

Salbari College Salbari , Baksa, BTR

Department of Zoology

Notes for Major/Minor

B.Sc 5th Semester

Phylum Arthropoda – Classification and Characteristics (Barnes, 1982)

General Characteristics:

1. Body segmented into head, thorax, and abdomen or tagmata.
2. Hard chitinous exoskeleton, periodically shed (ecdysis).
3. Paired, jointed appendages for movement and feeding.
4. True coelom reduced; body cavity is a hemocoel.
5. Open circulatory system with dorsal heart.
6. Nervous system with dorsal brain and ventral nerve cord.
7. Respiration via gills, tracheae, or book lungs.
8. Excretion by Malpighian tubules, green glands, or coxal glands.
9. Reproduction sexual, sexes separate, often with larval stages.
10. Enormous ecological and economic importance.

Classification of Arthropoda :

Subphylum	Class	Distinctive Features	Examples
Trilobitomorpha	Trilobita	Extinct; body 3-lobed; 3 tagmata (head, thorax, pygidium)	Calymene, Phacops
Chelicerata	Merostomata	Book gills; marine; horseshoe-shaped carapace	Limulus
	Arachnida	4 pairs of walking legs; book lungs or tracheae	Aranea (spider), Scorpio (scorpion)
	Pycnogonida	Long legs; small body; proboscis present	Nymphon (sea spider)
Crustacea	Branchiopoda	Flattened leaf-like appendages for swimming	Daphnia, Artemia
	Ostracoda	Tiny, bivalved crustaceans	Cypris
	Copepoda	Planktonic with median eye	Cyclops
	Cirripedia	Sessile; calcareous plates; hermaphroditic	Balanus, Lepas
	Malacostraca	Large crustaceans with cephalothorax; gills	Palaemon, Cancer
Myriapoda	Chilopoda	1 pair legs/segment; carnivorous	Scolopendra
	Diplopoda	2 pairs legs/segment; herbivorous	Julus, Spirobolus
	Pauropoda	Minute, soil-dwelling; soft-bodied	Pauropus
	Symphyla	Small, centipede-like; no eyes	Scutigerebella
Hexapoda	Entognatha	Wingless, primitive; mouthparts retracted	Collembola, Protura
	Insecta	Winged; three body regions; compound eyes	Musca, Apis, Danaus

Subphylum 1: Trilobitomorpha

Class 1: Trilobita

Extinct marine arthropods, abundant in Paleozoic seas.

Body flattened, divided into three lobes: a central **axial lobe** and two **pleural lobes**.

Body divided into **head (cephalon)**, **thorax**, and **pygidium (tail piece)**.

Biramous appendages and compound eyes present.

Example: *Calymene*, *Phacops*.

Subphylum 2: Chelicerata

General Features:

Body divided into **cephalothorax** and **abdomen**.

No antennae.

First pair of appendages modified into **chelicerae** for grasping or piercing.

Second pair are **pedipalps**; remaining pairs are walking legs.

Class 2: Merostomata

Marine forms with a broad, horseshoe-shaped carapace and long telson (tail spine).

Respiration by **book gills**.

Compound lateral eyes and median simple eyes present.

Example: *Limulus* (King crab or Horseshoe crab).

Class 3: Arachnida

Terrestrial, air-breathing arthropods.

Body divided into **cephalothorax** and **abdomen**.

Four pairs of walking legs, no antennae.

Respiration by **book lungs** or **tracheae**.

Mostly carnivorous.

Examples: *Aranea* (spider), *Scorpio* (scorpion), *Ixodes* (tick), *Sarcoptes* (mite).

Class 4: Pycnogonida

Marine, elongated body; small abdomen.

Long, slender legs (often eight or more).

Proboscis used to suck juices from soft-bodied animals.

Example: *Nymphon* (sea spider).

Subphylum 3: Crustacea

General Features:

Mostly aquatic (marine and freshwater).

Two pairs of antennae (unique feature among arthropods).

Biramous (branched) appendages.

Body covered with a **calcareous exoskeleton**.

Respiration by **gills**.

Class 5: Branchiopoda

Small, freshwater forms with flattened leaf-like appendages for respiration and locomotion.

Carapace present in many forms.

Examples: *Artemia* (brine shrimp), *Daphnia* (water flea).

Class 6: Ostracoda

Small, enclosed within a **bivalved carapace**.

Reduced appendages; planktonic or benthic.

Example: *Cypris*, *Conchostraca*.

Class 7: Copepoda

Small, planktonic crustaceans with a single median eye.

Important in aquatic food chains.

Example: *Cyclops*, *Diaptomus*.

Class 8: Cirripedia

Sessile marine crustaceans; body enclosed by calcareous plates.

Adults are hermaphroditic and sessile; larvae are free-swimming.

Example: *Balanus*, *Lepas* (barnacles).

Class 9: Malacostraca

Largest and most advanced crustaceans.

Body divided into head, thorax, and abdomen.

Examples: *Palaemon* (prawn), *Cancer* (crab), *Lobster*, *Squilla*.

Subphylum 4: Myriapoda

General Features:

Terrestrial, elongated body with many segments.

One pair of antennae.

Uniramous appendages.

Respiration by tracheae.

Class 10: Chilopoda

Centipedes; body flattened with one pair of legs per segment.

First pair of legs modified into poison claws. Carnivorous.

Example: *Scolopendra*, *Lithobius*.

Class 11: Diplopoda

Millipedes; cylindrical body with **two pairs of legs per segment** (diplosegments).

Herbivorous or detritivorous.

Example: *Julus*, *Spirobolus*.

Class 12: Pauropoda

Minute, soft-bodied myriapods.

Fewer segments (9–11 pairs of legs).

Lives in soil and leaf litter.

Example: *Pauropus*.

Class 13: Symphyla

Small, white, centipede-like soil dwellers.

12 pairs of legs, no eyes.

Example: *Scutigera*.

Subphylum 5: Hexapoda

General Features:

Terrestrial, with body divided into **head, thorax, and abdomen**.

Three pairs of legs, one pair of antennae.

Respiration by tracheae.

Class 14: Entognatha

Primitive, wingless arthropods.

Mouthparts retracted within the head.

Found in soil or leaf litter.

Example: *Collembola* (springtail), *Protura*, *Diplura*.

Class 15: Insecta

Largest and most diverse class in the animal kingdom.

Body divided into **head, thorax, and abdomen**.

Three pairs of legs, usually two pairs of wings.

Compound eyes and antennae well developed.

Excretion through **Malpighian tubules**.

Example: *Musca domestica* (housefly), *Danaus plexippus* (butterfly), *Apis mellifera* (honeybee).