

HAEMATOLOGY AND PARASITIC GASTROINTESTINAL INFESTATIONS OF DOMESTIC PIGEONS (*Columba livia domestica*)

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ABSTRACT

A cross sectional study was carried out on domestic pigeons in Ingawa Local Government Area of Katsina State with the sole aim of studying blood profile of these domestic pigeons (*Columba livia domestica*) in the event of parasitic gastrointestinal infestation. A total of 55 domestic pigeons were randomly sampled across the LGA using table of random numbers. The pigeons were categorized into young, grower and adult. Blood and faecal samples were collected for haematology and parasitic screening respectively. Data was analyzed using Analysis of Variance (ANOVA). Statistical significance of analyzed parameters was considered at $P \leq 0.05$. Adult group of pigeon had the highest prevalence of 47% with corresponding high eosinophilia. Also, marked differences in Packed Cell Volume (PCV) and total protein were significantly associated with high prevalence of gastrointestinal parasites. This study was able to establish variation in blood parameters of pigeons in the advent of parasitic gastrointestinal infestation.

Keywords: Haematology, Gastrointestinal, infestation, Katsina, Parasites, Prevalence

INTRODUCTION

In Nigeria, domestic pigeons are mainly kept for small scale business and research purposes. However, in many parts of the country domestic pigeons are seen daily searching for food together with other poultry species. Domestic pigeons may be infected by many organisms, thus they are described as a reservoir of many parasitic diseases for poultry and the close contact of domestic pigeons with other domestic birds increases risk of parasitic infestation in birds (Piasecki, 2006; Sari *et al.*, 2008). Among the birds, importance of domestic pigeons in relation to domestic chicken cannot be ignored, as domestic pigeons act as reservoir host or carrier and an important source of infection for other avian host, which share the common parasitic fauna and sometimes harbor zoonotic parasites. Domestic pigeons, like other domestic poultry, are also part of subsistence farming done by most of the people (Hafez, 2011). Domestic pigeons cause contamination of surroundings with their droppings. Domestic pigeons (*Columba livia domestica*) tend to come in close contact with humans and birds as a source of protein, hobby, and recently as laboratory animals (Hafez, 2011; Harlin, 1994; Radfar *et al.*, 2011). Previous reports showed that domestic pigeons too are often affected by diseases; various parasites significantly impede pigeon growth, development and productivity as well as cause death (Fakhar *et al.*, 2010). The current study aimed at complimenting previous works and also went a step further to highlight the effects of gastrointestinal parasitic infestations on haemogram.

MATERIALS AND METHODS

The study was cross sectional involving 11 wards of Ingawa LGA, Katsina State. In each ward, 5 domestic pigeons were randomly sampled using table of random numbers. The birds were aged using plumage and grouped into young, grower and adult as described by Sari *et al.*, 2008. A total of 55 domestic pigeons were sampled. For the haematology and parasitic screening, 33 birds were randomly allocated into 3 groups in a completely randomized design (CRD) with each group having 11 replicates. 3mls of blood samples were collected using sterile 5ml syringe from the left wing vein and transferred into an EDTA blood sample tube. Using sterile cotton swabs, faecal samples were collected rectally. All sampled were labeled appropriately and

sent to clinical pathology and parasitology laboratories of Faculty of Veterinary Medicine, Ahmadu Bello University for haematology and parasitic examination. Blood sample was examined based on the method of Soulsby (1986). Collected faecal sample was screened for the presence of helminth eggs and *Coccidia* oocysts as described by Soulsby (1986).

Prevalence was calculated using the formula:

$$\text{Prevalence (\%)} = \frac{\text{Number of positive samples}}{\text{Number of birds sampled}} \times 100 \quad (\text{Jamilu } et al., 2018)$$

The data obtained were analyzed statistically using ANOVA (Steel and Torrier, 1980). Data was descriptively presented in table as Mean and standard deviation from mean (Mean $\pm$ SD). Statistical significance of analyzed parameters between groups was reported at $P \leq 0.05$.

RESULTS AND DISCUSSIONS

Cumulative parasitic gastrointestinal prevalence of 58% was recorded (Table 1.0). Adult group had a prevalence of 47% while Grower group recorded 11%. The high prevalence in adult could be attributed to their behavioral nature of extensive flights and feeding habits that makes them more exposed to risk factors of parasitic infections. This finding was in concordance with the reports of Natala *et al* (2009) who similarly reported higher prevalence in adult pigeons than growers. However, young birds recorded 0% prevalence. Young birds are usually sedentary and catered for in their nest by their parents making them less vulnerable to parasitic infection as opined by Imura *et al* (2012).

Table 1.0: Prevalence of Gastrointestinal Parasites in Domestic Pigeons According to Age Groups

Age	No. Sampled	No. Positive	Prevalence (%)
Young	2	0	0
Grower	14	6	11
Adult	39	26	47
Total	55	32	58

Haematological data shown in Table 2.0 demonstrates significant difference ($P < 0.05$) in PCV, total protein, total white blood cell count, total red blood cell count, heterophils, lymphocytes, monocytes and band cells across age groups. Continuums of increased values were observed in these parameters from young through to adult. Gibbs *et al*, 2001 also advanced similar findings in a work they conducted on domestic pigeons. PCV and Haemoglobin concentration were observed to be lower than established normal values in growers and adults. Eosinophilia of 2.5 ± 3.5 was observed in adult groups. Trophic habits of gastrointestinal parasites which dwells mainly on absorbed food nutrients and body fluids would better explain the gross reduction in these parameters (Esmaeili *et al.*, 2006). Eosinophilia as reported in many clinical pathology studies (Harlin, 1994; Imura *et al.*, 2012) is suggestive of parasitic infection as observed in this study. Lymphocytic leucocytosis (lymphocytosis) was very eminent in adult group due to massive infestation and concurrent cell line response to the gastrointestinal parasitic infestations. Lymphocytosis, eosinophilia and monocytophilia have been reported to be associated with GIT parasitic infestation due to the pronounced inflammatory reactions on the bird's alimentary canal (Imura *et al.*, 2012).

Table 2.0: Haematologic and Prevalence Data of Domestic Pigeons in Ingawa LGA Katsina State

Blood Parameters	Young (Mean±SD)	Grower (Mean±SD)	Adult (Mean±SD)	P-Values
Packed Cell Volume (%)	3.2±10.1 ^a	49.7±61.2 ^b	121.3±63.4 ^c	0.01
Haemoglobin (g/dl)	1.1±3.5	16.6±20.4	40.1±20.8	0.2
Total Protein (g/dl)	0.8±2.3 ^a	4.2±3.6 ^b	16.8±13.4 ^c	0.00
Total White Blood Cell Count (x10 ⁹ /l)	2.5±7.9 ^a	19.0±16.8 ^b	55.7±33.4 ^c	0.01
Total Red Blood Cell Count (x10 ¹² /l)	0.5±1.6 ^a	7.7±10.3 ^b	22.8±13.8 ^c	0.01
Heterophils (%)	4.4±13.3 ^a	26.2±22.6 ^b	88.3±67.2 ^c	0.00
Lymphocytes (%)	20.0±56.6 ^a	139.0±158.5 ^b	370.1±223.1 ^c	0.3
Eosinophils (%)	0	0	2.5±3.5	0.3
Monocytes (%)	0	4.8±7.1 ^a	5.3±6.1 ^b	0.04
Band cells (%)	0	6.6±10.9 ^a	13.4±14.8 ^b	0.05

Means within row with different superscript are significantly ($p < 0.05$) different

CONCLUSION

This study has re-echoed the facts that GIT parasitic infestations have a direct impact on overall haematologic parameters. It has been shown by this study that pigeons harbor significant GIT parasites and may serve as reservoir for these parasites.

RECOMMENDATION

Appropriate and adequate flock health management plan should be developed and instituted for domestic pigeons for the prevention and control of parasitic gastrointestinal infestations.

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