



## Food and feeding pattern of *Channa punctatus* in two different habitats at Tarai region of Uttarakhand

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### Abstract

A comparative study was conducted for the food items and feeding pattern of *Channa punctatus* in pond environment and in reservoir of Tarai region in Uttarakhand state. Observation was made for body length, gut length, food and feeding frequency and qualitative and quantitative analysis of gut content. Both, body length and gut length were in higher side with a ratio of 1:2.1 for the natural fish stock of reservoir. Gut content mainly consists of crustacean, insects, mollusks, small fishes and semi-digested material. There was significant difference for the percent occurrence of the food items ( $p < 0.01$ ) of natural stock of reservoir and pond reared stock. The study revealed that seasonal variability of natural food items in different habitats and their biological diversity put impacts on the biological needs in terms of food and feeding pattern of the same fish species.

### Key words

Food, Feeding pattern, *Channa punctatus*, Tarai region

### Introduction

The air breathing fishes can thrive well in derelict swampy water. Among the different air breathing fishes, *Channa punctatus* is one of the most important fish species of flood plains (Hossain *et al.*, 2000). It has a great demand in market because of its high nutritive value (Bhuiyan *et al.* 2006). The spotted snakehead, *Channa punctatus* is a highly priced freshwater food fish species in India. The culture of snakeheads is still not common due to the scarcity of quality seed supply and lack of knowledge on their feeding and breeding techniques (Marimuthu *et al.*, 2009). Study of food and feeding habits of fishes have manifold importance in fishery biology. For successful fish farming a thorough knowledge about the food and feeding habit is necessary. In natural environment, adult snakeheads are voracious carnivore, feeding mainly on live animals, while, larger fry and fingerling commonly feeds on invertebrates, frog and smaller fish (Rao *et al.*, 1998; Bhuiyan *et al.*, 2006). Fish farmers are much less familiar with the culture of murrel species because of the lack of breeding and feeding

technique and non-availability of seeds (Meehan, 2002). It is well known fact that the knowledge on fish biology particularly food and feeding habit in natural environment like reservoir and pond reared stock is of utmost importance. The aim of this experiment was to understand the biological process involved along with the prey habit of *Channa punctatus* in different habitats.

### Materials and Methods

15 adult fish of 150-250g were collected fort nightly during January to December 2008 from the ponds of College of Fisheries, Pantnagar, U.S. Nagar and from Dhaura reservoir in Uttarakhand and transported in an iced preserved condition to the laboratory at Pantnagar. Pond reared stock was also given supplementary feed apart from the available natural food in the pond, which consisted of rice bran, bone meal powder and de-oiled cake in equal proportion. Samples of the gut content were collected for each sample and preserved in 10% formalin from the fresh fish after taking the body length and gut length. Individual food items

collected from stomach were separated in Petri-dish and identified. Gravimetric methods (Hynes, 1950) were followed for the estimation of percentage composition of individual ingested food items. The correlation ( $R^2$  value) between body and gut length was also computed using linear regression method (Zar, 1984).

**Results and Discussion**

The mean values of body length and gut length observed in the range of 19.00-25.66 and 7.96-12.13 cm for the natural occurring stock of reservoir, respectively with the ratio of 1:2.10. In pond reared stock, the body length and gut length was observed in the range of 14.50-22.67 and 5.73-9.00 cm with the ratio of 1:2.53. Being as carnivorous fish, this species has low value of relative gut length with significant difference in the studied habitats. Abbas (2010) also stated that carnivorous fishes (*E. vacha*) have low value of relative gut length. Karachle and Stergiou (2010) also reported that total length and gut length also differ for the same species with different habitats. Linear regression equation for body length and gut length relationship ( $R^2$ ) were 0.925 and 0.773 for natural stock and pond reared stock. The correlation between body and gut length in natural stock of reservoir was more significant than pond reared stock.

The most common food items ingested identified were as crustacean, insects and larvae, mollusks, fishes, semi-digested and miscellaneous food matter. In case of natural stock of reservoir, food items occurred were 3.11-4.17% crustacean, 6.27- 6.41% insect, 6.48- 8.33% mollusks, 69.93-70.94% fishes, 7.95- 10.92% semi-digested and 2.46-3.11% miscellaneous. In specimens from pond reared stock, 2.07- 6.50% crustacean, 4.10- 6.88% insects, 5.06-10.17% mollusks, 6.56-10.61% fishes, 37.52- 44.74% semi-digested and 23.65-29.39% miscellaneous group was observed. There was a significant difference among the occurrences of each food item in different two habitats.

Observation on food and feeding frequency also showed a significant difference in both the habitats ( $p < 0.01$ , f-values 11.87 and 36.04). Food and feeding frequency is directly related to the food availability in the surroundings which is affected by the seasonal variation and other factors (Bhuiyan et al., 2006; Kariman et al., 2009).

Availability of food and feeding conditions play an important role in maturity and growth and early sexual maturity in fish can be achieved either by genetic selection or better nutrition (Le Bail, 1996; Schultz et al., 1994). Results of the present study also revealed that highest percentage of food item content in stomach of natural stock was small

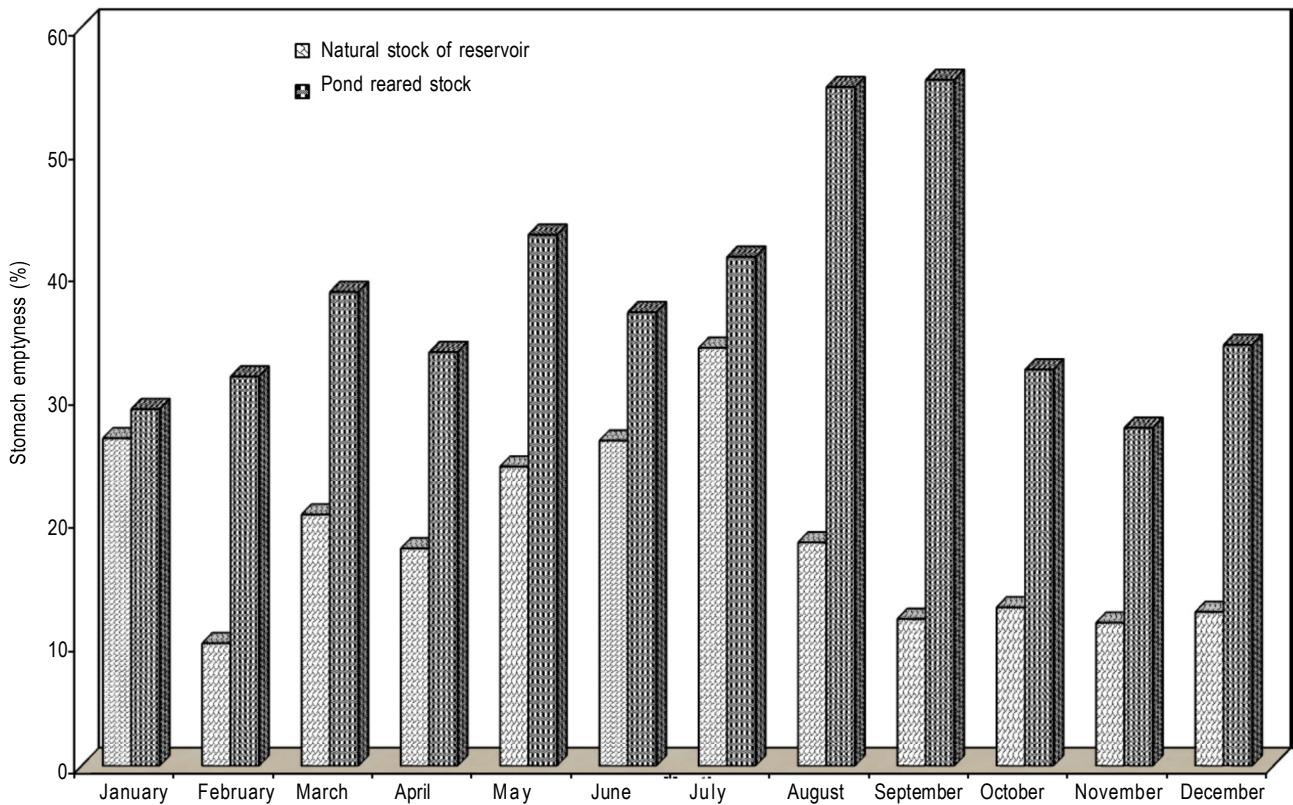


Fig. 1 : Pattern of food and feeding frequency in *Channa punctatus* under two different habitat

**Table 1** : Body length-gut length observation of *Channa punctatus* reared in natural reservoir and pond reared

Months	Natural stock of reservoir			Pond reared stock		
	Body length (cm)	Gut length (cm)	Gut length / Body length ratio	Body length (cm)	Gut length (cm)	Gut length / Body length ratio
January	15.43±0.11	5.61±0.07	1:2.75	14.50±0.50	5.73±0.15	1:2.53
February	18.25±0.50	7.50±0.15	1:2.43	21.00±1.0	7.76±0.15	1:2.43
March	24.68±0.50	11.70±0.06	1:2.10	22.67±0.70	9.00±1.32	1:2.10
April	25.66±0.62	12.13±0.46	1:2.11	19.16±1.25	7.40±0.72	1:2.11
May	20.33±1.04	7.48±1.20	1:2.71	19.00±1.92	6.93±0.15	1:2.71
June	21.50±0.50	8.18±0.17	1:2.62	16.66±1.90	6.86±1.40	1:2.62
July	14.50±0.30	5.66±0.05	1:2.56	18.08±1.90	8.33±0.28	1:2.56
August	14.06±0.11	5.57±0.06	1:2.52	20.16±2.84	8.40±0.17	1:2.52
September	15.41±1.01	5.56±0.05	1:2.77	16.83±1.75	6.76±0.75	1:2.77
October	15.76±1.66	5.75±0.15	1:2.74	21.70±1.8	9.36±1.33	1:2.74
November	16.03±1.84	5.70±0.10	1:2.81	17.36±1.26	6.92±0.44	1:3.16
December	20.16±1.04	7.51±0.12	1:2.68	19.00±1.50	7.76±0.80	1:2.68

Value are mean + standard error of 15 fish

fish, while it was miscellaneous group for the pond reared stock. This significant difference in food items occurrence in stomach of *C. punctatus* may be due to difference in availability of food for consumptions and ingestion. This confirms the findings of Serajuddin *et al.* (1998); Meye *et al.* (2009) and Cheng *et al.* (2009) that changes in food consumption in stomach in natural stock of reservoir and pond reared stock depend on the frequency of their occurrence. Feeding performance during maturing stage was poor from May-July (natural stock of reservoir) and May to August (pond reared stock) and the findings of the present study indicates that foraging activity of the fish fluctuated seasonally and the intensity of feeding declined during spawning season and this might be to avoid any stress on spawning activity. These findings coincide with the findings of Bhuiyan *et al.* (2006) and Kariman *et al.* (2009). The stress brought to bear on the alimentary canal of the fish (*M. armatus*) by its developed gonads during breeding season (Serajuddin *et al.*, 1998).

The somatic growth of the fish may differ according to biotic and abiotic factor, water temperature, food availability, and habitat type, species, stage of fishes due to sex, maturity, season and environmental conditions (Olurin and Aderibigbe, 2006; Bakhaum, 1994; Khallaf, 2003; Mohammad and Kanan, 2009). From the present findings, it can be inferred that variability in habitat, availability of food, seasonal variation affects the food and feeding activity of *Channa punctatus*.

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