

# Gastrointestinal Helminth Parasites of Domestic Pigeons *Columba Livia Domestica* in Funtua Local Government Area, Katsina State, Nigeria

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## Abstract

The prevalence of helminthes infections in domestic pigeons (*Columba livia domestica*) in Funtua was carried out to determine species composition, prevalence and possible association between host sex. Sixty pigeons comprising 30 males and 30 females were collected for a period 3 months. Two methods were used for the examination of helminthes parasites, floatation method and intestinal scrapping method. A total infection of 81.6% was recorded consisting of the following nematodes and cestodes; *Ascaridia columbae* 14 pigeons (23.3%), *Heterakis gallinarum* 8 pigeons (13.3%), *Ascaridia galli* 4 pigeons (6.67%), *Raillietina tetragona* 11 pigeons (18.33%), *Raillietina echinobothrida* 6 pigeons (10%) and *Hymenolepis carioca* 29 pigeons infected (48.33%). There was no significant difference in infection rates between the sexes ( $p > 0.05$ ). The result obtained showed that helminth parasite is more distributed in the small intestine of birds. It is concluded that Cestodes are more prevalent than Nematodes in domestic pigeons in Funtua area.

**Keywords:** Helminth Parasites, Domestic Pigeons, Funtua LGA

## 1.1 INTRODUCTION

Pigeons and doves constitute the family columbidae within the order columbiformes. But the many species of each are not easily defined (David 1968). Doves however are usually smaller than pigeons, all domesticated breeds of pigeons and doves belong to the species *Columba livia*. Pigeons are ground or arboreal birds ranging in size from small to large (15-80cm).

Pigeons are granivorous; they feed on a wide range of food it which includes grains, slugs, earthworm, and insects (Adang 1999). Pigeons have proportionately small eggs but the incubation period is long (David 1968). An interesting characteristics of pigeons is their display of defensive threat, this is done by erecting the plumage, spreading the tail and lifting one or both wings. This display is given when the birds are simultaneously activated by conflicting impulses to attack and to escape and is commonly shown at highest intensity towards potential next predators (David 1968).

Pigeons suffer the depredations of a wide variety of parasites which can occur in almost any part of their bodies, some of these parasites are highly pathogenic causing diseases (Jacob 1909). Pigeons are of tremendous economic importance, they act as reservoirs of Zoonosis such as Ornithosis and Salmonellosis. The most common diseases of pigeons are the Helminth parasites (Soulsby 1982).

Helminthes are Endoparasites and are divided into flatworms, phylum Platyhelminthes and roundworms, phylum Nematoda. The Platyhelminthes are further divided into Trematodes and Cestodes, the class Trematoda consist of one unit only that have bodies which are flattened dorsoventrally. They are hermaphrodites that is each individual is both male and female. The class Cestoda has bodies which consist of a number of segments which occurs one after another, each containing separate reproductive organs, but with nervous and excretory system continuous throughout the body and having a head region which attaches to the host by means of hooks or suckers. The Cestodes are popularly known as tape worms.

The round worms phylum Nematelminthes as their name implies are round in cross section, cylindrical, Pointed at either end and with a smooth white, semi-stiff skin; they range in size from 1mm-500mm in length. They are not hermaphrodite.

A considerable number of Helminthes are found in pigeons especially Cestodes and nematodes, however it is the nematodes which are most likely to be troublesome, in particular Ascarids and Capillaria spp

## AIMS

This study aimed at investigating the helminthes parasites that harbours the intestine trait of pigeons and to determine possible association between host sex and helminthes parasites.

## 1.2 OBJECTIVES

The objectives of this study are as follows:

- i. To determine the Helminthes parasites that harbours the intestinal tract of pigeons.
- ii. To determine the prevalence of the Helminth parasites found in different sites of the study.
- iii. To determine the possible association between host sex and Helminth parasites.

### 3.1 MATERIALS AND METHODS

Pigeons (*Columba livia domestica*) were bought from 3 different areas in Funtua Local Government Area, Katsina State. These Areas include Funtua Main Market, Jabiri and Kasuwan Mata.

A total number of 60 pigeons were used for this study. The pigeons were bought between August to October, 2009. They were brought to the department alive in a collection box.

The pigeons were identified to species level in the Department of Parasitology and Entomology, Faculty of Veterinary Medicine the pigeons were found to belong to the species of *Columba livia domestica*. The identification was based on their size and colouration.

The various sexes of *Columba livia domestica* were determined after dissection by their reproductive organs. The males have conspicuous testes, while the females are differentiated by the absence of testes and or by the presence of eggs in most cases.

For examination of helminth parasites, the pigeons were humanely killed and dissected according to Fatihu et al. (1991), Soulsby (1982). The digestive tract was removed intact and the various section Crop, Small intestine, Large intestine, Caecum and Gizzard were separated and placed into a petridishes containing 10% formalin. Fatihu et al. (1991). A dissecting scissors, a scalpel, formalin solution, a gauge, centrifuge tube, cover slide and a microscope were used.

Two methods were used for the identification of Helminth parasites which are; Floatation technique and Intestinal scraping method. Chi-square test was used to find the association between helminth parasites and host sex.

### 4.1 RESULTS

The occurrence of gastrointestinal parasites infestation was noted to be diversified with respect to genera and species distribution. Six (6) species of helminth parasites were recovered out of which 3 were Cestodes (Table IV) Nematodes parasites (Table III).

The Cestode parasites recovered were *Raillietina tetragona*, *Raillietina echinobothrida* and *Hymenolepis carioca*, *Hymenolepis Carioca* was the most abundant affecting 29 pigeons (48.33%). *Raillietina tetragona* was second in abundance affecting 11 pigeons i.e. 18.33% (Table III) *Raillietina echinobothrida* was the least in abundance, 6 pigeons were infected (10%).

The Nematode parasites recovered were *Ascaridia columbae*, which is the most abundant; it was recovered in 14 pigeons (23.3%). *Heterakis gallinarum* rank second in abundance, it was recovered from 8 pigeons (13.3%) and *Ascaridia galli* was recovered from 4 pigeons (6.67%) (Table IV).

Among the helminth parasites recovered *Raillietina tetragona*, *Raillietina echinobothrida*, *Hymenolepis carioca*, *Ascaridia columbae*, and *Ascaridia galli* were found in both the Small and Large intestine, but were more abundant in the Small intestine.(86.6%).

*Ascaridia galli* species were found in the small intestine while *Heterakis gallinarum* was exclusively recovered in the Caecum of pigeons (Table IV).

Chi-square test was employed to determine association in parasite prevalence between Sexes. More males birds were infected than females, but the difference was not significant ( $p > 0.05$ ) because the calculated chi-square value was 5.009 and the critical table value was found to be 11.071 at 5 degree of freedom.

**Table 1: Distribution of Helminth Parasites in the gastrointestinal tract of Pigeons (*Columba livia domestica*)**

Parasite species	Large Intestine	Small Intestine	Caecum	Crop	gizzard
<i>Hymenolepis carioca</i>	10	26	-	-	-
<i>Raillietina tetragona</i>	4	8	-	-	-
<i>Raillietina echinobothrida</i>	5	2	-	-	-
<i>Ascaridia columbae</i>	2	12	-	-	-
<i>Ascaridia galli</i>	1	4	-	-	-
<i>Heterakis gallinarum</i>	-	-	8	-	-

**Table 2: Prevalence of Parasite infection in Pigeons from Funtua Area.**

Collection site	Number examined	Number infected	% infected per locality
Main market	20	16	80%
Jabiri	20	17	85%
Kasuwan mata	20	16	80%

$$\text{Percentage infected per locality} = \frac{\text{Number infected} \times 100}{\text{Number examined}}$$

**Table 3: Number and Percentage of Pigeons infected with Cestode Parasites**

Parasite species	Total number examined	Number infected	% positive
<i>Raillietina tetragona</i>	60	11	18.33%
<i>Raillietina echinobothrida</i>	60	6	10%
<i>Hymenolepis carioca</i>	60	29	48.33%

**Table 4: Number and Percentage of Pigeons infected with nematode Parasites**

Parasite species	Total number examined	Number infected	% positive
<i>Ascaridia columbae</i>	60	14	23.3%
<i>Ascaridia galli</i>	60	4	6.67%
<i>Heterakis gallinarum</i>	60	8	13.3%

**Table 5: Association of Helminth Parasites with respect to Host sex (Male and Female)**

Parasite species	Sex	
	Male	Female
<i>Raillietina tetragona</i>	8	3
<i>Raillietina echinobothrida</i>	2	2
<i>Hymenolepis carioca</i>	17	12
<i>Ascaridia Columbae</i>	3	0
<i>Ascaridia galli</i>	7	7
<i>Heterakis gallinarum</i>	3	5

## 5.1 DISCUSSION

The prevalence of 81.6% helminthic infections recorded in this study could be an indication of high incidence of the infective stages and intermediate hosts of the parasites in places where pigeons are reared. The intermediate hosts of these parasites include; beetles, pill bugs, ants, earthworm and snails which form part of the diet of pigeons (Adang, 1999) are abundant and may easily infect the birds via their diet since they travel long distance in search of food.

The prevalence of 81.6% helminthic infection recorded in this study is considered very high compared with 48.3% reported in domestic pigeons in zaria (Adang et al. 2008), 43.4% reported in the same area (Audu et al. 2004). Alarming rates of 66.7% and 69.2% have been reported (Dede & Richards 1998; Oniye et al. 2000) in both wild and domestic pigeons in north-east zone of Nigeria and the Zaria Area.

The higher prevalence of Cestodes recorded in this study is similar to earlier report Adang et al. 2008, Dede & Richards '1998; Oniye et al. 2000; Audu et al. 2004, Atsineka & banke 2006). *Raillietina* species which are second most dominant parasites in this study are considered as cosmopolitan, and contributes to nutrient depletion in birds (Cheng 1973.)

The low prevalence of Nematodes may be attributed to the food searching habits of the pigeons of not scratching below the surface soil where most infective stages of these Nematodes are hidden. All the birds examined are adults and this may also have conferred certain level of host immunological response against the establishment of the Nematodes.

Another reason for the low prevalence of Nematodes may be probably due to the mode of infection, as the infective egg dries off when the environment is harsh. There has also been the suggestion of a possible migration of *Ascaridia galli* to the Caecum. Roberts (1937) reported that the eggs hatch in the upper part of the intestine and at the end of 24 hours the majority of the young worms have reached the Caecum.

Mixed infection of 2 or more species of parasites per bird was common, because in most of the pigeons examined there are few birds found with single infection.

Both Cestodes and Nematodes showed high pre-direction for specific sites in the gastrointestinal tract of the birds. The Cestodes were found in the small and large intestine, but were abundant in the small intestine.

In this work, there was no single parasite recovered in the crop and gizzard which are filled up always with grains, undigested food items like the stones and thus contributes to the unfavourable environment for the parasites to live successfully in the site. (Ssenyonga 1982).

Transmission of the gastrointestinal parasites of the pigeons can also be achieved through contact with one another when they are captured, kept and fed together. It is possible that they transmit the infective eggs of the parasites to one another through the faeces since they sometimes defecate inside their feeding containers.

## 5.2 CONCLUSION

The study being carried out on the prevalence of gastrointestinal helminth parasites of pigeons under free range of breeding showed that helminth parasite are more distributed in the small intestine of birds. It is concluded that Cestodes are more prevalent than Nematodes in domestic pigeon in funtua area.

## 5.3 RECOMMENDATION

Since pigeons are of great economic value, a good source of protein and are found to harbour a lot of Helminthes parasites in them. Therefore it is imperative to institute an integrated parasitic control through constant changing of litter, regular use of anti-helminthes , and dusting of birds with pesticides; it is also imported to educate the breeders of these birds on the need to adhere strictly to these control measures. These perhaps will boost the production of domesticated pigeons, consequently argumenting the animal protein required.

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