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The Greenland Fishery for Northern Shrimp (Pandalus borealis) on Flemish Cap, NAFO Division 3M, in 1994 and 1995

by

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Introduction

In 1994 nine Greenland vessels participated in the Flemish Cap fishery from middle April to late September, all using single trawl. In 1995 only six vessels were fishing in Div. 3M, but now two vessels were using twin trawls improving catch rates significantly. The Greenland fishery in the area in 1995 went on from late May to early August.

Based on weekly reportings to Greenland authorities by all Greenland vessels the total catch at Flemish Cap in 1994 amounted to 2276 tons. The total catch in 1995 until August 6th amounts to 2322 tons.

Logbook data provided information on fleet performance to the Greenland Institute of Natural Resources. Logbook data covered 8450 hours of trawling and a total catch of 2200 tons in 1994. In 1995 recieved logbooks until September 1th covers 3941 trawling hours and 1859 tons of catch - about 80% of the total reported catch in 1995.

This paper updates information on the geographical distribution and catch rates for both 1994 and 1995 in Div. 3M and presents results from analysis of samples from the commercial shrimp fishery.

Materials and methods

Based on compulsory weekly reportings to Greenland authorities total catches and numbers of vessels in the shrimp fishery i NAFO Div. 3M were compiled by month from April 1994 until early August 1995.

Catch and effort data from individual fishing vessels as reported in vessels logs were analysed to show the monthly distribution of catches, fishing effort and mean unstansardiced catch rates.

Size composition of shrimp catches were generated from samples from the commercial fishery in June, 1994 and

May and July, 1995. Samples taken by observers before processing were sorted by sexual characteristics and mesured to the nearest 0.1 mm carapace length. The data were then pooled in 0.5 mm length groups by month.

Results

Reported Catches 1994 - August 1995

Table 1 shows catches by month and the numbers of reporting vessels in Div. 3M in 1994 and 1995 as reported to Greenland authorities. As from 1993 to 1994 the number of vessels participating in the Flemish Cap fishery continues to decline from 1994 to 1995. The total catch however has after a decline in 1993 to 1994 stabiliced around 2300 tons in 1994 and 1995. The shrimp catch in 1994 amounts to 2276 tons taken by 9 vessels. In 1995 the total catch was 2322 tons sheared by 6 vessels.

Table 1. Shrimp catches (tons) and no. of vessels participating in fishery in NAFO Div. 3M by month in 1994 and 1995 as reported to Greenland authorities.

Year	Month:	April	May	June	July	Aug.	Sep.	Total
1994	Catch (tons)	70	471	850	637	178	70	2276
	No. of vessels	1	5	8	8	2	1	9
1995	Catch (tons)	-	335	900	1086	-	-	2321
	No. of vessels	-	3	6	4	-	-	6

Catch, effort and CPUE

Logbook records showed that in both 1994 and 1995 most catch and effort occured in June and July (table 2). Compared to 1994 effort dropped more than 50% from 8450 hours to 3941 in 1995 while the catch only dropped 16% from 2200 tons to 1859 tons.

Table 2. Catch (tons) and effort (hours) divided in single trawl fishery (1) and twin trawl fishery (2), as reported in vessel logs in 1994 and 1995.

Year	Month:	April		May		June		July		Aug.		Sep.		Total
	Trawl	1	2	1	2	1	2	1	2	1	2	1	2	1+2
1994	Tons	66	-	383	-	867	-	637	-	161	-	86	-	2200
	Hours	435	-	1225	-	3259	-	2351	-	725	-	455	-	8450
1995	Tons	-	-	37	196	214	526	144	661	2	79	-	-	1859
	Hours	-	-	137	364	832	881	467	1103	6	151	-	-	3941

The catch rates for single trawl fishery were at about the same level in 1994 and 1995 (table 3). However the introduction of twin trawl in 1995 with about twice the catch rate of single trawl resulted in a 80% increase in the total CPUE compared to 1994.

Table 3. Catch rates (kg/hr) in single (1) and twin (2) trawl fishery as reported in vessel logs in 1994 and 1995.

Year	Month:	April		May		June		July		Aug.		Sep.		Total
	Trawl	1	2	1	2	1	2	1	2	1	2	1	2	1+2
1994	kg/hr	152	-	313	-	267	-	271	-	222	-	190	-	260
1995	kg/hr	-	-	273	537	257	597	310	599	298	525	-	-	472

In 1994 the weekly catch rates (fig. 1) showed a steady increase from a very low level of 50 kg/hr in April to a peak of about 400 kg/hr in late May. Except for a breif increase at the middle of July catch rates hereafter declined until ending of the fishery in late September.

In 1995 the fishery commenced one and a half month later than in 1994 and at a catch rate of about 180 kg/hr (single trawl). The CPUE showed an increasing trend through the season and peaked at about 400 kg/hr just before ending the fishery in early August. The catch rates for twin trawlers in 1995 showed a different trend. They started "low" at about 550 kg/hr in late May. CPUE's then increased to nearly 800 kg/hr at the end off June - thereafter declining to about 500 kg/hr in early August.

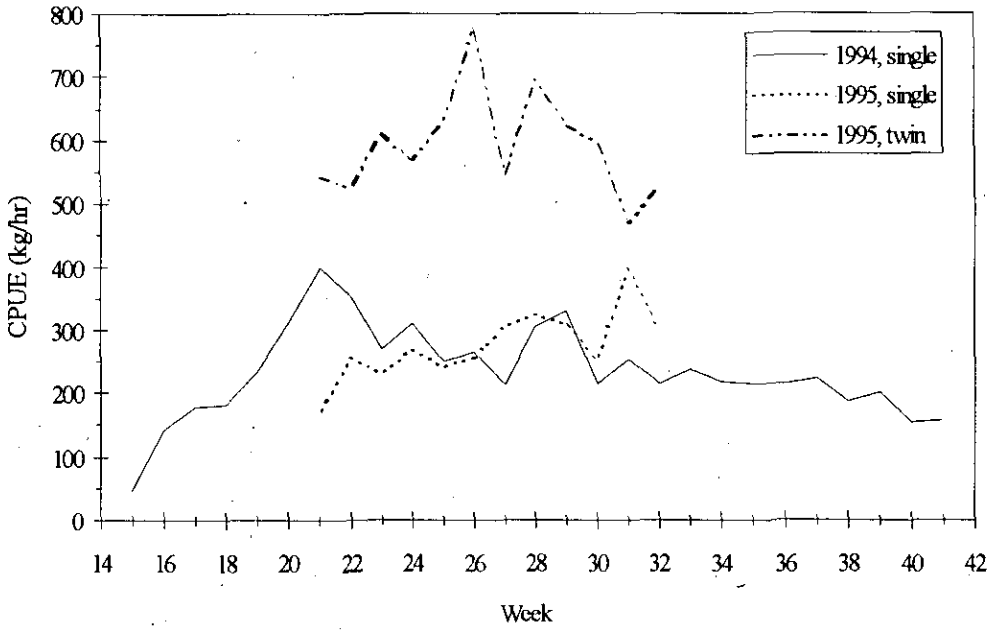


Fig 1. CPUE (kg/hr) in NAFO Div. 3M from logbook data by week in 1994 and 1995 divided in single and twin trawl fishery.

Shrimp Discard and By-catches

Information on by-catch and shrimp discard were compiled from logbooks (table 4). Redfish was the most dominant spices in the by-catch wich seemed to decline significantly from 1994 to 1995. However reported levels on by-catch and shrimp discard should be taken with caution.

Table 4. Discard and by-catch in absolute weight (kg) and in % of total shrimp catch as reported in vessel logs.

Year	Spec.	April	May	June	July	Aug.	Sep.	Total
1994	Redfish	1155	3419	12895	7959	215	0	25643
	Mixed	1145	3017	3581	2539	190	0	10472
	Total	2300	6436	16476	10498	405	0	36115
	% by-catch	3.5%	1.7%	1.9%	1.6%	0.3%	0.0%	1.6%
	Shrimp disc.	0	619	998	1202	211	10	3040
	% disc.	0.0%	0.2%	0.1%	0.2%	0.1%	0.0%	0.1%
1995	Redfish	-	490	2488	2145	270	-	5393
	Mixed	-	486	2019	2716	316	-	5537
	Total	-	976	4507	4861	586	-	10930
	% by-catch	-	0.4%	0.6%	0.6%	0.7%	-	0.6%
	Shrimp disc.	-	1105	2716	2435	361	-	6617
	% disc.	-	0.5%	0.7%	0.3%	0.1%	-	0.4%

Geografical Distribution of the Fishery

Figure 2 and 3 shows the geografical distribution of the catches in 1994 and 1995 respectively as recorded in vessel logs. The fishery were in both years concentrated at the western side of the Flemish Cap with smaller catches in the north. In 1994 thoug catches were also reported at the eastern side between 44 and 45 degreas longitude. Catches from this area were practicaly abcent in 1995. Figure 3a-3d show the monthly distribution of catch-rate(kg/h) and effort by single and twin trawl.

Length Distributions

The estimated size compositions of the Greenland catches in May 1995 showed that smaal males with a mode of 15 mm CL and a larger male group of 21 mm CL dominated the catch (fig.4). Other male groups were not not evident but this may be due to overlapping with the dominating groups. The females form a broad group with suggested peaks at 22.5 mm, 25 mm and 28 mm.
In July the modal structure was very much the same but now the 15 mm male group completely domminates the catch (fig. 5). However a smaal male group of about 9 mm apeared in July.

If the estimated size composition in 1994 is representative, as it is based on 19 samples from only one month (June), the 1994 size composition differs significantly from the one in 1995 (fig. 6). Female shrimp at 28 mm CL were dominating the catches (fig. 7). 3 male groups at Cpl 17.5 mm, 21 mm and 24 mm was also suggested in the data but the large 15 mm male group seen in 1995 was completely abcent.

Discussion

The fishery for northern shrimp on Flemish Cap is on the third year and can still be considered as a new fishery. However data available from the Greenland component reveal some important finding.

1. Effort shifted to more western and southwestern areas from 1993 to 1994 and the fishing area were diminished futher in 1995.

2. The introduction of the twintrawl in 1995 improved the catch rates significantly. However when fishing with singel trawl the catch rate were at about the same level in 1994 and 1995, and never reach the 1993 level.

3. The observed drop in effort in 1995 is mainly due to the introduction of twintrawl.

4. Size and age composition of the shrimp catches in 1995 were markedly different from thos of 1994. Male accounted for almost 85 % of the estimated catchnumbers in 1995 compared to 40 % in the previous year.

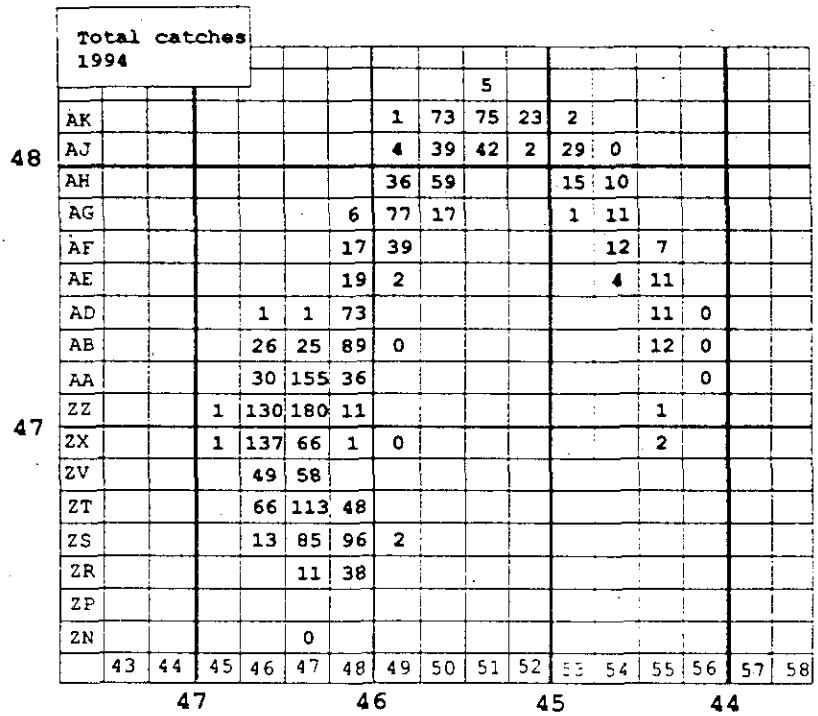
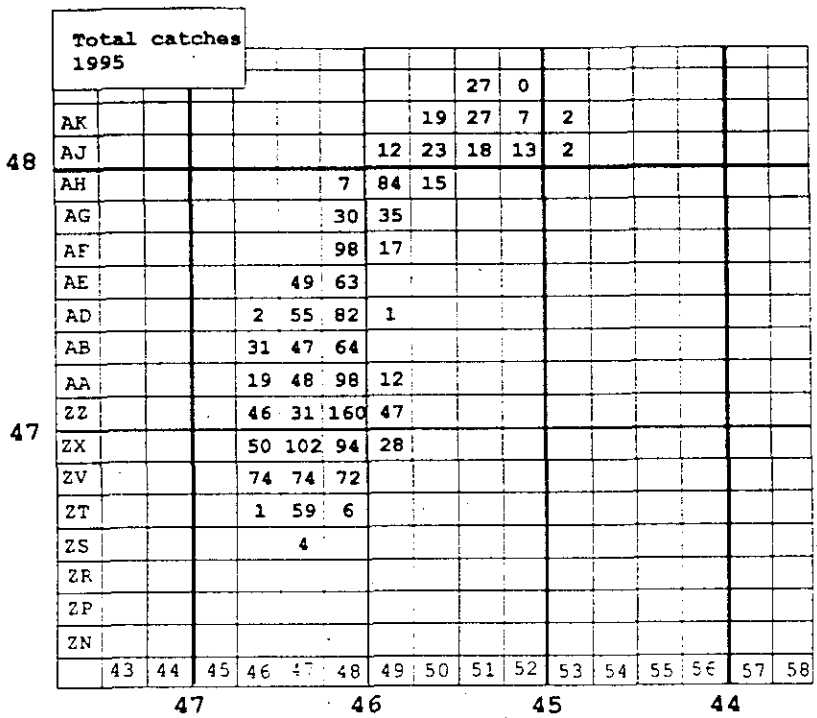


Fig. 2. Distribution of total catches of shrimp (tons per statistical unit) in 1994, based on logbooks from Greenland trawlers.



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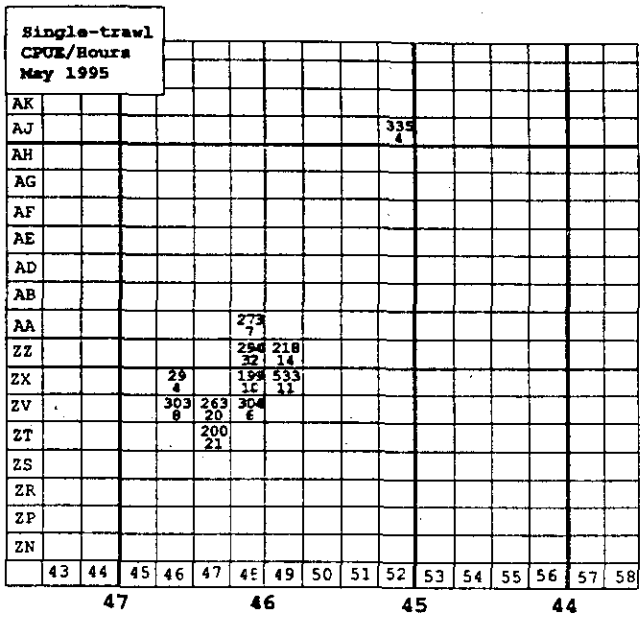


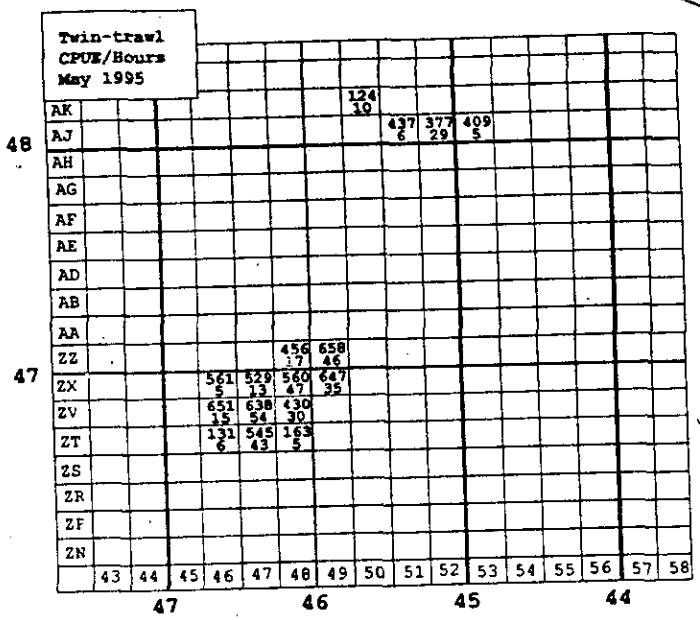
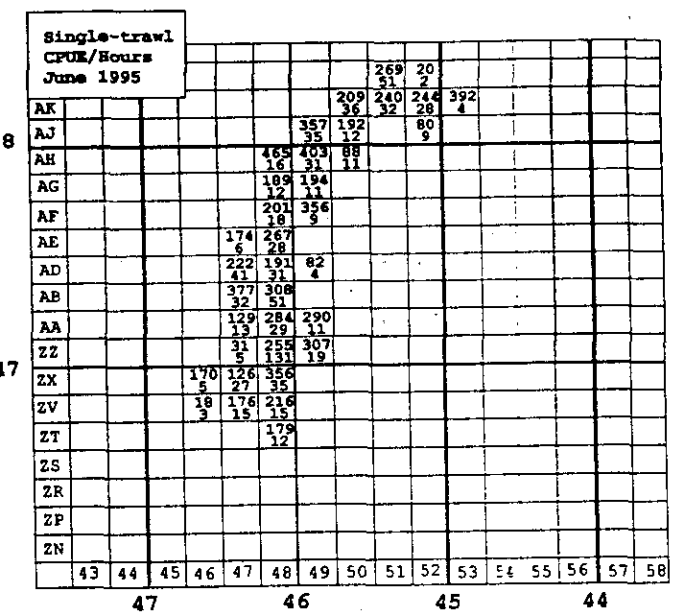


Fig.3a. Distribution of catchrate (kg/hour) and effort (hours) in each statistical unit in 3M in May 1995 for twin and single trawl.



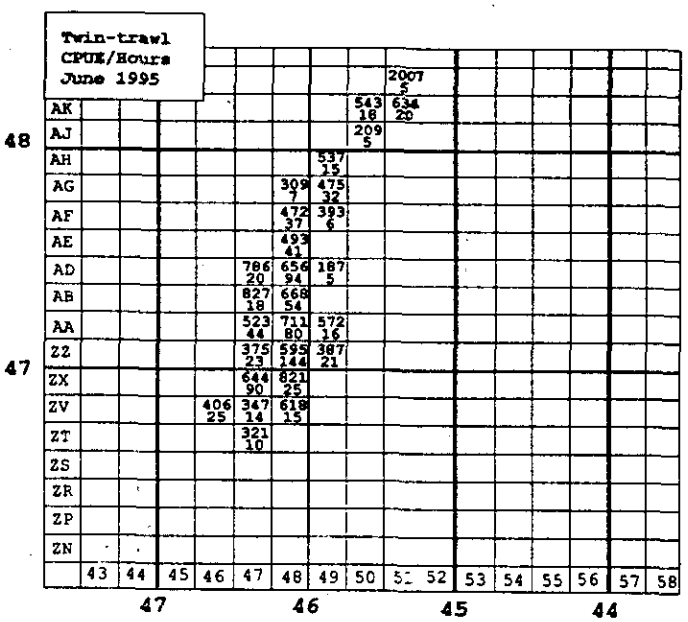


Fig.3b. Distribution of catchrate (kg/hour) and effort (hours) in each statistical unit in 3M in June 1995 for twin and single trawl.

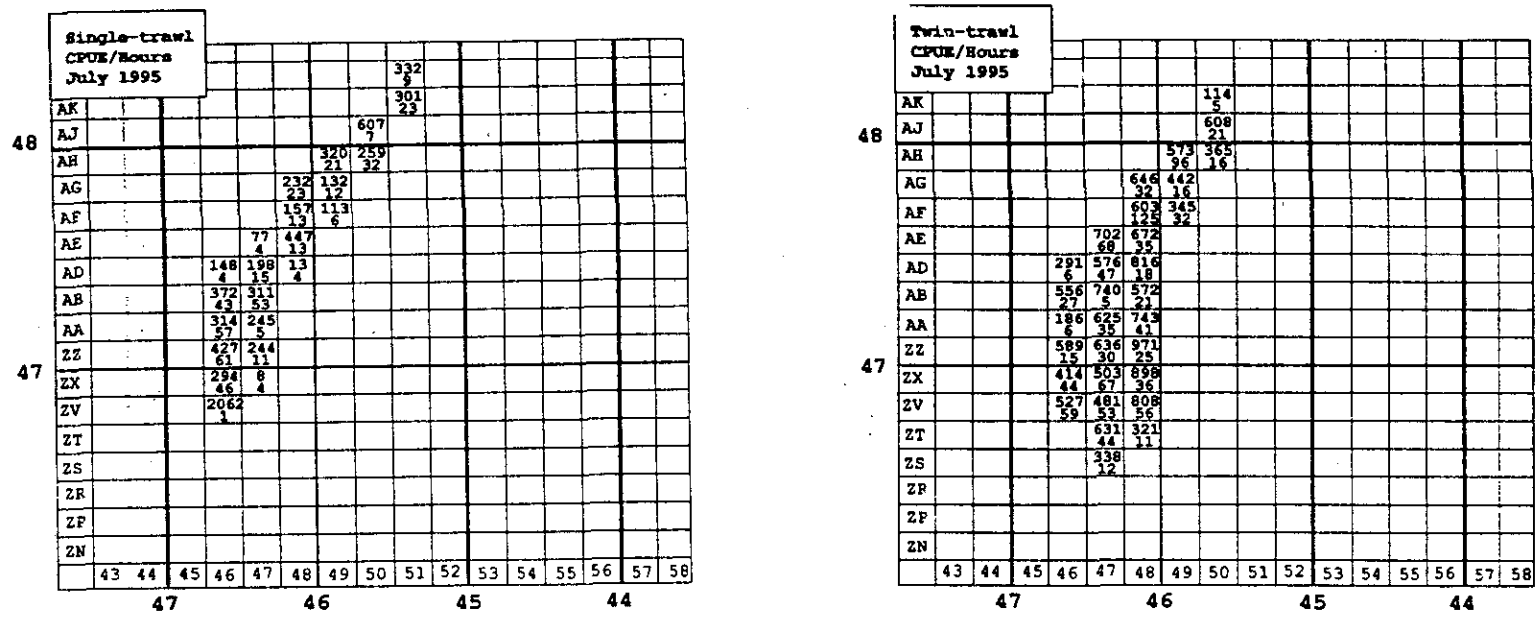


Fig.3c. Distribution of catchrate (kg/hour) and effort (hours) in each statistical unit in 3M in July 1995 for twin and single trawl.

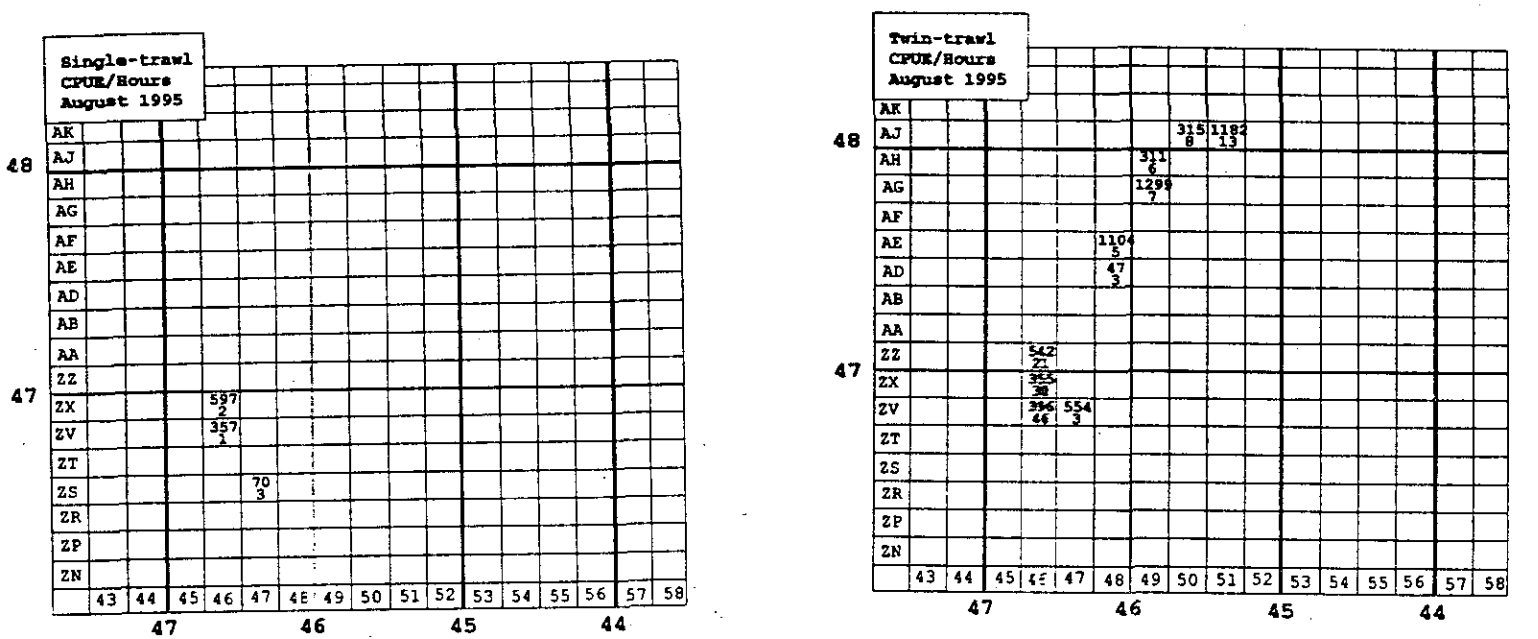


Fig.3d. Distribution of catchrate (kg/hour) and effort (hours) in each statistical unit in 3M in August 1995 for twin and single trawl.

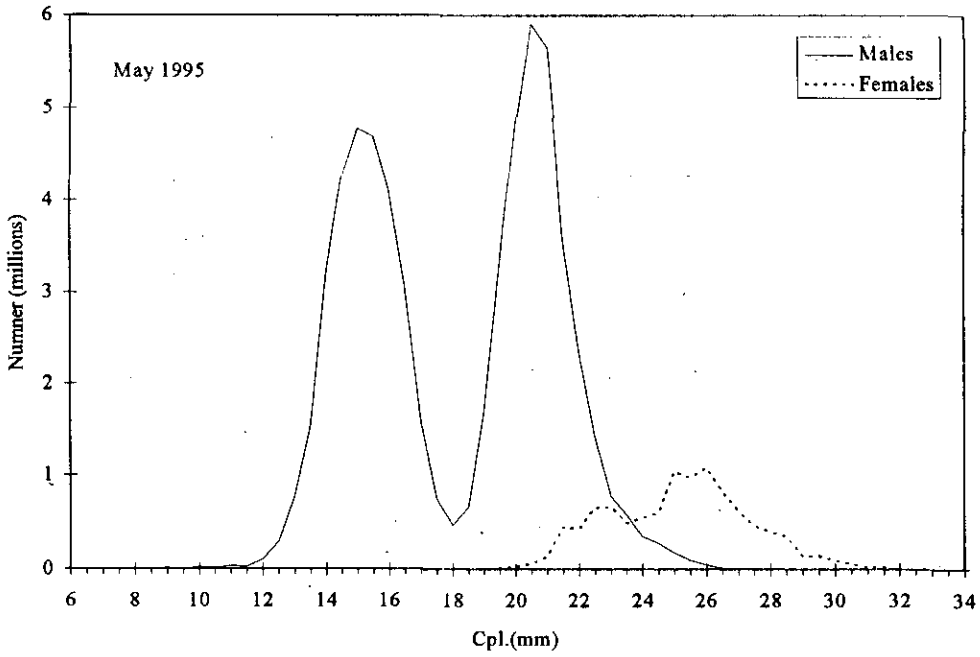


Fig.4 Commercial length distribution by sex in Greenland catches, NAFO Div. 3M, May 1995, based on 12 samples including 8,013 shrimps.

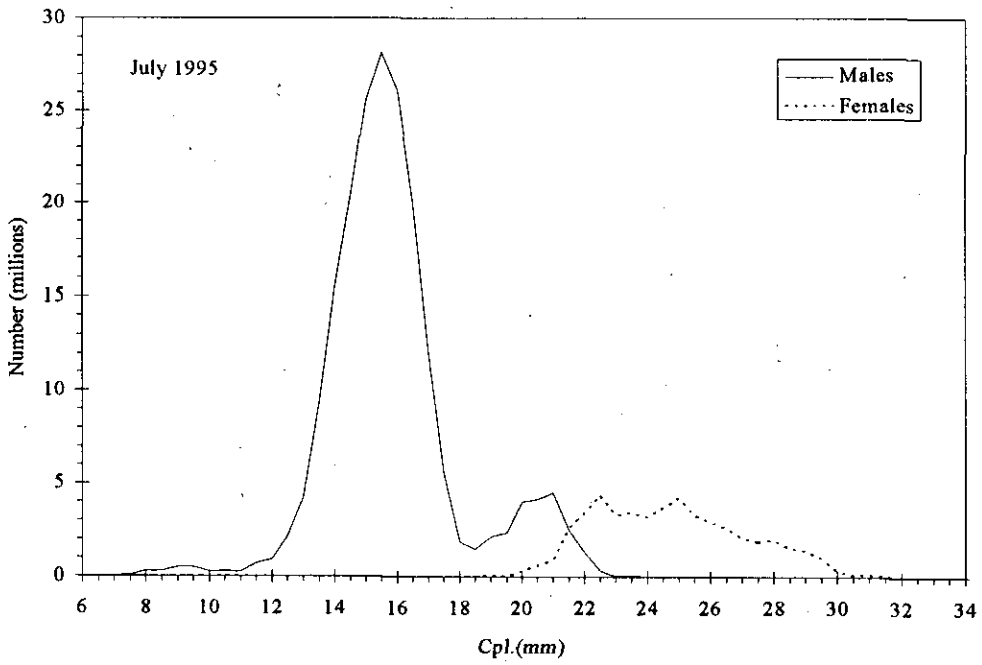


Fig. 5 Commercial length distribution by sex in Greenland catches, NAFO Div. 3M, July 1995, based on 11 samples including 8,654 shrimps.

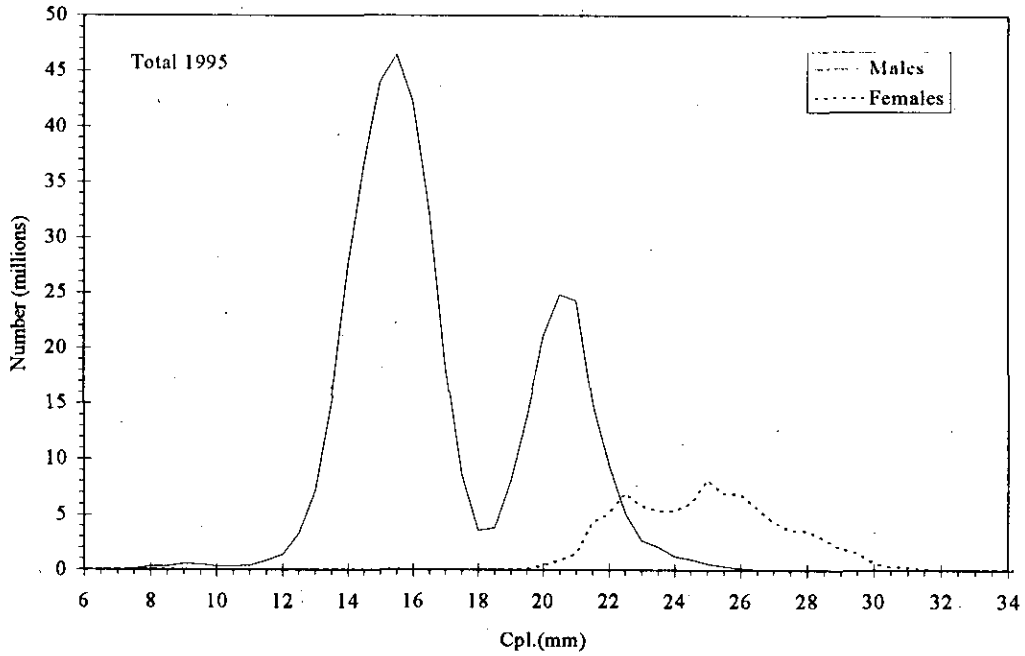


Fig.6 Commercial length distribution by sex in Greenland catches, NAFO Div. 3M, 1995, based on 23 samples taken in May and July and including 16,677 shrimps.

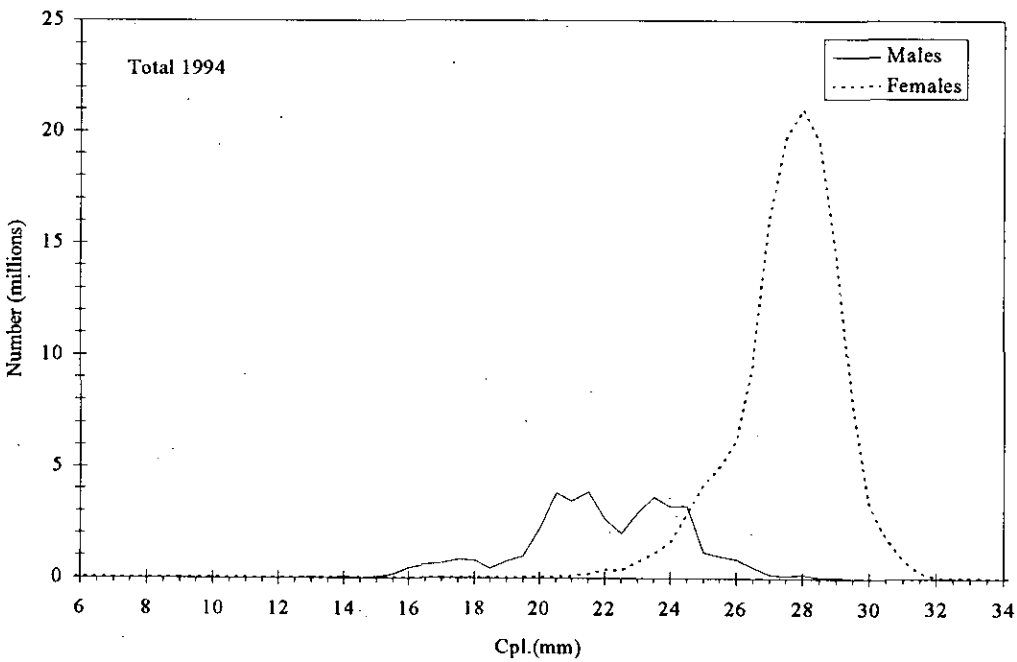


Fig. 7 Commercial length distribution by sex in Greenland catches, NAFO Div. 3M, 1994, based on 19 samples taken in June including 6,117 shrimps.