SHARK EXPLOITATION AND CONSERVATION IN SYRIA

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Abstract

Sharks are vulnerable to over fishing because they are long-lived, take many years to mature, and only have a few youngs at a time. To provide protection and rebuild and maintain sustainable shark fisheries, the Laboratory of Marines Sciences at Tishreen University has been conducting since 2001 a research program on shark monitoring, distribution and exploitation off the Syrian coast.

Data collection programs, permitting and reporting requirements, identification of essential fish habitat, by-catch reduction of sharks in all fisheries, and promoting safety at sea for shark fishermen.

Thirty-nine cartilaginous fish species including 22 shark species have been recorded in the Mediterranean Syrian water. Some of these species are commercially important and have been exploited over the ages as target species or bycatch, while others are rare or very rare, and therefore have not been recorded on a regular basis. Due to the negative impact of irresponsible fisheries on sharks, a decline of some shark populations has been observed. The aim of this paper is to present the status of sharks in the Mediterranean coast of Syria and to propose some measures for their conservation and better management of their exploitation.

Key words: Sharks, exploitation, conservation, Mediterranean, Syria.

Introduction

Cartilaginous fishes off the Syrian coast have not been studied systematically as yet. Only one work was realized during the last century (GRUVEL, 1931) in which was reported the presence of 15 species of Chondrichthiyes in Syrian Coast . Recently ALI and SAAD (2003) reported 22 species, and SAAD *et. al* (2004) presented a commented list of 37 Chondrichiteyes species living in Syrian coast.

Despite the sharks and rays constitute important resources within Syrian fisheries, there is a lack of information on the landings and on the biology, distribution and abundance of their populations in Syrian waters.

As a result, the Marine Sciences Laboratory (MSL) at the Faculty of Agriculture, Tishreen University have undertaken a research programme on these fishes, its objectives are:

-Inventory of cartilaginous fish species living in the Syrian coast (Eastern Mediterraneansea)
- Identification and determination of catch composition of cartilaginous fish
- Study of exploitation level of shark fish
- Determination of threats to the cartilaginous fish stock

The purpose of this work is to present a preliminary field survey of the cartilaginous fish study and their exploitation state of the Syrian coast

Materials and Methods

The area investigated is situated between the border of Turkey (in North) and border of Lebanon (in south), to a depth of 25 to 1800 m; its about 180 x 20 = 3600 square km.

Samples were obtained by fishing with long- line and trawl (some time by beach seine) during 2001-2004 in the Syrian waters. The main line, firm braided nylon rope, 4.7 mm in diam., was held to the bottom by weights distributed along its length and anchored by a 30-50 kg iron sinker. Every 5-10 m a 1.2 mm diam., monofilament branch, 100-150 cm long, was attached to the main-line by a snap-on connector and swivel. The hooks were ringed no.6, 7 and 8 or Mustad tuna circle hooks no. 8 and 9, and were connected to the branches by 10 cm-long. 1 mm diam.stainless steel wire, in order to prevent sharks from cutting the branchline. The bait consisted primarily of Sparidae (*Boops boops, Diplodus* sp., *Pagellus* sp., *Lithognathus mormyrus* ect.)

Mesurments and counts follow COMPAGNO (1984), WHITEHEAD *et al.* 1984, FISCHER *et al.* (1987), GOLANI (1987), and NELSON (1994). All measurement and calculation refer to total length (TL). The following parameters were recorded in landing place or in laboratory (for the small specimens), for each individual of fish: total weight, total length, sex and stage of maturity. In particular the maturity of males can be easily and best defined from the state of development of the mixopterygia.

Maturity of females must be determined by internal examination. The described specimens have been deposited in the Laboratory of Marine Sciences- Faculty of Agriculture at Tishreen University, Fish collection (MLS).

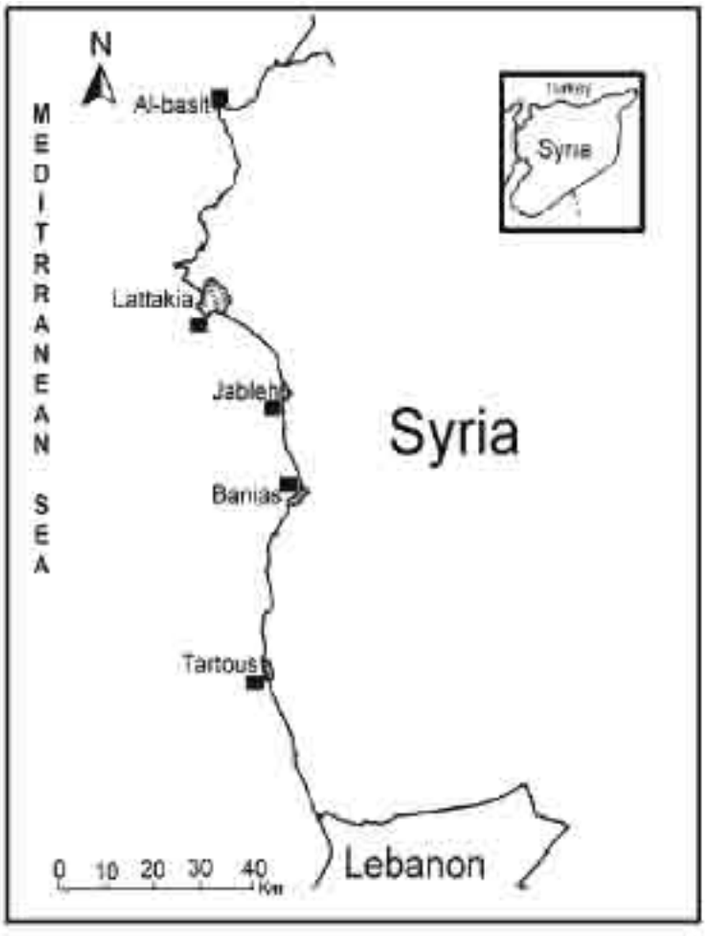

Figure 1. Area of study on the Syrian coast: ■ = places of fish landing and sampling

Results and Discussion

At present, sharks and rays comprise 39 species in Mediterranean Syrian coast (Table1) and represent 14.9 % of total marine species number and 3.4% of total marine catch in weight (ALI, 2003), whereby most of them have a slow growth rate, late sexual maturity and a low number of eggs or offspring.

Such characteristics reflect a low increase in population size, combined with a strong susceptibility to every type of fishing. Managing their populations is thus indispensable, but unfortunately, the majority of the fisheries which have developed worldwide do not give this any consideration.

In addition, many of the large-sized shark and ray species demonstrate extensive migration behavior, making it just as imperative that national and international agreements are established to regulate their management.

Authorities concerned must give high priority to the management of sharks and rays because these animals with their slow population growth rates are very susceptible to overfishing and hence collapse of their populations (CASTRO *et al.*, 1999).

The data obtained in this study have discovered for first time the presence of *Torpedo* (*Torpedo*) *simuspersici* Olfers, 1831 (SAAD *et al.*, 2004) and confirmed the presence of *Dalatias licha* in the eastern Mediterranean, as observed by GILAT and GELMAN (1984). However, in the present study, the use of long-lining scatter baits made them more accessible to smaller species.

Some other aspects, such as the presence of recruits both between 200 and 400 m and between 400 and 650 m, a greater percentage of mature individuals in the mesobathyal than in epibathyal and homoeothermic condition in the bathyal environment of Mediterranean, indicate, in our opinion, that the reproduction occurs at the lowest depths at which the species is found. In the first years of life, *Galeus melastomus* is distributed on a wide bathemtric bathyal slope, probably because of the different feeding requirements of the young compared to those of the adult (QUIGNARD and TOMASINI, 2000) and , successively, it moves to greater depths investigated, reproducing and concluding its life cycle.

Further studies and collection of fish in the bathyal of Syrian marine waters are necessary to increase our knowledge and understanding of the deep–water ichthyofauna in this region.

Table 1. List of Cartilaginous fish species recorded in the Syrian coast (present work) and reported by GRUVEL (1931).

Taxons	Gruvel 1931	Present work
Sharks		
HEXANCHIDAE		
Hexanchus griseus (Bonnaterre, 1788)		*
Heptranchias perlo (Bonnaterre, 1788)		*
SQUALIDAE		
Squalus acanthias Linnaeus, 1758	+	
Squalus blainvillei (Risso, 1826)		*
Squalus sp. cf. *megalops*		*
CENTROPHORIDAE		
Centrophorus granulosus (Bloch & Schn., 1801)	+	*
Centrophorus sp. cf. *uyato* (Rafinesque, 1809)		*
Centrophorus sp.		*
SOMNIOSIDAE		
Somniosus rostratus (Risso, 1810)		*
OXYNOTIDAE		
Oxynotus centrina (Linnaeus, 1758)		*
DALATIIDAE		
Dalatias licha (Bonnatere, 1788)		*
SQUATINIDAE		
Squatina aculeata Duméril in Cuvier, 1817		*

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Centrophorus sp. cf. *uyato* (Rafinesque, 1809)		*
Centrophorus sp.		*
SOMNIOSIDAE		
Somniosus rostratus (Risso, 1810)		*
OXYNOTIDAE		
Oxynotus centrina (Linnaeus, 1758)		*
DALATIIDAE		
Dalatias licha (Bonnatere, 1788)		*
SQUATINIDAE		
Squatina aculeata Duméril in Cuvier, 1817		*

Table 1. (Cont.)		
Squatina oculata Bonaparte, 1840		*
Squatina squatina (Linnaeus, 1758)	+	*
ALOPIIDAE		
Alopias superciliosus (Lowe, 1839)		*
LAMNIDAE		
Isurus oxyrinchus Rafinesque, 1810		*
SCYLIORHINIDAE		
Galeus melastomus Rafinesque, 1810		*
Scyliorhinus canicula (Linnaeus, 1758)	+	*
Scyliorhinus stellaris (Linnaeus, 1758)	+	
TRIAKIDAE		
Mustelus mustelus (Linnaeus, 1758)	+	*
Mustelus punctulatus Risso, 1826		*
CARCHARHINIDAE		
Carcharhinus obscurus (Lesueur, 1818)		*
Carcharhinus plumbeus (Nardo, 1827)		*
SPHYRNIDAE		
Sphyrna zygaena (Linnaeus, 1758)	+	*
RYS		
PRISTIDAE		
Pristis pectinata Latham, 1794	+	
RHINOBATIDAE		
Rhinobatos cemiculus Geof. St Hilaire, 1817 G. St Hilaire, 1817		*
Rhinobatos rhinobatos (Linnaeus, 1758)		*
TORPEDINIDAE		
Torpedo (Tetronarce) nobiliana Bonaparte, 1835		*
Torpedo (Torpedo) marmorata Risso, 1810	+	*
Torpedo (Torpedo) sinuspersici Olfers, 1831		*
Torpedo (Torpedo) torpedo (Linnaeus, 1758)	+	
RAJIDAE		
Dipturus oxyrhynchus (Linnaeus, 1758)		*
Raja clavata Linnaeus, 1758	+	*
Raja miraletus Linnaeus, 1758	+	*
Raja montagui Fowler, 1910		
Raja radula Delaroche, 1809		*
DASYATIDAE		
Dasyatis pastinaca (Linaeus, 1758)	+	*
Dasyatis sp. cf. *tortonesei* Capapé, 1977		*
Pteroplatytrygon violacea (Bonaparte, 1832)		*
GYMNURIDAE		

Table 1. (Cont.)		
Gymnura altavela (Linnaeus, 1758)		+
MYLIOBATIDAE		
Myliobatis aquila (Linnaeus, 1758)	+	
Pteromylaeus bovinus (Geof. St Hilaire, 1817)		+
RHINOPTERIDAE		
Rhinoptera marginata (Geof. St. Hilaire, 1817)		+
MOBULIDAE		
Mobula mobular (Bonnatere, 1788)		+
CHIMERA		
CHIMAERIDAE		
Chimaera monstrosa Linnaeus, 1758	+	+
Total number of Shark species	7	22
Total nuber of Rays species	7	16
Total nuber of Chemera species	1	1
Total number of Condrichthuas species	15	39

Exploitation

The Chondrichthyes species found at present in the Syrian marine waters can be divided to three groups according to its economical importance:

Very economically important species being caught in plentiful quantities and highly consumable: *Carcharhinus plumbeus, Mustelus mustelus Centrophorus uyato, Rhinobatos cemiculus, Hexanchus griseus, Squalus* sp.cf. *blanvllei,*

Moderate economically important species either for being caught in little quantities with high efforts in fishing, or for their little demand for human consumption, or may be both reasons: *Heptranchias perlo, Isurus oxyrinchus, Alopias superciliosus, Carcharhinus obscurus,Dalatias licha, Somniosus rostratus, Squatina squatina, Squatina oculata, Squatina aculata, Rhinobatos rhinobatos, Torpedo marmorata, torpedo nobiliana Raja oxyrinchus, Raja clavata,Raja radula, Dasyatias* sp. cf. *tortonesei, Dasyatis violacea, Centrophorus granulosus, Centrophorus moluccensis, Squalus megalops, Gymnura altavela, Pteromylaeus bovinus, Mobula mobular.*

Not economically important species with no demand for human consumption or caught in little quantities: *Galeus melastomus, Scyliorhinus canicula Oxynotus centrina, Torpedo* sp. cf. *sinuspersici ,Chimaera monstrosa,Centrophorus acus.*

The total fishing quantity of Chondrichthyes during 2002 amounted to 13020 fish, with a total weight of / 85.6 / Tons (ALI, 2003)

Further studies elasmobranches of Syrian marine water are necessary to evaluate with precision the commercial importance of sharks and rays in the marine fisheries and to propose the adequate methods for conservation.

References

ALI, M., 2003. Systematic and Econonical Study of Cartilaginous fish in Syrian marine waters, MSc Thesis, Tishreen University, pp 64 (in Arabic with Summary in English).

ALI, M., SAAD, A., 2003. Sharks nand Rays in Syrian Sae waters. *al-Assad Journal For Engineering Sciences. No.* 17, 45-76 (in Arabic with abstract in English).

CADENAT, J., BLANCHE, J., 1981. Requins de Mediterranee et de l'Atlantique. Faune Trop. OROSTOM, 21, pp 330.

CASTRO, J. I., WOODLY, C. M., BRUDEK, R. L., 1999. A preliminary evaluation of the status of shark species. *FAO fisheries technical paper*. No. 380, Rome, 72 p.

COMPAGNO, L. J. V., 1984. *FAO* Species catalogue vol.4, part1: shark of the world: an annotated and illustrated catalogue of shark species *known* to date. *FAO fisheries Synop.*No125. FAO, Rome, Italy. 249 p

COMPAGNO, L., J., V., 1984a. FAO species catalogue. Vol. of the world. An annoted and illustrated catalogue of shark species known to date. Part.1. Hexanchiformes to Lamniformes. Synop.125. 251-655.

COMPAGNO,L., J.,V., 1984b. FAO Species catalogue vol.4, part 2:shark of the world: an annotated and illustrated catalogue of shark species known to date. FAO fisheries Synop. No.125. FAO,Rome, Italy. pp 251-655.

FAO, 2000. Fish and Fisheries vol 1, FAO, Rome, pp 210.

FISCHER,W, BOUCHOT, M. L., SCHNEIDER, M., 1987. Fiches FAO identification des especes pour les besoins de la peche, Mediterranee et mer Noir,Zone de peche 37, Vol. II, pp 761-1530 .

GILAT, E., GELMAN, A., 1984. On the sharks and fishes observed using underwater photography during a deep-water cruise in the Eastern Mediterranean. *Fish. Res.* **2**, 257-271.

GOLANI, D., 1987. On deep water sharks caught off the Mediterranean sea of Israel. *Is. Jour. Zool.* **34**, 23-31.

GRUVEL, A., 1931. Les Etats de Syrie.Richesses marines et fluviales .Exploitation actuelle et Avenir. Soc. Edit Geogr, Marit. et Colon, Paris, pp 453.

NELSON, J. S., 1984. Fishe of the world. 2nd edition, Awiley-intercience publication, New york, Chichester, Brisban,Torento, Singapour, pp 523.

NELSON J. S., 1994. Fishes of the World. John Wiley , and Sons, INC, pp 600.

QUIGNARD, J. P., TOMASINI, J. A., 2000. Mediterranean Fish Bidiversity. *Biol. Mar. Medit.* 7(3), 1-66.

SERET, B., 1990. Les requins :questions et reponses . *Revue du palais de la Deconverte* Vol .18., No : 180, pp 19 –42.

SAAD, A., SERET, B., ALI, M. 2004. Liste commentée des Chondrichthyens de Syrie (Méditerranée orientale). *Rapp. Comm.in . Mer.Medit.* **37**, 430.

TORTONESE, E., 1960. General remarks on the Mediterranean deep-sea fishes. *Bull. Inst. Oceanogr., Monaco* **1167**, 1-14.

WHITEHEAD, P. J. P., BAUCHOT, M. L., HUREAU, J. C., NIELSEN, J., TORTONESE, E., 1984. Fishes of the North-eastern Atlantic and the Mediterranean, United Kingdom, Unesco, pp 510.