Northwest Atlantic Fisheries Organization

Serial No. N1104

NAFO SCR Doc. 86/6

SCIENTIFIC COUNCIL MEETING - JANUARY 1986

Catch, Effort and Biological Data of Shrimp (Pandalus borealis) in the French Fishery off East Greenland in 1985

by

J. C. Poulard[1], B. Fontaine[2], A. Battaglia[1] and P. Derible[1]

I - Introduction.

In 1985, the French fishery for shrimp off East Greenland was conducted by two trawlers during the spring, one in summer and one in autumn. The total reported catch of shrimp was 642 tons. The fishing logbooks of Finlande III have been available to the Saint-Pierre et Miquelon laboratory and eleven samples of shrimp were collected on board, frozen and examined at the Boulogne laboratory.

Information on location of the spring and autumn fisheries, catches (effort and c.p.u.e.) and on biological characteristics of shrimp (length distribution, composition by sex) are presented in this paper.

II - Observations on catches and fishing effort.

Finlande III fished off East Greenland firstly from April 10th to June 10th and caught 238 tons of shrimp and secondly from October 7th to November 4th and caught 83 tons of shrimp. The gear used, as previous years, was a "Kalut" otter trawl.

1. Location of the fishery.

The fishery was located on the Dorhn Bank, on the Greenland side of the mid-line to Iceland.

In April, the shrimp fishery stretched from 65°30 N to 66°30 N on depths from 275 m to 485 m. Most of tows however were located in a small area in the south of the Dorhn Bank (units 112 JX, 112 JV and 113 JV) on depth 350-400 m (fig. 1 a and 1 b, table 1).

In May, the fishery shifted northwards (fig. 2 a and 2 b). Most of effort was made between 66°00 N and 66°30 N on depths from 275 m to 325 m.

In June, the fishing area was restricted along the 66°30 N parallel from 28°30 to 29°45 W, on depth 300-350 m (fig. 3 a and 3 b).

1 - Institut Français de Recherche pour l'Exploitation de la Mer
B.P. 4240 - 97500 SAINT PIERRE ET MIQUELON

2 - Institut Français de Recherche pour l'Exploitation de la Mer
150 Quai Gambetta - 62200 BOULOGNE-SUR-MER

It is noted that during the last two weeks of this first trip, the ice cover disturbed the fishery, impeding the trawler to move northeast. A total of 34 units (representing an area of 4800 km²) was fished in April, May and June.

In October and beginning of November, the fishery took place mainly south of 66°30 N with most of the tows in the vicinity of units 114-115 Ka and Kb (fig. 4 a, 4 b, 5 a and 5 b) on depths from 275 to 325 m. 16 units (2200 km²) were fished during the second trip.

2. Catch and c.p.u.e.

Catch, effort and average c.p.u.e. obtained by Finlande III during the spring 1985 are given monthly in the following table :

Fishing period	April 10-30	May 1-31	June 1-10	Total
Catch (tons)	88	120	30	238
Fishing effort (hours)	257	402	137	796
CPUE (kg/hour)	342	299	219	299

As in 1981, the c.p.u.e. declined throughout the fishing period. Exception made of the year 1984 for which the French fishery had taken place at an earlier period, the mean c.p.u.e for April-June period (299 kg/hour) is the best one observed since the beginning of the French shrimp fishery in East Greenland waters. Monthly mean c.p.u.e are generally above the c.p.u.e observed in previous years (April 1981 and the year 1984 excepted, fig. 6, table 2).

For the first time since the beginning of the French shrimp fishery at East Greenland, the Finlande III fished in autumn. Catches, effort and average c.p.u.e obtained are presented per month, in the following table :

Fishing period	October 7-31	November 1-4	Total
Catch (tons)	74	9	83
Fishing effort (hours)	294	37	331
CPUE (kg/hour)	252	243	251

Table 3 shows the distribution of mean c.p.u.e and effort per month and depth range.

3. Discards and by-catches.

Shrimp discards were reported during the spring trip only. On a total catch of 238 tons, 1435 kg (6 % of weight) were discarded. No information on by-catches was available.

III - Observations on samples.

1. Methods.

As in previous years, the shrimp of each sample were sorted by reference to sexual characteristics and also to the stage of the sternal spines (DUPOUY et al., 1983).

Characteristics of the eleven samples collected on board Finlande III are presented in table 4.

2. Results.

a) Spring samples.

i) Sexual composition and hatching period.

The total catch is composed of 9 % males, 6 % transitionals and 85 % females. In spring 1984, we had respectively : 3, 4 and 93 % (POULARD et al., 1985). The percentages of males and transitionals are higher in May than in April.

If we take in account only the shrimp involved into the 1984-1985 breeding season (i.e. females ovigerous, with eggs partially hatched and with egg-setae) we can observe in the following table the evolution of the reproduction in spring 1985 :

Time period	April 13	April 21-28	May 5-12	May 19-26
Females with eggs not hatched (%)	100	99	87	34
Females with eggs partially hatched (%)		1	13	34
Females with eggs totally hatched (%)				32

The hatching started at the end of April and was well advanced by the end of May. DUPOUY et al., 1983 and BISEAU et al., 1984 reported an hatching period from mid-May to mid-June for the years 1982 and 1983. In 1985, the hatching period seems to have started about two weeks earlier than in these two previous years.

ii) Length distribution.

The lengths of all the individuals ranged from 20 to 34 mm (table 5, fig. 9) with the bulk between 27 and 30 mm. The mean length was, before sorting, 28.9 mm which is nearly the same than in spring 1984 : 29.1 mm (POULARD et al., 1985). The average weight was 15.6 g against 16.2 g in 1984.

Table 5 and figure 7 give a more detailed description of composition of the samples by lengths and sexual components.

b) Autumn samples.

i) Sexual composition.

The total catch is composed of 14 % males, 1 % transitionals and 85 % females. The high percentage of males (40 %) in sample number 8 must be noted. 89 % of females were ovigerous and 10 % of females spines III had no eggs.

ii) Length distribution.

The size distribution of shrimp ranged from 21 to 34 mm (table 6, fig.9) with the bulk between 28 and 31 mm. The mean length and weight of the individuals caught were, before commercial sorting, 29.6 mm and 16.7 g respectively.

Table 6 and figure 8 provide more detailed information on composition of the samples by lengths and sexual components.

IV - Conclusions.

In 1985, the total reported catch of shrimp by French trawlers from the Greenland part of the Denmark strait was 642 tons. Fishing period extended from spring to autumn.

The average CPUE (299 kg/hour) obtained by the Finlande III in spring (April-June period) is below the CPUE observed last year for the March-May period (415 kg/hour), but is well above the CPUE observed at the same period (April-June) from 1981 to 1983.

The samples collected on board Finlande III in spring show that the hatching period started about two weeks earlier than in 1983 and 1982.

Acknowledgements

We want to express our thanks to Mr. A. BLIBOULET and Mr.Y. IHUEL, the Captains of Finlande III, and to Mr. J. DEZEUSTRE, Director of SNPL, for providing the logbooks and samples used for this paper.

References

BISEAU (A.), FONTAINE (B.) and FORESI (A.), 1984.- Catch, Effort and Biological Data of Shrimp (Pandalus borealis) in the French fishery off East Greenland in 1983.- Northw. Atlant. Fish. Organ., SCR DOC 84/I/7, 17 p.

DUPOUY (H.), MINET (J.P.) and DERIBLE (P.), 1981.- Catch, Effort and Biological Characteristics of Shrimp (Pandalus borealis) in the French Fishery off East Greenland in 1981.- Northw. Atlant. Fish. Organ., SCR DOC 81/XI/157, 13 p.

DUPOUY (H.), DERIBLE (P.) and BISEAU (A.), 1983.- Catch, Effort and Biological Characteristics of Shrimp (Pandalus borealis) in the French Fishery off East Greenland in 1982.- Northw. Atlant. Fish. Organ., SCR DOC 83/I/4, 21 p.

POULARD (J.C.) and FONTAINE (B.), 1985.- Catch, Effort and Biological Data of Shrimp (Pandalus borealis) in the French Fishery off East Greenland in 1984.- Northw. Atlant. Fish. Organ., SCR DOC 85/I/40, 12 p.

Table 1 - Monthly bathymetric distribution of the tows made by the Finlande III at East Greenland in 1985.

Depth range (m)	April	May	June	Total first trip	October	November	Total second trip
175-199					2		2
200-224					7		7
225-249					2		2
250-274					1		1
275-299	7	70	1	78	43		43
300-324	18	76	43	137	59	14	73
325-349	4	8	18	30			
350-374	45	13		58			
375-399	35	5		40			
400-424	2			2			
425-449							
450-474							
475-500	4			4			
Total	115	172	62	349	114	14	128

Table 2 - No. of hours trawled by year and month from March to November in the French fishery at East Greenland as reported in logbooks of 1 trawler in 1980, 1981 and 1982, 2 trawlers in 1983 and 1984, and 1 trawler in 1985.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1980							40						40
1981				157	522	257							936
1982				331	563	238							1132
1983				248	245	206							699
1984			132	723	349								1204
1985				257	402	137				294	37		1127

Table 3 - Monthly bathymetric distribution of the mean c.p.u.e. (kg/hour) and the effort (hours, in bracket) obtained by the Finlande III at East Greenland in 1985.

Depth range (m)	April	May	June	Total	October	November	Total
175-199					698 (2)		698 (2)
200-224					356 (13)		356 (13)
225-249					457 (3)		457 (3)
250-274					155 (1)		155 (1)
275-299	329 (16)	417 (164)	92 (2)	405 (182)	252 (123)		252 (123)
300-324	310 (39)	231 (175)	202 (95)	232 (309)	236 (150)	243 (37)	240 (187)
325-349	239 (8)	161 (18)	247 (39)	222 (65)			
350-374	429 (99)	196 (30)		375 (129)			
375-399	283 (83)	214 (12)		274 (95)			
400-424	93 (4)			93 (4)			
425-449							
450-474							
475-500	311 (7)			311 (7)			

Table 4 - Characteristics of samples collected on board Finlande III off East Greenland in 1985.

Sample nº	Date	Average position		Depth range (m)	Time of trawling (GMT)	Nº of shrimp examined	Composition by sex in percentage		
		Lat N	Long W				Males	Transitionals	Females
1	April 13	66°11'	29°35'	296-314	15:40 - 19:00	95	7.4	3.2	89.5
2	April 21	65°46'	29°58'	356-368	17:45 - 20:45	88	0	1.1	98.9
3	April 28	65°52'	30°04'	366-380	18:30 - 21:50	91	3.3	1.1	95.6
4	May 05	66°23'	28°52'	282-318	14:50 - 18:20	108	20.2	17.6	62.0
5	May 12	66°06'	29°27'	295-300	05:15 - 08:15	89	2.2	0	97.8
6	May 19	65°40'	30°00'	352-360	13:05 - 16:50	91	14.3	6.6	79.1
7	May 26	66°03'	29°33'	294-300	11:40 - 15:10	91	13.2	7.7	79.1
					Total first trip	653	9.0	5.7	85.3
8	Oct. 11	66°22'	29°13'	295-315	15:20 - 19:20	89	40.4	0	59.6
9	Oct. 17	66°16'	29°04'	270-300	14:05 - 18:05	92	8.7	0	91.3
10	Oct. 24	66°09'	29°29'	295-300	16:40 - 20:40	86	2.3	0	97.7
11	Nov. 01	66°20'	29°36'	312-320	10:40 - 14:40	96	5.2	2.1	92.7
					Total second trip	363	14.0	0.6	85.4

Table 5 - Length distribution by sex of shrimp collected on board Finlande III during the first trip (April-May 1985) off East Greenland.

Lcp (mm)	Males	Transitionals and Females II	Females III	Total
20	2			2
21	5			5
22	5			5
23	11			11
24	15	2		17
25	21	0	5	26
26	12	6	21	39
27	14	14	101	129
28	6	12	170	188
29		43	190	233
30		20	170	190
31		8	87	95
32		3	41	44
33		2	11	13
34			3	3
Total/1000	91	110	799	1000
Mean (mm)	25.08	29.13	29.34	28.94
S.d. (mm)	4.02	2.77	2.42	4.00

Table 6 - Length distribution by sex of shrimp collected on board Finlande III during the second trip (October-November 1985) off East Greenland.

Lcp (mm)	Males	Transitionals and Females II	Females III	Total
21	3			3
22	3			3
23	3			3
24	11			11
25	25			25
26	27			27
27	39		14	53
28	25	3	110	138
29	5	11	220	236
30		5	245	250
31		0	149	149
32		3	77	80
33			19	19
34			3	3
Total/1000	141	22	837	1000
Mean (mm)	26.38	29.81	30.12	29.59
S.d. (mm)	2.76	1.82	1.69	3.47

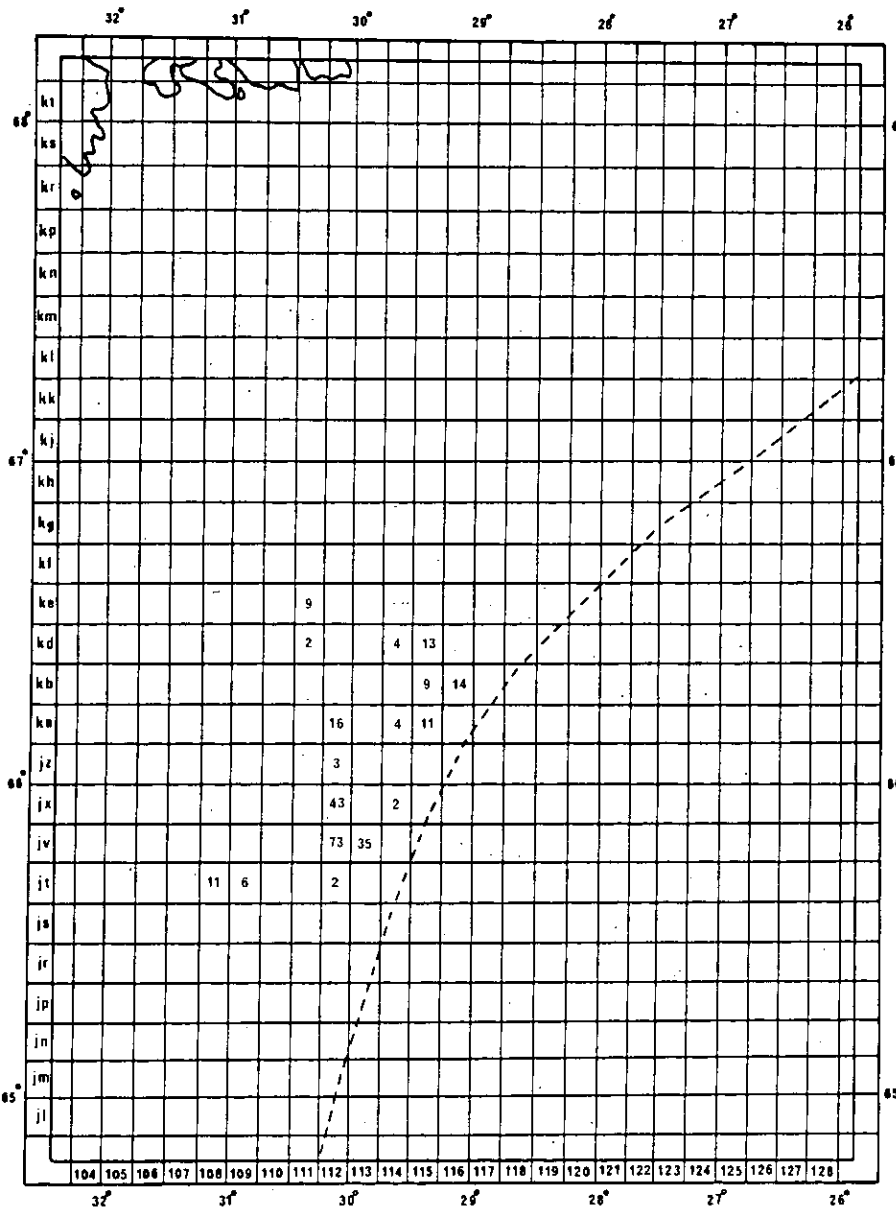

Fig. 1 a - Distribution of the effort (hours) of Finlande III at East Greenland in April 1985

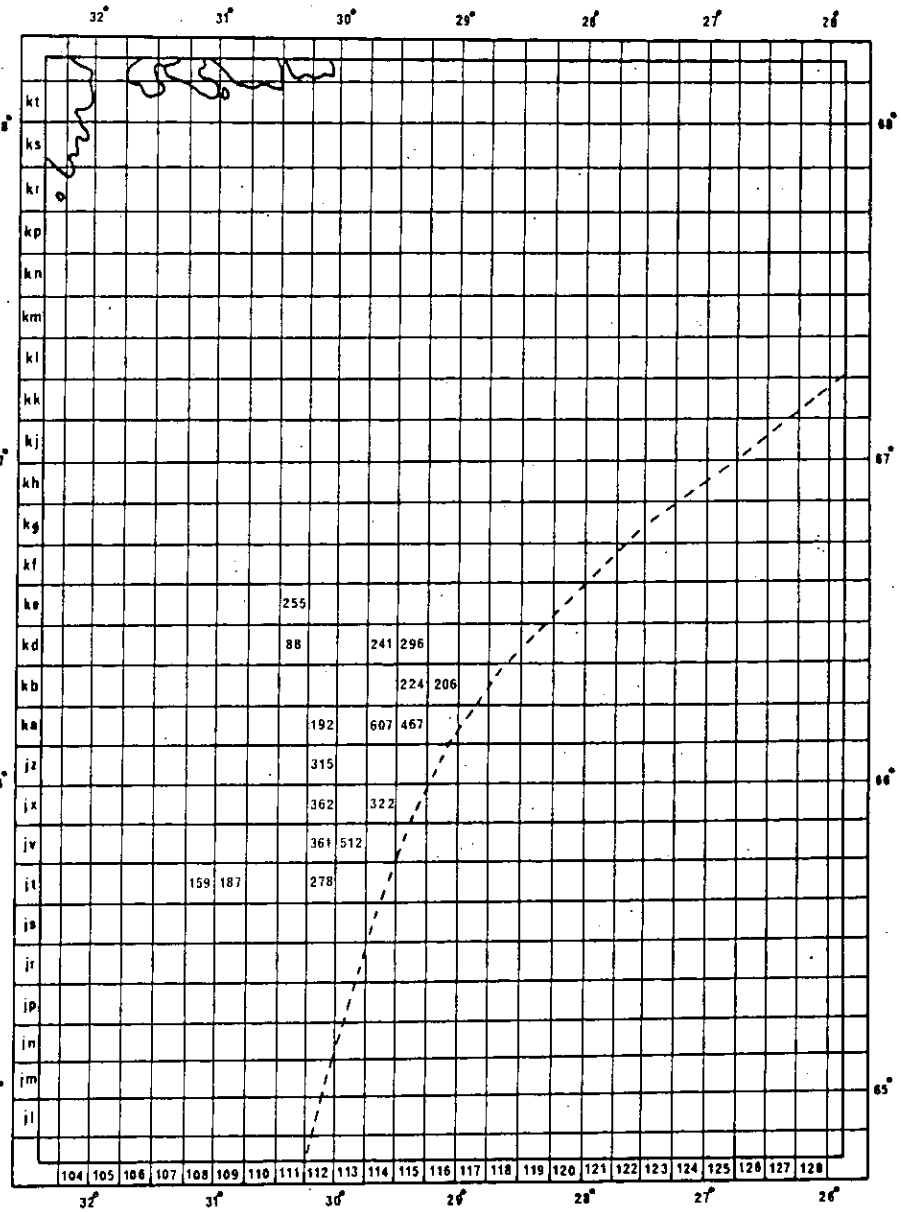

Fig. 1 b - Distribution of the CPUE (kg/hour) of Finlande III at East Greenland in April 1985.

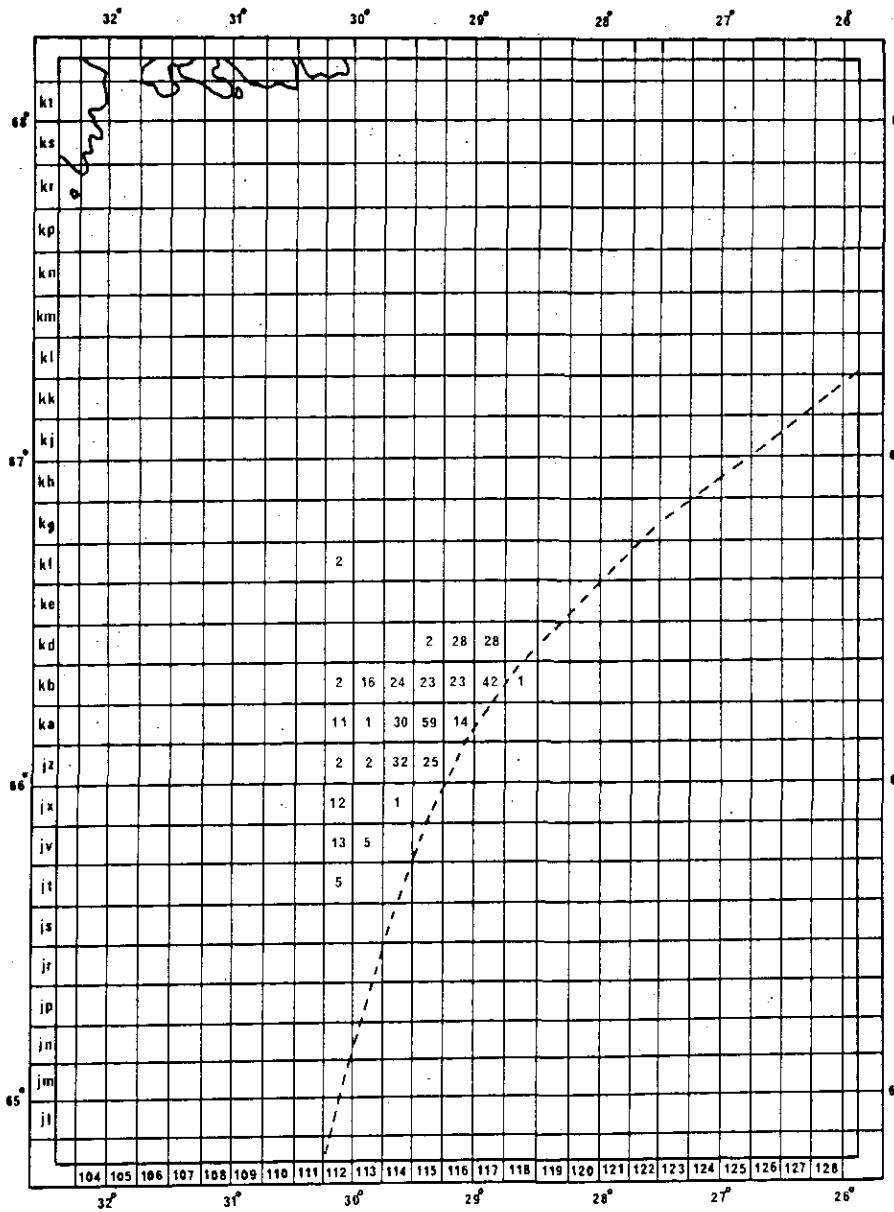

Fig. 2 a - Distribution of the effort (hours) of Finlande III at East Greenland in May 1985

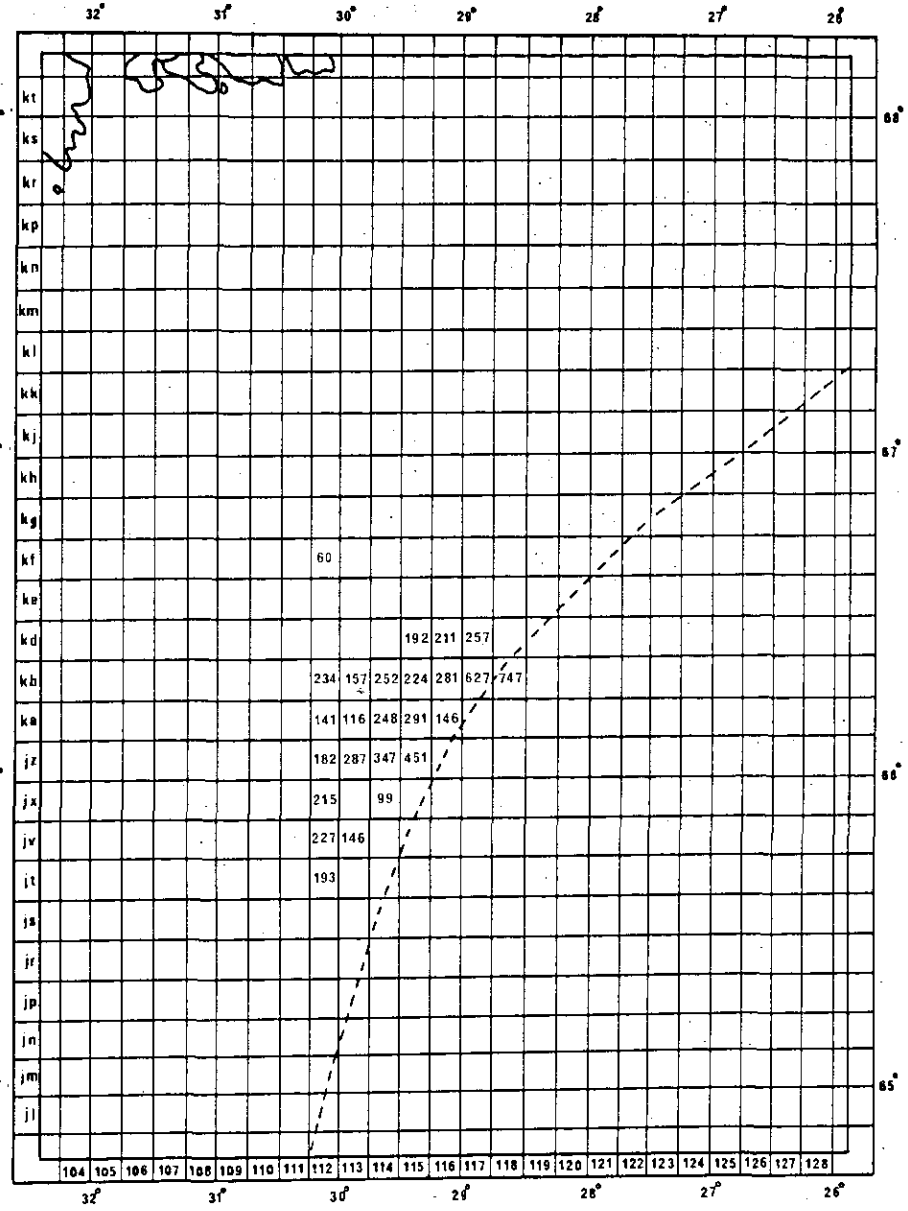

Fig. 2 b - Distribution of the CPUE (kg/hour) of Finlande III of East Greenland in May 1985

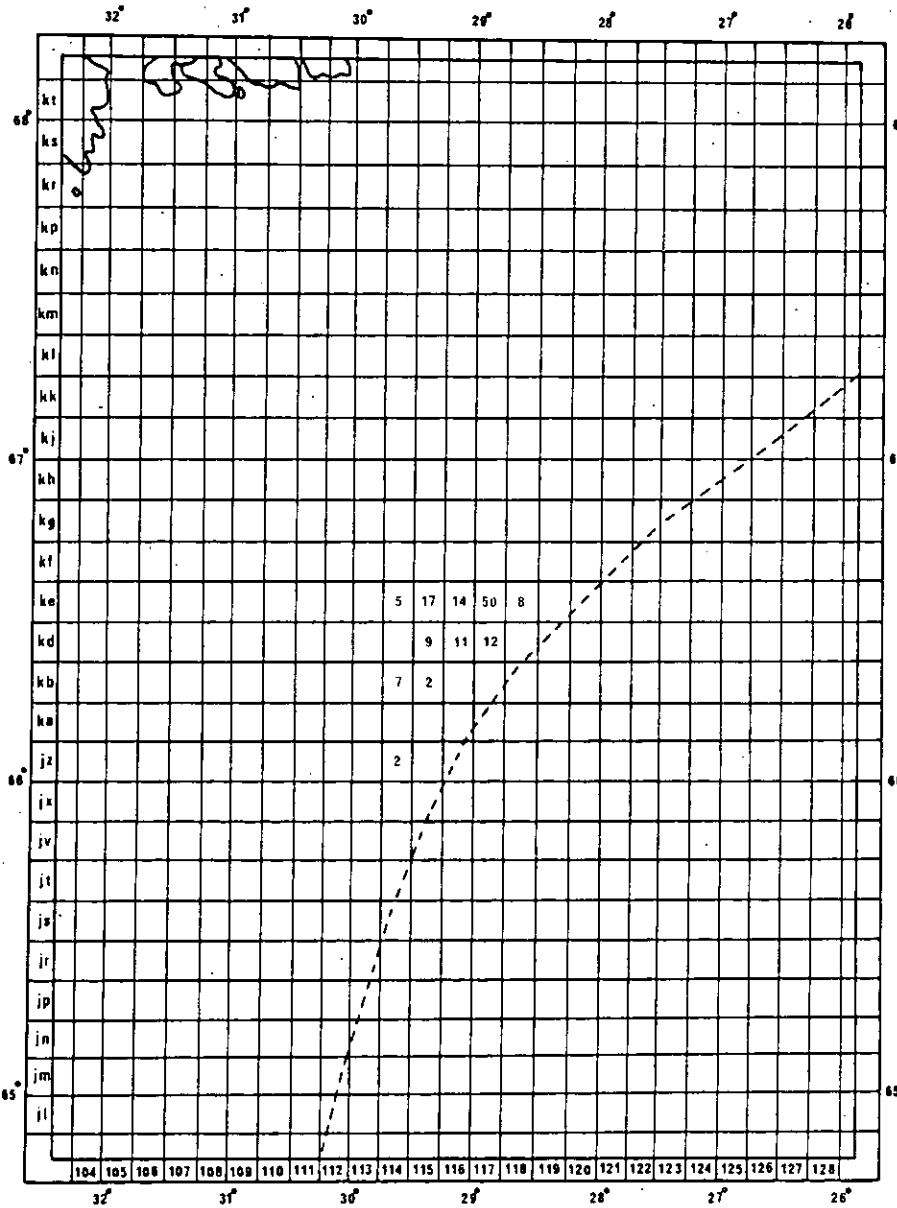

Fig. 3 a - Distribution of the effort (hours) of Finlande III at East Greenland in June 1985

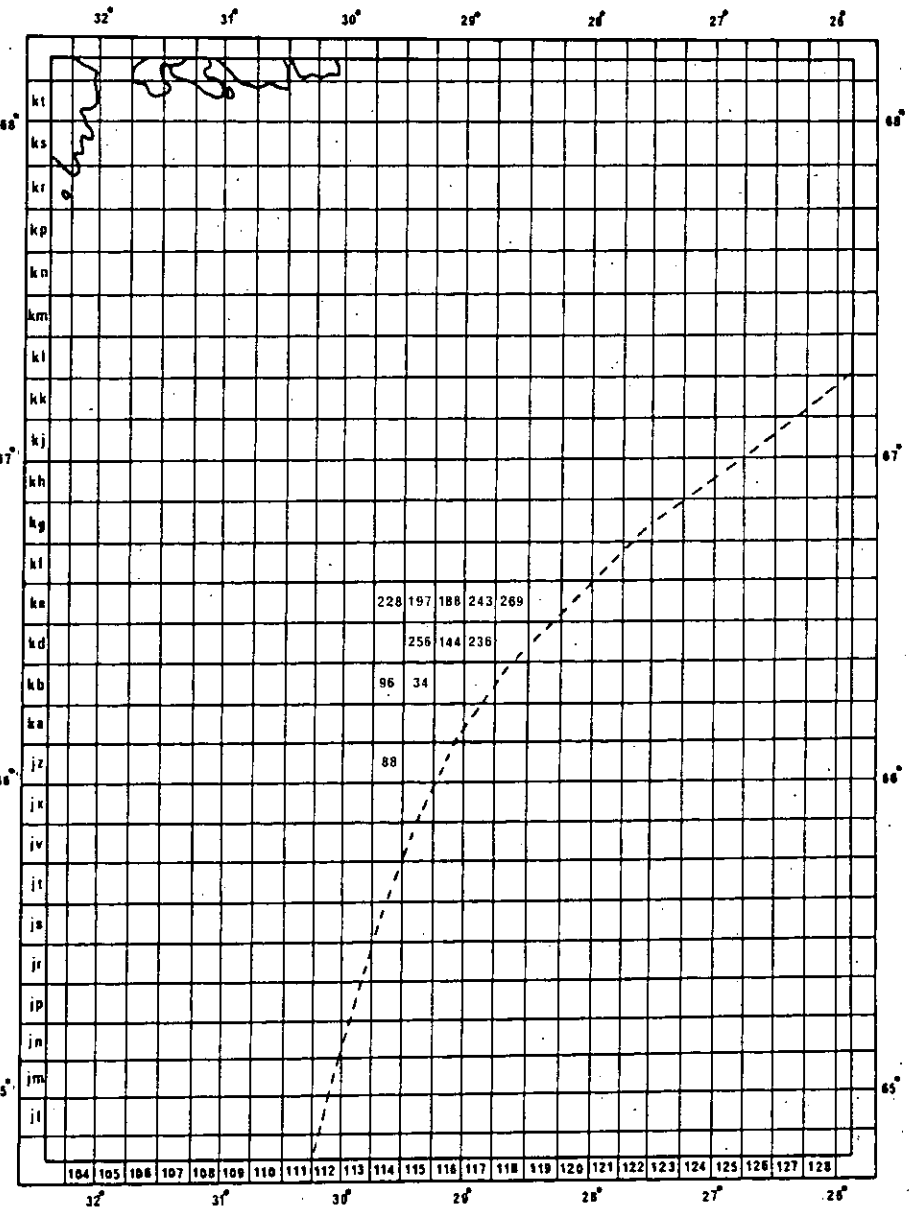

Fig. 3 b - Distribution of the CPUE (kg/hour) of Finlande III at East Greenland in June 1985

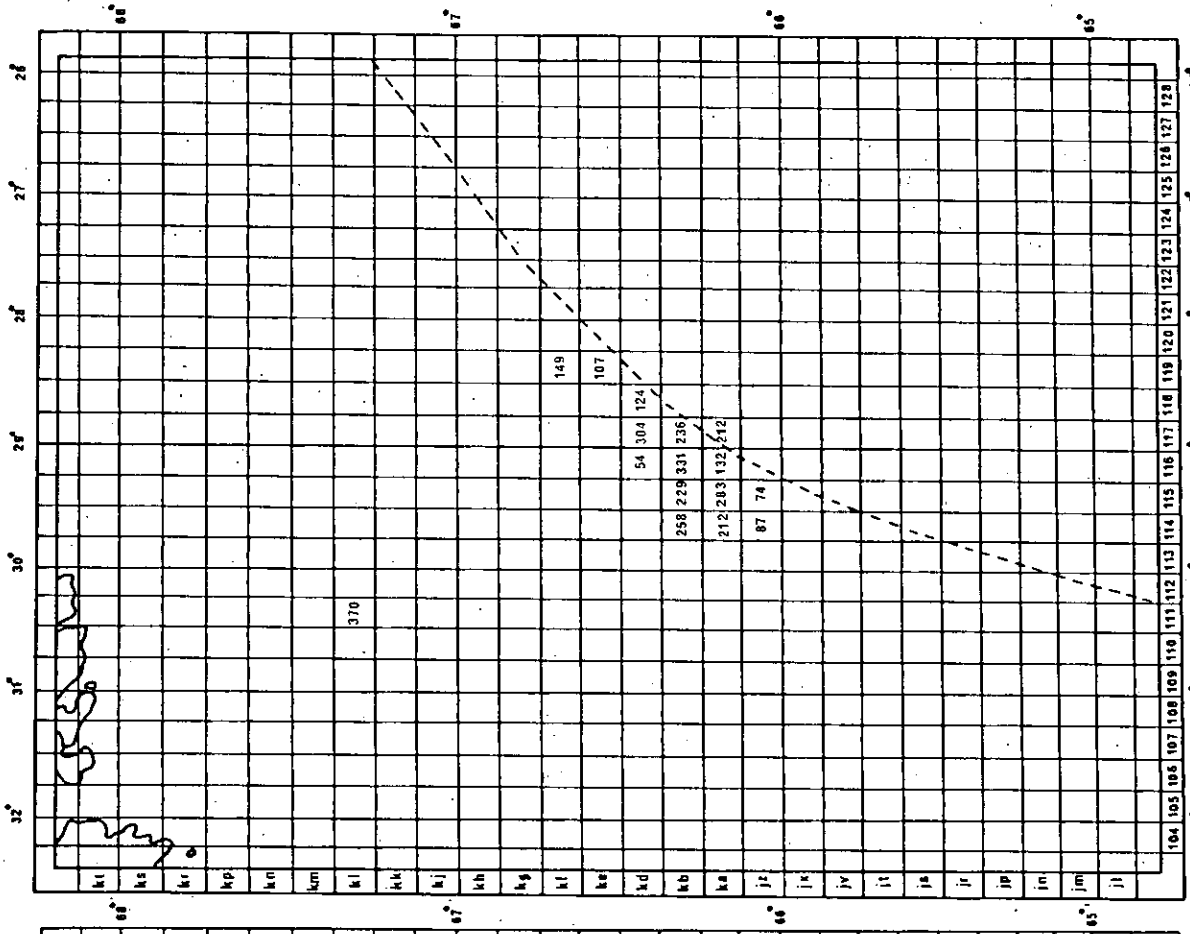

Fig. 4 b - Distribution of the CPUE (kg/hour) of Finlande III at East Greenland in October 1985

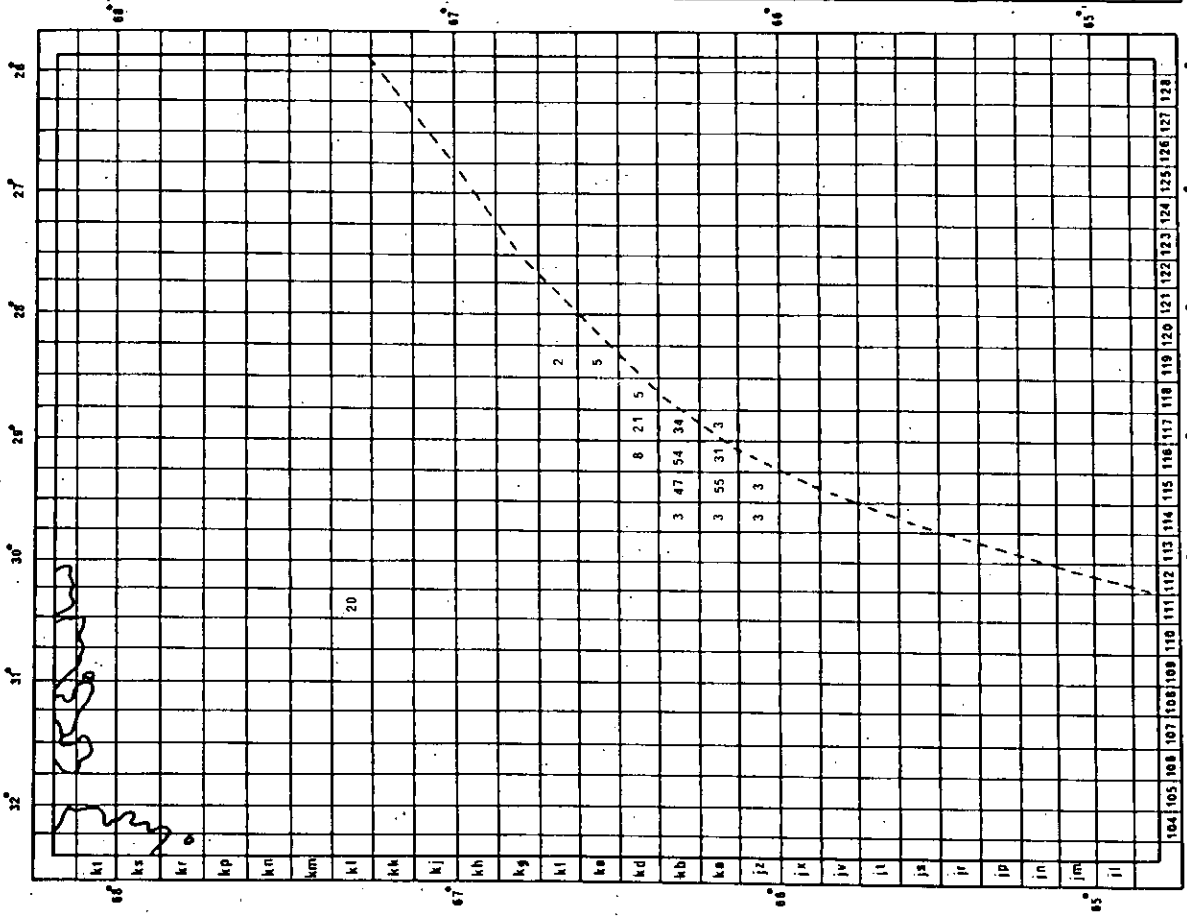

Fig. 4 a - Distribution of the effort (hours) of Finlande III at East Greenland in October 1985

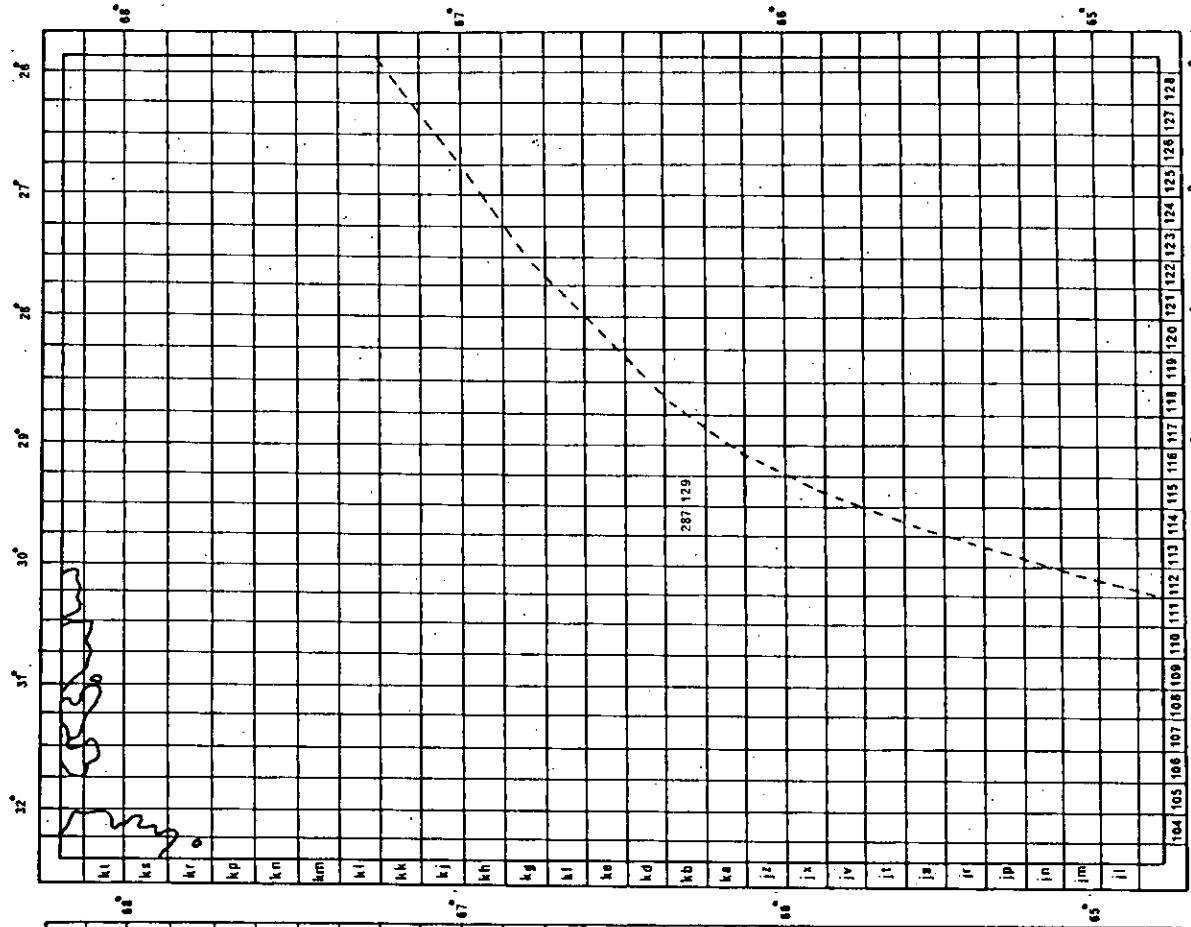

Fig. 5 a - Distribution of the effort (hours) of Finlande III
at East Greenland in November 1985

Fig. 5 b - Distribution of the CPUE (kg/hour) of Finlande III
at East Greenland in November 1985

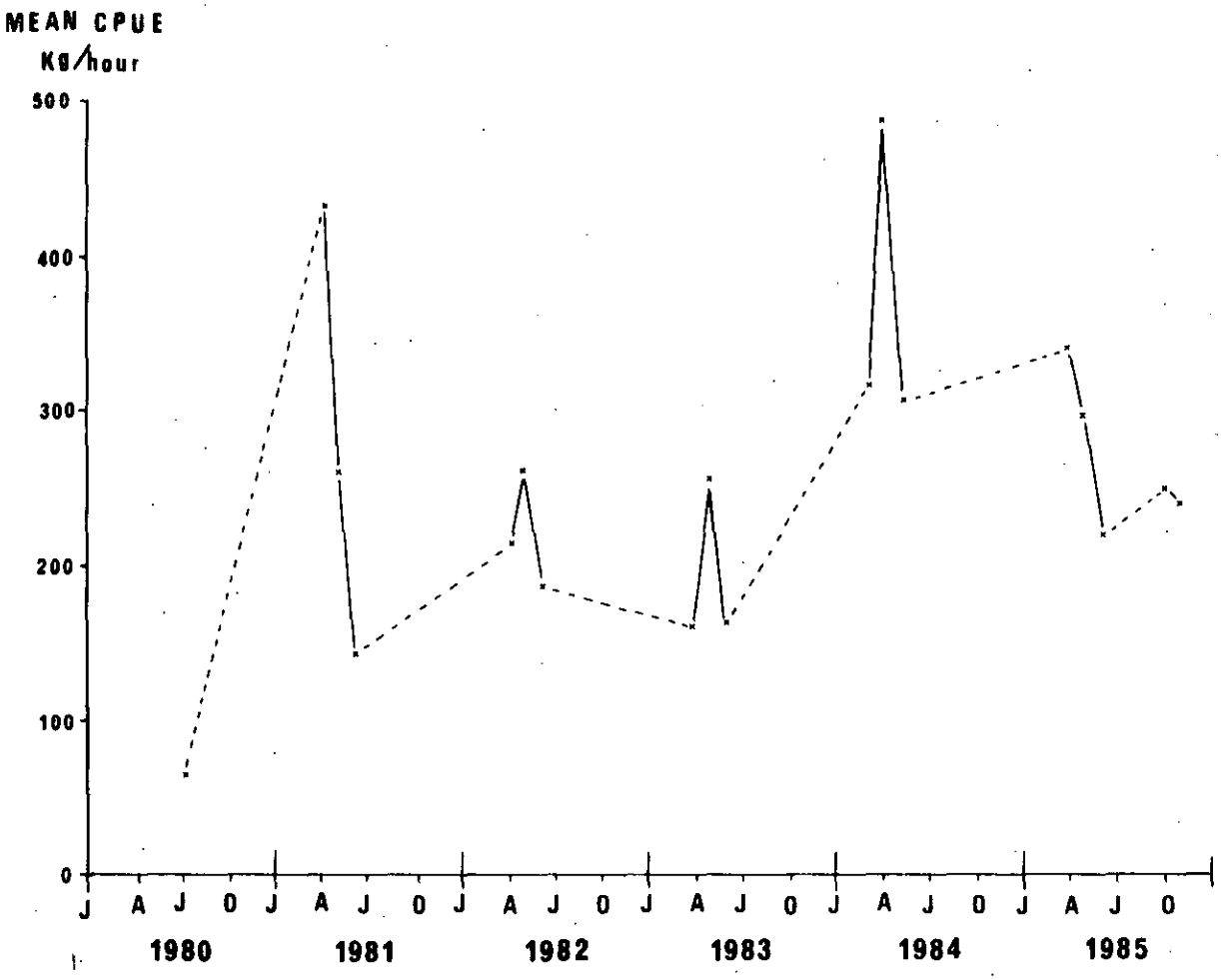

Fig. 6 - Monthly mean catch rate of shrimp (kg/hour) in the French fishery at East Greenland from July 1980 to November 1985 based on logbook information from 1 trawler in 1980, 1981 and 1982, 2 trawlers in 1983 and 1984, and 1 trawler in 1985 (table 2 shows the corresponding no. of hours trawled).

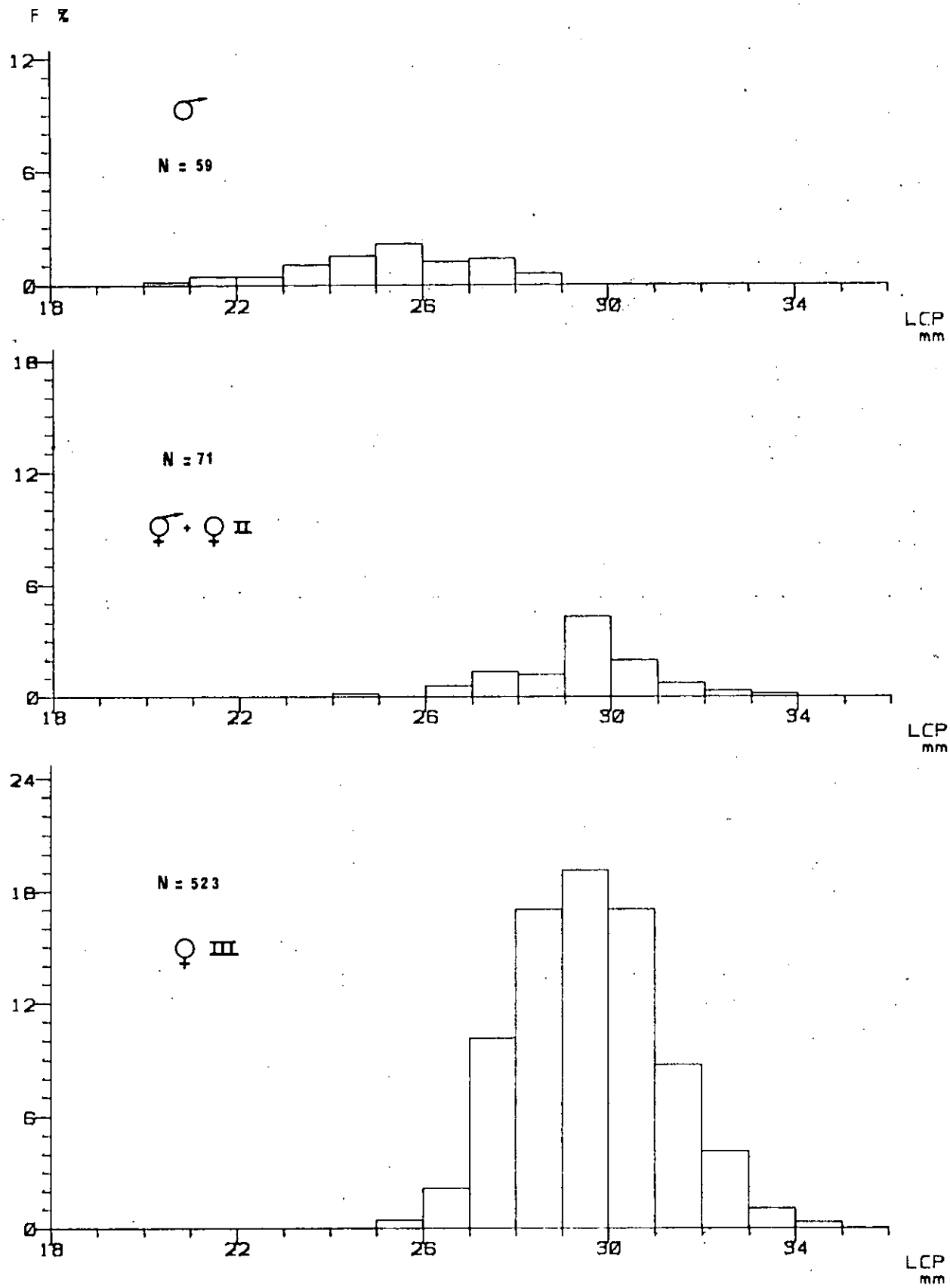

Fig. 7 - Length distributions of the males, transitionals and females with spines and females without spines (% of the total) from the seven samples collected on board Finlande III in April and May 1985.

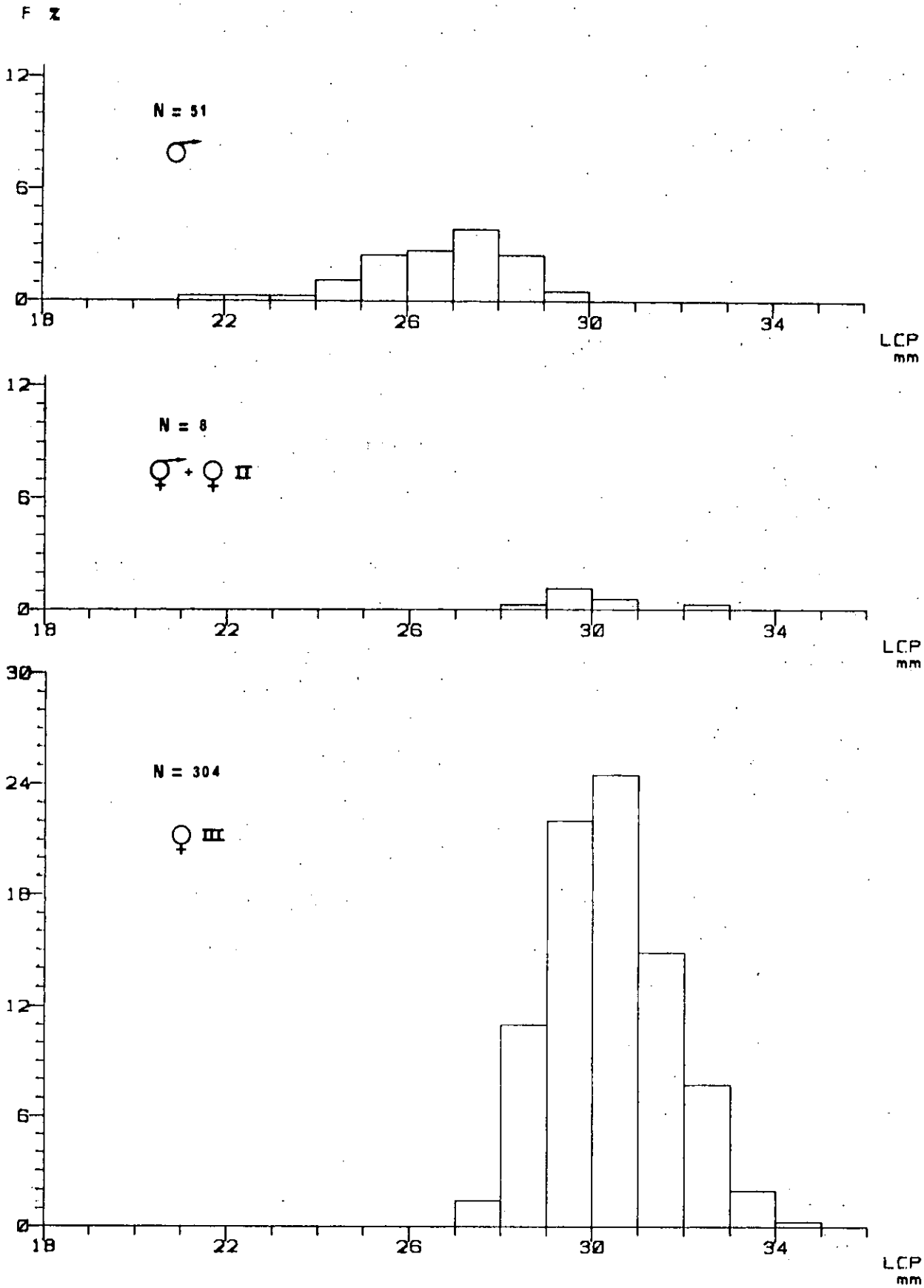

Fig. 8 - Length distributions of the males, transitionals and females with spines and females without spines (% of the total) from the four samples collected on board Finlande III in October and November 1985.

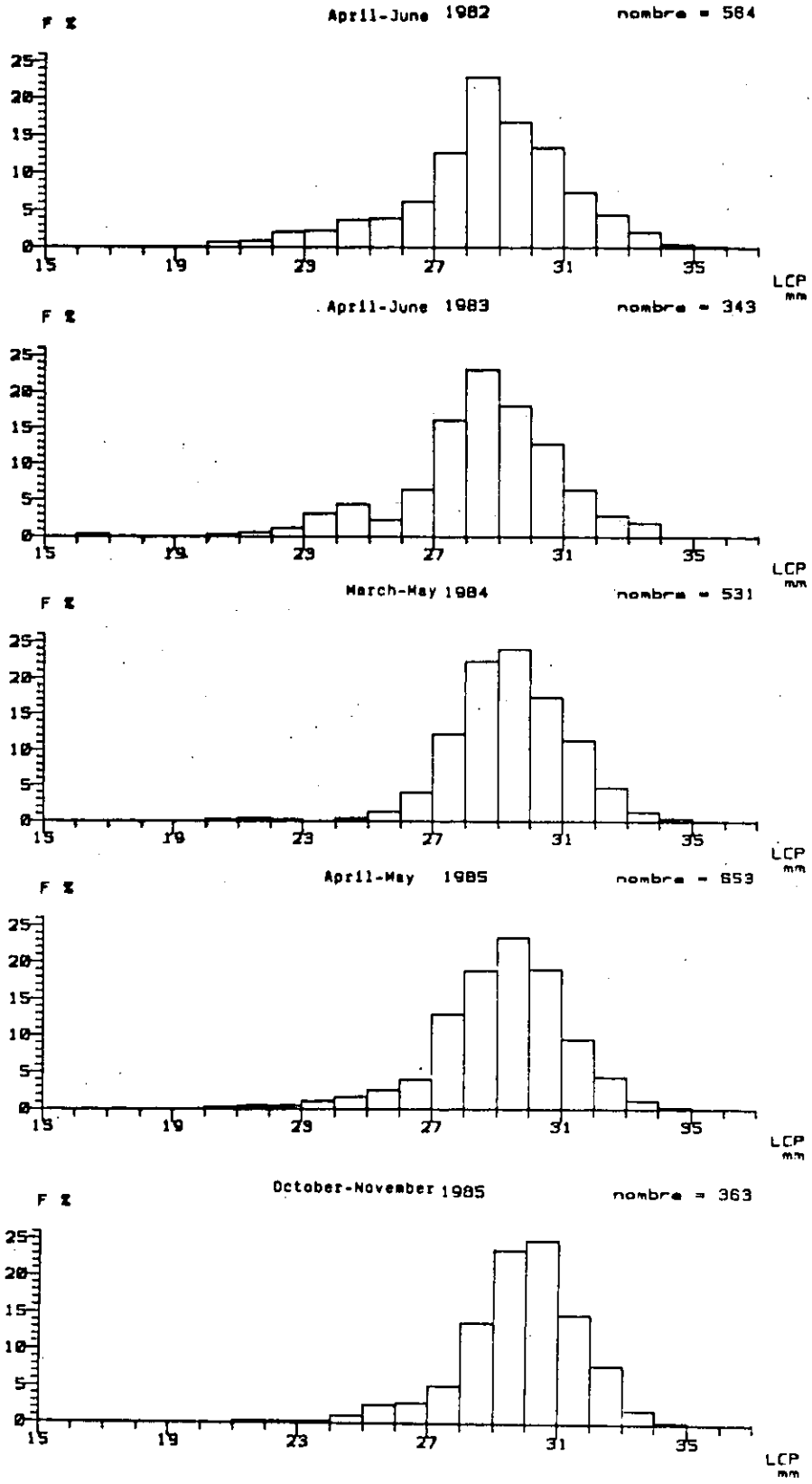

Fig. 9 - Comparisons of length distributions obtained by Finlande III off East Greenland from 1982 to 1985.