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Survey And Prevalence of Gastrointestinal Nematodes in Village Chickens (*Gallus gallus domesticus*) Slaughtered in Gombe Metropolis Poultry Dressing Slabs

J. R. Lawal[1], I. U. Hambali[2], S. M. Jajere[2], A. M. Bello[1], A. A. Biu[3], G. Musa[1]

[1]Department of Veterinary Medicine, Faculty of Veterinary Medicine, University of Maiduguri, P M B 1069, Maiduguri, Borno State, Nigeria
[2]Department of Veterinary Public Health and Preventive Medicine, Faculty of Veterinary Medicine, University of Maiduguri, P M B 1069, Maiduguri, Borno State, Nigeria
[3]Department of Veterinary Microbiology and Parasitology, Faculty of Veterinary Medicine, University of Maiduguri, P M B 1069, Maiduguri, Borno State, Nigeria

Abstract: **This study was conducted to investigate the prevalence of Nematodes of village chickens slaughtered at six poultry dressing slabs (N = 600) within Gombe metropolis by postmortem and parasitological examination of gastrointestinal tracts and trachea. A total of seven Nematode species were identified in this present study with an overall prevalence of 20.1% in the Nothern markets and 19.5% in the Southern markets of the study area. Three nematode species recovered from the intestine were *Heterakis gallinarum* (365), *Ascaridia galli* (267) and *Gongylonema ingluvicola* (21), *Subulura brumpti* (123) was found in the caecum while *Dispharynx nasuta* (34) and *Cheilospirura hamulosa* (34) were found in the gizzard and *Syngamus trachea* (6) was recovered from trachea. There were no statistical significant association between the occurrence of the infection and the two zones of the study area (p >0.05), except for *Syngamus trachea* having a statistical significant association (p< 0.05) between its occurrence and the two zones of the study area with the odd of occurrence having a value of 13.265 in the Northern zone. The study also indicated that female sex had a higher prevalence (70.1%) than the male (60.2%). There was a statistical significant association among the sex group and occurrence of the infection (p < 0.05). The odd of occurrence was about twice in the female than male. This study provides baseline data on prevalence and species distribution of nematodes of village chickens in Gombe. There is therefore the need for further studies on epidemiology and economic significance of nematodes of village chickens under the traditional free range management system.**

Keywords: **Nematodes, parasite, prevalence, village chickens, Gombe, Nigeria.**

1. INTRODUCTION

Village chicken production is an important agricultural activity of almost all rural communities in Africa, providing high quality animal protein in the form of meat and eggs as well as being a reliable source of petty cash (Alexander, 2001; Copland and Alders, 2005). In most African countries, it has been reported that the rural poultry accounts for more than 60% of the Total National Flock (TNF), with an asset value of more than 5.75 US Dollars (Nnadi and George, 2010). Nigeria has the largest poultry population in Africa (Duru *et al.*, 2008). It has been estimated that the country has about 130-150 million chickens (Saidu *et al*., 2006; Ezema *et al*., 2008; Duru *et al*., 2008; Nnadi and George, 2010). Of these only about 10 percent are the exotic breeds (Oyekunle *et al*., 2006; Duru *et al*., 2008). Village chickens account for the remaining population (Nwanta *et al*., 2008). However, several factors limits poultry production in Nigeria, particularly coccidiosis, helminthiasis, bacterial and viral diseases resulting in losses due to mortality and morbidity (Biu and

Etukwudo 2004; Luka and Ndams, 2007). The village chickens (*Gallus gallus domesticus*) are usually rose in an extensive management system, which is certainly the most common type of husbandry practice in rural communities where most of these village chickens area bred (Usman, 2002; Musa *et al*., 2008). However, there are some specific poultry health managements that are seldom practiced by village chicken farmers, especially the routine control of parasitic infections in their flocks. Poultry helminthes are commonly divided into three main groups; nematodes (roundworms), trematodes (flatworms) and cestodes (tapeworms). These helminthes parasites affecting scavenging chickens have been widely reported, with mixed infection being very common (Poulsen *et al*., 2000; Phiri *et al*., 2007). In Africa, prevalence (usually of multiple infections) of up to 100% has been reported (Poulsen *et al*., 2000; Permin *et al*., 2002; Phiri *et al*., 2007; Mukaratirwa and Khumalo, 2010). Nematodes constitute the most important group of helminth parasites of chickens both in number of species and the extent of damage they cause. *Ascaris galli* has been incriminated as the most common and most important nematode of poultry (Pam, *et al.*, 2006; Luka and Ndams, 2007; Matur *et al*., 2010). Gastrointestinal helminthes are distributed worldwide, their predilection sites and respective lesions associated with these gastrointestinal parasites have been reported specifically in village chickens (Mushi *et al*., 2000; Onyirioha, 2007; Mukaratirwa and Khumalo, 2010; Matur *et al.*, 2010; Salam *et al.*, 2010) in most developing countries including Nigeria.. This current study was designed to survey and determine the prevalence of gastrointestinal Nematodes of village chickens (*Gallus gallus domesticus*) frequently slaughtered and dressed in the six major poultry dressing slabs within Gombe metropolis, North Eastern Nigeria.

2. MATERIALS AND METHODS

STUDY AREA**:** The study was conducted in Gombe Metropolis, the capital of Gombe State. The state is located in the north-eastern part of Nigeria. The seasons in Gombe and most parts of Northern Nigeria were categorized as follows: Dry season (January - March), Pre-rainy season (April - June), Rainy season (July-September) and Pre-Dry season (October –December).

SAMPLE SIZE AND COLLECTION: The sample size used in this study was calculated according to previous method recommended by Thrusfield (2005). Fresh Gastrointestinal tracts content and trachea scrapings of 600 rural chickens were collected from six (6) different poultry markets and dressing slabs namely: Gombe main market, Pantami market, Riyal/ Bagadaza market, Dukku park market, Tudun wada market and Shongo park market) within Gombe metropolis between the months September and December, 2014. The six (6) markets were classified into two (2) based on their geographical locations within the state; hence Northern and Southern group of the markets were designed.

EXAMINATION PROCEDURE AND SAMPLE IDENTIFICATION: Fresh gastrointestinal tracts content and tracheal scrapings of 600 rural chickens after slaughter which included 100 samples from each of the six poultry dressing slabs were collected. Using Myoris scissors the alimentary tracts were dissected into sections containing respective organs –oesophagus, crop, proventriculus, gizzard, duodenum, small intestine, ceaca and rectum and kept separately in Petri dishes containing physiological saline as described by Fatihu *et al.* (1991). Visible Nematode to the naked eye were removed using a pair of thumb forceps. The were then grouped and counted. Recovered nematodes were preserved in 70% alcohol. Identification of the collected worms and other labeled samples was carried out by the Microbiology and Entomology diagnostic laboratory, National Veterinary Research Institute (NVRI), Vom, Plateau State, Nigeria. The adult worms were mounted on glass slides using polyvinyl alcohol and identified directly under the stereomicroscope using the characteristics described by Soulsby, (1982) and Permin and Nansen, (1998). Faecal samples were examined using saturated salt solution and sedimentation techniques and examined for ova under the microscope.

STATISTICAL ANALYSIS: Data obtained were subjected to Graph pad instat3. The observed prevalence and 95% confidence intervals (CI) were evaluated.

3. RESULT

Six hundred (600) village chickens visceral organs were collected from the six poultry dressing slabs within Gombe metropolis and were examined for the presence of nematode. Out of which 342 are males and 258 are female's village chickens. Table 1 and 2 depicts results of the number infected and prevalence of nematode species of village chickens from the six village poultry dressing slabs within Gombe metropolis. Out of the 600 village chickens visceral sampled, 368(179 from the northern market and 189 from the south) showed the presence of *Herterakis gallinarum* which was found in all parts of the intestine that was examined. *Ascaridia galli* was also found in all parts of the intestine in 267 (136

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from the northern market and 131 from the south) of the vi llage chickens sampled. *Subulura brumpti* was found in the caeca to be 123 (63 from the northern market and 60 from the south), *Dispharynx nasuta* and *Cheilospirura hamulosa* were found in the gizzard of 34 sampled village chickens each. *Gongylonema ingluvicola* was found in the intestine of 21(8 from the northern market and 13 from the south) while *Syngamus trachea* was found in the trachea of 6 in the northern market . Table 3 summarized the results of prevalence of nematodes helminthes in relation to sex of village chickens from the six village poultry dressing slabs within Gombe metropolis. Of the 600 village chickens visceral examined for helminth recovery and identification, 342 village chickens were males with 206 positive cases and 258 were females with 181 positive cases.

Table 1: Number infected and prevalence (%) of nematode species of village chickens from the six village poultry dressing slabs within Gombe metropolis.

Nematode species	Worm recovery site	Gombe main market n=100	Pantami market n=100	Dukku park market n=100	Shongo park market n=100	Riyald / Bagadaza market n=100	Tudun wada market n=100
Herterakis gallinarum	All parts of the intestine	67	63	53	58	68	59
Ascaridia galli	All parts of the intestine	47	42	45	41	48	44
Subulura brumpti	Caeca	32	22	13	17	21	18
Dispharynx nasuta	Gizzard	6	11	5	3	4	5
Syngamus trachea	Trachea	2	0	2	0	0	2
Gongylonema ingluvicola	Small intestine	3	5	3	5	3	2
Cheilospirura hamulosa	Gizzard	5	3	7	11	5	3
Total number of helminth species		**7**	**6**	**7**	**6**	**6**	**7**

Table 2: Number infected and prevalence (%) of nematode species of village chickens from the six village poultry dressing slabs within Gombe metropolis based on zones

Nematodes	Northern Markets (n=300)	Southern Markets (n=300)	P value	OR	95% CI
Herterakis gallinarum	179	189	0.450	0.868	0.625-1.207
				1.151	0.828-1.59
Ascaridia galli	136	131	0.742	1.070	0.775-1.47
				0.934	0.677-1.29
Subulura brumpti	63	60	0.839	1.063	0.715-1.58
				0.940	0.632-1.39
Dispharynx nasuta	16	18	0.860	0.882	0.441-1.76
				1.133	0.566-2.26
Syngamus trachea	06	0	0.030	13.265	0.74-236.6
				0.075	0.004-1.34
Gongylonema ingluvicola	08	13	0.374	0.604	0.246-1.48
				1.653	0.675-4.05
Cheilospirura hamulosa	15	19	0.596	0.778	0.387-1.56
				1.285	0.639-2.57

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Table 3: Prevalence of nematodes in relation to sex of village chickens from the six village poultry dressing slabs within Gombe metropolis

Sex	No. examined	No +(%)	P value	OR	95%CI
Male	342	206(60.2)	0.012	0.644	0.457-0.908
Female	258	187(70.1)		1.552	1.101-2.183
Total	600				

4. DISCUSSION

Village chicken production is often described as a low input/low output poultry system and involved small flocks left scavenging around to obtain their food. Low productivity is mainly caused by diseases including parasitic diseases, suboptimal management, and lack of supplement feed (Eslami *et al.*, 2009). The result of this study showed a wide range of nematodes infections among village chickens in the study area. The finding of this study showed that *Herterakis gallinarum* , *Ascaridia galli* , *Subulura brumpti* were among the most prevalent nematode species whereas *Dispharynx nasuta* , *Cheilospirura hamulosa* , *Gongylonema ingluvicola* and *Syngamus trachea* were of low prevalence in the study area. Similar reports have been documented from other parts of northern Nigeria; Jos – Plateau (Pam *et al.*, 2006), Zaria (Luka and Ndams, 2007), Bauchi (Yoriyo *et al*., 2010) and in Abuja (Matur *et al*, 2010). An overall prevalence of 20.1% and 19.5% were obtained from the Northern and Southern markets respectively. A number of prevalence studies on the nematode helminthes have been conducted on village chickens in different countries all over the world. In Gaza – Palestine, Rayyan *et al*. (2010) reported the prevalence rate of *A. galli* (75.6%) and *H. gallinarum* (68.9%). In Denmark, Permin *et al.* (1999) reported that 63.8% of the village chickens reared in an extensive system were infected with *Ascaridia galli* and 72.5% infected with *Heterakis gallinarum*. In Tanzania, Magwisha *et al.* (2002) found that 69 % of the chickens were infected with *A. galli* and 1% was harbored *Capillaria spp*. In the Goromonzi District in Zimbabwe, Permin *et al*. (2002) showed that prevalence of *A. galli* and *H. gallinarum* in village chickens were 48. 24% and 64.62% respectively. A study carried out by Irungu *et al.* (2004) in Kenya showed that 10 % of the examined intestinal tracts were infected with *A. galli* and 21.33 % were infected with *H. gallinarum* while only 1.5 % harbored *Capillaria spp.* In Bangladesh, Islam *et al.* (2004) reported that 62.7%, 54.6% and 4.5% of the scavenging village chickens were infected with *A. galli, H. gallinarum* and *Capillaria spp.* respectively. More recent studies by Phiri *et al*. (2007) in Zambian villages revealed that 28.8% and 32.8% of the chickens were infected with *A. galli* and *H. gallinarum* respectively. In Kenya, Kaingu *et al.* (2010) reported that most prevalent nematode species in village chickens is *H. gallinarum* while the species with the lowest prevalent rate is *S. trachea* (0.28%). The six(6) markets were classified into two (2) based on their geographical locations within the state, hence Northern and Southern group of the markets were designed.

There were no statistical significant association between the occurrence of the infection and the two zones of the study area, except for *Syngamus trachea* having a statistical significant association between its occurrence and the two zones of the study area with the odd of occurrence having a value of 13.265 in the Northern zone. The study also indicated that female had a higher prevalence than the male. There was a statistical significant association among the sex group and occurrence of the infection ($p < 0.05$). The odd of occurrence was about twice in the female than male. However , the difference in prevalence in this study area might be attributed to the possible exposure of the chicken in the northern markets to contaminated feed and environment(Luka and Ndams, 2007). There is therefore the need for further studies on epidemiology and economic significance of nematodes of village chickens under the traditional free range management system.

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