GENERAL FISHERIES COMMISSION FOR THE MEDITERRANEAN

COMMISSION GÉNÉRALE DES PÊCHES POUR LA MÉDITERRANÉE

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SCIENTIFIC ADVISORY COMMITTEE
Sub-Committee on Stock Assessment (SCSA)

Training courses on methodologies for stock assessment

Cairo, Egypt, 22 (Sunday) to 26 (Thursday) June 2008.

1- First session: Lecture and computer-based work on Stock Production Models

Lecturer: Alvaro J. Abella

During the course, attendants will receive a basic theoretical information regarding Production Models. Moreover, computer-based laboratory work will be organized for allowing the utilization of alternative approaches. Specific software suitable for the analysis of data proceeding from different sources will be available. It is expected that results obtained for these case studies will be presented and discussed during the next meeting of the Working Group of the GFCM-SAC that will be held in Izmir, Turkey, next September.

Part 1-Theory (Sunday 22 June 2008)

Stock Production Models

- Surplus Production Models. Basic concepts
- Model characteristics
- Logistic population growth

Types of models

- Graham-Schaefer
- Gulland-Fox
- Pella & Tomlinson
- Threshold models
- Single-species and multi-species models

Determination of model parameters and benchmarks

- Carrying Capacity and Maximum Population Size
- Maximum Sustainable Yield
- Maximum Biological production
- F_{MSY} and f_{MSY}

Data requirements

- Sources and obtained benchmarks
- Reliability

- Contrast
- Uncertainty, confidence limits

Models and software

- Brief information on available software and main characteristics
- Equilibrium and non equilibrium models
- Incorporating environmental variability
- Extensions to non-equilibrium models

Part 2- Practical exercises (23 and 24 June –morning-)

Goal: determination of benchmarks and assessment of stock status through the analysis of data derived from catch assessment surveys or trawl surveys.

1) Non-equilibrium production model using commercial data of catch and effort.
2) Non-equilibrium production model using time series of an abundance index and Z from trawl surveys data.
3) Composite models using spatial information regarding abundance index and Z for areas exploited at different rates.

The choice of a model by each participant will depend on their own available data. In any case, a complete analysis utilizing each one of the three approaches will be made by everybody in a plenary session.

2- **Second session: theoretical and practical aspects related to VPA tuning**

Lecturer: Manuela Azevedo

Structure and Program

Exercises will follow the theoretical aspects of the course and will be used to consolidate the main issues. For that I assume participants use Excel and are familiarised with solver. Main difficulties on theoretical aspects found by participants, if any, and spotted during the practical exercises, will be further clarified.

For the program I am assuming that the VPA tuning part will follow the lectures on Production models from Alvaro J. Abella. Therefore, the proposed schedule considers starting in the afternoon of the 3rd day and a half day for participants to explore VPA tuning using their own data. However, since the VPA tuning course is short, I anticipate that we can select 1 or 2 data sets to be used for this purpose. **The data set(s) must include a catch-at-age matrix and, at least, one abundance index by age**. An excel file is provided for guidance on the data type and format. I will prepare an extra exercise on VPA tuning, in case participant's data set is not available.

Day 3
(24 June –afternoon-)
- Age-structured models: introduction & basic equations
- VPA-type methods

- Simulation of an age-structured fish population (Exercise 1)

Day 4
(25 June morning)
- Solving VPA equations: approximate solutions, Newton method & least-squares
- Finding values of population size-at-age given catch-at-age data (Exercise 2)
- Auxiliary information on fish abundance trends: relating abundance/biomass index with stock size

(25 June afternoon)
- Simulation of an abundance index (Exercise 3)
- Integrated Analysis: required data, number of parameters to estimate, assumptions and simplifications
- Criterion of model fit
- Estimating population size-at-age (Exercise 4)

Day 5
(26 June morning)
- Estimating population size-at-age (Exercise 4, continued)
- Concluding remarks with emphasis on data quality, characterization of uncertainty & software available

(26 June afternoon)
- VPA tuning applied to participant's data sets