

# Digestive system of shrimp

- Digestive system comprises of alimentary canal and digestive gland .
- Alimentary canal- long tube running the entire length of the body .
- Only digestive gland present in shrimp – Hepatopancreas .

# Alimentary canal

- Three divisions – stomodaeum / foregut
  - Mesodaeum/mid gut
  - Proctodaeum / hind gut
- Stomodaeum – Mouth ,buccal cavity ,oesophagus and stomach
- Mesodaeum- Intestine
- Proctodaeum – rectum and anus

- Internal cuticular lining of fore gut and hind gut – intima
  - Endodermal lining – mid gut
1. Mouth – Ventral side of the head , upper lip / labrum , lower lip / labium , incisor teeth of mandible – lateral position

- Lobes of labium – paragnathae

2. Buccal cavity – short ,vertical ,anterio-posteriorly compressed chamber .Irregular cuticular foldings of intima ,

Molar teeth of mandible project into it for mastication of food .

3. Oesophagus – Short, wide vertical tube, 4 longitudinal foldings – anterior, posterior and two lateral.
- Oesophageal aperture – connecting oesophagus to stomach
4. Stomach – Large sac occupying more than half of the cephalothorax.

- Two division – large –cardiac stomach
  - small –pyloric stomach

Uncalcified cuticular lining , some areas thick and calcified - plates

Plates – Circular plates

Lanceolate plate

Hastate plate

Comb plate

Groove plate

- 1. Circular plate – anterior wall of oesophageal aperture .
- 2. Lanceolate plate – root of cardiac stomach
- 3. Hastate plate – floor of cardiac stomach
- 4. Comb plate – surrounding the hastate plate
- 5. Groove plate – on the floor of the groove between hastate and comb plate.



- Guiding ridge – blue-black colour folding , a pair
- Cardio-pyloric aperture – X –shaped , bounded by anterior ,posterior and lateral valves
- Anterior valve- formed by hind end of hastate plate

- Lateral valves– posterior end of both guiding ridges
- Posterior valve- semi-lunar folding in the posterior side of aperture

- Pyloric stomach – posterior part of cardiac stomach.
- Pair of triangular and rectangular plates ,together called pyloric filter apparatus .
- Two division – small- dorsal chamber and large ventral chamber .

- Dorsal chamber – small caecum to intestine – removal of undigested particle .
5. Intestine – long slender tube , extended upto 6<sup>th</sup> abdominal segment.
  6. Rectum – short , 1-1.5 cm long . From 6<sup>th</sup> abdominal segment to anus . Anterior part sac like , posterior narrow.

7. Anus – longitudinal slit on the ventral part of telson .radial muscle – open the anus

Circular muscle – close the anus.

Hepatopancreas – Bright orange red in colour , surrounding the stomach , secret digestive juice , store glycogen ,Ca and fat

Hepatic pancreatic duct carries digestive juice and opens into ventral pyloric stomach

# Digestion

- 4 –steps
- Ingestion – intake of food ,
- Chelate legs- small food particles
- Chelate legs + third maxillipeds – large food particles
- Maxillae and maxillipeds
- Incisor teeth- cut the food particles

- Molar teeth –grinding
- Peristalsis – movement of food from oesophagus to stomach .Sucking action – contraction and relaxation of stomach wall.
- Digestion – occurs in cardiac stomach ,mixing of digestive juice with food ,
- Filtering by valves

- Absorption – hepatopancreas and intestine
- Ejection- Removal of waste material – through anus .



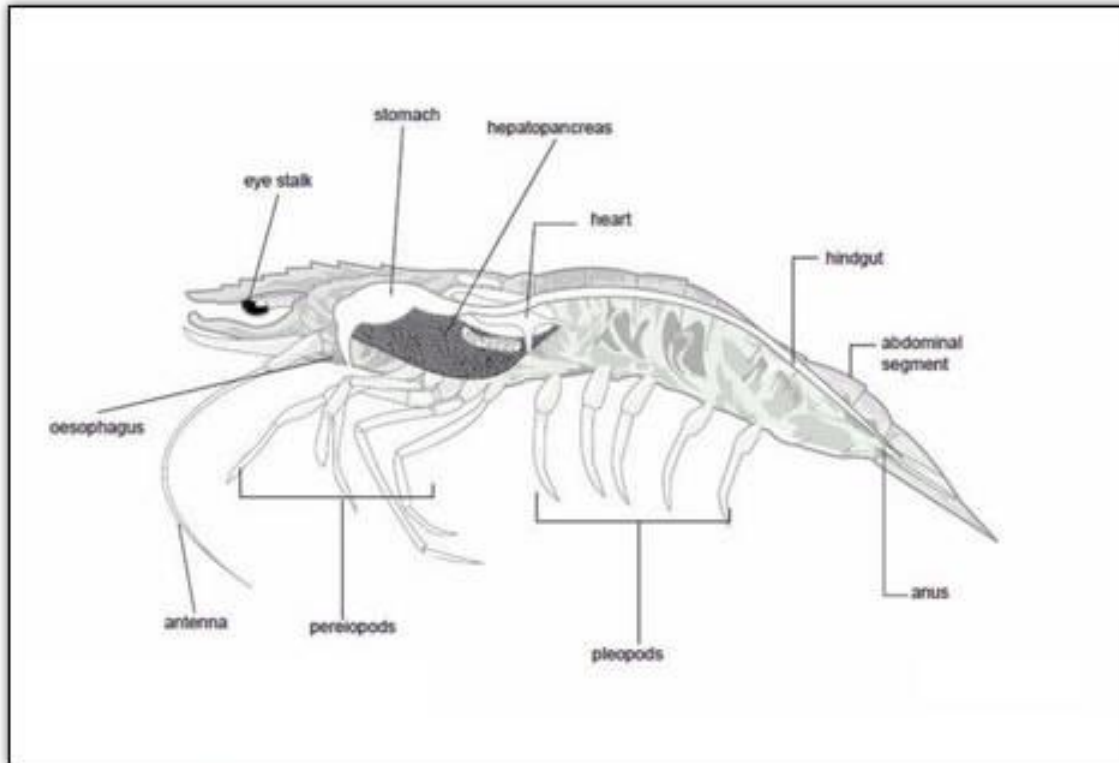


Figure 13: Shrimp digestive system (Source: FAO, 2001)