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Prevalence of Coccidiosis Among Local and Exotic Breeds of Chickens in Azare Metropolis of Bauchi State Nigeria

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Abstract

Coccidiosis is the most important protozoan disease to the world poultry industry and domestic chickens are considered susceptible to seven species of Eimeria. Eimeria species are protozoan parasites causing coccidiosis in exotic and local breeds of chickens. The survey was carried out between August and September 2019 in order to determine the species of Eimeria causing coccidiosis in both local and exotic breeds chickens in Azare metropolis, Bauchi State, Nigeria. The Wisconsin's faecal flotation technique was employed to analyze faecal samples obtained from 50 local breed and 50 exotic breed chickens within the metropolis. The samples were examined for the presence of Emeria oocysts. Fifty (50.0%) of the samples examined were positive for Eimeria oocysts. Four species of Eimeria were identified and the prevalence of infection were E. tenella 27 (54.0%), E. maxima 21 (42.0%), E. acervulina, 16 (32.0.8%) and E. necatrix 6 (12.0%). Higher prevalence were observed in females 32 (53.3%), young 38 (63.3%) and local breeds 31 (62.0%), than in males 18 (45.0%), adults 12 (30.0%) and exotic breed 19 (38.0%) respectively. Chi square test revealed no statistically significant differences in infections with sex but shows a significant difference in age and breeds.

Introduction

The poultry industry in Nigeria has witnessed expansion in recent times and the estimated poultry population in Nigeria was over 150 million in 2006 FAO, In Nigeria, local breed chicken constitute about 124 million of the poultry population and are considered the most important poultry species in terms of number and rate of investment in poultry production FAO, Zahraddeen Local breed chickens are found in all parts of Nigeria and their meat and eggs have continued to be the major source of animal protein for the rapidly growing Nigerian population. Local breed chicken production in Nigeria has the potential to provide relatively cheap animal protein to the rural populace and improve their nutritional status, to create both rural and urban employment and to generate income in times of difficulty. The rearing of local breed chickens for meat and egg production appears to be increasing at a fast rate and provides a form of employment to the local women in Azare metropolis. Annual losses in local breed chicken production due to infectious and parasitic diseases are uncountable and large sums of money are continuously being expended on preventive medication. Poultry coccidiosis has been reported as a major constraint to the successful backyard poultry farming, due to its significant high mortality rates and huge economic losses Bera.

Poultry coccidiosis which is a disease of almost universal importance in poultry production remains one of the most important protozoan parasitic diseases that are threatening local breed chicken production in Nigeria. About nine species of Eimeria have been identified and recognized in domesticated chickens which are E. brunette, E. maxima, E. necatrix, E. tenella considered to be the most pathogenic, E. acervulina, E. mitis, E. mivati considered to be less pathogenic and E. praecox and E. hagani which are less or nonpathogenic [1-5]. The occurrence of different Eimeria species combinations and intensity of infection vary considerably both locally and globally. The species differ in their localization in the gut and in their ability to induce morbidity and mortality.

Coccidiosis increases the consumption index, decreases growth, generates heterogeneous groups, causes weight loss, lowers feed conversion rate, delays sexual maturity and decreases egg production. Lesions of the intestinal mucosa and loss of pigmentation may also become apparent during the later stages of infection. In Nigeria, most households practice the extensive management system of poultry production, which is characterized by family ownership of chickens.

The chickens are left to scavenge outside for food and other nutritional needs. There is no attention given to feeding and shelter. There is high mortality from diseases, predators and theft. However, some households in Nigeria practice the semi-intensive management system of poultry production. Most of the chickens reared under this system, scavenge for most of their food and other nutritional needs. There is however, some form of attention given to the provision of feed supplements, vaccination and other disease preventive measures and provision of shelter [6-8].

Several studies have established the prevalence and economic importance of coccidiosis in both local and exotic breeds of chickens in Nigeria [9-13]. However, there are currently very few studies on the prevalence and occurrence of poultry coccidiosis in Azare metropolis, though a majority of the population practices backyard poultry farming for meat, egg and income [14]. Published information therefore, on the coccidian parasites of local breed and exotic breed chicken in Azare metropolis is scarce or unavailable, despite the economic importance of local breed chicken in the area. This study was therefore aimed to determine the prevalence of coccidiosis in local and exotic breed of chicken and to identify the most prevalent species of Eimeria causing coccidiosis in Azare metropolis, Bauchi State, Nigeria.

Materials and Method

Study area

Azare is a town located in katagum L.G.A of Bauchi, State, Nigeria. It is located between 11.67 latitude and 10.19 longitudes and it is situated at elevation 413 meters above sea level. Azare has a population of 105,687 making it the 2nd biggest city in Bauchi State. The major climate elements that influence the climate of the study area and affecting the farming system are temperature and precipitation (rainfall), the annual temperature ranged between 22-330 C from April to May [14,15]. The mean annual rainfall ranged between 615.6-985mm with peak between July- Augusts. The study area is in the Sudan savanna, the vegetation is greatly determined by the nature of the soil. The soil in the study area is aerosol with sandy and loamy sand texture and a high percolation rate (Figure 1).

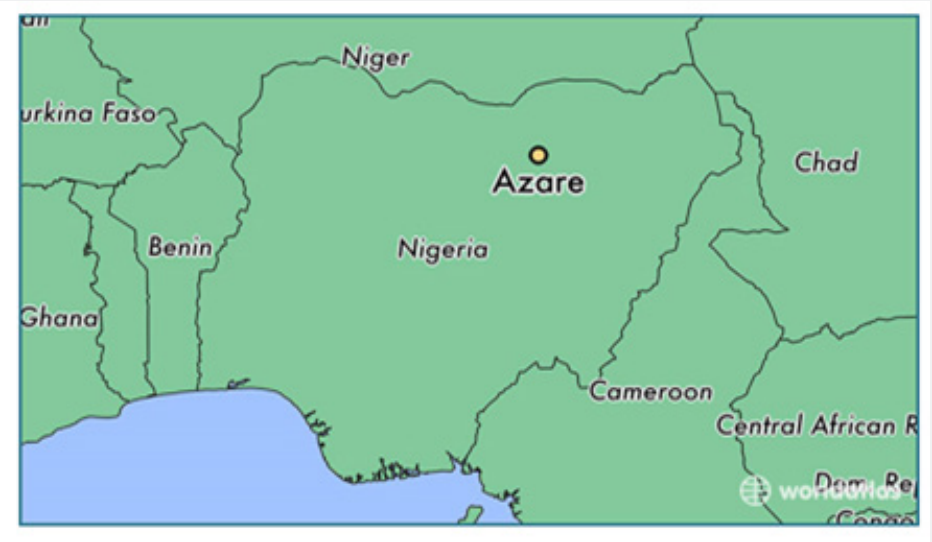

Figure1: Map of Nigeria showing the study area.

Study population

Total sample of hundred (100) chickens comprising of (50) exotic and (50) local breed were randomly collected.

Sample collection

Freshly deposited faeces samples from the selected chickens were collected using clean, Santana polythene bag. When the sample are collected, they were labeled and numbered based on the age, and farm from which it was collected and were transported to the Biological Sciences Laboratory, Bauchi State University for analysis. Faecal sample from the local breeds were collected by visiting some selected houses that grow the chicken. For the exotic, were collected in the poultry farms.

Sample Analysis

The samples were analyzed using floatation method as described by [16]. The collected Faecal Samples were dissolved in 5ml of sodium chloride (Nacl) in a test tube and were emulsified using sterile glass rod. The resulting faecal samples were filtered into a test tube. The test tubes were then filled up with sodium chloride to enable the oocyst float to the surface. Carefully cover slide were placed onto the test tube and left for 15minute at room temperature, the cover slide were then gently removed by swept turning of the slide from the test tube and the slide were placed immediately under the microscope for examination. The samples were then examined using microscope under x10 and confirm with x40magnification [17]. Present or absent of shape, of the

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wall of oocyst were observed for each of the samples that were collected. The species of Eimeria were identified based on the identification key given by [18].

Data Statistical analysis

All data generated were entered in to an excel software and letter transferred into SPSS software version 16.0 for descriptive analysis and chi-square were used to determined association between the variables. All tests were done at (P<0.05).

Results

The overall prevalence rate of 50% was found based on the feacal dropping samples of chickens examined for coccidial oocyst (Table 1). below shows the selected farms to which samples were collected in which Matsango have the highest prevalence value of (75%) followed by Makara Huta with (70%), Nasarawa B (65%), Nasarawa A (25%), and Tatari Ali Quarters has the lowest prevalence value of (15%) [19-22] (Table 2-5).

Table 1: Incidence of Coccidiosis in some poultry houses in Azare.

S/no_	Location	No of sample per poultry house	No of infected	Prevalence (%)
1	Nasarawa A	20	5	25%
2	Nasarawa B	20	13	65%
3	Matsango	20	15	75%
4	Tatari Ali Quarters	20	3	15%
5	Makara Huta	20	14	70%
	TOTAL	100	50	50%

Table 2: The association between sex of chicken and occurrence of coccidial diseases.

Sex	No of chickens examined	Positive results	Prevalence (%)	X^2	P – value
Male	40	18	45.0	0.694	0.405
Female	60	32	53.3		
Total	100	50	50		

Table 3: The association between breed of chickens and occurrence of coccidiosis.

Breed	No of chickens examined	Positive results	Prevalence (%)	X^2	P-value
Exotic	50	19	38	6.112	0.013
Local	50	31	62		
Total	100	50	50		

Table 4: The association between age of chickens and occurrence of coccidiosis.

Age	No of chickens examined	Positive results	Prevalence (%)	X^2	P –value
4-6weeks	60	38	63.3	14.035	0.00
6weeks and above	40	12	30.0		
Total	100	50	50		

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Table 5: Prevalence of Eimeria species of chickens in Azare.

Chicken Breed	No_ of Infected	*E. acervulina*		*E. maxima*		*E. necatrix*		*E. tenella*	
		No_	%	No_	%	No_	%	No_	%
Exotic	19	10	52.6	12	63.2	6	31.6	15	78.9
Local	31	6	19.4	9	29.0	0	0	12	38.7
Total	50	16	32	21	42.0	6	12.0	27	54

Out of the 50 exotic chickens' breeds examined 19 (38%) were infected with Eimeria oocyst and 50 local breed 31(62%) were positive. This shows that there was a higher prevalence of Eimeria infection in local breeds than in the exotic breeds in the area. The association was statistically significant (p= 0.013 x2= 6.112) The prevalence of coccidiosis based on age group reveals 63.3% for (4-6weeks) chickens infected with Eimeria oocyst and 30.0% for (6weeks and above) chickens examined. The prevalence of coccidiosis was higher in (4-6weeks) chickens than in (6weeks and above) in the study area. There is a statistically significant difference (p= 0.00 x2= 14.035) [23-25].

Discussion

In this study, the overall prevalence rate of 50% was found based on the feacal dropping samples of chickens examined for coccidial oocyst. The prevalence of Eimeria species was 63.3% in young (4-6weeks of age) chickens while in adults (6weeks and above) 30.0%. This rate is higher compared to results of other survey in Nigeria that fabiyi, reported 30%. These results agree with the report of M.S.D. International (2008) which stated that coccidiosis has been identified in all parts of the world as a deadly disease of flocks, with resultant economic losses. Coccidia prevalence has been reported in all flocks world-wide [26-30]. This finding support other finding in Nigeria, (Majaro), stated that infection with specie of Eimeria in poultry has been shown to be due to E. tenella, E. necatrix, E. brunette and E. acervulina. The result obtained in this work associated with the four species of Eimeria support the statement of (Beate and Martin 2008) which stated that the species of E. acervulina, E. maxima and E. tenella are considered to be the most important to poultry industry.

In the current study, coccidian infection was found to occur more in females (53.3%) than males chickens (45%) the association between the sexes was statistically non-significant (p= 0.407). These findings agree with those of Olijira who also reported higher frequency of avian coccidiosis in females' chickens (20.45%) as compared to male ones (19.3%). Absence of statistically significance different between female and male might be due to the equal chance of exposure for the coccidiosis infection. The prevalence of the disease as is significant (p= 0.013) higher in local breed (62%) than in exotic breed, (38%) [31-32]. This result disagrees with the most previous research work done in different part of the world, who reported higher prevalence of coccidiosis in exotic breed than local chickens. The current study agrees with the findings of the previous report by Benishikh Who reported higher coccidiosis rate in local chickens (38.8%) than in exotic breeds (22.8%).

Conclusion and Recommendation

The effect of coccidiosis on the production ability chickens and its economics importance should be further studied. Maintenance of good hygiene and sanitation in the farm is necessary because disinfectants are not effective against coccidian. The pens should be cleaned as well as removed off droppings regularly. Access of infected droppings should be prevented from the non-infected ones. There should be regular treatment and vaccination of the chickens. Keep the litter dry by frequent turning of the litter to reduce the sporulation of the oocyst and avoid moisture and humidity in the litters.

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References

1. Haug A, Gjevre AG, Thebo p, mattsson JG, Kaldhusdal M (2008) Coccidial infections in commercial broilers: Epidemiological aspects and comparison of Eimeria species identification by morphometric and polymerase chain reaction techniques. Avian pathol 37:161-170.
2. Anonymous (2009). Mapsofworld. Com. Available at http://www.mapsofworld.com /Nigeria/cities/azare/html mapXL Inc. 10s third street Suite 310 San Jose.
3. Azare IM (2013) Evaluation of farmer's response strategies to climate change in Katagum Local Government Area of Bauchi State. Journal of Environment Technology and Sustainable Agriculture 2 (10):26-33
4. Bashir MM, Bala A, Mohammed IT, Isa HJ, Adamu MB (2001) Request for the creation of Katagum state out of the present Bauchi State of Nigeria. A memorandum submitted to the speakers, House of Representatives National assembly, Abuja, Nigeria pp 1-28.
5. Beate ES, WS Martin (2008) Immunological aspect of infections with Eimeria maxima. A short review. Avian Pathol 28(6): 537-543.
6. Benishekh AA, Tom I, ThamusZY, Sanda KA, Biu AA (2013) comparative studies on the prevalence of coccidiosis in indigenous (Gallus gallus domesticus) and exotic breeds (layers) in Benisheikh town, Borno State. Journal of medical and applied Biosciences 5:33-37.

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7. Bowman D, (2009) Georges parasitology for veterinarians. 9th ed. India: sunders Elsevier pp: 2-94.
8. Dhama K, Basaraddi MS, Ruchi T, Shantaveer SB, (2012) Coccidiosis: An Overview. Avian Diseases Section Division of Pathology, Indian Veterinary Research Institute, Izatnagar, 243 122 (U.P.)
9. Dutsesy AS, Mc Dougald LF (2001) The Occurrence and Economic Important of coccidiosis in Chicken Carnegie Institute of Washington Publishers.Pp.622-631.
10. Fabiyi, JP, (2008) Coping with parasitic diseases in poultry. Nig. Livestock Farmer, 41:12-13.
11. Fayer NF, Reid WM (1989) Recommendate sanitary practice for Coccidiosis control. In Pvore (Ed.) coccidian and intestinal coccidiomorphs Pp 234-245.
12. Fernandez S, Pagotto AH, Furtado MM, Katsuyama AM, Madeira AMBN (2003) A multiplex PCR assay for the simultaneous detection and discrimination of the Seven Eimeria species that infect domestic fowl, Parasitology, 127: 317-325.
13. Fry M, Williams RB (1984) Effects of decoquinate and clopidol on electron transport in Mitochondria of Eimeria tenella (Apicomplexa: Coccidia). Biochem Pharmacol 33(2): 229-240.
14. Gari G, Tilahun, Dorchies, (2008) Study on poultry coccidiosis in Tiyo Distict, Arsi zone, Oromia Regional State, Ethiopio Intern J poul Sci 7:251-256.
15. Great E, Ploeger H, Henken A, Vriesreiling G, Noordhuizen J Effects of Initial litter contamination level with Emeria acervulina in population dynamics and Production characteristics in broilers Vet Parasitol 65: 223-232.
16. Jenkins M, Allen P, Wilkins G, Klopp S, Miska K, (2008) Eimeria praecox infection ameliorates effects of Eimeria maxima infection in chickens. Vet Parasitology 155: 10-14.
17. Khan M, Irshad H, Anjum r, Jahangir M, Nasir U, (2006) Eimeriosis in poultry of chickens
18. Levine ND (1961) Protozoan Parasites of Domestic Animals and Man. Minneapolis: Burgess Publishing Company.
19. Magner, B.R. (1991) Anticoccidial. Veterinary Applied Pharmacology and Therapeutics, 5thEdition. ELBS, Bailliere Tindall, London, Pp. 549-563.
20. Morgan JAT, GM Morris, BM Wlodek, R Byrnes, M Jenner, C.C. Constantinoiu GR Anderson, A.E. Lew-Tabor,
21. JB Molloy, RB Gasser, WK Jorgensen (2009) Real time Polymerase chain reaction (PCR) assays for the specific detection and quantification of Seven Eimeria species that cause coccidiosis in chickens. Mol. Cell Probes, 23: 83-89.
22. MSD international (2008) Product of greater poultry productivity merch sharp and Dohme (M.S.D. international). U.S.A. Pp: 13-15.
23. Musa W, Saidu L, Jatau ID, Adamu J, Otu MO, (2010) Outbreak of Coccidiosis In 5-day-old commercial broiler breeder flock in Zaria, Nigeria. International Journal of Poultry Science (12): 1112-1115.
24. Murrey J Kennedy, food safety division Reised in 2002 practical information for Alberta's Agriculture Industry Agdex 663-35.
25. Nsamba P, Rubaire Akiiki CM, Katunguka Rwakishaya E, Saimo M (2006) A Clinical Cases of Coccidiosis in Chicken in Kampala. Africa Journal of Animal and Biomedical science,
26. Olijira D, Melaku A,Bogale B (2012) Prevalence and risk factors of coccidiosis in poultry farms in and around Ambo Town, western ethiopia. American-Eurasian Journal of science and research 7: 146-149.
27. Permin A, Bojesen M, Nansen, Besgaard M, Frandsen F, Pearman M (1997) Ascaridiagalli Production in Chicken Following Single Infections with Different Dose Levels. Parasitological Reseacrh 83:614-617.
28. Puttalakshmamma G, Ananda K, Prathiush P, Mamatha GS, Rao S (2008) Prevalence of Gastrointestinal parasites of poultry in and around Banglore. Veterinary worlds 1: 201-202.
29. Shirley MW, Jeffers TK, Long PL (1983) Studies to determine the taxonomic Status of Eimeria mitis, Tyzzer 1929 and E. mivati, Edgar and Seibold Parasitology 87: 185-198.
30. Simon M, (2005) ASA Handbook on poultry disease 2nd Edn, Ame Soybean Ass,Species among broiler chicks in Tabriz (Northwest of Iran). Munis Entomology and zoology, 4(1) 53-58.
31. Vladimir Vrba, Poplstein M., and Pakandl M., (2011). The discovery of the 2 types of small Subunit ribosomal RNA gene in Eimeria mitis contests the existence of E. mivati as an Independent species. Vet. Parasitology 18Spec3
32. Williams RB (1999a) A compartmentalized model for the estimation of the cost of Coccidiosis to the world's chicken production industry. International Journal for Parasitology, 29, 1209-1229.

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