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Results of the Joint FRG-US Bottom Trawl Survey R. V. Anton Dohrn
11-28 October 1977 in ICNAF Subareas 4 and 5

by

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Introduction

A fishery Conservation and Management Act creating a 200-mile controlled fishing zone in United States coastal waters became effective in March 1977. US Regional Councils were established and assigned the responsibility of setting quotas and limits based on recommendations and data from the National Marine Fisheries Service. These councils decided that the international herring fishery was to concentrate in a "window" of 1000 sq. nautical miles (Figure 1). This area within the traditional herring grounds near Georges Bank was opened for fishing from 15 August to 30 September 1977, with only pelagic nets or purse-seines to be used. Herring catch quotas based on a herring fisheries management plan were established for each country granted a license to fish for herring. Consequently, biological information would be lacking from the traditional herring fishing grounds, especially of spawning herring from August to October. Therefore, it was decided by the Federal Republic of Germany to change the original 1977 schedule for the "Anton Dohrn", and send the ship to this area (ICNAF Subarea 5) to obtain the necessary basic herring data. The need and importance of this research effort was shown by the fact that both research and commercial vessels did not catch significant amounts of sea herring in the 1977 fishing season.

Materials and Methods

The Anton Dohrn departed Woods Hole, Massachusetts, on 11 October and returned 28 October. The survey area is shown in Figure 1. A total of 78 trawl stations, randomly selected according to depth and area were completed using the German 180 herring bottom trawl rigged with rollers, a kite (0.9 x 1.2 m) and a temperature netsonde. The standard small meshed cod ended trawl fished on juvenile herring surveys was not used, meshes in the cod end used measured 40 mm stretched. Normally tows were of 30 minutes duration; on six stations (Nos. 5, 16, 54, 57, 61, 62) when hang-ups occurred or due to strong indications of fish in the sounder and/or netsonde, the net was hauled earlier to avoid damage from heavy catches. Fishing operations took place mostly during daylight hours. Tows were made at a speed of about four knots. The echosounder was operating and observed continuously, especially during all tows and at night while steaming.

The total catch was normally sorted to species, then counted, weighted, and measured. Subsamples were taken of bigger catches. Length measurements were made to the centimeter below, sea herring to half centimeter below. Otoliths were

extracted from cod and haddock and taken to the Hamburg laboratory for studies of age determination.

Two XBT casts were normally made each day.

Results

Atlantic Herring (*Clupea harengus harengus*, L.)

The distribution and number of sea herring obtained during the cruise are shown in Figure 2. 94 specimens of herring were caught in 78 tows. The length of the fish ranged from 50 to 67 cm/2; the mean was 57.44 cm/2. Herring in stage of maturity VI (ripe and running) were not observed in the catches.

Silver Hake (*Merluccius bilinearis*, M.)

Silver hake were caught on 60 stations during the cruise. In Subareas 4 and 5 a total of 3,188 specimens was measured with an expanded catch total of 8,948 individuals. Length frequencies ranged from 7 to 67 cm, the mean was 32.70 cm.

Only five specimens were caught in Subarea 4 (Stas. 52-55).

Pollock (*Pollachius virens*, L.)

Pollock were caught on 26 stations during the cruise. The 675 measured fish were expanded to a total of 840 individuals. Lengths ranged from 31 to 100 cm with a mean of 62.32 cm.

No pollock were taken on Browns Bank (Subarea 4, Stas. 52-55).

Atlantic Cod (*Gadus morhua*, L.)

Cod were caught on 53 stations during the cruise (Figure 3). A total of 2,595 individuals was measured, the expanded catch total was 13,060. The sizes ranged from 13 to 134 cm with a mean of 51.49 cm in Subarea 5. A representative sample of otoliths was taken.

Haddock (*Melanogrammus aeglefinus* L.)

Haddock were caught on 43 of the 78 stations made during the cruise (Figure 4).

In Subarea 4 all 1,028 haddock caught were measured. Sizes ranged from 9 to 74 cm with a mean of 25.98 cm. In this area 34% of the catch were less than 20 cm in length.

In Subarea 5 the 5,475 measured fish were expanded to a total of 32,543 individuals. Only six of the haddock caught in Subarea 5 were less than 20 cm. Sizes ranged from 16 to 89 cm with a mean of 43.39 cm. Some of the catches were so large (estimated between 20,000 and 28,000 kg) that some inaccuracies in expanded totals were unavoidable. Otoliths were taken from a sample of the catch in Subareas 4 and 5.

Illex

Illex were caught on all but seven stations (Figure 5). In Subarea 4 Illex were caught on all stations but the catches were generally small when compared to Subarea 5. In both subareas 4,430 Illex were measured, the expanded total was 53,831 individuals. Mantle lengths ranged from 7 to 32 cm with a mean of 23.34 cm.

Loligo

Loligo were caught on 11 stations during the cruise. None were caught in Subarea 4. Most were caught on the southern edge or south of Georges Bank. Mantle lengths ranged from 3 to 27 cm, the mean length was 8.22 cm.

Discussion

Catch data and information available to data from both research vessels and commercial trawlers of the US, Canada, GDR, Poland, USSR, and the FRG show that sea herring catches were the lowest in the history of the modern Georges Bank

Fishery. Repeated trawl hauls with no herring, such as those seen on the Anton Dohrn, or reported by commercial vessels this fall are unprecedented in this fishery. The fact that during the cruise, when using a proven and efficient herring trawl only 94 herring were taken on 78 hauls shows that the autumn 1977 distribution may well have been anomalous and indicates a low abundance of herring. Moreover, it should be stressed, as shown in Figure 1 that the Anton Dohrn covered the traditional herring fishing areas on the north and west parts of Georges Bank at least two times without finding any considerable amounts of herring both in catches and as traces on the echosounders.

Only 108 mackerel were taken on the 78 tows showing a scarcity of the species on Georges Bank during the survey. Although catches were less than expected, conclusions concerning the status of the stocks cannot be made because only areas 5Z and parts of 5Y were surveyed.

Contrasting with the herring and mackerel catches were those of haddock and cod; although using a net especially designed to catch herring. Catches of both species were made up to an estimated 250 baskets (70 kg/basket). Throughout the cruise length frequency distributions of both species showed consistent numbers of two and three year old fish in the catch. The number of young-of-the-year haddock on Browns Bank may prove to be especially significant. Age determination studies from otoliths taken during the cruise (cod and haddock) will provide detailed information regarding the status of these stocks. The catch results of pollock, silver hake, and squid (*Illex* and *Loligo*) were consistent and included in this report because of their commercial importance to international fisheries.

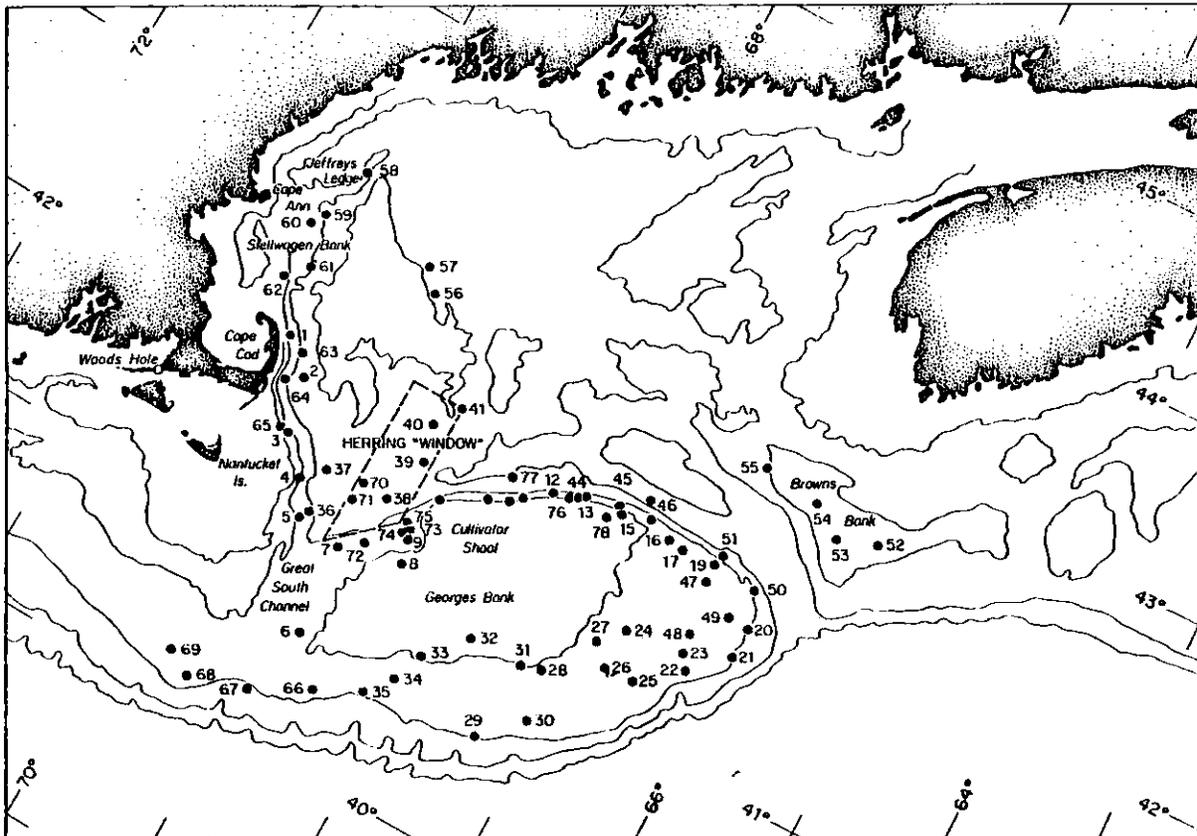


Figure 1. Station listing, R/V ANTON DOHRN, 11-28 October 1977. Outline (dashed lines) of US herring fishing "window."

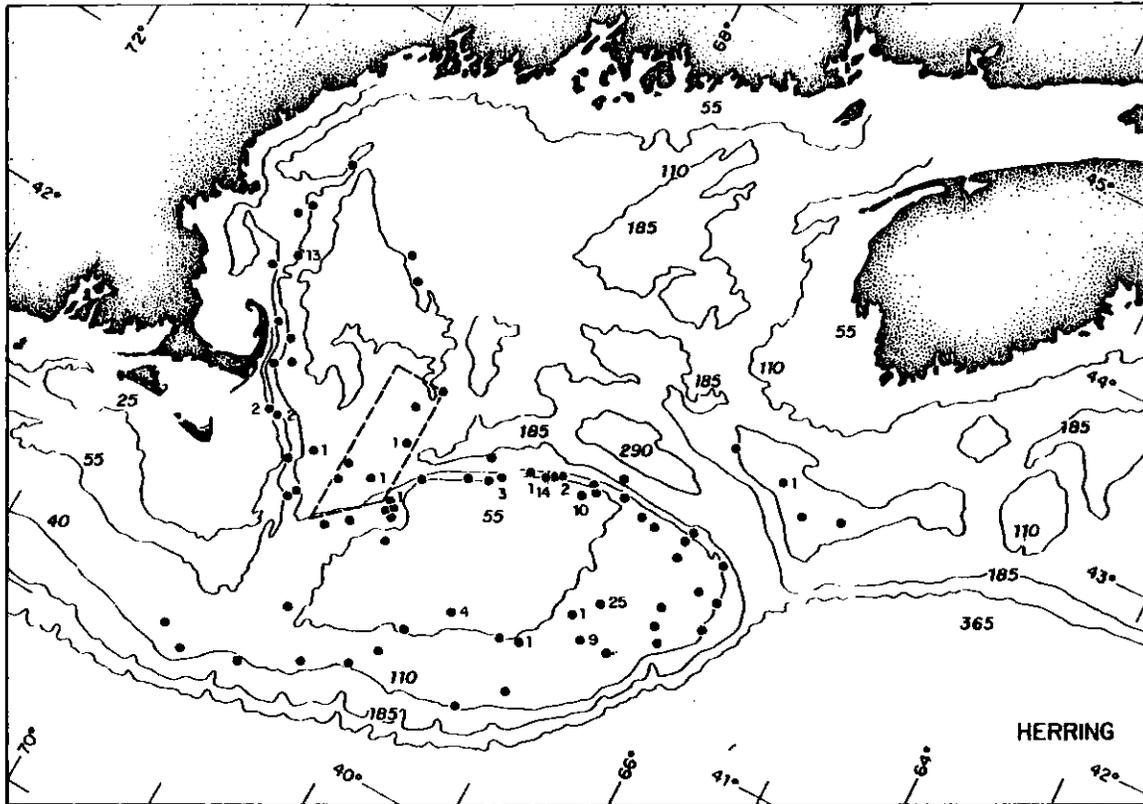


Figure 2. Location and numbers of herring caught aboard R/V ANTON DOHRN, 11-28 October 1977.

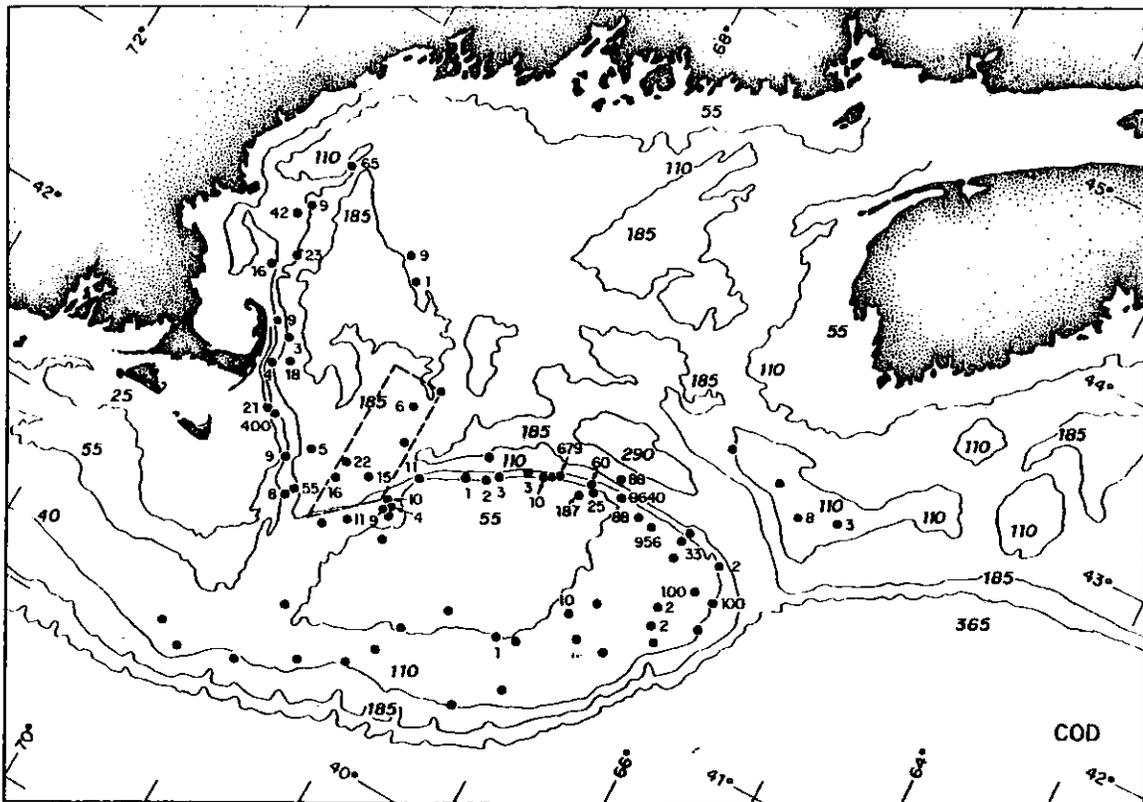


Figure 3. Location and numbers of cod caught aboard R/V ANTON DOHRN, 11-28 October 1977.

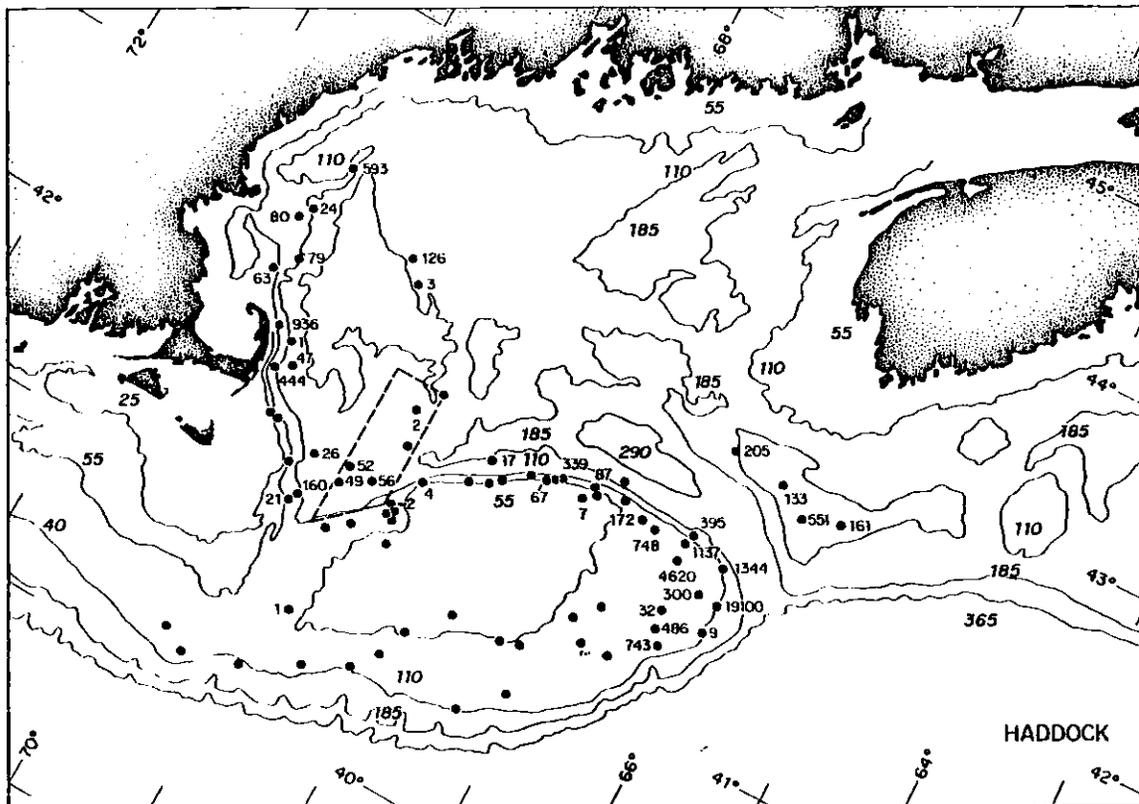


Figure 4. Location and numbers of haddock caught aboard R/V ANTON DOHRN, 11-28 October 1977.

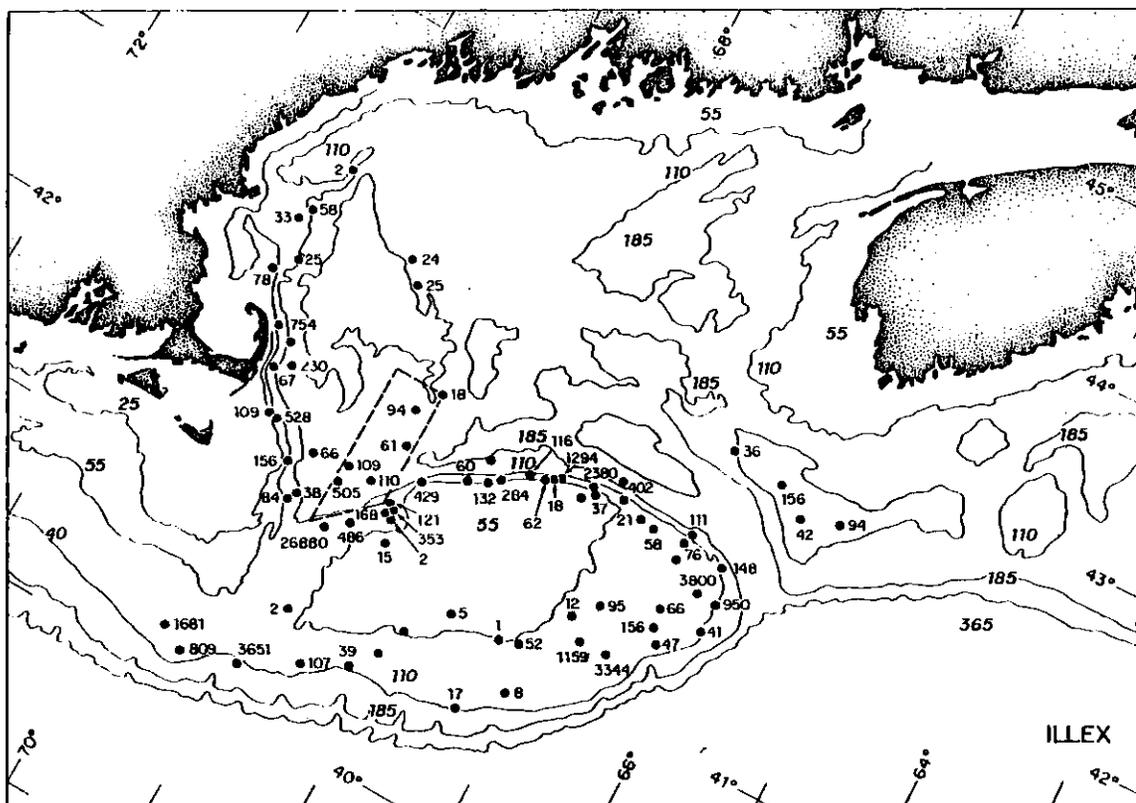


Figure 5. Location and numbers of Illex caught aboard R/V ANTON DOHRN, 11-28 October 1977.

