Prevalence of Intestinal Helminths and Protozoa Parasites of Ruminants in Minna, North Central, Nigeria

Agbajelola Victor Ibukun¹ and Falohun Olufarati Oludunsin¹
Department of Veterinary Microbiology and Parasitology, University of Ibadan

Abstract: The occurrence of gastrointestinal parasites of ruminant has been on the increase leading to great economic and production losses with more fatal cases occurring in developing countries. Minna, a north central city in Nigeria is faced with this problem of helminthosis occasioned by instability in management. This retrospective study was conducted to investigate and provide data on the prevalence and zoonotic impact of helminth and protozoan parasites of ruminants presented to the Niger state Veterinary hospital between 2012 and 2013. Faecal samples were examined by direct wet mount method. A total of 299 diarrhoeic faecal samples were collected from cattle, sheep and goats presented in 2012, while 127 similar samples were collected in 2013. Of the total 299 faecal sample examined, 177 (59.2 %) were positive for GIT parasites in 2012, whereas, 105 (82.7%) were positive for gastrointestinal parasites in 2013. Coccidiaspp, Fasciolaspp and Ascariaspp had the highest prevalence in both years, other parasites detected are Oesophagostomumspp, Bunostomumspp, Haemonchussspp, Strongylespp, Moniezaexpan, Trichuriaspp, Schistosomaspp and Taenia spp. The prevalence of GIT in 2013 was higher than in 2012. This study therefore concludes that adequate stocking rate, appropriate use of anthelmintics with proper veterinary supervision and optimum use of safer managemental practices are paramount in the control of GIT parasitic infections.

Keywords: Diarrhoea, Gastrointestinal parasites, Minna, Prevalence, Ruminant

I. Introduction

Gastrointestinal parasites are ubiquitous to Africa, where climatic and many environmental factors provide near-perfect conditions for their survival and development (Perry et al., 2002). Gastrointestinal parasites are common in both temperate and tropical countries, they are more prevalent in most geographical zone of Nigeria where sanitation is poor and standard of living is low (Schmidt, 2000), and cause enormous economic losses due to the associated morbidity and mortality (Chiejina and Ikeme, 2007). Ruminants provide multiple socio economic benefits both to the contribution to households proteins and income (Mathew man and Omeke, 2007), however, frequent helminthosis attack resulting in high morbidity rate has remained a major challenge to ruminants production (Boes, et al., 2000; Perry et al., 2002). Kuil (2009) estimated that about 20% of total goats flock in Nigeria are slaughtered or die in extremes due to helminthosis. Helminthosis is the most common cause of diarrhoea in ruminants; both young and old animals are susceptible and overgrazing of pastures can force animals to graze closely to faecal materials, where the parasite infectivity concentration is highest (Schoenian, 2007). The prevalence of various nematodes as recorded by (Ikem, et al., 2013) in SokotoGudali and West Africa Dwarf goats was relatively high. Previous works have shown that the prevalence of nematode infections in small ruminants in other part of Nigeria may be as high as 77-100% throughout the year with or without minor seasonal variation (Fakae, 2009). The study aims at determining and evaluating the prevalence of intestinal helminths and protozoans in ruminants with clinical sign of diarrhoea that were presented to the state veterinary hospital, Minna, Niger state in year 2012 & 2013.

II. Materials And Methods

2.1. Sampling location

Niger state lies on latitude 8°0’ to 11°30’ North and Longitude 03°30’ to 07°40 East. The state is bordered to the North by Zamfara state, west by Kebbi state, South by Kogi state, south west by Kwara state, North east by Kaduna state and south East by FCT.

2.2. Sample collection

A total of 299 diarrhoeic faecal samples comprising of 117 from cattle, 54 from sheep and 28 from goats in 2012, while a total of 127 diarrhoeic faecal samples comprising of 100 from cattle, 22 from sheep and 5 from goats in 2013 from different locations in Changhagaanda BossoLocal Government areas of Minna, Niger state were collected at the state veterinary Hospital. The parameters used for collection were colour (mucous to bloody) and consistency (pasty to watery) of the faeces as described by Schoenian,(2007).

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Faecal samples were appropriately collected from the rectum of ruminants presented with clinical signs of diarrhoea using protective disposable gloves into clean and dry glass slides and taken to Diagnostic parasitology laboratory section of the Niger State Veterinary Hospital, Bosso, Minna for parasite identification.

2.3. Detection of gastrointestinal parasites

Faecal examination was conducted for the presence of helminth eggs and/or protozoan oocysts by simple faecal centrifugation flotation technique as described by Foryet (2001). Briefly, 2 g of faeces was mixed with 60 ml of sugar solution; the sample was strained through a tea strainer into test tubes and single-step centrifugation was carried out at 3000 rpm for 10 minutes (Weber et al., 1992). A plastic pipette was used to pick few drops from the top layer for a wet mount. Identification of parasitic eggs, oocysts and larvae was carried out based on morphology and size as described by Kassai (1999) and Charles and Hendrix (2006).

2.4. Statistical analysis

The data obtained were analyzed by calculating percentage positivity of gastrointestinal parasites.

III. Results

Of the total 299 faecal samples analyzed in 2012, 177 (59.2%) were positive for gastrointestinal parasites, whereas in 2013, 105 (82.7%) in 127 samples were positive for gastrointestinal parasites.

In cattle, the gastrointestinal parasites observed were Coccidiaspp, Ascarisspp and Fasciolaspp with prevalence of 42.1%, 30.5% and 18.9% respectively. Oesophagostomumsspp, Strongylespp and Trichuriaspp were also detected but at lower prevalence of 1%, 1% and 2.1% respectively. Moniezasspp, Schistosomasssp, Taeniaspp and Haemonchusspp were not detected in the cattle samples analyzed in 2012. Whereas only Trichurisspp was not detected in cattle in 2013 as Coccidiaspp 39.2%, Ascarisspp 26.1%, Fasciola spp. 15.4%, Bunostomumsspp 5.9%, Oesophagostomumsspp, Strongylespp, Moniezasspp and Schistosomasssp had 2.3% prevalence (Table 3) each were all detected in the samples.

In sheep, coccidiaspp had the highest prevalence of 47.1%, followed by Fasciolaspp, Haemonchusspp, Ascarisspp and Strongylespp with 11.3%, 15%, 9.4% and 5.6% respectively. Bunostomumsspp, Oesophagostomumsspp, Schistosomasssp and Taeniaspp were also detected but at lower prevalence of 1.8%, 3.7%, 1.8% and 3.7% respectively in 2012 (Table 3), whereas in 2013 Coccidiaspp had the highest prevalence of 58.2%, followed by Haemonchusspp, Moniezasspanss and Strongylespp with 23.5%, 11.7% and 5.8% prevalence respectively. No Fasciolaspp, Ascarisspp, Bunostomumsspp, Oesophagostomumsspp, Trichuriaspp, Schistosomasssp and Taeniaspp were found in 2013.

In goats, Cocciidaaspp had the highest prevalence of 40.7%, followed by 25.9% of Fasciolaspp, 14.8% of Haemonchus spp. Ascarisspp, Bunostomumsspp, Oesophagostomumsspp, Strongylespp and Taeniaspp had 3.7% prevalences each. No Moniezasspp, Trichuriaspp nor Schistosomasssp were found in the samples in 2012 (Table 3). In 2013 only Cocciidaaspp, Fasciolaspp, Ascarissppum and Haemonchusspp were recorded in goats with 25% prevalence each (Table 3).

Table 1: showing the prevalence of gastrointestinal parasites in ruminants for both year 2012 and 2013.

<table>
<thead>
<tr>
<th>Year</th>
<th>Cattle</th>
<th>Sheep</th>
<th>Goats</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total samples</td>
<td>Positive (%)</td>
<td>Negative (%)</td>
</tr>
<tr>
<td>2012</td>
<td>117</td>
<td>95 (81.2)</td>
<td>22 (18.8)</td>
</tr>
<tr>
<td>2013</td>
<td>100</td>
<td>84 (84)</td>
<td>16 (16)</td>
</tr>
</tbody>
</table>

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Table 2: showing the prevalence of the 11 gastrointestinal parasites examined in ruminants for year 2012.

<table>
<thead>
<tr>
<th>Gastrointestinal parasites</th>
<th>Cattle Positive samples (%)</th>
<th>Sheep Positive samples (%)</th>
<th>Goats Positive samples (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oocysts of Coccidia</td>
<td>40 (42.1)</td>
<td>25 (47.1)</td>
<td>11 (40.7)</td>
</tr>
<tr>
<td>Ova of Fasciola</td>
<td>18 (18.9)</td>
<td>6 (11.3)</td>
<td>7 (25.9)</td>
</tr>
<tr>
<td>Ova of Ascaris</td>
<td>4 (4.2)</td>
<td>5 (9.4)</td>
<td>1 (3.7)</td>
</tr>
<tr>
<td>Ova of Bunostomum</td>
<td>1 (1.0)</td>
<td>2 (3.7)</td>
<td>1 (3.7)</td>
</tr>
<tr>
<td>Ova of Oesophagostomum</td>
<td>0 (0)</td>
<td>8 (15.0)</td>
<td>1 (3.7)</td>
</tr>
<tr>
<td>Egg of Haemonchus</td>
<td>1 (1.0)</td>
<td>3 (5.6)</td>
<td>4 (14.3)</td>
</tr>
<tr>
<td>Egg of Strongylus</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>1 (3.7)</td>
</tr>
<tr>
<td>Egg of Monieziexpansa</td>
<td>2 (2.1)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Larvae of Schistosomum</td>
<td>0 (0)</td>
<td>2 (3.7)</td>
<td>1 (3.7)</td>
</tr>
<tr>
<td>Egg of Taenia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>95</td>
<td>53</td>
<td>27</td>
</tr>
</tbody>
</table>

Table 3: showing the prevalence of the 11 gastrointestinal parasites examined in ruminants for year 2013.

<table>
<thead>
<tr>
<th>Gastrointestinal parasites</th>
<th>Cattle Positive samples (%)</th>
<th>Sheep Positive samples (%)</th>
<th>Goats Positive samples (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oocysts of Coccidia</td>
<td>33 (39.2)</td>
<td>10 (58.2)</td>
<td>1 (25)</td>
</tr>
<tr>
<td>Ova of Fasciola</td>
<td>13 (15.4)</td>
<td>0 (0)</td>
<td>1 (25)</td>
</tr>
<tr>
<td>Ova of Ascaris</td>
<td>5 (5.9)</td>
<td>0 (0)</td>
<td>1 (25)</td>
</tr>
<tr>
<td>Ova of Bunostomum</td>
<td>2 (2.3)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Ova of Oesophagostomum</td>
<td>1 (1.1)</td>
<td>4 (23.5)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Ova of Haemonchus</td>
<td>2 (2.3)</td>
<td>1 (5.8)</td>
<td>1 (25)</td>
</tr>
<tr>
<td>Ova of Strongylus</td>
<td>2 (2.3)</td>
<td>2 (11.7)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Ova of Monieziexpansa</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Ova of Trichurispp</td>
<td>2 (2.3)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Ova of Schistosomum</td>
<td>1 (1.1)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Ova of Taenia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>84</td>
<td>17</td>
<td>4</td>
</tr>
</tbody>
</table>

Figure 1: Compound bar chart showing the prevalence of gastrointestinal parasites in ruminants in 2012.
IV. Discussion

The prevalence of gastrointestinal parasites in 2013 is higher than in 2012, this might be partly due to the lower number of samples analyzed in 2013 probably because of the therapeutic intervention given to most ruminants presented with diarrhea and subsequent clinician advices administered to animal owners in 2012, hence fewer cases in 2013, also variations in climatic factors such as rainfall and humidity in both years might impart a significant difference in prevalence.

The observed high prevalence of gastrointestinal nematodes in this study agrees with the findings of separate studies of Okaiyeto et al., (2008) and Jatau et al., (2011), which could be as a result of the semi intensive system of husbandry being practiced by most livestock owners in the state, and partly due to the dynamics of the rainy season and high humidity, whereas animals are housed together with little or no proper care and management expose them to protozoan and helminth infection, this is in accordance with Nwigwe et al., (2013) and Adejinmi et al., (2015).

The prevalence of Coccidia parasite is highest in both 2012 and 2013, this might probably be due to the criteria used for sample collection as one of the prominent sign of clinical coccidiosis is diarrhea as stated by Hansen and Perry (1990). Furthermore, this result corroborates with the findings of Obijiaku and Agbede, (2007), Schoenian, (2007) and Jatau et al., (2011), who also observed a high prevalence of Coccidia lambs and kids, this might be partly due to overcrowding and poor hygiene as reported by Adejinmi&Osayomi(2010), that increase rate of protozoa infection was as a result of overcrowding and poor hygienic practice which can greatly encourage the spread of these parasites, as these animals become carriers of intestinal protozoa parasites and continually contaminate the environment with eggs and oocysts of the parasites.

No Strongyloides spp was isolated in this study in both years; this is contrary to Nawatheetal.,(1985)andGadalhiet al., (2009) who noted that the most pathogenic helminths and protozoan parasites in the intestinal tract of small ruminants are Strongyle spp, Strongyloides spp and Coccidia spp. Although, this study in 2013 disagrees with Adejiniet al.,(2015) who detected Monieza spp and Strongyle spp in domestic goats in Oyo state, but agrees with the detection of Coccidiaspp in goats.

N'Depo, (2004) recorded high prevalence of Haemonchusspp in sheep the reasons for this, according to Ovutoret al.,(2014) who concluded that Haemonchusspp can acquire resistance quickly than other gastrointestinal parasites because of their high biotic factor and could be due to long life span ofHaemonchusspp than Strongylespp,(Yaroet al., 2015) which also correlates with the high prevalence of Haemonchusspp in sheep with diarrhea in 2012 and 2013, this on the other hand contradicts Zajac (2006) who suggested that unlike many other gastrointestinal parasites Haemonchusspp is not a primary cause of diarrhea.

The prevalence of Ascarisspp in goats in this study was higher in both years than in study conducted by Ovutoret al.,(2014) in the Port Harcourt although, this can be due to the distinct climatic conditions of the study area as compared to Niger state.

Infection of Fasciolasp was higher in cattle in both years than in sheep and goats as this could be due to the fact that cattle are more prone to the infection than sheep and distant goats but surprisingly, goat infection

Figure 2: Compound bar chart showing the prevalence of gastrointestinal parasites in domestic ruminants in 2013.

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of *Fasciolasp** was higher than sheep in both years of this study which is also contrary to study by Ardo&Aliyara, (2014).

The prevalence of *Strongylasp** in 2012 and 2013 were both low as compare to the high prevalence reported by Kuil, (2009); Ikemegh et al., (2013) and Yaro et al., (2015).

This study agrees partly withBiuet et al., (2009) who reported incidence of parasitic gastroenteritis of ruminants kept under traditional husbandry method, as some of the small ruminants observed were under traditional management by subsistence animal owners in the state.

The detection of *Fasciolasp*, *Taeniaasp* and *Trichuriasp* in 2012 emphasizes the need for awareness and control programs among consumers of intestinal parts of animals (offals) on the zoonotic implications.

V. Conclusion

In conclusion, poor veterinary infrastructure and medication could have been the causative factors in Niger state and other places with similar high prevalence of gastro-intestinal parasites. Therefore; adequate stocking rate, strategic use of anthelmintic with proper veterinary supervision and effectiveness of safe managemental practices such as frequent disposal of faecal materials should be imploded as a means of preventing and controlling the ever present issue of parasitic infections in ruminants provided by our constant but seemingly changing ecosystem.

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Conflict of interest: the authors declare that there is no conflict of interest between them.

References

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