

Small Exchange of *Scomber colias* Otoliths Programme From Atlantic and Mediterranean areas.

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1 – INTRODUCTION

Following a recommendation of the Planning Group on Commercial Catches, Discards and Biological Sampling (PGCCDBS) in 2011, an exchange of chub mackerel otoliths was carried out in 2012-2013 to assess difficulties in age reading, provide a first evaluation of the agreement, precision and accuracy of age determination. Five age readers from Portugal and Spain participated in the exchange. A total of 244 otoliths were examined, collected in 2011 off the ICES areas VIIIc, IXa and in Western Mediterranean (Martins et al., 2014).

The Planning Group on Commercial Catch, Discards and Biological Sampling (PGCCDBS) meeting in February 2014, recommended a Workshop to discuss the results of this exchange and the development of validation studies in this species. This Workshop on Age Reading of Chub Mackerel (*Scomber colias*) [WKARCM], chaired by Andreia Silva, Portugal, and Maria Rosario Navarro, Spain, will be held in Lisbon, Portugal, the 2-6 of November, 2015.

However, due to the time passed since the exchange took place and a renovation of the readers of this species (retirements and new incorporations), it was thought necessary to carry out a new otolith exchange before the start of the Workshop. As the time available to carry out the new exchange is so short, it was decided to use a selection of 150 otolith images from the previous exchange. This Small Exchange of *Scomber colias* otolith images will be held via WebGr between March and June 2015.

2-OBJECTIVES

The exchange will have the following objectives:

- 1- Evaluate the current precision in otolith age reading of chub mackerel among readers of fishery and surveys samples throughout the year.
- 2- Identify major difficulties in chub mackerel otolith interpretation for age determinations concerning observed disagreements (e.g. identification of true rings or checks).
- 3- Report results to the Workshop on Age Reading of Chub Mackerel (*Scomber colias*) [WKARCM] that will take place in November 2015.

3- MATERIAL AND METHODS

3.1 SETS OF OTOLITHS: The adopted sets of otoliths are shown in Table 1. They are a selection of 150 images from the three sets of the previous exchange (50 images selected from each set).

3.2 PARTICIPANTS AND QUALIFICATION OF READERS:

A list with the participants is shown in Table 2, with a summary of their experience in the age determination of *Scomber colias*, as well as other species, and with the information about their area of expertise.

Readers were ranked as High, Medium and Low level considering the number of otoliths (first) and the number of years of experience (second) with this species. It was considered that an expert reader (High level) should be those with an experience aging at least 10000 otoliths, Readers with a Medium level should be those with an experience ageing between 2000-10000 otoliths, being readers with a Low level those with an experience ageing less than 2000 otoliths. As no reader had an experience with 10000 or more otoliths, it was considered the participants to be ranked as Medium and Low levels. A summary with the readers experience scale is shown in Table 3.

Table 1. Set of otoliths used in the Small Exchange of *Scomber colias* Otoliths.

Institute providing data	Areas	Nº images by set and month				Length rate
		Fist half of the year		Second half of the year		
		Nº images	Months	Nº images	Months	
IEO - Murcia (Spain)	GSA06, Western Mediterranean	24	January, March, April	26	July, November, December	18-39 cm
IEO - Santander (Spain)	VIIIcE, Bay of Biscay	25	January, March, April, June	25	August - November	27-39 cm
IPMA (Portugal)	IXa, Portugal waters	23	January-May	27	July, October	17-39 cm
Total images		72		78		
		150				

Table 2. Participants of the Small Exchange of *Scomber colias* Otoliths.

Country	Institute & postal address	Participants in workshop	Email	Readers or Not ?	Age reading expertise level Chub mackerel			Age reading expertise level Other species			Chub mackerel Stock/Area of expertise
					High/Medium/Low	Years	No. Of otoliths	Species	Years	No. Of otoliths	
Spain-IEO (C.O. Santander)	Instituto Español de Oceanografía (IEO) Promontorio de San Martín, s/n 39004 Santander (Cantabria) Spain	Rosario (Charo) Navarro	charo.navarro@st.ieo.es	Yes - WKARCM Co-chair	Medium	2011-2014	5000	Atlantic mackerel Anchovy	2007-2014 2008-2012	> 20000 > 10000	Bay of Biscay (ICES Subarea VIII) + ICES IXaN
		Begoña Villamor	begona.villamor@st.ieo.es	No - Coordinator	-	-	-				
		Clara Dueñas	clara.duenas@st.ieo.es	Yes	Low	-	0	Horse mackerel Anchovy Atlantic mackerel	2007-2014 2007-2014 2007-2011	> 20000 > 15000 > 10000	
		Ana Antolínez	ana.antolinez@st.ieo.es	Yes	Low	-	0	Anchovy Horse mackerel Atlantic mackerel	1 year 1 year 1 year	300 600 700	
Portugal-IPMA	Instituto Português do Mar e Atmosfera (IPMA) Avenida de Brasília, 1449-006 Lisbon, Portugal	Andreia V. Silva	avsilva@ipma.pt	Yes - WKARCM Co-chair	Low	2013-2014	900	Atlantic sardine Anchovy	2010-2014 2013-2014	> 10000 500	ICES IXa
		Alexandra Silva	asilva@ipma.pt	No - Coordinator	-	-	-				
		Eduardo Soares	esoares@ipma.pt	Yes – Coordinator	Low	-	0	Atlantic sardine Anchovy	1990-2014 2011-2014		
		Sandra Dóres	sdores@ipma.pt	yes	Low	-	0	Merluccius merluccius	2004-2014	> 20000	
		Dina Silva	dsilva@ipma.pt	yes	Low	-	0	Trisopterus luscus	2014	> 1000	
		Delfina Morais	dmorais@ipma.pt	yes	Low	2013-2014	1000	Atlantic sardine	2000-2014	>20000	
Spain-IEO (C.O. Tenerife)	Instituto Español de Oceanografía (IEO) Dársena Pesquera, Pcl. 8 38180 S/C Tenerife (Canary Islands) Spain	Alba Jurado Ruzafa	alba.jurado@ca.ieo.es	Yes	Medium	2005-2011	2000	Trachurus picturatus Sardina pilchardus	2005-2006 2010-2011	>3000 >2000	CECAF-Canary Islands CECAF-Mauritania
Spain-IEO (C.O. Murcia)	Instituto Español de Oceanografía (IEO) Calle Varadero, N°1 30740 San Pedro del Pinatar (Murcia) Spain	Miguel Vivas	miguel.vivas@mu.ieo.es	Yes	Medium	2011-2014	2000	mackerel blue whiting sardine	2010-2014	6000	Mediterranean
		Encarnación García	encarnacion.garcia@mu.ieo.es	Yes	Medium	2011-2015	2000	mackerel blue whiting	2010-2015	3000	
Greece-FRI	Fisheries Research Institute (FRI) 64007 Nea Peramos Kavala, Greece	Athanasios Spetsiotis	aspetsiotis@inale.gr	Yes	Low	2013-2015	800	Scomber scombrus	2013-2014	200	Aegean Sea, eastern Mediterranean Sea, GFCM sub-area 22
Italy-COISPA	COISPA Tecnologia & Ricerca - Stazione Sperimentale per lo Studio delle Risorse del Mare, Via dei Trulli 18/20. 70126 Bari - Torre a Mare Italy	Carbonara Pierluigi	carbonara@coispa.it	Yes	Low	2010-2014	1000	Hake, red mullet, stripped red mullet, anchovy, sardine, horse mackerel, Atlantic mackerel, Mediterranean horse Mackerel, anglerfish	2006-2014	>30000	FAO-GSA: 10, 18, 19
Italy-CIBM	CIBM, Centro Interuniversitario di Biologia Marina ed Ecologia Applicata, Violen N. Sauro, 4 57128 Livorno, Italy	Andrea Massaro	andreamassaro@live.it	Yes	Low	2013-2014	100	Hake, red mullet, stripped red mullet, horse mackerel, Atlantic mackerel, Mediterranean horse Mackerel, common sole	2011	8000	FAO-GSA: 9

Table 3. Summary of readers and their experience in *Scomber colias* otoliths age reading.

READER	EMAIL	EXPERIENCE, YEARS	EXPERIENCE, Nº OTOLITHS	EXPERTISE LEVEL
Rosario (Charo) Navarro	charo.navarro@st.ieo.es	2011-2014	5000	Medium
Alba Jurado	alba.jurado@ca.ieo.es	2005-2011	2000	Medium
Encarnación García	encarnacion.garcia@mu.ieo.es	2011-2014	2000	Medium
Miguel Vivas	miguel.vivas@mu.ieo.es	2011-2014	2000	Medium
Pierluigi Carbonara	carbonara@coispa.it	2010-2014	1000	Low
Delfina Morais	dmorais@ipma.pt	2013-2014	1000	Low
Andreia Silva	avsilva@ipma.pt	2013-2014	900	Low
Athanasios Spetsiotis	aspetsiotis@inale.gr	2013-2014	800	Low
Andrea Massaro	andreamassaro@live.it	2013-2014	100	Low
Eduardo Soares	esoares@ipma.pt		0	Low
Sandra Dores	sdores@ipma.pt		0	Low
Dina Silva	dsilva@ipma.pt		0	Low
Maria João Ferreira	mjferreira@impa.pt		0	Low
Clara Dueñas	clara.duenas@st.ieo.es		0	Low
Ana Antolínez	ana.antolinez@st.ieo.es		0	Low

3.4 AGE DETERMINATION PROCEDURES

WebGR will be used for the determination of the age and growth rings. See WebGR Workshop User's Manual for details about the use of WebGR. Readers should indicate the annual age determination and position of the winter rings supporting his/her interpretation of the age. Checks or false rings should not be marked, though if present they could be mentioned in the remark field of the reading.

Minimum knowledge for age determination:

Age reading should be made preferably without consulting the length of the fish, based on the otolith examination according to the date of capture and general knowledge of the seasonal otolith growth pattern during the year and being aware of the conventional birth date.

- For the three sets of otoliths of this exchange, the conventional birth date is 1st January.
- The spawning period of this species occurs in spring, between March and June in Iberian waters (Martins, 1996; Navarro et al., 2014)
- True annual rings will be those formed in winter each year. Checks or false rings may be present throughout the year and cause problems in age determination.

4. DATA ANALYSIS

A standard statistical analysis will be used to investigate the age interpretation among readers using the GussEltink spreadsheet (Eltink, 2000). Precision will be estimated by the coefficient of variation (CV) of annuli counting between the different readers. Relative bias and percentage agreement between readers, and modal age, as well as an overall estimate for percentage agreement will be performed.

5. AGENDA FOR THE EXCHANGE OF OTOLITHS

The exchange will start in March of 2015 and will end by 16th June.

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