



**CopeMed II - MedSudMed Workshop on Fisheries and appraisal of
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**Dolphinfish (*C. hippurus*) recreational fishing in the Mediterranean Sea,
a theoretical tool for scientist and managers**

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1. Introduction

The participation of recreational fisheries actors in the management process of some fisheries resources is an opportunity for fishermen, scientists and administrations in the Mediterranean in order to achieve the goals of the Code of Conduct for responsible fisheries of the FAO (FAO, 1995) and to improve the implementation of the principles and recommendations of the Ecosystem Approach to Fisheries Management (EAF) in the Mediterranean, in the framework of the GFCM.

The Code of Conduct promote the participation of all the interested domestic parties, having a legitimate interest in the use of fisheries resources, in the management process establishing arrangements for consulting them to gain their collaboration in achieving responsible fisheries, and the (EAF) recommends wider stakeholders participation. Such participation may be implemented at many different levels of involvement of the stakeholders in the management process in data collection, knowledge-building, option analysis, decision-making and even implementation, including enforcement (Garcia et al, 2003).

The GFCM recognize the important role of the recreational fisheries in fisheries management. Moreover, in 2010, a GFCM transversal meeting on recreational fisheries was undertaking providing with recommendations to the 2010 GFCM meeting.

2. Dolphinfish fisheries in the Mediterranean Sea. The Spanish situation

Dolphinfish is an epipelagic species inhabiting open waters but also approaching the coast following ships and forms small concentrations below floating objects. It has pelagic eggs and larvae and spawning generally occurs during summer (June to September). Distributed elsewhere worldwide in tropical and subtropical seas, is present in the Mediterranean. Fishing aggregation devices (FADs) are used to concentrate Dolphinfish before the nets are set. It is caught by trolling and by tuna longlining, and also occasionally with purse seines and driftnets (FAO Fish-Finder, 2011).

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A traditional small-scale fishery is carried out in the central Mediterranean (Sicily, Malta and Tunisia) and western part of the basin (Majorca Island) during summer-fall using FADs. This highly migratory middle size pelagic fish seems to be a single stock in the central-western Mediterranean and should be jointly managed (COPEMED, 2003). The Balearic island artisanal fishery (Masutti & Morales Nin, 1995) means to be the most important in Spanish waters.

This species is also recognized as a premier game and food fish wherever it is found. Historically harvested almost wholly by recreational fishermen around the world, only in recent decades caught the attention of commercial fishermen. Today the species is a shared stock between recreational and commercial interests (Hammond, Cooperative Science Services, LLC).

The weight of recreational fisheries worldwide and in the Mediterranean is very important, considering that only U.S. sports fishermen harvested more than 1.45 million Dolphinfish from the Gulf, Atlantic and Caribbean in 2008. (MRFSS Data, Dolphinfish Research Newsletter. August 2009).

Recreational fisheries are an important regional issue for the GFCM. A recent report of the GFCM (GFCM, 2011) stated that basic recreational fisheries resource needs to be managed but information on the status and trends are largely lacking to support recreational fishing regulations and management.

Recreational fisheries in Spanish Mediterranean waters are well developed, and the Majorca recreational fisheries targeting Dolphinfish are well known by professional artisanal fishermen and are or could be questioned due to conflicts between users.

According to the Confederation Española de Pesca Recreativa Responsable, Spanish recreational fisheries consist of 100.000 boats and the socio-economic impact is 1.000 million € annually. This Confederation is an observer of the GFCM, participating in different sub committees.

3. An approach to recreational fisheries information and data on Dolphinfish

Recreational fisheries are very important in all the Mediterranean countries. Some studies on recreational fisheries in Mediterranean countries were presented during the transversal workshop of the GFCM (2010) referred to Italy (Colella et al., 2010), Balearic Islands in Spain (Morales-Nin and Palmer, 2010), Turkey (Unal and Özgül, 2010), Maroc (Zahri and Abdellaoui) including one presentation on spearfishing in Spain (Sagué Pla, 2010). Recreational underwater fisheries are practically unknown from the point of view of the number of fishermen, target species or production.

Studies on Dolphinfish captured, recreational fisheries and spearfishing are very rare. In this document we propose to explore new digital formats that include information on this species in the Mediterranean Sea in order to improve our knowledge and the biological information as well as looking for new possibilities of monitoring and basic data gathering. The aim is to facilitate the organisation of a monitoring framework including

most of the recreational fisheries information set as requested by the GFCM WG on recreational fisheries.

A preliminary review of existing information on Spanish sport fishing fora websites has begun in order to investigate whether biological and fishing information provided by sport fishermen could be used to know more about the biology and ecology of Dolphinfish in the Mediterranean. The review was done without intending to obtain statistical data but to investigate whether that information could be used as an additional valid source for researching into the state of the resource and applying this approach in the Mediterranean region.

From the information of recreational fisheries websites and from the information provided by the fishermen in digital fora, some conclusions that could improve understanding of this species in the Spanish Mediterranean have been drawn and in some way facilitate the development of a database sport fishing of this species.

As first attempt to test this methodology three websites were reviewed: the web www.pescamediterraneo2.com, which includes information from Spanish fishermen in the Mediterranean; the fishing forum web <http://foro.latabernadelpuerto.com/showthread.php?t=22489>; and the website of the Spanish Confederation of Responsible Recreational Fisheries (<http://www.pescarecreativaresponsable.es>), that is a confederation that brings together 13 associations and federations of recreational fishing from boats on the Spanish coast.

4. The recreational Dolphinfish fishery in Spanish Mediterranean Sea: Preliminary results

The information obtained that can be useful for the WG include: date, fisherman base location, fishing area, fishing depth, fishing period of the year, number of catch, weight of the specimens, type of gear used, the destination of specimens (consumption, distribution) and so on. A summary of the information obtained from the visited websites is shown next:

Gear types and fishing methods: according to these forums, Dolphinfish boat fishing is carried out in very different ways, from spinning and jigging to the more usual trolling. It is also caught baiting the water with sardine to attract them. Since the species tends to shelter, it is caught near the feeding and fattening aquaculture cages and using floating devices. It is also mentioned that using trolls, once a specimen is attracted to the boat, if left hooked in the water, the presence of the first one usually attract new specimens increasing the boat captures.

Fishing strategy and fishing methods: it is highly varied, from which the one that go fishing after consulting in a forum some information about the presence of specimens in their area, to the ones that have information about the fishing season and abundance because of their greater experience, or those mentioning that "we must observe any movement of seabirds, floating debris or some fish shoals, that will guarantee a good

fishing". Some time detection of Dolphinfish schools is made by observing the sea birds flying around FADs, the movement of the water surface, or other indicators.

Depth and fishing zones: are varied, from 60-70 m deep (Saint Pedro del Pinatar, southern Murcia) to over 300 m (deep-sea for fishing competition) but it seems that sometimes can be caught near the coast ("I saw 15 m from the coast the -queen of Dolphinfish-, nearly 1m long one") or in lower depths (20 to 30 m in January in Tarragona), or even in some bays (Alicante, December 2003). Fishing is reported in Tarragona, Baleares, Valencia, Alicante, Murcia and Cabo de Gata (Andalucía).

Fishing seasons: the main fishing season runs from June to September (although in November is reported in Majorca). Nevertheless captures are reported during the whole year: in April 2004 a fisherman from Barcelona says: "I caught fifteen Dolphinfish and I returned more than half of them to the water as they were so small, keeping the rest that would not exceed 1 Kg". The fishing season varies from one area to another, being able to get valuable information on the distribution areas and sizes in different mainland coastal and Balearic Islands areas: "In June 2003, in Javea-Moraira it was caught a specimen 15-25 miles from the coast. In Valencia, November 22, one was caught 30 miles from the coast. In Almería, very few reported in November 2003".

Sizes and / or weight of specimens catch: data tables can be made with sizes and / or specimens weights information, in different areas and periods of the year. For example, it was reported: "seven small Dolphinfish caught, all with little more than several inches (> 20 cm) on November 11, 2003. In October, in Alicante, 200 gr specimens. In December, one specimen with a little less than 1 Kg in southern of Salou (Tarragona)". That it is clear from the anglers' information is that mean length composition of the Dolphinfish increase during the summer fishing season in Spanish waters.

Biology of the species: from October to December and in some cases in January, 200 gr specimens are reported (Alicante, October 2003), and 1 Kg specimen (Tarragona, December). Such kind of data may provide information about areas and recruitment on the Spanish coast. In this period it is also commented that "the size is increased the entire months of September and October, and then in November they disappear".

Abundance in the sea: most fishermen give information about their fishing zones and if the fishing is good or not, which could identify some key areas in the sea where adults and juveniles are concentrated: "Near Denia there is a lot of Dolphinfish (April 2003), most specimens with more than 1 Kg and some with more than 2kg".

Total catch per vessel: only some information of total catch, primarily in number of specimens (from 200 to 1 or 2, with varied sizes). The comments, sometimes comment total catch: "Catch may reach nearly 200 kg in 1 hour time of 3-4 Kg specimens in Tabarca. In August, fish over 2 kg are caught in Alicante. 150-200 Dolphinfish were caught 3 miles from San Carlos de la Rápita, in 6 hours, in 2007".

Spanish Confederation of Responsible Recreational Fishing (<http://www.pescarecreativaresponsable.es>): it is a non-governmental, non-profit organization that brings together several associations and federations of recreational sea

fishing in Spain. It is committed to promote the practice of responsible recreational fishing, the spread of its code of conduct based on respect for the marine environment and sustainability of fishery resources. According this Confederation, the Spanish fishery represents 100.000 boats and the Socio-economic impact is 1.000 million € annually.

This Confederation is involved in scientific activities (mainly tagging programs) in collaboration with Spanish scientific institutions: IEO, CSIC and AZTI, three important marine research institutions in Spain.

Registers from National and International competition

Data on catch could also be obtained through the national and international competitions registers. As an example we include here the International Federation of Sporting Sea-Angling, (<http://www.fipsmer.org>) with a register called **F.I.P.S./M. Competition World Record Catches** with different lists where they include the biggest captures during championships, including two Dolphinfish:

- Dolphinfish *C. hippurus*; 13,0 Kg; date: 24.06.2003 in Dakar, Senegal during the World Championship; fisher: Carlos Garin, Spain
- Dolphinfish *C. hippurus*; 20,4 Kg; date: 26.08.2003 in Alicante , Spain during the Club Championship; angler: Cristobal Miravet Sturm, Spain

This second record corresponds to a Dolphinfish captured in the Mediterranean.

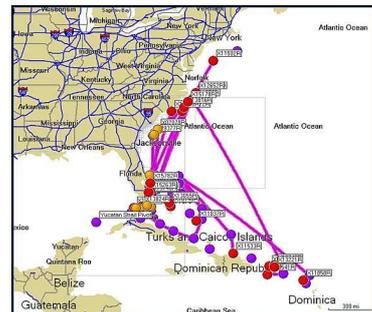
Tagging research programs on Dolphinfish

The USA Marine Resources Division of the South Carolina Department of Natural Resources (SCDNR) initiated a study on Dolphinfish in 2002 adopting a tagging program in collaboration with the recreational anglers (<http://www.dolphintagging.com>). The Tagging Study is a scientific research project conducted to the fishermen with the aim of establishing the temporal and spatial occurrence, movement patterns and essential habitat of the species in the USA territorial waters, Gulf of Mexico, Western North Atlantic and Caribbean Sea. It is also intended to foster more research on the biology and behaviour of Dolphinfish. The program has been extremely successful, having more than 11,000 fish marked with the majority released along the U.S. Atlantic coast.

2005 SPECIAL RECAPTURE MAPS



2010 RECAPTURES MAP



Dolphinfish tagged off the U.S. East Coast have travelled to southern Azores Islands in the Eastern North Atlantic, Puerto Rico, Antigua, St. Kitts, Venezuela, Mexico and Cuba.

The Confederación Española de Pesca Recreativa Responsable is associated to this tagging program and could be an important contributor to this activity in Spain.

5. Some conclusions and recommendations

- Recreational fisheries targeting Dolphinfish in western Mediterranean are an important annual activity for anglers based in several ports of Balearic Islands, Catalonia, Valencia and north of Cabo de Gata in Spain.
- The total catch and the number of anglers involved in the capture of this species in Spain are unknown at present.
- Web pages of professionals and digital fora on recreational fisheries are an important source of information related to the biology, distribution, fishing periods and fishing zones, weight and sizes, production, fishing methods and environmental variables (fishing depths, sea state, winds, etc).
- Registers from National and International competitions could be a source of information on Dolphinfish.
- Information provided by recreational fishers could be incorporated to a data base of the Spanish recreational Dolphinfish fishery.
- Catch occurs from January to December in coastal and offshore areas with peaks of captures during the end of the summer and autumn.
- Dolphinfish average length composition in Spanish Mediterranean waters increase from April-May until the end of October.
- Target sizes (>1Kg) disappear in some areas in November.
- During October, November and December anglers from Majorca and from coastal areas (Barcelona, Alicante) report of catch of small Dolphinfish (<1 Kg, sometimes about 200 gr). This information could indicate the existence of a juvenile/recruitment area in western Mediterranean Sea for the species to be investigated.
- Collaboration between the Spanish Confederación Española de Pesca Recreativa Responsable and national marine research institutions, and also between the USA Confederation and the CSS Dolphin Tagging Study project for tagging Dolphinfish could be a starting point for fisheries scientists in the Mediterranean to collaborate with the members of the Spanish Confederation.
- Tagging programmes in collaboration with recreational organisation could provide important information on size, growth, distribution and migratory patterns of Dolphinfish in the Mediterranean Sea.
- To reinforce the knowledge on the fishery and the species and also for management purposes it is recommended to improve the collaboration of national scientists and fisheries administrators working on Dolphinfish fisheries with national or international recreational anglers associations aiming

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