
EXERCISE 14 ARTHROPODA-II – SUBPHYLUM UNIRAMIA : CLASSES CHILOPODA AND PAUROPODA AND PHYLUM ONYCHOPHORA

Structure

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 - General Features
 - Study of the specimen *Julus*
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 - Study of the specimen *Peripatus*
 - Affinities of *Peripatus*
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14.1 INTRODUCTION

The subphylum is called Uniramia because of the presence of unbranched appendages. These animals have non-jointed mandibles, unbranched appendages without any palps. They have only a single pair of antennae that correspond to the second cephalic segment (second antennae). Malpighian tubules act as excretory organs. This subphylum has 10,1300 species belonging to classes Chilopoda, Pauropoda, Symphyla and Insecta. Here in this exercise we will take the class Chilopoda and Pauropoda only, class Insecta being a very large group will be taken up separately in the next exercise No. 15.

Phylum Onychophora with the single example *Peripatus* has a unique position showing affinities with annelids, arthropods and molluscs.

Objectives

After performing this exercise you should be able to:

- identify the specimens of *Scolopendra*, *Julus* and *Peripatus*,
- classify the identified specimens and justify their classification,
- mention the habit and habitat of the specimens,
- list the affinities of *Peripatus* with annelids, arthropods and molluscs.

14.2 MATERIAL REQUIRED

Preserved specimens of:
Scolopendra (centipede)
Julus (millipede)
Peripatus

14.3 CLASS CHILOPODA

14.3.1 General Features

There are many trunk segments each bearing a single pair of legs. The head bears a single pair of antennae, mandibles and two pairs of maxillae, The 2nd maxillae fuse to form a labium. A poison gland is also present in these animals.

14.3.2 Study of the specimen *Scolopendra*

Centipedes are active and aggressive **carnivores**. About 3000 species have been discovered so far. These are found **under** surfaces of stones, soil and humus, **and** barks and logs.

Examine the **specimen** and note the following features:

- (i) Centipedes feed on terrestrial invertebrates worms, snails and other arthropods.
- (ii) Body is **elongated** and dorsoventrally flattened. .
- (iii) Head is distinct and bears a pair of antennae, a pair of mandibles and two pairs of maxillae.
- (iv) **Trunk** segments are numerous and **each** segment bears **one** pair of legs. **The** first pair of **trunk** legs are clawed and forwardly directed to form **maxillipedes** that bear a sharp claw connected with **poison glands**..
- (v) Genital opening is situated at the hind end of the body.
- (vi) Sexes are separate.

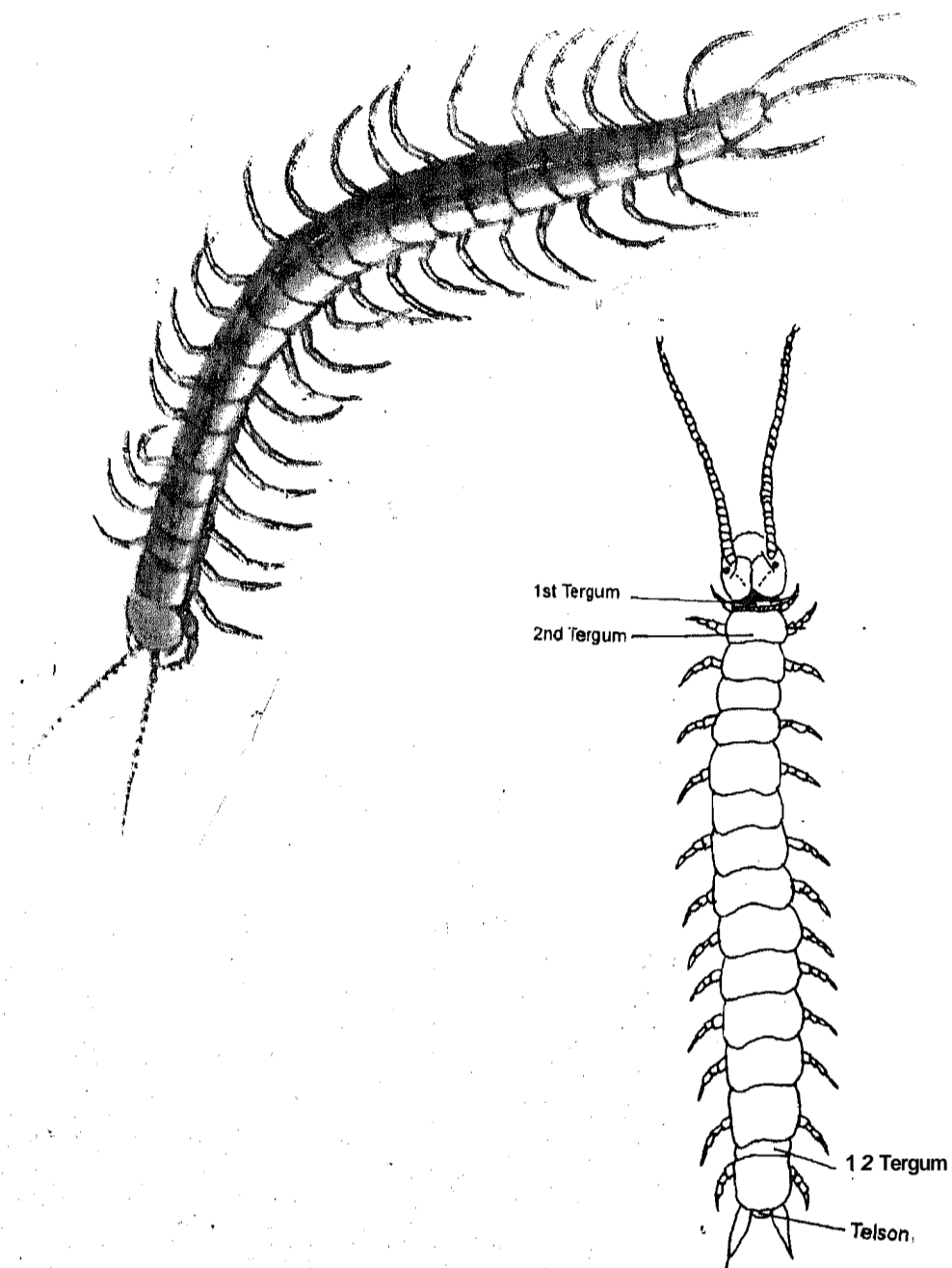


Fig. 14.1: *Scolopendra*.

Habit and Habit

Lives in soil and humus, beneath stones, barks and logs. Predacious.

Arthropoda-II – Subphylum
Uniramia : Classes Chilopoda
and Pauropoda and Phylum
Onychophora

Geographical Distribution

Inhabits both tropical and temperate regions of the world.

Classification and its Justification

Kingdom	Animalia	Animals, multi-cellular organisms with cells that lack a cell wall, many capable of movement or movement of some of their body parts or capable of movement at some time of their life cycle; heterotrophic nutrition.
Phylum	Arthropoda	Jointed appendage, segmented body.
Subphylum	Uniramia	Unbranched appendages
Class	Chilopoda	Numerous trunk segments each bearing a pair of legs
Genus	<i>Scolopendra</i>	
Species	<i>gigantica</i> (large variety)	
Common name	Centipede or Scutigera	

14.4 CLASS PAUROPODA

14.4.1 General Features of Pauropoda

There are eleven trunk segments. The head bears one pair of antennae, one pair of mandibles and one pair of maxillae. Each trunk segment bears a pair of legs and is devoid of blood vascular system and trachea.

14.4.2 Study of specimen *Julus*

Examine the specimen of *Julus* and note the following features:

- (i) Body consists of many segments.
- (ii) Head bears short seven-jointed antennae, a pair of maxillae and a pair of mandibles forming a gnathochilarium.
- (iii) On the dorsal surface there are six tergites which produce segmental coupling. This reduces undulations during movement.
- (iv) Heart and tracheae are absent. Direct diffusion of respiratory gases through the skin takes place.
- (v) Each trunk segment except the first four and last segment bears two pairs of legs.
- (vi) Poison jaws are absent, sting glands are present at the sides of the body.
- (vii) Sexes are separate, genital opening on the 3rd segment behind the head.

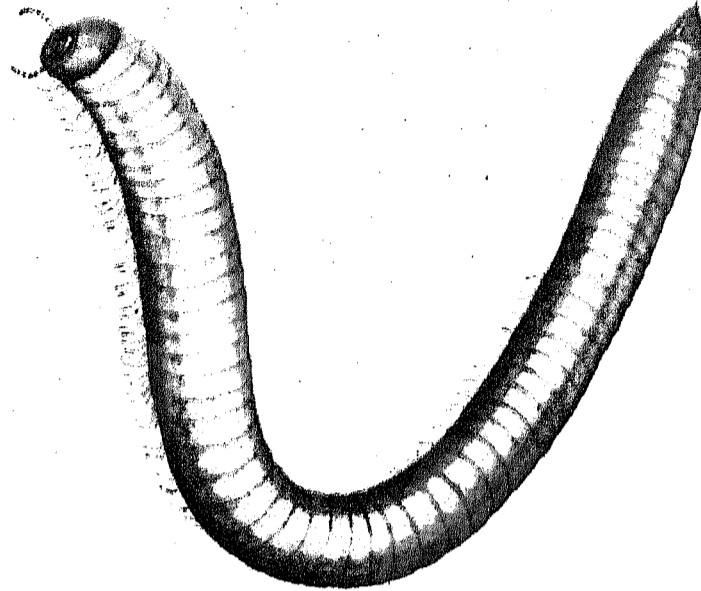
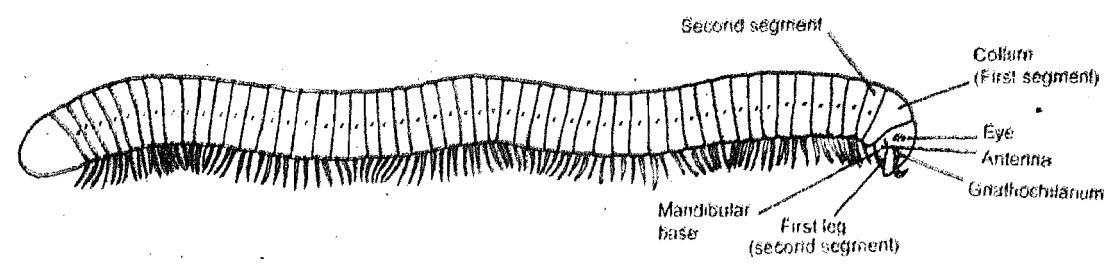


Fig. 14.2: *Julus*.

Habit and Habitat

They live in soil and humus and eat fungus and decaying matter. It is found rolled up under stones.

Geographical Distribution

Cosmopolitan, found in India.

Classification and its Justification

Kingdom	Animalia	Animals, multi-cellular organisms with cells that lack a cell wall, many capable of movement or movement of some of their body parts or capable of movement at some time of their life cycle; lieterotrophic nutrition.
Phylum	Arthropoda	Jointed appendage, segmented body
Subphylum	Uniramia	Unbranched appendages
Class	Paupoda	Head bears antennae, one pair of mandibles, one pair of maxillae
Genus	<i>Julus</i>	
Common name	Millipede or Spirobolus	

It was earlier considered under class Myriapoda. They are commonly known as millipedes. About 380 species have been described so far. They are found hidden in dark and damp places.

14.5 PHYLUM ONYCHOPHORA

Arthropoda-II – Subphylum
Uniramia : Classes Chilopoda
and Pauropoda and Phylum
Onychophora

14.5.1 Study of the specimen *Peripatus*

Onychophora (*Onycho* – claws, *phoros* – bearing) means claw bearing animals. Onychophorans bridge the gap between annelids and arthropods. They have a wide discontinuous distribution around the world.

Examine the specimen and observe the following characters:

- (i) External segmentation is absent.
- (ii) Skin has its own characters.
- (iii) Antennae are not similar to those of arthropods.
- (iv) A condition of three segmented head is a link character between arthropoda and annelida. Segments behind head are similar.
- (v) Tracheae and their arrangement are different from arthropods. It has numerous spiracles on each segment.
- (vi) Ventral nerve cords are widely separated.

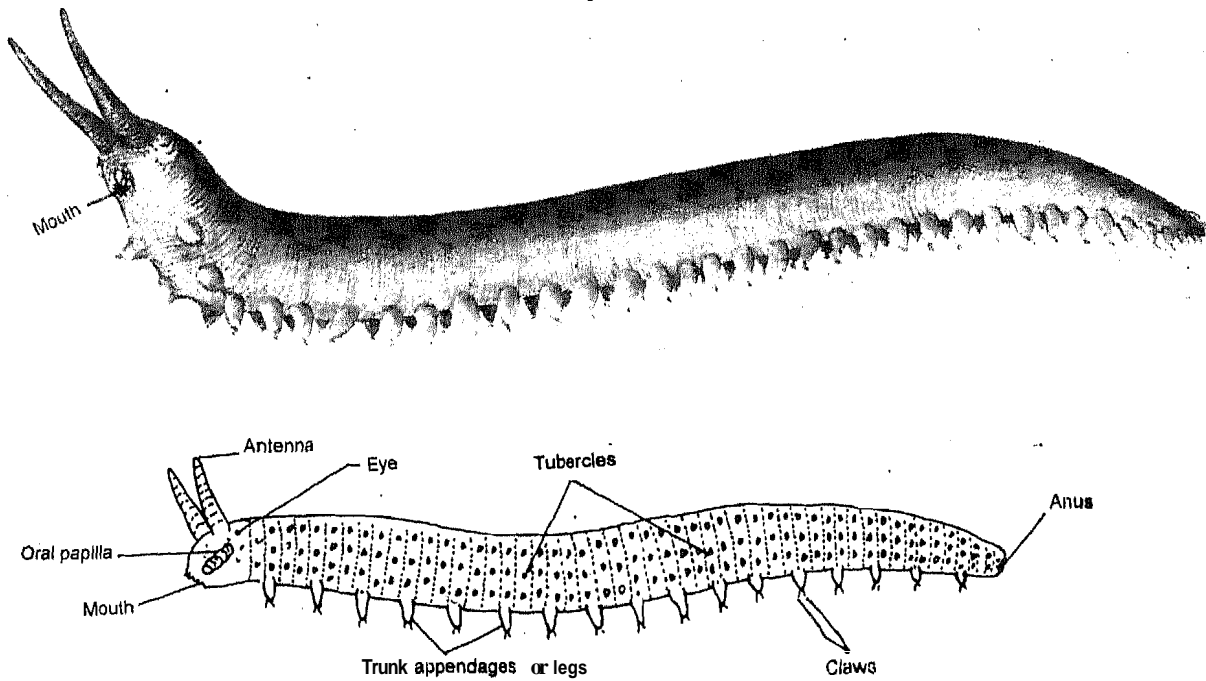


Fig. 14.3: *Peripatus*. External features in lateral view.

Habit and Habitat

In moist ground, crawling under debris.

Geographical Distribution

Abundantly found in South Africa and Australia.

Classification and its Justification

Kingdom	Animalia	Animals, multi-cellular organisms with cells that lack a cell wall, many capable of movement or movement of some of their body parts or capable of movement at some time of their life cycle; heterotrophic nutrition.
Phylum	Onychophora	Claw-bearing, unsegmented, possess nephridia
Genus	<i>Peripatus</i>	

14.5.2 Affinities

Peripatus shows striking similarities with three phyla, namely Annelida, Arthropoda and Mollusca. These are as follows:

a) ANNELIDIAN AFFINITIES

1. Body has long trunk and vermiform structure which resembles annelidan contour.
2. Head is absent.
3. Eyes are simple
4. Body wall consists of thin cuticle underlying circular and longitudinal muscles fibres.
5. Appendages are hollow and unjointed. It shows peristaltic movements like earthworm to perform locomotion.
6. Hollow, stumpy appendages which are extensions of the body wall, similar to the parapodia of annelida.

b) ARTHROPODAN AFFINITIES

1. Body is covered with chitinous cuticle.
2. Appendages bear claws.
3. Jaws are modified appendages.
4. Legs bear definite musculature.
5. Haemocoel present and perivisceral part of coelom is absent.
6. Thachlieae serve as respiratory structures opening to the outside by spiracle.

c) MOLLUSCAN AFFINITIES

1. It looks like a slug.
2. Nervous system resembles polycophoran and prosobranchiates.

Because of their above mentioned affinities they are considered as a connecting link between arthropoda and annelida.

14.6 TERMINAL QUESTIONS

1. List any two most characteristic differences between centipedes and millipedes.
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2. What is so peculiar about the appendages of *Peripatus*?
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3. List any three features each in which *Peripatus* resembles (i) Annelida and (ii) Arthropoda.
 - (i) Resemblance with Annelida
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 - (ii) Resemblance with Arthropoda
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