Infection with infectious myonecrosis virus (IMNV)

Also known as infectious myonecrosis

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

Figure 1 Gross signs of infectious myonecrosis in naturally infected farmed Pacific white shrimp (*Penaeus (Litopenaeus) vannamei*)



Note: Various degrees of skeletal muscle necrosis, visible as an opaque, whitish discolouration of the abdomen.
Source: DV Lightner

Figure 2 Gross signs of infectious myonecrosis in naturally infected farmed Pacific white shrimp (*Penaeus (Litopenaeus) vannamei*)



Note: Reddened tail, and skeletal muscle necrosis visible as an opaque, whitish discolouration of the abdominal segments.
Source: DV Lightner

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.

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

- lethargy
- large numbers of moribund animals and significant mortalities (up to 70%), during or following stressful events
- The acute form of the disease produces gross signs and elevated mortalities, but disease progresses to a chronic phase with persistent low-level mortalities.

Gross pathological signs are:

- focal to extensive white necrotic areas in the striated muscle commonly observed in distal abdominal segments
- necrotic and reddened tail fan
- lymphoid organs increased to 3 to 4 times normal size
- moribund prawns with a full stomach because affected individuals may continue to feed until death.

Microscopic pathological signs are:

- coagulative necrosis of skeletal muscle by haemolytic infiltration and fibrosis.

Disease agent

Infectious myonecrosis is caused by infection with infectious myonecrosis virus (IMNV), a putative totivirus. Phylogenetic analysis based on its RNA-dependent RNA polymerase gene coding sequence groups IMNV most closely with *Giardia* lamblia virus, a member of the family Totiviridae.

Host range

Table 1 Species known to be susceptible to IMNV

Common name	Scientific name
Black tiger prawn	*Penaeus monodon*
Brown tiger prawn	*Penaeus esculentus*
Gulf banana prawn	*Penaeus (Fenneropenaeus) merguiensis*
Pacific blue shrimp	*Penaeus (Litopenaeus) stylirostris*
Pacific white shrimp[a]	*Penaeus (Litopenaeus) vannamei*
Southern brown shrimp	*Penaeus (Farfantepenaeus) subtilis*

a Naturally susceptible.

Presence in Australia

Exotic disease—not recorded in Australia.

Map 1 Presence of IMNV, by jurisdiction



Epidemiology

- IMNV was originally identified in northeastern Brazil in cultured *Penaeus (Litopenaeus) vannamei*. The virus has since been reported in South-East Asia, including Indonesia, India and Sri Lanka.
- Clinical signs may have sudden onset following stressful events (such as capture by net, reduced feeding or sudden changes in temperature or salinity).
- Affected life stages include juveniles and subadults. Significant mortalities occur in juvenile and subadult pond-reared populations.
- Horizontal transmission has been demonstrated via cannibalism. Vertical transmission (direct passage from parents to offspring via eggs or sperm) is likely but not confirmed.

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.

The clinical signs described and shown here may also be symptomatic of other bacterial or viral infections or poor water quality. Further laboratory examination is needed for a definitive diagnosis.

Similar diseases

Infection with *Macrobrachium rosenbergii* nodavirus (MrNV) and infection with shrimp haemocyte iridescent virus (SHIV).

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.

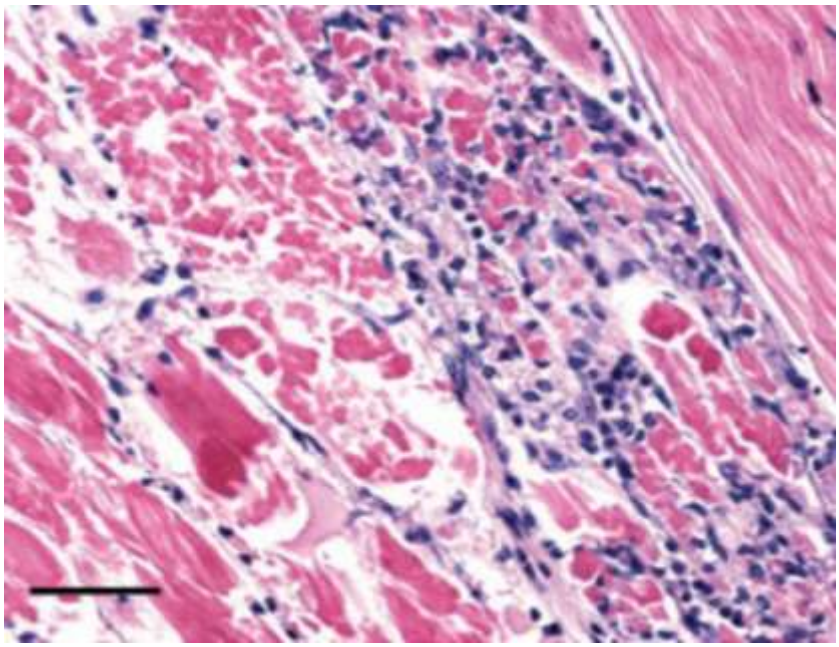
Emergency disease hotline

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.

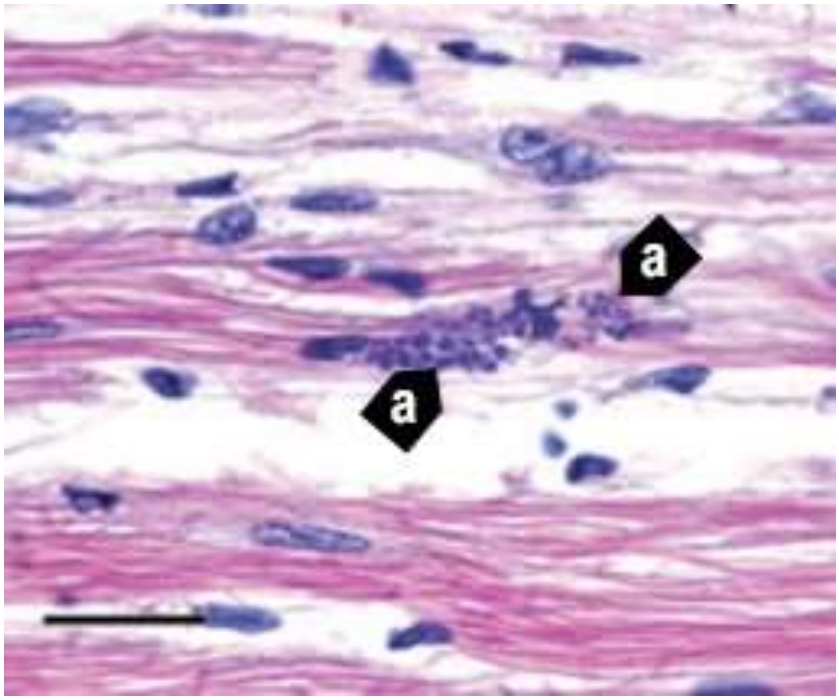
Microscope images

Figure 3 Skeletal muscle of Pacific white shrimp (*Penaeus (Litopenaeus) vannamei*) infected with IMNV



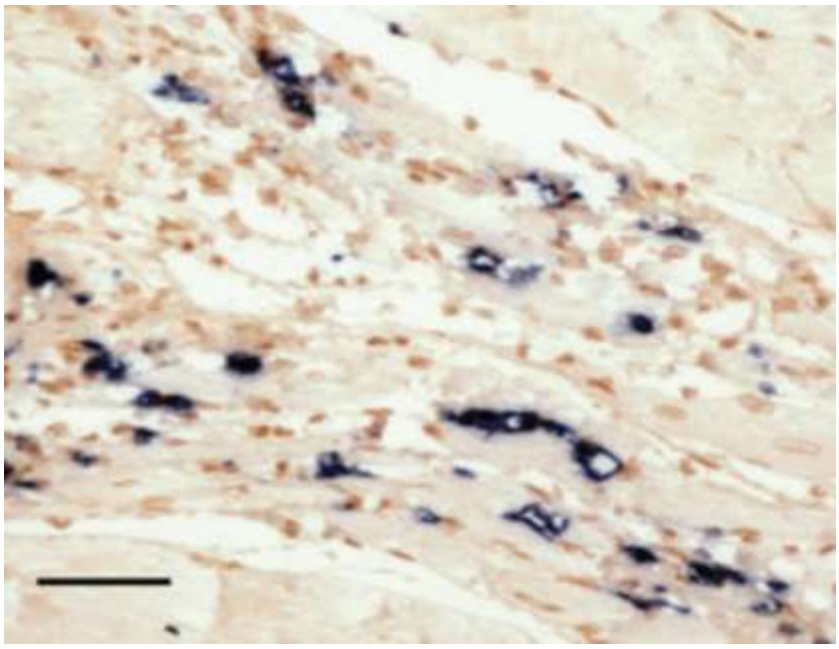
Note: Coagulative necrosis of skeletal muscle accompanied by haemocytic infiltration and fibrosis. Normal skeletal muscle can be observed in the upper right corner. Haematoxylin and eosin stain Scale bar = 50µm.
Source: DV Lightner

Figure 4 Muscle cells of Pacific white shrimp (*Penaeus (Litopenaeus) vannamei*) infected with IMNV



Note: Perinuclear pale basophilic to dark basophilic inclusion bodies in a group of muscle cells (a).Haematoxylin and eosin stain. Scale bar = 20µm.
Source: DV Lightner

Figure 5 In situ hybridisation of skeletal muscle tissue using a digoxigenin-labelled IMNV probe



Note: Black precipitate is present in areas where probe has hybridised with target virus. Bismarck brown counterstain. Scale bar = 50µm.
Source: DV Lightner

Further reading

CABI Invasive Species Compendium Infectious myonecrosis

CEFAS International Database on Aquatic Animal Diseases Infectious myonecrosis

World Organisation for Animal Health Manual of diagnostic tests for aquatic animals

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

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