PREVALENCE OF POULTRY COCCIDIOSIS IN AND AROUND BAHIR DAR, ETHIOPIA.

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Abstract: A cross sectional study was conducted in and around Bahir Dar with the objective of determining prevalence of poultry coccidiosis in local strain and white leghorn breed chicken that are kept under free range and deep litter management systems, respectively. Flotation technique was employed to harvest coccidial oocysts from the sampled chicken faces. Out of a total of 400 chickens examined during the study period 248 (60.6%) were found to be positive for coccidial oocysts. According to breed distribution out of 200 each fecal samples from white leghorn and local strain chickens 69.04 % and 51.7 % were positive, respectively. Regarding, the management system coccidial infection was significantly higher (X^2= 12.795; P=0.000) in deep litter management system 145 (69.04%) when compare to free range management system 103(51.7%). Prevalence of coccidiosis according to different age groups indicated that significantly higher prevalence rate of coccidiosis (X^2 =28.287; P=0.000) were registered in young chicken when compare to their older counter parts. However, significant variation was not noticed in different sex groups of chickens (X^2= 1.367; P=0.242). Generally the present study showed that coccidiosis is an important parasitic disease in the study area and further studies using large sample size should be undertaken so as to get the overall picture of the disease in the area.

Key words: Bahir Dar; Coccidiosis; Poultry; Prevalence

INTRODUCTION

Poultry is among the important species of livestock kept in Ethiopia. Three production systems are identified in the country. These are backyard poultry production system,

small scale and large scale intensive poultry production systems [1]. The population of poultry in Ethiopia is estimated to be 38.1 million excluding the pastoral and agro pastoral areas [2]. Despite the presence of large number of chicken in Ethiopia, contribution to the national economy or benefit exploited is very limited due to nutritional limitation and diseases [3].

Mortality due to disease is estimated between 20% to 50% but can go as high as 80% during times of epidemic [4]. Among parasitic diseases poultry coccidiosis is one of the major problems of the chicken industry in the world which is characterized by blood tinged faces, riffled feather, loss of appetite, poor growth and reduced egg production [5]. Coccidiosis is caused by the protozoa of the subphylum Apicomplexa, family Eimeriididae and genus *Emeria* which undergo direct lifecycle with transmission between hosts by way of the resistant oocyst. Chicken are the natural host of the nine *Emeria* [6].

Coccidiosis is endemic in Ethiopia, causing great economic losses, particularly in growing chickens, in all production system. For instance, prevalence rate of 50.8% and 11% in deep litter and back yard production systems, respectively from Debre Ziet and its surrounding Fessessework, [7]; 38.34% clinical coccidiosis from Kombolcha Lobago *et al*., [8] and 80.65% and 61.25% prevalence rate in Rhode Island Red and local strains, respectively in Arsi, Tiyo district Getachew, [9] were reported. Coccidiosis was identified as a major cause of direct and indirect losses in Ethiopia. Average losses due to mortalities, culling and coccidiostat costs were estimated at Ethiopian Birr 898.80 and 5301.80 per farm or 0.55 and 0.53 Ethiopian birr per chicken in small scale and large scale poultry farms, respectively. This contributed to an average of 11.86% and 8.40% loss in enterprise profit per farm in small and large scale farms, respectively [10]. This indicates that coccidiosis is a problem of significant order meriting attention and implementation of control program. For establishment of a control strategy, detail information about the significance of the disease must be known. Therefore, the objective of this study was to conduct prevalence study of poultry coccidiosis in and around Bahir Dar.

MATERIAL AND METHODS

Study Area : Bahir Dar is located 570 km north west of Addis Ababa, at an altitude of 1730 meter above sea level with 11'29'N latitude and 37'29'W longitude. The area has summer rainfall with mean annual rainfall and mean annual temperature of 1465mm and 29.5^{o}c, respectively [2].

Study Population

The sampling units are 200 white leghorn and 200 local strain chickens from deep litter and free range management systems, respectively found in and around Bahir Dar town. Factors such as management system, breed, age, and sex were considered to determine their association with the disease picture.

Study Design and Sampling methods

A cross-sectional study was conducted for the period of six months to determine the prevalence of poultry coccidiosis. The sample size was determined based on Thrusfield [11] using possible prevalence rate (p) of the disease from previous researcher Guale, [12] 50.8%.

$$n = \frac{Z^2 p_{exp} (1-p_{exp})}{d^2}$$

Where Z (a multiplier for 95% confidence interval based on the normal distribution) = 1.96, p= 50.8% and d = 5% the required sample size estimated to be 384 but to increase precision sample size of 400 were taken. Simple random sampling method was employed for sampling of chickens.

Fecal sample collection and parasitological examination

This study methodology involved qualitative fecal examination to investigate oocyst discharge. The samples were collected in plastic bottles and brought to parasitological laboratory where they were examined. When the samples were not immediately examined they were stored at refrigeration temperature (about 4 ^{0}c) until examination. Oocysts in feces of infected chicken were detected by using flotation methods with sheather's solution was applied to float oocysts.

Data Analysis Data generated from fecal examination were recorded in Microsoft excel program and analyzed using SPSS version 17. Pearson's chi-square test was used to identify the significance level. Significance was considered at P value < 0.05.

RESULTS

Out of 400 fecal samples examined 248(60.6%) were positive for coccidial oocysts. The higher prevalence rate of coccidiosis in white leghorn 69.04% in the present study as compared to local strain chicken 51.7% were found to be significant (X^2= 12.795; P=0.000) as indicated in table 1.

Table 1: Prevalence of poultry coccidiosis in different breeds.

Breed	Sample examined	Positive	Chi square (X^2)
WLH	200	145(69.04%)	X^2=12.795
LSC	200	103(51.7%)	P= 0.000
	400	248 (60.6%)	

Key: WLH – White leghorn LSC – Local strain chickens

In this study prevalence of coccidiosis in deep litter and free range management systems were assessed and found to be deep litter management system was significantly (X^2=12.795; P = 0.000) higher than free range management system. According to the sequential distribution of the disease in different age groups, 82.05% occurred at < 2 mths of age followed by the lower number of coccidiosis 69.7% at 2-4 mth of age; 65.2% at 4-6mth of age and 49.5% >6mth of ages, positive cases were reported. As indicated in table 2 significantly (X^2=28.287; P = 0.000) higher number of young chickens were positive than their counter part adult chicken.

Table 2: Prevalence of coccidiosis according to age and management system.

Division	Category	Sample examined	Prevalence rate (%)	Chi square (X^2)
Management	FR	200	103(51.7%)	X^2=12.795
	DL	200	145(69.04%)	P= 0.000
Age	>6 mth	207	107(49.5%)	X^2=28.287
	4-6 mth	72	47(65.2%)	P=0.000
	2-4 mth	43	30(69.7%)	
	<2 mth	78	64(82.05%)	

FR - Free range DL- Deep litter

As indicated in table 3 the highest prevalence rate was recorded in female chicken 147 (63.09%) when compare to male 101 (57.38%). However, the difference was not statically significant (X^2=1.367; P=0.242).

Table 3: Coccidiosis prevalence rate in different sex groups.

Sex	Sample examined	Positive cases	Chi square (X^2)
Female	233	147 (63.09%)	X^2 = 1.367
Male	176	101 (57.38%)	P=0.242
Total	409	248(60.6%)	

DISCUSSION

The result of the present study showed that out of 400 chickens tested for coccidiosis 248(60.6%) of them were found positive for coccidial oocysts. The current study is higher when compared to the finding of Guale [12] who recorded 50.8 % and Worku [13] 38.5 % in Kombolcha poultry multiplication and research center. The present finding is

relatively lower than that report of Almargot [14] 80% prevalence in and around Debre Zeit.

The result of the present study revealed prevalence of coccidiosis in different breeds. The higher prevalence rate of coccidiosis was recorded in white leghorn 69.04% when compared to local strain chicken 51.7% can be related to their management systems. White leghorn chickens were kept under deep litter management systems whereas local strain chickens were kept under free range management systems. The amount of oocyst discharged from infected chicken depends on the dose of oocysts ingested [15, 16]. Thus, the chance of the chicken to pick up large numbers of sporulated oocysts can be more likely than the local strain chicken and this finding is in agreement with the finding of Getachew [9] who reported the prevalence of 80.65% and 61.25% in RIR and local strain chicken in deep litter management systems and free range management system, respectively.

Coccidiosis in deep litter management system was significantly higher than in free range management system. In deep litter poultry houses, which offer optimal condition of temperature and humidity for oocyst sporulation, the risk of infection is further increased [17]. Therefore, the opportunity of the chicken to pick-up large numbers of sporulated oocysts can be more likely in chicken which are kept in deep litter management than free range management system.

According to different age groups the result indicates that significantly higher number of chicken less than 2 months of age affected by the disease than their adult counter parts. This indicates that the numbers of chicken affected by coccidia were increased when the age of the chicken increased. These finding is in agreement with most of the published literatures; significantly higher prevalence of coccidiosis is observed in young birds compared to the adults as the former immunity is not well developed [18]. Coccidiosis is usually a disease of young birds, but birds can be infected at any time if never before exposed. Coccidia populations take time to build to dangerous levels, therefore outbreaks usually occur when birds are between 3 and 8 weeks of age [19].

The finding of the present study was showed the absence of significance in the prevalence of coccidiosis between the two sex groups. This finding is in agreement with Pinard- Van Der Laan [20], which stated the absence of significant natural resistance variation in relation to sex.

CONCLUSIONS

The current study revealed that poultry coccidiosis is still an important health problem of poultry production in the study area. Whereas, prevalence of the disease reduces while the age of the chicken increases. Similarly, the prevalence of the disease was higher in deep litter management system when compare to free range management system. As recommendations Bio-security practices such as hygiene of poultry house, personnel and premises; disinfection and litter management should be primary concept in the prevention and control of coccidiosis in deep litter management system should be practices.

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