

BONAMIASIS

Disease:

Causative agent:

Susceptible species:

Significance:

Bonamiasis

Bonamia ostrea

Ostrea edulis (European flat oyster)

Serious threat to wild and cultivated native oyster stocks



HEALTHY OYSTER - INTERNAL VIEW

Introduction

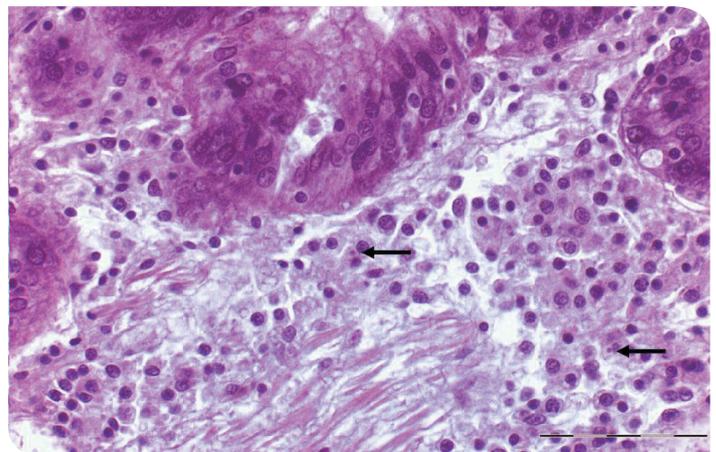
Haplosporidian microcells belonging to the genus *Bonamia* infect the haemocytes of different oyster species around the world. Infections can lead to extensive losses in cultured flat oysters. *Bonamia ostreae* was first detected in France from cultured European flat oyster, *Ostrea edulis* in 1979. The introduction and spread of *B. ostreae* in Europe are believed to have occurred through the movements of infected oyster seed from a Californian hatchery to France and Spain. Since January 1993 bonamiasis has been a notifiable (list II) disease in the United Kingdom with the introduction of the Fish Health Regulations (1992). However, from late 2008 these regulations were replaced with new legislation, namely the 2008 EC Directive 2006/88 which enables countries to prevent the spread of the disease to Approved Zones by regulating movements of live European flat oysters from infected areas to waters known to be free of bonamiasis.

Pathology

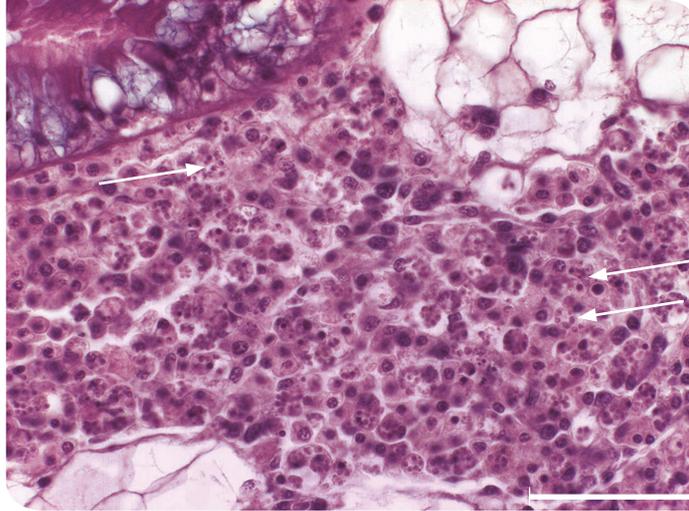
Dead or gaping oysters may be indicative of bonamiasis but these gross signs are not pathognomonic for infection with *B. ostreae* in oysters. A yellowing of the body tissues can be recorded and extensive lesions including perforated ulcers maybe recorded in the connective tissues of the gills, mantle and digestive gland. However, oysters can appear normal even though infected with *B. ostreae*.

Diagnosis

The presence of *Bonamia* spp. is observed by microscopic examination of stained histological sections of the oyster tissues. The parasite infects the cytoplasm of blood cells (haemocytes), and dense cellular accumulations, possibly indicative of infection can be observed microscopically due to infiltration of these cells especially in the interstitial tissue among gastric glands, gills



HISTOLOGICAL SECTION SHOWING VERY MILD INFECTION BY *BONAMIA OSTREA* (ARROWS) IN THE FLAT OYSTER.
H&E STAIN, BAR SCALE = 50µm



HISTOLOGICAL SECTION SHOWING HIGH LEVEL INFECTION BY *BONAMIA OSTREA* (ARROWS) IN THE FLAT OYSTER
H&E STAIN, SCALE BAR = 50µm.

and mantle lobes. In heavily infected animals parasites are also observed extracellularly, with a massive infiltration of haemocytes and necrosis of visceral tissues. New infections with the parasite can be associated with high mortality, although there are few warning signs prior to infection. The presence of the related but not notifiable *Bonamia (B. exitosa)* is distinguished from *B. ostrea* through DNA based molecular diagnostic techniques.

Transmission

The complete life cycle of the parasite outside of the host remains uncertain but direct transmission from host to host has been demonstrated by cohabitation or inoculation of purified parasites. The parasite may occur throughout the year but prevalence and intensity of infection tend to increase during the spring and summer. A prepatent period of at least three months is observed.

Significance

Bonamiosis has a severe negative impact due to the high mortality it can induce and therefore it represents a serious threat to both wild and cultivated European flat oyster stocks. The current geographic distribution of *B. ostrea* is Canada (British Columbia), France, Ireland, Italy, The Netherlands, Morocco, Spain, United Kingdom and USA (California, Maine and Washington States).

Control Measures

The prevention of exposure to known infected stocks is the most effective control measure, as there is no known treatment for the disease. Infected stocks should not be transferred to waters known to be free of the parasite.

