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COCCIDIOSIS OF VILLAGE SCANVENGING FOWLS IN ABIRIBA, ABIA STATE, NIGERIA.

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ABSTRACT

Coccidiosis is a major parasitic disease that impacts on dietary protein and food security in Nigeria. A study to determine the prevalence of coccidiosis in free-range fowls was carried out in Abiriba, Ohafia L.G.A. of Abia State. Samples were collected in sterile vials and analyzed using the concentration technique. Of the 140 randomly collected faecal samples, an overall 59(47.0%) were positive ($p<0.05$; =0.013i68). However, community specific prevalence indicated 28(20.0%) and 31(22.14%) occurrences ($p>0.05$,=0.72869) in Amogudu and Aneke communities respectively. Age specific-prevalence declined as age of the birds increased with 1-6 weeks birds having 44.06% prevalence, 7-16 (33.89%) and 16+ aged birds having 13(22.03%) prevalence. There was no significant difference ($P>0.05$; =0.16605)) in parasite load between the sexes in the study. The build-up of immunity in older birds was attributed to consistent presentations of infective oocytes to the birds during feeding. Parasite load in individual birds did not manifest clinical symptoms in the birds. The cultural practice of free ranging of fowls is a weak link to the control of coccidiosis in Abriba community due to the constant exposure of susceptible chicks to viable infective oocysts.

Key words: Age-specific prevalence, immunity, parasite load, infective oocytes.

INTRODUCTION

The rapid increase in the world's population is of great concern to governments globally. The implication of this population explosion to the developing world is ultimately inadequacy of food, disease outbreaks and high mortality rate particularly women and children. Food insecurity has been a major factor in the poor results recorded against preventable diseases that have plagued the developing world. At the fore front of this consistent spread of poverty and disease in sub Saharan Africa is protein malnutrition (Müller and Krawinkel, 2005, WHO, 2009, 2016,). It has been estimated that massive population growth, declining incomes and the growing consumption of meat will drive the demand for food in the next two decades, notwithstanding the projected increase in food production that will occur due to advancement in technology (UNEP, 2009). The frantic efforts by international organizations to stem hunger by providing quality health care and high yielding seeds and animal products respectively to resource-poor farmers in Africa and Asia

(FAO, 2009a, 2009b) is seen as a step in the right direction. Although, this intention had been consistently marred by myriads of factors such as regional conflicts, natural disasters and syndrome of poor leadership, that is peculiar to the African nations (Müller and Krawinkel 2005, Mirmiran *et al*., 2009). There is still a glimmer of hope that the dooms day is not with us yet.

Numerous researches showed that poultry keeping in all its forms are veritable approaches and strategies to improving protein nutrient demand of the ever-increasing world population (UNEP, 2009, Abdu *et al.*, 2010). This is true when the advantages of keeping poultry are juxtaposed with that of other forms of animal husbandry. Poultry yields numerous utility products such as; organic manure, feather, bone, shell, egg, meat and money to the farmer, making it very important in the strategic quest to eradicate poverty by many sub Saharan countries. Again, the ease of moving poultry around especially in times of political crises and natural disasters makes it a veritable source of protein in times of stress.

Despite the advantages of poultry, it is still plagued by coccidiosis; an infectious parasitic disease caused by a protozoan of the genus; *Eimeria* (Merck Vertirenary Manual (MVM) 2015, Khaboudi *et al*., 2016). Avian cocccidiosis is a common enteric parasitic disease that is economically important in poultry worldwide, causing production losses, high mortality due to acute bloody enteritis. It is estimated that an annual loss of $3 billion dollars is incurred due to the incidence of coccidiosis worldwide (Lillehoj, 2006).

In Africa, poultry farmers have to grapple with four main diseases namely, Newcastle, Fowl Typhoid, Coccidiosis and Gumboro-Infectious bursal disease (Cole and Friend, 1999, Mumero, 2012). Epizootiological studies in Nigeria have established the economic importance of coccidiosis as a major parasitic disease of poultry impacting negatively on poultry production. Droopiness, paleness of the comb, diarrhoea, emaciation, ruffled feather, and dehydration are manifest in mild attacks. However, loss of appetite and occasional appearance of blood in droppings are evident in addition to the outlined symptoms in light attacks. Destruction of the epithelial cells, dilation of the caecae, posterior lesion of the intestinal tract and death are common symptoms in severe attacks (Cole and Friend, 1999)

Poultry keeping comes with great variability in the West African sub region. However, two major forms are recognized in Nigeria namely; the free-range and confined systems (Fanatico, 2000, Kaboudi and Munir, 2016). The former usually consists of indigenous domestic fowls (*Gallus domesticus*) popularly referred to as the local or rural chicken or fowl, backyard poultry or village chicken that are allowed to fend for themselves with minimal attention from the keepers. On the other hand, the confined system comprises birds specifically raised on the basis of demand for their products (George, 2010). Native (village) chickens play key roles in the socio-cultural-economic lives of Nigerians as they are common items in marriage and religious ceremonies aside, being veritable sources of protein and revenue to their keepers (Okitoi *et al.*, 2007, Hadipour, 2010). There is great interest all over the world in agriculture which also in-cooperate the use of the free range poultry as a way of curtailing the use of anti-coccidial drugs in poultry (Chapman, 2000, Fanatica, 2000).

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In view of the numerous benefits of free range poultry to the greater population of rural dwellers that constitute more than 60% of the poultry enterprise in Nigeria, it is pertinent to determine the coccidiosis status of free range-fowls in Abiriba, a rural area in Ohaofia Local Government Area of Abia State, Nigeria in order to develop effective control strategies to manage incidences of the paratosis of poultry in the rural areas.

MATERIALS AND METHODS

Study Area

The study was conducted in Ameke and Amogudu communities in Abiriba, Ohafia L.G.A of Abia State, Nigeria. The study area is a rural area with some advancement towards urbanization in terms of settlement patterns and social amenities. The people of the study area are culturally oriented as indigenes retain most of the cultural and agricultural heritage of the Abriba people. Abriba has a population of about 40,449 inhabitants (Nigerian Census, 2006) and lies between Latitude $5^{\circ}42'0''$ North and Longitude $7^{\circ}44'0''$ East of the Greenwich meridian. The study area falls within the rainforest zone of South-Eastern Nigeria climate with an average annual rainfall of about 2,082mm and an annual average temperature of about 26.6^{0}C.

Sample Collection

A total of 140 faecal samples were randomly collected from the two communities; Ameke and Amogudu (67 and 73 respectively). Prior to stool sample collection, the consent of the owners of the free-range fowls was obtained and resting sites of the birds identified. Plastic baskets and thick cardboards were provided for the owners of the birds to use in restricting the movement of the fowls while at rest. The thick cardboards were placed underneath the resting fowls to collect uncontaminated droppings. The next morning, the droppings were scooped into sterile vials which were pre-labelled indicating the age, sex and location of collection. The stool samples were preserved with 4% formalin and taken to the Department of Animal and Environmental Biology laboratory, University of Port Harcourt for examination. The concentration (Sedimentation) technique was used to analyze the samples according to Agi *et al.*, (2010). Sporulated and un-sporulated oocysts were specifically identified using the compound microscope in line with the size, shape and colour as outlined by Soulsby (1968).

Analysis of Data

Data was analyzed using Analysis of Variance (ANOVA). Statistically significant value must be $\leq$ or p- value of <0.05.

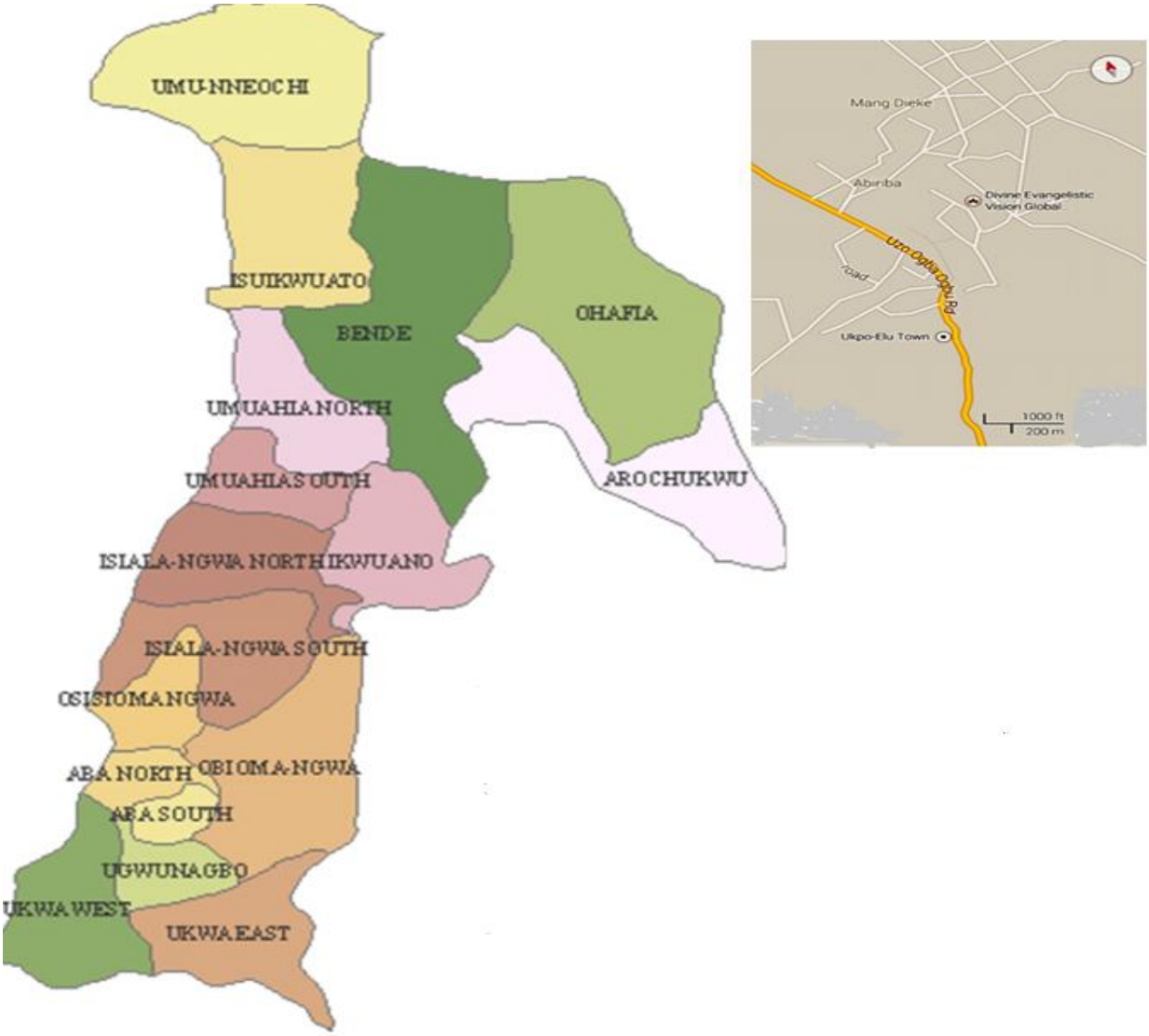

Plate 1, Map of the Study Areas

RESULTS

Overall prevalence of coccidiosis in the sampled fowls

A total of 140 feacal samples from free-range fowls were examined with 59 (42%) birds being infected. Of this, 26(44.06%) birds were within the age range of 1-6 weeks, 20(33.89.0%) were from the age range of 7-16 weeks; and 13 (22.03%) birds were in the age range of 16 weeks and above. Study showed that birds from Ameke community had the highest prevalence of 31(22.14%) infection compared with the birds from Amogudu that recorded 28(20.0%) prevalence (Table 1). The variability in parasite load recorded in the two communities was statistically significant ($p<0.05$). However, the overall age–related prevalence of the disease amongst the communities was low in relation to the uninfected.

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Table 1: Age-related prevalence of coccidiosis of free-range fowls in two communities in the study area

Age (weeks)	Number Examined	Amogudu No. Infected (%)	Ameke No. Infected (%)	Total No. Infected (%)
1 – 6	55	13(23.63)	13(23.63)	26(44.06)
7 – 16	47	9(19.14)	11(23.40)	20(33.89)
16+	38	6(15.78)	7(18.42)	13(22.03)
Total (%)	140	28(20.0)	31(22.14)	59(42.14)

P=0.72869 (df=1) within communities, and 0.013168 (df=2) across communities

Sex related prevalence of coccidiosis in free range fowls

Sex-related prevalence of coccidial infection in free-ranged fowls in the study showed that a total of 34(57.0%) male birds and 25(43.0%) female birds were infected in the study. Of these 28(20.0%) and 31(22.14%) prevalence were recorded for male and female birds respectively in Amogudu community. However, 15(22.05%) of the male birds were infected while 16(56.61%) of the females were infected in Ameke community (Table 2.). The study showed that the male birds 34(57.0%) generally harboured more parasites than the female birds. Also, the male birds from Amogudu harbored more parasites than female birds while females from Ameke had more parasites than the male (Table 2). There was no significant difference ($p>0.05$, = 0.16605, df=1) in sex related prevalence in the study.

Table 2: Overall sex related prevalence of coccidiosis in free-range fowls in Abiriba, Ohafia L.G.A. of Abia State.

SEX	Number Examined	Amogudu No. Infected (%)	Ameke No. Infected (%)	Total No. Infected (%)
Male	68	16(23.52)	15(22.05)	34(57.0)
Female	72	12(16.66)	16(51.61)	25(43.0)
Total (%)	140	28(20.0)	31(22.14)	59(42.14)

P= 0.16605 (df=1) within communities and 0.55095 (df=1) across communities

DISCUSSION

The overall prevalence of coccidiosis in the study area was relatively high, indicating that the factors which predispose birds to infective oocysts are common and sustained in the environment. It is envisaged that the unsanitary nature of the resting pens and scavenging habit of the fowls exacerbated the parasites infectivity. Age-related prevalence declined as age of birds increased in the sampled communities. The result indicated that free-ranged fowls were susceptible to coccidiosis and particularly vulnerable to the infection at the young age as observed in the 1-6 weeks old birds (Braunius, 1980, Permin 1997a, Nsamba *et*

al., 2006). The vulnerability of young fowls to coccidiosis in this study was associated with host specific factors such as the immune status of the birds. According to Agi, *et al*.,(2010) and Robinson *et al*.,(2010) poor build-up of immunity hamper the survival of young chicks especially during the wet season. Age as viewed in this study is factor that exposed birds to natural infections repeatedly and this induce accelerated immune competence in the birds'. The researchers are of the view that there may be certain environmental factors that could be responsible for the inhibitory effect on the establishment of *Eimeria* Spp.in the intestinal lumen of the host.

The study also showed that there was no association between the parasite load and the sex of birds in the study. Therefore, sex of the free-range fowls cannot be said to be a determining factor in the manifestation of clinical symptoms of the infection. The observed sex-related disparity in the parasite load was not statistically significant (p>0.05, 0.16605, df=1, within communities and 0.55095, df=1, across communities). Generally, the result of the study also showed that the scavenging fowls showed relatively high tolerance to coccidia infection which indicated the possibility of an inhibitory factor in the ambient condition of the environment the fowls grazed. The study opined that the constant browsing on herbs could be sources of the anti-coccidial substances that could enhance the immunity of the fowls. There is then a need to identify these plant materials as they would bring about a cheaper control of coccidiosis in poultry. This observation supports the new wave in coccidial control where birds are naturally exposed to repeated bouts of infective agents to stimulate the build-up of immunity and discourage use of coccidiocides (Chapman 2000 and Fanatico 2000). More so, the study recommends that an improvement in sanitation and hygienic disposal of sewage can reduce the prevalence of the infection especially in the rural areas.

The research reveals that coccidiosis although a dreaded parasitic infection of birds world over is particularly not deleterious to free range birds in the study area. This is due to the early and repeated exposure of the birds to infective oocytes that enhance the build-up of resistant proteins that promote coccidial immunity. This phenomenon of acquiring natural immunity is now advocated for as a strategy in the green agriculture innovation.

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