Internship Experiment in the Kim Trung industrial fishery cooperative, Kim Trung commune, Kim Sơn district, Ninh Binh province

By: NGUYEN QUANG DAT
Supervised by: Eng. PHAM HUY TRUNG

Introduction

Vietnam is considered one of the oldest countries in shrimp farming which it has brought high economic profits by the shrimp farming. However, in recent years the development of shrimp farming has caused difficulties for environment management. With the development of a asynchronous and self- development, water supply and drainage network for shrimp farming areas are still confused not distinguish the waste channel, where the water channel.

Despite the huge initial investment for this work, people also face no less risk of shrimp disease kills a wide range, quality and quantity of product to be low, causing huge losses for people. With limited understanding of people, out of work construction investment for ponds, feed, so the control of water quality and disease is very difficult to solve problem. It usually occurs on the individual or complex shrimp is the process of interaction between shrimp, pathogens and environment. The reciprocal relationship between environment, host and pathogen, so environment factors play a very important role, that impact on beneficial or detrimental to the relationship between shrimp and pathogen.

Besides technical, economic issues and social environment, creating conditions for sustainable development of shrimp farming areas are urgently needed. That's why I choose to do internship "*Monitoring changes of water environment factors in shrimp ponds in the Kim Trung fishery cooperative, Kim Trung commune, Kim Sơn district, Ninh Binh province".*

Time of research

Form March to June, 2010

Content of the research

Investigating and collecting pond water samples for analysis of water environmental parameters in Kim Trung fishery cooperative.

Propose some management measures and evaluate the quality of pond waters.

Research methodology

- Samples for physico-chemical indicators in shrimp ponds (temperature, pH, DO, salinity, alkalinity) were on-site collected and measured. Water samples for NH_3, NO_2 were analyzed in the laboratory.

- Conducting survey using questionnaire covering pond size and structure, feed, disease control, water disinfection, economic profit..

Overview of the aquaculture cooperative

Scale and structure of the ponds

There are 70 hectares in scale aquaculture of cooperatives, including 54 ponds accounting 43,6 hectares. Infrastructure was completed by investment and used in 2004. Common size of pond is 7.000 – 8.000 m^2.

Landscape of shrimp culture area in the Kim Trung fishery cooperative

Using chemical

Shrimp ponds operating as semi-extensive model mainly used lime for water treatment during cultivation. Extensive shrimp ponds use $KMnO_4$, chlorine for water treatment and lime to improve pond water.

Liming to treat pond bottom

Culture time and stocking density

Stocking time falls from 1- 30/4/2010, mainly with black tiger and white leg shrimp. There were 45 semi-extensive ponds used for tiger shrimp, stocking density of 8-10 PL/m^2 (P15). For white shrimp, there were 9 extensive ponds, stocking density of 40 shrimp/m^2.

Check the PL15 before stocking

Feed and feeding regime

Of 45 tiger shrimp ponds aquafarmers used home- made food by means of extruder. The materials included trash fish, rice bran, corn bran. They were all low quality and sanitation was not guaranteed. While industrial feed of CP was used in 9 white shrimp ponds.

Food using for culture White shrimp

Shrimp disease outbreak and preventions

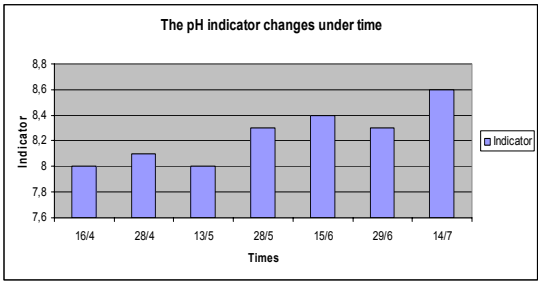
Disease happens intermittently causing mortality for tiger shrimp. It is accused by low quality of pond bottom, water leaking, input water is not well treated (without going through sedimentation and chemical

treatment. In white shrimp ponds, although high densities of shrimp, household adhere to the technical procedures, no shrimp disease manifestations experienced as a results

Shrimp health monitoring

Water quality analysis and monitoring

pH indicator

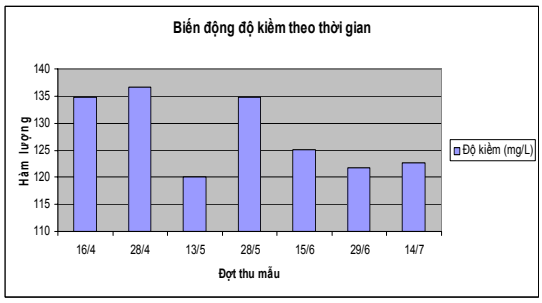


The pH indicator changes with culture time

pH stayed at high level with minor variation, ranging from 8-8.6 over culture period. pH amplitude of more than 0.5 units is blamed as a result of algal growth in ponds.

On site pH measurement using test kit

Alkalinity

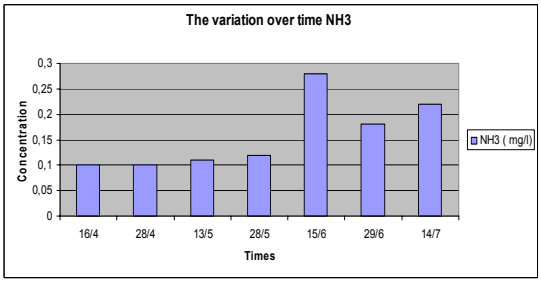


Alkalinity fluctuation over time

Alkalinity was recognized to be in a suitable range for shrimp culture (120-136.6 mg/l.)

Alkalinity measurement

NH_3

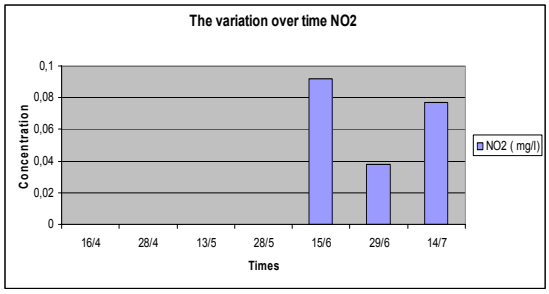


Fluctuation of NH_3 over culture time

Concentration of NH_3 increased steeply in the third month of culture. It varied from 0.1 to 0.28 mg/l. The upper limit could cause health problem for shrimp (safety limit < 0.13 mg/l by Chen and Chin, 1998). Its high level is attributed by high pH and alkaline water environment.

.

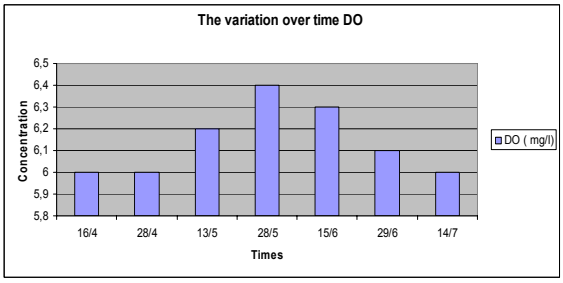
NO_2



The variation of NO_2 over time

Level of NO_2 was a minor fluctuation and tend to increase over culture time. For the first 4 samples, there was only a trace of NO_2, but the 5^{th} sample appeared in a low level of NO_2 (roughly 0,09mg/l).

Dissolved Oxygen

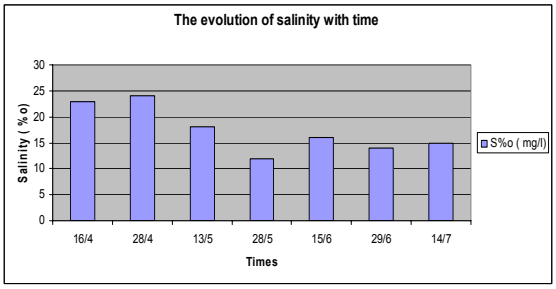


The DO variation with time

DO level increased within the first two month of the culture period, then gradually reduced. DO greatly changed within s day, often reaching the highest value at 12-14 PM daily in ponds with high algal density. The presence of algae including *Cyanophyta, dinoflagellate, diatomae, chlorophyta* would experience DO saturation at daytime but DO deficiency at nighttime.

Check for DO variation

Salinity



The evolution of salinity with time

Salinity was highly variable (10-24‰) and decreased gradually towards the end of crop. The range of salinity was considered to be appropriate for shrimp culture. But daily amplitude of > 5‰ would bring a disadvantage for shrimp's health leading them more susceptible to disease infection

Salinity recordings using refracphoto-metter

Conclusion and recommendation

Infrastructure of culture area in the Kim Trung is synchronous, however, the understanding on culture techniques as well as use of food and chemical products is still limited.

Taking water into culture ponds directly from source, not well- pond bottom preparation and treatment has led to the accumulation of toxic gases such as NH_3, as well as other pathogens in the bottom of pond contaminating pond water.

The use of home-made food causes water pollution as a result of organic decomposition of shrimp faces and uneaten food. This is the favorable conditions for toxic algae, parasite as pathogens as well as harmful microorganisms to develop and nourish. They are all potential risk for disease outbreak leading to loss of production and poor quality of shrimp.

Pond water was of high pH, alkaline environment, toxic gases such as NH_3, NO_2. They are potentially toxic to shrimp. There was a big fluctuation of DO and Salinity over 24 hours which may be negative to health of shrimp.

Recommendations

- Technical staff and quafarmers should strictly follow technical guides and procedures including well- preparation of pond bottom, water treatment, better controlling of feeding and higher quality of food used, regularly monitoring water quality factors for timely correction measures.

- Probiotics and other treatment bio-products should be used to improve water quality and shrimp heath condition.

- An integrated culture with molluscs (clams,..) or fish (tilapia,…) would be an environmentally friendly practice. Combined species can make used of excess nutrients in water and reduce solid waste in the pond.

- An introduction of aquatic plants (not more than ¼ of culture water surface area) to culture pond system would be an option to reduce water pollution.

A word of thanks

For completing the internship program in highly success, I had got many help from the head of Kim Trung fishery cooperative and its staff member. I am grateful to thank them a lot for all their help.

I would also like to thank Mr. Pham Huy Trung who guide me during the internship period, thank EU-Asia Link project – Phase 2, and International Training & Cooperation Department – RIA 1 for offering the internship program./.