
Universidade do Algarve
Faculdade de Ciências do Mar e do Ambiente
Mestrado em Biologia Marinha (2º ciclo)
Fisheries Biology Class
1st Year - 1 st Semester 2007/2008

Preface Note:

The present task should be carried out as a project team, each containing 3 elements. Students are expected to work collaboratively on the development of this work and deliver the results, imperatively **until 17:00 February 10, 2008**. The team composition (name, number and E-mail) should be sent to me by e-mail as soon as possible. Each team should deliver a small report (hard copy) and the spreadsheet used (Excel file) with all computations made by the team. The report should be placed in my mail box (**Nº 20**). The spreadsheet (with the computation) and the word (with the report) files produced by each team must be sent to me by e-mail (madias@ualg.pt), until **17:00 February 10, 2008**.

The spreadsheet has to be well organized with all computations properly defined. Please do not forget to identify your work; the names of the members of each project team should be clearly printed in the cover of the report as well as in the first worksheet of your Excel spreadsheet. Each team must present its own spreadsheet with data processing and results. It is totally inadmissible to share the spreadsheet between project teams, even if you have modified it.

Throughout the different proposed tasks you should describe the appropriate methodology (detailed description of the methodology used and followed procedures) followed by the final results. The computations and intermediate results are to be presented in the spreadsheet.

The data to be used in the different tasks will be given to you in a digital format (Excel file named BP0708_TrabalhoGrupo_Dados.xls), along with the description of each task. Task no 6 includes some questions on the methodology used in an age and growth study, attached to this document.

Task 1

Consider the data on total length, CT (mm) and maximum body height, AMC (mm) (Fig. 1), along with total weight (g), obtained for the sand sole *Pegusa lascaris* (=*Solea lascaris*), commonly known in Algarve as "Macaca" (Afonso-Dias *et al.*, 2002), captured off Algarve between June 1998 and June 1999. CT was measured in a measuring board and AMC was measured with a digital calliper. The data available for this task are for combined sexes (**Annexes A e B**).

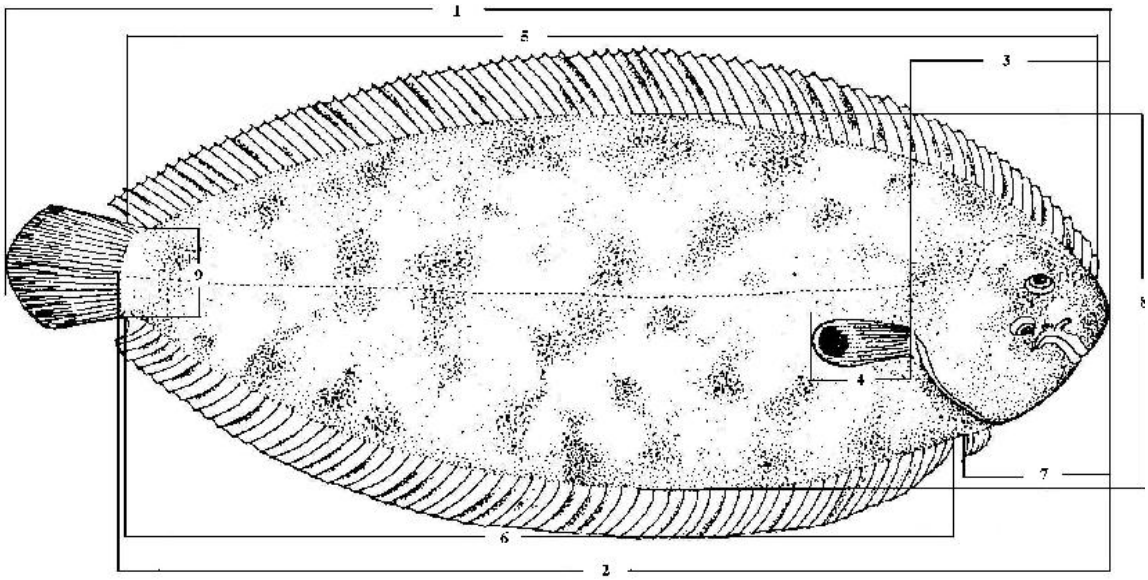

Figure 1. Illustration of a *Pegusa lascaris* showing the different morphometric measures taken: 1- total length; 2- standard length; 3-head length; 4- pectoral fin length; 5- dorsal fin length; 6- anal fin length; 7- pre-anal fin length; 8- maximum body height and 9- minimum body height (Modified from Fisher *et al.* (1987) in Afonso-Dias *et al.* (2002)).

1.1.

a) Estimate a morphometric relationship for the sand sole (sexes combined) in order to be able to predict AMC from CT, using the available data in **Annex A** relationship with a 95% confidence level;
b) Estimate the mean AMC of a sand sole with 20 cm of CT;
c) Show that it is possible to have only one conversion factor to convert total length in maximum body height (AMC=X.CT). Compute the conversion factor (*i.e.*, the value X) and use it to calculate the AMC of a sand sole with 25 cm of CT.

1.2.

a) Estimate the Total Weight (g)–Total length (cm) relationship for sand sole using the data available in **Annex B** and plot it;
b) Compute the mean total weight of a sand sole with 20 cm of total length;
c) Verify statistically if there is isometry in the weight/length relationship for sand sole.

Task 2

Consider the results of three independent age readings of a sample of 103 otoliths of the small pelagic *Trachurus picturatus* captured off Madeira Island (Figure 2), carried out by the same reader in three different moments (**Annex C**).

2.1. Carry out the necessary analyses to verify the consistency (precision) of the age readings made by this reader;

2.2. Verify if the precision of this reader varies with the age of the fishes. Justify your answer.

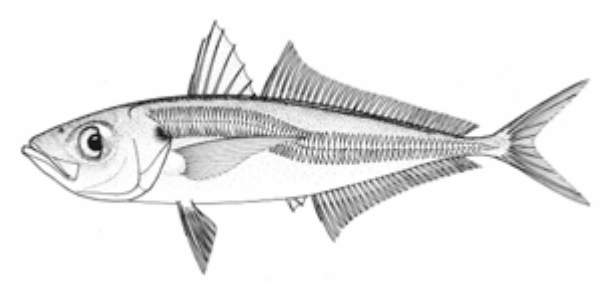

Figure 2. Illustration of a *Trachurus picturatus* specimen (in FAO Species Fact Sheets - http://www.fao.org/fishery/species/2306)

Task 3

Annex D contains a table with an age and length key calculated for the Swannee River (Florida, USA) sturgeon, *Acipenser oxyrinchus desotoi*, both sexes combined. For this exercise a simple randomly selected sample of 91 individuals was used.

3.1. Estimate the von Bertalanffy growth parameters in length for this species;

3.2. Plot the estimated growth curve;

3.3. Estimate the mean length of the sturgeon at age 10.

Task 4

Consider the gonad weights and the total weights taken from females of the small pelagic *Selar crumenophthalmus* (Olho-largo) caught off Cabo Verde Islands (Figure

3), obtained by the "Instituto Nacional de Desenvolvimento das Pescas" during the biological sampling of the commercial catches between 2000 and 2003 (**Annex E**).

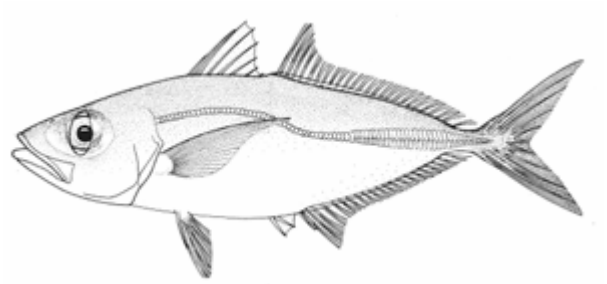

Figure 3. Illustration of a specimen of *Selar crumenophthalmus*
(in FAO Species Fact Sheets - http://www.fao.org/fishery/species/2326)

4.1. Calculate the mean monthly gonadosomatic indexes (IGS) and plot it;

4.2. Please say when this species gonad maturation starts and its duration;

4.3. Indicate the spawning period for this species off Cabo Verde Islands. Justify your answer.

Task 5

Annex F contains the number of mature females and the total number of individuals by age of great northern tilefish (*Lopholatilus chamaeleonticeps*) off Georgia, USA (Figure 4). The sample was taken during the spawning period of this species.

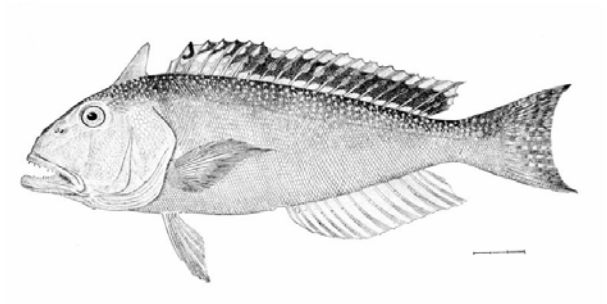

Figure 4. Illustration of a specimen of *Lopholatilus chamaeleonticeps* (maximum lengths: males = 125 cm; females = 95 cm). *In* Goode & Bean, 1896. Oceanic Ichthyology (plate 75).

5.1. Calculate the percentage of mature individuals by age group and use a dispersion graph to visually display the data;

5.2. Adjust a logistic curve to the observed data (sexual maturity ogive by age);

5.3. Calculate the age at first maturity (Tm_{50}) from the maturity ogive estimated previously.

Project 6

Read the scientific paper attached to this document on age and growth of the blue rockfish *Sebastes mystinus* from the coast of California (USA) and answer the following questions:

1. What methods were used to:

1.1. Age the fishes;

1.2. Validate the age readings;

1.3. Verify the age readings (precision);

1.4. Estimate growth parameters;

1.5. Compare growth curves.

Good Work!

Manuel Afonso-Dias

01 February 2008