

### History

Sydney rock oysters (SROs), (*Saccostrea glomerata*) grown in Pimpama river, Qld sourced from Rainbow Reach estuary, Macleay river, NSW, on 10.5.2006. Signs of disease and no growth noted in August 2006 affecting approximately 50% of batch.

### Solutions and Discussions

Q1.

Figure 2 is the normal oyster because the digestive gland (syn. Hepatopancreas, digestive diverticula) is of a dark brown colour due to stores of enzymes and lipid/glycogen in the epithelial cells of the gland. The relative size of the entire visceral mass to the mantle cavity (about 50%) is also greater in this oyster. Figure 1 shows an oyster with a smaller, pale (decolourised) digestive gland and a lower visceral size to mantle cavity ratio (about 30%), indicative of a poorer condition oyster.

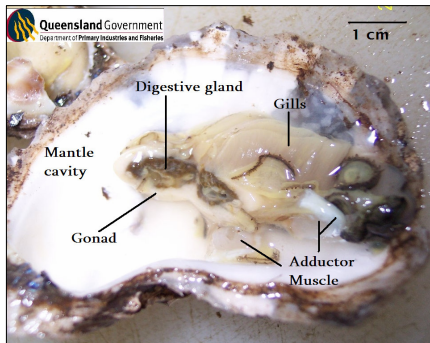


Figure 1. *Saccostrea glomerata* – Sydney rock oyster (Diseased).



Figure 2. *Saccostrea glomerata* – Sydney rock oyster (Normal).

Q2.

There is only 1 pathogen showing various stages of development, ie this is a parasitic disease. Small unicellular Giemsa positive cells (< 5 µm diameter) are the daughter cells of *Marteilia sydneyi* – expelled from the sporont casing. Immature sporogonic stages of the protozoan parasite *Marteilia sydneyi* are 5-7 µm diameter and Giemsa positive. Largest sporogonic stages (>10 µm diameter) containing refractile spherical bodies are the mature sporonts and they are Giemsa negative.

The very tiny basophilic bodies (< 2 µm diameter) are spermatocytes produced when the cut viscera is that of gonad tissue surrounding the digestive gland. This is a male oyster.

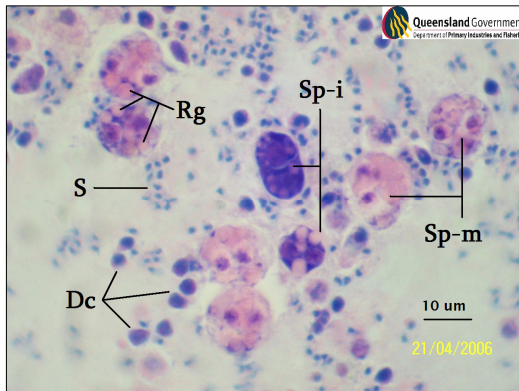


Figure 3. Giemsa stained impression smear of cut viscera.

S = Spermatocytes  
Dc = Daughter cells  
Sp-i = Immature sporonts  
Sp-m = Mature sporonts  
Rg = Refrigen granules (bodies)

Q3.

There is virtually no normal hepatopancreatic epithelium left except for 1 cell in that micrograph. *Marteilia sydneyi* sporonts have replaced the normal structure of the hepatopancreas and sporulation is occurring with the release of spores containing large refractile (refrigent) bodies.

The histopathology explains the gross discolouration of the digestive gland in the affected oyster because of the substantial loss of normal epithelium and consequent decline in the digestive function, nutrient stores of the oyster which produces an oyster in poor condition. Once sporulation is complete, the oyster dies. Note however that the gonad tissue (cream colour) is still normal in the

diseased oyster, perhaps indicative of the relatively gradual process of sporont maturation and sporulation which allows some energy diversion to gonad development.

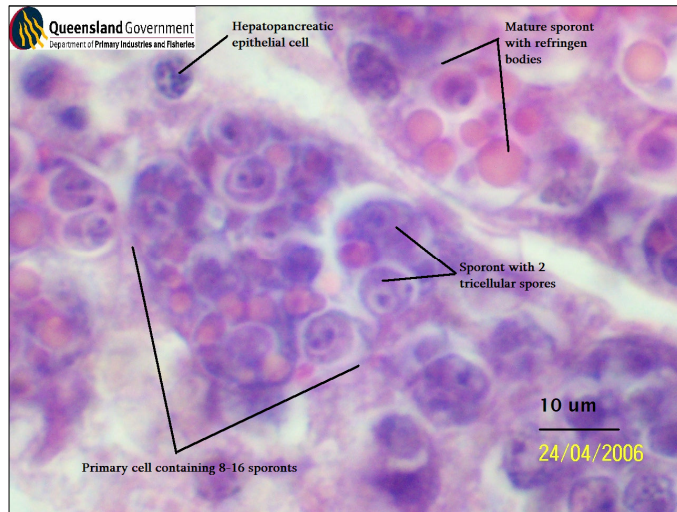


Figure 4. H&E of hepatopancreatic tubules.

#### QX Disease

**Impact:** *Marteilia sydneyi* is a protozoan parasite that infects *Saccostrea glomerata* (= *commercialis*), the Sydney rock oyster and possibly also *Saccostrea echinata*. Found in New South Wales, Queensland and Western Australia. Serious outbreaks Georges river (1984) and Hawkesbury River (2004) threatening \$28 million p.a. industry.

**Pathogenesis:** *M. sydneyi* sporulate in the epithelia of the digestive gland, where infection is associated with poor condition index, emaciation of the oyster and exhaustion of its reserves of energy (glycogen), discoloration of the digestive gland, cessation of growth, and mortalities. Death in 60 days post infection.

**Risk factors:** Summer/autumn infection and mortalities with sporulation all year round possible. High salinities limit infection. Intermediate host involved and is considered to be a member of the marine polychaete worms. Non-zoonotic.

**Diagnosis:** Grossly the digestive gland (hepatopancreas) is very pale compared to a dark brownish-green normal colour. Impression smear of the hepatopancreas and Giemsa stain to demonstrate *M. sydneyi*. Histopathology – plasmodial and sporulating stages in the hepatopancreatic tubular epithelium. PCR testing with *M. sydneyi* primers. In-situ hybridisation test with *M. sydneyi* markers.

**Management:** Restrict movement of oysters from infected to disease free areas which requires health testing of batches and active area surveillance to enable disease zoning.

Useful Web Links on QX disease -

[http://www.qm.qld.gov.au/education/resources/qx/pdf/dd003a\\_oyster\\_QX\\_disease.pdf](http://www.qm.qld.gov.au/education/resources/qx/pdf/dd003a_oyster_QX_disease.pdf)

<http://www.pac.dfo-mpo.gc.ca/sci/shelldis/pages/marsydoyle.htm>

<http://www.disease-watch.com/documents/cd/index/html/mp040mar.htm>

<http://www.oie.int/aac/eng/Publicat/Cardsenglish/3.1.3.%20MARTEILIOSIS%20September%2000.DOC>