

## Consumption pattern of small indigenous species (SIS) of fish with special emphasis on mola (*Amblypharyngodon mola*) among growers and non-growers level

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**Abstract:** A study was carried out on the pattern of small fish (SIS) consumption in six villages viz. Rajmangalpur and Gazipur of Comilla, Kalaighat and Nawdapara of Dinajpur and Fulpur and Rahamatpur of Kishoreganj for a period of 10 months (August 2005 - May 2006) using a participatory approach through different PRA tools – questionnaire interview, situation analyses, wealth ranking, group discussion and so on. Data were collected on - consumption of fish, consumption of SIS and SIS consumption in mola culture households and non-mola culture households. Data from consumption surveys were analyzed to obtain SIS intake pattern. In the surveyed villages per capita per day SIS consumption was found to be 6.38 g, 7.10 g, 5.90 g, 6.10 g, 48.50 g and 50.41 g in Rajmangalpur, Gazipur, Kalaighati, Nawdapara, Fulpur and Rahamatpur villages, respectively. The highest SIS consumption was found in Fulpur and Rahamatpur villages under the district of Kishoreganj. The households involved in mola culture consumed 1.69 g, 1.88 g, 1.11 g and 1.39 g mola per capita per day in the surveyed Rajmangalpur, Gazipur, Kalaighati, and Nawdapara villages, respectively. The non mola culture households or who did not have any ponds were found to consume 0.448 g, 0.720 g, 0.620 g and 0.384 g mola per capita per day in the villages Rajmangalpur, Gazipur, Kalaighati and Nawdapara, respectively. The higher consumption of mola among the mola-culture villagers was mainly due to additional mola production in their mola culture ponds.

**Key words:** *Amblypharyngodon mola*, SIS, consumption pattern, mola culture households

### Introduction

Bangladesh is blessed with vast fisheries resources due to favorable climatic condition and geographical location of the country. There are 267 species of fresh water indigenous fishes in Bangladesh (IUCN, Bangladesh, 2003) in which 143 species are considered as small indigenous species (SIS). The small indigenous species of fishes are generally considered which grow to a length of about 25 cm, *i.e.*, 9 inches at maturity (Felts *et al.*, 1996 and Hossain *et al.*, 1999). Small indigenous fish species (SIS) are found in all types of natural waterbodies. The possibility of culturing small indigenous species of fish was first explored in Bangladesh under a UNICEF supported programme (Alam, 1979), then a number of culture technologies have been developed in Bangladesh (Kohinoor *et al.* 2001). SIS is playing a vital role in the diet and culture of Bangladeshi people. SIS are the major source of animal protein in Bangladesh as 63% animal protein comes from fish (DoF, 2005). They are significant in respect of their taste, availability, lower market price and nutritional value. The SIS are rich in terms of protein, micronutrients, vitamins and minerals. Therefore, SIS are important for poor and lower income groups in terms of nutrition. The rural poor prefer to eat SIS instead of cultured carps because they can afford to buy a small amount at a time, and it is easier for them to distribute the fish among their family members (Rajts *et al.*, 1997). Among the small indigenous fishes, mola (*Amblypharyngodon mola*), dhela (*Osteobrama cotio cotio*), chela (*Chela cachius*) and punti (*Puntius sophore*) are the most commonly preferred SIS in Bangladesh. The world standard of fish requirement for an average person is about 49 g per day. At present national average fish consumption is about 41.2 g per capita per day in Bangladesh (DoF, 2005). Therefore, on an average there is a deficit of 7.8

g fish per capita per day. However, among the SIS mola (*Amblypharyngodon mola*) plays a more significant role in the rural livelihoods both in the context of nutrition and culture potentiality in comparison to the other SIS. Therefore, the present study has been undertaken to determine the consumption pattern of SIS with emphasis on mola (*A. mola*) among person engaged in its cultivation and those who are buying it for consumption.

### Materials and Methods

The study was carried out for a period of 10 months from August 2005 to May 2006 in a participatory way where questionnaire interview, situation analyses, wealth ranking, group discussion, focus group discussion was employed. Data were collected on - consumption of fish, consumption of SIS and SIS consumption in mola culture households and non-mola culture households using a pre-tested well structured questionnaire. Final qualitative and quantitative data collections were performed randomly. The average of the collected information was tabulated and analyzed. To study the SIS consumption, one to one interview technique was followed. For collecting information of SIS consumption each of the selected household was surveyed two times during the experimental period, one in the peak period (December) and other in the lean period (May). The SIS consumption was studied in six village *viz.* Rajmangalpur, Gazipur, Kalaighati, Nawdapara, Fulpur and Rahamatpur under three districts (Comilla, Dinajpur and Kishoreganj) of Bangladesh. The survey was conducted in 40 households (10 households from each village) from 4 villages *viz.* Rajmangalpur, Gazipur, Kalaighati, Nawdapara in which 5 households of each villages involved in mola culture in their ponds and also survey 10 households of 2 villages *viz.* Fulpur and Rahamatpur who were not involved in mola culture

## Results and Discussion

### Consumption pattern of SIS

The per capita per day total fish consumption, big fish consumption and SIS consumption was found varied among the surveyed six villages Table 1.

Total fish consumption in the households was more or less similar in the surveyed villages and relatively higher in Fulpur and Rahamatpur. However, SIS consumption in mola culture households was zero in the latest two villages whereas it was much higher in non-mola culture households. The non-mola culture households of the first four villages took a minimal amount of SIS. The households of first four villages consumed scanty amount of mola but higher than the non-mola cultured households, the latest two villagers did not consume mola. It may be said their mola consumption was the result of mola culture in their ponds. The villagers of Rajmangalpur, Gazipur, Kalaighati, Nawdapara, Fulpur and Rahamatpur were found to consume 5.90 - 50.41 g SIS and 4.74 - 37.58 g big fish per capita per day (Table 1).

The consumption of SIS was found higher in Fulpur and Rahamatpur but lower in Rajmangalpur, Gazipur, Kalaighati and Nawdapara. On the other hand, the consumption of big fish was found higher in Rajmangalpur, Gazipur, Kalaighati and Nawdapara, but lower in Fulpur and Rahamatpur. The Fulpur and Rahamatpur villages are situated in the highest open water fisheries resources area of Bangladesh such as *haors, boars, beels*, canals, ditches, rivers, rice fields and floodplains, which is dominated by SIS. The surrounding villagers also easily caught the fish from the open water at free of costs which consists mainly SIS and they used this SIS almost for their family consumption. As a result, the consumption of SIS was higher and the consumption of big fish was lower in the villagers of Fulpur and Rahamatpur.

The villages Rajmangalpur, Gazipur, Kalaighati and Nawdapara were situated in the areas of having very little fisheries resources. In this area open water fisheries resource were very few and as a result the amount of SIS capture was very little, so the villagers consumed small amount of SIS. To mitigate the local demand of fish, the fish traders collect mainly the big fish from the various parts of the country and. Besides this, the villagers consumed small amount of big fish from the pond culture practice of the pond owner of the villagers. As a result the SIS consumption were found lower but the consumption of big fish were found higher in the villagers of Rajmangalpur, Gazipur, Kalaighati and Nawdapara.

### Consumption of total fish in the surveyed villages

Fish consumption was found to vary markedly in the surveyed areas. The villagers of Rajmangalpur, Gazipur, Kalaighati, Nawdapara, Fulpur and Rahamatpur were found to consume 39.05 - 56.12 g total fish per capita per day, respectively (Table.1). The average per capita per day fish consumption in Kalaighati (36.45g) and Nawdapra (39.05g) were moderately lower than the national average (41.2g). On the other hand, the average per capita per day fish consumption in Rajmangalpur (43.17g) and Gazipur (44.68g) was comparatively higher and Fulpur (53.24g) and Rahamatpur (56.12g) was found to be remarkably higher than that of the national average. The total fish consumption was found higher in Fulpur and Rahamatpur villages. The reason was that the villages are situated in the highest fisheries resources area of the country. On the other hand lower consumption of fish was found in the villages of Rajmangalpur, Gazipur, Kalaighati and Nawdapara because the villages are situated in the very little fisheries resources area of the country.

**Table 1** Fish consumption status in the surveyed villages

Sl. No.	Parameter	Rajmangalpur	Gazipur	Kalaighati	Nawdapara	Fulpur	Rahamatpur
1	Total fish consumption	43.17	44.68	36.45	39.05	53.24	56.12
2	Average big fish consumption	36.79	37.58	30.55	32.95	4.74	5.71
3	Average SIS consumption	6.38	7.10	5.90	6.10	48.50	50.41
4	SIS consumption in mola culture household	8.38	9.18	6.70	7.61	0.00	0.00
5	SIS consumption in non-mola culture household	4.380	5.026	5.096	4.602	48.495	50.412
6	Mola consumption in mola culture household	1.686	1.88	1.108	1.394	0.00	0.00
7	Mola consumption in non-mola culture household	0.448	0.720	0.620	0.384	0.00	0.00
8	Mola increase in mola culture household	1.238	1.16	0.488	1.01	0.00	0.00

The present findings are in agreement with the findings of Roos *et al.* (2003) where 37 g raw edible fish person<sup>-1</sup> day<sup>-1</sup> in July, 1997; 82 g raw edible fish person<sup>-1</sup> day<sup>-1</sup> in October, 1997 and 55 g was edible fish person<sup>-1</sup> day<sup>-1</sup> in February, 1998 were reported to be consumed by the villagers of Kishoreganj district.

Haque (2004) reported a very wide range of per capita per day fish consumption in three villages of Netrakona district (20-91 g, 20-77 g and 12-69 g in the villages Iaran, Kismat Barenga, and Bade Barenga, respectively). According to him the probable reasons

of variation in fish consumption were financial ability of villagers and availability of fishes.

### SIS consumption by the mola culture and non-mola culture households

The villagers of Rajmangalpur, Gazipur, Kalaighati and Nawdapara of the surveyed areas who cultured mola in their ponds, the SIS consumption rate was higher amount compared to the villagers who did not culture mola. There were no ponds in the Fulpur and Rahamatpur villages because the villages were situated in the open water area of Kishoregonj. The villagers having mola culture ponds in Rajmangalpur, Gazipur, Kalaighati and Nawdapara were found to consume 8.38 g, 9.18 g, 6.70 g and 7.61 g SIS per capita per day, respectively (Table 1). The villagers of Rajmangalpur, Gazipur, Kalaighati and Nawdapara where mola was not cultured or who have no ponds were found to consume 4.380 g, 5.026 g, 5.096 g and 4.602 g SIS per capita per day, respectively (Table 1). The higher consumption of SIS among the mola-culture villagers was mainly due to additional mola production in their mola culture ponds.

### Mola consumption by the mola culture and non-mola culture households

There was a great variation in per capita per day consumption of mola in the households having mola culture ponds and without mola culture ponds. The villagers of Rajmangalpur, Gazipur, Kalaighati and Nawdapara where mola was cultured in their ponds, the consumption rate of mola was found 1.686 g, 1.880 g, 1.108 g and 1.394 g per capita per day, respectively which was higher than that of the non mola-culture villagers (Table 1). The villagers of Rajmangalpur, Gazipur, Kalaighati and Nawdapara where mola was not cultured in their ponds or who has no pond, the consumption rate of mola was found to be 0.448 g, 0.720 g, 0.620 g and 0.384 g per capita per day, respectively (Table 1) which was lower compared to mola culture villagers. The household, in which mola was cultured in their ponds, the consumption rate was higher and the rate were 1.238 g, 1.16 g, 0.488 g and 1.01 g mola per capita per day in the villages of Rajmangalpur, Gazipur, Kalaighati and Nawdapara, respectively. In the villages of Fulpur and Rahamatpur of Kishoreganj district, there were no ponds and the consumption of mola was absent.

### Small indigenous species of fish consumed

In the study period 29 SIS were consumed by the surveyed villagers. The consumption patterns of different varieties of SIS were found to vary from village to village. The SIS viz. punti, tengra, guchi baim, chanda, choto chingri were very common consumption items in six villages while SIS like *Ompok pabda*, *Anbus testudineus*, *Heteropneustes fossilis*, *Clarias batrachus*, *Amblypharogodon mola*, *Rohtee cotio*, *Esomus danricus*, *Clupisoma garua*, *Eutropiichthys vacha*, *Colisa fasciata*, *Tricogaster chuna* were rather rare items. On the basis of quantity, *Puntius sophore*, *Mystus vittatus*, *Mastacembelus pancalus*, *Mastacembelus armatus*, *Chanda nama* and small prawns were on the top of the list. The SIS and

prawns were the main animal protein sources for the poor villagers as they could harvest them free of cost from the wild sources in the surveyed areas. Khanam (2003) stated that some SIS were common in the rural areas of Bangladesh, which agrees with the present result.

### People perception about SIS

The nutritional awareness among the villagers of the surveyed areas was found more or less positive during the study period. It was observed that the awareness about nutritional point of view was higher in Comilla region (92.50%) and Dinajpur region (90%), but it was found lower in Kishoreganj region (77.50%) (Fig.1). The nutritional awareness was well known about the benefit of SIS by the government and non-government activities. On the other hand, the activity of non-government organization was very poor in the Kishoreganj as the surveyed villages of kishoreganj were situated in the remote area than that of other two surveyed regions.

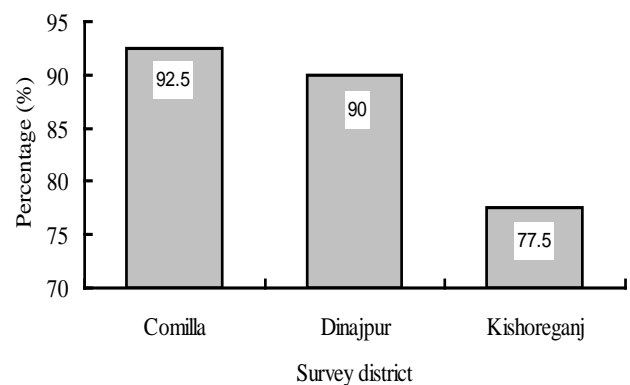


Fig. 1 People perception about SIS

### Consumption sharing of SIS among family member

The consumption rate of SIS among the family members were not uniform but varied depending in different situations. It was observed that within the household, the head of the household was always found to consume more SIS followed by boy children of the family. On the other hand, the female members of the household were always found to take less amount of SIS than that of the other family members (Fig. 2).

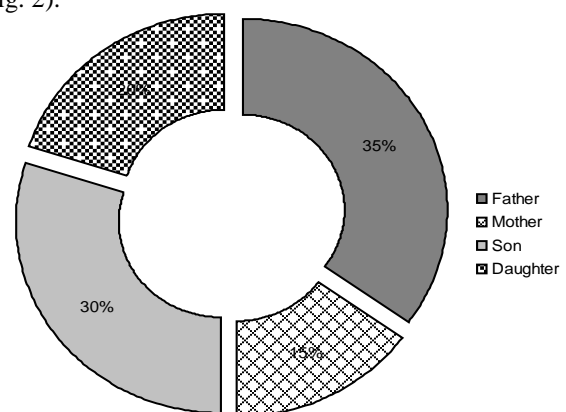


Fig. 2 SIS consumption rate among the family Members

This agrees with the findings of Haque (2004). The consumption rate of SIS was found higher in the head of the family because the head of the family was the main earning member of the family and they are habituated in that way from the generation.

### Conclusion

There is a huge gap of fish consumption between national average and at different level of the society. Certain groups of poor are vulnerable to certain diseases due to lack of fish protein. Open water fisheries require some measures to protect the rich biodiversity as well as the rights of the poor to access those water bodies so that they can eat fish regularly. Traditional carp polyculture system now requires the inclusion of the SIS in Bangladesh. These steps will ensure the availability of small fish to the rural poor for household consumption.

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