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Diphyllobothriasis in Cats Fed Daily with Raw '*Mujair*' fish in Surabaya, East Java, Indonesia

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Abstract

This study was aimed to investigate the occurrence of diphyllobothriasis in a cat, fed daily with raw '*Mujair*' fish, in Surabaya, East Java, Indonesia. Faecal samples were collected from nine different *Felis domestica* cats fed with raw '*Mujair*' fish. Microscopic examination was carried out to detect and identify the presence of *D.mansoni* eggs.The result of the microscopic examination identified the presence of *D.mansoni* eggs in 3 cats. Confirmation was made by collecting adult worms from the intestine of the positive test cat, and macroscopic examination identified the presence of proglottids from *D.mansoni*. The findings generated in this study showed that diphyllobothriasis infection is present in *Felis domestica* cats fed daily with raw '*Mujair*' fish, in Surabaya, East Java, Indonesia.

Key words: Cat, Diphyllobothriasis, '*Mujair*' fish feeding.

Diphyllobothriasisis infection is caused by tapeworm called *Diphyllobothrium mansoni* (a.k.a *Diphyllobotrium erinacei* or *Spirometra erinacei*). The definitive host of *D.mansoni* includes mammals such as dogs and cats. The adult worm is predominantly found in the small intestine of cats (Faust *et al*, 1970.,Yamaguchi, 1981.,Neva and Brown, 1994., Roberts and Janovi, 2006., Margono *et al*, 2007).The primary intermediate hosts of the parasite include

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species of *Cyclops* while secondary intermediate host include small rodents, snakes, frogs, and fishes. Cats may aquire diphyllobothriasis by drinking water contaminated with *Cyclops* containing the procercoid larvae, or by consuming frogs or fishes that harbor the plerocercoid or sparganum larvae (Faust *et al*, *loc. cit*., Neva and Brown, *loc. cit*., CDC, 2017). The diagnosis of diphyllobothriasis can be carried out by the microscopic examination of cat's faecal sample for *D.mansoni* eggs. Gravid proglottids of *D.mansoni* are seldom found in the examination of faecal sample (Ridley, 2012). Tapeworm of genus *Spirometra* are characterized by a piling of uterine coils, which occur as dark spots in the middle of mature and gravid proglottids (Faust *et al*, *loc. cit*., Yamaguchi, *loc. cit*., Neva and Brown, *loc. cit*., CDC, *loc. cit*).

Diseases caused by *D.mansoni* include zoonotic disease, in which man is a second intermediate host (paratenic host). The infection in humans causes sparganosis (Yamaguchi, *loc. cit*., Roberts and Janovi Jr, *loc. cit*., Liu *et al*, 2015., CDC, *loc. cit*).The study was aimed to investigate the occurrence of diphyllobothriasis in cats fed daily with raw '*Mujair*' fish, in Surabaya, East Java, Indonesia. This study was also aimed to determine, if fishes serve as an intermediary host of the infection.

Materials and Methods

Faecal sample were obtained from a *Felis domestica* cat fed with raw '*Mujair*' fish (*Java tilapia* and *Oreochromis mossambicus*) purchased from the traditional market.

The faecal samples were preserved in a 10% formalin solution.Lugol's iodine staining technique was used to identify *D.mansoni* eggs under the 100 x and 400x magnification of the microscope (WHO, 1991).The detection of *D.mansoni* eggs of specific morphology, size (57 to 66 microns by 33 to 37 microns) and shape (ellipsoidal, asymmetric, conical operculum) is indicative of a positive test (Faust *et al*, *loc. cit*., Yamaguchi, *loc. cit*., CDC, *loc. cit*). Confirmation was made by collecting adult worms from the intestine of the positive test cat by the oral administration of *Carica papaya* leaf juice. A sonde was used to administer 15 cc of the juice as single dose. Macroscopic examination was carried out by observing morphology of proglottids. Proglottids produced by *D.mansoni* are characterized by the presence of dark spot (due to the presence of apiling of uterin coils) in the middle of mature and gravid proglottid (Faust *et al, loc cit*., Yamaguchi, *loc. cit*., Neva and Brown, *loc. cit*., CDC, *loc. cit*).

Results and Discussion

The microscopic examination of faecal sample of cats revealed the presence of *D. mansoni* eggs in 3 samples.

The administration of *Carica papaya* juice removed the adult worms from the gut of the positive cats. However, the cat ate some of the worms prior to its collection for further study. As a result, the proglotid observed were without scolex and the macroscopic examination identified the presence of proglottids from *D.mansoni*.

Diphyllobothriasis and sparganosis are relatively uncommon tapeworm infection in Indonesia (Margono *et al*, *loc. cit*). However, the detection of diphyllobothriasis in the faecal sample of *Felis domestica* cat require immediate attention because they may act as definitive host which can spread the *D. mansoni* parasite. More attention is also needed against '*Java tilapia*' fish or *Oreochromis mossambicus*, which in Indonesia is better known by the name '*Mujair*' fish, a kind of commonly consumed freshwater fish.In this case '*Mujair*' fish may act as an intermediate host for the spread of diphyllobothriasis in cats and sparganosis in humans. However, it has been documented that the incidence of sparganosis in humans in Indonesia and other countries such as Italy and the United States, sparganosis is contracted by drinking of water contaminated by copepods containing procercoid larvae (Pampliglione *et al*, 2003., Margono *et al*, *loc. cit*., Liu *et al*, *loc. cit*.). The incidence of sparganosis in humans is associated with eating habits of raw frogs in China, South Korea, Japan, and Thailand (Ming *et al*, 2009., Anantaphruti *et al*, 2011., Cui *et al*, 2011., Li *et al*, 2011). Many people in China contract sparganosis due to their traditional habit of eating raw snakes to cure a panoply of

illnesses (Roberts and Janovi Jr, *loc. cit*).

Summary

The study revealed the presence of *diphyllobothriasis* infection in *Felix domestica* cats fed daily with raw fish in Surabaya, East Java, Indonesia.

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