

# WELCOME

Topic Phylum – Mollusca  
FYBSC (CBCS)

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## UNIT-4

# PHYLUM – MOLLUSCA

4.1 Introduction to Phylum Mollusca

4.2 Salient features of Phylum Mollusca

4.3 Classification

Class – Gastropoda e.g. *Pila globose* (Apple snail)

Class – Pelecypoda e.g. *Lamellidens marginalis* (Bivalve)

Class – Polyplacophora e.g. *Chiton*

Class – Cephalopoda e.g. *Octopus vulgaris*, *Sepia officinalis*

4.4 Economic Importance of Mollusca

Mollusca means soft bodied animals.

## Salient features of Phylum Mollusca

The organisms belonging to phylum Mollusca exhibit the following characteristics:

1. They are mostly found in marine and freshwater. Very few are terrestrial and found in moist soil.
2. They exhibit organ system level of organization.
3. Their body has a cavity.
4. The body is divided into head, visceral mass, muscular foot and mantle.
5. The head comprises of tentacles and compound eyes.
6. The body is covered by a calcareous shell.
7. The muscular foot helps in locomotion.
8. They have a well-developed digestive system, the radula is the rasping organ for feeding.
9. They respire through the general body surface, gills or pulmonary sac.
10. The blood circulates through the open circulatory system.
11. They have a pair of metanephridia that helps in excretion.
12. The nervous system consists of number of paired ganglia and nerves.
13. The tentacles, eyes, osphradium, and statocysts act as the sensory organs.
14. The sexes are separate in most of the molluscs but some species are hermaphrodites.
15. Fertilization may be external or internal.
16. They are generally oviparous with indirect development.

## Class – Monoplacophora

1. Marine and they are called living fossils.
2. Body has bilateral symmetry and is covered by a spoon or cup shaped shell.
3. Head bears tentacles. The disc like foot has a flat creeping sole.
4. The visceral mass is divided into five segments each with a pair of shell muscles, gills, auricles, nephridia and gonads.
5. Buccal cavity contains radula. Stomach contains a crystalline style.
6. Nervous system lacks ganglia. Sexes are separate.

Example Neopilina

## Class – Amphineura

1. They are marine, bottom dwelling primitive molluscs.
2. Body is bilaterally symmetrical, vermiform, elongated and flattened.
3. Head is not distinct, without tentacles and eyes.
4. Foot is large, ventral, flattened and useful for creeping.
5. Dorsal side of the body shows spicules or calcareous plates.
6. Respiration by gills. Nervous system is primitive.
7. Excretion by pair of kidneys. Sexes are separate or united.
8. Fertilization is external and development includes a pelagic trochophore larva.

Example: Chiton, Neomenia, Chaetoderma

## Class – Scaphopoda

1. Body elongated, worm like and bilaterally symmetrical.
2. Shell is tubular, curved and open at both the ends.
3. Foot is conical and useful for digging.
4. Head rudimentary and without eyes and true tentacles.
5. Long, thread like, prehensile, knobbed processes called captacula useful for capturing the food.
6. Ctenidia or gills are absent. Respiration by mantle.
7. Sexes are separate and life history includes a veliger larva.
8. Example: Dentalium (Tusk shell), Siphonodentalium

## Class – Gastropoda

1. Gastropoda includes marine, freshwater as well as terrestrial forms.
2. Body is asymmetrical due to torsion. Head is distinct and bears tentacles and eyes.
3. Foot is ventral, large and flat useful for locomotion and attachment. It bears operculum for closing the shell aperture. Shell is univalved and spiral, secreted by mantle.
4. Buccal cavity contains odontophore with radula having transverse rows of chitinous teeth.
5. Respiration by body surface or gills or lungs.
6. Circulatory system is open and lacunar, heart has one or two auricles and one ventricle.
7. The excretory system consists of a single kidney.
8. Sexes are separate or united. Development may be direct or includes trochophore and veliger larval stages.
9. Example: Pila, Haliotis, Patella, Cypraea, Helix, Lymnea

## **Class – Pelecypoda**

1. Majority of animals are marine, some are freshwater and generally lead sedentary or burrowing life.
2. Body is bilaterally symmetrical and laterally compressed.
3. Head is reduced without eyes and tentacles but bears a pair of labial palps.
4. Foot is ventral, large, muscular wedge shaped adapted for burrowing in sand and mud.
5. Shell consists of two valves movably hinged dorsally and closed by one or two adductor muscles.
6. Mantle comprises two lobes which are united dorsally but hanging free ventrally.
7. Inhalent and exhalent siphons are present for the entry and exit of water into and from the mantle cavity.
8. Respiration by ctenidia.
9. Alimentary canal is coiled tube without radula.
10. Circulatory system consists of sinuses and vessels, heart has two auricles and one ventricle enclosed in pericardium.
11. Excretion by paired kidneys.
12. Sexes are separate.
13. Development includes trochophore, veliger and glochidium larvae.

Example: Unio, Mytilus, Pecten, Pinctada, Solen

## **Class – Cephalopoda**

1. They are marine, fast swimming, highly organised, predaceous animals.
2. Body is bilaterally symmetrical having head and trunk.
3. Head is prominent and bears pair of eyes and mouth.
4. Foot is partly modified into numerous sucker bearing arms or tentacles surrounding the mouth. The tentacles may be 8 or 10.
5. The trunk is uncoiled.
6. Shell may be external and well developed or internal and reduced or absent altogether.
7. Mouth is provided with horny jaws and radula.
8. Respiration by two pairs of ctenidia.
9. Excretion by two pairs of kidneys.
10. Sexes are separate.
11. In male one arm is nectocotylized. Serves as a copulatory organ.
12. Development is direct.

Example: Sepia, Loligo, Octopus, Nautilus

## **Economic Importance of Mollusca:**

- The great variety of shells, their colouration, symmetry, shapes and sizes have attracted millions of collectors, young and old.
- These shells are used in ornaments, as well as in making fancy gift articles.
- These attractive shells are also used for many other purposes.
- The inner side of the clam shells are with iridescence and hence from such shells buttons are made.
- These shells are also used in making knife handles and many other ornamental objects.
- Some molluscs like pearl oysters produce natural pearls which are highly precious having values ranging up to several hundred rupees each.
- Some rare and colour pearls are very costly.
- Man has now employed these molluscs for generating cultured pearls and by selling pearls making profit.
- The molluscs shells are useful for detecting geological ages of various stratifications or layers of earth.
- Some molluscs are harmful to man as pest and do untold damage every year. They feed on cultivated plants.
- Some species are injurious to crops as well as human beings.
- The molluscs like teredos can cause serious damage to wooden ships and wharves.
- Some freshwater species of snails serve as an intermediate hosts for parasitic trematode worms of man and his domestic animals.

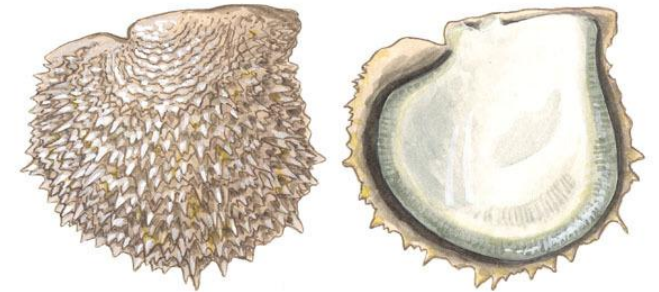


## Pearl Industry:

Pearl oysters are economically very important bivalves because they have ability to produce high quality pearls as gems. Pearl oysters belongs genus *Pinctada* under family pteriidae. Some important species are found in Indian water.

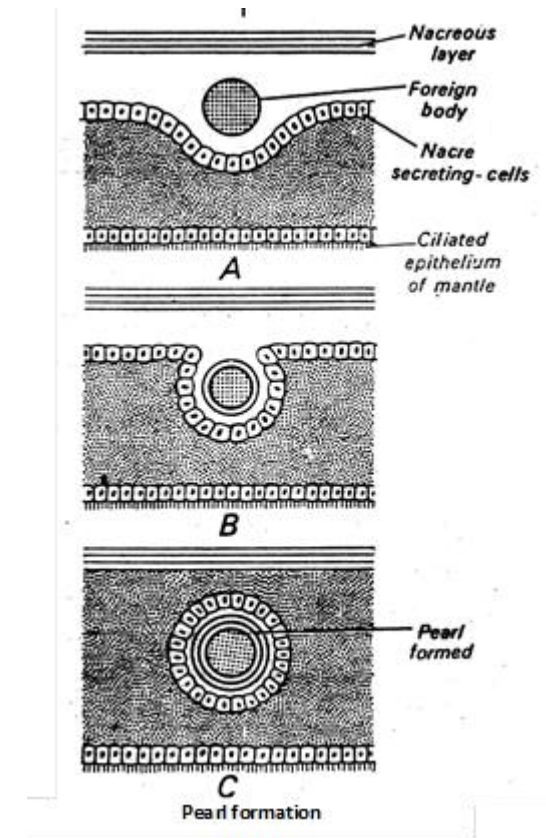
1. *Pinctada vulgaris*
2. *Pinctada fucata*
3. *Pinctada chemitzii*
4. *Pinctada sugillata*

- The pearl oyster forms pearl banks along the Indian coasts extend from Cape Comorin to Rameshwarm Island with the most productive ones near Tuticorin.
- They are at 10-12 fathoms of water depth and at a distance about 20 km from shore.
- Pearl oysters are attached to the substratum by shell with a strong byssus. They are filter feeder.
- It can grow upto 65 mm in about 5.5 years and breeds twice a year in April-May and September-October.
- Sexes are separate and fertilization is external and larval period is of 3 weeks.



## Pearl Formation:

- When any foreign particle, parasite, sand grain enters the body and adheres mantle cavity, the mantle epithelium starts to secrete and concentric layers of nacre around as a defensive mechanism and the particle is completely enclosed gradually.
- Such several layers are formed and pearl is formed.
- This is natural phenomenon but now purposely sand grains are injected in mantle wall and animal forced to form pearl is called cultured pearl.
- For this pearl oysters are collected and reared in cages. Then foreign particles are inserted in the mantle and again cages are suspended in water and pearls are cultured in the body of oysters.
- The best quality pearl is Lingha pearl. Pearls obtained from freshwater bivalve are not valuable as marine oyster pearl.
- The bivalve shells having brilliant silvery sheen called mother of pearl are also collected from various parts of world for manufacture of buttons and other fancy articles.



Thanks