International Journal of Engineering Research and Science & Technology

www.ijerst.org

ISSN : 2319-5991

Vol. 22 No. 1(s) (2026)



ijerst.editor@gmail.com

editor@ijerst.com

www.ijerst.com
© 2026 IJERST. All Rights Reserved
Peer Reviewed, Referred & Indexed Journal

Research Paper

Study of Buccal Cavity *Rastrelliger Kanagutra* Indian Mackerel.

Gedam Ajit, K., and Phulwade Durgesh N.
Jijamata College of Arts and Science, Bhenda Tq. Newasa, Dist. Ahilyanagar. (Ahmednagar).
Nanasaheb Y.N. Chavan Arts, Science and Commerce College, Chalisgaon. Dist. Jalgaon.
Email: durgeshphulwade@gmail.com.

Abstract:

The Study of Buccal Cavity of *Rastrelliger Kanagutra* Indian Mackerel Its head is long, One-fourth of length to caudal and its mouth large, gaping back to the middle of the eye the premaxillaries are not protractile, while the jaws, which are of equal length, are armed with small, sharp, slender teeth. The eye is large, and the hollows in front of and behind it are filled with the so-called "adipose eyelid," a transparent, gelatinous mass in the form of two scales, a forward and a hinder, which cover the eye except for a perpendicular slit over the pupil.

Introduction:

The mackerel body moderately deep, gill rakers very long, visible when mouth is opened. Back blue/ green, flanks silver with golden tint rows of small, dark spots on sides of dorsal fin bases, narrow dark longitudinal bands on upper part of body and black spot-on body near lower margin of pectoral fin. Rests of fins are yellowish to dusky. **(B-1).**

The mackerel is fusiform in outline, tapering rearward to a very slim caudal peduncle and forward to a pointed nose. Its body is about four and one-half to five and one-half times as long as it is deep, oval in section, thick and firm-muscled as are all its tribe. Its head is long (one-fourth of length to caudal) and its mouth large, gaping back to the middle of the eye (the premaxillaries are not protractile), while the jaws, which are of equal length, are armed with small, sharp, slender teeth. The eye is large, and the hollows in front of and behind it are filled with the so-called "adipose eyelid," a transparent, gelatinous mass in the form of two scales, a forward and a hinder, which cover the eye except for a perpendicular slit over the pupil. There are two large dorsal fins: the first originating over the middle of the pectoral fins when the latter are laid back is triangular, of 10 to 14 (usually 11, 12, or 13) rather weak spines that can be laid down along the midline of the back in a deep groove; the second dorsal, separated from the first by an interspace longer than the length of the latter, is smaller (9 to 15 rays, usually 12) and is followed by several small fin lets, of which there are usually

5, but sometimes 4 or 6. The anal fin is similar to the second dorsal in shape and size, originates slightly behind it, and is similarly succeeded by 5 small fin lets that correspond to the dorsal fin lets in size and shape. The caudal fin is broad, but short and deeply forked. The caudal peduncle bears two small longitudinal keels on either side but no median lateral keel, the absence of the latter being a distinctive character. The ventral fins stand below the origin of the first dorsal and are small, as are the pectorals. The scales of the mackerel are so small that its skin feels velvety to the touch; indeed they are hardly to be seen on the belly with the naked eye, but those about the pectoral fins and on the shoulders are somewhat larger. The upper surface is dark steely to greenish blue, often almost blue-black on the head. The body is barred with 23 to 33 (usually 27 to 30) dark transverse bands that run down in an irregular wavy course nearly to the mid-level of the body, below which there is a narrow dark streak running along each side from pectoral to tail fin. The pectorals are black or dusky at the base, the dorsal and caudal are gray or dusky. The jaws and gill covers are silvery. The lower parts of the sides are white with silvery, coppery, or brassy reflections and iridescence; the belly silvery white. **(A-1).**

Material and Methods:

For the study of Buccal Cavity of *Rastrelliger Kanagutra* Indian Mackerel the fish were collected from local fish market, it was 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 glycerine for stretching. The jaws, teeth, gills and gill rakers were examined properly for detailed studies and photographs were taken. **(1).**

Result:

Its head is long (one-fourth of length to caudal) and its mouth large, gaping back to the middle of the eye (the premaxillaries are not protractile), while the jaws, which are of equal length, are armed with small, sharp, slender teeth. The eye is large, and the hollows in front of and behind it are filled with the so-called "adipose eyelid," a transparent, gelatinous mass in the form of two scales, a forward and a hinder, which cover the eye except for a perpendicular slit over the pupil.

1. Structure of the Jaws

The mouth of *Rastrelliger kanagurta* is terminal and comparatively wide. It extends backward to the middle region of the eye. Jaws are protractile, meaning they can extend

forward to capture fast-moving prey. The mouth is terminal, positioned at the very front of the head. The upper and lower jaws are almost equal in length and operate together during feeding. The upper jaw is primarily composed of the premaxilla and maxilla bones, while the lower jaw is mainly formed by the dentary bone. These skeletal elements provide flexibility and allow effective movement of the jaws during prey capture. The tongue is small, fleshy, and non-protrusible. It plays a minor role in manipulation of food within the buccal cavity. Four pairs of gill arches are present. Each arch bears numerous slender gill rakers which help in filtering plankton and preventing the escape of food particles.

2. Teeth Arrangement and Morphology

The teeth are small, sharp and conical in shape and pointed (villiform type). They are arranged in a single row on both the upper and lower jaws. The teeth are slightly curved backward which prevents the escape of prey once it is captured. Designed for gripping, holding, and tearing, rather than chewing. Palatal teeth are either absent or poorly developed in this species. Therefore, the main function of capturing and retaining prey is performed by the teeth located on the jaws.

3. Functional Adaptations

Sharp points Pierce soft-bodied prey such as small fishes and crustaceans. Backward curve Acts like a hook, keeping prey secure. Protractile movement. Extends the striking range and creates suction. Single-row pattern Minimizes water resistance, allowing fast mouth closure.

4. Feeding Process and Mechanism

During feeding, the fish rapidly opens its mouth creating suction within the buccal cavity. This suction draws prey organisms into the mouth. The conical teeth then firmly grasp the prey and prevent it from escaping. Approach & strike the fish swims swiftly toward its prey with the mouth partly open. Jaw Projection the premaxilla thrusts forward, widening the gape. Suction Feeding rapid mouth opening produces negative pressure, pulling prey inside. Grasping conical teeth firmly hold the captured prey. The captured prey is swallowed whole without chewing.

Discussions:

The Indian mackerel (*Rastrelliger kanagurta*) is a pelagic, carnivorous fish from the family Scombridae. Its jaw and teeth structures are specialized for catching and holding small prey such as planktonic crustaceans, tiny fishes, and molluscs.

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).

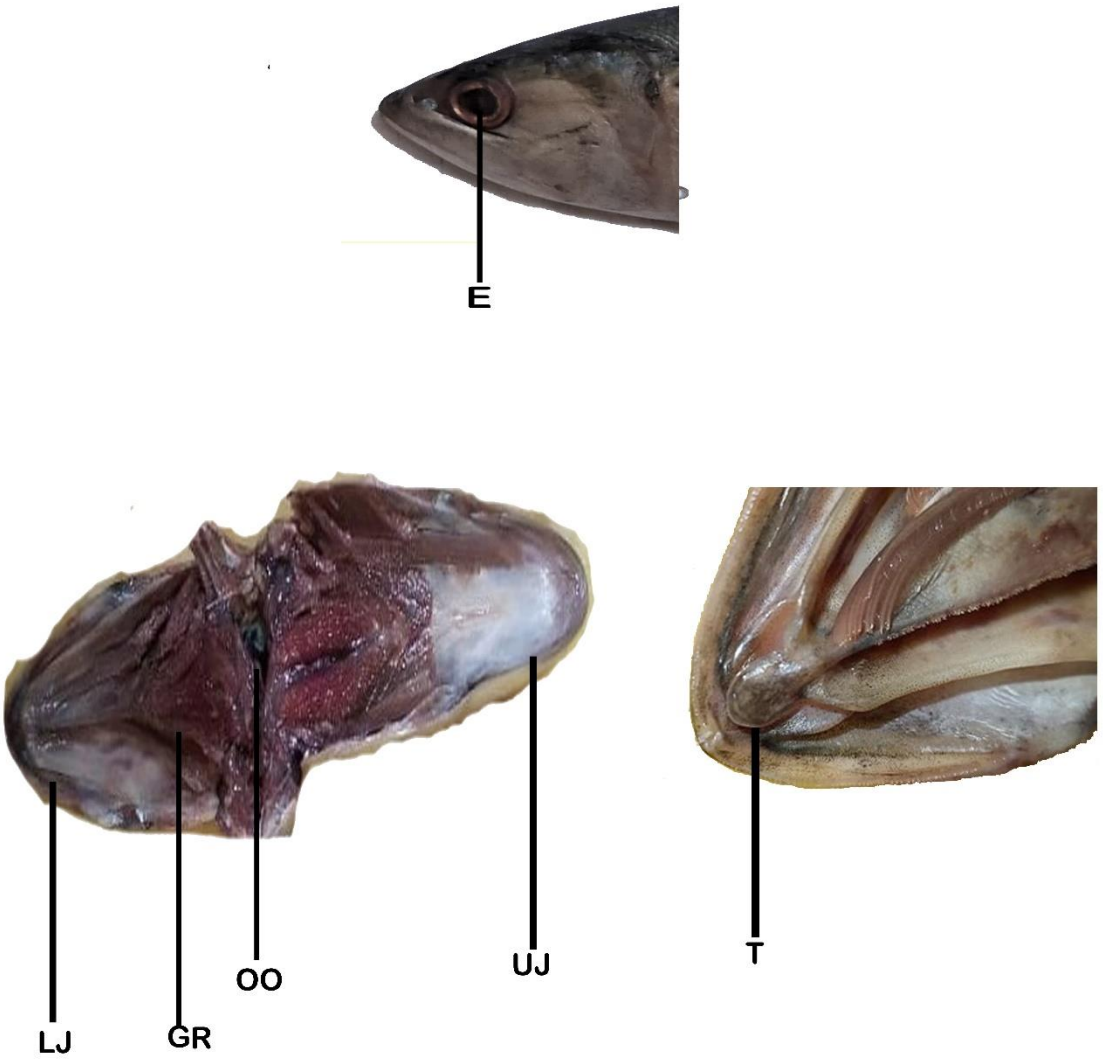
The gill rakers are situated on each side of the gill arch in a single row. The gill rakers of Channa punctatus are observed to be modified into flat circular plates. (Nijaguna et al.,1990) reported that these discs are provided with a series of small pointed teeth. **(1).**

The mouth of *Oreochromis mossambicus* is large, surrounded by upper and lower lips which are thick. The lower jaw extends the upper jaw. The Mouth of *Channa puntatus* is horizontal and terminal in position and the gap of the mouth is wide, surrounded by strong papillated jaws, the upper jaws and lower jaw. The upper jaw is shorter than the lower jaw. The lower jaw is protruding, large and is not protractile. In carnivorous fish Mystus seenghala where the tongue is well developed and mobile and help in pushing the prey into the buccal cavity. During the study of jaws and teeth of *Clarias batrachus*, it was observed that the head is dorso-ventrally depressed mouth is broad, surrounded by fleshy upper and lower lips. **(5).**

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 re-curved, 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. (Gedam et al., 2015b). The pacu teeth are unable to pierce the meat and instead cause a flattening effect. This provides evidence as to how the conically- shaped teeth are designed for piercing while the cusped-teeth of the pacu are more suitable for crushing. This has been shown to occur in shark teeth where broader triangular teeth are less efficient at puncturing when compared to narrower teeth. (Audrey Velasco-Hogan., et al., 2021). It is a hardy species with a rapid shift in dietary composition, in accordance with the environment and survival at depleted oxygen levels. The species possesses a powerful dentition that is capable of serious bites to humans and other aquatic organisms and damage to fishing nets such as gill and cast

nets in the reservoir of Pune, India and causing great economical damage to local fishers. (Roshni., et al., 2014). **(6).**

PLATE



Mouth of Rastrelliger Kanagutra Indian Mackerel, GR. gill rakers, OO. Opening of esophagus, UJ. Upper jaw., LJ. Lower jaw.

References:

1) Gedam Ajit, K., Phulwade Durgesh. N. and Sonawane Smita. (2015): Structures Associated with Feeding in *Channa Punctatus* from Kaigaon Toka Aurangabad (M.S.) The Ecoscan Special issue, Vol. VII: 245-248., An International Quarterly Journal of Environmental Sciences. ISSN: 0974 – 0376.

2) Gedam Ajit. K, Phulwade Durgesh. N. And Sonawane Smita. (2015): Oral Cavity Architecture in *Oreochromis Mossambicus.* Trend in Fisheries Research An International Peer-Reviewed Journal. DAMA International. Volume 4, Issue 3 (2015) ISSN: 2319–474X (p); 2319–4758 (e).

3) Phulwade Durgesh N., Shaikh Salim R. and Ghumnar Hardik S. (2020): Study of Buccal Cavity *Channa punctatus.* Our Heritage ISSN: 0474-9030Vol-68, Special Issue-38.

4) Gaikwad D.M., Phulwade Durgesh N. and Shaikh Salim R. (2020): Study of Buccal Cavity *Clarias Batrachus*. Trend in Fisheries Research an International Peer-Reviewed Journal. DAMA International. Volume 9, Issue 1, ISSN: 2319–474X (p); 2319–4758 (e).

5) Gaikwad D.M., Phulwade Durgesh N. (2021): Study of Buccal Cavity *Pangasius pangasius*. Special Issue Theme: Narural Resources and Sustainable Development (Special Issue No.95) ISSN 2349-638x Impact Factor 7.149.

6) Durgesh N. Phulwade, *Rajani S. Amrawkar and Ratnakar Subhash More. (2024): Jaws and Teeth of *Piaractus brachypomus.* Bioinfolet 21 (1): 11 – 13.

7) Agrawal N. and Mittal A.K. (1992): Structural organisation and histochemistry of the epithelia of lips and associated structures of a carp – *Cirrhina mrigala*. *Can. J. Zool.* 70: 71-78.

8) Ashraf abbas (2010): Food and feeding habits of freshwater catfish, (bleeker) *Eutropiichthys vacha*. *Indian J. Sci. Res.*1 (2): 83-86, 2010.

9) Atukorallaya Devi, Sewvandini Atukorala, Christine Hammer, Megan Dufton and Tamara Anne Franz-Odendaal (2013): Adaptive evolution of the lower jaw dentition in Mexican tetra (*Astyanax mexicanus*). Atukorala et al. *Evo Devo* 4:28.

10) M. Dasgupta (2000): Adaptation of the alimentary tract to feeding habits in four species of fish of the genus *Channa. Indian J. Fish.,* 47(3): 265-269

11) Mittal A.K. and Agrawal N. (1994): Modifications in the epithelia of lips and associated structures of the predatory murrel (*Channa striata*). *J. Appl. Ichthyol*. 10: 114-122.

12) Neveen El Said Reda El Bakary (2012): Morphology of the buccal cavity of sea bream *(sparus aurata)* and its relation to the type of feeding using scanning electron microscopy. *Global Veterinaria.* 9 (6): 779-784, 2012ISSN 1992-6197© IDOSI Publications, 2012 DOI: 10.5829/idosi.gv.2012.9.6.7196.

13) Paul J. Linser, William e. S. Carr, holly s. Cate, charles d. Derby, and James c. Netherton (1998): Functional Significance of the Co-Localization of Taste Buds and Teeth in the Pharyngeal Jaws of the Largemouth Bass, *Micropterus salmoides*. Bid. Bull. 195: 273-281.

14) Rafiquel Islam, Liton Kumar Mondol, Liton Sheikh, S.K. Shahinur Rahman, Mominul Islam and Atiqur Rahman (2013): Identification of fatty acid profile, lipid characterization and nutritional status of *Clarias batrachus*. *Nutritional Sci. Food Tech.* doi: 10.7243/2054-1848-1-1.

15) Raji A.R. and Norozi E. (2010): Distribution of External Taste Buds in Walking Catfish *(Clarias batrachus)* and Piranha *(Serrasalmus nattereri)*. *J. Appl. Anim.*

Books/Articles:

A-1) Article in Fishery Bulletin of the Fish and Wildlife Services: Mackrel. http://www.gma.org/fogm.

B-1) Handbook for Field Identification of Fish Species Occurring in the Indian Seas. Fishery Survey of India. Department of Animal Husbandry, Dairying and Fisheries Ministry of Agriculture Botawala Chambers, Sir P. M. Road, Fort, Mumbai - 400 001. MAY 2009.