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The Icelandic Shrimp (Pandalus borealis) Fishery
in Denmark Strait in 1985

by

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In 1985 the Icelandic shrimp fishery in the Denmark Strait, i.e. east of the Iceland-Greenland midline, commenced in February and lasted throughout the year. The total catch was 1223 tons, the mean catch per trawling hour was about 88 kg.

Table I shows the effort, catch and catch per trawling hour by months of the Icelandic shrimp fishery in the Denmark Strait since 1983 to 1985.

In 1984 the Icelandic shrimp fishery in the Denmark Strait amounted to 4.5 % of the total Icelandic offshore shrimp fishery. In 1985 this proportion is about 9.6 % (preliminary). No figures are yet available for December.

Table 2 shows the proportion of different sex categories by months in the Icelandic catch. It appears that males are very prominent in July, decreasing to October and rising again in November and December. Transitionals are only found in small numbers in November. It can be noted that females with sternal spines are totally absent in August as they have already spawned as indicated in Fig. 2. From October and onwards these are appearing again indicating a change of sex. As to females with eggs, it was observed that all the eggs were without eye-spots. This once again indicates a long period of ovogenesis which appears to last for at least 8 months, i.e. from November to July. This is in accordance with observations made by Stickney and Perkins (1980).

Altogether 1916 specimens were length measured to the nearest half mm and most of them weighed to the nearest 0.1 g. The length-weight relationship of 636 specimens from the Oct.-Nov. samples is shown in Fig. 1.

Table 3 shows the proportion of females without sternal spines. They are also without eggs, have no head roes, and are thus not expected to spawn until next year. This has been observed before in the Icelandic material (Jónsson and Hallgrímsson 1981), and might indicate that a small proportion of the mature females only spawns every second year.

Spawning appears to take place in July-August (see Fig. 2). By the 25th and 26th of August 1985 no females were found with headroes. The same is true for late October but in November a small proportion of non-ovigerous females had pale-green ovaries as has been noted before in the Icelandic material (Hallgrímsson and Skúladóttir 1985) and might, as pointed out before, indicate a slow ovogenesis, as spawning is not considered to take place until July-August.

Figs. 3 and 4 show the length- and weight-frequency distributions respectively of the July 1985 samples. In the male category the length distribution indicates two age classes, the female categories are more difficult to interpret. However, we estimate the males to be 4 and 5 years old and the main bulk of the females 6 and 7 years. The weight frequency distribution is more difficult to interpret, but a coarser grouping might clarify the picture.

Figs. 5 to 8 show the length distributions of the August-October samples, while Fig. 9 shows the weight distribution of the October samples, the length distribution of which is shown in Fig. 8. The weight distributions of the August and November samples are not shown here as these were difficult to interpret, similar to those of July. However, the weight distribution in October indicates 4 or 5 age classes to be present in the females without spines, although this is not so apparent in the length distribution.

The size of shrimp in the Denmark Strait, east of the Iceland-Greenland midline, was larger in November 1985 than in the same month in 1984, see Fig. 10. The deviations in August show a similar trend, indicating two rather strong age-classes of approximately 6 and 7 years old.

References:

- Hallgrímsson I. and U. Skúladóttir 1985: The Icelandic Shrimp (*Pandalus borealis*) Fishery in the Denmark Strait in 1984. NAFO SCR DOC. 85/1/11.
- Jónsson E. and I. Hallgrímsson 1981: The Icelandic Shrimp (*Pandalus borealis*) Fishery in the Denmark Strait. Int. Counc. Explor. Sea. Shellfish Committee: C.M. K:7
- Stickney A.P. and H.C. Perkins 1980: Environmental Physiology of Northern Shrimp (*Pandalus borealis*). Dep. Mar. Resour. W. Boothbay Harbor, Maine. Project 3-324-R.

Table I

	<u>Trawling hrs</u>	<u>Catch (tons)</u>	<u>kg/hr</u>
<u>1983</u>			
June	52	5.1	98.6
October	80	13.8	172.4
November	158	24.5	155.3
<u>Total</u>	<u>290</u>	<u>43.4</u>	<u>149.8 (mean)</u>
<u>1984</u>			
June	53	2.2	42.2
July	655	45.4	69.3
August	116	8.0	69.6
September	1546	152.7	98.8
October	1887	291.0	154.2
November	2391	175.7	73.5
December	569	66.8	117.5
<u>Total</u>	<u>7217</u>	<u>741.8</u>	<u>102.8 (mean)</u>
<u>1985 (preliminary)</u>			
February	53	5.6	104.7
March	7	0.1	12.9
April	19	0.4	22.4
May	2256	157.9	70.0
June	1620	185.3	114.4
July	3066	306.1	99.8
August	2992	245.7	82.1
September	3337	293.1	87.9
October	247	12.0	48.5
November	317	17.6	55.4
<u>Total</u>	<u>13914</u>	<u>1223.4</u>	<u>88.0 (mean)</u>

Table II

Proportions (%) of different sex categories by months

	Males	Transit- ionals	Females with spines	Females without spines without eggs	Females with eggs	Total number
July	50.2	0.0	2.2	29.9	17.6	402
August	23.8	0.0	0.0	18.7	57.5	395
October	1.7	0.0	0.9	7.0	90.4	230
November	17.2	1.2	1.5	14.1	66.1	751
December	23.2	0.0	4.3	4.3	68.1	138
<u>Total</u>						<u>1916</u>

Table III

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

July	27.2
August	20.6
October	7.1
November	17.5
December	6.0

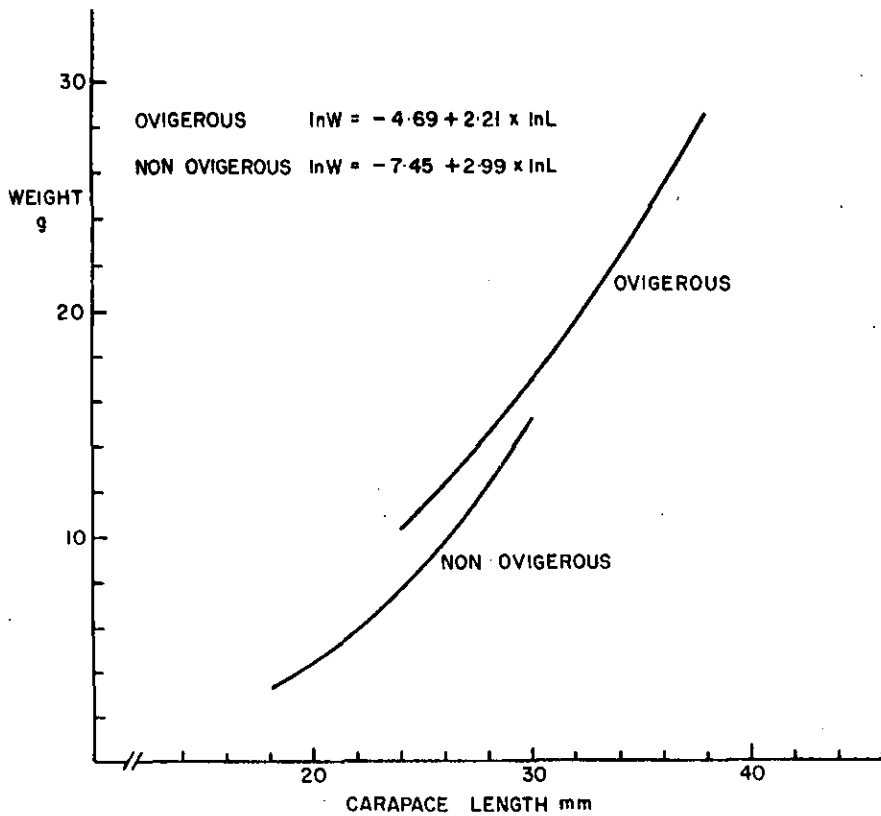


Fig. 1. The length-weight relationships of 531 ovigerous and 105 non ovigerous shrimps from October and November samples.

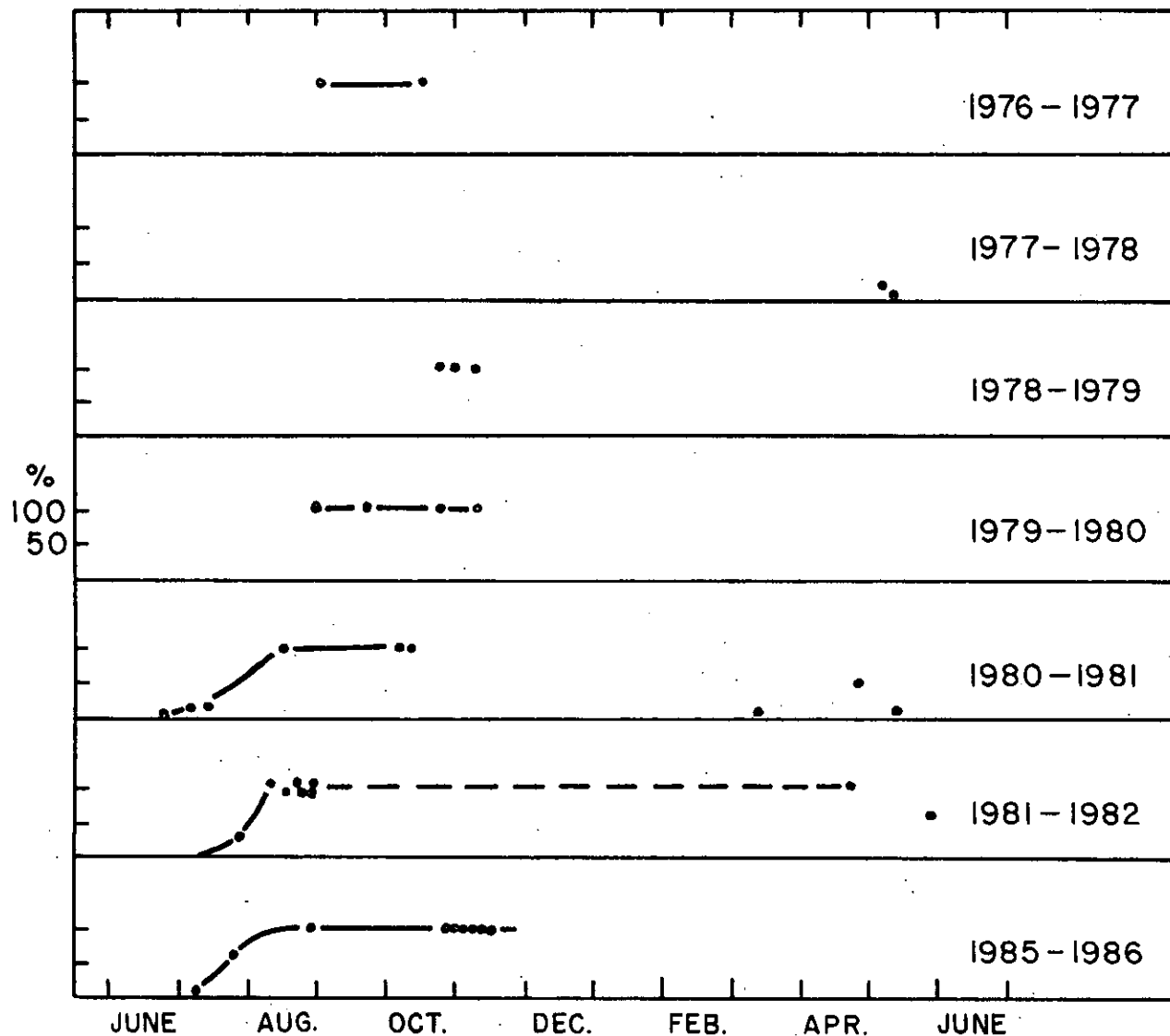


Fig. 2. shows the state at eggbearing. Spawning is completed or 100 % when all females with dark green ovaries (\otimes) have been replaced by ovigerous females (♀_e). In July-August the proportion spawned is estimated from the proportion $\text{♀}_e \div (\otimes + \text{♀}_e)$. Hatching is estimated as the percentage of ♀_e in the length classes 29-33 mm for the season 1980-81 and 29-32 mm for 1981-82, e.g. the percentage of ♀_e in the length-classes 29-32 for the 27th of May 1982 was 39.3 % as compared to 56.7 % ♀_e in the autumn in the same length classes. Hatching is then 30.7 % or 69.3 % are still eggbearing.

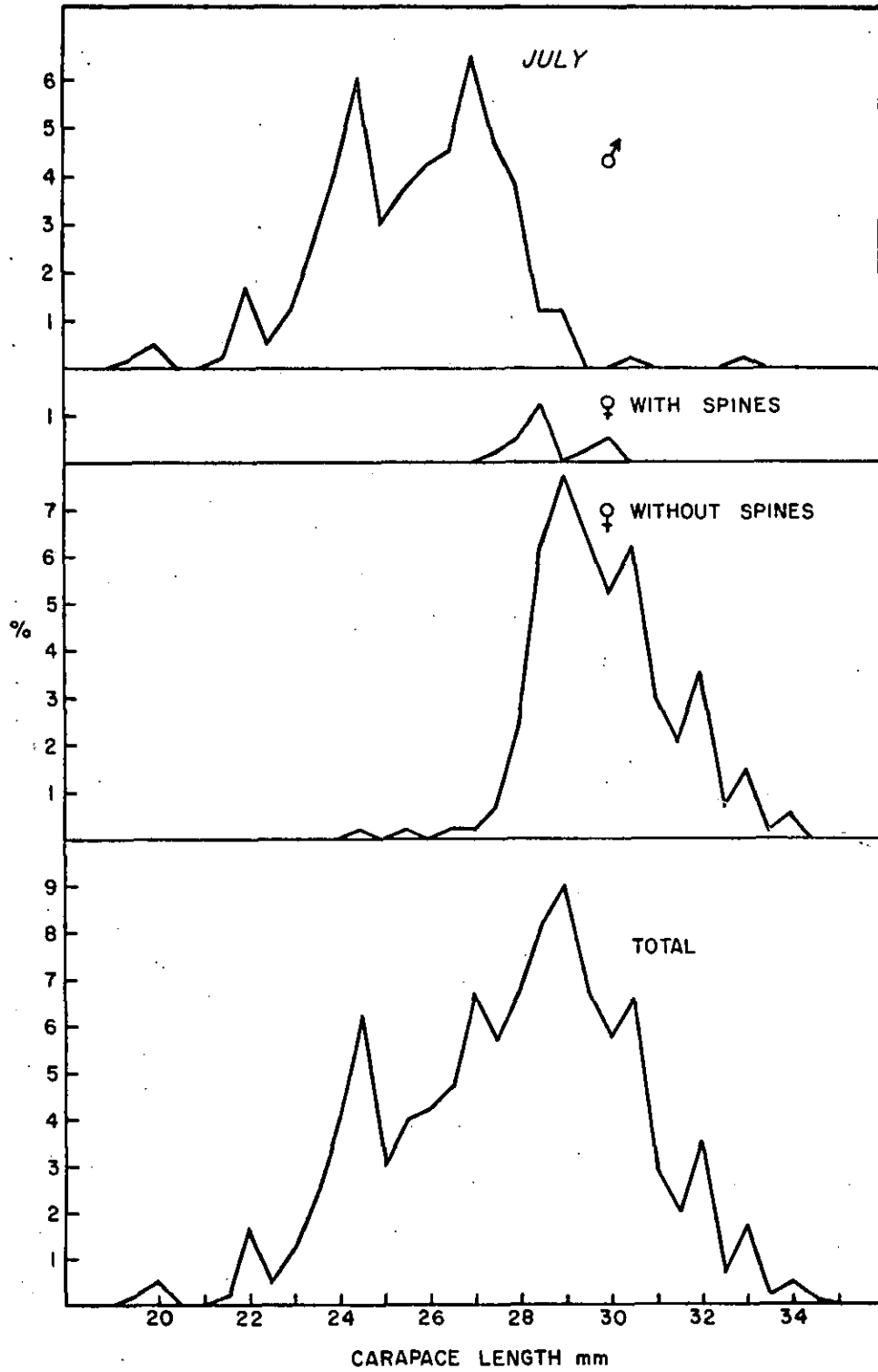


Fig.3. Length-frequency distribution of P. borealis in 0.5 mm intervals, July 1985. Compare to Fig. 4.

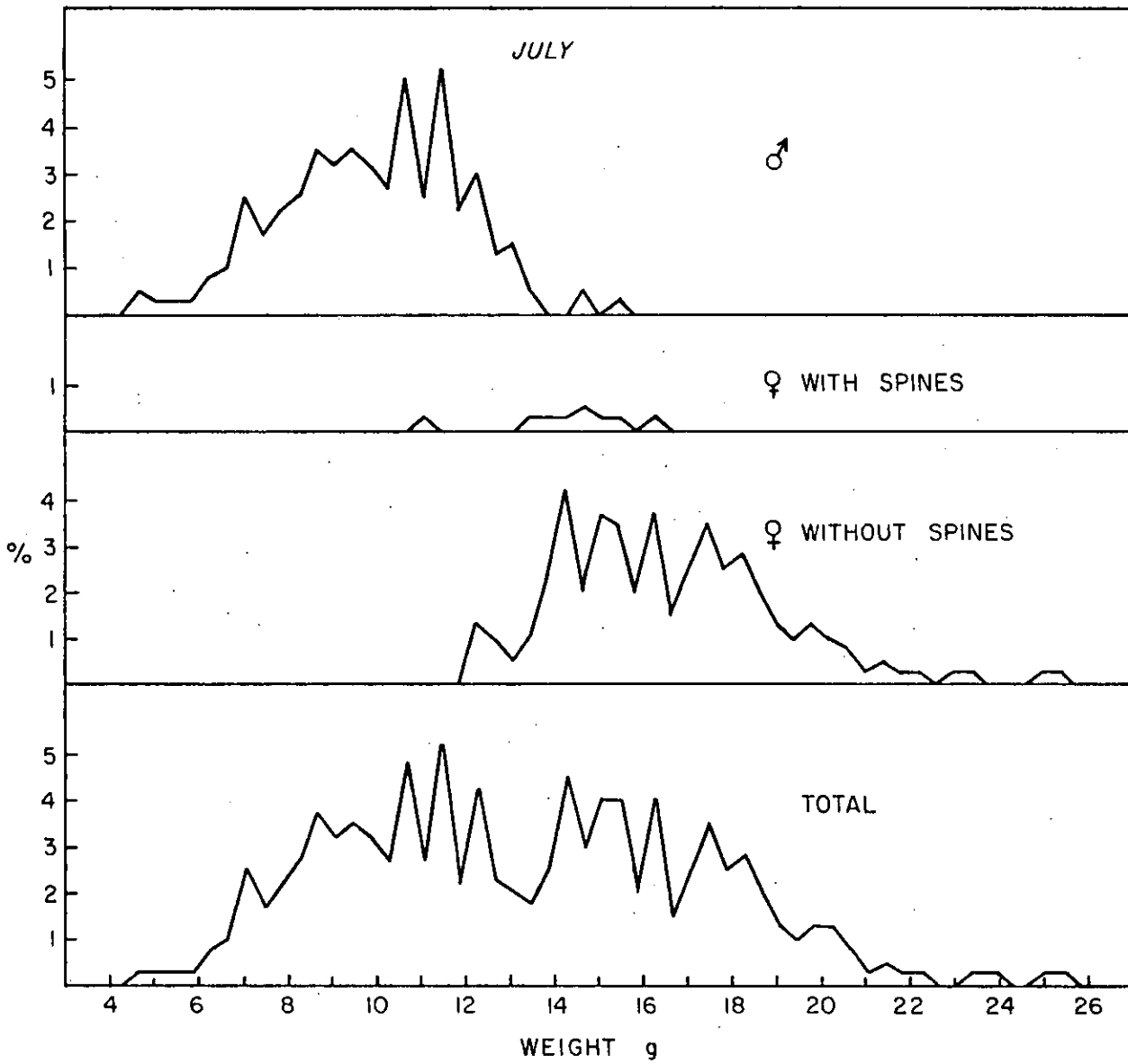


Fig. 4. Weight-frequency distribution, grouped in 0.4 g intervals, in July 1985. Compare to Fig. 3.

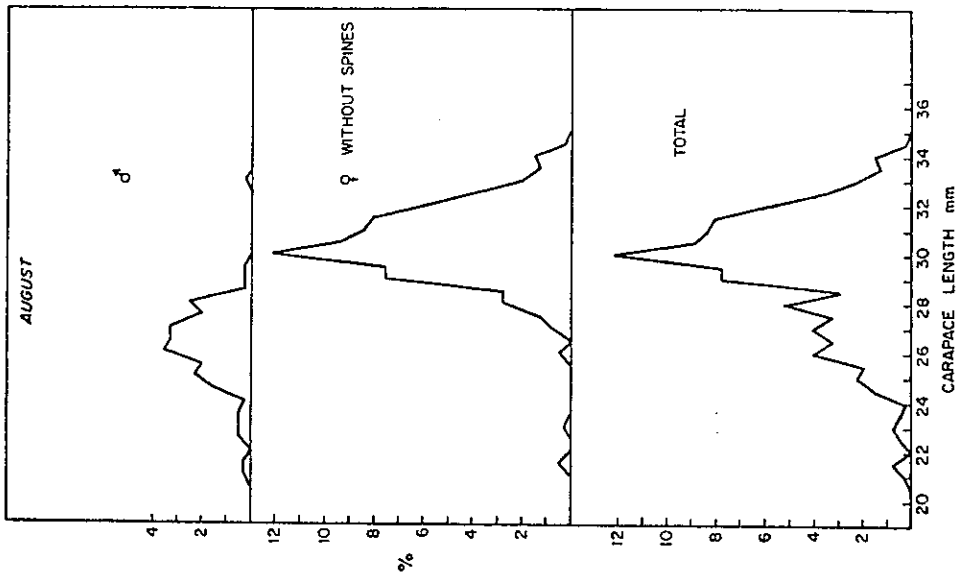


Fig. 5

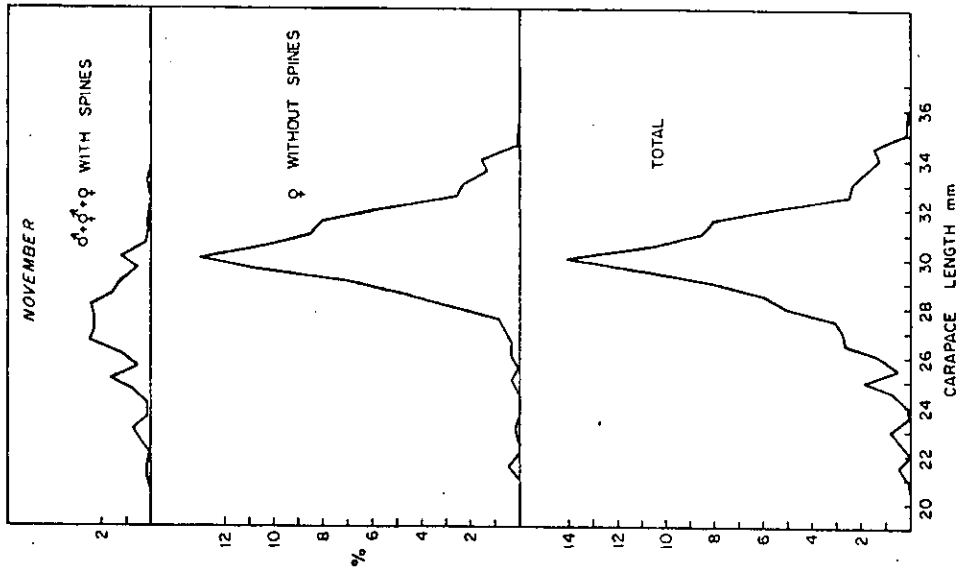


Fig. 6.

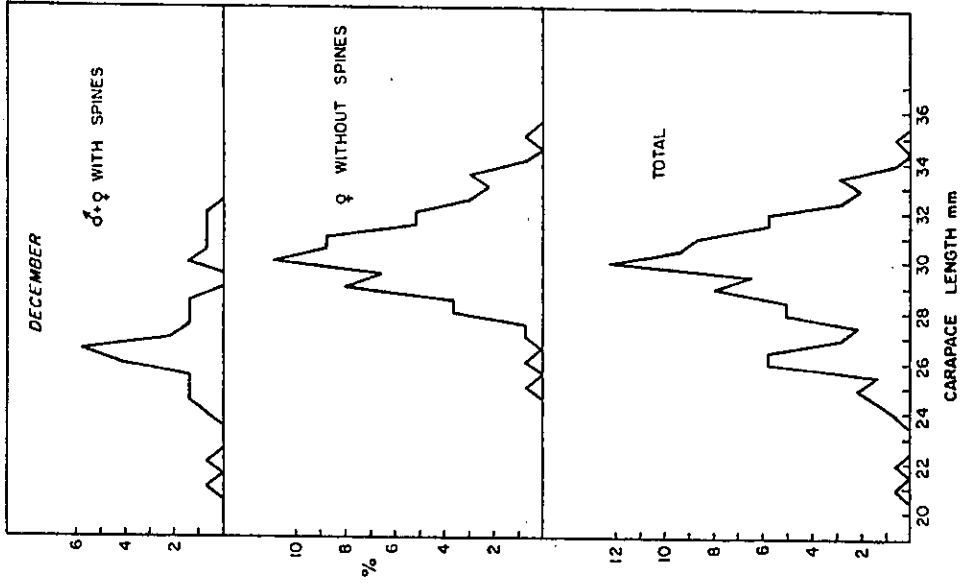


Fig. 7

Length-frequency distributions of shrimp in 0.5 mm intervals in August, November and December 1985.

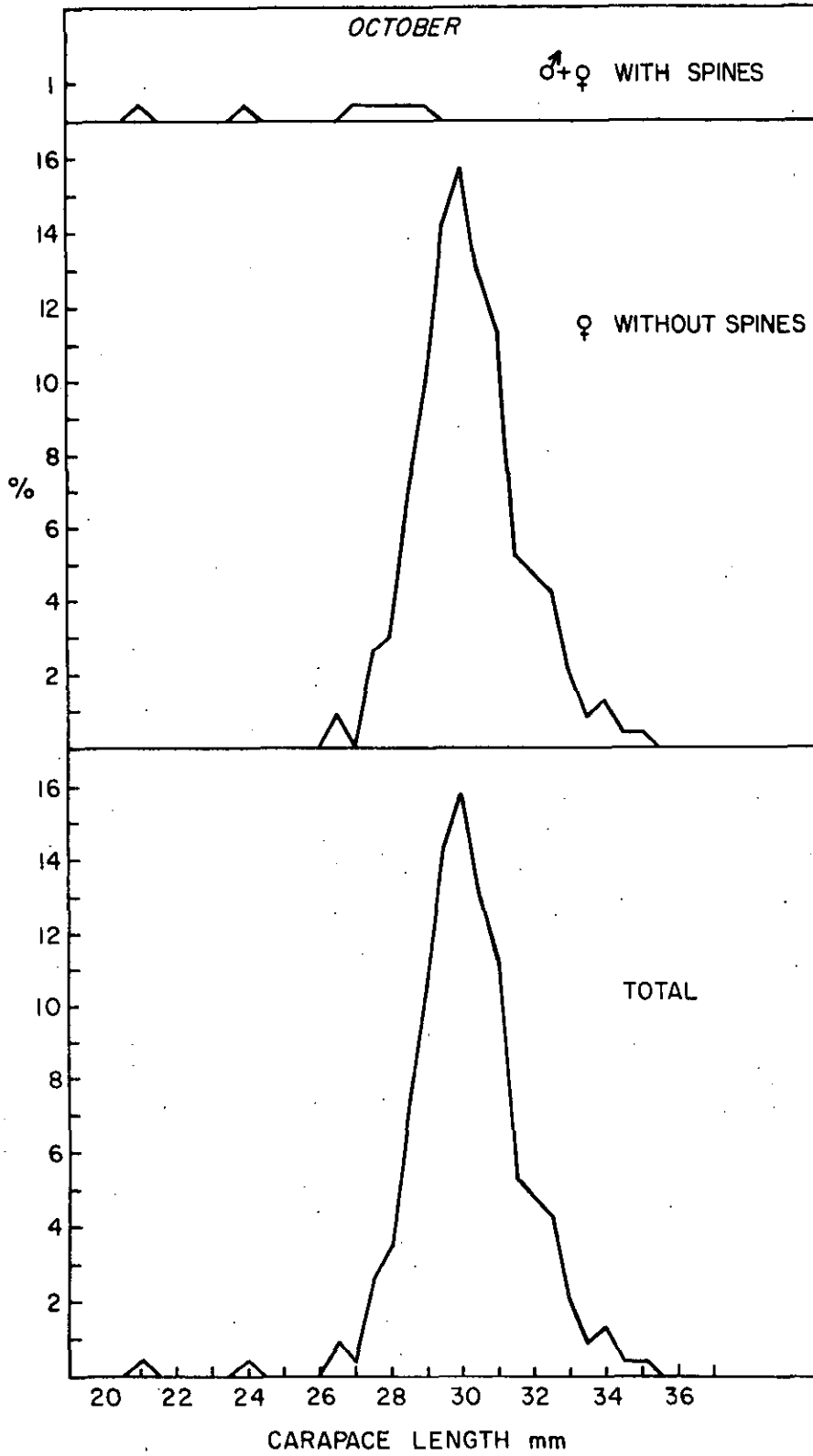


Fig. 8. Length-frequency distribution of shrimp in 0.5 mm intervals, October 1985. Compare to Fig. 9.

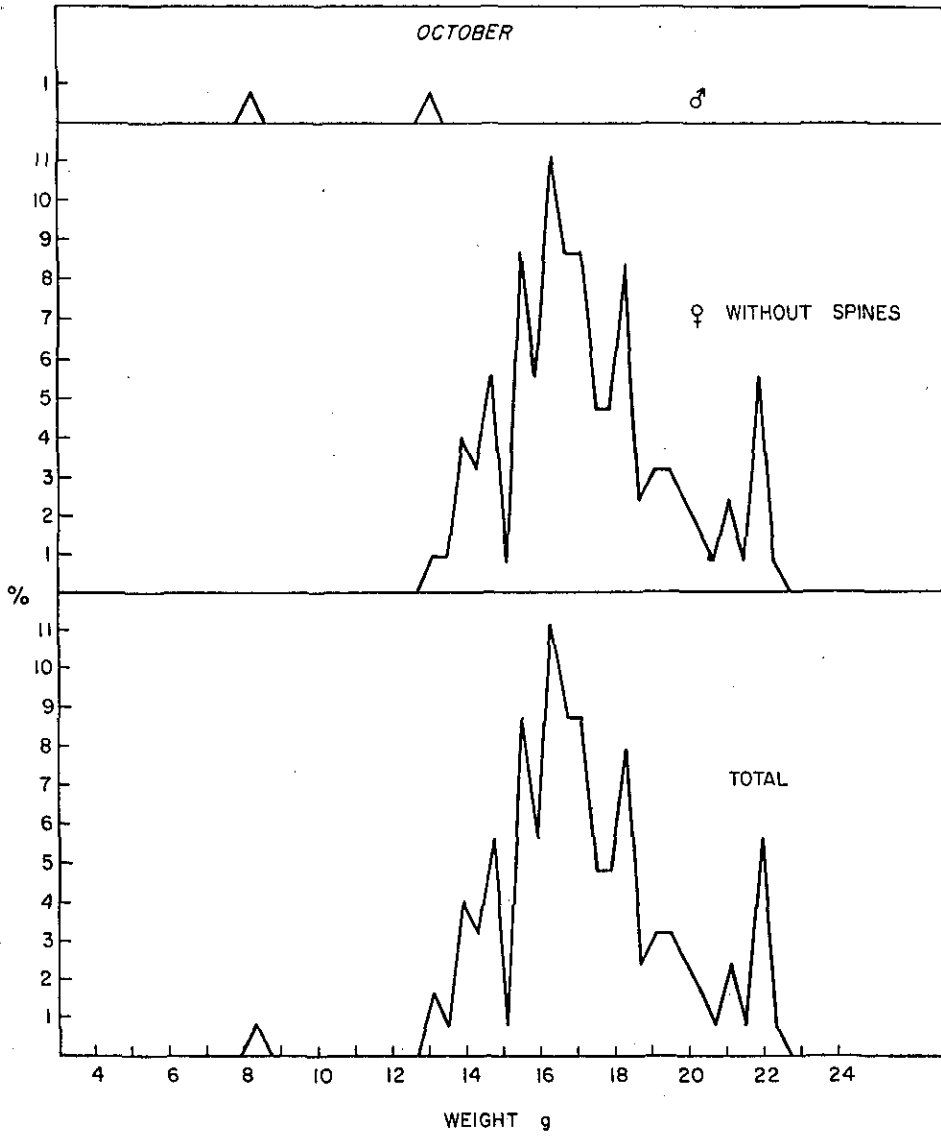


Fig. 9. Weight-frequency distribution, grouped in 0.4 g intervals, in October 1985. Compare to Fig. 8.

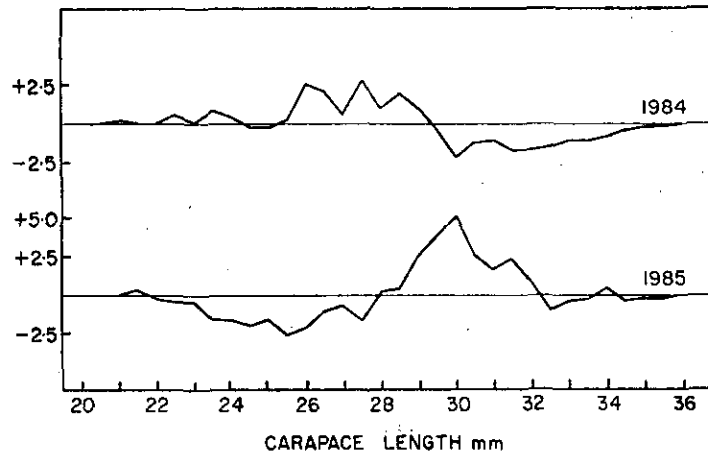


Fig. 10. Deviations in 1984 and 1985 of the length frequencies of *P. borealis* in the Denmark Strait in November, where the base is formed by pooling the length frequencies of 1978, 1979, 1984 and 1985 of the same month.