

ANIMAL

KINGDOM 04



BY MRIDUL YADU



MBC – Mridul Bhaiya Classes

B.Sc. 1st NOTES

ZOOLOGY NOTES

PART - 04

GENERAL CHARACTERISTICS AND CLASSIFICATION OF ARTHROPODA AND MOLLUSCA

TYPE STUDY – PALAEMON AND PILA

- ✓ Detailed notes
- ✓ PYQs with answers
- ✓ Graphics included



Zoology is the division of biology that deals with the animal kingdom. It is the scientific study related to the entire species of the animal kingdom.



UNIT – 04 (SEMESTER 1ST)

TOPICS TO BE COVERED

- A. General Characteristics and Classification of Phylum Arthropoda (Upto Class)
Arthropoda – Type study : Palaemon
- B. General Characteristics and Classification of Phylum Mollusca (Upto Class)
Mollusca – Type study : Pila

UNIT- 04

GENERAL CHARACTERISTIC AND CLASSIFICATION OF PHYLUM ARTHROPODA

TYPE STUDY - PALAEMON

[Greek Arthros = Jointed + podos = foot]

General Characteristics

1. **Habitat** : animals are found in water, land, and air in all three environment. Some animals are parasite.
2. **Level of organisation** : Organ system level of organization.
3. **Symmetry** : Bilaterally symmetrical
4. **Germ Layer** : Triploblastic organisation.
5. **Body** : Thick cuticle functions as a rigid **exoskeleton** or external skeleton. It is composed of protein and flexible chitin.
The important function of exoskeleton are :
 - a. It provides places for muscle attachment for support and movement
 - b. It protects the animals from predators and injury.
 - c. It protects from water loss.
6. Numbers of segments definite, and the body is divided into **Head, thorax** and **abdomen**.
7. Head and thorax together forms **Cephalothorax**.
8. **Coelom** : They are coelomates. The internal cavity is called **haemocoel**. It is filled with **haemolymph**.
9. **Digestion** : The digestive system is complete. Alimentary canal can be distinguished into three regions : a.) Foregut b.) Midgut c.) Hindgut



10. **Circulation** : Circulatory system is open type and its blood contains a pigment haemocyanin.
11. **Respiration** : Generally from general surface of body or by gills, respiratory tubes – **Trachea** and **Booklungs**.
12. **Excretion** : By **Coelomoducts** or **Malpighian tubules** and **green** or **coxal glands**.
13. **Locomotion** : A well-developed muscular system is present below the hinged parts help the arthropods in movement.
14. **Neural system and sensory cells** : Consists of **Cerebral ganglion** with a nerve ring and **double ventral nerve cord**, in which segmental ganglion are present. Sensory organs well developed. Presence of two compound eyes.
15. **Reproduction** : Mostly **Unisexual. Sexual dimorphism** Is present.
16. Fertilization inside the female body or internal.
17. Presence of one or more larval stages, by transformation of which adult develops.

TYPE STUDY: PALAEMON OR PRAWN

CLASSIFICATION:

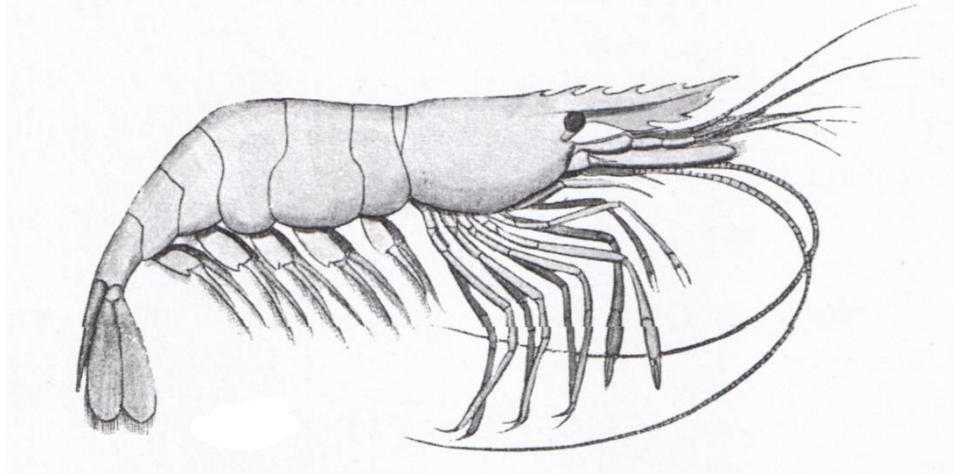
Phylum – Arthropoda

Class – Crustacea

Order – Decapoda

Genus – *Palaemon*

Nineteen (19) pairs of jointed appendages are found in prawn.



HABIT AND HABITAT:

- Palaemon is found in fresh water ponds, lakes, and rivers.
- It is commonly known as Prawn
- It remains hidden at the bottom of reservoirs during the day time and coming to the surface at night In search of food.
- It is omnivorous animal.
- Generally like slow running water and are bottom feeder. Its food is generally algae, or other water plants and sometimes feed on insects.
- Walks slowly with its walking legs and swims actively with the help of its pleopods.

In a desperate attempt to escape from the enemy's grasp, it can shed off one or more of its appendages. This process is known as **autotomy**.

EXTERNAL MORPHOLOGY

Shape and Size: the body is elongated, spindle shaped, bilaterally symmetrical animal.

Colour: Palaemon are usually translucent, and white in colour in embryonic stage. In adult colour is dull pale yellow with orange red patches.

Body: The body of the Palaemon is divided into two distinct regions:

(i) Cephalothorax (ii) Abdomen.

Cephalothorax is immovable, rigid, and unsegmented and is covered by a large chitinous shield called as **carapace**.

Cephalothorax is divided into two:

a) Head

b) Thorax

Head : Head is the anterior part of Cephalothorax. In the head there are five pairs of segmented appendages, which are.

a. Antennule b. Antenna c. Mandibles d. Maxillula and e. Maxilla.

Thorax : Just behind the head thorax is situated.

- Head and thorax together form the Cephalothorax.
- The first three pairs of appendages are Maxilla like and known as **Maxillipeds**.
- The last five pairs of thoracic appendages are used for walking.
- These legs are tubular elongated and segmented.
- First and second pairs of walking legs are provided with forceps.

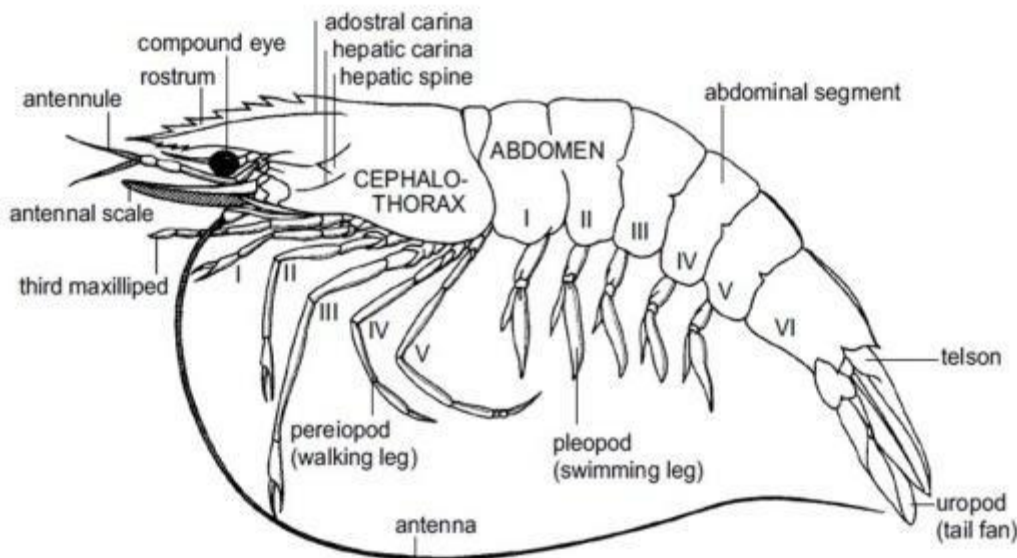
The Cephalothorax is covered by a hard covering known as **Carapace**. At the anterior end of *carapace* there is a pair of black, round stocked **compound eyes**. In between the eyes there is a laterally compressed flat saw-like **rostrum**.

Abdomen

The elongated portion of the body behind the Cephalothorax is abdomen.

- It is round dorsally, and a bit compressed laterally.
- The abdomen consists of six segments. In every segment of the abdomen there is a pair of appendages. They are used for swimming and known as **Pleopods**.
- The first five pairs of swimming legs are similar. All the legs are segmented.

Uropod: The sixth or the last abdominal appendages are uropod. These are very big oar-shaped. At the end of abdomen, the pointed portion is known as **Telson**.





External Aperture: Mouth is mid-ventral slit like, lies at the anterior end of cephalothorax. The anus is situated at the base of the telson.

Appendages:

There are 19 pairs of joined appendages in *Palaemon*.

- 5 pairs in head as **cephalic appendages**.
- 8 pairs of **thoracic appendages**.
- 6 pairs of **abdominal appendages**.

A. Cephalic Appendages: Five pairs are as follows.

1. Antennule, 2. Antennae, 3. Mandibles, 4. Maxillulae, 5. Maxillae

B. Thoracic Appendages: These consists of three pairs which form **maxillipedes** and five pair of walking legs or **Paraeopods**.

C. Abdominal Appendages: First five are meant for swimming and are known as **Pleopods**. And Sixth pair **Telson** forms **tail fin**. It is called **Uropod**.

DIGESTIVE SYSTEM

It consists of **alimentary canal** and associated with **digestive gland or gastric gland or Hepatopancreas**.

I. Alimentary Canal: Alimentary canal is divided into three regions, (A) Fore gut (B) Mid gut (C) Hind Gut.

A. Fore-gut: It is divided in four parts:

(i) Mouth: It is a big opening on the ventral side of the head situated at the junction of 3rd and 4th cephalic segments. Food enters through this opening.

(ii) Buccal Cavity: Behind the mouth this short cavity is situated where food crushed.

(iii) Oesophagus: A short and wide oesophagus is present at the back of buccal cavity from where food passes to the stomach.

(iv) Stomach: It is a big sac like organ behind the oesophagus. The anterior portion of the stomach is **cardiac stomach**, and the posterior part is **pyloric stomach**. Food is digested in the stomach.

B. Mid Gut: This is straight, long, narrow, and tubular portion of the alimentary canal. It is extended along the mid dorsal line up to the 6th abdominal segment. Its function is to absorb digested food and undigested food passes to the rectum through mid-gut.

C. Hind Gut: Behind the mid gut a small tube extended up to anus. It has two portions,

i. Rectum: Small sac-like, first portion of posterior alimentary canal rectum.

ii. Narrow tubular posterior portion: It is located behind the rectum. At its posterior end anal opening is present. The undigested waste materials are stored here. The faecal waste is eliminated through the anus.

2. Digestive Glands: The name of digestive gland of prawn is **hepatopancreas**, which is orange coloured and occupies most of the regions of Cephalothorax. It is a large gland surrounding the stomach. This gland functions like the liver, pancreas, and small intestine of higher animals. They secrete enzymes that take part in digestion.

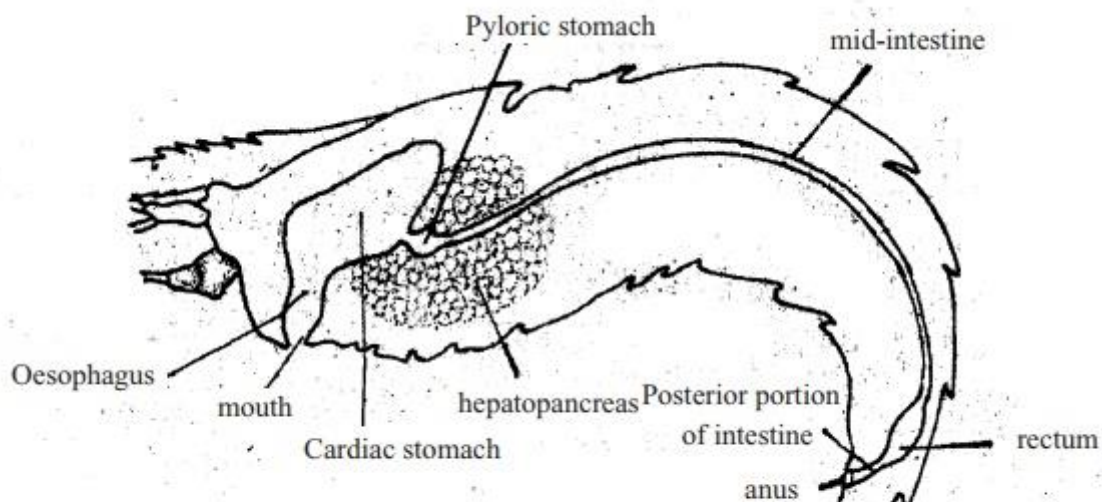


Fig : Digestive system of Prawn