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$$\begin{aligned} 40 &\rightarrow PA \rightarrow \frac{60}{100} \times 40 = 24 \\ &\rightarrow CA \rightarrow \frac{40}{100} \times 40 = 16 \\ \text{Sum} &= \frac{16}{6} = 2,67 \end{aligned}$$

## *Neobenedeniagirellae* from Cultured Silver Pompano (*Trachinotus blochii*) in Floating Net Cages at Marine Culture Lombok, West Nusa Tenggara, Indonesia

Ilham Fajar Aryadi, Nabilla Tri Buana Dewi, Al FathThoriq Arrizal, Dini Rahayuning Mardika, Panji Aulia Syahputra, Sri Subekti<sup>1</sup> and Gunanti Mahasri

Department of Marine, Faculty of Fisheries and Marine, Universitas Airlangga, Surabaya, Jalan Mulyorejo, Surabaya 60115, Indonesia

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### Abstract

Monogeneans is widely distributed in the world, infest the wild fish and interfere fish cultivation. Infestation of monogeneans is difficult to be avoid, especially in culture floating net cages. The ectoparasite infestation is caused by the poor management and maintenance of net cages, uncontrolled water quality, erratic water currents and garbage discharged into the water bodies. Other factors like high density of fishes in the cages leads to poor food and oxygen availability which acts as contributory factors to the infestation.

**Key word:** monogeneans, *Neobenedeniagirellae*.

Silver Pompano (*T. blochii*) is introduced first in Taiwan since 2007 (Ransangan *et al.*, 2011). Increasing market demand of pompano has encouraged cultivation activities in floating net cages. The problem often encountered was infestation of monogeneans parasites (Ogawa *et al.*, 2014). Monogeneans on marine fish cultivation in western Indonesia were *Benedenia*, *Neobenedenia*, *Haliotrema* and *Diplectanum*, which were found in Lampung bay (Novriadi *et al.*, 2014)

### Materials and Methods

The study was conducted at Marine culture center Lombok, West Nusa Tenggara Indonesia. The material used for this study was silver pompanos that were taken from 12 floating net cages comprising 152 host fish. Fish were kept in plastic bag containing sea water and transported to the laboratory and examined for fluke (*trematode*) under dissecting microscope. Parasites

were fixed in Alcohol glycerine 5%, stained with Acid carmine, dehydrated in a graded ethanol series, and mounted by Hung's I and Hung's II. Illustrations were made with drawing using a microscope equipped with camera lucida.

### Results and Discussion

*N. girellae* is a type of helminth fluke (*trematode*) that is often infests marine aquatic fish such as silver pompano, grouper, snapper, and Cobia. *Neobenedenia* has two pairs of eye spots contained in the anterior body (Morsy *et al.*, 2011). *N. girellae* is characterized by its jagged testes, the anterior hamuli, posterior hamuli and accessory sclerite that is different from other species. It has a body shape on the anterior body between the two attachments of a flat concave organ (Kinami *et al.*, 2005). Ogawa *et al.* (1995) reported that the total body length of *N. girellae* can reach 5.6 mm, while body width is between 1.8-3.1 mm.

The accessory sclerites of *N. girellae* were found to be longer than the maximum accessory sclerites mentioned by (Ogawa, *et al. loc cit*) measuring 0.24 mm. Koesharyani *et al.* (1999) found length of accessory sclerites of *N. Girellae* was 0.23 mm in *Cromileptesaltivelis* in Indonesian waters. This suggested that this species has a wide range of size variations, therefore for identification of *N. Girellae* should not only be based on the body alone.

The greatest number infestation of *N. Girellae* on pompano silver was on the head area, and in the eyes skin and fins. In severe infestation by large number of parasites, can cause blindness (Ogawa *et al., loc. cit*). *N. Girellae* is a parasite has a low specificity for host, this parasite can be found in almost all infected

<sup>1</sup>Correspondence author : Email : srisubektiunair@gmail.com



**Table I.** Morphometry of helminth fluke (*trematode*) *N. girellae* in floating net cages at Marine culture Center Lombok.

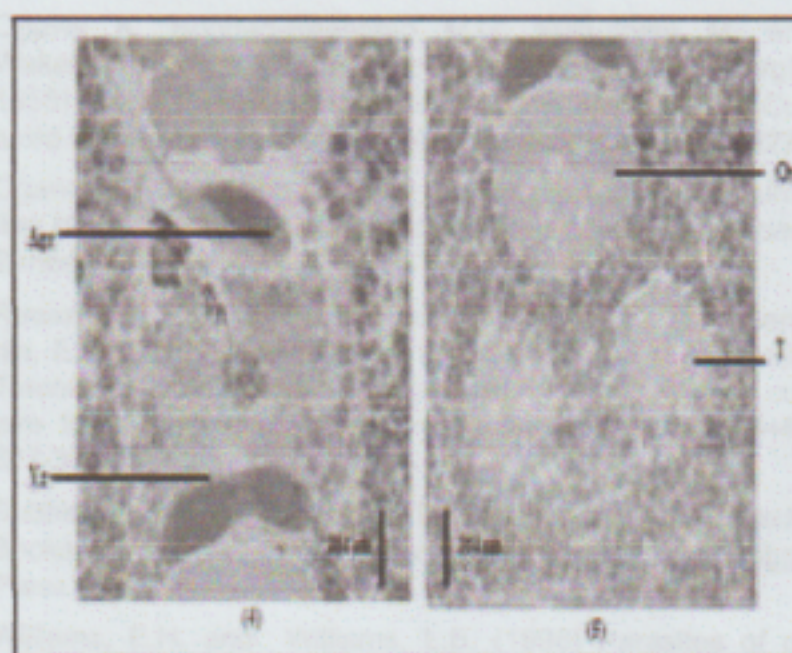
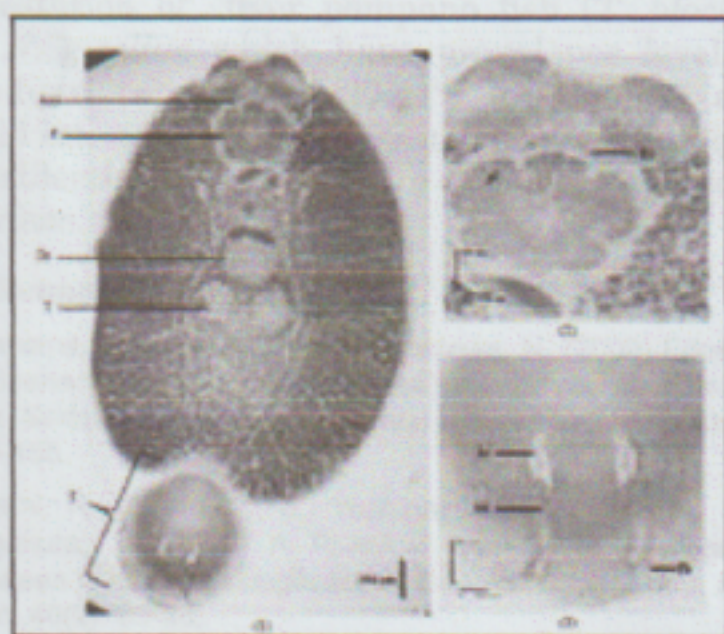
Parameters	Morphometry Measurement (mm)	
	Observed values	Reference Value (Ogawal et al., 1995)
Body length	2.94 – 4.30	3.6 – 5.6
Body width	1.53 – 3.31	1.8 – 3.7
<i>Opisthaptor</i>	0.75 – 1.06 x 0.74 – 1.04*	0.8 – 1.3 x 0.7 – 1.4*
<i>Anterior attachment</i>	0.22 – 0.29 x 0.30 – 0.39*	0.28 – 0.48 x 0.32– 0.55*
<i>Accessory sclerites</i>	0.16 – 0.24	0.12 – 0.21
<i>Anterior hamuli</i>	0.22 – 0.30	0.18 – 0.37
<i>Posterior hamuli</i>	0.07 – 0.10	0.08 – 0.14
<i>Pharynx</i>	0.30 – 0.43 x 0.38 – 0.64*	0.36 – 0.55 x 0.41 – 0.72*
<i>Ovary</i>	0.20 – 0.30 x 0.23 – 0.42*	0.18 – 0.38 x 0.25 – 0.50*
<i>Testes</i>	0.23 – 0.43	0.38 – 0.80
Specimen tested no.	10	22
<i>Host</i>	<i>T. blochii</i>	<i>Cromilaptesaltivelis</i>
<i>Country</i>	Indonesia	Japan

sea fish. The attachment organs of *N. Girellae* are useful for attaching to the host's body and migration (Hirayama *et al.*, 2009). *Neobenedenia* sp. can injure and cause bleeding in the skin epithelium (Koesharyani *et al.*, 1999).

The prevalence value of flukes (*trematode*) in floating net cages has medium category value, of 30.41% (William and William, 1996). Thus hindering the cultivation process, by causing organ damage and secondary infection by bacte-

ria or fungi (Subekti and Mahasri, 2016).

The intensity of parasitic infestation is classified as, mild infestations 1-5, moderate 6-50, heavy 51-100, very heavy infestations with more than 100 parasites (Williams and Williams, *loc. cit.*). The more the number of parasites that infest the fish the more the organs are damaged. 152 fish samples surveyed on silver pompano (*T. blochii*) only 1.57 individuals had infestation which can be classified as mild category (Table II).

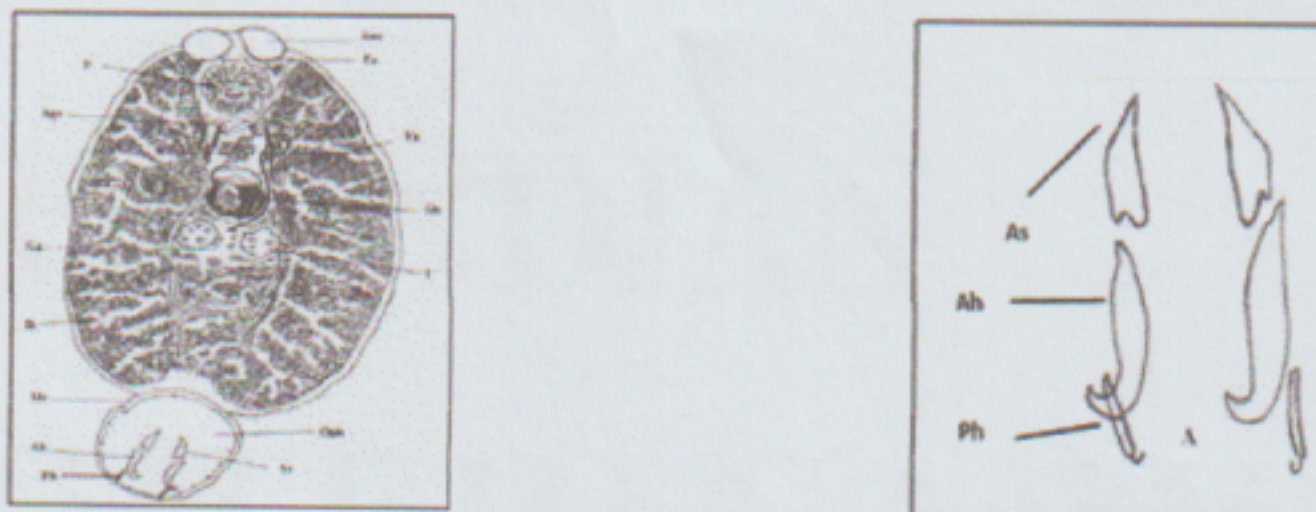


**Fig 1.** *Neobenedeniagirellae* (1) Ventral view, (2) Anterior view, (3) *Opisthaptor* (4) dan (5) Reproduction Organs. (Aao) Anterior attachment organ, (Agr) Accessory gland reservoir, (Ah) Anterior hamuli, (As) Accessory sclerite, (Es) Eye spots, (Op) *Opisthaptor*, (Ov) Ovary, (P) Pharynx, (Ph) Posterior hamuli, (T) Testes, (Vr) Vitelline reservoir.



**Table II.** Prevalence of *N. girellae* from cultured Silver Pompano (*Trichonotus blochii*) in floating net cages at Marine culture center Lombok (152 fish samples)

Trematode species	Infested fish(individu)	Prevalence (%)	Intensity (ind/fish)
<i>N.girellae</i>	42	30.41	1.57



**Fig 2.** *Neobenedeniagirellae* (Aao) Anterior attachment organ, (Agr) Accessory gland reservoir, (Ah) Anterior hamuli, (As) Accessory sclerite, (Gg) gland of Goto, (Es) Eye spot, (Ib) Intestinal branch, (Mv) Marginal valve, (Oph) Opisthaptor, (Ov) Ovary, (P) Pharynx, (Ph) Posterior hamuli, (T) Testes, (Vr) Vitelline reservoir

A fish that spends its entire life cycle in only one type of water will have fewer parasites than a migrating fish. The study revealed that infected fishes by *N. girellae* did not cause serious impact on the health of silver pompano, since the infestation is relatively low to moderate in nature.

**Summary**

Based on the result of identification of trematode infestation of silver pompano fish (*T. blochii*) is *N. girellae* which have prevalence level in medium category of 30.41% (commonly) and mild intensity level of 1.57 individuals / fish and predilection of parasites are on the eye and body surface.

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