International Journal of Soft Computing 4 (4): 148-150, 2009
ISSN: 1816-9503

A Survey of Parasites of Domesticated Pigeon (*Columba livia domestic*) in Zaria, Nigeria

A.J. Natala, N.D. Asemadahun, O.O. Okubanjo, B.M. Ulayi,
Y.H. Owolabi, I.D. Jato and K.H. Yusuf
Department of Veterinary Parasitology and Entomology,
Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria, Nigeria

Abstract: From a major slaughter slab in Zaria, samples were collected from 250 domesticated pigeons and screened for helminths, ectoparasites and protozoan parasites. *Eimeria* sp. *Haemoproteus columbae*, *Leucocytozoon* sp. and *Plasmodium relictum* were the protozoan parasites encountered with 49.2, 15.6, 6.4 and 0.8% prevalence, respectively. *Raillietina tetragona* (4.9%), *Raillietina cesticillus* (3.0%), *Raillietina echinobothrida* (7.6%), *Ascaridia columbae* (1.2%), *Ascaridia galli* (1.2%) and *Cappillaria anatis* (0.8%) were the helminths seen, while *Pseudolynchia canariensis* (17.6%) was the only ectoparasite seen. The presence of these parasites were considered to pose a danger to achieving the full potentials of the up-coming pigeon barbecue business in Zaria.

Key words: Survey, parasites, pigeon, livestock, Zaria, Nigeria

INTRODUCTION

There is in the majority of developing countries an acute and growing shortage of animal protein. Jasiorowski (1972) reported that in developed countries an average daily per capital consumption of animal protein is 49 g as compared to an under nutrition of protein intake of about 11 g in the underdeveloped countries. The level of animal protein consumption in Nigeria is about 50% of the Food and Agricultural Organization (FAO) recommended standard and 30% of the British Medical Association requirement for developing countries. The inadequate supply of animal proteins for human consumption in underdeveloped countries is further aggravated by many prevalent factors limiting animal productivity within the affected countries.

Incidentally, the demand for domesticated pigeons (*Columba livia domestica*) is of late on the increase as indicated by records in slaughter houses and subsequently, displayed at barbecue spots in many urban settlements in Northern Nigeria. For now, it is a delicacy as its price is comparatively higher than those of beef, chevous and chicken sold at barbecue spots. Pigeons also rapidly attain table weight faster than the aforementioned meat sources, are easy to breed and keep, make relatively little noise and need little supervision and can are easily kept by novices. This therefore, suggests its increasing acceptability and perhaps gives pigeon the potential and puts it in an advantageous position to contribute significantly to this protein demand.

Poor animal husbandry systems, hazardous seasonal variations such as heat stress, diseases, malnutrition are only some of the factors preventing availability of increased animal protein in developing countries (Sekoni *et al*., 1988). Diseases are the most important limiting factors to livestock productivity in most sub-saharan African countries. Available reports show that pigeons too are often affected by diseases. Various parasites significantly impede pigeon growth, development and productivity, it at times result to death, especially, the squabs (Fatihu *et al*., 1991). Such sick birds are often slaughtered pre-maturely by the breeders instead of seeking for their cure. Previously conducted studies in Zaria were restricted mainly to helminths of pigeons (Audu *et al*., 2004). Information on the ectoparasites and protozoan parasites of domesticated pigeons in this region appears to be poorly documented. The current study was therefore, designed to provide holistic information on parasites of domestic pigeons, with the hope of designing an integrated parasite control for these birds, thus sustaining their increasing demand.

MATERIALS AND METHODS

Blood, faeces, gastro intestinal content and ectoparasites were collected from 250 domesticated pigeons taken for slaughter at the Zaria market slaughter slab. In recovering ectoparasites, the bodies of the birds were searched and thoroughly examined by separating the wings and separating the feathers so as to expose the

Corresponding Author: A.J. Natala, Department of Veterinary Parasitology and Entomology, Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria, Nigeria

skin. The ectoparasites found were collected and preserved in 70% alcohol. Approximately, 2 mL of blood was collected from each of the birds into sample bottles containing the 0.1 mg mL^{-1} of sodium salt of Ethylene Diamine Tetra Acetic acid (EDTA). The bottles were rocked and rolled gently to allow for uniform mixing of the blood with the anti coagulant and thereafter screened for haemoparasites.

Faecal samples from all the birds were collected and put into differently labeled sample bags. As the digestive tract were dissected out, the trachea, esophagus, crop, proventiculus, gizzard, small and large intestine were each put in separate sample bottles containing 0.9% physiological saline. The lumen of each organ was thereafter, opened longitudinally to expose the content as described by Fatihu *et al.* (1991). Lower down the alimentary canal, faeces were checked for ova and oocysts. Adult parasites found in organs were all identified according to standard procedures (Soulsby, 1982). The ectoparasites collected were similarly subjected to standard laboratory procedures and subsequently identified.

RESULTS

The protozoan parasites encountered as indicated in Table 1, were *Eimeria* sp. (49.2%), *Haemoproteus columbae* (15.6%), *Leucocytozoon* sp. (6.4%) and *Plasmodium relictum* (0.8%). The cestodes were three species of *Raillietina*, which were *R. tetragona* (4.9%) *R. cesticillus* (3.0%) and *R. echinobothrida.* (7.6%), while the nematodes were *Ascaridia columbae* (1.2%), *Ascaridia galli* (1.2%) and *Capillaria anatis* (0.8%) as indicated in Table 2. *Pseudolynchia canariensis* was the only ectoparasite seen with the percentage prevalence of 17.6 (Table 3).

Table 1: Prevalence of protozoan parasites in domesticated pigeons in Zaria. Number of birds sample (N = 250)

Parasite	No. of birds infected	Percentage positive
Eimeria oocyst	123	49.2
Haemoproteus columbae	39	15.2
Leucocytozoon sp.	16	6.4
Plasmodium relictum	2	0.8

Table 2: Prevalence of helminthes in domesticated pigeons in Zaria. Number of birds sample (N = 250)

Parasite	No. of birds infected	Percentage positive
Cestode		
Raillietina tetragona	8	4.9
Raillietina cesticillus	5	3.0
Raillietina echinobothrida	19	7.6
Nematode		
Ascaridia columbae	3	1.2
Ascaridia galli	3	1.2
Capillaria anatis	2	0.8

Table 3: Prevalence ectoparasites in domesticated pigeon in Zaria, Number of birds sample (N = 250)

Ectoparasite	No. of birds infected	Percentage positive
Pseudohynchia canariensis	44	17.6

DISCUSSION

The result from this study showing *Eimeria* to occur in close to half of the pigeons (49.2%) is considered to be high (Lawal *et al.*, 2001). The reason for the high prevalence may be due to the fact that the pigeons in this part of the country are mainly kept on free range and also the housing they retire to are raised mud huts. This offers optimal conditions of temperature and humidity for the sporulation of the oocysts. Although, species identification of the *Eimeria* was not done in this study, earlier reports in other places have indicated the presence of *Eimeria labbeana* in majority of the samples (Taylor *et al.*, 2007).

There was a noticeable relationship between the prevalence of *Haemoproteus columbae* and its vector *Pseudolynchia canariensis*. The closeness in their percentage prevalence suggests that most of the vector harbored by the pigeons were probably carrying Pathogens. Higher percentages of *Haemoproteus columbae* and *Plasmodium relictum* in earlier studies could be due to differential parasite carrying capacity of the vectors and the differences in the seasons, in which the studies were carried out.

Although, clinical signs and mortality pictures were not the focus of this study, as samples were collected at the point of slaughter, anaemia, anorexia and high mortality has been reported especially, in squabs (Taylor *et al.*, 2007). The presence of *Plasmodium* and *Leucocytozoon* in the blood of the pigeons was an indication of the presence of *Culex* and *Simulium*, respectively as they are established vectors of these haemoparasites (Taylor *et al.*, 2007).

The presence of three species of *Raillietina* clearly support their cosmopolitan nature in chickens, guinea fowls, Turkeys, Pigeons, doves and bush fowls (Soulsby, 1982; Oniye *et al.*, 2001; Audu *et al.*, 2004). Ants of the genera *Pheidole* and *Tetramorium*, including various beetles, termites, flies and other arthropods, in addition to fruits and seeds form the major diets of dove and pigeon (Adang, 1999). The arthropod portion of the food, by carrying the infective stages, serves as intermediate host Mush *et al.* (2000). It may be therefore, right to postulate that the degree of prevalence is determined by levels of the infective stages present in the intermediate host and subsequently, their availability to the definitive host.

The three species of nematode encountered (*Ascaridia galli, Ascaridia columbae* and *Capillaria anatis)* were of low percentage prevalence. This is probably due to the mode of infection, as the infective egg dries off when the environment is harsh. Perhaps, most of the infective stages that got to the final host were through earth worms as transport host. There has also, been the suggestion of a possible migration of *Ascaridia galli* to the liver, trachea and lung to develop, rather than remain in the intestine (Michel, 1974). Despite their low prevalence, severe haemorragic enteristis, intestinal obstruction, reduction in egg production and subsequently death have been known to occur (Audu *et al*., 2004). The absence of *Capillaria* in the previous studies Oniye *et al.* (2001) and Audu *et al.* (2004) was probably due to variation in sample sizes.

From the parasitic fauna seen in this study, it is imperative to institute an integrated parasitic control through constant changing of litter, regular use of antihelminthics, anticoccidials and dusting of birds with pesticides. It is also, important 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 pigeon, consequently augmenting the animal protein required.

ACKNOWLEDGEMENTS

The researchers acknowledge the contributions of the Laboratory Technologists of the Department of Veterinary Parasitology and Entomology, Ahmadu Bello University, Zaria.

REFERENCES

Adang, L.K., 1999. Some aspects of the Biology of four columbid Species in Zaria, Nigeria. Unpublished M.Sc. Thesis, Biological Sciences, Ahmadu Bello University Zaria, Nigeria.

Audu, P.A., S.J. Oniye and P.U. Okechukwu, 2004. Helminth Parasites of domesticated pigeons (*Columba livia domestica*) in Zaria, Nigeria. J. Pest, Dis. Vect. Manage., 5: 356-360.

Fatihu, M.Y., V.C. Ogbogu, C.V. Njoku and D.I. Sarror, 1991. Comparative Studies of Gastrointestinal Helminth of poultry in Zaria. Rev. Elev. Med. Vet. Pays. Trop., 44 (2): 175-177. PMID: 1818365.

Jasiorowski, A.H., 1972. FAO's activities in livestock development. World Anim. Rev., (1): 2-9.

Lawal, A.I., O.O. Igbozurike, O.O. Okubanjo and A.J. Natala, 2001. A comparative study of parasitism in the free range, deep litter and battery cage chickens in Zaria. J. Trop. Biosci., 1: 89-92.

Michel, J.F., 1974. Arrested Development of Nematodes and Some Related Phenomena in Advances in Parasitology. In: Ben Dawes (Ed.). Publ: Academic Press London and New York, pp: 277-366.

Mush, E.Z., M.G. Binta, R.G. Chabo, R. Nelebele and R. Panzirah, 2000. Parasites of domestic pigeons (*Columba livia domestica*) in Sebele, Gaberone and Botswana. J. S Afr. Vet. Assoc., 71: 249-250.

Oniye, S.J., P.A. Audu, D.A. Adebote, B.B. Kwaghe, O.J. Ajanusi and M.B. Nfor, 2001. Survey of helminth Parasites of laughing dove (*Streptopelia senegalensis*) in Zaria. Afr. J. Nat. Sci., 4: 65-66.

Sekoni, V.O., J. Kumi-Diaka, D.I. Saror and C.O. Njoku, 1988. The effect of *Trypanosoma vivax* and *Trypanosoma congolense* infections on the reaction time and semen characteristics in the Zebu Bull. Br. Vet. J., 144: 388. http://www.ncbi.nlm.nih.gov/sites/entrez.

Soulsby, E.J.L., 1982. Helminths, Arthropods and Protozoa of Domesticated Animals. 7th Edn. Publ: Baillere Tindal, London, pp: 763-777. ISBN: 070200 9059.

Taylor, M.A., R.L. Coop and R.L. Wall, 2007. Veterinary Parasitology. 3rd Edn. Publ. Blackwell Ltd. Oxford, pp: 1-874. ISBN: 978-14-051-1964-1.