Northwest Atlantic Fisheries Organization

Serial No. N983

NAFO SCR Doc. 85/33
(Revised)

SCIENTIFIC COUNCIL MEETING - JUNE 1985

Distribution of Some Groundfish Species on the Scotian Shelf Slopes During the 1984 Fishing Season from the Data of Soviet Observers

by

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Abstract

Distribution of silver hake, haddock, cod, saithe and redfish catches per trawling hour in May-August of 1984 on the Scotian shelf slopes in the area open for foreign fishery is analysed. A significant difference in silver hake distribution and behaviour as compared with the previous years has been revealed. In 1984 dense and stable silver hake aggregations stayed southward of the SMGL throughout the fishing season from May to the first ten-day period of August including. The situation observed during the first half of the 1984 season (May-June) bears the closest resemblance to that in the same period of 1982. A negligible by-catch of the other groundfish species is peculiar to 1984.

Introduction

In 1984 the Soviet observers continued sampling of silver hake for length-age analysis from commercial catches taken in NAFO Division 4W in the area open for foreign fishery. In addition, the species composition and distribution of some other species found in the catches was studied. In the present paper the distribution of silver hake and the other most abundant groundfish catches per trawling hour during the fishing 1984 season is considered in comparison with similar data for the previous years.

Materials and methods

Sampling was performed by three Soviet observers in 1984, during their stay on board commercial ships from May to early

August inclusive. Occasional data were also obtained in the first ten-day period of September on board the ship which was intended to detect short-finned squid aggregations. Standard methods (Rikhter et al., 1980; Waldron, 1978, 1979) were used for sampling and analysis of the distribution of catches per trawling hour. Unlike the previous year, the species distribution was analysed only by month due to stable fishing conditions in 1984. In figures and in the table the occurrence in the catches of individual specimens of the species other than silver hake is designated by a symbol +. Alltogether, the observers measured 49 049 silver hake specimens (245 samples), and collected 956 pairs of otoliths for age determinations.

Results and discussion

Silver hake

The distribution of silver hake catches in May-July and in the first ten-day period of August is depicted in figs.1-4. Over the reference period, silver hake was found in all sets. In May it ranged along the slopes between 59°50' and 63°10'W (fig. 1). The fishing was made at 110 to 280 m depths (table 1). In May 1984, the mean catch per trawling hour appeared to be considerably larger than in the previous years except for 1982 (table 2). However it should be remembered that the amount of observations in May 1982 was inferior to that in 1984, and it would have been unreasonable to give absolute priority to 1982. The mean catch per trawling hour in June was actually the same as in 1983, and a half that in 1982. In July 1985 the CPUE appeared to be the largest over the entire observation series (table 2). The observers' data indicate that in July the area of aggregations somewhat reduced (fig. 3), but the density markedly increased against June. In the third ten-day period of June 1983 the silver hake abundance on the shelf slopes sharply decreased as a result of massive migration of the fish northward of the SMGL (Rikhter, Turok, 1984). Nothing of the kind was observed either in June or in July 1984. Dense silver hake aggregations on the shelf slopes persisted through August to the closure of the fishing season. However certain changes occurred in the

distribution (fig. 4). The area of aggregations reduced, and silver hake concentrated in the eastern part of the fishing area with the region between 59° and 60°W included. The depths of 160 to 180 m were fished there, i.e. greater depths compared to July (table 1). The catches per trawling hour in the first ten-day period of August appeared to be larger than in July (table 2), which is an obvious anomaly compared with the previous years, when the catches markedly decreased in the end of July and early in August due to spawning migration of silver hake northward of the SMGL (Rikhter, Grinkov, 1984). Accordingly, in most cases, the fishery ceased before the allocation was taken. In 1984 the fleet left the fishing area as soon as the allocation was taken. It is worth noting that early in September dense silver hake aggregations were still observed in the area by a commercial ship intended for detection of squid aggregations.

Undoubtedly, the situation observed on the shelf slopes in spring and summer of 1984 was not typical and must be explained. According to the data from the Canadian groundfish surveys the silver hake abundance appears to have stabilized during the recent years keeping to the level recorded in early seventies (Provisional report of Scientific council, June, 1984). The silver hake biomass in the reference period is known to be the largest over the entire observation series. However the concentration of the major part of the stock on the shelf slopes hardly could have persisted if it were not for favourable hydrometeorological conditions. To a certain degree, delayed departure of silver hake from the shelf slopes might have been related to a slackened sexual maturation rate recorded by the observers in spring and summer of 1984. Certainly, this question pertinent to the influence of biological factors on silver hake migration and behaviour requires a detailed investigation.

Haddock

The by-catch of the species other than silver hake was insignificant because of dense silver hake aggregations southward of the SMGL. Haddock was no exception (figs. 5-7). Relatively large haddock by-catches reported were taken in June, in

two sets from the area between 60°20' and 60°30'W (fig. 6). In the majority of catches haddock occurred individually.

Cod, saithe and redfish

The by-catch of these species in kg. per trawling hour was reported only in May (figs. 8-10). In June-August they occurred in the catches individually. A reduced by-catch of cod, saithe and redfish seems also to be related to a high abundance of silver hake on the shelf slopes.

Summary

The 1984 fishing season was characterized by the availability of extraordinarily dense and stable silver hake aggregations. The catches per unit effort had been large throughout the fishing season from May onwards with the first ten-day period of August included, when the fleet left the Scotian shelf with the allocation caught. The situation observed in 1984 bears a close resemblance to that in 1982. However the silver hake fishery in 1982 ceased almost a month earlier, therefore, a possibility of complete analogy of fishing conditions during the reference periods is out of question. Most probably, in 1984 some factors were working that promoted favourable conditions in the area southward of the SMGL. Apart from high abundance and oceanographic conditions these factors might have included a slackened sexual maturation rate. Another peculiar feature of the 1984 season was a very low by-catch of the other groundfish species, which seems to be related to a high silver hake abundance on the shelf slopes throughout the fishing season . Again, the 1982 season was the closest to 1984 in this respect.

References

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2. Rikhter V.A., Yu.S.Grinkov, 1984. On fishing conditions and catching silver hake allocations on the Scotian Shelf southward of small mesh gear line. NAFO SCR Doc. 84/VI/36, 8 p.

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4. Provisional report of Scientific Council, 1984, NAFO SCS Doc. 84/VI/23, 94 p.

5. Waldron D.E., 1978. Catch compositions during the 1977 Scotian Shelf international fishery, with emphasis on the silver hake and squid (Illex) fisheries. ICNAF Res. Doc. 78/9.

6. Waldron D.E., 1979. Preliminary results of a joint international observer program to evaluate the silver hake small-mesh gear line in ICNAF Divisions 4VWX. ICNAF Res. Doc. 79/17.

Table 1 Fished depths by month in 1981-84

Year	Month	Main depths fished, m	Max. depths fished, m	No. of sets
1981	May	100-130	250	36
	June	100-170	250	98
	July	90-140	180	117
1982	May	130-200	350	72
	June	140-250	370	111
	July	100-165	220	99
1983	May	150-280	320	160
	June	120-210	340	105
1984	May	180-220	280	90
	June	120-160	240	57
	July	110-120	130	125
	August	160-180	220	26

Table 2 Catches per trawling hour (kg) by species and month in 1981-84 (brackets show no. of sets)

Year	Month	Species			
		Silver hake	Haddock	Cod	Redfish
1981	May	2 368 (33)	3 (10)	2 (4)	106 (3)
	June	1 121 (69)	20 (46)	30 (31)	1 (2)
	July	1 909 (68)	8 (37)	64 (67)	- -
1982	May	8 654 (34)	22 (23)	- -	- -
	June	5 471 (103)	- -	- -	96 (41)
	July	1 724 (99)	10 (74)	14 (94)	- -
1983	May	2 771 (160)	17 (81)	46 (65)	34 (118)
	June	2 778 (105)	40 (90)	1 013 (87)	49 (53)
1984	May	5 738 (90)	6 (37)	3 (15)	7 (51)
	June	2 783 (57)	17 (53)	+ (8)	+ (13)
	July	3 298 (125)	+ (71)	+ (6)	+ (12)
	August	4 931 (26)	-	-	+ (10)

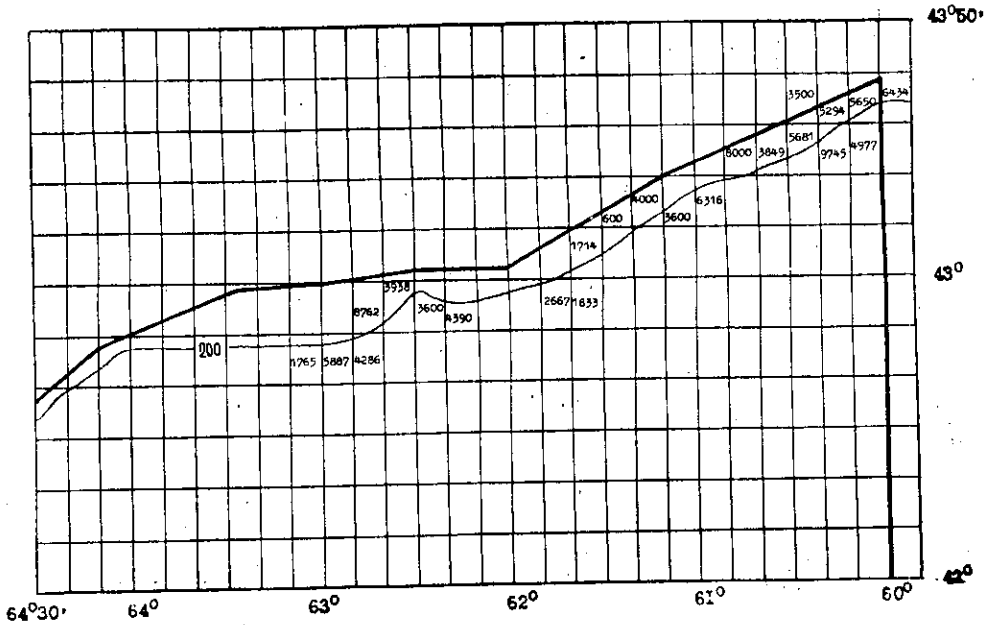

Fig. 1. Silver hake catches per trawling hour (kg) in May 1984.

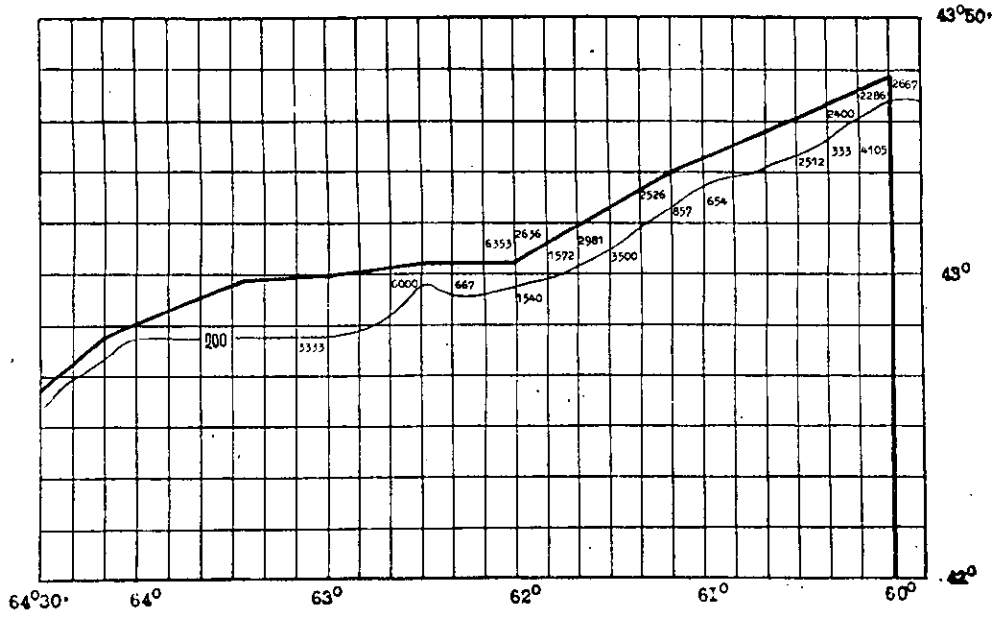

Fig. 2. Silver hake catches per trawling hour (kg) in June 1984.

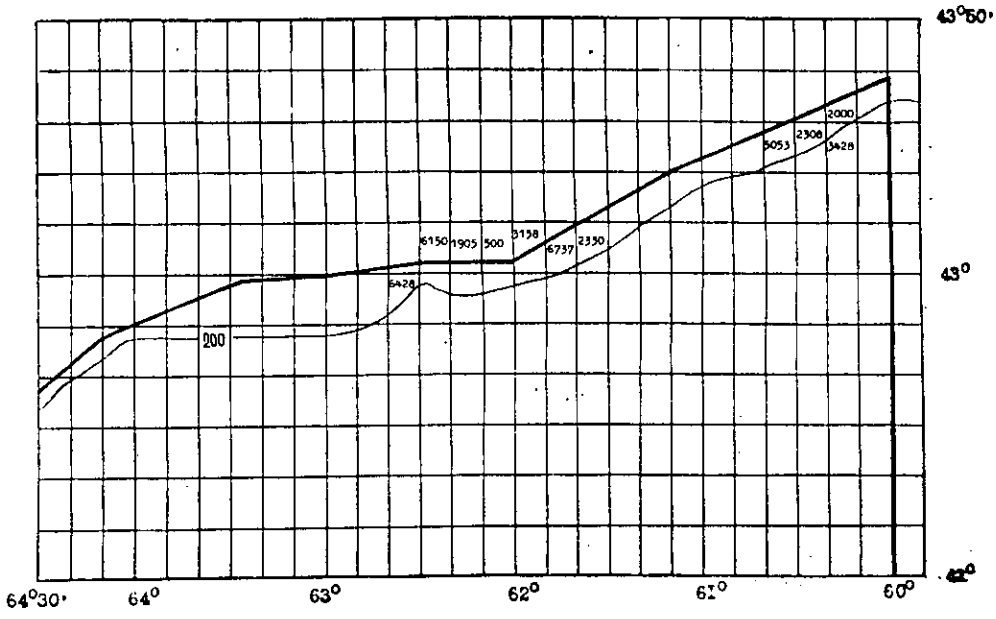

Fig. 3. Silver hake catches per trawling hour (kg) in July 1984.

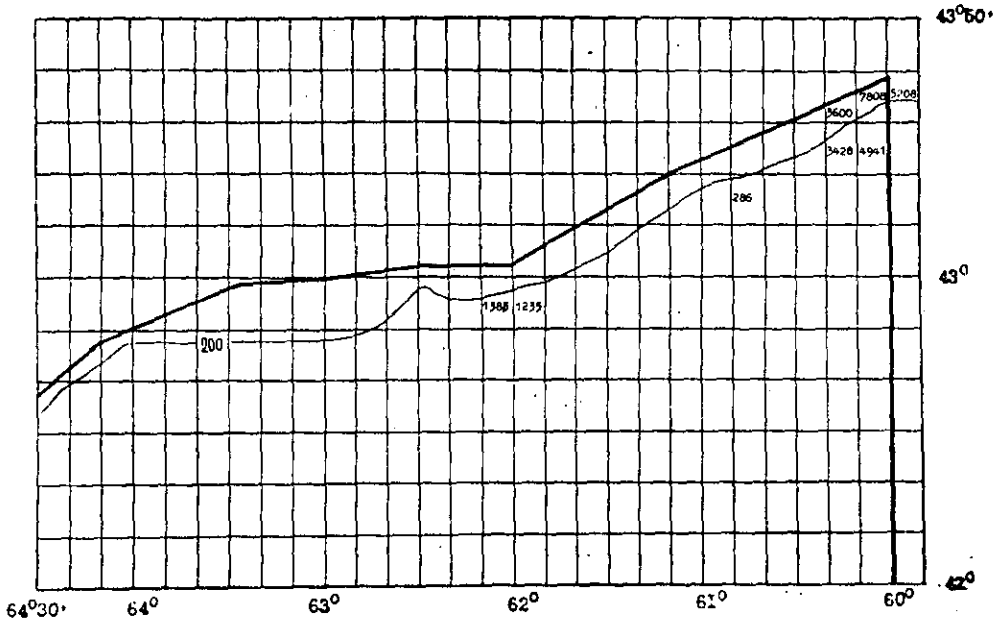

Fig. 4. Silver hake catches per trawling hour (kg) in August 1984.

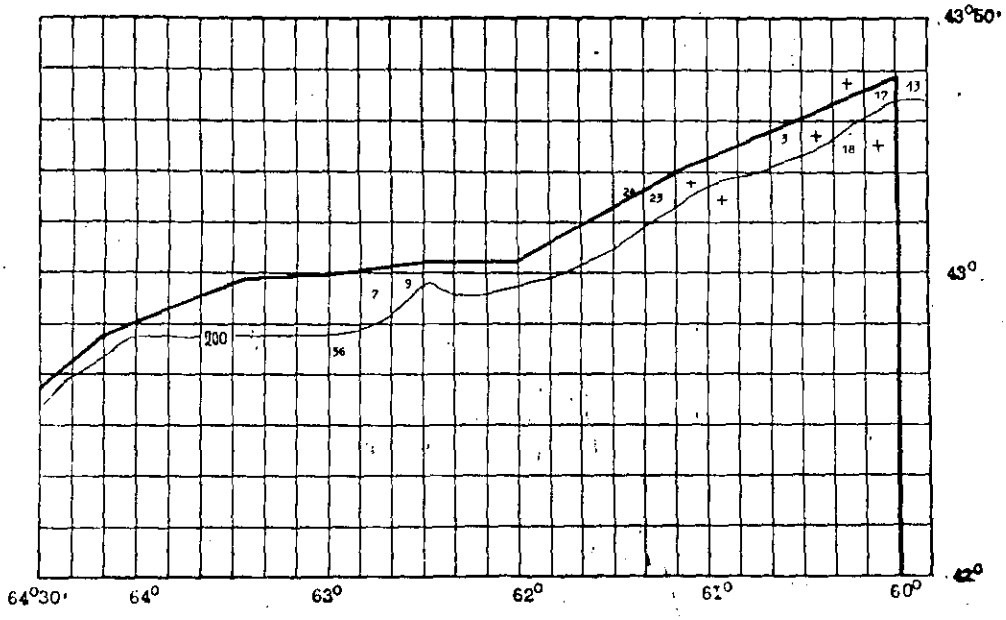

Fig. 5. Haddock catches per trawling hour (kg) in May 1984.

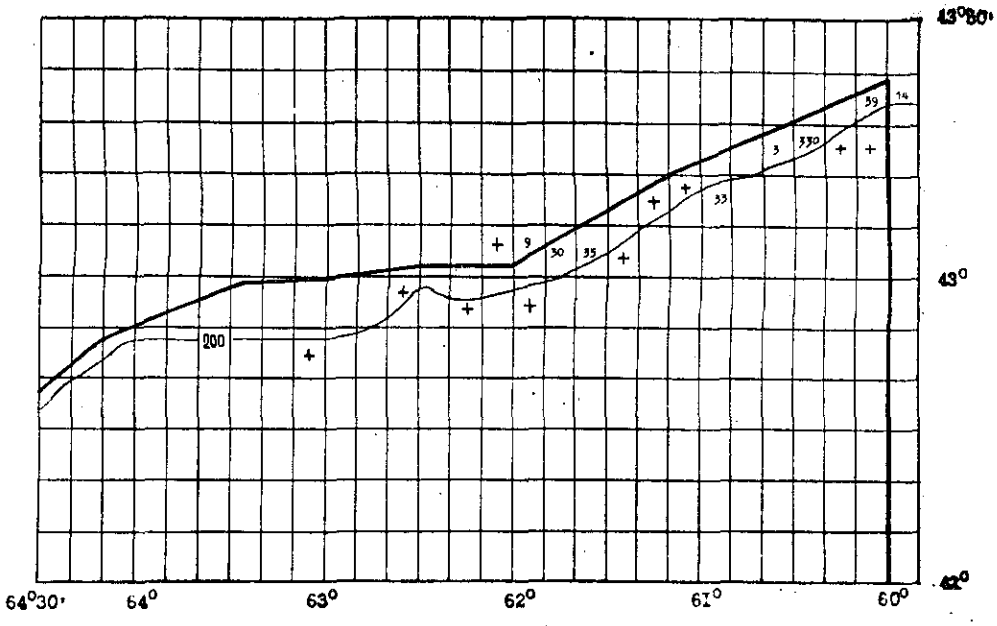

Fig. 6. Haddock catches per trawling hour (kg) in June 1984.

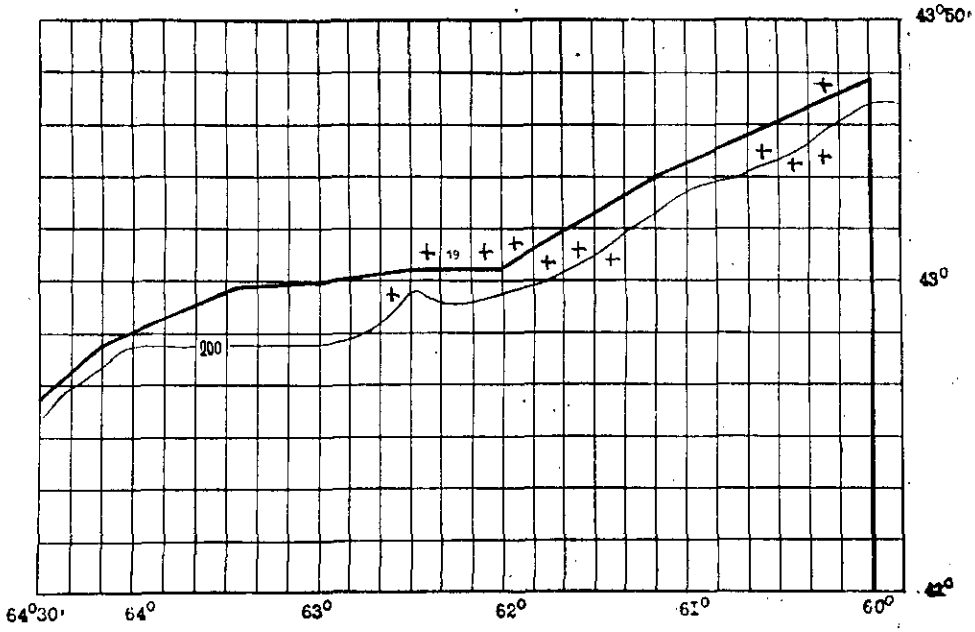

Fig. 7. Haddock catches per trawling hour (kg) in July 1984.

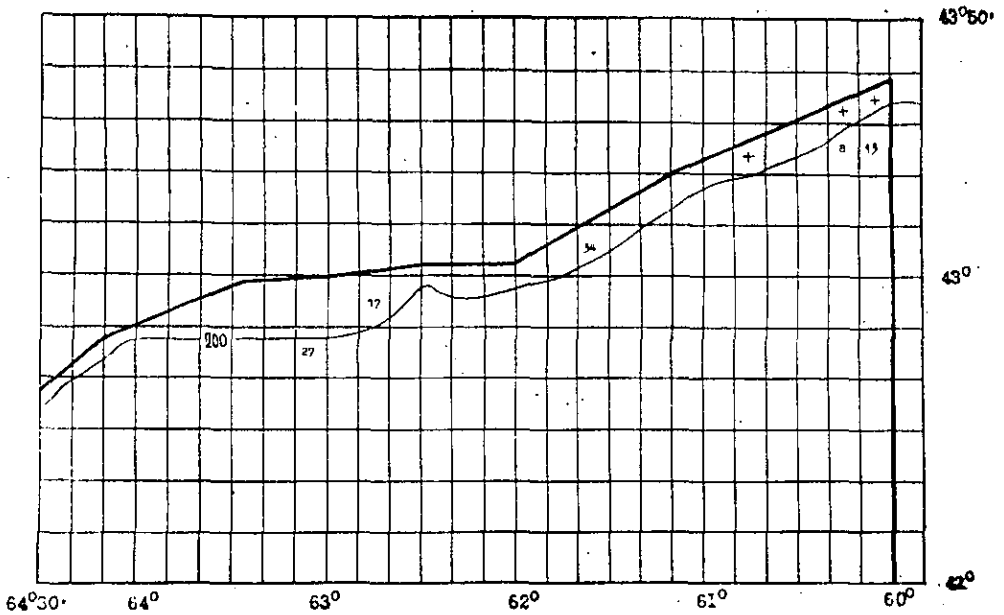

Fig. 8. Cod catches per trawling hour (kg) in May 1984.

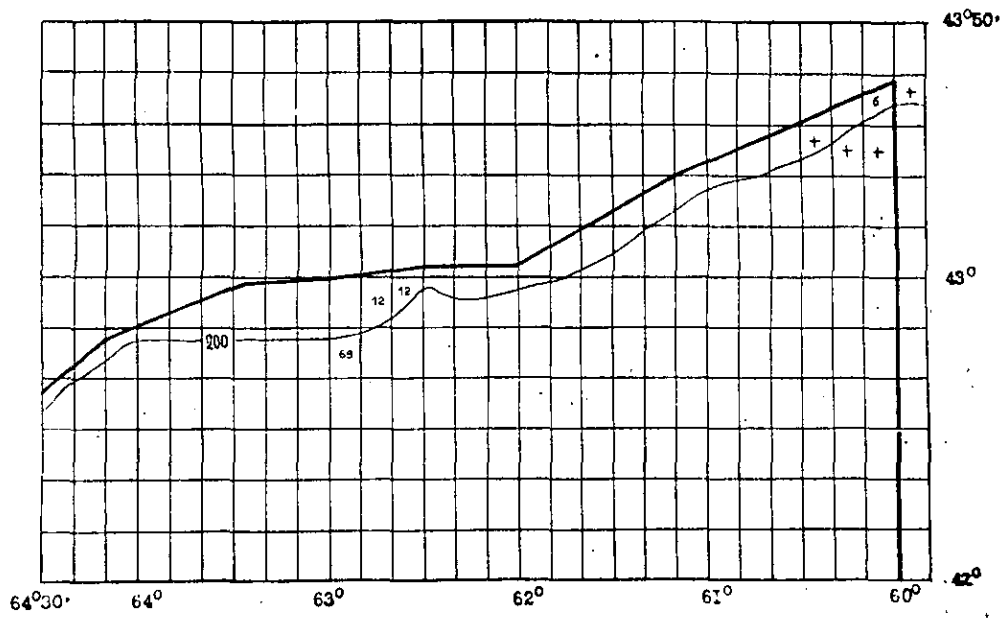

Fig. 9. Saithe catches per trawling hour (kg) in May 1984.

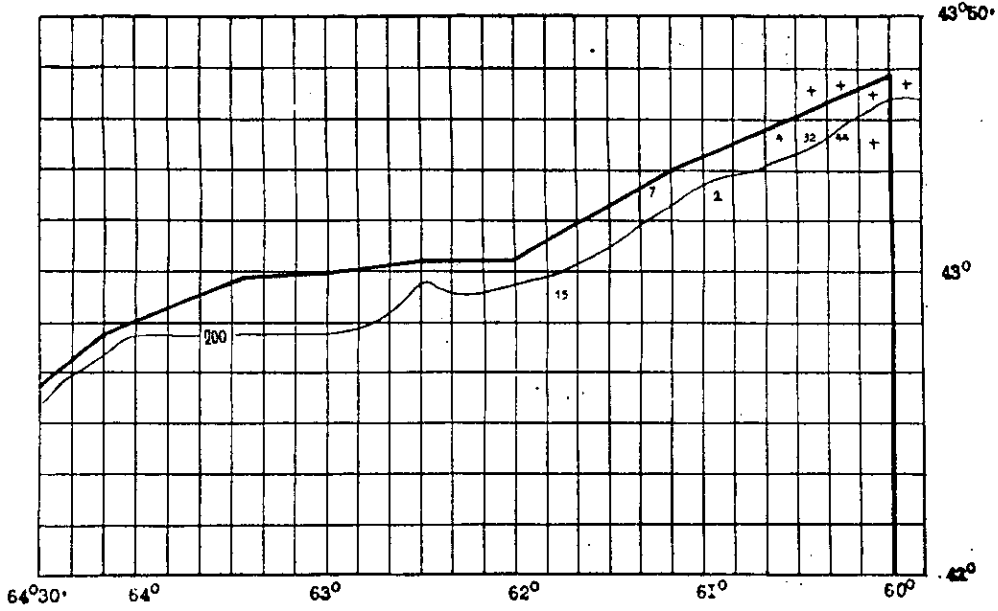

Fig. 10. Redfish catches per trawling hour (kg) in May 1984.