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Survey Estimates for Cod in Division 2J from Data Obtained

by RV Anton Dohrn in Autumn of 1982

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#### Introduction

Since 1972 stratified-random groundfish surveys have been regularly conducted in late autumn in Division 2J mostly by RV *Anton Dohrn* and RV *Walther Herwig* (1973, 76 and 79) respectively.

Estimates of the minimum trawlable biomass of cod were obtained by applying the "swept area" method. Both research vessels are of approximately the same size and used standard survey trawls (140' bottom trawls) of the same construction and rigging and, therefore, the trawl parameters used were the same for both vessels:

Towing time:	30 min.
Av. towing speed:	4.5 knots
Horizontal net opening:	22 m

Since a reliable estimate of the catchability coefficient was not available, it was taken as 1.0 to avoid overestimation of the biomass. Confidence intervals are given at the 95% significance level.

#### Results

The survey conducted in October-November 1982 was restricted to strata covering a depth range from 100 to 500 m. All strata fished, the number of successful standard tows and mean catches per tow are given in Table 1. Estimates of the minimum trawlable biomass of cod for the survey area covered in Division 2J are shown in Figure 1 for the whole time series from 1972 to 1982. Extremely high values obtained in 1979 by RV *Walther Herwig* and in 1981 by RV *Anton Dohrn* are both associated with very high variances indicating a comparatively uneven distribution of cod in Division 2J during these surveys and hence a possible overestimation of the respective biomasses.

Estimates of the trawlable biomass of cod for the area covered (21,052 nm<sup>2</sup>) by the survey in 1982 amounted to:

92,254 metric tons  $\pm$  24% and in numbers  
to 62,751  $\times$  10<sup>3</sup>  $\pm$  21.8%

A breakdown in numbers by ages for different depth ranges as well as for the total survey area and also the mean number per tow by age is given in Table 2. The predominating year-classes were those of 1978 (age 4) with 24% and 1975 (age 7) with 16% of the biomass estimate in numbers for the total survey area. Ages 3-9 made up 94%.

Length frequencies of the trawlable biomass in numbers for the whole area as well as in proportion to the areas of different depth ranges are shown in Figure 2. The modes at 37.5 cm and 61.5 cm of the very distinct bimodal length distribution mainly reflect the dominating year-classes 1978 and 1975 respectively.

Table 1. Mean catch of cod per standard tow per stratum fished by RV *Anton Dohrn* in Oct/Nov 1982 and weighted mean catch for total area covered in Div. 2J.

Depth zones (m)	Stratum No.	Area nm <sup>2</sup>	No. of tows	Mean catch per 30 min. standard tow	
				kg.	Nos.
101 -200	201	1,427	4	133.75	103.5
	205	1,823	4	136.75	117.5
	206	2,582	7	95.50	80.5
	207	2,246	1	28.00	38.0
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201 -300	202	440	2	258.00	103.5
	209	1,608	4	51.63	35.0
	210	774	3	98.67	76.0
	213	1,725	5	180.40	165.0
	214	1,171	9	406.55	232.0
	215	1,270	10	379.00	162.5
	228	1,428	5	59.40	43.0
234	not fished				
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301 -400	203	480	2	75.50	22.0
	208	448	2	38.00	16.5
	211	330	2	41.50	22.5
	216	384	1	0.0	0.0
	222	441	2	3.20	1.5
229	567	3	20.33	12.5	
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401 -500	204	354	2	13.50	4.5
	217	268	1	0.0	0.0
	223	180	2	0.20	0.5
	227	686	3	3.13	1.0
	235	420	2	14.25	4.5
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Total		21,052	76	117.24	97.64
Upper limit				145.38	118.93
Lower limit				89.10	76.34

Table 2. Age composition of cod in different depth ranges and in total survey area of Div. 2J according to minimum trawlable biomass (nos. x 10<sup>3</sup>) and to mean number per tow obtained from survey data, RV *Anton Dohrn*, Oct/Nov 1982.

Year-class	Age	per depth ranges (m)			Total	Mean number per tow
		101 -200	200 -300	301 -500		
81	1	298	37	-	326	0.507
80	2	1,215	1,104	49	2,368	3.686
79	3	4,186	3,910	94	8,190	12.749
78	4	7,423	7,503	129	15,055	23.436
77	5	3,312	5,363	96	8,771	13.654
76	6	909	2,310	61	3,280	5.106
75	7	2,721	7,005	333	10,059	15.659
74	8	2,418	5,773	322	8,513	13.252
73	9	1,606	3,287	260	5,153	8.022
72	10	346	491	51	888	1.382
71	11	-	-	-	-	-
70	12	23	24	1	48	0.075
69	13	15	7	-	22	0.034
68	14	5	20	-	25	0.039
67	15	19	5	-	24	0.037
Total		24,487	36,839	1,396	62,722	97.638
Upper limit					76,402	118.933
Lower limit					49,042	76.343

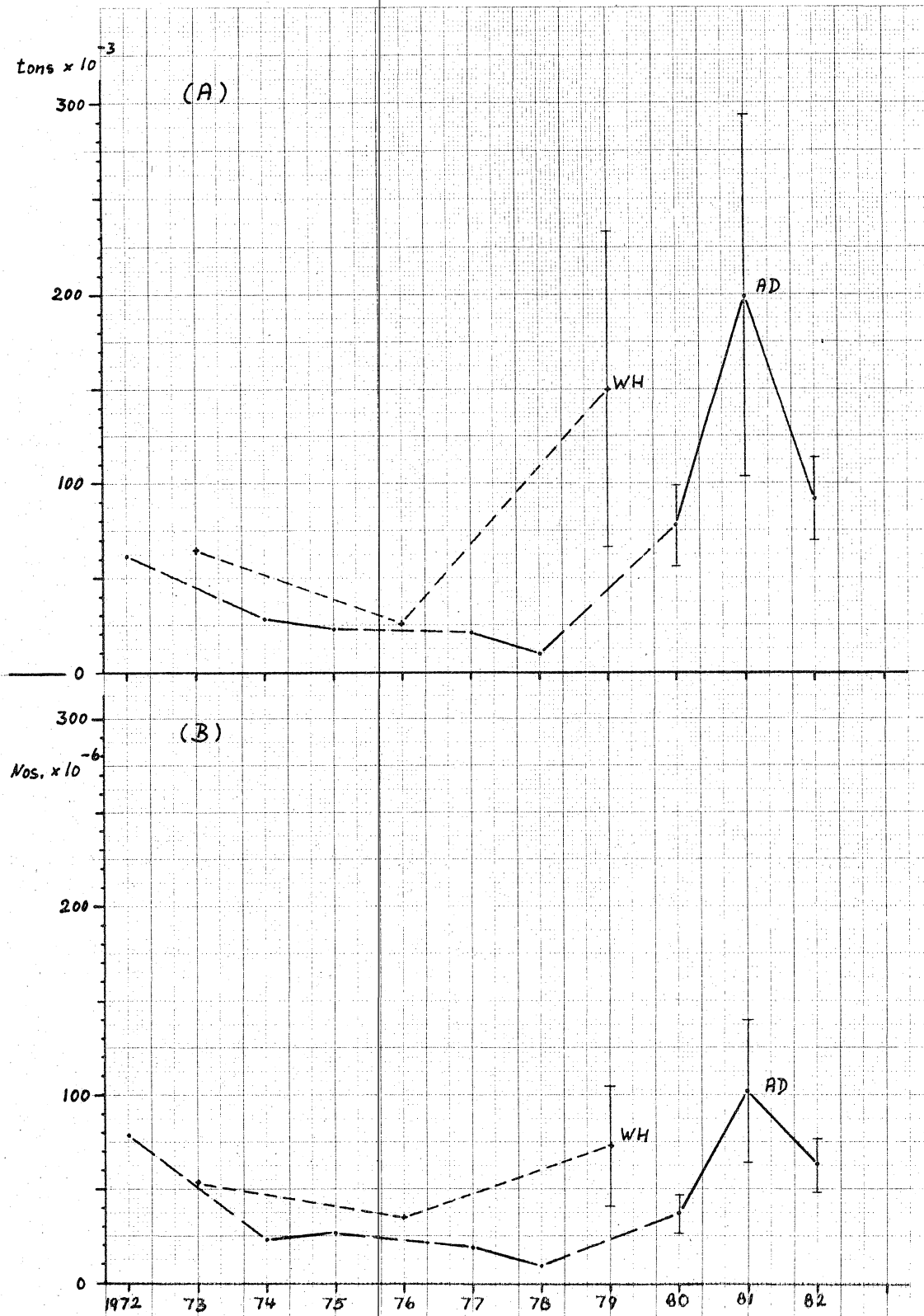


Fig. 1. Minimum trawlable biomass estimates of cod in Division 2J by weight (A) and numbers (B) from stratified random bottom trawl surveys conducted yearly in late autumn by RV Anton Dohrn (AD) and RV Walther Herwig (WH) respectively from 1972-82 (partly with confidence limits of 95% significance level).

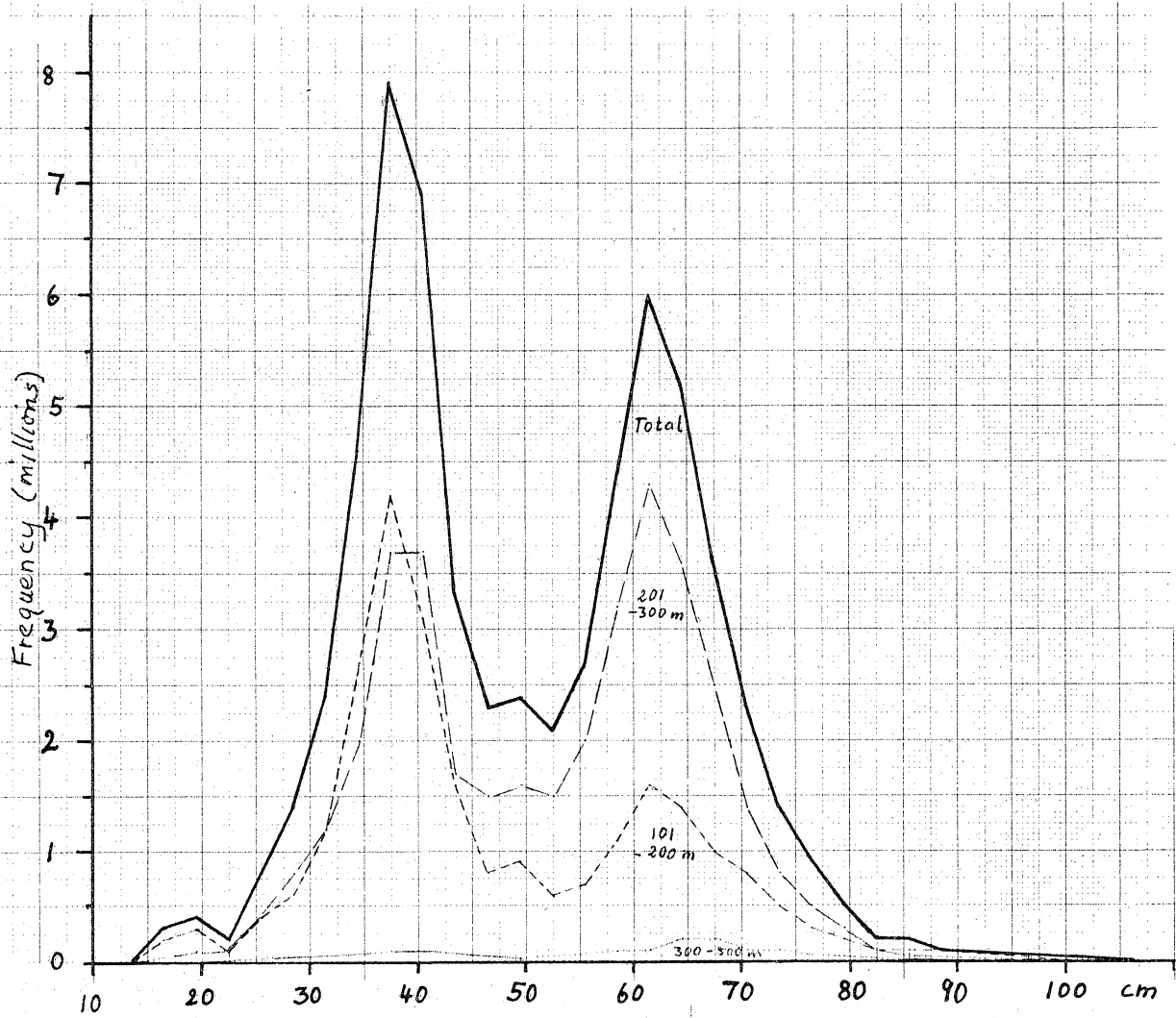


Fig. 2. Length frequency distribution of minimum trawlable biomass in numbers of cod proportional to depth zones in Division 2J obtained from survey data, RV *Anton Dohrn*, Oct./Nov. 1982.