ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 17, Issue, 09, pp.34852-34854, September, 2025
DOI: https://doi.org/10.24941/ijcr.49620.09.2025

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

A SEASONAL STUDY ON THE GUT CONTENT ANALYSIS OF *CATLA CATLA* FROM WAN PRAKALPA RESERVOIR, PARLI VAIJNATH, BEED DISTRICT, MAHARASHTRA, INDIA

[1,*]Dr. Jagdish V. Jagatkar and [2]Mr. Somnath B. Choure

[1]Department of Zoology, Vaidyanath College Parli Vaijnath, District Beed, MH; [2]PG Department & Zoology Research centre, MRS. K. S. K. College Beed, MH

ARTICLE INFO

Article History:
Received 20th June, 2025
Received in revised form
24st July, 2025
Accepted 29th August, 2025
Published online 30th September, 2025

Keywords:
Catla catla, gut Content Analysis, Seasonal Variation, Feeding Ecology, Plankton, Wan Prakalpa.

***Corresponding author:**
Dr. Jagdish V. Jagatkar

ABSTRACT

Understanding the feeding ecology of commercially important fish species is crucial for fisheries management. This study investigated the seasonal dietary composition of the major carp, *Catla catla*, in the Wan Prakalpa reservoir, Parli Vaijnath, Beed District, Maharashtra, India. Over twelve months (June 2024 to May 2025), 25 fish specimens were collected seasonally. Gut content analysis was performed using the Occurrence Method and the Points Volume Method. The results revealed that *Catla catla* is a planktivorous fish, with phytoplankton constituting the bulk of its diet (68.2% annually). Zooplankton and detritus comprised 20.5% and 11.3% of the diet, respectively. Chlorophyceae (42.1%) and Bacillariophyceae (39.8%) were the dominant phytoplankton groups. Seasonal variation was evident, with phytoplankton consumption highest in post-monsoon (75.4%) and summer (72.6%) months, while zooplankton intake peaked during the monsoon (28.3%). The Index of Preponderance consistently ranked phytoplankton highest across all seasons. This study confirms the planktivorous, surface-feeding nature of *Catla catla* and highlights significant seasonal dietary shifts influenced by plankton availability in the Wan Prakalpa reservoir.

Citation: **Dr. Jagdish V. Jagatkar and Mr. Somnath B. Choure.** ***2025.*** *"*A Seasonal Study on the Gut Content Analysis of *Catla catla* from Wan Prakalpa Reservoir, Parli Vaijnath, Beed District, Maharashtra, India.". *International Journal of Current Research, 17, (09), 34852-34854.*

INTRODUCTION

The Indian major carp, *Catla catla* (Hamilton, 1822), is a cornerstone of freshwater aquaculture and inland fisheries in India due to its rapid growth rate and high market value (Jhingran, 1991). Effective management and culture of this species necessitate a detailed understanding of its feeding habits, which are known to be influenced by season, habitat, and food availability (Yadav & Singh, 2020). *Catla catla* is morphologically adapted as a surface feeder, possessing a large, upturned mouth and fine gill rakers ideal for filtering plankton from the water (Talwar &Jhingran, 1991). While generally classified as a planktivory, its specific dietary composition can exhibit significant spatial and temporal variations. Seasonal changes in water temperature, rainfall, and nutrient influx directly affect plankton dynamics, which in turn influence the diet of planktivorous fish (Sarkar & Debnath, 2019). The Wan Prakalpa reservoir is a vital aquatic ecosystem in the semi-arid region of Beed district, supporting local biodiversity and fisheries. However, a detailed, seasonally comprehensive study on the feeding biology of *Catla catla* in this reservoir is lacking. This study was therefore designed to: (i) qualitatively and quantitatively analyse the gut contents of *Catla catla*, (ii) investigate seasonal variations in its diet, and (iii) determine its feeding niche and preferences in the Wan Prakalpa reservoir over a full annual cycle.

MATERIALS AND METHODS

Study Area and Sample Collection: The study was conducted at the Wan Prakalpa reservoir near Parli Vaijnath, Beed District, Maharashtra (Coordinates: 18.865815°N, 76.431061°E). Over a twelve-month period from June 2024 to May 2025, a total of 25 adult *Catla catla* specimens were collected seasonally from local fishermen. The seasons were classified as: Monsoon (June-September), Post-Monsoon (October-January), and Summer (February-May). The total length (TL in cm) and body weight (BW in g) of each specimen were recorded. Sample Collection *Catla catla* from Wan Prakalpa (Nagapur Dam), Parli Vaijnath, Beed District, MH, India.

Gut Content Analysis: The alimentary canal from the oesophagus to the anus was carefully dissected out and preserved in 5% buffered formalin. In the laboratory, the gut was slit open, and the contents were washed into a Petri dish. The food items were identified under a compound microscope using standard taxonomic keys (APHA, 2017; Bellinger & Sigee, 2015). Dietary composition was assessed using:

- **Occurrence Method (%F):** The percentage frequency of occurrence of each food item across all guts
  % F = (Number of guts containing item 'A' / Total guts examined) × 100

- **Points Volume Method:** A volumetric score (0-10) was assigned to each food category in every gut. The points for each category were summed and expressed as a percentage of the total points for all guts (Hyslop, 1980).

- **Index of Preponderance (Ip):** This index was calculated to determine the dominant food item (Natarajan &Jhingran, 1961).
  Ip = (Vi × Oi / Σ (Vi × Oi)) × 100
- Vi represents the percentage volume of a food item, while Oi signifies its percentage frequency.

OBSERVATIONS

Analysis of 25 gut samples revealed a diet consisting of phytoplankton, zooplankton, and detritus. Seasonal shifts in dietary composition were observed. The phytoplankton community was dominated by Chlorophyceae and Bacillariophyceae across all seasons. The zooplankton intake was dominated by Rotifers, especially during the monsoon.

Table 1: Seasonal Variation in the Dietary Composition of *Catla catla* (% by Volume)

Season(n)	Phytoplankton (%)	Zooplankton (%)	Detritus (%)
Monsoon (n=8)	63.4	28.3	8.3
Post-Monsoon (n=9)	75.4	15.2	9.4
Summer (n=8)	72.6	17.9	9.5
Annual Average	**68.2**	**20.5**	**11.3**

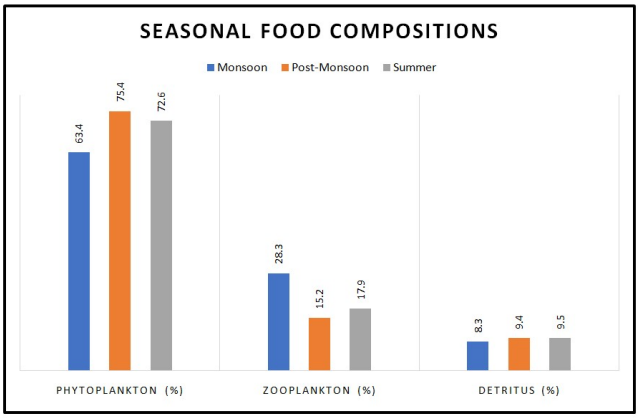
Table 2. Seasonal Composition of Phytoplankton in the Gut (% within Phytoplankton)

Phytoplankton Group	Monsoon	Post-Monsoon	Summer	Annual Average
Chlorophyceae	38.5	44.5	43.2	**42.1**
Spirogyra, Volvox				
Bacillariophyceae	45.2	38.1	36.1	**39.8**
Navicula, Cyclotella				
Cyanophyceae	16.3	17.4	20.7	**18.1**
Oscillatoria, Anabaena				

Table 3. Seasonal Composition of Zooplankton in the Gut (% within Zooplankton)

Zooplankton Group	Monsoon	Post-Monsoon	Summer	Annual Average
Rotifera	48.5	35.2	38.8	**40.8**
Brachionus				
Cladocera	32.1	38.9	35.5	**35.5**
Daphnia				
Copepods	19.4	25.9	25.7	**23.7**
Cyclops				

Graphical Representation



RESULTS

The annual dietary analysis confirmed *Catla catla* as a primary plankton feeder, with phytoplankton constituting an average of 68.2% of the gut content volume. Zooplankton and detritus accounted for 20.5% and 11.3%, respectively. Seasonally, phytoplankton consumption was highest during the post-monsoon season (75.4%) and remained high in the summer (72.6%). Its relative contribution was lowest during the monsoon (63.4%). Conversely, zooplankton formed a significantly larger part of the diet in the monsoon (28.3%) compared to other seasons. Detritus remained a minor but consistent component. Within the phytoplankton, Chlorophyceae was the most consumed group annually (42.1%), followed closely by Bacillariophyceae (39.8%). Bacillariophyceae (diatoms) were relatively more prevalent in the monsoon guts (45.2%), while Chlorophyceae dominated in post-monsoon and summer. Among zooplankton, rotifers were the most preferred group, especially during the monsoon (48.5% of zooplankton volume). The Index of Preponderance (Ip) consistently ranked phytoplankton as the most important food item across all seasons (Monsoon Ip=0.59, Post-Monsoon Ip=0.78, Summer Ip=0.75), reinforcing its status as the staple diet.

DISCUSSION

The findings of this study firmly establish that *Catla catla* is planktivorous in the Wan Prakalpa reservoir, which is consistent with previous research (Jhingran, 1991; Sarkar & Debnath, 2019). The dominance of phytoplankton, particularly the palatable Chlorophyceae and Bacillariophyceae, aligns with its morphology as an efficient filter feeder. The observed seasonal variation is a key finding. The high intake of zooplankton during the monsoon can be attributed to increased runoff and nutrient inflow, which often triggers a zooplankton bloom (Yadav & Singh, 2020). The turbid conditions might also make larger zooplankton a more accessible target than microscopic phytoplankton. The post-monsoon and summer peaks in phytoplankton consumption coincide with stable water conditions and higher water transparency, allowing for substantial phytoplankton growth, which the fish efficiently harvests (Bellinger &Sigee, 2015). The shift within phytoplankton groups is also ecologically significant. The higher proportion of diatoms (Bacillariophyceae) during the monsoon is likely due to their ability to thrive in turbulent,

nutrient-rich waters. The subsequent rise of green algae (Chlorophyceae) in stable, sunlit waters of post-monsoon and summer is a typical successional pattern in freshwater bodies. The consistent, though minor, presence of detritus indicates incidental ingestion during feeding. The high Index of Preponderance for phytoplankton throughout the year confirms it as the preferred food. However, the seasonal increase in zooplankton consumption demonstrates dietary flexibility, a crucial adaptation for optimizing energy intake in a changing environment (Hyslop, 1980).

CONCLUSION

This study provides a comprehensive, seasonal overview of the diet of *Catla catla* in the Wan Prakalpa reservoir. It concludes that this species is a specialized planktivory with a clear preference for phytoplankton, but it exhibits significant seasonal plasticity by increasing its consumption of zooplankton during the monsoon. The reservoir supports a healthy and dynamic plankton community that sustains this important fish population. For fisheries managers and aqua culturists in the region, these results suggest that maintaining high phytoplankton productivity, particularly of green algae and diatoms, is key to enhancing *Catla catla* production. Stocking strategies should also consider these seasonal dietary patterns. Future research should correlate these dietary shifts with simultaneous water quality parameters and plankton density in the reservoir for a more holistic ecosystem-based management approach.

ACKNOWLEDGMENTS

The authors sincerely thank the Department of Zoology, Vaidyanath College, Parli Vaijnath, for providing the necessary laboratory facilities to conduct this research. We are also grateful to the local fishermen of the Wan Prakalpa reservoir for their invaluable assistance in the sample collection process.

****

REFERENCES

APHA. 2017. *Standard methods for the examination of water and wastewater* 23rd ed.. American Public Health Association.

Bellinger, E. G., &Sigee, D. C. 2015. *Freshwater algae: Identification and use as bioindicators*. John Wiley & Sons.

Hyslop, E. J. 1980. Stomach contents analysis—a review of methods and their application. *Journal of Fish Biology, 17*4, 411–429. https://doi.org/10.1111/j.1095-8649.1980.tb02775.x

Jhingran, V. G. 1991. *Fish and fisheries of India*. Hindustan Publishing Corporation.

Natarajan, A. V., &Jhingran, A. G. 1961. Index of preponderance—a method of grading the food elements in the stomach analysis of fishes. *Indian Journal of Fisheries, 8*1, 54-59.

Sarkar, U. K., & Debnath, K. 2019. Food and feeding habits of the Indian major carp, *Catla catla* Hamilton, 1822 in a tropical reservoir. *Journal of Environmental Biology, 40*1, 26-31. https://doi.org/10.22438/jeb/40/1/MRN-859

Talwar, P. K., &Jhingran, A. G. 1991. *Inland fishes of India and adjacent countries* Vol. 1 & 2. Oxford & IBH Publishing Co.

Yadav, B. N., & Singh, R. 2020. Feeding biology of freshwater fish *Catla catla* from the Ganga River, India. *International Journal of Fisheries and Aquatic Studies, 8*3, 318-322.