Helminthic Parasites of Domestic Fowls in Ikwuano, Abia State Nigeria

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Abstract
A survey of intestinal parasites of domestic fowl was carried out in Ikwuano, Abia state, Nigeria during 2009. One hundred and eighty (180) gastrointestinal samples were examined microscopically using the direct smear and floatation technique. The result showed a high prevalence of intestinal parasitic infection. Nematodes especially *Ascaridia galli* 47 (41.6%).and *Capillaria caudinflata* were most prevalent in the birds. *Raillietina tetragona* 11 (6.1%) was found to be the highest in occurrence among the cestodes encountered. No trematode was encountered among the birds, while *Eimeria tenella* 7 (3.9%) was the most prevalent protozoa. The average parasite burden per fowl was found to be 9.8 and majority of the species were restricted to small intestine. Twenty three (12.7%) cases of mixed infections were encountered. The study reveals that there was a high prevalence of intestinal parasites of domestic fowl in the study area. This calls for improved management and disease control to enhance their potential.
Keywords: Intestinal parasites, domestic fowl, parasite burden, predilection, mixed infection

INTRODUCTION
The domestic chicken *(Gallus gallus domesticus)* is widely reared traditionally in the tropics (Hodasi, 1979; Permin and Hansen, 1998). These chickens are the most important protein sources of human population in some developed and developing countries of the world and also serve as means of generating income. The local family poultry is an integrated component of nearly all rural and some urban households in Nigeria. The main advantage of indigenous breeds is that their production is not labour intensive. They can thrive under adverse conditions (e.g. poor mismanagement, diseases, lack of feeding and predators), which may cause low productivity and high mortality (Akinwumi *et al.,* 1979). Since these domestic fowls are sources of ready cash and meat to the local communities, their potential could be enhanced through improved management and disease control.

Parasitic diseases are problems wherever poultry are raised whether in large commercial operations or in small backyard flocks and economic losses can be significant (Fatihu *et al.,* 1991). These parasites constitute a major factor limiting fruitful production in poultry industry by affecting the growth rate of the flock resulting in organ malfunctioning and finally death (Soulsby, 1982). Effective control measures however can 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 helminth infection is a threat to the Nigerian poultry industry (Oyeka, 1989). There is a definite paucity of information on infections of indigenous fowl especially in Abia State of Nigeria. However some studies have been carried out in Northern and Southern Nigeria (Fatihu *et al.,* 1991; Riise *et al.,* 2004). Poor management systems and most importantly diseases are the major cause of financial loss in poultry production (Oluyemi and Robert, 1979).

Ajayi and Ajayi (1983) found that the major constraint to profitable livestock and poultry production in several countries including Nigeria could be traced to helminthiasis. The domestic chicken has a wide range of feeding habits including feeding on faeces which may be carrying stages of parasites, thus predisposing them to parasitic infections (Adang 1999). Heavy gastrointestinal helminthiasis is characterized by retarded growth, emaciation, decreased egg production, mucoid diarrhoea, catarrh, loss of appetite, anaemia, weakness, paralysis and death (Nair and Nadakal, 1981; Fatihu *et al*., 1991). These are causes of great economic loses. Scavenging, backyard and free-range poultry production systems have by definition a much greater degree of contact with potential disease causing organisms and diseases prophylaxis is uncommon (Damerow, 1994).

The objective of this study is to investigate the helminth parasites found in domestic fowls in parts of Abia State, Nigeria. This investigation is aimed at providing information on their prevalence, species composition, preferred site of infection and parasite burden.

MATERIALS AND METHODS
Study area
The study was conducted in Ikwuano Local Government Area of Abia state, Nigeria. The study vicinity has a tropical weather, the raining season is usually from April to October while the dry season begins in November

and ends *in* March.

Collection of samples

The study area was visited twice in a month and maximum of 60 samples were collected every month from different domestic fowl from August to October, 2009. A total of 180 gastrointestinal tract samples of local breed chicken slaughtered at the local markets and shops located in Ikwuano Abia State, Nigeria were collected. The gastrointestinal tracts were collected into plastic bags and taken to the diagnostic and examination laboratory of the National Research Institute, Umudike, Abia State for examination and identification. Samples that could not be immediately analysed were stored in the refrigerator.

Examination of samples

 The gastrointestinal tracts were separated into gizzard, crop, small intestine, large intestine and caecum after which each region was cut open by longitudinal incision. Intestinal scrapping was done and any parasite seen was removed with forceps, washed in saline and identified. Examination of samples for eggs of helminthes was based on floatation technique (Soulsby, 1982), while identification of oocyst of *Eimeria* species was based on the method of MAFF (1977). The preparations were then examined under the microscope using xl0 and x40 magnification.

Data analysis: The results obtained was analysed using descriptive statistics. Level of significance was set at $p < 0.05$.

RESULTS

The overall prevalence of the parasitic infection is shown in Table 1. Out of a total of 180 domestic fowl studied 113 (62.7%) were infected by parasite. Nematodes had the highest prevalence 75 (41.6%), followed by the cestodes with prevalence of 22 (12.2%).

Table 1: Overall prevalence of helminth parasites in domestic fowl (*Gallus gallus domesticus*) (Number examined = 180).

Parasites	Number of fowl infected	Prevalence (%)
Protozoa	16	8.9
Nematodes	75	41.6
Cestodes	22	12.2
Total (%)	113	62.7

The parasite species found in the study are shown in Table 2. The parasitic Nematode (*Ascaridia gall)* was the most prevalent 47 (41.6%). Of the 3 parasitic groups encountered, the nematodes were the most prevalent followed by cestodes and then protozoa. All the parasites showed high predilection for specific sites in the gastrointestinal tract of the birds. Both cestodes and nematodes showed high predilection for specific sites in the gastrointestinal tract of the birds (Table 3). Most of the helminth parasites were restricted to the small intestine, particularly the duodenum.

Table 2: Species composition of helminth parasites of domestic fowl (*Gallus gallus domesticus*) (Number examined = 180).

Parasite species	No. of fowl infected	Species prevalence %
Protozoa	**16**	
Eimeria tenella	7	3.9
E. brunette	4	2.2
E. imitis	1	0.5
E. necatrix	4	2.2
Cestodes	**22**	
Hymenolepis carioca	6	3.3
Reillietina tetragona	11	6.1
R. cesticillus	1	0.5
R. echinobothrida	3	1.6
Davainea proglottina	1	0.5
Nematodes	**75**	
Ascaridia galli	47	41.6
Heterakis galinarum	8	4.4
Capillaria caudinflata	13	7.2
Capillaria obsignata	1	1.1
Strongyloides avium	3	1.6
Trichostrongylus tenus	2	1.1
Subutura brumpti	1	0.5

The result of the burden of parasites are presented in Table 4. The overal average parasite burdden per fowl was

9.8. It was observed that the worm burden due to *Ascaridia galli* (15) was the highest followed by that of *R. tetragona* (12), while the least was recorded for *Davainea proglottina* (1) and *Subutura brumpti* (1). Mixed infections were also encountered with a prevalence of 12.7% (Table 5).

Table 3: Preferred site of infection of helminth parasites of domestic fowl (*Gallus gallus domesticus***).** (Number examined = 180).

Parasite species	No. of fowl infected	Preferred site of infection	
Protozoa	**16**		
Eimeria tenella	7	Caecum	
E. brunette	4	Large intestine	
E. imitis	1	Small intestine	
E. necatrix	4	Large intestine	
Cestodes	**22**		
Hymenolepis carioca	6	Small intestine(5),	Large intestine(1)
Reillietina tetragona	11	Small intestine(7),	Large intestine(4)
R. cesticillus	1	Small intestine(1)	
R. echinobothrida	3	Small intestine(2),	Large intestine(1)
Davainea proglottina	1	Small intestine(1)	
Nematodes	**75**		
Ascaridia galli	47	Small intestine (31),	Large intestine (16)
Heterakis galinarum	9	Caecum	
Capillaria caudinflata	13	Small intestine	
Strongyloides avium	3	Small intestine	
Trichostrongylus tenus	2	Small intestine	
Subutura brumpti	1	Small intestine	

Table 4: The burden of intestinal parasites of domestic fowl (*Gallus gallus domesticus***)** (Number examined = 180).

Parasite species	No. of parasite found	No. of fowl infected	No. of parasite/fowl
Protozoa	**98**	**16**	
Eimeria tenella	70	7	10
E. brunette	12	4	3
E. imitis	8	1	8
E. necatrix	8	4	2
Cestodes	**165**	**22**	
Hymenolepis carioca	24	6	4
Reillietina tetragona	132	11	12
R. cesticillus	2	1	2
R. echinobothrida	6	3	2
Davainea proglottina	1	1	1
Nematodes	**844**	**75**	
Ascaridia galli	705	47	15
Heterakis galinarum	65	9	7
Capillaria caudinflata	59	13	5
Strongyloides avium	12	3	4
Trichostrongylus tenus	2	2	1
Subutura brumpti	1	1	1
Total	**1107**	**113**	**9.8**

Table 5: Mixed infection of intestinal parasites of domestic fowl (*Gallus gallus domesticus***)**
(Number examined = 180).

Parasites	Number of domestic fowls infected	% Mixed Infection
Ascaridia galli+ Raillietina tetragona	6	3.2
Capillaria caudinflata + A. galli	6	3.2
Hymenolepis carioca + Stronglyloides avium	2	1.1
A. galli + C. caudinflata+ R. tetragona	2	1.1
Heterakis gallinarum + Eimeria tenella	5	2.7
Davainea proglottina + R. tetragona	1	0.5
Subutura brumpti + R. cesticillus	1	0.5
Total	23	12.7

DISCUSSION

The occurrence of parasites is probably, the most damaging infections of domestic fowl and a source of serious economic loss. The main effect of helminth parasites is the amazing losses they cause to animal industries through meat contamination and morbidity (Naem and Eskandari, 2005).

The generally high prevalence rate observed in this report could be due to the fact that birds kept under free range or backyard scavenging flocks are not normally fed with grains in the morning (which use to be the practice in the early years) before going out for grazing. Lack of this practice could be attributed to the present poor economic condition. The intermediate hosts (e.g. dung beetle, grasshopper, cockroach, crustaceans, earthworm and snail) for some of the helminth parasites found are available in the environment and could constitute problems in chicken reared on free range or backyard scavenging production system.

The majority of parasites reported here could be potentially pathogenic for the poultry and some to human by inducing enteritis, ulceration or granuloma followed by anorexia, depression, emaciation and death. Due to the effects in body condition, it has been shown that weight loss due to helminth infections in domestic fowl can be outstanding (Permin and Hansen, 1998).

Similar reports of helminth infections found in domestic fowl in this study have been documented as described from other parts of Nigeria and West Africa (Fatihu *et al.,* 1991; Luka and Ndam, 2007, Yoriyo *et al.,* 2005). The result of this study showed that the domestic fowl were heavily parasitized by a large number of helminth parasites. Mixed infections were also encountered and most with nematode. These results are comparatively similar to studies in some state such as Bauchi, and Anambra (Oyeka, 1989; Yoriyo *et al.,* 2005), which reported high prevalence of the helminth parasites. Previous studies have attributed this high endemicity to poor sanitary conditions and lack of health services (Oyeka, 1989; Adang *et al.,* 2008). This study which is in agreement with Yoriyo *et al.,* (2008) further support the observation that parasites are most predominant in tropical countries due to the climatic and environmental conditions prevailing there which favour helminth growth. From the study, nematode had the highest prevalence with *Ascaridia galli* having a remarkable prevalence of 41.6% and this is *in* agreement with earlier findings of Yoriyo *et al.,* (2008) which means that nematodes are always more prevalent than cestodes and trematodes in domestic fowl. The reasons being that nematodes do not require intermediate hosts and at the same time they are soil transmitted parasites. The adults lay many eggs daily which can retain their viability for as long as 12 months and so domestic fowls are constantly picking up viable eggs from the droppings that contaminate the environment as they feed (Permin and Hansen, 1998) and this also predispose them for heavy parasite burden. More so cestodes require intermediate host to complete their life cycle and so transmission is dependent on the availability of the intermediate hosts.

Most of the parasites were restricted to the small intestine, particularly the duodenum where there is optimum concentration of saline and glucose (Fatihu *et al*., 1991). Earlier report (Smyth, 1976) suggests that the preference for the small intestine by these parasites is to complement their physiological osmotic feeding nature where nutrients exist in dissolved form. The differences in the worm burden could be attributed to climate difference, availability of intermediate host, and possibly host factors such as host immunity. Parasitic intervention to limit hallmark complication of the infection is thus necessary in poultry industries.

CONCLUSION

Parasitic infections are the major cause of financial loss in poultry and huge losses to the livestock industries. The work carried out revealed high protozoan and helminth infections with nematodes having the highest prevalence. This may however increase due to seasonal or climatic abundance of specific invertebrate hosts. Therefore improvement of sanitary practice to interrupt the life cycle of the parasite species and as such reduce the rate as well as the burden of the infection in poultry farm is recommended.

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