

# Exchange of *Scomber colias* Otoliths 2017

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# Background

- ✓ *Scomber colias* is not yet assessed. However, the increase of the captures of this species in Portugal and the Atlantic coast of Spain could lead to its assessment in the near future. Hence the importance of the realization of calibration exercises between otolith readers.
- ✓ **Exchange of *Scomber colias* otoliths (2017):** Recommended by WKARCM 2015 and WGBIOP 2016
- ✓ **Objective:** Assess whether the new criteria developed during the last workshop WKARCM 2015 have been adopted by all readers.

# Exchange Procedure

- ✓ Small exchange with otolith images, via WebGR. Carried out between May-October 2017. Report is ongoing.
- ✓ **16 readers, 15 from 4 European countries** (Portugal, Spain, Italy and Greece) and **1 reader from USA**. The reader from USA (University of Southern Mississippi) was invited to participate due her interest in comparing the information of chub mackerel in the two areas of the Atlantic.
- ✓ A total of **216 otoliths** from Atlantic (East and West) and Mediterranean areas :

## East Atlantic :

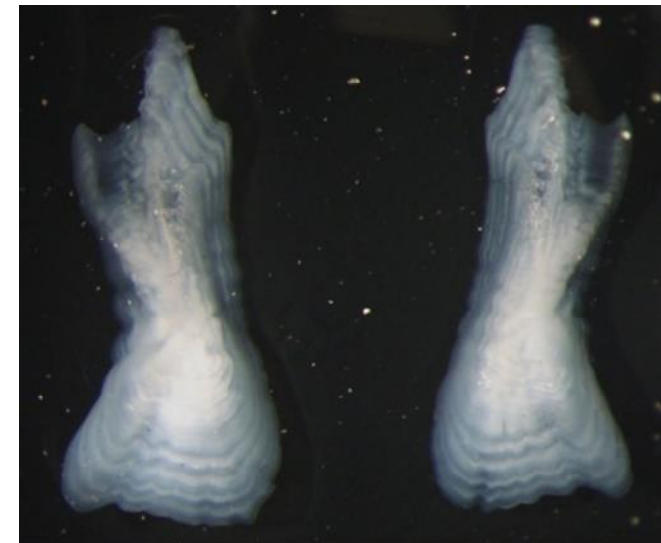
- Bay of Biscay (ICES div. 8.c): 39 otoliths
- Galician waters (ICES div. 9.aN): 10 otoliths
- Portugal waters (ICES div. 9.aN, 9.aC, 9.aS): 26 otoliths
- Canary Islands waters (CECAF): 40 otoliths

## Mediterranean Sea:

- Ligurian Sea (GSA09): 32 otoliths
- Eastern Mediterranean Sea (GSA22): 40 otoliths

## West Atlantic:

- New England and Mid-Atlantic regions (North West Atlantic ): 29 otoliths



# Results:

✓ Analyses were performed for the total of areas (with and without North West Atlantic set) and each area separately, in four groups:

- ✓ **All readers.**
- ✓ **WKARCM readers** (previous workshop participants): R1, R2, R3, R4, R5, R6, R7, R8 and R10.
- ✓ **Training readers:** R9, R11, R12, R13, R14, R15 and R16.
- ✓ **Main European readers**, (readers whose age estimations would be used in case of assessment): R1, R2, R4, R5 and R14.

✓ **Overall agreement** is very low, only **59.4%**, lower even than last WKARCM exchange (60.6%). When analyzing only WKARCM readers' results the agreement does not improve (59.2%). The best results are obtained when analyzing the results of **Main European readers**, with **66.5%** agreement.

✓ **Overall CV** is high, **59.0%**, in comparison with last WKARCM exchange (45.6%). The best results are obtained by **Main European readers'** group, with a CV of **34.0%**.

WKARCM 2015		
% Agreement	CV	bias
60.6%	45.6%	0.01

✓ **By area**, the best agreement is obtained for the **CECAF-Canarias** set for each group analyzed, with **80.3%** agreement for the main European readers' group and around **70-71%** agreement for the rest. The lowest agreement was obtained for the **NWA** and **GSA09** sets, with **51.7%** and **52.4%** agreement, respectively, for all readers' analysis.

## % Agreement

Set	All readers	WKARCM readers	Trainig readers	Main European readers
Total	59.4%	59.2%	64.2%	66.5%
Total - NWA	60.6%	60.3%	65.9%	68.8%
8c	56.5%	57.3%	61.2%	65.5%
9a	56.8%	60.3%	57.1%	62.4%
CECAF	70.3%	71.4%	70.7%	80.3%
GSA09	52.4%	50.9%	62.7%	63.4%
GSA22	64.7%	59.8%	76.1%	70.5%
NWA	51.7%	51.8%	58.1%	52.1%

## CV

Set	All readers	WKARCM readers	Trainig readers	Main European readers
Total	59.0%	62.0%	56.7%	34.0%
Total - NWA	62.0%	64.2%	61.1%	33.9%
8c	67.1%	74.6%	58.7%	24.1%
9a	35.6%	38.0%	32.7%	31.3%
CECAF	68.0%	72.4%	64.2%	24.3%
GSA09	111.3%	100.1%	135.6%	67.8%
GSA22	35.3%	40.9%	26.2%	28.1%
NWA	39.6%	47.9%	28.3%	34.6%

## Bias

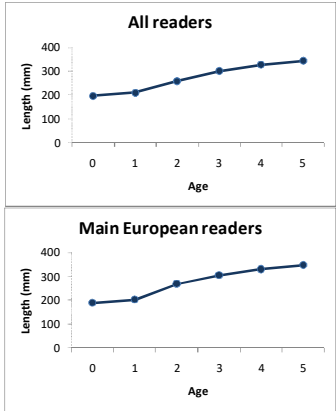
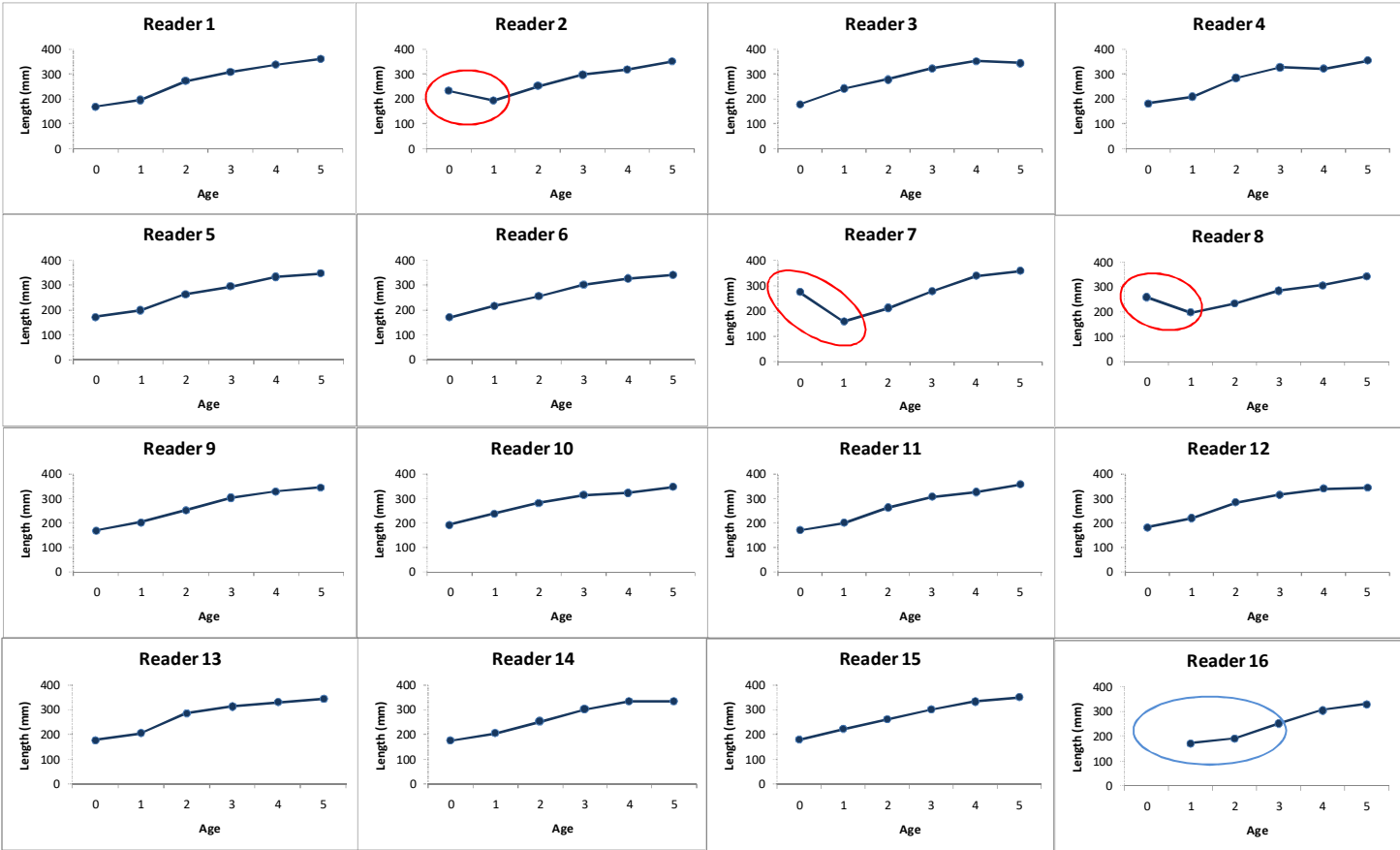
Set	All readers	WKARCM readers	Trainig readers	Main European readers
Total	0.09	0.03	0.13	0.00
Total - NWA	0.09	0.03	0.13	0.01
8c	0.02	-0.01	0.04	0.17
9a	0.13	0.01	0.14	0.11
CECAF	0.07	-0.03	0.17	0.05
GSA09	0.32	0.30	0.30	-0.08
GSA22	-0.04	-0.04	0.04	-0.20
NWA	0.03	0.04	0.04	-0.04

# Results:

✓ The table of mean length by age shows that some readers have problems identifying otoliths with age 0.

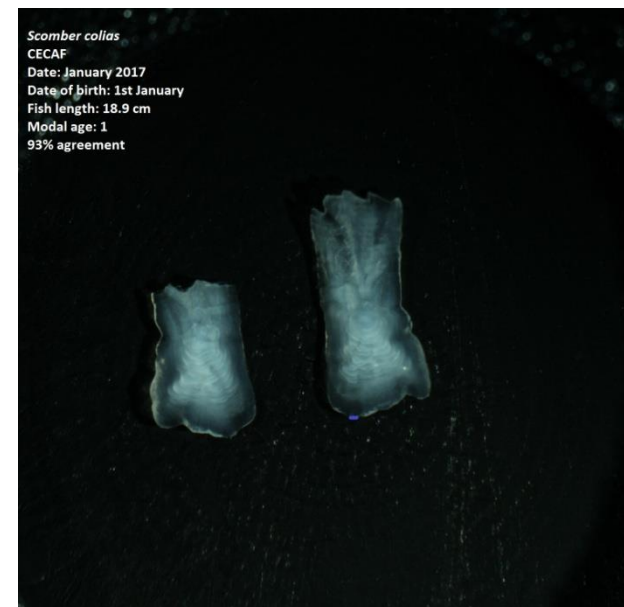
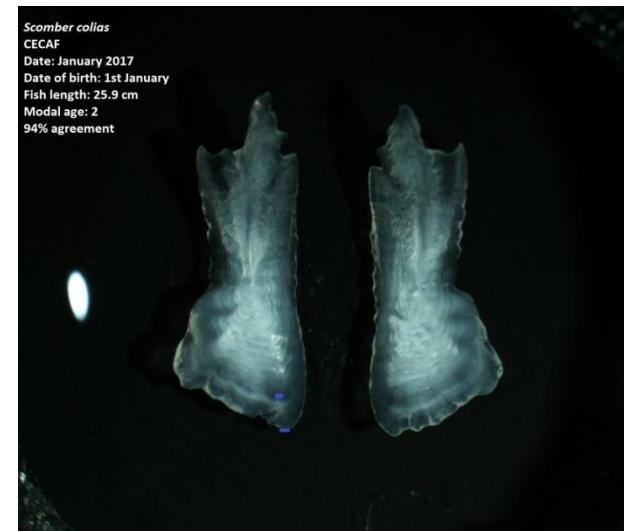
Age	Sp CN	Sp AJ	Pt AS	Pt DM	It AM	Pt ES	Pt GC	Pt DF	Pt MJF	Pt DS	Pt SD	Sp AA	Sp CD	Gr AS	USA TD	Sp EH	All readers	Main Europ. readers
0	171	235	179	185	173	171	275	259	169	191	171	183	178	177	180	173	198	190
1	198	194	243	212	201	216	160	198	202	237	200	221	206	205	223	173	211	203
2	275	254	280	288	264	255	212	235	252	282	263	285	286	253	262	191	259	269
3	311	298	325	330	295	301	279	285	303	315	308	316	314	302	302	252	301	306
4	340	319	354	325	333	327	340	307	328	323	326	341	331	333	333	305	328	330
5	363	352	346	357	347	341	359	343	345	348	357	344	344	333	351	330	344	348

✓ Reader 16 shows overestimation in all ages.



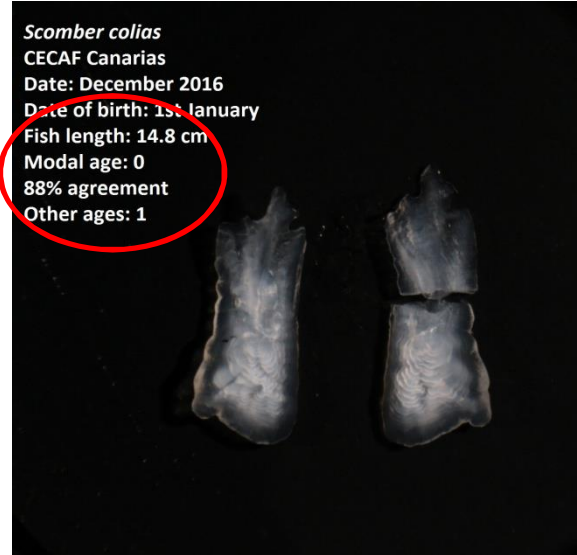
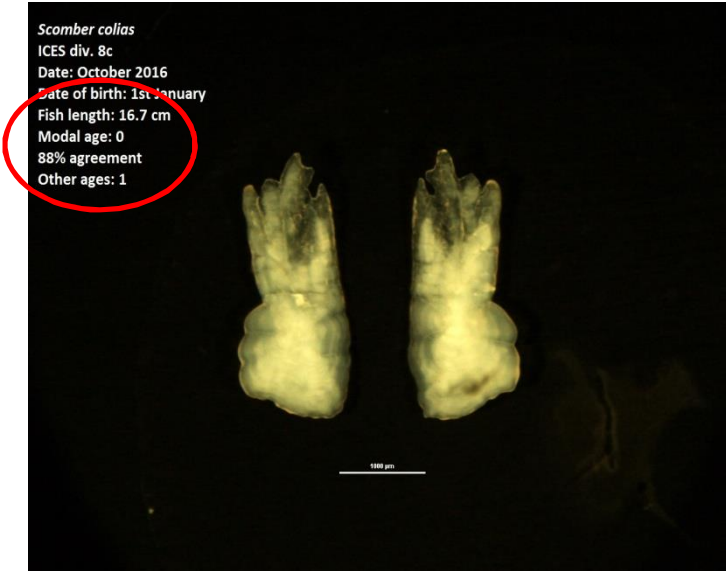
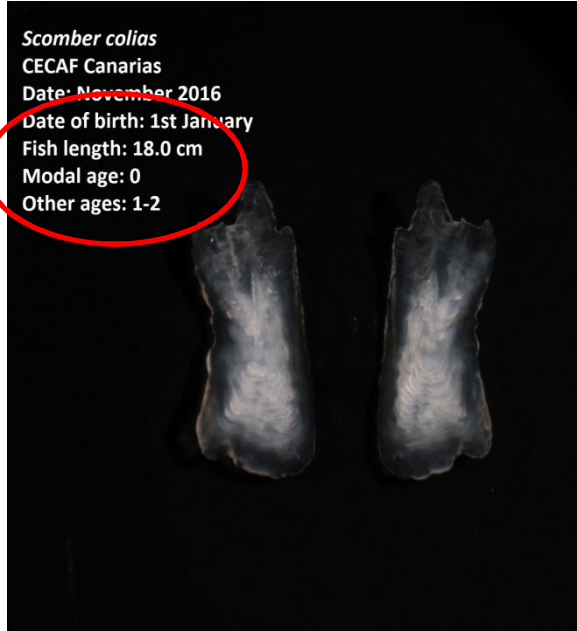
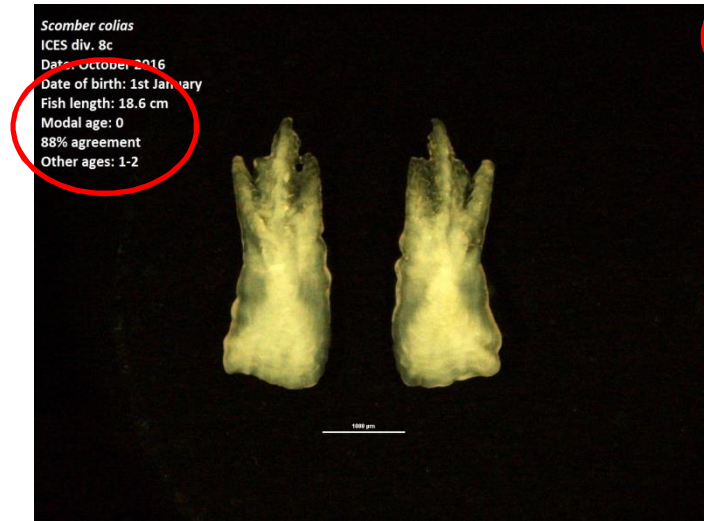
All readers' results:

✓ There was only **one** otolith with **100% agreement** and **two** with an agreement between **91-99%**.



**All readers' results:**

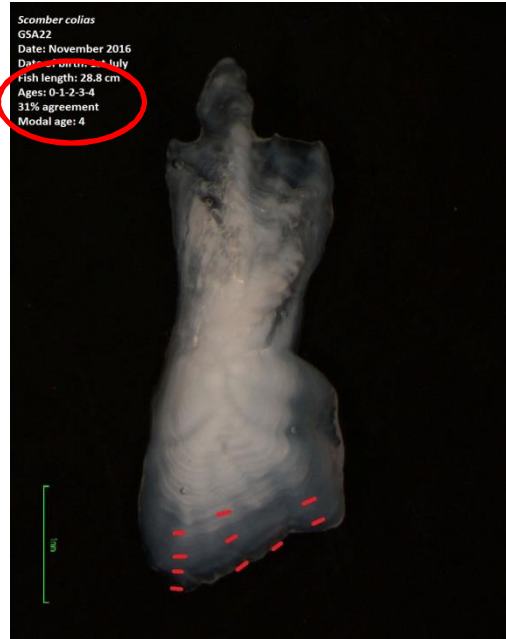
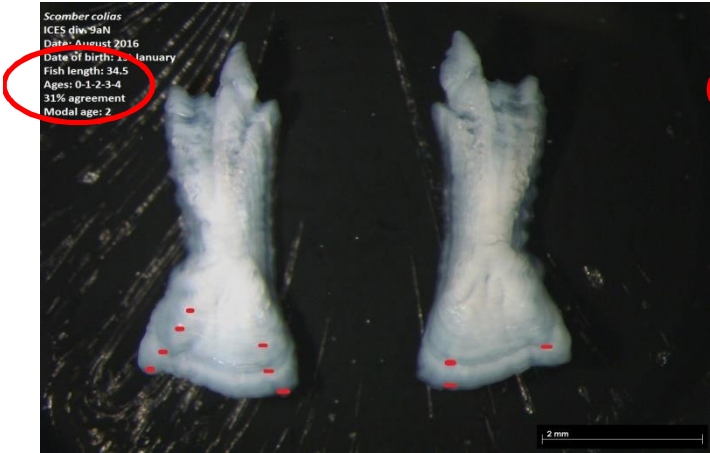
✓ There were 13 otoliths with 88% agreement, mainly with modal age 0. Only two readers estimated a different age.





**All readers' results:**

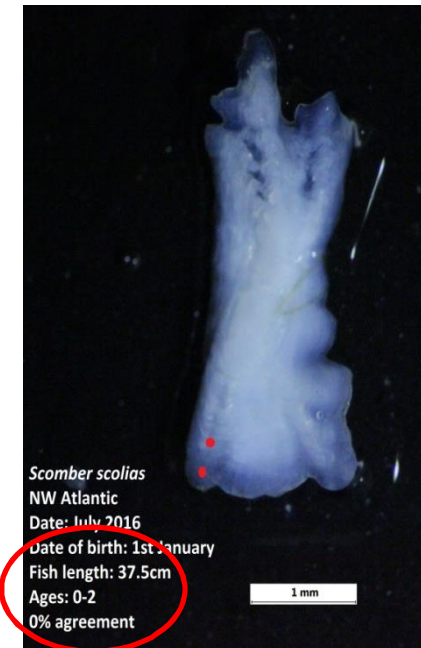
- ✓ There were many otoliths with less than 40% agreement.
- ✓ The **lowest agreement** was **31%** (4 otoliths).
- ✓ Age range in these otoliths goes from 0 to 4.
- ✓ This indicates that many readers have problems identifying the first ring in *Scomber colias* otoliths.
- ✓ Many otoliths with < 40% agreement correspond with GSA09 and GSA22 areas, where date of birth is 1<sup>st</sup> July which may confuse the readers of the other areas.





## Main European readers' results:

- ✓ There were **40 otoliths** with **100%** agreement when considering only this group. They were mostly ages 0 and 1 but there are also otoliths with ages 2, 3 and 4.
- ✓ Also, there were **37 otoliths** with **80%** agreement.
- ✓ There were **3 otoliths** with **< 40%** agreement, all of them with 0% agreement. They correspond with the NWA set, which is the one with the lowest agreement in all analyses.



## CONCLUSIONS:

- ✓ It seems that the age reading criteria developed in the last workshop have not been adopted by all readers.
  
- ✓ The **overall agreement** is very low, **59.4%**, lower than in last workshop exchange, WKARCM 2015 (60.6%). When analyzing only WKARCM readers' results the agreement does not improve (59.2%). Training readers have better agreement, 64.2%. The best results are obtained when analyzing the results of **Main European readers** (readers whose estimations would be used in case of assessment), with **66.5%** agreement.
  
- ✓ **Overall CV** is high, **59.0%**, in comparison with last WKARCM exchange (45.6%). The best results are obtained by **Main European readers'** group, with a CV of **34.0%**.
  
- ✓ **By area**, the best agreement is obtained for the **CECAF-Canarias** set for each group analyzed, with **80.3%** agreement for the main European readers' group and around **70-71%** agreement for the rest. The lowest agreement was obtained for the **NWA** and **GSA09** sets, with **51.7%** and **52.4%** agreement, respectively, for all readers' analysis.
  
- ✓ Main problems seems to be:
  - ✓ Identification of first ring
  - ✓ Identification of age 0 by some readers
  - ✓ Confusion when estimating the age when the date of birth is 1<sup>st</sup> July (sets GSA09 and GSA22) by readers of other areas

## RECOMMENDATIONS FOR FUTURE WORK:

- ✓ Although *Scomber colias* is yet not assessed, Portugal and Spain have sent information about this species to WGWIDE and WGHANSA in the last few years in anticipation of a possible assessment of this species in the near future.
- ✓ This information includes the age estimations of this species, which is a important feature of the fish assessment. Age estimations should be as reliable as possible. For this reason it should be recommended the realization of:
  - ✓ A Workshop on age estimation of chub mackerel in 4-5 years, with a previous otolith exchange.
  - ✓ Meanwhile it would be important to carry out validation studies of each area.