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Education Series

Bacterial White Spot Syndrome (BWSS)

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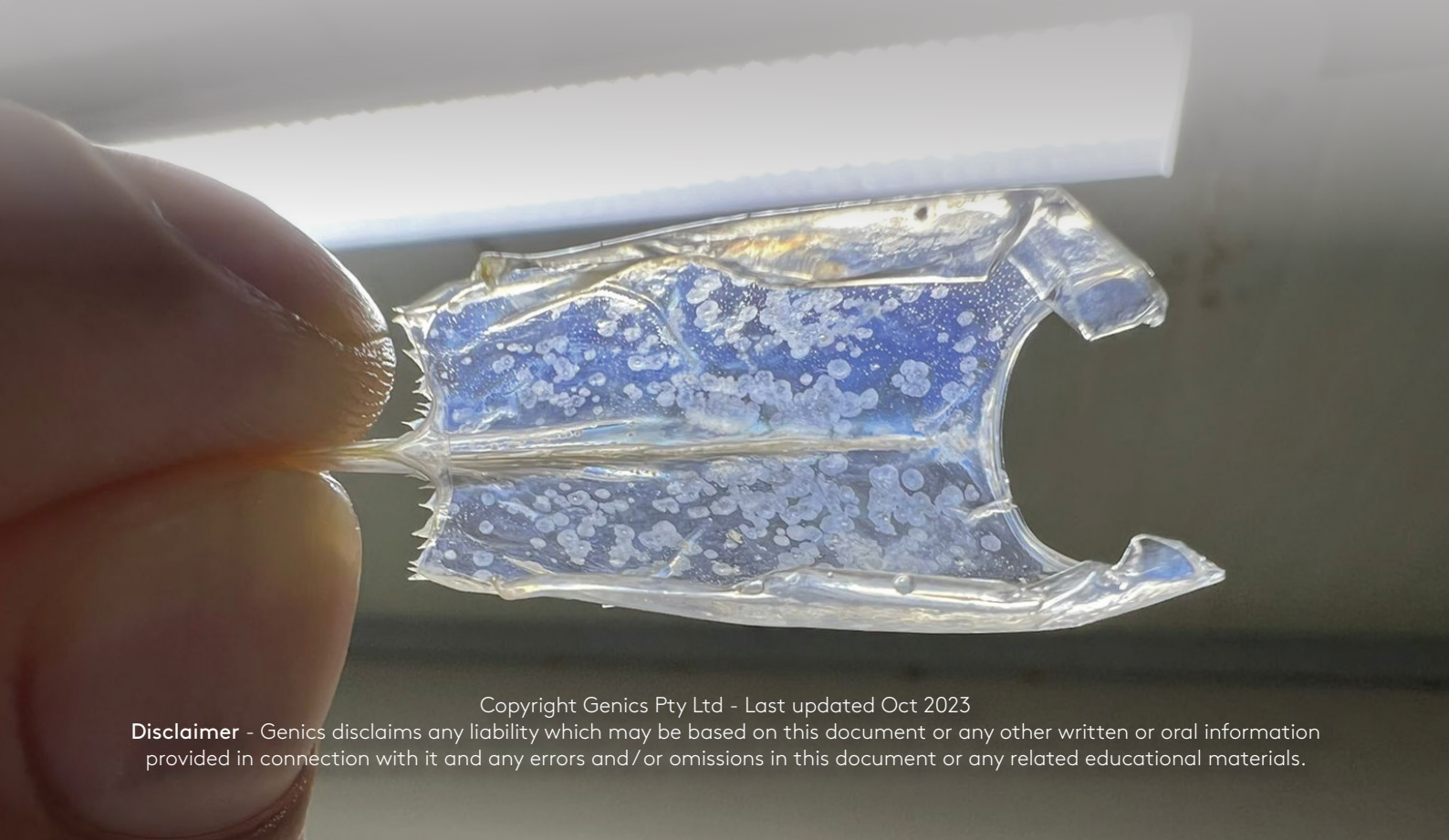


Shrimp get sick too. Commonly, white spots on shrimps have been associated with the White Spot Virus, but there is another cause that should be taken into consideration. It has been called Bacterial White Spot Syndrome (BWSS) and shrimps affected by it show similar clinical signs of white spots, with the difference that they remain active, in an apparently healthy condition and grow normally without suffering significant mortalities.

A study published in 2000, showed that the shrimp who presented the white spots were able to molt without the occurrence of significant mortalities when compared with normal shrimp. It was noted that the occurring infection was localized and did not seem to be systemic, given there were no pathological changes in the deeper tissues, like the underlying muscles.

As for the white spots themselves, they seem to be the result from degeneration and discoloration of the cuticle following the erosion and disappearance of the epicuticle due to heavy bacterial infection.

The causative agent of BWSS is *Bacillus subtilis* used mainly as a common component in formulated mixtures of beneficial bacteria in probiotics. In one scientific study, high numbers of white spots on the shrimp cuticle were seen after the application of probiotics in the ponds.

Clinical signs of BWSS are white spots on the cuticle of the animals. On a closer look, using wet mount microscopy these appear as opaque brownish lichen-like lesions with a crenated margin. Under higher magnification, numerous bacteria and degenerating hemocytes are found in the matrices of spots, with bacteria concentrated at the center of the spot.

Even though BWSS is a non-systemic infection and the lesions are normally gone after molting, it should be considered that severe infections along with inadequate husbandry might delay molting and the affected animals may succumb to secondary infections. This is due to the potential change in osmotic regulation and molting activity as a consequence of the abnormalities caused by heavily infected cuticles and epidermis.

Wet mount microscopy, histopathology and scanning electron microscopy consistently reveal heavy bacterial concentrations at the white spot lesions and erosion and perforation of the cuticle in BWSS cases. If shrimp have gross morphology of white spots on the carapace in the absence of mortality, BWSS may be the cause.

Difference with WSSV

To differentiate from WSSV, there are some factors to consider in relation to the white spots:

1. In the early stages of infection with BWSS, the spots are barely visible on the cuticle of live shrimp but are readily seen on the peeled or molted cuticle. The spots are not dense and have a marginal ring with or without a pin-point whitish dot at the center. In contrast, WSSV spots are dense and easily observable on live shrimp.
2. Under light microscopy, BWS have a lichen-like profile with a crenated margin, numerous radiating lines, tiers of homocentric rings, and an eroded or perforated center area in which bacteria are clustered. In contrast, WSSV spots consists of a marginal ring (sometimes absent) and a central area that contains abundant melanized dots.
3. The main difference is that shrimps infected with WSSV usually suffer severe mortalities within a few days of the occurrence of clinical signs. In BWSS no significant mortalities were reported.
4. The shrimp affected by BWSS did not show WSSV particles or typical intranuclear inclusions by Transmission Electron Microscopy (TEM) and light microscopy, respectively.

Susceptible species for BWSS infection include *Penaeus monodon* and *L. vannamei*.

Early detection using Shrimp Multi Path™ will allow to discern between WSSV and BWSS, by confirming or ruling out the presence of White Spot Syndrome Virus. Suspected WSSV samples should be submitted to the laboratory for confirmatory diagnosis.

Target organs for sensitive Shrimp **Multi**Path™ detection of WSSV are cuticular epithelium (skin) of the shrimp and subcuticular connective tissues.

Sampling and preservation of tissues for PCR tests for WSSV (exclusion testing for BWSS) should be done in labelled vials or tubes that seal and fixative should be 70% laboratory grade ethanol. Tissue size can be 2-5 mm^2 in size. Sample equipment must be sterilized between sample tubes.

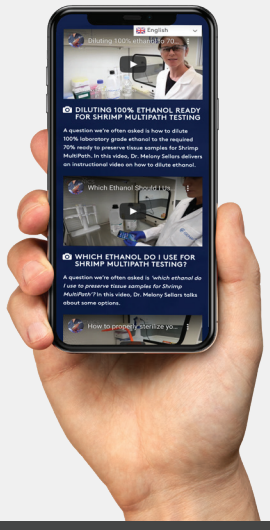
Sampling numbers and health management plans should be established with your health expert who will take into account factors such as climate, farm size and location, company structure, market channels for sale of product, etc. There is also the option to pool samples for Shrimp **Multi**Path™ testing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

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 **Multi**Path™ testing



Questions?

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BWSS

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 **Multi**Path™. It's the ultimate early warning system for farmers, **detecting up to 16 pathogens in a single test** that is unparalleled in today's industry for its sensitivity and accuracy.