



CENTRAL INSTITUTE OF BRACKISHWATER AQUACULTURE (Indian Council of Agricultural Research)

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Ensuring WSSV Free Soil and Water for Prevention of White Spot Disease

WSSV is widespread in shrimp aquaculture ecosystems globally and is transmitted vertically from infected brood stock to larvae and horizontally by ingestion of infected organisms. Better management practices (BMPs) have helped alleviate this problem to a great extent, by minimising risks of its transmission through carriers. However, concerns of WSD transmission through contaminated water and pond soil remain unaddressed. Research carried out at CIBA has indicated that white spot disease can be transmitted by WSSV contaminated inadequately dried pond sediments. The disease affected ponds may contain as high as 10 lakh (10^6 g^{-1}) WSSV particles in sediments and of the order of 100s (10^2 ml^{-1}) of WSSV particles in water and may remain viable and infective for varying periods of time. The viability of WSSV in pond sediment depends upon several factors, and the most important factor is the moisture content in the soil. WSSV remains infective in sediment with moisture content of 1.3 to 1.5%. To completely inactivate WSSV, ponds have to be dried for at least three weeks to prevent WSD in newly stocked ponds. Hence, ponds have to be thoroughly sun-dried. As standard operating procedures (SOPs), testing sediment for WSSV by PCR before commencing new crop can help in preventing shrimp mortalities during early days of culture. Additionally, water in the reservoir after appropriate treatment should be tested for WSSV, in order to obtain freedom from WSD in one's farm.

BMPs for prevention of WSD

1. Source water: Ideally farms must have reservoirs of adequate requirement of seawater for operation of aquaculture. Filter source water first through coarse screens to remove larger aquatic animals and debris and then pump into a supply/settling canal. Then, pass the water through a series of progressively finer screens and finally through a fine mesh (150–250 μm mesh size) bag screen before being introduced into the reservoir.
2. Chlorinate water in the reservoir with sufficient chlorine (10 ppm) to kill any potential vectors or carriers in the source water collected in the reservoir. For one ha reservoir / pond of one meter depth, 150-160 kg of calcium hypochlorite providing 65% active chlorine would give a final concentration of 10ppm (Personnel handling such chemicals should take precautions to protect their skin and eyes). Since commercial bleach powders vary in active chlorine content,

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dosages need to be adjusted accordingly. Vigorously aerate reservoir at least 48 h for de-chlorination to remove residual chlorine.

3. Disinfection of WSD affected grow-out ponds: Do not discharge water from WSD affected ponds. Remove aeration devices and implements and disinfect separately. Disinfect by evenly distributing calcium hypochlorite to provide a minimum final free chlorine concentration of 10 ppm within the entire system's water. Allow the system to stand for a minimum of 24–48 hours at this minimal chlorine concentration by adding hypochloride if required.
4. Disinfection of effluent water: Chlorinate (50 ppm chlorine) for 24–48h. Vigorously aerate reservoir at least 48 h for de-chlorination to remove residual chlorine. Alternatively, ozone treatment may be carried out if available at levels of 0.08–1.0 mg per litre to significantly reduce microbial load.
5. Following harvest after a crop, the deposits of organic debris in the pond bottom should be removed or treated, ploughed and tilled. Level the ponds and ensure that there are no wet patches in the ponds, especially at the centre or near the sluice gates. All parts of ponds should be thoroughly sun dried for at least three weeks.
6. Disinfection of dried earthen ponds can be further carried out with quicklime (calcium oxide) at a rate of 4000–5000 kg per ha. Quicklime causes desiccation / dehydration of organic matter.

Once the pond is ready to start fresh culture after having completed pond preparation following the above BMPs, pond sediment may be tested for WSSV by PCR to ascertain biosecurity from WSSV

How to collect pond sediment for WSSV testing?

Collect about half-a-kilo of sub surface sediment sample after scraping off about top 4-6 inches of sediment from four to five points especially in the wetpatches within the pond including the area near the sluice gate. Pool all the samples, mix thoroughly and send about half-a kg of sediment to the laboratory in zip-lock bag taking care to avoid air within the cover.

Based on the test results how to decide on starting new crop?

If the sediment is first step PCR positive for WSSV (OIE 2012), do not stock ponds. Disinfect the pond and dry the pond thoroughly and get the testing done again. If the sediment is nested PCR positive for WSSV, farmers may stock the pond after about 4-5 days, since the viral load is likely to reduce further to non-infective levels.

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