

Jariyavadee Suriyaphan 2011: Effects of Nutrients, Soil and Water Qualities on Plankton Communities in Intensive Pacific White Shrimp (*Litopenaeus vannamei*) Ponds. Doctor of Philosophy (Fisheries Science), Major Field: Fisheries Science, Department of Fishery Biology. Thesis Advisor: Associate Professor Chalor Limsuwan, Ph.D. 194 pages.

A study on the effect of water and soil qualities on the phytoplankton communities of intensive Pacific white shrimp (*Litopenaeus vannamei*) culture ponds of low salinity water (5-7 psu) in Ratchaburi province and normal saline water (30-35 psu) in Prachuabkirikhun province was carried out. Six earthen ponds approximately 5 rais (8,000 m²) of low salinity culture area were selected to estimate the effect of total suspended solid (TSS) on *L. vannamei* culture. For normal saline water, six earthen ponds of approximately 5 rais (8,000 m²) were divided into two groups. First group consisted of three ponds which had unstable phytoplankton bloom from previous crop. Second group consisted of three ponds which had more stable phytoplankton community from previous crop. The water color shades, plankton abundance, water and soil qualities were recorded throughout the culture period. It was found that in low-salinity ponds phytoplankton density was related with water quality such as pH, dissolved oxygen (DO), nitrogen and phosphorus of the pond water while the water quality was related with the soil quality. Moreover, increased of TSS during the culture period and phytoplankton die-offs resulting in the lack of oxygen in the pond bottom soils and affected shrimp production.

Phytoplankton density from normal salinity ponds were significantly related with pH and DO, whilst there were significant negative correlation with hardness and total phosphorus of the pond water (P<0.05). On the other hand, total nitrogen, total phosphorus and organic matters in the pond bottom were positively correlated with nitrite-nitrogen, nitrate-nitrogen and total phosphorus of the water. Statistical analysis compared between stable color ponds and unstable color ponds showed that the density of phytoplankton, phosphorus of the water column and soil pH were significantly different between the groups. The solubility of phosphorus was affected by soil pH that allowed total phosphorus of the bottom soil to dissolve into water column. When the total phosphorus was higher than 0.5 mg/l caused significant decrease of phytoplankton and water color. The average production, body weight and growth rate from stable color ponds was significantly different than the unstable water color ponds. However, survival rate and feed conversion ratio from both groups were not significant different.

Student's signature

Thesis Advisor's signature