SECONDARY INTERMEDIATE HOSPES OF CLINOSTOMUM (TREMATODA DIGENEA) IN RIAU PROVINCE, INDONESIA

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ABSTRACT

The aim of study was to understand the morphology of metacercariae of *Clinostomum* sp. found in freshwater fishes in Riau, Indonesia as second intermediate hospes. Freshwater fish were collected from Sail River, identified and examined for morphological observation. Encysted metacercariae of *Clinostomum* were excysted with a needle, fixed in 10% formalin and stained with Semichon's Acetocarmine. *Clinostomum* parasites were observed under a stereomicroscope and numbers recorded. The result showed that infected freshwater fish were identified as *Trichogaster trichopterus* and prevalence of *Clinostomum* infection to the fish was17,1%. The infected fish had total length between 5,6-11cm, while the weight range was 2,01-28,64 g. The cysts were 1,5-2 mm in diameter, with a thin (c. 0,9 µm wide). There was no spinae in tegument dan had 2 suckers (oral and ventral), posteriorly located genitalia and paired digestive caeca. This digeneans were identified as the metacercariae of *Clinostomum* sp. This research is the first case of *Clinostomum* in freshwater fish in Riau, Indonesia.

Keywords: Morphology, *Trichogaster trichopterus*, metacercariae *Clinostomum*, Riau

INTRODUCTION

One species of the genus *Clinostomum* potentially caused disease in farmed fish was *Clinostomum complanatum* (Thatcher, 1991). These parasites included trematodes digenea and larvae known as the yellow grub that contains metacercariae ellip shaped yellow or whitish nodules with two mm diameter. Nodules were often found under the skin and fins of fish. Infection metacercariae *C. complanatum* weight can be spread throughout the body such as the gills, body cavity wall, visceral organs, caused death and economic losses (Eiras *et al.,* 1999). Parasites infections caused unattractive fish and would be rejected by consumers (Kagei *et al.,* 1984).

Aohagi *et al*., (1992 and 1993) reported that freshwater fish species found in Korea as a intermediate host of *Clinostomum* spp. were *Acheilognathus koreensis*, *Rhodeus uyekii* and *Sqalidus majimae gracilis* (Lo *et al*., 1987), and also *Carassius carassius* (Chung *et al*.,

1995), *Cyprinus carpio* (Aohagi *et al.,*1993), *Oreochromis niloticus, Cobitis anguillicaudatus* (Dias *et al.,* 2006). Freshwater fish reported as a intermediate host in Europe and Asia were catfish (*Clarias batrachus*), *Oreochromis niloticus*) and *Cyprinus carpio* (Dias *et al.,* 2003).

Clinostomum complanatum was zoonotic parasite can infected humans (Kamo *et al.*, 1962). Transmission of *C. complanatum* occured when people eat raw freshwater fish or fish was perfectly cooked. *Clinostomum complanatum* pharynx infected and caused "*laryngo-pharyngitis*" and caused death due to asphyxia in humans (Shirai *et al.*,1998). Cases of *laryngo-pharyngitis* occured at the first time in Japan (Kifune *et al.*, 2000), Israel (Witenberg, 1944), India (Cameron, 1945), Korea (Chung *et al.*, 1995a), Iran (Kifune *et al.* 2000) and Thailand (Chung *et al.*, 1995). The research on the life cycle, distribution, morphology and molecular analysis *Clinostomum* sp. have to advance in the future.

Metaserkaria *Clinostomum* sp. cyst in freshwater fish in Indonesia, such as *Ophiocephalus striatus* and *Osphronemus gouramy*. Infection of *Clinostomum* sp. attacked the carp seed length 2-3 cm and maintained in the rice fields in Purwokerto, Central Java (Indonesia). Cyst found on size of fish seeds 3-4 cm long is 50 cysts/fish. The results of abundant of parasites in *Ophiocephalus striatus* in Java reported showed 4% of fish infected by cyst of metacercariae *Clinostomum* sp. and intensity of infection ranged 1-9/ fish (Kabata, 1985). Morphological and molecular identification of *Clinostomum* sp. to ensure the type of *Clinostomum* in freshwater fish in Indonesia has not been reported. However, there is no information on morphological characteristics of metacercariae of the parasite. To get information on the morphological characteristics and prevalence of *Clinostomum* sp. metacercariae that infect freshwater fish in Riau, a study has been conducted.

MATERIALS AND METHODS

The research method used survey technique and Sail River in Riau, Pekanbaru made as the sampling site. Site selection based on the results of previous surveys to found out the

location of the *Clinostomum* sp. infection. Freshwater fish from the Sail river, Riau captured use gill nets with the size of 0.75 and 1.75. Fish obtained inserted into a large bucket with aerator, taken to the laboratory of Fisheries and Marine Science Faculty, University of Riau, Pekanbaru, to be identified and made observations digenea trematode parasites (Saanin, 1984). Metacercariae of *Clinostomum* sp. found in freshwater fish from Riau, removed using a needle, was transferred in a physiological solution (0.65%), preserved in 10% formaline and stained using *Semichon's acetocarmine* (Pritchard and Kruse, 1982). The metacercariae were identified based on Chung *et al.*, (1995). Investation, intensity average and prevalence of the parasite were counted based on Bush *et al.*, (1997).

RESULTS AND DISCUSSION

There were 16 fish species captured in the Sail River, namely *Cyprinus carpio*, *Clarias batrachus*, *Oreochromis niloticus*, *Pristolepis Grooti*, *Mystus numerus*, *Channa striata*, *Helostoma temminchi*, *Channa micropeltes*, *Osteochilus kahajanensis*, *Labiobarbus ocellatus*, *Puntius bulu*, *Kryptopterus apogon*, *Anabas testudineus, Kryptopterus cryptopterus*, *Rasbora argyrotaenia*, *Trichogaster trichopterus*. Among the fishes captured, the *Clinostomum* sp. infest in *T. trichopterus* only and it is the first record of the *Clinostomum* sp. infestation in this type of fish. Other records of *C. complanatum* have been reported by Hanafi (1983) that found the parasite in the visceral organ of *Trichogaster trichopterus* from India. Lo *et al.,* (1987) stated that there are 3 freshwater fish species that represent as 2nd intermediete host of *Clinostomum* sp., they are *Acheilognathus koreensis, Rhodeus uyeki* and *Sqalidus gracilis majimae*. Aohagi *et al.*, (1992) states that other freshwater species such as *Clarias batrachus* and *Cyprinus carpio* also represent as 2nd intermediete host of *Clinostomum* sp .

Clinostomum metacercariae cysts are distributed in the thorax and abdominal cavities of *T. trichopterus*. By using a *semichon's acetocarmine* staining method, the morphological characteristics of the *Clinostomum* metacercariae can be seen clearly. The cysts are ellipse, 1,5-2 mm in diameter, with a thin (c. 0,9 µm wide), transparant, off white and attach in the fish tissue. *C. complanatum* metacercariae may present in many body parts of fish. Prevalence of *C. complanatum* metacercariae in the *T. tricopterus* captured in the Sail River, Pekanbaru was 17,1%. Among 105 fish captured, 18 fishes were parasited by *Clinostomum* metacercariae. Aohagi *et al.,* (1992) stated that metacercariae of *Clinostomum* sp. present in the intestine of *Oreochromis niloticus* and *Sarotherodon galilaeus* captured in the Niger River, Kenya, while Dias *et al.,* (2003) obtained the metacercariae in the muscle and visceral organs of several freshwater fish species in Brazil.

Observation of fish behavior *Trichogaster trichopterus* infected *Clinostomum* sp. showed the behavior of infected fish showed symptoms like weak swimming movements, the fish always swim to the surface and can not be completely closed operculum. Macroscopic changes in all *Trichogaster trichopterus* infected by *Clinostomum* sp. showed bleeding in the attachment the worm, pale body color, a lot of mucus production, tail fin, chest, back and belly torn, the fish will not eat and looks thin, the scales fall off. *Trichogaster trichopterus* infected metacercariae of *Clinostomum* sp. showed clinical signs such as anorexia, pale body color, a lot of mucus production, ripped stomach, scales fall off, the fish always swim to the surface and rub, rubbing her body to other objects.

Description of metacercariae *Clinostomum* sp. from Riau was tongue shaped. The surface of the body does not have spinae. The anterior part was narrower than posterior. Posterior end was round and had no pharynx. The range from oral sucker to ventral sucker was 28.6 (21.4 to 35.7) µm. Seca extended from the oral sucker to posterior end of the body associated with excretory pore. Material in intestinal dark brown, the same material was

found also in line excretory pore. Uterus extended between two testicles to postacetabular. Testes paired, lobulated irregular. Testes anterior third of the triangle does not irregular in the posterior part of the body, rather left with extended to the anterior leads. Posterior testis was wider than the anterior testis, which the tip leads in the posterior. Range of ventral sucker to anterior testis was 95.8 (80 to 111.5) µm. The distance between the anterior testis and testicular posterior was 15.7 (11.4 to 20) µm. Cirrus sac was small, lobulated located between anterior testis with wipe right, near the ovary. Pore of anterodextral testes genitalia. Ovary lobulated, smaller than the cirrus pouch, between the testes. The results of morphological identification of metaserkaria *Clinostomum* sp. found in *Trichogaster trichopterus* from Sail, Riau suspected new species of *Clinostomum* sp.

CONCLUSION

The morphology of *Clinostomum* sp. found in *Trichogaster trichopterus* is tongue shape, ellipse, around 1,5-2 mm in diameter, with a thin (c. 0,9 µm wide). The size of *T. trichopterus* that is infected is range from 5,6-11 cm TL and 2,01-28,64 g BW. Results of this research prove that *T. trichopterus* the 2nd intermediete host of *Clinostomum* in Riau, Indonesia.

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REFERENCES

Aohagi Y, Shibahara T, Machid N, Yamaga Y, Kagota K. 1992. *Clinostomum complanatum* (Trematoda: Clinostomidae) in Five New Fish Hosts in Japan. *J. Wildl. Dis*. 28 (3): 467-469.

Aohagi Y, Shibahara T, Machida N, Yamaga Y, Kagota K. 1993. *Clinostomum complanatum* (Trematoda: Clinostomidae) in wild herons and egrets, Tottori Prefecture. *J. Wildl. Dis*. 28: 470-471.

Bush A.O, Lafferty K.D, Lotz J.M, Shostak A.W. 1997. Parasitology meets ecology on its own terms: Margolis *et al.*, revisites. *J. Parasitol.* 83 (4): 575-583.

Cameron T.W.M. 1945. Fish carried parasites in Canada. I. Parasites carried by fresh water fish. *Can. J. Comp. Med*. 9: 245-254, 283-286, 302-311.

Chung D, Kong H.H, Joo C.Y. 1995. Demonstration of the second intermediate hosts of *Clinostomum complanatum* in Korea. *The Korean J. Parasitol.* 33 (4): 305-312.

Dias M.L.G.C, Eiras J.C, Machado M.H, Souza G.T.R, Pavanelli G.C. 2003. The life cycle of *Clinostomum complanatum* Rudolphi, 1819. (Digenea, Clinostomidae) on the floodplain of the High Parana River, Brazil. *Parasitol. Res*. 89: 506-508.

Dias M.L.G.G, Minte-Vera C.V, Eiras J.C, Machado M.H, Souza G.T.R, Pavanelli G.C. 2006. Ecology of *Clinostomum complanatum* Rudolphi, 1814 (Trematoda: Clinostomidae) infecting fish from the floodplain of the high Parana River, Brazil. *Parasitol. Res.* 99: 675-681.

Eiras J.C, Dias M.L.G.G, Pavanelli G.C, Machado M.H. 1999. Histological studies on the effects of *Clinostomum marginatum* (Digenea, Clinostomidae) in its second intermediate host *Loricariichths platymetopon* (Osteichthyes, Loricariidae) of the upper Parana River, Brazil. *Acta Scientiarum* 21(2): 237-241.

Hanafi K. 1983. Studies on the helminth parasites infected in Pla-Kadi-Mor *Trichogaster trichopterus* (Pallas) from natural water at Mueang District, Ayuthaya Province. Thesis. Kasetsart University, 1983: 133.

Kabata Z. 1985. Parasites and Diseases of Fish Culture in the Tropics. Philadephia, Taylor & Francis Limited. 21.

Kagei N, Yanohara Y, Uchinawa R, Sato A. 1984. On the *yellow grubs*, metacercariae of *Clinostomum complanatum* (Rudolphi, 1819), found in the cultured loach. *Japanese J. Parasitol.* 33: 59-62.

Kamo H. Ogino K, Hatsushika A.R.A. 1962. Unique infection of man with *Clinostomum* sp. a small Trematoda causing acute laryngitis. *Yonago Acta Medica*. 6: 37-40.

Kifune T, Ogata M, Miyahara M. 2000. The first case of Human Infection with Clinostomum (Trematoda: Clinostomidae) in Yamaguschi Prefecture, Japan. *Med. Bull. Fukuaka Univ*. 27 (2): 101-105.

Lo C.F, Kou G.H, Huber F, Liu F.G. 1987. The study of *Clinostomum complanatum* Rudolphi 1819. The metacercariae of *Clinostomum complanatum* in the sweet fish (*Plecoglossus altivelis*). The memoir of parasitology in fish disease, 2 (11): 56-63.

Prichard M.H, Kruse G. 1982. The collection and preservation of animal parasites. Lincoln, NE: University of Nebraska Press. 147.

Saanin H. 1984. Taksonomi dan Kunci Identifikasi Ikan. Jilid I dan II. Cetakan ketiga. Bina Cipta. Jakarta. 205.

Shirai R, Mathubara K, Ohnishi T, Nishiyama H, Watanabe A, Harada R, Kaduta J, Kohno S. 1998. A case of human infection with *Clinostomum* sp. *Kansenshogaku Zasshi* 72 (11): 1242-5.

Thatcher V. E. 1991. Amazon fish parasite. *Amazoniana.* 11 (3/4): 263-571.