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Prevalence of Trematodes on Red Snapper (*Lutjanus argentimaculatus*) in Floating Net Cages at Lampung, Indonesia

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Abstract

This study was designed to identify the prevalence of trematodes on red snapper (*L. argentimaculatus*) in floating net cages at Center for Marine culture, Lampung, South Sumatra, Indonesia. The prevalence of trematodes in floating net cages was 83.33%. Among them *H. epinepheli* was 26.66%, and there were 50% mixed infestation with two species *B.epinepheli* and *H. epinepheli* and the other mixed infestation by three species of trematodes *B. epinepheli, N. girellae* and *H. epinepheli* were 6.67%.

Key words: Trematodes, floating net, Prevalence, Indonesia.

Only a few of red snapper (*L.argentimaculatus*) have been produced from aquaculture. Trematodes worms that often attacked red snapper are *B.epinepheli* found on the fins and skin (Jithendrand *et al.*, 2005), N.girellae (Zafran *et al.*, 1998). Haliotrema spp., Diplectanum squamatum (Santos *et al.*, 2002). This study was carried out on red snapper (*L.arguimenticulatus*) fish at Center for Marine culture, Lampung, Indonesia.

Materials and Methods

Approximately 30 fish with measuring 25-35 cm (20% of the fish captured population)(Barreiro and Albandoz, 20010). Fishes were subsequently taken to a Fish Health Laboratory, Center of Marine culture Lampung for trematodes identification. Trematodes were observed under a microscope on red snappers body surface, skin, gills, fins and operculum (Martins, *et al.,* 2015). By scrapping gills (native method) (Noga, 2010) observation was drawing and with a microscope equipped with camera lucida.

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Results and Discussion

Prevalence of the trematodes was presented in Table I the results of the study revealed that there were three species of trematodes, *Benedenia epinepheli, Neobenedenia girellae.* and *Haliotrema epinepheli.*

Benedenia epinepheli parasite was found on the body surface (Fig 1), particularly in the dorsal, ventral, anal, caudal fins and skin of red snapper fish. This parasite is dorso-laterally flat and has a pair of attachment organ and opisthaptor in posterior body, and has a wavy shaped pharynx. This trematode is similar to the finding of Jithendran *et al.* (*loc. cit*) who found *B epinepheli* from Indian ocean state declared that this species has sucker in anterior and opisthaptor with two pairs of hamuli and a pair of accessory sclerite in posterior body. Ogawa *et al.* (1995a) stated that the total body length of *B.epinepheli* is 1.5 - 3.0 mm and body width is 0.8-1.6 mm.

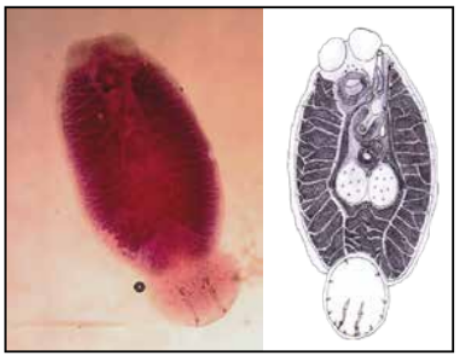

Fig 1. *Benedenia epinepheli* adult (magnification 40x; bar scale 216 mm),with Semichoen Carmine staining and *B. epinepheli* adult (bar scale 281 mm), drawing with *Camera Lucida.*

Table I. Prevalence of *B. epinepheli, N. girellae* and *H.epinepheli* trematode in floating net cages of red snappers at Center for Marine culture

No	Trematodes species	Total fish infested		Total	Prevalence (%)
		Single infestation	Mixed infestation		
1	*B. epinepheli* x *N. girellae x H.epinepheli*	0	2	2	6.67
2	*B. epinepheli* x *H. epinepheli*	0	15	15	50.00
3	*H. epinepheli*	8	0	8	26.66
Total		8	17	25	83.33

Neobenedenia girellae belongs to a class Trematoda was found to be attached to dorsal fin and head skin of red snapper fish. It has a elongated rounded body with a length of 5.5 mm. *N.girellae* have a pair of anterior attachment organs, two sets of eyes, posterior portion is greater than the anterior part of the eye, which concurs the description of Ogawa *et al.* (1995 a) who stated that *N.girellae* was flatly elongated round with total length and width of the body was 3.6-5.6 mm and 1.8-3.1 mm with the thickness of 0.8- 1.3 mm and has a pair of *attachment organ* and flower shaped pharynx. *Neobenedenia girellae* found infesting skin of head only. The high infestation can cause death of fish. Ogawa *et al.* (2006) found the parasite on the skin and also in the eye which causes blindness (Fig 2).

Haliotrema epinepheli is classified under the order Monopisthocotylea and Dactylogyridae family. This trematode was ovoid in the anterior part with two pairs of eye spots and a pair of posterior part of the eye is little larger. *Haliotrema epinepheli* has a copulatory organ which is different from other Dactylogyridae families. Klassen, (1991) stated that *H. epinepheli* has *haptoral sclerities* on the posterior part of the body. They have an average body length of 200.8 µm and elongated body. The posterior part of the body is equipped with opisthaptor and two pairs of anchors (Fig 3).

The prevalence of trematodes was 83.3%, among them the mixed infestation was 56.67%, (*B.epinepheli*, *N.girrelae*; and *H.epinepheli* was group constituted to 6.67% and *B epinepheli* and *H epinepheli* was 50%). *H. epinepheli* has been reported infested grouper fish, species of genus *Epinephelus* that consists *E. fasciatus, E. malabaricus,* and *E. merra* species (Justine *et al.,* 2007).

The poor water quality and infestation of trematodes of fishes reared in floating net cages and high density the red snappers in the net cages can cause adverse effect on the immune

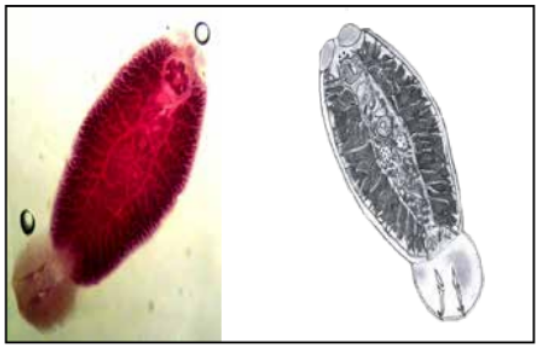

Fig 2. *N.girellae* adult (magnification 40x; bar scale 5,6 mm), With Semichoen Carmine staining and *N.girellae* adult (bar scale 5,8 mm), drawing with Camera Lucida.

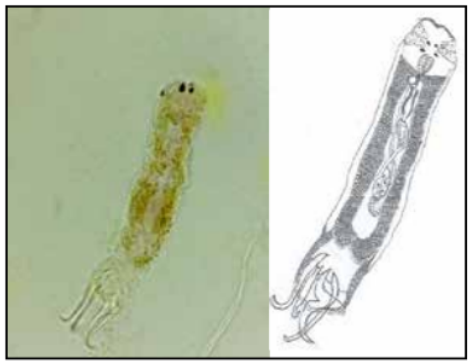

Fig 3. *H.epinepheli* adult (magnification 40x; bar scale 146 um), with Semichoen Carmine staining and *H.epinepheli* adult (bar scale 200 um), drawing with Camera Lucida.

system of the fish. The water quality monitoring on temperature, pH, salinity and dissolved oxygen were important criteria for successful sea farming. The floating net cages of Lampung were located in polluted water, contaminated by factory waste, household and industrial waste which were discharged near the cage farming location leading to reduction in water quality.

Summary

Based on identification of trematodes it is concluded that, the red snapper (*L.argentimaculatus*) is infested with *B.epinepheli*, *N. girellae* and *H. epinepheli*. Prevalence rate of trematodes was high (83.33%), which consisted of single infestation of *H. epinepheli (* 26.66 %), mixed of three infestation (6.67 %); and mixed of two infestation *B. epinepheli* and *H. epinepheli* (50.00 %).

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