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Age determination of Canadian mackerel

by

Philip Cox

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AGE DETERMINATION OF CANADIAN MACKEREL

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This study was made at the Atlantic Biological Station during three weeks in the summer of 1933. The purpose was to obtain all the information available about the various age groups, met with in this fishery, which might help, in part, to solve the question of the relation of the Gulf of St. Lawrence mackerel to those of the Atlantic coastal waters of Nova Scotia.

Material from both regions was used; that from the Gulf was collected by the writer at the Magdalen Islands in 1925, while the data from Nova Scotia was the work of the biologist of the ship "Prince" in 1921 and '22 and came from St. Margaret Bay and other points along the coast. Each fish had been measured, weighed, and scales from behind the head or from the base of the pectoral fin carefully taken, and each sample enclosed in a separate envelope with the place, date, sex, etc. inscribed.

It is an old story to remark on the difficulty of making accurate reading of the scales of this fish. Every investigator sets up the same wail, and is tortured at times by the same perplexities and worrying uncertainties others have experienced. After exhausting all the scales in an envelope without making a decision, he may be tempted to venture an approximation, in other words to substitute a mere judgment for objective truth. In a case like this, the only remedy is the rejection of the whole sample. Usually I mounted all the scales, and after careful examination, a majority was found to agree.

A very noticeable feature of table I is the complete absence of the first three year classes. During the whole season, only 3 examples of the III-year class were seen, 345, 350 and 360 mm. long respectively. They were mature. Not a single example of the first two classes was met with. The condition was at first thought to be due to the gill-nets, everywhere used in the spring fishery in the Gulf, exercising a selective effect, but lining later failed also to show their presence, though the previous autumn there had been a heavy run of fish of the II-year class, a very rare thing at the Magdalens.

The dominance of the IV-year class is evident. It was true also of the commercial fishery, as graphs disclosed that from 40% to 50% of the total catch consisted of fish of this age. Differential growth is also a marked feature, the group comprising a wide range of lengths, extending from 360 to 415 mm., the mean lying between 390 and 400.

The V-year group also includes fish of a wide range of lengths, the extremes being 385 and 435, with a mean value for the whole of 410, an increase of about 20 mm. over the mean of the IV-year class, which corresponds with what has been found elsewhere (Ehrenbaum, 1912), (Nilsson, 1914).

The VI-year class is quite restricted in number and range of size, there being only 10 fish, with lengths between 440 and 470 with the mean at 450. The apparent annual increment is evidently too great; there is no well marked maximum from which the lengths recede in increasing and diminishing values, and the range, as remarked, is very restricted. For some reason it is not a true expression or picture of a year-class.

The VII-year class is better balanced and shows the decreasing percentage of fish, reaching the older age-groups. Only 6 examples of the VIII-year class occurred. No record is made of 3 specimens of older fish whose age could not be determined.

In table II is given the age analysis of 188 mackerel from station 283 and other points near Barrington, N. S. This material was collected by the biologist of the ship "Prince" in July and August 1921-22.

We see here a new class, the II-year group, but the I and III-year fish are not in evidence, but the position that III would occupy in the record is plainly marked by a blank. Its limits presumably would be between 290 and 360 mm. It is doubtful if the material represents correctly the full extent of variation in length within the year class, for the largest and smallest fish may have been eliminated from it by the mode of capture-in gill nets of $1\frac{3}{4}$ inch mesh. The record, however, presents the usual appearance of the normal conditions of a group - a majority mean trailing away in both directions.

As in table I, the IV-year class is made up of fish of many sizes, and its limits are poorly defined. The record lacks balance. Numerically it does not occupy the dominant position it does in the Gulf material, due perhaps, to a gradual filtering out of the smaller and weaker individuals as the migration swarms northward. On the contrary the V-year class is well represented in the table, and occupies about the same position numerically as it does in table I. Its mean is about 444, and it is limited by 400 and 470.

The VI-year class as well as the VII suggest selection in some way not understood. Both contain a large percentage of the fish examined and within surprisingly narrow limits. These two year classes make up more than half of the whole lot. Only 10 examples of the VIII-year class were found and 1 fish was placed in the IX-year group.

Table I. Numbers of mackerel of each length group in each year class, Magdalen Id., 1925. Length in

Year class	35	36	36½	37	37½	38	38½	39	39½	40	40½	41	41½	42	42½	43	43½	44	44½	45	45½	46	46½	47	47½	48	48½	49	49½	50	Total	
IV		1	2	2	2	5	3	9	3	7	3	1	3																			4
V							3	4	2	3	2	4	3	1	2		3	1														
VI																	3	1	2			1	2	1								14
VII																				1	1	2	1	4	1	1	1	1				13
VIII																											3				3	

Table II. Numbers of mackerel of each length group in each year class, Outer Nova Scotia, 1921 and 1922. Length in cm.

Year class	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	Total		
II	1	3	6	26	21	13	1																								71
IV												1	1	4	1	1	2			1	2	3	1								17
V																	1	1	2	3	4	9	5	2							27
VI																						1	5	11	11	10					38
VII																								3	13	6	3				25
VIII																										1	4	5		10	
IX																												1		1	