INTERNATIONAL COUNCIL FOR THE
EXPLORATION OF THE SEA

C.M. 1974/F : 15
Demersal Fish (Northern) Committee

A COMBINED REPORT ON THE PELAGIC O-GROUP GADOID SURVEYS UNDERTAKEN BY SCOTLAND, ENGLAND AND THE NETHERLANDS IN THE NORTH SEA IN 1974

by

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Introduction

In 1974 three vessels took part in a survey designed to investigate the distribution and abundance of O-group gadoids in the North Sea. The dates of the survey were as follows:

Country	Vessel	Sampling period
England	Corella	20/5 - 7/6/1974
Scotland	Explorer	6/6 -31/6/1974
Netherlands	Tridens	28/6 - 8/7/1974

All vessels used the international young gadoid pelagic trawl, although there were minor differences in the rigging of the gear. The "Corella" used a slightly different bridle rig than in 1973 to allow easier working on this stern trawler.
The "Tridens" used smaller Süberkrüb doors than "Corella" and "Explorer".
The net was fished in a standard way, 20 minutes close to the bottom, 20 minutes in midwater and 20 minutes close to the surface except where the sea was too shallow when the trawl was towed for 30 minutes near the bottom and 30 minutes near the surface. Each haul was made in the middle of a statistical rectangle, or as near as was practicle. The squares fished by each vessel are shown in figure 1.

Results

1. Distribution

The mean catches per hour in each statistical rectangle are shown for each species separately, in figure 2- 7.

Cod

Very few cod were caught west of the Greenwich meridian (figure 2).
High catch rates were obtained between 57°30' N and 60°30' N and between the Greenwich meridian and 3° E. The main concentrations of cod in the middle North Sea were to the north east of the Dogger Bank and off the Danish coast.

Haddock

As in all previous surveys, the highest catch rates of haddock were taken between 59° and 61° N and between the Greenwich meridian and 3° E. Appreciable numbers were taken near the Orkney Islands and in the eastern middle North Sea near the Danish coast. Few haddock were caught off either the Scottish or English east coasts (figure 3).

Whiting

In the northern North Sea whiting were taken mainly north of 59° N and off the north coast of Scotland (figure 4). The distribution differed considerably from those observed in the Scottish 0-group surveys of 1969 - 1973, where the highest catch rates of whiting were generally obtained south of 59° N and west of longitude 02° E. In the middle North Sea whiting were found in a patch off the Danish coast between 54° and 57° N.

Saithe

Most of the saithe caught were taken between 57°30' N and 60°30' N and between 01° W and 03° E (figure 5) by the "Corella" and the "Explorer" during late May and the first half of June. When the northern area was surveyed by "Tridens" during the end of June and early July only three saithe were caught. For this reason only English and Scottish catches are shown in figure 5.

Norway pout

The main concentration of Norway pout was found between 59° and 61° N and between 01° W and 03° E. None were caught south of 57° N (figure 6).

Blue whiting

Blue whiting were absent south of 58° N. Small numbers were caught between 04° W and 03° E (figure 7).

2. Mean lengths

Mean lengths, standard deviations and length ranges are shown in Table I for each species for groups of four statistical rectangles. The mean lengths of fish caught in the middle North Sea were smaller than those caught in the northern North Sea but this difference might be attributable to the earlier sampling in the former area. There was a similar difference, attributable to the same cause, between the mean lengths of fish caught by "Tridens" and "Explorer" in the northern North Sea, summarized in table II.
There was also a difference between the mean lengths of fish caught in the northern and southern parts of the northern North Sea, those in the former area being generally larger than those in the latter.

This can not be attributed to differences in sampling times, but could be due either to differences in growth rates, or the size at which the fish take to the bottom.

3. Abundance

The average numbers of cod, haddock and whiting caught in the 1972, 1973 and 1974 surveys are shown in table III. The averages are only for those statistical rectangles which were fished in each of the three years. The North Sea has been subdivided into a (central) northern North Sea area, a British east coastal zone and a German Bight area. These areas are shown in figure 1.

Cod

In 1974 cod were very much more abundant in the northern North Sea and German Bight than in either 1972 or 1973 but off the British east coast they were much less abundant.

Haddock

Haddock were also much more abundant in the northern North Sea and German Bight than in 1972 and 1973 and much less abundant off the British coast, a pattern similar to that of cod.

Whiting

Whiting were twice as abundant in the northern North Sea as in 1972 and much more abundant than in 1973. In the German Bight and, in particular in the British east coastal zone, whiting were less abundant than in either 1972 or 1973.

For all species the results from the three years are not strictly comparable because the same gears were not used throughout all the surveys; in 1972 the English Survey was conducted with a Boothbay net and in the first half of 1973 with a capelin trawl. However, they do suggest that the sizes of the 1974 year classes are well above average. However, the distribution of whiting in the northern North Sea was atypical in 1974, and less than average numbers of all these species were found along the east coast of Britain, so it will be interesting to see how these fish recruit to the fisheries.

The numbers of cod, haddock and whiting caught in the northern North Sea in 1969, 1970 and 1971 are also shown (from Hislop, 1973). The results of these surveys are not strictly comparable with those obtained in later years because the trawl was fished in the scattering layer for one hour and the numbers of statistical rectangles differed between years but they give an indication as to how much more abundant these three species are in 1974 than in previous surveys in this area.

Methodological information

1. Haul to haul differences in catch rates

During the period 29-31/6/1974 the "Explorer" carried out a series of 1/2 hour hauls at different depths and different times of day at a fixed position in statistical rectangle E 19. The mean catches per hour and the standard errors of the means are given in table IV for each species and for each type of haul separately. Also shown in the table are the results obtained when the rectangle was fished by the "Explorer" on 11-6-1974 and by the "Tridens" on 3-7-1974. It can be seen that the catch rates of the "Explorer" were very much lower at the end of June than on the first occasion when the rectangle was fished and were similar to the catch rates of the "Tridens" made in early July.

During the special series of hauls catch rates of all species were very much higher in the surface hauls than in the midwater and bottom hauls, suggesting that a very substantial proportion of the population of 0-group gadoids in the area was still in the upper water layers*). In fact, bearing in mind that the hauls were of short duration, it is likely that many of the fish taken in the midwater and bottom hauls may have been captured when the net passed through the upper water layers during shooting and hauling. The catch rates in the oblique (3 depths) hauls were generally intermediate between those of midwater and bottom hauls. An encouraging feature of the results was that, for each method of sampling, reasonably consistent catch rates were obtained, the standard errors being low (table IV).

2. Ship to ship variation in catch rates

There was little overlap between the English and Scottish survey and as fish were scarce in that area it is not possible to compare the catch rates, although the "Explorer" did catch more cod than the "Corella".

There were considerable differences between the catch rates of the "Explorer" and the "Tridens" in those rectangles which were fished by both vessels (table V). On average, the catch rates of the "Explorer" were much higher than those of the "Tridens", although in some individual squares the reverse was true. Although the catch rates differed, the areas of highest abundance of cod, haddock, whiting and, to a lesser extent, blue whiting were similar for both vessels (except in rectangle G 14, where the "Explorer" caught 3560 cod and 9000 haddock compared with catches of 0 and 2 respectively by the "Tridens". The difference in catch rates was most marked for saithe: the "Explorer" caught a total of 1725 saithe, the "Tridens" only 3.

In former years, when the two ships were operating more or less at the same time, no marked differences in the catch rates were observed. Therefore, much of the difference between the catch rates might be related to the time difference of $\pm$ 3 weeks between the two surveys and reflect either a real decrease in abundance due to natural mortality or an apparent decrease due to increased escapement from the net (more active

*)During this period none of the species showed a diurnal vertical migration pattern. Both day and night surface hauls yielded the highest catch rates.

net avoidance related to the increased size, cf, table II, or as a consequence of fish having taken to the bottom and thus escaping capture by the gear).

3. Estimation of the total number of 0-group fish in the North Sea

The data from the surveys in 1972, 1973 and 1974 have been used to estimate the numbers of 0-group cod, haddock and whiting present in the North Sea in the summer of each year. The following assumptions were made:

I. The path of the trawl was 10 m in width;
II. The net efficiency is 100 %;
III. The trawl was towed for an average distance of 4500 m (2,5 miles);
IV. Fish are concentrated at the 3 depth layers, which were fished by the net (surface, near the thermocline and at the bottom).

All these assumptions tend to underestimate the absolute abundance of 0-group fish and therefore the ultimate figures can be expected to be very much of underestimates.
The estimated density of fish per square metre of surface can then be calculated from the equation:

$$N/m^2 = 3 \frac{N/hour}{10 \times 4500}$$

The total abundance is obtained by adding the catches per hour fishing from all statistical rectangles, raised by the surface area of each rectangle (900 square miles). The results, given in table VI, can be interpreted in two ways. First the decrease in numbers from the Scottish survey to the Dutch survey in 1974 enables one to estimate natural mortality rates on an annual basis. Assuming the time difference to be one month this results in high and unlikely values of M = 28, 17 and 8 for cod, haddock and whiting respectively. However, these values are likely to be overestimates, because part of the 0-group population might have taken to the bottom by the time of the Dutch survey, introducing an "apparent" natural mortality. This seems especially likely for cod and to a lesser extent for haddock, as is also implied by the analysis of observed growth rates of the different species by HISLOP (1973). On the other hand net avoidance might have become significant during the Dutch survey, for which the very low saithe catches might speak well, because this species is not supposed to take to the bottom. Also, during the special series of hauls by the "Explorer" in E 19 it was apparent that by the end of June most fish were still in the upper water layers. Therefore, it seems unlikely that the lower abundance during the "Tridens" survey can be explained entirely by a change-over to the bottom phase.

Secondly the figures can be compared with indices of average recruitment at I-year old during the period 1963-1972, calculated from VPA (ANON., 1974). Apparently the estimated numbers of the 1974 yearclasses of all species from the combined surveys, though underestimates, are very much higher

than the average number of recruits at age I.

For cod it is even twice as large as the recruitment figure of the extremely strong 1970 year class and for haddock and whiting the 0-group abundance is in the same order of magnitude as the recruitment figures of the exceptionally abundant 1967 year classes. Taking into account that the 0-group indices are very much underestimated this suggests that very high natural mortalities are operating during the pelagic phase or that exceptionally strong year classes can be expected to recruit to the fisheries.

Summary and discussion

Pelagic 0-group gadoid surveys were undertaken by England, Scotland and the Netherlands in the North Sea in the period May 20 - July 8th, using standard gear and fishing methods. The combined results suggest that cod, haddock and whiting were much more abundant in the northern North Sea than in the years 1969 - 1973 and that whiting showed a more northerly distribution than had been seen during previous surveys in this area. Off the east coast of Britain all three species were less abundant than in 1972 and 1973. In the eastern central North Sea cod and haddock were more abundant and whiting less abundant than before.

In the northern area catch rates declined during the period covered by the surveys and mean lengths increased substantially during the same period, although the overall distributions of the species, except saithe, did not alter appreciably. It could not be stated whether this decline in catch rates was due to mortality or to part of the population taking to the bottom or becoming otherwise invulnerable to the pelagic gear, but the data sofar indicate a combination of these factors. More information is still needed on the size and age at which gadoids adopt a demersal way of life. This information could be obtained if those vessels participating in the surveys made some hauls with a demersal trawl during subsequent weeks in the areas of main abundance. The fact that abundance may change very rapidly with time means that the timing of combined surveys should be standardized.

References

ANON., 1974 — Report of the North Sea Roundfish Working Group. ICES C.M. 1974/F : 5 (mimeo)

HISLOP, J.R.G., 1973 — Scottish surveys of pelagic 0-group gadoids in the northern North Sea, 1969 - 1972. ICES C.M. 1973/F : 16

/MV

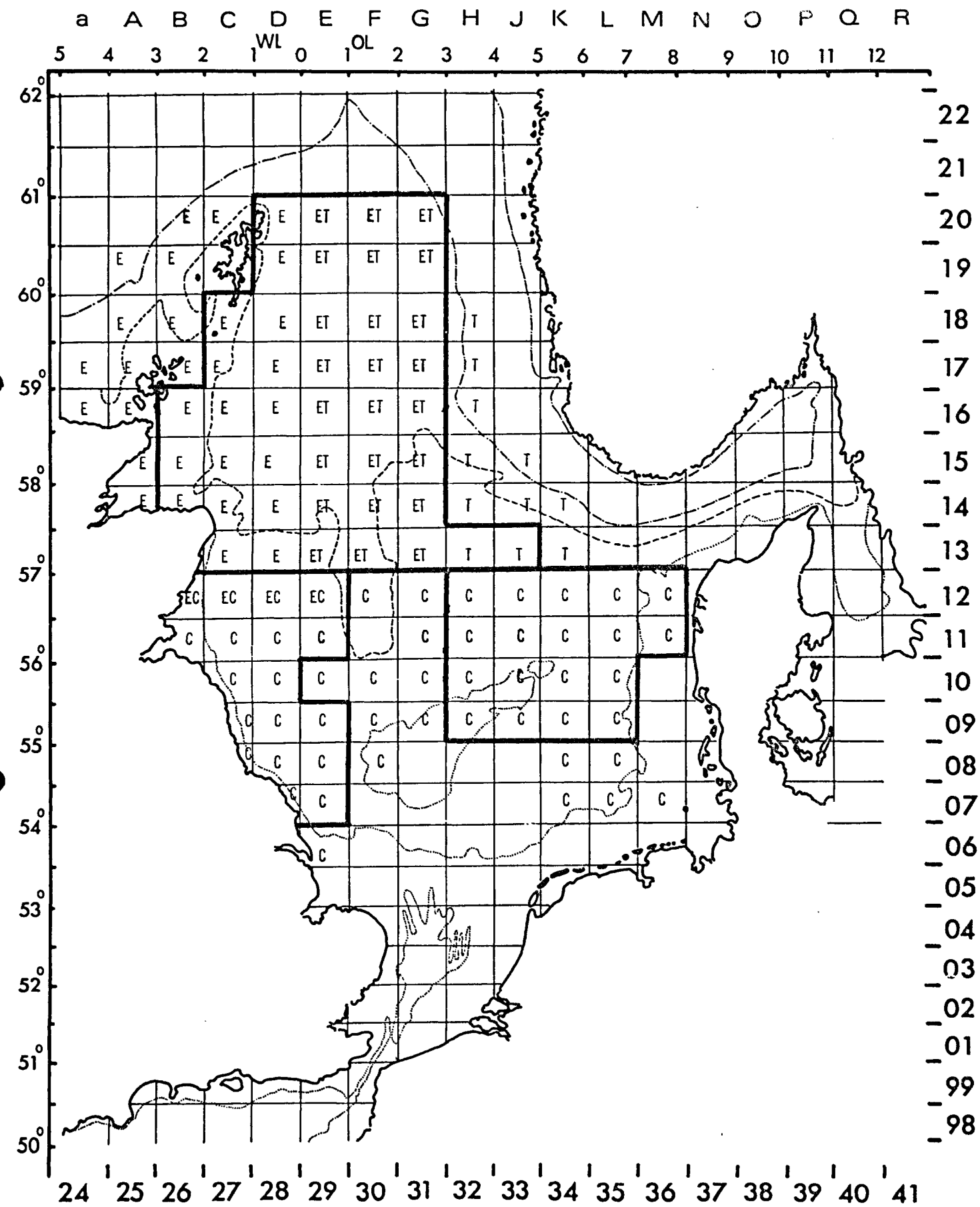

FIGURE 1 - Statistical rectangles sampled by each vessel during the 1974 0-group gadoid survey.

C = Corella; T = Tridens: E = Explorer. For meaning of large areas: see text.

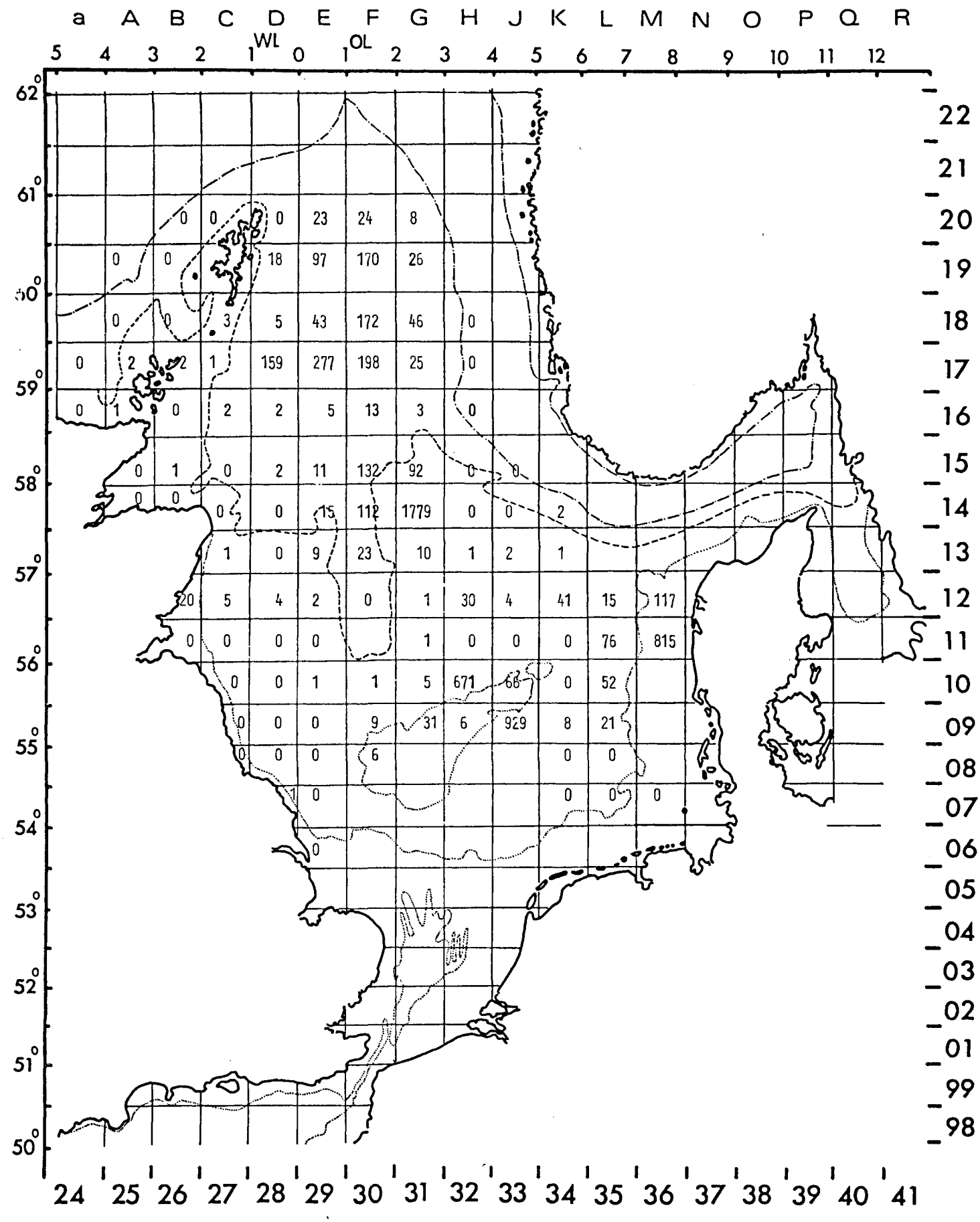

FIGURE 2 - Cod, mean catch per hour.

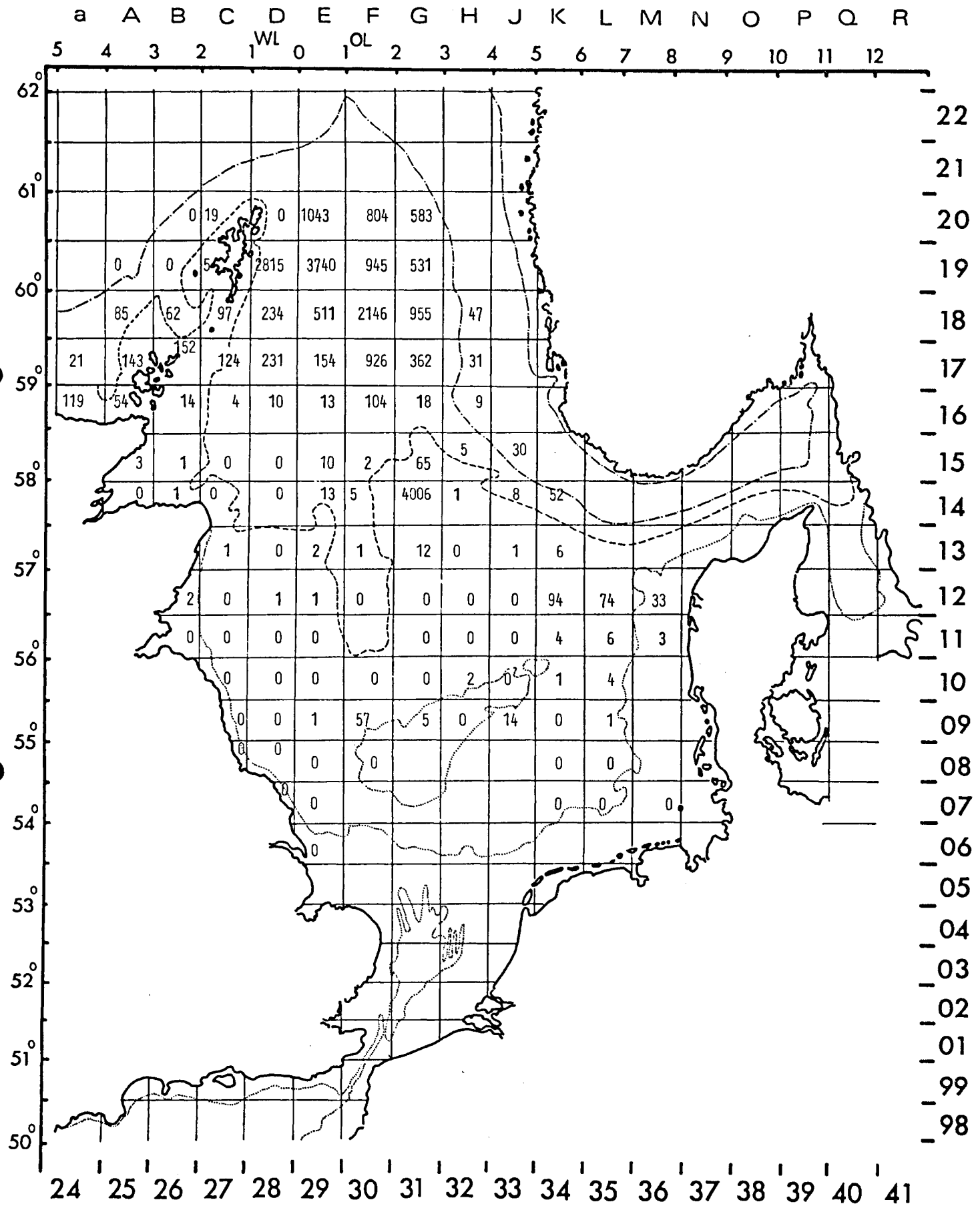

FIGURE 3 - Haddock, mean catch per hour.

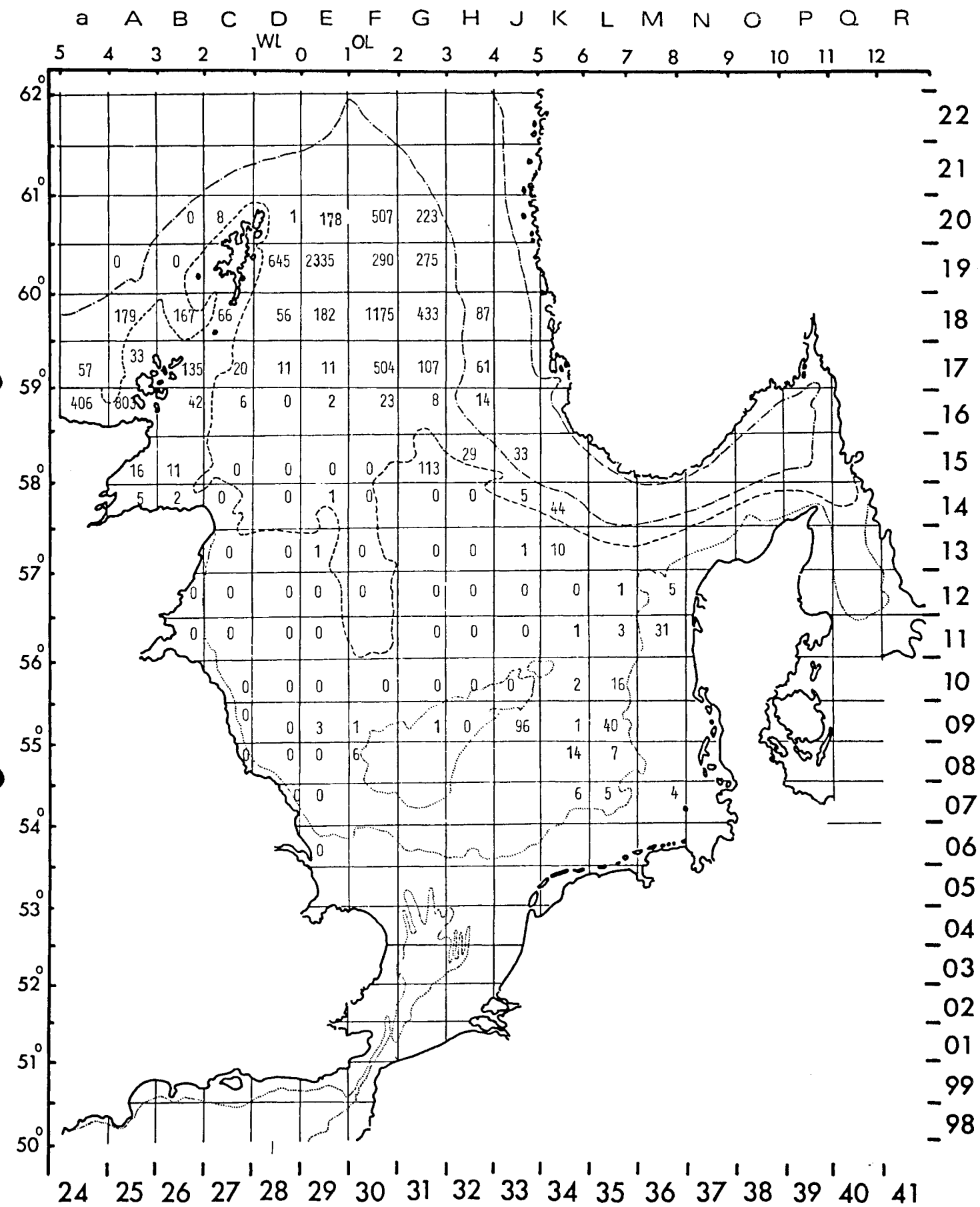

FIGURE 4 - Whiting, mean catch per hour.

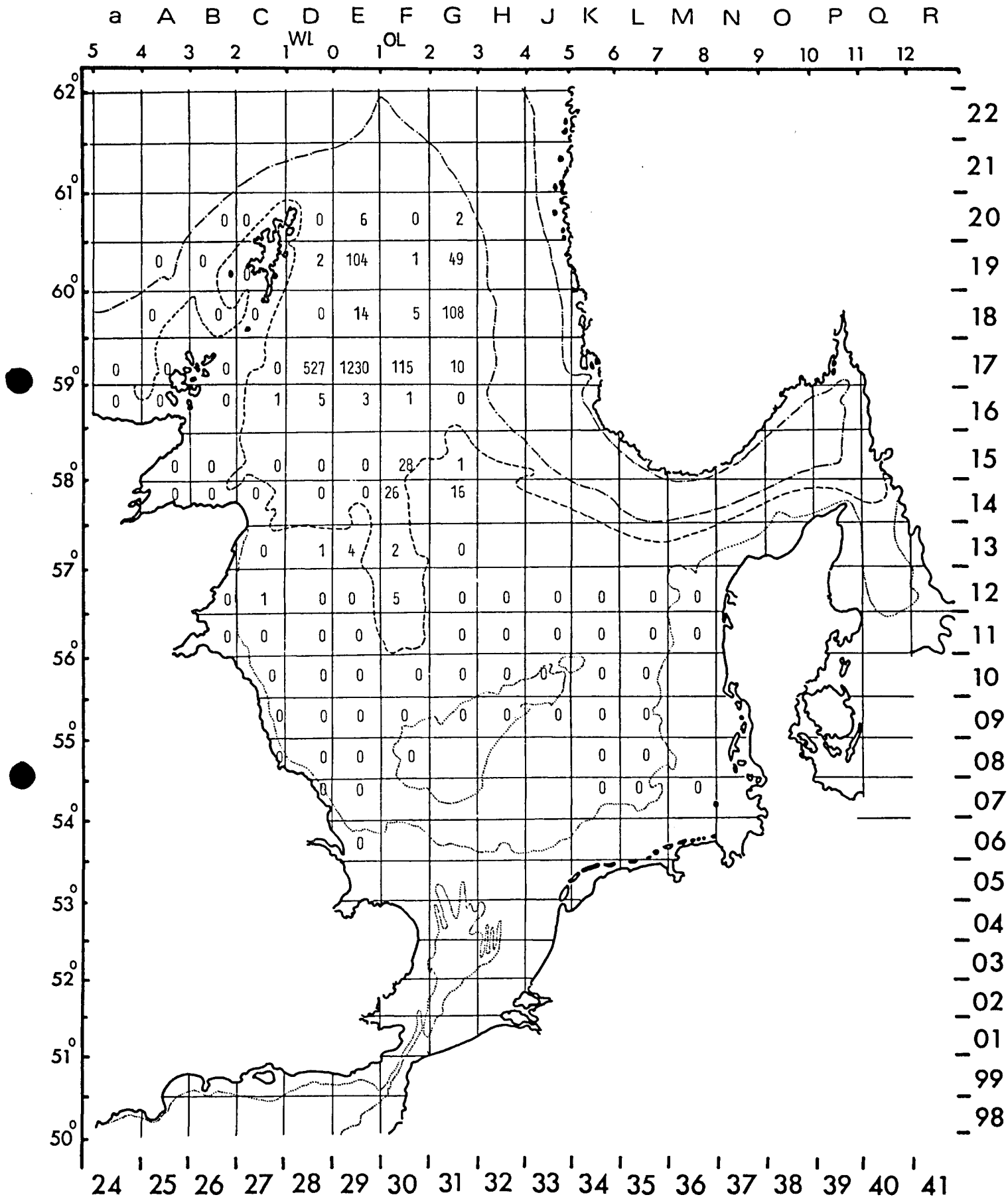

FIGURE 5 - Saithe, mean catch per hour excluding Dutch data.

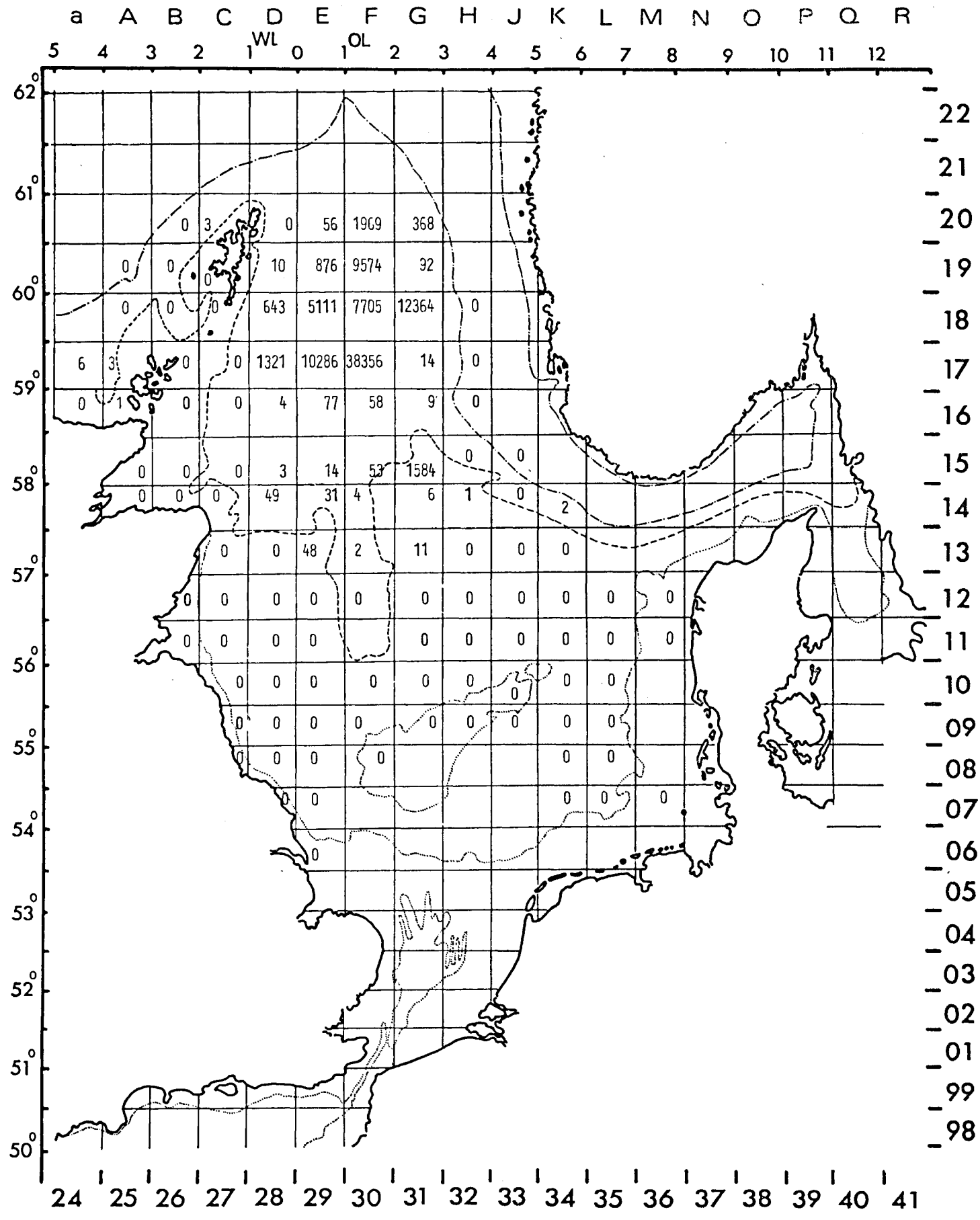

FIGURE 6 - Norway pout, mean catch per hour.

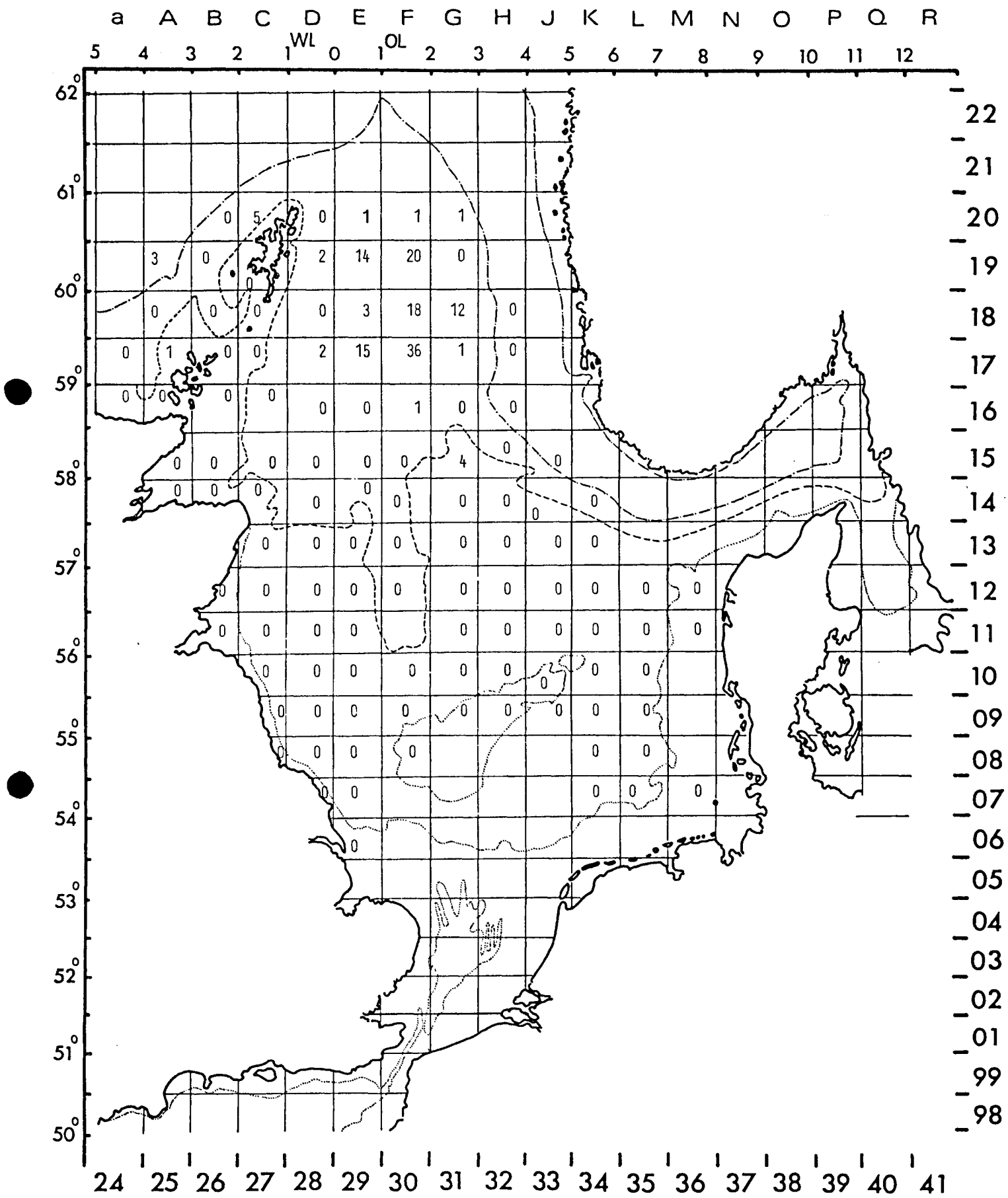

FIGURE 7 - Blue whiting, mean catch per hour.

TABLE I - Catch rates, mean length (cm), standard deviations and ranges of lengths arranged by species, ship and block of four statistical rectangles.

Block	Date	ship	Cod				Haddock				Whiting				Saithe				Norway pout				Blue whiting			
			N/hour	L̄	Sd	Range	N/hour	L̄	Sd	Range	N/hour	L̄	Sd	Range	N/hour	L̄	Sd	Range	N/hour	L̄	Sd	Range	N/hour	L̄	Sd	Range
AB 6030	21/23-6	E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2.75	.87	1.5- 3.5
CD 6030	22/23-6	E	4	5.61	.73	4.0-8.0	710	5.63	1.18	1.5- 8.0	165	5.17	.10	1.0- 7.5	< 1	5.75	.71	5.0-6.5	3	4.52	1.62	1.5-6.5	2	3.54	1.54	2.0- 6.5
EF 6030	10/11-6	E	90	4.43	.57	2.5-7.0	2581	4.69	1.01	2.0-10.0	1505	3.50	.82	2.0- 6.5	27	4.43	.57	3.0-6.5	4971	3.96	1.26	2.0-5.5	14	5.81	.87	3.0- 7.5
	3/4/5-7	T	66	6.41	.87	3.7-8.9	684	7.65	1.62	4.2-13.6	199	6.31	.96	4.2-10.5	-	-	-	-	1516	5.58	1.05	3.0-8.0	-	-	-	-
GH 6030	22/23-6	E	32	4.48	.57	3.0-6.5	576	4.92	1.01	3.0- 9.0	230	3.86	.82	2.0- 7.0	25	4.38	.60	3.0-6.5	455	3.05	.33	1.5-5.5	1	6.0	1.34	5.5- 6.5
	3/4-7	T	1	4.60	.57	4.2-5.0	537	7.24	1.17	4.0-11.4	268	6.78	.98	2.8-10.8	-	-	-	-	4	5.00	1.60	3.0-7.5	-	-	-	-
ZZ 5930	24-6	E	-	-	-	-	21	4.68	2.17	1.5- 8.0	57	2.80	.54	1.5- 5.0	-	-	-	-	6	2.25	.07	1.5-3.0	-	-	-	-
AB 5930	18/21-6	E	1	4.88	.73	4.0-6.0	188	4.77	1.65	2.0- 8.5	128	3.66	.74	2.0- 7.5	-	-	-	-	1	3.25	2.40	2.5-4.5	< 1	6.75	-	6.5- 7.0
CD 5930	16/18/22-6	E	42	4.71	.60	3.0-7.0	171	5.45	1.48	2.5-12.0	38	4.61	.22	1.5- 7.5	132	4.67	.61	3.0-7.5	491	4.46	.57	2.5-6.5	< 1	5.00	2.47	3.0- 7.0
EF 5930	11/12-6	E	335	4.40	.68	3.0-7.0	1256	4.90	1.09	2.0- 9.5	299	3.86	1.22	2.0- 7.0	341	4.40	.67	2.5-7.0	14345	3.88	.70	2.0-6.0	24	5.46	1.96	4.5- 7.0
	5/8-7	T	10	6.40	.76	5.0-8.2	612	8.18	1.26	5.9-11.9	639	7.29	.93	5.5-10.8	-	-	-	-	16383	6.22	.64	3.0-8.0	16	9.57	1.22	7.0-12.4
GH 5930	9-6	E	65	4.40	.71	3.0-6.5	1213	4.48	1.26	2.5-10.0	396	3.75	.71	2.5- 6.0	59	4.82	.62	3.5-7.0	12877	3.44	.53	2.5-5.5	12	5.60	.99	3.5- 7.0
	2/4-7	T	3	5.13	.64	3.7-6.2	71	6.77	1.25	3.4- 9.6	108	5.77	1.51	2.6-10.0	-	-	-	-	1	2.75	-	2.5-3.0	-	-	-	-
ZZ 5830	24-6	E	-	-	-	-	119	4.50	2.49	3.0- 8.5	406	4.12	.79	1.5- 8.0	-	-	-	-	-	-	-	-	-	-	-	-
AB 5830	17/18/25-6	E	< 1	3.50	.34	3.0-4.0	18	4.15	.69	2.5- 6.5	218	3.80	.89	1.5- 7.5	-	-	-	-	< 1	2.25	-	2.0-2.5	-	-	-	-
CD 5830	15/16-6	E	1	3.80	.71	3.0-5.0	3	4.82	.11	3.5- 8.0	< 1	3.92	.60	3.0- 5.0	2	5.00	1.40	3.5-7.0	2	3.56	.54	2.0-4.5	-	-	-	-
EF 5830	8/12-6	E	62	3.37	1.90	2.0-6.0	13	3.40	.34	2.0- 5.0	1	2.92	.26	2.5- 4.5	< 1	4.25	-	4.0-4.5	55	3.14	.37	2.0-5.0	-	-	-	-
	4/5/8-7	T	18	4.98	.77	3.5-7.4	51	8.09	1.16	4.1-10.9	12	7.97	1.57	6.0-11.9	< 1	6.93	1.03	5.8-7.8	65	6.30	.94	3.0-8.5	-	-	-	-
GH 5830	9-6	E	23	3.29	.51	2.0-4.5	82	2.78	.71	1.0- 5.0	6	3.33	1.09	1.5- 5.5	-	-	-	-	-	-	-	-	-	-	-	-
	2/4-7	T	71	4.78	1.08	3.2-7.7	11	2.79	1.53	3.3-10.2	62	5.27	1.65	2.5- 8.4	-	-	-	-	769	6.61	.94	2.0-8.0	-	-	-	-
AB 5730	17/25-6	E	-	-	-	-	< 1	5.75	-	-	3	3.96	.66	3.0- 5.5	-	-	-	-	-	-	-	-	-	-	-	-
CD 5730	6/7/15-6	E	< 1	3.25	-	3.0-3.5	< 1	2.58	.31	2.0- 3.0	-	-	-	-	< 1	3.25	-	3.0-3.5	12	2.26	.58	1.0-4.0	-	-	-	-
EF 5730	7/8/13-6	E	69	3.16	.76	1.5-4.5	7	2.80	.85	1.0- 6.0	-	-	-	-	8	4.13	.71	2.5-6.5	27	3.63	.70	2.0-5.5	-	-	-	-
	28-6/1-7	T	10	4.80	1.22	2.3-7.1	2	3.61	1.65	2.2- 7.0	1	5.60	2.00	3.3- 7.0	-	-	-	-	20	4.50	1.28	2.0-6.5	-	-	-	-
GH 5730	13-6	E	1780	3.22	.54	2.0-5.0	4511	3.28	.63	1.5- 5.0	-	-	-	-	8	4.50	.28	4.0-5.0	4	3.25	0.01	2.5-3.5	-	-	-	-
	28-6/1-7	T	4	2.41	.86	2.0-3.1	3	2.57	.83	1.5- 4.8	-	-	-	-	-	-	-	-	7	2.27	.61	1.5-5.0	-	-	-	-
JK 5730	27/28-6/1-7	T	1	3.40	1.43	1.8-5.7	17	4.50	1.35	1.8- 7.8	15	3.46	1.05	1.8- 7.5	-	-	-	-	4	3.00	.35	2.5-3.5	-	-	-	-
AB 5630	22-5	C	1	1.25	-	1.0-1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14-6	E	38	2.56	.41	1.5-4.5	4	2.75	.41	2.0- 3.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CD 5630	23-5	C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14-6	E	8	3.57	.20	2.5-4.5	1	1.75	-	-	-	-	-	-	1	5.25	.22	4.5-6.0	-	-	-	-	-	-	-	-
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	14-6	E	3	3.25	.50	2.5-4.0	2	2.00	.36	1.5- 2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GH 5630	24/26-5	C	8	3.42	.82	2.0-4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JK 5630	26/27-5	C	11	3.13	.81	1.0-5.0	25	2.65	.94	1.0- 6.5	1	2.75	-	2.5- 3.0	-	-	-	-	-	-	-	-	-	-	-	-
LM 5630	27/28-5	C	256	3.64	.70	1.0-5.5	29	3.35	.55	2.0- 5.5	10	3.49	.68	1.5- 5.0	-	-	-	-	-	-	-	-	-	-	-	-
EF 5530	20-5/3-6	C	3	3.30	.65	1.0-4.0	15	6.25	.90	2.0- 7.5	1	2.25	.41	1.5- 3.0	-	-	-	-	-	-	-	-	-	-	-	-
GH 5530	2/3-6	C	178	2.90	.43	2.0-5.0	2	4.32	1.17	2.5- 6.0	1	2.75	-	2.5- 3.0	-	-	-	-	-	-	-	-	-	-	-	-
JK 5530	4-6	C	251	2.87	.48	1.5-4.5	4	4.55	1.11	3.0- 6.5	26	2.94	.56	2.0- 4.5	-	-	-	-	-	-	-	-	-	-	-	-
LM 5530	28-5	C	38	2.90	.81	1.0-4.0	2	3.45	.57	2.5- 4.5	28	3.71	.78	2.0- 6.0	-	-	-	-	-	-	-	-	-	-	-	-
CD 5430	21-5/1-6	C	1	1.25	-	1.0-1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EF 5430	21-5/2-6	C	2	3.00	.27	2.5-3.5	-	-	-	-	3	2.17	.49	1.5- 3.0	-	-	-	-	-	-	-	-	-	-	-	-
JK 5430	5/6-6	C	-	-	-	-	-	-	-	-	10	3.33	.80	2.0- 5.0	-	-	-	-	-	-	-	-	-	-	-	-
LM 5430	5-6	C	-	-	-	-	-	-	-	-	5	4.53	1.09	2.5- 7.0	-	-	-	-	-	-	-	-	-	-	-	-

Table II
Mean lengths and range of lengths (cm) of gadoids caught during the Scottish and Dutch survey in the area of overlap.

Ship	Mid date of sampling period	Cod		Haddock		Whiting		Saithe		Norway Pout		Blue Whiting	
		$\bar{L}$	range	$\bar{L}$	range	$\bar{L}$	range	$\bar{L}$	range	$\bar{L}$	range	$\bar{L}$	range
'Explorer'	12-6-1974	3.48	2.0-7.0	4.07	1.0-10.0	3.62	1.5-7.0	4.44	2.5-7.0	3.71	1.5-6.0	5.60	3.0- 7.5
'Tridens'	3-7-1974	5.43	2.0-8.9	7.66	1.5-13.6	6.81	2.5-11.9	6.93	5.8-7.8	6.18	1.5-8.5	9.57	7.0-12.4

Table III
Estimates of 0-group abundance (numbers per 1 hour's fishing) of some recent year classes of cod, haddock and whiting in the North Sea (area according to fig. 1).

Cod

Area/Year	1969	1970	1971	1972	1973	1974
Northern North Sea	7.1*	11.6*	6.2*	10.0	3.7	81.6
British east coast				9.6	8.1	1.8
German Bight				8.6	6.8	158.4

Haddock

Area/Year	1969	1970	1971	1972	1973	1974
Northern North Sea	69.1*	30.8*	230.2*	36.1	70.9	476.3
British east coast				1.9	1.0	0.3
German Bight				1.0	2.6	13.1

Whiting

Area/Year	1969	1970	1971	1972	1973	1974
Northern North Sea	5.9*	1.6*	14.8*	80.3	11.7	168.1
British east coast				18.1	21.6	0.2
German Bight				94.9	44.6	10.9

* Results of Scottish surveys in which fishery was restricted to the scattering layer.

Table IV

Numbers per one hour's fishing caught in statistical rectangle E 19 by the 'Explorer' and the 'Tridens'. (S_e = standard error).

Date	Ship	Type of haul*	Number of haul		COD	HADDOCK	WHITING	SAITHE	POUT	BLUE WHITING
11-6-'74	Explorer	O	1		160	5495	4625	104	968	16
29/31-6-'74	Explorer	O	4		16	1200	737	2	3259	8
				S_e	±5	±214	±196	±1	±1224	±3
29/31-6-'74	Explorer	S	5		34	4422	3808	20	15791	25
				S_e	±17	±529	±268	±3	±4516	±12
29/31-6-'74	Explorer	M	5		23	1883	898	1	9718	11
				S_e	±11	±541	±223	±0.5	±3104	±4
29/31-6-'74	Explorer	B	4		9	955	863	4	1878	8
				S_e	±2	±160	±295	±2	±737	±4
3-7-'74	Tridens	O	1		34	1984	144	-	784	11

* O = Net fished at three depths.
S = Net fished at 20 - 30 m
N = Net fished at 40 - 50 m
B = Net fished at 100-130 m

Table V

Comparison of the catch rates of the 'Tridens' (T) and the 'Explorer' (E), respectively the 'Corella' (C) and the Explorer in each rectangle fished by both vessels.

	Species	Cod		Haddock		Whiting		Saithe		Norway Pout		Blue Whiting	
Rectangle	Ship	T	E	T	E	T	E	T	E	T	E	T	E
E 20		4	41	28	2057	190	265	0	6	96	16	0	1
F 20		17	30	146	1461	344	670	0	0	3936	2	1	0
G 20		0	15	919	246	343	103	0	2	3	732	0	2
E 19		34	100	1984	5495	144	4625	0	104	784	968	11	16
F 19		210	130	576	1313	120	460	0	1	1248	18900	1	38
G 19		2	50	154	907	192	358	0	49	5	178	0	0
E 18		18	68	160	862	220	144	0	14	848	9374	1	4
F 18		3	341	2176	2116	1952	398	1	5	0	15409	0	35
G 18		7	84	116	1798	98	768	0	108	1	25727	0	24
E 17		2	551	0	308	8	14	0	1230	172	20399	1	28
F 17		16	380	112	1739	368	640	0	115	64512	12200	42	30
G 17		3	46	90	633	188	25	0	10	0	28	0	1
E 16		1	9	0	25	0	3	0	3	138	15	0	0
F 16		11	14	186	21	46	0	0	1	108	8	1	0
G 16		0	5	0	35	4	12	0	0	2	15	0	0
E 15		1	20	13	7	0	0	0	0	0	27	0	0
F 15		58	205	3	1	0	0	1	28	13	93	0	0
G 15		142	42	0	129	216	0	1	1	3072	95	7	0
E 14		23	6	2	23	2	0	0	0	1	61	0	0
F 14		2	221	3	6	0	0	0	26	3	4	0	0
G 14		0	3557	2	9009	0	0	0	16	3	8	0	0
E 13		8	10	2	1	1	0	0	4	52	43	0	0
F 13		5	39	0	1	0	0	0	2	2	1	0	0
G 13		15	4	9	14	0	0	0	0	22	0	0	0
	Ship	T	E	C	E	C	E	C	E	C	E	C	E
B 12		1	38	0	4	0	0	0	0	0	0	0	0
C 12		0	10	0	0	0	0	0	2	0	0	0	0
D 12		0	7	0	1	0	0	0	0	0	0	0	0
E 12		0	3	0	2	0	0	0	0	0	0	0	0

Table VI

Estimates of total number (millions) of 0-group cod, haddock and whiting present in the North Sea in 1972, 1973 and 1974 together with recruitment figures as I year olds (average 1963-1972 and range) derived from VPA. (cod $M = .2$; haddock and whiting $M = .3$)

Year	Country	COD	HADDOCK	WHITING
1972	Surveys combined	289	377	1266
1973	Surveys combined	102	644	361
1974	English	581	60	49
	Scottish*	1269	6622	2329
	Dutch*	123	1569	1219
	Surveys combined	1277	4156	1823
Yearclass strength at I year old in Subarea IV.				
Average		235	1559	1007
Range		88-569	84-7976	476-2553

* corrected for differnnces in fished areas by 'Explorer' and 'Tridens' by taking the ratio of the catches in the area of overlap.