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Preliminary report on mortality of oysters in Hillsborough river and Brackley bay and on the problem of oyster diseases generally.

by

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FISHERIES RESEARCH BOARD OF CANADA

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A serious mortality of oysters has occurred during the past season in Hillsborough river and in Brackely bay. It became apparent during the 1936 fishing season and this preliminary report is intended to bring together the rather inadequate picture of the situation which is available and to suggest some possible explanations and plans. It is prepared hurriedly and must not be considered in any way a finished report on the subject but only a very preliminary survey of the situation.

Mortality in Hillsborough River. In 1935 the Department of Fisheries dredged in the deep water of Hillsborough river near Scotchfort 454 barrels of mixed small oysters and shell for sale to lessees of oyster areas in neighbouring north shore bays. The public fishery in that year had an apparently normal yield. No evidence of any abnormal mortality was seen.

In 1936 spat collection trials were conducted at Scotchfort in the course of which apparently normal spawning of oysters on a shallow bed there was followed. A good "set" was obtained and up to late in November showed a normal survival. No abnormal mortality was in evidence in these operations.

Repetition of the dredging of small oysters for sale to oyster growers was planned for 1936. Exploratory dredging, however failed to discover sufficient supplies without encroaching on the public fishery, although good quantities of oysters were available in the channel of West river. This dredging was confined in East river to the rather limited area of channel where confliction with the public fishery would be avoided - i.e., it did not include public fishing grounds of any importance. While many empty shells were obtained on the area dredged in 1935 no dead or dying oysters with the meats in them and no oysters with evidence of disease were found. As the proportion of live oysters in the material dredged was falling towards the end of the 1935 operations and as the shells might have been stirred up from lower levels a heavy mortality was not in evidence. Although some of the oysters appeared to have died recently, other explanations were sufficient.

At the beginning of August some difficulty was encountered in obtaining two or three barrels of live oysters in the immediate vicinity of Charlottetown for transfer to Brackley and Tracadie bays in experiments in purification by the health authorities. However, tides were not favourable and no abnormal oysters were found. When the oysters, after planting on firm bottoms in Brackley and Tracadie bays, were examined again in the middle of September it was found that about a third were dead (28 out of 87

in one lot which had been marked). While this was suspected it might have occurred without disease and been due to rough handling, warm weather, etc. Oysters were examined and kept in the air under observation. There were, however, no definite indications of disease, although the oysters were not in the best conditions, and the oysters kept did not open unusually quickly.

The opening of the fishing season at the beginning of October, however, brought conclusive evidence that a heavy mortality had occurred. No oysters were obtained in East river in commercial quantities except for a very few in the Pisquid vicinity. It was thought that as the season advanced supplied of live oysters might be located and the losses be found not as heavy as at first indicated. It has turned out, however, that, although fair quantities have been fished in West river, the fishery in Hillsborough river has been practically wiped out. While no dead or dying oysters with the meats still in them were reported, practically nothing but empty shells was found in a number of places where large quantities of small or poor quality oysters were known to be present at the close of the 1935 season.

It must be concluded that a heavy mortality occurred and that this was principally in the late summer of 1936.

Brackley-Covehead and other north shore bays. The oysters from Hillsborough (East) river sold to lessees in these bays in 1935 met with varying success. In Rustico bay poor survival was reported. In Brackley bay examination on August 10, 1936, of those planted by W. A. Seaman showed only about 10% dead of those which were alive when planted. Inspector Shaw reported similar conditions on the area of J. P. McIntyre in Savage harbour. In Tracadie bay near Corranbann a much smaller percentage was found alive on the area of messrs. Court but bottom conditions where the oysters were put out, was sufficient explanation. Another planting of large oysters in that vicinity made later in the season was a complete loss but the conditions under which the transfer was made were poor.

The material sold to the lessees included a large proportion of empty shells (apparently due to over-crowding) which made careful examination necessary to estimate mortality after planting. The older empty shells could be eliminated by the presence of limpets, barnacles, etc. on the inside. Up to the beginning of August there is no evidence of serious mortality in this material not attributable to careless planting on poor bottom, and no epidemic was in evidence. On the other hand the growth had been poor- a common occurrence with transferred oysters in the early part of the next year.

Some losses of other oysters were reported in Brackley bay which might have been due to shifting bottom but no conclusive evidence of a general mortality appeared until autumn. Further information is yet to be procured when returns are obtained from each grower but present indications are that there has been a serious mortality of both planted and native oysters in Brackley bay - probably as complete as in Hillsborough river. There is no evidence of native oysters in Rustico bay being affected and the conditions in Savage harbour and Tracadie bay in this regard are doubtful - practically no native oysters being present in the latter.

Apparently an epidemic disease. The mortality in Hillsborough river and Brackley bay has been too complete to be explicable on the basis of over-fishing, shifting of bottom, starfish or other common normal causes of death among oysters. An epidemic disease seems the probable explanation and the only one in view which appears acceptable.

In view of the large quantities of oysters transferred from Hillsborough river to Brackley bay in recent years it seems highly probable that the same disease is responsible in the two inlets. The "Malpeque disease", which caused the almost complete mortality in Malpeque and Cascumpeque bays and their tributaries, caused oysters introduced in the autumn of 1929 to die in the late summer of 1930. If this is the same or a similar disease the introduction of the micro-organism responsible probably occurred in 1935 or earlier to allow for growth of the epidemic to affect so large and area. The disease may, therefore, have been carried to the other north shore bays although not yet epidemic there.

It seems probable that the epidemic will spread in the next year or two to West and North rivers (the other two branches of Charlottetown harbour) and possibly also to Pownal bay and Vernon and Orwell rivers.

Perhaps the "Malpeque Disease". In a report in 1931 it has been pointed out that the disease was apparently still present in Malpeque bay as late as 1929 and the local oysters resistant to it. Oysters introduced from East river, and Percival and Enmore rivers, in1928 and 1929 practically all died late in the next summer while local Malpeque oysters planted under the same conditions were not affected.

Supposing the micro-organism responsible for the Malpeque disease to be present there, it may have been carried to Hillsborough river and thence to Brackley bay. No oysters from the Malpeque area are believed to have been deliberately planted in those inlets and so far as is known, no gear used in the Malpeque bay area was used in Brackley bay other than spat collection materials used in 1936, but fishermen from Grand river have gone in 1934 and 1935 with their dories and tongs to East (Hillsborough) river. Their headquarters were at Apple-tree wharf about midway between Charlottetown and Scotchfort and in the middle of the affected area.

This, which is the only source of such a disease definitely in view, may well have been responsible for the epidemic.

Implications if it is the "Malpeque disease". If the mortality in Hillsborough river and Brackley bay is due to a spread of the "Malpeque disease," which on admittedly doubtful grounds appears somewhat probable, there are a number of important implications.

1. The disease was slow in its action and may, therefore, have been introduced into the other north shore bays without being yet epidemic.
2. The "Malpeque disease" spread, over a number of years, from southern Malpeque bay to Kildare river and the same disease would be expected to spread to the other Charlottetown inlets and probably to Pownal bay and Vernon and Orwell rivers.

3. If it is the "Malpeque disease" it demonstrates the difficulty of preventing its spread as it is highly improbable that any oysters were taken from the Malpeque area to Hillsborough river deliberately as oysters are definitely of more value in the Malpeque area than in Hillsborough river. This is a very important consideration as it means that all other oyster areas in the province are in danger (as well, perhaps, as those outside). In the case of small areas such as Wolf Inlet it might be better policy to develop them by introducing Malpeque stock than to slowly build up an industry with a limited local stock which would be in constant danger of the introduction of the disease.

4. If it is the "Malpeque disease" the Malpeque industry is not in danger as the oysters there are apparently resistant.

5. If it is the "Malpeque disease" and Malpeque oysters are resistant the industry can be re-established more quickly by using that stock than by awaiting natural recovery of the local stock. In the case of the oyster farming in the north shore bays this might be fairly rapid by making it premissible for lessees to obtain seed stock from the Malpeque area. In the case of Hillsborough river it would be more difficult but still probably beneficial.

Perhaps a different disease. If a different disease (or no disease) is responsible for the mortality in Hillsborough river and Brackley bay investigations are just as necessary and quarantine measures must be considered. In that case the industry in the Malpeque area would be in greater danger although the spread of the mortality from one area to another would not be indicated.

Need for investigation. The "Malpeque disease" is known to us principally through the mortality which it caused, its spread, the apparent resistance of local Malpeque oysters to a mortality affecting introduced oysters etc. The micro-organism responsible is not known and the symptoms are not sufficient to diagnose the disease definitely. It seems highly desirable that as much as possible be learned of the present disease. The symptoms should be closely studied, an attempt made to find the micro-ortanism and the progress of the disease in the next few years closely observed.

The lack of sufficiently definity symptoms and the small number and irregularity of the observations make it impossible to give any opinion on this basis as to the identity of the mortality in Hillsborough river with the "Malpeque disease". This applies also to other areas. In Egmore and Percival rivers, for example, the presence of such a disease was suspected in 1933 but no definite evidence forthcoming. In that region, as in many others, the fishery has fluctuated so much in the past thourgh variations in the success of reproduction that the failure of the fishery in itself cannot be considered evidence in this regard. The close and continued observations at the right season necessary to discover the dying oysters have not been possible in any suspected case.

An attack on the whole problem is needed and it would seem that investigations in the Charlottetown inlets and in Brackley bay should be made next year. Without attempting at this stage to outline a complete program some lines of attack may be mentioned.

1. The spread of the disease in the Charlottetown inlets should be followed closely by observing samples of oysters at close intervals throughout the coming season.

2. Microscopic examination of affected oysters and possibly attempts to infect oysters should be made to try to identify the micro-organism responsible and to establish definite symptoms.

3. The introduction of Malpeque oysters into Brackely bay might be tried. If they are unaffected and resistant it would provide a basis for re-establishing the affected areas. As the stocks are already largely destroyed and no oyster cultural efforts will be made by private individuals until investigations give favourable results, there is no additional danger involved, commensurate with the prospects for advantages.

4. Hearing of spat collected at Scotchfort in Hillsborough river in 1936 and further spat collection should be tried. It is reported that following the epidemic in Malpeque bay "sets" occurred but that a high proportion of the spat died at an early age. The occurrence and survival of "sets" at such a time is an important subject both as regards the re-establishment of the oyster population and as regards the recognition of the occurrence of the disease in other areas.

Summary. A serious mortality in Hillsborough river and Brackley bay has destroyed the oyster industries there. It may well be due to an indroduction of the "Malpeque disease" in which case there is little danger to the Malpeque industry and some prospects of using Malpeque stock to advantage in re-establishing the oyster industries in the affected areas. In any case the problem of oyster disease is brought to the front and investigations should be pressed next year. The whole policy in regard to quarantine and transfers of oysters from one inlet to another must be reconsidered carefully. The subject is covered in only a sketchy manner in this huriedly compiled preliminary survey of the situation.

Ellerslie, P.E.I.,
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