



EDO UNIVERSITY IYAMHO
Department of Biological Sciences
AEB 111 ANIMAL AND ENVIRONMENTAL BIOLOGY

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An introduction to Fauna biodiversity

A description and classification of the animal kingdom in taxa.

Biodiversity – this is the study of variety of organisms in an ecosystem

All organisms in a population living in a certain area plus their physical environment. This includes all form of animals (animal and animal-like). Two groups are obtainable :

- ▶ Invertebrates (Animals with back bone)
- ▶ Vertebrates (animals without back bone)

Taxonomy is the aspect of biology that deals with classification

This includes naming of organisms (nomenclature). The systematic assignment of organisms into groups called taxa. Taxa is often referred to as systematics

Two types of classification

Artificial classification (based on one or more easily observable xtics such as colour, mode of locomotion, habitat etc)

Natural classification (phylogenetic and reflects possible evolutionary relationships based on ancestry and descent)

In phylogenetic classification organisms belong to the same taxa are believed to have a common ancestor this may be represented by a (cladogram) family tree

Phenetic classification (data on morphological (structural), cytological (cellular) and biochemical similarities or differences.

Binomial nomenclature - introduced by Carl Von Linnaeus (1707 – 1778)

Latinized name of two words to each organism printed in italics or underlined if hand written or typed. The first word names of the genus which is capitalized (begins with an upper case alphabet) and the second is the species epithet (specific name) which is written in lower case for example *Pomadasys jubelini*

INVERTEBRATE CLASSIFICATION

1. PROTOZOA

They are most part of their lives unicellular, they are made up of one cell.

They are described as being acellular. (cells do not divide).

Their vital functions are carried out by organelles

2. MESOZOA

These organisms are believed to be intermediate between the parazoa and the metazoans.

Their bodies are cellular

They do not have more than two cell layers; the outer layer is ciliated and the inner layer is reproductive

They have no organs

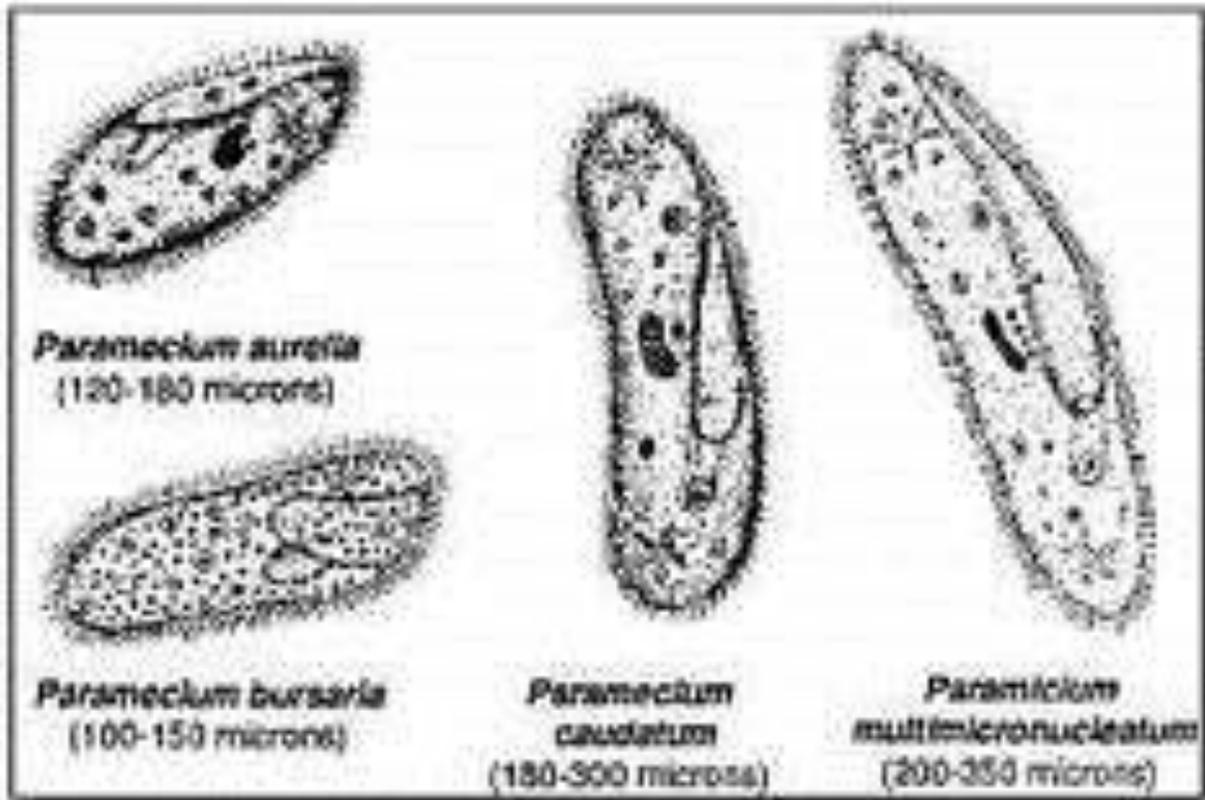
They are bilaterally symmetrical

they have no body cavity

Gametes and agametes are produced from special cells which form the central part of the body.

Their life cycle form involves the alternation of asexual and sexual generations

They are mainly marine



PARAZOA

These are multicellular invertebrates which possess collared flagellate cells that make them unique among the other multicellular invertebrates

The many cells in their bodies are not organised into tissues and organs

They are at the cellular level of organisation

METAZOA

These are invertebrates with marked cellular organisation and differentiation

The metazoans show two levels of organisation

a. **diploblastic**;- these are animals with two cell layers showing tissue level of organisation where the body is composed of an inner endoderm and an outer ectoderm.

b. **Triploblastic**;- these include animals with three cell layers showing organ level of organisation where the body is composed of an inner endoderm, an outer ectoderm and a middle mesoderm

PHYLUM CNIDARIA (Coelenterata)

They are diploblastic animals

They have tissue grade organisms

They possess a single cavity in the body known as enteron which is for egestion and ingestion

They have no anus

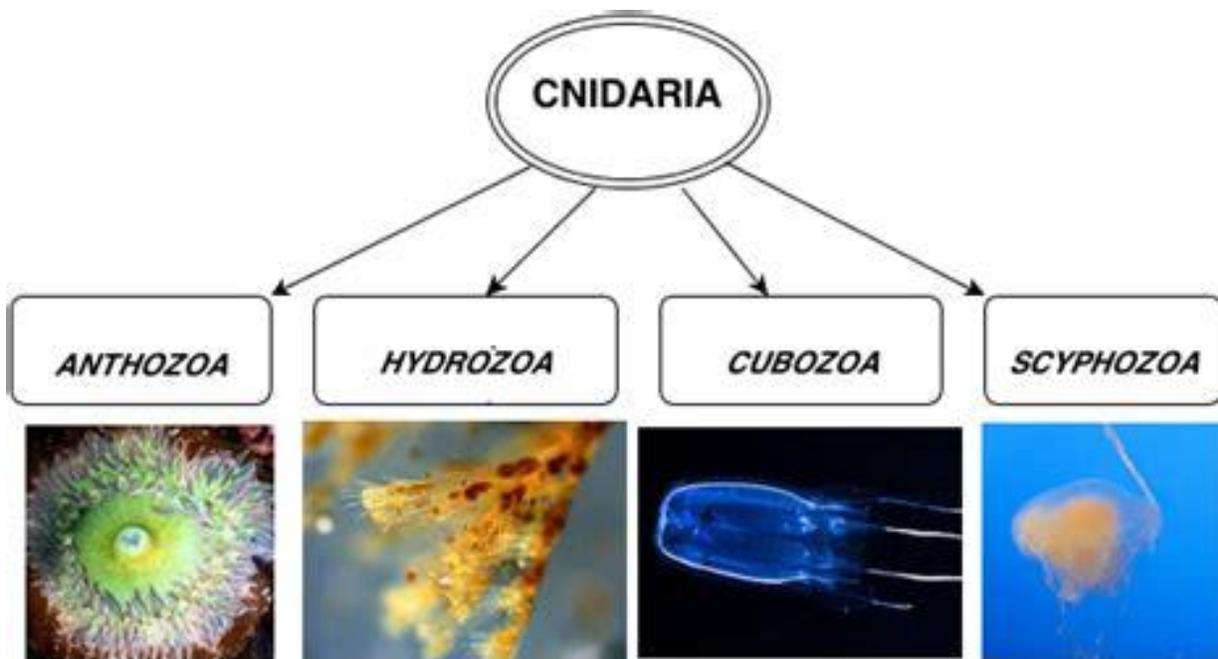
The mouth is surrounded by tentacles

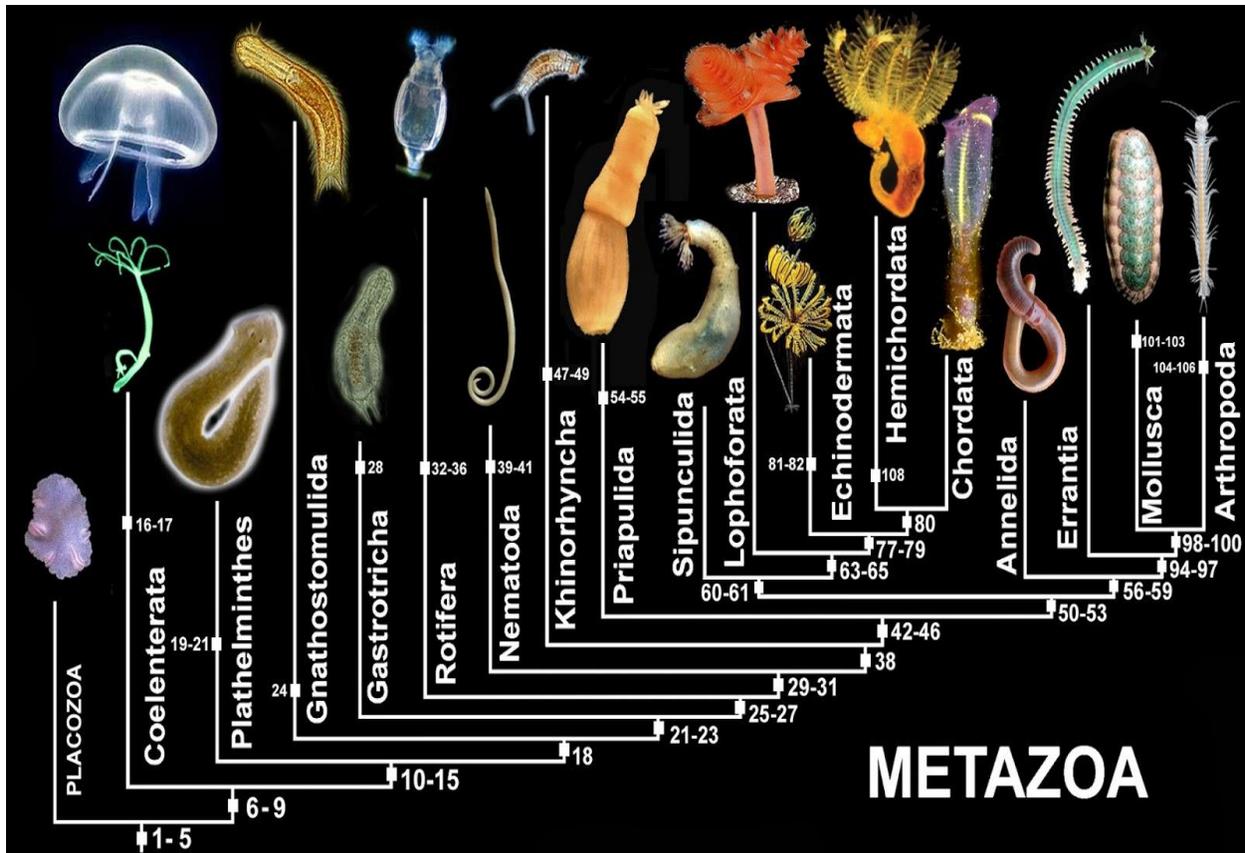
They produce nematocyst which serve for defense and food capture

They are either free living or sedentary

They exhibit polymorphism, occurring either as hydroid

This phylum is divided into four classes





PHYLUM PLATYHELMINTHES

These are flat worms because they are dorsoventrally flattened

ARTHROPODA

This is the largest phylum in the animal kingdom- contains about 80% of the animal kingdom

Characteristics:

They are diploblastic, bilaterally symmetrical, metamerically segmented coelomate animals

They possess more than one pre-oral segment (they have three)

They have a stout chitinous cuticle

The cuticle is flexible at some point on the trunk and limbs to provide joints

Growth occurs after shedding of cuticle

Muscles are in discrete bundles

Coelom is reduced to the cavity of the gonads

They possess compound eyes

They have an open vascular system,

Appendages are structures joined to the main body and limbs e.g mouth parts, antennae, wings, styles and cerci

Classification of arthropods

Trilobita

Onychophora

Crustacea

Diplopoda

Chilopoda

Symphyla

Pauropoda

Arachnida

Pycnogona

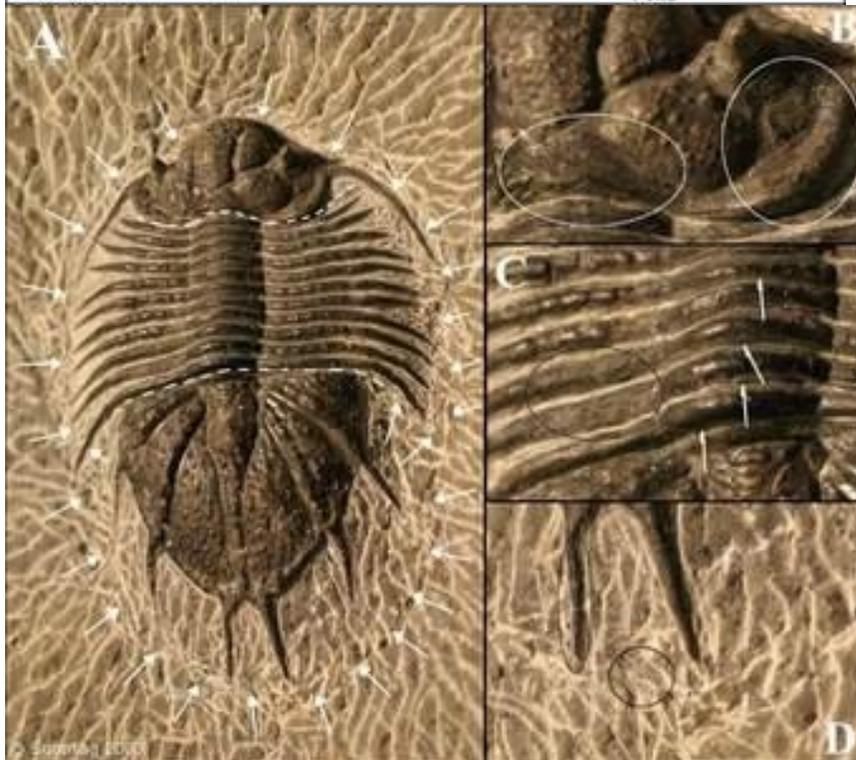
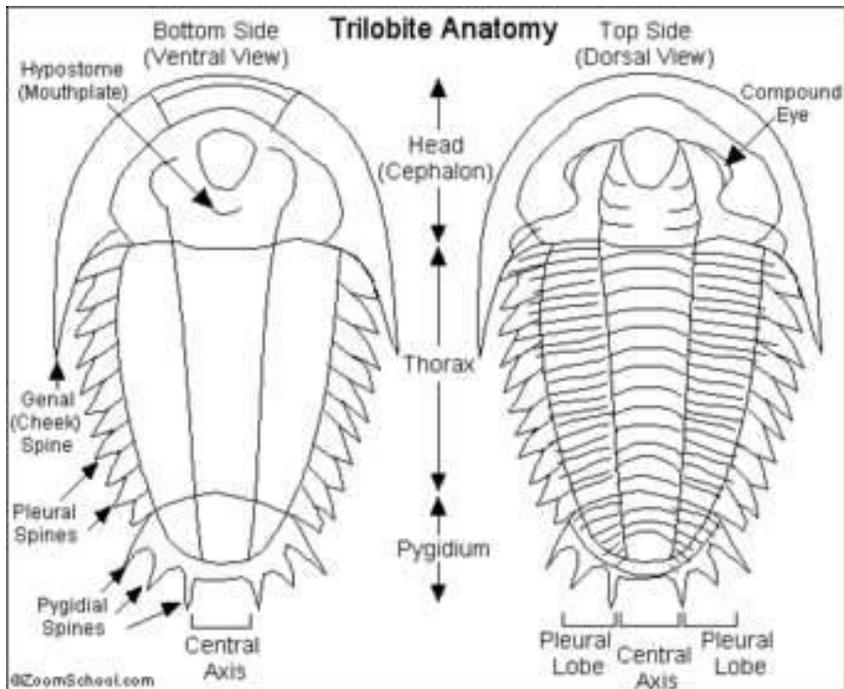
Insecta (Hexapoda)

Class Trilobita

This is the extinct group of arthropods, only fossil records are available. The body was molded longitudinally into 3 lobes

They had a pair of antennae and all appendages on the post antennal sommites were of common type.

e.g *Olenus sp*



Class Onychophora

They are terrestrial caterpillar animals

They possess a combination of arthropod and annelid characters

They occur in damp forest beneath logs of wood, leaves and beneath the bark of rotten logs

They are largely nocturnal and avoid light

e.g. *Peripatus*



Class Crustacea

Primarily aquatic arthropods they occur in sea and fresh water

Body consist of head, thorax which is fused to form a cephalothorax

There are three segments on the head and it bears three pairs of post oral appendages that act as jaws

A compound eye is present

They posses biramous appendages on every segment of the thorax and abdomen

The biramous appendage is Y shaped consisting of a basal protopodite and two arm, the exopodite and the endodite

Gaseous exchange is by gills

Excretion is by means of green glands

e.G Astacus (cryfish), Daphnia (water flea), Artemia (fairy shrimp)



SUBPHYLUM MYRIAPODA

These are terrestrial arthropods with one pair of antennae and many pairs of walking legs

Myriapoda means many footed

Their bodies consist of a head and a long trunk

They lack a waxy epicuticle in their exoskeleton and are therefore prone to desiccation; for this reason, they live in humid environments

True compound eyes are absent, simple eyes are often present

Respiration is by means of trachea

Excretion is by means of malpighian tubules

Sexes are separate

Young resemble adults but possess fewer segments

CLASS DIPLOPODA

Commonly known as millipedes

Each segment bears two pairs of legs (double feet)

The first four segments represent the thorax, which bears one pair of legs each

The genital pore is in the third thoracic segment

They are sluggish and sensitive, they coil up when disturbed

They generally keep away from light

They are cosmopolitan in the tropics, hiding under leaves, stones and logs

They are herbivorous

e.g. *Julus*, *Polydesmus*, *Ophiulus*





Class Chilopoda

They are commonly known as centipedes

The body is dorsoventrally flattened

The first trunk segment bears poison claws or maxillipeds which cover the other mouth parts

The cuticle is not elastic and segmented

The genital pore is located at the posterior end of the body

They are fast moving but do not coil but also live under the leaves of bark of trees beneath stones and around the house

They are carnivorous

E.g. *Lithobius*, *Scutigera*



Class Symphyla

They are small, less than 8mm long

They are morphologically similar to the centipedes

The leg bearing segment are not more than 12

They have a pair of leg on each segment

They have a single pair of tracheas that open through spiracles on the head

They are blind and they are herbivorous

E.g *Scolopendrella*



Class Pauropoda

They are very small, less than 2mm long

They feed on fungal hyphae

They look like millipedes

The head bears two maxillae

The first two and last two trunk segments have no legs

They have no heart

They have branched antennae

They are blind and colourless

e.g. *Pauropus*



Class Arachnida

They are terrestrial arthropods

Body is divided into two, anterior prosoma that is not divided into head and thorax but is made of six segments, the posterior opisthosoma consist of thirteen segments

The first body segment bears a pair of prehensile appendages called chelicerae

The second body segment bears a pair of sensory or prehensile pedipalps

They lack antennae and compound eyes but possess simple eyes

There is a pair of walking legs on each segment 4-7 (==4 pairs of legs)

Respiration is by internal air spaces which may be lung books or tracheae

e.g. scorpions, spiders, ticks, mites





Class Insecta

They are mainly terrestrial arthropods only a few are aquatic

Body is divided into prothorax, mesothorax and metathorax, each has a pair of walking legs ventrally.

Mesothorax bears a pair of membranous wings dorsally, which are used for flight

The abdomen consist of eleven segments with no walking legs

Respiration is by means of trachea

Excretion is by means of Malpighian tubules

Insects undergo metamorphosis.





ECONOMIC IMPORTANCE OF INSECTS

Some serve as food for humans and other insects

They pollinate flowers

They produce raw materials for industries

They are decomposers; feeding on dead decaying organic matter

They are used in the biological control of insects

Some are vectors of parasites

Some attack stored food items and produce

They destroy wooden structures in furniture

PHYLUM ECHINODERMATA

The phylum Echinodermata is said to be a link between the invertebrates and chordates in that they share certain similar characteristics

The echinoderms and chordates are known as **deuterostomes** because they both have the blastopore of the embryo that develops into the anus and the mouth forms at the opposite end.

In the **protostomes**, the blastopore of the embryo gives rise to the mouth of the adult.

Echinoderms are typically **pentamerous** i.e having five arms as seen in the starfish and sand dollar



Characteristics

The Echinoderms have an Internal skeleton of Calcium carbonate. Calcium carbonate for the formation of this skeleton is obtained from the sea

They have a spiny skin

They have larvae which are planktonic, bilaterally symmetrical and ciliated

They are pentaradially symmetrical coelomate animals

There are two main types of body forms among adults :- radiate and globular

They are not cephalised but have oral to aboral axis

Their body wall is made up of ciliated epidermis underneath which is a dermis that contains calcareous ossicles, which give rise to spines

The musculature of their body wall is poorly developed

Their coelom is large and is in three distinct compartments

A unique water vasculature system is formed from one of the compartments of the coelom. This is the most unique feature of the echinoderms

The tube feet (podia) are offshoots of the radial canals of the water vascular system and the suckers at their end facilitate attachment to a substrate and are also used for locomotion

No special organ of excretion

e.g Sea lillies and feather stars

The pharynx possesses lateral openings or pouches (pharyngeal or visceral clefts), which may appear only during development.

The epidermis of the body wall is stratified. A dermis of mesodermal origin lies between the epidermis and the elaborate, primitive musculature

Sexes are separate (dioecious)

