KEY POINTS

⇒ Aristotle ⟶ Animals
- → Invertebrate
- → Vertebrate

⇒ Theophrastus ⟶ Plants
- → Non flowering plant
- → Flowering plant

⇒ Carleus Linneous ⟶ Two kingdom system
- → Kingdom Animalia
- → Kingdom Plantae

⇒ Robert Whitteker (1969) ⟶ Five kingdom system
- → Kingdom Animalia
- → Kingdom Plantae
- → Kingdom Fungi
- → Kingdom Protista

Fig 9.1: History of Classification

⇒ Dr Carl Woese ⟶ 3 Domain / Super Kingdom
- Archea
- Bacteria
- Eukaryotai
  - → Plantae
  - → Animalia
  - → Fungi
  - → Protista

Fig 9.2: Kingdom and Phylum

.C.O.F.G.S
Domain =>Kingdom =>Phylum =>Class =>Order =>Family =>Genus =>Species

S G F O C P K D

SPECIES

The group of similar organisms which can freely interbreed and produce offsprings and have constant number of chromosomes.

TAXONOMY

Branch of biology in which we study about identification binomial nomenclature and classification is called taxonomy.

BINOMIAL NOMENCLATURE

Binomial nomenclature system was introduced by Carolus Linnaeus. In this each organism has two names. First name represents Genus, second name represent Specie. First word of Genus is written in capital whereas the first word of Specie is written in small. It must be written in italics or should be underlined.

e.g. Home Sapien

↓ ↓

Genus Species

CHARACTERISTICS OF ANIMALS:

(1) Word animals is derived from Latin word *anima* which means soul or breath. So soul bearing organisms are called animals.
(2) Eukaryotes in nature.
(3) Diploid (Having two sets of chromosomes)
(4) Develop from haploid (Sperm (n) + Ova (n))
(5) Store food in the form of Glycogen.
(6) Centriole is present.
(7) Cell wall is absent.
(8) Cell membrane is the outer most layer of cell.
(9) Multicellular in nature.
(10) 1.5 million species are present.

Fig 9.3: Different phylum and Classes

(11) Kingdom Protista is the possible ancestor of animals. (12) Heterotrophic in nature.

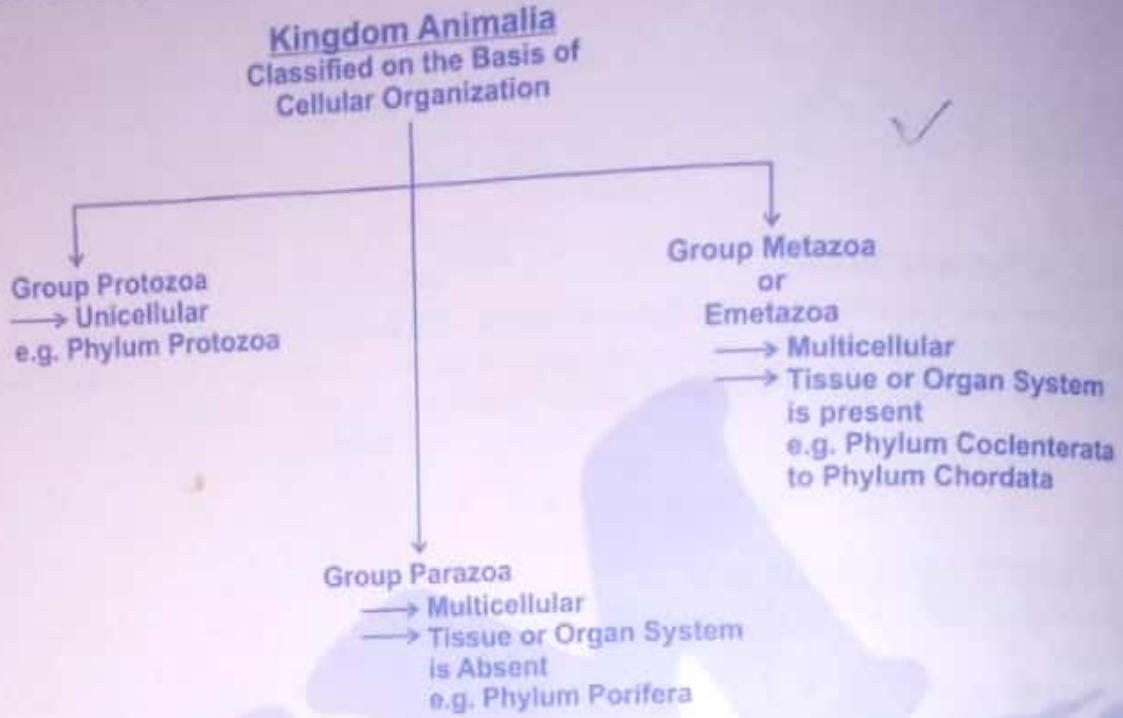

Fig 9.4: Kingdom Animalia Classification

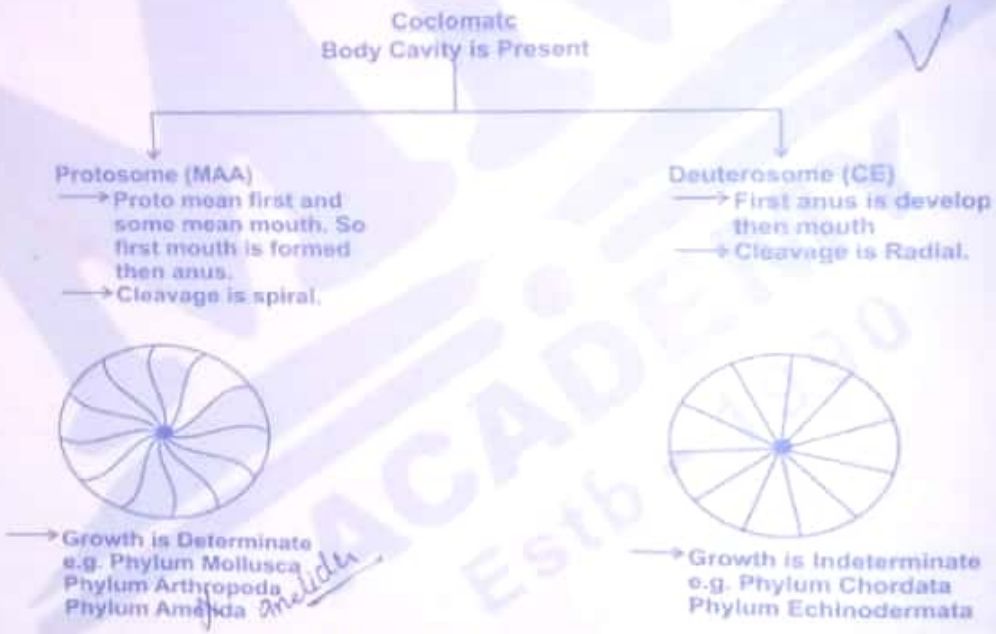

Fig 9.5: Classification of coelomate

- Total number of species:
  - a) Animals 1.5 million.
  - b) Platyhelminthes 15000 → Planaria → 10mm
    → Tape worm → 16 feet / 5 meter
  - c) Mollusca 80,000 → 35000 species are fossil
  - d) Pisces or fishes → 29000 → 48% of total Chordata
  - e) Class Onychophora of phylum Arthropoda → 70 species and 10 genera
  - f) Sub class Dipnoi or lung fishes of class Pisces → 3 species
- Latin words used

(a) Anima (soul) (c) Porifera (pori mean pore, fera mean bearing)
(c) Mollusca (soft) (d) Amphibia (both water and land)

- Largest Phylum → Phylum Arthropoda (1 million species)
- Second Largest phylum (80,000 species)
- Largest phylum in aquatic life → Phylum Mollusca
- Exclusively Aquatic → Phylum Coelenterata
- Exclusively Marine → Phylum Echinodermata
- Hermaphrodite/Monoecious/Bisexual
  (i) Phylum Platyhelminthes (ii) Phylum Annelida
- External fertilization occur in
  (i) Phylum Mollusca (ii) Phylum Echinodermata
  (iii) Class Pisces or Fishes (iv) Class Amphibia
- Larval stage is free living while adult is sessile in Phylum Porifera and Sub phylum Urochordate
- Notochord is absent in Sub phylum hemichordate
- Notochord is present in larval stage while absent in adult stage in Sub phylum Urichordate
- Larval stages:
  a) Planula larva → Phylum Coelenterata
  b) Trochophore larva → Phylum Annelida
  c) Glochidium larva → Phylum Mollusca
  d) Bipinnaria larva → Phylum Echinodermata
  e) Tornaria larva → Subphylum Hemichordata
  f) Tadpole larva → Frog
- Larval stage is Bilateral symmetric while adult is Radial symmetric in Phylum Echinodermata
- Bipinnaria and Tornaria larva are identical/similar.
- Excretory organs
  a) Phylum Platyhelminthes → Flame cell
  b) Phylum Annelida → Nephridia
  c) Phylum Mollusca → Kidney
  d) Phylum Echinodermata → Amoebocyte cells
  (E) Phylum Arthropoda
  - → Class insecta → Malpighiantubule
  - → Class Crustacean → Coxal gland / green gland
  - → Class Arachnida → Coxal gland / green gland

- Locomotory Organs:

(A) Phylum Protozoa
- → Amoeba → Pseudopodia
- → Paramecium → Cilia
- → Trypanosoma → Flagella

(B) Phylum Coelenterata
- → Jelly Fish
  - → Jet Propulsion, Fastest
- → Physalia → 12.1 cm/sec

(C) Phylum Annelida
- → Earth worm → Setae or Chatae
- → Leech → Two hooks
- → Neries → Parapodia

(D) Phylum Mollusca → Sticky Muscular foot
(E) Phylum Echinodermata → Star fish → Tube feet

- Respiratory organs:

(A) Phylum Annelida
- → Earthworm → Moist skin (Cutaneous Respiration) → Dry → Died → Asphyxia
- → Neries → Gills

(B) Phylum Mollusca → Gills

(C) Phylum Echinodermata
- → Star fish → Tube feet + Papule
- → Brittle star → Genital bursai
- → Sea Urchin → Peristomical gills + Cloacal respiratory tract

(D) Phylum Arthropoda
- → Class insecta → Spiracle
- → Class Crustaceam → Gills
- → Class Anachnida → Book lungs

- The phenomenon of autotomy is present in Brittle star.
- Close circulatory system is present in Earthworm.
- Open circulatory system is present in Phylum Arthropoda.
- Different species and their scientific names:

a) Phylum Protozoa
Amoeba + Trypanosoma + Trichonympha + Paramecium + Balantidium coli + Plasmodium

b) Phylum Porifera
Sycon + Spongilla + Leucosolenia + Euplectella or Venus flower basket

c) Phylum Coelenterata
Hydra + Obelia + Jellyfish + Sea anemone + Corals + Porpita + Velella

d) Phylum Platyhelminthes
Planaria + Tapeworm + Liver fluke
- Planaria → Dugessia
- Tapeworm → Tanea solium, Tanea siginatum (Human Tapeworm)
- Liver fluke → Fascoila hepatica

e) Phylum Aschelminthes
Ascaris → Ascaris Lumbricoides + Pinworm → Enterobius vermicularis

f) Phylum Mollusca
Garden snail → Helix aspersa
Slug → Limax maximus
Fresh water mussel → Anodonta grandis
Marine Mussel → Mytilus edulis
Oyster → Ostrea lurida
Squid → Loligo pealii
Cuttlefish → Sepia officinalis
Octopus → Octopus bairdii

g) Phylum Annelida
Neries + Earthworm + Leech
- Earthworm → Pheritema posthuma
- Leech → Hirudinaria medicinalis

(H) Phylum Arthropoda
- Class insecta
  - Collembolan
  - Cockroaches
  - Wasps
  - Butterfly
  - Grasshopper
  - Moths
  - Beetles
- Class Arachnida
  - Scorpion
  - Spider
- Class Crustacean
  - Lobsters
  - Prawn
  - Cyclops

(I) Phylum Echinodermata
- Brittle star → Ophiothrix fragilis
- Sea Urchin → Arbacia punctulata
- Sea Cucumber → Thyone briareus
- Star fish → Asterias rubens

(J) Subphylum Hemichordate
- Saccoglossus
- Balanoglossus

(K) Subphylum Urochordate
- Molgula
- Ciona intestinalis

(l) Subphylum Cephalochordata → Branchiostoma (Amphioxus)

- The word Platyhelminthes was proposed by Gaugenbaur in 1859
- Phylum Aschelminthes was classified into five classes by Hegner and Engemann
- Water canal system or Aquiferous system is present in Phylum Porifera
- Fresh water animal of phylum porifera is Spongilla
- Body cavities:
  - i) Phylum Porifera → Spongocoel
  - ii) Phylum Coelenterate → Enteron or Gastrovascular cavity
  - iii) Phylum Arthropoda → Haemocoel

- Major characteristics or properties of phylum coelenterate:
  - (A) Polymorphism
  - (B) Metagenesis or Alternation of generation
  - (C) Coral reef
    - Fringing reef or shore reef
    - Platform reef or table reef
      - Without lagoon
    - Barrier reef or great barrier reef (1250 miles or 2012 km)
- Various classes of phylum Aschelminthes are:
  - (i) Class Gastrotricha
  - (ii) Class Rotifera
  - (iii) Class Kinorhyncha

(iv) Class Nemotode (v) Class Nemotomorpha

- Insomnia (sleeplessness) is caused by Enterobius vermicularis.
- Pseudoheart is present in Phylum Annelida.
- Absent larval stage:
  Larval stage is absent in reptiles.
- Among plattyhelminthes, larval stage is absent in class tubullaria (planeria) and cestoda (tape worm).
- Larva is found in Trematoda (liver fluke).

Locomotory organ:

- Locomotry in free living platyhelminthes is performed by muscular layers.
- Male ascaris is short i.e. 6 - 12 inches.
- Female ascaris is long i.e. 8 - 16 inches.
- At one time female ascaris contain 27 million eggs and lays about 2,00,000 eggs per day.
- Respiratory organs in octopus and cuttle fish (certain molluscs not all) is haemocyanin.
- Haemocyanin is blue when oxygenated due to copper as its central metal.
- Haemocyanin can transport three times more oxygen than haemoglobin.
- Complete metamorphosis (Holometabola) e.g. Flies, butterflies, moths, beetles etc.
- Incomplete metamorphosis (Hemimetabola) e.g. Cockroach and wasps.
- Absent metamorphosis (Ametabola) e.g. Collembola and primitive wingless insects.
- Madreporite is found in Echinodermeta.

Fishes (Pisces):

Cyclostomata or Agnatha	Chondrichthyes or Cartilaginous fishes	Osteichthyes or Bony fishes
• Jawless • Mouth is circulars • 7 pair of gills • Skin is naked e.g without scales • No stomach • Petromyzon marinus • Myxine glutinosa (hagfish)	• Marine • Mouth is ventral • Body with placid scales • 5 - 7 pairs of gills • Gills are not covered with upper column • Viviparous e.g. shark, rays, skates and chimaeras	• Scales body • Median fins (DAC) dorsal fin, anal fin, caudal fin • Pectoral fin: pelvic and pectoral fin • Gills are covered with bony cover called operculum • 10 pairs of cranial nerves • Vivi, ovi and ovo-vivi parous.

Tab. 9.1: Different Classes of Fishes

- Aestivation is the summer sleep which occurs in fishes.
- During summer lung fishes are aestivated in the holes and dig deep in the mud and respire through well vascularized swim bladder which acts as lungs.
- Swim bladder occur only in bony fishes.