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REPORT ON THE TRAINING COURSE ON ICHTHYOPLANKTON

22-26 February 2016
Malaga, Spain

CopeMed II Technical Documents Nº41
GCP/INT/028/SPA; GCP/INT/006/EC

REPORT OF THE TRAINING COURSE ON ICTHYOPLANKTON

February 2016

The conclusions and recommendations given in this document and in other documents in the *Co-ordination to Support Fisheries Management in the Western and Central Mediterranean* CopeMed II Project series are those considered appropriate at the time of preparation. They may be modified in the light of further knowledge gained in subsequent stages of the Project. The designation employed and the presentation of material in this publication do not imply the expression of any opinion on the part of Food and Agriculture Organization of the United Nations, FAO, the Government of Spain or the Commission of the European Union concerning the legal status of any country, territory, city or area, or concerning the determination of its frontiers or boundaries. This document has been financed by the European Union and the Government of Spain. The views expressed herein can in no way be taken to reflect the official opinion of the European Union or the Government of Spain.

Preface

The CopeMed II Project on *Co-ordination to Support Fisheries Management in the Western and Central Mediterranean* is executed by the Food and Agriculture Organization of the United Nations (FAO) and funded by the Government of Spain, represented by the Secretaría General de Pesca (Mº de Agricultura, Alimentación y Medio Ambiente, MAGRAMA), and the European Union, represented by the European Commission (EC).The premises of the project at the Subdelegación del Gobierno in Málaga (Spain) are part of the Spanish contribution included in the agreement with the FAO.

The objective of the project is to maintain the sustainability of the marine fisheries in the central and western Mediterranean Sea and its ecosystem, taking into consideration environmental, biological, economic, social and institutional issues. In addition, the project will continue to reinforce the collaboration among the participating countries of the sub-region by facilitating their participation in the activities of the Scientific Advisory Committee (SAC) and in the General Fisheries Commission for the Mediterranean (GFCM).

Regions covered by CopeMed II are the western and central sub-regions of the Mediterranean. Participating countries are Algeria, France, Italy, Libya, Malta, Morocco, Tunisia and Spain. The main beneficiaries are the fishery policy-makers, managers and fishery administrations in the western and central Mediterranean countries. The project is also contributing to the strengthening of regional collaboration by supporting the participation of the countries in relevant regional scientific organizations, such as the FAO's General Fisheries Commission for the Mediterranean (GFCM). Secondary beneficiaries include the national research institutes, fishers and fishers' associations, and industrial organizations.

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Comments on this document would be welcomed and should be sent to the Project premises:

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ABSTRACT

The study of the first life stages of fishes is crucial for the understanding of their population dynamics. Fisheries assessment, and the subsequent adoption of management measures, needs to be based on sound scientific knowledge of biological processes such as growth, reproduction, recruitment, trophic interactions, environmental influences, etc. Moreover there are a number of ichthyoplankton-based methods that can be used to enhance our knowledge of these processes. CopeMed Countries, conscious of the importance of these studies and of the lack of expertise in their scientific institutions have reiteratively requested the support of the project on strengthening this field of research.

This training was attended by participants from Morocco, Spain and Tunisia The training course of a week gave information on the methods and sampling equipment needed to sample ichthyoplankton. It also helped participants to acquire the basic knowledge on ichthyoplankton taxonomic identification, larval fish ecology and on the basic applications of ichthyoplankton research for fisheries assessments and management.

Report on the *Training Course on Ichthyoplankton*

Fuengirola (Málaga), Spain
22-26 February 2016
Spanish Institute of Oceanography (IEO)

The Training course on Ichthyoplankton, organized by the FAO Regional Project CopeMed II and hosted by the Spanish Institute of Oceanography (IEO), was held in the premises of the Oceanographic Center of Málaga (Fuengirola) during 22-26 February, 2016. The course stems from a recommendation of the Coordination Committee of CopeMed II to extend ichthyoplankton field research and its potential use in fisheries management in the western Mediterranean. Likewise, it was agreed that the course should prioritize on the taxonomic identification of fish eggs and larvae. Nevertheless, lectures on different ichthyoplankton research topics were given on a daily basis, so as to stimulate participants in future applications of ichthyoplankton-related research.

The course was coordinated by Dr. Alberto García (IEO), who planned and provided the terms of reference for the course. Dr. Alberto Garcia (IEO), Dr. José María Rodriguez (IEO) and Dr. Rafik Zarrad (INSTM) acted as lecturers and were assisted by Pablo Marina (UMA). The lecturers followed the program agreed upon and shown in Appendix 1 of this report. A demonstration of sampling procedures at sea was envisaged, but due to unusually bad weather conditions, the arrival of the IEO' s R/V Francisco de Navarro was largely delayed, thus motivating the cancellation of the training sampling demonstration at sea.

Two scientists from Morocco, two from Algeria, two from Tunisia and three from Spain participated in the course. A Turkish participant cancelled his participation due to a delay in the visa application. The list of participants is shown in Appendix II.

Pilar Hernandez, fishery expert of the CopeMed II Project, inaugurated the course welcoming the participants and expressing her thanks to organizers, professors and host institution wishing that ichthyoplankton research be able to begin new cooperative actions of research and establishing a

future network of researchers between the participant countries. Participants were asked to introduce themselves and explain their research expertise.

Dr. García then proceeded to thank CopeMed II for its efforts in engaging collaborative activities with southern Mediterranean countries and expressed the need of capacity building integrating efforts between the different scientific disciplines and by establishing a network of ichthyoplankton researchers, under the CopeMed II umbrella. These elements are required for fully developing the capabilities of ichthyoplankton research for fisheries assessment and in the implementation of the Ecosystem Approach to Fisheries (EAF).

Instructions on the course methodology were given to participants. It consisted in the identification of larvae at different developmental stages that Dr. Rodriguez had prepared prior to the course. To fulfill this exercise, 10 stereoscopic binocular microscopes were provided, so each participant had one assigned for his personal use throughout the duration of the course (see pictures). Although, more larval collections were available, full preference was given to Dr. Rodriguez's collection because it was complemented with a customized guide for fish larval identification.

On the first day, a series of introductory presentations (see Annex 1) were given by A. García and J. M. Rodriguez. These comprised the following topics:

1) Introduction to ichthyoplankton research and its application in ecology and fisheries studies
2) Sampling strategies, methods and gears
3) Laboratory equipment, sample preparation, ichthyoplankton sorting, preserving and storing fish eggs and larvae
4) Introduction to ichthyoplankton identification

Bibliographic references, especially those that originate from the IEO's Larval Fish Ecology Research Group, comprising scientists of different disciplines and oceanographic centers, were made available to the participants, so as to stimulate the establishment of cooperative actions of multidisciplinary research among them. CopeMed created an online workspace based on Sharepoint where the presentations of the course are uploaded, as well as documents and scientific research papers.

After these introductory talks, each participant received a zooplankton sample to sort fish eggs and larvae. Afterwards, a set of larval specimens in different ontogenetic stages were given to the participants for taxonomic identification. Dr. Rodriguez kept track of the larval identifications in a spreadsheet. Participants felt at ease because there was a fluid and permanent consultation with the experts. The samples for identification rotated between the participants. This method seemed very appropriate because the larval collection comprised the most representative and most common Families and species present in the Western Mediterranean. This procedure of identification was followed onwards along the duration of the course.

A presentation of different ichthyoplankton topics were carried out on a daily basis as described in the program (Appendix I). This recess was essential not only for the purpose of disseminating research applications but to give some respite from binoculars examination of larvae. Two presentations addressed the description of larval fish assemblages of the coasts of Alborán (P. Marina) and the other was on the Gulf of Tunisia off the Tunisian waters (Dr. R. Zarrad). The first study was done on request of the Fisheries Services of the Government of Andalucía for using ichthyoplankton derived data to establish a fishing reserve in the future. These studies provided a vision of the use of ichthyoplankton data for the assessment and management of coastal fisheries. After the presentations, some time was allocated for questions and discussion. Upon finishing discussion, the course resumed with larval identification throughout the day.

The next presentation given on the following day was on “Fish larval growth and its applications to fish ecology and fisheries assessment”. A. García presented a series of case studies based on observations of several species undertaken by the Larval Ecology of the IEO. These studies showed the importance of analyzing larval growth to understand the link between mortality and recruitment. As in the previous day, the course resumed its main activity, which continued with larval identification exercises.

The last presentation related with ichthyoplankton research was prepared by Dr. R. Laiz-Carrión, expert on trophic ecology of fish larvae by using stable isotope signatures. The use of stable isotopes in unveiling the early life trophic food web dynamics is novel from the larval standpoint. Some of the case species shown covered the relationship between growth and trophic level at larval stages. Since this topic covered a wide suite of species and environmental

scenarios, it was presented by A. García on two subsequent days. Ensuing the presentations, the course continued with the larval identification exercises.

The course finalized with discussion on the future perspectives for the participants from Tunisia, Argelia and Morocco. One of the objectives of the course was to set up a network of ichthyoplankton experts in the Western Mediterranean. The Project was requested to facilitate interactions among the different research groups, and in particular maintain a permanent contact with the Larval Ecology Research Group of the IEO. To this end, CopeMed II agreed to set up a share-point where supporting documents of the course could be stored and a discussion forum can be set up.

Plans for future actions of the network are to provide continuity in ichthyoplankton research among participants in the short-medium term. These actions discussed among participants and lecturers may be as follows:

- Short research stays (7-10days) of scientists from South Mediterranean countries at the IEO center based in Gijón to participate in the monthly multidisciplinary oceanographic cruises which include physico-chemical parameters as well as planktonic hauls for different fractions (from micro to macrozooplankton). This would enable participants to acquire knowledge on different disciplines of an oceanographic cruise.
- Extended stays (month) at the IEO centers of Gijón, Majorca and Málaga to continue the laboratory training on identification, age determination and trophic interactions for the main commercial species.
- The possible participation of some IEO experts on future surveys carried out on joint cooperation activities.

Appendix I

Training Course on Ichthyoplankton

Fuengirola (Málaga), Spain
22-26 February 2016
Spanish Institute of Oceanography (IEO)

Lecturers: Dr Jose María Rodriguez**,** Dr. Rafik Zarrad, D. Pablo Marina and Dr A. García

Program of the course

Monday 22 February
10:00-17:30

- Lectures:
  1. Introduction to ichthyoplankton research and its application in ecology and fisheries studies;
  2. Sampling strategies, methods and gears;
  3. Laboratory equipment, sample preparation, ichthyoplankton sorting, preserving and storing fish eggs and larvae;
  4. Introduction to ichthyoplankton identification
  5. Bibliographic references and webs useful for the identification of fish larvae
  6. Eggs and larval fish measurements: equipment, methods and introduction to the use of the free software IMAGEJ 1.45s (available at http://imagej.nih.gov/ij/)
- Practical examples of larval fish identification

Tuesday 23 February
9:00-17:30

- Lectures:
  7. Ichthyoplankton studies off the Gulf of Tunis
  8. Ichthyoplankton from the Alboran Sea
- Practical examples of larval fish identification
- Identification exercices by participants

Wednesday 24 February
9:00-17:30

- Lecture:
  1. Fish larval growth and its applications to fish ecology and fisheries assessment
- Review of larval identifications from previous day and resolution of raised doubts.
- Identification exercices by participants

<u>Thursday 25 February</u>
9:00-17:30

- Lectures:
  10. Trophic ecology of fish larvae;
  11. Introduction to data analysis in fish larval ecology studies. Description of the main statistical tools and relevant software.
- Review of larval identifications from previous day and resolution of raised doubts.
- Identification exercices by participants

<u>Friday 26 February</u>
9:00-17:30

- Review of larval identifications from previous day and resolution of raised doubts.
- Identification exercices by participants
- Wrap up and revision of identified species during the course
- Description of current works in process in the different countries by the participants and discussion on proposals on follow up activities by the CopeMed II Project

Working hours will be from 9:00 to 17:30. Lunch break will be from 13:00 to 14:30.

Appendix II

List of participants

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Appendix III. Pictures

COPEMED Ichthyoplankton course participants and lecturers

COPEMED Ichthyoplankton course premises and equipment

On the job training of COPEMED Ichthyoplankton course participants

Scientific presentation during COPEMED Ichthyoplankton course

On the job training of COPEMED Ichthyoplankton course participants

Dr. R. Zarrad and Dr. F. Alemany aiding larval identification to Spanish scientists

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