

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

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Preliminary observations carried out over the last three years have revealed that, very high mortalities occur in cultured shrimp due to outbreaks of white spot syndrome (WSS) during the period that the farming area receive heavy rains. The present study investigated whether the Northeast monsoon rains and associated changes in culture water contribute as risk factors for the occurrence of WSS outbreaks in *Penaeus monodon* in grow-out ponds located in different shrimp farming zones (demarcated by NAQDA) 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 WSS negative (by PCR), good quality post larvae and fed with formulated shrimp feed (36-38% crude protein). Water quality parameters in culture water of each pond were recorded weekly while random shrimp samples were observed for the development of gross clinical signs of WSS at weekly intervals. Moribund shrimp were tested for the presence of WSS virus 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 systems.

Results revealed that heavy Northeast monsoon rains 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 the occurrence of WSS outbreaks.

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 the heavy rainy period. Avoidance of stocking the ponds that are located in the zones which receive high rainfall during Northeast monsoon rainy period also could be a strategy in preventing outbreaks of white spot syndrome.