

Bonamiosis

Overview

- Generally limited to the genus *Ostreae* with *O. edulis* (native oyster) being the species of commercial importance. Although the Chilean oyster *O. chilensis* and the New Zealand dredge oyster *Tiostrea lutaria* are susceptible.
- Outbreaks can occur throughout the year.
- Can cause economic losses in shellfish
- No treatment
- Notifiable disease in the UK
- In the UK mortalities rarely more than 20%, can be much higher on the continent
- Known to be widespread in continental Europe

Introduction:

Bonamiosis is a disease of the native oyster, *Ostrea edulis*, affecting both wild and cultivated stocks, and is caused by the infestation of a protozoan parasite, *Bonamia ostreae*. It was first recorded in Europe in the 1970's following the investigation of oyster mortalities in French shellfish farms. The first recorded incidence in the British Isles occurred in 1982 in the River Fal. Although the disease can produce mortality rates as high as 80% in affected oysters, within the UK the prevalence of *Bonamia* is relatively low, and typically reaches 10-20% with relatively low levels of mortality.

Geographical distribution:

B. ostreae is believed to originate from the USA where it was first identified in the 1960's. The disease then spread to Europe through movements of oysters and was first diagnosed in England in October 1982, following an investigation into an unexplained mortality in the river Fal in Cornwall. Over subsequent years the disease has spread through movements of infected stock and now occurs in most of the major oyster producing areas.

B. ostreae has also been isolated in France, Denmark, Ireland, Holland, Mediterranean and Spain.

Susceptible species:

The *Bonamia* parasite is generally limited to the genus *Ostrea* with *O. edulis* (native oyster) being the species of commercial importance. Although the Chilean oyster *O. chilensis* and the New Zealand dredge oyster *Tiostrea lutaria* are susceptible.

Epizootiology and Clinical signs

The causative agent for Bonamiosis, *Bonamia ostreae*, is an intracellular plasmodial protozoan parasite (2-5µm) that affects the granular blood cells (haemocytes) of flat oysters. Bonamiosis can be lethal to *O. edulis* especially if the oyster is stressed. Clinical signs, which can take up to 5 months after exposure to appear, may consist of yellow discoloration, lesions occur in the connective tissue of the gills, mantle, and digestive gland. Infection may result in high mortalities of oysters especially when environmental conditions change or during periods of stress such as spawning.



Image showing *Bonamia ostreae* present in the haemocytes of a native oyster

The means of transmission of *B. ostreae* is uncertain, and little is known about the biology of the life cycle of the parasite. It is thought that the most likely means of transmission of the parasite between oysters is by water contact or through an intermediate host. However, studies have shown that direct transmission of the parasite can occur horizontally, from oyster to oyster, and there is evidence to suggest that entry of the parasite may occur via the gills.

Diagnosis:

Diagnosis of infected oysters is made by histological or cytological examination and molecular techniques.

Histology can be carried out using fixatives and non-specific stains. After treatment *B. ostreae* can be located within the haemocytes and/or freely in the connective tissue, gill, gut or mantle epithelium.

Cytological examination can be carried out by the use of imprints. Smears of whole juvenile oysters or heart tissue from adult oysters are fixed and stained then examined microscopically.

Molecular techniques such as Polymerase Chain Reaction (PCR) may also be used to confirm the identification of *B. ostreae* in affected oysters.

Cefas use histology to scan material for *Bonamia spp.* In areas with a known history of Bonamiasis, confirmation of infection can be made following histological identification of *B. ostreae* in a susceptible host species. The identification is then confirmed by PCR.

Treatment, and Control

There is no known treatment for Bonamiasis and therefore the only effective measure is to prevent the introduction of the disease.

To this end, controls are placed on the movement of live molluscan shellfish around the British coast. The aim of these controls is to prevent the spread of Bonamiasis by restricting live movements from positive areas in England, Wales, Scotland and Northern Ireland.

Some infected areas have had success in the management of *B. ostreae* by leaving highly infected areas fallow and reducing the stocking density.

References:

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

http://www.oie.int/eng/normes/fmanual/A_00035.htm