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Research Vessel Survey Results for Cod in Division 2J as
obtained by *RV Anton Dohrn* and *RV Walther Herwig*
in Autumn 1972-83

by

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Introduction

Stratified-random groundfish surveys have been regularly conducted in Division 2J in late autumn since 1972. The coverage of the survey area is given for each year in Table 1. In order to achieve at comparable results the surveys were preferably carried out by *RV Anton Dohrn*. Only in 1973, 1976 and 1977 the vessel had to be replaced by *RV Walther Herwig*. However, both vessels were of similar size and used standard trawls of the same dimensions and rigging. The trawl parameters to calculate the swept area were therefore assumed to be the same:

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

For minimum biomass and abundance estimates a catchability coefficient of 1.0 was applied. Confidence intervals are given at the 95% level of significance.

Results

For the most recent surveys, 1982 and 1983, catch rates by number and weight per stratum as well as the corresponding biomass and abundance estimates are compiled in Table 2. The data clearly indicate a significant increase of biomass and abundance of the cod stock component in Division 2J in 1983. The trends in cod biomass and abundance levels in Division 2J since 1972 are reflected in figures 1 and 2 by the respective mean catch rates. After a considerable decrease of stock size between 1972 and 1974 a low level was maintained until 1978 followed by a continuing increase again up to the levels observed at the beginning of the survey time series. Extreme high catch rates obtained in 1979 and 1981 were both associated with very high variances and therefore not included in the trend curves.

The age compositions of cod for the whole survey time series, given by mean number per tow, are compiled in Table 3. Mean weights per tow are given for each year at the bottom of the table and mean lengths at age for 1982 and 1983 are also included. The age compositions 1982 and 1983 show, that year-class 1979, not yet fully recruited in 1982, appears to be predominant in 1983. Further good recruitment is indicated by considerable numbers of younger cod (year-classes 1980 and 1981) in recent survey catches. Cod of ages 2-5 amounted to 74% and among adult cod year-class 1975 (age 8) dominated in 1983. The length frequency distribution of cod in Division 2J as obtained from survey results in 1983 is given in Figure 3. The modes at 25.5 cm, 46.5 cm and 61.5 cm mainly reflect the outstanding year-classes 1981, 1979 and 1975 respectively.

Table 1. Number of tows per stratum from surveys conducted by *RV Anton Dohrn* (AD) and *RV Walther Herwig* (WH) in Division 2J.

Depth (m)	Strata	AD 1972	WH 1973	AD 1974	AD 1975	WH 1976	AD 1977	AD 1978	WH 1979	AD 1980	AD 1981	AD 1982	AD 1983
101-200	201	-	2	2	2	2	1	-	4	2	5	4	4
	205	1	4	5	5	4	4	-	6	5	5	4	4
	206	4	6	5	6	6	5	4	8	8	7	7	8
	207	2	3	3	3	4	1	5	5	4	7	1	-
	Total	7	15	15	16	16	10	9	23	19	24	16	16
201-300	202	-	-	-	1	2	1	-	2	2	2	2	3
	209	3	4	3	4	4	3	3	5	3	4	4	5
	210	-	1	-	2	3	2	2	3	5	2	3	5
	213	2	3	2	3	4	3	-	5	5	4	5	3
	214	-	2	4	2	3	3	-	3	2	4	9	10
	215	3	2	2	1	3	3	-	4	5	4	10	6
	228	-	4	6	5	4	4	4	4	7	3	5	5
	234	-	-	-	2	2	2	-	2	2	2	-	2
	Total	8	16	17	20	25	22	9	28	31	25	38	39
301-400	203	-	-	-	-	-	-	-	-	-	2	2	3
	208	-	-	-	-	-	-	-	-	-	1	2	3
	211	-	1	-	-	-	-	1	-	-	2	2	1
	216	1	2	2	4	2	2	-	2	1	2	1	3
	222	-	2	2	1	-	2	-	2	2	2	2	2
	229	-	2	-	1	2	2	2	2	2	1	3	1
	Total	1	7	4	6	4	6	3	6	5	10	12	13
401-500	204	-	-	-	-	-	-	-	-	-	2	2	3
	217	-	1	-	-	-	1	-	2	2	2	1	-
	223	-	1	1	-	1	2	-	2	2	2	2	-
	227	1	1	1	2	2	-	-	3	3	3	3	-
	235	-	-	-	-	-	-	-	-	-	1	2	1
	Total	1	3	2	2	3	3	0	7	7	10	10	4
GRAND TOTAL		17	41	38	44	48	41	21	64	62	69	76	72

Table 2. Mean catch of cod per standard tow, biomass, and abundance estimates per stratum by RV Anton Dohrn in October/November 1982 and 1983, in Div. 2J. Mean catch totals are weighted to the respective areas covered.

Depth zones (m)	Strata	Area nm ²	No. of sets		Mean catch per 30 min. tow				Biomass estimates		Abundance estimates	
			1982	1983	kg		Nos.		MT		Nos. x 10 ⁻³	
					1982	1983	1982	1983	1982	1983	1982	1983
101-200	201	1,427	4	4	133.75	153.28	103.5	106.0	7,141	8,184	5,526	5,661
	205	1,823	4	4	136.75	135.56	117.5	116.5	9,327	9,246	8,014	7,923
	206	2,582	7	8	95.50	83.11	80.5	76.0	9,226	8,029	7,777	7,322
	207	2,246	1	-	28.00	-	38.0	-	2,353	-	3,193	-
	Total	8,078	16	16	92.80	116.67	81.10	96.00	28,047	25,459	24,510	20,906
201-300	202	440	2	3	258.00	111.23	103.5	55.0	4,247	1,831	1,704	907
	209	1,608	4	5	51.63	448.20	35.0	312.0	3,106	26,965	2,106	18,762
	210	774	3	5	98.67	105.98	76.0	78.0	2,857	3,069	2,201	2,261
	213	1,725	5	3	180.40	401.28	165.0	338.5	11,643	25,896	10,649	21,855
	214	1,171	9	10	406.55	296.10	232.0	205.5	17,812	12,973	10,164	9,000
	215	1,270	10	6	379.00	220.69	162.5	132.5	18,009	10,486	7,721	6,299
	228	1,428	5	5	59.40	29.03	43.0	41.0	3,174	1,551	2,297	2,200
	234	508	-	2	-	140.06	-	84.0	-	2,662	-	1,593
	Total	8,924	38	39	103.24	255.88	117.01	135.62	60,848	85,433	36,842	62,877
301-400	203	480	2	3	75.50	72.38	22.0	23.5	1,356	1,300	395	424
	208	448	2	3	38.00	23.25	16.5	12.5	637	390	277	207
	211	330	2	1	41.50	285.75	22.5	145.1	512	3,528	278	1,792
	216	384	1	3	.00	66.98	.0	35.0	0	962	0	501
	222	441	2	2	3.20	5.79	1.5	2.5	53	96	25	37
	229	567	3	1	20.33	25.88	12.5	40.5	431	549	265	859
	Total	2,650	12	13	30.15	68.83	12.5	38.59	2,989	6,825	1,240	3,820
401-500	204	354	2	3	13.50	17.67	4.5	9.0	179	234	60	122
	217	268	1	-	.00	-	.0	-	0	-	0	-
	223	180	2	-	.20	-	.5	-	1	-	3	-
	227	686	3	-	3.13	-	1.0	-	80	-	26	-
	235	420	2	1	14.25	.00	4.5	.0	224	0	71	0
	Total	1,908	10	4	6.79	8.08	2.23	4.12	484	234	160	122
TOTAL		21,560	76	72	117.24	173.41	97.64	129.02	92,254	117,949	62,751	87,725
Upper limit					145.38	232.73	118.93	176.94	114,395	158,306	76,431	120,313
Lower limit					89.10	114.09	76.34	81.10	70,113	77,593	49,071	55,136

Table 3. Mean number and mean weight of cod per standard tow (1972-83) and mean length-at-age (1982-1983) from surveys conducted by R/V Anton Dohrn (AD) and R/V Walther Herwig (WH) in Division 2J.

Age	Mean number and mean weight of cod per standard tow (1972-83)										Mean length-at age (cm)			
	AD	WH	AD	AD	WH	AD	AD	WH	AD	AD	Year Class	1982	1983	
1	-	.024	1.642	-	.147	-	-	.024	-	-	1982	-	18.8	
2	.171	.164	4.025	.631	.930	.219	.182	.489	4.457	.507	81	1	17.2	
3	18.781	.797	1.577	21.975	9.604	.727	.887	1.491	15.045	3.684	80	2	27.3	
4	34.612	3.310	1.653	10.320	23.575	4.269	1.262	8.772	10.751	12.743	79	3	34.8	
5	73.249	13.482	2.975	3.593	8.977	3.129	5.505	9.330	23.424	20.665	78	4	39.4	
6	53.140	22.001	6.392	2.325	1.800	2.602	14.109	37.667	18.971	13.647	77	5	47.1	
7	27.285	21.498	9.117	2.774	.930	2.278	10.733	10.562	21.658	5.103	76	6	55.3	
8	6.810	12.507	5.103	2.518	.954	.866	5.295	20.926	15.658	10.935	75	7	62.7	
9	2.744	6.305	2.116	1.846	.587	.287	1.093	5.397	13.245	5.495	74	8	65.0	
10	1.030	2.453	1.298	.975	.429	.165	.084	.623	8.018	4.837	73	9	68.8	
11	-	.939	.796	.427	.069	.148	.120	.197	1.382	.212	72	10	75.9	
12	.855	.307	.301	.221	-	.113	.094	.358	-	.176	71	11	85.6	
13	.348	.231	.131	-	-	.063	.010	.075	.075	-	70	12	93.4	
14	.400	.074	.049	.101	-	.034	.070	-	.034	.050	69	13	100.8	
15	-	.036	-	.117	-	-	.006	.016	.039	-	68	14	103.3	
16	-	-	-	-	-	-	-	-	.037	.031	67	15	(95.1)	
NK	.239	.071	.032	-	-	-	-	.041	-	.045	-	-	16	(103.5)
TOTAL	219.67	84.19	37.21	47.83	48.00	33.93	39.27	76.90	107.81	97.64				
Mean Weight kg	178.37	103.97	46.48	41.28	36.19	Upper Limit	119.29	49.63	159.52	118.93				
						Lower Limit	34.51	28.91	56.10	76.36	81.10			
Mean Weight kg	178.37	103.97	46.48	41.28	36.19	Upper Limit	244.33	104.26	312.34	145.38				
						Lower Limit	70.67	60.74	109.86	89.10	114.09			

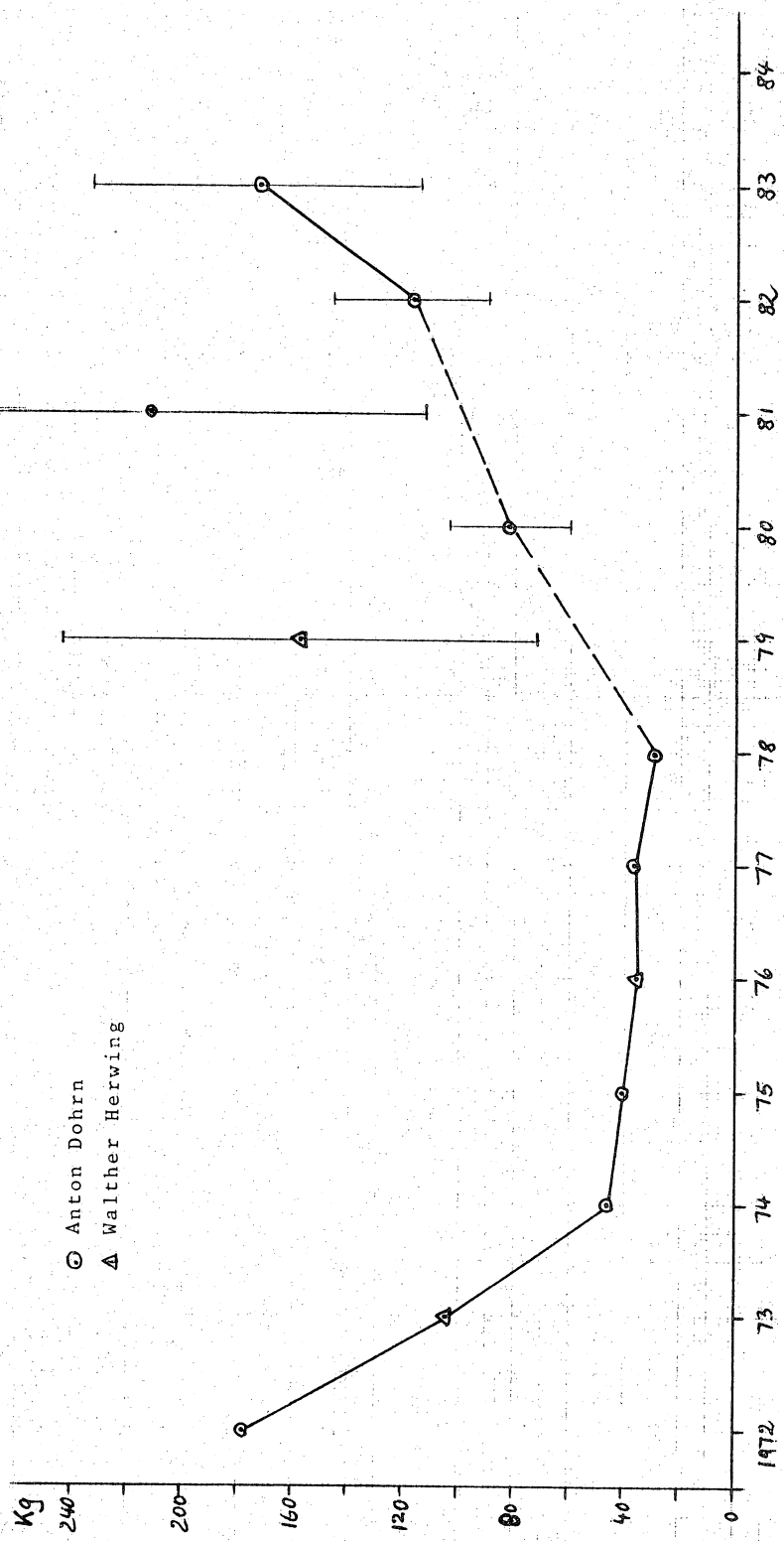


Fig. 1. Mean weight per tow for cod from surveys conducted by R/V Anton Dohrn and R/V Walther Herwig in Division 2J.

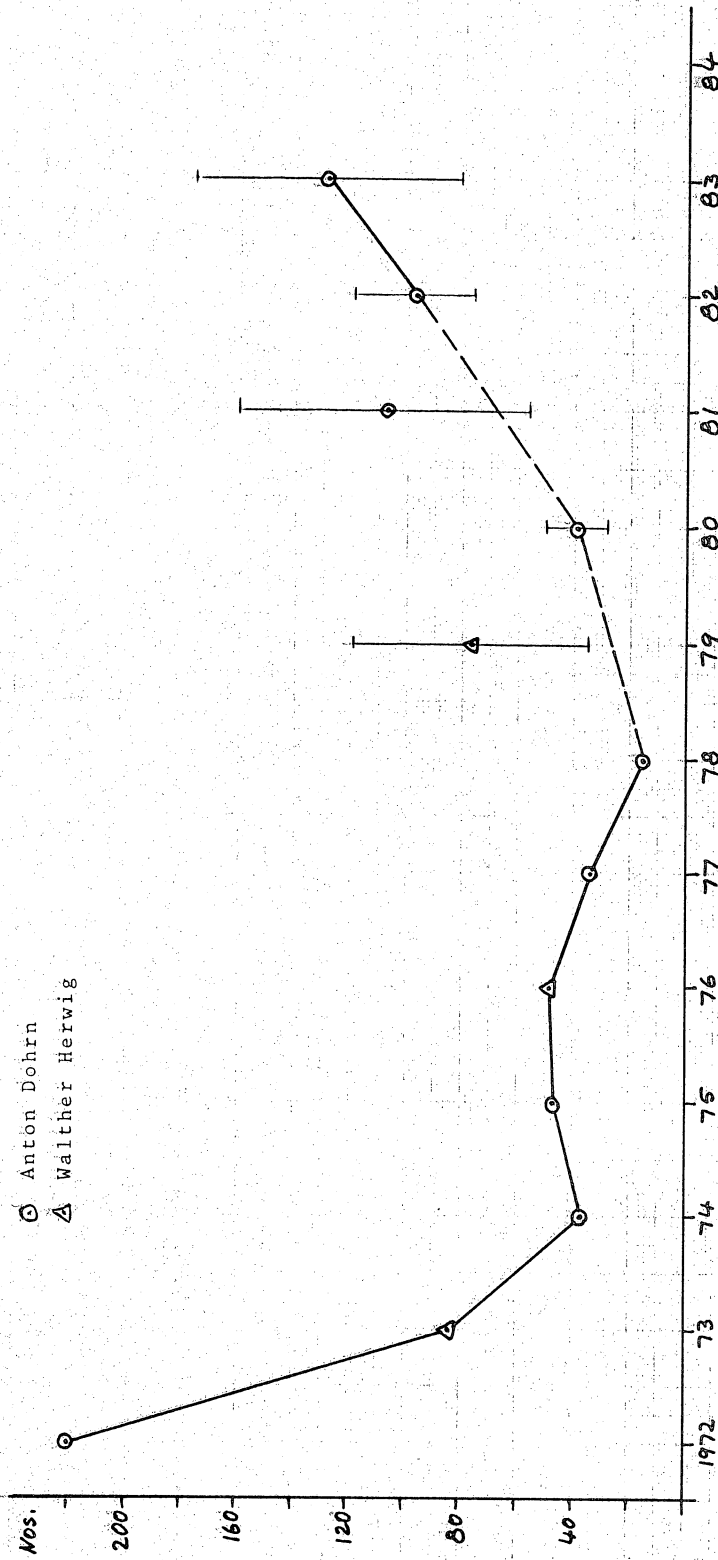


Fig. 2. Mean number per tow for cod from surveys conducted by R/V Anton Dohrn and R/V Walther Herwig in Division 2J.

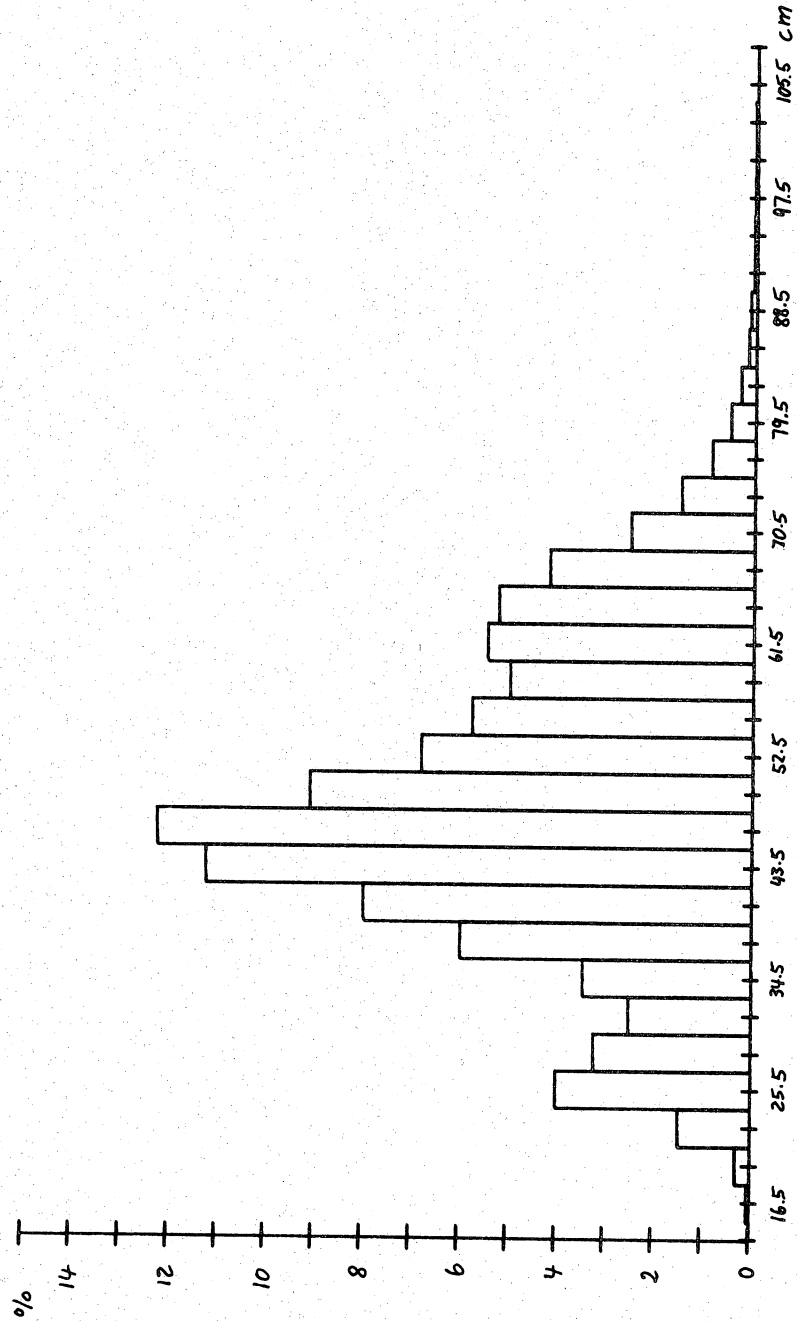


Fig. 3. Length frequency distribution of cod in Division 2J per 3 cm group (%) according to survey data obtained by R/V *Anton Dokim* in autumn of 1983.

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