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Observation on discarding in the West Greenland fishery in 1990.

by

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Introduction

In the assessment of the West Greenland cod fishery the natural mortality is normally raised from 0.2 to 0.3 per year for age groups 3 and 4 to account for discarding (Riget, 1990). Using the mean annual F from cohort analysis (op. cit) from the period 1980 to 1989 this corresponds to an average discard of 78 % and 34 % of these age groups in the catches (table 1 and 2).

This procedure implies that the number of fish discarded is related to the number of fish in the sea. A more reasonable approach would be to relate the discard to fishing effort. This requires an estimate of the discard by all component of the fleet.

In 1990 we were able to get some idea of the amount of discard from length distributions of the catches and the landings in the pound net fishery and the trawl fishery.

Data

In 1990 length measurements of cod were obtained from following sources (number of observations is shown in brackets):

Pound net fishery

Div. 1B, August, Landings (2) - 719 fishes
Catches (19) - 7552 fishes

Div. 1D, July, Landings (3) - 1059 fishes
Catches (1) - 747 fishes

Trawl fishery

Div. 1F, March, Discard (4 hauls) - 452 fishes
Catches (9 hauls) - 2540 fishes
Landings (1) - 1226 fishes

All samples are independent, i.e. in no cases are the catch, landing or discard taken from the same haul/net setting.

Results

Pound net fishery

Figs. 1 and 2 show length distributions of catches and landings in the pound net fishery in Div. 1B, August, and in Div. 1D, July. Almost no cod below the minimum landing size of 44 cm was landed. It is therefore not unreasonable to estimate the discarding by a knife edge selection at 44 cm on the catches. The % discards by numbers are given below.

Area	% Discarded	
	Nuuk (Div. 1D)	Sisimiut (Div 1B)
Age 3	100	100
4	80	67
5	22	45
6	2	5
Total	55	43

Trawl fishery

Fig. 3 shows length frequencies of the catch, landing and discard of the trawl fishery in Div. 1F, March. Again nearly no cod below 44 cm are landed and few of the discards exceed the minimum landing size. Again applying a knife edge selection at 44 cm leads to the following level of discards :

Area	% Discarded
Nanortalik bank (Div.1F)	
Age	
5	30
6	1
7	0
Total	9

Unfortunately, no age 3 or 4 cod were taken in the trawl fishery (also the age group 7+ is scarce as only 12 specimens (0.5% of the catch) were taken).

Discussion

The comparisons between the size distribution of catches, landings and discards indicates that the minimum landing size of 44 cm is respected by the Greenland trawlers and pound net fishermen. This is generally observed in port sampling of landings where significant proportion of undersized cod is very rarely seen.

The level of discarding in the pound net fishery (totally being estimated to 55% and 43% in numbers for Nuuk and Sisimiut, respectively) is very high. However, the fish is not damaged in the pound net fishery and if sorted immediately after catching only a very small fraction of the discard is killed. This have been acknowledged by the fisheries authorities and the procedure of sorting immediately has been enhanced by articles in the fishermen magazine and in TV programs. In former times, however, sorting were usual combined with the gutting of the fish and a high proportion were therefore dead before discarding.

The discard in the trawl fishery is significant especially for the age 5 cod where it amounts to 30% in the samples. Of two reasons this level should however be considered to be an over estimate of the total offshore discarding. Firstly, with growth occurring over the year more of the 5 years old will attain landing size later in the season. Secondly, the minimum landing size for the non-greenland fisheries is only 40 cm. Assuming the same size distribution as observed in the samples and using a knife edge selection of 40 cm reduces total discards to 1% and age 5 discards to 4%. The non-greenland trawl catches accounted for 22% of the total offshore catches in 1990.

No discarding on age 5 cod is assumed in previous assessments. It is obvious that such a discarding have taken place in 1991. Cod size at age has been declining within the last decade (Riget and Hovgård, 1990) and mean weight of age 5 cod was the lowest in 15 years in 1991 (Hovgård, 1991). On historical data little discarding should therefore be expected on age 5 cod.

With no cod of age 3 and 4 in the offshore samples it is not possible to evaluate whether the discarding rate implicitly used by applying a discarding mortality of 0.1 in the VPA is appropriate. However, assuming sizes of cod offshore equivalent to the observed size distribution in the inshore gill net survey (Nygård and Pedersen, 1991) would indicate that the discard estimate used in the VPA is on the low side.

References

- Hovgård, H. 1991. Preliminary assessment of Subarea 1 cod. NAFO SCR Doc. 91/76.
- Nygård, K. H., and S. A. Pedersen. 1991. Young cod distribution and abundance in West Greenland inshore areas, 1990. NAFO SCR Doc 91/64.
- Riget, F. F., and H. Hovgård. 1990. Size-at-age of cod off West Greenland, 1976-90. Paper presented on ICES Multispecies Assessment Working Group meeting, Woods Hole, Dec. 1990,
- Riget, F. F. 1990. Data and preliminary assessment of subarea 1 cod. NAFO SCR Doc. 90/55.

Table 1 : Calculation of mean discarding of age 3 cod off West Greenland, based on discard mortality of 0.1, natural mortality of 0.2 and mean fishing mortality over the 1980 to 1989 period.

Mortality	Mortality rate	% death	%discard
Fishing	0.028	2.387	78
Discarding	0.1	8.526	
Natural	0.2	17.051	
Total	0.328	27964	

Table 2 : Calculation of mean discarding of age 4 cod off West Greenland, based on discard mortality of 0.1, natural mortality of 0.2 and mean fishing mortality over the 1980 to 1989 period.

Mortality	Mortality rate	% death	%discard
Fishing	0.193	15.237	34
Discarding	0.1	7.895	
Natural	0.2	15.789	
Total	0.493	38.921	

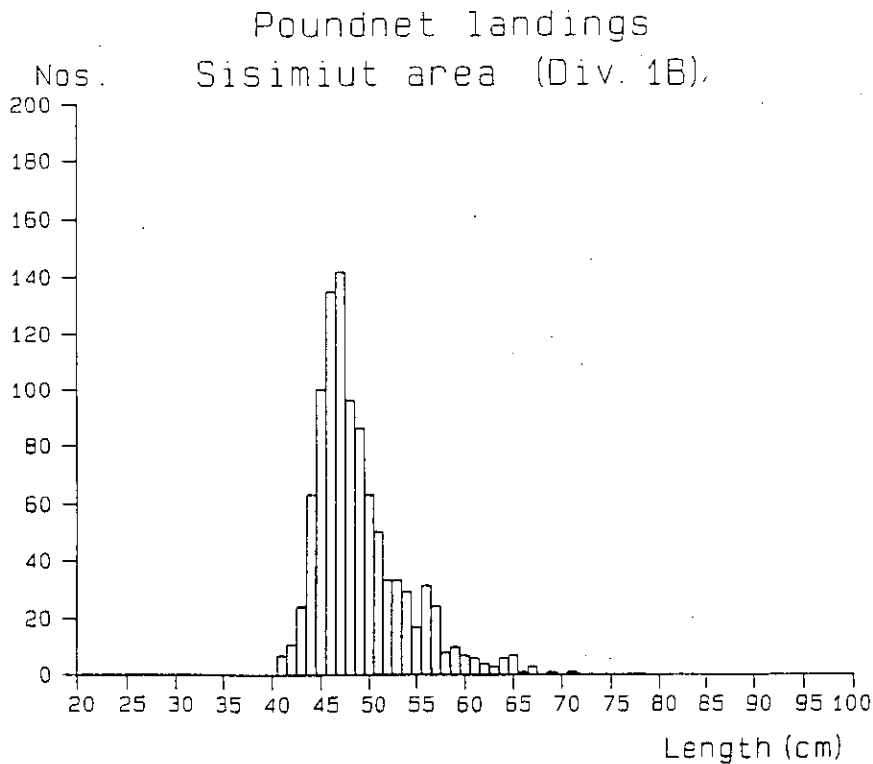
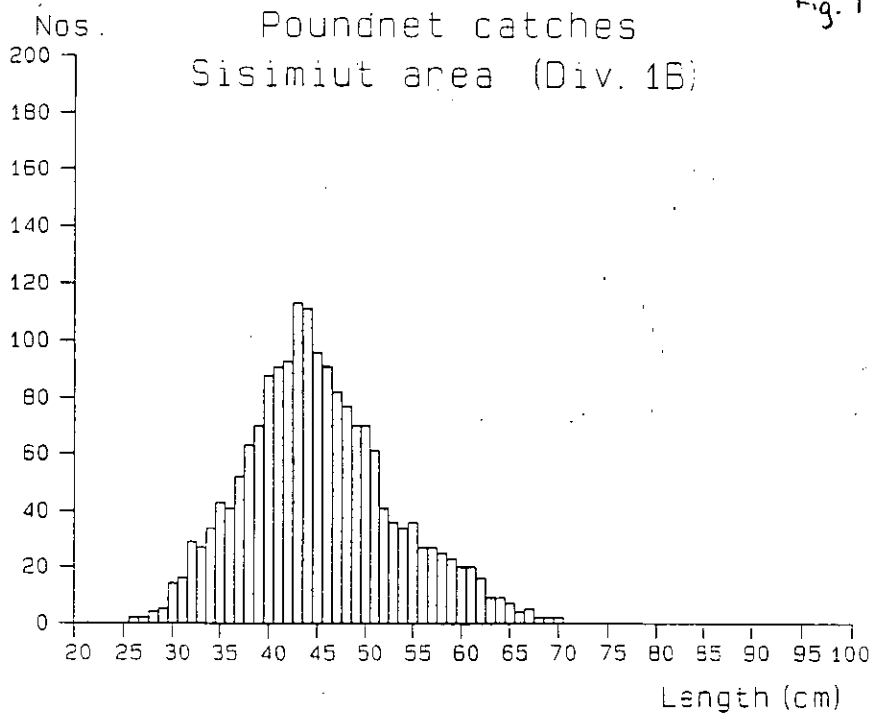


Fig. 2

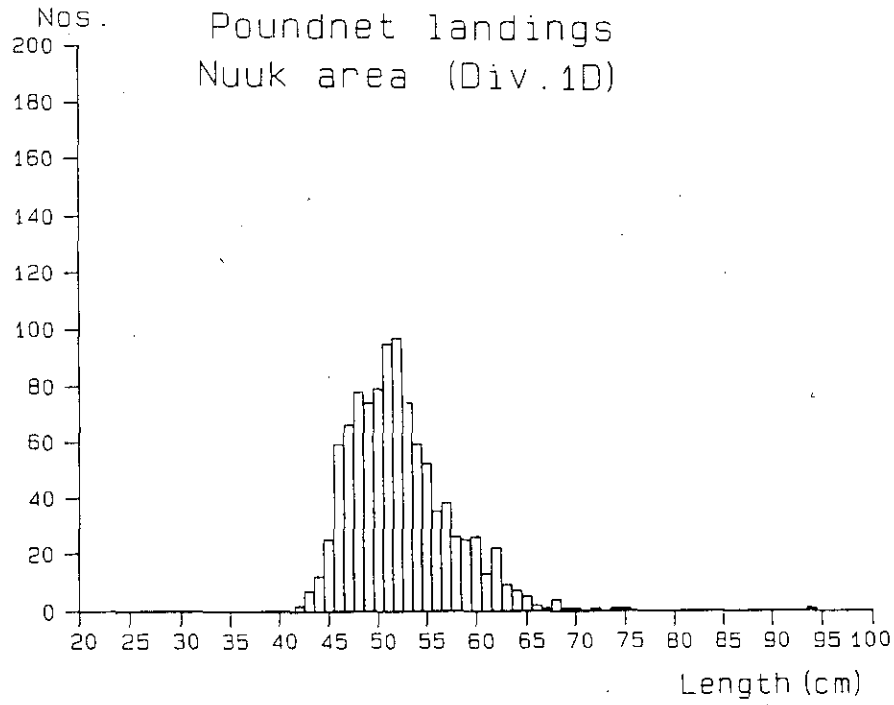
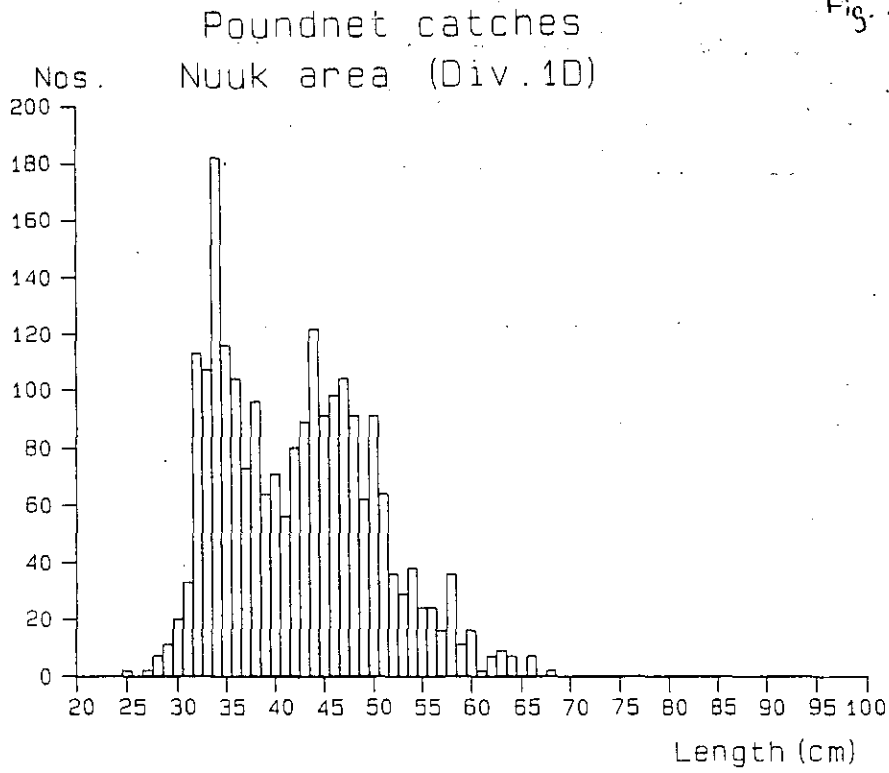


Fig. 3

