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PREVELENCE OF HELMINTHS AND COCCIDIA IN LOCAL AND BROILER CHICKENS SLAUGHTERED IN JALINGO MARKET

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ABSTRACT

A study was carried-out to investigate the prevalence of helminths and coccidia in150 localand exotic broiler chickens slaughtered in Jalingo live bird market using floatation method of fecal sample examination. Both descriptive statistics (frequencies and percentage) and inferential statistics (Chi-square test) were used to analyze the data obtained. A total of 93 representing 62.00% of the birds were infected with helminthes and 88 representing 58.67% of the birds were infected with coccidia. Eight helminth parasites were encountered namely *Raillietinatetragona* 6(4.51%), *Raillietinaechinobothrida*6 (4.51%), Raillietinacesticillus21 (15.79%), Ascaridiagalli45 (33.83%) *Davaineaproglottina*3 (2.26%), Capillaria species 6(4.51%), *Choanotaenia* infundibulum 21(15.79%) and *Heterakisgallinantum*25 (18.80%), with no single trematode parasite recorded. Ascaridiagalliwas found to be the most abundant Nematode while *Choanotaeniainfitndibulum*and *Raillietinacesticilhts*were the most abundant cestodes found. Three Eimeria species were found infecting the sampled chickens, which include *Eimeriatenella*56 (63.64%), *Eimerianecatrix*25 (28.41%) and *Eimeriaacervulina*7 (7.95%), *Eimeriatanella*was the most occurring species discovered. Fifty-nine (63.44%) of the birds had single infection, 29 (31.18%) had double infections, 4 (4.30%) had triple infections and 1(1.08%) harbored four helminth parasites. No significant ($p>0.05$) difference in the infection rates of helminths and cocccidia between sexes and growth stage, but a significant ($p<0.05$) difference exists between breed in both helminths and coccidia infections. The study, suggests that helminths and coccidia are serious problems of poultry production in Jalingo, and appropriate control measures should be adopted to control these economically important parasites.

Keywords: Broiler, local chickens, helminths

INTRODUCTION

Poultry are kept in backyard or commercial production in most areas of the world, compared to a number of other livestock species because fewer social and religious taboos are related to the production, marketing and consumption of their products (FAO, 1998). The Nigerian poultry industry was estimated at N80 billion ($600 million) and is comprise of approximately 650,000 MT of eggs and 290,000 MT of poultry meat in 2013. From a marked size perspective, Nigeria's egg production is the largest in Africa (SAHEL, 2015). Helminth and coccidia parasites continue to feature in the free-range local chicken industry at higher prevalence. This has a great impact on the chicken productivity with substantial impact on rural poor farmers' livelihoods (Komba*et al.*, 2013).

Parasitic diseases are among the major constraints of poultry production, the common internal parasitic infections occurring in poultry include gastrointestinal

helminths (Cestodes, Nematodes) and Coccidia *(Eimeria species).* Nematodes are the most common and most important helminth species and more than 50 species have been described in poultry; the majority of which cause pathological damage to the host (Abebe*et al.,* 2016). In the whole world, helminthinfections occur with high prevalence in rural backyard chicken (Mustafa *et al.,* 2009). It is generally reported that cestode infections of poultry are common in free-range poultry and are rare in confined poultry (FAO, 1998). Junaidu*et al.* (2014) stated that, cestodes are also common in broiler and layer chicken kept in deep litter. *Ascaridiagalli*is the most prevalent gastrointestinal parasite affecting chicken (Jegede*et al.,* 2015; Junaidu*et al.,* 2014). Poor de-worming regime, health care, and improper sanitation are among the major factors responsible for the high prevalence of gastrointestinal parasitism in chicken production (Komba*et al.,* 2013).

The domestic fowls are raised traditionally under free-range management system in villages with little or no supplementary feeding and without any veterinary care, thereby exposing them to parasitic infections (Dereck and Barber, 2013). The cost of disease treatment and losses due to infections tends to increase production cost and hence reduced profit earned by Poultry farmers (Akintunde*et al.,* 2015). In the light of this, the present study was aimed at investigating the occurrence of Helminths and Coccidia in local and broiler chickens slaughtered in Jalingo market.

MATERIALS AND METHODS

Study Area

The study was carried out in Jalingo Local Government Area of Taraba State, which is situated between Longitude 8^0 89N and Latitude 11º. 36'E within a land mass of 195.007 $km^{2.}$. Its climatic condition tallies the two (dry and wet) seasons commonly experienced in the tropical region. The wet season covers up to seven months starting from April to October with average annual rainfall range of 1058mm – 1300mm while the dry season covers about five months starting from November to March. Predominantly, farming and livestock rearing are the major occupation of the people within the study area (Taraba State Dairy, 2021).

Sample Size and Samples Collection

A total of one hundred and fifty (150) gastrointestinal tracks of slaughtered chickens constituted the sample size for the study. The gastrointestinal tracts were carefully removed, placed into a polythene bag labeled accordingly and taken to the Parasitology laboratory, College of Agriculture, Jalingo on ice block for analysis. The samples were collected within two months (May - June)in six (6) different visits to the poultry market during the period. On each sampling day, twenty-five (25) samples were collected based on sex, stage of growthand breed.

Preparation of Sheather's Solution

Sheather's solution is a solution containing common salt and edible sugar, which is used for flotation method of the analysis of fecal samples. Sheather's solution has the specific gravity of 1.27, which gives it the ability to float many common ova or cysts of helminthes and protozoans (Jorgensen labs. 2017). Sheather's solution was prepared as follows: An electronic weighing scale was set, using a foil paper placed on the weighing scale, 500g of edible sugar was weighed and put into a 4-litre container then 400g of common salt was also weighed and added to the sugar in the container. Distilled water (1000ml) was then added to the mixture in the container and then stirred thoroughly until it was totally dissolved and the sheather's solution was then ready for use.

Laboratory Procedure

All utensilswere sterilized and each sample collected was rinsed in clean water before carrying out the main procedure in order to avoid contaminations. The entire length of the intestine was incised and about three grams of faeces was emptied into a mortar then 20ml of sheather's solution was added to it and mixed thoroughly using pistel. The solution was then filtered into a meniscus beaker using a coffee sieve and then filled into a test tube until a meniscus is formed. The meniscus was covered with a cover slip and was allowed to stand for 10 minutes so that the helminth's ova or cysts of protozoans present in the solution was floated and become attached to the underside of the cover slip. Thereafter, it was allowed to stand for 10 minutes, and then the cover slip was removed and placed on a slide and viewed under the microscope using 10x and then 40x dry objective lens for identification of characteristic ova and oocysts using identification keys.

Statistical Analysis

All data collected were analyzed using descriptive statistics (frequencies and percentage) and Chi-square (x^2) test in SPSS version 20. The statistical level of significance was set at ($p<0.05$).

Results and Discussion

Results

Hehninths

A total of one hundred and fifty samples were examined, out of which 93(62%) were found infected with Helminths ova (Table 1). From the samples examined, 59(63.44%), 29(31.18%), 4(4.30%) and 1(1.08%) had single, double, triple and quadruple infections respectively (Table 1). Nematodes had the highest occurrence rate of infections with 76(57.14%) and cestodeshad 57(42.86%). Among the helminths ova found in the samples, *Ascaridiagalli* had the highest frequency of 45(33.83%), followed by *Heterakisgallinarum* with 25(18.80%). On the lower side, *Capillaria species and Rallietinacesticillus* had 6(4.51) each as their occurrence rate, while *Davaineapraglottina*had the lowest occurrence rate with 3(2.26%) (Table1). There was no significant difference ($p > 0.05$) in the occurrence of helminths on the basis of sex; of which male has the infection of 46(49.50%) while female had 47(50.50%) as indicated in Table (2). On the basis of growth stage, 45(48.40%) infections were detected in young chickens while 48(51.60%) were detected in the adults, which showed no significant ($p > 0.05$) difference in their infection rates (Table 2). The occurrence of helminths based on breed recorded 58(62.40%) infections for the local breed while (37.60%) for the broilers which was found statistically significant ($p<0.05$) in their occurrence as indicated in Table (2).

Table 1: Overall Occurrence of Helminths In The Samples

Infection status	Frequency	Percentage (%)
Infected	57	38
Non-infected	93	62
Total	150	100
No. of infections		
Single	59	63.44
Double	29	31.18
Triple	4	4.30
Quadruple	1	1.08
Total	93	100
Species		
Cestode		
1. Rallietinacesticillus	21	15.79
2. Davaineaproglottina	3	2.26
3. Rallietinaechinobothrida	6	4.51
4. Rallietinatetragona	6	4.51
5. *Choanotaenia infundibulum*	21	15.79
Total	57	42.86
Nematode	25	18.80
1. Heteakisgallinarum	6	4.51
2. Capillaria species	45	33.83
3. Ascaridagalli		
Total	76	57.14
Grand Total	133	100

Table 2: Occurrence of Helminths Based on Sex, Growth Stage and Breed

Parameter	Infected	Percentage	Chi-square Value	p-value
Sex				
Male	46	49.5	0.028	0.866
Female	47	50.5		
Total	93	100		
Growth Stage				
Young	45	48.4	0.255	0.614
Adult	48	51.6		
Total	93	100		
Breed				
Local	58	62.4	14.970	0.000
Exotic	35	37.6		
Total	93	100		

Coccidia

Out of one hundred and fifty samples analyzed, 88 (58.67%) were found infected with coccidiaoocyst while 62 (41.33%) were free form the parasite (Table 3). The species of coccidiafound were *Eimerianecatrix*, *Eimeriaacervulina* and *Eimeriatenella* with the occurrence rates of 25(28.41%), 7(7.95%) and 56(63.64%), respectively (Table 3). Some of the species occurs double and others were found in the samples conjointly with helminth species. The occurrence of coccidia based on sex recorded 46(52.30%) for males and 42(47.70%) recorded for females, which showed no significant difference ($p > 0.05$) as indicated in Table 4. Based on growth stage, young chickens recorded the infections rate of 45(51.10%) while adults recorded 43(48.90%) which also showed no significant ($p>0.05$) difference in their occurrence (Table 4). Based on breed, local chickens had the infection rate of 36 (40.90%) while exotic broilers had 52(59.10%), which showed a significant ($p<0.05$) difference in their occurrence (Table 4).

Table 3: Overall occurrence of *Coccidia* in the Samples

Infection status	Frequency	Percentage
Infected	88	58.67
Non-infected	62	41.33
Total	150	100
Species		
1. Eimerianecatrix	25	28.41
2. Eimeriatenella	56	63.64
3. Eimeriaacervulina	7	7.95
Total	88	100

Table 4: Occurrence of *Coccidia*Based on Sex, Growth Stage and Breed

Parameter	Infected	Percentage	Chi-square Value	p-value
Sex				
Male	46	52.30	0.044	0.507
Female	42	47.70		
Total	88	100		
Growth Stage				
Young	45	51.10	0.110	0.740
Adult	43	48.90		
Total	88	100		
Breed				
Local	36	40.90	7.038	0.008
Exotic	52	59.10		
Total	88	100		

DISCUSSION

The study revealed that overall occurrence of helminths was 93(62%) which is higher than (14.6%) previously reported by Jegede*et al.* (2015) but lower than (96%) reported by Idika*et al*. (2016). Lower occurrence could be due to the combined study of local chickens reared under free-range management system and exotic reared under intensive system of management. Fakaeand Nwalusi (2001) suggested that, local chicken managed under free range conditions were heavily parasitized especially during rainy season. The high rate of infections in local chickens is due to abundance and the free access of the birds to invertebrates that transmit the parasites. The present study reveals that, occurrence of helminths and coccidia varied with breeding system, out of 75 samples obtained from local chickens, 58(77.33%) were infected with helminths, which is lower than the 81% and 96% reported in the previous studies by Junaidu*etal*,(2014) and Idika*et al*. (2016) in Kaduna State and Enugu State, respectively.

This study also reveals that, out of 75 samples examined from exotic broilers, 35(46.67%) were infected with helminthes, however, Mustafer -not listed*et al.* (2009) in their study reported that no helminth was found in broiler chicken. Studies reported that helminths are less prevalent in exotic breeds due to their system of management because they are mostly raised under intensive systems of management and do not have much access to the intermediate hosts of helminths such as insects and earth worms (Idika*et al*., 2016). Out of theeight species of helminths detected in the present study, *Ascaridiagalli* is the most prevalent, followed by *Heterakisgallinarunt* which was similar to what was reported by Jegede*et al.* (2015) in Gwagwalada, Nigeria and Uhuo*et al.* (2013 not listed) in Abakaliki, Nigeria. *Ascaridiagalli* is a large roundworm that affects young birds more severely. Mild infections may go unnoticed but large number of worms may interfere with feed absorption thereby leading to poor growth of the chicken. Ashenafi and Eshetu (2004) in central Ethiopia, Ngongeh, (2014) in Nsukka Nigeria, and Abebe*et al.* (2016) in Ethiopia also reported that, *Ascaridiagalli* is the most prevalent helminths affecting chickens. The occurrence rate of *Ascaridiagalli* (33.83%) in the present study is comparable with 32.3% reported by Heyradin*et al.* (2012) in Pakistan and 36.1% reported by Jegede*et al.* (2015) in Gwagwalada, Nigeria, On the contrary, Fakae and Paul-Abiade (2004) reported a very low prevalence of 1.25% in local chickens slaughtered at Nsukka in Nigeria. In addition, the prevalence of cestode *(Raillietinatetragona)* in their study was 92.5% being much higher than the 4.51% obtained in this study.

It is generally reported that cestode infections of poultry are common only in free range poultry and rare in confined poultry (FAO, 1998). The findings in this

study has illustrated that cestode infections are also common in broiler chickens kept in deep litter system, given that the intermediate hosts of cestodes namely earthworms, beetles, flies, ants or grasshoppers are nearly found everywhere and can easily inhabit pens in confined poultry especially with some moisture in case of earthworms. Being the second prevalent parasite in this study, *Heterakisgallinarrint* has a major effect on the health of chicken by sharing feed, thereby resulting in stunted growth and low productivity that may be related to the damage of intestinal mucosae (Permin*et al.*, 2002). Sometimes the parasite causes major irritation and inflammation to the mucosae of the chicken, thus interfering with the absorption of food. It also affects the caecum by causing marked inflammation and thickening of the mucosa with petechial hemorrhages (Permin*et al.*, 2002). In addition to that, *Heterakisgallinarium*may produce nodular diarrhea, emaciation and death (Soulsby, 1982). This study also revealed that, there was no significant difference in helminths' infections between the male and female chicken. This implies that the infection is not significant between male and female fowls, which agrees with the findings of Heyradin*et al.* (2012) in Pakistan, Jegede*et al.* (2015) in Gwagwalada Nigeria, and Uhuo*et al.* (2013 not listed) Abakaliki Nigeria. Similar to the present study, Mustafa *et al.* (2009) in Turkey indicated that there was a significant difference in the infection of helminths based on breeds but it is contrary to the findings of Jegede*et al.*,(2015) in Gwagwalada Nigeria, which indicated that age difference is a factor in terms of helminths infections.

Coccidia in commercial broilers showed higher occurrence than local breed with 52(69.33%) out of 75 samples examined.The overall occurrence of coccidia (58.60%) in this study is not comparable to 31.80% reported by Lawalet al. (2016) in Maiduguri, Nigeria and Khaled et al. (2016) in Tunisia, 28.00% by Eke et al. (2016) and 33.33% by Jatauetal. (2017). Similar to the present study, Lawalet al. (2016) in Maiduguri found that a significant difference exist between breeds and not between sexes. Jatauetal. (2017) in Zaria and Khaled et al. (2016) in Tunisia also reported that occurrence of coccidia between breeds is statistically significant. On the contrary, Khaled etal. (2016) and Lawaletal.(2016) reported that age is a factor in coccidia infections. The highest occurring Eimeria specie is Eimeriatenella (63.64%) which is comparable with the findings of Khaled et al. (2016) in Tunisia. As indicated,out of 75 samples examined from local chicken, (48.00%) were infected with coecidiawhich is greatly higher than 11.10% reported by Kornbaet al. (2013)-not listed in Tanzania and 14.6% reported by Jegedeet al. (2015) in Gwagwalada, Nigeria. The findings revealed that season could influence helminthes and coccidia infection due to rainfall thatfavours growth of the micro-organisms Conclusion

Based on the findings in this study, a significant difference exists in the occurrence of both helminths and coccidia in local and broiler chickens but notbetween the sexes and also the growth stage (young and adult) in the study area. The higher rate of helminth infections in local chickens could be attributed to the birds ranged freely and being exposed to the intermediate hosts of Helminths such as earthworms, beetles, flies, ants or grasshoppers. Also the higher rate of coccidia infections in broilers was because the birds were raised in a confinement where they have direct contact with their feces. The most frequent Nematode and Cestode species were *Ascaridiagalli*, *Heterakisgallinarum*, *Choanotaeniainfundibulum and Raillietinacesticillus*. *Eimeriatenella* and *Eimerianecatrix*w ere the coccidiaoocysts frequently detected in the study area.

Recommendations

Based on the revelations, it is recommended that intermediate hosts of helminths and coccidia should be properly controlled using appropriate procedures. Regular strategic deworming of the birds should be done to control these economically important parasites,proper sanitations should be done in order to reduce contact with the faeces of infected birds.Prevention and control measures with better management system should be enhanced, and public awareness scheme be introduced in the study area

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