March 2011

GENERAL FISHERIES COMMISSION FOR THE MEDITERRANEAN

COMMISSION GÉNÉRALE DES PÊCHES POUR LA MÉDITERRANÉE

GENERAL FISHERIES COMMISSION FOR THE MEDITERRANEAN
Thirty-fifth Session
Rome, Italy, 9-14 May 2011
ELASMOBRANCHS OF THE MEDITERRANEAN AND BLACK SEA: STATUS, ECOLOGY AND BIOLOGY ANALYSIS* Salammbô, Tunisia, 20-22 September 2010

(Draft)

***Available in English only**

Elasmobranchs of the Mediterranean and Black Sea:

Status, ecology and biology
Bibliographic analysis

By

Mohamed Nejmeddine BRADAI, Bechir SAIDI & Samira ENAJJAR

ional des Sciences et Technologies de la Mer

INSTM

September 2010

Preparation of this document

In its fourty-fourth session (Athens, Greece, 12-17 April 2010), the GFCM Commission endorsed the programme of work on elasmobranchs species proposed by the SAC and recommended to the SCMEE to Implement in the 2010 intersession the programme, including an expert meeting and training course. In this frame, a first transversal expert meeting on Elasmobranchs in the Mediterranean and Black Sea was proposed to be organised at Sfax, Tunisia from 20 to 22 September 2010.

This document was elaborated as working document for this meeting.

Acknowledgements

The authors especially like to thank Mr. Abdellah Srour GFCM Executive Secretary a.i for his support regarding our efforts to produce this document. Very large thanks to Ms. Saida messaoudi, head librarian of the Institut National des Sciences et Technologies de la Mer-Salammbô. Thanks also to Ms. Sondes Marouani, preparing a thesis on Squalidae family.

Warmest thanks are also adressed to all participants to the first transversal expert meeting on Elasmobranchs in the Mediterranean and Black Sea (Sfax-Tunisia, 20 - 22 September 2010).

Elasmobranchs of the Mediterranean and Black Sea: Status, ecology and biology Bibliographic analysis

By

Mohamed Nejmeddine Bradai, Bechir Saidi & Samira Enajjar

Institut National des Sciences et Technologies de la Mer

Table of contents

Elasmobranchs of the Mediterranean and Black Sea: Status, ecology and biology Bibliographic analysis

By
Mohamed Nejmeddine Bradai, Bechir Saidi & Samira Enajjar

Background

In the Mediterranean region, elasmobranchs are characterized by their diversity (49 sharks and 36 rays). The region is known to be an important habitat for cartilaginous fish and is thought to encompass unique breeding grounds for species such as the White Shark (*Carcharodon carcharias*) and Thornback Ray (*Raja clavata*).

Elasmobranchs constitute an important by-catch of commercial fisheries targeting bony fishes, rare are fisheries targeting sharks, but usually almost all specimen bycatch are marketed. Elasmobranchs represent about 1-2 % of the total landings. These landings increased from 10,000 to 25,000 tonnes between 1970 and 1985, and then slowly decreased to 10,000 tonnes in 2000. Subsequently, reported landings declined to 7,000t nowadays

Going back in the history, it has been demonstrated that sharks in the Mediterranean Sea have declined by more than 97 percent in number and "catch weight" over the last 200 years. They risk extinction if current fishing pressure continues (Ferretti et al., 2008). The last 200 years have seen a dramatic decline of large predatory sharks in the Mediterranean Sea. This loss of top predators could hold serious implications for the entire marine ecosystem, greatly affecting food webs throughout this region.

There is evidence that the elasmobranchs of the Mediterranean are declining in abundance, diversity and range due to the intense fishing activity primarily in response to the rapidly increasing demand for shark fins, meat and cartilage. However, this direct fishing mortality is not the only impact on elasmobranchs populations. There are fishing impacts on habitats through disturbance of biotic communities and substrates. Shipping and underwater exploration, construction, mining, and electrical installation also affect habitats, and increasing ambient sound, light, electromagnetic fields, and chemical contamination stimulate the sensory systems of these fishes.

Their biological characteristics (low fecundity, late maturity and slow growth rates) make also elasmobranchs vulnerable to fishing pressure. Overfishing, habitat degradation and slow recovery rates are potential factors that lead to such dramatic declines especially in areas such as the Mediterranean Sea where fishing has long been a way of life and continues to be intense. Some species are already threatened.

Among the 85 species known in the Mediterranean, only 71 were assessed in the frame of the IUCN red list. More than 40% are vulnerable and endangered to critically endangered

(Cavanagh and Gibson, 2007).

In addition, there is a lack of aggregated knowledge on the biology and fishery of elasmobranchs in many parts of the Mediterranean. 18 species of the 71 evaluated ones are deficient data (DD) (Cavanagh and Gibson, 2007).
Taking into account the vulnerability of elasmobranchs fishes and in frame of a protection and stock management strategy of this group, many action plans were elaborated on this issue

(FAO IPOA-shark, the Action Plan for the conservation of the cartilaginous fishes in the Mediterranean (UNEP-RAC/SPA, 2003), the EC Action Plan for the Conservation and Management of Sharks…). In this way, the GFCM organized a transversal working group on bycatch/incidental catches (Italy, September 2008) and a transversal workshop on selectivity improvement and by-catch reduction (Tunisia, September 2009) where elasmobranchs were well concerned.

These last meetings concluded that there is a lack of knowledge on the biology and fishery of elasmobranchs in many parts of the Mediterranean and strongly encouraged more studies on population dynamics (population size, structure and demographics) on species of conservation concern (also in terms of fishery management) in parallel to mitigation measure in those cases where protected species are involved.

The above mentioned workshop held in Tunisia suggested to setup a medium term working programme to identify and fill gaps in the current knowledge that exist in elasmobranchs fisheries, in order to assess and manage the Mediterranean stocks. This program should identify the activities to be carried out including the organisation of a specific expert meeting on the elasmobranchs during 2010. This bibliographic document is elaborated as a work document for this expert meeting on the status of elasmobranchs in the Mediterranean and Black Sea (Sfax-Tunisia, 20-22 September 2010) to implement this programme in the frame of the intersessional period activities of the Sac Advisory Committee (SAC) of the General Fisheries Commission of the Mediterranean (GFCM).

Knowledge on elasmobranchs in the Mediterranean and Black Sea compiled in the present document are based on analysis of 595 bibliographic references. Recommendations to fill gaps in order to protect and manage elasmobranchs stocks are also proposed.

I- The main characteristics of the region

The Mediterranean

The Mediterranean is the largest (2,969,000 km2) and deepest (average 1,460 m, maximum 5,267 m) enclosed sea on Earth. It is surrounded by Africa, Europe, and Asia. The Mediterranean Sea connects through the Strait of Gibraltar to the Atlantic Ocean in the west and through the Dardanelles to the Sea of Marmara and the Black Sea in the northeast. In the southeast, the Suez Canal links the Mediterranean to the Red Sea and the Indo-pacific region.

A shallow ridge at 400 m depth, between Sicily Island and Tunisian coasts, divides the sea into two main sub regions: the western and the eastern basins.
The climate in the region is characterized by hot, dry summers and cool, humid winters. The annual mean sea surface temperature shows a high seasonality and important gradients from west to east and north to south. The basin is generally oligotrophic. The biological production decreases from north to south and west to east and is inversely related to the increase in temperature and salinity. The Mediterranean has narrow continental shelves, a large part of the Mediterranean basin can be classified as deep sea and includes some unusual features: (1) high homothermy from 300–500 m to the bottom, where temperatures vary from 12.8 °C–13.5 °C in the western basin to 13.5°C–15.5°C in the eastern, and (2) high salinity of 37.5–39.5 psu. The recent marine biota in the Mediterranean Sea is primarily derived from the Atlantic Ocean, but the wide range of climate and hydrology has contributed to the co-occurrence and survival of both temperate and subtropical organisms.

The Mediterranean region has been inhabited for millennia, and ecosystems have been altered in many ways. Therefore, impacts of human activities are proportionally stronger in the Mediterranean than in any other sea of the world. Its coasts support a high density of inhabitants, with 200 million tourists per year, the region contributes notably to global economy and trade; more than 1% of world landings come from Mediterranean fisheries. Therefore, combined natural and anthropogenic events shaped the biodiversity of the Mediterranean Sea in the past and are likely to continue to do so (Coll et al., 2010).
The Mediterranean is known to encompass a high diversity of elasmobranchs and many very important habitats that are threatened nowadays.

The Black Sea
The Black Sea is one of the world's most isolated seas and the largest anoxic plan of water on the world (87 per cent of its volume is anoxic). The total surface area of the Black Sea is 423,000 km2 and it is surrounded by Turkey, Bulgaria, Romania, Ukraine, Russia and Georgia **(Fig. 1).** On the north-east, the Black Sea is connected to the Sea of Azov and to the Sea of Marmara on the south-west. The maximum depth is 2212 m. The most striking characteristics of the Black Sea are the high level of hydrogen sulphide (H2S) and the presence of a permanent halocline between 150 and 200m.
The average surface salinity is about 18-18.5 per mille during winter, and increases by 1.0-1.5 per mille in summer. The mean annual surface temperature varies from 16°C in the south to 13°C in the northeast and 11°C in the northwest. Seasonal fluctuations in temperature are registered until 50 m depth; the temperature of the deeper water remains constant throughout the year (9°C at a depth of 1,000m). The gradual increase of temperature during the history (last 10,000 years) has facilitated the penetration of Mediterranean species in the Black Sea. Today, 80% of total fauna in the Black Sea are Mediterranean origin (Ozturk, 2010).

Figure 1: Map of the Mediterranean and black Sea (Coll et al., 2010)

II- Analysis of bibliographic data

A very thorough literature search led us to collect **595** references, dealing with elasmobranchs, of which the majority of articles published in reputable scientific journals. These references were classified as follows by period, topic, species or group of species and geographic area. The exhaustive list of references is shown in **appendix 1**

The chronology of appearance of publications shows that interest on elasmobranchs research is relatively recent. It was starting in the last of the 1990s when landings decreased and some species became threatened **(Fig. 2)**

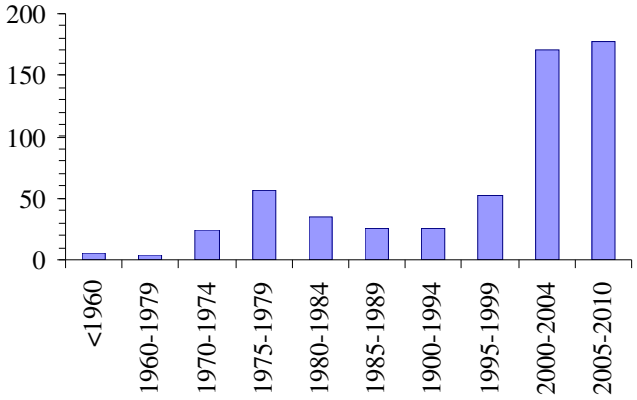


Figure 2: Temporal distribution of the number of published papers dealing with elasmobranchs in the region.

The distribution of available papers by areas is as follows:

- **Black Sea (38 papers):**

15, 17, 193, 211, 227, 229, 230, 231, 232, 233, 234, 249, 255, 265, 266, 269, 277, 285, 301, 308, 342, 367, 371, 372, 373, 435, 444, 458, 467, 483, 484, 485, 503, 504, 516, 546, 549 and 554

❖ **Marmara Sea (7 papers):**

340, 348, 349, 354, 355, 358 and 572

❖ **Western Mediterranean (347 papers):**

7, 8, 10, 13, 14a, 16, 18, 19, 21, 22, 23, 24, 25, 26, 27, 35, 36, 37, 38, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 56, 60, 60a, 60b, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 111, 112, 113, 114, 115, 116, 118, 119, 120, 121, 122, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165,167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 181, 185, 187, 188, 189, 190, 191, 192, 193, 194, 200, 202, 203, 205, 206, 209, 211, 212, 213, 214, 219, 220, 222, 225, 226, 235, 237, 244, 245, 247, 248, 256, 257, 266, 266b, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 285, 286, 287, 288, 290, 291, 293, 301, 304, 305, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 375, 381, 383, 384, 384a, 386, 387, 396, 397, 398, 399, 410, 411, 412, 413, 414, 415, 415a, 416, 417, 418, 419, 420, 421, 422, 423, 424, 426, 427, 428, 429, 430, 431, 435, 436, 437, 438, 439, 440, 441, 442, 443, 447, 450, 451, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 471, 472, 473, 474, 475, 475a, 476, 477, 478, 479, 480, 483, 498, 503, 504, 505, 506, 507, 508, 509, 509a, 509b, 510, 511, 512, 513, 514, 515, 516, 517, 518, 533, 538, 539, 540, 541, 542, 543, 544a, 545, 546, 549, 550, 554, 559, 560, 561, 562, 563, 564, 565 and 566.

❖ **Central Mediterranean (201 papers):**

7, 11, 14, 19, 19a, 34, 39, 42, 43a, 52, 53, 54, 55, 56, 57, 58, 59, 61, 62, 110, 116, 117, 123, 136, 137, 141, 166, 179, 180, 182, 183, 184, 186, 193, 196, 197, 198, 199, 201, 204, 207, 208, 209, 210, 211, 215, 216, 217, 218, 221, 223, 224, 226, 228, 235, 236, 238, 239, 240, 241, 195, 242, 243, 246, 249, 250, 251, 252, 253, 254, 258, 259, 260, 261, 262, 263, 264, 266, 266a, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 280, 285, 289, 292, 301, 307, 308, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 361, 362, 365, 370, 370a, 374, 376, 377, 378, 379, 380, 382, 385, 387, 388, 389, 390, 391, 392, 393, 394, 395, 401, 405, 406, 414a, 414b, 425, 427a, 432, 433, 434, 435, 451, 452, 453, 458, 468, 467, 469, 470, 483, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 499, 500, 501, 502, 503, 504, 516, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 534, 535, 536, 537, 544, 546, 549, 553, 554, 555, 556, 557, 558, 560, 573, 575 and 576.

❖ **Eastern Mediterranean (99 papers):**

1, 2, 3, 4, 5, 6, 9, 12, 20, 28, 29, 30, 31, 32, 33, 40, 41, 193, 211, 266, 267, 269, 277, 281, 282, 283, 284, 285, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 306, 308, 324, 325, 326, 339, 341, 343, 344, 345, 346, 347, 350, 351, 352, 353, 356, 357, 367a, 458, 359, 360, 363, 364, 366, 368, 369, 400, 402, 403, 405, 406, 407, 408, 409, 435, 445, 446, 448, 449, 454, 467, 481, 482, 483, 503, 504, 516, 546, 547, 548, 549, 551, 552, 554, 567, 568, 569, 570, 571 and 574.

The distribution of available papers by species or group of species is as follows:

- **Batoids (180 papers):**

1, 2, 3, 4, 5, 6, 8, 12, 21, 29, 30, 33, 36, 37, 38, 39, 40, 46, 48, 53, 60a, 60b, 61, 63, 65, 67, 73, 74, 75, 76, 77, 78, 79, 80, 82, 83, 86, 87, 88, 89, 90, 91, 93, 94, 95, 96, 97, 98, 99, 100, 101, 104, 108, 109, 112, 113, 114, 117, 118, 121, 123, 126, 129, 130, 131, 132, 135, 143, 144, 145, 146, 147, 148, 152, 153, 154, 155, 156, 159, 160, 164, 166, 175, 177, 179, 180, 181, 182, 183, 184, 186, 187, 191, 192, 195, 198, 212, 213, 215, 220, 229, 230, 253, 254, 257, 258, 259, 260, 261, 262, 263, 264, 265, 267, 286, 287, 292, 298, 299, 318, 319, 320, 321, 322, 325, 326, 329, 330, 332, 337, 341, 361, 362, 367a, 372, 380, 386, 389, 389, 398, 401, 412, 413, 428, 429, 430, 431, 432, 433, 434, 439, 452, 453, 455, 459, 461, 466, 468, 474, 479, 484, 485, 499, 503, 505, 506, 507, 509, 509a, 509b, 512, 551, 555, 565, 566, 567, 568, 570, 572, 574.

- **Sharks (278 papers) :**

7, 9, 11, 15, 17, 20, 22, 23, 24, 25, 26, 27, 28, 34, 35, 43, 44, 47, 49, 50, 51,55, 57, 59, 60, 62, 64, 66, 68, 70, 72, 84, 85, 92, 102, 103, 105, 106, 107, 110, 111, 119, 120, 122, 125, 127, 133, 136, 137, 138, 139, 140, 142, 149, 149a,150, 157, 158, 161, 162, 165, 167, 168, 169, 170, 171, 173, 174, 176, 178, 185, 188, 189, 190, 194, 196, 197, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 214, 216, 217, 218, 219, 221, 222, 224, 225, 226, 227, 231, 232, 233, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 250, 251, 252, 255, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 283, 284, 288, 289, 290, 291, 293, 294, 302, 304, 305, 310, 313, 314, 315, 316, 317, 323, 324, 328, 331, 334, 335, 336, 340, 342, 345, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 367, 367a, 368, 369, 370, 371, 373, 374, 375, 376, 377, 378, 379, 384, 387, 388, 390, 391, 392, 393, 394, 395, 399, 402, 403, 404, 405, 406, 407, 408, 409, 411, 414, 416, 417, 418, 419, 420, 423, 424, 425, 426, 427, 437, 438, 441, 442, 443, 447, 450, 460, 465, 470, 475, 476, 477, 478, 480, 481, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 500, 508, 510, 513, 514, 520, 521, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 538, 539, 540, 541, 542, 543, 548, 550, 552, 553, 556, 557, 561, 562, 563, 564, 573, 575.

- **Batoids and sharks (115 papers):**

10, 13, 14, 16, 18, 19, 31, 32, 41, 42, 45, 52, 54, 56, 58, 69, 115, 116, 71, 81, 124, 128, 134, 141, 151, 163, 172, 193, 211, 223, 228, 234, 248, 249, 256, 279, 280, 281, 282, 295, 296, 297, 300, 303, 306, 307, 308, 309, 311, 312, 327, 333, 338, 339, 343, 344, 346, 363, 364, 365, 366, 381, 382, 383, 385, 396, 397, 400, 410, 415, 421, 422, 435, 440, 444, 445, 446, 448, 449, 451, 454, 456, 457, 458, 462, 463, 464, 467, 469, 471, 472, 473, 482, 498, 501, 502, 504, 511, 516, 518, 519, 522, 535, 536, 537, 544, 545, 546, 547, 558, 559, 560, 569, 571, 576.

- **GFCM priority species**

Prionace glauca (7 papers): 224, 245, 246, 291, 315, 405 and 406.
Isurus oxyrinchus (4 papers): 102, 201, 202 and 519.
Lamna nasus (3 papers): 390, 529, 539.
Squatina squatina (1 papers): 165.
Rostroraja (Raja) alba (2 papers): 79 and 89.

❖ **Some endangered species**

Carcharodon carcharias (26 papers): 22, 26, 59, 197, 199, 201, 219, 236, 237, 239, 243, 270, 271, 272, 274, 289, 349, 359, 414, 419, 493, 527, 529, 530, 541 and 452.

Cetorhinus maximus (14 papers): 43, 59, 136, 345, 351, 377, 387, 513, 514, 529, 530, 531, 575 and 427.

Mobula mobular (7 papers): 53, 126, 177, 198, 318, 436 and 499.

II- 1 Mediterranean and Black Sea species

All cartilaginous fishes belong to the Chondrichthyes class comprising sharks, batoids (skates, stingrays, guitarfishes and sawfishes) and chimaeroid fishes and including about 60families, 189 genera and about 1,200 living species (Compagno *et al*. 2005) . The chimaeras fall in Subclass Holocephalii and the sharks and rays in Subclass Elasmobranchii. We deal in this document with this former subclass named generally elasmobranchs. Elasmobranchs are divided into sharks (Squalii, Pleurotremata) and rays (Batoidea, Hypotremata),
In all convention and action plans, the term "sharks" is used to refer to the Chondrichthyan or cartilaginous fishes, which comprise elasmobranchs (sharks and batoids) and chimaeras.

According to Compagno (2001), Compagno *et al*. (2005) and Serena (2005), the chondrichthyan fish fauna is relatively diverse with an estimated 80 species (approximately 7% of total living chondrichthyans), comprising 45 species of sharks from 17 families, 34 batoid species from nine families and one species of chimaera. In this document we give a new list after critical analysis of the literature and taking in count new published data on the systematic of elasmobranchs. In total we consider 86 species of elasmobranchs thought to occur in the Mediterranean Sea. This number comprises 49 species of sharks from 17 families and 37 batoids species from 9 families **(Appendix 2)**. Photos of some of them were presented in **coulour plates** in the end of the document.

Among the 86 species 13 species (7 sharks and 6 batoids) were recorded in the Black Sea (3 rays are doubtful). Three species are relatively common; the thornback ray *Raja clavata* and the common stingray *Dasyatis pastinaca* having no commercial importance due their low market demands and the spiny dogfish *Squalus acanthias* witch is more common **(Appendix2)** However, it should be noted that several species of elasmobranchs have been reported in the Marmara Sea which is with the Black Sea and Sea of Azov in the same FAO sub-area: Black Sea sub-area. These species are following records made by kabasakal (2003 and 2009) and Kabasakal and Karhan (2007): *Echinorhinus brucus*, *Oxynotus centrina, Alopias superciliosus*, *Carcharodon carcharias*, *Scyliorhinus stellaris*, *Galeus melastomus*, *Mustelus asterias* and *Mustelus mustelus.*

II-1-1 Status of some problematic species

For some species, taxonomic status is doubtful, valid for certain ichthyologists and invalid for others or synonyms of other species. We try in this section to review the status of these species taking into account new works and observations.

Squalus megalops

Squalus megalops has been recorded in the western Mediterranean by Muñoz-Chápuli *et al. (*1984) and Muñoz-Chápuli and Ramos (1989). *Squalus megalops* (Macleay, 1881) has been recorded from many localities of the eastern Atlantic and Indo-west Pacific (Compagno, 2005). However, its presence in the Mediterranean Sea was considered doubtful by many authors. Last and Stevens (1994) suggested that the southern Australian *S. megalops* was probably distinct from nominal *S. megalops* in other parts of the world and appeared to be endemic to Australia.

Besides the longnose spurdog *Squalus blainvillei* (Risso, 1827) occurring in the Gulf of Gabès (southern Tunisia, central Mediterranean), a short snout spurdog of the *Squalus megalops-cubensis* group was identified in this area. Morphometrical and meristic data along with genetic analysis (DNA Inter Simple Sequence Repeats markers and molecular Barcoding methods) support the assignation of this short snout spurdog to *Squalus megalops* (Macleay, 1881) (Marouani et al., *in press*). The presence of this species in the Mediterranean is well confirmed. It seems also that *S. megalops* is more common than *S. Blainvillei*.

The tortonese'stingray *Dasyatis tortonesei Capapé(1975)*;

Dasyatis tortonesei Capapé, 1975, has been considered synonym of *D. pastinaca* by Tortonese (1987). Formerly considered dubious by Compagno (1999), is often confused with *D. pastinaca*. Probably a distinct *Dasyatis* species lives in the Mediterranean but with nomenclature problem and currently under investigation (Serena, 2005). The species *D. tortonesei* is then not considered valid in the Field identification guide to the sharks and rays of the Mediterranean and Black Sea.

Parasitological studies in the gulf of Gabes distinguish monogeneans specific to *D. pastinaca* and to *D. tortonesi* described by Capapé (1975); *Heterocotyle capapei,* monogenean gill of *D. tortonesei* and *Heterocotyle pastinacae* for *D. pastinaca* (Neifer *et al.*, 1998 and 2000). Cestods fauna in spiral intestine of the two species are also different (Zayan and Neifer, comm. Pers).

Besides anatomic carachteristics and genetic, parasitology studies are in fact a very usefull tool for systematic of elasmobranchs (Ball et al., 2003 ; Beveridge et al;, 2004; Essafi, 1975; Euzet, 1959; Euzet et Radujkovic, 1989; Ktari et Maillard, 1972; Maillard,1966; Mokhtar-Maamouri et Zamali,1981 et 1982 ; Neifar et al., 1998 et 1989; Neifar, 2001; Tazerouti, 2007).

Further investigations in the Gulf of Gabes demonstrated the presence of the two species on the basis of clear differences in morphometric, meristic and anatomic characteristics (Bradai, pers.comm.). Moreover, a new description of the two species and a rigourous research to know wich species of both was described by Linnaeus are necessary. The appellation *tortonesi* should be replaced by a new one because it is synonym of *pastinaca*.

In this document we consider *D. tortonesi* as valid species but under another future appellation.

The Marbled stingray *Dasyatis marmorata* (Steindachner, 1892)

The Marbled stingray *Dasyatis marmorata* (Steindachner, 1892) *is* closely related to *D. pastinaca* (Linnaeus, 1758) and, therefore, the two species are often confused and misidentified. According to Cowley & Compagno (1993), these species can be distinguished by the ratio between the disk length and disk width. In addition, the species differ in coloration: the dorsal surface of *D. pastinaca* is grayish-green to olive brown, conspicuous bright blue blotches and branching lines on a golden background on the dorsal surface of the other species.

Dasyatis marmorata was reported for the first time in the Mediterranean in the Gulf of Gabès (southern Tunisia) by Maurin & Bonnet (1970) as *D. pastinaca* var. *marmorata*. This occurrence was confirmed under the same taxon by Quignard & Capapé (1971).

In another hand, a closely related species Dasyatis *chrysonota* is found in Gulf of Guinea (Fowler 1936), Angola (Krefft 1968) to South Africa (Cowley &Compagno 1993).

Referring probably to earlier taxonomical papers (see Cowley & CompagnO, 1993) such as Fredj & Maurin (1987) and Capapé & Desoutter (1990), Quignard & Tomasini (2000) considered (*D. chrysonota* = *D. marmorata*) a valid species.

On this consideration, many records of this species as *Dasyatis chrysonota* were reported in the Mediterranean; off the coast of Israel (eastern Mediterranean) (Golani and Capape, 2004) and in the Lagoon of Bizerte (North-eastern Tunisia, central Mediterranean) (El Kamel et al., 2009)

In the Field identification guide to the sharks and rays of the Mediterranean and Black Sea., FAO Species Identification Guide for Fishery Purposes, Serena (2005) gave the name *Dasyatis chrysonota marmorata (*Steindachner, 1892) and wrote that this name is an interim solution . It may become *D. marmorata* after DNA studies.

Considering photos of *D. chrysonata* off the Africa (East Atlantic) (Seret, pers.comm.), a difference seems to be clear between this Atlantic species and *D. marmorata*. In the Field identification guide to the sharks and rays of the Mediterranean and Black Sea (Serena, 2005), the schema of the called *Dasyatis chrysonota marmorata* represents *D. chrysonata* and the photo is of *D. marmorata*. Differences interest mainly the body shape and the dorsal coloration.

Considering tail spine characteristics of stingrays, Schwartz (2007) distinguished *D. chrysonata* and D. *marmorata*

In conclusion at this bibliographic analysis and following further discussions with colleagues, *Dasyatis marmorata* is a species of West African and Mediterranean (Seret, in press - Dasyatidae, in FAO species identification guide for Fishery Purposes, The Living Resources of the Eastern Central Atlantic). *Dasyatis chrysonota* is a South African species. There are several distinctive features (colour and morphology). However, a genetic study should

formally reaffirm the validity of *D. marmorata* and redefine the two species (Seret, pers.comm.).

In this document, we consider only *D. marmorata* and all records of *D. chrysonata* in the Mediterranean as *D. marmorata*. Further investigations should be undertaken.

***Glaucostegus halavi* (Forsskäl, 1775)**
The species was recorded firstly by Vinciguerra (1884) in the gulf of Tunis but following morphologic description given by the author, it was *Rhinobatos cemiculus* (Quignard & Capapé, 1971). Tortonese (1951) recorded it also in Egyptian waters but it was not confirmed (Ben-Tuvia, 1966). Later a single specimen was recorded from the gulf of Gabès (Tunisia) (Ben Souissi et al., 2007). This record seems to be doubtful and a reconsideration of the specimen in question is necessary. It is not considered in this document.

***Centrophorus granulosus* (Bloch & Schneider, 1801) and *Centrophorus uyato* (Rafinesque, 1809)**
This genus needs revision worldwide (Daley *et al.* 2002, Lloris and rucabado, 1998).

***Isurus paucus* Guitart, 1965** (Family **LAMNIDAE)**
It is caught in Algeria (Hemida, 2000; Hemida and Capape, 2002). It will be considered in the list

***Carcharhinus melanopterus* (Quoy & Gaimard, 1824)** (Family CARCHARHINIDAE)
Carcharhinus melanopterus is an Indo-Pacific species present in the Red Sea (Gohar & Mazhar, 1964) and seems to have colonized the south-east Mediterranean. Branstetter (1984) and Fischer et al. (1987) considered questionable its presence in the western basin. The species is very rare in the gulf of Gabes where it is reported for the first time by Quignard & Capapas (1971). The capture of a male specimen of one meter long in the Gulf of Gabes, in December 1993, confirms the previous observations of blacktip shark in the south Tunisia (Bradai et al., 2002).

***Galeocerdo cuvier* (Peron & LeSueur, 1822)** (Family CARCHARHINIDAE)
Very rare tropical Atlantic species; Its occurrence in the Mediterranean was doubtful, but two substantiated records were reported in the Mediterranean, first off Malagá, Spain (Pinto de la Rosa, 1994), then in Messina, Italy (Celona, 2000). It is considered in the list.
Two other doubtful species of carcharinidae family *C. leucas* and *C. longimanus*, recorded in the Mediterranean, were considered as not valid (Serena, 2005). They are not included in the present list.

PRISTIDAE
Sawfish was once common in the Mediterranean and Eastern Atlantic, but has now been probably extirpated from Europe and the Mediterranean. Populations depleted because of the

destruction of littoral and freshwater habitats and its vulnerability to coastal gill-net fisheries. Only historical records exist.

***Torpedo (Torpedo) alexandrinis* Mazhar, 1982** and ***Torpedo (Torpedo) fuscomaculata* peters, 1855** (F. TORPEDINIDAE)
These two species are not considered as valid species (Serena, 2005). They are not considered in this document

***Raja africana* Capape, 1977**
Validity of this species is questioned in Compagno's 1999 checklist and Serena (2005). We consider it in the list and further investigation should be undertaken.

***Raja rondeleti* Bougis, 1959** (Rondelet's skate)
The taxonomic status of this species is doubtful (Serena, 2005). It is not considered in the list.
It is necessary to point out also the two following remarks:

- Moreno & Hoyos (1983) record the presence of a new species *Carcharhinus acarenatus* in the Mediterranean but Compagno (1984) put it in Synonymy with *C. Brachyurus*.
- De Maddalena and Dell Rovere (2005) report the First Mediterranean record of the pigeye shark, *Carcharhinus amboinensis* (Müller & Henle, 1839) in the North-west Ionian Sea on the basis of jaws measurements. We don't consider it in our list.

II-1- 2 Mediterranean endemic species

Endemism of chondrichthyans in the Mediterranean is low, with only four batoid species (Maltese skate *Leucoraja melitensis*, speckled skate *Raja polystigma*, rough ray *R. radula* and giant devilray *Mobula mobular*) that could be considered endemic (Serena 2005). Within the Mediterranean, the distribution of chondrichthyan fishes is not homogenous (Serena 2005).

II-1-3Alien species in the Mediterranean

8 chondrichthyan alien species were recorded in the Mediterranean, five sharks and three batoids:

- **The Bignose shark *Carcharhinus altimus* (Springer, 1950).**

This tropical Atlantic species was recorded first on Moroccan coast, Alborán Sea (Moreno and Hoyos, 1983); One record in Levantine waters (Golani, 1996), now frequent in Algerian waters (Hemida and Labidi, 2001). It is considered as established (on the basis of at least three distinct published records well spread out in time and space.)

- **The Silky shark *Carcharhinus falciformis* (Bibron, in Müller & Henle, 1839).**

Tropical Atlantic species, recorded first in Alborán Sea (Moreno, 1987). Subsequently, it was caught in eastern Algerian waters (Hemida and Labidi, 2001) and in Tunisia (Bradai et al., 2004).

- **The Tiger shark *Galeocerdo cuvier* (Peron & Lesueur, in Lesueur, 1822).**

Very rare tropical Atlantic species; only two substantiated records in the Mediterranean, first off Malagá, Spain (Pinto de la Rosa, 1994), then in Messina, Italy (Celona, 2000).

- **The Milk shark *Rhizoprionodon acutus* (Rüppell, 1837).**

Very rare tropical Atlantic species; only a single specimen recorded in the Mediterranean in Gulf of Taranto, Ionian Sea (Pastore and Tortonese, 1985).

- **The Great hammerhead *Sphyrna mokarran* (Rüppell, 1837).**

Very rare, only a single specimen recorded in the Mediterranean in Camogli, Ligurian Sea, Western Mediterranean (Boero and Carli, 1977), introduced probably via Gibraltar.

- **The honeycomb whipray *Himantura uarnak* (Forsskael, 1775).**

Established indo-pacific species, introduced Via the Suez Canal first from Israel (Ben Tuvia, 1955); successive records in Mersin, Turkey (Ben-Tuvia, 1966), Lebanon (Mouneinne, 1977), Egypt (El Sayed, 1994), Turkey (Basuta *et al.*, 1998).

- **Halaves guitar fish *Glaucostegus halavi* (Forsskäl, 1775)**

Only a single record from the gulf of Gabès (Tunisia) (Ben Souissi et al., 2007) is known. This record seems to be doubtful and a reconsideration of the specimen in question is necessary.

- **The variable torpedo ray *Torpedo (Torpedo) sinuspersici* Olfers, 1831**

Lessepsian species reported in the Mediterranean, in the Levantine Sea by Saad et al. (2004)

II-2 Spatial distribution

Spatial predicted patterns of species richness in the Mediterranean Sea based on the AquaMaps model [80, and File S2] show that concentration of rays and sharks occurred in coastal waters especially in the waters of Tunisia and Libya **(Fig. 3)**.

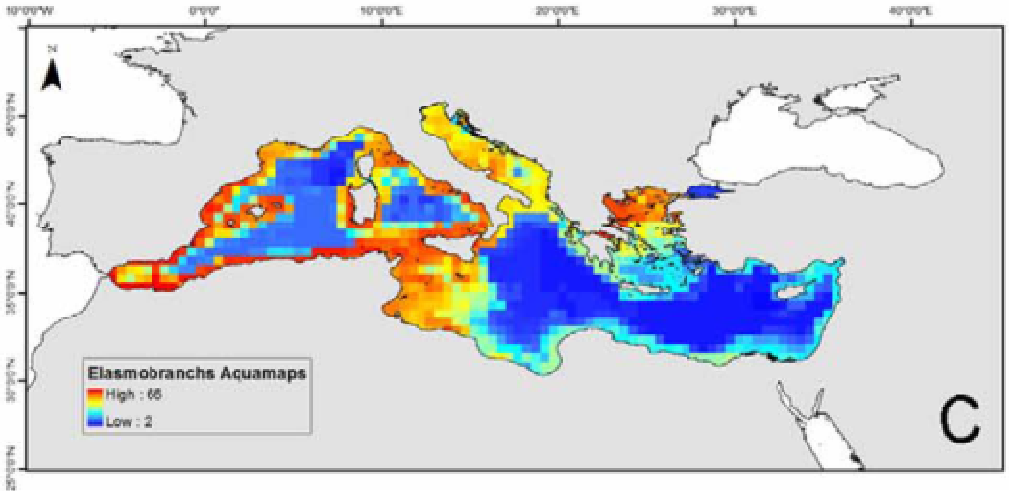


Figure 3: Spatial predicted patterns of species richness in the Mediterranean Sea based on the AquaMaps model [80, and File S2]. (C) elasmobranchs (n = 74). map was generated without imposing a probability threshold. Colors express species occurrence from blue (little or no occurrence) to red (highest occurrence). The size of the cell is 0.560.5degree (Coll et al., 2010).

Within the Mediterranean, the distribution of elasmobranch fishes is not homogenous (Serena, 2005). Some areas are considered critical habitat for elasmobranchs. For example, Tunisian waters provide a nursery area for great white shark *Carcharodon carcharias*, the sandbar shark *Carcharhinus plumbeus* and probably for many other species (saidi, 2008 and Enajjar, 2009). Some species have a restricted range within the Mediterranean, for example a small population of the smalltooth sand tiger shark *Odontaspis ferox* seems resident in a particular area off Lebanon (Canavagh & Gibson, 2007). In the Adriatic Sea, the presence of cartilaginous fish species is scarce especially in the northern part. The basking shark is a rather rare but constantly present species in the eastern Adriatic Sea. However, over the period 2000-2002 their occurrence in that area highly increased (Soldo et al., 2008). Besides its oceanographic characteristics that may limit biodiversity, this area was populated more recently than other parts of the Mediterranean. A total of 52 species of cartilaginous fish have been recorded in the Adriatic Sea. Only 10 species are widely distributed. Some bathyal species of the group inhabit exclusively the central and southern parts of this sea (Serena, 2005). In the Black Sea the number of cartilaginous fish species is lower. The Black Sea fauna is composed of Mediterranean species and most of the organisms present are eurythermic and euryhaline. Thirteen elasmobranchs species are assumed to live in the Black Sea (Serena, 2005). However, it should be noted that several species of elasmobranchs have been reported in the Marmara Sea which is with the Black Sea and Sea of Azov in the same FAO sub-area: Black Sea sub-area.

Precisions on spatial distribution of some species

- Carcharhinus obscurus

The species is an occasional transient within the Mediterranean, it was recorded in Malta (Fergusson and Compagno, 2000), the Gulf of Gabès (Saïdi, 2008), in Syria (Saad *et al*., 2004) and in Palestine (Golani, 2005). Based on the capture data, the species may occupy a wider range than supposed.

- Carcharhinus brachyurus

The species was not cited along the oriental basin. It's occurrence in the Mediterranean Sea may be confined only in the occidental basin. It was recorded in Algerian coast (Hemida *et al*., 2002) and in Balearic Islands (Moery & Massuti, 2003).

***- Carcharhinus taurus*.**

The occurrence of the species seems to be restricted to occidental basin. However, the species is probably disappearing from the area (Fregusson *et al*., 2000).

- Echinorhinus brucus

In the oriental basin, the species occurred only on the north coast of the Mediterranean Sea. It was recorded in the Sea of Marmara (Kabasakal, 2003). The species was not observed along the southern coasts of oriental basin.

- Isurus paucus

The species is rare in the area. It is accidentally caught.

- Squatina aculeata* and *S. Squatina

These two species occurred along all Mediterranean coasts. However we think these squatinidae are disappearing from several areas

- Squalus acanthias

The species occurs along the occidental basin coasts and only along the north coast of oriental basin of the Mediterranean Sea. The species is abundant in Black Sea (Avsar, D. 2001; Ademürhan & Seyhan, 2006).

- Centroscymnus coelolepis

The occurrence of this species may be restricted to the north occidental basin. According our investigations and also in the literature: no mention of this species along the North African coasts.

- Alopias superciliosus

The species may occupy all the Mediterranean Sea. It was observed in Syria (Saad *et al*., 2004), the Ionian Sea and Levantine basin (Megalofonou *et al*., 2005; Golani, 2005).

- Rhinobatos cemiculus / R. rhinobatos

These two species are common off the south coasts of the Med but no observed along the north ones (no recorded in MEDITS campaigns) (Bertrand *et al.*, 2000; Baino *et al.*, 2001).

-Dasyatis marmorata

Capapé (1989) suggested that in southern Tunisian waters, *D. marmorata* undergoes competitive pressure from related dasyatid species. Consequently, it inhabits restricted areas in the Gulf of Gabès, entering a closed hyperhaline lagoon, the Bahiret el Biban (Capapé & Zaouali, 1992, 1993, 1995). Nowadays, this species extends it distribution area (Enajjar, 2009; El Kamel et al., 2009; Golani and Capapé, 2004)

II-3 Critical habitats

Critical habitats should be identified for conservation porpoises. In fact, a big lack of knowledge on critical habitats of this group was noted in the Mediterranean and Black Sea. However, some mapping of nursery areas and spawning ground for some species being carried out by some countries.

Some areas are considered critical habitat for chondrichthyans. For example, Tunisian waters provide a nursery area for white shark *Carcharodon carcharias*. Aggregations of basking shark *Cetorhinus maximus*, have been observed in the northern Balearic region, the Northern Adriatic and the Tyrrhenian Sea (Walker *et al*. 2005). Tunisian waters provide a nursery areas for great white shark *Carcharodon carcharias* (Centre of Tunisia) and for the sandbar shark *Carcharhinus plumbeus* (Bradai et al., 2005) (gulf of Gabes - south of Tunisia). This area

seems to be also a nursery for many other elasmobranchs (Saidi, 2008 and Enajjar, 2009). However, a large knowledge on the presence of juveniles, gravid females and other biological parameters (i.e. size at first maturity) are srongly needed to identify a nursery area in order to make solid conclusions to restrict the areas to be protected, eventually in order to create MPAs, since the Gulf of Gabès is the most fished area in Tunisian waters.

II-4 Status of the species

Among 71 Mediterranean species, assessed in the frame of the IUCN red list (2007 regional assessment), 42. 25 % are vulnerable and endangered to critically endangered, 18.31 % are Near Threatened (NT) and 25.35 % are Data Deficient (DD) **(Tab.l).** The status of all species assessed is represented in **appendix III**

This assessment shows clearly the vulnerability of elasmobranchs and the lack of data on this fish group.

Table 1: IUCN red list of Mediterranean elasmobranchs species (Gibson *et al*., 2007).

IUCN red list categories	Number of species
Critically Endangered (CE)	13
Endangered (E)	08
Vulnerable (VU)	09
Near Threatened (NT)	13
Least Concern (LC)	10
Data Deficient (DD)	18
Not Evaluated (NE)	0
Total number of species	71

II-5 Elasmobranchs fisheries

II-5-1 FAO Statistics

Elasmobranchs fish species are exploited for their fins, skin, jaws or meat. Sometimes they are directly targeted by commercial and recreational fisheries while in other cases they are incidentally caught as bycatch. In Mediterranean Sea, elasmobranchs fish catches represent only 1.1% of the total landings (Serena, 2005).

In many areas of the world such as the Mediterranean Sea, a decline in cartilaginous fish species landings has been observed while fishing effort has generally increased. The catches during the last 30 years show an increasing trend; 24,000 tonnes attained in 1983 and since then a regular decrease are observed. The present elasmobranchs productions are about 7000 tonnes annually **(Fig. 4)**. Sharks represent 1.3 times the production of batoïdes **(Fig. 4)**.

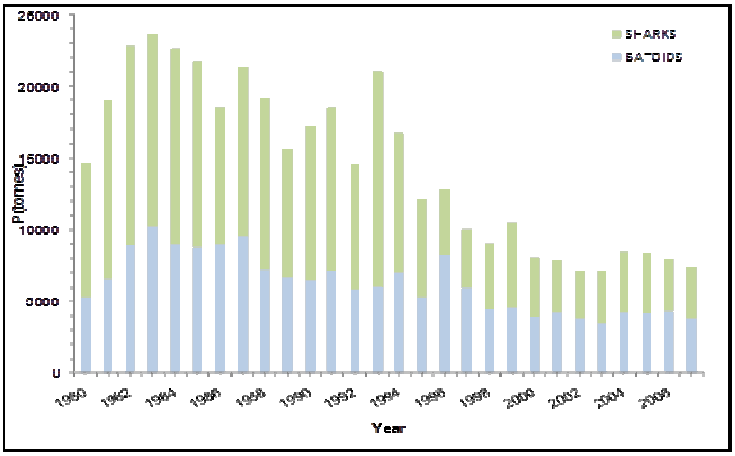


Figure 4: Mediterranean and Black Sea trend of elasmobranchs catches in the last 30 years

Countries report generally shark statistics without distinction between species or, worse still, the species are not recorded at all. Moreover, FAO data only report official landings and therefore bycatch returned to the sea is not included. About 50% of the estimated global catch of elasmobranchs fish species is gathered as bycatch and these are not mentioned in official fishery statistics.

In the way to improve statistics, the workshop on selectivity improvement and bycatch reduction (Tunis, Tunisia, 23-25 September 2009) suggested that a protocol should be developed to collect and promote the collection of basic data on species of conservation concern. The aim of the protocol is to collect data which can then be fed into existing databases. The data collection is notably aiming to characterise and assess captures of species of conservation concern including unwanted species and size classes. The data is required by operational unit in order to fit into the GFCM Task I data matrix.

Triakidae and the group Rajiiformes (without distinction of species) represents on average 70% and 87 % respectively of sharks and batoïdes captured during the last 30 year in the Mediterranean and the Black Sea **(Figures 5 and 6)**.

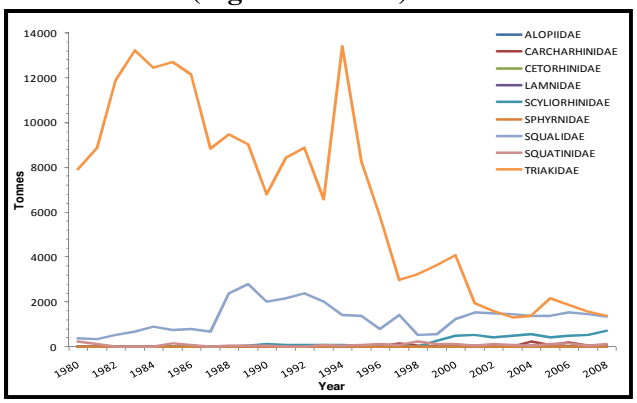


Figure 5: Mediterranean and Black Seas trend of catches of sharks in the last 30 years

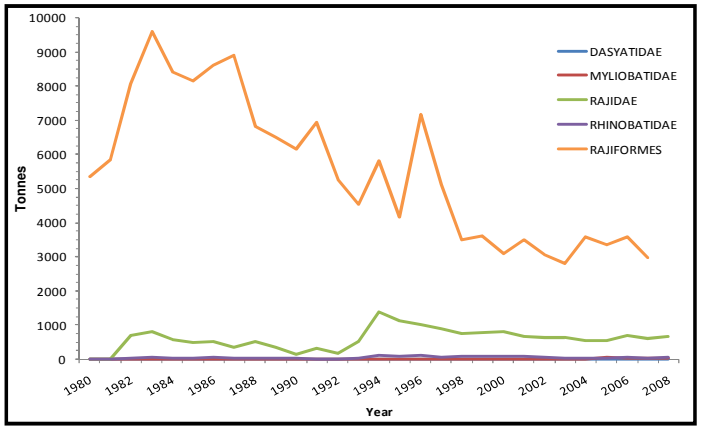


Figure 6: Mediterranean and Black Seas trend of catches of batoïdes relatives in the last 30 years

The major elasmobranchs fishing countries within the Mediterranean are Italy, Turkey and Tunisia; they contributed on average with 76 % in the production of elasmobranchs during the last 30 year **(Fig. 7)**.

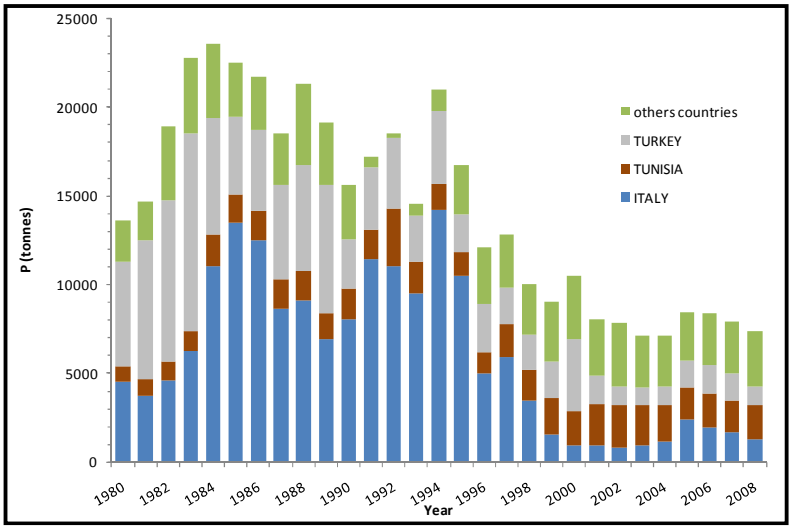


Figure 7: Contribution of Italy, Turkey and Tunisia in the Elasmobranchs production in the the Mediterranean and the Black Sea from 1980 to 2008.

Low production characterises priority species of the GFCM (*Rostraraja alba*, *Isurus oxyrinchus, Lamna nasus, Prionace glauca* and *squatina squatina*); it's about 250 tonnes for *Prionace glauca* and don't exceed tens of tonnes annually for the others species. Statistic information for *Mobula mobular* and *Carcharodon carcharias* are absent **(Fig. 8)**.
Raja clavata seems to be among the few species that their production is increasing. It's in relation with the new habit of fishing ant not in relation with the good status of the exploitation of the population **(Fig. 8)**.

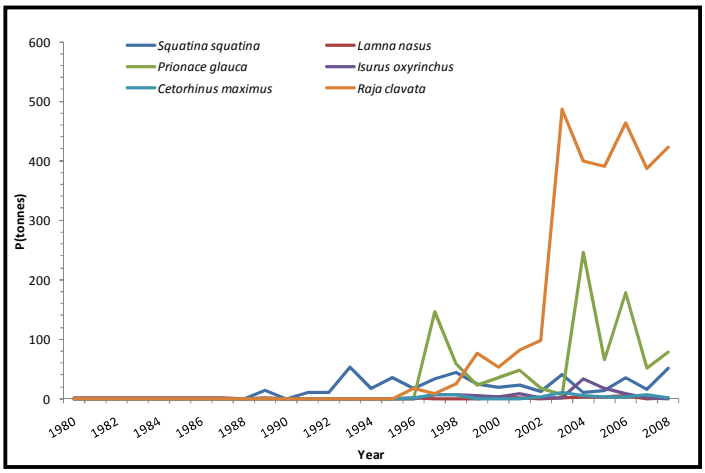


Figure 8: Landings evolution of some elasmobranchs species in the Mediterranean and the Black Sea Between 1980 and 2008.

II-5-2 Fishing gears

In the Mediterranean, almost no elasmobranchs are subject to directed fisheries, but elasmobranchs constitute part of the bycatch in most local artisanal fisheries.

Catches of elasmobranchs primarily derive from two different fisheries: the pelagic artisanal fishery with longlines and gillnets, where smoothhounds are the most common group, and the demersal trawl fishery, where rays and catsharks constitute the main groups among elasmobranchs. In both cases elasmobranchs represent only a bycatch, being the longline fishery directed to swordfish or tunas and the trawl fishery to various assemblages of finfish, shrimps and cephalopods.

II-5-3 Elasmobranchs Bycatch

II-5-3-1 Introduction

In recent years, the Bycatch has become one of the issues to be considered in any development of fisheries. Indeed, in addition to their biological and ecological impacts, incidental catches are also a loss of biological resources (Hall et al., 2000). In 1994, FAO estimated that 27 million tons of marine products caught are not landed and are non-target species and particularly discards. This is mainly due to the low selectivity of fishing gear used.

The Bycatch of juveniles of commercial species may adversely affect the future stock and catch levels (Hall et al., 2000). On the other hand, the ecological consequences of Bycatch are worrisome when it comes to endangered species such as marine mammals, seabirds, turtles and elasmobranchs. These groups of species are very sensitive given their particular biological characteristics (Musick et al. 2000; Gilmen et al., 2006). The Bycatch can induce imbalances between top predators and prey and consequently affect biodiversity (Hall et al., 2000).

The biology of elasmobranchs, late sexual maturity, long life cycle, low fecundity, long

lifespan and the fact that they are at the top of the food web, making them more vulnerable to fishing than most teleosts (Stevens et al ., 2000).

Elasmobranchs of the Mediterranean are mainly coastal species (80%) and most benthic fauna, and this is likely to be affected by fishing activities, concentrated mainly in coastal areas. Several species (12 species) are pelagic. The species of depths (15 species) are particularly benthic. Target fishing of these species is unusual in these waters. Only a few species of elasmobranch are targeted. In the Mediterranean, more than 100,000 sharks are taken as incidental catch each year. The incidental catch of these species are highly variable in time and space and using the techniques of fishing. However, the magnitude of these catches and discards is not well documented.

To this end, the incidental capture of elasmobranchs by commercial fisheries has been subject to a special attention for a better knowledge of targeted and incidental catch of sharks and conservation of populations (IPOA-Shark (FAO, 1999),

In this part of the document dealing with elamobranchs bycatch, we analyse the available bibliographic data on this issue in the Mediterranean and Black Sea. Results are given following geographic fishing areas, fishing gears and species or groups of species.

II-5-3-2 Bycatch definitions

There are several definitions of what bycatch or incidental catch is:

- "that portion of the catch returned to the sea as a result of economic, legal or personal consideration plus the retained catch of non-target species" (McCaughran 1992).
- "Animals other than the target species which are unmarketable because they are too small or for some other reason" (Alverson et al., 1994).
- "that portion of the capture that is discarded at sea dead (or injured to an extent that death is the most likely outcome) because it has little or no economic value or because its retention is prohibited by law" (Hall, 1996).
- all catches of sharks and rays in fisheries targeting other species (Bonfil, 2005)

In simpler words, these definitions say respectively that bycatches are:

All discards plus retained non-target species

Discards of non-target species

All dead discards

General definitions were proposed in the frame of the SAC activities:

- "*The total catches of unwanted animals including vulnerable and endangered species. By-catch of commercial species should be reported as associated species.''* (Report of the ninth session of the Sub-Committee on Statistics and Information (SCSI), Antalya - Turkey, 13–16 October 2008). This definition was reported in the draft glossary of scientific terms of interest for the SAC.

- "*The part of the catch taken together with the [authorised] target species. In a broadcontext, this includes all non-targeted catch including (by-product), discards,*

illegal and species of conservation concern (GFCM/SAC selectivity workshop 2009)".

In this document, we opt for the Bonfil definition. This definition is specific for elasmobranchs.

II-5-3-3 References dealing with bycatch

96 papers were identified and analyzed in the context of this topic. They cover many aspects and approaches to fisheries. These references are: 8, 10, 14, 17, 18, 19, 42, 45, 58, 60, 136, 140, 189, 193, 198, 218, 223, 224, 225, 226, 229, 244, 245, 246, 247, 248, 255, 258, 266, 271, 277, 278, 279, 280, 288, 290, 291, 292, 307, 308, 309, 311, 313, 338, 339, 357, 365, 366, 370, 382, 383, 385, 386, 387, 396, 397, 404, 407, 408, 409, 411, 412, 415, 422, 438, 440, 444, 448, 451, 452, 453, 454, 469, 473, 475, 479, 481, 483, 486, 488, 496, 498, 501, 505, 512, 517, 518, 533, 534, 536, 537, 545, 548, 549, 550 and 559.

The chronology of appearance of publications shows that interest in the incidental catch is relatively recent **(Fig. 9)**

- **Before 1990 (7 papers):** 17, 45, 225, 245, 280, 412 and 475.

- 1990s (14 papers): 10, 60, 247, 248, 271, 311, 313, 339, 440, 505, 512, 517, 534 and 537.

- From 2000 to 2004 (35 papers): 18, 19, 136, 140, 189, 198, 218, 226, 244, 246, 291, 292, 309, 338, 357, 382, 383, 385, 396, 397, 408, 411, 415, 438, 444, 454, 469, 473, 488, 498, 518, 533, 536, 545 and 559.

-From 2005 to 2010 (40 papers): 8, 14, 42, 58, 193, 223, 224, 229, 255, 258, 266, 277, 278, 279, 288, 290, 307, 308, 365, 366, 370, 386, 387, 404, 407, 409, 422, 448, 451, 452, 453, 479, 481, 483, 486, 496, 501, 548, 549 and 550.

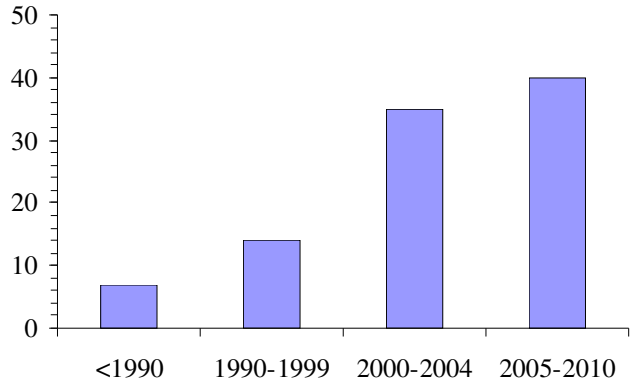


Figure 9: Temporal distribution of the number of published papers dealing with elasmobranch bycatch in the region.

Papers dealing with fishing gears are as follows:

- Trawls (50 papers): 8, 10, 18, 19, 42, 58, 136, 140, 189, 218, 223, 258, 271, 277, 279, 292, 307, 308, 311, 313, 338, 339, 356, 366, 370, 382, 357, 385, 386, 387, 396, 397, 415, 444, 454, 469, 473, 481, 483, 486, 488, 496, 498, 505, 512, 518, 534, 537, 545 and 549.

- **Longline** (34 papers): 60, 224, 226, 229, 244, 245, 246, 247, 271, 280, 290, 291, 308, 339, 357, 383, 404, 407, 408, 411, 412, 438, 440, 444, 451, 452, 453, 475, 479, 483, 533, 536,548, 549
- **Drifnets** (6papers) **:** 483, 248, 266, 308, 517 and 550
- **Gillnets and Trammel nets** (3 papers): 483, 422 and 536.
- **Purse seine** (1paper): 288
- **Tuna trap** (4 papers): 45, 271, 309 and 559

The distribution of available papers by areas is as follows:

- **Black Sea** (4 papers): 17, 229, 255 and 444.

- Western Mediterranean (51 papers): 8, 9, 18, 19, 42, 45, 60, 136, 140, 189, 225, 226, 247, 248, 266, 277, 278, 279, 288, 290, 291, 308, 309, 311, 313, 383, 386, 387, 396, 397, 411, 412, 415, 422, 438, 440, 451, 473, 475, 479, 483, 498, 505, 512, 517, 518, 533, 545, 549, 550 and 559.

- Central Mediterranean (43 papers): 14, 19, 42, 58, 136, 140, 198, 218, 244, 245, 246, 259, 266, 271, 277, 278, 280, 290, 292, 307, 338, 339, 357, 370, 385, 386, 387, 404, 408, 409, 452, 453, 469, 483, 486, 488, 496, 501, 518, 534, 536, 537 and 549.

- **Eastern Mediterranean** (15 papers): 223, 224, 365, 366, 382, 404, 407, 408, 409, 448, 454, 481, 483, 548 and 549.

II-5-3-4 Interaction elasmobranchs / fishing gears

All cartilaginous fishes are caught accidentally in most fishing gear in the Mediterranean (Cavanagh et Gibson, 2007) **(Fig.10).** It seems that trawlers, longlines and nets pose the major threat.

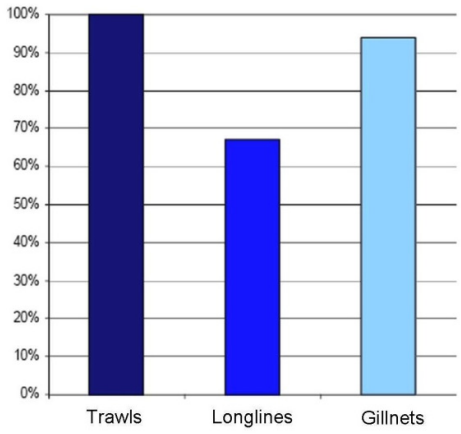


Figure 10: Percentage of elasmobranch species (n=71) within the Mediterranean, for which bycatch in trawls, longlines and nets, pose a major threat (Cavanagh et Gibson, 2007).

- **Trawling bycatch**

Mediterranean trawling uses various techniques suitable for production of benthic, demersal and pelagic species. It is practiced by a little over than 10% of the Mediterranean fleet.

Trawlers contribute approximately a little over half of the landed catch, which underlines the importance of this activity.

This technique generates several problems: juvenile catches, important discards and negative impact on the environment (Sacchi, 2007). In the Mediterranean, discards constitute over 40% of the catch (Sanchez et al., 2004).

There is no fishery targeting elasmobranchs, but all species are mainly caught by this fishing gear; 62 species are listed in the trawl fisheries in Greece, 62 in Catalonia and 74 in Italian waters (Bertrand et al., 2000). However, demersal species, particularly *Galeus melastomus*, *Etmopterus spinax*, *Scyliorhinus canicula*, *Mustelus sp* and rajidés, are most caught (Baino et al. 2001; Massutí & Morant, 2003). The proportion depends on the landed value of species and regions.
In Balearic Islands, *S. canicula*, *G. melastomus*, *E. spinax* represent 4.91 to 8.24% by weight of total catches (Carbonell et al., 2003). Discards from these species represent 1 to 6.5%. In Alboran Sea, trawlers targeting the red shrimp *Aristeus antennatus*, catch more *G. melastomus* than the target species (Torres et al., 2001).

Among rays, it is noted that *Raja clavata*, *R. radula* and *R. miraletus* are the species most commonly caught in the Mediterranean trawling (Bertrand et al. 2000; Abella and Serena, 2005)

This technique generates occasional catch of pelagic sharks as *Alopias vulpinus*, *Prionace glauca*, *C. carcharias*, *I oxyrinchus* and rarely the basking shark *Cetorhinus maximus*. In the Mediterranean, 5% of the basking shark catches are reported in trawl fisheries (Mancusi et al., 2005). Furthermore this gear generates capture of juvenile white sharks mainly in the central Mediterranean and especially in the Gulf of Gabes, where respectively 30% and 80% of the white shark and the Bluntnose sixgill shark *Hexanchus griseus* are caught by benthic trawlers (Saidi et al., 2007).
For this fishing gear, very often the information concerns a listing of species without an estimate of catch rates by fishing effort. Recently, preliminary information on this issue was reported in the Aegean Sea (Damalas et al., 2010) and in the gulf of Gabes (Hamdaoui, 2010).

Number of individuals for each of the 3 species caught, percentage of total catch and their occurrence as well as abundance indices (mean CPUE) in the 342 hauls of the bottom trawl experimental surveys in the Aegean Sea (Damalas et al., 2010) were as follows:

Raja montagui	Spotted ray	405	0.08%	21.3%	1.7
Scyliorhinus canicula	Small-spotted catshark	10,909	2.21%	67.0%	46.2
Torpedo marmorata	Spotted torpedo	259	0.05%	21.9%	1.3

The study in the gulf of Gabès shows that Elasmobranchs by catch averaged 5.42% of the total landing (1.7% Sharks and 3.7% Rays). Fishes, cephalopods and crustaceans represent

respectively 74.15%, 12.32% and 9.4% of the total landings. The CPUE was estimated at 70.10 Kg/Landing (CPUE=23.25 Kg/Landing for shark and 46.75 for rajiforms). The Cpue (Kg/landings) for the major elasmobranch families caught in the gulf of Gabes by bottom trawlers are shown in **table 2** (Hamdaoui, 2010)

Table 2: Cpue (Kg/landings) for the major elasmobranch families

Families	**cpue**
CARCHARHINIDAE	0.8087
TORPEDINIDAE	1.4407
SCYLIORHINIDAE	2.5908
RHINOBATIDAE	5.1687
SQUALIDAE	5.2494
RAJIDAE	14.0726
TRIAKIDAE	15.0187
MYLIOBATIDAE.	17.7554
DASYATIDAE	19.6659

By catch varied greatly, not only in terms of weight, but also in the number of species. The abundance indices (CPUE) was estimated for the rare species; *Raja alba* (0.1 specimens/landing), *Gymnura altavela* (0.05 specimens/landing), *Heptranchias perlo* (0.05 specimens/landing), *Mustellus asteria* (0.019 specimens/landing), *Carcharodon carcharias* (0.014 specimens/landing).

The West bassin is relatively the most studied zone (Tyrrhenian Sea, Ionian, Aegean and the Balearics). On the south side, apart from the Gulf of Gabes, studies of this kind are practically absent.

The sustained increase in trawl fishing effort appears to have contributed to a decline in biodiversity in the Mediterranean elasmobranch (stock and habitat) (Aldebert, 1997; Peladic-Jukic et al., 2001).

- **Longline fisheries**

Several types of longlines are used in the Mediterranean. Depending on the species targeted demersal or pelagic, there are respectively bottom longline and surface longline. The surface longlines target, according to the hook size and immersion depth, mainly swordfish (*Xiphias gladius*), albacore (*Thunnus alalunga*) and tuna. These lines generate significant bycatch of sharks.

At least 12 species of sharks (*Prionace glauca*, *Isurus oxyrinchus*, *Alopias vulpinus*, *Galeorhinus galeus*, *Lamna nasus*, *Alopias superciliosus*, *Sphyrna zygaena*, *Hexanchus griseus*, *Carcharinus plumbeus*, *Squalus blainvillei*, *Mustelus mustelus*, *and Cetorhinus maximus*) are affected by surface longline (Di Natale, 1998; Mejuto et al. 2002; Megalofonou et al., 2005a, b). In addition, bycatch of young white shark (*Carcharodon carcharias*), *Dasyatis violacea* and *Mobula mobular* are also reported in longline fisheries in the Mediterranean (spinning et al. 1986; Garibaldi, 2006; Peristeraki et al., 2007).

Generally, sharks are landed to be sold so that rays are rejected for most at Sea (Di Natale, 1998).

The bottom longlines incidentally bring several demersal species such as *Mustelus sp*, *Squalus sp*., *Torpedo* sp. and some *Rajidae* (Stergiou et al., 2002).

A study of pelagic longline fisheries in several northern Mediterranean areas has shown that sharks represent generally 6.2% by number and 13.5% in biomass in the total catch of these fisheries (Megalofonou et al., 2005b). For the study areas, the catch rate was the highest in Alboran Sea (34.3%) followed by the Adriatic (15.11%). CPUE averaged 0.74 ind/1000 hooks (Megalofonou et al., 2005a, b). CPUE is higher in the Alboran Sea (3.8% ind/1000 hook) and Adriatic (1 ind/1000 hook) than other areas (Megalofonou et al., 2005 b).
The importance of sharks in terms of weight in the catch varies with type of longline, it represents 17.7% and 0.3% respectively in longline fisheries targeting swordfish and albacore (Megalofonou and al., 2005a, b).
Along the coast of Morocco, studies show that shark catches do not exceed 3% of total weight landed by surface longline (Srour and Abid, 2004).

In all areas studied, the blue shark, *P. glauca*, is the species the most represented in the catch of surface longline. It is over 70% of the elasmobranchs catch. It is followed by mako *Isurus oxyrinchus*. It also seems that for all species, individuals captured in the Levantine Basin are larger than those caught in the western basin of the Mediterranean (Megalofonou et al., 2005a, b).
Bottom longline catch especially batoids; in Aegean Sea, the Rajidae (*Raja radula*, *R. clavata* and *R. miraletus*) represent 6 to 19 % of the total catch. These rates vary with the hook size (Stergiou et al., 2002).

It is finally noted that studies of elasmobranch fishery bycatch by hooks are missing on the southern shore of the Mediterranean.

- **Driftnet fisheries**

A drift net is a net held near the sea surface by floats and drifting with the current. It is most often attached only to the fishing vessel. The drift nets in the Mediterranean are used primarily for large pelagic (bluefin tuna, swordfish). Although banned now, few fleets Mediterranean (France, Italy, Morocco, and Turkey) continue to use it. They generate incidental catch of elasmobranchs (EJF, 2007).

Incidental catches of large sharks (*Prionace glauca*, *Carcharhinus carcharias*, *Alopias vulpinus*, *Isurus oxyrinchus*, *Cetorhinus maximus*), the pelagic stingray *Pteroplatytrygon violacea* and the giant devil ray *Mobula mobular* have been cited in various driftnet fisheries (Di Natale et al., 1995; Silvani et al. 1999; Celona, 2004, Tudela et al., 2005).

At the Strait of Gibraltar, the monitoring of Moroccan and Spanish driftnet fisheries reveals that elasmobranchs represent less than 1% of total catches (Silvani et al., 1999).

In Italian waters CPUE was estimated at 0,005 specimen / km for *A. vulpinus*, 0.009 sharks /

km for *P. glauca*, 0,001 specimens / km for *C. maximus*, 0.022 individuals / km for *P. violacea* and 0,005 individuals / km for *M. mobular*.

Monitoring of Moroccan driftnet fisheries reveals that in twelve months this fleet catch 20,000-25,000 pelagic sharks (*P. glauca*, *I. oxyrinchus*, *A. vulpinus*) at Alboran Sea and from 62,000 to 92,000 individuals in the straits of Gibraltar (Tudela et al., 2005). In the Ionian Sea, sharks represent 11.3% by mass of drift net catches (Megalofonou et al., 2005). CPUE is 0.04 individuals / km of net.
For the basking shark *C. maximus*, driftnets contribute by about 1% of total catch (Mancusi et al., 2005).

- **Trammel nets and gillnets fisheries**

Trammel nets and gillnets are the nets the most commonly used by small Mediterranean fisheries. These nets are often used at night. The length of set nets depends on the size of the fishing boat.

In the Mediterranean, there is a little use of gillnet targeting sharks. We mention a spring artisanal fishery targeting Hound sharks *Mustelus sp* and Dogfish sharks *Squalus sp* in the north of the Adriatic Sea and one in the Gulf of Gabes targeting *Mustelus sp*, *Carcharhinus plumbeus* and *Rhinobatos sp.* (Bradai et al., 2006). The mesh size varies from one group of species to another. However, these nets bring several other non-target species: species *Scyliorhinus canicula*, *Squalus acanthias*, *S. stellaris*, *Myliobatis aquila*, *Pteromylaeus bovinus Galeus melastomus*, *Centrophorus granulosus Carcharhiuns sp*. *Dasyatis sp* (Costantini et al., 2000, Morey et al., 2006).

Regarding trammel nets, monitoring of fisheries in the Balearic Islands shows the capture of 12 species of elasmobranchs (10 sharks and 2 rays) representing 10% in abundance and 28% in biomass of the total catch. The most common species are *Dasyatis pastinaca*, *Raja radula* and *Torpedo marmorata* representing respectively 48%, 24% and 15% of catches of elasmobranchs (Morey et al., 2006).
In the Aegean, elasmobranchs (mainly Rajidea) represent 6% to 10% by weight of total catches of trammel (Stergiou et al., 2002).
Trammel nets contribute by 30% of the total catch of basking shark in the Mediterranean (Mancusi et al., 2003).

- **Purse seine fisheries**

The purse seine is constituted by a long net made of a series of layers of different mesh sizes with floats on the headline and weights attached to the bottom rope. The codend or "pocket" is located at one end

Although there is little information available in the literature on the bycatch of encircling nets, these nets catch occasionally pelagic sharks and stingrays in fisheries of the bluefin tuna and small pelagic (Hattour et al. , 2000; Farrugio & Fromentin, 2005). In central Mediterranean over 70% of the white shark catches are reported to the purse seine (Fergusson, 1996, Saidi et

al., 2005). Other species are also reported in the catch, *Isurus oxyrinchus*, *Cetorhinus maximus* and *Alopias vulpinus*.

- **Tuna trap fisheries**

These fixed fisheries are placed along the coast, on the passage of migratory species, especially bluefin tuna as they approach the shore. These structures were distributed along the Mediterranean coast, mainly from Italy, but today and after the fall of their productions, many have been abandoned. Some, however, currently remain on the main islands of Italy and Tunisia. Incidental catches of sharks are historically reported (Vacchi et al., 2000).

Recent observations show that at least three species of large pelagic sharks are caught in traps. Tey are the white shark *Carcharodon carcharias*, the mako shark *Isurus oxyrhincus* and the thresher shark *Alopias vulpinus*. In the trap of Sidi Daoud, north of Tunisia, the sharks are 0.3 and 2.3% in biomass of total catch (Hatour et al., 2004).

II-5-3-5 Mitigation measures to reduce bycatch

Fishing trawl

The use of Bycatch Reduction Devices (BRD), similar to those used for marine turtles: TED (Turtle Excluding Device) could be effective solutions for the escape of unwanted animals (Ferretti & Myers, 2006).

These exhaust systems placed in front of the codend and involving a rigid grid splitter and an escape preferably oriented toward the bottom have been successfully tested in Australian fisheries. Among these systems, we cite the NAFTED, SUPER SHOOTER TED using for turtles, sharks and rays and the SEYMOUR more suitable for large individuals. These systems are effective in reducing the catch of large animals but also small fish, can therefore represent significant commercial losses

Gillnet

Based on experiences undertaken in North Carolina on the bottom gill nets, it is suggested to increase the tension of nets to reduce catches of sharks. The tension of the net could be increased by increasing the weights and buoyancy by adding more floats. The impact on commercial production should be evaluated

Longlinig

On the basis of experiences gained in several longline fisheries (Gilman et al., 2007), the following recommendations are important:

- Setting longline the day and by depth

In fact the main species of pelagic sharks and stingrays *Dasyatis sp.* are usually taken in surface waters (Williams 1997) and shark activity is generally nocturnal. This recommendation runs counter the conservation of seabirds.

- Avoid attracting sharks and rays

Avoid jettison of waste, viscera and unmarketable fish to not attract night eaters, as are most elasmobranchs.

- Reduce setting time, so that elasmobranchs are attracted in large numbers by the captured preys.

- Avoid certain types of bait may be more attractive than others; several observations made by the professionals have shown that sharks are attracted by more squid than fish. To avoid catching rays and sharks, mackerel or horse mackerel should be used instead of sardines.
Furthermore, the development of artificial bait may contribute favourably to the reduction in catches of sharks and rays (Erickson et al., 2000).

- Reduce the mortality induced by fishing operations
The majority of elasmobranchs caught by longline being alive at the time of retrieval of longlines and should be able to release them immediately if possible. In general, the use of monofilament that sharks can more easily cut is preferable to any other type of synthetic braided fibres or steel (De la Serna et al., 2002)

- repel elasmobranchs baited hooks
Pre-treatment of baits with synthetic substances could keep out carcharhinid without affecting other fish (Tachibana & Gruber, 1988).

- Small magnets in alloy steel, neodymium and boron would be able to keep away small sharks and rays of baited hooks (Gilman, 2007).

Many other management tools and technical procedures could be suggested to reduce bycatch:

- **Size limits:**

Size limits can be legal minimum sizes or legal maximum sizes. They can be an effective management measure where sharks are landed from the fishing gear live and in condition where the survival rate of released animals is high. Hence, they are effective for many species that survive release from hooks, seine nets, and fish traps, but are not effective for many species released after capture by gillnets and trawls where survival rates are low.

- **Reducing effort:**

This limitation reduce the by-catch in the same proportion to the effort reduction and can be obtained by (1) a limited number of licenses to take fish (2) a reducing fishing time (3) restricted capacity of the fleet… These measures are often incompatible with the social objective of providing employment for fishing communities.

- **Regulation of fishing gear:**

Regulation of fishing gear can be used for control of fishing mortality, of impacts on habitats and ecosystems, and of the food quality of fish retained. The regulation is efficient at capturing target species while avoiding small animals to minimize growth overfishing and avoiding large breeding animals to minimize recruitment overfishing of the species.

- **Area and time restrictions**
- **Marine Protected Areas**
- **Fishing area closure**

II-6 Dynamic populations and stock assessment of elasmobranchs/ Abundance indices

Population dynamics and demographic of elasmobranch fishes are poorly understood worldwide. The paucity of knowledge is due to the difficulty in studying elasmobranch populations and assessing their sizes and to the lack of basic biological and ecological information for numerous species (mainly age and growth parameters).

In the Mediterranean Sea, there are no standardised studies on elasmobranch population dynamics. However, some assessments, based on abundance indices such as elaborated in the frame of Medits bottom trawl surveys, are avaiabe; various studies give data on species richness, population structure, distributional pattern, mean catch rates, abundance and biomass, mean weight for many species.

References inventoried on this issue are: 8, 19, 255, 278, 279, 292, 313, 338, 370, 397, 444, 469, 473, 476, 478 and 510 **(Appendix I)**. These references concern the north of the Mediterranean.

Among all species, *Galeus melastomus*, *Scyliorhinus canicula*, *Etmopterus spinax*, *Squalus acanthis*, *Raja asterias* and *Raja clavata* are the more studied. Biomasses and abundance indices (Kg/Km^2 or individuals/Km^2) are relatively important for four species: *Etmopterus spinax*, *Scyliorhinus canicula*, *Galeus melastomus* and *Raja clavata*. These species were abundant everywhere in the studied area (European coasts, North Mediterranean (Baino et al., 2001; Baino & Serena, 2005; Bertrand et al., 2000; Rey et al., 2004). Series of data based on Medits programme are too short to identify specific trends in species abundances (Bertrand et al., 2000). This programme should be extended to the entire region.

Indices of abundance expressed in CPUE are developed in the bycatch section of this document.

Landings sturture

There is evidence that the elasmobranchs of the Mediterranean are declining in abundance and diversity. Their biological characteristics (low fecundity, late maturity and slow growth rates) make them vulnerable to fishing pressure mainly on juvenile stages. A big proportion of landed specimens are generally juvenile. The following studies illustrate clearly this issue.

The size composition of the most bycaught species varies with gears types. Trawls tend to catch more juvenile specimens than longline. Figure11 shows landings structure of *Mustelus mustelus* in trawling and longline fisheries of the Gulf of Gabès. Trawl catch consists mainly of immature individuals while longline catches more mature ones.

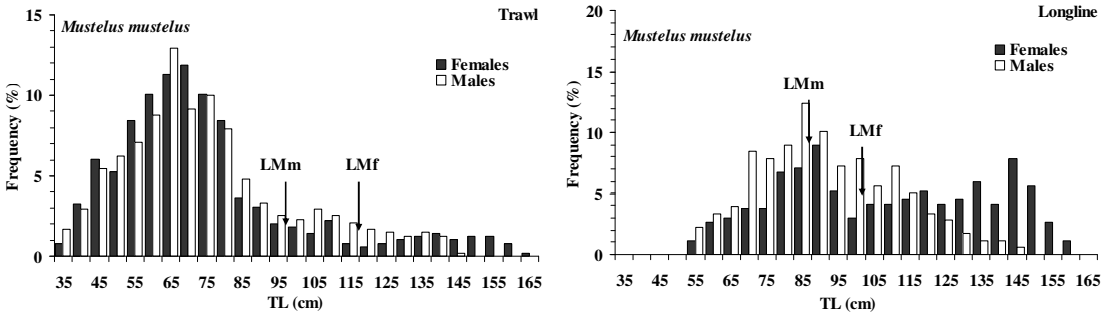


Figure 11: Size distribution in trawl and longline landings of *Mustelus mustelus* in the gulf of Gabès. LMm and LMf: Size at first maturity respectively of males and females (Saidi, 2008).

In Italian waters, trawl captures different stages of demersal species. All immature individuals of *S. canicula* are discarded while some immature individuals of *R. clavata* are landed. Almost, all specimens of *R. asterias* are immature (Fig. 12)

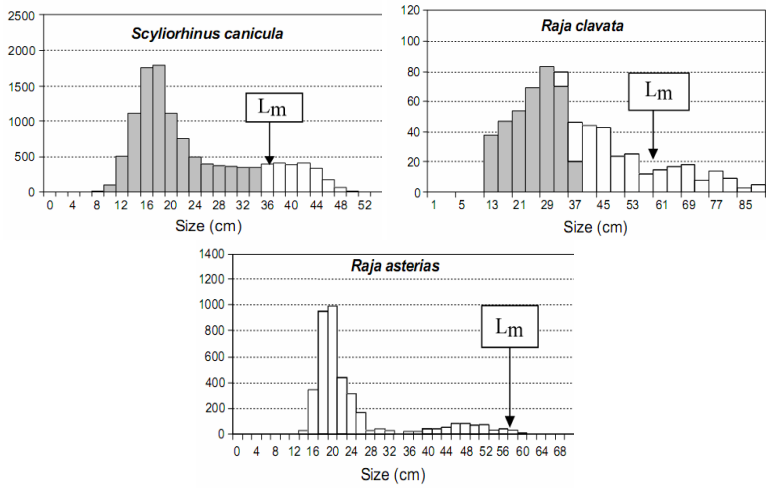


Figure 12: Size distribution in the trawl catches of *S. canicula, R. asterias* and *R. clavata* (Abella & Serena, 2005). Dark bars: Discarded fraction; Lm: size at first maturity of females.

In the Gulf of Gabès, gillnet catches of *Glaucostegus cemiculus* consist mainly on adults, whereas juvenile and subadult specimens were more frequent in the trawl fishery (Fig.13).

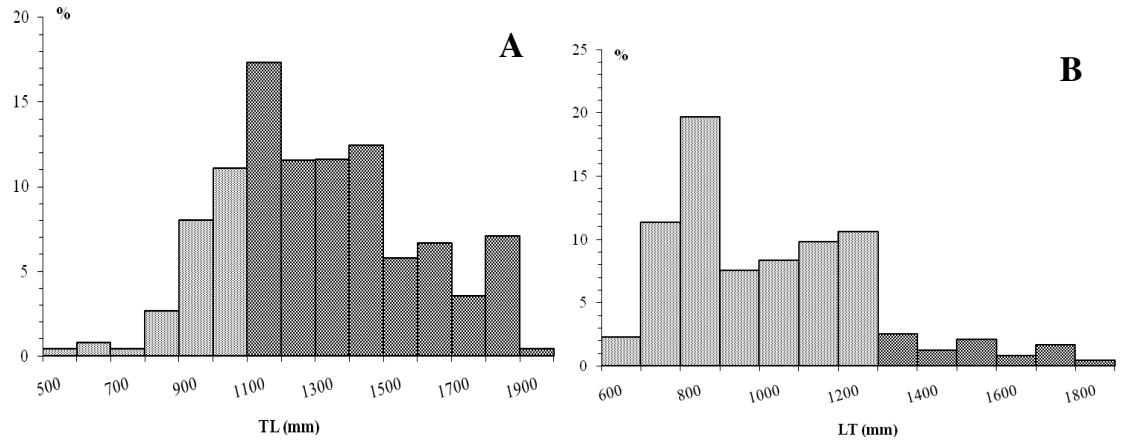


Figure 13: Size distribution in gillnets (A) and trawl (B) landings of *Glaucostegus cemiculus*. Dark bars indicate the landed mature individuals (Enajjar, pers. comm.).

The length-frequency distribution of large pelagic sharks caught incidentally in the swordfish and tuna fisheries of the Mediterranean Sea show that catch consisted mainly of juveniles (Fig.14).

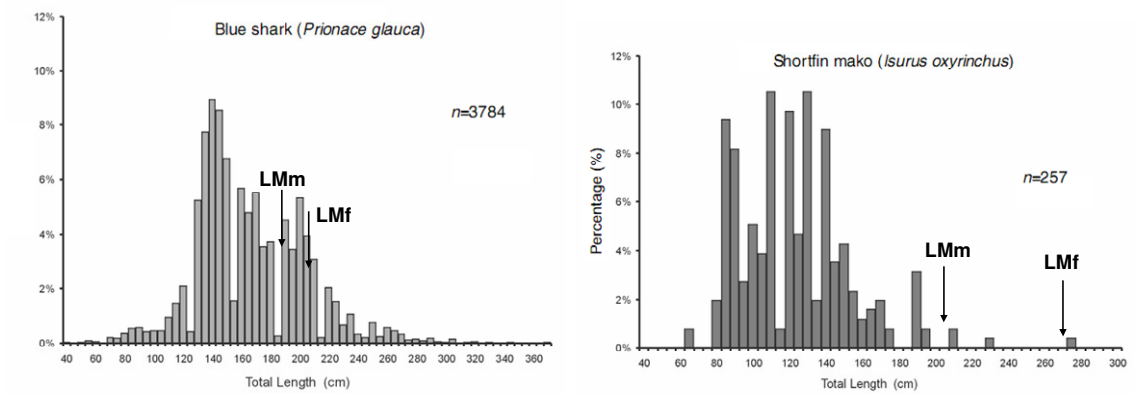


Figure 14: Length-frequency distribution (in percentage by 5-cm size classes) for *Prionace glauca* and *Isurus oxyrinchus* sampled in the Mediterranean swordfish and tuna fisheries during 1998−2000. (Megalofonou et al., 2005)

Size distributions of species show that over 70% of landed specimens are immature (Except for gill net landings).

II-7 Biologic parameters

II-7-1 Reproductive biology

II-7-1- 1 References dealing with the issue

140 references dealing with the biology of the reproduction were inventoried but only 97 papers report detailed data on reproductive parameters, the others give some general information:

3, 4, 6, 12, 15, 20, 21, 24, 49, 63, 64, 65, 66, 67, 76, 77, 78, 79, 84, 85, 86, 90, 91, 92, 93, 95, 97, 98, 99, 100, 101, 103, 107, 110, 111, 117, 118, 123, 124, 125, 127, 133, 134, 137, 138, 139, 142, 143, 147, 148, 149, 150, 152, 153, 154, 155, 156, 157, 160, 161, 163, 165, 167, 169,

170, 171, 172, 173, 174, 175, 178, 180, 182, 183, 184, 186, 187, 188, 191, 194, 195, 204, 208, 213, 218, 227, 230, 232, 240, 241, 258, 259, 261, 263, 275, 302, 305, 312, 314, 322, 325, 326, 329, 350, 352, 367, 367a, 368, 381, 391, 402, 403, 405, 406, 418, 460, 461, 466, 470, 471, 472, 475a, 476, 478, 479, 486, 489, 490, 491, 494, 507, 508, 521, 552, 555, 556, 557, 561, 570 and 576.
About 50% of these papers were published in the latest decade **(Fig. 15)**.

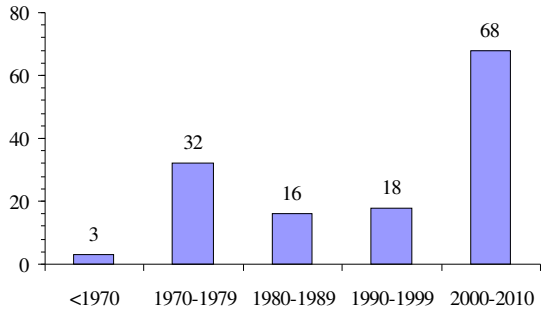


Figure 15: Chronological apparition of papers on the reproductive biology

II-7-1- 2 Distribution of studies as regards the geographic areas

Western Mediterranean (81papers):
21, 24, 49, 63, 64, 65, 66, 67, 76, 77, 78, 79, 84, 85, 86, 90, 91, 92, 93, 95, 97, 98, 99, 100, 101, 103, 107, 111, 118, 124, 125, 127, 133, 134, 137, 138, 139, 142, 143, 147, 148, 149, 150, 152, 153, 154, 155, 156, 157, 160, 161, 163, 165, 167, 169, 170, 171, 172, 173, 174, 175, 178, 187, 188, 191, 194, 275, 305, 312, 322, 381, 418, 460, 461, 466, 475a, 476, 478, 479, 507, 508 and 561.

Central Mediterranean (35 papers):
110, 117, 123, 134, 156, 163, 180, 182, 183, 184, 186, 213, 218, 240, 241, 258, 259, 261, 263, 275, 322, 329, 391, 470, 471, 472, 486, 489, 490, 491, 494, 555, 556, 557and 576.

Eastern Mediterranean (23 papers):
3, 4, 6, 12, 20, 195, 204, 208, 275, 302, 325, 326, 350, 352, 367a, 368, 402, 403, 405, 406, 521, 552 and 570.

Black Sea (5 papers):
15, 227, 230, 232 and 367.

Information on the biology of the reproduction is available for only 43 species, 33 viviparous and10 oviparous. The main reproductive parameters are summarised in **tables 3 and 4**. Studies were carried out mainly in the western Mediterranean and in its central part.

Table 3: Reproductive variables of viviparous elasmobranch species. Litter size corresponds to uterine. PCL: Pre Caudal Length, DW: Disk Width, TL: Total Length.

Scientific name	GSAs	Sex	Size at maturity, (cm TL/DW)	Gestation time (Months)	Reproductive periodicity	Litter size	Size at birth	Reference Number
Heptranchias perlo	12	M F	81-92 85-100	10	annual	6-18		103
Hexanchus griseus	Med	M F	300-354 394	12?	Annual?		55.6-68	24/137/ 350/352
Mustelus asterias	12	M F	60-75 90-96	12	annual	10-35	28-32?	107
Mustelus mustelus	12/14	M F	96-118 108-123	11-12	annual	4-22	34-42	66/486/490
Mustelus punctulatus	12/14	M F	75-90 87.5-100	11-12	annual	5-30	24.5- 30.5 (40-43)	157/491
Galeorhinus galeus	4/12/14	M F	113-126 125-140	12	alternate years	8-41	24-32	125/150
Carcharhinus brevipinna	4/12/14	M F	172 196	13-14?	Annual?	6-10	61-69	139
Carcharhinus limbatus	4/12/14	M F	167 178	12	biannual	6-8	61-65	169
Carcharhinus plumbeus	14	M F	160-166 170-172	12-14	biannual	3-14	50-65	110/494
Prionace glauca	18,19,20, 21;22, 23,24	M F	187-203 203-214.7	-	-	-	-	405/406
Alopias vulpinus	1/3	M F				3-7	117- 155	418
Oxynotus centrina	12/22	M F	60 65	-	annual	10-15	21-24	170/403
Centrophorus granulosus	6/12/23/27	M F	74.5-80 80-85	-	-	1	27.3- 37.2 (PCL)	111/302/ 305/402
Squalus blainvillei	23/14/12 /19/20	M F	40.3-56 52.3-70	-	-	1-6	+19	368/391/460/521
Squalus acanthias	29/23	M F	47-82 51.5-88	22-24	biannual	1-8	28-29	15/204/227 /232/367
Etmopterus spinax	12/10	M F	28-37 34-46	12?	-	5-18	9-11	127/194/ 508/561
Dalatias licha	4/12	M F	74			6	32-39	138
Squatina aculeata	12	M F	120-122 137-143	12	biannual	8-12 (11.1)	30.3-35	133
Squatina oculata	12	M F	71 90	–	–	5-8	–	165
Squatina squatina	12	M F	80 128	–	–	7-18	–	165
Rhinobatos rhinobatos	14/26/24	M F	68-75 69-87	5-12	annual	4-12	22.2-31	6/123/180/ 186/195/258/ 263/326
Glaucostegus cemiculus	14	M F	100-112 110-138	8-12	annual	4-12	35-38	180/183/ 186/258
Dasyatis centroura	12	M F	74-80 66-100	4	?	2-6	-	67/118
Dasyatis pastinaca	26/12/14/24	M F	22-31 DW 24-38 DW	4	2 times/year	3-6	12	12/77/ 259/325/570
Dasyatis tortonesei	12	M F	38 DW 46 DW	4	2-3 times/year	3-8	-	93
Dasyatis marmorata	14	M	30 DW	3-4	2-3 times/year	2-4	11.8	117/182

		F	32 DW					/184
Pteroplatytrygon violacea	4/12/14	M F	42 DW 45 DW	4-5	1-2 times/year	2-7	-	322
Torpedo nobiliana	12/7	M F	55 90	12	biannual	-	17-22	65/148
Torpedo torpedo	12/14/26/10	M F	18-25 19/26	12	Annual	1-16	8-9.7	3/213/261/466
Torpedo marmorata	26/12/10	M F	25-29 31-39.5	10-12	Three year?	2-19	> 10	3/65/97/213
Pteromylaeus bovinus	12	M F	80 DW 90-100 DW	4-8	annual	2-6	-	156/381
Myliobatis aquila	12/7	M F	50-54 DW 70-73 DW	12	biannual	8-12	21-29 DW	147/175
Gymnura altavela	12	M F	78 DW 68-108 DW	9	annual	2-6	+ 29	67/187

Table 4: Reproductive variables of oviparous elasmobranch species.
DW: Disk Width, TL: Total Length.

Scientific name	**GSAs**	**Sex**	**Size at maturity, (cm TL)**	**Fecundity**	**References**
Scyliorhinus canicula	12/7/18	M F	40-44 35-47	38-190	84/167/171/173/489/557
Scyliorhinus stellaris	12	M F	77-79 82	77-109	85/174
Galeus melastomus	12/7/16/1/3/18	M F	36-43 39-46	15-25	149/178/470/476/556
Raja alba	12	M F	91 DW 98 DW	-	79
Raja asterias	12/10/9	M F	51.5-54 56-61	34-112	90/479/507
Raja miraletus	12/26/17/18	M F	28-36.4 30-42.3	10-90	4/153/329/555
Raja melitensis	12/	M F	40 40	10-56	91
Raja radula	12	M F	48 52	-	63
Raja clavata	12/7/29/17	M F	36-48 DW 48-56 DW	108-262	78/143/230/329
Raja polystigma	12	M F	53 63	20-62	86/160

II-7-2 Age and growth

II-7-2-1 References dealing with age and growth

20 references (2, 15, 29, 46, 61, 62, 228, 231, 233, 258, 293, 304, 325, 326, 395, 405, 406, 507, 520, and 570)

II-7-2-2 Species studied

Only 11 species (about 12 % of the Mediterranean elasmobranchs fauna) were the subject of such studies. They are: *Dasyatis pastinaca*, *Etmopterus spinax*, *Prionace glauca*, *Rhinobatos rhinobatos*, *Glaucostegus cemiculus*, *Squalus acanthias*, *Squalus blainvillei*, *Raja asterias*, *Raja miraletus*, *Raja clavata* and *Centrophorus granulosus*.

II-7-2-3 Studied areas

Western Mediterranean: 3 papers concerning: *Centrophorus granulosus, Etmopterus spinax* and *Raja asterias*

Central Mediterranean: 5 papers concerning: *Etmopterus spinax, Squalus blainvillei, Glaucostegus cemiculus, Prionace glauca* and *Raja clavata*

Eastern Mediterranean: 4 papers concerning: *Raja miraletus*, *Prionace glauca, Dasyatis pastinaca* and *Rhinobatos rhinobatos*

Black Sea: 2 papers concerning: *Squalus acanthias*

Samples of *Prionace glauca* come from Aegean Sea, the Ionian Sea, the Adriatic Sea and the Levantine basin.

Age and growth data presented in this Section include parameters for the von Bertalanffy growth model (VBGM) (von Bertalanffy 1938) which provides estimates of L∞, the asymptotic or maximum length (or width for some batoids), k, the growth coefficient, and t0, the age or time when length theoretically equals zero **(tabl. 5)**.

Table 5: Von Bertalanffy growth model (VBGM) parameters: L_∞ (mm TL), k ($year^{-1}$), t_0 (years); t_{max} oldest fish (years), A_{mat} age at maturity (years). Band count method: Vert, vertebral band count; Ext DS, external dorsal spine band count; Int DS, internal dorsal spine band count. GSAs: the number refers to GFCM geographical sub-areas.

Species	GSAs	Methods	Sex	VBGM parameters			t_{max}	A_{mat}	Reference
				L_{∞} (mm)	K	t_0			
Centrophorus granulosus	6	Int. DS	M	917	0.107	-9.78	25	8.5	Guallart (1998)
			F	1094	0.096	-5.48	39	16.5	
Etmopterus spinax	10	Vert.	M	394.3	0.19	-1.41	8		Gennari E & Scacco U. (2007)
			F	450	0.16	-1.09	10		
	19/20	Vert.	M+F				7	5	Sion et al. (2002)
Squalus blainvillei	16	Vert.	M	960	0.135	-1.397	8	3.3	Cannizzaro et al. (1995)
			F	1179	0.102	-1.380	8	5.1	
	14	Int. DS	M	91.1	0.14	-1.42	15	4.79	Marouani et al.

			F	105.7	0.11	-1.12	19	7.44	2010
Squalus acanthias	29	Ext DS	M	1245	0.171	-2.62	27		Demirhan & Seyhan (2007)
			F	1405	0.141	-2.69	38		
	29	Int. DS	M	1280	0.20	-0.3	13		Avsar (2001)
			F	1450	0.17	-0.7	14		
Prionace glauca	18,19, 20, 21;22, 23,24	Vert.	M	402	0.13	-0.62	12	4.9	Megalofonou et al. (2005, 2009)
			F					5.5	
Dasyatis pastinaca	24	Vert.	M	203.13	0.039	-2.00	8		Yeldan et al. (2008)
			F	219.85	0.041	-2.61	12		
			M+F	294.94	0.029	-2.20			
			M+F	121.5	0.089	-1.615	10		Ismen. (2003)
Rhinobatos rhinobatos	24	Vert.	M	121.65	0.310	-0.131	15		Başusta et al. (2008)
			F	154.88	0.134	-1.264	24		
Glaucostegus cemiculus	14	Vert.	M	181.6	0.272	-0.71	10	2.89	Enajjar. (2009)
			F	200	0.202	-0.81	14	5.09	
Raja asterias	9/10	Vert.	M+F	67.45	0.454	-0.23			Serena et al. (2005)/ Bono et al. (2005)
Raja miraletus	26	Vert	M	87.87	0.19	-0.50	15		Abdel-Aziz (1992)
			F	91.92	0.17	-0.25	17.2		
Raja clavata	16	Vert	M	116.7	0.106	-0.412	5.9-6.2	11	Cannizzaro et al. (1995)
			F	126.5	0.098	-0.512	9-9.4	13	

All ageing estimates are invalidated and many are preliminary.

Only one species, *Squalus acanthias* was studied in the Black Sea and not in the Mediterranean and only one species is listed on annex 3 of SPA/BD protocol of Barcelona convention. Ten GSAs, among thirty, are concerned by such studies, species concerned are generally different from a GSA to another.

The organization of a training course on age reading and growth parameters of the main elasmobranchs species seems to be very urgent to enhance research on this field. Growth parameters are necessary for stock assessment studies.

II-7-3 Food and feeding habits

Studies of feeding habits are essential to the understanding of the functional role of fish within the ecosystem. Knowing what a species eats can provide information about possible distribution and its position in food webs.

Sharks are considered top predators and may have an important role in the regulation of marine ecosystems at lower trophic levels. Information about the food habits is essential to appreciate the species biology and ecology, since the quality and quantity of food directly affect species growth and their maturation and mortality. In addition, quantitatively describing the diet and foraging habitat and predator-prey interactions of top predators in a community is a key step in ecosystem approaches to fisheries management.

II-7-3 -1 References dealing with the issue

In the Mediterranean and Black Sea, 88 identified published works report information on diet of 35 species : 1, 3, 5, 15, 16, 25, 30, 34, 35, 68, 70, 71, 72, 73, 74, 75, 80, 87, 88, 89, 94, 96, 103, 111, 112, 113, 114, 120, 121, 129, 158, 159, 176, 179, 181, 190, 191, 199, 218, 220, 230, 233, 234, 258, 262, 264, 267, 268, 274, 284, 287, 291, 302, 325, 326, 328, 334, 335, 336, 337, 343, 346, 347, 350, 361, 362, 363, 384, 393, 399, 402, 424, 425, 439, 441, 442, 443, 479, 484, 485, 487, 491, 492, 497, 507, 535, 568 and 570.
More than 55% of papers appeared last decade **(Fig. 16)**.

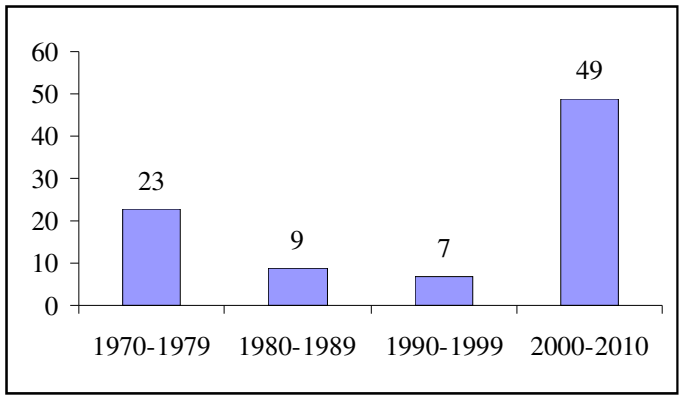


Figure 16: Chronological apparition of papers on diet.

Papers cover all Mediterranean and Black Sea but primarily in the occidental and central areas.

II-7-3 -2 studied areas

Western Mediterranean: 43 papers: 16, 25, 35, 68, 70, 71, 72, 73, 74, 75, 80, 87, 88, 89, 94, 96, 103, 111, 112, 113, 114, 120, 121, 129, 158, 159, 176, 190, 191, 220, 268, 287, 291, 384, 399, 424, 425, 439, 441, 442, 443, 479 and 507.

Central Mediterranean: 23 papers: 34, 179, 181, 199, 218, 258, 262, 274, 328, 334, 335, 336, 337, 361, 362, 363, 393, 487, 491, 492, 497, 535 and 570.

Eastern Mediterranean: 16 papers: 1, 3, 5, 30, 264, 267, 284, 302, 325, 326, 343, 346, 347, 350, 402 and 568.

Black Sea: 7 papers: 15, 230, 233, 234, 264, 484 and 485.

Most species appear to be opportunistic feeding predators, foraging on broad range of prey species **(Tabl. 6)**. However, crustaceans and teleost fishes are the main preys of elasmobranchs. Cephalopods are major prey for *Squalus blainvillei, Galeus melastomus, Centroscymnus coelolepis, Prionace glauca, Dasyatis marmorata, Pteromylaeus bovines, Myliobatis aquila*. Polycheates, sipunculids and echinoderms were of minor importance food; in contrast, *O. centrina* is the only shark species ingesting polycheates. Chondrchtyans are reported to be preys also for various species.

The Giant devilray *Mobula mobular* and the basking shark *Cetorhinus maximus* are mainly planktivorous. It appears that increased basking sharks occurrence is not directly influenced by changes in temperature and salinity. However, obtained data suggest relative importance of copepods, especially of *Calanus helgolandicus*, in relation to the occurrence of basking sharks. (Soldo et al., 2008)

The White shark *Carcharodon carcharias* ingests principally cartilaginous fishes (*Isurus sp*., *Myliobatis aquila*, *Dasyatis sp*.) and bony fishes (*Scomber scombrus*, *Thynnus thunnis*, *Sarda sarda*) and other preys such as marine turtles (*Chelonia mydas*) and cetaceans (*Delphinus sp*.) (Postel, 1958; Capapé, 1975, Bradai, 2000)

Table 6: Diet composition of elasmobranch species from the Mediterranean Sea (xxx: main preys, xx: secondary items, x: accessory item, -: accidental items), Fish: teleost fishes, Mol: molluscs, Cr: crustaceans, other: other invertebrates (echinoderms, sipunculids…).

Species	***GSAs***	***Frequency of Prey***						***Reference number***
		Chon	Fish	Cr	Mol	An	others	
Heptranchias perlo	12	x	xxx	xx	x			103
Hexanchus griseus	22	x	xxx				-	350
Squalus acanthias	29	x	xxx	xx				15/233/234/
Squalus blainvillei	14/22		xxx	xxx	x	-		72/328/347/393
Centrophorus granulosus	12/23/27		xxx	xx				111/302/402
Etmopterus spinax	1/6/10/17/18		xxx	x	x			34/35/268/384/442
Galeus melastomus	1/6/9/10/12	-	x	xxx	x	-	-	35/176/190/268/384/441
Datalis licha	6	xx	xxx	xx	xx			384/399
Centroscymnus coelolepis	6		x	x	xxx		-	190
Oxynotus centrina	7		x	x		xxx	x	120
Carcharhinus plumbeus	14	x	xxx	x	xx	-		492
Mustelus mustelus	6/14/17		xx	xxx	x	-	-	218/334/335/424/497
Mustelus punctulatus	12/14/17		xx	xxx	x	-	-	158/334/336/491

Scyliorhinus canicula	6/11/12/22		xx	xxx	x	-	-	68/284/425/487
Scyliorhinus stellaris	12		xx	xxx	x	-	-	70
Prionace glauca	9	x	x	x	xxx		x	291
Carcharodon carcharias		x	xxx		x		x	274
Rhinobatos rhinobatos	14/24		xxx	xxx	x	-	-	5/30/179/258/262/326
Glaucostegus cemiculus	14		xxx	xxx	x	-	-	258
Dasyatis pastinaca	12/24/29		xx	xxx	x	x		73/325/484/570
Dasyatis tortonesei	12	-	xxx	x	x			94
Dasyatis marmorata	14		x	x	xxx	x	-	181
Pteroplatytrygon violacea	9			xxx				439
Torpedo torpedo	26		xxx	x	-	-	-	3
Torpedo marmorata	7/26		xxx	-	x	-	-	3/129
Pteromylaeus bovinus	14		xxx	x	xxx	-	-	87/113
Myliobatis aquila	12/17		-	-	xxx	-	x	80/113/337
Raja alba	12	x	xxx	x	x			89
Raja asterias	9/10/12		xx	xxx	x	-	-	159/220/479/507
Raja brachyura	11		xxx	xx	x	-		191/287
Raja miraletus	11/12/26		x	xxx	x	-	-	1/121/267/287
Raja melitensis	12			xxx				75
Raja radula	12/26		x	xxx	x	-	-	1/121
Raja clavata	11/12/14/26/29		xx	xxx	x	-	-	1/74/230/264/362/425/485/568
Raja polystigma	12		xx	xxx	x	x	x	96

Although the important number of papers dealing with feeding habits of Mediterranean elasmobranch species, our understanding on the issue remains rudimentary. In fact, most of papers simply describe stomach contents of a particular species in a particular zone and using few samples.

Among papers on dietary composition only 15, concerning 12 species, determine dietary indexes F%, N%, M%, IRI% and study dietary changes in relation to size and/or seasons and sex **(tabl. 7)**.

Table 7: studies calculating dietary indexes F%, N%, M%, IRI% and studying dietary changes in relation to size and/or seasons and sex

Species	GSAs	References
Etmopterus spinax	10/1,6	35/ 268
Galeus melastomus	10/1,6	35/190/268

Centroscymnus coelolepis	6	190
Carcharhinus plumbeus	14	492
Mustelus mustelus	17/6/14	335/424/ 497
Mustelus punctulatus	17/14	336/491
Rhinobatos rhinobatos	26/14	5/258
Glaucostegus cemiculus	14	258
Dasyatis pastinaca	29	484
Raja brachyura	11	191/287
Raja miraletus	11	287
Raja clavata	29	485

There are relatively few investigations comparing diets of sympatric species of elasmobranchs (1 study). In several studies, standard ecological indices of similarity were used to calculate dietary overlap among elasmobranch species, among elasmobranchs and teleosts caught in the same location, or among different size classes of a single species. Such comparisons represent initial attempts to characterize food partitioning and competition among elasmobranchs and co-occurring teleosts. Ecological indices of dietary breadth or diversity have also been calculated for several species of elasmobranchs to examine the degree of feeding specialization.

Rate of consumption, feeding patterns, and the fate of food once ingested have been examined for very few species of elasmobranchs.

II-8 Data on common elasmobranchs species in the Black Sea

Regarding the lack of information on elasmobranchs in the Black Sea and the few species occurred in this region, we summaries knowledge on the three main species; *Raja clavata, Dasyatis pastinaca* and *Squalus acanthias* in some Black Sea countries following the proceedings of the work shop on demersal resources in the Black Sea and Azov Sea edited by Ozturk and Karakulak (2003). Many papers in Russian were not analyzed in this document.

Bulgaria

The thornback ray *Raja clavata* and the common stingray *Dasyatis pastinaca* have no commercial importance due its low market demands in the Bulgarian Black Sea. The mean landings of the thornback ray during the period 1925-2002 was 1.2 tons. The spiny dogfish *Squalus acanthias* is more common, landing for the same period ranged between 0 to 153 tons, 100 in 2002 and a mean of 15.3 year.

Ukraine

Picked dogfish.

It inhabits the whole Black Sea shelf at the water temperatures 6-15° C. It undertakes regular migrations in the waters of Ukraine. In autumn feeding migrations are aimed at the grounds of the formation of the wintering concentrations of anchovy and horse mackerel in the vicinity of the Crimean coasts. Reproductive migrations of viviparous picked dogfish take place towards the coastal shallow water with two peaks of intensity in spring and autumn. The autumn migration for reproduction covers more individuals usually.

Most of picked dogfish is harvested in spring and autumn months by target fishing with nets of the mesh size100 mm and with long-lines and during sprat trawl fisheries as by-catch.

To assess the picked dogfish stock, the area coverage technique incorporating the data of trawl surveys, as well as dynamic model of an isolated population, being a combination of Baranov's analytical model and the reproduction model (Shlyakhov, 1997; Kirnosov and Shlyakhov, 1988) were applied. The results of the picked dogfish stock assessments are given in **table 8**. Picked dogfish in the waters of Ukraine tend to be reduced slowly, although its population is harvested slightly. This is connected with progressive deterioration of reproductive ability of the females, which we have observed since the early 1990s. If in 1970-80s the mean number of yolk ovocytes for one female made up 22, and embryos 14, so by the late 1990s these figures made up, respectively, 19.5 and 12.4. As a result, the abundance of recruits reduces year by year.

Table 8: Commercial stock of picked dogfish in the Black Sea and along the coast of the former USSR and in the water of Ukraine in 1992 -2002 (thousand tons).

years	Waters of Ukraine, the Russian Federation and Georgia		Waters of Ukraine	
	Trawl survey	Modeling	Trawl survey	Modeling
1992	62.9	60.3	56.9	-
1993	-	57.1	30.2	-
1994	-	52.9	36.0	42.1
1995	-		-	37.6
1996	-		-	32.1
1997	-		-	31.0
1998	-		32.0	30.8
1999	-		-	28.0
2000	-		-	24.3
2001	-		-	22.3
2002	-		-	21.0

Monitoring of non-reported catches of picked dogfish in the waters of Ukraine in 1992-2003 was not carried out, but, according to the data available, their major amount fell on by-catch in sprat trawl fishing; in 1998 its value in the waters of Ukraine was estimated as 0.8 thousand tons, while the official landing of picked dogfish in by-catch made up about 0.2 thousand

tons, and total annual catch 1.7 thousand tons. As in the case of turbot, a part of the picked dogfish as by-catch in trawls is released to the sea, not losing viability at this time.

To regulate picked dogfish fishing in the Black Sea the following norms were established:

-minimum commercial fishing size -85 cm (SL);

-allowable by-catch of its juveniles in target fisheries not more than 15% in numbers.

Thornback ray and common stingray: Over the shelf of Ukraine two representatives of Rajiformes *family* thornback ray and stingray occur. Thornback ray does not undertake distant migrations. Its local migrations are spring approaches to the coast in depth 10 -40 m and autumn escapes to the open sea in depth more than 40 m. In summer, in the period of reproduction, and in the early autumn thornback ray is forming commercial concentrations mainly in the coastal waters of Crimea. In the rest periods of a year it distributes by segregations over a large area of the shelf zone.

Stingray is a warm-Ioving fish; therefore distant wintering migrations are typical in autumn, in the waters of Ukraine towards the southern coast of Crimea. With water warming in spring, common stingray comes back to the coastal shallow water for reproduction and feeding. It belongs to viviparous fish; fingerlings are born at temperature more than 15°C. It distributes with maximum density in Kalamitsky and Karkinitsky Bays in depth of 5 -30 m.
Grounds and fishing gears for target fishing of *Rajiformes* are the same as for picked dogfish. By-catch of *Rajiformes* in trawls is inconsiderable and usually it releases to sea completely as these fishes are of little demand at the domestic market. Till the early 1990s totally the whole yield of *Rajiformes* were processed into the minced meat for feeding of poultry and other domestic animals. After 1992 sales of minced flesh as feeds for animals slumped and fishermen lost their interest for harvesting of *Rajiformes*. For recent years in Ukraine there has been observed people's demand for *Rajiformes* as human food. In this connection their fishing becomes to revive.
Till 1993, when the intensity of *Rajiformes* fisheries was high in the waters of Ukraine and catches of thornback ray varied within the range 0.3-0.6 thousand tons, the stock of this species was assessed by VPA method applying the software ANACO produced by FAO (Shlyakhov, 1997; Shlyakhov and Lushnikov, 1995). For the subsequent years the intensity of the coastal fisheries became so low that application of this method was incorrect. For some years the stock of thornback ray was assessed by the trawl surveys data, however, due to the under-recording of fishes in small depths these assessments were underestimated **(Table 9)**.

Table 9: Commercial stock (thousand tons) of thornback ray in the Ukrainian Black Sea in 1992 1998.

Years	**stock**	
	VPA	**Trawl Survey**
1992	**2.6**	**1.1**
1993	**-**	**-**

1994	**-**	**0.9**
1995	**-**	**-**
1996	**-**	**-**
1997	**-**	**-**
1998	**-**	**1.0**

Russia
Some data on the biology of dogfish and stingrays are given. All these fish have secondary commercial importance because their annual catches are not big.

The dogfish *squalus acanthias* Linnaeus, 1758 is a small shark (it is up to 2 m long, weight is up to 18 kg), inhabits the whole water column but prefers lower layers. Its main food items are anchovy, kilka and other small fish, especially those which form accumulations. Its annual catch has decreased during last decades, but they do not reflect the state of the stock. The scientific trawl surveys undertaken every year show that the biomass of the dogfish in the north-eastern part of the Black Sea is near 20 th.t and the total admissible catch (TAC) can be estimated as 700 tons.
Rays. There are two species (the thornback ray *Raja clavata* Linnaeus 1758 and the stingray *Dasyatis pactinaka* Linnaeus, 1758) in the Russian part of the Black Sea. They occupy different ecological niches. Their stocks are about 800 t. Rays are usually caught together with dogfish and flounders. TAC for ray cannot be more than 100 t.

Georgia
Squalidae
Squalus acamthias Linnae-Found in the Black Sea coastal zone of Georgia, in 1090m depth in small groups length about 120-140cm. Its favourable temperature is 6-18°C. Females acquire reproductive abilities at the age of 17, and males at the age of 13-14. The copulation period is spring. The period of pregnancy is 18-22 months. It lays eggs in October November and December in 10-35m depth, mostly 20-30cm long. It feeds on fish and bottom invertebrates.

Rajidae
Raja calvata found in the Black Sea coastal zone of Georgia in small quantities in 10-90m depth. Length up to 90cm. Avoids the temperature higher than 18-19°C. After copulating in March-April on the bottom of 10-40m depth, it lays eggs in instal1ments several tens of eggs. The development of the laid eggs takes 5 months. The length of the appeared fish is about 12-13cm, its width 8 cm. It feeds on fish and bottom invertebrates. It is captured in small amounts.

Dasyatidae
Dasyatis pastinaca found in the Black Sea coastal zone of Georgia in medium quantities, in silty and sandy ground, in 10-80m depth. Length 100 cm. It avoids the temperature lower than 11-12°C. It feeds on fish and bottom invertebrates. Here it is caught in medium amounts.

Romania
Capture evolution of *Squalus acanthias* in Romania costs is shown in **table 10**.

Table 10: Capture evolution of *Squalus acanthias* during 1970 -2002.

	YEARS	

	1970-1980	1981-1990	1991-2002	**TOTAL**
Squalus acanthias	277	532	98	907

III- Conservation measures

Protection currently granted to chondrichthyan fish species in the Mediterranean Sea under various regional and international conventions

III-1 Global instruments

III-1-1 The Convention on the Conservation of Migratory Species of Wild Animals (CMS or Bonn Convention, 1979)

Three threatened shark species are currently included in the Appendices of the Convention on Migratory Species (CMS), in recognition of their unfavourable conservation status and need for concerted international conservation measures. Whale shark *Rhincodon typus* was listed on Appendix II in 1999, white shark *Carcharodon carcharias* on Appendices I and II in 2002, and basking shark *Cetorhinus maximus* on Appendices I and II in 2005. Several other highly migratory shark species require concerted international conservation measures may in future be nominated for inclusion in the CMS Appendices.

III-1-2 The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

CITES was established in recognition that international cooperation is essential for the protection of certain species of wild fauna and flora from over-exploitation through international trade. It came into force in 1975, creating the international legal framework for the prevention of trade in endangered species of wild fauna and flora and for the effective regulation of international trade in other species which may become threatened in the absence of such regulation. Three shark species are listed on Appendix II of CITES: basking shark *Cetorhinus maximus*, whale shark *Rhincodon typus*, and white shark *Carcharodon carcharias*, and CITES maintains an active involvement in shark conservation issues under the Resolution on the Conservation and Management of Sharks.

III-1-3 United Nations Convention on the Law of the Sea (UNCLOS)

UNCLOS was adopted in 1982 and came into force in 1994. It provides a framework for the conservation and management of fisheries and other uses of the seas by giving coastal States rights and responsibilities for the management and use of fishery resources within their national jurisdictions (the territorial sea, which can extend up to 12 nautical miles) and enabling the establishment of EEZ.

For stocks that occur within the exclusive economic zones of two or more coastal States, or both within the exclusive economic zone and in an area beyond and adjacent to it, UNCLOS calls upon the coastal States and States fishing in the high seas to seek agreement upon the measures necessary for the conservation and development of those stocks in the adjacent high seas area. Such stocks are likely to include the highly migratory species listed in UNCLOS Annex 1 (*Hexanchus griseus*; *Cetorhinus maximus*; Family *Alopiidae*; *Rhincodon typus*;

Family *Carcharhinidae*; Family *Sphyrnidae*; Family *Isuridae*) and other species that fall within the CMS definition of migratory. UNCLOS also calls upon the coastal States and other States fishing highly migratory species to cooperate in ensuring conservation and promoting the optimum utilization of those resources in their whole area of distribution.

III-1-4 United Nations Agreement on the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFSA)

UNFSA was established to implement the provisions of UNCLOS pertaining to the conservation and management of straddling and highly migratory fish stocks.

UNFSA, adopted in 1995, ratified in 2001, calls for Parties to protect marine biodiversity minimise pollution, monitor fishing levels and stocks, provide accurate reporting of and minimise by-catch and discards, and gather reliable, comprehensive scientific data as the basis for management decisions. It mandates a precautionary, risk-averse approach to the management of straddling and highly migratory stocks and species in cases where scientific uncertainty exists.

III-1-5 FAO International Plan of Action for the Conservation and Management of Sharks (IPOA–harks)

By 2000, FAO had developed the International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks) to form part of the Code of Conduct for Responsible Fisheries. The IPOA-Sharks emphasizes that the harvest of chondrichthyan fishes should be biologically sustainable, economically rational, utilizing all body parts of the sharks killed, and managed to ensure biodiversity conservation and maintenance of ecosystem structure and function. Under this action plan, signatory nations are obliged to develop and implement a National Plan of Action for the Conservation and Management of Sharks

III-2 Regional protection instruments

III-2-1 The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention, 1982)

The Convention aims to ensure conservation of wild flora and fauna species and their habitats. Special attention is given to endangered and vulnerable species, including endangered and vulnerable migratory species specified in appendices.

The Bern Convention covers most of the natural heritage of the European continent and extends to some States of Africa.

The basking shark *Cetorhinus maximus* and the white shark *Carcharodon carcharias* were listed on Appendix II as s**trictly protected species.**

The following Mediterranean species were listed in Appendices III among protected fauna species:

PLEUROTREMATA

Lamnidae: *Isurus oxyrinchus /Lamna nasus*
Carcharhinidae: *Prionace glauca*
Squatinidae: *Squatina squatina*

HYPOTREMATA
Rajidae: *Raja alba*

III-2-2 Convention for the Protection of the Mediterranean Sea against Pollution (Barcelona Convention, 1976)/ Protocol on Specially Protected Areas and Biological Diversity (SPA &BD, 1995).

This Protocol which has come into force in December 1999 lists the Basking Shark and the Great White Shark along with the Devil Ray as Endangered or Threatened species (Appendix II). Parties signing the protocol must ensure "the maximum protection possible and the recovery of these species". This Protocol recommends that exploitation of five other species is regulated (Appendix III): *Isurus oxyrinchus*, *Lamna nasus*, *Prionace glauca*, *Squatina squatina* et *Raja alba*.

III-2-3 Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea

A specific Plan of Action has been developed by the UNEP for the Conservation of Cartilaginous Fish in the Mediterranean. This plan was drawn up in collaboration with the IUCN Centre for Mediterranean Cooperation and the Shark Specialist Group, and adopted by the contracting parties to the Barcelona Convention in November 2003. This is a very significant step, since it is the first regional Plan of Action on sharks drawn up by the United Nations Environment Programme (UNEP).

The objectives, as written in this Action plan, are:

- The general conservation of the chondrichthyan populations of the Mediterranean, by supporting and promoting national and regional programmes for sustainable fisheries of commercial stocks either as they are target and accessory species;
- The protection of selected chondrichtyan species, whose populations are considered endangered;
- The protection and the restoration of critical habitats, such as mating, spawning and nursery grounds;
- The improvement of scientific knowledge by research and scientific monitoring, including the creating of regional standardised databases;
- The recovery of depleted chondrichthyan stocks;
- Public awareness and capacity-building about conservation of chodrichthyans.

The **table 11** summarises species listed in appendixes of main conventions.

Table 11: Mediterranean Elasmobranchs currently included in the appendixes

of International Conventions

Species	Bern convention	Bonn convention	Barcelona convention	CITES
Carcharodon carcharias	Appendix II	Appendix I Appendix II	Appendix II	Appendix II
Cetorhinus maximus	Appendix II	Appendix I Appendix II	Appendix II	Appendix II
Mobula mobular	Appendix II		Appendix II	
Isurus oxyrinchus	Appendix III		Appendix III	
Lamna nasus	Appendix III		Appendix III	
Prionace glauca	Appendix III		Appendix III	
Squatina squatina	Appendix III		Appendix III	
Raja alba	Appendix III		Appendix III	

III-2-4 EU Action Plan for the Conservation and Management of Sharks

In February 2009 the European Commission adopted the first ever EU Action Plan for the Conservation and Management of Sharks. The aim of the plan is to ensure that effective steps are taken to help rebuild shark stocks wherever they are under threat, if necessary on a precautionary basis, and to set down guidelines for the sustainable management of the fisheries concerned, including those where shark are taken as by-catch. The plan also includes measures to improve scientific knowledge of shark stocks and shark fisheries.

III-3 other initiatives for conservation

III-3-1 The IUCN Red List of Threatened Species

The IUCN Red List of Threatened Species is a widely-recognised system for classifying species at risk of global extinction. It has no legal standing, but is frequently used by governments and environmental institutions to set priorities and conservation actions.

III-3-2 The IUCN Shark Specialist Group

This group was established by IUCN, as part of its Species Survival Commission in 1991. The SSG was formed to assess and address the conservation needs of sharks. The SSG is currently part way through a programme to complete global assessments for all chondrichthyan species

III-3-3 The Mediterranean Large ElasmobranchsMonitoring (MEDLEM)

MEDLEM is a monitoring program on the captures and sightings of the large cartilaginous fishes occurring in the Mediterranean Sea. This program directly links up with the FAO IPOA-SHARKS and it has been submitted to the discussion of the SAC Sub-Committee on Marine Environment and Ecosystems of the GFCM (Barcelona, 6-9 May 2002) as “subproject Basking shark”. In the context of this Sub-Committee there is a continuous updating of information on incidental catches of protected species and on by catch of large migratory sharks in the commercial fisheries.

17 great cartilaginous fishes are actually concerned by the programme. The definition of “great cartilaginous fishes” is referred to sharks with total length bigger than 100 cm or batoid fishes (rays and skates) with disc width bigger than 150 cm.

18 Mediterranean research centers and organizations cooperate on this subject and conform in the collection of data. The IUCN (International Union for Conservation of Nature and Natural Resources–) and EEA (European Elasmobranch Association) endorsed the project. **11** different countries involved, so far **21** species recorded and **1300** records in the database **24** passwords for the access to the database

Another important aspect of this project is the collection of scientific papers related to elasmobranchs in the Mediterranean area. About 400 bibliographic references are actually listed in a specific set of the project database.

III-4 National Species protection status

Legislation on species protection is generally elaborated implementing CITES Convention and/or Bern convention and SPA –Biodiversity protocol of Barcelona Convention (Greece, Italy, Malta, Croatia, Montenegro and Monaco). In this way *Cetorhinus maximus, Carchadon carcharias* and *Mobula mobular* benefit of a strict protection. Strict protection is also applied for *Carcharhinus plumbeus* in Turkey. Some species of national interest may be subject to management measures (Malta, Tunisia). In Israel all Cartilaginous Fishes are protected. Some information's are gathered as follows:

Croatia: Strict protection for *Cetorhinus maximus, Carchadon carcharias* and *Mobula mobular* (OG n°7/2006, issued by Nature Protection Directorate, Ministry of Culture).

European community: Catch, retention on board, transhipment and landing prohibited since 2007 for *Cetorhinus maximus* and *Carchadon carcharias*.

Greece: Protected species are the ones that are mentioned in CITES Convention Bern convention and SPA –Biodiversity protocol of Barcelona Convention

Israel: All Cartilaginous Fishes (2005 declaration within the legislative framework of National Parks, Nature Reserves and National Monuments 1998 (Ministry of Environmental Protection)).

Italy: Applies to species listed for strict protection under Barcelona Protocol, Bern Convention and in CITES Appendices.

Malta: Strict protection for *Carcharodon carcharias, Cetorhinus maximus* and *Mobula mobular*.

14 species of national interest whose taking in the wild and exploitation may be subject to management measures (Sch.VIII): *Alopias vulpinus, Carcharhinus, brevipinna, Carcharhinus limbatus, Carcharhinus plumbeus, Carcharias taurus, Galeorhinus galeus, Hexanchus griseus, Isurus oxyrinchus, Lamna nasus, Leucoraja melitensis, Prionace glauca, Pristis pristis, Rostroraja alba, Squatina squatina*. (Flora, Fauna and Natural Habitats Regulations (311/2006) issued under the Environment Protection Act (Malta Environment and Planning Authority).

Monaco: species listed in CITES Appendices (Ordonnance Souveraine n° 67 du 23 mai 2005, Journal de Monaco du 26 mai 2006 n° 7757).

Montenegro: protection for *Carcharodon carcharias* and *Lamna nasus* (Decision on Endangered or Threatened Species of Flora and Fauna (2006) and CITES implementation legislation (Decision on Strict control list of import, export and transit: Official Gazette RME, no. 28/06).
Slovenia : Strict protection for *Carcharodon carcharias* and *Cetorhinus maximus* (Decree on Protected Wild Fauna, Official Bulletin 46/2004 (Ministry of Environment and Physical Planning)
Tunisia: It is prohibited to fish rays and skates less than 40 cm and torpedos below 20 cm in length, measured from tip of snout to start of tail (Decree 28.9.1995, Minister of Agriculture)
Turkey: Strict protection for *Carcharhinus plumbeus* and *Cetorhinus maximus* (Circulars on Fisheries related to Fisheries Law: 1380) (Ministry of Agriculture and Rural Affairs).

III-5 Habitat protection/MPAs to support Elasmobranchs conservation

According information available, there are no MPAs established specifically for Elasmobranchs in the Mediterranean Sea except in Turkey where Mating and breeding habitats of *Carcharhinus plumbeus* in the Bay of Boncuk are protected by the Environmental Protection Agency for Special Areas. The lack of legislation in this issue would come mainly from lack of knowledge on critical habitats of this group. Some mapping of nursery areas and spawning ground for some species being carried out by some countries. Critical habitats should be identified for conservation porpoises. Otherwise, Sharks are protected in MPAs along with other marine species but no MPAs established with reference to these species such as PELAGOS Sanctuary (for cetaceans) and the two MPAs: Larvotto (Ordonnance Souveraine du 25 avril 1978) and Spélugues (Ordonnance Souveraine du 29 août 1986) in Monaco.
Marine protected area can be efficient to manage sharks fisheries: (to protect nursery area, parturition zone….).
Temporary closure of fishing area can be efficient to reduce capture of critical stage of the life history of the species (new born, pregnant females….). In Tunisia the gulf of Gabès is closed to trawling fishery from July to Septembre,

III-6 Regulation of shark finning

Shark fins are among the most highly priced fisheries products in eastern Asia and this is stimulating the targeting of sharks and retention of only their fins, the practice known as ‘finning’.This practise is wasteful of protein and other potential products derived from sharks. In fact only fins are used, the remainder being thrown away. Finning causes the death of tens of millions of sharks in the world, directly threatening rare and vulnerable shark species and indirectly impacting other commercial species due to the effects of removal of top predators from these food webs.

As fining activities don’t take place generally in Mediterranean countries, there are no national regulations of shark fining except in Spain. However, Regulation EC n°1185/2003 bans removal of fins followed by discard of the carcass at sea. Finning with retention of carcasses on board is permitted in accordance with the provisions of Regulation. The

theoretical correspondence between the weight of fins retained and the parts of the bodies retained on board should be established by the Member States but cannot exceed 5% of the live weight of the shark catch. In Mediterranean, this activity is likely to interest more and more fishermen.

The ICCAT 2004 regulation and the GFCM 2005 regulation recommend the full utilisation of sharks (only head, skin and guts may be discarded). Landed fins are not to exceed 5% of landed shark weight. The live release of incidentally caught sharks is encouraged but not required.

In Spain, the order of the Ministry of Agriculture, Fisheries and Food, dealing with specific conditions for the catching of sharks (June 2005), prohibits shark finning (removal of fins and discarding the carcass at sea). It is prohibited to hold on board, unload, tranship or transport sharks' fins without the corresponding weight of the rest of the body. In cases where fins or the rest of the shark's body are held on board, transhipped, unloaded or transported separately, they should be accompanied by a document certifying the placing on the market of each part, as applicable. Such activity is therefore permitted only under special permit in accordance with EC Regulation n° 1185/2003.

Conclusion

595 references, dealing with elasmobranchs, were analyzed in this document. The temporal apparition of papers shows that interest on elasmobranchs research is relatively recent. It was starting in the last of the 1990s. Works were concentrated mainly in the western Mediterranean following by the Eastern basin. Few works concerned endangered species and those of the GFCM priority list.

After critical analysis of the literature and taking into acount new published data on the systematic of elasmobranchs, we consider 86 species of elasmobranchs thought to occur in the Mediterranean Sea (49 species of sharks and 37 batoids). Among the 86 species 13 species (7 sharks and 6 batoids) were recorded in the Black Sea. At least other 8 species of elasmobranchs have been reported in the Marmara Sea which is with the Black Sea and Sea of Azov in the same FAO sub-area. However, much confusion persists for some species and some others are doubtful. These species need more systematic revision.

Endemism of chondrichthyans in the Mediterranean is low, only four batoids species were considered as endemic. Alien species are increasingly recorded, 8 species are known to occur in the Mediterranean

Within the Mediterranean, the distribution of elasmobranch fishes is not homogenous. A recent work showed that concentration of rays and sharks occurred in coastal waters of the western basin and the central Mediterranean especially in the waters of Tunisia and Libya. In the Adriatic Sea, the presence of cartilaginous fish species is scarce especially in the northern part. The Black Sea fauna is composed of Mediterranean species. Thirteen elasmobranchs species are assumed to live in the Black Sea whose three species are relatively common; the thornback ray *Raja clavata* and the common stingray *Dasyatis pastinaca* having no commercial importance and the spiny dogfish *Squalus acanthias*. Some areas are considered

critical habitat for elasmobranchs. For example, Tunisian waters provide a nursery area for great white shark *Carcharodon carcharias*. The gulf of Gabès seems to be also a nursery for many other elasmobranchs.

The IUCN red list (2010 regional assessment) shows clearly the vulnerability of elasmobranchs and the lack of data on this fish group; 42. 5 % are vulnerable and endangered to critically endangered, 22.5 % are Near Threatened (NT) and 21. 25 % are Data Deficient (DD).

Elasmobranchs fish species are exploited for their fins, skin, jaws or meat. Sometimes they are directly targeted by commercial and recreational fisheries while in other cases they are incidentally caught as bycatch. In Mediterranean Sea, catches represent only 1.1% of the total landings. A decline in cartilaginous fish species landings has been observed while fishing effort has generally increased. The catches show an increasing trend; 24,000 tonnes attained in 1983 and since then a regular decrease are observed. The present elasmobranchs productions are about 7000 tonnes annually. Sharks represent 1.3 times the production of batoïdes. The major elasmobranchs fishing countries within the Mediterranean are Italy, Turkey and Tunisia; they contributed on average with 76 % in the production of elasmobranchs during the last 30 years. Countries report generally shark statistics without distinction between species or, worse still, the species are not recorded at all. Moreover, FAO data only report official landings and therefore bycatch returned to the sea is not included. A protocol should be developed to collect and promote the collection of basic data on elasmobranchs species.

In the Mediterranean, almost no elasmobranchs are subject to directed fisheries, but elasmobranchs constitute part of the bycatch in most local artisanal fisheries. Catches of elasmobranchs primarily derive from two different fisheries: the pelagic artisanal fishery with longlines and gillnets and the demersal trawl fishery.

The Bycatch has become one of the issues to be considered in any development of fisheries. Elasmobranchs who's considered mainly as bycatch are very sensitive given their particular biological characteristics. The Bycatch can induce imbalances between top predators and prey and consequently affect biodiversity.

96 papers covering many aspects and approaches to fisheries were identified and analyzed. The interest in the incidental catch is relatively recent; More than 75 % of papers on this topic appeared last decade.

Trawling generates several problems: juvenile catches, important discards and negative impact on the environment. In the Mediterranean, discards constitute over 40% of the catch. At least 74 species are mainly caught by trawlers. The sustained increase in trawl fishing effort appears to have contributed to a decline in biodiversity in the Mediterranean elasmobranch (stock and habitat). For this fishing gear, very often the information concerns a listing of species without an estimate of catch rates by fishing effort. A regional research programme on this issue should be launched.

Surface longlines targeting swordfish, albacore and tuna generate significant bycatch of sharks. At least 15 species of sharks are affected by this gear. In all areas studied, the blue shark, *P. glauca*, is the species the most represented in the catch of surface longline. It is over 70% of the elasmobranchs catch. It is followed by mako *Isurus oxyrinchus.*
The bottom longlines incidentally bring several demersal species such as *Mustelus sp*, *Squalus sp*., *Torpedo* sp. and some Rajidaes. It catches especially batoids.
It is finally noted that studies of elasmobranch fishery bycatch by hooks are missing on the southern shore of the Mediterranean.

Although banned now, few fleets Mediterranean (France, Italy, Morocco, Tukey) continue to use the drift nets. They generate incidental catch of elasmobranchs. Incidental catches of large sharks species have been cited in various driftnet fisheries.

In the Mediterranean, there is a little use of gillnet targeting sharks. However, these nets bring several other non-target species of elasmobranchs.

Although there is little information available in the literature on the bycatch of encircling nets, these nets catch occasionally pelagic sharks and stingrays in fisheries of the bluefin tuna and small pelagic. In central Mediterranean over 70% of the white shark catches are reported to the purse seine.
Many management tools and technical procedures were suggested to reduce bycatch but a big effort is needed to enhance researches on this issue and to adapt procedures tested worldwide.

Sharks and rays occupy a high level in the trophic webs and are characterised by a K-strategy. This determines a high sensibility to even relatively low fishing pressure, but in the Mediterranean very few stocks assessment and standardised data are available. However, some assessments, based on abundance indices such as elaborated in the frame of Medits bottom trawl surveys, are available. Series of data based on this programme are too short to identify specific trends in species abundances. This programme should be extended to the entire region. Stock assessment of elasmobranchs, based on biologic parameters (mainly age and growth) should be developed.

138 references dealing with the biology of the reproduction were inventoried but only 97 papers report detailed data on reproductive parameters, the others give some general information. A standardisation of methods and expression of results should be generalised in the whole Mediterranean. Data is available for only 43 species, 33 viviparous and10 oviparous.

Only 11 species (about 12 % of the Mediterranean elasmobranchs fauna) were the subject of age and growth studies (20 references in total). Data were scarce.
The organization of a training course on age reading and growth parameters of the main elasmobranchs species seems to be very urgent to enhance research on this field. Growth parameters are necessary for stock assessment studies.

Sharks are considered top predators and may have an important role in the regulation of marine ecosystems at lower trophic levels. In addition, quantitatively describing the diet and foraging habitat and predator-prey interactions of top predators in a community is a key step in ecosystem approaches to fisheries management.

Analysis of bibliography dealing with Food and feeding habits shows that most species appear to be opportunistic feeding predators, foraging on broad range of prey species. However, crustaceans and teleost fishes are the main preys of elasmobranchs. Cephalopods are major prey for some species. Polycheates, sipunculids and echinoderms were of minor importance food; in contrast, *O. centrina* is the only shark species ingesting polycheates. Chondrchtyans are reported to be preys also for various species.

Papers on biologic parameters cover all Mediterranean and Black Sea but primarily in the occidental and central areas. Their majority appeared in latest decade.

Few elasmobranchs species occurred in the Black Sea and some data on biology and ecology are available mainly for three common species; *Raja clavata, Dasyatis pastinaca* and *Squalus acanthias*. Many papers in Russian, on the issue, were not analyzed in this document.

Protection currently granted to chondrichthyan fish species under various regional and international conventions where generally few species were considered. An amendment of some convention lists and action plans should be undertaken in parallel with developing knowledge on this fish group.

Few countries developed their own legislation on species protection which is generally elaborated implementing CITES Convention and/or Bern convention and SPA –Biodiversity protocol of Barcelona Convention. In Israel all Cartilaginous Fishes are protected. National action plans should be elaborated and generalised in the Mediterranean and Black Sea countries

According information available, there are no MPAs established specifically for Elasmobranchs in the Mediterranean and Black Sea. The lack of legislation in this issue would come mainly from lack of knowledge on critical habitats of this group. Marine protected area can be efficient to manage sharks fisheries (protection of nursery areas, parturition zone….).

As fining activities don't take place generally in Mediterranean countries, there are few national regulations of shark fining but this activity is likely to interest more and more fishermen. National legislations should be also developed in many countries.

Following the present bibliographic analysis and the diagnostic of the situation of elasmobranchs in the Mediterranean and Black Sea, research programmes and conservation Priorities for Sharks of the region are as follow:

- Developing research programs on systematic, general biology, ecology and population dynamics for species of concern.
- Identifying and mapping critical habitat.
- Taking action to collect reliable statistics on landings and Bycatch of elasmobranchs
- Initiating fisheries management strategies for commercially exploited species.
- Developing research programs to reduce elasmobranchs bycatch
- Developing National Action Plans as recommended by the FAO IPOA-Sharks.

Bibliographic references (See Appendix 1)

APPENDIX 1

BIBLIOGRAPHIC REFERENCES ON ELASMOBRANCHS IN THE MEDITERRANEAN & BLACK SEA

1. **Abdel-Aziz S.H. 1986.** Food and feeding habits of *Raja* species (Batoidei) in the Mediterranean waters of Alexandria. *Bulletin of Institute of Oceanography and Fisheries.* ARE*,* 12: 265–276.

2. **Abdel-Aziz S.H. 1992.** The use of vertebral rings of the brown ray *Raja miraletus* (Linnaeus, 1758) off Egyptian Mediterranean coast for estimation of age and growth. *Cybium*, 16: 121-132.

3. **Abdel-Aziz S.H. 1994.** Observations on the biology of the common *Torpedo (Torpedo torpedo*, Linnaeus, 1758) and marbled electric Ray (*Torpedo marmorata*, Risso, 1810) from EgyptianMediterranean waters. *Australian Journal of Marine and Freshwater Research*, 45: 693-704.

4. **Abdel-Aziz S.H., Ezzat A., & Hussein M. 1987.** Sexuality, reproduction and fecundity of *Raja miraletus* (L) from the Mediterranean waters off Alexandria**.** *Bulletin of Institute of Oceanography and Fisheries*. ARE*,* 13: 119-132.

5. **Abdel-Aziz S.H., Khalil A.N. & Abdel-Maguid S.A. 1993.** Food and feeding habits of the common guitarfish, *Rhinobatos rhinobatos* in the Egyptian Mediterranean waters. *Indian Journal of Marine Sciences*, 22: 287–290.

6. **Abdel-Aziz S.H., Khalil A.N. & Abdel-Maguid S.A. 1993.** Reproductive cycle of the common guitarfish, *Rhinobatos rhinobatos* (Linnaeus, 1758), in Alexandria waters, Mediterranean Sea. *Australian Journal of Marine and Freshwater Research*, 44: 507–517.

7. **Abdulla A. 2004.** Status and conservation of sharks in the Mediterranean Sea. IUCN Technical Paper. Gland: IUCN.

8. **Abella A.J. & Serena F. 2005.** Comparison of elasmobranch catches from research trawl surveys and commercial landings at port of Viareggio, Italy, in the last decade. *Journal Northwestern Atlantic Fisheries Science,* 35: 345–356.

9. **Aka Erdogan Z., Torku Koç H., Türker Çakir D., Nerlovic V. & Dulcic J. 2004.** Sexual dimorphism in the small-spotted catshark *Scyliorhinus canicula* (L, 1758), from the Edremit Bay (Turkey). *Annales, Series Historia Naturalis*, 14: 165-170.

10. **Aldebert Y. 1997.** Demersal resources of the Gulf of Lions (NW Mediterranean). Impact of exploitation on fish diversity. *Vie et Milieu*, 47: 275–284.

11. **Al-Hassan L.A.J. & Busneina A.M. 1999**. Regional variations of centra in the vertebral column of two cartilaginous fishes from Libyan coastal waters. *Oebalia,* 25: 111-117.

12. **Allam S.M., Ezzat A.A. & Hashem M.T.C. 1990.** Biology of *Dasyatis pastinaca* from Mediterranean waters off Alexandria. *Bulletin of the Institute of Oceanography and Fisheries,* ARE, 16: 90-108.

13. **Aloncle H. 1972**. Descriptive catalogue of fishes in Moroccan seas. Part 1: Cyclostomata, selachii, Holocephali. Holocephali or Chimaeridae. *Bull. Inst. Pêches Marit. Maroc*, 19: 161-163.

14. **Arapi D., Sadikaj R. & Nelaj E. 2006.** Fishing and Cartilaginous fishes on Adriatic and Ionian Seas of Albania. pp. 209-213. *In* : Başusta N., Keskin Ç., Serena F., Seret B. (eds.), The Proceedings of the International Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean, Istanbul, 2005, Turkish Marine Research Foundation, Turkey.

14 a. **Ardizzone G.D., Belluscio A., Carpentieri P., Colloca F. 2002.** Annotated checklist of the skates (Chondrichthyes, Rajidae) in the Central Tyrrhenian Sea. *Biologia Marina Mediterranea*, 10: 769-773.

15. **Avsar D. 2001.** Age, growth, reproduction and feeding of the spurdog (*Squalus acanthias* Linnaeus, 1758) in the South-eastern Black Sea. *Estuarine, Coastal and Shelf Science,* 52: 269–278.

16. **Azouz A. & Capapé C. 1971.** Les relations alimentaires entre les sélaciens et le zoobenthos des côtes nord de la Tunisie. *Bulletin de l'Institut National Scientifique et Technique d'Océanographie et de Pêche, Salammbô,* 2: 121-130.

17. **Bacalbasa N. 1968.** Consideration sur la pêche de l'Aiguillat (*Squalus acanthias* L.) dans le nord-ouest de la Mer Noire (CIESM). *Rapport et Proces-Verbaux des Reunions* XIX (2), 237–239.

18. **Baino R. & Serena F. 2000.** Abundance estimation and geographical distribution of some selachii in the Northern Tyrrhenian and Southern Ligurian Sea. *Biologica Marina Mediterranea*, 7: 433-439.

19. **Baino R., Serena F., Ragonese S., Rey J. & Rinelli P. 2001.** Catch composition and abundance of elasmobranchs based on the MEDITS Program. *Rapport de la Commision Internationale pour l'Exploration Scientifique de la Méditerranée,* 36 :234.

19a**. Ball D., Neifar L., & I. Euzet. 2003.** Description of *Scalithrium* n. gen. (cestoda, tetraphyllidea) with *Scalithrium minimum* (van beneden, 1850) n.comb., a parasite of *Dasyatis pastinaca* (Elasobranchii, Dasyatidae), as type species. Parasite. 10 : 31-7.

20. **Baranes A. & Webdling J. 1981.** The early stages of development in *Carcharhinus plumbeus*. *Journal of Fish Biology,* 18: 159-175.

21. **Barone M., De Ranieri S., Fabiani O., Pirone A. & Serena F. 2007.** Gametogenesis and maturity stages scale of *Raja asterias* Delaroche, 1809 (Chondrichthyes, Raijdae) from the South Ligurian Sea. *Hydrobiologia*, 580:245–254.

22. **Barrull J. 1993.** Historical Mediterranean record of the white shark *Carcharodon carcharias* (Linnaeus, 1758) in the Catalonian sea (Mediterranean Sea) documented by jaw teeth. *Miscellania Zoologica*. Barcelona, 17: 283-285.

23. **Barrull J. & Mate I. 1995.** Presence of little sleeper shark *Somniosus rostratus* (Risso, 1826) in the Catalonian Sea. *Miscellania Zoologica*. Barcelona, 18 : 200-202.

24. **Barrull J. & Mate I. 2000.** Biología de la cañbota *Hexanchus griseus* (Bonnaterre, 1788) en el Mar Mediterráneo. *Boletín de la Asociación Española de Elasmobranquios*, 3 : 13–20.

25. **Barrull J. & Mate I. 2001.** First confirmed record of angular rough shark *Oxynotus centrina* (Linnaeus 1758) predation on shark egg case of small-spotted catshark *Scyliorhinus canicula* (Linnaeus 1758) in Mediterranean waters. *Annales, series Historia Naturalis*, 11: 23-28.

26. **Barrull J. & Mate I. 2001.** Presence of the great white shark *Carcharodon carcharias* (Linnaeus, 1758) in the Catalonian Sea (NW Mediterranean): review and discussion of records, and notes about its ecology. *Annales, series Historia Naturalis*, 11: 3-12.

27. **Barrull J. & Mate I. 2001.** First record of a pregnant female little sleeper shark *Somniosus rostratus* (Risso, 1826) on the Spanish Mediterranean coast. *Boletin del Instituto Espanol de Oceanografia*, 17: 323-325.

28. **Başusta N. 2002.** Occurrence of a sawback angelshark (*Squatina aculeata* Curier, 1829) off the eastern Mediterranean coast of Turkey. *Turkish Journal of Veterinary and animal Sciences*, 26: 1177-1179.

29. **Başusta N., Demirhan S.A., Çiçek E., Başusta A. & Kuleli T. 2008.** Age and growth of the common guitarfish, *Rhinobatos rhinobatos*, in Iskenderun Bay (north-eastern Mediterranean, Turkey). *Journal of the Marine Biological Association of the United Kingdom*, 88: 837–842.

30. **Başusta N., Demirhan S.A., Karalar M. & Cekic M. 2007.** Diet of common guitarfish (*Rhinobatos rhinobatos* L., 1758) in the Iskenderun Bay (North-eastern

Mediterranean Sea). *Rapport de la Commision Internationale pour l'Exploration Scientifique de la Méditerranée*, 38: 426.

31. **Başusta N., Erdem Ü. 2000.** A study on the pelagic and demersal fishes of Iskenderun Bay. *Turkish Journal of Zoology*, 24: 1-19.

32. **Başusta N., Erdem Ü. & Çevik C. 1998.** An investigation on chondricthyes in İskenderun Bay. *Celal Bayar Univ. J. Sci. Arts Fac*, 1:63-69.

33. **Başusta N., Erdem Ü. & Kumlu M. 1998.** Two new fish records for the Turkish Sea: Round stingray *Taeniura grabata* and Skate stingray *Himantura uarnak* (Dasyatidae). *Israel Journal of Zoology*, 44: 65-66.

34. **Bello G. 1998.** The feeding ecology of the velvet belly, *Etmopterus spinax* (Chondrichthyes, Squalidae) of the Adriatic Sea on the basis of its stomach contents. *Atti della Società Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano* 139: 187-193.

35. **Belluscio A., Scacco U., Colloca F., Carpentieri P., Ardizzone G.D. 2000.** Feeding strategies of two species of demersal chondrichthyans, *Galeus melastomus* (Rafinesque, 1810) and *Etmopterus spinax* (Linnaeus, 1758), in the central Tyrrhenian Sea. *Biologia Marina Mediterranea*, 7: 417-426.

36. **Ben Brahim R. & Capapé C. 1997.** The teeth rows counts in two skates *Raja miraletus* (Linnaeus, 1758) and *R. radula* (Delaroche, 1809) from Tunisian coasts (Central Mediterranean). *Oebalia*, 23: 95-105.

37. **Ben Brahim R., Seck A. & Capapé C. 1998.** Albinisme chez une torpille ocellée, *Torpedo* (*torpedo*) *torpedo*. *Cybium*, 22, 83-86.

38. **Ben Souissi J., Mejri H., Ben Salem M., Hemida F. & Capapé C. 2005.** On the occurrence of the pelagic stingray *Dasyatis violacea* (Bonaparte, 1832) (Chondrichthyes: Dasyatidae) in a perimediterranean lagoon: the Tunis Southern Lagoon (Tunisia, Central Mediterranean). *Revue de l'Institut national agronomique de Tunisie*, 20: 171-172.

39. **Ben Souissi J., Golani D., Mejri H., Ben Salem M. & Capapé C. 2007.** First confirmed record of the Halave's guitarfish, *Rhinobatos halavi* (Forsskål, 1775) (Chondrichthyes: Rhinobatidae) in the Mediterranean Sea with the description of a case of albinism in elasmobranchs. *Cahiers de Biologie Marine*, 48: 67-75.

40. **Ben-Tuvia A. 1955.** Two Indo-Pacific fishes, *Dasyatis uarnak* and *Upeneus moluccensis*, in the eastern Mediterranean. *Nature*, 176: 1177-1178.

41. **Ben-Tuvia A. 1971.** Revised list of the Mediterranean fishes of Israel. *Israel Journal of Zoology*, 20: 1–39.

42. **Bertrand J., Gil De Sola L., Papakonstantinou C., Relini G. & Souplet A. 2000.** Contribution on the distribution of the Elasmobranchs in the Mediterranean Sea (from the MEDITS Surveys). *Biologia Marina Mediterranea*, 7: 385-399.

43. **Besson J. 1977.** Un requin-pelerin a Port-Cros. *Trav. Sci. Parc Natl. Port-Cros*, 3: 205.

43a. **Beveridge I., Neifar L. & L. Euzet. 2004.** Eutetrarhynchid cestodes from Atlanticans *Mediterranean elasmobranch fishes, with the description of two new species of Dollfusiella* Campbell & Beveridge, 1994 and redescriptions of *Prochcristianella papillifer* (Poyarkoff, 1909) Dollfus, 1957 and *Parachristianella trygonis* Dollfus, 1946. Syst Parasitol. 59 : 81-102.

44. **Boero F. & Carli C., 1977.** Prima segnalazione mediterranea di *Sphyrna mokarran* (Rüppel, 1837) (Selachii, Sphyrnidae). *Bollettino di Musei e degli Istituti Biologici dell'Universita Genova*, 45: 91-93.

45. **Boero F. & Carli A. 1979.** Catture di Elasmobranchi nella tonnarella di Camogli (Genova) dal 1950 a 1974. *Boll. Mus. Ist. Biol. Univ. Genova*, 47: 27-34.

46. **Bono L., De Ranieri S., Fabiani O., Lenzi C., Mancusi C. & F. Serena. 2005.** Study of the growth of *Raja asterias* (Delaroche, 1809) (Chondrichthyes, Rajidae) through the analysis of vertebral sections. *Biologia Marina Mediterranea*, 12: 470-474.

47. **Bottaro M., Ferrando S., Gallus L., Girosi L., Vacchi M. 2005.** First record of albinism in the deep water shark *Dalatias licha*. *JMBA2. Biodiversity Records*.

48. **Bottaro M., Consalvo I., Ferrando S., Gallus L., Girosi L., Psomadakis P.N., Atkinson C.J.L. & Vacchi. M. 2007.** New records of blonde ray (*Raja brachyura*) from the Ligurian Sea. *JMBA2. Biodiversity Records.*

49. **Bottaro M., Clo S., Dalu M., Modena M., Vacchi M. 2003**. Preliminary notes about the biology of the kitefin shark *Dalatias licha* (Bonnaterre, 1788) from the Gulf of Genoa. Poster presented to the 7th Annual European Association Meeting, San Marino.

50. **Bozzano A. 2004.** Retinal specialisations in the dogfish *Centroscymnus coelolepis* from the Mediterranean deep-sea. *Scientia Marina,* 68 : 185-195.

51. **Bozzano A., Murgia R., Vallerga S., Hirano J. & Archer S. 2001.** The photoreceptor system in the retine of two dogfshes *Scyliorhinus canicula* and *Galeus melastomus*: possible relationship with depth distribution and predatory life-style. *Journal of Fish Biology*, 59: 1258-1278.

52. **Bradai M.N. 2000.** Diversité du peuplement ichtyque et contribution à la connaissance des Sparidés du golfe de Gabès. *Thèse de Doctorat d'état. Faculté des sciences de Sfax, Tunisie*. 595 p.

53. **Bradai M.N & Capapé C. 2001.** Capture du diable de mer, *Mobula mobular*, dans le golfe de Gabès. (Tunisie méridionale, Méditerranée centrale). *Cybium*, 25: 389-391.

54. **Bradai M.N., Ghorbel M., Bouain A. & Abdelmouleh A. 1992.** Observations ichtyologiques effectuées dans la région du golfe de Gabès (Tunisie). *Bulletin de l'Institut National Scientifique et Technique d'Océanographie et de Pêche, Salammbô,* 19 : 57-65.

55. **Bradai M.N., Jarboui O. & Capape C. 2000.** First record of the blackmouth catshark, *Galeus melastomus* (Pisces, Scyliorhinidae) in the Gulf of Hammamet (Eastern Tunisia,

Central Mediterranean). *Bulletin de l'Institut National Scientifique et Technique d'Océanographie et de Pêche, Salammbô*, 27 : 107-109.

56. **Bradai M.N., Quignard J.P., Bouaïn A., Jarbouï O., Wannes-Ghorbel A., Ben abdallah L., Zaouali J., Ben Salem S. 2004.** Ichtyofaune autochtone et exotique des côtes tunisiennes : recensement et biogéographie. *Cybium*, 28 : 315-328.

57. **Bradaï M.N., Saidi B., Bouaïn A., Guelorget O. & Capapé C. 2005.** The Gulf of Gabès (Southern Tunisia, Central Mediterranean): a nursery area for sandbar shark, *Carcharhinus plumbeus* (Nardo, 1827) (Chondrichthyes: Carcharhinidae). *Annales, Series Historia Naturalis*, 15 : 187-194.

58. **Bradaï M.N., Saidi B., Enajjar S. & Bouaïn A. 2006.** The Gulf of Gabès: a spot for the Mediterranean elasmobranchs. pp. 107-117. *In* : Başusta N., Keskin Ç., Serena F., Seret B. (eds.), The Proceedings of the International Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean, Istanbul, 2005, Turkish Marine Research Foundation, Turkey.

59. **Bradai M.N., Saidi B., Ghorbel M., Bouain A., Guelorget O. & Capape C. 2002.** Observations sur les requins du golfe de Gabes (Tunisie meridionale, Mediterranee centrale). *Mesogée*, 60: 61-77.

60. **Buencuerpo V., Rios S. & Moron J. 1998.** Pelagic sharks associated with the swordfish, *Xiphias gladius,* fishery in the eastern North Atlantic Ocean and the strait of Gibraltar. *Fishery Bulletin*, 96: 667-685.

60a. **Cannas R., Follesa M.C., Cabiddu S., Porcu C., Salvadori S., Iglésias S.P., Deiana A.M., Cau A. 2010.** Molecular and morphological evidence of the occurrence of the Norwegian skate *Dipturus nidarosiensis* (Storm, 1881) in the Mediterranean Sea. *Marine Biology Research*, 6: 341-350.

60 b. **Cannas R., Pasolini P., Mancusi C., Follesa M.C., Cabiddu S., Hemida F., Serena F. & Tinti F. 2008.** Distribution, molecular systematics and phylogeography of *Raja polystigma* and *Raja montagui* in the Mediterranean. *Biologia Marina Mediterranea*, 15:188-191.

61. **Cannizzaro L., Garofalo G., Levi D., Rizzo P. & Gancitano S. 1995.** *Raja clavata* in the Sicilian Channel: growth, distribution, abundance. *Biologia Marina Mediterranea*, 2: 257-262

62. **Cannizzaro L., Rizzo P., Levi D. & Gancitano S. 1995**. Age determination and growth of *Squalus blainvillei*, (Risso, 1826). *Fisheries Research*, 23: 113-125.

63. **Capapé C. 1974.** Contribution à la biologie des Rajidæ des côtes tunisiennes. II. *Raja radula* Delaroche 1809. Répartition géographique et bathymétrique, sexualité, reproduction et fécondité. *Archives de l'Institut Pasteur de Tunis*, 51 : 211-228.

64. **Capapé, C. 1974.** Observations sur la sexualité, la reproduction et la fécondité de 16 sélaciens pleurotrêmes vivipares aplacentaires des côtes tunisiennes. *Archives de l'Institut Pasteur de Tunis,* 51: 229-256.

65. **Capapé C. 1974.** Note préliminaire sur la biologie de *Torpedo (Torpedo) marmorata* Risso, 1810 et de *Topedo (Tetronarce) nobiliana* Bonaparte, 1835 des côtes Tunisiènnes. *Archives de l'Institut Pasteur de Tunis*, 51: 257-267.

66. **Capapé, C. 1974.** Observations sur la sexualité, la reproduction et la fécondité de 8 sélaciens pleurotrèmes vivipares placentaires des côtes tunisiennes. *Archives de l'Institut Pasteur de Tunis,* 51 : 329–344.

67. **Capapé C. 1974.** Première données sur le cycle de la reproduction de *Dasyatis centroura* (Mitchill, 1815) et de *Gymnura altavela* (Linné, 1758) des côtes tunisiennes. *Archives de l'Institut Pasteur de Tunis*, 51: 345-356.

68. **Capapé, C. 1974.** Contribution a la biologie des Scyliorhinidae des côtes tunisiennes II. *Scyliorhinus canicula* Linné, 1758: Régime alimentaire. *Annales, Institut Michel Pacha*, 7 : 13–26.

69. **Capapé C. 1975.** Sélaciens nouveaux et rares le long des côtes tunisiennes. Première observations biologiques. *Archs. Inst. Pasteur Tunis*, 52: 107-128.

70. **Capapé C. 1975.** Contribution à la biologie des Scyliorhinidae des côtes tunisiennes. IV. *Scyliorhinus stellaris (*Linné, 1758). Régime alimentaire. *Archs. Inst. Pasteur Tunis*, 52: 383-394.

71. **Capapé C. 1975.** Observations sur le régime alimentaire de 29 Sélaciens pleurotrêmes des côtes tunisiennes. *Archives de l'Institut Pasteur de Tunis*, 52: 396-414.

72. **Capapé C. 1975.** Etude du régime alimentaire de *Squalus blainvillei* (Risso, 1826) des côtes tunisiennes. *Bull. Inst. Océanogr. Pêche, Salammbô*, 4 : 61-73.

73. **Capape C. 1975.** Contribution a la biologie des Dasyatidae des cotes Tunisiennes. II. *Dasyatis pastinaca* (Linne, 1758). Régime alimentaire. *Ann. Inst. Michel Pacha,* 8 :1-5.

74. **Capapé C. 1975.** Contribution a la biologie des Rajidae des cotes tunisiennes. IV. *Raja clavata* (Linné 1758). Régime alimentaire. *Ann. Inst. Michel Pacha*. 8 : 16–32.

75. **Capapé C. 1975.** Contribution a la biologie des Rajidae des cotes tunisiennes. VIII. *Raja melitensis* Clark, 1926. Régime alimentaire. *Archives de l'Institut Pasteur de Tunis*, 1-2 :40-46.

76. **Capapé C. 1975.** Note sur la presence en tunisie de *Raja naevus* Müller et Henlé, 1814 et de *Raja melitensis* Clark, 1926 : Description, premières observations biologiques. *Bull. Inst. Océanogr. Pêche, Salammbô,* 4 : 75-92.

77. **Capapé C. 1976.** Contribution a la biologie des Dasyatidae des côtes tunisiennes. I. *Dasyatis pastinaca* (Linne, 1758). Répartion geographique et bathymetrique, sexualite, reproduction, fecondité. *Annali del Museo Civico di Storia naturale di Genova*, 81: 22-32.

78. **Capapé C. 1976.** Contribution à la biologie des Rajidæ des côtes tunisiennes. III. *Raja clavata* Linné, 1758. Répartition géographique et bathymétrique, sexualité, reproduction et

fécondité. *Bulletin du Muséum National d'Histoire Naturelle*, Paris, 3ème série, n° 393, Zoologie, 275: 907-922.

79. **Capapé C. 1976.** Contribution à la biologie des Rajidæ des côtes tunisiennes. *Raja alba* Lacépède, 1801. Répartition géographique et bathymétrique, sexualité, reproduction, fécondité. *Ann. Inst. Michel Pacha*, 9 :23-47.

80. **Capapé C. 1976.** Étude du régime alimentaire de l'aigle de mer, *Myliobatis aquila* (L., 1758) des côtes tunisiennes. *J. Cons. Int. Explor. Mer*, 37 (1): 29-35.

81. **Capapé C. 1977.** Liste commentée des Sélaciens de la région de Toulon (de La Ciotat à Saint-Tropez). *Bulletin du Muséum d'Histoire naturelle de Marseille*, 37: 5-9.

82. **Capapé C. 1977.** *Raja africana* n. sp., une nouvelle espèce pour les côtes ouest -africaines et tunisiennes. *Bull. Soc. Sc. nat. Tunisie*, 12 : 69-78.

83. **Capapé C. 1977.** Les espèces du genre *Dasyatis* Rafinesque, 1810 (Pisces, Rajiformes) des côtes tunisiennes. *Cybium*, 3 ème série, 2: 75-105.

84. **Capapé C. 1977.** Contribution à la biologie des Scyliorhinidæ des côtes tunisiennes. I. *Scyliorhinus canicula* (Linné, 1758): répartition géographique et bathymétrique, sexualité, reproduction, fécondité. *Bulletin de l'Office National des Pêches de Tunisie***,** 1: 83-101.

85. **Capapé C. 1977.** Contribution à la connaissance de la biologie des Scyliorhinidae des côtes Tunisiennes. III. *Scyliorhinus stellaris* (Linné, 1758). *Acta Adriatica,* 17:1-21.

86. **Capapé C. 1977.** Contribution à la biologie des Rajidae des côtes tunisiennes. X. *Raja clavata* Linné, 1758 : étude complémentaire de la fécondité. *Bull. Off. natn. Pêch. Tunisie*, 1 (2) : 169-172.

87. **Capapé C. 1977.** Etude du régime alimentaire de la Mourine vachette, *Pteromylaeus bovinus* (Geoffroy Saint-Hilaire, 1817) (Pisces, Myliobatidae) des côtes tunisiennes. *J. Cons. int. Explor. Mer*, 37 (3): 214-220.

88. **Capapé C. 1977.** Observations sur le régime alimentaire de quelques Raies des côtes tunisiennes. *Rapp. Comm. int. Mer Médit*, 24 : 5.

89. **Capapé C. 1977.** Contribution a la biologie des Rajidae des cotes tunisiennes. XII. *Raja alba* Lacepede, 1803. Regime alimentaire. *Arch Inst Pasteur Tunis*, 54: 85–95.

90. **Capapé C. 1977.** Contribution à la biologie des Rajidæ des côtes tunisiennes. IV. *Raja asterias* Delaroche, 1809: répartition géographique et bathymétrique, sexualité, reproduction et fécondité. *Bulletin du Muséum National d'Histoire Naturelle de Paris,* 435, Zoologie: 305-326.

91. **Capapé C. 1977.** Contribution à la biologie des Rajidæ des côtes tunisiennes. VII. *Raja melitensis* Carck, 1926: sexualité, reproduction, fécondité. *Cahiers de Biologie Marine,* 18 : 177.190.

92. **Capapé C. 1978.** Contribution à la biologie des Scyliorhinidæ des côtes tunisiennes. VI. *Scyliorhinus canicula* (Linné, 1758): Étude complémentaire de la fécondité. Relations taille-poids du corps, taille-poids des gonades, poids du corps-poids du foie, poids du corps poids des gonades, poids du foie-poids des gonades. Coefficients de condition. Rapports hépato et gonosomatique. *Bulletin de l'Office National des Pêches de Tunisie*, 2(1-2): 109-140.

93. **Capapé C. 1978.** Contribution à la biologie des Dasyatidae des côtes tunisiennes. III. *Dasyatis tortonesei* Capapé, 1975. Répartition géographique et bathymétrique, sexualité, reproduction, fécondité. *Bull. Inst. natn. Scient. Tech. Océanogr. Pêche Salammbô*, 5: 97-110.

94. **Capapé C. 1978.** Contribution à la biologie des Dasyatidae des côtes tunisiennes. IV. *Dasyatis tortonesei* Capapé, 1975. Régime alimentaire. Arch. Inst. Pasteur Tunis, 55: 359-369.

95. **Capapé C. 1979.** Contribution à la biologie des Rajidae des côtes tunisiennes. XX. *Raja clavata* Linné, 1758. Relations taille-poids du corps, du foie et des gonades. Rapports hépato et gonosomatique. Coefficients de condition. Arch. Inst. Pasteur Tunis, 56 (4) : 425 – 463.

96. **Capapé C. 1979.** Contributiona la biologie des Rajidae des côtes Tunisiennes -*Raja polystigma* Regan, 1926. Regime alimentaire. *Biljeske-Notes, Split*, 35: 1-10.

97. **Capapé C. 1979.** La torpille marbrée, *Torpedo marmorata* Risso, 1810 (Pisces, Rajiformes) des côtes tunisiennes: nouvelles données sur l'écologie et la biologie de la reproduction de l'espèce, avec une comparaison entre les populations méditerranéennes et atlantiques. *Annales des Sciences Naturelles, Zoologie, Paris*, 13ème série, 1: 79-97.

98. **Capapé C. 1980.** Contribution à la biologie des Dasyatidae des côtes tunisiennes. V. *Dasyatis tortonesei* Capapé, 1977. Relations taille-poids du corps, du foie et des gonades. Rapports hépato et gonosomatique. Coefficients de condition. Cycles sexuels femelles. *Archives de l'Institut Pasteur, Tunis,* 57 (1-2) : 61-85.

99. **Capapé C. 1980.** Contribution à la biologie des Rajidae des côtes tunisiennes. 18. *Raja melitensis* Clark, 1926. Relations taille-poids du corps, du foie et des gonades. Rapports hépato et gonosomatique. Coefficients de condition. *Bull. Inst. natn. Scient. tech. Océanogr. Pêche Salammbô*, 7 : 113 - 126.

100. **Capapé C. 1980.** Contribution à la biologie des Rajidae des côtes tunisiennes. 19. *Raja polystigma* Regan, 1923. Relations taille-poids du corps, du foie et des gonades. Rapports hépato et gonosomatique. Coefficients de condition. *Cahiers de Biologie Marine*, 21 : 363-373.

101. **Capapé C. 1980.** Contribution à la biologie des Rajidae des côtes tunisiennes. 21. *Raja asterias* Delaroche, 1809. Relations taille-poids, taille-poids du foie, taille-poids des gonades. Coefficients de condition, Rapports hépatosomatique et gonosomatique. *Bull. off. Natn. Pêch. Tunisie,* 4 (1) : 47 – 65.

102. **Capapé C. 1980.** Etude morphologique des ptérygopodes de *Isurus oxyrinchus* Rafinesque, 1810 (Pisces, Lamnidae). *Bull. off. Natn. Pêch. Tunisie*, 4 (2): 265–270.

103. **Capapé C. 1980.** Nouvelle description de *Heptranchias perlo* (Bonnaterre.1788) (Pisces, Pleurotremata, Hexanchidae). Données sur la biologie de la reproduction et le régime alimentaire des spécimens des côtes tunisiennes. *Bull. off. Natn. Pêch. Tunisie*, 4(2) : 231-264.

104. **Capapé C. 1981**. Nouvelle description de *Gymnura altavela* (Linnaeus, 1758) (Pisces, Rajiformes, Gymnuridae). *Bull. Inst. natn. scient. tech. Océanogr. Pêche Salammbô*, 8 : 59-68.

105. **Capapé C. 1981.** Etude morphologique de la ceinture pelvienne et des ptéropodes de *Scyliorhinus canicula* (Linne, 1758) et de *Scyliorhinus stellaris* (Linne, 1758) (Pisces, Pleurotremata, Scyliorhinidae) des côtes tunisiennes. *Bulletin de l'Office National de Pêches Tunisie,* 5: 167-173.

106. **Capape C. 1982.** Etude morphologique de la ceinture pelvienne et des pterygopodes de *Squalus blainvillei* (Risso, 1826) (Pisces, Pleurotremata, Squalidae). *Bulletin de l'Institut National Scientifique et Technique d'Oceanographie et de Pêche de Salammbô*, 9 : 111-119.

107. **Capapé C. 1983.** Nouvelles données sur la biologie de la reproduction de *Mustelus asterias* Cloquet, 1821 (Pisces, Pleurotremata, Triakidae) des côtes tunisiennes. *Vie et Milieu*, 33 : 143–152.

108. **Capapé C. 1983.** Répartition géographique et affinités bio-écologiques des espèces tunisiennes du genre *Dasyatis* Rafinesque, 1810 (Pisces, Rajiformes, Dasyatidae). *Rapp. Comm. int. Mer Médit*., 28 (5) : 19 - 23.

109. **Capapé C. 1983.** Données nouvelles sur la morphologie des Dasyatidæ (Pisces, Rajiformes) des côtes tunisiennes. *Bulletin de l'Institut national scientifique et technique d'Océanographie et de Pêche de Salammbô*, 10: 69-98.

110. **Capapé C. 1984.** Nouvelles données sur la morphologie et la biologie de la reproduction de *Carcharhinus plumbeus* (Nardo, 1827) (Pisces, Carcharhinidae) des côtes tunisiennes. *Investigaciòn Pesquera,* 48: 115-137.

111. **Capapé C. 1985.** Nouvelle description de *Centophorus granulosus* (Schneider, 1801) (Pisces, Squalidae). Données sur la biologie de la reproduction et le régime alimentaire des spécimens des côtes tunisiennes. *Bulletin de l'Institut national scientifique et technique d'Océanographie et de Pêche de Salammbô*, 12 : 97 – 141.

112. **Capapé C. 1985.** Données générales sur le régime alimentaire des Dasyatidae (Pisces, Selachii). *Archives de l'Institut Pasteur de Tunis*, 62 (3) : 299–304.

113. **Capapé C. 1985.** Données générales sur le régime alimentaire des Myliobatidae (Pisces, Selachii). *Archives de l'Institut Pasteur de Tunis*, 62 (4) : 42–427.

114. **Capapé C. 1986.** Données générales sur le régime alimentaire des Gymnuridae et des Mobulidae (Pisces, Selachii). *Archives de l'Institut Pasteur de Tunis*, 63 (2 - 3) : 247-275.

115. **Capapé C. 1987.** Propos sur les sélaciens des côtes tunisiennes. *Bull. Inst.Océanogr. Pêche, Salammbô, vol*. 14 : 15-32.

116. **Capapé C., 1989.** Les Sélaciens des côtes méditerranéennes : aspects généraux de leur écologie et exemples de peuplement. *Océanis*, 1(3) : 309-331.

117. **Capapé C., 1990.** Observation sur la biologie de la reproduction de *Dasyatis marmorata* (Steindachner, 1892) (Pisces, Dasyatidae) de la mer des Bibans (Tunisie méridionale). *Rapp. Comm. int. Mer Medit*., 32 (1): 263 – 263.

118. **Capapé C., 1993.** New data on the reproductive biology of the thorny stingray, *Dasyatis centroura* (Pisces: Dasyatidae) from off the Tunisian coasts. *Environnemental Biology of Fishes*, 38: 73 - 80.

119. **Capapé C. 1994.** Morphology of pelvic girdle and claspers of the velvet belly, *Etmopterus spinax* (Linnaeus, 1758) (Pisces: Squalidae). *Oebalia*, 20: 45-51.

120. **Capapé C. 2008.** Diet of the angular rough shark *Oxynotus centrina* (Chondrichthyes: Oxynotidae) off the Languedocian coast (Southern France, North-western Mediterranean). *Vie et Milieu*, 58: 57-61.

121. **Capapé C. & Azouz A. 1975.** Etude du régime alimentaire de deux raies communes dans le golfe de Tunis : *Raja miraletus* Linné, 1758 et *R. radula*, Delaroche, 1809. *Archives de l'Institut Pasteur de Tunis,* **52:** 233–250.

122. **Capapé C. & Ben Brahim R. 1984.** Nouvelles données sur la morphologie de *Galeus melastomus* Rafinesque, 1810 (Pisces, Scyliorhinidae). *Oebalia*, 10: 1-16.

123. **Capapé C., Ben Brahim R. & Zaouali J. 1997.** Aspect de la biologie de reproduction de la guitare commune, *Rhinobatos rhinobatos*, 1758 (Rhinobatidae) des eaux tunisiennes (Méditerranée centrale). *Ichtyophysiologica Acta*, 20, 113-127.

124. **Capapé C., Ben Salem M. & Ben Amor M.M. 2007.** Size of eight oviparous elasmobranch species hatched in two Mediterranean areas: a survey and recent data. *Annales, series Historia Naturalis*, 17: 29-36.

125. **Capapé C., Ben Souissi J., Mejri H., Guélorget O. & Hemida F. 2005.** The reproductive biology of the school shark, *Galeorhinus galeus* Linnaeus 1758 (Chondrichthyes: Triakidae), from the Maghreb shore (southern Mediterranean). *Acta Adriatica*, 46: 109-124.

126. **Capapé C., Bouchereau J.L. &. Tomasini J.A 1990.** Présence du diable de mer *Mobula mobular* (Bonnaterre, 1788) (Pisces, Rajiformes, Mobulidae) dans le golfe d'Aigues-Mortes. Anatomie de la ceinture pelvienne et des ptérygopodes. *Mésogée*, 50 : 9-14.

127. **Capapé C., Bradai M.N., Seck A.A., Diatta Y., Tomasini J.A. & Quignard J.P. 2001.** Aspects of the reproductive biology of the velvet belly, *Etmopterus spinax* (Elasmobranchii: Squalidae). *Bulletin de l'Institut National Scientifique et Technique d'Océanographie et de Pêche, Salammb*, 28: 55-64.

128. **Capapé C., Chadli A. & Prieto R. 1976.** Les Sélaciens dangereux des côtes tunisiennes. *Archives de l'Institut Pasteur de Tunis,* 1–2:61–108.

129. **Capapé C., Crouzet S., Clément C., Vergne Y. & Guélorget O. 2007.** Diet of the marbled electric ray *Torpedo marmorata* (Chondrichthyes: Torpedinidae) off the Languedocian coast (Southern France, Northern Mediterranean). *Annales. Series historia naturalis*. 17: 17-22.

130. **Capapé C. & Desoutter M., 1979.** Etude anatomique du neurocrâne, de la ceinture pelvienne et des ptérygopodes de *Raja melitensis* Clark, 1926 (Pisces, Rajiformes). *Bulletin de l'Office National de Pêches Tunisie*, 3 (2) : 183 - 192.

131. **Capapé C. & Desoutter M., 1979.** Note sur la validité de *Raja asterias* Müller et Henle, 1841. *Cybium*, (5): 71-85.

132. **Capapé C. & Desoutter M. 1981.** Nouvelle description de *Torpedo* (*Torpedo*) *torpedo* (Linné, 1758) (Pisces, Torpedinidæ). *Bulletin du Muséum national d'Histoire naturelle*, Paris, 7ème série, section A, n° 4: 1205-1217.

133. **Capapé C., Diatta Y., Seck A.A., Guélorget O., Ben Souissi J. & Zaouali J. 2005**. Reproduction of the sawback angelshark *Squatina aculeata* (Chondrichthyes: Squatinidae) off Senegal and Tunisia. *Cybium*, 29: 147–157.

134. **Capapé C., Diop M., N'Dao M. & Ben Brahim R. 1996.** Observations biologiques comparées entre quelques espèces de sélaciens des côtes tunisiennes (Méditerranée centrale) et de la région de Dakar-Ouakam (Sénégal Atlantique oriental). *Ichtyophysiologica Acta*, 19 : 179-199.

135. **Capapé C. & Farrugio, H. 1986.** Nouvelle description de *Torpedo* (*Torpedo*) *fuscomaculata* Peters, 1855 (Pisces, Torpedinidae). *Bulletin de l'Institut National Scientifique et Technique d'Océanographie et de Pêche, Salammb,* 13: 55-70.

136. **Capapé C., Hemida F., Bensaci J., Saïdi B. & Bradaï M.N. 2003.** Records of basking sharks, *Cetorhinus maximus* (Gunnerus, 1765) (Chondrichthyes: Cetorhinidae) off the Maghrebin shore (southern Mediterranean): a survey. *Annales Ser. Hist. Nat*, 13:13- 18.

137. **Capapé C., Hemida F., Guélorget O., Barrll J., Mate I., Ben Souissi J. & Bradaï M.N. 2004.** Reproductive biology of the Bluntnose sixgill shark *Hexanchus griseus* (Bonnaterre, 1788) (Chondrichthyes: Hexanchidae) from the Mediterranean Sea: a review. *Acta Adriatica*, 45 (1): 95-106.

138. **Capapé C., Hemida F., Quignard J.P., Ben Amor M.M. & Reynaud C. 2008.** Biological observations on a rare deep-sea shark, *Dalatias licha* (Chondrichthyes: Dalatiidae), off the Maghreb coast (south-western Mediterranean). *Pan-American Journal of Aquatic Sciences***,** 3(3): 355-360.

139. **Capapé C., Hemida F., Seck AA., Diatta Y., Guelorget O. & Zaouali J. 2003.** Distribution and reproductive biology of the spinner shark, *Carcharhinus brevipinna*

(Mueller and Henle, 1841) (Chondrichthyes: Carcharhinidae). *Israel Journal of Zoology*, 49: 269-286.

140. **Capapé C., Guélorget O., Barrll J., Mate I., Hemida F., Seridji R., Bensaci J. & Bradaï M.N. 2003**. Records of the bluntnose sixgill shark, *Hexanchus griseus* (Bonnaterre, 1788) (Chondrichthyes: Hexanchidae) in the Mediterranean Sea: A historical survey. *Annales Ser. Hist. Nat*, 13: 157-166.

141. **Capapé C., Guélorget O., Quignard J.P., El Abed A., Ben Souissi J. & Zaouali J. 2004.** The Elasmobranch species from the Bahiret El Biban (Southern Tunisia, Central Mediterranean): a survey. *Annales, series Historia Naturalis*, 14(1): 19-28.

142. **Capape C., Guelorget O., Reynaud C., Marques A., Bochereau J.L. & Zouali J. 2003.** Effects of reproductive factors on interrelationships between three deep water sharks from northern Tunisia (central Mediterranean). *Annales. Series historia naturalis*, 13: 181-190.

143. **Capapé C., Guélorget O., Siau Y., Vergne Y. & Quignard J.P. 2007.** Reproductive biology of the thornback ray *Raja clavata* L., 1758, (Chondrichthyes: Rajidae) from the coast of Languedoc (Southern France, Northern Mediterranean). *Vie et Milieu*, 57(1-2): 83-90.

144. **Capapé C., Guélorget O., Vergne Y., Marquès A. & Quignard J.P. 2006.** Skates and rays (Chondrichthyes) from waters off the Languedocian coast (southern France, northern Mediterranean). *Annales, series Historia Naturalis*, 16: 165-178.

145. **Capapé C., Guélorget O., Vergne Y. & Quignard J.P. 2006.** An unsual nine-ocellated common torpedo, Torpedo torpedo (Linnaeus, 1758) (Chondrichthyes: Torpedinidae) from southern France. *Acta Adriatica*, 47(1): 73-78.

146. **Capapé C., Guélorget O., Vergne Y. & Quignard J.P. 2006.** On a rare skate, the speckled ray, *Raja polystigma* Regan, 1923 Chondrichthyes: Rajidae) captured off the coast of Languedoc (Southern France, Northern Mediterranean). *Annales, series Historia Naturalis*, 16. 37-42.

147. **Capapé C., Guélorget O., Vergne Y. & Quignard J.P. 2007.** Reproductive biology of the common eagle ray, *Myliobatis aquila* (Chondrichthyes: Myliobatidae) from the coast of Languedoc (Southern France, Northern Mediterranean). *Vie et Milieu*, 57(3): 1-6.

148. **Capapé C., Guélorget O., Vergne Y., Quignard J.P. Ben Amor M.M & Bradai M.N. 2006.** Biological observations on the black torpedo, *Torpedo nobiliana* Bonaparte 1835 (Chondrichthyes: Torpedinidae), from two Mediterranean areas. *Annales, series Historia Naturalis*, 16. 19-28.

149. **Capape C., Guelorget O., Vergne Y. & Reynaud C. 2008.** Reproductive Biology of the Blackmouth Catshark, *Galeus melastomus* (Chondrichthyes: Scyliorhinidae) Off the Languedocian Coast (Southern France, Northern Mediterranean). *Journal of the Marine Biological Association of the United Kingdom*, 88: 415-421.

150. **Capapé C. & Mellinger J. 1988.** Nouvelles données sur la biologie de la reproduction du milandre, *Galeorhinus galeus* (Linné, 1758) (Pisces, Triakidae) des côtes tunisiennes. *Cahiers de Biologie Marine*, 29: 135- 146.

151. **Capapé C. & Pantoustier G. 1975.** Anomalies chez quelques sélaciens des côtes tunisiennes. *Archives de l'Institut Pasteur de Tunis*, 52 : 251-262.

152. **Capapé C. & Quignard J.P. 1974.** Dimorphisme sexuel et observations biologiques sur *Myliobatis aquila* (L., 1758). Contribution à l'étude du genre *Myliobatis*, Cuvier, 1817. *Annali del Museo Civico di Storia naturale di Genova*, 50: 1-27.

153. **Capapé C. & Quignard J.P. 1974.** Contribution à la biologie des rajidae des côtes tunisiennes. I. *Raja miraletus* Linné, 1758: répartition géographique et bathymétrique, sexualité, reproduction, fécondité. *Archives de l'Institut Pasteur de Tunis,* 51: 39-60.

154. **Capapé C. & Quignard J.P. 1974.** Contribution à la biologie des rajidae des côtes tunisiennes. XVI. *Raja miraletus* Linné, 1758: relations taille-poids du foie, poids du corps, poids des gonades, coefficient de condition, rapports hépato- et gonadosomatique. *Ann. Inst. Michel Pacha*, 10: 19-46.

155. **Capapé C. & Quignard J.P. 1975.** Essai d'évaluation de la fécondité chez les sélaciens ovipares: cas de *Raja miraletus* Linné, 1758 et *R. radula* Delaroche, 1809 des côtes tunisiennes. *Archives de l'Institut Pasteur de Tunis*, 52: 263-276.

156. **Capapé C. & Quignard J.P. 1975.** Contribution à la systématique et à la biologie de *Pteromylæus bovinus* (Geoffroy Saint-Hilaire, 1817), (Pisces, Myliobatidæ) des côtes tunisiennes. *Bulletin du Museum National d'Histoire Naturelle*, Paris, 3ème série, n° 338, Zoologie, 240: 1329-1347.

157. **Capapé, C. & Quignard J.P. 1977.** Contribution à la biologie des Triakidae des côtes tunisiennes. I. *Mustelus mediterraneus* Quignard et Capapé, 1972: répartition géographique et bathymétrique, migration et déplacement, reproduction, fécondité. *Bulletin de l'Office National de Pêches Tunisie*, 1: 103-122.

158. **Capapé C. & Quignard J.P. 1977.** Contribution à la biologie des Triakidae des côtes tunisiennes II. *Mustelus mediterraneus* Quignard et Capapé, 1972 : Régime alimentaire. *Bulletin de l'Office National de Pêches de Tunisie*, 1 : 173-179.

159. **Capapé C. & Quignard J.P. 1977**. Contribution à la biologie des Rajidae des côtes tunisiennes. 6 - *Raja asterias* Delaroche, 1809. Régime alimentaire. *Bull. Inst. Natl. Sci. Tech. Océanogr. Pèche, Salammbô*, 4 (2-4): 319-332.

160. **Capapé C. & Quignard J.P. 1978**. Contribution à la biologie des rajidae des côtes tunisiennes. 14. *Raja polystigma* Regan, 1923: répartition géographique et bathymétrique, sexualité, reproduction, fécondité. *Cahiers de Biologie Marine,* 19 : 233-244.

161. **Capapé C. & Quignard J.P. 1980.** Recherche sur la biologie de *Squalus blainvillei* (Risso, 1826) (Pisces, Squalidae) des côtes tunisiennes : Relation taille-poids du corps, du

foie et des gonades. Coefficients de condition. Rapports hépato et gonosomatique. Croissance embryonnaire. *Archives de l'Institut Pasteur de Tunis*, 57 (4), 385-408.

162. **Capape C. & Quignard J.P. 1983.** Nouvelles données sur la morphologie de *Mustelus asterias* Cloquet, 1981. *Oebalia*. 1983.

163. **Capapé C., Quignard J.P., Guélorget O., Bradaï M.N., Bouaïn A., Ben Souissi J., Zaouali J. & Hemida F. 2004.** Observations on biometrical parameters in elasmobranch species from the Maghrebin shore: a survey. *Annales, series Historia Naturalis*, 14(1): 1-10.

164. **Capapé C., Quignard J.P., & Kartas F. 1980.** Nouvelle description de *Raja polystigma* Regan, 1923 (Pisces, Rajiformes). *Bulletin de l'Office National de Pêches de Tunisie*, 4 (1) : 27 -45.

165. **Capapé C., Quignard J.P. & Mellinger J. 1990.** Reproduction and development of two angelsharks, *Squatina squatina* and *S. oculata* (Pisces: Squatinidæ), off Tunisian coasts: Semi-delayed vitellogenesis, lack of egg capsule and lecithotrophy. *Journal of Fish Biology*, 37: 347-356.

166. **Capapé C., Quignard J.P. & Zaouali J. 1981.** Nouvelle description de *Rhinobatos rhinobatos* (Linné, 1758) et de *Rhinobatos cemiculus* Geoffroy Saint-Hilaire, 1817 (Pisces, Rhinobatidae). *Bulletin de l'Office National de Pêches de Tunisie*, 5 : 1-27.

167. **Capapé C., Reynaud C., Vergne Y. and J.P. Quignard. 2008.** Biological observations on the smallspotted catshark *Scyliorhinus canicula* (Chondrichthyes: Scyliorhinidae) off the Languedocian coast (southern France, northern Mediterranean). *Pan-American Journal of Aquatic Sciences.* 3: 282-289.

168. **Capapé C. & Roux C. 1980.** Étude anatomique des ptérygio-podes des Squatinidæ (Pisces, Pleurotremata) des côtes tuni-siennes. *Bulletin du Muséum national d'Histoire naturelle de Paris*, 4ème Serie., 2e section A, 4: 1161-1180

169. **Capapé C., Seck A.A., Diatta Y., Reynaud C., Hemida F., & J. Zaouali. 2004.** Reproductive biology of the Blacktip shark, *Carcharhinus limbatus* (Chondrichthyes: Carcharhinidae) off West and North African coasts. *Cybium,* 28(4): 275-284.

170. **Capapé C., Seck, A.A. & Quignard J.P. 1999.** Observations on the reproductive biology of the angular rough shark, *Oxynotus centrina* (Oxynotidae). *Cybium***,** 23(3): 259-271.

171. **Capapé, C., Tomasini J.A. & Bouchereau J.L. 1991.** Observations sur la biologie de reproduction de la petite roussette, *Scyliorhinus canicula* (Linnæus, 1758) (Pisces, Scyliorhinidæ) du golfe du Lion (France méridionale). *Ichtyophysiologica Acta*, 13: 87-109.

172. **Capape C., Tomasini J.A. & Quignard J.P. 2000.** Les elasmobranchs pleurotrêmes de la côte du Languedoc (France Méridionale): observations biologiques et demographiques. *Vie et Milieu*. 50, 123-133.

173. **Capapé C., Vergne Y., Reynaud C., Guélorget O., & Quignard J. P. 2008.** Maturity, fecundity an occurrence of the smallspotted catshark *Scyliorhinus canicula* (Chondrichthyes: Scyliorhinidae) off the Languedocian coast (Southern France, Northern western Mediterranean). *Vie et Milieu,* 58(1): 47-55.

174. **Capapé C., Vergne Y., Vianet R C., Guélorget O., & Quignard J. P. 2006.** Biological observations on the nursehound, *Scyliorhinus stellaris* (Linnaeus, 1758)(Scyliorhinidae) in captivity. *Acta Adriatica*, 47 (1): 29 – 36.

175. **Capapé C., Vergne Y., Quignard J.P. & Reynaud C. 2008.** New biological data on the eagle ray, *Myliobatis aquila* (Chondrichthyes: Myliobatidae), off Languedocian coast (Southern France, Northern Mediterranean). *Annales, series Historia Naturalis*, 18: 167-172.

176. **Capapé C. & Zaouali J. 1976.** Contribution à la biologie des Scyliorhinidaedes côtes tunisiennes V. *Galeus melastomus* Rafinesque, 1810. Régime alimentaire. *Archives de l'Institut Pasteur de Tunis*, 53: 281–291.

177. **Capapé C. & Zaouali J. 1976.** Note sur la présence de la mante de mer *Mobula mobular* (Bonnaterre, 1788) (Sélaciens, Rajiformes) dans les eaux tunisiennes. *Doriana*, 5 : 1-8.

178. **Capapé C. & Zaouali J. 1977.** Contribution à la biologie des Scyliorhinidae des côtes tunisiennes - VI - *Galeus melastomus* Rafinesque, 1810 - Répartition géographique et bathymétrique, sexualité, reproduction, fécondité. *Cahiers de Biologie Marine*, 18: 449-463.

179. **Capape C. & Zaouali J. 1979.** Etude du régime alimentaire de deux Sélaciens commune dans le golfe de Gabès (Tunisie) : *Rhinobatos rhinobatos* (linnaeus, 1758) et *Rhinobatos cemiculus* Geoffory Saint-Hilaire, 1817. *Archives de l'Institut Pasteur de Tunis*, 56 : 285 – 306.

180. **Capape C. & Zaouali J. 1981.** Note sur la taille de première maturité sexuelle de *Rhinobatos rhinobatos* (Linné, 1758) et de *Rh. cemiculus* Geoffroy Saint-Hilaire, 1817 (Pisces, Rhinobatidae) des côtes tunisiennes. *Archives de l'Institut Pasteur de Tunis*, 58: 105–114.

181. **Capape C. & Zaouali J. 1992.** Le régime alimentaire de la pastenague marbrée, *Dasyatis marmorata* (Pisces, Dasyatidae), des eaux Tunisiennes. *Vie et Millieu*, 42 : 269–276.

182. **Capape C. & Zaouali J. 1993.** Nouvelles données sur la biologie de la reproduction de la pastenague marbrée, *Dasyatis marmorata* (Steindachner,1892) (Pisces, Rajiformes, Dasyatidae), des côtes meridionales de la Tunisie (Mediterranée centrale). *Ichtyophysiologica Acta*, 16 : 1-34.

183. **Capape C. & Zaouali J. 1994.** Distribution and reproductive biology of the blackchin guitarfish, *Rhinobatos cemiculus* (Pisces: Rhinobatidae) in the Tunisian waters. *Australian Journal of Marine and Freshwater Research*, 45: 551-561

184. **Capapé C. & Zaouali J. 1995**. Reproductive biology of the marbled stingray, *Dasyatis marmorata* (Steindachner, 1982) (Pisces: Dasyatidae) in Tunisian waters (Central Mediterranean). *Journal of Aquariculture and Aquatic Sciences*, 7: 108-119.

185. **Capapé C., Zaouali J. & Desoutter M., 1979.** Note sur la présence en Tunisie de *Carcharhinus obscurus* (Lesueur, 1818) (Pisces, Pleurotremata) avec clé de détermination des Carcharhinidae des côtes tunisiennes. *Bulletin de l'Office National de Pêches de Tunisie,* 3: 171-182.

186. **Capapé C., Zaouali J. & Quignard J.P. 1976.** Premiéres données sur le cycle de la reproduction de *Rhinobatos rhinobatos* (Linné 1758) et de *Rhinobatos cemiculus* (Geoff roy Saint-Hilaire, 1817) des côtes Tunisiennes . *Archives de l'Institut Pasteur de Tunis,* 53 : 47-60.

187. **Capapé C., Zaouali J., Tomasini J.A. & Bouchereau J.L. 1992.** Reproductive biology of the spiny butterfly ray, *Gymnura altavela* (Linnæus, 1758) (Pisces: Gymnuridæ) from off the Tunisian coasts. *Scientia Marina*, 56 (4): 347-355

188. **Capapé C., Zorzi G. & Seck A.A. 1999**. New data on the eggs of the angelshark *Squatina oculata* Bonaparte, 1840 Pisces: Squatinidae). *Oebalia*, 25: 53-60.

189. **Carbonell A., Alemany F., Merella P., Quetglas A. & Román E. 2003.** The by-catch of sharks in the western Mediterranean (Balearic Islands) trawl fishery. *Fisheries Research*, 61: 7–18.

190. **Carrasson M., Stefanescu C. & Cartes J.E. 1992.** Diets and bathymetric distributions of two bathyal sharks of the Catalan deep sea (western Mediterranean). *Marine Ecology Progress Series*, 82: 21-30.

191. **Catalano B., Dalù M., Scacco U. & Vacchi M. 2007**. New biological data on *Raja brachyura* (Chondrichthyes, Rajidae) from around Asinara Island (NW Sardinia, Western Mediterranean). *Italian Journal of Zoology*, 74: 55–61.

192. **Catalano B., Mancusi C., Clò S., Serena F. & Vacchi M.. 2003.** Tag and release of juvenile specimen of ray *Raja asterias* in Tuscan waters: preliminary results and working perspectives). *Biologia Marina Mediterranea*, 10: 789-791.

193. **Cavanagh R.D. and Gibson C. 2007.** Overview of the conservation status of cartilaginous Fishes (chondrichthyans) in the Mediterranean Sea. IUCN, Gland (Switzerland) and Malaga (Spain). vi + 42 pp.

194. **Cecchi E., Mancusi C., Pajetta R., & Serena F. 2004.** Note on the biology of *Etmopterus spinax* (Linnaeus, 1758) (Chondrichthyes, Etmopteridae). *Biologia Marina Mediterranea*, 11: 564-568.

195. **Çek Ş., Başusta N., Demirhan S.A. & Karalar M. 2009.** Biological observations on the common guitarfish *Rhinobatos rhinobatos* from İskenderun Bay (Turkey, Eastern Mediterranean). *Animal Biology*, 59: 211–230

196. **Celona A. 2000.** First record of a tiger shark *Galeocerdo cuvier* (Peron & Lesueur, 1822) in the Italian waters. *Annales, Series Historia Naturalis*. 10 : 207-210.

197. **Celona A. 2002.** Due catture di squalo bianco*, Carcharodon carcharias* (Linneo, 1758) avvenute nelle acque di Marzamemi (Sicilia) negli anni 1937 e 1964. *Annales Series Historiae Naturalis*, 12: 207-210.

198. **Celona A. 2004.** Catture ed avvistamenti di Mòbula, *Mobula mobular* (Bonnaterre, 1788) Nelle acque dello stretto di Messina*. Annales Series Historiae Naturalis*, 14 : 11–18.

199. **Celona A., De Maddalena A. & Comparetto G. 2006.** Evidence of predatory attack on a bottlenose dolphin *Tursiops truncatus* by a great white shark *Carcharodon carcharias* in the Mediterranean Sea. *Annales Series Historiae Naturalis,* 16 :149-164.

200. **Celona A., De Maddalena A. & Romeo T. 2005.** Bluntnose sixgill shark, *Hexanchus griseus* (Bonnaterre, 1788), in the Eastern North Sicilian waters. *Bollettino del Museo civico di Storia naturale di Venezia*, 56: 137–151.

201. **Celona A., Donato N. & De Maddalena A. 2001.** In relation to the captures of a great white shark *Carcharodon carcharias* (Linnaeus, 1758) and a shortfin mako *Isurus oxyrinchus* Rafinesque, 1809 in the Messina Strait. *Annales Series Historiae Naturalis*, 11: 13-16.

202. **Celona A., Piscitell L. & De Maddalena A. 2004.** Tow large shortfin makos, *Isurus oxyrinchus*, Rafinesque 1809, caught off Sicily, western Ionian Sea. *Annales Series historia naturalis*, 14: 35-42.

203. **Chakroun F. 1966.** Captures d'animaux rares en Tunisie. *Bulletin de l'Institut National Scientifique et Technique d'Océanographie et de Pêche, Salammbô*, 1 : 75-79.

204. **Chatzispyrou A. & Megalofonou P. 2005.** Sexual maturity, fecundity and embryonic development of the spiny dogfsh, *Squalus acanthias*, in the eastern Mediterranean Sea. . *Journal of the Marine Biological Association of the United Kingdom*, 85: 1155-1161.

205. **Cigala Fulgosi F. 1983.** First record of *Alopias superciliosus* (Lowe, 1839) in the Mediterranean, with notes on some fossil species of the genus *Alopias*. *Annali del Museo Civico di Storia Naturale di Genova*, 84, 211–229.

206. **Cigala Fulgosi F. 1983.** Confirmation of the presence of *Carcharhinus brachyurus* (Günther, 1870) (Pisces, Selachii, Carcharhinidae) in the Mediterranean. *Doriana*, 5(249): 1-5.

207. **Cigala Fulgosi F., Nonnis Marzano F., Gandolfi G. & Tagliavini J. 2000.** Evidence of interspecific low mitochondrial divergence between *Mustelus asterias* and *M. manazo* (Chondrichthyes, Triakidae). *Biologia Marina Mediterranea*, 7: 440-443.

208. **Cihangir B., Unluoglu A. & Tirasin E.M. 1997.** Distribution and some biological aspects of the lesser spotted dogfish (Chondrichthyes, *Scyliorhinus canicula*, Linnaeus, 1758) from the northern Aegean Sea*. Mediterranean Fisheries Congress*. 9-11 April 1997, Izmir, pp. 585-603.

209. **Clo S., Bonfil R. & De Sabata E. 2008.** Additional records of the bigeye thresher shark, *Alopias superciliosus*, from the central and eastern Mediterranean Sea. *JMBA 2. Biodiversity Records.*

210. **Clo S., Dalu M., Danovaro R. & Vacchi M. 2002.** Segregation of the Mediterranean population of *Centroscymnus coelolepis* (Chondrichthyes: Squalidae): a description and survey (Elasmobranch Fisheries). *Scientific Council. Res. Doc. NAFO*. no. 02/83, 3 pp.

211. **Coll M., Piroddi C., Steenbeek J., Kaschner K., Ben Rais Lasram L., Aguzzi1 J., Ballesteros E., Nike BianchiC., Corbera J., Dailianis T., Danovaro R., Estrada1E., Froglia C., Galil B., Gasol1J.M., Gertwagen R.,Gil J.,Guilhaumon F., Kesner-Reyes K., Kitsos M.S., Koukouras A., Lampadariou N., Laxamana E., Lopez-Fe C.M., De la Cuadra, Lotze H.K., MartinD., Mouillot D., Oro D., Raicevich S., Rius-Barile J., Saiz-Salinas J.I., Carles San Vicente22, Somot S., Templado J., Turon X., Vafidis D., Villanueva R. & Voultsiadou E. 2010.** The Biodiversity of the Mediterranean Sea: Estimates, Patterns, and Threats. *PLoS ONE.,* www.plosone.org*.,* August 2010, Vol 5 (8): e11842.

212. **Consalvo I., Psomadakis P.N., Bottaro M. & Vacchi M. 2008.** First documented record of *Leucoraja circularis* (Rajidae) in the central Tyrrhenian Sea. *JMBA2, Biodiversity Records.*

213. **Consalvo I., Scacco U., Romanelli M. & Vacchi M. 2007.** Comparative study of the reproductive biology of *Torpedo torpedo* (Linnaeus, 1758) and *T. marmorata* (Risso, 1810) in the central Mediterranean Sea. *Scientia Marina*, 71: 213-222.

214. **Consoli P., Romeo T., Florio G., Perdichizzi F., Greco S., Vacchi M. & Rinelli P. 2004.** First record of *Carcharhinus plumbeus* (Pisces: Carcharhinidae) from the Southern Tyrrhenian Sea. *Journal of the Marine Biological Associationof the United Kingdom*, 84: 1085-1086.

215. **Corsini-Foka M. 2009.** Uncommon fishes from Rhodes and nearby marine region (SE Aegean Sea, Greece). *Journal of Biological Research-Thessaloniki*, 12:125-133.

216. **Corsini-Foka M. & Sioulas A. 2008.** On two old specimens of *Alopias superciliosus* (Chondrichthyes: Alopiidae) from the Aegean waters. *JMBA2. Biodiversity Records.*

217. **Costantini M. & Affronte M. 2003.** Neonatal and juvenile sandbar sharks in the northern Adriatic Sea. *Journal of Fish Biology*, 62: 740-743

218. **Costantini M., Bernardini M., Cordone P., Guilianini P.G. & Orel G. 2000**. Observations on fishery, feeding habits and reproductive biology of *Mustelus mustelus* (Chondrichthyes, Triakidae) in Northern Adriatic Sea. *Biologica Marina Mediterranea,* 7: 427–432.

219. **Cristo B., Storai T., Zuffa M., Zinzula L., Floris A. 2006.** Presence of *Carcharodon carcharias* (Condrichthyes, Lamnidae) in the Sardinian waters (Central Mediterranean). *Biologica Marina Mediterranea*, 13: 266-267.

220. **Cuoco, C., Mancusi C. & Serena F. 2005.** Study on feeding behavior of *Raja asterias* Delaroche, 1809 (Chondrichthyes, Rajidae). *Biologia Marina Mediterranea*, 12: 504-508.

221. **Cugini G. & De Maddalena A. 2003.** Sharks captured off Pescara (Italy, western Adriatic Sea). *Annales Series historia naturalis*, 13: 201-208.

222. **Dalu M., Danovaro R. & Vacchi M. 2003.** The Mediterranean deep-shark *Centroscymnus coelolepis*: a separate population? *Biologia Marina Mediterranea*, 10: 799-802.

223. **Damalas D., Maravelias C.D., Katsanevakis S., Karageorgis A.P. & Papaconstantinou C. 2010.** Seasonal abundance of non-commercial demersal fish in the eastern Mediterranean Sea in relation to hydrographic and sediment characteristics. *Estuarine, Coastal and Shelf Science*, 89: 107-118.

224. **Damalas D. & Megalofonou P. 2010.** Environmental effects on blue shark (*Prionace glauca*) and oilfish (*Ruvettus pretiosus*) distribution based on fishery-dependent data from the eastern Mediterranean Sea. *Journal of the Marine Biological Association of the United Kingdom*, 90: 467-480.

225. **Delattre G. & J. Maigret. 1986.** L'exploitation des requins sur les côtes françaises de Méditerranée (quartier de Nice). *Rapport de la Commision Internationale pour l'Exploration Scientifique de la Méditerranée*, 30: 238.

226. **De la Serna J.M., Valeiras J., Ortiz J.M. & Macías D. 2002.** Large pelagic Sharks as By-catch in the Mediterranean Swordfish Longline Fishery: Some Biological Aspects. Elasmobranch Fisheries – NAFO Scr Doc. 02/137.

227. **Demirhan S.A., 2004.** Biological characteristics of spiny dogfish (*Squalus acanthias* L. 1758) Southeastern Black Sea. PhD Thesis. Karadeniz Technical University, Trabzon. Turkey.

228. **Demirhan S.A., Çek S., Basusta A. & Basusta N. 2010.** Ageing with alcian blue duying techniques for some elasmobranchs in Iskenderun Bay, eastern Mediterranean. *Rapport de la Commision Internationale pour l'Exploration Scientifique de la Méditerranée*, 39:492.

229. **Demirhan S.A., Engin S. & Can M.F. 2005.** A preliminary study on thornback ray and spiny dogfish fishing with longline. *Turkish Journal of Aquatic Life*, 4: 77-82

230. **Demirhan S.A., Engin S., Seyhan K. & Akamca E. 2005.** Some biological aspects of thornback ray (*Raja clavata* L., 1758) in the Southeastern Black Sea. *Turkish Journal of Fisheries and Aquatic Sciences* 5: 75-83.

231. **Demirhan S.A., Ogut H., Engin S., Basusta N. & Genc E. 2006.** Difficulties in age readings from dorsal spines of spiny dogfish (*Squalus acanthias* L. 1758). pp. 28-34. *In* : Başusta N., Keskin Ç., Serena F., Seret B. (eds.), The Proceedings of the International Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean, Istanbul, 2005, Turkish Marine Research Foundation, Turkey.

232. **Demirhan S.A. & Seyhan K. 2006.** Seasonality of reproduction and embryonic growth of spiny dogfish (*Squalus acanthias* L., 1758) in the eastern Black Sea. *Turkish Journal of Zoology,* 30: 433-443.

233. **Demirhan S.A. & Seyhan K. 2007.** Life history of spiny dogfish, *Squalus acanthias* (L. 1758), in the southern Black Sea. *Fisheries Research*, 85: 210–216.

234. **Demirhan S.A., Seyhan K. & Basusta N.** 2007. Dietary overlap in spiny dogfish (*Squalus acanthias*) and thornback ray (*Raja clavata*) in the southeastern Black Sea. *Ekoloji* 16, 62: 1-8.

235. **De Maddalena A. 2000.** The Italian Great White Shark Data Bank. *Annales, Series Historia Naturalis,* 10: 331-332.

236. **De Maddalena A. 2000.** Historical and contemporary presence of the great white shark *Carcharodon carcharias* (Linnaeus, 1758), in the Northern and Central Adriatic Sea. *Annales, Series historia naturalis*, 10: 3-18.

237. **De Maddalena A. 2006.** A catalogue of great white sharks *Carcharodon carcharias* (Linnaeus, 1758) preserved in European museums. *Journal of the National Museum, Natural History Series*, 175 (3–4): 109–125.

238. **De Maddalena A. & Dell Rovere G. 2005.** First record of the pigeye shark, *Carcharhinus amboinensis* (Müller & Henle, 1839), in the Mediterranean Sea. *Annales. Series historia naturalis*, 15: 209-212.

239. **De Maddalena A., Glaizot O. & Oliver G. 2003.** On the great white shark, *Carcharodon carcharias* (Linnaeus, 1758), preserved in the Museum of Zoology in Lausanne. *Marine life*, 13: 53-59.

240. **De Maddalena A. & Piscitelli L. 2001.** Morphometrics of neonate velvet belly, *Etmopterus spinax* (Linnaeus, 1758). *Annales, Series historia naturalis,* 11: 17-22.

241. **De Maddalena L., Piscitelli L. & Malandra R. 2001.** The largest specimen of smooth hound, *Mustelus mustelus* (Linnaeus, 1758), recorded from the Mediterranean Sea. *Biljeske-Notes,* 84: 1-8.

242. **De Maddalena A. & Zuffa M. 2003.** A gravid female Bramble shark, *Echinorinhus brucus* (Bonnaterre, 1788), caught off Elba Island (Italy, northern Tyrrhenian Sea). *Annales, Series historia naturalis,* 13 : 167-172.

243. **De Maddalena A., Zuffa M., Lipej L. & Celona A. 2001.** An analysis of the photographic evidences of the largest great white sharks, *Carcharodon carcharias* (Linnaeus, 1758), captured in the Mediterranean Sea with considerations about the maximum size of the species. *Annales, Series historia naturalis*, 11: 193-206.

244. **De Metrio G., Cacucci M., Deflorio M., Desantis S. & Santamaria N. 2000.** Incidence of the large pelagic fishing on the shark catches. *Biologia Marina Mediterranea,* 7: 334–335.

245. **De Metrio G., Petrosino G., Montanaro C., Matarrese A., Lenti M. & Cecere E. 1984.** Survey on Summer-Autumn population of *Prionace glauca* L. (Pisces, Chondrichthyes) during the four-year period 1978–1981 and its incidence on swordfish (*Xiphias gladius* L.) and albacore (*Thunnus alalunga* (Bonn)) fishing. *Oebalia*, 10: 105–116.

246. **De Zio V., Pastorelli A.M., Rositani L. 2000.** By catch of blue shark *Prionace glauca* (L.) during large pelagic fishery in southern Adriatic Sea (1984-1998). *Biologia Marina Mediterranea*, 7: 444-446.

247. **Di Natale A. 1998.** By-catch of shark species in surface gear used by the Italian fleet for large pelagic species. *Col. Vol. Sci. Pap. ICCAT*, 48 (3): 138-140.

248. **Di Natale A., Mangano A., Maurizi A., Montaldo L., Navarra E., Pinca S., Schimmenti G., Torchia G. & Valastro M. 1995.** A review of driftnet catches by the Italian fleet: species composition, observers data and distribution along the net. *Col. Vol. Sci. Pap. ICCAT*, 44 (1):226-235.

249. **Doğan K. 2006.** The production and economic importance of sharks in Turkey. pp. 79-87. *In* : Başusta N., Keskin Ç., Serena F., Seret B. (eds.), The Proceedings of the International Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean, Istanbul, 2005, Turkish Marine Research Foundation, Turkey.

250. **D'Onghia G., Matarrese A., Tursi A. & Sion L. 1995.** Observations on the depth distribution pattern of the small-spotted catshark in the North Aegean Sea. *Journal of Fish Biology,* 47: 421–426.

251. **D'Onghia G., Politou C-Y., Bozzano A., Lloris D., Rotllant G., Sion L. & Mastrototaro F. 2004.** Deep-water fish assemblages in the Mediterranean Sea. *Scientia Marina*, 68: 87-99.

252. **Dragičević B., Dulčić J. & Capapé C. 2009.** Capture of a rare shark, *Oxynotus centrina* (Chondrichthyes: Oxynotidae) in the eastern Adriatic Sea. *Journal of Applied Ichthyology*, 25: 56-59.

253. **Dulcic J., Jardas I., Onofri V. & Bolotin J. 2003.** The roughtail stingray *Dasyatis centroura* (Pisces: Dasyatidae) and spiny butterfly ray *Gymnura altavela* (Pisces: Gymnuridae) from the southern Adriatic. *Journal of the Marine Biological Association of the United Kingdom*, 83: 871-872.

254. **Dulcic J., Lipej L., Orlando Morana A., Jenkos R., Grbec B., Guélorget O. & Capapé C. 2008.** The Bull Ray, *Pteromylaeus bovinus* (Myliobatidae), in the northern Adriatic Sea. *Cybium*, 32: 119-123.

255. **Düzgünes E., Okumus I., Feyzioglu M. & Sivri N. 2006.** Population parameters of spiny dogfish, *Squalus acanthias* from the Turkish Black Sea coast and its commercial exploitation in Turkey. pp. 1–9. In: *In* : Başusta N., Keskin Ç., Serena F., Seret B. (eds.), The Proceedings of the International Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean, Istanbul, 2005, Turkish Marine Research Foundation, Turkey.

256. **El Kamel O., Mnasri N., Ben Souissi J., Boumaïza M., Ben Amor M.M. & Capapé C. 2009.** Inventory of elasmobranch species caught in the Lagoon of Bizerte (North-eastern Tunisia, central Mediterranean). *Pan-American Journal of Aquatic Sciences*, 4: 383-412.

257. **El Kamel O., Mnasri N., Boumaïza M. & Capapé C. 2009.** Atypical abnormality in a common *torpedo*, *Torpedo torpedo* (Chondrichthyes: Torpedinidae) from the Lagoon of Bizerte (northern Tunisia, central Mediterranean). *Cahiers de Biologie Marine*, 50: 97-101.

258. **Enajjar S. 2009.** Diversité des Rajiformes et etude eco-biologique de *Rhinobatos rhinobatos* et *Glaucostegus cemiculus* (Famille des Rhinobatidae) du Golfe de Gabès (Tunisie). *Thèse de doctorat en Sciences biologiques. Faculté des Sciences de Sfax, Tunisie*. 173 p.

259. **Enajjar S., Bradaï M.N. & Bouaïn A. 2003.** Données préliminaire sur la reproduction de la pastenague commune *Dasyatis pastinaca* (Linnaeus, 1785) du golfe de Gabès. *Bulletin de l'Institut des Sciences et Technologies de la Mer de Salammbô*, 8 : 26 - 30.

260. **Enajjar S., Bradaï M.N. & Bouaïn A. 2004.** État du débarquement du poisson guitare fouisseur *Rhinobatus cemiculus* dans le golfe de Gabès. *Bulletin de l'Institut des Sciences et Technologies de la Mer de Salammbô*, 9 : 53 – 56.

261. **Enajjar S., Bradaï M.N. & Bouaïn A. 2002.** La reproduction de la torpille ocellée *Torpedo (Torpedo) torpedo* (Linnaeus, 1758) du Golfe de Gabès. *Bulletin de l'Institut des Sciences et Technologies de la Mer de Salammbô*, 7: 40-43.

262. **Enajjar S., Bradaï M.N. & Bouaïn A. 2007.** Feeding habits of *Rhinobatos rhinobatos* in the Gulf of Gabès. *Rapport de la Commision Internationale pour l'Exploration Scientifique de la Méditerranée,* 38 *:* 468.

263. **Enajjar S., Bradaï M.N. & Bouaïn A. 2008.** New data on the reproductive biology of the common guitarfish of the Gulf of Gabès (southern Tunisia, central Mediterranean). *Journal of the Marine Biological Association of the United Kingdom*, 88: 1063–1068.

264. **Erdem Y., Ozdemir S. & Sumer C. 2001.** A study of stomach contents of thornback ray (*Raja clavata* L.). pp. 351-359 *In*: Akyurt I, Basusta N (eds.), Proceedings of XI. National Symposium on Fisherres and Aquaculture, September 2001, Hatay, Turkey.

265. **Erkoyuncu I. & Samsun O. 1986.** Some morphometric characteristics, meat productivity, relationships between liver weights and meat quality of thornback ray (*Raja clavata* L. 1758) in the Black Sea. *E.U. Journal of Fisheries & Aquatic Sciences*, 5: 19-20.

266. **Ejf. 2007.** Illegal Driftnetting in the Mediterranean. Environmental Justice Foundation, London, UK.

266a**. Essafi K. 1975.** Contribution à l'étude des copépodes parasites des Sélaciens de Tunisie. Thése de 3ème cycle. Faculté des Sciences de Tunis: 1-111.

266b**. Euzet L. 1959.** Recherches sur les cestodes Tetraphyllides de Sélaciens des côtes de France. *D. Sc. Thesis. Université de Montpellier, France: 263p.*

266c. **Euzet L. & B.M. Radujkovic. 1989.** *Kotorella pronosoma* (Stossich, 1901) n. gen., n. comb., type des Kotorellidae, nouvelle famille de Trypanorhyncha (Cestoda), parasite intestinal de *Dasyatis pastinaca* (L., 1758) Annales de parasitologie humaine et comparée 64, 420-425.

267. **Ezzat A., Abdel-Aziz S.H., El-Charabawy M.M. & Hussein M.O. 1987.** The food of *Raja miraletus* Linnaeus, 1758 in Mediterranean waters off Alexandria. *Bulletin of Institute of Oceanography and Fisheries*. Cairo, 13: 59–74.

268. **Fanelli E., Rey J., Torres P. & Gil de Sola L. 2009.** Feeding habits of blackmouth catshark *Galeus melastomus* Rafinesque, 1810 and velvet belly lantern shark *Etmopterus spinax* (Linnaeus, 1758) in the western Mediterranean. *Journal of Applied Ichthyology*, 25: 83-93.

269. **Fergusson I.K. 1994.** Check-list of shark species frequenting the Mediterranean Sea. pp 49-51. *In*: Fowler S.L. & R.C. Earl (eds). Proceeding of the 2nd European Shark and Ray Workshop, Peterborough 1994, England.

270. **Fergusson I.K. 1994.** Preliminary notes on white shark (*Carcharodon carcharias*) predation and scavenging upon odontocetes in the Mediterranean Sea. pp. 52–56. *In*: Fowler S.L. & R.C. Earll (eds.) Proceedings of the 2nd European Shark and Ray Workshop, Peterborough 1994, Englnd.

271. **Fergusson I.K. 1996.** Distribution and autecology of the white shark in the eastern North Atlantic Ocean and Mediterranean Sea. pp. 321-345. *In*: Klimley A.P. and D.G. Ainley (eds.) Great white sharks: The Biology of *Carcharodon carcharias*. Academic Press, San Diego.

272. **Fergusson I.K. 2002.** Occurrence and biology of the great white shark, *Carcharodon carcharias*, in the central Mediterranean Sea: a review. pp. 7-30. *In*: Vacchi M., La Mesa G., Serena F., B Seret (eds.), Proceedings of the 4th meeting of the European Elasmobranch Association,Livorno, Italy 2000.

273. **Fergusson I.K. & Compagno L.J.V. 2000.** Distributional note on the dusky shark, *Carcharhinus obscurus*, from the Mediterranean Sea, with a first record from the Maltese Islands. pp. 57-65. In: Séret B. & J.y. Sire (eds.), Proceedings of the 3rd meeting of the European Elasmobranch Association, Boulogne-sur-Mer, France, 1999.

274. **Fergusson I.K., Compagno L.J.V. & Marks M.A. 2000.** Predation by white sharks *Carcharodon carcharias* (Chondrichthyes: Lamnidae) upon chelonians, with new records from the Mediterranean Sea and a first record of the ocean sunfish Mola mola (Osteichthyes: Molidae) as stomach contents. *Environmental Biology of Fishes*, 58, 447-453.

275. **Fergusson I.K., Graham K.J. & Compagno L.J.V. 2008.** Distribution, abundance and biology of the smalltooth sandtiger shark *Odontaspis ferox* (Risso, 1810) (Lamniformes: Odontaspididae). *Environmental biology of fishes*, 81: 207-228.

276. **Fergusson I.K., Vacchi M. & Serena F. 2002.** Note on the declining status of the sandtiger shark *Carcharias taurus* in the Mediterranean Sea. pp. 73-76. *In*: Vacchi M., La Mesa G.,

Serena F., B Seret (eds.), Proceedings of the 4th meeting of the European Elasmobranch Association, Livorno, Italy 2000.

277. **Ferretti F. & Myers R.A. 2006.** By-catch of sharks in the Mediterranean Sea: available mitigations tools. pp.149-161. *In* : Başusta N., Keskin Ç., Serena F., Seret B. (eds.), The Proceedings of the International Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean, Istanbul, 2005, Turkish Marine Research Foundation, Turkey.

278. **Ferretti F., Myers R.A., Serena F. & Lotze H.K. 2008.** Loss of large predatory sharks from the Mediterranean Sea. *Conservation Biology*, 22: 952-964.

279. **Ferretti F., Myers R.A., Serena F. & Sartor P. 2005.** Long term dynamics of chondrichthyan fish community in the upper Tyrrhenian Sea. *ICES Council Meeting Documents.* Copenhagen. **ICES CM 25.**

280. **Filanti T., Megalofonou P., Petrosino G. & De Metrio. G. 1986.** Incidence of Selachii in longline swordfish fishery in the Gulf of Taranto. *Nova Thalassia*, 8: 667–669.

281. **Filiz H. & Bilge G. 2004.** Length–weight relationships of 24 fish species from the North Aegean Sea, Turkey. *Journal of Applied Ichthyology*, 20: 431–432

282. **Filiz H. & Mater S. 2002.** A preliminary study on length-weight relationships for seven elasmobranch species from north Aegean Sea, Turkey. *E.U. Journal of Fisheries & Aquatic Sciences*, 19: 401–409.

283. **Filiz H. & Taskavak E. 2006.** Sexual dimorphism in the head, mouth, and body morphology of the smallspotted catshark, *Scyliorhinus canicula* (Linnaeus, 1758) (Chondrichthyes: Scyliorhinidae) from Turkey. *Acta Adriatica*.47 (1): 37-47.

284. **Filiz H. & Taskavak E. 2006.** Food of the lesser dogfish, *Scyliorhinus canicula* (Linnaeus, 1758) in Foca (The Norheast Aegean Sea, Turkey) in Autum 2002. pp. 60-68. *In* : Başusta N., Keskin Ç., Serena F., Seret B. (eds.), The Proceedings of the International Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean, Istanbul, 2005, Turkish Marine Research Foundation, Turkey.

285. **Fischer W., Bauchot M.L. & Schneider M. 1987.** Fiches FAO d'identification des espèces pour les besoins de la pêche. (Revision 1). Mediterranée et mer Noire. Zone de Pêche 37. Volume II : Vertèbres. pp.761-1530. Rome FAO.

286. **Follesa M.C., Addis P., Murenu M., Saba R. & Sabatini A. 2003.** Annotated check list of the skates (Chondrichthyes, Rajidae) in the Sardinian Seas. *Biologia Marina Mediterranea*, 10: 828-833.

287. **Follesa M.C., Mulas A., Cabiddu S., Porcu C., Deiana A.M., Cau A. 2010.** Diet and feeding habits of two skate species, *Raja brachyura* and *Raja miraletus* (Chondrichthyes, Rajidae) in Sardinian waters (central-western Mediterranean). *Italian Journal of Zoology*, 77: 53-60.

288. **Fromentin J. & Farrugio H. 2005**. Results on the 2003 observer program on board the French purse seiner targeting Atlantic bluefin tuna in the Mediterranean Sea. Col. Vol. Sci. Pap. ICCAT, 58(2): 779-782.

289. **Galaz T. & De Maddalina A. 2004.** On a great white shark *Carcharodon carcharias* (Linnaeus, 1758), trapped in a tuna cage off Libya, Mediterranean Sea. *Annales, Series Historia Naturalis,* 14: 159-164.

290. **Garibaldi F. 2006.** A summary of shark by-catch in the Italian pelagic fishery. pp.169-175. *In* : Başusta N., Keskin Ç., Serena F., Seret B. (eds.), The Proceedings of the International Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean, Istanbul, 2005, Turkish Marine Research Foundation, Turkey.

291. **Garibaldi F. & Orsi-Relini L. 2000.** Summer abundance, size and feeding habits of the blue shark, *Prionace glauca*, in the pelagic sanctuary of the Ligurian Sea. *Biologica Marina Mediterranea*, 7: 324-333.

292. **Garofalo G., Gristina M., Fiorentino F., Cigala Fulgosi F., Norrito G. & Sinacori G. 2003.** Distributional pattern of rays (Pisces, Rajidae) in the Strait of Sicily in relation to fishing pressure. *Hydrobiologia*, 503: 245-250.

293. **Gennari E. & Scacco U. 2007.** First age and growth estimates in the deep water shark, *Etmopterus Spinax* (Linnaeus, 1758), by deep coned vertebral analysis. *Marine Biology*, 152: 1207-1214.

294. **Golani D. 1987.** On deep-water sharks caught off the Mediterranean coast of Israel. *Israel Journal of Zoology*, 34: 23-31.

295. **Golani D. 1996.** The marine ichthyofauna of the eastern Levant—history, inventory and characterization. *Israel Journal of Zoology*, 42: 15–55.

296. **Golani D. 2005.** Checklist of the Mediterranean Fishes of Israel. Zootaxa, 947: 1-90.

297. **Golani D. 2006.** Cartilaginus fishes of the Mediterranean coast of Israel. pp. 95-100. *In* : Başusta N., Keskin Ç., Serena F., Seret B. (eds.), The Proceedings of the International Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean, Istanbul, 2005, Turkish Marine Research Foundation, Turkey.

298. **Golani D. & Capapé C. 2004.** First records of the blue stingray, *Dasyatis chrysonota* (Smith, 1828) (Chondrichthyes: Dasaytidae), off the coast of Israel. *Acta Adriatica,* 45: 107-112.

299. **Golani D. & Levy Y. 2005.** New records and rare occurrences of fish species from the Mediterranean coast of Israel. *Zoology in the Middle East*, 36: 27–32.

300. **Golani D., Öztürk B. & Başusta. 2006.** Fishes of the Eastern Mediterranean. Istanbul: *Turkish Marine Research Foundation*.

301. **Golani D., Orsi-Relini L., Massutí E. & QUIGNARD J.P. 2002.** CIESM Atlas of exotic species in the Mediterranean: Fishes. CIESM (Monaco): 254 pp.

302. **Golani D. & Pisanty S. 2000.** Biological aspects of the gulper shark, *Centrophorus granulosus* (Bloch and Schneider, 1801), from the Mediterranean coast of Israel. *Acta Adriatica*, 41: 71-78.

303. **Goren M. & Galil B.S. 1997.** New records of deep-sea fishes from the Levant Basin and a note on the deep-sea fishes of the Mediterranean. *Israel Journal of Zoology*, 43: 197-203.

304. **Guallart J. 1998.** Contribución al conocimientto de la taxonomía y la biología del tiburón batial *Centrophorus granulosus* (Bloch & Schneider, 1801) (Elasmobranchii, Squalidae) en el Mar Balear (Mediterráneo occidental). PhD Thesis, Universitat de Valencia, Valencia. 291p.

305. **Guallart J. & Vicent J.J. 2001.** Changes in composition during embryo development of the gulper shark, *Centrophorus granulosus* (Elasmobranchii, Centrophoridae): an assessment of maternal-embryonic nutritional relationships. *Environmental Biology of Fishes*, 61: 135–150.

306. **Hadjichristophorou M. 2006.** Chondrichthyes in Cyprus. pp.162-168. *In* : Başusta N., Keskin Ç., Serena F., Seret B. (eds.), The Proceedings of the International Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean, Istanbul, 2005, Turkish Marine Research Foundation, Turkey.

307. **Hamdaoui B. 2009.** Les élasmobranches dans les débarquements des chalutiers au port de pêche de Sfax, golfe de Gabès. Master thesis. *Faculté des Sciences de Sfax,* Tunisie.75p.

308. **Hareide N.R., Carlson J., Clarke M., Clarke S., Ellis J., Fordham S., Fowler S., Pinho M., Raymakers C., Serena F., Seret B. & S. Polti. 2007.** European Shark Fisheries: a preliminary investigation into fisheries, conversion factors, trade products, markets and management measures. European Elasmobranch Association.

309. **Hattour A., Macias D. & de la Serna J.M. 2004.** Les prises accessoires des madragues et des sennes tournantes tunisiennes. Col. Vol. Sci. Pap. ICCAT/2004.

310. **Hattour A. & Nakamura I. 2004.** Young thresher shark Alopias vulpinus (Bonnaterre, 1788) Chondrichthyes, Elasmobranchs, Alopidae, from the Tunisian coast (Central Mediterranean). *Bulletin de l'Institut des Sciences et Technologies de la Mer de Salammbô,* 31: 121-123.

311. **Hemida F. 1998.** The shark and the skate fishery in the Algerian basin: biological technological aspect. *Shark News*, 12. 14.

312. **Hemida F. 2005.** Les sélaciens de la côte algérienne : Biosystématique des Requins et des Raies ; Ecologie, Reproduction et Exploitation de quelques populations capturées. *Thèse de Doctorat. Université des sciences et de la Technologie, Houari Boumediene.* Algérie. 231p.

313. **Hemida F., Ait-Daoud R., Benramdhane N. & Labidi N. 1998.** Recensement, importance halieutique et écologique des populations des requins de la côte algérienne. *Bulletin de la Société d'Histoire Naturelle d'Afrique du Nord*. 72: 51-55.

314. **Hemida F. & Capape C. 2002.** Observations on a female bramble shark, *Echinorhinus brucus* (Bonnaterre, 1788) (Chondrichthyes: Echinorhinidae), caught off the Algerian coast (southern Mediterranean). *Acta adriatica,* 43: 103-108. 2002.

315. **Hemida F. & Capape C. 2003.** Observations on blue sharks, *Prionace glauca* (Chondrichthyes: Carcharhinidae), from the Algerian coast (southern Mediterranean). *Journal of the Marine Biological Association of the United Kingdom*. 83, 873-874.

316. **Hemida F. & Capape C. 2008.** On the occurrence of the longfin mako, *Isurus paucus* (Chondrichthyes: Lamnidae) off the Algerian coast (southwestern Mediterranean). *Acta Adriatica,* 49: 185-189.

317. **Hemida F. & Labidi N. 2002.** Notes on the Carcharinids of the Algerian basin. pp. 192-193. *In*: Vacchi M., La Mesa G., Serena F. & B. Séret, (eds) Proceedings of the 4th meeting of the European Elasmobranch Association, Livorno Italy, 2000.

318. **Hemida F., Mehezem S. & Capapé C. 2002.** Captures of the giant Devil ray *Mobula mobular* Bonnaterre, 1788 (Chondrichthyes: Mobulidae) off the Algerian coast (southern Mediterranean). *Acta Adriatica*, 43, 69–76.

319. **Hemida F., Moumene F. & Giordano D. 2000.** Distribution of some ray species from the Algerian basin. *Biologia Marina Mediterranea*, 7: 412-416.

320. **Hemida F., Sergoua W. & Seridji R. 2007.** Nouvelle liste commentée des raies du bassin Algerien. *Rapp. Comm. int. Mer Médit,* 38 : 497.

321. **Hmida F., Sergoua W. & Seridji R. 2007**. Analyse des données morphométriques de quelques espèces du genre *Raja* Linnaeus, 1758 dans Le bassin Algérien. *Rapp. Comm. int. Mer Médit.,* 38: 498.

322. **Hemida F., Seridji R., Enajjar S., Bradai M.N., Collier E., Guélorget O. & Capapé C. 2003.** New observations on the reproductive biology of the pelagic stingray, *Dasyatis violacea* (Bonaparte, 1832) (Chondrichthyes: Dasyatidae) from the Mediterranean Sea. *Acta Adriatica*, 44: 193-204.

323. **Hemida F., Seridji R., Labidi N., Bensaci J. & Capapé C. 2002.** Records of *Carcharhinus* spp. (Chondrichthyes: Carcharhinidae) from off the Algerian coast (southern Mediterranean). *Acta adriatica,* 43, 83-92.

324. **Hornung H., Krom M.D., Cohen Y. & Bernhart M. 1993.** Trace metal content in deep-water sharks from the eastern Mediterranean. *Marine Biology*, 115: 331-338.

325. **Ismen A. 2003.** Age, growth, reproduction and food of common stingray (*Dasyatis pastinaca* L., 1758) in Iskenderun Bay, the eastern Mediterranean. *Fisheries Research*, 60: 169-176.

326. **Ismen A., Yığın C. & Ismen P. 2007.** Age, growth, reproductive biology and feed of the common guitarfish (*Rhinobatos rhinobatos* Linnaeus, 1758) in ˙Iskenderun Bay, the eastern Mediterranean Sea. *Fisheries Research*, 84: 263–269

327. **Jardas I. 1972.** Supplement to the knowledge of ecology of some Adriatic cartilaginous fishes (Chondrichthyes) with special reference to their nutrition. *Acta Adriatica*, 14: 55-57.

328. **Jardas I. 1972**. Result of the stomach contents analysis of *Squalus fernandinus,* Molina. *Acta Adriatica*. 14: 3-10.

329. **Jardas I. 1973.** A contribution toour knowledge of the biology and ecology of thornback ray (*Raja clavata* L.) and brown ray (*Raja miraletus* L.) in the Adriatic. *Acta Adriatica*, 15: 1-28.

330. **Jardas I. 1975.** The morphometry and population diagnosis of thornback ray, *Raja clavata* L., in the Adriatic. *Acta Adriatica*, 17: 1–26.

331. **Jardas I. 1979.** Morphological, biological and ecological characteristics of the lesser spotted dogfish, *Scyliorhinus canicula* (Linnaeus, 1758) population in the Adriatic Sea. *Reports-Researches into Fisheries Biology*, Hvar, 4. 104 p.

332. **Jardas I. 1981.** Morphometric characteristics of the brown ray, *Raja miraletus* L. (Pisces, Chondrichthyes) in the Adriatic Sea. *Biosistematika*, 7: 159-171.

333. **Jardas I. 1984.** Horizontal and vertical distribution of benthos Selachia (Pleurotremata, Hypotremata) in the Adriatic. FAO Fish. Rep., (290): 95-108.

334. **Jardas I. & Nerlović V. 1999.** Preliminary data on the feeding of *Mustelus mustelus* (L.) and *Mustelus punctulatus* Risso (Chondrichthyes: Triakidae) in the Adriatic Sea. pp 235-245. *Proceedings of the Ist Congress of Macedonian Ecologists*. Special issues of Macedonian Ecological Society, Vol.5, Skopje, 1999.

335. **Jardas I., Šantić M., Nerlović V. & Pallaoro A. 2007.** Diet of the smooth-hound, *Mustelus mustelus* (Chondrichthyes: Triakidae), in the eastern Adriatic Sea. *Cybium*, 31: 459-464.

336. **Jardas I., Šantić M., Nerlović V. & Pallaoro A. 2007.** Diet composition of blackspotted smooth-hound, *Mustelus punctulatus* (Risso, 1826), in the eastern Adriatic Sea. *Journal of Applied Ichthyology*, 23: 279-281.

337. **Jardas I., Šantić M. & Pallaoro A. 2004.** Diet composition of the eagle ray, *Myliobatis aquila* (Chondrichthyes: Myliobatidae), in the eastern Adriatic sea. *Cybium*, 28: 372-374

338. **Jukic-Peladic S., Vrgoc N., Krstulovic-Sifner S., Piccinetti C., Piccinetti-Manfrin G., Marano G. & Ungaro N. 2001.** Long-term changes in demersal resources of the Adriatic Sea: Comparison between trawl surveys carried out in 1948 and 1998. *Fisheries Research*, 53: 95-104.

339. **Kabasakal H. 1998**. Sharks and rays fisheries in Turkey. *Shark News*, 11: 8.

340. **Kabasakal H. 1998.** The first record of the bluntnose six-gill shark *Hexanchus griseus* (Bonnaterre, 1788) in the Sea of Marmara. *Acta Adriatica*, 39: 67-70.

341. **Kabasakal H. 1998.** The first record of the speckled ray, *Raja (Raja) polystigma* Regan, 1923 in the seas of Turkey. *Acta Adriatica*, 39: 61-66.

342. **Kabasakal H. 1998.** A note on the occurrence of the thresher shark, *Alopias vulpinus* from the south-western Black Sea. *Journal of the Marine Biological Association of the United Kingdom*, 78: 685–686.

343. **Kabasakal H. 2001.** Preliminary data on the feeding ecology of some selachians from the north-eastern Aegean Sea. *Acta Adriatica,* 42:15-24.

344. **Kabasakal, H. 2002.** Elasmobranch species of the seas of Turkey. *Annales, series Historia Naturalis*, 12: 15-22.

345. **Kabasakal H. 2002.** Capture of a female basking shark, *Cetorhinus maximus* (Gunnerus, 1765), from southern Turkey. *Annales, Series historia naturalis*, 12: 31-34. 2002.

346. **Kabasakal H. 2002.** Cephalopods in the stomach contents of four Elasmobranch species from the northern Aegean Sea. *Acta Adriatica*, 43: 17-24.

347. **Kabasakal H. 2002.** Stomach contents of the longnose spurdog, *Squalus blainvillei* (Risso, 1826) from the North-Eastern Aegean Sea. *Annales, Series historia naturalis*, 12: 173-

348. **Kabasakal H. 2003.** Historical and contemporary records of sharks from the Sea of Marmara, Turkey. *Annales, Series historia naturalis,* 13. 1-12.

349. **Kabasakal H. 2003.** Historical records of the Great White Shark, *Carcharodon carcharias* (Linnaeus, 1758) (Lamniformes: Lamnidae), from the Sea of Marmara. *Annales, series historia naturalis,* 13: 173–180.

350. **Kabasakal H. 2004.** Preliminary observations on the reproductive biology and diet of the bluntnose sixgill shark, *Hexanchus griseus* (Bonnaterre, 1788) (Chondrichthyes: Hexanchidae), in Turkish. *Acta adriatica*, 45: 187-196.

351. **Kabasakal H. 2004.** *Cetorhinus maximus* (Gunnerus, 1765), (Lamniformes, Cethorinidae) in the Gulf of Antalya in 1987. A summary of the previous records of the species from Turkish coastal waters in the Mediterranean. *Annales, Series historia naturalis*, 14: 29-34.

352. **Kabasakal H. 2006.** Distribution and biology of the bluntnose sixgill shark, *Hexanchus griseus* (Bonnaterre, 1788) (Chondrichthyes: Hexanchidae), from Turkish waters. *Annales Series Historia Naturalis,* 16: 29–36.

353. **Kabasakal H. 2007.** On the occurrence of the thresher shark (Lamniformes: Alopiidae) from Turkish coastal waters. *Annales Series Historia Naturalis,* 17: 23-28.

354. **Kabasakal H. 2008.** On the occurrence of the bluntnose sixgill shark, *Hexanchus griseus* (Chondrichthyes: Hexanchidae), in the Sea of Marmara. *JMBA2. Biodiversity Records.*

355. **Kabasakal H. 2009.** Observations on a rare shark, *Oxynotus centrina* (Chondrichthyes: Oxynotidae), in the Sea of Marmara (north-western Turkey). *Pan-American Journal of Aquatic Sciences*, 4: 609-612.

356. **Kabasakal H. & Kabasakal E. 2002.** Morphometrics of young kitefin sharks, *Dalatias licha* (Bonnaterre, 1788), from northeastern Aegean Sea, with notes on its biology. *Annales, Series historia naturalis*, 12: 161-166.

357. **Kabasakal H. & Kabasakal E. 2004.** Shark captured by commercial fishing vessels off the coast of Turkey in the northern Aegean Sea. *Annales, Series historia naturalis*, 14: 171-180.

358. **Kabasakal H. & Karhan S.U. 2007.** On the occurrence of the bigeye thresher shark, *Alopias superciliosus* (Lamniformes: Alopiidae), in Turkish waters. *JMBA2. Biodiversity Records*.

359. **Kabasakal H. & Özgür Gedikoğlu S. 2008.** Two new-born great white sharks, *Carcharodon carcharias* (Linnaeus, 1758) (Lamniformes; Lamnidae) from Turkish waters of the north Aegean Sea. *Acta Adriatica*, 49: 125-135.

360. **Kabasakal H. & Unsal N. 1999.** Observation on *Etmopterus spinax* (Pisces: Squalidae), from the north-eastern Aegean Sea. *Biljeske-Notes*. 81: 1-11.

361. **Kadri H., Bradaï M.N., Saïdi B. & Bouaïn A. 2006.** Etude préliminaire du régime alimentaire de *Raja clavata* dans le golfe de Gabès. *Bulletin de l'Institut des Sciences et Technologies de la Mer de Salammbô* 10 : 78-80.

362. **Kadri H., Marouani S., Bradaï M.N., Saïdi B. & Bouaïn A. 2010.** Régime alimentaire de *Dipturus oxyrinchus* dans le golfe de Gabès. *Rapport de la Commision Internationale pour l'Exploration Scientifique de la Méditerranée,* 39: 551.

363. **Karachle P.k. & Konstantinos S. 2010.** Food and feeding habits of nine elasmobranch species in the Aegean Sea. *Rapport de la Commision Internationale pour l'Exploration Scientifique de la Méditerranée*, 39: 553.

364. **Karakulak F. S., Erk H. & Bilgin B. 2006.** Length–weight relationships for 47 coastal fish species from the northern Aegean Sea, Turkey. *Journal of Applied Ichthyology*. 22 : 274–278.

365. **Katsanevakis S., Maravelias C.D. 2009.** Bathymetric distribution of sixteen demersal fish in the Aegean and Ionian Seas based on generalized additive modelling. *Fisheries Science*, 75:13-23.

366. **Keskin C. & Karakulak F.S. 2006.** Preliminary results on depth distribution of cartilaginous fish in the North Aegean Sea and their fishing potential in summer 2001. pp.69-78. *In* : Başusta N., Keskin Ç., Serena F., Seret B. (eds.), The Proceedings of the International Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean, Istanbul, 2005, Turkish Marine Research Foundation, Turkey.

367. **Kirnosova I.P. 1989.** Reproduction of spiny dogfish, *Squalus acanthias*, in the Black Sea. *Journal of Ichthyology*, 29: 21-26.

367a. **Kousteni V., Kontopoulou M. & Megalofonou P. 2010.** Sexaul maturity and fecundity of *Scyliorhinus canicula* (Linnaeus, 1758) in the Aegean Sea. *Marine Biologyu Research*, 6: 390-398.

368. **Kousteni V., Megalofonou P. 2010.** Reproductive biology of *Squalus blainvillei* (risso, 1826) in the Eastern Mediterranean Sea. *Rapport de la Commision Internationale pour l'Exploration Scientifique de la Méditerranée,* 39: 562.

369. **Kousteni V., Megalofonou P., Dassenakis M. & Stathopoulou E. 2006.** Total mercury concentration in edible tissues of two elasmobranch species from Crete (eastern Mediterranean Sea). *Cybium*, 30: 119-123.

370. **Krstulović Šifner S., Vrgoč N., Dadić V., Isajlović I., Peharda M. & Piccinetti C. 2009.** Long-term changes in distribution and demographic composition of thornback ray, *Raja clavata*, in the northern and central Adriatic Sea. *Journal of Applied Ichthyology*, 25: 40-46.

370a. Ktari M. H. & C. Maillard. 1972. *Neonchocotyle pastinaca* n. g. n. sp. (Monogenea-Hexabothriidae) parasite de *Dasyatis pastinaca* dans le golfe de Tunis : description de l'adulte et de la larve. *Annales de Parasitologie Humaine et comparée. 47 : 181-191.*

371. **Kutaygil N. & Bilecik N. 1977.** Recherches sur le *Squalus acanthias* L. du littoral Anatolien de la Mer Noire. Rapports et Proces-Verbaux des Reunions, Commission Internationale pour L'exploration Scientifique de la Mer Méditerraneé, Monaco 24, 80–83.

372. **Kutaygil N. & Bilecik N. 1979.** La distribution du *Raja clavata* L. sur le littoral Anatolien de la Mer Noire. Rapports et Proces-Verbaux des Reunions, Commission Internationale pour L'exploration Scientifique de la Mer Méditerraneé, Monaco 25/26, 94–98.

373. **Kutaygil N. & Bilecik N. 1998.** Studies on spiny dogfish (*Squalus acanthias*) in the southeastern Black Sea. Ministry of Agriculture and Rural Affairs, vol. B (2). Bodrum Fisheries Research Center Publications, Republic of Turkey, 40 pp.

374. **Ledoux J-C. 1970.** Affinités et origines du *Squalus blainvillei* de Méditerrannée. *Journées Ichtyologiques*, 65-69, 3 fig. Rome, C.I.E.S.M (1970).

375. **Leloup J. & Olivereau M. 1951.** Données biométriques comparatives sur la roussette (*Scyliorhinus canicula* L.) de la Manche et de la Méditerranée. *Vie et Milieu*, 2: 182–209.

376. **Lipej L., De Maddalena A. & Soldo A. 2004.** Sharks of the Adriatic Sea. knjižnica annales Majora, koper, 254 pp.

377. **Lipej L., Makovec T. & Orlando M. 2000.** Occurrence of the basking shark, *Cetorhinus maximus* (Guennerus, 1765), in the waters off Piran (Gulf of Trieste, northern Adriatic). *Annales, Series historia naturalis*, 10: 211-216.

378. **Lipej L., Makovec T., Soldo A. & Žiza V. 2000.** Records of the sandbar shark *Carcharhinus plumbeus,* (Nardo, 1827) in the Gulf of Trieste (Northern Adriatic). *Annales, Series historie naturalis*, 10 : 199–206.

379. **Lipej L., Mavrič B., Dobrajc Ž. & Capapé C. 2008.** On the occurrence of the sandbar shark, *Carcharhinus plumbeus* (Chondrichthyes: Carcharhinidae) off the Slovenian coast (northern Adriatic). *Acta Adriatica*, 49: 137-145.

380. **Lipej L., Mavrič B. & Dulčić J. 2009.** Size of the bull ray, *Pteromylaeus bovinus* (Geoffroy Saint-Hilaire, 1817), from the northern Adriatic. *Journal of Appied. Ichthyology*, 25:103-105.

381. **Lo Bianco S. 1909.** Notizie biologiche riguardanti specialmente il periodo di maturita sessuale degli animali del golfo di Napoli. Mittheilungen der Zoologischen Satation, Neapel, 19 : 513-761.

382. **Machias A., Vassilopoulou V., Vatsos D., Bekas P., Kallianiotis A., Papaconstantinou C. & Tsimenides N. 2001.** Bottom trawl discards in the northeastern Mediterranean Sea. *Fisheries Research*, 53: 181-195.

383. **Macías D. & de la Serna J.M. (2000).** By-catch composition in the Spanish Mediterranean longline fishery. p. 198. *In*: Vacchi M., La Mesa G., Serena F., B Seret (eds.), Proceedings of the 4th meeting of the European Elasmobranch Association,Livorno, Italy 2000.

384. **MacPherson E. 1980.** Régime Alimentaire de *Galeus melastomus* Rafinesque, 1810, *Etmopterus spinax* (L., 1758) et *Scymnorihinus licha* (Bonnaterre, 1788) en Méditerranée Occidentale. *Vie et milieu*, 30 : 139-148.

384a. **Maillard C.1966.** Etude sur les Hexabothriidae (Monogenea) parasites de Sélaciens de la région de Sète. *Thèse Université de Montpellier.1-151.*

385. **Maiorano P., Carlucci R., Casamassima F., De Nicolo EV. 2000.** Occurrence of the selachians on the trawl fishing in the North-western Ionian Sea. *Biologia Marina Mediterranea,* 7: 447-451.

386. **Mancusi C., Abella A., Ria M., Barone M. & Serena F. 2006.** Time series analysis in the south Ligurian and north Tyrrhenian Sea with some notes on trends in landings of *Raja asterias* Delaroche, 1809. pp 1-18. Proceedings 8thMeeting of the Sub-Committee on Stock Assessment. Rome, September 2006, FAO

387. **Mancusi C., Clò S., Affronte M., Bradaï M.N., Hemida F., Serena F., Soldo A. & Vacchi M. 2005.** On the presence of basking shark (*Cetorhinus maximus*) in the Mediterranean Sea. *Cybium*, 29: 399-405.

388. **Marano CA., Marsan R. & Di Turi L. 2000.** Notes about distribution and biology of juveniles of velvet belly shark *Etmopterus spinax* (L. 1758) in the South Adriatic epi and mesobathyal bottoms. *Biologia Marina Mediterranea*, 7: 452-454.

389. **Marano C.A., Manfrin-Piccinetti G., Pasolini P., Tinti F. & Ungaro N. 2003.** Annotated checklist of the skates (Condrichthyes, Rajidae) in the Adriatic Sea. *Biologia Marina Mediterranea,* 10: 856-862.

390. **Marconi M. & De Maddalena A. 2001.** On the capture of a young porbeagle, *Lamna nasus* (Bonnaterre, 1788), in the western Adriatic Sea. *Annales, Series historie naturalis*, 11 : 179-184.

391. **Marouani S., Bradai M.N. & Bouain A. 2007.** Taille à la maturité sexuelle de *Squalus blainvillei* (Risso, 1826) du golfe de Gabès (Tunisie)**.** *Rapport de la Commision Internationale pour l'Exploration Scientifique de la Méditerranée*, 38 : 536.

392. **Marouani S., Bradai M.N. Saidi B., Bouain A. & Capapé C. 2006.** A propos du genre *Squalus* Linnaeus, 1758 (Chondrichthyens : Squalidae) dans le golfe de Gabès (Tunisie méridionale, Méditerranée centrale). *Bulletin de l'Institut des Sciences et Technologies de la Mer de Salammbô*, 10: 78-80.

393. **Marouani S., Bradaï M.N., Saidi B. & Bouain A. 2007.** Contribution à l'étude du régime alimentaire du *Squalus blainvillei* dans le golfe de Gabès. *Bulletin de l'Institut des Sciences et Technologies de la Mer de Salammbô*, 11 : 78-80.

394. **Marouani S., Chaaba R., Kadri H., Saidi B., Bouain A., Maltagliati F., Last P., Seret B. & Bradai M.N. 2010**. Occurrence of *Squalus megalops* (Macleay, 1881) and *S. blainvillei* (Risso, 1827) (Chondrichthyes: Squalidae) in the Mediterranean Sea. *Scientia Marina*, In Press.

395. **Marouani S., Kadri H., Bradaï M.N., Saidi B. & Bouaïn A. 2010.** Age, growth and age at sexual maturity of the longnose spurdog*, Squalus blainvillei*, in the Gulf of Gabès (Tunisia). *Rapport de la Commision Internationale pour l'Exploration Scientifique de la Méditerranée*, 39: 581.

396. **Massutí E., Gordon J.D.M., Moranta J. Swan S.C., Stefanescu C. & Merreti N.R. (2004).** Mediterranean and Atlantic deep-sea fish assemblages: difference in biomass composition and size-related structure. *Scientia Marina*, 68: 101-115.

397. **Massutí E. & Moranta J. 2003.** Demersal assemblages and depth distribution of elasmobranchs from the continental shelf and slope off the Balearic Islands (western Mediterranean). *ICES Journal of Marine Science*, 60: 753–766.

398. **Matallanas J. 1974.** Sobre la presenzia de *Raja brachyura* Lafont (Rajiformes, Rajidae), en la Mar Catalana. *Boletin de la Sociedad de Historia Natural de Baleares,* 19 : 51–56.

399. **Matallanas J. 1982.** Feeding habits of *Scymnorhinus licha* in Catalan waters. *Journal of Fish Biology*, 20, 155-163.

400. **Mater S., Kaya M. & Bilecenoglu M. 2005.** Turkish Marine Fishes, Cartilaginous Fishes (Chondrichthyes). Ege University, Fisheries Faculty Publication, Izmir, Turkey.

401. **Mavrič B., Jenko R., Makovec T. & Lipej L. 2004.** On the occurrence of the pelagic stingray *Dasyatis violacea* (Bonaparte, 1832) in the Gulf Trieste (Northen Adriatic). *Annales, series Historia Naturalis*, 14: 181-186.

402. **Megalofonou P. & Chatzispyrou A. 2006.** Sexual maturity and feeding of gulper shark, *Centrophorus granulosus*, from the eastern Mediterranean Sea. *Cybium*, 30: 67-74.

403. **Megalofonou P. & Damalas D. 2004.** Morphological and biological characteristics of a gravid angular rough shark (*Oxynotus centrina*) and its embryos from the eastern Mediterranean Sea. *Cybium*, 28(2): 105-110.

404. **Megalofonou P., Damalas D., Deflorio M. & De Metrio G. 2009.** Modeling environmental, spatial, temporal, and operational effects on blue shark by-catches in the Mediterranean long-line fishery. *Journal of Applied Ichthyology*. 25, 47-55.

405. **Megalofonou P., Damalas D. & De Metrio G. 2005.** Size, age and sexual maturity of blue shark, *Prionace glauca*, in the Mediterranean Sea. ICES Council Meeting documents, Copenhagen. **CM 2005/N: 09**

406. **Megalofonou P., Damalas D. & De Metrio G. 2009.** Biological characteristics of blue shark, *Prionace glauca*, in the Mediterranean Sea. *Journal of the Marine Biological Association of the United Kingdom*, 89: 1233-1242.

407. **Megalofonou P., Damalas D. & Yannopoulos C. 2005.** Composition and abundance of pelagic shark by-catch in the eastern Mediterranean Sea. *Cybium,* 29: 135-140.

408. **Megalofonou P., Damalas D., Yannopoulos C., De Metrio G., Deforio M., De la Serna J.M. & Macias D. 2000.** Bycatches and discards of sharks in the large pelagic fsheries in the Mediterranean Sea. Final Report of the Project No. 97/50 DG XIV/C1. 336 p. and Annex.

409. **Megalofonou P., Yannopoulos C., Damalas D., De Metrio G., Deflorio M., de la Serna M.J. & Macias D. 2005.** Incidentals catch and estimated discards of pelagic sharks from the swordfish and tuna fisheries in the Mediterranean Sea. *Fishery Bulletin,* 103: 620–634.

410. **Mejri H., Ben Souissi J., Zaouali J., El Abed A., Guélorget O. & Capapé C. 2004.** On the recent occurrence of elasmobranch species in a perimediterranean lagoon: the Tunis Southern Lagoon (Northern Tunisia). *Annales, series Historia Naturalis*, 14: 143-158.

411. **Mejuto J.B., Garcia-Cortés B. & de la Serna J.M. 2002.** Preliminary scientific estimations of by-catches landed by the Spanish surface longline fleet in 1999 in the Atlantic Ocean and Mediterranean Sea. Col. Vol. Sci. Pap. ICCAT, 54(4): 1150-1163.

412. **Minervini R., Giannotta M. & Bianchini M.L. 1985.** Observations on the fishery of Rajiormes in central Tyrrhenian Sea. *Oebalia*, 11: 583- 591.

413. **Mnasri N., Boumaïza M. & Capapé C. 2009.** Morphological data, biological observations and occurrence of a rare skate, *Leucoraja circularis* (Chondrichthyes: Rajidae), off the northern coast of Tunisia (central Mediterranean) *Pan-American Journal of Aquatic Sciences*, 4: 70-78.

414. **Mojetta A., Storai T. & Zuffa M. 1997.** Segnalazioni di squalo bianco (*Carcharodon carcharias*) in acque italiane. *Quaderni della Civica Stazione Idrobiologica di Milano* 22: 23–38.

414a**. Mokhtar-Maamouri F. & F. Zamali.1981.** A new Cestode : Phyllobothrium pastinacae sp. . described from the spiral valve of Dasyatis pastinaca taken from Tunis gulf. 56 : 375-379.

414b. **Mokhtar-Maamouri F. & F. Zamali.1982.** Les Cestodes Tetraphyllidea parasites de Sélaciens du golfe de Tunis. Première liste commentée. *Archives de l'Institut Pasteur de Tunis. 59, 327-338.*

415. **Moranta J., Massuti E. & Morales-Nin B. (2000).** Fish catch composition of the deep-sea decapod crustacean fisheries in the Balearic Island (Western Mediterranean). *Fisheries Research*, 45:253-264.

415 a. **Moranta J., Palmer M., Massuti E., Stefanescu C. & Morales-Nin B. 2004.** Body fish size tendencies within and among species in the deep-sea of the western Mediterranean. *Scientia Marina*, 68 (Suppl. 3): 141-152.

416. **Moreno J.A. & Hoyos A. 1983.** Première capture en eaux espagnoles et en Mediterranee de *Carcharhinus altimus* (S. Springer, 1950). *Cybium,* 7: 65-70.

417. **Moreno J.A. & Hoyos A. 1983.** *Carcharhinus acarenatus*, nov sp., nouveau requin Carcharhinidae de l'Atlantique Nor-oriental et de la Mediterranée Occidentale. *Cybium*, 7 : 57-64.

418. **Moreno J.C., Parajúa J.I & Morón J. 1989.** Biologiía reproductiva y fenología de *Alopias vulpinus* (Bonnaterre, 1788) (Squaliformes: Alopiidae) en el Atlántico nor-oriental y Mediterráneo occidental. *Scientia Marina*, 53: 37-46.

419. **Morey G., Martinez M., Massuti E. Moranta J. 2003.** The occurrence of white sharks, *Carcharodon carcharias*, around the Balearic Islands (western Mediterranean Sea). *Environmental biology of fishes*, 68: 425-432.

420. **Morey G. & Massuti E. 2003**. Record of the copper shark, *Carcharhinus brachyurus*, from the Balearic Islands (Western Mediterranean). *Cybium.* 27, 53-56.

421. **Morey G., Moranta J., Massuti E., Grau A., Linde M., Riera F. & B. Morales-Nin, 2003.** Weight-length relationships of littoral to lower slope fishes from the Western Mediterranean. *Fisheries Research*, 62: 89-96.

422. **Morey G., Moranta J., Riera F., Grau A.M. & Morales-Nin B. 2006.** Elasmobranchs in trammel net fishery associated to marine reserves in the Balearic Islands (NW Mediterranean). *Cybium*, 30:125-132.

423. **Morey G., Soldo A., Riera F. & Serena F. 2008.** Records of *Carcharhinus limbatus* and *C. plumbeus* (Chondrichthyes: Carcharhinidae) from off the Balearic Islands (NW Mediterranean). *Cybium*, 32: 195-200.

424. **Morte S., Redon M.J. & Sanz-Barau A. 1997.** Feeding habits of juvenile *Mustelus mustelus* (Carcharhiniformes, Triakidae) in the western Mediterranean. *Cahiers de Biologie Marine*, 38 : 103-107.

425. **Mulas A., Bellodi A., Pendugiu A. A. and Cabiddu S. 2010.** Preliminary data on the trophic interactions between *Scyliorhinus canicula* (scyliorhinidae) and *Raja clavata* (Rajidae) in the Central-Western Mediterranean. *Rapp. Comm. int. Mer Médit.,* 39: 596.

426. **Muňoz-Chapuli R. & Perez Ortega A. 1985.** Resurrection of *Galeus atlanticus* (Vaillant, 1888), as a valid species from the NE-Atlantic Ocean and the Mediterranean Sea. *Bulletin*

du Museum national d'Histoire naturelle (France). *4ème serie. Section A. Zoologie, biologie, et ecologie animales.* Paris. 7 : 219-233.

427. **Najai S. 1980.** Note sur la présence de deux requins pèlerins dans le golfe de Tunis. *Bulletin de l'Institut national scientifique et technique d'Océanographie et de Pêche*, *Salammbô*, 7: 151 - 152.

427a**. Neifar L.2001.** Biodiversité et évolution des plathelminthes parasites d'Elasmobranchs des Côtes tunisiennes. *Thèse de doctorat, Faculté des Sciences de Tunis* :1-326 pp.

428. **Neifar L., Euzet L. & Ben Hassine O.K. 1998.** Nouveaux Monocotylidae (Monogenea), parasites branchiaux de *Dasyatis pastinaca* (L.) (Euselachii, Dasyatidae). Compléments à la description de Heterocotyle pastinacae Scott, 1904. *Systematic Parasitology*, 41: 197-208.

429. **Neifar L., Euzet L. & Ben Hassine O.K. 1999.** Trois nouveaux Heterocotyle (Monogenea, Monocotylidae) parasites branchiaux de *Taeniura grabata* (Euselachii, Dasyatidae) en Tunisie. *Zoosytema,* 21: 157-170.

430. **Neifar L., Euzet L. & Ben Hassine O.K. 1999a.** Myliocotyle Pteromylaei GN. Et Sp. N. (Monogenea, Monocotylidae) parasite Branchial de *Pteromylaeus Bovinus* (Euselachii, Myliobatidae) en Tunisie. *Parasite,* 6 : 323-327.

431. **Neifar L., Euzet L. & Ben Hassine O.K. 2000.** New species of the Monocotylidae (Monogenea) from the stingray *Dasyatis tortonesi* Capapé (Euselachii, Dasyatidae) off the Tunisian coast, with comments on host-specificity and the specific identities of Mediterranean stingrays. *Systematic Parasitology*, 47: 43–50.

432. **Neifar L., Euzet L. & Ben Hassine O.K. 2001.** Monocotylidae (Monogenea) nouveaux parasites de *Rhinobatos rhinobatos* (Euselachii, Rhinobatidae). *Zoosystema*, 23: 659-667.

433. **Neifar L., Euzet L. & Ben Hassine O.K. 2002.** A new species of Monocotylidae (Monogenea) gill parasite of *Rhinobatos cemiculus* (Euselachii, Rhinobatidae), with proposal of a new genus and an amendment to the diagnosis of the Monocotylidae. Zoosystema, 24: 699-706.

434. **Neifar L., Tyler G.A. & Euzet L. 2001.** Two new species of Macrobothridium (Cestoda: Diphyllidea) from rhinobatid elasmobranchs in the Gulf of Gabes, Tunisia, with notes on the status of the genus. *Journal of Parasitology*, 87: 673- 680.

435. **Notarbartolo di Sciara G. & Bianchi I. 1998.** Guida degli squali e delle razze del Mediterraneo. Franco Muzio Editore, 388 pp.

436. **Notarbartolo di Sciara G. & Serena F. 1988.** Term embryo of *Mobula mobular* (Bonnaterre, 1788) from the northern Tyrrhenian Sea (Chondrichthyes: Mobulidae). *Atti Società Italiana di Scienze Naturali, Museo Civico di Storia Naturale, Milano*, 129: 396–400.

437. **Orsi-Relini L. 1998.** *Carcharhinus brachyurus* (Günther, 1870) in the Museum of the Institute of Zoology, University of Genoa. *Boll. Mus. Ist. Biol. Univ. Genova*, 62-63: 93-98.

438. **Orsi-Relini L. 2000.** Longline fisheries, blue shark catches and conservation problems. *Biologica Marina Mediterranea*, 7: 313-323.

439. **Orsi-Relini L., Garibaldi F., Digitali B. & Lanteri L. 2002.** Abundance of the pelagic stingray, (*Pteroplatytrygon* (*Dasyatis) violacea*), in the Ligurian Sea, with preliminary notes about its feeding and growth. p 193. *In*: Vacchi M., La Mesa G., Serena F., B Seret (eds.), Proceedings of the 4th meeting of the European Elasmobranch Association,Livorno, Italy 2000.

440. **Orsi-Relini L., Palandri G., Garibaldi F. & Cima C. 1999**. Longline swordfish fishery in the Ligurian Sea: eight years of observations on target and bycatch species. Col. Vol. Sci. Pap. ICCAT, 49 (1) : 146-150.

441. **Orsi-Relini L. & Wurtz M. 1975.** Osservazioni sull'alimentazione di *Galeus melastomus* dei fondi batiali lig-uri. *Quad. Lab. Tecnol. Pesca*, 2: 17-36.

442. **Orsi-Relini L. & Wurtz M. 1976.** Research on the food habits of *Etmopterus spinax* (Chondrichthyes, Squalidae)]. *Boll. Pesca Piscic. Idrobiol*, 31: 257-265.

443. **Orsi-Relini L. & Wurst M. 1977.** Patterns and overlap in the feeding of two selachians of bathyal fishing grounds in the Ligurian Sea. *Rapp. Comm. Int. Mer Médit*., 24: 89-93.

444. **Öztürk B. & Karakulak F.S. (Eds) 2003.** Workshop on demersal resources in the Black Sea and Azov Sea. Published by Turkish Marine Research Foundation, Istanbul, Turkey. Publication number: 14: 130 pp.

445. **Pallaoro A., Jardas I. & & Šantić M. 2005.** Weight-length relationships for 11 chondrichthyan species in the eastern Adriatic Sea. *Cybium* 29(1): 93-96.

446. **Papaconstantinou C., Vassilopoulou V., Petrakis G., Caragitsou E., Mytilinaeou C., Fourtouni A. & Politou C.-Y. 1994.** The demersal fish fauna of the North and West Aegean Sea. *Bioscience*, 2: 35–45.

447. **Pastore M. & Tortonese E. 1984.** First report of the shark *Rhizoprionodon acutus* (Ruppell) from the Mediterranean. *Thalassia salentina. Porto Cesareo*, 14: 11-15.

448. **Peristeraki P., Kypraios N., Lazarakis G. & Tserpes G. 2007.** By-catches and discards of the Greek swordfish fishery. Col. Vol. Sci. Pap. ICCAT, SCRS/2007/106

449. **Petrakis G. & Stergiou K.I. 1995.** Weight length relationships for 33 fish species in Greek waters. *Fisheries Research*, 21: 465-469.

450. **Pinto de la Rosa F.J. 1994.** Tiburones del mar de Alboran. Servicio publicaciones Centro de Ediciones de la Diputacion de Malagá. (CEDMA)**.**

451. **Piovano S. 2007.** Italy Mediterranean Industrial Pelagic Longline Swordfish Fishery: Industry Practices and Attitudes towards Shark Depredation and Bycatch. pp. 100–110. *In*: Gilman E, Clarke S, Brothers N, Alfaro-Shigueto J, Mandelman J, Mangel J, Peterson S, Piovano S, Watling D, Dalzell P, Donoso M, Goren M, Werner T (Eds.), Shark Depredation and Unwanted By-catch in Pelagic Longline Fisheries: Industry Practices and Attitudes, and

Shark Avoidance Strategies Western Pacific Regional Fishery Management Council, Honolulu, USA.

452. **Piovano S., Clò S., Basciano G. & Giacoma C. 2008.** Reducing pelagic stingray (*Pteroplatytrygon violacea*) bycatch in central Mediterranean longline fisheries. pp. 163–164 (Abstract Book of 2008). *Annual Meeting of the Society for Conservation Biology*.

453. **Piovano S., Clò S. & Giacoma C. 2010.** Reducing longline bycatch: The larger the hook, the fewer the stingrays. *Biological Conservation*, 143: 261–264.

454. **Politou C.Y., Kavadas S., Mytilineou Ch., Tursi A., Lembo G. & Carlucci R. 2001.** Fisheries resources in the deep waters of the eastern Mediterranean (Greek Ionian Sea) (Deep-sea Fisheries Symposium). *Scientific Council Meeting*, NAFO SCR Doc. 01/104. 12 pp.

455. **Psomadakis P.N., Dalù M., Scacco U. & Vacchi M. 2005.** A rare batoid fish *Gymnura altavela* (Chondrichthyes: Gymnuridae) in Tyrrhenian Sea. *JMBA2. Biodiversity records.*

456. **Psomadakis P.N., Maio N. & Vacchi M. 2009.** The chondrichthyan biodiversity in the Gulf of Naples (SW Italy, Tyrrhenian Sea): An historical overview. *Cybium.* 33: 199-209.

457. **Psomadakis P.N., Scacco U. & Vacchi M. 2006.** Recent findings of some uncommon fishes from the central Tyrrhenian Sea. *Cybium*, 30: 297-304.

458. **PNUE PAM RAC/SPA. 2003.** Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea*.* Ed. RAC/S PA, Tunis. 56pp.

459. **Quignard JP. 1965.** Les raies du golfe de Lion. Nouvelle méthode de diagnose et d'étude biogéographique. *Comm. Int. Explor. Scient. Mer Médit*, 18 : 211-212.

460. **Quignard J.P. 1971.** Recherches sur la biologie de *Squalus blainvillei* (Risso, 1826). *Trav. Lab. Biol. Halieutique, Univ. Rennes,* 5 :125-141.

461. **Quignard J.P. 1974.** Recherches sur la biologie d'un sélacien du golfe de Tunis, *Torpedo torpedo* Linné, 1758 (croissance relative, croissance absolue, coefficient de condition.*Ann. Inst. Michel Pacha*, 6 : 72-110.

462. **Quignard J.P. & Capapé C. 1971.** Note préliminaire sur le marquage des sélaciens des côtes de Tunisie. *Bulletin de l'Institut National Scientifique et Technique d'Océanographie et de Pêche, Salammbô*, 2: 143-55.

463. **Quignard J.P. & Capapé C. 1971.** Liste commentée des Sélaciens de Tunisie. *Bulletin de l'Institut National Scientifique et Technique d'Océanographie et de Pêche, Salammbô*, 2 : 131-141.

464. **Quignard J.P. & Capapé C. 1972.** Complément à la liste commentée des Sélaciens de Tunisie. *Bulletin de l'Institut National Scientifique et Technique d'Océanographie et de Pêche, Salammbô*, 2 : 445-447.

465. **Quignard J.P. & Capapé C. 1972.** Note sur les espèces méditerranéennes du genre *Mustelus* (Selachii, Galeoidea, Triakidae). *Rev. Trav. Inst. Pêch. Marit*, 36:15-29.

466. **Quignard J.P. & Capapé C. 1974**. Recherches sur la biologie d'un sélacien du golfe de Tunis, *Torpedo torpedo* Linné, 1758 (Ecologie, sexualité, reproduction). *Bulletin de l'Institut national scientifique et technique d'Océanographie et de Pêche*, *Salammbô*, 3 : 99-129

467. **Quignard J.P. & Tomasini J.A 2000.** Mediterranean fish Biodiversity. *Biologia Marina Mediterranea*, 7: 1–66.

468. **Ragonese S., Cigala Fulgosi F., Bianchini M.L., Norrito G. & Sinacori G. 2003.** Annotated checklist of the skates (Condrichthyes, Rajidae) in the Strait of Sicily (Central Mediterranean). *Biologia Marina Mediterranea*, 10: 874-881.

469. **Ragonese S., Di Stefano L. & Bianchini M.L. 2000.** Capture and selectivity of cartilaginous fishes in the red shrimp fishery; Strait of Sicily. *Biologia Marina Mediterranea*, 7: 400-411.

470. **Ragonese S., Nardone G., Ottonello D., Gancitano S., Giusto G.B., Sinacori G. 2009.** Distribution and biology of the blackmouth catshark *Galeus melastomus* in the Strait of Sicily (Central Mediterranean Sea). *Mediterranean Marine Science*, 10: 55-72.

471. **Ranzi S. 1932.** Le basi fisio-morfologiche dello sviluppo embrionale dei Selaci. I. Pubblicazioni della Stazione Zoologica di Napoli, 12 : 209-290.

472. **Ranzi S. 1934.** Le basi fisio-morfologiche dello sviluppo embrionale dei selaci. Parte II & III. Pubblicazioni della Stazione Zoologica di Napoli, 13: 331-437.

473. **Relini G., Biagi F., Serena F., Belluscio A., Spedicato M.T., Rinelli P., Follesa M.C., Piccinetti C., Ungaro N., Sion L. & Levi D. 2000.** Selachians fished by otter trawl in the Italian Seas. *Biologia Marina Mediterranea,* 7: 347–384.

474. **Relini G., Mannini A. & Piano T. 2003.** Annotated checklist of the skates (Condrichthyes, Rajidae) in the Northern Ligurian Sea. *Biologia Marina Mediterranea*, 10: 882-885.

475. **Rey J., Caminas J.A., Alot E. & Ramos A. 1986.** Captures de requins associées à la pêche espagnole de palangre en Méditerranée occidentale, 1984-1985 : Aspect halieutiques. *Rapp. Comm. int. Mer Médit,* 32 : 240.

475a. **Rey J., Coelho R., Lloris D., Séret B. & Gil de Sola L. 2010.** Distribution pattern of *Galeus atlanticus* in the Alborán Sea (south western Mediterranean) and some sexual character comparison with *Galeus melastomus*. *Marine Biology Research*, 6: 364- 372.

476. **Rey J., Gil de Sola L. & Massutí E. 2005.** Distribution and biology of the blackmouth catshark *Galeus melastomus* in the Alboran Sea (South-western Mediterranean). *J. Northwest Atl. Fish. Sci,* 35 : 215–223.

477. **Rey J., Séret B., Lloris D., Coelho R. & Gil de Sola L. 2006.** A new redescription of *Galeus atlanticus* (Vaillant, 1888) (Chondrichthyes: Scyliorhinidae) based on field marks. *Cybium* 30: 7-14.

478. **Rinelli P., Bottari T., Florio G., Romeo T., Giordano D. & Greco S. 2005.** Observations on distribution and biology of *Galeus melastomus* (Chondrichthyes, Scyliorhinidae) in the southern Tyrrhenian Sea (central Mediterranean). *Cybium*, 29: 41-46.

479. **Romanelli M., Colasante A., Scacco U., Consalvo I, Finoia M.G. & Vacchi M. 2007.** Commercial catches, reproduction and feeding habits of *Raja asterias* (Chondrichthyes: Rajidae) in a coastal area of the Tyrrhenian Sea (Italy, northern Mediterranean). *Acta Adriatica*, 48 : 57–71.

480. **Roux C. 1977.** Les anges de mer (Squatinidae) de l'Atlantique et de la Méditerranée. *Bulletin de l'Office National de Pêches de Tunisie,* 1: 159-167.

481. **Saad A., Ali M. & Seret B. 2006.** Shark exploitation and conservation in Syria. pp. 202-208. *In* : Başusta N., Keskin Ç., Serena F., Seret B. (eds.), The Proceedings of the International Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean, Istanbul, 2005, Turkish Marine Research Foundation, Turkey.

482. **Saad A., Seret B. & M. Ali. 2004.** Liste commentée des chondrichthyens de Syrie (Méditerranée orientale). *Rapport de la Commision Internationale pour l'Exploration Scientifique de la Méditerranée*, 37 :430.

483. **Sacchi J. 2007.** Impact des techniques de pêche en Méditerranée : Solutions d'amélioration. GFCM:SAC10/2007/Dma.3.

484. **Saglam H., Ak O., Kutlu S. & Aydin. 2010.** Diet and feeding strategy of the common stingray *Dasyatis pastinaca* (Linnaeus, 1758) on the Turkish coast of south-eastern Black Sea. *Cahiers de Biologie Marine*, 51: 37-44.

485. **Saglam H. & Bascinar N.S. 2008.** Feeding ecology of thornback ray (*Raja clavata* Linnaeus, 1758) on the Turkish coast of the south-eastern Black Sea. *Marine Biology Research,* 4: 451-457.

486. **Saidi B. 2008.** Les requins du golfe de Gabès : Diversité et écobiologie de trois espèces à importance économique *Carcharhinus plumbeus*, *Mustelus mustelus* & *M. punctulatus.* Thèse de doctorat en Sciences biologiques. Université de Sfax, Tunisie. 192 p.

487. **Saidi B., Bradaï M.N. & Bouaïn A. 2002**. Régime alimentaire de la petite roussette *Scyliorhinus canicula* des côtes est et sud-est de la Tunisie. *Bulletin de l'Institut National des Sciences et Technologies de la Mer*, 7 : 17-20.

488. **Saidi B., Bradaï M.N. & Bouaïn A. 2003.** La pêche des requins dans la région du golfe de Gabès. *Bulletin de l'Institut National des Sciences et Technologies de la Mer*, 8: 84-87.

489. **Saidi B., Bradaï M.N. & Bouaïn A. 2004.** Taille à la maturité sexuelle de *Scyliorhinus canicula* des côtes Est et Sud-est de la Tunisie. *Rapport de la Commision Internationale pour l'Exploration Scientifique de la Méditerranée*, 37. 433.

490. **Saidi B., Bradaï M.N. & Bouaïn A. 2008.** Reproductive biology of the smooth-hound shark *Mustelus mustelus* in the Gulf of Gabès (south-central Mediterranean Sea). *Journal of Fish Biology*, 72: 1343-1354.

491. **Saidi B., Bradaï M.N. & Bouaïn A. 2009.** Reproductive biology and diet of *Mustelus punctulatus* (Risso, 1826) (Chondrichthyes: Triakidae) from the Gulf of Gabès, central Mediterranean Sea. *Scientia Marina***,** 73(2). 249-258

492. **Saidi B., Bradaï M.N., Bouaïn A. & Capapé C. 2007**. Feeding habits of the sandbar shark *Carcharhinus plumbeus* (Chondrichthyes: Carcharhinidae) from the Gulf of Gabès, Tunisia. *Cahiers de Biologie Marine,* 48: 139-144.

493. **Saidi B., Bradaï M.N., Bouaïn A., Guélorget O. & Capapé C. 2005.** Capture of a pregnant female white shark, *Carcharodon carcharias* (Lamnidae) in the Gulf of Gabes (Southern Tunisia, central Mediterranean) with comments on oophagy in sharks. *Cybium,* 29: 303-307.

494. **Saidi B., Bradaï M.N., Bouaïn A., Guélorget O. & Capapé, C. 2005.** Reproductive biology of the sandbar shark, *Carcharhinus plumbeus* (Chondrichthyes: Carcharhinidae) from the Gulf of Gabès (southern Tunisia, Central Mediterranean). *Acta Adriatica*, 46: 47-62.

495. **Saidi B., Bradaï M.N., Marouani S., Guélorget O. & Capapé C. 2006.** Atypical characteristics of an albino embryo of *Carcharhinus plumbeus* (Chondrichthyes: Carcharhinidae) from the Gulf of Gabès (southern Tunisia, central Mediterranean). *Acta Adriatica*, 47: 167–174

496. **Saidi B., Bradaï M.N., Menif L., Mkhan A. & Bouaïn A. 2007.** Captures accessoires des requins dans le golfe de Gabès. *Rapport de la Commision Internationale pour l'Exploration Scientifique de la Méditerranée,* 38 : 583.

497. **Saidi B., Enajjar S., Bradai M.N. & Bouain A. 2009.** Diet composition of smooth-hound shark, *Mustelus mustelus* (Linnaeus, 1758), in the Gulf of Gabès, southern Tunisia. *Journal of Applied Ichthyology,* 25: 113–118.

498. **Sánchez P., Demestre M. & Martín P. 2004.** Characterisation of the discards generated by bottom trawling in the northwestern Mediterranean. *Fisheries Research,* 67: 71-80.

499. **Scacco U., Consalvo I. & Mostarda E. 2008.** First documented catch of the giant devil ray *Mobula mobular* (Chondrichthyes: Mobulidae) in the Adriatic Sea. *JMBA2. Biodiversity Records.*

500. **Scacco U., La Mesa G., Dalu M. & Vacchi M. 2002**. Changes of swimming ability with length in a small benthic elasmobranch, *Galeus melastomus* a work hypotesis. pp. 127-134. *In*: Vacchi M., La Mesa G., Serena F., B Seret (eds.), Proceedings of the 4th meeting of the European Elasmobranch Association,Livorno, Italy 2000.

501. **Schembri T. 2006.** Conservation management of sharks and rays in the Maltese islands (Central Mediterranean) -a review of statuts and trends. pp.177-187. *In* : Başusta N., Keskin Ç., Serena F., Seret B. (eds.), The Proceedings of the International Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean, Istanbul, 2005, Turkish Marine Research Foundation, Turkey.

502. **Schembri T. Fergusson I.K & Schembri P.J. 2003.** Revision of the records of shark and ray species from the Maltese islands (Chordata: Chondrichtyes). *The central Medierranean Naturalist*, Malta, 4: 71-104.

503. **Schwartz F.J. 2005.** Tail spine characteristics of stingrays (Order Myliobatiformes) found in the northeast Atlantic, Mediterranean and Black Seas. *Electronic Journal of Ichthyology*, 1:1–9.

504. **Serena F. 2005.** Field identification guide to sharks and rays of Mediterranean and Black Sea. *FAO Species Identification Guide for Fisheries Purpose*. Rome 97pp.

505. **Serena F. & Abella A. 1999.** Assessment of the effect of fishing on the demersal assemblages of the Northern Tyrrenian Sea with special reference to *Raja asterias*. ICES/SCOR Symposium "Ecosystem effect of Fishing" Montpellier, France, book of abstracts: p 42.

506. **Serena F., Baino R., Righini P. 1988**. Geographical and depth distribution of Rays in Northern Tyrrhenian Sea. *Rapport de la Commision Internationale pour l'Exploration Scientifique de la Méditerranée*, 31: 277.

507. **Serena F., Barone M., Mancusi C. & Abella A. J. 2005.** Reproductive biology, growth and feeding habits of *Raja asterias* (Delaroche, 1809), from the North Tyrrhenian and South Ligurian Sea (Italy), with some notes on trends in landing. *International Council for the Exploration of the Sea*. CM 2005/ N: 12. 17p.

508. **Serena F., Cecchi E., Mancusi C. & Pajetta R. 2006.** Contribution to the knowledge of the biology of *Etmopterus spinax* (Linnaeus 1758) (Chondrichthyes, Etmopteridae). FAO Fisheries Proceedings no. 3/2: 388-394.

509. **Serena F., Mancusi C. & Auteri R. 2003.** Annotated checklist of the skates (Chondrichthyes, Rajidae) in the South Ligurian and North Tyrrhenian Sea. *Biologia Marina Mediterranea*, 10: 918–926.

509a. **Serena F., Mancusi C., Barone M. (eds). 2010.** Field identifcation guide to the skates (Rajidae) of the Mediterranean Sea. Guidelines for data collection and analysis Biol. Mar. Mediterr., 17 (Suppl. 2): 204 pp.

509b. **Serena F., Mancusi C., Barone M., Abella A.J. 2005.** Abundance and distribution of rays in the south Ligurian and north Thyrrenian Sea. 2005 ICES Annual Science Conference; Theme Session on Elasmobranch Fisheries Science, 20-24 September. CM2005/N: 20.

510. **Serena F., Papaconstantinou C., Relini G., De Sola L.G. & Bertrand J.A. 2009.** Distribution and abundance of spiny dogfsh in the Mediterranean Sea based on the Mediterranean International Trawl Survey Program. *Biology and Management of Dogfsh Sharks*, 139–149.

511. **Serena F. & Relini G. 2006.** Use of scientific camping (trawl surveys) for the knowledge of the sensitive habitats. A review of the medits, with special attention to Italian Sea. pp. 135-148. *In* : Başusta N., Keskin Ç., Serena F., Seret B. (eds.), The Proceedings of the

International Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean, Istanbul, 2005, Turkish Marine Research Foundation, Turkey.

512. **Serena F., Silvestri R. & Voliani A. 1999.** On the incidental catches of *Taeniura grabata* (E. Geoffrey Saint-Hilaire, 1817) (Chondrichthyes, Dasyatidae). *Biologia Marina Mediterranea,* 6: 617-618.

513. **Serena F. & Vacchi M. 1996.** The presence of the basking-shark (*Cetorhinus maximus* Guennerus) in the northern Tyrrhenian and Ligurian Seas. *Biologia Marina Mediterranea*, 3: 387-388.

514. **Serena F., Vacchi M. & Notarbartolo di Sciara G. 2000.** Geographical distribution and biological information on the basking shark, *Cetorhinus maximus* in the Tyrrhenian and Liguarian Seas. pp. 47-56 In: Séret B. & J.y. Sire (eds.), Proceedings of the 3rd meeting of the European Elasmobranch Association, Boulogne-sur-Mer, France, 1999.

515. **Seret B. & McEachran D.J. 1986.** Catalogue critique des types de Poissons du Muséum national d'Histoire naturelle. *Bull. Mus. Natn. Hist. nat., Paris, 4 sér., 8, 1986, section A, n° 4, supplément :*3-50.

516. **Séret B. & Serena F. 2002.** The Mediterranean chondrichthyan fishes (sharks, rays, skates and chimaeras): status and priorities for conservation. United National Environment Programme (UNEP) Regional Activity Centres/Special Protected Areas (RAC/SP) Final Report, Tunis, Tunisia.

517. **Silvani L., Gazo M. & Aguilar A. 1999.** Spanish driftnet fishing and incidental catches in the western Mediterranean. *Biological Conservation,* 90: 79–85.

518. **Sion L., Bozzano A., D'Onghia G., Capezzuto F. & Panza M. 2003.** Chondrichthyes species in deep waters of the Mediterranean Sea. *Scientia Marina*, 68: 153–162.

519. **Sion L., D'Onghia G., Basanisi M. & Panza M. 2000.** Selaci demersali del Mar Ionio nord-occidentale. *Biologia Marina Mediterranea*, 7(1): 455-460.

520. **Sion L., D'Onghia G. & Carlucci R. 2002.** A simple technique for ageing the velvet belly shark, *Etmopterus spinax* (Squalidae). pp 135–139. *In*: Vacchi M., La Mesa G., Serena F., B Seret (eds.), Proceedings of the 4th meeting of the European Elasmobranch Association,Livorno, Italy 2000.

521. **Sion L., D'Onghia G. &. Tursi A. 2003.** First data on distribution and biology of *Squalus blainvillei*, (Risso, 1826) from the Eastern Mediterranean Sea. *J. Northw. Atl. Fish. Sci*, 31: 213-219.

522. **Sion L., D'Onghia G., Tursi A. & Matarrese A. 2003.** Annotated checklist of the skates (Condrichthyes, Rajidae) in the North-Western Ionian Sea. *Biologia Marina Mediterranea*, 10: 935-940.

523. **Skaramuca B. & Prtenjaca I. 1985.** A contribution to the study of biological and ecological characteristics of the catfish (*Scyliorhinus stellaris* L. 1758). *Biljeske-Notes*, Split, 61: 1-8.

524. **Soldo A. 1996.** Characteristics of the teeth and jaws of Elasmobranchii (Chondrichthyes). Thesis. University of Split. 68 pp. (in Croatian)

525. **Soldo A. 2003.** Status of sharks in the Mediterranean. *Annales, Series Historia Naturalis,* 13 : 191-200.

526. **Soldo A. 2006.** Status of sharks in the Adriatic Sea. pp. 128-134. *In* : Başusta N., Keskin Ç., Serena F., Seret B. (eds.), The Proceedings of the International Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean, Istanbul, 2005, Turkish Marine Research Foundation, Turkey.

527. **Soldo A. & Dulcic J. 2005.** New record of a great white shark, *Carcharodon carcharias* (Lamnidae) from the eastern Adriatic Sea. *Cybium* 1 (29): 89–90.

528. **Soldo A., Dulcic J. & Cetinic P. 2000.** Contribution to the study of the morphology of the teeth of the nursehound *Scyliorhinus stellaris* (Chondrichthyes: Scyliorhinidae). *Scientia Marina*, 64: 355-356.

529. **Soldo A. & Jardas I. 2002.** Large sharks in the eastern Adriatic. pp 141–155. *In*: Vacchi M., La Mesa G., Serena F., B Seret (eds.), Proceedings of the 4th meeting of the European Elasmobranch Association,Livorno, Italy 2000.

530. **Soldo A. & Jardas I. 2002.** Occurrence of great white shark, *Carcharodon carcharias* (Linnaeus, 1758) and basking shark, *Cetorhinus maximus* (Gunnerus, 1765) in the Eastern Adriatic and their protection. *Periodicum Biologicum*, 104: 195-201.

531. **Soldo A., Lucic D. & Jardas I. 2008.** Basking shark (*Cetorhinus maximus*) occurrence in relation to zooplankton abundance in the eastern Adriatic Sea. *Cybium*, 32: 103-109.

532. **Soldo A & Peirce R.** 2005. Shark chumming in the eastern Adriatic. *Annales, Series Historia Naturalis,* 15 : 203-208.

533. **Srour A. & Abid N. 2004.** Prises accessoires dans la pêche de l'espadon pris au FMD dans la côte méditerranéenne du maroc. Col. Vol. Sci. Pap. ICCAT, 56: 978-980.

534. **Stergiou K.I., Economou A., Papaconstantinou C., Tsimenides N & Kavadas S. 1998.** Estimates of discards in the Hellenic commercial trawl fishery. *Rapport de la Commision Internationale pour l'Exploration Scientifique de la Méditerranée,* 35: 490.

535. **Stergiou K.I. & Karpouzi V.S. 2002.** Feeding habits and trophic levels of Mediterranean fish. *Reviews in Fish Biology and Fisheries*, 11: 217–254.

536. **Stergiou K.I., Moutopoulos D.K & Erzini K. 2002.** Gillnet and longlines fisheries in Cyclades waters (Aegean Sea): species composition and gear competition. *Fisheries Research*, 57: 25–37.

537. **Stergiou K.I. & Pollard D. 1994**. A spatial analysis of the commercial fisheries catches from the Hellenic Aegean Sea. *Fisheries Research*, 20: 109–135.

538. **Storai T. 2004.** Check-list degli elasmobranchi delle acque Toscane (Mar Ligure meridionale, Mar Tirreno Settentrional). Parte I : Squali. *Atti Soc. tosc. Sci. nat, Mem*, Serie B, 111 : 7-11**.**

539. **Storai T., Celona A., Zuffa M. & De Maddalena A. 2005.** On the occurrence of the porbeagle, *Lamna nasus* (Bonnaterre, 1788) (Chondrichthyes: Lamnidae) off Italian coasts (northern and central Mediterranean Sea): A historical survey. *Annales, Series Historia Naturalis*, 15: 195- 202.

540. **Storai T., Cristo B., Zuffa M., Zinzula L., Floris A. & Campanile A.T. 2006.** The Sardinian large elasmobranch database. *Cybium*, 30: 141-144.

541. **Storai T., Mojetta A., Zuffa M. & Giuliani S. 2000.** Nuve segnalazioni di *Carcharodon carcharias* (L.) nel Mediterraneo centrale. *Atti Soc. Toscana Sci. Nat., Mem*. Serie B, 107 : 139-142.

542. **Storai T., Vanni S., Zuffa M. & Biagi V. 2003.** Occurrence of Great White Shark *Carcharodon carcharias* (Linnaeus, 1758) in waters of Tuscany: analysis and review of the historical and recent records (1876-2002) in the Southern Ligurian Sea and Northern Tyrrhenian Sea. Proceedings 7th EEA Meeting (Cattolica, San Marino, 26-28 September 2003), Book of abstracts. p 54.

543. **Storai T., Zinzula L., Cristo B. & Human B. 2007.** First record of *Carcharhiuns brachyurus* (Gunther, 1870) (Chondrichthyes: Carcharhinidae), from Sardinian water (Central Mediterranean). *Annales, Series Historia Naturalis*, 17: 177-182.

544. **Storelli M.M., Giacominelli-Stuffler R. & Marcotrigiano G.O. 2002.** Total and methylmercury residues in cartilaginous fish from Mediterranean Sea. *Marine Pollution Bulletin*, 44: 1354-1358.

544a**. Tazerouti F. 2007**. Biodiversité et bio-écologie des parasites de poissons Sélaciens Hypiotremata du littoral Algérois. *Thèse de doctorat-ès Sciences. Université des sciences et de la technologie Houari Boumediène. Alger : 1-301.*

545. **Torres P., Gonzales M., Rey J., Gil de Sola L., Acosta J. & Ramos-Segura A. 2001**. Rose shrimp fishery's associated fauna in not exploited grounds on the Alboran Sea slope (Western Mediterranean Sea). *Rapport de la Commision Internationale pour l'Exploration Scientifique de la Méditerranée,* 36 : 330.

546. **Tortonese E. 1956.** Fauna díItalia. II. Leptocardia, Ciclostomata, Selachii. Edizioni Calderini: Bologna, Italy, 332 pp.

547. **Torcu H. & Akaa Z. 2000.** Study on the Fishes of Edremit Bay (Aegean Sea). *Turkish Journal of Zoology*, 24: 45–61.

548. **Tserpes G., Tatamanidis G. & Peristeraki P. 2006.** Oilfish and shark by-catches of the Greek swordfish fishery in the eastern Mediterranean; a preliminary analysis applied to "presence-absence" data**.** Col. Vol. Sci. Pap. ICCAT 59: 987-991.

549. **Tudela S. 2004**. Ecosystem effects of fishing in the Mediterranean: an analysis of the major threats of fishing gear and practices to biodiversity and marine habitats. Studies and Reviews. *General Fisheries Commission for the Mediterranean*. No.74. Rome, FAO. 2004. 44p.

550. **Tudela S., Kai K.A., Maynou F., El Andalossi, M., Guglielmi P. 2005.** Driftnet fishing and biodiversity conservation: the case study of the large-scale Moroccan driftnet fleet operating in the Alboran Sea (SW Mediterranean). *Biological Conservation*, 121 : 65–78.

551. **Turan C. 2008.** Molecular Systematic Analyses of Mediterranean Skates (Rajiformes). *Turkish Journal of Zoology*, 32 437-442.

552. **Türker Çakir D., Torcu Koç H. & Erdoğan.** 2006. Some biological aspects of the lesser spotted dogfish *Scyliorhinus canicula* (Linnaeus, 1758) in Edremit Bay (The Northern Aegean Sea) Turkey. pp. 17–27. *In* : Başusta N., Keskin Ç., Serena F., Seret B. (eds.), The Proceedings of the International Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean, Istanbul, 2005, Turkish Marine Research Foundation, Turkey.

553. **Tursi A., D'Onghia G., Matarrese A. & Piscitelli G. 1993.** Observations on population biology of the blackmouth catshark *Galeus melastomus* Chondrichthyes, Scyliorhinidae) in the Ionian Sea. *Cybium*, 17: 187-196.

554. **UNEP-MAP RAC/SPA, 2007.** Report on the status of Mediterranean chondrichthyan species. By Melendez, M.J. & D. Macias, IEO. Ed. RAC/SPA, Tunis. 241pp

555. **Ungaro N. 2004.** Biological parameters of the Brown ray, *Raja miraletus*, in the southern Adriatic Basin. *Cybium*, 28(2): 174-176.

556. **Ungaro N., Marano G. & Marsan R. 1996.** *Galeus melastomus* Rafinesque (Selachii, Scyliorhinidae): distribuzione e biologia sui fondali batiali del basso Adriatico. *Atti Relaz. Accad. Pugl. Sci*., 49: 195-207.

557. **Ungaro N., Marano G. & Marzano M.C. 2002.** On the length-at-maturity of the smallspotted catshark – *Scyliorhinus canicula* (L.) – in the Southern Adriatic Sea (Mediterranean Sea). pp. 171-175. *In*: Vacchi M., La Mesa G., Serena F., B Seret (eds.), Proceedings of the 4th meeting of the European Elasmobranch Association, Livorno, Italy 2000.

558. **Ungaro N., Marano G. & Musci E. 1997.** Some aspects of demersal cartilaginous fishes reproduction in south-western Adriatic basin. *Biologica Marina Mediterranea*, 4: 567-570.

559. **Vacchi M., Biagi V., Pajetta R., Fiordiponti R., Serena F. & Notarbartolo di Sciara G. 2000.** Elasmobranch catches by tuna trap of Baratti (Northern Tyrrhenian Sea) from 1898 to

1922. pp. 177-183. *In*: Vacchi M., La Mesa G., Serena F., B Seret (eds.), Proceedings of the 4th meeting of the European Elasmobranch Association,Livorno, Italy 2000.

560. **Vacchi M. & Notarbartolo di Sciara G. 2000.** The cartilagineous fishes in Italian Seas, a ressource that urges to be protected. *Biologica Marina Mediterranea*, 7: 296-311.

561. **Vacchi M. & Orsi-Relini L. 1980.** Reproductive patterns in *Etmopterus spinax* (L.) (Chondrichthyes, Squalidae). *Memorie di Biologia Marina e di Oceanografia, Messina,* 10 : 341-342.

562. **Vacchi M. & Serena F. 1997**. Squali di notevoli dimensioni nel Mediterraneo centrale. *Quad Civica Stazione Idrobiol Milano*, 22:39–45.

563. **Vacchi M. & Serena F. 2000.** On a large specimen of bigeye thresher shark, *Alopias superciliosus* (Lowe, 1839) (Chondrichthyes: Alopiidae) stranded in Tavolara Island (Eastern Sardinia, Mediterranean). pp. 84. *In*: Séret B. and Sire J.-Y. (eds). Proceedings of the 3rd European Elasmobranch Association Meeting, Boulogne-sur-Mer (France), 1999.

564. **Vacchi M. & Serena F. & Biagi V. 1996.** Cattura di *Carcharhinus brachyurus* (Günther, 1870) (Pisces, Selachii, Carcharhinidae), nel Mar Tirreno settentrionale. *Biologica Marina Mediterranea*, 3: 389-390.

565. **Valsecchi E., Vacchi M. & Notarbartolo di Sciara G. 2005.** Characterization of a New Molecular Marker for Investigating Skate Population Genetics: Analysis of Three Mediterranean Skate Species (genus *Raja*) of Commercial Interest as a Test Case. *J. Northw. Atl. Fish. Sci,* 35: 225–231.

566. **Viva C., Reale B. & Sbrana M. 2003.** Annotated check list of skates (Chondrichthyes; Rajidae) in the northern Tyrrhenian Sea. *Biologia Marina Mediterranea*, 10: 958-965.

567. **Yiğin C. & Ismen A. 2009.** Length–weight relationships for seven rays from Saros Bay (North Aegean Sea). *Journal of Applied Ichthyology*, 25:106-108.

568. **Yiğin C. & Ismen A. 2010.** Diet of thornback ray (*Raja clavata* Linnaeus, 1758) in saros bay (the north Aegean Sea). *Rapp. Comm. int. Mer Médit,* 39: 700.

569. **Yeldan H. & Avsar D. 2006.** Sediment structure and occurrence of skates and rays inhabiting in Babadillimani bight located in northeastern Mediterranean. pp. 35-41. *In* : Başusta N., Keskin Ç., Serena F., Seret B. (eds.), The Proceedings of the International Workshop on Mediterranean Cartilaginous Fish with Emphasis on Southern and Eastern Mediterranean, Istanbul, 2005, Turkish Marine Research Foundation, Turkey.

570. **Yeldan H., Avsar D. & Manaşirli M. 2009.** Age, growth and feeding of the common stingray (*Dasyatis pastinaca*, L. 1758) in the Cilician coastal basin, northeastern Mediterranean Sea. *Journal of Applied Ichthyology*, 25: 98-102.

571. **Yeldan H. & Avsar D. 2007.** Length–weight relationship for five elasmobranch species from the Cilician Basin shelf waters (Northeastern Mediterranean). *Journal of Applied Ichthyology,* 23: 713–714.

572. **Yuece. 2006.** The rough ray, *Raja radula* Delaroche, 1809 (Rajidae), new to the Sea of Marmara, Turkey. *Zoology in the Middle East*, 39: 112.

573. **Zava B. & Montagna E. 1992.** Cattura di *Odontaspis ferox* (Risso, 1810) al largo di Linosa (Isole Pelagie, Sicilia) (Selachii, Galeoidea). *Boll Museo Reg Sci Nat Torino* 10:359–365.

574. **Zogaris S. & Dussling U. 2010.** On the occurrence of the Bull ray *Pteromylaeus bovinus* (Chondrichthyes: Myliobatidae) in the Amvrakikos Gulf, Greece. *Mediterranean Marine Science***,** 11: 177-184.

575. **Zuffa M., Soldo A. & Storai T. 2001.** Preliminary observations on abnormal abundance of *Cetorhinus maximus* (Gunnerus, 1765) in the central and northern Adriatic Sea. *Annales, Series Historia Naturalis,* 11: 185-192.

576. **Zupanovic S. 1961.** Contribution to the knowledge of the biology of the Adriatic Chondrichthyes fish. *Acta Adriatica*, 9: 151p.

APPENDIX II

LIST OF ELASMOBRANCHS OF THE MEDITERRANEAN AND THE BLACK SEA

 Presence in Mediterranean and Black Sea

? Doubtful presence in Black Sea

SHARKS

Order **HEXANCHIFORMES**. Cow & frilled sharks

Family **HEXANCHIDAE**. Sixgill & sevengill sharks

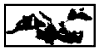
Heptranchias perlo (Bonnaterre, 1788). Sharpnose sevengill shark

Hexanchus griseus (Bonnaterre, 1788). Bluntnose sixgill shark

Hexanchus nakamurai Teng, 1962. Bigeye sixgill shark

Order **SQUALIFORMES**. Dogfish sharks

Family **ECHINORHINIDAE**. Bramble sharks

Echinorhinus brucus (Bonnaterre, 1788). Bramble  shark

Family **SQUALIDAE**. Dogfish sharks

Squalus acanthias Linnaeus, 1758. Piked dogfish
Squalus blainvillei (Risso, 1826). Longnose spurdog 
Squalus megalops (Macleay, 1881). Shortnose spurdog

Family **CENTROPHORIDAE**. Gulper sharks
Centrophorus granulosus (Bloch & Schneider, 1801). Gulper shark
Centrophorus uyato (Rafinesque, 1810)

Family **ETMOPTERIDAE**. Lantern sharks
Etmopterus spinax (Linnaeus, 1758). Velvet belly

Family **SOMNIOSIDAE**. Sleeper sharks
Centroscymnus coelolepis Bocage & Capello, 1864. Portugese dogfish
Somniosus rostratus (Risso, 1810). Little sleeper shark

Family **OXYNOTIDAE**. Roughsharks
Oxynotus centrina (Linnaeus, 1758). Angular roughshark

Family **DALATIIDAE**. Kitefon sharks
Dalatias licha (Bonnaterre, 1788). Kitefin shark

Order **SQUATINIFORMES**. Angel sharks

Family **SQUATINIDAE.** Angel sharks
Squatina aculeata Dumeril, *in* Cuvier, 1817. Sawback angelshark
Squatina oculata Bonaparte, 1840. Smoothback angelshark
Squatina squatina (Linnaeus, 1758). Angelshark. 

Order **LAMNIFORMES**. Mackerel sharks

Family **ODONTASPIDIDAE**. Sand tiger sharks
Carcharias taurus Rafinesque, 1810. Sand tiger shark
Odontaspis ferox (Risso, 1810). Smalltooth sand tiger

Family **ALOPIIDAE**. Thresher sharks
Alopias superciliosus (Lowe, 1839). Bigeye thresher
Alopias vulpinus (Bonnaterre, 1788). Thresher shark

Family **CETORHINIDAE**. Basking sharks
Cetorhinus maximus (Gunnerus, 1765). Basking shark.

Family **LAMNIDAE**. Mackerel sharks
Carcharodon carcharias (Linnaeus, 1758). Great white shark
Isurus oxyrinchus Rafinesque, 1810. Shortfin mako
Isurus paucus Guitart Manday, 1966. Longfin mako
Lamna nasus (Bonnaterre, 1788). Porbeagle shark.

Order **CARCHARHINIFORMES**. Ground sharks

Family **SCYLIORHINIDAE**. Cat sharks
Scyliorhinus canicula (Linnaeus, 1758). Smallspotted catshark 
Scyliorhinus stellaris (Linnaeus, 1758). Nursehound
Galeus atlanticus (Vaillant, 1888). Atlantic catshark

Galeus melastomus Rafinesque, 1810. Blackmouth catshark

Family **TRIAKIDAE**. Hound sharks

Galeorhinus galeus (Linnaeus, 1758). Tope shark

Mustelus asterias Cloquet, 1821. Starry smoothhound

Mustelus mustelus (Linnaeus, 1758). Smoothhound

Mustelus punctulatus Risso, 1826. Blackspot smoothhound

Family **CARCHARHINIDAE**. Requiem sharks

Carcharhinus altimus (Springer, 1950). Bignose shark

Carcharhinus brachyurus (Günther, 1870). Bronze whaler shark

Carcharhinus brevipinna (Müller & Henle, 1839). Spinner shark

Carcharhinus falciformis (Bibron, *in* Müller & Henle, 1839). Silky shark

Carcharhinus limbatus (Valenciennes, *in* Müller & Henle, 1839). Blacktip shark

Carcharhinus melanopterus (Quoy & Gaimard, 1824). Blacktip reef shark

Carcharhinus obscurus (Lesueur, 1818). Dusky shark

Carcharhinus plumbeus (Nardo, 1827). Sandbar shark

Galeocerdo cuvier (Peron & Lesueur, *in* Lesueur, 1822). Tiger shark

Prionace glauca (Linnaeus, 1758). Blue shark

Rhizoprionodon acutus (Rüppell, 1837). Milk shark

Family **SPHYRNIDAE**. Hammerhead sharks

Sphyrna (Sphyrna) lewini (Griffith & Smith, *in* Cuvier *et al.* 1834). Scalloped hammerhead

Sphyrna (*Sphyrna*) *mokarran* (Rüppell, 1837). Great hammerhead

Sphyrna **(*Mesozygaena*)** *tudes* (Valenciennes, 1822). Smalleye hammerhead 

Sphyrna (*Sphyrna*) *zygaena* (Linnaeus, 1758). Smooth hammerhead

BATOIDS (SKATES & RAYS)

Order **PRISTIFORMES**. Sawfishes

Family **PRISTIDAE.** Sawfishes

Pristis pectinata Latham, 1794. Smalltooth sawfish

Pristis pristis (Linnaeus, 1758). Common sawfish

Order **RHINOBATIFORMES**. Guitarfishes

Family **RHINOBATIDAE**. Guitarfishes

Rhinobatos (Glaucostegus) cemiculus St. Hilaire, 1817. Blackchin guitarfish

Rhinobatos (Rhinobatos) rhinobatos (Linnaeus, 1758). Common Guitarfish

Order **TORPEDINIFORMES**. Electric rays

Family **TORPEDINIDAE**. Torpedo rays

Torpedo (Tetronarce) nobiliana Bonaparte, 1835. Great torpedo

Torpedo(Torpedo) sinuspersici

Torpedo (Torpedo) marmorata Risso, 1810. Spotted torpedo
Torpedo (Torpedo) torpedo (Linnaeus, 1758). Ocellate torpedo

Order **RAJIFORMES**. Skates

Family **RAJIDAE.** Skates

Dipturus batis Linnaeus, 1758. Gray skate **?**
Dipturus oxyrhynchus Linnaeus, 1758. Sharpnose skate
Dipturus nidarosiensis (Storm, 1881). Norwegian skate
Leucoraja circularis Couch, 1838. Sandy skate
Leucoraja fullonica Linnaeus, 1758. Shagreen skate
Leucoraja melitensis Clark, 1926. Maltese skate
Leucoraja naevus Müller & Henle, 1841. Cuckoo skate
Raja undulata Lacepede, 1802. Undulate skate
Raja africana Capape, 1977. African skate
Raja asterias Delaroche, 1809. Atlantic starry skate
Raja brachyura Lafont, 1873. Blonde skate **?** 
Raja clavata Linnaeus, 1758. Thornback skate 
Raja miraletus Linnaeus, 1758. Twineye skate
Raja montagui Fowler, 1910. Spotted skate **?** 
Raja polystigma Regan, 1923. Speckled skate
Raja radula Delaroche, 1809. Rough skate
Rostroraja alba Lacepede, 1803. White skate

Order **MYLIOBATIFORMES**. Stingrays

Family **DASYATIDAE**. Whiptail stingrays

Dasyatis centroura (Mitchill, 1815). Roughtail stingray
***Dasyatis marmorata* (Steindachner, 1892)**
Dasyatis pastinaca (Linnaeus, 1758). Common stingray 
Dasyatis tortonesei Capape, 1975. Tortonese's stingray
Himantura uarnak (Forsskael, 1775). Honeycomb whipray
Pteroplatytrygon violacea (Bonaparte, 1832). Pelagic stingray
Taeniura grabata (Geoffroy St. Hilaire, 1817). Round fantail stingray

Family **GYMNURIDAE**. Butterfly rays

Gymnura altavela (Linnaeus, 1758). Spiny butterfly ray

Family **MYLIOBATIDAE**. Eagle rays 
Myliobatis aquila (Linnaeus, 1758). Common eagle ray
Pteromylaeus bovinus (Geoffroy St. Hilaire, 1817). Bullray

Family **RHINOPTERIDAE**. Cownose rays

Rhinoptera marginata (Geoffroy St. Hilaire, 1817). Lusitanian cownose Ray

Family **MOBULIDAE**. Devil rays

Mobula mobular (Bonnaterre, 1788). Giant devilray

APPENDIX III

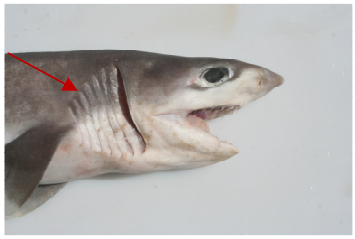
The regional IUCN Red List status of all assessed Mediterranean elasmobranch species (Gibson et al., 2007).

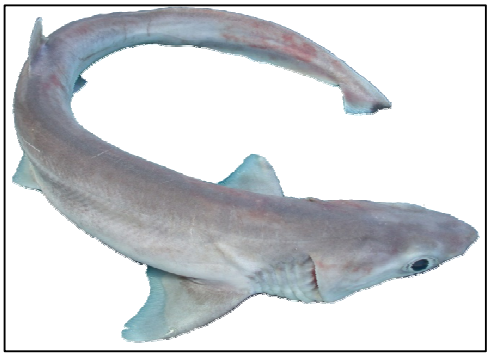
Scientific name	Common name	Threatened Status Mediterranean assessment
Oxynotus centrina	Angular roughshark	CR A2bd
Squatina aculeata	Sawback angelshark	CR A2bcd+3cd+4bcd
Squatina oculata	Smoothback angelshark	CR A2bcd+3cd+4bcd
Squatina squatina	Angelshark	CR A2bcd+3cd+4bcd
Pristis pectinata	Smalltooth sawfish	CR A2bcd+3cd+4bcd
Pristis pristis	Common sawfish	CR A2bcd+3cd+4bcd
Dipturus batis	Common skate	CR A2bcd+4bcd
Leucoraja melitensis	Maltese skate	CR A2bcd+3bcd+4bcd
Rostroraja alba	White skate	CR A2cd+4cd
Gymnura altavela	Spiny butterfly ray	CR A2bcd
Carcharias taurus	Sand tiger shark	CR A2abcd+3cd+4abcd
Isurus oxyrinchus	Shortfin mako	CR A2acd+3cd+4acd
Lamna nasus	Porbeagle shark	CR A2bd

Squalus acanthias	Spiny dogfish	EN A2bd+4bd (VU Black Sea)
Rhinobatos cemiculus	Blackchin guitarfish	EN A4cd
Rhinobatos rhinobatos	Common guitarfish	EN A4cd
Leucoraja circularis	Sandy skate	EN A2bcd+3bcd+4bcd
Giant devilray	Giant devilray	EN A4d
Odontaspis ferox	Smalltooth sand tiger	EN A2abd+4abd
Carcharodon carcharias	Great white shark	EN A2bc+3bc+4bc
Carcharhinus plumbeus	Sandbar shark	EN A2bd+4bd
Heptranchias perlo	Sharpnose sevengill	VU A2d+3d+4d
Centrophorus granulosus	Gulper shark	VU A3d+4d
Alopias vulpinus	Thresher shark	VU A2bd+3bd
Cetorhinus maximus	Basking shark	VU A2bd
Galeorhinus galeus	Tope shark	VU A2bd
Mustelus asterias	Starry smoothhound	VU A2ab+3bd+4ab
Mustelus mustelus	Smoothhound	VU A2ab+3bd+4ab
Prionace glauca	Blue shark	VU A3bd+4bd
Sphyrna zygaena	Smooth hammerhead	VU A4bd
Chimaera monstrosa	Rabbitfish	NT
Hexanchus griseus	Bluntnose sixgill shark	NT
Dipturus oxyrhynchus	Sharpnose skate	NT
Leucoraja naevus	Cuckoo skate	NT
Raja clavata	Thornback skate	NT
Raja polystigma	Speckled skate	NT
Dasyatis centroura	Roughtail stingray	NT
Dasyatis pastinaca	Common stingray	NT
Pteroplatytrygon violacea	Pelagic stingray	NT
Myliobatis aquila	Common eagle ray	NT
Rhinoptera marginata	Lusitanian cownose ray	NT
Galeus atlanticus	Atlantic catshark	NT
Scyliorhinus stellaris	Nursehound	NT
Etmopterus spinax	Velvet belly	LC
Centroscymnus coelolepis	Portuguese dogfish	LC
Somniosus rostratus	Little sleeper shark	LC
Torpedo marmorata	Spotted torpedo ray	LC
Torpedo torpedo	Ocellate torpedo ray	LC
Raja asterias	Atlantic starry skate	LC
Raja miraletus	Twineye skate	LC
Raja montagui	Spotted skate	LC
Galeus melastomus	Blackmouth catshark	LC
Scyliorhinus canicula	Smallspotted catshark	LC
Hexanchus nakamurai	Bigeye sixgill shark	DD
Echinorhinus brucus	Bramble shark	DD
Dalatias licha	Kitefin shark	DD
Torpedo nobiliana	Great torpedo ray	DD
Leucoraja fullonica	Shagreen skate	DD
Raja brachyura	Blonde skate	DD
Raja radula	Rough skate	DD
Raja undulata	Undulate skate	DD
Dasyatis chrysonota	Blue stingray	DD

Himantura uarnak	Honeycomb whipray	DD
Taeniura grabata	Round fantail stingray	DD
Alopias superciliosus	Bigeye thresher	DD
Mustelus punctulatus	Blackspot smoothhound	DD
Carcharhinus altimus	Bignose shark	DD
Carcharhinus brachyurus	Bronze whaler shark	DD
Carcharhinus brevipinna	Spinner shark	DD
Carcharhinus limbatus	Blacktip shark	DD
Carcharhinus obscurus	Dusky shark	DD

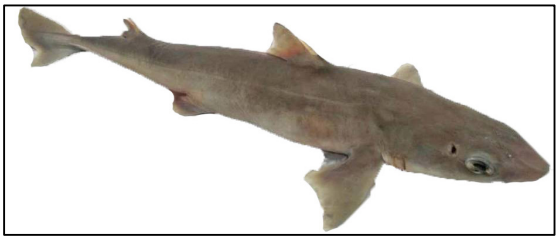
COLOUR PLATES



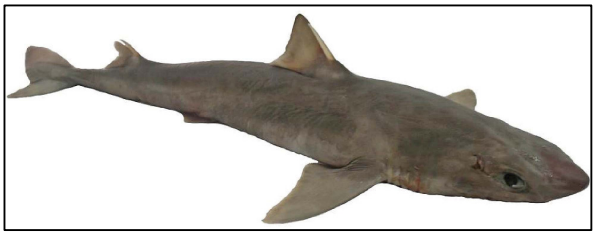


HEXANCHIDAE *Heptranchias perlo*

HEXANCHIDAE *Hexanchus griseus*



SQUALIDAE *Squalus megalops*



SQUALIDAE *Squalus blainvillei*

CENTROPHORIDA *Centrophorus granulosus*

OXYNOTIDAE *Oxynotus centrina*

SQUATINIDAE *Squatina squatina*

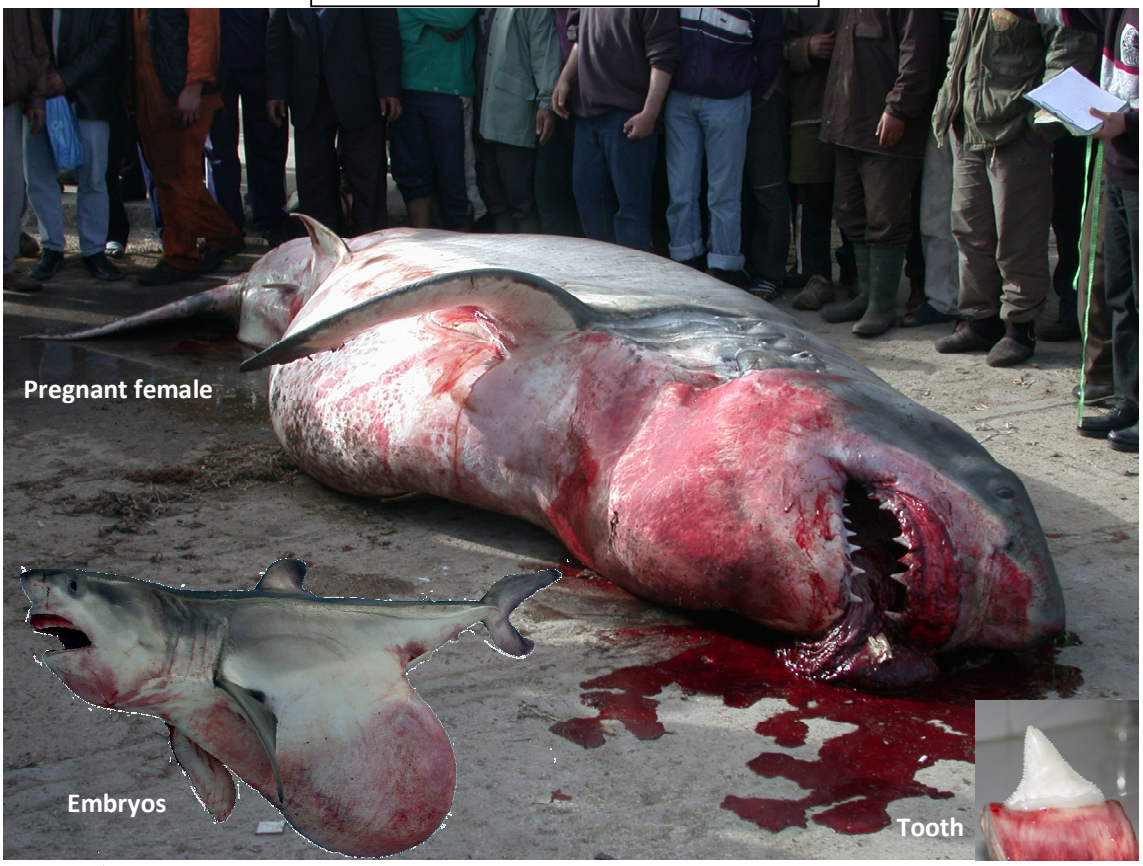
SQUATINIDAE *Squatina aculeata*

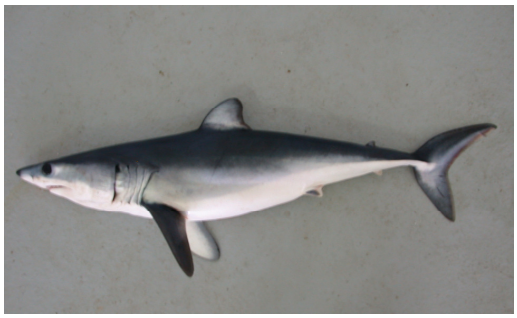
SQUATINIDAE *Squatina oculata*

ALOPIIDAE *Alopias vulpinus*

CETORHINIDAE *Cetorhinus maximus* **(juvenile)**

LAMNIDAE *Carcharodon carcharias*





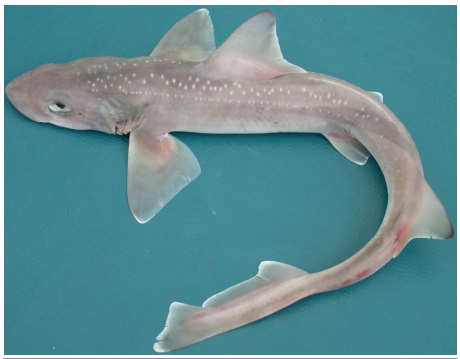
LAMNIDAE *Isurus oxyrinchus*

SCYLIORHINIDAE *Scyliorhinus canicula*

SCYLIORHINIDAE *Scyliorhinus stellaris*

TRIAKIDAE *Mustelus punctulatus*

TRIAKIDAE *Mustelus mustelus*



TRIAKIDAE *Mustelus asterias*

CARCHARHINIDAE *Prionace glauca*

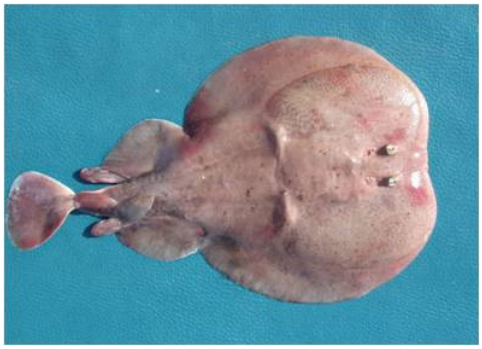
CARCHARHINIDAE *Carcharhinus plumbeus*

CARCHARHINIDAE *Carcharhinus brevipinna*

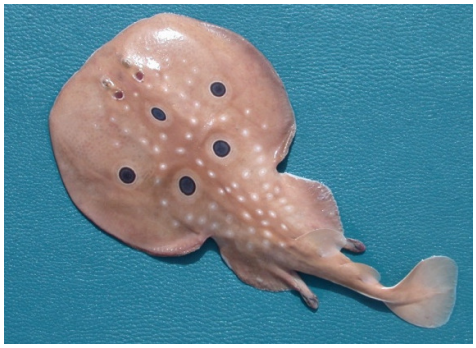
SPHYRNIDAE *Sphyrna (Sphyrna)* zygaena

RHINOBATIDAE *Rhinobatos (Rhinobatos) rhinobatos*

RHINOBATIDAE *Rhinobatos (Glaucostegus) cemiculus*



TORPEDINIDAE *Torpedo marmorata*



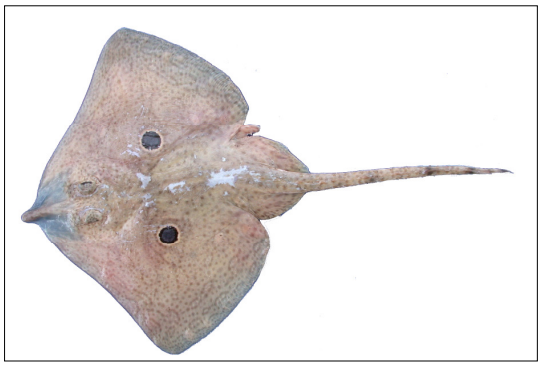
TORPEDINIDAE *Torpedo torpedo*

RAJIDAE *Rostroraja alba*

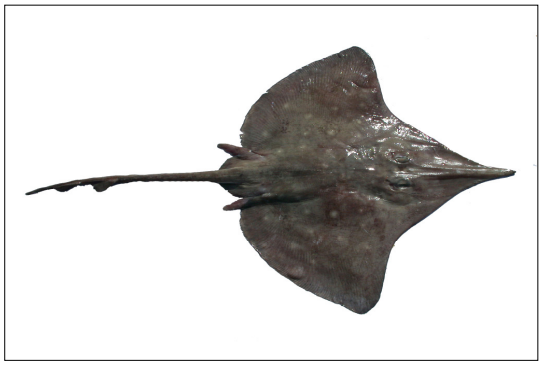
RAJIDAE *Raja asterias*

RAJIDAE *Raja clavata*

RAJIDAE *Leucoraja melitensis*



RAJIDAE *Raja miraletus*



RAJIDAE *Dipturus oxyrinchus*

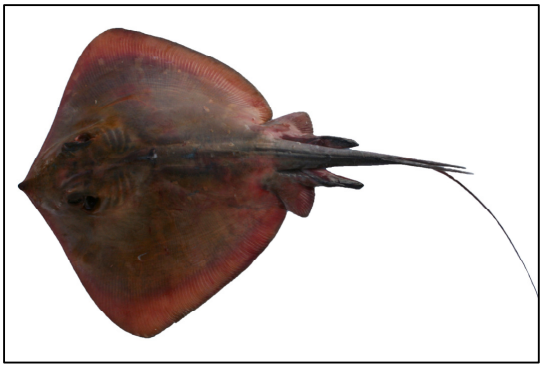
RAJIDAE *Raja radula*

Dasyatidae *Dasyatis marmorata*

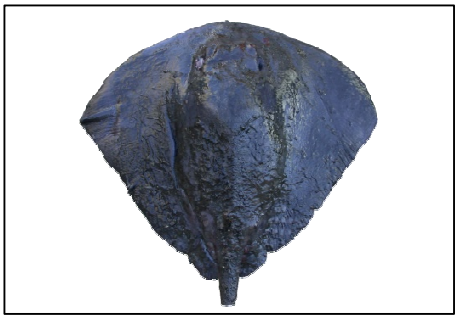
Dasyatidae *taeniura grabata*

Dasyatidae *Dasyatis centroura*

Dasyatidae *Dasyatis pastinaca* ?



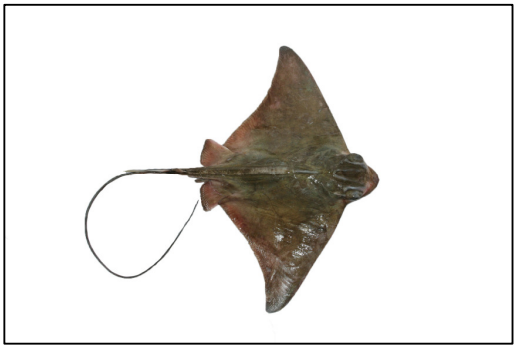
Dasyatidae *Dasyatis tortonesei* ?



Dasyatidae *pteroplatytrygon violacea*

GYMNURIDAE *Gymnura altavela*

MYLIOBATIDAE *Pteromylaeus bovinus*



MYLIOBATIDAE *Myliobatis aquila*

MOBULIDAE *Mobula mobular*