



Food and Agriculture  
Organization of the  
United Nations



Indian Ocean Tuna Commission  
Commission des Thons de l'Océan Indien

# Identification: Target and Non-target Fish Species

*IOTC ROS SFO TR9*



## **Descriptor**

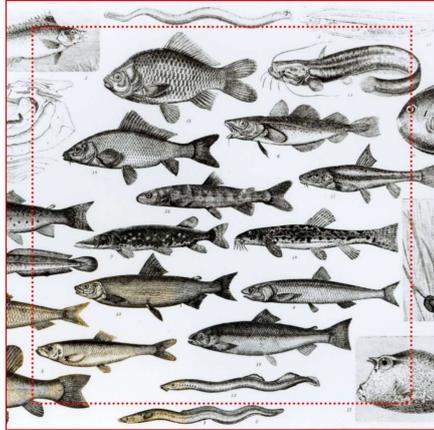
This module aims to familiarize Observers with the main diagnostic features used in the identification of target and non-target species, including fish and sharks (with special incidence in the identification of juvenile YFT and BET) as these will be used daily in their routine work.



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# Nomenclature & Anatomical Features

*IOTC ROS SFO  
TR9.1 & 2*

Category: Identification: Target and Non-target of Fish Species

*IOTC ROS SFO TR9*



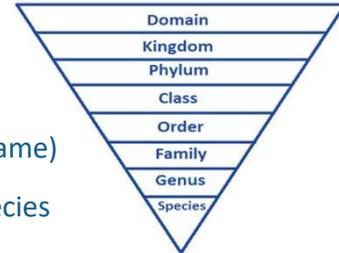
CapMarine  
Capricorn Marine Environmental

## Course learning outcomes include:

- Understand the need to use nomenclature
  - ✓ Nomenclature for recording family, genus and species;
  - ✓ Danger of incorrect identification from using common names.
- Identify the anatomical and diagnostic features of bony and cartilaginous fish
  - ✓ Main anatomical features of fish;
  - ✓ Differences between bony and cartilaginous fish;
  - ✓ External diagnostic features used for bony and cartilaginous (sharks and rays) species identification

# Taxonomy

- Classification of organisms
- Ranks organisms into taxonomic categories
- Names them using the Latin binomial (scientific name)
- Scientific name is composed of the Genus and species
- Scientific name is written in Latin



*Homo sapiens*

Genus      Species



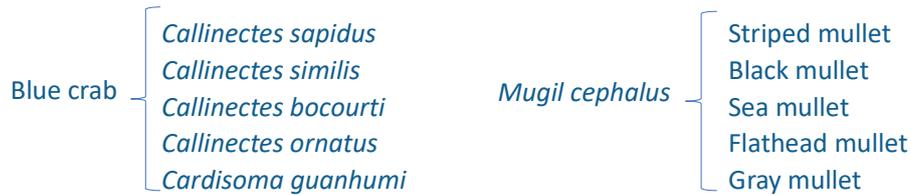
- 1<sup>st</sup> part identifies the genus to which the species belongs (*Homo*), starts with a capital letter.
- 2<sup>nd</sup> part identifies the species within the genus (*sapiens*) starts with a small letter.

In biology, taxonomy (from Ancient Greek τάξις (taxis) 'arrangement', and -νομία (-nomia) 'method') is the scientific study of naming, defining (circumscribing) and classifying groups of biological organisms based on shared characteristics. Taxonomy uses a hierarchical classification system based on the relationships between living organisms. The principal ranks in modern use are domain, kingdom, phylum, class, order, family, genus, and species.

Taxonomy uses binomial nomenclature for naming all living things by giving each a name composed of two parts, both of which use Latin grammatical forms. The 1<sup>st</sup> part of the name identifies the **genus** to which the species belongs and the 2<sup>nd</sup> part of the name identifies the species within the genus. Species binomial name is also called species scientific name.

## Why the Need to Use Nomenclature

- Danger of incorrect identification if using common names
- Common names often not specific to a particular species
- Same species can have more than one common name
- Species scientific name is international



***To avoid any confusion or ambiguity observers are to use scientific names when identifying species***

Captains, officers and vessel crew will often refer to common names from their native country or a name that a fish buyer / target market calls the species. This may not be the same species of fish that you know it to be called. It is thus exceptionally important to know what the scientific name of the species is. Your electronic database for data entry will also reference a three (3) letter FAO species code related to a specific fish species and it's generally recognised English or French common name and scientific name. For example "YFT" will refer to "yellowfin tuna" which has a world wide recognized scientific name of *Thunnus albacares*.



## Basic Rules of Scientific Nomenclature

1. Use both genus and species name
2. Scientific names are always italicized
3. The genus is always capitalized, and the species is never capitalized
4. After the first use, abbreviate the genus name to its initial
5. A species name is never used without a genus or genus abbreviation.
6. If one must use a common name, first define it in terms of the scientific name
7. Use the abbreviation "sp." ("spp." plural) for **unknown or unspecified** species



The format for writing scientific names of animals and plants is standardized and internationally accepted. In scientific writing (and in science in general), common names are rarely used. The Latin binomial (i.e. "scientific name") is used instead. There are several important rules regarding the use of scientific names. Failure to follow these rules in your writing flags you immediately as an amateur, so make it a practice to follow them.

1. Scientific names are **always** italicized. When hand-writing text, you can underline them instead, but there is no excuse not to italicize when using a word processor. Example: use *Bos taurus*, not Bos taurus.

2. The genus is **always** capitalized.

3. The species is **never** capitalized, even when it refers to the name of a place or person. Be careful because word processors will often "auto-correct" a species name and incorrectly capitalize it or change the spelling. Example: *Juniperus virginiana*, not *Juniperus Virginia*.

4. **In its first use within a particular document, the genus is always written in full.** In subsequent uses, the genus can be abbreviated using the first initial and a period. Example: on first use, write *Escherichia coli* and reserve *E. coli* for subsequent references.

5. **A species name is never used without a genus or genus abbreviation.** Example: write *Tribolium confusum* or *T. confusum* but never just *confusum*.

6. If you must use a common name, first define it in terms of the scientific name. For example, "*Pan troglodytes* (chimpanzee)".

## Classifying Groups Organisms Based on Shared Characteristics

### CONCEPTS USED TO HELP SEPARATE SPECIES

- Incapacity to interbreed with close relatives
- **Distinct anatomical features** →
- Behaviour
- Genetics
- Evolutionary history



❖ *Presence of gill slits*

❖ *Number of gill slits*

All living organisms are classified based on basic, shared characteristics. Organisms within each group are then further divided into smaller groups. These smaller groups are based on more detailed similarities within each larger group. This grouping system makes it easier for scientists to study certain groups of organisms. Characteristics such as appearance, reproduction, mobility, and functionality are just a few ways in which living organisms are grouped together.

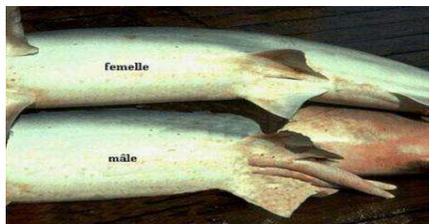
As previously seen there are seven main levels of classification in the hierarchy, the Kingdoms being the most basic classification and species the most specific.

Species is the lowest and most strict level of classification of living things. The main criteria for an organism to be placed in a particular species is the ability to breed with other organisms of that same species.

## Anatomical Differences: Bony and Cartilaginous Fish

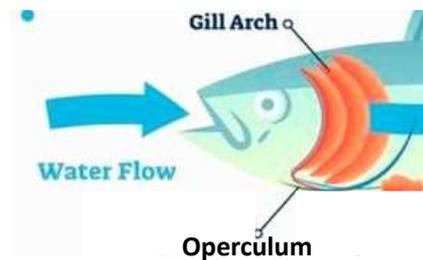
### Cartilaginous fish

- Cartilaginous skeleton
  - Sharks and rays
  - *Elasmobranches from the Greek elasmos = beaten metal and brangchia = gills*
- Presence of gill slits
- Internal fertilization (visible sexual dimorphism)



### Bony fish

- Bone skeleton
  - Groupers, snappers, tuna...
  - *Osteichthyes from the Greek osteon= bone and ikhthus = fish or bone fish*
- Presence of gills and operculum
- External fertilization



Cartilaginous fishes have skeletons composed mostly of cartilage while bony fish have a skeleton composed mostly of bone. Furthermore, these two types of fish fall under different taxonomic groups – Cartilaginous fish are grouped under the class Chondrichthyes and all bony fish fall under the superclass Osteichthyes.

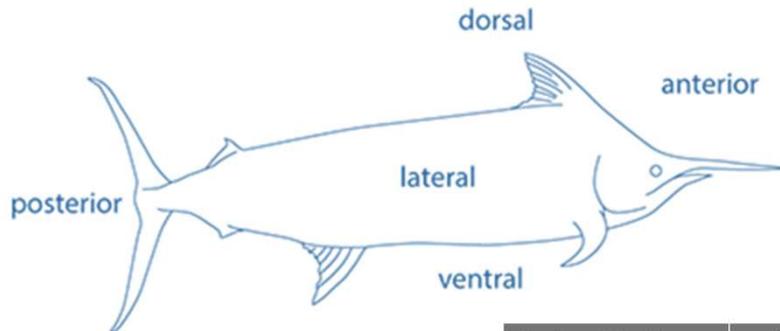
### Bony Fish Main Characteristics

- Their endoskeleton is entirely made of bone
- They have an operculum on either side of their gills
- They possess an air bladder that also performs hydrostatic functions
- They fertilize their eggs externally

### Cartilaginous Fish Characteristics

- Their endoskeleton is primarily made of cartilage
- On either side, they have gill slits and they don't have an operculum
- Their mode of fertilization is through internal mechanisms

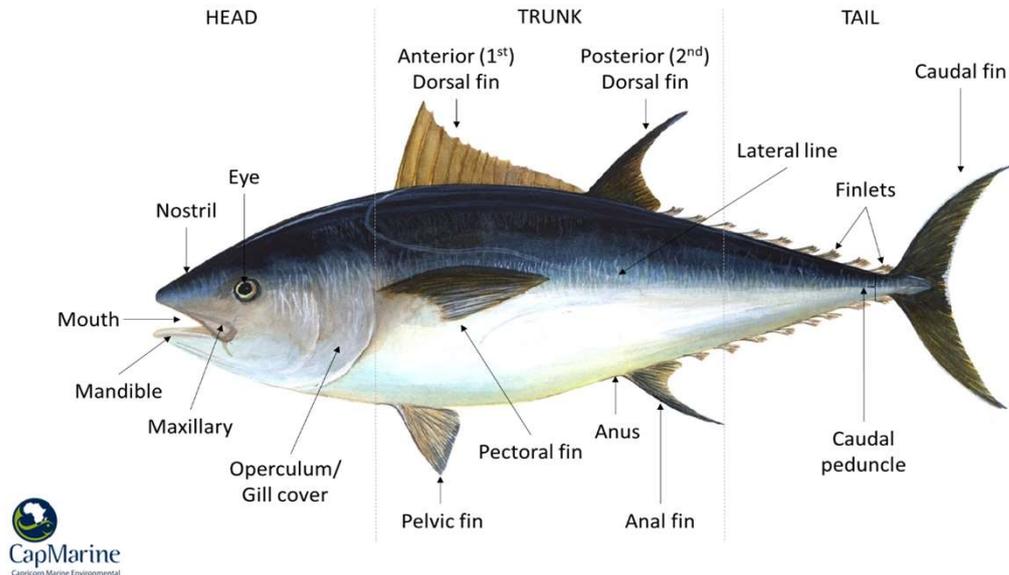
## External Anatomy of Fishes



Anatomy Word	...of the organism
Anterior	The head end...
Posterior	The tail end...
Dorsal	The back
Ventral	The front or belly
Lateral	The side or flank

Anatomy is the study of an organism's structures. Fishes come in a diverse array of forms, many with special modifications. Scientists measure and describe the external features of fishes to identify species. When describing the basic anatomy of an organism, it is useful to have some common terms to help with orientation.

## Morphology Of Bone Fish

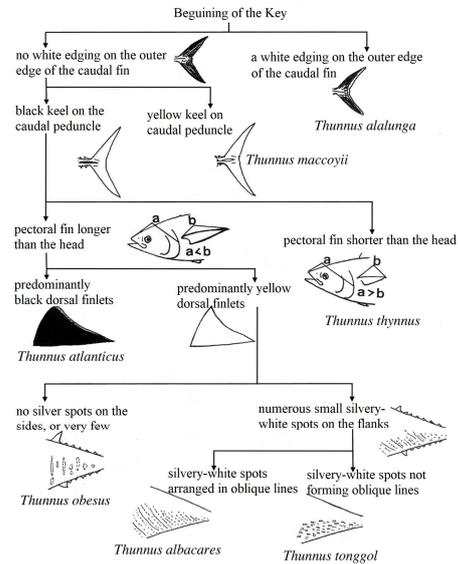


Take note of the various terms describing the various features of bone fish in particular the names of the fins and their positions relative to each other and the fish body since you will use them to help you identify different fish species.

Fins are either single along the centreline of the fish: the dorsal fin, anal fin, and tail fin, called the caudal fin; or paired fins: the pectoral fins and ventral fins.

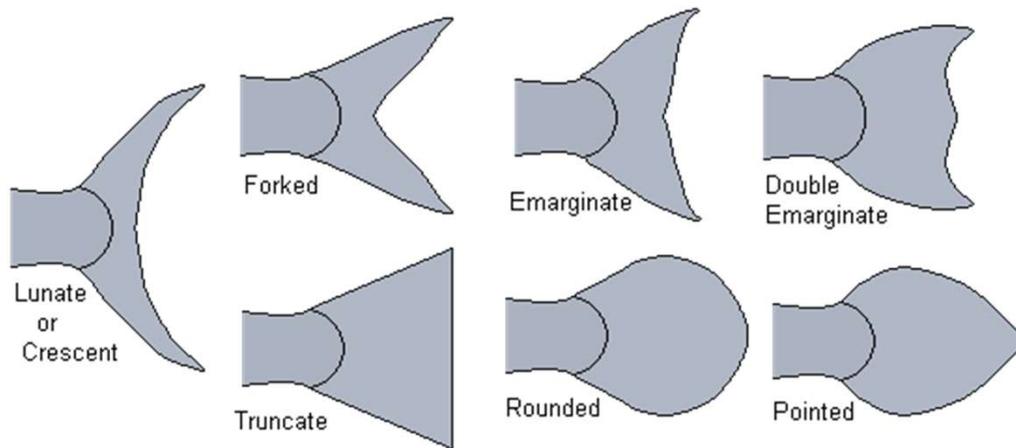
## External Anatomical Features Bone Fish Sp. ID

- Color, shape and pattern of the body
- Color and shape of fins
- Fins position relative to the body and the other fins
- Color of caudal keel & finlets

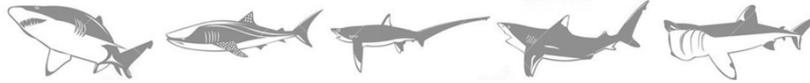


1. The various species of tuna are an example of bony fish.
2. Some species can be difficult to separate, but by looking at some anatomical features we can get a identification to a high degree of certainty.

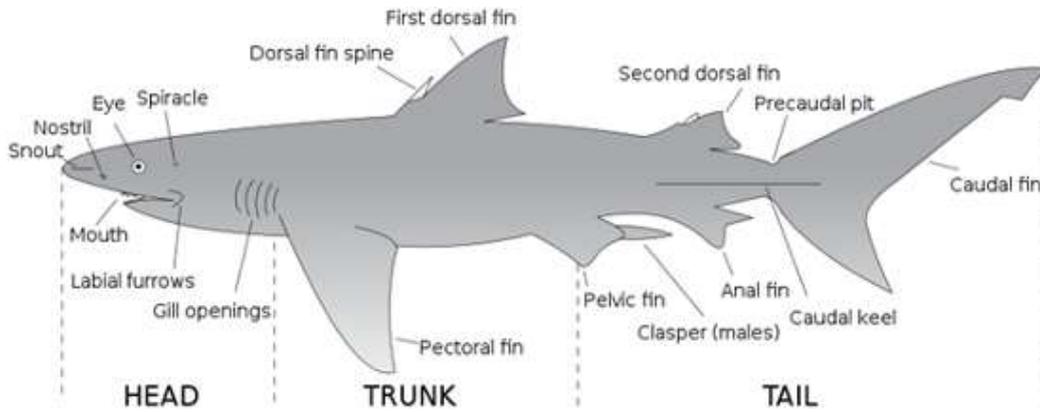
## Basic Fish Caudal Fin Shapes



The fins of modern fish come in an amazing array of shapes and forms, however many of them can be related to the seven basic patterns depicted. It is important to be able to identify fish caudal fin shape since you'll be requested to measure the fish differently depending on their caudal fin shape.

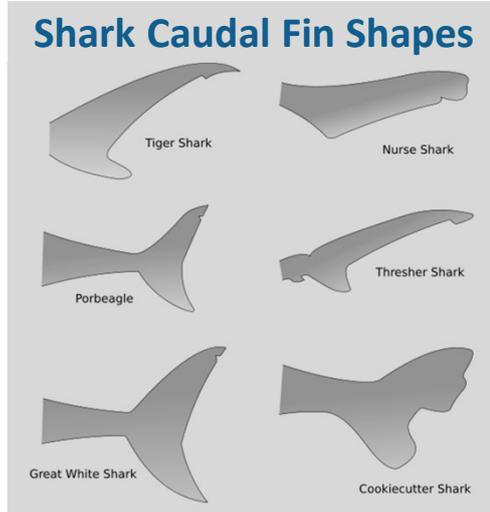


## Morphology of a Shark

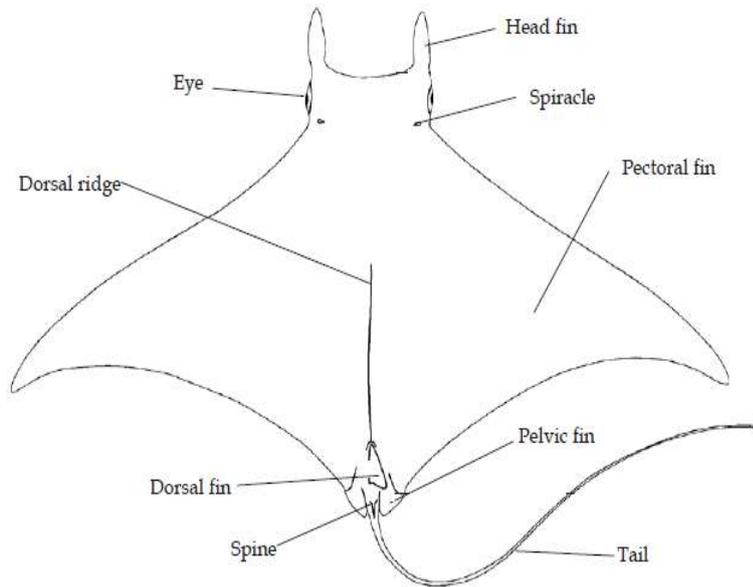


Take note of the various terms describing the various features of sharks. Pay special attention to the name of the fins, their shape and positions. Also notice the fin spines, the number of gill openings, the shape of the body and of the mouth since you will use these morphological characteristics to help you identify different species of shark.

## Shark Fins Shape

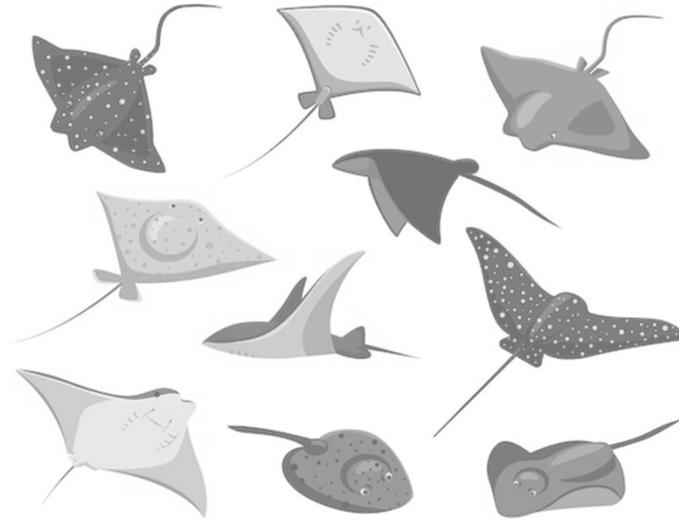


## Morphology of a Ray



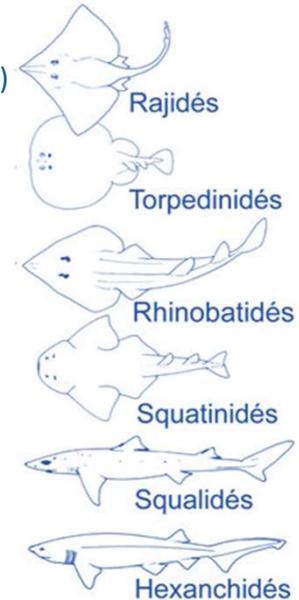
Take note of the various terms describing the various features of rays. Pay special attention to the name of the fins and their positions. Also notice the fin spines, the shape of the body and of the tail since you will use these to identify different species of rays.

## Rays Body Shape



## Cartilaginous Fish Sp. ID External Anatomical Features

1. Body shape
2. Presence / absence of fins (anal, pelvic and dorsal)
3. Presence / absence of spines in dorsal fins
4. Fins color
5. Fins position relative to other fins
6. Gill number
7. Head shape
8. Mouth position
9. Shape of anterior nasal flaps
10. Height of inter-dorsal ridge
11. Teeth shape



- You can use the numbered items as a checklist for separating species of sharks and rays based on their anatomical features – if there are any terms that you do not know, reference you ID cards or search the internet for answers



## ANY QUESTIONS?



*send us a message via Talents LMS*

