

Prevalence of Gastrointestinal Endoparasites in Free-Range Chicken at Traditional Market Payakumbuh

Prevalensi Endoparasit Gastrointestinal pada Ayam Kampung di Pasar Tradisional Payakumbuh

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ABSTRACT

Background: Worm infections in free-range chickens are an important health issue in the animal food industry and consumption in Indonesia. **Purpose:** This study aims to determine the prevalence of worms in the intestines of free-range chickens sold in traditional markets in Payakumbuh City, and to identify their types. **Method:** Worm identification was carried out using samples of chicken intestines from traditional markets in Payakumbuh City. The samples were taken to the laboratory to be dissected to check for the presence of worms in the intestines. Intestines that were positive for worms were placed in a petri dish containing distilled water before being placed in a plastic bottle containing 70% ethanol. The method used for staining was Acetocarmine Semichon for cestodes and clove oil for nematodes. Worm species was determined by observation under a microscope. Data in the form of the types of worms found was analyzed descriptively. Data obtained quantitatively, namely the prevalence of endoparasites, was processed using Ms. Excel 2013. **Results:** The results showed that 31 out of 50 samples of free-range chicken intestines (*Gallus domesticus*) examined in traditional markets in Payakumbuh City were positive for worm infections. The prevalence of worm infections in traditional markets in Payakumbuh City was found to be 62%. The prevalence based on the type of endoparasite in traditional markets in Payakumbuh City was *Railletina sp.* (28%), *Hymenolepis sp.* (6%), *Ascaridia sp.* (14%), and *Heterakis sp.* (14%). **Conclusion:** The prevalence rate of worm infections in free-range chickens in traditional markets in Payakumbuh City was 62%. The types of worms found were *Railletina sp.*, *Ascaridia sp.*, *Heterakis sp.*, and *Hymenolepis sp.* The most common type of worm was *Railletina sp.*

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ABSTRAK

Latar Belakang: Infeksi cacing pada ayam kampung merupakan masalah kesehatan penting dalam industri pangan hewani dan konsumsi di Indonesia. **Tujuan:** Penelitian ini bertujuan untuk mengetahui prevalensi cacing pada usus ayam kampung yang dijual di pasar tradisional Kota Payakumbuh dan mengidentifikasi jenisnya. **Metode:** Identifikasi cacing dilakukan dengan menggunakan sampel usus ayam yang berasal dari pasar tradisional Kota Payakumbuh. Sampel tersebut dibawa ke laboratorium untuk dibedah guna memeriksa keberadaan cacing pada usus. Usus yang positif cacing ditempatkan pada cawan petri yang berisi akuades sebelum ditempatkan pada botol plastik yang berisi etanol 70%. Metode yang digunakan untuk pewarnaan adalah Acetocarmine Semichon yang digunakan untuk cestodes dan minyak cengkeh untuk nematodes. Spesies cacing ditentukan dengan pengamatan di bawah mikroskop. Data berupa jenis cacing yang ditemukan dianalisis secara deskriptif. Data yang diperoleh secara kuantitatif yaitu prevalensi endoparasit diolah dengan menggunakan Ms. Excel 2013. **Hasil:** Hasil penelitian menunjukkan bahwa dari 50 sampel usus ayam kampung (*Gallus domesticus*) yang diperiksa di pasar tradisional Kota Payakumbuh, sebanyak 31 sampel positif terinfeksi cacing. Prevalensi infeksi cacing di pasar tradisional Kota Payakumbuh ditemukan sebesar 62%. Prevalensi berdasarkan jenis endoparasit di pasar tradisional Kota Payakumbuh adalah *Railletina sp.* (28%), *Hymenolepis sp.* (6%), *Ascaridia sp.* (14%), dan *Heterakis sp.* (14%). **Kesimpulan:** Angka prevalensi infeksi cacing pada ayam kampung di pasar tradisional Kota Payakumbuh sebesar 62%. Jenis cacing yang ditemukan adalah *Railletina sp.*, *Ascaridia sp.*, *Heterakis sp.*, dan *Hymenolepis sp.* Jenis cacing yang paling banyak ditemukan adalah *Railletina sp.*

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INTRODUCTION

The demand for animal protein is increasing, along with the growing population of Indonesia. Products derived from chickens are among the most consumed animal food products by both industry and households (Sulastri and Hamdani, 2008). Knowing the health status of reared chickens is crucial for achieving effective management, particularly the sanitation level of poultry housing to maintain high production and low mortality (Badriyah and Ubaidillah, 2013). In 2020, the production of free-range chicken meat in Indonesia reached a total of 293,140 tons (BPS, 2021).

The main factor causing a decline in production is health disturbances caused by bacteria, viruses, and parasites in the form of ectoparasites and endoparasites (Fadilah, 2004). A parasite is an organism that uses another organism as a living place, seeking food, and sometimes staying either permanently or temporarily (Soviana and Hadi, 2010). Parasites present in livestock can cause organ damage to the livestock. Chickens infected with parasites can experience weight loss. Chickens can be infected by endoparasites such as nematodes through contaminated food, drinking water, and equipment with feces (Parede et al., 2005).

The life cycle of worms starts from eggs, through to larvae and adult worms. To infect chickens, cestoda requires intermediaries such as flies, ants, and beetles. Cestoda worm eggs are eaten by the intermediate host, hatch in its digestive tract, and remain there until chickens consume the intermediate host. After the intermediate host is consumed, the worm larvae attach to the chicken's intestinal wall. Then, young worm segments gradually form and develop into adults (Medion, 2019). Chickens attacked by parasites are due to parasite infestation on the chicken's body but the impact does not lead to infection. Some parasites that can attack free-range chickens include *Echinostoma revolutum*, *Strongyloides avium*, *Ascaridia galli*, *Heterakis gallinarum*, *Capillaria caudinflata*, *Tetrameres americana*, *Railletina sp.*, *Davainea proglottina*, *Trichostrongylus tenuis*, and protozoa *Eimeria sp.* (Pradana et al., 2015). The increasing interest of Indonesian people in free-range chicken meat has also increased its demand. Thus, it requires strict supervision regarding the health of free-range chickens. One of the diseases that often attacks free-range chickens that is quite difficult to identify and control due to a lack of information is worm infection. This examination can identify and measure the prevalence of worms in the intestines of free-range chickens and the results obtained are expected to provide information about the health of free-range chickens sold in traditional markets in Payakumbuh City. Based on this, a study was conducted on the prevalence of worm infections in the intestines of free-range chickens in traditional markets in Payakumbuh City.

MATERIAL and METHOD

Sample

The sampling of free-range chicken intestines was carried out in markets located in Payakumbuh City. The number of

Material

The materials used in this study consisted of 50 samples of free-range chicken intestines, distilled water, 70% alcohol, Semichon's Acetocarmine stain, clove oil, 70% ethanol, alcohol acid, HCl, 10% KOH, and graded alcohol (70%, 85%, 90%, and 96%). The tools used in this study were a microscope, a set of surgical tools for dissecting the intestines, petri dishes, plastic bottles, sample plastic bags, black plastic, and gloves.

Method

The collected free-range chicken intestine samples were placed in numbered plastic bags containing water and placed in a cool box. According to (Kusumadewi, 2018), the procedure for identifying worms in free-range chicken intestines can be seen below. The intestines were separated into the small intestine, large intestine, and cecum. Then, the intestine was placed on black plastic, and opened using surgical tools. Adult worms were collected in a petri dish containing distilled water. Plastic bottles were filled and labeled with 70% ethanol with the worms. Semichon's Acetocarmine staining was performed for the cestoda types and clove oil staining for nematode types. The worm species were determined and observed under a microscope.

Data Analysis

Data on the types of worms found were analyzed descriptively. The quantitative data obtained, namely the prevalence of endoparasites, was processed using Ms. Excel 2013.

RESULTS

Prevalence

Based on the results of the study of free-range chicken intestine samples in traditional markets in Payakumbuh City, it was found that the prevalence of worm infections was 62 %, with 31 out of 50 intestine samples being positive for worms (Table 1).

Table 1. Prevalence Based on Positive Sample Results for Worms.

Type of Parasites	Genus	Positives Samples	Prevalence (%)
Nematoda	<i>Ascaridia sp.</i>	7	14
	<i>Heterakis sp.</i>	7	14
Cestoda	<i>Railletina sp.</i>	14	28
	<i>Hymenolepis sp.</i>	3	6
Total Prevalence		31	62

Based on Table 2, the results from the study of free-range chicken intestine samples in traditional markets in Payakumbuh City showed a prevalence of 64%, with 32 out of 50 intestine samples being positive for worms. In sample no. 8, two different worms were found, namely nematodes and cestodes. Based on Table 3, the places most frequently found with worms were the small intestine and cecum. Three types of worms were found in the small intestine, such as *Ascaridia*, *Railletina sp.*, and *Hymenolepis*. In the cecum, *Heterakis* worms were found.

Table 2. Prevalence Based on Positive Sample Results for Worms.

Type of Parasites	Genus	Positives Samples	Prevalence (%)
Nematoda	<i>Ascaridia sp.</i>	7	14
	<i>Heterakis sp.</i>	7	14
Cestoda	<i>Railletina sp.</i>	15	30
	<i>Hymenolepis sp.</i>	3	6
Total Prevalence		32	64

Table 3. Worms Based on Location Found.

Type of Parasites	Genus	Location Found
Nematoda	<i>Ascaridia sp.</i>	Small intestine
	<i>Heterakis sp.</i>	Cecum
Cestoda	<i>Railletina sp.</i>	Small intestine
	<i>Hymenolepis sp.</i>	Small intestine

DISCUSSION

The results of the study on free-range chicken intestine samples in traditional markets in Payakumbuh City showed a worm infection prevalence rate of 62% and a worm infection rate of 64%. The study conducted by Kusumadewi in Jakarta and Bogor found higher prevalence rates, with 70% in Bogor and 56% in Jakarta. Free-range chickens search for food in the superficial layers of soil, moving from one place to another. The soil can be contaminated by insects or earthworms that can become intermediate hosts for worm parasites, increasing the chances of chickens getting infected (Ashenafi and Eshetu, 2004).

The most common endoparasite attacking free-range chickens is *Railletina sp.* (Table 2, 3). The study results show that there are many types of cestoda worms. Cestoda are the most common worms infecting the free-range chickens sold in traditional markets in Pekanbaru. This is due to the environment where chickens live, with many insects acting as hosts for *Railletina sp.* (Rismawati et al., 2013). According to Dar and Tanveer (2013), the frequent finding of *Railletina sp.* worms is due to easy access to intermediate hosts such as flies, beetles, and ants in the chicken's living area. Cestoda infection in chickens causes growth retardation, enteritis, diarrhea, hemorrhage, and vitamin B deficiency.

According to Rasyaf (2011), poultry farming systems are carried out extensively (free-range) and intensively (caged). Chickens reared intensively are more productive and only slightly infected with parasites compared to those reared extensively. This is because chickens reared extensively have a higher probability of carrying and transmitting parasites from the environment where they usually search for food (Supriatna, 2010). Many factors can increase the likelihood of worm infection in poultry farming, including management, farm location, and infection sources. Slimane (2016) suggests taking strict measures to control these economically important parasites. Efforts to improve management systems, cage cleanliness (Dakpogan et al., 2019), maintain a clean and

hygienic environment (Jaiswal et al., 2020), ensure food and drinking water cleanliness, and administer deworming medication at the right dosage are necessary. In poultry farming, proper management can reduce worm infection prevalence (Iboh, 2019; Uhuo et al., 2013). The positive impact of low worm infection prevalence can be felt by farmers, such as obtaining optimal profits.

Based on Table 2, the identification results of worm infestations in the intestines of free-range chickens at traditional markets in Payakumbuh City found four types: *Ascaridia*, *Heterakis*, *Hymenolepis*, and *Railletina sp.* Research conducted by Kusumadewi (2020) in the Jakarta and Bogor areas found a greater variety of species compared to Payakumbuh City, with a total of seven: *Ascaridia galli*, *Heterakis gallinarum*, *Hymenolepis cantianiana*, *Hymenolepis carioca*, *Railletina cestocillus*, *Railletina echinobothrida*, and *Railletina tetragona*. The worms *R. echinobothrida*, *R. tetragona*, and *R. cestocillus* belong to the same genus but have slight differences. One of the differences is the size and shape of the rostellum and sucker. *R. echinobothrida* has a round-shaped rostellum and sucker, while *R. tetragona* has a small round rostellum and an ovoid sucker. *R. cestocillus* has a head without a neck, a large rostellum, and an unhooked sucker (Nandi and Samanta, 2010). *Railletina echinobothrida* can reach a length of up to 25 cm, with suckers having 8-15 rows of hooks and a rostellum consisting of 2 rows of hooks, with 200-250 hooks each (Saif et al., 2008). *Railletina tetragona* also reaches up to 25 cm in length but has suckers with 8-12 rows of hooks and a rostellum with 2 rows of hooks with 90-130 hooks each (Mandal, 2012). Unlike the other two species, *R. cestocillus* can grow up to 15 cm long with a broad rostellum having 400-500 small hooks (Saif et al., 2008). Other cestodes that infect chickens in this study are *Hymenolepis cantianiana* and *Hymenolepis carioca*. *H. cantianiana* can grow up to 2 cm long, with unhooked suckers and rostellum, and a unilateral genital pore positioned anterolaterally to mediolaterally. *H. carioca* can grow 3-8 cm long, with the segment width being 3-5 times the length of the segment (Wehr, 1972).

Nematode infections in chickens in this study are caused by *Ascaridia sp.* and *Heterakis sp.* Adult *Ascaridia* worms are about 6-12 cm long, semi-transparent, and yellowish-white in color. *A. galli* has a thick extracellular cuticle to protect the plasma membrane of the adult worm's hypodermis from the host's digestive enzymes (Zaharah et al., 2016). According to Rahman and Manaf (2014), *Heterakis* has a mouth with three lips, a small mouth capsule, and the vulva is located in the middle of the body (Zaharah et al., 2016).

CONCLUSION

The prevalence rate of worm infection in free-range chickens in traditional markets in Payakumbuh City was found to be 62%. The types of worms found were *Railletina sp.*, *Ascaridia sp.*, *Heterakis sp.*, and *Hymenolepis sp.* The most common type of worm was *Railletina sp.*

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CONFLICT of INTEREST

The authors declare that there are no conflicts of interest with any of the parties involved in this study.

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ETHICAL APPROVAL

This research activity did not require ethical approval.

AUTHORS' CONTRIBUTIONS

Concept and research design: YI and EZ, data collection; YI and IAP, data analysis and interpretation; YI and IAP, manuscript writing; YI, IAP, and EZ, manuscript revision; EZ, S, YSA.

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