

REPORT ON THE OTOLITH WORKSHOP

held at the Soviet/Norwegian symposium on the Barents Sea capelin,
Bergen, Norway 14-19 August 1984

Reported by Harald Gjøsæter (IMR)

The workshop was held Wednesday 15. between 1330 and 1500 hours.

Participants: N.G. Ushakov (PINRO)
V.N. Shleinik (PINRO)
O. Alvheim (IMR)
H. Gjøsæter (IMR)

In addition Dir. G.I. Luka attended the workshop without taking part in the practical session on otolith reading.

The participants agreed on the working plan shown below.

1. Practical session on otolith reading.
 - a) Independent reading of some otoliths new to all participants.
 - b) Comparison of the results and discussion of the otoliths using video equipment.
2. Exchange and discussion of the results from the inter-calibration of otolith reading by scientists from the PINRO and the IMR.
3. Discussion of various topics relevant to ageing of capelin.

1. Practical session.

The 23 otoliths read during the workshop were chosen to elucidate different problems in the age-reading. The otoliths were read by all participants independently, after which the readers, who in this report appear by their number only, submitted their results for comparison. (Table 1). All otoliths which had been interpreted differently were then displayed on a video screen for individual discussion, and each reader explained his evaluation of the otolith. Emphasis was not on reaching an agreement, but rather on classifying the otoliths according to the type of problem which lead to the disagreement. However, on some otoliths a full agreement was reached after the discussion.

TABLE 1. Number of otoliths interpreted differently between pairs of readers. A total of 23 otoliths were examined.

Nos. of otol. differently interpreted	Pairs of readers (referenced by their nos.)					
	1-2	1-3	1-4	2-3	2-4	3-4
	5	5	4	6	1	5

Reader no. 1 and 3 are PINRO scientists, the other two from the IMR. No differences greater than one year were detected. As so few otoliths were read one should be cautious to conclude on any inter- or intra-institute variation. This topic will be discussed in the next section, covering the exchanged otolith samples. More interestingly, those otoliths interpreted differently, could be classified in two groups, namely, those with the first ring problem and those with the false or additional ring problem.

The false ring problem evidently exists, and can hardly be solved. Many criteria are considered, consciously and unconsciously, when discriminating between true and false rings, and hence the variation is due more to individual rather than institutional differences. The otoliths problematic in this respect were considered difficult by all participants. All readers agreed on the more objective criterion for discriminating between true and false rings of considering the otolith growth pattern.

The other difficulty was the first-ring problem. There was some disagreement whether the small first rings of some otoliths should be counted or not. Moreover, there was no consensus over which criteria to use for such discrimination. The PINRO scientists count such rings if some summer growth can be seen inside, while the IMR scientists tend to use the size of the zone as a criterion. Despite this difference, the disagreement over these otoliths was not always between the institutes.

2. The samples exchanged between the PINRO and the IMR.

On a meeting in Murmansk in March 1984 between Soviet and Norwegian scientists it was decided to exchange some samples of capelin otoliths to intercalibrate the ageing carried out on this species. Four samples of otoliths were brought to PINRO and exchanged with four samples read by the Soviet scientists. It was agreed to exchange results at the joint symposium on the Barents Sea capelin in Bergen August 1984. In accordance with this the results from the intercalibration on earlier exchanged otoliths were presented and briefly discussed on the workshop.

2.1 The PINRO samples.

The four samples were brought to the IMR and mounted on otolith plates according to the normal Norwegian procedure. They were then read by two people independently, of which one (no. 1) is a very experienced reader.

The otoliths were classified as good, difficult or impossible to read. Two of the samples were from the winter, and contained mainly older fish. The other two were collected in the autumn, and contained 1-3 year old fish. After the reading, all results were compared from both institutes.

The results, given as per cent deviations between the different readers (number of otoliths read differently in per cent of total number of otoliths) appears in Table 2.

The variation is largest for the spring samples. The percentage of otoliths classified as difficult or impossible by one or both Norwegian readers was also much higher for these samples. This may partly be associated with the higher mean age in these samples.

With only one exception, no deviations greater than one year were found. The number of deviations varied between 3 and 13% between the PINRO-reader and IMR reader no. 1, amounting to an average of 5.75%. Of these otoliths, about 1/3 were classified as difficult by reader no. 1.

TABLE 2. Percent deviation between pairs of readers.

Sample no.	Season	PINRO - 1	PINRO - 2	1 - 2
1	winter	13	14	11
2	winter	4	6	5
3	autumn	4	5	4
4	autumn	3	6	5

It can be seen that the percentage deviation is practically identical between all readers, effectively eliminating institutional differences as a primary cause of the variation.

2.2 The IMR samples.

The results from the PINRO reading of the samples sent from IMR is displayed in Table 3.

TABLE 3. Percent deviation between pairs of readers.

Sample no.	Season	PINRO-reader - IMR-reader
1	winter	18
2	winter	0
3	autumn	4
4	autumn	0

The PINRO scientists stated that these samples were aged by different readers at PINRO, and some variations appeared between those readers.

3. Conclusions.

After the practical session, and a discussion of the results from the exchanged otolith samples, the workshop reached some conclusions which are recapitulated below.

1. The overall variation in otolith reading between PINRO and IMR seems to be of the same magnitude as that between individual readers at each institute.
2. No systematic differences can be traced between the institutes.
3. The difficulties are of two types, (1) how to interpret small first rings, and (2) how to discriminate false or additional rings from true winterrings.
4. The workshop is of the opinion that the first problem is the most serious, because differences between institutes here could partly be caused by employing different criteria to small first rings. The second problem of false rings can be minimized when samples are aged by experienced readers only.