IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS)
e-ISSN: 2319-2380, p-ISSN: 2319-2372. Volume 8, Issue 11 Ver. II (Nov. 2015), PP 27-32
www.iosrjournals.org

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

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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 northcentral 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. Coccidia sp., *Fasciola* sp. *and Ascaria* sp. *had the highest prevalence in both years; other parasites detected are Oesophagostomum* sp., *Bunostomum* sp., *Haemonchus* sp., *Strongyle* sp., *Monieza expansa, Trichuria* sp., *Schistosoma* sp. *and Taenia* sp. *The Prevalence of GIT in 2013 was higher than in 2012.This study therefore concludes that adequate stocking rate, appropriate use of anthelmintic 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 household 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 Sokoto Gudali 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

1.1. Sampling location

Niger state lies on 9.61^0 North latitude, 6.56^0 East longitudes and 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.

1.2. Sample collection

A total of 299 diarrhoeic faecal samples comprising of 117 from cattle, 54from 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 Changhaga and Bosso Local 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).

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.

1.3. 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).

1.4. 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 gastro intestinal parasites observed were *Coccidia* sp., *Ascaris* sp. and *Fasciola* sp. with prevalence of 42.1%, 30.5% and 18.9% respectively, *Oesophagostomum* sp., *Strongyle* sp. and *Trichuria* sp. were also detected but at lower prevalenceof 1%, 1% and 2.1% respectively.Moniezaspp, Schistosoma spp, *Taenia* sp. and *Heamonchus* sp. were not detected in the cattle samples analyzed in 2012. Whereas only *Trichuris* sp. was not detected in cattle in 2013 as *Coccidia* sp. 39.2%, *Ascaris* sp. 26.1%, *Fasciola* sp.15.4%, *Bunostomum* sp. 5.9%, *Oesophagostomum* sp., *Strongyle* sp., *Monieza* sp. and *Schistosoma* sp. 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 *Fasciola* sp., *Haemonchus* sp., *Ascaris* sp. and *Strongyle* sp. with 11.3%, 15%, 9.4% and 5.6% respectively, *Bunostomum* sp., *Oesophagostomum* sp., *Schistosoma* sp. and *Taenia* sp. 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 *Coccidia* sp. had the highest prevalence of 58.2% , followed by *Haemonchus* sp., *Monieza expansa* and *Strongyle* sp. with 23.5%, 11.7% and 5.8% prevalence respectively. No *Fasciola* sp., *Ascaris* sp., *Bunostomum* sp., *Oesophagostomum* sp., *Trichuria* sp., *Schistosoma* sp. and *Taenia* sp. were found in 2013.

In goats, *Coccidia* sp. had the highest prevalence of 40.7%, followed by 25.9% of *Fasciola* sp., 14.8% of *Haemonchus* sp., *Ascaris* sp., *Bunostomum* sp., *Oesophagostomum* sp., *Strongyle* sp. and *Taenia* sp. had 3.7% prevalences each. No *Moneiza* sp., *Trichuria* sp. nor *Schistosoma* sp. were found in the samples in 2012 (Table 3), In 2013 only *Coccidia* sp., *Fasciola* sp., *Ascaris suum* and *Haemonchus* sp. 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.

	Cattle			**Sheep**			**Goats**		
Year	Total samples	Positive (%)	Negative (%)	Total samples	Positive (%)	Negative (%)	Total samples	Positive (%)	Negative (%)
2012	117	95 (81.2)	22 (18.8)	54	53 (98.1)	1 (1.9)	28	27 (96.4)	1 (3.6)
2013	100	84 (84)	16 (16)	22	17 (77.3)	5 (22.7)	5	4 (80)	1 (20)

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

Gastrointestinal parasites	Cattle Positive samples (%)	Sheep Positive samples (%)	Goats Positive samples (%)
	40 (42.1)	25 (47.1)	
Oocysts of Coccidia	18 (18.9)	6 (11.3)	11 (40.7)
Ova of Fasciola	29 (30.5)	5 (9.4)	7 (25.9)
Ova of Ascaris	4 (4.2)	1 (1.8)	1 (3.7)
Ova of Bunostomun	1 (1.0)	2 (3.7)	1 (3.7)
Ova of Oesophagostomum	0 (0)	8 (15.0)	1 (3.7)
Egg of Haemonchus	1 (1.0)	3 (5.6)	4 (14.8)
Egg of Strongyle	0 (0)	0 (0)	1 (3.7)
Egg of Moniezaexpansa	2 (2.1)	0 (0)	0 (0)
Egg of Trichurisspp	0 (0)	1 (1.8)	0 (0)
Larvae of Schistosoma	0 (0)	2 (3.7)	0 (0)
Egg of Taenia			1 (3.7)
TOTAL	95	53	27

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

Gastrointestinal parasites	Cattle Positive samples (%)	Sheep Positive samples (%)	Goats Positive samples (%)
	33 (39.2)	10 (58.2)	
Oocysts of Coccidia	13 (15.4)	0 (0)	1 (25)
Ova of Fasciola	22 (26.1)	0 (0)	1 (25)
Ova of Ascaris	5 (5.9)	0 (0)	1 (25)
Ova of Bunostomun	2 (2.3)	0 (0)	0 (0)
Ova of Oesophagostomum	1 (1.1)	4 (23.5)	0 (0)
Ova of Haemonchus	2 (2.3)	1 (5.8)	1 (25)
Ova of Strongyle	2 (2.3)	2 (11.7)	0 (0)
Ova of Moniezaexpansa	0 (0)	0 (0)	0 (0)
Ova of Trichurisspp	2 (2.3)	0 (0)	0 (0)
Ova of Schistosoma	1 (1.1)	0 (0)	0 (0)
Ova of Taenia			0 (0)
TOTAL	84	17	4

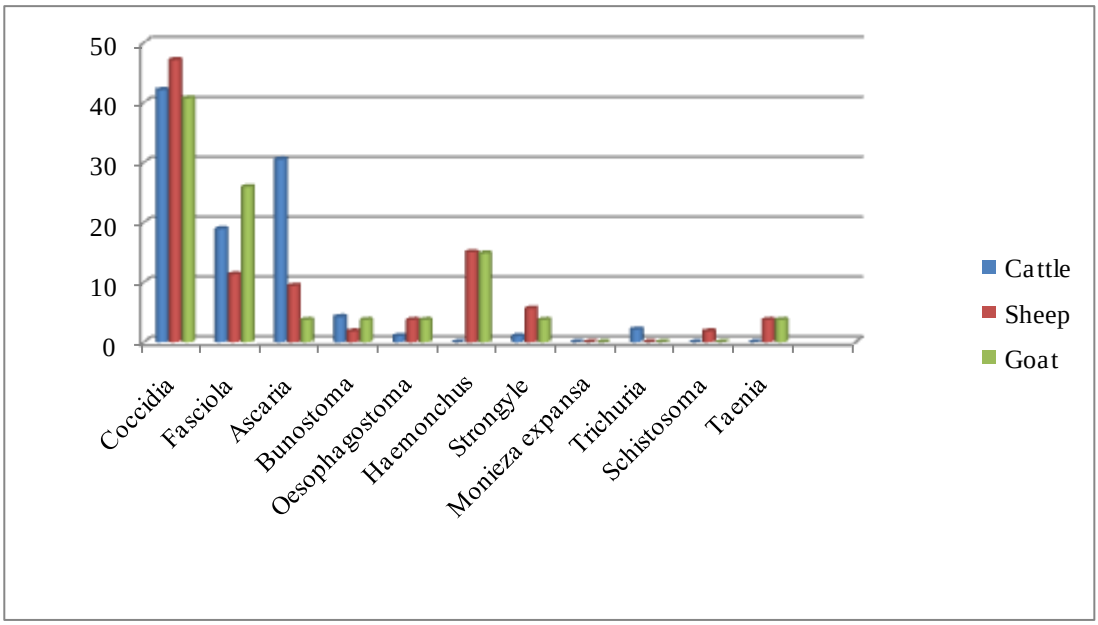

Figure 1: Compound bar chart showing the prevalence of gastrointestinal parasites in ruminants in 2012.

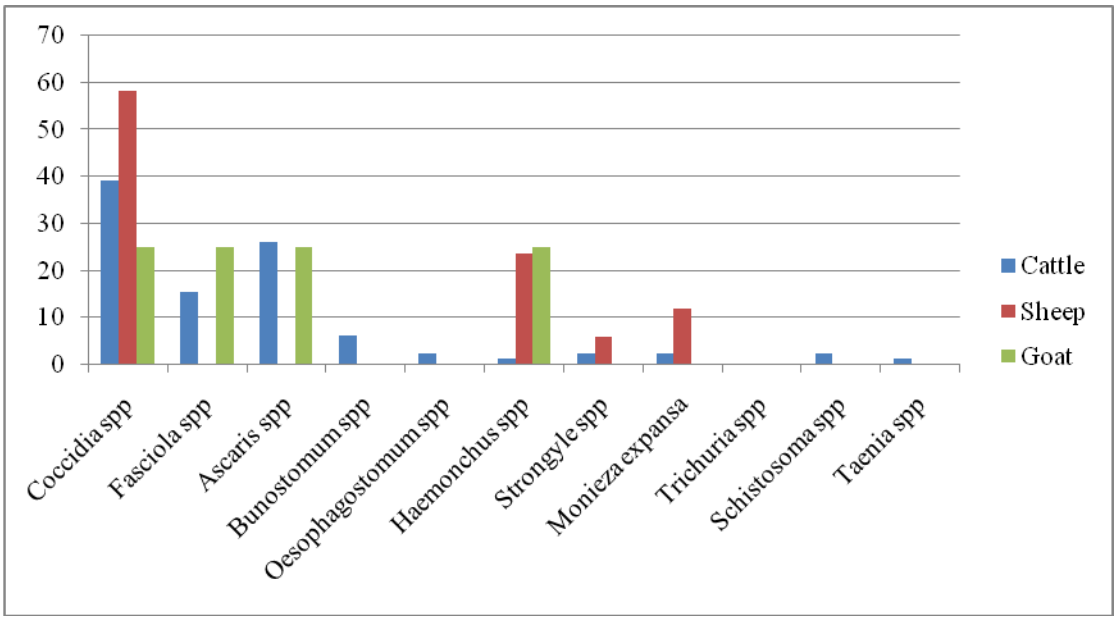

Figure 2: Compound bar chart showing the prevalence of gastrointestinal parasites in domestic ruminants in 2013.

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 diarhoea 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 diarrhoea 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* in 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* sp. was isolated in this study in both years; this is contrary to Nawathe *et al.*,(1985)and Gadahi *et al.*, (2009) who noted that the most pathogenic helminths and protozoan parasites in the intestinal tract of small ruminants are *Strongyle* sp., *Strongyloides* sp. and *Coccidia* sp. Although, this study in 2013 disagrees with Adejinmi *et al.*, (2015) who detected *Monieza* sp. and *Strongyle* sp. *in* domestic goats in Oyo state, but agrees with the detection of *Coccidia* sp. in goats.

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

The prevalence of *Ascaris* sp. in goats in this study was higher in both years than in study conducted by Ovutor *et 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 *Fasciola* sp. 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

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

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

This study agrees partly with Biu *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 *Fasciola* sp., *Taenia* sp. and *Trichuria* sp. 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 effective use of safe managemental practices such as frequent disposal of faecal materials should be implored as a means of preventing and controlling the ever present issue of parasitic infections in ruminants provided by our constant but seemingly changing ecosystem.

Acknowledgements

We thank Mr. Sam Kolo of the Parasitology laboratory of the Niger state veterinary Hospital, Minna, for his support and assistance.

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

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