Management of white feces syndrome (WFS) in *P. vannamei* farms

What is White feces Syndrome (WFS)?

White feces syndrome (WFS) has recently been recognized as a serious concern for shrimp aquaculture in major shrimp farming nations. The syndrome is named as WFS, since the affected farmed shrimps excrete white faecal strings. According to the study carried out at ICAR-CIBA, the WFS has been found to be significantly associated with the microsporidian *Enterocytozoon hepatopenaei* (EHP) in *P. vannamei* grow-out farms. It has been reported that the Thai production loss due to WFS was estimated to be about 10–15% in 2010. In India since 2015, 17% of shrimp farms in the east coast were affected with WFS. The disease can cause moderate to severe economic loss due to reduced productivity compared to the normal ponds.


White faecal strings floating on the surface of pond

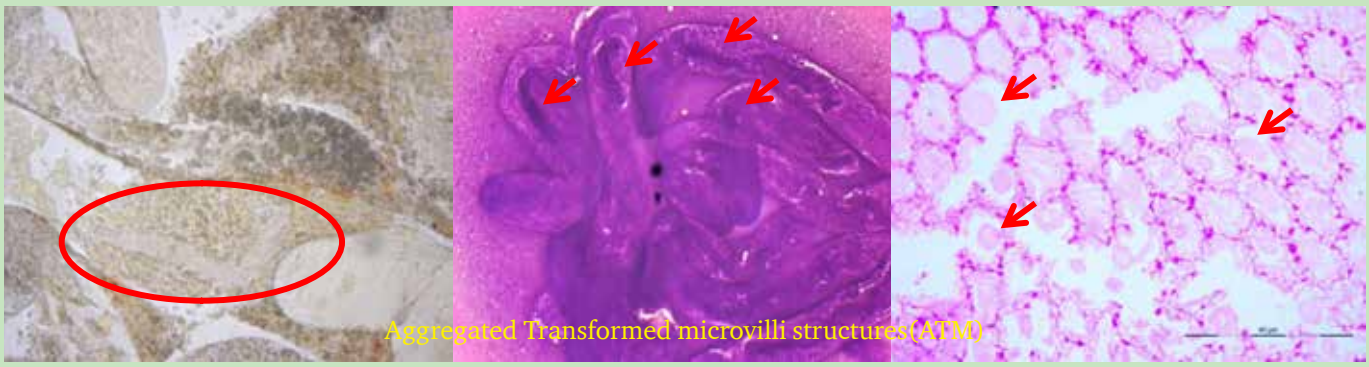
What are the Clinical signs of WFS?

In affected shrimp farms, WFS is evident with whitish faecal strings floating on the pond surface. White faecal threads could also be found in the feeding trays. Shrimp affected with WFS excrete white faecal strings and show white/golden brown intestine. Feed consumption in the affected ponds is significantly reduced.

WFS usually become evident after 30-40 days of culture. Ponds affected with WFS show white faecal strings floating on the pond surface for a period of 10 days to 45 days or more, elevated FCR, growth reduction, size variation, loose shell and daily mortalities. Loose shell affected shrimps are less active and found sluggishly swimming at the surface of pond water.

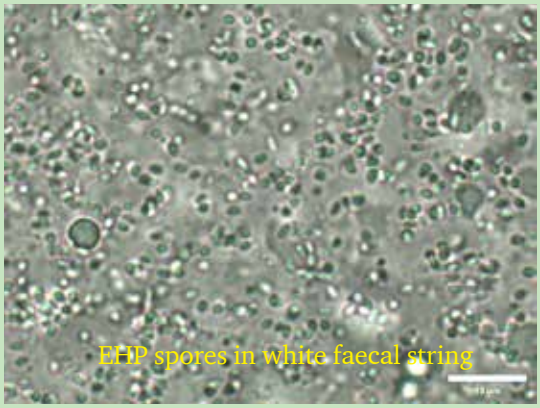
How to Diagnose WFS ?

Apart from clinical signs, the disease is diagnosed by squash preparation and histopathological examination of hepatopancreas. Squash preparation of WFS affected hepatopancreas reveals non-motile vermiform bodies/ ATM structures (aggregated transformed microvilli structures) in the lumen of the tubules of the hepatopancreas (HP). Smears of affected HP stained with Eosin clearly show ATM structures inside HP tubule lumen. Histological sections of affected HP stained with hematoxylin and eosin (H & E) reveal the cross section of ATM structures in the HP tubule lumen and dilated HP tubules, sloughed HP epithelial cells, accompanied by severe necrosis.



What is the causative agent of WFS?

The occurrence of WFS has been reported to be associated with gregarine worms, ATM structures, vibriosis, *Enterocytozoon hepatopenaei,* bacteria such as *Candidatus, Bacilloplasma* and *Phascolarcto,* blue green algae and fungi. It was later found that Gregarines worms had no role in WFS. No vibrio spp was found to be predominant among the WFS affected shrimp according to the metagenomic studies conducted at CIBA. One study reported that WFS was due to aggregated transformed sloughed of (ATM) microvilli structures in HP tubule. EHP is significantly found to be associated with WFS affected shrimps according to investigations at ICAR-CIBA.



Management of WFS

Occurrence of WFS can be reduced by good management practices and proactive biosecurity measures in the farm. During the WFS affected period, feed can be reduced in shrimp ponds. White faecal threads containing dense EHP spores should be removed from the affected ponds on daily basis. Since shrimp hepatopancreas show regeneration ability, medications/additives (e.g taurine) enhancing the epithelial cell proliferation may be used. Since EHP is highly prevalent in WFS affected shrimps, effective measures recommended against EHP may be followed. Pond preparation should be carried out as per best management practices (BMPs) by drying and disinfection after every harvest to ensure that the EHP spores along with the carriers are destroyed. Treatment of pond sediments by application of CaO (quick lime) @ 6 tons per ha has been recommended. The use of higher dose of lime is essential as spores will get killed only by raising the pH of soil 12 or more. It is advised to plough the CaO into the dry pond sediment (10-12 cm) and then moisten the sediment to activate the lime. NACA also suggested >15 ppm $KMnO_4$ or >40 ppm chlorine to inactivate spores in soil. Then pond should be left for one week for drying before filling. Farmers are also advised to stock only PCR tested EHP-free seeds in ponds with good plankton/bloom. In hatcheries, all live feed must be tested by PCR to ensure absence of EHP.

"Brackishwater aquaculture for food, employment and prosperity"

ICAR-Central Institute of Brackishwater Aquaculture

(ISO 9001:2015 certified)

Indian Council of Agricultural Research,

75, Santhome High Road, MRC Nagar, Chennai 600 028 Tamil Nadu, India

Phone: +91 44 24618817, 24616948, 24610565 | Fax: +91 44 24610311

Web: www.ciba.res.in | Email: director.ciba@icar.gov.in, director@ciba.res.in

Follow us on : /icarciba