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GENERAL FISHERIES COMMISSION
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COMMISSION GÉNÉRALE DES PÊCHES
POUR LA MÉDITERRANÉE

| GENERAL FISHERIES COMMISSION FOR THE MEDITERRANEAN |
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| SCIENTIFIC ADVISORY COMMITTEE (SAC) |
| Thirteenth Session |
| Marseille, France, 7-11 February 2011 |
| **Introduction to the GFCM Database on Biological Parameters*** **(Advanced version)** **(by GFCM Secretariat)** |

*Available in English only

## BACKGROUND

During its 9th meeting (June 2010, FAO-HQ, Italy), the CMSC stressed the importance to improve knowledge on biology, life history parameters and stock structure (including the spatial location of nurseries and spawning areas) of selected fish species of the Mediterranean Sea, also for stock assessment purposes. It agreed on the importance to gather and to compile the available parameters from various sources including the circulation of a questionnaire to national scientists in order to collect recent and/or updated information. It was decided that a first stage of this work should focus on six priority species such as red mullet (*Mullus barbatus*), stripped red mullet (*Mullus surmuletus*), European hake (*Merluccius merluccius*), anchovy (*Engraulis encrasicolus*), sardine (*Sardina pilchardus*) and deep-water pink shrimp (*Parapenaeus longirostris*). The CMSC has also envisaged the launch of this task by the Secretariat in collaboration with the SCSA and concerned scientists. Table 1 summarizes the population dynamics features and parameters investigated.

**Table 1**
Biological parameters and population dynamics features identified as priority by the SCSA.

| |
|---|
| Von Bertalanffy Growth Function parameters ($L_\infty$, K, $t_0$) |
| Length-weight relationship (a and b) |
| Natural mortality rate (M) |
| Length/age at 50% maturity |
| Length/age at habitat recruitment |
| Vector of maturity by length/age |
| Vector of natural mortality by length/age |
| Reproduction period |
| Recruitment period |
| Spatial distribution of spawning areas |
| Spatial distribution of nursery areas |

## CONCEPTS AND METHODS

In order to become aware of quality and quantity of the information available to date for the selected species, the GFCM Secretariat started investigating different sources back to the first decades of the last century, up to present times. With the aim of sharing the knowledge gathered through the data collection, it was planned to design a database for online consultation through the GFCM website available by the end of 2011.

### *Data sources*

To gather as much information as possible on life history parameters and biological characteristics of the six priority species of the Mediterranean and Black Sea, several sources were explored without omitting the oldest records. First data imported were those already filed in the GFCM Stock Assessment Forms (SAFs) and in FAO Fishery Reports. Also, several sources were gained from Technical Documents produced by FAO Regional Projects such as AdriaMed (Vrgoč et al. 2004) and MedSudMed (Fiorentino et al. 2008). SGMED Working Group Reports (SGMED, 2009; 2010), released by the Scientific, Technical and Economic Committee for Fisheries (STECF), were also a solid source to compare references and to obtain new parameters. FishBase[1], as an example of existing database which files worldwide data on telost species, turned out to be a useful mean to obtain and compare data and references. Besides this, the bulk of sources recorded in the GFCM Database comes from a long consultation of scientific papers and publications through the Internet and the Library of FAO Fishery.

All the authors quoted in the GFCM Database will be linked to the full original reference; whenever it was not possible to trace the origin of the data, the papers/books/reviews containing such information were also cited.

Moreover, the GFCM Secretariat circulated a technical questionnaire among national scientists to collect recent and/or updated information (as foreseen by the 9th CMSC). The questionnaire, circulated by electronic mail on 8th November 2010, consisted of a simplified Excel spreadsheet to be filled in by experts and resubmitted to the GFCM-Secretariat. To this date, the Secretariat

[1] www.fishbase.us

received only one questionnaire, which was from Malta; however a wider participation of scientist from all the countries is expected within the next months.

***Data structure***

With the aim of providing complete and organized information to the final users, six Microsoft Excel spreadsheets - one per species - were designed. The sheets were divided into 14 columns, 11 of which containing information on the biological features investigated (cf. Table 1) and 3 containing information on the sources such as author(s), year of publication, Geographical Sub-Area (GSA)[2] where the study has been carried out. Table 2 summarizes the main entries of the Database.

**Table 2**

Outline of the spreadsheet designed to record the biological data collected (GSA VBGF: Von Bertalanffy Growth Function parameters, M: mortality rate as scalar, L: length).

| Author(s) | Year | GSA | VBGF | M | Length-weight relationship (*a* and *b*) | $L_{recruitment}$ | $L_{maturity}$ | Reproduction period | Recruitment period | Spawning area | Nursery area | Vector of maturity | Vector of mortality |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

VBGFs, mortality rate (M), *a* and *b* parameters, length at 50% maturity, vectors of maturity and mortality entries were divided in their turn into gender subfields (males, females, combined). Where needed, the measure unit (cm, mm, etc.) was specified as well as the length measure reference (total, standard, fork, carapace length). The entries of maturity and mortality vectors were split into class age cells (0-10 years).

Each row contains data coming from the author(s) indicated in the first cell; in most cases only some of the parameters investigated are provided, thus several cells remain empty. If a source provides more values for the same entry (*i.e.* different $L_\infty$ values calculated in different location within the same GSA), the same reference (Author(s), year, GSA) is repeated as many times as needed. Rows are sorted by increasing chronological order. Also, entries such as Reproduction and Recruitment periods, Spawning and Nursery areas, show a great variability of results since these biological features can be described in several ways strongly dependent on Authors' criteria.

***First results and insights***

At present, most of data available for the Mediterranean and Black Sea have been filed in the GFCM Database; all the information and references have been checked to avoid repetitions and inconsistencies. About n=670 records were imported into the database; figure 1 summarizes percentages of information obtained *per* species.

The patchy distribution of the sources, emerged during the data collection phase, gives first insights on the different level of knowledge on the biology of these species within the Region. Figure 2 shows clearly a lack of studies in several GSAs, especially in the Eastern Mediterranean

[2] Resolution GFCM/33/2009/2 on the establishment of Geographical Sub-Areas in the GFCM area amending the Resolution GFCM/31/2007/2

Basin (with the exception of the GSA 22-Aegean Sea) and the Black Sea area. With regard to the Western Basin few data are available for GSA 8 and 11 (Corsica and Sardinia islands).

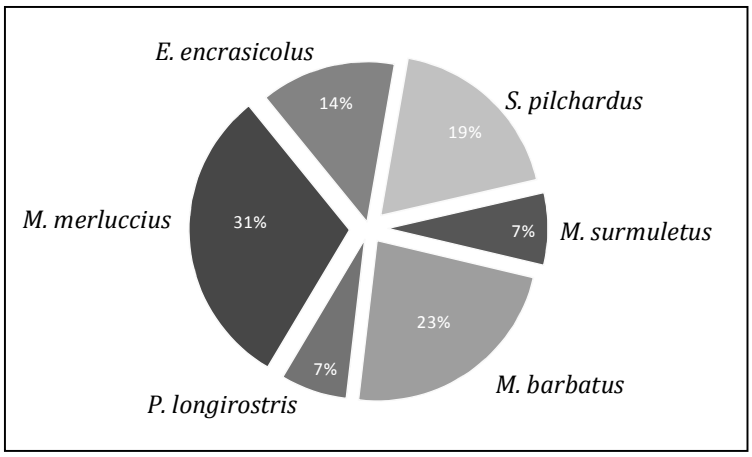


**Figure 1**. Amount of data filed on the six priority species (as percentage).

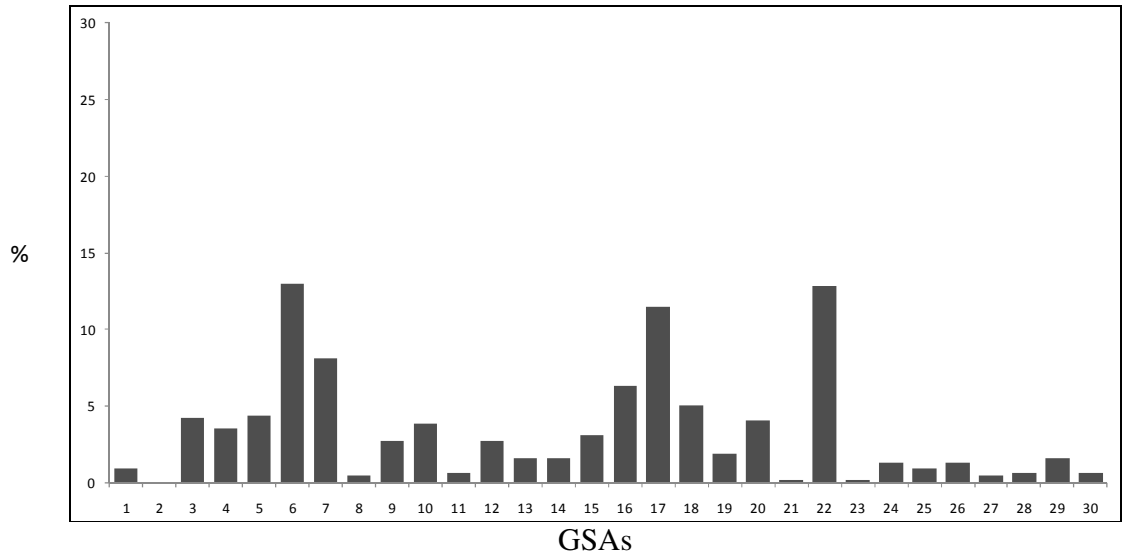


**Figure 2**. The chart shows the GSAs where the database information comes from (as percentage).

## SUB-COMMITTEE ON STOCK ASSESSMENT (SCSA) 2010 Meeting Inputs.

A first feedback on the database project arrived during the 12th session of the GFCM-SAC-SCSA held from 29th to 2nd December 2010, in Malta. On that occasion, the GFCM Secretariat had the chance to introduce progresses achieved in the elaboration of the database to the participants . The Sub-Committee made some preliminary recommendations as to add the **depth range** distribution of the species and the **method used** to gather length-related data (otoliths, total length, etc.); it also suggested to add ***Pagellus bogaraveo*** to the species list of the Database. According to the SCSA, it also would be desirable to have the new GFCM Database linked to the

Stock Assessment Forms (SAFs) through the Operational Unit code in order to make the information available for the stock assessment purposes.

The depth range and the method used will be included in the near future to complete the information already stored in the GFCM Database. With regard to the possible connection between the Database and the SAFs, this is one of the objectives of the web application. The database intends to become the main tool for national experts to submit/consult parameters for stock assessment purposes (see below). Furthermore, species such as *Pagellus bogaraveo*, will be included among others in the GFCM Database, once operating at full capacity.

## EXPECTED OUTCOMES OF THE GFCM DATABASE ON BIOLOGICAL PARAMETERS

The GFCM Database on Biological Parameters intends to become not only an archive quickly and easily consultable, but also a Regional source of updated information and a benchmark for experts and fishery managers.

Filters to look for specific information (VBGPs, *a*/*b*, nursery area, etc.) for each species will be provided; users will be able to sort them by species, GSA, year, etc.; all the information provided will be matched to the corresponding bibliographical reference.

Every year, national experts are invited to submit to the GFCM Secretariat SAFs duly filled. New and updated biological parameters information, provided by those SAFs, could be easily and quickly imported into the Database if a connection is created through the GSA code. In this way, the SAFs user could easily retrieve the values of the parameters needed for his assessment exercises. Another connection is being proposed with the forms of the GFCM Scheme for data submission, specifically with the information to be provided through the so called Task 1.5 on biological characteristics of catch (length, age, sex, maturity), both in terms of landings and discards.

The GFCM Database on Biological Parameters functionality will be firstly tested within the Secretariat and, in a second step through the feedback from users who will be requested to send comments and suggestions to improve the application usability.

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