Infection with *Bonamia* species

Also known as bonamiosis
From *Aquatic animal diseases significant to Australia: identification field guide*, 5th edition

Signs of disease

Important: Animals with this disease may show one or more of these signs, but the pathogen may still be present in the absence of any signs.

Diseases caused by any of the microcell species are similar. In cases of light infection, few signs or no clinical or gross signs may be present. Concurrent infections with more than one species of *Bonamia* may also occur. Definitive identification of infection with *Bonamia* or *Mikrocytos* species requires histological laboratory examination and molecular diagnostic techniques.

Disease signs at the farm, tank or pond level are:

- dead or gaping oysters
- increased mortality.

Gross pathological signs are:

- stunted growth and poor condition
- weakened shell closure, leading to slight gaping
- watery flesh, pale atrophied digestive gland in clinically diseased oysters
- algae-covered shell lips after the mantle shrinks and no longer reaches the edges
- deformities to the gill margins.

Infection with *Bonamia* spp. rarely results in gross pathological signs of disease in oysters under natural conditions.—Most infections are asymptomatic.

Microscopic pathological signs are:

- microcell parasites in or near epithelia-may be in very low numbers
- microcells may also occur within haemocytes and vesicular connective tissues (especially the gill or mantle)
- individual microcells are basophilic, spherical or ovoid parasites, 2 to 3µm in diameter
- some species of exotic *Bonamia* spp. produce spores (such as *B. perspora*).

Disease agent

Bonamiosis is caused by infection with *Bonamia* spp., intrahaemocytic protists classified in the order Haplosporidia (class Ascetosporea). Both flat and cupped oysters may become infected.

This disease listing includes *B. perspora* and unidentified *Bonamia* spp., but excludes *B. exitiosa* and *B. ostreae*, which are addressed in separate disease listings.

Host range

Table 1 Species known to be naturally susceptible to infection with *Bonamia* spp.

Common name	Scientific name
Crested oyster	*Ostrea equestris*
Dwarf oyster	*Ostrea stentina*
European flat oyster	*Ostrea edulis*
Hawaiian oyster	*Dendostrea sandvicensis*
New Zealand dredge oyster	*Ostrea chilensis*
Pacific oyster	*Crassostrea gigas*
Southern mud oyster or Australian flat oyster	*Ostrea angasi*

Presence in Australia

Exotic disease—not recorded in Australia.

Bonamia exitiosa has been recorded from flat oysters in Victoria and New South Wales, and in a very low percentage of Sydney rock oysters in New South Wales. It is likely that *Bonamia* spp. previously recorded in flat oysters in Tasmania, South Australia and Western Australia are also *B. exitiosa.*

Bonamia ostreae and other *Bonamia* spp. are exotic to Australia, so any differential diagnosis of *Bonamia* spp. infection in Australian oysters requires specific confirmation using molecular diagnostic techniques to differentiate between the endemic *B. exitiosa* and exotic *B. ostreae* and *Bonamia* spp.

Map 1 Presence of *Bonamia* spp. (excluding *B. exitiosa*), by jurisdiction

Epidemiology

- Mortalities may occur all year, but usually happen in spring and summer.
- In most cases, oysters are lightly infected without mortalities. Factors that contribute to disease outbreaks are often unclear.
- *Bonamia* spp. are thought to be spread by human movements of subclinically infected oysters, and via infected hosts carried in biofouling on shipping.

Differential diagnosis

The list of similar diseases in the next section refers only to the diseases covered by this field guide. Gross pathological signs may also be representative of diseases not included in this guide. Do not rely on gross signs to provide a definitive diagnosis. Use them as a tool to help identify the listed diseases that most closely account for the observed signs.

Similar diseases

Infection with *Bonamia exitiosa*, infection with *Bonamia ostreae* and infection with *Mikrocytos mackini.*

There are few or no visual cues to the presence of this disease other than poor condition, shell gaping and increased mortality. Consequently, it is impossible to use gross signs alone to differentiate between infection by *Bonamia* species and *Mikrocytos* species. Concurrent infections with more than one species of *Bonamia* may also occur. Any presumptive diagnosis requires further laboratory examination.

Light microscopy can contribute diagnostic information (such as in the case of *B. perspora* infection when spores are present), but further laboratory examination and molecular diagnostic techniques are required for a definitive diagnosis.

Sample collection

Only trained personnel should collect samples. Using only gross pathological signs to differentiate between diseases is not reliable, and some aquatic animal disease agents pose a risk to humans. If you are not appropriately trained, phone your state or territory hotline number and report your observations. If you have to collect samples, the agency taking your call will advise you on the appropriate course of action. Local or district fisheries or veterinary authorities may also advise on sampling.

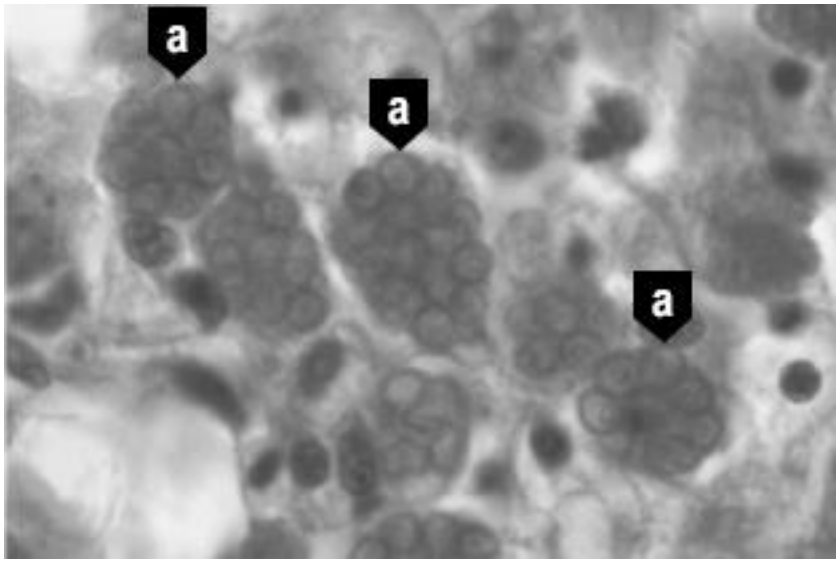
Emergency disease hotline

See something you think is this disease? Report it. Even if you’re not sure.

Call the Emergency Animal Disease Watch Hotline on **1800 675 888**. They will refer you to the right state or territory agency.

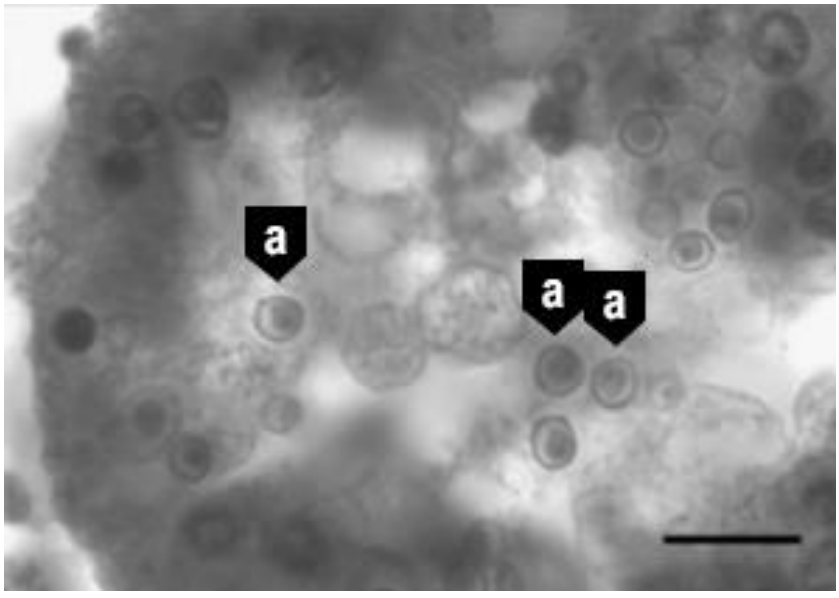
Microscope images

Figure 1 Histological section of digestive gland of crested oyster (*Ostrea equestris*) with *Bonamia perspora* sporocysts



Note: Sporocysts of *B. perspora* (a).
Source: R Carnegie

Figure 2 Histological section of digestive gland of crested oyster (*Ostrea equestris*) with *Bonamia perspora* spores



Note: Individual spores of *B. perspora* (a) released into the lumen of the digestive gland tubule. Scale bar = 10µm.
Source: R Carnegie

Further reading

Australia and New Zealand standard diagnostic procedure Bonamiosis in Australian 'Ostrea angasi'

CEFAS International Database on Aquatic Animal Diseases Bonamiosis

These hyperlinks were correct at the time of publication.

Contact details

Emergency Animal Disease Watch Hotline 1800 675 888
Email AAH@agriculture.gov.au
Website agriculture.gov.au/pests-diseases-weeds/aquatic