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Results of the 1986, 1987 and 1989 Greenland-Canada
Greenland Halibut Otolith Exchange

by

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1. Introduction.

At present no analytical assessment is performed of Greenland halibut in NAFO Subarea 0+1. To comply with a future assessment on this stock age determinations have recently been commenced by the Greenland Fisheries Research Institute. In order to validate age determinations otoliths have been exchanged between Greenland (Denmark) and Canada. This paper summarizes results of the 1986, 1987 and 1989 comparison age readings.

2. Materials and Methods.

Three samples of otoliths, the first in 1986 (152 otoliths), the second in 1987 (104 otoliths) and the third in 1989 (93 otoliths) have been exchanged between Greenland and Canada. The 1986 and 1989 samples were collected in NAFO Subarea 1 by staff from Greenland Fisheries Research Institute, while the 1987 sample were collected in Subarea 3 by staff from Northwest Atlantic Fisheries Centre of St. John's, Newfoundland. Otoliths were stored in dry condition in paper envelopes.

Only otoliths from the left sacculus were used for ageing. Before reading otoliths were placed in a 96% ethanol solution. All otoliths were of good quality. If necessary otoliths were ground on the convex surface to expose the center more clearly. Age readings were made independantly by the two age readers.

3. Results.

For the 1986 exchange the overall agreement was 53% (Table 1). Of the 47% divergence 14% of the Greenland ages were one year less than the Canadian, 1% was more than one year less, 23% were one year more and 9% were more than one year more. The difference of the readings in regard to Canada indicates a bias for the Greenland readings to be higher, although general disagreement is high with great variation in readings.

In the 1987 comparison of estimates of age overall agreement was 61% (Table 2). Of the 39% divergence 16% of the Greenland ages were one year less than the Canadian, 22% were one year more and 1% were two years more. As in the 1986 exchange, the difference of the readings in regard to Canada indicates a bias for the Greenland readings to be higher.

The overall agreement for the 1989 exchange was 69% (Table 3). Of the 31% divergence 13% of the Greenland ages were one year less than the Canadian while 18% were one year more.

4. Conclusions.

In otolith exchanges 1986-89 level of inter-reader agreement in age determinations of Greenland halibut increased from 53% to 69% in the period. Considering the 1987 and 1989 materials consist of younger age-groups than the 1986 material, disagreements in all exchanges seem biased as the Greenland reader generally read a higher age than the Canadian, although the trend decreased in the period.

In order to eliminate the biased discrepancy between the Greenland and the Canadian reader further otolith exchange must be recommended.

Table 1. Comparison of estimates of age of Greenland halibut by Greenland and Canadian readers in 1986.

age	Greenland age												Totals		Difference			
	8	9	10	11	12	13	14	15	16	17	18	19	20	21		22	GRL	CAN
C																2	2	0
a	2															2	2	0
n		2														14	11	+3
a			2													25	37	-12
d				2												39	34	+5
i					2											26	34	-8
a						2										17	11	+6
n							2									8	8	0
17								2								8	8	0
a									1							7	4	+3
18										2						3	1	+2
19											1							
20												1						
21													1					
22														1		0		+1
Totals	2	2	14	25	39	26	17	8	8	7	3		1	152	152			
Overall agreement.....														53 %				
One year less.....														14 %				
One year more.....														23 %				
More than one years less...														1 %				
More than one years more...														9 %				

Table 2. Comparison of estimates of age of Greenland halibut by Greenland and Canadian readers in 1987.

age	Greenland age													Totals		Difference		
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	GRL		CAN	
C	5	2														3	2	+1
a	6	1	2													9	3	+6
n	7	7	13													20	20	0
a	8	7	16	2												16	25	-9
d	9	7	13	8	2											15	21	-6
i	10			13	8	3										10	5	+5
a	11				2	4										7	4	+3
n	12						2									1	2	-1
g	13						1	6	3							9	10	-1
e	14							1	4	2						7	7	0
	15									1	2					3	3	0
	16										1	1				2	2	0
	17												1			1	0	+1
	18															1	0	+1
Totals	3	9	20	16	15	10	7	1	9	7	3	2	1	1	104	104		
																		Overall agreement..... 61 %
																		One year less..... 16 %
																		One year more..... 22 %
																		Two year more..... 1 %

Table 3. Comparison of estimates of age of Greenland halibut by Greenland and Canadian readers in 1989.

age	Greenland age											Totals		Difference				
	3	4	5	6	7	8	9	10	11	12	13	14	15		GRL	CAN		
C	3	7														7	7	0
a	4	4	1													7	5	+2
n	5	3	4	1												5	8	-3
a	6			5												7	5	+2
d	7			1	17	2										20	20	0
i	8			1	3	9	7									11	19	-8
a	9					11	2									21	13	+8
n	10					3	3	3								5	9	-4
	11							1	2							4	1	+3
a	12								2							2	2	0
g	13									1	1					2	2	0
e	14										1					2	1	+1
	15											1				0	1	-1
Totals	7	7	5	7	20	11	21	5	4	2	2	2			93	93		
																		Overall agreement..... 69 %
																		One year less..... 13 %
																		One year more..... 18 %