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Gastrointestinal parasitism in local and exotic breeds of chickens reared in Gwagwalada Guinea Savannah zone of Nigeria

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Abstract

The present study was carried out to establish the gastrointestinal parasites in local and exotic breeds of chickens reared in Gwagwalada, Guinea Savannah Zone of Nigeria. It was conducted between July and September, 2014. Two hundred and eighty (280) faecal samples from local and exotic breeds of chicken and 50 intact whole intestines were collected randomly from seven (7) major towns (Gwagwalada, Dobi, Gwako, Giri, Anagada, Tungan Maje and Zuba) in Gwagwalada Area council and examined for gastrointestinal parasites using flotation and sedimentation methods. Six (6) different gastrointestinal parasite eggs and oocytes were identified in 42.5% of the birds examined. Of these parasites, *Ascaridia* species was found to be the most prevalent (36.1%) among the chickens. Other parasites encountered include; *Eimeria* oocytes (34.5%), *Heterakis* species (12.6%), *Rallietina* species 10.1%; *Capillaria* species (4.2%) and *Syngamus* species (2.5%). There were mixed infection of 1.4% among the infected birds. Interestingly, none of the birds examined was infected with trematodes There was no significant difference ($p>0.05$) in prevalence rate of infection between the local and exotic breeds of chickens. Although males had a higher prevalence of infection than the females in both breeds, there was no significant difference ($p>0.05$) in the prevalence of infection among sexes. However, there was significant difference ($P<0.05$) between the age groups, with highest infection occuring in growers (46.2%). 20 (40%) of the 50 intact whole intestines screened were positive for gastrointestinal parasites by gross examination of intestinal tract. Out of the 20 positive, 12 were nematodes, 3 cestodes and remaining 5 were mixed infections. Therefore, sustainable ways of controlling these parasites at a particular age and further studies on the prevalence of gastrointestinal parasites in chicken need to be elucidated for improved intensive egg and poultry meat productions

Keywords: Chickens, Exotic, Gastrointestinal, Local, Parasites, Prevalence

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Introduction

Poultry are domesticated birds kept by man for the purpose of obtaining meat, eggs and sometimes feathers. They include birds like chicken, duck, goose and turkey. Poultry are kept in backyards or commercial production systems in most areas of the world. It is one of the most important sources of protein and farm manure, for man (Frantovo, 2002).

In the last few years, with increase of poultry production, a lot of losses have been linked to disease causing agents such as viruses, bacteria and parasites (Sayyed *et al*., 2000). Although parasitic diseases are among the major factors that decrease productivity of chickens, they are often neglected as they are most times subclinical. Parasitism is one of the major problems which inflict heavy economic losses to poultry production in the form of retarded growth, reduced weight gain, decrease egg production, diarrhea, intestinal obstruction and poor feathers. Stress from parasites could affect the blood picture and cause anorexia (Dube *et al*., 2010). However, there is a reduction in parasitic infection in commercial poultry production mostly due to improved housing, hygiene and management practices.

The domestic chicken feed on a wide range of food substances ranging from grains, fruits to insects which may harbor infective stages of parasites

thereby predisposing them to parasitic infection, particularly gastrointestinal parasites (Oniye *et al*., 2000; Frantovo, 2002).

The prevalence and intensity of helminths infections may be influenced by several factors, including those that pertain to the host such as age, sex and breed. Furthermore, climatic conditions may alter the population dynamics of the parasites resulting in dramatic changes in the prevalence and intensity of helminths infection (Magwisha *et al*., 2002). Many insects that act as vectors for helminths are also favored by high temperature and to some extent humidity. These factors may explain the wide range and distribution of nematode and cestodes species in poultry, especially during the tropical rainy season (Dube *et al*., 2010). In the past, few studies have analyzed the incidence of helminthe parasites in the free-range local or backyard and commercial chickens in different parts of the country (Eshetu *et al*., 2001; Ashenafi & Eshetu, 2004) with less information on the parasites especially around the Federal Capital Territory, Abuja. This study, is therefore, aimed at investigating the gastrointestinal parasites of local free range and exotic breeds of chickens reared in 7 major towns in Gwagwalada Area Council, Guinea Savannah zone of Nigeria.

Materials and methods

Study area

This study was conducted in the Gwagwalada Area Council which is one of the six Area Councils of the Federal Capital Territory, Abuja, Nigeria. It is located geographically in the central part of Nigeria, between latitudes 8^0 and 9^0 N and longitudes 6^0 and 7^0 E. It has a guinea savannah type of vegetation, with rainy season stretching from April to October and dry season, November to March. The temperature ranges from 30-37^{o}C yearly with the highest temperature of the area experienced in the month of March. Other towns included in this area council are Dobi, Tunga-Maje, Zuba, Igwa, Giri, Anagada, Ibwa, Sheriagu, Shaga, etc.

Study methods

A total of 280 freshly voided faecal samples, 140 each of local and exotic breeds of poultry and 50 intact whole intestines of both local and exotic breeds of chickens were collected randomly from 7 towns in Gwagwalada Area Council, between July and September 2014. From each town, a total of 40 faecal samples were collected. Chickens of different age groups and sexes kept in deep litter system were included in the study. The samples were collected with a spatula, which was washed and cleaned after each collection to avoid contamination. Each faecal sample was placed in a sample bottle and labeled properly indicating the towns, dates, breed and sex of the chicken.

Direct microscopic examination, centrifugation floatation technique and sedimentation technique as described by Urquhart *et al*. (1987) were used to investigate faecal sample. Identification of the eggs or oocyst made on the basis of morphorlogy and size of eggs.

Faecal samples obtained were examined using saturated concentrated sugar solution floatation and sedimentation techniques and eggs or oocysts identified using the light microscope at x100 objective.

50 intact whole intestines 25 each of local and exotic poultry breeds were collected at slaughter in Gwagwalada main market. The intestines were dissected longitudinally and screened for the presence of helminth parasites. The adult parasites removed from the intestines wre preserved in 10% formalin for identification.

Data collected on prevalence and numbers of gastrointestinal parasites in faecal samples of each breed were statistically analyzed using simple statistical method such as percentage, student t-test and Chi square (χ^2). The test statistics was applied at 0.05 level of significance, to test whether or not there were significant differences.

Results

The result revealed that nematodes had the highest prevalence rate of infection in both the local and exotic breeds, with *Ascaridia* species having the highest prevalence rate followed by *Heterakis* species. The percentage prevalence recorded was 15.4% and 5.4% respectively. *Capillaria* species and *Syngamus* species had prevalence rates of 1.8% and 1.1% respectively. The protozoan species recorded was *Eimeria* oocyst with a prevalence of 14.6%, while the cestode species recorded was *Rallietina* species with a prevalence of 4.3% (Table 1). The overall prevalence according to breed is as shown in table 2. The prevalence of infection in local breed was 44.3% while that for the exotic breed was 20.4%

In table 3, parasites preference in relation to sex and age were also observed. Out of the 79 males examined, 46.8% were infected by the gastrointestinal parasites while out of the 201 female birds examined, 40.8% were positive for gastrointestinal parasites, although, this was not statistically significant ($P>0.05$). Chickens within the age group of 7-15wks (growers) were more significantly ($P<0.05$) infected than the chicks, but not ($P>0.05$) more than the adults. (Table 4). In Exotic breeds, males had a significantly ($P<0.05$) higher occurrence infection rate of 72.7% than 44.9% of females examined (Table 5). Again, the exotic chicks recorded significantly ($P<0.05$) lower rate of infection (28.6%) when compared with the growers (Table 6). In local breeds, female birds had a higher rate of infection (48.2%) as against the 36.8% of the male, although, this was not

significant (P>0.05) (Table 7). Also, Adults recorded 48.3% of infection as against the other age group (Table 8).

Among the 50 whole intestines screened for the presence of gastrointestinal parasites, 20 were found positive for gastrointestinal parasites by gross examination of the gastroitetsinal tract with *Ascaridia* species accounting for 12, *Rallietina* species 3 and 5 were mixed infections of both (Plates I, II & III)

In the local breed, 16 out of the 25 intact whole intestines screened were positive for gastrointestinal parasites giving a prevalence of 64%. While in the exotic birds 4(16%) out of the 25 intact whole intestines screened were positive for gastrointestinal parasites.

Table 1: Overall prevalence of gastrointestinal parasites of chicken (n=280)

Parasites	No. Infected(n=280)	% Prevalence
Ascaridia species	43	15.4
Eimeria oocyst	41	14.6
Heterakis species	15	5.4
Rallietina species	12	4.3
Capillaria species	5	1.8
Syngamus species	3	1.1
Total	**119**	**42.5**

Table 2: Prevalence of gastrointestinal parasites of chickens according to Breed (n=280)

	Variables	No. of birds examined	No. (%) infected	No. (%) not infected
Breed	Local	140	62(44.3)	78(55.7)
	Exotic	140	57(40.7)	83(59.3)
Total		280	119(42.5)	161(57.5)

$\chi 2 = 0.3654$ P =0.5455

Table 3: Prevalence of gastrointestinal parasites of chickens according to sex

	Variables	No. of birds examined	No. (%) infected	No. (%) not infected
Sex	Male	79	37(46.8)	42(53.2)
	Female	201	82(40.8)	49(59.2)
Total		280	119(42.5)	161(57.5)

$\chi 2 = 0.8464$ P =0.3576

Table 4: Prevalence of gastrointestinal parasites of chickens according to age

	Variables	No. of birds examined	No. (%) infected	No. (%) not infected
Age	0-6wks (chicks)	70	21(30)	49(70)
	7-15wks (Grower)	93	47 (50.5)	46(49.5)
	>16wks (Adults)	117	51 (43.6)	66(56.4)
Total		280	119(42.5)	161(57.5)

$\chi 2 = 6.991$ P = 0.03033

Table 5: Prevalence of gastrointestinal parasites in exotic chickens according to sex(n=140)

	Variables	No. of birds examined	No. (%) infected	No. (%) not infected
Sex	Male	22	16(72.7)	6(27.3)
	Female	118	53(44.9)	65(55.1)
Total		140	69(49.3)	71(50.7)

$\chi 2 = 5.738$ P =0.01660

Table 6: Prevalence of gastrointestinal parasites in exotic chickens according to age (n=140)

	Variables	No. of birds Examined	No. (%)infected	No. (%)not infected
Age	0-6wks (chicks)	35	10(28.6)	25(71.4)
	7-15wks (Grower)	48	26(54.2)	22(45.8)
	>16wks (Adults)	57	21(36.8)	36(63.2)
Total		140	57(40.7)	83(59.3)

$\chi 2 = 6.091$ P =0.04758

Table 7: Prevalence of gastrointestinal parasites in Local chickens according to sex (n=140)

	Variables	No. of birds examined	No. (%) infected	No. (%) not infected
Sex	Male	56	21(37.5)	35(62.5)
	Female	84	41(48.8)	43(51.2)
	Total	140	62(44.3)	78(55.7)

$\chi 2 = 1.8$ P =0.1799

Table 8: Prevalence of gastrointestinal parasites in Local chickens according to age (n=140)

	Variables	No. of birds Examined	No. (%)infected	No. (%)not infected
Age	0-6wks (chicks)	35	10(28.6)	25(71.4)
	7-15wks (Grower)	45	23(51.1)	22(48.9)
	>16wks (Adults)	60	29(48.3)	31(51.7)
Total		140	62(44.3)	78(55.7)

$\chi 2 = 4.751$ P =0.09297

Discussion

The overall prevalence of infection with gastrointestinal parasites recorded in this study was 42.5%. This finding is in agreement with the previous report of 35.5% by Nnadi & George, (2010) from Nsukka and 37.6% by Agbolade *et al*. (2014) from Ijebu North, South Western Nigeria and by Shiferaw *et al*. (2012) from Ethiopia.

The prevalence of 42.5% recorded here was greatly lower than 92.6% reported by Mikail & Adamu (2008) in Sokoto Metropolis; 96.3% by Fakae & Paul-Abiade (2003), in Nsukka; 81.5% by Junaidu *et al*. (2014) in Giwa, Kaduna State; 63.6% by Ogbaje *et al*. (2012) in Makurdi and 59.64% by Yehualashet (2011) in Ethiopia This discrepancy could be related to the differences in the management systems, control practices in the farms and seasonal differences. It has been reported that these factors exacerbates the infection of domestic birds in the tropics (Opara *et al*., 2014). *Ascaridia* species had the highest prevalence rate in both local and exotic breeds. Similar reports have been documented from other parts of Nigeria; Zaria in Kaduna State (Luka & Adams, 2007), Jos in Plateau State (Pam *et al*., 2006) and Nsukka in Enugu State (Nnadi & George, 2010). In other climes, especially Africa, several studies have strongly suggested that *Ascaridia galli* is the commonest and most important helminths of poultry (Eshetu *et al*., 2001; Kaingu *et al*., 2010). *Syngamus* species that was absent in exotic breed had low prevalence rate in local breed (2.5%). This is in agreement with Pam *et al.* (2006), Luka & Ndams, (2007) who reported in their work that this parasite has low prevalence rate of infection compared to the other helminth parasites.

Although, the overall prevalence of infection in local breeds (44.3%) was higher than the exotic breeds (40.7%), there was no significant difference ($P > 0.05$) in the rate of infection between breeds.

This study showed that there was significant difference ($p<0.05$) among the age groups, with highest infection rate occurring in grower birds (50.6%) using the Chi Square test, thus indicating that age played a role in the infection of the birds with gastrointestinal worms. This could be attributed to the existing maternal immunity in the chicks and the longer exposure of the older birds to both helminth ova and coccidian oocyst from the environment.

As was observed in previous studies by Uhuo *et al*. (2013), Magwisha *et al*. (2002), Ashenafi & Eshetu (2004), and Hirut (2009), the result of the present study showed that there was no sexual dimorphism with regards to helminth infection of the birds examined.

The gross parasites found were in accordance with Puttalakshmamma *et al*. (2008) who found positive infections in local fowls in intestinal examination in and around Banglore.

In conclusion, this study revealed a higher but not so significant prevalence of gastrointestinal parasitism in the exotic breed of chicken and that sex did not influence the rate at which the birds were infected.

Ascaridia species was the most prevalent gastrointestinal parasite affecting the chickens reared in Gwagwalada Area Council of Abuja.

Poor deworming regime, health care, and improper sanitation are among the major factors responsible for the high prevalence of gastrointestinal parasitism in the farm.

Therefore, sustainable ways of controlling these parasites through proper and timely deworming of the local and exotic chickens would help to improve egg and poultry meat production.

It is also therefore, recommended that, appropriate deworming and treatment of infected birds be carried out regularly, particularly at the grower stage by a Veterinarian. In addition, proper and adequate nutrition would also minimize the incidence rate of helminthosis of domestic birds in the Area Council.

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