

Diseases of crustaceans

Viral diseases—**Yellowhead disease**

Signs of disease

Important: animals with disease may show one or more of the signs below, but disease may still be present in the absence of any signs.

Disease signs at the farm level

- moribund prawns aggregate near surface at pond edges
- infected 5–15 gram prawns begin feeding at abnormally high rate for several days and then cease feeding entirely
- mass mortality three days after cessation of feeding

Clinical signs of disease in an infected animal

- white, yellow or brown gills
- yellowing of the cephalothorax and general bleaching of body
- yellow, swollen digestive gland makes head appear yellow

Disease agent

The causative agent of yellowhead disease is yellowhead virus (YHV), a corona-like RNA viruses in the genus *Okavirus*, family *Ronaviridae* and order *Nidovirales*.

Host range

YHV is highly infectious for most known species of cultivated penaeid prawns.

Crustaceans known to be susceptible to yellowhead disease:

- black tiger prawn* (*Penaeus monodon*)
— primarily
- Gulf banana prawn* (*Penaeus merguensis*)



Yellowhead disease in giant black tiger prawn (*Penaeus monodon*). Note yellow heads of infected prawns on left. Prawns on right are normal

Source: DV Lightner



Yellowhead disease continued

northern white shrimp*	(<i>Penaeus setiferus</i>)
prawn*	(<i>Palaemon styliferus</i>)
red endeavour prawn*	(<i>Metapenaeus ensis</i>)
tropical krill*	(<i>Acetes</i> spp)
blue shrimp	(<i>Penaeus stylirostris</i>)
northern brown shrimp	(<i>Penaeus aztecus</i>)
northern pink shrimp	(<i>Penaeus duorarum</i>)
Pacific white shrimp	(<i>Penaeus vannamei</i>)

Until proven otherwise, it should be assumed that most penaeid prawns worldwide are susceptible to infection with yellowhead disease.

Presence in Asia–Pacific

Yellowhead disease has been officially reported from India, Thailand and Vietnam.

Epidemiology

- The tiger prawn suffers acute epidemics, with mortality reaching 100% within 3–5 days from first appearance of the gross signs.
- Transmission is horizontal, direct from the water column and through ingestion of infected material.
- Tiger prawns younger than 15 days postlarvae (PL-15) are fairly resistant to yellowhead disease compared to those from PL-20–25 to subadult, which are highly susceptible.
- Massive mortality usually affects early to late juvenile stages in rearing ponds.
- There appear to be at least four types of virus in the YHV group. Only yellow head virus has been reported to cause yellowhead disease.
- Vectors may include asymptomatic carrier crustaceans.



Gill-associated virus, which has a similar ultrastructure to that of YHV, has been reported from Australia:

Comparison of DNA sequences of reverse-transcription polymerase chain reaction (RT-PCR) products from YHV and GAV suggests that they are closely related, but distinctly different viral strains or species.

* naturally susceptible (other species have been shown to be experimentally susceptible)



Yellowhead disease continued

Differential diagnosis

The differential diagnostic table and the list of similar diseases appearing at the bottom of each disease page refer only to the diseases covered by this field guide. Gross signs observed might well be representative of a wider range of diseases not included here. Therefore, these diagnostic aids should not be read as a guide to a definitive diagnosis, but rather as a tool to help identify the listed diseases that most closely account for the gross signs.

Similar diseases

Taura syndrome

Sample collection

Because of uncertainty in differentiating diseases using only gross signs, and because some aquatic animal disease agents might pose a risk to humans, you should not try to collect samples unless you have been trained. Instead, you should phone your national hotline number and report your observations. If samples have to be collected, the agency taking the call will advise you on what you need to do. Local or district fisheries/veterinary authorities could advise you on sampling.

Emergency disease hotline

For your national emergency disease hotline number, see Whom to contact if you suspect a disease.

Further reading

http://www.oie.int/aac/eng/cards/en_diseasecard.htm

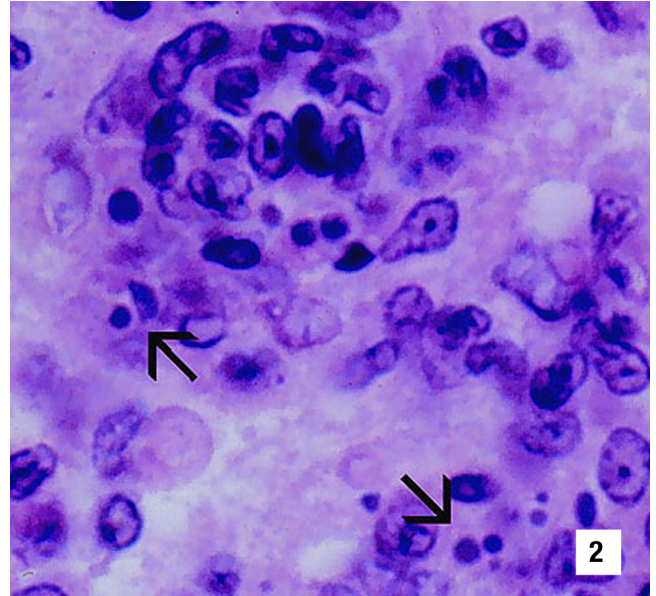
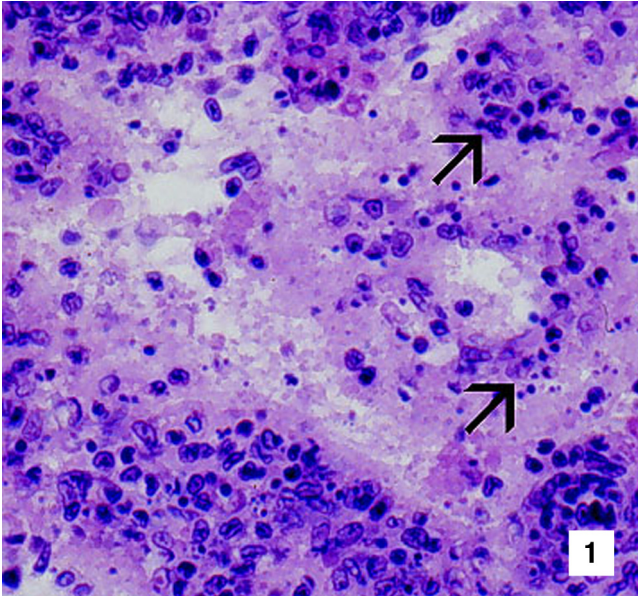
The currently accepted procedures for a conclusive diagnosis of yellowhead disease are summarised at http://www.oie.int/eng/normes/fmanual/A_00050.htm

These hyperlinks were correct and functioning at the time of publication.



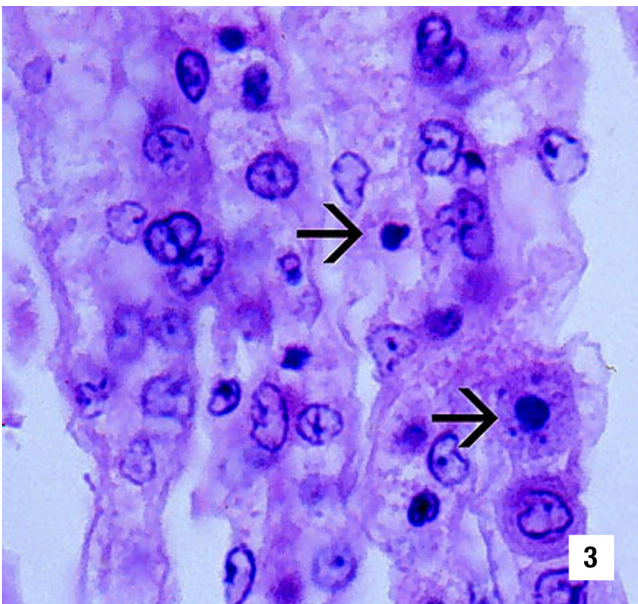
Yellowhead disease continued

Histological images



Histological section of the lymphoid organ (LO) of a juvenile giant black tiger prawn (*Penaeus monodon*) with severe acute yellowhead disease (YHD) at low (525x) and high (1700x) magnification. A generalised, diffuse necrosis of LO cells is shown. Affected cells display pyknotic and karyorrhectic nuclei. Single or multiple perinuclear inclusion bodies, ranging from pale to darkly basophilic, are apparent in some affected cells (arrows). This marked necrosis in acute YHD distinguishes YHD from infections due to Taura syndrome virus, which produces similar cytopathology in other target tissues, but not in the LO

Source: DV Lightner



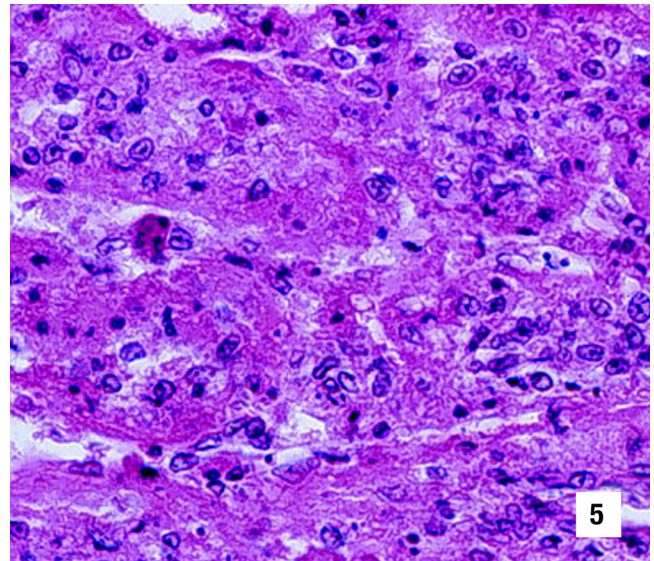
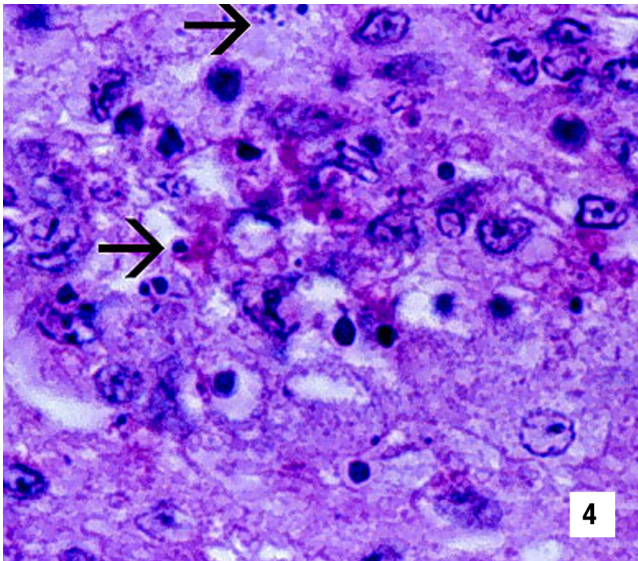
Histological section (1000x) of the gills from a juvenile black tiger prawn with YHD. A generalised, diffuse necrosis of cells in the gill lamellae is shown, and affected cells display pyknotic and karyorrhectic nuclei (arrows). A few large, conspicuous, generally spherical cells with basophilic cytoplasm are present in the section. These cells may be immature haemocytes, released prematurely in response to a YHV-induced haemocytopenia

Source: DV Lightner



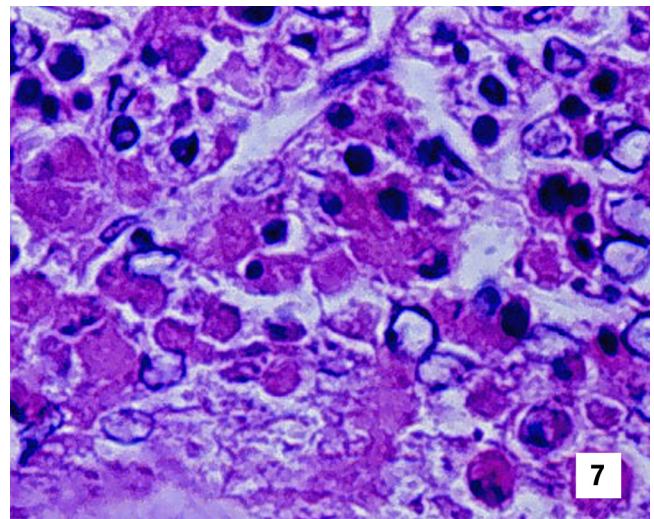
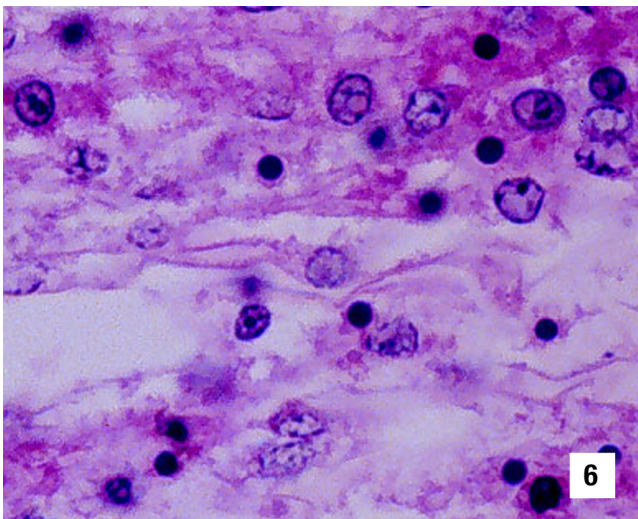
Yellowhead disease continued

Histological images



Histological sections of the LO of juvenile white shrimp (*P. vannamei*) (Fig 4, 1000x) and northern brown shrimp (*P. aztecus*) (Fig 5, 525x) experimentally infected with YHV. Severe (grade 3–4) diffuse to multifocal necrosis, characterised by cells with increased eosinophilic cytoplasm, pyknotic or karyorrhectic nuclei (arrows) and pale to densely basophilic perinuclear inclusions, is present

Source: DV Lightner



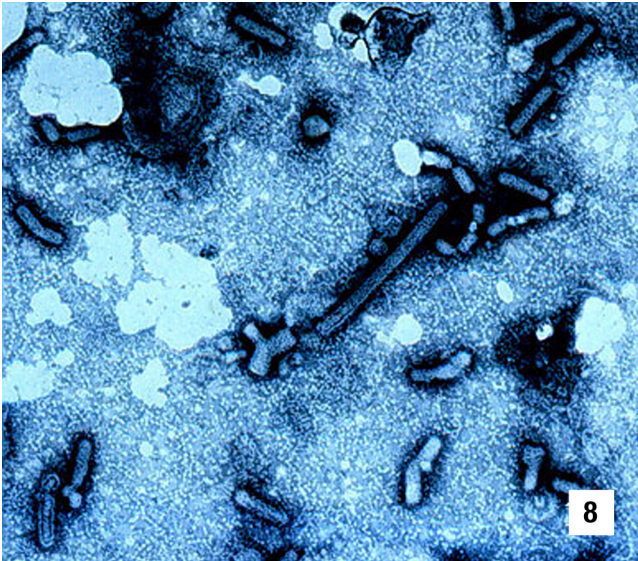
Histological sections (1000x) of the gills of a juvenile northern pink shrimp (*P. duorarum*) (Fig 6) and the oesophagus of a white shrimp (Fig 7) experimentally infected with YHV. Severe (grade 4) diffuse to multifocal necrosis, characterised by cells with increased eosinophilic cytoplasm, pyknotic or karyorrhectic nuclei, and pale to densely basophilic perinuclear inclusions, is present

Source: DV Lightner



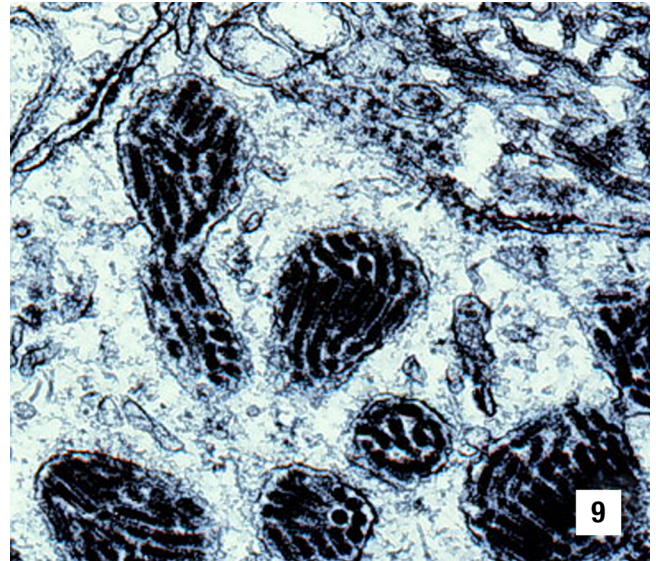
Yellowhead disease continued

Histological images



Semipurified preparation of YHV from the haemolymph of an experimentally infected white shrimp. Rod-shaped, enveloped virions of YHV, which are highly variable in length, are illustrated. 2% PTA stain, ~18 000x

Source: DV Lightner



TEM (~50,000x) of a section of YHV-infected tissue from a giant black tiger prawn. Cytoplasmic inclusions packed with enveloped virions of YHV are well shown. Less obvious but present near the membrane-bound viral inclusions are very thin, fibre-like to rod-shaped, unenveloped nucleocapsids of YHV. (Micrograph: TW Flegel, Bangkok, Thailand)

Source: DV Lightner

