Intestinal Parasites of Local and Exotic Domestic Fowls in Owoyele, Yewa North, Ogun State, Nigeria

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Accepted 17 November, 2014

Many parasites infest both exotic and local breeds of domestic fowls, significantly impairing optimum productivity in the birds. Fresh faeces of 150 domestic fowls, consisting of 50 (20 males, 30 females) local and 100 (layers) exotic breeds in Owoyele, Yewa North, southwest Nigeria, were examined qualitatively using super-saturated saline floatation technique and quantitatively using McMaster counting technique between April and June 2013. The pooled prevalence of intestinal parasites in the domestic fowls was 66.7%. Local breed (60.0%) and exotic breed (70.0%) had statistically similar prevalences (P > 0.05). The intestinal parasites recorded were *Ascaridia galli*, *Heterakis gallinarum*, *Capillaria* sp. (nematodes) and *Eimeria* sp. (protozoan). *A. galli* was the most prevalent in both local (P < 0.001) and exotic (P < 0.001) breeds. Double infestations of *A. galli* + *A. gallinarum* were recorded in 2.9% (2/70) of the infested exotic fowls. *Capillaria* and *Eimeria* had the least and highest mean intensity of 100 eggs/g and 2190.9 cysts/g, respectively. There is urgent need to effectively control intestinal parasites of domestic fowls in the study community to pave way for meaningful progress of poultry industry.

Keywords: domestic fowls, intestinal parasites, parasitic nematodes, parasitic protozoans, Nigeria.

INTRODUCTION

Poultry is one of the most developed and lucrative animal production enterprises. Its importance in national economies of developing countries and its role in improving the nutritional status and income of many small-scale farmers has been established and documented by various workers. Poultry production in developing countries is divided into large-scale (involving exotic breed fowl) and small-scale (involving local or village chicken) types, each with its peculiarities (Denmark and Cromroy, 2006). Exotic domestic fowls often enjoy some form of care and management, whereas local chicken are usually exposed to many negative extrinsic factors such as malnutrition, poor management and absence of veterinary care services (Magwisha et al., 2002). In Nigeria, local poultry is the most important form of poultry production, constituting approximately 60% of total poultry production (Ikpi and Akinwumi, 1981).

Parasitic diseases are known to infest both exotic and local breeds of domestic fowls, significantly impairing optimum productivity in the birds. This scenario has fostered researches towards understanding the epidemiology of the parasitic infestations towards formulation of control and eradication strategies. Reports on such studies include those of Luka and Ndams (2007), Matur et al. (2010), Hadipour et al. (2011), and Okafor-Elenwo and Elenwo (2014).

Although many inhabitants of Owoyele, Yewa North area of southwest Nigeria engage in poultry farming, there seems to be dearth of information on the epidemiological pattern of parasites of domestic fowls from the area. In
view of the foregoing, this study aimed at understanding the diversity, prevalence and intensity of intestinal parasites of local and exotic domestic fowls in Owoyele, Yewa North, and southwest Nigeria.

MATERIALS AND METHODS

Study area
The study was carried out in Owoyele Village, Yewa North area, southwest Nigeria. The area is located within the derived savannah belt, between Latitudes 2° 45’ and 3° 15’ N and Longitudes 6° 45’ and 7° 30’ E. The area has an average rainfall of 194mm and average maximum and minimum temperature of 30.17°C and 27.80°C, respectively. It falls in the semi-seasonal equatorial climatic zone with associated wet and dry seasons.

Faecal sample collection and examination
This study occurred between April and June 2013. Prior to faecal sample collections, domestic fowls’ owners were educated on the nature and sampling procedure of the study, and their permission was solicited. However, only those who consented (verbally) to the request had their domestic fowls included in the study. The study domestic fowls consisted of 50 (20 males, 30 females) local and 100 (layers) exotic domestic fowls. The exotic fowls were denied of routine deworming for three months before faecal sample collection.

Fresh faecal samples were collected from the domestic fowls and put into labelled sample bottles. In the laboratory, each sample was analysed for eggs/cysts of intestinal parasites both qualitatively (to determine presence or absence of eggs) using supersaturated saline floatation technique and quantitatively (to determine intensity) using McMaster counting technique. For qualitative analysis, 2g of each sample was mixed with 10ml of super-saturated saline. The mixture was strained through a fine mesh sieve (205µm aperture) into a test tube. Afterward more super-saturated saline was added to the sieved mixture filling the test tube to the brim. A cover slip was then placed on top of the test tube, and left for 20-30 minutes. The cover slip was carefully removed and placed on a glass slide, and examined microscopically for characteristic eggs and cysts of intestinal parasites (Soulsby, 1982).

For quantitative analysis, 3g of each sample was mixed thoroughly with 42ml of water, and strained through a fine mesh sieve (205 µm aperture). The filtrate was agitated and centrifuged at 2000 rpm for two minutes. The supernatant was decanted, the sediment was agitated, and the test tube was filled with super-saturated saline and inverted a number of times for thorough mixing while a Pasteur pipette was used to fill both sides of the McMaster counting chamber. The filled counting chamber was allowed to stand for some five minutes before microscopic examination. All the eggs and cysts in the etched areas of the chamber were identified using characteristic morphology (Soulsby, 1982). For each species, the number of eggs or cysts/g of faeces was determined by multiplying the counted number by 50 (Mwale and Masika, 2011).

Statistical analysis
The chi-square test ($\chi^2$) was used for comparison of prevalences and mean intensities among groups for statistical similarities or differences.

RESULTS

The pooled prevalence of intestinal parasitic infestation in the examined domestic fowls was 66.7% (100/150). The prevalence of intestinal parasitic infestation in local breed (60.0%, 30/50) and exotic breed (70.0%, 70/100) of domestic fowls examined were statistically similar ($\chi^2 = 0.77$, df = 1, $P > 0.05$). Among the intestinal parasites recorded, Ascaridia galli and Heterakis gallinarum (nematodes) occurred in both breeds, while Capillaria sp. (nematode) and Eimeria sp. (protozoan) occurred only in exotic and local breeds, respectively. The prevalences of infestation of the parasites in the two breeds of domestic fowls are shown in Table 1. A. galli was the most prevalent infestation among both local ($\chi^2 = 37.2$, df = 2, $P < 0.001$) and exotic ($\chi^2 = 82.8$, df = 2, $P < 0.001$) breeds.

Double infestations of A. galli + A. gallinarum were recorded in 2.9% (2/70) of the infested exotic fowls. The intensity ranges of A. galli were 100-3,300 eggs/g and 100-4,000 eggs/g in local and exotic breeds, respectively. H. gallinarum had intensity range of 100-600 eggs/g in exotic breed, while the intensity range of Eimeria in local breed was 100-48,000 cysts/g. The geometric mean intensities of infestations among the domestic fowls are summarised in Table 2. Among the local breed, Eimeria sp. had statistically highest mean intensity of infestation ($\chi^2 = 2396.8$, df = 2, $P < 0.001$), while A. galli had the highest among the exotic breed ($\chi^2 = 194.9$, df = 2, $P < 0.001$).

DISCUSSION

In view of the established significant pathological effects of intestinal parasites on domestic fowls, their presence in Owoyele, Yewa North, southwest Nigeria is a threat to poultry industry in the community. The occurrence of intestinal parasites in both local and exotic domestic fowls in study community, corroborates related earlier reports on domestic fowls (Matur et al., 2010), and also lends support to the cosmopolitan status of parasitic infestations in poultry (Jordan and Pattison, 1996). However, the similar...
Table 1. Prevalence of intestinal parasites in domestic fowls in Owoyele, Yewa North, and southwest Nigeria

<table>
<thead>
<tr>
<th>Intestinal parasites</th>
<th>No. (%) positive</th>
<th>Local breed (n=50)</th>
<th>Exotic breed (n=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. galli</td>
<td>21 (42.0)</td>
<td>59 (59.0)</td>
<td></td>
</tr>
<tr>
<td>A. gallinarum</td>
<td>3 (6.0)</td>
<td>9 (9.0)</td>
<td></td>
</tr>
<tr>
<td>Capillaria</td>
<td>0 (0)</td>
<td>2 (2.0)</td>
<td></td>
</tr>
<tr>
<td>Eimeria</td>
<td>6 (12.0)</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>30 (60.0)</td>
<td>70 (70.0)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Mean intensity of intestinal parasites in domestic fowls in Owoyele, Yewa North, and southwest Nigeria

<table>
<thead>
<tr>
<th>Intestinal parasites</th>
<th>Geometric mean intensity (eggs or cysts/g)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Local breed</td>
</tr>
<tr>
<td>A. galli</td>
<td>278.7</td>
</tr>
<tr>
<td>A. gallinarum</td>
<td>400</td>
</tr>
<tr>
<td>Capillaria</td>
<td>0</td>
</tr>
<tr>
<td>Eimeria</td>
<td>2190.9</td>
</tr>
</tbody>
</table>

prevalences of infestation recorded in both breeds in the study community differs remarkably from the frequent report of relatively higher infestation levels in local fowls (Matur et al., 2010). This divergence may be partly because the exotic fowls examined in this study were denied of routine prophylactic treatment three months prior to faecal examination. Findings on the suspension and resumption of prophylactic treatment of the exotic breed will be reported in a subsequent paper.

Although A. galli and H. gallinarum infested both local and exotic breed in this study, A. galli had highest prevalences in both breeds in consonant with some previous reports (Magwisha et al., 2002; Ohaeri and Okwum, 2013). Nevertheless, a similar study in Ijebu North, southwest Nigeria revealed Eimeria and Giardia with highest prevalences of occurrence in local and exotic breeds, respectively (Agbolade et al., 2014). In this study, Eimeria was recorded only in local breed. This observation attests to the documented poor management and neglect of local domestic fowls by farmers in developing countries (Percy et al., 2012). However, the absence of Capillaria infestation in the local fowls in this study, despite its presence in exotic ones, seems to be contradictions in terms, and may be a reflection of the limitation of the smaller sample size of the local breed examined.

The presence of double infestations in exotic breed in the study community conforms with previous reports of some workers who posit that domestic fowls often harbour more than one type of parasites (Nnadi and George, 2010; Adang et al., 2014; Okafor-Elenwo and Elenwo, 2014). Unlike in some other reports (Ohaeri and Okwum, 2013), only A. galli + A. gallinarum double infestations were observed in the study community. The co-infection of A. galli + A. gallinarum may suggest that the prevailing environmental factors favour their coexistence in domestic fowl in the study area.

The intensity of intestinal parasites recorded in this study was higher than that reported earlier by some workers (Percy et al., 2012). The recorded high intensity in the study community is worrisome because it depicts heavy load of the eggs/cysts of the parasites in the community. The inevitable corollary is the high possibility of transmission and continuity of the infestations in the community. This is because it is common knowledge that local fowls litter their environment indiscriminately with contaminated faeces during their characteristic roaming. The matter is worsened by the situation whereby faeces of exotic domestic fowls are often not treated prior to disposal. In the light of this, both infection-free old and fresh stocks of domestic fowls are readily exposed to infestation by intestinal parasites and other faeces-transmitted infestants.

Conclusively, the findings of this study have shown that both local and exotic breeds of domestic fowls are infested by intestinal parasites in the study community. Although A. galli is the most prevalent in both breeds in the study community, virtually all the recorded intestinal parasites had high intensities. Therefore, there is urgent need to effectively contain and control intestinal parasites of domestic fowls in the study community to pave way for meaningful progress of poultry industry in Owoyele, Yewa North, and southwest Nigeria. This is achievable partly through education of the farmers, regular treatment of
domestic fowls and disinfestations of the faeces of exotic breed fowls before disposal.

ACKNOWLEDGEMENT

We sincerely thank the staff of the Department of Veterinary Parasitology, College of Veterinary Medicine, Federal University of Agriculture, Abeokuta, Nigeria, who offered much advice, technical assistance and laboratory facilities towards the success of this study.

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