Pak. Jour. Agri. Sci.
22 (3), 139, 1985

NATURE OF FEED CONSUMED BY MAJOR CARPS

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Ten specimens each of *Catla catla* (Ham.), *Labeo rohita* (Ham.), and *Cirrhina mrigala* (Ham.) were collected from different waters of Lahore. The young fishes were 20-25 cm long. Their gut contents were studied for the macro and micro contents to determine the nature of feed consumed by them.

INTRODUCTION

World fish production has exhibited a gradual increase over the years. At the same time, there has been a steady rise in yields from fish resources developed by means of Aquaculture, namely, culture and propagation. Fish culture is a method of fostering the growth of fishery resources in an enclosed water area. Propagation is a method of maintaining and increasing yield by controlling the living conditions and environment of natural habitats of fishery resources in water. In the light of global outlook for future food production, the culture and propagation of fishery resources is attracting great attention as a source of supply of animal protein from water.

The nature of food of a living organism has a relative bearing to the environmental factors under which it survives. Therefore, it is necessary to have full knowledge of the specifications of feed both qualitatively and quantitatively for better production of fish.

There are two ways to feed fish : (a) direct feeding and (b) indirect feeding. In case of direct feeding, the feed material is supplied to the fish in a form which becomes easily available. For indirect feeding, the water is manured by organic and inorganic fertilizers which result in the production of plankton and aquatic flora which are eaten by fish (Huq, 1057). Although many workers have worked on fish feed and feeding behaviour, yet it needs more attention for further investigation. In this study, macro and micro contents of gut of *Catla catla* (Ham.) and *Cirrhina* mrigala (Ham.) were explored to determine the nature of feed consumed by them.

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MATERIALS AND METHODS

With a view to solving this important problem research for feed of major carps in the laboratory was started and for this purpose extensive examination of the gut contents of ten specimens each of *Catla catla* (Ham.), *Labeo rohita* (Ham.), and *Cirrhina mrigala* (Ham.), cultured in confined waters was carried

Table 1 Feed contents of gut of major carps

Nature of feed	*Catla catla*	*Labeo rohita*	*Cirrhina mrigala*
Phytoplankton			
Bacillariophyceae			
Diatoms	+	+	+
Navicula sp.	+	+	+
Fragilaria	+	+	+
Chlorophyceae			
Closterium	+	+	+
Cosmarium	+	—	+
Rhizoclonium	+	—	—
Zygnema	+	—	+
Spirogyra	+	+	+
Chlamydomonas	—	+	—
Volvox	+	+	+
Euglenophyceae			
Euglena	+	+	+
Aquatic plants			
Hydrilla verticellata	+	+	+
Vallisneria spiralis	+	+	+
Potamogeton crispus	+	+	+
Typha augustata	+	+	+
Azolla sp.	—	—	+
Zooplankton			
Crustacea			
Daphnia	+	+	+
Cyclops	+	+	+
Rotifers	+	+	+

out. Collections were made from different waters of Lahore, so that a precisely comparative view of their standard feed affinity and deviation could well be studied. Stomach contents of the specimens of young fish, 20-25 cm long, were studied under low as well as high power of microscope. Feed contents of guts were examined and recorded as shown in Tables 1 and 2.

Table 2. *Percentage composition of gut contents of major carps*

Name of fish	Algae	Higher plants	Protozoa	Crustacea	Mud & sand
Catla catla	25	10	20	45	—
Labeo rohita	35	20	23	15	7
Cirrhina mrigala	12	38	15	20	15

RESULTS AND DISCUSSION

From the observations recorded, it can be concluded that the nature of feed of fish indicates that a particular species has affinity towards particular items of feed and accordingly these fishes can be grouped under separate feed affinities. In majority of fresh water species the natural feed of fry is predominantly zooplankton (Akhtar, 1979). Fishes that live on surface of water feed chiefly on zooplankton, preferably crustacea (Hussain, 1955). This feeding habit is found in *Catla catla* (Ham.), while *Labeo rohita* (Ham.), a column feeder, takes increasing quantities of decayed vegetable matter including higher plants which might form more than half the bulk. This fish can thus be called a herbivore. *Cirrhina mrigala* (Ham.) is an omnivore and fishes upto 25 cm in length feed preferably on zooplankton—crustaceans and rotifers. Adult fish subsist on blue green algae, filamentous algae, diatoms and pieces of higher plants, decayed vegetable matter, mud and detritus. Strictly speaking, no fish is either genuinely carnivorous or herbivorous. They are classified under separate categories, according to maximum percentage of feed which they consume (Mookerjee, 1944).

It is, therefore, necessary that stocking of fish should be done in such a way as to avoid competition for feed amongst different fish species. The major carps, i. e. *Catla catla* (Ham.), is a surface feeder, *Labeo rohita* (Ham.), a column feeder and *Cirrhina mrigala* (Ham.) is a bottom feeder. These fishes are herbivo-

rous (Khan, 1934; and Ahmad, 1963 and 1966). Due to their feeding habits, they can be economically cultured together as they do not compete for feed amongst themselves and all feed available at different columns of water can be fully utilized (Misra, 1954). Knowledge of ecology of water is also essential as the flora and fauna that are directly responsible for upkeep of fishes have definite affinities to particular water levels. Feed has direct link with the health and growth of the fish, and in order to achieve better crop yields it is necessary to correctly estimate the proper availability of feed of fish in the pond. It is also necessary to adjust the ratio of three species of carps according to the feed available at different levels of water.

ACKNOWLEDGEMENT

The author is thankful to Dr. Nazir Ahmad, Ex-Director of Fisheries, Punjab, for his valuable guidance and for going through this paper.

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