PREVALENCE OF INTESTINAL PARASITES IN LAYING BIRDS FROM THREE SELECTED FARMS IN LAGELU LOCAL GOVERNMENT AREA, OYO STATE, NIGERIA

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ABSTRACT. This study investigates the prevalence of intestinal parasites of Isa-brown layer birds in three selected farms in Lagelu Local Government Area of Oyo State, Nigeria, between the months of May and July 2017. Faecal samples were aseptically collected from the cloaca of 150 randomly selected layer birds, consisting of 50 birds from each of farm A, B and C. Three (03) g faeces were collected from each bird for laboratory screening using flotation method and McMaster counting technique. In the end, the data were subjected to descriptive statistical analyses. The results revealed an overall prevalence rate of 25.33 % with farm-specific prevalence rates of 8.00 %, 10.00 %, and 7.30 % for farm A, B and C, respectively. The four species of parasites identified showed prevalence of 16.00 %, 1.30 %, 4.00 %, and 4.00 % for *Eimeria spp*, *Trichostrongylus spp, Heterakis gallinarum* and *Ascaridia galli* respectively. The egg/oocyst per gram (EPG) of parasites isolated were 5 x 10^2, 1 x 10^2, 1 x 10^2 and 3 x 10^2 for *Eimeria spp*, *Trichostrongylus spp, Heterakis gallinarum,* and *Ascaridia galli,* respectively. Age-related prevalence rates showed 6.67 %, 8.00 %, and 10.67 % for Point of Lay (POL), Laying Pullets (LP), and Spent Layers (SL), respectively. In farm A, POL, LP, and SL had prevalence rates of 1.33 %, 2.67 % and 4.00 % while farm B had 2.67 %, 2.67 %, and 4.67 %, and farm C recorded 2.67 %, 2.67 %, and 2.00 % for POL, LP, and SL respectively. The outcome of this study has shown that more attention is needed in controlling parasitic infections in the study area to maximize the laying potentials of the birds. Therefore, a quarterly administration of broad spectrum anthelminthic and anticoccidia is recommended to reduce the prevalence of intestinal parasite infestation in chickens.

Keywords: prevalence, laying birds, intestinal parasites, Lagelu

INTRODUCTION

In recent times there has been a surge in poultry production with around 75 % of a total of 15 billion chickens found in the developing countries (FAO, 2004; Ferdushy *et al*., 2016). In Nigeria, poultry is an essential component of the livestock subsector with a total population of over 200 million (NBS, 2016). It is a source of animal protein especially in developing countries, contributes to the economy of the nation (Nnadi & George, 2010; Dube *et al*., 2010; Adang *et al*., 2014; Ferdushy *et al*., 2016), and is utilized for sociocultural activities (Permin, 2020) with little or no religious, ethnic, or social prohibitions (Mafu & Masika 2003). Intensive raising of poultry in commercial farms inevitably exposes flock to various types of diseases which results to mortality and monetary loss to the farmers (Olafadunsin, 2017). The diets of chickens contain grains, leaves, seeds, larvae, and adult stages of various arthropods, snails, and earthworms (Jordan & Pattison, 1996). A considerable number of the food items mentioned above have been implicated as intermediate hosts of intestinal parasites (Soulsby, 2006). Sheikh *et al. (*2016) described the effects of intestinal parasites on bird as follows: marked reduction in feed intake, gastroenteritis, stunted growth, reduced weight

gain, lowered meat, poor feathers, increased production cost associated with increased need for medication and feed, and reduced breeding efficiency.

There has been various research works in the country on the prevalence of gastrointestinal helminths in birds reared under different systems within Nigeria (Attah *et al.,* 2013; Ohaeri & Okwum, 2013; Ngongeh *et al.*, 2014; Junaidu *et al.,* 2014; Opara *et al.*, 2014; Imam *et al.*, 2017; Wokem & Obinyor, 2018; Afia *et al.,* 2019; Ola-Fadunsin *et al.*, 2019; Gimba *et al.,* 2019; Usman & Abubakar, 2019; Fadimu *et al.*, 2020; Elele *et al.*, 2021) and globally (Alam *et al.*, 2014; Abdel aziz, 2016; Asumang *et al.,* 2019; Berhe *et al.,* 2019; Denizhan & Karakus, 2019; Van *et al.*, 2020; Win *et al.,* 2020; García Cuadrado *et al.*, 2021), however, little is known of the prevalence of intestinal parasites on intensively raised birds in the study area, thus, the need for this study.

MATERIALS AND METHODS

Study Area

The study area is three farms located in Lagelu Local Government area (L.G.A.) of Oyo state. The headquarters of Lagelu is situated at Iyana Offa, Oyo State. Nigeria. It has an area of 338 km^2 and a population of 147,957 at the 2006 census (NPC, 2006). The population of poultry in Nigeria is about 180 million with about 57 % of that in southern Nigeria where Lagelu belongs. The main occupation of the people in this local government area is farming.

Method

A total of 150 faecal samples were aseptically collected from the cloaca of 50 birds per farm, which were randomly selected. The samples were stored in thermoregulatory boxes with ice packs prior to transportation to the laboratory for investigation. Samples were thoroughly mixed and 3 g faeces each were used for flotation method and McMaster counting technique. The simple flotation method was conducted based on the protocol of Eckert (1992). Meanwhile, the McMaster counting technique was applied as described by Permin and Hansen (1998) with 3 g faeces and 42 ml saturated NaCl solution as floatation fluid. Egg counting was performed after 10 mins of rest. This quantitative method has a detection limit of 50 eggs per gram (EPG) faeces (Permin & Hansen, 1998). The collected samples were worked on immediately but those that were not analysed on the same day were preserved in 10 % formalin until they were used. Age and egg counts were also recorded, and the results were analyzed with descriptive statistics. The parasites observed were morphologically identified using Soulsby (2006) and Taylor *et al.* (2007).

RESULTS

Out of 150 birds sampled from the three farms, 38 birds, which represented 25.33 % were found infected with various intestinal parasites with a farm prevalence of 12 (8.00 %), 15 (10.01 %) and 11 (7.33 %) from farm A, B and C, respectively.

Table 1. The number and percentages of intestinal parasites detected in three selected chicken farms.

Farm	Intestinal Parasites			
	Eimeria spp.	***Trichostrongylus spp.***	***Heterakis gallinarum***	***Ascardia galli***
A	9 (6.00 %)	1 (0.67 %)	2 (1.33 %)	0 (0.00 %)
B	9 (6.00 %)	1 (0.67 %)	1 (0.67 %)	4 (2.67 %)
C	6 (4.00 %)	0 (0.00 %)	3 (2.00 %)	2 (1.33 %)
Total	24 (16.00 %)	2 (1.33 %)	6 (4.00 %)	6 (4.00 %)

Table 1 shows the genera prevalence of intestinal parasites in the study area. Four genera of parasites were isolated in the study area including *Eimeria spp*., *Trichostrongylus spp*., *Heterakis gallinarium* and *Ascardia galli*. A total of 24 chickens were infested with *Eimeria spp*., with a prevalence rate of 16.00 %, followed by chickens with *Trichostrongylus spp with 2 (1.33 %), Heterakis gallinarium with 6 (4.00 %)* and *Ascardia galli with 6 (4.00 %)* prevalence rates, respectively.

Table 2. The number and percentages of parasites detected in three selected chicken farms according to age.

Farms	Total number of POL 18-20 wk	Positive Intestinal Parasites (%)	Total number of LP 30-40 wk	Positive intestinal parasites +ve (%)	Total number of SP examined ≥ 70 wks	Positive intestinal parasites +ve (%)	Total number of chickens examined	Total number of positive intestinal parasites +ve (%)
A	16	2 (1.33)	16	4 (2.67)	18	6 (4.00)	50	12 (8.00)
B	17	4 (2.67)	16	4 (2.67)	17	7 (4.67)	50	15 (10.00)
C	17	4 (2.67)	16	4 (2.67)	17	3 (2.00)	50	11 (7.33)
Total	50	10 (6.67)	48	12 (8.00)	52	16 (10.67)	150	38 (25.33)

Legend: Point of lay (POL), Laying pullets (LP), Spent Layers (SP).

Table 2 shows the age distribution of intestinal parasites in the study area. Out of the 150 chickens, 50 hens were at point of lay (POL, 18-20 weeks), 48 hens were laying pullets (L.P, 30-40 weeks) and 52 hens were spent layers (S.P., ≥ 70 weeks), and each had prevalence rates of 6.67 % (10 chickens), 8.00 % (12 chickens) and 10.67 % (16 chickens), respectively. Farm A, B and C had prevalence rates of 8.00 % (12 chickens), 10.00 % (15 chickens), and 7.33 % (11 chickens), respectively.

Table 3. Load of intestinal parasites in the study area.

Parasites isolated	Average egg or oocysts per/gram (EPG)
Eimeria spp.	5×10^2
Trichostrongylus spp.	1×10^2
Heterakis gallinarum	1×10^2
Ascardia galli	3×10^2

Table 3 shows the loads of intestinal parasites found in the study area. The results show average egg/oocyst per gram (EPG) of feaces for *Eimeria spp*. as $5x10^2$ followed by *Ascardia galli* with $3x10^2$, *Heterakis gallinarum* and *Trichostrongylus spp*. being the lowest with $1x10^2$ each.

DISCUSSION

The poultry industry worldwide has suffered greatly from gastrointestinal helminths (Augere-Granier, 2019). Globally, there has been an increase in prevalence of helminths in chickens as reported by Shifaw *et al.* (2021). There has been reports of gastrointestinal helminthiasis in poultry in Nigeria (Ogbaje *et al.,* 2012; Adang *et al.,* 2014; Afolabi *et al.,* 2016; Taiwo *et al.,* 2016; Imam *et al.,* 2017; Ola-fadunsin *et al.,* 2019; Elele *et al.,* 2021) and across the world (Abdel Aziz., 2016; Ferdushy *et al*., 2016; Wuthijaree *et al.,* 2019).

Overall Prevalence of Intestinal Parasites in Selected Farms in the Study Area

The overall prevalence of 25.33 % in the present study is similar to the report of Afolabi *et al*. (2016) and Opara *et al.* (2014) who had prevalence rates of 20.5 % and 28.9 % respectively. This similarity could be attributed to the farming system employed and good management system. However, the prevalence was low compared to that of other authors Abdel Aziz (2016), and Wokem and Obinyor (2018) who reported prevalences of 84.4 %, 65.0 %, 68.7 %, 60.5 %, and 88.6 %, respectively. The high prevalence in these studies could be related to the fact that most of them were conducted on free range birds and for those with intensively managed birds there was poor litter management which encouraged a favourable environment for parasite multiplication. The prevalence from the present study could be said to be high compared to reports from Ola-Fadunsin *et al.* (2019) who had an overall prevalence of 16.7 %. Ola-Fadunsin *et al.* (2019) had their work carried out on intensively managed farms just like the case with this work. Even though Ola-Fadunsin *et al.* (2019) had a lower prevalence, their study reported more number of parasites than this study.

Prevalence of Intestinal Parasites based on Species and Load

The prevalence of the parasites based on species and load is similar to the report by Gimba *et al.* (2019) and Das *et al.* (2022) who reported *Eimeria* with the highest specie prevalence and load. However, other reports by Wokem and Obinyor (2018) and Win *et al.* (2020) showed that helminths had a higher prevalence by species and this could be as a result of lowered immunity and type of housing system used in keeping the animals.

Prevalence of Intestinal Parasites based on Age

The prevalence of gastro intestinal parasites was generally higher in spent layers (10.7 %).

This could possibly be due to the fact that less attention is given to them because of the possible nearest culling-off. The prevalence in point of lay was generally lower possibly as a result of the increased level of attention received since they were still very much in their reproductive stages. This implies that a higher prevalence in adults might be related to cohort effect in accordance with the findings of Radfar *et al.* (2012). However, parasite prevalence in nestlings was also high in most of the studied populations which suggests that infections generally occurred at early ages.

CONCLUSION

This study has shown that chicken (layers) is infected with various species of intestinal parasites that could have negative influence on their growth, productivity, and other performances. It can be concluded that *Eimeria spp* was the most prevalent, followed by the duo of *Heterakis gallinarum,* and *Ascardia galli* while the least was *Trichostrongylus spp*. The point-of-lay was the least infested while the spent layer was the most infested groups. With respect to EPG (eggs/gram of faeces), *Eimeria spp.* was the highest and closely followed by *Ascardia galli* whereas the rest were the least. Based on the results of this study, it is recommended that chickens should be dewormed with broad spectrum anthelminthics every three months to keep to bay the high prevalence of intestinal parasites. Also, the use of anticoccidia should be encouraged as a way to keep the birds healthy.

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