DIET COMPOSITION OF POOL BARB *Puntius sophore* (HAMILTON, 1822) OF BRAHMAPUTRA VALLEY, ASSAM, INDIA

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ABSTRACT
The pool barb, Puntius sophore, belongs to family Cyprinidae and has a wide range of distribution. This species is the most common Puntius of northeast India. The present study revealed that the species is chiefly an herbivore though occasionally feeds on zooplankton as well. The most dominant food item was found to be Diatoms(PU= 0.49), followed by Desmids (PU=0.35), Blue green algae (PU =0.09), Chlorophyceae (PU = 0.06) and Zooplankton (PU= 0.01). From the food items it appears that the fish has a narrow niche width (H'=1.19).

Key words: *Puntius sophore*, food, feeding, trophic niche

INTRODUCTION

Puntius sophore (Cyprinidae:Cypriniformes), is commonly known as pool barb or stigma barb is widely distributed in the inland water bodies of South Asia, China and Myanmar (Talwar and Jhingran, 1991, Mirza 2003, Phukan and Biswas, 2012). This is reported to be an active swimmer across the depth of the water bodies like rivers, streams, beels, and ponds of plains and sub montane regions, feeding on benthic as well as free swimming organisms (Menon, 1999). This fish is a good source of protein and micronutrients specifically for the rural area (Roos et al. 2007). Further, the fish is said to be a potent ornamental aquariumfish and is exported from the country (Froese and Pauly, 2011, Gupta and Banerjee, 2012).Though the species is placed under IUCN Least Concern category, the present status of the species is declining in nature (Gupta, 2015).

Though *Puntius sophore* is a commercially important fish of Assam having food as well as ornamental value, comprehensive information on its food and feeding is lacking, specifically from the valleys of northeast India.Therefore the present study has been carried out to evaluate diet composition of *Puntius sophore* of the Brahmaputra valley, Assam.

MATERIALS AND METHODS

The present study was conducted on *Puntius sophore* collected from two landing stations of Brahmaputra valley, North-Lakhimpur(27.2253°N and 94.1053°E)andGuwahati(26.1445°N and 91.7362°E) during December 2015 to April 2016. After collection the fishes were immediately preserved in 10% buffered formalin and transported to the laboratory. Selected parameters like: SL-standard length (from the tip of the snout to the base of caudal fin); HL-head length (from the tip of the snout to the posterior margin of operculum) along with weight of each specimen were recorded.

The Gut content of each sample was collected by slicing and the volume was measured by water displacement method. Individual food item was identified following Needham and Needham (1962).

Proportional Utilization (PU) of each food resource group was calculated:

$$PU = \frac{\text{Total number of prey items of a specific group consumed}}{\text{Total number of prey items of all groups consumed}}$$

Occurrence frequency (OF) in terms of percentage of each food resource group was calculated as :

$$OF = \frac{\text{Number of individuals with specific food item}}{\text{Total number of individuals of all food items}} \text{ X } 100$$

The degree of dominance of food items was worked out by Berger-Parker index (*d*)

$$d = N_{max} / N$$

Where, N_{max} is the number of individuals in the most abundant resource type and N is the total number of individuals. The reciprocal form of the measure was employed so that the index increases with increasing prey diversity.

The niche width was calculated using computer software ECSTAT where niche width was expressed as

$$\text{Niche width} = - \sum \text{pilnpi.}$$

The prey specific abundance (P_i) was calculated using Costello (1990) modified model by Amundsen *et al.*, (1996)

$$P_i = (\Sigma S_i / \Sigma St_i) \text{ X } 100$$

Where,

S_i = stomach content (volume, weight or number) comprised of prey *i*

St_i = total stomach content in only those predators with prey *i* in their stomach

RESULTS

In the present study 40 individuals of *Puntius sophore* were measured along with the colour patterns and markings. The fish was found to have the following characteristics:

Body silvery colour with reddish tinge; undersidewhite; tip of dorsal, anal, pectoral and caudal fins reddish orange. Dark spot present on dorsal fin in between 4th -8th fin ray. Another black spot present at the base of the caudal fin, stretched in between 21st - 23rd scales. Body with more convex dorsal profile than the ventral. Head short about 26 % of the SL. The size of the studied specimens ranged from 43.02 mm to 96.98 mm in total length and from 3.1 to 16.8 g in weight.

Five different food items of both plant animal origins were recorded in the study. Zooplankton was found to be least consumed group (PU = 0.013) and also with very low frequency of occurrence (OF = 9.375%). The most dominant group both in occurrence (100%) and proportional utilization (PU= 0.49) was Diatom. The desmids were also consumed at higher rate (PU= 0.36) and found to be consumed (OF = 96.77%) by most of the fishes studied. The two dietary groups viz. Diatom and Desmid were found to constitute 85% of the total diet and thus the niche width was found to be low (H′= 1.19) with high dominance (d= 0.485) (Table I)

	DESMID	BLUE GREEN ALGAE	CHLOROPHYCEAE	DIATOM	ZOOPLANKTONS
PU	0.35	0.09	0.06	0.49	0.01
OF	96.77	56.25	34.37	100	9.37
Pi	36.29	13.97	12.27	100	7.78
D	0.485	(Reciprocal=2.79)			
H’	1.19				

Table I: Food items with proportionate utilization (PU), Occurrence Frequency (OF), Prey specific abundance (Pi), dominance (D), niche with (H’) of *Puntius sophore*

DISCUSSION

Day (1878), Talwar and Jhingran (1991) as well recently Gupta (2015) documented the morphological features of *Puntius sophore*. They recorded the colour of the fish as beautiful silvery, black grey-green to brownish; flanks with a somewhat bluish lusture. The differences in colour as observed during the present study might be due to different ecological conditions of the habitat of this fish. Further it is already has been established that the body colour varies with the habitat conditions and also with the surroundings (Das 1992).

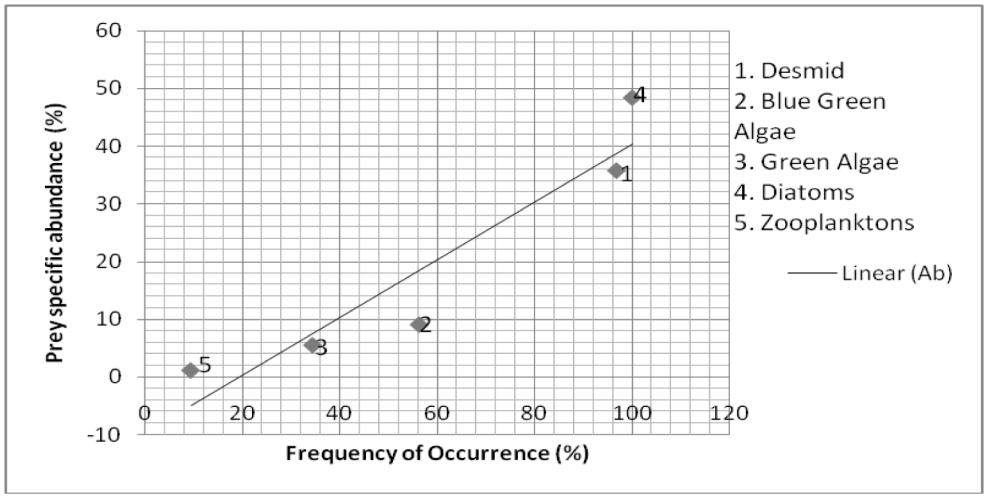

Fig. 1. The feeding strategy and dietary item importance diagram of *Puntius sophore*.

Larger species of *Puntius* (*P. sarana, P.chilinoides, P. gonionotus)* are reported to be omnivorous (Badola and Singh, 1980, Nair and Sobhana, 1980, Hossain *et al*., 2012, Mondol *et al*., 2005) while most of the smaller species (*P. vittatus, P. sophore*) were reported to be mostly herbivorous (Geetha *et al*., 1990). Herbivorous food habit of *P. sophore has* also been reported by other workers (Mitra *et al.*, 2006, Kiran, 2015) which is inconformity with the present study. Mitra et al (2006) also opined that *P. sophore* was herbivory in feeding habit and consumed mostly Bacillariophyceae followed by chlorophyceae. However, Banik and Saha (2013) recorded pico planktons, zooplanktonic organisms, broken fish and small prawns in the gut of *P. sophore*. Nazneen and Bari (1982) observed phytoplankton feeding habit of *P. sophore* and found *Chlorella* species as the most abundant phytoplankton consumed by the fish. However, our study revealed Bacillariophyceae (Diatoms) and Desmids are the two dominant food items of *Puntius sophore*. In the present study we failed to observe any

difference in the type of food consumption amongst different size groups, however, volume of consumption was found to be higher in 80 – 100 mm length-size group than 40-60 mm length-size group ($p<0.05$).

The first stride to understand ecology of animal is to gather information on its feeding biology (Hodar, 1997). Food items of fishes may be classified into four basic categories as basic food, secondary food, incidental food and obligatory food (Nikolsky, 1963). The basic food item for *Puntius sophore* appeared to be diatoms and desmids, while the secondary food were blue green algae and chlorophyceae and zooplankton constituted the incidental food.

Castello (1990) proposed a model for feeding strategy and dietary item importance with dominant item at the upper and rare (unimportant) at the lower end. In the present study the diatoms appeared to be most dominant (important) food item while zooplanktons constituted as rare and unimportant prey item for the fish. The vertical axis of the graph represents the feeding strategy in terms of genaralisation (lower part) and specialization (upper part). In the present study there was no specialization shown by individual fish but the population of the fish is specialized for consuming diatom and desmid. Further the diagram (Fig. 1) also depicted narrow niche width. Similar results have been reported by Amundsen *et al*., (1996) for Arttic-charr, *Salvelinusalpinus*.

Yusuf (1967) have suggested that freshwater species of fish found in isolated pocket showed genaralisation in food and feeding habits. *Puntius sophore* found to be specialized for consuming diatom and desmid which may be due to their wide spread occurrence in the flood plains of Assam.

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