SmartDots Summary for event 200 – brill exchange in area 27.4.b, 27.4.c, 27.7.d

# Executive summary

The last brill (*Scophthalmus rhombus*) exchange took place in 2005. A small scale exchange was recommended in 2009 by PGCCDBS for brill in the North Sea and English Channel (Subarea 4 and 7.d-e). Unfortunately, a full report from the 2005 exchange is missing, so few background is known. Brill is a category 3 stock (no ages used is the assessment). Nevertheless, several countries collect age samples for brill, partly under obligation by the EU Data Collection Regulation. A scoping meeting for brill is planned in 2020.

The objectives of the exchange were:

* Estimate the accuracy and precision of the age readings for whole otoliths and sectioned and stained otoliths.
* Detect any potential age reading problems.
* Compare the results between whole and sectioned & stained (SS) otoliths

In this report, you will only find the results of the advanced age readers for stained sectioned otoliths as these are the data used in the assessments. A more detailed view of all data of the exchange can be found in the “Report of Otolith Exchange Analysis of Brill, 2019”.

Two otolith sets were included in the exchange: a North Sea brill set (N=71) and a set from the English Channel (N = 53). A total of 8 participants from 3 countries (Belgium, France and the Netherlands) participated in the exchange. Only 3 advanced readers participated, which are all used to reading stained sectioned otoliths.

The age reading performance of the advanced readers was very good: the percentage agreement (PA) was 95%, variation coefficient (CV) was 8% and the average percentage error was only 1%.

From the 2005 exchange, we only know that the PA was high (90%) and that no bias between the readers was evident. In this exchange, the PA for stained sectioned otoliths of the advanced readers was very high (95%) and was still satisfactory for all readers (84 %). No bias was evident between the advanced readers for stained sectioned otoliths.

No major issues were detected for advanced readers when ageing stained sectioned brill otoliths.

# Overview of samples and advanced readers

**Table 2.1:** Overview of samples used for the brill exchange in area 27.4.b, 27.4.c, 27.7.d. The modal age range for all samples is 0-10.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Year** | **ICES area** | **Quarter** | **Number of samples** | **Modal age range** | **Length range** |
| 2005 | 27.4.b | 4 | 8 | 2-5 | 310-570 mm |
| 2011 | 27.4.b | 3 | 2 | 1 | 250-260 mm |
| 2014 | 27.4.c | 3 | 6 | 1-6 | 240-560 mm |
| 2015 | 27.4.c | 4 | 6 | 1-4 | 285-370 mm |
| 2016 | 27.4.c | 4 | 2 | 3-8 | 325-365 mm |
| 2017 | 27.4.b | 3 | 19 | 2-10 | 260-570 mm |
| 2017 | 27.4.b | 4 | 13 | 0-7 | 190-580 mm |
| 2017 | 27.4.c | 2 | 5 | 3-5 | 365-445 mm |
| 2017 | 27.4.c | 3 | 10 | 0-3 | 135-435 mm |
| 2017 | 27.7.d | 1 | 14 | 2-8 | 325-630 mm |
| 2017 | 27.7.d | 2 | 10 | 1-7 | 220-535 mm |
| 2017 | 27.7.d | 3 | 18 | 1-8 | 280-615 mm |
| 2017 | 27.7.d | 4 | 11 | 0-5 | 270-520 mm |

**Table 2.2:** Overview of advanced readers.

|  |  |
| --- | --- |
| **Reader code** | **Expertise** |
| R02 NL | Advanced |
| R04 BE | Advanced |
| R06 BE | Advanced |

# Results overview

## Age readings

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Modal age** | **R02 NL** | **R04 BE** | **R06 BE** | **total** |
| 0 | 7 | 8 | 7 | **22** |
| 1 | 17 | 18 | 17 | **52** |
| 2 | 19 | 19 | 19 | **57** |
| 3 | 20 | 20 | 20 | **60** |
| 4 | 17 | 18 | 18 | **53** |
| 5 | 15 | 15 | 14 | **44** |
| 6 | 12 | 13 | 13 | **38** |
| 7 | 7 | 7 | 7 | **21** |
| 8 | 3 | 3 | 3 | **9** |
| 9 | 2 | 2 | 2 | **6** |
| 10 | 1 | 1 | 1 | **3** |
| **Total** | **120** | **124** | **121** | **365** |

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## 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 NL** | **R04 BE** | **R06 BE** | **all** |
| 0 | - | - | - | **-** |
| 1 | 26 % | 0 % | 0 % | **14 %** |
| 2 | 12 % | 17 % | 0 % | **12 %** |
| 3 | 7 % | 7 % | 0 % | **6 %** |
| 4 | 12 % | 0 % | 0 % | **7 %** |
| 5 | 0 % | 9 % | 0 % | **5 %** |
| 6 | 0 % | 5 % | 0 % | **3 %** |
| 7 | 0 % | 0 % | 8 % | **5 %** |
| 8 | 0 % | 0 % | 0 % | **0 %** |
| 9 | 0 % | 8 % | 8 % | **6 %** |
| 10 | - | - | - | **6 %** |
| **Weighted Mean** | **9 %** | **6 %** | **1 %** | **8 %** |

## 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 NL** | **R04 BE** | **R06 BE** | **all** |
| 0 | 100 % | 88 % | 100 % | **95 %** |
| 1 | 94 % | 100 % | 100 % | **98 %** |
| 2 | 95 % | 89 % | 100 % | **95 %** |
| 3 | 95 % | 95 % | 100 % | **97 %** |
| 4 | 76 % | 100 % | 100 % | **92 %** |
| 5 | 100 % | 80 % | 100 % | **93 %** |
| 6 | 100 % | 92 % | 100 % | **97 %** |
| 7 | 100 % | 100 % | 71 % | **90 %** |
| 8 | 100 % | 100 % | 100 % | **100 %** |
| 9 | 100 % | 50 % | 50 % | **67 %** |
| 10 | 0 % | 100 % | 100 % | **67 %** |
| **Weighted Mean** | **93 %** | **93 %** | **98 %** | **95 %** |

## 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 NL** | **R04 BE** | **R06 BE** | **all** |
| 0 | 0.00 | 0.25 | 0.00 | **0.08** |
| 1 | -0.06 | 0.00 | 0.00 | **-0.02** |
| 2 | -0.05 | -0.11 | 0.00 | **-0.05** |
| 3 | 0.05 | 0.05 | 0.00 | **0.03** |
| 4 | -0.12 | 0.00 | 0.00 | **-0.04** |
| 5 | 0.00 | 0.07 | 0.00 | **0.02** |
| 6 | 0.00 | 0.08 | 0.00 | **0.03** |
| 7 | 0.00 | 0.00 | 0.00 | **0.00** |
| 8 | 0.00 | 0.00 | 0.00 | **0.00** |
| 9 | 0.00 | -0.50 | -0.50 | **-0.33** |
| 10 | -1.00 | 0.00 | 0.00 | **-0.33** |
| **Weighted Mean** | **-0.03** | **0.02** | **-0.01** | **-0.01** |

## Bias plot



**Figure 3.1:** Age bias plot for advanced readers.

## Age error matrices

**Table 3.5:** Age error matrix (AEM) for brill in areas 27.4.b, 27.4.c, 27.7.d.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Modal age** | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **Age 0** | 0.95455 | 0.01923 | - | - | - | - | - | - | - | - | - |
| **Age 1** | - | 0.98077 | 0.05263 | - | - | - | - | - | - | - | - |
| **Age 2** | 0.04545 | - | 0.94737 | - | - | - | - | - | - | - | - |
| **Age 3** | - | - | - | 0.96667 | 0.05660 | - | - | - | - | - | - |
| **Age 4** | - | - | - | 0.03333 | 0.92453 | 0.02273 | - | - | - | - | - |
| **Age 5** | - | - | - | - | 0.01887 | 0.93182 | - | - | - | - | - |
| **Age 6** | - | - | - | - | - | 0.04545 | 0.97368 | 0.04762 | - | - | - |
| **Age 7** | - | - | - | - | - | - | 0.02632 | 0.90476 | - | - | - |
| **Age 8** | - | - | - | - | - | - | - | 0.04762 | 1 | 0.3333 | - |
| **Age 9** | - | - | - | - | - | - | - | - | - | 0.6667 | 0.3333 |
| **Age 10** | - | - | - | - | - | - | - | - | - | - | 0.6667 |

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# Conclusion

The age reading performance of the advanced readers was very good: the percentage agreement (PA) was 95%, variation coefficient (CV) was 8% and the average percentage error was only 1%.

No major issues were detected for advanced readers when ageing stained sectioned brill otoliths in areas 27.4.b, 27.4.c, 27.7.d.