
Comparative Studies on the Prevalence of Coccidiosis in Indigenous (*Gallus- Gallus domesticus*) and Exotic Breeds (Layers) in Benisheikh Town, Borno State

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ABSTRACT

A survey was conducted to determine the comparative studies between *Gallus-gallus domesticus* and exotic breeds of chickens and prevalence of coccidiosis in Benisheikh Town, Borno State. A total of 211 chickens were examined in four wards of Benisheikh town. Sixty (60) chickens were examined from North (Lawanti ward), 70 chickens from South (Ajari ward), 37 chickens from West (Mallamti ward), 44 chickens from East (Kasula ward) respectively. 211 chickens surveyed consists of 106 (50.2%) were *Gallus-gallus domesticus* and 105 (49.8%) were exotic breeds. 122 (57.8%) were between 12 and 36 months (Adults) while 89 (42.2%) were between greater than 18 months (medium). There was however, no statistical difference ages ($\chi^2 = 0.60$, $df = 1$, $p = 0.44$). One hundred and thirty 130 (61.6%) of the chickens had coccidian parasite in their sample. Coccidiosis infection of these 74 (35.1%) were males while 56 (26.5%) were females but the difference was not found to be statistically significant ($p > 0.005$). infection rate was higher among the *Gallus-gallus domesticus* 32 (38.8%) than the exotic breeds 48 (22.8%) and the difference was found to be statistically significant ($p < 0.05$). The identification of coccidiosis based on their morphometry and region of intestine affected by coccidian species revealed that, *E. tenella*, *E. nacatrix*, *E. brunetti*, *E. maxima* measured 19 x 22.6, 14.2 x 16.7, 21.7 x 26.8 and 22.6 x 29.3 microns respectively. With *E. tenella* found in schizont and oocyst in ceca, *E. nacatrix* found in small intestine oocyst, intestine mucosa, *E. brunetti* in intestinal wall thickened, and *E. maxima* found in blood flecks in exudate as their region of intestine affected sites respectively. These findings may be useful to evaluate the infection potential when considering control programs in Benisheikh town and its vicinity.

Keywords: Prevalence, Coccidiosis, *Gallus-gallus domesticus* and Exotic breeds.

INTRODUCTION

Parasitism is one of the major problems which inflict heavy economic losses to the poultry in the form of retarded growth, reduced weight gain, and decreased egg production, diarrhea, obstruction of intestine, morbidity and mortality ^[1]. These parasites constitute a major factor limiting productivity of the poultry industry by affecting the growth rate of the host resulting in malfunctioning of organs and eventually death ^[2]. The domestic chickens has a wide range of feeding habits from grains, fruits to insects which may be carrying stages of parasites, thus predisposing them to parasitic infections ^[3]. And a wide range of diets, a habit that is attributed to their infection ^[4]. With many of the foods carrying infective stages of the parasites thereby serving as intermediate hosts in chickens that are free ranging ^[5]. A study of incidence of different species of coccidian was made 1960-62 in England ^[6]. There was a rise in the amount of coccidiosis caused by *E. brunetti* and *E. maxima*, while *E. tenella* showed a decrease *E. brunetti* and *E. tenella* was most common in chickens over 10 weeks of age, whereas *E. acervulina* was most common in birds under 10 weeks of age; ^[7]. All of the coccidial infections of birds are self-limiting, i.e. birds that survive the original acute attack will recover completely and eliminate all traces of the

infection, providing means of re-infection are banished. Chronic coccidiosis of birds, therefore, is a disease kept alive by repeated re-infections of the same species, or by repeated infections with different species ^[8].

Immunity of a rather high order is produced by one or two light infections with some species, with others a number of re-infections are necessary ^[9]. In all cases apparently enough resistance is established eventually to prevent re-infection or to make it so slight as to be symptomless ^[10] and ^[11]. Research have shown that age is not the essential factor in immunity to *E. tenella*, an organism that causes severe infections in young chicks but does not often affect adults ^[12].

MATERIALS AND METHODS

Study Area: A survey was carried out between November 2010 and December 2011, a total of 211 chickens (both exotic and *Gallus-gallus domesticus*) faecal sample were collected from four cardinal locations in Benisheikh town, Borno State. Areas surveyed are Ajari in the south, Lawanti in the north, Mallamti in the west and Kasula in the east.

Sample Collection

All the intestines and caeca were opened and their contents (faeces) were collected in a beaker. The

faeces were macerated overnight in potassium dichromate solution at 37°C. The suspension was filtered through a Muslim cloth and allowed to sediment. The supernatant was discarded and the oocysts in the sediment were separated by floatation method in saturated sodium chloride solution. They were examined microscopically and the species were examined microscopically and the species were identified on the basis of morphology^[13] and differentiated based on morphometry (length, breadth and shape index)^[14].

DATA ANALYSIS

Data assessable were analysed using PEPI, the computer programme for Epidemiological Students Association was established using chi-square test at 95% confidence limit.

RESULT

Of the 211 chickens examined 106 (50.2%) were *Gallus-gallus domestica* and 105 (49.8%) were exotic breeds as shown in table 1. Majority of adult breeds 122 (57.8%) were medium, there was however no statistical difference between ages ($\chi^2 = 0.60$, $df = 1$, $p = 0.44$).

Table 2 shows the distribution of chickens breeds in Benisheikh town, Borno State. A total of 211 chickens were collected randomly in four

cardinal points with one representing each wards. A total of 60 chickens were enrolled to the survey from north (Lawanti ward) which consists of 29 (48.3%) exotic breeds and 31 (44.3%) *Gallus-gallus domestica*, while 70 chickens were from south (Ajari ward) out of which 30 (42.9%) were exotic breeds, 40 (50.1%) were *Gallus-gallus domestica*, 37 chickens were from west (Mallamti ward) with 24 (64.9%) were exotic breeds while 13 (35.1%) were *Gallus-gallus domestica*, and finally, 44 chickens from East (Kasula ward) 22 (50%) were exotic breeds and 22 (50%) were *Gallus-gallus domestica*.

Table 3 shows the morphometry characteristics and region of intestine affected by the coccidian species and degree of severity of coccidiosis. *E. tenella*, *E. necatrix*, *E. brunetti*, *E. maxima* measured 19 x 22.6, 14.2 x 16.7, 21.7 x 26.8 and 22.6 x 29.3 microns with schizonts and oocyst in ceca, schizonts in small intestine, oocyst, intestinal mucosa and intestinal wall thickened, blood flecks in exudate as their region of intestine affected site respectively.

The degree of severity of infection revealed that, *E. tenella* and *E. necatrix* are highly pathogenic and destructive parasites. However, *E. brunetti* and *E. maxima* possess virulence of a medium grade and

generally are associated with chronic infections.

DISCUSSION

The prevalence of coccidiosis observed in this study was 61.6%. The high rate of prevalence in the study area is attributable to poor management of poultry houses which plays a significant role in the spread of *Eimeria spp.* because *Coccidial oocysts* are ubiquitous and are easily disseminated in the poultry house environment. Furthermore, the prevalence of coccidiosis showed the highest prevalence during rainy season than the dry season, suggesting that low humidity and warm environmental conditions like in the study area (Benisheikh town) favour the development of these parasites.

However, the domestic chicken has a wide range of feeding habits from grains, fruits to insects which may be carrying contaminants of coccidiosis infections. As the result of the experiment revealed *E. tenella* and *E. necatrix* are highly pathogenic and destructive parasites

which are in agreement with those of ^[15], who revealed that at least six species of *Eimeria spp.* were identified from single flock. However, reports from Sweden, France, Jordan (except *E. brunetti*) suggesting that those species of *Eimeria* are widespread in most countries where poultry are produced on a commercial basis ^[16].

CONCLUSION

Conclusively, more attention should be focused towards the improvement of the management and care of intensive and free ranging chickens. The study revealed high prevalence of coccidiosis infection in domestic and exotic chickens of Benisheikh town, Borno state.

Quite certainly, the result of the above experiment when consulted would help tremendously to minimize the economic losses in poultry industry in Benisheikh and moreover, these findings may be useful to evaluate the infection potential when considering control programs in the study area.

Table 1: Prevalence of Coccidiosis in Indigenous (*Gallus-gallus domestica*) and Exotic Breeds

Age (in months)	Parameters (breeds)	Infected		Not Infected		Total	
		No.	%	No.	%	No.	%
18<months	Indigenous (<i>Gallus-gallus domestica</i>)	48	22.8	41	19.4	89	42.2
12 – 36 months	Exotic breeds	82	38.8	40	19.0	122	57.8
Total		130	61.6	81	38.4	211	100.0

Table 2: Distribution of Breeds of Chicken in Benisheikh Town, Borno State

	North (Lawanti)	South (Ajari)	West (Mallamti)	East (Kasula)
No. of chickens	60	70	37	44
Exotic breeds	29 (48.3)	30 (42.9)	24 (64.9)	22 (50)
Indigenous breeds (<i>Gallus-gallus domestica</i>)	31 (44.3)	40 (57.1)	13 (35.1)	22 (50)

Table 3: Morphometric Characteristics and Region of Intestine Affected by Coccidiosis in Chickens (Both Breeds)

Coccidian species	Average Size (Microns)	Region of Intestine Affected	Degree of Severity of Coccidiosis
<i>Eimeria tenella</i>	19 x 22.6	Schizonts and oocyst in the ceca	++++
<i>Eimeria necatrix</i>	14.2 x 16.7	Schizonts in small intestine, oocysts	+++
<i>Eimeria brunetti</i>	21.7 x 26.8	Intestinal mucosa	+++
<i>Eimeria maxima</i>	22.6 x 29.3	Intestinal wall thickened, blood flecks in exudate	+++

REFERENCE

- Anwar, A.H, S. Hayat and C.S. Hayat, (1999). Prevalence of Gastrointestinal Parasitic Fauna of Indigenous and Exotic Layer Chickens in and Around Faisalabad. *Pak. Vet. J.* 1:9-12.
- Soulsby, E.J.L (1982). Helminths, Arthropods and Protozoans of Domesticated Animals (7th Edition). Bailliere Tindale London.
- Adang, L.K. (1999). Some Aspects of the Biology of Columbids in Zaria, Nigeria. M.Sc. Thesis, Department of Biological Sciences, A.B.U Zaria, Nigeria. 98 pp.
- Smyth J.D. (1976). Introduction to Animal Parasites 2nd Edition. Hazzel Watson and Viney Limited. Aylesbury Bucks.
- Frantovo, D. (2000). Some Parasitic of Birds (Aves) in the Czech Republic. *Acta*

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- Societies Zoologicae
Bohemicae 66 (1):13-28
6. Long. *Brit. Vet. Jour.*, (1994), 120, 110.
7. Long. *Parasitology*, (1966), 56, 575.
8. Hodgson. *Brit. Vet. Jour.*, (1968), 124, 209.
9. Ryley. *Vet. Rec.*, (1965), 77, 1498.
10. Johnson. *Oreg. Agr. Exp. Sta. Bul.* 358, 1938
11. Tyzzer. *Am. Jour. Hyg.*, (1929), 10269.
12. Long. *Parasitology*, (1966), 56,575
13. Levine, N.D., (1985). *Veterinary Protozoology*, Iowa State University Press, Ames, Iowa, USA.
14. Soulsby E.J.L., *Helminthes, Arthropods and Protozoa of Domesticated Animals*. Lea & Febiger, Eighth Edition, ELBS, London, Philadelphia, Pg. 614-5.
15. Williams, R.B., (1995). *Epidemiological Studies of Coccidiosis in Domestic Fowl (Gallus-gallus)*. Physical Condition and Survival of *Eimeria acervulina* oocyst in Poultry House Litter. *Appl. Parasitol.*, 36:90-96.
16. Al-Natour, *et al.*, (2002). Flock-level Prevalence of *Eimeria species* Among Broiler Chicks in Northern Jordan. *Preventive Veterinary Medicine*, 53(3): 305-310.

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