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Prevalence Of Gastrointestinal Parasite Of Domestic Pigeon (Columba Livia) In Mubi North LGA Of Adamawa State, Nigeria

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Abstract: ***Pigeons (Columba livia domestica) are ubiquitous bird and can be found virtually in every town and city around the world. There is scanty information on the gastrointestinal parasite of Columba livia in Mubi North, therefore this study is however tried to identify the gastrointestinal parasites of Columba livia by sex and location.30 Columba livia, 15 males and 15 females were used. Diethyl ether method of parasite identification was used, microscopical examination and parasite identification using microscope of 10 x 10 for nematode and cestode eggs, then 10 x 40 for coccidian oocysts and 10 x 4 for trematode eggs. Results show that out of the 30 Columba livia examined, 18 (60%) were infected. The infection rate was higher in males with 11 (36.67%) rate and females had 7(23.33%). However there was no significant difference between the gender and gastrointestinal infection since P>0.05. The infection rate was higher from those obtained from Market with 26.67%, followed by Shuware with 20% and the least was found in Barama with 13.33%. Statistically, there was no significant difference in the infection rate between Columba livia of the different location. Capillaria anatis, Reillietina cestillus, Eimeria sp., Subulura brumpti, Ascaridia galli, Reillietina tetragona, Reillietina echinobothrida in the parasites identified in this study. It also shows that, those that harbored only one type of parasite has an infection rate of 12(66.67%), those with two different types of parasites with rate of 5(27.78%), while those that harbored three parasites with 1(5.56%). The study reveals that there was high infection rate in the Columba livia examined; even though, the rate of infection is not significant when compared to gender and location. Therefore there should be proper hygiene of the Columba livia house to reduce the rate of infection, also other methods such as intensive rearing should be adopted, other than the free range method and consumption of the C. livia intestine should be stop to avoid the human infection by these parasites.***

Keywords: Prevalence, Pigeons (Columba livia domestica), gastrointestinal parasite, Mubi

I. INTRODUCTION

Pigeons (*Columba livia domestica*) of the order Columbiformes are ubiquitous bird and can be found virtually in every town and city around the world (Marques *et al.* 2007; Parsani and Momin *et al*. 2010). There are about three hundred (300) species of pigeons, the male and female of the same species look alike. (Saeed *et al.*2009; Matur *et al.* 2010). Pigeons have been accompanied by human since ancient time. They live side by side with human as a source of food, hobby and experimental purpose. Pigeons are worldwide free living species which was found since in the ancient time, (Sari *et al.* 2008; Musa *et al.* 2011; Opara *et al.* 2012). They are most widely distributed among hoppy in the world as well as in most cities and villages in Nigeria (Al-Bakry, 2009). In some countries, pigeons are used as human food, ornamental

purposes, as well as bio-indicators of chemical pollution (Nam *et al.*, 2004; klein *et al.*,2008; Albarwari and Sadeed, 2012). The domesticated pigeon, (*Columba livia domestica*) usually kept as pet or for economic purpose are commonly found in the Northern parts of Nigeria where they are of large number either on free range or under semi intensive management.

Pigeons are considered as a serious health problem for man (Vazquez *et al.*2010) and livestock including poultry as they may carry many infectious agents or pathogens such as *Campylobacter* and *Chlamuydophila psittaci*, *Listeria*, *Salmonella*, *Aspergillus*, Newcastle disease and *Microsporidia* (Ashrafihelan *et al.* 2010). *Enterocytozoon* and *Encephalitozoon* and nematodes such as *Filaria* have also been reported (Bahrami *et al.* 2013). Humans or other poultries may be infected by dry fecal dust (Marques *et al.* 2007). The resultant situation leads to loss of body weight, retardated growth, reduced egg production, weakened body resistance and even death (Borghare *et al.* 2009). Significant differences in haemoglobin (Hb), packed cell volume (PCV) and red blood cells (RBCs) values have been reported between infected chicken with cestodes and non-infected chicken (Saeed *et al.* 2009; Ghosh *et al* 2014). Investigations in chickens and ducks managed under similar environmental conditions, like pigeons have shown high prevalence of gastrointestinal helminths (Magwisha *et al.* 2002; Muhairwa *et al.* 2007) and have been thought to impair productivity and health of these birds.

Domestic pigeon may host a wide variety of internal and external parasites. Haemoparasites, those that inhabit the blood are some of the most significant known to cause septicemia, neonatal bacterial diarrhea, and marginal anaemia in birds. Vectors commonly known to transmit haemoparasites to birds include mosquitoes (*Culicoides*), blackflies (*Simulidae*), biting midges (*Ceratopognidae*) and Hippoboscid flies (*Hippoboscidae*) which are widely distributed geographically (klein *et al.* 2008). Parasitic diseases such as those caused by helminthes, arthropods, blood and gastrointestinal protozoans especially Coccidian species of *Eimeria columbae, E. columbarium, E. labbeanae, E. tropicalis* have been reported to infect pigeons worldwide (Sari *et al.* 2008; Vazquez *et al.* 2010) with all being very pathogenic and are best treated using sulphaguanidine anticoccidials or controlled by improved hygienic standard (Msoffe *et al*. 2010).

In Mubi North Local Government Area of Adamawa State, Nigeria, most of the domestic pigeon sold and consumed in the market come from different homes within and around the city. Hence, domestic pigeon may get infected from their feeding habits which lead them to prey on arthropod such as housefly and ants as their source of protein. These insects are readily found inside rotten wood and crevices in the ground as reported by (Dawet *et al*. 2012). Therefore there is need for a scientific approach to identify the gastrointestinal parasites of *Columba livia* and to enhance their health condition. The study is aimed at examining domesticated pigeons (*Columba livia*) for the presence of gastrointestinal parasites, with the following objectives to identify the gastrointestinal parasites according to the gender and according to the location of *C. livia*.

II. MATERIALS AND METHOD

A total of 30 pigeons were bought from three different places (Mubi main market, Shuware and Barama housing areas) and were used for this research. Ten *C. livia* in pairs (male and female) from each of the aforementioned places were bought and tagged early in the morning from their cages and were transported in a carton to the Department of Biological Sciences laboratory, Adamawa State University, Mubi, the pigeons were slaughtered one at a time, after which the feathers were removed and the birds were placed on a dissecting tray and pinned using dissecting pins at the wings and the legs. The birds were dissected from the tail region and beneath the anus using dissecting knife to expose the intestine as in (Robert and Janovy, 2009). The intestines were removed and put on another dissecting tray and cut open using pointed scissors. The feaces were removed using forceps and placed in petri dishes containing little water and placed in a preservation bottle containing 10% formalin. The faecal samples were inverted inside the sample bottles, each sample were labeled according to their location and sex of the birds after collection as in (Soulsby, 1986; Adejinmi *et al*. 2011) and the identifications were carried out using a light microscope.

DIETHYL ETHER METHOD OF PARASITE IDENTIFICATION: Following the method of (Ochei and Kolhatkar, 2008). 0.5g of feacal sample was transferred to 10ml of 10% formalin in a 15ml test tube and mixed then allowed to stand for 30 minutes for adequate fixation. The feacal suspension was strained through two layers of guaze in a funnel into a centrifuge tube. 3ml of diethyl ether was added, the test tube was closed with a glass stopper and was properly shaked for 30 seconds, and the stopper was carefully removed. The test tube was centrifuged for two to three minutes at 5rpm, until four layers were formed; these are: A small amount of sediment at the bottom of the tube containing parasites, a layer of formalin, a plug of feacal debris and a layer of ether at the top. The plugs of debris were loosened from the side of the test tube using an applicator stick and the tube was rapidly inverted to pour off the ether, debris and the formalin. The sediment was stained by adding one drop of methylene blue and the sediment was transferred to a microscope slide and covered with a slip.

MICROSCOPICAL EXAMINATION: The prepared samples on microscope slides from diethyl ether method of parasite identification were examined in the microscope of magnification of 10 x 10 for nematode and cestode eggs, 10 x 40 for coccidian oocysts and 10 x 4 for trematode eggs.

Chi square test was the statistical tool used to analyse the proportion of the data obtained.

III. RESULT

Out of the 30 samples of *C. livia* examined, 18 (60%) were infected while 12 (40%) were not infected. *Capillaria anatis, Reillietina cestillus, Eimeria sp., Subulura brumpti, Ascaridia galli, Reillietina tetragona, Reillietina echinobothrida* are the parasites encountered in this study.

PREVALENCE OF GASTROINTESTINAL INFECTION BY GENDER: The infection rate of gastrointestinal parasite

base on gender of *C. livia* was higher in males with 73.3% rate and 46.7% in females as can be seen in Table 1. However, there was no significant difference between gender and gastrointestinal infection (P > 0.05)

PREVALENCE OF GASTROINTESTINAL PARASITES BASE ON LOCATION: The infection rates of gastrointestinal parasites in *C. livia* base on location were higher in those obtained from the Market with 80%, followed by Shuware with 60% and the least was Barama with 40% as presented in Table 2. However, result obtained was not statistically significant (P > 0.05).

Gender	Number infected	Number not infected	Total
Females	7 (23.33%)	8(26.67%)	15
Males	11(36.67%)	4(13.33%)	15
Total	18(60%)	12(40%)	30

P<0.05

Table 1: Prevalence of Gastrointestinal Infection by Gender

Location	Number infected	Number not infected	Total
Barama	4(13.33%)	6(20.00%)	10
Market	8(26.67%)	2(6.67%)	10
Shuware	6(20.00%)	4(13.33%)	10
Total	18(60%)	12(40%)	30

P< 0.05

Table 2: Prevalence of Gastrointestinal Parasites base on Location

PREVALENCE OF INFECTION BASED ON NUMBER OF PARASITES FOUND IN BIRDS SAMPLED: Infected birds with only one species of parasite have an infection rate of 66.67%, birds that harbor two different species of parasites had 27.78% and those with three different species of parasites had 5.56% infection rate as can be seen in Table 3.

Infected pigeons	Number of different parasites in a pigeon
12(66.67%)	1
5(27.78%)	2
1(5.56%)	3

Table 3: Prevalence of infection based on number of parasites found in bird sample

PREVALENCE OF GASTROINTESTINAL PARASITES IN ALL BIRDS SAMPLED: Table 4: shows the type of parasite found in each birds sampled in the different locations. Seven different parasites were encountered in the study. The parasites encountered are; *Capillaria anatis, Reillietina cestillus, Eimeria sp., Subulura brumpti, Ascaridia galli, Reillietina tetragona, Reillietina echinobothrida* with infection frequency of 9, 5, 3, 3, 2, 1, 1 respectively.

S/No	Location	Sex	Result	Parasites found
1	Shuware	M	Infected	*Capillaria anatis*
2	Shuware	F	Infected	*Eimeria sp.*
3	Shuware	M	Infected	*Raillietina tetragona, Capillaria anatis*
4	Shuware	F	not infected	
5	Shuware	M	Infected	*Capillaria anatis*
6	Shuware	F	not infected	
7	Shuware	M	not infected	
8	Shuware	F	not infected	
9	Shuware	M	Infected	*Raillietina cestillus, Capillaria anatis*
10	Shuware	F	Infected	*Ascaridia galli*
11	Barama	M	Infected	*Raillietina echinobothrida*
12	Barama	F	not infected	
13	Barama	M	not infected	
14	Barama	F	not infected	
15	Barama	M	Infected	*Raillietina cestillus*
16	Barama	F	not infected	
17	Barama	M	Infected	*Subulura brumpti*
18	Barama	F	not infected	
19	Barama	M	Infected	*Raillietina cestillus, Ascaridia galli*
20	Barama	F	not infected	
21	Market	M	Infected	*Raillietina cestillus, Capillaria anatis, Eimeria sp.*
22	Market	F	Infected	*Capillaria anatis*
23	Market	M	Infected	*Capillaria anatis*
24	Market	F	Infected	*Subulura brumpti*
25	Market	M	not infected	
26	Market	F	Infected	*Eimeria sp.*
27	Market	M	not infected	
28	Market	F	Infected	*Raillietina cestillus, Capillaria anatis*
29	Market	M	Infected	*Capillaria anatis*
30	Market	F	Infected	*Subulura brumpti*

Key
M = Male
F = Female

Table 4: Prevalence of gastrointestinal parasites in all birds samples

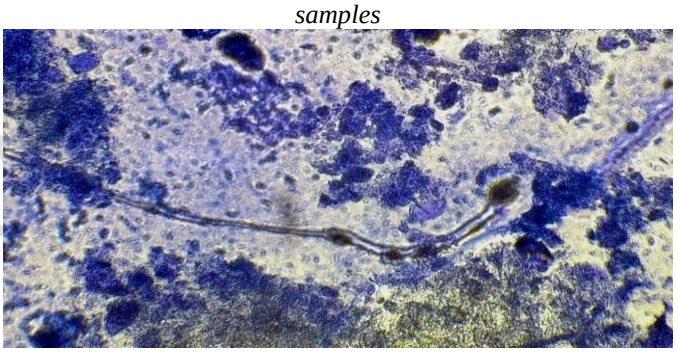

Plate 1: An adult Raillietina cestillus observed under the microscope

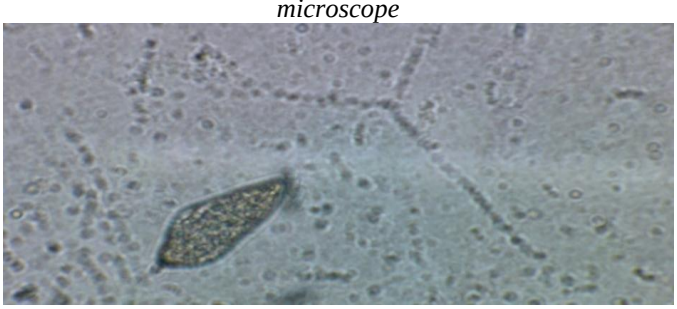

Plate 2: An Eimeria sp. egg observed under the microscope

IV. DISCUSSION

Out of the 30 pigeons examined, 18 (60%) of them were infected with one or more parasite. The *Columba livia domestica* examined in this study are reared mostly in free range and it has high infection rate. This result is in line with the work of Msoffe *et al*. (2010), who reported that the high infection rate was higher in the free range compared to birds kept in enclosures and hard floors. The result of this study also agree with the result of Backford (2014), who recorded 58% infection rate in *Columba livia domestica* of Plateau State. He

reported that there is more infection in the rainy season than the dry season. This high infection rate may be attributed by the fact that most of the birds are reared on free range, thereby making their movement uncontrollable and hence exposing them to contacting infection from different places visited during their flight.

30 of the pigeons examined, 15 were male and 15 were females. Males have higher infection of 73.3% compared to females who have 46.7% infection rate. The result of this study is in line with the findings of Adang (2008), who recorded high infection rate in males than females *Columba livia* and stated that it may be as a result of the males involved in travelling long distances in search of food and nest building materials. However, the difference in the infection rate is not significant ($P > 0.05$).

10 of the pigeon obtained from the market have the highest infection rate of 80%, followed by Shuware (60%) and lastly, Barama (40%). This result conformed with the result of Adejinmi, (2011), who recorded different infection rates at different markets within Ibadan. The differences in infection rates base on location may be related to the hygiene of the location. There was no significant difference between rate of infection and location ($P > 0.05$).

Out of the 18 infected pigeon, 12 harbored just one type of parasite, 5 harbored two types of different parasite and only 1 harbored three different types of parasites. This result is in accordance with the result from Muhsin, (2008), who recorded 68% infection in single occurrence of parasite, 42% infection rate in double occurrence of parasites and 0% in triple infection in Jos, Plateau State capital.

The difference in the number of parasites infecting the birds may be as a result of the areas which birds visited, that is, those visiting infected areas are more likely to be infected by more parasites than those that do not.

The study reveals that there is high prevalence of 60% rate of infection in pigeons (*C. livia)* that were examined. Male had higher infection rate than female and those obtained in the market had the highest, followed by shuware and the least infection rate was observed from those obtained in Barama even though; the rate of infection is not significant when compared to gender and location. Following the results obtained in this study, the following recommendations are made; there should be proper hygiene of the *C. livia* house to reduce the rate of infection, other methods such as intensive rearing should be adopted other than the free range method and there should be routine treatment of *C. livia* after their flying season and consumption of the *C. livia* intestine should be restricted to avoid human infection by these parasite.

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