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Preliminary Report of a Cruise with M/T *Masi* to East Greenland Waters in September 1987

by

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1. INTRODUCTION

In the last years a total of about 5000 tons of shrimp have been fished in Denmark Strait. Except for sampling of the commercial catches, little is known about the stock in this area. Therefore, Norway has since 1983 conducted scientific cruises in East Greenland waters (Smedstad, 1984, 1985, 1986 and 1987). In 1983 the cruise was carried out with R/V "Eldjarn" in november, but the investigations were very hampered by ice. In 1984 we therefore carried out the investigations earlier in the autumn. A freshfish trawler were hired for the period 7 - 28 September. The experiences from this cruise were so good that the same period and also the same ship were chosen for 1985, 1986 and 1987. The cruise in 1987 was carried out in the period 31. August - 25. September. This report gives some results from that cruise.

2. MATERIAL AND METHODS.

The investigated area lies between 65^0N and 68^0N (Fig. 1). We had no problems with ice, but the weather was very windy most of the period.

M/T "Masi" F 68 H is a commercial freshfish trawler 46.7 m long with a main engine of 1200 Hp. The bottom trawl equipment was as follows:

Trawldoors: Steinshavn nr 8 (about 8 m^2).
Bridles : 40 m.
Gear : Six 21" steelbobbins on each side, and six 24" steelbobbins in the middle.
Trawl : "Campelen Super 1800 mesh" shrimp trawl with 35 mm meshes in the codend. 50 extra floats along the sides and about 20 extra floats along the fishline.

Towing speed was 2.5 knots and standard towing distance was 1 nautical mile. In the western area, the bottom conditions were so bad that we had to decrease towing distance to 0.5 nautical mile. 69 trawlstations were taken. The positions are seen in Fig. 1.

For calculations of "swept area" we used 11.7 m as the width of the trawl. This is the same width as used in the Barents Sea for the same trawl (Teigsmark and Øynes, 1982).

In lack of good depth data over the area, the different strata were defined as statistical squares (Fig. 2). Because of few trawlhauls, some strata were combined. The combined strata are: 10 and 11, 12 and 19, 25 and 26, and 30 and 31.

The statistical treatment of the catch data was done as described in

Randa and Smedstad (1982). For biomass calculations the following length/weight relations were used (Smedstad 1986):
Ovigerous females:

$$w = 0.003498\ L^{2.51}$$

Individuals without eggs:

$$w = 0.00148\ L^{2.71}.$$

The carapace length was measured to nearest mm below.

The determination of sex was based on the form of the endopodite of the first pleopod as described by Rasmussen (1953). Females and transitionals were classified by use of the following scheme:

1. (BR - E): Ovigerous females, eyes not visible on the eggs.
2. (BR + E): Ovigerous females, eyes visible on the eggs.
3. (JH) : Females with setae on the pleopods.
4. (HR) : Females or transitionals with head roe.
5. (WR) : Females or transitionals without roe.

Stages found on this cruise were males, females without roe, females with head roe and ovigerous females with no eyes on the eggs.

On this cruise we had no possibility to take hydrographical samples.

3. RESULTS

The shrimp catches are seen in Fig 3. The biggest catches of shrimp were taken northeast of Dohrn Bank along the boarder between the Islandic and the Greenlandic zones.

3.1 Horizontal distribution

The horizontal distribution of the sexes shows the same pattern as found in earlier years. Fig. 4 shows that males were found in greatest numbers in the western and northern areas. Looking at the relative abundance of males in different strata (Fig. 5), we find the same pattern with highest abundance in west and in north. Males were found in smallest numbers around Dohrn Bank. For the total investigated area 52.6 % of the shrimp in numbers were males.

Females were found in greatest numbers northeast of Dohrn Bank (Fig. 6 and 8). Most of the females were ovigerous (BR - E), very few had head roe (HR), and 28.3 % of the females were without roe (WR). The highest frequencies of females without roe were found in the north and the lowest frequencies around Dohrn Bank (Fig. 7).

3.2 Length distribution

Fig. 10 shows length distributions of shrimp from selected stratas. The stratas represent a line from north to south (Fig. 2). It is clearly seen from these samples that the shrimps increase in length southwards. The smallest males are mainly found in the north, and the abundance of females increase southwards. Fig. 11 shows the length distribution of the estimated stock for the investigated area.

3.3 Biomass

Table 1 and Fig. 9 show the calculated biomasses for each strata. The stock in the investigated area was estimated to 28 000 tons. This is a decrease of about 21 000 tons from last years estimate. Some of this decrease may be due to bad weather. During most of the period the weather was rather windy. The number of trawl stations should have been greater in the western area, but we had problems with the bad bottom conditions. The accuracy of the biomass estimation is less because of this.

4. DISCUSSION

The present results agree well with the results from earlier years,

and support the theory of the Dohrn Bank area as a breeding area, the nothern and western areas being nursery areas and with an active. migration of ovigerous females towards the breeding area in winter and early spring.

It is difficult to interpreat the results of the trawlsurvey because the time seriesis so short, and the weather conditions in 1987 was very different from the conditions in 1985 and 1986. It is also a big problem that we have so few stations in the western area. As already mentioned the estimated biomass is considerably lower in 1987 than in 1986. However, the abundance of males seem to be relatively stable over the three years of investigation (Table 2). This indicates that the recruitment to the spring fishery should be the same as in the earlier years. In 1987 we also found a fair amount of individuals smaller than 20 mm, which we did not find in 1985 and 1986. The reason for this may be either that the small individuals had a different behavior in 1987, or that a strong yearclass is coming into the stock.

5. REFERENCES

RANDA, K. and SMEDSTAD, O. M. 1982. The Norwegian groundfish survey at Bear Island and West-Spitsbergen in the autumn 1981. Coun. Meet. int. Coun. Explor. Sea, 1982(G:42): 1-17.

RASMUSSEN, B. 1953. On the geographical variation in growth and sexual development of the deep sea prawn (Pandalus borealis Kr.). FiskDir. Skr. Ser. HavUnders., 10 (3): 1-160.

SMEDSTAD, O. M. 1984. Report of the cruise of F/F "Eldjarn" to East Greenland waters in November 1983. Coun. Meet. int. Coun. Explor. Sea, 1984 (G:33): 1-18.

SMEDSTAD, O. M. 1985. Preliminary Report of a Cruise with M/T "Masi" to East Greenland Waters in September 1984. NAFO SCR Doc. 85/I/5: 1-6.

SMEDSTAD, O. M. 1986. Preliminary report of a cruise with M/T "Masi" to East Greenland waters in September 1985. NAFO SCR Doc 86/8: 1-12.

SMEDSTAD, O. M. 1987. Preliminary report of a cruise with M/T "Masi" to East Greenland waters in September 1986. NAFO SCR Doc 87/2: 1-12.

SMEDSTAD, O. M. and TORHEIM, S. 1986. Investigations on shrimp (Pandalus borealis) in the Norwegian Fishery off East Greenland in 1985. NAFO SCR Doc. 86/9: 1-6.

SMEDSTAD, O. M. and TORHEIM, S. 1987. Investigations on shrimp (Pandalus borealis) in the Norwegian fishery off East Greenland in 1986. NAFO SCR Doc. 87/3: 1-9.

TEIGSMARK, G. and ØYNES, P. 1982. Norwegian investigations on the deep Sea shrimp (Pandalus borealis) in the Barents Sea in 1982. Coun. Meet. int. Coun. Explor. Sea, 1982 (K:12): 1-8.

Table 1. Estimated biomasses of shrimp in Denmark Strait in the years 1985, 1986 and 1987. Weight in tonnes.

	West of 31°W	East of 31°W	TOTAL
1985	18 549	12 533	31 082
1986	16 257	32 628	48 885
1987	7 337	20 708	28 045

Table 2. Estimated numbers of males in Denmark Strait in the years 1985, 1986 and 1987. Numbers in millions.

	West of 31°W	East of 31°W	TOTAL
1985	716	319	1035
1986	359	917	1276
1987	336	856	1192

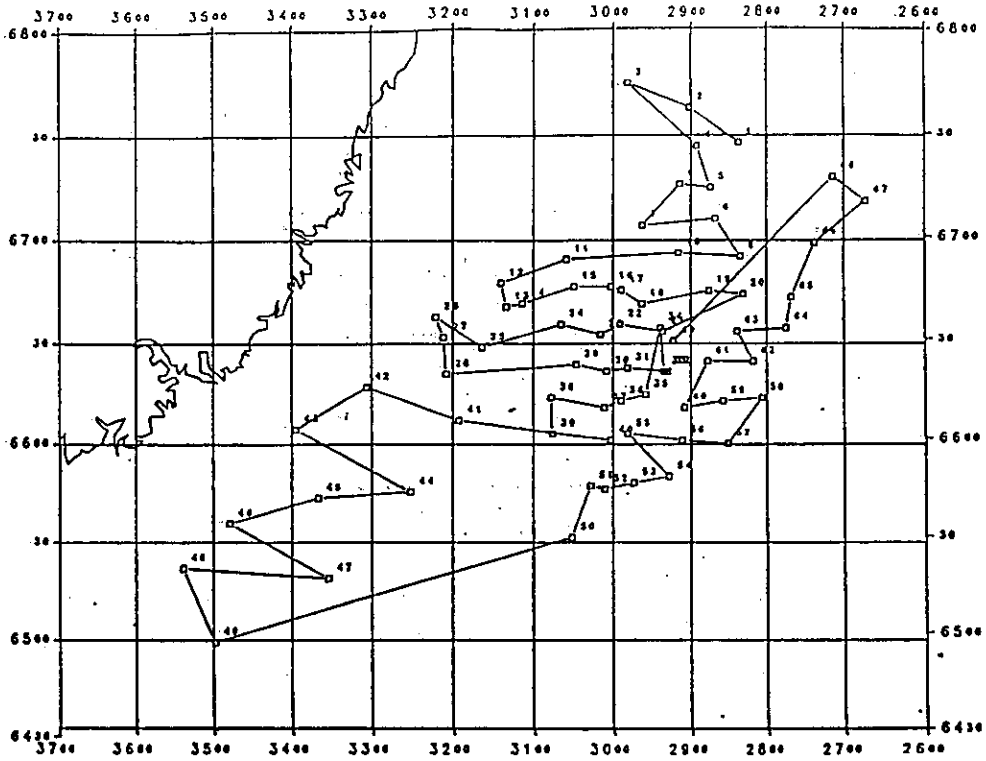

Fig.1. Survey tracks and trawl stations taken by M/T "Masi" in September 1987.

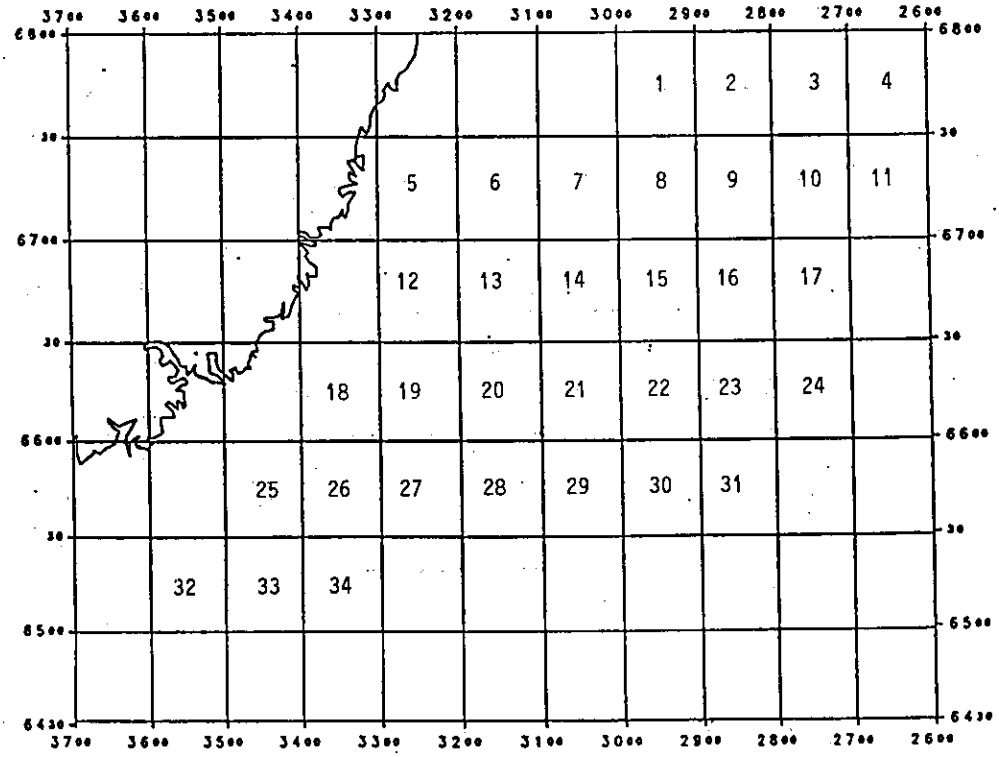

Fig.2. Strata numbers.

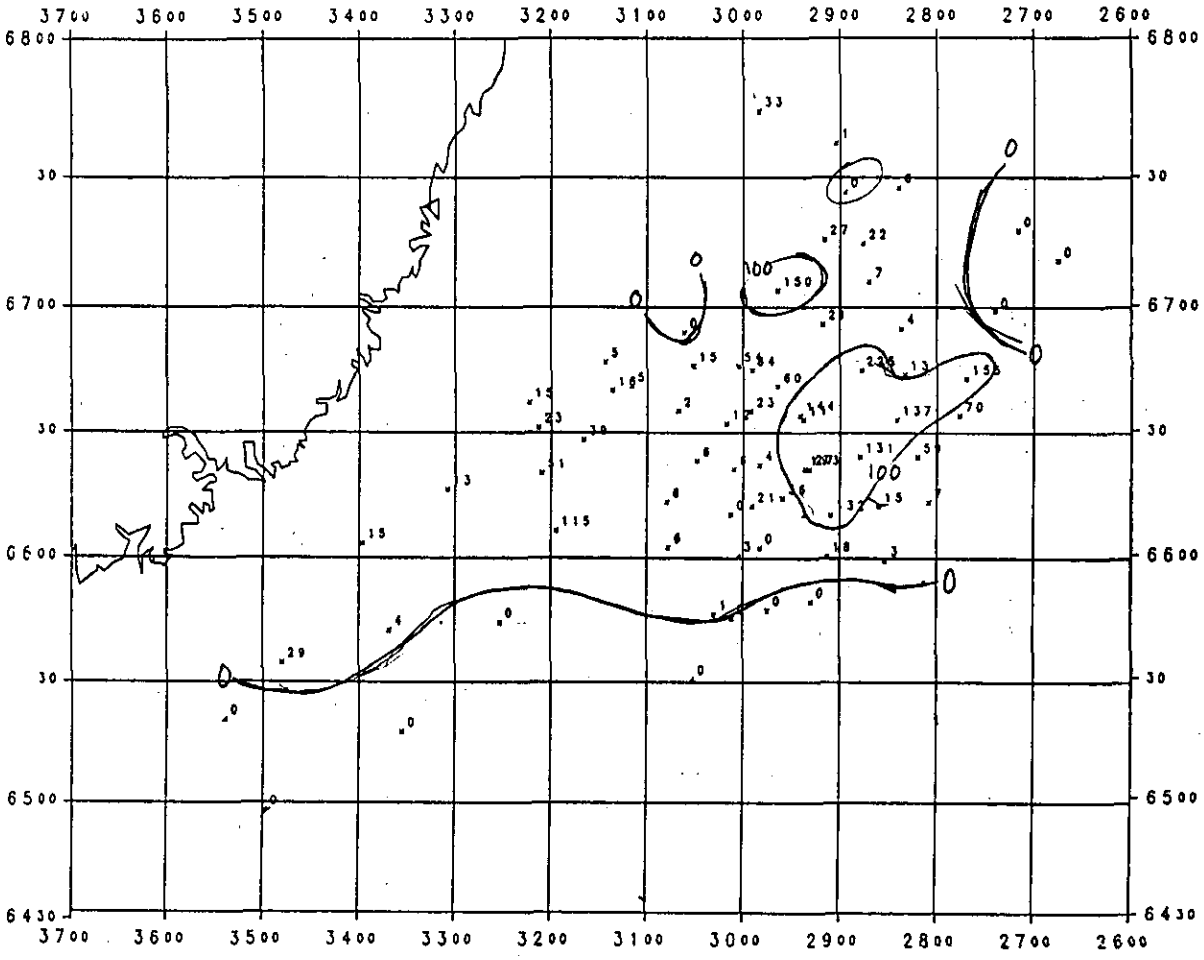

Fig.3. Catches of shrimps in kg per 3 nautical miles.

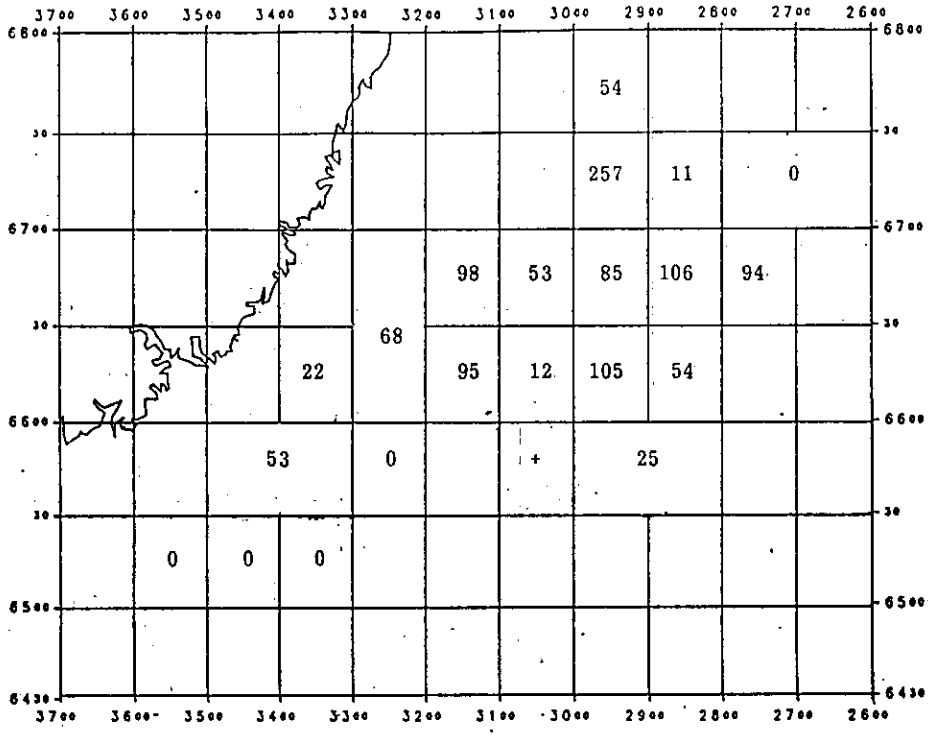

Fig.4. Calculated numbers of males and intersexes (In milliones).

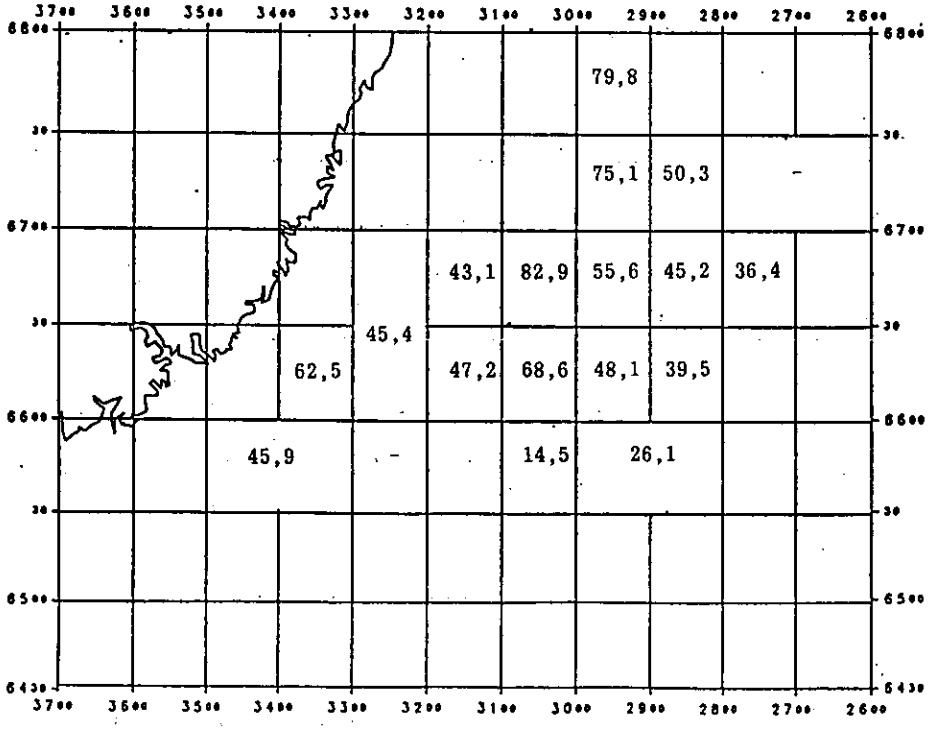

Fig.5. Males and intersexes in per cent of total number.

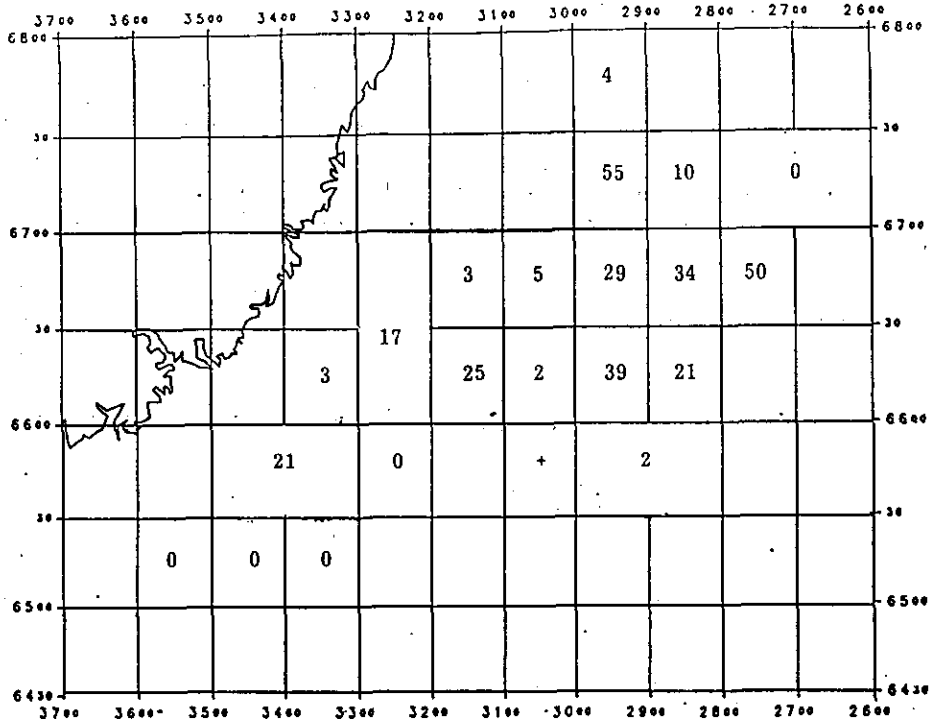

Fig.6. Calculated numbers of female shrimps without roe (In millions).

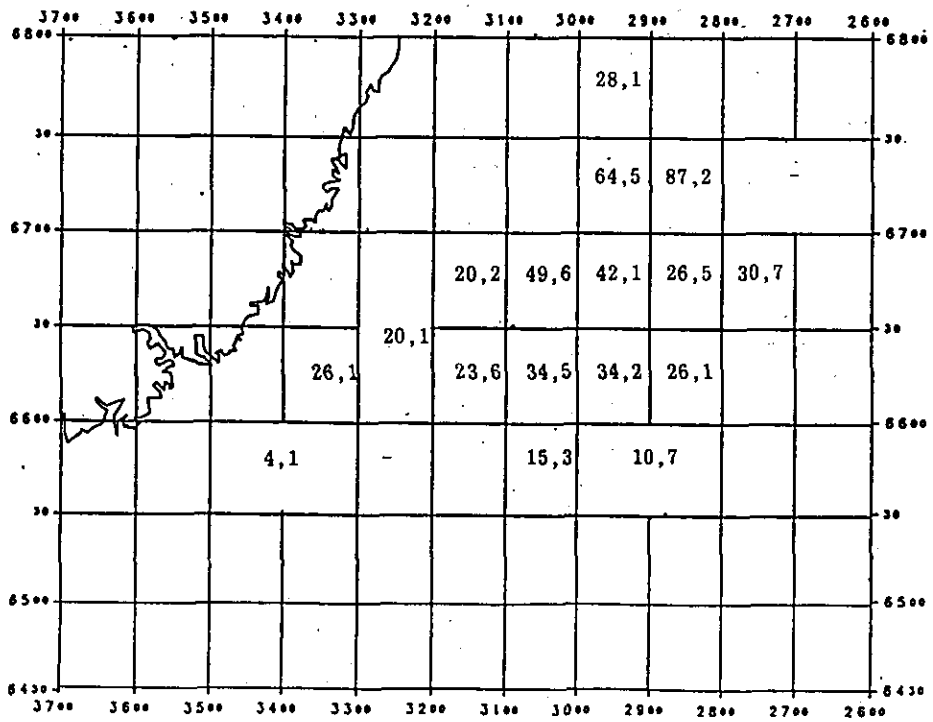

Fig.7. Female shrimps without roe in per cent of total females.

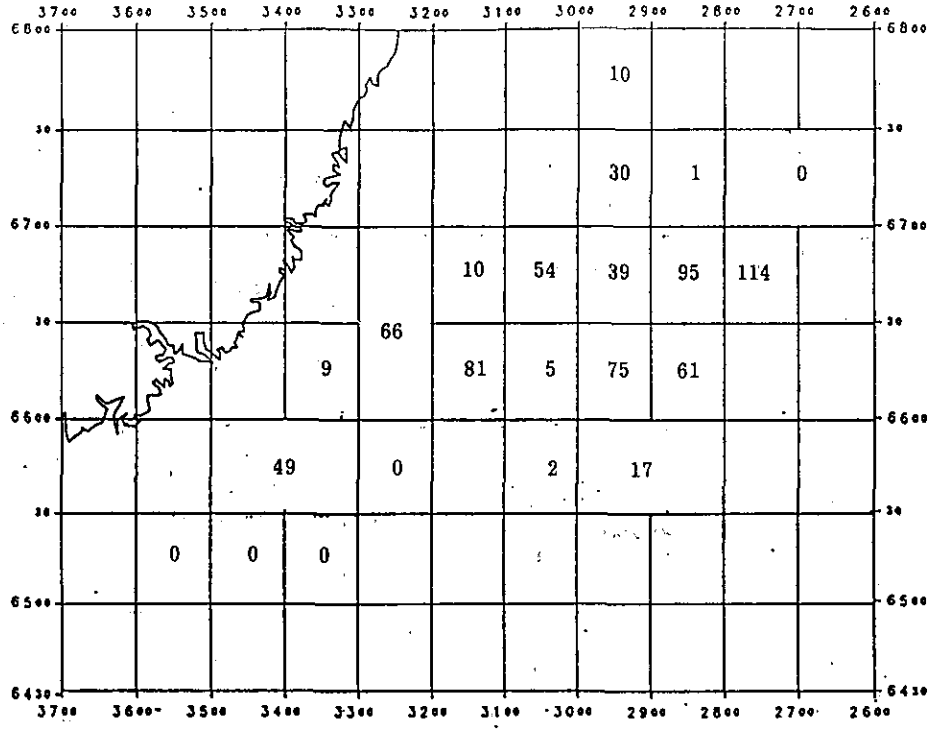

Fig. 8. Calculated numbers of female shrimps with roe (In millions).

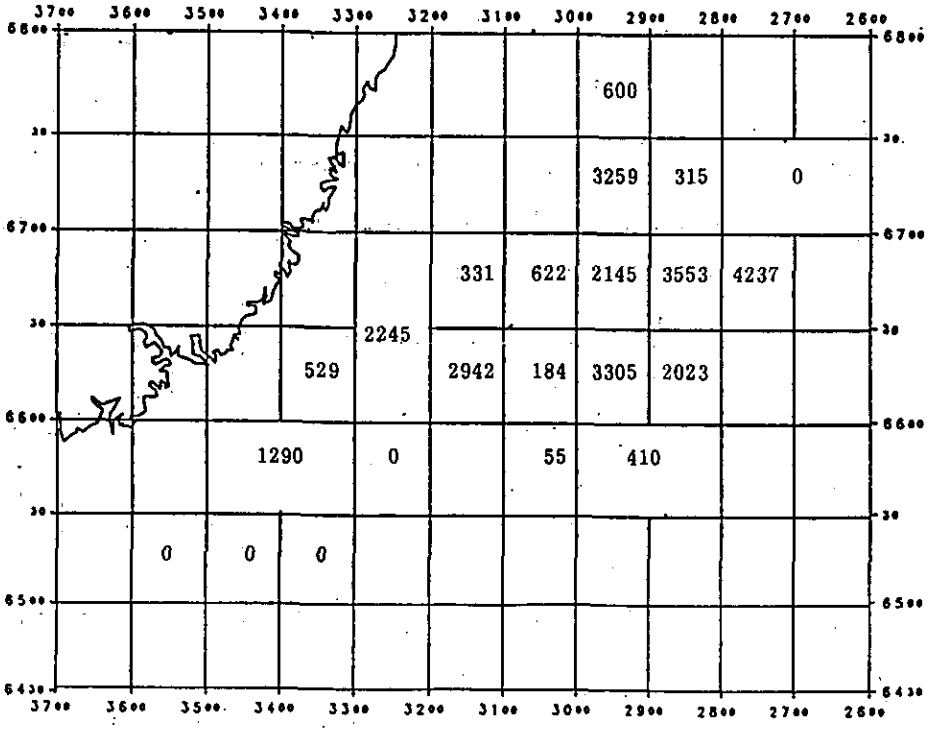

Fig. 9 Calculated total biomass of shrimps in tons.

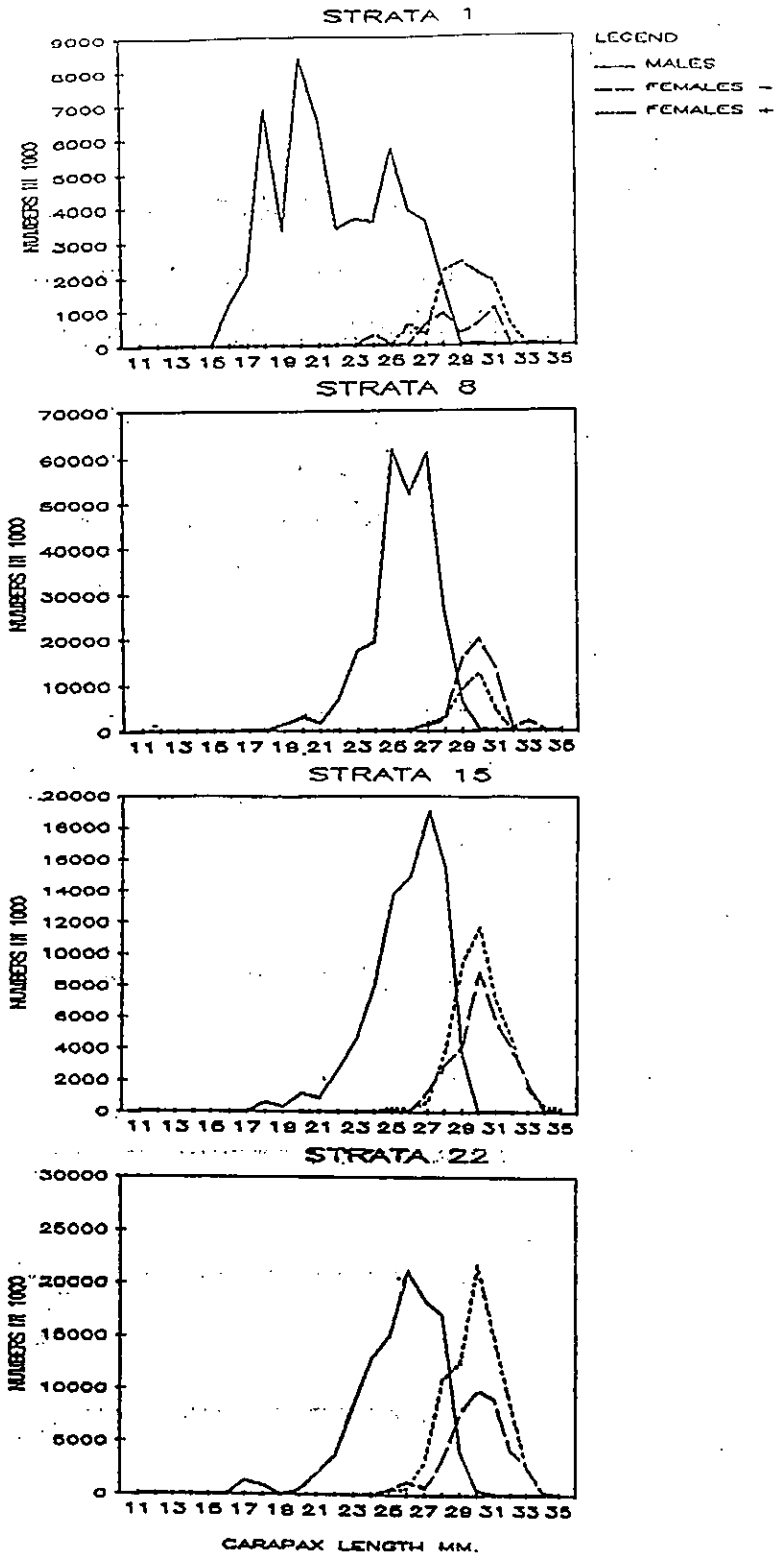

Fig.10. Length distributions of shrimp from selected strata from corth (strata 1) to south (strata 22).

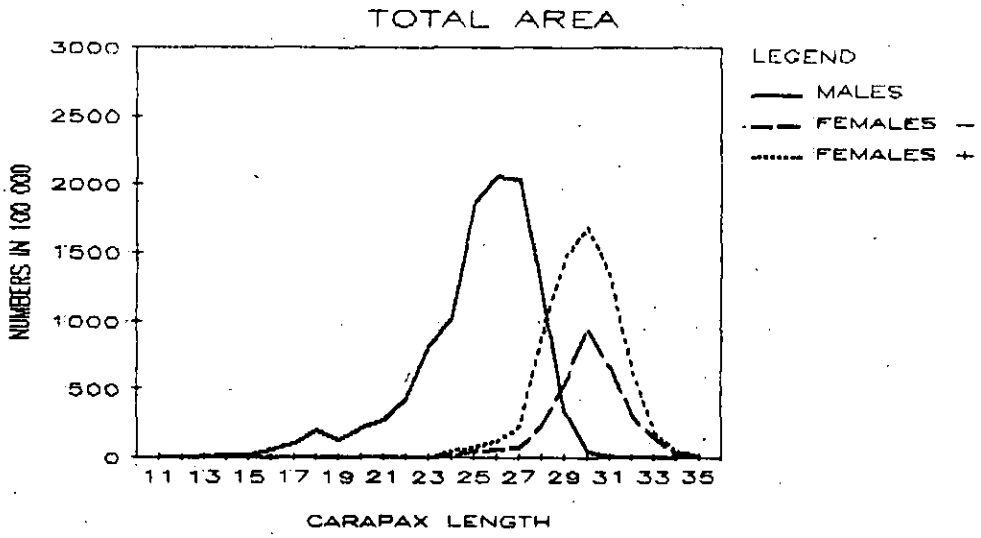

Fig.11. Length distribution of the shrimp stock in the investigated area.