

Diseases of crustaceans

Viral diseases—**Spherical baculovirus**

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

- lethargy

Clinical signs of disease in an infected animal

- emaciation
- secondary gill and surface fouling by ectoparasites

Gross signs of disease in an infected animal

- white hepatopancreas (digestive gland) and midgut

Disease agent

The causative agent is a *Penaeus monodon*-type baculovirus.

Host range

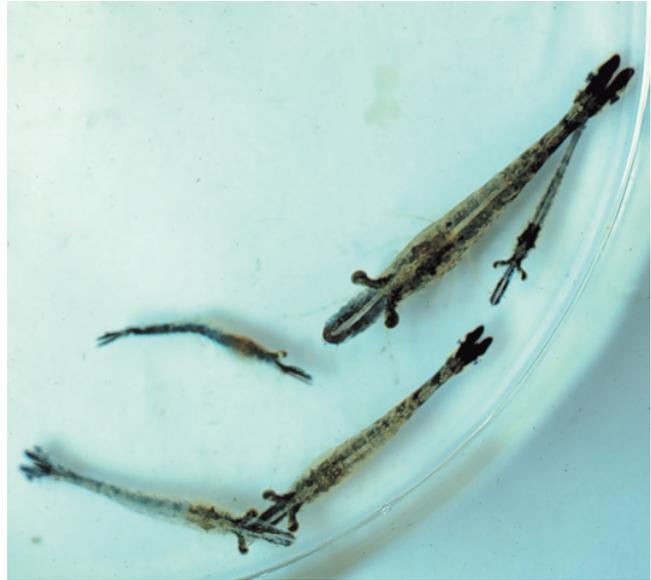
Crustaceans known to be susceptible to the virus:

banana prawn*	(<i>Penaeus merguensis</i>)
brown tiger prawn*	(<i>Penaeus esculentus</i>)
caramote prawn*	(<i>Penaeus kerathurus</i>)
eastern king prawn*	(<i>Penaeus plebejus</i>)
giant tiger prawn*	(<i>Penaeus monodon</i>)
— most susceptible	
grooved tiger prawn*	(<i>Penaeus semisulcatus</i>)
red endeavour prawn*	(<i>Metapenaeus ensis</i>)
redtail prawn*	(<i>Penaeus pencillatis</i>)

Presence in Asia–Pacific

Spherical baculovirus has been officially reported from Australia and Vietnam. However, various strains of *Penaeus monodon*-type baculovirus are considered enzootic in wild penaeid stocks throughout the Asia–Pacific region.

* naturally susceptible



Giant black tiger prawn (*Penaeus monodon*) with severe spherical baculovirus. Note white streak in midgut line, seen through the shell

Source: DV Lightner



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.

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Spherical baculovirus continued

Epidemiology

- Transmission is horizontal, direct from the water column or through cannibalism. It is believed, but not proven, that transmission can also be vertical from broodstock to offspring.
- Other species of prawns exposed to the virus may act as carriers.
- Up to 90% mortality occurs in postlarval hatchery prawns, especially at high densities.
- With good culture practices, mortalities from even severe spherical baculovirus infections in cultured populations can be negligible.

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, tetrahedral baculovirus

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 spherical baculovirus are summarised at http://www.oie.int/eng/normes/fmanual/A_00052.htm

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



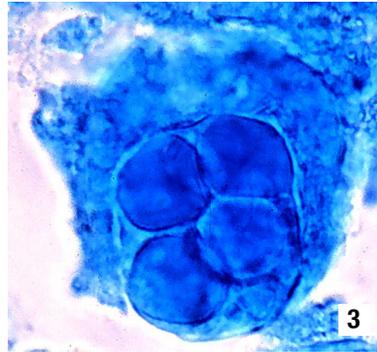
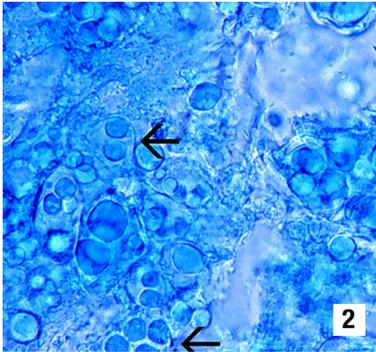
Spherical baculovirus continued

Histological images



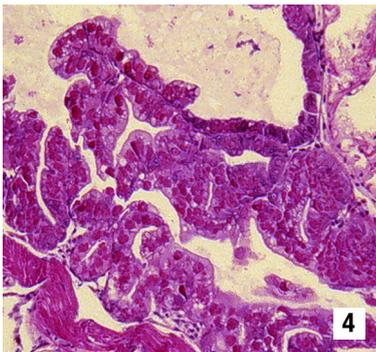
A wet-mount prepared from the midgut contents of an adult giant black tiger prawn (*Penaeus monodon*) infected with spherical baculovirus. Clusters of spherical occlusion bodies (arrows), held together by remnants of the nuclear membrane, are illustrated. No stain, 700x

Source: DV Lightner



Mid (Fig 2, 700x) and high (Fig 3, 1700x) magnification views of tissue squash preparations of the hepatopancreas (HP) from postlarval (PL) black tiger prawns with grade 4 spherical baculovirus infections. Most HP cells in both PLs display multiple, generally spherical, intranuclear occlusion bodies (arrows) that are diagnostic for spherical baculovirus. 0.1% malachite green

Source: DV Lightner



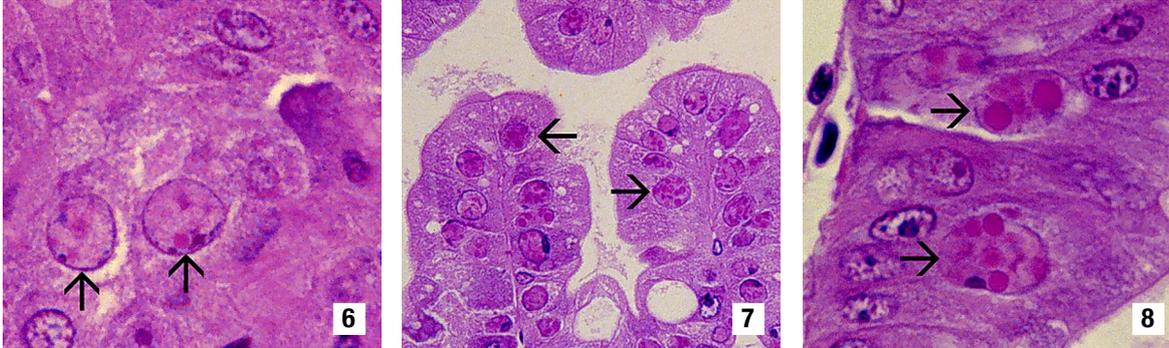
Low (Fig 4, 175x) and high (Fig 5, 700x) magnification views of the same mid-sagittal section of the hepatopancreas of a PL black tiger prawn with a grade 4 spherical baculovirus infection. Only one HP tubule in the lower left of Fig. 5 contains normal looking HP cells. Virtually all of the remaining HP tubules are displaying infected cells with fully developed intranuclear occlusion bodies. In H&E preparations, spherical baculovirus occlusion bodies appear as eosinophilic, generally multiple, spherical inclusion bodies in enormously hypertrophied nuclei (arrows)

Source: DV Lightner



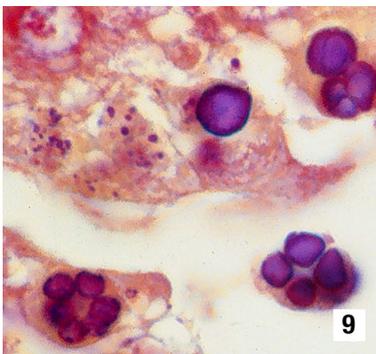
Spherical baculovirus continued

Histological images



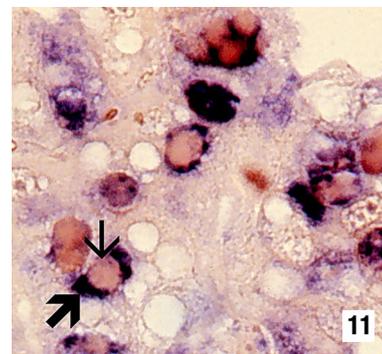
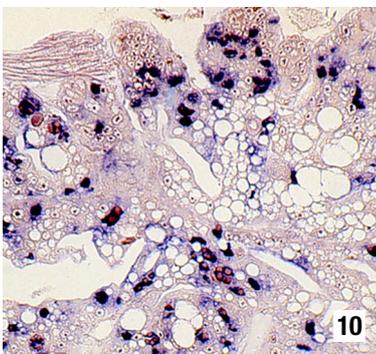
Mid (700x) and high (1700x) magnification views of spherical baculovirus-infected cells in the HP of PL or juvenile black tiger prawn. Different stages of development are illustrated in the photomicrographs, ranging from very early to fully developed. Fig 6 best illustrates an early stage of infection when nuclear hypertrophy and chromatin margination have occurred, but occlusion body formation has just begun. Figs 7 and 8 show all stages of spherical baculovirus infection development

Source: DV Lightner



Spherical baculovirus occlusion bodies may be stained with a variety of stains, such as tissue Gram stains for bacteria. In this example, baculovirus occlusions have been stained purple. However, the results are highly variable and red staining with tissue Gram stains also occurs. Brown and Brenn Gram stain, 1700x

Source: DV Lightner



Low (Fig 10, 250x) and high (Fig 11, 1000x) magnification views of a mid-sagittal section of the HP from a spherical baculovirus-infected black tiger prawn, which has been reacted with a DIG-labelled DNA probe to the virus. Spherical baculovirus occlusion bodies are impermeable to the baculovirus probe (small arrow), but they are surrounded by intensely baculovirus-positive intranuclear areas, as marked by the dark blue stain (large arrow). DIG-labelled probe and Bismarck Brown

Source: DV Lightner

