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## Food and Feeding Habit of Juvenile *Channa punctatus* (Bloch) from a Semi-closed Water Body in Chalan Beel Floodplain, Bangladesh

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**Abstract:** The food and feeding habit of the juvenile *Channa punctatus* (Bloch) have been carried out from a semi-closed water body during the month of Dec. to Mar. The present study revealed that the average percentage occurrence of the food items of juvenile *C. punctatus* was crustaceans (10.38%), insects (16.87%), molluscs (14.27%), fishes (34.73%), plant materials (10.58%) and semi-digested food materials (13.16%). The present investigation also revealed that the juvenile of *C. punctatus* is carnivorous in feeding habit, mainly fed on the animal food (76.25% of the total consumption) viz., crustaceans, insects, molluscs and fishes.

**Key words:** Food-feeding, juvenile *Channa punctatus* semi-closed beel

### INTRODUCTION

All organisms for their survival need food. The nature of food for a particular class of living organisms has relative bearing to the environmental conditions under which they live. Obviously therefore, knowledge about the specification of food in all its analytical standpoint, both qualitatively and quantitatively is essential when one goes in for a culture of a particular life. Studies of food and feeding habit of fishes have manifold importance in fishery biology. For successful fish farming, a thorough knowledge about the food and feeding habit is necessary. The study of the food of fishes began to attract the attention of the fishery scientists only towards the close of the last century. As the nature of food depends to a great extent upon the nature of environment, the problem is interesting from specific, as well as ecological points of view. The food and feeding habit of fishes vary from season to season. Different fishes consume different types of food. So, the study of food and feeding habit have immense ecological values, because by studying the food and feeding habit the pattern of inter specific competition of fishes can easily be known.

*Channa punctatus* (Bolch) is a common freshwater fish which is abundantly found in ponds, beels and canals of Bangladesh<sup>[1]</sup>. Some works have been done on this species but almost no work on the food and feeding habit of juvenile *C. punctatus* from a particular habitat. The present study deals with the food and feeding habit of

juvenile *C. punctatus* from a semi-closed water body in Chalan beel floodplain of Bangladesh.

Studies on the food and feeding habit of different fishes have been made by Hynes<sup>[2]</sup>, Alikunhi<sup>[3]</sup>, Das and Moitra<sup>[4]</sup>, Darnell and Meirotto<sup>[5]</sup>, Ahmed and Akhtar<sup>[6]</sup>, Karim and Hossain<sup>[7]</sup>, Doha<sup>[8]</sup>, David and Rajagopal<sup>[9]</sup>, Dewan *et al.*<sup>[10]</sup>, Mustafa and Ahmed<sup>[11]</sup>, Mustafa *et al.*<sup>[12]</sup>, Dewan and Saha<sup>[13]</sup>, Bhuiyan and Islam<sup>[14-16]</sup>, Bhuiyan *et al.*<sup>[17-24]</sup>

### MATERIALS AND METHODS

The experiment for the estimation of food and feeding habit of *Channa punctatus* was done for the juvenile stage. A total of 418 specimens were collected from "Bara beel" in Chalan Beel floodplain areas under Tarash Upazilla of Sirajgonj district during the period from Dec. 2001 to Mar. 2002. Bara beel is a semi-closed water body situated in the south-eastern part of the Chalan beel floodplain. It is now completely separated from the main water bodies that became a semi-closed beel with the effect of flood control dam since 1980's. More recently, bara beel has completely divided in to two distinct part by newly constructed highway in between Banpara (Natore) and Hatikumrul (Sirajgonj). It is almost closed water body with single regulatory patches (sluice gate) that ultimate became closed and water has been logged round the year.

The samples were collected twice in a month. Out of 418 specimens, 112 juvenile (TL 90 to 125 mm) fishes were

sorted out from Dec. to Mar. and used in the food analysis. The specimens were preserved on spot in 10% formalin solution to stop digestion of food items. Some live samples were dissected out for food analysis just after collection. The stomach contents of the specimens were noted and the stomachs were classified as full, ¾ full, ½ full, ¼ full, 1/8 full and empty categories. Food items were dissected out from the gut, individual item separated in petridish and identified under simple and compound microscopes. The undigested food items were sorted into the different taxonomic groups. Gravimetric method<sup>[2]</sup> was followed for estimation of the percentage composition of different food items. The food organisms particularly the plankton were identified following Ward and Whipple<sup>[25]</sup>. The relationships between the total length (TL) and the alimentary canal length (ACL) of the juveniles were established by using the statistical formula ( $Y = a+bX$ ) and the ratios of the same were calculated.

### RESULTS

The stomach contents of 112 specimens of juveniles *C. punctatus* were examined during the month of Dec. 2001 to Mar. 2002. There is no juveniles found in rest of the months *i.e.* before Dec. or after the month of Mar. For the analysis of the food and feeding habit of juveniles *C. punctatus* were under taken and described on the following headlines.

**Food of the juvenile *C. punctatus*:** Table 1 shows the percentages of fullness and empty or very poorly fed stomachs in different months of the study periods. The highest percentage of empty stomachs was recorded in Feb. (24.24%) and the lowest in Mar. (14.28%) during the observation.

The percentage occurrence of various groups of food items of the juvenile *C. punctatus* is shown in Table 2. It shows the various food organisms in the stomach contents of the juvenile of *C. punctatus*. It is observed from the Table 2 that the food of the juvenile of *C. punctatus* consisted of crustaceans, insects, molluscs, fishes, plant materials and semi-digested materials.

**Crustaceans:** The highest percentage of crustaceans was observed in the month of Dec. 2001 (14.28%) and the lowest in Mar. (4.71%) in the observation. The average percentage occurrence of crustaceans was 10.38%. The crustacean food items included copepods, ostracods, cladocerans and small prawns. The copepods were represented mainly by *Cyclops*. The ostracods included *Cypris* and *Eucypris*. The cladocerans were represented by *Daphnia* and *Moina* (Table 3).

Table 1: Percentage of the fullness and empty stomachs of the juvenile (TL 90 to 125) of *C. punctatus* (N= 112)

Year	Months	No. of stomachs examined	No. of stomachs with food	% of stomachs with food	No. of empty stomachs	% of empty stomachs
2001-02	Dec.	31	25	80.65	6	19.35
	Jan.	27	23	85.19	4	14.81
	Feb.	33	25	75.76	8	24.24
	Mar.	21	18	85.72	3	14.28
Total		112	91	81.25	21	18.75

**Insects:** The highest percentage of insects occurred in Dec. (19.05%) and the lowest in Jan. (15.79%) in the observation. The average percentage composition of insects in the stomach contents of the juvenile of *C. punctatus* was 16.87%. The insect food items included mosquito larvae and insects pupae (Table 2).

**Molluscs:** The highest percentage of molluscs occurred in Dec. 2001 (23.01%) and the lowest was in Jan. 2002 (5.26%). Young *Unio* and *Pila* mainly represented molluscan food (Table 3). The average occurrence of molluscs food was 14.27% of the total consumption (Table 2).

**Fishes:** The highest percentage of occurrence of fishes in the stomach contents of the juvenile of *C. punctatus* was recorded in Mar. 2002 (37.50%) and the lowest in Dec. 2001 (28.57%). The average percentage composition of fishes over four months of the observations was 34.73%. The average percentage of fishes in the stomachs of juveniles *C. punctatus* was the highest (34.73%) among all the food items (Table 2). Fish larvae and hatchlings of different fishes are represented the fish food items.

**Plant materials:** Dry stems, leaves and roots represented plant materials food item in the stomachs of juveniles *C. punctatus* (Table 3). The highest and the lowest percentage of occurrence of plant materials was noticed in Jan. 2002 (21.05%) and Feb. 2002 (4.00%). The mean percentage composition of plant materials in the stomach contents of the juvenile of *C. punctatus* was 10.58% (Table 2).

**Semi-digested materials:** The highest percentage of semi-digested materials in the stomach content of the juvenile of *C. punctatus* was in Feb. 2002 (24.00%) and the lowest in Mar. 2002 (7.79%). The mean of the observation of the semi-digested food was 13.16% (Table 2).

**Degree of feeding and seasonal occurrence:** All fishes do not feed in the same intensity. The feeding intensity as well as the feeding condition varies from individuals to individuals. There is a seasonal variation in the degree of

Table 2: Percentage occurrence of various groups of food items of the juvenile (TL 90 to 125) of *C. punctatus* (N=112)

Year	Month	No. of fish examined	Crustaceans	Insects	Molluscs	Fishes	Plant material	Semi digested food
2001-02	Dec.	31	14.28	19.05	23.01	28.57	4.76	10.33
	Jan.	27	10.53	15.79	5.26	36.84	21.05	10.53
	Feb.	33	12.00	16.00	8.00	36.00	4.00	24.00
	Mar.	21	4.71	16.67	20.83	37.50	12.50	7.79
Total		112	10.38	16.87	14.27	34.73	10.58	13.16

Table 3: List of food organisms in the stomach of the juvenile of *C. punctatus*

Food groups	Food items
Crustaceans	A. Copepods: i. <i>Cyclops</i> B. Ostracods: i. <i>Cypris</i> ii. <i>Eucypris</i> C. Cladocerans: i. <i>Daphnia</i> ii. <i>Moina</i> D. Prawn's larvae and juveniles Mosquito larvae and insects pupae
Insects	
Molluscs	Larvae of <i>Pila</i> and <i>Unio</i>
Fishes	Fish larvae and hatchlings of different fishes
Plant materials	Dry stems, leaves, roots etc.
Semi-digested materials	Sands, mud, fish scales, bones etc.

Table 4: Mean total length (TL) and Alimentary canal length (ACL) ratio of the juvenile of *C. punctatus*

Month and year	No. of observation	Mean TL (mm)	Mean ACL (mm)	Ratio of TL:ACL
Dec. 2001	31	92.81	34.78	1: 0.37
Jan. 2002	27	96.26	35.24	1: 0.36
Feb. 2002	33	98.89	38.09	1: 0.38
Mar. 2002	21	104.15	38.74	1: 0.37
Total	112			
Mean±Sd.		98.03±4.78	36.71±1.99	1: 0.37±0.03

feeding too. For determination of the condition of feed or the degree of feeding of *C. punctatus* all the stomachs were examined and classified as full, 3/4 full, 1/2 full, 1/4 full, 1/8 full and empty by visual estimation depending on the distension or fullness of the stomachs. The total number of stomachs examined in each month, the actual number and percentage occurrence of stomachs under each category was classified. Fishes with full, 3/4 full and 1/2 full stomachs were considered to be actively fed, while fishes with 1/4 full, 1/8 full and empty stomachs were considered to be very poorly fed or empty.

Variation occurs in the food of fishes throughout the year. This is primarily due to the change in the composition of food organisms occurring at different seasons. Seasonal changes in temperature not only influence food composition and the rate of digestion but also the quantity and quality of various food. The seasonal pattern of feeding of fishes have therefore, received considerable attention.

**Total length (TL) and alimentary canal length (ACL)**

**ratio:** The ratio of the total length (TL) and alimentary canal length (ACL) of the juvenile of the fish *C. punctatus* is shown in Table 4. It is observed from the table that the average TL and ACL of the juveniles has the ratio of 1: 0.37±0.03 with the total length of the juvenile (Table 4). It was observed that the alimentary canal length was shorter than the total length.

**DISCUSSION**

The food and feeding habit and the total length-gut length relationship of the juvenile *C. punctatus* was

studied. The food analysis of 112 specimens of the juveniles (TL 90 to 125 mm) of *C. punctatus* revealed that the food of the juveniles consisted of crustaceans, insects, molluscs, fishes, plant materials and semi-digested food materials. The average percentage occurrence of the food items of juvenile of *C. punctatus* during the study period was crustaceans (10.38%), insects (16.87%), molluscs (14.27%), fishes (34.73%), plant materials (10.58%) and semi-digested food materials (13.16%). The present investigation revealed that the juvenile of *C. punctatus* is carnivorous in feeding habit, mainly fed on the animal food viz. crustaceans, insects, molluscs and fishes. Zisman *et al.*<sup>[26]</sup> observed that the bulk of the gut contents of the young grey mullets was the copepods. Dewan *et al.*<sup>[13,27]</sup> recorded that the most important food items of the juvenile of *Labeo rohita* was the organic detritus, phytoplankton and aquatic macrophytes. Bhowmick<sup>[28]</sup> worked on *Glossogobius giuris* and found that crustaceans formed the major food of the juvenile while the most preferred food of the adults was fish.

From the present study it can be concluded that the fish changes its food habit with the change of seasons. These findings agree with those of Dewan and Saha<sup>[13]</sup> who reported that *Tilapia nilotica* changed its food habit with the change in seasons. It has been found that smaller fishes and their larvae were very dominant food items of juvenile *C. punctatus*. The juvenile of *C. punctatus* fed on higher percentage of crustaceans, insects, molluscs and fishes, and lower percentage of plant materials. So it can be inferred that juvenile *C. punctatus* is a surface feeding carnivorous fish.

Das and Moitra<sup>[4]</sup> noted that the surface feeders are both omnivorous and carnivorous which feed on algae, rotifers, micro crustaceans and their larvae. The mid or column feeders are herbivorous, and carnivorous which feed on crustaceans, insects, molluscs, fishes, and the bottom feeders omnivorous fed on crustaceans, molluscs,

fishes, sand, mud etc. They further concluded that the surface feeders feed on surface plants and animals, the mid and column feeders feed on sub-surface food organisms and the bottom feeders feed on mud, decaying substances and bottom fauna and flora.

The ratio of the total length (TL) and alimentary canal length (ACL) of the juvenile of *C. punctatus* is 1:0.37. The present observation revealed that the juvenile of *C. punctatus* feeds on animal foods (crustaceans, insects, molluscs, and fishes) and it has a shortened alimentary canal. Similar results were also reported on the juveniles and preadult fishes by Bhuiyan and Haque<sup>[29]</sup> on *Glossogobius giuris*; Bhuiyan and Islam<sup>[14]</sup> on *Xenentodon cancila*; Hossain *et al.*<sup>[30]</sup> on *Notopterus notopterus* and Bhuiyan and Islam<sup>[16]</sup> on *Ompok pabda* from different habitat and considered as the carnivorous.

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