

Special Environments

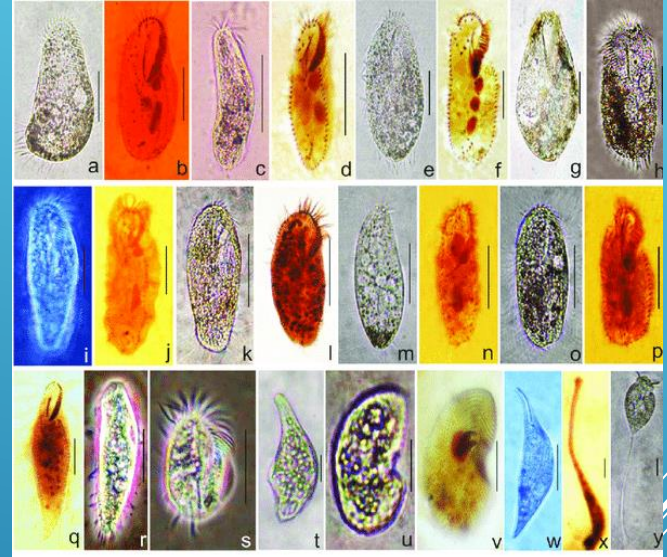
Lect. #4

4th

Chemistry-Zoology
Group

1- Protozoa

- ▶ Represented mainly by Rhizopods, ciliates, and flagellates.
- ▶ They feed on bacteria (bacteria feeders).
- ▶ Some feed on organic matter & fungi.
- ▶ Some able to ingest cellulose.



2- Platyhelminthes

- ▶ Represented by Planarians.
- ▶ Small in size.
- ▶ Found in highly organic forest soils.
- ▶ They are predators or carrion feeders.



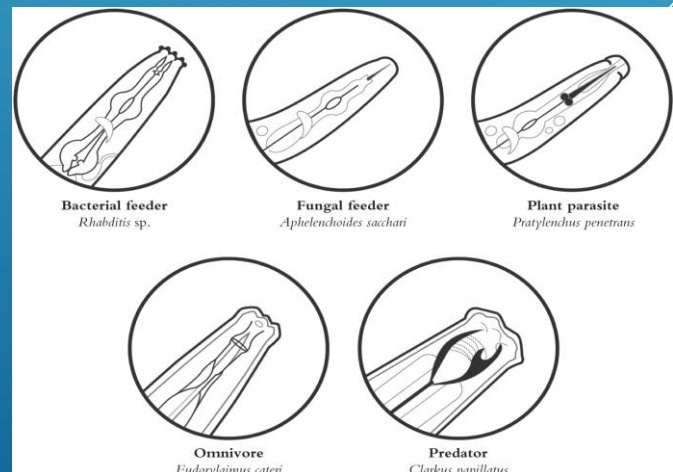
3- Nematodes

- ▶ Represented by:
 - ▶ Eggs
 - ▶ Free living nematode larvae.
 - ▶ Free living adults.
 - ▶ Parasitizing adults on plant roots.



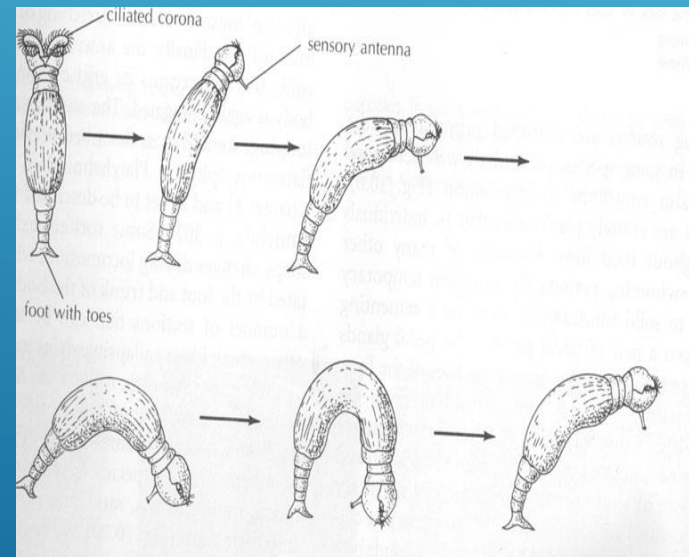
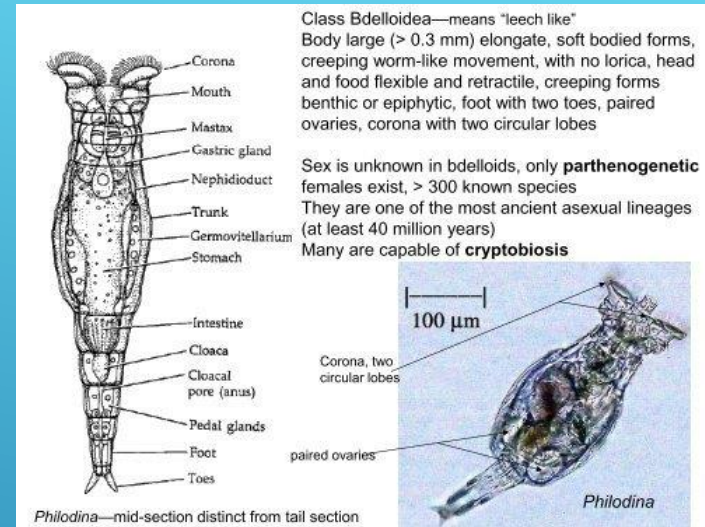
- Nematodes can be most easily classified according to their feeding habits as

1. plant feeders
2. Microbial feeders.
3. Humus feeders.
4. bacteria and fungi feeders.
5. prey on other tiny animals.



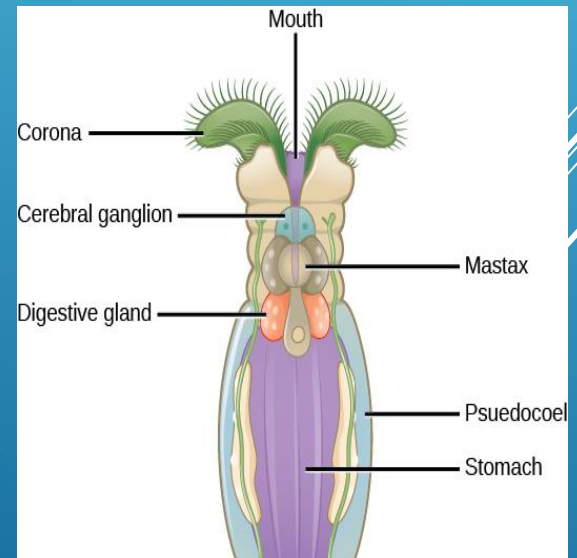
4. Rotifers

- ▶ Also known as ‘Wheel animalcules’ .
- ▶ **Microscopic** animals less than 2mm in length.
- ▶ Largely inhabit **freshwaters**, and some colonize soil and known as soil water fauna.
- ▶ Rotifers **creep** over substratum in looping action, attaching the foot with secretions from the pedal glands, extending the body, attaching the head to substrate, then releasing the foot and using muscle bands to move the body forward.



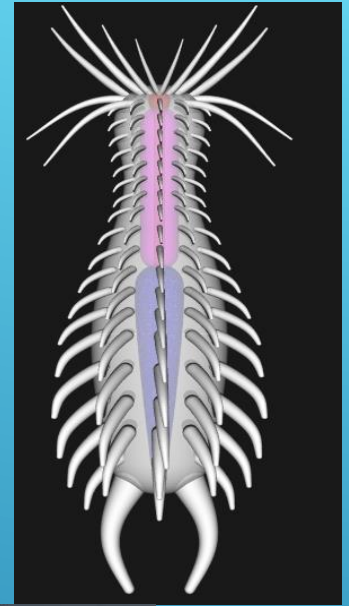
4. Rotifers

- ▶ Soil **Rotifers** are active only in moisture soils.
- ▶ When soil is dried, they protect themselves by forming a shell around their body.
- ▶ They use debris particles and facial materials from the environment and secret adhesive material to built the shell.
- ▶ They are vortex feeders, the cilia of **wheel organ (corona)** create currents attracting organic matter toward the mouth.
- ▶ They are participate in **decomposition of organic matter**.



5- Gastrotrichia

- ▶ Gastrotriches are soil water fauna.
- ▶ Small animals less than 1mm in length.
- ▶ Identified by their spiny or bristly appearance.
- ▶ They are predators on other soil fauna.



6- Annelida

- ▶ It is represented by Oligochaete in soil, and usually known as Earthworms.
 - ▶ Family Lumbricidae is the most commonest annelids.
 - ▶ Nile muddy banks showed presences of 6 families.
 - ▶ Large earthworm can penetrate down the soil to several feet more than small ones.
- Also, they help in aeration of soil.
 - Their distribution is controlled by:
 1. soil pH, where they found in neutral or slightly alkaline or most slightly acidic soils.
 2. Soil moisture.



6- Annelida

▶ Surface dwelling earthworm species migrate vertically down the soil in summer to avoid high temperature and desiccation.

▶ Important of Earthworms:

1. They influence decomposition process of organic materials forming organo-mineral complexes.
2. They redistribute the organic materials in soil and hence increase soil fertility.
3. Their burrows work to provide water, nutrients and air to plant roots.
4. They work to make the soil structure stable.



7- Mollusca

- ▶ Represented by terrestrial snails.
- ▶ They belong to Pulmonate gastropods.
- ▶ They breathe by means of a “lung”.
- ▶ They live on the surface of the soil or in crevices and in sometimes found below the surfaces.
- ▶ They feed on a variety of organic materials as aerial parts of plants, roots, fungi and animals carrions.
- ▶ They affected by very cold weather in winter and migrate down into subsurface layers to a depth of 15-22 cm.
- ▶ By this action, they transport organic matter and minerals into soil profile.



8- Arthropoda

- ▶ Arthropods are the dominant soil fauna.
- ▶ Soil arthropods are represented by almost all of its families' members as Onychophora, Crustacea, Myriapoda, Tardigrada, Insecta, Arachnida.
- ▶ They all are important for soil.



Isopods



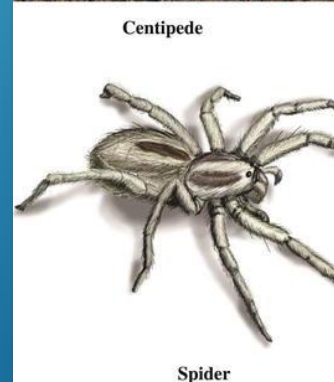
Millipede



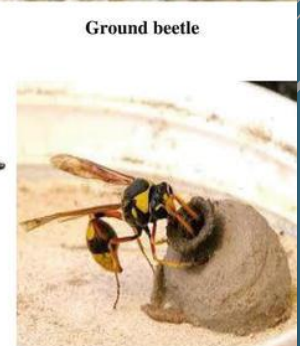
Centipede



Ground beetle



Spider



Mud wasp

8- Arthropoda

a- Onychophora

- ▶ **Primitive arthropods** as *Peripatus* sp.
- ▶ Their body is elongated and worm-like.
- ▶ Found among leaf litters and decaying logs.
- ▶ They **carnivores** – feed on soft bodied invertebrates. They secrete digestive enzymes onto prey and then suck out the liquefied tissues.



8- Arthropoda

b- Crustacea

- ▶ Members of Ostracoda, Copepoda, Amphipoda, Decapoda & Isopoda are found in the soil.
- ▶ However, only terrestrial Isopoda is succeeded in colonizing the soil.
- ▶ Isopods or Woodlice found all over the world and colonize variety of terrestrial habitats.
- ▶ They are found in humid litters (in tropical & subtropical forests) to hot dry soils (in deserts of North Africa & North America).



8- Arthropoda

b- Crustacea

- ▶ Isopoda usually found in moisture layers of soil. *Armadillidium* sp. found in top 4cm of soil during wet season and migrate down to 12-25cm depth in dry season.
- ▶ Also, during **dry season**, isopods move to the surface at night only to feed.
- ▶ Isopods are **omnivorous** feed on decay plant materials, invertebrate carrions, algae, fungi & fecal pellets.



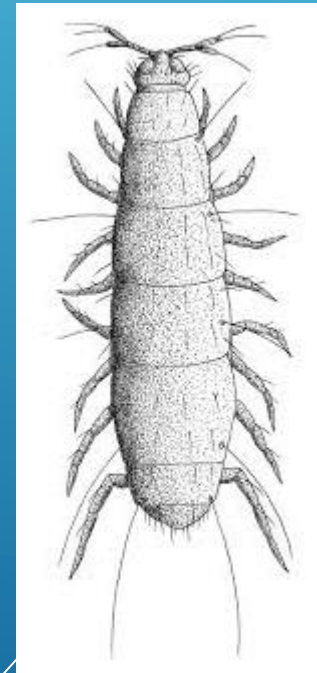
8- Arthropoda

c- Myriapoda

► This class contains 4 groups:

1- Pauropoda:

- Small with body length less than 1mm.
- They have branched antennae.
- Some species with flattened bodies, while others have elongated bodies.
- They found in mountains under stones, under fallen trees, among dump leaf litters & mosses.
- They feed on decaying plant materials, animal carrions & fungi.
- Sometimes they being temporary predators.



8- Arthropoda

c- Myriapoda

2- Symphyla

- Delicate white arthropods with >10mm length.
- Have 11-12 pair of legs in adult forms.
- Found all over the world living in cultivated areas, grass lands & forest litters.
- They prefer subsurface soil and may moved to depths of several centimeters.
- They affected by environmental conditions, so they migrate down into soil (to **moisture parts**) during summer (due to **high temperature and dryness**) and the opposite in spring & autumn.
- They feed on plants (**phytophagous**) and decaying organic matter (**saprophagous**).



8- Arthropoda

c- Myriapoda

3. Chilopoda (centipedes):

- They have long **slender** body with pale color.
- Widely distributed in moisture habitats.
- *Scolopendra* sp. with 21-23 pairs of legs and up to 15cm long.
- They are common in loose leaf litter of woodlands & forests.
- They live in **soil cervices, under stones, under trucks of decaying fallen trees.**
- Some species are **able to burrow** through the soil by their body muscle pressure to enlarge soil spaces.
- They are **carnivorous**. They have **poisonous claws** used to capture and paralyze its prey.



8- Arthropoda

c- Myriapoda

4. Diplopoda (millipedes):

- They have Cylindrical body with large number of segments (100 or more) 7 2 pairs of legs on each segment.
- They are common in calcareous soil & woodlands.
- *Lulus* sp. burrow deep in soil. They mix minerals & organic matter in soil.
- They feed on decaying plants (leaves & wood).
- Some of them feed on fresh leaf litters or living plant materials.



8- Arthropoda

d- Tardigrada

- They are **microscopic** arthropods.
- The surface of their bodies bear a series of plates giving the appearance of segmentation.
- they have **4 pairs of papillae** working as legs with claws.
- They are found in mosses, wet soils near lakes banks & lichens growing in damp soils.
- some **feed on living plants**, others feed on **organic debris, bacteria, fungi, algae & live or dead small soil animals** as **nematodes**.

