

Norwegian investigations on zooplankton in the Norwegian
Sea during the years 1950-1960.

by

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In the postwar period, sampling of zooplankton in the Norwegian Sea in connection with the Norwegian herring investigations started in the summer of 1948 and continued each year up to 1954. The coastal and offshore areas off western and north-western Norway were investigated on plankton during July-August 1957. An extensive area of the Norwegian Sea was investigated on zooplankton during a cruise in May-June 1958, and the central part in June 1959. The latter cruise was coordinated with Sovietic, Danish and Icelandic investigations. Since 1949, and up the present date, zooplankton has also been sampled continuously during the whole year at the weather station M at 66°N, 02°E, by the crew of the Norwegian weather-ships.

During the cruises, the plankton has mainly been collected in vertical hauls in the upper 50-200 m with Nansen net "8/70", or egg net, 0/100. At station M, vertical hauls have been taken with the Nansen net each week in the upper 100 m, with additional hauls down to 2000 m each month. With the meter net, half-hour's tows have been taken at the surface once a week, both day and night.

The plankton from the cruises has been worked up and published (Wiborg 1955, 1960 a, b). The material from station M has been treated by Østvedt (1955) and Wiborg (1954, 1955, 1958, 1960 a).

Results.

With the exception of the cruise in June 1959, the relation between plankton and herring has not been studied separately, but the material has been used in order to get a general picture of the quantitative distribution of the zooplankton in the Norwegian Sea during the summer months (May-August). The distribution of the various

plankton organisms has also been plotted (Wiborg 1955). During the summer there is maximum abundance of zooplankton along the "polar front", The Icelandic-Faroe ridge and along the edge of the continental shelf off Norway. Calanus hyperboreus is the most abundant organism in the cold areas, whereas C. finmarchicus is the dominating species in the temperate waters.

The plankton material from July - August 1957 revealed plankton concentrations south and southwest of the Bear Island in mixed and cold waters, but otherwise a sparse plankton (Wiborg 1960 a). The observations from June 1958 also showed concentrations of plankton in cold water northeast of Jan Mayen and off the northwestern coast of Norway, in similarity with observations in earlier years, whereas the central part of the Norwegian Sea was poor in plankton. The plankton material taken in June 1959 was worked up by U. Lie, Bergen, Norway, and incorporated in the observations taken by Soviet, Danish and Icelandic scientists. A chart of the quantitative distribution of the plankton was worked out and presented at a meeting in Thoshavn at the Faroe Islands in June 1959. The same chart has already been published by Pavshikovs (1960). A paper by Lie is in press. According to Lie the greatest concentration of zooplankton was observed along the border between Atlantic water and Norwegian coastal water at the edge of the continental shelf between 64° and 67°N. The coastal banks were poor in plankton. In Atlantic water farther south, the plankton was more abundant than in the East-Icelandic Arctic current, which was very poor. Distribution charts have been worked out for the various stages of Calanus finmarchicus. A negative correlation was found between herring and zooplankton. In the area richest in zooplankton the herring were very scarce, while the concentrations of herring were located in areas where the plankton was very scanty, mainly consisting of later stages of C. finmarchicus. Lie inferred that the herring had grazed down the zooplankton.

The plankton material from the weather ship station M has given valuable information on the annual variation of the plankton both in quantitative and qualitative respect. Østvedt (1955) has given a complete analysis of the zooplankton at M during a whole year. Some data are also included in the papers of Wiborg (1954, 1955). Data on the variation in quantity of plankton are also given in: Wiborg 1958.

In table 1. are given the mean volumes in the upper 100 m for the months April-August of the years 1951-1960, and for the whole period. In some years there are no observations during the months July and August, because the weather ships were stationed at station A in East Greenland waters.

Table 1. Monthly mean volumes (drained) of zooplankton at station M, 1951-1960. Nansen net "8/70", 100-0 m.

| Year | April | May | June | July | August | Mean |
|------|-------------|------|------|------|--------|------|
| 1951 | 4.3 | 6.6 | 10.9 | 11.0 | 4.6 | 7.5 |
| 1952 | 11.2 | 7.7 | 11.1 | 6.9 | 9.8 | 9.3 |
| 1953 | 16.7(night) | 7.1 | 9.0 | 7.8 | 5.7 | 9.3 |
| 1954 | 2.3 | 7.6 | 3.4 | - | - | 4.4 |
| 1955 | 3.2 | 6.1 | 10.4 | 8.4 | 3.1 | 6.2 |
| 1956 | 3.2 | 5.5 | 8.7 | - | - | 5.8 |
| 1957 | 2.8 | 7.2 | 6.1 | 6.1 | 4.1 | 5.3 |
| 1958 | 1.7 | 4.1 | 2.7 | - | - | 2.8 |
| 1959 | 2.3 | 4.0 | 6.5 | 15.5 | 5.3 | 6.7 |
| 1960 | 7.8 | 12.4 | 12.3 | - | - | 10.8 |
| Mean | 5.6 | 6.8 | 7.1 | 9.3 | 5.4 | 6.8 |

There is a decrease in plankton volume from 1952 to 1958, with marked minima in 1954 and 1958, thereafter a rise during 1959 and 1960. April is poor in plankton in all the years in question, in May the quantity is above the mean in 1954, while in 1958 and 1959 there is again little plankton. As to June, the years 1954 and 1958 are poor, 1959 about average.

Salps, which are usually considered as indicators of water of Atlantic origin, occurred in September-November 1953, Sept.-Okt. 1955, November-December 1959, and were according to observations along the Norwegian coast, probably present in the autumn of 1954 and 1958. In 1951, salps were found off the west coast of Norway, at the Sognefjord and Møre, but were not observed at station M, in spite of frequent plankton hauls (at least once a week).

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