# CRUISE REPORT
# CRUISE 007, 29/4 - 28/5, 1996,

# R/V "G.O. SARS"

## List of Content



## Personell

All personel participating in the cruise are employed at Institute of Marine Research, Bergen. These were: Valentine Antonypillai (29.04 - 28.05), Anna Ersland Bækkevold (15.05 - 28.05), Martin Dahl (29.04 - 28.05), Julio Erices (15.05 - 28.05), Arne Hassel (29.04 - 28.05), Kåre Lauvås (29.04 - 28.05), Ole Arve Misund (cruise leader, 29.04 - 28.05), Bente Skjold (29.04 - 15.05), Rolf Sundt (29.04 - 15.05), Jorunn Træland (29.04 - 15.05), Egil Øvretveit (29.04 - 28.05), Jostein Eide (15.05 - 28.05).

# 1. Introduction

The purpose of this cruise was primarily to map the distribution of the Norwegian spring spawning herring on the continental shelf off western Norway and in the Norwegian Sea, and possibly to provide an estimate of abundance of the herring stock. The cruise is one of seven Norwegian cruises aimed at mapping and abundance estimation of the Norwegian spring spawning herring in the Norwegian Sea and adjacent waters in 1996. The cruise is also part of the coordinated research activity on Norwegian spring spawning herring and the environment in the Norwegian Sea that is established between Faroe Islands, Iceland, Norway and Russia (Anon. 1995; 1996).

The cruise is also part of the *Mare Cognitum* research program at Institute of Marine Research, Bergen. The purpose of this program is to explore the physical environment and biological ecosystem in the Norwegian Sea. This research programme requires specific sampling procedures with frequent CTD and MOCNESS stations, and trawl sampling throughout the whole water column from surface to 700 m depth.

To fulfill these purposes, the cruise was attempted to be run as a combination between an acoustic exploration survey of fish resources, an acoustic abundance estimation survey, and an environmental exploration and monitoring survey. The survey has therefore been conducted with predetermined transects, continous acoustic recording, aimed trawling on recordings and fixed environmental stations.

The transects sailed and the pelagic trawl stations taken are given in Figure 1a, and the CTD, water bottles, MOCNESS and WP2 stations taken are given in Figure 1b. Totally, 90 pelagic trawl stations, 97 CTD stations, and 58 MOCNESS stations were taken during the cruise. The cruise was mostly run in good weather, but the activities and recordings were somewhat disturbed by a strong northern gale when sailing east along the transect at 66° north and to the Norwegian coast.

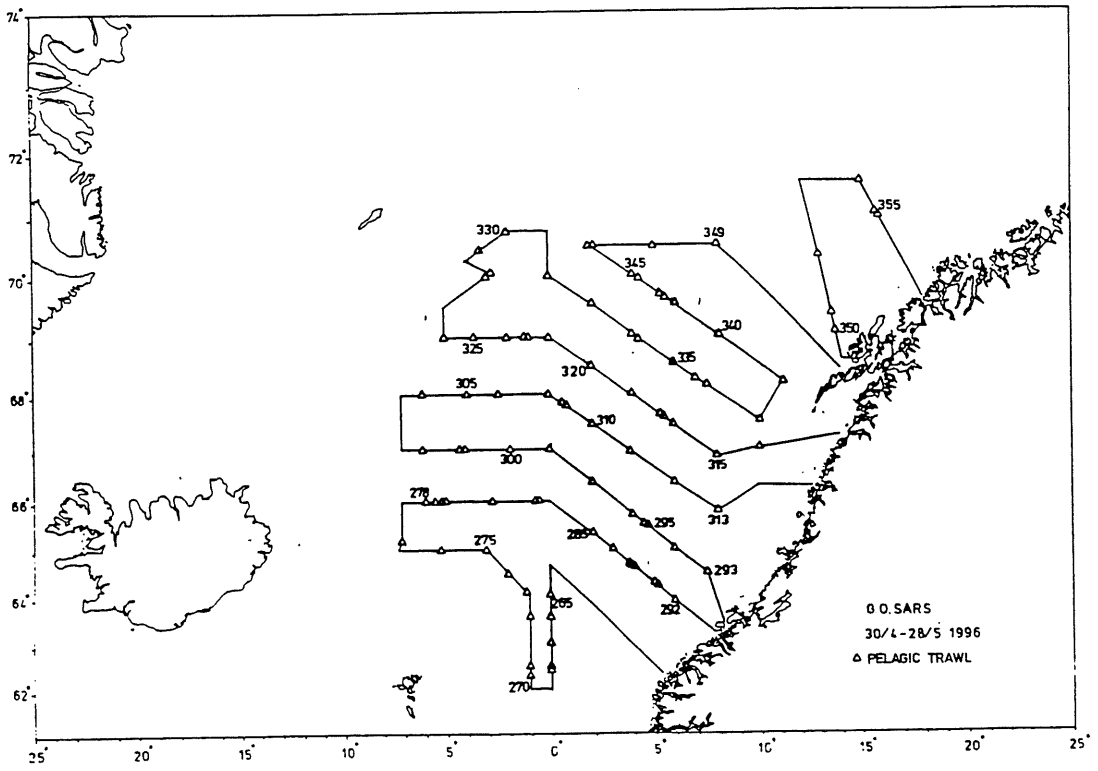


*Figure 1a. Course tracks and pelagic trawl stations taken in the period 30 April - 28 May 1996.*

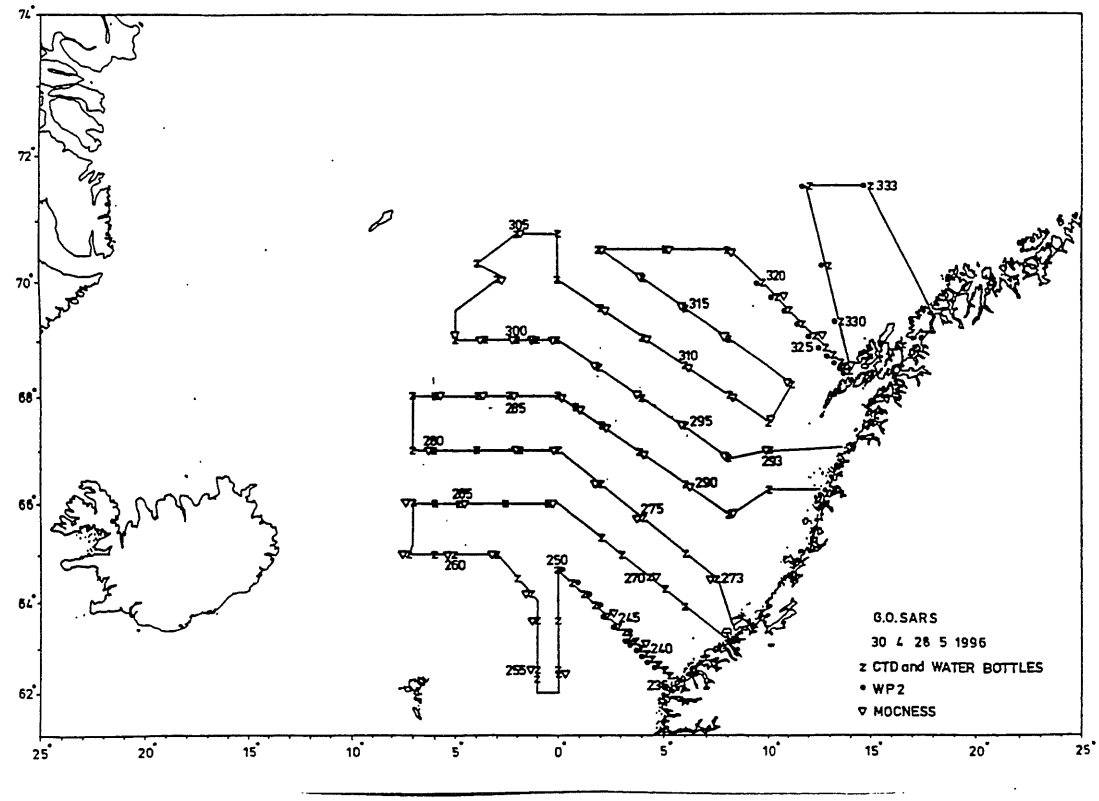


*Figure 1b. Course tracks and CTD, water bottles and MOCNESS stations taken in the period 30 April - 28 May 1996.*

## 2. Methods for recording, sampling and abundance estimaton of fish

Continuous acoustic recordings of fish and plankton were made by a calibrated echo integration unit consisting of a 38 kHz Simrad EK500 working at a range of 0 - 500 m. The integration unit was connected to a Bergen Echo Integrator (BEI) for postprocessing of the recordings and allocation of area backscattering strengths ($s_A$) to species. The $s_A$ - recordings per nautical mile were averaged over five nautical miles. The echo sounder was operated with the following settings: max. power: 4000 W, time varied gain: 20 log R, pulse length: 1 ms, bandwidth: wide, angle sensitivity: 21.9, 2-way beam angle: -21.0 dB, Sv transducer gain: 25.0 dB, TS transducer gain: 24.9 dB, 3 dB beamwidth: 7.0 dB.

A 95 kHz Simrad SA950 sonar was used to record schools near surface at a range of 50 - 300 m to the side of the vessel, and to track selected schools in the survey area. The sonar was operated with the following settings; TX power: max, range: 300 m, pulse: FM auto, gain: 9, display gain: 9, TVG: 30 log R, AGC: weak, Normalization: weak, Ping-to-ping filter: weak. The sonar is connected to a HP 9000 work station with software for detection and measurements of schools. This school detection system was operated with the following settings; minimum range: 50 m, maximum range: 300 m, colour detection threshold: 15, detection radius: 30 m, minimum gap 5 m, minimum width 5 m, minimum interval 5 m, minimum detection pings: 4.

To record migration behaviour and school dynamics, selected schools were tracked for up to 30 minutes. The schools were then continously recorded by the sonar system, and the position of the vessel was obtained from a global positioning system (GPS). The migration speed and direction of the schools was calculated by procedures written in SAS software. The dynamics of the schools were noted continously by a rapporteur in cooperation with a sonar operator, both watching the sonar display.

Acoustic recordings of fish were identified by use of the Åkra-trawl, which has a vertical opening of about 30 m. By ordinary rigging the trawl can be used to catch deep recordings, but the trawl can also be rerigged to catch recordings near the surface by removing the weigths, extending the upper bridles by 12 m, and attaching two large buoys to each upper wing. Such surface trawling was conducted at fixed stations at intervals of 50 - 60 nautical miles. The Åkra-trawl was also used during four large «Mare Cognitum»-stations with stepwise tows from 600 - 200 m depth, and from 150 - 50 m depth and near surface.

Subsamples of up to 100 specimens of herring and blue withing were taken from the trawl catches. The length down to nearest 0.5 cm, weight, sex, maturation stage, and stomach content were recorded. Scales from 50 herring and otholits from 50 blue withing were taken for age reading. The stomachs from 30 herring and 20 blue withing from each subsample were frozen for later analysis. Other fish species were length measured, weighed or frozen for later analysis.

The echo recordings were post-processed by the BEI-system, and $s_A$-values of defined recordings allocated to herring according to the trawl catches and the appearance of the recordings. To estimate the abundance of herring , the allocated $s_A$-values were averaged for statistical squares of $1^\circ$ latitude and $2^\circ$ longitude. For each statistical square, the area density of herring ($\rho_A$) of herring in number per square nautical mile (N n.mile$^{-2}$) was calculated by the equation;

$$\rho_A = s_A/\sigma \qquad (N\ n.mile^{-2}) \qquad (1.1)$$

where:

$$\sigma = 4\pi \cdot 10^{1/10 \cdot TS} \qquad (1.2)$$

$$TS = 20 \log L - 71.9 \qquad (1.3)$$

Insertion of equation 1.3 to 1.2, and 1.2 to 1.1 give:

$$\rho_A = s_A \cdot 1.23 \cdot 10^6 \cdot L^{-2} \qquad (N\ n.mile^{-2}) \qquad (1.4)$$

To estimate the total abundance of herring, the area abundance for each statistical square was multiplied by the number of square nautical miles in each square, and then summed for all the statistical squares in defined sub-areas and the total area. The biomass was calculated by multiplying the area abundance by the average weight of the herring for each statistical square, and summing for all squares within defined sub-areas and the total area. The average length, weight, area density and biomass for each yearclass was aslo estimated for each statistical square, for defined sub-areas, and for the total area. These herring abundance estimations were conducted by a computer-program developed at the Institute of Marine Research, Bergen.

The sonar recordings of herring schools were also used to calculate an estimate of herring abundance. This was done by programmes written in SAS software. The maximum horizontal area for each school was identified and summed for distances of one nautical mile, and the summed one nautical mile areas was then summed for five nautical miles. The summed five nautical mile areas were then scaled to represent a summed school area estimate per square nautical mile. These summed school area estimates were converted to biomass by using the equation:

$$\text{School biomass} = 18.4 * \text{School area (kg)} \qquad (1.5)$$

The quality of the sonar recordings and the school detections and measurments are very sensitive of the recording conditions. Only recordings made when the herring occurred exclusively in distinct schools, and in good weather with minor rolling and pitching were applied. Also recordings made when the herring were shoaling or occurring in scattered layers near surface were deleted from the sonar analysis.

## 3. Temperature distribution

The sea temperature from surface to 400 m depth in the Norwegian Sea recorded during the cruise was characterized by clear east - west gradients with colder water towards west (Fig. 3.1. - 3.5.). This is because of the dominance of the East Iceland Current in the western part of the area. The 2° C isoterm is about at the border of the 200 nautical mile Icelandic economic zone at surface and down to 100 m depth.

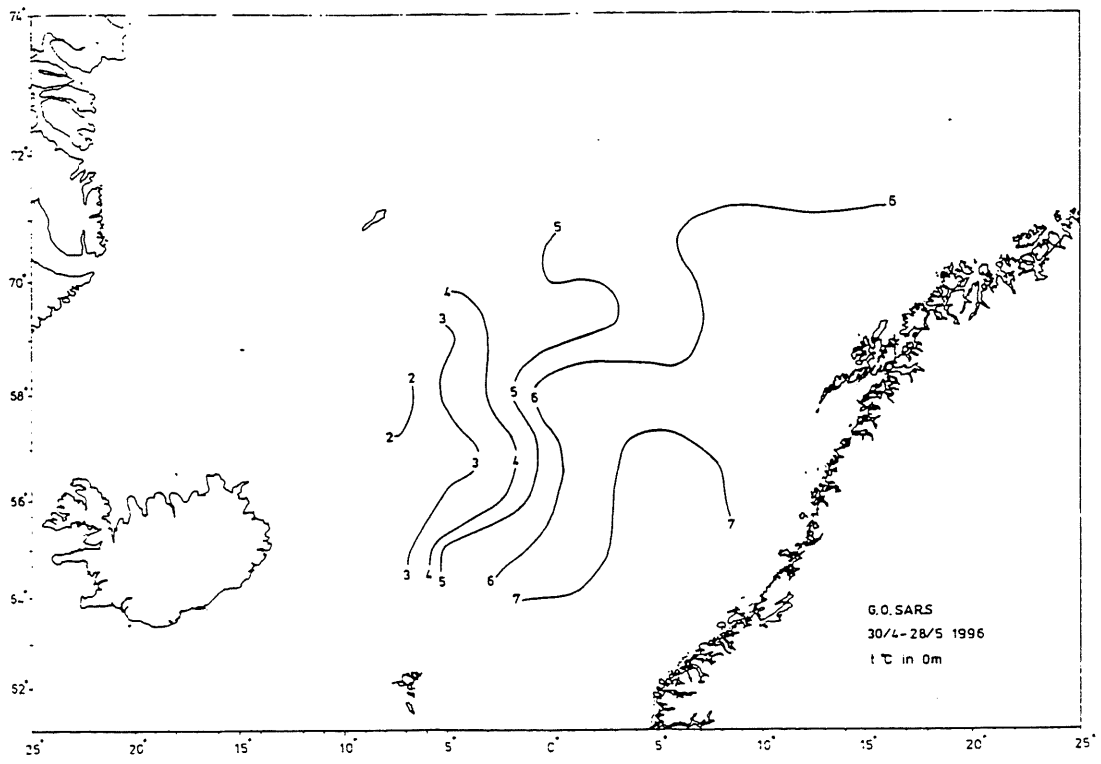


*Figure 3.1. Temperature (° C) at surface in the Norwegian Sea 30 April - 28 May 1996.*

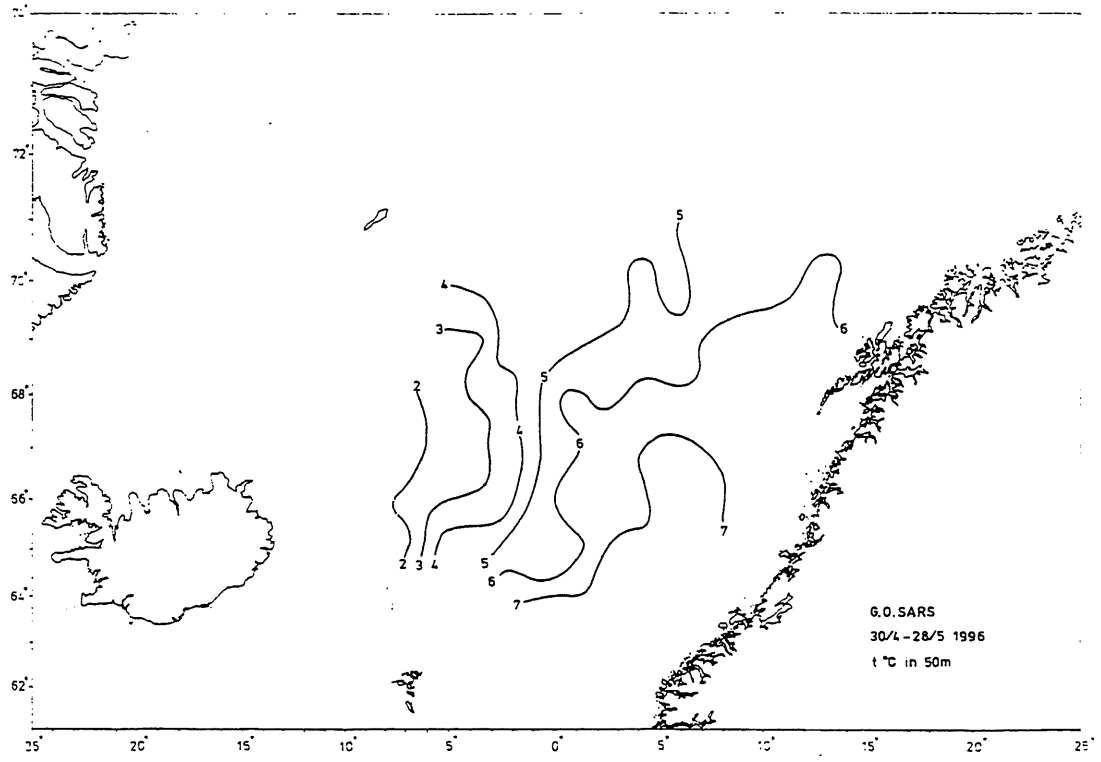


*Figure 3.2. Temperature (° C) at 50 m depth in the Norwegian Sea 30 April - 28 May 1996.*

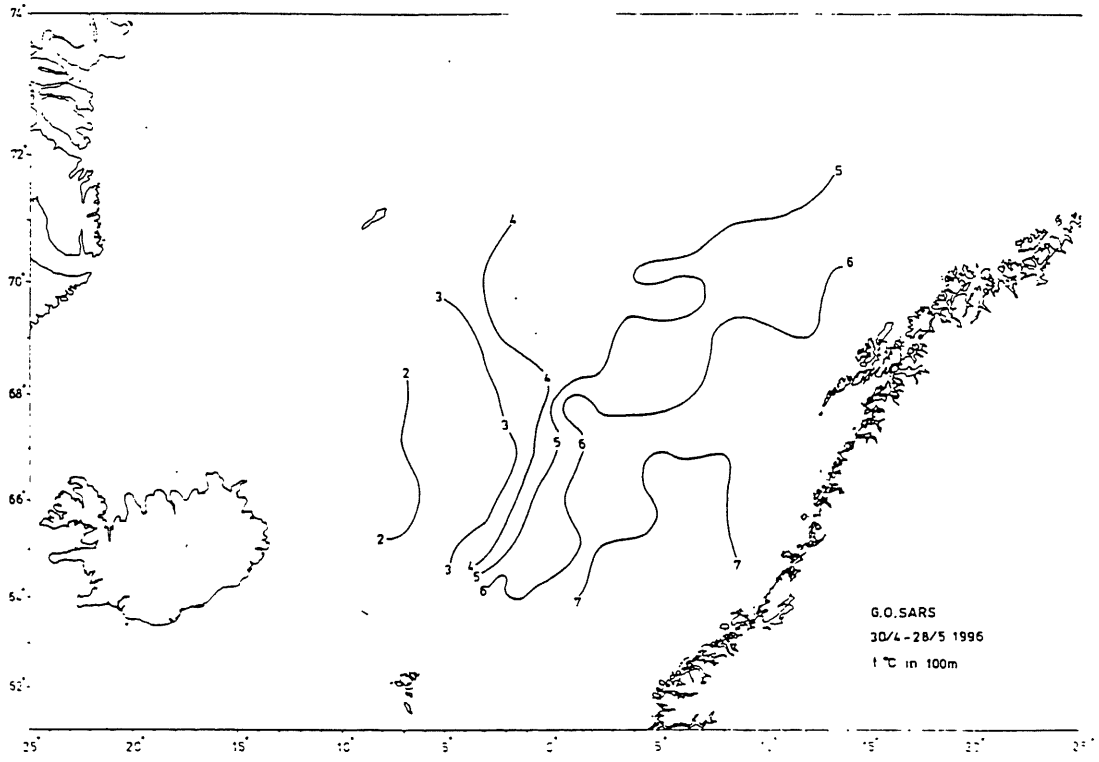


*Figure 3.3. Temperature (° C) at 100 m depth in the Norwegian Sea 30 April - 28 May 1996.*

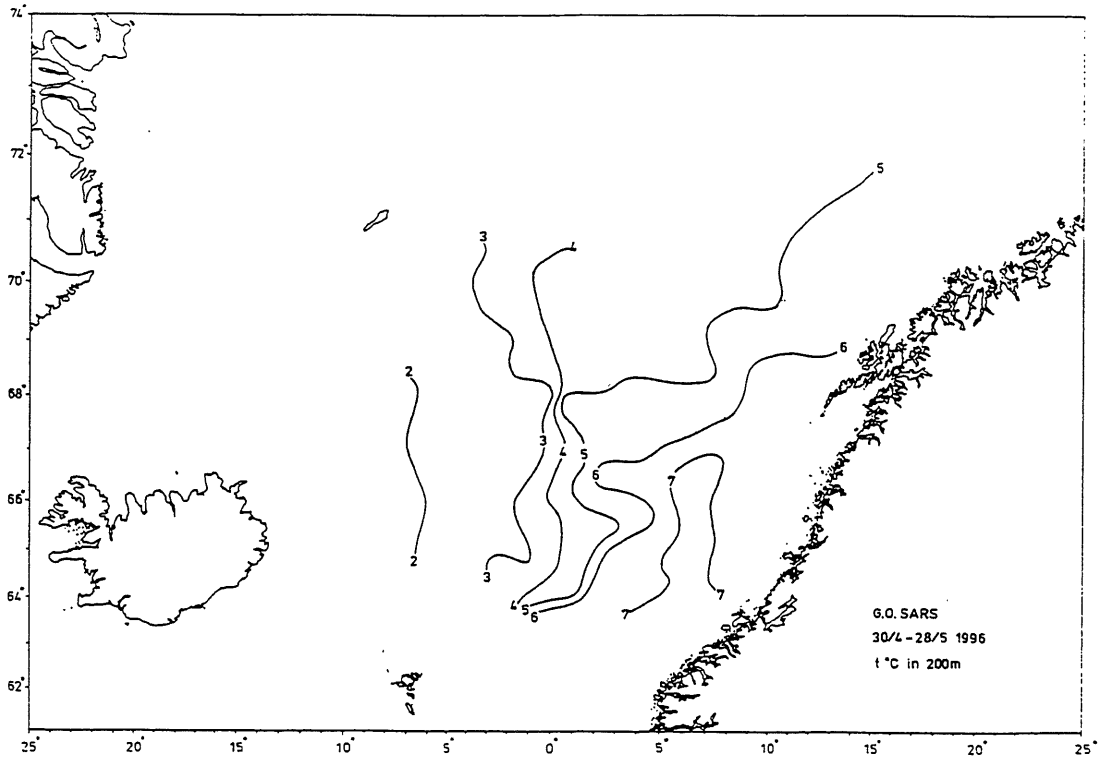


*Figure 3.4. Temperature (° C) at 200 m depth in the Norwegian Sea 30 April - 28 May 1996.*

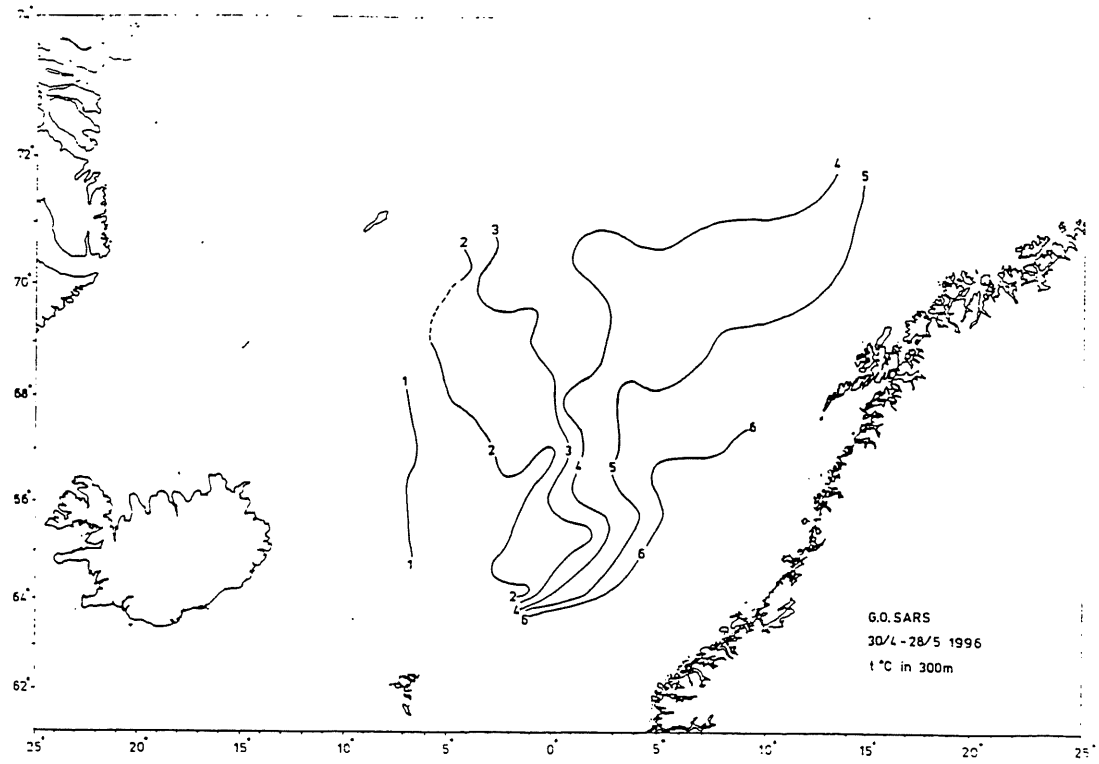


*Figure 3.5. Temperature (° C) at 300 m depth in the Norwegian Sea 30 April - 28 May 1996.*

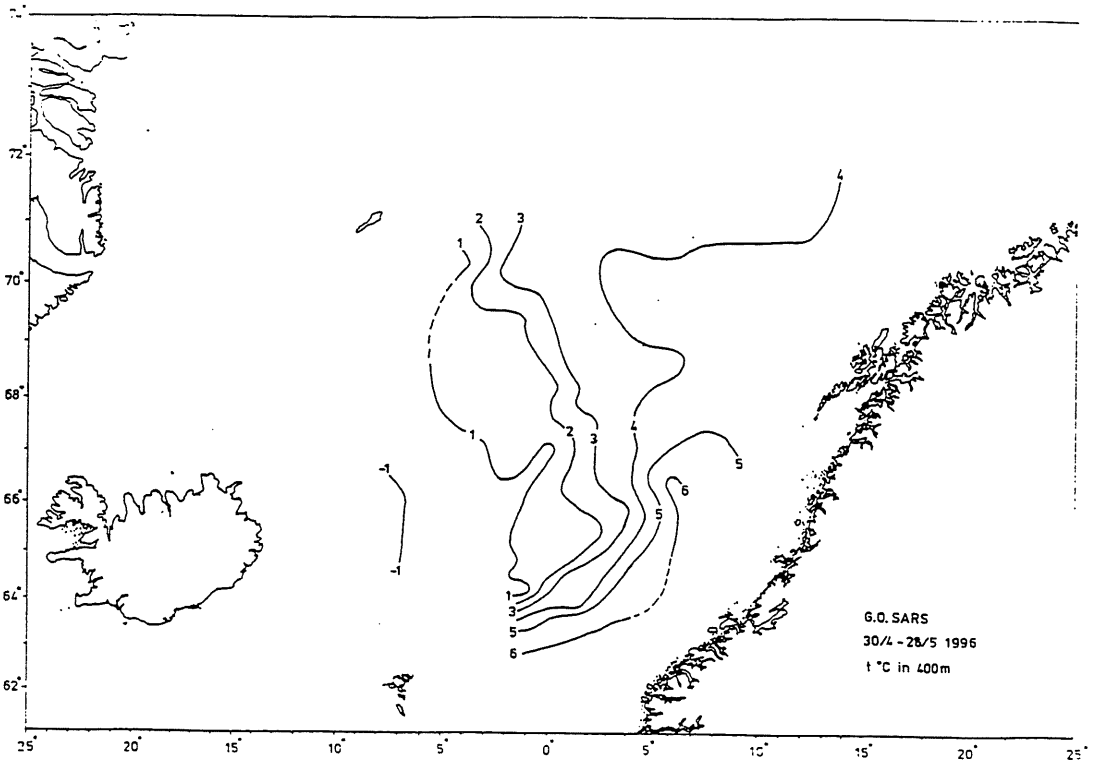


*Figure 3.6. Temperature (° C) at 400 m depth in the Norwegian Sea 30 April - 28 May 1996.*

## 4. Herring distribution and abundance

The herring were observed over a wide area in the Norwegian Sea (Fig. 4.1). The southern border was at about 62° 30' north in the EU-zone, the western border followed the cold front between about 6° west at 66° north to 3° west at 70° north, the most northern and eastern concentrations were found at about 71° north at about 16° east. The southern border in the Faroes zone, and the northern and eastern border in the Norwegian zone were not found during the cruise. The total geographical distribution of the herring stock in the Norwegian Sea was therefore not mapped completely during the cruise. R/V "Magnus Heinasson" reported recordings of herring schools south to 63° 30' north and about 6° west on May 17th, which was probably the most southern distribution in the Faroes zone. The distribution northwards and eastwards towards the Barents Sea is not known.

The herring occurred in two distinct categories of distribution. Rather young herring dominated by the 91- and 92- yearclasses were distributed in a wide area off the Norwegian coast, into the eastern regions of "Smutthavet", and south into the Faroes and EU-zone. Within this distribution the herring occurred mostly in small schools or scattered in layers at about 25 to about 100 m depth. Off the coast of northern Norway the herring occurred in distinct schools at about 100 m to about 250 m depth. In the eastern corner of the Icelandic zone, the western regions of "Smutthavet", and up into the Jan Mayen zone, the herring occurred in large schools mostly between 250 m to 400 m depth. In the Jan Mayen zone there were recordings of large schools from the surface to about 200 m depth. The herring in this western distribution were somewhat larger with up to 45 % of the 1983 yearclass in numbers in one catch in the Jan Mayen zone. However, the 91- and 92- yearclass dominated also in the western distribution, but the 1983 yearclass contributed to about 20 % of the biomass. According to radio contacts with Norwegian purse seiners during the cruise, the purse seine and pelagic trawl fisheries in May were mostly directed on herring in the western distribution in "Smutthavet".

The total biomass of herring recorded during the survey amounts to about 8 million tonnes or 42 billion individuals (Table 4.1.). 2 % of the biomass was recorded in the EU-zone, 4 % in the Faroes zone, 8 % in the Icelandic zone, 44 % in the Norwegain zone (including the Jan Mayen zone), and 43 % in international waters in "Smutthavet".

The biomass of the 92- and 91- yearclasses dominated with about 32 % and 28 % of the total biomass respectively (Table 4.2.). In numbers the 92- and 91-yearclass were even more dominating with about 45 % and 27 % of the total numbers respectively. The 1983 yearclass is still important in the population with about 15 % of the biomass and about 7 % of the numbers respectively (Table 4.2.).

*Table 4.1. Biomass and numbers of herring recorded in the Norwegian Sea, May 1996.*

| Zone of estimat | Country/Region | Biomass (tonnes · $10^3$) | Numbers (N· $10^6$) |
|---|---|---|---|
| 200 mile EC-zone | EU | 154 | 533 |
| 200 mile EC-zone | Faroes Islands | 350 | 2 120 |
| 200 mile EC-zone | Iceland | 624 | 2 242 |
| 200 mile EC-zone | Norway, Jan Mayen | 724 | 2 677 |
| International | "Smutthavet" | 3 416 | 15 603 |
| 200 mile EC-zone | Norway | 2 801 | 20 700 |
| Total | | 7 997 | 43 875 |

*Table 4.2. Biomass (B, in tonnes · $10^3$), number (N · $10^6$), average length (L) and weigth (W) per yearclass of herring recorded in the Norwegian Sea, May 1996.*

| Age | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| B | 40 | 138 | 2541 | 2229 | 1173 | 564 | 133 | 5 | 2 | 48 | 1124 |
| N | 382 | 1421 | 19584 | 11939 | 4793 | 2032 | 424 | 14 | 7 | 145 | 3134 |
| L (cm) | 24.4 | 23.9 | 26.7 | 30.4 | 33.2 | 34.6 | 36.0 | 35.8 | 37.8 | 36.5 | 37.8 |
| W (g) | 105 | 97 | 130 | 187 | 245 | 277 | 314 | 332 | 328 | 329 | 359 |

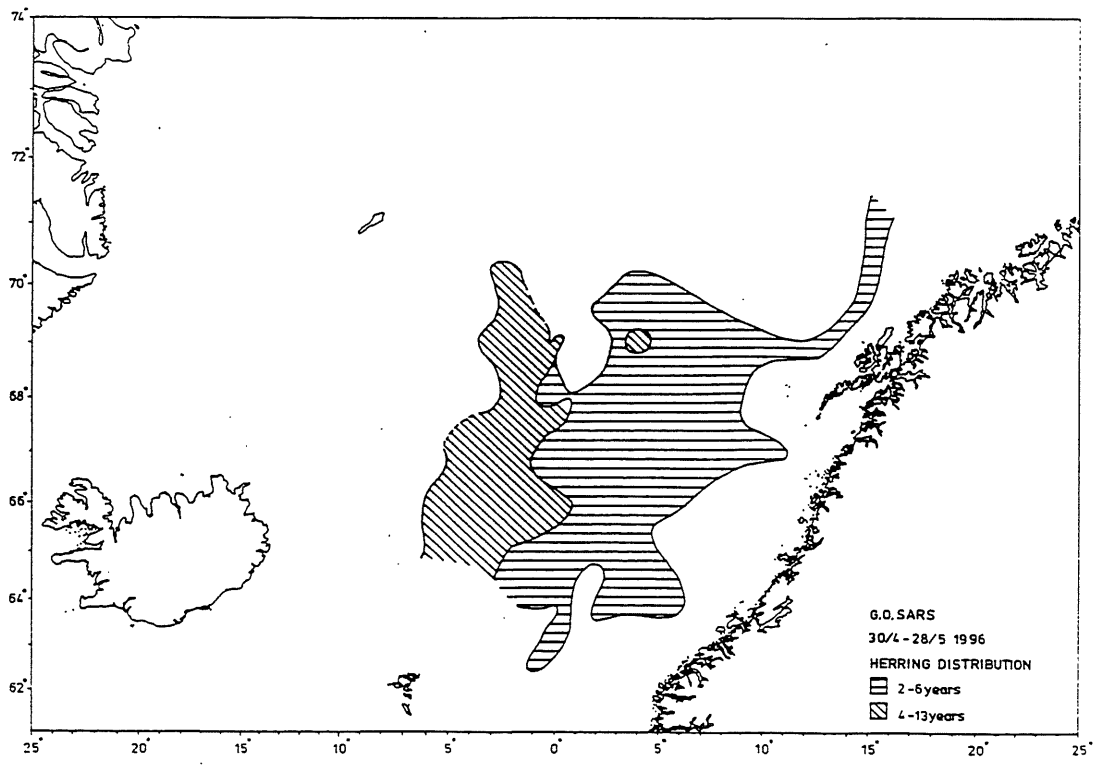


*Figure 4.1. Distribution of herring recorded by R/V "G. O. Sars" 29/4 - 27/5 1996.*

## 5. Comparison of echo integration and sonar estimates of herring biomass

The recording conditions during substantial parts of the cruise fulfilled the rather strict criteria set for use of sonar recordings, i.e. that the herring should occur in schools close to surface and that the weather conditions should be good with minor rolling and pitching. However, for some parts of the cruise as in the EU-zone, Faroes zone, and the transect from N66° W07° (log 8250 - log 9350) these criteria were not fulfilled, and the sonar recordings in these areas could therefore not be used to calculate abundance estimates.

For the other areas of the cruise there was generally a certain correspondance between the sonar and the echo integration estimate of herring abundance (Fig. 5.1.). However, in the western areas of "Smutthavet" the schools occurred at great depth, and were only recorded by the shallow tilted sonar during pelagic trawl stations and school trackings. Consequently, only echo integration estimates exist from these areas (e.g. log 9600 -9700, 10800 -11350).

Totally, the average abundance estimate obtained by echo integration (37 tonnes n. $m.^{-2}$, SD=137 tonnes n. $m.^{-2}$, N=702) was significantly higher ($p = 0.0001$, Wilcoxon 2-Sample Test) than that obtained by sonar (average = 30.5 tonnes n. $m.^{-2}$, SD=92 tonnes n. $m.^{-2}$, N=702). If comparing only the estimates obtained when herring were recorded by both methods, there was no significant difference between the echo integration and sonar estimate ($p>0.05$). The sonar recordings thereby confirm that quite representative estimates of herring abundance were obtained by the echo integration method over large areas covered during the survey. Quite representative estimates of herring abundance were also obtained by the echo integration method when the herring were scattered in shoals or layers. This was confirmed by more or less continous recordings both on the echo sounder and the sonar at depths from about 25 m to about 100 m. Similar representative recordings of herring abundance were obtained by the echo integration method during rather bad weather beacuse of just minor air blocking and bubble attenuation when the ship was having the waves from the side. Probably, rather representative echo integration estimates were also obtained of the deep herring schools in the western regions of "Smutthavet" and the eastern part of the Icelandic zone.

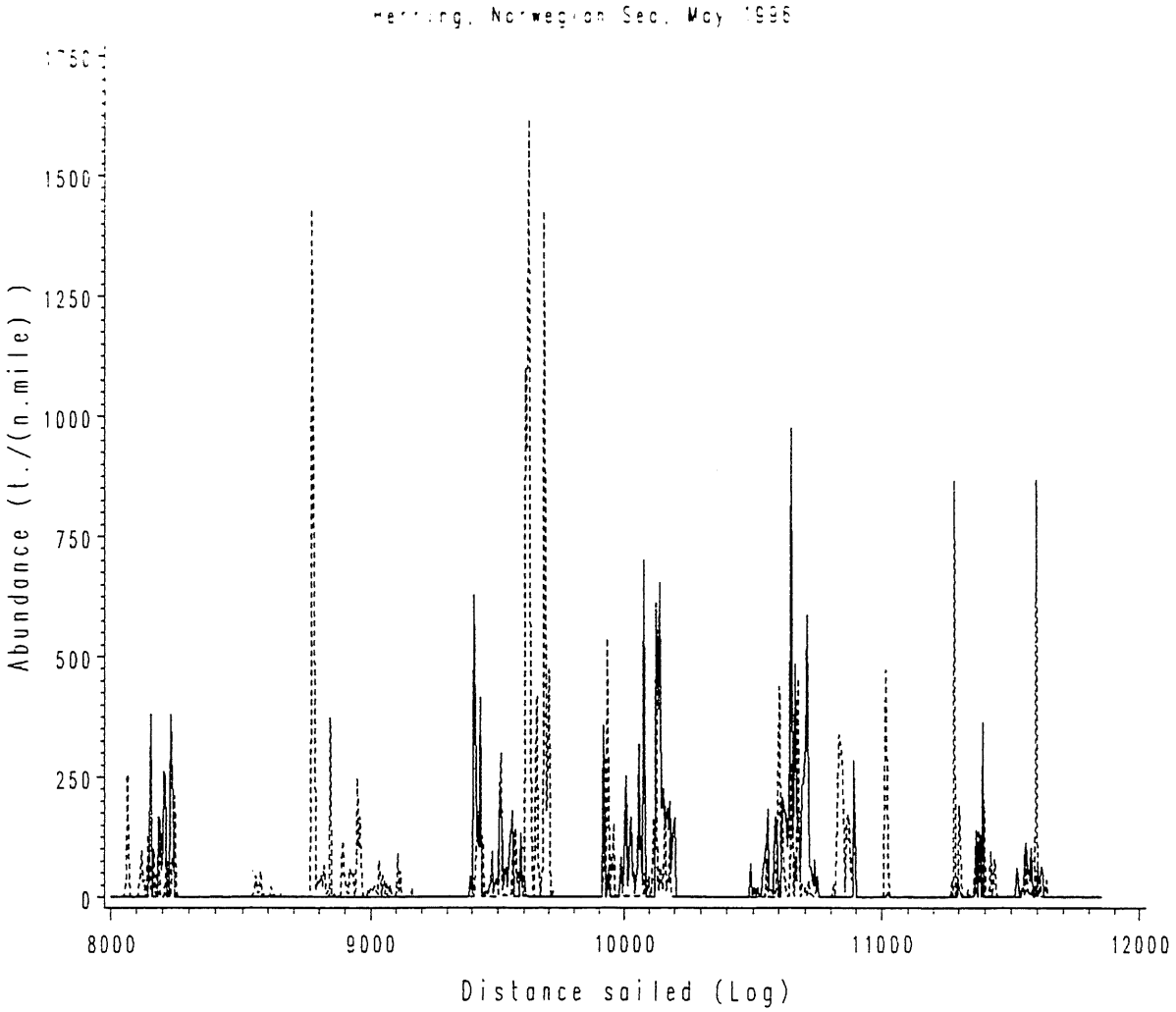


*Figure 5.1. Abundance of herring in tonnes per square nautical mile (t. n. mile$^{-2}$) as estimated from the echo integration (broken line) and sonar (full line) recordings.*

# 6. Biological status of herring

### Biological sampling of herring

The distribution of herring catches is shown in Figure 6.1. From each catch 50 or 100 herring were examined for weight, length, age, fat content, sex, stage of maturity, *Ichtophorus hoferi* and stomach fullness. Thirty stomachs were frozen for content examination.

Length distribution of herring at all trawl stations is shown in Table 6.1.

### Age and length distribution

The age distribution in the Norwegian- EU - and Faroe zones shows that young herring belonging to the 1992 and 1991 year classes are dominating (Table 6.2, 6.3, and 6.7).

In the Icelandic and the Jan Mayen zones older adult herring were found (Figure 6.2). The catches did mainly consist of 5, 6 and 7 years old herring (Table 6.4 and 6.5). The 1983 year class was here represented with 20 % in each zone.

In the International area the oldest herring was distributed in the western part and the younger in the east. In the sample from PT 302 more than 60 % of the catch belonged to the 1983 year class. The mean length was 36,2 cm and the mean weight was 321 gram. Table 6.6 shows the age- and length distributions in the International zone.

In trawl haul PT 349, north in the Norwegian zone, one 0-group herring was found in the catch, length 43 mm.

### Stomach fullness

Some stomach content was present in most of the samples. Most content was found in the Icelandic zone and in the southwestern part of the Jan Mayen zone.

The disease *Ichtophonus hoferi* was found in totally 8 individuals, four cases in the Norwegian zone, one case in the Faroe and one in the Jan Mayen zone, and two individuals in the International area.

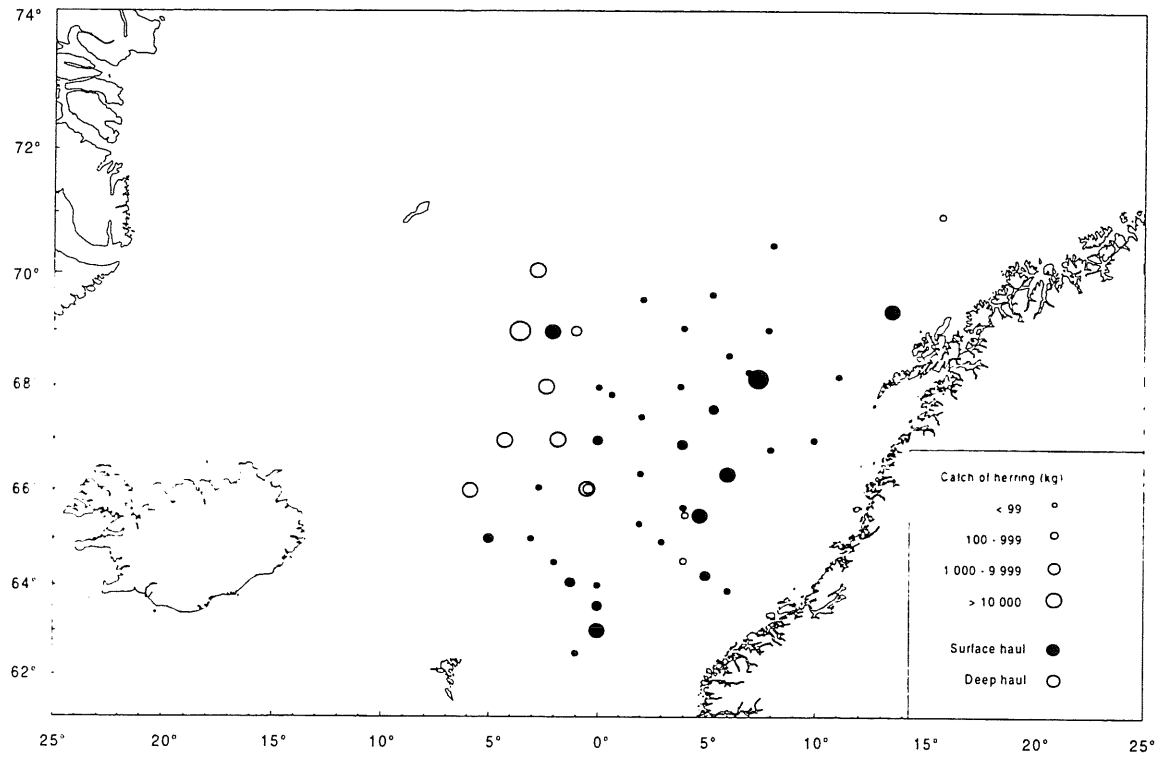


*Figure 6.1. Distribution of pelagic trawl caches of herring.*

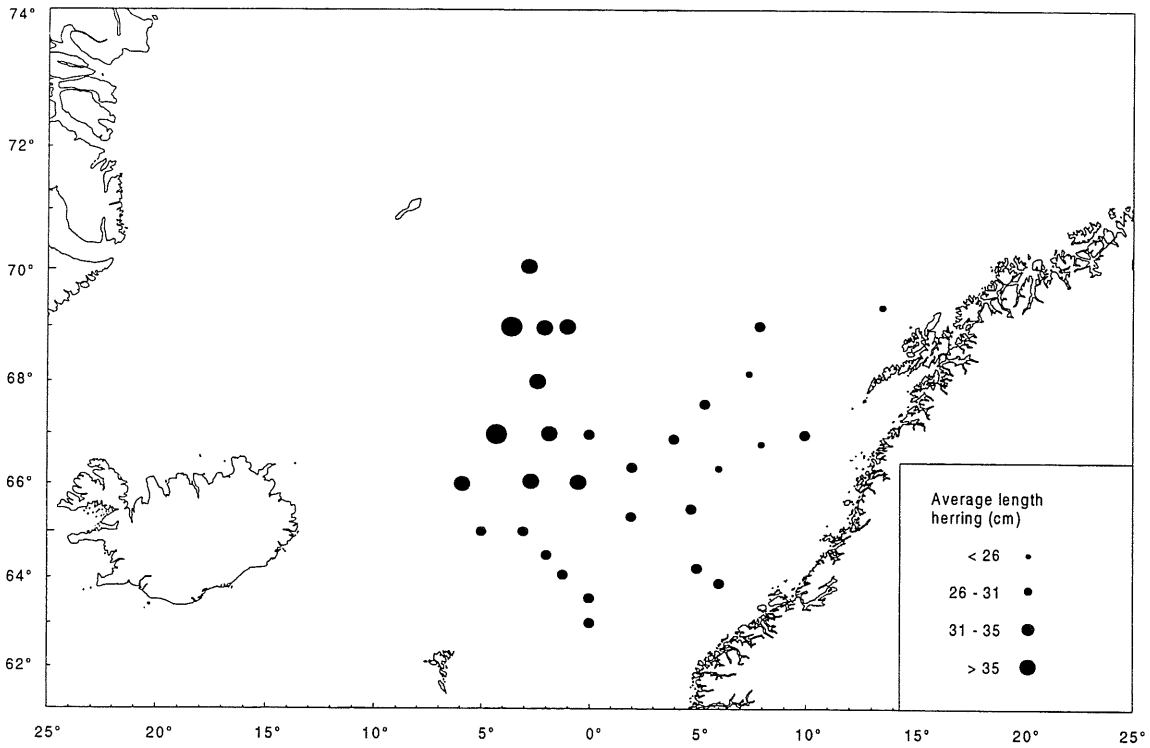


*Figure 6.2. Average length of herring in the trawl samples taken by R/V «G.O.Sars» 29/4 - 28/5 1996.*

*Table 6.1. Length distribution of herring and blue whiting, May 1996*

| DATE | 960501 | | 960501 | | 960502 | | 960502 | | 960502 | | 960502 | | 960502 | | 960503 | | 960503 | | 960504 | | 960504 | | 960505 | | 960505 | | 960506 | | 960506 | | 960506 | | 960507 | | 960507 | | 960507 | | 960507 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST.NO. | 265 | | 266 | | 267 | | 268 | | 269 | | 270 | | 271 | | 273 | | 274 | | 275 | | 276 | | 278 | | 282 | | 283 | | 284 | | 285 | | 286 | | 289 | | 289 | | 290 | |
| SPECIES: | HERRING | | HERRING | | HERRING | | BLUE WH | | BLUE WH | | BLUE WH | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | | BLUE WH | | HERRING | |
| cm | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) |
| 15.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16.5 | | | | | | | 2 | 21 | 1 | 25 | 2 | 26 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17.0 | | | | | | | 2 | 29 | | | 2 | 28 | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | |
| 17.5 | | | | | | | 2 | 29 | 3 | 28 | 3 | 31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18.0 | | | | | | | 5 | 33 | 6 | 31 | 7 | 33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18.5 | | | | | | | 9 | 34 | 11 | 35 | 7 | 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19.0 | | | | | | | 4 | 39 | 5 | 37 | 5 | 37 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19.5 | | | | | | | 7 | 41 | 2 | 40 | 9 | 41 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20.0 | | | | | | | 7 | 43 | 6 | 45 | 5 | 43 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20.5 | | | | | | | 8 | 47 | 11 | 45 | 5 | 48 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21.0 | | | | | | | | | 3 | 49 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21.5 | | | | | | | 2 | 51 | 1 | 53 | 4 | 54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22.0 | | | | | | | 1 | 62 | 1 | 50 | 1 | 56 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 90 |
| 23.0 | | | | | | | 1 | 66 | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 97 | | | | | 1 | 100 |
| 23.5 | | | 1 | 90 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 100 | | | | | 2 | 101 |
| 24.0 | | | 1 | 95 | | | | | | | | | | | 1 | 106 | 1 | 98 | | | | | | | | | | | | | | | 4 | 109 | 2 | 104 | | | 3 | 107 |
| 24.5 | | | 2 | 112 | | | | | | | | | | | 4 | 104 | | | | | | | | | | | | | | | | | 6 | 115 | 1 | 106 | | | 7 | 111 |
| 25.0 | | | 5 | 110 | 2 | 119 | | | | | | | | | 12 | 109 | 4 | 108 | 1 | 113 | | | | | | | | | | | | | 12 | 123 | 4 | 113 | | | 13 | 120 |
| 25.5 | | | 9 | 115 | 1 | 120 | | | | | | | | | 11 | 118 | 10 | 114 | 1 | 124 | | | | | | | | | | | | | 15 | 126 | 3 | 121 | | | 13 | 124 |
| 26.0 | | | 5 | 121 | 8 | 126 | | | | | | | | | 18 | 117 | 9 | 118 | 2 | 121 | | | | | | | | | | | | | 14 | 131 | 2 | 127 | | | 10 | 132 |
| 26.5 | | | 10 | 127 | 7 | 131 | | | | | | | | | 8 | 114 | 9 | 123 | 4 | 128 | 1 | 121 | | | | | | | | | | | 15 | 140 | 7 | 133 | | 1 | 17 | 144 |
| 27.0 | | | 12 | 135 | 15 | 140 | | | | | | | 1 | 136 | 12 | 139 | 13 | 130 | 8 | 134 | 3 | 132 | | | | | 3 | 130 | 1 | 115 | | | 10 | 147 | 5 | 136 | | | 12 | 149 |
| 27.5 | | | 13 | 143 | 11 | 151 | | | | | | | | | 14 | 145 | 15 | 139 | 14 | 143 | 2 | 164 | | | | | 3 | 144 | 1 | 145 | | | 10 | 154 | 6 | 146 | | | 5 | 159 |
| 28.0 | | | 13 | 150 | 17 | 159 | | | | | | | 1 | 134 | 10 | 149 | 14 | 142 | 11 | 153 | 2 | 142 | | | | | 6 | 147 | 1 | 157 | | | 5 | 164 | 7 | 145 | | | 5 | 165 |
| 28.5 | | | 5 | 160 | 4 | 161 | | | | | | | 3 | 156 | 3 | 161 | 7 | 152 | 7 | 154 | 10 | 158 | | | | | 2 | 165 | 4 | 157 | | | 4 | 165 | 3 | 152 | | 1 | 3 | 171 |
| 29.0 | | | 5 | 170 | 12 | 176 | | | | | | | 2 | 161 | 3 | 172 | 7 | 158 | 7 | 166 | 6 | 161 | | | 2 | 168 | 10 | 167 | 1 | 152 | | | 2 | 184 | 3 | 170 | 1 | 170 | 2 | 189 |
| 29.5 | | | 4 | 175 | 10 | 181 | | | | | | | 1 | 166 | 2 | 192 | 3 | 166 | 13 | 168 | 10 | 173 | | | 2 | 177 | 5 | 182 | | | | | | | 1 | 175 | | | 3 | 187 |
| 30.0 | | | 5 | 178 | 6 | 195 | | | | | | | 5 | 170 | | | 3 | 173 | 4 | 179 | 14 | 175 | 2 | 197 | 6 | 197 | 12 | 186 | 4 | 173 | | | | | 3 | 188 | | | 1 | 177 |
| 30.5 | | | 4 | 186 | 2 | 190 | | | | | | | 3 | 179 | | | 1 | 201 | 13 | 190 | 13 | 187 | 3 | 206 | 11 | 193 | 19 | 191 | 7 | 183 | 1 | 185 | | | 1 | 177 | | | | |
| 31.0 | 1 | 196 | 2 | 193 | 3 | 205 | | | | | | | 2 | 181 | 1 | 186 | 1 | 183 | 2 | 198 | 15 | 194 | 10 | 214 | 19 | 200 | 12 | 199 | 6 | 188 | | | | | | | | | | |
| 31.5 | | | 3 | 196 | 2 | 211 | | | | | | | 4 | 214 | | | 2 | 200 | 4 | 209 | 7 | 203 | 10 | 231 | 21 | 211 | 4 | 219 | 14 | 196 | | | | | | | | | | |
| 32.0 | | | | | | | | | | | | | 1 | 205 | | | | | 1 | 212 | 4 | 209 | 10 | 230 | 9 | 220 | 5 | 220 | 16 | 204 | | | 1 | 205 | | | | | 2 | 208 |
| 32.5 | | | 1 | 203 | | | | | | | | | 1 | 213 | 1 | 253 | | | 1 | 241 | 7 | 219 | 9 | 240 | 10 | 231 | 7 | 232 | 5 | 221 | | | | | | | | | | |
| 33.0 | | | | | | | | | | | | | 2 | 245 | | | | | 2 | 219 | 3 | 223 | 6 | 266 | 11 | 241 | 3 | 256 | 17 | 222 | | | | | | | | | | |
| 33.5 | | | | | | | | | | | | | 2 | 244 | | | | | 4 | 241 | 1 | 249 | 3 | 257 | 2 | 260 | 5 | 261 | 5 | 231 | | | | | | | | | | |
| 34.0 | | | | | | | | | | | | | 1 | 246 | | | | | | | 1 | 267 | 6 | 279 | 2 | 254 | 2 | 248 | 5 | 237 | | | | | | | | | | |
| 34.5 | | | | | | | | | | | | | 1 | 284 | | | | | | | 1 | 243 | 8 | 303 | 1 | 259 | 1 | 259 | 6 | 258 | | | | | | | | | | |
| 35.0 | | | | | | | | | | | | | 1 | 326 | | | | | | | | | 7 | 289 | 1 | 280 | 1 | 295 | 2 | 255 | | | | | | | | | | |
| 35.5 | | | | | | | | | | | | | | | | | | | | | | | 4 | 313 | | | | | 5 | 284 | | | | | | | | | | |
| 36.0 | | | | | | | | | | | | | | | | | | | | | | | 2 | 333 | 2 | 303 | | | | | | | | | | | | | | |
| 36.5 | | | | | | | | | | | | | | | | | | | | | | | 3 | 319 | | | | | | | | | | | | | | | | |
| 37.0 | | | | | | | | | | | | | | | | | | | | | | | 9 | 355 | | | | | | | | | | | | | | | | |
| 37.5 | | | | | | | | | | | | | | | | | | | 1 | 346 | | | 4 | 372 | | | | | | | | | | | | | | | | |
| 38.0 | | | | | | | | | | | | | | | | | 1 | 347 | | | | | 4 | 371 | 1 | 337 | | | | | | | | | | | | | | |
| 38.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 292 | | | | | | | | | | |
| 39.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SUM | 1 | | 100 | | 100 | | 50 | | 50 | | 50 | | 31 | | 100 | | 100 | | 100 | | 100 | | 100 | | 100 | | 100 | | 101 | | 100 | | 49 | | 1 | | 3 | | 100 | |
| MEAN W. | | 196.0 | | 144.6 | | 159.0 | | 39 6 | | 39 2 | | 39 2 | | 196.2 | | 131.6 | | 139.2 | | 167.9 | | 184.1 | | 274.5 | | 216.8 | | 195.9 | | 210.8 | | 136.7 | | 142.3 | | 170.0 | | 0.0 | | 138.8 |
| MEAN L. | 31.0 | | 27.6 | | 28.1 | | 19.3 | | 19 3 | | 19 1 | | 30 9 | | 26.7 | | 27.5 | | 29.1 | | 30.3 | | 33.7 | | 31.7 | | 30.6 | | 32.2 | | 26.7 | | 27,9 | | 29.5 | | 24.5 | | 26.8 | |

*Table 6.1. Continued*

| DATE | 960507 | | 960507 | | | | 960508 | | 960509 | | 960509 | | 960509 | | 960510 | | 960510 | | 960510 | | 960511 | | 960512 | | 960512 | | 960512 | | 960512 | | 960513 | | 960513 | | 960513 | | 960516 | | 960516 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST.NO. | 291 | | 292 | | | | 293 | | 295 | | 296 | | 297 | | 298 | | 299 | | 300 | | 302 | | 306 | | 307 | | 308 | | 309 | | 310 | | 311 | | 312 | | 314 | | 315 | |
| SPECIES: | BLUE WH | | HERRING | | BLUE WH | | BLUE WH | | HERRING | | BLUE WH | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | | BLUE WH | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | |
| cm | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) |
| 15.0 | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15.5 | | | | | | | | | | | 1 | 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16.0 | | | | | | | | | | | 1 | 22 | | | | | | | | | | | | | | | | | 1 | 26 | | | | | | | | | | |
| 16.5 | 2 | 24 | | | | | 1 | | | | 1 | 24 | | | | | | | | | | | | | | | | | 2 | 28 | | 21 | | | | | | | | |
| 17.0 | 3 | 27 | | | | | 3 | | | | 2 | 25 | | | | | | | | | | | | | | | | | 8 | 31 | | 29 | | | | | | | | |
| 17.5 | 1 | 29 | | | | | 3 | | | | 8 | 29 | | | | | | | | | | | | | | | | | 2 | 33 | | 29 | | | | | | | | |
| 18.0 | 4 | 32 | | | | | 4 | | | | 15 | 31 | | | | | | | | | | | | | | | | | 13 | 36 | | 33 | | | | | | | | |
| 18.5 | 9 | 35 | | | | | 2 | | | | 7 | 33 | | | | | | | | | | | | | | | | | 9 | 38 | | 34 | | | | | | | | |
| 19.0 | 12 | 38 | | | | | 3 | | | | 4 | 36 | | | | | | | | | | | | | | | | | 5 | 40 | | 39 | | | | | | | | |
| 19.5 | 6 | 39 | | | | | 3 | | | | 4 | 39 | | | | | | | | | | | | | | | | | 8 | 44 | | 41 | | | | | | | | |
| 20.0 | 6 | 44 | | | 1 | | 3 | | | | 4 | 44 | | | | | | | | | | | | | | | | | 2 | 46 | | 43 | | | | | | | | |
| 20.5 | 3 | 43 | | | | | | | | | 1 | 45 | | | | | | | | | | | | | | | | | | | | 47 | | | | | | | | |
| 21.0 | 2 | 47 | | | 1 | | | | | | 1 | 50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 51 | | | | | | | | |
| 22.0 | 1 | 55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 62 | | | | | | 1 | 70 | |
| 22.5 | 1 | 58 | | | | | | | | | 1 | 59 | | | | | | | | | | | | | | | | | | | | | | | 1 | 86 | | 1 | 75 | |
| 23.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 66 | | | 1 | 86 | 1 | 83 | 1 | 88 |
| 23.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 4 | 96 | 4 | 95 | 2 | 91 |
| 24.0 | | | | | | | | | 2 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 108 | 2 | 93 | 5 | 94 |
| 24.5 | | | 1 | 101 | | | | | 1 | 105 | | | | | 1 | 101 | | | | | | | | | | | | | | | | | | | 11 | 109 | 4 | 104 | 6 | 100 |
| 25.0 | | | 3 | 109 | | | | | 3 | 108 | | | | | 4 | 113 | | | | | | | | | | | | | | | | | 2 | 119 | 22 | 113 | 7 | 108 | 21 | 105 |
| 25.5 | | | 1 | 111 | | | | | 6 | 119 | | | | | 1 | 116 | 2 | 118 | | | | | | | | | | | | | | | 1 | 120 | 13 | 119 | 16 | 115 | 14 | 113 |
| 26.0 | | | 3 | 116 | | | | | 13 | 120 | | | | | 8 | 118 | 5 | 124 | | | | | | | | | | | | | | | 8 | 126 | 17 | 124 | 9 | 121 | 16 | 117 |
| 26.5 | | | 4 | 122 | | | | | 8 | 128 | | | | | 5 | 125 | 4 | 131 | | | | | | | | | | | | | | | 7 | 131 | 11 | 132 | 10 | 129 | 12 | 122 |
| 27.0 | | | 8 | 138 | | | | | 13 | 133 | | | | | 15 | 132 | 12 | 135 | 2 | 141 | | | | | | | | | | | | | 15 | 140 | 8 | 135 | 10 | 133 | 5 | 134 |
| 27.5 | | | 6 | 136 | | | | | 13 | 140 | | | | | 13 | 140 | 22 | 146 | 1 | 139 | | | | | | | | | | | | | 1 | 156 | 11 | 151 | 2 | 134 | 8 | 149 | 7 | 132 |
| 28.0 | | | 3 | 143 | | | | | 12 | 145 | | | | | 13 | 147 | 13 | 151 | 2 | 149 | | | | | | | 1 | 164 | | | | | 2 | 159 | 17 | 159 | 4 | 157 | 5 | 143 | 5 | 145 |
| 28.5 | | | 6 | 157 | | | | | 9 | 155 | | | | | 9 | 153 | 10 | 158 | 2 | 159 | | | | | | | | | | | | | | | 4 | 161 | | | 6 | 159 | 4 | 152 |
| 29.0 | | | 4 | 167 | | | | | 4 | 170 | | | | | 5 | 158 | 10 | 170 | 5 | 171 | | | | | | | 2 | 159 | | | | | | | 12 | 176 | | | 8 | 167 | | |
| 29.5 | | | 1 | 165 | | | | | 3 | 168 | | | | | 3 | 167 | 9 | 174 | 2 | 173 | | | 1 | 169 | | | 1 | 190 | | | | | | | 10 | 181 | 2 | 175 | 3 | 169 | | |
| 30.0 | | | 4 | 186 | | | | | 5 | 181 | | | 1 | 162 | 8 | 173 | 4 | 186 | 2 | 191 | | | 2 | 178 | | | | | | | | | | | 6 | 195 | | | 3 | 186 | | |
| 30.5 | | | 3 | 191 | | | | | 4 | 182 | | | | | 6 | 184 | 5 | 184 | 2 | 193 | 1 | 205 | 2 | 194 | | | 4 | 206 | | | | | | | 2 | 190 | | | | | | |
| 31.0 | | | 1 | 198 | | | | | 1 | 184 | | | | | 2 | 194 | 4 | 185 | 5 | 205 | | | 7 | 206 | | | 2 | 211 | | | | | | | 3 | 205 | | | | | | |
| 31.5 | | | 1 | 197 | | | | | 3 | 204 | | | | | 1 | 203 | | | 6 | 206 | | | 8 | 212 | 2 | 218 | 2 | 208 | | | | | | | 2 | 211 | 1 | 104 | 2 | 228 | | |
| 32.0 | | | | | | | | | | | | | | | 2 | 204 | | | 9 | 232 | 5 | 224 | 11 | 221 | | | | | | | | | | | | | | 1 | 220 | | |
| 32.5 | | | 1 | 228 | | | | | | | | | | | 2 | 221 | | | 5 | 240 | 4 | 254 | 15 | 237 | | | 2 | 241 | | | | | | | | | | | | | |
| 33.0 | | | | | | | | | | | | | | | | | | | 7 | 245 | 4 | 244 | 10 | 245 | | | | | | | | | | | | | | 1 | 236 | | |
| 33.5 | | | | | | | | | | | | | | | 2 | 233 | | | 12 | 256 | 3 | 261 | 10 | 258 | | | | | | | | | | | | | | | | | |
| 34.0 | | | | | | | | | | | | | | | | | | | 6 | 278 | 3 | 270 | 5 | 274 | | | | | | | | | | | | | | | | | |
| 34.5 | | | | | | | | | | | | | | | | | | | 7 | 267 | 6 | 285 | 6 | 272 | | | | | | | | | | | | | | | | | |
| 35.0 | | | | | | | | | | | | | | | | | | | 2 | 296 | 3 | 274 | 8 | 286 | | | | | | | | | | | | | | | | | |
| 35.5 | | | | | | | | | | | | | | | | | | | | | 4 | 307 | 4 | 307 | | | | | | | | | | | | | | | | | |
| 36.0 | | | | | | | | | | | | | | | | | | | 3 | 337 | 7 | 315 | 3 | 317 | | | | | | | | | | | | | | | | | |
| 36.5 | | | | | | | | | | | | | | | | | | | 2 | 330 | 5 | 335 | 2 | 333 | | | 1 | 317 | | | | | | | | | | | | | |
| 37.0 | | | | | | | | | | | | | | | | | | | 7 | 339 | 14 | 334 | 2 | 313 | | | 1 | 336 | | | | | | | | | | | | | |
| 37.5 | | | | | | | | | | | | | | | | | | | 5 | 358 | 14 | 348 | | | | | | | | | | | | | | | | | | | |
| 38.0 | | | | | | | | | | | | | | | | | | | 4 | 359 | 13 | 361 | 2 | 396 | | | | | | | | | | | | | | | | | |
| 38.5 | | | | | | | | | | | | | | | | | | | 1 | 365 | 9 | 380 | 1 | 406 | | | | | | | | | | | | | | | | | |
| 39.0 | | | | | | | | | | | | | | | | | | | 1 | 345 | 5 | 384 | | | | | | | | | | | | | | | | | | | |
| 39.5 | | | | | | | | | | | | | | | | | | | | | | | 1 | 370 | | | | | | | | | | | | | | | | | |
| 40.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SUM | 50 | | 50 | | 2 | | 23 | | 100 | | 50 | | 1 | | 100 | | 100 | | 100 | | 100 | | 100 | | 2 | | 16 | | 50 | | 3 | | 100 | | 100 | | 100 | | 100 | |
| MEAN W. | | 37.8 | | 148.8 | | 0.0 | | 0 0 | | 142 2 | | 33 5 | | 162 0 | | 150.1 | | 154.3 | | 254.5 | | 321.3 | | 254.0 | | 218.0 | | 216.8 | | 37.0 | | 158.0 | | 159.0 | | 121.0 | | 135.4 | | 115.4 |
| MEAN l. | 19.1 | | 27.9 | | 20.5 | | 18.2 | | 27 5 | | 18 4 | | 30 0 | | 28.2 | | 28.2 | | 33.2 | | 36.2 | | 33.3 | | 31.5 | | 31.3 | | 18.2 | | 27.8 | | 28.1 | | 25.7 | | 26.8 | | 25.8 | |

*Table 6.1. Continued*

| DATE | 960517 | | 960517 | | 960517 | | 960518 | | 960518 | | 960519 | | 960519 | | 960520 | | 960521 | | 960521 | | 960521 | | 960521 | | 960522 | | 960522 | | 960522 | | 960525 | | 960525 | | 960527 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST.NO. | 316 | | 318 | | 319 | | 323 | | 324 | | 325 | | 328 | | 332 | | 333 | | 335 | | 336 | | 337 | | 339 | | 340 | | 343 | | 350 | | 351 | | 354 | |
| SPECIES: | BLUE WH | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | | HERRING | | BLUE WH | | HERRING | | HERRING | |
| cm | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) | n | w(g) |
| 15.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 17 | | | | |
| 15.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 10 | 19 | | | | |
| 16.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 10 | 21 | | | | |
| 16.5 | 1 | 27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 8 | 23 | | | | |
| 17.0 | 1 | 28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 19 | 26 | | | | |
| 17.5 | 4 | 31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 24 | 28 | | | | |
| 18.0 | 4 | 32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 14 | 31 | | | | |
| 18.5 | 4 | 36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 6 | 33 | | | | |
| 19.0 | 4 | 37 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 4 | 34 | | | | |
| 19.5 | 1 | 39 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 40 | 1 | 56 | | |
| 20.0 | 1 | 44 | | | | | | | | | | | | | | | | | | | | | 1 | 67 | | | | | | | 1 | 39 | 1 | 58 | 1 | 62 |
| 20.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 44 | 1 | 66 | 1 | 64 |
| 21.0 | 4 | 52 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 67 | 1 | 77 |
| 21.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 5 | 77 | | |
| 22.0 | | | 1 | 75 | | | | | | | | | | | | | | | | | | | 3 | 86 | | | | | | | | | 7 | 81 | | |
| 22.5 | | | | | | | | | | | | | | | | | | | | | | | 1 | 87 | | | | | | | | | 4 | 90 | 2 | 95 |
| 23.0 | 1 | 66 | 2 | 84 | | | | | | | | | | | | | | | | | | | 10 | 91 | | | | | | | | | 3 | 89 | | |
| 23.5 | | | 2 | 95 | | | | | | | | | | | | | | | | | | | 7 | 98 | 2 | 91 | 1 | 104 | | | | | 7 | 103 | 2 | 101 |
| 24.0 | | | 2 | 91 | | | | | | | | | | | | | | | | | | | 19 | 105 | 1 | 96 | 3 | 104 | | | | | 10 | 109 | 4 | 109 |
| 24.5 | | | 3 | 109 | | | | | | | | | | | | | | | | | | | 11 | 112 | 2 | 114 | 4 | 110 | | | | | 11 | 113 | 3 | 115 |
| 25.0 | | | 8 | 110 | | | | | | | | | | | | | | | | | | | 13 | 114 | 3 | 111 | 13 | 116 | | | | | 6 | 122 | 2 | 121 |
| 25.5 | | | 15 | 119 | | | | | | | | | | | | | | | | | | | 14 | 124 | 3 | 114 | 9 | 125 | | | | | 12 | 127 | 1 | 119 |
| 26.0 | | | 14 | 126 | | | | | | | | | | | | | 1 | 133 | | | | | 9 | 127 | 4 | 119 | 12 | 130 | | | | | 5 | 134 | 3 | 137 |
| 26.5 | | | 16 | 129 | | | | | | | | | | | | | | | | | | | 7 | 138 | 3 | 127 | 9 | 140 | | | | | 7 | 139 | | |
| 27.0 | | | 11 | 138 | | | | | | | | | | | | | | | | | | | 4 | 141 | 2 | 135 | 14 | 142 | | | | | 6 | 144 | | |
| 27.5 | | | 8 | 145 | | | | | | | | | | | | | | | | | | | 1 | 158 | 4 | 142 | 10 | 150 | | | | | 1 | 163 | 2 | 160 |
| 28.0 | | | 2 | 153 | | | | | | | | | | | | | 1 | 145 | | | 1 | 129 | | | 2 | 154 | 6 | 159 | | | | | 3 | 159 | 1 | 162 |
| 28.5 | | | 5 | 157 | 3 | | 1 | 167 | | | | | | | | | 4 | 157 | | | | | | | 2 | 160 | 6 | 168 | | | | | 3 | 162 | 5 | 165 |
| 29.0 | | | 3 | 163 | 1 | | 1 | 194 | 1 | 176 | | | | | | | 3 | 166 | 1 | 185 | | | | | 3 | 170 | 6 | 177 | | | | | 1 | 181 | 1 | 182 |
| 29.5 | | | 4 | 172 | | | 2 | 223 | 2 | 175 | | | 3 | 202 | | | 3 | 172 | 1 | 186 | | | | | 1 | 185 | 1 | 171 | | | | | 1 | 183 | 3 | 180 |
| 30.0 | | | 3 | 182 | | | 6 | 194 | 5 | 191 | | | 3 | 196 | 1 | 193 | 6 | 190 | | | | | | | | 2 | 188 | | | | | | | | |
| 30.5 | | | | | 1 | | 4 | 200 | 2 | 200 | | | 4 | 200 | | | 8 | 192 | | | | | | | 1 | 197 | | | | | | | | | | |
| 31.0 | | | | | 1 | | 10 | 211 | 9 | 201 | | | 4 | 219 | | | 4 | 205 | | | | | | | 1 | 193 | 2 | 201 | | | | | 1 | 219 | 1 | 202 |
| 31.5 | | | | | | | 14 | 217 | 16 | 212 | | | 6 | 233 | | | 4 | 206 | | | | | | | | | | | | | | | | | 1 | 202 |
| 32.0 | | | | | | | 12 | 227 | 14 | 224 | 2 | 224 | 9 | 237 | | | 4 | 215 | | | | | | | 1 | 221 | 1 | 211 | | | | | 1 | 197 | | |
| 32.5 | | | | | | | 9 | 242 | 14 | 233 | 2 | 239 | 3 | 295 | | | 1 | 219 | | | | | | | 1 | 229 | | | | | | | | | | |
| 33.0 | | | 1 | 216 | | | 13 | 250 | 8 | 243 | 7 | 265 | 7 | 260 | 1 | 258 | 1 | 235 | | | | | | | | | | | | | | | | | |
| 33.5 | | | | | | | 9 | 261 | 7 | 254 | 4 | 262 | 9 | 289 | | | | | | | | | | | | | | | | | | | | | | |
| 34.0 | | | | | | | 9 | 277 | 3 | 251 | 7 | 292 | 3 | 291 | | | 1 | 242 | | | | | | | | | | | | | | | | | | |
| 34.5 | | | | | | | 3 | 279 | 5 | 286 | 5 | 295 | 7 | 303 | | | | | | | | | | | | | | | | | | | | | | |
| 35.0 | 1 | 291 | | | | | | | 5 | 301 | 4 | 312 | 7 | 312 | | | 1 | 273 | | | | | | | | | | | | | | | | | | |
| 35.5 | | | | | | | 3 | 311 | | | 10 | 321 | 6 | 321 | | | | | | | | | | | 1 | 298 | | | 1 | 347 | | | | | | |
| 36.0 | | | | | | | | | 2 | 311 | 8 | 333 | 2 | 353 | | | | | | | | | | | | | | | | | | | | | | |
| 36.5 | | | | | | | 3 | 312 | 1 | 317 | 9 | 356 | 7 | 352 | | | 1 | 299 | | | | | | | | | | | | | | | | | | |
| 37.0 | | | | | | | | | 3 | 340 | 7 | 357 | 7 | 355 | | | 1 | 335 | | | | | | | | | | | | | | | | | | |
| 37.5 | | | | | | | | | 1 | 338 | 9 | 372 | 7 | 361 | | | 1 | 354 | | | | | | | | | | | | | | | | | | |
| 38.0 | | | | | | | | | | | 13 | 378 | 5 | 377 | | | 1 | 346 | | | | | | | | | 1 | 350 | | | | | | | | |
| 38.5 | | | | | | | | | 2 | 385 | 8 | 403 | | | | | 1 | 367 | | | | | | | | | | | | | | | | | | |
| 39.0 | | | | | | | | | | | 3 | 391 | 1 | 391 | | | | | | | | | | | | | | | | | | | | | | |
| 39.5 | | | | | | | 1 | 378 | | | 1 | 450 | | | | | | | | | | | | | | | | | | | | | | | | |
| 40.0 | | | | | | | | | | | 1 | 416 | | | | | | | | | | | | | | | | | | | | | | | | |
| SUM | 26 | | 100 | | 6 | | 100 | | 100 | | 100 | | 100 | | 2 | | 47 | | 2 | | 1 | | 100 | | 37 | | 100 | | 1 | | 100 | | 100 | | 34 | |
| MEAN W. | | 48.0 | | 131.4 | | 0.0 | | 240 0 | | 239 6 | | 337 0 | | 292.7 | | 225.5 | | 207.9 | | 185.5 | | 129.0 | | 112.8 | | 144.2 | | 143.3 | | 347.0 | | 27.0 | | 116.8 | | 134.7 |
| MEAN l. | 19.5 | | 26.5 | | 29.3 | | 32.4 | | 32 7 | | 36 1 | | 34 1 | | 31.5 | | 31.2 | | 29.3 | | 28.0 | | 24.7 | | 27.3 | | 26.9 | | 36.0 | | 17.7 | | 25.2 | | 26.4 | |

## Table 6.2. Age- and length distribution in the EU zone, May 1996.

| Length | Age (years) | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| cm | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15+ | Sum | Undet | Total | % |
| 25.0 | | | 1 | | | | | | | | | | | | | | 1 | 1 | 2 | 1.5 |
| 25.5 | | | | | 1 | | | | | | | | | | | | 1 | | 1 | .8 |
| 26.0 | | | | | 7 | | | | | | | | | | | | 7 | 1 | 8 | 6.1 |
| 26.5 | | | | | 6 | | | | | | | | | | | | 6 | 1 | 7 | 5.3 |
| 27.0 | | | | | 14 | 1 | | | | | | | | | | | 15 | 1 | 16 | 12.2 |
| 27.5 | | | | | 5 | 5 | | | | | | | | | | | 10 | 1 | 11 | 8.4 |
| 28.0 | | | | | 8 | 6 | | | | | | | | | | | 14 | 4 | 18 | 13.7 |
| 28.5 | | | | | 4 | 2 | | | | | | | | | | | 6 | 1 | 7 | 5.3 |
| 29.0 | | | | | 3 | 7 | | | | | | | | | | | 10 | 4 | 14 | 10.7 |
| 29.5 | | | | | | 9 | | | | | | | | | | | 9 | 2 | 11 | 8.4 |
| 30.0 | | | | | 1 | 10 | | | | | | | | | | | 11 | | 11 | 8.4 |
| 30.5 | | | | | | 5 | | | | | | | | | | | 5 | | 5 | 3.8 |
| 31.0 | | | | | 1 | 3 | 1 | | | | | | | | | | 5 | | 5 | 3.8 |
| 31.5 | | | | | 1 | 2 | 2 | | | | | | | | | | 5 | 1 | 6 | 4.6 |
| 32.0 | | | | | | 1 | | | | | | | | | | | 1 | | 1 | .8 |
| 32.5 | | | | | | 1 | | | | | | | | | | | 1 | | 1 | .8 |
| 33.0 | | | | | | | | | | | | | | | | | 0 | 2 | 2 | 1.5 |
| 33.5 | | | | | | | 1 | | | | | | | | | | 1 | 1 | 2 | 1.5 |
| 34.0 | | | | | | | 1 | | | | | | | | | | 1 | | 1 | .8 |
| 34.5 | | | | | | | | | | | | | | | | | 0 | 1 | 1 | .8 |
| 35.0 | | | | | | | | | | | | | | | | | 0 | 1 | 1 | .8 |
| Sum | 0 | 0 | 1 | 0 | 51 | 52 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 109 | 22 | 131 | 100.0 |
| % | .0 | .0 | .9 | .0 | 46.8 | 47.7 | 4.6 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | 100.0 | | | |
| Mean L | .0 | .0 | 25.3 | .0 | 27.7 | 29.7 | 32.5 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | 28.8 | 29.7 | 29.0 | |

## Table 6.3. Age- and length distribution in the Faroe zone, May 1996.

| Length | Age (years) | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| cm | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15+ | Sum | Undet | Total | % |
| 24.0 | | | | | 2 | | | | | | | | | | | | 2 | | 2 | .5 |
| 24.5 | | | | | 4 | | | | | | | | | | | | 4 | | 4 | 1.0 |
| 25.0 | | | | | 17 | | | | | | | | | | | | 17 | | 17 | 4.3 |
| 25.5 | | | | | 22 | | | | | | | | | | | | 22 | | 22 | 5.5 |
| 26.0 | | | | | 26 | | | | | | | | | | | | 26 | 3 | 29 | 7.3 |
| 26.5 | | | | 1 | 21 | | | | | | | | | | | | 22 | | 22 | 5.5 |
| 27.0 | | | | | 30 | 5 | | | | | | | | | | | 35 | 1 | 36 | 9.0 |
| 27.5 | | | | | 36 | 9 | | | | | | | | | | | 45 | | 45 | 11.3 |
| 28.0 | | | | | 28 | 8 | | | | | | | | | | | 36 | 1 | 37 | 9.3 |
| 28.5 | | | | | 13 | 14 | | | | | | | | | | | 27 | | 27 | 6.8 |
| 29.0 | | | | | 11 | 11 | | | | | | | | | | | 22 | 1 | 23 | 5.8 |
| 29.5 | | | | | 2 | 26 | | | | | | | | | | | 28 | | 28 | 7.0 |
| 30.0 | | | | | 2 | 18 | | | | | | | | | | | 20 | 1 | 21 | 5.3 |
| 30.5 | | | | | 2 | 24 | | | | | | | | | | | 26 | 1 | 27 | 6.8 |
| 31.0 | | | | | 2 | 14 | 3 | | | | | | | | | | 19 | | 19 | 4.8 |
| 31.5 | | | | | | 10 | 3 | | | | | | | | | | 13 | | 13 | 3.3 |
| 32.0 | | | | | | 4 | 1 | | | | | | | | | | 5 | | 5 | 1.3 |
| 32.5 | | | | | | 4 | 3 | 1 | | | | | | | | | 8 | 1 | 9 | 2.3 |
| 33.0 | | | | | | 2 | 2 | | | | | | | | | | 4 | 1 | 5 | 1.3 |
| 33.5 | | | | | | | 4 | 1 | | | | | | | | | 5 | | 5 | 1.3 |
| 34.0 | | | | | | | | 1 | | | | | | | | | 1 | | 1 | .3 |
| 34.5 | | | | | | | 1 | | | | | | | | | | 1 | | 1 | .3 |
| 35.0 | | | | | | | | | | | | | | | | | 0 | | 0 | .0 |
| 35.5 | | | | | | | | | | | | | | | | | 0 | | 0 | .0 |
| 36.0 | | | | | | | | | | | | | | | | | 0 | | 0 | .0 |
| 36.5 | | | | | | | | | | | | | | | | | 0 | | 0 | .0 |
| 37.0 | | | | | | | | | | | | | | | | | 0 | | 0 | .0 |
| 37.5 | | | | | | | | | | | | | | 1 | | | 1 | | 1 | .3 |
| 38.0 | | | | | | | | | | | | | | 1 | | | 1 | | 1 | .3 |
| Sum | 0 | 0 | 0 | 1 | 218 | 149 | 17 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 390 | 10 | 400 | 100.9 |
| % | .0 | .0 | .0 | .3 | 55.9 | 38.2 | 4.4 | .8 | .0 | .0 | .0 | .0 | .0 | .5 | .0 | .0 | 100.1 | | | |
| Mean L | .0 | .0 | .0 | 26.8 | 27.2 | 30.0 | 32.7 | 33.6 | .0 | .0 | .0 | .0 | .0 | 38.0 | .0 | .0 | 28.6 | 29.0 | 28.6 | |

## Table 6.4. Age- and length distribution in the Icelandic zone, May 1996.

| Length | Age (years) | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| cm | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15+ | Sum | Undet | Total | % |
| 30.0 | | | | | | 2 | | | | | | | | | | | 2 | | 2 | 2.0 |
| 30.5 | | | | | | 3 | | | | | | | | | | | 3 | | 3 | 3.0 |
| 31.0 | | | | | | 10 | | | | | | | | | | | 10 | | 10 | 10.0 |
| 31.5 | | | | | | 7 | 3 | | | | | | | | | | 10 | | 10 | 10.0 |
| 32.0 | | | | | | 6 | 4 | | | | | | | | | | 10 | | 10 | 10.0 |
| 32.5 | | | | | | 2 | 4 | 2 | | | | | | | | | 8 | 1 | 9 | 9.0 |
| 33.0 | | | | | | | 5 | | | | | | | | | | 5 | 1 | 6 | 6.0 |
| 33.5 | | | | | | | 1 | | | | | | | | | | 1 | 2 | 3 | 3.0 |
| 34.0 | | | | | | | 2 | 3 | | | | | | | | | 5 | 1 | 6 | 6.0 |
| 34.5 | | | | | | | 2 | 6 | | | | | | | | | 8 | | 8 | 8.0 |
| 35.0 | | | | | | | | 5 | 1 | | | | | | | | 6 | 1 | 7 | 7.0 |
| 35.5 | | | | | | | | | 2 | | | | | | | | 2 | 2 | 4 | 4.0 |
| 36.0 | | | | | | | | | | | | | | 1 | | | 1 | 1 | 2 | 2.0 |
| 36.5 | | | | | | | | | 2 | | | | | 1 | | | 3 | | 3 | 3.0 |
| 37.0 | | | | | | | | | | | | | | 9 | | | 9 | | 9 | 9.0 |
| 37.5 | | | | | | | | | | | | | | 4 | | | 4 | | 4 | 4.0 |
| 38.0 | | | | | | | | | | | | | | 3 | | | 3 | 1 | 4 | 4.0 |
| Sum | 0 | 0 | 0 | 0 | 0 | 30 | 21 | 16 | 5 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 90 | 10 | 100 | 100.0 |
| % | .0 | .0 | .0 | .0 | .0 | 33.3 | 23.3 | 17.8 | 5.6 | .0 | .0 | .0 | .0 | 20.0 | .0 | .0 | 100.0 | | | |
| Mean L | .0 | .0 | .0 | .0 | .0 | 31.5 | 33.0 | 34.6 | 36.0 | .0 | .0 | .0 | .0 | 37.4 | .0 | .0 | 33.9 | 34.9 | 34.0 | |

## Table 6.5. Age- and length distribution in the Jan Mayen zone, May 1996.

| Length | Age (years) | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| cm | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15+ | Sum | Undet | Total | % |
| 28.5 | | | | | 1 | | | | | | | | | | | | 1 | | 1 | .3 |
| 29.0 | | | | | | | | | | | | | | | | | 0 | 2 | 2 | .5 |
| 29.5 | | | | | 1 | 2 | | | | | | | | | | | 3 | 4 | 7 | 1.8 |
| 30.0 | | | | | 2 | 3 | | | | | | | | | | | 5 | 9 | 14 | 3.5 |
| 30.5 | | | | | | 6 | | | | | | | | | | | 6 | 4 | 10 | 2.5 |
| 31.0 | | | | | | 12 | | | | | | | | | | | 12 | 11 | 23 | 5.8 |
| 31.5 | | | | | 1 | 11 | 5 | | | | | | | | | | 17 | 19 | 36 | 9.0 |
| 32.0 | | | | | 2 | 12 | 6 | | | | | | | | | | 20 | 17 | 37 | 9.3 |
| 32.5 | | | | | | 6 | 11 | | | | | | | | | | 17 | 11 | 28 | 7.0 |
| 33.0 | | | | | | 3 | 8 | 1 | | | | | | | | | 12 | 23 | 35 | 8.8 |
| 33.5 | | | | | | 3 | 9 | 3 | | | | | | | | | 15 | 14 | 29 | 7.3 |
| 34.0 | | | | | | 2 | 10 | 3 | | | | | | | | | 15 | 7 | 22 | 5.5 |
| 34.5 | | | | | | | 4 | 5 | | | | | | | | | 9 | 11 | 20 | 5.0 |
| 35.0 | | | | | | | 2 | | 1 | | | | | | | | 3 | 13 | 16 | 4.0 |
| 35.5 | | | | | | | 1 | 3 | 3 | 1 | | | | | | | 8 | 11 | 19 | 4.8 |
| 36.0 | | | | | | | 2 | 1 | | | | | | 2 | | | 5 | 7 | 12 | 3.0 |
| 36.5 | | | | | | | | 3 | | | | 3 | | 3 | | | 9 | 11 | 20 | 5.0 |
| 37.0 | | | | | | | | | 1 | | | 1 | | 6 | | | 8 | 9 | 17 | 4.3 |
| 37.5 | | | | | | | | | | | 1 | | | 12 | | | 13 | 4 | 17 | 4.3 |
| 38.0 | | | | | | | | | | | | | | 10 | | | 10 | 8 | 18 | 4.5 |
| 38.5 | | | | | | | | | | | | | | 3 | | | 3 | 7 | 10 | 2.5 |
| 39.0 | | | | | | | | 1 | | | | | | 1 | | | 2 | 2 | 4 | 1.0 |
| 39.5 | | | | | | | | | | | | | | 2 | | | 2 | | 2 | .5 |
| 40.0 | | | | | | | | | | | | | | 1 | | | 1 | | 1 | .3 |
| Sum | 0 | 0 | 0 | 0 | 7 | 60 | 58 | 20 | 5 | 1 | 1 | 4 | 0 | 40 | 0 | 0 | 196 | 204 | 400 | 100.5 |
| % | .0 | .0 | .0 | .0 | 3.6 | 30.6 | 29.6 | 10.2 | 2.6 | .5 | .5 | 2.0 | .0 | 20.4 | .0 | .0 | 100.0 | | | |
| Mean L | .0 | .0 | .0 | .0 | 30.8 | 31.9 | 33.5 | 35.2 | 36.0 | 35.8 | 37.8 | 36.9 | .0 | 37.9 | .0 | .0 | 34.1 | 34.0 | 34.1 | |

Table 6.6. Age- and length distribution in the International area, May 1996.

| Length cm | Age (years) 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15+ | Sum | Undet | Total | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24.5 | | | | | 1 | | | | | | | | | | | | 1 | | 1 | .1 |
| 25.0 | | | | | 4 | | | | | | | | | | | | 4 | | 4 | .5 |
| 25.5 | | | | | 3 | | | | | | | | | | | | 3 | | 3 | .4 |
| 26.0 | | | | | 12 | | | | | | | | | | | | 12 | 1 | 13 | 1.6 |
| 26.5 | | | | | 8 | 1 | | | | | | | | | | | 9 | | 9 | 1.1 |
| 27.0 | | | | | 27 | 4 | | | | | | | | | | | 31 | 2 | 33 | 4.0 |
| 27.5 | | | | | 36 | 5 | | | | | | | | | | | 41 | | 41 | 5.0 |
| 28.0 | | | | | 30 | 7 | | | | | | | | | | | 37 | 1 | 38 | 4.6 |
| 28.5 | | | | | 10 | 16 | | | | | | | | | | | 26 | 1 | 27 | 3.3 |
| 29.0 | | | | | 7 | 22 | | | | | | | | | | | 29 | 5 | 34 | 4.1 |
| 29.5 | | | | | 3 | 17 | | | | | | | | | | | 20 | 7 | 27 | 3.3 |
| 30.0 | | | | | 5 | 33 | | | | | | | | | | | 38 | 4 | 42 | 5.1 |
| 30.5 | | | | | 1 | 48 | 3 | | | | | | | | | | 52 | 4 | 56 | 6.8 |
| 31.0 | | | | | 1 | 48 | 5 | | | | | | | | | | 54 | 11 | 65 | 7.9 |
| 31.5 | | | | | 1 | 44 | 5 | 1 | | | | | | | | | 51 | 9 | 60 | 7.3 |
| 32.0 | | | | | | 13 | 14 | | | | | | | | | | 27 | 19 | 46 | 5.6 |
| 32.5 | | | | | | 15 | 31 | 1 | | | | | | | | | 47 | 16 | 63 | 7.7 |
| 33.0 | | | | | | 2 | 21 | 5 | | | | | | | | | 28 | 13 | 41 | 5.0 |
| 33.5 | | | | | | 2 | 20 | 9 | | | | | | | | | 31 | 7 | 38 | 4.6 |
| 34.0 | | | | | | | 9 | 8 | | | | | | | | | 17 | 7 | 24 | 2.9 |
| 34.5 | | | | | | | 7 | 6 | | | | | | | | | 13 | 10 | 23 | 2.8 |
| 35.0 | | | | | | | 5 | 8 | 2 | | | 1 | | | | | 16 | 4 | 20 | 2.4 |
| 35.5 | | | | | | | | 3 | 1 | | | | | 1 | | | 5 | 3 | 8 | 1.0 |
| 36.0 | | | | | | | | 3 | 1 | | | 1 | | 3 | | | 8 | 7 | 15 | 1.8 |
| 36.5 | | | | | | | | 1 | 2 | | | | | 5 | | | 8 | 2 | 10 | 1.2 |
| 37.0 | | | | | | | | | | | | 1 | | 15 | | | 16 | 8 | 24 | 2.9 |
| 37.5 | | | | | | | | | | | | | | 8 | | | 8 | 11 | 19 | 2.3 |
| 38.0 | | | | | | | | | | | | | | 7 | | | 7 | 13 | 20 | 2.4 |
| 38.5 | | | | | | | | | | | | | | 8 | | | 8 | 4 | 12 | 1.5 |
| 39.0 | | | | | | | | | | | | | | 1 | | | 1 | 5 | 6 | .7 |
| 39.5 | | | | | | | | | | | | | | 1 | | | 1 | | 1 | .1 |
| Sum | 0 | 0 | 0 | 0 | 149 | 277 | 120 | 45 | 6 | 0 | 0 | 3 | 0 | 49 | 0 | 0 | 649 | 174 | 823 | 100.0 |
| % | .0 | .0 | .0 | .0 | 23.0 | 42.7 | 18.5 | 6.9 | .9 | .0 | .0 | .5 | .0 | 7.6 | .0 | .0 | 100.1 | | | |
| Mean L | .0 | .0 | .0 | .0 | 27.8 | 30.7 | 33.1 | 34.5 | 36.0 | .0 | .0 | 36.3 | .0 | 37.7 | .0 | .0 | 31.3 | 33.9 | 31.9 | |

Table 6.7. Age- and length distribution in the Norwegian zone, May 1996.

| Length cm | Age (years) 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15+ | Sum | Undet | Total | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20.0 | | | | | | | | | | | | | | | | | 0 | 1 | 1 | .1 |
| 20.5 | | | 1 | | | | | | | | | | | | | | 1 | | 1 | .1 |
| 21.0 | | | | | | | | | | | | | | | | | 0 | | 0 | .0 |
| 21.5 | | | | | | | | | | | | | | | | | 0 | | 0 | .0 |
| 22.0 | | | | 1 | | | | | | | | | | | | | 1 | 4 | 5 | .4 |
| 22.5 | | | | 2 | | | | | | | | | | | | | 2 | 2 | 4 | .3 |
| 23.0 | | | | 7 | 3 | | | | | | | | | | | | 10 | 7 | 17 | 1.3 |
| 23.5 | | | 1 | 5 | 8 | | | | | | | | | | | | 14 | 12 | 26 | 2.0 |
| 24.0 | | | 2 | 1 | 13 | | | | | | | | | | | | 16 | 25 | 41 | 3.2 |
| 24.5 | | | 1 | 2 | 24 | | | | | | | | | | | | 27 | 30 | 57 | 4.4 |
| 25.0 | | | 2 | 2 | 66 | | | | | | | | | | | | 70 | 45 | 115 | 8.9 |
| 25.5 | | | 2 | 1 | 79 | | | | | | | | | | | | 82 | 51 | 133 | 10.3 |
| 26.0 | | | 2 | 2 | 88 | 4 | | | | | | | | | | | 96 | 44 | 140 | 10.9 |
| 26.5 | | | | 2 | 77 | 7 | | | | | | | | | | | 86 | 36 | 122 | 9.5 |
| 27.0 | | | | | 91 | 7 | | | | | | | | | | | 98 | 45 | 143 | 11.1 |
| 27.5 | | | | 2 | 72 | 12 | | | | | | | | | | | 86 | 18 | 104 | 8.1 |
| 28.0 | | | | 1 | 51 | 13 | 1 | | | | | | | | | | 66 | 22 | 88 | 6.8 |
| 28.5 | | | | | 38 | 20 | | | | | | | | | | | 58 | 16 | 74 | 5.7 |
| 29.0 | | | | | 16 | 27 | | | | | | | | | | | 43 | 13 | 56 | 4.3 |
| 29.5 | | | | | 6 | 23 | | | | | | | | | | | 29 | 9 | 38 | 3.0 |
| 30.0 | | | | | 2 | 28 | 1 | | | | | | | | | | 31 | 9 | 40 | 3.1 |
| 30.5 | | | | | 2 | 22 | 1 | | | | | | | | | | 25 | 2 | 27 | 2.1 |
| 31.0 | | | | | 1 | 10 | 1 | | | | | | | | | | 12 | 2 | 14 | 1.1 |
| 31.5 | | | | | | 12 | 1 | | | | | | | | | | 13 | 1 | 14 | 1.1 |
| 32.0 | | | | | | 4 | 3 | 1 | | | | | | | | | 8 | 2 | 10 | .8 |
| 32.5 | | | | 1 | | 2 | 1 | | | | | | | | | | 4 | 1 | 5 | .4 |
| 33.0 | | | | | | 1 | 1 | 1 | | | | | | | | | 3 | | 3 | .2 |
| 33.5 | | | | | | | | | | | | | | | | | 0 | | 0 | .0 |
| 34.0 | | | | | | | | 1 | | | | | | | | | 1 | | 1 | .1 |
| 34.5 | | | | | | | | | | | | | | | | | 0 | | 0 | .0 |
| 35.0 | | | | | | | 1 | | | | | | | | | | 1 | | 1 | .1 |
| 35.5 | | | | | | | | | | | | | | | | | 0 | | 0 | .0 |
| 36.0 | | | | | | | | 1 | | | | | | 1 | | | 2 | | 2 | .2 |
| 36.5 | | | | | | | | 1 | | | | | | | | | 1 | | 1 | .1 |
| 37.0 | | | | | | | | | | | | | | 1 | | | 1 | | 1 | .1 |
| 37.5 | | | | | | | | | | | | | | 1 | | | 1 | | 1 | .1 |
| 38.0 | | | | | | | | | | | | | | 2 | | | 2 | | 2 | .2 |
| 38.5 | | | | | | | | | | | | | | 1 | | | 1 | | 1 | .1 |
| Sum | 0 | 0 | 11 | 29 | 637 | 192 | 11 | 5 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 891 | 397 | 1288 | 100.2 |
| % | .0 | .0 | 1.2 | 3.3 | 71.5 | 21.5 | 1.2 | .6 | .0 | .0 | .0 | .0 | .0 | .7 | .0 | .0 | 100.0 | | | |
| Mean L | .0 | .0 | 24.8 | 24.9 | 26.8 | 29.6 | 31.8 | 34.5 | .0 | .0 | .0 | .0 | .0 | 37.8 | .0 | .0 | 27.5 | 26.4 | 27.2 | |

# 7. Herring migration

Twenty-five schools were tracked for up to 30 min during the cruise. The schools were distributed all over the survey area, and occurred at depths from about 20 m to about 300 m. Similarly, the swimming behaviour of the schools varied considerably. The migration direction varied from 47° to 285° and the migration speed from 0.07 m $s^{-1}$ up to 1.28 m $s^{-1}$. South of 66° north it seems not to be clear tendencies in the migration behaviour of the schools, and even schools recorded in nearby positions were swimming in opposite directions, one east, the other west (Fig. 7.1.). North of 66° north most schools were heading in an easterly direction (Fig. 7.1.). This may indicate that the easterly heading schools north of 66° had started migrating back to the Norwegian coast, while the schools south of 66° north were swimming around in various directions searching for prey. Three of the four schools recorded off northern Norway (position 71° north, 15° 40' east) were heading in a southern direction, and one was heading straigth west at a speed of 1.28 m $s^{-1}$. The schools occurred at about 250 m depth and seem to be on a migration out of the western Barents Sea and into the eastern Norwegian Sea.

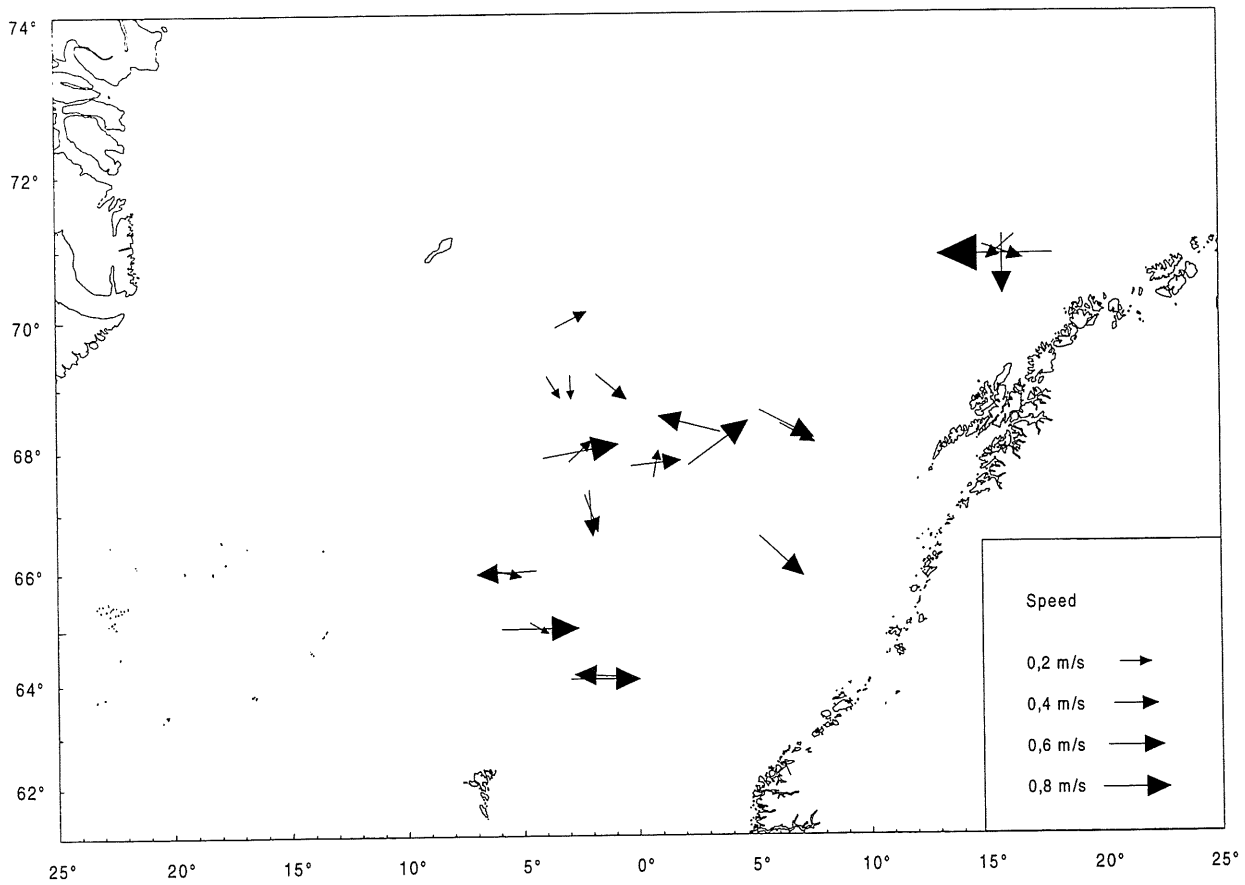


*Figure 7.1. Migration direction and speed of selected herring schools tracked for 30 minutes.*

## 8. Other pelagic fish

The geographical distribution of blue whiting is shown in Figure 8.1, and the length distribution is given in Table 6.1.

In Table 6.1 the length distribution of blue whiting is shown. The catches mostly consisted of one year old immature fish. The length varied from 15 to 35 cm. Twenty stomachs were frozen for content examination.

Lumpsucher were found on 44 trawl stations and the length varied from 5 to 46 cm.

In the northwestern part of the International area two salmon were caught. One species was 71 cm and the other 80 cm, total weight 6,93 kg.

Totally five 0-group capelin were found, two species in the International area, and three in the Jan Mayen zone. The length varied from 42 to 70 mm.

At trawl station PT 352, north in the Norwegian zone, two 0-group cod were caught, length 28 and 31 mm.

In the stepwise deep tows at the four «Mare Cognitum» stations there were catches of lanternfish, *Paralepis,* and pearlside from totally 0,04 -2,9 kg (average 1,1 kg in 6 catches).

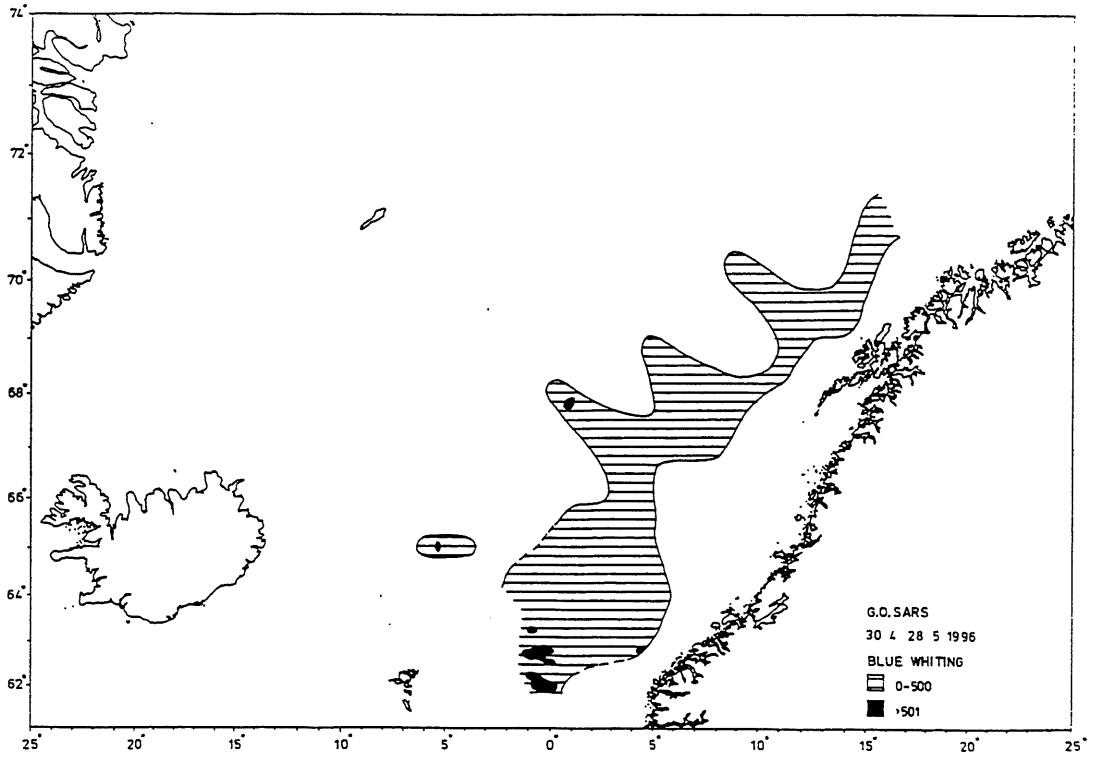


*Figure 8.1. Distribution of blue whiting recorded by R/V «G.O.Sars» 29/4 - 27/5 1996.*

# 9. Zooplankton distribution and abundance

## Water samples

Water bottle samples were taken from 0, 10, 20, 30, 50, 100 and 500 m (also 1000 m on the Svinøy transect and 1500 m on the Gimsøy transect) on nearly all CTD-stations. Nutrient salts were sampled from all depths except 0 m, and chlorophyll samples was taken on most stations in 0, 10, 30, 50 and 100 m. Samples for phytoplankton counts were taken on the transects. All analysis will be conducted in laboratory at the Institute of Marine Research in Bergen.

## Zooplankton

### Methods

A standard WP2-net with 180 µm mesh was hauled vertically in 200-0 m on all stations with CTD on the Svinøy transect and the Gimsøy transect. A $1m^2$ MOCNESS, also with 180 µm mesh, was used on trawl stations with surface trawl. On these "short" stations the upper 200 m was covered with four of the nets: 200-100 m, 100-50 m, 50-25 m and 25-0 m. During "long" stations including two deep trawls the water column was covered to 700 m: 700-500 m, 500-400 m, 400-300 m, 300-200 m, 200-100 m, 100-50 m, 50-25 m and 25-0 m.
The plankton samples were divided for formaldehyde preservation and biomass purposes. The size of the subsamples were usually 1/2, very large samples were divided down to 1/8 or 1/16. The biomass sample was sieved on a 2000 µm, 1000 µm and a 180 µm mesh respectively to obtain three size fractions of plankton. The fractions were transferred to preweighed aluminium trays. Krill, shrimps and fish were removed from the 2000 µm fraction and placed in separate trays. Dominating species or taxonomic groups from each category were noted. The samples were placed in oven and dried for later dry weight determinations. To obtain a preliminary estimate of the plankton biomass during the cruise to be used in this report, the volumes of the plankton in the plankton sample bottles were measured after the plankton had sedimented to the bottom. The results are presented in this report as "sedimentation volumes" ($ml/m^3$ seawater) after correction for size of subsamples and amounts of water filtrated through each of the MOCNESS nets. Compared to dry weight measurements these volumes will tend to overestimate samples containing e.g. small medusae and arrow worms. However, copepods constituted the far more important component, and the volume estimates will serve the purpose to display the trends of distribution, both vertically and horizontally. Ctenophores and jellyfishes are not included in the plankton volumes as these categories were removed from the samples.

### Species composition

The general characters of the plankton composition can be described with little plankton in east along the coast of Norway and in the central area south of 69°N, and rich plankton in the east and north at the border to colder water masses. In the area with low zooplankton concentrations was a relatively narrow zone with high phytoplankton concentration (*Phaeocystis* sp.), reaching to the shore at the Gimsøy transect. In the same area was also presence of ctenophores. Both categories caused some clogging of the plankton nets. Blooms

of *Phaeocystis*, however, were restricted to few stations. The zooplankton was always poor when the phytoplankton dominated.

*Meganyctiphanes norvegica* (20-30 mm) and *Thysanoessa longicaudata* (10-15 mm) were both common krill species in the MOCNESS-samples. *M. norvegica* was mainly observed in the southern area of investigation, typically at depth 100-200 m. This large and very mobile species avoid smaller plankton gears and is not representatively caught in the MOCNESS. Krill was often observed in shoals on echo registrations, and the presence was verified in trawl catches, especially when a Harstad trawl with a fine meshed inner net was used.

*Calanus finmarchicus* (4 mm) was the far most common and abundant copepod in all samples. When going to the west there was usually a marked transition to large concentrations of plankton where *C. finmarchicus* dominated completely. Here it appeared dark red and was highly abundant in the upper 25 m, sometimes in the 50-25 m layer as well. 100 $m^3$ of seawater often contained as much as 1 liter of this species. Along the cold water front in west the plankton was characterised by a strong presence of the larger *C. hyperboreus* (10 mm) which is a cold water form coming to the surface in arctic water masses. It appeared generally together with *C. finmarchicus*, but in lower concentrations.

Other copepods. The large carnivorous *Euchaeta norvegica* was common at depths below 100 m. *Metridia longa* was also a common in the samples. Among the smaller copepod genera less than 1 mm *Pseudocalanus*, *Microcalanus* and *Oithona* should be mentioned.

Arrow worms, probably *Sagitta elegans*, was always present at intermediate and lower depths. Large hyperid amphipods (*Themisto* sp.) were rare in the MOCNESS-samples, while individuals measuring 10 mm and less occurred frequently without contributing significantly to the biomass. Large amphipods were often found in the trawl catches together with large krill.
*Aglantha digitale* (10-15 mm) was a common hydromedusae at a few stations, and *Beroe* sp. was probably the most abundant ctenophore but was difficult to quantify.
The pteropod *Limacina retroversa* was identified but was not common, and the naked gastropod *Clione limacina* occurred in some samples.

Biomass distributions

Horizontal distribution of sedimented plankton volumes, $ml/m^3$, as weighed mean values for 200-0 m is shown in fig. 1. The large values in west and north reflect the strong presence of *C. finmarchicus*. In 25-0 m its influence is much more pronounced (fig. 2), while it is not so evident in 50-25 m (fig. 3).
Table 1. displays the plankton volumes at all MOCNESS depth intervals and stations, and the depth profiles are shown in sequence in fig. 4.

*Table 9.1. Sedimentation volumes of zooplankton in the upper 200 m, based on MOCNESS-samples.*

| | Lat. | Lat. | Long. | Long. | East/ | Zooplankton sedimentation volumes (ml/m3) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Station | degr. | min. | degr. | min. | West | 700-500m | 500-400m | 400-300m | 300-200m | 200-100m | 100-50m | 50-25m | 25-0m | Mean 200-0m | Remarks |
| 241 | 62 | 57.4 | 3 | 55 | E | 0.19 | 0.43 | 0.24 | 0.18 | 0.09 | 0.20 | 0.41 | | 0.14 | |
| 246 | 63 | 39.8 | 2 | 20.3 | E | 0.33 | 0.64 | 0.42 | 0.09 | 0.35 | 0.57 | 2.56 | 1.57 | 0.83 | |
| 251 | 63 | 35 | 0 | 1.6 | W | | | | | 0.35 | 1.71 | 2.27 | 1.70 | 1.10 | |
| 253 | 62 | 28 | 0 | 4.3 | W | | | | | 0.43 | 0.34 | 1.03 | 2.56 | 0.75 | |
| 255 | 62 | 25.1 | 1 | 4.6 | W | | | | | 0.13 | 0.54 | 0.60 | 0.56 | 0.34 | |
| 256 | 63 | 33 | 1 | 4 | W | | | | | 0.29 | 0.27 | 0.64 | 1.15 | 0.44 | |
| 257 | 64 | 3 | 1 | 23.5 | W | | | | | 0.55 | 0.19 | 0.24 | 0.26 | 0.39 | |
| 259 | 65 | 0 | 3 | 5 | W | | | | | 1.02 | 1.29 | 0.68 | 0.77 | 1.02 | |
| 260 | 65 | 0 | 5 | 6.5 | W | | | | | 0.66 | 0.71 | 0.33 | 0.56 | 0.62 | |
| 262 | 65 | 0 | 7 | 11 | W | | | | | 0.30 | 0.32 | 0.50 | 3.95 | 0.79 | |
| 263 | 66 | 0 | 7 | 0 | W | | | | | 0.81 | 0.99 | 9.50 | 14.44 | 3.65 | |
| 265 | 65 | 59.7 | 4 | 50 | W | 0.41 | 0.73 | 0.96 | 0.79 | 0.86 | 1.31 | 1.69 | 0.94 | 1.09 | |
| 267 | 66 | 2 | 0 | 29 | W | | | | | 0.69 | 0.98 | 2.76 | 2.06 | 1.19 | |
| 269 | 64 | 57 | 3 | 0 | E | | | | | 0.51 | 0.67 | 3.58 | 2.22 | 1.15 | |
| 270 | 64 | 28 | 4 | 18 | E | 0.29 | 0.90 | 0.64 | 0.69 | 0.72 | 0.59 | 0.67 | 0.88 | 0.70 | |
| 273 | 64 | 30 | 7 | 30 | E | | | | | 0.77 | 1.02 | 0.79 | 0.29 | 0.77 | |
| 274 | 65 | 0 | 6 | 0 | E | | | | | 0.73 | 0.51 | 1.04 | 1.11 | 0.76 | |
| 275 | 65 | 41 | 4 | 0 | E | | | | | 0.55 | 1.35 | 1.34 | 2.22 | 1.05 | |
| 276 | 66 | 20 | 2 | 0 | E | | | | | 3.22 | 3.87 | 4.00 | 3.62 | 3.53 | |
| 277 | 67 | 0 | 0 | 0 | E | | | | | 0.71 | 3.54 | 4.58 | 3.68 | 2.27 | |
| 278 | 67 | 0 | 2 | 0 | W | | | | | 0.78 | 0.81 | 1.94 | 2.50 | 1.15 | |
| 279 | 67 | 0 | 4 | 0 | W | | | | | 0.53 | 1.08 | 1.91 | 6.52 | 1.59 | |
| 280 | 67 | 0 | 6 | 0 | W | | | | | 0.48 | 0.38 | 9.71 | 4.71 | 2.14 | |
| 283 | 68 | 0 | 6 | 0 | W | | | | | 0.97 | 0.99 | 0.57 | 10.00 | 2.05 | |
| 284 | 68 | 0 | 4 | 0 | W | | | | | 0.36 | 0.45 | 5.07 | 6.10 | 1.69 | |
| 285 | 68 | 0.3 | 2 | 29.1 | W | | | **0.39** | 0.55 | 0.71 | 0.66 | 2.80 | 8.45 | 1.93 | **350-300m** |
| 286 | 68 | 0 | 0 | 0 | E | | | | | 0.75 | 1.28 | 2.00 | 2.62 | 1.27 | |
| 287 | 67 | 46.6 | 0 | 44.5 | W | | **0.34** | 0.52 | 0.45 | 0.53 | 3.79 | 3.72 | 2.88 | 2.04 | **450-400m** |
| 288 | 67 | 27 | 2 | 0 | E | | | | | 1.25 | 0.90 | 0.69 | 2.50 | 1.25 | |
| 289 | 66 | 53.3 | 4 | 2.7 | E | | | | | 0.66 | 1.61 | 2.17 | 3.27 | 1.41 | |
| 290 | 66 | 19 | 6 | 0 | E | | | | | 0.23 | 0.58 | 1.78 | 1.09 | 0.62 | |
| 293 | 67 | 0 | 10 | 0 | E | | | | | 0.19 | 1.60 | 0.25 | 0.29 | 0.56 | |
| 294 | 66 | 50 | 8 | 0 | E | | | | | 0.18 | 0.95 | 3.10 | 1.64 | 0.92 | |
| 295 | 67 | 27 | 6 | 0 | E | 0.63 | 0.62 | 0.34 | 0.29 | 0.50 | 1.00 | 1.38 | 1.33 | 0.84 | |
| 296 | 68 | 0 | 4 | 0 | E | | | | | 0.25 | 2.43 | 1.59 | 2.13 | 1.19 | |
| 297 | 68 | 30 | 2 | 0 | E | | | | | 0.44 | 0.59 | 1.80 | 3.85 | 1.07 | |
| 298 | 69 | 0 | 0 | 0 | E | | | | | 0.55 | 1.31 | 4.51 | 5.30 | 1.83 | |
| 299 | 69 | 2 | 1 | 6 | W | | | | | 0.98 | 1.03 | 1.17 | 0.94 | 1.01 | |
| 301 | 69 | 1 | 3 | 38 | W | | | | | 0.61 | 0.54 | 0.96 | 11.54 | 2.00 | |
| 302 | 69 | 0 | 5 | 0 | W | | | | | 0.60 | 0.41 | 4.79 | 8.22 | 2.03 | |
| 303 | 70 | 0 | 3 | 0 | W | | | | | 0.17 | 0.35 | 4.96 | 2.83 | 1.15 | |
| 305 | 70 | 45 | 2 | 0 | W | | | | | 0.30 | 0.47 | 6.49 | 2.04 | 1.33 | |
| 307 | 70 | 0 | 0 | 0 | E | | | | | 0.15 | 0.38 | 4.00 | 11.56 | 2.12 | |
| 308 | 69 | 34 | 2 | 0 | E | | | | | 0.29 | 0.26 | 0.65 | 11.91 | 1.78 | |
| 309 | 69 | 3 | 4 | 0 | E | | | | | 0.85 | 0.43 | 0.11 | 1.81 | 0.77 | |
| 310 | 68 | 33 | 6 | 0 | E | | | | | 1.16 | 2.14 | 3.61 | 6.53 | 2.38 | |
| 311 | 68 | 0 | 8 | 0 | E | | | | | 0.65 | 1.54 | 2.99 | 2.86 | 1.44 | |
| 312 | 67 | 30 | 10 | 0 | E | | | | | 0.78 | 0.97 | 1.03 | 0.27 | 0.79 | |
| 313 | 68 | 10 | 11 | 10 | E | | | | | | **1.13** | 0.81 | 0.80 | 0.48 | **120-50m** |
| 314 | 69 | 0 | 8 | 0 | E | | | | | 0.26 | 2.86 | 11.27 | 1.64 | 2.46 | |
| 315 | 69 | 30 | 6 | 0 | E | 0.35 | 0.53 | 0.53 | 0.91 | 0.43 | 0.87 | 4.21 | 16.92 | 3.07 | |
| 316 | 70 | 0 | 4 | 0 | E | | | | | | 2.98 | 1.45 | 0.81 | 1.03 | |
| 317 | 70 | 30 | 2 | 0 | E | | | | | 0.27 | 1.14 | 0.82 | 10.81 | 1.88 | |
| 318 | 70 | 30 | 5 | 0 | E | | | | | 0.15 | 0.31 | 1.17 | 11.82 | 1.77 | |
| 319 | 70 | 30 | 8 | 0 | E | | | | | 0.24 | 0.50 | 1.38 | 5.19 | 1.07 | |
| 321 | 69 | 42 | 10 | 16 | E | 0.45 | 0.19 | 0.25 | 0.24 | 0.31 | 0.38 | 0.77 | 12.57 | 1.92 | |
| 324 | 69 | 2 | 12 | 17 | E | | | | | 0.49 | 0.48 | 2.65 | 0.13 | 0.71 | |

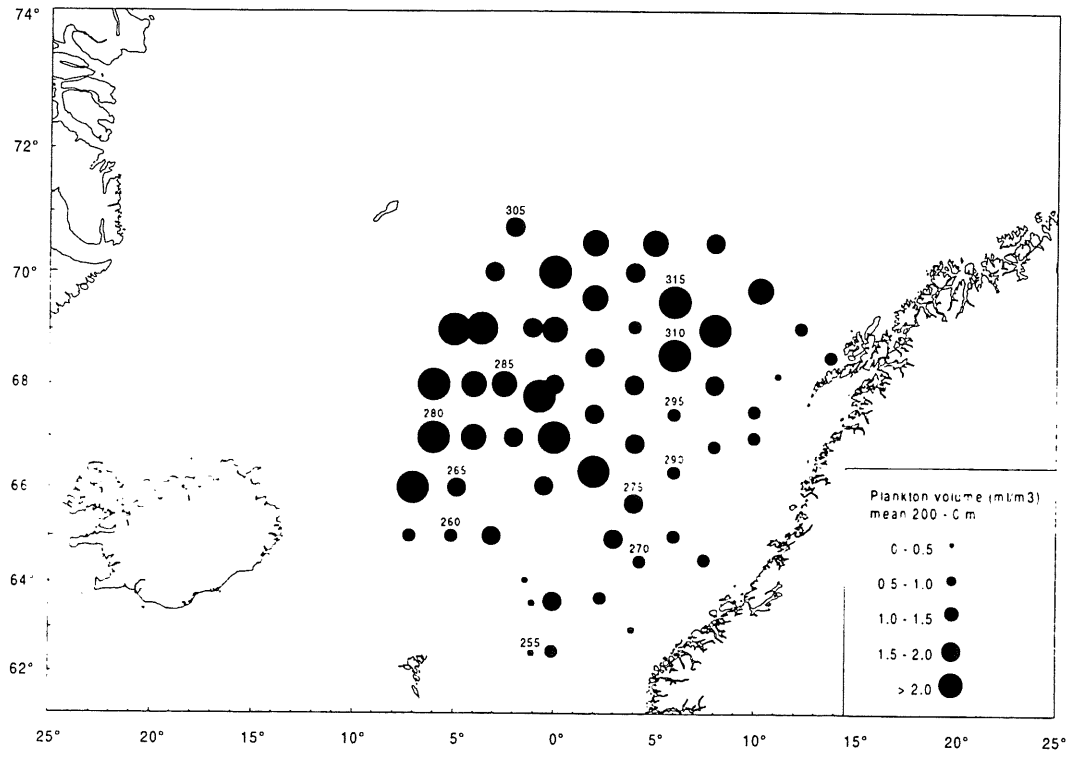


*Figure 9.1. Zooplankton volumes (ml/m3), weighed mean for 200-0 m.*

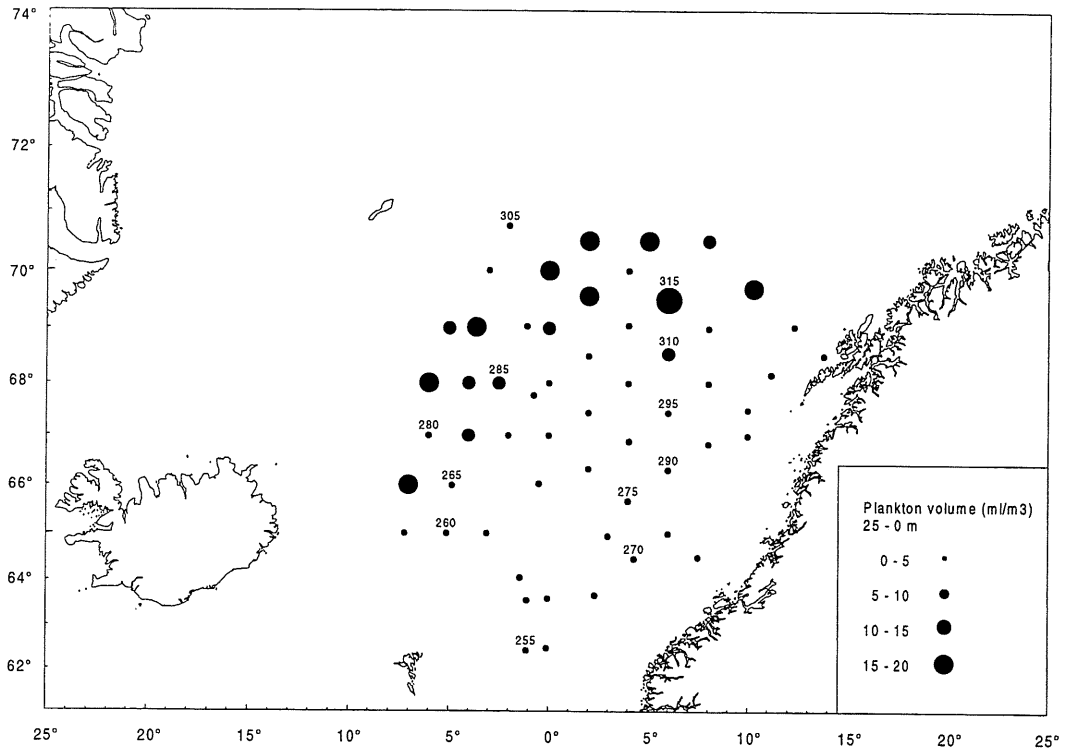


*Figure 9.2. Zooplankton volumes (ml/m$^3$) in 25-0 m.*

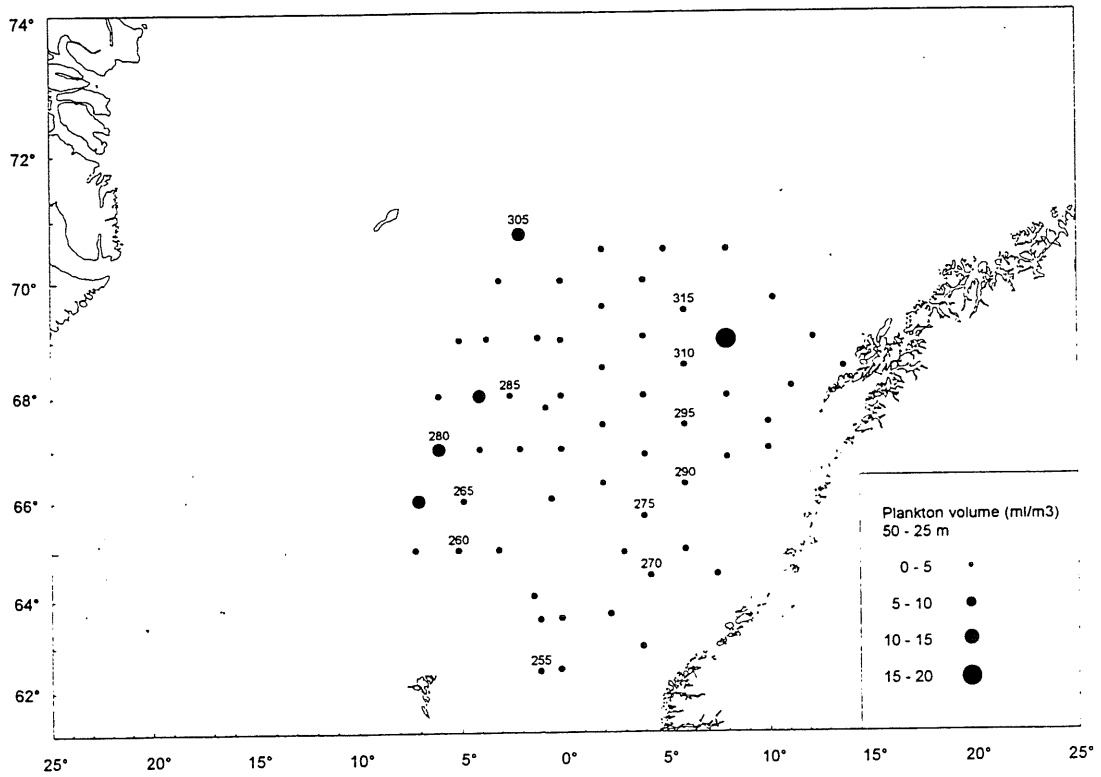


*Figure 9.3. Zooplankton volumes (ml/m$^3$) in 50-25 m.*

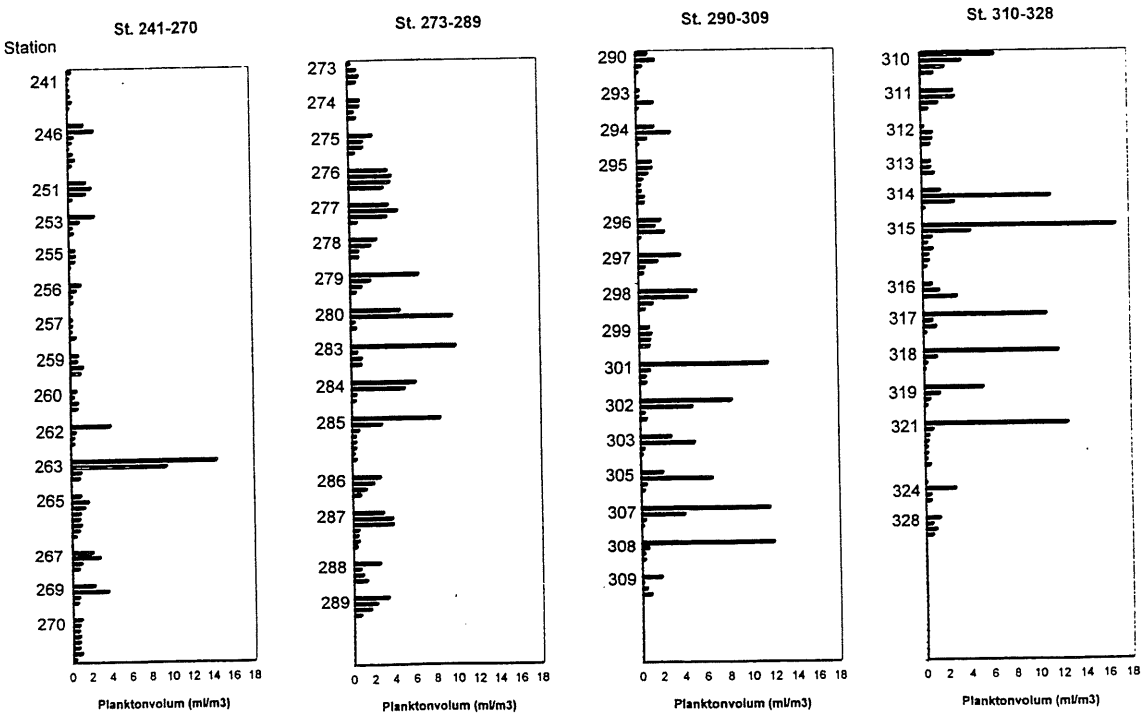


*Figure 9.4. Vertical distribution of zooplankton volumes (ml/m$^3$). Four columns cover 200-0 m, eight columns cover 700-0 m. Exceptions: See Table 1. Data based on MOCNESS-samples.*

## 10. Whale observations

As seen in fig. 10.1 six species of whales and one seal were observed in the period 30/4 - 28/5. The investigated area is known for being rich on whales, and fin whale, minke whale and sperm whale were observed most frequently during the cruise. During some of the observations two or more specimens were seen together. The white beaked dolphin always occurred in herds, the highest recorded number of individuals was 30.

When the occurrences of whales are compared to the distribution of plankton (tab. 10.1) it seems that the baleen whales (fin whale, minke whale and humpback whale) are found in areas with high abundance of *Calanus*. This area also coincided with high echo registrations of herring (tab. 10.1). The sperm whale is a toothed whale known to eat squid (*Gonatus*) which was frequently found in the trawl catches. Three of the four sperm whale observations were done west of the Lofoten area where this species is common.
The whales were observed from the wheelhouse of «G. O. Sars» by the crew who are doing these observations regularly. Some times the boat was stopped to observe more carefully, and each dive was recorded. These times usually many people observed, and the whales (fin whale and sperm whale) were recorded on video. Determination of the species was based on the characteristics of the blow and the shape of the head and the dorsal fin, and on size and colour of the animal. The sperm whale was also unique in resting still for an extended period after coming to the surface, and in pointing the the tail upwards prior to diving. For help in identification was used «Camphuysen, C.J. 1991. Hvalguide-Veiledning i bestemmelse av hval i de Nordøst-Atlantiske havområder. NINA temahefte 1:1-41».
The tendency for more observations in north may partly be a result of an intensified effort during the second part of the cruise, while the motivation for observing might be lower during the first part. The weather was also generally better for observing in the northern area with calm sea and midnight sun.

| Latitude | Longitude | E/W | Date | Species | Spesimen | Herring (SA-value) | Plankton/Krill (SA-verdi) |
|---|---|---|---|---|---|---|---|
| 66° 00' | 6° 02' | W | 05.05.96 | Humpback whale | 2 | >1000 | <50 |
| 65° 26' | 4° 52' | E | 09.05.96 | Killer Whale | 4 | >500 | >100 |
| 68° 00' | 6° 09' | W | 11.05.96 | Minke whale | 1 | ingen | <100 |
| 68° 00' | 2° 36' | W | 12.05.96 | Fin Whale | 4 | >500 | <50 |
| 68° 00' | 2° 27' | W | 12.05.96 | Fin Whale | 2 | >500 | <50 |
| 68° 00' | 0° 06' | W | 12.05.96 | Fin Whale | 2 | lite sild | >50 |
| 69° 00' | 2° 18' | W | 18.05.96 | Sperm Whale | 3 | >500 | >100 |
| 68° 50' | 3° 20' | W | 18.05.96 | Fin Whale | 2 | >500 | >50 |
| 70° 00' | 2° 50' | W | 19.05.96 | Minke whale | 5 | >1000 | >50 |
| 70° 00' | 2° 50' | W | 19.05.96 | White-beaked Dolphin | 8 | >1000 | >50 |
| 70° 44' | 1° 39' | W | 20.05.96 | Seal | 1 | ingen | >50 |
| 70° 45' | 0° 23' | W | 20.05.96 | Fin Whale | 1 | ingen | >50 |
| 70° 03' | 0° 11' | E | 20.05.96 | Fin Whale | 3 | ingen | >50 |
| 69° 40' | 1° 38' | E | 20.05.96 | Fin Whale | 2 | ingen | >50 |
| 69° 26 | 2° 29' | E | 20.05.96 | Fin Whale | 1 | >100 | >100 |
| 68° 32' | 9° 36' | E | 22.05.96 | Sperm Whale | 1 | >300 | >100 |
| 68° 55' | 8° 20' | E | 22.05.96 | Minke whale | 2 | <100 | >100 |
| 69° 27' | 6° 15' | E | 23.05.96 | White-beaked Dolphin | 30 | >100 | >100 |
| 69° 27' | 6° 11' | E | 23.05.96 | Fin Whale | 1 | >100 | >100 |
| 69° 50' | 4° 33' | E | 23.05.96 | Minke whale | 1 | ingen | >100 |
| 70° 30' | 2° 27' | E | 23.05.96 | Fin Whale | 1 | ingen | >100 |
| 70° 30' | 2° 35' | E | 23.05.96 | Fin Whale | 2 | ingen | >200 |
| 70° 30' | 2° 45' | E | 23.05.96 | Minke whale | 3 | ingen | >100 |
| 70° 31' | 4° 52' | E | 24.05.96 | Fin Whale | 1 (big !) | ingen | >100 |
| 70° 29' | 5° 23' | E | 24.05.96 | Fin Whale | 1 | ingen | >100 |
| 70° 29' | 5° 38' | E | 24.05.96 | White-beaked Dolphin | 15 | ingen | >100 |
| 62° 42' | 10° 16' | E | 24.05.96 | Fin Whale | 2 | ingen | >100 |
| 69° 15' | 11° 35' | E | 25.05.96 | Sperm Whale | 3 | ingen | >500 |
| 69° 13' | 13° 35' | E | 25.05.96 | Sperm Whale | 2 | ingen | >500 |
| 71° 30 | 12° 29' | E | 26.05.96 | White-beaked Dolphin | 10 | ingen | >300 |
| 71° 31 | 14° 37' | E | 27.05.96 | White-beaked Dolphin | 4 | ingen | >100 |

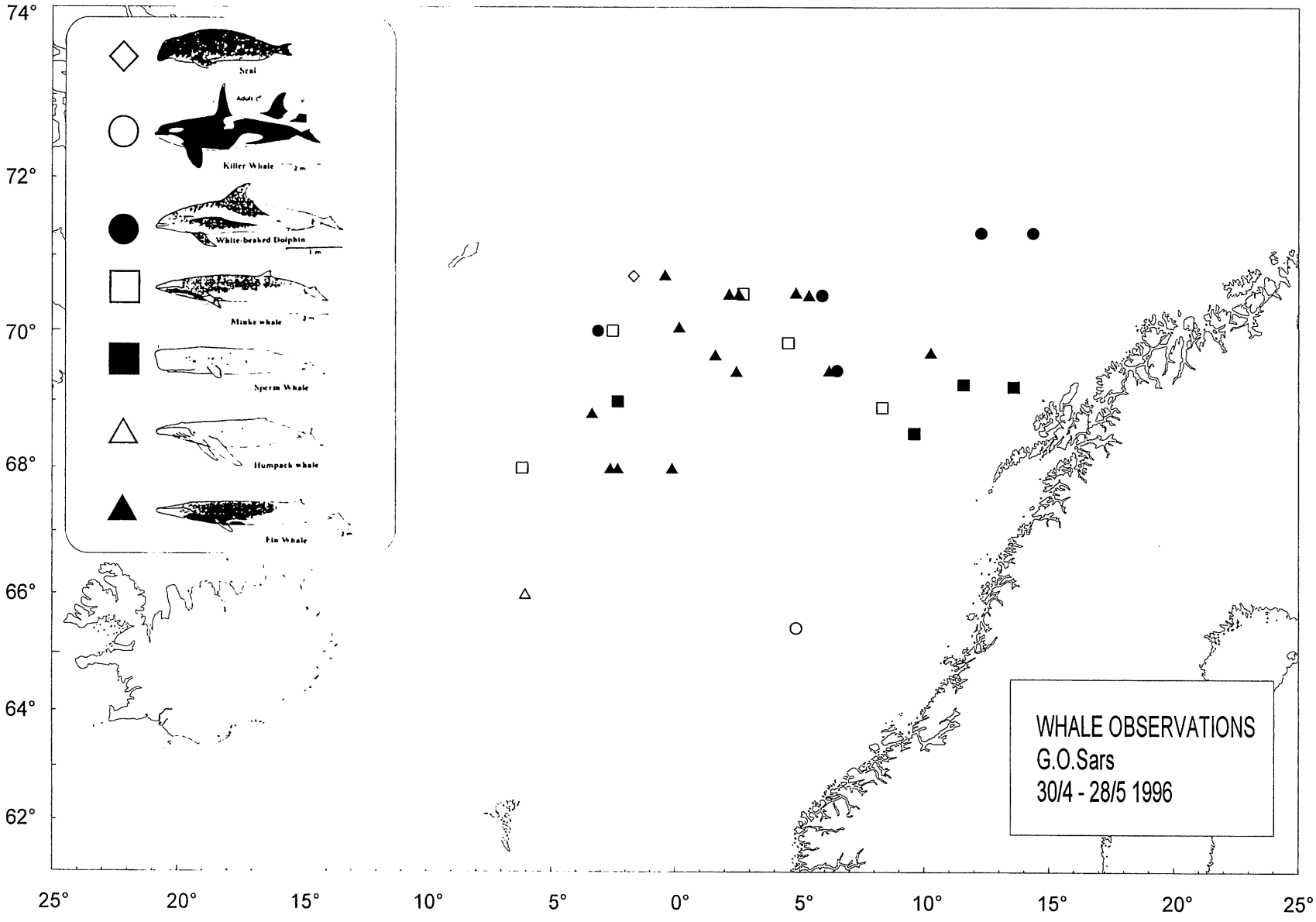


Fig. 10.1 Whale observations in the Norwegian Sea. G.O.Sars 30/4 - 28/5 1996.

# APPENDIX

## Record of daily activity (in norwegian)

### 29/4

"G.O. Sars" ved kai i Ålesund, avgang sett til kl. 2100
kl. 1700 alle toktdeltakere ombord, kaptein H. Østervold ombord kl. 1830,
Toktmøte kl. 2100. Gjennomgang av formål, dekningsområde, oppgåver og forveta produkt frå toktet. Sette opp vaktlister.
Avgangen utsett pga. feil med powersupply til hovedmotor. Feilen retta av service-verkstad i Ålesund, avgang for bukring ved Norol kl. 2400.

### 30/4

Bunkrer og kursar ut Breisundet, og sørover til Svinøya. Første stasjon på Svinøy-snittet kl. 0600. Bra ver. Tar stasjonane på Svinøysnittet i henhold til oppsatt plan. Samtale med "Atlantic Viking" som gjekk frå Ålesund kl. 2100 går kveld. Han var no på Frøyabanken, men registrerte ikkje sild. Orienterte han om våre registreringar på toktet tidlegare i april, og han ville sett kursen mot 67° Nord 1° Vest.

### 1/5

Nordvestleg liten kuling, spaknande utover dagen. Snøbyger.
Tek dei vestlegaste stasjonane på Svinøysnittet i henhold til oppsett plan. Ferdig med Svinøysnittet kl. 1500. Kursar sørover om inn i EU-sonen. PT265 i pos. 64° 01' Nord 0°, blåsehal på registreringar nær overflata, fangst 1 sild. kl. 2100 samtale med "Atlantic Viking" som var i posisjon 67° 07' Nord, 1° 32' Vest. Han hadde registrert berre nokre få mindre stimar på 300-400 m djup i området. Han hadde imidlertid hatt gode registreringar på 100 -150 m djup i posisjon 66° 35' Nord 1° 35' Aust. Dette kan vere stimar som har trekt på sør-aust slik vi observerte i midten av april, og båten ville sett kursen dit. Han hadde også oppfanga eit rykte om at danske båtar hadde teke sildefangstar 20 nautiske mil inn i færøyisk sone. Avtalte ny samtale ned "Atlantic Viking" i morgon. PT266 i pos 63° 30' Nord, 0°, blåsehal, fangst 6 korger NVG-sild, silda har altså trekt sørover og inn i EU-sonen.

### 2/5

Nordleg bris. Snøbyger.
PT267 i posisjon 63° N 0° , fangst 40 hl NVG sild, MOC, PT268 i posisjon N62° 30', 0° , fangst 3 korger kolmule, CTD. PT269 i posisjon N 62° 25' , 0°, fangst 1 korg kolmule. Går sørover til 62° N, deretter vestover til 1° W, så nordover igjen, Samtale med "Broegg" som tråla blåkveite og uer på ca. 700 m djup i posjon N62°, W 0° 40'. Tråla var av og til kledd med kolmule når sløret slo seg ned på botnen. PT270 i posisjon N62° 16', 1° W, fangst 98 kg kolmule, samtale med "Atlantic Viking" kl. 2300, han hadde registreringar i posisjon N66° 35', 1° 35' E og ville kaste når stimane kom nærmare overflata. Han tok ein fangst på 20 tonn i går kveld i posisjon N67° 07', 1° 30' W. Dette var stor sild med gjennomsnittsvekt på 270 gram (det betyr eit betydeleg innslag av 83-årsklassen).

3/5

Nordleg frisk bris.
PT271, blåsehal, posisjon N62° 30', 1° W. fangst 31 NVG sild. Sendte melding om våre registreringar og kontaktar til Bjordal og co. PT272, blåsehal, posisjon N63° 34', 1° W, fangst 6 rognkjeks.MOC. PT273, blåsehal på registrering nær overflata i posisjon N64° 04', 1° W fangst 20 korger sild, gjennomsnittsvekt 133g. Stimfølging av stim 1 og 2, stim 2 trekte nordvest, deretter norøst, tilsaman ca. 0.4 nautiske mil på 1/2 time. Førsøkte å kalle på "Magnus Heinasson" og "Arni Fridriksson" på 2182 kHz men utan å oppnå kontakt. Sendte telex til "Arni Fridriksson". Samtale med "Atlantic Viking", han var i posisjon N 66° , 0° 50 E og hadde bra registreringar og skulle til å kaste ca. kl 23 30. Han hadde hatt eit bra kast i posisjon N66° 35', E 1° 35' i går kveld. Stimane trekte sakte sørover, og silda i fangsten var 238 g i snitt. Danske båtar var i fangsting i posisjon N 65° 54', W 4°.

4/5
Nordaustleg bris, bra ver.
PT274 i posisjon N 64° 30' W 2°, blåsehal, fangst 50 kg sild, gjennomsnittsvekt 140g. PT275 i posisjon N65° W03°, fangst 52 kg sild, gjennomsnittsvekt 168 g, vestover langs N 65° , PT276 i posisjon N65° W05°, blåsehal, fangst 320 kg sild, gjennomsnittsvekt 183g, hadde sild vest til W 5° 20', gjekk vestover til vi kom ut av færøyisk sone i posisjon 65° W 07° 05' , CTD på enden, deretter NE til N 65° 10', W07°, så nordover. PT277 i posisjon N65° 12' W07°, fangst 3 rognkjeks. Samtale med "Atlantic Viking" som var i posisjon N65° 11', W04° 11', han hadde nettopp kasta, og gjekk frå området han fangsta i går pga lita sild (205 g i snitt), på turen vestover hadde han sild til W 01° deretter opphald til W 03° 20' og deretter silderegistreringar vidare vestover til noverande posisjon. Danske båtar låg endå litt lengre vest.

5/5

Nordleg bris, aukande til stiv kuling om ettermiddagen.
MOC i posisjon N 66° W 07°, deretter austover, stimregisteringar på 200 m djup i posisjon N 66° , W 06° , ca. 10 nautiske mil inn i islandsk sone, PT278 i posisjonen, fangst 20 hl stor sild, gjennomsnittsvekt på ca. 280 gram, 25 % var av 83 årsklassen, tracking av stim 5 og 6 i posisjon N 66° , W 05° 45' ,stim 5 trekt SE, stim 6 trekte E, observerte to danske snurparar i posisjon N66° W05° 30', den eine var "Strømfjord" (gamle "Nortreff"), stor stasjon kl. 10 00 i posisjon N 66° W05° 30', ferdig med stasjonen i posisjon N66° W04° 55' kl 17:00. Kaldfronten går mellom W07° (2.1° C i overflata), W06° (2.5° C) og W05° (3.1° C). Samtale på VHF med "Atlantic Viking" på kanal 16 kl. 18:30. Han var i posisjon N65° 55' W04° 17'. Han fekk 70 tonn i går, gjennomsnittsvekt 217 gram, 235 tonn natta før. Han produserer filet av silda. Passerte 1/2 nautisk mil fra han kl. 20 00. Opplyste han om våre registreringar tidlegare på dagen. Samtale med Hjalmar Vilhjalmsson ombord på "Arni Fridriksson" kl. 2100 UTC. Han var då på N65° W08' og kursa austover. Avtalte at han skulle segle kursar langs N64° 30', N65° 30', og N66° 30' slik at området vart fullstendig dekka. Fortalte han føreløpig ikkje om våre registreringar i islandsk sone. Har også prøvd "Magnus Heinasson" kvar kveld sidan 3/5 på 2182 kHz utan å få kontakt. Nye sildeforhandlingar med Island, Færøyane og Russland i Oslo i morgon får mykje merksemd på nyhetene. Forhandlingane er løfta opp på eit høgare nivå i og med at både fiskeri og utanriksministrar deltar, og statsministrane har også vore i kontakt om saka. Hjalmar var av den oppfatning at saka allereie var avgjort.

**6/5**

Nordleg stiv kuling spaknande til nordleg frisk bris om morgonen, tung sjø, aukande til stiv kuling igjen om kvelden.
Sendte rapport til Bjordal & Co. kl 08 45. PT283 i posisjon N66° W00 31' på stimar på 50 m djup, fangst 1 korg, stor sild, MOC, CTD. PT284 i same området på registrering av stimar på 250 m djup. PT285 i posisjon N65° 18' E02°, fangst 2 korger sild, CTD, ingen MOC pga av tung sjø. Sildeavtale med Island, Færøyane og Russland underteikna. Norge får 690 000 tonn ( 63 %) av totalt 1.1 mill. tonn. Fiskebåtreiarane og Norges Fiskarlag klagar over avtalen som er ein seier for forvaltninga av sildebestanden. Gratulerte Hjalmar med avtalen, og mottok gratulasjonar tilbake. Han var oppgitt over sine landsmenn som var sterkt misfornøgd med avtalen.

**7/5**

Nordleg stiv kuling om natta, spaknande til bris om morgonen, skifte av vindretning og auking til sørleg stiv kuling om ettermiddagen.
PT286 posisjon N64° 56' E03° , blåsehal, fangst 49 sild, 143 g i snitt. Sendte melding til Bjordal & Co. Stor Mare Cognitum - stasjon i posisjon N64° 30' E04° , PT287-289 nestan utan fangst, 53 laksetobis og 142 nordlig lysprikkfisk på trålhal frå 200 - 600 m. Debatt om sildeavtalen på Dagsnytt 18, fiskeriministeren nemnde at han hadde mottatt rapport om sild i islandsk sone under forhalndlingane i går. Så nådde vår informasjon heilt fram! Framleis stor misnøye med avtalen i Norges Fiskarlag og Fiskebåtredernes forbund. PT290 i posisjon N 64° 14', E05°, blåsehal, fangst 6 korger sild, PT291 på djupregistrering i same posisjon, fangst 10 kg kolmule.

**8/5**

Sørleg stiv kuling om natta, og framover formiddagen.
PT292 i posisjon N63° 53' E06°, blåsehal, fangst 40 kg sild. Tar ikkje stasjon på E07° pga. tung sjø frå sør. Går inn ved Grip om ankommer Kristiansund ca. kl. 10:00, får ombord ny power-supply til hovedmotor, kaptein H.Østervold mønstrar av pga. av rygg og nakkesmerter, og får ombord flaskevatn og farris pga. av koliforme bakteriar i drikkevatnet, dette etter vedtak i HI's AMO utvalg. Avgang kl. 14:30. Går ut mellom Smøla og Hitra, Nordleg frisk bris. Telex frå Hjalmar som registrerte mykje sild i området N66° W06°.

**9/5**

Nordleg laber bris, fine forhold.
PT293 i posisjon N64° 30' E07° 30', fangst øyepål, PT294 i posisjon N65 E06°, fangst 2 rognkjeks. PT295 i posisjon N65° 28' E04° 46', blåsehal på registreringar, fangst 2.5 tonn sild, PT296 i posisjon N65° 31' E04° 34' , djuphal i 250 m på registrering, fangst 2 korger kolmule. PT 297 i posisjon N65° 41', E04°, ingen fangst trass mykje silderegistrering, truleg stor unnaviking.

**10/5**

Sørvestleg liten kuling, ein del slingring, spaknande utover kvelden.
PT298 i posisjon N66° 25' ,E02°, fangst 45 kg sild, snittvekt 153 g. Sendte status-rapport etter anmodning fra Røttingen ca, kl 10:00. Samtale med Hjalmar ombord på "Arni Fridriksson" kl 09:00 UTC. Han var i posisjon N66° 45' W04° 35', og registrerte stimar på 300 - 350 m djup,

desse synest å vere på vandring sørover. Stimane kom opp til overflata om kvelden, held seg der utover natta, og går ned i djupet igjen om morgonen. Hadde gått østover frå W08° , men registrerte sild først fra W05° 20'. Han skulle gå sørover til N66° 30', deretter nord til N67° 30'. PT299 i posisjon N67° 0° , fangst 4 korger sild. PT300 på registreringar på 300 m djup, posisjon N67° W01° 40' , fangst 10 hl stor sild, tracking av stim 7 og 8 i 1/2 time kvar i same posisjon, begge trekte rett sør over distanse på 0.3 og 0.4 nautiske mil. Samtale med "Magnus Heinasson" som hadde vært på kolmule-survey på færøybanken. Han var no på N63° 19' W02°. Orienterte han om våre registreringar så langt. Samtale med "Gardar" som låg i posisjon N66° 55', W02° 39', såg han og "H.Østervold", "Kings Bay", "Storeknut" og "Slåtterøy" radaren, tett tåke i området. Store stimar på 300 m djup i området, desse trekte på nord, altså motsatt av det vi observerte lengre aust, skotsk partrål-lag gjorde det godt i området tidlegare i veka, silda i området 240-270 g i snitt. Samtale med Hjalmar ombord på "Arni Fridiksson" han på N66° 39' W02° 20', bra stimer i området men vanskeligere å fange, 4-5 sildebåter i området.

**11/5**

Sør-austleg flau vind, tåke, sol seinare på dagen.
PT301 på N67° W04° , blåsehal på stasjon, ingen fangst. PT302 på N66° 56' W04° 05' på registreringar i 300 m djup, ein stim gjekk under, dykka ca. 100 m, andre stimen dykka også frå 250 til 350 m , men såg den kom under, bakka opp og slepte trålen ned over den, fangst 550 kg sild, 320 g i snitt. Samtale "Arni Fridriksson" kl 0900 UTC, han på N66° 30', W02° 20', fekk sild 30-38 cm lang, silda går nord også i følge islandske båter. PT302, blindhal med blåser i posisjon N67° W06°, fangst 2 loddelarver. Vest til W07° deretter nord til N68°, PT303, blindhal med blåser i posisjon N68° W06° . Samtale med "Magnus Heinasson" og "Arni Fridriksson" kl 2100 UTC, M.H på N66° og W02°, småstimer i overflaten frå N65°, fornøygd med blåsehal-teknikken som han fekk teikningar på tidlegare. A.F. på N67° W01° 30', tråler på stimer på 200 m, vanskeleg å fange.

**12/5**

Nordleg laber bris, bra forhold, sol, og mobilkontakt med land!
Austover langs N68°, Samtale "Arni Fridriksson", tråltrekk N67° W01° 30', sild 32-35 cm. Observasjon av fire finnkvalar i posisjon N67° W02° 30'. Første stimregistreringar på ca. 300 m djup i posisjon N68° W02° 27', i samme posisjon vart det observert to store finnkvaler, desse stakk raskt unna når vi bakka opp på stimane, tracking av stim 9 og 10 á 30 min, stimane trekte NE med fart ca. 0.8 knop, PT306 på registrering på 300 m, stimen på 280-330 m, stakk ikkje ned under trålinga, fangst 750 kg, snittvekt 250 gram, silda var full av stor krill (Meganyctiphanes) som den nyleg hadde beita på, under judginga kunne blå flekkar som truleg var krill tydeleg skiljast ut på ekkogrammet, fekk imideltid berre ein liten krill i MOCNESS trekk i det aktuelle djup på ca. 300 m. PT307 i posisjon N68° 0°, blåsehal på stasjon, fangst 2 sild. PT308, blåsehal på registrering fangst, 50 sild. Samtale "Arni Fridriksson" og "Magnus Heinasson". A.F dekkt N67° 30' til W06° ikkje sild W av W02° 35'. M.H. vest langs N66° til W07° til N65° 35' W07° , tråltrekk på N66° W06° gav 150 kg stor sild, temperatur < 1.0° C i djupet (300 m), krill i magen, nord-aust vandring på silda.

**13/5**

Nordleg flau vind, bra forhold.

Tracking av stim 1 1 og 12 i posisjon ca. N67° 48', E00 50', PT309 i same posisjon, fangst 150 kg kolmule, 16 - 20 cm, PT 310, blåsehal på stasjon i posisjon N67° 30', E02°, fangst 3 sild. Telex med informasjon frå 10-12/5 til Bjordal & Co. PT311 i posisjon N66° 54' E03° 57', fangst 510 kg sild, PT312, blåsehal på stasjon i posisjon N66° 19' E06° , fangst 2325 kg sild. Samtaler med "Arni Fridriksson" og "Magnus Heinasson" kl. 09 og 21 UTC.

**14/5**

Nordleg frisk bris, aukande til sterk kuling utover formiddagen.
PT313, blåsehal på stasjon i posisjon N65° 46' E08° 00', ingen fangst. Samtale med "Arni Fridriksson" og "Magnus Heinasson" kl 09 UTC. Kursar NE mot Bodø, umulige registreringsforhold pga. av stamping. Tar berre CTD-måling på stasjon på N66° 15' E10° . Legger deretter kursen inn mot Åsværfjorden, og går leia nordover mot Bodø.

**15/5**

Ankommer Bodø, kl. 0600, fint men kaldt ver.
Bente Skjold, Rolf Sundt, og Jorunn Træland reiser heim, Anna Bækkevold og Jostein Eide ankommer. Bunkrer, fyller smørolje, vatn og reparerer radar. Kaptein H. Østervold tilbake.

**16/5**
Nordleg bris, bra forhold.
Avgang Bodø kl. 0600.
PT314, blåsehal på stasjon i posisjon N67° E10°, fangst 30 kg sild, snittvekt 135 gram. PT315, blåsehal på stasjon i posisjon N66° 49' E08° , fangst 30 kg sild, snittvekt 115 gram. Samtale "Magnus Heinasson" og "Arni Fridriksson" kl 2300 UTC. Færøyisk, Islands og EU-fisket nå i full gang i Smutthavet.

**17/5**

Nordaustleg bris, bra forhold.
Stor stasjon i posisjon N67° 25' E06°, PT316, djuphal 200 - 600 m djup, fangst ca. 10 kg, uer, laksetobis, lysprikkfisk osv. PT317, djuphal 50-150m, fangst 0.5 kg. laksetobis og lysprikkfisk, PT318 blåsehal, posisjon N67° 30', W05° 21', fangst 17 korger sild, 131 gram i snitt. PT319 på ny stasjon i posisjon N68° E04° , fangst 6 sild, likevel ein del stimar i området. La stilt etter stasjonen frå 1745 til 1845 for feiring av 17mai med biff, rødvin og is. Tracking av stim 14 som trekte NE med fart 1.4 knop. Samtale med "Maguns Heinasson" og "Arni Fridriksson" kl. 2100 UTC.

**18/5**

Austleg bris, bra ver.
Vestover langs N69°, PT320 i posisjon N68° 31' E02° , fangst 19 *Gonatus*, PT321 i posisjon N69° 0°, ingen fangst, Samtale med "Magnus Heinasson" og "Arni Fridriksson" kl. 0900 UTC. De fleste islandske og færøyiske snurpebåtane to fangst i begynnelsen av veka slik at det no berre var få båtar igjen på feltet. Tracking av stim 16 i posisjon N69° E01°, PT322 på registrering i posisjon N69° W01°, stimen stakk under trålen på ca. 100 m djup ingen fangst, Legger

umiddelbart ut igjen, PT323 og gjør fire forsøk på stor stim i ca. 125 m djup, dei tre første forsøka går stimen ned mot 250 m kvar gong tråldørene kommer mot den, video-opptak av forsøka, snur kvar gong og gjør nye fangstforsøk, på fjerde forsøket deler stimen seg foran trålen, fangst 4 korger sild, PT323 varer i fire timer og går over distanse på 9 nautiske mil. To gode peilingar av stimen viste at den vandra nord-nord-aust med fart på 1 knop. Snittvekt 238 gram. PT324 i posisjon N69° W02°, blåsehal, fangst 3 tonn sild, tracking av stim 17 som vandra i ca. 200° med fart 0.3 knop. Observasjon av to spermkval i området. Melodi Grand Prix i Oslo. Tracking av stim 18 som vandra i 16° med fart 0.12 knop. Norge nr. 2 i MGP. PT325 på stim 18 i posisjon N69° W03° 33', stor stim på oppmot 7000 $m^2$, stimen gjekk over tråla ved første forsøk, fangst på ca. 20 tonn i andre forsøk, video og sonarregistrering av fangstforsøka, stor sild, 335 g i snitt. telex til Hjalmar ombord på "Arni Fridriksson" med gratulasjonar om Islands innsats i MGP, og takk for poeng til Norge.

**19/5**

Austleg bris, bra ver, flau vind utover ettermiddagen, nesten havblikk.
PT326 på stasjon i posisjon N69° W05°, fangst rognkjeks og *Gonatus*, PT327 på stasjon N70° W03°, fangst 9 rognkjeks. Tracking av stim 19 i posisjon N70° W02° 48', stimen trekte 340° med fart 1.2 knop. 5 vågekval og 3 springere observert i området. PT328 på stimen, bom i første forsøk pga. stimen gjekk over trålen, fangst av mindre stim i området som stod på ca. 275 m djup. Fangst 4 korger stor sild. Under trålforsøket vart det registrert stor stim som stod heilt i havflata. For å avgrense utbreiingsområdet til silda kursa vi vidare norvestover til N70° 15' W04° og deretter nordaust. PT329 i posisjon N70° 24' W03° 25', fangst to korger rognkjeks, krillsværmar i området.

**20/5**

Austleg bris, bra ver.
PT330 i posisjon N70° 45' W02°, melding om våre registreringar til Bjordal & Co. E til 0°, PT331 i posisjon N70° 0°, følging av finnhvaler, registrerte de på sonaren, fleire kvalobservasjonar i området, PT332 i posisjon N69° 33', E02°, fangst 2 sild, ingen silderegistreringar i dag.

**21/5**

Austleg bris, bra ver.
PT333 på stasjon i posisjon N69° 04' E04°, fangst 47 sild, 76 *Gonatus*. PT334 på registrering i posisjon N68° 58', 04° 14', ingen fangst, PT335 på stasjon i posisjon N68° 34' E06°, 2 sild, PT336 på registrering i posisjon N68° 18' E06° 59', ingen fangst, PT337 på registrering i posisjon N68° 10' E07° 23', fangst 30 tonn sild, ytternettet på sekken revna av feste på forlenginga men innernettet holdt, måtte skjære sekken, nok igjen til prøve. Laga splitt i sekken i leisen, ca. 4 m framom codend. Telex til Hjalmar.

**22/5**

Austleg bris, bra ver.
PT338 på stasjon i posisjon N67° 33' E10°, ingen fangst, orientering av Are og Ingolf per telefon. PT339 på stasjon i posisjon N68° 10' E11° 10', fangst 30 sild. Telex til Valdemarsen og

Hjalmar om konstruksjon av slitt i trålsekken. Observasjon av spermkval, såg den på sonaren i det den dykka, såg registreringar som var i stor bevegelse, låg i same posisjon i ca. 1 time men oppdaga ikkje kvalen igjen. PT340 i posisjon N68° 50' E08° , fangst 2.5 korger sild 144 g i snitt. Telex til Hjalmar som var umulig å få tak i på radioen.

**23/5**

Austleg bris, bra ver.
Stor stasjon, PT341-PT343 i posisjon N69° 32' E05° 46' til N69° E05° 18', fangst: *Gonatus*, rognkjeks, *Perifylla*, laksetobis og lysprikkfisk. PT344 i posisjon N69° 57' E04° 12' på registrering, Harstad-tråI m/6 mm innernett, video-opptak av sonarstyrt tråling på krillsværm, fanst 2.6 kg krill, PT345 på stasjon i posisjon N70° 02' E03° 57' , PT346 på krillsværm i overflata på stasjon i posisjon N70° 30' E02°, Hardstadtrål m/blåser, ingen fangst, stimen til sides for dørene, PT347 på registrering i av krill-sværmer i posisjon N70° 30' E02° fangst i 2. forsøk, 7.4 kg krill, Samtale med "Arni Fridriksson" kl 2100 UTC. Vi har hatt sild i overflata nordover til N69° 18' E06° 49' og nokre få stimar på 150 -350 m djup nord til N70° 08' E03° 38'.

**24/5**

Havblikk, men overskya.
PT348 på stasjon i posisjon N70° 30' E05° , PT349 på stasjon i posisjon N70° 30' E08°, bruker Harstad-tråI pga. av krill-registreringer nær overflata. Tar til med Gimsøy-snittet.

**25/5**

Austleg bris, bra ver.
Ferdig med Gimsøy-snittet ca. kl. 1400. Går inn til Stokmarknes for livbåtmanøver og for å hente nye teiknepennar for å gjere ferdig toktrapporten. Ankomst Stokmarknes kl. 1600, avgang kl. 1700. PT350 på registrering på 250-300 m djup, fangst 1-gruppe kolmule. Observasjonar av to spermkvaler på Jenegga.

**26/5**

Austleg laber bris, aukande til liten storm ut på ettermiddagen, tung sjø, spaknande til natta.
PT351 på registrering i posisjon N69° 21' E13° 29', manøvrerer stim rett i trålen, ser sild som går ut splitten i overflata, ca. 4 tonn sild vaska ut bak hekken, 1200 kg sild i sekken på dekk, 116 g i snitt. PT352 på planktonregistrering i overflata i posisjon N70° 12' E12° 50', bruker Harstad-tråI for eventuelt å fange krill, ingen fangst. Arbeider med toktrapporten.

**27/5**

Sørleg lett bris, bra ver.
PT353 på stasjon i posisjon N71° 30' E15°, ingen sildefangst, PT354 på registrering i posisjon N70° 58' E15° 47', fangst 34 sild + 1 hyse. Tracking av stim 22 - 25. PT 355 på registreringar der stim 22-25 var fulgt, posisjon N70° 59' E15° 39', taua i fire timar, fangstforsøk på fem sildestimar, fire veik til sides, ein stakk under trålen, siste del av trålhalet vart det gjort

registreringar av krill-sværmar, og desse gjekk mellom dørene. Kun 0.3 kg krill i trålen. Kursar mot Hekkingen frå kl. 17:00. Gjer ferdig toktrapporten, vasker laboratoriene, og pakker ned utstyr.

**28/5**

Ankom Tromsø ca. kl. 07:00.
Toktet avslutta.

F/F "G. O. Sars" 28/5-1996
Ole Arve Misund