

**Northeast monsoon rain and associated changes as risk factors for the
occurrence of white spot syndrome in cultured *Penaeus monodon* in the
Northwestern province, Sri Lanka**

By

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Abstract

Preliminary observation carried out over the last three years have revealed that, during the period that the farming area of the Northwestern province receive heavy rain under Northeast monsoon rain, very high mortalities occur in culture shrimp due to outbreak of white spot syndrome. Therefore, the present study was carried out to investigate whether the Northeast monsoon rains and associated changes in culture water contribute as risk factors for the occurrence of white spot syndrome outbreaks in *Penaeus monodon* in grow-out ponds located in different zones of the Northwestern province.

Nine experimental shrimp culture ponds were selected from each zone (6 zones) representing three replicate ponds from each culture system (intensive, semi-intensive and extensive). Each pond was stocked with PCR negative (for white spot syndrome), good quality post larvae and fed with formulated shrimp feed (36-38%, crude protein). Water quality parameters and *Vibrio* population in culture water were recorded weekly while random shrimp samples were observed for the development of gross clinical signs of white spot syndrome at weekly intervals. Moribund shrimp were tested for the presence of WSSV by PCR technique and Mortalities were recorded to allocate a severity index of WSS. Mean value of water quality parameters were analyzed by principal component analysis (PCA) for ponds managed under different culture system. Results revealed that heavy Northeast monsoon rain and associated changes in water quality parameters of pond water, viz, low dissolved oxygen, low water temperature, high transparency, high pH and high unionized ammonia act as triggering factors for occurrence of WSSV outbreaks. Fluctuation of water quality parameters were significantly related to increased *Vibrio* population of pond water.

Effect of heavy rainfall and associated changes of water quality parameters was found to be less on shrimp reared in intensive culture ponds compared to the shrimp reared in semi-intensive and extensive culture ponds due to improved condition in intensive system.

Challenge experiment carried out in the laboratory showed that water temperature and salinity significantly contribute ($p < 0.05$) to the mortality of shrimp infected with WSSV.

Therefore, all the farmers should be educated and supported in managing their ponds in such a way that shrimp would experience minimum stress due to abrupt changes of water quality parameters during heavy rainy period. Avoidance of stocking the ponds, specially the ones that are located in zones 3, 2, 4 and 5, during heavy Northeast monsoon rainy period also could be strategy to prevent outbreaks of WSSV.