CCAMLR

Commission for the Conservation of Antarctic Marine Living Resources
Commission pour la conservation de la faune et la flore marines de l'Antarctique
Комиссия по сохранению морских живых ресурсов Антарктики
Comisión para la Conservación de los Recursos Vivos Marinos Antárticos

WG-FSA-2019/47

23 September 2019

Original: English

WG-FSA

2019 update of ongoing work on age and growth of Antarctic toothfish (Dissostichus mawsoni) from Divisions 58.4.1 and 58.4.2

Delegations of Australia, Republic of Korea and Spain

EN

2019 update of ongoing work on age and growth of Antarctic toothfish (*Dissostichus mawsoni*) from Divisions 58.4.1and 58.4.2.

Delegations of Australia, Republic of Korea and Spain.

1. INTRODUCTION

Spanish and Australian scientists are working on the age and growth estimates of Antarctic toothfish within divisions 58.4.1 and 58.4.2 from 2015 and 2017 respectively. During 2019, Korean scientists have joined this colaborative work.

Age-length frequencies from the three members are shown and a posteriori calibration between ESP and KOR has been made.

2. METHODS

Methodology, preliminary results and previous calibration exercises have been presented at the four latest WG-FSA meetings (WG-FSA-18/54 Rev. 1, WG-FSA-17/66, WG-FSA-16/58, WG-FSA-15/06)

In 2019, KOR has read 854 TOA otoliths. Each otolith has been read always by the same korean reader for six times, three times using a photograph and three times using the microscope. So, for every otolith we had 6 reading estimates available. With the purpose of carrying out the calibration, one resultant of each of both methods has been calculated, where the most abundant age from the three is always kept or in the case that the three estimations are different, the intermediate age determination has been choosed.

A posteriory calibration between KOR and ESP has been made in 2019 using 40 random otolith photographs from the 854 made by KOR. Spanish readers had neither prior knowledge of the length nor the age estimated by the Korean reader. Calibration has been made using the CCAMLR-NIWA R code AgeCompare library.

3. RESULTS

During 2019, Korean scientists have joined this colaborative work with an analysis of 854 pairs of otoliths collected between 2015 and 2017 seasons from division 58.4.1 (Table 1), while Australians have continued reading otoliths collected in the 2018 season, 210 from division 58.4.2 and 163 from division 58.4.1.

Table 1.- Number of *Dissostichus mawsoni* otoliths aged by season for Australia, Spain and Republic of Korea in divisions 58.4.1 and 58.4.2. Season is abbreviated to the end year.

Season	AUS	ESP	KOR
2013		514	
2014		495	
2015			346
2016	329	341	308
2017	200	260	200
2018	375		

The Age-length plots of all the readings made up to now by member and research block are shown in Figure 1. Before 2016, some of the otoliths read by Spain doesn't correspond with a research block (Out in the figure).

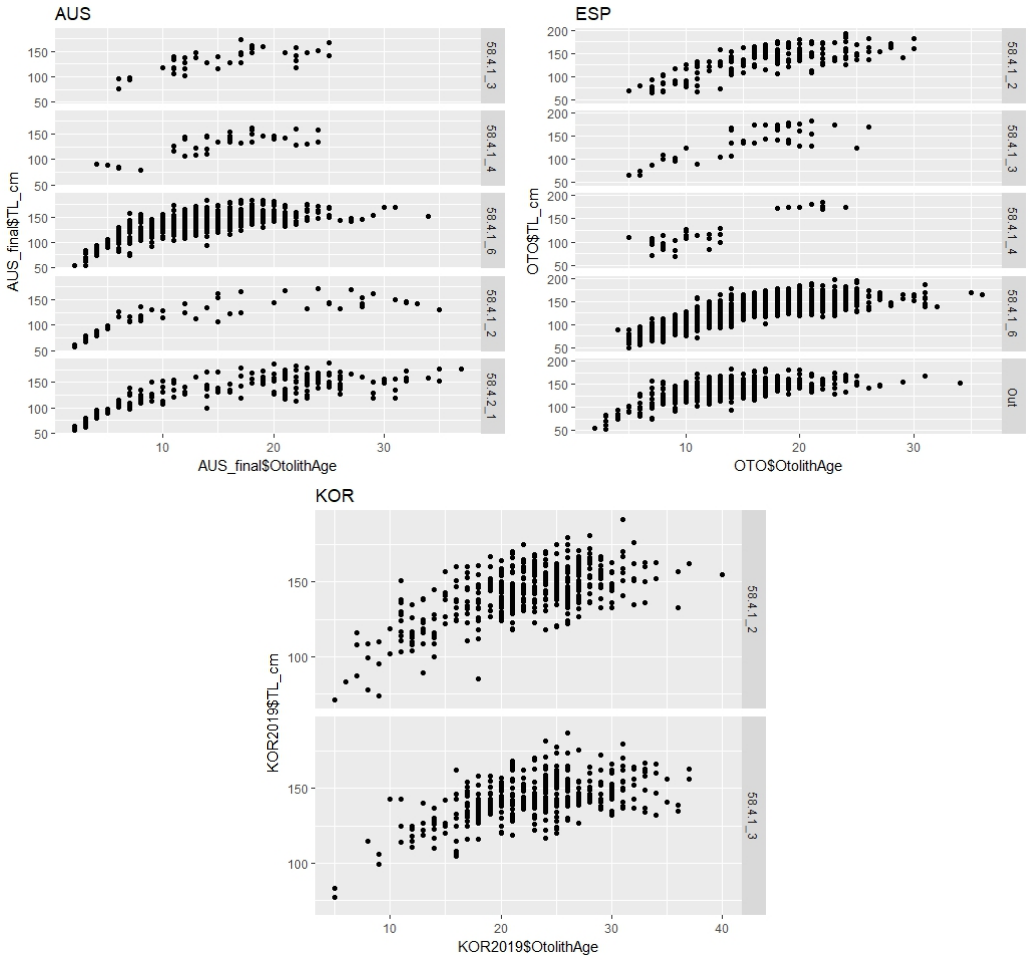

Figure 1.- Age-length plots by member and research block. Top left:Australia;Top right:Spain; Bottom: Republic of Korea

Korean results show differences between the two different type of age determinations from photographs or from samples under the microscope (Figure 2). From each otolith we had 6 reading estimates available, so one resultant of each of both methods has been calculated, where the most abundant age has been kept. If we delete all the readings that doesn't have at least two identical reads, from 854 otoliths we keep 382 (44.7% of the total).

Otolith reading results from photographs have the trend of interpreting less age rings than doing it directly from the samples under the microscope/magnifier.

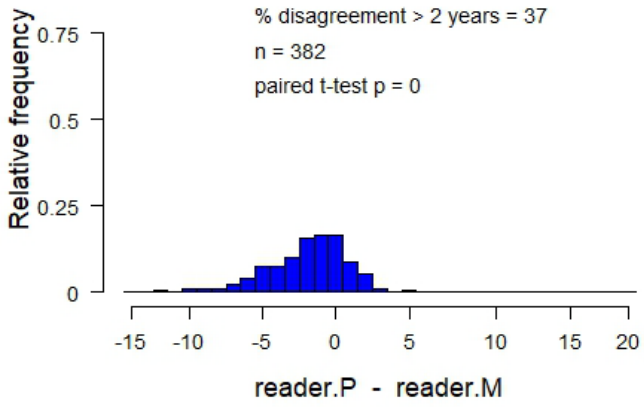

Figure 2.- Relative frequency of disagreement for more than two years between the readings made by photographs (reader.P) and by samples under the microscope (reader.M)

"A posteriory" calibration between KOR and ESP has been made using 40 random otolith photographs from the 854 pairs read by KOR to determinate their age by ESP. Results are presented in Figure 3 being the CV=10.81%, a bit high, likely due to some of the oldest ages, where Korean scientist use to count more rings than the Spanish ones. From the 40 otoliths used by the calibration, 33 have been readable.

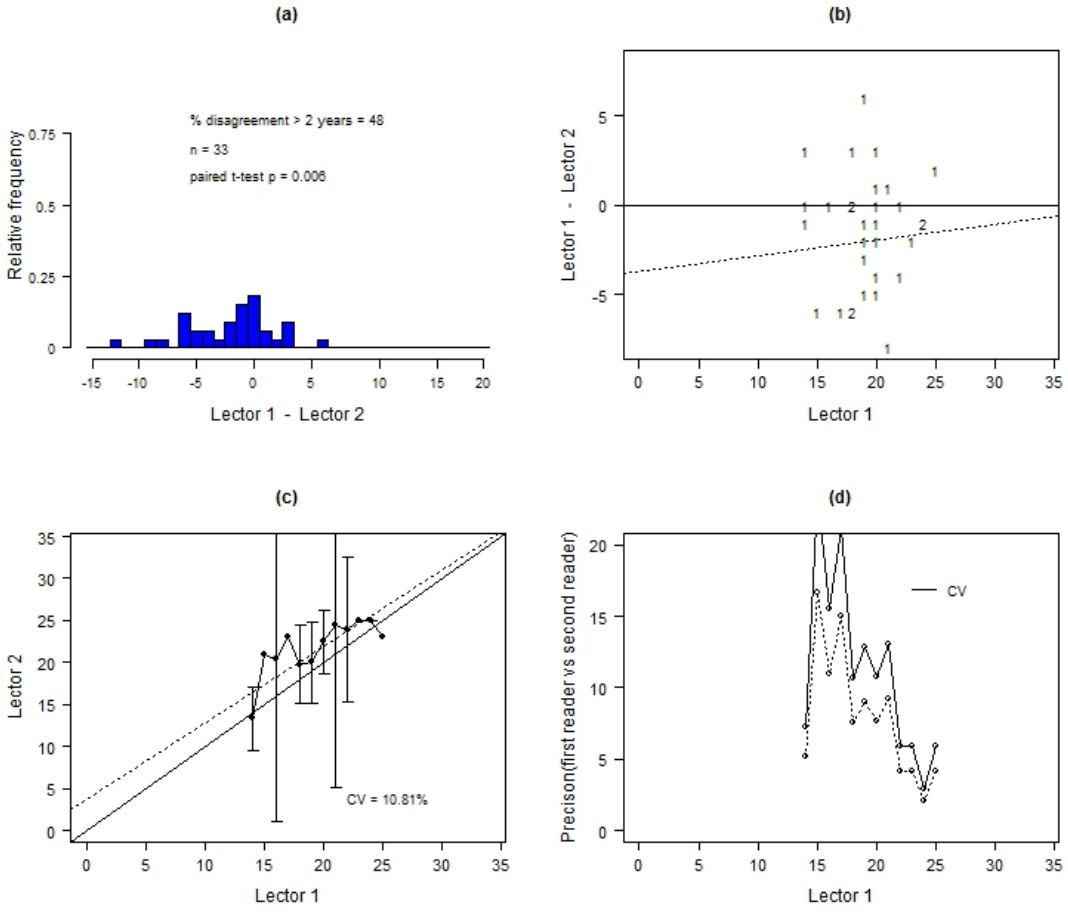

Figure 3.- KOR-ESP calibration from pics made by Korean scientist. Lector 1: ESP. Lector 2: KOR.

4. DISCUSSION

Age estimates by the same reader on the same sample but with two different methodologies allow differences in interpretation to be isolated and monitored. Age determination from samples under a microscope or magnifier looks more accurate that those made from pictures, although reading from pictures facilitates the exchange between different members and helps with the interpretation of the ring pattern, very useful for intercalibration.

These results from the Korean analysis highlight the difficulty of the TOA otolith ring interpretations and the importance of calibrating between readers prior to perform the otolith age-readings.

This analysis also highlights the importance and need for comparisons within and among ageing programmes as a routine procedure to provide confidence in the comparability of ages used for management (Parker et al, 2013).

With all the research proposals that are in place from different CCAMLR members, more scientists are involved in the toothfish age determination from otolith ring readings, in order to incorporate the results into the upcoming assessments. A workshop on age determination of *D.*

eleginoides and *D. mawsoni* similar to the last one that took place during the FSA-WG in 2012 in Hobart would help to the new scientists that have been doing this analysis in recent years.

5. REFERENCES

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