

## **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. Coccidiaspp, Fasciolaspp and Ascariasspp had the highest prevalence in both years, other parasites detected are Oesophagostomumspp, Bunostomumspp, Haemonchusspp, Strongylespp, Monieziaexpansa, Trichuriaspp, Schistosomaspp and Taenia spp. 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*

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### **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 households 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 SokotoGudali 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**

#### **2.1. Sampling location**

Niger state lies on latitude 8° to 11°:30' North and Longitude 03°:30' to 07° 40' East. The state 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.

#### **2.2. Sample collection**

A total of 299 diarrhoeic faecal samples comprising of 117 from cattle, 54 from 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.

### 2.3. 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).

### 2.4. 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 *Coccidiaspp*, *Ascaris spp* and *Fasciolaspp* with prevalence of 42.1%, 30.5% and 18.9% respectively, *Oesophagostomum spp*, *Strongylespp* and *Trichuriaspp* were also detected but at lower prevalence of 1%, 1% and 2.1% respectively. *Moniezaspp*, *Schistosomaspp*, *Taeniaspp* and *Haemonchusspp* were not detected in the cattle samples analyzed in 2012. Whereas only *Trichurispp* was not detected in cattle in 2013 as *Coccidiaspp* 39.2%, *Ascaris spp* 26.1%, *Fasciola spp* 15.4%, *Bunostomum spp* 5.9%, *Oesophagostomum spp*, *Strongylespp*, *Moniezaspp* and *Schistosomaspp* 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 *Fasciolaspp*, *Haemonchusspp*, *Ascaris spp* and *Strongylespp* with 11.3%, 15%, 9.4% and 5.6% respectively, *Bunostomum spp*, *Oesophagostomum spp*, *Schistosomaspp* and *Taeniaspp* 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 *Coccidiaspp* had the highest prevalence of 58.2% , followed by *Haemonchusspp*, *Moniezaexpansa* and *Strongylespp* with 23.5%, 11.7% and 5.8% prevalence respectively. No *Fasciolaspp*, *Ascaris spp*, *Bunostomum spp*, *Oesophagostomum spp*, *Trichuriaspp*, *Schistosomaspp* and *Taeniaspp* were found in 2013.

In goats, *Coccidiaspp* had the highest prevalence of 40.7%, followed by 25.9% of *Fasciolaspp*, 14.8% of *Haemonchus spp*. *Ascaris spp*, *Bunostomum spp*, *Oesophagostomum spp*, *Strongylespp* and *Taeniaspp* had 3.7% prevalence each. No *Moniezaspp*, *Trichuriaspp* nor *Schistosomaspp* were found in the samples in 2012 (Table 3), In 2013 only *Coccidiaspp*, *Fasciolaspp*, *Ascaris spp* and *Haemonchusspp* 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.**

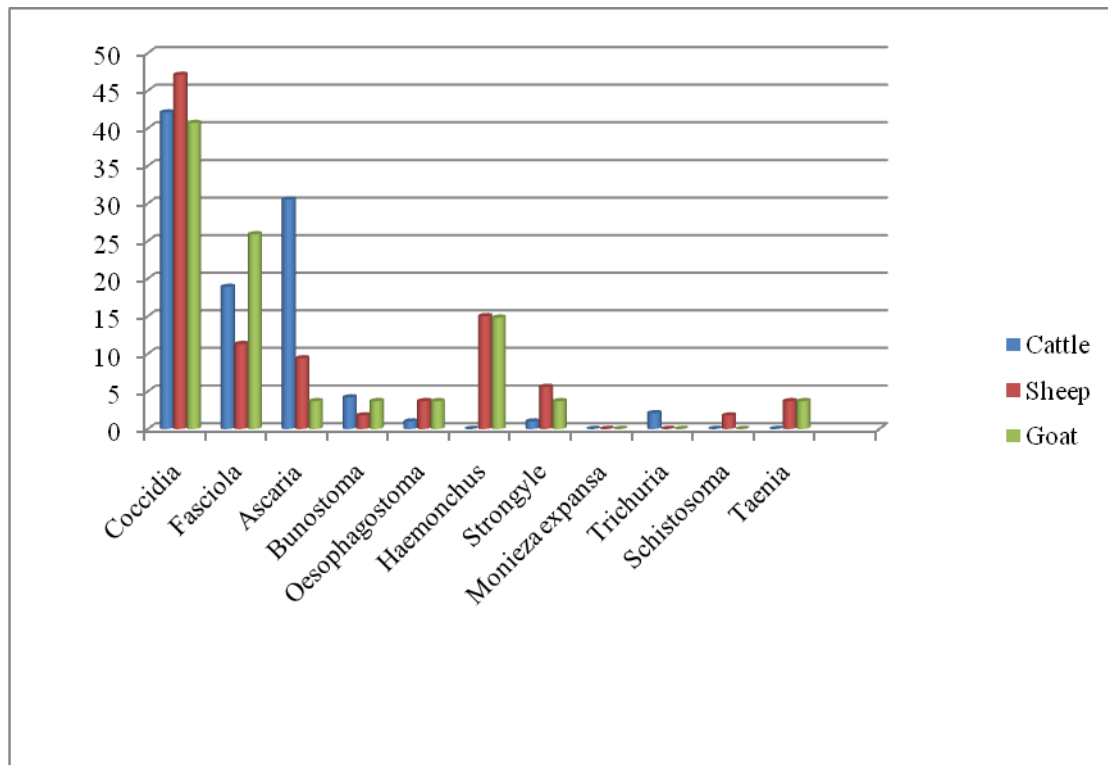
Year	Cattle			Sheep			Goats		
	Total samples	Positive (%)	Negative (%)	Total samples	Positive (%)	Negative (%)	Total samples	Positive (%)	Negative (%)
2012	117	95 (81.2)	22 (18.8)	54	53 (98.1)	1 (1.9)	28	27 (96.4)	1 (3.6)
2013	100	84 (84)	16 (16)	22	17 (77.3)	5 (22.7)	5	4 (80)	1 (20)

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

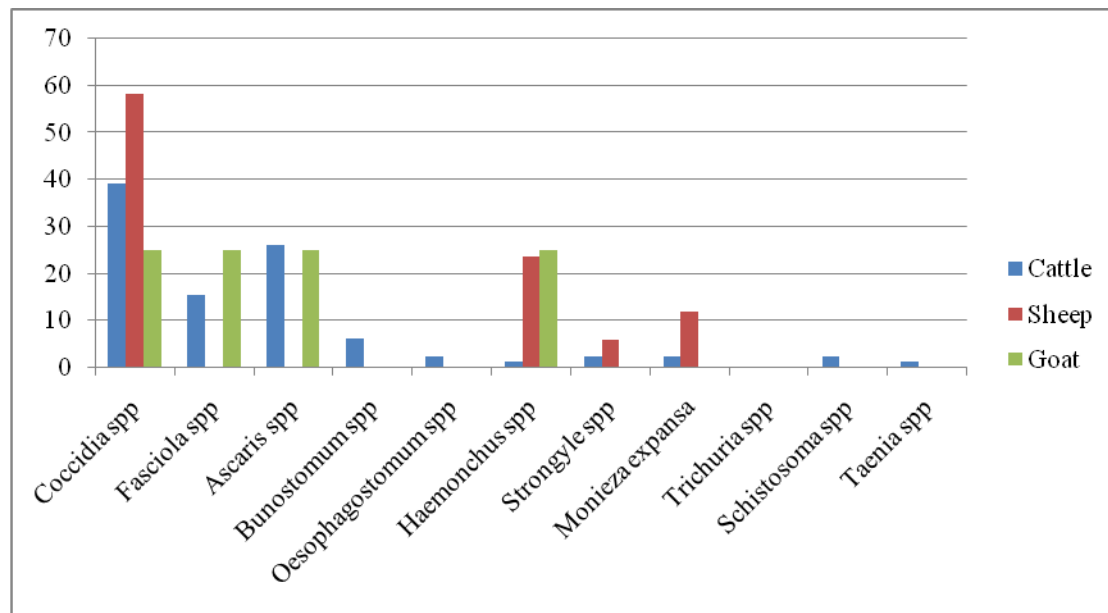
Gastrointestinal parasites	Cattle Positive samples (%)	Sheep Positive samples (%)	Goats Positive samples (%)
Oocysts of Coccidia	40 (42.1)	25 (47.1)	11 (40.7)
Ova of Fasciola	18 (18.9)	6 (11.3)	7 (25.9)
Ova of Ascaris	29 (30.5)	5 (9.4)	1 (3.7)
Ova of Bunostomum	4 (4.2)	1 (1.8)	1 (3.7)
Ova of Oesophagostomum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

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

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



**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 diarrhoea 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 Jatauet *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 Nwigweet *et al.*, (2013) and Adejinmiet *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 Jatauet *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 *Strongyloidesspp* was isolated in this study in both years; this is contrary to Nawathe *et al.*, (1985) and Gadahiet *et al.*, (2009) who noted that the most pathogenic helminths and protozoan parasites in the intestinal tract of small ruminants are *Strongylespp*, *Strongyloidesspp* and *Coccidia spp*. Although, this study in 2013 disagrees with Adejinmiet *et al.*, (2015) who detected *Moniezaspp* and *Strongylespp* in domestic goats in Oyo state, but agrees with the detection of *Coccidiaspp* in goats.

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

The prevalence of *Ascarisspp* in goats in this study was higher in both years than in study conducted by Ovutoret *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 *Fasciolasp* 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 *Fasciolasp* was higher than sheep in both years of this study which is also contrary to study by Ardo & Aliyara, (2014).

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

This study agrees partly with Biuet *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 *Fasciolasp*, *Taeniaspp* and *Trichuriaspp* 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 management 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.

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

## References

- [1]. Adejinmi, O. O. Adejinmi, J.O. Falohun, O.O. Aderoju O.R and Dauda, W.J. (2015): Prevalence of Gastrointestinal Parasites of Goats in Ibadan, Southwest, Nigeria." World Journal of Agricultural Research, vol. 3, no. 2 49-51. doi: 10.12691/wjar-3-2-2.
- [2]. Adejinmi, J.O. and Osayomi, J.O. (2010): Prevalence of intestinal protozoan parasites of dogs in Ibadan, south western Nigeria. Journal of Animal & Plant Sciences, Vol. 7, (2): 783-788
- [3]. Biu, A. A, Maimuna, A.Salamatu, A. F. and Agbadu, E. T. (2009): A faecal survey of gastro-intestinal parasites of ruminants on the University of Maiduguri research farm, 5, 175-179.
- [4]. Boes, J, Willingham, A.L, Shi, F.H, Hu, X.G, Eriksen, L, Nansen, P, and Stewart, T.B. (2000): Prevalence and distribution of pig helminths in the Dongting Lake Region (Human Province) of the People's Republic of China. J. Helminthol. 74: 45-52.
- [5]. Charles, and Hendrix. (2006): Diagnostic Veterinary Parasitology for Technicians. Third Edition, Mosby.
- [6]. Chiejina, S. N. and Ikeme, B. O. (2007): Arrested development of gastro-intestinal trichostrongylids in goats in Nigeria. Veterinary Parasite, 28, 103 - 113.
- [7]. Fakae, B. B. and Fakae, S. N. (2009): Further studies on the development and availability of infective larvae of Bovine gastro-intestinal trichostrongyloides on pasture in eastern Nigeria, Veterinary parasite, 28, 143-152.
- [8]. Foryet, J.W. (2001): Veterinary Parasitology: Reference Manual. 5th ed. Blackwell Inc. India. 38-39.
- [9]. Gadahi, J.A, Arshed, M.J, Ali, Q, Javaid, S.B. and Shah, S.I. (2009): Prevalence of Gastrointestinal Parasites of Sheep and Goat in and around Rawalpindi and Islamabad, Pakistan Veterinary World, Vol. 2 (2), pp: 51-53.
- [10]. Jatau, I.D, Abdulganiyu, A, Lawal.A.I, Okubanjo, A.I and Yusu, K.H (2011): Gastrointestinal and haemoparasitism of sheep and goats at slaughter in Kano, northern-Nigeria. Sokoto Journal of Veterinary Sciences, Volume 9 (Number 1).
- [11]. Ikem, C.O, Rose, N. O, Doris, N.O. and Micheal, A. (2013): High prevalence of gastro-intestinal parasite in indigenous goats of Nigeria, Indian Journal of research Parapex, 2(10), 17-19.
- [12]. Kassai, T. (Veterinary Helminthology. Butterworth-Heinemann, Boston, MS. 1999) pp 102-103.
- [13]. Kuil, H. (2009): Livestock development and parasites. Proceedings of the Conference on Livestock Development in the Dry and Intermediate Savanna Zone, Zaria.
- [14]. Manuda, A, Moammed, A. A, Alayande, M. O, Habila, Y. I., Lawal, M. D., Usman, M., Raji, A. A., Saidu, B., Yahaya, M. S. and Suleiman, N (2014): Prevalence and distribution of gastro-intestinal parasites of working camel in Sokoto metropolis, Veterinary world, 7(3), 108-112.
- [15]. Mathew man, R. W and Omeke, I.A (2007): survey of small ruminant production at village level in the derived savannah and lowland forest zones. Department of Agriculture and Horticulture, University of Reading. 2007. 65.P. 45.
- [16]. N'depo, E. A. (2004): Helminthiasis of the digestive system of sheep in Cote D'ivoire. In: First African Veterinary Days. (Proceedings of Conference held at Hammamet, Tunisia, May/June 1987, OIE, Paris), France, 3 - 16.
- [17]. Nawathe, D. R., Sohael A.S and Umo, I (1985): Health management of a dairy herd on the Jos Plateau (Nigeria). Bull. Anim. Health. Prod. Africa 33: 199-205.
- [18]. Nwigwe, J.O., Njoku, O.O., Odikamnoro, O. O. and Uhuo, A. C (2013): Comparative study of intestinal helminths and protozoa of cattle and goats in Abakaliki metropolis of Ebonyi State, Nigeria. Advances in Applied Science Research, 4 (2): 223-227. 2013.
- [19]. Obijiaku, I.N and Agbede, R.I.S, (2007): Prevalence of coccidiosis and associated pathology in lambs and kids from three contrasting management systems. In: Proceedings of the 44th Annual congress of the Nigerian Veterinary Medical Association (NVMA), Delta 2007. Pp 229-232.
- [20]. Okaiyeto, S.O, Tekdek, L.B, Sackey, A.K.B, and Ajanusi, O.J (2008): Prevalence of haemo and gastrointestinal parasites in sheep and goats kept by the nomadic Fulanis in some Northern states of Nigeria. Research Journal of Animal Science, 2(2): 31-33.
- [21]. Ovutor, O, Kingsley, E and Lebari B. G (2014): Prevalence of Gastrointestinal helminths in exotic and indigenous goats slaughtered in selected abattoirs in port Harcourt, south-south Nigeria. Chinese journal of biology volume, Article ID 435913.
- [22]. Perry, B. D., Randolph, R. F., McDermott, J. J., Sones, K. R., and Thomsom, P. K. (2002): Investigation in animal health research to alleviate poverty. International livestock research institute Nairobi, Kenya. 148.

- [23]. Schmidt, G. D., Roberts, L. S. and Janovy, J. Foundation of Parasitology. McGrawhill, Boston, Massachusetts, Science, 2000. pp 670.
- [24]. Schoenian, S. (2007): Diarrhoea (scours) in small ruminants, Maryland small ruminant page.
- [25]. Weber, R. (1992): Improved light-microscopical detection of Microsporidia spores in stool and duodenal aspirates. New Eng. J. Med. 326 (3), 161 – 166.
- [26]. Yaro, M. B., Alo, E. B., Naptali, R. S., Pukuma, M. S., Nganjiwa, J. I., Tumba, D. P. and Daniel, L. A. (2015): The Prevalence of Gastro-Intestinal Parasites of Small Ruminants in Madagali Local Government Area, Adamawa State Nigeria, Journal of Agriculture and Veterinary Science, Volume 8, Issue 5 Ver. I, PP 86-89
- [27]. Zajac, A.M (2006): Gastrointestinal nematodes of small ruminants: life cycle, anthelmintic and diagnosis. North Am vet Clin, Food animal prac 2006, 22:529-541.