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TREMATODE INFECTION IN GASTROINTESTINAL TRACT OF DUCK FROM CHICKEN SLAUGHTERHOUSES IN BOGOR, WEST JAVA

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ABSTRACT

This study aims to identify and calculate the percentage of trematode infection in the gastrointestinal tract of ducks from chicken slaughterhouses in Bogor, West Java. This research used 10 duck's gastrointestinal tract, of which five came from chicken slaughterhouse in Bojong Gede and the rest came from a chicken slaughter house in Cibinong Market. The gastrointestinal tract was divided into four parts: the upper, middle and lower part of the intestine and cecum. Each feces sample was examined by making slides using native and floatation methods to identify the egg of endoparasite. Adult trematodes found in the sample were stained for genus identification. This study showed that 4 out of 10 ducks were positive for endoparasite infection. Trematodes found in this study were *Echinostoma* spp. (20%) along the small intestine, large intestine, and cecum. *Echinostoma* spp. egg was also found in this study another trematode genus found was *Hypoderaeum* spp. (10%) in the large intestine and cloaca.

Key words: Duck, *Echinostoma* spp., gastrointestinal tract, *Hypoderaeum* spp., trematode

ABSTRAK

Penelitian ini bertujuan mengidentifikasi dan menghitung persentase infeksi trematoda pada saluran pencernaan itik yang berasal dari tempat pemotongan ayam di Bogor, Jawa Barat. Penelitian ini menggunakan 10 saluran pencernaan itik, lima di antaranya berasal dari tempat pemotongan ayam di Bojong Gede dan sisanya berasal dari tempat pemotongan ayam di Pasar Cibinong. Saluran pencernaan dibagi menjadi empat bagian, yaitu usus bagian atas, tengah, bawah, dan sekum. Setiap sampel feses diperiksa dengan membuat preparat menggunakan metode natif dan metode apung untuk mengidentifikasi telur endoparasit. Trematoda dewasa yang ditemukan dalam sampel kemudian diwarnai untuk identifikasi sampai tingkat genus. Hasil penelitian menunjukkan bahwa 4 dari 10 itik positif terinfeksi endoparasit. Trematoda yang ditemukan dalam penelitian ini adalah Echinostoma spp. (20%) yang tersebar di usus halus, usus besar, dan sekum. Telur Echinostoma spp. juga ditemukan dalam penelitian ini. Genus trematoda lain yang ditemukan adalah Hypoderaeum spp. (10%) yang terdapat di usus besar dan kloaka.

Kata kunci: itik, Echinostoma spp., saluran pencernaan, Hypoderaeum spp., trematoda

INTRODUCTION

Duck is a poultry that raised for meat and eggs. The increasing population of ducks every year shows that the consumption of food products from ducks keep growing. Food products from ducks that are commonly found in Indonesia are egg, salted egg and duck meat (Ketaren 2007). The public widely consumes duck meat because it contains nutrients that can fulfill the needs of the body's needs. In 100 grams of duck meat, there are 18.28 grams of protein, 5.95 grams of fat, 73.77 grams of water, 0.94 grams of carbohydrates, minerals and vitamins (USDA 2019). The consumption of duck meat is still low compared to the consumption of chicken meat. This is because duck meat is tougher and has a rancid smell compared to chicken meat (Mattitaputty and Suryana 2010).

Several diseases that often attack ducks are helminthiasis and protozoan infections. Helminthiasis is a disease caused by endoparasitic worm nematodes, cestodes and trematodes. Most worms attack the gastrointestinal tract, but some also attack other body parts, such as the respiratory tract and eyes (Retno *et al.* 2015). Ducks are susceptible to parasitic infections. Ducks participate as definitive and intermediate hosts in protozoa and helminth infection. This parasitic infection is very detrimental because it causes serious health problems in ducks, causing economic losses due to reduced body weight and egg production (AbouLaila *et al.* 2011). Gastrointestinal parasites take nutrients, minerals and vitamins from the host's body causing serious health problems such as enteritis, immunosuppression, stunted growth and decreased productivity (El-Shahawy and Elenien 2015).

Based on research by Musa *et al.* (2012) trematode that infects ducks is *Echinostoma revolutum* that causes weight loss, enteritis catarrhalis, and even leads to death in young ducks. Apart from *Echinostoma revolutum*, a high prevalence infection with *Echinostoma recurvatum* and *Hypoderaeum conoideum* have been reported in local ducks in Bangladesh (Yousuf *et al.* 2009). Information about trematode infection in ducks is not widely found in Indonesia, especially in Bogor, so this study was conducted to determine the type and calculate the percentage of trematode infection of ducks in Bogor, West Java.

MATERIALS AND METHODS

There were 10 samples of the gastrointestinal tract of ducks used in this research. The samples came from two different chicken slaughterhouses. Five samples came from chicken slaughterhouse in Bojong Gede, and the other five came from a chicken slaughterhouse in Cibinong market. The gastrointestinal samples were from the small intestine to the cloaca.

The samples collected were put into a plastic bag containing distilled water, labeled for each part of the intestines, and stored in a cool box containing an ice pack. The samples were brought to the Laboratory of Helminthology, Division of Parasitology and Medical Entomology. School of Veterinary Medicine and Biomedical Sciences, IPB University for further observation. The intestinal sample was divided into four anatomical sections: upper intestine, middle intestine, lower intestine, and cecum, to facilitate region-specific analysis of histological and physiological parameters (Figure 1).

Each gastrointestinal tract sample was divided into the upper, middle, and lower parts of the intestine and cecum. Each sample part was placed in a petri dish and opened using surgical tools to remove the gut contents. During this process, the presence of adult trematodes was observed macroscopically. Adult trematodes found in every part of the sample were collected into a petri dish containing distilled water. The trematodes were stored in a plastic pot containing 70% alcohol and labeled for each part. Furthermore, the trematodes were stained using Semichon's Acetocarmine and observed under a light microscope for identification (Jacobs *et al.* 2016; Taylor *et al.* 2016).

The presence of trematode eggs was observed using native and flotation methods. The preparation the native method was carried out by collecting the gut contents into a petri dish. It separated them according to their parts, such as the intestine's upper, middle, and lower parts and cecum. The gut content was filtered to exclude coarse materials. The filtrate was placed on the object glass, covered with cover glass and observed using a light microscope to examine trematode eggs. The following method is the flotation method. This technique was done by adding 2 mL of the gut contents that had been filtered before into a test tube. The saturated NaCl solution was added until it reached the top of the tube and formed a convex surface. The cover glass was placed on top of the test tube and left to sit for 10 minues. The cover glass was removed and placed on the object glass for further observation under a microscope. The trematode eggs found were photographed using the Dino Eye Eyepiece Camera.

Data Analysis

Trematodes in the gastrointestinal tract were analyzed descriptively to determine each genus. The percentage of trematode infection was calculated using Microsoft Excel 2016 and the data was presented in tabular form.

RESULTS AND DISCUSSION

The examination of gastrointestinal endoparasites in ducks revealed that 4 out of 10 ducks (40%) were infected. Notably, all infected ducks originated from a chicken slaughterhouse in the Cibinong market, whereas those from the Bojong Gede slaughterhouse showed no signs of endoparasite infection (Figure 2 and Figure 3).

Among the identified endoparasites, adult trematodes of the genus *Echinostoma* spp. were found in the cecum with a prevalence of 20%. Additionally, *Hypoderaeum* spp. was identified in the large intestine and cloaca of one duck (10%). Eggs of *Echinostoma* spp. were also found scattered along the gastrointestinal tract, from the upper to the lower intestines, including the cloaca.

The trematode genera identified in this study were distinguished based on their morphological characteristics. *Echinostoma* spp. exhibited the highest infection rate (20%) and were found in both adult and egg forms. The adult worms were dorsoventrally flattened with collar spines around the oral sucker and a relatively larger ventral sucker, consistent with the description by Huffman and Fried (1990). Chantima *et*

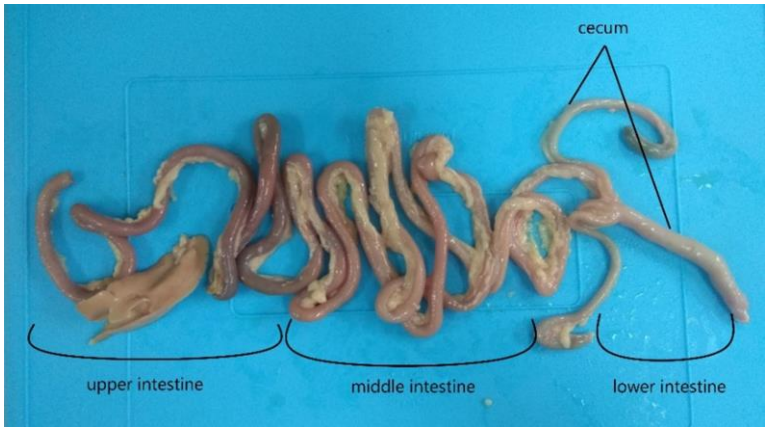

Figure 1. The intestines sample was divided into four parts

Table 1. Trematode genera infection in ducks

Trematode genera	Duck 7	Duck 8	Duck 9	Duck 10	Number of positive ducks	Trematode infection (%)
Echinostoma spp.	+	+	-	-	2	20%
Hypoderaeum spp.	+	-	-	-	1	10%
Other trematodes	+	+	-	-	2	20%

The percentage of trematode infection is calculated by the formula (t/n) x 100%. T= Number of positive ducks, n= Total of ducks

al. (2013) further supported the identification, stating that adult *Echinostoma* spp. are characterized by collar spines arranged in a semicircle at the anterior end (Figure 4). The eggs had distinctive features: oval shape, thin shell, yellowish coloration, and the presence of an operculum, aligning with descriptions by Evrintya (2017) and Butboonchoo *et al*. (2020).

In addition to *Echinostoma* spp., *Hypoderaeum* spp. was also identified. This genus is recognized by the presence of oral and ventral suckers, with the ventral sucker being approximately four times larger. The cirrus sac is located near the ventral sucker, as previously described by Azizi *et al*. (2015). These morphological features help distinguish *Hypoderaeum* spp. from other trematodes. It is also known that *Hypoderaeum* spp. possess a well-developed cirrus and genital sac.

Furthermore, unidentified trematodes were observed in 20% of the examined ducks. However, species identification was hindered by the absence of key body parts, particularly the head. As morphological

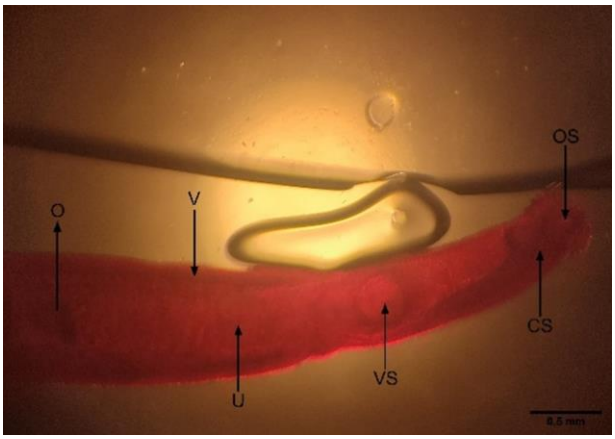

Figure 2. Morphology of *Echinostoma* spp. OS= Oral sucker, CS= Collar spine, VS= Ventral sucker, U= Uterus, V= vitellaria, O= Ovary. Perbesaran 4X

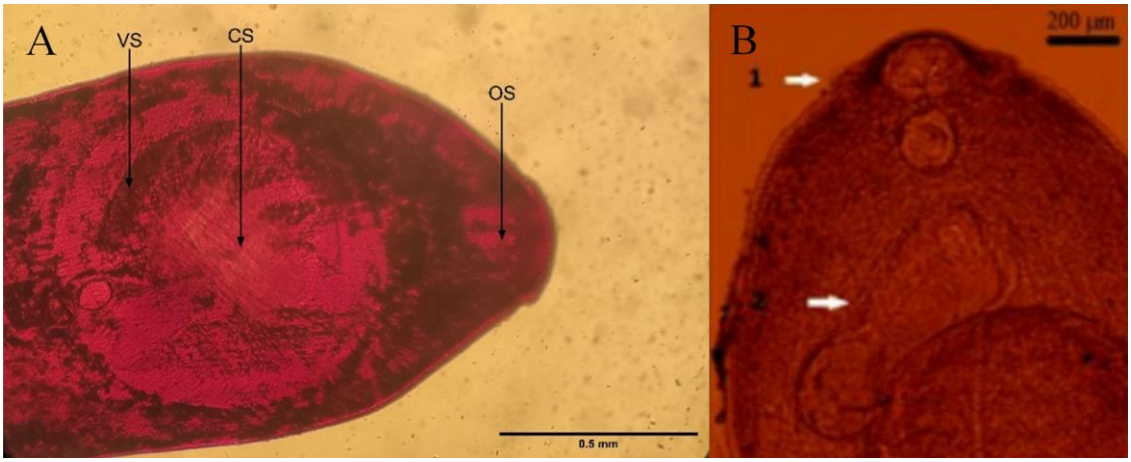

Figure 3. Morphology of the *Hypoderaeum* spp. A (10X), *Hypoderaeum conoideum* B (Azizi *et al.*, 2015). OS= Oral sucker, VS= Ventral sucker, CS= Cirrus sac

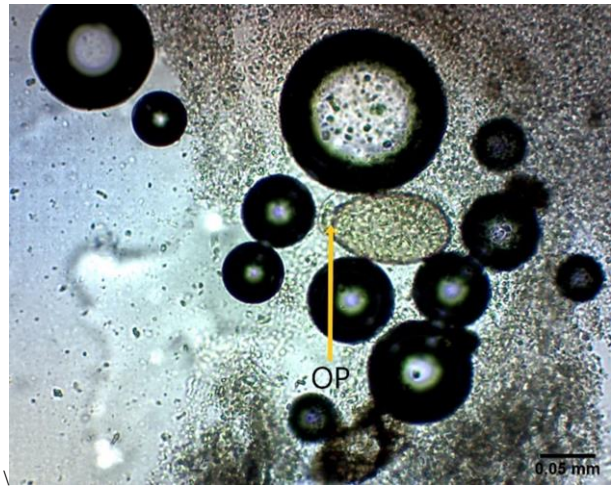

Figure 4. *Echinostoma* spp. Egg. OP= Operculum, 10x

identification relies heavily on complete anatomical features, further examination is needed to classify these unidentified trematodes.

Regarding predilection sites, adult *Echinostoma* spp. were predominantly located in the cecum, while the eggs were dispersed from the small intestine to the cloaca. This finding corresponds with Taylor *et al*. (2016), who reported the predilection site of *Echinostoma revolutum* in the cecum and rectum of ducks, geese, and other waterfowl. Conversely, *Hypoderaeum* spp. in this study was found in the large intestine near the cloaca. This contrasts with Azizi *et al*. (2015), who noted *Hypoderaeum conoideum* primarily in the small intestine of ducks.

In terms of infection rates, *Echinostoma* spp. showed a higher prevalence (20%) compared to *Hypoderaeum* spp. (10%). The presence of *Hypoderaeum* spp. in the large intestine, although at a lower rate, is notable because this trematode is known to infect various waterfowl and can potentially transmit to other vertebrates, including humans (Chai *et al*. 2009; Yousuf *et al*. 2009; Toledo *et al*. 2012).

CONCLUSION

Trematodes found in the gastrointestinal tract of ducks from a chicken slaughterhouse in Cibinong Market are the adult form of *Echinostoma* spp. in the cecum and the egg along the small intestine to the cloaca, with 20% infection. Besides that, *Hypoderaeum* spp. was also found in this study, with 10% infection, which is a rare incidence of infection by this genus in ducks.

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