



GENICS

Education Series

Mourilyan Virus (MoV)

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Shrimp get sick too. Mourilyan virus (MoV) is a virus that affects some species of shrimp. It was first detected in diseased giant tiger prawns (shrimp) (*Penaeus monodon*) collected in 1996 at a farm near the township of Mourilyan in North Queensland, Australia. It is worth noting that the shrimp were also infected with the crustacean nidovirus, Gill Associated Virus (GAV), which is commonly found concurrently with MoV, hence, the difficulty in knowing if the adverse effects are due to one or the other virus. Furthermore, both viruses have been found in high infection loads in moribund shrimp collected from Mid Crop Mortality Syndrome (MCMS) outbreaks, but recent studies suggest that it is in fact GAV the one that causes the mortalities, and not MoV.

MoV occurs in eastern Australia in wild and farmed giant tiger (*P. monodon*) and kuruma shrimp (*Penaeus japonicus*). MoV is known to also occur in Fiji, Malaysia, Thailand and Vietnam. It is considered enzootic in Australian *P. monodon*. In this species, MoV can exist as a chronic or acute infection. In *P. japonicus* however, MoV is associated with increased mortality rate. In general, *P. monodon* seems to be quite tolerant of MoV infection, unlike *P. japonicus*.

Causative agents of infection with MoV. MoV is a closely related variant of Wenzhou shrimp virus 1 (WSV1, strain BJDx-5) from Zhejiang Province in China, in the order Bunyavirales, consisting of four or three segments of negative-sense single stranded RNA (ssRNA). MoV displays enveloped, spherical to ovoid (85–100 nm diameter) particle morphology with a diffuse surface structure, characteristic of bunyaviruses. It infects tissues of mesodermal and ectodermal origins, it replicates in the cytoplasm and the virion maturation occurs at endoplasmic membranes.

Transmission can be horizontal via injection, and likely via ingestion of infected tissue. Vertical transmission has not been reported but it cannot be excluded.

Clinical signs of MoV include the formation of lymphoid organ spheroids which are aggregates of cells with hypertrophied nuclei, the most obvious histopathological finding of MoV. Spheroids numbers, the extent of cytoplasmic vacuolization within spheroid cells, and the amount of necrotic cell debris within spheroids, increase in relation to infection severity. In severe infections, ectopic spheroids may also be detected in gill and in connective tissue associated with various cephalothorax organs.

Susceptible species for MoV infection include the giant tiger shrimp (*Penaeus monodon*) which seems to be tolerant to MoV disease, and kuruma shrimp (*P. japonicus*) which suffers mortalities from MoV infection.

Early detection using Shrimp MultiPath™ can give farmers time to mitigate disease spread and maximize production outputs. It is important to establish early MoV disease mitigation strategies. They may include viral exclusion programs, in order to confirm when broodstock or postlarvae are positive to MoV. It can be used for early rejection of infected shrimp batches before stocking in maturation or grow-out ponds.

Target life-history stages for accurate early detection include young to adult shrimp.

Questions?

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Target organs for sensitive Shrimp **MultiPath™** detection is the lymphoid organ.

Sampling and preservation of tissues for PCR test should be done in labelled vials or tubes with screw cap seals and fixative should be 70% laboratory grade ethanol. Tissue size can be 2-5 mm² in size. Sample equipment must be sterilized using appropriate methods between sample tubes.

Sampling numbers and health management plans should be established with your health expert who will take into account factors such as nauplii/postlarvae source, climate, farm size and location, company structure, market channels for sale of product, etc. There is also the option to pool samples for Shrimp **MultiPath™** testing to maximize value for money with PCR testing.

Longer term solutions include developing tolerant and resistant lines of *P. monodon*, and pathogen free lines of *P. japonicus* using Shrimp **MultiPath™** PCR exclusion programs. Early pathogen detection and risk mitigation through the use of Shrimp **MultiPath™** is also a foundational approach to solving MoV pond consequences.

Contact Genics at info@genics.com if you would like to discuss shrimp health management options for your operation or visit www.genics.com for further details.

Learn how to dissect your shrimp for testing

Visit our new Educational page [here](#) to learn how to:

- Sterilize your equipment before sampling
- Selecting the correct ethanol for tissue preservation
- Identifying and sampling shrimp target organs for Shrimp **MultiPath™** testing



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Did you know?

Shrimp rarely harbour only one pathogen and farmers often don't know which ones they are. This is a significant economic risk for farmers. **Genics has solved this problem** with Shrimp **MultiPath™**. It's the ultimate early warning system for farmers, **detecting 16 pathogens in a single test** that is unparalleled in today's industry for its sensitivity and accuracy.