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## A study on analysis of gut content in certain freshwater food fishes found in River Kosi

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**Abstract-** Gut content analysis is widely used to find out or to ascertain the food & feeding habit of fish species. To have knowledge about the inter - specific relation between the aquatic fauna & and the productivity of the water body the study of food and feeding habit of the fish is very important. Behavior, condition, energy intake, etc are the ecological components that can be only represented when the diet of fishes are known. In the present study the gut content analysis was done in four fish species *Labeo rohita*, *Channa punctata*, *Cirrhinus mrigala* & *Cyprinus carpio*. Volumetric methods & preponderance index method was used for the estimation of diet in various fishes. The result thus obtained shows that dead and decayed organic matter, rotifers, sand and mud etc.

**Key words:** Gut content, food fishes, Madhepura, Bihar

### INTRODUCTION

Fish is regarded as one of the important part of human food since the time immemorial. Harvesting of fish by the fisherman is passed from one generation to other.<sup>1</sup> Survivability of the fish usually depends on the aquatic availability of the organic matter and optimal sized prey in appropriate concentration, lack of which influences the larval survival. Heavy mortality rate has been seen in fishes usually during the time when these fishes transit from endogenous to exogenous mode of feeding. It is regarded as one of the most critical phase of their life because it is the time when they require right type of food for their growth & nourishment. Hence low survival rates are regarded as one of the most important drawback in the

successful culture of many marine and freshwater fishes.<sup>2</sup> In India major carps, rohu (*Labeo rohita*) is considered as one of the most intensively cultured species.<sup>3</sup> It account for about 15% of worlds freshwater aquaculture production. *Cirrhinus mrigala* is one of the very fast growing fish which is generally large in size and commonly it is known as mrigala.<sup>4</sup> Knowledge about its feeding habit is very important to evaluate the ecological role and position of fish in the food web of ecosystem.<sup>5</sup> Thus it is very important to understand the ecology as well as ethology of feeding.

The annual fish production of River Kosi in Madhepura region was estimated as 2.9 ton in 2015. The major species of fishes found in this region were generally *Catla catla*, *Cirrhinus mrigala*, *Labeo calbasu*, *Labeo rohita*, *Labeo bata*, *Labeo dyocheilus*, *Puntius sarana*,

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*Cyprinus carpio*, *Notopterus notopterus* and *Ompok bimaculatus*. However there has been decline in the fish production for last couple of years rated the recruitment of catla as very feeble.<sup>6</sup> Mrigal showed a steep decline in the reservoir and its recruitment was described as moderate to poor. Volumetric methods & preponderance index method was used for the estimation of diet in various fishes.<sup>6,7</sup>

## MATERIALS & METHODS

### Study area

Different specimens of fish having different age groups were collected from the River Kosi in Madhepura district of Bihar. The specimen of four predatory fish species *Labeo rohita*, *Channa punctata*, *Cirrhinus mrigala* & *Cyprinus carpio* were collected by random sampling method from different localities in the River Kosi. Samples of fish species were collected during the period of January 2016 to December 2016 in fresh condition by using the planktonic net.

### Species collection

Total of 200 specimens of fishes were collected and separated according to different species. Out of the 200 species 80 of the species were found to be *Labeo rohita*, 70 of the species belonged to *Channa punctata*, 30 belonged to *Cirrhinus mrigala* & 20 of it belonged to *Cyprinus carpio*.

For the further study the collected species were then taken to the laboratory in the water medium. In the laboratory the species were identified. Later on the species were dissected under the supervision of the professor in charge. The content in the stomach and intestine which was very partially or totally in undigested state were removed by using forceps and soft brush. The gut content was then kept in petridish for the further analysis. The gut content was then examine and counted under the microscope and the percentage composition was worked out. Index of preponderance, a method was adopted for

grading the food element in the stomach during analysis of fishes along with volumetric method.<sup>8</sup>

## OBSERVATION

From the above study it was found that the gut content of 80 fishes belonging to *L. rohita* mainly contained the foods items *closterium* sp., *Pediastrum simplex*, and *spirogyra* sp. among the chlorophyceae, *Nostoc* sp., *Oscillatoria* sp., *Anabaena* sp., *Microcystis aeruginosa* among the Cyanophyceae; *Synedra ulna* among the Bacillarophyceae were observed. Organic matter along with mud content was also found in significant amount. Since the food of these fishes comprised of micro organisms, individual separation of food items was not possible therefore percentage was used to indicate its value.

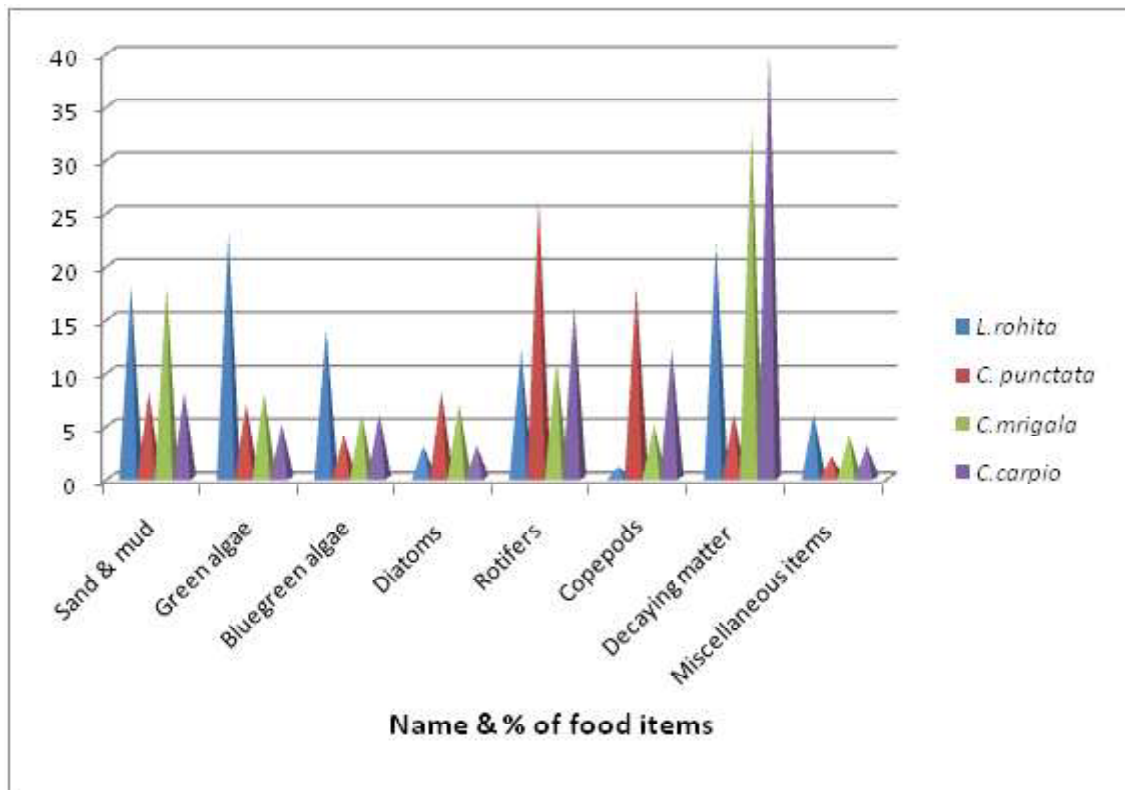
In *Channa punctatus* the gut content showed zooplanktons and rotifers in dominance amount. In *Cirrhinus mrigala* the gut content analysis showed large amount dead and decaying organic matter, mud along with other green algae consisting of *Spirogyra* sp., *Pediastrum simplex*, *Closterium* sp & *Diatoms*. In *Cyprinus carpio* the gut content showed large amount of *Daphnia rosea*, *Cyclops insignis*, *Brachionus tridens* tender roots and leaves of higher aquatic plants. Thus percentage of food content found in the four different species of the fishes have been given in the table 1 and in fig; 1.

## RESULT & DISCUSSION

Thus the result obtained from the above research on gut content of the different fish shows that *Labeo rohita*, *Channa punctata*, *Cirrhinus mrigala* & *Cyprinus carpio* feed on wide variety of food items. The ability of these fishes to digest some algae and not others largely depends on the nature of the algal cell wall. Gupta (1996)<sup>9</sup> reported that food of *Labeo rohita* mainly composed of algal and crustacean but in the present investigation the food of *Labeo rohita* in River Kosi mainly composed of algae and rotifers., George(1964)<sup>10</sup> observed large quantities of mud

Table 1- Percentage composition of food items in different fishes as revealed from the gut content

Name of the fish	Sand & mud	Green algae	Bluegreen algae	Diatoms	Rotifers	Copepods	Decaying matter	Miscellaneous items
<i>L.rohita</i>	18	23	14	3	12	1	22	6
<i>C. punctata</i>	8	7	4	8	26	18	6	2
<i>C.mrigala</i>	18	8	6	7	11	5	33	4
<i>C.carpio</i>	8	5	6	3	16	12	40	3



**Fig. 1- Percentage composition of different food items of fresh water fish of River Kosi**

sand , and fragments of decaying plants in addition to the planktonic algal food. According to the above findings also confirms that blue green algae were not utilized as food for many fishes which is also mentioned by Gupta (1996).<sup>9</sup>

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