Neobenedenia girellae infestation on cobia (Rachycentron canadum) in Hurun Bay Lampung, Indonesia

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Abstract. Cobia (Rachycentron canadum) is newly developed fish in Indonesia with an export value, however, the production activities of this fish continue to decrease due to fish massive mortality caused by disease. This study aimed to determine the predilection, prevalence, and intensity of Neobenedenia girellae infestation on cobia in floating net cages culture at Hurun Bay, Lampung. The sampling method used in this study was the purposive sampling method. Fish samples were taken at 20-30 cm as much as 50 fish, while 40-50 cm as much as 20 fish. Neobenedenia girellae were found on cobia eyes, head, and fins. Results showed the prevalence level in 20-30 cm fish was 30% and intensity level was 2.31 parasites/fish, while in 40-50 cm fish showed the prevalence level of 65% with the intensity of 1.47 parasites/fish.

1. Introduction
One of the marine fish commodities in Indonesia is Cobia (Rachycentron canadum). Cobia has not been widely known to the public. However, it interests to research and commercial field. Cobia can be cultured in either controlled tanks or floating net cage [1]. This fish has the advantage of rapid growth, highly economical value, and well qualified meat.

One of the cultural activity problems the disease caused by ectoparasitic worm infestation. Parasites infesting Cobia, Neobenedenia girellae, was firstly found in Taiwan with 91% prevalence level [2]. Ectoparasitic worm infestation on the fish body surface and eyes can cause a lethal effect on fish and consequently substantial harm to the fishery industries [3].

2. Materials and methods
Cobia (R.canadum) samples were taken from the floating net cages of Lampung Marine Culture Center on April-May, 2018. This study used survey study method. Sampling was performed by using the purposive sampling method. Samples were taken 10% of the total fish population, which considered to have represented the total population.

Samples taken in this study were Cobia (R.canadum) with size 20-30 cm and 40-50 cm. Fish sized 20-30 cm were taken from five cages with the stocking density of 100 fish/cage, thus the total fish in
cages were 500 fish and taken as much as 50 fish from each cage. Fish sized 40-50 cm comprised four cages with the stocking density of 50 fish/cage, thus the total fish in cages were 200 fish and taken as much as 20 fish. Different size would indicate the stadia or age in Cobia. Cobia sized 20-30 cm showed the fish was in the fingerling rearing period. Cobia sized 40-50 cm showed the fish was in the adult stadia. Different size of fish may also indicate that the age of fish can affect the amount of ectoparasitic worm infestation. The ectoparasitic worm was examined by scrapping the fish sample body part, namely body surface, head, eyes, gills, and fins, including dorsal, ventral, anal, pectoral, and caudal fins. Worm discovered was then observed by using a binocular microscope with 40x and 100x magnification. Parasite samples found were put in 5% alcohol glycerin and stained by using Semichoen-Acetic Carmine staining.

3. Results and discussion
The study results on Cobia in Hurun Bay, Lampung indicated a species of Monogenean ectoparasitic worm, is *Neobenedenia girellae*. *N. girellae* worm is found infesting eyes, head, and fins of Cobia. *N. girellae* which infested Cobia can be seen in Figures 1 and 2.

3.1. *N. girellae* description
Identification of ectoparasitic worm was conducted based on morphological classification as this species is included in phylum Platyhelminthes, class Trematoda, sub-class Monogenean, order Monopisthocotylea, family Capsalidae, genus *Neobenedenia*, and *Neobenedenia girellae*. This species characteristic with a branched of accessory sclerite formed with the tip of the blunt branch. The accessory sclerite size is 0.19–0.27 mm with the anterior hamuli length of 0.17–0.35 mm and the posterior hamuli length of 0.07–0.13 mm. The total length and width of body size are 3.2-5.3 mm and 1.86-3.5 mm respectively.
3.2. Prevalence, intensity, and predilection

*N. girellae* is ectoparasitic worm that attached body surface, eyes, head, operculum and lateral body side of cobia fish. *N. girellae* were mostly found infesting eyes area. The prevalence and intensity of this monogenean parasite that was observed infesting cobia fish can be seen in Table 1.

| Size (cm) | Sample (fish) | Positive | Negative | Prevalence (%) | Intensity (parasites/fish) |
|----------|---------------|----------|----------|----------------|---------------------------|
| 20-30    | 50            | 15       | 35       | 30             | 2.31                      |
| 40-50    | 20            | 13       | 7        | 65             | 1.47                      |

Prevalence level and intensity of *N.girellae* which infested cobia (*Rachycentron canadum*) in Hurun Bay Lampung, Indonesia respectively were 30% and 2.31 parasites/fish for 20-30 cm of fish size; 65% and 1.47 parasites/fish for 40-50 cm of fish size (Table 1). This result is lower than the results of the Ogawa *et al* [2] study, was found infesting cobia in Taiwan with 91% prevalence and 12.6 parasites/fish intensity.
N. girellae was found infesting eyes and surface body, which is related to the nutritional needs of N. girellae [4]. Fish infested by N. girellae will have lesions, eyes turned into white and the skin has blindness, besides triggering the occurrence of bacterial secondary infection [5].

Identification of ectoparasitic worms conducted based on morphological studies indicated the prevalence value of 30% for fish sized 20-30 cm (50 fish) and 65% for fish sized 40-50 cm (20 fish). The infestation level of ectoparasitic worms affects the fish damage as the higher amount of infestation will increase highly organ damage. Poor environmental conditions can trigger the development of ectoparasitic worms as the floating net cages for fish sized 40-50 cm was cleaner than fish sized 20-30 cm. The floating net cages observed were dirty due to the feed waste as well as other organisms attached to the cage net base, triggering the development of ectoparasitic worms. However, the amount of parasite intensity observed in cobia sized 20-30 cm had the greater number in ectoparasite infestation than cobia sized 40-50 cm with each size of intensity value was 2.31 parasites/fish and 1.47 parasites/fish respectively. This is related to the immunity system of cobia sized 20-30 cm was more susceptible to disease attack than fish sized 40-50 cm.

4. Conclusion
N. girellae was found infesting Cobia on eyes, head, and fins in Hurun Bay, Lampung. N. girellae has a prevalence rate of 30% and an intensity of 2.31 parasites/fish in Cobia fish sized 20-30 cm, while fish sized 40-50 cm had 65% prevalence and 1.47 parasites/fish intensity.

5. References
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