Government of **Western Australia**
Department of **Fisheries**

NAAHTWG Slide of the Quarter (July – September 2006 - Translocated Sydney rock oysters (*Saccostrea glomerata*) exposed to *Marteilia sydneyi* (QX disease)

Case 1 m06-001126 (Numbers 1 and 36)

Sydney rock oysters (*Saccostrea glomerata*) translocated from Crookhaven to Hawkesbury Rivers in January 2006 and examined six weeks later as part of on-going research project. No clinical signs of disease at that time.

No 1.

In the digestive gland there is severe diffuse sporulating infection with *Marteilia sydneyi* (QX disease). The architecture is still preserved, despite almost all tubule cells replaced by the parasites (see Figures 1 and 2). The ducts within the gland are mainly spared.

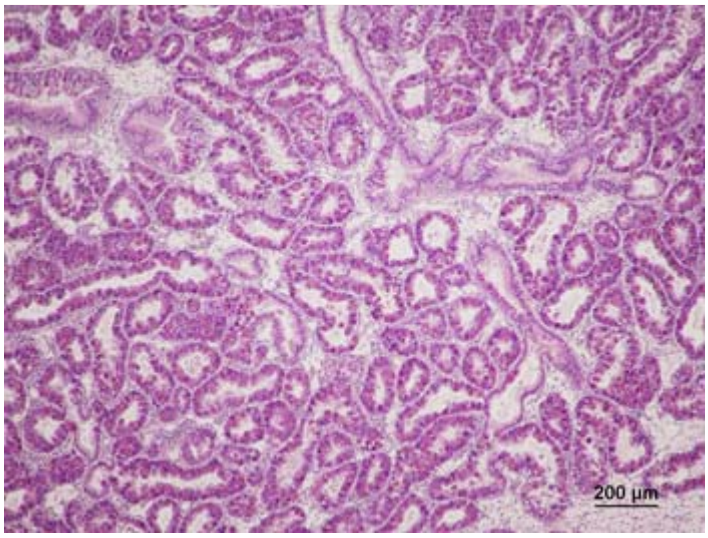

Figure 1. 06-1126-1: Digestive gland, low power. Note preservation of the general architecture at this stage.

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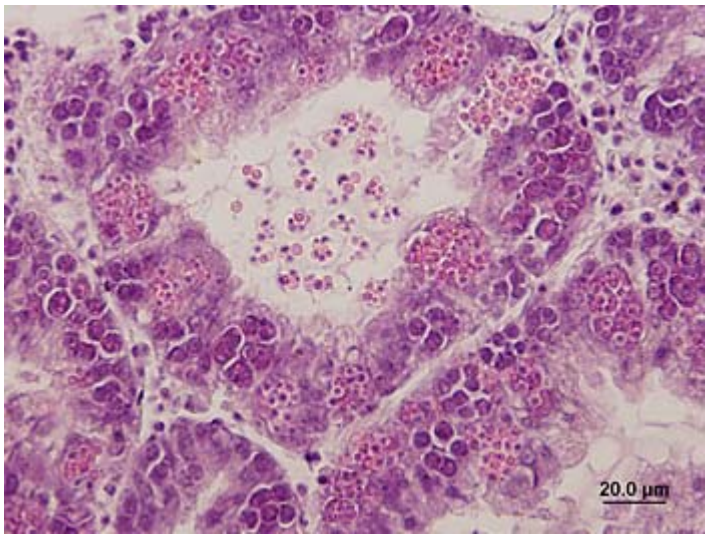

Figure 2. 06-1126-1: high power. **Note the almost total replacement of tubule parenchymal cells by QX sporangiosori. Mature sporonts, both within the epithelium and free in the lumen, contain refractive granules that stain mainly eosinophilic in H&E, but in DiffQuik smears are a vivid royal blue.**

Sporonts are mainly located within the sporangiosori in the tubule epithelium, but in occasional tubules are free in the lumen. Earlier plasmodial forms are also present along the basal laminae and interstitially, but are far more easily discerned in DiffQuik stained impression smears (Figure 5). Mild interstitial haemocyte infiltration is also present.

There are focal lesions in the gills, showing haemocyte infiltration and disruption of normal filament structure. Plasmodial forms of *M. sydneyi* can be recognised within these lesions (both interstitially and within the epithelium), but no sporing forms are seen. There is also mild to moderate, focal and diffuse interstitial haemocyte infiltration in most other organs, that may or may not be related to *M. sydneyi* infection.

No 36.

There is very severe haemocyte infiltration of the digestive gland and the architecture is destroyed, with only a few remnant tubules present. Again, the ducts within the gland are mainly spared (see Figures 3 and 4).

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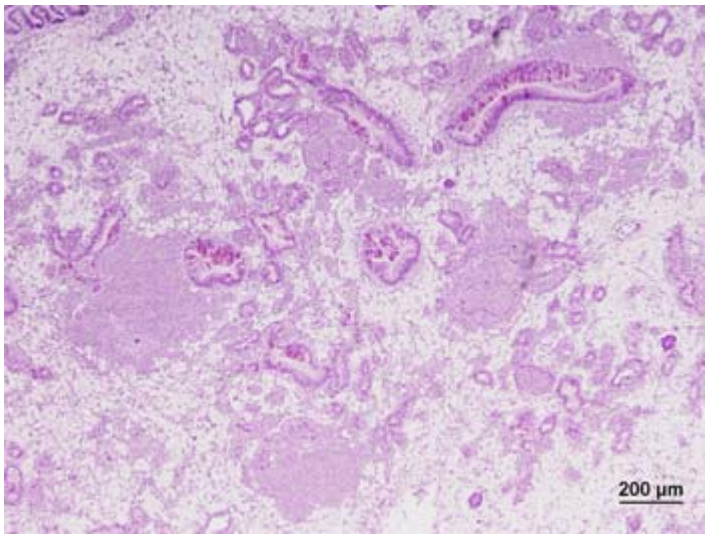

Figure 3. 06-01126-36: Digestive gland, low power. Severe haemocyte infiltration has destroyed the glandular architecture.

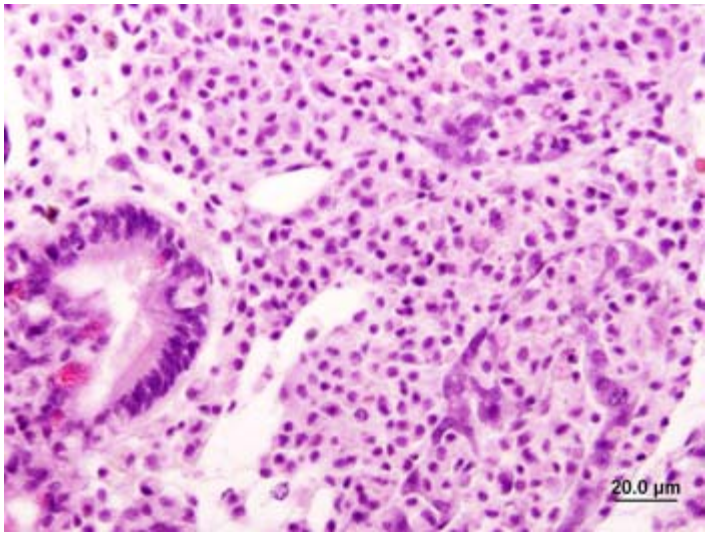

Figure 4. 06-01126-36: **High power. Tubules infiltrated and replaced by haemocytes. The duct at left is spared – note the eosinophilic granule cells (normal) that must be differentiated from QX sporonts.**

Haemocytes are seen interstitially, within the epithelium and within the lumen. Often, dense clumps of haemocytes appear to force the digestive gland parenchymal cells off the basement membrane, and below there may be a few regenerating cells. Many tubules are essentially replaced by sheets of haemocytes.

Rarely some equivocal QX forms can be imagined – these are, however, easily recognised in impression smears (Figure 5). The infiltrating cells are mainly small haemocytes (sometimes termed hyalinocytes), but moderate numbers of granulocytes (these have an appearance similar to gitter cells)

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are also present, particularly within vessels. There are also moderate numbers of 'brown cells' interstitially – these are very large macrophage-like cells with prominent yellow-brown pigment granules.

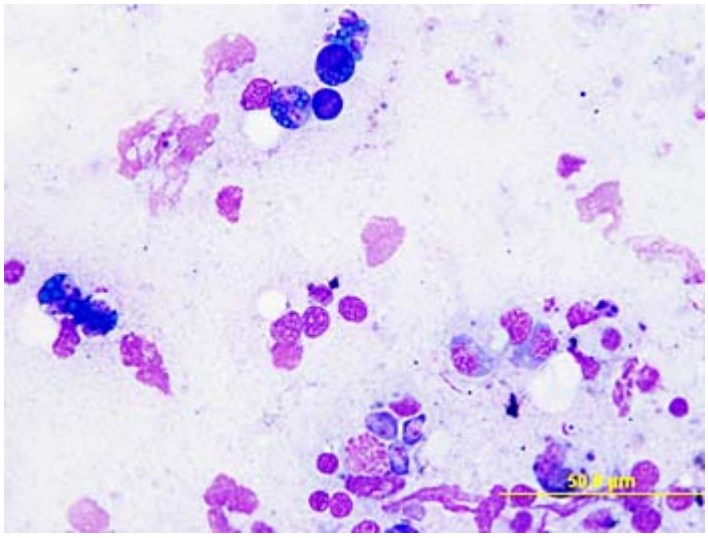

Figure 5. DiffQuik stained impression smear from the digestive gland of oyster 1, oil imersion. The vivid blue refractive granules of the mature sporonts can be unequivocally recognised even at moderate magnification (200x). Note also three plasmodial forms together in lower centre, with blue cytoplasm; nuclei are pale with scattered fuzzy clumped chromatin; one shows distinct cell-within-cell form that is pathognomonic for *Marteilia*. Oyster cell nuclei are larger with more diffuse chromatin.

This oyster also has moderate inflammatory changes in other tissues, both interstitially and associated with vessels. Haemocyte infiltration is prominent at many levels of the gut. In the oesophagus, the infiltrate is prominent in the peri-oesophageal sinus and in the arteries emptying into it. There is also moderate intraepithelial infiltrate.

There are similar changes but less severe at other gut levels. In the gills there is mild to moderate diffuse and multifocal haemocyte infiltration of the interstitium and vasculature; epithelium seems unaltered. There are similar changes in gonad and overlying mantle. The adductor muscle, kidney and heart are relatively less affected.

Comment

These two oysters demonstrate markedly different host reactions to exposureto *Marteilia sydneyi* (QX disease). At that time of year, very high levels of transmission of the disease were occurring in the Hawkesbury (100 per cent by PCR, 90 per cent by examination of smears from digestive glands). Thus, both of these naïve oysters were presumed to have been

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exposed to very high levels when first introduced to the river, six weeks prior to examination.

In oyster 1, there is massive sporulation in the face of minimal host reaction. Although the architecture of the digestive gland was still preserved at the time of examination, it is likely that within a few weeks it would be destroyed as maturing sporonts were shed to the lumen.

Alternately, the oyster might die of starvation, and sporonts be released *en-masse* post mortem. In contrast, there is no sporulation at all in oyster 36, but the host reaction has been so severe that survival of the oyster would also be unlikely.

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