

Environmental and Public Health Perspective of the Prevalence of Intestinal Helminths Infection of Cattle in Gubi and Galambi Ranches in Bauchi, Nigeria

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Abstract

Faecal samples were collected from cattle in Gubi and Galambi cattle ranches and examined for eggs of intestinal helminths. The ages of the cattle ranged from 1-10 years and were grouped into two - 1-4 years and 5-10 years representing younger and older cattle respectively. A total number of 600 cattle (300 from each farm) were examined for intestinal parasites out of which 355 cattle were found to be infected in the two cattle ranches. Out of the 355 infected cattle, 50.99% were from Galambi, while Gubi had slightly lower cases of 49.01%. Out of the 10 helminths species identified in the two cattle ranches the most prevalent was *Oesophagostomum radiatum*. Female cattle were more infected (60.66%) in Gubi than their male counterparts in which 55.32% infection rate was recorded. Similar trend was also observed in Galambi where the rate of infection recorded in the female (62.00%) was higher than 58.62% recorded in the male cattle. Among the younger cattle aged 1-4 years, 29.36% were infected in Gubi while 26.00% of the same age group were harbouring the parasites in Galambi. It is recommended among others that pens should not be overstocked and cattle farmers should be educated on the importance of environmental sanitation and hygiene in cattle ranches management.

Key words: Intestinal, Helminths, Cattle Ranches, Bauchi

1.0 Introduction

The helminths consist of parasites of plants, man and other animals that inhabit different parts of their host. Helminths infection is a worldwide problem which brings about large economic losses in a variety of ways to both large and small scale farmers. Infection can cause reduction in food intake and lower weight gains. There could also be a reduction in milk production or even mortality in extreme cases (Aliyara *et al*, 2012).

The most common intestinal helminths of cattle include the *trichostrongylus spp*, *Heamonchus spp*, *Oestergia spp*, *Oesophagostomum spp*, *Bunostomum spp*, *Trichuris spp*, *etc*. The larva of intestinal helminth is released after the host ingests the eggs. The larva penetrates the interior part of small intestine for about 2-10 days before moving to the caecum where it moults to adult (Hunter, 1994; Schillhorn van Veen, 1974; Hall, 1985).

The cattle are vertebrate animals belonging to the class of mammals which are herbivores in feeding and are also called ruminants' animals. The ruminants are animals that digest plant based food by initially softening it within their first stomach in a form of semi digested mass known as cud. The process of chewing and re-chewing matter that stimulates digestion is called ruminating. Cattle contribute a lot to the well being of man as they are the main sources of meat milk wools and even revenue to farmers. Anything that affects cattle also affects man either directly or indirectly. Researchers have shown that many of our livestock especially cattle die as result of helminths infections (Sarojin 2001).

Since establishment, little or no attempt has been made to carry out a comprehensive study on the intestinal helminth infections in Galambi and Gubi cattle ranches in Bauchi LGAs of Bauchi state. Thus, this study was carried out to determine the prevalence of intestinal helminth infections in relation to sex and age in the two cattle ranches.

2.0 Methodology

2.1 Collection of samples

The ages of the cattle sampled ranges from 1-10 years based on the information received from the cattle ranch owners. The cattle were grouped based on their ages and sexes. Thus there were those between the ages of 1-4

years (young) and 5-10 years (adult) and the other grouping was the male and the female groups. A total of 300 stool samples were collected from each farm with the assistance of the herdsmen of the farm. Samples were collected in nylon bags and specimen bottles to prevent desiccation and formal saline was added to keep the eggs in their original shape. The egg samples were then taken to the laboratory for further analysis.

2.2 Laboratory Analysis

2.2.1 Formal ether Concentration Technique

Formal ether concentration technique was used for concentrating helminthes eggs. 2 mg of stool was emulsified in 7ml of 10% formalin in centrifuge tube using an applicator stick and the mixture was passed through a sieve (1mm pore sizes) into an evaporating basin. It was replaced into another centrifuge tube and 3ml of ether was added and shaken vigorously for of least 30 seconds. The tube was then centrifuge for another 3 minutes. After the centrifuge, the top layer was decanted and the sediment was examined microscopically for ova of the parasites. Identification keys by Hansen and Perry (1990), Shah-fischer and Say (1989) Sloss *et-al.* (1994) and Soulsly (1982) were used for the identification of helminths' eggs.

3.0 Results

The prevalence of helminths infection in cattle from Galambi and Gubi cattle ranches in Bauchi LGA of Bauchi state is as shown in Table 1. A total number of 600 cattle (300 from each farm) were examined for intestinal parasites out of which 355 cattle were found to be infected in the two cattle ranches. Out of the 355 cattle infected, 50.99% were from Galambi, while Gubi had slightly lower cases of 49.01%.

A total of 10 intestinal helminths were identified from the samples examined in Gubi cattle ranch. The helminths include 1 Trematoda (*Paramphistomum sp.*), 1 Cestoda (*Moniezia sp.*) and 8 Nematodes (*Strongylolides sp.*, *Haemonchus sp.*, *Oesophagostomum radiatum*, *Trichostrongylus sp.*, *Trichuris sp.*, *Toxocora vitulorum*, *Bunostomum phlebotomum*, *Cooperia sp.*) (Table 2).

In Gubi cattle ranch, *Oesophagostomum radiatum* was the most prevalent helminth species with 16.67% infection rate, followed by *Haemonchus sp.* with 10.33% rate of infection, while *Trichuris sp.* and *Paramphistomum sp.* had the least prevalence rate with 1.00% and 2.33% infection rate respectively. In Galambi ranch similar high infection rate was found to be associated with *Oesophagostomum radiatum* (19.00%) it is however followed by *Moniezia sp.* with 6.33% infection rate. The least infection rates in the cattle ranch were caused by *Strongylolides sp.*, *Trichostrongylus sp.* and *Cooperia sp.* with only 1.67% infection rate each.

3.1 Sex related infection

In relation to sex, female cattle in Gubi were more infected (60.66%) than their male counterparts in which 55.32% infection rate was recorded. Similar trend was also observed in Galambi where the rate of infection recorded in the female (62.00%) was higher than 58.62% recorded in the male cattle (Table 3)

3.2 Age related infection

The helminths burden among the adult cattle (aged between 5 – 10 years) was higher than what was recorded in the young cattle (aged between 1 – 4 years) both in Gubi and Galambi ranches. The total infection rate among the adults in the two ranches was 90.67% while that of the young was only 27.67% as shown in Table 4.

4.0 Discussion

The result of this investigation showed higher helminths burden in cattle Galambi cattle ranches compared to those sampled from Gubi. Three classes of helminths belonging to Trematoda, Cestoda and Nematoda were observed. A total of 10 species of intestinal helminths were identified which include 8 nematodes, 1 Cestode and 1 Trematode thus indicating a higher rate of nematode infection compared to the other two classes. This is in agreement with the findings of Shirale *et al.* (2008) who also examined fecal content of cattle for gastrointestinal helminthes and recorded high incidences of Nematodes compared to other classes of helminths that were identified.

Generally, this investigation revealed high level of intestinal helminths infection from the two cattle ranches. The high level of infection may not be unconnected with the poor sanitation and other management practices in the cattle ranches. It was observed in the course of this investigation that the sanitary condition of the two cattle ranches is generally poor. The animals could therefore continue to re-infect themselves by contaminating the grazing ground with their feces and urine. This is in agreement with the findings of Kagira *et al.* (2008) who reported a significant negative association between the frequency of dug removal and prevalence of livestock helminths infection.

The implications are enormous to our livestock and as well as economy of the nation. High rate of infection will negatively affect livestock production. Cattles are among the major sources of protein, minerals and vitamins to man through their meat and milk. Many industries (especially those making shoes and bags) depend on cattle for

their raw material. The cattle ranch owners depend on cattle for revenue generation.

The distribution of the intestinal helminthes in the animals from the two cattle ranches revealed that female had more helminthes infection both in Gubi (60.66%) and Galambi (62.00%) than their male counterpart with 55.32% and 58.62% for Gubi and Galambi ranches respectively. The male cattle were more infected probably because of their maternal role like parturition and lactation of calves which usually make the females loss nutrients and become more susceptible to infections. Poor feeding also can contribute to the difference in parasite load. Naturally males are stronger than females hence they may have competitive advantages over the females in terms of getting quality and enough food for themselves especially when the food is scarce. The inability of the comparatively weaker female to compete for enough and quality food makes them prone to infection due to lower immunity. This corroborates the findings of Adejinmi and Harrison (1996) who emphasized the close relationship between nutrition and helminth infection. The authors observed that infestation by intestinal nematodes is considerably influenced by the level of the host nutrition and reported that reduction in overall food intake could bring about low level of protein, vitamins and minerals in the animals which consequently lead to low resistance to infection.

The adult (aged between 5-10 years) were generally more infected that the young ones (aged between 1-4 years). The difference in infection rate between the two age groups could be related to difference in pastoral management as well as nutritional difference and frequency of exposure.

The high rate of helminths infection among the cattle means that many of them could die leading to the reduction of the number of cattle available for human consumption. This could in turn lead to deficiency diseases of man e.g. kwashiorkor, rickets, anaemia, impaired vision etc. among the immediate human population. Moreover, the few that survive will be ill which may lead to low meat and milk production, depressed wool, reduce reproductive performance. Also more money will be spent on their treatment hence impoverishing the cattle ranch farmers. Helminths infections not necessarily those of intestinal origin should be investigated without delay. This is because many of such infections remain major public health problem especially when the infections are transmitted to man. Some of these helminths have complex life cycles which require man as their final or intermediate host in order to complete their life cycles – a process which is harmful to man. Also due to poor sanitary conditions of the ranches, the animals can either re-infect themselves or humans through their fecal matter or urine.

Therefore, due to the adverse effects of helminths diseases on our livestock and human health, the following recommendations are necessary to curb their menace.

- i. Mass education to cattle farmers on the importance of environmental sanitation and hygiene in cattle ranches management.
- ii. Social/infrastructural facilities should be provided to reduce the rate of helminths infection in the two ranches
- iii. Drug and vaccines should be made available for the treatment of the infected cattle and to increase their resistance to helminths infection.
- iv. Posture should be treated before grazing especially in penned or restricted management system while rotational organizing is helpful in free range system.
- v. The ranch should not be over stocked and young calves should be separated from the older ones in order to reduce the rate infection with parasites.
- vi. Cattle should be de-wormed from time to time especially of the onset of either the rainy or the dry season.

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Table 1. Prevalence of intestinal helminthes infection in cattle in Gubi and Galambi ranches

Name of farm	Number examined	Number infected	% infection
Gubi	300	174	49.01%
Galambi	300	181	50.99%
Total	600	355	100%

Table 2. Number of cattle infected with different types of intestinal helminths species from Gubi and Galambi cattle ranches

Name of species	Percent infection	
	Gubi	Galambi
<i>Paramphistomum sp</i>	7 (2.33%)	14 (4.67%)
<i>Moniezia sp</i>	11 (3.67%)	19 (6.33%)
<i>Strongylodes sp</i>	15 (5.00%)	5 (1.67%)
<i>Haemonchus sp</i>	31 (10.33%)	15 (5.00%)
<i>Oesophagostomum radiatum</i>	50 (16.67%)	57 (19.00%)
<i>Trichostrongylus sp</i>	8 (2.67%)	5 (1.67%)
<i>Trichuris sp</i>	3 (1.00%)	6 (2.00%)
<i>Toxocora vitulorum</i>	9 (3.00%)	8 (2.67%)
<i>Bunostomum phlebotomum</i>	29 (9.67%)	8 (2.67%)
<i>Cooperia sp</i>	11 (3.67%)	5 (1.67%)
Total	174 (58.00%)	181 (60.00%)

Table 3. Prevalence of intestinal helminths infection in cattle at Gubi and Galambi cattle ranches in relation to sexes of the cattle

Name of Species	Number and percent infection			
	Gubi		Galambi	
	Female	Male	Female	Male
<i>Paramphistomum</i> sp	5 (3.33%)	2(5.33%)	4 (2.67%)	10(6.67%)
<i>Moniezia</i> sp	3 (2.00%)	8 (5.33%)	8(5.33%)	11 (7.33%)
<i>Strongylodes</i> sp	9 (6.00%)	6 (4.00%)	3 (2.00%)	2 (1.33%)
<i>Haemonchus</i> sp	16 (10.67%)	15 (10.00%)	8 (5.33%)	7 (4.67%)
<i>Oesophagostomum radiatum</i>	24 (16.00%)	26 (17.33%)	31(20.67%)	26 (17.33)
<i>Trichostrongylus</i> sp	3 (2.00%)	5 (3.33%)	4 (2.67%)	1 (0.67)
<i>Trichuris</i> sp	2 (1.33%)	1 (0.67%)	3 (2.00%)	3 (2.00%)
<i>Toxocora vitulorum</i>	4 (2.67%)	5 (3.33%)	2 (1.33%)	6 (4.00%)
<i>Bunostomum phlebotomum</i>	20 (13.33)	9 (6.00%)	28(18.67%)	19(12.00%)
<i>Cooperia</i> sp	5 (3.33%)	6 (4.00%)	2 (1.33%)	3(2.00%)
Total	91 (60.66%)	83 (55.32%)	93(62.00%)	88 (58.62%)

Table 4. Prevalence of intestinal helminthes in cattle in Gubi and Galambi cattle ranches in relation to age

Name of Farm	Total number examined		Percent prevalence	
	Adult cattle	Young cattle	Adult cattle	Young cattle
Gubi	150	150	130 (86.00%)	44 (29.00%)
Galambi	150	150	142 (94.67%)	39 (26.00)
Total	300	300	272 (90.67%)	83 (27.67%)