Inventory of ectoparasite helminth on the Hybrid Grouper (Epinephelus fuscoguttatus x Epinephelus lanceolatus) from traditional ponds in the Kampung Kerapu Lamongan East Java Indonesia

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Abstract. The purpose of this study was to determine ectoparasite helminth species, predilection, prevalence and intensity of attacks on Hybrid Grouper “Cantang” (Epinephelus fuscoguttatus x Epinephelus lanceolatus) from traditional ponds in Kampung Kerapu, Lamongan. This research is a survey with descriptive method. Hybrid Grouper “Cantang” samples were taken as many as 45 fish. Observations were made at the Anatomy and Fish Culture Laboratory, and Microbiology Laboratory of the Faculty of Fisheries and Marine Airlangga University, Surabaya. The result of this study, 25 of 45 Grouper were known to be infested. The ectoparasite helminth which infest the Groupers is Zeylanicobdella arugamensis which is a group of marine leech with a prevalence of 55.56 % so that it belongs to the very often category and the intensity of 11.32 ind/fish is classified in the moderate category. The distribution of Zeylanicobdella arugamensis predilection which infested Groupers was found most on the fins, 162 individual or 57.24 %.

1. Introduction
Several species of Grouper have been cultured in Indonesia and become important fish commodities due to its high price in both domestic and international markets. Several Hybrid Grouper have been developed to increase the quality of fish. Hybridization is cross-breeding between genetically different organisms, good in one species known as intraspecific hybridization and between species as interspecific
hybridization. Hybridization has become an effective way to get characteristics desired or improve quality of fish that are cultivated. Deep hybridization aquaculture aims to get fish that has advantages compared both the parent or combination between them, like having a fast growth rate, resistant to disease attack, has tolerance for environmental changes, improve quality of fish meat, and other superior properties. Hybridization can also be used for manipulating the sex ratio and also producing sterile fish [1]. Hybrid Grouper “Cantang” is produced as a result of crossbreed between female Tiger Grouper (Epinephelus fuscoguttatus) and male Giant Grouper (Epinephelus lanceolatus) [2]. Hybrid Grouper “Cantang” (Epinephelus fuscoguttatus x Epinephelus lanceolatus) morphologically is similar to both parent species, while growth performance is better than the Tiger Grouper or Giant Grouper. In addition, this Grouper is more and adaptive and resistant to certain disease [3].

Lamongan has Hybrid Grouper “Cantang” commodity which is cultured in traditional ponds located in Kampung Kerapu, Kentong, Labuhan, Brondong. Hybrid Grouper “Cantang” is easily cultured in ponds because the Grouper species growth is faster than other Groupers [4]. The problem in Grouper aquaculture is the presence of helminth that become parasites in Groupers. Ectoparasite helminth infestation in aquaculture can cause losses for farmers because it can inhibit fish growth. Parasites can harm their host because they take food in their host’s body for metabolic needs. Grouper having infested ectoparasite on its skin, will rub the body on objects around so it causing injuries that can cause secondary infection [5], which is characterized by the appearance of bacteria or viruses. The presence of secondary infections, can worsen the condition of fish to cause death.

The purpose of this study was to determine ectoparasite helminth species, predilection, prevalence and intensity of attacks on Hybrid Grouper “Cantang” (Epinephelus fuscoguttatus x Epinephelus lanceolatus) from traditional ponds Kampung Kerapu, Lamongan. Furthermore, the results of this study are expected to be used in determining appropriate prevention and control efforts to reduce the risk of aquaculture losses.

2. Materials and methods
This research is a survey with descriptive method. This research was conducted in July-August 2019. Hybrid Grouper “Cantang” (10-20 cm) was taken from a traditional pond in Kampung Kerapu, Kentong, Labuhan, Brondong, Lamongan, East Java. Temperature, pH, Dissolved Oxygen, salinity, and ammonia are measured to determine water quality. Samples were examined at the Anatomy and Fish Culture Laboratory and Microbiology Laboratory, Faculty of Fisheries and Marine Airlangga University, Surabaya.

Ectoparasite helminth examination was carried out to determine the presence of helminth on the external body parts of the Grouper. Observation of ectoparasite helminth predilection was carried out on body surfaces, fins and gills. Ectoparasite helminth examination was carried out by the native method by scraping [6] and staining by the Semichen-Acetic Carmine method [7]. Observations were made using a microscope with 40x and 100x magnification. Ectoparasite helminth that found in each organ were morphologically identified, by looking at the structure, shape, and parts of the external body, guided by the identification book [8] and then documented. Prevalence and intensity are calculated by the formula [9]:

\[
\text{Prevalence} = \frac{\sum \text{infested fish}}{\sum \text{examined fish}} \times 100%
\]

\[
\text{Intensity} = \frac{\sum \text{parasite found}}{\sum \text{infested fish}}
\]
Data obtained from the results of an ectoparasite helminth inventory on the Hybrid Grouper “Cantang” (*Epinephelus fuscoguttatus* x *Epinephelus lanceolatus*) from traditional ponds in Kampung Kerapu, Lamongan were analyzed descriptively.

3. Result and discussion

3.1. Identification of Ectoparasite Helminth

Ectoparasite helminth were found in the examination of Hybrid Grouper “Cantang” (*Epinephelus fuscoguttatus* x *Epinephelus lanceolatus*) from traditional pond in Kampung Kerapu, Lamongan. From the 45 Groupers, 25 were infested by ectoparasite helminth. Based on the identification carried out, ectoparasite helminth which infested this Grouper was *Zeylanicobdella arugamensis* which is a group of leeches. That helminth are classified in kingdom Animalia, phylum Annelida, class Clitellata, subclass Hirudinea, infraclass Euhirudinea, order Rhynchobdellida, family Piscicolidae, genus *Zeylanicobdella*, species *Zeylanicobdella arugamensis* [10]. Same with previous studies, that helminth infest hybrid Grouper are *Zeylanicobdella arugamensis* [11,12]. The examination results are presented in Table 1.

| Examination Results | Amount of Samples | Parasite               |
|---------------------|-------------------|------------------------|
| Positive            | 25                | *Zeylanicobdella arugamensis* |
| Negative            | 20                | -                      |

Observation of the morphology of ectoparasite helminth shows the presence of two sucker discs on the anterior and posterior parts. Posterior sucker is bigger than anterior. In the anterior sucker there are two points, which are suspected to be the eye. The body is elongated and has a cylindrical shape. In the identification book [8] *Zeylanicobdella arugamensis* are small sized. Body cylindrical. The anterior sucker is cupuliform with its dorsal portion longer than the ventral portion. A pair of conspicuous irregularly-shaped maroon to umber pigmented eyes is present on the lower third of the anterior sucker on its dorsal surface. The abdomen is not distinctly marked from the neck. The clitellum is not pronounced and genital pores are not discernible. The posterior sucker is large and discoidal. The fore part of the abdomen is the widest region of the body. Ten pairs of lateral pulsatile abdominal vesicles occur laterally on the abdomen. The observations can be seen in Figure 1 and Figure 2.
3.2. Predilection, Prevalence and Intensity

The results of the examination by predilection of body surfaces, fins and gills, *Zeylanicobdella arugamensis* were found scattered in these three parts. The distribution of predilections was found most on the fins as many as 162 individual with a percentage of 57.24 % (Table 2).

| Predilection    | Σ Ectoparasite leeches (ind) | Percentage (%) |
|-----------------|------------------------------|----------------|
| Body Surfaces   | 112                          | 39.58          |
| Fins            | 162                          | 57.24          |
| Gills           | 9                            | 3.18           |
| **Total**       | **283**                      | -              |

*Zeylanicobdella arugamensis* most infested on the fins. This parasite utilizes blood on the fish’s fins as its food. It is because the fins are part of a thin fish’s body and make it easy for leeches to stick their suckers [24]. The symptoms of leeches infection are frayed fins, hemorrhages, and swelling of the host’s
The pathogenicity of this parasite was low, but a heavy infection might cause skin lesions leading to secondary bacterial infections [26]. The leech is very strong attached to the body of its host. Adult leeches will migrate or escape from their host and attach to the tub or maintenance equipment for laying eggs. The life cycle of an egg until it hatches and becomes an adult leech takes 17-22 days [11,12,15]. But the leech's life cycle can be shorter if leeches are maintained with running water [12].

The prevalence of *Zeylanicobdella arugamensis* on Hybrid Grouper “Cantang” at the traditional pond aquaculture site in Kampung Kerapu, Lamongan was 55.56 % so that it was included in the *very often* category [13]. The intensity of *Zeylanicobdella arugamensis* on the Grouper was 11.32 ind/fish, it was classified in the *moderate* category [13]. This prevalence and intensity were higher than that reported in Hybrid Grouper “Cantang” in the Pegametan Bay, Buleleng with a prevalence of 42 % and intensity of 2.6 ind/fish [27]. The maintenance facilities in soil pools, that have many substrates, can lead to an increase in the prevalence and intensity of ectoparasite that require substrates in their lives [25]. Good management is needed, so that the water quality is maintained.

3.3. Water Quality

The water quality parameters such as temperature, salinity, pH, dissolved oxygen and others should be within the ranges for the growth of the cultured species [15]. The results of water quality measurements in traditional ponds in Kampung Kerapu, Lamongan obtained a range that is classified as normal, where the temperature range is 29.7-30 °C, pH 8, Dissolved Oxygen 4.70-5.8 mg / L, salinity 30-31 ppt, and ammonia 0.5 mg / L. As according to the Indonesian National Standard [16] the ideal water quality for aquaculture Grouper fish in ponds is temperature 28-32 °C, pH 7.5-8.5 Dissolved Oxygen of at least 4 mg / L, salinity ideal 24-33 g / l, and ammonia according to quality standards.

Temperature also affects the parasitic reproduction process. One of the supporting factors of ectoparasite leech infestation is facility management and poor water quality [17]. High temperatures will reduce dissolved oxygen content. Temperature is one of the most important factors in regulating the life processes of organisms. Water temperature can affect fish life, because the higher the temperature the lower the oxygen solubility. At the same time an increase in temperature also results in an increase in the metabolic activity of aquatic organisms so that oxygen demand will also increase [18]. Temperature also affects the parasitic reproduction process [19]. Juveniles were able to hatch at temperatures ranging from 25 to 35 °C but failed at 40 °C [20]. *Zeylanicobdella arugamensis* both when the egg stage and adult species are able to hatch and live on sea water maintenance media until brackish water or with 5-30 ppt salinity [21]. Adult leeches and small leeches can live in salinity ranging from 10 to 40 ppt [20]. This is directly proportional to the salinity needed for the cultivation of the Grouper, so that with a salinity range of 30-31 ppt the *Zeylanicobdella arugamensis* can grow and develop.

pH also has an important role, which is related to the fish's immunity against parasites. Inadequate pH, will force the fish to maintain its metabolic balance and also weakens fish immunity. At too acidic pH or bases cause fish to stress and won't eat so their body is vulnerable. Fish body immunity the weak will facilitate the fish in infected with parasites. This stress state benefit the parasite so that its propagation is encouraged and cause an increase in population [22].

The calm waters are known to have an impact on *Zeylanicobdella arugamensis* longer life cycle in experiencing growth [15]. In addition, the remaining decomposed feed can cause high ammonia content. Trash fish as food that has varying quality can potentially be a carrier of disease and provide high waste disposal [23].

4. Conclusion

As many as 45 Hybrid Grouper “Cantang” (*Epinephelus fuscoguttatus* x *Epinephelus lanceolatus*) were observed, 25 fish were known to be infested with ectoparasite helminth. The ectoparasite helminth which
infest the Grouper is *Zeylanicobdella arugamensis* with a prevalence of 55.56% so that it was included in the *very often* category and the intensity of 11.32 ind/fish, it was classified in the *moderate* category. The distribution of *Zeylanicobdella arugamensis* predilection which infested Groupers was found most the fins as many as 162 individual with a percentage of 57.24%. After knowing the species, characteristics and habitat of ectoparasite helminth which infest the Hybrid Grouper “Cantang”, in fact by conducting water quality management it is insufficient to prevent the infestation of *Zeylanicobdella arugamensis*. So additional efforts are needed to prevent these leeches, especially in the direction of increasing the defense system or fish body immunity.

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