



Research Paper

**ON CERTAIN ASPECTS OF FEEDING BIOLOGY OF PUFFER FISH
Tetraodon cutcutia (TETRAODONTIDAE) FROM JORHAT DISTRICT,
ASSAM**

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Abstract

The feeding biology of emerald puffer fish, *Tetraodon cutcutia* (Tetraodontidae), from Upper Assam reported.. The mean RLG value in different size groups and sexes was always < 1.0. Gut content analysis shows variation in percentage of occurrence through the year. . The most preferred food item of this fish constitute with miscellaneous substances (22.44%) followed by insects (19.48%), muck (16.47%) and molluscs (14.09%) Feeding intensity (GSI) ranged from 0.39±0.05 (January) to 1.869±0.75 (August) in case of male and from 0.39±0.16 (January) to 2.401±0.74 (September) in females. The adults often turn to be cannibalistic in captive condition devouring young specimens if food supply is scarce. This potential aquarium fish exhibits an aggressive behavior when kept with other species. The values of RLG and gut content analysis reveal that the species is a carnivorous fish.

Key words: *Tetraodon cutcutia*, feeding biology, cannibalism, Assam.

INTRODUCTION

Tetraodon cutcutia (Hamilton-Buchanan) is considered as a trash fish in the Indo-Gangetic basin. It belongs to the family Tetraodontidae under order Tetraodontiformes. Commonly known as *Gangatop* in Assam, the species is widely distributed throughout the plains of N.E. India and the fish is utterly neglected as it has no food value. However, this small sized fish is a potential aquarium fish. It mainly occurs in riverine habitats but also found in the *beels* (wetlands). Literature on the feeding biology of the fish is scanty. Few researchers (1) worked on the nutrition feeding research in the (*Sphoeroides annulatus*). Some researchers (8) worked on the feeding responses of the corellivorous puffer fish *Arothron meleagris* and some (12) worked on the feeding ecology of the banded puffer fish *Colomesus psittacus* The present communication is, therefore, focused on the study the feeding biology of *T. cutcutia*.

MATERIAL AND METHODS

The fish specimens for the study were collected from the Brahmaputra at Nimatighat and its adjoining areas (lat & long ?) in Jorhat District of Upper Assam.

Feeding biology of *Tetraodon cutcutia* includes morphology of the alimentary system, relative gut length (RLG), feeding intensity (GSI) were analysed as suggested by (3).

$$\text{RLG} = \frac{\text{Length of the gut}}{\text{Total length of body}}$$

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

Both occurrence and volumetric method was used for gut content analysis. Gut content analysis through occurrence (10) and volumetric method (15). Index of preponderance was evaluated by (13).

RESULTS

Relative Length of Gut (RLG) shows variation in this study (Table 1). The mean RLG value was found to be highest in the size group 2.5-4.5cm (0.81 ± 0.05) and lowest in 6.5-7.5cm (0.67 ± 0.09) in case of male *T. cutcutia*. In case of female, the highest RLG value was found in the size group 4.5-6 cm (0.86 ± 0.03) and that of the lowest in 9-10.5cm (0.73 ± 0.04). Gut content analysis shows variation in this study during different months of the year (Table 2). Highest active feeding (full gut) occurs in August (46.67) and lowest occurs in the month of March (5) whereas from October to February there is no active feeding was observed. Highest moderate (1/2) feeding was observed in February (25) and lowest in December (5). Maximum poor feeding (nearly empty) recorded in December (30) and that of minimum in August (3.33). The stomach was nearly empty in May (4). The most preferred food item of this fish species (Table 3) constitute with miscellaneous substances (22.44%) followed by insects (19.48%), muck (16.47%), molluscs (14.09%) and intestine of fishes (13.09%). The feeding intensity or gastro-somatic index (GSI) of *T. cutcutia* was observed monthly (Table-4) and the value ranged from (0.39 ± 0.05) on January to (1.869 ± 0.75) on August in case of male and in female (0.39 ± 0.16) on January to (2.401 ± 0.74) on September.

DISCUSSION:

The digestive apparatus of fishes show marked diversity in its morphology and function. This is related to both the taxonomy and different feeding habits, as well as to body shape. Mouth of *T. cutcutia* is terminal. *Tetraodon cutcutia* preying largely on intestine of other small fishes; the adult occasionally found to consume shrimps and other aquatic invertebrates. RLG values of all examined specimens were less than unity irrespective of their sex and body size. This implies that the fish is carnivorous in feeding habit (6). Further RLG value was found to decrease as the fish grew. In carnivorous fishes, the RLG value is generally low, as in *Bagarius bagarius* (0.8) and *Notopterus chitala* (0.4) as reported by (7). According to (11) the fresh water *Colomesus psittacus* is carnivorous, feeding mainly on molluscs. (16) found both qualitative and quantitative changes with growth in the diets of *Sophoerides spengleri* and *S. testudineus*. Puffer stomachs have poorly developed digestive glands with most digestion taking place in the intestine (4). Therefore, only the intestinal contents were analyzed. Several examples of similar diet spectra have been observed in Tetraodontidae family as reported in milk-spotted puffer, *Chelonodon patoca* (5) and also in puffers *Sophoerides spengleri* and *S. testudineus* (16). *Tetraodon cutcutia* were consumed few gastropods. According to (2) the puffer fish *Lagocephalus sceleratus* feeding on invertebrates and fish. Puffer have beak like, terminal mouth with a bony plate and 2 teeth in both jaws that can crush hard-shelled organisms like molluscs. A broad head apparently favours the ingestion of hard and massive prey such as most of the crabs and some fish species (9). Reason for low feeding intensity in winter because of their low metabolic rate as the fish is poikilothermic animal.

Table-1: Mean Relative Length of Gut (RLG) value in *T. cutcutia*

Length group(cm)	Sex	RLG
2.5-3.5	M	0.81±0.05
3.5-4.5	M	0.81±0.04
4.5-5.5	M	0.79±0.07
5.5-6.5	M	0.75±0.05
6.5-7.5	M	0.67±0.09
3.0 -4.5	F	0.81±0.11
4.5-6.0	F	0.86±0.03
6.0-7.5	F	0.83±0.05
7.5-9.0	F	0.77±0.06
9.0-10.5	F	0.73±0.04

Table-2: Fullness of gut (Volumetric method) in *T. cutcutia*

Month	No. of fish examined	Active feeding - full	Active feeding - ³ / ₄ full	Moderate feeding -1/2 full	Poor feeding- 1/4 full	Poor feeding-nearly empty	Empty
Jan	21	-	-	14.29	19.05	28.57	38.09
Feb	20	-	10.0	25.0	20.0	15.0	30.0
Mar	20	5.0	15.0	20.0	15.0	20.0	25.0
Apr	25	33.33	14.81	18.52	11.11	14.81	7.41
May	25	32.0	12.0	24.0	16.0	12.0	4.0
June	22	45.45	22.73	18.18	13.64	-	-
July	26	46.15	23.08	19.23	11.54	-	-
Aug	30	46.67	23.33	16.67	10.0	3.33	-
Sept	31	45.16	19.35	16.13	9.68	6.45	3.23
Oct	23	-	13.04	17.39	17.39	21.74	30.43
Nov	20	--	--	10.0	20.0	25.0	45.0
Dec	20	--	--	5.0	25.0	30.0	40.0
Overall	285	23.86	13.68	17.19	15.09	13.68	16.49

Table 3: Index of Pre-ponderance of food items in *T. cutcutia*

Food items	Vol %	Occ.%	ViOi	ViOi × 100 / \sum ViOi	Grading
Insects	14.98	16.49	247.02	19.48	II
Crustaceans	6.33	5.61	35.51	2.80	VII
Worms	3.63	3.16	11.47	0.905	IX
Molluscs	13.77	12.97	178.59	14.09	IV
Fish fins	10.70	10.88	116.42	9.22	Vi
Fish intestine	11.53	14.39	165.92	13.09	V
Cuticle of insects	3.47	3.51	12.18	0.96	VIII
Cannibalism	3.53	2.11	7.45	0.59	X
Muck	14.43	14.74	208.80	16.468	III
Mics.items	17.63	16.14	284.55	22.442	I
Total	100	100	1267.91		

Table 4: Monthly gastro-somatic index (GSI) in *T. cutcutia*

Month	Sex	GSI	Sex	GSI
Jan	M	0.38±0.18	F	0.6±0.02
Feb	M	0.478±0.21	F	0.306±0.14
Mar	M	0.646±0.31	F	2.332±0.87
Apr	M	0.544±0.24	F	2.054±0.85
May	M	0.85±0.43	F	3.018±0.94
June	M	1.251±0.63	F	3.459±1.21
July	M	0.975±0.44	F	4.026±0.56
August	M	1.072±0.34	F	4.221±1.35
Sept	M	1.192±0.26	F	4.832±0.47
Oct	M	0.897±0.02	F	0.835±0.39
Nov	M	0.45±0.12	F	0.762±0.29
Dec	M	0.49±0.21	F	0.754±.23

ACKNOWLEDGEMENT:

Authors are grateful to the Head, Dept. of Life Sciences for giving necessary permission to carry out the study.

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