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Distribution and abundance of larval herring on Georges Bank

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During the late 1950's, fall and winter cruises were made cooperatively by U.S. and Canadian research vessels in the Gulf of Maine and Georges Bank to determine the distribution of larval herring. The abundance of newly-hatched larvae in the plankton collections provided evidence that major spawning occurred on Georges Bank and along the southern coast of Nova Scotia. There was also evidence that spawning on a lesser scale occurred along the inshore waters of the Gulf of Maine. Drift bottle studies suggested that the progeny of the Georges Bank spawning were carried principally southward and eastward during late fall and early winter. Other studies suggested that larvae found on the Northern Edge of the Banks could be carried northward to the Nova Scotia coast. In general, the consensus was that larvae would be carried away from Georges Bank. The ultimate fate of these larvae, however, was not determined.

In 1962, we again initiated surveys of larval herring to obtain additional information on the distribution of larvae. Oblique plankton tows of 15 minutes duration (20 meters to the surface) have been made with one-meter #0 mesh nets at various stations during our spring and fall cruises.

No larval herring were obtained on the Banks in early September, 1963, while yolk-sac larvae were obtained from the Northern Edge in 1964, and from the Northern Edge and Southeast Part in 1965. During October, 1964 larval herring were collected from the Northern Edge, Cultivator Shoals and Georges Shoals, while in October, 1965, larvae were collected only from the Southeast Part. During November of 1963, 1964, and 1965, larval herring were collected from the Northern Edge, Cultivator Shoals, Southwest and Southeast Parts of the Banks. In December of 1962, larvae were obtained from the Northern Edge, Cultivator Shoals, Georges Shoals, Little Georges, and Southeast Part of the Banks, while in December of 1963, larvae were obtained only on the Northern Edge. During the December cruise in 1962, larval herring were also obtained from Jaques Swell, Great Sout Channel and Cape Cod, Mass. Though differences in mean length occurred between the larvae obtained in the late 1950's and 1960 studies, their distribution in time and space was similar. The

difference in mean lengths for different years for the same month is to be expected, as the spawning time on the Banks varies from year to year.

During April of 1965 and 1966, larval herring were collected from several parts of the Banks. Although the presence of larvae on the Banks at this time of year has been previously reported by U.S. investigators, the numbers obtained per tow were considerably less than those obtained in the same waters during our recent cruises. The maximum number obtained in earlier years was 39 larvae per 10-15 minute surface tow, while our maximum number was 2068 per tow. Although larvae were obtained from several parts of the Banks, the largest collections were from the Northern Edge. During cruises in October, 1964 and April, 1966, transects were made between Georges Bank and the coastal waters of the Gulf of Maine. No larvae were obtained in the plankton tows between Georges Bank and the coastal areas of Jeffreys Ledge and the Isles of Shoals.

The dates, locations of capture, number of tows, number of larvae, mean length (T.L. in mm) and range in length are shown in Table I. As larval herring are still present in high numbers in late April on Georges Bank, and since larval and immature herring of comparable length are obtained in the inshore waters of the Gulf of Maine at the same time of year, it is possible that the distribution of offshore herring is restricted to the vicinity of Georges Bank. Additional studies on the fate of larvae and immature herring, along with racial studies, should provide information as to the possible discreteness of the Georges Bank populations.

Table I. Seasonal distribution of larval herring on Georges Bank and adjacent waters.

Month	Year	Location	Number of tows	Number of larvae	Mean length (TL in mm)	Range (in mm)	
SEPT.	1964	Northern Edge	19	41	6	4-7	
	1965	Northern Edge	5	391	7	5-17	
		Southeast Part	2	8	7	6-8	
OCT.	1964	Northern Edge	15	299	11	6-17	
		Cultivator Shoals	3	31	13	9-16	
		Georges Shoals	2	5	14	12-15	
		Jeffreys Ledge	1	1	11	11	
		Isles of Shoals	1	1	19	19	
	1965	Southeast Part	3	2	13	12-14	
NOV.	1963	Northern Edge	5	32	16	10-21	
		Cultivator Shoals	2	1	14	14	
	1964	Northern Edge	5	89	14	7-28	
		Southwest Part	1	1	18	18	
	1965	Northern Edge	2	39	19	12-25	
		Southeast Part	1	1	20	20	
DEC.	1962	Northern Edge	6	115	16	14-32	
		Cultivator Shoals	5	112	20	15-29	
		Georges Shoals	2	175	12	5-32	
		Little Georges	3	76	16	5-28	
		Southeast Part	3	17	11	5-28	
		Great South Channel	4	37	22	15-27	
		Cape Cod, Mass.	2	2	19	16-22	
		Jaques Swell	1	5	22	19-29	
	1963	Northern Edge	1	7	26	23-31	
	APR.	1965	Northern Edge	7	344	39	27-52
			Cultivator Shoals	3	70	36	29-49
Southeast Part			10	34	38	28-47	
Southwest Part			1	1	29	29	
1966		Northern Edge	5	5241	40	30-57	
		Cultivator Shoals	2	400	37	31-50	
		Little Georges	3	609	39	30-46	
		Isles of Shoals	2	55	41	30-48	
JUNE	1965	Northern Edge	8	1	40	40	