



**EDO UNIVERSITY IYAMHO**  
**FACULTY OF SCIENCE SEMINAR SERIES**

**THE MOUTH AND GASTRO-INTESTINAL TRACT OF**  
***POMADASYS JUBELINI* (CUVIER, 1830) IN THE**  
**NEW CALABAR-BONNY RIVER, RIVERS STATE, NIGERIA**

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# Introduction:

- The functional morphology of the mouth and gastro-intestinal tract of different fish species, revealed to a large extent the type of food and mode of feeding habits of the fish species.
- The varieties of dietary items found in the aquatic ecosystem are to a large extent is responsible for the variations in morphological modifications to acquire and utilize the different food item by various species.

- Adaptation to the mode of feeding could be found in the mouth and jaws, teeth, the shape and size of gill rakers, stomach and intestine (alimentary canal). The intestinal tract of fishes shows a remarkable diversity of morphology and functional characteristics.
- This is often related to their different feeding habits and to taxonomy as well as body shape, weight, size and sex (Diaz *et al.*, 2008; Banan-Khojasteh *et al.*, 2009).
- This knowledge may help identify differences in the anatomy and histology of the intestinal tract among various species.
- *Pomadasys jubelini*, as an important source of fish supply for man has successfully adapted itself to the estuarine and marine environment which is reflected in their mode of feeding (non piscivorous carnivore).

# AIM

- This study is aimed at investigating the gastrointestinal tract of *Pomadasys jubelini* and the knowledge obtained will be helpful in understanding the biology of the fish (structure and morphology), its functional mechanisms and in formulating suitable feeds.

# Materials and methods:

- Samples of *Pomadasys jubelini* were collected from three different locations in the New Calabar-Bonny River, Rivers state Nigeria.
- Immediately after collection the samples were rinsed with water and wiped dry. The length (g) and weight (g) of each sample were determined using a measuring board and an electronic scale respectively.
- The gastro-intestinal tract was removed and tissue samples of oesophagus, stomach and intestines were immediately fixed in 10% formaldehyde.
- Then the samples were dehydrated through a standard ethanol series to 100%, cleared in xylene and embedded in paraffin wax. 5–6  $\mu\text{m}$  serial sections were deparaffinized and stained.
- Prepared slides of the gastro-intestinal tract, were mounted and examined on the Electronic Olympus microscope (model Bino Cxi IS4381) that has Samsung camera (model PL120) attached, to capture features of biological importance.
- Pictures of the mouth, jaws and pharyngeal teeth were taken with a Samsung digital camera (Model PL 210).

# Results and Discussion

- *Pomadasys jubelini* has a terminal mouth which is wide and protractile, with scales around it. The snout is pointed and elongated (Plate I).
- The mouth opens as wide as 20% of its total length (Plate II).
- It also has a tongue which arises as a fold from the floor of the buccal cavity.



• **Plate I:** The mouth of *Pomadasys jubelini*

**Plate II:** The mouth gape of *Pomadasys jubelini*

- There are no teeth on the tongue.
- Multiserial bands of setiform teeth which are found on the lower and upper jaws.
- The teeth of the upper jaw are premaxillary (teeth present in the front margin of the upper jaw) (Plate III) while the lower jaw has teeth arranged in a mandibular position (teeth present on the margin of the lower jaw) (Plate IV).

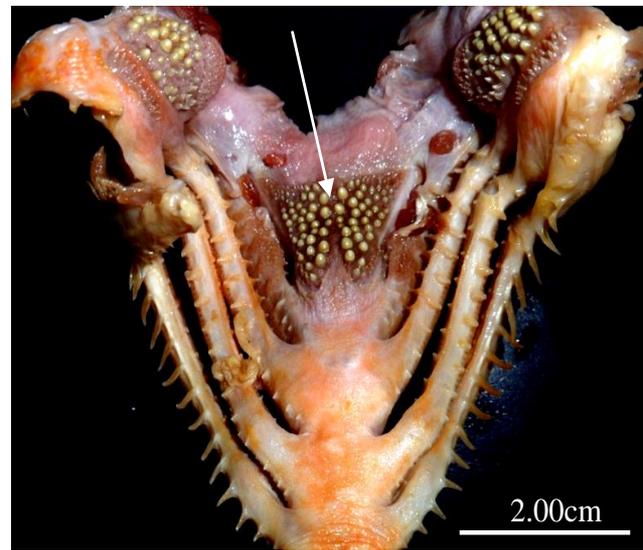


**Plate III:** The upper jaw of *P. jubelini* exhibiting premaxillary teeth (arrows).



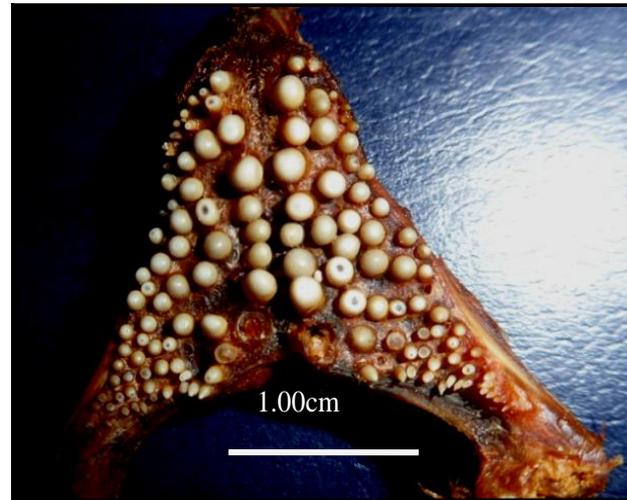
**Plate IV:** The lower jaw of *P. jubelini* exhibiting mandibular teeth. MT, Mandibular teeth

- Teeth are present on the pharyngeal bones at the back of the mouth (in the throat) on the ventral and dorsal surfaces.



**Plate V:** The pharyngeal teeth (arrow) of *P. jubelini* as situated in the pharynx

- The ventral surface is made up of a pair of pharyngeal teeth. These teeth are in the form of smooth pebbles (Plate V).



**Plate VI:** The lower pharyngeal band of teeth is triangular in shape



**Plate VII:** The upper pharyngeal teeth of *P. jubelini*

The gills are made up of four arches on each of the left and right sides (a total of 8).

The gill arch is thick and cartilaginous and has thick, long, sparsely arranged spiky gill rakers (18 on Plate VI).



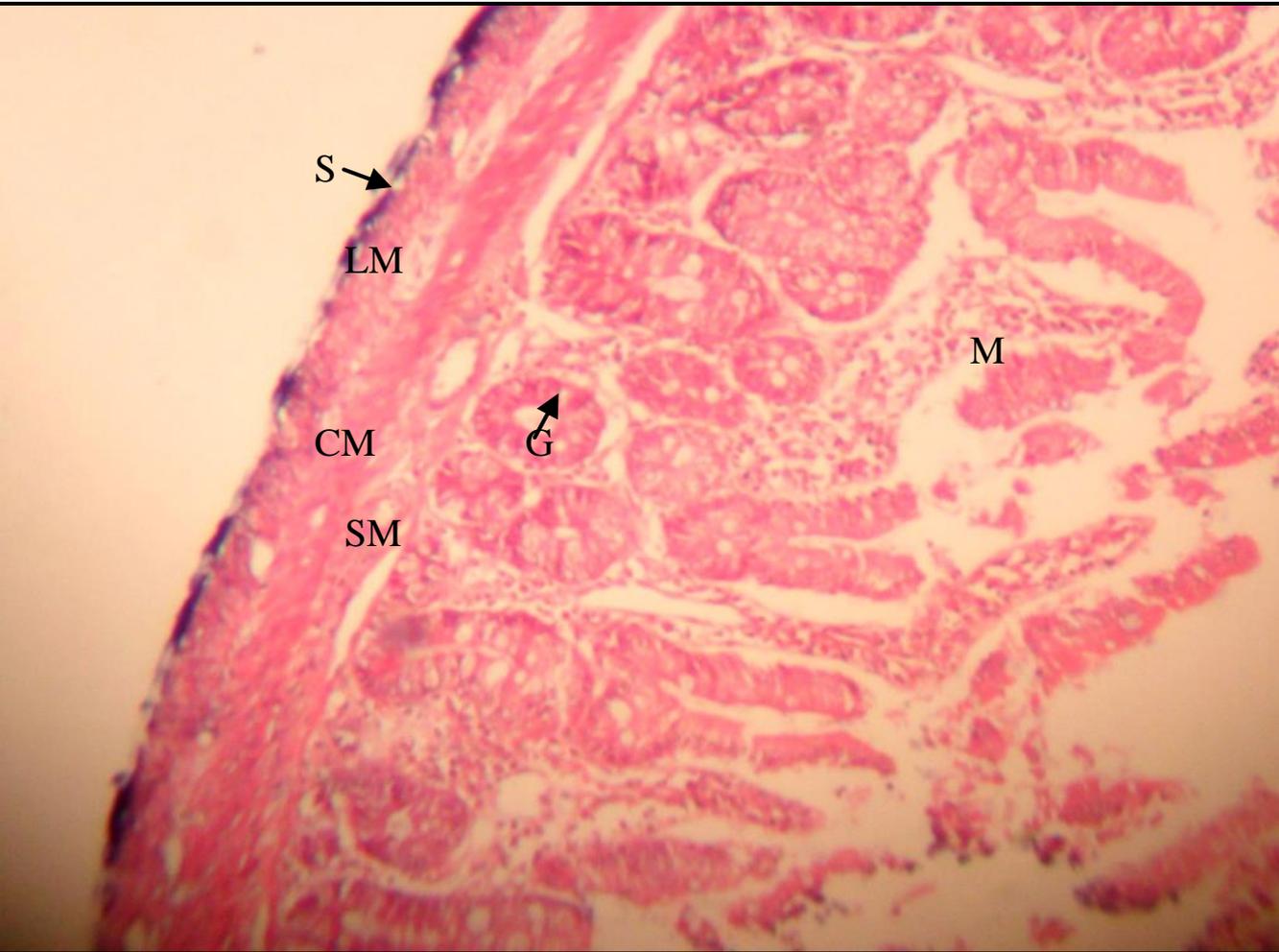
**Plate VIII:** One gill of *Pomadasys jubelini*



**Plate IX:** The gastrointestinal tract of *Pomadasys jubelini*. O, Oesophagus;  
S, Stomach; D, Duodenum; PC, Pyloric Caeca; I, Intestine; R, Rectum; C, Cloaca

# Histology of the Gastro-intestinal tract of *Pomadasys jubelini*

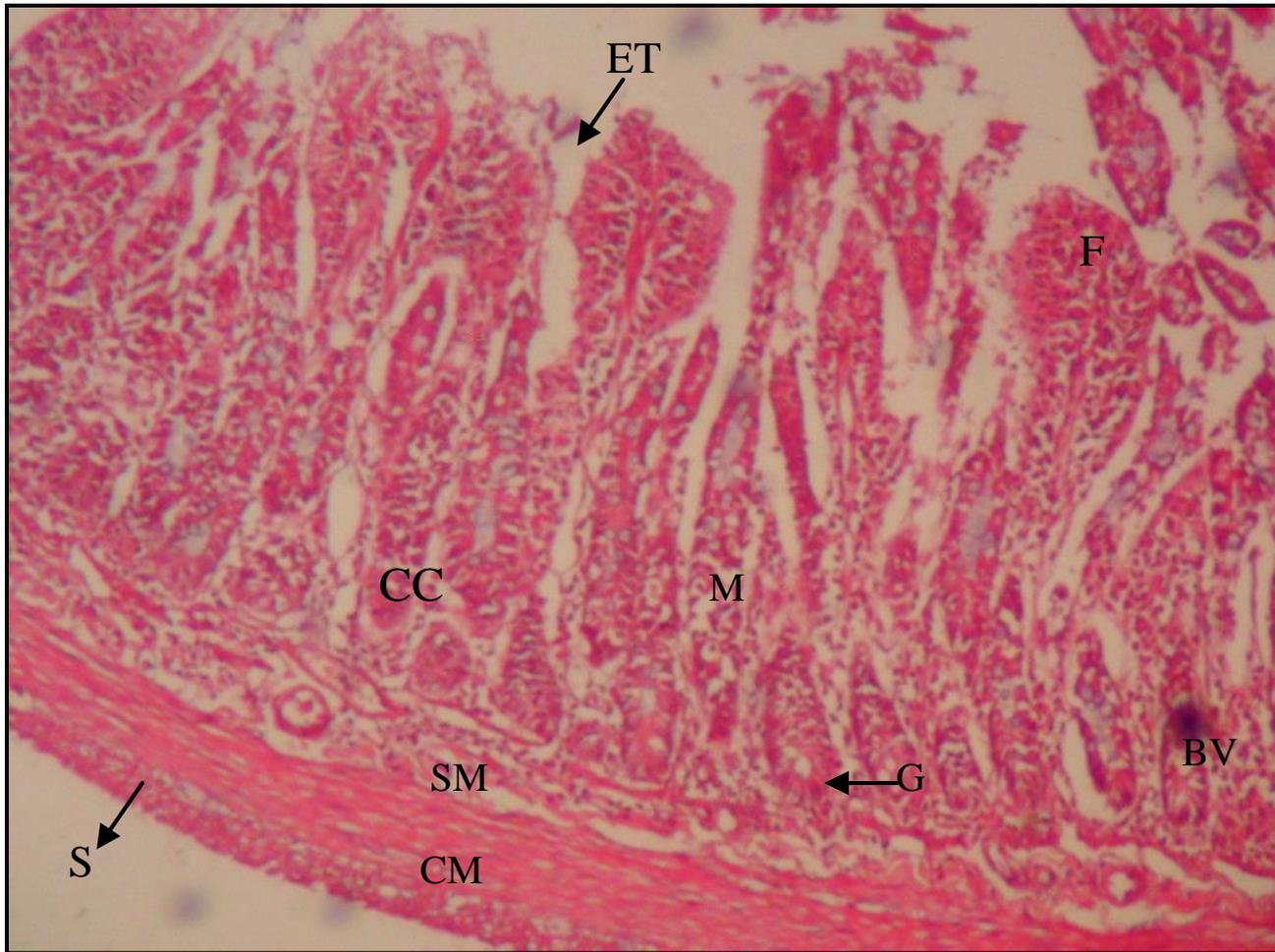
- The alimentary canal from oesophagus to the rectum consist of the following layers
- Serosa: the outermost layer of which connective tissue are superimposed
- Outer longitudinal muscle layer, a thin sheet of muscular bundle having longitudinal fibre.
- Inner circular muscle layer: a thick layer of striated and smooth muscle fiber
- Submucosa: This layer is made up of connective tissue embedded with blood vessels, ducts and fibers
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- Muscularis mucosa: A thin layer of fibre separating the submucosa from the mucosa
- Mucosa: A membrane of variable thickness usually from folds of different lengths depending on the region to which it belongs



**Plate XXI:** Transverse Section of the Oesophagus of *Pomadasys jubelini*

S – Serosa, LM= Longitudinal muscle layer, CM – Circular muscle layer,

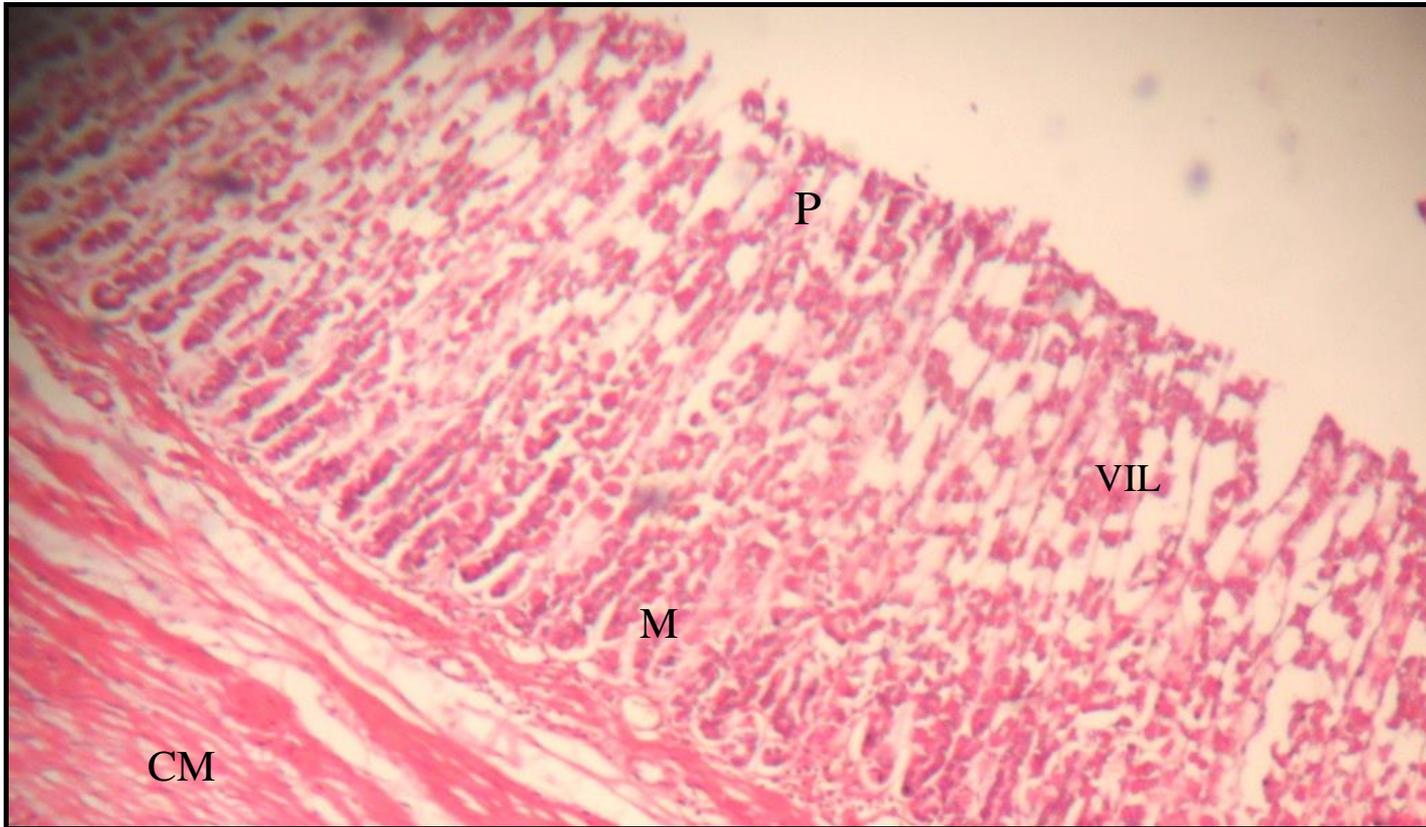
SM – Submucosa, M – Mucosa, G= Goblet cell, (Haematoxylin and Eosin, ×40)



**Plate XXII:** Transverse Section of the Stomach of *Pomadasys jubelini*

S – Serosa, CM – Circular muscle, SM – Submucosa, G – Goblet cells,  
M – Mucosa, BV= Blood cell, F= Fold, ET= Epithelial tissues,

(Haematoxylin and Eosin,  $\times 40$ )

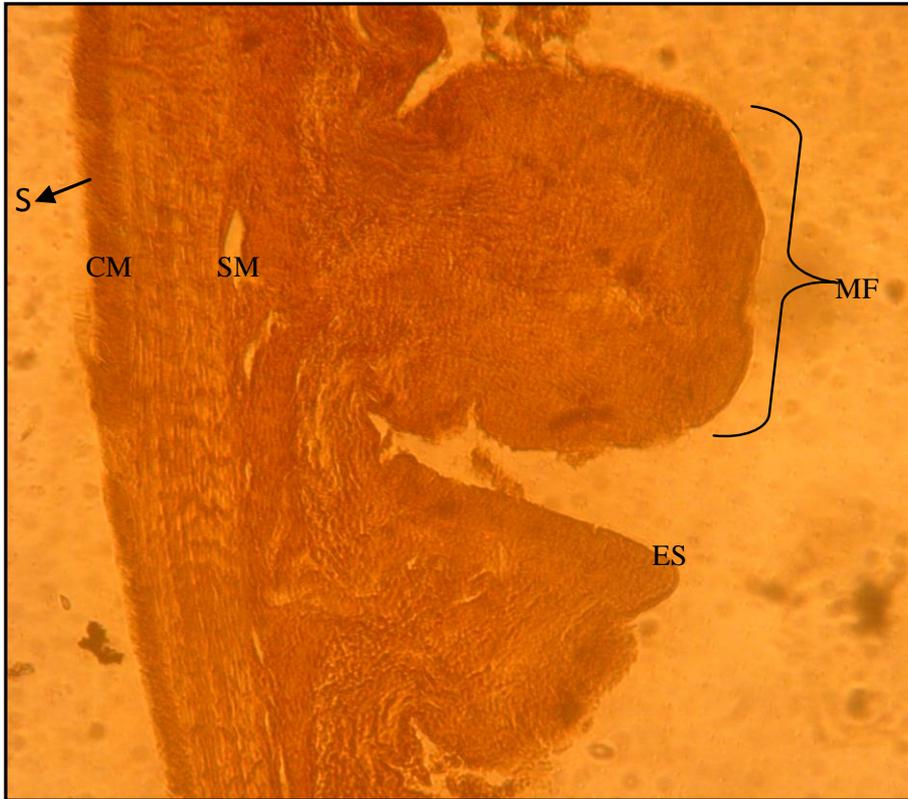


**Plate XXIII:** Transverse Section of a Pyloric caecum of *Pomadasys jubelini*  
CM – circular muscle, M – mucosa, VIL – Villi, P – Pits, (Haemotoxylin and  
And Eosine X 40)



**Plate XXIV:** Transverse Section of the Intestine of *Pomadasys jubelini*

LM – Longitudinal muscle, CM – Circular muscle, M – Mucosa, (Haemotoxylin and Eosin,  $\times 40$ )



**Plate XXV:** Transverse Section of the Rectum of *Pomadasys jubelini*  
S, Serosa: CM, Circular muscle: SM, Submucosa; MF, Mucosal fold;  
ES, Epithelial sheath; (Haemotoxylin and Eosin,  $\times 40$ ).

# Conclusion

- *Pomadasys jubelini* is a carnivorous fish with a simple GIT . The histology reveals conspicuous carnivorous characteristics

# References

- Bana-Khojasteh, S.M., Sheikhzadeh, F., Mohammadnejad, D and Azami,A. (2009). Histological, histochemical and ultrastructural study of the intestine of rainbow trout. (*Oncorhynchus mykiss*) *World Applied Science Journal*, 6:1525-1531.
- Bana-Khojasteh, S.M. (2012). The morphology of the post gastric alimentary canal in teleost fishes: a brief review. *International journal of Aquatic sciences*, 3 (2) 71-88
- Dasgupta, M. (2000). Adaptation of the alimentary tract to feeding habits in four species of fish of the genus *Channa*. *Indian Journal of Fish*, 47 (3) 265-269
- 
- Das, S.M. and Moitra, S.K. (1995). Studies on the food of some fishes of Uttar Pradesh, Part1: The surface feeder, mid feeder and bottom feeder. *Proceeding of National Academic Science*, 25B (1-2): 1-6
- 
- Diaz, A.O., Gracia, M. A. and Goldemberg, A. L (2008). Glycoconjugates in the mucosa of the digestive tract of *Cynoscion guatucupa*: a histo-chemical study. *Acta Histochemica*, 110: 76-85.
- 
- Eastman, J.T. and Devries, A.L. (1997). Morphology of the digestive system of Antarctic nototheniid fishes. *Polar Biology*, 17: 1-13
- 
- Pandey, K and Shukla, J.P. (2005). *Fish and Fisheries*. A text book for university students. Rastogic Publications. 500pp.
- 
- Srivastava, C. B. L. (1988). *A Text Book of Fisheries Science and Indian Fisheries*. Kitab Mahal, Allahabad, India.
- 
- Ugwumba, A.A. and Ugwumba, O.A. (2007). *Food and Feeding Ecology of Fishes in Nigeria*. Jodetan Ventures. Ibadan. (70pp)

**Thank You.....**