

Analysis of Food and Feeding Habits of *Channa Punctata* from Ashihali Beel of Hailakandi District of Assam, India

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ABSTRACT

The pattern of food and feeding habits of *Channa punctata* was studied during April 2021 to August 2021 from Ashihali Beel, a seasonal wetland of Hailakandi district, Assam, India. The food and feeding habits of this freshwater perciformes revealed that *Channa punctata* is carnivorous in nature and the percentage composition of various food items in stomach content of *Channa punctata* were insects (61.70%), small fishes (50%), rotifers (55%), crustaceans (51.70%), molluscs (45%), annelids (50%) and miscellaneous plant debris (21.70%).

Keywords: Food and feeding habits; Gastrosomatic index (GSI); Relative length of gut (RLG), *Channa punctata*

INTRODUCTION

Analysis of the food and feeding habits of a fish is crucial in determining the habitat and behavior of a fish in water bodies and thus ascertaining the feeding preference, thereby minimizing the extent of competition for food. Suggested that the natural food of fishes could be classified into three groups, viz, (a) main food, i.e., the natural food which the fish prefers under favorable conditions and, on which, the fish thrives the best; (b) Occasional food, i.e., the natural food which is said to be well-liked by the fish and is consumed as and when available; and, (c) emergency food, i.e., the food which is ingested by the fish when the preferred food items are not available and on which the fish is just able to survive [1].

Nikolskii classified the food of fishes into four broad categories according to the relationship between the fishes and their food. These categories are as follows: (a) Basic food, which the fish usually consumes, comprising the main part of the gut contents; (b) Secondary food, which is frequently found in the guts of fishes, but in small amount; (c) Incidental food, which is said to enter the gut of the fish only rarely; and, (d) Obligatory food, which the fish is said to consume in absence of the basic food [2]. Nikolskii further, grouped fishes into following groups:

- the fishes which feed on vegetable matter and detritus.
- the fishes which feed on animals.
- the fishes which prey upon.

Nikolskii further categorized fishes into three categories according to the extent of variation in the types of food consumed by them, viz, (a) Euryphagic: the fishes which feed on a variety of food items; (b) Stenophagic: the fishes which feed on a selected few types of food and (c) Monophagic: the fishes which feed on a single type of food [3].

Analysis of food components in the gut of fish species collected from different ecosystem provides us with the information on how much that particular species is selective in food items or how much that fish species is flexible in feeding on different types of food items. Further, feeding habit is one of the primary criteria in enabling us to decide on adaptation of species to new ecosystems with least possible damage or competition with the indigenous native ichthyofaunal diversity [4].

Study site: Ashihali Beel is a seasonal wetland located along the western periphery of Serispore Tea Estate of Hailakandi District, Assam, India. The Wetland is at its full storage level during the monsoon months and dries up subsequently at the advent of winter season. The wetland harbours a wide variety of ichthyofauna and is mainly used as capture fisheries. Rapid siltation rate and seasonal agricultural activities like paddy farming during the dry season are mainly responsible for the degradation of this wetland [5].

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MATERIALS AND METHODS

A total of 60 specimens were collected from the fish landing station of the wetland. The specimens were preserved in 10% formaldehyde immediately after the collection and were brought to the laboratory for further analysis [6]. Total body length and weight were taken with the help of a metre scale and an electronic balance respectively. After taking the length and weight, the entire gut was taken for the analysis of the different food items. The stomach of the fishes were dissected with the help of a pair of scissors and the stomach contents were taken into a petri-dish and were examined under Olympus stereoscopic microscope and identified with the help of standard literature [7,8].

The degree of distension of gut was expressed as full, F (20 points), $\frac{3}{4}$ full (15 points), $\frac{2}{4}$ full (10 points), $\frac{1}{4}$ full (5 points), and empty (0 points) [9]. The characterization of different sized fish as a carnivore, herbivore and omnivore was undertaken by using the Relative Gut Length (RGL) as a main morphological

variable while feeding intensity was determined by Gastro-Somatic Index (GSI) and the estimation of gut content were analyzed with the help of occurrence method [10,11]. Mathematical expression of Relative Gut Length and Gastro-Somatic Index are:

$$RLG = \frac{\text{Total length of the Gut}}{\text{Total length of the fish}}$$

$$GaSI = \frac{\text{Weight of the gut content}}{\text{Total weight of fish}} \times 100$$

The mathematical derivation of Occurrence Method is:

$$\% \text{ Occurrence} = (n_i/N) \times 100$$

Where,

n_i = Total no. of stomach in which the given food item was present.

N = Total no. of stomach examined.

Table 1: Morphometric assessment related of feeding habits of *C. punctata*.

Species	Characteristics	
<i>Channa punctata</i>	Mouth position	Terminal
	Mouth gape	Medium and reaching up to orbit
	Lips	Non-fringed and stout
	Jaws	Strong and stout carnivore type
	Teeth	Strong canines, several rows of well-developed vomerines
	Stomach	Strong musculature, visibly separable from intestine

Table 1a: Length group: 110-135 mm.

Species	Specimen No	TL/TW (mm/gm)	Fullness Stomach (F)	of Points Allotted	GaSI	RLG
<i>C. punctata</i>	1	110/12=9.16	$\frac{3}{4}$ F	15	2.5	0.8
	2	111/16=6.93	$\frac{1}{4}$ F	5	1.25	0.81
	3	113/15=7.53	F	20	4	0.81
	4	113/17=6.64	$\frac{3}{4}$ F	15	1.64	0.8
	5	113/19=5.94	$\frac{1}{4}$ F	5	1.21	0.82
	6	117/23=5.08	F	20	3.73	0.81
	7	118/25=4.72	$\frac{1}{4}$ F	5	2.92	0.81

<i>Channa punctata</i>	8	119/23.9=4.97	F	20	3.51	0.81
	9	120/18.2=6.59	F	20	4.67	0.83
	10	122/24.3=5.02	2/4 F	10	2.96	0.82
	11	123/20.8=5.91	¼ F	5	1.2	0.82
	12	124/20=6.20	¼ F	5	3.75	0.83
	13	124/21.3=5.82	2/4 F	10	2.48	0.83
	14	124/22=5.63	2/4 F	10	2.45	0.83
	15	126/22.2=5.72	2/4 F	10	2.47	0.83
	16	127/29.3=4.33	¾ F	15	2.62	0.82
	17	127/26.5=4.79	¼ F	5	3.5	0.82
	18	128/23=5.56	2/4 F	10	2.26	0.82
	19	128/27.4=4.67	F	20	3.35	0.82
	20	128/26.8=4.77	F	20	3.47	0.82
	21	130/22.5=5.77	¼ F	5	2.04	0.84
	22	132/24=5.50	¼ F	5	2.04	0.84
	23	133/31.6=4.20	¾ F	15	2.43	0.84
	24	134/24.8=5.40	2/4 F	10	2.74	0.84
	25	135/25.2=5.35	2/4 F	10	2.73	0.84

** TL=Total Length; TW=Total Weight

Table 1b: Length Group: 140 to 165 mm.

Species	Specimen No	TL/TW (mm/gm)	Fullness Stomach (F)	of Points Allotted	GaSI	RLG
<i>Channa punctata</i>	26	140/32=4.37	F	20	2.93	0.85
	27	142/33=4.30	F	20	2.84	0.85
	28	142/31.7=4.47	¼ F	5	2.99	0.85
	29	143/32.1=4.45	F	20	2.99	0.86
	30	144/36.8=3.91	F	20	2.98	0.86
	31	145/28.1=5.16	¼ F	5	1.24	0.86
	32	145/36=4.02	F	20	3	0.86
	33	148/36=4.11	2/4 F	10	3.02	0.85
	34	150/41=3.65	F	20	2.78	0.86

35	151/43.2=3.49	F	20	2.75	0.86
36	152/30.3=5.01	¼ F	5	3.23	0.8
37	152/43=3.53	2/4 F	10	2.13	0.8
38	156/40.2=3.88	¼ F	5	1.61	0.85
39	156/34.2=4.56	¼ F	5	1.98	0.85
40	156/44.8=3.48	¾ F	15	2.5	0.85
41	156/48.2=3.23	¾ F	15	2.36	0.85
42	158/44.2=3.57	¼ F	5	1.87	0.86
43	158/46=3.43	2/4 F	10	2.43	0.86
44	160/39=4.10	2/4 F	10	2.48	0.87
45	163/41.7=3.90	¾ F	15	2.58	0.87
46	163/44=3.70	F	20	2.75	0.87
47	163/40.8=3.99	2/4 F	10	1.78	0.87
48	165/50.6=3.26	F	20	3.32	0.87

** TL=Total Length; TW=Total Weight

Table 1c: Length Group: 169 to 195 mm.

Species	Specimen No	TL/TW (mm/gm)	Fullness Stomach (F)	of Points Allotted	GaSI	RLG
Channa punctata	49	169/48=3.52	¾ F	15	2.33	0.88
	50	170/69=2.46	F	20	4.07	0.88
	51	172/75=2.29	F	20	3.9	0.88
	52	173/76.7=2.25	F	20	4.06	0.88
	53	175/73.8=2.37	¾ F	15	3.18	0.86
	54	176/72=2.45	¼ F	5	1.05	0.87
	55	177/78=2.26	2/4 F	10	2.47	0.87
	56	180/76=2.36	2/4 F	10	2.52	0.88
	57	187/80.2=2.33	F	20	4.22	0.88
	58	187/82.3=2.27	F	20	4.13	0.86
	59	193/96=2.01	¾ F	15	4.25	0.89
	60	195/93.7=2.08	F	20	4.38	0.89

** TL=Total Length; TW=Total Weight

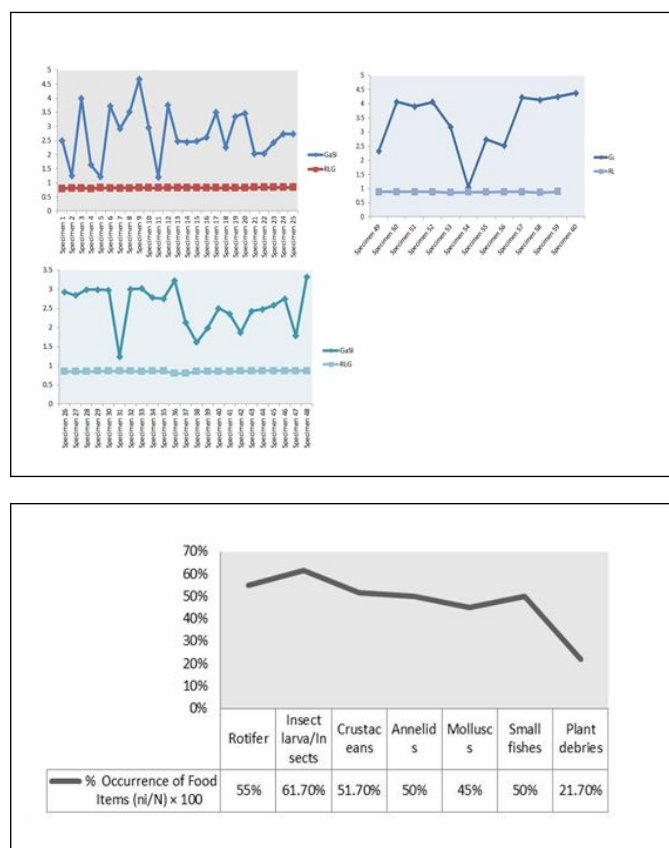


Figure 1: Schematic representation of the GaSI and RLG range and % of gut content of *Channa punctata*.

RESULTS AND DISCUSSION

The specimens were grouped into three categories based on their length as: and some of their morphometric characters were also analyzed (Table 1). It was observed that the RLG of the 60 fishes ranges from 0.80 to 0.84 of length group 110-135 mm (Table 1a); 0.85 to 0.87 of length group 140-165 mm (Table 1b); 0.88 to 0.89 of length group 169 to 195 mm (Table 1c). The GaSI of the fishes of Length group 110 to 135 mm ranged from 1.20 to 4.67 (Table 1a), 1.34 to 3.32 of length group 140-165 mm (Table 1b) and 1.05 to 4.38 for the length group 169 to 195 mm (Table 1c) which coincided with the studies of who found that the general pattern of the alimentary canal of *Channa orientalis*, *C. punctatus*, *C. striatus* and *C. Marulius* to be similar and of carnivorous type.

The study on the gut contents of *Channa punctata* based on occurrence method of food items suggested that they feeds on insects, fishes, rotifers (55%), crustaceans (51.70%), molluscs (45%), Annelids (50%), decayed organic matter, algae, sand, mud and miscellaneous items, plant debris, semi digested materials (21.70%) suggesting the similarity in the findings of S M Nurul Amin et al (2014) who revealed that the most

important diet of fry according to the simple resultant index was copepods (23.37%), cladocerans (20.52%), insects (20.07%), molluscs (13.70%), worms (9.58%), shrimps (9.12%) and others (3.65%). Predominant diet found in the stomach of adult was aquatic insects (27.46%) (Figure 1).

These observations indicate that the *Channa punctata* is a carnivore and this species can be used in integrated paddy farming for effective biological insect pest management.

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