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Preferences of fishes to different types of *Katha* materials used in sanctuaries in three rivers of Netrokona

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Abstract. Use of different fish-friendly '*katha*' materials in fish sanctuary is a new concept in Bangladesh. Two kilometers area of each of the three rivers namely the Updakhali, the Kalihar and the Kangsha in Netrokona district were used to set up four sanctuaries in order to evaluate the preference of fishes to *katha* materials. Three types of *katha* materials viz. tree roots, bamboo roots and tree branches (traditional) and one blank spot (without *katha* materials) as control were tested. The study was conducted for two years from November 2003 to March 2005 and fish were harvested three times per year during December, February and March. A total of 43 species of fish were recorded. In the second year, the total number of fish increased 6.40, 8.42 and 8.39 folds than that of the first year in the tree root, bamboo root and traditional *katha,* respectively. The maximum species compositions (40) was found in the traditional *katha* and the minimum (30) in the bamboo root katha. Out of 43 species, 11 species were found to prefer all the three types of *katha* materials and aggregated in large numbers. Among the mostly available 11 species, Titari, *Psilorhynchus sucatio* showed the highest abundance (3,859) followed by Tengra, *Mystus vittatus* (3,597) in traditional and bamboo root *kathas,* respectively in the second year while Tengra also showed highly preference for bamboo root *Katha* in the first year. Prawn (*Macrobrachium rude*) showed no special affinity for any particular *katha* while Mola (*Amblypharyngodon mola),* Chanda (*Chanda ranga*), Chapila *(Gudusia chapra),* and Darkina (*Esomus danricus*) showed the highest preference for traditional *katha.*

Introduction

Bangladesh has a total inland water area of 4.3 million ha of which 94% is used for open water capture fishery and 6% for closed water culture fishery. An estimated 1.03 million ha rivers and estuaries, 0.82 million ha floodplains and 0.06 million ha Kaptai lake offer tremendous scope and potential to augment fish production in the country. The inland open water fishery resources have been playing a significant role in the economy, culture, tradition and feeding habit of the people of Bangladesh (Ahmed et al., 1997). Rivers and their ramified branches cover about 8,50,000 ha area of land. More than 2 million people directly or indirectly depend on inland capture fisheries for their livelihood.

Few attempts have been made for natural conservation of open water fishes of Bangladesh. Production from open water is gradually declining because of over-fishing, earth filling, pollution and myopic management practices and so on. A good number of natural fishes which are highly preferred for their taste and nutritive value are now endangered. To protect the native species different development projects attempted to establish fish sanctuaries in the open water bodies of different areas in the country.

Fish sanctuaries refer certain sections of rivers, beels or any other reservoirs that are closed for fishing for a certain period or all the year round where fish congregate naturally for feeding and breeding and are found in large number (Jhingran, 1984). From time immemorial tree branches and roots are generally used to aggregate and harvest fish in the rivers and *beels* which is called *Katha* fishery. The '*Katha*' fishery is essentially a 'Fish Aggregating Device' (FAD). The term '*Katha*' also varies regionally with a number of synonyms like '*Jhag*', '*Katta*' and '*Jhata*'. The same technique is called '*Komar*' in the Oxbow lake areas of Bangladesh (Middendorp *et al*., 1996). Welcomme (1972) introduced the term fish sanctuary as '*Acadjas*' in the coastal lagoon of West Africa. In Cambodia these devices are named as '*Samarahs*' (Shankar *et al*., 1998). Traditional *kathas* in Bangladesh are usually constructed with branches of bushy trees like Hizole (*Barringtonia acutangula*), Gamboling (*Diospyros pererina*) or Babla (*Acacia sp*.). The device is supported by a number of bamboo poles fixed around the *katha* to prevent downstream drifting of the structure by water current. Water hyacinth (*Eichhornia crassipes*) is used to cover the *katha*.

A number of non-government organizations like BRAC, CARITAS, CNRS, PROSHIKA and WorldFish Centre (CBFM project) are involved in fish stock development by establishing traditional sanctuaries in *beels* and rivers of Bangladesh (Ahmed and Ahmed, 2002, Ahmed 2002, Ahmed *et al.* 2003). Most of them established *kathas* with traditional materials like tree branches, bamboos etc. However, no attempt has been made to study the effectiveness of diversified *katha* materials to attract selective fishes into the katha. Hence, attempts were made to investigate the preference of fish to different *katha* materials with a view to conserve fishes naturally with a particular *katha* material.

Materials and methods

Three *katha* materials *i.e*. bamboo roots, tree roots and tree branches were chosen to be placed in three locations within two-kilometer area in each of the three rivers namely the Updakhali, the Kalihar and the Kangsha in Netrokona district. *Kathas* under 4th treatment were made without any *katha* material (blank) and were surrounded by bamboo poles and frames only. Thus in each river four fish aggregating devices (FAD) were arranged. Respective *kathas* were established

involving the local fishing communities. Signboards of various kinds and flags of different colours were made for individual *katha* in order to create awareness to the local community about the ongoing work. The size of each *katha* was 10 m x 10 m i.e. 100 m^2. The number of tree roots, bamboo roots and tree branches were 30, 150 and 25, respectively. There were eight bamboo poles with flags surrounding each *katha*. Besides, aquatic vegetation like water hyacinth (*Eichhornia crassipes*), helencha (*Enhydra fkuctuans),* kalmi (*Ipomia aquatica*), singra (*Trapa maximowiczii*), malancha (*Euryale ferox*) were also used at the middle zone of every *katha* for stable shade following Ahmed *et al*. (2003).

A good understanding was maintained with different committees such as BMC (*Beel* Management Committee), RMC (River Management Committee) and SC (Sanctuary Committee) in order to manage the sanctuaries efficiently. Fishing was done by encircling the *katha* with a *Ber jal* (Seine net) following the removal of the *katha* materials. Fishing was also done using '*Jhaki Jal*' (cast net). The '*Ber jal*' was pulled through the *katha* to catch the remaining fishes keeping pace with the system followed by Ahmed and Hambrey (1999). Fishes were harvested thrice in a year during December, February and March of 2003-04 and 2004-05. Collected from different *kathas* placed in three rivers were tabulated and presented under the head of four *kathas* for two years separately. Fishes were identified following Rahman (1989) and Fishbase (2006).

Results and discussion

A total of 43 species of fish were caught where the maximum species composition (40) was found in traditional *kathas* and the minimum (30) in bamboo root *kathas* (Tables 1 and 2). Out of 43 species 11 species were found to prefer all the three types of *katha* materials. Among the 11 species, the highest number (3,859) was given by Titari, *Psilorhynchus sucatio* followed by Tengra, *Mystus vittatus* (3,597) in traditional and bamboo root *kathas*, respectively in the second year (Fig. 1). Tengra also preferred bamboo root *Katha* in the first year and occupied the first position (1,036) among the top five species. Prawn (*Macrobrachium rude*) showed no special affinities for any particular *katha* material as its abundance was recorded from all the *katha* materials. Mola (*Amblypharyngodon mola),* Chanda (*Parambassis ranga*), Chapila *(Gudusia chapra),* and Darkina (*Esomus danricus*) showed the highest preference for traditional *katha*. A considerable number of Mola, Chanda, Darkina, Batashi and Titari were found in the blank *kathas* as well.

During the first and second years, 33 and 42 species were found to be aggregated respectively in the *kathas*. Out of 43 total species recorded from the *kathas* during the two years period, Air, Boal, Bacha, Baghair, Laacho, Magur, Mrigel, Rui and Titari were not found in the first year and only Dhela was not observed in the

second year and the rest 34 species were common in both the years. In the second year more fishes were found to be aggregated in the different *kathas* and the total number of fish was 6.40, 8.42 and 8.39 folds higher than that of the first year in the tree root, bamboo root and traditional *kathas,* respectively (Fig.3). Kholisha (C*olisa fasciata*) showed no specific preference to any particular *katha*. Jat punti (*Puntius sophore*) showed more affinity for bamboo root followed by tree root and traditional *katha* (Fig.1).

Table 1 Catch composition of different fish species in different *kathas* during 2003-2004

Sl. No.	Local name	Scientific name	Total fish catch (in number) in different *kathas* from three rivers			
			Tree root	Bamboo root	Tradi-tional	Blank
1	Air	*Sperata seenghala*	0	0	0	0
2	Baim	*Mastacembelus armatus*	2	0	0	0
3	Bata	*Labeo bata*	0	0	2	0
4	Batashi	*Pseudeutropius atherinoides*	0	0	1	0
5	Bele	*Glossogobius giuris*	3	6	2	6
6	Boicha	*Colisa lalia*	0	0	3	0
7	Bujuri	*Mystus tengra*	6	0	6	0
8	Bacha	*Eutropiichthys vacha*	0	0	0	0
9	Baghair	*Bagarius bagarius*	0	0	0	0
10	Boal	*Wallago attu*	0	0	0	0
11	Cheka	*Chaca chaca*	0	6	1	2
12	Chanda	*Chanda nama*	158	33	328	72
13	Chapila	*Gudusia chapra*	0	0	1	0
14	Chela	*Salmostoma bacaila*	43	37	78	7
15	Kuchia	*Monopterus cuchia*	6	0	0	0
16	Darkina	*Esomus danricus*	0	11	14	80
17	Dhela	*Osteobrama cotio*	0	3	0	0
18	Foli	*Notopterus notopterus*	1	0	4	0
19	Gagla	*Hemibagrus menoda*	2	0	0	0

Sl. No.	Local name	Scientific name	Total fish catch (in number) in different *kathas* from three rivers			
			Tree root	Bamboo root	Tradi-tional	Blank
20	Goina	*Labeo gonius*	0	0	0	0
21	Golsha	*Mystys cavasius*	7	0	1	0
22	Gutum	*Lepidocephlichthys guntea*	3	1	4	1
23	Kachki	*Corica soborna*	0	0	2	0
24	Kholisha	*Colosa faciata*	11	15	22	57
25	Laacho	*Labeo ariza*	0	0	0	0
26	Meni	*Nandus nandus*	2	0	0	0
27	Magur	*Clarias batrachus*	0	0	0	0
28	Mrigal	*Cirrhinus cirrhosus*	0	0	0	0
29	Mola	*Amblypharyngodon mola*	302	20	112	27
30	Naftani	*Ctenops nobilis*	3	7	1	4
31	Nandina	*Labeo nandina*	0	0	3	0
32	Pabda	*Ompok pabda*	5	0	0	0
33	Potka	*Chelonodon patoca*	0	0	2	0
34	Jat Punti	*Puntius sophore*	143	43	187	17
35	Rani	*Botia dario*	1	0	1	0
36	Rui	*Labeo rohita*	0	0	0	0
37	Sharpunti	*Puntius sarana*	1	0	0	0
38	Shol	*Channa striata*	0	2	0	0
39	Taki	*Channa punctata*	1	0	1	0
40	Tara Baim	*Macrognathus aculeatus*	0	6	0	0
41	Tangra	*Mystus vittatus*	12	1036	4	3
42	Titari	*Psilorhynchus sucatio*	0	0	0	0
43	Chingri	*Macrobrachium rude*	1810	980	1570	290
	Total		**2522**	**2206**	**2350**	**566**

Table 2 Catch composition of different fish species in different *kathas* during 2004-2005

Sl No	Local name	Scientific name	Total fish catch (in number) in different kathas from three rivers			
			Tree root	Bamboo root	Traditional	Blank
1	Air	*Sperata seenghala*	10	9	0	0
2	Baim	*Mastacembelus armatus*	0	83	2	4
3	Bata	*Labeo bata*	0	0	3	0
4	Batashi	*Pseudeutropius atherinoides*	779	1064	489	281
5	Bele	*Glossogobius giuris*	20	216	77	20
6	Boicha	*Colisa lalia*	0	81	9	0
7	Boal	*Wallago attu*	6	0	3	0
8	Bujuri	*Mystus tengara*	331	665	287	35
9	Bacha	*Eutropiichthys vacha*	1	0	3	0
10	Baghair	*Bagarius bagarius*	1	0	0	0
11	Cheka	*Chaca chaca*	72	216	3	10
12	Chanda	*Chanda nama*	959	691	2036	340
13	Chapila	*Gudusia chapra*	17	0	1981	0
14	Chela	*Salmostoma bacaila*	589	543	437	87
15	Kuchia	*Monopterus cuchia*	0	0	0	1
16	Darkina	*Esomus danricus*	276	27	1769	131
17	Dhela	*Osteobrama cotio*	0	0	0	0
18	Foli	*Notopterus notopterus*	19	0	8	0
19	Gagla	*Hemibagrus menoda*	21	27	18	18
20	Goina	*Labeo gonius*	4	13	7	0
21	Golsha	*Mystys cavasius*	134	36	9	0
22	Gutum	*Lepidocephlichthys guntea*	4	7	4	7
23	Kachki	*Corica soborna*	0	0	6	0

Sl No	Local name	Scientific name	Total fish catch (in number) in different kathas from three rivers			
			Tree root	Bamboo root	Traditional	Blank
24	Khailsha	*Colisa faciata*	78	106	48	31
25	Laacho	*Labeo ariza*	15	158	3	5
26	Meni	*Nandus nandus*	0	0	0	5
27	Magur	*Clarias batrachus*	0	0	5	0
28	Mrigal	*Cirrhinus cirrhosus*	12	0	12	0
29	Mola	*Amblypharyngodon mola*	424	123	2963	444
30	Naftani	*Ctenops nobilis*	3	19	5	11
31	Nandina	*Labeo nandina*	0	0	5	0
32	Pabda	*Ompok pabda*	34	30	8	1
33	Potka	*Chelonodon patoca*	0	61	44	0
34	Jat Punti	*Puntius sophore*	950	1382	1504	87
35	Rani	*Botia dario*	6	44	6	8
36	Rui	*Labeo rohita*	0	0	1	0
37	Sharpunti	*Puntius sarana*	0	19	7	0
38	Shol	*Channa striata*	3	3	2	0
39	Taki	*Channa punctata*	2	0	2	0
40	Tara Baim	*Macrognathus aculeatus*	0	25	0	0
41	Tangra	*Mystus vittatus*	344	3597	26	20
42	Titari	*Psilorhynchus sucatio*	408	422	3859	197
43	Chingri	*Macrobrachium rude*	10609	8835	4056	1368
	Total		**16131**	**18502**	**19707**	**3111**

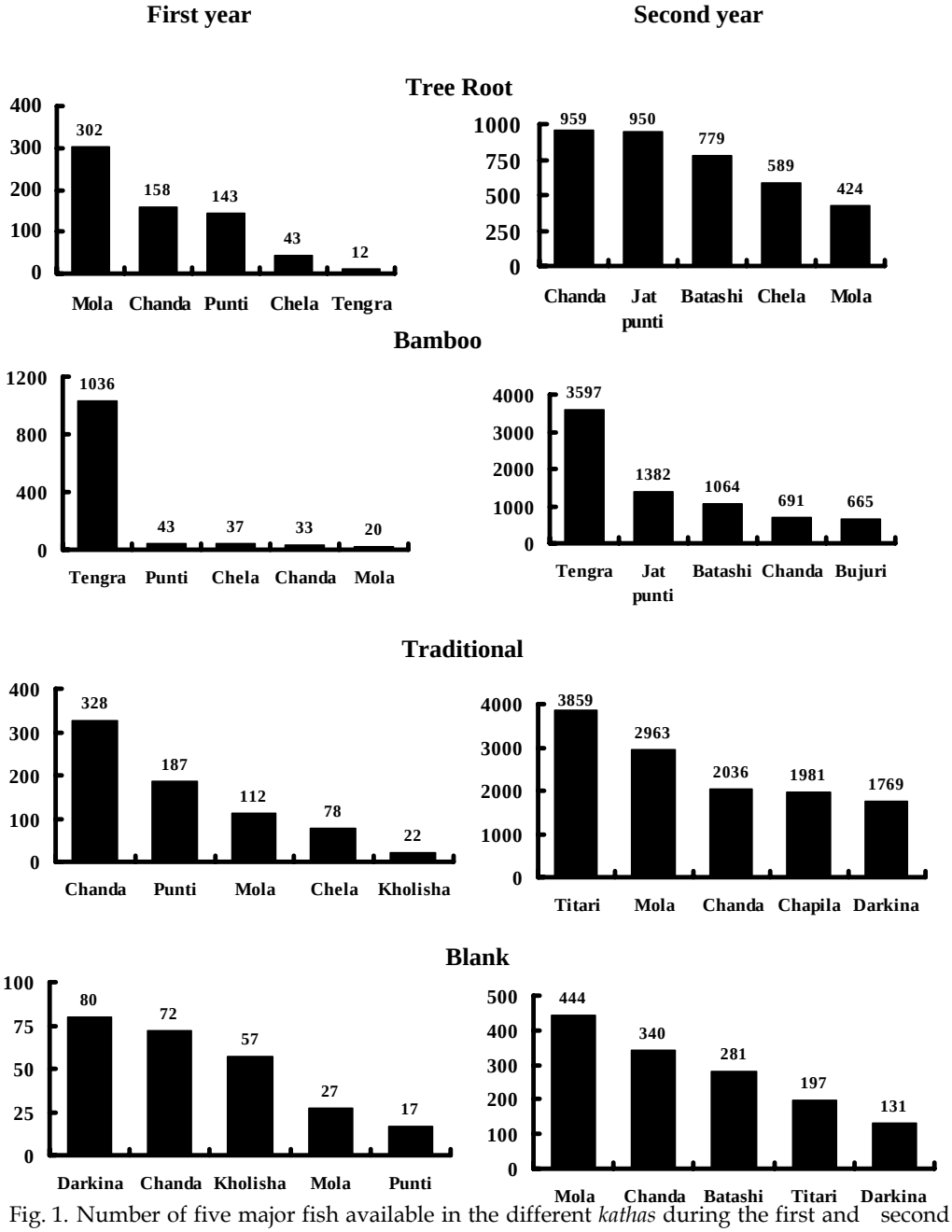

Fig. 1. Number of five major fish available in the different *kathas* during the first and second year (excluding *chingri*).

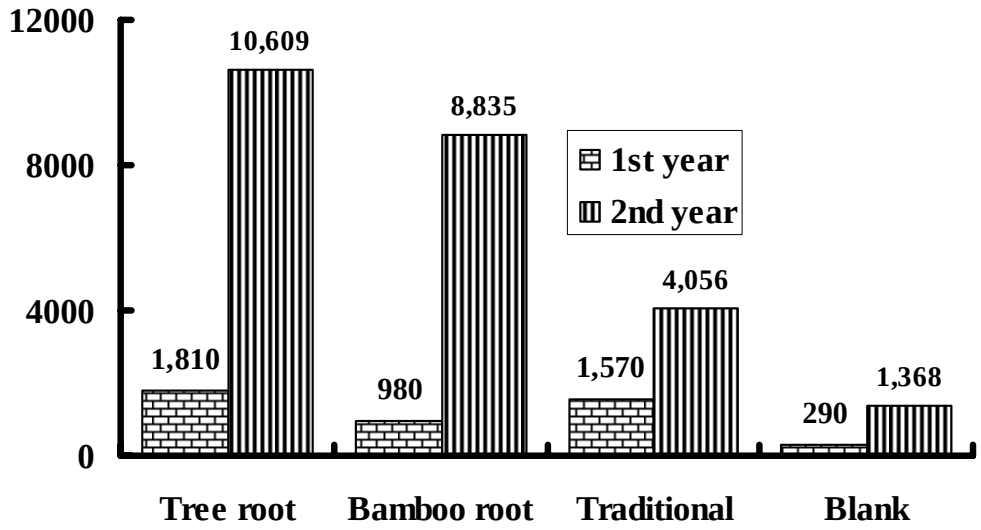

Fig. 2. Number of *chingri* available in the different *kathas* during the 1st and 2nd year.

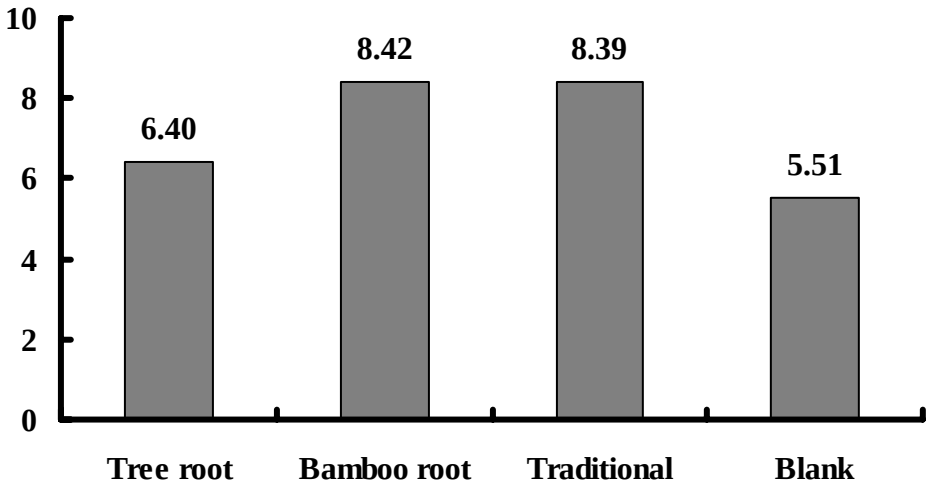

Fig. 3. Number of fish increased (in times) in the second year in different *kathas* in comparison to that of the first year.

The numbers of other species present in different *kathas* were very poor. Present study revealed that the maximum fish species diversity was observed in traditional *kathas* followed by bamboo root and tree root *kathas*. Ahmed *et al.* (2003) recorded 35 fish and shrimp species from the *katha* fishery at the Titas river. The total number of

species (43) recorded in the present study is higher in terms of species diversity in comparison to the studies carried out in floodplain rivers by Sarker *et al*. (1999), Kader *et al.* (1999) and Ahmed *et al.* (2003). In the present study, high numbers of catfish (*M. vittatus*) were recorded in different *kathas* and the finding is in conformity with the study of Ahmed *et al***.** (2003) who obtained high amount of catfishes in the *kathas* of Titas river.

The result of the present study revealed that the number of prawn (*Macrobrachium rude*) occupied the first position in all the three *kathas* except the bamboo root *katha* in first year (Fig. 2). The bamboo root *katha* of each river had unusual turn out of tengra (*M. vittatus*) in comparison to the other *kathas* (Fig. 1) while *M. vittatus* was found in lower numbers in each of the tree root, traditional and blank *katha* of the same river. From the study it is clear that *M. vittatus* has got strong affinity for bamboo roots in the recession period in the river system. The highest number of prawn (*Macrobrachium rude*) was reported from tree root *katha* followed by bamboo root *katha* and its number in the other *kathas* was also considerable (Tables 1, 2 and Fig. 2). Hence, the specific affinity of prawn for any particular *katha* material could not be ascertained. Kholisha (C*olisa fasciata*) showed no specific preference to any particular *katha* material. It was also found that punti (*Puntius sophore*) showed more affinity for traditional *kathas* followed by tree roots and other *katha* materials. Mola (*Amblypharyngodon mola*) were mostly found from tree root and traditional *kathas* and lesser number in other *kathas*. The other species of fishes represented in the Tables 1 and 2 were insignificantly reported from different *kathas*.

Conclusion

The present study has provided some primary information on sanctuary materials that aggregate selective fishes. The cause of the poor presence of many fish species in the studied *kathas* may also be linked with their less availability in the rivers which deserves immediate study on fish stock assessment of the rivers. The findings of this study are interesting to some extent especially in case of catfish(tengra) and prawn. However, the subject under study deserves more intensive research in the same rivers and other rivers with other *katha* materials in order to reach a consensus regarding choice of fishes towards sanctuary materials with a view to suggest an effective measure for better and sustainable management of *katha* fishery in Bangladesh.

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