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Prevalence of *Ascaridia galli*, *Heterakis gallinarum* and Tapeworm Infections in Birds Slaughtered in Makurdi Township

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Abstract: A survey was conducted to determine the prevalence of gastrointestinal helminthes in local chickens, broilers and layers slaughtered in Makurdi metropolis between September 2007 and April 2008. A total of 440 samples were collected from male and female chickens. Of the total samples examined, 200(45.5%) were from domestic chicken, 140(31.8%) from broilers and 100(22.7%) from layers. Of the total sample examined, 280(63.6%) were infected with one or more species of helminthes. Of the number positive for infections, 103(23.4%) had single infection, 105(23.9%) double infections and 60(13.6%) triple infections. Overall, 165(37.5%) of the samples had *Ascaridia galli*, 122(27.7%) had *Heterakis gallinarum* and 214(48.6%) had various tapeworm species. Out of the 200 samples from domestic chickens, 110(55%) were found infected with *Ascaridia galli*, 80(40%) with *Heterakis gallinarum* and 145(72.5%) with different tapeworm species. Of the 140 gastrointestinal tracts from broilers, 50(35.7%) were infected with *Ascaridia galli*, 40(28.6%) with *Heterakis gallinarum* and 60(42.9%) with various tapeworm species. Out of the 100 gastrointestinal tracts from layers, 5(5%) were infected with *Ascaridia galli*, 2(2%) with *Heterakis gallinarum* and 9(9%) with various tapeworm species. The species of tapeworm encountered were *Raillietina* species, *Choanotaenia* species and *Hymenolepis* species. These respective species constitute 30.9%, 5.2% and 3.6% of the tapeworm burdens. This study has highlighted the need for proper medication in flocks in Makurdi.

Key words: Infection, gastrointestinal tract, parasite, poultry, slaughter, market

INTRODUCTION

Poultry production is an important means of providing high quality of protein for human consumption. The population of poultry in the world was estimated in 1995 to be 12.664 million, of which 1.068 million were found in African continent while 1.164 million were found in Europe (FAO, 1995). Poultry productions thus represent a significant portion of the economy as a source of income for small and large holder farmers. In Africa and Europe, the most commonly kept poultry are the domestic chicken (*Gallus gallus domesticus*), ducks (*Carina moschata*), turkeys (*Meleagris gallopavo*) and geese (*Anser anser*). Among these, the domestic chicken is the most important.

In most Africa countries, practically every family owns some form of poultry, but majority of the birds are unimproved local types which are kept mainly a household scavenger and managed under the open range system. The local birds are generally smaller in size than the exotic breeds, their productivity is low, but they are stronger, more resistant to diseases and require less food (Hassan *et al*., 1989). The exotic or local breed of the domestic fowl, *Gallus gallus domesticus* is reared by rural and urban house holders who use their eggs and meat as source of animal protein, farm manure income (Kekeocha, 1984; Frantovo, 2000).

The protein short fall, especially that of animal, is one of the most important aspects of malnutrition and undernourishment afflicting millions of people in several regions of the world. It has been estimated that in the underdeveloped and developing countries, between 300 to 500 million persons do not receive adequately balanced diet (FAO, 1995). In order to increase production level, there have been researches conducted on the development of high yielding breeds of broiler birds through selective breeding; along with improved nutrition and the use of vaccines and antibiotics to control diseases (Law and Payne, 1990; Anon, 1994).

Diseases affecting poultry production include bacterial diseases such as fowl cholera, viral diseases such as Newcastle disease, mycotic diseases such as aspergillosis and parasitic diseases, Ewen (1980) regarded parasitic diseases as the most important challenge militating against poultry production. Important parasitic diseases affecting poultry are helminthic diseases such as cestodosis and ascariodiosis; and ectoparasitism (lice and flea infestation). Ascariodiosis is the most helminth diseases of poultry (Fatihu *et al*., 1991).

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About one hundred helminth species have been recognized in wild and domestic birds. The best fed, housed and genetically ideal chicken will not grow or lay eggs up to its potential if diseased or infected with parasites (Card and Neshein, 1972). In rural scavenging poultry in Africa and Asia, a number of helminth species are widely distributed (Pandey *et al*., 1992; Bagust, 1994). Intestinal parasitism is a common problem in Nigeria (Fatihu *et al*., 1991)

In commercial table egg production systems, the most commonly reported species are *Ascaidia galli*, *Heterakis gallinarum* and *Capillaria annulata* (Permin *et al*., 1997). However, only few reports deal with the prevalence and significance of helminth species in the commercial production systems. In Switzerland, Morgenstern and Lobsiger (1993) reported that the prevalence of *Ascaridia galli*, *Capillaria* species and cestodes were in the range of 20-30% in free range systems.

This study was undertaken to determine the prevalence and severity of gastrointestinal tract helminth infestation in local birds, broilers and layers in Makurdi Metropolis. Information generated from this study would further contribute to available knowledge on gastrointestinal parasites of poultry especially in Makurdi.

MATERIALS AND METHODS

The study was conducted from September, 2007 to April 2008. The major market (Makurdi Modern Market, Wadata Market and Wurukum Market) in Makurdi Township were selected to conduct a cross-sectional study of gastrointestinal helminthes in poultry.

Sample collection: A total of 440 male and female chickens (domestic chickens, broilers and layers) slaughtered at the various markets were examined for the presence of gastrointestinal parasite (*Ascaridia galli*, *Heterakis gallinarum* and tapeworms).

Procedure for parasitic isolation and identification: The alimentary canal from the oesophagus to the rectum, including both cecal tubes, were extracted intact and removed from body cavity. Each segment was separated by ligation, after which it was slit opened and its content discharged into the Petri dishes, after which parasites in the lumen were picked up. The contents were washed thoroughly under running tape water. The mucosal surface was carefully rubbed between fingers to remove any parasites on the surface Fatihu *et al*. (1991). The mucosa was then scrapped into Petri dishes and observed under a microscope for smaller helminthes. All worms visible to the naked eyes were removed using thumb forceps. The helminthes were collected into Petri dishes and counted. The parasites were fixed and preserved in labeled sample bottles containing 10% buffered formalin.

Identification of each parasite was done as described by Soulsby (1982), Ruff (1984) and Calnek *et al*. (1997).

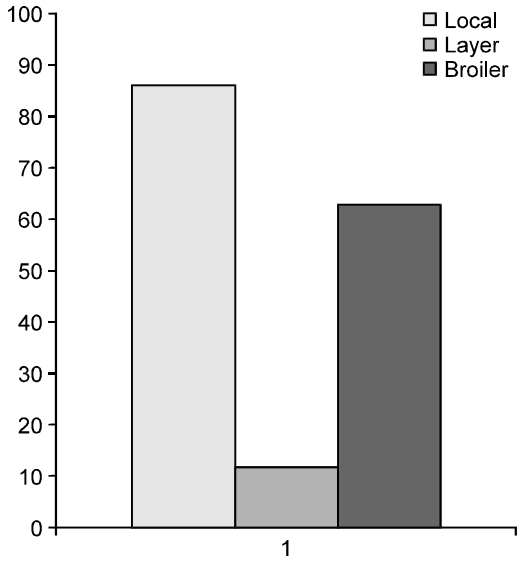

Fig. 1: Overall distribution of infection rate in percentage by bird type

RESULTS

Of the 440 gastrointestinal tracts examined, 200 (45.5%) were from domestic chickens (*Gallus gallus domesticus*), 140 (31.8%) from broiler birds and 100 (22.7%) from layers. The overall infection rates (%) in each of these three groups were 86, 12 and 62.9 (Fig. 1). The overall prevalence rates (%) for *Ascaridia galli*, *Heterakis gallinarum* and tapeworm species were 37.5, 27.7 and 48.6 respectively.

Out of the 200 gastrointestinal tracts of domestic chicken (local birds) examined, 110(55%) were found to be infected with *Ascaridia galli*, 80(40%) *with Heterakis gallinarum*, 94(47%) with *Raillientina* species, 11(5.5%) with *Hymenolepis* species and 15(7.5%) with *Choanotaenia* species. Out of the 140 gastrointestinal tracts obtained from broilers, 50(35.7%) were infected with *Ascaridia galli*, 40(28.6%) with *Heterakis gallinarum*, 35(25%) with *Raillietina* species, 5(3.6%) with *Hymenolepis* species and 8(5.7%) with *Choanotaenia* species. Out of the 100 gastrointestinal tracts from layers, 5(5%) had *Ascaridia galli*, 2(2%) had *Heterakis gallinarum* and 7(7%) had *Raillietina* species (Fig. 2).

The prevalence of tapeworm infections in the different types of birds shows that infection with *Raillietina* species was highest in the local birds (47%). Similarly, infection with *Hymenolepis* species infection rate was highest in the local birds (5.5%) followed by broiler (3.6%) and layers (0%). For *Choanotaenia* species, the respective rates were 7.5%, 5.7% and 0% for the local birds, broilers and layers (Fig. 2).

Overall infection with one species of helminth was encountered in 103 birds (23.4%). Infection with two and three species was encountered in 105 (23.9%) and

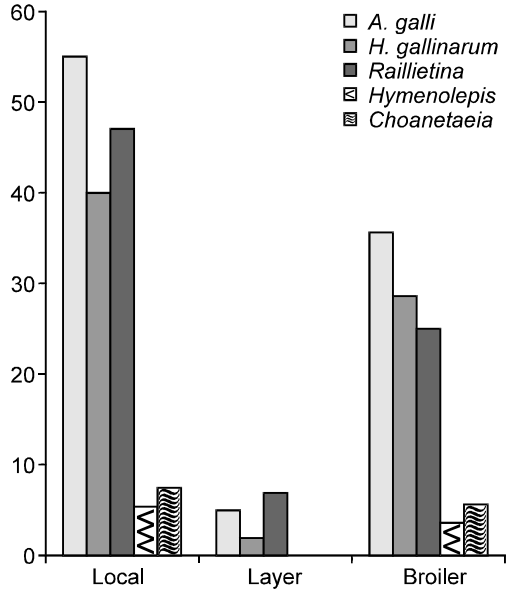

Fig. 2: Over all prevalence rates in percentage of helminth infection in the three different bird types

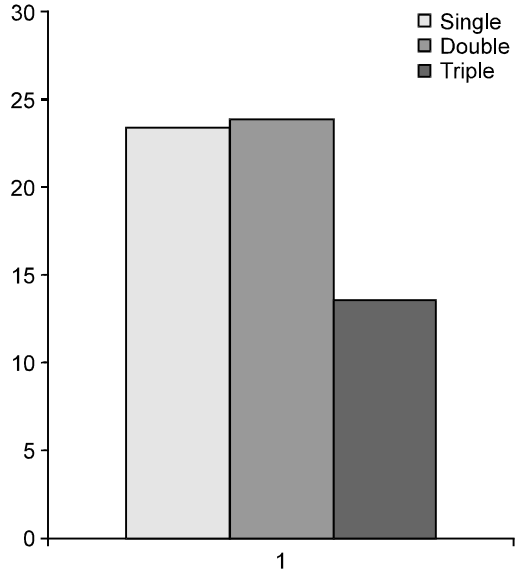

Fig. 3: Overall percentage distribution of type of infection (Single, double and triple infections)

60(13.6%) birds respectively (Fig. 3). In the broilers and layers, single infections constituted 28.6% and 9% respectively of the overall infection; while double infections constituted 37.1% and 1.7% respectively. On the contrary, single infections in local chickens constituted 27% while double infection was higher, constituting 35% of the overall infection (Fig. 4). The commonest type of double infection was that of *Ascaridia* and Tapeworm which constituted 54.4% of the double infections. The mean *Ascaridia galli* burden in

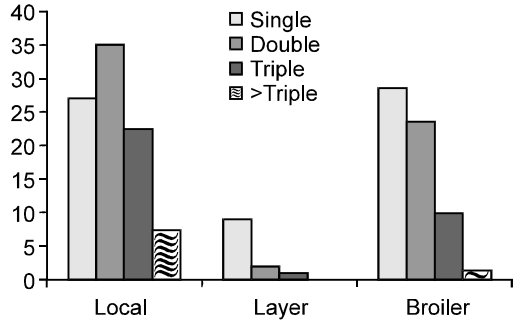

Fig. 4: Overall percentage distribution of type of infection in the three types of birds

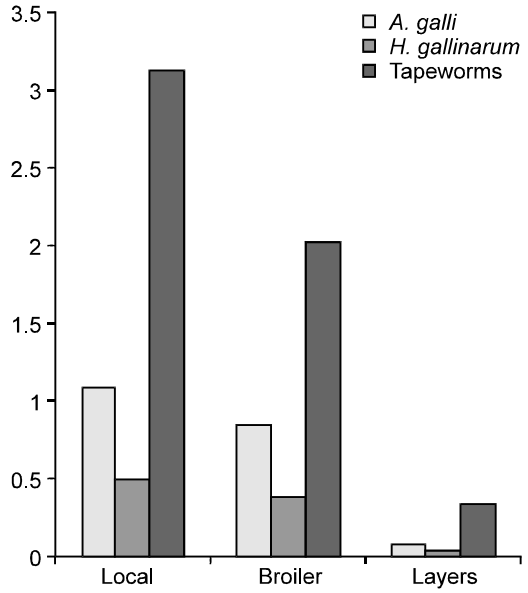

Fig. 5: The means helminth infections burdens in the three types of birds

the local birds, broilers and layers were 1.09±0.08, 0.85±0.10 and 0.08±0.06 respectively. Similarly, the mean *Heterakis gallinarum* burdens in the three groups of birds were 0.55±0.06; 0.39±0.07 and 0.04±0.05 respectively (Fig. 5).

DISCUSSION

The total prevalence of 76.1% of gastrointestinal tract parasites seen in domestic chicken (*Gallus gallus*) observed in this study is far less than the 90% recorded by Fabiyi (1972), 92% by Gadzama and Strivastava (1986), 100% by Okon and Enyenihi (1980) and 95.2% by Fatihu *et al.* (1991). This decrease in the over all prevalence may not be unconnected to the general improvement in sanitary habit, which makes the environment less conducive for the parasites and their intermediate hosts. The level of information now

available to some farmers has also contributed to the proper management of the farms. The growing awareness of the essence of good sanitation habit in the farm and the environment has increased awareness on the need for regular deworming of the birds and this may also have contributed to the low level of infections observed in this study.

The domestic chicken feeds on a wide range of diets, a habit that predisposes them to parasitic infections (Smyth, 1976), with many of the foods carrying infective stages of the parasites, thereby serving as intermediate medium in chickens that are free ranging (Frantovo, 2000). This may account for the high prevalence rate seen on free range birds in this study. This result is in agreement with those of Luka and Ndams (2007), Abubakar and Garba (2000) and Permin *et al.* (1997). The high rate of *Ascaridia* infection in this study may be due to environmental conditions such as moisture which supports larval development and facilitate transmission (Kenndy, 1975; Audu *et al*., 2004). The amount of dietary protein available to birds also affects the rate of infection of *Ascaridia galli*. The high rate of *Ascaridia galli* infection in local birds in this study could be as a result of indiscriminate scavenging behaviour, poor sanitary condition of the environment and lack of proper medication to the birds as observed by Permin *et al.* (1997). The high rate of *Ascaridia galli* infection in broiler birds could be due to poor biosecurity, poor hygiene and management, improper medication and poor housing.

In the free range birds, the heavy worm burden in the gastrointestinal tract maybe due to continuous ingestion of the infected droppings or infected intermediate hosts such as earthworms, grasshoppers, cockroaches, beetles that are readily available to them in poorly managed stocks as suggested by Majaro (1993). An exact identification of some of the cestodes was not possible due to missing scolexes.

Conclusion: Generally from the study, there is a high prevalence of cestodes and *Ascaridia galli* infection in the gastrointestinal tract of the three types of birds. These findings are in accordance with the observation of Wilson *et al.* (1994); Zeiller (1990); Morgenstern and Lobsiger (1993); Luka and Ndams (2007) and Eshatu and Tilahum (2000). Mixed infections of two or more species of parasites per bird was common in the present study. This might be attributed to food preference at a particular time which determines the establishment of mixed or single infection (Kenndy, 1975). The high prevalent rate of these parasites could serve as a silent source of economic loss to the poultry industry through reduced productivity. This study therefore suggests the need for giving proper and timely medication to birds. The high prevalent rates of *Ascaridia* and tapeworm infection suggests the need for proper sanitation in poultry houses to get rid of the infective stages and intermediate host, this will maximize profits and also provide healthy birds for human consumption.

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