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LAMPIRAN

Lampiran 1. English Ver

***Heterakis gallinarum* infection in free-range chicken (*Gallus domesticus*) in Daya Traditional Market, Makassar**

Nur Aliah Bahmid

¹¹Department of Veterinary Professional Education, Faculty of Veterinary Medicine, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10 Makassar 90245

Email: aliahbahmid@gmail.com

ABSTRACT . *Heterakis gallinarum* is one of the most frequently diagnosed nematodes as a parasite in the digestive tract of birds. This article aimed to determine *Heterakis gallinarum* infection in free-range chicken (*Gallus domesticus*) in Daya Traditional Market, Makassar. Observations were carried out at the Hasanuddin University Education Animal Clinic Integrated Laboratory on March 2022. Worms in the observed sample were directly taken from intestines of free-range chickens. Morphology of the worm was observed under a microscope. The result shows that the observed *Heterakis gallinarum* had a whitish color with a length of about 1.5 cm and an elongated pointed tail.

Keywords : Free-range chicken, *Heterakis gallinarum* , Nematodes, Intestines

INTRODUCTION

Free-range chickens (*Gallus domesticus*) are commonly found as local chicken in Indonesia. Local chickens are defined as chickens growing in Indonesian local environment where the chickens live (Moenek and Oematan, 2017). People consume the chicken as a source of food for the family, on the other hand, their eggs and meat can also be on sale for savings (Iskandar, 2010). The chickens are extensively left for free in the yard find their feed by themselves. This rearing system causes the chickens easily infected with helminth parasites or worms, naturally found in various types of wild and domesticated fowl. The most parasites infecting domestic poultry such as ducks, ducks, birds and chickens are known as nematodes. The spread of nematode worms to livestock passes through feed, water, and livestock equipment (Kurnia *et al.*, 2021). Nematode worms commonly infecting the digestive tract of chickens include *Capilaria spp*, *Tetrameres*

spp, *Aquaria spp*, *Ascaridia galli*, *Strongyloides avium*, and *Heterakis gallinarum* (Belo *et al.*, 2023)

Heterakis gallinarum is parasite and one of the most frequently diagnosed nematodes in the digestive tract of birds (Prayoga *et al.*, 2014). The presence of nematode worms in the body of native chickens can cause damage to certain organs. Helminthiasis in native chickens is a disease that can affect native chicken productivity and generally does not *cause* death, but is chronic in nature resulting in emaciation, weakness and decreased production (Kurnia *et al.*, 2021). Worm infection causes chronic bleeding because the migrating larvae cause gastrointestinal damage including gastritis, enteritis, and digestive tract ulceration which eventually causes a condition called chronic blood loss. Worm infections also cause draining of food fluids and intestinal blockage by roundworms and tapeworms as well as the presence of lumps in the intestine (Moenek *et al.*, 2019).

Chicken for human consumption should be in good health and free from various types of parasites. Information about native chickens infected with parasites is needed to maintain the health of chickens and prevent the occurrence of zoonotic diseases (diseases that can be transmitted from animals to humans) (Rismawati et al., 2013). Based on the background, this article aimed to determine *Heterakis gallinarum* infection in free-range chicken (*Gallus domesticus*) in Daya Traditional Market, Makassar.

MATERIALS AND METHODS

Time and place

The research was conducted in March 2022. Samples were collected from Daya Traditional Market, Makassar. Worm samples were investigated at the Integrated Laboratory of Educational Veterinary Clinic, Hasanuddin University.

The small intestine organs were taken from the infected chickens and then dissected. The small intestine of the chicken was then incised for

examination of nematode worm infection. Worm samples were taken and put into a container containing NaCl solution. The sample is then taken to the laboratory for examination under a microscope.

Native Inspection Method

Worm samples obtained from the small intestine of chickens were washed and rinsed repeatedly using NaCl to remove dirt until clean. The cleaned worms were then placed on *the object glass*, then dripped with up to 3 drops of immersion oil on *the object glass*. Samples were observed under a microscope using 40x magnification.

RESULTS AND DISCUSSION

The worm samples were identified in the intestines of native chickens in Daya Traditional Market, Makassar, namely *Heterakis gallinarum* worms. The results of worm detection *Heterakis gallinarum* can be known through the morphology that appears on the microscope, shown in Figure 1. (A, B, and C).



Picture 1. *Heterakis gallinarum* worms identified from the intestines of native chickens under a 40x microscope (A. Head, B. Body, C. Tail)

The *Heterakis gallinarum* has the characteristics of a whitish worm with a length of up to 1.5 cm and an elongated pointed tail. According to Saif (2008), adult *Heterakis gallinarum* worms are white, and male worms are 7-13 mm in size, while female worms are 10-15 mm in size. The *Heterakis gallinarum* worm has wide *lateral alae*, with a strong esophageal bulb. The male worm's tail is equipped with large *alae*, a prominent, rounded *precloaca sucker* and 12 pairs of *papillae*. The spicules are not the same, the right one is 2 mm slender, the left one has a 0.65-0.7 mm wide wing. The vulva is in the center of the female worm's body, the eggs are thick-walled, smooth, with a size of 65-80 μ x 35-46 microns.

Heterakis gallinarum parasite is one of the most frequently diagnosed nematodes in the digestive tract of birds (Prayoga et al., 2014). This worm was first discovered by Schrank in 1788.

Similar to *Ascaridia galli*, *Heterakis gallinarum* has a direct life cycle. Unembryoned eggs pass in the feces and develop into infective eggs in about 2 weeks, depending on temperature and humidity. When the infective eggs are ingested by a sensitive host, they hatch in the small intestine. Within 24 hours, the larvae have reached the cecum through the intestinal lumen where they develop into adult worms. Prepatent time is 24 - 30 days (Kurniawan et al., 2010). Female worms can produce eggs that are elliptical in shape, have smooth skin. When the eggs are released, the worms are 65-80 μ m x 35-48 μ m render difficult to distinguish them from *Ascaridia galli* worms. The larvae hatch in the upper intestine of a susceptible *host* (Saif, 2008). The larval and adult stages of *Heterakis gallinarum* migrate towards the cecum of chickens, turkeys, ducks, geese, grouse, guinea fowl, partridges, pheasants, and quail (Prayoga et al., 2014).

Husairi *et al* (2022) studied helminth infections in the intestines of free-range chickens reared around the paddy fields of Gambut District. The result showed the most common type of nematode that infects native chickens is *Heterakis gallinarum*, with a prevalence of 50%. The high frequency of this presence was because these worms can survive in damp places. This type of worm often infects poultry that live in a dirty environment where the conditions are favorable for the growth and development of worms (Ananda *et al.* , 2017). Chickens can eat worm larvae or earthworms, then the larvae migrate causing gastrointestinal damage including gastritis, enteritis, and ulceration of the digestive tract which eventually causes chronic blood loss (Moenek *et al*, 2019).

Field surveys showed the chickens infected with worms was indicated with initial symptoms of decreased appetite, weakness, dull feathers, stunted growth with diarrhea (Tanuwijaya and Febraldo, 2021). Infection of *Heterakis gallinarum* is generally subclinical, where the infected chickens have pathological changes with inflammation and the thickness of cecal wall and the severity of the lesion depending on the load parasite. In cases of severe infection, the formation of nodules on the mucosa of the cecum is an indication. The main economic importance of *Heterakis gallinarum* is due to its role as a vector for *Histomonas meleagridis* or a protozoan parasite, which induces *blackhead disease*. (Prayoga *et al.*, 2014). *Blackhead* is a disease that causes high mortality in turkeys, around 100%. In chickens, mortality is 10-20% with high morbidity up to 20% (McDougald, 2005).

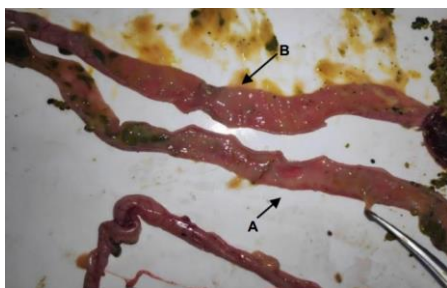


Figure 2. Pathological changes in the chicken intestine. (A) Small intestine, (B) Large intestine (Tanuwijaya and Febraldo, 2021).

Many factors can increase the prevalence of *Helminthiasis* in a chicken farm, including maintenance management, farm location and source of infection. Therefore, Slimane (2016) argues that decisive action must be taken to control this

economically important parasite. Efforts to improve maintenance systems, cage sanitation, a hygienic environment to keep feed and drinking areas clean and to provide anthelmintics and the right dosage in free-range chicken farms need to be carried out properly and correctly so that the prevalence of *Helminthiasis* can be suppressed (Kusuma *et al.* , 2021). Salam (2015) explained that in most cases, the severity of pathological changes due to *Helminthiasis* depending on the degree of parasitic infection in addition to the pathogenic potential of the parasite.

CONCLUSION

Observations to the collected chicken from the local market found a nematode worm, which is *Heterakis gallinarum* with white color, a length of up to 1.5 cm, and an elongated pointed tail. Infection from *Heterakis gallinarum* is generally subclinical, infected chickens showing inflammation and the thickness of the cecal wall and the severity of the lesion depending on the load parasites.

SUGGESTION

The need for deworming for free-range chickens, due to the high incidence of *Heterakis gallinarum* worm infectio. The importance of environmental hygiene management needs to be considered to minimize the occurrence of *Heterakis gallinarum* worm infection.

AUTHOR INFORMATION

The author's full name is Nur Aliah Bahmid S.KH, born on the 1st June 1999 , in Pare-pare, South Sulawesi .

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RIWAYAT HIDUP



Penulis bernama lengkap Nur Aliah Bahmid, dilahirkan pada tanggal 01 Juni 1999 di Kota Pare Pare, Provinsi Sulawesi Selatan, dari ayahanda Ir. Basir, MMA dan ibunda Hj. Nursiah. Penulis merupakan anak keempat dari lima bersaudara.

Penulis menyelesaikan Taman Kanak-kanak di TK Aisyah Sidorejo pada tahun 2005, kemudian melanjutkan pendidikan ke Sekolah Dasar di SDN 17 Sidorejo dan lulus pada tahun 2011, kemudian penulis kembali melanjutkan pendidikan ke SMPN 1 Wonomulyo dan lulus pada tahun 2014. Pada tahun 2017 penulis menyelesaikan pendidikan di SMAN 1 Polewali. Penulis diterima di Program Studi Kedokteran Hewan, Fakultas Kedokteran, Universitas Hasanuddin pada tahun 2017 melalui seleksi nasional melalui Seleksi Bersama Masuk Perguruan Tinggi Negeri (SBMPTN).

Selama Perkuliahan penulis aktif di dalam kegiatan internal dan eksternal kampus yaitu Himpunan Mahasiswa Kedokteran Hewan (HIMAKAHA) FK- UNHAS menjabat sebagai Anggota Bidang Informasi dan Komunikasi pada periode 2019-2020, Koordinator Bidang Informasi dan Komunikasi HIMAKAHA periode 2020-2021, Anggota HMI Komisariat FK-UNHAS periode 2018-2020 dan Anggota Medical Muslim Family (M2F) FK-UNHAS. Mengikuti kegiatan Musyawarah Nasional Ikatan Mahasiswa Kedokteran Hewan Indonesia (IMAKAHI) XXI dan berbagai kegiatan kepanitiaan didalam dan diluar kampus. Pada bidang akademik, penulis pernah menjabat sebagai koordinator Asisten Lab. Diagnosa Klinik, serta sebagai anggota Asisten Lab. Anatomi Veteriner 1 & 2. Penulis juga merupakan penerima beasiswa Peningkatan Prestasi Akademik (PPA) dari pihak Kementerian Riset, Teknologi dan Pendidikan Tinggi.

Tugas akhir berupa skripsi dengan judul **“Pengaruh Pemberian Jus Jeruk Pomelo (*Citrus maxima*) terhadap Kualitas Spermatozoa pada Mencit (*Mus musculus*) Strain Balb/c Jantan yang Diinduksi Gentamisin”** dan Tugas Akhir strata profesi dokter hewan dengan judul **“Infeksi *Heterakis Gallinarum* pada Ayam Kampung (*Gallus domesticus*) di Pasar Tradisional Daya, Kota Makassar”**.

