Comparative study on the diversity and abundance of gastrointestinal parasites in local and exotic chickens

Survey of the gastrointestinal parasite of chickens slaughtered in Kugiya Bukuru market, Jos South L.G.A of Plateau State was carried out. 200 intestinal content of local and exotic chickens were collected from poultry dressing units in Kugiya market and kept in polythene bags, samples were then transported to the Parasitology laboratory of the National Veterinary Research Institute Vom analysis. Faecal samples were screened using two methods: The formal-ether concentration and the saturated NaCl floatation techniques. Demonstration of the parasites was by microscopic examination of smears made after the concentration method. Four species of Eimeria were encountered in this study: Eimeria necatrix (9(34.62)) had the highest followed by E. brunette (7(26.92)) the least prevalence was observed in the case of E. tenella (6(26.92%)) in the local breed, Eacevulina (5(35.71)) recorded the highest prevalence in the case of the exotic breed. The prevalence of 13(50.00) was observed for both the male and the female local breed but the female 9(62.00) had the highest prevalence than the male 5(38.00). Other species that recorded significant level of infection include Ascaridia galli (13(11.40) and 3(4.60), Capillaria annulata 9 (11.4%) and 7(4.60) in both the local and exotic breed and Eimeria Sp 40 (40.0%). The overall prevalence of infection in Local breed was significantly higher ($x^2 = 4.50$, df = 3, $p = 0.034$) than the exotic breed.

Key words: Comparative, diversity, abundance, gastrointestinal, parasites, birds

INTRODUCTION

The chicken, Gallus gallus is believed to have descended from the wild Indian and South East Asian red jungle fowl (Permin and Ranvig, 2001). The bird provides man with high nutritional value and other socio-economic benefits which cannot be over emphasized (Matur, 2002). Besides providing employment and income for small-scale farmers particularly in the off cropping season, poultry integrates very well into other farming activities like cropping and fish farming (Aini et al., 1990). A lot of losses in poultry have been linked to diseases causing agents such as viruses, bacteria and parasites. It has been estimated that more than 750 million chickens, guinea fowls and ducklings in Africa die each year as a result of various infections (Sonaiya, 1990). Although, somewhat reduction in bird’s parasitic infection has been achieved in commercial production system mostly due to improved housing hygiene and management practices, the prevalence of gastrointestinal parasites is still very rampant (Pandey et al., 1992). The domestic chicken feeds on a wide range of food substances. This ranges from grains, fruits to insects which may harbor infective stages of parasites thereby predisposing them to parasites infection particularly gastro-intestinal parasites (Oniye et al., 2001; Frantovo, 2000). Helminth parasites of chickens are prevalent in many parts of the world (Hodasi, 1978). In Nigeria, documented evidences abound from Anambra (Oyeka, 1989), and Zaria (Fatihu et al., 1991). Oniye et al., 2001; Luka and Ndams, 2007) to Plateau State (Fabiyi, 1972; Pam et al., 2006). Helminth parasites of poultry are commonly divided into three main groups;...
nematodes, cestodes and trematodes. Nematodes constitute the most important group of helminth parasites of poultry both in number of species and the extent of damage they cause. The main genera include *Capillaria, Heterakis* and *Ascaridia* (Jordan and Pattison, 1996). *Ascaris galli* has been incriminated as the most common and most important parasite of poultry (Hodasi, 1978; Pam et al., 2006; Luka and Ndams, 2007). The cestodes of significant importance are the two genera *Railleitina* and *Hymenolepis* (Oniye et al., 2001; Luka and Ndams, 2007). These trematode infections are not very common in domestic chickens as *Prosthogonimus ntowi* has been the only species reported from the forest belt of Ghana (Hodasi, 1978).

The teeming population of Bukuru, Jos South LGA of Plateau State has necessitated certain socio-economic measures taken towards meeting up with the standard of living which includes increased poultry production and its attendant management practices. Also, paucity of information about helminth parasites of domestic chickens in the area and development of new variant species forms of parasites and other disease is what necessitates this survey.

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According to Pandey et al. (1992), although, somewhat reduction in bird’s parasitic infection has been achieved in commercial production system mostly due to improved hygiene and management practices, the prevalence of gastro-intestinal parasites is still very rampant. The identification of enteric parasites in chicken is important for control or preventive measures to be taken.

**MATERIALS AND METHODS**

**Description of the study area**

The research was carried out in Jos South Local Government Area of Plateau State, which is located around Coordinate 9° 46'N 8° 48'E/9.767⁰N, 8.800⁰E and the area of 5,104 km² (1,971m²). The major ethnic group are Berom beside other major settlers like Hausa, Igbo, Yoruba, Miango and Tarok etc.

The major animals found include birds, dogs, sheep, goats, cattle, rabbits, rats etc. The area has a temperature of 30.4°C in March and 12.7°C in January by Plateau State government (Press release, 2010).

**Sampling**

Two hundred intestinal content of local and exotic birds were collected from poultry dressing units in Kugiya in Jos south LGA market and kept in polythene bags, samples were then transported to the Parasitology laboratory of the National Veterinary Research Institute Vom, for analysis.

**Processing of faecal samples**

Feecal samples were screened using two methods: By necropsy and by concentration methods: a, formal-ether, b)the saturated sodium chloride floatation techniques (Mc Nabb et al, 1985).

**Microscopic examination**

Demonstration of the parasites was by microscopic examination of smears made after the concentration method. The identification keys of Soulsby(1982) and Khali et al. (1994) were adopted.

**RESULTS AND DISCUSSION**

The survey of the gastrointestinal parasite of chickens slaughtered in Kugiya Bukuru market Jos South LGA of Plateau State was carried out. Four (4) species of intestinal parasites were encountered in this study: *Eimeria necatrix* 9(34.62%) and *E. acervulina* 5(35.71%) had the highest prevalence in both local and exotic breed respectively (Table 1). This species had been reported in several studies as the commonest and most important parasites infection of poultry (Jordan and Pattison, 1996). Similar reports have been documented from other part of Nigeria; Jos-Plateau (Fabiyi; 1972; Pam et al., 2006) and Anambra State south east of Nigeria (Onyeka, 1989) and Zaria (Fatihu et al., 1991; Oniye et al., 2000; Luca and Ndams, 2007). These reports incriminated the *Eimeria* as very important parasites of the birds (chicken), it is know that the domestic chicken feed on a wide range of diets, a habit that predispose them to parasites infections with many of the foods carrying infective stages of the parasites thereby serving as intermediate hosts in chickens that are free ranging (Hodasi, 1978; Pam et al., 2006; Luca and Ndams, 2007). *Hymenolepis carioni* that was absent in the exotic breed had low prevalence rate in the local breed 3(2.1%) as presented in Table 3, this is in agreement with Pam et al., (2006); Luke and Ndams, (2007) who reported in their work that this parasite has low prevalence compared to other intestinal parasites. Other species that recorded significant level of infection include *Ascaridia galli* 13(11.4%), *Capillaria annulata* 9(11.4%), and *Eimeria tenella* 4(15.30%). The overall prevalence of infection in Local breed 26 (100%) was significantly higher (x² = 4.50, df = 1, p = 0.0034) than the exotic breed 14(100%). This is not uncommon because of the free range mode of management practice which allows them free access to virtually all types of environment and hence, predisposing them to various form of infections. According to Frontovo, (2000) and Oniye et al. (2001), domestic chicken feed widely therefore, they become more predisposed to infection.
Table 1: Prevalence of Protozoan (*Eimeria* sp) in relation to breed

<table>
<thead>
<tr>
<th>Parasite</th>
<th>Location in the host</th>
<th>Local No +ve(%)</th>
<th>Local No+ve(%)</th>
<th>Exotic No +ve(%)</th>
<th>Exotic No+ve(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Eimeria tenella</em></td>
<td>caecum</td>
<td>4(15.38)</td>
<td>3(21.43)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>E. acevulina</em></td>
<td>Small intestine</td>
<td>6(23.076)</td>
<td>5(35.71)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>E. necatrix</em></td>
<td>Large intestine</td>
<td>9(34.62)</td>
<td>3(21.43)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>E. brunette</em></td>
<td>Large intestine</td>
<td>7(26.92)</td>
<td>3(21.43)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>26(100.00)</td>
<td></td>
<td>14(100.00)</td>
<td></td>
</tr>
</tbody>
</table>

The rate of prevalence of the parasite depends on the breed. ($\chi^2 = 4.50$, df = 3, $P = 0.034$)

Table 2. Prevalence of *Eimeria* species in relation to sex

<table>
<thead>
<tr>
<th>Sex</th>
<th>Breed</th>
<th>Male (%)</th>
<th>female (%)</th>
<th>Total(100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>13</td>
<td>13</td>
<td>26(100)</td>
<td></td>
</tr>
<tr>
<td>Exotic</td>
<td>5</td>
<td>9</td>
<td>14(100)</td>
<td></td>
</tr>
</tbody>
</table>

There is no significant difference in the prevalence between the breed in relation to sex. ($\chi^2 = 0.750$, $df = 1$, $P > 0.05$)

Table 3: Prevalence of Helminth in the relation to breed

<table>
<thead>
<tr>
<th>Helminth</th>
<th>Location in the host</th>
<th>Local</th>
<th>Exotic</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Ascaridia galli</em></td>
<td>Large Intestine</td>
<td>13(11.4)</td>
<td>3(4.6)</td>
</tr>
<tr>
<td><em>Hymenolepis carioca</em></td>
<td>Small intestine</td>
<td>3(2.1)</td>
<td>0(0.9)</td>
</tr>
<tr>
<td><em>Capillaria annulata</em></td>
<td>9(11.4)</td>
<td></td>
<td>7(4.6)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>25</td>
<td>10</td>
</tr>
</tbody>
</table>

Note: Values in the parentheses are the corresponding expected frequencies.

The prevalence of the helminthes is independent of the breed. ($\chi^2 = 3.763$, $df = 2$, $P > 0.05$)

The duration for the local breed to reach table size is much longer compared to the exotic breeds which are fed usually on artificial diets. This of course could be the likely reason for the higher infections in the local breeds which continue to accumulate parasites in the system as well as poor management practice inherent in free range system.

The study revealed in Table 3 that local birds were more 26(65.00%) than the exotic birds 14 (35.00%). This might not be unconnected to their feeding. Local birds (chicken) are known to be more voracious in their feeding habits than the exotic which remain largely selective (Sonaiya, 1990). We recommend improvement on management system for both the local and the exotic birds in the study area.

CONCLUSION

The present study revealed high prevalence of parasitic infection in domestic chicken slaughtered in Kugiya, Nigeria which could serve as silent source of economic loss to the poultry industry through reduced productivity. Therefore, more attention should be focused towards the improvement of the management and care of free ranging chickens. This is because of high contact with a larger area of land and different intermediate hosts while feeding.

REFERENCES


- 35.
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