Hexamitiasis of Ostrea edulis L. and Crassostrea virginica (Gmelin)

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*Abstract

Certain types of recurring mortalities have been observed for years in oysters of Holland (*Ostrea edulis*). Oysters shipped as seed from France are often referred to as "weak" because subsequent to transplanting to Dutch waters considerable mortalities are expected. Also a disease known in Holland as the "pit disease" often takes heavy toll of oysters held for market in temperature controlled basins during the winter. In an effort to learn more about the cause of death in these cases oysters have been sectioned for histological study in the hope that if an organism is the etiological agent of the mortalities it could be detected microscopically.

Such an organism has been observed and studied. In one group of live oysters of French origin three out of eight sectioned were found to be infected by a species of the flagellate genus Hexamitus. In two of these the infections had progressed to the point of producing obvious histologic damage. In another group of six moribund oysters from a holding basin at Bergen op Zoom, all were heavily infected by the parasites. Other normal oysters failed to show infection, or contained a few flagellates only.

Hexamitus is a genus at present known to infect trout and other fish, both in Europe and America, and also occurs in insects. A condition known as "pin head disease" is caused in trout and has been reported on by Moore and Davis. Although the trout disease is known in nature, it is predominantly a hatchery disease and the pathological effect on the host seems to be in proportion to the severity of handling procedures in shipment. It may be significant that handling of oysters also seems to increase liability to development of Hexamitiasis. As for the oyster, the fact of flagellate infection has been long known. Certes reported finding Hexamitus and is apparently the first to do so. Orton, while studying mortalities of oysters in England found flagellates in sick oysters (hockleys). He called them Bodo, obviously a misnomer since he figures intracellular stages of Hexamitus but failed to recognize them as such. In America the credit for original discovery of Hexamitus in oysters belongs to Dr. L. R. Richardson, who while investigating mortalties of Malpecque Bay oysters in Canada, found the parasites and reported his findings. His report was mimeographed but not published; a copy was presented to the authors by Dr. R. R. Logie. In a conversation with the senior author Dr. Richardson stated that he believed that the flagellates were the cause of the Malpecque Bay mortalities reported by Needler and Logie so it is certain that he appreciated the possible pathological role of Hexamitus.

Morphologically Hexamitus of oysters is similar to but quite distinct from *H. salmonis* (Moore) of trout. The trophozoite has eight flagellae of which two are trailing. The double nucleus is quite compact and in sectioned material appears usually as a single mass at the anterior end. The axostyles are unique in being curved and spread wide apart, and in the tissues of the oyster they appear very much like prongs of a closed safety pin. Cysts are spherical and

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have two or four nuclei. Intracellular stages (in leucocytes) are common in oyster tissues.

In the oyster infection is primarily of the blood sinuses and arteries. They also penetrate connective tissues surrounding the tubules of the digestive gland. Masses of the trophozoites may be sufficient to produce occulsion of vessels, and large visceral abcesses result from destruction of connective tissue. Leucocytes are attacked by the parasites which become intracellular. Most of the details of the cycle are unknown.

A few oysters infected by Hexamitus have been found in Barataria Bay, La., but the disease is apparently not common on the Gulf Coast. Present data indicate that the parasites are acclimated to low temperatures (below 5° C) but the upper limits are not known. It is probable that Gulf Coast temperatures are above the optimum, but that may not be true of the east coast of the United States.