

Prevalence of Coccidiosis in Free Range Domestic Chicken reared at Semi Arid Zone of Borno State, Nigeria

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ABSTRACT

A survey was conducted to determine the prevalence and intensity of coccidian species infecting free-range domestic chicken reared at Semi Arid Zone of Borno State, Nigeria.

A total of 100 Domestic chicken were examined, of which 29(29%) were infected, with a total oocysts burden of 308. The common species of oocysts were *Eimeria Maxima* 105(34.0%); *Eimeria tenella* 73(27.3%), *Eimeria necatrix* 77(25.0%) and *Eimeria mitis* 53(17.2%). Of the 35 males examined 8(22.9%) were infected with a oocysts burden of 108(35.1%) Compared to the 65 females examined with (32.3%) infected, and a oocysts burden of 200(64.9%), however, there was no statistical significant difference infection between sexes ($P>0.05$), prevalence of infection based on the age of the chickens examined showed that the groups of >12 months had 27(26.6%) with a oocysts burden of 300(97.4%), while chickens < 12 months had 2(22.2%) with a oocysts burden of 8(2.6%) ($P>005$). The identification of coccidiosis based on their morphometry, Region of intestine affected and degree of severity of the disease revealed that *E. maxima*, *E. tenella*, *E. necatrix* and *E. mitis*. 22.6 x 29.3, 19 x 22.6, 14.2 x 16.7, and 15.5 x 16.2 Average size (Microns) respectively, with *E. maxima* found in posterior half of small intestine, *E. tenella* in the schizonts and oocysts in ceca, *E. necatrix* in the schizonts in small intestine and *E. mitis* found in the anterior half of small intestine. The results of this finding may be useful to evaluate the infection potential when

considering control programs in this Semi Arid Zone of Nigeria.

Key word: coccidiosis; prevalence free- range; domestic chicken; reared at Semi Arid zone

INTRODUCTION

Coccidiosis is a disease of the intestinal lining of chickens caused by protozoan parasites of the genus, *Eimeria*. Chickens become infected with *Eimeria* by ingesting infective oocysts (eggs) from litter, soil and contaminated feed and water. The infected birds excrete oocysts into faeces and are a source of infection for other birds (Braunius,1980) as *Eimeria* species can survive for long period in infected bird and the environment, the parasite is ubiquitous wherever chickens are raised (MC Dougald,2003).

The disease causes high mortality, morbidity and adverse effects on the growth of infected birds (Anjum, 1990) it has been documented that it is the most consistently reported health problem in poultry (Biggs, 1982) and (Williams, 1999). It is caused by the genus *Eimeria* of an Apicomplexa protozoan parasite (Shirley,1995). This parasitic infection occurs in the epithelial cells of the intestine, despite the advances in nutrition, chemotherapy management and genetics (magner,1991) most *Eimeria* species affect birds between 3 and 18 weeks of age and can cause high mortality in young chicks (Mc Dougald et al; 1997).

About 1800 *Eimeria* species affect the intestinal mucosa of different animals and birds

(Shirley,1995). In the domestic fowl *Gallus gallus*, nine *Eimeria* species are recognized: *E. brunette*, *E. maxima*, *E. necatrix* and *E. tenella* are highly pathogenic, *E. acervulina*, *E. mitis* and *E. mivati* are rather less pathogenic, and *E. praecox* and *E. hagani* are regarded as the least pathogenic (thebo et al; 1988).

Bad management encourages oocysts sporulation, contaminated drinking water, contaminated feeds, and etc. can exacerbate the clinical signs (Ruff, 1993).

Coccidiosis can be controlled by good management including good ventilation, dry and clean litter (Jordan,1995), cleaning and decontaminated of drinkers and feeders (Gross,1985) and; proper stoking density in the farm (Jordan,1995). The purpose of this study was to determine the frequency,; prevalence rate, and diversity of coccidia species infecting free range domestic chickens reared at Semi Arid zone of Borno State, Nigeria.

MATERIAL AND METHODS

Field Study Area:

The study was carried out in Semi Arid Zone of Borno Sate, Nigeria during the wet and dry season from July 2013 to June 2015.

Sampling Size:

A total 100 faecal sample were randomly collected from free-Range domestic chicken reared at Semi Arid zone of Borno Sate, Nigeria; the faecal sample were put separately into plastic containers, closed with a lid and data pertaining to sex, age and faeces consistency was recorded. And the faecal samples spaces were incubated separately in Petri/space dishes at room temperature.

Parasitological technique

At parasitology Laboratory of Faculty of Veterinary Medicine,; University of Maiduguri, the faeces were meshed using pestle and mortar macerated overnight in 2.4% potassium dichromate solution at 37°C and left for 24-48 hours to allow unsporulated oocysts to sporulate. Little saturated salt solution were added to the faecal sample and the supernatant

was discarded and the oocysts in the sediment were separated by floatation Technique in saturated sodium chlorate solution. They were examined microscopically and species were identified on the basis of shape and size of sporocysts and the sporozoites, presence or absence of the micropyle and its cap, and presence or absence of residence, polar and stiedae bodies.

Data Collection:

Information collected at the time of sampling consists of Age of chicken, sex, Flock age, flock size and total number of birds in a flock.

RESULTS

A study to identify and determine the prevalence of Coccidiosis (*Eimeria* spp) infecting 100 free range domestic chickens revealed overall prevalence 29(29.0%), with a total oocysts burden of 308. The common coccidiosis (*Eimeria* spp) oocysts harvested were *E. maxima* 105(34.0%), *E. tenella* 73(27.%), *E. necatrix* 77(25.0%) and *E.mitis* 53(17.2%) (Table I).

Table 2 shows the prevalence of the oocysts (*Eimeria* spp) based on the sex and age of chickens examined. Of the 35 males and 65 females examined, the prevalence was 8(22.8%) and 21(32.3%) respectively. There was no significant ($P>0.05$) different between prevalence and sex, with oocysts burdens of 108(35.1%) and 200 (64.9%) for males and females respectively ($P>0.05$). Also age-groups of >12 months had 27(29.6%) with a oocysts burdens of 300(97.4%), while chickens <12 months had a prevalence of 2(22.2%) with a oocysts burden of 8(2.6%).

Oocysts (*Eimeria* spp) distribution/burden based on the sex, and age of the chickens were examined is presented in(table 3).

E. tenella were more evenly distributed among both sexes and age-groups with 2(25%) and 7(33.3%) prevalence among males and females and 7(25.9%) and 1 (50.0%) among >12 and <12 months age groups respectively.

The morphometry and region of intestine affected of the Eimeria Spp identified is represented in table 4 E. maxima, E.tenella, E. necatrix and E. mitis measured 22.6 x 29.3, 19 x 22.6, 14.2 x 16.7 and 15.5 x 16.2 Average size (microns) respectively, found in the posterior half of small intestine, schizonts and oocysts in the ceca schizonts in small intestine oocysts in ceca and anterior half of small intestine as their region of intestine affected respectively.

DISCUSSION

This study has revealed a prevalence of 29% for Coccidiosis in free- Range Domestic chickens reared at Semi Arid zone of Borno State, Nigeria.

The fairly high prevalence could be attribute to the free-range practice in this region despite the fact that the disease has a definite seasonal pattern with a high prevalence during rainy season and wide range of feeding habits from grains, fruits to insects which may be carrying stage of parasite thus predisposing them to parasitic infections (Adang,1999) and (Oniye,2000).

The results of this study showed that the prevalence of Coccidiosis in domestic chickens

reared at Semi Arid zone of Borno State were found infected with the Eimeria species identified as follow:

E. maxima, E. tenella, E. necatrix, and E. mitis. These results are in agreement with those of (Williams,1995) who reported that at least six species of Eimeria (E. acervulina E. maxima, E. tenella, E. brunetti, E. mitis and E. praecox) were found in the little from single flock during its first six weeks.

CONCLUSION

Conclusively, the insufficiency of veterinary attention to the free-range domestic chickens exposes them to parasitic (Coccidiosis) hazards with a declination of poultry production in general. Thus, alternatives are proffered such that, the villagers should be educated on the consequences of the disease to their chickens, and enlightenment campaigns on seasonal administration of coccidiostats should be emphasized in the study area.

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Table 1: Prevalence of Coccidiosis (Eimeria spp) in Domestic Chickens Reared in Semi Arid Zone of Borno State.

Eimeria spp (Coccidiosis)	Total No. (%) Harvested
Eimeria Maxima	105(34.0%)
Eimeria tenella	73(27.3%)
Eimeria necatrix	77(25.0%)
Eimeria mitis	53(17.2%)

Table 2: Prevalence of Eimeria spp (oocysts) Harvested Based on sex and age of free –range domestic chickens reared at Semi Arid zone of Borno State, Nigeria.

	Total Examined	No. (%) infected	Oocysts burden (%)	Relative Rock	95% Confidence Interval
Overall:	100	29	308		
Sex:					
Male:	35	8(22.9)	108(35.11)	0.7188	0.45-1.14
Female:	65	21(32.3)	200(61.9)	1.391	0.88-2.20
Age:					
>12	91	27(29.7)	300(97.4)	1.361	0.85-2.19
<12	9	2(22.2)	8(2.6)	0.7333	0.46-1.18

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Fisher's exact test with two-sided p-value.

Age: P= 0.2590 Not Significant

Sex: P= 0.2050 Not Significant

	No (%) infected M	F	Parasite Aghe > 12 Months	<12 Months	No (%) oocysts harvested
E. Maxima	1(12.5%)	7(33.3%)	6(22.22%)	1(50.0%)	10534.0%
E. tenella	2(25%)	7(33.3%)	7(25.9%)	1(50.0%)	7327.3%
E. necatrix	3(37.5%)	4(19.0%)	6(22.2%)	0(0.0%)	7725.0%
E. mitis	2(25.0%)	3(14.5%)	8(29.6%)	0(0.0%)	5317.3%
Overall					

Table 4: Morphometric Characteristic and Region; of intestine affected by Coccidiosis (Eimeria spp) in free-range Domestic chickens

Oocysts (Eimeria spp)	Meansize (Lxb) Microns	Region of Intestine Affected by Coccidiosis
Eimeria Maxima	22.6 x 29.3	Posterior half of small intestine.
Eimeria tenella	19 x 22.6	Schizonts and oocysts in the ceca.
Eimeria necatrix	14.2 x 16.7	Schizonts in small intestine, oocysts in ceca.
Eimeria mitis	15.5 x 16.2	Anterior half of small intestine.

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