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The Continuous Plankton Recorder Survey : plankton in the ICNAF Area in 1976

by

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INTRODUCTION

The survey with the Continuous Plankton Recorder (Hardy, 1939) was continued in 1976 on the same basis as in other years. Annual reports on the plankton in the ICNAF area have been published every year since 1971 and reports on the plankton of the waters round the British Isles and in the Irminger Sea are published every year in Annales Biologiques of ICES.

METHODS

Continuous Plankton Recorders are towed at a depth of 10 m by merchant ships and Ocean Weather Ships once in each month, whenever possible, along a number of standard routes (Figure 1). Routes MA and MB are maintained by scientists of the United States National Marine Fisheries Service at Narragansett, Rhode Island. The rolls of silk are cut into sections each representing 10 miles of tow and alternate sections, bearing the plankton from 3 m^3 of water, are analysed. The methods of analysis have been described by Rae (1952) and Colebrook (1960) and automated data processing procedures by Colebrook (1975). The area of the survey has been sub-divided into a grid of rectangles (each of 1^o of latitude and 2^o of longitude) which have been grouped into larger areas corresponding with ICNAF areas 1-5. Sampling has been affected by changes in shipping schedules and it has not been possible to maintain the survey to the same extent as in previous years.

Recorders were towed 1715 miles in sub-area 1 (no sampling in February, March and May), 2233 miles in sub-area 2 (no sampling from February to May), 5425 miles in sub-area 3 (no sampling in July, August and October) and 798 miles in sub-area 4 (sampling in February, April and May only). There was no sampling in sub-area 5.

The results for a few of the commonest species in the best sampled area (3) are given in Figure 2 and comments made about results from other areas. For each month, the mean number of each organism per Recorder sample (of 3 m^3) for each sub-area, has been calculated. The data for 1976 are presented as histograms (gaps in the baseline indicate that there was no sampling in July, August and October); these can be compared with the average seasonal cycles for the period 1961 to 1975 which are provided by line graphs. Both the monthly means for 1976 and the long-term means were calculated from logarithmic transformations of the original counts.

RESULTS

An estimate of phytoplankton in sub-area 3 (Figure 2A) was obtained from a visual assessment of the green coloration of the filtering silks; the timing of the spring outbreak was slightly early, but numbers were below average during the spring peak in April, May and June. Thalassiosira spp. (Figure 2B), which are the dominant diatoms in spring, were late in appearing and less abundant than usual but numbers of Chaetoceros spp. were above the long-term mean. Phytoplankton was much above average in sub-area 1 in June and sub-area 4 in April and May.

Numbers of copepods were above average in sub-area 3 (Figure 2C) in the early part of the year (January, March, April and June) but above average in the second half of the year in sub-area 1 (July to October) and sub-area 2 (June to October). Numbers of copepodite stages I-IV of Calanus finmarchicus were lower than usual in sub-area 3 (Figure 2D) in every month in which samples were taken except January and June; they were scarce in sub-area 1 but above average in sub-area 2 from June to October. The overwintering adult stages (V-VI) of C. finmarchicus were more abundant than usual in sub-area 3 (Figure 2E) in March, April and June, and then again in November, much later in the year than usual. Numbers were also higher than average in sub-area 1 from August to October, sub-area 2 from July

to October and sub-area 4 in February and April. There has been a trend of increasing numbers of Euchaeta norvegica in sub-area 3 (Figure 2F) since 1961 and numbers were above average in 1976. It was abundant also in sub-area 1 but scarce in sub-area 2.

Numbers of Euphausiacea (mostly Thysanoessa longicaudata) were close to the long-term mean in sub-area 3 (Figure 2G) with peak numbers in April, June and December. They were much above average in sub-area 1 with highest numbers in July, August and October but scarce in sub-area 2 in every month except September.

Sebastes spp (Figure 2H) appeared earlier than usual in sub-area 3, but no samples were taken in July, the month when peak numbers have been found in previous years. Sebastes was not found in sub-areas 1, 2 and 4.

CONCLUSIONS

In sub-area 3, phytoplankton was less abundant than usual and numbers of copepods about average, with younger stages of C. finmarchicus below average and Euchaeta norvegica maintaining its trend of increasing numbers. There were indications that phytoplankton was abundant in spring in sub-areas 1 and 4 and that copepods were abundant in the second half of the year in sub-areas 1 and 2.

ACKNOWLEDGEMENTS

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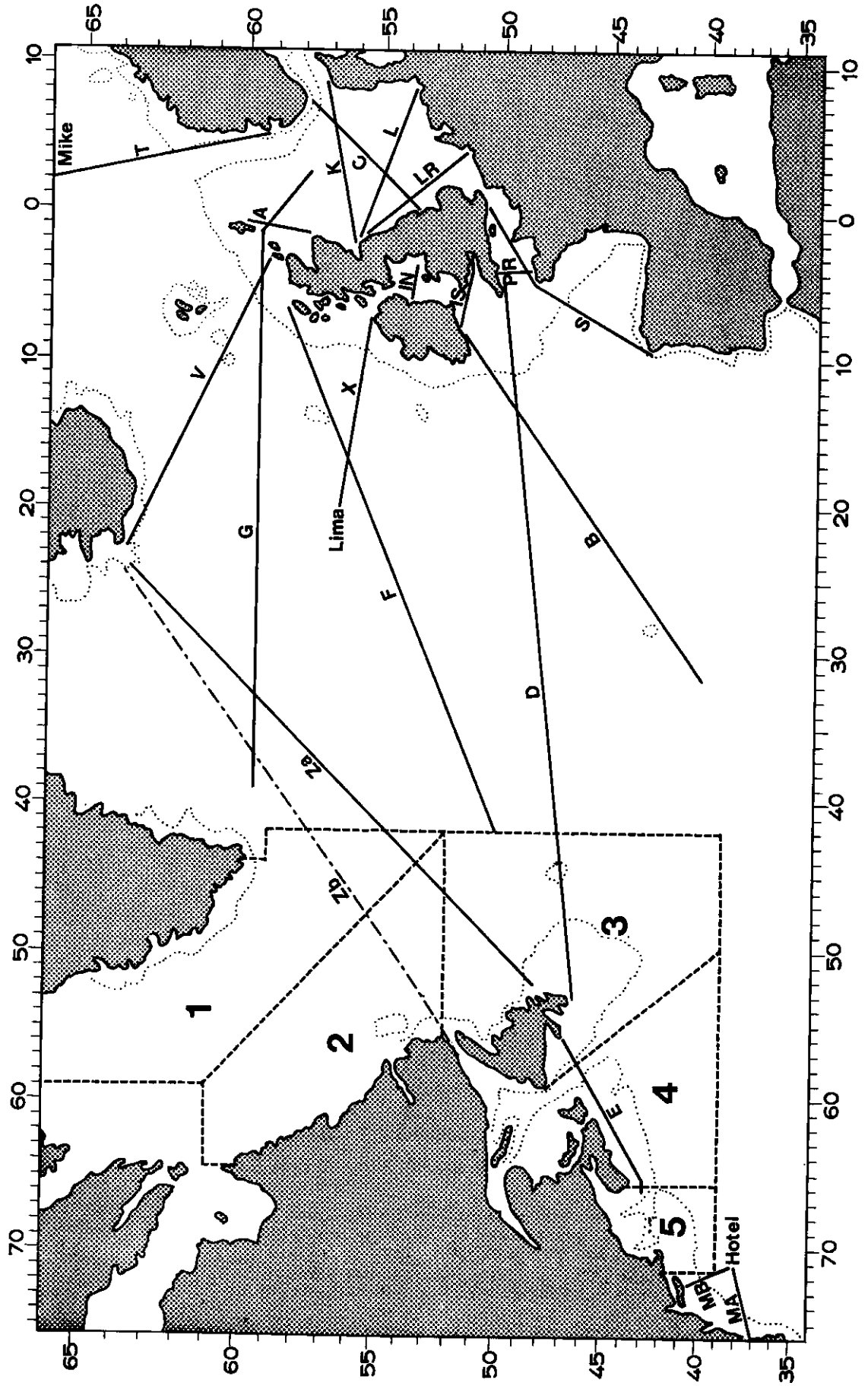

Fig. 1. The Continuous Plankton Recorder Survey during 1976. The routes are identified by code letters and Ocean Weather Stations by their international names. The Z route takes a more northerly track in summer and autumn (Zb). The boundaries of ICNAF Areas 1-5 are outlined.

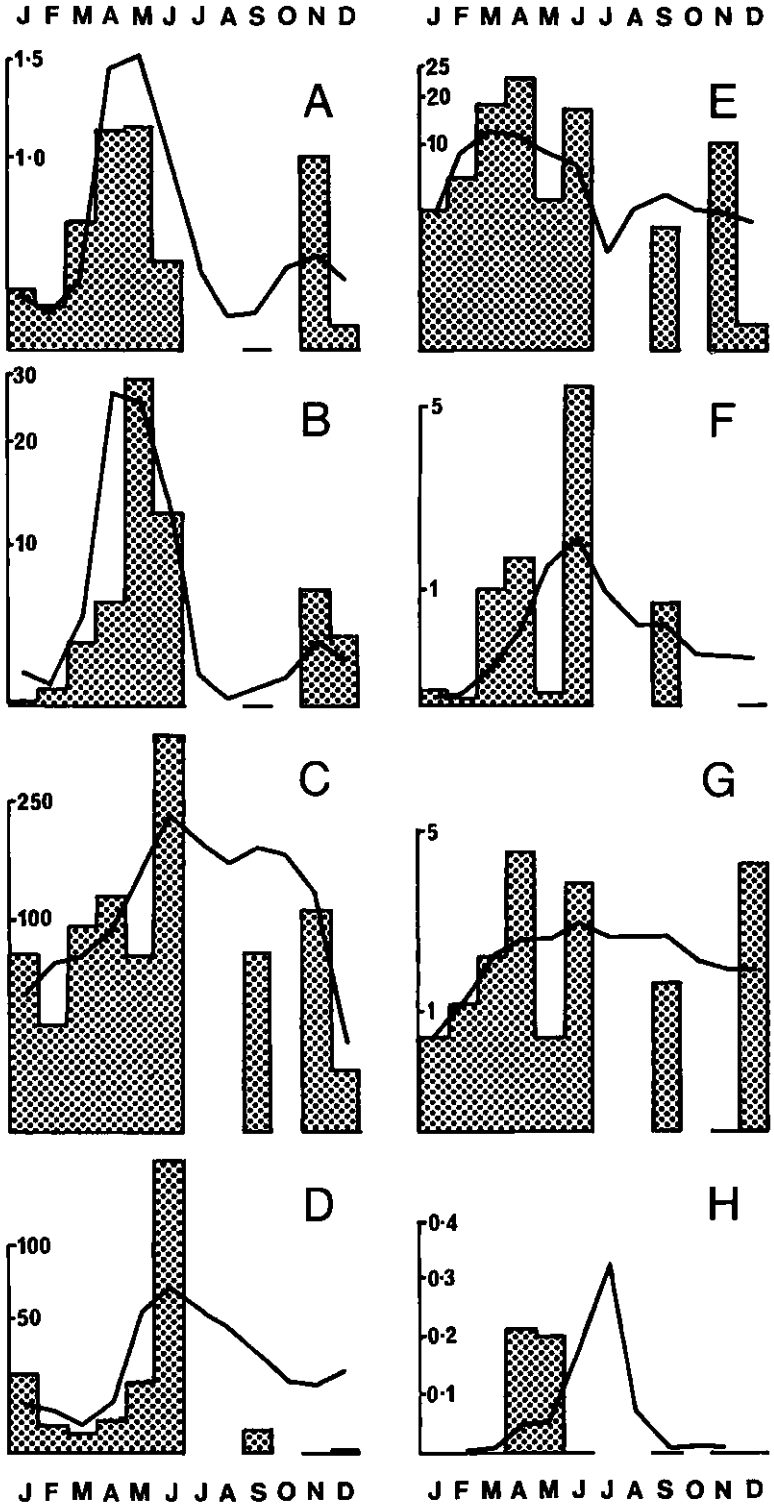

Fig. 2. Histograms showing average numbers per Recorder sample of (A) phytoplankton, (B) Thalassiosisa spp., (C) Total copepods, (D) Calanus finmarchicus, stages I-IV, (E) C. finmarchicus stages V-VI, (F) Euchaeta norvegica, (G) Euphausiacea and (H) Sebastes spp.