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Diet Composition in Juveniles of Four Commercially Important Fin-Fishes of Daroji Lake, Ballari

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Abstract: ***The sustainable productivity of lentic water ecosystem is entirely dependent on the prevailing biota and its overall health. The present investigation was aimed at plotting relationships between fish and plankton. Hydrobiological parameters also play important role understanding the nutritional niche of organisms.***

1. Introduction

The analysis of gut content of fishes helps us to know the plankton food and other fauna present in different parts of the gut of fishes. Quantification of the introduced fish or invasive fish species to native fish populations (Fritts & Pearsons 2004) may be understood. Moreover, it is important in assessing integrity of ecosystem and assemblage functional redundancy (Matthews et al. 1982). Hence it is a key element in the protection of species within its ecosystem, understanding the natural history of a species and its role in the trophic ecology of aquatic ecosystems (Braga et al. 2012). Diet composition analysis can be used to evaluate effects of ontogeny or the establishment of exotic species (Gelwick & Matthews 2006; Chipps & Garvey 2007). Fish gut analysis is used in understanding many aspects of fish ecology and helps to explain specific problems on interaction, evolution, speciation, invasion, fishery management and in various practical applications.

Fishes are the aquatic animals whose habitat includes all type of water bodies like wetland, rivers, ponds, lakes, oceans etc. where they breed, spawn, feed, and grow to attain maturity. Fishes can be divided into four types based on their trophic behaviour; i) Herbivorous ii) carnivorous iii) planktonivorous iv) detritus feeders and so on. Majority of the fishes feed upon unicellular algae, filamentous algae, diatoms and other phytoplankton as well as zooplankton. The Morphometric measurements and gonado somatic index study helps us to know their physiological status and trophic behaviour. Morphometry by truss network method as well as conventional methods give less deviated data.

2. Materials and Methods

Daroji is a village, near Ballari of Karnataka. It is one of the oligotrophic lakes of Karnataka. This lake feeds the agricultural grounds around and a source of potable water too. Tungabhadra dam is also known as Pampasagara from which water is drawn into the present lake during shortage. The former dam is located in Munirabad, Koppal district. The Juveniles of common fish species found in these two places were chosen for diet composition studies. *Oreochromis* spp, *Labeo rotita, Catla catla, Wallago attu* fishes were obtained by gill net operations at monthly intervals from Tungabhadra and Daroji. The samples were brought to the laboratory and further investigation was carried out as per standard methodology given by Zacharia, Chipps S.R and E.J. Garvey 2002, and FAO, 1974. Maturity of fish was estimated by Gonado Somatic Index (GSI).

3. Results and Discussion

The diet composition of gut was isolated and the contents of plankton were enumerated qualitatively and quantitatively using light binocular microscope with the help of Sedwick rafter cell counter chamber. Many plankton species found by focusing the content under the microscope are depicted in the pictures below. Later the gonads were identified in the fishes and the percentage of GSI of four fish species is *Oreochromis* spp, *Labeo rohita, Catla catla* and *Wallago attu* were 0.81%, 0.57%, 0.65% and 0.17% respectively. Out of 40 juvenile fish collected during the study period 12 fish (18.5%) gut content was messy and completely digested and the remaining 28 fish (81.5%) gut contained prey organisms.

Table 1: Gonado somatic index of juveniles of four fin fishes from the sampling station

Fish Species	GSI (%)							
	Jul 2018	Aug 2018	Sep 2018	Oct 2018	Nov 2018	Dec 2018	Jan 2019	Feb 2019
Labeo rohita	0.6 ±0.8	0.62 ±0.5	0.6 ±0.8	0.62 ±0.5	0.66 ±0.8	0.69 ±0.5	0.69 ±0.5	0.65 ±0.5
Catla catla	0.65 ±0.8	0.67 ±0.6	0.6 ±0.8	0.68 ±0.2	0.69 ±0.4	0.72 ±0.6	0.73 ±0.5	0.72 ±0.6
Oreochromis spp	0.7 ±0.8	0.69 ±0.5	0.7 ±0.8	0.69 ±0.3	0.71 ±0.5	0.69 ±0.5	0.75 ±0.5	0.68 ±0.5
Wallago attu	im	Im	0.3 ±0.3	0.3 ±0.2	0.3 ±0.2	0.42 ±0.5	0.4 ±0.5	0.4 ±0.2

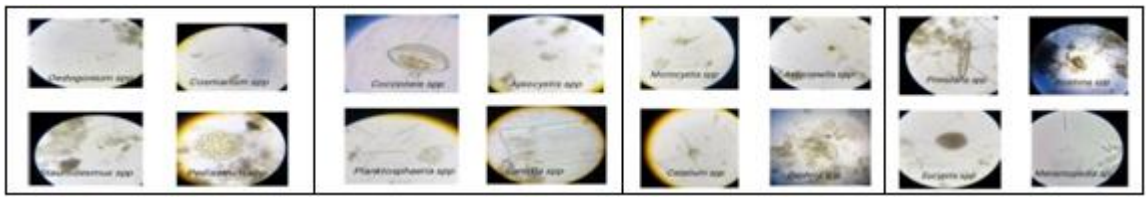

Figure 1: Pictograph of plankton obtained from the fish guts

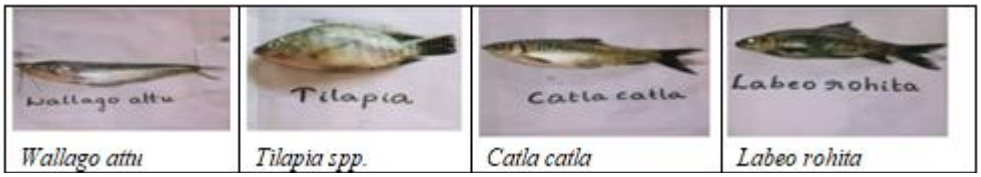

Figure 2: Pictograph of juvenile fishes collected from the sampling stations

4. Conclusion

The diet composition in juveniles of four commertially important fin-fishes helped us to know planktivous trophic nature of the larvae. Phytoplankton, zooplankton and filamentous algae were encountered in all the fish guts and were dominated by calanoid Copepods, *Keratella*, *Spirogyra*, *Oedogonium*, *Cosmarium*, *Microcystis*, *Navicula*, *Pediastrum* etc. The morphometric TL was 22cm, 19.5cm, 26.3cm & 20.9cm respectively. SL, FL, BD were 16.7, 16.2, 22.2, 18cm; 19.1, 18.3, 23.6, 18.3cm; and 7.8, 7.5, 6.7, 4.4cm respectively. Month wise morphometric characteristics and GSI revealed that Carps were at their fullest matured states whereas *Wallago attu* was immature. This was in agreement with Peña-Mendoza, B (2005) wherein catfishes entered dry period during Nov-Dec months. It was attributed to high temperature of the lake. The gut content showed similar plankton composition coincided with bloom of phytoplankton. Strict monitoring and protection of breeding seasons and regulated administration of mesh sizes during commercial fish catch would yield good sized fish. Some of the gut contents were mutilated hence could not be identified due to partial digestion. Close similarly in the diet composition showed common trophics owing to certain degree of competition. Data of the diet composition of these fin fishes can be a source of information for further trophic modelling studies of fin fishes in the lentic water ecosystems.

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