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RAINY SEASON PERIOD PREVALENCE OF HELMINTHS IN THE DOMESTIC FOWL (*Gallus gallus*) IN NSUKKA, EASTERN NIGERIA

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SUMMARY

Eighty (80) gastrointestinal tracts of adult (>6 month old) domestic fowl (*Gallus gallus)* were examined for gastrointestinal helminths during the rainy season (April to August) in Nsukka, Nigeria. Monthly incidence of helminths in the chickens ranged from 94 to 100%. 96.3% of the birds were infected with at least one genus of helminth. Helminths observed were mainly of nematods species comprising *Tetrameres americana* (57.5%); *Subulura brumpti* (16.3%), *Heterakis brevispi culum* (8.8%), *Dispharynx spiralis* (7.5%), *Ascaridia galli* (1.25%) and *Gongylonema species* (1.25%). Only one cestode specie, *Raillietina tetragona* was observed and it had the highest prevalence rate of 92.5% of the screened birds. No cestode was recovered. Polyparasitism predominated more than monoparasitism. Male fowls carried significantly ($p<0.5$) more parasite burden than the females. The implications of the results are discussed with reference to the epidemiology, public health and control of helminthosis of the domestic fowl in Nigeria.

Key Words: Helminth, Domestic fowl (*Gallus gallus* , epidemiology.

INTRODUCTION

The local chicken (*Gallus gallus*) is widely reared traditionally in the tropics (Hodasi, 1979; Fakae *et al.,* 1991; Mpoame and Agbede, 1995; Permin *et al.*, 1997). It has been estimated that indigenous domestic chicken contributes over 90% of the internal supply of poultry meat in Nigeria (Ikeme, 1997). The meat of *Gallus gallu* is also much preferred locally to those of the exotic breeds (Obiora *et al.,* 1983; Obanu *et al.,* 1984).

These local birds are however traditionally raised under extensive management in villages, with little or no supplementary feeding (Fakae *et al.*, 1991) and without any veterinary care. Under this system of management, the birds are no doubt exposed to viral, bacterial and parasitic infections. Moreover, parasites can profoundly influence social rank and growth of infected birds (Zuk *et al.*, 1998).

Since these domestic fowls are a source of ready cash and meat to the local communities, their potential could be enhanced through improved management and disease control. Effective control measures, however, can only be realistic if based on a thorough knowledge of the epidemiology of the endemic infectious agents.

Limited studies undertaken on commercial farms, which raise mainly exotic birds indicated that gastrointestinal helminth infection is a threat to the Nigerian poultry industry (Umeche and Eno, 1987; Okoye and Chime, 1988; Oyeka, 1989). Attempts have been made by Fabiyi (1972) and Gadzama and Srivastava (1986) to report on occurrence of gastrointestinal helminth of the domestic fowl in northern Nigeria. Due to the vastness of the country Malaki (1976) and Fakae *et al.* (1991) under took studies in the south of the country. These studies were however limited to the dry season, a period of low gastrointestinal parasite intensity as shown by earlier works of Chiejina and Fakae (1989), Chiejina *et al.* (1989) and Fakae (1990) on domesticated ruminants.

Fakae *et al.* (1991) showed that 92% of the local chickens in eastern Nigeria were infected with at least one or more species of gastrointestinal helminths during the dry season. The present paper is a follow up study, conducted in the rainy season with the intention of complementing and adding to the existing knowledge. The present and future trends of gastrointestinal parasite infection in the domestic fowl are also summarized. It is hoped that the information provided would help in planning effective control measures against gastrointestinal parasites and thus enhance the productivity of the indigenous domestic fowl as well as improving public health.

MATERIALS AND METHODS

Collection of samples

During the rainy months of April to August, fresh alimentary tracts were obtained from eighty adult (> 6 months old) local birds slaughtered locally in Nsukka area of eastern Nigeria. The different regions of the alimentary tract were ligated to prevent migration of their contents and the samples were collected in sterile labeled polyethylene bags and taken to the laboratory.

Parasitological technique

In the laboratory, the different regions of the alimentary tract were processed separately according to the method of Fakae *et al*, (1991). Sections of the gut were cut and placed separately into white-labeled plastic containers. Each was then slit open and observed for lesions caused by parasite.The contents were washed into the same container with clean water. Contents of the containers were processed by the method of sedimentation and decantation (Fakae, 1990) until the sediments were clean. Aliquots of 10mls in a ruled petri dish were examined under a stereomicroscope and the parasites were counted. Female *Tetrameres* recovered were teased out of the mucosa of the proventriculus . Tiny worms and scolices of tapeworms were picked up with a pair of fine tissue culture forceps for examination and confirmation under the compound microscope.

Identification of recovered parasites was done by clearing the helminths in lactophenold and examined under the light microscope. Recovered parasites were identified as in Soulsby (1982). They were differentiated into males and females. The helminthes were fixed and preserved in sample bottles containing 10% formal saline.

Thin fresh fecal smears were made from the caeca in drop of normal saline on a glass slide covered with cover slip and examined directly under the microscope for coccidian oocysts.

Weather records

Weather records were obtained from the meteorological station of the University of Nigeria, Nsukka.

Statistics

Results were presented as means and percentages. Data were compared statistically by Mann- Whitney (non-parametric) test and Least Squares, Linear Regression (Instant, Graph pad U. S. A).

RESULTS AND DISCUSSION

The most common helminths species observed were nematode comprising *Tetrameresa americana, Subulura brumpti, Heterakis brevispiculum, Dispharynx spiralis, Ascaridia galli* and *Gongylonema* species. Only one cestode species, *Raillietina tetragona* was observed and this was the most prevalent helminth in the screened birds. No trematode worm was recorded. The prevalence and the worm burden of the birds examined are shown in Table I. Out of these 96.3% were infected with at least one species of helminth. Male birds carried significantly more worm burden than the females ($P<0.05$: Table 1). The monthly mean worm burden and incidence rates of the helminths recovered are represented in Fig.1. There was little or no fluctuation in the incidence rates which did not significantly correlate with the mean worm burden ($P>0.05$).

The common combinations of helminths observed are presented in Table II. Combinations involving two helminths genera were the commonest (Fig. 2). Coccidia occurred in 22.5% of the birds and in all cases occurred concurrently with at least one helminth.

Pathological lesions such as discolouration of the gastrointestinal tract, catarrhal enteritis, ulceration and thickening of the parts of the gastrointestinal tract were observed. The globular female *T. americana* in the proventricular glands produced enlargement of the proventriculi in 25% of the birds. Coccidian infections were associated with some degree of mild enteritis in several of the birds.

The weather records were about the average for the area under study when compared with the 10-year average (Fakae, 1986). The mean monthly rainfalls during the period of study from April to August were 200, 275, 250, 225 and 205mm respectively. A modest positive but non-significant correlation existed between mean monthly rainfall and worm burden ($r=0.5319$, $P=0.3562$).

TABLE I: Species, frequency and burden of helminths recovered from the domestic fowl (Gallus gallus) in eastern Nigeria during the rainy season

Site		Worm Burden		
	Species	*Frequency (%)*	*Mean*	*Male: female ration*
Crop	-	0	0	0
Proventriculus	*Tetrameres americana*	57.5	19.5	1:0.25
	Dispharynx spiralis	7.5	29.3	1:0.21
Gizzard	*Gongylonema species*	1.25	3.0	3:0
Small intestine	*Raillietina tetragona*	92.5	66.6	-
	Ascaridia galli	1.25	2.0	0
Caecum	*Subulura brumpti*	16.3	4.8	1:0.7
	Heterakis brevispiculum	8.8	8.1	0:0.42
Rectum	-	0	0	0

TABLE II: Common combinations of helminths observed in the domestic fowl (Gallus gallus) in eastern Nigeria during the rainy season

Genera	Infection rate (%)
Raillietina alone	22.5
Raillietina *and* Tetrameres	52.5
Raillietina and *Heterakis*	7.5
Raillietina and *Dispharynx*	7.5
Raillietina and *Ascaridia*	1.3
Raillietina and *Gongylonema*	1.3
Raillietina and *Coccidia*	22.5

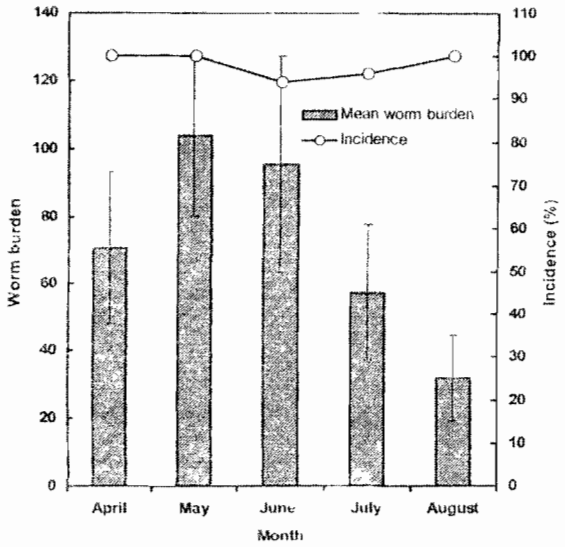

Fig 1: Monthly mean worm burden and incidence of helminth infection in the domestic fowl in eastern Nigeria during the rainy season

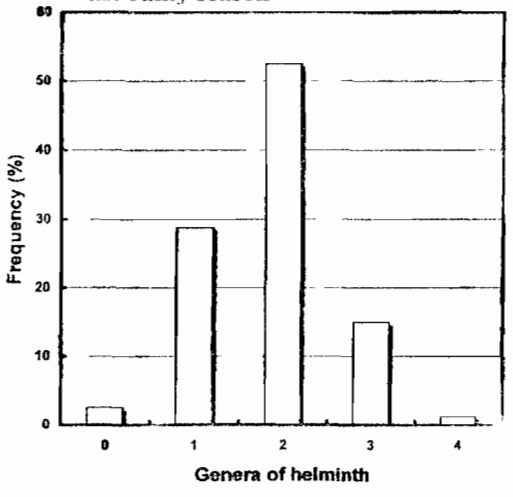

Fig. 2: Frequency distribution of the combinations of helminth genera observed in the domestic fowl (*Gallus gallus*) during the rainy season in eastern Nigeria

The overall prevalence of helminths in the traditionally reared *Gallus gallus* (96.3%) recorded in the present study was slightly higher than those recorded by Fabiyi (1972), Gadzama and Srivastava (1986) and Fakae *et al.* (1991) who had 90, 92 and 92% respectively. This could be explained by the fact that this was carried out during the rains which is considered favourable for the development and survival of the pre-parasitic stages of these helminths (Chiejina *et al.*, 1989). The highest mean worm burden and incidence was recorded in the month of May, which coincided with the highest record of mean monthly rainfall during the period of study. A modest positive but non-significant correlation existed between mean monthly rainfall and worm burden (r=0.5319, P=0.3562). These findings strongly suggest that the rains may be playing an important role in the epidemiology and incidence of these helminths in our local chicken, especially because evidence showed that the rains positively correlated with the worm burden.

R. tetragona, which occurred most (92.5%) in this study, has also been reported as the most widely prevalent and most common helminth in northern Nigeria (Fabiyi, 1972; Gadzama and Srivastava, 1986). In the dry season study conducted by Fakae *et al.* (1991) in Nsukka areas of Eastern Nigeria, this cestode also ranked highest with an incidence of 72.5%. The cestode, *R. tetragona* can be said to be a major problem of the local birds in Nigeria especially when such high incidence is associated with clinical raillietinosis (Okoye and Chime, 1988). In addition, mechanical interference and intestinal obstruction have also been associated with this cestode and some nematodes in the small intestine (Soulsby, 1982). The prevalence of this cestode however, has been reported less in intensively managed birds since they do not

encounter the intermediate hosts as those on free range.

Female *T. americana*, which were usually observed to be fully engorged with blood, could have contributed to the anaemia observed in the birds. The incidence and the burden in birds of this parasite were comparatively higher in this survey than that of a similar study conducted in the same area during the dry season (Fakae *et al.*, 1991). *T. americana* whose main pathology is anaemia is unaffected by the common anthelminthics because of their location in the proventricular glands (Soulsby, 1982). These led Fakae *et al.* (1991) to suggest that in view of its high prevalence it may contribute significantly to the poor health of rural birds in the tropics. Polyparasitism involving two helminth genera was most common in the present study. This contrast with the dry season survey, conducted in the same part of the country, in which monoparasitism predominated (Fakae et al., 1991). This strongly suggests that the local chickens harbour more species of helminths during th

e rainy season than in the dry season. The present findings corroborate those of Fakae *et al.* (1991) that, helminthosis in the rural chicken may be mainly due to raillietinosis and polyparasitism involving *Raillietina* in combination with *Tetrameres* species.

Concurrent infections of helminths with coccidia as observed in 22.5% of the birds is noteworthy since coccidia ordinarily are known to cause severe weight loss and drop in egg production (Hedge and Reid, 1969). They are also capable of suppressing the immune mechanisms of the host to result in pronounced clinical signs during concurrent infections with nematodes (Catchpole and Harris, 1989).

This study strongly suggests that the local chicken managed under free-range conditions are heavily parasitized and especially during the rains. What raises the most concern is that majority of helminths, which parasitize the domestic fowl, are all transmitted by invertebrate intermediate hosts which are abundant in the tropics and whose control is almost impossible. The protection and promotion of public health however is of utmost importance. Other studies across the continent of Africa (Ssenyonga, 1982; Jansen & Pandey, 1989; Fatihu *et al.*, 1992; Terregino *et al.*, 1999) have also maintained that the predominant gastrointestinal helminths of the domestic fowl are those that require invertebrate vectors. It is thus very likely that the dominant roles of the adult male bird may have predisposed them to picking more (infective stage carrying) vectors than the females, hence the very significant difference in the worm burden between the sexes observed in the present study.

The trends of infection in these birds are bound to change in the future with the introduction of modified traditional management systems. Dwellers in urban centres have recently embarked on semi-intensive systems of husbandry for these local fowls. As some of these birds are now raised in backyard enclosure with standard poultry feed supplementation, contact with invertebrate intermediate host should be reduced. Until this practice becomes widely adopted, the use of broad-spectrum anthelmintics in drinking water and maintenance of clean environment remain the most probable and reliable option for the control of helminth infection in local chicken in Nigeria. Preventive and control strategies are the surest way in public health veterinary medicine of preventing infection in animals. The addition of suitable coccidiostats in drinking water may also

prevent coccidiosis, a condition which itself predisposes to clinical helminthosis, in the birds.

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