

**Short Communication**

## **Associated Structures of Feeding in Near Threatened Murrel Rainbow Snakehead (*Channa bleheri* Vierke, 1991)**

**Nipen Nayak<sup>1</sup>, Seuj Dohutia<sup>1</sup>, Jyotirmoy Sonowal<sup>2</sup>, Shyama Prasad Biswas<sup>1</sup>** <sup>1</sup>Department of

<sup>1</sup>Life Sciences, Dibrugarh University, India

<sup>2</sup>D.D.R College, Chabua, Dibrugarh, India

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**Corresponding author:**

**Nipen Nayak**, Department of Life Sciences, Dibrugarh  
University, India

**E-mail:** [nipennayak2014@gmail.com](mailto:nipennayak2014@gmail.com)

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**Abstract:**

Associated structure of *C. bleheri* like other species of *Channa* is also modified for carnivorous mode of feeding. Features like wide mouth opening of mouth, thick stomach, polyphyodont teeth directed backwards surrounded by papillated jaw, the upper jaw and lower jaw reflects their adaptability towards different live food. Lower jaw is not protrusible and larger as compared to upper jaw. The buccal cavity is capacious with presence of palatine, maxillary, pre-maxillary and vomerine in upper jaw and mandibular teeth in the lower jaw with the presence of gill rakers.

**Keywords:** *C. bleheri*, carnivorous, jaw

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## **Introduction**

*C. bleheri* is an endemic murrel found in the different water bodies of Upper Brahmaputra. Due to its exploitation in the name of ornamental trade, this species is enlisted as Near Threatened according to IUCN red list (ver. 3.1) (Lakra et al., 2010). Understanding the different aspects of feeding is one of the preliminary approaches in conservation of fish species. Hence, detail aspects on the associated structure of *C. bleheri* related to feeding was studied.

Mouth cavity of fishes shows agility and adaptability towards exploitation of different food items (Kapoor et al., 1975). According to Huysseune and Sire (1998) teleost fishes have combination of two traits i.e. teeth on numerous bones of oral jaws, tongue and plate; pharyngo-branchial skeleton and polyphyodonty (many tooth generations). Teeth are generally found in oropharyngeal cavity of most fishes frequently associated with pharyngeal jaws in pharynx just anterior to oesophagus (Casciotta and Arratia, 1993). Alimentary canal in fishes starts with lip and buccal cavity and ends through intestine and rectum (Borman et al., 2015). The knowledge on the associated structures of feeding will be very beneficial to understand the type of food and mechanism of food intake by this species.

## **Materials and Methods**

Specimen were collected from different lotic and lentic waters bodies of Dibrugarh and Tinsukia district, Assam, India. For the structure study, the fishes collected were washed and preserved in 10% formalin solution. The structures of the jaws were opened by cutting the fish at all angles of mouth. The buccopharyngeal roof and floor was properly washed and then preserved in 70% alcohol and glycerine for stretching. Proper examination of the jaw, teeth, gills, gill rakers and all the structures associated with feeding was done.

## **Result**

**Mouth:** Mouth was placed horizontal and terminal with a wide gap extending beyond posterior margin of eye and surrounded by strong papillated jaws. Upper jaw was shorter than lower jaw, while lower jaws appear protruding and not protractile. Multiple rows of pointed teeth could be seen on both the jaws. The mouth was seen to be guarded by lips.

**Teeth:** It was seen that various teeth were available in bunches in the bucco pharyngeal area. On the

top of the buccal depression maxillary, palatine, vomerine and pharyngeal teeth were available. The maxillary teeth on the upper jaw were seen to be little sharp and were borne on the pre maxillaries. The foremost maxillary teeth were seen to be bigger than the back. Simply behind and corresponding to the upper jaw, the vomerine teeth were available in a little fix. It was found that the palatine teeth were found simply behind the maxillary teeth on the sense of taste. The foremost maxillary teeth reach out in a fix and were available simply behind the palatines. The palatine teeth were comparatively fit as a fiddle to the back maxillary teeth. The pharyngeal teeth were the biggest and most grounded on the top of the buccal hole. The lower jaw of *C. bleheri* had a solitary line of villiform teeth which broadens to form 5 to 6 lines at the jaw symphysis. The horny cushion teeth were available on the internal side of the villiform teeth. Mandibular teeth were available on the lower jaw with 3 to 6 canines behind single line of villiform teeth. It was seen that the front mandibular teeth and the back mandibular teeth on the lower jaw were organized in lines. The front mandibulars were tiny as compared to the back mandibular teeth. It was seen that the horny cushion teeth were available on the lower jaw. There were two sets of horny cushions, the foremost horny cushion teeth and the back horny cushion teeth which fit as a fiddle to the vomerine teeth. The front horny cushion teeth were watched to be held up in a fix on the horny cushions. The lower pharyngeal teeth were missing in the back pharyngeal area.

**Buccal cavity:** The buccal cavity was broad and generous. Its roof was produced by the base of cranium and side dividers, and the floor of buccal cavity was shaped by the branchial curves. It was found that the smooth mucous film with an enormous mucous secreting cells line the dividers of buccal cavity.

**Pharynx:** Pharynx was seen to be wide and capacious. It was observed that a couple of ovoid upper pharyngeal cushions were available on the top of the pharynx.

**Tongue:** Tongue was seen to be very much evolved and portable which was fixed firmly along the floor of the buccal cavity.

**Oesophagus and stomach:** The length

of oesophagus appeared long and the wall is thick with well developed sac-like muscular stomach. Pyloric caeca was paired in the pyloric portion. The intestine was short and straight and rectum not differentiated externally.

**Gill rakers:** On each side of the gill arch gill rakers are positioned which are modified into flat circular plates provided with series of pointed teeth with are smaller in size.

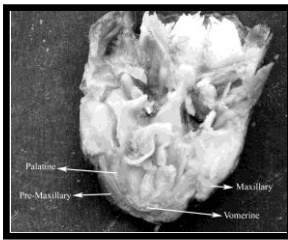


Fig: Upper jaw of *C. bleheri*

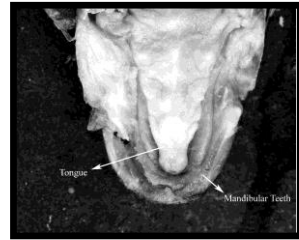


Fig: Lower jaw of *C. bleheri*

## Discussion

Different types of teeth i.e. pre-maxillary, maxillary, vomerine, palatine and mandibular could be found in *C. bleheri* as was also found in other snakeheads (Rao et al., 1998; Singh et al., 2011). Structural arrangement of upper and lower jaw in *C. bleheri* was reported similar to other snakeheads (Talwar and Jhingran, 1992; Jayaram, 1999; Das and Moitra, 1956; Das and Nath, 1965). The modification in the position, size and shape of mouth in different fishes could be correlated with type and manner in which food was obtained. High protractile mouth in murels is an adaptation to increase the gape of mouth in these fishes. Arrangement of teeth pattern in upper jaw and lower in *C. bleheri* was analogous as reported in other murels (Gedam et al., 2015). Teeth were arranged in pharyngeal pads; especially the larger ones appeared recurved and directed backwards to prevent escape of prey once caught. Presence of teeth on numerous bones in the oral jaws, movable tongue, polyphyodont nature and pharyngo-branchial skeleton provide chance to adapt towards variability in different locations as well as feed component (Nelson, 1969; Stoner and Livingston, 1984; Nakajima and Yue, 1995). The location and pattern of pharynx in carnivorous is similar in most carnivorous species (Kang and Lee, 2010). Similar observation could be seen in this species as well as other species of *Channa* (Rao et al., 1998).

Mobile and well developed tongue was seen in *C. bleheri* that help them push the prey into buccal cavity. Rajan (1955) reported similar observation in the carnivorous fish *Mystus seenghala*. A well defined stomach with two unequal pyloric caecae in *C. bleheri* reflects the common characteristic of snakeheads. The morphology of the gut reflects the carnivorous nature of the species. Das and Moitra (1955) proposed that carnivorous and predatory fishes have large buccal cavity, longer and thick distensible oesophagus and straight intestine. The variations in the morphology of the associated structures shown by different species could be clearly understood if we consider the type of food taken by them (De Groot, 1971). Among the murels also variation in food components could be seen which were related to associated structures. For example, *C. striata* with larger buccal cavity and larger stomach was more carnivorous in nature as compared to snakeheads of smaller size (Dasgupta M., 2000). Observation of small teeth on gill rakers was also reported from *C. punctata* (Nijaguna and Yue, 1990; Gedam et al., 2015).

## Conclusion

The data generated on the mouth structure could be correlated with the types of food consumed by the fish. It also reflect the adaptation of fishes towards different mode of feeding.

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