



Serial No. 2578  
(D.c.9)

ICNAF Res.Doc.71/101

ANNUAL MEETING - JUNE 1971

AGE, LENGTH AND MATURITY OF ADULT HERRING

IN ICNAF SUBAREAS 4 and 5, 1970

by

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Comparisons were made of year class contribution, length and gonadal development of adult herring collected in 1970 from ICNAF subareas 4 and 5. Seventeen samples (772 herring) from Georges Bank, 12 samples (816 herring) from Jeffreys Ledge, 36 samples (2488 herring) from coastal Gulf of Maine and 8 samples (682 herring) from Nova Scotia were obtained for the study.

In this report data on herring of age-groups II through VIII+ from Georges Bank and Jeffreys Ledge have been presented to encompass the entire age-group composition of the fisheries in the two areas. The samples from the coastal Gulf of Maine and Nova Scotia were selected from fisheries for adult herring and include age-groups III through VIII+.

Gonadal Development

On Georges Bank, 61 percent of herring of age-group III had matured while on Jeffreys Ledge, coastal Gulf of Maine and Nova Scotia, 1 percent, 4 percent, and 0 percent, respectively, of age-group III had matured. On Georges Bank 99 percent of herring of age-group IV had matured while on Jeffreys Ledge, coastal Gulf of Maine and Nova Scotia, 66 percent, 66 percent and 79 percent, respectively, of fish of this age-group had matured. Fish of age-group III which had matured were approximately 26.0 cm. long. Fish of age-group IV which had matured were approximately 27.0 cm. long while fish of the same age-group which had not matured were less than 27.0 cm. long.

There were slight differences in gonadal development of herring from Georges Bank, Jeffreys Ledge and the coastal Gulf of Maine (no data available for Nova Scotia) up to and including May (Figure 1). During the first five months of the year, the majority of fish were maturing. In the coastal Gulf of Maine, however, a small percentage of spawning fish were obtained in January, while a few spawners were obtained from Jeffreys Ledge in April. No spawning fish were obtained from the Bank during these months.

From June through the remainder of the year the majority of gonadal development in the four areas was similar. The onset of spawning (except for the spring spawners from Nova Scotia) occurred in late August and the peak of spawning occurred in October. Although spawning fish were still evident during November from Georges Bank and the coastal Gulf of Maine, the frequency of recovering fish increased in percentage occurrence.

#### Year Class Contribution

The data on year class contribution are presented by quarters and annually (Figure 2). On Georges Bank fish of age-group IV (1966 year class) dominated the samples for the year. In the first quarter only fish of age-group II and III were obtained and these were from the extreme western part of Little Georges in waters of less than 30 fathoms. In the remaining quarters (number of fish in quarter 4 was only 2) fish of age-group IV were dominant. The herring obtained in quarter 2 were from the southeast and southwest parts of the Bank while the herring obtained in quarter 3 were from the northern part of the Bank. Herring of age-group III (1967 year class) ranked second in percentage occurrence followed by age-group V (1965 year class).

On Jeffreys Ledge fish of older age-groups dominated the samples. Age-group VIII+ (primarily herring of the 1961 and 1960 year classes) dominated the samples for the year, followed in percentage occurrence by herring of age-group VIII (1962 year class) and age-group VII (1963 year class). Herring of age-groups II, III, and IV represented only a small segment of the samples. Herring of age-group VIII+ dominated the samples in the second and fourth quarters while herring of age-group VI dominated the samples in the third quarter.

In the coastal Gulf of Maine age-group III (1967 year class) dominated the samples for the year, followed in percentage occurrence by age-group IV (1966 year class) and age-group V (1965 year class). In the first two quarters older fish were predominant in the samples, the reverse was true during the 3d and 4th quarters.

In Nova Scotia herring of age-group VIII+ (primarily 1961 and 1960 year classes) dominated the samples for the year, followed in percentage occurrence by herring of age-group VII (1963 year class) and age-group IV (1966 year class). The percentage occurrence of the various age-groups differed between the two quarters, except for the dominant fish of age-group VIII+.

#### Length-frequency Distributions

In 1970 herring from Georges Bank (age-groups II-VIII+) ranged in length from 12.6 to 35.7 cm.; herring from Jeffreys Ledge (age-groups II-VIII+) ranged in length from 20.6 to 36.9 cm.; herring from the coastal Gulf of Maine (age-groups III-VIII+) ranged in length from 23.3 to 38.2 cm. and herring from Nova Scotia (age-groups III-VIII+) ranged in length from 23.8 to 36.7 cm. The mean lengths of fish of a given age-group of the various year classes for a particular month do not appear to differ between areas (Table 1).

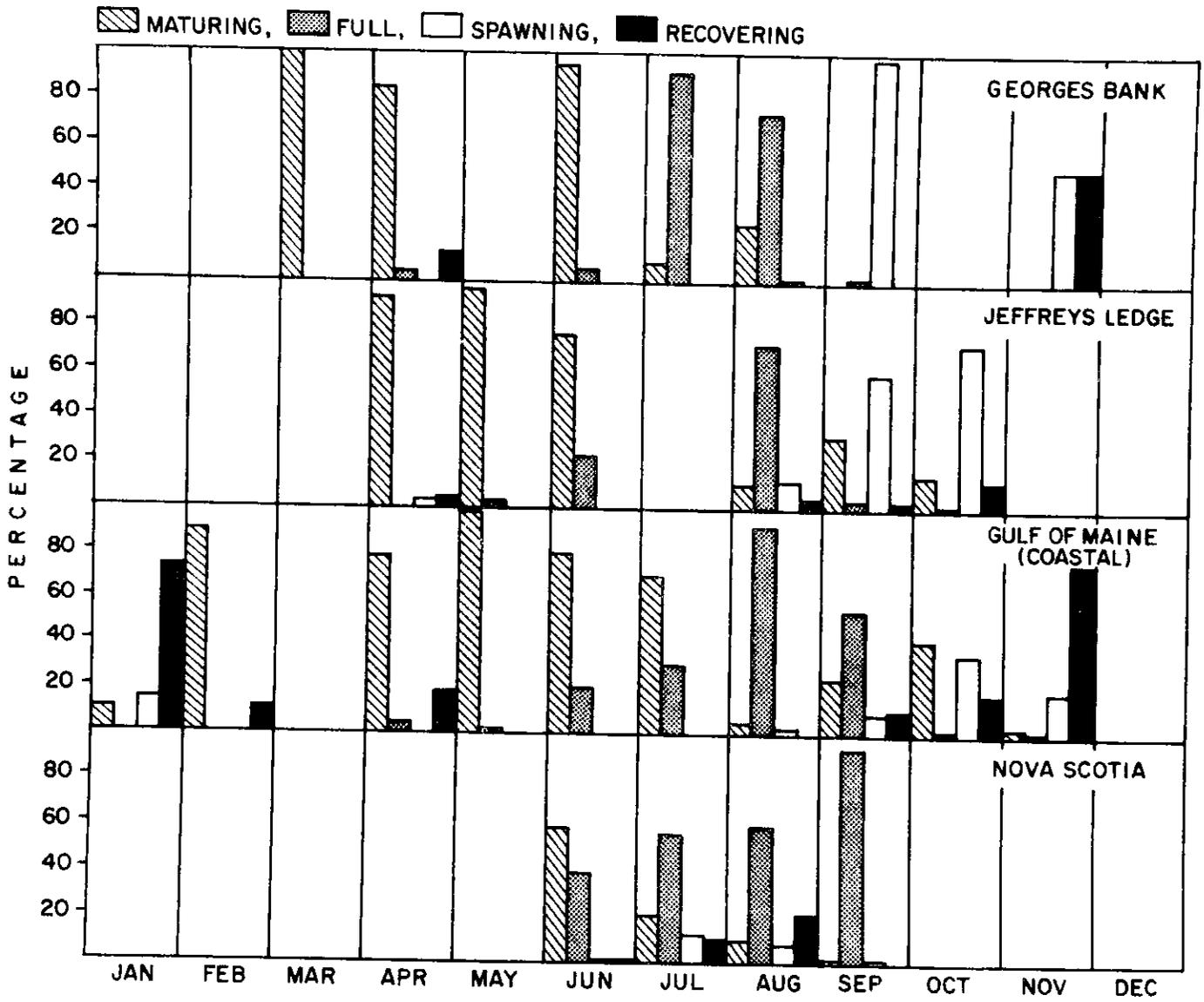


Figure 1. Gonadal development of herring from Georges Bank, Jeffreys Ledge, coastal Gulf of Maine and Nova Scotia, 1970.

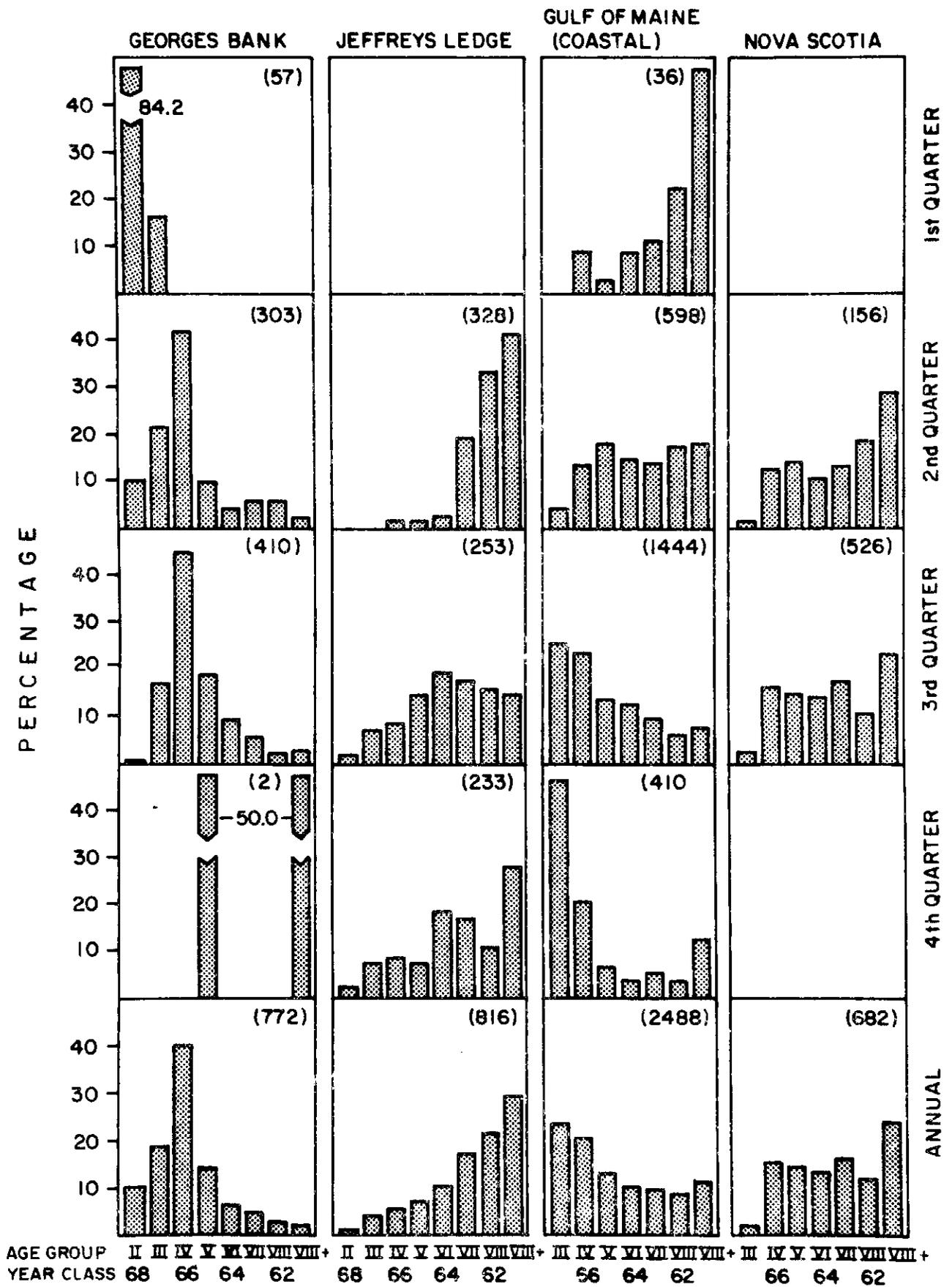


Figure 2. Age composition of herring from Georges Bank, Jeffreys Ledge, coastal Gulf of Maine and Nova Scotia, 1970. The total number of fish sampled are indicated in parentheses.

Table 1. Mean lengths by months of herring of various year classes from Georges Bank (GB), Jeffreys Ledge (JL), Coastal Gulf of Maine (GM) and Nova Scotia, 1970.

YEAR CLASS	AGE GROUP	AREA	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
1968	II	GB	--	--	14.9	15.8	--	19.3	22.0	--	--	--	--	--
		JL	--	--	--	--	--	--	--	--	21.8	21.5	--	--
1967	III	GB	--	--	19.0	21.4	--	23.9	25.0	24.5	25.1	--	--	--
		JL	--	--	--	--	--	--	--	25.2	25.1	25.2	--	--
		GM	--	--	--	23.3	23.5	23.5	24.3	24.8	25.3	25.3	--	--
		NS	--	--	--	--	--	24.5	24.7	--	--	--	--	--
1966	IV	GB	--	--	--	24.6	--	26.6	27.4	27.1	27.1	--	--	--
		JL	--	--	--	--	27.3	26.0	--	27.5	26.5	27.5	--	--
		GM	24.9	--	--	26.0	26.1	26.7	26.9	27.4	27.4	27.6	27.5	--
		NS	--	--	--	--	--	26.1	27.1	27.4	27.8	--	--	--
1965	V	GB	--	--	--	27.7	--	28.2	28.7	28.9	28.9	--	29.8	--
		JL	--	--	--	27.5	28.2	28.6	--	28.9	29.3	28.9	--	--
		GM	27.9	--	--	27.7	27.6	28.2	28.4	28.9	29.0	29.1	29.3	--
		NS	--	--	--	--	--	27.9	28.8	28.8	29.0	--	--	--
1964	VI	GB	--	--	--	28.8	--	29.7	30.4	30.5	30.5	--	--	--
		JL	--	--	--	29.8	29.7	29.4	--	30.5	31.0	30.9	--	--
		GM	29.7	--	--	29.1	29.3	29.8	30.2	30.4	30.6	30.8	31.3	--
		NS	--	--	--	--	--	29.7	30.5	30.4	30.9	--	--	--
1963	VII	GB	--	--	--	30.9	--	31.3	31.7	31.8	31.9	--	--	--
		JL	--	--	--	30.7	31.0	31.2	--	32.1	32.3	32.2	--	--
		GM	31.2	--	--	30.5	31.2	30.9	31.6	31.7	31.9	32.0	30.6	--
		NS	--	--	--	--	--	31.0	31.8	31.9	32.0	--	--	--
1962	VIII	GB	--	--	--	31.5	--	32.3	32.4	32.6	32.9	--	--	--
		JL	--	--	--	31.9	32.1	31.8	--	33.0	32.9	33.0	--	--
		GM	32.2	--	31.9	32.0	32.0	32.0	32.7	32.6	32.5	--	33.1	--
		NS	--	--	--	--	--	32.4	32.8	32.8	32.8	--	--	--
1961 and older	VIII+	GB	--	--	--	--	--	33.2	34.0	33.5	33.9	--	33.9	--
		JL	--	--	--	33.3	33.5	33.4	--	33.9	34.6	34.4	--	--
		GM	34.5	--	33.7	33.4	33.6	33.1	34.0	33.9	34.3	33.8	34.4	--
		NS	--	--	--	--	--	34.4	34.2	33.8	34.4	--	--	--