International Council for the
Exploration of the Sea

C.M. 1963
Plankton Committee
No. 1 P

Seasonal Abundance of Ctenophores in the Northern North Sea

by
J. H. Fraser

This paper puts forward the results of one item of a research programme on the significance of ctenophores in the northern North Sea and is based on the numbers taken by 1 metre plankton nets over the period 1925-1939 and 1946-1960 by Scottish research vessels. Only Pleurobrachia pileus and Beroe cucumis are of importance in this area.

In many of the collections, including almost all the early collections, the abundance of ctenophores is given by the use of symbols (r, few, c, etc.). To enable these to be averaged and presented in graphical form a series of arbitrary numbers has been given, based partly on a discussion with colleagues and partly by going back over a selected series of stored samples. The figures chosen for this purpose are:-

a) Pleurobrachia: rr. =1, r. =3, r-f. =5, f. =8, f-sev. =10, sev. =15, sev.-c. =20, c. =40, c-cc. =70, cc. =100, ccc. =300

b) Beroe: rr. =1, r. =2, r-f. =3, f. =4, f-sev. =5, sev. =6, sev.-c. =7, c. =10, c-cc. =15, cc. =20, ccc. =30.

No claim for precision is made for these figures, nor is the precise volume of water filtered taken into account, hauls being based on a 15 minute tow at about 2 knots. Nevertheless they should be of the right order and should be roughly comparable on this general basis. The data have been extracted from the record books and an average figure obtained for each month of each year. These have then been averaged to give a single figure for each month covering the 30 years. By this method most of the major discrepancies due either to an error in mathematical assessment or to abnormally large or small populations will be smoothed out. The results are given in Figure 1.

An alternative method of presentation, which emphasises the times of the important periods of abundance is to plot the number of times per month in which the ctenophores were found exceeding a given figure. Three grades of abundance are given in Figure 2 for Pleurobrachia, and in Figure 3 for Beroe.

These show that Pleurobrachia has its minimum in February rising to an early summer peak in June, followed by a drop but increasing to its main period of maximum abundance in late autumn, particularly in November. This indicates two broods a year in the northern North Sea, but the large size-range found at almost any period would suggest that both spawnings are spread over a considerable period.

Beroe has a single maximum in July, although a minor peak occurred in September in the year 1925 only. Relatively few very young specimens were taken in the northern North Sea, suggesting that whilst some spawning takes place the bulk of the population is due to incursion from outside.

It would appear that the adults of both species die off after spawning, the young growing quickly in summer, but the young Pleurobrachia from the late spawning overwinter in deep water.

At a rough approximation, the 1 metre net filters 25o m^3 in 15 minutes at 2 knots. Figure 1 shows that Pleurobrachia averages less than 1 per 25 m^3 throughout the year, and Beroe about 1 in 25o m^3. Nevertheless at times of abundance numbers are frequently about loo times this average, in the order of 2 per m^3 for Pleurobrachia and 1 per 2 m^3 for Beroe. Occasionally figures are even higher, but in none of the collections do they approach the 4oo per m^3 given by Kamshilov (196o) for Bolinopsis in the Arctic.

Plotting the distribution of Pleurobrachia in the 3o year period shows that the June peak is fairly widespread in the northern North Sea but the late autumn peak is closer inshore and particularly so near the Scottish coasts between the Moray Firth and Firth of Forth. Beroe in July also had its greatest numbers near the Scottish coast but fairly large numbers were found from June to October over a wide area of the northern North Sea. The year 1925 seemed exceptional in that high numbers were found near Shetland in September.

Summary

In the northern North Sea Pleurobrachia has a minor summer peak in June but has its greatest abundance in November. Beroe has a single peak of abundance in July.

Reference

Kamshilov, M. M. 196o "Biology of ctenophores off Murman". ICES, C.M. 196o, No.157 (mimeogr.)

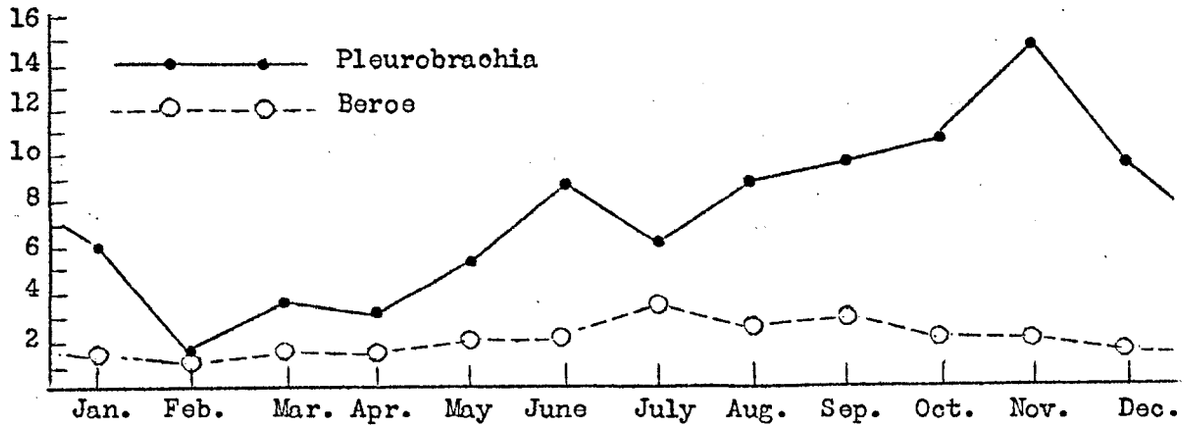

Figure 1. Monthly average numbers per haul 1925-39, 1946-60.

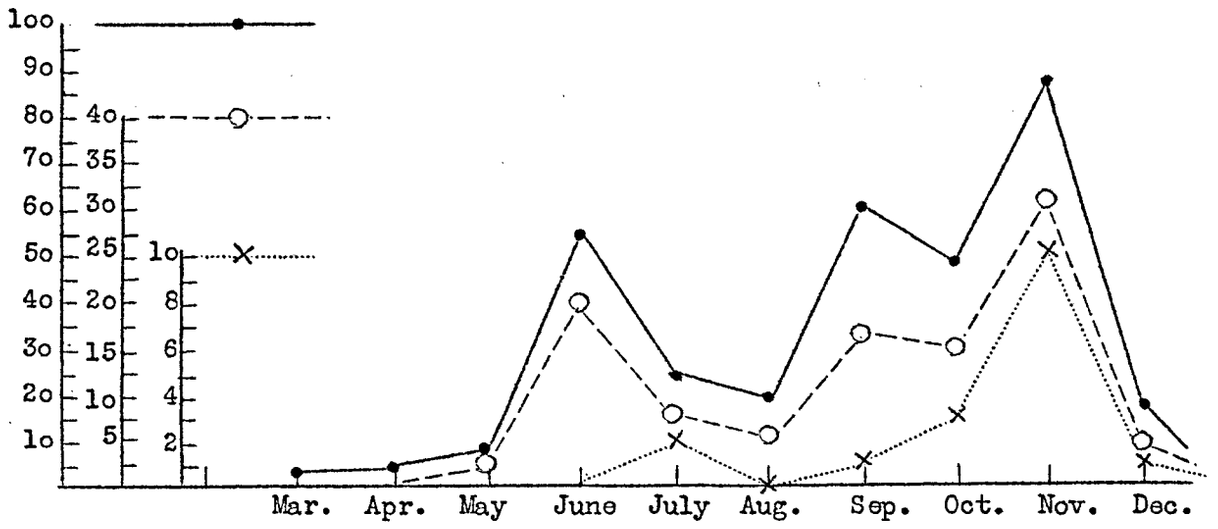

Figure 2. Number of times when Pleurobrachia exceeded 40 (—•—), 100 (--○--), and 300 (····×····) per haul.

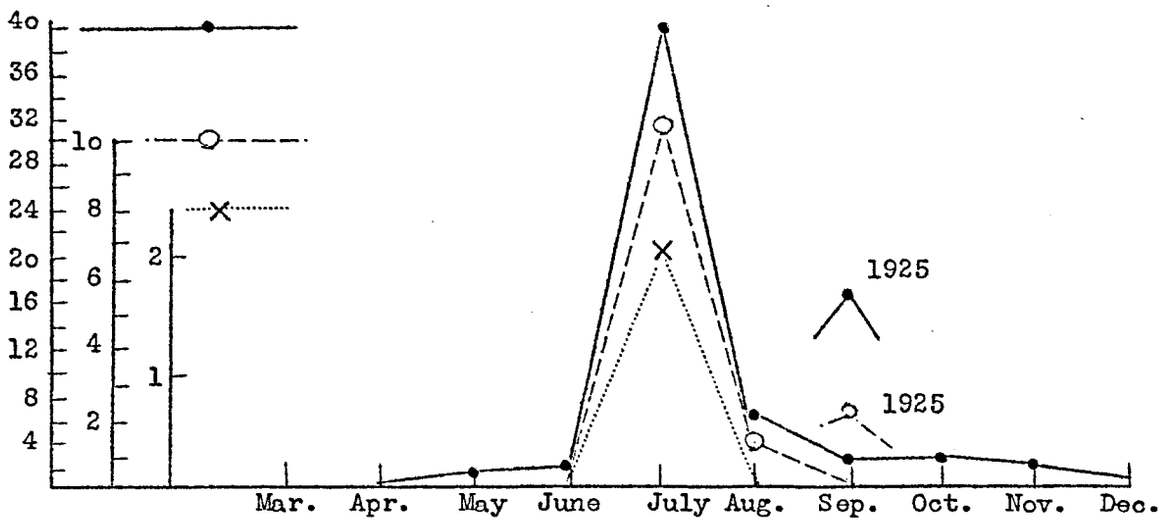

Figure 3. Number of times when Beroe exceeded 10 (—•—), 20 (---○---), and 30 (····×····) per haul.