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Case Study on The Prevalence and Intensity of *Pseudorhabdosynochus Coioidesis* in Humpback Groupers (*Cromileptes Altivelis*); Lampung and Situbondo Waters

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Abstract

Humpback Groupers (*Cromileptes altivelis*) are a type of fish with great economic value that has the potential to be developed in Indonesia. Pseudorhabdosynochus coioidesis is one of the species that has been documented to infest Humpback Groupers. The purpose of this study was to determine the prevalence and severity of the parasitic worm Pseudorhabdosynochus coioidesis in Humpback Groupers in Lampung and Situbondo seas. 75 Humpback Groupers (20-35 cm) were sampled from Lampung waters, and 60 from Situbondo seas. The data were processed descriptively and presented in tabular form. The results showed that there was *Pseudorhabdosynochus coioidesis* worm infestation on the gills of Humpback Groupers in Lampung and Situbondo waters. The prevalence value of *Pseudorhabdosynochus coioidesis* in Humpback Groupers in Lampung waters was 93% with the almost always category and the intensity value was 1.48 in the low category while in Situbondo waters the prevalence value was 95% with the almost always category and the intensity value was 1.33 with low category. The low-intensity result indicates that the presence of Pseudorhabdosynochus coioidesis is not as dangerous to crop yields, but it should still be monitored.

Keywords: *Cromileptes altivelis*, Intensity, Prevalence, *Pseudorhabdosynochus coioidesis*.

INTRODUCTION

Humpback Groupers (*Cromileptes altivelis*) is a fish that has high economic value and has the potential to be developed in Indonesia (Wiyatno *et al.*, 2012). Fish disease is one of the serious problems that must be faced in the development of fish cultivation business. One of the diseases that commonly infest the cultivation of Humpback Groupers (*Cromileptes altivelis*) is parasitic attack. Parasites are organisms that live on the bodies of other organisms and take food from the organisms they host, causing harm to their hosts (Juniarsih *et al.*, 2017). Based on their predilection, parasites are divided into two categories, namely endoparasites and ectoparasites. The ectoparasites that are often found infesting these fish are from the monogenea subclass. Monogenea parasitic worms are pathogens in aquaculture systems that can cause uncontrollable mortality and

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susceptibility rates that can cause economic losses for farmers. Monogenea parasitic worms that have been reported to infest the gills of Humpback Groupers are the genus *Pseudorhabdosynochus* (Kritsky *et al.*, 2015). *Pseudorhabdosynoochus sp*. is a parasite that attacks the gills of fish. Currently in the worldwide, around 80 valid species of *Pseudorhabdosynochus* genus worms have been found (Costello, 2016). One of them which has been found in Indonesian waters is *Pseudorhabdosynochus coioidesis* (Bu *et al*., 1999). The impact of losses caused by the infestation of *Pseudorhabdosynochus coioidesis* can be one of the factors for infection with more dangerous pathogenic organisms. In addition, if the attack of the parasitic worm *P. coioidesis* becomes more widespread, red spots can be found on the gills which indicate that inflammation has occurred (Subekti et al, 2010). Other non-lethal losses can be in the form of damage to the gills and skin, as well as slow growth, therefore reducing the selling value (Wijaya *et al.*, 2019).

MATERIAL AND METHODS

Site study

This study was conducted in May - December 2019. Sampling was performed at the floating net cages for Humpback Groupers from Lampung and Situbondo waters. Observations and parasites identification were performed at the fish and environmental health Laboratory of the Lampung Marine Aquaculture Center (BBPBL) and the Situbondo Brackish Water Cultivation Center (BBAP).

Equipment and materials

The equipment which was used were object glass, a set of surgical instruments (dissecting set), digital scales, ruler, binocular microscope, label paper. The materials used in this study were 5% alcohol glycerin, distilled water, physiological solution.

Sampling

The samples of Humpback Groupers (*Cromileptes altivelis*) of 75 fish were taken from cage culture in BBPBL Lampung and 60 fish from Situbondo BBAP cage culture. All samples with the average length was between 20 - 35 cm. Fish sampling was in accordance with the standards set by the Hang Nadim Batam Class I Fish Quarantine Station (2010), which stated that fish samples were taken for 5-10% of the total fish population. Aside from fish samples, water quality samples were taken, it included the pH, DO, temperature, ammonia levels and salinity.

Calculation of Prevalence and Intensity Values

Pseudorhabdosynochus coioidesis was examined by dissecting the fish on the gill organs of Humpback Groupers. The gills that have been taken and removed using tweezers were then placed in an object glass with a physiological saline solution added. *Pseudorhabdosynochus coioidesis* was observed using a binocular microscope (Olympux CX22), then the prevalence and intensity values were calculated and

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categorized based on the level (William and William, 1996). The formula used in the calculation of prevalence and intensity based on Kabata (1985) is as follows:

$$\text{Prevalence} = \frac{\text{Number of fish samples infected with parasites}}{\text{total number of fish samples observed}} \times 100\%$$

$$\text{Intensity} = \frac{\text{Total number of infesting parasites}}{\text{number of infested fish samples}}$$

Water Parameter Measurement

The measured water parameters were temperature using a mercury thermometer, dissolved oxygen in water (DO) was measured using the Winkler titration method, acidity (pH) using a pH meter, ammonia (NH_3) levels were measured using a sera ammonia tester, and salinity using a refractometer. Measurements were made at the time of sampling Humpback Groupers in the KJA, namely in the morning at 08.00 - 09.00 West Indonesian Time.

Data analysis

The obtained data were processed descriptively and presented in a tabular form.

RESULTS AND DISCUSSION

Based on the performed research, *Pseudorhabdosynochus coioidesis* infestation was found on the gills of Humpback Groupers (*Cromileptes altivelis*) in Lampung waters and Situbondo waters. The results of the calculation found that the prevalence value in Lampung waters was 93% with the category almost always and the intensity value obtained was 1.48 individuals/head in the low category. In Situbondo waters, the prevalence value was 95% with the category almost always and the intensity value obtained was 1.33% with the low category. The calculation results of the prevalence and intensity values can be seen in (table 1).

Table 1. Prevalence and intensity values of *Pseudorhabdosynochus coioidesis* in Lampung and Situbondo waters

Location	Number of samples		Prevalensi (category)	Intensity (category)
Lampung bay	75	70	93% (Almost Always)	1,48 (Light)
Situbondo sea	60	57	95% (Almost Always)	1,33 (Light)

The prevalence values obtained are different from several previous studies (Table 1). In the previous study, the prevalence and prevalence values were 16.67% and 32%, respectively. The highest infestation was found on the gills of Humpback Grouper in Hurun Bay, Lampung. Meanwhile, the Pseudorhabdosynochus sp infestation was also found in milkfish (*Chanos chanos*) in the floating net cages of UPBL Situbondo with a prevalence value of 10%. The low prevalence value was caused by the adaptability of a parasite to its host and the quality of its environment (Wijaya et al, 2019). The results showed a high prevalence value. This was because the poor management of fish maintenance, such as the problem of net cleanliness in the cultivation process and the lack of good control of water quality. Climatic factors also have an effect on causing fish to be weak and susceptible to disease and disturbances in fish physiology. Currents in excessive waters can damage the cages and can

cause stress for fish (Wiyatno et al, 2012; Kordi, 2005). The pathogenicity of the worm *Pseudorhabdosynochus coioidesis* causes the gills to experience hyperplasia and proliferation (Hardi, 2015). In addition, mucus production increases so that it interferes with breathing. Fish appetite becomes decreased and causes stunted growth (Gibson et al, 2000). Measurement of water quality in floating net cages from the Lampung Marine Cultivation Fisheries Center (BBPBL) and Situbondo Brackish Water Cultivation Center (Table 2).

Table 2. Water Quality Parameters During Research

Parameter	Lampung Waters	Situbondo Waters	Quality Standards
Temperature (ºC)	29-30	28-33	28-30*
Salinity (%)	32-33	31-33	33-34*
pH	7-8,5	7-9	7-8,5*
Ammonia (mg/l)	0,044-0,22	0,02-1,1	0,3*
Dissolved Oxygen (DO) (mg/l)	6-8,37	5-10	>5*

Remarks: * Decision of the Minister of the Environment Number 51 of 2004

The measurement results found that the ammonia content in Situbondo waters was in the range of 0.02-1.11, indicating that it was higher than Lampung waters and the quality standard. This causes the prevalence value in Situbondo waters to be higher. The water temperature parameters obtained indicate the temperature of Situbondo waters is higher than Lampung waters and the quality standard. This high temperature can have an impact on the decrease in dissolved oxygen content. This was related to the obtained results that the dissolved oxygen content in Situbondo waters was smaller than the dissolved oxygen content in Lampung waters. Although the oxygen content of Situbondo waters was smaller, this was still included in the quality standard. Lampung waters and Situbondo waters were examples of waters that have high activity because around the environment, aside from the cultivation activities, there were tourist attractions which may cause uncontrolled waste production. This led to an increase in the pH value. The resulting waste or garbage contained various kinds of chemical compounds, such as detergent discharge, which can affect the pH value of the waters.

CONCLUSION

Based on the performed research, it can be concluded that the prevalence value of *P. coioidesis* on the gills of Humpback Groupers in Lampung waters was 93% with an intensity value of 1.48 individuals and 95% in Situbondo waters with an intensity value of 1.33 individuals, this is categorized as *P. coioidesis* almost always attacks the Humpback Groupers and the low intensity value can be interpreted that the existence of *P. coioidesis* is not so threatening the cultivation yields, but it still needs to be watched.

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