ISSN 1682-8356
ansinet.org/ijps

INTERNATIONAL JOURNAL OF

POULTRY SCIENCE

ANSInet
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorijps@gmail.com

International Journal of Poultry Science 3 (2): 135-139, 2004

Prevalence and Management Issues Associated with Poultry Coccidiosis in Abak Agricultural Zone of Akwa Ibom State, Nigeria

E.B. Etuk[1], I.C. Okoli[2] and M.U. Uko[3]
[1]Department of Animal Science and Technology, Federal University of Technology, P.M.B.1526, Owerri, Nigeria
[2]Tropical Animal Health Production Research Laboratory, Department of Animal Science and Technology, Federal University of Technology, Owerri, Nigeria
[3]Department of Animal Production and Health, Akwa Ibom State College of Agriculture, Obio Akpa, Nigeria
E-mail: edeheetuk@yahoo.com

Abstract: A study of six farms each randomly selected from each of five local government areas of Abak agricultural zone of Akwa Ibom State, Southeastern Nigeria, was conducted to assess on-farm prevalence and management of poultry coccidiosis. The study, which involved scrutiny of farm and clinical records, distribution of structured and pre-tested questionnaires to elicit relevant data, showed that in the previous 12 months, 3,327 (29.36%) birds out of 11,333 encountered in the 30 farms suffered from coccidiosis. Overall mortality rate was 2.63%. The highest prevalence rates were recorded in the rainy season (12.7%), among birds managed in deep litter (26.69%), birds 1-5 weeks old (18.75%), layers (22.29%) and Harco strain (26.42%). Sixty percent of the farms consulted veterinarians for diagnosis and treatment especially at first incidence while 34.94% indulged in self-diagnosis. Good sanitary and hygiene practices were being employed in 50% of the farms as the major preventive measure. Combined administration of anticoccidial drugs and removal of litter (43.33%) ranked highest as control measure. Continued veterinary education and extension services are needed in the area to update the knowledge of the farmers especially on the benefits of vaccination, dangers of self-diagnosis and adoption of an integrated approach involving good hygienic practices and use of both drugs and vaccines in disease prevention.

Key words: Poultry, coccidiosis, prevalence, management, Nigeria

Introduction

The poultry industry in Nigeria has recorded considerable expansion in recent times (FAO, 2000). For example, the creation of Akwa Ibom state in 1987 and the increased activities of oil and gas companies in the area with the resultant improvement in the local economy has precipitated an upsurge in the demand for animal protein especially in the form of poultry products. This has led to the establishment of poultry farms around major cities in the state. Field observations (Etuk, 1991) show that a reasonable number of these farms are located in Abak agricultural zone of the state.

While overall national increase in poultry production has probably triggered off vigorous research into alternative and cheaper feed resources urgently needed to sustain such growth, there is the need to continually focus attention on the health of the animals in other to realize the full potentials of the industry (Fasami, 1990). Poultry diseases remain one of the major threats to boosting poultry production in Nigeria (Halle *et al*., 1998; Laseinde, 2002). Parasitic diseases are of particular importance because of their high incidence in poultry occasioned by the tropical environmental conditions under which the farmers operate (Seifert, 1996). Epidemiological studies have established the economic importance of coccidiosis as a major parasitic disease of poultry in Nigeria (Majaro, 1980, 1983, 2001).

The importance of coccidiosis is based on the economic implications of its outbreak in poultry farms (Barksh, 1989; Majaro, 1980). Although coccidiosis is controllable under most circumstances, the cost of control makes the disease one of the most expensive parasitic diseases encountered in the poultry industry (Majaro, 1980, 1981).

With the increasing interest in poultry production evidenced by the proliferation of poultry farms, it is pertinent to continually evaluate the prevalence and management issues associated with common poultry diseases such as coccidiosis in any given zone. This study therefore aims at assessing the prevalence and management issues associated with poultry coccidiosis in selected poultry farms in Abak agricultural zone of Akwa Ibom state, Nigeria.

Materials and Methods

Study area: Abak agricultural zone of Akwa Ibom state, southeastern Nigeria is made up of five local government areas namely; Abak, Etim Ekpo, Ika, Oruk Anam and Ukanafun (Okoli *et al*.,1995). The zone lies between latitudes 4° 33`` and 5° 75`` N and longitudes 7° 35`` and 8° 25``E. It is classified under the humid tropical rainforest zone although most parts have been

modified into oil palm bushes, arable crop farms and farm fallows because of agricultural activities and population pressure (Ofomata, 1975). There are two distinct seasons characterized by seven months (April-October) of wet season and five months (November-March) of dry season. Mean annual rainfall is 3500mm while temperature ranges from 29 °C to 33 °C. Rural households keep few sheep, goats, local chicken and pigs. Extensive rearing of started exotic birds is also becoming popular. The Annang speaking people who are mainly farmers and traders inhabit the area. Major crops include, yam, cassava, vegetables, and cash crops such as oil palm, citrus, rubber and kola nuts.

Data collection: The study involved scrutiny of farm and clinical records and distribution of structured questionnaires to farmers and their managers, private and government veterinarians and agricultural extension officers to elicit relevant data on farm activities in Abak agricultural zone over the previous 12 months (March, 1999-February, 2000). Data were obtained from such key players in thirty poultry farms spread across the five local government areas of Abak agricultural zone. Six farms were randomly selected from each local government area, making 30 farms studied. Structured questionnaires were developed, pre tested to eliminate ambiguity and then used during scheduled interviews to elicit relevant information required from the farmers, managers and other key players in the selected farms. Enough time and necessary explanations were offered to the respondents enabling them to give clear answers to the questions. Where farmers were not sufficiently literate, questions were translated into their local language and their responses recorded. All the questionnaires were correctly completed and used for the analysis. Farm records where available were scrutinized and direct observation on the hygienic practices in each farm noted.

Clinical records in the study area are generated through the diagnostic activities of both state and private veterinarians, agricultural extension officers or the farmers themselves. Among the first three groups of practitioners, coccidiosis diagnosis usually involves clinical examination of the flock and individual cases, post mortem and parasitological examination of feces and intestinal scrapings. The farmers on the other hand usually base diagnosis of coccidiosis on the combined factors of citing bloody diarrhea from the birds and witnessing a positive response of such diarrheic birds to coccidiosis treatment. The primary draw back of this practice is probably that only coccidiosis cases presenting clear bloody diarrhea are diagnosed while 'occult' cases are omitted or ascribed to other disease conditions.

Information generated included, farm location, flock size, date of visit, poultry species and strain with specification of typology (e.g. broiler, cockerel or layer), age, clinical diagnosis, husbandry details, housing and treatment records.

Data Analysis: Data generated were analyzed using descriptive statistics with emphasis on absolute distribution and percentages. The prevalence of coccidiosis among the different farm sizes, strains/breed, typology, age, season and management systems were calculated. Means of percentages of the different prevalence rates were separated using the Least Significant Difference (LSD) and Student's T-test where applicable as outlined by (Steel and Torrie, 1980).

Results

Flock distribution and characteristics: The distribution of farm size and bird populations is shown in Table 1. The thirty farms sampled were in 60 flocks with a total bird population of 11,333. Average flock size was 188.8 birds while average bird population per farm was 377.7. Two farms had over 1000 birds accounting for 49.59% of total bird population while fourteen farms had 100 and below which accounted for only 7.29% of the population. Farms with bird population of 101-500 had an equal ratio of layers to broilers while those having 501-1000 birds had only layers (Table 2). In all the farms studied, there was a preponderance of Harco strain of birds except in farms with less than 100 birds.

Prevalence of coccidiosis: Based on the data generated from this study, 3327 of the 11,333 birds were found to have suffered coccidiosis during the previous 12 months (March, 1999 to February, 2000), giving a prevalence rate of 29.36% with 2.63% mortality (Table 3). The highest prevalence rate (57.14%) occurred in farms with 501-1000 birds while the least occurrence (12.94%) was recorded in farms with 101-500 birds. Mortality resulting from coccidiosis was however highest (8.11%) in farms with less than 100 birds and lowest (0.35%) in farms with 1001 birds and above.

Overall, age incidence of infection (Table 4a) showed that birds aged 1 to 5 weeks were the most affected (18.75%). There was a slightly higher prevalence rate (12.76%) during the rainy season, which was not significantly different ($P>0.01$) from the 11.02% recorded during the dry season (Table 4b). Correspondingly, mortality was significantly higher ($P<0.01$) during the rainy season. Birds managed on deep litter recorded a higher incidence of coccidiosis (26.69%) and also had 2.66% mortality, indicating significantly higher figures in both parameters ($P<0.01$) than those recorded in birds in cages (Table 4c).

Among the different strains of birds kept in the area (Table 5a), Harco recorded a significantly ($P<0.01$) higher prevalence rate (26.42%) and mortality (2.39%) while Cobb had the lowest rates. Layers on the other hand, recorded significantly ($P<0.01$) higher prevalence

Table 1: Distribution of poultry farm sizes and bird population in Abak Agricultural zone of Akwa Ibom State, Nigeria

Farm Size (No. of birds)	No. of farms	Bird population	Average bird population/farm	% Total bird population
≤100	14	826	59.0	7.29
101-500	11	2837	257.0	25.03
501-1000	3	2050	683.3	18.09
≥ 1001	2	5620	2810	49.59
Totals	30	11,333	337.76	100.00

Table 2: Flock characteristics in relation to farm size in Abak Agricultural zone of Akwa Ibom State, Nigeria*

Farm size (No. of birds)	Type of birds		Breed/Strain			
	Layers	Broilers	Harco	Anak	Cobb	Unspecified
≤ 100	354 (42.86)	472 (57.14)	319 (38.62)	_	_	507 (61.38)
101-500	1286 (45.36)	1551 (54.64)	1240 (43.71)	350 (12.33)	500 (17.62)	747 (26.34)
501-1000	2050 (100.00)	_	2050 (100.00)	_	_	_
≥ 1001	3620 (64.42)	2000 (35.49)	3620 (64.42)	2000 (35.49)	_	_
Totals	7310 (65.50)	4023 (35.49)	7229 (63.78)	2350 (20.73)	500 (4.41)	1254 (11.06)*

* Values between brackets represent percentage of birds within total sample population

rate (22.29%) and mortality (7.05%) than broilers (3.51% and 1.43% for morbidity and mortality respectively) (Table 5b).

Diagnosis, prevention and control of coccidiosis: Sixty percent of the farms employ the services of veterinarians in diagnosing the disease condition, 34.44% indulged in self-diagnosis while 6.66% employed the services of agricultural extension agents (Table 6a). Again, Table 6b shows that the farmers and managers had considerable knowledge of the disease. Fifty percent of the farms employed good sanitation and hygiene as preventive measures, 33.33% administered prophylactic doses of anticoccidial drugs while 10% used antibiotics. None of the farms carry out vaccination as a preventive measure against the disease. Table 6c shows that farmers in the study area employed different measures either solely or in combination to control outbreaks. Forty percent of the farms use anticoccidial drugs while 43.33% administer anticoccidial drugs in addition to removal of litter. Only 6.66% consulted veterinarians after the first outbreak of the disease. Another 3.33% of the farms control the disease by disposing of infected birds while 3.33% employed local remedies to control the disease.

Discussion

Infection with species of the genus *Eimeria*, the causative agents of coccidiosis in poultry has been shown to be due to *E. tenella, E. necatrix, E. brunetti* and *E. acervulina* among others in Nigeria (Majaro, 1980, 1981, 1983). These coccidia organisms have been widely studied as regards morphology, life cycle, pathogenicity and agents of spread. A recent study (Majaro, 2001) highlighted the role of the common housefly in the mechanical spreading of coccidiosis, thus predisposing even birds in new houses to outbreaks. Coccidiosis is usually controlled by the inclusion of anticoccidial drugs in feed and drinking water. Due to the acquisition of resistance by *Eimeria* species, many compounds in use today are however; less effective than when they were first introduced (Chapman, 1997; Chapman, 1999). Coccidiosis therefore remains a very important limiting health problem in intensive poultry husbandry in Nigeria (Majaro, 2001, 2002).

The present study reveals a moderately high prevalence rate of coccidiosis in poultry farms in Abak agricultural zone of Akwa Ibom state, Nigeria. This is in agreement with earlier reports of 36-43% prevalence rates for *E. acervulina* in other parts of southern Nigeria (Majaro, 1980, 1981). Good sanitary measures and prophylactic treatment reported here among farmers in the zone may have aided the lower prevalence rates obtained in the farms. Such measures have been shown to reduce the incidence rates of coccidiosis outbreaks in poultry farms (Chapman, 2000; Seneviratha, 1979).

The higher prevalence rate of coccidiosis during the rainy season agrees with earlier reports that the disease incidence is positively influenced by the warm and humid weather, which characterizes the rainy season period by providing favorable conditions for the growth and development of the infective oocysts (Alawa *et al.*, 2001; Halle, 1998; Oluyemi and Roberts, 1979). However, prevalence rate during the dry season did not show any significant difference ($P>0.01$) from that of the rainy season. This also agrees with the report that exposure potential of chicken to coccidia parasites in warm humid tropical conditions is high, since environmental conditions favor an all year round

Table 3: Influence of farm size on the prevalence of coccidiosis in Abak Agricultural zone of Akwa Ibom State, Nigeria*

Farm size	Morbidity	Mortality
≤ 100	180 (21.79)[a]	67 (8.11)[a]
101-500	367 (12.94)[a]	51 (1.80)[b]
501-1000	1180 (57.56)[b]	160 (7.80)[a]
≥ 1001	1150 (20.46)[a]	20 (0.35)[b]
SEM	9.98	2.00
Totals	3327 (29.36)**	290 (2.63)**

*Values between brackets represent percentage of birds within farm size group. SEM = Standard error of Mean. **Values between brackets represent percentage of birds within total sample population. a,b: means with different superscripts are significantly different (P<0.05).

Table 4: Influence of Age, Season and Management System on the prevalence of coccidiosis in Abak Agricultural zone of Akwa Ibom State, Nigeria

Parameters	Morbidity	Mortality
(a) Age in weeks		
1-5	18.75[a]	NA
6-10	5.48[b]	NA
11-15	0.00[b]	NA
16-20	0.00[b]	NA
≥21	5.11[b]	NA
SEM	3.43	–
(b) Season		
Rainy season	12.76[a]	0.72[a]
Dry season	11.02[a]	0.48[b]
T- test $_{cal}$	0.48	
18.60		
(c) Management System		
Deep litter	26.69[a]	2.66[a]
Battery cage	8.34[b]	0.00[b]
T-test $_{cal}$	5.68	10.64

T-test$_{tab}$ (0.01) = 2.998. SEM = Standard error of Mean. NA = Not available

development of the coccidial organisms (Obasi *et al.*, 2001). Generally, our prevalence rates during both seasons were lower than the 51.5-97.6% earlier reported for Zaria and Makurdi in Northern Nigeria (Halle *et al.*, 1998; Uza *et al.*, 2001).

Birds managed on deep litter showed higher incidence of coccidiosis due perhaps to their close contact with the infective oocysts in the litter. Coccidiosis was also most prevalent among young chicks of 1-5 weeks of age. This again agrees with the report that oocysts could appear in faecal sample of birds as early as 7 days of age with the clinical disease manifesting by the 4th week (Majaro, 2001; Obasi *et al.*, 2001). This early infection has been shown to be partly due to the activities of flies attracted by the odour of feeds. These flies contaminate the feeds during their feeding activities with the resultant infection of the chicks (Majaro, 2001). Resistance to the

Table 5: Prevalence of coccidiosis in relation to breed/strain and typology of bird in Abak Agricultural zone of Akwa Ibom State, Nigeria

Parameters	Morbidity	Mortality
(a) Breed/strain		
Harco	26.42[a]	2.39[a]
Anak	1.50[b]	0.11[b]
Cobb	0.08[b]	0.00[b]
Unspecified	1.34[b]	0.50[b]
SEM	6.36	0.55
(b) Typology of bird		
Layers	22.29[a]	7.05[a]
Broilers	3.51[b]	1.43[b]
T-test $_{cal}$	36.32	6.06

T-test $_{tab}$ (0.01) = 2.998. SEM = Standard error of Mean. a,b: means with different superscripts are significantly different (P<0.01)

Table 6: Management of coccidiosis at different farms in Abak Agricultural zone of Akwa Ibom State, Nigeria

Parameters	% of farms
(a) Disease diagnosis	
Veterinarians	60.00
Agricultural extension agents	6.66
Farmers/managers	34.44
(b) Preventive measures employed	
Good sanitary management	50.00
Administration of anticoccidial drug	33.33
Administration of antibiotic	10.00
Periodic consultation with veterinarians	6.66
Vaccination	0.00
(c) Control of disease outbreak	
Administration of anticoccidial drugs	40.00
Local remedies	3.33
Disposal of affected birds	3.33
Removal of litter and use of coccidiostat	43.33
Consultation with veterinarians	6.66

disease usually increases with age of birds. This perhaps explains the decrease in prevalence rates with increasing age of birds in this study (Chapman, 1997; Uza *et al.*, 2001). The 5.11% prevalence recorded among birds aged above 21 weeks may have resulted from stress occasioned by egg production, and corresponds with the higher prevalence rate observed among layers.

Poultry farmers in Abak agricultural zone tend to have a clear knowledge of coccidiosis and its pattern of outbreak probably from their experience with the indigenous chicken and contact with veterinarians. Preventive and control measures in the forms of good sanitation and administration of anticoccidial drugs by farmers agrees with earlier reports that coccidiosis though highly prevalent can be successfully managed

using a combination of chemoprophylaxis and good hygienic practices (Chapman, 2000; Halle *et al.*,1998; Obasi and Mbagwu, 2000; Uza *et al.*, 2001).

Current efforts towards farm coccidiosis prevention are relying more on vaccination. Continued education and extension services are therefore recommended for poultry farmers in Abak agricultural zone in order to update them on the advantages of vaccination and adoption of integrated approach involving good hygienic practices and the use of both drugs and vaccines to prevent this disease. Furthermore, self-diagnosis of common poultry infections such as coccidiosis, which is being practiced, by a good number of the farmers in the study area should be discouraged.

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