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Analysis on Infectious Disease Intensity Level for Vaname Shrimp (*Litopenaeus Vannamei*) in Lombok, West Nusa Tenggara Province, Indonesia

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Abstract: Prevention and control of disease has become priority to ensure sustainable fishing industry. Purpose of the study is to conduct monitoring/surveilance andanalyze distribution of disease in vaname shrimp farms located in Lombok Provinsi Nusa Tenggara Barat. The monitoing/surveilance started in February until March 2016. It is conducted to find out parasite, bacteria and viruses. The findings show that *Vorticella* sp is the bacterium with the highest distribution in the vaname shrimp farms while *Vibrio Ordalii* sp and*Vibrio Anguillarum* spare the most frequently found microorganism in the vaname shrimp farms. When test for IMNV (*Infectious Myonecrosis Virus*) was conducted, the result came back negative.
Keywords: surveilance, fish disease, parasite, bacteria, virus, Lombok West Nusa Tenggara.

Introduction

Aquaculture activities growing massively by the implementation of intensive system have resulted in decreasing carring capacity for fish farms against farmed fish and shrimp[1]. Fish farm is very vulnerable towards infections caused by parasites, bacteria and viruses[2]. The pathogenic microorganism infection has caused tremendous loss of US$ 3 billions per year[3]anddecreases number of productions worldwide[4]. Besides pathogenic microorganism infection, environment is one of the obstacles in ensurinng sustainable fish industry[5].

Monitoring/surveilance is conducted to minimize spread of fish disease. It involves all aspects of aquaculture including identification as well as fish disease and environmental risk management, and decreases pathogenic spread risk until use of chemical substance[2].

The study analyzes fish disease distribution and environmental condition in vaname shrimp farms in Lombok, West Nusa Tenggara. West Nusa Tenggara was selected as the setting of the study due to huge potentials and ability it has to develop vaname shrimp farms. It is expected fish and shrimp production in Lombok, West Nusa Tenggara increases since fish and shrimp farms in the area are fully supported by the regional government. Increasing production that is closely related to intensive farming system results in infectious disease and environmental damage[6] so that careful planning for aquaculture development is pivotal. Comprehensive analysis using physiscs, chemistry and biology parameter is expected to estimate possibile consequences that arise as the result of increasing aquaculture production[7]. The analysis aims at analyzing distributions of disease and environmental condition in Lombok, West Nusa Tenggara.

Methodology

The study used descriptive analysis and began in February until March 2016 in Lombok, West Nusa Tenggara. It involves production unit of vaname shrimp farms in Central and East Lombok.The analysis towards distribution of disease and environmental condition in the monitoring/surveilanceinvolves three stages namely pre site, on site andpost site. Pre site refers to data collection based on information and materials from the fish farmers. The result of presite analysis is then verified through field observation (on site).During the on site stage, analysis is conducted towards some parameters related to quality of water such as salinity that is measured using refractometer, temperature measured using thermometer, acidity (pH) measured using pH meter and dissolved oxygen using DO meter.

Clinical signs being observed involves behavior and abnormality found on shrimp's body. The collected data are analyzed and discussed descriptively based on related literature. Post site analysis is conducted after field observations for parasite, bacteria and viral analysis. Parasite analysis is conducted using microscopic method. Both shrimp external and internal organs are taken and placed on object glass that previously have been given NaCl physiology solution. The glass object is then covered and put under light microscope[8]. Parasite found is then identified using comparison method to find out the type. Bacterial analysis is conducted using conventional method that involves isolation, purification, biochemical test and bacterial identification. Viral analysis is carried out using Polymerase Chain Reaction (PCR) method that consists of extraction, amplification and electroforesis. The data involve clinical signs and type of pathogenic organism that caused disease for shrimp. Type of pathogenic organisms being observedare macro extoparasite and endoparasit, bacteriaand viruses. Result of parasite, bacterialand viral analysis is then collected and analyzed in order to find out causes of shrimp disease.

Findings and Discussions

Parasiteandbacteria can be agents that cause disease for aquatic organism[9]. The main media for these biological contamination agents are environment, maintenance facilities[10]andalso introduction of fish fry from different hatchery[11].

The study that lasted between February and March2016 showed that Epistylis spand Vorticella sp are the most common parasites found in the shrimp farms located in Lombok, East Nusa Tenggara. During monitoring/surveilance which began in February to March 2016, parasite infection is found in Central and East Lombok. Table 1. Summarizes the results of monitoring/surveilance, observations on pathogenic microorganism infestation in vaname shrimp farms in Lombok, West Nusa Tenggara Barat.

Table 1. Number of Paracites, Number of Vaname Shrimp with Parasite Infection and Number of Vaname Shrimp without Parasite Infection

No	Location of Sample	Number of Analyzed Shrimp	Number of Vaname Shrimp with Parasite Infection	Number of Vaname Shrimp without Parasite Infection	Intencity	Type of Parasite	Number of Parasite
1	Obel-Obel, one-month shrimp	20	7	13	0.3	*Voticella*sp. *Carchesium*sp.	15 13
2	Padak Goar, two-month shrimp	22	8	14	0.36	*Vorticella* sp. *Epistylis* sp. *Zoothamnium* sp. *Carchesium* sp.	13 8 1 14
3	Bile Lando, two-month shrimp	20	6	12	0.3	*Vorticella* sp. *Epistylis* sp. *Polypochepalius* sp. *Zoothamnium* sp. *Carchesium* sp.	14 10 1 1 9

There are two types of parasite found in samples taken from Obel-obelnamely Vorticella spandCarchecium sp.Intensity of parasite infection in the area is Vorticella sp andCarcheciumsp. infection. These two bacteria have the same level of intensity. Table 2. Describes intencity of paracite infection in the samples taken from shrimp farms located in Obel-Obel.

Table 2. Parasite Infection Intencity of Vaname Shrimp in Obel-Obel Shrimp Farms

No.	Infected Vaname Shrimps	Intencity
1	Number of shrimp with *Vorticella* sp.infection	7/20 = 0.35
2	Number of shrimp with*Carchesium* sp. infection	7/20 = 0.35
3	Number of shrimp with zero infection	13/20 = 0.65

Types of parasites found in PadakGoarshrimp farms are Vorticella sp. Epistylissp.,ZoothamniumspandCarchesium sp. The parasites with the highest infection intensity are Vorticella sp andCarehesiumsp. Table 3.Describes intencity of paracite infection in the samples taken from shrimp farms located in Padak Goar.

Table3. Parasite Infection Intencity of Vaname Shrimp in Padak Goar Shrimp Farms

No	Infected Vaname Shrimps	Intencity
1	Number of shrimp with*Vorticella* sp. infection	8/22 = 0.36
2	Number of shrimp with *Epistylis* sp. infection	5/22 = 0.22
3	Number of shrimp with*Zoothamnium* sp.infection	1/22 = 0.04
4	Number of shrimp with*Carchesium* sp. infection	8/22 = 0.36
5	Number of shrimp with zero infection	14/22 = 0.63

Types of parasites found in Bile Lando shrimp farms are Vorticella sp., Epistylissp.,Polypochepaliussp., ZoothamniumspandCarchesiumsp.The parasites with the highest infection intensity are Vorticellasp andCarchesiumsp. Table 4.Describes intencity of paracite infection in the samples taken from shrimp farms located in Bile Lando.

Table 4. Parasite Infection Intencity of Vaname Shrimp in Bile Lando Shrimp Farms

No	Infected Vaname Shrimps	Intencity
1	Number of shrimp with*Vorticella* sp. infection	8/20 = 0.4
2	Number of shrimp with*Epistylis* sp. infection	5/20 = 0.25
3	Number of shrimp with*Polypochepalius* sp. infection	1/20 = 0.05
4	Number of shrimp with*Zoothamnium* sp. infection	1/20 = 0.05
5	Number of shrimp with*Carchesium* sp. infection	8/20 = 0.4
6	Number of shrimp with zero infection	12/20 = 0.6

Bacterial analysis is conducted for the samples taken from the setting of the study. The samples are isolated from targeted organ that is hepatopancreas.Based on the analysis, there are two types of bacteria infecting vaname shrimps in the three shrimp farms namely Vibrio OrdaliiandVibrio Anguillarum.Data from the bacteria contained in the table 5.

Table 5. Results of Bacterial Analysis

Obel-Obel		**PadakGoar**		**Bile Lando**	
Sample Code	Result of Analysis	Sample Code	Result of Analysis	Sample Code	Result of Analysis
085	*V. Ordalii*	086	*V. Anguillarum*	087	*V. Ordalii*
168	*V. Anguillarum*	090	*Negative*	169	*V. Ordalii*

Infectious Myonecrosis Virus (IMNV)test conducted towards the samples taken from three shrimp farms came back negative. It means the vaname shrimp from the three farms are not infected by IMNV. Based on the analysis, it is revealed that Bile Lando shrimp farm has the highest number and type of parasites compared to Obel-ObelandPadakGoar shrimp farms. It happened since quality of water in Bile Lando is decreasing that causes increasing number and type of bacteria infecting the shrimps. It is in line withprevious study[12] that state the worse environmental condition a shrimp farm has, the more parasite infection occurs in the farm.

The most frequently found parasites in the three shrimp farms are Vorticella spandCarchesium sp. In other words, there is tendency for the bacteria to infect vaname shrimps. Furthermore, intensity of parasite infection from the two bacteria is relatively high. The intensity level of Vorticella sp in Obel-Obelis and intensity valueVorticellaspis 0.35 andthe intensity level of Carchesiumsp in the farm is 0.35. The intensity levels of Vorticella sp and Epistylis sp in PadakGoarare 0.36and0.22 respectively while those in Bile Landoare 0.4and0.25. The findings are related to a study conducted by Irawan[13]that VorticellaspandEpistylisspare two types of parasites commonly found in vaname shrimp.

The bacteria found in Obel-Obel, PadakGoarand Bile LandoareVibrio OrdaliiandVibrio Anguillarum. Vibrio bacteria are gram negative bacteria, conus-shaped and grown in TCBS media[14]. Vibrio bacteria are generally found in fish farms and they are not pathogenic towards vaname shrimp in well-balanced environment. Therefore, in order to minimize impact of those bacteria it is important to maintain quality of water for fish farms. The viral analysis shows negativeInfectious Myonecrosis Virus(IMNV).

In conclusion, based on the findings of the study, the highest intensity of parasite infection occurs in Padak Goar shrimp farms. Moreover, the bacteria found in the samples are *Vibrio Ordalii* and *Vibrio Anguillarum.* Meanwhile, IMNV testing conducted to the samples came back negative.

From the discussion above, it can be suggested that Vaname shrimp to be examined should be alive or just dead few hours before examination in order to facilitate identification process of parasite, bacteria and virus. Moreover, other species of shrimp like tiger shrimp or lobster can be used as samples in studies related to parasite, bacterial and viral infections in shrimp. Finally, similar studies on vaname shrimp should be conducted in other shrimp farms and it is expected that the findings can provide description or overview about types of parasites, bacteria and viruses in Lombok, West Nusa Tenggara Province.

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