

# **Major taxa of marine fishes upto family level**

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### Elasmobranch fishes

The shark, ray and skate are cartilaginous fishes and they all come under the class Chondrichthyes. In global waters, about 600 - 700 species are represented in this group. The cartilaginous group are considered as primitive compared to their counter part, the bony fishes. Some of the members of cartilaginous fishes are specialized in their own way as are the teleosts among bony fishes. This group could be distinguished by the following characters:

1. Notochord constricted by vertebrae
2. Cartilaginous skeleton - The cartilage are calcified giving the appearance of bone.
3. Swim bladder absent.
4. Skull lacks sutures in living forms.
5. Teeth usually not fused to jaws and replaced serially.
6. Nasal openings on each side usually single and more or less ventral in position.
7. Intestinal spiral valve present.
8. Fertilization external or internal.
9. Males with pelvic claspers.
10. Embryo encapsulated in a leather like case.

The cartilaginous fishes come under the class Chondrichthyes. This class includes two subclasses - viz. (i) Elasmobranchii and (ii) Holocephali.

The subclass, Elasmobranchii (sharks, rays and skates) includes 128 genera and 608 living species. The characteristics that are diagnostic to elasmobranchs are:

1. Five to seven gill openings with spiracle (secondarily lost in some species).
2. Body covered with placoid scales.
3. Upper jaw not fused to cranium but attached with either amphistylic or holostylic suspension.
4. Numerous teeth.
5. Cloaca present.
6. Males usually have intromittant organs.

The fossil forms of this group are recorded from Devonian time onwards.

The members, of the subclass Holocephali are called as ratfishes because of their long slender tail. The chimaeras come under this subclass and about twenty five species are represented in this group and most of the species come under the family, Chimaeridae. The following are the diagnostic characters of this group:

1. Four gill openings and spiracle absent.
2. Upper jaw fused to skull.
3. Teeth few in number, large, flat plates.
4. Scales absent.
5. In males, claspers are seen on head region (in addition to the pelvic claspers).

## **Elasmobranchii**

### **Subclass Elasmobranchii**

The subclass, Elasmobranchii includes the following superorders (Compagno, 1973):

1. Galeomorphii
2. Squatinomorphii
3. Squalomorphii
4. Batoidea

### **Superorder Galeomorphii**

Galeomorph sharks have varied shapes. Some of the species differ markedly from the typical body shape of a shark. This superorder includes the following orders (living groups):

1. Heterodontiformes
2. Lamniformes

### **Order Heterodontiformes**

Popularly called as horn sharks and are considered to be ancestral group of living elasmobranchs (Moyle *et al.*, 1982). The members of this group are sluggish and are shallow water bottom dwellers. This group contains a single family, Heterodontidae having 6 species.

### **Order Lamniformes**

This order includes seven families. They are i) Orectolobidae (nurse sharks), ii) Odontaspidae (sand sharks), iii) Lamnidae (thresher sharks or mackerel sharks), iv)

Scyliorhinidae (cat sharks), v) Carcharhinidae (smooth sharks), vi) Sphyrnidae (hammerhead sharks) and vii) Rhinodontidae (whale sharks). This order has 56 genera and 200 species.

The typical sharks come under the family, Lamnidae and Carcharhinidae. The sharks of this order are mostly pelagic forms, large with blade like teeth. Most of the members of this group are highly predacious feeding on large fishes, squids, cuttlefishes and marine mammals. Some of the sharks, *Carcharodon carcharias*, *Isurus oxyrinchus* and *Galeocerdo cuvieri* are the man eating sharks.

The whale sharks (*Rhinodon typus*) and the basking sharks (*Cetorhinus maximus*) are not capable of biting attacks on humans and have developed mechanisms for straining plankton. The whale shark attaining a maximum length of 18 m is considered as world's largest fish.

### **Superoorder Squatinomorphii**

The angel sharks are represented in this superorder. This superorder includes a family Squatinidae. The family includes one genus, *Squatina* having 11 species. The members of this group appear to be intermediate between sharks and rays and shares many characters of sharks and rays, at the same time possess its own specifications. Because of these features, Compagno (1973) placed the angel sharks in the superorder, Squatinomorphii. However, Nelson (1978) placed this group under the superorder, Squalomorphii.

### **Superorder Squalomorphii**

Though morphologically these sharks look like a ray with flattened body, yet the large pectoral fins are not attached to head. Large spiracles are located on top of head, the five gill openings are more laterally located with terminal mouth. Two dorsal fins are located on the caudal region of the body and anal fins are wanting.

This superorder includes three orders namely, Hexanchiformes, Squaliformes and Pristophoriformes. Six species are represented under the order, Hexanchiformes and are deep water forms (Moyle and Ceech, 1982). Six or seven gill openings are seen. This order includes two families namely, Chlamydoselachidae and Hexanchidae.

Cow sharks coming under the order are rather flabby, bottom oriented sharks with weak jaws and have small teeth. This group comes under the family, Hexanchidae. The order, Squaliformes contains two families *viz.* Squalidae (dog fish sharks) and Echinorhinidae (bramble sharks).

The order, Pristiophoriformes, the saw sharks, have teeth attached to their snout and is extended as a long flat blade. The pristiophorids have many ray like characters and are closely related to Batoidimorpha. Two genera and four species are included in this family.

### **Superorder Batoidea**

This superorder includes rays and skates having the following characters:

1. Gill openings ventral in position.
2. The pectoral fins enlarged, attached to side of head anterior to the five gill openings.
3. No anal fins.
4. Eyes and spiracle located on the top of the head and pavement like teeth present.
5. Nictitating membrane absent.

The members of this group are primarily adapted for bottom living and are benthic in habitat. This superorder includes the following orders:

1. Rajiformes
2. Pristiformes
3. Torpediniformes
4. Myliobatiformes

## **Bony fishes**

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5. Nictitating membrane absent.
6. Rajiformes

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### **Subclass Dipneusti**

Lungfishes are placed in this group. They are all freshwater fishes with a long independent evolutionary history. The living lungfish genera are *Neoceratodus* (Australian lungfish - *N. forsteri*), *Lepidosiren* (South American lungfish - *L. paradoxa*) and *Protopterus* (African lungfish).

### **Subclass Crossopterygii**

The fringe finned fishes are represented in this group. *Latimeria chalumnae*, a living species comes under this subclass. This species was discovered by J.L.B. Smith, having distribution in South Africa and Comores Archipelago.

### **Subclass Brachiopterygii**

This subclass is represented by a single family, Polypteridae, which includes 10 species. The members of this group have ganoid scales and spiracle is present. The fishes of this group respire with gills, supplementing them with lungs (e.g., *Calamoichthys calabaricus*).

## **Subclass Actinopterygii**

The subclass, Actinopterygii, ray finned fishes contain most of the bony fishes. This is divided into three infraclasses namely, Chondrostei, Holostei and Teleostei.

### **Chondrostei**

Ganoid scales and a spiracle are present; heterocercal tail and interoperculum are absent, 25 species are represented in this group.

### **Holostei**

Two families namely, Lepisosteidae (gars) and Amiidae (bow fishes) are included in this group. This infraclass includes two genera and 9 species.

### **Teleostei**

Teleostei are the most diversified group of all vertebrates. This group includes about 18000 species placed in 31 orders, 455 families and 3869 genera (Nelson, 1976).