

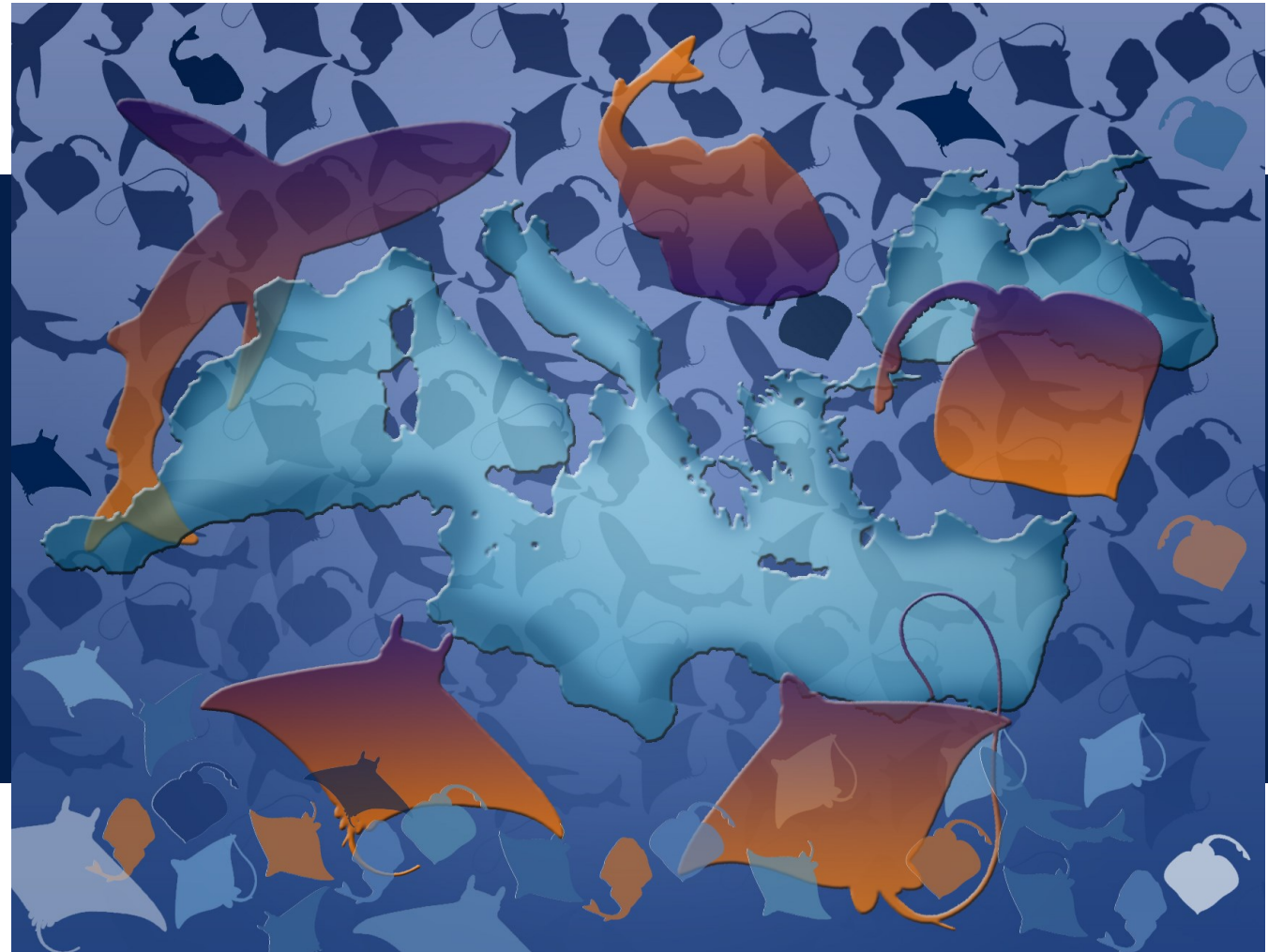


Food and Agriculture Organization  
of the United Nations

## SHARKS, RAYS AND CHIMAERAS IN MEDITERRANEAN AND BLACK SEAS

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Key to identification



**Cover image:** Emanuela D'Antoni

# SHARKS, RAYS AND CHIMAERAS IN MEDITERRANEAN AND BLACK SEAS KEY TO IDENTIFICATION

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## PREPARATION OF THIS DOCUMENT

The publication conception and design started during the preparation of the FAO EastMed “Training course for onboard observers for the collection of data on discards and bycatches “ held in Alexandria, Egypt, in March 2017. The FAO EastMed and CopeMed projects supported other similar training activities, held in Bou Ismaïl, Algeria, in July 2018, and in Cyprus (remotely), in November 2020. In the recent years, the authors have refined the key to identification conducting a training course in Chioggia, Italy, in May 2019 and periodic courses at the specialized training center for the Italian coast guard, in Livorno, Italy. Financial support for the finalization and the translation of this document was provided by the FAO EastMed Project “Scientific and Institutional Cooperation to Support Responsible Fisheries in the Eastern Mediterranean” (GCP/INT/363/EC).

## SUMMARY

This guide contains the illustrated key to orders, families, genera and species to the Chondrichthyes of the Mediterranean and Black Seas (FAO fishing area 37), currently represented by 38 sharks, 48 batoids and 2 chimaeras. The species are described following the taxonomic order and are grouped in functional groups. Near the illustration of each species, the relevant diagnostic features are complemented by a set of icons representing the management measures and the data collection requirements as per existing GFCM Recommendations. The technical terms and the minimum standard measurements are provided as Annexes.

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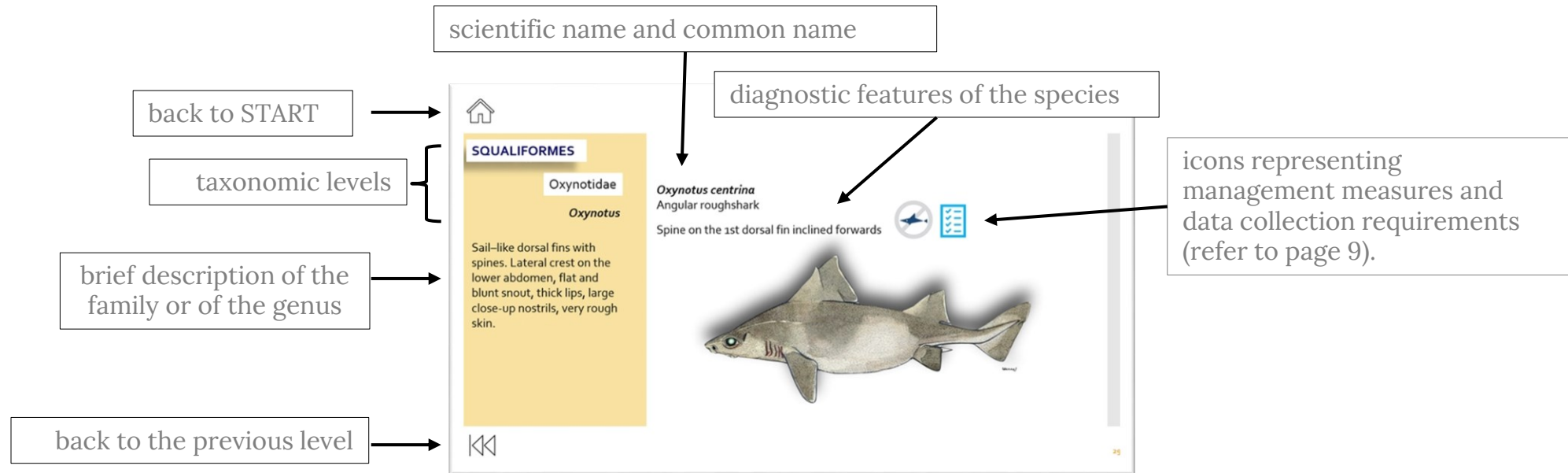
## ACKNOWLEDGEMENTS

We express our gratitude to Simon Weigman for his advice on the systematics of Chondrichthyes. We extend our thanks to Jacopo Bernardi for testing the functionalities of the keys to identification. Sincere thanks goes to Dr. Issam Krouma for his revision and suggestions during the translation of this publication, that will be available also in Arabic. Special thanks are due to Stefano Lelli and Marcelo Vasconcellos for their support in coordinating the publication procedure and for the enthusiasm they demonstrated.



## HOW TO USE THIS GUIDE

The first key guiding in the identification of sharks, rays, skates and chimaeras, belonging all to the cartilaginous fishes (Class Chondrichthyes), is the distinction in elasmobranchs (sharks, rays and skates) and chimaeras based on the number of gill openings. Once you know you have an elasmobranch, click or turn to page 7, and follow the illustrated key to orders. Continue following the sequence of questions until you have identified the taxon within which your specimen occurs. Similarly, If you have a chimaera, click or go to page 67. If you intend to take measurements and make photographs, consult the Annex II and III. This publication has been designed to be visualized as PDF<sup>1</sup> on computers, smartphones, and tablets, allowing to click on the taxon name to go to the corresponding page; each page contains the buttons to navigate the document.

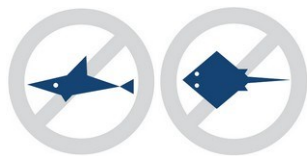


<sup>1</sup> For the full functionalities, it is advisable to use the guide with a PDF reader application enabled to open hyperlinks.

The species are described following the taxonomic order, for practical purpose and training they are grouped under functional groups, presented with different colours. Each group corresponds, as much as possible, to the habitats where the species occur or are captured more frequently, as described below.

Functional groups	Description
Large DEMERSALS	Sharks of relatively large size, by-catch of coastal multispecies and multigear fisheries.
Large PELAGICS	Oceanic, pelagic, and highly migratory sharks, by-catch of tuna and tuna-like fisheries; including oceanic-coastal pelagic (e.g. hammerheads) bycatch of both high-seas and coastal multispecies fisheries.
Small DEMERSALS	Continental shelves sharks of relatively small size, by-catch of multispecies multigear coastal fisheries; including deep-sea sharks by-catch of deep-sea fisheries.
Demersal RAYS & SKATES	Demersal rays and skates, by-catch of multispecies multigear coastal fisheries, including deep sea skates, by-catch of deep-sea fisheries.
Other RAYS	Benthopelagic and pelagic rays, by-catch of tuna-like fisheries and multispecies multigear coastal fisheries.

Conservation and management measures as well as data collection requirements relevant for each species are represented with the following icons.



Prohibited species - Species listed in Appendix II, SPA/BD Protocol of the Barcelona Convention. Recommendation GFCM/42/2018/2 and GFCM/44/2021/16 (GFCM, 2018; 2021). For EU countries, this is implemented by the EU Regulation 1343/2011 (EU, 2011).



Monitoring and data collection requirements for the species listed either in Annex II or Annex III of the SPA/BD Protocol. Recommendations GFCM/42/2018/2 and GFCM/44/2021/16 (GFCM, 2018a; 2021).



General Fisheries Commission for the Mediterranean (GFCM) - Data Collection Reference Framework (DCRF): Species in Group 1 (G1) Group 2 (G2) and Group 3 (G3) are object of different data collection requirements. The colour is assigned according to the Subregion: **Western Mediterranean Sea**, **Central Mediterranean Sea**, **Adriatic Sea**, **Eastern Mediterranean Sea**. The icon for the entire **Mediterranean Sea** is in grey and a specific annotation is used for **Black Sea**. More details are provided in Annex IV (GFCM, 2018b).



Rare species: their presence in the area is questionable and it is extremely important taking photographic and genetic samples, and also preserving the whole specimen (GFCM, 2018b).



By-catch limitation for the Highly Migratory Species listed in the UNCLOS Annex 1, and for EU countries under the EU Regulations 1967/2006 and 2019/1241 (EU, 2006; 2019).

KEYS FOR  
CARTILAGINOUS FISH  
IDENTIFICATION

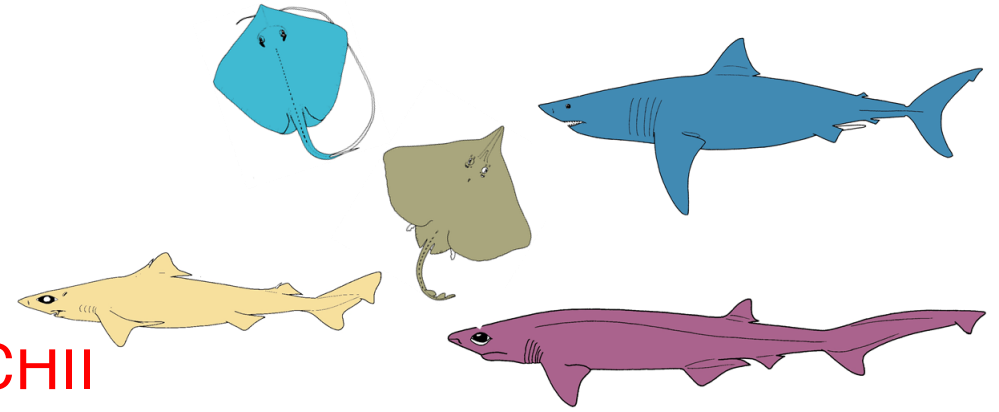
CLASS  
CHONDRICHTHYES

**5 to 7 gill slits**

Subclass

**ELASMOBRANCHII**

Sharks, rays and skates

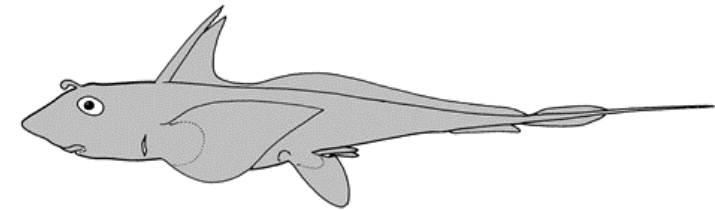


**1 gill slit**

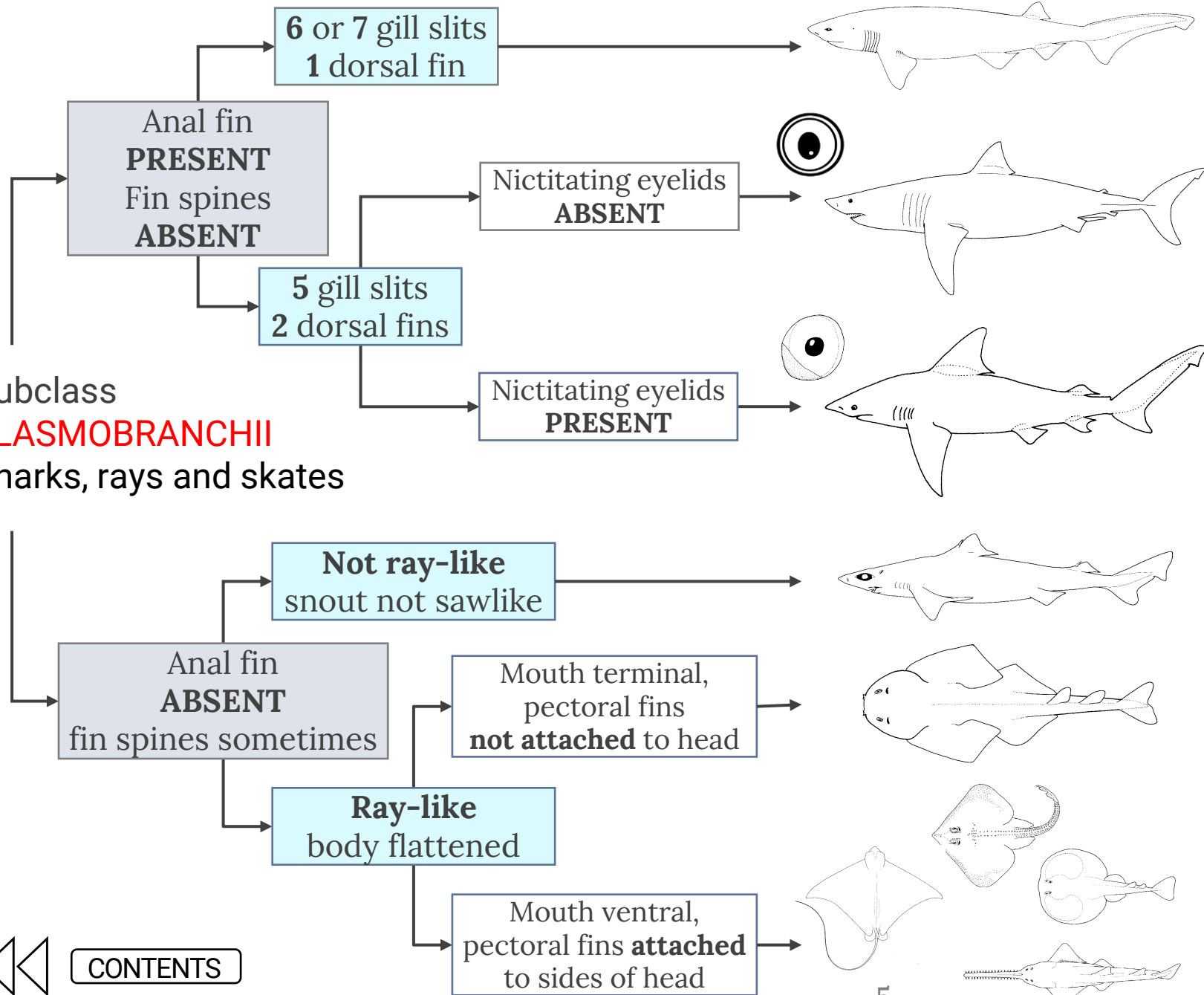
Subclass

**HOLOCEPHALI**

Chimaeras



Subclass  
**ELASMOBRANCHII**  
Sharks, rays and skates



large DEMERSALS  
HEXANCHIFORMES

large PELAGICS  
LAMNIFORMES

CARCHARHINIFORMES

small DEMERSALS

SQUALIFORMES & ECHINORHINIFORMES

SQUATINIFORMES

demersal RAYS & SKATES

*Batoid fishes*

other RAYS



SHARKS

ORDERS

Families

HEXANCHIFORMES

Hexanchidae

large DEMERSALS



CONTENTS



6 or 7 gill slits, 1 dorsal fin

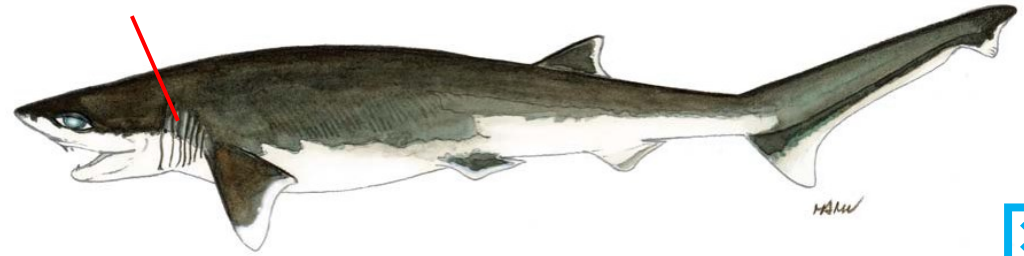
# HEXANCHIFORMES

## Hexanchidae

SEVEN pairs of gill openings

*Heptranchias*

**Sharpnose sevengill shark** (*Heptranchias perlo*) HXT

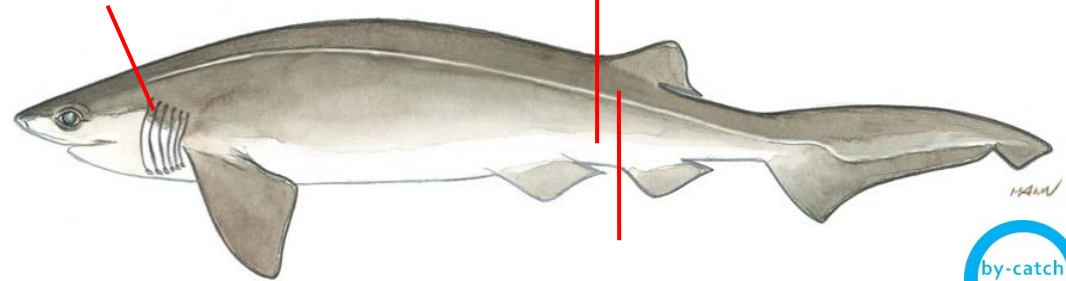


SIX pairs of gill openings

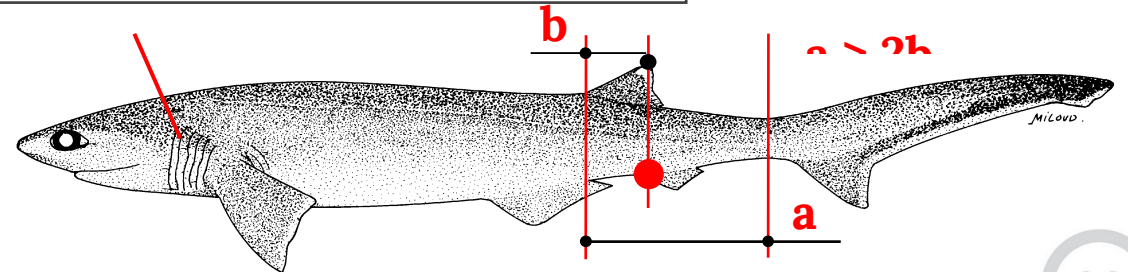
*Hexanchus*

Origin of the dorsal fin almost over the anal fin origin

**Bluntnose sixgill shark** (*Hexanchus griseus*) SBL



Origin of the dorsal fin well ahead the anal fin origin



**Bigeyed sixgill shark** (*Hexanchus nakamurai*) HXN



large DEMERSALS



CONTENTS



# SHARKS

## ORDERS

## Families

LAMNIFORMES

Carchariidae  
Odontaspidae  
Alopiidae  
Cetorhinidae  
Lamnidae

CARCHARHINIFORMES

Carcharhinidae  
Galeocerdonidae  
Sphyrnidae  
Scyliorhinidae  
Pentanchidae  
Triakidae

# large PELAGICS



CONTENTS





5 gill slits 2 dorsal fins, nictitating eyelids **ABSENT**

**LAMNIFORMES**

Keels on caudal peduncle **ABSENT**

Keels on caudal peduncle **PRESENT**

Caudal fin much shorter than trunk of body

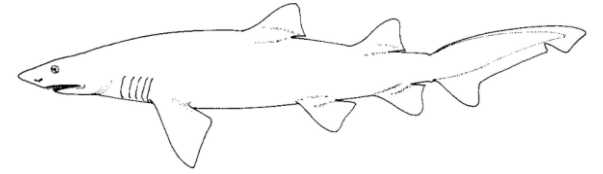
Origin of the pelvic fins slightly posterior to the base of the first dorsal fin

Origin of the pelvic fins distinctly behind the free rear tip of the first dorsal fin

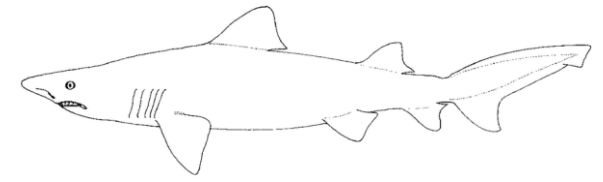
Caudal fin about as long as trunk of body

Gill slits extremely large, extended dorsally onto surface of head

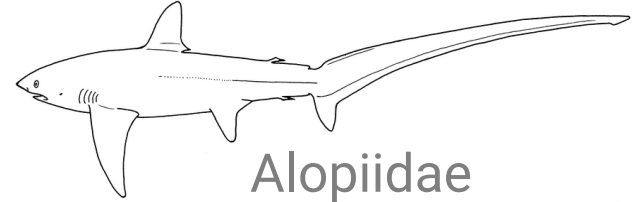
Gill slits large, but not extending onto dorsal surface of head



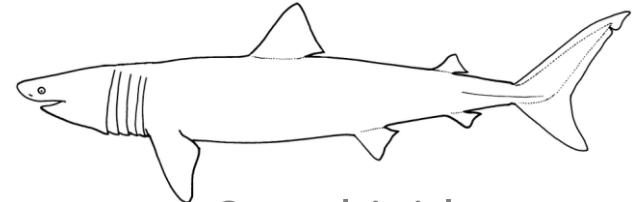
Carchariidae



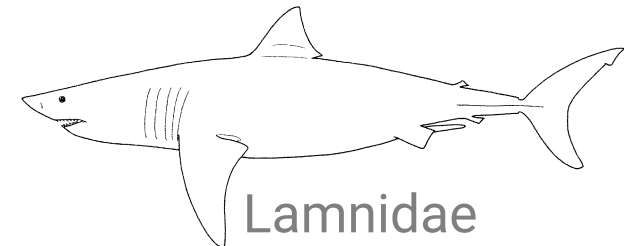
Odontaspidae



Alopiidae



Cetorhinidae



Lamnidae

large PELAGICS



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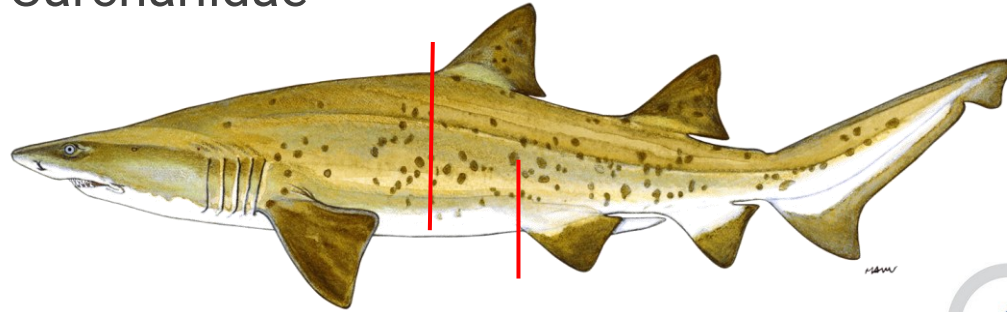


**NO** Nictitating eyelids, **keel** on caudal peduncle absent, caudal upper lobe relatively short

## LAMNIFORMES

Origin of the pelvic fins slightly posterior to the base of the first dorsal fin

Carchariidae

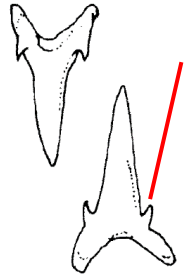


**Sand tiger shark** (*Carcharias taurus*) CCT



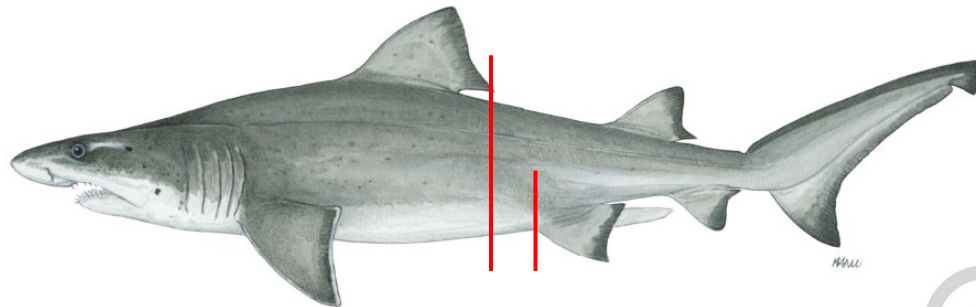
First dorsal fin similar in size to second dorsal and anal fins.

Teeth typically with one lateral cusp.



Origin of the pelvic fins distinctly behind the free rear tip of the first dorsal fin

Odontaspidae

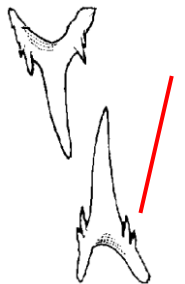


**Smalltooth sand tiger** (*Odontaspis ferox*) LOO



First dorsal fin much larger than second dorsal and anal fins.

Teeth typically with two or more lateral cusps.



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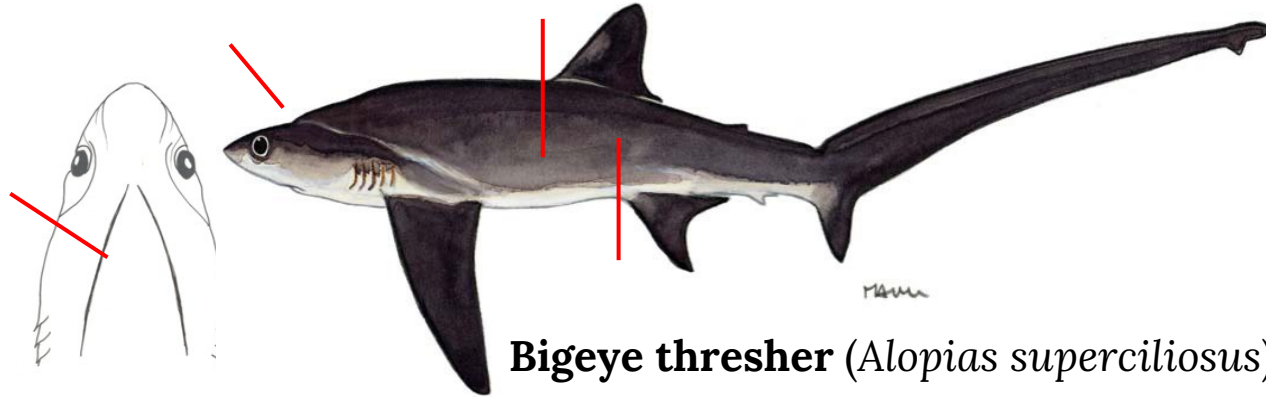
**NO** nictitating eyelids, keels on caudal peduncle absent, **caudal fin about as long as trunk of body.**

Two dorsal fins, the second one very small

## LAMNIFORMES

### Alopiidae

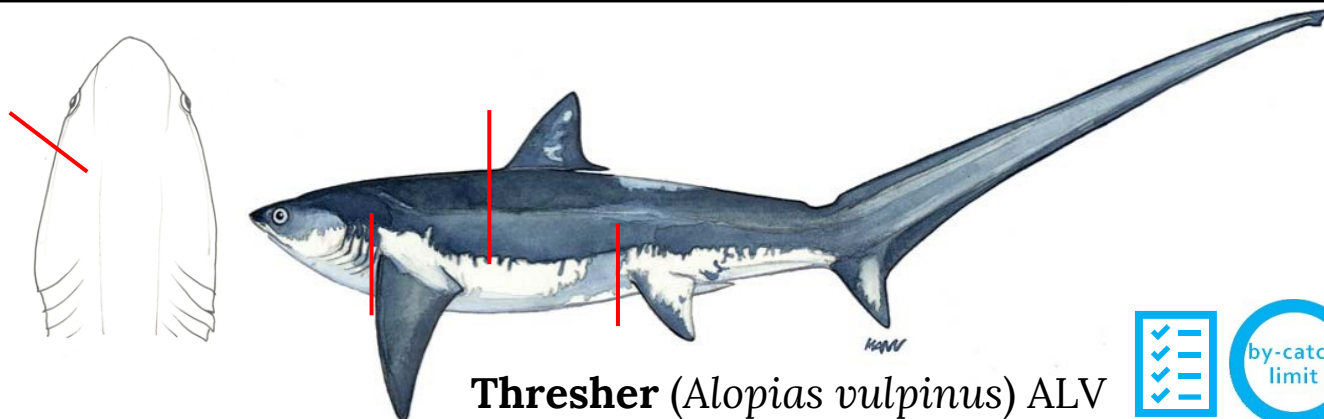
Head with a **deep horizontal groove** extending around each side.  
**Eyes are very large**, with orbits expanded onto the dorsal head surface. Base of first dorsal fin closer to pelvic bases than to pectoral bases



**Bigeye thresher** (*Alopias superciliosus*) BTH



Head without a deep horizontal groove extending around each side.  
Eyes relatively smaller, with orbits not expanded onto the dorsal head surface. Base of first dorsal fin about equidistant between pectoral and pelvic-fin bases or closer to pectoral-fin bases



**Thresher** (*Alopias vulpinus*) ALV



large PELAGICS



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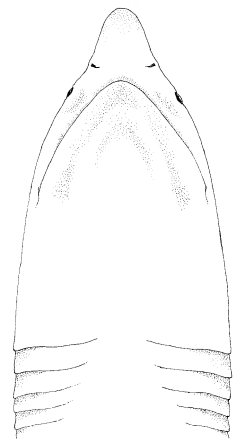
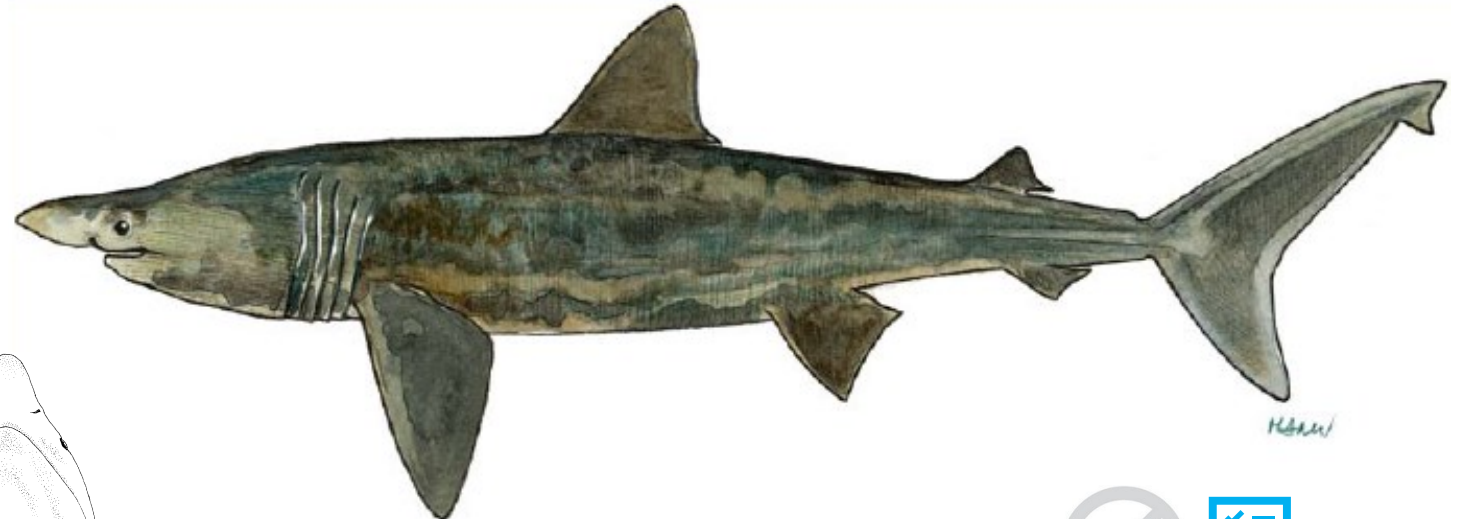


**NO** nictitating eyelids, **keels on caudal peduncle** present

LAMNIFORMES

Cetorhinidae

Great size, **enormous gill slits** that virtually encircle the head, modified gill rakers, **pointed snout**, huge, subterminal mouth with **minute hooked teeth**, caudal peduncle with strong lateral keels, and lunate caudal fin distinguish this shark from all others.



Underside of head



upper theet

**Basking shark** (*Cetorhinus maximus*) BSK



large PELAGICS



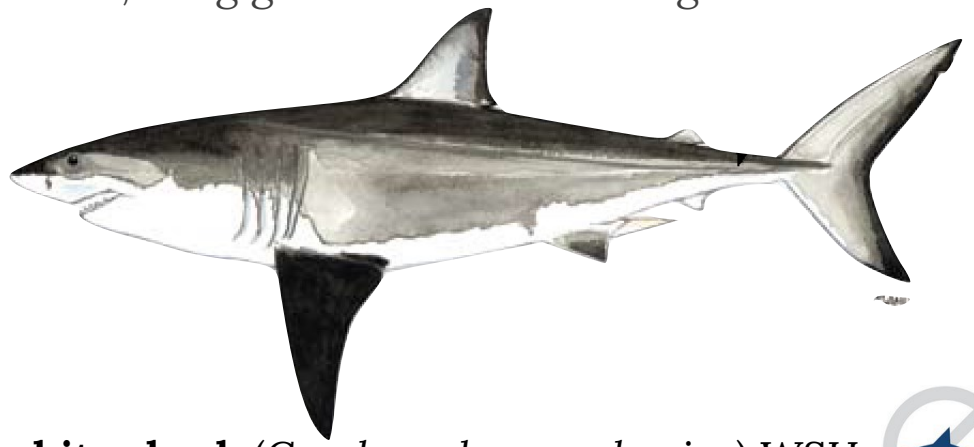
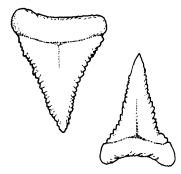
CONTENTS



NO Nictitating eyelids, keels on caudal peduncle present, long gill slits not encircling the head.

# LAMNIFORMES

Wide and triangular teeth with serrated edges and concave

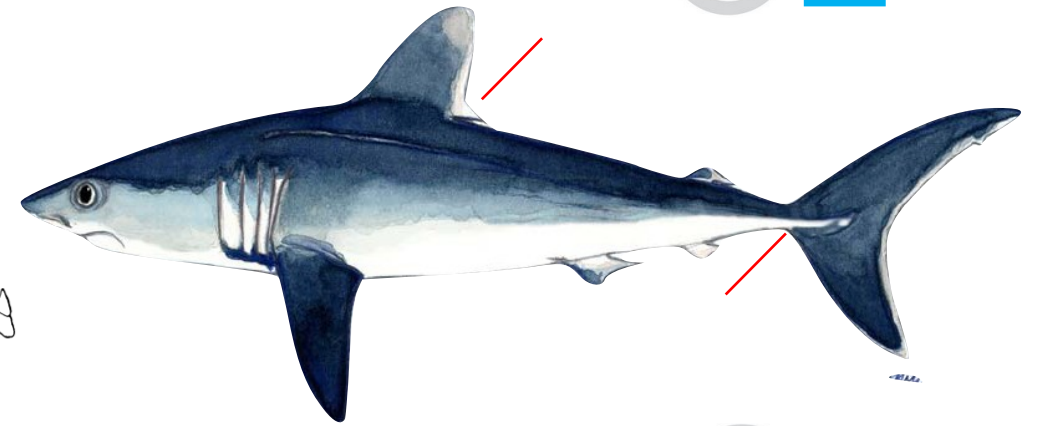


**Great white shark** (*Carcharodon carcharias*) WSH



# Lamnidae

Teeth with lateral cusps at the base. 1st dorsal fin with distinctive white free rear tip. Secondary keel below main keel on caudal peduncle



**Porbeagle** (*Lamna nasus*) POR



Teeth elongated not serrated

Teeth without lateral cusps at the base



*Isurus*

large PELAGICS



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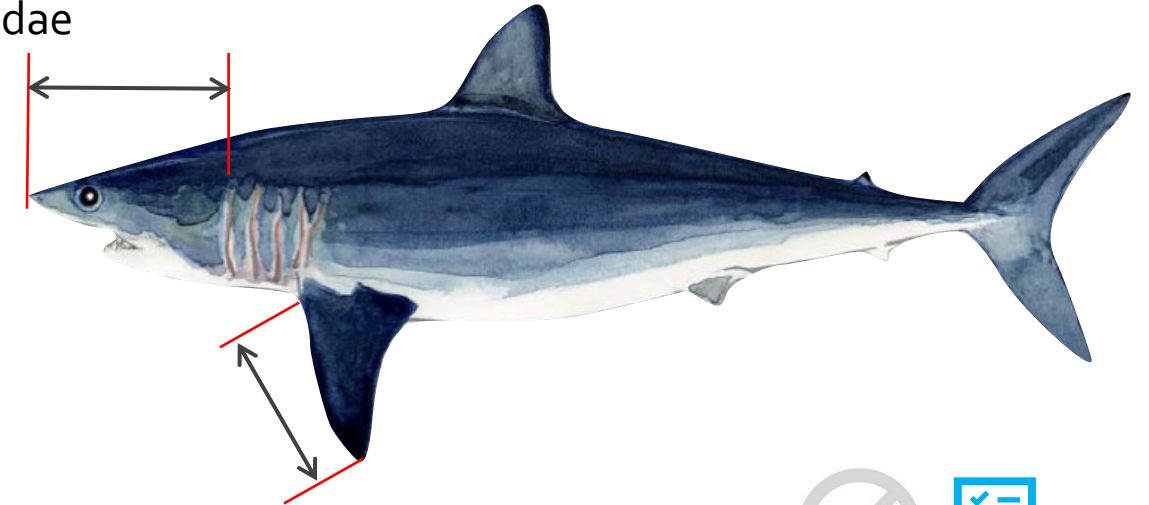
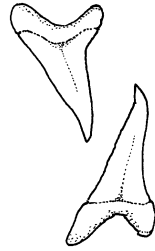
LAMNIFORMES

Lamnidae

*Isurus*

Back to other Lamnidae

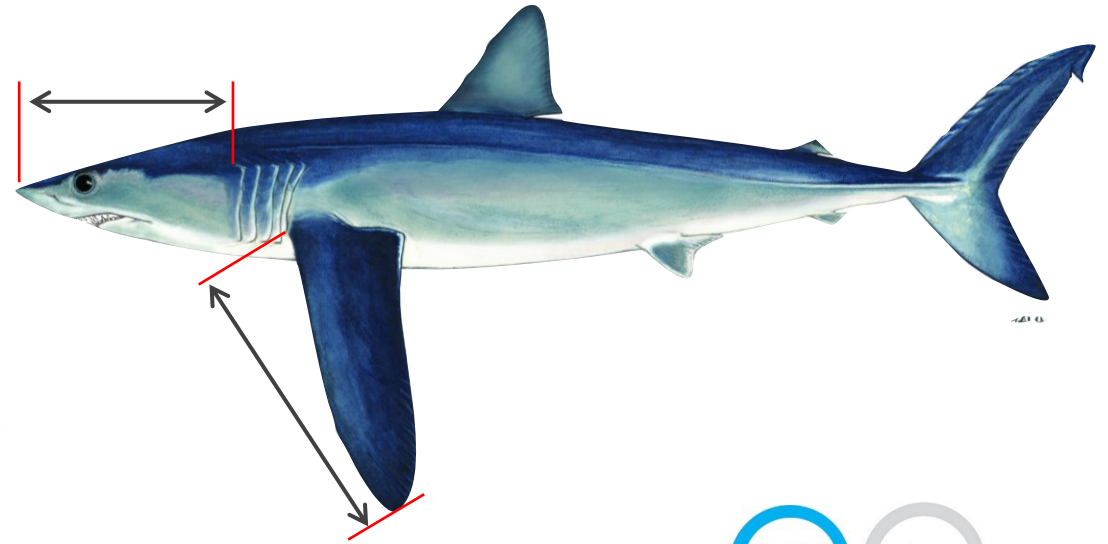
Pectoral fins shorter than head length



**Shortfin mako** (*Isurus oxyrinchus*) SMA



Pectoral fins longer than head length



**Longfin mako** (*Isurus paucus*) LMA



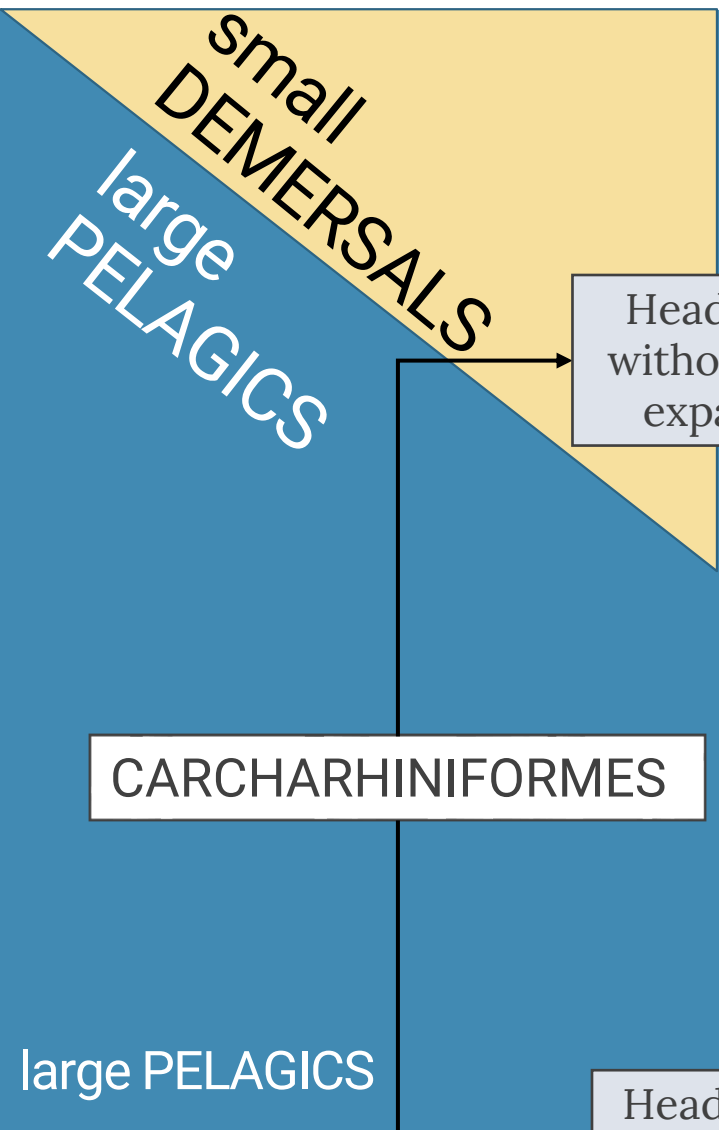
large PELAGICS



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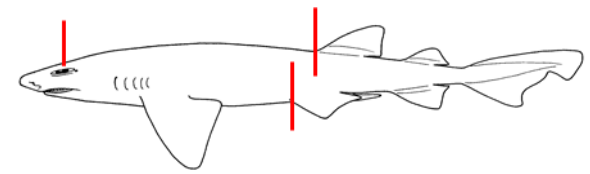
5 gill slits 2 dorsal fins,  
nictitating eyelids **PRESENT**



Head normal  
without lateral  
expansions

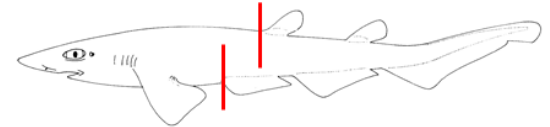
1<sup>st</sup> dorsal-fin origin  
opposite or behind  
pelvic-fin origin

Supraorbital crests  
**PRESENT**



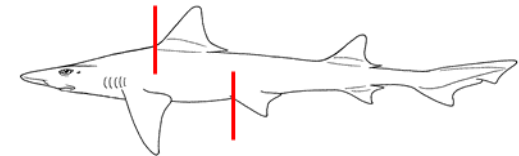
**Scyliorhinidae**

Supraorbital crests  
**ABSENT**



**Pentanchidae**

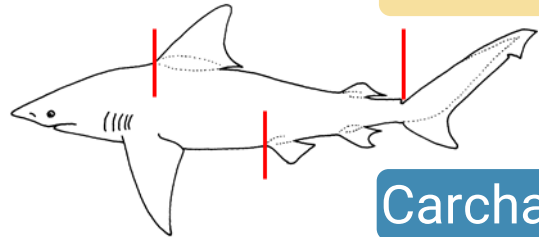
Precaudal pits  
**ABSENT**



**Triakidae**

1<sup>st</sup> dorsal-fin origin  
well ahead  
pelvic-fin origin

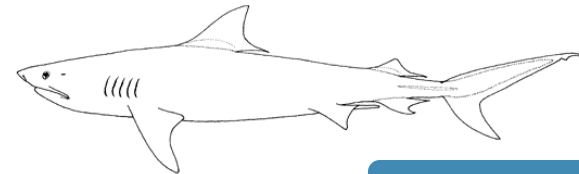
Spiracles  
**ABSENT**



**Carcharhinidae**

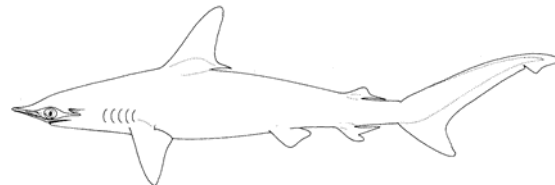
Precaudal pits  
**PRESENT**

Spiracles  
**PRESENT**



**Galeocerdonidae**

Head with lateral  
bladelike  
expansions



**Sphyrnidae**



CONTENTS



Nictitating eyelids **PRESENT**, not hammer-like head, interdorsal ridge present

# CARCHARHINIFORMES

## Carcharhinidae

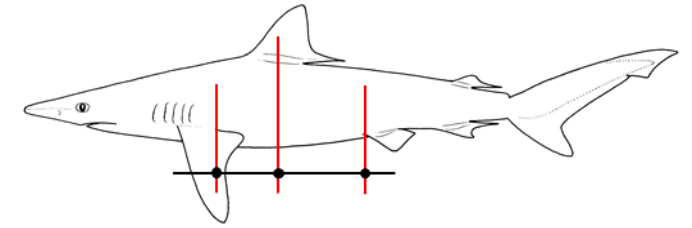
Spiracles **ABSENT**  
Upper labial furrows long to very short,  
not extending in front of eyes

Origin of the 2nd dorsal fin above or slightly behind the origin of the anal fin

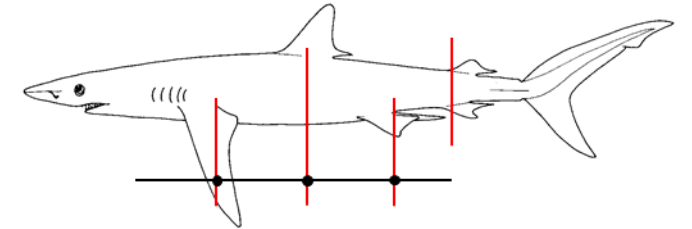
Midpoint of 1st dorsal-fin base closer to pectoral-fin axilla than pelvic fins origin

Midpoint of 1st dorsal-fin base equidistant between pectoral and pelvic-fin axilla or closer to pectoral fins

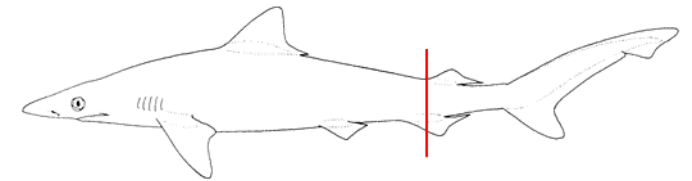
Origin of the 2nd dorsal fin above or behind the middle of the anal fin



*Carcharhinus*



*Prionace*



*Rhizoprionodon*

large PELAGICS



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# CARCHARHINIFORMES

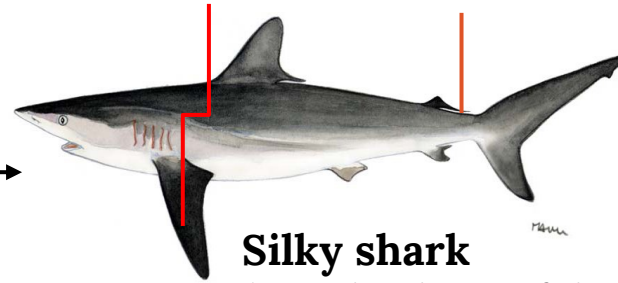
## Carcharhinidae

### *Carcharhinus*

Interdorsal ridge  
**PRESENT**

Interdorsal ridge  
**ABSENT**

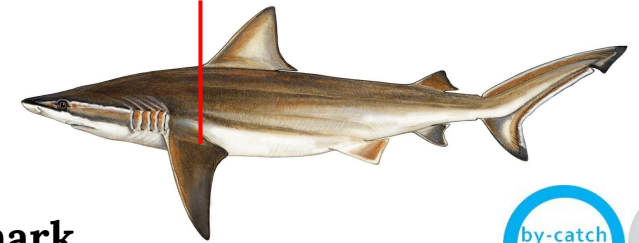
First dorsal fin origin  
behind the pectoral fin  
axilla



**Silky shark**  
(*Carcharhinus falciformis*) FAL



Snout narrowly rounded.  
Length greater than  
mouth width

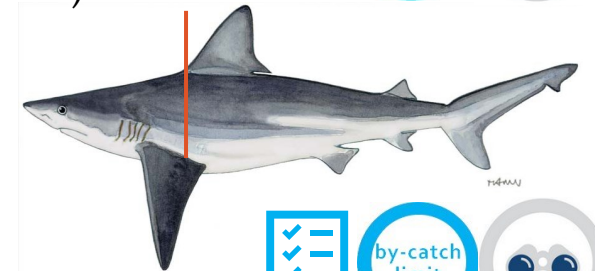


**Bignose shark**  
(*Carcharhinus altimus*) CCA



First dorsal fin origin  
over or anterior to  
pectoral fin free rear tips

First dorsal fin very high  
and triangular



**Sandbar shark**  
(*Carcharhinus plumbeus*) CCP



Snout broadly  
rounded

First dorsal fin low  
with curved anterior  
margin



**Dusky shark**  
(*Carcharhinus obscurus*) DUS



Continue in the next slide



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Return to the previous slide

CARCHARHINIFORMES

Carcharhinidae

Interdorsal ridge  
**PRESENT**

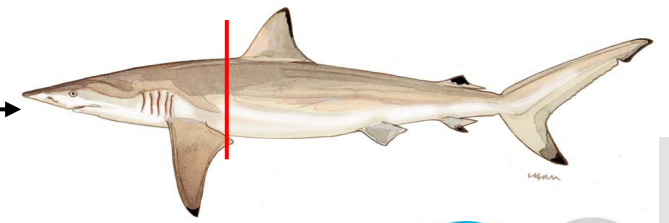
*Carcharhinus*

Interdorsal ridge  
**ABSENT**

Margin of pectoral fins  
and tip of the lower lobe  
of caudal fin  
**BLACK**

Pointed snout

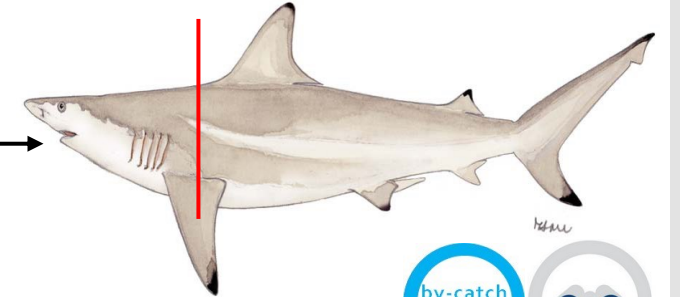
Origin of the 1st dorsal fin  
behind the inner margin  
of the pectoral fins



**Spinner shark**  
(*Carcharhinus brevipinna*) CCB



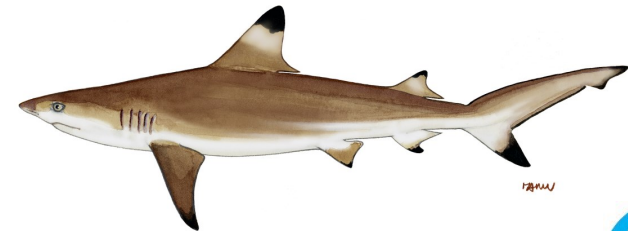
Origin of the 1st dorsal fin  
above the inner margin  
of the pectoral fins



**Blacktip shark**  
(*Carcharhinus limbatus*) CCL



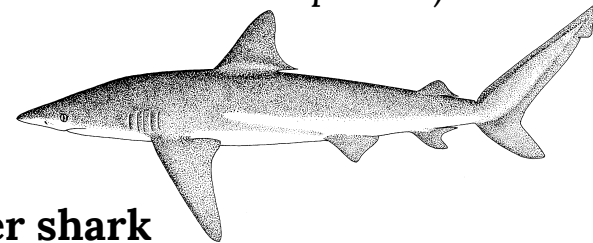
Rounded snout



**Blacktip reef shark**  
(*Carcharhinus melanopterus*) BLR



Margin of pectoral fins  
and tip of the lower lobe  
of caudal fin  
**NOT BLACK**



**Copper shark**  
(*Carcharhinus brachyurus*) BRO



large PELAGICS



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# CARCHARHINIFORMES

## Carcharhinidae

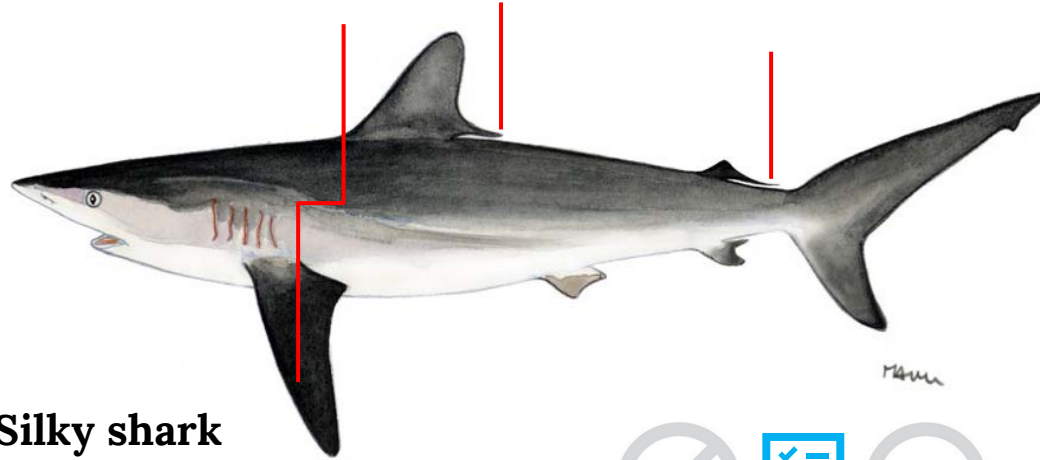
### *Carcharhinus*

Interdorsal ridge  
**PRESENT**

large PELAGICS



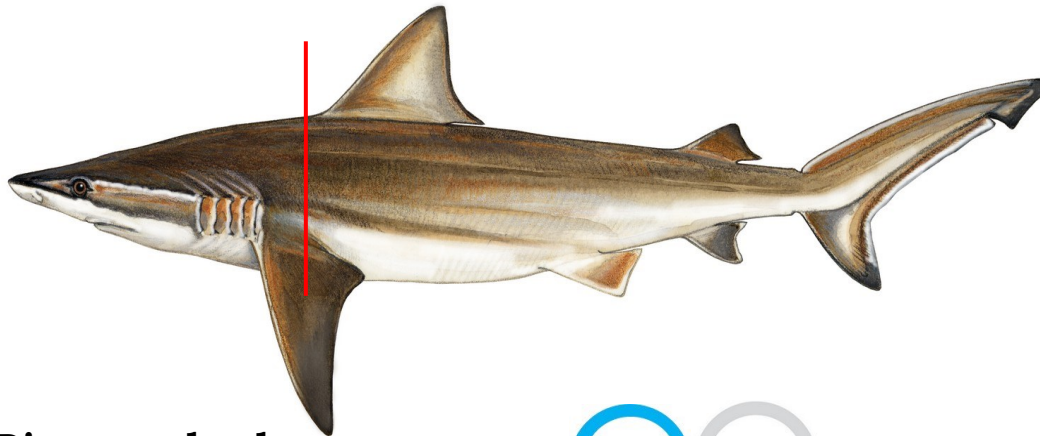
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**Silky shark**  
(*Carcharhinus falciformis*) FAL



Origin of the 1st dorsal fin behind to the pectoral fin axilla.  
Distinctively long free rear tips and inner margins on 2nd dorsal and anal fins.



**Bignose shark**  
(*Carcharhinus altimus*) CCA



Origin of the 1st dorsal fin ahead or above the pectoral fin axilla.  
Snout length greater than mouth width and moderately rounded.

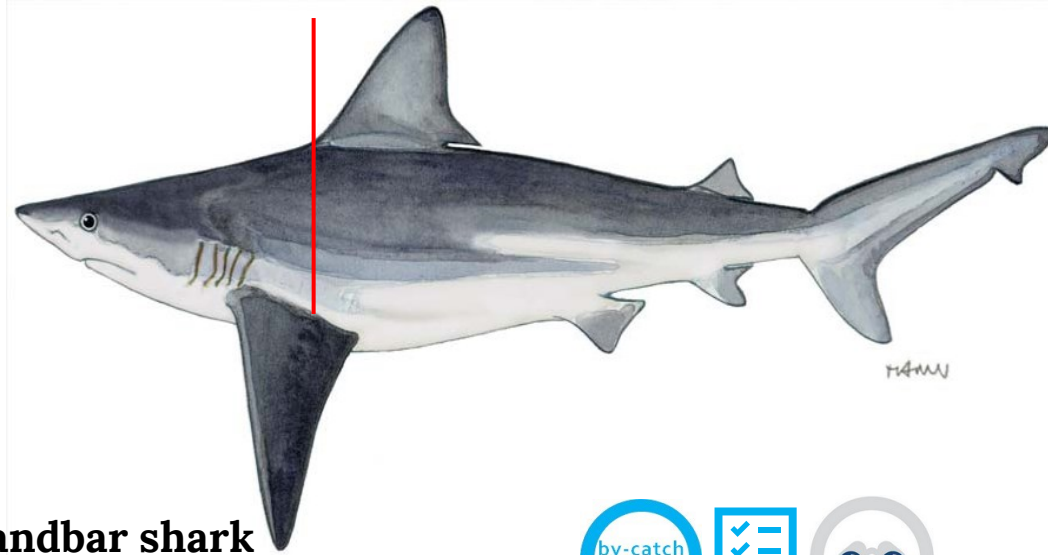


# CARCHARHINIFORMES

## Carcharhinidae

### *Carcharhinus*

Interdorsal ridge  
**PRESENT**

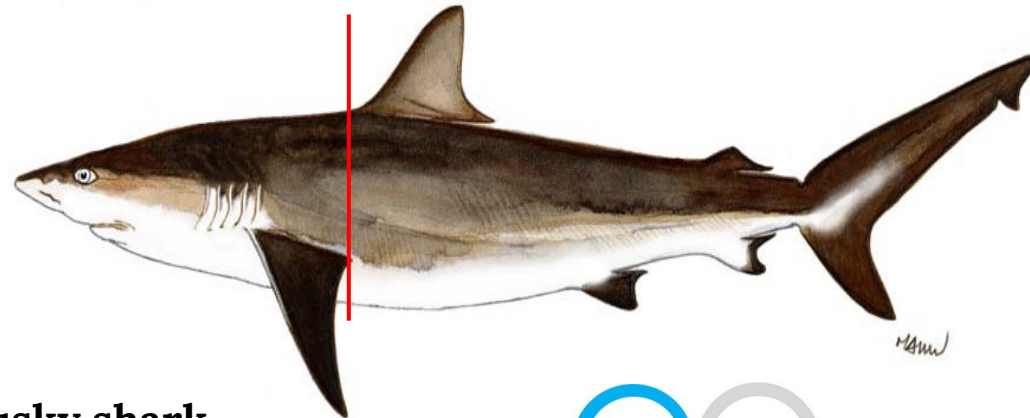


**Sandbar shark**  
(*Carcharhinus plumbeus*) CCP



Origin of the 1st dorsal fin slightly forward or above the pectoral fin insertion. Long and clearly round snout. First dorsal fin high and triangular.

Skin covered with large, very hard, denticles. This makes the skin feel smoother and harder than the other species of the genus.



**Dusky shark**  
(*Carcharhinus obscurus*) DUS



Origin of the 1st dorsal fin ahead or above the free rear tip of the pectoral fins. Long and clearly round snout. First dorsal fin low with curved anterior margin.



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# CARCHARHINIFORMES

## Carcharhinidae

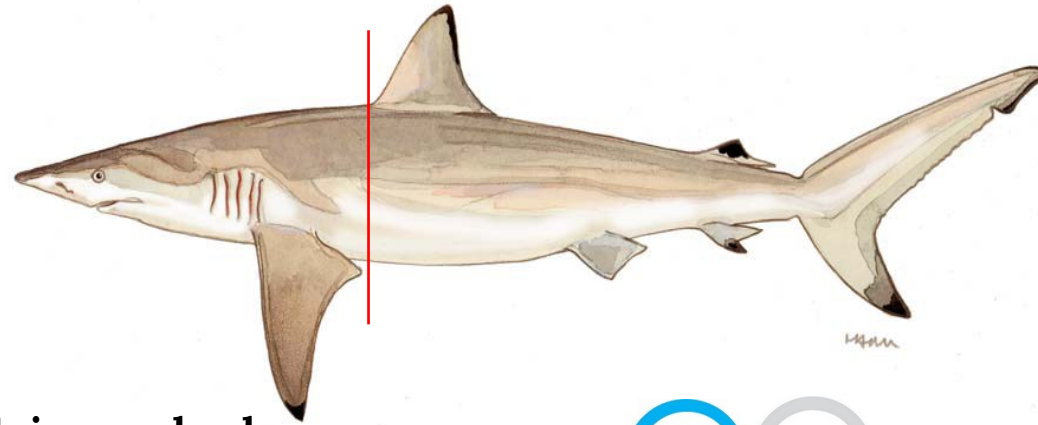
### *Carcharhinus*

Interdorsal ridge  
**ABSENT**

large PELAGICS



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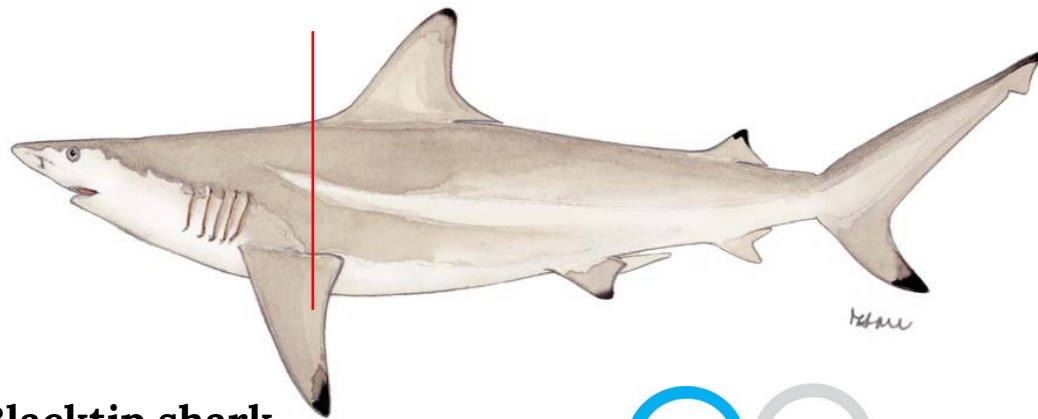
**Spinner shark**  
(*Carcharhinus brevipinna*) CCB



Bronze to grey upper body; pale underside.

Most fins have black or dusky tips. Anal fin almost always has distinctive black tip that looks like it has been dipped in black paint.

1<sup>st</sup> dorsal fin origin in line with or slightly behind free rear tips of the pectoral fins.



**Blacktip shark**  
(*Carcharhinus limbatus*) CCL



Bronze to grey upper body; pale underside.

Most fins usually have black or dusky tips, but anal fin does not have a distinctive 'paint-dipped' black tip. Large adults may lack black tips.

1<sup>st</sup> dorsal fin origin slightly forward of the free rear tips of the pectoral fins.



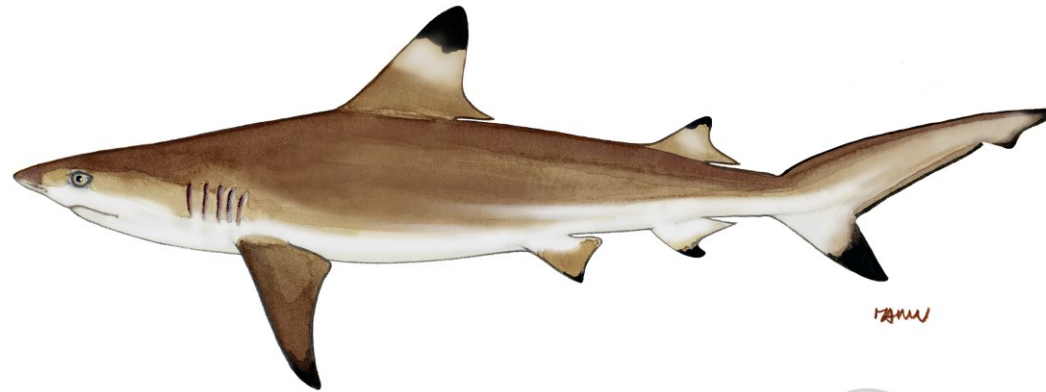
# CARCHARHINIFORMES

## Carcharhinidae

### *Carcharhinus*

Interdorsal ridge  
**ABSENT**

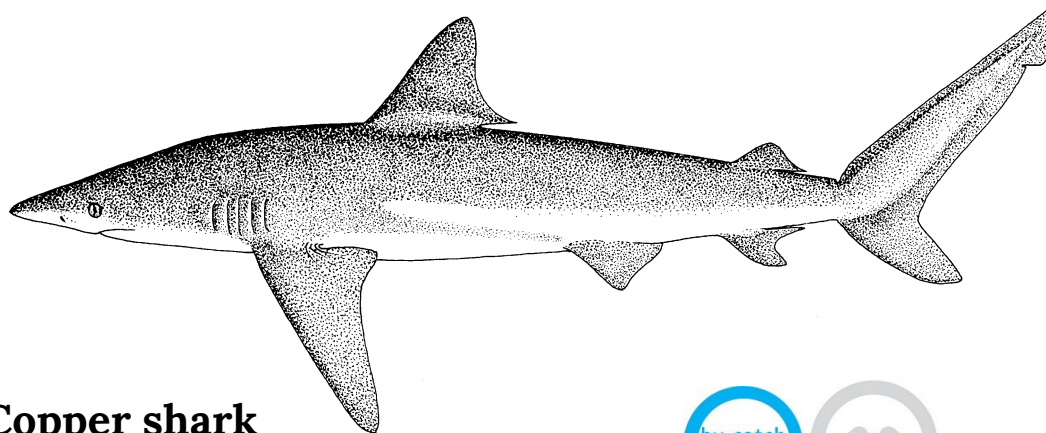
large PELAGICS



**Blacktip reef shark**  
(*Carcharhinus melanopterus*) BLR



First dorsal fin apex with a prominent black blotch.  
Rounded snout.



**Copper shark**  
(*Carcharhinus brachyurus*) BRO



Bronze to greyish upper body; creamy white underside.  
Fins lack distinctive markings although margins and tips can be dusky.  
Relatively long, rounded snout and relatively small 2nd dorsal fin.



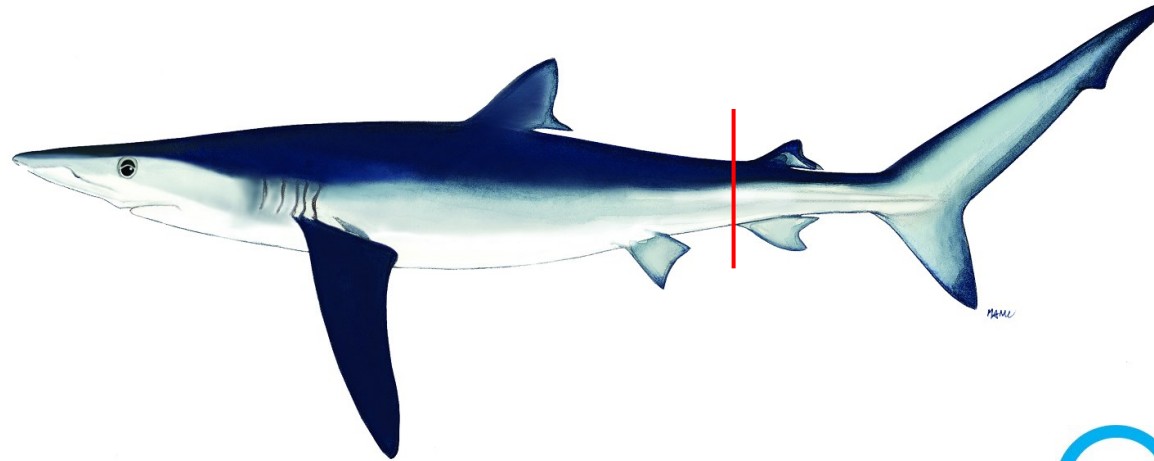
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# CARCHARHINIFORMES

## Carcharhinidae

### *Prionace*

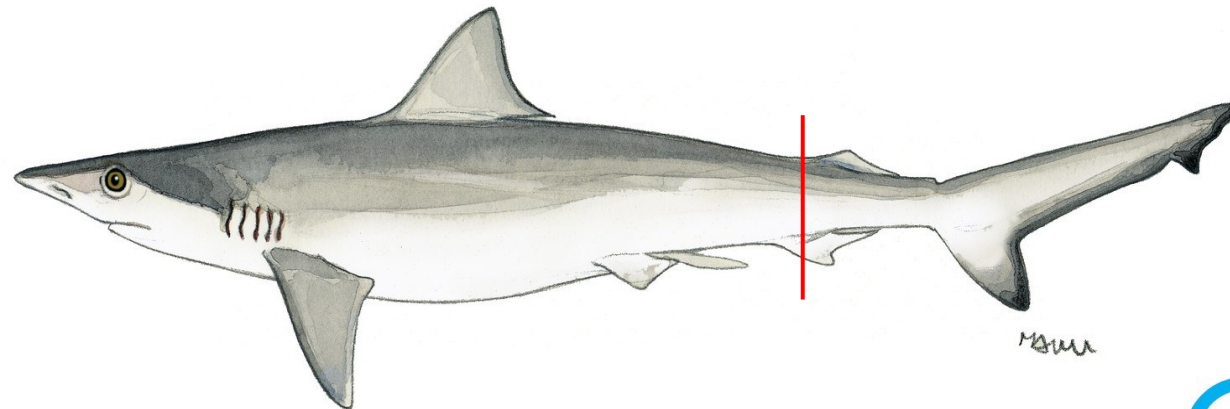


Bright blue (indigo blue)  
Origin of the 2<sup>nd</sup> dorsal fin above or slightly behind the anal fin origin. Pectoral fins long and falcate.

**Blue shark** (*Prionace glauca*) BSH



### *Rhizoprionodon*



Spiracle absent. Origin of the 2<sup>nd</sup> dorsal fin above or well behind the middle of the anal fin.

**Milk shark** (*Rhizoprionodon acutus*) RHA



large PELAGICS



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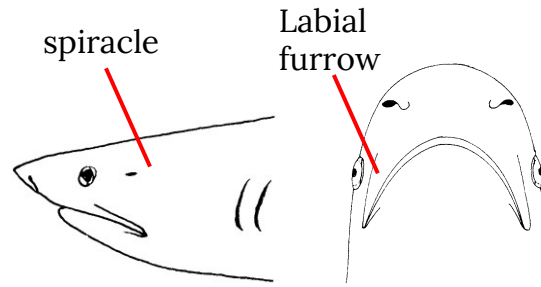


Nictitating eyelids **YES**, not hammer-like head, interdorsal ridge present

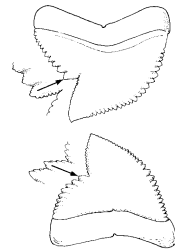
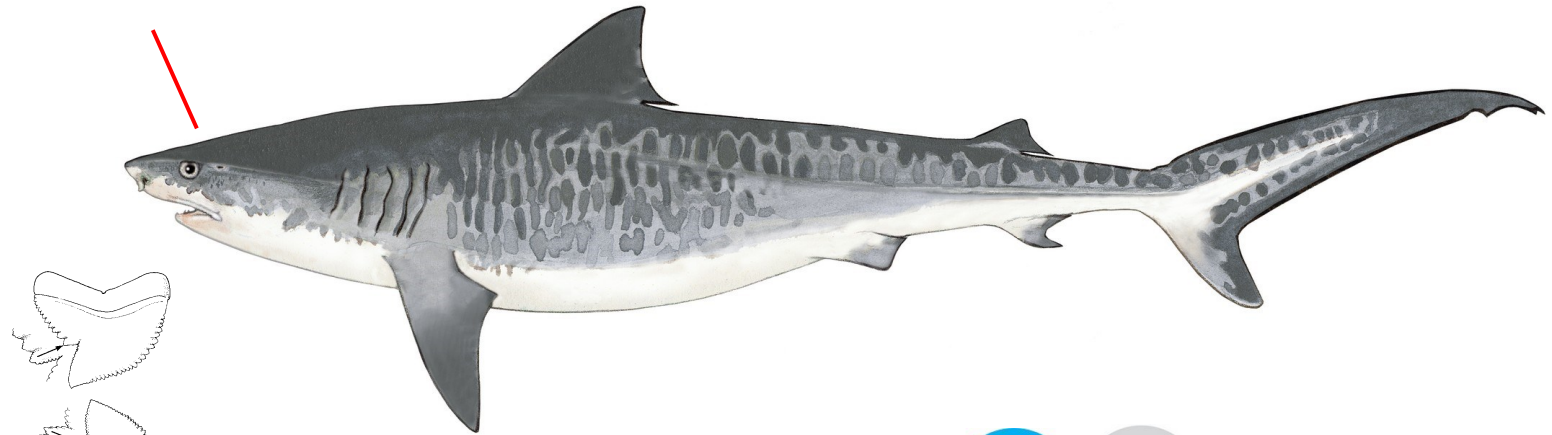
# CARCHARHINIFORMES

## Galeocerdonidae

Spiracles **PRESENT**  
Upper labial furrows very long, extending to front of eyes.



Square snout, interdorsal fin ridge present, dark vertical bars on the body, oblique teeth.



**Tiger shark** (*Galeocerdo cuvier*) TIG



large PELAGICS



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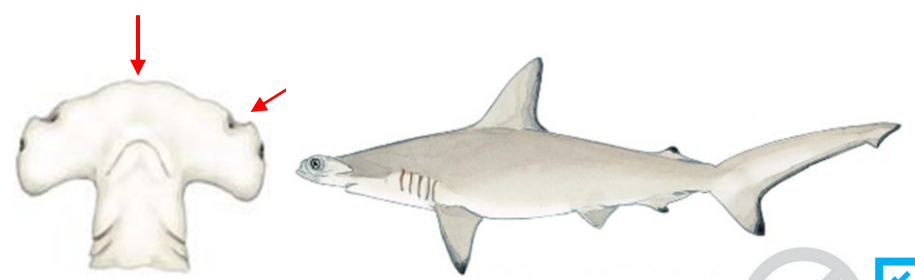




# Head with lateral bladelike expansions

CARCHARHINIFORMES

Nasal grooves **PRESENT**



**Scalloped hammerhead** (*Sphyrna lewini*) SPL



median indentation on anterior margin of head **PRESENT**

First dorsal fin falcate. Anterior margin of head nearly straight



**Great hammerhead** (*Sphyrna mokarran*) SPK



nasal grooves **ABSENT** or poorly developed

First dorsal fin not falcate

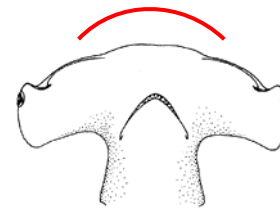


**Smalleye hammerhead** (*Sphyrna tudes*)\* SPQ



Sphyrnidae

median indentation on anterior margin of head **ABSENT**



**Smooth hammerhead** (*Sphyrna zygaena*) SPZ



\*Species to be confirmed for the Mediterranean.

large PELAGICS



CONTENTS



# SHARKS

# small DEMERSALS

## ORDERS

CARCHARHINIFORMES

SQUALIFORMES

ECHINORHINIFORMES

SQUATINIFORMES

## Families

Scyliorhinidae  
Pentanchidae  
Triakidae

Carcharhinidae  
Galeocerdonidae  
Sphyrnidae

Dalatiidae  
Etmopteridae  
Somniosidae  
Oxynotidae  
Centrophoridae  
Squalidae

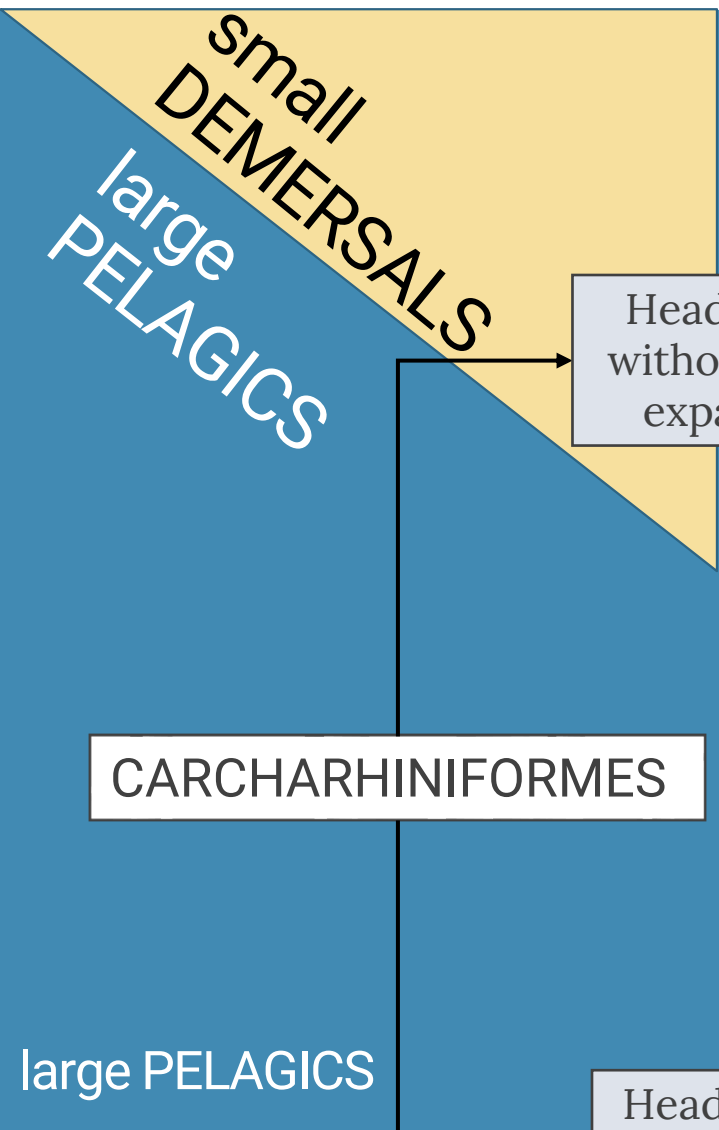
Echinorhinidae

Squatidae





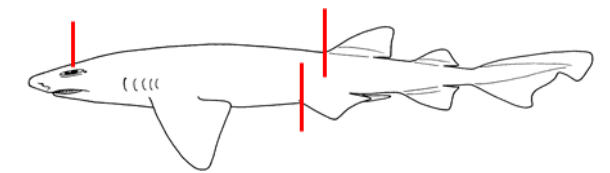
5 gill slits 2 dorsal fins,  
nictitating eyelids **PRESENT**



Head normal  
without lateral  
expansions

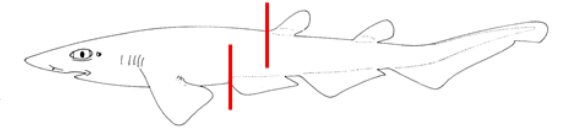
1<sup>st</sup> dorsal-fin origin  
opposite or behind  
pelvic-fin origin

Supraorbital crests  
**PRESENT**



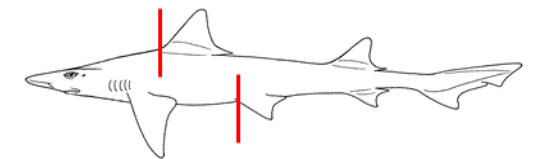
**Scyliorhinidae**

Supraorbital crests  
**ABSENT**



**Pentanchidae**

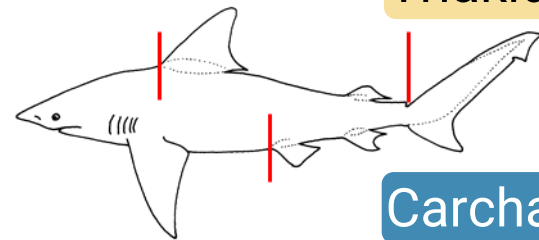
Precaudal pits  
**ABSENT**



**Triakidae**

1<sup>st</sup> dorsal-fin origin  
well ahead  
pelvic-fin origin

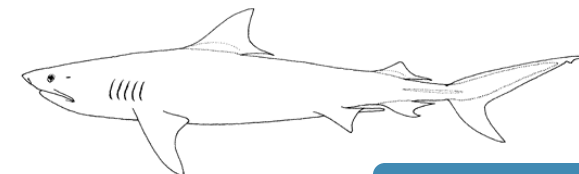
Spiracles  
**ABSENT**



**Carcharhinidae**

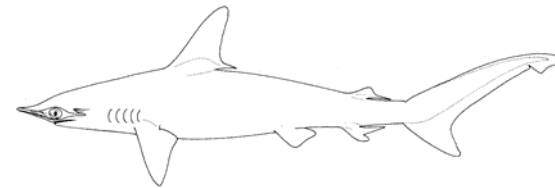
Precaudal pits  
**PRESENT**

Spiracles  
**PRESENT**



**Galeocerdonidae**

Head with lateral  
bladelike  
expansions



**Sphyrnidae**



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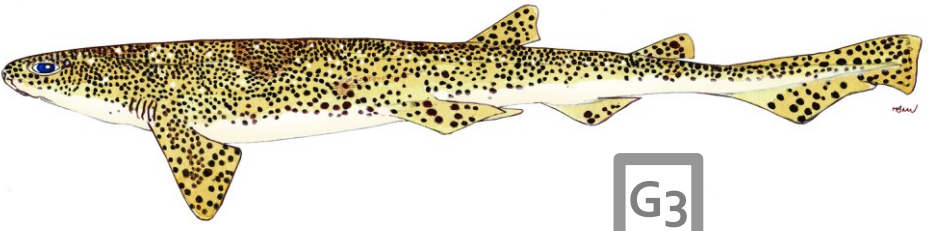
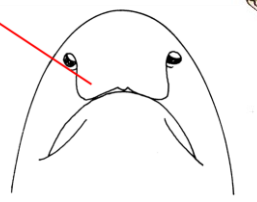


# CARCHARHINIFORMES

Supraorbital crest present.  
White oral cavity

## Scyliorhinidae

Nasal flaps long to the mouth.  
Numerous small dark spots

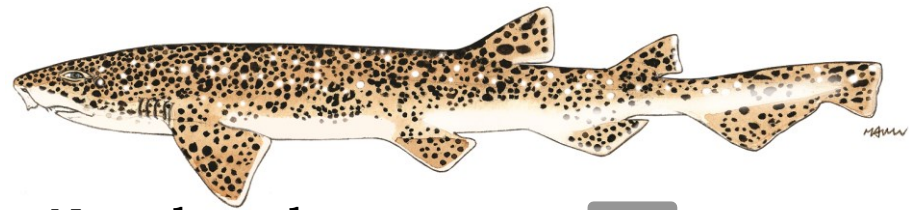
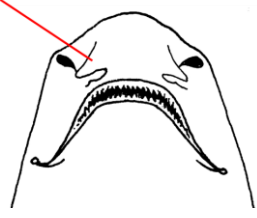


**Small-spotted catshark**  
(*Scyliorhinus canicula*) SYC

G3

G3 Black Sea

Nasal flaps not up to the mouth  
and well separate.  
Numerous large dark spots



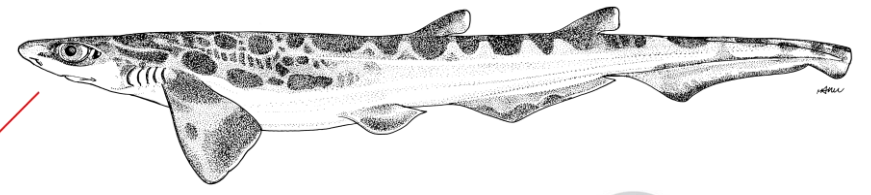
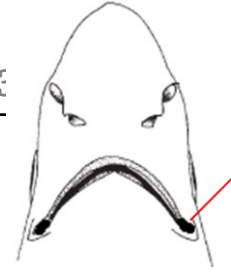
**Nursehound**  
(*Scyliorhinus stellaris*) SYT

G3

Supraorbital crest absent.  
Black oral cavity

## Pentanchidae

Black labial furrows. Up to 10 dark  
blurry spots on the back. One or  
two black lines along the lower  
edge of the caudal fin



**Atlantic sawtail catshark**  
(*Galeus atlanticus*) GHA



White labial furrows. Up to 20  
distinct dark spots on the back.  
Two or three dark spots along the  
lower edge of the caudal fin



**Blackmouth catshark**  
(*Galeus melastomus*) SHO

G2

G3

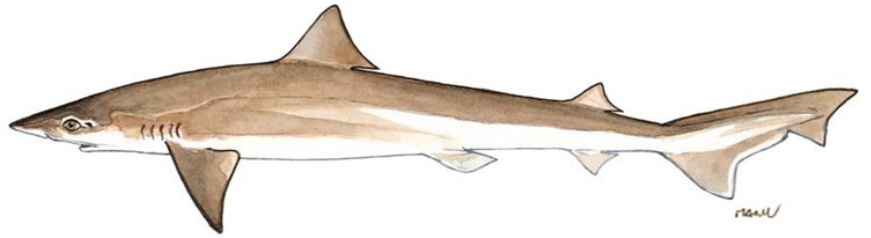
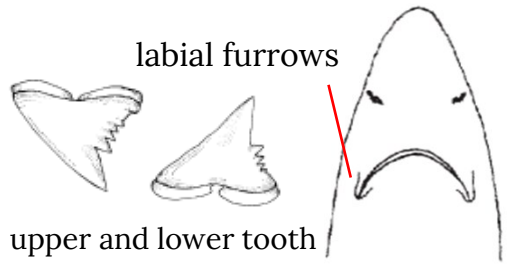
small DEMERSALS



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# CARCHARHINIFORMES



1<sup>st</sup> dorsal fin larger than the second. Long and conical snout. Small anterior nasal flaps. Terminal lobe of the caudal fin long. Teeth bladelike

*Galeorhinus*

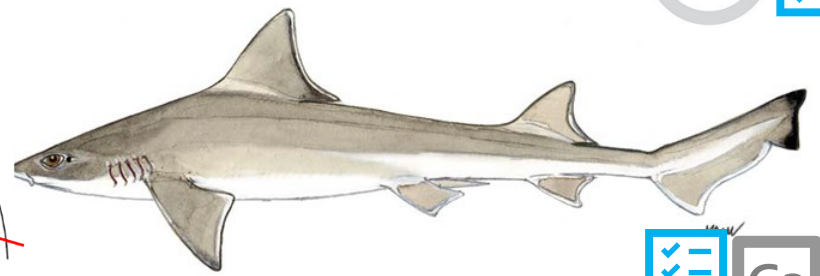
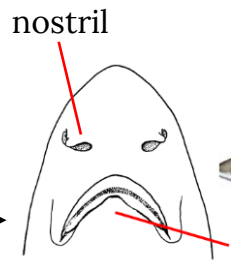
**Tope shark** (*Galeorhinus galeus*) GAG



## Triakidae

1<sup>st</sup> dorsal fin almost equal to the second. Short and relatively rounded snout. Teeth not bladelike, molariforms

Distance between the nostrils 1.4 times their length. Gray dorsal surface. **Lower jaw at angle**

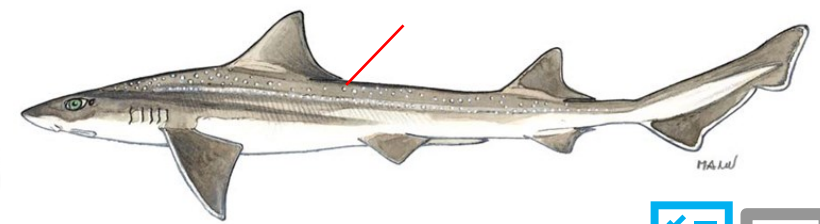


**Smooth-hound** (*Mustelus mustelus*) SMD



*Mustelus*

Gray dorsal surface with white spots

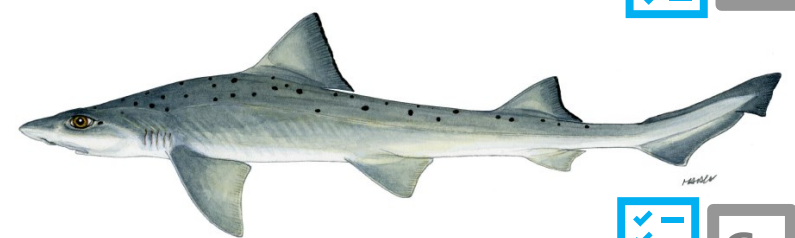
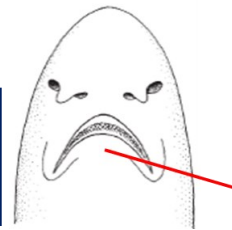


**Starry smooth-hound** (*Mustelus asterias*) SDS



Distance between the nostrils less than 1.4 times their length

Gray dorsal surface with possible dark spots. **Lower jaw rounded**



**Blackspotted smooth-hound** (*Mustelus punctulatus*) MPT



small DEMERSALS

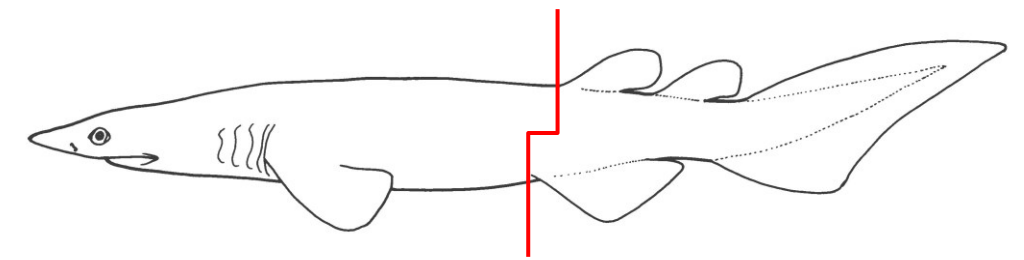
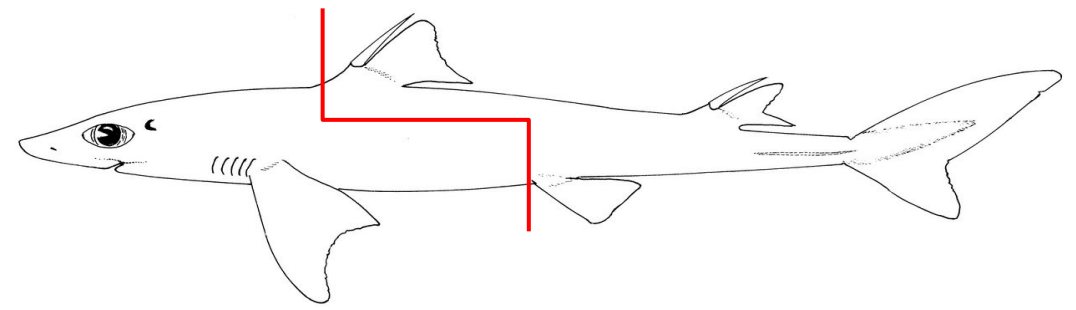


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SQUALIFORMES & ECHINORHINIFORMES

First dorsal fin origin well ahead pelvic fin origin → SQUALIFORMES

First dorsal fin origin behind pelvic fin origin → ECHINORHINIFORMES



small DEMERSALS

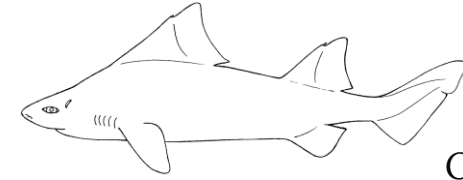


Anal fin **ABSENT**, fin spines **PRESENT** (sometimes absent), body not ray-like

# SQUALIFORMES

**TRIANGULAR BODY**  
Sail shaped dorsal fins

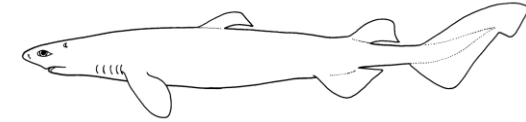
Oxynotidae



*Oxynotus centrina*

Conical snout  
No dorsal fin spines

Dalatiidae



*Dalatias licha*

Grey dorsal side, black abdomen

Etmopteridae

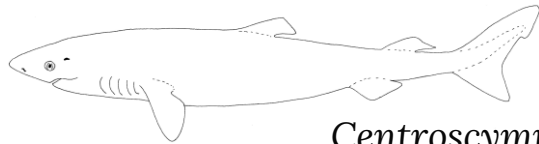


*Etmopterus spinax*

**CYLINDRICAL BODY**

Flat snout. Very small fin spines or no spines

Somniosidae



*Centroscygnus coelolepis*  
*Somniosus rostratus*

Brown body, green eye

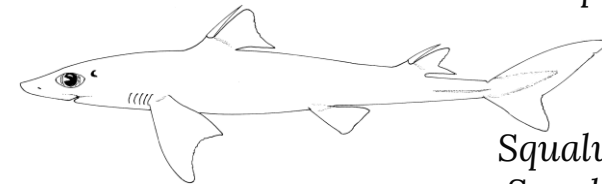
Centrophoridae



*Centrophorus uyato*

Caudal peduncle with pit and keels

Squalidae



*Squalus acanthias*  
*Squalus blainville*  
*Squalus megalops*

small DEMERSALS



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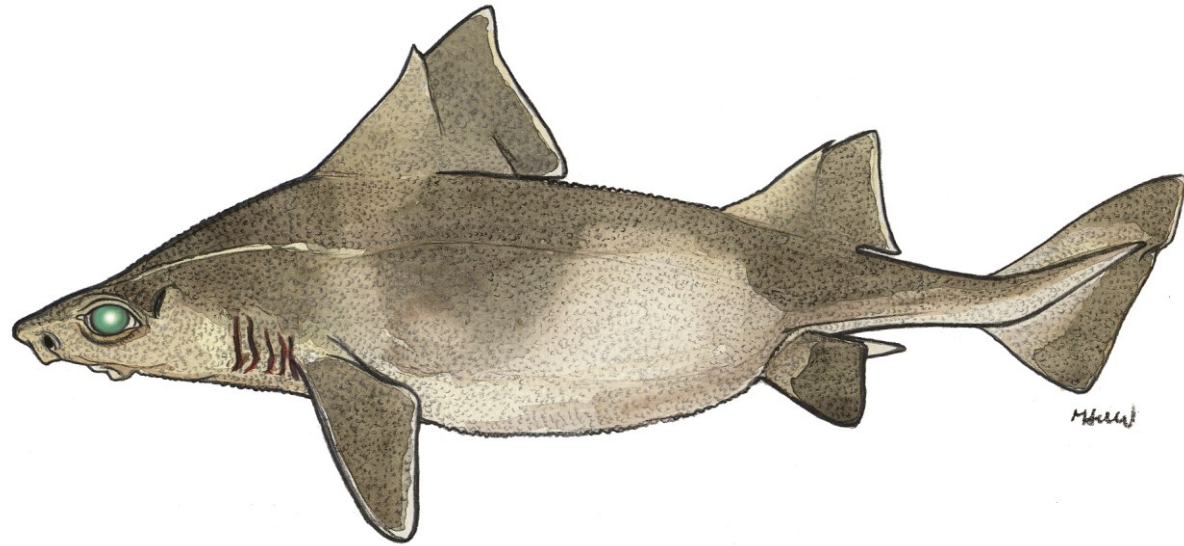
## SQUALIFORMES

### Oxynotidae

#### *Oxynotus*

Sail-like dorsal fins with spines.  
Lateral crest on the lower  
abdomen, flat and blunt snout,  
thick lips, large close-up  
nostrils, very rough skin.

Spine on the first dorsal fin inclined forwards



**Angular roughshark** (*Oxynotus centrina*) OXY



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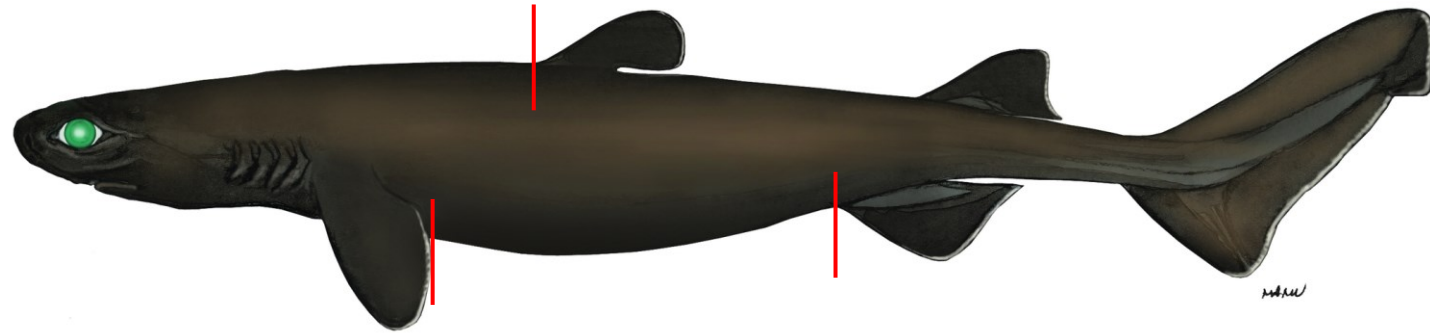
## SQUALIFORMES

### Dalatiidae

#### *Dalatias*

Free rear tip of pectoral fins rounded. Two dorsal fins without spines. Long dorsal lobe of the caudal fin with terminal notch.

Dorsal fins of equal size; base of the first dorsal fin relatively closer to the pectorals than to the pelvic fins. Posterior margin of fins usually whitish.



**Kitefin shark** (*Dalatias licha*) SCK



small DEMERSALS



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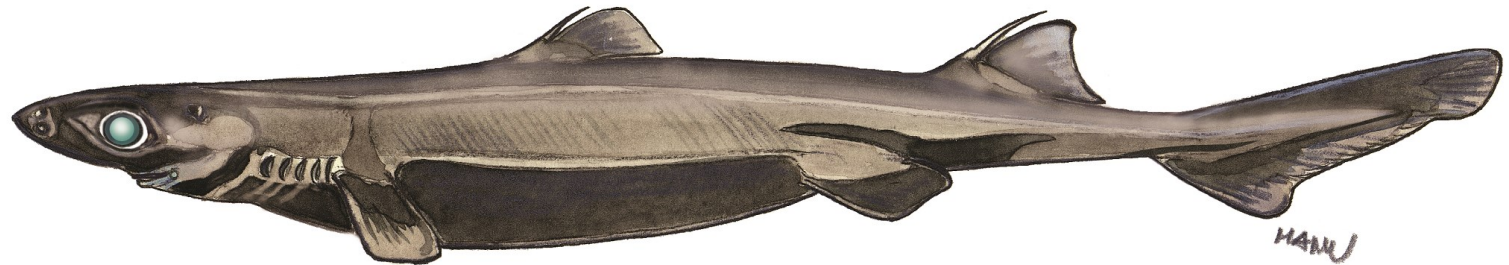
SQUALIFORMES

Etmopteridae

*Etmopterus*

Dorsal fins with strong grooved spines, the second fin and its spine, are larger than the first.

Very small gill openings, second dorsal fin about twice the first.



**Velvet belly** (*Etmopterus spinax*) ETX



small DEMERSALS



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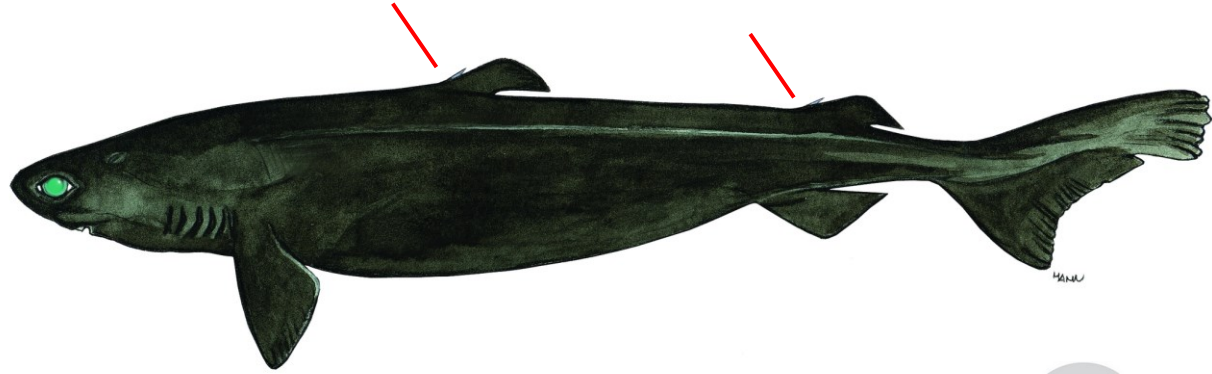


SQUALIFORMES

Somniosidae

Wide spiracles behind the eyes, pectoral fins with rounded free edge. Heterocercal caudal fin.

Dorsal fins WITH SPINES → *Centroscymnus*

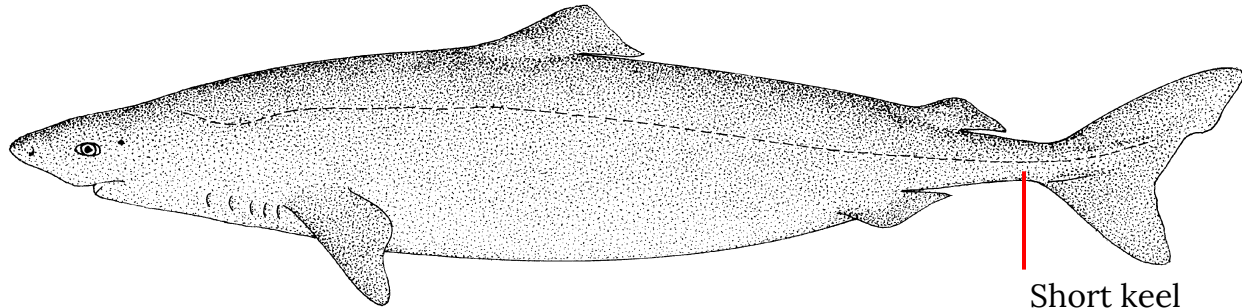


Equal dorsal fins, with small spines. No keel on the base of the caudal peduncle.

**Portuguese dogfish** (*Centroscymnus coelolepis*) CYO



Dorsal fins WITHOUT SPINES → *Somniosus*



Dorsal fins not equal, without small spines. Keels on the base of the caudal peduncle.

**Little sleeper shark** (*Somniosus rostratus*) SOR



Short keel

small DEMERSALS



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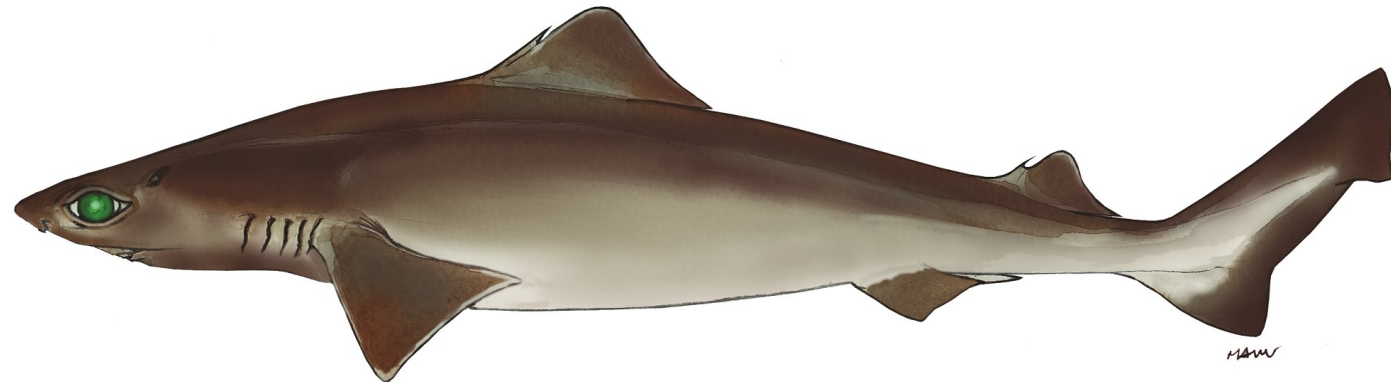


## SQUALIFORMES

### Centrophoridae

### *Centrophorus*\*

Spine of dorsal fins with lateral groove. Lower margin of caudal fin with notch. Inner corner of the pectoral fin squared or angular. Large eyes, green or yellowish. Interdorsal ridge.



**Gulper shark** (*Centrophorus uyato*) GUP



\*The genus *Centrophorus* is currently under major taxonomic revision and the former Mediterranean *C. granulosus* is now considered synonym of *C. uyato*. *C. granulosus* might be no longer a valid species in Mediterranean.

small DEMERSALS



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# SQUALIFORMES

## Squalidae

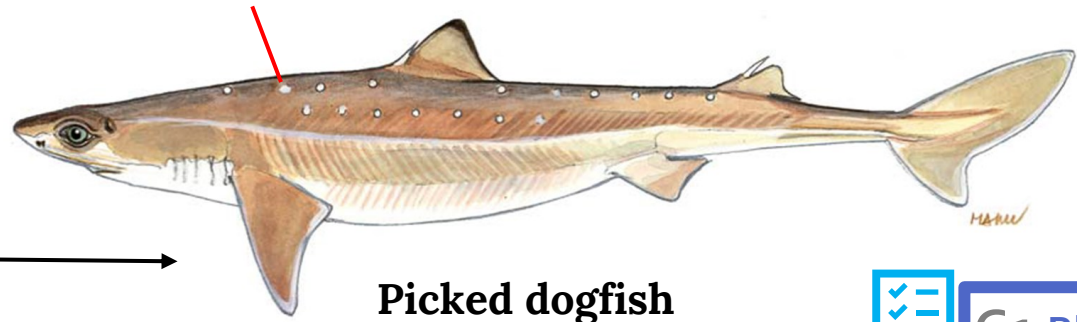
Body with white spots

Body without white spots

Origin of the 1<sup>st</sup> dorsal fin almost above the pectoral fin armpit (young) or in correspondence of the inner margin of the pectoral fin (adults). Denticles on the sides of the body with 3 cusps. Clasper like a hook. Caudal fins grey with dusky posterior margins

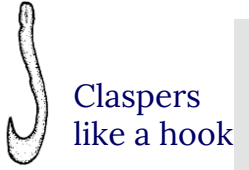
Origin of the 1<sup>st</sup> dorsal fin well behind the inner margin of the pectoral fin. Denticles on the sides of the body with 1 cusp. Claw claspers. Caudal fins grey with dusky posterior margins

Spine of dorsal fins without lateral groove.  
Lower margin of caudal fin without notch.  
Large spiracles near and behind the eyes.



**Picked dogfish**  
(*Squalus acanthias*) DGS

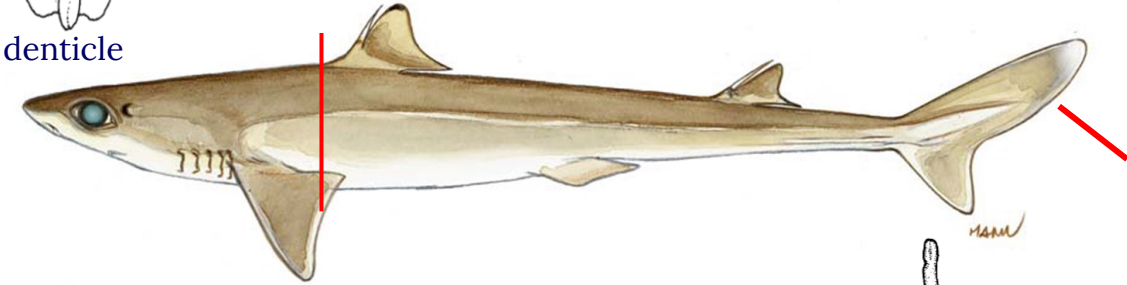
**G1 Black Sea** **G3**



Claspers like a hook

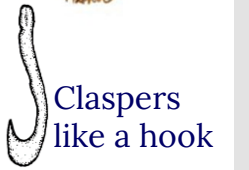


denticle

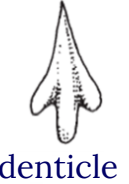


**Longnose spurdog**  
(*Squalus blainville*) QUB

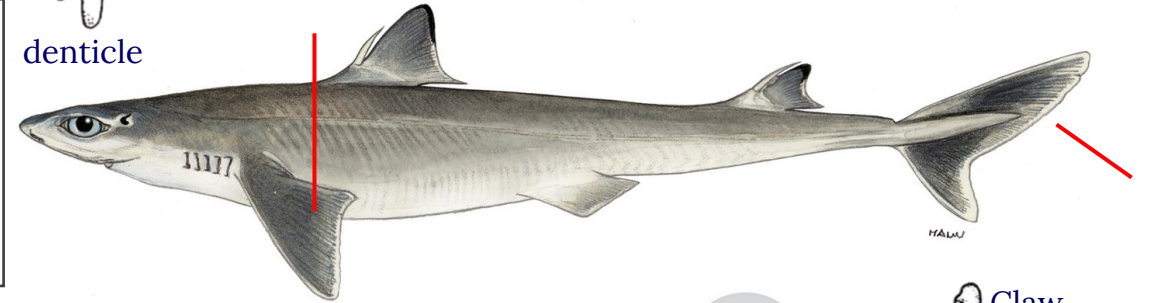
**G3**



Claspers like a hook



denticle



**Shortnose spurdog**  
(*Squalus megalops*) DOP



Claw claspers

small DEMERSALS

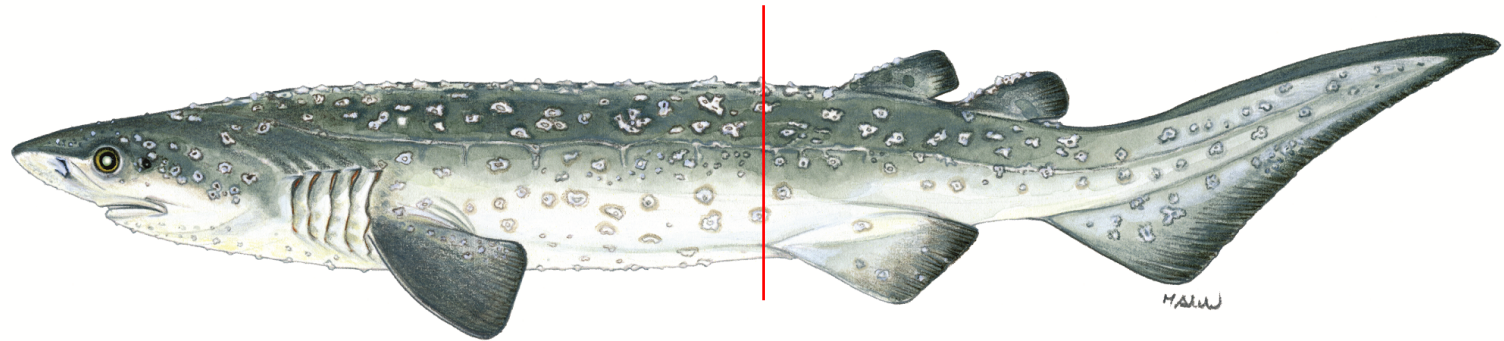


## ECHINORHINIFORMES

### Echinorhinidae

### *Echinorhinus*

First dorsal fin originating behind pelvic fin origin. Large thorn-like dermal denticles irregularly distributed over the body, also ventrally.



**Bramble shark** (*Echinorhinus brucus*) SHB



small DEMERSALS



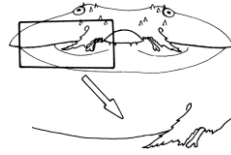
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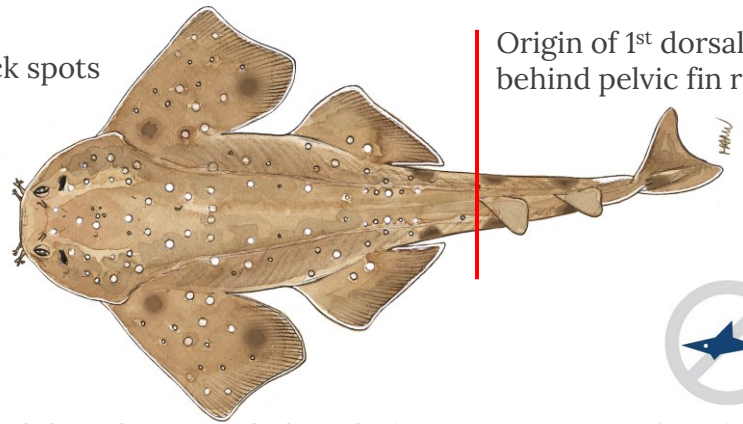
Mouth terminal. Pectoral fins not attached to head

# SQUATINIFORMES

Rear apex of the ventral fins does not reach the origin of the 1<sup>st</sup> dorsal fin



Black spots



Origin of 1<sup>st</sup> dorsal fin behind pelvic fin rear apex

**Smoothback angelshark** (*Squatina oculata*) SUT

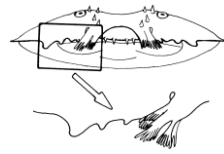


## Squatinidae

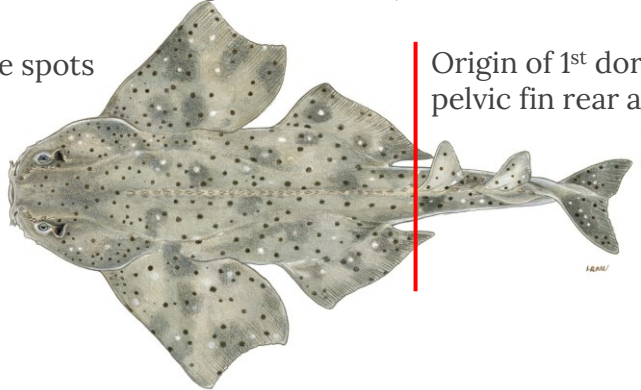
Dorsal eyes, gill openings on the side of the head, small keel on the caudal peduncle.

Rear apex of the ventral fins can reach the origin of the 1<sup>st</sup> dorsal fin

Belly completely wrinkled. Row of denticle on the middle of the back



White spots

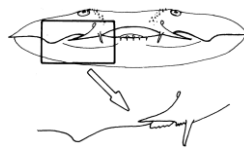


Origin of 1<sup>st</sup> dorsal fin ahead pelvic fin rear apex

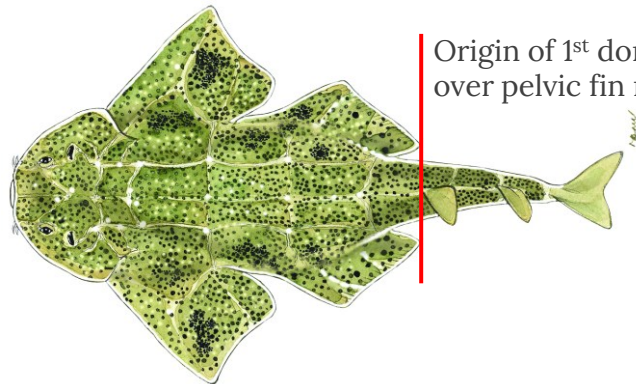
**Sawback angelshark** (*Squatina aculeata*) SUA



Rough belly only on the edges of the paired fins and on the tail



Origin of 1<sup>st</sup> dorsal fin over pelvic fin rear apex



**Angelshark** (*Squatina squatina*) AGN



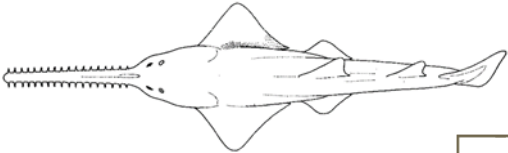
small DEMERSALS



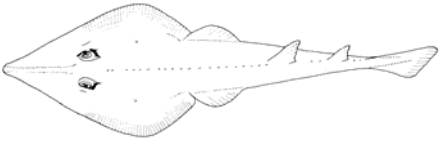
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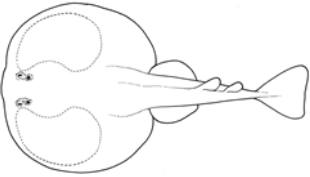
Moderately depressed body. Pectoral fins slightly enlarged but not merged with the head.  
Very elongated and pointed snout with rostrum



**RHINOPRISTIFORMES**



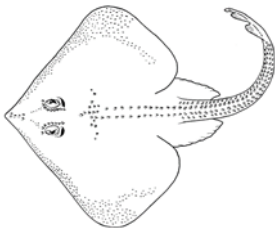
Disc oval or rounded, soft body, naked skin. Truncated head with rostral cartilages. Presence of electric organs on the sides of the head



**TORPEDINIFORMES**

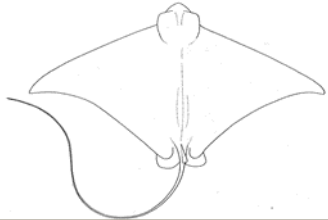
Wide tail with DORSAL FINS

Quadrangular disc, skin with scattered denticles. Pointed head with evident rostrum



**RAJIFORMES**

Very depressed body. Pectoral fins enlarged and fused with the head



**MYLIOBATIFORMES**

Narrow tail without fins but with SPINES



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Batoid fishes

# Demersal RAYS & SKATES

## ORDERS

## Families

TORPEDINIFORMES

Torpedinidae

RHINOPRISTIFORMES

Rhinobatidae  
Glaucostegidae  
Pristidae

RAJIFORMES

Rajidae



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Shape of the body truncated anteriorly

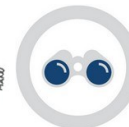
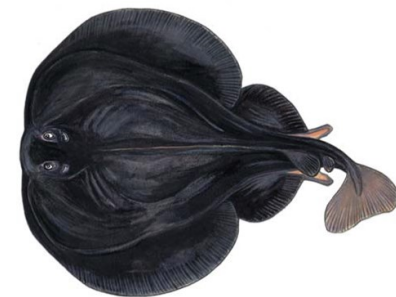
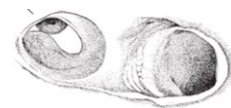
## TORPEDINIFORMES

### Torpedinidae

Spiracles without papillae

*Tetronarce*

**Electric ray** (*Tetronarce nobiliana*) TTO  
Dorsal surface grayish or blackish brown.



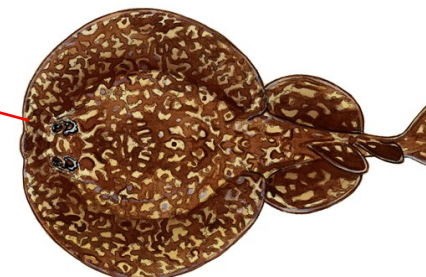
Spiracles with papillae

*Torpedo*

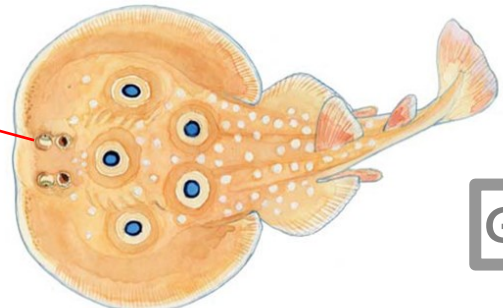
**Marbled electric ray** (*Torpedo marmorata*) TTR  
Dorsal surface brown with various irregular spots. Edge of the spiracles with 6–9 papillae reaching the centre of the spiracle. Eye diameter about 1.5 times the distance between the spiracles.



**Variable torpedo ray** (*Torpedo sinuspersici*)\* TTJ  
Dorsal surface brown with vermiculations. Edge of the spiracles with 9–10 papillae not reaching the centre of the spiracle. Eye diameter smaller than spiracles.



**Common torpedo** (*Torpedo torpedo*) TTV  
Dorsal surface with 1–7 ocelli, light blue. Spiracles with small papillae up to 6, centre dark blue and whitish contours. Eye diameter smaller than spiracles.



\*Species to be confirmed for the Mediterranean.

Demersal  
RAYS



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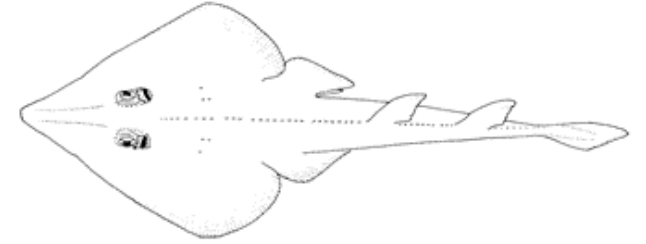
# RHINOPRISTIFORMES

Pectoral fins slightly enlarged but not merged with the head.  
Very elongated and pointed snout with rostrum.

Snout long pointed

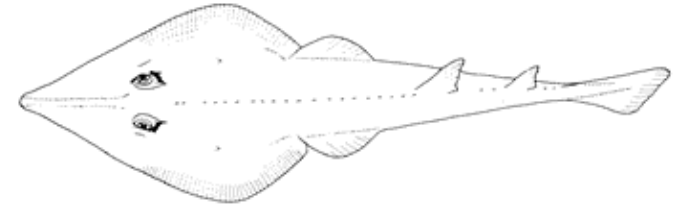
Snout length LESS than 5 times the diameter of the eye's orbit.  
Nasal openings: circular

Rhinobatidae



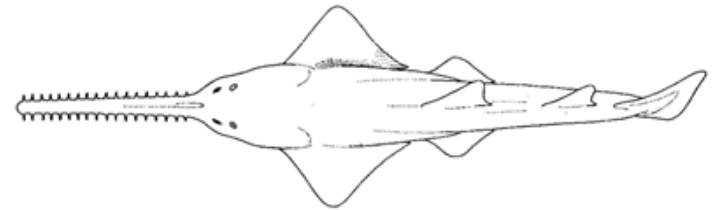
Snout length MORE than 5 times the diameter of the eye's orbit.  
Nasal openings almost rectangular

Glaucostegidae



Snout very elongated like a saw

Pristidae



Demersal  
RAYS



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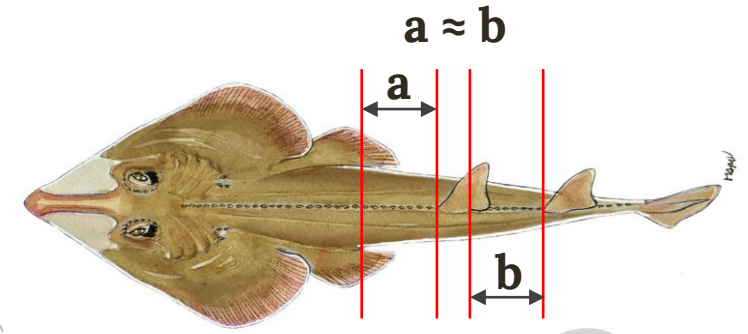
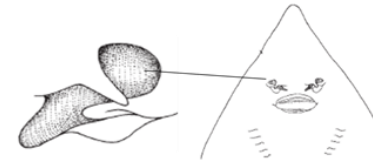


# RHINOPRISTIFORMES

## Rhinobatidae

*Rhinobatos*

Distance between the base of the ventral fins and the origin of the 1<sup>st</sup> dorsal fin (**a**) approximately equal to the distance between the dorsal fins (**b**).  
Posterior nostril valve with large flap



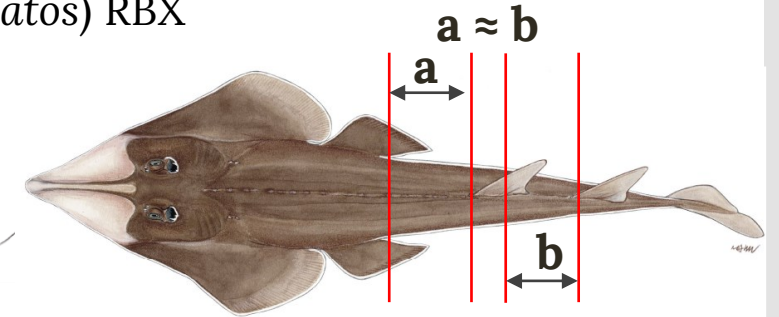
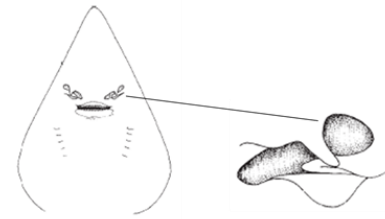
**Common guitarfish**  
(*Rhinobatos rhinobatos*) RBX



## Glaucostegidae

*Glaucostegus*

Distance between the base of the ventral fins and the origin of the 1<sup>st</sup> dorsal fin (**a**) approximately equal to the distance between the dorsal fins (**b**).  
Posterior valve of the nostril: narrow

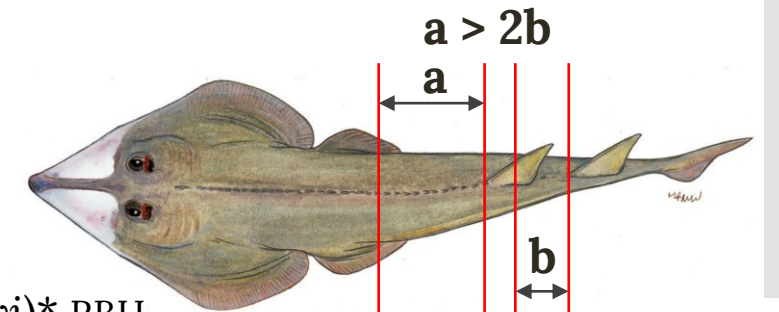


**Blackchin guitarfish**  
(*Glaucostegus cemiculus*) RBC



## Demersal RAYS

Distance between the base of the ventral fins and the origin of the 1<sup>st</sup> dorsal fin (**a**) more than twice the distance between the dorsal fins (**b**)



**Halavi ray**  
(*Glaucostegus halavi*)\* RBH

\*Species to be confirmed for the Mediterranean.



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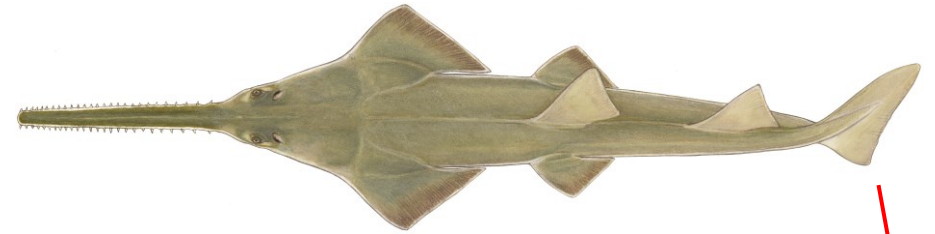
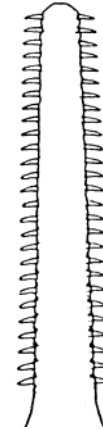
# RHINOPRISTIFORMES

## Pristidae

Two dorsal fins equal in shape and size.

### *Pristis*

20–32 pair of rostral teeth.  
Origin of the 1<sup>st</sup> dorsal fin over the origin of the pelvic fin. Caudal fin without lower lobe



**Smalltooth sawfish**  
(*Pristis pectinata*)\* RPP



15–20 pair of rostral teeth.  
Origin of the 1<sup>st</sup> dorsal fin slightly ahead the origin of the pelvic fin. Caudal fin with lower lobe



**Common sawfish**  
(*Pristis pristis*)\* RPR



\*Considered extinct in Mediterranean

Demersal RAYS



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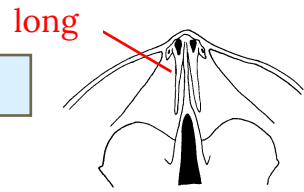
RAJIFORMES

Rajidae

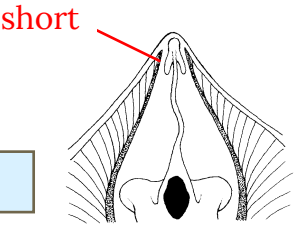
Demersal SKATES

Rays of the pectoral fins up to the apex of the snout. Soft rostral cartilage.

Rostral cartilage long



Rostral cartilage short

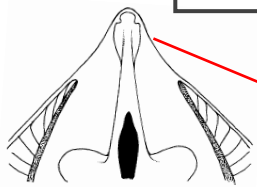


Rays of the pectoral fins not up to the apex of the snout. Linear and robust rostral cartilage up to the apex of the snout

Snout long and pointed. Anterior disc margin concave

White belly, clear ampullary pores

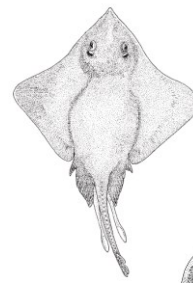
Dark belly, blackish ampullary pores



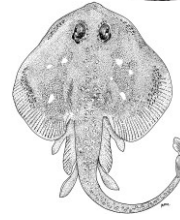
Nuchal spines arranged in a triangle

Snout short and angled. Anterior disk margin somewhat convex

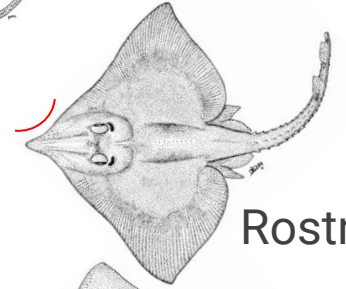
Nuchal spines, if present, not arranged in a triangle



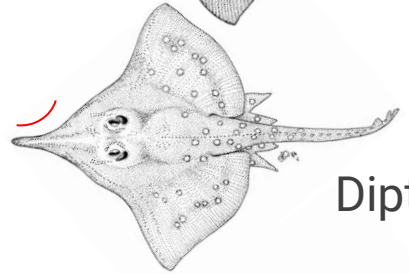
Bathyraja  
Neoraja



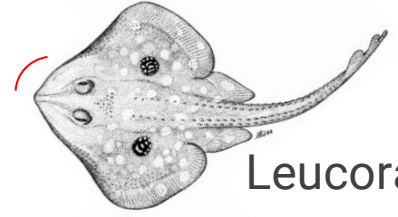
Breviraja



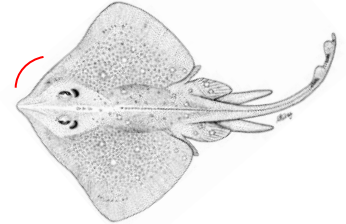
Rostroraja



Dipturus



Leucoraja



Raja

ATLANTIC

MEDITERRANEAN



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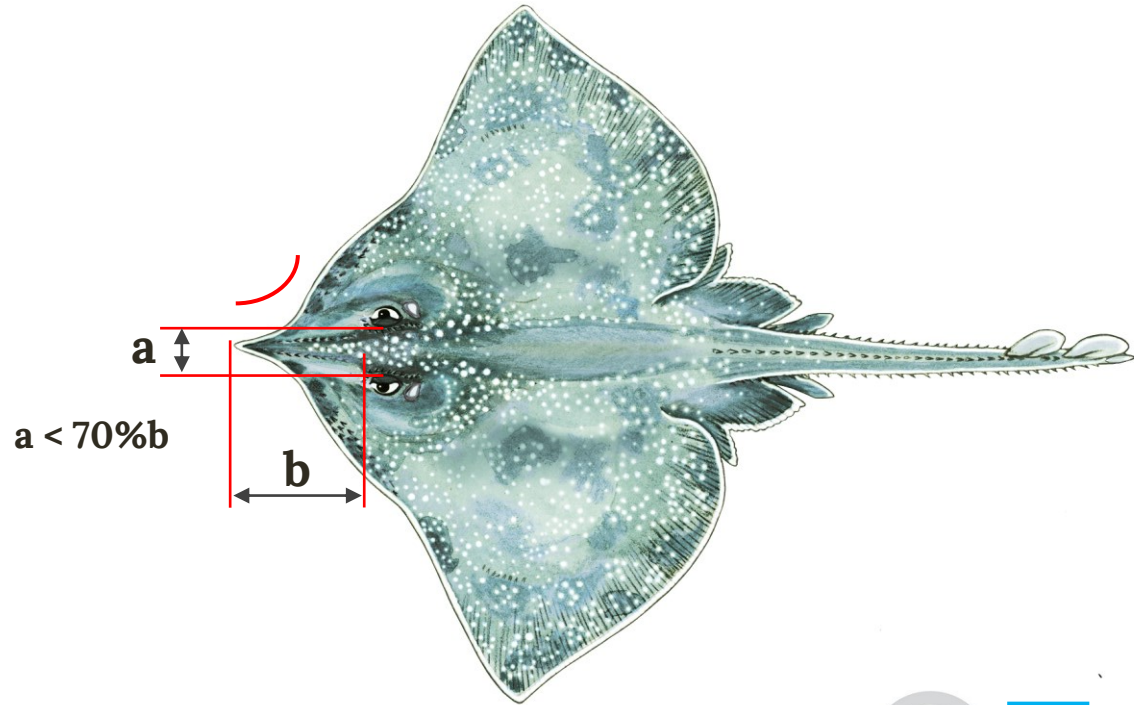
## RAJIFORMES

### Rajidae

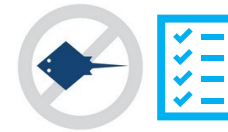
#### *Rostroraja*

Snout long and pointed with the anterior edge of the disc somewhat concave. Internasal space (a) less than 70% the distance between one nostril and the apex of the snout (b).

Dorsal surface covered with small sharp thorns, nape or back without thorns. White belly with margins of the disc and pelvic fins from blackish (young) to grey (adults). Pores and ampullary canals on the ventral surface light. Pectoral fin angulated. Three rows of large thorns on tail, one thorn between dorsal fins.



**White skate** (*Rostroraja alba*) RJA



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## RAJIFORMES

### Rajidae

#### *Dipturus*

Internasal space (a) less than 70% the distance between one nostril and the apex of the snout (b). Dark belly, black sensory pores.  
Rostrum long more than 60% of the head.

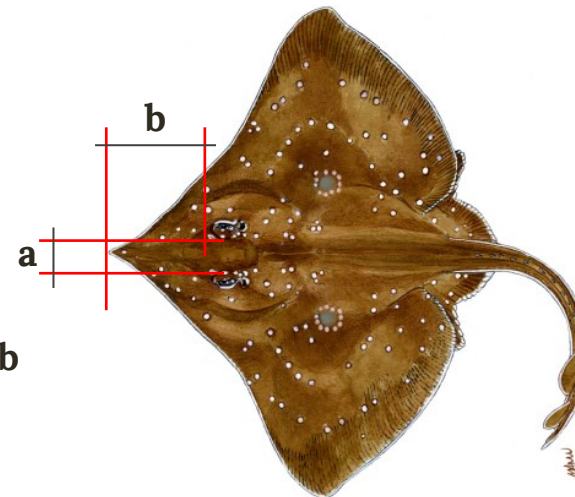
## Demersal SKATES



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### **Blue skate** (*Dipturus cf. batis*)\* RJB

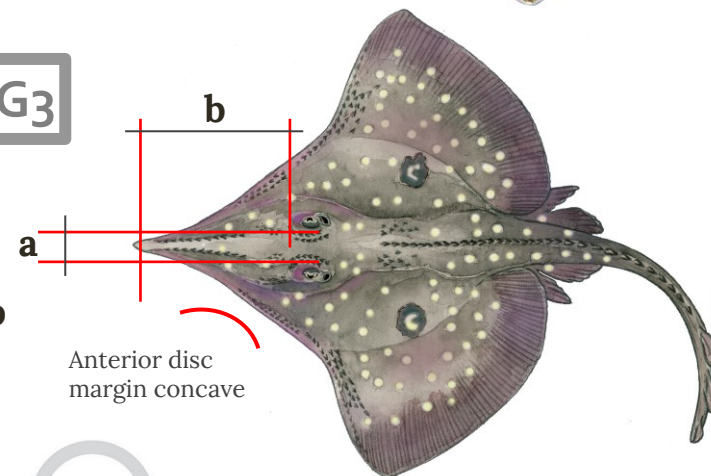
Back and belly with dark and light spots, abdomen without blackish mucus.



$$a = 2.5-4 b$$

### **Longnosed skate** (*Dipturus oxyrinchus*) RJO

Back and belly with dark and light spots, abdomen without blackish mucus.

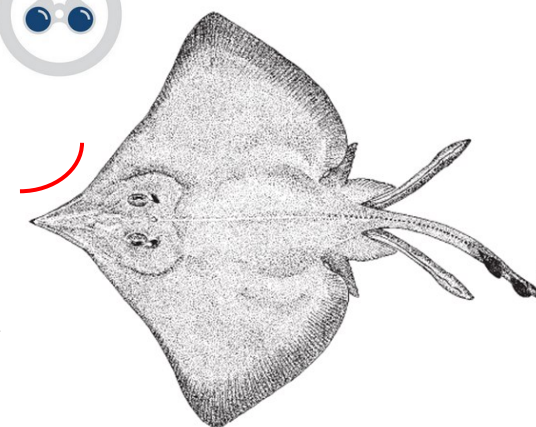


$$a = 5.5-7 b$$

Anterior disc margin concave

### **Norwegian skate** (*Dipturus nidarosiensis*) JAD

Dorsal and ventral sides uniformly dark, abdomen with dark mucus.



\* *D. batis* is currently considered a “complex” divided into two nominal species: *D. cf. flossada* and *D. cf. intermedia*.





# RAJIFORMES

## Rajidae

### Leucoraja

No blackish spots on the dorsal side

**Sandy ray** (*Leucoraja circularis*) RJI  
Dorsal surface with 4–6 pairs of small white-cream symmetrical dots.



**Shagreen ray** (*Leucoraja fullonica*)\* RJF  
Pattern on dorsal side uniform. Long tail with two parallel rows of 50 spines.



Central blackish spots on the dorsal side

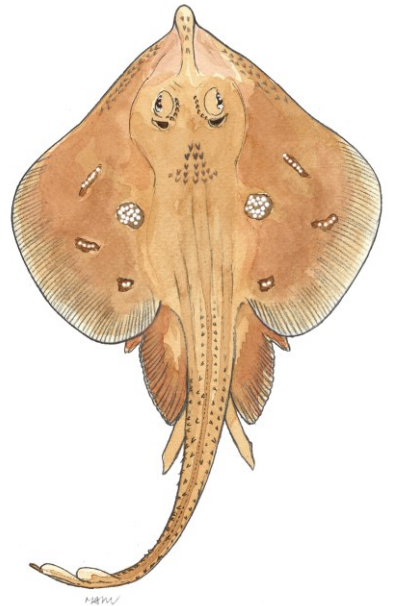
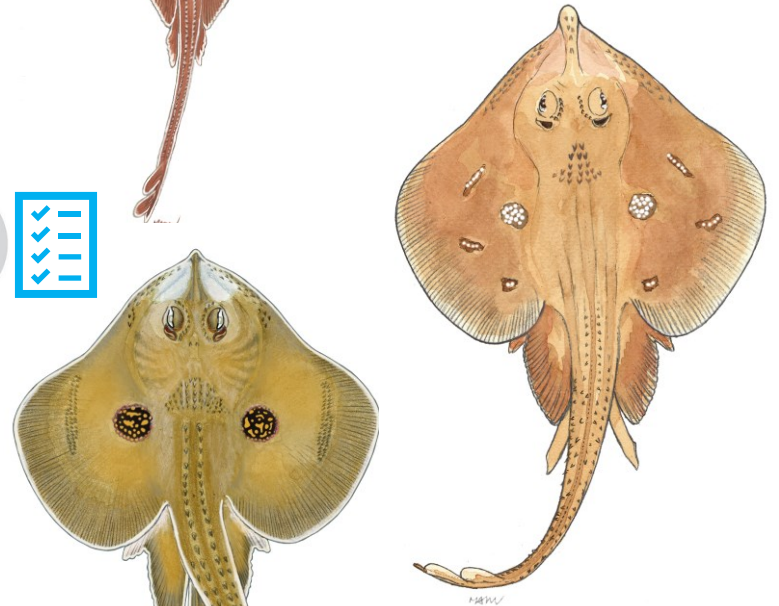
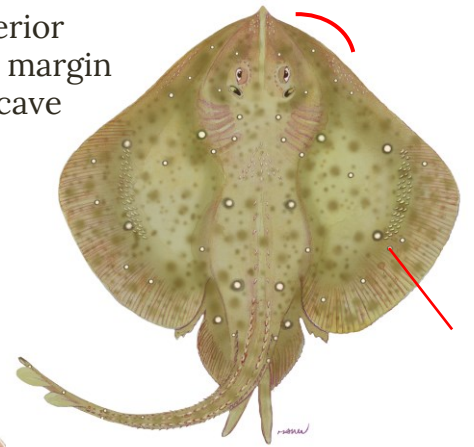
**Maltese ray** (*Leucoraja melitensis*) JAM  
Wide and weak sub-oval dark spots, with points and vermiform stripes.



**Cuckoo ray** (*Leucoraja naevus*) RJN  
Large sub-circular blackish spots, with points and vermiform stripes.



Anterior disc margin concave



Internasal space more than 70% the distance between one nostril and the apex of the snout. Spines on the nape and in the scapular area arranged in a triangle.

\*Species to be confirmed for the Mediterranean.



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## RAJIFORMES

### Rajidae

#### *Raja*

Internasal space greater than 70% the distance between nostril and the apex of the snout. Spines, if present, on the nape and in the scapular area **not arranged in a triangle**.

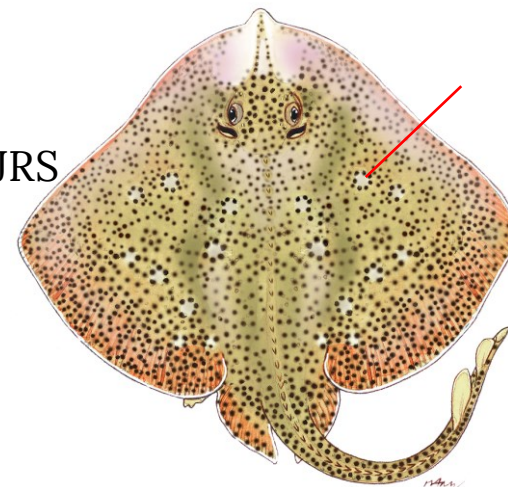
Demersal  
SKATES



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#### **Mediterranean starry ray** (*Raja asterias*) JRS

Dorsal surface smooth in juveniles with scattered dark spots. White spots surrounded by small black dots.



G2

G3

#### **Blonde ray** (*Raja brachyura*) RJH

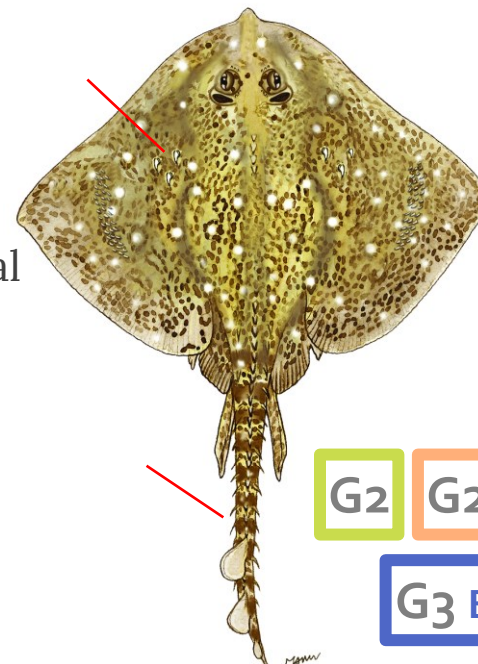


Dorsal surface smooth with many black dots which can reach up to the edge of the pectoral fins. Tail relatively short.



#### **Thornback ray** (*Raja clavata*) RJC

Dorsal surface fully prickly with some large thorns sometimes also on ventral side. Snout bluntly pointed. Tail with typically crossbars light and dark.



G2

G2

G3

G3

G3 Black Sea

[Go to other «Raja»](#)



## RAJIFORMES

### Rajidae

#### *Raja*

Internasal space greater than 70% the distance between nostril and the apex of the snout. Spines, if present, on the nape and in the scapular area not arranged in a triangle.

Demersal  
SKATES



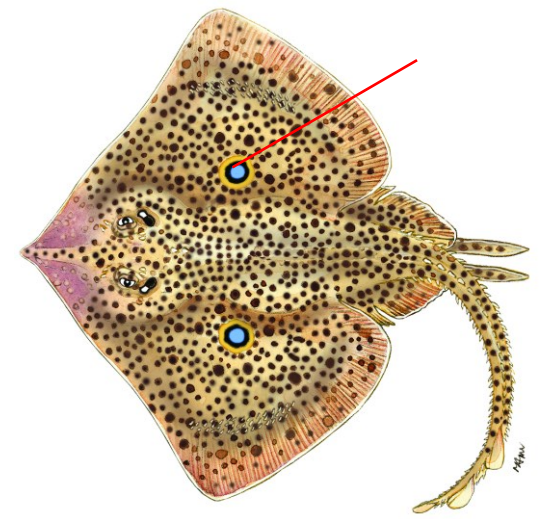
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G3

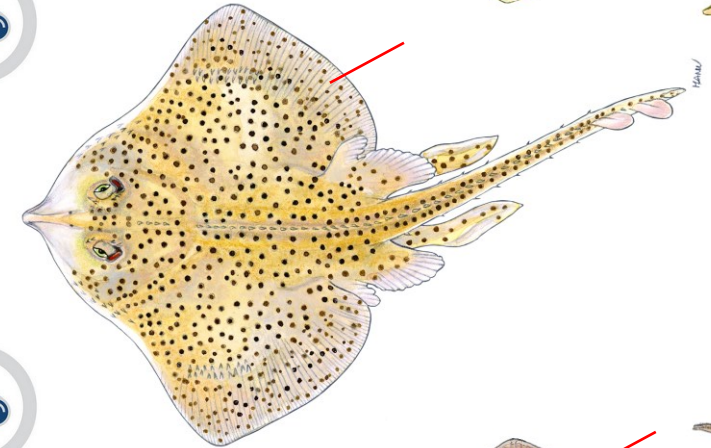
#### **Brown ray** (*Raja miraletus*) JAI

Large circular eyespot on inner centre of each pectoral fin. Outer ring yellow-orange; middle ring dark blue; centre light blue.



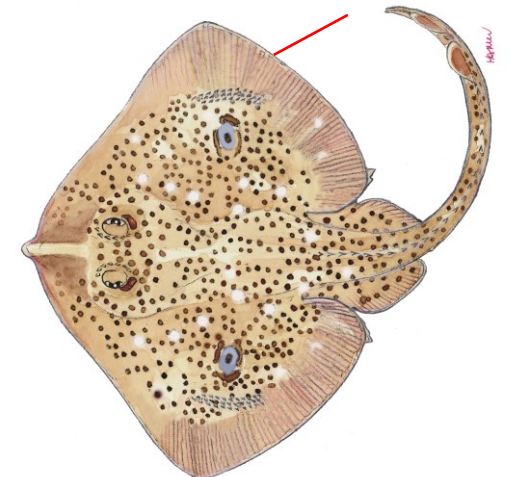
#### **Spotted ray** (*Raja montagui*)\* RJM

Dorsal surface prickly in adults with black spots that can reach up to the outer edge of the pectoral fins. Median row of 20–50 spines from the nape to the 1st dorsal fin. Relatively long tail.



#### **Speckled ray** (*Raja polystigma*) JAY

Dorsal surface smooth with prickly only on the snout and on the anterior edge of the disc. Black dots distributed everywhere, which may not reach up to the outer edge of the disc. Relatively long tail.



\*Confirmed only along Algerian coasts.

[↓ Go to other «Raja»](#)



[↑ Back to other «Raja»](#)

## RAJIFORMES

### Rajidae

#### *Raja*

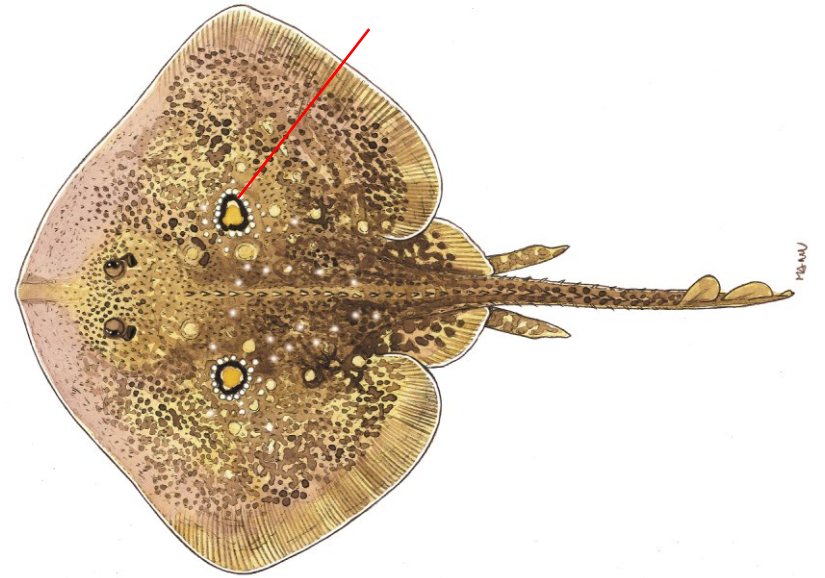
Internasal space greater than 70% the distance between nostril and the apex of the snout. Spines, if present, on the nape and in the scapular area not arranged in a triangle.

Demersal  
SKATES



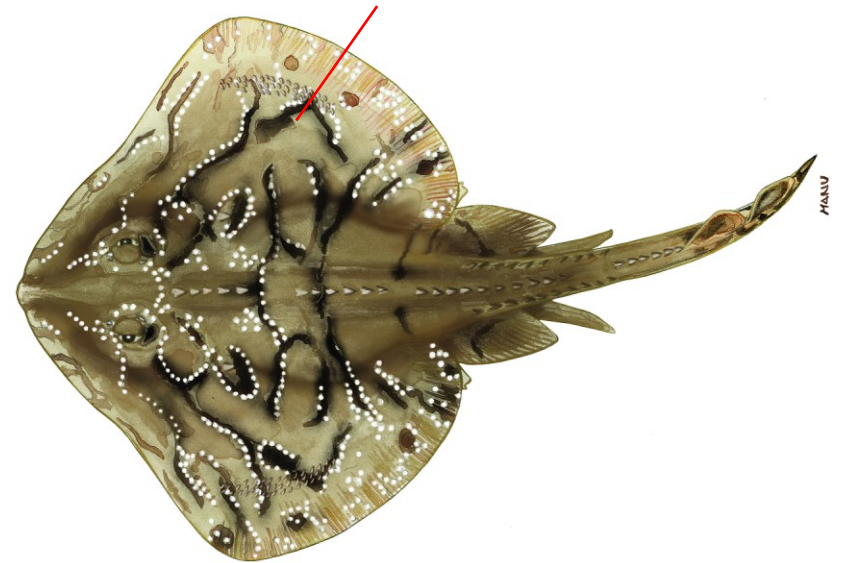
#### **Rough ray** (*Raja radula*) JAR

Eye-spot with yellowish centre and a dark outer edge encircled by light dots, becoming less evident in adults. Snout short and obtuse.



#### **Undulate ray** (*Raja undulata*) RJU

Several undulating dark bands with white spots. Snout short.



CONTENTS



Batoid fishes

ORDERS

Families

MYLIOBATIFORMES

- Dasyatidae
- Gymnuridae
- Aetobatidae
- Myliobatidae
- Rhinopteridae
- Mobulidae

Other RAYS



CONTENTS



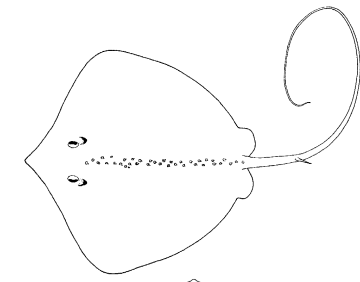
Batoid fishes

MYLIOBATIFORMES

Other RAYS

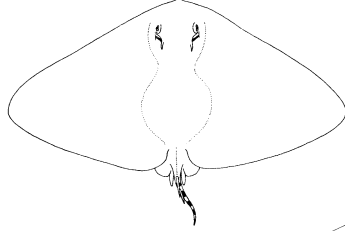
Head not markedly out of the disc, eyes and spiracles above the head

Disc width smaller than the length



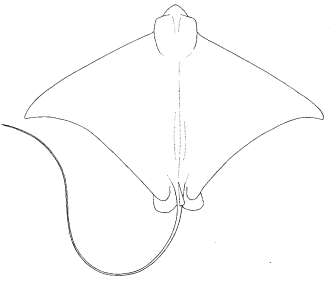
Dasyatidae

Disc width greater than the length



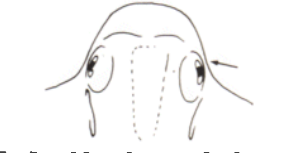
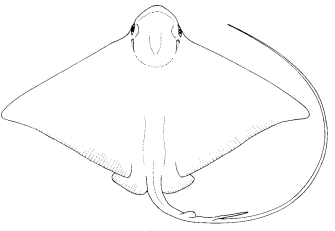
Gymnuridae

Subrostral lobe pointed



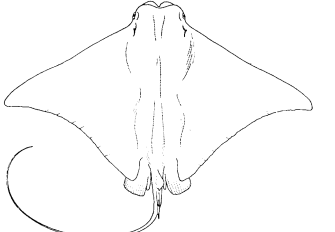
Aetobatidae

Subrostral lobe undivided



Myliobatidae

Subrostral lobe rounded

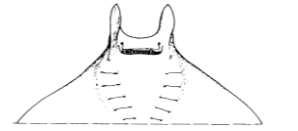
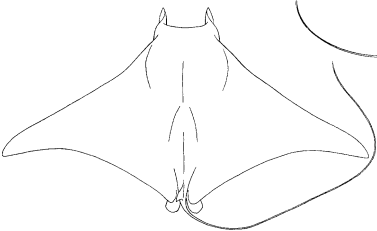


Rhinopteridae

Cephalic fins absent

Subrostral lobe deeply incise

Head markedly out of the disc, eyes and spiracles on the head sides



Mobulidae

Cephalic fins present



# MYLIOBATIFORMES

## Dasyatidae

One or more toxic spines on the tail and lack of dorsal or caudal fins.

Rostrum length 1.5–2.5 times the sum of the length of the orbit and spiracle. Long and depressed tail. Spines scattered on the disc.

*Bathytoshia*



Rostrum length 1–1.5 times the sum of the length of the orbit and spiracle. Short and depressed tail. Dorsal surface of the disc without thorns.

*Dasyatis*



Rhomboid disc, tail longer than the disc ending in a filament, without folds.

*Himantura*



Disc-width longer than its length. Anterior margins convex and posteriors straight. Very short rostrum with two slight indentations on the sides.

*Pteroplatytrygon*



Disk almost round. Tail compressed and not thin, as long as the disc, with 1–2 spines and with a ventral membranous fold.

*Taeniurops*



Other RAYS



CONTENTS



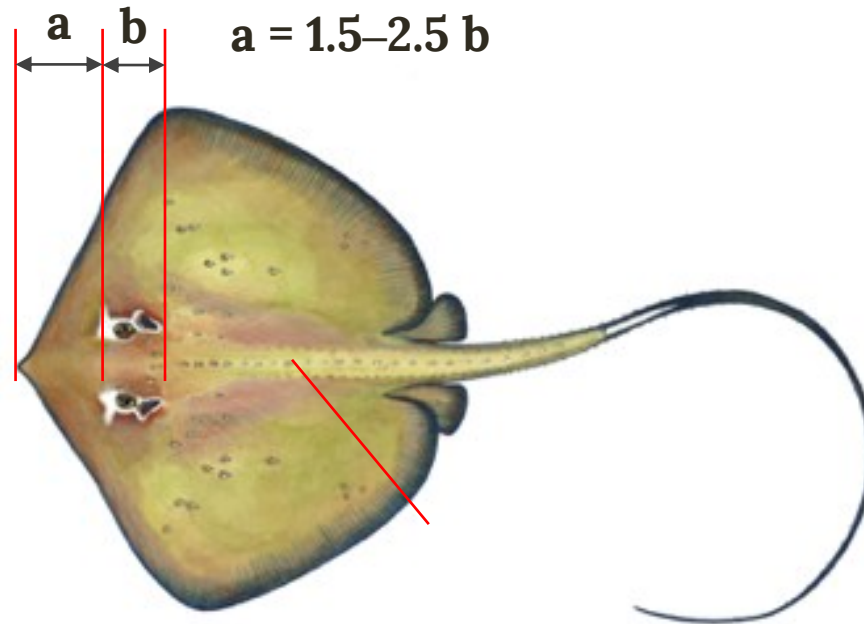
Head **not** markedly out of the disc

## MYLIOBATIFORMES

### Dasyatidae

*Bathytoshia*

Rostrum length 1.5–2.5 times the sum of the length of the orbit and spiracle. Spines scattered on the back. Long and depressed tail.



**Roughtail stingray** (*Bathytoshia lata*) RDC



Other RAYS



CONTENTS





Head **not** markedly out of the disc

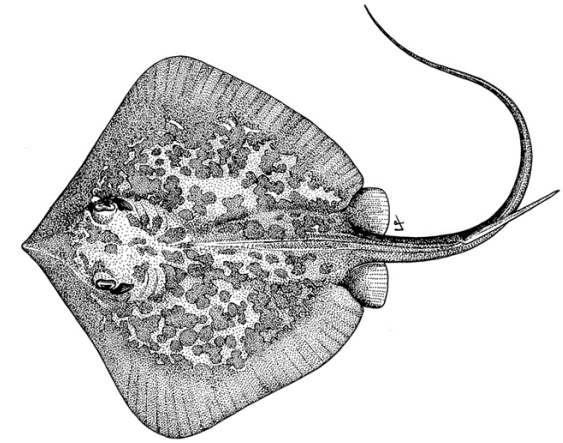
## MYLIOBATIFORMES

### Dasyatidae

#### *Dasyatis*

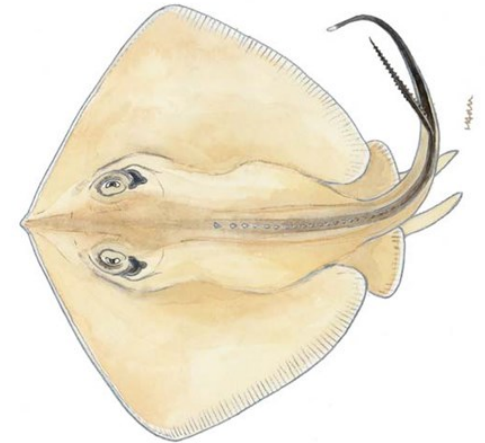
#### **Marble stingray** (*Dasyatis marmorata*) RDQ

Colour of the dorsal surface of the disc from blue to golden brown. Very short ventral skin fold of the tail.



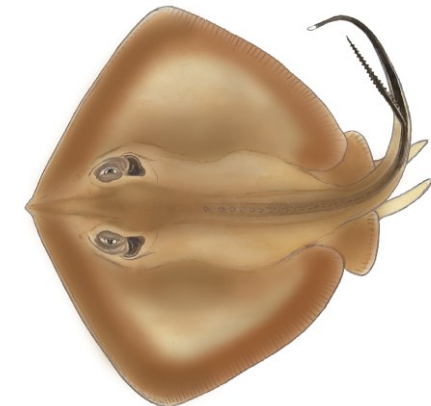
#### **Common stingray** (*Dasyatis pastinaca*) JDP

Colour of the dorsal surface of the disc from brown to dark gray. Dorsal keel along the whole tail and well developed ventral skin fold. White margins of the nostrils and mouth.



#### **Tortonese's stingray** (*Dasyatis tortonesei*)\*

Colour of the dorsal surface of the disc from brown to ocher. Dorsal keel along the whole tail with low upper skin fold. Margins of the nostrils and mouth, dark.



\*This species requires confirmation.

Other RAYS



CONTENTS



Head **not** markedly out of the disc

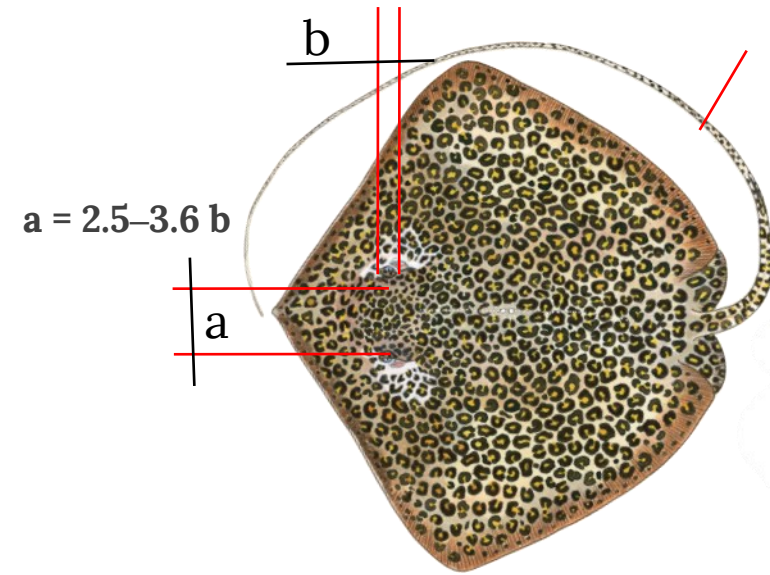
## MYLIOBATIFORMES

### Dasyatidae

*Himantura*

Tail with dark brown reticulation.

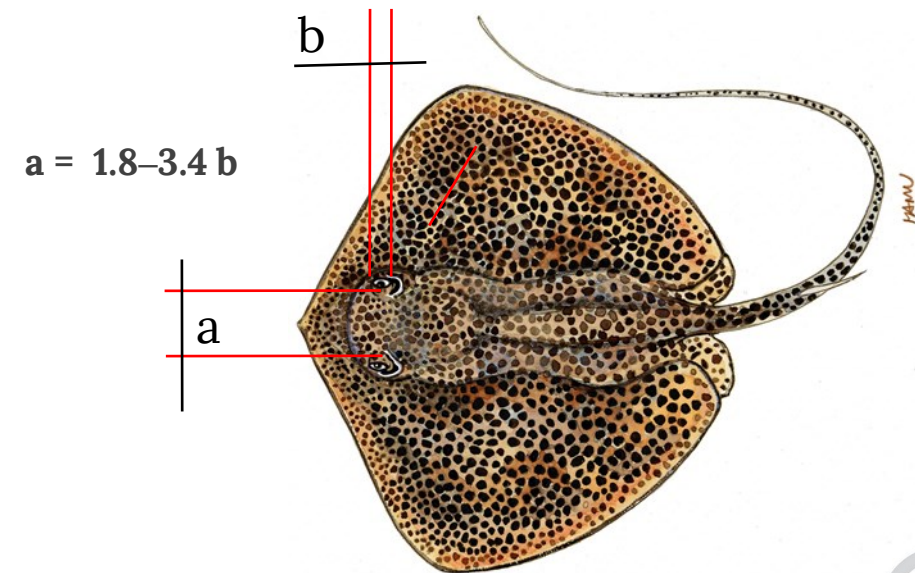
Interorbital space (a) 2.5–3.6 times the orbital length (b).



**Leopard whipray** (*Himantura leoparda*) DKL



Interorbital space (a) 1.8–3.4 times the orbital length (b).



**Coach whipray** (*Himantura uarnak*) DHV



Other RAYS



CONTENTS



Head **not** markedly out of the disc

## MYLIOBATIFORMES

### Dasyatidae

#### *Pteroplatytrygon*

Very long and thin tail.  
Dorsal disc surface uniform dark purple, ventral similarly dark.  
In juveniles, dorsal disc surface smooth. In adults, a single small spine, centrally located on the disc, and a median row of 10–12 small spines reaching the typical spine on the tail.



**Pelagic stingray** (*Pteroplatytrygon violacea*) PLS

G3

Other RAYS



CONTENTS



Head **not** markedly out of the disc

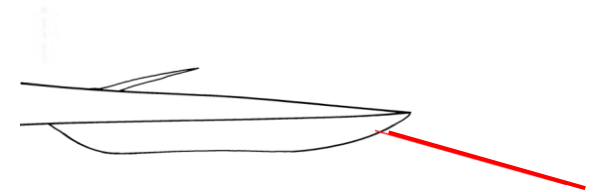
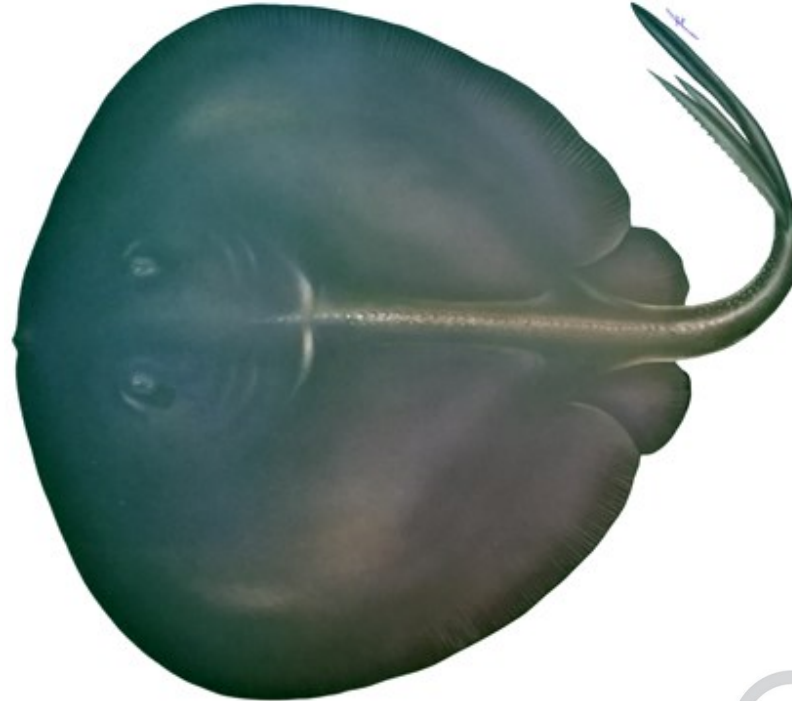
MYLIOBATIFORMES

Dasyatidae

*Taeniurops*

Other RAYS

Tail with a lower membranous fold ending sharpened



**Round stingray** (*Taeniurops grabatus*) RTB



Similar species currently not confirmed in Mediterranean:  
**Round ribbontail ray** (*Taeniurops meyeni*) RTE.

Tail with a lower membranous fold ending truncated.



CONTENTS



Head **not** markedly out of the disc

## MYLIOBATIFORMES

### Gymnuridae

Lozenge-shaped disc,  
short and obtuse snout,  
short and slender tail  
with 1 or 2 serrated pins.  
Dorsal surface of the disc  
smooth.

Other RAYS



CONTENTS

### Spiny butterfly ray (*Gymnura altavela*) RGL



Tail very short. Disc width more than its length. A keel on the dorsal side of the tail. One distinct tentacle on the posterior margin of each spiracle.



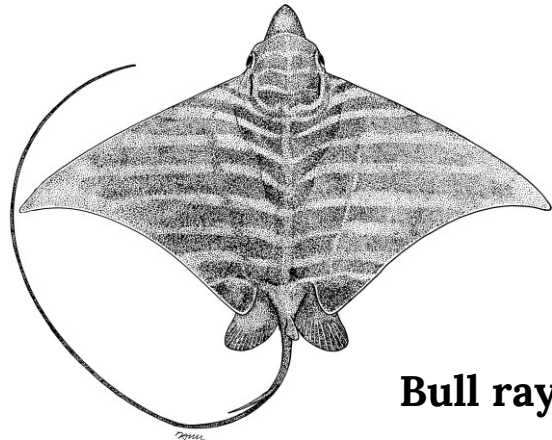


Head markedly out of the disc

# MYLIOBATIFORMES

Subrostral lobe pointed

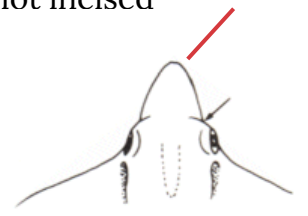
Aetobatidae



**Bull ray** (*Aetomylaeus bovinus*) MPO G3



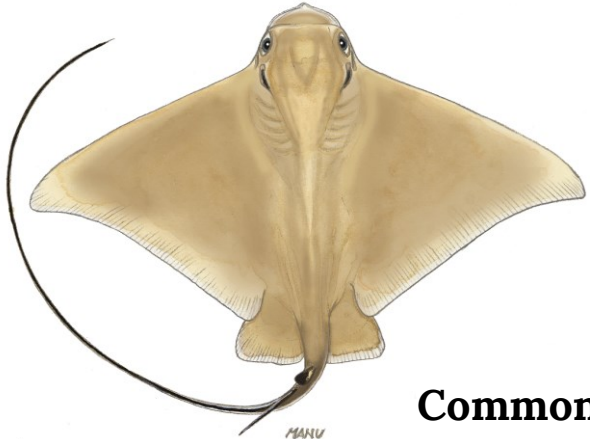
Subrostral lobe pointed, not incised



Subrostral lobe not divided

Subrostral lobe rounded

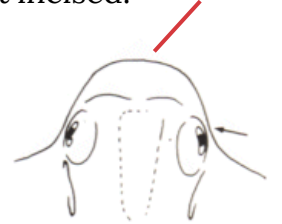
Myliobatidae



**Common eagle ray** (*Myliobatis aquila*) MYL

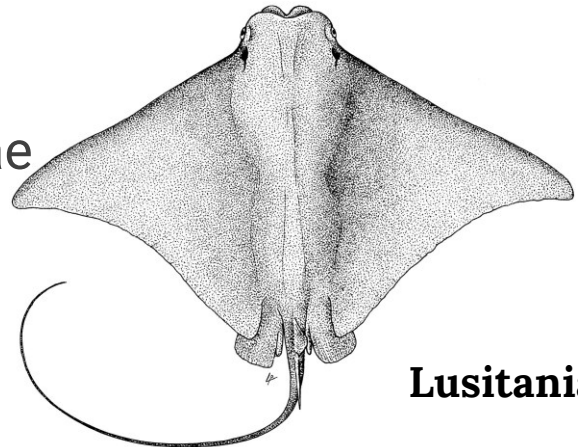


Subrostral lobe rounded, not incised.



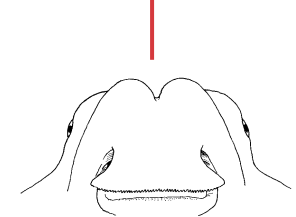
Subrostral lobe strongly indented

Rhinopteridae



**Lusitanian cownose ray** (*Rhinoptera marginata*) MRM

Subrostral lobe deeply incised



Other RAYS



CONTENTS



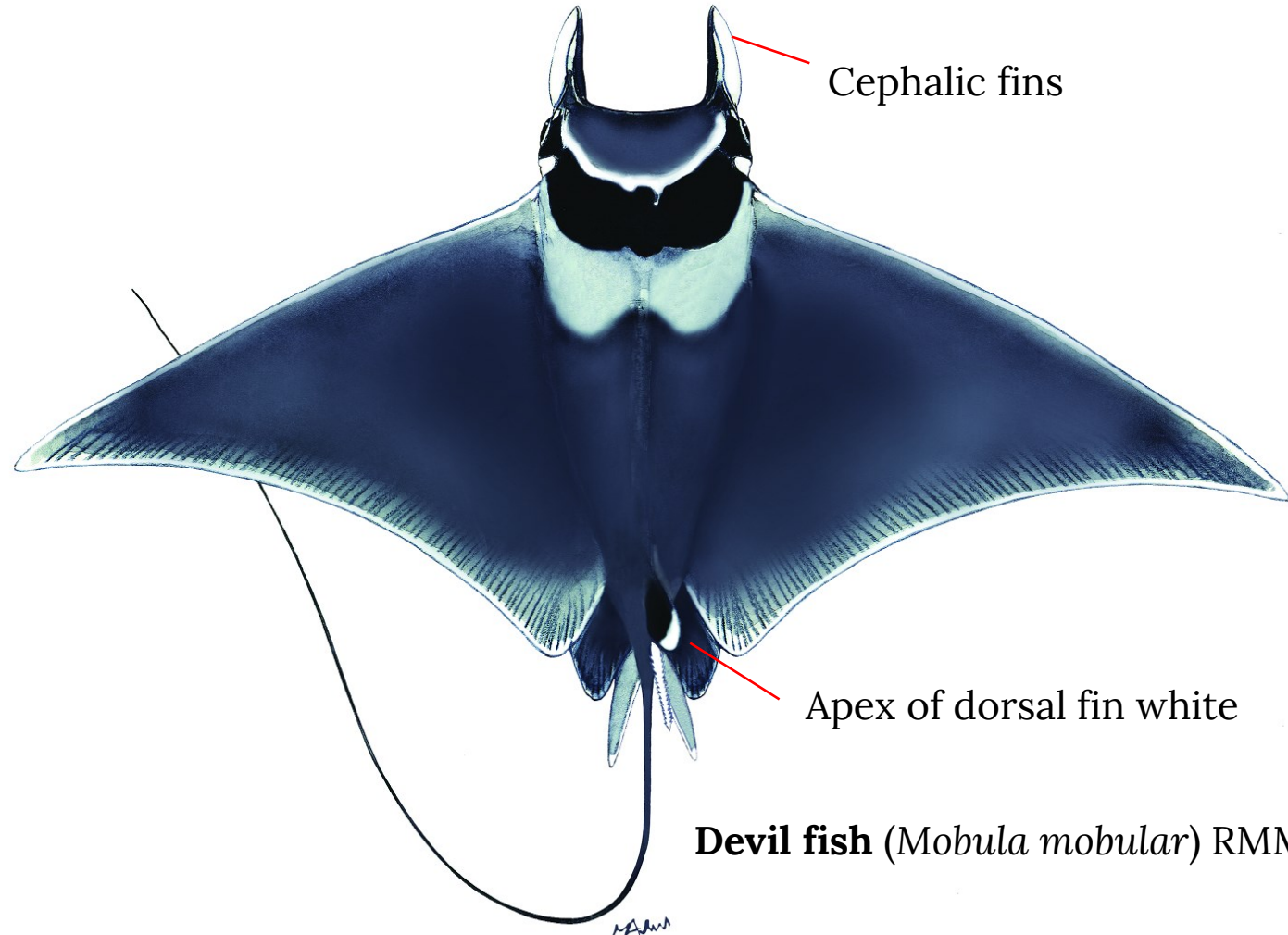
Head markedly out of the disc

## MYLIOBATIFORMES

### Mobulidae

Disc 2–3 times wider than long,  
cephalic fins present.

Back more or less dark blue colour, with usually a whitish band around the head. Short dorsal fin located at the base of the tail.



**Devil fish** (*Mobula mobular*) RMM



CONTENTS



ORDERS

Families

CHIMAERIFORMES

Chimaeridae

Subclass  
**HOLOCEPHALI**  
CHIMAERAS



CONTENTS





# CHIMAERIFORMES

Anal fin **SEPARATED**  
from the caudal fin

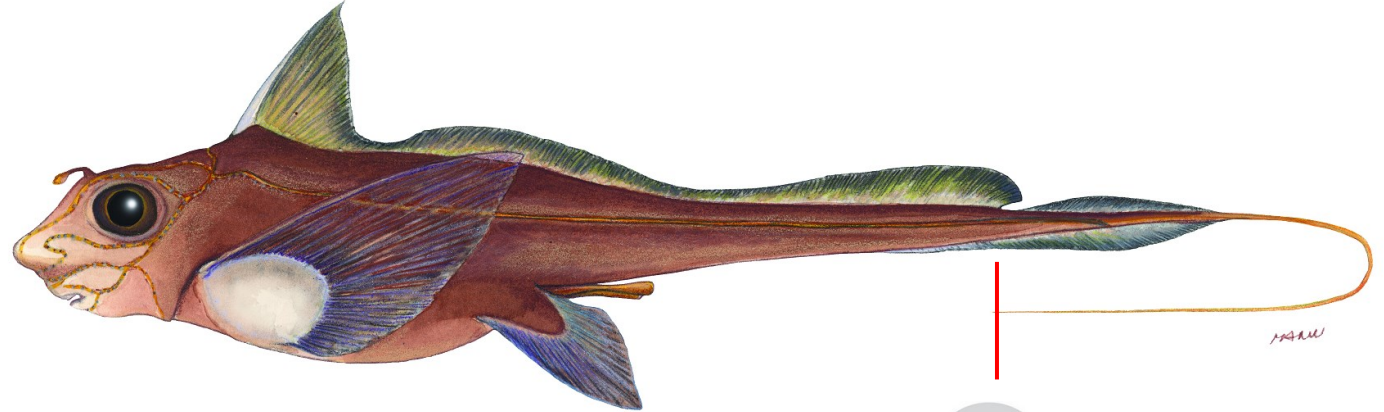


**Rabbit fish** (*Chimaera monstrosa*) CMO  
Height of the first dorsal fin 2/3 of the distance from the tip of the snout to the gill opening. Silver grey body.

## Chimaeridae

Snout short,  
round and  
conical.

Anal fin **JOINED**  
to the caudal fin



**Large-eyed rabbitfish** (*Hydrolagus mirabilis*)\* CYH  
Tips of the pectoral fins arrive behind the base of the pelvic fins.

# CHIMAERAS



CONTENTS

\*Species to be confirmed for the Mediterranean.

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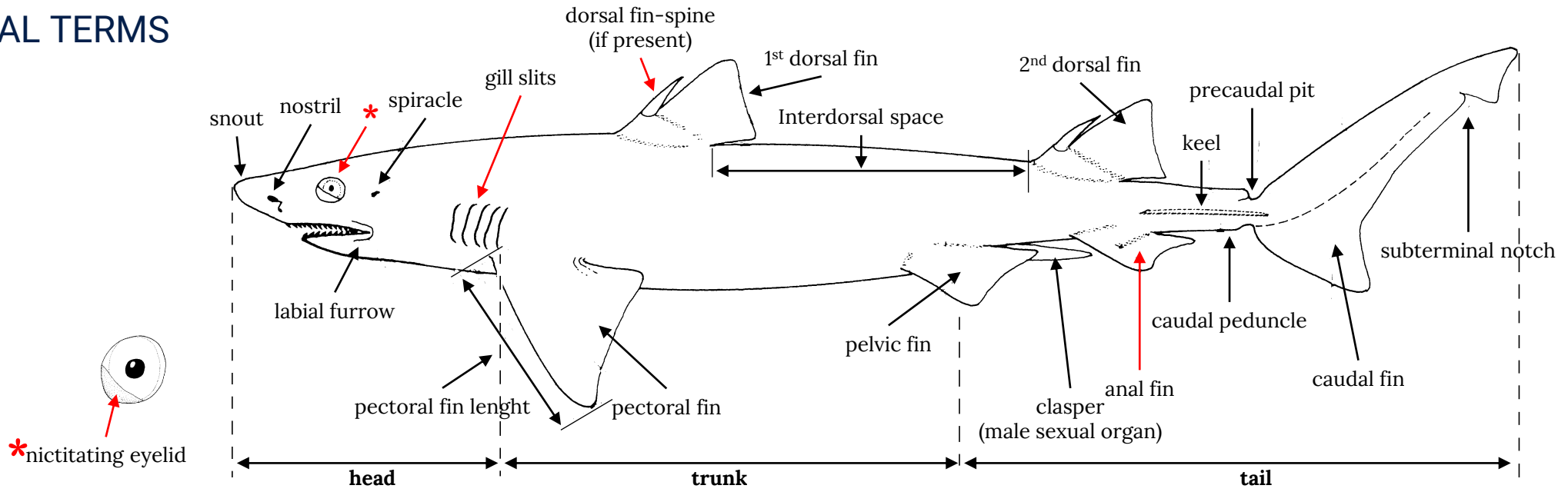


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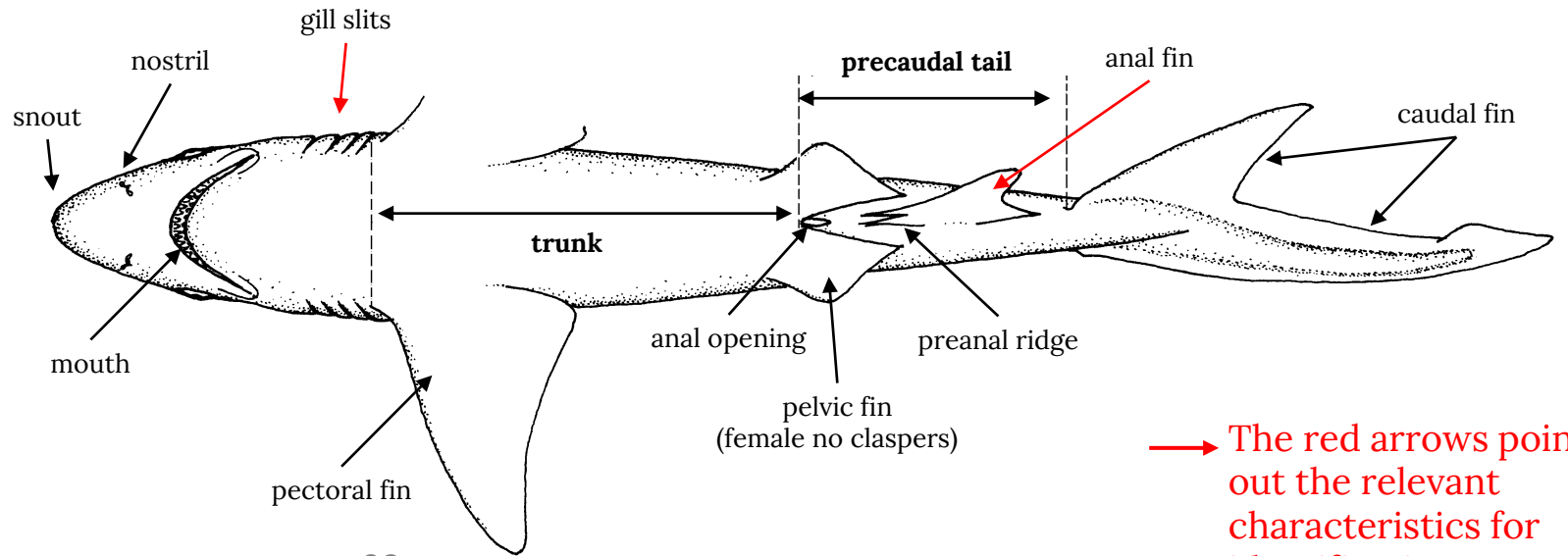
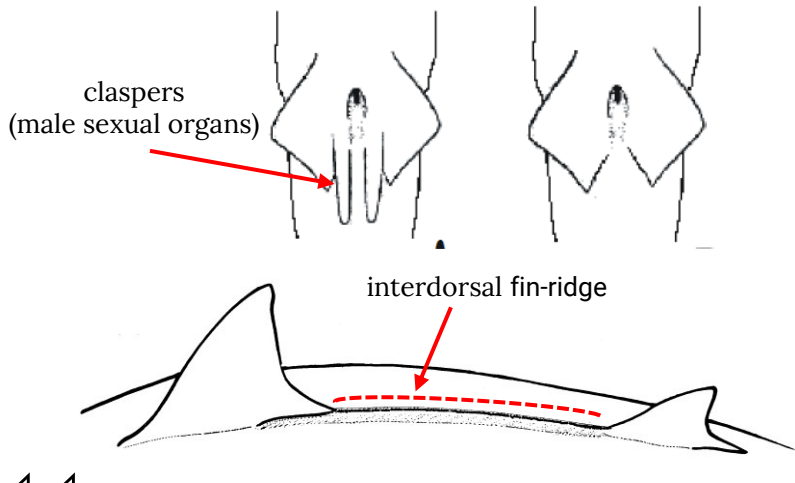
# ANNEX I - TECHNICAL TERMS

## SHARKS



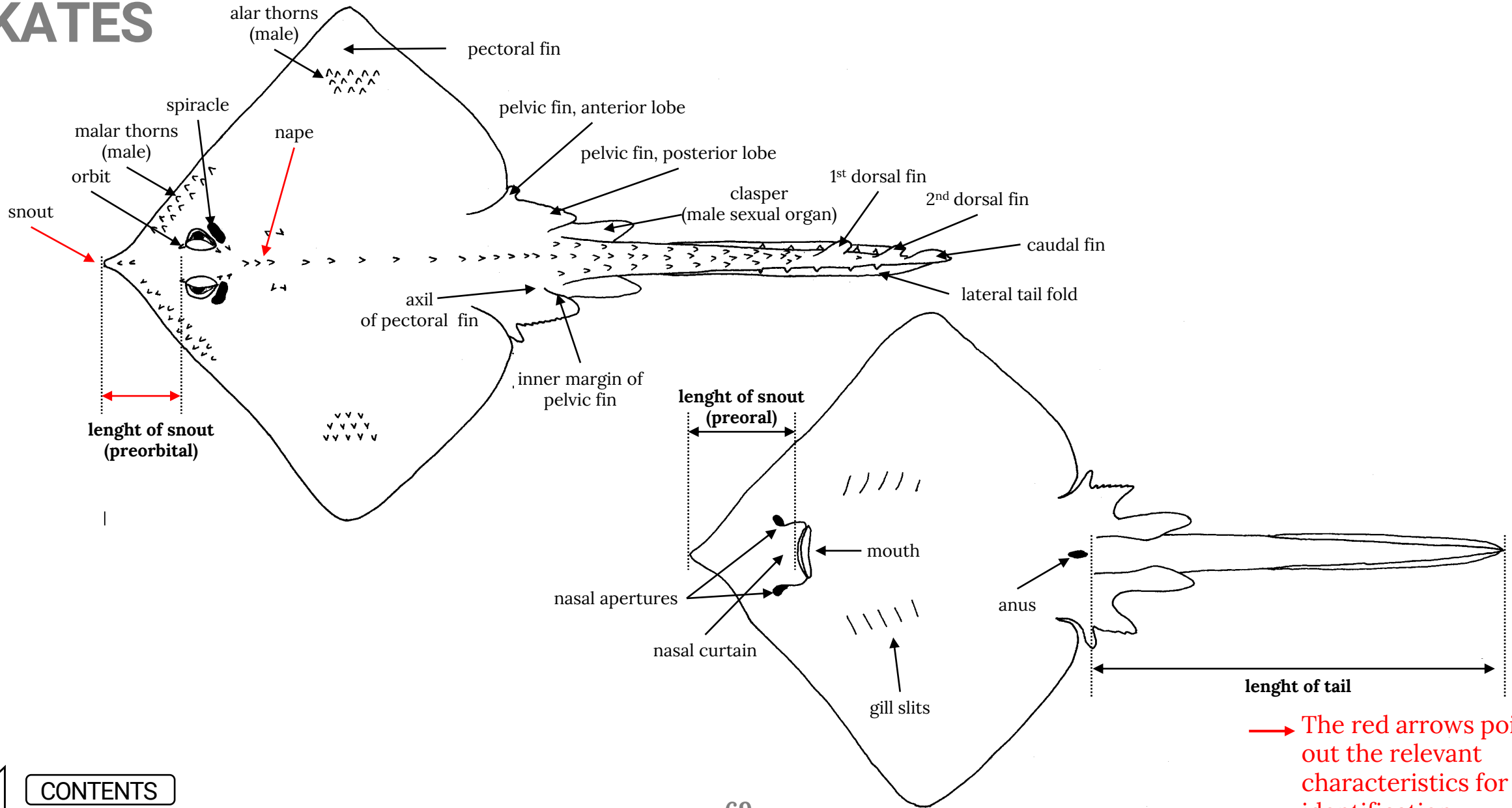
OBSERVE THE SEX ON THE VENTRAL SIDE

**MALE**      **FEMALE**



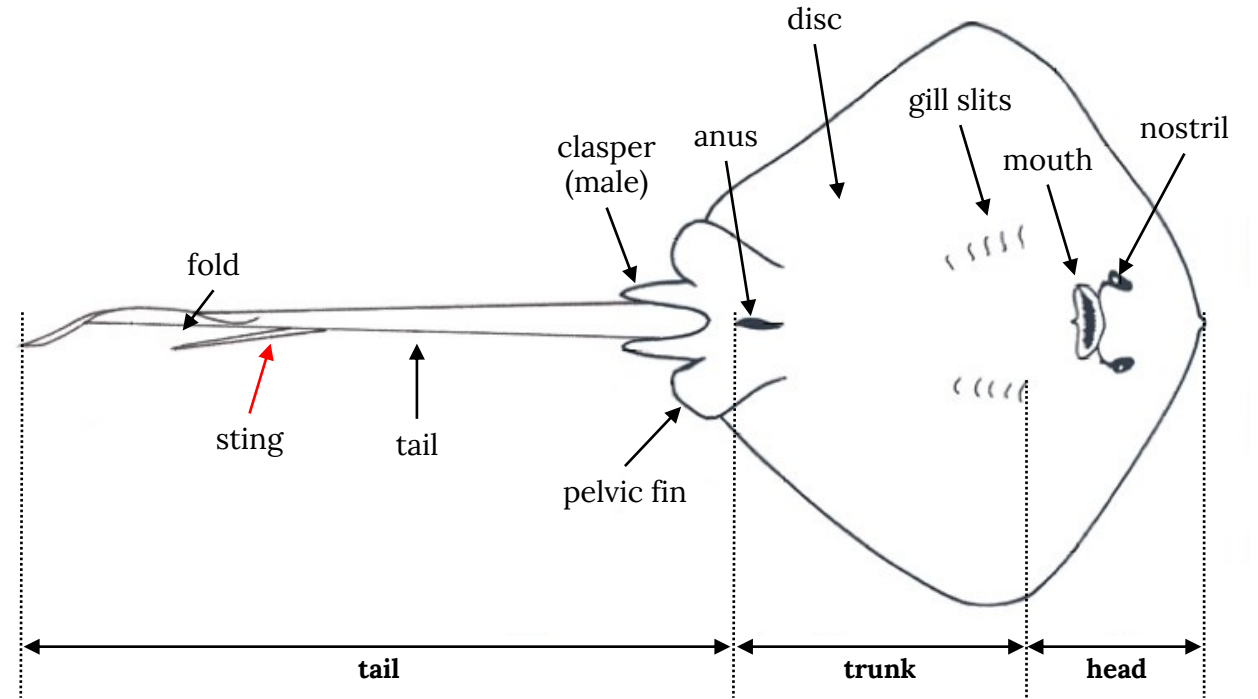
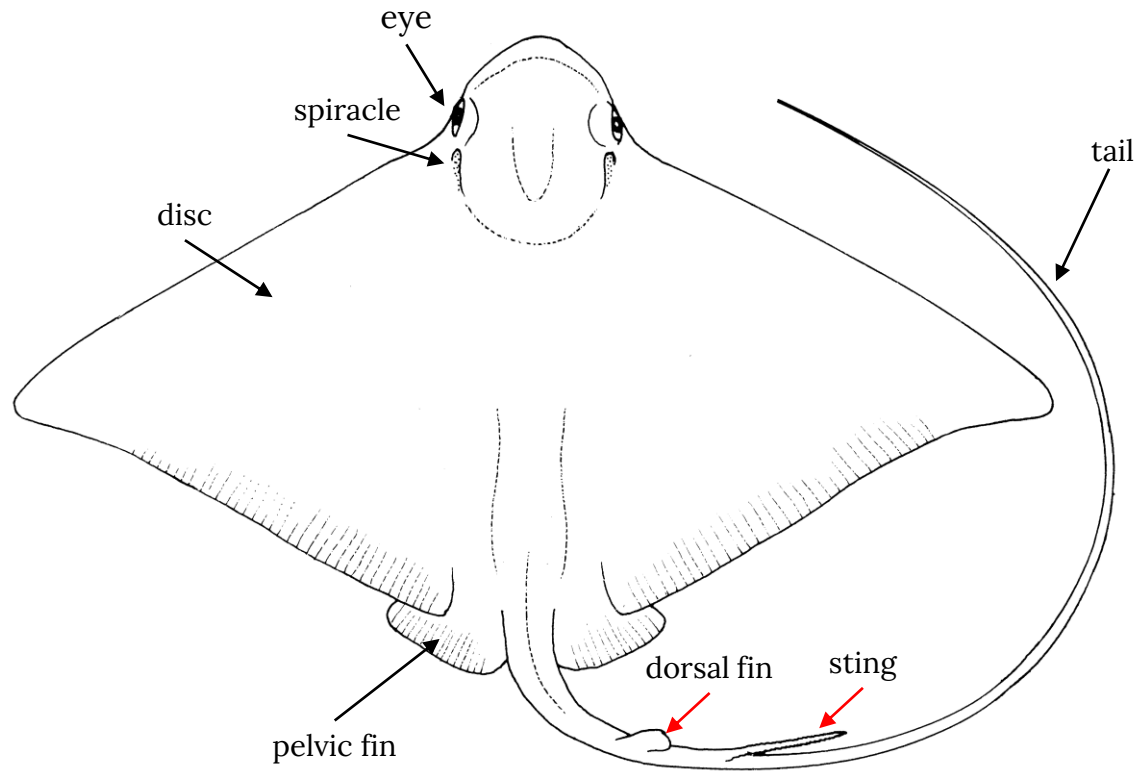
→ The red arrows point out the relevant characteristics for identification

# SKATES



→ The red arrows point out the relevant characteristics for identification

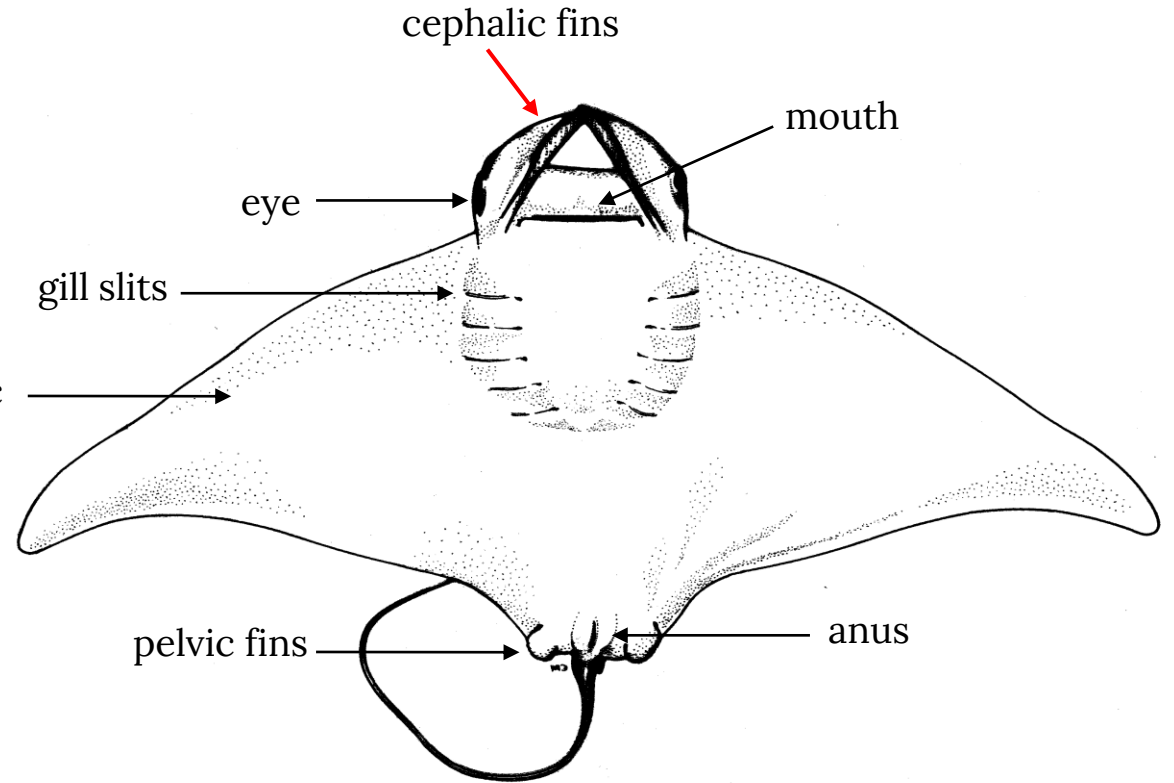
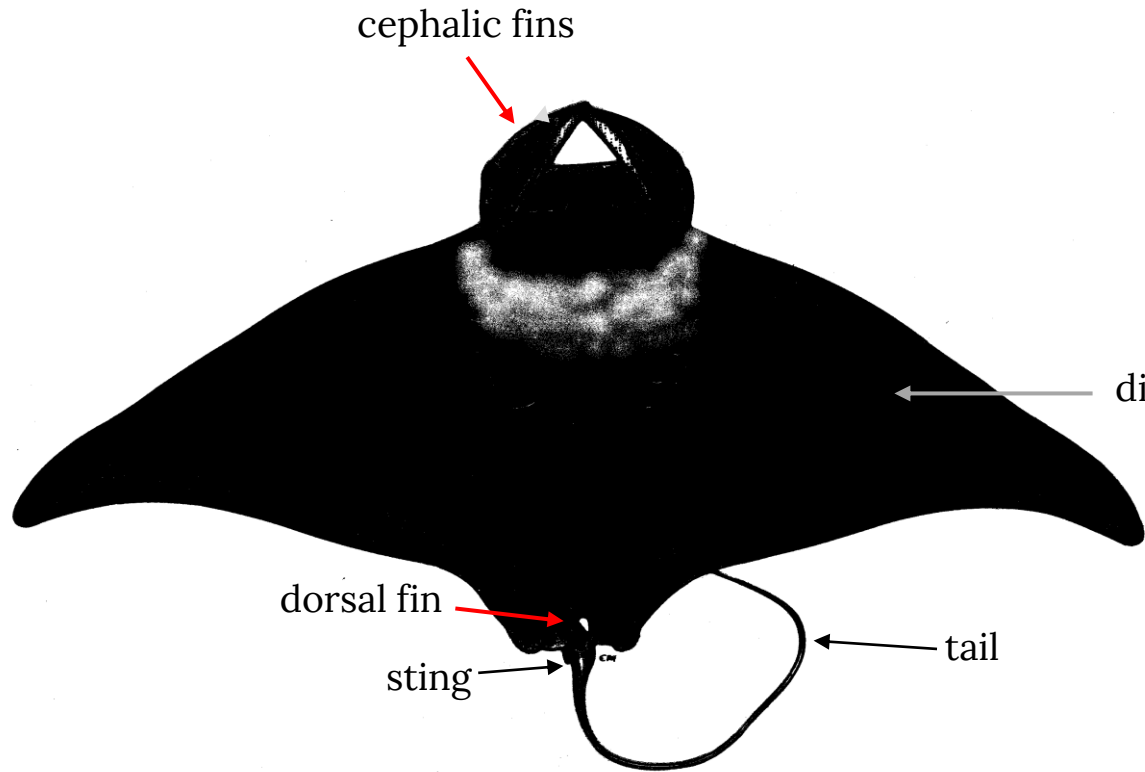
# RAYS



→ The red arrows point out the relevant characteristics for identification



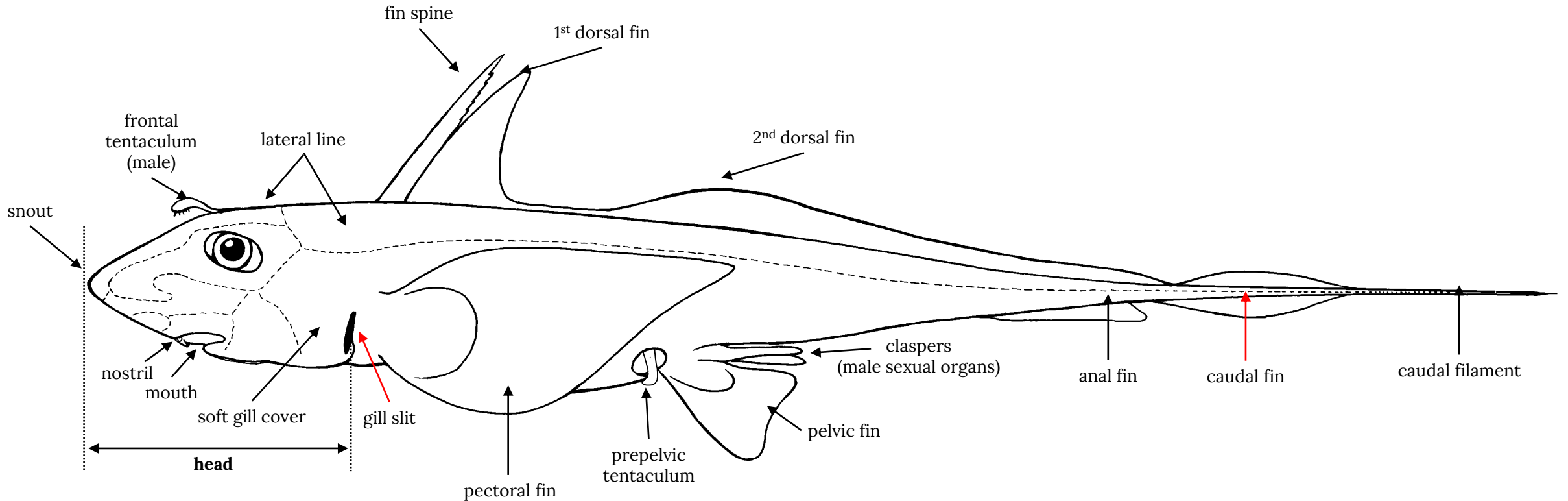
# DEVIL RAYS



→ The red arrows point out the relevant characteristics for identification



# CHIMAERAS



→ The red arrows point out the relevant characteristics for identification



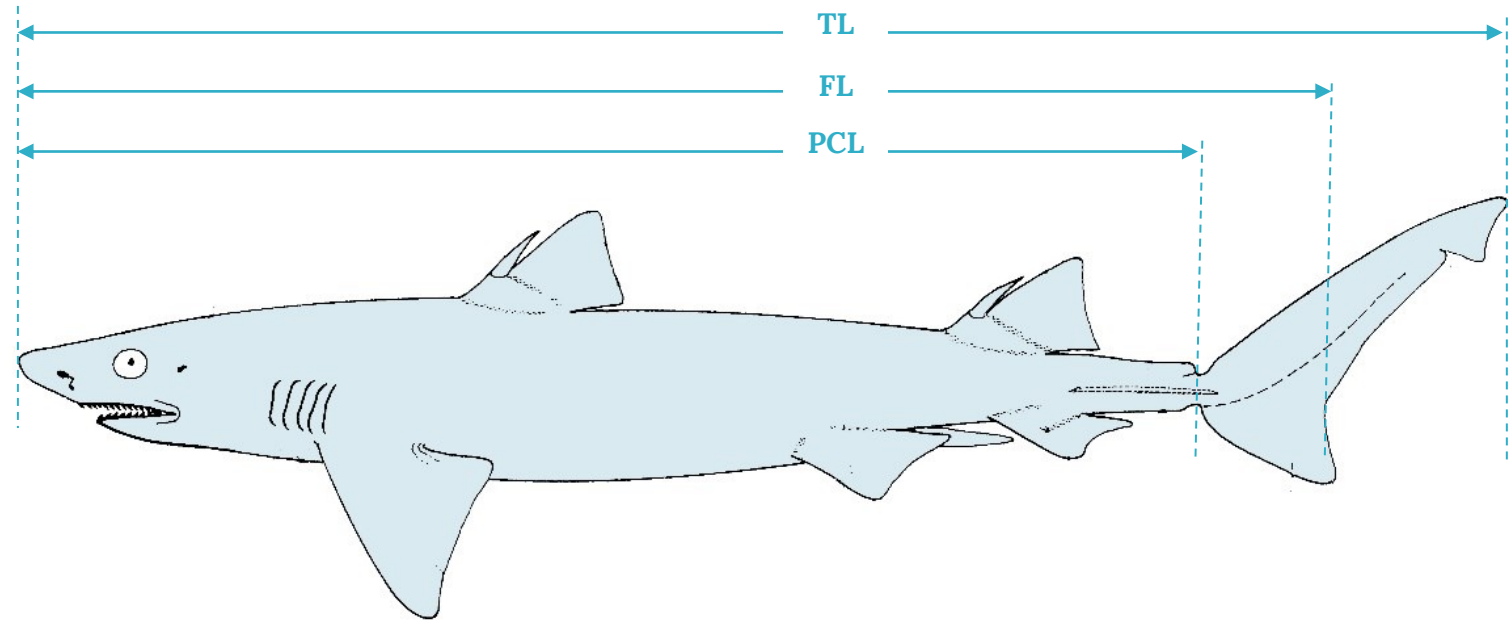


# SHARKS

**Total Length (TL):** Tip of the snout to the posterior tip of the tail.

**Fork Length (FL):** Tip of the snout to the fork in the tail.

**Pre-Caudal Length (PCL):** Tip of the snout to the beginning of the tail.

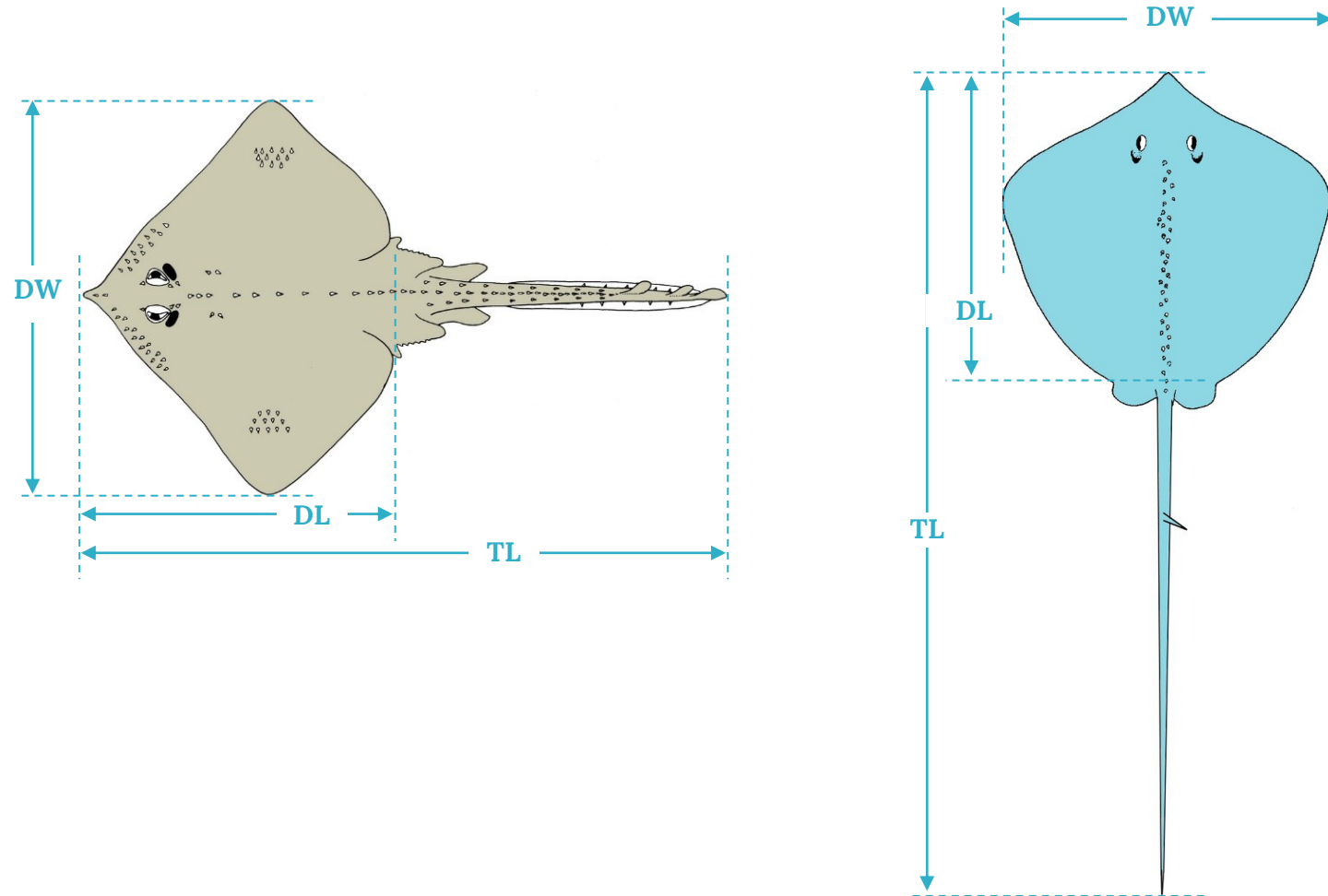


# SKATES and RAYS

**Disc Length (DL):** Tip of the snout to the posterior edge of the disc.

**Disc Width (DW):** Distance between outermost tips of pectoral fins.

**Total length (TL):** Tip of the snout to the tip of the tail.

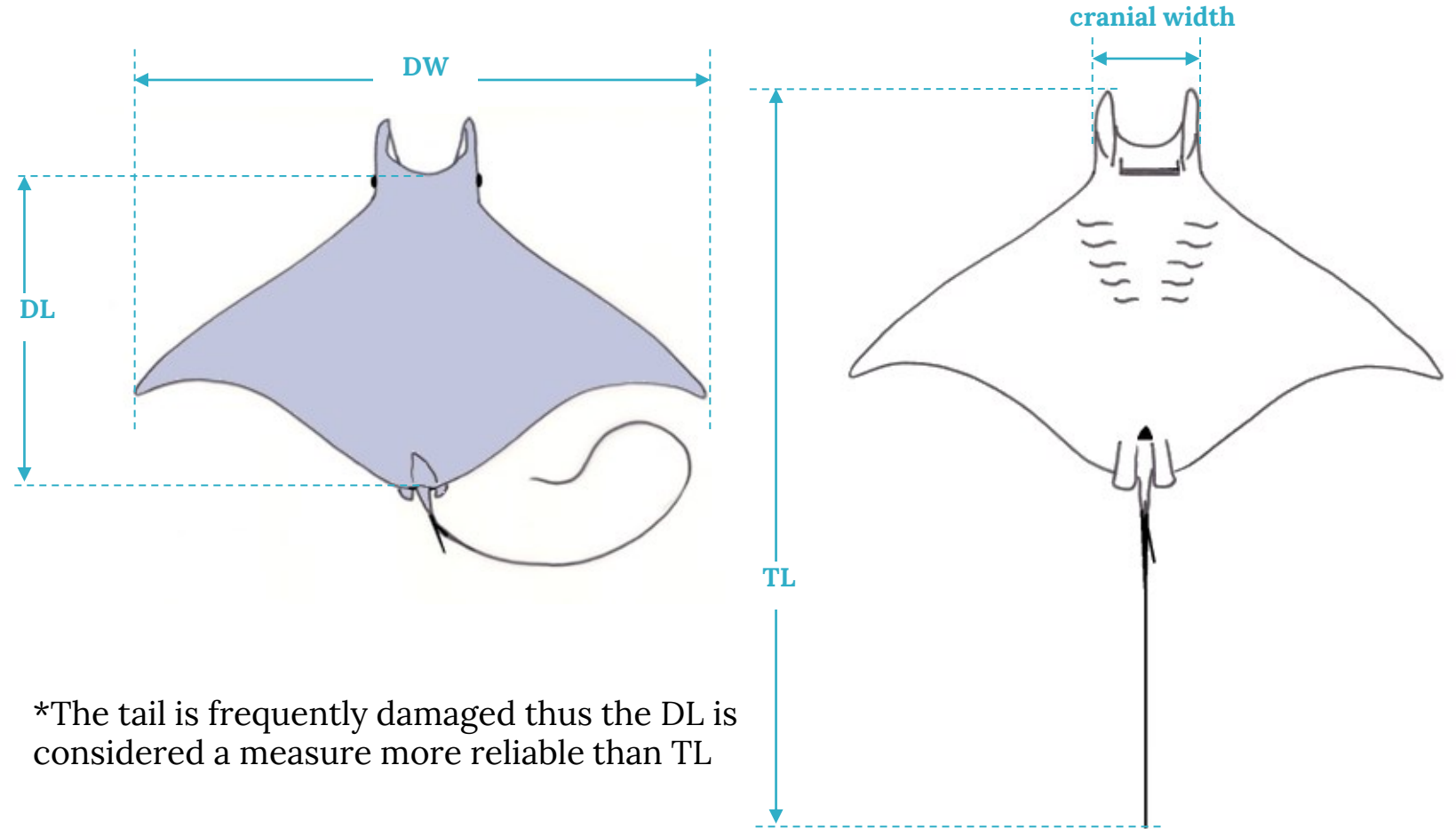


# DEVIL RAYS

**Disc Length (DL):** From midpoint of rostral margin to the posterior edge of the disc.

**Disc Width (DW):** Distance between outermost tips of pectoral fins.

**Total length (TL):** From the tip of cephalic fins to the tip of the tail\*.



\*The tail is frequently damaged thus the DL is considered a measure more reliable than TL

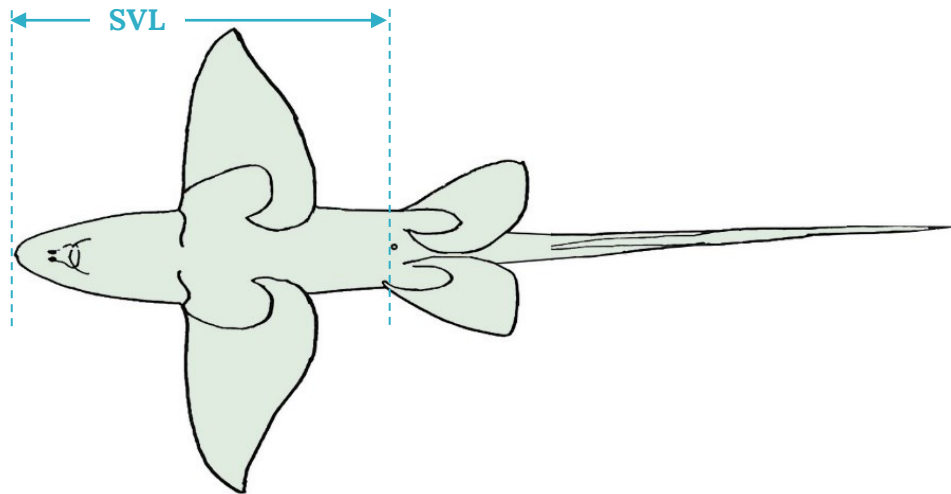
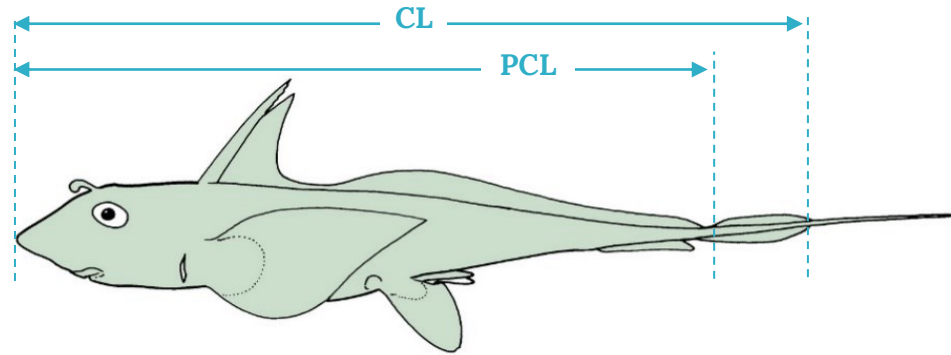


# CHIMAERAS

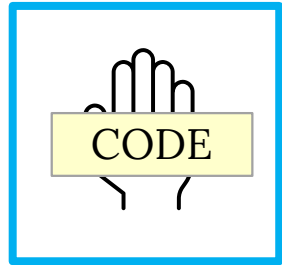
**Chimaera length (CL):** tip of the snout to the posterior edge of the supracaudal fin, excluding the caudal filament.

**Precaudal length (PCL):** tip of the snout to the anterior edge of the supracaudal fin.

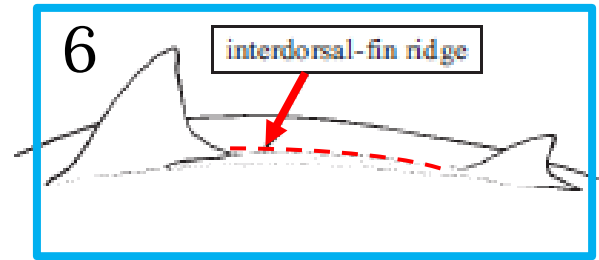
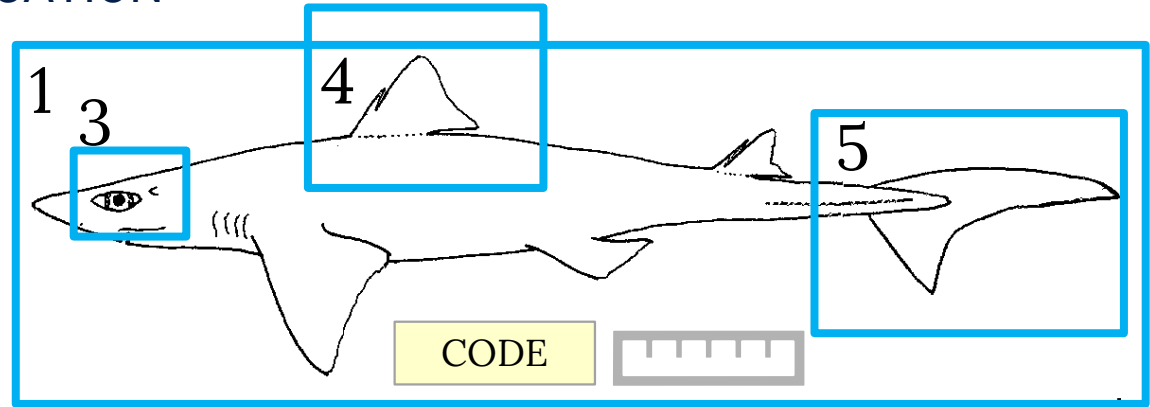
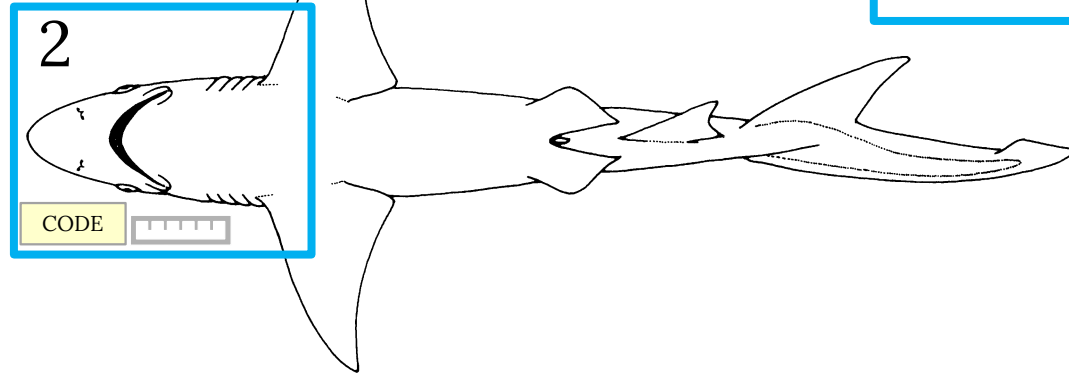
**Snout to vent length (SVL):** tip of the snout to the anterior edge of the vent.



## ANNEX III - USEFUL PHOTOS FOR SHARK IDENTIFICATION



BEFORE STARTING  
MAKE A PHOTO OF THE CODE

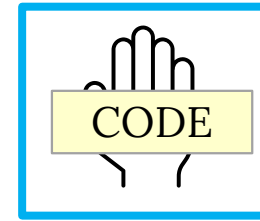


- 1: (Standard) - lateral view – complete if possible - with the code label and a ruler on it
- 2: (Standard) - ventral view of the head - with the code label and a ruler on it
- 3: Eye
- 4: First dorsal fin
- 5: Caudal fin, with the eventual precaudal pit visible
- 6: Interdorsal fin ridge (important in *Carcharhinus* species)

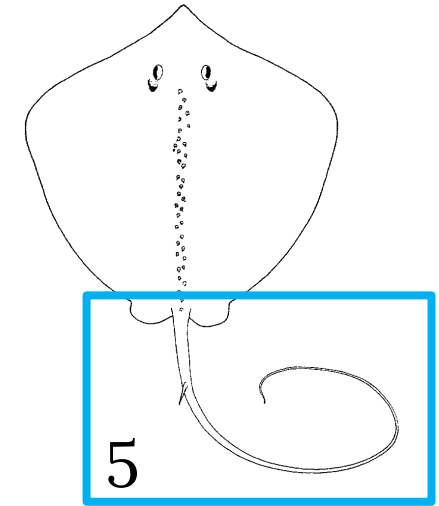
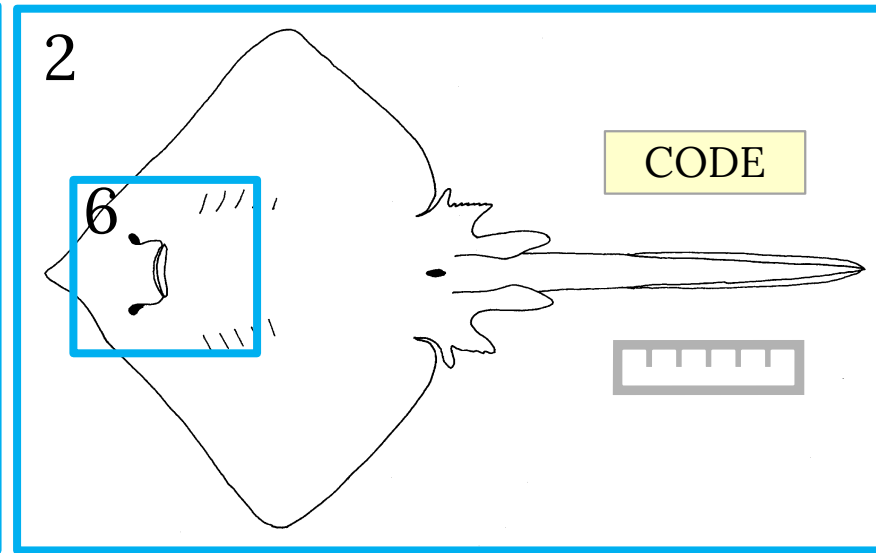
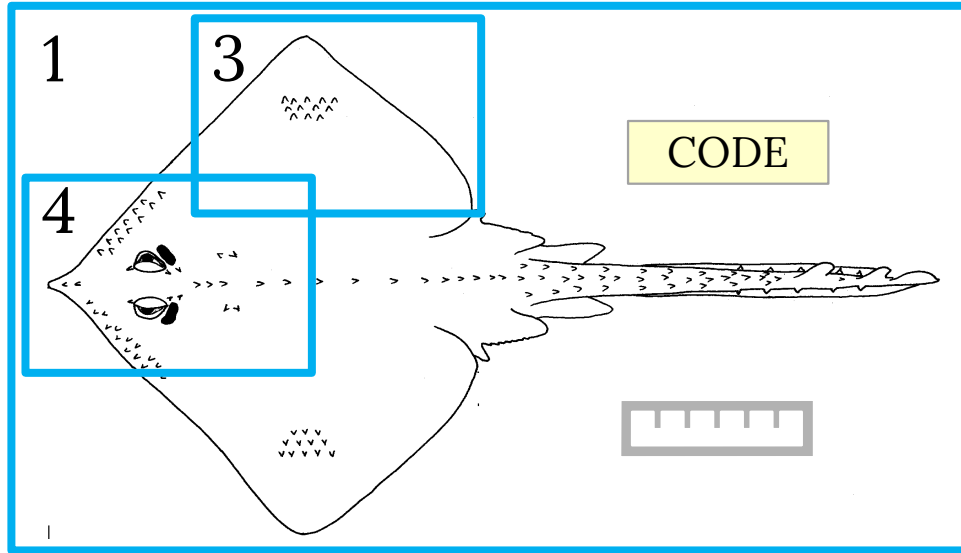
Note: Standard photos need to be taken perpendicular to the plane of the fish, avoiding distortion.



# ANNEX III - USEFUL PHOTOS FOR SKATES AND RAYS IDENTIFICATION



before starting  
make a photo of the code



- 1: (Standard) – dorsal view - with the code label and a ruler on it
- 2: (Standard) - ventral view - with the code label and a ruler on it
- 3: Dorsal pattern well defined
- 4: Nuchal zone and spiracles (with eventual spines)
- 5: Tail (with eventual spines)
- 6: Particular of the nostrils

Note: Standard photos need to be taken perpendicular to the plane of the fish, avoiding distortion



CONTENTS

## ANNEX IV – Shark, ray and skate species in the Data Collection Reference Framework of the General Fisheries Commission for the Mediterranean

The DCRF is the GFCM framework for the collection and transmission of the fisheries-related data that are requested as per existing GFCM Recommendations. Within the DCRF, CPCs should guarantee the quality and completeness of the data at the requested aggregation level and, according to an agreed format, transmit them in a timely manner to the GFCM Secretariat. Mandatory data differ for species in Group 1, Group 2, Group 3.

SPECIES	GFCM subregions				Black Sea
	Western Mediterranean Sea	Central Mediterranean Sea	Adriatic Sea	Eastern Mediterranean Sea	
<b>Group 1:</b> Species that drive the fishery and for which assessment is regularly carried out					
<i>Squalus acanthias</i>					X
<b>Group 2:</b> Species which are important in term of landing and /or economic value at regional and subregional level, and for which assessment is not regularly carried out					
<i>Galeus melastomus</i>	X				
<i>Raja asterias</i>	X				
<i>Raja clavata</i>	X	X			



ANNEX IV (continue)

SPECIES	GFCM subregions				Black Sea
	Western Mediterranean Sea	Central Mediterranean Sea	Adriatic Sea	Eastern Mediterranean Sea	
<b>Group 3:</b> species within international/national management plans and recovery and/or conservation action plans; non-indigenous species with the greatest potential impact					
<i>Hexanchus griseus</i>	X	X	X	X	
<i>Galeus melastomus</i>		X	X	X	
<i>Scyliorhinus canicula</i>	X	X	X	X	X
<i>Scyliorhinus stellaris</i>	X	X	X	X	
<i>Mustelus asterias</i>	X	X	X	X	
<i>Mustelus mustelus</i>	X	X	X	X	
<i>Mustelus punctulatus</i>	X	X	X	X	
<i>Prionace glauca</i>	X	X	X	X	
<i>Dalatias licha</i>	X	X	X	X	
<i>Etmopterus spinax</i>	X	X	X	X	





## ANNEX IV (continue)

SPECIES	GFCM subregions				Black Sea
	Western Mediterranean Sea	Central Mediterranean Sea	Adriatic Sea	Eastern Mediterranean Sea	
<b>Group 3:</b> species within international/ national management plans and recovery and/or conservation action plans; non-indigenous species with the greatest potential impact					
<i>Squalus blainville</i>	X	X	X	X	
<i>Squalus megalops</i>	X	X	X	X	
<i>Torpedo marmorata</i>	X	X	X	X	
<i>Torpedo torpedo</i>	X	X	X	X	
<i>Dipturus oxyrinchus</i>	X	X	X	X	
<i>Raja asterias</i>		X	X	X	
<i>Raja clavata</i>			X	X	X
<i>Raja miraletus</i>	X	X	X	X	
<i>Pteroplatytrygon violacea</i>	X	X	X	X	
<i>Myliobatis aquila</i>	X	X	X	X	



## ANNEX V. List of species occurring in the area

### Subclass Neoselachii (Elasmobranchii) – Sharks , rays and skates

#### HEXANCHIFORMES

Hexanchidae	Sharpnose sevengill shark ( <i>Heptranchias perlo</i> ) HXT	<u>7</u>
	Bluntnose sixgill shark ( <i>Hexanchus griseus</i> ) SBL	<u>7</u>
	Bigeyed sixgill shark ( <i>Hexanchus nakamurai</i> ) HXN	<u>7</u>

#### LAMNIFORMES

Carchariidae	Sand tiger shark ( <i>Carcharias taurus</i> ) CCT	<u>10</u>
Odontaspidae	Smalltooth sand tiger ( <i>Odontaspis ferox</i> ) LOO	<u>10</u>
Alopiidae	Bigeye thresher ( <i>Alopias superciliosus</i> ) BTH	<u>11</u>
	Thresher ( <i>Alopias vulpinus</i> ) ALV	<u>11</u>
Cetorhinidae	Basking shark ( <i>Cetorhinus maximus</i> ) BSK	<u>12</u>
Lamnidae	Great white shark ( <i>Carcharodon carcharias</i> ) WSH	<u>13</u>
	Shortfin mako ( <i>Isurus oxyrinchus</i> ) SMA	<u>14</u>
	Longfin mako ( <i>Isurus paucus</i> ) LMA	<u>14</u>
	Porbeagle ( <i>Lamna nasus</i> ) POR	<u>13</u>



CARCHARHINIFORMES		
Scyliorhinidae	Small-spotted catshark ( <i>Scyliorhinus canicula</i> ) SYC	<u>28</u>
	Nursehound ( <i>Scyliorhinus stellaris</i> ) SYT	<u>28</u>
Pentanchidae	Atlantic sawtail catshark ( <i>Galeus atlanticus</i> ) GHA	<u>28</u>
	Blackmouth catshark ( <i>Galeus melastomus</i> ) SHO	<u>28</u>
Triakidae	Starry smooth-hound ( <i>Mustelus asterias</i> ) SDS	<u>29</u>
	Smooth-hound ( <i>Mustelus mustelus</i> ) SMD	<u>29</u>
	Blackspotted smooth-hound ( <i>Mustelus punctulatus</i> ) MPT	<u>29</u>
	Tope shark ( <i>Galeorhinus galeus</i> ) GAG	<u>29</u>
Carcharhinidae	Bignose shark ( <i>Carcharhinus altimus</i> ) CCA	<u>19</u>
	Copper shark ( <i>Carcharhinus brachyurus</i> ) BRO	<u>22</u>
	Spinner shark ( <i>Carcharhinus brevipinna</i> ) CCB	<u>21</u>
	Silky shark ( <i>Carcharhinus falciformis</i> ) FAL	<u>19</u>
	Blacktip shark ( <i>Carcharhinus limbatus</i> ) CCL	<u>21</u>
	Blacktip reef shark ( <i>Carcharhinus melanopterus</i> ) BLR	<u>22</u>
	Dusky shark ( <i>Carcharhinus obscurus</i> ) DUS	<u>20</u>
	Sandbar shark ( <i>Carcharhinus plumbeus</i> ) CCP	<u>20</u>



Carcharhinidae	Blue shark ( <i>Prionace glauca</i> ) BSH	<u>23</u>
	Milk shark ( <i>Rhizoprionodon acutus</i> ) RHA	<u>23</u>
Galeocerdonidae	Tiger shark ( <i>Galeocerdo cuvier</i> ) TIG	<u>24</u>
Sphyrnidae	Scalloped hammerhead ( <i>Sphyrna lewini</i> ) SPL	<u>25</u>
	Great hammerhead ( <i>Sphyrna mokarran</i> ) SPK	<u>25</u>
	Smalleye hammerhead ( <i>Sphyrna tudes</i> ) SPQ	<u>25</u>
	Smooth hammerhead ( <i>Sphyrna zygaena</i> ) SPZ	<u>25</u>
<b>SQUALIFORMES</b>		
Dalatiidae	Kitefin shark ( <i>Dalatias licha</i> ) SCK	<u>33</u>
Etmopteridae	Velvet belly ( <i>Etmopterus spinax</i> ) ETX	<u>34</u>
Somniosidae	Portuguese dogfish ( <i>Centroscymnus coelolepis</i> ) CYO	<u>35</u>
	Little sleeper shark ( <i>Somniosus rostratus</i> ) SOR	<u>35</u>
Oxynotidae	Angular roughshark ( <i>Oxynotus centrina</i> ) OXY	<u>32</u>
Centrophoridae	Gulper shark ( <i>Centrophorus uyato</i> ) GUP	<u>36</u>
Squalidae	Picked dogfish ( <i>Squalus acanthias</i> ) DGS	<u>37</u>
	Longnose spurdog ( <i>Squalus blainville</i> ) QUB	<u>37</u>
	Shortnose spurdog ( <i>Squalus megalops</i> ) DOP	<u>37</u>



ECHINORHINIFORMES		
Echinorhinidae	Bramble shark ( <i>Echinorhinus brucus</i> ) SHB	<u>38</u>
SQUATINIFORMES		
Squatinidae	Sawback angelshark ( <i>Squatina aculeata</i> ) SUA	<u>39</u>
	Smoothback angelshark ( <i>Squatina oculata</i> ) SUT	<u>39</u>
	Angelshark ( <i>Squatina squatina</i> ) AGN	<u>39</u>
TORPEDINIFORMES		
Torpedinidae	Electric ray ( <i>Tetronarce nobiliana</i> ) TTO	<u>42</u>
	Marbled electric ray ( <i>Torpedo marmorata</i> ) TTR	<u>42</u>
	Variable torpedo ray ( <i>Torpedo sinuspersici</i> ) TTJ	<u>42</u>
	Common torpedo ( <i>Torpedo torpedo</i> ) TTV	<u>42</u>
RHINOPRISTIFORMES		
Rhinobatidae	Common guitarfish ( <i>Rhinobatos rhinobatos</i> ) RBX	<u>44</u>
Glaucostegidae	Blackchin guitarfish ( <i>Glaucostegus cemiculus</i> ) RBC	<u>44</u>
	Halavi ray ( <i>Glaucostegus halavi</i> ) not available	<u>44</u>
Pristidae	Smalltooth sawfish ( <i>Pristis pectinata</i> ) RPP	<u>45</u>
	Common sawfish ( <i>Pristis pristis</i> ) RPR	<u>45</u>



## RAJFORMES

Blue skate ( <i>Dipturus cf. batis</i> ) RJB	<u>48</u>
Norwegian skate ( <i>Dipturus nidarosiensis</i> ) JAD	<u>48</u>
Longnosed skate ( <i>Dipturus oxyrinchus</i> ) RJO	<u>48</u>
Sandy ray ( <i>Leucoraja circularis</i> ) RJI	<u>49</u>
Shagreen ray ( <i>Leucoraja fullonica</i> ) RJF	<u>49</u>
Maltese ray ( <i>Leucoraja melitensis</i> ) JAM	<u>49</u>
Cuckoo ray ( <i>Leucoraja naevus</i> ) RJN	<u>49</u>
Mediterranean starry ray ( <i>Raja asterias</i> ) JRS	<u>50</u>
Blonde ray ( <i>Raja brachyura</i> ) RJH	<u>50</u>
Thornback ray ( <i>Raja clavata</i> ) RJC	<u>50</u>
Brown ray ( <i>Raja miraletus</i> ) JAI	<u>51</u>
Spotted ray ( <i>Raja montagui</i> ) RJM	<u>51</u>
Speckled ray ( <i>Raja polystigma</i> ) JAY	<u>51</u>
Rough ray ( <i>Raja radula</i> ) JAR	<u>52</u>
Undulate ray ( <i>Raja undulata</i> ) RJU	<u>52</u>
White skate ( <i>Rostroraja alba</i> ) RJA	<u>47</u>



MYLIOBATIFORMES		
Dasyatidae	Roughtail stingray ( <i>Bathytoshia lata</i> ) RDC	<u>56</u>
	Marble stingray ( <i>Dasyatis marmorata</i> ) RDQ	<u>57</u>
	Common stingray ( <i>Dasyatis pastinaca</i> ) JDP	<u>57</u>
	Tortonese's stingray ( <i>Dasyatis tortonesei</i> )	<u>57</u>
	Leopard whipray ( <i>Himantura leoparda</i> ) DKL	<u>58</u>
	Coach whipray ( <i>Himantura uarnak</i> ) DHV	<u>58</u>
	Pelagic stingray ( <i>Pteroplatytrygon violacea</i> ) PLS	<u>59</u>
	Round stingray ( <i>Taeniurops grabatus</i> ) RTB	<u>60</u>
Gymnuridae	Spiny butterfly ray ( <i>Gymnura altavela</i> ) RGL	<u>61</u>
Aetobatidae	Bull ray ( <i>Aetomylaeus bovinus</i> ) MPO	<u>62</u>
Myliobatidae	Common eagle ray ( <i>Myliobatis aquila</i> ) MYL	<u>62</u>
Rhinopteridae	Lusitanian cownose ray ( <i>Rhinoptera marginata</i> ) MRM	<u>62</u>
Mobulidae	Devil fish ( <i>Mobula mobular</i> ) RMM	<u>63</u>
Subclass Holocephali - Chimaeras		
	Rabbit fish ( <i>Chimaera monstrosa</i> ) CMO	<u>65</u>
	Large-eyed rabbitfish ( <i>Hydrolagus mirabilis</i> ) CYH	<u>65</u>



This guide contains the illustrated key to orders, families, genera and species to the Chondrichthyes of the Mediterranean and Black Seas (FAO fishing area 37), currently represented by 38 sharks, 48 batoids and 2 chimaeras. The species are described following the taxonomic order and are grouped in functional groups. Near the illustration of each species, the relevant diagnostic features are complemented by a set of icons representing the management measures and the data collection requirements as per existing GFCM Recommendations. The technical terms and the minimum standard measurements are provided as Annexes.

