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Investigation of Gastrointestinal Parasites of Local Chickens (*Gallus domesticus*) in Ugep, Yakurr Local Government Area, Cross River State, Nigeria

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

Background: Investigation of gastrointestinal parasites of local chicken (*Gallus domesticus*) was conducted in four council wards of Ugep in Yakurr Local Government Area, between October 2017 and June 2018.

Aim: The aim of this study was to investigate the parasitic load of male and female scavenging chickens.

Materials and Methods: Digestive tracts of scavenging chickens were obtained and processed by parasitological means.

Results: From a total of 320 local scavenging chickens examined 240 (75.0%) were parasitized by helminthes. Out of the 180 male and 140 female chickens examined, 75 (52.8%) and 120 (85.7%) were positive for helminth parasite eggs respectively. There was statistical significant difference ($p < 0.05$) in the prevalence of helminth parasites between male and female chicken. A total of 12 helminth parasite species were recovered in this study, comprising of 7 nematodes and 5 cestodes.

Conclusion: The high prevalence of helminth parasites among local chickens was attributable to lack of periodic deworming and climatic factors. Local breeds are tastier than exotic breeds and people prefer them more than exotic ones during Christmas celebrations. Occasional deworming exercise is advocated to reduce their worm burden and zoonotic infection.

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1. INTRODUCTION

In Nigeria, every household owns some form of poultry, but majority of the birds are unimproved local types which are kept mainly as scavengers and managed under the open range system [1]. An average of 5 to 100 birds per household are kept extensively with little financial or labour input [2]. They can thrive under adverse conditions, such as poor management, diseases, lack of feeding and parasites, which might cause low productivity [3]. Besides being an important source of income and cheap protein to the village/rural people, the free-range poultry is an integral part of village life and has an important social value [1,3]. There has been a lot of emphasis placed on modern poultry production using exotic breeds of chicken in Nigeria [1]. However, since the inception of commercial poultry in 1956 in Nigeria to bridge the protein deficiency gap, it has been bedeviled by so many problems [5]. Helminthiasis was considered to be an important problem of local chicken and helminth parasites have been incriminated as a major cause of ill-health and loss of productivity in different parts of Nigeria [6]. Parasitism is one of the major problems which inflict heavy economic losses to the poultry in the form of retard growth, reduced weight gain, emaciation, decreased egg production, diarrhea, obstruction of intestine, poor feathers, anaemia, paralysis, catarrh, morbidity and mortality [7,8]. Despite information on helminthiasis of birds in northern and southern parts of Nigeria [9], there is paucity of information on infection of indigenous fowl in Cross River State, especially in Ugep. However, in studies by Ruff 100% of rural scavenging chickens examined in Cross River Nigeria were positive for one or more helminthes parasites. Various studies have reported a wide range of helminthes distribution worldwide [8] (40.14%) in Gurez valley of Jammu and Kashmir, India; [11] (34.8%) in Khorramabad, West India; [12] (96.8%) in Nsukka, Nigeria; [2] (64.8% and 64.1%) of different species in Zimbabwe and [13] (63.3%) in Gombe, Nigeria. Despite much work on helminthiasis on scavenging chickens in other parts of the world and Nigeria in particular, there is scarce information on helminth infection of local scavenging chickens in Ugep, Yakurr Local Government Area of Cross River State, Nigeria. The aim of this study is to determine the prevalence of helminthes species in male and female local scavenging chickens in Ugep, Cross River State, Nigeria.

2. MATERIALS AND METHODS

2.1 The Study Area

This study was conducted in four council wards of Ugep, in Yakurr Local Government Area. Ugep is one of the largest native towns in Eastern Nigeria, and people of all works of life are resident here, and therefore high demand for poultry products. Ugep lies between latitudes 4° and 6° north of the equator and longitudes 6° and 8° East of the Greenwich Meridian. The area is in the equatorial rainforest of Nigeria. Subsistence farming is the main occupation of farmers. Household practice local poultry farming with a range of 2 to 40 local scavenge chickens per household.

2.2 Sample Collection

Digestive tracts of 320 local scavenging chickens were collected from four council wards of Ugep in Yakurr Local Government Area between October 2017 and June 2018. These digestive tracts were put into labeled plastic vials indicating council ward and sex of the chicken, before transportation to the parasitological laboratory of Cross River University of Technology, Calabar, for processing.

2.3 Isolation and Identification of Parasites

The digestive tract of each chicken was separated by ligation into oesophagus, crop, proventriculus, gizzard, small and large intestines and caecum. Each section was slit open in a separate petri dish, and the content washed thoroughly under running tap water over a 200µm sieve. The mucosae surfaces were rubbed between fingers to remove any parasites on the surface. Examination of samples for eggs of helminthes was based on the floatation technique [14]. The preparations were examined under the microscope using x10 and x40 magnifications.

2.4 Data Analysis

Chi-square test (χ^2) was used to compare infection between male and female chickens and council wards.

3. RESULTS

From a total of 320 local scavenging chickens examined 240 (75.0%) were parasitized by

helminthes, comprising of nematodes 155 (48.4%) and cestodes 85 (26.6%) (Table 1).

Table 2 reveals prevalence of infection of helminthes according to sex. Out of 180 male and 140 female chickens examined, 95(52.8%) males and 120 (85.7%) females were positive for helminthes parasites. There was statistical significant difference ($p < 0.05$) in the prevalence of helminthes between male and female scavenging chickens.

In table 3, the number of local scavenging chickens infected, the preferred site of infection and the council wards are shown. A total of seven (7) species of nematodes and five (5) species of cestodes were recorded from the various sections of the digestive tracts. Of the 214 local chickens infected with helminthes, 62 (19.4%) were *Ascaridia galli*, 28 (8.8%) *Heterakis gallinarum*, 11 (3.4%) *Gongylonema congolense*, 25 (7.0%) each for *Tetrameres ameriana* and *Subulura brumpi*, 24 (7.5%) *Cheilospirura haamulosa*, 14 (4.4%) *Capillaria contorta*, 7 (2.2%) *Choanotaenia infundulum*, 19 (5.9%) *Raillietina echinobothrida*, 6 (1.9%) *Reillietina tetragonia*, 14 (4.4%) *Hymenoslepis cantaniana* and 5 (1.6%) *Hymenolepis carioca* (Table 3). The most frequently encountered nematode was *Ascarida galli* in the intestine, while the least was *Gongylonema congolense* in the crop. Nematodes were prevalent in all sections of the digestive tract. Cestodes prevalence was restricted to the small intestine and duodenum.

Prevalence of helminthes in the four council wards revealed that 88 local scavenging chickens in Ijom ward were infected by ten species of helminthes. In Bikobiko, Ijiman, and Ikpakapit wards 41, 76, and 35 scavenging chickens were parasitized by 7, 6, and 7 species of helminthes respectively (Table 3).

4. DISCUSSION

This study revealed that local chicken breed by households in Ugep are heavily parasitized by two classes of helminthes, namely nematodes and cestodes. Similar findings have been reported earlier by different researchers in Africa

[12,15,16]. The overall prevalence of helminthes infection (75.0%) recorded in this study is in agreement with 76.1% reported by Ogbaje et al. [1] in Markurdi Township, Benue State, Nigeria. The reported 75.0% prevalence of helminth infection in this study revealed a relative decrease from previously observed prevalence of 100% by Ruff et al. [10] and 96.8% by Idika et al. [12]. The decrease prevalence is attributable to the level of proper management information to most local chicken breeders as earlier reported by Ogbaje et al. [1]. Domestic chickens have indiscriminate scavenging behavior of seeking food from diverse diets containing infective stages of helminth parasites, which predisposes them to parasitic infections [1,4]. This gives a clue for the high prevalence rate observed in free-range chickens in this study. The result is in consonance with previous reported work [17,18]. From this study, nematodes have a higher prevalence rate of 48.4% with *Ascaridia galli* having a very reasonable prevalence of 19.4 compared with cestodes having a prevalence of 26.6%. This finding buttress the report of several studies [3,4,16,19], who agreed that nematodes are always higher in prevalence than cestodes. They reasoned that nematodes do not require intermediate hosts and thus transmitted directly from the soil, while cestodes transmission is dependent on the availability of intermediate hosts.

Ascaridia galli showed the highest infection rate in this study. This high rate of infection may be due to moist environmental factors around the study area which has enhanced larval development and subsequent transmission [20]. This study reported a higher prevalence rate of helminthes infection in female scavenging chickens (85.7%) than males (52.8%). Explanation to this difference in infection could be that because female chickens dissipates much energy during egg production and incubation, it induces their voracious and indiscriminate feeding habit on diverse diets containing infective stages of the parasites. But male chickens are selective and therefore less infected than females. This observation is in line with the report of many researchers [21,22], but in sharp contrast with that of Yoriyo et al. [4].

Table 1. Overall prevalence of helminth eggs

Parasites	Chickens examined	Parasites recovered	% infection
Nematodes	190	155	48.4%
Cestodes	130	85	26.6%
Total	320	240	75.0%

Table 2. Prevalence of helminth egg infection according to sex

Sex	Number examined	Number positive	% prevalence
Male	180	95	52.8
Female	140	120	85.7

Table 3. No of scavenging chickens infected and site of helminth recovery according to council wards

Species	Site of recovery	Ijom N = 120	Bikobiko N = 65	Ijiman N = 80	Ikpakapit N = 50	Overall infection
Nematodes						
<i>Ascarida galli</i>	Small intestine	22 (18.3)	15 (23.1)	19 (23.8)	6 (12.0)	62 (19.4)
<i>Heterakis gallinarum</i>	Caecum	12 (10.0)	9 (13.8)	0	7 (14.0)	28 (8.8)
<i>Congylostrongylus congolense</i>	Crop	2 (1.7)	4 (6.2)	0	5 (10.0)	11 (3.4)
<i>Tetrameres americana</i>	Proventriculus	10 (8.3)	0	15 (8.8)	0	25 (7.8)
<i>Subulura brumpti</i>	Caecum	9 (7.5)	0	12 (15.0)	4 (8.0)	25 (7.8)
<i>Cheilospirostrongylus hamulosa</i>	Gizzard	5 (4.2)	0	13 (16.3)	6 (12.0)	24 (7.5)
<i>Capillaria contorta</i>	Oesophagus	6 (5.0)	5 (7.7)	0	3 (6.0)	14 (4.4)
Cestodes						
<i>Choanotaenia infundulum</i>	Small intestine	4 (3.3)	3 (4.6)	0	0	7 (2.2)
<i>Reillietina echinobothrida</i>	Small intestine	7 (5.8)	0	12 (15.0)	0	19 (5.9)
<i>Reillietina tetragona</i>	Small intestine	0	2 (3.1)	0	4 (8.0)	6 (1.9)
<i>Hymenolepis cantaniana</i>	Duodenum	11 (9.2)	3 (4.6)	0	0	14 (4.4)
<i>Hymenolepis carioca</i>	Duodenum	0	0	5 (6.3)	0	5 (1.6)
Total number of chickens		88	41	76	35	240
Total species			7	6	7	

Nematode parasites were found in all the sections of the digestive tracts, with *Ascaridia galli* frequently encountered in the small intestine. This finding is in agreement with the report of Ohaeri and Okwum [3]. The small intestine and duodenum harboured all the cestodes encountered in this study. The reason for their occupation of these sections of the digestive tracts is to acquire the available food nutrients here. This observation conforms to Ohaeri and Okwum [3] who posited that it was to complement their physiological osmotic feeding nature where there is optimum concentration of saline and glucose. The overall prevalence of helminth parasites of scavenging chickens showed a significant statistical difference ($p < 0.001$) between council wards. This could be due to variation in climatic factors such as soil moisture and humidity in the council wards, which facilitate development and subsequent transmission. This finding is similar to several studies [3,20].

5. CONCLUSION

In conclusion, this study revealed that local chickens bred from the four council wards of Ugep are heavily parasitized by two classes of helminth parasites, namely nematodes and cestodes. A total of twelve (12) helminth parasites were recovered during the study, that is, seven nematodes and five cestodes. The high

prevalence of helminth parasites in the study area is not unconnected with climatic factors and lack of occasional deworming. Periodic deworming of local scavenging chickens to reduce their worm burden is highly recommended for profitable rearing.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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