

Preventing and Controlling White Feces Disease

About White Feces Disease

White Feces Disease (WFD) has become a growing problem for shrimp production. Many factors are related to its increase over the past few years, including deteriorating water quality due to increased organic load from upstream industry, the impact of higher stocking densities, and excessive feed use leading to higher levels of sediment waste. Additionally, environmental factors can promote disease inducing conditions, such as increases in seasonal temperatures, heavy rain that reduces pond salinity or impacts pH, and poor water quality from rivers with higher salinity due to rising sea water.

What Causes White Feces Disease?

The exact causative agent has not been identified. Research on WFD shows that it could be due to an infestation of various *Vibrio* bacteria. A number of *Vibrio* species have been identified with WFD. For example, *Vibrio parahaemolyticus*, *V. fluvialis*, *V. mimicus*, *V. alginolyticus*, as well as other *Vibrio* spp. have been isolated from the feces of WFD-infected shrimp. Additionally, EHP (*Enterocytozoon hepatopenaei*), a microsporidian parasite, has also been associated with WFD, but causation has not been confirmed. Lastly, the disease may also be caused by physical sloughing of hepatopancreatic tubules, possibly due to a new, unidentified, bacterial toxin.

Many potential factors are thought to contribute to WFD:

- High stocking densities
- Poor pond bottom conditions, including those with a lot of sludge
- High algae bloom due to poor water management
- Pond water with low transparency of <20 cm
- Significant algae crash coupled with rising total ammonia nitrogen (TAN)
- Cyanophyta being replaced by dinoflagellata and ciliata/protozoa in the pond
- Poor feeding management strategies that can result in a lot of uneaten feed left in pond
- High total *Vibrio* count in water, defined as a count of $> 1 \times 10^4$ CFU/mL, or >12% of the total bacteria load
- High alkalinity, defined as >200 ppm or <80 ppm
- Prolonged low dissolved oxygen, defined as <3.0 ppm
- Poor pH management

How Can I Identify WFD?

WFD should be suspected in shrimp when their digestive system and the feces turn from the normal brown color to pale white. If present, the disease is typically observed 50-60 days after stocking PL. The hepatopancreas becomes nearly white and soft. It may appear pale yellow in color. White feces excreted by shrimp are buoyant and tend to float on the pond water surface, appearing like fecal strings.

Severely infected shrimp can also show a loose exoskeleton and epibiotic protozoa that may cause a dark discoloration of the gills. Shrimp infected by WFD exhibit a marked reduction in feed intake, an increased feed conversion ratio, and, subsequently, reduced growth. A severe infection of WFD may also result in up to 60% mortality.



WFD infected shrimp with pale/white hepatopancreas



White fecal strings floating on pond surface



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How Can I Prevent WFD?

Prevention practices are the best approach for dealing with WFD. Farmers must be alert and observant for the possible onset of WFD symptoms.

Start with a thorough pond preparation management practice. BiOWiSH recommends including BiOWiSH® AquaFarm in your pond (Please refer to our technical bulletins on Pond Management: Nursery Tank & Ponds; Grow-out Ponds at www.int.biowishtech.com/technicalbulletins for complete details).

This may also include sterilization of water and stringent control of feed to limit organic input, which will prevent excessive organic waste from accumulating in the pond. Organic waste accumulation provides a source of unwanted bacteria growth.

BiOWiSH recommends that producers only stock SPF certified PL. BiOWiSH also recommends stocking PL that have been treated with BiOWiSH® MultiBio 3PS and BiOWiSH® AquaFarm dosed from hatchery and nursery through the grow-out period to help sustain shrimp health and improve their resistance to stress and disease challenge.

Diligent monitoring of *Vibrio* and water quality parameters is required to prevent WFD and other disease. For monitoring *Vibrio* and water quality parameters, please refer to BiOWiSH® technical bulletins Pond Management: Nursery Tanks and Ponds and Pond Management: Grow-Out Ponds at www.int.biowishtech.com/technicalbulletins

Treatment

If WFD is present, it is important to detect and treat the disease as early as possible before shrimp lose their appetite and the disease becomes severe. WFD is known to transfer horizontally in shrimp through contaminated waste consumption and cannibalism, so constant observation and pond surveillance is necessary, even at night.

If WFD symptoms are prevalent, BiOWiSH first recommends that farmers reduce pond stocking densities during the hot season. This will help reduce organic sediment matter and *Vibrio* load in the pond bottom.

Second, BiOWiSH recommends applying an immediate and sustained treatment with BiOWiSH® MultiBio 3PS coated onto feed to improve shrimp health and increase their immune resistance, and water treatment with BiOWiSH® AquaFarm to improve water quality and establish a healthy population of beneficial bacteria. Please refer to our user guides, Nursery Tanks and Pond Applications and Grow-Out Pond Applications, for application rates at www.biowishtech.com/userguides. These treatments both help improve shrimp health and mitigate disease effects through improved water quality and inhibiting growth of *Vibrio* bacteria.

If partial white strands of feces are observed, then further, more aggressive treatments can also be applied. Those include reducing feed levels significantly or eliminating feeding for an entire day, and significantly increasing pond aeration.