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Protozoan parasites of Vannamei Shrimp (*Litopenaeus vannamei*) in farmed fish from Pasuruan, Indonesia

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Protozoan parasites of Vannamei Shrimp (*Litopenaeus vannamei*) in farmed fish from Pasuruan, Indonesia

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Abstract. This work investigated the protozoan parasites infesting the vannamei shrimp in farmed fish from Pasuruan, Indonesia. The protozoan parasites found in infested vannamei shrimp were ectoparasites; the protozoan *Zoothamnium* sp., *Vorticella* sp. and *Epistylis* sp. The fish were collected from a fish culture center in Pasuruan, Indonesia, weekly for one month. The diagnosis method as a part of the protozoan ectoparasite examination was scrapping. The prevalence rate of protozoan ectoparasites were, respectively, 72,5% for *Zoothamnium* sp., 55% for *Vorticella* sp. and 42,5% for *Epistylis* sp.

1. Introduction

Over the last few years, commodities that have a lot of contribution to the aquaculture sector in Indonesia include vannamei shrimp (*Litopenaeus vannamei*). This species is relatively easy to breed and culture, so they have become an economic commodities in several countries globally. The advantages of vannamei shrimp include their tolerance to viral infections such as WSSV (White Spot Syndrome Virus), TSV (Taura Syndrome Virus) and IHHNV (Infectious Hypodermal and Hematopoietic Necrosis Virus) [1].

In line with the number of enthusiasts for shrimp culture, there are also some disturbing problems which hamper the development of shrimp culture businesses, which comes from fish parasites. According to [2], the parasites that attack vannamei shrimp culture generally come from the Ciliata class. Some species from the Ciliate class includes *Zoothamnium* sp., *Vorticella* sp., and *Epistylis* sp. One of the diseases that often attacks shrimp in both ponds and hatcheries comes from a pathogen of the ciliate group, especially the species' *Zoothamnium* sp. and *Vorticella* sp. [3]

This study aims to observe protozoa parasites in vannamei shrimp culture from farm ponds in Pasuruan, Indonesia. This information is expected to provide information on the field of parasitology and the enforcement of shrimp health diagnosis. [4] monitored parasites in fish and shrimp culture with the aim of knowing the types of parasites that attack both fish and shrimp in order to determine the factors causing a decline in growth, meat quality and productivity.

2. Material and methods

A total of 40 vanamei shrimps were taken randomly from shrimp culture ponds in Kalianyar Village, Bangil District, Pasuruan Regency, East Java. The shrimp were brought live to the laboratory for an ectoparasite examination in accordance with [5]. The examination of ectoparasites covered the surface



of the body of the shrimp, their gills, swimming leg and walking leg. The examination of the swimming leg and walking leg was done by the cutting method so then all parts of the leg could be observed for ectoparasites. The specimen was then observed using a binocular microscope with a magnifications of 40x and 100x.

The measurement of the water quality parameters in the form of temperature, pH, DO, ammonia and nitrite was also carried out at the time of the vanamei shrimp sampling.

3. Results and discussion

Based on the observations, it was found that vannamei shrimps were infested by Ciliata ectoparasites; *Zoothamnium* sp., *Vorticella* sp., and *Epistylis* sp.

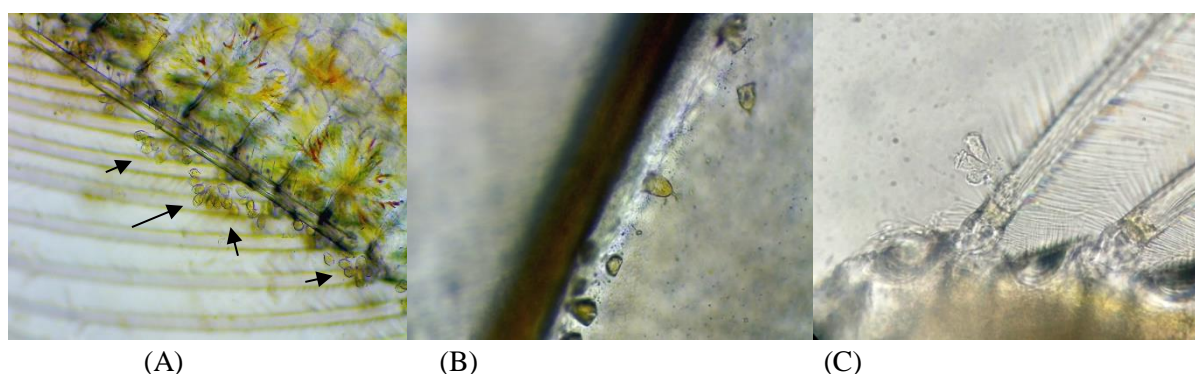


Figure 1. Infestation of protozoan ectoparasites in vannamei shrimp (*Litopenaeus vannamei*); A. Swimming leg of vannamei shrimp infested by *Zoothamnium* sp. (400x); B. Body surface of vannamei shrimp infested by *Vorticella* sp. (400x) and C. *Epistylis* sp. infested walking leg of vannamei shrimp (400x).

3.1 Prevalence and Intensity

The prevalence and intensity of ectoparasite infestations in vannamei shrimp has been shown in Table 1.

Table 1. Prevalence and intensity of the ectoparasites infesting vannamei shrimp

Parasites	Predilection			Prevalence (%)	Intensity of the parasite
	Body surface	Telson	SL/WL		
<i>Zoothamnium</i> sp.	145	93	560	72,5	27,5
<i>Vorticella</i> sp.	43	52	206	55	13.7
<i>Epistylis</i> sp.	8	9	107	42.5	7.29

(SL = swimming leg; WL = walking leg)

The prevalence value of ectoparasites in vanamei shrimp ranged from 22.5% - 72.5% with the highest intensity value being for the *Zoothamnium* sp. infestation.

Protozoan ectoparasite abundance varies greatly depending on the different physico-chemical conditions of the water bodies. As stated, generally highly nutrient rich waters commonly found in culture situations tend to favor the proliferation of ectoparasite organisms, which feed by filtering nutrients or microorganisms from the water [6]. Giving too much food causes the remaining food to be left in many ponds. This means that the content of the organic matter in the pond is high and spurs on the growth of the parasites which are also able to grow well. This is because according to [7], *Zoothamnium* sp. is a normal living ciliate in shrimp culture ponds. So, even though the water quality

is good, this parasite can still grow. An abundance of *Zoothamnium* sp. infested the vannamei shrimp in this study; this is still reasonable so long as they do not cause high mortality.

Parasitic groups of protozoan are generally found in environmental conditions that experience instability in the water quality, especially temperature, as *Zoothamnium* sp. can breed faster in environmental conditions that have a temperature value above 30 °C [8]

The presence of this parasite is not widely found. It could be because the environment is not suitable for growth, because according to [9], *Vorticella* sp. lives well in fresh and marine waters. The growth in brackish waters, as a medium for vannamei shrimp culture, also affects the growth rate of the parasite *Vorticella* sp. This protozoan parasite is generally found in conditions where the shrimp are stressed and affected by changes in the fluctuation of the water quality conditions, especially temperature, as well as maintenance that contains a lot of feed residues. As a result of this, there is an accumulation of organic matter which will increase the ammonia levels so then the dissolved oxygen content in the water will decrease. According to [10], these parasites are found naturally in the culture environment and can cause death, but they can also cause problems in shrimp culture when the environmental conditions are poor and suitable for its development.

4. Conclusion

The research obtained its results from the fish that were collected from the fish culture center in Pasuruan, Indonesia, weekly for one month. The diagnosis method for protozoan ectoparasites was scrapping. The prevalence rates of protozoan ectoparasites were, respectively, 72,5% for *Zoothamnium* sp., 55% for *Vorticella* sp. and 42,5% for *Epistylis* sp.

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