



Prevalence of gastrointestinal helminths of waterfowls and its possible public health implications in Ibadan, Nigeria

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Abstract

Helminths are organisms that are capable of causing high mortality in all avian species including the domestic chickens and water fowls. This work was carried out to determine the prevalence of helminthosis and its implication in public health. In this study on waterfowls in Ibadan, pooled fecal samples from 100 waterfowls (81 ducks and 19 geese) were collected and processed using standard coprological techniques. Seventeen samples including 13 (16.04%) in ducks and 4 (21.05%) in geese were positive for parasite, Seven different types of helminthes were identified in which 3 of the organisms were nematodes, 2 cestodes and 2 trematodes. The *Heterakis gallinae* (43.27%), a nematode was the most prevalent parasite followed by cestode *Amoebotaenia sphenoides* (18.91%) . The higher prevalence of these helminth parasites was seen in samples collected from rural areas and from birds that were raised on extensive type of management. It was recommended that waterfowls should be checked regularly for signs of helminthosis and a routine of deworming schedule should be adopted for good management practice.

Keywords: Coproscopy, Helminths, Nigeria, Public health, Waterfowls

Introduction

Helminths can survive in their hosts for many years, manipulating the host immunity by secreting immunomodulatory products (CDC, 2014; Jrillo *et al.*, 2014). Helminth ova have a strong shell that protects the eggs against a range of environmental conditions, thus aiding their longevity. Poultry includes all species of domestic birds used for meat and egg production (Al-Nasser *et al.*, 2007). Examples include chicken, ducks, turkey, guinea fowl, goose, quail, pheasant and peafowl. (Adejinmi & Oke, 2011). They outnumber all other livestock reared in Nigeria, with a fair performance throughout the country especially within human settlement (Kamani *et al.*, 2010). Waterfowls are majorly wild fowls with a few domesticated species

like the ducks. Some of their adaptive features are long necks and webbed feet for swimming (Carboneras, 1992). In Nigeria, waterfowls fulfill a great proportion of animal protein deficiency as in any other developing countries of the world in the form of meat and eggs (Hai *et al.*, 2008). The waterfowl population in Nigeria is estimated to be 3.3 million with 1.1 million of it based in Oyo state. Annually, about 10,588 of them are slaughtered (NBS, 2006). Hence, they contribute immensely to household food security and poverty alleviation in this area. The suitable climatic condition of adequate rainfall of over 95 mm and average daily temperature of 32°C in Ibadan and environs favours the rearing of ducks and also creates an ideal

environment for the development, survival and spread of parasites (Adejinmi & Oke, 2011). The majority of the owners of waterfowl are poor and they live in a rural area, they are usually not financially capable of providing a structured housing, balanced feeding and appropriate routine Veterinary care to the birds. These birds are often reared under semi-intensive system which coupled with the ecology of the parasites and host-parasite relationship produce a great influence on gastrointestinal parasitism in poultry (Muhairwa *et al.*, 2007; Sandh *et al.*, 2009). The role of waterfowls as source of income and nutritional especially among small farmers also tends to give height to the public health implication of the human-waterfowl relationship. This study aims at investigating the gastrointestinal helminthes in waterfowls in Ibadan metropolis, Oyo state and also checks for the zoonotic parasites in these waterfowls.

Materials and Methods

Study area

The samples were collected in four local government areas (Akinyele, Ibadan South, Ibadan North and Iddo) within Ibadan, Oyo state. Live bird markets and household back yard/ extensive rearing system were selected for sample collection.

Table 1: Table showing prevalence of helminthes in waterfowls in the study areas

Type of waterfowl	Total Sampled	No positive	Positive (%)
Duck	81	13	16.05
Geese	19	4	21.05
Total	100	17	37.10

Table 2: Prevalence of mixed or single helminth infection in water fowls

Types of Helminths	Ducks Geese	
	Ducks	Geese
Nematode		
<i>Heterakis gallinae</i>	+++	+
<i>Cappilaria infindibulum</i>	+	-
<i>Ascaridia galli</i>	+	-
Trematodes		
<i>Prosthogonimus spp</i>	-	+
<i>Hymenolepsis spp</i>	+	+
Cestodes		
<i>Amoebataenia sphenoides</i>	++	-
<i>Ralettina spp</i>	+	+
Mixed infections		
<i>Heterakisgallinae/Amoebataeniasplenoides/Ascaridiagalli</i>	+++	-
<i>Heterakisgallinae/Hymenolepsis/ Cappilaria infindibulum</i>	+++	-
<i>Ascaridia galli/ Rallietina spp</i>	+	++

Faecal sample collection

The samples were collected into sterile polythene bags using gloved hands and were transferred to ice packs from where they were transported to the laboratory for analysis. Analysis was done as soon as possible post sample collection.

Faecal analysis

The McMaster slide method was used for the coprological analysis. Using this method, the number of eggs per gram of faeces was calculated using standard procedure (Gupta & Singla, 2012). The eggs were identified using a guide by Thienpont (1979).

Results and Discussion

The quantitative assessment of helminthosis among water fowls sampled is as shown in table 1. Ducks raised on an extensive system of management constituted (40%) of the sampled ducks while the rest (60%) were raised on semi-intensive system of management. The geese were all raised on semi-intensive management. Most of the birds were found in rural areas (81.25%) as against 18.75% in urban areas. The birds were sourced more from households (68.75%) than markets (31.25%). Table 2 showed the type of infection (single or mixed) and the type of helminth egg seen.

The study revealed a total of 7 species of helminthes from 100 samples collected including 3 species of nematode, 2 species of cestode and 2 species of trematode. *Heterakis gallinarum* (43.27%) was the most commonly seen helminth followed by *Amoebotaenia sphenoides* (18.91%). This is contrary to earlier findings by Adejinmi & Oke, (2011) revealing that *Ascaridia galli* (46.8%) was the most commonly seen followed by *Heterakis gallinarum* (23.4%). This could be due to difference in the weather and year when the samples were collected, and also the difference in sample size. In the present study the total prevalence of helminthes was 17 per cent.

The prevalence of trematode, cestode and nematodes was 13.50, 32.42 and 54.08 per cent, respectively. Higher prevalence was seen in the present case than that reported by Adang *et al.* (2014). They found the prevalence of helminthes to be 4.7% with 2.72, 3.63 and 1.81 prevalence rate for nematode, cestode, trematode, respectively. This difference could be due to the seasonal difference in which the studies were carried out and the type of management the birds were subjected. Few of the helminths seen are potential public health hazards as some species of these organisms have been known to be of public health importance. Hymenolepis species have been studied and proven to infect man (Marangi *et al.* 2003; Walwe & Dardi, 2008).

This study was limited to the rainy season which is considered as the period favourable for the development and survival of preparasitic stages of helminthes (Chiejina *et al.*, 1989). Helminth infection was high in birds that were raised on extensive system (this could be due to the exposure of the birds to varieties of helminth intermediate host), followed by those raised on semi-intensive system. The intensive system of management for rearing birds as well as adequate Veterinary care for the birds and strict hygiene for the owners and/or attendants may be helpful in reducing the infection rate. This result also showed that mixed infection was more commonly seen than single infection. This contravenes the report established by Muhairwa *et al.* (2007) who reported that single infections were more common than mixed infections. This could also be due to location and the hygiene level of the rearing of these birds in both countries.

In conclusion, the presence of helminths in these waterfowls examined brings to fore the fact that both terrestrial and water animals suffer from helminthosis. Since gastrointestinal helminths have been shown to have a negative impact on economic situation of rearers (Newbold *et al.* 2017), better management to reduce worm burden can better their lot in production. Vector management is also encouraged since they act as intermediate hosts to some of these helminths that were identified.

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