

Age determination and preliminary growth parameters of round sardinella (*Sardinella aurita* Valenciennes, 1847) off Northwest Africa

Détermination de l'âge et paramètres de croissance de la sardinelle Ronde (*Sardinella aurita* Valenciennes, 1847) au large de l'Afrique du nord-ouest
(English only/En anglais seulement)

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ABSTRACT

The age interpretation of round sardinella (*Sardinella aurita* Valenciennes, 1847) is very difficult due to the high opacity of the growth rings of the otoliths and the presence of false rings on the scales. In the current study these difficulties are showed using samples from Mauritania (Northwest Africa). The age resulting from both otoliths and scales were analysed in order to determine the percentage of coincidence between them. We also consider the reliability in the age determination. In spite of these difficulties and following the FAO recommendations (FAO, 2002), a preliminary estimation of the growth parameters is presented as a contribution to the knowledge of the growth studies of this species in this area.

RÉSUMÉ

La détermination de l'âge de la sardinelle ronde (*Sardinella aurita* Valenciennes, 1847) est très difficile à cause de la très haute opacité des anneaux de croissance déposés sur l'otolithe et la présence des faux anneaux sur les écailles. Dans l'étude présente, ces difficultés sont mises en évidence par des échantillons de la Mauritanie (Afrique du nord-ouest). Les âges obtenus à partir des otolithes et des écailles ont été analysés pour déterminer le pourcentage de coïncidence entre eux. On a également pris en considération la fiabilité de la détermination de l'âge. Malgré ces difficultés et en suivant les recommandations de la FAO (FAO, 2002) une estimation préliminaire des paramètres de croissance est présentée comme contribution aux connaissances des études de la croissance de cette espèce dans cette zone.

1. INTRODUCTION

In order to assess the resources of round sardinella (*Sardinella aurita*) from Northwest Africa waters through analytical methods, FAO has strongly recommended that the age of this species is determined. To achieve that, three otolith exchanges (2002, 2003 and 2006) and two workshops (2003) have been carried out.

The age determination of round sardinella is very difficult due to the high opacity of the growth rings of the otoliths, their structure not being calcified in some cases, and also to the presence of false rings in the scales. The ages resulting from both otoliths and scales were analysed in order to determine the percentage of coincidence between them. The analysis also considers the reliability in the age determination.

In spite of the above mentioned difficulties and as a contribution to the knowledge of the growth studies of this species in this area, we present an estimation of the growth parameters fitting the length-age pair values to the von Bertalanffy growth function.

2. MATERIAL AND METHODS

The samples were obtained from the landings in Gran Canaria (Canary Islands) of the EU pelagic trawlers that had been fishing in Mauritanian waters during 2005. A total of 1 873 otoliths and 1 162 scales from January to November (except for March) were analysed. Specimens ranged between 13.0 cm and 39.5 cm (total length).

After extraction otoliths (*sagitta*) were washed, dried, mounted and preserved on black plastic plaques in a synthetic resin (©Eukitt) labelled with the date and number of specimens. Four or five scales were removed from the left shoulder of the fish between the head and the dorsal fin, rinsed with water and mounted between 2 glass microscope slides.

Observations of otoliths under reflected light were made using a binocular with 20x magnification. Scales were observed with a profile projector. The fish length was unknown in order to avoid influencing the age attribution. The age interpretation criteria applied were those previously established and presented in FAO (2007). In addition, a reliability of between 1 and 4 was assigned, depending on the confidence placed in the reading: 1 (completely unreliable), 2 (unreliable), 3 (reliable), 4 (very reliable). When the reliability was 1, the age assigned was rejected.

3. RESULTS AND DISCUSSION

Fifty-one percent of otoliths and 41 percent of scales were rejected. The percentage of agreement between both otoliths and scales was 87.2 percent (CV=7.1%). The agreement Age-Otolith in relation to the final age was 98.9 percent. The agreement Age-Scale in relation to the final age was 75.4 percent.

Otoliths seem to be more reliable structures than scales:

Otoliths (R1 = 45%, R2 = 39%, R3 = 12%, R4 = 4%)
Scales (R1 = 75%, R2 = 22%, R3 = 3%, R4 = 0%)

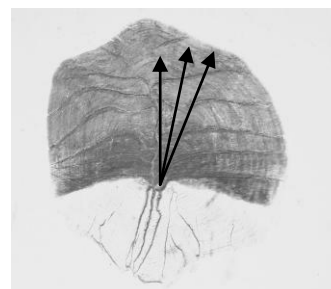
However, in some months (April–June) scales are very useful due to the better observation of the new growth zone on the edge.



Catch: June
 TL: 21.4 cm
 Age: 1



Catch: November
 TL: 32.2 cm
 Age: 3



Catch: May
 TL: 30.3 cm
 Age: 3

The growth parameters of *S. aurita* estimated in the present work were:

| Sex | K | L_{∞} | T_0 |
|-----------------|-------|--------------|--------|
| Males | 0.405 | 362.5 | -1.458 |
| Females | 0.325 | 393.7 | -1.578 |
| All individuals | 0.316 | 389.7 | -1.780 |

The annual growth parameters estimated in this study show values of K generally similar to other authors for *S. aurita* of Northwest Africa, and values for L_{∞} , very near to the real ones, and hence seem to show a coherent pattern of interpretation. However, the number of specimens smaller than 20 cm (TL) in this study was very low. It would be necessary to confirm these results by increasing the number of juveniles (age class 0 and 1) in later studies.

4. RECOMMENDATION

In the case of *S. aurita* it is very useful to read the scales and compare the results with those obtained from reading otoliths. The advantage being the use of the otoliths for help and comparison in age reading, but the disadvantage being the arduousness of this work and of course, how much time-consuming the biological sampling is. For this species it is recommended to extract and prepare at least 20–40 otoliths for each centimetre to allow for the rejection of those that do not show the growth zones clearly.

5. REFERENCES

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