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Oyster Mortality in the Charlottetown Region.

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OYSTER MORTALITY

IN THE

CHARLOTTETOWN REGION

1939.

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INTRODUCTION

Investigation of the disease which appeared among oysters in the Charlottetown region during 1936 was begun in 1937, carried on in 1938, and continued in 1939. Stations were located in the diseased areas, as in the previous years, at which observations on the course of the disease were made on four occasions during the period from June 10 to October 23. Hydrographical records were obtained at each of these locations. Transfer experiments of oysters from outside regions into the diseased areas were made in an attempt to determine the reactions of these oysters to the disease. In one locality a large planting of oysters from Malpeque bay, which have shown themselves to be strongly resistant to the disease, has been made in the hope that spat from the resistant strain could be obtained.

SYMPTOMS OF THE DISEASE

Diseased oysters were identified by the same symptoms as given in the reports for 1937 and 1938. These may be mentioned briefly as, (1) the appearance of yellow-green lesions, oval in outline, and varying from 0.5 mm. to as much as 5 mm. in diameter; (2) practically complete cessation of growth; (3) shrinkage of the body of the oyster and (4) weakness of the adductor muscle.

SURVEY OF THE DISEASED AREAS

Examinations of oysters in the diseased areas were made during the past year on four occasions, namely, (1) middle ten days of June; (2) first ten days of August; (3) last two days of August and (4) ten days in the latter half of October.

One of the important features arising from these examinations is that the disease which took such a heavy toll of oysters in the previous years appeared in a very light attack with little or no mortality, thus failing to become epidemic this year.

Transfer experiments were continued on a larger scale and continue to lend support to the theory that oysters from the Malpeque region are strongly resistant to the disease in the Charlottetown region. This fact, of course, leads one to suspect that the disease which occurred in Malpeque Bay in the years following 1915 is similar to the disease in the Charlottetown area.

The disease was first noticed among oysters in the Hillsborough river in 1936. In 1937 it spread to adjacent areas and by the end of 1938 the disease had spread to all important oyster areas in the Province with the exception of Bedeque bay (which may have experienced the disease in former years) and one or two other small areas. The heavy mortality which has resulted from the disease is clearly shown by the large drop in the oyster catch for the Charlottetown region. The total catch for the Charlottetown region in 1935 was about 8000 barrels. By 1938 the total catch for the region had dropped to about 200 barrels and for this year the catch was around 100 barrels or less.

A survey of the conditions at the various stations is given in the following paragraphs. Additional details can be obtained from the accompanying tables.

Elliot river. Examinations were made at three stations on this tidal river and each was visited four times, namely, on June 16, August 9, August 29 and for the last time on October 20. See table I.

Over 90% of the oysters now in this locality are less than two years old, being composed of 1938 and 1939 spat sets. The 1938 set was a particularly good one, indicating that when conditions are favourable a very small nucleus of spawning oysters are capable of producing a large number of young. These small oysters maintained a healthy appearance during the summer and fall and showed a good rate of growth.

The first diseased specimens were found at

Yorke point on August 9 when three oysters out of eighty examined showed disease symptoms (yellow-green lesions). No indications of any significant mortality having recently occurred could be observed. Only one oyster of a group of two hundred and fifty set aside on June 16 for the purpose of estimating mortality, had died. On August 29 and October 20 large numbers of oysters were examined and on each occasion the percentage of diseased specimens found was insignificant. During the entire period from June 16 to October 20, only three of the two hundred and fifty grouped for observation died - little more than 1%.

On the basis of the above information, supplemented by additional information obtained by observations at representative areas in the locality, it is estimated that not more than 3 to 4% of the oyster population in the Elliot river died during the past summer and fall.

Yorke river. Two stations on the Yorke river (tidal) were visited on four occasions (June 16, August 9, August 29 and October 20). The picture here is practically identical to that on the Elliot river. The adult oyster population has been nearly all wiped out by the disease during 1937 and 1938 and the surviving oysters are almost all less than two years old.

During the whole period only one diseased oyster was found (see table 1). One death occurred in a group of

one hundred and fifty. The estimated mortality for this area during the past summer and fall is about 4%.

On October 21 a survey of the Yorke river oyster population was made with the aid of the Department of Fisheries patrol boat "Capitol". The survey disclosed that the present oyster population is chiefly composed (about 98%) of young oysters, one to two years old. The remaining 2% consists of old stock, survivors of the disease.

Hillsborough river. Examinations were made at two stations on four occasions and at three other stations on three occasions. See table I & II. Native survivors of the 1938 epidemic have been held in floating trays at Scotchfort. By the end of August, 1939, approximately 83% of them had died. Several hundred of the 1938 spat have been held also in trays. To the end of August, 1939, about 37% of them had died. During the period over which they were observed, the 1938 spat showed very little growth.

With the exception of a few adult oysters still remaining alive at St. Stewart (9 barrels were fished in 1939) practically no large oysters remain in the Hillsborough river area. Considerable quantities of small oysters from the 1936, 1937, 1938 and 1939 spat sets are in the area. The 1936 set has not shown much growth, but the 1937 and 1938 spat has shown fairly good growth. The mortality among these young oysters was practically negligible during the period June 13 to October 20. See table I & II for additional details.

Pownal - Vernon area. This area suffered a heavy mortality of over 65% of its oyster population during 1938. During the past year no appreciable numbers of adult oysters, or perhaps more correctly marketable oysters, could be located. The surviving oysters are mainly one and two years old, all below the marketable size. Only very slight traces of the disease were found and the mortality was negligible.

The surviving oysters in the Charlottetown region are mostly young and below the marketable size. Mortality among them was negligible during the past year and a good rate of growth was shown. There are now sufficient young oysters in the Charlottetown region to form the nucleus of a replenishing stock of the native variety. These oysters would probably be killed by a reoccurrence of the disease in the near future. Evidence from Malpeque and Enmore indicates that a reoccurrence is quite likely.

Enmore river. Approximately 45% of the Enmore 1937 spat which was alive in November, 1938, died during the past winter. About 5% of the winter survivors died during the period June 12 to October 23 and the majority of these deaths occurred in the early part of the summer. (See Table II). This mortality is only about one-fifth that which occurred during a similar period in 1938. The percentage of oysters observed with disease symptoms was also very small compared with the percentage observed in a similar period in 1938. The survivors did not show a very good rate of growth.

INTRODUCED OYSTERS

Transfer experiments were carried on in a number of localities in the diseased area. These experiments were designed to test the susceptibility of oysters brought in from other regions to the disease. The first experiments were carried out in 1937; they were continued and enlarged in 1938; and in 1939 the first of a series of large-scale experiments was begun.

Oysters from Wallace, Nova Scotia, have been held in trays since early 1937. Up to the end of August, 1939, 85% of them had died. The heavy mortality was not unexpected as they had been brought from an area that has never been affected by the disease so far as is known.

At Brackley bay oysters from Malpeque bay have been located on a private lease since 1937. To date these oysters have not shown any significant mortality. These oysters have shown exceptionally good growth and have spatted successfully for the three years. Details are available in table I.

Oysters from Malpeque bay were held in floating trays at Seal river in the Pownal-Vernon area from 1938. Six percent died during the winter and about 2% died during the period June 15 to October 21. This percentage is not of a significant character. Growth was good.

One hundred barrels of Malpeque oysters were placed on an old oyster bed in Johnson's river, a tributary of Hillsborough river, in June. At the end of October the

mortality was within the normal figure expected following the transfer of oysters from one place to another. It is hoped to collect disease resistant spat from these oysters.

At Enmore river 1937 Malpeque spat has been held in floating trays under conditions similar to the native Enmore spat already referred to. From the time that they were placed in the trays (June, 1938) to the present none have died and no indication of a diseased condition has been observed. Compare with the heavy mortality which has taken place among the Enmore natives. The Malpeque spat has grown rapidly and is now at an average size which is twice that attained by the surviving Enmore natives in an identical length of time and under the same growing conditions.

In no instance was a Malpeque bay oyster found in the diseased areas which exhibited any of the disease symptoms.

These transfer experiments indicate quite definitely that oysters native to Malpeque bay have a strong resistance to the disease which has in the past three or four years killed off the oyster population in the Charlottetown region. Therefore, the best method of re-establishing the industry in the diseased areas seems to lie in the use of Malpeque stock. Nucleus stocks of Malpeque bay oysters should be placed in suitable locations and from these beds the various areas could be built up gradually from spat collections.

Hydrographic data were obtained at the stations during each of the visits made. This is incorporated into the report as an appendix.

TABLE I.

RECORD OF DISEASE AND MORTALITY AMONG OYSTERS IN ELLIOT RIVER, 1939

Date	Yorke point			Long creek		McEachern's wharf		
	No. Exam.	No. Diseased	No. Dead	No. Exam.	No. Diseased	No. Exam.	No. Diseased	No. Dead
June 16	102	0	Placed 150 in a group for mortality estimation	29	0	38	0	Placed 100 in a group to facilitate the estimation of mortality
Aug. 9	80	3	1	33	0	25	0	0
Aug. 29	174	1	0	42	1	30	1	1
Oct. 20	98	1	2	49	0	34	0	0

RECORD OF DISEASE AND MORTALITY AMONG OYSTERS IN THE NORTH (YORKE) RIVER, 1939

Date	Brighton			North river road	
	No. Exam.	No. Diseased	No. Dead	No. Examined	No. Diseased
June 16	50	0	Placed 75 in a group	19	0
Aug. 9	50	0	0	24	0
Aug. 29	44	1	0	16	1
Oct. 20	42	0	0	37	0

TABLE I. (CONTINUED)

RECORD OF DISEASE AND MORTALITY AM NG NAIPE UE OYSTERS IN BRACKLEY BAY, 1939

Date	No. Examined	No. Diseased
June 13	40	0
Aug. 9	40	0
August 29	40	0
October 19	40	0

RECORD OF DISEASE AND MORTALITY AMONG NATIVE AND INTRODUCED OYSTERS IN THE HILLSBOROUGH R. 1939

	Natives			Scotchfort			Wallaces			Mt. Stewart		Apple-Tree wharf	
Date	No.Exam.	No. Diseased	No. Dead	No.Exam.	No. Diseased	No. Dead	No.Exam.	No. Diseased	No. Dead	No.Exam.	No. Diseased	No.Exam.	No. Diseased
June 13	trays	still	sunk	ot	Corranbann					48	0	62	0
Aug. 9	15	0	9	10	0	6				33	0	51	0
Aug. 30	Not	visited		Not	visited					45	0	66	1
Oct. 19	Unable to reach trays			--	--	--				39	0	73	0

TABLE II.

RECORD OF DISEASE AND MORTALITY AMONG MALPEQUE OYSTERS AT ST JOHNSTON'S R.

Date	No. Examined	No. Diseased	No. Dead
	1939		
June 15			
Aug. 7	15	0	
Aug. 30	15	0	
Oct. 21	25	0	

RECORD OF DISEASE AND MORTALITY AMONG NATIVE OYSTERS AT RED POINT WHARF (HILLSBOROUGH R.)

Date	No. Examined	No. Diseased	No. Dead
	1939		
June 15	40	0	Placed 200 in a group
Aug. 7	29	0	0
Aug. 30	55	0	1
Oct. 21	51	0	4

RECORD OF DISEASE AND MORTALITY AMONG NATIVE OYSTERS IN THE MISCOU-MONCTON AREA

	Malpeques at Seal R.			Natives at Seal R.			Natives at Pownal		
Date	No. Examined	No. Diseased	No. Dead	No. Exam.	No. Diseased	No. Dead	No. Exam.	Diseased	Dead
June 15	10	0	1	5	0	0	29	0	100 placed in a group
Aug. 4	10	0	1	5	0	1	154	1	0
Aug. 30	10		0	5	0	3	162	0	1
Oct. 21	10	0	2	5	0	1	40	0	0

TABLE II. (CONTINUED)

RECORD OF DISEASE AND MORTALITY AMONG NATIVE AND INTRODUCED OYSTERS

AT ENMORE

	Malpeques (1937 spat)			Malpeques (adults)		Natives (1937 spat)		
Date	No. Exam.	No. Diseased	No. Dead	No. Exam.	No. Diseased	No. Exam.	No. Diseased	No. Dead
June 12	25	0	0	20	0	50	0	16
Aug. 10	25	0	0	20	2	50	2	38
Oct. 23	25	0	0	20	0	50	1	8

1,100 Enmore 1937 spat alive on June 12. Total.....62

Mortality....5.5%

HYDROGRAPHICAL RECORDS 1939

Mt. Stewart

Date	Time	Tide	Surf. Temp.	Surf. Salinity
June 13	4.10 p.m.	Full E	21.9	19.0
August 8	11.50 a.m.	1/6 R.	24.6	19.3
Aug. 30	5.45 [illegible]	1/5 [illegible]	21.4	22.0
Oct. 19	11.15 a.m.	1/4 R.	4.0	17.0

Scotchfort

June 13	2.45 p.m.	4/5 E.	21.4	20.1
Aug. 8	10.10 a.m.	4/5 E.	24.5	19.6
" 30	6.55 a.m.	1/4 R.	21.3	21.2
Oct. 19	9.30 a.m.	Full E.	4.4	18.4

Johnston's R.

June 15	2.15 p.m.	Full E.	20.6	20.0
Aug. 7	10.00 a.m.	1/5 R.	23.3	21.6
Aug. 30	9.30 a.m.	3/4 R.	21.0	23.5
Oct. 21	3.45 p.m.	3/4 R.	9.8	26.7

Brackley bay

June 13	9.05 a.m.	4/5 E.	20.4	26.9
Aug. 9	3.15 p.m.	1/2 R	20.5	27.0
Aug. 29	9.10 a.m.		22.5	28.6
Oct. 19	3.35 p.m.	1/2 E.	4.2	28.0

Yorke point

June 16	3.00 p.m.	1/5 R.	16.0	27.5
Aug. 9	7.00 a.m.	1/6 R.	19.0	27.8
Aug. 29	4.15 p.m.	1/6 R.	23.8	30.1
Oct. 20	10.40 a.m.	1/6 R.	10.6	28.2

Brighton

June 16	1.50 p.m.	Full ebb	16.5	27.0
Aug. 9	5.00 a.m.	ebb	19.0	28.1
Aug. 29	3.00 p.m.	ebb	23.6	29.7
Oct. 20	9.40 a.m.	Full ebb	10.5	28.0

HYDROGRAPHICAL RECORDS 1939 (CONTINUED).

Long creek

Date	Time	Tide	Surf. Temp.	Surf. Salinity
June 16	4.20 p.m.	1/4 R.	17.1	24.7
Aug. 9	8.30 a.m.	1/4 R.	20.5	24.1
Aug. 29	5.45 p.m.	1/4 R.	24.6	25.8
Oct. 20	11.50 a.m.	1/5 R.	10.5	27.0

North river

June 16	5.45 p.m.	1/3 R.	17.0	24.9
Aug. 9	10.30 a.m.	1/3 R.	21.0	25.5
Aug. 29	2.05 p.m.	4/5 ebb	26.8	25.0
Oct. 20	12.45 p.m.	1/4 R.	10.5	24.1

Pownal

June 15	11.30 a.m.	3/4 F.	19.8	27.0
Aug. 4	7.30 a.m.	1/6 R.	19.5	28.4
Aug. 30	5.05 p.m.	1/6 R.	21.0	28.9
Oct. 21	11.35 a.m.	1/6 R.	7.5	27.0

Seal river

June 15	12.45 p.m.	4/5 F.	21.0	26.5
Aug. 4	9.35 a.m.	1/4 R.	20.1	27.0
" 30	6.15 p.m.	1/5 R.	22.3	27.0
Oct. 21	10.15 a.m.	Full F.	8.3	27.0

Kinmore

June 12	2.30 p.m.	1/5 F.	23.4	24.0
Aug. 10	2.15 p.m.	Full F.	26.5	25.1
Oct. 23	8.15 a.m.	4/5 R.	8.0	24.5