

A note on Elasmobranches (sharks and rays) of UAE and Musandam, Oman, with special mention of Bowmouth Guitarfish or Shark Ray (*Rhina ancylostoma*)

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Introduction

There are over 1,000 species of Chondrichthyans (cartilaginous fish) including Elasmobranches: the sharks (c. 400 species, not all described) and batoid fish (including skates, stingrays, guitarfishes and sawfishes – c. 600 species, not all described), and Holocephales: chimaeroid fish (c. 30+ species, poorly known with confused taxonomy) in the world (Camhi *et al.* 1998). Sharks and their relatives have lived for over 450 million years. The now extinct Megalodon (*Carcharodon megalodon*), a giant prehistoric shark, which lived between 16 and 1.6 million years ago, is the biggest known carnivorous fish to have ever lived. Because of its cartilaginous skeleton, no fossil of Megalodon has thus far been found, and it is only known from its teeth, up to 17 cm long. The reproduction of its jaws, based on some of the largest teeth, suggests that the Megalodon could grow to a length around 13 to 16 metres and an approximate mass of 48 tonnes. Sharks, like apex predators on land, play an important role in the structure and functioning of marine communities, and as such, are a part of a healthy marine ecosystem (Camhi *et al.* 1998, Compagno *et al.* 2005).

Folktales from UAE pearl divers mention isolated attacks by sharks in the Arabian Gulf but jellyfish or barracuda were considered more dangerous. Regularly, local press reports (i.e. Gulf News 30 May 2007:

<http://archive.gulfnews.com/articles/07/05/30/10128732.html>) of shark sightings in UAE waters provoke excitement, a mix of fascination and fear, imprinted in our minds since the release in the seventies of the movie “Jaws” about shark attacks on Amity Island, a quiet summer resort town on the east coast of the USA.

However, except for a single article from Brown (1992) published in *Tribulus*, a rough compilation in Hellyer and Aspinall (2005), and field guides referring to Oman coastal waters (Randall 1995, Field 2005) or the Arabian Peninsula in general (Carpenter *et al.* 1997), there has been little information published on Chondrichthyans inhabiting UAE waters.

Based on this scarce published literature, the official website “UAE Interact” (<http://www.uaeinteract.com>) supported by The National Media Council, and unpublished reports from the Environment Agency-Abu Dhabi (EAD), Emirates Marine Environment Group (EMEG) and local deep sea fishing companies (Ocean Active Ltd.), there should be at least 45 different species of sharks, guitarfish and rays present in the waters of the Arabian Gulf and off the Eastern Coast of UAE (**Table 1**). For those who are not fishermen or divers, fishmarkets and harbour docks are often the only place where you can admire these particular fish (**Figure 1**).

On 7th August 2007, while offloading diving equipment from a diving trip, we easily identified a female Tiger Shark (*Galeocerdo cuvier*) of 225 cm total length (from tip of the snout to tip of the tail measured with a ruban meter) laying on the docks of Dibba-Fujairah port (**Figure 2**). As one of the most widespread species of sharks in temperate and tropical waters in the world, the Tiger Shark has already been reported from UAE waters (Hellyer and Aspinall 2005).

It is mostly considered a coastal species, found from near the surface to depths of 140 m, occurring on, or adjacent to, continental and insular shelves, frequenting river estuaries, harbours, coral atolls and lagoons (Compagno 1984a). Mostly nocturnal, their diet is quite eclectic, ranging from fish to seabirds and rubbish. They are considered potentially harmful to humans, responsible for fatal attacks on people but often unaggressive when encountered underwater (Compagno *et al.* 2005). This species is classified as “Near Threatened” by the World Conservation Union (IUCN), caught in target and non-target fisheries (Simpfendorfer 2000). Tiger Sharks from the Arabian Gulf and Oman Sea are said to reach up to 750 cm total length (Assadi and Dehghani 1997). We were told by fishermen that an individual of 6 m had been caught in the same waters the week before the Dibba-Fujairah specimen noted above.



Figure 1. Sharks for sale in the Dubai fishmarket, January 2007. Black-tipped pectoral fins of the hammerhead shark in the back indicates probably a Scalloped Hammerhead (*Sphyrna lewini*). Photo C. Manini.

Table 1. Elasmobranches (sharks and rays) of UAE and Musandam. Names follow the latest FAO and IUCN Shark specialist Group nomenclature (Carpenter et al. 1997, Bonfil and Abdallah 2004, Compagno et al. 2005). 1: Field (2005), 2: Hellyer and Aspinall (2005), 3: UAE interact: (<http://www.uaeinteract.com/nature/marine>), 4: Ocean Active Ltd (pers. com.), 5: Emirates Marine Environment Group (pers. com.), 6: Brown (1992), 7: EAD (unpublished), 8: this study.

Family	Scientific name	Common name	Source
STEGOSTOMATIDAE	<i>Segostoma fasciatum</i>	Zebra Shark	1,4
RHINCODONTIDAE	<i>Rhincodon typus</i>	Whale Shark	2,4,5,6
HEMISCYLLIDAE	<i>Chiloscyllium arabicum</i>	Bamboo Shark	2,4,7
	<i>Chiloscyllium griseum</i>	Grey bambooshark	7
LAMNIDAE	<i>Carcharodon carcharias</i>	White Shark	5
	<i>Isurus oxyrinchus</i>	Shortfin Mako	3?,4
TRIAKIDAE	<i>Hypogaleus hyugaensis</i>	Blacktip Tope	3(*)
	<i>Mustelus mosis</i>	Arabian smooth Houndshark	7
HEMIGALIDAE	<i>Hemigaleus macrostoma</i>	Hootooth Shark	3
CARCHARHINIDAE	<i>Carcharhinus sealei</i>	Blackspot Shark	3
	<i>Carcharhinus dussumieri</i>	Whitecheek Shark	3,7
	<i>Carcharhinus plumbeus</i>	Whaler Shark	3,7
	<i>Carcharhinus brevipinna</i>	Spinner Shark	3,4,8
	<i>Carcharhinus limbatus</i>	Blacktip Shark	3,4,7
	<i>Carcharhinus sorrah</i>	Spottail Shark	2,3?
	<i>Carcharhinus amblyrhynchos</i>	Grey Reef Shark	1
	<i>Carcharhinus melanopterus</i>	Blacktip Reef Shark	1,2,3,4,7
	<i>Carcharhinus leucas</i>	Bull Shark	2,4,5,7
	<i>Galeocerdo cuvier</i>	Tiger Shark	2,3,4,5,8
	<i>Rhizoprionodon acutus</i>	Milk shark	4,7
	<i>Rhizoprionodon oligolinx</i>	Grey sharpnose shark	7
	<i>Negaprion acutidens</i>	Sicklefin Lemon Shark	3?
	<i>Scoliodon laticaudus</i>	Spadenose shark	7
SPHYRNIDAE	<i>Eusphyrna blochii</i>	Winghead shark	7
	<i>Sphyrna mokarran</i>	Great Hammerhead	3,5
	<i>Sphyrna lewini</i>	Scalloped Hammerhead	2,4,5
PRISTIDAE	<i>Anoxypristis cuspidata</i>	Narrow/Knifetooth Sawfish	2,5
	<i>Pristis zijsron</i>	Longcomb/Green Sawfish	2,5
TORPEDINIDAE	<i>Torpedo panthera</i>	Panther Electric Ray	1,3,7
	<i>Torpedo sinuspersici</i>	Marbled Electric Ray	1,4
RHINOBATIDAE	<i>Rhina ancylostoma</i>	Bowmouth Guitarfish	8
	<i>Rhinobatos granulatus</i>	Sharpnose Guitarfish	2,3,7
RHYNCHOBATIDAE	<i>Rhynchobatus djiddensis</i>	Giant Guitarfish	2,7
DASYATIDAE	<i>Himantura gerrardi</i>	White-spotted Whipray	2
	<i>Himantura uarnak</i>	Reticulate Whipray	1,2,3
	<i>Himantura jenkinsii</i>	Pointed-nose Stingray	1
	<i>Himantura imbricate</i>	Scaly Whipray	7
	<i>Taeniura meyeni</i>	Blotched Fantail Ray	1,3,7
	<i>Pastinachus sephen</i>	Cowtail Stingray	1,4,7
	<i>Dasyatis kuhlii</i>	Spotted Stingray	3,4
GYMNURIDAE	<i>Gymnura poecilura</i>	Longtail Butterfly Ray	7
MYLIOBATIDAE	<i>Aetomyleus nichofii</i>	Banded Eagle Ray	2,3,7
	<i>Aetobatus narinari</i>	Spotted Eagle Ray	2,3,4,7
	<i>Rhinoptera javanica</i>	Javanese Cownose Ray	3
MOBULIDAE	<i>Manta birostris</i>	Giant Manta	1,4

(*) cited as "Grey reef shark (*Hypogaleus balfouri*)"



Figure 2. Female Tiger Shark (*Galeocerdo cuvier*) caught by UAE fishermen offshore Dibba and landed in Dibba-Oman port on 8th August 2007. Note the broad, bluntly rounded snout and the vertical dark grey bars and spots on the flanks and back. A one dirham coin was added as comparison. Photo M. K. Shuriqi.



Figure 3. One of the three Spinner Shark (*Carcharhinus brevipinna*) caught by UAE fishermen offshore and landed in Dibba-Fujairah port on 8th August 2007. Note the dark grey/black-tipped pectoral and dorsal fins, the narrow pointed snout. Photo M. K. Shuriqi.



Figure 4 (above). Bowmouth Guitarfish or Shark Ray (*Rhina ancylostoma*) caught by Omani fishermen in the Musandam Peninsula (Hormuz Straits) and landed in Dibba-Oman port on 8th August 2007. The white 43 sized flip-flop is used as scale. Note the pectoral fins attached to the head and not overlapping pelvic fins as in Angelsharks (Squatinidae). Photo C. Tourenq.

Figure. 5 (right). Details of the head of the Bowmouth Guitarfish or Shark Ray (*Rhina ancylostoma*) caught by Omani fishermen in the Musandam Peninsula (Hormuz Strait) landed in Dibba-Oman port on 8th August 2007. Note the prominent spiracles behind the eyes and the three rows of spines. Photo C. Tourenq.



Figure 6. (below) Ventral view of Bowmouth Guitarfish landed in Dibba-Oman port on 8th August 2007. Note the gills at the intersection of the pectoral fins and the head, the nostrils with incurrent and excurrent apertures above the mouth with ridged jaws and crushing teeth in undulating rows. Photo S. Lebon.



Along with the Tiger Shark, we also saw at Dibba-Fujairah port on 7th August 2007 three female Spinner Shark (*Carcharhinus brevipinna*) of 220 cm each (**Figure 3**). The Spinner Shark is a slender shark, grey above, white below, with a white band on its flanks, often not conspicuous, and with a long, narrow, pointed snout, long gill slits and small, narrow-cusped teeth. The first dorsal fin is usually small, there is no interdorsal ridge and the labial furrows longer than in any other grey shark (Compagno 1984a). Young Spinner Shark individuals are plain-finned, but large juveniles to adults show black tips usually on the pectorals, second dorsal, anal and ventral caudal lobe, and sometimes on pelvics, first dorsal and dorsal caudal lobe (Compagno *et al.* 2005). The absence of an interdorsal ridge prevents confusion with the Spot-tail Shark (*Carcharhinus sorrah*) and the origin of the first dorsal fin behind the rear tip of the pectoral fin prevents confusion with the very similar Blacktip Shark (*Carcharhinus limbatus*), both species said to be present in UAE waters and the region (Carpenter *et al.* 1997, Bonfil and Abdallah 2004, Hellyer and Aspinall 2005).

The Spinner Shark is a common coastal-pelagic shark species of the continental and insular shelves in, near and offshore warm-temperate, subtropical and tropical shallow waters, from a depth less than 30 m to at least 75 m. It forms schools and feeds mainly on pelagic bony fishes, also small sharks and copepods. The name Spinner comes from its vertical spinning leap out of the water as a feeding technique or when caught by the line. This species is classified worldwide as “*Lower Risk/near threatened*” by the IUCN and is frequently captured in recreational and commercial fisheries, its meat being valuable and its fins marketable (Burgess 2000). However, because it frequents nearshore waters as adults, and inshore areas as juveniles, the Spinner Shark is highly vulnerable to fishing pressure and human-induced habitat alteration. As a consequence, the northwest Atlantic subpopulation of the Spinner Shark was classified as endangered and the species as “*Vulnerable*” in this part of the world (Burgess 2000). Spinner Sharks are amongst the most common sharks caught by deep sea sport-fishermen offshore of Musandam and in the Gulf (N. Bowles, *pers. comm.*).

On 8th of August 2007, one of us (C. Chellapermal) alerted other authors to the presence of a strange “shark” for sale by local fishermen on the docks of Dibba-Oman port. We were among several witnesses to see this “shark” that did not resemble any other fish species that we knew (**Figure 4**). It was a female, measuring a total length of 180 cm, with a broad, rounded snout, two dorsal fins of which the first being above the pelvic fins, large high pectoral fins, and remarkable ridges of spiky thorns over the eyes and on the back and shoulders. Its colour was olive-grey above with numerous white spots on fins, upper body and tail, and white below. A faded black band could be seen between the two prominent spiracles behind the eyes (**Figure 5**). Our first impression

was that it was a species of “Angelshark” (Squatinaidae). But, unlike most of Angelsharks, its pectoral and pelvic fins were not overlapping and its gills were located at the insertion of the pectoral fins to the head. Its mouth with teeth in undulating rows was situated well behind the snout, indicating bottom-dwelling feeding habits (**Figure 6**). After consultation of published references (Compagno 1894b, Frimodt 1995, Randall 1995, Assadi and Dehghani 1997, Carpenter *et al.* 1997, Bonfil and Abdallah 2004, Compagno *et al.* 2005, Field 2005, Hellyer and Aspinall 2005) and the recognised scientific online source “FishBase” (Froese and Pauly 2007), we quickly identified the “shark” as a Bowmouth Guitarfish or Shark Ray (*Rhina ancylostoma*).

The Bowmouth Guitarfish inhabits coastal areas, and coral reefs close inshore. Even though it can be found sometimes in the water column, it is mostly a benthic species that lives on sand and mud sea bottoms where it feeds mainly on bottom crustaceans and molluscs (Compagno and Last 1999, Michael 1993). Its heavily ridged jaws with teeth in undulating rows are used to crush the hard shell of its preys (Compagno *et al.* 1989). Because of the rows of large spines present above the eye, on the centre of the nape, and on the shoulder that might have a defensive function, this guitarfish is difficult to handle and can damage the catch when caught in trawls (Compagno and Last 1999). Its distribution in the Indo-West Pacific ranges from the Red Sea and East Africa to Papua New Guinea, north to Japan, to south to New South Wales, Australia (Compagno and Last 1999, Bonfil and Abdallah 2004).

Being taken as by-catch of demersal trawl fisheries, this species is classified as “*Vulnerable*” by IUCN (McAuley and Compagno 2003) and is said to be rare in the region and even absent from the published local fish fauna lists (Randall 1995, Carpenter *et al.* 1997, Field 2005, Hellyer and Aspinall 2005). When interviewed, Omani fishermen said that they caught some individuals time to time with their lines and that only the fins are used for human consumption.

An urgent need for the study and conservation of sharks and rays in the UAE.

Since the sharks at Dibba-Fujairah were quickly sold, we unfortunately could not take any other pictures, nor take a sample for DNA analysis or other measurement. It should be mentioned that the species described above are all classified as endangered by the IUCN (IUCN 2006). Because of their particular biology (*i.e.* slow growth, long maturity, high longevity but low fecundity) and ecology (selective food, segregation of breeding and feeding grounds), sharks and rays are very sensitive to overfishing, and albeit not targeted *per se*, they form a significant part of the by-catch from commercial fisheries (Camhi *et al.* 1998, Pauly *et al.* 2005).

Populations of Elasmobranches are declining worldwide and some of them are already at the brink of extinction (Camhi *et al.* 1998, Baum *et al.* 2003, Myers and Worm 2003, Pauly *et al.* 2005).

In the UAE, the Whale Shark (*Rhincodon typus*) is the only Elasmobranch species protected by the law under the CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) as listed in the Appendix II of the convention (*trade in specimens of such species subject to strict regulation in order to avoid utilization incompatible with their survival*). Catching and trading sharks (and rays) is thus legal in the UAE, and Oman, the latter being not yet being a signatory of the CITES convention. However absence of trawl-net practices reduces the risk for these species in UAE and Omani territorial waters. Most of the shark parts are suitable for consumption, although the carcass is often discarded because of the high price for fins (E. Grandcourt, *pers. comm*). Whereas it is not rare to see at the bottom of the sea in some parts of the world finned dead or dying sharks that have been thrown back alive into the sea, finning (the cutting of fins from live sharks) is strictly prohibited by UAE and Omani laws, as is bringing shark fins to shore separate from the body (Al-Janahi and Cherian 2007), although one of the authors (CT) observed shark fins drying on the deck of dhows mooring at Sharjah Port in February 2002. Nevertheless, whereas in the past, they were considered a non-commercial or low value item of the catch, sharks have been more and more targeted in UAE waters (as is the case worldwide) because of the increasing value of their fins on the Asian market.

Data from the recent fish resource assessment in UAE Waters by EAD-Abu Dhabi and Shallard & Associates (2003) suggest a seasonal pattern in the catch of some species of sharks and rays (EAD, unpublished data). Seasonal gatherings of Sphyrnidae (hammerhead sharks) and other shark species in the Hormuz Strait and Arabian Gulf are regularly reported by divers and professional fishermen (Algate, Bowles, and Al Suwaidi, *pers. comm.*). We do not know if the fact that the pelagic sharks observed (*G. cuvier* and *C. brevipinna*) were all females measuring the same size suggests the occurrence of seasonal movements with a seasonal and/or spatial segregation of populations in this region.

A segregation of the populations by sex (adult males vs females) and/or age (neonates and juveniles) in different geographic areas and habitats has been observed for other species of sharks. For example, the blue shark (*Prionace glauca*) is a highly migratory species, with complex movement patterns related to reproduction (with a segregation of the population by age and sex for much of the year) and the distribution of prey. Trans-Atlantic and Trans-Pacific migrations have been demonstrated from tagging studies, showing movements of up to 4,000 km annually. Pupping takes place in offshore nursery areas in the Mediterranean and off Portugal in the Atlantic, and in the sub-Arctic boundary of the Pacific, where there is a large prey biomass for the juveniles. Juvenile blue sharks remain in these nursery areas and do not take part in the extensive adult migrations until they reach a length of 1.30m. (Camhi *et al.* 1998, Compagno *et al.* 2005). Such segregation of populations by age and sex is already known in *C. brevipinna* (Compagno 1984a, Compagno *et al.* 2005). Therefore, we can not exclude the possibility

that the Arabian Sea could be an area of primary conservation interest for these species, and perhaps for other Elasmobranchs in general.

A systematic compilation and collection of data on sex, age and date of Elasmobranchs observation/capture in the whole country would be a first step for a proper conservation of shark and rays populations in the Arabian Gulf and the Arabian Sea / Gulf of Oman. For some species, like the Bowmouth Guitarfish, nothing is known of their biology and they may well disappear before we reach an understanding of their reproductive cycle and ecology that will permit the proposing of stock management solutions. And for a healthy sea, we need healthy teeth...

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