American Journal of Zoology
2021; 4(2): 14-18
http://www.sciencepublishinggroup.com/j/ajz
doi: 10.11648/j.ajz.20210402.12

Epidemiological Studies of Gastrointestinal Parasitic Infection of Cattle and Goats in Akure Abattoirs, Nigeria

Iyabo Adepeju Simon-Oke*, Oluwaseun Awosolu

Parasitology and Public Health Unit, Department of Biology, Federal University of Technology, Akure, Nigeria

Email address:
aisimon-oke@futa.edu.ng (I. A. Simon-Oke), obawosolu@futa.edu.ng (O. B. Awosolu)

*Corresponding author

To cite this article:
Iyabo Adepeju Simon-Oke, Oluwaseun Awosolu. Epidemiological Studies of Gastrointestinal Parasitic Infection of Cattle and Goats in Akure Abattoirs, Nigeria. *American Journal of Zoology.* Vol. 4, No. 2, 2021, pp. 14-18. doi: 10.11648/j.ajz.20210402.12

Received: November 18, 2020; **Accepted**: December 4, 2020; **Published**: May 14, 2020

Abstract: Cattle and Goats are one of the most domesticated livestock in Nigeria which provides varieties of products and services to man but are also prone to infection with pathogens that are harmful to it and man. Faecal samples were obtained directly from the rectum of 440 cattle and goats slaughtered and preserved in 10% formalin solution for microscopic examination of intestinal parasites. 367 samples were found positive with one or more parasites giving an overall prevalence of 83.40%. Goats recorded the higher (90.0%) prevalence of GIT parasites and cattle (76.8%). Prevalence was higher in females of both cattle and goats (86.48, 97.56%) than males (71.91, 81.50%) respectively with a significant difference (P<0.05). Cattle between the ages of 0-1 years had the highest prevalence of infection (78.75%) while among the goats, ages 2-3 years recorded the highest prevalence of infection (92.63%) with a significant difference (P<0.05). Cattle and Goats recorded higher prevalence of infection during rainy than the dry season (P<0.05). The overall gastrointestinal parasites identified in both cattle and goats were *Moniezia* spp. (22.26%), *Haemonchus contortus* (44.94%), *Trichuris trichuira* (54.84%), *Dicrocoelium dentriticum* (41.41%), (*Strongyle* sp 55 (9.2%), *Fasciola* sp (11.31%), *Schistosoma mansoni* (6.24%), *Paramphistomum* sp (43.97%), *Eimeria* sp (29.53%), Coccidian oocyts (79.98%) and *Strongyloides* sp (24.15%). Mixed infections of *Dicrocoelium dendriticum* and *Eimeria* species (5.90%) and *T. trichuira*, *Dicrocoelium dendriticum* and *Eimeria* species (5.90%) was greater in cattle than in goat (2.27 and 0.90%) respectively. This study revealed that gastrointestinal helminths and protozoa parasites are more dominant in goats than in cattle.

Keywords: Gastrointestinal Parasites, Cattle, Goat, Prevalence, Abattoir

1. Introduction

Rearing of cattle and goats for consumption is a profitable enterprise because of the high demand for dietary animal protein in many parts of the world [1]. Cattle and goats are widely distributed in Nigeria and their distribution is such that about three to five goats are kept per household in the southern part of Nigeria and up to ten per household in the northern part of the country [2]. Goats and Cattle serve as major animal protein source consumed by the people, so they are widely distributed and reared in many parts of the Country. In Nigeria, Cattle are daily slaughtered in almost all the abattoirs, where the meat are been sold out to the public for different purposes. According to Adedipe [3], beef gotten from cattle and meat from goats account for about 70% of the total meats consumed in the country. Goats as small ruminants have some advantages over larger animals such as cattle, because of their lower purchase price, fecundity and prolificacy, they have ability to survive on low quality diet in difficult condition, and they are more readily available and easily domesticated. In spite of these advantages, they are also infected with parasites like cattle [4].

From previous report by Sulieman [5], milk is obtained from both cattle and goat but goat milk has higher percentage of protein, energy, fat and amino acid contents. Goat meat is also known to be a very good source of calcium, phosphorus and chlorine which is very important for bone growth. The use of dead animals and their faeces as manures for economic activities has been reported to be one of the sources of spreading some helminths and protozoa parasites. The productive and reproductive performances such as loss in body weight, digestive disturbance, and emaciation of these animals are hindered by intestinal parasites [6]. Some factors

such as the presence of intermediate hosts and vectors; the number of infective larvae and eggs in the environment; pasture management, nutritional imbalance, climate and grazing habits predispose these animas to parasite infections [7]. In Nigeria, the absence of well-established veterinary diagnostic services, abattoir statistics and thorough inspection of the abattoirs posed a major hindrance in obtaining important data on these animals [8]. To improve the productivity of the ruminants, there is need for parasitic control, education of the farmers on farm management and balanced diet nutrition. This study assessed parasitic infection in cattle and goats slaughtered in two major abattoirs in Akure Metropolis.

2. Materials and Methods

2.1. Study Area

Akure is a city in South-West Nigeria and it is the capital of Ondo State. Akure is located between latitude 7°15'0"N and longitude 5°11'42"E. The city has a population of 387100 [9]. The raining season is from March to October while the dry season begins in November and ends in February. The relative humidity is about 60%.

2.2. Sampling Design

Prior to the collection of samples, the selected abattoirs were visited to familiarise and sensitize the owners of the abattoirs on the objectives of the study. Questionnaires which included information on the age, sex of the animal, management practices in the abattoir and health conditions of the animals were administered to all the owners of the animals to be examined. Oral interviews were also conducted to obtain other relevant information about the ruminants and the study site.

2.3. Study Sites

The study was carried out at two major abattoirs (cattle and goats). Ondo State abattoir situated along Benin-Owo express road, and Ilesha Motor Park along Ilesha express road, Akure, owned and controlled by private sector.

2.4. Sample Collection

The abattoirs were visited between 0700 and 0900 hours, when most of the slaughtering was done. Faecal samples were collected for six months between the months of January and June, 2019. Faecal samples were collected from the rectum of the animals after they were slaughtered using disposable hand gloves and transferred into sterile, labelled, wide mouthed specimen bottles with screw caps. The samples were preserved in 10% formalin solution and taken to the Parasitology Laboratory, Department of Biology, Federal University of Technology, Akure for microscopic examination.

2.5. Faecal Sample Processing

The modified Formol-Ether concentration technique was used to concentrate eggs and cysts of the gastrointestinal parasites [10]. 1g of stool sample was emulsified with 4 ml of 10% formol saline in a test tube. The mixture was filtered into a test tube using a cloth gauge and 3-4 ml of diethyl ether was added and shaken vigorously and allowed to stand for two minutes. The mixture was then centrifuged at 1000 revolutions per minutes (1000 rpm) for 3 minutes. Using a glass rod, the faecal debris from the side of the tube was loosened and the tube inverted to pour off the supernatants. The tube was returned to its original upright position and the fluid from the side of the tube allowed draining to the bottom. The bottom of the tube was tapped to resuspend and mix the sediment. The sediment was transferred to a slide, stained with Lugols Iodine and examined for presence of eggs of parasites using the X10 and X40 objectives.

2.6. Identification of Parasites

The keys of Kaufmann [11] and Foreyt [12] was used for parasite identification.

2.7. Statistical Analysis

Percentages were using in determining the prevalence of infection. The relationship between the prevalence of infection to the sex, age breed, season and vegetation zones were determined using chi square ($\chi 2$). P value of <0.05 was considered as statistically significant.

3. Results

A total of 440 faecal samples, comprising of 220 cattle and 220 goats were examined. The overall prevalence showed that 169 (76.81%) of cattle and 198 (90.00%) of goats were infected with at least one parasite (Table 1). There is a significant difference in the infection rate of cattle and goat (P<0.05).

Table 1. *Overall Prevalence of Gastrointestinal parasites.*

Animal	Number Examined	Number Infected	Prevalence (%)	X^2	*P value*
Cattle	220	169	76.81	13. 812[a]	0.000
Goat	220	198	90.00		
Total	440	367	83.40		

(P<0.05)

The results of the study also revealed that the prevalence was higher in females of both cattle and goats (86.48, 97.56%) than males (71.91, 81.50%) respectively with a significant difference (*P*<0.05) (Table 2). Cattle between the ages of 0-1 years had the highest prevalence of infection (78.75%) compared to 2-3 years (77.00%) and 4 years and above age groups (37.50%). However, there is no significant difference (*P*>0.05). Among the goats, ages 2-3 years recorded the highest prevalence of infection (92.63%) compared to 0-1 years (75.64%) and 4 years and above age groups (27.65%). There is a significant difference among the age groups. (P<0.05) (Table 3). The findings of the study also showed that season was found to significantly influence the

prevalence of infection in both cattle and goats. Cattle and Goats recorded higher prevalence of infection during rainy than the dry season (P<0.05) (Table 4).

Table 2. *Prevalence of Gastrointestinal parasites in relation to Sex.*

Animal	Sex	Number Examined	Number Infected	Prevalence (%)	X^2	*P value*
Cattle	Male	146	105	71.91	41.867[a]	0.000
	Female	74	64	86.48		
Goat	Male	138	118	85.50	8.304[a]	0.004
	Female	82	80	97.56		

(P<0.05)

Table 3. *Prevalence of Gastrointestinal parasites in relation to Age.*

Animal	Age	Number Examined	Number Infected	Prevalence (%)	X^2	*P value*
Goat	0 - 1	68	65	92.63	6.757[a]	0.034
	2 - 3	105	95	75.64		
	4 and above	47	38	27.65		
	Total	220	198	90.00		
Cattle	0 - 1	80	63	78.75	5.755[a]	0.056
	2 - 3	100	81	77.00		
	4 and above	40	25	37.50		
	Total	220	169	79.82		
Overall total		440	367	83.40		

Table 4. *Prevalence of Gastrointestinal parasites in relation to Season.*

Animal	Season	Number Examined	Number Infected	Prevalence (%)	X^2	*P value*
Goat	Rainy	110	107	97.27	12.929[a]	0.000
	Dry	110	91	82.82		
	Total	220	198	90.00		
Cattle	Rainy	110	103	93.63	34.944[a]	0.000
	Dry	110	66	60.00		
	Total	220	169	76.81		

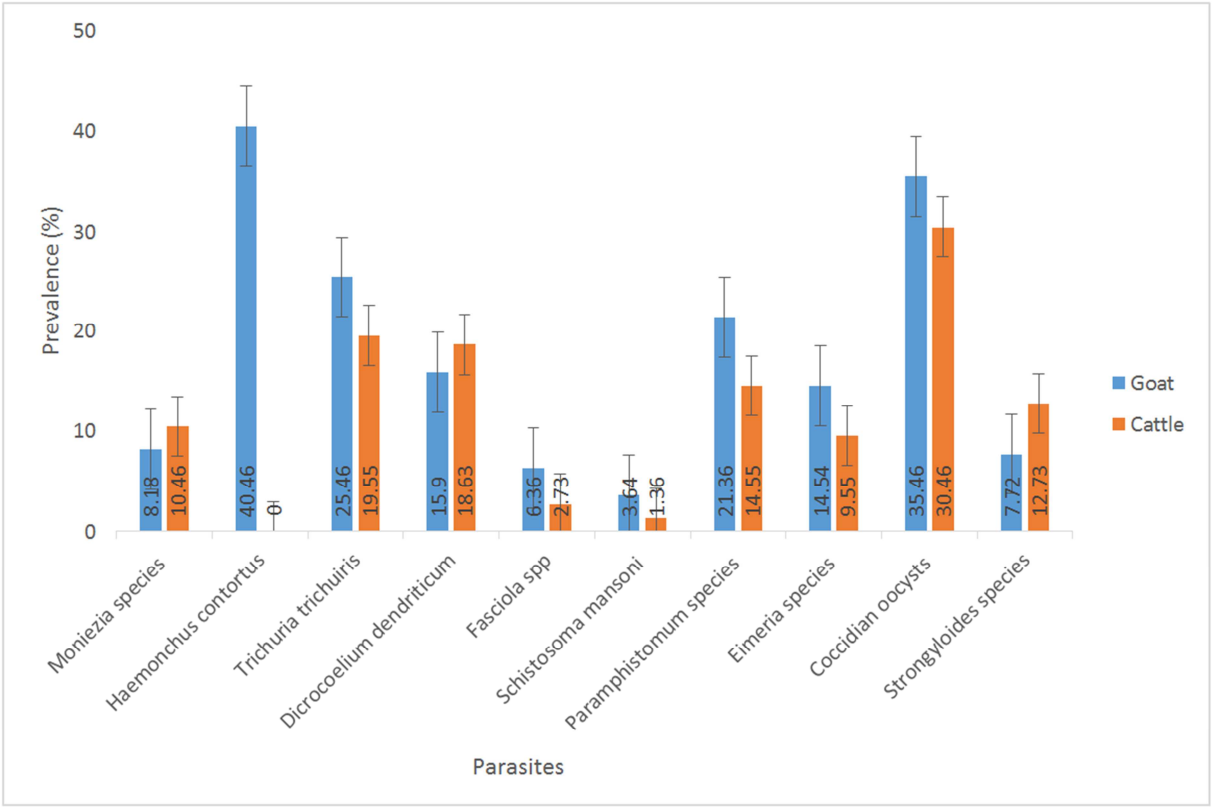

Figure 1. *Distribution of gastrointestinal parasites in relation to type of parasites.*

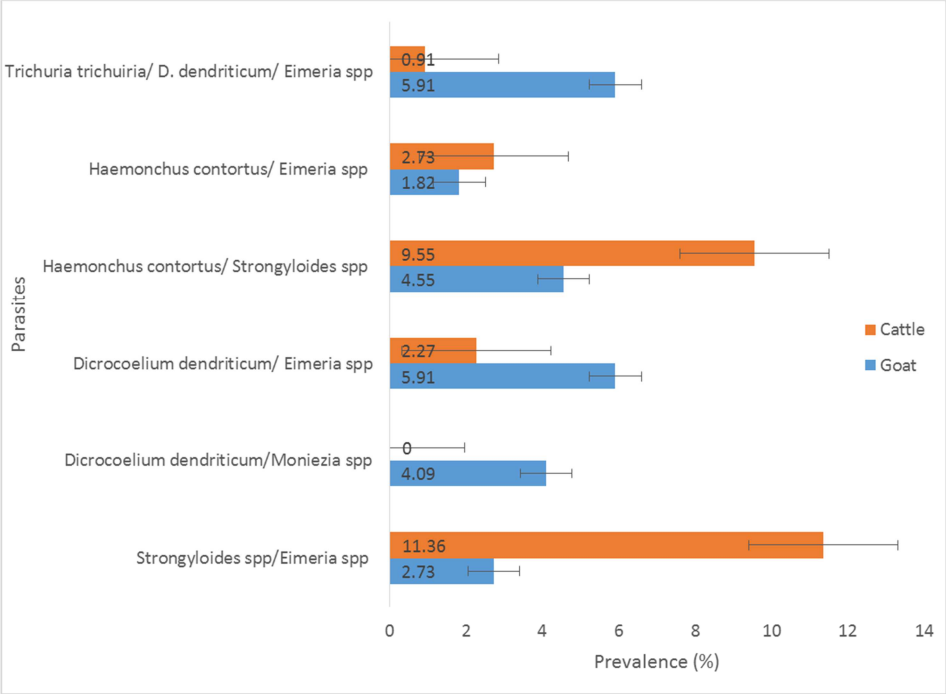

Figure 2. *Prevalence of mixed infections in cattle and goats.*

The overall gastrointestinal parasites identified in both cattle and goats were *Moniezia* spp. (22.26%), *Haemonchus contortus* (44.94%), *Trichuris trichuira* (54.84%), *Dicrocoelium dentriticum* (41.41%), (*Strongyloides* sp 55 (9.2%), *Fasciola* sp (11.31%), *Schistosoma mansoni* (6.24%), *Paramphistomum* sp (43.97%), *Eimeria* sp (29.53%), Coccidian oocyts (79.98%) and *Strongyloides* sp (24.15%). Goats recorded the higher prevalence rate (44.94%) of *Haemonchus contortus* while none was found in cattle (Figure 1).

Mixed infection of *Dicrocoelium dendriticum* and *Eimeria* species (5.90%) and *T. trichuira*, *Dicrocoelium dendriticum* and *Eimeria* species (5.90%) was greater in cattle than in goat (2.27 and 0.90%) respectively. The mixed infection of Strongyloides and *Eimeria* species (11.36%) was the highest in goats with the least in *Dicrocoelium dendriticum* and *Moniezia* species (0%). However, there was a significant difference ($p<0.05$) with mixed infection for both cattle and goats (Figure 2).

4. Discussion

The major classes of helminths infection of cattle and goats found in this study are; nematode, cestode and trematode. Coccidian oocysts were observed and *Eimeria* species is the only protozoa parasite of cattle and goats encountered. The results revealed that there is high prevalence (83.40%) with 76.81 and 90.00% of gastrointestinal parasites among the cattle and goats respectively. However, the prevalence rates of gastrointestinal parasitic infections obtained in this study is lower than the 86.4% reported in Plateau State, North-central Nigeria [6] but higher than 77.1% reported in Southwestern Nigeria [4]. The higher prevalence of GIT in the study area may be attributed to the existence of favourable environmental factors which are necessary for the prolonged survival, development of infective larval stage of most parasites and re infection during grazing [13]. High prevalence rate in goats may be as a result of poor management systems [14].

The coccidian oocysts were more prevalent compared to the other parasites in cattle. This observation is similar to the report of [13] in Katsina State but contradicts the reported prevalence of coccidian oocysts of [4] who reported a prevalence of 2.55% among 275 bovines slaughtered in Akure abattoirs. *H. contortus* recorded the highest prevalence in goats while none was found in the cattle sampled. This indicates that *H. contortus* is a major and widespread infection of goats in the study area. This study also revealed that both the cattle and goats were infected with only one cestode (*Moniezia* sp.) This corroborates the previous findings where *Moniezia* sp. was the only cestode in their studies [3, 15]. The low prevalence of *Strongyloides* sp. among cattle (10.05%) and goats (14.10%) in this study is dissimilar to the reported cases of high prevalence of this nematode in Oyo and Plateau State respectively [3, 6].

Dicrocoelium sp. *Fasciola* sp. *Paramphistomum* sp. and *Schistosoma* spp were the Trematodes identified; this is in agreement with the findings of Karave [6]. This abundance may be attributed to favourable conditions in the grazing lands where the cattle and goats were sourced or reared which serve as intermediate hosts for the parasites [16]. However, *Fasciola* sp and *Schistoma mansoni* prevalence rates were low in both the cattle and goats sampled. The reason may be that the grazing area does not favour propagation of the snail intermediate hosts.

In this study, GIT prevalence was higher in females than males with statistically significant differences; this may be as

a result of poor feeding, lack of veterinary care and management practices. The higher prevalence of infection encountered in the 0-1 years age group in cattle might be attributed to lack of protective immunity, lack of nutritional requirement and drinking of contaminated water [17].

The prevalence of infection was higher during the rainy season compared to the dry season. This is in agreement with the findings of Sulieman [5] and Agba and Aguh [13]. This may be due to the warm temperature, moderate humidity and water obtained during the rainy season which may be favourable for the proliferation of these parasites. Also during the dry seasons, larva may develop successfully to infective stages in faeces but might not emerge until moisture levels are optimal. Infected faeces continue to be passed out by the cattle until moisture is available when pasture contamination can then rise rapidly.

Parasitic infections in livestock are known to affect productivity which manifest in low fertility, reduction in food intake, low weight gain, high treatment cost and high mortality. Farmers should, therefore, be encouraged to adopt the use of broad spectrum anthelminthics to improve productivity and to imbibe healthy management practices.

5. Conclusion

The data reveal high prevalence and multiple infections in the cattle and goats sampled, with most of the animals having at least three parasites. The results suggest considerable helminthic parasitic problem for the animals, hence there is need to strengthen existing control measures and devise new ways to curb the problem.

Ethics Approval and Consent to Participate

Permission was obtained from the Director, Veterinary Services under the Ministry of Health, Ondo State as well as the managers of the abattoirs before faecal samples were collected.

Acknowledgements

The authors are grateful to the workers in the abattoirs used for sample collection and Mr Adebayo Akeju for his assistance.

References

[1] Dappawar, M. K., Khillare, B. S., Narladkar, B. W. and Bhangale, G. N. (2018). A Coprological Survey of Gastrointestinal Parasites of Cattle in Udgir, Marathwada, India. I*nternational Journal of Current Microbiology and Applied Sciences*, 7 (06): 2851-2857.

[2] G. Futagbi, J. K Abankwa, P. S Agbale and I. F Aboagye (2015). Assessment OF Helminth Infections in Goats Slaughtered in an Abattoir in a suburb of Accra, Ghana. *West African Journal of Applied Ecology*, 23 (2): 35-42.

[3] Adedipe, O. D., Uwalaka, E. C., Akinseye, V. O., Adediran, O. A. and Cadmus, S. I. B. (2014). Gastrointestinal Helminths in Slaughtered Cattle in Ibadan, South-Western Nigeria. *Journal of Veterinary Medicine*, 2014: 1-6.

[4] Afolabi, O. J., Simon-Oke, I. A. and Ademiloye, A. O. (2017). Gastro-intestinal parasites of bovine in Akure abattoirs, Nigeria. *Journal of Entomology and Zoology Studies,* 5 (5): 1381-1384.

[5] Sulieman, Y., Ibrahim, S. O., Eltayeb, R. E., Pengsakul, T., Afifi, A., Zakaria, M. A. and Khairala, M. A. (2017). Gastrointestinal helminth parasites of ruminants slaughtered in Shendi abattoir, River Nile State, Sudan. *Journal of Coastal Life Medicine*, 5 (6): 249-253.

[6] Karaye, P. G., Ola-Fadunsin, S. D. and Dogo, G. A. (2018). Diversity of gastrointestinal parasites affecting some domestic animals in Plateau State, North Central Nigeria. *Science World Journal*, 13 (1): 82-86.

[7] Marskole, P., Verma, Y., Dixit, A. K. and Swamy, M. (2016). Prevalence and burden of gastrointestinal parasites in cattle and buffaloes in Jabalpur, India, *Veterinary World*, 9 (11): 1214-1217.

[8] Yahaya A. and Tyav Y. B. (2016). A survey of gastrointestinal parasitic helminths of Bovine slaughtered in abattoir, Wudil Local Government Area, Kano State, Nigeria. *Greener Journal of Biological Sciences*, 4 (4): 128-134.

[9] National Population Census (2006). National Population Census Commission, Nigeria.

[10] Cheesbrough, M. (2009). District Laboratory Practice in Tropical Countries, *Cambridge University Press,* New York. 192-200.

[11] Kaufmann, J. (1996). Parasitic infections of domestic animals: *a diagnostic manual.* Springer, Basel. Pp 24-35.

[12] Foreyt, J. W. (2001): Veterinary Parasitology: *Reference Manual. Blackwell Publishers.* Iowa. Pp: 69-70.

[13] Agba A. A and Aguh I. B (2020). Intestinal Parasitic Infection among Cattle slaughtered in some Abattoirs in Katsina State, Nigeria. *International Journal of Science for Global Sustainability* 6 (2): 44-49.

[14] Ntonifor H. N, Shei S. J, Ndaleh N. W and Mbunkur G. N (2013). Epidemiological Studies of gastrointestinal parasites infections in ruminants in Jakiri, Biu Division, North West region of Cameroon. *Journal of Vetrinary Medicine and Animal Health* 5 (12): 344-352.

[15] Umeanaeto, P. U., Ogbogu, N. E., Irikannu, K. C., Onyido, A. E., Okwelogu, I. S., Mbanefo, E. C. and Ifeanyichukwu, M. O. (2016). A comparative analysis of the gastro-intestinal helminth parasites of cattle in Awka and Obosi abattoirs in Anambra State, Southeastern Nigeria. *Journal of Advanced Research in Health and Nursing,* 1 (8): 1-6.

[16] Heinz M. (2016). Animal Parasites Diagnosis, Treatment, Prevention. *Springer International Publishing* Switzerland. Pp. 251.

[17] Oyedeji, F. N. (2016). Intestinal Helminth Parasite of Cattle Slaughtered in Abbatiors in Gwagwalada. *World Rural Observations*, (8): 23-26.