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STRUCTURES ASSOCIATED WITH FEEDING IN *CHANNA PUNCTATUS* FROM KAIGAON TOKA AURANGABAD (M.S.)

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ABSTRACT

The structures associated with feeding of Channa punctatus shows interesting modifications reflecting carnivorous mode of feeding habit with several morphological characters such as, wide mouth, surrounded by papillated jaws, the upper jaw and lower jaw .The upper jaw is shorter than lower jaw was not protrusible .buccal cavity was wide, pharynx spacious, on the roof of buccal cavity maxillary, palatine, vomerine and pharyngeal teeth are present, gill rakers are present.

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INTRODUCTION

The adaptations of fish alimentary canal to their food are particularly evident in mouth form mouth size shape and structure of the oro-pharynx dentition, gill rakers esophagus, stomach and intestine (Hassan M.M, Khalaf Allah, 2013). The mouth, buccal cavity and pharynx are associated with the selection and seizure of the food (O. P. Saxena, 1980). (Kapoor *et al.,* 1975; Kapoor and Khanna, 1994; Horn, 1998). Meyer (1990) and Greenwood (1964) described polymorphism found in the pharyngeal bones and teeth of a number of cichlid fishes (Teleostei: Cichlidae) and characterized by two morpho types. One morph exhibits a gracile dentition with a large number of fine, conical teeth "papilliform", while the other morph exhibits a robust dentition with a small number of large, broad and flat teeth "molariform".

Pharyngeal jaws and teeth in some species involved in the process of food, whereby it is masticated and crushed before being transported to the oesophagus for swallowing (Sibbing, 1982; Claes and De Vree, 199 1; Vandewalle *et al.,* 1994, 1995).

The present study was carried out to study the structure associated with food and feeding in Channa punctatus.

MATERIALS AND METHODS

For the study of jaws and teeth of Channa punctatus the fish were collected from local fish market, washed and preserved in 10% formaline solution. The preserved fish were cut and opened at each angles of the mouth. The roof and floor of the buccopharynx was properly washed and preserved in 70% alcohol and glycerin for stretching. The jaws, teeth, gills and gill rakers were examined properly for detailed studies.

RESULTS AND DISCUSSION

Mouth

The mouth of Channa punctatus is horizontal and terminal in position and the gap of the mouth is wide, surrounded by strong papillated jaws, the upper jaw and lower jaw. The upper jaw is shorter than the lower jaw. The lower jaw is protruding, large and is not protractile (Plate 1a).

Similar observations were reported by Talwar and Jhingran, (1992); Jayaram, (1999), Courtenay and Williams, (2004); Das and Moitra (1956); Das and Nath (1965), Paul *et al.* (2009) while describing the morphological characters of Channa species.

Modifications in the position, shape and the size of the mouth in various species of fishes are correlated with the character of food and the manner in which it is obtained. Highly protractile mouth of Nandus nadus and of various species of Channa and the slightly protractile mouth of Anabas are the adaptations for increasing the gape of mouth. The mouth is usually guarded by the lips. These are, fleshy in suctorial fishes like sturgeon, Labeo, Cirrhinus and Puntius, etc.

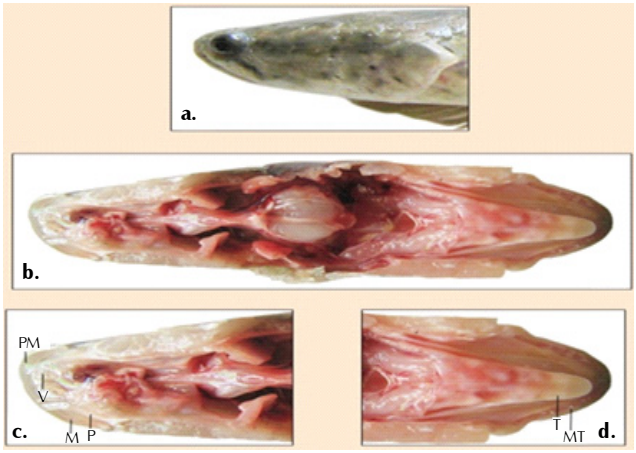

Plate 1: a Lateral view of mouth of *Channa punctatus.*;*b* Buccal cavity of *Channa punctatus.*;*c* Upper jaw or roof of the mouth of *Channa punctatus* showing teeth, (PM) premaxillary, (M) maxillary, (V) vomerine, and (P) palatine.;d Lower jaw or floor of the mouth of *Channa punctatus* showing, (MT) mandibular teeth, (T) tongue.

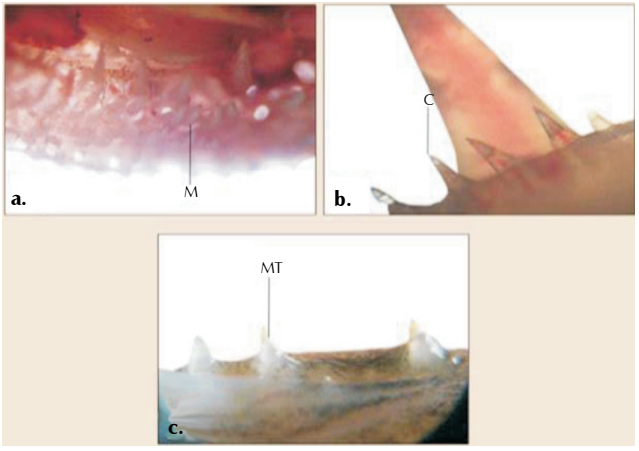

Plate 2: a - Magnified view of upper jaw of *Channa punctatus* showing (M) maxillary teeth. b - Magnified view of lower jaw of *Channa punctatus* showing; c - canine teeth (caniniform). (MT) Mandibular teeth on the lower jaw of *Channa punctatus*

Buccal cavity

The buccal cavity is wide and spacious. Its roof is formed by the base of the cranium and side walls, and the floor of the buccal cavity is formed by the branchial arches. It is observed that the smooth mucous membrane with a large number of mucous secreting cells line the walls of buccal cavity (Plate 1b).

Similar observations are made by Gautam Ranjan (2008) in carnivorous fish Mystus seenghala and Khanna (1970) in some Teleosts.

Pharynx

Pharynx is observed to be wide and spacious. It is observed that, a pair of ovoid upper pharyngeal pads are present on the roof of the pharynx (Plate 1b). Paul *et al.* (2009), Chao-Kai Kang (2010) reported that in Siamese fighting fish a carnivorous fish has similar pharyngeal organ located on the dorsal pharynx where the four pairs of gills converge. Miller, 1964; Sanderson *et al.,* 1991; Bauchot *et al.,* 1993 observed that the structure of the pharyngeal organ of Channa punctatus is similar to that of other teleosts.

Tongue

Tongue is observed to be well developed and mobile which is affixed along the mid dorsal line of the floor of the buccal cavity (Plate 1d). Similar observations are made by Gautam Ranjan (2008) in carnivorous fish Mystus seenghala where the tongue is well developed and mobile and help in pushing the prey into the buccal cavity.

Teeth

It was observed that numerous teeth are present in groups in the bucco pharyngeal region. On the roof of the buccal cavity maxillary, palatine, vomerine and pharyngeal teeth are present. The maxillary teeth on the upper jaw are observed to be small and sharp. They are borne on the pre maxillaries. The anterior maxillary teeth are observed to be larger than the posterior. Just behind and parallel to the upper jaw, the vomerine teeth are present in a small patch (Plate 1c and 2a). It was observed that the palatine teeth are located just behind the maxillary teeth on the palate. The anterior maxillary teeth extend in a patch and are present just behind the palatines. The palatine teeth are similar in size and shape to the posterior maxillary teeth. The pharyngeal teeth are the largest and strongest on the roof of the buccal cavity (Plate 1c and 2a).The lower jaw of Channa punctatus has a single row of villiform teeth which widens to form 5 to 6 rows at the jaw symphysis. The horny pad teeth are present on the inner side of the villiform teeth (Plate 1d). Mandibular teeth are present on the lower jaw with 3 to 6 canines behind single row of villiform teeth (Plate 2c). It was observed that the anterior mandibular teeth and the posterior mandibular teeth on the lower jaw are arranged in rows. The anterior mandibulars are smaller than the posterior mandibular teeth. The anterior mandibulars are similar in size and shape to the anterior maxillary teeth. It was observed that the horny pad teeth are present on the lower jaw. There are two pairs of horny pads, the anterior horny pad teeth and the posterior horny pad teeth. The anterior horny pad teeth and the posterior horny pad teeth are similar in size and shape to the vomerine teeth. The anterior horny pad teeth are observed to be lodged in a patch on the horny pads. The lower pharyngeal teeth are absent in the posterior pharyngeal region.

A pair of ovoid upper pharyngeal pads arc observed on the roof of the pharynx. The teeth are distinctly arranged in two groups on the pharyngeal pads. The larger teeth are present in the anterior half and the smaller teeth are present in the posterior half of the pharyngeal pads. All the teeth appear recurved, especially the larger ones, each with a strong base and high conical cusp. The lower pharyngeal bones together form a triangular structure and are situated on the floor of the pharynx present just opposite the upper pharyngeal tooth pads. Each lower pharyngeal bone shows several rows of straight teeth on its surface. Some teeth are large with stumpy base and some are smaller. The arrangement and direction of teeth on the pharyngeal pads suggest that they aid in preventing the escape of prey. Similar teeth in Channa gachua are described by (Nijaguna *et al.,* 1990).Teleost fishes generally

possess a combination of two traits, teeth on numerous bones of the oral jaws, palate and tongue, and pharyngo-branchial skeleton and polyphyodonty (many tooth generations) (Huysseune and Sire, 1998).

These traits provide opportunities for variability in locations and number of teeth (Nelson, 1969) and through successive replacement cycles, sizes and shapes of teeth may vary ontogenetically (Stoner and Livingston, 1984), (Gottfried 1986), (Nakajima and Yue 1995), (Mullaney and Gale 1996), (French, 1997) or in response to environmental conditions, (Greenwood 1964, Kas'yanov *et al.,* 1982, Meyer 1990, Wimberger, 1991).

These differences may result from genetic and/or environmental factors, and in some species molarization may be triggered when individuals consume foods of increased hardness (*e.g.*, crushing snails versus eating soft detrital material).

Teeth are present in the oropharyngeal cavities of many fishes. Teeth in the pharynx are frequently associated with pharyngeal jaws, which are situated immediately anterior to the oesophagus (Casciotta and Arratia, 1993; Vandewalle *et al.,* 1994, 1995).

Gill rakers

The gill rakers are situated on each side of the gill arch in a single row. The gill rakers of Channa punctatus are observed to be modified into flat circular plates (Plate 1b). (Nijaguna *et al.,*1990) reported that these discs are provided with a series of small pointed teeth.

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