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Virginia Institute of Marine Science
(Virginia Fisheries Laboratory)
Gloucester Point, Virginia

Special Report No. 1
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STATUS OF DISEASES OF OYSTERS IN CHESAPEAKE BAY

By
Jay D. Andrews and J. L. Wood



Oysters in lower Chesapeake Bay survived the ravages of Dermo-
cystidium during some hot summers in the past decade only to be scourged
by a new disease (MSX) which appeared in 1959. We had learned to live
with Dermocystidium by avoiding infected seed and by limiting the number
of hot summers that oysters were held in infested areas. Now we are faced
with the more difficult problem of adjusting to MSX, which is a devastating
killer of oysters. The beginning of a new season of planting seed is an
appropriate time to review our knowledge of the various diseases of oysters.

MSX

MSX is continuing to kill oysters in lower Chesapeake Bay at a rate
prohibitive to oyster planting. New disease-free seed imported to such
areas as Mobjack Bay, Hampton Bar and Gloucester Point, experienced mort-
alities beginning in August and September 1961, just as in 1960. The hope
that isolated plantings would survive in areas such as Mobjack Bay where
most oysters had been marketed or had died has not been fulfilled. There
has been no important extension of areas afflicted with MSX and no notice-
able retreat of MSX from oyster areas in 1961.

Seasonality of Infection and Deaths

MSX kills oysters mostly in the summer and fall, from June through
November. Apparently most infections also occur during this period when
oysters are dying. The time of first kill depends upon the time of
planting. It may vary from 6 weeks after infection to 8 months. A useful
rule-of-thumb is that oysters infected in early summer die in late summer

and those infected in late summer die the following early summer. A small late winter kill occurs in populations which have had previous losses from MSX. Oysters infected for the first time in late summer do not exhibit a late winter mortality.

Losses from MSX are usually about 50 per cent the first year and slightly less each succeeding year. Once a bed is infested, oysters continue to die throughout the year with greatest losses occurring from July to October.

Distribution and Status of MSX by Areas

The opening of James River seed beds on 1. October poses these problems for each planter: (1) where can disease-free seed be obtained and (2) where is it safe to plant? A review of present knowledge by areas should be helpful, although each oysterman must accept responsibility for his decisions.

1. James River. As far as we know, seed above Wreck Shoal is free of MSX. Last winter one-third of Wreck Shoal oysters had MSX from mid-summer infections. Most of these oysters got rid of the disease and there was no appreciable kill. Recent samples showed a low level of about three infections in 25 oysters on Wreck Shoal. Samples were taken close to the channel but oysters inshore and in shallower water apparently did not get infections. Oysters at Brown Shoals continue to die and show considerable MSX. The lower part of the seed area should be avoided, particularly by planters in disease-free or border-line areas. Hampton Roads and the lower parts of its tributaries are infested with MSX. These areas should not be used as seed sources in disease-free areas and planting in Hampton Roads is risky.

2. York River and Mobjack Bay. It is not possible to give any detailed advice on safe planting areas in the tributaries of Mobjack Bay.

Oystermen can best judge where it is safe to plant by recent experience. If heavy unexplained losses with the timing of deaths described in this report are observed, there are strong reasons to suspect that MSX is active. In our experience no area once infested with MSX has been found subsequently to be free of the disease.

Losses have been reported up the York River as far as Clay Bank but our trays outside of Fox Creek (above Capahosic) have shown no evidence of MSX kills. Recent samples from B. M. Bunting's ground about opposite Clay Bank revealed two infections in 25 oysters.

3. Rappahannock River. Some losses were experienced at the mouth of the Rappahannock River in 1960. Spring samples showed an increase in MSX below Hoghouse. We presume that extensive losses resulted but this area has not been rechecked. There has been very little evidence of MSX activity at Hoghouse and higher in the river. Recent samples, including one from a private ground above Urbanna Creek where losses had been quite heavy, show no disease (one case of MSX in 25 oysters at Hoghouse was an exception). Public grounds and private beds (except one) examined show no recent deaths and if this is generally true, it is almost certain that no losses from MSX will occur now before June and July 1962. Beds which look normal now undoubtedly escaped early summer infections and there is no reason to expect late summer infections. In short, the prospects look excellent for oyster culture in the upper Rappahannock River above Hoghouse.

4. Potomac River. Not much is known about the Virginia tributaries of the Potomac. No MSX has been found in samples from Nomini Creek. MSX-infested oysters were found at the mouth of the Great Wicomico in 1960.

5. Pocomoke Sound. No recent samples have been collected from Pocomoke Sound but MSX was found in abundance all the way to the Maryland line in 1960. Presumably retreat to low-salinity waters is the only safe

course of action in this area.

6. Bayside Creeks of Eastern Shore. There are so many creeks it is not feasible to sample enough to draw lines of distribution for MSX. Oystermen must rely upon experience with individual beds based upon the magnitude and the timing of losses to judge whether MSX is active. Cherrystone Creek and the Gulf are two areas of regular sampling where MSX is known to occur in abundance. Creeks higher up the peninsula are less salty and may have better prospects.

7. Seaside of Eastern Shore. Nature is always reluctant to give up all her secrets and Seaside has more than its share in respect to Dermocystidium and MSX. MSX was first found on Seaside in October 1958. It is present in all areas we have sampled and as many as five cases in 25 have been observed, yet no epidemic has occurred. This is a most fortunate situation for Seaside oystermen and we hope this status is maintained. It has been argued that Seaside oysters are more resistant to MSX than others and this may be true in part, but James River oysters moved to Seaside have so far shown the same exemption from losses.

Dermocystidium

Dermocystidium, the fungus disease of oysters, has so far been at a relatively low level in 1961. Very few oysters with infections survived from 1960 mortalities. This has reduced and delayed infections this summer. Hot weather in early August and early September has resulted in a rapid increase in Dermocystidium infections and it is now an important cause of deaths in areas where old oysters were left. Late summer and fall deaths of oysters can be caused by MSX or Dermocystidium or both.

Seaside Organism (SSO)

During our monitoring studies for MSX on Seaside, we encountered a new disease of oysters caused by an agent which we call SSO (Seaside

Organism). It kills oysters in a short epidemic in May and June before MSX kills abundantly. Losses are usually of the magnitude of 10 per cent each year in young oysters of typical plantings. If such oysters are held an extra year, as many as 50 per cent may die from SSO. This disease seems to have been on Seaside for a long time and presents no serious threat to industry. Quick growth and early harvesting are the keynotes for avoiding SSO losses. Spat and yearlings are not bothered much by SSO but thereafter losses can be expected each May-June that oysters are left on the beds. It is apparently restricted to the very high salinity waters of Seaside for the most part and probably cannot persist in Chesapeake Bay.

Future Research Efforts

In the past two years, we have expended a considerable amount of effort examining samples of oysters for oystermen to form a basis for predictions and warnings. We believe that effort in other directions will bring more benefit now. Most important are the efforts to breed resistant oysters and to learn more of the life history of MSX. We will continue to watch over major growing areas for signs of improvement and we think oystermen should also make and watch trial plantings. There is still much to be done in our attempt to understand border-line areas where the disease comes and goes. It will be almost impossible to follow and predict events in such areas.

The Institute has had excellent cooperation from oystermen in its studies. We would appreciate continued advice and warnings of possible trouble.

MEMORANDUM TO OYSTERMEN

FROM

William J. Hargis, Jr., Director
Virginia Institute of Marine Science
(Virginia Fisheries Laboratory)
Gloucester Point, Virginia

In the last two and a half years research activity at the Virginia Institute of Marine Science (Virginia Fisheries Laboratory), has almost doubled. Much of this increase has been devoted to projects of direct benefit to the oyster industry. All projects receiving state support have been designed and carried out with the welfare and interests of the various marine industries and the general marine economy in view.

Even those projects which are not directly concerned with shellfish and finfish but fall under such subjects as hydrography (oceanography), the effects of engineering projects on the marine environment, pollution research and plankton research are of immediate and long-term interest to the commercial and sport fishing industries, and particularly to the shellfishery industries. All interested persons must certainly be aware that an understanding of currents is important in following movements of finfish, crab and oyster larvae; that engineering projects (dams, channels, salt-marsh drainage) may affect all marine organisms; that pollution or sublethal contamination may be a serious problem; and that finfish and shellfish larvae are always directly dependent upon plankton for their food. These are the practical reasons for the Laboratory's interest in the subjects listed.

All the Institute's list of state-supported projects contribute to our knowledge of the factors affecting fisheries. Most of the grant-supported projects are also of this nature. A few projects, grant-supported, are of more academic nature, but these enhance the scientific

and cultural stature of the Laboratory and the Commonwealth and enable us to compete more favorably for research funds and for qualified personnel. In short, the entire marine program of the Institute is a credit to the Commonwealth and promises much to the commercial and sport fishing interests. It deserves your constructive support. It is important to remember that the broad approach to research (including both basic and applied aspects) almost always yields greater dividends than a too-narrow approach.

Though no cures have been developed, the mortality and microbiology-pathology programs, expanded in 1959, have been very fruitful. Since late summer 1959 the Laboratory has, through continuous contact with oystermen, given out much information concerning the spread and incidence of MSX. This information has permitted considerable saving to the industry. Almost all planters operating in areas of heavy infestation have been able to avoid, in some measure, some losses as a result. This has been of direct economic benefit to the industry.

Virginia's oyster industry is still in great trouble. Many oyster planters are still suffering severe losses. The Institution pledges its efforts to alleviate this cause of economic hardship.

For oystermen in favorable, uninfested areas these mortalities create, paradoxically, greater opportunities. It is also important that these planters be given all available information to enable them to fully develop and benefit from their opportunities. This the Institute will continue to do.

Special Report No. 1 is a continuation of the Institute's information service to the industry and is circulated in the hope that it will facilitate better advance planning for the 1961-62 oyster season.