FAO SPECIES IDENTIFICATION GUIDE FOR FISHERY PURPOSES

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FIELD IDENTIFICATION GUIDE TO THE SHARKS AND RAYS OF THE RED SEA AND GULF OF ADEN

PERSGA

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FIELD IDENTIFICATION GUIDE TO THE SHARKS AND RAYS OF THE RED SEA AND GULF OF ADEN

by

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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PREPARATION OF THIS DOCUMENT

This document was prepared under the coordination of the Species Identification and Data Programme of the Marine Resources Service, Fishery Resources and Environment Division, Fisheries Department, Food and Agriculture Organization of the United Nations (FAO).

This field guide is largely based on material prepared for training courses on elasmobranch identification delivered in the region by the first author, and promoted by the Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA), as an activity of PERSGA's Strategic Action Programme (SAP) towards capacity building and technical assistance in the Red Sea and Gulf of Aden region. Printing was supported by Japanese Government funds.

The increasing recognition of the significance of sharks and batoid fishes as ecosystem health indicators, as well as their particular importance in exploited ecosystems in the Red Sea and the Gulf of Aden, have been key considerations to promote the preparation of this Field Guide. Furthermore, in recent years the reported catches of elasmobranchs in the Red Sea and the Gulf of Aden showed a marked increase.

Concern has been growing around the world about the threats to shark populations from both habitat degradation and fishing. For this reason an International Plan of Action (IPOA) for the Conservation and Management of Sharks is being implemented, aiming among others to (i) facilitate improved species-specific catch and landings data and monitoring of shark catches; and (ii) facilitate the identification and reporting of species-specific biological and trade data.

With this Field Guide the FAO contributes to facilitate the identification of elasmobranch species in such sensitive areas as the Red Sea and Gulf of Aden are.

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Field identification guide to the sharks and rays of the Red Sea and Gulf of Aden.

FAO Species Identification Guide for Fishery Purposes.

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ABSTRACT

This volume presents a fully illustrated field guide for the identification of the sharks and rays most relevant to the fisheries of the Red Sea and Gulf of Aden. An extensive literature review and two field surveys in the region were carried out for the preparation of this document. A total of 49 sharks and 45 batoids reliably reported for the region are listed and those common in the fisheries or likely to be found through fishing operations are fully treated (44 sharks and 33 batoids). Included here are the first confirmed reports for the region of *Hemigaleus microstoma*, *Carcharhinus dussumieri*, *Aetomylaeus vespertilio*, *Himantura fai*, *Mobula japanica* and an undescribed *Dasyatis* sp. The guide includes sections on technical terms and measurements for sharks and batoids, and fully illustrated keys to those orders and families that occur in the region. Each species account includes: at least one annotated illustration of the species highlighting its relevant identification characters; basic information on nomenclature, synonyms and possible misidentifications; FAO, common and local names; basic information on size, habitat and biology, importance to fisheries, and distribution. Colour plates for a large number of the species are included.

ACKNOWLEDGEMENTS

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A large number of persons provided field assistance during surveys in the region, as well as valuable help with the collection of samples in some cases. Their kindness is gratefully appreciated. The following list is intended to be comprehensive but unavoidably one or two names might be missing, we apologize in such case for the omission: Khaled Hariri, PERSGA; Ahmed Barrania, LMR-WG member, Egypt; Ahmed Ibrahim, National Institute of Oceanography and Fisheries (NIOF); Abd-Alhamied Al-Rashash (Suez) and Galal Abu Al-Wafah (Hurghada), General Authority for Fisheries Resources Development, Egypt. Talal Shusha and Abdul Rahman Fallatah, KSA Fisheries Research Center, Ministry of Agriculture and Water Resources (MAWR); Faisal Showkani, Sulaiman Jhaseb, and Brander Al-Jahdali, KSA Fisheries Department; Salih Al-Shihri, Coast Guard Service, KSA; Osman Farah LMR-WG member and Mahgoub Hassan, NPC/SAP, Sudan; Nasser Djama Abdi, NPC/SAP, Djibouti; Ibrahim Elmi LMR–WG member and Nasser Ali Mahamoud, Ministry of Agiculture, Livestock and Sea (MAEM), Djibouti; Mohamed Mahadi Abubaker, NPC/SAP, Yemen; Hashem Al-Saqqaf LMR-WG member and Murtada Ahmed, Marine Sciences and Resources Research Center (MSRRC), Yemen; Ali Yusr and Omar Mohamed Mazroah, Ministry of Fish Wealth (MFW), Yemen; Fuad Naseeb, Socotra Conservation of Biodiversity Project; Abdul Hakim Said, Fisheries Marketing Services, Mokha; Hassan Bamohaimedan Fisheries Cooperatives, Qusayar. Due acknowledgement is paid to the following authors of the PERSGA reports: K. Hariri, P. Nichols, F. Krupp, S. Mishrigi, A. Barrania, A. Farah Ali, S. M. Kedidi, N. Pilcher, A. Alsuhaibany, and to the PERSGA editor, R. Fleming. Vardis Tsontos (USC) provided help in the preparation of bathymetry and temperature maps.

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INTRODUCTION

The Red Sea and Gulf of Aden (Fig. 1) have formed a traditional trading route for centuries. Since the opening of the Suez Canal in 1869 and the discovery of oil in the mid-1900s, the geopolitical significance of the Region and the importance of these waters for international trade have grown enormously. This route now carries around 7% of total world shipping (Suez Canal Authority statistics 1996), which is equivalent to 14 000 or more vessels each year. Although still relatively understudied, the living marine resources of the Region have attracted increasing interest in recent years, both locally and internationally. Some of the earliest collections, particularly of fish, were made by the renowned Swedish naturalist Peter Forsskål during 1761-1762. The most recent studies in the Region include the work carried out through the Strategic Action Programme, a multi-disciplinary project executed by the Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA) and funded by the Global Environment Facility, and the Biodiversity Conservation and Sustainable Development Programme for the Socotra Archipelago, implemented through the United Nations Development Programme. An indication of the global importance of the Region is shown by the high degree of biodiversity at genetic, species and ecosystem levels. Endemism is also unusually high; 17% of the fish species are not found outside the Region.

Physical and chemical characteristics of the region

Geology and physical features

The Red Sea is a relatively newly formed ocean located in an arid zone between 12.5°N and 30°N. It consists of a deep, narrow trench 1 932 km in length with an average width of 280 km; the widest point (300 km) is found near Massawa (Eritrea) (ALECSO-PERSGA/UNESCO, 1990). The average depth is about 500 m but its greatest depth exceeds 2 000 m (Fig. 2). At the southern end of the Red Sea are the straits of Bab el Mandeb (literally “Gate of Lamentations”), only 29 km wide and with a maximum depth of 130 m. This structure has profound effects on the movement of waters between the Red Sea and the Gulf of Aden and in the past, during periods of lower sea level, has effectively separated the two water bodies.

Fig. 1 Map of the Red Sea and Gulf of Aden

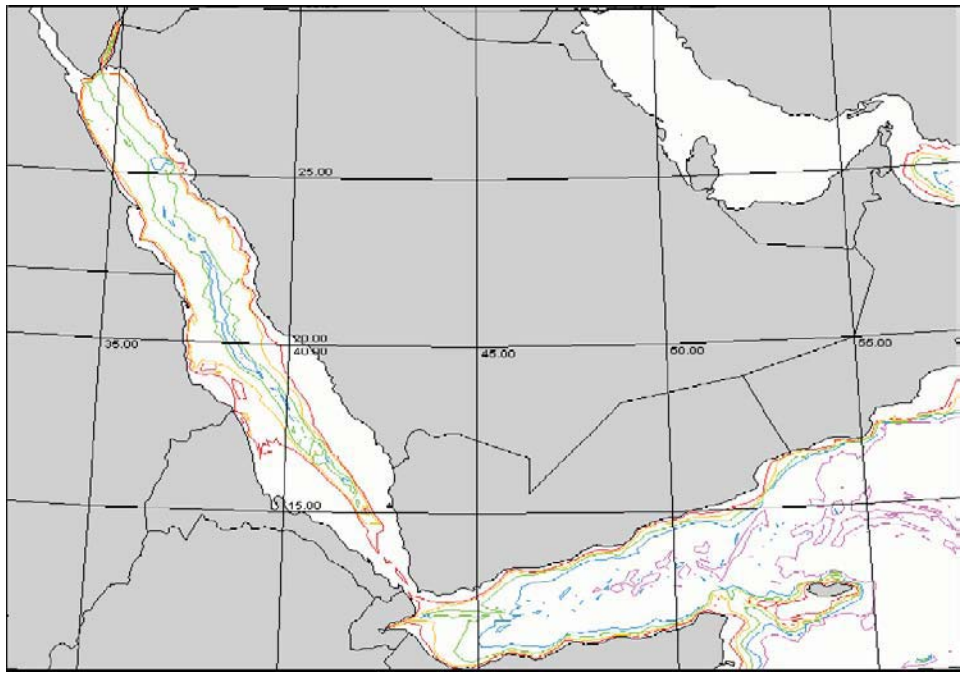


Fig. 2 General bathymetry of the Red Sea and Gulf of Aden
(100 m = Red; 200 m = Orange; 500 m = Green; 1 000 m = Blue; 1 500 m = Dark Blue; 2 500 m = Purple)

The Red Sea developed from the separation of the Arabian plate from the African plate, an event which began about 70 million years ago. The western and southern edges of the plate lie along the rift that runs from the Dead Sea, down the Gulf of Aqaba, the Red Sea, and out through the Gulf of Aden. The Arabian plate is moving northeast away from the African plate and rotating counter-clockwise as the sea floor spreads. Rifting has not taken place as a continuous process, but in episodes. After a recess in the latter part of the Tertiary, rifting recommenced between 2 and 5 million years ago, giving a spreading rate averaging 2 cm per year (Sheppard *et al*., 1992).

The Gulf of Aqaba is a continuation of the Red Sea rift. It is short and narrow (150 km by 16 km) but also deep, up to 1 800 m with steeply shelving sides. A strike-slip faulting pattern has caused the formation of three deep basins. The Gulf meets the Red Sea at the Straits of Tiran where a relatively shallow bar or sill (250-300 m) separates the two water bodies.

The Gulf of Suez, (length 280 km, width 20-40 km), is spreading due to normal faulting. It is shallow with depths mostly less than 50 m, reaching nearly 100 m at the southern end where it meets the Red Sea. In stark contrast to the Gulf of Aqaba, the sea-floor of the Gulf of Suez is generally flat or of low relief.

Wind, temperature, currents and tides

The wind patterns over the northern Red Sea are dominated by the weather systems of the Mediterranean, whereas the southern Red Sea and Gulf of Aden are strongly influenced by Asian weather patterns, and the Indian Ocean monsoons (Fig. 3). In the northern Red Sea (north of latitude 20°N) winds are predominantly from the north northwest, all year round. Only during winter months are there occasional southerly winds. The Bab el Mandeb, the Gulf of Aden and the Red Sea south of 20°N are subject to two monsoonal events each year. During the winter (October to May) the northeast monsoon winds blow into the Gulf of Aden and wind funnels up into the Red Sea from the south southeast. During the summer (June to September) the southwest monsoon winds blow over the Gulf of Aden but the strong winds from the north northwest extend their influence over the southern Red Sea until they are deflected northeast up the southern coast of Arabia. These summer wind patterns cause strong upwelling of deep, cold, nutrient-rich ocean water along the southern Arabian coastline. Coral growth is inhibited, but kelp beds thrive and productivity is high, reflected in the rich coastal fisheries (Sheppard *et al*., 1992).

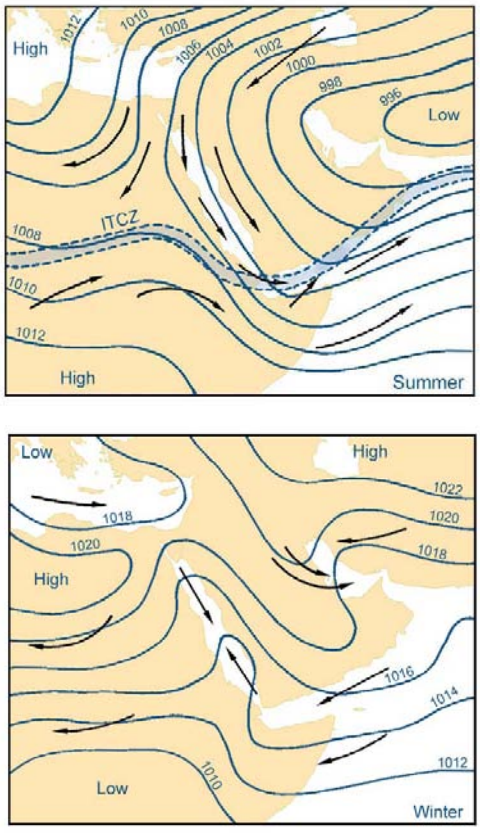
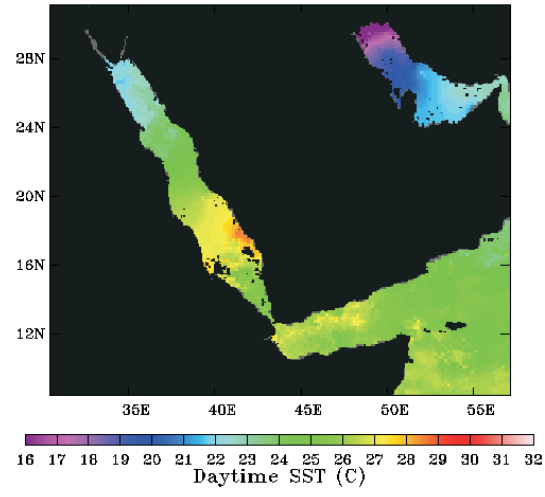


Fig. 3 Major barometric pressure systems and prevailing wind patterns for the Arabian Peninsula and the Intertropical Convergence Zone (ITCZ)
(after Sheppard *et al*., 1992)

Water currents in the Red Sea are driven by density and wind. Evaporation levels of 1-2 m/yr greatly exceed precipitation (10 mm/yr) raising salinity, particularly in the north, to 42 ppt. The loss of water is made up by an inflow of cooler, less saline (39 ppt), surface water from the Gulf of Aden that drifts north. During the winter, in the northern Red Sea and Gulf of Suez, the high salinity surface water cools and its density increases, causing it to sink below the thermocline and flow back towards and into the Gulf of Aden, flowing over the shallow sill at the Bab el Mandeb below the incoming surface water. However, during the summer the wind is blowing from the north northwest out through the Bab el Mandeb. This causes the inflowing 'surface current' to be split vertically into two layers, a top layer flowing out into the Gulf of Aden driven by the wind, a lower layer continuing to flow into the Red Sea to replace the net loss, with the dense saline water continuing to flow out of the Red Sea at a deeper level.

Due to its shape, depth and relative isolation from other major water bodies, the Red Sea is one of the warmest water bodies on earth, reaching surface temperatures of over 32°C during the summer and rarely cooling to less than 20°C during the winter (Fig. 4). The temperature regime of the Red Sea has a strong influence over the Gulf of Aden which has generally similar temperatures to the Red Sea even during summer, when the adjacent waters of the northwest Indian Ocean are several degrees cooler.



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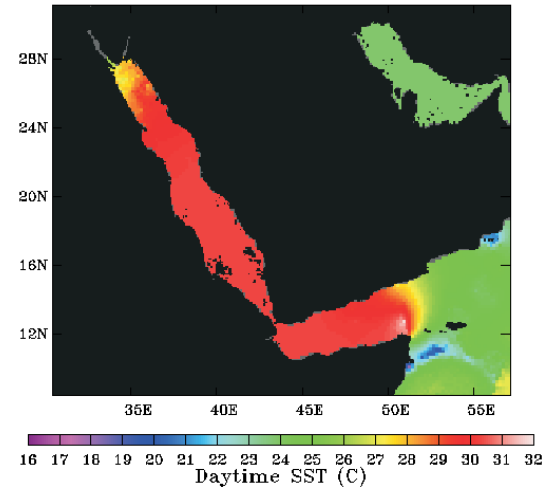


24-31 August 2000

Fig. 4 Average sea surface temperature maps of the Red Sea and Gulf of Aden calculated with AVHRR data using NASA's Distributed Active Archive Center

The tide system within the Red Sea is generally semi-diurnal with a difference of about six hours in the time of high water between the north and the south. The tidal range is low. The average spring range is 0.5 m in both north and south, decreasing from both ends to a point where there is no appreciable semi-diurnal range near Port Sudan and Jeddah. In the Gulf of Aden the tide is generally diurnal, with the extreme range being about 3 m at Aden and Djibouti. Eastwards the tidal system becomes more semi-diurnal, though the diurnal inequality remains great, with ranges up to 3 m.

Biological characteristics of the region

The Red Sea has become one of the most important repositories of marine biodiversity in the world. Its relative isolation has given rise to an extraordinary range of biological diversity and endemism, particularly among reef fishes and reef-associated organisms. The coral reef systems of the Region are legendary. They are comprised of more than 250 species of scleractinian corals, representing the highest diversity in any section of the Indian Ocean. The coasts of the northern Red Sea and the Gulf of Aqaba are fringed by an almost continuous band of coral reef, which physically protects the shoreline. Corals assemblages in the shallow Gulf of Suez are less well developed. Further south the shelf becomes much broader and shallower; the fringing reefs gradually disappear and are replaced with shallow, muddy shorelines. Despite the seasonal upwellings in the Gulf of Aden, diverse and complex reefs and non-reef assemblages exist and well-developed coral systems occur around the Socotra Archipelago. (PERSGA, 2003).

Mangrove systems have developed where the continental shelf is wider and inter-tidal distances are greater. They assist in the accumulation and retention of sediments and prevention of coastal erosion. Mangroves are well developed in the southern part of the Red Sea, contributing their high primary productivity to the marine ecosystem and providing important nursery grounds for a wide range of marine fauna.

Seagrasses constitute the only group of higher plants to have adapted to a sub-aquatic habitat and inhabit shallow water areas with soft benthos. The Region's seagrass areas are highly productive ecosystems where many species of living marine resources abound. For example, in the Khor-Umeira lagoon in the west of the Gulf of Aden, Halodule spp. provide important feeding grounds for the green turtle *Chelonia mydas* and many species of sea cucumbers that form the basis of important artisanal fisheries.

The fisheries of the region

The fisheries of the Red Sea and Gulf of Aden are of considerable socio-economic importance to the coastal nations of the region in terms of national food security and income generation for rural communities, with the exception of Jordan, which has minimal fisheries in the Red Sea. Fishery resources are exploited by artisanal subsistence fishermen, local commercial fishers and foreign industrial fleets targeting invertebrates, demersal finfish and pelagic finfish. Many species cross national boundaries and are essentially shared stocks. Some are truly highly migratory, for example the tuna, some sharks and the small shoaling pelagic species of the Region (PERSGA/GEF, 2002).

Fisheries are also an important source of employment in the region. In the artisanal sector at least 29 500 fishermen and 9 000 vessels are employed in the Red Sea and at least 27 900 fishermen and 6 400 vessels in the Gulf of Aden. The Red Sea industrial sector includes at least 7 500 fishermen and 1 600 industrial vessels and the Gulf of Aden at least another 450 fishermen and 65 vessels. Artisanal fishermen use a range of gear including longlines, handlines, gillnets, trawls, trammel nets, tangle nets, set nets, traps and spears. Industrial vessels utilize purse-seine, trawl, longline and vertical drop-line gear.

The artisanal and industrial fisheries in the Red Sea and Gulf of Aden produced around 17 096 t of invertebrate species and 194 844 t of finfishes in 1998. These figures indicate a considerable increase in the region's production from 7 951 t of invertebrates and 135 904 t of finfishes in 1988 (PERSGA/GEF, 2002). Important commercial invertebrate species include penaeid shrimps in the Red Sea and cuttlefish and rock lobsters in the Gulf of Aden. Pelagic finfish catches are dominated by sardines, Indian mackerel, Spanish mackerel and yellowfin tuna. The demersal catch is dominated by species of snapper, jack, emperor, lizard-fish, grouper, seerfish, rabbitfish and sea-bream. In comparison, fish collecting for the aquarium trade is only significant in Saudi Arabia and Yemen. The former has at least seven aquarium fish exporters in operation

The greatest fishery production occurs in Yemen. In 1998 Yemen accounted for 56% of total production of invertebrates and 52% of total fin-fish production in the region. Egypt and Saudi Arabian are the next most important players. Artisanal fisheries are comparatively minor in Djibouti, Sudan and Somalia. However, declines in catches have been reported for several major fisheries e.g. Indian mackerel,

kingfish, sharks, cuttlefish, shrimp, rock lobster and *Trochus*.

Marine aquaculture in the region includes shrimp farming in Egypt and Saudi Arabia and pearl-oyster farming in Sudan. Turtles are caught opportunistically by fishermen throughout the southern Red Sea and Gulf of Aden. Turtle meat and eggs are eaten and oil collected along the coasts of Sudan, Djibouti, Yemen and Somalia.

The exploitation of shark-like fishes in the Red Sea and Gulf of Aden region dates back several decades and in some cases even centuries. Small-scale fishing boats are commonly used but in some places larger fishing vessels with long-range capabilities also take part in the fishery. The catches have been modest for most part of this century but a considerable increase in landings has been observed since the mid-1970s. According to FAO statistics, the main shark-fishing nation in the region is Yemen, with the Kingdom of Saudi Arabia, Egypt, and Eritrea reporting smaller catches of sharks. Information on shark landings in other countries of the region is lacking mainly due to problems of political unrest or absence of a proper general system for monitoring fishery landings. Nevertheless, it is known from other sources that shark fishing also takes place in Somalia and probably Sudan, although none of these countries report shark catches to FAO. According to Marshall (1996) the total shark catch of Somalia is estimated at around 6 700 t/yr, although this figure is very uncertain. FAO statistics for 1998 indicate that Yemen reported 5 000 t of sharks, Saudi Arabia, 1 500 t, Egypt, 135 t (not including Mediterranean catches), and Eritrea, 15 t. This makes an estimated total catch of about 14 000 t of shark-like fishes per year for the entire region. However, this is likely to be an underestimate because of the lack of information of the catches in Sudan, and the likely underestimate of most of the reported catches given the limited coverage of the monitoring systems in many of the countries of the region.

The countries fishing for sharks and rays in the Red Sea and Gulf of Aden share common problems. The principal and most pressing problem is that none of these countries has any kind of control in the form of management measures to make sure that the shark and ray populations remain healthy for the fisheries to continue on a sustainable basis. Furthermore, there is a general lack of knowledge of how many species of shark and rays are found in the region, which are the main species in the catches, and even what is the real size of the catches and the amount of fishing effort put by the fishermen in the region. It is not surprising then that without such essential information, there are no stock assessments for the shark-like populations of the region. Given the trend of increase in the catches of these resources, it is urgent that the countries in the region increase their capability to monitor, assess and manage the shark and ray resources they are exploiting.

The shark resources of the Region are heavily fished especially in Sudan, Djibouti, Yemen, around the Socotra Archipelago, and off Somalia where there are signs of stock depletion. This is attributed to a lack of control over national shark fisheries and also an increase in illegal fishing by fishermen working outside their normal territorial boundaries for the south-east Asia shark-fin market. Some of the current problems in the shark fisheries include: lack of reliable (and species-specific) catch data gathering systems; heavy exploitation of newborn sharks in pupping/nursery grounds that compromises the future recruitment to the reproductive stocks; the widespread use of species-unselective gear such as gillnets in the fishery, which together with shrimp trawls cause very high bycatch rates of non-target fish, sea-turtles and dolphins; shark carcasses are many times discarded once the fins are removed; poor quality control of shark products and lack of full utilization of sharks, wasting very useful parts such as the skins for the production of leather.

In the Red Sea, there are signs that industrial trawl fisheries for penaeid shrimps are placing considerable pressure on shrimp stocks. The large but unrecorded bycatch of non-target species taken by shrimp trawlers, which is dominated by juveniles, is having an unknown impact on the recruitment of other living marine resources. Despite the importance of fishing as a source of income and in terms of national food supply, the direct effects of fishing on fish stocks, especially vulnerable species such as sharks, cuttlefish, shrimps and rock lobster, and indirectly on the marine environment is largely unknown.

Although most of the coastal areas and the waters of the Region are considered still to be in a pristine state, this situation is changing. The accelerated growth and expansion in urban coastal centres during the 1980s and 1990s, coupled with a wide range of human activities, have increased the risk of environmental degradation, depletion of fisheries resources and the loss of the invaluable amenity of the Region's precious coastal and marine habitats and ecosystems

General remarks

The Class Chondrichthyes comprises a diverse group of fishes (chimaeras, sharks and batoids) whose most obvious common feature is the possession of a cartilaginous skeleton, as opposed to the bony skeleton of the Osteichthyes or bony fishes. The cartilaginous fishes form an ancient successful group dating back to the Devonian, in which basic models remain largely unchanged since their last large flourish during the Cretaceous. Despite their ancient origin, sharks and their relatives have evolved some of the most acute and remarkable senses found in the animal kingdom, allowing them to coexist successfully with the more modern teleost designs. The chondrichthyans are grouped into two main subclasses: the Holocephalii (chimaeras or ghostsharks, ratfishes and elephant fishes) with about 50 species that inhabit cool and deep waters; and the Elasmobranchii which is a large and diverse group (including sharks and batoids) with representatives in all types of environments, from fresh waters to the depths of marine trenches and from polar regions to warm tropical seas. The great majority of the commercially important species of chondrichthyans are elasmobranchs. The latter receive their name from their plated gills, which communicate to the exterior by means of 5 to 7 gill openings.

Although the elasmobranchs have traditionally been divided into two major groups, sharks and batoids, there is amounting evidence that the two groups are actually part of a single continuum. Typical sharks always have gill slits placed clearly on the sides of the body, have pectoral fins well separated from the head, and generally have fusiform bodies. Current knowledge indicates that there are almost 500 species of 'typical' sharks (Compagno, 2001). Batoids tend to have a body which is flattened to various degrees, gill openings always on the ventral side of the body, and pectoral fins fused to the sides of the head. Furthermore, batoids comprise a wide array of elasmobranchs with over 600 species, including skates, rays, guitarfishes, sawfishes and mantas.

One of the most attractive features of sharks is that they can be fully utilized, with each part of the shark used for different purposes. Shark meat is used for human consumption and is an excellent source of fat-free protein. The liver of sharks provides high quantities of oil that, depending on the species, can have very high contents of vitamin-A, or in other cases, a highly prized chemical compound known as squalene, which is used in the production of cosmetics, pharmaceuticals and paints. Shark skins can be turned into some of the most resistant and high-quality leathers known. Traditional Chinese cuisine uses shark fins as a base for a soup that attains very high prices in restaurants around the globe. The corneas of sharks have been used for human transplants and even the cartilage is now marketed as a presumed cure for all sorts of human ailments. Shark jaws and teeth also used to make souvenirs for tourists and collectors. Even the offal that remains after utilizing most of the shark is burned down for use in fishmeal and added as a complement to animal feed.

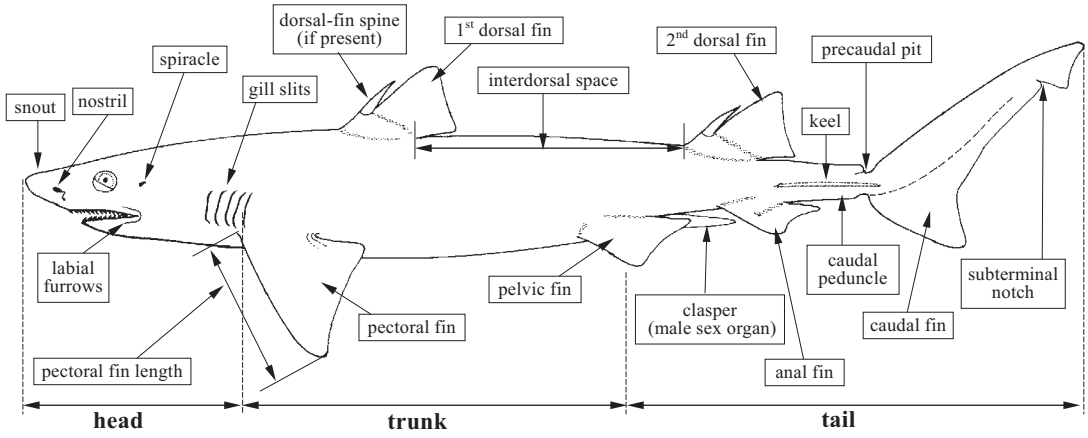
The incentive for increased shark fishing due to the high price of the fins, together with the ever expanding need for food supply globally, have meant that world elasmobranch catches have increased year-after-year, reaching an estimated total of 800 000 t of sharks and shark-like fishes (including skates, rays, etc.) in 1998 (FAO FishStat Database, 2000). However, the true total catch is probably larger by an estimated 50-100% due to unreported catches and bycatches (Bonfil, 1994). Almost every fishing nation has shark catches, but the larger part of the total catch is taken by only a few countries: Indonesia, Spain, India, Pakistan, USA, Taiwan (Province of China), Mexico, Japan, Argentina and Sri Lanka, are respectively the top shark fishing nations according to 1998 catch statistics, with a collective catch of 463 000 t (57% of the reported worldwide total). Naturally, for these nations sharks are an important asset, but sharks can be important also for nations where sharks contribute in a proportionally large amount to the total fishery production even though their shark catch might be small by international standards. This is the case of countries like Costa Rica, the Maldives, Tanzania, Oman, Cuba, Gabon, Yemen, Australia, Portugal and Brazil.

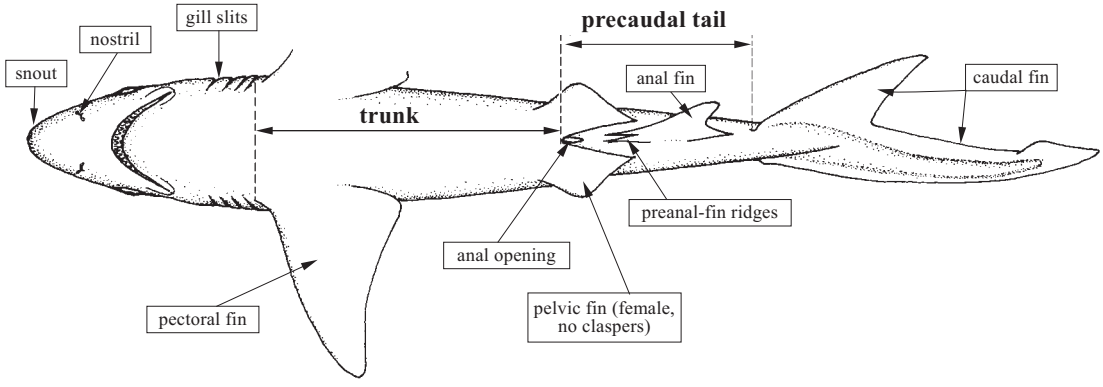
Fisheries for sharks and shark-like fishes face a major problem. The biological and ecological characteristics of these fishes make them highly prone to overexploitation. Most shark and many batoid species are long-lived and this, together with their typical slow growth, results in a late age of first sexual maturation, which commonly ranges between 3 and 25 years depending on the species. Most elasmobranchs have very low fecundity when compared with bony fishes or marine invertebrates; the number of young produced by each female is between 2 and 125 per litter, but most commonly about 12. The combination of the above factors translates into a low reproductive potential and means that the productivity of elasmobranchs and their ability to sustain fishing pressure are comparatively low.

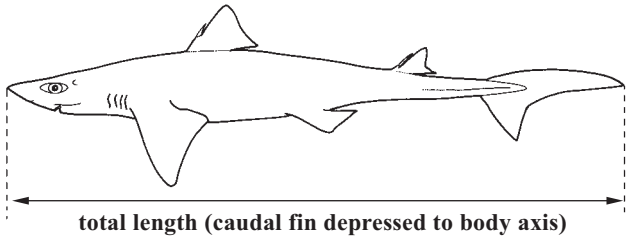
The present guide is designed to help alleviate the lack of knowledge about the diversity of the elasmobranch fauna of the Red Sea and the Gulf of Aden region, and the pressing problem of inadequate fisheries data gathering that currently prevents the proper assessment and management of these important resources.

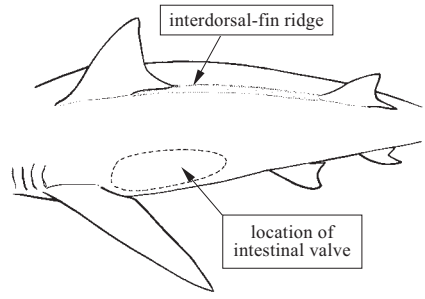
SHARKS

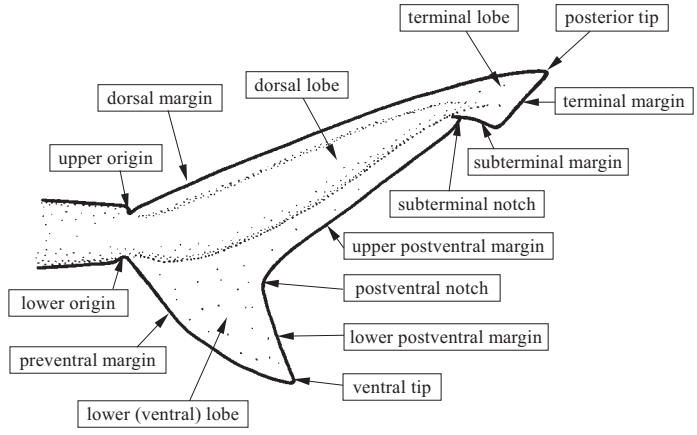
TECHNICAL TERMS AND MEASUREMENTS











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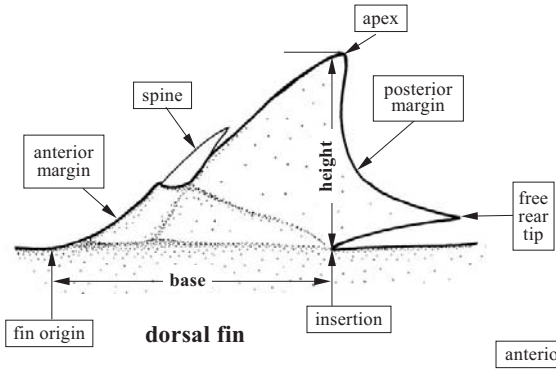
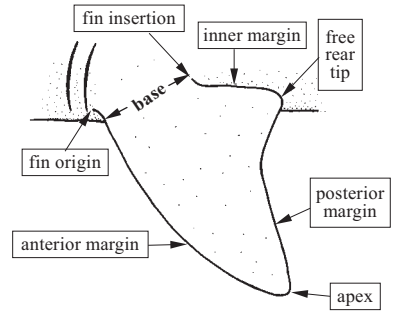
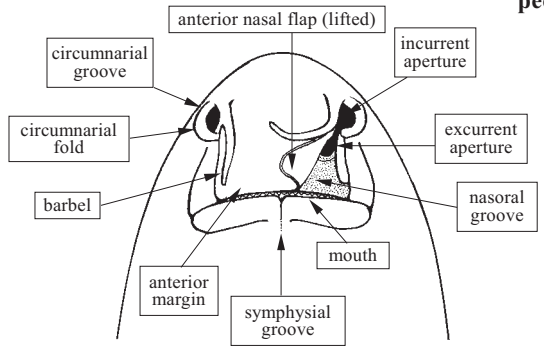


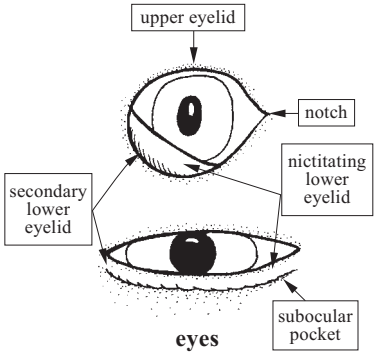
dorsal fin



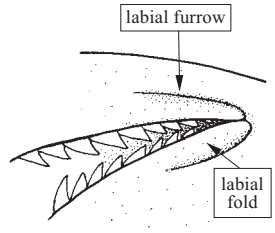
pectoral fin



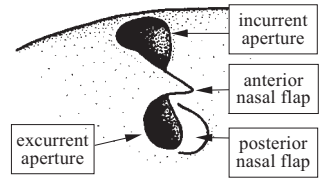
head of orectoloboid shark (ventral view)



eyes



mouth corner



nostril

LIST OF FAMILIES AND SPECIES OCCURRING IN THE AREA

An asterix (*) is given when species accounts are included. A question mark (?) before the scientific name indicates that presence in the area needs confirmation.

Order **Squaliformes**
- Family **ECHINORHINIDAE**
  - * ***Echinorhinus brucus***
- Family **CENTROPHORIDAE**
  - * ***Centrophorus atromarginatus***
  - * ***Centrophorus granulosus***
  - * ***Centrophorus tessellatus***
  - * ***Deania profundorum***

? Order **Squatiniformes**
- ? Family **SQUATINIDAE**
  - ? ***Squatina africana***
  - ? ***Squatina squatina***

Order **Heterodontiformes**
- Family **HETERODONTIDAE**
  - * ***Heterodontus ramalheira***
  - * ***Heterodontus*** sp A

Order **Lamniformes**
- Family **ODONTASPIDIDAE**
  - * ***Carcharias taurus***
- Family **ALOPIIDAE**
  - * ***Alopias pelagicus***
  - * ***Alopias superciliosus***
  - ?* ***Alopias vulpinus***
- Family **LAMNIDAE**
  - ? ***Carcharodon carcharias***
  - * ***Isurus oxyrinchus***

Order **Orectolobiformes**
- Family **STEGOSTOMATIDAE**
  - * ***Stegostoma fasciatum***
- Family **GINGLYMOSTOMATIDAE**
  - * ***Nebrius ferrugineus***
- Family **RHINCODONTIDAE**
  - * ***Rhincodon typus***

Order **Carcharhiniformes**
- Family **SCYLIORHINIDAE**
  - * ***Apristurus indicus***
  - * ***Halaelurus boesemani***
- Family **PROSCYLLIDAE**
  - * ***Eridacnis radcliffei***
- Family **TRIAKIDAE**
  - * ***Iago omanensis***
  - * ***Mustelus mosis***
- Family **HEMIGALEIDAE**
  - * ***Hemigaleus microstoma***
  - * ***Hemipristis elongatus***
- Family **CARCHARHINIDAE**
  - * ***Carcharhinus albimarginatus***
  - * ***Carcharhinus altimus***
  - * ***Carcharhinus amblyrhynchoides***
  - * ***Carcharhinus amblyrhynchos***
  - * ***Carcharhinus amboinensis***
  - * ***Carcharhinus brevipinna***
  - * ***Carcharhinus dussumieri***
  - * ***Carcharhinus falciformis***
  - * ***Carcharhinus leucas***
  - * ***Carcharhinus limbatus***
  - * ***Carcharhinus longimanus***
  - ? ***Carcharhinus macloti***
  - * ***Carcharhinus melanopterus***
  - ? ***Carcharhinus obscurus***
  - * ***Carcharhinus plumbeus***
  - * ***Carcharhinus sealei***
  - * ***Carcharhinus sorrah***
  - * ***Galeocerdo cuvier***
  - * ***Loxodon macrorhinus***
  - * ***Negaprion acutidens***
  - * ***Triaenodon obesus***
  - * ***Rhizoprionodon acutus***
- Family **SPHYRNIDAE**
  - * ***Sphyrna lewini***
  - * ***Sphyrna mokarran***

GUIDE TO THE ORDERS AND FAMILIES OF SHARKS OCCURRING IN THE AREA

How to use this guide

Readers are strongly advised to follow these simple steps in order to successfully identify any shark or batoid found in the area. First, read carefully through the description of key characters listed under each Order. Use the illustrations of the Families under each Order only as a secondary aid in making certain that the right Order has been found. Once the right Order has been identified, proceed to narrow down the Family of the specimen using the illustration for the Family and key characters annotated in each illustration; make use of the size data included for each Family. Once the Family has been identified, move to the corresponding pages where the species for that Family are illustrated. These illustrations and the key characters marked on them should allow proper identification of all sharks and batoids known from the area. To facilitate comparisons and identification, after the taxonomical arrangement of species, they are presented by similarity rather than by the traditional alphabetical order.

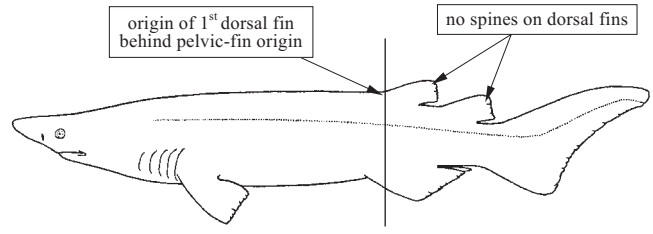
Order SQUALIFORMES – Dogfish sharks

No anal fin; body cylindrical; two dorsal fins often with spines in the anterior margins; mouth extending behind front of eyes.

ECHINORHINIDAE Page 15

Bramble sharks

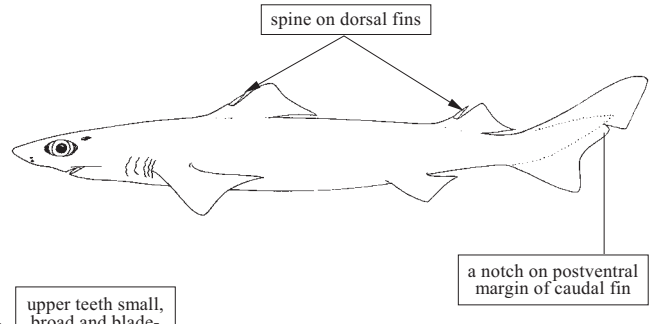
To 4 m. Demersal sluggish sharks, mostly in cold and deep waters to at least 1 100 m, occasionally found in the intertidal. A single species occurring in the area.

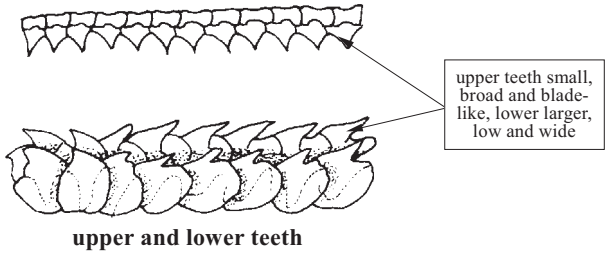


CENTROPHORIDAE Page 15

Gulper sharks

To 1.7 m. Primarily demersal deep-water sharks from 200 to at least 2 400 m. Four species occurring in the area, but probably more to be discovered.





upper and lower teeth

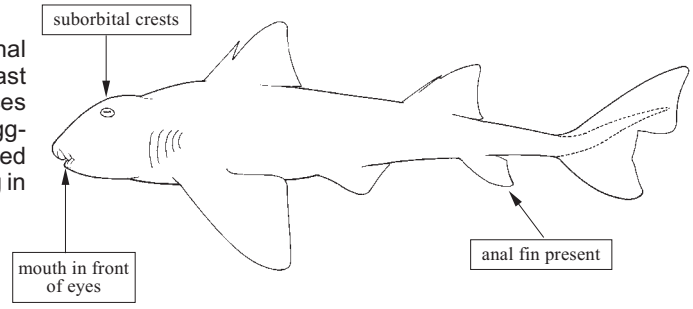
Order HETERODONTIFORMES – Bullhead sharks

Anal fin present; two dorsal fins with spines in the anterior margins; small mouth in front of eyes; head elevated and with supraorbital crests.

HETERODONTIDAE Page 17

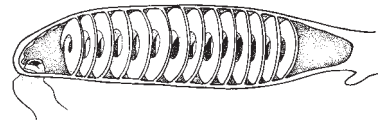
Bullhead sharks

To 1.62 m. Demersal, sluggish, nocturnal sharks, from the intertidal to at least 275 m. Some species like rocky crevices and caves. Egg-laying species, egg-cases have peculiar spiral-flanged shapes. Possibly two species occurring in the area.



Order LAMNIFORMES – Mackerel sharks and allies

No spines on dorsal fins; mouth strongly arched and extending behind front of eyes; no movable nictitating eyelid; intestinal valve of ring type.

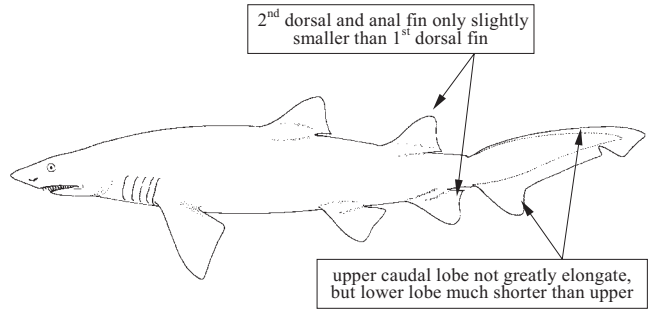


ring type intestinal valve

ODONTASPIDIDAE Page 18

Sand tiger sharks

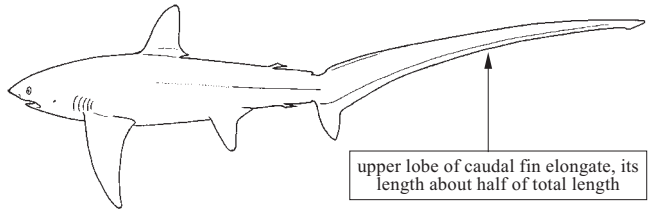
To 3.2 m. Usually demersal, but sometimes pelagic, from the surface to a depth of 191 m. A single species occurring in the area.



ALOPIIDAE Page 19

Thresher sharks

To 5.5 m. Pelagic in coastal and oceanic waters, from the surface to at least 500 m Three species occurring in the area.

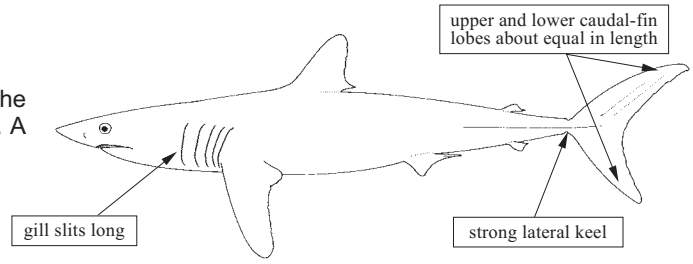


LAMNIDAE

Page 20

Mackerel sharks

To 6 m. Mainly epipelagic, from the surface to a depth of at least 1 280 m. A single species occurring in the area.



Order ORECTOLOBIFORMES – Nurse, carpet and whale sharks

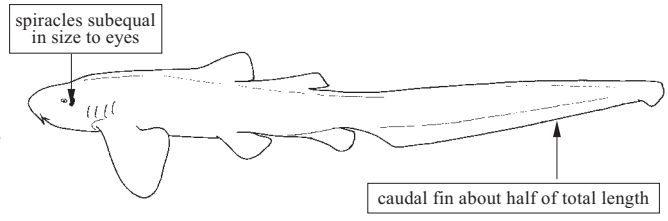
Mouth in front of eyes; five gill slits on each side of the head, the 4th usually overlapping the 5th; nostrils with barbels.

STEGOSTOMATIDAE

Page 21

Zebra sharks

Possibly to 3.54 m. Inshore demersal sharks of coral reefs and sandy bottoms, from the intertidal down to 62 m. A single species occurring in the region.

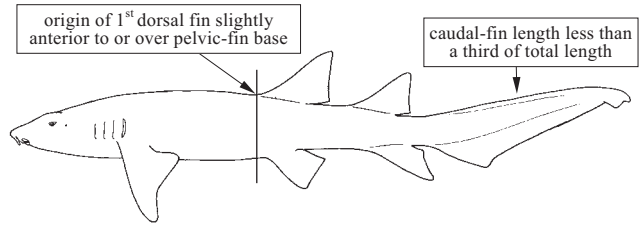


GINGLYMOSTOMATIDAE

Page 21

Nurse sharks

To 3.0 m. Demersal, from the intertidal to a depth of at least 70 m. A single species occurring in the area.

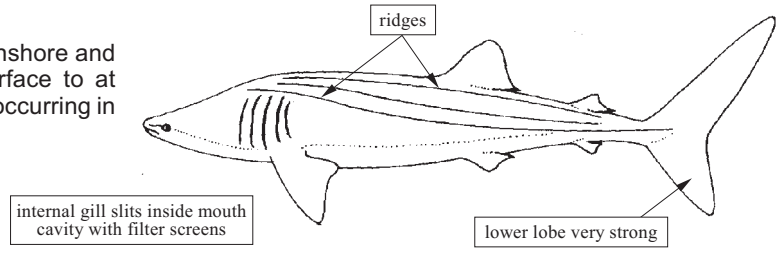


RHINCODONTIDAE

Page 22

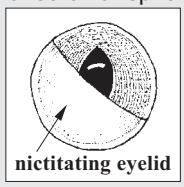
Whale sharks

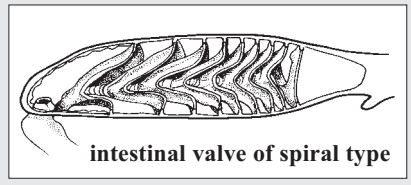
Possibly to 18 m. Pelagic, in inshore and offshore waters, from the surface to at least 700 m. A single species occurring in the area.

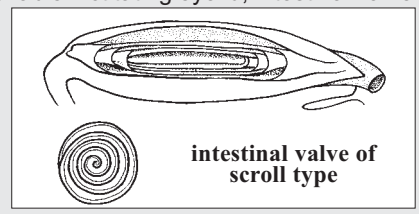


Order CARCHARHINIFORMES – Ground sharks and allies

Mouth arched and extending behind anterior end of eyes; a movable nictitating eyelid; intestinal valve of scroll or spiral type.



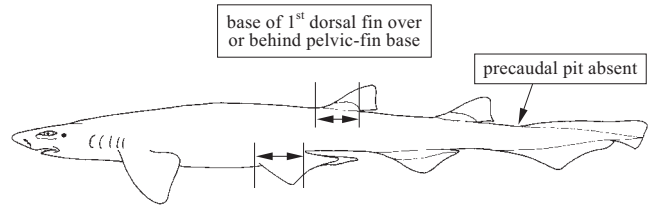




SCYLIORHINIDAE Page 22

Catsharks

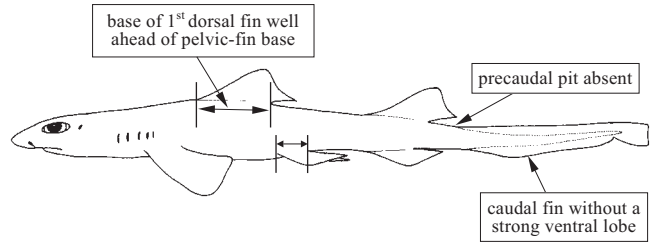
To 1 m. Demersal, from depths of 37 to 1 840 m. Two species occurring in the area. Spiral type intestinal valve.



PROSCYLLIIDAE Page 23

Finback catsharks

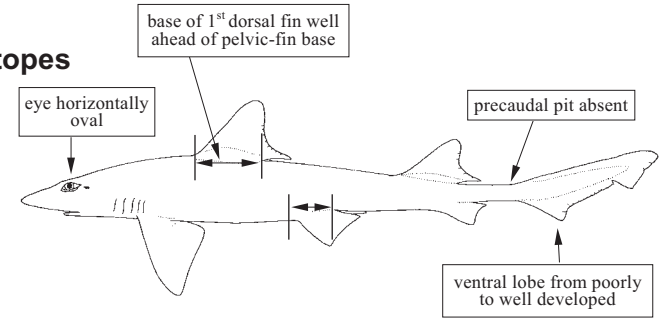
To 46 cm. Demersal, from depths of 70 to 766 m. One species occurring in the area. Spiral type intestinal valve.



TRIAKIDAE Page 24

Houndsharks, smoothhounds, topes

To 1.5 m. Demersal, from the intertidal to a depth of at least 1 000 m. Two species occurring in the area. Spiral type intestinal valve.

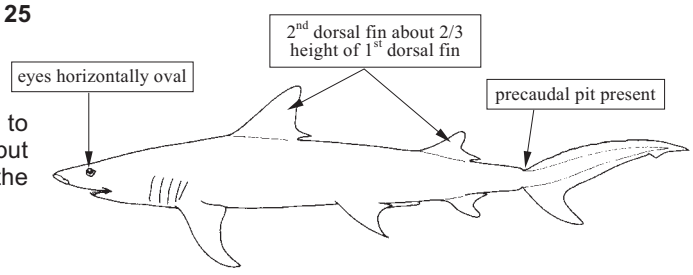


HEMIGALEIDAE

Page 25

Weasel sharks

To 2.4 m. Demersal, from depths of 1 to 30 m. Two species in the region, but possibly up to 5 species occurring in the area. Spiral type intestinal valve.

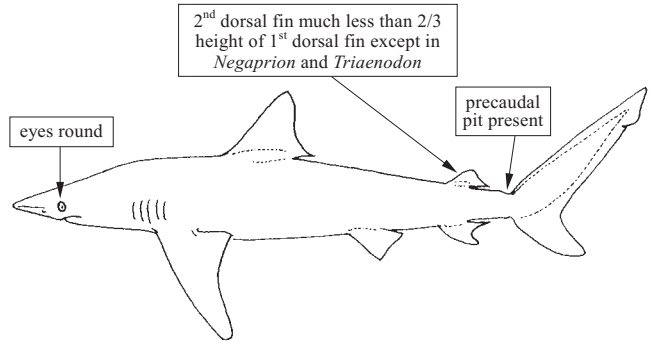


CARCHARHINIDAE

Page 26

Requiem sharks

To 5.5 m. Demersal to epipelagic, from intertidal and surface waters to a depth of at least 800 m. At least 19 species but possibly up to 24 occur in the area. Scroll type intestinal valve.

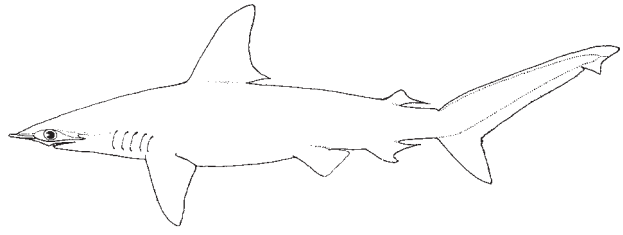


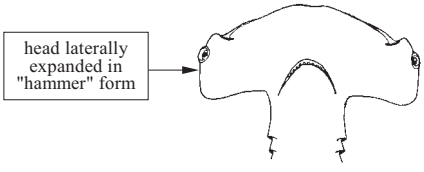
SPHYRNIDAE

Page 36

Hammerhead sharks

To 6 m. Coastal and oceanic, from the intertidal and surface waters to a depth of at least 260 m. Two species occurring in the area. Scroll type intestinal valve.



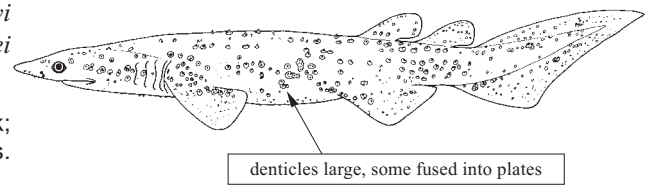


underside of head

ECHINORHINIDAE

Echinorhinus brucus (Bonnaterre, 1788)

Frequent synonyms / misidentifications: *Echinorhinus (Rubusqualus) mccoyi* Whitley, 1931 / *Echinorhinus cookei* Pietschmann, 1928.



FAO names: En - Bramble shark; **Fr** - Squale boucle; **Sp** - Tiburón de clavos.

Local names:

Size: To 310 cm.

Habitat and biology: Mostly deep water between 200 and 900 m, occasionally found inshore in cold-temperate areas. Ovoviviparous with 15 to 26 young. Feeds on bony fishes, smaller sharks and crustaceans (including crabs).

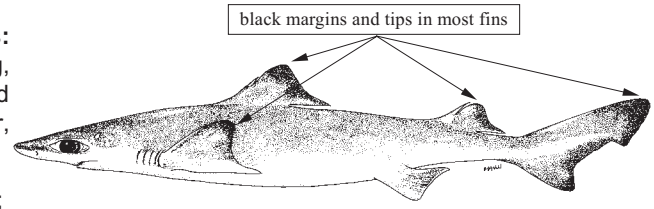
Importance to fisheries: Of little interest to fisheries but frequently caught as bycatch with bottom trawls and line gear in the northeast Atlantic; used for fishmeal and oil.

Distribution: Found in the Atlantic, Indian (including Gulf of Aden), and western Pacific oceans.

CENTROPHORIDAE

Centrophorus atromarginatus Garman, 1913

Frequent synonyms / misidentifications: *Centrophorus armatus barbatus* Teng, 1962 / *Centrophorus granulosus* (Bloch and Schneider, 1801); *C. moluccensis* Bleeker, 1860.



FAO names: En - Blackfin gulper shark; **Sp** - Quelvacho de márgenes negros.

Local names:

Size: To at least 94 cm.

Habitat and biology: In outer continental and insular shelves and upper slopes, between 150 and 450 m. Feeds on shrimps.

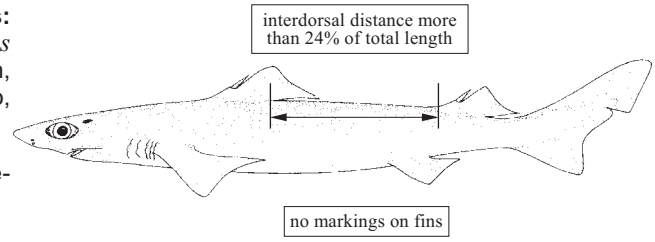
Importance to fisheries: Caught in Japan, and off Taiwan (Province of China). Used for production of squalene from the liver oil.

Distribution: Off Somalia (Gulf of Aden), India, Sri Lanka, Japan, Taiwan (Province of China) and northern Papua-New Guinea.

underside of head

Centrophorus granulosus (Bloch and Schneider, 1801) (Plate I, 1 & 2) CENTROPHORIDAE

Frequent synonyms / misidentifications: None / *Centrophorus atromarginatus* Garman, 1913; *C. harrissoni* McCulloch, 1915; *C. lusitanicus* Bocage and Capello, 1864; *C. niaukang* Teng, 1959.

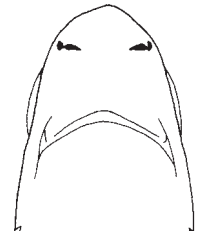


FAO names: En - Gulper shark; **Fr** - Squale-chagrin commun; **Sp** - Quelvacho.

Local names:

Size: To 105 cm or possibly 110 cm.

Habitat and biology: Found usually on or near the bottom in outer continental shelves and upper slopes between 50 and 1 440 m. Ovoviviparous with one or two young. Feeds on herring, smelts, hake, cods, rattails, epigonids, lanternfish, squid and crabs.

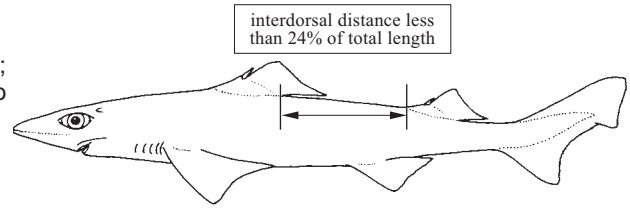

underside of head

Importance to fisheries: Caught in the eastern Atlantic with various gears. Consumed smoked or dried-salted; valuable for the high squalene content in the liver oil. It is listed as Vulnerable on the 2000 IUCN Red List of Threatened Species.

Distribution: Found in the Atlantic, western Indian (including the Gulf of Aden) and western Pacific oceans.

Centrophorus tessellatus Garman, 1906 CENTROPHORIDAE

Frequent synonyms / misidentifications: None / None.

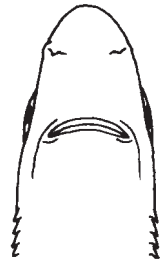


FAO names: En - Mosaic gulper shark; **Fr** - Squale-chagrin mosaïque; **Sp** - Quelvacho mosaico.

Local names:

Size: To at least 89 cm.

Habitat and biology: A little-known gulper shark of the insular slopes near or on the bottom at depths from 260 to 732 m.

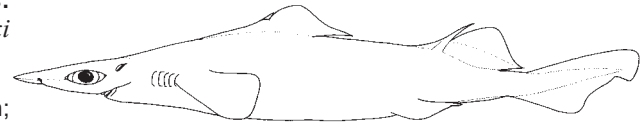

underside of head

Importance to fisheries: Of little or no importance to fisheries.

Distribution: Known from the western North Atlantic, Indian (including seamount off the Gulf of Aden), western and Central Pacific oceans.

Remarks: Status of this species uncertain, might be synonymous with *C. granulosus*. Except for the type locality, records of this species are provisional.

Deania profundorum (Smith and Radcliffe, 1912) (Plate I, 3) CENTROPHORIDAE



Frequent synonyms / misidentifications: *Deania elegans* Springer, 1959; *D. cremouxi* Cadenat, 1960 / None.

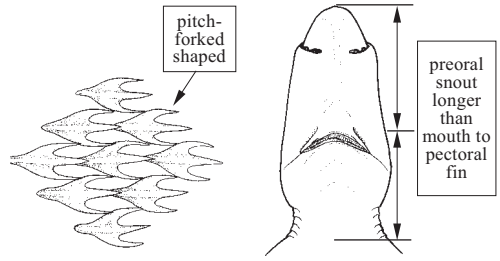
FAO names: En - Arrowhead dogfish; **Fr** - Squale-savate lutin; **Sp** - Tollo flecha.

Local names:

Size: To 97 cm.

Habitat and biology: Lives on or near the bottom in deep waters of continental and insular slopes between 275 and 1 785 m. Sometimes forms large schools. Ovoviviparous with 5 to 7 young. Feeds on small bony fishes, squids and crustaceans.

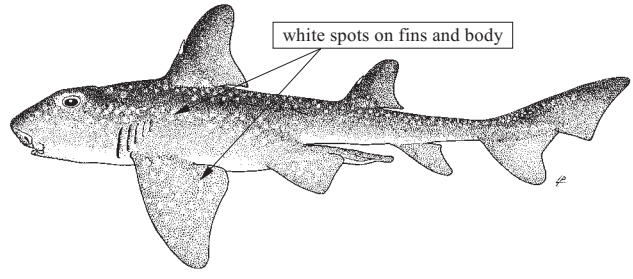
Importance to fisheries: Of little interest to fisheries. Utilized for liver oil and meat where caught (mostly as bycatch.



Distribution: Known from the western North Atlantic, eastern Atlantic, western Indian (including the Gulf of Aden) and western Pacific oceans.

HETERODONTIDAE

Heterodontus ramalheira (Smith, 1949)



Frequent synonyms / misidentifications: None / None.

FAO names: En - Whitespotted bullhead shark; **Fr** - Requin dormeur chabot; **Sp** - Dormilón boquigrande.

Local names: Al-Qirsh Al-Omani abu nokkat bidaa.

Size: To about 83 cm.

Habitat and biology: A rare benthic species of the outer shelf and upper slope; in depths from 40 to 274 m. Presumably ovoviviparous but eggs unknown. Recently hatched young have been found at a depth of 110 m. Known to feed on crabs.

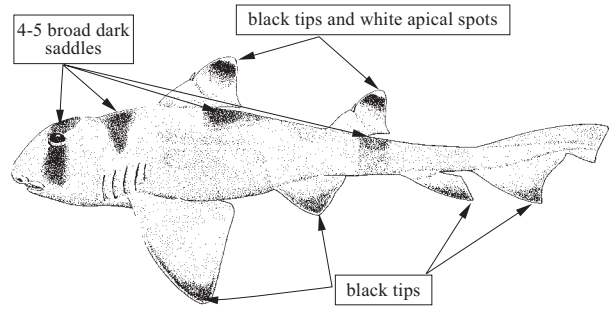
Importance to fisheries: Occasionally caught by bottom trawlers in deep waters (over 100 m) but of no commercial use.

Distribution: Known only from South Africa, Mozambique, Somalia and southern Oman.

Remarks: Newborns with thin curved lines on body.

Heterodontus sp. A

HETERODONTIDAE



Frequent synonyms / misidentifications: None / None.

FAO names: En - Oman bullhead shark; **Fr** - Requin dormeur d'Oman; **Sp** - Dormilón de Omán.

Local names: Al-Qirsh Al-Omani azrak al-raas.

Size: To 61 cm.

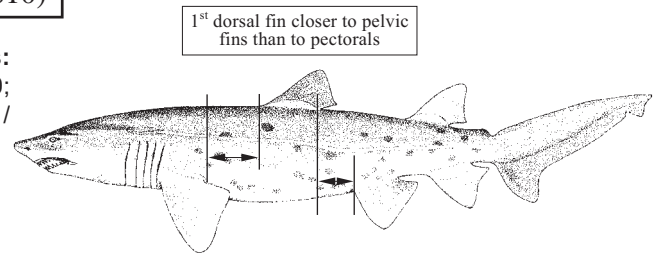
Habitat and biology: A rare species known only from one specimen caught off Oman by a commercial trawler at a depth of 80 m.

Importance to fisheries: Of no importance to fisheries at present. Caught with bottom trawls.

Distribution: Known only from the coast of Oman. Likely to occur in the Gulf of Aden and other parts of the northern Indian Ocean.

ODONTASPIDIDAE

Carcharias taurus (Rafinesque, 1810)



Frequent synonyms / misidentifications: *Odontaspis taurus* Rafinesque, 1810; *Eugomphodus taurus* (Rafinesque, 1810) / *Odontaspis ferox* (Risso, 1810).

FAO names: En - Sand tiger shark; **Fr** - Requin taureau; **Sp** - Toro bacota.

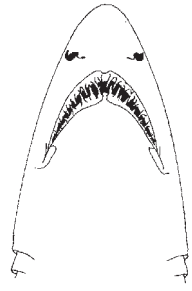
Local names: Al-nemer Al-ramli.

Size: Possibly up to 4.3 m, known to reach 3.2 m and common between 2.2 and 2.8 m.

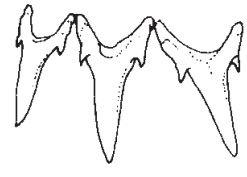
Habitat and biology: Littoral, inshore and offshore, usually near the bottom; migratory. Ovoviviparous with uterine cannibalism. Feeds on small bony fishes, small sharks and rays, and occasionally on crabs and lobsters.

Importance to fisheries: Caught with line gear and gillnets and utilized for human consumption; its meat is highly prized in some places. Caught also by sport fishermen across its range. Lives well in aquaria.

Distribution: Warm-temperate and tropical coastal waters of all oceans of the world except the central and eastern Pacific.



underside of head

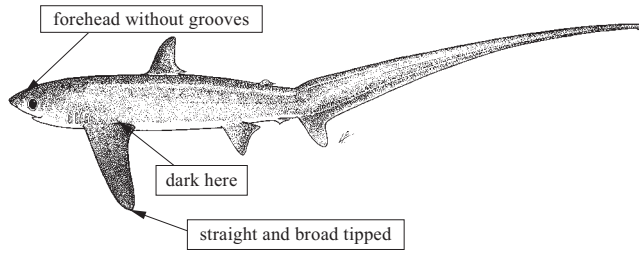


upper anterior teeth

ALOPIIDAE

Alopias pelagicus (Nakamura, 1935)

(Plate I, 4 & 5)



Frequent synonyms / misidentifications: None / *Alopias superciliosus* (Lowe, 1839); *A. vulpinus* (Bonaterre, 1788).

FAO names: En - Pelagic thresher; **Fr** - Renard pelagique; **Sp** - Zorro pelágico.

Local names: Husseni; Qoutt Al-Bahar.

Size: To 3.7 m.

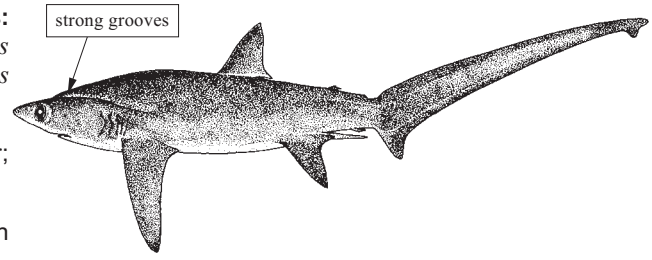
Habitat and biology: Oceanic, epipelagic, caught near shore where shelf is narrow, from the surface to a depth of at least 152 m. Ovoviviparous and oophagous; two embryos per litter. Presumably feeding on pelagic fish and possibly squid. Thought to use its long tail to herd and stunt prey.

Importance to fisheries: Caught with longlines and driftnets; meat used for human consumption, liver for oil extraction, hide for leather production, and the fins for the oriental soup market.

Distribution: Poorly known due to confusion with other threshers. Absent from the Atlantic Ocean, but known from South Africa, the Red Sea and Gulf of Aden, and several areas of the Pacific Ocean.

Alopias superciliosus (Lowe, 1839)

(Plate I, 6 & 7) **ALOPIIDAE**



Frequent synonyms / misidentifications: *Alopias profundus* Nakamura, 1935 / *Alopias pelagicus* Nakamura, 1935; *A. vulpinus* (Bonaterre, 1788).

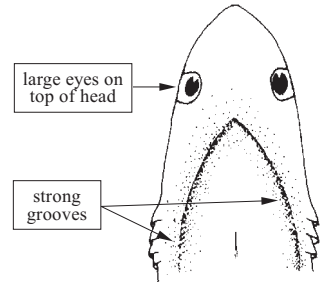
FAO names: En - Bigeye thresher; **Fr** - Renard à gros yeux; **Sp** - Zorro ojón.

Local names: Al-Thaalab Abu-aien kabeerah.

Size: To 4.6 m.

Habitat and biology: Oceanic and coastal, in depths to 500 m. Ovoviviparous and oophagous with litters of 2 to 4 embryos. Feeds mostly on pelagic fishes such as herring, mackerel and small billfishes, but also on demersal fishes such as hake, and on squids. It probably stunts its prey with its long caudal fin.

Importance to fisheries: Caught with longlines, fixed bottom and pelagic gillnets, and trawls, and occasionally by sport fishermen. Meat used fresh, smoked and salt-dried for human consumption, its liver, fins and hide are also utilized.

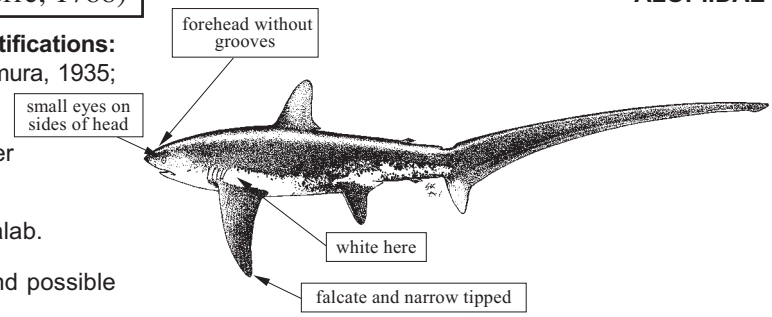


dorsal view of head

Distribution: Found in all tropical and warm temperate seas of the world.

Alopias vulpinus (Bonaterre, 1788)

ALOPIIDAE



Frequent synonyms / misidentifications: None / *Alopias pelagicus* Nakamura, 1935; *A. superciliosus* (Lowe, 1839).

FAO names: En - Thresher shark; **Fr** - Renard; **Sp** - Zorro.

Local names: Al-Qirsh Al-Thaalab.

Size: Known to reach 5.7 m and possible up to 6.1 m.

Habitat and biology: Coastal on continental and insular shelves, and epipelagic far from land; young often close inshore and in shallow bays. Migratory. Ovoviviparous and possibly oophagous, with litters of 2 to 7 embryos. Feeds mainly on small schooling fishes, but also on cephalopods and pelagic crustaceans; known to herd and stun its prey with its tail.

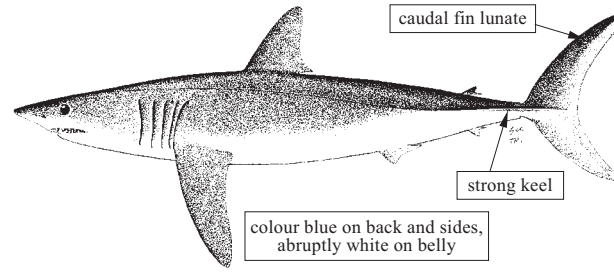
Importance to fisheries: Caught with pelagic longlines and driftnets, often hooked by its tail. An important target of some fisheries for the high quality of its meat. Fins, hides and livers also utilized. An important target for sport fishermen.

Distribution: Circumglobal in cold temperature and tropical waters.

LAMNIDAE

Isurus oxyrinchus (Rafinesque, 1810)

(Plate II, 8)



Frequent synonyms / misidentifications: *Isurus glaucus* (Müller and Henle, 1839) / *Isurus paucus* Guitart-Manday, 1966.

FAO names: En - Shortfin mako; **Fr** - Taupe bleu; **Sp** - Marrajo dientuso.

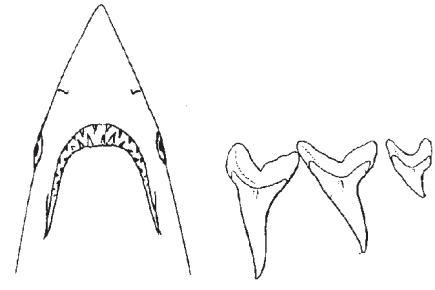
Local names: Cawar; Qirsh Al-sieb; Deebah.

Size: To 4.0 m, common to 2.0 m.

Habitat and biology: Highly migratory, oceanic and coastal, usually in surface waters. Ovoviviparous and oophagous with 10 to 25 young per litter. Feeds mainly on pelagic and demersal fishes, but also eats cephalopods and other sharks and rays.

Importance to fisheries: Caught with longlines, hook-and-line and gillnets; meat of extremely high quality. Very important for sport fisheries.

Distribution: Worldwide in all temperate and tropical waters.



underside of head **upper anterior teeth**

Remarks: Considered dangerous, responsible for unprovoked attacks on swimmers and boats.

STEGOSTOMATIDAE

Stegostoma fasciatum (Hermann, 1783) **(Plate II, 9)**

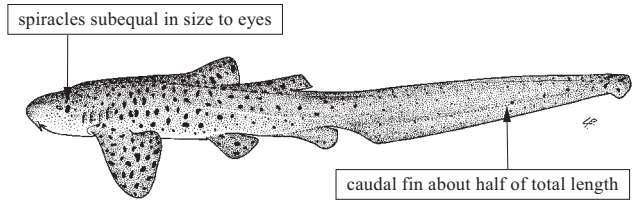
Frequent synonyms / misidentifications: *Stegostoma varium* (Seba, 1758); *S. tygrinus* (Bonaterre, 1788) / None.

FAO names: En - Zebra shark; **Fr** - Requin zebre; **Sp** - Tiburón acebrado.

Local names: Farluuq Shabeellow; Hayyasa; Frenkay mekhatatah.

Size: To possibly 3.5 m, commonly up to 2.5 m.

Habitat and biology: Inshore, very common on coral reefs. Oviparous. Feeds on molluscs, crustaceans and small bony fishes.



juvenile

Importance to fisheries: Caught with bottom trawls, floating and fixed bottom gillnets, longlines.

Distribution: Tropical waters of Indian and Western Pacific oceans, from South Africa to the Red Sea, eastward to Japan, Palau, Australia and New Caledonia.

GINGLYMOSTOMATIDAE

Nebrius ferrugineus (Lesson, 1830) **(Plate II, 10 & 11)**

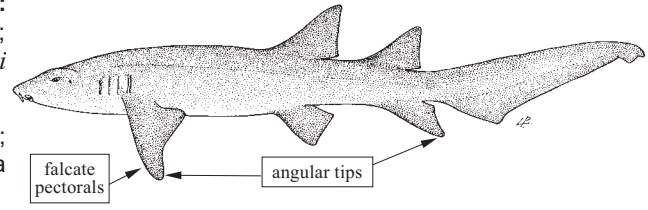
Frequent synonyms / misidentifications: *Ginglymostoma ferrugineum* (Lesson, 1830); *Nebrius concolor* Rüppell, 1837; *N. doldi* Smith, 1953 / None.

FAO names: En - Tawny nurse shark; **Fr** - Requin nourrice fauve; **Sp** - Gata nodriza atezada.

Local names: Frenkah adeiah; Massasah.

Size: Reported to 3.2 m, common to 2.5 m.

Habitat and biology: In shallow waters from the intertidal zone to a depth of at least 70 m. Demersal, on coral and rocky reefs, in lagoons and on sand flats. Ovoviviparous and oophagous. Feeds on a variety of cephalopods, crustaceans, sea urchins, corals, small fishes and occasionally sea snakes.



underside of head

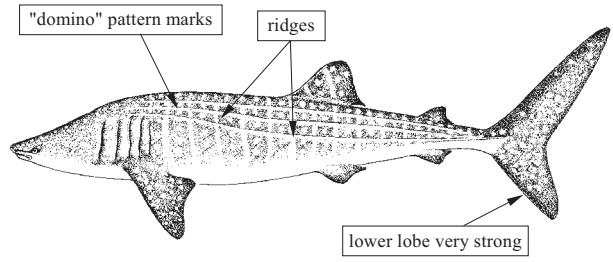
upper front tooth

Importance to fisheries: Caught with gillnets and line gear and utilized for human consumption fresh or salt-dried. Fins used for the oriental trade. Target for sport fishing in Queensland, Australia.

Distribution: Tropical waters of the Indian and western Pacific oceans, from South Africa to the Red Sea, and eastward to China, southern Japan, Australia, New Caledonia, Palau, Marshall Islands and Tahiti.

RHINCODONTIDAE

Rhincodon typus Smith, 1828



Frequent synonyms / misidentifications: *Rhiniodon typus* Smith, 1828 / None.

FAO names: En - Whale shark; **Fr** - Requin baleine; **Sp** - Tiburón ballena.

Local names: Qirsh al-hoot; Battan; Ballhaa.

Size: To at least 12 m, possibly to 21 m.

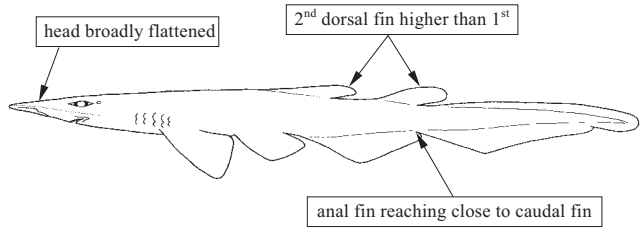
Habitat and biology: A highly migratory pelagic filter feeder, occurring singly or in schools, often near the surface but also down to 700 m. Ovoviviparous with up to 300 embryos per female. Feeds on zooplankton, schooling fishes and squids.

Importance to fisheries: Caught with floating gillnets and harpoons and incidentally in trawls; utilized for human consumption in Pakistan, India and Taiwan (Province of China). Probably more valuable as a focus of ecotourism.

Distribution: Found in all tropical and warm temperate oceans of the world; coastal and oceanic.

SCYLIORHINIDAE

Apristurus indicus (Brauer, 1906)



Frequent synonyms / misidentifications: None / None.

FAO names: En - Smallbelly catshark; **Fr** - Holbiche artouca; **Sp** - Pejegato índico.

Local names: Al-Qout abu kersh sagher.

Size: To at least 34 cm.

Habitat and biology: Poorly known; in deep waters from depths of 1 289 to 1 840 m.

Importance to fisheries: Caught probably with bottom trawls, presently of no interest to fisheries.

Distribution: Off Somalia, Gulf of Aden, and Oman; possibly in South East Atlantic off Namibia and South Africa.

Halaelurus boesemani (Springer and D'Aubrey, 1972)

SCYLIORHINIDAE

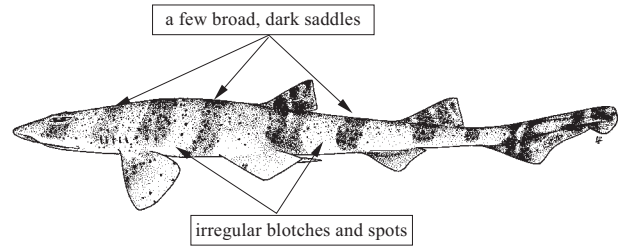
Frequent synonyms / misidentifications: None / None.

FAO names: En - Speckled catshark; **Fr** - Holbiche mouchetée; **Sp** - Pejegato pintado.

Local names: Al-Qout Al-Mubakaah.

Size: To 48 cm.

Habitat and biology: Bottom-dwelling on the continental and insular shelves, at depths from 37 to 91 m.



Importance to fisheries: Caught probably with bottom trawls, presently of no interest to fisheries.

Distribution: Somalia, Gulf of Aden, Western Australia, Indonesia, the Philippines and Viet Nam.

PROSCYLLIIDAE

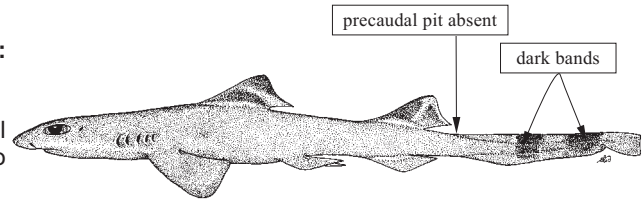
Eridacnis radcliffei Smith, 1913

Frequent synonyms / misidentifications: *Proscyllium alcocki* (Misra, 1950) / None.

FAO names: En - Pygmy ribbontail catshark; **Fr** - Requin chat pygme; **Sp** - Tollo coludo pigmeo.

Local names: Al-Qout Abu Ziel shareti Mubakaa.

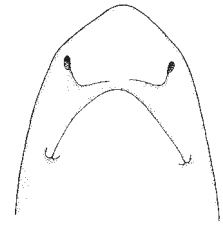
Size: To 24 cm.



Habitat and biology: An abundant deepwater benthic shark found on mud bottoms of the upper continental and insular slopes and the outer shelves at depths from 71 to 766 m. Ovoviviparous, with 1 or 2 young per litter. Feeds primarily on small bony fishes and crustaceans and occasionally on squid.

Importance to fisheries: Caught with bottom trawls, presently of no interest to fisheries.

Distribution: Widespread but spottily distributed in the Indian and Western Pacific oceans: Tanzania, Gulf of Aden, India, Andaman Islands, Viet Nam, and the Philippines.



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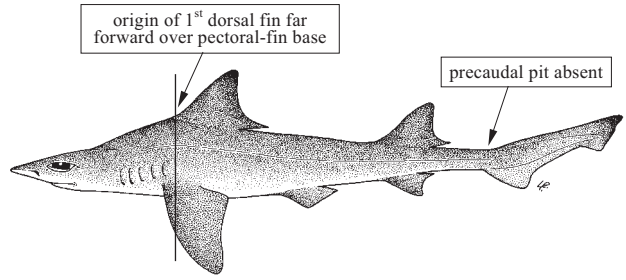
TRIAKIDAE

Iago omanensis (Norman, 1939) **(Plate II, 12 & 13)**



Frequent synonyms / misidentifications: None / *Galeorhinus omanensis* (Norman, 1939).

FAO names: En - Bigeye houndshark; **Fr** - Requin-ha à gros yeux; **Sp** - Cazón ojigrande.

Local names: Al-Qirsh Al-qezm.

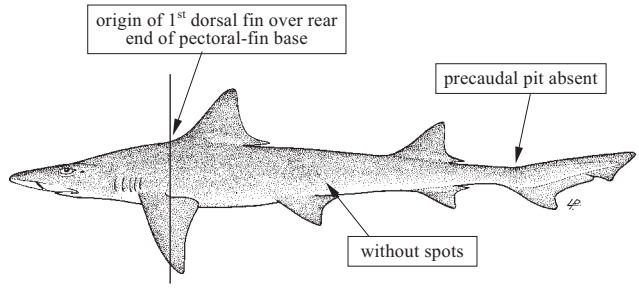
Size: To 59 cm.

Habitat and biology: Inhabits deep waters from 110 m or less to at least 1 000 m. Viviparous with 2 to 10 young. Feeds mainly on cephalopods and bony fishes, but also on shrimps, bivalves, gastropods and polychaetes.

Importance to fisheries: Caught with gillnets and handlines, utilized fresh for human consumption in India and Egypt.

Distribution: Red Sea, Gulf of Oman, Pakistan and western India.

Mustelus mosis (Hemprich and Ehrenberg, 1899) **(Plate II, 14 & 15)** **TRIAKIDAE**



Frequent synonyms / misidentifications: None / *Mustelus manazo* (not Bleeker, 1854).

FAO names: En - Arabian smooth-hound; **Fr** - Emissole d'Arabie; **Sp** - Musola arábiga.

Local names: Mustoulah; Qirsh Al-kalb; Mahmal.

Size: To 1.5 m.

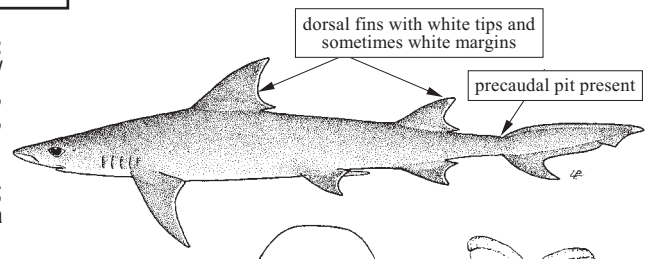
Habitat and biology: Bottom-dwelling in inshore and offshore waters, also on coral reefs. Viviparous with 6 to 10 young per litter. Feeds on small bottom fishes, molluscs and crustaceans. Lives well in captivity.

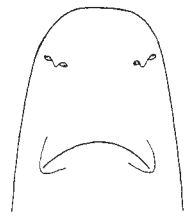
Importance to fisheries: Caught with bottom trawls, fixed bottom and floating gillnets, and line gear. Utilized for human consumption in the Red Sea, Pakistan and India.

Distribution: Red Sea to India, also northern South Africa.

HEMIGALEIDAE

Hemigaleus microstoma Bleeker, 1852 (Plate III, 16 & 17)





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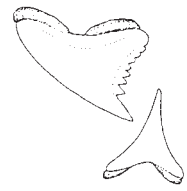


upper and lower front teeth

Frequent synonyms / misidentifications: *Negogaleus microstoma* (Bleeker, 1852) / *Chaenogaleus macrostoma* (Bleeker, 1852); *Hemipristis elongatus* (Klunzinger, 1871).

FAO names: En - Sicklefin weasel shark; **Fr** - Milandre faucille; **Sp** - Comadreja segadora.

Local names:

Size: To about 1.1 m.

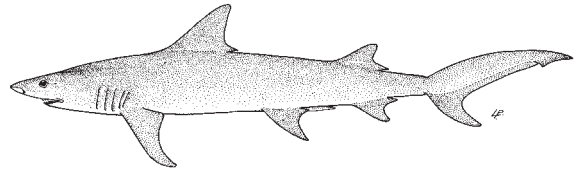
Habitat and biology: Coastal, inshore and offshore at depths down to 170 m. Viviparous; 2 young per litter. Feeds mainly on octopus, cuttlefish and squid, but also on crustaceans and equinoderms.

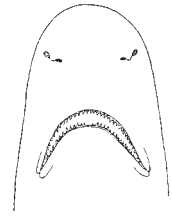
Importance to fisheries: Caught with floating and bottom gillnets, longlines and hook-and-line. Utilized fresh for human consumption; offal used for fishmeal.

Distribution: Red Sea, southern India and Sri Lanka; from tropical China to northern Australia.

Remarks: Collected by the author at Gizan (KSA), Aden (Yemen) and Hurghada (Egypt).

Hemipristis elongatus (Klunzinger, 1871) (Plate III, 18 & 19) HEMIGALEIDAE





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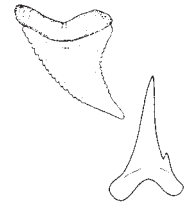


upper and lower front teeth

Frequent synonyms / misidentifications: *Hemipristis pingali* Setna and Sarangdhar, 1946; *Paragaleus acutiventralis* Chu, 1960; *Heterogaleus ghardaquensis* Gohar and Mazar, 1964 / *Hemigaleus microstoma* Bleeker, 1852.

FAO names: En - Snaggletooth shark; **Fr** - Milandre chicor; **Sp** - Comadreja sobrediente.

Local names:

Size: Between 1.2 and 2.0 m; reported to 2.4 m.

Habitat and biology: Inshore and offshore down to 30 m. Viviparous; 6 to 8 young per litter. Feeds on anchovies, sea catfish, mackerel, croakers, grey sharks and butterfly rays.

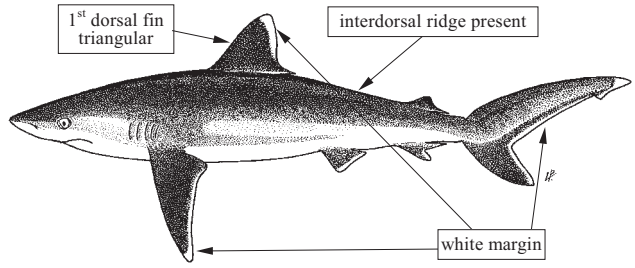
Importance to fisheries: Caught with floating and fixed bottom gillnets and floating longlines. Meat used for human consumption, very appreciated in India; liver used for oil extract and fins for the oriental shark-fin soup market.

Distribution: Indian and western Pacific oceans, from South Africa to China and Australia including the Red Sea and Gulf of Aden.

CARCHARHINIDAE

Carcharhinus albimarginatus (Rüppell, 1837)

(Plate III, 20 & 21)



Frequent synonyms / misidentifications: *Eulamia (Platypodon) platyrhynchus* Gilbert 1892 / *Carcharhinus platyrhynchus* (Gilbert, 1892); *Triaenodon obesus* (Rüppel, 1837).

FAO names: En - Silvertip shark; **Fr** - Requin pointe blanche; **Sp** - Tiburón de puntas blancas.

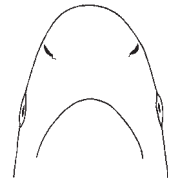
Local names: Al-Qirsh abiad al-haaphah.

Size: To 3.0 m.

Habitat and biology: Coastal and pelagic, from the surface to a depth of 800 m. Viviparous; 1 to 11 young per litter. Feeds on pelagic and bottom fish, including flyingfishes, tunas, soles, eagle rays and cephalopods.

Importance to fisheries: Caught by small-scale fisheries with longlines and gillnets, and also as bycatch in some tuna fisheries.

Distribution: From the western Indian Ocean (including the Red Sea) all the way to the eastern Pacific.

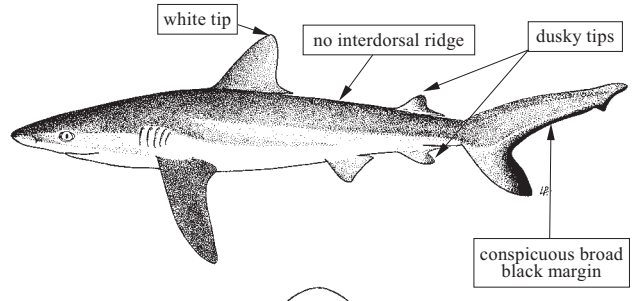


underside of head

upper and lower front teeth

Carcharhinus amblyrhynchos (Bleeker, 1856)

(Plate III, 22 & 23) **CARCHARHINIDAE**



Frequent synonyms / misidentifications: *Carcharhinus menisorrah* (Valenciennes, 1839), *C. wheeleri* Garrick, 1982 / None.

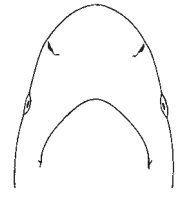
FAO names: En - Grey reefshark; **Fr** - Requin dagsit; **Sp** - Tiburón de arrecifes.

Local names: Qirsh Al-bahah; Safteet.

Size: To 2.33 and possibly 2.55 m.

Habitat and biology: A common coastal, inshore to offshore reef species; from the surface to a depth of 140 m. Viviparous; 1 to 6 young per litter; gestation about 12 months. Feeds on surface bottom, and reef fishes, cephalopods, crabs and shrimp.

Importance to fisheries: Caught with line gear and gillnets. Utilized for human consumption salt-dried or fresh; fins used for the oriental shark-fin soup market.



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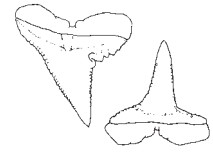


upper and lower front teeth

Distribution: Indian Ocean, including the Red Sea and western and Central Pacific.

Remarks: The blacktail reefshark *C. wheeleri* is considered to be a synonym of *C. amblyrhynchos* (L.J.V. Compagno pers.comm.). This shark can be very aggressive when cornered or confronted.

Carcharhinus altimus (Springer, 1950) (Plate IV, 24 & 25) CARCHARHINIDAE

Frequent synonyms / misidentifications: *Carcharhinus radamae* Fourmanoir, 1961 / *Carcharhinus galapagensis* (Snodgrass and Heller, 1905); *C. obscurus* (Lesueur, 1818); *C. plumbeus* (Nardo, 1827).

FAO names: En - Bignose shark; **Fr** - Requin babosse; **Sp** - Tiburón baboso.

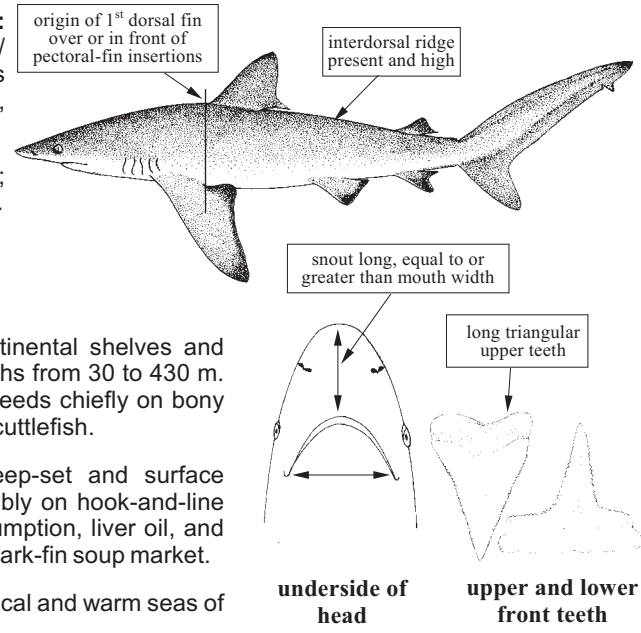
Local names: Qirsh Abu Bouz taweel.

Size: To about 3 m; commonly to 2.4 m.

Habitat and biology: Found off the continental shelves and uppermost slopes near the bottom, at depths from 30 to 430 m. Viviparous; with 3 to 15 young per litter. Feeds chiefly on bony fishes, but also on small sharks, rays and cuttlefish.

Importance to fisheries: Taken on deep-set and surface longlines, also in bottom trawls and probably on hook-and-line and with gillnets. Utilized for human consumption, liver oil, and shagreen; fins appreciated in the oriental shark-fin soup market.

Distribution: Patchily distributed in all tropical and warm seas of the world.



Carcharhinus plumbeus (Nardo, 1827) (Plate IV, 26-28) CARCHARHINIDAE

Frequent synonyms / misidentifications: *Carcharhinus milberti* (Valenciennes, 1839) / *Carcharhinus altimus* (Springer, 1950).

FAO names: En - Sandbar shark; **Fr** - Requin gris; **Sp** - Tiburón trozo.

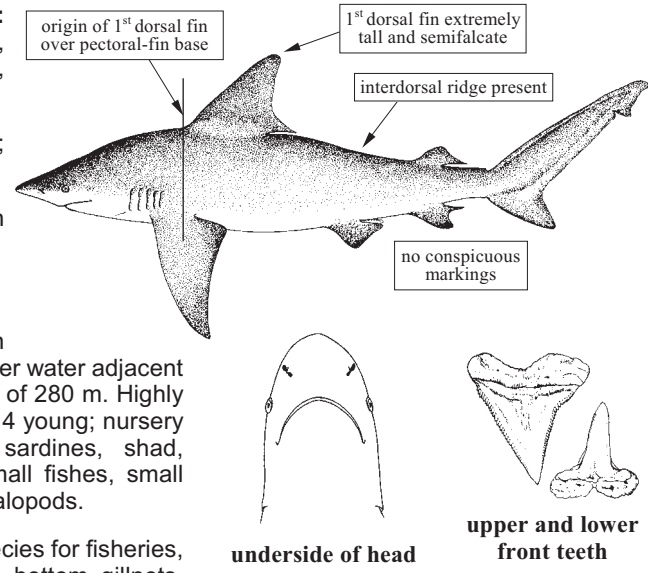
Local names: Hawaash; Qirsh tarh; Qirsh Aghbar; Zefa.

Size: To possibly 3.0 m, common to 2.4 m.

Habitat and biology: Coastal-pelagic, on continental and insular shelves and in deeper water adjacent to them; from the intertidal zone to a depth of 280 m. Highly migratory in some areas. Viviparous; 1 to 14 young; nursery areas in coastal lagoons. Feeds on sardines, shad, menhaden, mullets, flatfish, and other small fishes, small sharks and batoids, crustaceans and cephalopods.

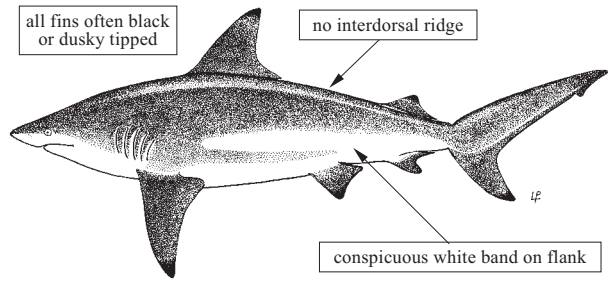
Importance to fisheries: An important species for fisheries, caught with longlines, hook-and-line, and bottom gillnets. Also sought by sport fishermen. Utilized fresh, frozen, smoked or salt-dried for human consumption. Highly appreciated for its fins in the oriental shark-fin soup market. Liver and hides also much appreciated.

Distribution: Found in all tropical and warm-temperate seas of the world with the possible exception of the eastern Pacific (unconfirmed records).



Carcharhinus amblyrhynchoides (Whitley, 1934)

CARCHARHINIDAE



Frequent synonyms / misidentifications: *Carcharhinus pleurotaenia* (Bleeker, 1852) / *Carcharhinus limbatus* (Valenciennes, 1839); *C. brevipinna* (Müller and Henle, 1839).

FAO names: En - Graceful shark; **Fr** - Requin gracile; **Sp** - Tiburón grácil.

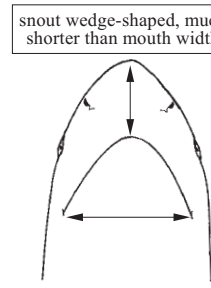
Local names:

Size: To at least 1.67 m.

Habitat and biology: An inshore, coastal pelagic species. Viviparous; details on reproduction unknown. Feeds mainly on carangids and mugilids, but also on cephalopods and crabs.

Importance to fisheries: Caught with longlines and drifting gillnets in fisheries across its range. Utilized fresh and dried for human consumption, fins used in the oriental shark-fin soup market.

Distribution: Gulf of Aden, India, Gulf of Thailand, Viet Nam, the Philippines, Indonesia and northern Australia.



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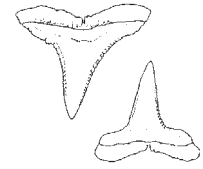
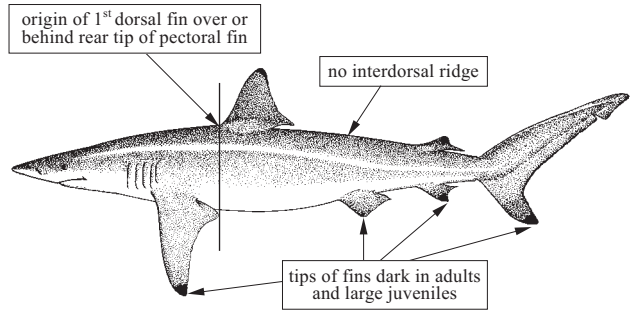


upper and lower front teeth

Carcharhinus brevipinna (Müller and Henle, 1839)

(Plate IV, 29 & 30)

CARCHARHINIDAE



Frequent synonyms / misidentifications: *Carcharhinus johnsoni* Smith, 1951 / *Carcharhinus limbatus* (Valenciennes, 1839); *C. amblyrhynchoides* (Whitley, 1934); *C. melanopterus* (Quoy and Gaimard, 1824); *C. sorrah* (Valenciennes, 1839).

FAO names: En - Spinner shark; **Fr** - Requin tisserand; **Sp** - Tiburón aleta negra.

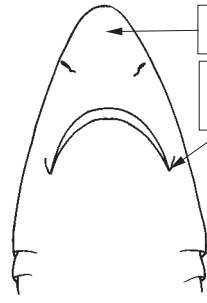
Local names: Al-Qirsh Al-Suezy.

Size: To 2.8 m, common to 2.5 m.

Habitat and biology: Pelagic in coastal waters; highly migratory, sometimes forming schools. A fast-swimming shark that sometimes leaps out of the water when feeding. Viviparous; with 6 to 20 embryos per litter. Feeds mainly on small schooling fishes and squids, but also on small sharks and rays.

Importance to fisheries: Caught with drifting gillnets and longlines; also targetted by sport fishermen. Utilized fresh and salt-dried for human consumption, fins used in the oriental shark-fin soup market.

Distribution: Tropical and temperate waters of Atlantic, Indian and western Pacific Oceans.

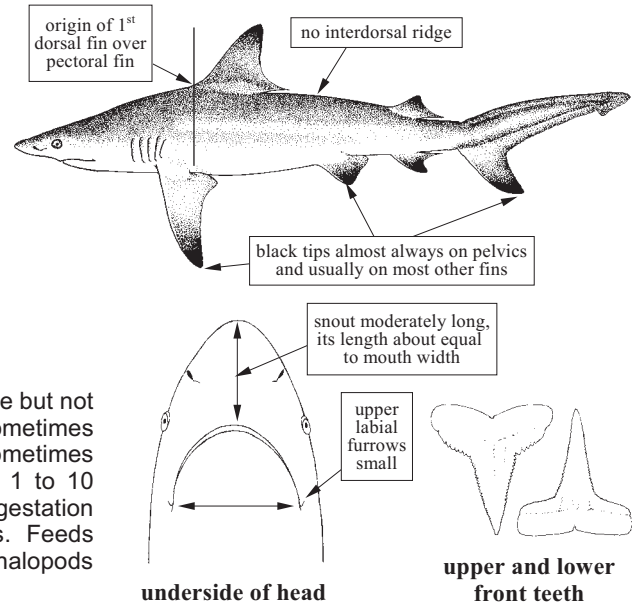


underside of head

upper and lower front teeth

Carcharhinus limbatus (Valenciennes, 1839)

(Plate V, 31-34) **CARCHARHINIDAE**



Frequent synonyms / misidentifications: None / *Carcharhinus brevipinna* (Müller and Henle, 1839); *C. amblyrhynchoides* (Whitley, 1934); *C. melanopterus* (Quoy and Gaimard, 1824); *C. sorrah* (Valenciennes, 1839).

FAO names: En - Blacktip shark; **Fr** - Requin borde; **Sp** - Tiburón macuira.

Local names: Al-Qirh al-akhdar; Qirsh al-sahel; Eisah.

Size: To 2.6 m, common to 1.5 m.

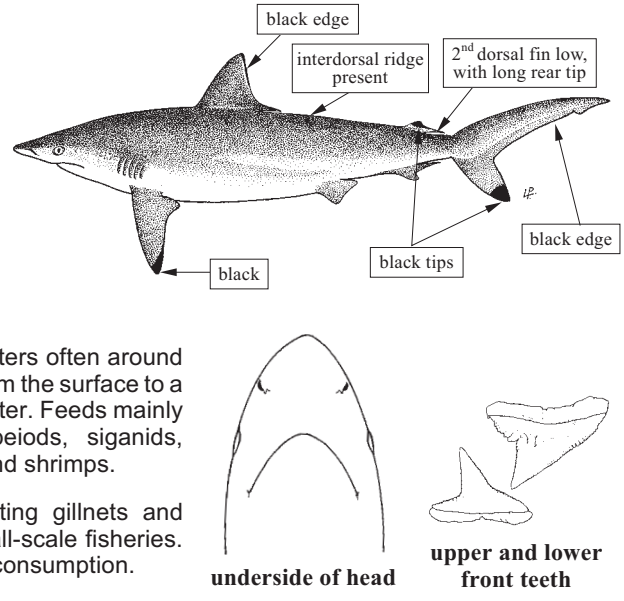
Habitat and biology: A coastal and offshore but not truly oceanic species. Highly migratory, sometimes forming large schools. Fast-moving, sometimes leaping out of the water. Viviparous; with 1 to 10 embryos per litter and a 10 to 12-month gestation period; nursery areas in coastal lagoons. Feeds mainly on schooling fishes but eats also cephalopods and crustaceans.

Importance to fisheries: Caught commercially with floating longlines and gillnets, and incidentally in trawl nets; an important species for sport fishermen. Sometimes an important bycatch of coastal tuna fisheries. Its meat is highly appreciated fresh for human consumption; its fins, hides and liver are also utilized.

Distribution: Widespread in all tropical and warm-temperate seas of the world.

Carcharhinus sorrah (Valenciennes, 1839)

(Plate V, 35 & 36) **CARCHARHINIDAE**



Frequent synonyms / misidentifications: *Carcharhinus bleekeri* (Dumeril, 1865) / *Carcharhinus brevipinna* (Müller and Henle, 1839); *C. limbatus* (Valenciennes, 1839)

FAO names: En - Spottail shark; **Fr** - Requin à queue tachetée; **Sp** - Tiburón rabo manchado.

Local names: Qirsh Al-sara.

Size: To 1.6 m.

Habitat and biology: Common in inshore waters often around coral reefs, sometimes found also offshore; from the surface to a depth of 140 m. Viviparous; 2 to 6 young per litter. Feeds mainly on small bony fishes (e.g. mugilids, clupeiods, siganids, teraponids) but also on cephalopods, crabs and shrimps.

Importance to fisheries: Caught with floating gillnets and longlines. Sometimes locally important in small-scale fisheries. Its meat is utilized dried and fresh for human consumption.

Distribution: From Madagascar to the Red Sea, eastward to Japan, tropical Australia and the Solomon Islands.

Carcharhinus melanopterus (Quoy and Gaimard, 1824)

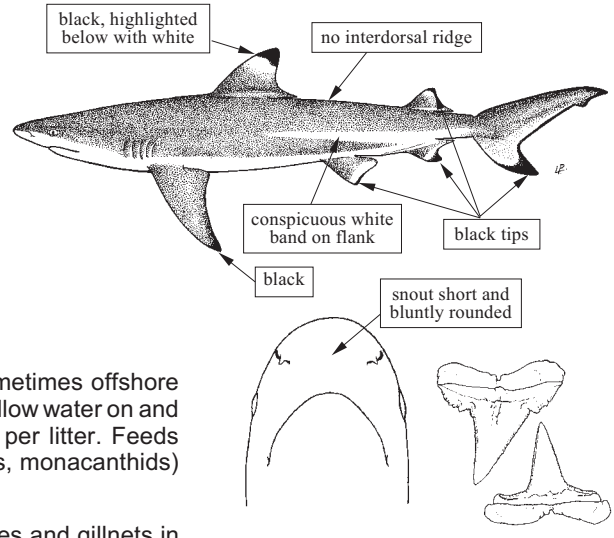
(Plate V, 37 & 38) **CARCHARHINIDAE**

Frequent synonyms / misidentifications: *Hypoprion playfairi* (Günther, 1870) / *Carcharhinus brevipinna* (Müller and Henle, 1839); *C. limbatus* (Valenciennes, 1839).

FAO names: En - Blacktip reef shark; **Fr** - Requin pointes noires; **Sp** - Tiburón de puntas negras.

Local names: Abu rishah saudah; Abu sawadah; Noffari.

Size: To about 2 m, common to 1.6 m.



underside of head

upper and lower front teeth

Habitat and biology: Found inshore and sometimes offshore on continental and insular shelves; prefers shallow water on and around coral reefs. Viviparous; with 4 young per litter. Feeds mainly on bony fishes (carangids, leiognathids, monacanthids) and cephalopods.

Importance to fisheries: Caught with longlines and gillnets in coastal fisheries. Utilized fresh or salt-dried for human consumption.

Distribution: Wide-ranging in all the Indian Ocean including the Red Sea, and the western and Central Pacific.

Carcharhinus dussumieri (Valenciennes, 1839)

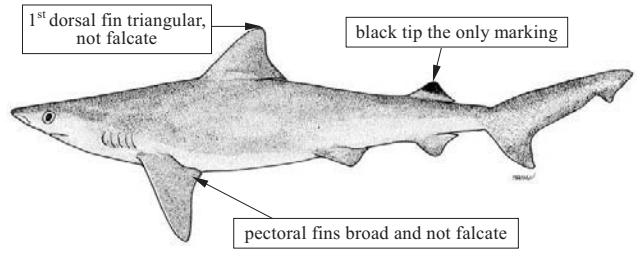
(Plate VI, 39 & 40) **CARCHARHINIDAE**

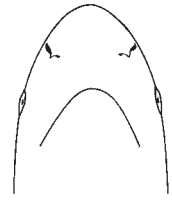
Frequent synonyms / misidentifications: *Carcharhinus menisorrah* (Valenciennes, 1839); *C. tjutjot* (Bleeker, 1852) / *Carcharhinus sealei* (Pietschmann, 1916).

FAO names: En - Whitecheek shark; **Fr** - Requin à joues blanches; **Sp** - Tiburón cariblanco.

Local names: Qirsh Al-aamaak.

Size: To about 90 cm.





underside of head

upper and lower front teeth

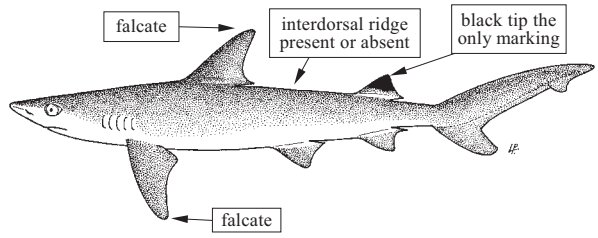
Habitat and biology: A common, but little-known shark of the continental and insular inshore waters. Viviparous; with 1 to 4 young per litter. Feeds primarily on crabs, shrimp and bony fishes, also on other crustaceans, cephalopods and other molluscs.

Importance to fisheries: Caught with gillnets and longlines in small-scale fisheries. Commonly marketed for its meat for human consumption.

Distribution: Occurs from the Red Sea eastward to Thailand, China, southern Japan, Java, Borneo, and probably New Guinea and northern Australia.

Remarks: This species differs from the blackspot shark, *Carcharhinus sealei* by its triangular rather than falcate first dorsal fin, more numerous upper teeth, a broader mouth, broader pectoral fins, and less numerous vertebrae. Observed by the author at the Jeddah (KSA) fish market in two different seasons, but fishing locality unknown.

Carcharhinus sealei (Pietschmann, 1916) (Plate VI, 41 & 42) CARCHARHINIDAE



Frequent synonyms / misidentifications: *Carcharhinus menisorrah* (Valenciennes, 1839) / *Carcharhinus dussumieri* (Valenciennes, 1839).

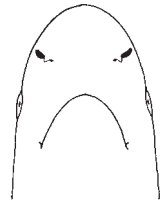
FAO names: En - Blackspot shark; **Fr** - Requin à taches noires; **Sp** - Tiburón alinegro.

Local names: Qirsh Al-aamak.

Size: To 95 cm.

Habitat and biology: A coastal shark of the continental and insular shelves, from the surfline to a depth of 40 m. Viviparous; 2 young per litter; gestation period about 9 months. Feeds on small fishes, squids and prawns.

Importance to fisheries: Caught with line gear and gillnets. Sometimes locally important in small-scale fisheries. Its meat is utilized dried and fresh for human consumption.



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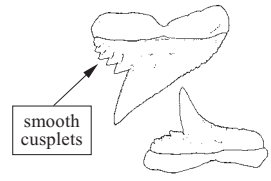
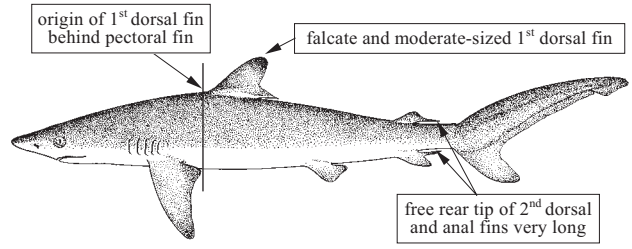


upper and lower front teeth

Distribution: Found from South Africa northwards to the mouth of the Gulf of Aden (Socotra Archipelago); also known from Pakistan and Sri Lanka, and in the western Pacific from China to New Guinea and possibly northern Australia.

Carcharhinus falciformis (Bibron, 1839) (Plate VI, 43-45) CARCHARHINIDAE



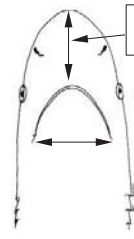
Frequent synonyms / misidentifications: None / *Carcharhinus obscurus* (Lesueur, 1818).

FAO names: En - Silky shark; **Fr** - Requin soyeux; **Sp** - Tiburón jaquetón.

Local names: Al-hariri.

Size: To 3.3 m.

Habitat and biology: Coastal and oceanic, common near shelves and slopes, from the surface to a depth of 500 m. Late juveniles commonly associated with tuna schools. Viviparous; with 2 to 16 young per litter; nursery areas in the outer shelves. Feeds mainly on fish, including sea catfish, groupers and snappers, tunids and clupeoids, but also on squids, octopi and crustaceans.



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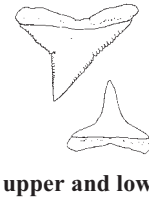


upper and lower front teeth

Importance to fisheries: Very important in fisheries throughout its range, caught with longlines, handlines and gillnets. One of the most common bycatches of industrial tropical tuna fisheries with longlines and specially purse seines. Utilized fresh or salt-dried for human consumption, livers used for oil extraction (rich in Vitamin A), fins for the oriental shark-fin soup market, and hides for leather.

Distribution: Found in all tropical seas of the world, one of the most common sharks worldwide. Known from the Red Sea and Gulf of Aden.

Remarks: Reported to be dangerous to humans.

Carcharhinus amboinensis (Müller and Henle, 1839) (Plate VII, 46) CARCHARHINIDAE

Frequent synonyms / misidentifications: *Triaenodon obtusus* Day, 1878 / *Carcharhinus leucas* (Valenciennes, 1839).

FAO names: En - Pigeye shark; **Fr** - Requin balestine; **Sp** - Tiburón baleta.

Local names: Qirsh kabeer Al-aien.

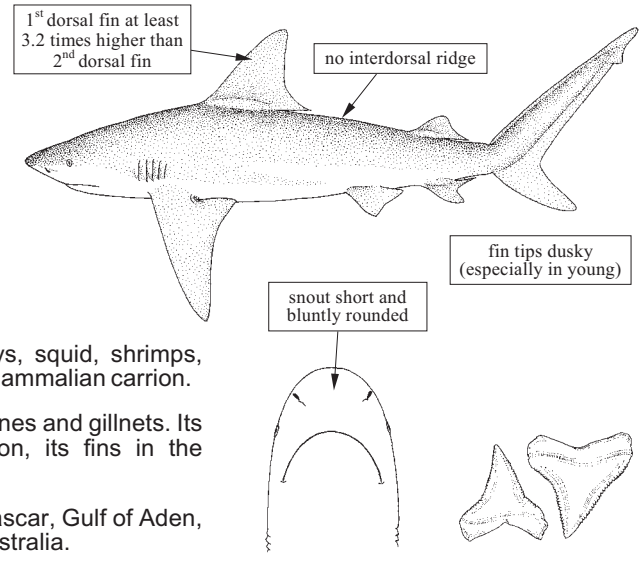
Size: To 2.8 m.

Habitat and biology: Occurs inshore and offshore, from the surfline to a depth of 60 m. Viviparous; 3 to13 young per litter. A bottom-feeding shark, preying on pelagic and demersal bony fishes, sharks and rays, squid, shrimps, cuttlefish, octopi, lobsters, gastropods and mammalian carrion.

Importance to fisheries: Caught with longlines and gillnets. Its meat utilized fresh for human consumption, its fins in the oriental shark-fin soup market.

Distribution: Nigeria, South Africa, Madagascar, Gulf of Aden, Pakistan, Sri Lanka, Indonesia, northern Australia.

Remarks: Potentially dangerous to people.



underside of head **upper and lower front teeth**

Carcharhinus leucas (Valenciennes, 1839) (Plate VII, 47-49) CARCHARHINIDAE

Frequent synonyms / misidentifications: *Carcharhinus zambezensis* (Peters, 1852); *C. vanrooyeni* Smith, 1958 / *Carcharhinus amboinensis* (Müller and Henle, 1839).

FAO names: En - Bull shark; **Fr** - Requin bouledogue; **Sp** - Tiburón sarda.

Local names:

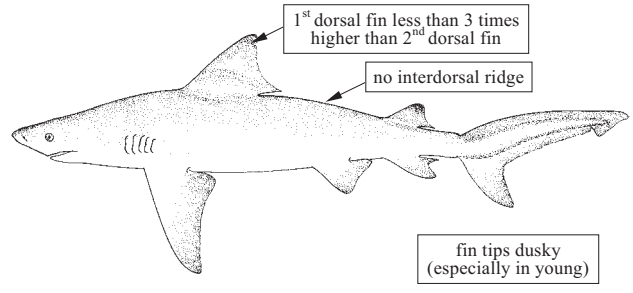
Size: To 3.5 m.

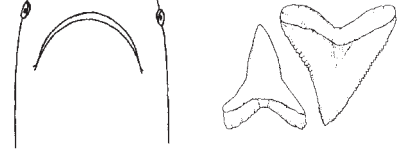
Habitat and biology: In coastal, estuarine, riverine and lacustrine waters, usually found close inshore in marine habitats; occurs from depths of 1 to 152 m. Viviparous; with 6 to 12 young per litter; nursery areas in estuaries and coastal lagoons. Omnivorous, feeding mainly on other sharks and rays and bony fishes, but also on crabs, shrimp, turtles, sea birds and carrion.

Importance to fisheries: A common catch on inshore small-scale shark fisheries, caught with gillnets and longlines. Used for its meat for human consumption, and priced for its fins, hides and livers.

Distribution: Found in coastal areas of all tropical and subtropical seas of the world. Known to enter freshwater systems and found several hundred kilometres upstream in rivers and lakes.

Remarks: One of the most dangerous sharks, known to attack and kill people.





underside of head **upper and lower front teeth**

Carcharhinus longimanus (Poey, 1861) (Plate VII, 50 & 51) CARCHARHINIDAE

Frequent synonyms / misidentifications: *Carcharhinus maou* (Lesson, 1830) / None.

FAO names: En - Oceanic whitetip shark; **Fr** - Requin oceanique; **Sp** - Tiburón oceánico.

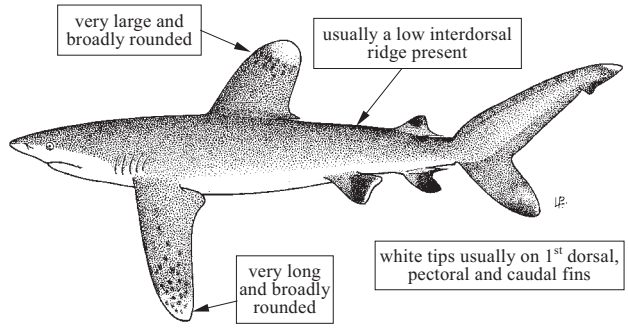
Local names: Abu rishah baidaa; Oush; Ekhtiemaiah; Tarfei.

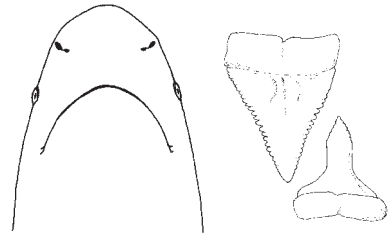
Size: To 3.5 m, common to 2.7 m.

Habitat and biology: An oceanic-epipelagic species found mostly far offshore but occasionally in coastal waters. Viviparous; with 1 to 15 embryos per litter and a gestation period of about one year. Feeds mainly on pelagic fishes and squids, but also on seabirds, turtles and crustaceans.

Importance to fisheries: Caught with floating longlines, drifting gillnets and handlines; an important bycatch of many tropical tuna fisheries. Utilized fresh for human consumption, its fins highly appreciated in the oriental shark-fin soup market.

Distribution: Widespread in all tropical and subtropical seas of the world.





underside of head — upper and lower front teeth

Galeocerdo cuvier (Péron and Lesueur, 1822) (Plate VIII, 52 & 53) CARCHARHINIDAE

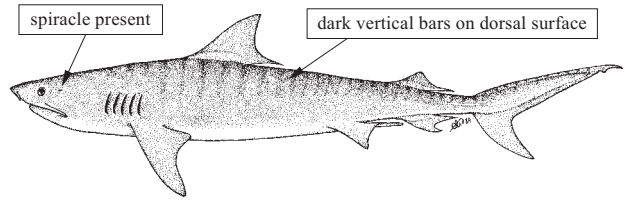
Frequent synonyms / misidentifications: *Galeocerdo arcticus* (Faber, 1829) / None.

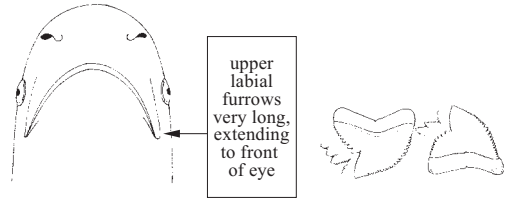
FAO names: En - Tiger shark; **Fr** - Requin tigre commun; **Sp** - Tiburón tigre.

Local names: Qirsh namrani; Al-Qirsh Al-Nemer.

Size: Exceptionally to 7.4 m, common to 4 m.

Habitat and biology: An inshore and offshore species, near the surface and bottom; often in shallow waters, including rivers and estuaries. Ovoviviparous; with 10 to 82 young per litter; gestation possibly slightly over a year. A voracious, indiscriminate predator feeding on all kinds of fish, marine mammals, turtles, seabirds, sea snakes, squids, molluscs and crabs.





underside of head — upper and lower front teeth

Importance to fisheries: Caught with floating and bottom gillnets and longlines. Also sought by sport fishermen. Its meat is utilized fresh, salt-dried, and smoked for human consumption, hide and fins of high quality, liver rich in oil and vitamin A.

Distribution: Worldwide in tropical and warm-temperate waters.

Remarks: One of the most dangerous sharks; attacks divers, swimmers and even boats.

Loxodon macrorhinus Müller and Henle, 1839

(Plate VIII, 54 & 55) CARCHARHINIDAE

Frequent synonyms / misidentifications: *Scoliodon acutus* (Rüppell, 1837); *S. ceylonensis* Setna and Sarangdhar, 1946 / *Scoliodon laticaudus* (Müller and Henle, 1838).

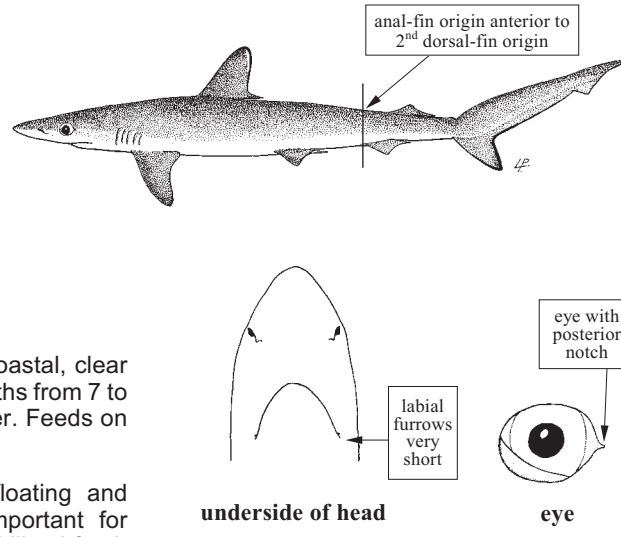
FAO names: En - Sliteye shark; **Fr** - Requin sagrin; **Sp** - Tiburón ojuelo.

Local names: Libax; Jeer-Jeer; Al-Qirsh Al-Hindi.

Size: To 90 cm.

Habitat and biology: Occurs in tropical, coastal, clear waters, near the surface and bottom; at depths from 7 to 80 m. Viviparous; with 2 to 4 young per litter. Feeds on anchovies, croakers, shrimp and cuttlefish.

Importance to fisheries: Caught with floating and bottom gillnets and line gear. Locally important for small-scale fisheries in parts of its range. Utilized fresh for human consumption.



Distribution: Indian Ocean and western Pacific Ocean; from South Africa to the Red Sea, eastward to Japan and eastern Australia.

Rhizoprionodon acutus (Rüppell, 1837)

(Plate VIII, 56 & 57) CARCHARHINIDAE

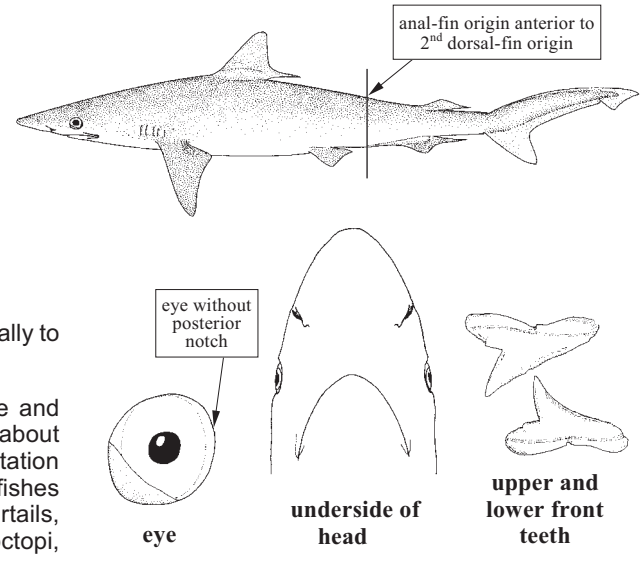
Frequent synonyms / misidentifications: *Scoliodon acutus* (Rüppell, 1837); *S. palsorra* (Bleeker, 1853); *S. walbeehmi* (Bleeker, 1856) / *Rhizoprionodon oligolinx* Springer, 1964; *Loxodon macrorhinus* Müller and Henle, 1839; *Scoliodon laticaudus* Müller and Henle, 1838.

FAO names: En - Milk shark; **Fr** - Requin museau pointu; **Sp** - Tiburón lechoso.

Local name: Qirsh.

Size: Common to less than 1.1 m, exceptionally to 1.78 m.

Habitat and biology: An abundant inshore and offshore shark, from the surfline to depths of about 200 m. Viviparous: 2 to 8 young per litter; gestation period about 1 year. Feeds on small bony fishes (lizardfish, goatfish, threadfins, wrasses, hairtails, sardines, croakers, mojarras), squids, octopi, cuttlefish, shrimps, crabs and sea snails.

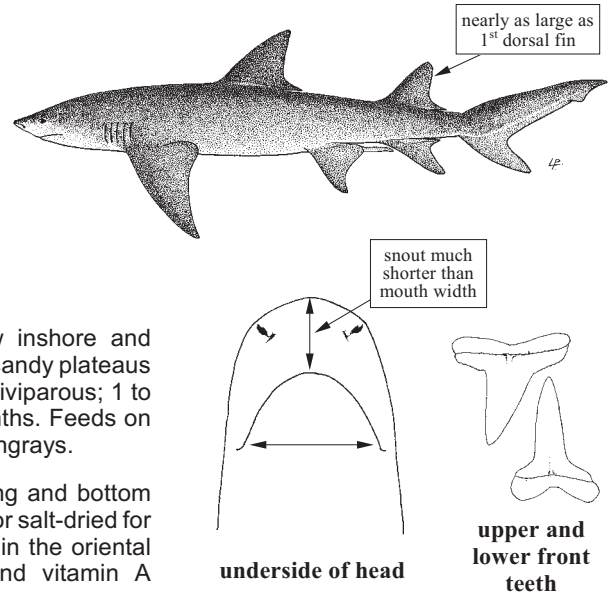


Importance to fisheries: An important species for inshore small-scale fisheries across its range. Caught with longlines, gillnets and trawls. Utilized fresh and salt-dried for human consumption.

Distribution: In tropical and subtropical waters of the south eastern Atlantic, the Indian (including the Red Sea and Gulf of Aden) and the western Pacific oceans.

Negaprion acutidens (Rüppell, 1837)

(Plate VIII, 58) **CARCHARHINIDAE**



Frequent synonyms / misidentifications: None / *Lamiopsis temmincki* (Müller and Henle, 1839).

FAO names: En - Sicklefin lemon shark; **Fr** - Requin limon faucille; **Sp** - Tiburón segador.

Local names: Libax; Farluuq; Qirsh Abu-bouse areed.

Size: To 3.1 m.

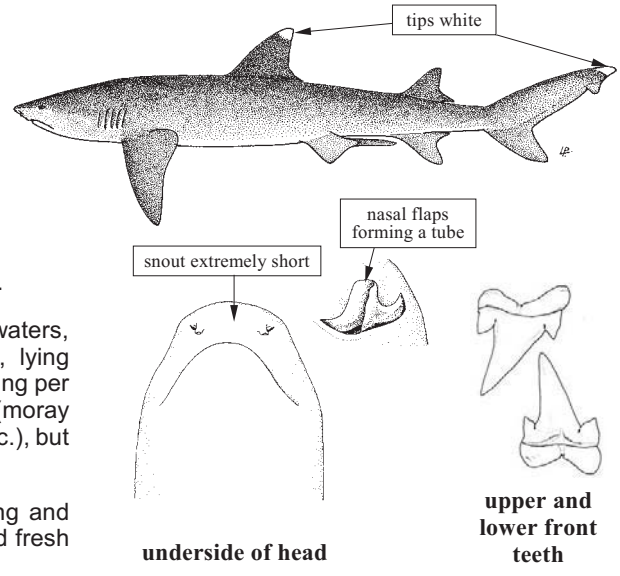
Habitat and biology: Demersal in shallow inshore and offshore waters; often around coral reefs and sandy plateaus near coral, at depths down to at least 23 m. Viviparous; 1 to 13 young per litter; gestation 10 or more months. Feeds on bottom fishes including porcupine fish and stingrays.

Importance to fisheries: Caught with floating and bottom gillnets and line gear. Its meat is utilized fresh or salt-dried for human consumption, fins highly appreciated in the oriental shark-fin soup market, and liver for oil and vitamin A extraction.

Distribution: Indian and Western Pacific oceans, from South Africa to the Red Sea, eastward to Cambodia, Papua-New Guinea, tropical Australia, and Palau, Marshall Islands and Tahiti.

Triaenodon obesus (Rüppell, 1837)

(Plate IX, 59 & 60) **CARCHARHINIDAE**



Frequent synonyms / misidentifications: *Triaenodon apicalis* Whitley, 1939 / *Carcharhinus albimarginatus* (Rüppell, 1837).

FAO names: En - Whitetip reef shark; **Fr** - Requin corail; **Sp** - Cazón coralero ñato.

Local names: Libaax; Daaha; Abu-shaaf; Qirsh salmani.

Size: Common to 1.7 m; said to attain 2.13 m.

Habitat and biology: Occurs in coastal clear waters, very commonly associated with coral reefs, lying inside holes or crevices. Viviparous; 1 to 5 young per litter. Feeds on a wide variety of reef fishes (moray eels, parrot fishes, snappers, squirrelfishes, etc.), but also octopus, lobsters and crabs.

Importance to fisheries: Caught with floating and bottom gillnets, and line gear. Its meat utilized fresh or salt-dried for human consumption.

Distribution: Widely distributed in the Indian and Pacific Oceans, from eastern Africa and the Red Sea to the tropical Pacific Islands and some localities of western America.

SPHYRNIDAE

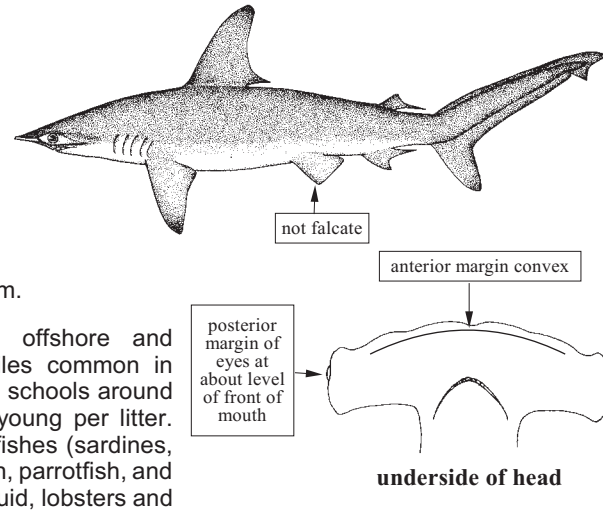
Sphyrna lewini (Griffith and Smith, 1834)

(Plate IX, 61-64)

Frequent synonyms / misidentifications: *Sphyrna diplana* Springer, 1941 / *Sphyrna mokarran* (Rüppell, 1837).

FAO names: En - Scalloped hammerhead; **Fr** - Requin-marteau halicorne; **Sp** - Cornuda común.

Local names: Manyaaso; Kerrnat Al-diplana; Abu-mattrakah.



Size: Common to 3.7 m, exceptionally to 4.2 m.

Habitat and biology: From inshore to offshore and semi-oceanic waters. Newborns and juveniles common in estuaries and shallow bays; adults form large schools around offshore sea mounts. Viviparous; 15 to 31 young per litter. Feeds on a variety of pelagic and demersal fishes (sardines, anchovies, mackerel, jacks, flatfish, sea catfish, parrotfish, and others) as well as several sharks and rays, squid, lobsters and other crustaceans.

Importance to fisheries: An important species for small and large-scale fisheries throughout its range. Caught with most kinds of longlines and gillnets and particularly vulnerable to the latter around the seamounts where large schools of the species congregate. A common bycatch of tuna and billfish fisheries when operating in coastal waters. Its meat used fresh or salt-dried for human consumption; fins highly appreciated in the oriental shark-fin soup market; hides good for leather production.

Distribution: In all tropical and warm-temperate seas of the world.

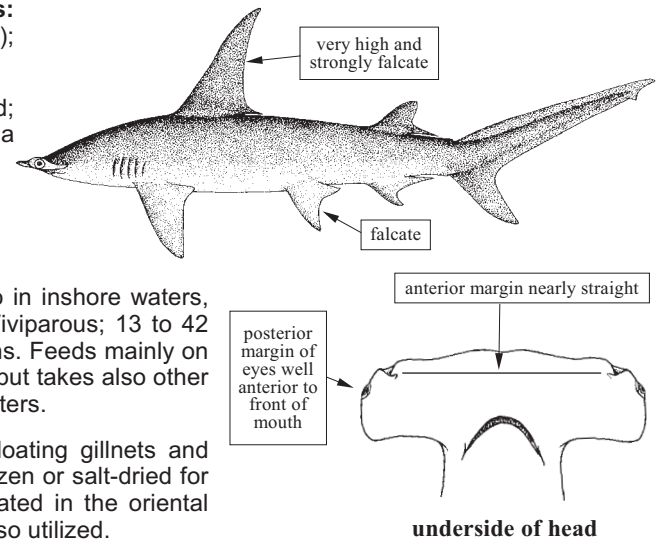
Sphyrna mokarran (Rüppell, 1837)

(Plate IX, 65 & 66) **SPHYRNIDAE**

Frequent synonyms / misidentifications: None / *Sphyrna tudes* (Valencienes, 1822); *S. lewini* (Griffith and Smith, 1834).

FAO names: En - Great hammerhead; **Fr** - Grand requin-marteau; **Sp** - Cornuda gigante.

Local names: Cawar; Kerrnah; Mokarran.



Size: To 6 m.

Habitat and biology: Semi-oceanic, also in inshore waters, often found around and on coral reefs. Viviparous; 13 to 42 young per litter; gestation at least 7 months. Feeds mainly on skates, rays, groupers and sea catfishes, but takes also other bony fishes, small sharks, squids and lobsters.

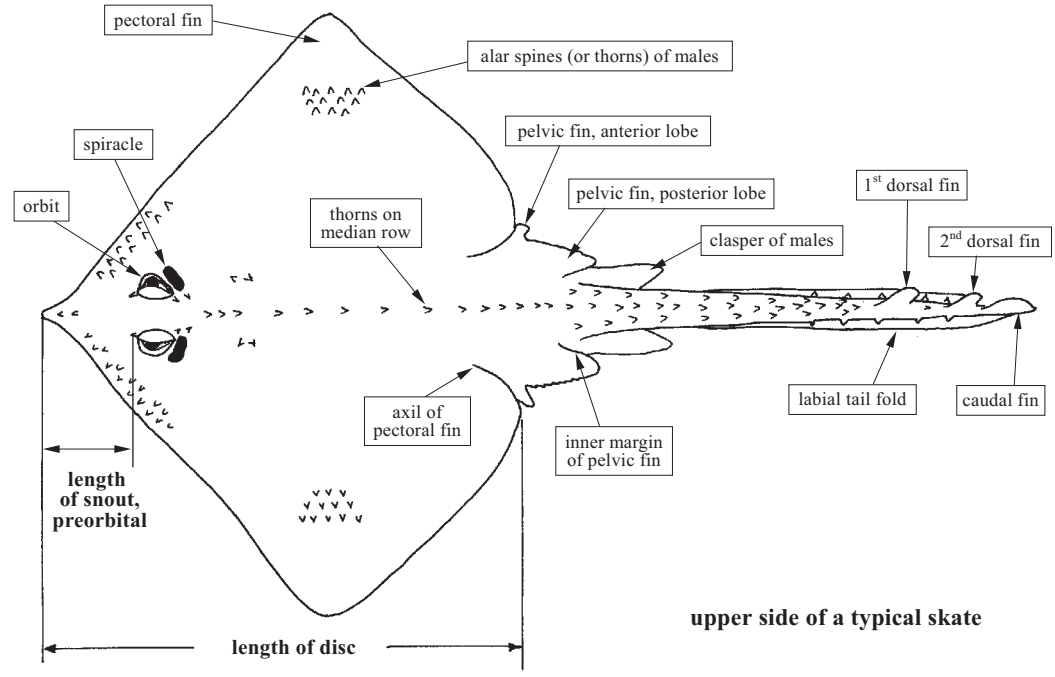
Importance to fisheries: Caught with floating gillnets and floating longlines. Its meat used fresh, frozen or salt-dried for human consumption. Fins highly appreciated in the oriental shark-fin soup market. Livers and hides also utilized.

Distribution: In all tropical and warm-temperate seas of the world.

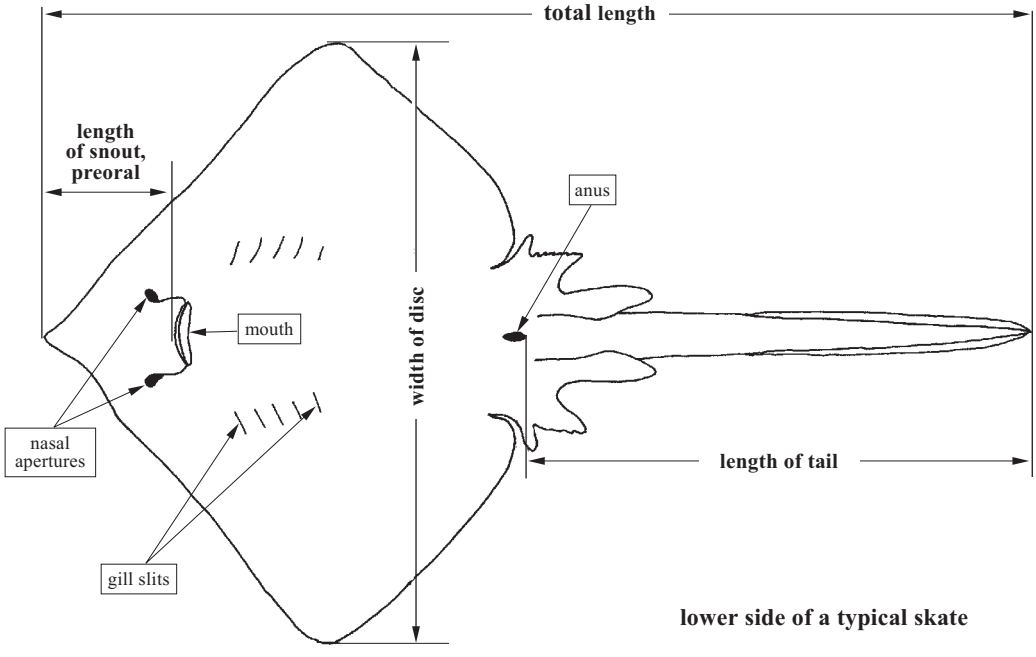
BATOID FISHES

Rays, Skates, Guitarfishes and Mantas

TECHNICAL TERMS AND MEASUREMENTS



upper side of a typical skate



lower side of a typical skate

LIST OF FAMILIES AND SPECIES OCCURRING IN THE AREA

An asterix (*) is given when species accounts are included. A question mark (?) before the scientific name indicates that presence in the area needs confirmation. A question mark (?) after the scientific name indicates that the identification needs confirmation.

Order **Pristiformes**

Family **PRISTIDAE**

* ***Anoxypristis cuspidata***

* ***Pristis pectinata***

* ***Pristis zijsron***

Order **Torpediniformes**

Family **TORPEDINIDAE**

* ***Torpedo panthera***

* ***Torpedo sinuspersici***

Family **NARCINIDAE**

Narcine oculifera

Family **NARKIDAE**

* ***Heteronarce bentuviai***

Heteronarce mollis

Order **Rhinobatiformes**

Family **RHINOBATIDAE**

? ***Rhinobatos cemiculus***

?* ***Rhinobatos granulatus***

* ***Rhinobatos halavi***

? ***Rhinobatos obtusus***

* ***Rhinobatos punctifer***

?* ***Rhinobatos salalah***

?* ***Rhinobatos schlegelii***

?* ***Rhinobatos thouin***

Family **RHYNCHOBATIDAE**

* ***Rhina ancylostoma***

? ***Rhynchobatus australiae***?

* ***Rhynchobatus djiddensis***

Order **Myliobatiformes**

Family **Dasyatidae**

* ***Dasyatis kuhlii***

? ***Dasyatis pastinaca***

***Dasyatis* sp.**

* ***Himantura fai***

* ***Himantura gerrardi***

* ***Himantura imbricata***

* ***Himantura uarnak***

* ***Pastinachus sephen***

? ***Taeniura grabata***

* ***Taeniura lymma***

* ***Taeniura meyeni***

* ***Urogymnus asperrimus***

Family **GYMNURIDAE**

? ***Aetoplatea tentaculata***

* ***Gymnura poecilura***

Family **MYLIOBATIDAE**

* ***Aetobatus flagellum***

* ***Aetobatus narinari***

? ***Aetobatus ocellatus***

* ***Aetomylaeus milvus***

* ***Aetomylaeus vespertilio***

Family **RHINOPTERIDAE**

* ***Rhinoptera javanica***

? ***Rhinoptera jayakari***?

Family **MOBULIDAE**

* ***Manta birostris***

* ***Mobula eregoodootenkee***

* ***Mobula japanica***

? ***Mobula kuhlii***

* ***Mobula tarapacana***

GUIDE TO THE ORDERS AND FAMILIES OF BATOID FISHES OCCURRING IN THE AREA

How to use this guide

Readers are strongly adviced to follow these simple steps in order to successfully identify any shark or batoid found in the region. First, read carefully through the description of key characters listed under each Order. Use the illustrations of the Families under each Order only as a secondary aid in making certain that the right Order has been found. Once the right Order has been identified, proceed to narrow down on the Family of the specimen using the illustration for the Family and key characters annotated in each illustration; make use of the size data included for each Family. Once the Family has been identified, move to the corresponding pages where the species for that Family are illustrated. These illustrations and the key characters marked on them should allow proper identification of all sharks and batoids known from the area.

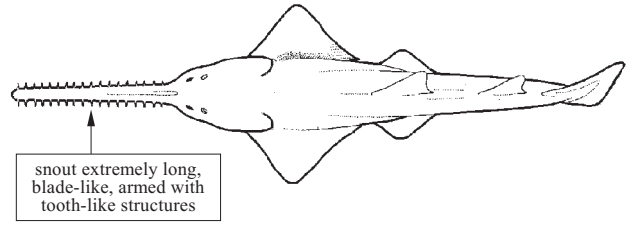
Order PRISTIFORMES – Sawfishes

Body shark-like with a saw-like elongated snout bearing a row of strong lateral teeth on each side, gill slits on the underside of the head.

PRISTIDAE Page 43

Sawfishes

To 7.3 m total length. Demersal in shallow marine waters and estuaries, entering fresh water. Three species in the area, all under threat from overexploitation.



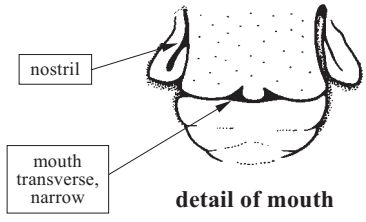
Order TORPEDINIFORMES – Electric rays

Pectoral fins greatly expanded and fused with head and trunk, forming a large oval disc; tail stout and shark-like, without any spines, a large electric organ on each side of head, usually visible through the skin as a pattern of hexagonal markings.

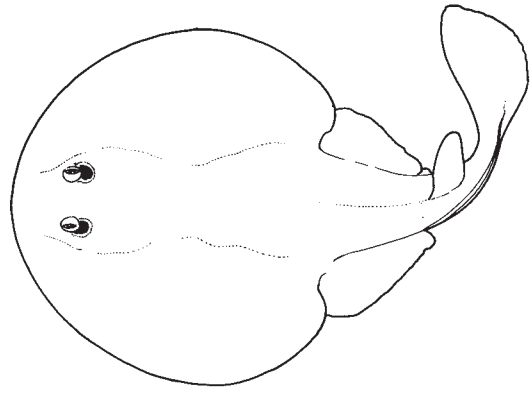
NARKIDAE Page 44

Sleeper rays

To at least 46 cm total length. Demersal, from the intertidal to a depth of at least 330 m; unable to penetrate fresh water. Two species in the area.



detail of mouth

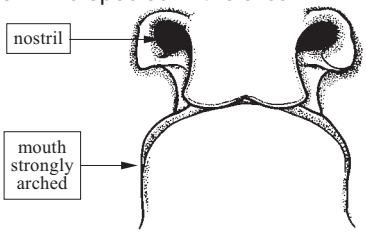


TORPEDINIDAE

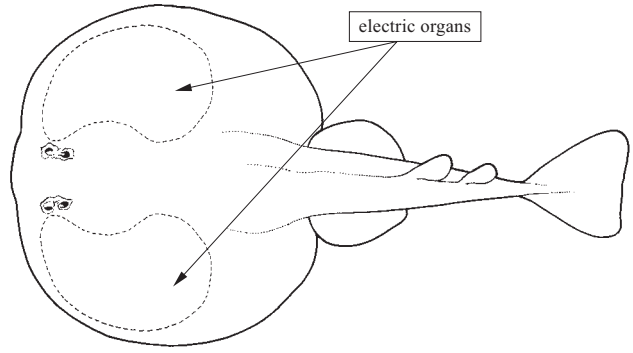
Page 44

Torpedoes

To at least 1.8 m total length. Demersal, from shallow waters to a depth of 1 100 m; they can occur off river mouths and in estuaries, but do not penetrate fresh water. Two species in the area.



detail of mouth



Order RHINOBATIFORMES – Guitarfishes, wedgefishes and shark-rays

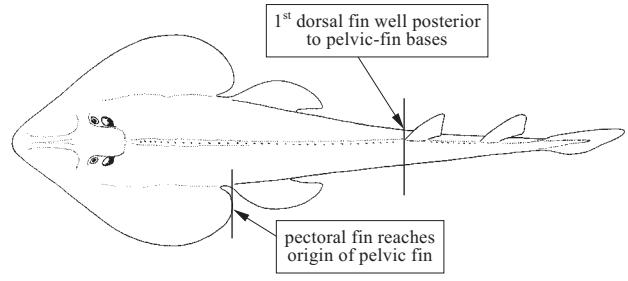
Body elongated and shark-like with pectoral fins expanded and fused with head and trunk; two subequal and well separated dorsal fins; no saw-like snout.

RHINOBATIDAE

Page 45

Guitarfishes

To 3 m total length. Demersal, in inshore waters and sometimes in deeper waters of the upper slope; off sandy beaches, muddy bays, estuaries, and off river mouths. From the intertidal down to 366 m. Possibly 6 species in the region.

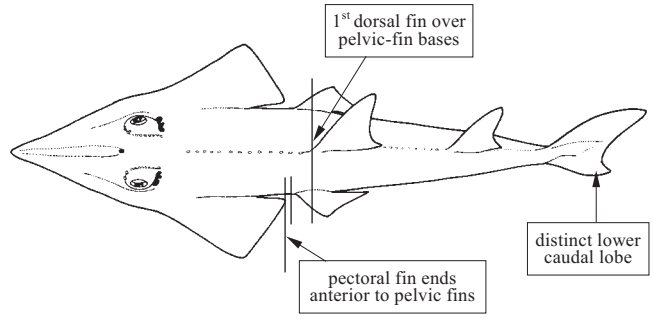


RHYNCHOBATIDAE

Page 47

Wedgefishes and shark-rays

To 3 m total length. Demersal, in inshore waters, muddy bays, estuaries and river mouths, and coral reefs; from the intertidal to at least 64 m. Possibly two species in the area.



Order MYLIOBATIFORMES - Stingrays, butterfly rays, eagle rays and mantas

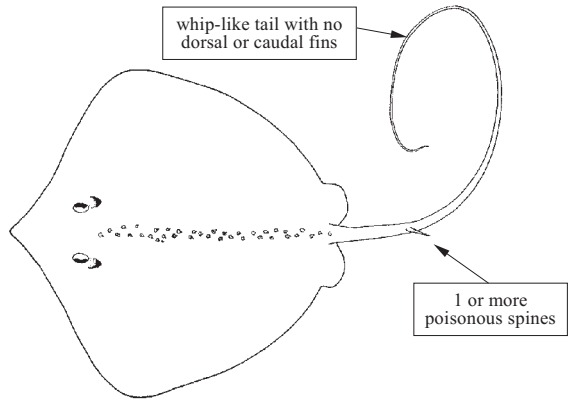
Body flattened with pectoral fins greatly expanded and fused with head and trunk; tail slender or whip-like, usually with one or several spines; usually with a single dorsal fin, but no caudal fin. No electric organ.

DASYATIDAE

Page 48

Stingrays

To 2 m disc width. Mostly demersal, with one species pelagic. In marine, estuarine and fresh-water habitats, down to a depth of 480 m. At least nine species in the area.

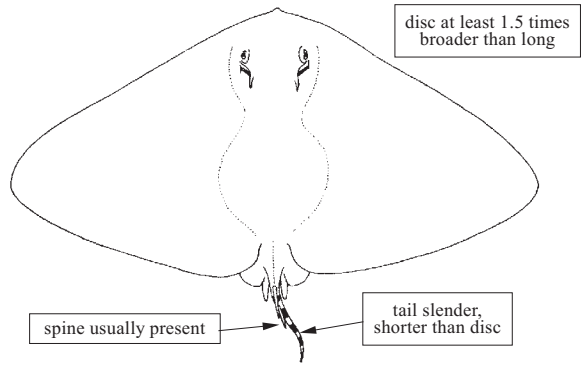


GYMNURIDAE

Page 52

Butterfly rays

To 2.5 m disc width. Demersal, inshore waters off sandy beaches, estuaries, enclosed bays and lagoons, and offshore banks down to a depth of 110 m. A single species in the area.

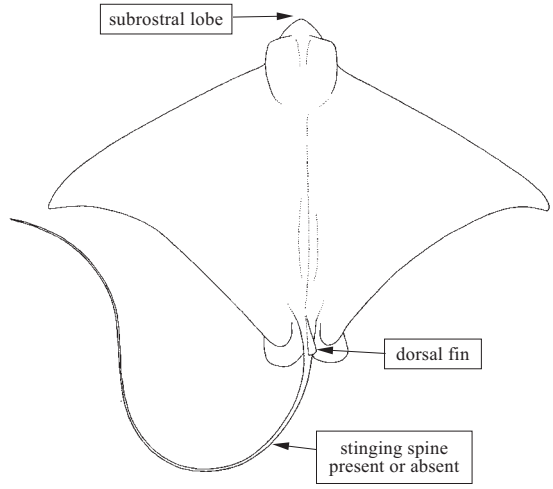


MYLIOBATIDAE

Page 53

Eagle rays

To 3 m disc width. Semi-pelagic in inshore waters, around coral or rocky reefs, kelp beds, estuaries and enclosed bays and lagoons, but often found also in the epipelagic zone. From the intertidal to a depth of 527 m. Four species in the area.

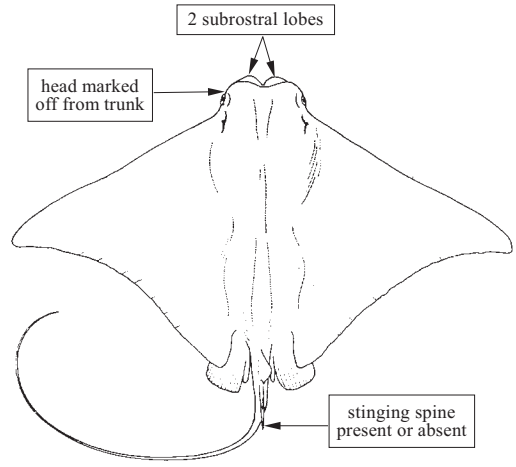


RHINOPTERIDAE

Page 55

Cownose rays

To 1.5 m disc width. Semi-pelagic inshore and offshore, off sandy beaches, estuaries, enclosed bays and lagoons, and offshore banks; from the intertidal to a depth of at least 26 m. One species in the area, possibly two.

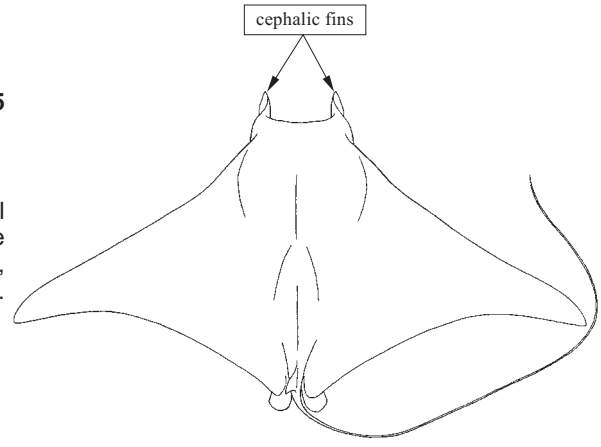


MOBULIDAE

Page 55

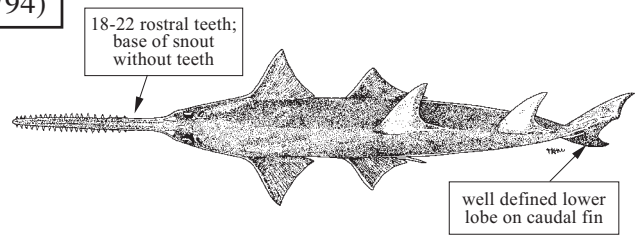
Mantas and devil rays

To at least 6.7 m disc width. Pelagic, in coastal and oceanic waters from the intertidal to the epipelagic zone; around coral and rocky reefs, in lagoons and enclosed and open bays. Possibly four species in the area.



PRISTIDAE

Anoxypristis cuspidata (Latham, 1794)



Frequent synonyms / misidentifications: None / *Pristis pectinata* Latham, 1794; *P. zijsron* Bleeker, 1851.

FAO names: En - Narrow sawfish.

Local names: Abu minshaar; Shuqrah.

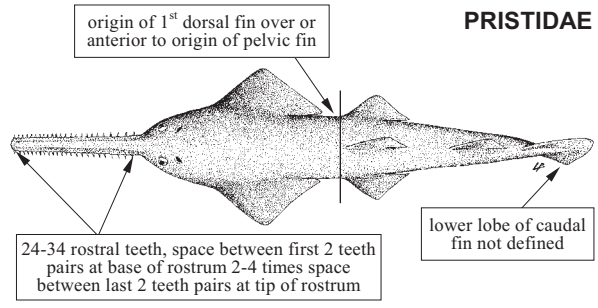
Size: To at least 4.7 m total length.

Habitat and biology: Found close inshore in the intertidal to a depth of 40 m, frequents river deltas and estuaries, and may go upstream in rivers. Ovoviviparous; litters from 6 to 23 young. Feeds on small fish and cuttlefish.

Importance to fisheries: Caught in bottom trawls, in fixed bottom gillnets, and probably with line gear. Meat utilized for human consumption. Severely depleted throughout its range. In need of strong conservation measures.

Distribution: Confined to the Indo-West Pacific, from the Red Sea to southern Japan, New Guinea and tropical Australia.

Pristis pectinata Latham, 1794



Frequent synonyms / misidentifications: None / *Anoxypristis cuspidata* (Latham, 1794); *Pristis zijsron* Bleeker, 1851.

FAO names: En - Smalltooth sawfish; **Fr** - Poisson-scie commun; **Sp** - Pez sierra comun.

Local names: Libaax-Miinshaar; Zaraacimo.

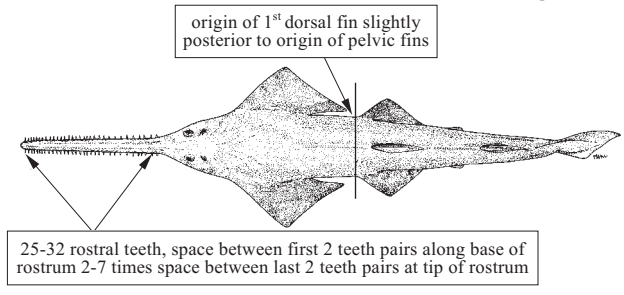
Size: Probably to 7.6 m total length, common to 5.5 m.

Habitat and biology: In shallow bays, lagoons and estuaries, also enters fresh water.

Importance to fisheries: Caught with line gear and bottom trawls. Flesh of good quality. Severely depleted throughout its range. In need of strong conservation measures.

Distribution: Possibly found in all warm-temperate and tropical seas of the world, but status of nominal records uncertain. Presence in the Red Sea needs confirmation.

Pristis zijsron Bleeker, 1851



Frequent synonyms / misidentifications: None / *Anoxypristis cuspidata* (Latham, 1794); *Pristis pectinata* Latham, 1794.

FAO names: En - Longcomb sawfish.

Local names:

Size: Reported to reach 7.3 m total length.

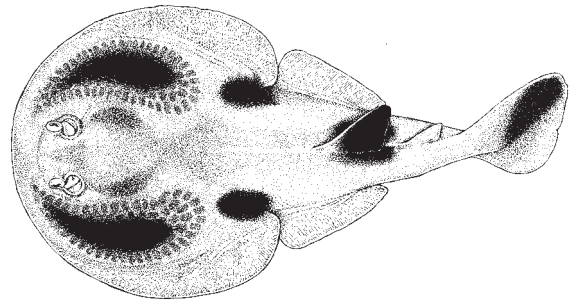
Habitat and biology: In shallow waters, also enters fresh water.

Importance to fisheries: Caught with line gear and bottom trawls. Flesh of good quality. Severely depleted throughout its range. In need of strong conservation measures.

Distribution: Confined to the Indian and western Pacific oceans. From South Africa north to the Red Sea and eastward to southern China, New Guinea and Australia.

NARKIDAE

Heteronarce bentuviai (Baranes and Randall, 1989) (Plate X, 67)



Frequent synonyms / misidentifications: None / None.

FAO names: En - Elat electric ray; **Sp** - Raya eléctrica de Elat.

Local names:

Size: To at least 19 cm total length.

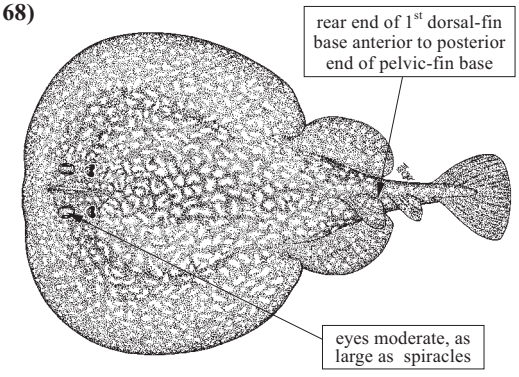
Habitat and biology: On sandy and possibly muddy bottoms, from depths of 80 to 200 m.

Importance to fisheries: Caught as bycatch with gillnets and trawl nets.

Distribution: Known only from the Gulf of Aqaba.

TORPEDINIDAE

Torpedo panthera Olfers, 1831 (Plate X, 68)



Frequent synonyms / misidentifications: None / *Torpedo sinuspersici* Olfers, 1831.

FAO names: En - Panther electric ray.

Local names: Raash; Fattarah; Khaddala ramlya; Ruketa kahrabaeia.

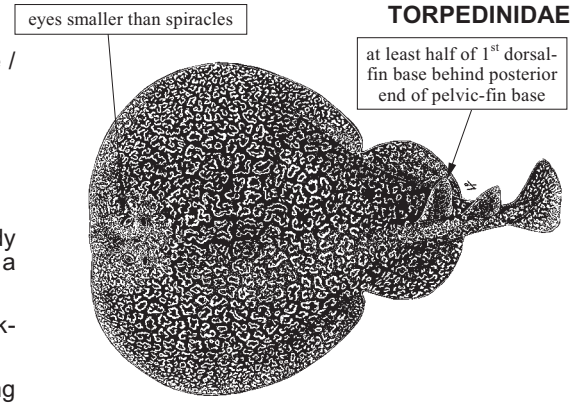
Size: To 1 m total length.

Habitat and biology: On mud or sandy bottoms, from shallow water to a depth of 110 m. Can deliver a strong electric shock.

Importance to fisheries: Caught with bottom trawls and hook-and-line.

Distribution: Red Sea. Reports from other areas probably refer to a different species.

Torpedo sinuspersici Olfers, 1831



Frequent synonyms / misidentifications: None / *Torpedo panthera* Olfers, 1831.

FAO names: En - Marbled electric ray.

Local names:

Size: To 1.3 m total length, 90 cm disc width.

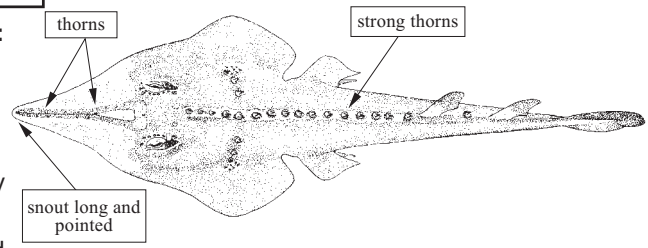
Habitat and biology: Inshore waters over sandy bottoms, down to a depth of 200 m. Can deliver a strong electric shock.

Importance to fisheries: Caught with hook-and-line and bottom trawls. Flesh edible.

Distribution: From South Africa to India, including the Red Sea.

RHINOBATIDAE

Rhinobatos granulatus Cuvier, 1829



Frequent synonyms / misidentifications: None / None.

FAO names: En - Sharpnose guitarfish.

Local names: Shippeen.

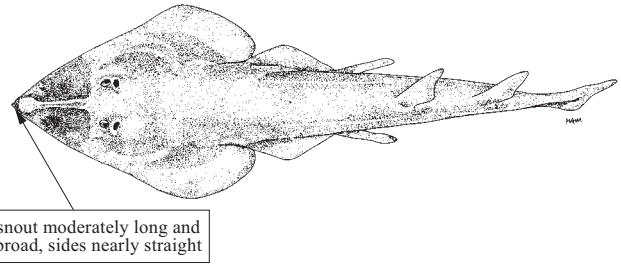
Size: To at least 1.8 m total length, possibly to 2.15 m.

Habitat and biology: Found inshore and offshore from the intertidal to the outer continental shelves down to 119 m. Biology little known.

Importance to fisheries: Utilized where it occurs, but details lacking.

Distribution: Occurs in the Indo-West Pacific from the Persian Gulf and off India east to Viet Nam and New Guinea. Presence in the region needs to be confirmed.

Rhinobatos halavi (Forsskål, 1775) (Plate X, 69) RHINOBATIDAE



Frequent synonyms / misidentifications: None / None.

FAO names: En - Halavi guitarfish.

Local names: Halwani khshen; Archetah.

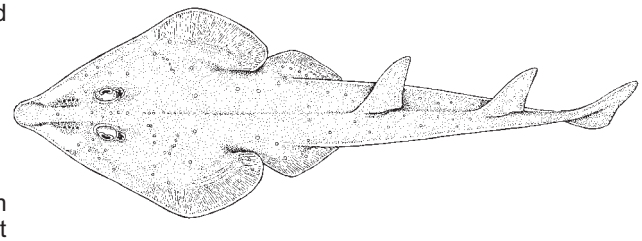
Size: To 150 cm total length.

Habitat and biology: An inshore species of sandy bottoms. Up to 10 young per litter. Feeds on prawns and other crustaceans.

Importance to fisheries: Utilized where it occurs, but details lacking.

Distribution: Occurs in the Indo-West Pacific from the Red Sea to the Gulf of Oman. Possibly east to the Persian Gulf, India, Myanmar, the Philippines, Viet Nam and China.

Rhinobatos punctifer Compagno and Randall, 1987 (Plate X, 70) RHINOBATIDAE



Frequent synonyms / misidentifications: None / *Rhinobatos schlegelii* Müller and Henle, 1841.

FAO names: En - Spotted guitarfish.

Local names: Salfooh.

Size: To at least 88 cm total length.

Habitat and biology: Presumably a bottom dwelling species like other guitarfishes, but details of its biology unknown.

Importance to fisheries: Caught incidentally with bottom trawls in the northern Red Sea; utilized fresh for human consumption.

Distribution: From the northern Red Sea to Oman.

Rhinobatos salalah Randall and Compagno, 1995 (Plate X, 71) RHINOBATIDAE

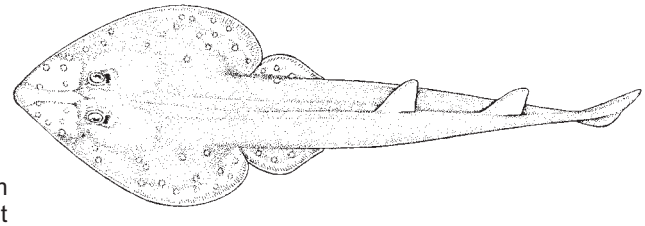
Frequent synonyms / misidentifications: None / *Rhinobatos obtusus* Müller and Henle, 1841.

FAO names: En - Salalah guitarfish.

Local names: Shippeen.

Size: To at least 88 cm total length.

Habitat and biology: Presumably a bottom dwelling species like other guitarfishes, but details of its biology unknown.



Importance to fisheries: Little known, the only specimen collected at a fish market in Oman.

Distribution: Currently known only from the coast of Oman (Salalah).

Rhinobatos schlegelii Müller and Henle, 1841 RHINOBATIDAE

Frequent synonyms / misidentifications: None / None.

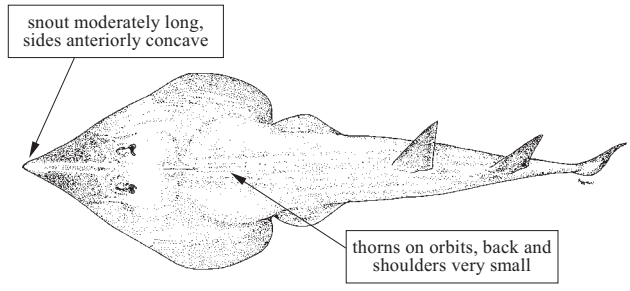
FAO names: En - Brown guitarfish.

Local names: Halwani naeim.

Size: To at least 75 cm total length.

Habitat and biology: An inshore species. Biology little known.

Importance to fisheries: Probably utilized where it occurs, but details lacking.



Distribution: Occurs in the western Pacific off China, Korea and Japan, also Viet Nam and the Philippines; westward records from India and Oman may not be this species.

Rhinobatos thouin (Anonymous, in Lacepéde, 1798) (Plate X, 72) RHINOBATIDAE

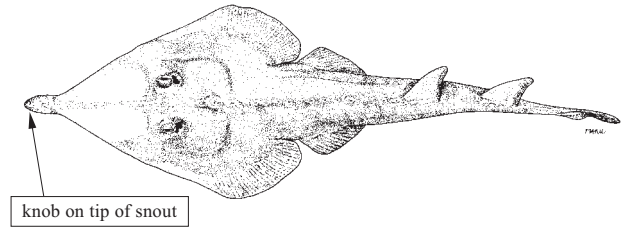
Frequent synonyms / misidentifications: None / None.

FAO names: En - Clubnose guitarfish.

Local names: Shippeen.

Size: To 2.5 and possibly 3.0 m total length.

Habitat and biology: Found inshore. Biology little known.

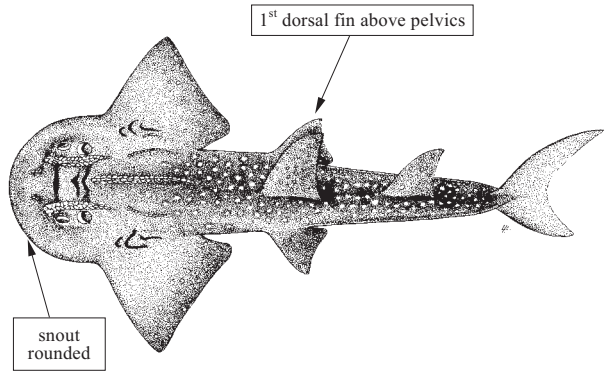


Importance to fisheries: Caught in inshore and offshore fisheries in trawls and probably gillnets and line gear. Utilized for human consumption fresh and probably salt-dried.

Distribution: Occurs in the Indo-West Pacific from the Red Sea, Malaysia, Singapore, Thailand, Viet Nam, Indonesia, New Guinea and Japan.

RHYNCHOBATIDAE

Rhina ancylostoma Bloch and Schneider, 1801 (Plate X, 73)



Frequent synonyms / misidentifications: None / None.

FAO names: En - Bowmouth guitarfish; **Fr** - Angelot.

Local names: Oolo-Oolo; Tuurey Haloul; Al-Bahloul.

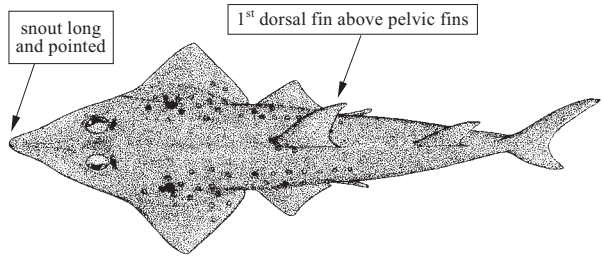
Size: Reported to reach 2.7 m total length.

Habitat and biology: A bottom living species that occurs close inshore and on offshore reefs, from depths of 3 to 90 m. Feeds on crabs and shellfish.

Importance to fisheries: Caught with bottom trawl. Commercially caught off Asia.

Distribution: Confined to the Indian and western Pacific oceans. From South Africa north to the Red Sea and eastward to Japan, New Guinea and Australia.

Rhynchobatus djiddensis (Forsskål, 1775) (Plate X, 74) RHYNCHOBATIDAE



Frequent synonyms / misidentifications: None / None.

FAO names: En - Giant guitarfish; **Fr** - Poisson paille à pois; **Sp** - Pez cuña manchado.

Local names: Oolo-Oolo; Shabeelley; Aurab.

Size: To at least 3 m total length.

Habitat and biology: Occurs in shallow inshore waters, on sandy bottoms, from depths of 2 to 50 m. Feeds on benthic invertebrates.

Importance to fisheries: Caught with line gear gillnets and bottom trawls. An important species in small-scale fisheries throughout its range. Meat used for human consumption; fins highly appreciated in the oriental shark-fin soup market.

Distribution: Known from the western Indian Ocean including the Red Sea and Gulf of Aden. Possibly also in the eastern Indian and western Pacific Oceans but records need confirmation.

Remarks: Another species of *Rhynchobatus* is reported from the area. Similar or identical to *R. australiae* Whitley, 1939, its status and distribution needs further study.

DASYATIDAE

Himantura fai Jordan and Seale, 1906 (Plate XI, 75)

Frequent synonyms / misidentifications: None / *Himantura jenkinsii* (Annandale, 1909).

FAO names: En - Pink whipray.

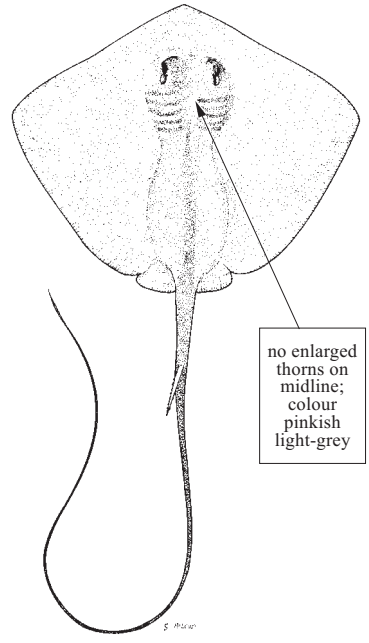
Local names: Rouketah.

Size: To at least 500 cm total length and more than 150 cm disc width.

Habitat and biology: Occurs in the inner continental shelf, often in aggregations over soft substrates. Biology poorly known.

Importance to fisheries: Caught as a bycatch with bottom trawl nets, and presumably utilized for human consumption but details unknown.

Distribution: Poorly known due to confusion with *H. jenkinsii*. Likely widespread in the Indian and western Pacific Oceans, from South Africa to Micronesia including Australia. Found in the Red Sea.



Himantura gerrardi (Gray, 1851) (Plate XI, 76)

Frequent synonyms / misidentifications: *Himantura macrurus* (Bleeker, 1852) / None.

FAO names: En - Whitespotted whipray.

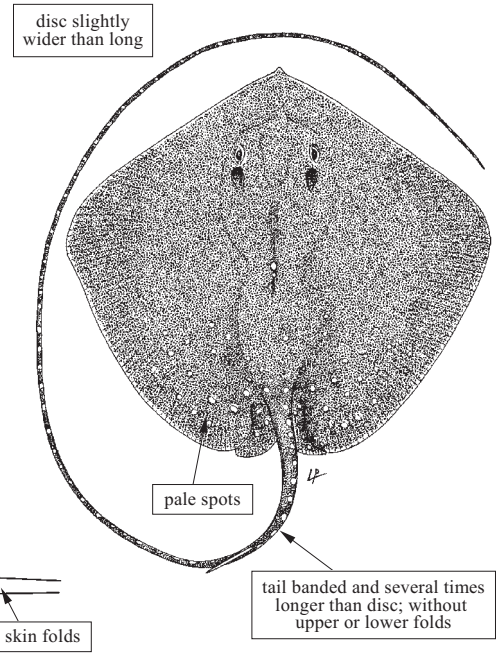
Local names: Al-Rouketah Al-safraa.

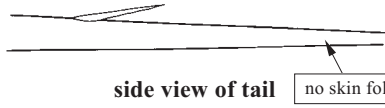
Size: Total length to at least 200 cm; maximum disc width 90 cm or more.

Habitat and biology: Depth distribution limits unknown, but likely to be confined to inner continental shelf.

Importance to fisheries: An important commercial stingray in some areas and the most regularly landed. Meat used for human consumption salt-dried, the skin also used to produce leather.

Distribution: Widespread in the Indo-Pacific from the Red Sea to New Guinea, north to Taiwan (Province of China). Reported from the south and east African coasts, but records need to be validated.





Himantura imbricata (Bloch and Schneider, 1801)

(Plate XI, 77) **DASYATIDAE**

Frequent synonyms / misidentifications: None / None.

FAO names: En - Scaly whipray.

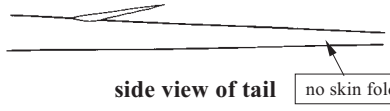
Local names: Rouketah.

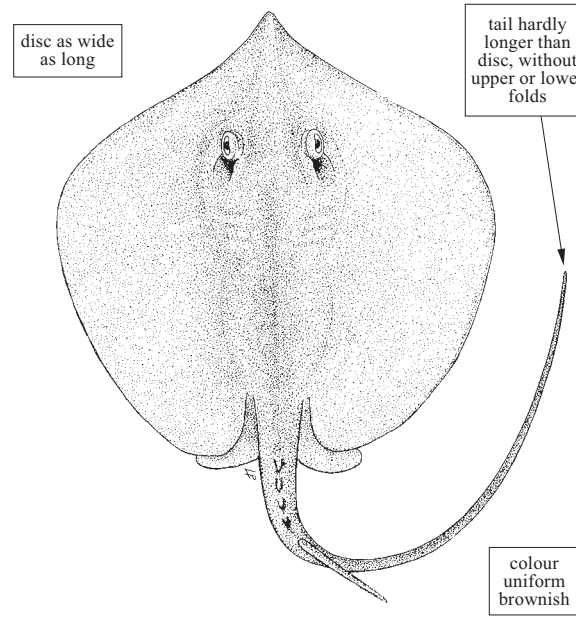
Size: Maximum total length about 65 cm; maximum disc width 22 cm.

Habitat and biology: Demersal in inshore coastal waters. Ovoviviparous. Feeds on bottom invertebrates.

Importance to fisheries: Caught in bottom trawls. Utilization unknown.

Distribution: Found in the Indo-Malay Archipelago but distribution not well defined. Thought to occur from the Red Sea to Java.





Himantura uarnak (Forsskål, 1775)

(Plate XI, 78) **DASYATIDAE**

Frequent synonyms / misidentifications: *Himantura punctata* (Günther, 1870); *Himantura* sp. 1 [Gloerfelt-Tarp and Kailola, 1984] / None.

FAO names: En - Reticulate whipray.

Local names: Al-Rouketah Al-bounni; Um Al-Shriet.

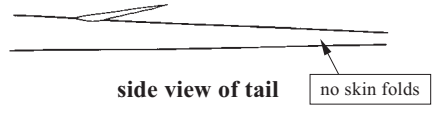
Size: Maximum total length at least 450 cm; maximum disc width about 150 cm.

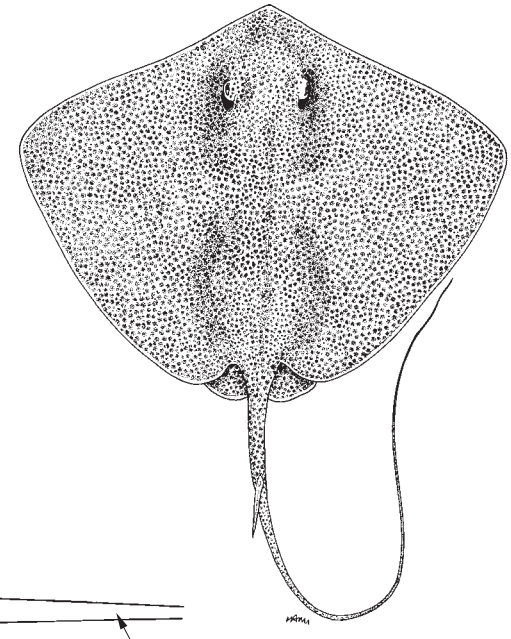
Habitat and biology: Occurs inshore on soft substrates; often intertidal but to depths of at least 50 m.

Importance to fisheries: Caught with bottom trawls. Important commercial species through some of its range.

Distribution: Widespread in the Indo-Pacific; from South Africa and the Mediterranean and Red seas, to Australia and Taiwan (Province of China).

Remarks: Several colour morphs exist, some of which may prove to be distinct species.





Pastinachus sephen (Forsskål, 1775)

(Plate XI, 79) **DASYATIDAE**

Frequent synonyms / misidentifications: *Dasyatis gruveli* Chabanaud, 1923 / None.

FAO names: En - Cowtail stingray.

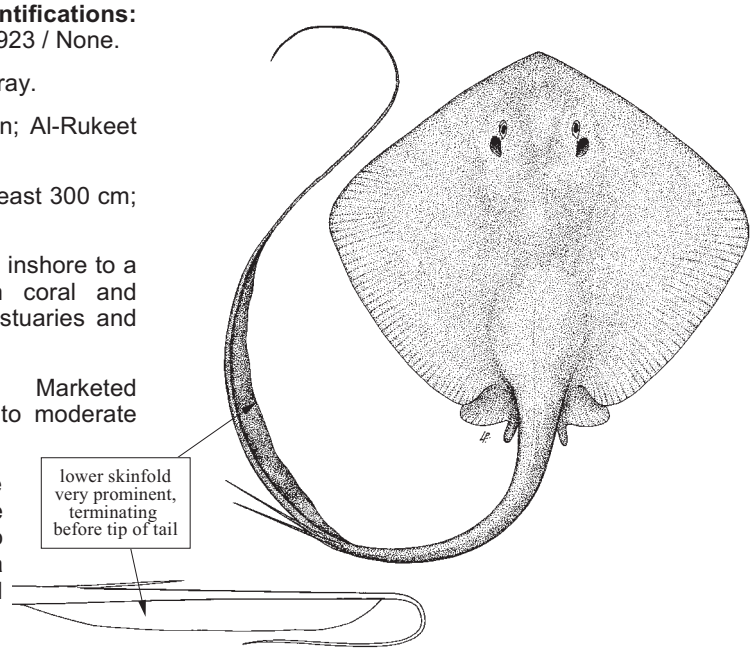
Local names: Saphan; Daffaan; Al-Rukeet Abu-reshah.

Size: Maximum total length at least 300 cm; maximum disc width 180 cm.

Habitat and biology: Common inshore to a depth of 60 m or more in coral and sedimentary habitats. Enters estuaries and fresh water.

Importance to fisheries: Marketed throughout its range in small to moderate quantities.

Distribution: Widespread in the tropical Indo-Pacific from the Red Sea, north to Japan, east to Australia, including Melanesia and Micronesia. Also reported from South Africa.



side view of tail

Dasyatis kuhlii (Müller and Henle, 1841)

(Plate XI, 80) **DASYATIDAE**

Frequent synonyms / misidentifications: None / None.

FAO names: En - Bluespotted stingray.

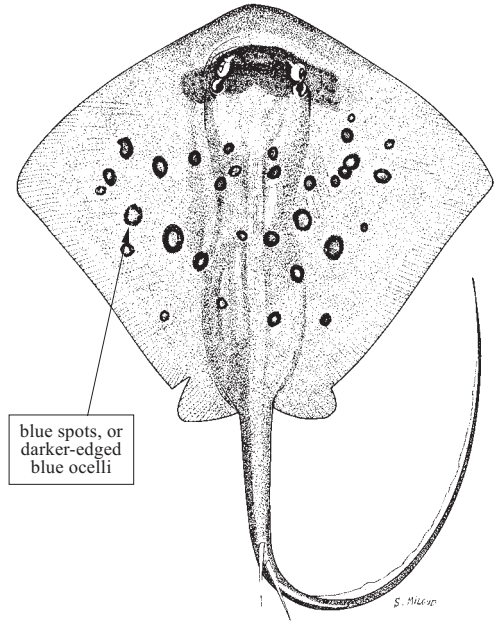
Local name: Rouketah.

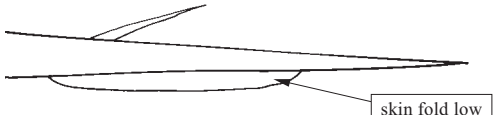
Size: To 38 cm disc width and about 67 cm total length.

Habitat and biology: In coastal waters, to a depth of 90 m.

Importance to fisheries: Caught with line gear and bottom trawls.

Distribution: Indian and western Pacific oceans. From South Africa north to the Red Sea and eastward to Japan, Melanesia and Micronesia, and including Australia.





side view of tail

Taeniura lymma (Forsskål, 1775)

(Plate XII, 81) **DASYATIDAE**

Frequent synonyms / misidentifications: None / None.

FAO names: En - Bluespotted ribbontail ray; **Fr** - Pastenague queue à ruban; **Sp** - Raya latigo rabo cinta.

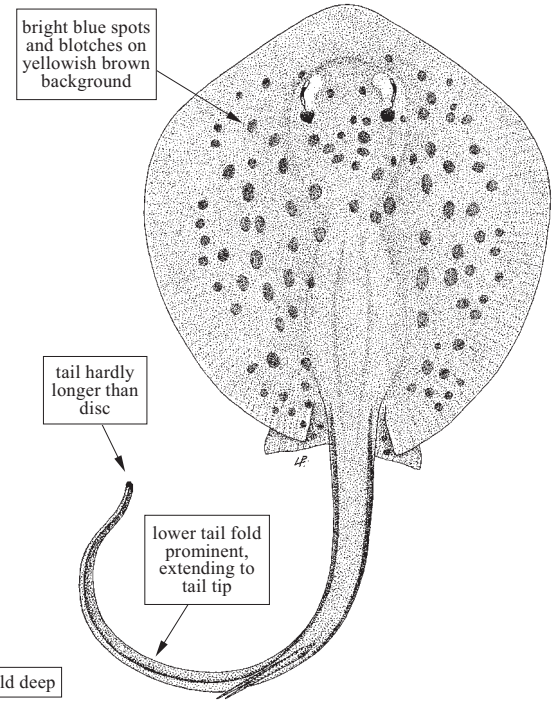
Local names: Rukeetet Sheab; Shafane; Um Salem; Um Qurbaj.

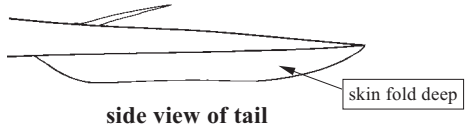
Size: To at least 70 cm total length and about 30 cm disc width.

Habitat and biology: In coastal waters over sandy bottoms and specially on coral reefs, to depths of at least 20 m. Feeds mainly on molluscs, worms, shrimps and crabs.

Importance to fisheries: Caught with line gear.

Distribution: Widespread in the Indian and western Pacific oceans. From South Africa north to the Red Sea and eastward to the Philippines, Australia, New Guinea and the Solomon Islands.





side view of tail

Taeniura meyeni Müller and Henle, 1841

(Plate XII, 82) **DASYATIDAE**

Frequent synonyms / misidentifications: *Taeniura melanospilos* Bleeker, 1853 / None.

FAO names: En - Blotched fantail ray; **Fr** - Pastenague eventail.

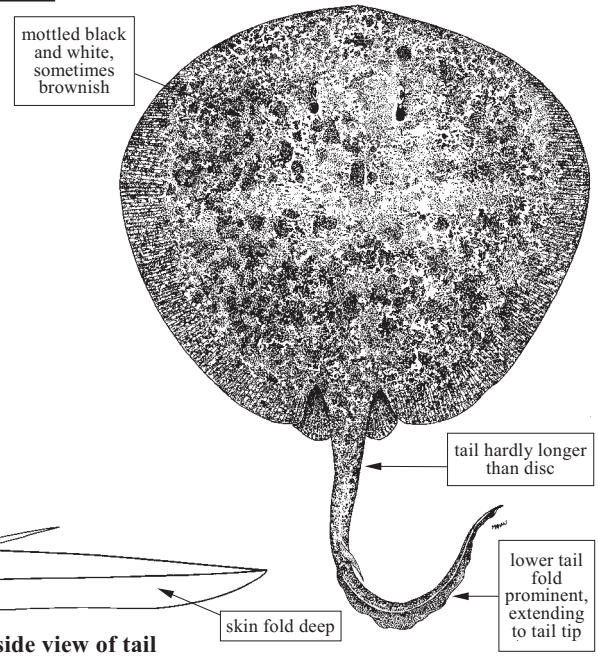
Local names: Rouketah.

Size: To at least 3.3 m total length and 1.8 m disc width.

Habitat and biology: Found in coral reefs and offshore on soft bottoms. Most common between depths of 20 and 60 m, but known to occur in a depth of 450 m.

Importance to fisheries: Caught with line gear and bottom trawls. Utilization unknown.

Distribution: Known from the Indian and western Pacific oceans. From South Africa north to the Red Sea and eastward to Japan, Australia, New Guinea, Lord Howe Islands and Micronesia.



side view of tail

Urogymnus asperrimus (Bloch and Schneider, 1801) (Plate XII, 83) DASYATIDAE

Frequent synonyms / misidentifications: *Urogymnus africanus* (Bloch and Schneider, 1801); *U. rhombeus* (Klunzinger, 1871) / None.

FAO names: En - Porcupine ray.

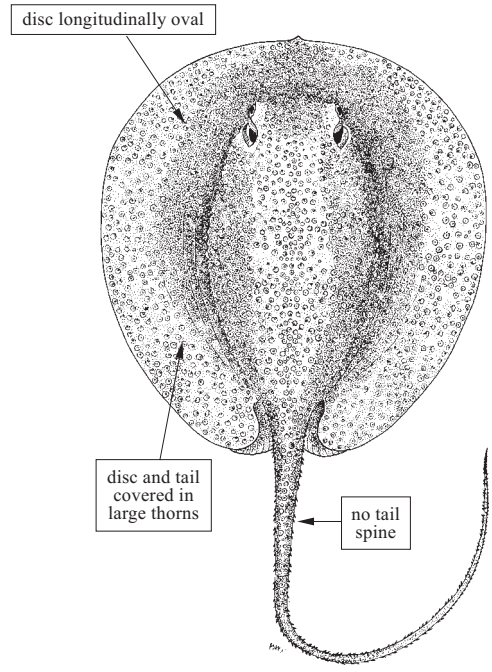
Local names: Rouletah.

Size: Up to at least 1 m disc width.

Habitat and biology: Demersal in shallow inshore waters, associated to coral reefs and also found in brackish waters and sandy bottoms, often in caves. Feeds on polycheates, bottom crustaceans and some bony fishes.

Importance to fisheries: Of very little or no importance to fisheries but often caught in trawls and beach seines. Utilized seasonally for its liver in some localities in the Red Sea (Farasan Islands, KSA).

Distribution: Coast of East Africa and Red Sea eastward to Marshall Islands and Fiji, and south to northern Australia; also known from central western Africa.



GYMNURIDAE

Gymnura poecilura (Shaw, 1804) (Plate XII, 84)

Frequent synonyms / misidentifications: None / None.

FAO names: En - Longtail butterfly ray.

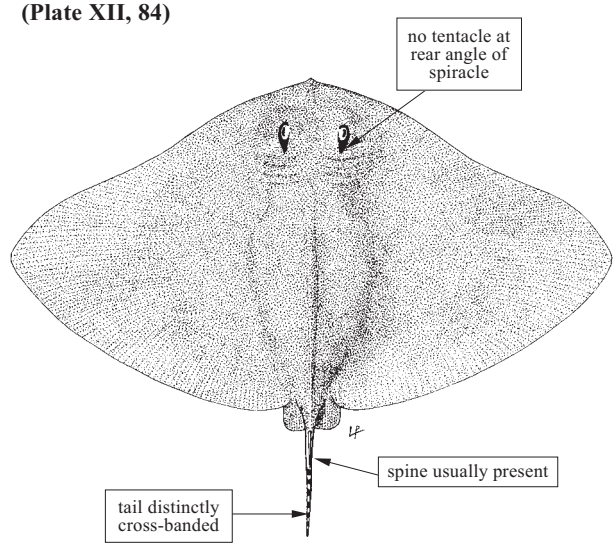
Local names:

Size: To a total length of at least 66 cm and width of at least 82 cm.

Habitat and biology: Locally common, found in shallow inshore waters over sandy and muddy bottoms. Ovoviviparous. Feeds mainly on crustaceans and clams.

Importance to fisheries: Caught as bycatch in bottom trawls and sometimes by hook-and-line. Utilized for human consumption in some parts of its range.

Distribution: From the Red Sea eastward to the Society Islands, China, and southern Japan.



MYLIOBATIDAE

Aetobatus flagellum (Bloch and Schneider, 1801)

Frequent synonyms / misidentifications: None / None.

FAO names: En - Longheaded eagle ray.

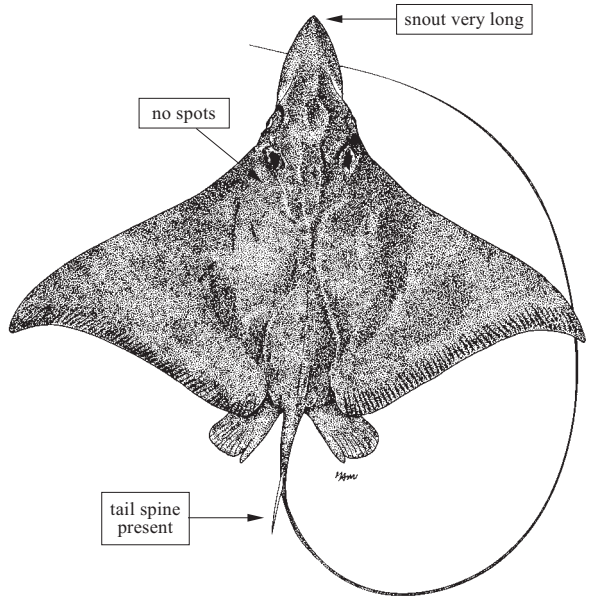
Local names:

Size: To at least 126 cm in total length, width to 47 cm.

Habitat and biology: An inshore species. Biology not well known.

Importance to fisheries: Details of utilization unknown, but it is regularly landed in the fish markets of Jakarta.

Distribution: From the Red Sea, India, Indonesia and southern China; records from the eastern Atlantic and Hawaii need validation.



Aetobatus narinari (Euphrasen,1790)

(Plate XII, 85) **MYLIOBATIDAE**

Frequent synonyms / misidentifications: None / None.

FAO names: En - Spotted eagle ray; **Fr** - Aigle de mer leopard.

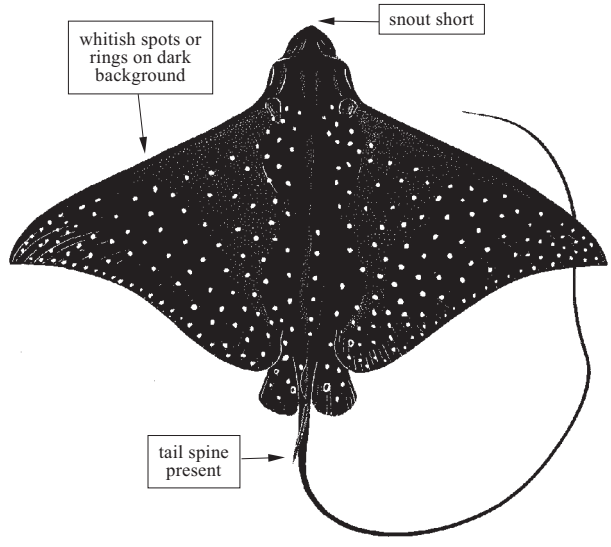
Local names: Maylan; Abu-rweis.

Size: To at least 8.8 m total length when tail undamaged and 3.3 m disc width.

Habitat and biology: Inshore semi-pelagic found in coral reefs, estuaries, off beaches, and enclosed bays; to a depth of 60 m. Can form large schools and can leap out of the water. Number of young usually 4. Feeds mainly on bivalves, but also on shrimps, crabs, octopi and worms.

Importance to fisheries: Caught with hook-and-line and harpoons. Flesh edible but seldom utilized. Ideal for display in Aquaria.

Distribution: Apparently found in all tropical and subtropical seas of the world, but records from the Atlantic Ocean might be an undescribed species.



Aetomylaeus milvus (Valenciennes, 1841)

MYLIOBATIDAE

Frequent synonyms / misidentifications: None / None.

FAO names: En - Ocellate eagle ray.

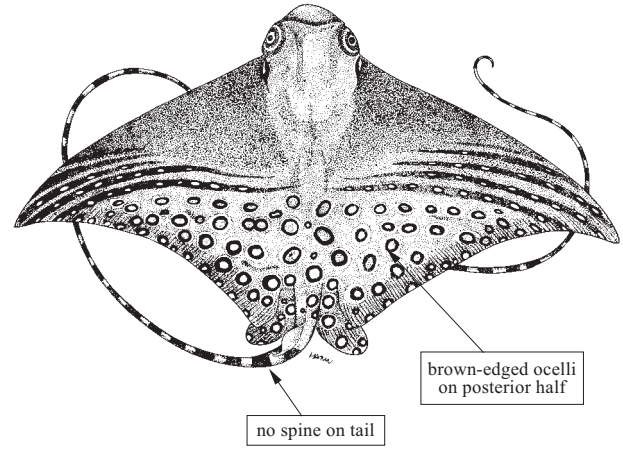
Local names:

Size: To at least 37 cm disc width.

Habitat and biology: An inshore eagle ray, with biology poorly known.

Importance to fisheries: Details of utilization sketchy; utilized for human consumption in some parts of its range.

Distribution: Thought to occur in the Indo-West Pacific from the Red Sea, Pakistan, India, Malaysia, Indonesia and Thailand, the Philippines, and China. May be the juvenile of either *Aetomylaeus maculatus* or *A. vespertilio*.



Aetomylaeus vespertilio (Bleeker, 1852)

MYLIOBATIDAE

Frequent synonyms / misidentifications: *Aetomylaeus reticulatus* (Teng, 1962) / None.

FAO names: En - Ornate eagle ray.

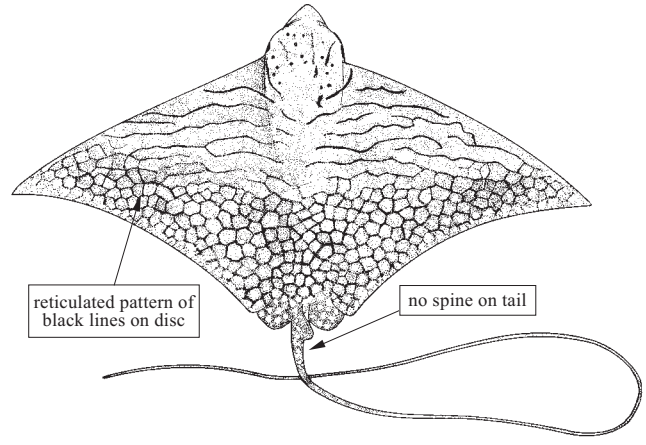
Local names:

Size: To 160 cm disc width and 385 cm total length.

Habitat and biology: Occurs inshore and offshore associated with muddy bays and coral reefs; to a depth of 110 m. Biology poorly known.

Importance to fisheries: Caught with gillnets and probably other gear. Utilized for human consumption in Thailand and probably elsewhere, but details lacking.

Distribution: Found in Indian and western Pacific oceans; Mozambique, the Maldives, Malaysia, Thailand, Indonesia, and northern Australia, the South China Sea and Taiwan (Province of China). Recorded by the author in the Red Sea.



RHINOPTERIDAE

Rhinoptera javanica Müller and Henle, 1841

(Plate XII, 86)

Frequent synonyms / misidentifications: None / *Rhinoptera adspersa* Valenciennes, 1841.

FAO names: En - Javanese cownose ray; **Fr** - Mourine javanaise.

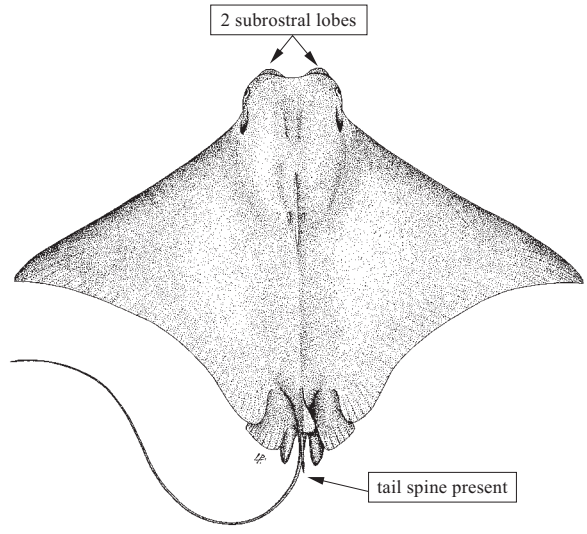
Local names: Mayla-Cadde.

Size: To 1.5 m disc width.

Habitat and biology: In coastal waters. Gregarious, often occurring in large numbers. Ovoviviparous. Feeds mainly on clams, oysters and crustaceans.

Importance to fisheries: Caught in gillnets, hook-and-line, and beach seines; edible but seldom utilized. Fished by sport fishermen, and also displayed in public aquaria.

Distribution: Nominally from South Africa and Mozambique and eastward to Southeast Asia and tropical northern Australia; recorded by the author in the Gulf of Aden.



MOBULIDAE

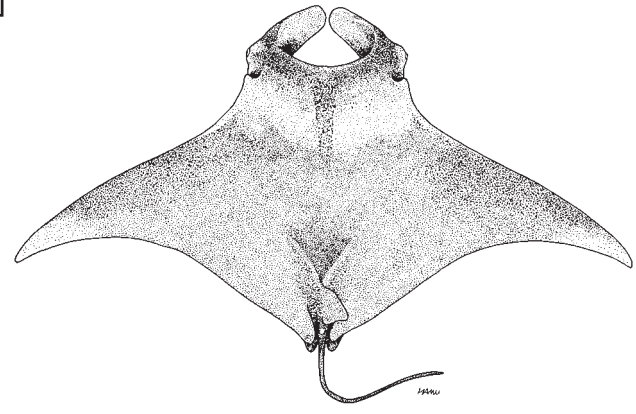
Manta birostris (Donndorff, 1798)

Frequent synonyms / misidentifications: None / None.

FAO names: En - Giant manta; **Fr** - Mante geante; **Sp** - Manta voladora.

Local names: Rukeetet Al-Manta.

Size: Disc width at least 6.70 m, with unsupported citations to 7.63 m and about 9.10 m in width.



Habitat and biology: A common inshore and offshore inhabitant of all temperate and tropical seas, found in shallow muddy bays and the intertidal as well as river mouths and off coral reefs. Occurs individually, or in groups probably highly migratory. Feeds on zooplankton and small to moderate-sized fishes.

Importance to fisheries: Caught with harpoons. Utilized for human consumption in some parts of its range. Easy to be approached by divers and willing to investigate them. A preferred species for eco-touristic diving operations.

Distribution: Found in all warm seas of the world. Recognition of a single species in the genus *Manta* is provisional, and needs to be critically examined.

Mobula eregoodootenkee (Bleeker, 1859)

MOBULIDAE

Frequent synonyms / misidentifications: None / None.

FAO names: En - Pygmy devilray.

Local names: Al-Meyla.

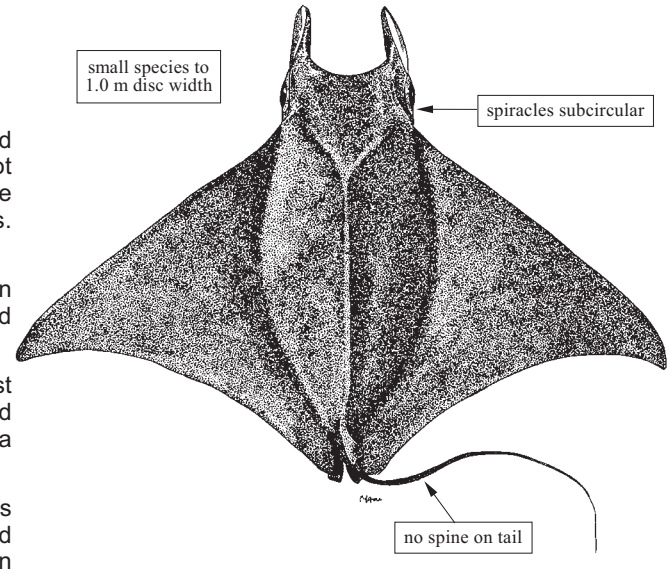
Size: Disc width to about 1.0 m.

Habitat and biology: Lives inshore and offshore in continental coastal waters, not known to penetrate the epipelagic zone and not recorded from oceanic islands. Biology little known.

Importance to fisheries: Utilization pattern in the area poorly known, marketed in some parts of its range.

Distribution: Occurs in the Indo-West Pacific from South Africa north to the Red Sea, eastward to Viet Nam, New Guinea and tropical northern Australia.

Remarks: Use of the species name is provisional, according to Compagno and Last (1999), as Cuvier's original citation in 1829 was binomial.



Mobula japanica (Müller and Henle, 1841)

MOBULIDAE

Frequent synonyms / misidentifications: None / None.

FAO names: En - Spinetail mobula; **Fr** - Mante aiguillat; **Sp** - Manta de aguijón.

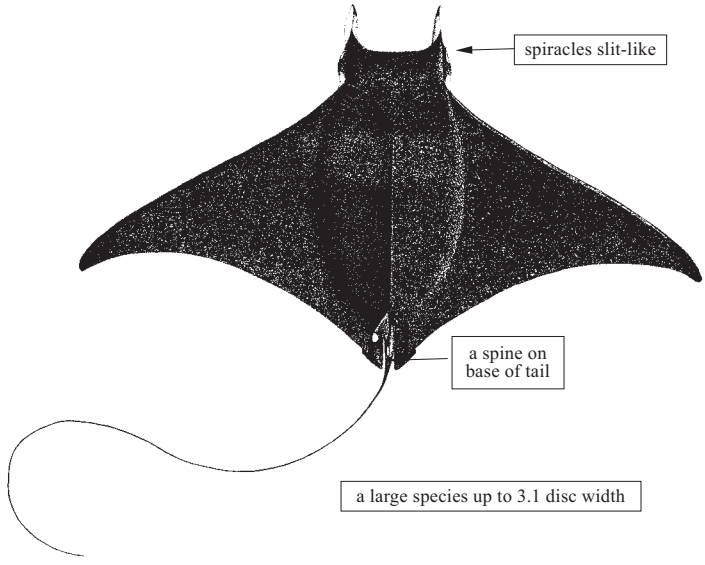
Local names: Al-Meyla.

Size: To 310 cm of disc width, and probably larger.

Habitat and biology: Occurs singly or in groups inshore, offshore and probably in oceanic waters in warm-temperate and tropical seas. Biology poorly known, birth size about 85 cm.

Importance to fisheries: Poorly known, but likely to be mostly a bycatch species. Caught incidentally with floating longlines in the Gulf of Aden and presumably utilized there for human consumption.

Distribution: Probably circum-tropical in all warm-temperate and tropical seas.



Mobula tarapacana (Philippi, 1892)

MOBULIDAE

Frequent synonyms / misidentifications: None / None.

FAO names: En - Chilean devilray; **Fr** - Mante chilienne; **Sp** - Manta comuda.

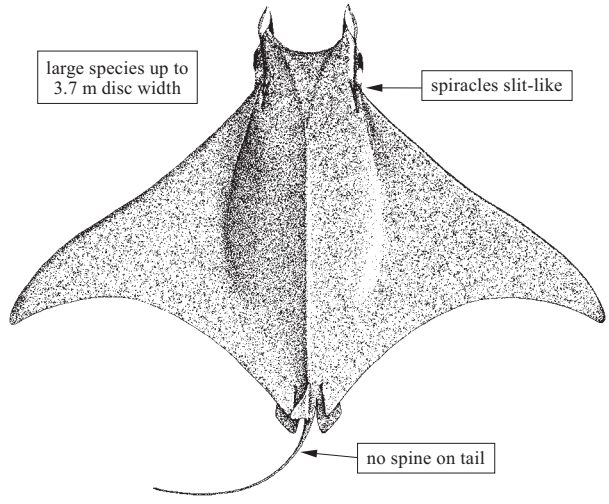
Local names: Al-Meyla.

Size: Disc width to about 3.7 m

Habitat and biology: An uncommon inshore and offshore species. Biology poorly known, feeds on planktonic crustaceans. Sometimes strands on beaches in temperate areas.

Importance to fisheries: Utilization pattern in the area little known.

Distribution: Probably in all tropical seas of the world, but recorded from scattered localities including the western Atlantic (off Venezuela), eastern Atlantic (Ivory Coast), Atlantic and Indian Ocean coasts of South Africa, the northwestern Red Sea, the western Pacific (Japan, Taiwan (Province of China), and probably tropical Australia), and eastern Pacific (Gulf of California and Chile).



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INDEX OF SCIENTIFIC AND VERNACULAR NAMES

EXPLANATION OF THE SYSTEM

Italics : Valid scientific names (double entry by genera and species)

Italics : Synonyms and misidentifications (double entry by genera and species)

ROMAN : Family names

ROMAN : Names of orders, class, subclass

Roman : FAO names.

Roman : Local names.

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LIST OF COLOUR PLATES

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2. CENTROPHORIDAE: ***Centrophorus granulosus***
3. CENTROPHORIDAE: ***Deania profundorum***
4. ALOPIIDAE: ***Alopias pelagicus***
5. ALOPIIDAE: ***Alopias pelagicus***
6. ALOPIIDAE: ***Alopias superciliosus***
7. ALOPIIDAE: ***Alopias superciliosus***

Plate II

8. LAMNIDAE: ***Isurus oxyrinchus***
9. STEGOSTOMATIDAE: ***Stegostoma fasciatum***
10. GINGLYMOSTOMATIDAE: ***Nebrius ferrugineus***
11. GINGLYMOSTOMATIDAE: ***Nebrius ferrugineus***
12. TRIAKIDAE: ***Iago omanensis***
13. TRIAKIDAE: ***Iago omanensis***
14. TRIAKIDAE: ***Mustelus mosis***
15. TRIAKIDAE: ***Mustelus mosis***

Plate III

16. HEMIGALEIDAE: ***Hemigaleus microstoma***
17. HEMIGALEIDAE: ***Hemigaleus microstoma***
18. HEMIGALEIDAE: ***Hemipristis elongatus***
19. HEMIGALEIDAE: ***Hemipristis elongatus***
20. CARCHARHINIDAE: ***Carcharhinus albimarginatus***
21. CARCHARHINIDAE: ***Carcharhinus albimarginatus***
22. CARCHARHINIDAE: ***Carcharhinus amblyrhynchos***
23. CARCHARHINIDAE: ***Carcharhinus amblyrhynchos***

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25. CARCHARHINIDAE: ***Carcharhinus altimus***
26. CARCHARHINIDAE: ***Carcharhinus plumbeus***
27. CARCHARHINIDAE: ***Carcharhinus plumbeus***
28. CARCHARHINIDAE: ***Carcharhinus plumbeus***
29. CARCHARHINIDAE: ***Carcharhinus brevipinna***
30. CARCHARHINIDAE: ***Carcharhinus brevipinna***

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32. CARCHARHINIDAE: ***Carcharhinus limbatus***
33. CARCHARHINIDAE: ***Carcharhinus limbatus***
34. CARCHARHINIDAE: ***Carcharhinus limbatus***
35. CARCHARHINIDAE: ***Carcharhinus sorrah***
36. CARCHARHINIDAE: ***Carcharhinus sorrah***
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38. CARCHARHINIDAE: ***Carcharhinus melanopterus***

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42. CARCHARHINIDAE: ***Carcharhinus sealei***
43. CARCHARHINIDAE: ***Carcharhinus falciformis***
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45. CARCHARHINIDAE: ***Carcharhinus falciformis***

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49. CARCHARHINIDAE: ***Carcharhinus leucas***
50. CARCHARHINIDAE: ***Carcharhinus longimanus***
51. CARCHARHINIDAE: ***Carcharhinus longimanus***

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53. CARCHARHINIDAE: ***Galeocerdo cuvier***
54. CARCHARHINIDAE: ***Loxodon macrorhinus***
55. CARCHARHINIDAE: ***Loxodon macrorhinus***
56. CARCHARHINIDAE: ***Rhizoprionodon acutus***
57. CARCHARHINIDAE: ***Rhizoprionodon acutus***
58. CARCHARHINIDAE: ***Negaprion acutidens***

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60. CARCHARHINIDAE: ***Triaenodon obesus***
61. SPHYRNIDAE: ***Sphyrna lewini***
62. SPHYRNIDAE: ***Sphyrna lewini***
63. SPHYRNIDAE: ***Sphyrna lewini***
64. SPHYRNIDAE: ***Sphyrna lewini***
65. SPHYRNIDAE: ***Sphyrna mokarran***
66. SPHYRNIDAE: ***Sphyrna mokarran***

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67. NARKIDAE: ***Heteronarce bentuviai***
68. TORPEDINIDAE: ***Torpedo panthera***
69. RHINOBATIDAE: ***Rhinobatos halavi***
70. RHINOBATIDAE: ***Rhinobatos punctifer***
71. RHINOBATIDAE: ***Rhinobatos salalah***
72. RHINOBATIDAE: ***Rhinobatos thouin***
73. RHYNCHOBATIDAE: ***Rhina ancylostoma***
74. RHYNCHOBATIDAE: ***Rhynchobatus djiddensis***

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76. DASYATIDAE: ***Himantura gerrardi***
77. DASYATIDAE: ***Himantura imbricata***
78. DASYATIDAE: ***Himantura uarnak***
79. DASYATIDAE: ***Pastinachus sephen***
80. DASYATIDAE: ***Dasyatis kuhlii***

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82. DASYATIDAE: ***Taeniura meyeni***
83. DASYATIDAE: ***Urogymnus asperrimus***
84. GYMNURIDAE: ***Gymnura poecilura***
85. MYLIOBATIDAE: ***Aetobatus narinari***
86. RHINOPTERIDAE: ***Rhinoptera javanica***

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COLOUR PLATES

PLATE I

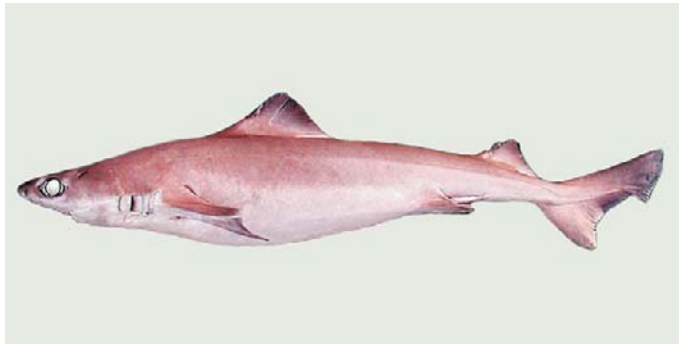

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PLATE II

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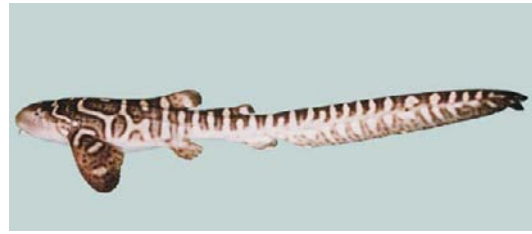
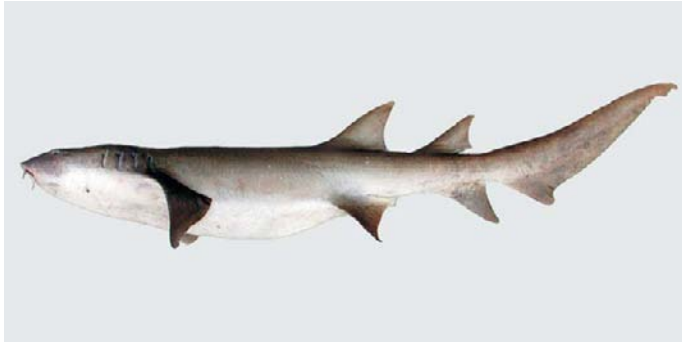


9. STEGOSTOMATIDAE: ***Stegostoma fasciatum*** (juvenile)



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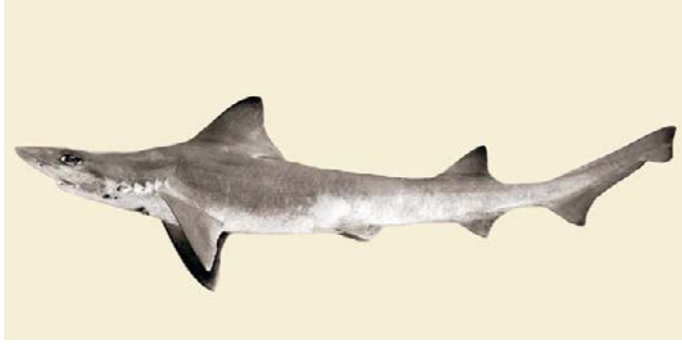

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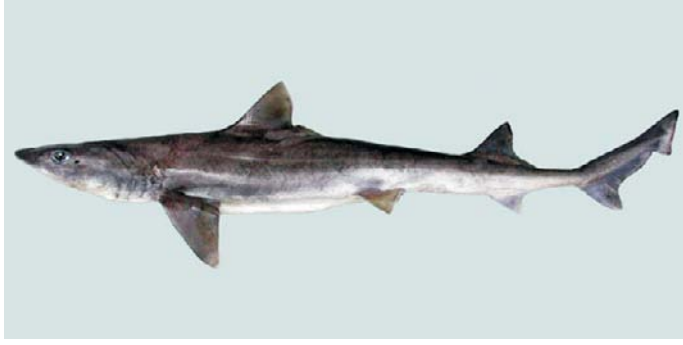

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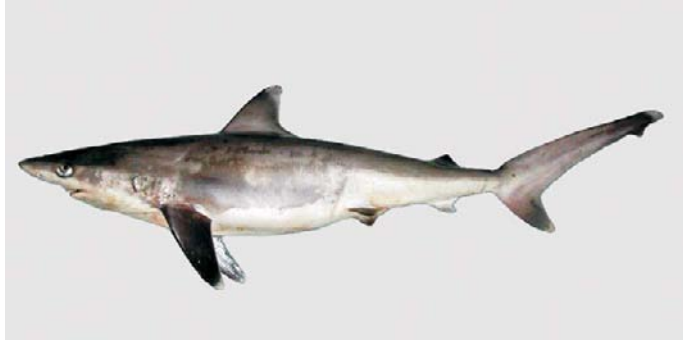

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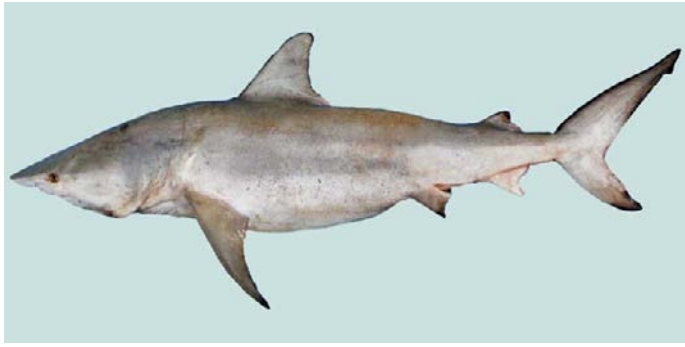
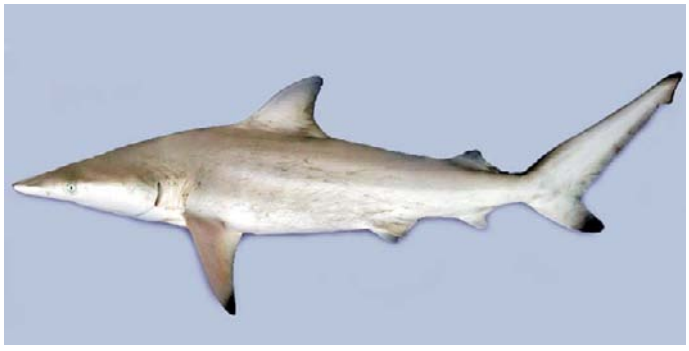
30. CARCHARHINIDAE: ***Carcharhinus brevipinna***

PLATE V



31. CARCHARHINIDAE: ***Carcharhinus limbatus***

32. CARCHARHINIDAE: ***Carcharhinus limbatus***

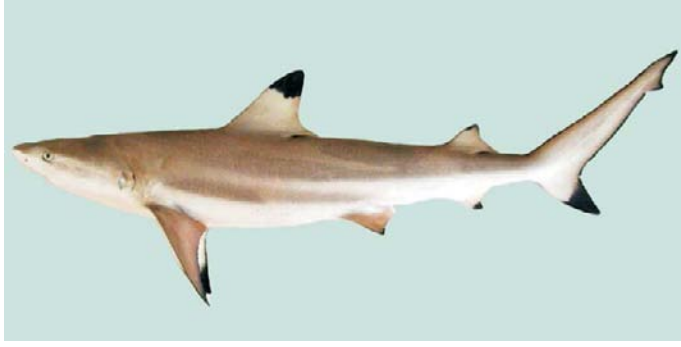


33. CARCHARHINIDAE: ***Carcharhinus limbatus*** (juvenile)

34. CARCHARHINIDAE: ***Carcharhinus limbatus*** (juvenile)

35. CARCHARHINIDAE: ***Carcharhinus sorrah***

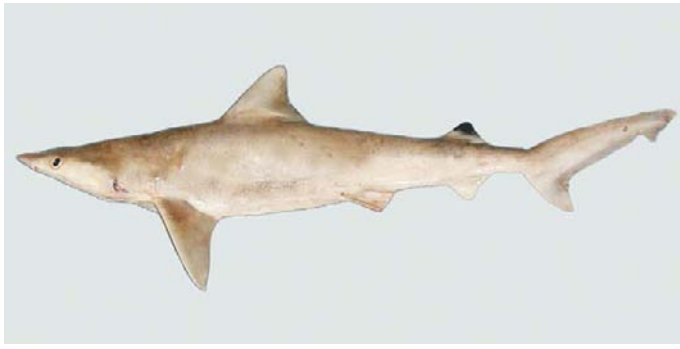
36. CARCHARHINIDAE: ***Carcharhinus sorrah***



37. CARCHARHINIDAE: ***Carcharhinus melanopterus***

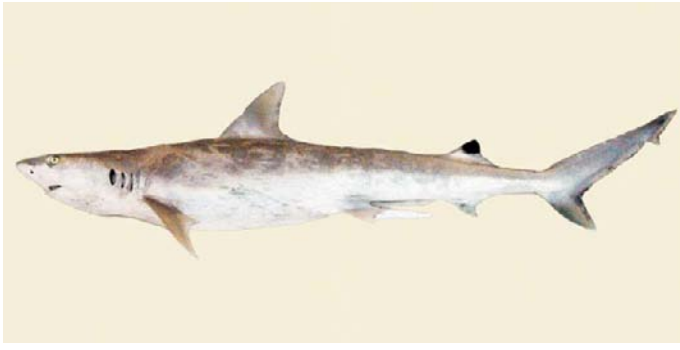
38. CARCHARHINIDAE: ***Carcharhinus melanopterus***

PLATE VI



39. CARCHARHINIDAE: ***Carcharhinus dussumieri***

40. CARCHARHINIDAE:
Carcharhinus dussumieri



41. CARCHARHINIDAE: ***Carcharhinus sealei***

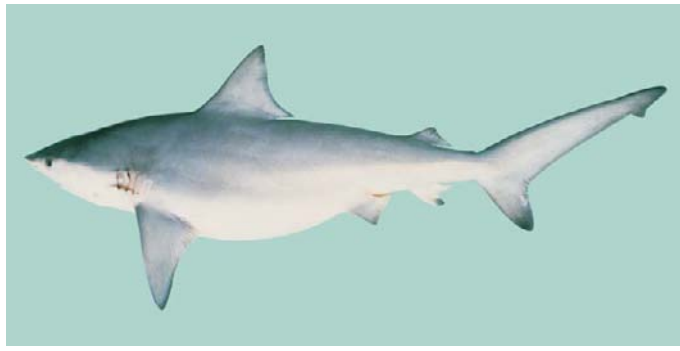
42. CARCHARHINIDAE:
Carcharhinus sealei

43. CARCHARHINIDAE: ***Carcharhinus falciformis***

45. CARCHARHINIDAE:
Carcharhinus falciformis

44. CARCHARHINIDAE: ***Carcharhinus falciformis***
(juvenile)

PLATE VII



46. CARCHARHINIDAE: ***Carcharhinus amboinensis***

47. CARCHARHINIDAE: ***Carcharhinus leucas***
(adult)

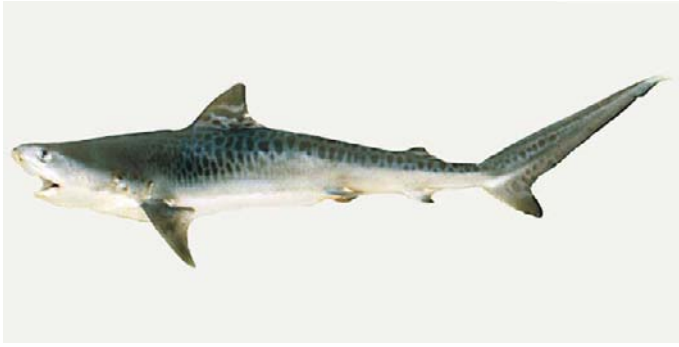
49. CARCHARHINIDAE:
Carcharhinus leucas

48. CARCHARHINIDAE: ***Carcharhinus leucas***
(newborn)

50. CARCHARHINIDAE: ***Carcharhinus longimanus***
(juvenile)

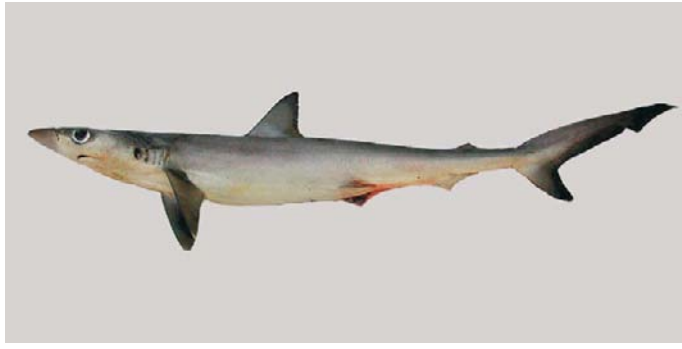
51. CARCHARHINIDAE:
Carcharhinus longimanus
(juvenile)

PLATE VIII



52. CARCHARHINIDAE ***Galeocerdo cuvier*** (juvenile)

53. CARCHARHINIDAE: ***Galeocerdo cuvier*** (juvenile)

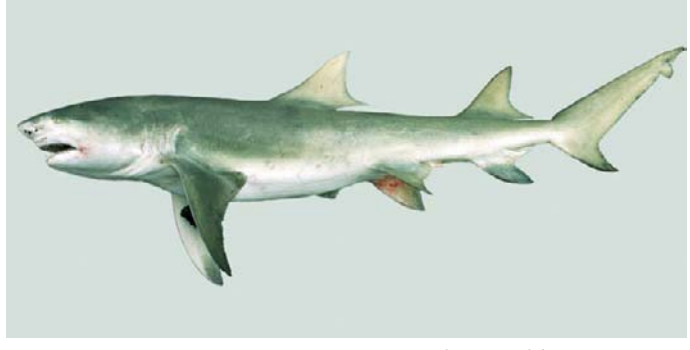


54. CARCHARHINIDAE ***Loxodon macrorhinus***

55. CARCHARHINIDAE: ***Loxodon macrorhinus***

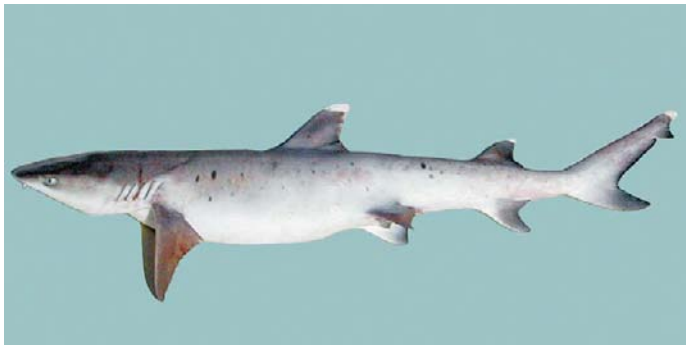
56. CARCHARHINIDAE: ***Rhizoprionodon acutus***

57. CARCHARHINIDAE: ***Rhizoprionodon acutus***



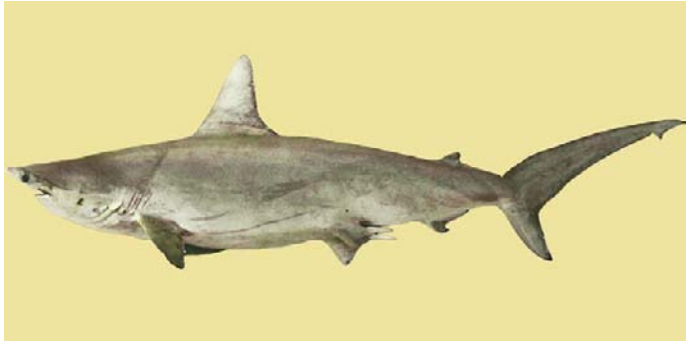
58. CARCHARHINIDAE: ***Negaprion acutidens***

PLATE IX



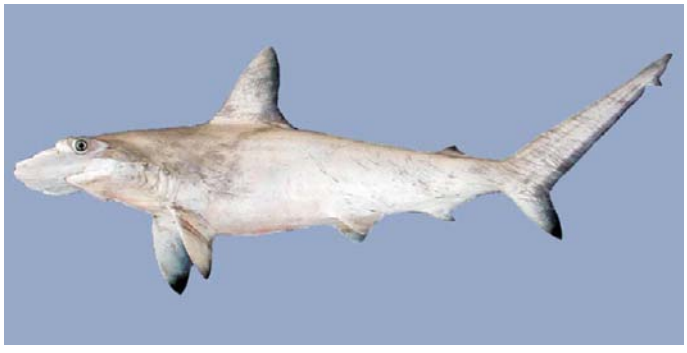
59. CARCHARHINIDAE: ***Triaenodon obesus***

60. CARCHARHINIDAE:
Triaenodon obesus



61. SPHYRNIDAE: ***Sphyrna lewini***

62. SPHYRNIDAE:
Sphyrna lewini



63. SPHYRNIDAE: ***Sphyrna lewini***
(juvenile)

64. SPHYRNIDAE:
Sphyrna lewini
(juvenile)

65. SPHYRNIDAE: ***Sphyrna mokarran***

66. SPHYRNIDAE:
Sphyrna mokarran

PLATE X

67. NARKIDAE: ***Heteronarce bentuviai***

68. TORPEDINIDAE: ***Torpedo panthera***

69. RHINOBATIDAE: ***Rhinobatos halavi***

70. RHINOBATIDAE: ***Rhinobatos punctifer***

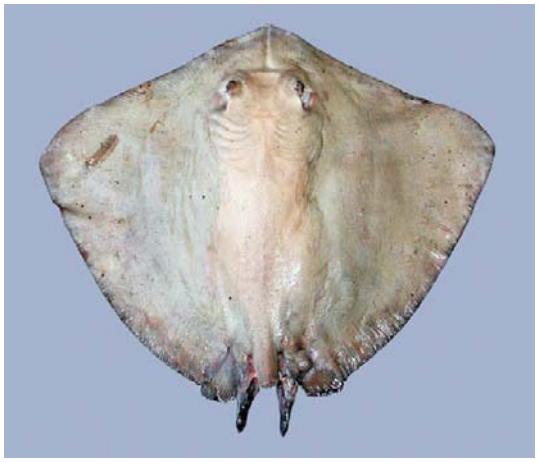
71. RHINOBATIDAE: ***Rhinobatos salalah***

72. RHINOBATIDAE: ***Rhinobatos thouin***

73. RHYNCHOBATIDAE: ***Rhina ancylostoma***

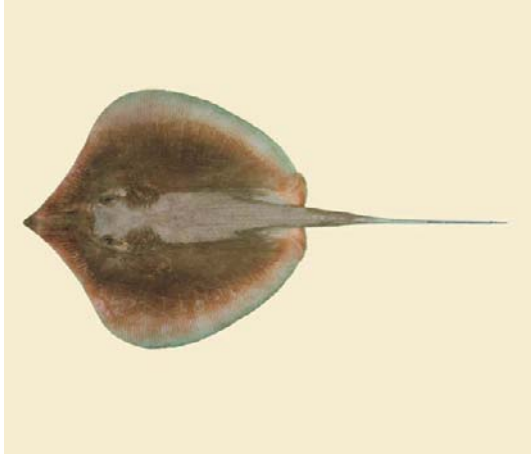
74. RHYNCHOBATIDAE: ***Rhynchobatus djiddensis***

PLATE XI

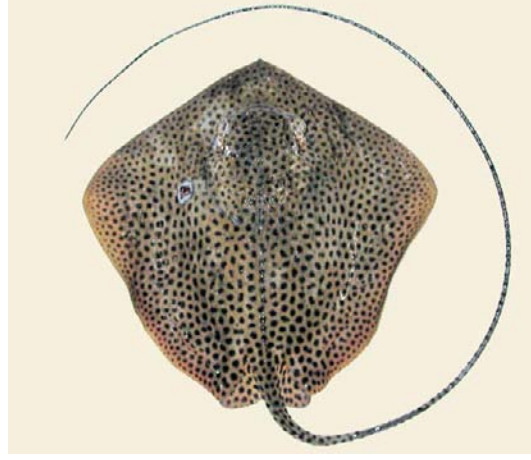


75. DASYATIDAE: ***Himantura fai***
(tail missing)

76. DASYATIDAE: ***Himantura gerrardi***



77. DASYATIDAE: ***Himantura imbricata***



78. DASYATIDAE: ***Himantura uarnak***

79. DASYATIDAE: ***Pastinachus sephen***

80. DASYATIDAE: ***Dasyatis kuhlii***

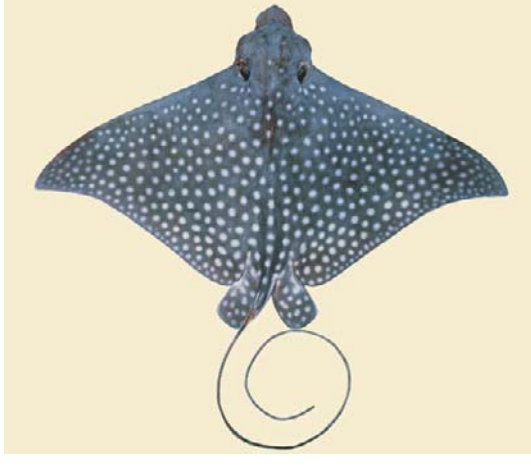
PLATE XII

81. DASYATIDAE: ***Taeniura lymma***

82. DASYATIDAE: ***Taeniura meyeni***
(tail missing)

83. DASYATIDAE: ***Urogymnus asperrimus***

84. GYMNURIDAE: ***Gymnura poecilura***



85. MYLIOBATIDAE: ***Aetobatus narinari***

86. RHINOPTERIDAE: ***Rhinoptera javanica***