Marteiliosis (*Marteilia refringens, M. sydneyi*)

AETIOLOGY

CLASSIFICATION OF THE CAUSATIVE AGENT

Marteiliosis is caused by two protistan parasites of the genus *Marteilia, Marteilia refringens* and *M. sydneyi,* (phylum Paramyxea).

Other *Marteilia* species are known to infect other bivalves. Until more is known about the identity and biology of these other *Marteilia* spp., their presence in any bivalve should be regarded as potentially serious.

RESISTANCE TO PHYSICAL AND CHEMICAL ACTION

Currently unknown.

EPIDEMIOLOGY

HOSTS

- The type species of the genus, *Marteilia refringens*, is a lethal parasite of the European flat oyster, *Ostrea edulis.* It may also infect mussels, *Mytilus edulis* and *M. galloprovincialis*.

- *Marteilia sydneyi* affects *Saccostrea* (= *Crassostrea*) *commercialis* (= *glomerata*) and possibly also *Saccostrea echinata*.

TRANSMISSION

- The mode of infection and the life cycle outside the host are unknown. Because it has not been possible to transmit the disease experimentally in the laboratory, the role of possible intermediate hosts is suspected.

OCCURRENCE

The geographical distribution of *M. refringens* is: France, Greece, Italy, Morocco, Portugal and Spain. *Marteilia sydneyi* is found in New South Wales, Queensland and Western Australia.

The period of infection for *M. refringens* in *Ostrea edulis* is confined to spring, summer and early autumn, when water temperature is greater than 17°C. Oysters may become infected with *M. sydneyi* in summer and early autumn. However, the disease is not seasonal, heavy mortality occurs and spores may be found all year round.

For detailed information on occurrence, see recent issues of *World Animal Health* and the OIE Web site.

DIAGNOSIS

CLINICAL DIAGNOSIS

- There are no pathognomonic signs of marteiliosis, although a pale translucent digestive gland is sometimes noted.

LESIONS

- *Marteilia refringens* develops mainly in the epithelia of the stomach and digestive gland and 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. Mortality appears to be related to the sporulation of the parasite. Earlier stages occur in the epithelia of the palps, stomach, digestive ducts and possibly the gills.

- Similarly, oysters infected with *M. sydneyi* are in poor condition with completely resorbed gonads. Massive invasion by *M. sydneyi* leads to complete disorganisation of the digestive gland epithelia. Death results from starvation in less than 60 days after initial infection.

DIFFERENTIAL DIAGNOSIS

- The unique feature of internal cleavage to produce cells within cells during sporulation differentiates *Marteilia* spp. from other protista.

LABORATORY DIAGNOSIS

Procedures

- Techniques applicable to molluscan pathogens are limited. Histology is the routine technique used for surveillance. When mortalities occur, various presumptive diagnostic methods can be used in addition to histology. When a pathogen is encountered, electron microscopy and/or molecular probes should be used for specific identification.

- For details refer to OIE *Diagnostic Manual for Aquatic Animal Diseases* (the *Manual*).

Histology

- Samples are handled in accordance with classical histological methods. Sections are stained with haematoxylin–eosin. It is recommended that two sections per oyster be examined.

- The young stages of *Marteilia* are present in the epithelia of the palps, stomach and digestive ducts; later developed stages can be found in the epithelia of the digestive tubules. Free sporangia can also be observed in the lumen of the intestine.

Cytological examination: tissue imprints

- A piece of digestive gland, free of excess moisture, is used to prepare the smears. The imprints are stained using a commercially available staining kit for blood cells in accordance with the manufacturer's instructions.

- The parasite is 5–8 µm in size in the early stages and may reach up to 40 µm during sporulation. The cytoplasm of the cells stains basophilic, the nucleus is eosinophilic. The secondary cells or sporoblasts are surrounded by a bright halo (colour may vary slightly with the stain used).

Electron microscopy examination

- Classical transmission electron microscopy procedures used for molluscs are given in the *Manual*.

- *Marteilia sydneyi* can be differentiated from *M. refringens* by the lack of striated inclusions in the plasmodia, formation of eight to sixteen sporangial primordia in each plasmodium (instead of eight), occurrence of two or three (rather than four) spores in each sporangium, and a heavy layer of concentric membranes surrounding mature spores, (compared with the lack of such a covering around *M. refringens* spores).

PREVENTION AND CONTROL

- There is no applicable treatment for molluscs.

SANITARY PROPHYLAXIS

Free countries, zones and aquaculture establishments:

- Targeted pathological surveillance for occurrences of any abnormal mortality outbreaks.

- Policy and procedures for importation of live molluscs.

RISK MITIGATION

- High salinities and low temperatures appear to limit the development of *Marteilia* spp.

REFERENCES

Chapter 3.1.3. in the OIE *Diagnostic Manual for Aquatic Animal Diseases*, OIE, Paris, France.

Chapter 3.1.3. in the OIE *International Aquatic Animal Health Code,* OIE, Paris, France.

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