Fifteen years of annual Norwegian-Russian cod comparative age readings

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The basic purpose

• Clear up possible reasons of age discrepancies
• Standardize methods
• Draw up recommendations in ageing
• Avoid serious errors in routine work
  (discover and correct errors immediately)
### Numbers of cod otoliths exchanged in 1992-2006

<table>
<thead>
<tr>
<th>Year</th>
<th>IMR</th>
<th>PINRO</th>
<th>1 half year</th>
<th>2 half year</th>
<th>I</th>
<th>IIa</th>
<th>IIb</th>
<th>Total</th>
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Portions of cod otoliths sampled in different areas (1992-2006)
Cod otolith
Techniques of cod ageing: Norwegian (IMR) (N) and Russian (PINRO) (R)

N: The opaque zone is continuous along the edge. The summer growth has ended. The zone should not be counted as an annual ring until the beginning of the next year.

Four opaque zones correspond to only three calendar years.

R: A wide opaque zone is continuous along the edge. The summer growth has ended.

Three translucent zones correspond to three calendar years.

August-September

3 years
Initial discrepancy in cod age readings (dark curve) and after re-reading (pink curve)

$R^2 = 0.4834$

$R^2 = 0.1901$
Comparison of age reading (N-R) for each year (using t-criterion for dependent samples)
Results by months

a) Number of otoliths

b) % agreement

c) % agreement vs. Number of otoliths

$R^2 = 0.1422$
Percentage of agreement in age reading for different areas
Percentage of agreement in age reading by cod ages

% agreement

R^2 = 0.43
Between reader bias by cod ages
Conclusions

• Equipment has been standardized
• The Labs have received important lessons (methods, reasons of discrepancies, training procedure, need of regular meetings)
• Differences in cod age reading between two labs have decreased
Further work

• Further analysis of data (*concerning growth rate, information on fish size, ownership of otoliths, risk analysis etc*)

• Formation of Reference collection

• Age-validation studies
Congratulations with 15 years anniversary!