GENERAL CHARACTERISTICS AND CLASSIFICATION OF CYCLOSTOMES UPTO CLASSES

Cyclostomata is a group of chordates that comprises the living jawless fishes: the lampreys and hagfishes. Both groups have round mouths that lack jaws but have retractable horny teeth. The name Cyclostomata means "round mouths". Their mouths cannot close due to the lack of a jaw, so they have to constantly cycle water through the mouth.

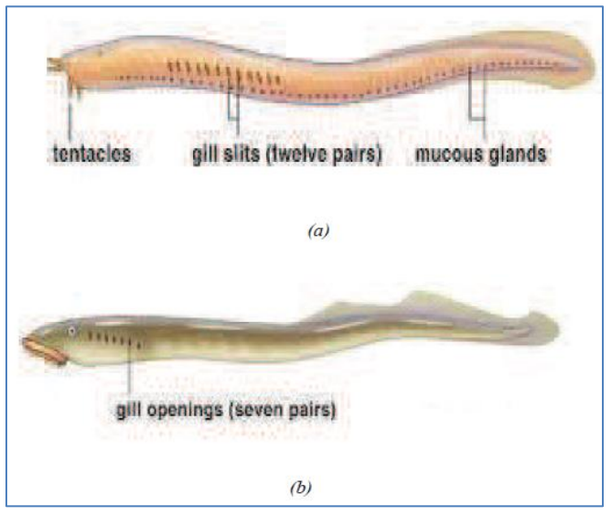

Fig: (a) Hag Fish (b) Lamprey

GENERAL CHARACTERS OF CYCLOSTOMATA:

- Cyclostomes are jawless primitive vertebrates. They may be marine or fresh-water. They include hag fishes and lampreys.
- The body is long, eel like. It has a trunk and a compressed tail.
- Paired fins are absent. Median fin is supported by cartilaginous fin-rays.
- The skin i.e soft and smooth. It is slimy. It is scale less.
- Z-shaped myomeres are present in the trunk and tail. Protractor and retractor muscles move the tongue.
- In this group a true coelom is seen.
- These vertebrates do not have jaws, hence called Agnatha.
- The mouth is circular. It works like a sucker and is surrounded by tentacles.

- Tongue bears teeth.
- Stomach is absent and oesophagus leads into the intestine. Endoskeleton is present.
- Skull is simple and primitive.
- Notochord presists throughout life.
- Vertebrae are represented by neural arches, around the notochord.
- Five to sixteen pairs of gills are present in sac like pouches
- The heart is two chambered. Sinus venousus is present, but conus arterosus is absent.
- Blood contains leucocytes and irregular nucleated erythrocytes.
- Brain is seen.
- Ten pairs or less number of cranial nerves are present.
- Nasal sac is single and median.
- Lateral line sense organ is present.
- Excretory system includes a pair of mesonephric kidneys.
- Sexes are separate.
- Gonad is single and without a gonoduct.
- Development may be direct or with a long larval stage.

CLASSIFICATION

The class Cyclostomata is divided into two orders:

1) Petromyzontia and (2) Myxinoidea

Order 1: Petromyzontia

- This includes Lampreys.
- The buccal funnel is suctorial and shows horny teeth.
- The mouth is present in the buccal funnel.
- The nasal sac is dorsal. It has no connection with the pharynx.

- Eyes are functional.
- Seven pairs of gill slits are present.
- A well-developed dorsal fin is present.
- Branchial basket is complete.
- Brain is well developed.
- Pineal eye is well developed.
- Ear has two semicircular canals.
- Example: *Petromyzon* (Sea-lamprey).

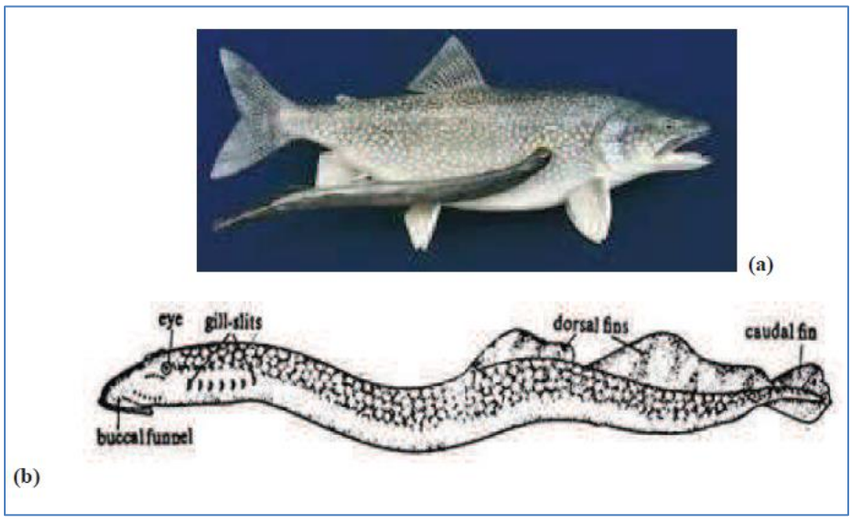

Fig: (a) Lamprey on lake trout (b) Sea Lamprey

Order 2: Myxinoidea

- It includes the hag-fishes or slime eels.
- Buccal funnel is absent.
- The nasal sac opens into pharynx through a canal.
- Eyes are vestigial.
- Dorsal fin is absent or very small.
- Branchial basket is poorly developed.
- Brain is primitive.
- Pineal eye is reduced.
- Ear has only one semicircular canal.

- The hag-fishes are all marine.
- Examples: 1. *Myxine glutinosa* (Hag-fish or slime eel). 2. *Eptatretus*

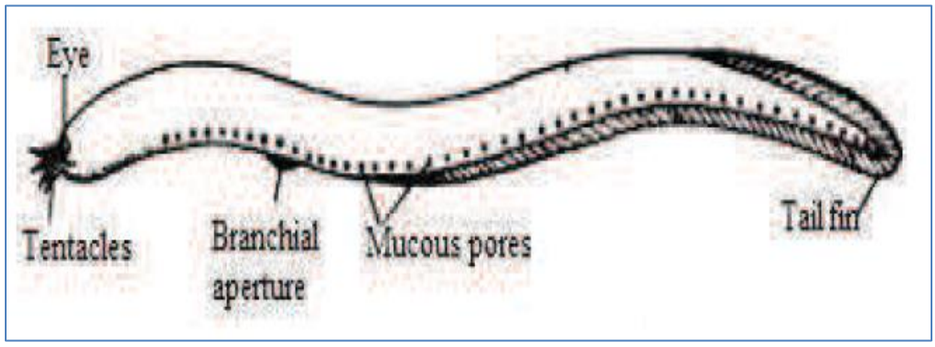

Fig: Myxine sp. lateral view.

Differences and similarities between *Myxine* and *Petromyzon:*

• Hagfish have no spinal cord, while lamprey's have.

• Lamprey can survive in both salt water and in freshwater, but hagfish cannot.

• While lampreys feed on the living, hagfish feed on the dead.

Cyclostomata comprises two families of living jawless fishes: hagfishes (Myxinidae, 44 species) and lampreys (Petromyzonidae, 41 species). Morphological analyses have favoured the closer relationship of lampreys to jawed vertebrates (gnathostomes) than to hagfishes.