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Ectoparasite Worm Pyragraphorus hollisae Intensity and Prevalence in Silver Pompano Fish (*Tranchinotus blochii*) in Lampung Waters, Sumatera, Indonesia

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Abstract

Pomfret (*Tracinotus blochii*) is a new commodity currently the mainstay of Indonesian marine aquaculture. Pomfret's exports totaled 2,150 thousand tons in 2018. From 2017 to 2018, this number increased by 100 percent from the export volume produced in Indonesia, which was 1,075 thousand tons. Of course, there are problems that are frequently encountered in the development of cultivation, such as the attack of ectoparasite worms. In this study, the silver pompano was found to be infested with the Pyragraphorus hollisae worm. The purpose of this study is to determine the prevalence and intensity of the ectoparasite worm Pyragraphorus hollisae in silver pompano (Trachinotus blochii) in Lampung waters, Sumatra, Indonesia. This is an experimental laboratory study, and the study design is a cross-sectional study. The purposive sampling method was used to collect silver pompano. The intensity and prevalence of the P. hollisae ectoparasite worm that infested the silver pompano (Tracinotus blochii) in Lampung waters were the main parameters observed. Physical and chemical parameters are used as supporting parameters in this study. In the light category, the P. hollisae ectoparasite worm that infested silver pompano from Lampung waters had an intensity value of 1.38 individuals/head. The prevalence of P. hollisae worms in silver pompano (*Trachinotus blochii*) in Lampung waters was 86.7 percent in the usual category.

Keywords: Intensity, Prevalence, *Pyragraphorus hollisae*. *Tranchinotus blochii*,

INTRODUCTION

Silver pompano (*Tracinotus blochii*) is a relatively new commodity that has emerged as a key component of current marine aquaculture and development efforts. Demand for international market exports is increasing. Particularly in Asia such as Singapore, China, Hong Kong, Japan, and Taiwan (Ministry of Indonesian Maritime Affairs and Fisheries' center for statistics and Information, 2019). These conditios making this fish one of Indonesia's main export commodities. The export amount of fisheries goods in 2017 reached 2,150 thousand tons, up from 1,075 thousand tons in 2016. In 2018, the export value of fisheries goods grew to USD 4,514, up from USD 4,172 in 2017 (Ministry of Maritime Affairs and Fisheries, 2019). However, despite the effective culture carried out by BBPBL (Marine Cultivation Fisheries Center) Lampung, there are still certain issues that cannot be rectified for the time being, such as illnesses caused by parasite infections. The main obstacle in the production process of silver pompano is the presence of diseases caused by infection

with pathogenic microorganisms. Fish disease divide in two categories which is non-infectious and infectious. Infectious diseases are more of a concern to farmers, because the clinical symptoms caused can have a negative impact on fish health, besides that the transmission and spread of disease agents is quite fast in the waters (Jasmanindar, 2011). One of the infectious diseases in fish can be caused by ectoparasite worm infestation. Ectoparasite worms are worms that infest the outer or surface of the host's body (Jangoux, 1987).

In this study, it was found that silver pompano was infested with the *Pyragraphorus hollisae* ectoparasite worm. *Pyragraphorus* ectoparasite worms infest the gill lamella using haptor, because the gill lamella as a food source in the form of gill tissue components, are blood, epithelial cells or mucus (Morsy et al., 2011). This study aims to determine the intensity and prevalence of the ectoparasite *P. hollisae* in silver pompano *(Trachinotus blochii)* in the waters of Lampung, Sumatra, Indonesia.

MATERIALS AND METHODS

Study Location

This study was conducted in May 2019 – March 2020. Sampling was carried out in Floating Net Cages in Hurun Bay, Lampung. The examination of ectoparasite worms was carried out at the Fish and Environmental Health Laboratory of the Marine Cultivation Fisheries Center (BBPBL) Lampung.

Equipment and Materials

The equipment used for sampling is a slide and a plastic bucket. The equipment used for ectoparasite worm examination and intensity calculation are trays, sectio tools such as scalpel, surgical scissors, tweezers, object glass, cover glass, pipette, tissue, ruler, digital scale, flashlight, magnifying glass, label paper, microtube, and binocular microscopes. The equipment used in sampling water quality measurements as supporting data includes pH, DO, salinity, ammonia, nitrite and temperature are erlenmeyer, pH paper, DO meter, refractometer, ammonia test-kit, nitrite test-kit and thermometer. The main ingredients used for the study were silver pompano *(Tracinotus blochii)* at the Lampung Marine Aquaculture Center (BBPBL), as well as worm samples.

Study Procedure

An experimental laboratory and a cross-sectional research technique are used in this work. Pomfret fish were collected using the purposive sampling approach. 60 fish samples were taken from cages in this study, with fish body lengths ranging from 18 to 30 cm. Examination of ectoparasite worms directly using a magnifying glass to see the pathological changes of the fish body, this is done to distinguish the physical damage to the fish body caused by the *Pyragraphorus hollisae* ectoparasite worm. Examination of samples of parasites in silver pompano *(Tracinotus blochii)* with the native method by taking gill lamellae from fish samples using tweezers and scissors, and avoid damage to the filament for examination as much as possible, cut the filament cartilage using a scalpel, put the gill pieces on the object glass, drip physiological NaCl on the

preparation until evenly distributed. Observing the preparations under a microscope with a magnification of 40x and 100x to examine the presence of ectoparasite worms in the lamellae. If it is positive that there are parasites on the gills, then parasite removal can be done by moving the gills on a petri-disk which is then flowed with physiological NaCl, then stirred evenly and slowly then taking the precipitated solution using a pipette for further storage in 5% alcohol glycerin solution.

Main Parameter

The main parameters observed in this study were the intensity and prevalence of the *Pyragraphorus hollisae* ectoparasite that infested the silver pompano *(Trachinotus blochii)* in Lampung waters. The parasites found were observed and their intensity and prevalence were calculated, then grouped by category of intensity and prevalence of *P. hollisae* worm infestation. Intensity and prevalence can be calculated using the formula (Ruckert et al., 2008). The calculation of the intensity and prevalence values is categorized by group, according to the Williams and Williams (1996).

$$\textbf{Intensity (in/tail)} = \frac{\textbf{Total of parasites infested}}{\textbf{Number of fish samples}}$$

$$\textbf{Prevalence} = \frac{\textbf{Number of parasites found}}{\textbf{Number of fish infested}} \times \textbf{100\%}$$

Supporting Parameter

Supporting parameters include physical and chemical parameters such as temperature, pH, and DO, which are measured for each sampling.

Data Analysis

The data on the intensity and prevalence of the *Pyragraphorus hollisae* ectoparasite that attack the silver pompano *(Trachinotus blochii)* are presented descriptively in tabular form.

RESULTS AND DISCUSSION

Observations revealed 72 Pyragraphorus hollisae ectoparasites in 52 silver pompanos afflicted in Lampung seas. P. hollisae was discovered adhering to gill filaments. This is consistent with Alvin et al., (2015), that one of the illnesses that frequently strike saltwater fish is a parasite disease caused by the parasitic organism Monogenea. Intensity and prevalence of *Pyragraphorus hollisae* worm that infests silver pompano *(Trachinotus blochii)* . The intensity value of *Pyragraphorus hollisae* worm that infested *Trachinotus blochii* in Lampung waters (table 1).

Table 1. Intensity and prevalence of *Pyragraphorus hollisae* worm that infests silver pompano *(Trachinotus blochii)* in Lampung waters

Number of Fish Samples (Tails)	Total Number of Infested Fish (Tails)	Total *P. hollisae* worms (Individual)	Intensity (Category)	Prevelance Value Range (Category)
60	52	72	1.38 (*Light)*	86,7 % (*Usually)*

The results of the examination of silver pompano *(Trachinotus blochii)* which were infested with ectoparasite worms of the *Pyragraphorus hollisae* species had an intensity value of 1.38 individuals/head of the total number of

worms obtained as many as 72 of 52 pompano infested, and included in the light infestation category. (Williams and Williams., 1996) found in gill filaments. Gills are organs that contain a lot of nutrients obtained through filtering food in the form of feed particles and binding oxygen so that they are most susceptible to being used as parasitic habitats and favored by parasites.

Morsy et al (2011), said that ectoparasite worms infest gill lamellae using haptors, because gill lamella as a food source in the form of gill tissue components, namely blood, epithelial cells or mucus. Fish infested with ectoparasite worms that attack the gills can cause anaemia, this is due to the hematogenous nature of the parasite that sucks the blood of the host and experiences anorexia (Sitjà-Bobadilla and Alvarez-Pellitero, 2009).

The prevalence value of *P. hollisae* worms in silver pompano *(Tracinotus blochii)* in Lampung waters is 86.7%, including in the usually category (Williams and Williams., 1996). This indicates that the incidence of *P. hollisae* worm infestation generally occurs in silver pompano. According to Rucket et al. (2009), that the *Microcotylidae* family infests the gills of fish *Nemipterus, japonicus, Gazza minuta*, *Leiognathus stercorarius* in Harun Bay, Lampung. These fish are used as feed substitutes for silver pompano. This may be the main factor in the distribution of *Pyragraphorus hollisae* infestations in large numbers. This is reinforced by previous study conducted by Putri et al., (2020) who said that the *Pyragraphorus hollisae* ectoparasite worm was found to infest the gills of silver pompano *(Tracinotus blochii)* showing an intensity value of 19.61 individuals/head and included in the moderate category.

According to Noble and Noble (1989), that *Monogenean* ectoparasite worms, especially gill worms can develop rapidly because the gills are the first entry point for ectoparasite worms that infest their hosts. Large numbers of *P. hollisae* ectoparasite worms may cause stunted fish growth and anaemia, making them susceptible to secondary infection, because the number of erythrocytes of silver pompano is low and results in reduced food supply to cells, tissues and organs so that the fish's metabolic process is hampered (Alamanda et al., 2006).

Based on the results of the examination of 60 samples of silver pompano, the prevalence value was 87.6%. The category of high prevalence of ectoparasite worms is thought to be because the cultivation location has unfavorable conditions, this is triggered by the geographical location of Lampung waters which is a bay. This may trigger the speed of disease development, including high fish density conditions and dirty net conditions because they are rarely cleaned. The important factor is the presence of host contact with the parasite, if the host conditions are suitable then the parasite can survive (Kennedy, 1979: Ulkhaq et al, 2018). Another factor is thought to be due to the decreased immunity of the silver pompano caused by the stress of the fish due to the current and disturbed water

circulation due to dirty nets. The decrease in body resistance is caused by the availability of nutrients, if poor nutrition can cause the host's immune system to decrease (Klasing, 2007). This makes it easier for ectoparasitic worms to enter the host's body, so it is possible that this can be used as a place for worm eggs to attach for the spread of ectoparasite worms in silver pompano. In addition, it is also related to the *Monogenea* life cycle according to (Kmentová et al, 2020), this ectoparasite worm has a direct life cycle, and if the ectoparasite worms have found a suitable host then the ectoparasite worms will attach and develop well.

Water Quality Parameter

Observations of water quality in this study including temperature, pH, salinity, DO, ammonia (NH_3) and Nitrite (NO_2) were measured twice in one week, namely in the morning in the floating net cages of the Marine Aquaculture Fisheries Center in Lampung Waters. The results of water quality measurements (table 2).

Table 2. Water quality at the floating net cage location for silver pompano *(Tracinotus blochii)* at Marine Cultivation Fisheries Center (BBPBL) Lampung

	Temperature (°C)	pH	Salinity(ppt)	Dissolve oxygen mg/l)	NH_3 (mg/l)	NO_{2-} (mg/l)
Average	30,5	7,5	32	5,75	0,25	0,05
Quality Standards	28-30*	7 – 8,5*	30-34*	5*	0,3	0,06*

(Source: Decree of the State Minister of Environment No. 51 of 2004)

The average value of water quality for silver pompano *(Tracinotus blochii)* culture in floating net cages at the Marine Cultivation Fisheries Center (BBPBL) Lampung is within the water quality standards. The water quality parameters are in accordance with the survival of the silver pompano *(Tracinotus blochii)*. If the water quality is not in accordance with the environmental conditions of the silver pompano *(Tracinotus blochii)* it may cause the fish to experience stress, so it will be susceptible to disease, but the survival of ectoparasite worms is different. The temperature of 30 ˚C is still at a condition that supports the survival of ectoparasite worms. This is in accordance with the statement of Lymbery et al. (2010), explained that parasites from the *monogenea* class will produce more eggs at water temperatures ranging from 30 - 32 ˚C, while at 15 ˚C the parasite development process becomes slower. Water quality in marine waters cannot be controlled, so prevention is necessary to minimize ectoparasite worm infestations in silver pompano *(Tracinotus blochii)*. One of the prevention activities carried out is that it can be changed regularly and soaked in fresh water once a month for 5-10 minutes.

CONCLUSION

Based on the research that has been done, it can be concluded that the

inspection of silver pompano *(Trachinotus blochii)* which is infested with the *Pyragraphorus hollisae* ectoparasite worm has an intensity value of 1.38 individuals/head and is included in the light category. The prevalence of *Pyragraphorus hollisae* in silver pompano *(Trachinotus blochii)* in Lampung waters is 86.7% which is included in the usually category.

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