



PREVALENCE OF GASTROINTESTINAL PARASITES OF CATTLE AND SHEEP IN ANIMAL PRODUCTION RESEARCH FARM, FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA, NIGER STATE, NORTH CENTRAL, NIGERIA

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ABSTRACT

This study was carried out to determine the prevalence of Gastrointestinal Parasites of Cattle and Sheep in animal production research farm, Federal University of Technology Minna, using centrifugal floatation and sedimentation technique. A total of one hundred and fifty (150) faecal samples were collected from cattle (75) and Sheep (75). An overall prevalence of 52.7% was recorded. Cattle (28.0%) had the highest prevalence than Sheep (24.7%) and the difference was non-significant ($P>0.05$). Seven (7) gastrointestinal parasites were encountered namely: *Toxocara spp* (12.0%), *Strongyloides spp* (4.0%), *Strongyle spp* (14.7%), *Eimeria spp* (10.7%), *Taenia spp* (5.3%), *Moniezia spp* (3.3%) and *Fasciola spp* (2.7%). *Strongyle spp* (14.7%) had the highest prevalence while the least prevalence was *Fasciola spp* (2.7%). Male cattle (29.3%) were more infected than female cattle (26.67%). Female Sheep (28.0%) were more infected than male sheep (21.3%). Adult cattle (36.0%) were more infected than young cattle (20.0%). Adult Sheep (26.7%) were more infected than young sheep (22.7%). Pregnant cattle (17.5%) and non-pregnant cattle (17.5%) were more infected than lactating Cattle (15.0%). Pregnant sheep (20.0%) were more infected than lactating (12.0%) and non-pregnant sheep (10.0%). There was no statistically significant difference ($P>0.05$) in the prevalence of infection between the sex, age of cattle and sheep and physiological status of the female cattle. There was a statistically significant difference ($P<0.05$) between prevalence and physiological status of the female sheep. Cattle and Sheep in the study area were infected with gastrointestinal parasites, hence the need for control effort, effective prevention and control measures should be developed to combat the dangerous effect of gastrointestinal parasites in these animals and reduce economic losses.

Keywords Gastrointestinal, Parasites, Cattle, Sheep, Research, Prevalence

INTRODUCTION

A significant portion of the diary meat and dairy products in cities and villages across the world are derived from ruminants, Cattle, Goats and Sheep, making them an important source of animal protein in many of these countries (Johansson, 2017). Parasitic infections remain a major threat to livestock economies and is significant in many agroecological zones (Mcneilly and Nisbet, 2014). Large and small scale farmers in the developing world face serious challenges due to trematode (flake) and gastrointestinal nematodes infections in ruminant livestock (Huang *et al.*, 2014; Hurisa *et al.*, 2021; Income *et al.*, 2021). Parasitic infections lead to reduced efficiency and productivity of animals and increased mortality, directly affecting the income of farming communities (Batool *et al.*, 2022). Basically, Gastrointestinal parasitism in Cattle and Sheep is caused by Helminthes and Protozoa (Cordero and Rojas, 1999). Gastrointestinal Helminthes are among the most important disease-causing agents in veterinary medicine, particularly livestock. They cause economic losses by reducing the production of milk, meat and wool (Income *et al.*, 2021). Nematodes are identified as one of the most harmful and economically significant Gastrointestinal parasites that infect ruminants as reported by previous studies (Jurasek *et al.*, 2010; Ahmad *et al.*, 2017; Win *et al.*, 2020). Among the nematodes, the most important and prevalent genera worldwide are those belonging to the Strongyle order, especially in tropical zones (Charlier *et al.*, 2009). Animals typically contract gastrointestinal helminthes infections by consuming eggs or larvae release into the environment by host

through faeces particularly in tropical regions, Strongyle nematodes of the order Strongylida represent a significant group of gastrointestinal helminthes that affect ruminant health (Stear and Murray, 1994; Odoi *et al.*, 2007; Haymanot and Kaba, 2022). Domestic livestock especially Cattle and Sheep are susceptible to Fasciolosis, an economically significant illness that occasionally affect humans (Haftu and Bacha, 2014). The two species most frequently identified as ethological agent of Fasciolosis are *Fasciola hepatica* and *Fasciola gigantica* (Haymanot and Kaba, 2022). The susceptibility of animals to various Gastrointestinal parasites is attributed to various factors such as unsanitary living conditions, inadequate treatment, close contact with pathogenic animals and harsh climatic conditions (Gadahi *et al.*, 2009; Dabasa *et al.*, 2017). Environmental factors and lack of awareness among animal owners further increase parasite infection (Tehmina *et al.*, 2014). Animal factors such as breed, age, and sex are normally associated with the susceptibility of the animal to parasites (Squire *et al.*, 2013; Zvinorova *et al.*, 2016). Cattle and Sheep in the study area are managed semi-intensively and there is paucity of published literature on gastrointestinal parasites of cattle and sheep in the study area. and without proper knowledge of the prevalence of gastrointestinal parasites of cattle and sheep, it will be difficult to design an effective prevention and control strategies. To fill this knowledge gap, this study was carried out to determine the prevalence of gastrointestinal parasite of Cattle and Sheep in animal Production Research farm, Federal University of Technology Minna.

MATERIALS AND METHODS

Study Area

The study was carried out at Animal Production Research Farm, Federal University of Technology, Minna, Gidan Kwano campus, Niger state. Geographically, Minna is located within latitude 09°31' 18.2''N, and longitude 6° 27' 40 'E with an elevation ranging from 230-250 m. The study area lies within the Southern Guinea savanna of Nigeria. The location's climate is sub-humid having a mean annual rainfall of 1338 mm, a dry season of about 5 months, and a mean temperature of about 30° C (FUT, 2012).

Study Animals

Study animals consist of cattle and sheep in animal production research farm of Federal University of Technology Minna, Niger State within various age groups, both sexes and physiological status of the females. The age of the animals was estimated by looking at the dentition pattern of the animals according to Kumsa *et al.* (2011) for Sheep and by owner's response. Animals less than 1 year were considered young while those equal and above 1 year were considered adults. The age of the cattle was estimated according to Kabir *et al.*, 2022. Cattle less than 2 years were considered young and cattle aged 2-8 years were considered adults. The sex of each animal was determined by physical examination of the reproductive organs. The Physiological status of the female was categorized as pregnant, non-pregnant and lactating.

Sample Collection and Examination of faecal samples

There are 97 Cattle and 80 Sheep in the research farm. A total of one hundred and fifty (150) fresh faecal samples were collected directly from the rectum of seventy-five (75) healthy cattle and seventy-five (75) healthy Sheep using sterile gloves November to December, 2023. Stratified random sampling technique was used for this study. The samples were placed in a sterile bottle and transported to the Animal Biology laboratory, Department of Animal Biology, Federal University of Technology, Minna for laboratory analysis. Fresh faecal samples were analyzed using Floation technique by Foreyt (2001) and centrifugal sedimentation technique (Hendrix and Robinson, 2012).

Floation Technique

The samples were subjected to the simple floation technique using saturated sodium chloride (NaCl). Briefly, 2 g of each faecal sample was mixed with quantity of saturated sodium chloride solution and filtered through a tea strainer into a glass test tube that is placed on test tube rack. The mixture was

centrifuge at 1500 rpm for 5 min. After centrifugation, the mixture was filled to the brim (forming a convex meniscus) with saturated sodium chloride solution, and a clean coverslip was gently placed on top of the test tube, thereby avoiding spillage. The coverslip was left for about 20 min. Afterward, the coverslip was carefully placed on a clean glass slide and examined under the microscope using the 10× and 40× objective lenses. Eggs of parasites were identified on the basis of their morphological features as described by (Soulsby, 1982).

Sedimentation Technique

Approximately 2g of faeces was mixed with water in a test tube. The mixture was strained through a gauze into a 15ml centrifuge tube. The tubes were balanced and centrifuge at 1500 rpm for 5 minutes. The supernatant was poured off without disturbing the sediment. A small amount from the top layer of the sediment was pipetted onto a microscope slide. A cover slip was placed on the slide and viewed under x10 and x40 objectives magnification of a microscope (Hendrix and Robinson, 2012). Eggs were identified on the basis of their morphological features as described by Soulsby (1982).

Statistical Analysis

The result obtained from this study was analyzed using descriptive statistics and results presented in tables. The association between the prevalence of infection and species, age, sex and physiological status of the females was analyzed using Chi-square (χ^2). In all analysis, confidence level was held at 95% and $P < 0.05$ was set as significance.

RESULTS AND DISCUSSION

Overall Prevalence of Gastrointestinal Parasites of Cattle and Sheep in Animal Research Farm, Federal University of Technology Minna, Niger State, Nigeria

The study revealed an overall Prevalence of Gastrointestinal Parasites of Cattle and Sheep in Animal Production Research farm, Federal University of Technology Minna, Niger State, Nigeria (table 1). The result of this study revealed that out of 75 cattle and 75 Sheep examined, 79 were infected with different gastrointestinal parasites with an overall prevalence of 52.7%. The study shows that 42 cattle and 37 sheep were infected with a prevalence of 28.0% in cattle and 24.7% in sheep. The study revealed that cattle were more infected than sheep and the difference was not statistically significant ($P > 0.05$).

Table 1: Overall Prevalence of Gastrointestinal Parasite (GIP) of Cattle and Sheep in the Study Area

Species	No. Examined	No. infected (%)	χ^2	df	P-value
Cattle	75	42 (28.0)	0.67	1	0.413
Sheep	75	37 (24.7)			
Total	150	79 (52.7)			

χ^2 =Chi Square, df= Degree of Freedom

Prevalence of Different Gastrointestinal Parasites of Cattle and Sheep Identified in the Study Area

From the study, a total of Seven (7) gastrointestinal Parasites were identified in cattle and sheep (Table 2) and these include three (3) nematode genera (*Strongyle spp*, *Toxocara spp* and *Strongyloides spp*), two cestode (*Taenia spp* and *Moniezia spp*), one trematode genera (*Fasciola spp*) and one protozoan (*Eimeria spp*). *Strongyle spp* (14.7) had the highest prevalence while *Fasciola spp* (2.7%) had the least prevalence among the parasites identified in cattle and sheep. six (6) gastrointestinal parasites were identified and include

Strongyle spp (13.3%), *Toxocara spp* (14.7%), *Taenia spp* (10.7%), *Moniezia spp* (4%), *Fasciola spp* (5.3%) and *Eimeria spp* (8.0%). *Strongyloides spp* were not encountered in cattle. The study revealed that *Toxocara spp* (14.7%) and *Strongyle spp* (13.3%) had the highest prevalence, followed by *Taenia spp* (10.7%), *Eimeria spp* (8.0%) being the only Protozoan specie identified in cattle, *Fasciola spp* (5.3%) being the only trematode specie identified in this study while *Moniezia spp* (4.0%) had the least prevalence among the parasites encountered in cattle.

The study revealed a total of five (5) gastrointestinal parasites identified in Sheep (Table 2) and these include *Strongyle spp* (16.0%), *Toxocara spp* (9.3%), *Strongyloides spp* (8.0%), *Eimeria spp* (13.3%) and *Moniezia spp* (2.7%) The study shows that *Strongyle spp* (16.0%) and *Eimeria spp* (13.3%)

had the highest prevalence of infection followed by *Toxocara spp* (9.3%), *Strongyloides spp* (8.0%) while the least prevalence was *Moniezia spp* (2.7%). *Taenia spp* and *Fasciola spp* were not encountered in Sheep.

Table 2: Prevalence of Different Gastrointestinal Parasites (GIP) of Cattle and Sheep Identified in the Study Area

Parasites	Cattle (n=75) No. infected (%)	Sheep (n=75) No. infected (%)	Total (n=150) No. infected (%)
<i>Strongyloides spp</i>	-	6 (8.0)	6 (4.0)
<i>Strongyle spp</i>	10 (13.3)	12 (16.0)	22 (14.7)
<i>Eimeria spp</i>	6 (8.0)	10 (13.3)	16 (10.7)
<i>Taenia spp</i>	8(10.7)	-	8 (5.3)
<i>Moniezia spp</i>	3 (4.0)	2 (2.7)	5 (3.3)
<i>Fasciola spp</i>	4 (5.3)	-	4 (2.7)
<i>Toxocara spp</i>	11 (14.7)	7 (9.3)	18 (12.0)
Total	42 (28.0)	37 (24.7)	79 (52.7)

n = Number Examined

Prevalence of Gastrointestinal Parasites (GIP) of Cattle and Sheep Based on Sex

Table 3 shows the Prevalence of Gastrointestinal parasites of cattle and sheep based on sex. The study revealed that, Male cattle (29.3%) were more infected than female cattle (26.7%)

and the difference was not statistically significant ($P>0.05$). Female sheep (28.0%) were more infected than male sheep (21.3%) and the difference was not statistically significant ($P>0.05$).

Table 3: Prevalence of GIP of Cattle and Sheep Based on Sex

Species	Sex	No. examined	No. Infected (%)	Prevalence (%)	χ^2	df	P-value
Cattle	Male	35	22	29.3	1.25	1	0.264
	Female	40	20	26.7			
	Total	75	42	28.0			
Sheep	Male	25	16	21.3	3.23	1	0.071
	Female	50	21	28.0			
	Total	75	37	24.7			

χ^2 =Chi Square, df= Degree of Freedom

Prevalence of Gastrointestinal Parasite (GIP) of Cattle and Sheep Based on Age

The prevalence of GIP of cattle and sheep based on ages is shown in Table 4. The result of this study showed that, Adult cattle (36.0%) were more infected than young cattle (20.0%)

and there was no statistically significant difference ($P>0.05$) in the prevalence of gastrointestinal parasites and age of cattle. Adult sheep (26.7%) were more infected than young sheep (22.7%) and the difference was not statistically significant ($P>0.05$).

Table 4: Prevalence of GIP of Cattle and Sheep Based on Age

Species	Age	No. examined	No. Infected	Prevalence (%)	χ^2	df	P-value
Cattle	Young	30	15	20.0	0.73	1	0.393
	Adult	45	27	36.0			
Total		75	42	28.0			
Sheep	Young	29	17	22.7	1.63	1	0.202
	Adult	46	20	26.7			
Total		75	37	24.7			

χ^2 =Chi Square, df= Degree of Freedom

Prevalence Gastrointestinal Parasite (GIP) of Cattle and Sheep Based on Physiological Status of the Female

Table 5 shows the prevalence of GIP of cattle and sheep based on the physiological status of the females. From this study, It was observed out pregnant cattle (17.5%) and non-pregnant cattle (17.5%) were more infected than lactating female cattle (15.0%) and the difference was not statistically significant

($P>0.05$). Pregnant female sheep (20.0%) had the highest prevalence as compared to lactating (12.0%) and non-pregnant female sheep (10.0%). There was a statistically significant difference ($P<0.05$) between the prevalence of gastrointestinal parasites and physiological status of the female sheep.

Table 5: Prevalence of GIP of Cattle and Sheep Based on Physiological Status of the Female

Species	Physiological status	No. examined	No. infected (%)	χ^2	df	P-value
Cattle	Pregnant	10	7 (17.5)	5.93	2	0.052
	Lactating	9	6 (15.0)			
	Non-pregnant	21	7 (17.5)			
Total		40	20 (50.0)			
Sheep	Pregnant	15	10 (20.0)	10.04	2	0.007*
	Lactating	10	6 (12.0)			
	Non-pregnant	25	5 (10.0)			
Total		50	21 (42.0)			

*Significant. χ^2 =Chi Square, df= Degree of Freedom

Discussion

The result of the study indicated that cattle and Sheep in the study area were infected with various gastrointestinal parasites. The prevalence recorded in this study is lower than the report of Gofwan *et al.* (2025) in Plateau State, Nigeria and slightly lower than the report of Leon *et al.* (2019) in cattle and Sheep in Columbian Northern eastern mountain. The differences in the prevalence could be attributed to differences in the environment, geographical location, sample size as well as farm management practices. The result of this study showed that cattle were more infected as compared to Sheep. The highest prevalence of infection recorded in cattle in this present study agrees with the findings of Gofwan *et al.* (2025), recorded the highest prevalence among cattle as compared to sheep. The highest prevalence recorded in cattle in this study is not in agreement with the findings of Fasae and Fatade (2017) and Leon *et al.* (2019), recorded the highest prevalence of gastrointestinal parasites in sheep as compared to cattle in Abeokuta and environs, Nigeria and Northern eastern mountain respectively. There was no statistically significant difference in the prevalence of infection between Sheep and Cattle. The high prevalence of infection recorded in cattle in this study could be attributed to the grazing habits and immunological response of cattle as compared to Sheep. From the result of this study, a total of Seven (7) gastrointestinal parasites were identified in cattle and sheep and this include three (3) nematode genera (*Strongyle spp.*, *Toxocara spp.* and *Strongyloides spp.*), two cestode genera (*Taenia spp.* and *Moniezia spp.*), one trematode genera (*Fasciola spp.*) and one protozoan parasite (*Eimeria spp.*). In cattle, six (6) gastrointestinal parasites were identified *Strongyle spp.*, *Toxocara spp.*, *Taenia spp.*, *Moniezia spp.*, *Fasciola spp.*, and *Eimeria spp.* *Strongyloides spp.* were not encountered in cattle. The study revealed that *Toxocara spp.* and *Strongyle spp.* had the highest prevalence while *Moniezia spp.* had the least prevalence among the parasites encountered in cattle. This agrees with the findings of Tiele *et al.* (2023) in Southern Ethiopia, recorded the highest prevalence among *Srrongyle spp.* and *Toxocara spp.* Terfa *et al.* (2023) in Central Ethiopia and Dosa *et al.* (2023) in Southern Ethiopia reported *Strongyle spp.* as the most dominant species in cattle. The study revealed a total of five (5) gastrointestinal parasites identified in Sheep and this include *Strongyle spp.*, *Toxocara spp.*, *Strongyloides spp.*, *Eimeria spp.*, and *Moniezia spp.* *Taenia spp.* and *Fasciola spp.* were not encountered in sheep. The study shows that *Strongyle spp.* had the highest prevalence of infection while the least prevalence was *Moniezia spp.* The highest prevalence of nematode species identified in this study could be attributed to the fact that nematodes have a direct lifecycle and do not require an intermediate host to complete their life cycle. Knapp-Lawitzke *et al.* (2016) reported that among the factors influencing the prevalence of *Strongyles spp.* are geographical conditions, temperature, climate, humidity, soil conditions and farm management.

The study revealed that male cattle had the highest prevalence than female cattle. This agrees with the report of Fasae and Fatade (2017), reported that male cattler were more infected than female cattle. The highest prevalence of infection among male cattle could be attributed to the genetic predisposition and differential susceptibility owing to hormonal control (Zuk and MacLean, 1996). Female sheep had the highest prevalence than male sheep. This is not in concordance with the findings of Tariq *et al.* (2010) in Kashmir Valley, Islam *et al.* (2017) in Bangladesh and Dey *et al.* (2021) in Bangladesh, reported the highest prevalence among male Sheep as compared to female sheep. There was no statistically significant difference between the prevalence of infection and age of cattle and sheep. The high prevalence of gastrointestinal parasites among female sheep may be attributed to the stress and weak immune system of the females during pregnancy and lactation which increase their susceptibility to infection.

The study revealed that adult cattle were more infected than young cattle. Adult sheep were more infected than young sheep. This agree with the findings of Maimadu *et al.* (2020) in Plateau State, Nigeria, reported that adult sheep were more infected than young sheep. This is in concordance with the report of Nwosu *et al.* (2013) and Ntonifor *et al.* (2013) which clearly showed that adult animals could have been harbouring matured worms. Several authors have documented that adult animals are more prone to infection (Urquhart *et al.*, 1996; Taswar *et al.* 2010) as they mature due repeated exposure (Dagnachew *et al.*, 2011). The high prevalence of infection observed in adult cattle and sheep in this study might be due to prolonged exposure to infective larvae on contaminated pastures and the cumulative nature of helminthes infections in grazing animals (Salehi *et al.*, 2022). There was no statistically significant difference between the prevalence of infection and age of cattle and sheep.

It was observed that Pregnant female cattle were more infected than non-pregnant and lactating female cattle and the difference was not statistically significant. pregnant female sheep were more infected than lactating female sheep and non-pregnant female Sheep. There was no statistically significant difference in the prevalence of infection in the physiological status of the female cattle but a statistically significant difference was recorded in the prevalence of infection and the physiological status of the female Sheep. This is similar to the findings of Dey *et al.* (2021) in Bangladesh, recorded the highest prevalence among pregnant and lactating female Sheep. The highest prevalence observed in pregnant female cattle and pregnant female sheep in this study may be attributed to the physiological stress condition in females during pregnancy and lactation which suppress the immunity and increased susceptibility to helminthe invasion (Salehi *et al.*, 2022; Said *et al.*, 2025).

CONCLUSION

Cattle and sheep in animal production research farm are infected with various gastrointestinal parasites. The study indicates that cattle were more infected than sheep. Male cattle were more infected than female cattle while female sheep were more infected than male sheep. Adult of both species were more susceptible to infection than young of both species. The study shows that pregnant female cattle were more infected than non pregnant and lactating female cattle. Pregnant sheep were more infected than lactating and non-pregnant sheep. Therefore, effective control and prevention measures should be put in place to combat the negative effect of gastrointestinal parasites of cattle and sheep in the study area. Cattle and Sheep should be strategically dewormed using an effective anthelmintic.

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