

## Food and feeding habits of cyprinid carp, *Labeo fimbriatus* (Bloch, 1797) from Bhadra Reservoir, Karnataka

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### Abstract

In the current study, food and feeding habits of Cyprinid fish *Labeo fimbriatus* (Bloch, 1797) of the Bhadra reservoir of Karnataka have been discussed in this paper. Both qualitative and quantitative composition of food from 340 male and 350 female fishes were analysed. The gut content consisted approximately 42.75% of mud and sand, 22.83% of diatoms, 16.75% of decayed organic material, 12.41% of chlorophycean algae, 4.0% of semi digested matter and 1.16% of miscellaneous items. The fishes with active feeding (Full,  $\frac{3}{4}$  full) was recorded during February to March, June and December. Moderate feeding was noticed during December-January and poor feeding was observed during monsoon/rainy months and the fishes with the percentage of empty stomachs were noticed during February, March, June, July and September to December.

**Keywords:** *Labeo fimbriatus*, food and feeding habits, Bhadra reservoir, gut content analysis

### Introduction

Cyprinid fish, *Labeo fimbriatus* (Bloch, 1797) belonging to the order Cypriniformes and included under family-Cyprinidae. This carp is widely distributed throughout central and peninsular region and extended through Orissa, Mumbai and up to Punjab. This fish also reported in Nepal, Burma and other regions. In peninsular India, *Labeo fimbriatus* is available in the rivers of Cauvery, Krishna, Mahanadi, Tunga and Tungabhadra. The fish is vernacularly called as “Kemmenu” in Karnataka. *Labeo fimbriatus* is a slow growing fish in its wild It attains an utmost length of 91 cm and weighing about 3.5 kg (David *et al*, 1974). It is an herbivore fish as it feeds on diatoms, blue-greens, green algae, high aquatic vegetation, insects and decayed organic matter. It spawns during rainy months and the species does not naturally spawn in confined waters (Basavaraju *et al*, 1993; Rajanna *et al*, 2015) [1, 9]. A variety of fishes devour various sorts of food things. In this way, the food and taking care of propensities for fish have tremendous biological worth. By examining the food and taking care of propensities, the example of between explicit competitions of fishes can be evaluated (Sakhare and Jetithor, 2016) [11]. Food plays a vital role in life history of fishes (Nikolsky, 1963) [7]. The study of food and feeding habits of fishes help in understanding various aspects of biology like migration, growth, maturation, spawning and seasonal variations in biochemical composition (Sukumaran, 2004) [12]. Keeping this in view the present study is undertaken to know the food and feeding habits of Cyprinid fish, *Labeo fimbriatus* from Bhadra reservoir of Karnataka.

### Materials and Methods

#### Study Area

Bhadra reservoir is located near Lakkavalli village of Tarikere taluk in Chikmagalur district (Figure 1). This reservoir has been constructed at an elevation of 601 m above MSL The reservoir is placed at latitude 13°42'00" N

and longitude 75°38'20"E. The Bhadra basin gets the rainfall ranged from 117 to 573 cm and the temperature varied from 30.1 to 18.8°C. The reservoir is having 186 ft in depth. The water of this reservoir is utilized for irrigation, drinking, fishery and hydroelectric power.

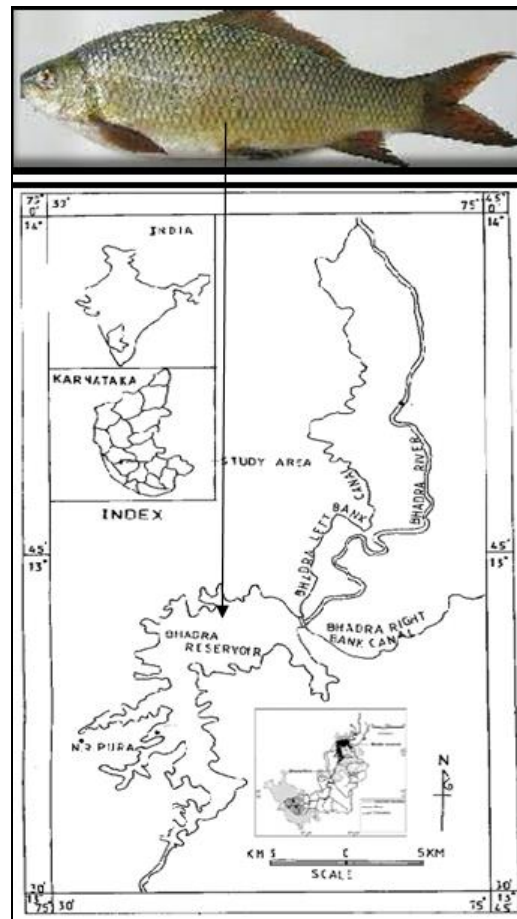


Fig 1: Location of the study area for *Labeo fimbriatus* sampling

The only craft used in the reservoir by the fisherman is the coracle. The main types of gear used are gill nets, long lines, cast nets and dragnets are used as a small scale. The gill nets of various sizes are used to catch all varieties of fishes from big to small carp fishes.

Fish samples were collected from the Bhadra reservoir fish landing centre from February 2011 to January 2012. The present study was based on the observation of *Labeo fimbriatus* (Bloch) ranging in size from 12 to 58 cm total length comprising 340 males and 350 females.

**Food and Feeding Habits**

Both qualitative and quantitative analysis were carried out to study the food contents of *Labeo fimbriatus*. Each fish gut was observed under a binocular microscope in the laboratory. For qualitative analysis, the identification of food items was made up to the generic and species level.

**Quantitative Analysis**

The stomach contents were washed and points were given depending on the relative volume of each food item taking into consideration the extent of fullness of stomach and the amount of food contained. In the present study, the fullness of the stomach was classified as (i) full; (ii) ¾ full; (iii) ½ full; (iv) ¼ full; (v) little; and (vi) empty based on the amount of feeding and the grade of distention of the stomach.

**Statistical Analysis**

One way ANOVA is calculated to know the significance difference in the food items of fishes by using good calculator software.

**Results and Discussion**

The qualitative and quantitative composition of food components are presented in Table 1 and Figures 2 to 4. The analysis of gut content showed that mud and sand, diatoms, decayed organic matter, chlorophycean algae formed the main food while the semi digested matter and miscellaneous items formed the minor food items. The gut consisted approximately 42.75% of mud and sand, 22.83% of diatoms, 16.75% of decayed organic matter, 12.41% of chlorophycean algae, 4% of semidigested matter and miscellaneous items with 1.16% respectively (Figure 3).

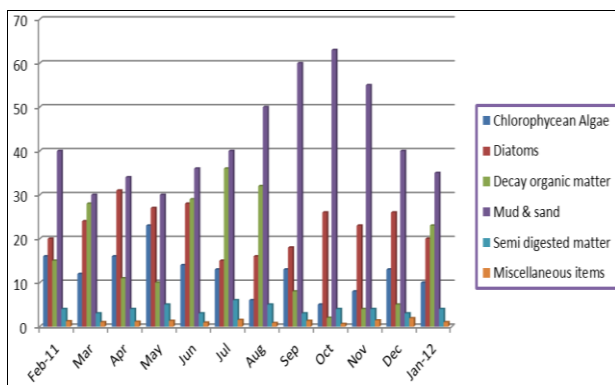
Mud and sand was in larger abundance during October with 63% (Figure 2). The lowest quantity of this item was found during March/May (30%). Diatoms formed a major constituent of the stomach content throughout the year.

High quantities of diatoms appeared in the month of April (31%) and minimum quantities were noticed in the month of July (15%). The diatoms were represented by *Cymbella tumida*, *Cyclotella stelligera*, *Synedra ulna*, *Surirella linearis*, *Gyrosigma elongatum*, *Navicula cryptocephala*, *Nitzschia palea*, *Gomphonema parvulum*, *Diatoma vulgare*, *Amphora ovalis*, *Cocconeis placentula*, *Diploneis subovalis* and *Pinnularia gibba*

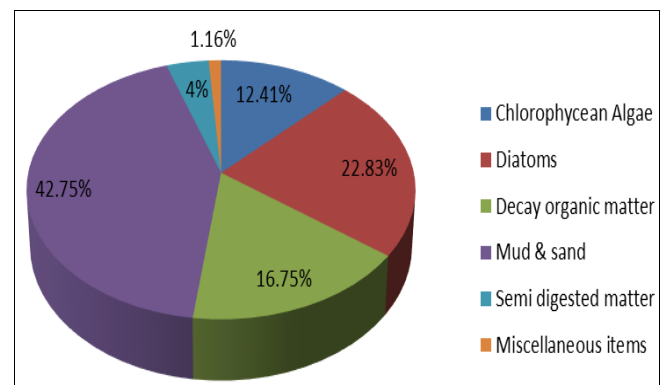
High percentage of decayed organic matter was recorded in July (36%) and lower percentage in the month of October (2.0%). Maximum quantities of chlorophycean algae appeared in the month of May (23%) and minimum quantities were noticed in the month of October with 5%. The species were represented by *Cosmarium tumidum*, *Pediastrum simplex*, *Scenedesmus quadricauda*, *Staurastrum gracile* and *Spirogyra sp.*

**Table 1:** Qualitative and Average composition of the gut content of *Labeo fimbriatus* during February 2011 to January 2012.

Sl. No	Food items	Average composition (%)
1	Decayed organic matter	16.75
2	Mud and sand	42.75
3	Semi digested matter	4.00
4	Miscellaneous items- Plant material, Insects, Shell pieces	1.16
5	Chlorophycean algae: <i>Cosmarium tumidum</i> <i>Pediastrum simplex</i> <i>Scenedesmus quadricauda</i> <i>Staurastrum gracile</i> <i>Spirogyra sp.</i>	12.41
6	Diatoms <i>Cymbella tumida</i> <i>Cyclotella stelligera</i> <i>Synedra ulna</i> <i>Surirella linearis</i> <i>Gyrosigma elongatum</i> <i>Navicula cryptocephala</i> <i>Nitzschia palea</i> <i>Gomphonema parvulum</i> <i>Diatoma vulgare</i> <i>Amphora ovalis</i> <i>Cocconeis placentula</i> <i>Diploneis subovalis</i> <i>Pinnularia gibba</i>	22.83



**Fig 2:** Quantitative composition of food items in the gut of *Labeo fimbriatus* during February 2011 to January 2012.



**Fig 3:** Average composition of food items in the gut of *Labeo fimbriatus* during February 2011 to January 2012.

**Feeding Intensity**

The percentage occurrence of stomach in various degree of fullness is presented in Figure 4.

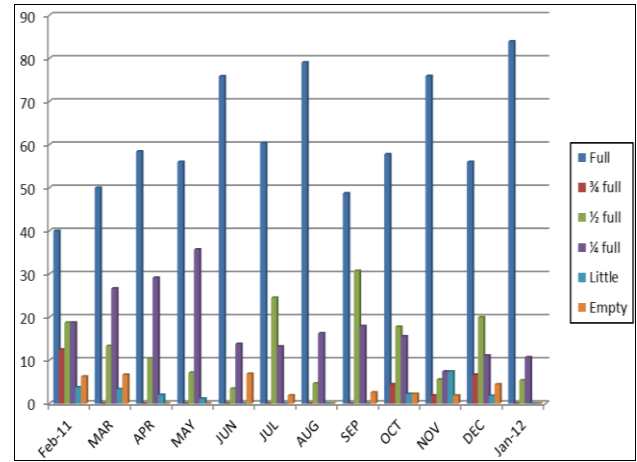
The fishes with active feeding (Full, ¾ full) was recorded during February to March, June and December. Moderate feeding was noticed during December-January and poor feeding was observed during monsoon/rainy months and the fishes with the percentage of empty stomachs were noticed during February, March, June, July and September to December.

Rajanna *et al* (2015) [9] studied the food and Feeding Habits of *Labeo fimbriatus* (Bloch) from the Vanivilas Sagar reservoir of Karnataka. They found that the gut content consisted 46.54% of mud and sand, 20.54% of diatoms, 17.13% of decayed organic matter, 11.48% of algae, 3.32% of semi digested matter and 0.98% of miscellaneous matter. They reported moderate feeding during winter months and poor feeding during rainy months and the percentage of empty stomach increased from June to August and decreased after September.

Ramesh and Kiran (2016) [10] have studied the pattern of food and feeding habits of cat fish, *Clarias batrachus*.

They reported that the food of *Clarias batrachus* consisted

of zooplankton, insect larvae, fish larvae, small shrimps and organic debris. On average for all months, insect larvae dominated. The feeding intensity is poorer from pre-spawning and spawning period but remarkably higher from post spawning period.



**Fig 4:** Percentage index of fullness in the stomach of *Labeo fimbria*

**Table 2:** One way ANOVA for degrees of fullness of food items of *Labeo fimbriatus*

Groups	N	Mean	Std. Dev.	Std. Error	
Full	12	61.84	13.7096	3.9576	
¾ full	12	2.1217	3.9296	1.1344	
½ full	12	13.4783	8.8761	2.5623	
¼ full	12	18.0267	8.4001	2.4249	
Little	12	1.8025	2.2252	0.6424	
Empty	12	2.73	2.6924	0.7772	
ANOVA Summary					
Source	Degrees of Freedom DF	Sum of Squares SS	Mean Square MS	F-Stat	P-Value
Between food items	5	32152.5072	6430.5014	105.7236	0
Within food items	66	4014.3648	60.8237		
Total:	71	36166.872			

F-statistic value = 105.7236

**Conclusion**

Qualitative and quantitative analysis of food revealed that the predominant items in the stomach were diatoms, mud and sand, chlorophycean algae and decayed organic matter. The fishes with active feeding was recorded during February to March, June and December. While, moderate feeding was noticed during December-January and poor feeding was recorded during monsoon/rainy months and the fishes with the percentage of empty stomachs were noticed during February, March, June, July and September to December.

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