Management Practices Followed by the Farmers in Semi-intensive Koi (*Climbing perch*) Farming

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Abstract

The purpose of the study was to determine the extent of semi-intensive management practices followed by the farmers in koi farming and to explore the relationships between selected characteristics of the farmers and their extent of management practices. Data were collected from 105 randomly selected koi farmers (out of 419 farmers) from Kheruajani union of Muktagachha upazila under Mymensingh district during March to April, 2011. Management practices followed by the farmers was measured by developing 19 management practices and each of the management practices was put against a four-point rating scale such as not at all practiced, rarely practiced, occasionally practiced and frequently practiced and the corresponding scores were given as 0, 1, 2 and 3, respectively. The findings indicate that the about half of the respondents (49 percent) had medium level of management practices followed by 30 percent having high level of management practices. Based on management practice index 'applying supplementary feed twice a day', 'checking growth of fish regularly by sampling', 'regular checking of fish diseases by sampling', and 'applying formulated commercial diet' were the top three aspects, respectively. Out of ten selected characteristics of koi farmers, their educational level, farm size, annual income, fish farming experience, communication exposure, training exposure, social mobility, and knowledge about koi farming showed significant positive relationships with management practices followed by them.

Keywords: Farmers, management practices, koi, semi-intensive farming.

Introduction

Fish and fisheries are extremely important for Bangladesh. Fisheries sector supports livelihood to about 12 million people of the country directly or indirectly. Another 3.08 million farmers are cultivating fish and shrimp at both subsistence and commercial level (Mazid, 2002). This sector is second to agriculture in the over-all economy of Bangladesh. It plays an important role in the development of agro-dependent economical condition, nutrition, employment generation, protein intake, poverty alleviation and foreign exchange earnings and also in the improvement of socio-economic conditions of poor fisherman.

Among the live fishes, climbing perch (*Anabas testudineus*), commonly known as koi, is an indigenous and demandable fish of Bangladesh. The species is considered as a valuable item because of its special nutritive and medicinal qualities; ailing patients use it as diet for recovering from illness. This fish has very good market demand and command more lucrative price than Indian major carps and other table fishes. Considering the culture potentials of this fish very recently, a sharp increasing trend has observed on Thai Koi culture in some selected areas of Bangladesh, particularly, it is predominant in several upazilas of Mymensingh district. Thai Koi

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is considered to be one of the most economic and important fishes of Bangladesh because of its high market demand, good nutritional value, delicious taste, availability of fry and fingerlings, growth rate, short duration of culture and easy marketing (Kulsum, 2005).

At the present situation of the country culture of koi is the most important and efficient aquaculture issue. Therefore it is necessary to develop an effective culture management technique for this species. Although the farmers culture this species commercially in many regions of the country, they do not follow the actual scientific management practices. So the total production and the net profit remain low for this species. Mainly middle class farmers do this culture by semi-intensive culture system, but they do this culture without any scientific knowledge or training. Considering the above facts, the researchers undertook a study with the following objectives; i. to determine the extent of management practices followed by the farmers in semi-intensive koi framing and; ii. to explore the relationships between selected characteristics of farmers and their extent of management practices.

Methodology

The total number of commercially cultivated koi farmers (419 farmers) in Kheruajani union was the population of the study. Among them 25 % of the farmers were selected randomly to constitute a sample size of 105. The independent variables of the study were ten selected characteristics of koi producing farmers namely, age, educational level, family size, farm size, annual income, fish farming experience, communication exposure, training exposure, social mobility and knowledge about koi farming. These were measured employing prevailing standard methods.

The dependent variable of the study was the management practices followed by the farmers in semi-intensive koi farming. The dependent variable was measured by developing a four-point rating scale with 19 management practices on two main aspects 8 pre-stocking and 11 post-stocking management practices). The scores 0, 1, 2 and 3 were assigned for not at all practice, rarely practice, occasionally practice and frequently practice, respectively. The extent of management practices score of a respondent was determined by adding up the score for responses against all of the 19 practices. Thus the management practices for koi farming, the score could range from 0 to 57, 0 indicates not at all practice and 57 indicate frequently practice. For getting clear understanding about the different management practices followed by the farmers, Management Practice Index (MPI) was determined based on the following formula:

$$MPI = (P_f \times 3) + (P_0 \times 2) + (P_r \times 1) + (P_n \times 0)$$

Where,

P_f = Number of respondents with frequent management practices

P_0 = Number of respondents with occasional management practices

P_r = Number of respondents with rare management practices

P_n = Number of respondents with not at all management practices

The MPI of a management practice could range from 0 to 300, 0 indicates no management and 300 indicates frequent management of the practices. Data were collected from the sample using a pre-tested and structured interview schedule by the researcher himself during 01 March to 14 April 2011.

Findings and Discussion

Selected Characteristics of Koi Producing Farmers

A summary of ten selected characteristics koi producing farmers has been presented in Table 1. Data in Table indicated that majority of the respondents (79%) were young to medium aged, while the highest proportion (54.29%) of them were found with secondary level of education. About two-thirds of the respondents (64%) were belonged to small to medium size of family and the overwhelming majority (89%) of them had small to medium farm size. Data related to annual income indicate that half of the respondents had medium income followed by high (41%).

Table 1 Salient features of the selected characteristics of koi producing farmers (N= 105)

Selected Characteristics (Unit of measurement)	Possible range	Observed range	Respondents' categories	Respondents		Mean	SD
				No	Percent		
Age (Year)	Unknown	21-65	Young (up to 30) Middle aged (31-45) Old (> 45)	38 45 22	36 43 21	40.54	10.38
Educational level (Year of schooling)	Unknown	0.5- 16	No education (0) Can sign only (0.5) Primary (1-5) Secondary (6-10) Higher secondary (>10)	0 9 22 57 17	0 9 21 54 16	8.12	3.91
Family size (Number)	Unknown	3-12	Small (up to 4) Medium (5-6) Large (>6)	23 44 38	22 42 36	6.18	2.15
Farm size (Hectare)	Unknown	0.03-3.87	Small (0.21-1.00) Medium (1.01-3.00) Large (>3.00)	32 62 11	30 59 11	1.21	0.845
Annual income ('000' Tk)	Unknown	83.5-850.5	Low (up to 100) Medium (101- 200) High (>200)	9 53 43	9 50 41	350.03	242.0
Fish farming experience (Year)	Unknown	1-6	Low (up to 2) Medium (3- 4) High (>4)	48 49 8	46 46 8	7.78	1.03
Communica-tion exposure	0-36	4-21	Low (1-12) Medium (13-24) High (>24)	65 40 0	62 38 0	11.59	3.48
Training exposure (Day)	Unknown	0-9	No training (0) Low (1-3) Medium (4-6 High (>6)	79 20 1 5	75 19 1 5	0.904	1.85
Social mobility (Score)	0-21	6-20	Less (up to7) Medium (8-14) High (>14)	15 65 25	15 65 25	11.55	3.34
Knowledge about koi framing (Score)	0-24	8-23	Low (up to12) Medium (13-18) High (>18)	20 47 38	19 45 36	16.45	3.82

The significant proportion (92%) of the farmers were found with low to medium experience with fish farming while, more than three-fifths of the respondents had low level of exposure with communication media. Findings related to training exposure of the respondents reveal that the highest proportion (75%) of the respondents had no training experience while the highest proportion (65%) of them had medium social mobility. Data contained in Table 1. indicate that the majority (44.76%) of the respondents had medium knowledge compared to 36.19% having high and only 19.05% having low knowledge about koi farming. It reveals that the majority of the koi farmers in the study area had medium knowledge about koi farming. That means that increase of farmers' knowledge is important for commercial koi culture. Rahman (2010), in his study on aquaculture management practices followed by the fish farmers found no respondent having low knowledge on aquaculture management practices.

Extent of Management Practices Followed by the Farmers
The major focus of the study was management practices followed by the koi producing framers. The management practice score ranged from 25 to 49 against a possible score of 0 to 57. On the basis of respondent score they were classified under the following categories presented in Table 2.

Table 2 Distribution of the koi producing farmers according to their management practices in semi-intensive koi culture

Management practices followed by the koi producing farmers	Koi farmers (n=105)		Mean	SD
	Number	Percent		
Low management practices (up to 32)	22	21		
Medium management practices (33 to 41)	51	49	37.81	7.78
High management practices (Above 41)	32	30		

Data in Table 2 indicate that slightly less than one half (49%) of the respondents follow medium management practices and 30% of the koi producing farmers possessed high management practices. Burhan (2009) in his study found that about 54% of the respondents had medium management practices of commercial pangus culture. The findings clearly indicate that most of the respondents had a medium management practice which was similar to the present study.
The management practices of the koi producing farmers were measured by using a total of 19 practices in two broad aspects of koi farming: Pre-stocking (8 practices), and Post-stocking (11 practices). For getting a deeper insight into the management practices followed by the farmers in semi-intensive koi farming, the researcher made a specific practice-wise analysis. The results of these analysis and Management Practice Index (MPI) along with rank order are presented in Table 3.
According to MPI 'applying supplementary feed twice a day' got the highest MPI (315). In case of two management practices namely- 'checking growth of fish regularly by sampling (1 times/week) and 'regular checking of fish diseases by sampling (1 times/week)', the MPI and rank were same i.e. 298 and 2.5 respectively. This is because when a farmer check the growth of fish he checks the disease occurrence

simultaneously. Burhan (2009) found that in the management practice named checking and selection of fish seeds for stocking (e.g. health and disease) the MPI and rank were 282 and 2 respectively which is very much similar to the present study. Rahman (2010) also found more or less similar findings in his study.

Table 3 Rank order of the management practices followed by the farmers in semi-intensive koi farming

Sl. No.	Management practices	Extent of practices				MPI	Rank order
		Frequently	Occasio-nally	Rarely	Not at all		
1.	Applying supplementary feed twice a day	105	0	0	0	315	1
2.	Checking growth of fish regularly by sampling (1 times/week)	88	17	0	0	298	2.5
3.	Regular checking of fish diseases by sampling (1 times/week)	88	17	0	0	298	2.5
4.	Applying formulated commercial diet	89	14	0	2	295	4
5.	Preparation of pond by dry method	72	29	4	0	278	5
6.	Stocking density (>500/dcm)	73	28	1	3	276	6
7.	Exchange water during winter (1 time/month)	77	17	5	6	270	7
8.	Construct net/fencing surrounding the pond	64	36	4	1	268	8
9.	Site selection based on suitable soil type (loam, silty-clay, sandy clay & silty-loam) and availability of sunlight	42	63	0	0	252	9
10.	Select standard quality fish seed for culture (e.g. size 1-2 cm)	42	55	5	3	241	10
11.	Applying lime to prevent disease and toxic gases and use antibiotic in fish feed to control disease	40	47	17	1	231	11
12.	Harvest marketable sized of fish	22	74	5	4	219	12
13.	Control aquatic weed by physical and biological methods before preparing pond	19	50	35	1	192	13
14.	Dike construction done during the end of the dry season	15	47	43	0	182	14
15.	Control undesirable fish species by netting and using rotenon	25	29	45	6	178	15
16.	Applying fertilizer to increase natural food and fertility of soil	9	21	27	48	96	16
17.	Applying traditional Koi feed	1	10	18	76	41	17
18.	Maintain natural productivity of food by supplying fertilizers	4	1	10	90	24	18
19.	Applying poultry litter in pond	2	1	12	90	20	19

Relationship Between the Selected Characteristics of Farmers and Their Management Practices

Results of the test of co-efficient of correlation between each of the independent variables and the dependent variables are shown in Table 4. In order to explore the relationships between the selected characteristics of farmers and the management practices followed in semi-intensive koi farming, Pearson's Product Moment Correlation Coefficient 'r' has been used.

Table 4 Co-efficient of correlation (r) between selected characteristics of practices farmers and their management practices

Characteristics of the farmers (independent variables)	Co-efficient of correlation (r)
Age	0.095
Educational level	0.328**
Family size	0.030
Farm size	0.201*
Annual income	0.198*
Fish farming experience	0.338**
Communication exposure	0.529**
Training exposure	0.465**
Social mobility	0.435**
Knowledge about koi farming	0.777**

* = Significant at 0.05 level,
** = Significant at 0.01 level with 103 df

Data in Table 4 indicate that out of farmers' ten selected characteristics, level of education, farm size, annual income, fish farming experience, communication exposure, training exposure, social mobility and knowledge about koi farming of farmers were positively correlated with their management practices. Farmers' two characteristics i.e, age and family size had no significant relationship with their management practices followed in semi-intensive koi farming.

An educated farmer generally becomes more conscious about using different improved cultivation techniques for farming. More education gets them aware about new farming techniques using improved technology. Rahman (2010) and Faruque (2007) found that educational level of the respondents was significant positive relationship with their aquaculture management practices. If farmers have large farm size with high annual income, they can take risk in adopting new cultivation techniques. Reza (2007) reported similar finding concerning farm size and farmers' annual income. A positive relationship between farmers' fish farming experience and their management practices meant that farmers with long experience in fish farming usually have good exposure in better management practices. Burhan (2009) in his study on management practices followed by the farmers in pangus farming found the similar findings.

The more the communication exposure, training exposure and social mobility of farmers the more the adoption and proper management of improved farming practices. Hoque *et al.* (2010) and Burhan (2009) and Rahman (2010) concluded similarly in their respective studies. The knowledge of farmers about koi framing had significant positive relationship with their management practices meant that farmers high knowledge about a specific farming practice helps him to conduct similar works properly. Faruque (2007) and Rahman (2010) reported similarly.

Conclusion

The findings of the present study indicate that koi producing farmers follow different management practices concerning semi-intensive koi cultivation in their locality. The majority of the farmers follow medium to high level of management practices in koi farming. This may be concluded in such a way that farmers in the study area already have some sort of previous knowledge and orientation about koi farming. As the study area was one of the commercially koi producing areas in Mymensingh district, farmers received some training both from GOs and NGOs. Farmer to farmer extension, easy access to information sources, availability of inputs and stable market prize may be helpful for koi producing farmers to cultivate koi more commercially in the study area. This will lead to increase their income and will help to improve their livelihoods. Therefore, the Department of Fisheries (DoF) and other local agencies who work for fisheries development may consider these issues during their policy formulations should.

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