Report of Otolith Exchange Analysis for Plaice (*Pleuronectes platessa*) in divisions 7.h-k (Celtic Sea South, Southwest of Ireland)

Executive summary

As there is no age calibration data available for plaice stock in divisions 7.h-k (Celtic Sea South, southwest of Ireland), Working Group on Biological Parameters (WGBIOP 2018) called for full scale otoliths exchange in order to identify and resolve age interpretation differences between readers and laboratories.

A total of 11 participants were involved in the Plaice 7.h-k otoliths exchange. Age readers represented all 4 countries where landings of plaice from divisions 7.h-k have been reported. Age estimation of plaice stock in 7.h-k is based on whole otoliths with the exception to UK-CEFAS where either sectioned otoliths or broken and burnt method are used.

Following WGBIOP Guidelines for Otoliths Exchanges (2018) a sets of 191 whole plaice otoliths and 64 of sectioned were selected and uploaded for analysing using the SmartDots application.

Despite the fact landings are evenly distributed between areas 7h and 7jk acquiring the samples of whole otoliths from 7h proved difficult and thus only 20 samples supplied by IFRAMER, France have been included in the exchange. Remaining 171 whole otoliths from division 7j were provided by Marine Institute, Ireland and all sectioned otoliths by CEAFAS, UK. No sampling by any of the participating institutes had taken place in division 7k therefore no otoliths were available to include in the exchange from this area.

The objectives of the present exchange were:

1) Revise and collate published age estimation protocols for plaice (*Pleuronectes platessa*).

2) Evaluate the accuracy and precision in otolith age reading of plaice in divisions 7.h-k (Celtic Sea South ,Southwest of Ireland).

3) Evaluate if age reading interpretation protocols for plaice in Celtic Sea presented in Ageing Manual in Report of the Workshop on Age Reading of North Sea (IV) and Skagerrak-Kattegat (IIIa) Plaice. ICES 2010. (WKARP) have been adopted by all age readers.

4) Identify issues related to age reading of plaice in divisions 7.h-k.

5) Report results to WGBIOP that will take place in October 2019

The statistics representing age reading performance were calculated for all readers combined and for experienced readers only. All areas were included and calculations were carried separately for each preparation method. As expected agreement was higher and variance (APE & CV) was lower for advanced readers compared to all readers regardless of preparation method. In all cases the statistics were significantly better for whole otoliths than for sectioned otoliths. The average percentage agreement of 76% and variance CV=13%, APE=8% were reached by all readers annotating whole otoliths. There was slight improvement when only advanced readers were combined: PA=78%; CV=12%; APE=7%. The results of present exchange for whole otoliths are in line with the statistics achieved during Workshop on Age Reading of North Sea (IV) and Skagerrak-Kattegat (IIIa) Plaice (WKARP 2010). Overall

average percentage agreement for sectioned otoliths PA=56% and variance CV=18%; APE=18% were lower. There was little improvement when only advanced readers are included: PA=64%; CV=17%; APE=10%.

Age readers were specifically asked to annotate only preparation methods they are familiar with as otherwise the results may be biased. Total of 10 age readers annotated whole otoliths and only 5 annotated sectioned plaice. Remaining 6 readers did not feel confident as they had none or very limited experience with this preparation method.

Differences in age determination mainly related to varied readers approach to otoliths irregular growth and edge interpretation. Age readers faced the same issues during Plaice Ageing Workshop back in 2010 (WKARP 2010). At the time the Ageing Manual for Plaice was included in the report with specific interpretation guidelines for plaice stock in Celtic Sea. It is believed if the readers consistently adhere to those rules the statistics should improve for whole plaice otoliths in 7.h-k.

Plaice in 7.h-k is considered as fast growing stock and specimens of age higher than 10 years are rare and represent small percentage of total catch. During WKARP 2010 it was concluded that for plaice in divisions 7a, 7b, 7g and 7j ranging from 1 to 10 years old, otolith sectioning is not necessary as reading whole otoliths does not result in underestimation of ages.

Using 2 different preparation methods for ageing the same stock may cause confusion and bias in interpretation of ages. Due to low reader agreement on 'sectioned' otoliths it is recommended that WGBIOP:

- Review the methods used to age plaice for stock assessment purposes in 7h-k and identify how to ensure consistency between institutes
- Define a framework/roadmap for improved reader agreement, i.e. regular mini exchanges utilising the SmartDots platform, revised protocol, unbalanced sample size for 7h and 7jk divisions

It is recommended that readers involved in age determination of plaice in 7.h-k should familiarize themselves with current reference sets/ interpretation protocols and consistently follow them while ageing.

Regular exchanges, both internally and externally in order to learn and to improve the agreements between readers should be organised using SmartDots application.