Prevalence of Avian Coccidiosis and Identification of Eimeria spp in Local Broilers and Chickens in Lafia Modern Market, Nassarawa State, Nigeria

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Abstract: Coccidiosis is an important enteric parasitic protozoan disease of poultry. The disease is usually associated with high economic losses to poultry farmers worldwide. This study was conducted to determine the prevalence of coccidiosis, identify the species of circulating Eimeria species, determine the prevalence of Eimeria in respect to breed and gender and determine the deviation of infected birds from normal range of birds slaughtered in Lafia modern market, Nassarawa State, Nigeria. Out of the 204 examined chickens, 36.3% (74/204) of them harbored different Eimeria species. A total of 32.6% (44/74) male and 43.5% (30/74) female were infected. Statistically, no significant difference \( p>0.05 \) (\( \chi^2=1.324, p=0.25 \)) was noted between the male and female. Among the local breed, 40.2% (49/74) was infected and for the broilers, 30.5% (25/74) was positive for coccidial infection. Again, there was no statistically significant difference \( p>0.05 \) (\( \chi^2=1.324, p=0.25 \)) between the male and broiler breeds. In the attempt made to identify the prevalent species of coccidian in the study area, five Eimerian species were identified, namely; Eimeria acervulina, Eimeria brunet, Eimeria mitis, Eimeria necatrix and Eimeria tenella with the prevalence of 14.22%, 5.88%, 1.07%, 1.47%, 6.86%, and 7.84% respectively. Results obtained from this study shows that coccidiosis is an important disease of chickens in the study area and further strategy needs to be implemented to reduce the infection rate of coccidiosis.

Keywords: Coccidiosis, Protozoan, Prevalence, Eimeria species, Enteric.

1.0 INTRODUCTION

Poultry have been on the earth for over 150 million years (Atteh, 2013). It dates back to the existence of the original wild jungle fowl. In contemporary times, other avian species like ducks, geese, turkeys, pheasants, pigeons, peafowl, guinea fowl and domestic chickens. Poultry provides humans with food and fiber in the form of eggs, meat and feathers. Large commercial chicken industries provide the requirement for eggs and meat (Conan et al., 2012). Due to the high population growth in Africa (WHO, 2010) and growing income, the demand for eggs and poultry meat have significantly increased in recent years across the continent. According to estimates by the USAID (United States Agency for International Development), this trend is very likely to continue over the years. Therefore, the consumption of poultry and eggs will increase by 200% between 2010 and 2020 in some countries in sub-Saharan Africa (Gerber et al., 2015).

One African country where this trend can clearly be seen is Nigeria. Nigeria is the largest country in Africa, with a total geographical area of 923,768 square kilometers (Asuming-Brempong et al., 2013). Its estimated population was 174.5 million people in 2013, and its population growth rate is 3% per annum (USDA, 2013). The Nigerian poultry industry in particular has been rapidly expanding in recent years and is therefore one of the most commercialized (capitalized) subsectors of Nigerian agriculture (Adewale and Ajibola, 2013).

In Lafia, Nassarawa State, as in most Urban and rural areas in Nigeria other developing nations,
chickens are the most important class of the poultry species in terms of number and rate of investment in poultry production. The exotic breeds are usually managed intensively either in battery cages or deep litter system of management, while the village chickens are reared extensively; where they are allowed to scavenge food for survival (Olumayowa and Abiodun, 2011). The Nigerian poultry farming has faced many challenges from inception, adversities from natural hazards such as unfavorable weather condition, to human deficiencies like shortage of fund and poor health attention. Diseases such as avian flu have equally threatened the existence of poultry farms in Nigeria. One of the most frightening of such diseases threatening the existence of poultry birds in Nigeria is poultry coccidiosis (Jatau, et al. 2012).

Coccidiosis causes considerable economic loss in the poultry industry. Chickens are susceptible to at least 11 species of coccidia. The most common species are *Eimeria tenella*, which causes the cecal or bloody type of coccidiosis, *E. necatrix*, which causes bloody intestinal coccidiosis, and *E. acervulina* and *E. maxima*, which cause chronic intestinal coccidiosis. The disease occurs only after ingestion of sporulated oocysts in susceptible hosts. Coccidiosis occurs in the epithelial cells of the intestine, despite the advances in nutrition, chemotherapy, management, and genetics (Hamidinejat et al., 2010). Bloody lesions, high morbidity and mortality are usually associated with *E. tenella* and *E. necatrix* which are the most pathogenic of all *Eimeria* species (Gari et al., 2008; Gýörke et al., 2013).

Coccidiosis in poultry is characterized by dysentery, enteritis, emaciation, drooping wings, and poor growth. Feed and water consumptions are usually reduced in infected birds. Weight loss, development of culls, decreased egg production, and increased morbidity and mortality often accompany outbreaks. Historically, poultry diseases remain one of the major threats to boosting poultry production in Nigeria (Akitunde et al., 2015; Etuk et al., 2004). One of the common internal parasitic infections occurring in poultry is coccidiosis caused by *Eimeria* species that causes considerable damage and great economic losses to the poultry industry due to malnutrition, decreased feed conversion ratio, weight loss, lowered egg production and death in young birds (Puttalakshmanma et al., 2008).

Avian coccidiosis is an enteric parasitic disease causing production losses, high morbidity (due to acute, bloody enteritis) and mortality rates (Abbas et al., 2012). A parasitic infestation brings about lack of thriftiness, poor growth and feed conversion, decreased egg production, and, in severe cases, death. There is need for more knowledge and availability of information which is essential in understanding the epidemiology of the disease as well as developing appropriate control measures. The aim of this research is to determine the prevalence of coccidiosis and identification of *Eimeria* spp in slaughtered birds in Lafia market, Nassarawa State, Nigeria.

### 2.0 MATERIALS AND METHODS

#### 2.1 Study Area

Lafia modern market is located within Lafia, Nasarawa state. Lafia is a town in central Nigeria (Latitude 8°35'N and Longitude 8°40'E) (Figure 3.1). It is the capital city and the largest town in Nasarawa State with a population of 330,712 inhabitants according to the 2006 census results. The State has 13 Local Government Areas namely; Awe, Nasarawa, Nasarawa Eggon, Obi, Toto, Wamba, Akwanga, Domasak, Karu, Keana, Keffi, Kokona and Lafia. Local Government Areas bothering Lafia include, Nasarawa Eggon, Obi, Akwanga and Domasak. Nasarawa State has a total land area of 27,137.8sqkm. It shares boundary in the North with Kaduna State, in the west with Federal Capital Territory Abuja, in the east with Plateau and Taraba States and in the south by Benue and Kogi State. The main economic activities of the State are agriculture; food such as yam, cassava and melon. Production of minerals such as salt is also another major economic activity in the state. Livestock keeping especially cattle is also practiced in the State, with large number of cattle herds’ resident and grazing within and around Lafia and other Local Government Areas. Also, the Fulani’s in the state engage in rearing local chickens and for commercial purposes as well as private individuals keeping large poultry.

The State has a climate typical of the tropical zone because of its location and is quite pleasant. It has a maximum and minimum temperature of 81.7°F and 16.7°F respectively. Rainfall varies from 131.73cm in some places to 145cm in others. The months of December, January and February are cold due to harmattan wind blowing across the State from the North-East. It is characterized by two distinct seasons: dry and rainy. The dry season spans from November to February, while the rainy season is from March to October (NPC, 2006).

#### 2.1 Study Design

A cross sectional study design was conducted from January to March, 2018 to determine the prevalence of coccidiosis in local and broiler chickens, to identify the prevalent species of *Eimeria* in the study area, to determine the risk factors of coccidiosis (breed and gender) and to determine the effect of coccidiosis on the hematology.
2.2 Sample Collection

The studied birds were local breeds and broilers from the Lafia modern market. A total of 204 chickens of both sexes were used. The age of the chickens was determined by observing color of the shank and growth of the spur. All the chickens were approximately in the range of adult (greater than 12 weeks of age).

A total of 204 fresh faecal samples, and 204 gastrointestinal tracts (GIT) from the same slaughtered chickens were collected and examined for coccidian oocysts. Two millilitres (2ml) of blood were collected from each chicken for haematological analysis. The faecal samples were collected into properly labeled sterile bottles and GIT collected in clean labeled polythene nylon. The blood samples were collected in Ethylene Diamine Tetraacetic Acid (EDTA) bottle. The blood samples were taken to Dalhatu Araf Specialist Hospital (DASH) Laboratory for analysis while the fecal and GIT samples were conveyed immediately to the Zoology Laboratory at Federal University Lafia for the detection of coccidian oocysts.

2.3 Study methodology

2.3.1 Postmortem examination

The intestinal tract was opened with scissor, extending from the duodenum to the rectum including both cecal pouches. The gastrointestinal tract was grossly examined carefully as described by (Sell, 1996). The intestinal portions were divided into 4 sections, the upper part (duodenum and jejunum), the middle part (ileum), lower part (distal ileum and rectum) and cecal pouches. The intestinal walls of the different sites were examined for thickening, petechiae, coagulative necrosis, reddening, whitish spots, cecal cores, or bleeding. All observed gross pathological lesions were recorded.

2.3.2 Parasitological examination

The faeces and intestinal scraping, which was taken after postmortem of each bird were collected in separate petri-dish.

2.3.3 Direct microscopic examination

Direct microscopic examination was done by placing a very small quantity of faecal sample on a glass slide using a tooth pick and emulsifying with a drop of normal saline on glass slides. A cover slip was then placed on the smear before viewing on the microscope (Edovue, 2002).

2.3.4 Concentration technique

The concentration and floatation methods were used to determine the presence and number of oocysts in the faecal samples according to Cheesbrough (2002). One gram of fresh faecal sample from the chicken was weighed with a weighing balance. The sample was then transferred into a beaker. A prepared saturated sodium chloride solution was poured into the sample in the beaker and mixed thoroughly, before sieving into another beaker using 90 mesh sieves. The filtrates were poured into test tubes and were placed in test tube racks. Each test tube was filled to the brim with the saturated solution of sodium with the help of Pasteur pipette.
Cover slips were used to cover the test tubes and were left to stand for about 20 minutes, allowing the ova/cysts of the parasites to float to the top of the test tube and attach itself on the cover slip. The cover slips were then gently lifted without brushing it against the test tube and placed on microscope slides sideways in one quick movement to avoid air bubbles on the glass-slides. The slides were viewed under a compound microscope using x10 and later with x40 objective lens. The Eimeria species were identified based on their morphologies using standard parasitological guide (Cheesbrough, 2002).

2.3.6 Identification of Species of Eimeria

Species of Eimeria were identified by combination of microscopic features of oocyst morphology (shape, size, sporulation time and color of the oocysts), the predilection site of Eimeria in the gut, the nature of gross lesions induced and histopathological finding as described by (Conway and McKenzie, 2008).

2.4 Data Analysis and Management

The data collected were coded and entered into Microsoft Excel and descriptive statistics was utilized to summarize the data using R-console Software program version 3.2.2. The point prevalence was calculated for all data by dividing positive samples by total number of examined samples and multiplied by hundred. Chi-square test was used to assess if there were statistically significant difference in poultry coccidiosis infection between gender and breed. For this analysis, P-value less than 0.05 was considered as significant whereas P-value greater than 0.05 was considered as not significant.

3.0 RESULTS

3.1 Prevalence of Coccidiosis

A total of 204(36.2%) birds were infected out of 204 chickens examined. Out of 122 local chickens screened, 49(40.2%) were positive of coccidiosis, while 25(30.5%) of the 82 broilers examined had infection (Table 1).

Table 1: Prevalence of Coccidiosis

<table>
<thead>
<tr>
<th>Breed</th>
<th>Numbers Examined</th>
<th>Numbers Infected</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>122</td>
<td>49</td>
<td>40.2%</td>
</tr>
<tr>
<td>Broiler</td>
<td>82</td>
<td>25</td>
<td>30.5%</td>
</tr>
<tr>
<td>Total</td>
<td>204</td>
<td>74</td>
<td>36.3%</td>
</tr>
</tbody>
</table>

3.2 Prevalence Rate of Coccidiosis in Respect to Gender and Breeds

A total of 204 chickens were examined. Out of these, 122 were Local breed and 82 were Broilers with an infection rate of 49(40.2%) and 25(30.5%) respectively. There was a total of 135 Males and 69 Females from the two breeds. Out of these, 44(32.6%) Males were infected while 30(43.5%) Females were also infected (Table 2). The total number of chickens that tested positive to Eimeria was 74 (36.27%). There was no significant difference between the variables (p>0.05).

Table 2: Prevalence Rate of Coccidiosis in Respect to Gender and Breeds

<table>
<thead>
<tr>
<th>Variables</th>
<th>Numbers of poultry examined</th>
<th>Numbers Positive (%)</th>
<th>χ² value</th>
<th>df</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>135</td>
<td>44 (32.6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>69</td>
<td>30 (43.5)</td>
<td>1.559</td>
<td>1</td>
<td>0.2118</td>
</tr>
<tr>
<td>Breed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local</td>
<td>122</td>
<td>49 (40.2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broiler</td>
<td>82</td>
<td>25 (30.5)</td>
<td>1.3236</td>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>Total</td>
<td>204</td>
<td>74 (36.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

P > 0.05: There was no significant difference observed in the prevalence of coccidiosis among the Different variables

3.5 Prevalence of Coccidia Species

Table 3 shows the prevalence of coccidian species in chickens from Lafia modern market. Out of the 204 samples examined, 74(36%) were found to be positive for coccidian oocyst of the Eimeria species.

The following species were encountered: E. acervulina, E. brunette, E. mitis, E. necatrix and E. tenella. E. acervulina had the highest number of infections of 29(14.22%), followed by E. tenella 16(7.84%), while E. mitis 3(1.47%) had the least number of infections.
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Table 3: Prevalence of Coccidia Species

<table>
<thead>
<tr>
<th>Eimeria Species</th>
<th>No. Infected (n=204)</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. acervuline</td>
<td>29</td>
<td>14.22</td>
</tr>
<tr>
<td>E. brunetii</td>
<td>12</td>
<td>5.88</td>
</tr>
<tr>
<td>E. mitis</td>
<td>3</td>
<td>1.47</td>
</tr>
<tr>
<td>E. necatrix</td>
<td>14</td>
<td>6.86</td>
</tr>
<tr>
<td>E. tenella</td>
<td>16</td>
<td>7.84</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>74</strong></td>
<td><strong>36.27</strong></td>
</tr>
</tbody>
</table>

Frequency Distribution of the Species as Single and Mixed Infection

E. tenella, E. necatrix, E. burnetii, E. mitis and E. acervulina were the five *Eimeria* species identified in the study. All these species were identified as a sole infective agent (Table 4.) while some were mixed infective agents. Mixed infection cases recorded included; E. tenella and E. acervulina, E. tenella and E. necatrix, E. acervulina and E. necatrix, E. brunetii and E. acervulina.

Among the single infection, *E. acervulina* occurred most frequently with prevalence of 31.08%, while *E. tenella*, *E. necatrix* and *E. brunetii* had 14.86% in each case. *E. mitis* had the least observed occurrence (4.05%). For the Mixed infection, *E. tenella* and *E. acervulina* occurred most frequently with prevalence of 8.11%, followed by *E. tenella* and *E. necatrix* (5.41%). The least prevalence was recorded for *E. acervulina* and *E. brunetii* (2.70%). The result showed overall prevalence of 79.7% (59/74) and 20.3% (15/74) for single and mixed infection, respectively as shown in Table 5.

Table 5: Frequency Distribution of the Species as Single and Mixed Infection

<table>
<thead>
<tr>
<th>Species of Eimeria as single infection</th>
<th>№ Observed</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. acervulina</td>
<td>23</td>
<td>31.08%</td>
</tr>
<tr>
<td>E. necatrix</td>
<td>11</td>
<td>14.86%</td>
</tr>
<tr>
<td>E. brunetii</td>
<td>11</td>
<td>14.86%</td>
</tr>
<tr>
<td>E. tenella</td>
<td>11</td>
<td>14.86%</td>
</tr>
<tr>
<td>E. mitis</td>
<td>3</td>
<td>4.05%</td>
</tr>
<tr>
<td>Mixed-Infections</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. tenella + E. acervulina</td>
<td>6</td>
<td>8.11%</td>
</tr>
<tr>
<td>E. tenella + E. necatrix</td>
<td>4</td>
<td>5.41%</td>
</tr>
<tr>
<td>E. acervulina + E. necatrix</td>
<td>3</td>
<td>4.05%</td>
</tr>
<tr>
<td>E. acervulina + E. brunetii</td>
<td>2</td>
<td>2.70%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>74</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Figure 2: A: Oocyst of *Eimeria necatrix* and B: *E. acervulina* (x400 magnification)
Morphological features of the oocyte of *Eimeria* Spp at x400 magnification shows that it is subspherical with rough bilayered oocyst wall. Oocyst residuum, polar granule and the micropyle were absent.

**4.0 DISCUSSIONS**

Coccidiosis is considered the most prevalent intestinal parasitic disease in commercial chicken production system worldwide (Nematollahi *et al.*, 2009). From this study, results show that chickens were infected with coccidiosis in the period of study which is January to March. This agrees with the finding of Lawal *et al.* (2016) who reported that in dry season, chickens could be infected with *Eimeria* species in Borno State, North East Nigeria. Similarly, it agrees with the findings of Awais *et al.* (2012) and Bachaya *et al.* (2015) who recorded peak coccidial infection in chickens in dry seasons in Pakistan. However, it disagrees with the findings of Ngele (2016) who reported that the high prevalence of infection among the chickens sampled was due to the period of the sampling which was during the rainy season. The high prevalence from this study may be attributed to the harsh dry cold harmattan weather which can be implicating in immunosuppression and predisposition of avian birds to wide range of diseases including coccidiosis. Poor management of poultry shed in the market could also be a factor.

The overall prevalence of coccidial infection from the 204 chickens sampled was 36.3%. This is in agreement with Muazu *et al.* (2008) who reported a prevalence of 36.65% in adult chickens from National Veterinary Research Institute, Vom, Jos-Nigeria. Ngele (2017) reported an overall prevalence of 33.6% in Afikpo Metropolis of Ebonyi State, Nigeria. Jatau *et al.* (2012) recorded a prevalence rate of 33.3% in Sokoto State, Nigeria. Olanrewaju *et al.*, 2014 recorded a total prevalence 69% of coccidian infection in chickens from their work carried out in Gwagwalada main market, Abuja Nigeria. The prevalence of 31.8% was reported by Nikam *et al.* (2012) carried out in India.

In previous studies infection rate was reported to be 54.3% in Turkey, 20.6% and 70.9% in Ethiopia (Karaer *et al.*, 2012; Oljri *et al.*, 2012), in Pakistan, 71.9% was recorded, 78% in Jordan, 88.4% in Argentina and 92% in Romania. The variation in the reported prevalence might be attributed to different factors such as sampling periods, sample size,
geographical area and climatic conditions observed in the different study areas. It should be borne in mind however, that incidence of coccidiosis is high in highly humid geographical areas explaining the higher prevalence reported in different parts of Nigeria.

The high prevalence recorded in this study confirms the endemicity of coccidiosis caused by Eimeria species in Lafia Modern Market of Nasarawa State. However, the high rate of infection among the chickens sampled may be due to the husbandry method and the environment in which they are being kept in the market (i.e., the place of purchase) support the development of oocysts through developmental stages. Chickens feed and water is contaminated by oocysts because the environment is damp especially in the market place where nobody cares about cleaning the chicken cages. The number of Eimeria oocysts in the litter increases significantly at the time of placement of subsequent flocks.

There is higher incidence of coccidiosis in local chickens 40.2% compared to broiler chickens, 30.4%. This is in agreement with the work of Olarewaju et al. (2014) who also recorded a higher rate of coccidiosis in local breed, 66% to broiler breeds with 60% from Gwagwalada Main market, Abuja-Nigeria. It also corroborates with the report by Benisheikh et al. (2013) who reported 38.8% rate of infection in local chickens and 22.8% in broiler chickens. Moreso, Ashenafi et al. (2004) in Ethiopia reported 25.8% incidence rate of avian coccidiosis in indigenous scavenging chickens. However, this does not agree with the reports of Jatau et al. (2012) with prevalence of 77.4% and 18.6% for broiler and local chickens respectively and Oljira et al. (2012) who reported high prevalence of coccidial infection in exotic broiler birds as compared to the local chickens with infection rate of 25.1% to 12.41% respectively. This variation in breed may be as a result of nutritional status of the breed as poorly feed birds may be more susceptible to coccidial infection although this finding shows no statistical significance in breed of the chickens.

Coccidian infection rate in this study was more in females than males with prevalence of 43.5% to 32.6% respectively. The association between the sex was statistically insignificant, \( p=0.21 \) indicating that both sexes have equal chance of acquiring and becoming infected with Eimeria oocysts during feeding or in an outbreak scenario. The finding agrees with the work of Lawal et al. (2014) who reported high frequency of coccidiosis in female chickens (7.4%), compared to the male counterpart (5.1%) in his Borno State, Nigeria. Oljira et al. (2012) also reported higher prevalence in female chickens (21.4%) than males (19.4%). However, Olarewaju et al. (2014) disagrees with the findings above, recording higher prevalence of coccidiosis in males (20%) than in female chickens (19.3%) in Gwagwalada, Abuja-Nigeria.

Five important species of Eimeria were identified in this present study. They are; E. acervulina, E. brunetti, E. mitis, E. necatrix and E. tenella with infection rate of 39%, 16.2%, 4.1%, 18.9%, and 21.6% respectively. The species of Eimeria identified from this study is in agreement with Ngele (2016) who reported five Eimerian species in his work carried out in Ebonyi State, Nigeria. Lawal et al. (2014) in Maiduguri also reported four species of Eimeria except for E. brunetti. Jatau et al. (2012) in his work carried out in Zaria, Nigeria reported about seven species, so is reports from Dinka and Yacob (2012) in Ethiopia, Muhammad et al. (2011) in Iran and Bachaya et al. (2015) in Pakistan all reported four Eimerian species except E. brunetti which suggests that those species of Eimeria are widely distributed in many countries.

The Eimerian species identified from this work are considered to be among the most important to poultry industry. Owai and Gloria (2010) and Jatau et al. (2012) reported that in Nigeria, coccidiosis is caused by E. tenella, E. necatrix, E. acervulina, E. mitis, E. brunetti, and E. praecox. The identification of E. tenella and E. necatrix in this study agrees with Maikai et al. (2007) who reported that they are the two most pathogenic species of Eimeria. Although E. acervulina has the highest prevalence of 39.2%, E. tenella and E. necatrix are the next two most prevalent with 21.6% and 18.9% infection rate respectively.

Single and mixed or co-infection of two Eimeria species were observed in the sample’s chickens. This same observation of infection was made by Nematollahi et al. (2009); Razmi and Kalidrideri (2000); Sharma et al. (2013); Nikam et al. (2012); Jatau et al. (2012) from their different research works. Single infections were frequently encountered than mixed or co-infection with a total proportion of 79.7% to 20.3% respectively. The larger proportion of mixed infection consists of E. acervulina which may be due to the wide spread distribution of the specie in the area. Patrick and Mgbere (2010) observed and reported that infection with a single species of coccidian is rare in natural conditions, mixed infection being the rule but nevertheless in many outbreaks, the clinical entity can be ascribed principally to one species and occasionally, a combination of two or more.

The species of Eimeria obtained were more in the GIT and few in the dropping. This may be attributed to the fact that more species causes intestinal coccidiosis compared to only E. tenella that causes
cecal coccidiosis. There are other intestinal parasites encountered in this study. They are cestodes and nematodes with overall prevalence of 49%. This is in agreement with the finding of Yoriyo et al. (2008) where Cestodes and Nematodes were implicated as the major cause of helminth infection in domestic chickens with a total infection rate of 87.8%.

CONCLUSION
It can be concluded that avian coccidiosis is endemic in Lafia Modern Market of Nassarawa state due to the high prevalence of result obtained from this study. This is more prominent in Local breed than in Broilers and higher in female chickens than male chickens however, no significant difference between breed as well as gender. From the specie of Eimeria obtained, E. acervulina occurred most frequently while E. mitis had the least frequency of occurrence. For the Mixed infection, E. tenella and E. acervulina occurred most frequently while E. acervulina and E. brunette occurred least frequently. Other disease-causing helminth organisms discovered in the tested samples include; Ascaridia galli, Hymenolepis cantaniana and Strongyloides avium amongst others.

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