

SmartDots Summary for event 221

1 Executive summary

This plaice age reading exchange took place between May and June 2019 using SmartDots software. No previous age calibration data is available for plaice stock in divisions 7.fg (Bristol Channel, Celtic Sea). Therefore, the Working Group on Biological Parameters (WGBIOP 2018) called for a full scale otoliths exchange in order to identify and resolve age interpretation differences between readers and laboratories. The most recent workshop on age reading of plaice was conducted in 2010 for North Sea and Skagerrak-Kattegat (WKARP).

A total of 14 participants were involved in the Plaice 7.f-g otoliths exchange. Age readers represented all countries where landings of plaice from divisions 7.fg have been reported. Age estimation of plaice stock in 7fg is based on whole otoliths with the exception of UK-CEFAS where either sectioned otoliths or broken and burnt method are used. Following WGBIOP Guidelines for Otoliths Exchanges (2018) a set of 83 whole and 83 sectioned otoliths from the same fish were selected (stratified by age, quarter and ICES area) and uploaded for analysing using the SmartDots application. The samples were all provided by ILVO, 39 samples from area 7.f and 44 samples from area 7.g.

The objectives of the present exchange were:

- Evaluate the accuracy and precision in otolith age reading of plaice in divisions 7.fg (Bristol Channel, Celtic Sea)
- Identify issues related to age reading of plaice in divisions 7.f-g
- Report results to WGBIOP that will take place in October 2019

In this report, only results of the advanced age readers for whole otoliths are presented as these are the data used in the stock assessments. A more detailed view of all data of the exchange can be found in file "Final_SmartDots_Report_Event_221_Plaice_7fg".

The statistics of only advanced 7f-g readers combined were PA=75%; CV=18%; APE = 10%. These results of only advanced readers were poorer than the statistics obtained during the Workshop on Age Reading of North Sea (IV) and Skagerrak-Kattegat (IIIa) Plaice (WKARP 2010).

Differences in age determination mainly related to varied readers approach to otoliths irregular growth, edge interpretation and interpretation of the first ring. Age readers faced the same issues during Plaice Ageing Workshop back in 2010 (WKARP 2010).

It is recommended that readers involved in age determination of plaice in 7.f-g 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. Also, as the last plaice workshop took place 9 years ago, a new plaice workshop is recommended.

2 Overview of samples and advanced readers

Table 2.1: Overview of samples used for the exchange. The modal age range for all samples is 1-10.

Year	ICES		Number of samples	Modal age range	Length range
	area	Quarter			
2010	27.7.f	4	1	1	210 mm
2011	27.7.g	1	1	1	190 mm
2011	27.7.g	3	1	1	200 mm
2013	27.7.g	2	1	1	180 mm
2015	27.7.g	1	5	2-9	180-500 mm
2015	27.7.g	3	6	5-9	260-450 mm
2016	27.7.f	2	1	10	400 mm
2016	27.7.f	3	6	2-8	220-435 mm
2016	27.7.g	3	3	2-4	180-200 mm
2016	27.7.g	4	1	1	200 mm
2017	27.7.f	1	11	1-9	180-495 mm
2017	27.7.f	2	7	2-8	200-400 mm
2017	27.7.f	4	2	3-4	230-260 mm
2017	27.7.g	1	2	4-6	230-270 mm
2017	27.7.g	2	10	2-10	200-520 mm
2017	27.7.g	4	11	2-9	230-410 mm
2018	27.7.f	2	2	1-9	180-425 mm
2018	27.7.f	3	3	2-9	240-445 mm
2018	27.7.f	4	6	2-9	210-430 mm
2018	27.7.g	1	3	7-9	330-395 mm

Table 2.2: Overview of advanced readers.

Reader code	Expertise
R02 IE	Advanced
R04 FR	Advanced
R10 BE	Advanced
R12 BE	Advanced
R16 IE	Advanced

3 Results overview

3.1 Age readings

Table 3.1: Age reading table presents the number of readings made per expert reader for each modal age.

Modal age	R02 IE	R04 FR	R10 BE	R12 BE	R16 IE	total
1	7	7	7	6	7	34
2	10	10	10	10	10	50
3	12	12	12	11	12	59
4	6	7	7	7	7	34
5	8	7	8	7	8	38
6	9	6	9	9	9	42
7	10	10	10	9	10	49
8	7	7	7	6	7	34

9	9	9	9	9	9	45
10	4	4	4	4	4	20
Total	82	79	83	78	83	405

3.2 CV table

Table 3.2: Coefficient of Variation (CV) table presents the CV per modal age and advanced reader, the CV of all advanced readers combined per modal age and a weighted mean of the CV per reader.

Modal age	R02 IE	R04 FR	R10 BE	R12 BE	R16 IE	all
1	0 %	58 %	0 %	0 %	33 %	29 %
2	0 %	30 %	15 %	29 %	19 %	22 %
3	14 %	14 %	28 %	22 %	0 %	22 %
4	14 %	38 %	0 %	0 %	22 %	20 %
5	16 %	18 %	7 %	7 %	7 %	12 %
6	6 %	18 %	5 %	5 %	8 %	10 %
7	17 %	13 %	19 %	14 %	11 %	16 %
8	10 %	14 %	0 %	0 %	14 %	14 %
9	8 %	17 %	5 %	8 %	29 %	16 %
10	10 %	20 %	0 %	0 %	13 %	11 %
Weighted Mean	10 %	23 %	10 %	11 %	15 %	18 %

3.3 PA table

Table 3.3: Percentage agreement (PA) table represents the PA per modal age and reader, advanced the PA of all advanced readers combined per modal age and a weighted mean of the PA per reader.

Modal age	R02 IE	R04 FR	R10 BE	R12 BE	R16 IE	all
1	100 %	71 %	100 %	100 %	86 %	91 %
2	100 %	70 %	90 %	80 %	80 %	84 %
3	83 %	83 %	58 %	55 %	100 %	76 %
4	67 %	43 %	100 %	100 %	71 %	76 %
5	75 %	57 %	88 %	86 %	88 %	79 %
6	89 %	33 %	89 %	89 %	78 %	79 %
7	80 %	40 %	70 %	78 %	70 %	67 %
8	86 %	0 %	100 %	100 %	29 %	62 %
9	89 %	56 %	67 %	56 %	56 %	64 %
10	25 %	50 %	100 %	100 %	50 %	65 %
Weighted Mean	83 %	53 %	83 %	81 %	73 %	75 %

3.4 Relative bias table

Table 3.4: Relative bias table represents the relative bias per modal age and advanced reader, the relative bias of all advanced readers combined per modal age and a weighted mean of the relative bias per reader.

Modal age	R02 IE	R04 FR	R10 BE	R12 BE	R16 IE	all
1	0.00	0.00	0.00	0.00	0.14	0.03
2	0.00	-0.10	0.10	0.30	0.20	0.10
3	0.00	-0.17	0.75	0.64	0.00	0.24
4	-0.33	-1.00	0.00	0.00	-0.43	-0.35
5	-0.38	-0.57	0.12	0.14	-0.12	-0.16
6	-0.11	-1.00	0.11	0.11	-0.22	-0.22
7	0.50	-0.50	0.80	0.44	0.50	0.35
8	-0.29	-2.00	0.00	0.00	-1.00	-0.66
9	-0.22	-0.89	0.33	0.56	-0.67	-0.18

10	-0.25	-1.50	0.00	0.00	-0.25	-0.40
Weighted Mean	-0.07	-0.67	0.28	0.27	-0.14	-0.07

3.5 Bias plot

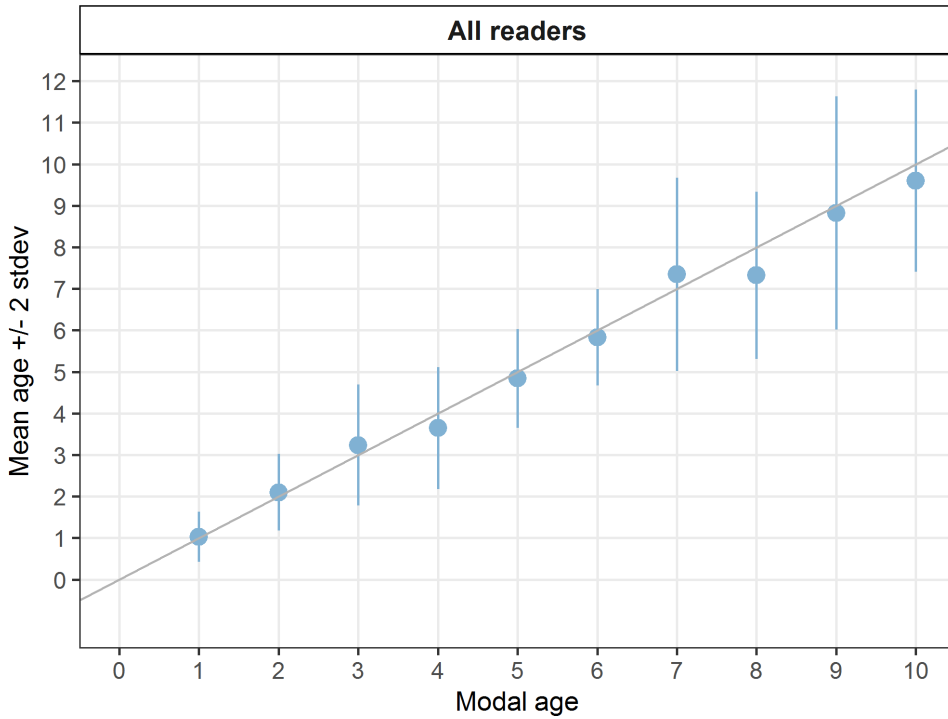


Figure 3.1: Age bias plot for advanced readers.

3.6 Age error matrices

Table 3.5: Age error matrix (AEM)

strata	Modal age	1	2	3	4	5	6	7	8	9	10
WH	Age 0	0.02941	-	-	-	-	-	-	-	-	-
WH	Age 1	0.91176	0.04	-	0.02941	-	-	-	-	-	-
WH	Age 2	0.05882	0.84	0.05085	0.05882	-	-	-	-	0.02222	-
WH	Age 3	-	0.10	0.76271	0.14706	0.05263	-	-	-	-	-
WH	Age 4	-	0.02	0.10169	0.76471	0.10526	0.04762	-	-	-	-
WH	Age 5	-	-	0.06780	-	0.78947	0.11905	0.02041	0.08824	0.02222	-
WH	Age 6	-	-	0.01695	-	0.05263	0.78571	0.08163	0.11765	-	-
WH	Age 7	-	-	-	-	-	0.04762	0.67347	0.17647	0.04444	0.10
WH	Age 8	-	-	-	-	-	-	0.10204	0.61765	0.06667	0.05
WH	Age 9	-	-	-	-	-	-	0.04082	-	0.64444	0.10
WH	Age 10	-	-	-	-	-	-	0.04082	-	0.17778	0.65
WH	Age 11	-	-	-	-	-	-	0.04082	-	0.02222	0.10

Conclusion

The statistics of only advanced 7.f-g readers combined were PA=75%; CV=18%; APE = 10%. These results were poorer than the statistics obtained during the Workshop on Age Reading of North Sea (IV) and Skagerrak-Kattegat (IIIa) Plaice (WKARP 2010).

Differences in age determination mainly related to varied readers approach to otoliths irregular growth, edge interpretation and interpretation of the first ring. Age readers faced the same issues during Plaice Ageing Workshop back in 2010 (WKARP 2010). Many of these issues can only be resolved by validation studies, however a new workshop could improve agreement amongst readers.

It is therefore recommended that readers involved in age determination of plaice in 7.f-g 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. Also, as the last plaice workshop took place 9 years ago, a new plaice workshop is recommended.