Viral diseases—**Tetrahedral baculovirosis**

Signs of diseases

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

- reduced feeding

Clinical signs of disease in an infected animal

- high mortality in larval, postlarval and juvenile prawns
- reduced growth rates in surviving juveniles and adults
- increased fouling with exoparasites

Gross signs of disease in an infected animal

- milky-white midgut

There are few visible signs indicating infection with this disease other than rapid high mortality of hatchery prawns in the early life stages. Therefore, diagnosis is usually based on microscopic and histological examination.

Disease agent

The causative agent is *Baculovirus penaei.*

Host range

Crustaceans known to be susceptible to tetrahedral baculovirosis:

aloha prawn*	(*Penaeus marginatus*)
blue shrimp*	(*Penaeus stylirostrus*)
giant black tiger prawn*	(*Penaeus monodon*)
northern brown shrimp*	(*Penaeus aztecus*)
northern pink shrimp*	(*Penaeus duorarum*)
northern white shrimp*	(*Penaeus setiferus*)
Pacific white shrimp*	(*Penaeus vannamei*)
Pomada prawn*	(*Protrachypene precipua*)
red-spotted shrimp*	(*Penaeus brasiliensis*)
redtail prawn*	(*Penaeus pencillatus*)
roughback shrimp*	(*Trachypenaeus similis*)
San Paulo shrimp*	(*Penaeus paulensis*)
southern brown shrimp*	(*Penaeus subtilis*)
southern white shrimp*	(*Penaeus schmitti*)

* naturally susceptible

Australian Government
Department of Agriculture, Fisheries and Forestry

Sourced from AGDAFF–NACA (2007) *Aquatic Animal Diseases Significant to Asia-Pacific: Identification Field Guide.* Australian Government Department of Agriculture, Fisheries and Forestry. Canberra.

Presence in Asia–Pacific

While tetrahedral baculovirosis is not officially reported under the NACA–FAO–OIE quarterly aquatic animal disease reporting program, it is known to be present in the region.

Epidemiology

- Transmission is horizontal, directly from the water column or through cannibalism.
- Eggs and newly hatched nauplii may be exposed to the virus through faeces of infected adult spawners taken from the wild.
- Infection is restricted to the hepatopancreas and anterior midgut.
- Disease is not known to occur in wild populations infected with *Baculovirus penaei*.
- Crowding, chemical stress or environmental stress may increase pathogenicity and the prevalence of disease.
- Transmission typically occurs via the oral route, with cannibalism and faecal–oral contamination the principal mechanisms.

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

Baculoviral midgut gland necrosis, spherical baculovirosis

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.

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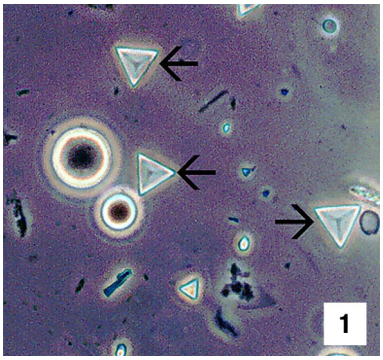
Further reading

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

The currently accepted procedures for a conclusive diagnosis of tetrahedral baculovirosis are summarised at http://www.oie.int/eng/normes/fmanual/A_00051.htm

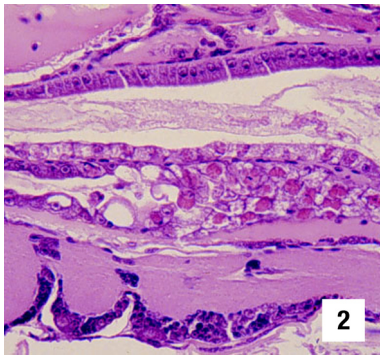
These hyperlinks were correct and functioning at the time of publication.

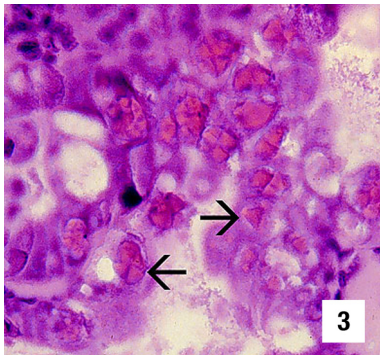
Histological images



Wet-mount of faeces from a white shrimp (*Penaeus vannamei*) with tetrahedral baculovirosis. The tetrahedral occlusion bodies (TOBs; arrows) are diagnostic for infection of the shrimp's hepatopancreas (HP) or midgut epithelial (MG) cells. TOBs are released into the gut contents by the necrosis and lysis of tetrahedral baculovirus-infected HP or MG epithelial cells. 700x

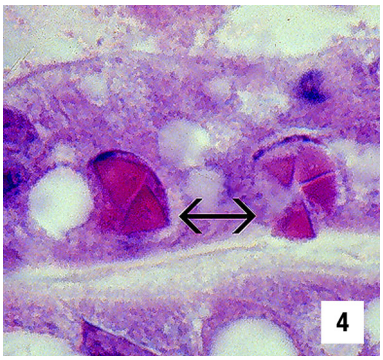
Source: DV Lightner





Low (Fig 2, 350x) and mid (Fig 3, 700x) magnification views of mid-sagittal sections of postlarva white shrimp with severe (grade 3–4) tetrahedral baculovirus infections of the HP. Baculovirus-infected cells display multiple eosinophilic baculovirus TOBs within markedly hypertrophied HP cell nuclei (arrows)

Source: DV Lightner



High-magnification (1800x) photomicrograph of an HP tubule showing several tetrahedral baculovirus-infected cells that illustrate well the diagnostic intranuclear, eosinophilic, tetrahedral (triangular or rhombohedral in section) occlusion bodies of baculovirus (arrows)

Source: DV Lightner

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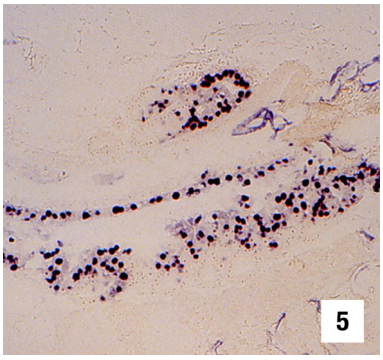
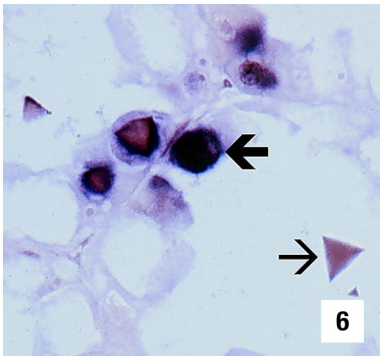
Histological images



Low-magnification (150x) view of a tetrahedral baculovirus-infected postlarva white shrimp that is similar in age and infection severity to the postlarva shown in Fig 2, but reacted with a DIG-labelled DNA probe for tetrahedral baculovirus. Baculovirus-infected cells are stained dark blue by the probe. Note that infected cells are confined to the HP and MG, and that baculovirus-positive cells are not present in the surrounding non-enteric tissues. Some nonspecific staining of the cuticle by the probe is apparent

Source: DV Lightner



High-magnification (700x) photomicrograph of the HP of a juvenile white shrimp infected with tetrahedral baculovirus. The section was reacted with a DIG-labelled DNA probe. Intact infected HP cell nuclei provide an intense positive reaction for virus and viral DNA that is free within the nucleoplasm (large arrow). However, because the TOBs are not penetrated by the probe, the TOBs by themselves do not show a positive reaction for the virus despite their viral content (small arrow)

Source: DV Lightner

Sourced from AGDAFF–NACA (2007) *Aquatic Animal Diseases Significant to Asia-Pacific: Identification Field Guide.* Australian Government Department of Agriculture, Fisheries and Forestry. Canberra.