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The Icelandic Shrimp (Pandalus borealis) Fishery in Denmark Strait in 1986

by

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In 1986 the Icelandic shrimp fishery in the Denmark Strait started in April and went on and off for most of the year. The total catch was about 1o3o tons (preliminary), and the mean catch per trawling hour was similar to that of 1985 or 89 kg. Table 1 shows the effort, catch, and catch per trawling hour by months for the Icelandic shrimp fishery in the Denmark Strait in 1985 and 1986.

Tables II to V show the samples taken in May, October and November by sex categories. All eggs had eye spots in May but no eggs with eye spots were found in October and November as noted previously (Hallgrímsson and Skúladóttir 1986). It should be noted that 83,6 % of the eggbearing females in late May do also have developing head roes, indicating a spawning in about two months. Therefore, judged from these samples, most females seem to be spawning annually. This is somewhat contrary to some previous findings, in the Greenland part of the fishing area, in connection with spawning which was considered to be predominant every other year, see e. g. DuPouy et al. (1983) who indicated that about 60 % of ovigerous females would spawn every second year. Our indications now are in accordance with older Icelandic data, e. g. from 1980 and 1984 (Jónsson and Hallgrímsson 1981, Hallgrímsson and Skúladóttir 1985), indicating between 70 and 90 % annual spawning.

According to Smestad (1986) Norwegian data from a survey in the Denmark Strait in 1985 showed the highest number of Pandalus males in the western, northern and easternmost parts of the investigated area in September that year, possibly indicating Pandalus nursery grounds.

Figs. 1 to 7 in this paper illustrate the monthly percentages of males in the Icelandic samples during 1985 and 1986. The occurence of males appears to be vey low in November in both years but a bit different in October 1985 and 1986. The highest

percentage is found in July 1985 namely 49,3 % (2 samples) and lowest in October 1985, 1,6 % (3 samples) and in May 1986 (4 samples). The males were mostly above 22 mm carapace length so it appears that the true nursery grounds are elsewhere.

Various authors have in NAFO SCR-Documents published length measurements of shrimp from the Denmark Strait from 1981 to 1985, either as single samples or mean length distributions covering a considerable length of time (Carlsson 1983 and 1985, DuPouy et al. 1981, Hallgrímsson et al. 1984 and 1986, Jakobsen et al. 1981 and 1983, Poulard et al. 1986 and Smestad et al. 1986).
In this paper we have pooled together all available length data, presented in abovementioned sources, from 1981 to 1985. There were some difficulties in this connection as some authors only measure to the nearest 1 mm, while others to the nearest o,5 mm. The former measurements were all tramsformed into that of o,5 mm by calculations. Moreover, the length frequencies taken from Poulard et al. had to be deduced from the percentages on the y-axis in his diagrams. The deviations in the length frequencies here presented (Fig. 8) show the sequence of deviations at three times of the year, namely in March to June, August and October to November. Of these, the August and October to November data are purely Icelandic from the easternmost part of the fishing grounds. The period March to June is evidently too long and it would be more appropriate to present the length frequency data on a monthly basis. There is a question of division into subareas if there are certain spawning and nursery fields as indicated by Smestad et al. (1986). The deviations are calculated as described earlier (Skúladóttir 1981).
It was hoped that the deviations would show the existence of strong year classes in the Denmark Strait area. The positive deviations (see Fig. 8) which appear in the years 1981 and 1982 are rather sporadic. It is possible, however, that the deviation seen in August 1982 at about 24 mm carapace length represents a year class which is about 27,5 mm in April-June 1983 and about 30,5 mm in August 1983. In October-November 1984 there might be two adjoining strong year classes at 26,5 mm and 29 mm respectively. In March-May 1985 the positive deviations indicate a growth of these presumed classes from 26,5 mm to about 29 mm, and from 29 to about to about 30,5 mm during the winter. That is indeed rather curious as most of the females in the older year class are eggbearing. The indicated growth from then on would be from 29 mm to about 30,5 mm and from 30 mm to about 31,5 mm in August 1985 respectively. Then there appears to be no growth during the winter 1985 to 1986 of the two year classes in question.

Although the above "interpretations" of the length deviations should be regarded as speculations only, they might indicate the need for more thorough and systematic sampling in the Denmark Strait shrimp fishing area.

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Table I.

1985	Trawling hrs.	Catch (tons)	kg/hr
February	60	6.3	104.7
March	8	0.1	12.9
April	22	0.5	22.4
May	2558	179.0	70.0
June	1837	210.1	114.4
July	3477	347.1	99.8
August	3393	278.6	82.1
September	4377	392.2	89.6
October	2022	166.2	82.2
Nobember	1232	101.9	82.7
December	443	112.0	253.0
Total	19429	1794.0	92.3(mean)
1986(preliminary)			
April	24	0.5	20.9
May	308	233.7	77.0
June	30	3.1	101.4
July	112	13.7	122.6
August	2904	273.0	94.0
September	3097	289.0	93.3
October	1551	129.2	83.3
November	758	66.4	88.4
December	81	20.9	257.7
Total	8865	1029.5	88.9(mean)

Table 2. Shrimp samples in late May or from the 26th to the 1st of June 1986. The berried females could also have had head roe, but that was not inspected.

CL mm.	♂♂♀♀ without head roe not berried	head roe	Females with head roe	Females berried	All
21 1/2	1				1
22 1/2	2				2
23 1/2	2		1		3
25	3		1		4
25 1/2			1		1
26	1				1
26 1/2	2		1	1	4
27	3		2	4	9
27 1/2	2		6	5	13
28			4	7	11
28 1/2	2		4	11	17
29	4		9	25	38
29 1/2	3		14	22	39
30	4		17	37	58
30 1/2	1		14	24	39
31	3		10	17	30
31 1/2	1		10	24	35
32	2		9	15	26
32 1/2			5	5	10
33			3	4	7
Total	36		113	207	356

Table 3. Shrimp samples from 20th-29th of May 1986.

CL mm	1	4	5	6	8	9	All
25 1/2						1	1
26	1						1
26 1/2	3						3
27	1					2	3
27 1/2					1		1
28					1	10	11
28 1/2					2	15	17
29		2			3	25	30
29 1/2	1				7	47	55
30		1			16	35	52
30 1/2				1	6	37	44
31		1			7	38	46
31 1/2		1			4	31	36
32					4	11	15
32 1/2						10	10
33			1		2	7	10
33 1/2						6	6
35					1		1
Total	6	5	1	1	54	275	342

Table 4. Shrimp samples from 26th to 29th of October 1986.

CL mm	1	4	7	All
7 1/2	1			1
15 1/2	1			1
20	1			1
21	1			1
21 1/2			1	1
23	3			3
23 1/2	1		1	2
24	1			1
24 1/2	2			2
25	4			4
25 1/2	4			4
26	3			3
26 1/2	4			4
27	3			3
27 1/2	4		2	6
28	5		6	11
28 1/2	6		10	16
29	2	3	11	16
29 1/2	1	3	16	20
30			18	18
30 1/2	1	3	17	21
31		1	23	24
31 1/2		6	10	16
32		1	10	11
32 1/2			12	12
33			4	4
33 1/2			1	1
34			2	2
35			1	1
Total	48	17	145	210

Table 5. One sample from 4th of November 1986.

CL mm	1	4	5	7	All
22 1/2	1				1
25 1/2			1		1
26 1/2		1			1
27 1/2	1			1	2
27 1/2				2	2
28				1	1
28 1/2	1			4	5
29	1	1		5	7
29 1/2				14	14
30		1		12	13
30 1/2		1		15	16
31				10	10
31 1/2		4		13	17
32				10	10
32 1/2				5	5
33		1		4	5
33 1/2				1	1
34				3	3
Total	4	9	1	100	114

Legend for tables 3 to 5.

Group 1. Juveniles and males.
- 2. Transitionals without head roe.
- 3. Females with sternal spines.
- 4. Females without sternal spines, without head roe, not berried but at times with egg hairs.
- 5. Females with sternal spines and with head roe.
- 6. Females without sternal spines but with head roe.
- 7. Females berried with no eyespots.
- 8. Females berried with eyespots.
- 9. Females berried and with head roe.

Table 3. Shrimp samples from 20th - 29th of May 1986.

Table 6. Proportions (%) of females without spines which will not spawn until next season.

1985	Not spawning %	Total number
July	27.2	402
August	20.6	395
October	7.1	230
November	17.5	751
December	6.0	138
Total		1916
1986		
May	17.6	342
October	10.5	210
November	8.3	114
Total		666

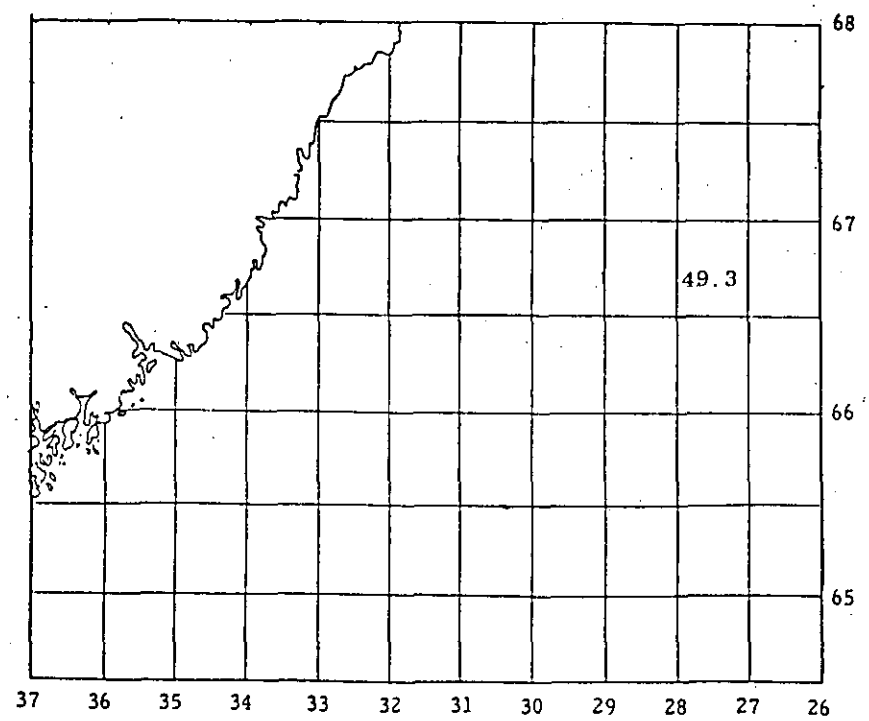

Fig.1. Males in percent of total number in July 1985

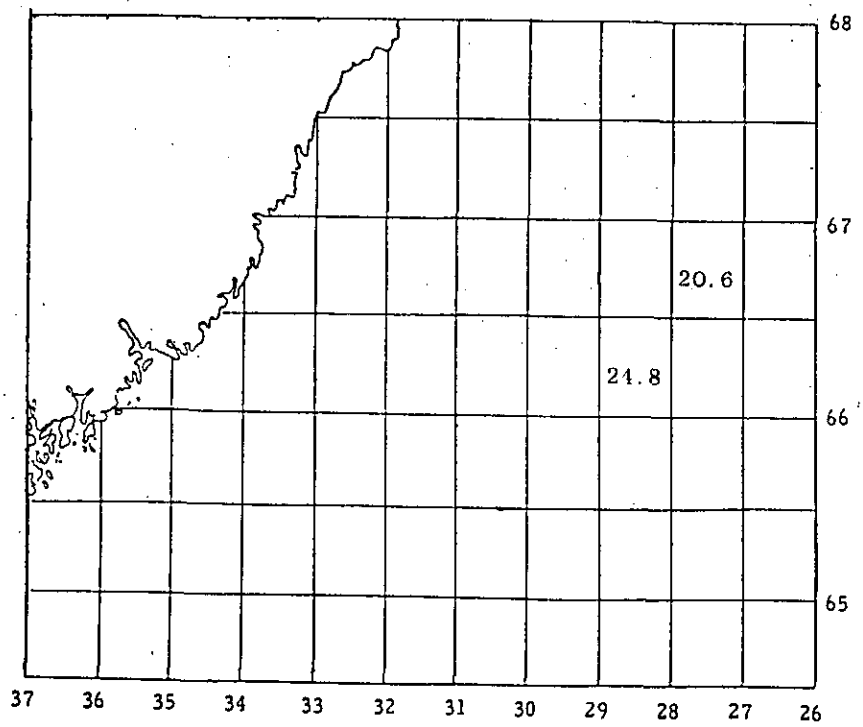

Fig. 2. Males in percent of total number in August 1985

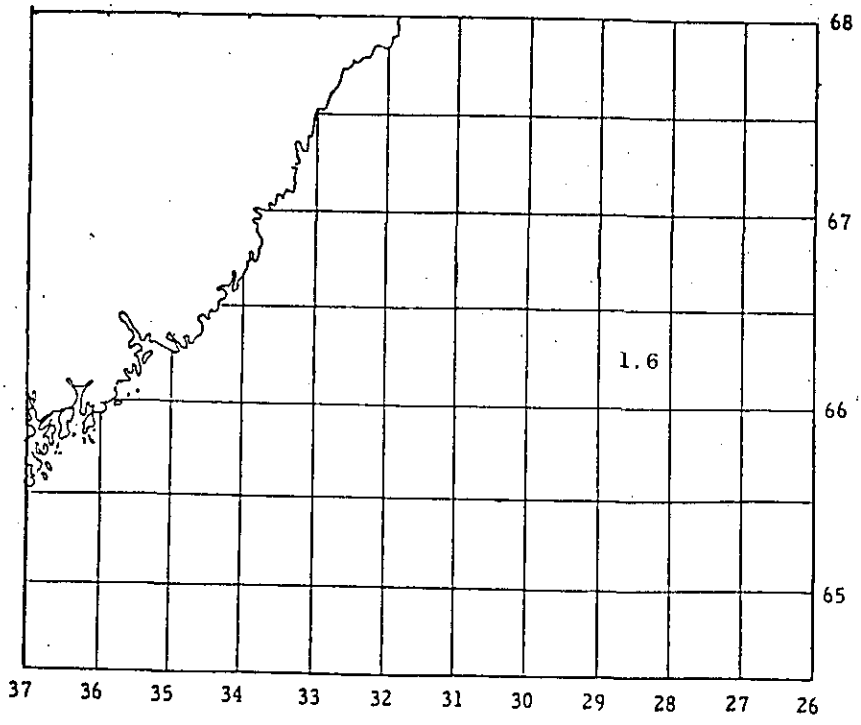

Fig. 3. Males in percent of total number in October 1985

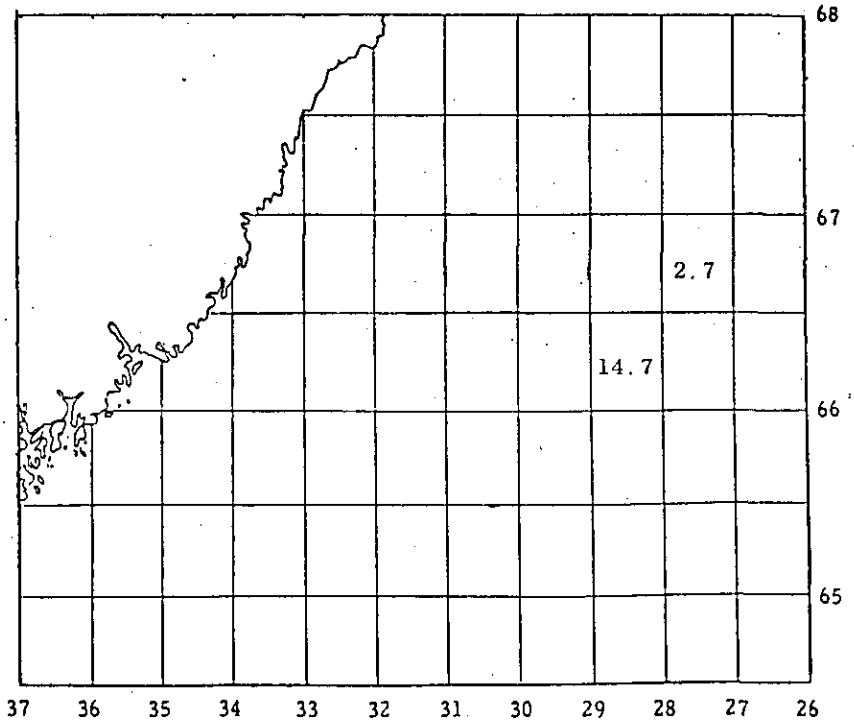

Fig. 4. Males in percent of total number in November 1985

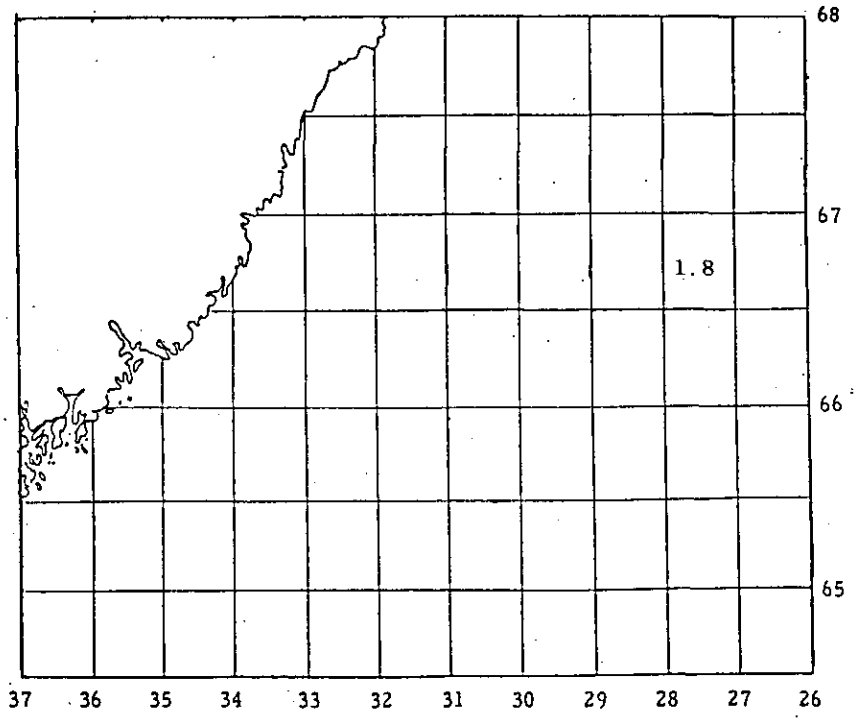

Fig. 5. Males in percent of total number in May 1986

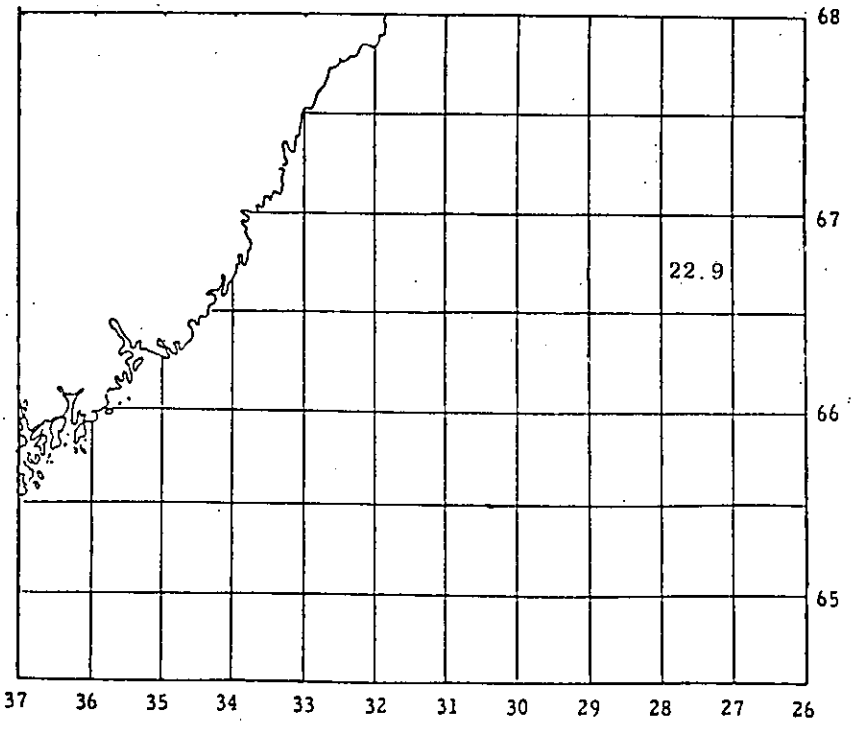

Fig. 6. Males in percent of total number in October 1986

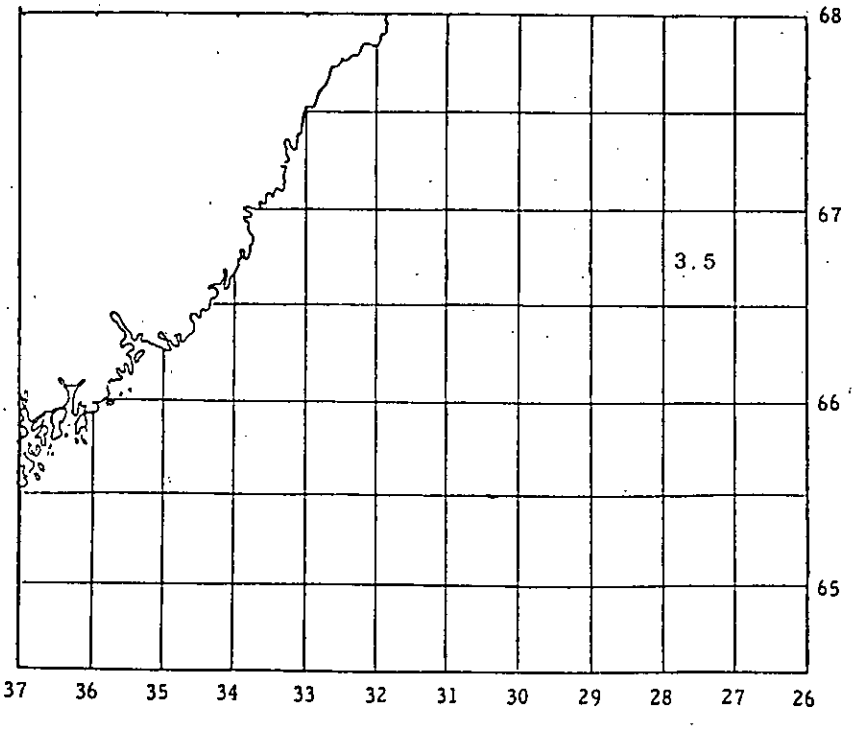

Fig. 7. Males in percent of total number in November 1986

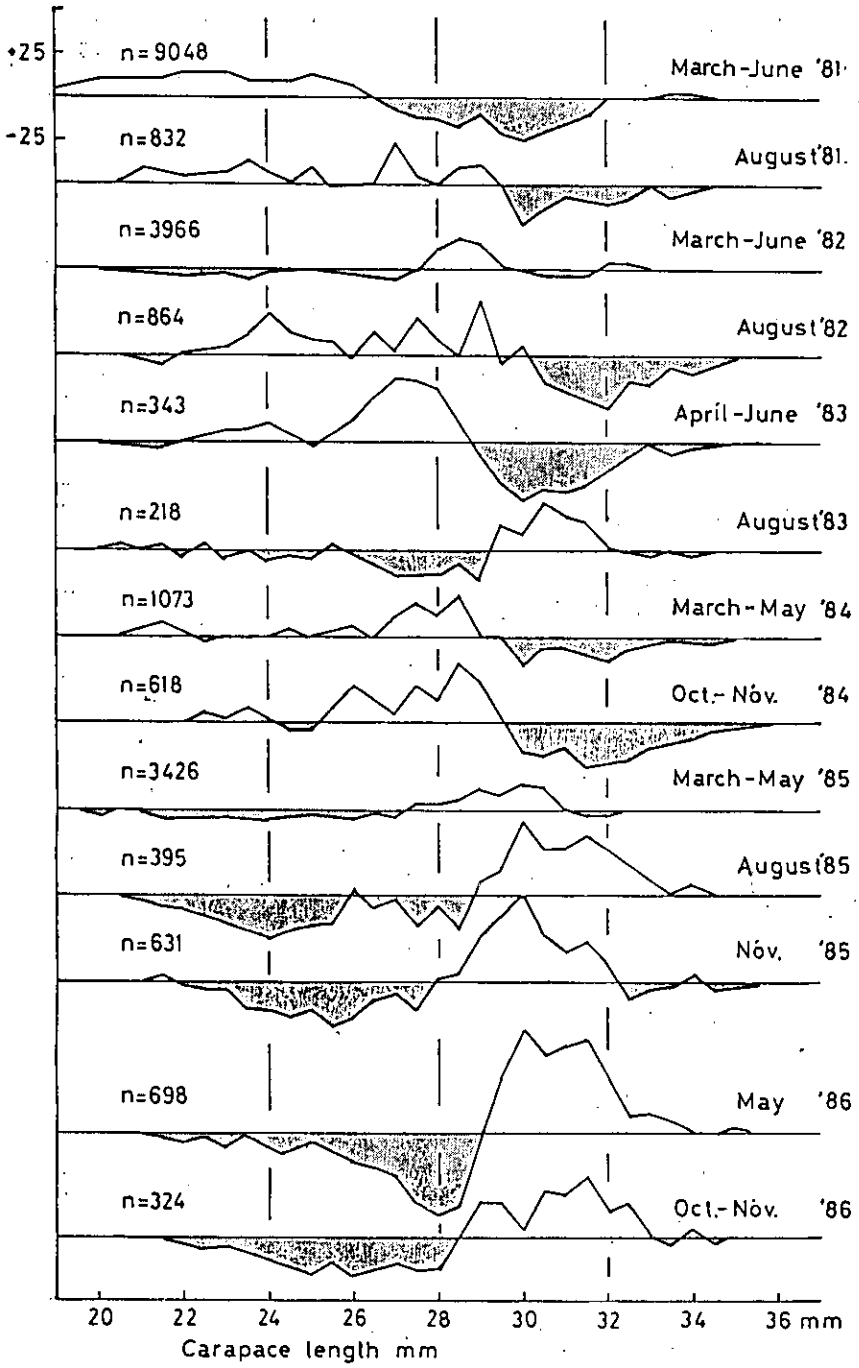

Fig. 8. The deviation of the mean length distribution (%) every year in a given month or period from that of the same period pooled together for several years.