



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

**\*<sup>1</sup>Adamu Amina Yawo, <sup>1</sup>Wani Chubiyajo Victoria, <sup>2</sup>Adamu Fatima Ndagi, <sup>1</sup>Faisal Abubakar, <sup>1</sup>Abduganiyu Khadija, <sup>1</sup>Lawal Saudat and <sup>3</sup>Adamu Fadila**

<sup>1</sup>Department of Animal Biology, Faculty of Life Sciences, Federal University of Technology Minna, Niger State, Nigeria.

<sup>2</sup>Department of Biological Sciences, Faculty of Life Sciences, Bayero University Kano, Kano State, Nigeria.

<sup>3</sup>Department of Microbiology, Faculty of Life Sciences, Federal University of Technology Minna, Niger State, Nigeria.

\*Corresponding authors' email: [meenat450@gmail.com](mailto:meenat450@gmail.com)

**ABSTRACT**

A cross sectional 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 (56%) had the highest prevalence than Sheep (49.3%) and the difference was non-significant ( $P > 0.05$ ). Seven (7) gastrointestinal parasites were encountered namely: *Toxocara spp* (12%), *Strongyloides spp* (4%), *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 (62.9%), male sheep (64%), Adult cattle (60%), young sheep (58.6%) and pregnant cattle (70%) were more infected than female cattle (50%), female sheep (42%), young cattle (50%), adult sheep (43.5%) and non-pregnant cattle (33.3%) and the difference was not significant ( $P > 0.0$ ). Pregnant sheep (66.7%) were more infected than non-pregnant sheep (20%) and a significant difference was observed ( $P < 0.05$ ). The result of this study revealed that cattle and sheep in this study area were infected with different gastrointestinal parasites and 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 are 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 female. The age of the animals was estimated by looking at the dentition pattern of the animals according to Fradson *et al.* (1992) and by owner's response. Animals less than 1 year were considered young while those above 1 year 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

There are a total of 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) cattle and seventy five (75) Sheep using sterile gloves from November to December, 2023. Stratified random sampling was employed for this research. 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.

### Examination of Faecal Samples

Fresh faecal samples were analyzed using Flootation technique by Foreyt (2001) and Cheesebrough (2009) as well as centrifugal sedimentation technique (Hendrix and Robinson, 2012)

#### Floation Technique

The samples were subjected to the simple floatation 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 cup. 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 ( $\chi^2$ ). In all analysis, confidence level was held at 95% and  $P < 0.05$  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 56% in cattle and 49.3% in sheep. The study revealed that cattle (56%) are more infected than sheep (49.3%) with no significant difference ( $P > 0.05$ ) between them.

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

Species	No. Examined	No. Infected (%)	$\chi^2$	Df	P-value
Cattle	75	42 (56.0)	0.67	1	0.413
Sheep	75	37 (49.3)			
Total	150	79 (52.7)			

$\chi^2$ =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*). In cattle, 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%). *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%) 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%) 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%), *Toxocara spp* (9.3%) *Strongyloides spp* (8%), *Eimeria spp* (13.3%) and *Moniezia spp* (2.7%) The study shows that *Strongyle spp* (16%) and *Eimeria spp* (13.3%) had the highest prevalence of infection followed by *Toxocara spp* (9.3%), *Strongyloides spp* (8%) 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 (56.0)	37 (49.3)	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, out of 35 male cattle and 40 female cattle examined, 22 (62.9%) and 20 (50%) were infected respectively. Out of 25 male sheep

and 50 female sheep examined, 16 (64%) and 21 (42%) were infected respectively. The study shows that male cattle (62.9%) and male sheep (64%) were more infected than female cattle (50%) and female sheep (42%) 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 (%)	$\chi^2$	df	P-value
Cattle	Male	35	22	62.9	1.25	1	0.264
	Female	40	20	50.0			
	Total	75	42	56.0			
Sheep	Male	25	16	64.0	3.23	1	0.071
	Female	50	21	42.0			
	Total	75	37	49.3			

 $\chi^2$ =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 indicated that, out of 30 young cattle and 45 adult cattle examined, 15 (50%) and 27 (60%) were infected. The study shows that adult cattle (60%) were more infected than young cattle (50%) with no

significant difference between them ( $P>0.05$ ). The study also revealed that out of 29 young sheep and 46 adult sheep examined, 17 (58.6%) and 20 (43.5%) were infected respectively. The study shows that young Sheep (58.6%) are more infected than adult sheep (43.5%) with no significant difference ( $P>0.05$ ) between them.

**Table 4: Prevalence of GIP of Cattle and Sheep based on Age**

Species	Age	No. examined	No. Infected	Prevalence (%)	$\chi^2$	df	P-value
Cattle	Young	30	15	50.0	0.73	1	0.393
	Adult	45	27	60.0			
	Total	75	42	56.0			
Sheep	Young	29	17	58.6	1.63	1	0.202
	Adult	46	20	43.5			
	Total	75	37	49.3			

 $\chi^2$ =Chi square, df= degree of freedom**Prevalence Gastrointestinal Parasite (GIP) of Cattle and Sheep based on Physiological Status of the Females**

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 of 10 pregnant, 11 lactating and 21 non-pregnant cattle examined, 7 Pregnant, 6 lactating and 7 non-pregnant were infected with a prevalence of 70%, 66.7% and 33.3% respectively. The study shows that pregnant female cattle (70%) and lactating female cattle (66.7%) were more infected than non-pregnant cattle (33.3%) and the difference

was non-significant ( $P>0.05$ ). Out of 15 pregnant, 10 lactating and 25 non-pregnant sheep examined, 10 pregnant, 6 lactating and 5 non-pregnant sheep were infected with a prevalence of 66.7%, 60% and 20% respectively. The study indicates that pregnant female sheep (66.7%) and lactating female Sheep (60%) were more infected than non-pregnant female Sheep (20%) and a statistically significant ( $P<0.05$ ) was recorded in the prevalence of infection and physiological status of the female sheep ( $P<0.05$ ).

**Table 5: Prevalence of GIP of Cattle and Sheep based on Physiological Status of the Females**

Species	Physiological status	No. Examined	No. Infected (%)	$\chi^2$	Df	P-value
Cattle	Pregnant	10	7 (70.0)	5.93	2	0.052
	Lactating	9	6 (66.7%)			
	Non-pregnant	21	7 (33.3)			
Total		40	20 (50.0)			
Sheep	Pregnant	15	10 (66.7)	10.04	2	0.007*
	Lactating	10	6 (60.0)			
	Non-pregnant	25	5 (20.0)			
Total		50	21 (42.0)			

\*Significant.  $\chi^2$ =Chi square, df= degree of freedom

### Discussion

The result of the study shows that, out of 150 faecal samples examined from 75 Sheep and 75 cattle, 79 were positive for various gastrointestinal parasites with an overall prevalence of 52.7%. The prevalence of 52.7% recorded in this study is lower than 93.1% recorded by Gofwan *et al.* (2025) in Plateau State, Nigeria and slightly lower than the 56.7% prevalence recorded by 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 and sample size as well as farm management practices.

The result of this study shows that cattle were more infected with a prevalence of 56% as compared to Sheep with a prevalence of 49.3%. The highest prevalence of infection recorded in cattle in this present study agrees with the findings of Gofwan *et al.* (2025) who 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 Leon *et al.* (2019) who recorded the highest prevalence of gastrointestinal parasites in sheep as compared to cattle in North eastern mountain. There was no statistically significant difference in the prevalence of infection between Sheep and Cattle. This is similar to the findings of Leon *et al.* (2019) and Gofwan *et al.* (2025) who recorded a non-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. The prevalence of 56% recorded in cattle in this study is similar to the findings of Obi *et al.* (2020) who recorded a prevalence rate of 57.6% in cattle in South eastern Nigeria. The 56% prevalence recorded in cattle in this study is slightly higher than the prevalence of 50.4% recorded by Lemmy *et al.* (2017) in Delta State, Nigeria and 53.3% recorded by Pam *et al.* (2013) in Plateau State, Nigeria. The prevalence of 49.3% recorded in Sheep in this study is lower than the findings of Leon *et al.* (2019) who recorded a prevalence of 63% in sheep in North eastern mountain, Maimadu *et al.* (2020) who recorded 64% prevalence in Sheep in Plateau State, Nigeria and Dey *et al.* (2021) who recorded a prevalence of 77.1% in Sheep in Bangladesh.

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.* (13.3%), *Toxocara spp.* (14.7%), *Taenia spp.* (10.7%), *Moniezia spp.* (4%), *Fasciola spp.* (5.3%) and *Eimeria spp.* (8%). *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%) being the only protozoan identified in cattle, *Fasciola spp.* (5.3%) being the only trematodes species identified in the study while *Moniezia spp.* (4%) had the least prevalence among the parasites encountered in cattle.

The study revealed that nematodes had the highest prevalence of infection which is in agreement with the findings of Tiele *et al.* (2023) in Southern Ethiopia who 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 nematodes (*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.* (16%), *Toxocara spp.* (9.3%) *Strongyloides spp.* (8%), *Eimeria spp.* (13.3%), and *Moniezia spp.* (2.7%). *Taenia spp.* and *Fasciola spp.* were not encountered in sheep. The study shows that *Strongyle spp.* (16%) and *Eimeria spp.* (13.3%) had the highest prevalence of infection followed by *Toxocara spp.* (9.3%), *Strongyloides spp.* (8%) while the least prevalence was *Moniezia spp.* (2.7%). 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 its life cycle. Knapp-Lawitzke *et al.* (2016) reported that among the factors influencing the prevalence of *Strongyles* are geographical conditions, temperature, climate, humidity, soil conditions and farm management. The presence of *Eimeria spp.* agrees with Das *et al.* (2015) who reported that *Eimeria spp.* is the most serious intestinal diseases of domestic animals that causes high morbidity. The presence of *Moniezia spp.* in Sheep and cattle may be attributed to the intake of oribatid mites carrying *Moniezia spp.* (Ntonifor *et al.*, 2013). The presence of flukes in cattle in this study may be attributed to the grazing system, environment and nutritional status that influences the incidence of flukes (Shinggu *et al.*, 2019).

The study revealed that males of both species, male cattle (62.9%) and male sheep (64%) are more infected than females of both species, female cattle (50%) and female sheep (42%) and the difference was not statistically significant ( $P>0.05$ ). This is similar to the findings of Tariq *et al.* (2010) in Kashmir Valley, Islam *et al.*, (2017) in Bangladesh and Dey *et al.* (2021) in Bangladesh who observed the highest prevalence among male Sheep as compared to female sheep. The study revealed a non-significant difference ( $P>0.05$ ) in the prevalence of infection between male and female Sheep. This is similar to the report of Dey *et al.*, (2021) who reported an insignificant difference in the prevalence of infection between male and female sheep. The highest prevalence of infection among males could be attributed to the genetic predisposition and differential susceptibility owing to hormonal control i.e testosterone (Zuk and MacLean, 1996).

The study also revealed that young Sheep (58.6%) are more infected than adult sheep (43.5%) with no significant difference ( $P>0.05$ ) between them. This is similar to the findings of Dey *et al.* (2019) who observed the highest prevalence among young sheep as compared to adult sheep with no significant difference between them. This also agrees with the findings of Sagma *et al.* (2012) in Tamul and Poddar *et al.* (2017) in Mysensing who reported a higher prevalence among young Sheep as compared to adults in Bangladesh. The high prevalence among young sheep reported in this study is not in agreement with the findings of Maimadu *et al.* (2020) in Plateau State, Nigeria who reported that adult sheep are more infected than young sheep with no significant difference between them.

The high prevalence of young sheep observed in this study could be attributed to the low and weak immune system of the young. The low prevalence of infection among adults may be attributed to the body resistance as they might have developed immunity due to repeated natural infection (Singh *et al.*, 2015). The study shows that adult cattle (60%) are more infected than young cattle (50%). 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 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).

It was observed that Pregnant female cattle (70%), pregnant female sheep (66.7%), Lactating female cattle (66.7%) and lactating female Sheep (60%) are more infected than non-pregnant female cattle (33.3%) and non-pregnant female Sheep (20%). There was no statistically significant difference ( $P>0.05$ ) 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 ( $P<0.05$ ). This is similar to the findings of Dey *et al.* (2021) in Bangladesh who recorded the highest prevalence among pregnant and lactating female Sheep. The highest prevalence observed in pregnant and lactating females 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

In conclusion, cattle and sheep in animal production research farm are infected with various gastrointestinal parasites with an overall prevalence of 52.7%. The study indicates that cattle are more infected than sheep. Males of both species are more infected than females of both species. Adult cattle are more infected than young cattle. Young sheep are more susceptible to infection than the adult sheep. The study shows that lactating female sheep and cattle are more infected than non-pregnant sheep and cattle. 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 broad spectrum anthelmintic.

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