

Mikrocytosis

Overview

- Affected species include *M. mackini* affect Pacific oyster (*C. gigas*) and the Olympia oyster ((*O. conchaphila* (=*O. lurida*))) Experimentally American oyster (*C. virginica*) and Native oyster (*O. edulis*) have been infected
- Outbreaks appear to be restricted to 2 year plus oysters usually occurring during the spring from April to May after prolonged periods (3-4 months) when water temperatures are less than 10°C.
- Can cause serious economic losses in oyster fisheries
- No treatment
- Notifiable disease in the UK
- Mortalities of up to 40% in 3-year-old oysters
- Known to be widespread on the west coast of Canada, and parts of USA.

Introduction

Mikrocytosis, also known as Denman Island Disease, is a disease of oysters that can cause mortalities of up to 40% in affected species. The disease occurs predominantly during the spring (April and May), and it seems to affect oysters more than 3 years old; as a result its effect on farmed stock is thought to be limited, as harvesting of farmed stock usually takes place within 3 years.

However experimental work has shown that spat can also suffer high mortality as a result of infection, although it is believed that the risk of infection in spat can be minimised by introducing stock after the transmission period that occurs in the spring.

Transmission of the disease is horizontal, from host to host via the water column with no intermediary stage being involved, and is probably acquired across the gills whilst feeding.

The aetiological agent is an intracellular protistan, *Mikrocytos mackini*, which causes microcell disease.

Geographical distribution

The disease is widespread on the west coast of Canada, probably ubiquitous throughout the Strait of Georgia and specific locations around Vancouver Island, and areas of Washington State, USA.

To date *M. mackini* has not been found in oysters in the UK.

Susceptible species

M. mackini affects the Pacific oyster (*Crassostrea. gigas*), the Native oyster (*O. edulis*), the American oyster (*C. virginica*) and the Olympia oyster (*Ostrea lurida*).

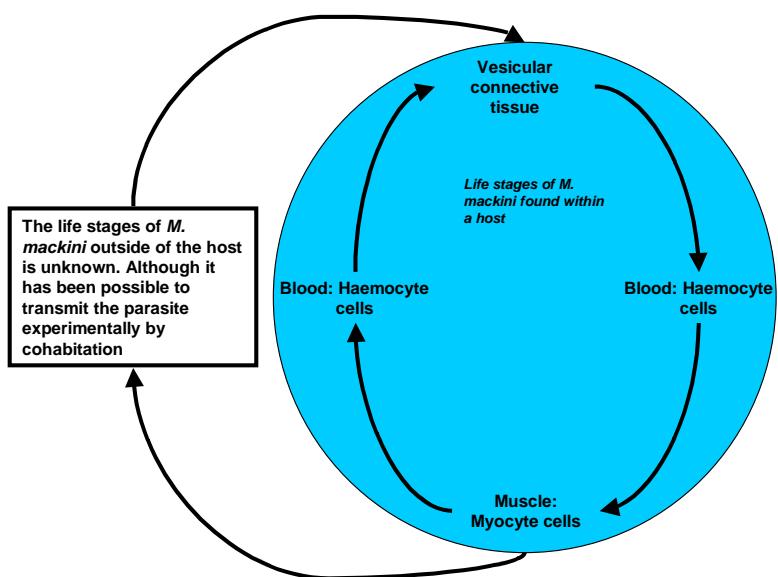
Epizootiology & clinical signs

Severe outbreaks of Mikrocytosis appear to be restricted to oysters over 3 years old, and usually occur during the spring from April to May after prolonged periods (3-4 months) when water temperatures are less than 10°C. Although oyster spat have been experimentally infected, farming methods mean that natural infections have not been reported.

Clinical signs include dead and gaping oysters found in the spring, gross examination of affected oysters may reveal focal lesions predominately of the vesicular connective tissue. These lesions may develop into pustules, abscesses and ulcerations in the area of the mantle often with corresponding brown scars on the shell. These symptoms are similar to that of many shellfish diseases and there are no pathognomonic signs that are specific to infection with *M. mackini*.

The exact life cycle of *M. mackini* remains unknown, although it has been proposed that development takes place within the host's connective tissue, adductor muscle fibres and haemocytes. The fate of the parasite outside the host is unknown, although cohabitation trials show that transmission from host to host occurs with no intermediary stage.

Hypothesized life cycle of *M. mackini*



Diagnosis

Histology is the most commonly used diagnostic tool for surveillance and monitoring programmes. Microscopic examination of the vesicular connective tissue, haemocytes within lesions and muscle cells may show the presence of the parasite.

Treatment and control

There is no known treatment for the disease, however management strategies can prevent the introduction and control the spread of infection. As with all disease, avoidance is the best policy; avoiding moving infected oysters into an uninfected area along with targeted surveillance will aid in the control of the disease.

Where the disease is present, the impact on susceptible stocks of shellfish has been reduced by moving the larger adult oysters to a higher location in the intertidal zone before March and not planting oysters before June at lower tidal levels.

References

Fish Diseases and Disorders: Vol 1 Protozoan and Metazoan Infections, 2nd Edition by P.T.K. Woo

http://www.oie.int/FDC/eng/en_diseasecard.htm

http://www.pac.dfo-mpo.gc.ca/sci/shelldis/pages/mikmacoy_e.htm

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