



ANNUAL MEETING - JUNE 1979

On the Consistency in Ageing Cod Otoliths at the St. John's Laboratory

by

W. N. Batten and R. Wells  
Newfoundland Environment Center  
St. John's, Newfoundland

INTRODUCTION

During the past few years, the number of cod otoliths collected for age compositions has increased dramatically and it became apparent that additional age readers would have to be trained.

In July 1978 a cod otolith exchange program was initiated to be distributed on a continuing monthly basis to monitor changes or developing bias by individuals reading cod otoliths. The aim was to keep individuals interpreting ages of otolith samples at an 80% or greater agreement level with the mode. The modal age was determined from the ages estimated by the four experienced readers and this mode to be used as a measure of acceptability for new prospective age readers.

The results of two cod otolith exchanges are tabled here, exchanges A and B, both from ICNAF Div. 3M.

MATERIALS AND METHODS

An otolith sample is prepared in the following manner: The otolith is cut across the sulcus with a scalpel and mounted on small blocks of plasticine, containing a specimen number and arranged in trays, each containing 50 specimens. A sample could consist of 700 otoliths or more. The otoliths are read with a binocular microscope and the ages recorded on Age and Growth forms for data processing.

Once a month a current otolith sample that has been read but not dismantled from the plasticine is used for the otolith exchange program. Samples are selected from different areas, time periods and fishing gears.

Fifty otoliths are taken for this exchange and chosen to give an equal spread i.e. if a sample consisted of 500 otoliths, every tenth otolith is taken, beginning with the first otolith in the sample.

Each reader is given Form 1 which at the time contains the basic information in the heading and only the specimen number and fish length in the body of the form. After reading the otoliths and recording the age and other relevant information for each specimen, the completed form (Table 1) is filed with the coordinator, who transfers the age readings to Form 2 (Table 2). The modal age of each specimen is then determined from the age determinations of the various readers, excluding that of the original reader. However, the original reader will also read the exchange sample.

The percent agreement or disagreement with the mode can now be determined for each reader. Over and under columns in Form 1 is used to record the number of years the readings were over or under the modal age. If a reader is below the 80% accepted agreement level he or she is encouraged to examine the discrepancies.

In training a person to become familiar with reading cod otoliths he may be given samples that have already been read by experienced readers so that he may examine and compare his readings. This person will also participate in the otolith exchange program to get a measure of his progress from the mode derived from more competent readers and he or she will also be given the opportunity to read new samples before being read by a competent reader, who will evaluate his readings.

#### RESULTS AND CONCLUSIONS

##### Results for two otolith samples from Flemish Cap

The modal ages and individual interpretations for two samples of cod otoliths from the Flemish Cap are given in Tables 2 and 3. A summary of the results follows:

<u>Sample:</u>	<u>Reader:</u>	<u>Agreements:</u>	<u>Over:</u>	<u>Under:</u>	<u>% Agreement with the mode:</u>
A (research)	submission reader (1)	43	4	-	91.5
	1	45	2	-	95.7
	2	47	-	-	100.0
	3	31	16	-	66.0
	4	47	-	-	100.0
B (commercial)	submission reader (3)	37	1	5	86.0
	1	39	3	1	90.7
	2	43	-	-	100.0
	3	35	8	-	81.4
	4	38	2	3	88.4

Agreement with the modal age is excellent except for reader 3 for Sample A. Disagreements with the mode tend to be over-reading. It would appear that the age interpretations for these two samples are consistent.

Table 1. Form used for cod otolith exchange program at the St. John's Laboratory, including a reader's results for Cod Otolith Exchange A (Form 1).

<u>Form 1</u>	SAMPLE TYPE	Research	READER	Submission Date
	SAMPLE FROM AREA	3M	NO. READ	NO. AGREED
	SAMPLE DATE	Jan. 27 - Feb. 12/78	NO. OVER	NO. UNDER
	ORIGINAL READER	No. 1	% AGREEMENT	

SPEC. NO.	LENGTH	AGE	EDGE	REMARKS	MODE	AGREEMENT	OVER	UNDER
770	82	7	T	Small 2				
807	25	3	T					
844	46	5	T					
881	66	6	T					
918	44	5	T					
955	27	3	T					
992	115	15	T					
1029	63	6	T					
1066	30	3	T					
1103	66	6	T					
1140	67	6	T					
1177	35	4	T					
1214	38	4	T					
1251	88	7	NT					
1288	103	12	T	Small 2				
1325	100	10	T					
1362	56	6	T					
1399	53	5	T					
1436	47	5	T					
1473	48	5	T					
1510	39	5	T					
1547	46	5	T					
1584	31	4	T					
1621	72	6	T					
1658	53	5	T					
1695	39	5	T					
1732	63	5	T					

Table 1. (Cont'd)

<u>Form 1</u>	SAMPLE TYPE <u>Research</u>	READER <u>Submission Data</u>
	SAMPLE FROM AREA <u>3M</u>	NO. READ <u>        </u> NO. AGREED <u>        </u>
	SAMPLE DATE <u>Jan. 27 &amp; Feb. 12/78</u>	NO. OVER <u>        </u> NO. UNDER <u>        </u>
	ORIGINAL READER <u>No. 1</u>	% AGREEMENT <u>        </u>

SPEC. NO.	LENGTH	AGE	EDGE	REMARKS	MODE	AGREEMENT	OVER	UNDER
1769	67	6	T					
1806	41	5	T					
1843	91	8	T					
1880	53	5	T					
1917	43	5	T					
1954	32	3	T					
1991	25	3	T					
2028	77	7	T					
2065	47	5	T					
2102	45	4	T	C <sub>2</sub>				
2139	23	3	T					
2176	23	3	T					
2213	36	4	T					
2250	43	5	T					
2287	60	5	T					
2324	79	7	T					
2361	29	3	T					
2398	61	5	T					
2435	88	8	T					
2472	47	5	T					
2509	60	5	T					
2546	39	4	T					
2583	72	6	T					

Table 2. Summary of results of Cod Otolith Exchange A (Form 2) from Flemish Cap.

SPEC. NO.	ORIG. READ.	AGE READERS				MODE
		NO. 1	NO. 2	NO. 3	NO. 4	
770	7	7	7	8	7	7
807	3	3	3	3	3	3
844	5	5	5	5	5	5
881	6	5	6	6	5	-
918	5	5	5	5	5	5
955	3	3	3	3	3	3
992	15	15	14	16	14	14
1029	6	6	6	6	6	6
1066	3	3	3	3	3	3
1103	6	6	6	6	6	6
1140	6	6	5	6	5	-
1177	4	4	4	4	4	4
1214	4	4	4	4	4	4
1251	7	7	7	8	7	7
1288	12	10	10	11	10	10
1325	10	10	10	11	10	10
1362	6	6	6	6	6	6
1399	5	5	5	5	5	5
1436	5	5	5	5	5	5
1473	5	5	5	5	5	5
1510	5	5	5	5	5	5
1547	5	5	5	5	5	5
1584	4	4	4	4	4	4
1621	6	6	6	6	6	6
1658	5	5	5	5	5	5
1695	5	5	5	5	5	5
1732	5	5	5	6	5	5
1769	6	5	5	6	6	-
1806	5	5	5	5	5	5
1843	8	7	7	8	7	7
1880	5	5	5	5	5	5
1917	5	5	5	5	5	5
1954	3	3	3	3	3	3
1991	3	3	3	3	3	3
2028	7	7	7	8	7	7
2065	5	5	5	5	5	5

Table 2. (Cont'd)

SAMPLE TYPE Research  
SAMPLE FROM AREA 3M  
SAMPLE DATE Jan. 27 - Feb. 12/78  
ORIGINAL READER No. 1

FORM 2

SPEC. NO.	ORIG. READ.	AGE READERS				MODE
		NO. 1	NO. 2	NO. 3	NO. 4	
2102	4	4	4	5	4	4
2139	3	3	3	3	3	3
2176	3	3	3	3	3	3
2213	4	4	4	4	4	4
2250	5	5	5	5	5	5
2287	5	5	5	6	5	5
2324	7	7	7	8	7	7
2361	3	3	3	3	3	3
2398	5	5	5	6	5	5
2435	8	8	7	9	7	7
2472	5	5	5	5	5	5
2509	5	5	5	6	5	5
2646	4	4	4	5	4	4
2583	6	6	6	7	6	6

Table 3. Summary of results of Cod Otolith Exchange B (Form 2) from Flemish Cap.

		Foreign-Commercial				
		SAMPLE TYPE				
		SAMPLE FROM AREA				FORM 2
		SAMPLE DATE				
		ORIGINAL READER				
SPEC. NO.	ORIG. READ.	AGE READERS				MODE
		NO. 1	NO. 2	NO. 3	NO. 4	
1	4	4	4	5	5	-
12	6	6	6	7	6	6
23	6	6	6	6	6	6
34	5	5	5	5	5	5
45	5	5	5	5	5	5
56	6	6	6	7	6	6
67	5	5	5	5	5	5
78	7	7	7	8	6	7
89	5	5	5	5	5	5
100	5	5	5	5	5	5
111	7	6	6	8	6	6
122	5	5	5	5	5	5
133	6	6	6	7	6	6
144	5	5	5	5	5	5
155	9	9	8	9	8	-
166	6	6	6	6	6	6
177	5	5	6	6	5	-
188	5	5	5	5	5	5
199	5	5	5	5	5	5
210	5	6	6	6	5	6
221	6	6	6	6	6	6
232	4	4	5	5	5	5
243	5	5	5	5	5	5
254	5	5	5	5	5	5
265	5	6	6	7	5	6
276	5	5	5	5	5	5
287	5	5	5	5	5	5
298	5	6	5	5	5	5
309	4	4	4	4	4	4
320	5	5	5	6	5	5
331	4	4	4	4	4	4
342	5	7	6	6	6	6
353	5	5	5	5	5	5

Table 3. (Cont'd)

SPEC. NO.	ORIG. READ.	AGE READERS				MODE
		NO. 1	NO. 2	NO. 3	NO. 4	
364	8	8	8	8	9	8
375	5	5	5	5	5	5
386	7	7	7	8	7	7
397	4	4	4	4	4	4
408	5	5	5	5	5	5
419	8	7	7	8	8	8
430	4	4	4	4	4	4
441	5	6	5	6	5	-
452	4	4	4	4	4	4
463	6	6	6	7	7	-
474	4	4	4	4	4	4
485	5	5	5	5	5	5
496	3	4	4	4	4	4
507	4	4	4	4	5	4
518	5	6	5	5	5	5
529	3	3	3	4	4	-
540	4	4	4	4	4	4