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Coccidiosis in Broilers of Selected Commercial Farms in Taraba State, Nigeria

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Abstract: *This study was conducted to assess the prevalence of coccidiosis in broilers in commercial farms of Jalingo and Wukari Local Government Areas of Taraba State. A total of 500 faecal samples from droppings of broilers were randomly collected from the poultry farms in Jalingo and Wukari LGAs of Taraba State. The faecal samples were collected from the rectum of the chicken, using a disposable hand gloves and the ova in each faecal sample of broilers were detected by using floatation technique. A total of 80 birds, from both Local Governments were sacrificed for histopathological assay. Intestinal scrapes were also collected from various parts of the intestines (duodenum, jejunum, gizzard, ilium and the caeca) of freshly slaughtered chickens into clean petri dishes, and the samples were examined microscopically for the presence of oocysts. Data obtained were entered into Microsoft Excel and analyzed using the Statistical Package for Social Sciences (SPSS) program version 23. Out 500 faecal samples collected 81/500 (16.2%) were positive for coccidian ova across Jalingo and Wukari LGAs of Taraba State with a statistical significant difference of (χ^2=5.477; P<0.05). Most of the infected broilers were in the age group 1-3 weeks and 4-6 weeks with a statistically non-significant difference of (χ^2=3.305; P>0.05). Infection with Coccidian ova was found to be higher, 19.7% (50/250) in Wukari than in Jalingo. They had 12.1% (31/250). The prevalence of coccidiosis in the gastro-intestinal tract (GIT) of the slaughtered broilers showed that the Caecum had the highest prevalence of 62.5% (25/40) of oocyst while Ilium had the least 37.5% (15/40). The knowledge of the coccidiosis among farmers in Jalingo and Wukari LGAs showed that all of the (12/12) respondents or 100% have heard of the disease. Majority of the respondent 81.8% (9/12) knows about coccidiosis from the veterinary while a few respondent 19.2% (3/12) get to know about coccidiosis from their friends. The Seasonal occurrence of coccidiosis showed majority of the respondent 7/12 (58.3%) attributed the occurrence of coccidiosis to rainy season within the year while 41.7% (5/12) attributed it to anytime of the season. The knowledge of the occurrence of coccidiosis despite preventive measures among farmers showed that majority of the respondent 91.7% (11/12) had Coccidiosis on their farms before while few, 16.7% (2/12) have not had reoccurrence of the disease. The percentage response of respondents based on the poultry population per pen showed that Majority of the farmers 50.0% (6/12) had between 1-200 poultry population per pen on their farm while 25.0% (3/12) had between 201-500 poultry population per pen. It is therefore necessary to design appropriate control strategies of coccidiosis in order to improve management of poultry birds in farms to boost poultry production in the part of the country.*

1. INTRODUCTION :

In domestic chickens and other fowl, coccidiosis is a common protozoan disease that causes enteritis and bloody diarrhea. Except for renal coccidiosis in geese, the intestinal system is impacted. Protozoan parasites belonging to the Eimeriidae family, genus Eimeria, are the cause of it. When the contaminated oocyst is ingested with food or water, the illness is contracted by the faecal-oral route. Following the consumption of sporulated (infectious) oocysts, the intestines produce hundreds of new oocysts as sporozoites are released into asexual and sexual cycles of development. The feces of the infected host release these oocysts, which sporulate and spread their infection to hens. (Alemayehu *et al.*, 2012).

This study aimed at assessing the prevalence of coccidiosis in broilers in some commercial farms of Jalingo and Wukari Local Government Area of Taraba State.

2. Research Study sites :

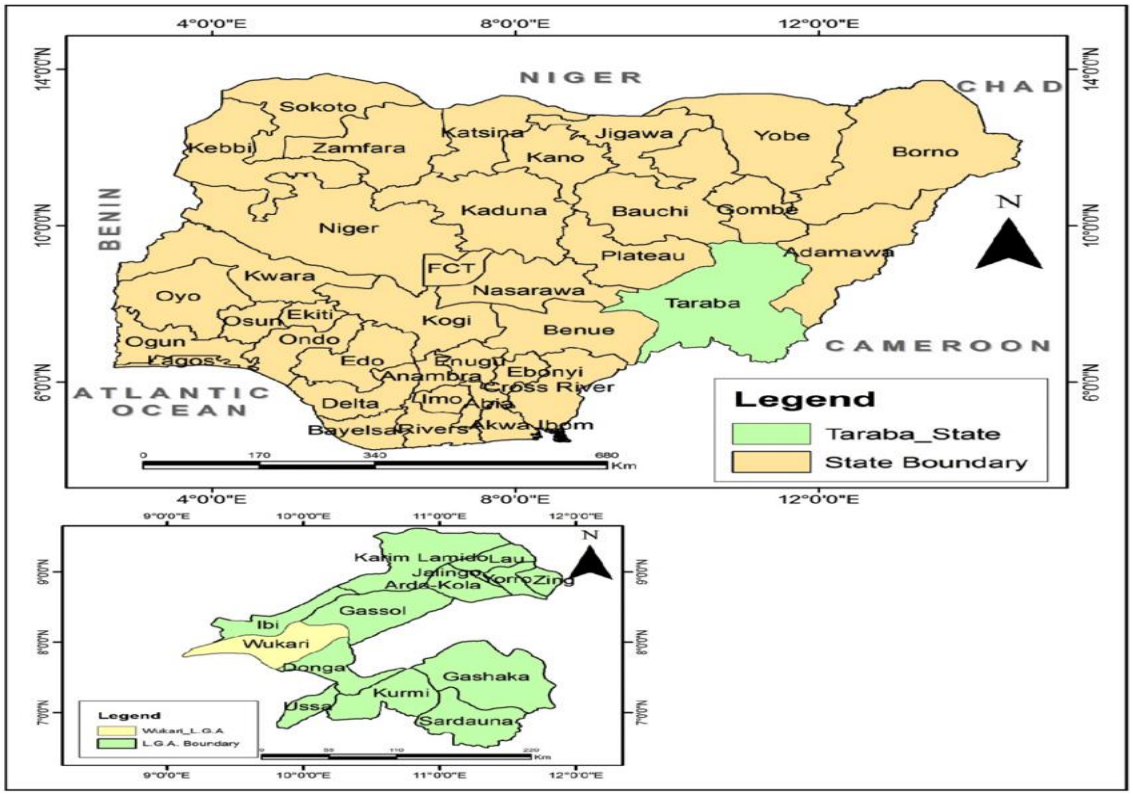

Figure 1: Map of Nigeria showing Taraba State and Study Areas. (Kehinde *et al.*,2015).

Sample collection

A total 500 faecal samples from droppings of broilers was randomly collected from each poultry farm in Jalingo and Wukari LGAs of Taraba State. The faecal samples were collected from the rectum of the chicken, using a disposable hand gloves and were taken to the laboratory for examination. All the samples were brought to the Microbiology/Parasitology laboratory, College of Agriculture, Jalingo, Taraba State for processing and microscopic examination. During sampling, different parameters were recorded such as management practices, breed, age groups, and external lesions. The identification of *Eimeria* species in chickens was done on the basis of criteria such as size, shape and presence or absence of microphyle. The intestine localization and the gross appearance and characteristics of intestinal lesions were also noted for each of the sample. A cross sectional study was done using qualitative faecal examinations. Oocysts in each faecal sample of broilers were detected by using floatation technique, using Sheather's solution.

Gastrointestinal tracts samples (GIT)

Due to the large faecal sample size (500), the samples collected from the gastrointestinal tract were limited to 40 samples from each LGAs. Intestinal scrapes were collected from various parts of the intestines (duodenum, jejunum, gizzard, ilium and the caeca) of freshly slaughtered chickens and put into clean petri dishes. They were examined microscopically for the presence of oocysts and result recorded.

3. Data analysis :

Data generated were analyzed using descriptive statistics with emphasis on percentage. Chi-square was also used to compare the proportion prevalence of coccidiosis in poultry farms in the two LGAs of Taraba State.

Results

Prevalence of coccidiosis based on location

Table 1 shows the prevalence of coccidiosis in broilers based on the location of the farms. The data revealed that the overall infection rate from the study (81\500) 15.9%. Wukari recorded higher number of Positive cases (50/250) 19.7% than Jalingo that had (31/250) 12.1%. Use of X^2 test indicates that the difference significant of (X^2=5.477; P<0.05).

Prevalence of coccidiosis in relation to age of Bird

Table 2 shows the age related prevalence of coccidiosis of the birds sampled. The age group 1-3weeks had the highest prevalence of (41/204) 41.0% while these ages 6 weeks and above had the lowest infection of (20/164) 12.0%. These difference is not significant statistically (X^2=3.305; P>0.05).

Prevalence of coccidiosis infection in the gastro-intestinal tract (GIT) of selected broilers

Table 3 describes the prevalence of coccidiosis in the gastro-intestinal tract (GIT) of the slaughtered broilers is shown in table 3. Results presented shows that gizzards had (12/40) 40.0% coccidian oocysts with the duodenum having (23/40) 57.5% of the coccidial oocys. The jejunum had coccidial positivity of (18/40) 45.0% while as the ilium had (15/40) 37.5%. The Caecum of the broiler had the highest prevalence of (25/40) 62.5% of the coccidial oocysts.

Table 1: Prevalence of coccidiosis in some poultry farms in Jalingo and Wukari L.G.A of Taraba State based on the location of the farm

Farm	Ova of *Eimeria* sp	
	Negative (%)	Positive (%)
Jalingo	219(87.9)	31(12.1)
Wukari	200(80.3)	50(19.7)
Total	419(84.1)	81(15.9)

(X^2=5.477; P<0.05)

Table 2: Prevalence of coccidiosis in some poultry farms in Jalingo and Wukari L.G.A of Taraba State in relation to age of bird

Age (weeks)	Number examined	Oocyst of *Eimeria* sp Positive (%)
1-3	214	41(18.8)
4-6	122	20(16.0)
>6	164	20(12.0)
Total	500	81(15.9)

(X^2=3.305; P>0.05)

Table 3: Prevalence of coccidiosis in some poultry farms in Jalingo and Wukari L.G.A of Taraba State in the gastro-intestinal tract of the birds

GIT	Oocyst of Emeria SP (%)		Total
	Negative	Positive	

Gizzard	28(60.0)	12(40.0)	40
Duodenum	23(57.5)	17(42.5)	
Jejunum	12(55.0)	18(45.0)	40
Ilium	25(62.5)	15(37.7)	
Caecum	15(37.5)	25(62.5)	40
			40
			40

Knowledge of coccidiosis among farmers in Jalingo and Wukari LGAs

The knowledge of coccidiosis as apoultry disease among farmers in Jalingo and Wukari LGA is presented in table 4. It can be seen that all the 12 farmers (12/12) 100% have heard of the disease. Majority of the respondents, (9/12) 81.8% know about Coccidiosis from veteromous while a few respondent 19.2% (3/12) get to know about coccidiosis from their friends.

Seasonal occurrence of coccidiosis among farmers in Jalingo and Wukari LGAs

Table 5 describes the Seasonal occurrence of coccidiosis among farmers in Jalingo and Wukari LGAs is shown in table 5. The majority of the respondents 7/12 (58.3%) attributed the occurrence of coccidiosis to amount of rainfall within the year while (5/12) 41.7% of the respondent indicated that the disease may occur at any time of the year.

Knowledge of coccidiosis in poultry farms despite preventive measures among farmers in Jalingo and Wukari LGAs

The knowledge of the occurrence of coccidiosis despite preventive measures among farmers in Jalingo and Wukari LGAs is charted in table 6. Majority of the respondent (11/12) 91.7% indicated that they had coccidiosis on their farms before implementation of preventive measures. Majority of the respondents (10/12) 83.3% had reoccurrence of Coccidiosis despite preventive measures employed to curtail its outbreak while a few, (2/12) 16.7% did not have reoccurrence of the disease on employement of preventive measures in their poultry farms

Perception of knowledge of coccidiosis by farmers in Jalingo and Wukari LGAs

Knowledge	Number Examined (N=12)	Percentage (%)
Heard of coccidiosis		
Yes	12	100
No	0	0.0
Source of information		
Vet/Vet clinic	9	81.8
Friend	3	19.2

Table 5: Season of recurrence of coccidiosis indicated by farmers in Jalingo and Wukari LGAs

	Number Examined (N=12)	Percentage (%)
Rainy season	7	58.3
Dry season	0	0.0
Others	5	41.7

Table 6: Comparison of occurrence of coccidiosis in some poultry farms in Jalingo and Wukari L.G.A despite preventive measures used to prevent outbreak of the disease

	Number Examined (N=12)	Percentage (%)
Occurrence of coccidiosis on farm		
Yes	11	91.7
No	1	8.3
Coccidiosis outbreak despite preventive measures		
Yes	10	83.3
No	2	16.7

Percentage of farmers that respond on the poultry population per pen among farmers in Jalingo and Wukari LGAs

Table 7 is the percentage response of respondents based on the poultry population per pen among in their farm in Jalingo and Wukari LGAs. Majority of the respondents (6/12) 50.0% had population of between 1-200 birds per pen on their farm while 25.0% (3/12) had between 201-500 poultry population per pen.

Percentage farmers response based on the type of poultry rearing pen by farmers in Jalingo and Wukari LGAs

Table 7 shows the percentage response of respondents based on the type of poultry rearing pen used by farmers in Jalingo and Wukari LGAs. Famers who rear their birds with controlled environment recorded higher percentage response of (9/12) 75.0% than those who rear their birds in open sided pen that had (3/12) 25.0%.

Percentage farmers responses based on the type poultry watering system used by farmers in Jalingo and Wukari LGAs

Table 9 shows the percentage response of respondents based on the type of watering system used among farmers in Jalingo and Wukari LGAs. The automatic watering system used by farmers recorded slightly higher percentage of (7/12) 58.3% than those with manual watering system which had (5/12) 41.7%.

Table 7. Poultry population per pen of farmers in Jalingo and Wukari LGAs

Population per pen	Number of farmers Examined	Percentage (%)
1-200	6	50.0
200-500	3	25.0
>500	3	25.0
Total	12	100

Table 8. Types of pen used by poultry farmers in rearing broilers in Jalingo and Wukari LGAs of Taraba State

	Number Examined (N=12)	Percentage (%)
Open sided	3	25.0
Controlled Environs	9	75.0
Total	12	100

Table 9. Type of poultry watering system used by farmers in Jalingo and Wukari LGAs of Taraba State

Watering system	Number Examined	Percentage (%)
Automatic	7	58.3
Manual	5	41.7
Total	12	100

Percentage response based on the duration of replacement of house litter by poultry farmers in Jalingo and Wukari LGAs

Table 10 shows the percentage response of respondents based on the time it takes to replace poultry litter by farmers of some poultry farms in Jalingo and Wukari LGAs. Farmers who replace the house litters of the formon a weekly basis recorded the highest percentage of (7/12) 58.3%.

Percentage response based on the water spillage on the litter among farmers in Jalingo and Wukari LGAs

Presented in Table 11 is the percentage response of poultry farmers on water spillage on litters in their farms in Jalingo and Wukari LGAs. Farmers that water spill on their litters recorded the highest percentage of 66.7% with the least being those that water does not spill on the litters that had a prevalence of 33.3%.

Table 10. Duration of house litter replacement among farmers in Jalingo and Wukari LGAs

Replacement of house litter	Number Examined	Percentage (%)
Weekly	7	58.3
2weeks	5	41.7
Total	12	100

Table 11. Poultry farms that had Water spillage on the litter in Jalingo and Wukari LGAs of Taraba State

Spill water on litter	Number Examined	Percentage (%)
Yes	8	66.7
No	4	33.3
Total	12	100

4. Discussion :

The result of the current study showed that Wukari recorded higher prevalence of coccidiosis than Jalingo and this could be attributed to the hygienic measures established by the different farms owner in the fight against coccidiosis and other related diseases in the study locations. The variation in coccidiosis between the study locations may be due to differences in environmental factors existing in the different locations as well as the management methods employed by the different farmers. The level of environmental sanitation, cultural and environmental factors that enhance the transmission of ova or oocysts of coccidia are also common according to the report by Shirzad *et al.* (2011). These authors opined that age of the birds is one of the most important principal factors in the spread of coccidiosis. This explains why the young birds

in the current study were more susceptible to the parasite than the older ones. This result corresponds with the work of Reyna and Eshetu (2003) who observed the same trend of coccidial infection in some poultry pens.

Examination of the gastrointestinal Track (GIT) of broilers revealed that high gross lesions were observed especially in the caeca followed by the duodenum, jejunum, gizzard and illium segments. Similar findings have been reported in previous studies by Gari *et al*. (2008) and Raman *et* al. (2011). The localization of these lesions in the specific locations of the gastro intestinalof these birds indicate the prediliction sites of the different *Emeria* spp. It also indicates that the lesions were due to *Emeria* spp for the lesions in the duodenum, *E.* spp. for the lesions in the jejunum, *E.* spp. for the lesions in the gizzards and *E.* spp. for the lesions of the illum segments. These lesions further demonstrate the pathogenicity of this *Emeria* spp. as their account for the mucoid enteritis as noted in fresh poultry droppings due to destruction of tissues of these gastro intestinal routs. According to Gharekhani *et al.*, (2014), epithelium damage caused by *Eimeria* species allows *Clostridium perfringens* to replicate rapidly and produce toxin. Leakage of these protein-rich fluids into the lumen of the gut favors proliferation of *Clostridium perfringens* as well as their toxic product which account for the mortalities due to toxemia.

Our finding showed that all the respondents in this study who are involved in poultry production have knowledge of coccidiosis as a poultry disease. This may be so because a lot of poultry farmers tend to learn about poultry diseases and way of preventing them even before they engage in poultry production. In the same vein, majority of the respondents said they got to know about coccidiosis from the veterinarians. This may be so since the poultry farmers frequently visit veterinary clinics to inquire the best preventive ways of management of outbreaks of poultry diseases.

Based on the respondents input on the type of watering system used by the farmers, majority of the farmers used automatic watering system than those who use manual watering system. This may drastically reduce the introduction of pathogens carried by humans into the drinking water of the birds that account for the low prevalence of the disease. This result corroborates the study by Olanrewaju and Agbor (2014) who observed that Poor poultry management where there is overcrowding, leaking water troughs and accumulation of faeces of the birds are factors that contributes to high prevalence of coccidiosis.

This study also showed that majority of the farmers replace the house litter of the birds on a weekly basis which may reduce their contamination with coccidial oocyst in the pen houses as litter tends to harbor microbes that produce a conducive environment for their growth if left to stay for too long. Our study also showed that majority of the farmer's spill water on their litter which may account for the high prevalence of coccidiosis in the broilers across the study areas. Water spillage on litters makes the litters' damp which provide more conducive environment for the growth of microbes as well as sporulation of the oocysts. This conforms to the work of Slayer and Mallison, (2005) who documented that overcrowding of the birds, accumulation of faeces and contamination of the feed and water with the faecal materials that have oocysts increases the number of *Eimeria* sp oocyst in the pen. This exposes most of the birds to infection leading to outbreak of the disease.

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