CLASSIFICATION OF PISCES (FISHES)

A fish is any member of a paraphyletic group of organisms that consist of all gill bearing aquatic craniate animals that lack limbs with digits. Included in this definition are the living hagfish, lampreys, and cartilaginous and bony fish, as well as various extinct related groups. Most fish are ectothermic ("cold-blooded"), allowing their body temperature to vary as ambient temperature changes though some of the large active swimmers like white shark and tuna can hold a higher core temperature. Fish are abundant in most bodies of water. They can be found in nearly all aquatic environments.

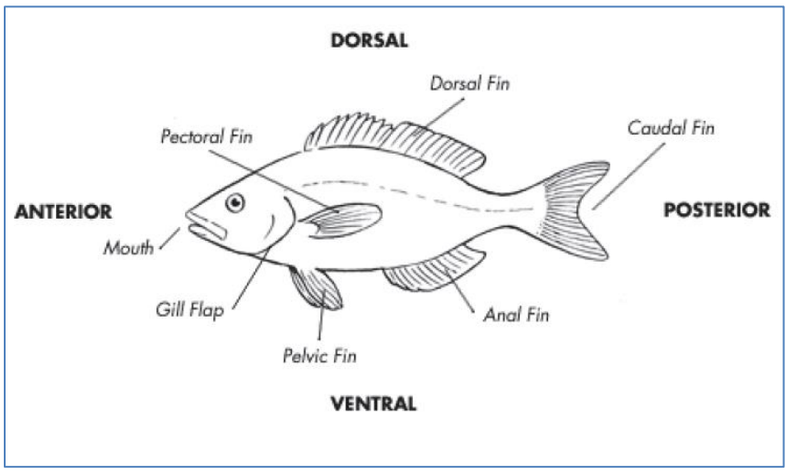


Fig: A Fish

Fishes belong to Animal Kingdom are classified into Phylum Chordata and Subphylum Vertebrata. Fishes bear notochord, tubular nerve chord, paired gills, post anal tail, ventral heart and an endoskeleton. A vertebrate possess backbone, this back bone supports and protects the spinal cord. The super class Gnathostomata includes craniates, in which one pair of the visceral arches is modified into this jaws. They have internal ear with three semi-circular canals and provided with paired 4 appendages (fins or limbs). Sexes are separate. The super class is divided into, two groups.

(1) **Pisces**

(2) **Tetrapoda**

The Pisces include three classes:

• **Placodermi (Aphstohyoids)** - extinct fishes

• **Chrondrichthyes** - cartilaginous fishes

• **Osteichthyes** - bony fishes

Class 1: Placodermi (Aphstohyoids)

1. It includes extinct fishes.
2. They are all armoured fishes. Their exoskeleton is in the form of bony plates or shields.
3. Their endoskeleton is bony.
4. The hyoidean gill-slits are complete. It is not reduced.
5. The autodiastylic jaw suspension is seen in these fishes.
6. Heterocercal caudal fin is seen.
7. Hyoid arch will not support the jaws.
8. Primitive jaws are seen.
9. They survived up to Permian period of Paleozoic era.

Examples: *Climatius*, *Bothriolepis*.

Class 2: Chondrichthyes or Elasmobranchi

1. These fishes are exclusively marine.
2. The exoskeleton in the form of placoid scales.
3. Their endoskeleton is cartilaginous.
4. Jaw suspension is amphistylic or hyostylic.
5. 5-7 pairs of gills are present.
6. External gill openings are separate. They are not covered by operculum.
7. Heterocercal caudal fin is seen.
8. Males show claspers for copulation.
9. Air-bladder is absent in these fishes.

The Class Elasmobranchi is divided into two sub-classes:

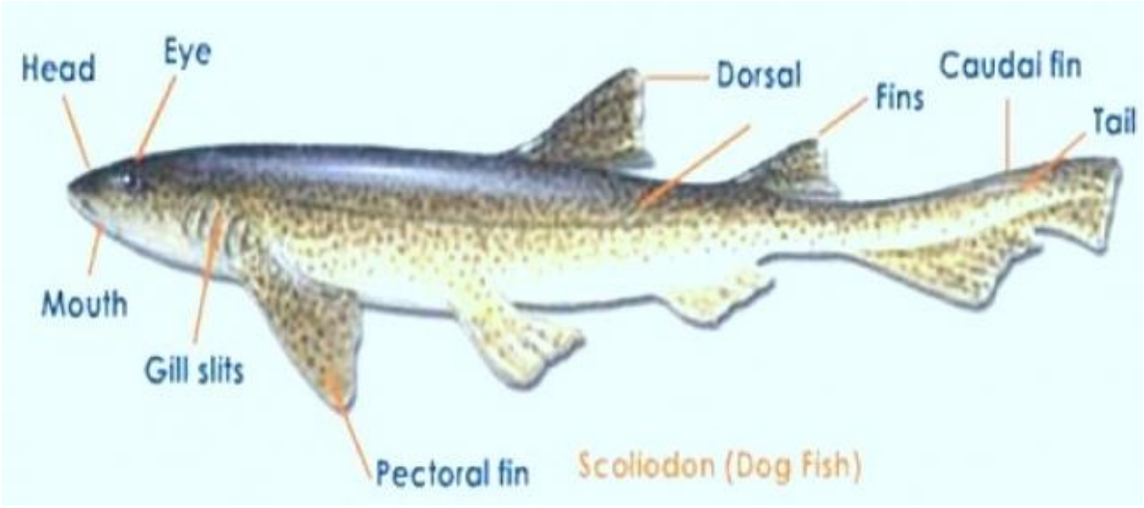
1. Sub-class Selachi:

In these fishes the pectoral fin has cartilaginous rods. Fins are well developed. The caudal fin is hetetocercal. This subclass has four orders in which only two are living.

Order 1: Proto selachi

1. Jaws show many pointed teeth.
2. Nasal openings are paired.
3. Hyostylic or Amphistylic jaw suspension.
4. It is represented by few living species.

5. Example: *Heteroloatas*



Order 2. Euselachi

1. Skin contains placoid scales.
2. These fishes are exclusively marine.
3. 5 pairs of gill slits. They open separately.

2. Sub-class Bradyodonti:

It includes fossil and modern chimaeras.

1. Mouth is small and bounded by lips.
2. Holostylic jaw suspension is seen.
3. Gill opening are enclosed in boneless operculum.
4. Male possesses a frontal clasper on the head.

It is divided into 2 orders.

Order 1: Eubradyodonti

It includes Helodus.

Order 2: Holocephali

It includes chimaera. These are called devil fishes.

Class 3: Osteichthyes (Telostomi)

1. These fishes are found in marine, fresh water and brackish water.
2. Cycloid, ctenoid or ganoid scales will form the exoskeleton.
3. Endoskeleton bony.
4. Jaws suspension is autostylic.
5. Operculum is present.
6. Claspers are absent.
7. Usually air bladder is present.

This class is divided into two sub-classes:

- Sub-Class I: **Crossopterygii**
- Sub-Class II: **Actinopterygii**

1. Sub-class: Crossopterygii

In this sub-class bony fishes are included which show lobed and massive fins. The sub-class includes two orders,

Order 1: Rhipidistia

This order includes extinct fishes. But in 1938 one coelacanth fish was caught. This was identified as, Rhipidistian fish by Miss. Latimer. The fish is called Latimeria. It is the oldest living fossil.

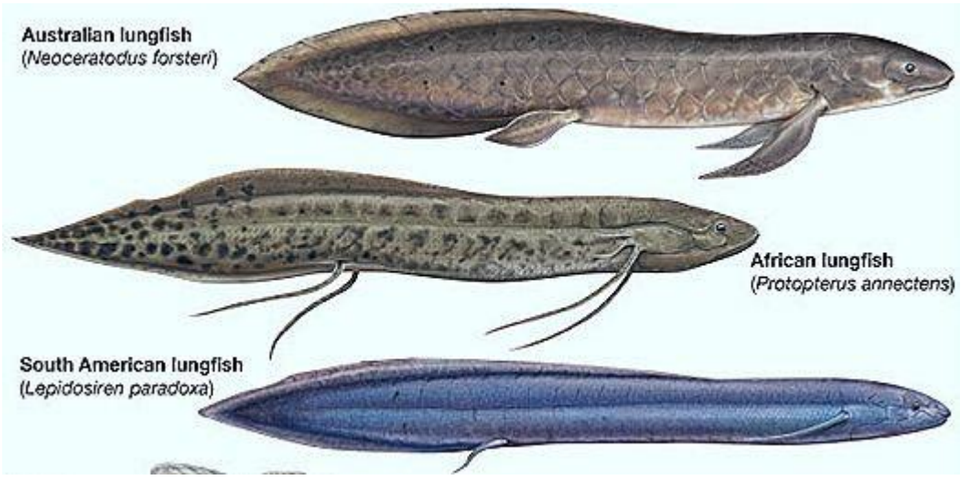
Order 2. Dipnoi

This order includes living fishes. In the present day only 3 genera are living. They show discontinuous distribution.

Examples:

1. *Neoceratodus* (Australian lung fish),

2. *Protopterus* (African lung fish)
3. *Lepidosiren* (South American lung fish).



2. Sub-class: Actinopterigii

These fishes will live in fresh water or marine water. They not show internal nostrils. This subclass is divided into three super orders.

Super order I: Chondrostei

This super order includes 3 orders, only fishes of one order surviving

Order polypterifonnes:

- The fishes with ganoid scales.
- Caudal fin is symmetrical.
- Dorsal fin has many peculiar fin-lets.

Example: *Polypterus.*

Super order II: Holostei

This includes 2 orders.

Order 1: Amiiformes

Caudal fin is heterocercal.

Example: *Antia* (Bowin).

Order 2: Lepidoteiformes

Nasal opening at the end of the much elongate snout. Caudal fin is heterocercal.

Example: *Lepidopsteus* (Gar pike).

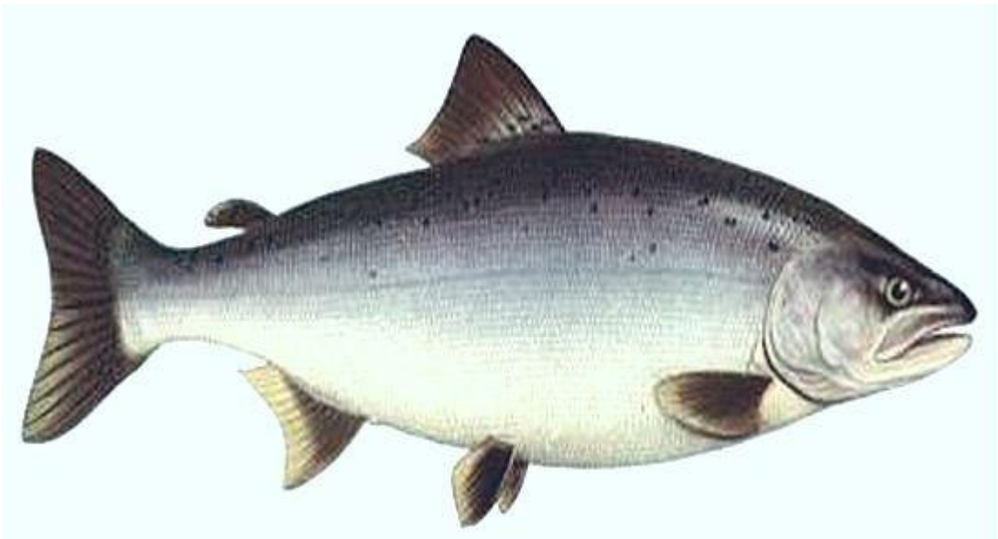
Super order III: Telosteti

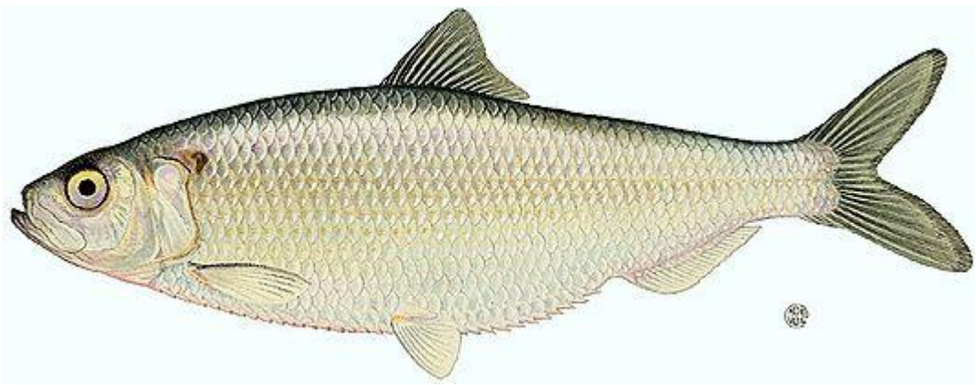
This is a very important super order. It includes nearly 25,000 species. They are divided into many orders.

1. ***Order : Clupeiformes:***

Caudal fin is homocercàl.

Examples: 1. *Hilsa* (Herrings) 2. *Salmon*.





2. <u>Order: Cypriniformes</u>

Weberian ossicles connecting the ear with air bladder is present. Air-bladder is connected with duct to the alimentary canal.

Example: Carps. (*Labeo*).

3. Order: Anguilliformes

Body eel like, air-bladder if present connected with intestine by a duct.

Example: *Anguilla*.

Anguilla

4. Order: Beloniformes

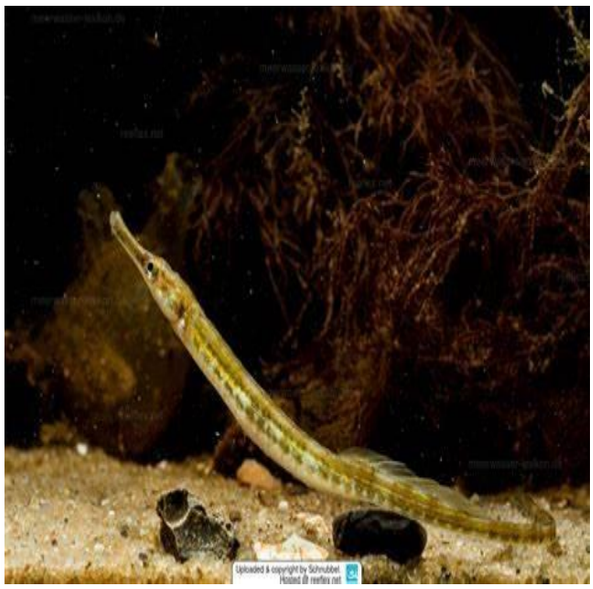
Physoclistic fishes in which fins are without spines.

Example: *Exocoetus* (flying fish), *Cypsilurus*

5. Order: Syngnathiformes

Physoclistic fishes in which the first dorsal fin, if present, is spinous.

Examples: *Hippocampus* (Sea horse), *Syngnathus* (Pipe-fish)

6. Order: Syinbranehiformes

Eel like body, air-bladder is absent and spines absent in fins.

Example: *Asnphinuous*.

7. Order: Psrciformes

Physoclistic fishes fins usually with spines. Usually two dorsal fins.

Eamples: *Fierasfer*, *Anabas* (Climbing perch).

8. Order: Pleuronectiformes

Both eyes are situated on one side and skull is asymmetilcal. Fins usually without spine. Adults without air bladder.

Example: *Cynogiossus*

9. Order: Echeneiformes

The spinous dorsal fin is situated into an adhesive disc placed on the head. Air bladder is absent.

Example: *Echeneis* (Sucker fish).

10. Order: Ophiocephaliformes

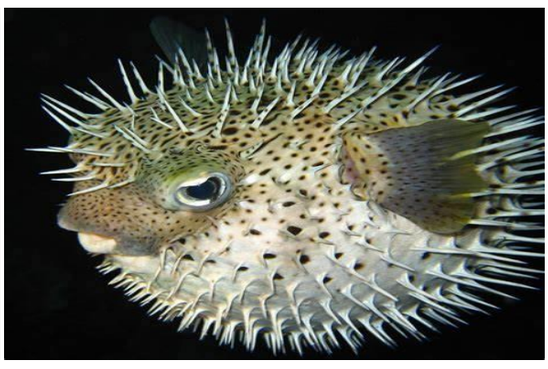
Physoclistic fishes without spine, scales are cycloid, air bladder is very long.

Example: *Channa* or *opiocephalus*.

11. Order: Tefradontiformes

Gill openings and restricted air bladder is present or absent.

Examples: *Tetrodon, Diodon* (Porcupine fish).



*12. **Order: Gadiformes***

Physoclistic fishes in which fins are without spines, scales cycloid.

Example: *Gadus* (cod).