INTRODUCTION

The study of the food and feeding habits of both fresh water and marine fishes has attracted the attention of scientific investigators since early times. The problem is of considerable importance to the fishery workers because of its varied bearing on the feeding adaptations of the fishes, their migrations and other allied aspects. Among the earliest workers in India, the contributions of Hornel (1911), Hornel and Naidu (1923), Job (1940, '41a, '41b), Mookerjee et al. (1946b, 1948) and Bapat and Bal (1950) on the feeding habits of fishes, are of special interest although according to the modern concept of functional zoology, the utility of their investigations is somewhat limited in a sense that none of these authors has attempted to correlate the feeding habits with the structural modifications of the alimentary canal in the fishes studied. Likewise Macallum (1886), Green (1912), Dawes (1929), Blake (1930, '36), Ghazzawi (1933, '35), Curry (1939) and Al-Hussaini (1945, '46, '47 & '49) among others devoted their attention to the study of histological structures of the alimentary canal of fishes without attempting to explain the modifications in the structures on the basis of their food and feeding habits. Blake (1930, '36) with his illuminating work on the comparative histology of certain teleost fishes, however, opened up a new line of investigation in functional histology.
Considerable work on the anatomy and histology of the alimentary canal of fish has been done in India during the last twenty years and the more important contributions are of Vanajakshi (1938) on Saccobranchus fossilis, Sarbahi (1940) on Labeo rohita, Mohsin (1944,'46) on Anabas testudineus; and Glossogobius giuris and Macrones (Myctes) vittatus, Dharamarajan (1936) on Otolithus ruber, Das and Bockerjee (1945) and Islam (1951) on some carnivorous and herbivorous fishes. Pillaiy (1935) in his studies on Mugil tade attempted to correlate the anatomical and histological structures of the alimentary canal with its food and feeding habits.

Literature on the physiology of the digestive organs in fishes under natural conditions is rather scanty, although considerable work under laboratory conditions has been done to study the effect of different enzymes on the various types of food items, injected artificially or introduced in the alimentary canal. The more important workers on the subject are Babkin and Bowie (1928), Mackay (1929), Chesley and Bernard (1952) who described the physiology of the digestive system of fishes in general. Al-Hussaini (1949) studied the anatomy, histology, physiology and cytology of the alimentary canal of three species of fishes, namely, Cyprinus carpio, Rutilus rutilus and Cobito gobio. Sarbahi (1951) worked on the digestive enzymes of gold fish,
Carassius auratus and the large mouth black bass, Micropterus salmoides in relation to their food and feeding habits.

With a view to explain the anatomical and histological modifications in the structure of the alimentary canal and the distribution of different types of enzymes present in various parts of the alimentary canal of fresh water fishes, on the basis of the food and feeding habits, detailed investigations were undertaken on Labeo calbasu (Hamilton), Tor tor (Hamilton) and Mystus (Osteobagrus) seenghala (Sykes) at Allahabad Sub-station laboratory of the Central Inland Fisheries Research Station. A thorough investigation of their feeding habits and alimentary adaptations forms an important aspect of the fishery biology and throws light on food proclivities of the fishes in natural environment. This information is valuable in pisciculture practices.

Labeo calbasu (Hamilton) "occurs in clear sluggish streams" (Shaw and Shebbeare, 1937) and Day (1889) gives its range of distribution as "the Punjab, Sindh, Cutch, Deccan, Southern India and Malabar from the Kistna through Orissa, Bengal and Burma". Tor tor (Hamilton) is known to occur in all the rivers of Northern India, the Ganga system, the Brahmaputra system and Narbada and Tapti river system, but in the largest size and greatest
abundance it occurs in mountain streams or those which are rocky. The small fish up to a few inches length may be found in any clear gravelly system. *Mystus* (*Osteobagrus*) *seenghala* (Sykes) is found in the Indus, salt ranges of the Punjab, Jamuna and Ganges certainly as low as Delhi, also the Deccan, Kistna river to its termination and Assam (Day, 1889).

In spite of the fact that these fishes constitute fishery of considerable importance in Indian river systems, little work has so far been done on the above-mentioned fishes. The only available literature on *Mystus* (*Osteobagrus*) *seenghala* is by Raj (1940) on its breeding habits and Dixit (1956) on its atretic oocytes. Recently Sarkar and Rai studied the skull of *M. seenghala* and Saigal and Motwani (in press) have completed the biology of this fish. Similarly in the case of *L. calbasu*, but for the publications of Mookerjee and Ganguly (1946) and Das and Moitra (1956) no work seems to have been done on this fish. *Tor tor* (Hamilton) in spite of its great importance as a sport and food fish has received little attention from the biologists. Hora (1939) gave a short account of the systematics and bionomics of this fish and recently Khandelwala (1960) briefly described the structure of its buccal cavity and its feeding habits.

The three species, *Labeo calbasu* (Hamilton), *Tor tor* (Hamilton) and *Mystus* (*Osteobagrus*) *seenghala*
were, therefore, selected for the exhaustive study of the anatomy, histology and physiology of the alimentary canal. \textit{Labeo calbasu} and \textit{Tor tor} belong to the sub-family \textit{cyprininae}, but the former is known to be herbivorous and the latter predaceous in its habits; \textit{ Mystus seenghala}, belonging to the family \textit{Bagridae}, is predaceous and carnivorous in habits. \textit{Labeo calbasu} and \textit{Tor tor} are both carps and the varied feeding habits are likely to have some bearing on the organs of feeding. On the other hand, \textit{Tor tor}, a carp and \textit{Mystus seenghala}, a cat fish, are both known to be predaceous in their feeding habits so that it might be expected that there would be some similarities in the anatomical and histological structures as also in the distribution of digestive enzymes in different parts of the organs of feeding. The present study relates to the comparative account of the anatomy, histology and physiology of the alimentary canal of three species of fresh water teleost fishes in relation to their food and feeding habits to bring out the structural similarities and dissimilarities according to their mode of feeding.