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Taxonomy of Shellfish

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Introduction

The systematic zoology is the science that discovers names, determines relationships, classifies and studies the evolution of living organisms.

It is an important branch in biology and is considered to be one of the major subdivisions of biology

Having a broader base than genetics, biochemistry and physiology.

Systematics includes taxonomy



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The term taxonomy is derived from the Greek word 'taxis' - arrangement and 'nomos' - law.

The name taxonomy was first proposed by Candolle (1813).

Taxonomy is defined as the theory and practice of classifying organisms.

In Fisheries science, the taxonomy of aquatic animals could be studied as two major components i.e. **shellfish** taxonomy and **finfish** taxonomy.



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The shellfish includes two highly diversified phyla
i.e. phylum **Arthropoda** and phylum **Mollusca**.

These two groups are named as **shellfishes**
because of the prominent carapace made of
chitin as exoskeleton in arthropods and **shells**
made of calcium in molluscs.

These two major phyla are **invertebrates**.

They show enormous diversity in their
morphology, in the habitats they occupy and in
their biology.

They include about 6.20 million species with wide
habitat preference.

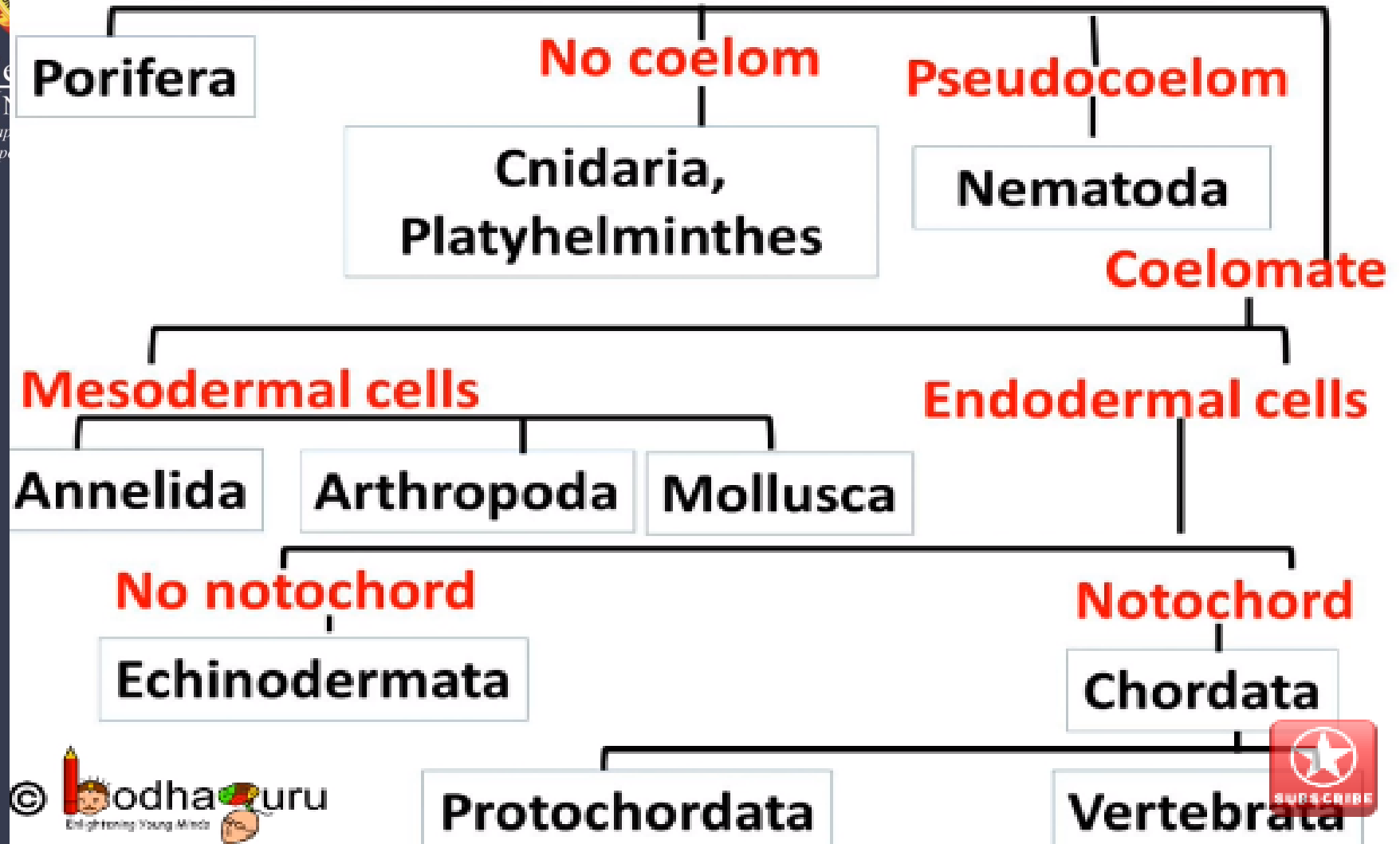


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The members of these two phyla have much economically important groups particularly lobsters, shrimps, crabs, oysters, chanks, squids and cuttlefishes.



Kingdom Animalia





Vertebrata

Pisces

Amphibia

Reptilia

Aves

Mammalia





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General characters of the Phylum Arthropoda

Arthropoda (Arthon- Jointed; podos- legs)

The Phylum Arthropoda includes spiders, scorpions, ticks, mites, crustaceans, millipedes, centipedes and insects.

This is the most successful phylum of animals both in diversity, distribution and in number of species and individuals.

They show remarkable adaptive features and are successfully adapted to life in water, land and in air.

About **80% of all known animal species** are represented in this phylum.

They can survive great extremes of temperature, toxicity, acidity and salinity.



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General characters

1. Cosmopolitan in distribution found in aquatic, terrestrial and aerial forms.
Some are ectoparasitic and vectors of disease.
2. Body have **jointed appendages** or **legs** (*which are modified to different structures to perform different functions like jaws, gills, walking legs, paddle*). There may be 3 pairs, 4 pairs, 5 pairs, many pairs.
3. Body is **triploblastic**.
4. **Bilaterally** symmetrical.
5. **Organ system** level of organization.
6. Body is divisible into head, thorax and abdomen.
NOTE: In some (crustacean and arachnida) body is divisible into cephalothorax (head and thorax is fused) and abdomen.



7. This is the first group to develop a true head, which contains sense organs and feeding organs specialized for their particular habitats.

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8. Body is covered with chitinous exoskeleton.

9. They are **haemocoelomate**. Coelom i.e. body cavity is filled with blood or fluid.

10. Head bears a pair of compound eyes and antenna.

11. Locomotion takes place by **jointed appendages**.

12. Digestive system **complete** with mouth, esophagus, stomach, intestine and rectum with associated glands for digestion.

13. Respiration takes place by general body surface or **gills** (aquatic forms) and trachea or book gills (in terrestrial forms).

14. Circulatory system is of **open type** i.e. do not have blood vessels and enters directly into the body chambers. The blood is colorless.



15. Paired excretory glands (**green glands**) seen in aquatic crustaceans (shrimps and lobsters) while terrestrial forms have **malphigian tubules** as excretory organs.

NOTE: Aquatic forms are ammonotelic, terrestrial forms are uniootelic.

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15. Nervous system is of **annelidian type**, which consists of brain and ventral nerve cord.

16. **Unisexual** i.e. sexes are separate.

17. Fertilization is **internal or external**.

18. They are either **oviparous** or **ovoviviparous**.

19. Development may be **direct or indirect**. During development, larval stages seen in most of the arthropods. The free swimming larva undergoes metamorphosis to become an adult.

20. **Moulting** or ecdysis, a common feature seen in arthropods. Moulting takes place from very young larval stages onwards. After the moult, the inner body increases in size and is able to adjust its expansion due to the softness of the cuticle.



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Examples

Zoological name Common name

Limulus -Horse shoe crab or King crab

Daphnia -Water flea

Cancer -Crab

Palaemon -Prawn

Astacus -Cray fish

Scolopendra -Centipede

Julus -Millipede

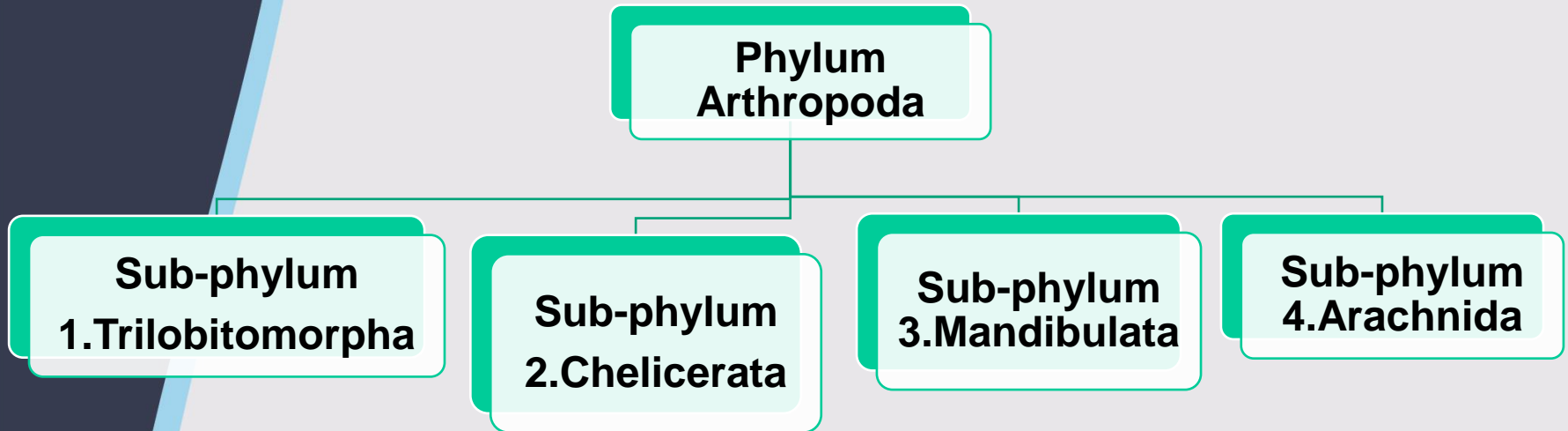
Aranea -Spider

Periplaneta americana -Cockroach



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The Phylum Arthropoda is classified into four sub-phyla as below:



Among the above four sub-phyla, only the sub-phylum **Mandibulata** consists of the organisms of our interests.



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Subphylum : Mandibulata

Class 1 -
Crustacea

Class 2 -
Diplopoda

Class 3 -
Chilopoda

Class 4 -
Symphyla

Class 5 -
Pauropoda

Class 6 -
Insecta