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Norwegian Investigations on Shrimp,  
Pandalus borealis, off West Greenland  
in 1979

by

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INTRODUCTION

The Norwegian quota of shrimp off West Greenland decreased from 10300 tons in 1978 to 5016 tons in 1979. 25 vessels have taken part in the fishery in both years.

Results of field investigations, together with analyses of commercial fishery data for the years 1975-1978, were reported by Ulltang and Øynes (1978, 1979). The results of investigations carried out in 1979 together with analyses of preliminary catch and effort data for 1979 and the final catch and effort data for 1978 are presented in this paper.

MATERIALS AND METHODS

From 15 May to 7 June one of the authors was an observer on board the stern trawler "Langskjær". The shrimp were sorted into "large", "small" and "discard" categories after they were separated from the fish species in the catch. Details of the trawl hauls which were examined by the observer are given in Table 1. Apart from two hauls at Sukkertoppen Dyb and one haul in Holsteinborg Dyb, all catches examined were taken in a small area on the slope of 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 redfish and Greenland halibut.

Monthly catch and effort data for 1978 and 1979 were compiled from logbooks of the vessels participating in the fishery. The 1979 data are not complete, covering catches of about 3000 tons compared to the quota of 5016 tons which probably will be taken.

SIZE COMPOSITION OF SHRIMP

Length compositions of shrimp in samples of total catch collected by the observer on board "Langskjær" are listed in Table 2. The weighted mean length composition (with catch as the weighting factor) for the slope of Store Hellefiske Bank is shown in Fig. 2. Large shrimp with a modal group around 26-27 mm were dominating, and the length composition is similar to those reported by Ulltang and Øynes (1979) for 1976 and 1978 in this area, the large shrimp being even a little more dominating in 1979 compared to shrimp around 21-22 mm which made a second modal group in 1976 and 1978. As stressed by Ulltang and Øynes (1979), sampling over a very short period each year limits the value of between-year comparisons.

The quantity of discarded shrimp was 6.5% of the retained catches, compared to 8.4% in the same area in 1976, 21.7% in 1977 and 10.0% in 1978 (Ulltang and Øynes, 1979).

BY-CATCHES IN THE SHRIMP FISHERY

By-catches of fish species in the trawl hauls of "Langskjær" examined by the observer are listed in Table 1. None of the fish were kept except those consumed on board during the trip. As in 1976-1978, redfish were by far 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 1976-1978 (Ulltang and Øynes, 1979).

Species	Mean number per haul			
	1976	1977	1978	1979
Redfish	2254	1334	906	630
Greenland halibut	105	63	67	20
Cod	6	3	+	+
Others	21	38	22	109
Mean by-catch	2386	1438	995	759
No. of hauls observed	71	38	54	40
Mean shrimp catch (kg)	1438	862	1215	420
No. of fish per kg shrimp	1.66	1.67	0.82	1.81

The rate of by-catch was approximately the same as in 1976-1977, but there was more of the category "others" in 1979. This group consisted mainly of small skates and flatfishes.

The length composition of redfish caught at Store Hellefiske Bank is similar to those observed in the same area in 1977 and 1978 (Ulltang and Øynes, 1979) with most of the fish being between 10 and 20 cm (Fig. 3A). In one trawl haul at Sukkertoppen Dyb 1500 larger redfish ranging in size from 30 to 60 cm with mode around 40 cm were caught (Fig. 3B). Most of the Greenland Halibut taken as by-catch in the Store Hellefiske Bank area ranged in size from 20 to 50 cm with mode around 35 cm (Fig. 4).

#### CATCH AND CATCH PER UNIT OF EFFORT

Table 3 shows catch and catch per hour trawling (CPUE) by month and division for the Norwegian shrimp fishery off West Greenland in 1978 and 1979. The 1979 data are not complete as some logbooks had not been received and some fishing was still going on at the time of this analyses.

The annual mean catch rates (Table 4) in Div. 1C and 1D increased somewhat from 1978 to 1979, and the preliminary 1979 values are more or less at the level observed in 1975-1977 in these divisions. Also in Div. 1B there was a slight increase from 1978, but the 1979 value is still significantly below CPUE in 1975-1977. The apparent atypical situation in 1978 with no period during the first half of the year with very high CPUE values as in 1975-1977 seems to have continued into 1979, although CPUE values during the 1. quarter of 1979 showed some temporary increase. The level it reached was however far below the peak levels in 1975-1977 (Fig. 5).

#### REFERENCES

- ULLTANG, Ø. and P. ØYNES. 1978. Norwegian investigations on the deep sea shrimp, Pandalus borealis, in West Greenland waters. ICNAF Sel. Papers No. 4: 35-42
- ULLTANG, Ø. and P. ØYNES. 1979. Norwegian investigations on shrimp, Pandalus borealis, off West Greenland in 1977 and 1978. ICNAF Sel. Papers No. 6: (in press)

Table 1. Catches of shrimp and by-catches of fish in some trawl hauls by MV "Langskjær" off West Greenland in May-June 1979

No.	Date	Time	Position		Towing time (hr)	Shrimp catch (kg)				By-catches (numbers)			
			N.lat.	W.long		Large	Small	Total	Dis-card	Cod hal.	Gre. hal.	Red fish	Other
1	15 May	2110	64°09'	53°11'	1.00	30	10	40	1	0	0	13	8
2	16 May	0800	64°42'	53°15'	2.00			50	0	0	0	1500	8
3	17 May	0038	66°23'	54°43'	1.33	85	3	88	1	6	1	200	40
4	17 May	1145	67°14'	56°42'	2.16	135	4	139	1	0	7	400	71
5	17 May	1050	67°14'	56°37'	3.00	865	93	958	12	0	10	800	8
6	17 May	1710	67°15'	56°57'	3.00	900	120	1020	15	0	8	700	75
7	18 May	1200	67°10'	56°31'	1.00	45	3	48		0	6	200	179
8	18 May	1800	67°09'	56°41'	3.50	348	35	383	8	2	5	800	40
9	19 May	0005	67°12'	56°39'	2.16	111	15	126	5	2	4	200	214
10	19 May	1110	67°17'	56°57'	3.00	600	55	655	10	0	28	1400	163
11	19 May	1620	67°16'	56°42'	2.50	525	75	600	25	0	19	1200	172
12	19 May	2050	67°17'	57°01'	3.00	399	33	432	5	0	31	1000	67
13	20 May	0105	67°14'	56°50'	1.00	81	5	86	0.5	0	4	not counted	27
14	21 May	1235	67°19'	57°01'	3.00	410	60	470	25	0	24	600	127
15	21 May	1700	67°17'	56°59'	2.00	230	45	275	2	0	23	900	78
16	28 May	1255	67°36'	56°48'	3.00	375	161	536		0	15	82	84
17	28 May	2310	67°27'	56°43'	3.00	430	160	590		0	37	600	163
18	29 May	0800	67°27'	56°47'	3.00	410	140	550		0	51	200	116
19	29 May	1220	67°19'	56°43'	3.00	440	90	530		0	16	600	118
20	29 May	1650	67°25'	56°47'	3.00	405	108	513		0	67	500	154
21	29 May	2030	67°16'	56°37'	3.00	435	108	543		0	29	600	73
22	30 May	0645	67°20'	56°20'	3.00	440	144	584		0	46	4000	not counted
23	30 May	1100	67°27'	56°34'	3.00	375	102	477		0	47	not counted	100
24	30 May	1450	67°29'	56°54'	3.16	325	90	415		0	37	900	65
25	30 May	1900	67°15'	56°42'	3.00	285	112	397	40	0	33	800	46
26	30 May	2300	67°19'	56°45'	3.00	450	112	562		0	17	not counted	87
27	3 June	1220	67°25'	56°50'	3.16	230	96	326	15	0	3	200	42
28	3 June	1700	67°14'	56°27'	2.00	250	120	370		0	34	700	278
29	3 June	2000	67°22'	56°35'	3.00	270	138	408	70	0	21	400	135
30	4 June	0000	67°13'	56°35'	3.00	290	60	350	20	0	15	600	180
31	4 June	0800	66°57'	56°20'	3.00	155	60	215	10	0	16	150	27
32	4 June	1215	66°56'	56°20'	3.00	265	126	391	50	0	1	150	21
33	4 June	1630	66°40'	56°15'	3.00	255	24	279	5	0	5	500	13
34	4 June	2030	66°33'	56°19'	3.00	120	12	132	1	0	13	400	84
35	5 June	0700	67°12'	56°31'	3.50	400	180	580	65	0	30	500	242
36	5 June	1130	67°22'	56°40'	2.66	350	126	476	45	0	17	300	40
37	5 June	1930	67°17'	56°36'	3.00	330	126	456	65	0	8	300	497
38	6 June	0000	67°09'	50°25'	3.00	350	110	460	45	0	15	400	203
39	6 June	0930	67°15'	56°29'	3.00	365	186	551	70	0	37	700	87
40	6 June	1820	67°31'	56°42'	3.00	290	78	368	40	0	22	200	92
41	6 June	2230	67°24'	56°43'	3.00	340	132	472	40	0	17	600	191
42	7 June	0730	67°32'	56°48'	3.00	370	130	500	40	0	24	400	115
43	7 June	1730	67°23'	56°48'	3.00	365	120	485	60	0	21	500	59

Table 2. Length composition of random samples from shrimp catches by MV "Langskjær" off West Greenland in May-June 1979 (Numbers in heading refer to tow numbers in the first column of Table 1.

Carapace length (mm)	3	4	5	10	14	16	30	32	35	39	42	43	Total
12	-	-	-	-	-	-	-	-	-	-	1	-	1
13	-	-	-	-	3	7	-	-	5	2	-	1	18
14	1	-	-	1	1	3	-	-	4	3	5	4	22
15	-	-	-	1	-	3	1	-	9	5	6	3	28
16	-	-	-	1	2	5	2	-	3	5	2	2	22
17	-	-	-	1	2	3	-	-	7	2	5	1	21
18	-	-	-	3	3	11	-	1	6	5	6	1	36
19	1	-	1	-	6	10	1	5	5	6	10	3	48
20	1	1	1	4	6	9	4	9	13	12	7	10	77
21	1	-	3	4	7	5	3	13	11	10	15	4	76
22	2	2	3	4	4	8	5	17	12	12	8	10	87
23	5	5	1	6	8	6	9	22	13	17	8	5	105
24	20	6	5	8	4	13	10	10	7	7	8	7	105
25	30	15	34	16	18	14	16	17	16	14	23	20	233
26	34	38	37	32	23	15	25	14	14	21	19	23	295
27	15	23	25	30	30	19	25	15	20	15	19	24	260
28	6	14	21	20	13	11	18	5	8	6	10	14	146
29	1	5	5	3	15	2	6	3	3	5	6	4	58
30	-	5	3	2	6	1	3	-	1	1	2	4	28
31	1	-	-	-	1	-	1	-	-	-	1	1	5
Total	118	114	139	136	152	145	129	131	157	148	161	141	1671

Table 3. Catch (metric tons) and catch per hour trawling (CPUE) by month and division in 1978 and 1979 (CPUE is calculated as total catch/total effort; data for 1979 are preliminary).

Year	Month	0A		1A		1B		1C		1D		1E		1F		Total catch
		Catch	CPUE	Catch	CPUE	Catch	CPUE	Catch	CPUE	Catch	CPUE	Catch	CPUE	Catch	CPUE	
1978	Jan					5	0.111	67	0.186	324	0.203					396
	Feb			688	0.199	60	0.158	170	0.141					2	0.065	920
	Mar			314	0.201	124	0.150	42	0.082							480
	Apr			441	0.268	13	0.098	32	0.115							486
	May			852	0.243	1	0.25	8	0.123							861
	Jun			5	0.217	364	0.216	67	0.219	218	0.159					654
	Jul	14	0.269	45	0.313	703	0.238	8	0.131	15	0.103					785
	Aug			141	0.423	1193	0.265			20	0.625					1354
	Sep			59	0.331	605	0.209	2	0.111	46	0.418					712
	Oct	1	0.083			955	0.192	2	0.095	1	0.111					960
	Nov					1296	0.199	13	0.143	30	0.153	1	0.143			1339
	Dec									27	0.105					27
Total	15	0.234	250	0.369	7416	0.220	357	0.162	933	0.161	1	0.143	2	0.065	8974	
1979	Jan					599	0.353									
	Feb					616	0.326	23	0.228	116	0.253					
	Mar					294	0.384	50	0.216	28	0.143					
	Apr					113	0.346									
	May					170	0.179									
	Jun					74	0.107	97	0.345	304	0.288					
	Jul					445	0.216	1	0.2	14	0.203					
	Aug					73	0.192			2	0.125					
	Sep															
	Oct															
Total					2384	0.272	171	0.276	464	0.258						

Table 4. Mean catch per hour trawling (metric tons) for shrimp off West Greenland by Norwegian vessels in 1975 to 1979.

Year	0A	1A	1B	1C	1D
1975	-	-	0.510	0.225	0.242
1976	-	-	0.452	0.323	0.239
1977	0.216	-	0.409	0.229	0.275
1978	-	0.369	0.220	0.162	0.161
1979			(0.272)	(0.276)	(0.258)

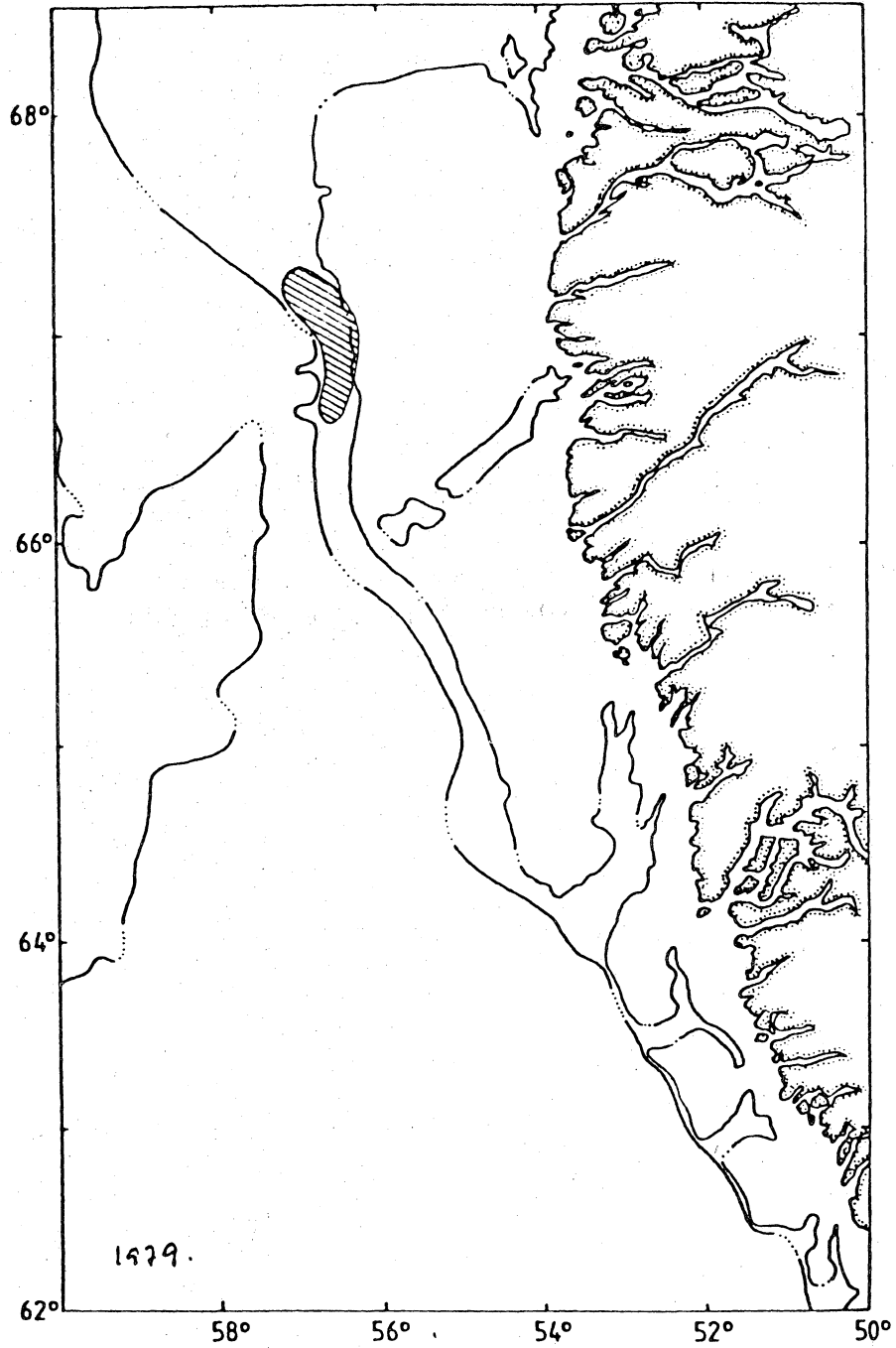


Fig. 1. Hatched area: Main area fished by MV "Langskjær" during the stay of the observer in May - June 1979.

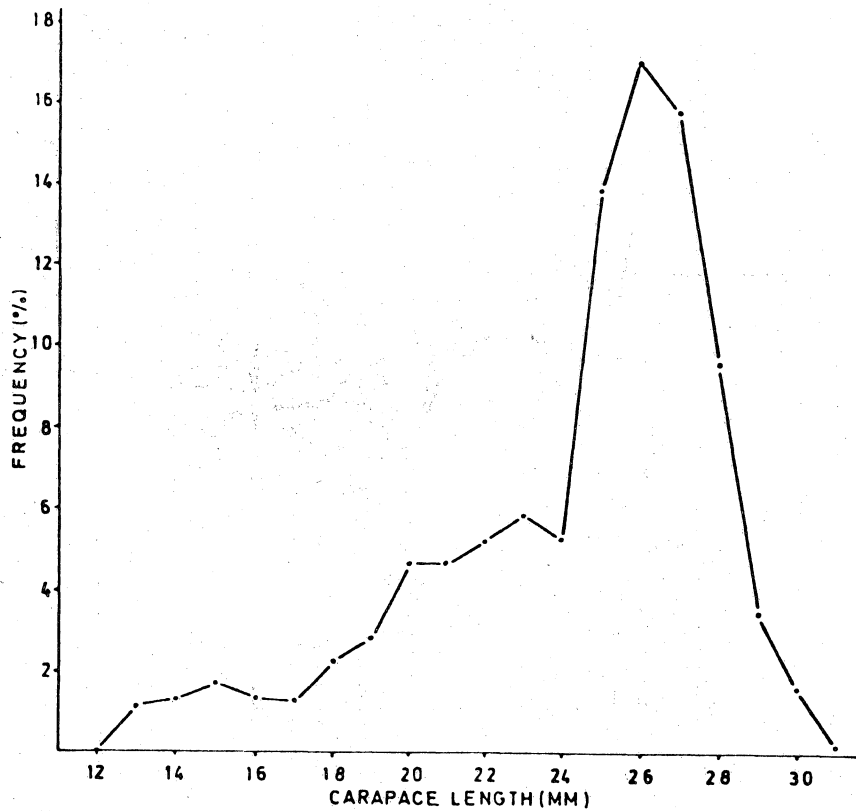


Fig. 2. Weighted mean length composition of shrimp from samples taken at Store Hellefiske Bank in May - June 1979.

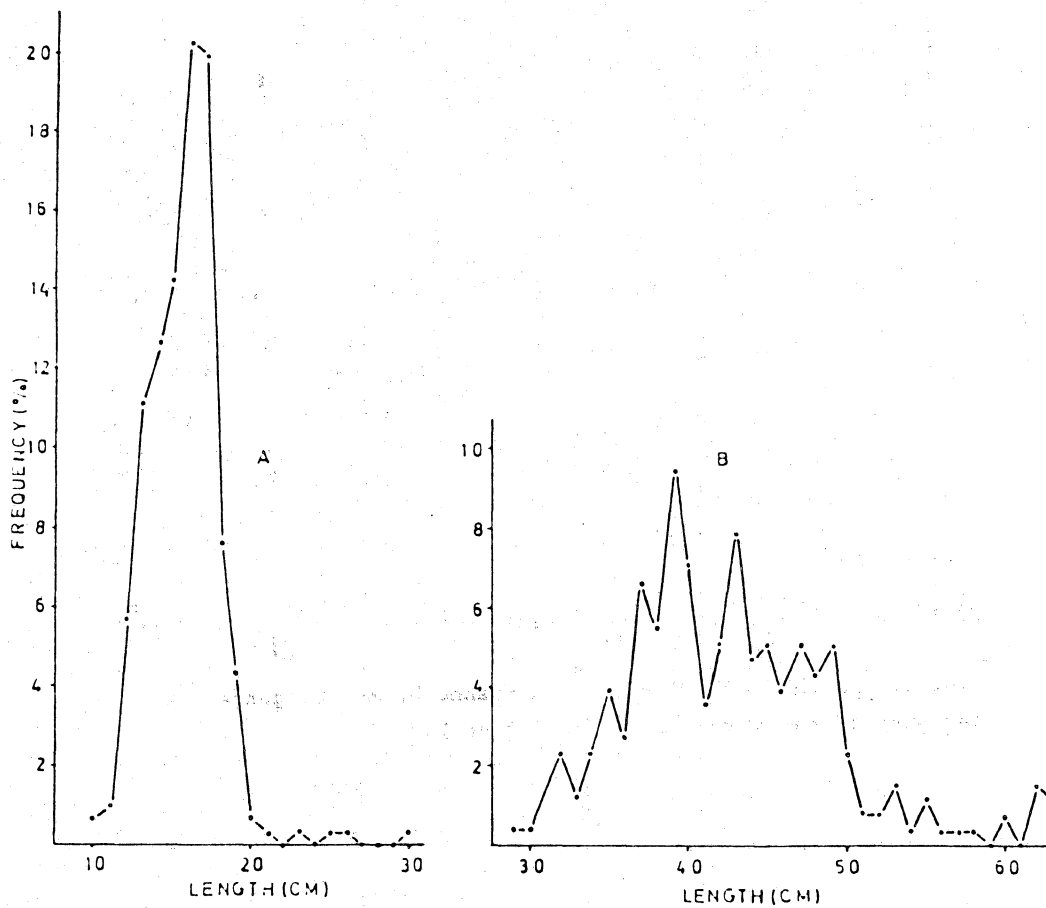


Fig. 3. Length composition of redfish taken as by-catch with shrimp off West Greenland in May - June 1979: (A) Store Hellefiske Bank, and (B) Sukkertoppen Dyb (caught in one trawl haul only).



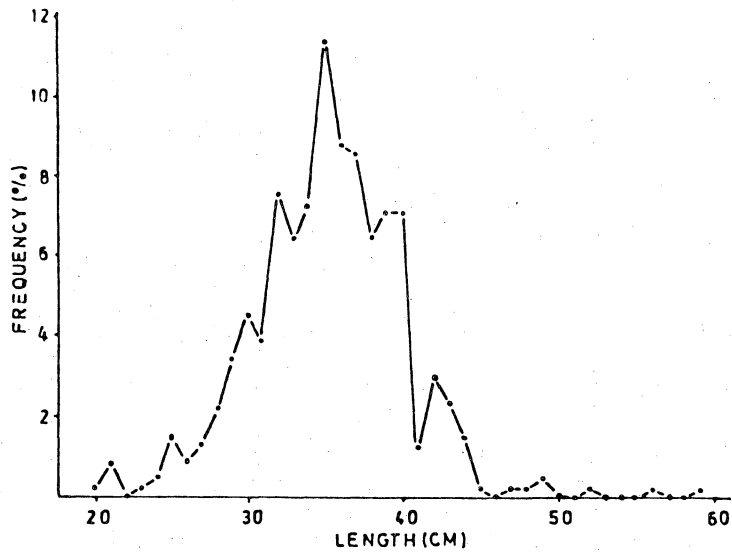


Fig. 4. Length composition of Greenland halibut taken as by-catch with shrimp at Store Hellefiske Bank in May - June 1979.

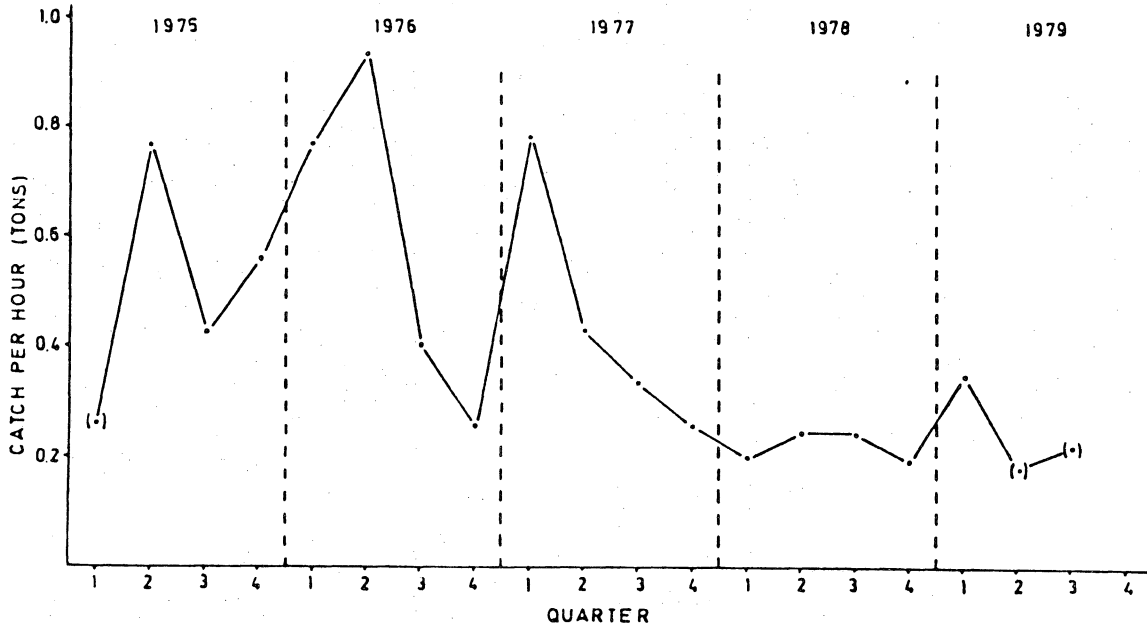


Fig. 5. Quarterly mean shrimp catch per hour trawling by Norwegian vessels in Div. 1B 1975 - 1979.