PREVALENCE OF Eimeria SPECIES ON EXOTIC CHICKENS REARED IN AFIKPO METROPOLIS, EBONYI STATE, NIGERIA

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Abstract

A research on the prevalence of Eimeria species, the causative agent of coccidiosis was carried on exotic chickens (poultry birds) in Afikpo Metropolis. Six different poultry farms were selected at random for the research. The poultry farms include, Esomchi, Akanu Ibiam Federal Polytechnic Farm, Edmond and Emmanuel (E & E), Madam Okereke, Rarebond and Ndubemchi poultry farms. Three hundred and seventy two (372) chickens were sampled using their fresh stool samples. This comprises of one hundred and eighty six layers and one hundred and eighty six Broilers. Of the 372 chickens sampled, the total prevalence of infection was 125 (33.6%). Broilers were more infected 72(40.3%) than the layers 53(28.5%). Different species of Eimeria were recovered which include E. tenella 47(12.6%) with the highest prevalence, while E. mitis had the least prevalence 11(3.6%). Other Eimeria species recovered include; E. necatrix 30(8.1%), E. maxima 12(3.2%) and E. acervulina 25(6.7%). Mixed infections were also observed with prevalence of 44(11.8%). The different species of Eimeria recovered from this work were found to infect in all the poultry birds sampled. Floatation method using saturated sodium chloride and concentration technique were the methods used in analyzing the faecal samples. The high prevalence of Eimeria species in this work was as a result of poor management practices, lack of vaccination of chickens, the wet environment and also lack of finance to embark on mass treatment of chickens. It is recommended that the stocking density of chickens should be reduced to accommodate an acceptable number of chickens per room. Also, proper management and hygiene practices should be practiced and maintained in every poultry farm.

Keywords: Eimeria species, poultry farm, coccidiosis, layers, and broilers.
1. Introduction

Coccidiosis is a disease of poultry. Poultry refers to domestic birds such as chickens, turkeys, ducks, and guinea fowl etc, kept by peasant farmers and also in mechanized farms (Nematollahi et al., 2009). Coccidiosis is caused by different Eimeria species belonging to the phylum protozoa, family Eimeriidae genus Eimeridae. It is one of the commonest diseases that affect poultry worldwide. The disease occur by injection of sporulated oocysts either in feed, water or by picking it on infected floor or susceptible hosts (Jamal et al., 2014). Infected chickens pass out oocysts through their droppings, which contaminate their feed, water, litter and the soil. Oocysts can also be transmitted through mechanical carriers such as feeding trough, water trough, clothing, farm workers and may be other animals (Handipour et al., 2011). Coccidiosis occurs in the epithelial cells of the intestine. The incubation period of Eimeria is very rapid. It is between 4-7 days. It is characterized by parasites replication in host cells with extensive damage to the intestinal mucosa (Bachaya et al., 2012). Eimeria tenella, E. necatrix and E. maxima are the most pathogenic Eimeria species on chickens. The effects are characterized by bloody lesions, high morbidity, mortality, dysentery, poor growth, emaciation, severe necrosis, hemorrhage etc (Gyorke and Cozma 2013; Olanrewaju and Agbor, 2014; Jamal et al., 2014). In Ethiopia, a study conducted by Kinunghi et al., 2004, reported that coccidiosis contributes to 8.4 and 11.5% losses in profit in large and small scale farms, respectively. Losses due to mortality following a severe outbreak may be devastating and incidence rates can be as high as 80% (Gari and Dorchies, 2008). Ajayi, 1981 reported that in many farms in Nigeria, about 305 birds die annually due to the effect of coccidiosis. Olanrewaju and Agbor 2014 reported high prevalence (69.0%) of coccidiosis disease in chickens examined in FCT Abuja, Nigeria. Also Muazu et al., 2008 working in vom Jos, Plateau State Nigeria reported high prevalence of coccidiosis (52.9%) in chickens sampled. The disease is endemic in most of the tropical and subtropical regions, where ecological and management conditions favour all year round development and propagation of the causative organisms (Obasi et al., 2006). This work is aimed at finding the different Eimeria species affecting chickens in Afikpo and its environs and also to evaluate the management practices carried out by poultry farmers in the areas, so as to recommend ways of preventing and checkmating the disease (coccidiosis) in the area. Also no research work has been carried
out on the prevalence of coccidiosis in the area. Afikpo is the second largest city in Ebonyi State after Abakaliki. There are serious proliferations of poultry farms in the area both commercial and peasant poultry farms. Therefore, there is need to carry out this research in order to enlighten the populace including the poultry farmers on the importance of the disease (coccidiosis), being caused by *Eimeria* species.

### 2. Materials and Methods

#### 2.1. Study site

The study was carried out in Afikpo North L.G.A. Ebonyi State, Nigeria. Afikpo lies between longitudes 7° 55' 00"E and latitudes 5° 53' 00"N (NPC, 2006). The study district is located in the South East geopolitical area of Nigeria. Six poultry farms rearing exotic chickens were examined, which included broilers and layers in Afikpo North L.G.A., were selected for random sampling using chicken droppings for the presence of *Eimeria* species, the causative agent of coccidiosis in chickens. Fig.1 is the map of Afikpo North Local Government Area, showing the study area.

#### 2.2. Sample collection

A total of 372 faecal samples of chickens were collected at random from six different poultry farms as follows; Esomchi poultry farm (31 layers and 31 broilers). Edmond & Emmanuel (E&E) poultry farm (31 layers and 31 broilers), Akanu Ibiam Federal Polytechnic, Unwana (AIFPU) poultry farm (31 layers and 31 broilers), Madam Okereke poultry farm (31 layers and 31 broilers), Rare bond poultry farm (31 layers and 31 broilers). The samples were randomly collected into sample bottles and were brought to the Biology laboratory Science Laboratory Technology Department, Akanu Ibiam Federal Polytechnic, Unwana for parasitological analysis.

#### 2.3. Parasitological analysis

The concentration and floatation methods were used to determine the presence and number of oocysts in the faecal samples (Cheesbrough, 2002). One gram of freshly deposited faecal sample of the chicken was weighed with a weighing balance. The sample was then put into a beaker; a prepared mixture of saturated sodium chloride solution was poured into the sample in a beaker and mixed thoroughly and strained using a 90 mesh sieve, and was sieved into another beaker.

The filtrates were poured into test tubes and were placed in test tube racks. Each test tube was filled to the brim with saturated solution of sodium chloride. Cover slips were used to cover the test tubes and were to stand for
about three hours, allowing the ova/cysts of the parasites to float to the top of the test tube and attached itself on the cover slip. The cover slips were gently lifted without brushing it against the test tube and were placed on microscope slides sideways in one quick movement to avoid air bubbles on the glass – slides and 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; Arora and Arora, 2002).

3. Results And Discussion
A total of three hundred and seventy two (372) chickens were sampled for different species of *Eimeria* which is the causative agent of coccidiosis in chickens. Out of the 372 chickens sampled, one hundred and eighty six (186) chickens were layers, while another one hundred and eighty six (186) chickens were broilers. Table 1 shows the prevalence of *Eimeria* species on poultry farms sampled in Afikpo North LGA. From the results, the total prevalence of infection on layers was 53(28.50%), while the total prevalence of infection on broilers was 72(40.30%). The overall prevalence of infection including layers and broilers was 125(33.60%). Broilers were more infected than layers (table 1). Madam Okereke farm was the most infected with *Eimeria* species 30(48.40%), while Ndubemchi farm had the least prevalence of infection 12(19.40%). Table 2 shows different *Eimeria* species isolated and identified from the fecal samples of chickens. *Eimeria tenella* was the commonest species of *Eimeria* isolated and identified from the poultry farms 47(12.60%) while *E. mitis* was the least *Eimeria* species isolated and identified.

Other *Eimeria* species isolated and identified include; *E. necatrix* 30(8.1%) *E. maxima* 12(3.20%) and *E. acervulina* 25(6.70%). Table 3 shows prevalence of mixed infections of *Eimeria* species from Afikpo North LGA. The total prevalence of mixed infections was 44(11.80%). All the five different species of *Eimeria* isolated and identified from the poultry farms sampled were found in all the poultry birds sampled.
Table 1: Prevalence of *Eimeria* species on poultry birds (chickens) sampled in Afikpo North L.G.A.

<table>
<thead>
<tr>
<th>Name of Poultry farm</th>
<th>Layers</th>
<th>Broilers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number examined</td>
<td>Number positive</td>
</tr>
<tr>
<td>Esomchi</td>
<td>31</td>
<td>10</td>
</tr>
<tr>
<td>AIFPU</td>
<td>31</td>
<td>08</td>
</tr>
<tr>
<td>E &amp; E</td>
<td>31</td>
<td>06</td>
</tr>
<tr>
<td>Madam Okereke</td>
<td>31</td>
<td>13</td>
</tr>
<tr>
<td>Rare bond</td>
<td>31</td>
<td>11</td>
</tr>
<tr>
<td>Ndubem</td>
<td>31</td>
<td>05</td>
</tr>
<tr>
<td>Total</td>
<td>186</td>
<td>53</td>
</tr>
</tbody>
</table>

Table 2: Different *Eimeria* species isolated and identified from faecal samples of chickens

<table>
<thead>
<tr>
<th>Poultry farm</th>
<th><em>E. tenella</em></th>
<th><em>E. necatrix</em></th>
<th><em>E. maxima</em></th>
<th><em>E. acervulina</em></th>
<th><em>E. mitis</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Esomchi</td>
<td>08</td>
<td>06</td>
<td>02</td>
<td>04</td>
<td>01</td>
</tr>
<tr>
<td>AIFPU</td>
<td>06</td>
<td>05</td>
<td>02</td>
<td>04</td>
<td>01</td>
</tr>
<tr>
<td>E &amp; E</td>
<td>07</td>
<td>05</td>
<td>01</td>
<td>04</td>
<td>02</td>
</tr>
<tr>
<td>Madam Okereke</td>
<td>09</td>
<td>04</td>
<td>02</td>
<td>03</td>
<td>02</td>
</tr>
<tr>
<td>Rare bond</td>
<td>13</td>
<td>08</td>
<td>04</td>
<td>07</td>
<td>03</td>
</tr>
<tr>
<td>Ndubem</td>
<td>04</td>
<td>02</td>
<td>01</td>
<td>03</td>
<td>02</td>
</tr>
<tr>
<td>Total</td>
<td>47(12.6%)</td>
<td>30(8.1%)</td>
<td>12(3.2%)</td>
<td>25(6.7%)</td>
<td>11(3.0%)</td>
</tr>
</tbody>
</table>

Table 3: Prevalence of mixed infections of *Eimeria* species in Afikpo North L.G.A.

<table>
<thead>
<tr>
<th>Types of birds</th>
<th>No Examined</th>
<th>No infected</th>
<th>% +ve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layers</td>
<td>186</td>
<td>19</td>
<td>10.2</td>
</tr>
<tr>
<td>Broilers</td>
<td>186</td>
<td>25</td>
<td>13.4</td>
</tr>
<tr>
<td>Total</td>
<td>372</td>
<td>44</td>
<td>11.8%</td>
</tr>
</tbody>
</table>

Discussion

Coccidiosis is the most prevalent intestinal parasitic disease of poultry worldwide (Nematollahi et al., 2009). In this study, the overall prevalence of infection was 33.6%.

This result agrees with Jatau et al., 2012 with a prevalence of 33.3% from their research work carried out in Zaria Nigeria. Muazu et al., 2008 also reported a prevalence of 36.6%
in adult chickens in their research work carried out in National Veterinary Research Institute, Vom, Jos, Nigeria. Fabiyi, 1984, reported 30.0% prevalence of Eimeria species from his research work. The prevalence rate of 31.8% was reported by Nikam et al., 2012 in their work carried out in India. In previous studies, the infection rate was reported to be 54.3% in Turkey, 20.6% and 70.9% in Ethiopia (Karaer et al., 2012; Olijira et al., 2012). Also reported were; 31.7% and 39.6% in India, 71.9% in Pakistan, 78.0% in Jordan, 88.4% in Argentina and 92.0% in Romania (Nikam et al., 2012). This prevalence rate of 33.6% reported in the present study confirms the presence and endemicity of coccidiosis caused by Eimeria species in Afikpo North L.G.A., Ebonyi State, Nigeria. This high rate of infection among the chickens sampled is likely due to the period of sampling of the chickens which was during the rainy season, which is characterized by wet environment, and a very good period for the transmission of the infection (Eimeria species), the causative organism of coccidiosis in chickens. Also, the poor management system of most of the poultry farms visited was equally a factor that resulted into high rate of coccidiosis infection in Afikpo North L.G.A. Madam Okereke farm had the highest rate of infection 48.4%. This was attributed to poor management system observed in the farm. Nikam et al., 2012; Diribia and Basaznew 2012 made similar observations. The farm with the least prevalence of infection was Ndubemchi farm 19.4%, because they maintain near to excellent management system that helped to reduce infection rate due to Eimeria species. Layers were less infected with Eimeria species 28.5% than broilers 40.3%. The layers were harder and more tolerant to coccidiosis infection than the broilers. Jatau et al., 2012; Adriana et al., 2013 made similar observations from their different research works. Prevalence rate of the disease among the chickens was higher in broilers 40.3% than in layers 28.5%. High prevalence rate in broilers was reported by Gari et al., 2008; Diriba and Basaznew 2012. This may be as a result of the breed, the season, and the management system. The Eimeria species with the highest prevalence observed in this study was E. tenella 12.6%, followed by E. necatrix 8.1%, E. Acervulina 6.7%, E. maxima 3.2% and the least E. mistis 3.0%. The species of Eimeria obtained from this work, support the findings of Beat and Martin, 1999, Muazu et al., 2008; Nikam et al., 2012; Jatau et al., 2012. The Eimeria species found in this work are considered to be the most important to poultry industry. This also agrees with the findings of Majaro 1981 and 1993. Mixed infections with two or more Eimeria species were observed in all the poultry birds (chickens) sampled. The
same observations were made by Namatollihi et al., 2009, Razmi and Kalider, 2000, Sharma et al., 2013; Nikam et al., 2012; Jatau et al., 2012, from their different research works. Adriana et al., 2013 also recorded multiple infections in chickens due to *Eimeria* species. Broilers were more infected with multiple infections of *Eimeria* species 13.4% than layers 10.2%. Out of the 372 chickens sampled, 44(11.8%) were infected with multiple infections of *Eimeria* species (Adraina et al., 2013). In conclusion, poor poultry management practices for example, where there is overcrowding, leaking water trough, accumulation of faeces, frequent wet season etc were possible factors and reasons that contributed to the high prevalence rate of *Eimeria* species in the study area. Reasons also being that birds feed and water were being contaminated with oocysts because the environment was wet and damp which encourages the spread of the oocysts of *Eimeria* species. Therefore, good hygiene is highly encouraged in order to reduce the menace of the *Eimeria* species resulting into coccidiosis infection.

**Recommendations**
- There should be constant awareness campaign on how to keep the poultry farms clean and neat from diseases.
- Seminars should be carried out regularly to educate and teach poultry farmers on the new and improved methods of poultry farming.
- Veterinary doctors should also be invited from time to time to vaccinate, de-beak and treat the chickens with correct drugs and correct doses.
- The litters should be changed regularly.
- There should be moderate stocking of the chickens to avoid overcrowding and congestion.
- Infected chickens should be isolated and quarantine appropriately from the healthy ones.

**References**
causing coccidiosis in, layer chickens. The journal of animal and plant sciences. 22(3): 597 – 600.


