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GUT CONTENT OF FRESHWATER CATFISH *RITA RITA* (HAMILTON) FROM RIVER SUTLEJ, DISTRICT KASUR, PAKISTAN

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Abstract: The catfish, *Rita rita* (Hamilton) were collected from river Sutlej, district Kasur. The total length of fish ranged from 20.2 to 30.3 cm and weighed from 79.0-542 g. The gut content of these fishes were extracted and examined carefully under microscope and four food items were recovered from the gut and were identified as; crustaceans, mollusca shells, fish scales and rotten vegetation/debris. Crustaceans dominated the fish food throughout the sampling period. In December fish had less diverse food than in January and February.

Key words: Fish Food; feeding habits; winter; River Sutlej

INTRODUCTION

About 180 native freshwater fish species, including 37 catfish species from order siluriformes has been reported from Pakistan and Kashmir. *Rita rita* is a food fish and distributed in Afghanistan, Pakistan, India, Nepal, Bangladesh and Myanmar (Mirza, 2003). It is bottom-dwelling carnivorous catfish and feed on mollusca, small fishes, crustaceans, insects as well as on decaying organic matter (Shrestha, 1990).

Food and feeding habits have been known to vary for individual fish with respect to size, age, sex, life history stage, kinds of food available, season, time of the day, as well as locality in which they are found (Lagler, *et al*., 2003). Restriction or cessation of feeding lowers growth rate in catfishes. Temporary feed restriction could affect the fish by lowering processing yield since muscle growth is reduced. A muscle may be utilized to meet maintenance energy requirements. Processing yield typically

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decrease in catfish from late fall through spring when cold water temperatures lower feed intake and feeding is reduced (Bosworth *et al*., 2002). Feeding activity of catfish in pond was observed to be influenced by the feed consumed the previous day rather than daily water temperature, dissolved oxygen and other environmental variables over growing season (Taylor *et al*., 1999). Measurement of amount of feed consumed by fish has largely been limited to various groups of fishes (Silverstein and Shimma, 1994; Bellardi *et al*., 1995). The present study was aimed to observe the feeding habits of a wild population of catfish, *R. rita* from River Sutlej, district Kasur during winter.

MATERIALS AND METHODS

Sampling site:

The River Sutlej is the longest of the five rivers that flow through the historic crossroad region of Punjab in northern India and Pakistan. The total length of the river is about 964 miles of which only 329 miles runs in Pakistan. Its source is in Tibet near Mount Kailas and it flows south and southwest. Sutlej joins with the Beas River in the state of Punjab, India and continues South West and enters into Pakistan at village Nagar Amin, Tehsil Kasur. It passes through Punjab and joins River Chenab at Panjnad south of Multan. At Panjnad, Sutlaj joins the Indus River at Mithankot. The fishing rights of river Sutlej are leased out annually by Fisheries Department Government of the Punjab, Lahore.

Fish collection and Processing:

The experimental fish was collected from River Sutlej at Ganda Singh Wala area with cast net (with the help of a commercial supplier/ fisher men) from December 2007 to February 2008. The fishes were packed in plastics bags with ice in fish box and brought to Fish Disease and Health management Laboratory, Zoology Department University of the Punjab, Lahore. The defrosted fishes were weighed to nearest 0.1g on digital balance and measured to nearest 0.1cm on wooden measuring board. The fishes were identified according to Mirza and Sharif (1996). For the study of gut contents, the fish was dissected (Fig.1a) and the gut was removed intact (Fig.1b) from esophagus to anus and placed in Petri dish

containing distilled water. The content of stomach and intestine of each fish were taken and studied with the help of magnifying glass and under microscope. The gut contents were separated and identified with the assistance of Dr. Abida Butt, Department of Zoology, University of the Punjab, Lahore, who also assisted in statistical analysis.

RESULTS AND DISCUSSION

The mean length, mean weight and mean gut weight of three fish samples (Table 1) shows decreasing trend from December to February. Analysis of variance shows that there is no significant relationship in the length and weight of the fish (F1= 4.26, P= 0.054, it may be close) and fish weight and gut weight (F1= 2.36, P= 0.142) in December. In January the relationship was still non significant between length and weight of the fish. (F1=0.11 P=0.741). However, a significant relationship existed between fish weight and gut weight (F1=9.68, P=0.006). During February still no significant relation was found in length and weight of the fish (F1=0.17 P=0.684). In the same way there was no significant relationship in fish weight and gut weight (F1=2.99, P=0.092), there may have slight change in gut weight as weight of fish increases.

Feeding habits of *R. rita* were observed from a wild population. The gut content (Table II) shows that 50-55% fish population in all samples had crustaceans in the stomach compared to molluscs shells, fish cycloid scales and rotten vegetation/debris. No food items were recovered from the gut of 22.5 - 40% of the fish. Sandhu (2000) observed that stomach of most of the catfish species were empty during winter. The feeding spectrum of *R. rita* is not broad in winter and gut content found in present study may be categorized into following items such as crustaceans, molluscs, fish cycloid scales and rotten vegetation. The most favorite food of fish seems crustaceans. Sandhu and Lone (2003) reported presence of algae, crustacean, insecta, mollusca, fishes and worms in the stomach of seven catfishes, *Sperata sarwari* (Mirza); *Mystus bleekeri* (Day); *Mystus vttatus* (Bloch); *Ompok bimaculatus* (Bloch); *Wallago attu* (Bloch & Schneider); *Bagarius bagarius* (Hamilton) and *Heteropneustes fossilis* (Bloch) in winter. However, algae, crustacean and fishes dominated the food items in these fishes to various extents.

In our study rotten vegetation was found in the gut in all samples but in low quantity indicating it as a less preferred Food item. The presence of rotten vegetation /debris has been found in other fishes. Some loricariid catfish have evolved the capacity to use wood as a food source. Gastrointestinal tracts of *Panaque* spp. and *Cochliodon* spp. have been observed filled entirely with fresh-cut wood shavings (Schaefer and Stewart, 1993). *Panaque* spp. is capable of extracting energy from a wood diet in algae-free water, and that they are capable of positive somatic growth under such conditions (Nelson, 1999). In contrast, a generalized loricariid, *Hypostomus* sp. is able to eat and extract energy from wood, but not in sufficient quantities to maintain weight or to grow (Nelson, 1999). Presumably fishes that acquired the ability to digest wood would be at a competitive advantage in dry season when many fish species stop feeding entirely because of food scarcity (Fink and Fink, 1979). *R. rita* consumed more rotten vegetation in February, when less crustaceans were available to fish. The fish scales are the third item recovered from gut of fish. The scales were of variable sizes indicating small and large size fish being preyed upon. The scales were broken and having damaged margins. It is also stated that *R. rita* is unable to eat fish larger than its own size. As no fish bones were extracted from the gut. So, it may be assumed that *R. rita* feed on scales. Moreover, it seems reasonable to state that *R. rita* must have plucked these scales from fishes.

The fourth food item that fish consumed was molluscs, which were present in February sample only. The molluscs were less in number, than cycloid scales and crustaceans. This seems to be due to their shells, which make them hard nuts for fish to crack. The repulsive odour, given out by some molluscs such as that of gastropods seem to be another reason for lack of popularity of these animal as food for catfish.

Most of the authors while studying the food contents of *R. rita* mentioned that this fish feed on insects, their larvae and on young fishes (Khan 1934); shrimp-like crustaceans and insect larvae (Islam, 1951). D`Abreu (1936) observed that stomach of these fishes was full of young bivalves of about the size of a pea from Nerbudda River.

This study indicates that almost 22-40% of wild population of *R. rita* either do not feed or feed less in winter. Sandhu (2000) stated that catfishes are cold blooded vertebrates and cannot withstand high and low

temperature. Morover, *R. rita* is predominantly carnivorous and prefer fishes and molluscs. Sandhu and Lone (2003) reported that seven catfishes (other than *R. rita*) feed maximum in Spring (March to May) and autumn (September to November). In summer, during breeding season these fishes feed little and in winter their feed intake is even less than summer. Since, these authors have not observed neither reported the gut content of *R. rita* hence, our results may not be compared with them. *R. rita* has also been found to show cannibalism behavior feeding on its own young one's in summer (Iqbal, unpublished data). From this study it may be concluded that during winter *R. rita* consume more crustacean than rotten vegetation, fish scales and mollusca shells. There may be two reasons to state for non significant relationship between length and weight of the fish; i) the food fish took was not enough to maintain significant relationship and ii) almost 35-40% of fishes were having empty stomach. Weak relationship between weight and gut weight may be due to the presence of some food in the gut. Clear picture of feeding pattern of *R. rita* may be observed if the similar study is extended for over one year from the same site in the wild.

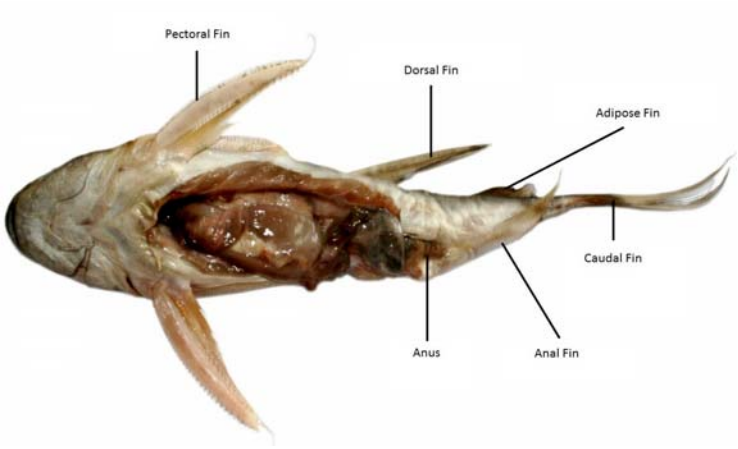
Table I: Gut content of *Rita rita* (in percentage food items).

Sample	Crustaceans	Mollusca shells	Fish scales	Rotten vegetation/ debris	Empty stomach
1 (n=20)	55	0	5	5	35
2 (n=20)	55	0	0	5	40
3 (n=40)	50.0	5.0	7.5	15	22.5

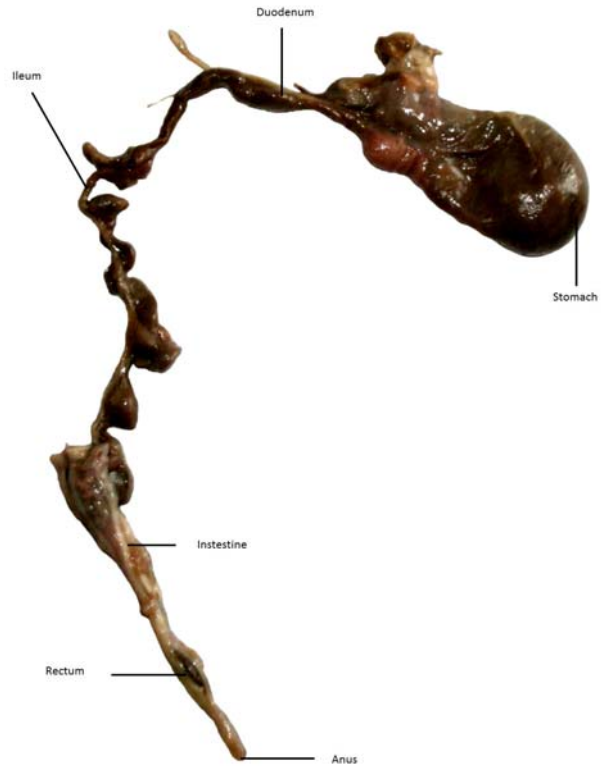
Table II: Morphometric observations of *Rita rita*

Sample	Mean TL (cm)	Mean Weight (g)	Mean weight of gut (g)	ANOVA (TL vs Wt)	ANOVA (Wt vs gut wt)
1 (n=20)	27.12± 2.79	314.12± 109.5	19.05± 5.55	F1=4.26, P=0.054	F1=2.36 P=0.142
2 (n=20)	28.42± 2.65	212.45± 98.36	13.55± 7.33	F1=0.11 , P=0.741	F1=9.68 P=0.006
3 (n=40)	23.47±	145.13±	7.55 ± 2.85	F1=0.17,	F1=2.99

	8.35	25.85	P=0.684	P=0.092



(a)



(b)

Figure 1: Dissected view **(a)** *R. Rita* **(b)** Digestive tract of *Rita rita*.

Figure 2: Gut contents of the *R. rita* **2a.** Crustaceans; **2b**. Molluscs; **2c**.Cycloid scales **2d**. Rotten vegetation.

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