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Norwegian Investigations on Shrimp (*Pandalus borealis*)

off West Greenland in 1984

by

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INTRODUCTION

The Norwegian quota of shrimp in West Greenland waters was reduced from 500 tonnes in 1983 to 450 tonnes in 1984. In 1984 four vessels have taken part in the fishery and the final reported landings are 451 tonnes.

Results of field investigations together with final catch and effort data for 1982 to 1984 are presented in this paper.

MATERIALS AND METHODS

From 24 April to 12 May 1984 one of the authors was an observer on board the stern trawler "Kap Farvel".

Due to bad ice conditions in West Greenland waters most of the tows were located in the Holsteinborg Dyb (around the position 66°N , Table 1). Out of 40 samples, 6 were taken in Sukkertoppen Dyb, 33 in Holsteinborg Dyb and only one at Store Hellefiske Bank (Fig. 1).

Random samples of shrimp catches were taken for length measurement (carapace length to nearest mm). In addition some length composition data were obtained for by-catches of Greenland halibut (Fig. 5), redfish (Fig. 6) and cod (Fig. 7). Monthly catch and effort data for 1982-1984 were compiled from logbooks of the vessels participating in the fishery (Table 3).

SIZE COMPOSITION OF SHRIMP

Length compositions of shrimp in samples collected by the observer on board "Kap Farvel" are listed in Table 2. The weighted mean length compositions (with catch as the weighting factor) for Sukkertoppen Dyb and Holsteinborg Dyb are shown in Fig. 2 and Fig. 3.

The catches at Sukkertoppen Dyb were made up of size groups from 21 mm to 29 mm. For the discards the size group 18 mm to 20 mm were dominating (Fig. 2). The quantity of discarded shrimp was 6.1 % of the total catches.

In the catches from Holsteinborg Dyb, shrimp with a modal group around 25 mm were dominating (Fig. 3). The quantity of discarded shrimp was 6.3 % of the total catches. From Store Hellefiske Bank only one catch of shrimp was sampled (Fig. 4). In the haul (tow 40, Table 1), the discard was 5.8% of the total catch.

BY-CATCHES IN THE SHRIMP FISHERY

By-catches of fish species in the trawl hauls of "Kap Farvel" examined by the observer are listed in Table 1 which shows that redfish were the most numerous. The mean number of fish relative to the mean shrimp catch (retained) per tow is given in the table below together with corresponding data for 1982-1983 (Smedstad and Torheim 1984). The table shows that the by-catch in the sampled catches were reduced especially for redfish.

Species	Mean number per haul		
	1982	1983	1984
Cod	2	+	2
Greenland halibut	48	36	6
Redfish	443	613	160
Others	129	14	14
Total	622	663	172
Nos of haul observed	34	34	40
Mean shrimp catch (kg)	1074	1115	1266
Nos of fish per kg shrimp	0,58	0,59	0,14

Length frequencies for Greenland halibut, redfish and cod are shown in Figs 5-7.

The categori others, i.e. mostly small skates, catfish and flatfish was at the same level as in 1983.

CATCH AND CATCH PER UNIT EFFORT

Table 3 shows catch per hour trawling (CPUE) by month and division for the Norwegian fishery at West Greenland from 1982 to 1984. The CPUE values in 1984 were highest in April in Div. 1 B.

The quarterly CPUE in Div. 1 B for the period 1980-1984 is shown in Fig. 8. The data for the second quarter in 1983 were very limited. However, it seems to have been a steady increase in the CPUE values for the second quarter from 1981 to 1984. The CPUE values for the third quarter show no significant change from 1982 to 1984.

REFERENCE

Smedstad, O. and Torheim, S. 1984. Norwegian Investigations on Shrimp, Pandalus borealis, off West Greenland in 1983. NAFO SCR Doc. 84/I/2.

Table 1. Catches of shrimp and by-catches of fish in some trawl hauls by M/V "Kap Farvel" off West Greenland in April - May 1984.

Nos	Date	Time (hr)	Position N W		Direc- tion towed	Towing- time (hr)	Shrimp catches				By-catches (Nos)				
							Landings		Discard		Total kg	Cod	Gre. hal.	Red fish	Other
							kg	%	kg	%					
1	24 April	0720	64°37'	53°08'	360°	4.00	340	20	5.6	360	11	5	200	-	
2	24 April	1200	64°46'	53°12'	360°	3.00	540	30	5.3	570	5	7	250	5	
3	24 April	1545	64°52'	53°11'	180°	2.41	540	35	6.1	575	11		60	29	
4	25 April	0525	64°43'	53°13'	360°	4.00	741	50	6.3	791	32	3	146	97	
5	25 April	0955	64°53'	53°11'	180°	3.41	900	60	6.3	960	4	-	10	8	
6	25 April	1555	64°48'	53°15'	360°	4.50	720	50	6.5	770	5	-	47	-	
7	26 April	0955	66°03'	55°25'	310°	4.00	1205	70	5.5	1275	-	-	60	-	
8	26 April	1716	66°04'	55°27'	320°	3.00	2000	42	2.1	2042	-	-	30	20	
9	27 April	0450	66°08'	55°22'	170°	2.16	1050	70	6.3	1120	-	7	200	39	
10	27 April	0745	66°03'	55°23'	340°	3.25	1200	60	4.8	1260	-	3	50	10	
11	27 April	1135	66°04'	55°26'	70°	1.58	1640	140	7.9	1780	-	-	60	36	
12	27 April	1415	66°05'	55°18'	120°	5.00	3750	300	7.4	4050	-	12	100	15	
13	28 April	0450	66°12'	55°25'	180°	3.33	900	40	4.3	940	-	20	50	-	
14	28 April	1530	66°10'	55°35'	120°	3.00	760	70	8.4	830	-	7	150	5	
15	29 April	0630	66°08'	55°12'	120°	1.50	390	30	7.1	420	-	-	20	-	
16	29 April	0835	66°08'	55°15'	250°	4.00	1680	86	4.9	1766	-	-	100	40	
17	29 April	1225	66°11'	55°27'	180°	1.08	1200	60	4.8	1260	-	-	82	18	
18	29 April	1620	66°12'	55°42'	-	2.50	905	40	4.2	945	-	-	90	30	
19	29 April	1945	66°08'	55°37'	340°	2.50	1405	100	6.6	1505	-	4	200	-	
20	30 April	0430	66°08'	55°25'	170°	3.25	985	60	5.7	1045	-	10	60	31	
21	30 April	0815	66°06'	55°21'	360°	3.00	1300	50	3.7	1350	-	3	50	4	
22	30 April	1420	66°12'	56°09'	140°	3.33	2300	120	5.0	2420	1	14	300	18	
23	1 May	0400	66°14'	55°18'	30°	2.50	990	80	7.5	1070	-	37	200	12	
24	1 May	0805	66°18'	55°11'	230°	2.66	440	40	8.3	480	-	3	20	9	
25	1 May	1520	66°14'	55°18'	270°	3.50	1080	100	8.5	1180	-	3	10	-	
26	2 May	0430	66°07'	55°16'	340°	3.50	880	60	6.4	940	2	22	196	-	
27	2 May	0830	66°15'	55°22'	150°	3.00	1700	90	5.0	1790	-	2	117	-	
28	2 May	1650	66°08'	55°29'	300°	2.80	1805	90	4.7	1895	1	2	100	-	
29	3 May	1200	66°12'	55°38'	360°	1.66	1355	270	16.6	1625	1	-	60	-	
30	3 May	1605	66°17'	55°42'	180°	2.00	1500	180	10.7	1680	-	-	100	4	
31	4 May	0335	66°12'	55°46'	360°	4.00	1350	90	6.3	1440	1	2	150	-	
32	4 May	1815	66°12'	55°41'	180°	3.75	1400	100	6.7	1500	-	-	7	58	
33	5 May	0540	66°58'	55°39'	360°	3.33	3000	200	6.3	3200	-	-	224	1	
34	5 May	1400	66°58'	55°40'	360°	-	2200	60	2.7	2260	-	-	50	-	
35	6 May	0635	65°58'	55°38'	360°	3.25	535	15	2.7	550	-	-	-	-	
36	7 May	0645	65°38'	55°25'	360°	3.25	1800	150	7.7	1950	3	-	300	34	
37	8 May	1840	66°04'	55°30'	50°	2.50	895	40	4.3	935	-	40	300	12	
38	9 May	1510	66°04'	55°42'	40°	2.50	900	60	6.3	960	2	2	100	12	
39	10 May	1535	66°10'	55°44'	180°	3.41	895	80	8.2	975	2	-	150	3	
40	12 May	1215	67°08'	56°34'	310°	3.00	1455	90	5.8	1545	-	12	2000	25	

Table 2. Length composition of random samples from shrimp catches by M/V "Kap Farvel" off West Greenland in April-May 1964. (Numbers in heading refer to tow numbers in the first column of Table 1).

Carapace-length (mm)	6	12	14	19	22	28	32	35	36	37	38	39	Total
15	-	-	-	-	-	1	-	-	-	-	-	-	1
16	1	-	2	2	-	2	-	-	1	1	-	1	10
17	3	-	2	3	2	3	-	-	-	1	-	1	15
18	5	4	8	7	6	16	12	-	4	6	1	5	74
19	11	1	8	8	7	7	12	-	-	5	3	14	76
20	20	6	19	19	10	16	25	4	1	8	3	13	144
21	20	12	30	24	19	20	33	5	2	11	6	44	226
22	15	10	34	30	16	26	30	5	6	12	3	37	224
23	10	29	16	23	14	18	13	17	27	19	10	11	207
24	23	41	20	24	33	25	19	40	51	23	33	13	345
25	32	52	27	25	24	21	20	50	42	37	39	15	384
26	30	28	9	17	30	21	16	41	34	36	47	17	326
27	13	6	11	11	20	13	13	15	26	23	27	16	194
28	11	6	12	4	16	8	6	20	5	15	17	5	125
29	4	5	2	3	3	2	1	3	1	3	6	7	40
30	2	-	-	-	-	1	-	-	-	-	5	1	9
Total	200	200	200	200	200	200	200	200	200	200	200	200	2400

Table 3. Catch (tonnes) and catch per hour trawling (CPUE) by month and division from 1982 to 1984.

Year	Month	1B		1C		1D		Not known		Total catch
		Catch	CPUE	Catch	CPUE	Catch	CPUE	Catch	CPUE	
1982	Apr	5	0.384	-	-	-	-	-	-	5
	May	64	0.151	2	0.083	-	-	-	-	66
	Jun	185	0.142	-	-	11	0.125	-	-	196
	Jul	109	0.228	55	0.200	396	0.274	-	-	560
	Total	364	0.164	57	0.191	407	0.265	-	-	828
1983	Jun	42	0.223	-	-	-	-	13	0.317	55
	Jul	137	0.255	-	-	210	0.298	-	-	347
	Aug	74	0.184	-	-	6	0.140	-	-	80
	Total	254	0.225	-	-	217	0.287	13	0.317	484
1984	Apr.	35	0.530	5	0.152	-	-	-	-	40
	May	43	0.261	29	0.363	-	-	-	-	72
	Jun	-	-	16	0.216	55	0.213	-	-	71
	Jul	133	0.250	39	0.224	51	0.206	26	0.274	249
	Aug	-	-	-	-	19	0.198	-	-	19
	Total	211	0.276	89	0.247	125	0.209	26	0.274	451

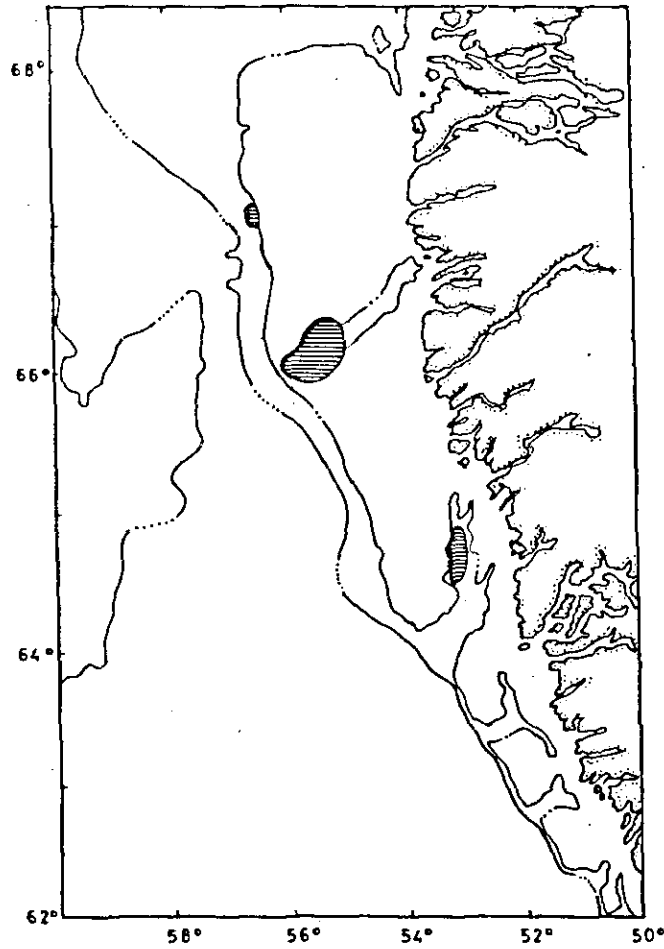


Fig.1. Hatched areas: Areas fished by M/V "Kap Farvel" during the stay of the observer in April - May 1984.

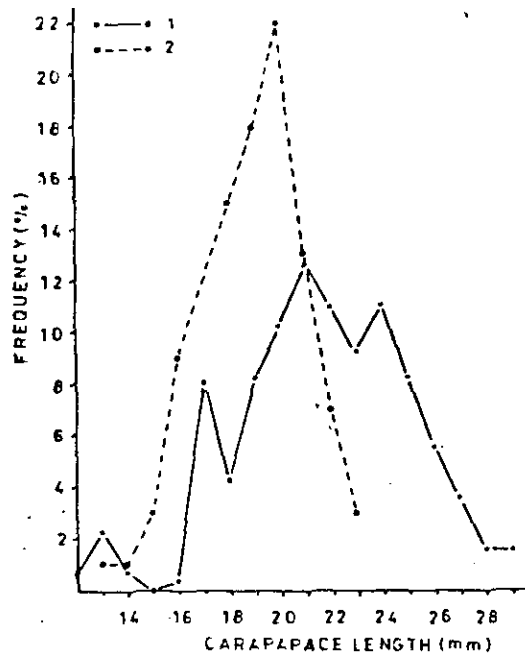


Fig.2. Weighted mean length composition of shrimp from Sukkertoppen Dyb in April 1984. 1) Landed shrimp 2) Discarded shrimp.

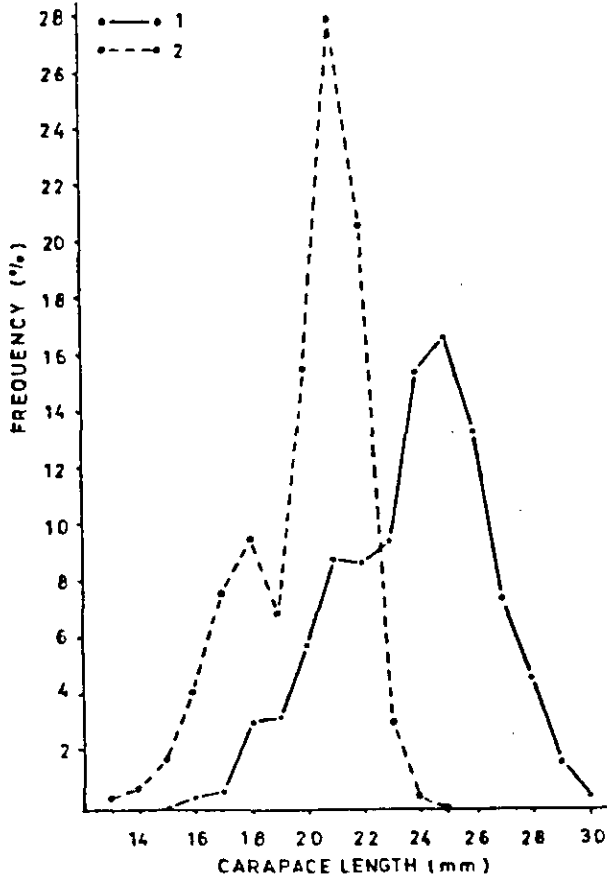


Fig. 3. Weighted mean length composition of shrimp from Holsteinborg Dyb in April-May 1984. 1) Landed shrimp 2) Discarded shrimp.

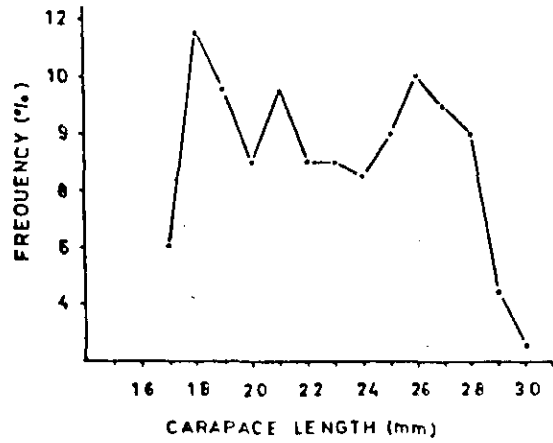


Fig. 4. Length composition of shrimp from one sample taken at Store Hellefiske Bank in May 1984.

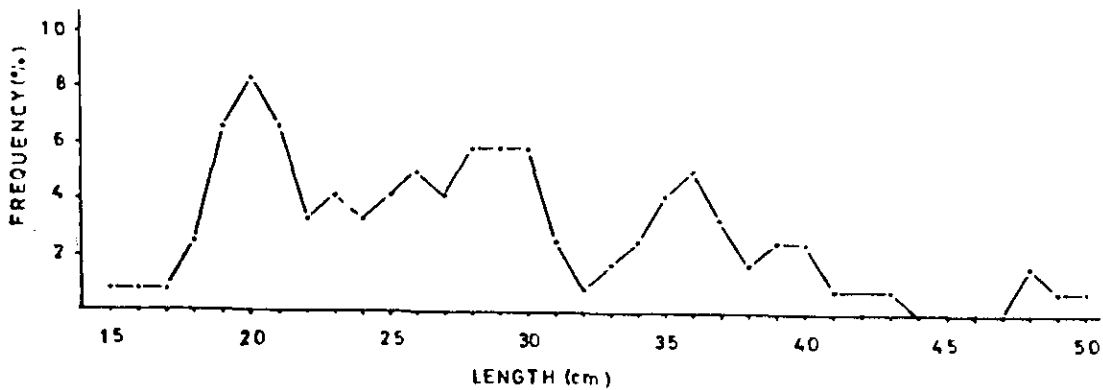


Fig. 5. Length composition of Greenland halibut taken as by-catch with shrimp off West Greenland (Holsteinborg Dyb) in April - May 1984.

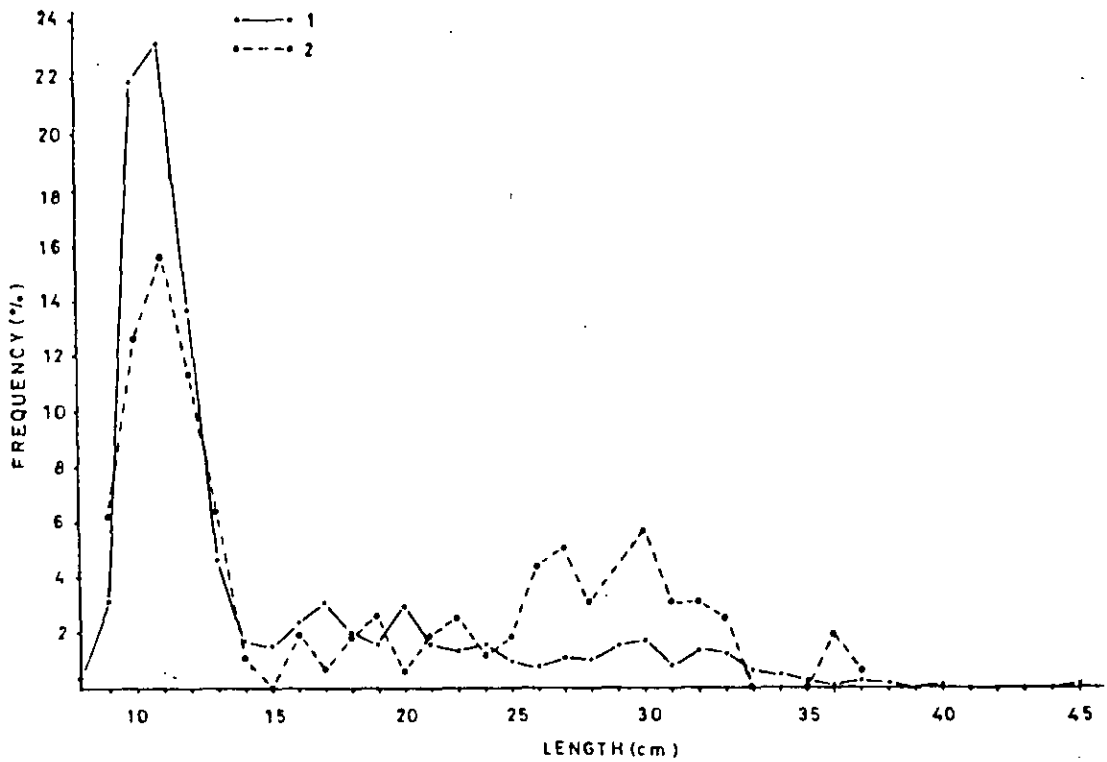


Fig. 6. Length composition of redfish taken as by-catch with shrimp off West Greenland in April - May 1984. 1) Holsteinborg Dyb 2) Sukkertopp Dyb.

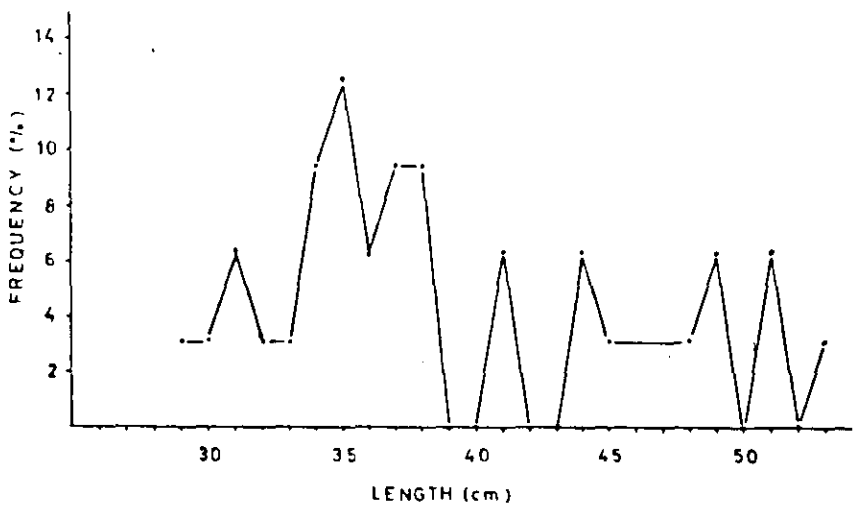


Fig. 7. Length composition of cod taken as by-catch with shrimp off West-Greenland (Sukkertopp Dyb) in April 1984.

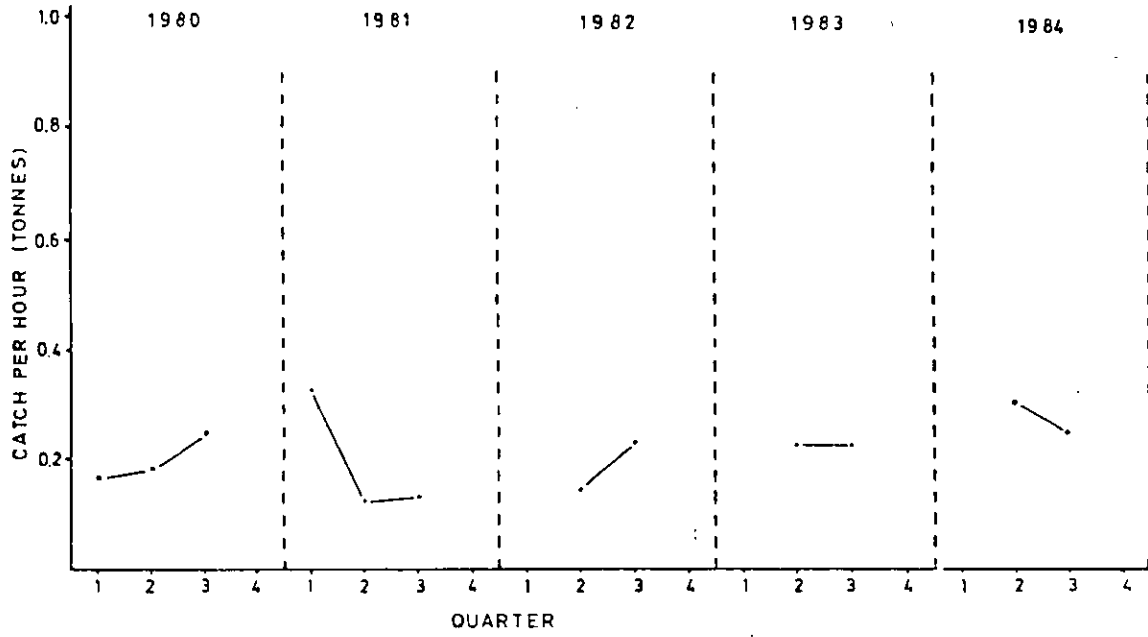


Fig. 8. Quarterly mean shrimp catch per hour trawling by Norwegian vessels in Div. 1 E 1980-1984.