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Data relative to the French fishery for the northern shrimp (*Pandalus borealis*) at West Greenland in 1978

by

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Introduction

The French fishery for shrimp off West Greenland in 1978 was conducted by the freezer trawler *Finlande III*, which to date has completed two trips, the first from 12 April to 12 June and other from 19 July to 11 September. The vessel is 87 m in length with engine capacity of 3,600 HP. It uses a semi-pelagic or bottom trawl with a large vertical opening (6-7 m), a 35-m headrope, a 42-m footrope, and a codend mesh size (stretched) of 40 mm. The master of the vessel agreed to take samples of shrimp and provided his fishing logbooks, which gave, for each haul, information on position and depth of fishing, time and duration of haul, the shrimp catch and by-catch of other species. Before commercial sorting of the catches had begun, samples of shrimp (approximately 3 kg each) were taken from 8 hauls on the first trip and 7 hauls on the second trip (Table 1) and frozen for subsequent examination in the laboratory.

Biological Observations

The sampled shrimp were measured to the nearest half-millimeter from the eye lobe to the dorsal posterior edge of the carapace (carapace length), after separation of the specimens into males, transitionals and females and the weight of each sexual component of the sample recorded. The length composition of the samples from the two trips are given in Tables 2 and 3 and are illustrated in Fig. 1. The data on weight are listed in Table 4.

Examination of the specimens involved the recording of the stages of development of the female ovaries and of the transitionals, according to the following:

Stage 0 - Anterior ends thin, just reaching the posterior part of the stomach; posterior ends thin, not extending beyond the dorsal posterior edge of the carapace; colour pink to light brown when fresh.

Stage 1 - Anterior ends extending to the mid-line of the stomach; the paired, tubular structures not enlarged, less than half the greatest width of the carapace; posterior ends enlarged, growing backwards; colour dark brown to greenish brown when fresh.

Stage 2 - Anterior ends reaching the front edge of the stomach; posterior ends conspicuous between the carapace and the abdomen, extending into the first abdominal segment; colour light green to light greenish blue when fresh.

Stage 3 - Anterior ends concealing the stomach, extending near the edge of the eye-sockets; the paired, tubular structures enlarged, more than half the greatest width of the carapace; posterior ends broad, well inside the first abdominal segment; colour dark greenish blue when fresh.

Stage 4 - Anterior ends reaching the eye-sockets, turning inside and joining on the middle front of the stomach; posterior ends very broad; ovaries filling nearly the totality of the carapace in upper view; colour dark green when fresh.

The results of the study on ovarian development of transitionals and females in the samples are given in Table 5. No notable change in the relative proportions of males, females and transitionals was observed between the two trips.

For individuals, which have developed to stages 2 and 3 in June and which will recruit to the spawning stock, ovarian development is complete in August, as indicated by the majority of stage 4 shrimp which are very near to spawning. It must be noted that ovarian development in female shrimp is delayed when compared to that of transitionals developing toward first spawning. This was also noted in *P. borealis* populations off Newfoundland and Labrador and in the Barents Sea.

Observations on Catches

Catch-per-unit-effort

The average catch per hour trawling in Div. 1B, calculated from the total catch and the duration of actual trawling (including hauls with no catches), is practically identical for both trips: 322 kg for the period from 12 April to 12 June, and 321 kg for the period from 19 July to 11 September.

Diurnal variation in catch rate

The catch rates (kg/hour), calculated after grouping the trawl hauls into 4-hour periods, show a similar trend for both trips (Table 6). Catch rates increased gradually from a low level after midnight (0005-0400 hr) to a peak in the afternoon or early evening (1205-2000 hr), and then decreased in the late evening hours. The shrimp seem to rise slowly in the water mass in late evening and return to the bottom during the morning hours.

Variation in catch rate with depth

The catch rates (kg/hour), calculated for 50-m depth intervals, are given in Table 7. Only the trawl hauls made between 0800 and 1800 hours (local time) were taken into account. For both trips, the best yields were obtained at depths of 251 to 350 m. However, it is noted that the fishing effort (expressed in trawling hours) was relatively high in the 150-250 m depth range during the first trip whereas it occurred mainly in the 251-300 m range during the second trip, even extending into 301-400 m depths. Although ice conditions may have restricted trawling at the greatest depths during the first trip, it appears that shrimp move to greater depths in August and September with consequent substantial yields.

Estimates of Stock Size

For both trips, the hauls made between 0800 and 1800 hours were chosen to calculate the average yield per hour fishing. In effect, it is assumed that shrimp remain on the bottom during this period of the day. The following results were obtained from Div. 1B and 1C:

Div.	Catch	Hours trawling	Catch rate (kg/hr)
1B	313,395	782.15	400.6
1C	9,000	31.40	284.2

a5

The distance between the wing tips of the trawl is generally taken as half of the length of the headline, i.e. 17.5 m in the case of the trawl used on the two trips. The trawling speed varies between 2.5 and 3 knots depending on fishing conditions. An average speed of 2.8 knots was used, thus defining a swept area of 0.0907 km^2 per hour of fishing. Using 9,000 km^2 as the area of the fishing grounds in Div. 1B and 2,300 km^2 in Div. 1C, the stock sizes in these divisions were estimated as follows:

Div. 1B : 39,750

Div. 1C : 7,207 tons

The estimate obtained for Div. 1B is equivalent to that given by Hoydal (1978). However, the difference noted for Div. 1C (2,200 tons) can be attributed to the small amount of fishing time in this area. Only the area north of Div. 1C (near 66°N) was intensively fished, as the shrimp grounds further south did not provide sufficient commercial yield.

Effort and Yield by Rectangular Units

The rectangular units, as described by Horsted (1978), were used. The number of hauls in each unit area fished by month is shown in Fig. 2 and 3 for the first and second trips respectively. The average catch rates (kg/hour fishing) in each unit area are shown in Fig. 4. The areas of shrimp concentration in certain rectangular units can be seen from the number of hauls, since the main objective of a commercial trawler is to obtain the best possible catches. The catch per hour of fishing is of minimal value here, since all hauls were taken into account regardless of the size of the catch.

Biomass Estimate in Div. 1B

Taking into consideration strata 4, 6 and 7, described by Carlsson *et al.* (1978), these coincide with the unit areas fished by the French trawler during the first trip. Stratum 4 comprises units KV7, KT5 and KS5,each unit having a surface area of about 144.5 km^2; stratum 6 consists of units KN3, KN4, KN5, KP3, KP4, KP5 and KR5, and stratum 7 includes rectangular units KL3, KL4, KL5, KM2, KM3, KM4 and KM5, each unit having a surface area of approximately 148 km^2. Using 0.0909 km^2 as the area swept by the trawl per hour of fishing and the average catch rates for the indicated unit areas (from Fig. 4), the partial biomass for each stratum was calculated. The total biomass was then estimated by applying the total surface area of the stratum. For example, in stratum 4, the 3 unit areas give a partial biomass of 1,646 tons for a surface area of $3 \times 144.5 = 433.5$ km^2. Since the total surface area of stratum 4 is 720 km^2, the total biomass was estimated at 2,733 tons. Similarly, stratum 6 has a total biomass of 11,707 tons for 2,430 km^2, and stratum 7 a total biomass of 3,398 tons for 1,140 km^2.

From data obtained during the second trip, biomass estimates were calculated (using the same unit areas) for the same strata as follows: 2,317 tons in stratum 4, 7,809 tons in stratum 6, and 1,541 tons in stratum 7.

The apparent decreases in biomass from the first trip to the second are probably normal, because data for the same unit areas were used in the calculations for both trips, although as noted above the best fishing during the second trip occurred at greater depths and probably in some unit areas not included in the calculations.

The catch rates from Fig. 4, used in the calculations of biomasses, are relatively small, since they represent average catches per hour (including nil catches) and no adjustments were made to catches during periods when shrimp were dispersed in the water mass. It is hoped that additional data from a third trip of the trawler will provide a better picture of the abundance and structure of the shrimp stock at West Greenland.

References

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Table 1. Information on trawl hauls from which samples of shrimp were taken by Finlande III on two trips to the West Greenland area in 1978.

Sample No.	Date		Average position Lat.	Long.	Duration of haul (local time)	Depth (m)	Shrimp Catch (kg)	Shrimp C/hr (kg)	Redfish C/hr (kg)
1	Jun	5	68°00'	56°05'	1800-2000	140-155	600	300	0
2	"	7	67°32'	57°30'	0400-0600	225-240	1,000	500	75
3	"	8	67°43'	56°27'	0300-0515	170	300	133	-
4	"	10	67°45'	56°34'	0500-0730	185-200	800	320	-
5	"	10	67°50'	56°40'	1900-2130	...	600	240	-
6	"	11	67°45'	56°47'	0500-0730	170-205	800	320	200
7	"	11	67°35'	56°40'	1700-1800	195-205	800	700	800
8	"	12	67°35'	56°38'	0700-0830	180-205	400	270	135
1	Jul	24	67°35'	56°55'	1630-1915	210-225	1,300	473	0
2	Aug	3	68°00'	59°00'*	0430-0630	290-300	500	250	few
3	"	4	67°35'	58°16'	0515-0645	280	700	467	0
4	"	7	67°30'	57°55'	1420-1600	240-260	1,400	840	300
5	"	17	68°05'	57°20'	0700-0930	300	1,400	560	0
6	"	26	67°50'	57°40'	1700-1930	280-310	1,500	600	50
7	Sep	9	67°45'	58°25'	0800-0915	310	800	640	240

* At this position on Aug. 2, a catch of 1,500 kg of shrimp was taken in $2\frac{1}{2}$ hours fishing from 1315 to 1545 hr.

Table 2. Size distribution of males (M), transitionals (T) and females (F) in 8 samples from trawl catches off West Greenland, June 1978.

Length (mm)	1 M	1 T	1 F	1 Sum	2 M	2 T	2 F	2 Sum
7.5								
.5								
8.0								
.5								
12.0								
.5								
13.0								
.5								
14.0								
.5	3			3				
15.0	1			1				
.5	2			2	1			1
16.0	2			2	2			2
.5	3			3	3			3
17.0	4			4	2			2
.5	8			8	8			8
18.0	2			2	3			3
.5	11			11	4			4
19.0	9			9	8			8
.5	15			15	11			11
20.0	13		(1)	14	7			7
.5	18		-	18	14			14
21.0	15		-	15	19			19
.5	21		1	22	18			18
22.0	12		1	13	14			14
.5	15	1	-	16	26			26
23.0	6	3	-	9	12	2		14
.5	9	5	3	17	17	1		18
24.0	5	9	2	16	6	2		8
.5	5	9	9	23	4	3	2	9
25.0	-	10	9	19	3	6	5	14
.5	2	6	18	26		13	7	20
26.0		3	11	14		7	16	23
.5		7	17	24		2	9	11
27.0		1	17	18		-	10	10
.5		2	10	12		-	7	7
28.0			5	5		-	5	5
.5			7	7		1	4	5
29.0			2	2			2	2
.5			2	2			1	1
30.0								
.5								
Totals				352				287

Length (mm)	3 M	3 T F	3 Sum	4 M	4 T	4 F	4 Sum
7.5							
.5							
8.0							
.5				1			1
12.0				-			-
.5				-			-
13.0	1		1	-			-
.5	-		-	2			2
14.0	-		-	2			2
.5	-		-	2			2
15.0	-		-	1			1
.5	-		-	3			3
16.0	4		4	6			6
.5	1		1	-			-
17.0	1		1	5			5
.5	2		2	4			4
18.0	2		2	4			4
.5	1		1	4			4
19.0	5		5	8			8
.5	1		1	3			3
20.0	9		9	5			5
.5	9		9	4			4
21.0	6		6	15			15
.5	10		10	2			2
22.0	10	1	11	13			13
.5	6	3	9	5	1		6
23.0	16	6	22	13	4	1	18
.5	5	7	12	2	5	1	8
24.0	4	28	32	10	5	1	16
.5	1	24	25	2	8	1	11
25.0	2	57	59	1	12	-	13
.5		29	29	-	9	3	12
26.0		19	19	1	11	5	17
.5		10	10	1	1	3	5
27.0		17	17	-	1	8	9
.5		10	10	-	-	6	6
28.0		8	8	1	1	7	9
.5		4	4			2	2
29.0		3	3			2	2
.5		3	3			1	1
30.0		1	1				
.5							
Totals			326				219

Length (mm)	5 M	5 T	5 F	5 Sum	6 M	6 T	6 F	6 Sum
7.5								
.5								
8.0								
.5								
12.0					1			1
.5					-			-
13.0	1	(1)		2	-			-
.5	1			1	-			-
14.0	1	(1)		2	-			-
.5	4			4	1			1
15.0	2	(1)		3	2			2
.5	1			1	3			3
16.0	4			4	3			3
.5	6			6	3			3
17.0	5	(1)		6	5			5
.5	2	(1)		3	5			5
18.0	6			6	8			8
.5	5			5	4			4
19.0	13			13	6			6
.5	7			7	6			6
20.0	8			8	12			12
.5	11			11	14			14
21.0	12			12	7			7
.5	14	1		15	14			14
22.0	9	1	(1)	11	7			7
.5	13	2		15	9	1		10
23.0	8	2		10	8	2	1	11
.5	12	7		19	9	-	-	9
24.0	4	15	2	21	4	1	1	6
.5	1	22	11	34	5	5	10	20
25.0		23	12	35	1	12	12	25
.5		18	8	26	1	11	23	35
26.0		15	12	27		9	18	27
.5		7	9	16		4	13	17
27.0		1	6	7		2	15	17
.5			7	7		1	10	11
28.0			3	3			14	14
.5			1	1			7	7
29.0			3	3			5	5
.5			5	5			1	1
30.0			2	2			1	1
.5								
Totals				351				317

Length (mm)	7 M	7 T	7 F	7 Sum	8 M	8 T	8 F	8 Sum
7.5	1			1				
.5	-			-				
8.0	-			-				
.5	-			-				
12.0	2			2				
.5	-			-	2			2
13.0	2			2	(1)			1
.5	-			-	3			3
14.0	3			3	-			-
.5	2			2	3			3
15.0	11			11	5			5
.5	4			4	8			8
16.0	13			13	9			9
.5	11			11	15			15
17.0	19			19	8			8
.5	8			8	10			10
18.0	16			16	10	(1)		11
.5	10			10	10	(1)		11
19.0	12			12	13			13
.5	6			6	17			17
20.0	17			17	12		(1)	13
.5	5			5	17		-	17
21.0	18			18	22		(1)	23
.5	15			15	16		-	16
22.0	26			26	22		-	22
.5	15	1		16	12	2	-	14
23.0	18	4		22	21	3	-	24
.5	6	5	1	12	9	6	2	17
24.0	4	12	1	17	5	7	1	13
.5	5	5	3	13	1	14	-	15
25.0	2	24	3	29	3	14	5	22
.5	2	7	8	17		17	7	24
26.0		21	12	33		10	14	24
.5		3	8	11		10	6	16
27.0		6	17	23		3	12	15
.5		1	9	10		2	8	10
28.0			6	6		1	3	4
.5			5	5			5	5
29.0			4	4		1	1	2
.5			-	-			5	5
30.0			-	-				
.5			1	1				
Totals				420				417

Length (mm)	Total all samples* M	T	F	Sum
7.5	1			1
.5	-			-
8.0	-			-
.5	1			1
12.0	3			3
.5	2			2
13.0	5			5
.5	6			6
14.0	7			7
.5	15			15
15.0	23			23
.5	22			22
16.0	39			39
.5	41			41
17.0	49			49
.5	46			46
18.0	50			50
.5	49			49
19.0	69			69
.5	65			65
20.0	74		(2)	76
.5	83		-	83
21.0	108		1	109
.5	100	1	1	102
22.0	103	1	2	106
.5	95	8	-	103
23.0	86	20	2	108
.5	64	29	7	100
24.0	38	51	8	97
.5	23	66	36	125
25.0	10	101	46	157
.5	5	81	74	160
26.0	1	76	88	165
.5	1	34	65	100
27.0	-	14	85	99
.5	-	6	57	63
28.0	1	2	43	46
.5		1	31	32
29.0		1	19	20
.5			15	15
30.0			3	3
.5			1	1
Totals				2689

* These frequencies do not include the frequencies for sample 3 for which females and transitionals were not separated.

Table 3. Size distribution of males (M), transitionals (T) and females (F) in 7 samples from trawl catches off West Greenland, July-September 1978.

Length (mm)	1				2				3				4			
	M	T	F	Sum	M	T	F	Sum	M	T	F	Sum	M	T	F	Sum
8.0																
.5	1			1												
9.0	-			-												
.5	1			1												
10.0	-			-												
.5	1			1												
13.0	3			3												
.5	-			-												
14.0	1			1												
.5	2			2												
15.0	3			3												
.5	5			5												
16.0	8			8	1			1								
.5	3			3	-			-								
17.0	8			8	-			-	4			4				
.5	10			10	1			1	5			5	1			1
18.0	18			18	-			-	2			2	1			1
.5	6			6	1			1	1			1	1			1
19.0	8			8	-			-	4			4	2			2
.5	7			7	2			2	9			9	2			2
20.0	9			9	-			-	10			10	2			2
.5	12			12	8	1		9	16			16	4			4
21.0	8			8	2	-		2	21			21	13			13
.5	19			19	6	-		6	26			26	13			13
22.0	18			18	7	-		7	17			17	15			15
.5	19	1		20	6	1		7	32			32	27			27
23.0	9	1	1	11	7	-	1	8	38			38	30			30
.5	5	-	1	6	7	1	-	8	37		1	38	25			25
24.0	5	6	5	16	9	-	1	10	27		-	27	16	1		17
.5	1	19	7	27	9	2	4	15	23	3	1	27	10	3		13
25.0	1	10	11	22	6	4	7	17	15	5	3	23	9	10	1	20
.5		13	19	32	5	6	7	18	10	5	5	20	1	14	3	18
26.0		4	15	19	6	8	7	21	2	6	8	16	2	17	9	28
.5		5	17	22	1	14	16	31	2	8	8	18	1	14	19	34
27.0		2	21	23	1	9	25	35		4	8	12		8	13	21
.5			17	17	-	7	17	24		3	15	18		6	14	20
28.0			10	10	1	3	16	20		1	9	10		2	10	12
.5			4	4		1	20	21			8	8			3	3
29.0			3	3			8	8			4	4			4	4
.5			4	4			6	6			1	1			4	4
30.0			2	2			3	3			1	1				
.5			1	1			2	2								
31.0							1	1								
.5																
32.0																
.5																
Total				390				284				408				330

Length (mm)	5				6				7				Total all samples			
	M	T	F	Sum	M	T	F	Sum	M	T	F	Sum	M	T	F	Sum
8.0	1			1									1			1
.5	-			-									1			1
9.0	-			-									-			-
.5	-			-									1			1
10.0	-			-									-			-
.5	-			-									1			1
13.0	-			-									3			3
.5	1			1									1			1
14.0	-			-									1			1
.5	1			1									3			3
15.0	1			1									4			4
.5	1			1									6			6
16.0	2			2	1			1					12			12
.5	2			2	-			-					5			5
17.0	2			2	2			2					16			16
.5	1			1	2			2					20			20
18.0	5			5	1			1					27			27
.5	7			7	3			3	1			1	20			20
19.0	6			6	4			4	-			-	24			24
.5	10			10	9			9	2			2	41			41
20.0	11			11	3			3	3			3	38			38
.5	8			8	7			7	4			4	59	1		60
21.0	23		1	24	4			4	2			2	73	-	1	74
.5	15		-	15	11			11	13			13	103	-	-	103
22.0	22		-	22	13			13	8			8	100	-	-	100
.5	20		-	20	9			9	13			13	126	2	-	128
23.0	19		2	21	17			17	21			21	141	1	4	146
.5	14	2	-	16	19	-	1	20	18	1		19	125	4	3	132
24.0	14	10	2	26	15	3	-	18	19	2	1	22	105	22	9	136
.5	5	8	7	20	9	8	5	22	13	1	2	16	70	44	26	140
25.0	5	12	9	26	10	7	16	33	14	10	3	27	60	58	50	168
.5		13	7	20	3	11	14	28	6	10	5	21	25	72	60	157
26.0		7	19	26	-	8	16	24	3	10	10	23	13	60	84	157
.5		5	20	25	1	4	29	34	6	13	12	31	11	63	121	195
27.0		2	18	20		2	18	20		10	19	29	1	37	122	160
.5		1	19	20		2	24	26		5	23	28	-	24	129	153
28.0		1	8	9		-	16	16		2	14	16	1	9	83	93
.5			4	4		-	7	7		1	12	13		2	58	60
29.0			4	4		1	5	6			5	5		1	33	34
.5			-	-			4	4			8	8			27	27
30.0			3	3			2	2			-	-			11	11
.5											1	1			4	4
31.0															1	1
.5																
32.0																
.5											1	1			1	1
Total				380				346				327				2465

Table 4. Number and weight of shrimp by sex in samples taken on two trips to West Greenland by *Finlande III*, 1978.

Trip No.	Sample No.	Male N	Male W(g)	Transitional N	Transitional W(g)	Female N	Female W(g)	Total N	Total W(g)
1	1	181	1030	56	480	115	1200	352	2710
	2	182	1030	37	340	68	710	287	2080
	3	96	...	(230)[1]	...	...	...	326	3870
	4	120	600	58	520	41	400	219	1520
	5	155	770	114	980	82	810	351	2560
	6	138	650	48	450	131	1430	317	2530
	7	253	1340	89	800	78	940	420	3080
	8	256	1350	90	830	71	730	417	2910
	Total	1285[2]	6770[2]	492[2]	4400[2]	586[2]	6220[2]	2689	21260
2	1	191	915	61	555	138	1430	390	2900
	2	86	590	57	555	141	1550	284	2695
	3	301	1855	35	335	72	760	408	2950
	4	175	1225	75	775	80	930	330	2925
	5	196	1100	61	540	123	1250	380	3030
	6	143	890	46	430	157	1670	346	2990
	7	146	1070	65	660	116	1570	327	3300
	Total	1238	7645	400	3850	827	9160	2465	20655

[1] Specimens not separated into "transitionals" and "females".
[2] Excludes figures for Sample No. 3.

Table 5. Number and percentage of female and transitional shrimp in samples from two trips to West Greenland waters in 1978.

Trip No.	Sample No.	Sex	Stage 0 N	Stage 0 %	Stage 1 N	Stage 1 %	Stage 2 N	Stage 2 %	Stage 3 N	Stage 3 %	Stage 4 N	Stage 4 %
1	2	Female	10(2)[1]	15	20(3)[1]	29	33(3)[1]	49	5	7	-	-
		Trans.	2	5	6	16	11	30	15	41	3	8
	5	Female	8	10	23	28	27	33	20	25	3	4
		Trans.	2	2	13	12	40	36	53	48	3	3
	6	Female	8(4)[1]	7	39(6)[1]	34	45(1)[1]	39	20	17	3	3
		Trans.	3	5	6	11	15	27	29	52	3	5
	8	Female	-	-	2	8	11	44	10	40	2	8
		Trans.	1	1	3	3	21	23	57	63	8	9
2	1	Female	3	2	-	-	13	9	89	65	33	24
		Trans.	-	-	-	-	1	2	18	29	42	69
	2	Female	10	7	6	4	27	19	83	59	15	11
		Trans.	-	-	-	-	5	9	29	51	23	40
	3	Female	1	1	1	1	23	32	40	56	7	10
		Trans.	-	-	-	-	2	6	18	51	15	43
	4	Female	1	1	-	-	7	9	50	63	22	27
		Trans.	-	-	-	-	1	1	28	37	46	61
	5	Female	1(2)[2]	3	-	-	4	3	26	21	90	73
		Trans.	1	2	1	2	-	-	15	24	44	72
	6	Female	1(6)[2]	4	-	-	1	1	13	8	136	87
		Trans.	-	-	1	2	-	-	6	13	39	85
	7	Female	1(3)[2]	3	-	-	1	1	21	18	90	78
		Trans.	-	-	-	-	-	-	7	11	58	89

[1] Numbers in parentheses are individuals in which the eggs are recently hatched (special setae on pleopods).
[2] Eggs at stage 0, without visible embryos.

Table 6. Variation in catch rates (CPUE) of shrimp by time of day, based on data from two fishing trips off West Greenland, 1978.

Trip No.	4- hour Period	Catch (kg)	Effort (hr)	CPUE (kg/hr)
1	0005-0400	12,510	77.35	161
	0405-0800	40,310	146.45	275
	0805-1200	45,210	128.30	352
	1205-1600	50,030	158.15	316
	1605-2000	76,660	168.50	468
	2005-2400	37,190	126.50	295
2	0005-0400	12,835	117.20	109
	0405-0800	32,585	177.35	183
	0805-1200	53,790	139.10	387
	1205-1600	86,655	175.20	494
	1605-2000	66,165	168.30	393
	2005-2400	50,615	169.20	299

Table 7. Variation in catch rates (CPUE) by depth, based on data from two fishing trips off West Greenland, 1978.

Trip No.	Depth (m)	Catch (kg)	Effort (hr)	CPUE (kg/hr)
1	< 150	5,225	17.20	301
	150 - 200	43,980	135.35	324
	201 - 250	53,730	124.35	431
	251 - 300	13,300	28.45	463
	301 - 350	7,000	25.40	273
	351 - 400	1,050	4.55	214
2	< 150	-	-	-
	150 - 200	4,275	13.30	317
	201 - 250	35,570	96.55	367
	251 - 300	81,095	165.20	490
	301 - 350	34,535	81.55	422
	351 - 400	10,230	22.35	453

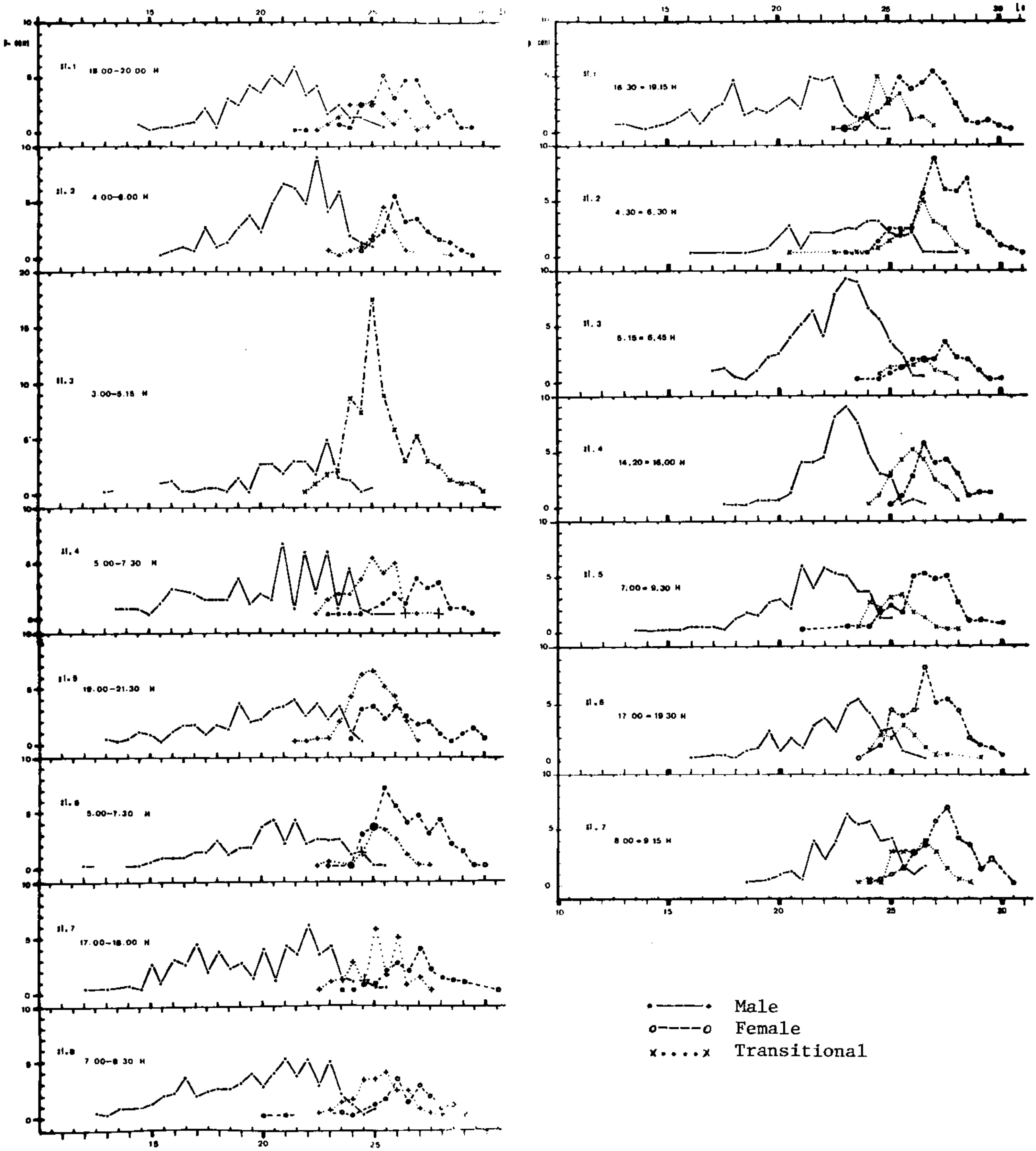

Fig. 1. Size composition of male, transitional and female shrimp in samples taken during two trips of the trawler *Finlande III* to West Greenland, 1978. (Samples taken in June are on the left and those taken in July-September are on the right side of the illustration.)

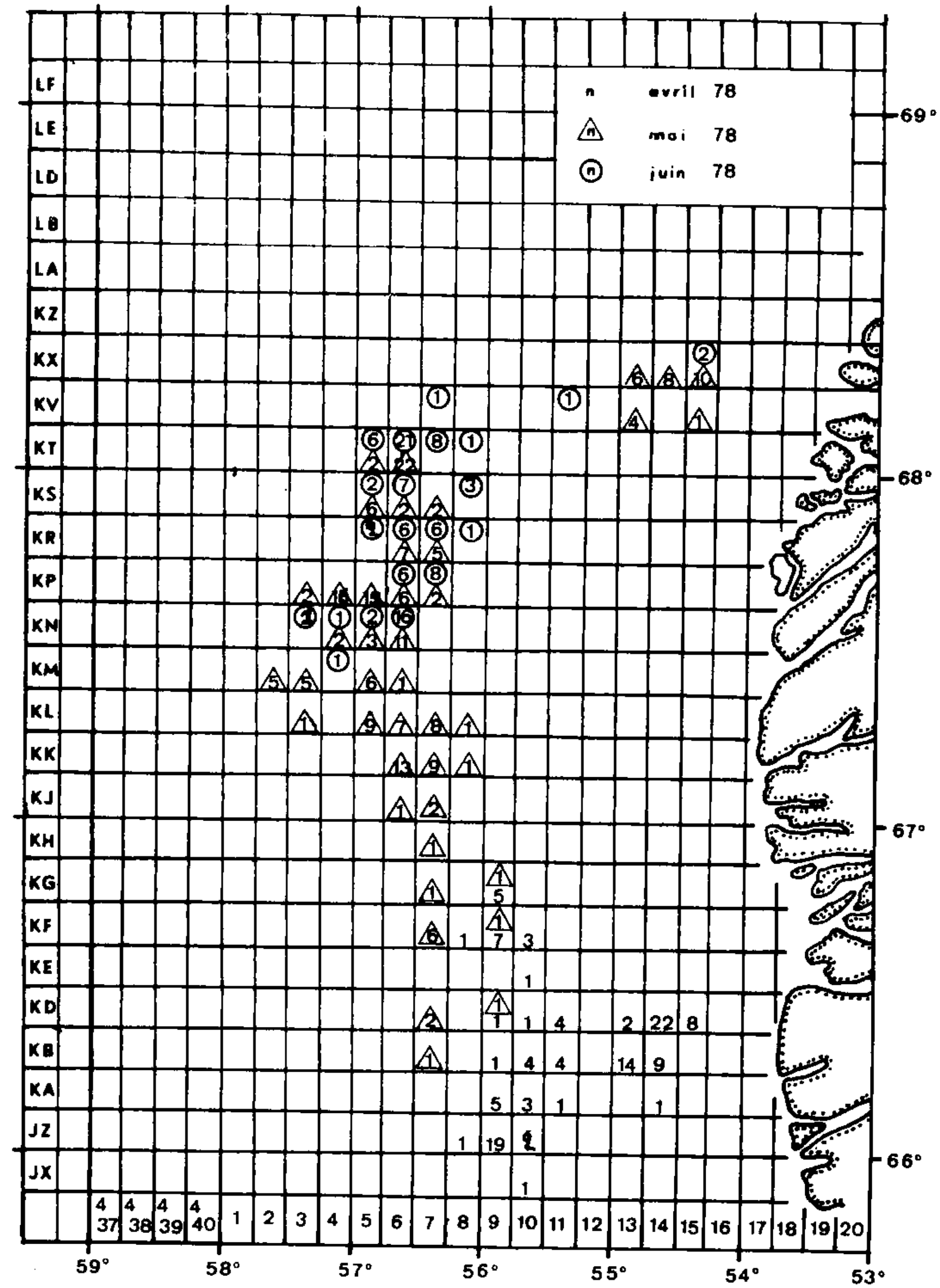

Fig. 2. Distribution of fishing effort (numbers of hauls by rectangular unit area for the first trip of *Finlande III* to West Greenland, 12 April-12 June 1978.

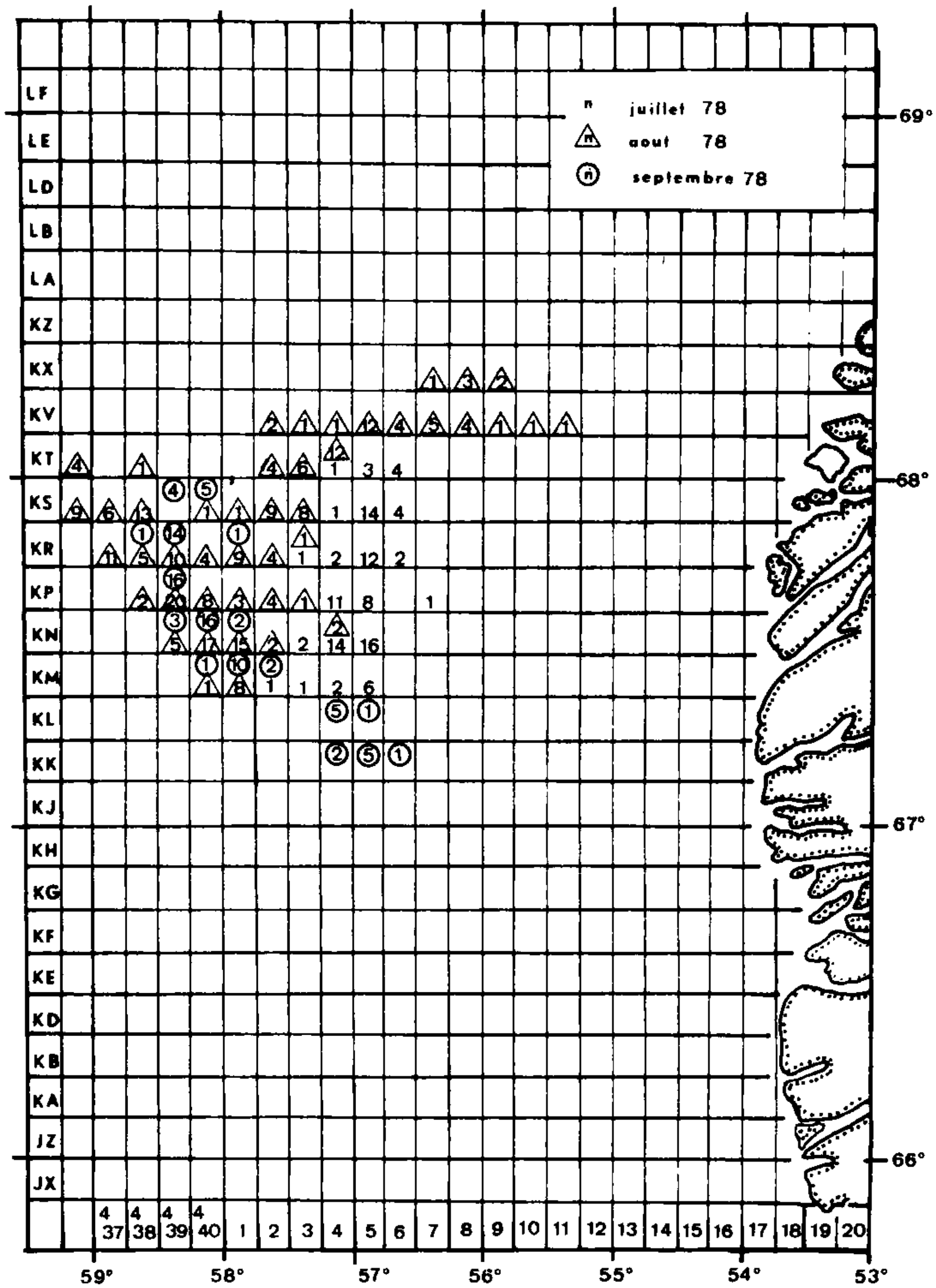

Fig. 3. Distribution of fishing effort (numbers of hauls by rectangular unit areas for the second trip of *Finlande* III to West Greenland, 19 July-11 September 1978.

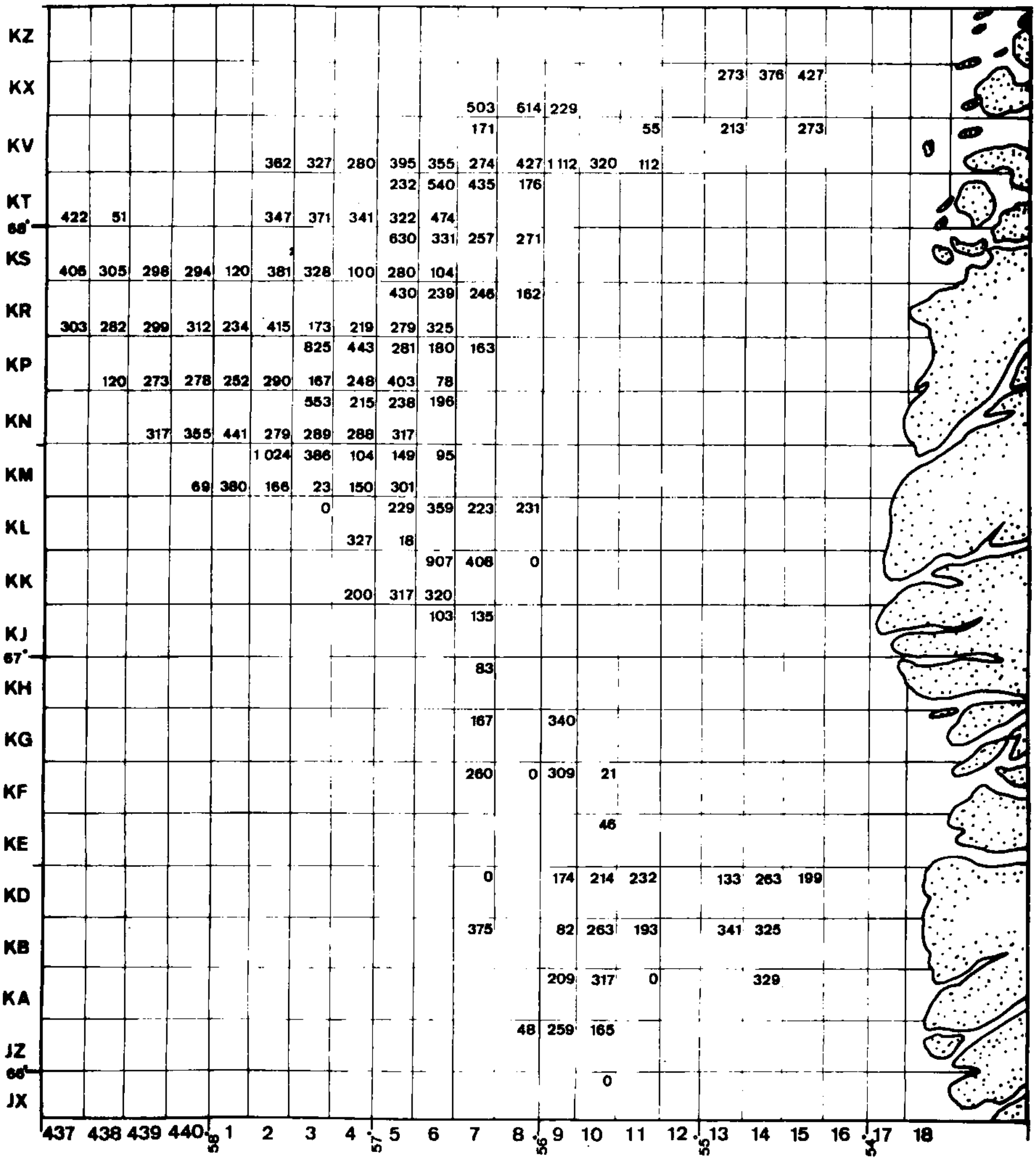

Fig. 4. Catch-per-unit-effort (kg/hr) by rectangular unit areas for *Finlande III* at West Greenland, 1978. (Figures in the upper part of the rectangles pertain to the first trip and those in the lower part pertain to the second trip.)