec.).

Key words*: *SIS-Carp, polyculture, homestead ponds, women

INTRODUCTION

Bangladesh is one of the most densely populated country in the world. The total population is 152 million of which 78 million (51 percent) are male and 74 million (49 percent) are female. The male-female ratio in rural areas is 103:100 (BBS 2012). Generally the rural society of Bangladesh is patriarchal. After marriage a girl moves to her husband's family, so her own identity is changed from father to husband. Therefore, women are usually dependent on male because of social structure and social relationship. The social system enables men to control property rights, source of income, and women's labor and enforces (Begum 1987). As a results, large number people of total population are being unused.

Bangladesh comprises a large quantity of water bodies i.e. about 1,46,890 ha of ponds, 1,14,161 ha of heels, 68,800 ha of Kaptai lake, 5,488 ha baors and 10,31,563 ha of rivers including estuaries except the Sundarban area (DoF 2012). Having a vest area of water body, the nation is being deprived of getting expected fish protein. Given the large water body, animal protein requirement can be fulfilled by fish through intensive and scientific aquaculture.

There is a big difference of yield between scientifically and traditionally culture system. It is recognized that use of supplementary inputs such as, feeds and fertilizer are very much important to increase production. Generally, a managed pond produced about 2,725kg/ha/year whereas yield of an unmanaged pond could not exceed more then 500kg/ha/year (Uddin 2002). Therefore, yield of fish pond can be increased by 5 to 6 times using proper management and it can be further increased through involvement of women. However, in the present study is to increase SIS with carps polyculture with involvement of women in homestead ponds for increasing household income.

MATERIALS AND METHODS

Study area

The experiment was conducted in three earthen ponds which are situated at Ramgopalpur under Gouripur upazila, Mymensingh district for a period of 6 months from July to December in 2012. The size of each pond used in this experiment was approximately 15 decimal. The water depths of the experimental ponds were maximum six feet.

Experimental design

Silver carp (*Hypophthalmichthys molitrix*), catla (*Catla catla*), rui (*Labeo rohita*), mrigal (*Cirrhinus mrigala*) and mola (*Amblypharyngodon mola*) was used as experimental species. Ponds were used as treatment-1 (T_1), treatment-2 (T_2) and treatment-3 (T_3) in which rice bran with mustard oil cake, rice bran and wheat bran were used as T_1, T_2 and T_3, respectively. Details experimental design is presented in Table 1.

Table 1. Design of the experiment (SIS with Carp polyculture)

Treatments	Experimental Species	Feeds	No of species being stocked per decimal
T_1	Silver carp (*H. molitrix*)	Rice bran with mustard oil cake	15
	Catla (*C. catla*)		6
	Rui (*L. rohita*)		20
	Mrigal (*C. mrigala*)		6
	Mola (*A. mola*)		150
T_2	Silver carp (*H. molitrix*)	Rice bran	15
	Catla (*C. catla*)		6
	Rui (*L. rohita*)		20
	Mrigal (*C. mrigala*)		6
	Mola (*A. mola*)		150
T_3	Silver carp (*H. molitrix*)	Wheat bran	15
	Catla (*C. catla*)		6
	Rui (*L. rohita*)		20
	Mrigal (*C. mrigala*)		6
	Mola (*A. mola*)		150

Experimental pond preparation

The bushy plants at the bank of experimental pond were cleaned thoroughly as well as excessive black soil of the pond bottom were removed manually. Rotenone was applied at the rate of 0.08 kg/dec. for killing unwanted fish species and then liming was applied at the rate of 1 kg/dec. After nine days, all the treated ponds were filled up with underground water and fertilized with cow dung, urea and TSP at the rate of 6, 0.15 and 0.075 kg/dec., respectively.

Stocking of fingerlings in the experimental ponds

Fingerlings of silver carp (*H. molitrix*), catla (*C. catla*), rui (*L. rohita*), mrigal (*C. mrigala*) and mola (*A. mola*) were collected from Ramgopalpur bazar under Gouripur upazila Mymensingh district. Average initial length of carp species were 5-10 cm and mola 2-3 cm. After ten days of fertilization, the fingerlings were stocked and similar stocking density was maintained in all the experimental ponds.

Experimental feed supply

Stocked fingerlings were fed with three different supplementary feed, such as rice bran with mustard oil cake in T_1, rice bran in T_2 and wheat bran in T_3 at the rate of 5-10% body weight twice daily by first two months. The rest of the months feed were used at the rate of 4-5% body weight.

Physico-chemicals parameters

The physico-chemicals parameters such as water temperature (^oC), dissolved oxygen (mg/l), carbon dioxide (mg/l) and pH were measured fortnightly using a Celsius thermometer, a Secchi-disk a portable dissolved oxygen or carbon dioxide meter (HI 9142, Hanna Instruments, Portugal) and a portable pH meter (HI 8424, Hanna Instruments, Portugal).

Harvesting of the cultured fish

After six months of culturing, the fish were harvested by pond drying. During harvesting, fishes were weighted as species wise to assess final weight, survival rate (%) and total production.

Data Analysis

The collected data were coded, summarized and processed for analysis. Any kind of inconsistencies in the data were searched and avoided. Data entry was made in computer and analysis was done using the concerned software Microsoft Excel.

RESULT

Physico-chemical parameters

During the study period, the physico-chemical parameters of water *viz.* temperature (^oC), dissolved oxygen (mg/l), carbon dioxide (mg/l) and pH were found within suitable ranges. The mean values of temperature were recorded 32.31±1.33 (T_1), 32.93±1.27 (T_2) and 32.01±0.94^oC (T_3) in the experimental ponds and presented in Table 2. The mean dissolved oxygen recorded during the study period was 6.64±0.53 to 7.04±0.50 mg/l in T_3 and T_2. The carbon dioxide (CO_2) content of the water varied from 6.30±0.7 to 7.31±0.39 mg/l. The mean values of pH were observed 7.33±0.44, 7.22±0.33 and 7.47±0.14 in T_1, T_2 and T_3, respectively.

Table 2. Physico-chemicals parameters (Mean±Sd) under different treatments during the study period

Parameters	Treatments		
	T_1	T_2	T_3
Temperature (^oC)	32.31±1.33	32.93±1.27	32.01 ±0.94
DO (mg/l)	6.93±0.57	7.04±0.50	6.64±0.53
CO_2 (mg/l)	6.69±0.41	6.30±0.74	7.31±0.39
pH	7.33±0.44	7.22±0.33	7.47±0.14

Growth, survival rate and production performance of cultured fish

Growth, survival rate and production performance of different cultured species among the treatments are shown in Table 3. Initial weight of silver carp, catla, rui, mrigal and mola were 16.88, 6.00, 22.5, 13.5 and 2.25 kg/15 dec., respectively during the stocking period. At the end of the experiments, the mean final weight were found of silver carp 80.00, catla 42.00, rohu 112.00 and mrigal 31.20 kg/15dec. in T_1 and, in T_2 silver carp 63.00, catla 35.00, rohu 96.25 and mrigal 26.25 kg/15dec. and in T_3 silver carp 178.00, catla 98.00, rohu 270 and mrigal 72 kg/15dec. in the experimental ponds. The mean final weight of mola was found 4.80, 4.75, and 4.70 kg/15 dec. in T_1, T_2 and T_3, respectively. However, species wise the highest mean weight trends were also found in T_1 then followed by T_2 and T_3 (Fig. 1). The survival rate (%) of different fish species in different treatments was fairly high in the study. Among the treatments, the survival rates of carps species were the highest in T_1 that ranging from 87.50 to 93.33. The lowest survival rate was found in T_3 among the carps species that ranging between 29.40 to 81.00. After stocking, mola started to natural breed within two months and the number had increased and thus the ultimate survival up to 100% at the end of the experiment. The total production was 270.00 in T_1 where as 225.25 in T_2 and 190.10 kg/15 dec. in T_3. However, the total production of SIS with carp polyculture was highest in T_1 and the lowest was in T_3 at the end of the experiment.

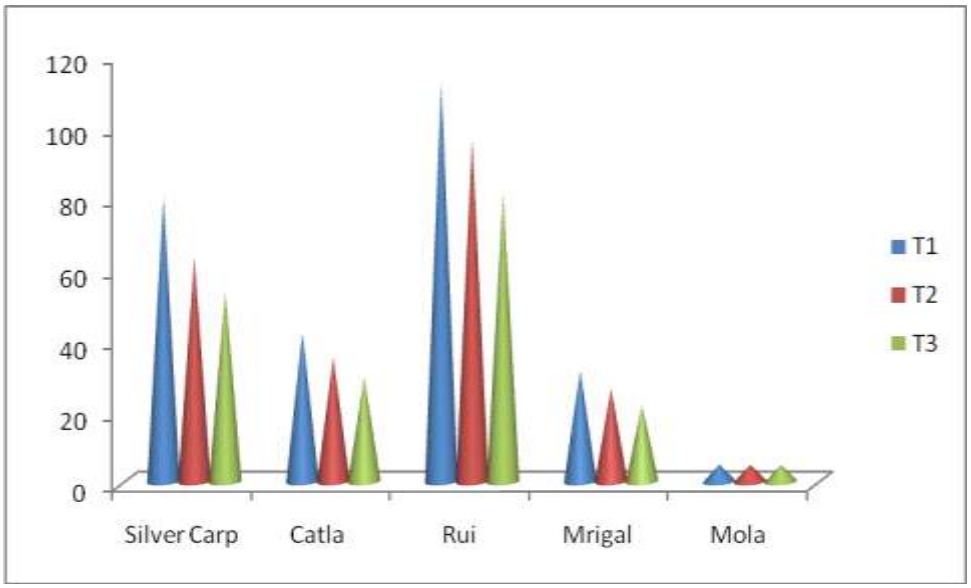

Fig. 1. The trends of yield performances (kg/15 dec.) in different treatments under SIS with carps polyculture systems

Table 3. Growth, survival rate and production of fish as obtained under three treatments during the study period

Treatments	Species	Fish stoked		Fish harvested			Production (kg/15 dec./ 6 months)
		No of fish/15 dec.	Initial weight of fish/15 dec./kg	No of fish harvested/ 15 dec.	Total final weight of fish/15 dec./kg	Species wise survival rate	Total production
T_1 (Rice bran With mustard oil cake)	Silver carp	225	16.88	200	80.00	88.88	270.00
	Catla	120	6.00	105	42.00	87.50	
	Rui	300	22.5	280	112.00	93.33	
	Mrigal	90	13.5	78	31.20	86.67	
	Mola	2250	2.25	2400	4.80	100	
T_2 (Rice bran)	Silver carp	225	16.88	180	63.00	80.00	225.25
	Catla	120	6.00	100	35.00	83.33	
	Rui	300	22.5	275	96.25	91.67	
	Mrigal	90	13.5	75	26.25	83.33	
	Mola	2250	2.25	2375	4.75	100	
T_3 (Wheat bran)	Silver carp	225	16.88	178	53.40	79.11	190.10
	Catla	120	6.00	98	29.40	81.67	
	Rui	300	22.5	270	81.00	89.01	
	Mrigal	90	13.5	72	21.60	80.00	
	Mola	2250	2.25	2350	4.70	100	

DISCUSSION

Growth, feed efficiency and feed consumption of fish are normally governed by a few environmental factors (Brett 1979 and Kohinoor *et al*. 2012). The physico-chemical parameters recorded in three treatments were measured more or less similar and those were within the suitable range for fish culture. The range of water temperature recorded in T_3 and T_1 were varied from 32.01 to 32.31^oC. Rahman and Monir (2013) recorded water temperature from 29 to 30^oC in their experimental ponds, which is lower than the result of present study. Uddin (2002) found water temperature varied from 25.60 to 33^oC in farmers carp polyculture ponds, which is more or less similar with the value of the present experiment. The mean dissolved oxygen (DO) concentrations were higher in T_2 (7.04 mg/l) than those obtained in T_1 (6.93 mg/l) and T_3 (6.64 mg/l). Rahman *et al.* (2013) measured dissolved oxygen from 4.13 to 4.71 mg/l in monoculture of Thai koi with seven months culture period. Ahmed *et al.* (2009) also recorded dissolved oxygen value range from 3.00 to 5.45 mg/l in four beels (Shidlong, Gangni, Buka, Kailla) of Mymensingh during April 2006 to March 2007, which are lower values than the present experiment. Rahman *et al.* (1992) reported that dissolved oxygen content of a productive pond should be 5.00 mg/l or more. However, the DO values in the present study were around 6 to 7. pH is considered as an important factor role in fish culture. The mean pH values were 7.33 in T_1, 7.22 in T_2 and 7.47 in T_3 which indicated good productive condition for fish culture. The pH values of pond water under different treatments were found to be slightly alkaline. Hoq *et al.* (1996) measured pH from 7.50 to 8.00 in five prawn ponds, which are almost similar with the present findings. However, the pH range was found to be suitable for fish culture that agree with the findings of Rahman *et al.* (2005) and Kohinoor *et al*. (2012).

The highest weight gain for each species in the experimental pond was observed in treatment T_1 receiving (rice bran with mustard oil cake) followed by T_2 fed with rice bran and T_3 fed with wheat bran. The better weight gain attained in T_1 might be due to proper utilization of both natural and supplementary feed by the fishes.

The mean survival rate (%) of silver carp, catla, rui and mrigal in different treatments were varied between 79.11 to 93.33%. which is almost similar with the findings of Ali *et al*. (2005) but higher than that reported by Azad *et al*. (2004). The survival rate of mola was 100% due to its prolific breeding behavior. Haroon and Hossain (2001) was found about 100% survival rate of mola in cemented cisterns.

The maximum fish production (270.00 kg/dec./5 month) was obtained in treatment T_1 fed with (rice bran with mustard oil cake) and the lowest fish production (190.10 kg/dec./5 months) was obtained from T_3 fed with wheat bran. However, in this experiment, the fish production was higher than those reported by Jose *et al.* (1992), Islam *et al*. (1999) and Hossain *et al*. (2003). Jose *et al*. (1992) reported a gross production of 106-254 kg/ha for a 160 days period. Therefore, rice bran with mustard oil cake can be used as supplementary feed for carp polyculture with SIS in homestead ponds with women farmer.

CONCLUSION

The socio-economic conditions of involved rural women in SIS carp polyculture at Ramgopalpur were not so good. They can easily improve their economic status to involve in fish culture by using their near homesteads ponds. However, rural women farmers can be used rice bran with mustard oil cake as supplementary feed for SIS-Carp polyculture in their homestead ponds.

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