

Identification and Prevalence of Endoparasite on Layer Chicken in Udanawu Sub-district Blitar

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Abstract

The aim of this research was to determine the prevalence and infection degrees of endoparasite on layer chicken in Sub-district Udanawu, Blitar. Ninety-six samples were taken from layer chicken in 3 different villages namely Bakung Village, Tunjung Village, and Slemanan Village. The examinations taken in this study are fecal examination using native, sediment, and floating methods and blood examination using blood smear method. Result showed that 81.25% samples are positive for helminthiasis infection consisting of *Ascaridia galli* (66.67%), *Heterakis gallinarum* (45.83%), *Raillietina* sp. (31.25%), and *Strongyloides avium* (7.29%). Blood examination result shown there is no positive sample that infect layer chicken in Sub-district Udanawu, Blitar. Chi-Square test result showed there are significant difference ($P<0.05$) of *Ascaridia galli and Heterakis gallinarum* in Bakung Village, Tunjung Village, and Slemanan Village in Sub-district Udanawu, meanwhile there are no significant difference ($P>0.05$) of *Raillietina* sp. and *Strongyloides avium*. Range of infection degrees of helminthiasis in Bakung village, Tunjung village, and Slemanan Village are 608.75 ± 588.53, 223.12 ± 359.21, 156.25 ± 332.39. There are significant difference ($P<0.05$) on helminthiasis infection degree of layer chicken in Udanawu District, Blitar.

Keywords: prevalence, infection degree, endoparasite, layer chicken, Blitar

Introduction

Prevalence of endoparasite in laying chicken's research in Udanawu District, Blitar Regency never been done before. According to a survey with farmers in Udanawu District, livestock conditions in Bakung Village, Tunjung Village, and Slemanan village has poor sanitation, which suitable for the parasitic infections in chickens (Junaidu *et al*., 2014). This study conducted to obtain information in the form of basic data regarding the prevalence and types of endoparasite on feces and blood of laying chicken in Blitar Regency. The role of veterinarians and breeders is very important to prevent parasitic infection in livestock through effective livestock management, nutrition, and treatment. By knowing the type of parasite that infects laying chicken, the right antiparasitic drug can be given so that treatment becomes more effective and lower the risk of the disease, and increasing the product of layer egg and be able to meet the needs of public.

Endoparasites that usually infect chickens are from the nematode group: *Ascaridia galli*, *Heterakis gallinarum*, *Capillaria* sp., and *Strongyloides avium*. In the cestodes group: *Davainea proglottina* and *Raillietina* sp. and in the group of protozoa: *Eimeria* sp., *Leucocytozoon* sp., and *Plasmodium* sp. (Mohammed *et al*. 2019).

Methods

This study is an observational study with a cross-sectional research design. Ninety-six productive laying chicken used in Bakung Village, Tunjung Village, and Slemanan Village in Udanawu District Blitar Regency. This research conducted from February to April 2022.

Fecal examination carried out by using the native method, sedimentation method, and floating method to determine the presence of worm eggs. Blood examination carried out by using the blood smear method to determine the presence of blood

protozoa. Founded worm eggs and blood protozoa then analyzed using the prevalence formula and Chi-Square test, and the Kruskal Wallis test followed by the Z test.

Results and Discussion

The results of the study conducted on 96 samples of laying chicken showed that there were 81.25% of the samples positively infected by worm eggs with the percentages shown in Table 1. The results of endoparasite examination in feces were in accordance with the study in Pakistan by Ullah *et al*. (2022). The results of this study are also in accordance with research in Ilorin, Nigeria by Ola-Fadunsin *et al*. (2019) that *Ascaridia galli* and *Heterakis gallinarum* were the highest prevalence found.

In this study, no digestive protozoa found that infect laying chicken. This is probably because there were no bloodstains in the stool specimens that taken in the study in West Lombok by Fitri *et al*. (2021). It could also be possible because the feeding in Bakung Village, Tunjung Village, and Slemanan Village already contained a coccidiostat so *Eimeria* sp. did not found in this study. Another possibility could also be from sampling not more than 7 days after infection with *Eimeria* sp. (Levine, 1995). *Eimeria* sp. can cause hemorrhagic diarrhea. In several studies, the symptoms of diarrhea in *Eimeria* sp. are usually followed by dehydration, hair standing, anemia, lethargy, weakness, bending of the head and neck and drowsiness (Tabbu 2006, Ekawasti and Martindah 2019).

Table 1. Results in Examination of Endoparasites in Laying Chicken Feces

Type of Parasite	Amount	Prevalence
Ascaridia galli	64	66,67%
Heterakis gallinarum	44	45,83%
Raillietina sp.	30	31,25%
Strongyloides avium	7	7,29%
Eimeria sp.	0	0,00%

The average degree of infection with worm eggs was highest in Bakung Village followed by Tunjung Village and Slemanan Village as shown in Table 2. There was a significant difference (P<0.05) between the prevalence of infection in *Ascaridia galli* and *Heterakis gallinarum* in Table 3 and Table 4 while in *Raillietina* sp. and *Strongyloides avium* there was no significant difference (P>0.05) as shown in Table 5.

Table 2. Average Degree of Worm Egg Infection that Infecting Layer Chickens in 3 Villages, Udanawu Sub-district, Blitar Regency

Location	Positive	Mean ± Std. Deviation
Bakung	31	$608,75^{a} \pm 588,53$
Tunjung	21	$223,12^{b} \pm 359,21$
Slemanan	26	$156,25^{b} \pm 332,39$

Different superscripts showed significant differences (P<0.05)

Table 3. Cases of *Ascaridia galli* in laying chicken in 3 villages in Udanawu sub-district, Blitar Regency

Location	Positive	Total Sample
Bakung	29^{a}	32
Tunjung	18^{b}	32
Slemanan	17^{b}	32

Different superscripts showed significant differences (P<0.05)

Table 4. Cases of *Heterakis gallinarum* in laying chicken in 3 villages in Udanawu District, Blitar Regency

Location	Positive	Total Sample
Bakung	21^{a}	32
Tunjung	15^{a}	32
Slemanan	8^{b}	32

The same superscript showed a significant difference (P<0.05)

Table 5. Case of positive *Raillietina* sp. and *Strongyloides avium* in laying chicken in 3 villages in Udanawu District, Blitar Regency

Location	*Raillietina* sp.	*Strongyloides avium*	Total Sample
Bakung	9^{a}	1^{a}	32
Tunjung	10^{a}	1^{a}	32
Slemanan	11^{a}	5^{a}	32

The same superscript showed no significant difference (P>0.05)

This made possible by the level of poor sanitation in Bakung and Tunjung villages. In Bakung Village, the condition of fecal waste under the battery cages of laying chicken looks mountainous and around the cage is flooded with rainwater. In Tunjung village there is dirt in the feed in the laying chicken cage. Likewise in Slemanan Village, the level of sanitation is better. Weather, temperature, and humidity factors that are in accordance with the life of worms as well as management or ways of maintenance and feeding that are not good can support the occurrence of worm infections (Pradana *et al*., 2015).

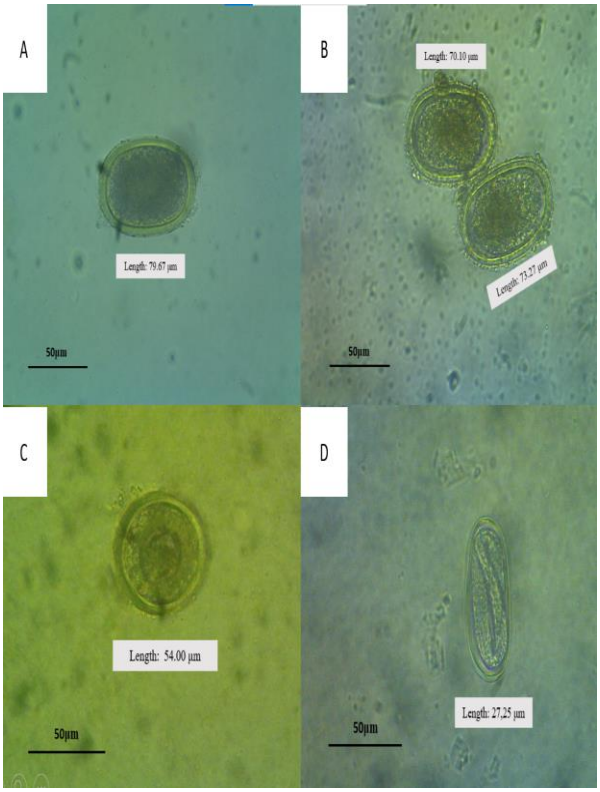

Figure 1. Endoparasites found in laying chicken in Udanawu District, Blitar Regency with 400x magnification. (A) *Ascaridia galli*, (B) *Heterakis gallinarum*, (C) *Raillietina* sp., (D) *Strongyloides avium*

There were 64 samples of laying chicken infected with *Ascaridia galli* (66.67%). This is in accordance with research conducted by Uhuo *et al*. (2013) that *Ascaridia galli* is the most common digestive tract parasite found. The eggs of the *Ascaridia galli* worm found have a morphology of oval shape, thick smooth walls, and the size of 79.67 x 48.71 µm as shown in Figure 1A. This characteristic is in accordance with the research conducted in Yogyakarta by Mubarokah *et al*. (2019), which is oval shape, smooth in shell, and measuring 75 x 30 µm. There are differences that are not too significant. This difference explained based on Mubarokah *et al*. (2019) who stated that the difference in egg size might be due to the difference in the number of worms used as the source of the measured egg collection.

In addition, this difference can also be possible by the influence of differences in temperature and humidity of the sampling area (Tarbiat, 2012). There are differences in temperature and humidity conditions in the Yogyakarta and the Blitar Regency areas. The minimum air temperature value in Yogyakarta City is 22.61ºC, the average temperature is 26.12ºC, the maximum air temperature is 31.60ºC, and the relative humidity value in Yogyakarta City is 82.14% (Kusuma, 2021). The average temperature value in Blitar Regency reaches 22-29ºC, the minimum temperature in the mountains reaches 18ºC (Mutaqin, 2019) and the relative humidity is 80% (Adiniyah, 2019)

There were 44 (45.83%) samples of laying chicken infected with *Heterakis gallinarum* and in this study *H. gallinarum* was the second most common worms found. This is in accordance with research conducted in Ghana by Anane *et al*. (2022) in the study *H. gallinarum* was also the second most common worm found. The eggs of the *H. gallinarum* worm found have an elliptical morphology with a slightly thick and smooth outer shell measuring about 70.10 x 44.97 µm as shown in Figure 1B. These characteristics are in accordance with the screening conducted by Marchiondo *et al*. (2019), which is elliptical in shape with a rather thick and smooth outer shell measuring 66-79 x 41-48 µm. The *H. gallinarum* infection in this study was mixed with *Ascaridia galli* as many as 24 (25%). These results are in accordance with the research conducted by Javaregowda *et al*. (2016) in Shimoga as many as 8 heads (15.1%).

There were 30 (31.25%) samples of laying chicken infected with *Raillietina* sp. This is in accordance with research conducted by Ben in Tunisia (2016), in that study Ben also found *Raillietina* sp. with prevalence (33.33%). Eggs of *Raillietina* sp. found by Ben has a rounded morphology and thick walls and measure about 54.00 x 37.59 µm as shown in Figure 1C. This characteristic is in accordance with research

conducted in the city of Surabaya by Afnan (2017) which is round with a diameter of 20-50 µm.

Raillietina sp. in this study, 9 tails were single (9.37%). These results are in accordance with the research conducted by Junaidu *et al.* (2014) that in this study also found a single infection in *Raillietina echinobothrida* in as many as 10 individuals. In this study, the infection of *Raillietina* sp. also mixed with *Ascaridia galli* and *Heterakis gallinarum* (Junaidu *et al.* 2014). This mixed infection also been reported in several studies (Luka and Ndams, 2007, Yoriyo *et al.*, 2008, Ohaeri and Okwum, 2013). In this study, most of the chickens had infections, which indicated that the sanitary conditions in the environment were poor and favorable for the spread of infection in these chickens (Junaidu *et al.* 2014).

There were 7 (7.29%) samples of laying chicken infected with *Strongyloides avium*. The eggs of the *Strongyloides avium* worm found have an oval shape and thin-walled morphology measuring about 27.25 x 65.11 µm as shown in Figure 1D. This characteristic is in accordance with the research conducted by Kusuma *et al.* (2021) which is a wide elliptical, thin-walled, colorless, chitinous shell with a smooth surface measuring 25-26 x 47-65 µm.

S. avium infection in this study was single in as many as 2 animals (2.08%). These results are in accordance with the research conducted by Kusuma *et al.* (2021) that in this study also found a single infection in *S. avium* as many as 2 tails (1.33%). In this study, *S. avium* infection was also mixed with *Ascaridia galli* and *Heterakis gallinarum* as many as 3 (3.12%). These results are in accordance with the research conducted by Ola-Fadunsin *et al.* (2019) that the study also found mixed infections in *Ascaridia galli*, *Heterakis gallinarum*, and *Strongyloides avium* as many as 2 (0.4%). The low prevalence in the study of Ola-Fadunsin *et al.* (2019) recorded may be related to the fact that the birds sampled in the study were intensively managed birds with better care in terms of biosecurity, hygiene, feeding, and disease prevention programs. Higher helminth infections reported in birds kept in open cages and litter cages.

The results of this study, based on morphology according to Taylor *et al.* (2016) and Arifiandani *et al.* (2019), no blood protozoan *Plasmodium* sp. and *Leucocytozoon* sp.

Plasmodiosis infection was not found, presumably due to the absence of *Culex* sp. as a spreader of diseases found in livestock areas. At the sampling location, the condition of the ditch and the waters of the rice fields dried up so that *Culex* sp., which caused the Plasmodiosis cannot be found in all types of waters including flowing rice fields (Floore 2002, Arifiandani *et al.* 2019). *Leucocytozoon* infection was not found, presumably due to the absence of the *Culicoides* sp., which in Indonesia is transmitted by *Culicoides arakwae* in the cage area. *Culicoides* usually found in the dry season and rainy season in chicken coops located in yards full of lush plants and in the back area of the cage there is a river (Arifiandani *et al.*, 2019) this is not in accordance with the situation in Bakung Village, Tunjung Village, and Slemanan Village.

Conclusion

Species of worm eggs that infect laying chicken in Udanawu District, Blitar Regency are *Ascaridia galli* (66.67%), *Heterakis gallinarum* (45.83%), *Raillietina* sp. (31.25%), and *Strongyloides avium* (7.29%). The average degree of infection in worms found in laying chicken in Udanawu District, Blitar Regency, from the highest in Bakung Village, Tunjung Village, and Slemanan Village.

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